# VOLUMETRIC MODULAR CONSTRUCTION IN BAY AREA AFFORDABLE HOUSING



# BARRIERS, OPPORTUNITIES AND INSIGHTS



EAST BAY ASIAN LOCAL DEVELOPMENT CORPORATION

BUILDING HEALTHY, VIBRANT AND SAFE NEIGHBORHOODS

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This paper benefited immeasurably from the insight of professionals across the affordable housing and modular construction industries who generously lent their time and expertise. In addition to anonymous sources, these include:

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Suggested Citation: East Bay Asian Local Development Corporation (2022). Volumetric Modular Construction in Bay Area Affordable Housing: Barriers, Opportunities and Insights

Cover Image: The Phoenix, an EBALDC Modular Project in West Oakland, Lowney Architecture Cover Design & Layout: Ramon Gil

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# VOLUMETRIC MODULAR CONSTRUCTION IN BAY AREA AFFORDABLE HOUSING: BARRIERS, OPPORTUNITIES AND INSIGHTS

East Bay Asian Local Development Corporation

November 2022

Funding provided by

JPMORGAN CHASE & CO.

## **Table of Contents**

Forward
Executive Summary
Introduction
Pricing Trends
Volumetric Modular Construction: A Housing Crisis Solution?
The Challenges
Industry-Wide Challenges
Affordable Housing Challenges
Case Studies
Tahanan Supportive Housing 12
EBALDC: 12th & Harrison, Lake Merritt BART, 34th & San Pablo and The Phoenix
Ideas, Observations and Considerations15
The Future
Resources
Endnotes
About EBALDC
EBALDC Leadership

## Foreword

Oakland sits at the epicenter of a major housing crisis in the Bay Area – a crisis that started years before the pandemic and is only worsening even as the pandemic recedes, with our economy veering towards recession levels. Historical and current policies have set the stage for this unequal path. Racially discriminatory policies in housing, employment, and banking have helped concentrate poverty in communities of color. Our communities are struggling because of restrictions on affordable housing development and inequitable school funding that make it difficult for quality schools, jobs and businesses to thrive in our neighborhoods.

The East Bay Asian Local Development Corporation (EBALDC) recognizes that solving the housing crisis is complex. The housing industry, especially community development corporations like EBALDC, must explore every potential solution to provide residential stability. With support from JPMorgan Chase, EBALDC had the opportunity to explore volumetric modular construction as one of many solutions to the affordable housing crisis. *Volumetric Modular Construction in Bay Area Affordable Housing: Barriers, Opportunities and Insights* summarizes our findings through extensive interviews with industry experts and case studies that include our own projects. What we learn is that modular construction should be one of many solutions to building our region out of the housing crisis. We also learn that much like our community building work, the most successful modular projects resulted from having project partners who work together to anticipate and provide solutions for challenges that arise from an industry that is still in its infancy on the West Coast.

For over 47 years, we have made Oakland our home, shaping healthy neighborhoods through our innovative approach to community development, which we define as the collective efforts required to build healthy, vibrant, and safe neighborhoods where residents and small businesses access the resources and support they need. Our work is about strengthening the community fabric so all of our loved ones and neighbors belong and thrive in Oakland and the East Bay.

We thank JPMorgan Chase for entrusting us to explore solutions to our region's housing crisis. As far as we know, this is the first feasibility study of its kind. It is our hope that *Volumetric Modular Construction in Bay Area Affordable Housing: Barriers, Opportunities and Insights* will spark conversation around not just modular construction but other tools so that low-moderate income individuals and households are able to stay in their neighborhoods and, ultimately, sustain the culture and diversity of Oakland.

Andy Madeira Chief Executive Officer **Capri Roth** *Executive Vice President, Real Estate Development*  Fifteen thousand five hundred and forty-six.

According to its draft housing element report<sup>1</sup>, this is the number of affordable housing units, serving residents making 0 - 80% of area medium income, the City of Oakland needs to build between 2023 through 2031 as part of its regional housing needs assessment.

The potential to decrease the cost of construction by 20% and reduce the time by up to 50% to build affordable housing makes volumetric modular construction (often shorthanded to "modular") an attractive tool in addressing the growing housing crisis in the Bay Area. Through interviews with nearly a dozen practitioners, research review, and two case studies of modular projects led by Bay Area affordable housing developers, *Volumetric Modular Construction in Bay Area Affordable Housing: Barriers, Opportunities and Insights* unveils both challenges and opportunities around modular construction for affordable housing. This white paper is funded by JPMorgan Chase.

## The Challenges

Prefabricated housing is commonplace in countries like Japan and Sweden, and volumetric modular specifically is prevalent in both the multi-family and single-family sectors on the East Coast. Interest has grown more recently on the West Coast, and in California in particular, as this region has seen some of the highest housing construction costs in the nation. Our research and interviews revealed multiple challenges to adopting modular more widely—many faced across the housing industry and two particular to affordable housing.

**Contractor bids:** As supported by EBALDC and others' experience, high contractor bids, despite cost savings at the factory, is one of the foremost industry-wide barriers

to modular construction's wider adoption. There are a range of views on what may be leading to the high bids. Other industry-wide challenges include prohibitive insurance costs and the higher risk profile of the modular process, where a factory can go dark if a project falls behind schedule.

**Predevelopment Financing:** Reserving a place in the modular production queue requires large up-front deposits and materials need to be ordered much sooner than in traditional construction. Structuring financing to sync with these timelines remains a major hurdle for affordable housing projects. Many modular factories cannot bond, which has posed another significant challenge for some affordable projects.

## The Opportunities

**Funding Innovations:** Research and interviewees recommended that government and philanthropic entities offer revolving funds and flexible capital that would accommodate modular timelines. Mercy Housing California's Tahanan Supportive Housing, a success story that is the subject of one of this paper's case studies, benefitted from a large pot of flexible and unencumbered predevelopment funds from a private, philanthropic entity.

**Standardization and replication:** To maximize savings and efficiencies, research and several interviewees recommended the use of standardized unit layouts that can be easily replicated, as well as minimal variety in layout. Several also underscored that modular construction is best-suited to projects under 100 units on flat, rectangular sites. Some also saw potential for hybrid projects that utilized certain prefabricated elements, and for material innovations that leveraged the factory setting.

## Conclusion

Our scan of the industry indicates that modular construction's potential to help solve the affordable housing crisis is limited. Still, it could become a more widely used piece of the affordable housing toolbox. Its greater adoption will be determined largely by the willingness of all players in our traditionally risk-averse industry to commit to removing the many barriers detailed in this white paper—and to fixing the many bottlenecks and broken pieces that plague affordable housing development and financing more broadly.



Modular units being prepared at Factory\_OS, March 2019 (Courtesy EBALDC Real Estate Development Department.)

## Introduction

One of the main constraints to affordable housing production in the Bay Area is rising construction costs, which have rapidly outpaced affordable housing funds, thus rendering many projects infeasible in predevelopment.

In recent years, volumetric modular construction (VMC, often short-handed to "modular") has been touted as a less expensive alternative to traditional construction. Other terms sometimes used for VMC include factorybuilt, system-built, or prefabricated, though the latter is a larger umbrella term under which VMC falls. For purposes of this paper, we use the terms "VMC" and "modular" interchangeably, while recognizing that VMC is only one type of modular construction method.

In VMC, modules are constructed in a factory, complete with fixtures, cabinets and paint, then delivered to the site on specialized trailers A crane lifts the modules off of their trailers and assembles them into a building. VMC is regulated by the same codes and standards as conventional construction. VMC buildings are permanently attached to a foundation. VMC is often confused with mobile homes, which are limited to single family dwellings. Mobile homes are permanently attached to steel frames, which enable them to be moved at a future date. Panelized construction is often also mistakenly included under the "modular" heading<sup>2</sup>.

Modular and other types of prefabricated construction methods are not new concepts. Prefabrication is commonplace in Japan<sup>3</sup> and accounts for more than 80 percent of the housing market in Sweden<sup>4</sup>. In the U.S., VMC specifically is prevalent in both the multi-family and single-family sectors on the East Coast. There are several East Coast VMC manufacturers that have been in business for more than 30 years. VMC is also gaining traction in certain industry sectors, like hospitality, where building types are largely standardized. In recent years, as the West Coast, and California in particular, have seen some of the highest housing construction costs in the nation, VMC has gained greater interest as one possible solution to the affordable housing crisis.

The East Bay Asian Local Development Corporation (EBALDC) is a nonprofit community development organization based in Oakland, CA, with over 47 years of experience in the development and management of affordable housing and commercial space, and the provision of vital neighborhood and economic support programs. EBALDC began researching modular construction and pursuing it as a potential cost-reduction innovation in 2017. In 2019, JPMorgan Chase awarded a grant to EBALDC to further research the benefits and constraints of using modular construction for affordable housing in the Bay Area. The overarching goal for this work is to determine how to increase production of affordable housing, decrease the cost of construction, and reduce the time it takes to develop affordable housing.

This white paper explores modular construction's potential as a solution to these challenges. It draws on our findings from several in-house projects where modular construction has been considered, as well as wider industry research and data, and interviews with a range of practitioners in the housing industry, including affordable housing developers, contractors, architects, lenders, fabricators, insurance brokers and an engineer.

## **Pricing Trends**

According to a 2020 report by the Terner Center for Housing Innovation at University of California-Berkeley, the costs to develop a new affordable housing unit using Low-Income Housing Tax Credits (LIHTC) in California increased 17 percent between 2008 and 2019.<sup>5</sup> In hard numbers, after accounting for inflation, this represents a jump from \$411,000 per unit to more than \$480,000 per unit. Costs per square foot have risen even more drastically, from \$451 per square foot in 2008 to \$700 per square foot in 2019, or 55 percent. (The difference between these two measures is attributed, in part, to the fact that: both unit size and the number of bedrooms per unit have decreased in recent years.) "This increase in costs has material consequences for the supply of new affordable housing," the report noted. "[I]n broad terms, the same amount of public subsidy is now needed to build two units at 1,000 square feet as was needed for three units just 10 years ago."6

These figures are even more staggering for the Bay Area. Looking at three-year intervals between 2008-2010 and 2017-2019, the total development costs for LIHTC projects in the Bay Area—including San Francisco, Oakland and San Jose—increased 22.4 percent to an average of almost \$600,000 per unit, compared to 12.6 percent statewide. Projects in San Francisco were by far the most expensive, averaging \$1,100 per square foot for all LIHTC projects built between 2008 and 2019. Costs remained lower in inland areas, including the Central Valley, Inland Empire, and rural TCAC regions, but the inland areas also experienced the greatest percent increase in development costs since the 2008 recession.<sup>7</sup>

The main driver of these increases is hard construction costs. "[D]evelopers consistently pointed to the bids coming from their general contractors as the key factor contributing to cost increases," the study found. As detailed in the Case Studies section, EBALDC's own experience bears this out. While both materials and labor contribute to the increases, labor accounts for the bulk of the jump by far. Construction loan interest rose as well, since borrowing amounts have had to increase, as did contingency costs.<sup>8</sup>

Non-construction cost factors include the inability to achieve efficiencies of scale due to both funding and political constraints; increasing financing complexity, exacerbated by the loss of redevelopment in 2012; approval delays; local requirements; and, in some jurisdictions, "astronomical development fees." Although the State of California has made permanent supportive housing a priority in recent years, financing complexity is especially challenging for these developments, further driving costs up. As the costs to produce affordable housing continue to escalate, seemingly unabated, the affordable housing industry is looking to cost-reducing innovations. While VMC is not a new concept, it is not widely employed in the U.S. — modular construction represented 4.39 percent of new starts nationwide in 2020.<sup>9</sup> But there has been increased buzz around the potential for this construction method in recent years, as the affordable housing industry looks to lower costs and speed up production, with the ultimate goal to get more people housed.

Modular's potential benefits are indeed compelling. "Industry research suggests that off-site construction can save as much as 20 percent on the cost of building a three or four story wood-frame multifamily development, and shorten the construction timeline by between 40 and 50 percent," the Terner Center found.<sup>10</sup> A widely referenced modular project in San Francisco, Mercy Housing California's Tahanan Supportive Housing, realized a 30 percent cost savings and was completed in 33 months from the time of acquisition, compared to the city's incredibly lengthy average of 76 months — or 6.3 years for multifamily developments. (EBALDC has experienced a similar timeline on many projects.) As the Case Study section of this paper shows, however, there were several unique factors that contributed to that project's success.

Our interviews revealed a full spectrum of views on the potential and pitfalls of modular construction: some interviewees were extremely optimistic, others said its potential has been overstated and many landed somewhere in the middle. The next section of this paper discusses the challenges these practitioners have encountered, followed by two case studies of modular projects led by Bay Area affordable housing developers. Then, we will discuss ideas and potential solutions to remove some of the barriers and make it easier to add modular construction to the affordable housing toolbox.



North Elevation of The Phoenix project (Courtesy of Lowney Architecture.)

Our research and interviews identified multiple challenges that often minimized the impact of modular's potential cost and time savings, if not made modular projects altogether infeasible. Views on whether these hurdles can realistically be cleared varied. This section will discuss barriers to widespread adoption of modular construction that are experienced across the housing industry as well as those particular to affordable housing.

## **Industry-wide Challenges**

#### **Contractor Bids**

As supported by EBALDC and others' experience, high contractor bids, despite cost savings at the factory, is one of the foremost barriers to modular construction's wide adoption as a solution to the affordable housing crisis. Some interviewees wondered if the limited pool of contractors experienced with modular has led to noncompetitive pricing. Others surmised that contractors may be cushioning bids due to a lack of familiarity with modular methods and uncertainty about what contingencies may arise. They expressed hope that, as contractors become more experienced, their bids will decrease. Interviewees also expressed optimism that as more contractors and subcontractors gained familiarity with modular methods, the pool would grow, which would also drive costs down.

## "The reality is it's a lot more complicated when you actually dive into the work."

- Arash Baradaran, Cahill Contractors LLC

Greg Sloditskie, an engineer and consultant with more than 30 years of experience in the modular industry on

both coasts, believes that the opposite will prove true, however. "The reality is that the Bay Area GCs (general contractors) who are experienced with VMC have actually raised their prices based on previous experience," he said.

A major determinant of contractor costs is the level of complexity of a project, noted Barbara Gualco, real estate director for Mercy Housing California (MHC), which has completed one modular project with three others in the pipeline. "Yes, there will be some savings (at the factory), but you still have all this other work in your typical setting," she observed. "I think it's incredibly important that that other work is, quite frankly, as simple as possible."

With a decade of experience building modular projects, Cahill Contractors has worked on several affordable modular developments in the Bay Area. Cahill vice president Arash Baradaran expounded on Gualco's point. "The expectation that these are just like lego blocks that we're just going to set and walk away is not reality," he said. "I think at this point there's enough site contractors, whether it's the setting or the exterior skin or the MEP (mechanical, electrical and plumbing) or whatever trades that have to come in after, that have experienced the process that know it. I think there have been some lessons learned along the way and perhaps accounting for some worst-case scenarios in pricing for new projects. There probably is some of that. There's not really one answer but all those things can come into play."

But developers can also misunderstand how much on-site construction is required after the units are delivered, Baradaran stressed. "The reality is it's a lot more complicated when you actually dive into the work that needs to be done on site after the mods are set than people anticipate," he said. "I think the understanding is there for the most part. It comes down to it being the right building and the right design and keeping it as simple as possible. Whatever deviations go from there, it adds costs on a significant level."

#### **Site Characteristics**

In dense areas, it can be difficult to find sites that lend themselves to modular construction, as modular buildings cannot be customized in the same way site-built can. Noted the Terner Center in a study of off-site housing in Southern California, "Housing demand tends to be highest in dense metropolitan areas, where urban infill projects stand to benefit the most from time and cost savings. However, infill locations can also be the sites with complex and unique constraints: lot geometry may be irregular, local zoning codes include maximum height constraints and minimum setbacks that restrict building area, modular methods may require large staging areas for construction cranes, and unpredictable soil conditions can create numerous complications."<sup>11</sup>

Many sites also lack appropriate room for storage of the modular units. Off-site storage may be possible, but becomes an added expense. With only a small number of modular factories across the U.S., shipping across great distances can be necessary and is "not a negligible cost," said architect Ken Lowney, who has designed thousands of affordable modular units working with multiple factories across the U.S. and in China.

#### **Supply Chain**

While pandemic-related supply chain issues have impacted the entire construction industry, they have affected modular projects in more dramatic ways. "The supply chain issues were real," Gualco noted. "Imagine if you're a stick-built project and you can't get XYZ product, you can try to pivot and work elsewhere. If you're an assembly line in factory-built housing and you can't get your windows, you're hosed. It's not nimble. It's efficient, it's quick, but what happened during the pandemic really hurt."

#### **An Evolving Industry**

There are a limited number of modular fabricators producing multifamily units in the U.S .— the number is likely in the double digits. Despite having several experienced modular companies on the West Coast, this region is still catching up. Our interviews indicated there is still a lot to learn.

One of the biggest risks as volumetric modular expands on the West Coast is companies going out of business. This seems to especially be true with startups that have gotten into the industry more recently. There are several wellknown recent examples of modular factories closing middevelopment. Zeta Communities, with headquarters in San Francisco and a factory near Sacramento, suddenly closed its doors in 2016. RAD Urban, also in the Bay Area, closed in 2021. Boise-based Guerdon Modular Buildings was sold at foreclosure auction in 2020 and purchased by an investor group led by its original founders, who formed the company in 2001 and sold it in 2014.<sup>12</sup> Tracy-based Katerra is often mentioned in the same context as these companies, though it offered 2D panelized products. After receiving a \$200 million bailout in 2020, the company, once valued at \$4 billion, filed for bankruptcy and sold off its assets the following year.<sup>13</sup> It was purchased by an East Coast manufacturer and transitioned to VMC. Beyond the impact on entities with projects tied up in these factories, these high-profile failures have served, for some, to undermine confidence in modular and/or other types of prefabricated construction altogether.

"On the East Coast, factories . . . can move to a single-family production if a multi-family project falls behind. On the West Coast, if a project falls behind, it leaves the factory dark."

- Greg Sloditskie, MBS Consulting

While the reasons for these firms' failures are complex, there are some overarching challenges that any modular fabricator must overcome in order to succeed. "The risk profile of a modular project is different. So much of the volume of your building is coming from one source, so if you run into some trouble, you're really in trouble. Whereas a site-built project is much more resilient, because you can hire other subs to fill in," observed Lowney. Indeed, the Terner Center, in its Southern California study, identified "stable workstream" as a key concern in the industry. "Shutting down a factory even for a short period—due to gaps of work between projects or delays in on-site work can debilitate a company through the loss of-- specialized labor and the need to re-hire (or re-train new) employees after restarting the factory," the study noted.<sup>14</sup>

Engineer Sloditskie said West Coast factories, in general, need to become more efficient. On the East Coast, factories offer more diverse products and can move to single-family production if a multi-family project falls behind. On the West Coast, if a project falls behind, it leaves the factory dark, he said.

Anecdotes of structural and design challenges abound as well. One contractor recounted conducting extensive research on the fabricator, an established firm, including visiting the factory twice, once during production, and visiting a construction site. "We felt that we were so prepared — the research, the questions we were asking, the coordination, we had a great plan in place. We came back from Thanksgiving break and started setting modules and two and a half weeks later, the entire superstructure was set," the contractor recalled. But the project — which had originally been designed to be stick-built — soon took a turn: "The modules were just riddled with problems. The sewer was sloping the wrong way, there were structural deficiencies, the exterior flashing details on the windows was wrong, they delivered portions unfinished, they forgot to ship some components so we had to site build those components, they had some code issues."

Even Lowney, a champion of modular, can recount all kinds of disasters. "There is only one way for a modular project to go right, and a million ways to go wrong," he told the San Francisco Business Times in 2021. The article continued: "Having designed and overseen the construction of modular buildings with over 5,000 units, Lowney has experienced most of the problems possible with the process: modules that fit like poorly cut jigsaw puzzle pieces, modules that were damaged in transit, modules that weren't properly weather-proofed and thus ruined while awaiting installation, and even the bankruptcy or failure of the modular construction companies themselves."<sup>15</sup> Still, the contractor referenced above said he would pursue a modular project again under the right circumstances. "Modular is a no-brainer for the right type of project. If this was done the right way, to have 135 apartment units set in two and a half weeks — you wouldn't even be starting your second level of framing in two and a half weeks with site-built," he said.

#### Financing

One major issue with modular from the financial perspective is that no two projects are alike, making risk assessment different on each job, noted Brooke Bright, vice president and assistant director of construction risk management at U.S. Bank CDC. The construction industry has more than 100 years of experience with stick-built structures and the risks are familiar. Not only that, but some of the risks associated with stick-built are less onerous than modular. For instance, if a subcontractor defaults on their subcontract or a supplier can't provide materials, then another subcontractor or supplier can be hired fairly easily. But if a modular manufacturer can't complete the units, finding a back-up factory is exponentially harder. Also, the likelihood that another factory could complete the job within the funding window is highly unlikely. "With a bank, most people think that the oversight is a little bit more flexible than public funding. It's not." said Bright. "It's just a different group of people we need to answer to and regulatory rules we need to abide by. I have explained to my banking colleagues the many differences in the construction and coordination risk involved with modular, and both of those things relate to a risk of time and money. It's hard to get comfortable with a project when you are not sure if you will be able to meet the financial constraints involved."

"With a bank, most people think that the oversight is a little bit more flexible than public funding. It's not."

- Brooke Bright, U.S. Bank CDC

"There are basic questions a lender needs answered for any modular underwriting considerations," Bright continued. "With modular, it's not just about the financial aspect (underwriting the loan and/or tax credit costs) of the project. We need to also understand the timing of manufacturing, to transporting the units, to storage, all the way to constructing the building. On top of this, we also need to understand the capabilities of the GC and the modular company. Do they have experience with this type of modular construction? Can the modular manufacturer sustain this project financially through their plant? How will the contract function? Will the modular company be a subcontractor to the GC or will they contract directly to the developer due to timing? These questions must be considered when underwriting a deal for a lender and investor and this process takes time."

Additional financing challenges pertaining specifically to affordable projects is discussed in the next subsection.

#### Insurance

At some point in nearly every one of our interviews, the subject of the October 2021 atmospheric storm in Northern California arose. The torrential wind and rain from the storm severely damaged housing projects throughout the Bay Area, including multiple modular projects that were far along in construction but did not yet have roofs on. As a result, insurers have increased scrutiny in their underwriting for construction projects, particularly in how projects are mitigating large water damage events. Where insurers view increased exposure or risk, they are increasing deductibles, reducing water damage coverage and/or carving water damage out of the policy to be purchased on a standalone basis entirely. "That atmospheric storm crushed the market with losses," observed Justin Dove, area executive vice president with insurance brokerage firm Arthur J. Gallagher & Co. "Insurance market conditions for wood frame projects had been deteriorating prior to that storm, but following it was an acceleration of that deteriorating pricing environment. Insurers quickly began retooling their rates and pricing models, and became emboldened with a desire to have increased deductibles, particularly for the peril of water damage." He said he is now seeing water damage

deductibles of \$100,000 up to \$1 million on larger wood frame projects (both modular and non-modular) on the West Coast. This is in addition to rising premiums and deductibles for fire damage and added requirements for strict site security protections, all required by the insurers in advance of issuing the policy. These challenges are especially acute in urban areas like Oakland, Portland, San Francisco, and Los Angeles, where many carriers refuse to insure projects due to crime rates and/or the perception of crime. Exacerbating all of this are numerous other factors: heavy consolidation in the industry; the necessity to insure larger projects with multiple carriers because no single one is willing to take on the entirety of the project risk by themselves; and the growing unpredictability of the weather due to climate change.

These premium and deductible hikes are not modularspecific. The entire insurance market for wood-frame projects has seen major increases. The atmospheric storm event added an increased burden for modular projects, however. Still, although he could not provide specific figures, Dove stressed that the price differential between modular and other large wood-frame projects should not be prohibitive in itself. "While it will vary by each project's specific characteristics, there is not a significant rating punishment, and I think when weighed relative to time savings and hard cost savings, people should not say no to modular simply because of insurance," he said. It is critical to begin the pricing discussion early in the project's life cycle, as numerous project characteristics, including location, crime score, number of stories, total hard cost value, general contractor and the modular manufacturer all influence the rating and coverage terms that can be secured, Dove added. Some projects will have challenging terms and pricing conditions, while others will not.

Vital to insurers, Dove stressed, is whether the general contractor has a strong track record with modular, their approach to temporary waterproofing the modules, overall water damage mitigation procedures and the modular manufacturer's waterproofing techniques. Perhaps illustrating his point is the varying degrees to which modular projects weathered the atmospheric storm — while some projects sustained massive damage resulting in large claims, others suffered none.

One benefit of modular is that it arrives at the site fireresistant. And in certain instances, once each floor has been set, the fire sprinklers can be activated. The quicker erection timeline further minimizes fire risk in the eyes of insurers, which is beneficial to all parties. The Intersection, a student housing development in Emeryville, famously endured two fires, both caused by suspected arson, along with a series of other setbacks while built conventionally. The developer decided to pursue modular construction after the second fire, and recently completed the project without incident.

#### Permitting

Modular projects have a different permitting structure. In California, the modular units are inspected and permitted at the factory, regardless of factory location, by a designated agent of the state, pursuant to the Health and Safety Code, commencing with Section 19960.<sup>16</sup> The remaining construction elements are inspected and permitted by the local authority having jurisdiction. Several projects experienced the challenge of local jurisdiction over-reach and the need to expend significant time and expense either adhering to local requirements that did not apply or sorting out the jurisdictional issues.

In one example shared by an interviewee, an East Bay municipality wanted to change some of the details of the framing in the modules, but the modules were already completed and had been permitted by the state's designated agent. "It slowed us down. I think it took us two months to untangle that knot," the interviewee recalled.

Additionally, the state permit resides with the factory, which creates issues if the factory closes or the client wants to take their drawings elsewhere. Lowney said there has been talk of changing this structure so that the permit is held by an entity other than the factory, such as the architect or the client.

## **Affordable Housing Challenges**

#### **Predevelopment Financing**

Timing is radically different for modular versus traditional construction. This makes financing one of the biggest challenges for affordable housing developers attempting to develop modular projects. Reserving a place in the production queue requires large up-front deposits and materials need to be ordered much sooner than in traditional construction. Structuring financing to sync with these timelines remains a major hurdle for many projects.

"You've got to get your place in the line and you have to put down these major deposits and basically pay for them. If they build them and you're not closing, they've got to sit in storage somewhere, which is another not great thing," said MHC's Gualco. "Our system makes it difficult. That line is pretty critical for that fabricator. It's hard because there are a lot of not very nimble things happening at once."

Several projects overcame this challenge due to unique circumstances that have not been, and in some cases are unlikely to be, widely replicated. For example, MHC had access to a large pot of flexible and unencumbered predevelopment funds from a private, philanthropic entity for its Tahanan Housing development. For an affordable housing project in the South Bay, the CEO of the modular factory was enthusiastic about affordable housing and waived the initial contract deposit until after the developer closed on financing. EBALDC continues to move forward with The Phoenix, described in more detail in the Case Studies section, because the modular units were built on spec and there was no need to reserve a place in a queue.

Mercy Housing California was able to access a large pool of private funding, which came with far greater flexibility and far fewer restrictions than public subsidies.

#### Bonding

Most affordable housing lenders require a bond against damage or other financial losses. In a stick-built project, the GC holds the bond. With modular, however, lenders will typically require that the factory be bonded as well (or the GC will require it, if the factory is listed as a subcontractor on the project). But modular is still considered different, and several modular companies are newer and/or do not have finances stable enough to make them bondable. Some developers have found workarounds, but the lack of factory bonding capacity was cited in the research and by many interviewees as a significant challenge.



Site and floorplan of The Phoenix project (Courtesy of Lowney Architecture.)

#### Tahanan Supportive Housing<sup>17</sup>

Tahanan Supportive Housing, at 833 Bryant Street in San Francisco, has been the subject of much study and media coverage. The project — 145 permanent supportive housing units, all studios — was built in half the time (33 months) and at 30% less cost (\$382,917 per unit) than comparable projects. Similar projects can cost up to \$600,000 and, in San Francisco's especially complex and contentious development environment, take five to ten years to build.

There are several unique factors that contributed to the project's success. First, the nonprofit developer, Mercy Housing California, was able to access a large pool of private funding, which came with far greater flexibility and far fewer restrictions than public subsidies. These funds were provided by a Homes for the Homeless Fund created by Tipping Point Community, a philanthropic organization, and the San Francisco Housing Accelerator Fund (HAF). While these were intended to be revolving funds, HAF, and Tipping Point accepted the risk that funds would not be returned. The project also benefited from Streamlined Ministerial Approval, an expedited process established by Senate Bill 35 in 2017.

"Modular construction can achieve greater cost efficiencies by allowing the construction of the building simultaneously with or in advance of the site work," observed a Terner Center study of the 833 Bryant Project. "Thus, the package of cost efficiencies for 833 Bryant allowed the project to avoid seven months of construction cost inflation and interest carry."

Challenges encountered during the project included opposition from labor unions — an issue that is prevalent in San Francisco but does not seem to be a concern in other Bay Area cities — and permitting. The union ultimately signed off on the Bryant project and MHC agreed to comply with San Francisco's stringent local permitting requirements. MHC also worked with the city to ensure understanding of the state/local jurisdiction inspection breakdown. Bonding was another challenge as the fabricator, Factory\_OS, was not able to bond at the time of this project. MHC was able to work around this issue by not requiring the GC to bond and working with the commercial lender to waive their bonding requirement.

MHC's Gualco stresses that the confluence of unique circumstances were vital to Tahanan's success, noting that a second MHC modular project in San Francisco, at 1064 Mission, is unlikely to realize any cost savings. However, due to federal mandates (the project is built on federally owned land), the construction timeline at 1064 Mission is very tight. Modular construction is enabling MHC to complete the project in the requisite three-year time frame.

## EBALDC: 12th & Harrison, 34th & San Pablo, Lake Merritt BART and The Phoenix

Since 2017, EBALDC has considered four sites in Oakland for modular construction: a quarter-block, corner lot at 12th Street and Harrison; two odd-shaped sites at 34th and San Pablo and at the Lake Merritt BART station; and The Phoenix at Pine and Shorey in West Oakland. 12th Street seemed an ideal site due to its location and square shape. After extensive research and discussions with Bay Area contractors and architects with modular experience, EBALDC elected to pursue a modular project, projecting a 5-10% cost savings and 25% reduction in construction time (14 months, down from 18 months). The GC quote, however, came in significantly higher than anticipated, with only about 25% of the GC's quote accounting for the modular units. Ultimately, the site was reconceptualized as a stick-built project, as the lack of savings did not justify the perceived higher risks and logistical hurdles associated with modular construction.

The Phoenix is the result of an effort between four organizations . . . to rapidly construct high quality and well-located supportive housing in a neighborhood suffering from high levels of homelessness.

While EBALDC is not sure what accounts for the quote coming in so much higher than projected, Executive Vice President for Real Estate Development Capri Roth points to an already small pool of contractors and subcontractors able to meet labor and contracting requirements attached to many affordable housing financing sources. That pool is then shrunk even further by the limited number who have experience with modular construction. "The takeaway, to me, was that because we have a smaller pool of contractors and a smaller pool of subcontractors, that it creates a noncompetitive environment," she said. Based on this insight and the fact that 34th and San Pablo is a more irregularly shaped site in the middle of a city block, which would make staging difficult and would not lend itself well to box-shaped units, EBALDC also elected to stick-build at this site. A similar decision was made for the Lake Merritt BART site.

EBALDC is moving forward with modular construction at The Phoenix, a 101-unit project of studios and one- and two-bedrooms designed to serve formerly homeless and at-risk of homeless households. The Phoenix is the result of an effort between four organizations — EBALDC, Allied Housing/Abode Services, Holliday Development and Factory\_OS — to rapidly construct high quality and welllocated supportive housing in a neighborhood suffering from high levels of homelessness. This project, too, has not been without challenges, not all related to the construction method. One significant challenge is that the financing has been extremely slow to come together. "Hypothetically, this project has been ready to start construction for over a year," said Roth. A unique aspect of this project has made it sustainable: the modular units were built on spec by Factory\_OS and are ready for EBALDC to use when the site is ready. If EBALDC had been required to line up a half-million dollars to secure a place in the production queue, the project could not have moved forward, Roth said.

"I don't know until I know when I'm going to be able to start construction. I can't confidently place a mod order until all of my financing is in place and I have certainty of execution. Of course, that's probably true on the market rate side as well, but their financing comes together based on economics and our financing comes together on funders' schedules," she explained. "We could have gotten funded for this project as early as November of last year (2021). If, in November, we had been successful with funding, we could have then put in an order with the factory and said 'We want mods' but if the factory said, 'I'm on a year-and-half-long wait list,' then that doesn't work for my funders who say 'You have to expend your funds with this period.' So that's a timing problem. And I don't get certainty on my funding path until something like four to six months until I'm supposed to start construction."

The project continues to move slowly as EBALDC waits for the city and state to administer and award funding, and rising contractor costs continue to be a barrier. "The construction industry is really challenging. That's one of the reasons people are so attracted to modular in the first place. I would love to see how modular can help fix that," said Roth. "But we routinely see trades where we can no longer get three competitive bids. And that's with stick-built or modular. But with modular you are only further limiting what is already a dwindled pool of contractors."

EBALDC's experience does not bode well for modular construction as a widespread solution to the affordable housing crisis. Roth wonders if there might be some type of hybrid solution that might not only bring costs down but improve worker safety and quality control. "If figuring out the logistics on modular is too challenging, it's not going to work, especially for affordable housing with all of its financing complexities that we can't get around," Roth said. "But I'm open to further learning and I am curious about hybrid methods like panelization. It would be great to land on approaches that can improve the feasibility of affordable housing and also improve worker conditions and building quality."



Ground level exterior render of The Phoenix project (Courtesy of Lowney Architecture.)

Despite the many hurdles, the fact remains that the production cost and time savings of modular construction, when all goes as planned, are very real. And there is a committed cadre of practitioners in the Bay Area working to develop solutions to the challenges, daunting as they are. Most are realistic about modular's potential, acknowledging that there are certain conditions where it works best, while also believing there is more the affordable housing ecosystem can be doing to make modular construction a more widely utilized option. This section does not offer hard-and-fast recommendations, but observations and ideas to spark discussion and spur further collaborative problem-solving.

#### **Experience + Education**

Nickolos Gomez, principal and director of modular design and construction at architecture firm AO, has permitted more than 2,500 units of factory-built housing in California. He believes greater education and collaboration across the industry is essential for addressing the many challenges. Ideally, the entire project team will have modular experience, Gomez said. "You really need an experienced team, not just your architect, that has done it before. You need a contractor who has done it before. And you need to work with a factory that has built the product type that you plan to use for the project."

Gomez acknowledges that this is not nearly as simple as it sounds. "It's such a difficult process. Any first time anyone does it, it's a learning curve. Respecting the process is something we say, but it's easy for me to say, 'You shouldn't be making changes late in the game' or 'Hey you, contractor, you need to understand the schedule of how the factory build component works, so you need to have up-front coordination to work with that,' but it doesn't always happen." Setbacks for an inexperienced team could be mitigated by bringing on an experienced practitioner as a consultant, Gomez recommended.

#### No More Business as Usual

Modular requires thinking differently about the entire design and construction process, several interviewees said. "What modular does is it forces you to think very simply, if you embrace what you're trying to do. The architect really has to do something the factory can build," said MHC's Gualco. By prohibiting design creep, "I think the whole discipline can help to control costs," Gualco added. While changing old habits will be necessary industry-wide, several interviewees singled out the need for contractors to approach projects differently. Many on-site tasks traditionally completed at the back end need to be moved to the front. "Everything has to be frontloaded and everything has to be much more collaborative," said Gomez. "I want to make sure that if the factory says, 'This detail works,' and there's a site component to it, I need the contractor to look at it. And I want him to have his field guy who does that install looking at it."

The construction schedule is a critical item that needs to be sequenced with the modular construction, Gomez continued. "A good set crew can stack up to 14 modules a day, and depending on the size of the building, that could be one entire level a week. There is some significant time savings here that can be eaten up in the schedule if the site MEP crews are slow to mobilize after the modular set. It is critical that the contractor work through this in their schedule to achieve the time-saving benefits of modular construction."

In a time of low supply and high demand, where contractors can be highly selective and bid high, Gomez said he still sees incentive for them to take on modular projects and alter their approach. "They're able to shift a nice chunk of the work to one entity, and not divide it up between five. It works for a labor shortage," he observed, adding: "They can have smaller crews do more jobs because of that scope of work now. So you could actually do more work if you embrace modular, and you need less crews to mobilize to do it."

Early adopters have begun to make resources available to share what they've learned. Mercy Housing California produced a Modular Construction Manual<sup>18</sup> for project managers. The American Institute of Architects also offers a Modular and Off-Site Construction Guide.<sup>19</sup> The Terner Center's Southern California study has useful recommendations for various entities involved in the construction process as well.

Robin Bolz, managing director and head of commercial real estate strategy for JPMorgan Chase, advocated for a much more disruptive paradigm. The future, he said, is in vertical integration. "They're not thinking outside the box," he said of developers who are pursuing projects in the conventional manner. "They're thinking about traditional methods of construction [and saying] 'We'll just build it all in a box, but then we'll still have the contractor, the subcontractor, the developer.' That's part of the broken paradigm. You don't need all those people. The only reason you needed all those people was because everything had to be assembled on-site in a bespoke manner...When you start getting into the mindset of production, you're going to build these things like Teslas or build these things like airplanes, that's a different mindset. You don't see Boeing building with a subcontractor or a general contractor. They're vertically integrated."

## **Growing the Experience Pool**

Some interviewees saw cause for optimism with regard to contractor bids. Now that his company has completed several projects with the same fabricator and general contractor, a project manager for a developer said they are seeing lower subcontractor quotes. "Almost all the low bids are with subcontractors who have worked on these projects in the past with us," he said. "For MEP, these bids are literally 25 percent lower than the other subcontractors."

Cahill's Baradaran said the pool seems to be expanding, too. "I feel like the list has been growing over the last couple years. Some of the contractors that are in our circle on these types of affordable deals in the Bay Area have started some of these modular projects recently. So I feel like the pool is expanding," he observed. "I think that's starting to happen just based on more and more owners and nonprofits really wanting to push the envelope on it and try this out. They're bringing on some of their GCs that they like to work with. I think it's been happening kind of naturally and I think that resume is growing for a lot of companies."

## **Recognizing the Limits**

Many interviewees stressed that modular construction is not suitable for every site or housing type. "It works best for projects under 100 units located on flat, rectangular sites with ample land area," architect Lowney told the San Francisco Business Times.<sup>20</sup>

MHC's Gualco concurred: "There are really good projects for modular. I think Tahanan was a good one, at 833 Bryant. I think massive deals with a lot of site work, complicated podiums, big projects — 1064 Mission (another MHC project in San Francisco) is a whale of a project, 248 units — maybe not so good."

Cahill's Baradaran agreed. "Some of (our past) projects, it was really not an ideal fit for modular in retrospect because the site was either a certain size or shape or whatever where we had to incorporate a lot of site-built into the modular. For example, some corridors connecting different wings and things like that," he reflected. "If you can't do it all modular above the podium, then you shouldn't do it at all. Just introducing that little element of site-built, even if it's just a few hundred square feet of corridors per floor, can slow down the process of getting the building completed and weather-tight and it sets up risk for everybody."

One of the most crucial lessons Gomez and others have learned: design the project modular out of the gate. Converting to modular once you've begun design development or wrapped up schematic design can lead to all kinds of problems. But the reverse is not true. "It's really easy to de-modularize a project," Gomez explained.

### **Funding Innovations**

Modular construction follows a completely different construction timeline, creating a need for differently structured, more flexible funding mechanisms. The Terner Center has recommended that the government and philanthropic entities offer revolving funds and flexible capital that would accommodate modular timelines.<sup>21</sup> JPMC's Bolz echoed these sentiments. Partnerships with municipalities who can provide backing can make a project appealing to a lender. He said: "Municipalities for now, are going to have to step up project by project."

LISC LA has created a revolving loan fund for modular projects, which could be replicated in the Bay Area and elsewhere. The April 2022 announcement of the fund clearly lays out the funding conundrum and the necessity for such an intervention:

> In order to deliver on faster timelines, developers are required to make large upfront deposits to modular manufacturers prior to construction closing in order to secure their place in the production assembly line. These deposits are often a sizeable percentage of the total modular cost and can stress a nonprofit developer's budget in the predevelopment stage. Construction lenders are unwilling to finance modular prefabrication deposits prior to construction loan closing which therefore leaves a developer with a large expense they can't easily cover. LISC LA's Modular Housing Fund aims to solve this problem by providing much needed bridge financing to developers so they can deliver on timeline expectations.

Gomez suggested that LIHTC and other funding timelines should be adjusted to accommodate the modular production process. "We need a different window," he said. "They should have a flexible way of working out a schedule. For modular construction, the architect needs to wait for the owner and contractor to select a factory before they can even start putting together their permit sets, and there are two parallel processes that have to happen for permitting, so it is not a straight line. The modular process requires more upfront coordination, meaning time. Agencies funding or lending for modular projects should have a different set of rules for them because they are not the same as site-built projects."

U.S. Bank CDC's Bright has worked within her company and the broader lending industry to find ways to help lenders better understand and become more open to modular projects. "There is a way to get comfortable with it," she insisted. "As a lender, we are always looking for the worst-case scenario. We try to plan for what could potentially happen, so we're prepared if it does. And if it doesn't happen, great. Oftentimes we over prepare. What we try to do is be as flexible as possible within the bank's parameters. But to get comfortable with a project, we need our partners to be as flexible and open-minded."

Despite the added layers of complexity, Bright has found ways to build flexibility into deals and find creative ways to bring modular projects to fruition such as: removing some extra requirements that the bank had been putting on modular projects that ultimately proved unnecessary; and allowing more frequent draws to accommodate the modular timeline.

#### Bonding

Interviewees and research offered few solutions to the challenge of bonding. The Terner Center recommended standardizing insurance and bonding policies to satisfy conventional lenders. "Bonding requirements from traditional lending institutions can be difficult for new offsite manufacturing companies to meet, but obstacles can be mitigated by firms that standardize their insurance policies to functionally fulfill the policies of existing funding sources," their Southern California study stated. "Furthermore, based on the likely lower risks of injury both for factory laborers as well as for on-site laborers that spend less time on an active site, industrialized housing producers could pursue reduced project insurance premiums to decrease costs."<sup>22</sup> Factory\_OS, based in Vallejo, is now bondable and has successfully bonded its past three projects. This should have significant implications in the Bay Area as many affordable housing producers have partnered or are currently partnering with them. There are only two other bondable factories on the West Coast to our knowledge: Nashua Builders in Boise, Idaho and Autovol in Nampa, Idaho. Both are also partnering with affordable housing developers in the Bay Area. Cahill's Baradaran said it is important to negotiate mutually agreeable contract language when working with factories that cannot bond.

#### Permitting

The issue of permitting confusion may be imminently solvable with education and better communications with local jurisdictions. Gomez said he gets all involved entities into a room to go over responsibilities and make sure everyone is clear about their roles. "Ninety-nine percent of the time, when the local jurisdiction gets the education, they get it and just ask us to be very clear in our documentation and that is something that is on us, the architect," said Gomez, who has worked through permitting issues on multiple modular projects. "I'm very clear about it, I work with my team to make sure they are very clear about it, and as long as we're very clear there is no gray area and it makes it very easy on the local reviewer to understand, 'This scope is out of my jurisdiction,' " he said.

The Terner Center recommended that the fabricator play a key role in delineating the permitting scope. "In collaboration with the project architects, off-site producers should separate the scopes for in-factory (state) and onsite (local) design review and inspection by creating two separate plans for each, visibly 'greying out' out-of-scope elements," their Southern California study stated. "This can minimize confusion and delays in the respective permitting processes and clarify the differences in scope for other project team members as well."

The California Department of Housing and Development provides thorough guidance<sup>23</sup> on this dual permitting process. MHC's Modular Construction Manual also offers detailed guidance on mitigating these permitting issues.

#### **Government Support**

Local government commitment to modular will be key to more widespread adoption. Several interviewees cited the City of Oakland as especially progressive around modular, conducting an Innovative Construction study that led to enactment of a new zoning ordinance.<sup>24</sup> Modular projects can exceed the zoning envelope due to the way they are stacked, and this ordinance — the only one of its kind that our interviewees were aware of — allows variances.

Government may have a role to play in relieving the insurance issues. Said MHC's Gualco, "I think the insurance challenges now make it a little harder for modular moving forward. I think the government needs to step in on insuring supportive housing, period, because the costs of insuring all aspects of supportive housing are astronomical. We get penalized for housing a population that's difficult to house."

#### **Logistical and Material Innovations**

Given the construction industry's widely acknowledged resistance to change, which has only been compounded by the shrinking of the field following the 2008 recession and with more recent labor shortages, the greatest potential for moving modular forward may lie in logistical and material innovations.

To maximize savings and efficiencies, several interviewees as well as Terner Center research recommended the use of standardized unit layouts that can be easily replicated, as well as minimal variety in layout: "The less variation in design and assembly between units and projects, the better the likely performance benefits achievable by industrialized methods. This is particularly salient for project types that offer consistency and self-containment between individual units, such as predominantly studiobased permanent supportive housing projects."<sup>25</sup>

Cahill's Baradaran agreed. "To get the benefit of modular, things have to be standardized and sometimes it's going with what the factory wants to use in terms of product or making sure the layout works within what they can comfortably build in the factory. That might mean some sacrifices in terms of how things would ideally be laid out or products that are used or things like that," he said. "The development team has to be willing to accept those things, and the design team as well. You're not always going to get the architecture that would be ideal. It's all about keeping things simple and standardized. That's how it works best."

Standardization can, in turn, lend itself to replicability, and that's where real efficiencies can be realized, Gualco projected. "If you got a box that a fabricator could build that's proven successful and you find the site and you can replicate that, and you can get really efficient at it, that's powerful. Maybe these are all buildings filled with studios housing homeless single adults, but it's developing critical housing at the best price point we can hit," she said. She added that a group of nonprofits in Los Angeles are working together to replicate modular units across multiple sites.

With several projects now under its belt, Factory\_OS has created a catalog of standardized units that they know are factory efficient and that they know work on-site — with separate catalogs for affordable and market rate. To achieve maximum cost savings, the Terner Center suggested that developers and producers might work together to bundle projects: "Bundling multiple projects together can help developers that target multifamily projects (especially those under 100 units) meet the unit scale at which off-site methods offer the most benefit," the Center stated.<sup>26</sup>

As discussed in the Case Study section above, after struggling to move even one of a planned four modular projects forward, EBALDC's Roth has pondered whether there is potential for hybrid projects, with only certain aspects of a development produced off-site. Sloditskie said this is feasible, stating: "Prefabricated bathroom, kitchen and mechanical cores are the answer to this question." The Terner Center reached a similar conclusion: "Pursuing more component-based offerings such as a kit-of-parts or a panelized flat-pack approach could be more appropriate for smaller projects and make it easier to find and use existing manufacturing capacity."<sup>27</sup>

It is a mystery to many why the industry has not yet figured out weatherproofing, and there seems to be ample room for improvement in this realm. Sloditskie said the West Coast in general is behind the curve. "Some of the weatherproofing has to do with the way the modules are set," he explained. "On the East Coast they're better at temporary weatherproofing. This is not to say that the East Coast does not have temporary weatherproofing failures. It happens. But they do not have the luxury of the rainless summers common in the Bay Area, so they have to be prepared for weather events to arise at any moment. And almost everyone has discovered you don't set a building a floor at a time. You set a building as towers. That's easier to waterproof than a whole open building."

But Sloditskie also sees potential for material innovations that do far more than address this one problem. "Someone at a higher level needs to take this on like a moonshot project and invest money into basic research about different materials, because right now if you walk into a modular factory, it's the same 2x6, it's the same Andersen windows, it's the same OSB subfloor and wall-sheathing. It's all site-built materials. And the biggest offender amongst all of them is drywall. It's a horrible product for a production line setting. It cracks, it takes a long time to finish, it's labor intensive. Someone needs to come up with a better solution. That's just one example," he says. "The future is new materials and new methods that leverage the fact that you're in a factory. Things that can't be done in the field. Right now, you walk into a factory and it looks just like you're at a construction site."

Our commitment to modular, as an ecosystem, will be determined by our broader commitment to fixing the many bottlenecks and broken pieces that plague affordable housing development and financing more broadly.

## **The Future**

Our scan of the industry indicates that modular construction's potential to help solve the affordable housing crisis is limited. The barriers are simply too many and too great. "If it's the next wave, it would already have happened," Sloditskie observed. But just because modular may not be *the* solution does not mean that is not a solution — one among many.

"It's not going to be the solution to all our housing woes, but to me there is a place for it," said MHC's Gualco. Even reflecting on the three affordable modular projects in the Bay Area that suffered severe damage during the atmospheric storm, and the fact that obtaining insurance has become exceedingly difficult, she said: "It would be unfortunate to say, 'That's it, we're never doing this again.'"

As a lender, U.S. Bank's Bright is well versed in the complexity of modular deals, and yet she continues to act as a champion within her industry. Why? "I think it's a really good idea and if done correctly it will do exactly what's promised. It will make construction faster," she said. Everything must work like a well-oiled machine, she acknowledged but "it can be done."

Some of the challenges, like permitting, seem eminently resolvable as those involved in the process gain more familiarity. Many other challenges, however, are truly both pervasive and deep, and our interviews revealed few concrete or broadly applicable solutions. Several of the completed Bay Area affordable modular projects to date have come to fruition largely through the efforts of highly dedicated players and/or unique circumstances that enabled them to circumvent some of the most seemingly intractable hurdles — like securing predevelopment funding to cover queue deposits or bonding the project. Insurability arose as a particularly pernicious barrier with no imminent resolution. Indeed, when asked how the problem of ever-escalating premiums and deductibles might be resolved, broker Dove said simply that at some point, "something's got to give."

Whether and to what degree modular moves forward as an affordable housing solution will be determined largely by the willingness of players across the industry to change not just how they operate but how they think. Concluded the Terner Center: "Taking full advantage of off-site methods will require a cultural shift to embrace new approaches in a broadly risk-averse and conservative industry, potentially creating friction with the entrenched interests of conventional business models and practices."<sup>28</sup>

Many of the challenges identified throughout this paper are faced by affordable housing projects in general, regardless of construction type. They are simply writ large for modular projects. Our commitment to modular, as an ecosystem, will be determined by our broader commitment to fixing the many bottlenecks and broken pieces that plague affordable housing development and financing more broadly — barriers that, if removed, can help us truly address the housing crisis and make good on our shared commitment to provide all Californians with a safe, comfortable and affordable home.

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## **Endnotes**

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## About EBALDC

Founded in 1975, the East Bay Asian Local Development Corporation (EBALDC) is a nonprofit community development organization that brings people and resources together to build healthy, vibrant, and safe neighborhoods where everyone has a place to call home. EBALDC partners with residents and local leaders to co-create neighborhood solutions, so everyone plays a role in shaping their future and strengthening their community fabric. EBALDC is one of the region's leading affordable housing developers and serves more than 6,000 people and 114 small businesses and nonprofits annually.



In 2013, EBALDC adopted a Healthy Neighborhoods Approach to Community Development. Our health and well-being is dependent on a range of interconnected social, economic, and physical factors that impact the place where residents live. EBALDC works to address place-based health inequities by providing vital social and financial services, affordable housing, and building collaborations that support residents to thrive.

For more information, visit www.ebaldc.org.

## **EBALDC Leadership**

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