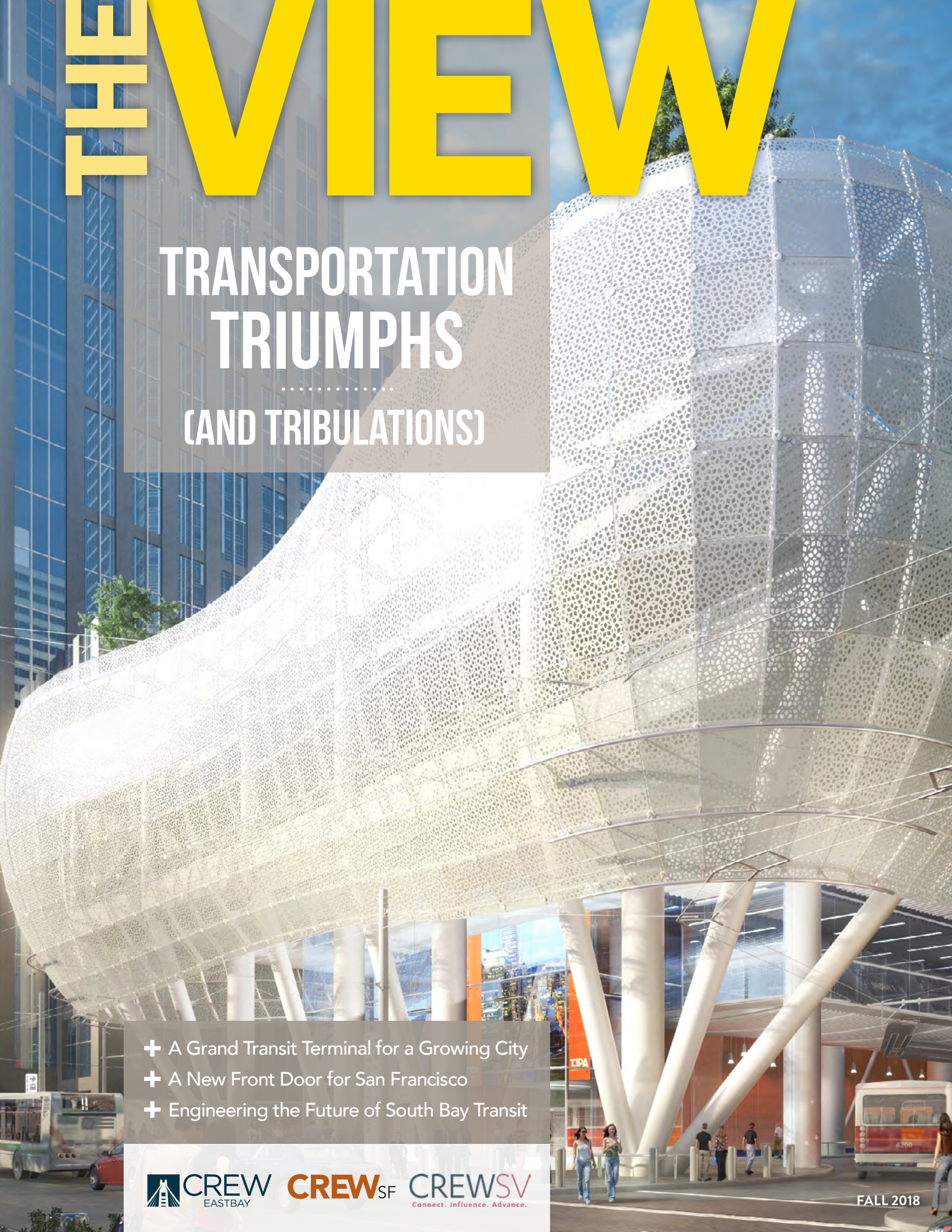
THE VIEW

TRANSPORTATION TRIUMPHS (AND TRIBULATIONS)



+ A Grand Transit Terminal for a Growing City
+ A New Front Door for San Francisco
+ Engineering the Future of South Bay Transit

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FALL 2018

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Cover image: Transbay Terminal [rendering courtesy of Transbay Architecture]]

LETTERS FROM THE EDITORS *Transportation Triumphs (and Tribulations)*

Year after year, a staggering influx of newcomers arrives at the gates of the Bay Area. Enticed by opportunity, high salaries, and our eternal sunshine, a population the size of the city of Danville packs up their bags and moves here every year. The nine-county San Francisco Bay Area is projected to add 1.1 million jobs, 2.1 million people, and 600,000 homes by the year 2030. This exploding population streams into existing transportation systems each morning on their way to their new jobs. In addition, rising housing costs are pushing existing residents toward longer commute times in search of housing they can afford. City governments are rushing to meet the high demand, but the system at times appears to be cracking, quite literally.

Bay Area real estate professionals are part of the team stepping up to fill this demand. Where do we go from here? Build, build, build. Where have we seen success? The "Transportation: Triumphs and Tribulations" issue of *the VIEW* looks at the steps being taken by CREW members to do their part to untangle this complex yet crucial puzzle.

Warmly,
Donna Schumacher, Executive Editor

Design piqued my interest in the build environment. Transportation woes made me think beyond the single structure. This is the origin of the narrative that carried me forward in my career and remains one of the issues that keeps me hopeful. This issue is filled with projects and efforts in the Bay Area that are attempting to address one of the most irritating challenges of our daily lives—the commute.

The Bay Area is featured in the traffic and congestion headlines in many publications, like most large American cities. It is easy to feel like there are little more than band-aid solutions being offered, particularly as cities continue to densify over time. But one area of transportation that shines a bright spot in this issue is air travel. The thoughtful design and sustainability features of the new development at SFO will be a welcome sight as we all fly home in coming years. Many thanks to members of the team who have shared a peek into what's in store.

Rebekah Palmer, Development Manager, Veritas Investments
Managing Editor

**according to the Bay Area Governments and the Metropolitan Transportation Commission.*

A GRAND TRANSIT TERMINAL FOR A GROWING CITY

Transbay Interior [rendering courtesy of Transbay]

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After eight years of construction and many more of planning, San Francisco's much-anticipated Transbay Transit Center—officially called the Salesforce Transit Center, after the cloud-computing giant acquired naming rights for $110 million—opened this summer.

The four-block-long terminal, dubbed "the Grand Central of the West," connects eight Bay Area counties and beyond through 11 transit agencies, including BART; Muni; AC Transit, which serves the East Bay; CalTrain, which runs through Silicon Valley to San José; and—eventually, perhaps—the $100 billion California high-speed rail line linking San Francisco and Los Angeles.

The $2.7 billion transit hub is packed with innovative and sustainable design features that will enable the facility to achieve LEED Gold certification. They include a gently undulating, perforated exterior wall that screens buses from view, provides natural ventilation, and creates a dramatic Grand Hall with a soaring "light column" that washes the interior in natural light. But perhaps the most innovative element of the design is a 5.4-acre rooftop public park that provides much-needed open space for transit passengers, neighborhood residents, and workers in nearby office buildings.

Building section [illustration courtesy of Transbay]

View of Transbay from above [rendering courtesy of Transbay]

In a recent interview with CREW SF, lead architect Fred Clarke said that one of the driving forces behind the design of the new transit center was to create a facility that was easily accessible and well integrated into the fabric of the neighborhood, the rapidly developing SoMa district, just south of the city's Financial District.

"Large transportation centers generally have a negative impact on the neighborhood," Clarke observed. "Penn Station in New York is a good example. They tend to be very unfriendly as they reach the ground. The movement of vehicles in and out creates pollution, waste, and congestion… We wanted the [Salesforce] building to be very welcoming and friendly and permeable. We wanted it to support the growth of the neighborhood."

To reduce ground-level congestion and pollution, most of the buses entering and leaving the building have been "lifted off the ground" via a bridge that links directly to the Bay Bridge. Indeed, the design of the bridge is actually a scaled-down version of the new eastern span of the Bay Bridge, with its distinctive single-tower design.

The transit center has been carefully aligned with the existing street grid so that pedestrians can easily walk through the building. And it is filled with welcoming art designed to draw the public in, such as the colorful terrazzo floor in the Grand Hall, designed by local artist Julie Chang, which evokes a lush, sunlit Victorian garden.

But the most welcoming element of the new center is unquestionably the rooftop park, which Clarke believes was a pivotal element in persuading the judges to pick the design of his firm (Pelli Clarke Pelli, based in New Haven, CT) over several other proposals. "It's unique and unprecedented," Clarke remarked, noting that the only park that can compare to it is the High Line in New York, a 1.5-mile-long elevated greenway fashioned out of an abandoned rail spur.

"The park was our invention. It wasn't in the original requirements," Clarke said. "Everybody loved the idea."

The quarter-mile long elevated park features an impressive array of amenities, including an outdoor theater, gardens populated by dozens of mature trees, a half-mile-long walking loop, open grass areas, and a children's play space, as well as a restaurant and café. The park design includes active spaces that allow for organized events like concerts and fairs, along with quiet areas where visitors can relax in informal natural settings.

One of the most innovative features of the elevated park is a water sculpture, designed by Bay Area artist Ned Kahn, composed of a thousand-foot-long line of water jets triggered by sensors in the bus deck below. The frequency, motion, and height of the jets corresponds to the level of activity below, making the arrival and departure of buses tangible to people in the park.

Clarke said his team approached the roof of the transit center as a "fifth façade," because many of the neighboring high-rises would look down on it. If office workers in nearby buildings could view a beautiful park rather than a sea of asphalt, they reasoned, that would be a big asset for the neighborhood.

Rooftop park [rendering courtesy of Transbay]

The park also doubles as a "living roof," providing shade to ground-level sidewalks, habitat for flora and fauna, and insulation for interior spaces, moderating heat buildup in warm weather and retaining heat during cooler weather. And unlike conventional roofs, which tend to absorb heat, the park cools the surrounding environment and improves air quality by capturing and filtering exhaust fumes.

One of the biggest challenges in building a park several stories above the ground was how to make it accessible to the public. To address that challenge the designers provided multiple means of access, including an express elevator, escalators, stairs, pedestrian bridges linking to the 61-story Salesforce Tower and an adjacent high-rise, and a diagonal elevator, or funicular, that rises through a copse of redwood trees from the main entry plaza at the corner of Mission and Fremont Streets.

The inspiration for the intricately designed, perforated metal apron that wraps around the building came from Roger Penrose, a renowned British mathematical physicist who has been exploring nonrepeating patterns for decades. Clarke was familiar with Penrose's work because he had been a physics major himself in college before turning to architecture.

"It's a simple idea but very complex," Clarks says of Penrose's design. "You can stare at it forever," because it never repeats itself. "It's like a flower that keeps opening and blossoming. It's the perfect intersection of science, architecture, and art—which is a perfect metaphor for the Bay Area."

The transit center was built on top of a giant underground concrete box designed to be the terminus for CalTrain—via a 1.3-mile-long tunnel from the current CalTrain station at the corner of 4th and King Streets—and the high-speed rail line. But adding those rail components will take many more years and hundreds of millions of dollars—and it's far from clear whether the political will or the financing exist to make it happen. ■

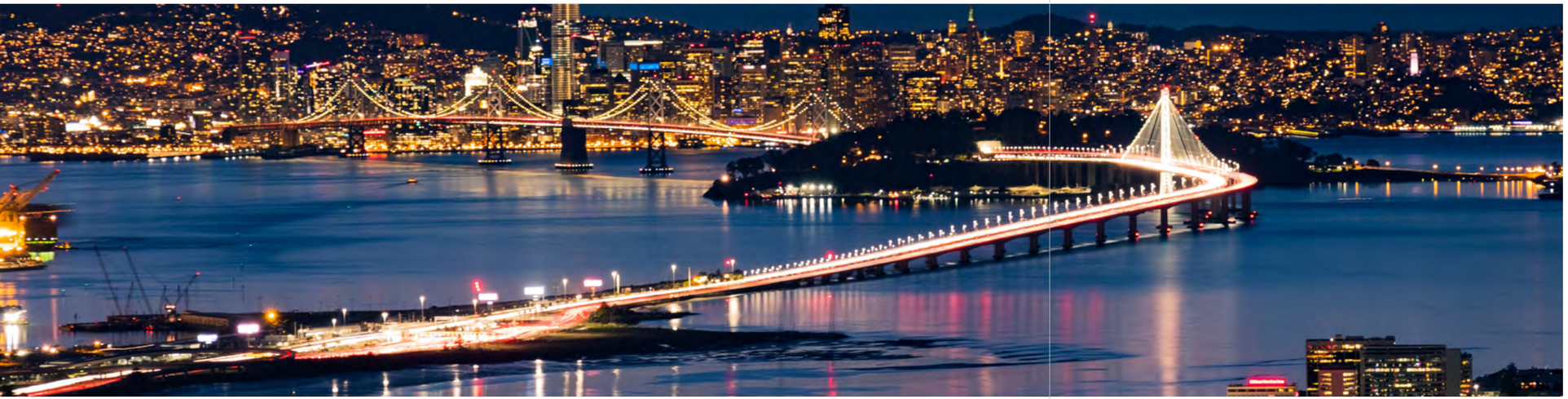
About the Author

Jen Chan, MBA, is the CEO and founder of White Tiger Condo Conversion. Headquartered in San Francisco, White Tiger innovates alternative real estate ownership and wealth strategies by leveraging leading-edge digital technology. Jen's mission is to revolutionize the American Dream through condo conversion—making property ownership and equity available to more people while at the same time building vibrant communities. She has more than 25 years of experience in residential and commercial real estate and related fields. For additional information, visit WhiteTiger.us.

Editors Note
Unfortunately, the Salesforce Transit Center has been temporarily closed since the original writing of this article. A fissure was found in a steel support beam leading the Transbay Joint Powers Authority to authorize a temporary closure of the center while the situation is under investigation.

A Better Transportation Infrastructure Plan for California

Bay Area drivers know all too well how desperately we need to improve our transportation infrastructure. Roads, bridges, and transit systems are jammed and crumbling. Meanwhile, transportation expenses are the second-highest household cost for working families—higher than food and healthcare. Californians are faced with two questions: how should we fund transportation projects, and what are real, meaningful improvements to our mobility in the Bay Area?



Bay Bridge [photo by Daiwei Lu for Unsplash]

Funding Transportation Improvements

Although state spending increased by $9 billion in 2016 and 2015—and $36 billion over the past five years—not one additional dime of that went to transportation improvements. Worse, the legislature raided billions in transportation funds year after year.

One proposal for addressing our transportation needs was to increase gas taxes and car fees. The proposal passed last year as SB 1. This law raised gas taxes by 70% and vehicle registration fees 47% to 330%, depending on the value of the car.

The SB1 tax increase is indexed to inflation, meaning that the taxes and fees will increase automatically in future years without any voter or legislative input, and with no limit on how high the increases can go. These increases come with no reforms for how the California Department of Transportation (CalTrans) should spend your dollars more wisely, and no reforms to or termination of the California high-speed rail project.

SB 1 also continues to allow the legislature to raid existing transportation revenue streams for spending unrelated to transportation. The legislation also prohibits the use of new gas and car taxes to build a single new road or highway to relieve congestion.

For these reasons, I opposed SB 1. My colleagues and I introduced an alternative: the Traffic Relief and Road Improvement Act (AB 496). The bill provided $5.6 billion annually—more than the SB 1 proposal—for transportation and transit improvements, without raising a single tax or fee on Californians. AB 496 dedicated billions of dollars Californians are already paying (such as vehicle sales taxes and truck weight fees) to roads and transit. Our plan also included an aggressive program to relieve congestion, devoting 30% of the funding to expanding road capacity and getting drivers out of traffic.

Our plan also established a transportation inspector general, added accountability measures and reforms to CalTrans spending, and required independent audits for major transportation projects, including high-speed rail. I also authored a complementary measure, AB 1363, to ensure that all transportation revenues go only to transportation projects. Unfortunately, neither AB 1363 nor AB 496 came up for a vote, and SB 1 became law. California voters will have an opportunity to weigh in on SB 1 in November with Proposition 6.

Meaningful Investments in Transportation

Ending BART Strikes

The Bay Area Rapid Transit (BART) system is invaluable to Bay Area commuters. Almost half a million people ride BART each working day. There have been five labor strikes in BART history; they created havoc for riders, jammed Bay Area roads, cost $73 million a day in lost economic activity, and caused environmental damage through greater carbon emissions. The first bill I introduced in the legislature would have prevented future BART strikes in a way that is fair to workers and riders. The legislature recently voted down measures to end the threat of future BART strikes, but I continue to believe stopping strikes would bring much-needed stability to BART.

Connecting Megaregions

The Altamont Pass between the San Joaquin Valley and the Tri-Valley in the East Bay area serves as a critical transportation route for commuters and commercial trucks. Traveling between these two megaregions, however, can take hours due to traffic congestion on Interstate 580, which is expected to increase by up to 60% from 2013 levels by 2040. Without having an alternate means of transportation, drivers will continue to spend even more time sitting in traffic on I-580.

I authored bipartisan legislation, AB 758, to create a rail authority to connect BART and Altamont Corridor Expressway (ACE) commuter trains in the Tri-Valley. This authority will connect the two transit systems to relieve traffic congestion, improve air quality, and lower commute times throughout the Bay Area. In fact, connecting BART and ACE through seamless transfer in the Tri-Valley will take 30,000 cars off I-580 every commute day. This is why a recent report by the Bay Area Council Economic Institute, "Tri-Valley Rising," found that "the single most impactful event for Tri-Valley transportation occurred when Governor Brown signed Assembly Bill 758 into law in October 2017." Full implementation of AB 758 is another example of smarter transportation improvements for the Bay Area.

Autonomous Shuttle Solutions

Another solution to mobility is the deployment of autonomous shuttles to connect neighborhoods, job centers, and transit in a cost-effective and environmentally friendly way. Under two of my bills, AB 1592 and AB 1444, autonomous shuttles are now being tested at the Concord Naval Weapons Station, Bishop Ranch Office Park, and Dublin/Pleasanton BART station. These shuttles ultimately can connect commuters in suburban areas, like Lamorinda and the Tri-Valley, to BART and job centers without relying on limited BART parking and congesting roadways.

Expanding BART Parking

An additional initiative I have undertaken is to build more BART parking. Through collaboration with Alameda County and my office, a new parking structure will break ground this fall at the Dublin/Pleasanton BART station, adding 650-700 additional parking spaces to this major station. The parking lot will be a state-of-the-art convertible structure. If parking is no longer needed in the future as technology advances, the structure can be turned into additional housing or commercial space.

Californians have choices on how to fund transportation, and what types of projects in the Bay Area improve mobility. The key to these choices is bipartisan cooperation that gets the job done and puts party politics aside. That will continue to be my goal. ■

About the Author

Catharine Baker has represented California's 16th Assembly District since 2014. Before joining the Assembly, she worked as an attorney, advising small businesses, individuals, and nonprofits. Catharine earned her bachelor's degree from the University of Chicago and a law degree from UC Berkeley. Catharine is married to her college sweetheart Dan; the two live in Dublin with their two children.

Editors Note
California Proposition 6 failed in the November 2018 election. The narrow margin of 55% of the voters against and 45% in favor reflects the challenges ahead for future legislation.

REEVALUATING PARKING IN REAL ESTATE DEVELOPMENTS

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Once a prominent example of America's expansive frontier spirit, automobiles are slowly losing their position as our preferred mode of transportation. With that comes an increased scrutiny of where all these vehicles are stored.

A 2017 report by the Urban Land Institute and Green Street Advisors[1] predicted that the need for parking spaces—which currently cover up to one-third of the urban land area in the United States—could drop by 50% by the year 2050. Teleworking, urban densification, traffic gridlock, ride-sharing, consumers' preferences for smaller vehicles, declining vehicle ownership among millennials, and technology advances in driverless vehicles are all contributors. These converging trends suggest that parking availability will be far be less important to the commercial success of future real estate developments than it has been for the past century.

So what do we do with all of these surface parking lots and parking garages, these homes for vehicles that aren't being used? Thanks to better technology in high-resolution photography and data analysis, we can quantify that the United States already has far more parking spaces than it needs. According to a recent report from the Mortgage Bankers Association's Research Institute for Housing America (RIHA),[2] parking in the five major US cities studied appears to be "out of balance [in excess of] with the current demand for parking in almost all cases, and even less in tune with what appears to be declining future demand."

This inefficient scenario presents two critical real estate issues that developers and policymakers must address: how to rethink parking (both surface and garage) in mixed-use projects under development, and how to retrofit existing parking garages to be more flexible when there are fewer cars to fill them.

Surface Parking

The future of surface parking is easier to reimagine. For existing lots, surface parking is no longer the highest and best use in many urban areas, given skyrocketing land prices and the scarcity of available parcels. In downtown San Francisco, where I work, my investment sales colleagues estimate that over the past five years, approximately 25 surface parking lots have been sold to developers. Most of these are expected to be converted into residential towers.

Owners of suburban commercial projects are also reevaluating their parking allocations. For many years, regional mall real estate investment trusts (REITs), such as Simon Property Group and General Growth Properties, sold parcels of peripheral parking lot acreage to restaurants, hotels, and other users seeking to develop freestanding buildings with access to major roads. What's changing now is that institutional owners are partnering with multifamily or student housing developers to raise new buildings on their parking fields, recognizing that even during the holidays they are unlikely to need all of their parking spaces.

Garage Parking

Increasing construction costs and changing settlement densities are dictating how much space developers allocate for parking. The 1950s saw a huge increase in parking garage development, close to new commercial projects and convenient for the office worker, hotel guest, diner, or shopper. The economics of parking structures required careful consideration; at the time, satisfying parking needs and integrating multilevel structures into a development could contribute up to one-quarter of a project's total cost.

In most municipal jurisdictions, parking ratios have long been determined by the government and adjusted based on the projected intensity of each residential or commercial use. Although there is still a lag in changes to laws, policymakers are starting to relax their parking minimums for new construction; Buffalo and Hartford are two places that recently eliminated minimum parking requirements (MPRs) for certain types of projects. In some cases, those MPRs are being replaced with parking maximums, or more flexibility in allocation, even as smaller unit sizes in residential projects would normally suggest a corresponding increase in parking allocation.

Building and retrofitting multilevel parking garages is where some exciting solutions are being proposed, with major architectural firms such as Gensler and Perkins + Will among the early adopters. The design of new aboveground parking structures allows for repurposing for other commercial uses and a focus on people rather than cars. Some of these innovative design elements include the following: (1) flat floors/no ramps, to allow floors to demise more easily into office, apartments, or retail; (2) symmetric floor plates with higher ceilings—the average parking floor clear height is 10 to 12 feet, retailers need a minimum of 12 feet, and many of today's designs embrace the aesthetic of soaring ceilings 14 feet or higher; (3) reinforced foundations and walls, not to mention negotiated air rights agreements, in anticipation of the need for additional future load-bearing capacity; (4) expanded utility hookups to accommodate offices or kitchenettes; (5) exterior ventilation screens that can be switched out for windows; and (6) coordinated façade design between the garage and the commercial or residential space above or below it.

Parking garages are also being designed with more thoughtful ground-floor layouts: better directional flow for the loading and unloading of ride-share vehicles, incorporating charging stations for hybrid cars and eventually including storage space for driverless cars.

There are even examples now of projects with parking garages being built with the expectation that they will eventually be repurposed, the ultimate in flexible design and a far cry from the imposing parking structures that defined so many 20th-century developments. Parking garages, while they may not go the way of the dinosaur or dodo so long as Americans love their cars and the open road, will play a very different role in the development, design, and financing of future real estate projects. ■

About the Author

Ann Natunewicz has spent more than 20 years working on behalf of retail landlords and tenants worldwide, advising them on their best real estate options given their strategic objectives. She has established high-level industry credibility and cultivated an extensive global executive network, and is frequently called on to analyze emerging trends in retail. She currently works with Colliers International, is based in its downtown San Francisco office, and is focused on street retail. Among her largest projects is leasing (with two colleagues) the 100,000 square feet of retail in the newly opened Salesforce Transit Center.

[1] *https://www.greenstreetadvisors.com/insights/press-releases/transportation-revolution-is-a-game-changer-for-real-estate-not-currently-priced-in*
[2] *https://www.mba.org/Documents/Research/RIHA/18806_Research_RIHA_Parking_Report.pdf*

Understanding Last-Mile Connection Options Is Key for Brokers in New BART Markets

San José Office of Economic Development,
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In a little over a year, brokers representing some of the South Bay's biggest jobs centers will have a new tool to attract tenants: a high-speed transit line providing frequent connections to the East Bay and San Francisco.

But so far, the future BART stations in Milpitas and San José's Berryessa district haven't created much of a buzz in commercial real estate, despite their proximity to major employment hubs and development sites.

The quiet won't last long, experts say.

"I think it's going to be a big deal," said Nanci Klein, assistant director of economic development for the city of San José. (Full disclosure: the writer of this article is an employee in her office.) "There have been a number of delays, so people will really start to pay attention when it's running."

Currently, the stations are slated to open in late 2019. The new stations—one located next to the Great Mall of Milpitas and the other next to the San José Flea Market—will eventually connect to downtown San José, Diridon Station, and Santa Clara University. That final phase is scheduled to open in 2026.

Even without the final leg, the current phase will unlock plenty of opportunity—especially for property near the Milpitas BART station, such as the Milpitas Boulevard industrial district and North San José. That's thanks to the station's seamless connection to light rail and other transit options. When the station opens, 42 buses and trains will depart every hour to take employees where they need to go.

"The Milpitas station is close to a huge number of jobs," said Jay Tyree, a senior transportation planner for the Valley Transportation Authority, which is building BART in Santa Clara County. "From Milpitas west, through the Golden Triangle and North San José and continuing to Santa Clara and Sunnyvale, there's a ton of jobs there. So we really do expect it to be a great market."

Although it lacks light rail access, the Berryessa BART station is also intriguing, thanks to its adjacency to a massive future development site, the Flea Market, as well as ample industrial and R&D buildings.

For employers, proximity to BART is likely to be a selling point, especially for those with a substantial number of workers who live in the East Bay or San Francisco. The option to zoom down the electric rail system, as opposed to fighting the region's congested freeways, could be a big draw for talent.

Still, Sethena Leiker, a tenant-rep broker with Cushman & Wakefield and a CREW Silicon Valley board member, said that tenants are in an "I'll believe it when I see it" mode. "To date, my clients have been focused on Palo Alto, Mountain View, Sunnyvale, Santa Clara, and San José, [and the] transit focus has been on CalTrain and/or light rail, depending on the requirement."

Sherman Chan, a senior vice president with CBRE, is representing Tasman Technology Park in Milpitas, a short distance from the Milpitas station. His marketing material trumpets its proximity to the station, but he agrees with Leiker that significant excitement about the station is still a ways off. "I think you will see more interest when it opens next year, and of course in a huge way after it connects to Diridon."

The increasing importance of the East Bay talent pool will also drive interest. "The East Bay is important and growing, given its housing affordability, and as more companies are locating along the 880 corridor," he added. "Fremont vacancy is very low, there's the Tesla effect, and companies from [central Silicon Valley] are being displaced and pushed to the east side. Also the resurgence of advanced manufacturing in the Valley, primarily along the 880 corridor, adds to the East Bay demand."

The trick for property owners, investors, and brokers? Understanding how to talk to employers about "last-mile" connections. That's where the Santa Clara Valley Transportation Authority (VTA) plays a big role.

Indeed, the VTA's light rail service already reaches the biggest employment centers in North San José, including along Tasman Drive (home to Cisco Systems) and North First Street. Nearly 100,000 jobs are in North San José, and many of them are walking distance to light rail.

But officials realize that light rail has a reputation for being slow, with overly long "headways" (gaps between arriving trains or buses). To help, the VTA has developed a plan, dubbed the "Next Network," that should enhance the attractiveness of these last-mile options.

The plan—slated to launch with the advent of BART next year—includes a host of improvements to light rail and bus service. It includes a new light rail line (the Orange Line) that will connect the Milpitas BART station to employment and retail areas along Tasman Drive, continuing west all the way into downtown Mountain View.

This new line will offer trains every 15 minutes all day on weekdays. It's in addition to the existing Blue Line, which runs every 15 minutes and heads south at Tasman. Also, a new bus route, the 60, will connect North San José job centers, the airport office submarket, and San José's airport itself, out to West San José and Santana Row.

These plans could change. The transit agency faces major financial difficulties, and the prospect of paring down Next Network has been raised at public meetings.

But everyone realizes that for BART Silicon Valley to be successful, commuters need more options to get from the stations to their destination.

"That's our job as a transit network: to fan out from the transit stations," Tyree said.

Still, not everything is easily walkable to light rail. To patch the gaps, employers and developers could play an active role through the formation of a transportation management authority, or TMA; such entities involve companies coming together to fund bus services that augment existing public transportation.

"If you could get companies to chip in for a first-year pilot, and get a loop going, that would be very promising," Klein said.

Already, some creative solutions are evident. Ford GoBike just launched dockless bike-sharing in North San José. Electric scooters, which have been popular in downtown areas, could come later. And the station itself is built to accommodate the way we commute now. It includes extended curb areas for employee shuttle buses and ride-share pickups, Tyree said. In the future, shared autonomous vehicles could pop up.

The Milpitas station was designed with extended curbs for employee shuttle buses and ride-share vehicles. [photo courtesy of the VTA]

The new Milpitas BART station, in the background, connects to existing light rail service at the Great Mall Transit Center. [photo courtesy of the VTA]

As for light rail's speed? The VTA is studying ways to make the system quicker. One option is to better time traffic signals to offer trains priority, an upgrade that comes with complex coordination with various partners.

Just how far will employees travel after transferring from BART? That's unclear, but Tyree has high hopes.

"There's always a bell curve of folks willing to travel farther," he said. "I don't think it's out of the realm of possibility that Santa Clara and Sunnyvale will benefit from BART."

One thing is for sure, Klein said: BART is coming, and investors, tenants, and brokers should be paying attention. "Getting in now is really good, because the area is less expensive than other BART-served areas. The smart folks will be looking at it sooner rather than later." ■

About the Author

At San José's Office of Economic Development, Nathan Donato-Weinstein engages with companies, developers, and brokers to facilitate opportunities for growth in San José, Northern California's largest city. A former real estate journalist, Nathan collects obsolete computers, including a prized 128K Macintosh, which takes up space in his mom's garage.

SoHAY Hayward's Best-Kept Secret Is Coming Sooner Than You Think

Conceptual design of SoHay's entrance in Hayward [courtesy of William Lyon Homes]

Since redevelopment agencies were abolished in 2011, local governments have struggled to improve blighted areas to spur economic development or create new public benefits. As the state recovered from the Great Recession, units slowly came onto the market and cities began approving more development projects to increase supply.

Many developers, still feeling the sting of the downturn, simplified amenities and created smaller but more dense development footprints to increase the overall number of units. New real estate developments, once a welcomed sight, began to be indiscernible from one another.

For this reason, when presented with the opportunity to take development into its own hands, the City of Hayward knew it could create something special. In recent years, the California Department of Transportation (CalTrans) began disposing of property previously slated for infrastructure projects. Typically, CalTrans auctions the land to the highest bidder. When a collection of parcels headed to auction in 2014, then City Manager Fran David reached out to Dominic Dutra (at DCG Strategies, where he was CEO at the time) to discuss possible options.

Together with senior staff and the City Council, a plan was crafted to purchase the land directly from CalTrans and create a development that would catalyze the South Hayward BART station area and provide a proper entry to Hayward along Mission Boulevard. In analyzing the plan, the City and Dutra realized that this was a project that could extend beyond the CalTrans parcels. The increased area would allow the project to expand to both sides of Mission Boulevard, including a trail connection across Dixon Street and along Industrial Parkway, and frontage along both Industrial and Valle Vista Avenue.

A single negotiation with one public agency turned into multiple negotiations with four agencies: CalTrans, the Hayward Area Parks and Recreation District, the Alameda County Flood Control District, and BART. While Dutra handled the negotiations, the City hired him to also assemble a design team led by architectural firm Dahlin Group to meet with senior city staff to develop the conceptual plan. City Manager David, along with then Assistant City Manager Kelly McAdoo and the heads of Planning, Public Works, Parks, and Economic Development, worked with the design team and market analysts for nine months to reimagine the 21 parcels into a new neighborhood, dubbed "SoHay."

Site plan of the 25-acre SoHay project [courtesy of William Lyon Homes]

The vision for the project was to be more than a transit-oriented residential development. It was to be a destination development: a place to live, shop, and enjoy recreation and entertainment. The concept also included a trail system, improvements along Dixon to the South Hayward BART station, and a public park just over two acres in size.

The City, while satisfied with the plan, knew it needed a competent and trusted partner to bring the project to fruition. In the fall of 2015, Newport Beach–based developer William Lyon Homes (WLH) was ultimately selected to enter into an exclusive-right-to-negotiate agreement to develop the concept, with the ultimate goal of arriving at a more fleshed-out plan and a purchase-and-sale agreement.

The final design, led by new City Manager McAdoo and Scott Roylance from WLH, spans 25 acres, including 20,000 square feet of retail; activates the Alameda County Flood Control District daylit flood channel with a plaza; more than doubles the Hayward Area Recreation and Park District park space; and establishes nearly 500 mixed-income units for sale and for rent. The park will include activities for all ages and will tie in to the existing trail system to the golf course and Garin Regional Park.

The City Council ultimately approved the project in June 2018, and it is slated to break ground later this year. Soon, these vacant parcels will be a distant memory, and the transit-friendly community of SoHay will be here to stay. ■

About the Author

Angelic Williams is a San Francisco native with degrees in architecture and real estate development. She is currently self-employed and specializes in entitlement, permitting, and tenant improvements for residential and commercial projects. In addition to real estate development, she is the founder and CEO of MyUmbrella, a social networking enterprise.

A New Front Door for San Francisco:

How Trends in Interior Design Are Shaping SFO's New World-Class Terminal

Opposite: Pier Arrival; above: Pier End; below: Elbow [renderings courtesy of SFO BAB]

Competition between airports is aggressive, and standards can be high, as anyone who's ever passed through the airports in Madrid, Dubai, or Amsterdam knows. But San Francisco International Airport aspires to be the best airport in the world, and the 2020 opening of SFO's Terminal One, Boarding Area B—aka Harvey Milk Terminal—will go a long way to elevating the Bay Area passenger experience.

Developed in the early 1960s, Terminal One is now elderly. Over the decades, it has become less efficient at managing the millions of passengers who visit each year. The new 1,100,000-square-foot upgrade will remedy that, offering 24 gates with guest lounges, ticketing, security, back-of-house and support spaces, and a new state-of-the-art baggage handling system. Passenger amenities will be vastly enhanced and cater to a wide variety of profiles, including locally owned concessions and dining.

Early visioning sessions with the design team and SFO set a goal of creating an exceptional and unparalleled guest experience. We at Woods Bagot drew upon our expertise in hospitality, residential, and transportation sectors to make the terminal feel like home, or a good hotel.

The Design Process

On such a large and complex project, the design and construction team includes dozens of disciplines. The Woods Bagot/HKS Architects joint venture collaborated with a team of architects and consultants, including ED2 International, Kendall Young Associates, and Tsao Design Group, to design the concourse, along with Austin Webcor design-build contractors. Gensler is leading the landside (departures and arrivals) design with Kuth Ranieri Architects, in partnership with Hensel Phelps design-build contractors. To facilitate the collaboration, the entire design team took over an airline hangar nicknamed "The Big Room,"[1] while the SFO team occupied their existing building adjacent to the hangar.

Early in the process, the design team held a "barn raising." All the stakeholders—the client and the builders, the architects and the project managers, the maintenance team and the guys who run the tarmac, the wayfinding team, the baggage team, and the executives—came together for a vision session, where we broke into discussion groups based on topics, such as recompose areas, gate lounges, concessions, departures, arrivals, and security. Together, we pulled inspiration imagery, created taglines, and established design principles. This collection of content became the vision road map from which the entire terminal design was derived.

[1] Metropolis *told the story at https://www.metropolismag.com/interiors/workplace-interiors/big-room-sfo/.*

Food court [rendering courtesy of SFO BAB]

We also deployed technology. Woods Bagot's data analysis arm, SuperSpace, analyzed exhaustive data sets, such as passenger profiles, aircraft movements, and concession typologies, to predict and optimize the design, commercial potential, and user experience in Boarding Area B. These data sets produced algorithms for the fastest, safest, least stressful, and most profitable route from car seat to plane seat.

An Elevated and Curated Guest Experience

It's no secret: air travel can be an ordeal. You sit in traffic, heart pounding. You rush—then you wait. And wait.

Good design can reduce the stress. A global trend in transportation is the incorporation of elements of the hospitality and residential worlds in order to create a soothing environment reminiscent of home or a good hotel. The focus is shifting from "the passenger experience" to "the guest experience."

At SFO, we are working to deliver a beautiful, thoughtfully rendered space with passenger delight in mind—to give the passenger what she needs, even if she didn't know she needed it.

In the main airside concourse areas, where people spend the most time, Woods Bagot is adding hotel- and spa-like amenities and design touches. The gate lounges (hold rooms, in the lingo) will mimic executive airline lounges, with powered community library tables, quiet booth zones, upgraded gender-neutral restrooms, and high-end furniture. Seating typologies have been crafted to suit all passenger types, whether it be a business traveler needing a secluded booth for a conference call or a chaise longue to power-nap. A leisure traveler can enjoy the view of the airfield in a high-back reclining lounge chair or have a bite to eat with friends on a cushioned banquette. Kids will enjoy an oversized chair in the shape of a Dalmatian, and the entire family can plop down and spread out on an oversized modular bench. The diversity of offerings will enhance the overall guest experience.

Power will be available at 80% of seats, with integrated table lamps that adjust the lighting levels to the time of day, creating a warmth and softness reminiscent of a hotel lobby. Kids will be able to run off their energy in a play area of redwood climbing structures, while learning about the history and ecology of Muir Woods. Animal relief rooms will surprise and delight pet lovers as they are immersed in a floor-to-ceiling outdoor experience. Parents won't want to leave the nurseries—private, calm sanctuaries equipped with changing tables, sinks, an adjustable nursing chair, low light levels, and soft music.

There will be greenery throughout the terminal, integrated into the casework. Cascading plants and mature trees will anchor the voluminous space at the end of the pier, taking advantage of the natural light brought in by clerestory windows. There will even be

Food court [rendering courtesy of SFO BAB]

Woods Bagot designed the passenger flow through the concourse based on SuperSpace's analysis. The simulation modeling told us how to calibrate the planning relationships, sight lines, and passenger movement between retail and food and beverage outlets, restrooms, and gates. Approximately 40% of T1's revenue is generated by retail, food, and beverage stores, so the design ensures that a majority of the passengers will pass by nearly all of the concessions.

The journey to the gate will be broken up into vignettes indicated by subtle visual guides: changes in lighting, bends in the road, ceiling carves, volume. The ceiling, lighting, and flooring profiles are designed to keep people moving through the space, even on a subconscious level. Flight information dashboards will always be in sight as you move through the terminal, guiding you to the right location or amenity.

At the middle gates, the ceilings will be lower and the column grid wider for better views of the airfield; the end of the concourse will have the feel of a neighborhood block party centered around a tree-lined play area and outdoor-like concessions.

Sense of Place

A final trend that we're working into the terminal is the genius loci—a sense of place. As soon as you step off the plane, there will be no mistaking where you are. To quote James Berry, our aviation director, "The most popular destinations across the world are those that offer an authentic experience, starting with the gateway itself. Airports and train stations are morphing from bland processing centers with little concern for user experience to distinctive environments that use form, light, material, product design, retail presence, and customer experience to evoke a sense of place." From its name—the Harvey Milk Terminal—to its redwood structures to its sourdough sandwiches, T1 will be a front door reflecting the distinct, beloved identity of the city people leave their hearts in. ■

pigs. The Wag Brigade is an organization of trained dog (and pig) volunteers who will be invited to stroll around the terminal with a vest that says "Pet Me." Study after study has shown that the presence of (gentle) animals and nature calms anxiety and makes the passenger journey more enjoyable.

True hospitality, however, is invisible. How easy is it to check your bag? Can you do it in the parking lot? Too much trouble? Ask the airline to pick it up from your hotel. What if your bag is waiting for you at baggage claim? That way you could request that Uber even before deplaning. Do you ever see trash? Does the restroom smell good and feel clean? (At SFO, there will be integrated "chases," hidden passages behind the stalls and sinks so toilets can be fixed and soap refilled invisibly.) All these unglamorous operational features are 100% integral to the elevated experience, and all in our day's work as architects.

Mapping the Journey

Before you can have your relaxing experience in the guest lounge, though, you have to find it. As SFO explains, "Wayfinding is the most crucial aspect for the success of the journey. It can be articulated with architectural and design cues, landmarks, and signage, and using both traditional variety new dynamic signage technologies."[2]

[2] *The Principles of R.E.A.C.H. (Revenue Enhancement and Customer Hospitality)*

About the Author

Katy Mercer has been practicing architecture and interior design, locally and internationally, for fifteen years. A versatile and creative designer, Katy has worked on a variety of project types, including transportation, workplace interiors, hospitality, high-end residential, and higher education, for clients ranging from Google to UCSF. As a principal and design leader at Woods Bagot, she excels in creating meaningful experiences for the user while blending hospitality, residential, and workplace influences. A native Californian, Katy has a bachelor's degree in architecture from California Polytechnic State University with international experience in Europe and Australia. She is deeply committed to the practice of architecture and passionate about promoting design excellence through narratives that invest in a human-centered experience and tell a unique story.

PUBLIC TRANSPORTATION LOOKS TO MEET THE NEEDS OF **A GROWING COMMUNITY**

Tech giants like Facebook, Amazon, Google, and Square, Inc. recently signed some of San Francisco's largest leases on the market. Following these and the signing of other major commercial leases over just the past two years, the Bay Area is set to receive a major increase in population, according to the *San Francisco Business Times*.

While local cities try to keep up with the rapid influx of people, some tech enterprises are developing new ways of getting around the congestion with innovative ride-share ideas. Companies such as LimeBike, Ford GoBike, and Boosted (maker of all-electric longboards) are flooding the streets with their products.

While these new ventures in transportation have attracted some consumers, they have not completely filled the gaps in our dated public transit systems. So, city officials are working hard to create plans for the future of public transportation.

Tam Tran, transportation planner for the City and County of San Francisco, says, "San Francisco, including SFMTA, is pursuing multiple efforts—both immediate and long-term—to maintain and improve public transportation for residents, workers, and visitors. There is…a multi-agency program, ConnectSF, to look at what types of long-range transportation investments will be made… This program incorporates land use considerations, including where growth is projected to occur and the travel flows that may emerge from that."

Although public transit plans can help alleviate daily commutes, Tran suggests we "step back for a minute," as a "more holistic look at accommodating growth would mean encouraging people to use all types of transportation." She added, "As part of the citywide Climate Action Strategy, we are looking to shift 80% of trips to sustainable trips by 2030—with 'sustainable' meaning trips made by transit, carpooling, biking, or walking. Thus, the City is continually looking at ways to increase the use of sustainable modes. Public transit is one part of the answer."

The biggest step forward in this direction—and hopefully with the greatest impact on commuters—will come from the Salesforce Transit Center, dubbed the "Grand Central Station of the West." According to the Transit Bay Joint Powers Authority (created by the City and County of San Francisco, the Alameda-Contra Costa Transit District, the Peninsula Corridor Joint Powers Board, and CalTrans), "It is time for public infrastructure to meet the needs of the 21st century…the new Transit Center will centralize a fractured regional transportation network…allowing people to travel and commute without the need for a car, decreasing congestion and pollution."

As transit companies look to keep up with demand, San Francisco's commercial real estate market seems to be reaching its limit. According to Robert Sammons, senior director of Northern California Research at Cushman & Wakefield, San Francisco has limited commercial real estate, making it likely that "nothing will be coming online until about 2022," in turn opening up opportunities for Oakland, which is "now coming into the picture, with space coming online in the next couple of years."

Meanwhile, BART has been working on a new plan to rebuild and improve the commuter rail system. BART has received $3.5 billion in bond funding to make various much-needed repairs to the rail system. Among those necessary changes is alleviating crowding on platforms and trains for its 430,000 daily passengers. If all goes well, the bond will provide funding for projects planned for completion at the end of the 2019 fiscal year.

As public transit systems are on a fast-track schedule to keep up with the growing population, the market is "finally catching up to housing [needs]…and [is] beginning to add more units at a pace that it should be," says Sammons.

Transit-oriented developments, a growing trend, are appearing at a fast rate, with projects like the MacArthur Station Parcel B, a 24-story, mixed-use development adjacent to the MacArthur BART station. These developments provide the new generation of workers a trendy place to live combined with the convenience of easily accessible transportation.

As leases multiply and job growth continues to rise, efforts are being made, according to Tran, to make sure that "transportation connections…will be conducive to facilitating the small and large needs of San Francisco and Bay Area residents and workers… whether it be social, economic, educational, etc." ■

About the Author

Vanessa Serpas is a marketing manager at Build Group, a general contractor with over 550 employees and offices in San Francisco, Silicon Valley, and Southern California. Founded in 2007, Build Group constructs residential and mixed-use communities, commercial development projects, and high-end interiors. With over 10 years of experience, Vanessa is responsible for all proposal and content management at Build Group, in addition to leading all community outreach and social responsibility programs for the company. In her free time, she enjoys writing, photography, and hiking.

Cable car on California Street [photo by Amogh Manjunath on Unsplash]

Engineering the Future of South Bay Transit:

Kimley-Horn's Leyla Hedayat Oversees the Huge BART Engineering Effort

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Sixty years ago, voters on the Peninsula opted to keep out speedy electric train service that tightly knit San Francisco to the East Bay, by turning down Bay Area Rapid Transit (BART).

We know where that led: a car-first transportation network for Silicon Valley, and the gridlock that came after explosive corporate tech growth.

It's been Leyla Hedayat's job to help figure out how to unravel this mess. For the last 11 years, the Kimley-Horn executive has been intimately involved in the 16-mile Silicon Valley extension of BART from Fremont to downtown San José and Santa Clara University. It's the culmination of decades of planning as well as several voter-approved tax measures.

That effort will bear fruit next year with the opening of the first two BART stations in Santa Clara County, in Milpitas (across from the Great Mall) and San José (near the San José Flea Market). The second phase, completing the line, is slated to open in 2026.

Hedayat's role: managing development of the BART extension for the Valley Transportation Authority, which is undertaking the project for BART. That effort includes developing the phased construction strategy, leading the environmental process, overseeing the conceptual engineering, helping secure federal funding, and coordinating with local cities. She recently enlarged her role at the engineering firm and now oversees 450 people. She spoke recently with *the VIEW* to discuss the future of the project, why she got into transit, and how the industry is evolving.

What's something that makes the engineering for BART Silicon Valley unique compared to other rail projects?
LH: It's a heavy rail system, and we're in very challenging soil conditions. If you go 10 feet below the street level, you hit the water table, so you're building a tunnel in a lake. We also have major faults, being in the Bay Area. We have everything you could think of an engineer would be salivating over.

The big news this summer was that BART signed off on building a "single-bore" tunnel through downtown San José, instead of a more common twin-tunnel design.
LH: It's actually the first time in the US there's a transit project doing this. We'll be advancing engineering over the next 18 months to two years in terms of the technical issues, like what the tunnel diameter will be, the station platforms, the vertical circulation elements… We're not going into the ground tomorrow; we have a bunch of work to do before we can get a contractor on board.

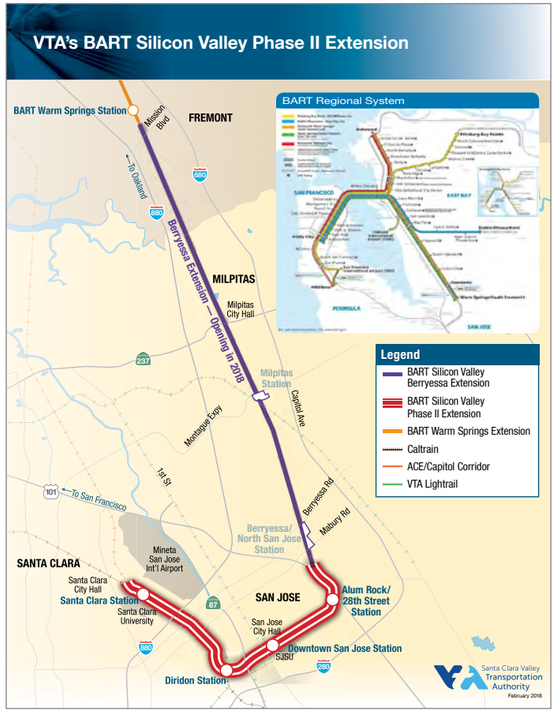
Does the uniqueness of it give you pause?
LH: It's exciting. It's not insurmountable. Everything is feasible. It's just being creative and figuring out how to do it. For instance, one reason single-bore was so interesting is that whenever you're trying to put walls in to prevent water intrusion, it's nice to have a single cohesive tunnel.

All of this lends itself to bringing the best of the best to come in and be part of this project. The best engineers and contractors—actually, the best in the world right now—are interested in doing the project.

What's the biggest change in your industry since you started?
LH: The most dramatic change is the number of women entering the business. When I went to graduate school for civil engineering, I was one of two. Now 50% of recruits coming out of college are women. I think it's a business case. Talent is changing; those of us who grew up a long time ago, our mentors were men. Now there are more women to look up to.

Why engineering?
LH: I got into engineering because I knew I'd always have a job. I was interested in construction, but I made more of a practical decision. I think the industry is evolving and changing, particularly the rail industry. On the public side, a significant portion of our clients are women and are taking significant leadership roles.

When open in 2019, riders will be able to zoom from San José's new Berryessa BART station to San Francisco via the East Bay in about an hour. [courtesy of VTA]



tion. *[Note: The program aims to recruit, develop, and retain women by providing career-development opportunities and training on gender communication differences, adding support for mothers and fathers, and allowing for flexible schedules.]* We have no choice but to. Not that we didn't want to—it's the right thing to do, and it's actually where the trend of the market is. Our clients are women; 50% of recruits are women. The most important thing is not to separate ourselves out but to integrate ourselves in.

How does Kimley-Horn support women in the industry?
LH: We developed the Lasting Impact for Tomorrow (LIFT) program for women at Kimley-Horn, and it was a business situa-

Why do you love the transit sector so much?
LH: For me, transit brings together every type of discipline that you can think of and integrates them. A development project is cool, but you can have that anywhere. Transit brings in every single engineering discipline. It brings in the community. It touches people in a way that makes you feel like you're doing something important for communities and growth.

OK, as a transit engineer, what do you think of Elon Musk's Boring Company and the Hyperloop?
LH: It's pretty incredible and cool. We need to keep things innovative…[the] private side energizes the public side to do great things. The proof is in the pudding, and if someone is going to do something that innovative, it's going to come from the private side. ■

About the Author

At San José's Office of Economic Development, Nathan Donato-Weinstein engages with companies, developers, and brokers to facilitate opportunities for growth in San José, Northern California's largest city. A former real estate journalist, Nathan collects obsolete computers, including a prized 128K Macintosh, which takes up space in his mom's garage.

SOARING TO SUSTAINABILITY:

SAN FRANCISCO INTERNATIONAL AIRPORT AIMS TO ACHIEVE ZERO NET ENERGY, CARBON, AND WASTE BY 2021

San Francisco International Airport (SFO) is one year into its five-year strategic plan to achieve zero net energy, carbon neutrality, and zero waste-to-landfill by 2021, thus becoming the first "triple-zero" airport campus in the world.

It doesn't stop there, though! The airport also has plans to cut potable water use with a future on-site water treatment plant and to provide healthy, inspiring environments for travelers and employees alike. Doing so requires critically reviewing past paradigms for how airport infrastructure is designed, constructed, and operated, and setting strict requirements for building energy use intensity (EUI) and product procurement in all of its new contracts.

As Erin Cooke, SFO's sustainability director, explained to a crowd of green building enthusiasts at this year's GreenerBuilder Conference in San Francisco, the airport aims to invest in "measures that matter," like improving air quality and lowering carbon emissions through strategic facility investments, while amplifying "the glamour of travel and creating a thrilling passenger experience" with such "surprise and delight" features as "recompose areas" after the security checkpoint and artwork to engage occupants throughout the campus.

This template of work seeks to expand the airport's mission "to provide an exceptional airport in service to our communities," as laid out in SFO's "Five-Year Strategic Plan, 2017–2021," which provides high-level goals in seven key areas (Figure 1). These goals and objectives were designed in collaboration with SFO's in-house management team through its "Reaching for Number One" (R4N1) committees, launched in 2011, and are supported by 32 key objectives and 160 initiatives created in collaboration with all airport divisions. The R4N1 committees comprise several hundred airport employees, who annually provide recommendations and suggestions and develop pilot programs to achieve the airport's goals in the areas of universal access, sustainability, water conservation, safety and security best practices, wellness, and performance management.

Stakeholder Engagement and Feedback Loops

To ensure that SFO's triple-zero R4N1 energy goals are met, the airport created a Zero Energy and Resilient Outcomes (ZERO) Committee that tracks and requires all project teams to report proposed conservation measures and renewable energy targets at each project delivery phase. The ZERO Committee monitors project phase progress and advises the airport's Project Management Office on allocation of its Zero Net Energy Capital Fund for achieving these goals, while providing guidance across teams on cost-effective, high-impact investments made to date.

As Anthony Bernheim, SFO's Healthy and Resilient Buildings Program Manager, says, "SFO is attempting to significantly reduce its energy use and carbon emissions, while at the same time providing healthy, comfortable, and safe environments for the traveling public and airport employees. Achieving this goal requires the active participation by all airport personnel, airlines, concessions, and even the traveling public."

GOALS AND OBJECTIVES

GOAL #1: REVOLUTIONIZE THE PASSENGER EXPERIENCE	GOAL #2: ACHIEVE ZERO BY 2021	GOAL #3: BE THE INDUSTRY LEADER IN SAFETY AND SECURITY	GOAL #4: NURTURE A HIGHLY COMPETITIVE AND ROBUST AIR SERVICE MARKET	GOAL #5: BE A WORLD CLASS DREAM TEAM	GOAL #6: DELIVER EXCEPTIONAL BUSINESS PERFORMANCE	GOAL #7: CARE FOR AND PROTECT OUR AIRPORT AND COMMUNITIES
1. Ensure Terminal 1 is rated as the best terminal in the world by Skytrax and Airport Service Quality (ASQ) Surveys **2.** Create seamless door-to-door airport experience for passengers who want leisurely dwell time and passengers who want a speedy and efficient process and achieve overall airport score of 4.4 on ASQ survey **3.** Bring the innovative flair of San Francisco and Silicon Valley with revolutionary technology solutions	**1.** Achieve Net Zero Energy at SFO **2.** Achieve Zero Waste **3.** Achieve carbon neutrality and reduce greenhouse gas emission by 50% (From 1990 Baseline) **4.** Implement a Healthy Buildings strategy for new and existing infrastructure **5.** Maximize water conservation to achieve 15% reduction per passenger per year[1]	**1.** Achieve an exceptional safety culture and superior regulatory inspections through a robust Safety Management System (SMS) **2.** By 2020, be the safest and most secure Airport in the U.S. with the lowest number of breaches and incursions **3.** Implement international standards for cyber-security **4.** Be excellent in the operation and maintenance of our airfield **5.** Enhance partnerships with local/federal regulators and law enforcement agencies (FAA, TSA, CBP, etc.)	**1.** Goal of maintaining and controlling CPE through 2021[2] **2.** Increase international carrier service by 25% and ensure maintenance of 24% low-cost carriers (LCC) **3.** Ensure a competitive environment by providing sufficient operational capacity for new and current airlines **4.** Educate stakeholders on value of SFO airline services **5.** Create the most welcoming and efficient Federal Inspection Services (FIS) area by ASQ survey **6.** Provide for an innovative and friendly environment for airlines	**1.** Be the Employer of Choice and achieve 85% overall employee satisfaction in bi-annual Work Climate survey **2.** Ensure diversity of people, ideas, socio-economic and cultural backgrounds across entire Airport community **3.** Engage Airport community to embrace SFO's standard of excellence **4.** Provide a work climate that supports wellness, health and work/life balance	**1.** Have the highest per passenger spend rate for combined food & beverage, retail and duty free in the U.S. **2.** Achieve an airport wide goal of 40% small business participation **3.** Introduce new technology to improve and streamline business performance **4.** Own and maintain superior technological infrastructure to support airport stakeholder business needs **5.** Maximize non-airline revenues	**1.** Maintain Airport's infrastructure to the highest standard of excellence to ensure no interruption in operations **2.** Ensure that on site airport employers meet the safety, security, and employee benefit standards of SFO **3.** Promote safe & healthy working conditions for Airport-based employees **4.** Support and promote giving back to the communities we serve
R4N1 Committees: · Disrupters · Universal Access	**R4N1 Committees:** · Sustainability · Water Conservation	**R4N1 Committees:** · Safety & Security Best Practices	**R4N1 Committees:** · CBP Processing	**R4N1 Committees:** · Great Place to Work · Team SFO · Wellness	**R4N1 Committees:** · Performance Management	**R4N1 Committees:** · MVP · Airport Business Continuity

Figure 1: Seven high-level goals of SFO's "Five-Year Strategic Plan, 2017–2021"

[1] Baseline year: 2013
[2] Final amount TBD upon approval of Capital Improvement Plan

Energizing While Decarbonizing

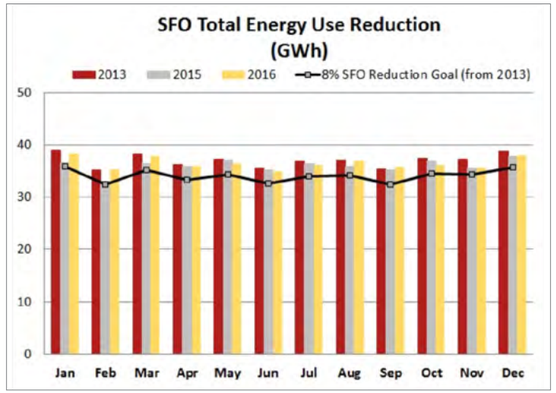
SFO currently consumes 440 GWh of energy annually and is one of the Bay Area's largest energy consumers. The airport's energy comes from a combination of 330 GWh of already emissions-free electricity supplied from the San Francisco Public Utilities Commission's Hetch Hetchy hydroelectric system (supplemented with renewable solar power) and 110 GWh of natural gas used at its central plant .

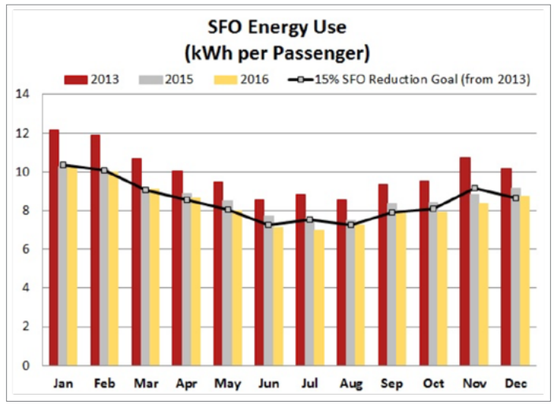
Progress toward high-performance and zero-net-energy facilities is already underway: the airport decreased its campuswide total energy use in 2017 by 4.2%, or 13.7 GWh, from a 2013 baseline, continuing past trends, despite expanding infrastructure and increasing passenger traffic. It has also activated a new R4N1 committee to "make ready" SFO's central plant transition to electric power and heat recovery, further cutting carbon, costs and new energy loads. This surpasses past trends (Figures 2 and 3), producing a total energy use reduction of 8% from 2013 to 2017, and a 15% reduction in energy use per passenger over the same timeframe.

The airport is also on track to meet aggressive EUI reduction targets through innovative design and advanced technologies, including the following ten energy-efficiency measures (EEMs):

1. Dynamic glazing
2. Floor/ceiling radiant heating and cooling
3. Efficient building enclosures
4. Wireless lighting, temperature, and occupancy sensors
5. Heat recovery from process loads
6. High-efficiency baggage handling systems
7. LED lighting
8. Regenerative elevators and escalators
9. Displacement ventilation
10. A renewable-energy generator

Applying EEMs judiciously on applicable projects, the design team for SFO's new Terminal 1 project, for example, expects to reduce its operational load by about 70%, down from the current average EUI of about 170-180 kBtu/sq. ft./year to approximately 60-70 (based on current energy models).





Figures 2 and 3: SFO total energy use reduction and SFO energy use per passenger, 2013-2016.

Additionally, a plan is underway to implement a fully integrated, airportwide energy management control system (EMCS), which will provide the airport with real-time energy use data, equipment malfunction information, and ongoing monitoring-based commissioning information, which will allow for more efficient and robust management of airport facilities.

Prioritizing Carbon-Free Facilities

Transitioning its central plant from gas to hydro-powered electricity will certainly help the airport reduce its carbon emissions, but new projects need to address carbon intensity in the procurement of materials and construction as well.

Urban Fabrick, a San Francisco–based sustainability consultancy, conducted life cycle assessment (LCA) models at the end of the concept, schematic design, design development, and construction documents phases of SFO's Terminal 1 Center project, using Tally LCA software to determine the most environmentally effective design features and thus cut construction carbon intensity. This exercise concluded that the environmental impact of the concrete-and-steel superstructure on the project accounted for 81% of overall construction material greenhouse gas (GHG) emissions.

The results of this assessment led to the selection of NuCor, a domestic steel manufacturer in Washington State powered by renewable hydroelectric power and 85% recycled water. The Gensler/Hensel Phelps design-build team then selected wide flange beams designed per NuCor's product suite to ensure provision of a more sustainable steel superstructure.

Urban Fabrick's LCA also cut down on the submittal and shop-drawing review process, as the beams were designed with NuCor's input in the design process, thus exemplifying design-build as an effective integrated design process and project delivery method for reducing embodied energy in building products and materials.

Based on Urban Fabrick's LCA, the design team also specified a concrete cement mix with 25% less cement and coordinated with the design-builder to allow for a 6% longer cure time without affecting the schedule, further reducing airport construction greenhouse gas emissions.

To provide some perspective on the magnitude of campuswide footprint, the total airport scope 1 and 2 emissions are currently estimated at about 22,000 metric tons (MTs). This, however, does not include the carbon intensity of building materials, because the airport uses the Airport Carbon Accreditation sector-based approach (not source methodology). GHG savings from material investments and procurement methods will continue to be tracked over time.

Terminal 1 Superstructure [rendering courtesy of Gensler]

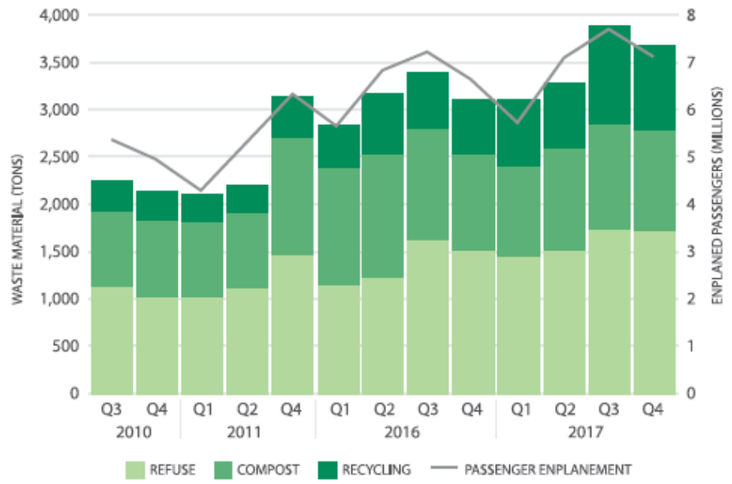


Figure 4: SFO's historical passenger enplanement and waste material generation rates

No Place for Waste in the Airport Space

The Zero Waste Alliance defines zero waste as diversion of at least 90% of domestic on-site waste from landfills and incinerators to recycling and composting streams. A recent SFO study confirmed that more than 95% of its waste is compostable or recyclable, which means a zero-waste goal is achievable.

In fiscal year 2015–16, the airport generated 12,200 tons, or 24,400,000 pounds, of solid waste (from domestic sources), representing both an inefficiency and an opportunity to reduce, reuse, or reclaim waste as an asset for the airport campus. Reducing waste through recycling and composting will further reduce GHG emissions associated with the extraction, manufacture, and transportation of new, nonrecycled products. Hence, not using them in the first place is a great offset! Construction and demolition debris diversion from landfall is also in the mid-90% range across all the airport's construction projects.

Earlier this year, the airport published its "Zero Waste Plan," outlining a number of measures to achieve zero waste by 2021 by working toward a closed-loop circular campus, which will control all material inputs and maximize recycling and recovery, while minimizing material waste. This major pivot from a landfill-centric system requires airport materials managers to test new technologies, track new metrics, team up with new stakeholders, and implement behavior-focused campaigns.

In fiscal year 2015–16, the airport's South San Francisco Scavenger Company (SSFSC) hauled 12,200 tons of solid waste, consisting of compostables, recyclables, and nonrenewable refuse material from its on-campus operations (not including construction and demolition waste or deplaned waste from international flights). Of this, approximately 57% (6,960 tons) was able to be source-separated on-site at SFO; of the source-separated materials, over 70% (4,917 tons) was reported as compostable.

Improved procurement plans and recapture processes will keep waste out of the landfill and create valuable new product streams, such as composting soil or recycled materials. Flipping the paradigm on its head, the airport is now able to grow its valuable waste streams proportionally to passenger growth (Figure 4), rather than create greater problems at the landfill. While landfill-destined waste will be significantly reduced, compost and recycling will grow proportionally with occupant growth, making new and "valuable" material waste streams available for reuse.

These careful analyses and action plans form a continuous improvement process, with many lessons learned along the way. We commend the airport for its transparency and fact-based work to improve this international transit hub and its effect on local and global communities alike. ■

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About the Author

Piper Kujac brings a deep passion for sustainability and a commitment to impactful projects in her work as Director of Project Management at Urban Fabrick, a consulting firm known for advancing green building policy, practice, and design. An architectural designer, consultant, and instructor, Piper holds an MBA in sustainability management. She is a former Climate Corps fellow who now mentors current fellows through the Environmental Defense Fund. She has also served as the owner's rep for the Commonwealth Club of California. Piper also serves on the board of directors of the Net Zero Energy Coalition, whose goal is to lower carbon emissions from buildings at scale.

Shuttling to the Future:
Going Autonomous at Bishop Ranch

Shuttles with passengers but no driver may soon become a typical sight at Bishop Ranch Business Park, home to such corporations as Chevron and General Electric.

Almost 30,000 employees go to work at the 585-acre business park in San Ramon each day, but now some will arrive on California's first street-legal driverless bus. After years of research and testing, in early 2018 the Easy Mile EZ10 autonomous shuttles became the first to be approved by the California Department of Motor Vehicles for testing on public streets.

Real-world trials started in March under the management of the Contra Costa Transportation Authority and Sunset Development Company (which operates Bishop Ranch). The $250,000 bright red shuttles each have seating for six passengers and standing room for the same number, in addition to a flat floor and ramp for a wheelchair. Once the trial phase of shuttles concludes, the autonomous vehicles will operate on specific routes in Bishop Ranch's giant parking lots.

Bishop Ranch has proved to be a unique opportunity to test the future of transportation and provide a new option for commuters in Contra Costa County. In fact, this may make it the leader in incorporating new technology into traffic mitigation plans for commercial centers across the Bay Area.

"This is one of the great transformations in public transportation, and we're excited to be a part of it," said Alex Mehran Sr., chairman and chief executive officer of Sunset Development Company. "Autonomous shuttles have the ability to improve safety, benefit the environment, reduce congestion, and make existing roads more efficient."

The next step—more widespread, regular use on public streets, such as to BART stations—would require additional government transportation authorities' approval, but Contra Costa County has a goal of almost 100 autonomous buses on the road by 2020.

As any local commuter knows, transportation is a major concern for residents, public officials, and businesses. Autonomous shuttles have the potential to remove numerous cars from the road, thereby reducing traffic (a great boon to the entire commercial real estate industry) and greenhouse gas emissions. Cleaner, faster, and easier commutes across the Bay Area might start for some in the not-too-distant future with a seat on a self-driving bus. ■

About the Author

Leah Denman is an assistant project manager at Lennar Corporation, where she focuses on residential development in the Bay Area. She previously worked in California education-related real estate and Stanford University's Office of Government and Community Relations, and managed a United Nations project while at the Brookings Institution in Washington, DC. She holds an MBA from the George Washington University and plays in an Irish sports league in San Francisco.

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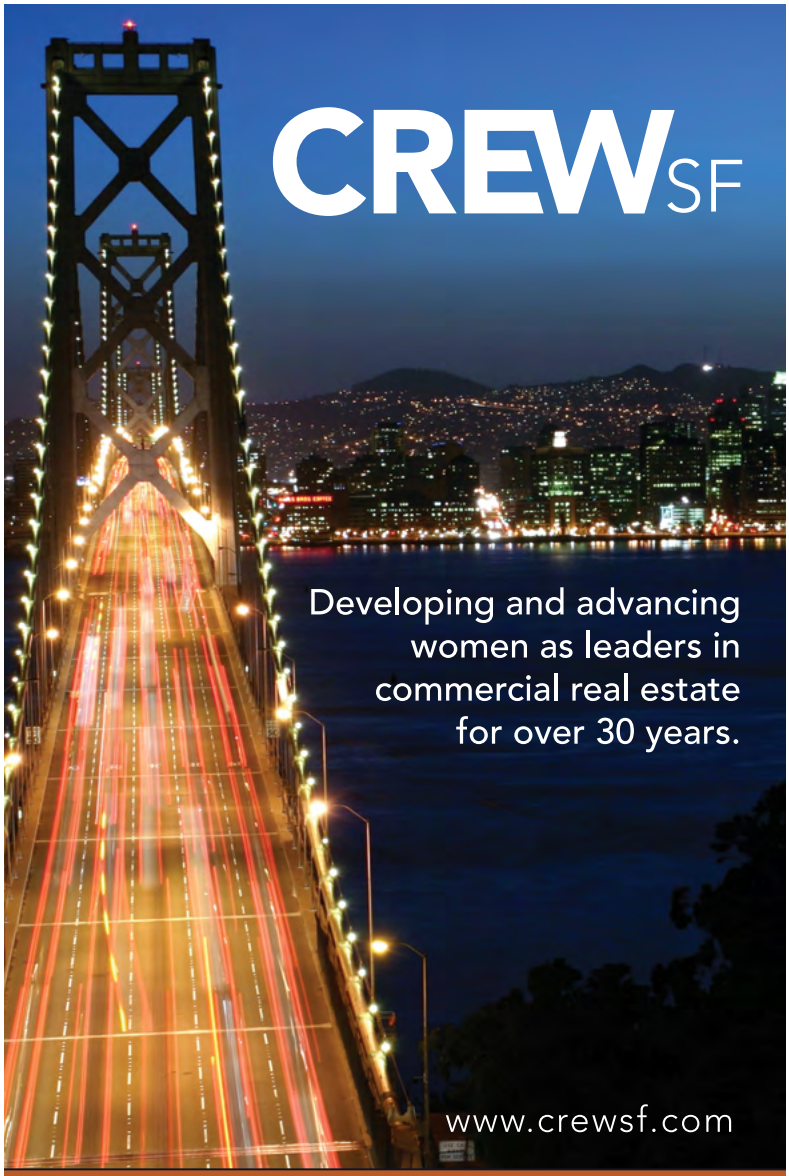

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