



About PAE

pae-engineers.com



About PAE

We're all about people and nature. Engineers have a reputation for complicating things. But at PAE, we like to keep it simple: People and nature are our driving forces. Internally, we look out for each other and the spaces we occupy—inside and out. And the same applies to our work. We design high-performing buildings that keep people comfortable, healthy, and productive inside, while restoring the natural world outside.

PAE's projects range from entirely new buildings to tenant improvements and historic building renovations. Essentially, we work with any type of building at any point in its lifespan, even when it's still just an idea. We do all this while balancing the project's first cost/pro forma and long-term operational cost requirements along with comfort, water conservation and energy efficiency goals.

PAE at Work

Founded in 1967, PAE is a firm of more than 350 employees providing an array of services in mechanical and electrical engineering, building analysis, and technology system design. With offices in Los Angeles, San Francisco, Portland, Eugene, Seattle, and Spokane, PAE serves public and private sector clients throughout the western United States and beyond.

Leaders in Sustainable Design

Sustainable design is a long-standing PAE focus. We have provided design and commissioning expertise for over 500 LEED rated, registered, and pursuing projects. Our over 100 LEED Platinum projects, range from university and corporate buildings to zoo habitats and laboratories, to affordable housing projects. They are about more than a certification – PAE's sustainable projects bring lower operation costs to owners and tenants, and use fewer natural resources.

17

LIVING
BUILDINGS

5 ACHIEVED, 12 PURSUING

100

LEED PLATINUM
BUILDINGS

50

NET ZERO ENERGY
BUILDINGS

90

ALL-ELECTRIC
BUILDINGS

SERVICES



Mechanical Engineering

PAE's mechanical engineering services are focused on building performance, comfort, controllability, energy use, maintainability, and the elegant integration of mechanical and plumbing systems with architectural design. We also offer related services such as fire-protection systems design, commissioning, comfort analysis, envelope optimization, water-cycle analysis, and energy modeling.



Technology Design

Our technology-design team works in partnership with our clients to provide tailored solutions that are reliable and robust. We design systems which enable occupants of the built environment to connect, collaborate, and innovate. We listen to each client user group and design intuitive audiovisual systems, powerful wired and wireless communications infrastructure, and dynamic physical security solutions.



Electrical Engineering

PAE provides engineered electrical systems, including designs for metering and renewable-energy systems, that are tailored to each client's project criteria and malleable enough to meet future goals. We work collaboratively to develop innovative ideas for lighting, control, power, and technology systems that are integrated and work in concert with the building and its occupants.



Architectural Lighting Design

LUMA is the architectural-lighting division of PAE. As independent architectural-lighting designers, we collaborate with our clients to decide on a common vision through light. We listen and probe. We question and clarify, exploring all options. We then use light to organize and reinforce the architectural vision.



Plumbing Engineering

We work early on with project teams to analyze the use of water to find healthy, innovative, and simple designs that elegantly integrate with the building's mechanical systems and architectural designs. Our Regenerative solutions for water and waste include: water use reduction and energy-saving design strategies, specialty piping systems, onsite treatment, and more.



Regenerative Design Services

Our Regenerative design services help clients make informed decisions from sustainability goals to building performance and occupant satisfaction. Through careful analysis and our deep understanding of building science to show predictive performance and the value of goals over time, we provide an understanding between architectural design and building systems. Our data analysis informs the vision, implements details, and tracks performance.

Sectors



Higher Education

From building design that optimizes Indoor Environmental Quality (IEQ) to master planning that maximizes energy and water efficiency on campuses, we create healthy higher-education environments for all budgets.



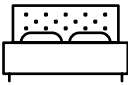
Commercial + Office

We have provided expertise for millions of square-feet of office space in the last decade. We believe our workplaces should be healthy and make us feel engaged, alive and comfortable.



Healthcare

We design healing environments that support improved patient outcomes and greater work satisfaction among healthcare employees, all without disrupting hospital operations and being mindful of budget.



Housing + Hospitality

In the last 10 years we have provided design expertise for more than 20,000 residential beds. We design comfortable and healthy living environments – from apartment complexes to hotels and dormitories.



K-12 Education

Working with tight operational budgets, we design K-12 schools that improve academic performance of students, increase building efficiency, and reduce maintenance for facilities staff.



Laboratories

Using innovative techniques to reduce energy and operating costs, we design MEP systems for university and corporate laboratories that are responsive to the dynamic needs of research and teaching facilities.



Government

Our work for government clients – including libraries, visitor centers, parks and recreation spaces, municipal buildings and federal offices, among others – meets high level sustainability and LEED requirements while staying on budget and schedule.



Cultural + Spiritual

The built environments we design for museums, aquariums, performance spaces, churches, and other cultural and spiritual settings inspire through lighting and ambiance while adhering to strict environmental requirements.



Mission Critical

We follow fast-paced schedules to design systems for mission-critical facilities, including data centers and server rooms, which address water and energy efficiency, redundancy and cooling needs, reliability, and serviceability.

Regenerative Design

What is Regenerative Design?

In a nutshell, Regenerative Design is essential for achieving a project's building performance goals. We can use Regenerative Design to help set the vision for the project. PAE relies heavily on Regenerative Design in order to help clients understand how their buildings will perform—before they are built.

Data Driven Results

PAE uses Regenerative Design early in the design process, when it can be most impactful. We provide our clients and project teams with information that allows projects to stay on budget while achieving optimal performance outcomes. These include increased productivity, employee attraction and retention, and energy and water conservation.

Regenerative Design not only maximizes the short and long-term value of buildings while protecting the environment but also makes projects financially viable, since high-performance buildings can be costly. Our Regenerative Design services help teams explore system alternatives in order to find an integrated design path that balances building performance with economic goals.

[Click](#) to read our Regenerative Design brochure.

SERVICES INCLUDE

- Energy Analysis
- Water-cycle analysis
- Envelope and form optimization
- Natural ventilation design
- Computational Fluid Dynamics (CFD) modeling
- Indoor environmental quality, including comfort analysis, wellness, and productivity
- Benchmarking
- Climate-change sensitivity analysis
- Master Planning
- Carbon and building portfolio management
- Measurement and verification
- Incentives program assistance
- Energy life-cycle cost analysis
- Building performance audits and retro commissioning
- Battery Analysis

Technology Systems Design

Our technology consulting team works closely with seasoned mechanical and electrical engineers to develop tailored solutions that promote efficiencies and facilitate connection. Before design work begins, our accredited team collaborates with clients to understand their unique technology needs. Our technology consulting team responds to current needs while anticipating what's to come.

Learn more about our technology services [here](#) integrated design path that balances building performance with economic goals.



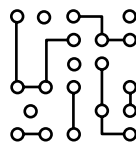
Electronic Safety and Security



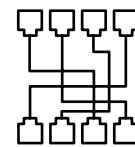
In-Building Wireless DAS



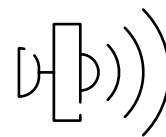
Telecommunications



IT Pathways and Space



Structured Cabling



Audiovisual



Architectural Lighting Design

LUMA Lighting Design

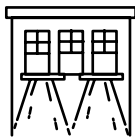
Created in 2001, LUMA Lighting Design is the independent and integrated lighting practice within PAE. At LUMA, we're focused on our clients and a shared vision of great design. For every project our goal is to bring a lighting approach that is as unique as each of our clients.

For more information on LUMA Lighting Design, visit the LUMA website [here](#).

LUMA



Architectural Lighting



Facade Lighting Design

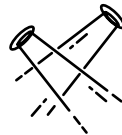
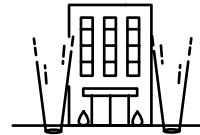


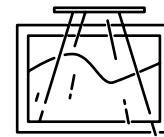
Exhibit Lighting



Custom Luminaire Design



Landscape and Site Lighting



Art and Installation Lighting



Diversity and Social Equity

A Triple Bottom Line firm, PAE's success is measured not only by profit, but by its commitment to people and the planet.

36

OF PAE'S WORKFORCE ARE WOMEN.

The national average in the engineering workforce is 15%

OUR POLICIES AND GOALS

PAE focuses on recruiting a diverse and inclusive workforce, and implements internal programs to contribute to our staff's overall health and happiness. PAE earned the International Living Future Institute's distinctive JUST label in 2018, a formal recognition of the company's equitable goals and transparency efforts.

21%

OF PAE'S WORKFORCE ARE BIPOC.

Black, Indigenous, People of Color.

COMMUNITY INVOLVEMENT

PAE takes its responsibilities as a member of the community seriously and we work to serve diverse communities throughout the West Coast. We are proud to work with and sponsor organizations that help to promote diversity in our industry.



Led by Principal Ruwan Jayaweera, the JEDI (Justice, Equity, Diversity, and Inclusion) Committee strengthens PAE as a company where diversity is a core asset, all experiences are valued, and individuality is not only encouraged, but also celebrated.

Principal Ruwan Jayaweera also co-founded Room for More, an open collective of diverse professionals in Portland-area architecture, engineering, and construction firms. The collective contributes to efforts to increase, mentor, and support BIPOC participation and success in the AEC profession.



COBID + MWESB AND WOMEN IN LEADERSHIP

Through a series of roundtables with our COBID-certified peers, we've formalized a COBID Partnership Program where we discuss effective strategies for collaboration and partnership, having honest conversations about the benefits and struggles of these teaming arrangements, and identifying opportunities for mutual aid and resource sharing. The goal is to move beyond contract requirements and correct industry-wide disparities in ownership of AEC firms to advance our BIPOC industry peers.

The Women in Leadership (WIL) Committee was created to provide leadership paths and development training for the women of PAE and to formalize a community of women so they can support and guide each other.



By becoming a JUST certified company, we are evaluating ourselves through a social justice and equity lens, and reporting on a range of organization and employee-related indicators.

As of 2021, we are a certified B-Corporation — a new kind of business that considers the impact of their decisions on their workers, customers, suppliers, community, and the environment. B-Corps create a community of leaders, driving a global movement of people using business as a force for good.



Our Team

Office Locations and Southern California Experience

350

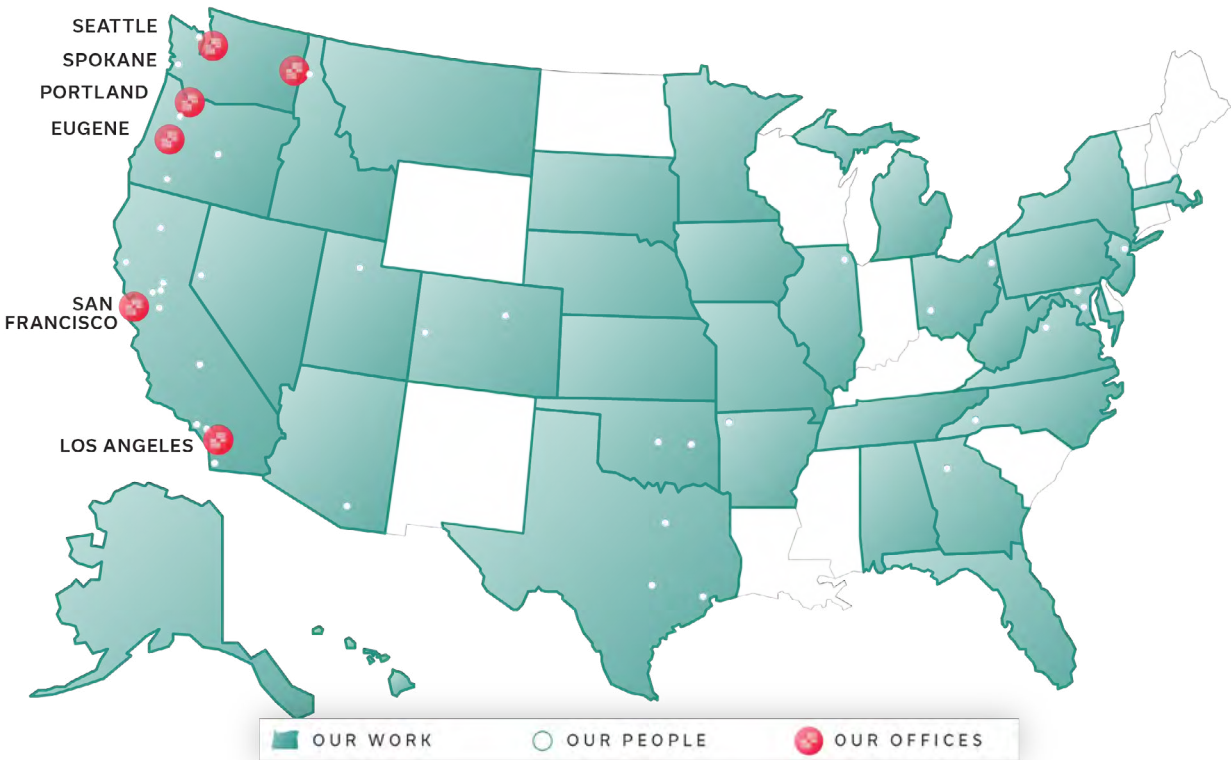
STAFF

6

OFFICES

56

YEARS



PAE has expanded its reach by increasing diverse project experience, in addition to growing our team and becoming geographically dispersed, allowing us to operate remotely outside of our 6 offices. As a result of the rise in our project demand in Southern California, PAE has gained extensive experience in providing design expertise for over two dozen projects in the Greater Los Angeles Area. Through these projects, PAE has established strong relationships with key entities such as the Los Angeles Building Department, LADWP, local contractors, and design partners. With a dedicated full team of local experts in each service we provide, operating between Los Angeles and San Diego, PAE is well-equipped to provide exceptional service and sustainable designs to our LA clients and the region. Please refer to the following pages to learn more about our Southern California office leaders.

KEY PERSONNEL



Christian J. Agulles PE

President and CEO

For over 30 years, Christian has led teams in the design of innovative building systems for a broad range of complex building types including sports arenas, a U.S. Embassy, LEED Gold and Platinum corporate headquarters, high-rise mixed-use buildings, and affordable housing projects. Christian has been involved in the design of several all-electric, net-zero carbon, resilient affordable housing projects.

EXPERIENCE

Stanford Research Institute Campus Redevelopment, Menlo Park, CA (Pursuing LEED Gold, Pursuing All Electric Building)

Meta ,Park Tower, San Francisco, CA

Genentech Alliance Partnership, South San Francisco, CA

Kaiser Permanente Thrive Center, Oakland, CA (Pursuing LEED Platinum)

LinkedIn Middlefield Campus, Mountain View, CA (Pursuing LEED Platinum)



Dawn MacFadyen PE, LEED AP BD+C

Associate Principal, L.A. Office Director

Dawn has nearly 25 years of experience in electrical engineering along with project and market development. As a key member of the management team, Dawn is spearheading PAE's expansion in Los Angeles and throughout Southern California. As a prominent engineer in downtown L.A., Dawn has mentored teams and managed notable technical projects such as NFL Media, Time Warner Cable Regional Sports Center, and NBC Universal City Broadcast Center.

EXPERIENCE

Ocean Avenue Project, Santa Monica, CA (Pursuing LEED Platinum)

Naskila Hotel, Casino Resort, Livingston, TX

National Football League, Media Screening Room, Hollywood Park, CA

Hollywood Palladium, Los Angeles, CA

Academy of Motion Pictures Arts & Sciences, Samuel Goldwyn Theater, Beverly Hills, CA

University of California - San Diego, The San Diego Supercomputer Center, San Diego, CA

University of California - Los Angeles, Pauley Pavilion Renovation, Los Angeles, CA (LEED Gold)

KEY PERSONNEL



Jeff Becksfort PE, LEED AP

Associate Principal

An excellent communicator with a keen attention to detail, Jeff is particularly skilled at leading multidisciplinary teams through all phases of a project. With over 20 years of experience in engineering heating, ventilation and air conditioning systems for environmentally sustainable buildings, Jeff adds depth and value to any project team. His clients know him best for producing designs within the confines of budgets, schedules, and existing conditions. Jeff has provided project management and design expertise for a wide range of projects including the LEED Platinum Carbon Neutral Port of Portland Headquarters & Parking Garage.

EXPERIENCE

Nike, World Headquarters Expansion (over 2 million sf), Beaverton, OR (LEED Platinum)

Port of Portland, Portland, OR

- Port of Portland Headquarters & Airport Parking Facility (LEED Platinum, Arch 2030)
- Terminal Core Redevelopment

University of California - Merced, Health and Science Building, Merced, CA (Pursuing LEED Platinum)



Agapeh Allahverdi IALD, IES

LUMA Lighting Designer

With nearly a decade of experience in architectural and experiential lighting design, Agapeh is keenly interested in the play of light and how it relates to health and wellbeing. Her past studies in astronomy and interior design allow her to look at lighting design from all angles and meet the needs of any space. With award-winning experience in K-12 education, hotels, residential, and more, Agapeh brings an innovative and client-focused lens to every project.

EXPERIENCE

Prometheus Mixed-Use, San Mateo, CA

Healthpeak Vantage Phase 2, San Francisco, CA

27th Street Apartments, Los Angeles, CA

Carlsbad Village Lofts, CA

RH Guesthouse, New York, NY

Four Seasons, Puerto Rico

Nomad Hotel Downtown Los Angeles, CA

KEY PERSONNEL



Grant Craig PE, LEED AP BD+C

California Region Leader, Principal

Grant has more than 20 years of experience in the planning and design of mechanical systems. As a principal, he works with teams to focus on Regenerative, energy-efficient, and high-performing design, with experience leading dozens of all-electric and LEED-rated projects. By engaging in early communication with the design team, he develops creative concepts that respond to the architectural and sustainable goals of the project. He has collaborated with reputable clients throughout the San Francisco Bay Area including Google, LinkedIn, and Facebook.

EXPERIENCE

Palladium, Mixed-Use High Rise Building, Los Angeles, CA (Pursuing All Electric Building)

Ocean Avenue Project, Santa Monica, CA (Pursuing LEED Platinum)

CityView Plaza Downtown San Jose Mixed-Use, San Jose, CA (Pursuing All Electric, LEED Gold)

Mission Rock District Plant and Phase 1 Design, San Francisco, CA (Pursuing LEED Gold)

Potrero Blocks 7, 8, and 10, San Francisco, CA (Pursuing LEED Gold, All-Electric)

Trinity Place Development Phase 4, San Francisco, CA (Pursuing LEED Gold)



Alan Shepherd PE, LEED AP, CENG

Principal, Regenerative Design

Alan is a California regional leader and mechanical engineer with over 35 years of experience, with a variety of experience with commercial offices, laboratories, and higher education facilities. Passionate about building systems and performance, Alan seeks sustainable solutions by helping clients obtain a clearer understanding of how they can measurably achieve their project goals. He excels at working closely with architects, owners, and fellow designers to produce integrated passive and active building systems that deliver high-quality building environments.

EXPERIENCE

Mission Rock District Plant and Phase 1 Design, San Francisco, CA (Pursuing LEED Gold)

SBO Phases 1 and 2, San Bruno, CA (Pursuing LEED Platinum, All electric)

University of California – Berkeley & California Institute for Quantitative Biosciences, Woo Hon Fai Hall, Bakar BioEngenuity HUB, Berkeley, CA (Pursuing LEED Gold)

Sunnyvale Civic Center – City Hall, Sunnyvale, CA (Pursuing LEED Platinum, NZE)

Maha Resort, Guenoc Valley, CA



Project Experience



Sustainability

Our Mission

We work with our clients to design the nation's highest performing built environments. For some sectors this means net positive buildings, for other sectors Net Zero, for others better learning environments, project pro forma financial goals or a combination of these.

HOW DO WE DO IT?



We **listen** to our clients and deeply understand their goals



We hire and retain **the best staff**



We provide innovative engineering **solutions that work**

Sustainable Design Philosophy

Sustainable design is a long-standing PAE focus. We have provided design and commissioning expertise for more than 500 LEED rated or registered projects. Our **over 100 LEED Platinum** projects, range from university and corporate buildings to zoo habitats and laboratories, to affordable housing projects. They are about more than a certification, PAE's sustainable projects bring lower operation costs to owners and tenants, and use fewer natural resources.

ULTIMATE VISION

Restorative Design

PAE's goal is to continually move our designs beyond just energy and water efficiency, beyond net zero energy, to a point where our projects are truly restorative.

THOSE PROJECTS WOULD:



Generate more energy than they use



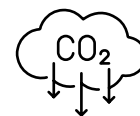
Clean more storm water than falls on their site



Create habitat



Provide Food



Absorb Carbon

Considerations | Zero Carbon and Zero Energy Design

PAE brings an integrated design approach to high performance projects. We hope that in our design meetings a new team member walking into the room couldn't tell who is the architect, the engineer, or the owner, because the design process is fluid and dynamic, and everyone is providing input on all areas. We have used this open collaborative approach to successfully deliver more than 50 Net Zero Energy / Water and over 500 LEED rated or registered buildings.



Start with an inspiring goal.

When you set measurable goals and inspire a group of passionate designers, it generates amazing focus and creates an environment that leads to breakthroughs and synergies.



Design for the climate.

We look deeply at the natural environment a building will exist in, both today, and in the future. We work with the entire design team to create an envelope that will work to maximize the natural resources of sun, wind, and water. We also work to limit the heating and cooling loads to those that can be met by light-touch, highly efficient mechanical systems.



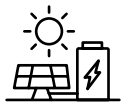
Reduce internal energy use.

When designing for net-zero, internal energy use is an important factor. This includes lighting, plug-load equipment, and other interior process like cooking. We take the approach of "energy accounting" and help design the building holistically to meet its energy and water budgets.



Choose efficient systems.

This step truly is "down the list." After the team has optimized the envelope and reduced internal loads, the stage is set for efficient systems that can provide superior thermal comfort for a fraction of the energy typically required.



Integrate renewables and grid-smart design.

Renewables balance the system energy demands and ideally produce enough energy to power the building. Many projects now are also incorporating batteries and other storage strategies for load management and resilience.



Verify performance.

We have been tracking the performance of our projects for many years and have a data library of nearly 100 projects actual energy that shows a strong track record of real performance. We help incorporate monitoring into our projects to enable ongoing optimal performance.

PAE All-Electric / Decarbonization Strategies

Low Greenhouse Gas Emission Design

As cities grow and our climate changes, buildings powered by fossil fuels are quickly becoming a thing of the past. While we are proud of our marquee achievements in sustainability, we also have a responsibility to advocate for clean, efficient, and resilient design that is accessible and appealing to owners and developers at all levels. **That's why at PAE, we're going all in on all-electric.**

At a basic level, an all-electric building is one where typical boilers, domestic hot water heaters, and kitchen equipment systems are replaced with electrical counterparts, eliminating the need for the use of natural gas and other fossil fuels. These system swaps are paired with other smart design strategies to regulate first costs, enhance building resilience, and reduce carbon footprint. Some of these complementary strategies include:



Natural Ventilation



Smart Controls



Grid-Interactive Systems



Energy Generation



Thermal Massing



Energy Storage



Enhanced Envelope Optimization



Daylighting



PGE, INTEGRATED OPERATIONS CENTER, PORTLAND, OR ALL-ELECTRIC BUILDING, PURSUING LEED CERTIFICATION



BEAVERTON PUBLIC SAFETY CENTER, BEVERTON, OR MICROGRID, NET ZERO READY, ARCH 2030

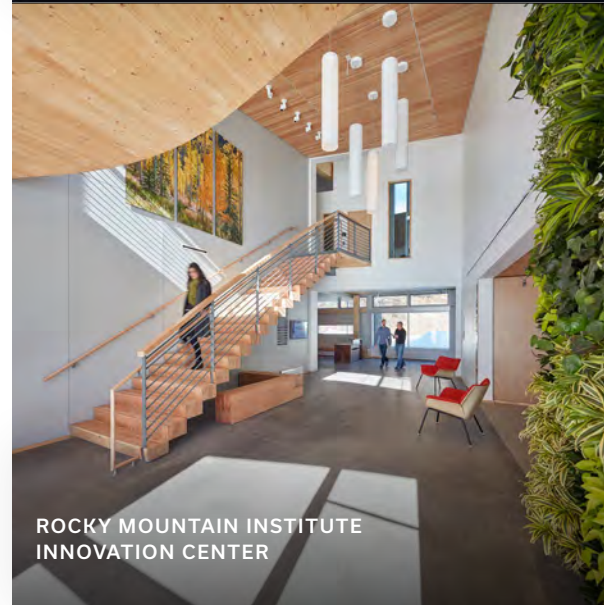
CHEMEKETA COMMUNITY COLLEGE, AGRICULTURE COMPLEX, SALEM, OR NET ZERO ENERGY, PURSUING ALL-ELECTRIC, PURSUING EUI OF 20-25

Sustainable Design Experience

- PAE Living Building, Portland, OR (Pursuing Full Living Building Certification, WELL Certification)
- SBO Phases 1 and 2 Office Headquarters (2M square feet campus), San Bruno, CA (Pursuing LEED Platinum, All-Electric Design)
- The Bullitt Center, Seattle, WA (Living Building, Architecture 2030, Net Zero Energy, Water and Wastewater)
- Georgia Tech, The Kendeda Building for Innovative Sustainable Design, Atlanta, GA (Living Building, Net Zero Energy, Net Zero Water)
- Rocky Mountain Institute Innovation Center, Basalt, CO (Living Building Petal Certified, Net Positive Energy, LEED Platinum, Passive House, Arch 2030)
- 180 Supportive Housing Project, Santa Cruz, CA (Pursuing Passive House)
- Aegis Living Lake Union, Seattle, WA (Pursuing Living Building Pilot Program)
- Beaverton Public Safety Center, Beaverton, OR (Microgrid, Net Zero Ready, Arch 2030)
- Belle Haven Community Center and Library, Menlo Park, CA (Pursuing LEED Gold)
- Confidential Kirkland Campus Building, Kirkland, WA (Pursuing Net Positive Energy)
- Goldman Tennis Center (previously Golden Gate Park Tennis Club), San Francisco, CA (Pursuing LEED Platinum, All-Electric, Net Zero Energy)
- McEvoy Dupont Apartments, San Jose, CA (Pursuing LEED Platinum, All-Electric Design)
- Montana Net Zero Development, Missoula, MT (Pursuing Net Zero Energy, Net Zero Water)
- Sage School Living Building, Hailey, ID (Pursuing Living Building)
- Sunnyvale Civic Center, Sunnyvale, CA (Pursuing LEED Platinum, Net Zero Energy)
- Portland General Electric, Integrated Operations Center, Portland, OR (All-Electric Building, Pursuing LEED Certification)
- Portland Building Renovation, Portland, OR (All-Electric Building, Well Building, LEED Platinum)
- Milwaukie Ledding Library Renovation, Milwaukie, OR (All-Electric Building, Architecture 2030, Net Zero Ready))
- Oregon Zoo, Education Center, Portland, OR (All-Electric Building, Net Zero Energy, LEED Platinum)



OREGON ZOO EDUCATION CENTER



ROCKY MOUNTAIN INSTITUTE INNOVATION CENTER



PAE LIVING BUILDING



PAE Living Building

LOCATION

Portland, OR

SIZE

58,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Renewable Energy System Design

Greenhouse Gas Consulting

Technology Design

Architectural Lighting Design (Luma)

CERTIFICATIONS

Pursuing Living Building, Net Zero Water,
Net Zero Energy, Architecture 2030

SPECIAL FEATURES

- Designed to last 500+ years
- First developer-led commercial Living Building proves business case and creates pathway for others
- Sustainable and healthy building materials include Pacific Northwest-sourced cross-laminated timber certified by the Forest Stewardship Council (FSC)
- First-of-its-kind multistory vacuum-flush compostable toilets reduce water use and transform waste into a rich nutrient source
- 105% of the energy use provided by onsite and offsite renewable energy
- 100% of building's water needs are collected and treated onsite
- 80% energy savings over a typical existing office building before solar harvesting



Kendeda Building for Innovative Sustainable Design

GEORGIA INSTITUTE OF TECHNOLOGY

LOCATION

Atlanta, GA

SIZE

37,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Renewable Energy System Design

CERTIFICATIONS

Living Building

SPECIAL FEATURES

- The building uses the campus chilled water loop as its heat source in the winter via a heat recovery chiller
- Radiant flooring distributes heating and cooling efficiently
- 320 kW of rooftop photovoltaic panels create a net positive solar array
- Onsite energy storage
- Air curtains at doorways act as a barrier to outside air coming in
- Condenser water heat recovery
- Rainwater reclamation for potable uses
- Composting toilets

Rocky Mountain Institute Innovation Center

LOCATION

Basalt, CO

SIZE

16,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

Building Performance Analysis

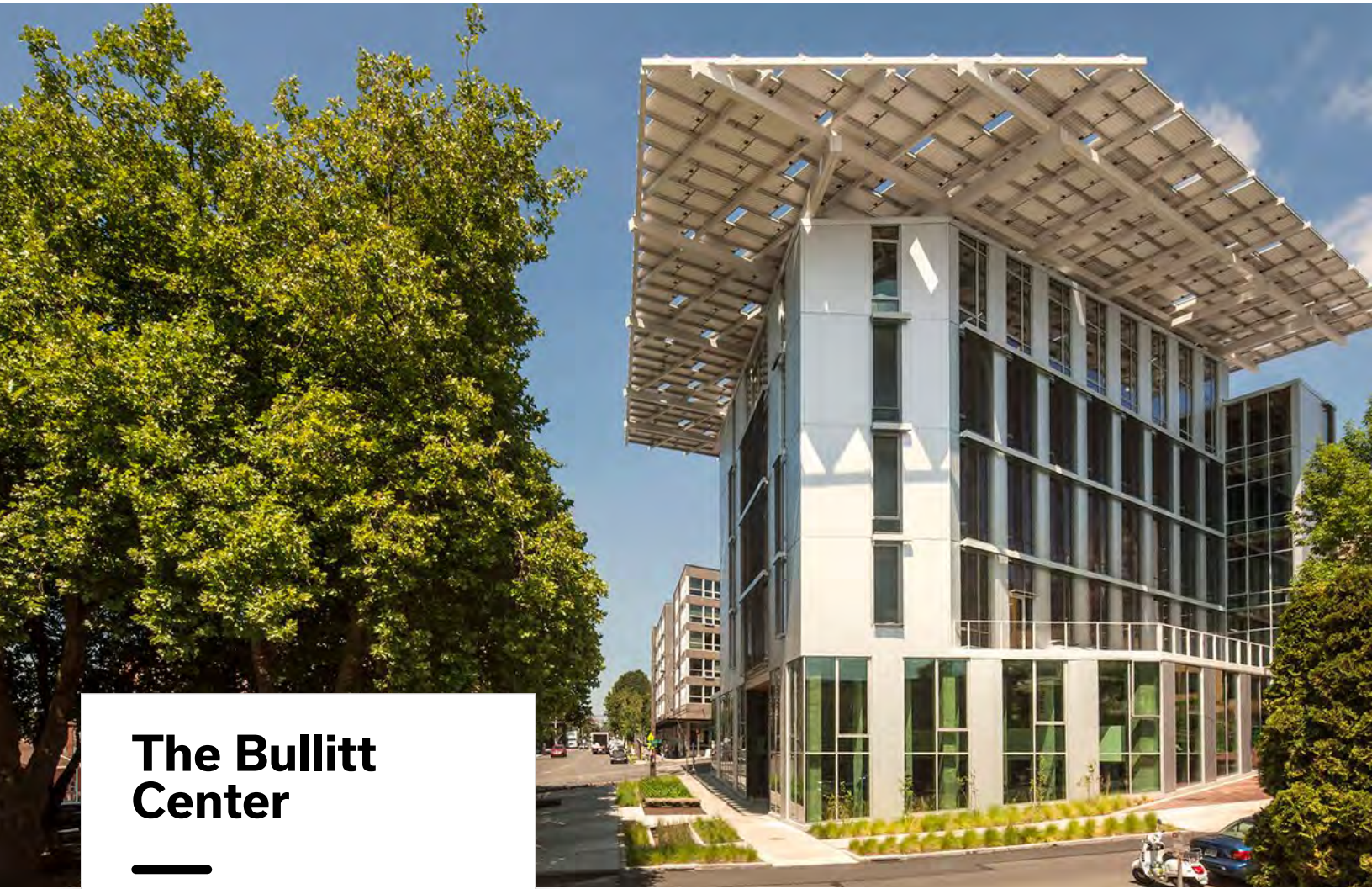
Renewable Energy Systems

CERTIFICATIONS

Living Building, LEED Platinum, Passive House, Net-Zero Energy, All-Electric

SPECIAL FEATURES

- 13.6 kBtu/sf/yr 1st year operating EUI
- Only passive cooling
- Electric resistance heating. Capacity is equivalent to about 1 hairdryer/1000sf. (16 total)
- 90+% Effective heat recovery (effectiveness is high enough to eliminate the need for heating in the ventilation system)
- Personal comfort systems through heating & cooled office chairs
- Quad-paned glazing with 70% glazed on Southern exposure for passive solar heating
- Automatic operable exterior shades on South and West Facades
- 0.34 ACH Air Tightness at 50 PA Test
- 83kW PV
- ~70% net positive, including EV charging on site
- CLT Structure



The Bullitt Center

LOCATION

Seattle, WA

SIZE

50,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Architectural Lighting Design

CERTIFICATIONS

Living Building

Net Zero Energy + Water

Architecture 2030

SPECIAL FEATURES

- The world's largest commercial Living Building
- Achieved 83% energy efficiency and 80% water efficiency
- EUI (Energy Use Index) rating of 10kbtu/sf/yr
- A 242kW photovoltaic array produced 60% more energy than the building used in 2014
- Geo-exchange system harvests energy from the earth to provide efficient heating and cooling
- Radiant floor heating and cooling system
- 56,000-gallon cistern for rainwater harvesting
- Greywater reclamation
- Composting, foam-flush toilets that save 96% more water



Sunnyvale Civic Center

LOCATION

Sunnyvale, CA

SIZE

138,800 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

CERTIFICATIONS

Pursuing LEED Platinum

Net Zero Energy

SPECIAL FEATURES

- The project is a four-story, building that will house various City Hall functions such as, the building permitting center, council chambers, NOVA jobs training center, and other administration functions
- 100% annual energy reduction with PV (Net-Zero)
- 73% peak electrical demand reduction with PV
- Electrical design includes PV, Battery Storage, and Microgrid systems for islanded mode operation and increased electrical resilience
- Heat recovery heat pumps for central heating and cooling plant
- Zero water use for HVAC

Commercial Office

- LinkedIn2 Campus, Mountain View, CA (Pursuing LEED Platinum)
- Meta (**10 million square feet**), various locations, including:
 - Playa Vista, Los Angeles, CA (LEED Gold)
 - The Farm, Fremont, CA (LEED Gold)
 - Park Tower, San Francisco, CA (LEED Gold)
 - Menlo Gateway, Menlo Park, CA (LEED Gold)
- PAE Living Building, Portland, OR (Pursuing Full Living Building Certification, WELL Certification)
- 1235 Vine Street, Los Angeles, CA
- NBC Universal (NBCU), Employee Center - Theater & Screening Rooms, Universal City, CA*
- NFL Media Los Angeles, Los Angeles, CA*
- SBO Phases 1 and 2 Office Headquarters (2M square feet campus), San Bruno, CA (Pursuing LEED Platinum, All-Electric Design)
- Genentech Alliance Partnership – Commercial Portfolio, South San Francisco, CA
- Google, (**6 million square feet**) tenant improvement projects, including:
 - Ameswell, Sunnyvale, CA (Pursuing LEED Platinum)
 - 600 Clyde, Mountain View, CA (Pursuing LEED Platinum)
 - Stierlin Court, Mountain View, CA (Pursuing LEED Gold)
 - PacShores Campus, Redwood City, CA
- 300 Lakeside, Oakland (Pursuing LEED Silver)
- The Bullitt Center, Seattle, WA (Living Building, Architecture 2030, Net Zero Energy, Water and Wastewater)
- Nike, World Headquarters, Beaverton, OR
 - Sebastian Coe Building (LEED Platinum)
 - Serena Williams Building (LEED Platinum)
- Mission Rock, Parcels A, B, G, and F, San Francisco, CA
- CalSTRS Headquarters Tenant Improvement, West Sacramento, CA (Pursuing LEED Platinum, Net Zero Energy, WELL Building)
- CityView Plaza, San Jose, CA (Pursuing LEED Gold)
- Helios Headquarters, Phoenix, AZ (Pursuing LEED Gold)
- Project Chevelle, Phoenix, AZ
- Confidential Office Expansion, Los Angeles, CA (Pursuing LEED Gold)

* Denotes projects completed by PAE staff prior to joining firm.



META THE FARM
LEED Gold



CALSTRS HEADQUARTERS
Pursuing LEED Platinum, Net Zero Energy, WELL Building



SBO PHASE 1+2 OFFICE HEADQUARTERS
Pursuing LEED Platinum



Meta Park Tower

LOCATION

San Francisco, CA

SIZE

43 levels

755,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

CERTIFICATIONS

LEED Gold

SPECIAL FEATURES

- PAE has worked on every phase of this tenant improvement project
- PAE's innovative mechanical design includes both an underfloor air distribution system for the low-rise portion of the building and overhead decoupled perimeter systems for the mid-rise and high-rise floors
- The underfloor air distribution system allows occupants a greater level of personal control via accessible diffusers, allowing for individualized occupant comfort



Helios Headquarters

LOCATION

Phoenix, AZ

SIZE

65,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

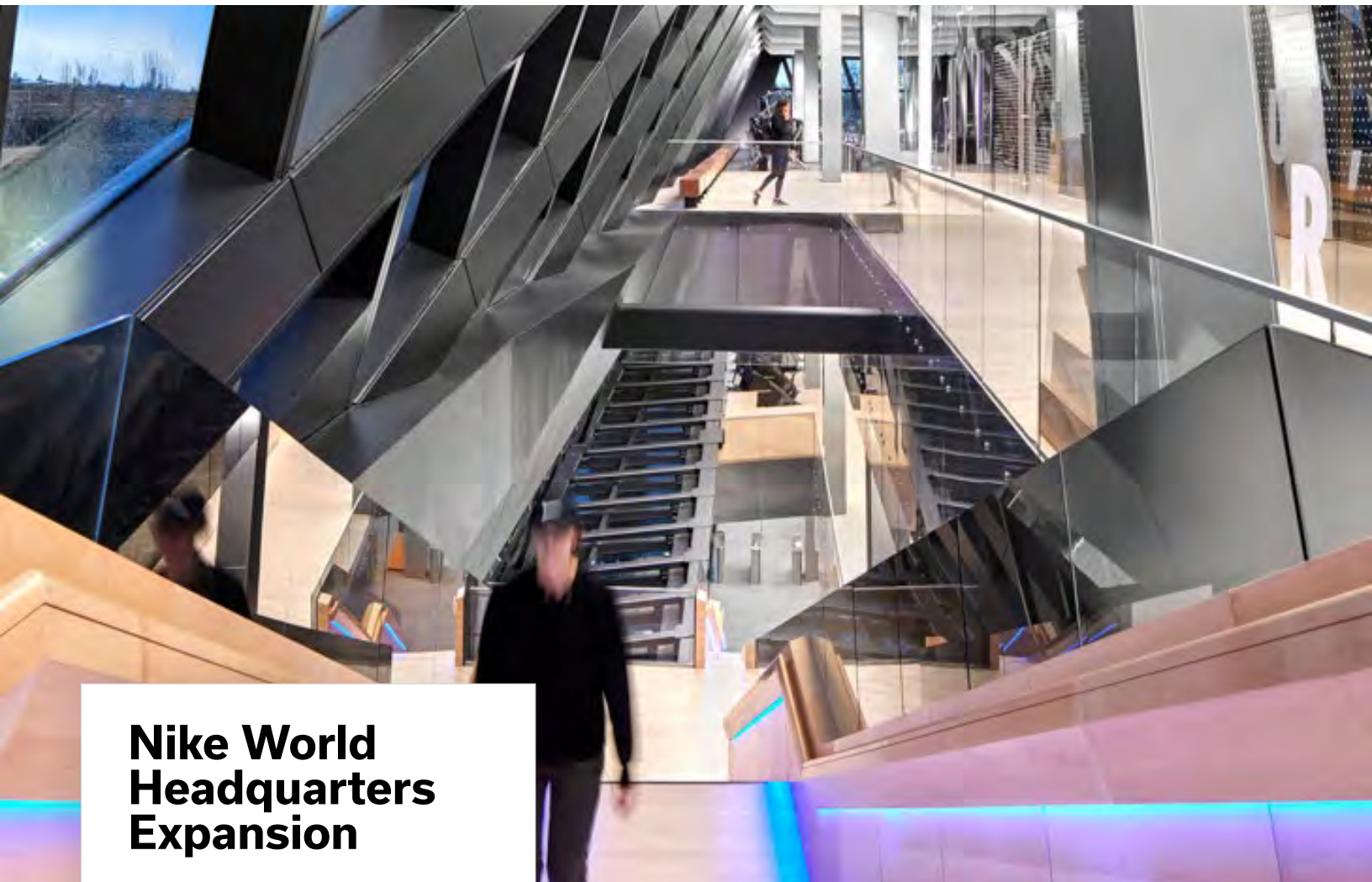
Architectural Lighting Design (via LUMA)

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- A campus built with the goal to foster collaboration among public officials, business and community leaders, while supporting Helios' mission to help students succeed throughout college and in their careers.
- PAE's mechanical design featured a dedicated outdoor air system with heat recovery, which provided improved ventilation and reduced heating/cooling loads, active chilled beam cooling distribution, and air-cooled chiller with variable speed fans and compressors which reduce cooling energy use.
- Rainwater catchment systems provide irrigation, and low flow plumbing fixtures reduce potable water use and reduce domestic hot water energy use.



Nike World Headquarters Expansion

LOCATION

Washington County, OR

SIZE

1.3M square feet

ROLE

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Technology Design

Architectural Lighting Design (via LUMA)

CERTIFICATIONS

LEED Platinum

SPECIAL FEATURES

- Buildings save 50% more energy and 70% more over code
- Design focuses on exceptional Indoor Air Quality (IAQ), thermal comfort, and access to daylight.
- Creating flexible designs allow easy reconfiguration of work spaces

SCOPE INCLUDES

- Food service and Coffee Shop
- Sundries Shop
- Employee Store
- Executive and general office space,
- Fitness center,
- Multiple parking garages
- District utility plant



300 Lakeside

LOCATION

Oakland, CA

SIZE

28 levels

1,060,090 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Fire Protection

Building Performance Analysis

Commissioning

CERTIFICATIONS

Pursuing LEED Silver

SPECIAL FEATURES

- Project encompasses a 28-story high-rise commercial office and retail building with three basement levels
- This space will house the new headquarters of PG&E which will extend over 18 levels
- Seismic retrofit
- PAE's building analysis and modeling identified solutions to minimize solar gains to reduce the building's cooling demand
- The project will be designed to achieve a LEED v4 ID+C Silver Certification and comply with the Oakland Green Building Ordinance requirements.
- Optimized use of existing air handling systems that take advantage of free-cooling opportunities
- Reduced indoor water use through selection of efficient fixtures



NBC Universal (NBCU), Employee Center - Theater & Screening Rooms

LOCATION

Universal City, CA

SIZE

83,000 square feet

SERVICES

Electrical Engineering

* Project completed by PAE staff prior to joining firm.

SPECIAL FEATURES

- This 83,000 sf building includes a large special events theater with state-of-the-arts projection and audio, two large screening rooms, and an events center on the top floor that captures full views across campus and flexible to host events for up to 1,000 attendees.
- A "flex floor" common space is home to a cafe, shared meeting and conference rooms.



NFL Media Los Angeles

LOCATION

Inglewood, CA

SIZE

250,000 square feet

SERVICES

Electrical Engineering

* Project completed by PAE staff prior to joining firm.

SPECIAL FEATURES

- NFL's new media headquarters brings together 1,000+ employees in an amenity-rich, next to Sofi Stadium.
- The collaborative hub facilitates growth and synergy among NFL's broadcast presence and its multitude of digital app-based and direct-to-consumer channels for distributing NFL news, shows, player stats, and live game day content.



CityView Plaza

LOCATION

San Jose, CA

SIZE

3.2 million square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

Building Performance Analysis

Renewable Energy Systems

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- Developed sustainability strategies to support LEED v4 Gold Certification and comply with the San Jose Green Building Ordinance requirements
- Sustainability approach includes climate analysis and the development of climate-responsive design strategies
- Our analysis focused on high-performance façade design and optimized external solar shading to reduce solar heat gain
- Hourly load profiles were analyzed to assess heat recovery opportunities, which influenced the central plant configuration.
- HVAC systems were designed take advantage of free-cooling opportunities and natural ventilation based on consistent wind direction



200 Park Avenue

LOCATION

San Jose, CA

SIZE

900,000 square feet

SERVICES

Technology Design

SPECIAL FEATURES

- 19 story above grade high-rise office tower with planning provisions for large ground floor single retail tenant
- The building will sit above 4 levels of below grade parking garage with a dedicated section of garage area assigned to Hyatt Hotel with separate garage entry and exit



Image: Broadreach Capital Pa

Google Ameswell (750 Moffett)

LOCATION

Mountain View, CA

SIZE

199,998 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

CERTIFICATIONS

Pursuing LEED Platinum

SPECIAL FEATURES

- 5-story tenant improvement project in a newly constructed building
- The building will house a cafe, work spaces, open office, meeting rooms, lounges, a maker-space and fitness rooms
- The project also includes limited scope in a 6-story parking garage



Meta Playa Vista

LOCATION

Los Angeles, CA

SIZE

260,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Technology Design

Architectural Lighting Design (Luma)

CERTIFICATIONS

LEED Gold

SPECIAL FEATURES

- Tenant improvement at a new commercial development
- Multi-building campus (3 project phases)
- Fast-paced design and construction schedule
- In-person Plan Check engagement with LADBS
- All buildings utilize sustainability features such as increased ventilation, Variable Refrigerant Flow (VRF) providing simultaneous cooling/heating, daylighting, low flow plumbing fixtures, and great outdoor (roof and balcony) amenities
- Rezoning of base-building equipment wells serving multi-tenants
- PT structural design requiring tight MEPT coordination

BUILDING SPACES

- Office space and Specialty labs
- Food service areas
- Event space



Cityline Block 3 & Building B

LOCATION

Sunnyvale, CA

SIZE

269,791 square feet (Block B)

500,000 square feet (Block 3)

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

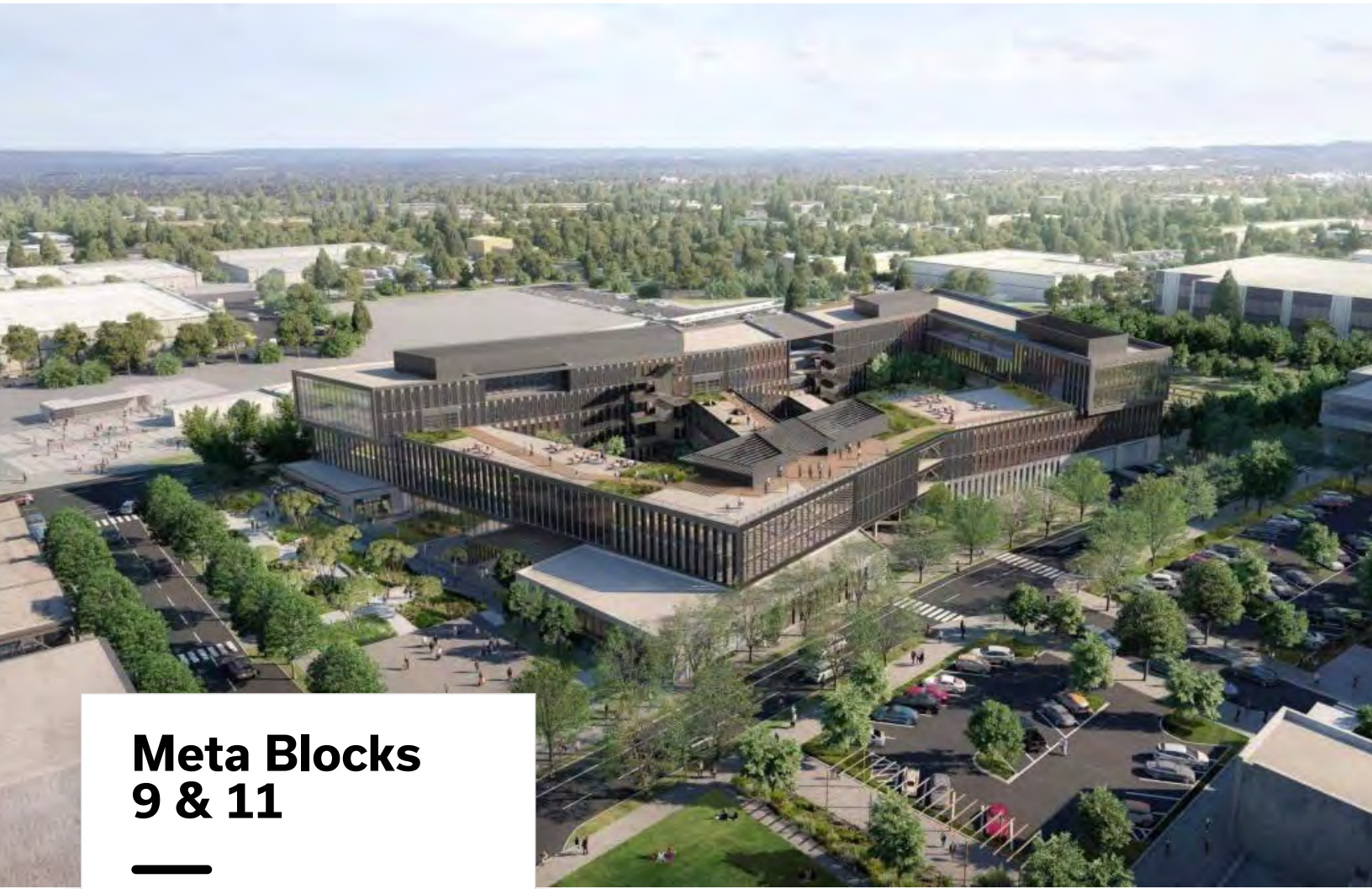
CERTIFICATIONS

Pursuing LEED Gold

All-Electric Design

SPECIAL FEATURES

- Block 3 includes two seven-level office buildings over a common parking garage with retail space
- Building B is a six-level office building with an below and above grade parking and retail space
- The Block 3 buildings are built over a 322,000 square foot two level underground parking garage



Meta Blocks 9 & 11

LOCATION

Bellevue, WA

SIZE

410,000 square feet across 2 buildings

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Systems Design

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- Tenant improvement and adaptive reuse of existing office building to meet the company's existing design standards
- Spaces include cafeteria, micro kitchens, open workspaces, event space, conference rooms, outdoor decks, and fitness facilities
- Elevated energy demands from technologically advanced, highly-integrated building met by utilizing sustainable design strategies



LinkedIn Middlefield

LOCATION

Mountain View, CA

SIZE

763,397 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

CERTIFICATIONS

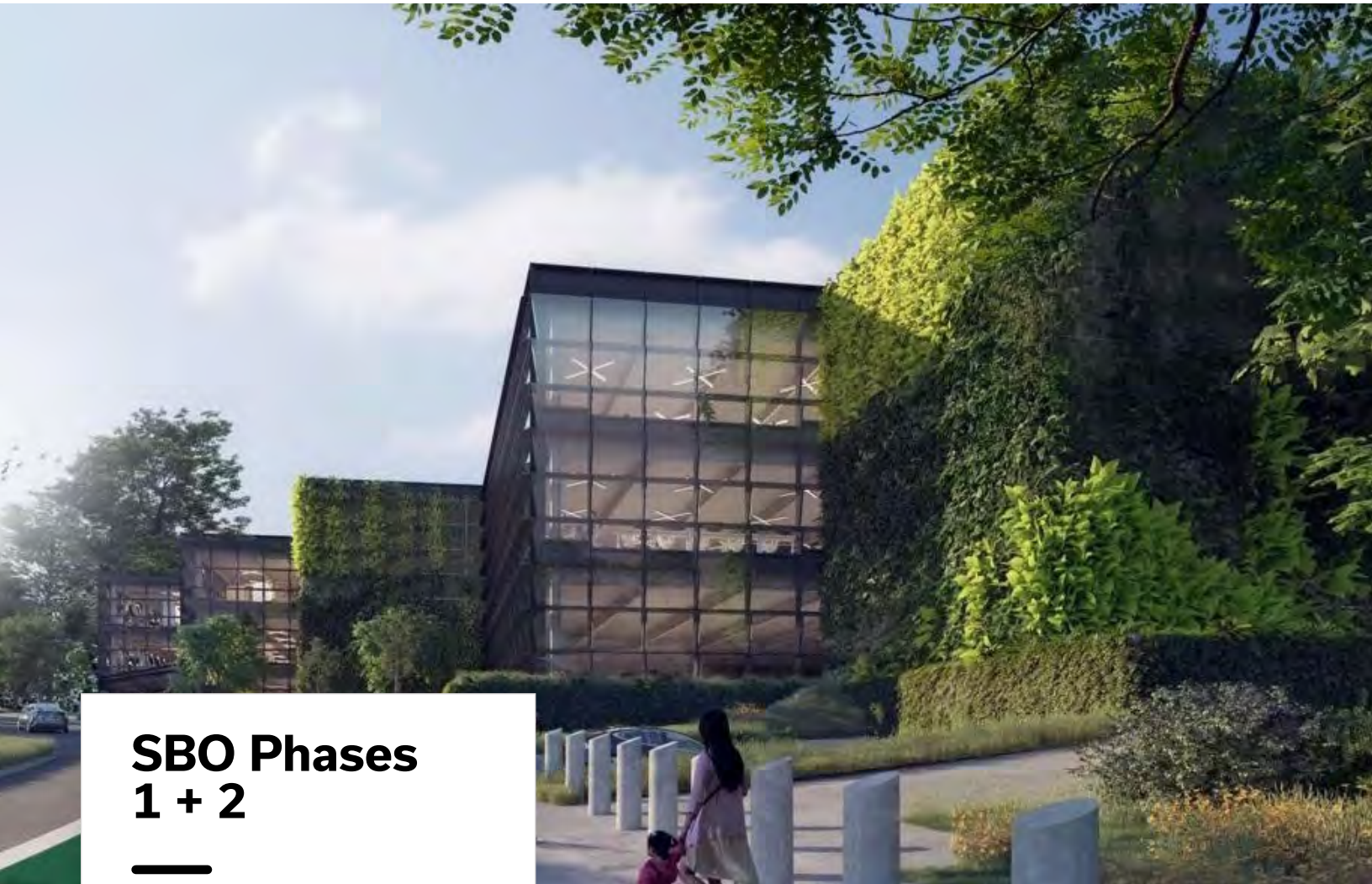
Pursuing LEED Platinum

DELIVERY METHOD

Full Design

SPECIAL FEATURES

- Mixed-use development of three buildings that will serve as a LinkedIn office hub, providing LinkedIn employees with office, conference, and amenity spaces in a highly sustainable environment
- A 60,000 square-foot rooftop photovoltaic system will initially offset 15-percent of the campus' energy use, and planned additions in the near future will help the campus reach Net Zero Energy
- The campus will utilize low flow fixtures to reduce the indoor water demand and offset the potable water demand further by utilizing municipal recycled water to meet the demands for irrigation, flushing, and heat rejection



SBO Phases 1 + 2

LOCATION

San Bruno, CA

SIZE

2 million square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Sustainable District Planning

CERTIFICATIONS

Pursuing LEED Platinum

All-Electric

SPECIAL FEATURES

- District ready design for thermal and water systems
- All-electric building design, reduction on embodied and operational carbon, and aspirational indoor environmental quality (IAQ, lighting, thermal comfort)
- This project is part of a district development that includes 5 phases, with a program that includes large kitchens, cafeterias, gym area, and wellness areas
- 3 levels of underground parking

Housing and Hospitality

- Ocean Avenue Project, Santa Monica, CA (Pursuing LEED Platinum)
- Wolfgang Puck Beach Restaurant, Los Angeles, CA
- 10 South Van Ness, San Francisco, CA (Pursuing LEED Gold, All-Electric Design)
- 30 Otis Street, San Francisco, CA (Pursuing LEED Silver)
- 1028 Market Street Mixed-Use Residential Tower, San Francisco, CA
- 1235 Vine Street Mixed-Use, Los Angeles, CA (Pursuing All-Electric)
- McEvoy & Dupont Apartments, San Jose, CA (Pursuing LEED Platinum, All-Electric)
- 8150 Sunset Boulevard, Los Angeles, CA (Pursuing LEED Gold)
- The Creamery at 4th & Townsend Mixed-Use Towers, San Francisco, CA (Pursuing LEED Gold)
- East Whisman R1 and R2, Mountain View, CA (Pursuing LEED Platinum)
- Facebook Willow Village, Menlo Park, CA (Pursuing LEED Gold)
- Kensington Tower, Salt Lake City, UT (Pursuing LEED Gold)
- Gramercy Apartments, Los Angeles, CA (LEED Gold)
- Mission Rock District Plant and Phase 1 Design, San Francisco, CA (Pursuing LEED Gold; All-Electric)
- Palladium Mixed Use, Los Angeles, CA (Pursuing LEED Gold)
- Aegis Lake Union, Seattle, WA (Pursuing All-Electric, Net Zero Water and Wastewater, Living Building Petal Certification)
- Potrero Power Station Mixed-Use Blocks 7, 8, and 10, San Francisco, CA (Pursuing LEED Gold, All-Electric)
- Trinity Place Development Phase 4, San Francisco, CA (Pursuing LEED Gold)
- MAHA Resort, Guenoc Valley, CA (Designed to LEED Gold, All-Electric Design)
- Confidential Resort Master Plan, UT (Exploring Net Zero Energy, Passive House, All-Electric)
- River One Hotel + Condominiums, Sacramento, CA
- Capitol Hill Lightrail Mixed-Use, Seattle, WA (LEED Platinum)
- Naskila Hotel and Casino Resort, Livingston, TX





Ocean Avenue

LOCATION

Santa Monica, CA

SIZE

442,000 square feet including:

- a 120-key hotel,
- a museum at 35,500 square feet,
- 164,600 square feet of retail, commercial, and below-grade parking,
- 100 residential units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Fire Protection

SPECIAL FEATURES

- New mixed-use complex with hotel, apartments, museum, public observation deck, retail and restaurant spaces, below-grade parking, and green spaces
- Pursuing LEED Platinum



10 South Van Ness

LOCATION

San Francisco, CA

SIZE

1,063,057 square feet

984 residential units

29,443 square feet retail

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

CERTIFICATIONS

Pursuing LEED Gold

All-Electric

SPECIAL FEATURES

- 55-story, 984-unit, residential high-rise mixed-use building
- PV solar system and living green roofs
- Energy efficient water source heat pump HVAC design
- Water efficient low flow plumbing fixtures
- On-site greywater treatment system
- Below grade parking structure
- 7 amenity decks/green roofs



Palladium

LOCATION

Los Angeles, CA

SIZE

1,440,922 square feet

731 residential units

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

SPECIAL FEATURES

- Two 28-story high rise mixed use buildings featuring rental units, retail, amenities, dining and 10 levels of parking
- Residential rental units sit above a podium built on the existing parking lot adjacent to the Palladium
- The existing Hollywood Palladium will be enhanced as part of this project and will receive historic cultural-monument status as part of the entitlements.



Potrero Power Station Blocks

LOCATION

San Francisco, CA

SIZE

881,040 square feet

735 rental units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

Architectural Lighting Design (Luma)

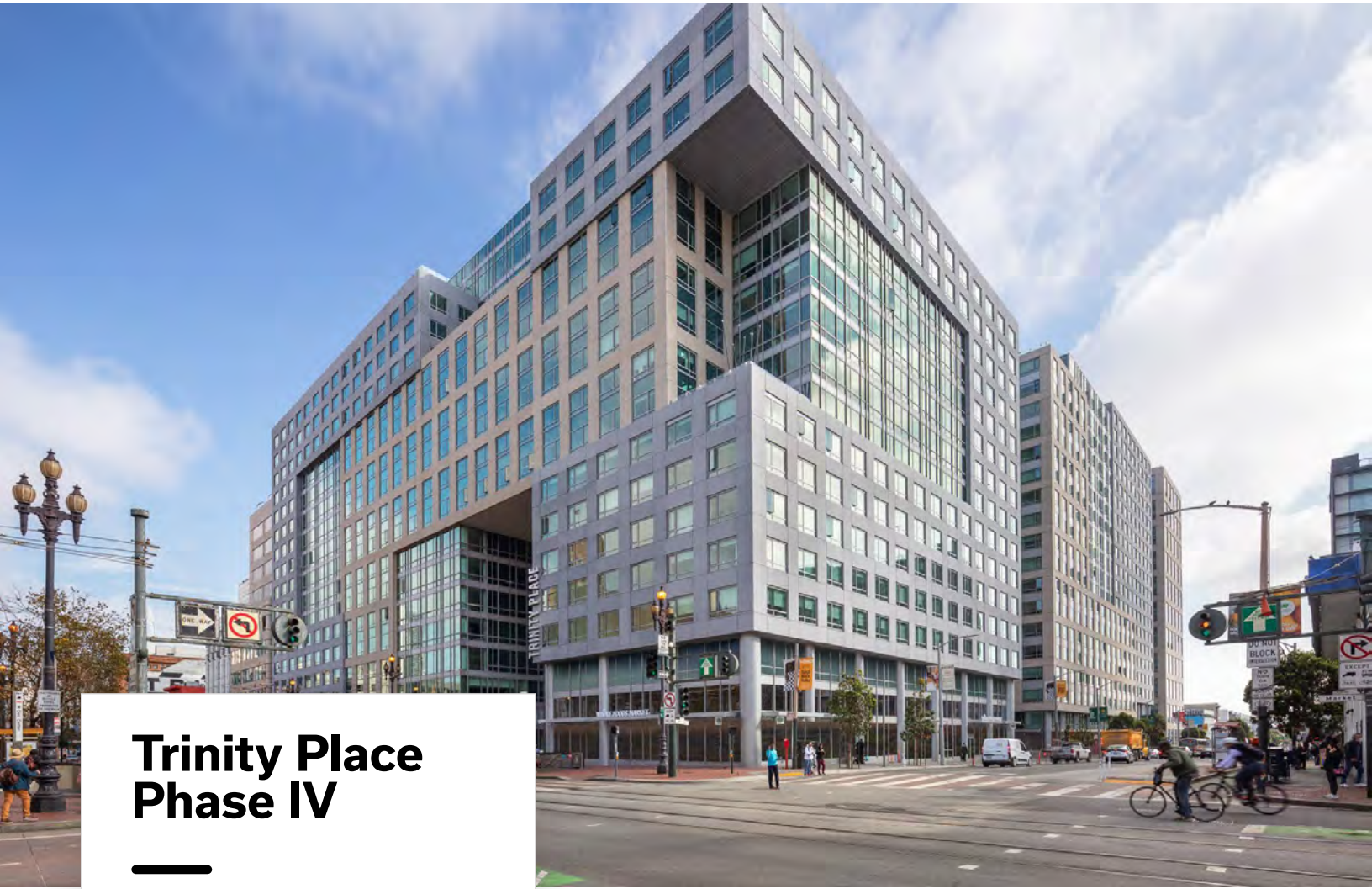
CERTIFICATIONS

Pursuing LEED Gold

All-Electric Design

SPECIAL FEATURES

- Residential towers at the Potrero Power Station
- Block 7: 7-story 417,000 square feet, 322 residential units
- Block 8: 7-story 381,000 square feet, 315 residential units, centralized blackwater plant
- Block 10: 83,040 square feet, 98 residential units



Trinity Place Phase IV

LOCATION

San Francisco, CA

SIZE

738,000 square feet

501 residential units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Technology Design

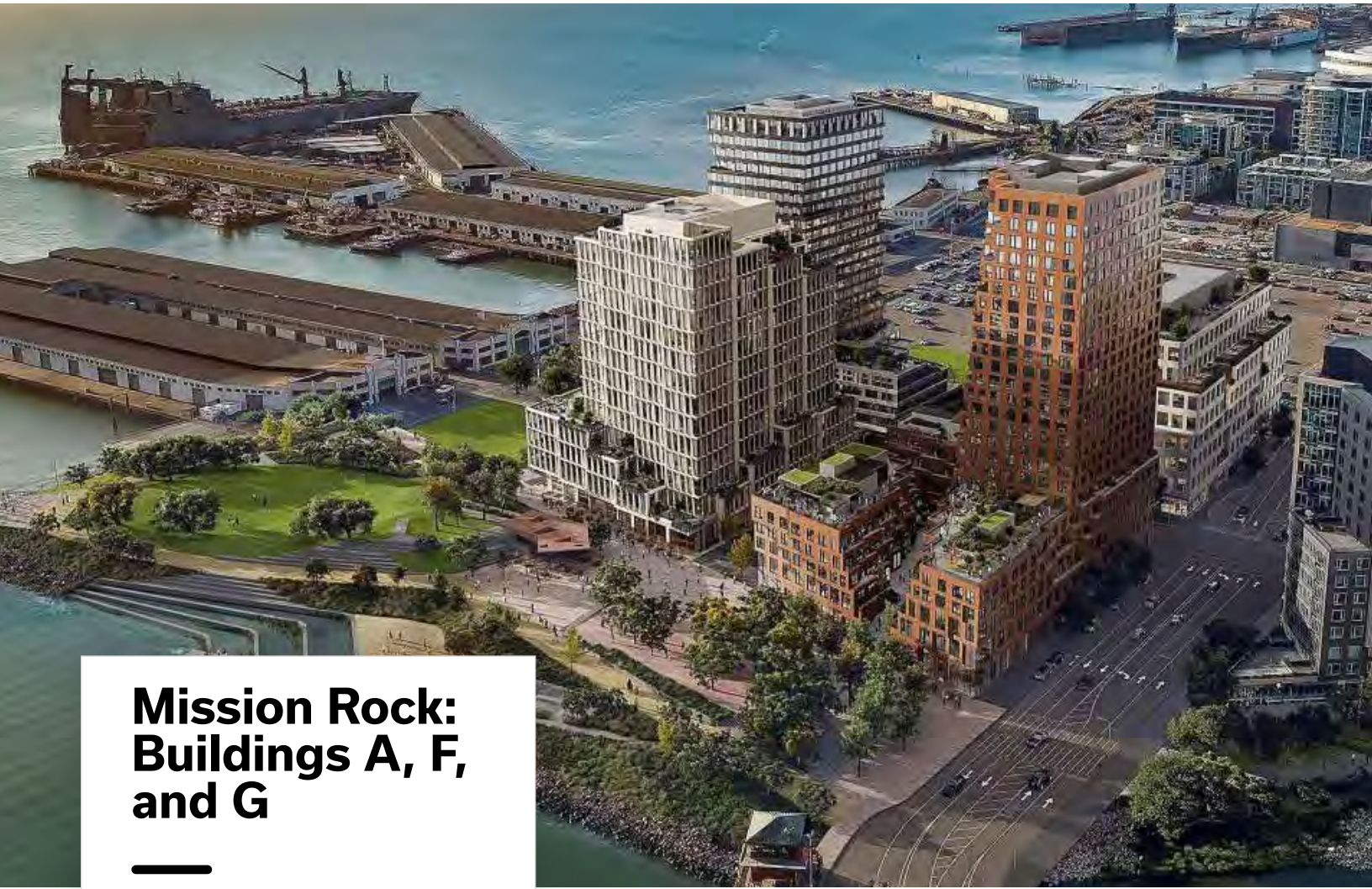
Architectural Lighting Design (Luma)

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- 100% outside air rooftop AC units provide increased ventilation air and improved thermal comfort to residents
- Electric vehicle charging for up to 5% of the total parking spaces
- High-efficiency LED and fluorescent lighting maximize energy savings
- A natural gas fired cogeneration system produces up to 75 kW of electrical capacity for base building electrical loads and utilizes waste heat to produce heating capacity for ventilation air and domestic water heating systems



Mission Rock: Buildings A, F, and G

LOCATION

San Francisco, CA

SIZE

3.5 million square feet

745 rental units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

Architectural Lighting Design (Luma)

CERTIFICATIONS

Pursuing LEED Gold

All-Electric Design

SPECIAL FEATURES

- Blackwater and district energy system includes central chilled water production, heating hot water production, and bay water exchange
- Anticipated to achieve a 65% reduction in annual energy use, a 3.7-million-gallon reduction in annual cooling tower water use, and a 1,760 ton reduction in onsite carbon emissions
- Non-potable water system onsite to treat and reuse available graywater, rainwater, and foundation drainage for toilet and urinal flushing and irrigation



8150 Sunset Boulevard

LOCATION

Los Angeles, CA

SIZE

763,224 square feet

208 residential units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Technology Design

CERTIFICATIONS

Pursuing LEED Silver

SPECIAL FEATURES

- Three mixed use buildings ranging from 3-13 stories
- 61,000 square feet retail
- Underground parking
- Resident amenities include a pool deck, fitness centers, treatment rooms, lounge, and club room with bar and food service areas



Kensington Tower

LOCATION

Salt Lake City, UT

SIZE

577,000 square feet (3,800 square feet of retail)

36 levels

380 rental units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- One 36-story residential building
- PAE is working closely with the architect to create a resilient and healthier building for residences and the greater community at large
- As part of the bidding and design process we are currently working with Jacobsen Construction, HKS, and local MEP sub contractors
- Project includes amenities, ground level retail, parking, gym, dining



Gramercy Apartments

LOCATION

Los Angeles, CA

SIZE

70,000 square feet

64 residential units

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

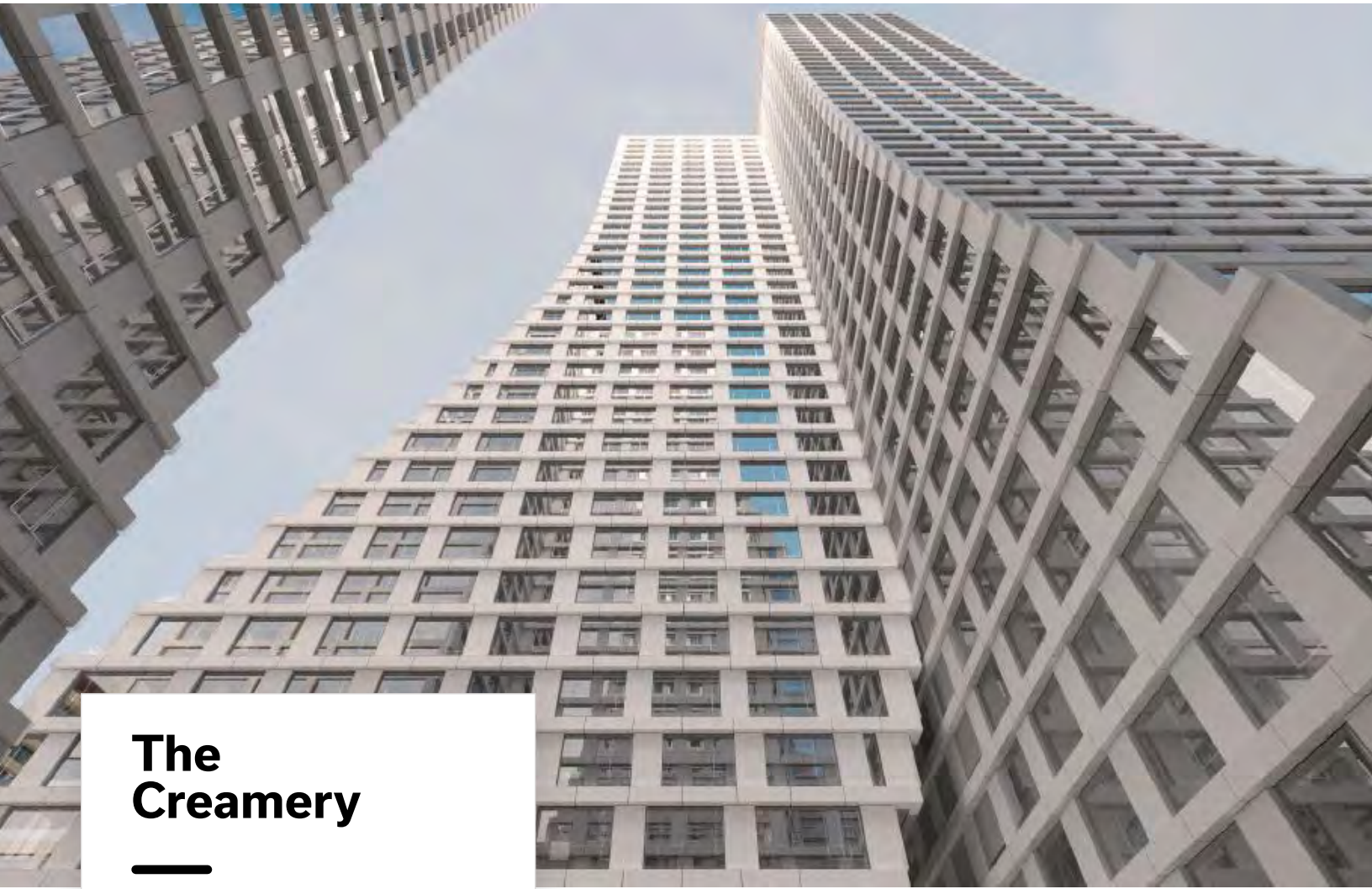
Fire Protection Design

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- The Gramercy Apartments, a senior supportive housing complex, contains multiple sub buildings ranging in height between 2 and 4 stories above one level of below grade parking garage
- Amenities include a community garden, manager's offices, fitness room and future retail location ground level
- Residents will have access to on-site case management, health and well-being management, and other enriching services



The Creamery

LOCATION

San Francisco, CA

SIZE

1,315,500 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- Two 400-foot tall residential towers
- 900 for-lease units, 50-key hotel and retail
- Electric charging for 20% of parking spots
- The base of each tower, through approximately level 20, is stepped to give the towers an L-shaped geometry, which stacks the core elements of the buildings where possible

Higher Education

- University of California - Berkeley
 - Bakar BioEnginuity Hall (Pursuing LEED Gold, All-Electric Design)
 - Helen Diller Anchor House Student Housing (Pursuing LEED Gold)
 - David Blackwell Residential Hall (LEED Gold)
- University of California - San Francisco
 - Health Sciences Instruction & Research Towers Renovation (LEED Gold)
 - Joan and Sanford I. Weill Neurosciences Building (Pursuing LEED Silver)
- University of California - Merced
 - Computational Lab Building
 - Biomedical Sciences and Physics Lab
 - Health and Sciences Building (Pursuing LEED Platinum)
- University of California - Santa Cruz, Environmental Health & Safety Facility, Santa Cruz, CA
- University of California - Davis, Cruess Hall Renovation, Davis, CA (LEED Gold)
- University of California - San Diego
 - Viterbi Laboratory Lighting (Pursuing LEED Silver)
 - The San Diego Supercomputer Center*
- Solano Community College, Biotechnology and Science Building, Fairfield, CA (Pursuing LEED Silver)
- Georgia Tech, The Kendeda Building for Innovative Sustainable Design, Atlanta, GA (Pursuing Living Building, Net Zero Energy, Net Zero Water, Net Zero Wastewater)
- Santa Clara University, The Sobrato Campus for Discovery and Innovation (STEM Lab), Santa Clara, CA
- Oregon Health & Science University, Portland, OR **(100+ Projects)**
- Oregon State University, Corvallis, OR **(100+ Projects)**
- Appalachian State University, Biodiversity Education and Research, Boone, North Carolina
- Portland State University, Portland, OR **(20+ Projects)**
 - Karl Miller School of Business Administration (LEED Platinum)
 - Vanport Building (co-owned by PSU, PCC, OHSU and City of Portland) (LEED Gold, Architecture 2030)
- University of Oregon, Eugene, OR **(15+ Projects)**
- University of Washington, Seattle & Tacoma Campuses, WA
 - Hans Rosling Center for Population Health, Seattle (LEED Platinum, Well Building)
 - Foster School of Business, Founders Hall, Seattle (Pursuing LEED Gold)



DAVID BLACKWELL STUDENT HOUSING
(LEED Gold)



KARL MILLER SCHOOL OF BUSINESS
(LEED Gold)



HANS ROSLING CENTER FOR POPULATION HEALTH
(LEED Platinum)



Bakar BioEnginuity Hub

UNIVERSITY OF CALIFORNIA - BERKELEY

LOCATION

Berkeley, CA

SIZE

94,247 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

CERTIFICATIONS

Pursuing LEED Gold

All Electric

SPECIAL FEATURES

- Wet and dry open labs with rentable benches and private labs for individual companies
- Planned to outperform the California Energy Code by 10% and have an EUI of 81.0 kBtu/SF-Yr, which is 60% better than the average lab building with a similar program
- All electric design with no gas use and carbon fuel on-site use
- Commercial office space will include open cubicle areas, private offices, and conference rooms



Gladys Valley Marine Science Building

OREGON STATE UNIVERSITY

LOCATION

Newport, OR

SIZE

72,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

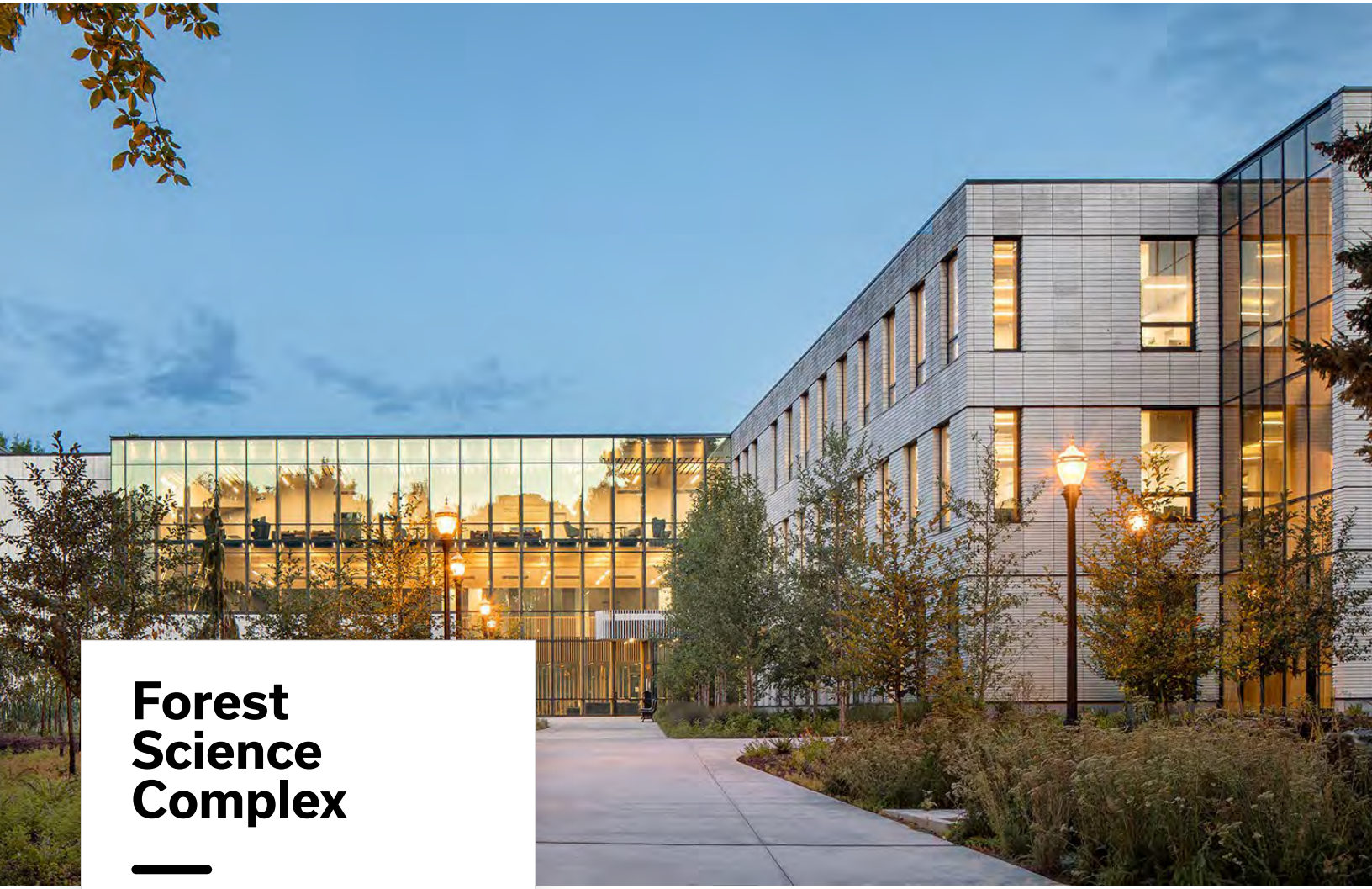
Plumbing Engineering

Architectural Lighting Design (via LUMA)

Technology Design

SPECIAL FEATURES

- One of the first 'vertical evacuation' tsunami sites in the United States for more than 900 people
- Laboratory air systems with hydronic heat recovery
- Control and duct-sizing to maximize air-side economizer hours and minimize cooling plant size
- Hybrid and waterless urinals and low-flow plumbing fixtures
- Illuminated evacuation ramp and tsunami warning beacon lights
- Auditorium lighting serves dual-purpose for entertainment and as a teaching tool
- Site lighting provides safety for students, and protection for the environment and night sky



Forest Science Complex

OREGON STATE UNIVERSITY

LOCATION

Corvallis, OR

SIZE

115,000 square feet

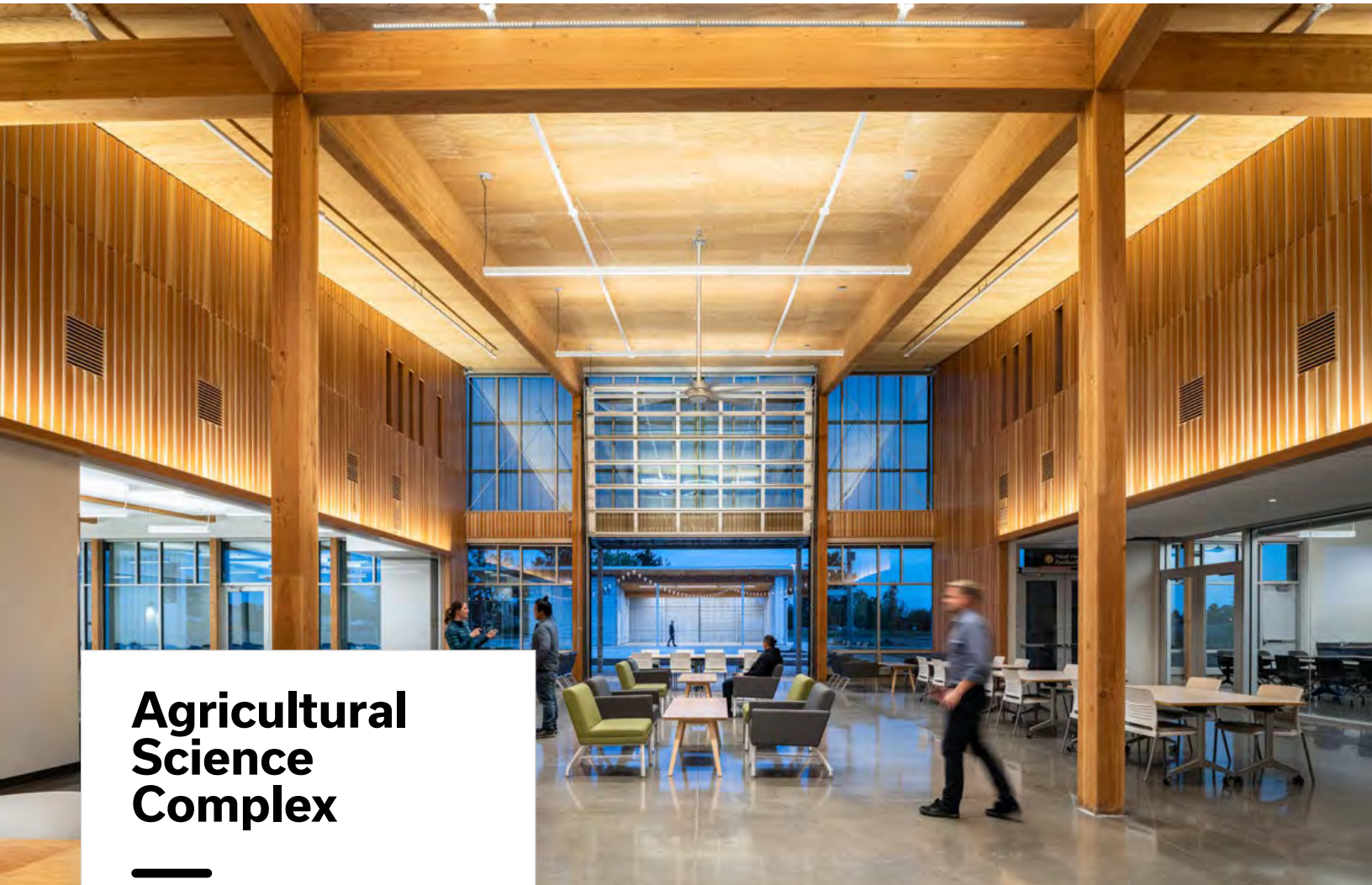
SERVICES

Mechanical Engineering

Fire Protection Engineering

SPECIAL FEATURES

- Renovation of existing buildings, and well as new construction, to serve the University's growing Advanced Wood Products Engineering department
- Two buildings - 18,000 square-foot Advanced Wood Products Laboratory; 90,000 square-foot classroom and office building
- Utilizes a heat recovery chiller with backup heat from the campus steam plant; this system allows for heat recovery from a neighboring building, as well as heat recovery from exhaust air
- In-floor radiant hydronic system and radiant ceiling panels - this radiant system also keeps the ceilings free of HVAC ductwork, preserving architectural aesthetics of the buildings' exposed cross laminated timbers
- Optimized building envelopes and exterior shading systems
- Natural ventilation via operable windows and gravity louvers for passive cooling at low load conditions
- An extensive measurement and verification system will closely monitor all of the building's energy use and display the data in the building lobby to further student education



Agricultural Science Complex

CHEMEKETA COMMUNITY COLLEGE

LOCATION

Salem, OR

SIZE

15,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

CERTIFICATIONS

Designed to LEED Silver

All Electric

Net Zero Energy

SPECIAL FEATURES

- Community and education hub to promote teaching and learning about sustainable agriculture
- Flexible learning and research areas
- Working and collaboration space for students, faculty, staff, and community partners
- A covered arcade along the south façade, utilizing photovoltaic roof structure that will serve double-duty as shelter and to harness energy from the sun to support the building
- Net Zero Energy Pilot Program through PGE
- Radiant floors for heating and cooling
- Mixed-Mode Ventilation using (1) operable windows and turbine ventilators for natural ventilation, and (2) Dedicated Outside Air system to provide mechanical ventilation
- Enhanced thermal performance of the building envelope allowed for reduced mechanical systems
- Heat pump water heater for domestic hot water



Foster School of Business, Founder's Hall

UNIVERSITY OF WASHINGTON

LOCATION

Seattle, WA

SIZE

85,500 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- Operable windows, ceiling fans, and strategic glazing placement provides low energy cooling solutions for key spaces in the building
- Highly insulated envelope greatly reduces mechanical heating needs earning significant energy savings
- Energy Use Intensity (EUI) of 27 compared to an EUI of 40 for a typical code school building
- Fossil-fuel free building
- Cross-laminated timber decking reduces the building's embodied carbon by 58%



Hans Rosling Center for Population Health

UNIVERSITY OF WASHINGTON

LOCATION

Seattle, WA

SIZE

300,000 square feet

SERVICES

Mechanical Engineering

Building Performance Analysis

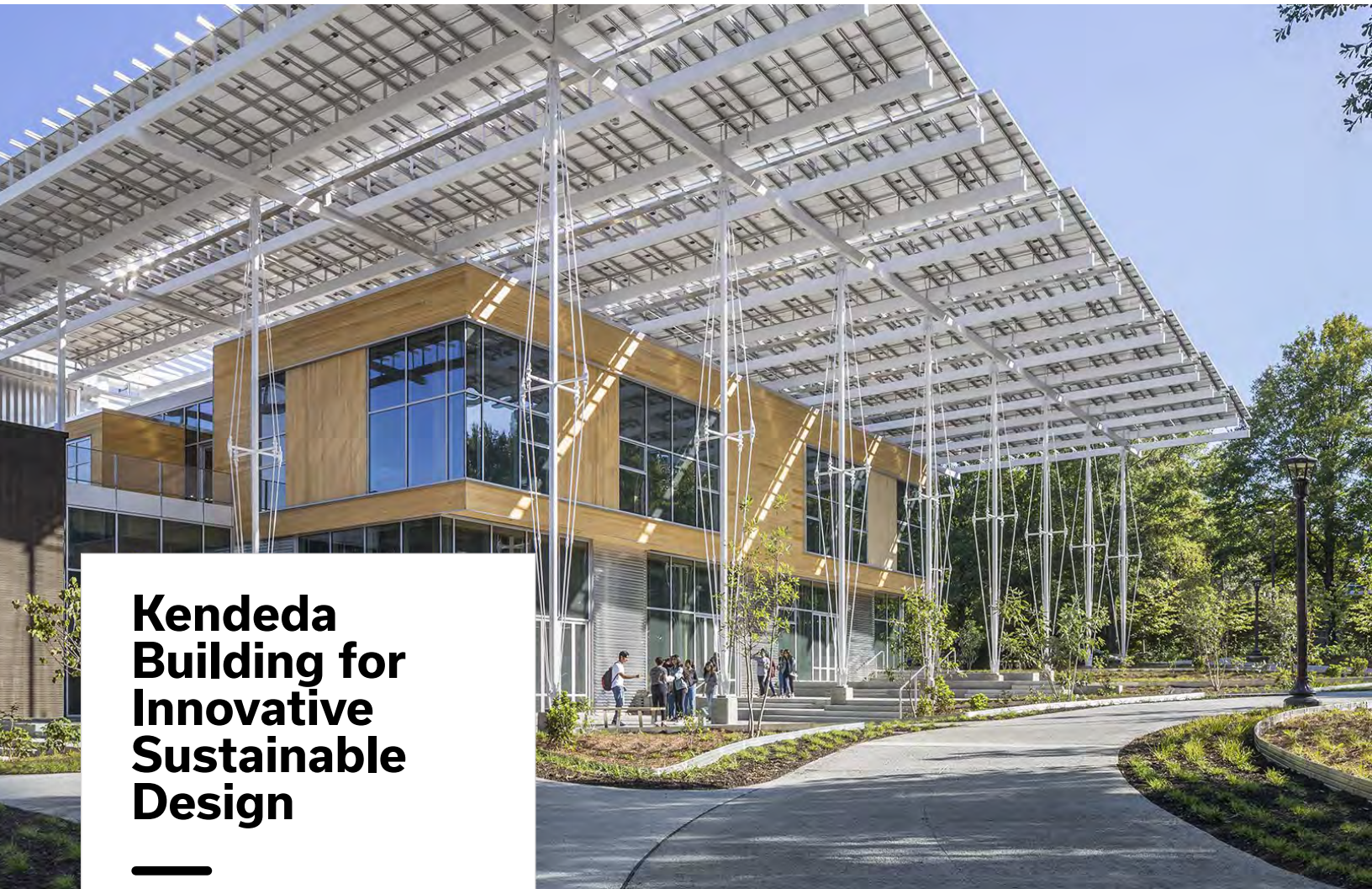
CERTIFICATIONS

LEED Platinum

WELL Building

SPECIAL FEATURES

- Classroom & laboratory spaces
- Rainwater and greywater reclamation systems
- Heat recovery pump
- Targeting 18-24% energy savings from ASHRAE baseline
- PV array provides 5% of buildings energy needs
- 30% more ventilation than required by LEED goals and WELL standard
- Heat recovery chillers heat building with 400% efficiency



Kendeda Building for Innovative Sustainable Design

GEORGIA INSTITUTE OF TECHNOLOGY

LOCATION

Atlanta, GA

SIZE

37,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Renewable Energy System Design

CERTIFICATIONS

Living Building

SPECIAL FEATURES

- The building uses the campus chilled water loop as its heat source in the winter via a heat recovery chiller
- Radiant flooring distributes heating and cooling efficiently
- 320 kW of rooftop photovoltaic panels create a net positive solar array
- Onsite energy storage
- Air curtains at doorways act as a barrier to outside air coming in
- Condenser water heat recovery
- Rainwater reclamation for potable uses
- Composting toilets

Laboratories

- Confidential Science Village, San Diego, CA (Pursuing Net Zero Energy)
- Project Blossom Basis of Design, Los Angeles, CA
- Torrey View Offices + Labs Lighting, San Diego, CA
- 9919 Jefferson Office & Research Lab Building, Culver City, CA
- 580 and 800 Dubuque Labs, South San Francisco, CA (Pursuing LEED Gold)
- Burlingame Life Science Development, Burlingame, CA (Pursuing LEED Silver, All Electric)
- 701 Dexter, Seattle, WA (Pursuing LEED Gold)
- 400 Dexter, Seattle, WA
- BioMed Realty, 500 Fairview Research Building Core & Shell, Seattle, WA (Pursuing LEED Silver)
- BioMed Realty, Lincoln Centre Life Sciences Research Campus, Foster City, CA (Pursuing LEED Gold)
- Oyster Point Life Sciences Complex, South San Francisco, CA (Pursuing LEED Gold)
- Meta, various locations
 - MPK17 Laboratory, Menlo Park, CA
 - MPK18-2S Pebbles Laboratory, Menlo Park, CA
 - Reality Lab, San Diego, CA
- Oregon Health and Sciences University, Knight Cancer Research Lab, Portland, OR (Architecture 2030, LEED Platinum)
- Intuitive Surgical Laboratory, Sunnyvale, CA (LEED Gold)
- Stanford Research Institute Campus Redevelopment, Menlo Park, CA (Pursuing LEED Gold, All Electric)
- Relativity Space Headquarters & Laboratories, Long Beach, CA*
- Virgin Orbit (includes clean rooms and manufacturing space), Long Beach, CA*
- Nantkwest Immunity Bio Research and Manufacturing Laboratory, El Segundo, CA*
- Apeel Sciences Offices and Laboratories, Goleta, CA*
- LOTT Alliance Water Quality Laboratory, Olympia, WA (LEED Platinum, Arch 2030)
- PeaceHealth, St Joseph Medical Center, Laboratory Remodel, Bellingham, WA

* Denotes projects completed by PAE staff prior to joining firm.



OHSU KNIGHT CANCER RESEARCH CENTER
LEED Platinum



BURLINGAME LIFE SCIENCE
Pursuing LEED Silver, All Electric



9919 JEFFERSON



Mission Rock, Building B

LOCATION

San Francisco, CA

SIZE

275,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

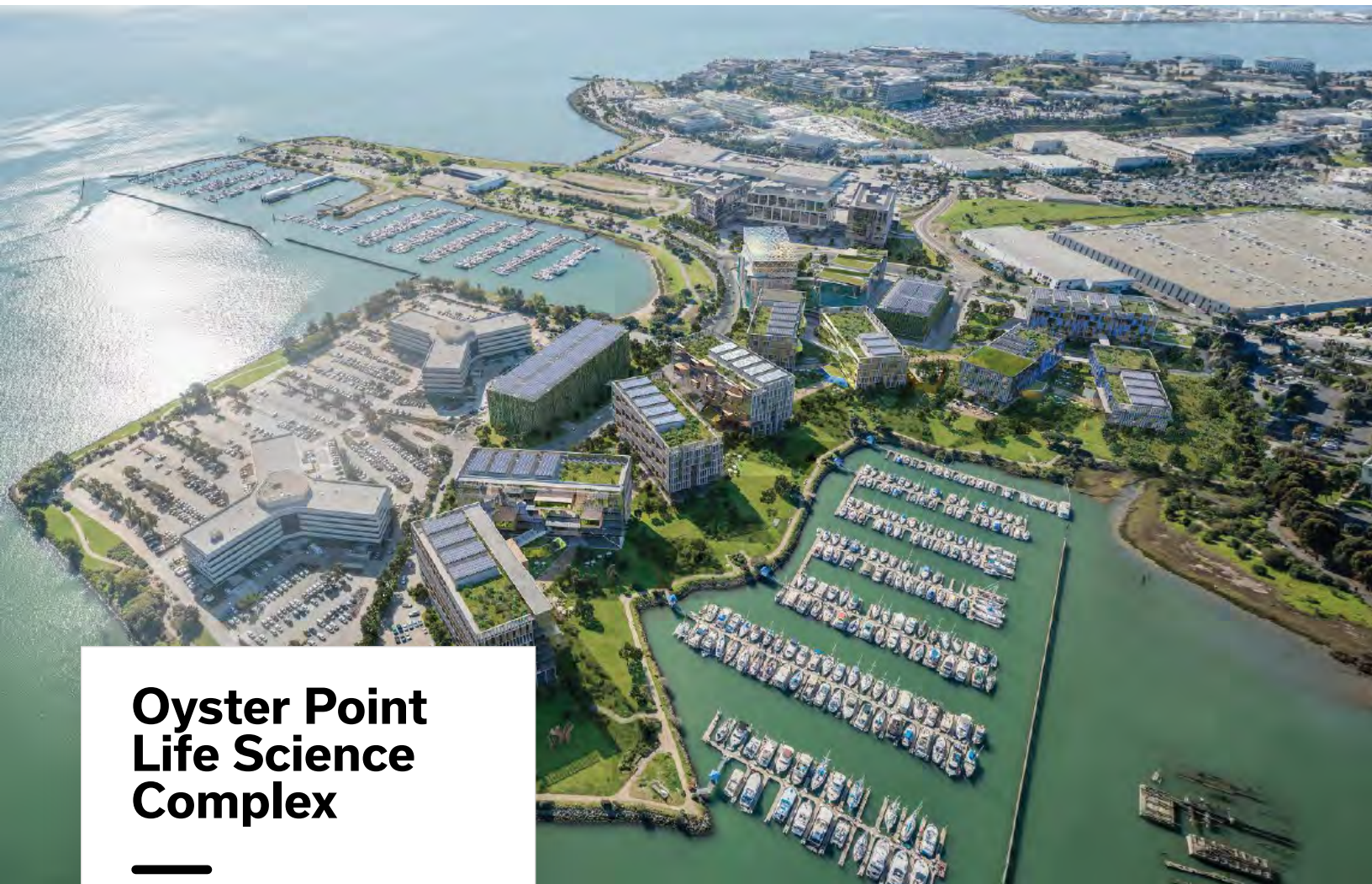
Building Performance Analysis

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- 8-story core and shell office to life science conversion
- 1 floor ground level retail
- Central district energy plant serves building with chilled water and heating water
- Central black-water plant serves building
- All-electric design
- Building initially designed as core and shell office, PAE re-designed before construction to be a lab-ready building



Oyster Point Life Science Complex

LOCATION

South San Francisco, CA

SIZE

1.7M square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- The project includes approximately 1,700,000 square feet of life science core and shell buildings, comprised of 8 high rise towers
- Targeted to achieve approximately 13.5% energy savings and providing 37,000 square feet of PV on the parking garage roofs
- All-electric design



400 Dexter Research Lab

LOCATION

Seattle, WA

SIZE

6,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

SPECIAL FEATURES

- 2 floors of Vivarium Lab space for animal housing, procedure spaces, and husbandry activities
- 100% Redundant Air Handling and Exhaust Systems
- 72 hour Backup by 2.5MW generator for all critical systems (AHU's, Chiller, Building Controls, Lights)
- 100% Redundant Electrical power infrastructure.
- Advanced controls to maintain tight pressure relationships



Image: Perkins & Will

580 Dubuque Office and Lab

LOCATION

South San Francisco, CA

SIZE

420,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

Technology design

Architectural Lighting Design (LUMA)

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- The project includes a 10-story core and shell speculative office and laboratory space
- 5 floors of above grade parking, along with a lobby and loading dock



570 Mercer Life Sciences

LOCATION

Seattle, WA

SIZE

200,000 square feet

SERVICES

Mechanical Engineering

Plumbing Engineering

CERTIFICATIONS

Pursuing Living Building Challenge

SPECIAL FEATURES

- 8-story core and shell life sciences and office building
- The building will include two levels of below grade parking, first floor retail space, and exterior amenity spaces



701 Dexter Office and Research Lab

LOCATION

Seattle, WA

SIZE

310,000 square feet

SERVICES

Mechanical Engineering

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- The project includes a 11-story core and shell research laboratory building with office space
- 3 floors of below grade parking, street level retail, locker rooms, bike storage, rooftop amenity decks, and conference spaces



Burlingame Life Sciences Development

LOCATION

Burlingame, CA

SIZE

1.5 M square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

CERTIFICATIONS

Pursuing LEED Silver

All Electric

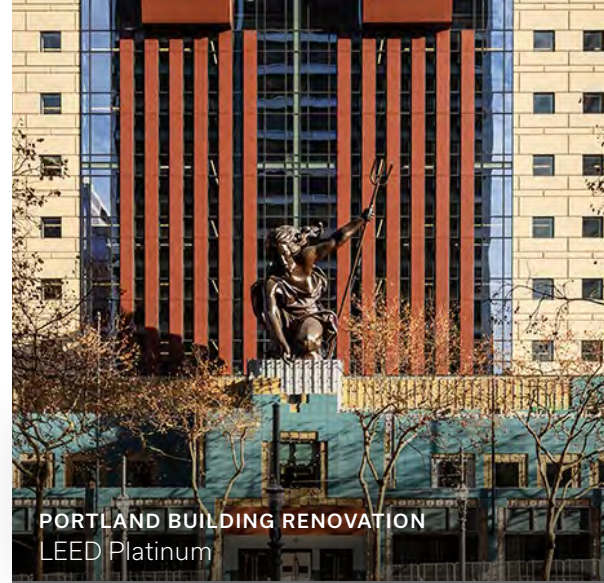
SPECIAL FEATURES

- Three separate life science and office high rise tower, with retail, and parking garage structures
- Core and Shell MEP infrastructure to support Life Science tenants, with an approximate overall building program split of 60% laboratory and 40% office.
- Provision has been made for vivaria on up to three levels

Civic and Cultural

- The Music Center, Music Center Plaza, Los Angeles, CA*
- Academy of Motion Pictures Arts & Sciences, Samuel Goldwyn Theater, Beverly Hills, CA*
- Plaza Theatre Renovation, Palm Springs, CA*
- Millennium Theatre, Los Angeles, CA*
- Museum of Riverside historical renovation and addition, Riverside, CA
- Bainbridge Art Museum, Bainbridge Island, WA
- Nordic Heritage Museum, Seattle, WA
- Congregation Kol Ami Synagogue, Vancouver, WA
- Federal Way Performance Arts Building, Federal Way, WA
- Foss Waterway & Maritime Museum, Tacoma, WA
- Patricia Reser Center for the Arts, Beaverton, OR
- Multnomah East county Flagship Library, Gresham, OR (Pursuing LEED Gold, Living Building Petal Certification)
- Oregon Coast Aquarium Phase II, Newport, OR
- Point Defiance Zoo & Aquarium, Pacific Rim Aquarium, Tacoma, WA
- Unitarian Universalist Retreat Center, Bend, OR
- Oregon Zoo, Portland, OR
 - New Elephant Habitat (LEED Gold)
 - Master Plan & Campus System Implementation
 - Education Center (LEED Platinum, Net Zero Energy)
- Seattle Aquarium Expansion Concept Phase, Seattle, WA
- Latino Network, Gresham, OR (Pursuing LEED Silver)
- Newport Performing Arts Center Expansion, Newport, OR
- Curran Theater Historic Renovation, San Francisco, CA
- Presidio Tunnel Tops, Crissy Field Center, San Francisco, CA (Pursuing Beyond Net-Zero Energy, Net-Zero Water, LEED Platinum)
- Newark Civic Center, Newark, CA
- Portland Building Renovation, Portland, OR (LEED Platinum, All Electric)
- Portland Japanese Gardens, Portland, OR

* Denotes projects completed by PAE staff prior to joining firm.





Academy of Motion Picture Arts and Sciences

LOCATION

Beverly Hills, CA

SIZE

46,000 square feet

SERVICES

Electrical Engineering

* Project completed by PAE staff prior to joining firm.

SPECIAL FEATURES

- Full renovation of the Academy of Motion Pictures Arts & Sciences 1970s Headquarters on Wilshire Boulevard.



Portland Japanese Gardens

LOCATION

Portland, OR

SIZE

10,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Architectural Lighting (LUMA)

SPECIAL FEATURES

- The new additions to the gardens were designed to expertly enhance the visitor's experience with quiet, unobtrusive systems and illuminations.



Pacific Seas Aquarium, Point Defiance Zoo & Aquarium

LOCATION

Tacoma, WA

SIZE

31,000 square feet

SERVICES

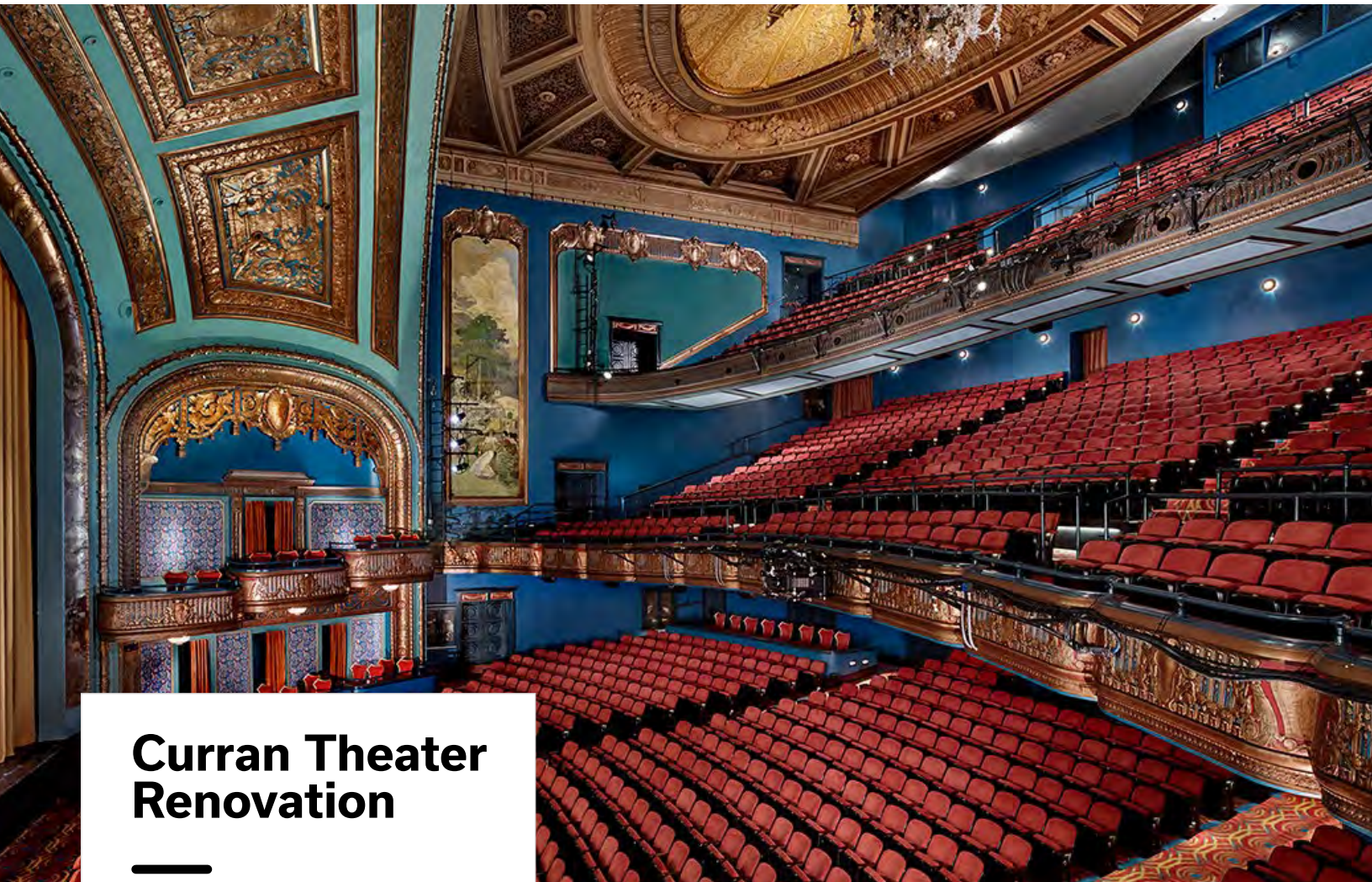
Building Performance

Technology Design

Architectural Lighting Design (LUMA)

SPECIAL FEATURES

- The aquarium renovation and expansion project from PAE is one of the only all-electric large aquariums in the country.
- Pursuing 30% energy efficiency than code requirements
- Pursuing 50% potable water efficiency than code requirements
- 100% outside air system provides exceptional indoor air quality
- Heat-recovery air-to-water heat pump and heat-pump recovery loop reduce energy and operational costs while providing effective heat exchange
- Radiant floors provide active heating
- Rainwater-reclamation system for flushing toilets



Curran Theater Renovation

LOCATION

San Francisco, CA

SIZE

25,000 square feet;
1,667 person capacity

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

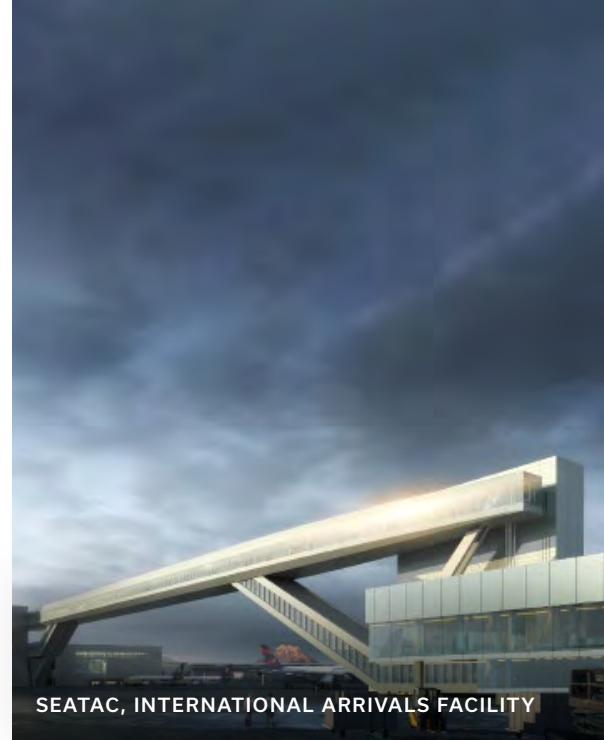
Technology design

SPECIAL FEATURES

- The design features energy efficient HVAC and lighting systems, and lighting controls that include LED technology, daylight harvesting, and automatic shut off controls.
- In utilizing as much of the existing pathways, duct work, and plenum spaces as possible, PAE helped to preserve the historic nature of the building.

Aviation

- SeaTac International Airport, Seattle, WA
 - International Arrivals Facility (Pursuing LEED Silver)
 - Concourse C Retail Expansion
 - Mechanical & Electrical IDIQ
 - Vertical Conveyance IDIQ
- Portland International Airport, Portland, OR
 - Headquarters & Parking Structure HQP2 (LEED Platinum, Arch 2030)
 - Terminal Core Redevelopment (TCORE)
 - Parking Addition & Consolidated Rent-a-Car Facility (PACR)
 - Terminal Expansion North
 - Terminal Expansion South
 - In-Line Baggage Handling System
 - Flight Information & Paging System
 - Virgin/American Airlines Ticket Counter & Office
 - Terminal Area Master Plan
 - Tenant Design Standards Update
 - Controls Upgrade
 - Heating Water Replacement
 - Air Rescue & Fire Fighters Storage Building
 - Concourse A HVAC Replacement
 - Delta Concourse 'K' Expansion (current Concourse E)
 - Multiple User Flight Information Display Systems
 - Multiple On-Call Projects
- San Jose International Airport, San Jose, CA
 - Multiple On-Call projects
- Southwest Oregon Regional Airport, North Bend, OR
 - New Control Tower
 - New Passenger Terminal
- Charles M. Schulz, Sonoma Airport Expansion, Sonoma County, CA
- King County International Airport Renovations, Seattle, WA
- Pasco Tri-Cities Airport Renovation & Addition, Pasco, WA



SEATAC, INTERNATIONAL ARRIVALS FACILITY



PORTLAND INTERNATIONAL AIRPORT, HQP2



PORTLAND INTERNATIONAL AIRPORT, CONCOURSE E



Portland International Airport, Terminal Expansion & Renovation

LOCATION

Portland, OR

SIZE

776,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Fire Protection

Technology Design

Architectural Lighting Design (Luma)

SPECIAL FEATURES

- Among the largest projects in the airport's history, this major renovation and addition to the terminal will double the size of the current ticketing and lobby area
- The complex phasing of design and construction was done while the facility was fully operational
- Open loop ground source heating and cooling system providing fossil fuel free heating for 95% of the year
- Decommissioned steam heating plant replaced with new heating plant in the resilient portion of the terminal building
- Installation of an emergency generator in the seismically resilient portion of the terminal building



SeaTac International Arrivals Facility

LOCATION

Seattle, WA

SIZE

458,000 square feet

SERVICES

Mechanical Engineering

Plumbing Engineering

Architectural Lighting Design (Luma)

CERTIFICATIONS

Pursuing LEED Silver

SPECIAL FEATURES

- Extensive 3D coordination including clash detection
- Working with contractors to reduce cost of the mechanical system without compromising the design
- Aiding in the sequencing of construction in order to maintain 24/7 airport operation
- Purple pipe flush system will connect to future rainwater collection system



Port of Portland Headquarters

LOCATION

Portland, OR

SIZE

205,000 square feet office

1.2M square feet parking

SERVICES

Mechanical Engineering

Electrical Engineering

Fire Protection

Technology Design

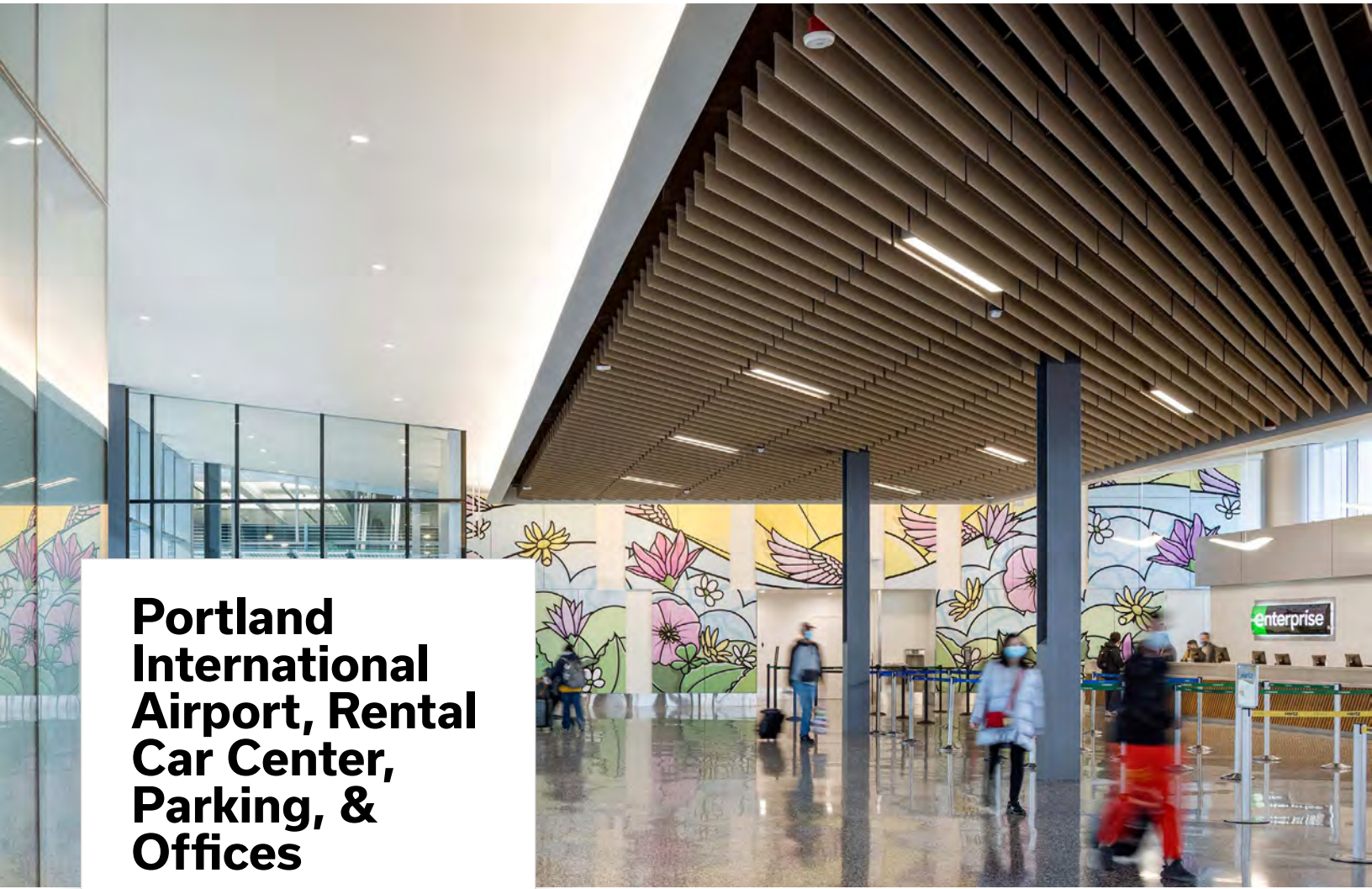
Building Performance Analysis

CERTIFICATIONS

LEED Platinum

SPECIAL FEATURES

- 200 vertical closed-loop geo-exchange boreholes provide renewable heating and cooling source
- Living machine to treat wastewater onsite
- Reclaimed water for toilet flushing
- Low-flow plumbing fixtures
- Radiant heating and cooling with heat recovery and dedicated outside-air ventilation
- Efficient daylighting controls
- Achieved 50% energy efficiency
- Achieved 80% potable water efficiency



Portland International Airport, Rental Car Center, Parking, & Offices

LOCATION

Portland, OR

SIZE

95,000 square feet office

1.6M square feet parking/rental car return

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Fire Protection

Technology Design

Architectural Lighting Design (Luma)

SPECIAL FEATURES

- Resilient design of power, water, and sewer systems for four days of emergency operation at the operations center
- 84.24 kW of building integrated PV array panels
- Radiant panels for comfortable heating and cooling
- Dedicated fresh air system with heat recovery
- 30% energy savings when compared to a code building
- 75% potable water use reduction

Sports Facilities

- University of Oregon, Eugene, OR
 - Hayward Field Renovation and Expansion
 - Marcus Mariota Sports Performance Center
- Seattle Storm Center for Basketball Performance, Seattle, WA (Pursuing LEED Gold)
- Nike World Headquarters Expansion, including Michael Krzyzewski Fitness Center, Washington County, OR (Pursuing LEED Platinum)
- Portland State University, Stott Center and Viking Pavilion, Portland, OR (LEED Gold)
- Western Washington University, Carver Hall, including Physical Education, Health, and Recreation Department, and gymnasiums, Bellingham, WA (Pursuing LEED Silver)
- Timbers Stadium Conversion and Addition (formerly PGE Park), Portland, OR (LEED Silver)
- Clatsop Community College, Patriot Hall Community Health and Fitness Center, Astoria, OR (Pursuing Net Zero Energy)
- City of Bend, Parks + Rec Department, Simpson Pavilion (sports facility and ice rink), Bend, OR
- Bend Parks + Rec District, Alpenglow Community Park, Bend, OR
- Oregon State University, Patrick Wayne Valley Stadium Upgrade (competitive-play outdoor soccer field), Corvallis, OR
- Sports & Performance Facilities - Liberty High School (softball and baseball fields, fieldhouse, grandstand, locker rooms), Hillsboro, OR
- American Airlines Arena, Miami, FL*
- American Airlines Center, Dallas, TX*
- Diamondbacks / Rockies Spring Training Complex, Scottsdale, AZ*
- Lucas Oil Field - (Indianapolis Colts), Indianapolis, IN*
- Princeton University Stadium, Princeton, NJ*
- Rangers Stadium, Arlington, TX*
- Stockton Events Center, Stockton, CA*

* Denotes projects completed by PAE staff prior to joining firm.



HAYWARD FIELD RENOVATION AND EXPANSION



BEND, PARKS + REC DEPT, SIMPSON PAVILION



SEATTLE STORM CENTER FOR BASKETBALL PERFORMANCE

**MARCUS
MARIOTA**
SPORTS
PERFORMANCE
CENTER

MAHALO
PHIL & PENNY
KNIGHT
THE RANDY PAPE FAMILY
ED AND CYNTHY MALETIS
RANDY AND LOUI MOPHERSON
GEORGE AND MONICA ROSEFIELD
MICHAEL G. SCHINDLER
JAN AND PETER JACOBSEN FAMILY
MURPHY FAMILY
WILLIAM AND DEBRA LARSON
DAVID S. BREWER FAMILY
TERRY L. HARRINGTON
DON AND NANCY SMITH

Mariota Sports Performance Center

UNIVERSITY OF OREGON

LOCATION

Eugene, OR

SIZE

25,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Telecommunications

Audio Visual Design

SPECIAL FEATURES

- The center houses cutting-edge sports-performance technology: performance testing areas; movement monitoring; fitness, equipment, and uniform storage; high-density compact storage; office space; and laundry facilities
- There are onsite motion-capture cameras and force-plate instruments for performing diagnostic tests and motion analysis
- PAE designed the supporting infrastructure for the sports-analysis equipment, working closely with exhibit designers to ensure technology systems were tightly integrated with the building's existing structure

Seattle Storm Center for Basketball Performance

LOCATION

Seattle, WA

SIZE

50,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

Architectural Lighting Design (Luma)

CERTIFICATIONS

Pursuing LEED Gold

All-Electric Design

SPECIAL FEATURES

- The first center in the U.S. to be specifically built for a professional women's sports team
- An all-female team of designers from PAE
- Heat pump water heaters
- Commercial cooking kitchen using electric heat
- No refrigerants within the building
- High performance envelope 15% better than Seattle Energy Code



Hayward Field Expansion

UNIVERSITY OF OREGON

LOCATION

Eugene, OR

SIZE

277,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Fire Protection

Telecommunications

Audio Visual Design

SPECIAL FEATURES

- In addition to increasing the capacity of the stadium, new support spaces will be created including locker rooms, concessions, a kitchen and the Bowerman Sports Science Center
- A new, nine-story tower will be built holding exhibits, conference rooms, an observation deck, and a training staircase to the top of the building
- To ensure the upgrades were benefitting everyone using the stadium, the PAE team organized special coordinated efforts with key stakeholders
- A robust fiber optic infrastructure was designed to provide ample headroom for future broadcast technologies, WiFi, and DAS, and the technology design also included the option to switch to a high density, multiple antennae wireless access point system



Virginia Mason Athletic Facility Master Plan

LOCATION

Renton, WA

SIZE

200,000 square feet

SERVICES

Master Planning Services

Mechanical Systems Evaluation + Design

Electrical Systems Evaluation + Design

The Virginia Mason Athletic Center ("VMAC") is the state-of-the-art training facility for the Seattle Seahawks. The private practice facility is situated on 19 acres of mixed use property, and includes a permanent indoor practice facility, three outdoor practice fields, and houses all business and football aspects of the organization, such as player meeting space and administrative office space. The facility also includes access for over 31,000 fans to attend Training Camp.

SPECIAL FEATURES

- Evaluation of the existing mechanical and electrical systems in the VMAC facility, including options to modernize existing spaces, as well as expand the facility
- Assessment of the facility for the remodel of the Training Room, Hydrotherapy Room, Cardio Deck Expansion, Production Space Expansion, Short Field/Large Room for Film Study, and the Kitchen/Cafeteria