Technology

PAE

About PAE

PAE

Established in 1967 with six offices along the West Coast from Seattle to Los Angeles, PAE is a firm of over 350 providing services in mechanical, electrical, and plumbing engineering, building performance analysis, technology design, and architectural lighting design by LUMA, a service group within PAE. We work with clients to design the highest performing built environments that help us achieve our vision for a world with clean air, energy, and water for all.

Our Technology Solutions

Our firm is fully integrated and we strategically work together whether on our shared projects, to develop cross-functional solutions, or to pioneer something entirely new. Our engineering, lighting, building performance analysis, and technology teams sit side-by-side. This type of dynamic environment fosters diverse perspectives all dedicated to developing climate-smart strategies.

With over 30 years of expertise, our technology team has consistently led the way in systems design. We actively drive conversations surrounding best practices and innovations, participate in national conferences, and engage with both industry and sector-specific organizations. This extensive experience empowers us to deliver efficient and creative solutions that work.

WiredScore Accredited

The WiredScore technology systems rating demonstrates that the building has been well planned to ensure wired connectivity now and for the future. It also includes an emphasis on resiliency and redundancy, and consideration for constant technological improvements. For tenants, the benefit is in knowing your connectivity is secure, and for owners, it's in being able to promise more to tenants and let lease rates reflect that.

Collaboration in a safe and secure environment

Experiential Impact

Accessibility to information

Artistic Impact

Sectors and Services

PAE's technology consulting group works in partnership with our clients to provide tailored solutions that are reliable and robust. We design systems that allow the built environment to connect, collaborate, and inspire. We listen to each user group and design intuitive audiovisual systems, dynamic wired and wireless communications infrastructure, local area networks, and physical security in all sectors of the built environment.

- HIGHER EDUCATION
- CULTURAL AND CIVIC
- HOUSING AND HOSPITALITY
- HEALTHCARE
- GOVERNMENT
- LABORATORIES
- COMMERCIAL OFFICE
- MISSION CRITICAL
- K-12 EDUCATION

Electronic Safety and Security

In-Building Wireless DAS

Data Centers

WLAN and WMN mobility

IT Pathways and Space

Outside Plant Cabling

Structured Cabling

Audiovisual

Clinical/Health Care Systems

Sustainability

Sustainable Design Philosophy

Sustainable design is a long-standing PAE focus with nearly 100 LEED Platinum buildings, 5 certified Living Buildings, 14 Net Zero energy, and 41 All-Electric projects with many more on the way. More than a certification, our sustainable projects bring lower operation costs to owners and tenants, and use fewer natural resources.

Technology in Living Buildings

In building truly sustainable and regenerative projects such as Living Buildings, the role of technology has often been downplayed or even looked at as a burden. However, technology such as telecommunications, security, and A/V can greatly impact the goals of a project and can even be a boon to achieving Living Building certification.

By integrating technology goals into a project early, designers can be mindful of energy loads and work to minimize impacts. For example, A/V might look to be a large energy user, but by designing strategically we can still include the important collaborative features while also minimizing the energy impact.

Moreover, advanced technology is extremely important to tenants and occupants. With smart design and a range of technology options, projects can include high-quality, advanced tech while avoiding over consumption of power. If the design is not mindful of important systems and features, it could have a negative impact on the user experience as well as a large energy impact.

By designing with technology in mind, a project can take back physical space using passive systems or even by removing a telecom room. It can create a dynamic and collaborative digital space that can increase a community's belonging while still being sustainably responsible. By planning ahead and knowing options, projects do not have to compromise on technology to achieve a project's sustainable goals.

19

LIVING BUILDINGS

5 ACHIEVED, 14 PURSUING

99

LEED PLATINUM BUILDINGS

52 ACHIEVED, 47 PURSUING

44

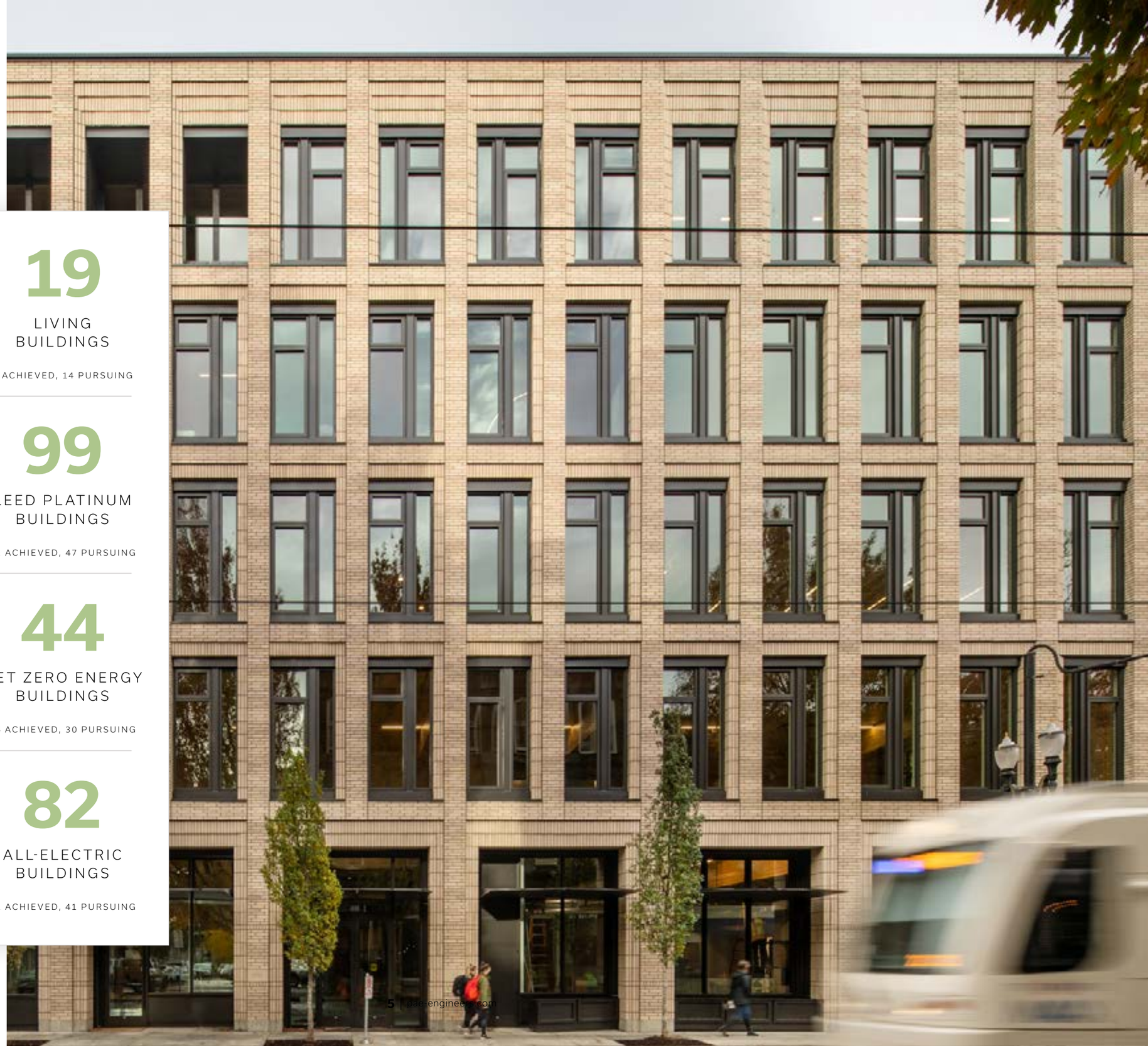
NET ZERO ENERGY BUILDINGS

14 ACHIEVED, 30 PURSUING

82

ALL-ELECTRIC BUILDINGS

41 ACHIEVED, 41 PURSUING



Stanford Healthcare Block E Medical Office Building

LOCATION

Redwood City, CA

SIZE

265,000 square feet medical office building
272,500 square feet parking garage

SERVICES

Mechanical Engineering
Electrical Engineering
Plumbing Engineering
Technology Design
Architectural Lighting Design (LUMA)

CERTIFICATIONS

Pursuing LEED Silver

SPECIAL FEATURES

- New 9-story medical office building (MOB), including a 3 story plinth and 4-story parking garage
- Two floors of the plinth will be shelled, as well one adjacent floor of the MOB for a future tenant improvement
- Block E will be HCAI/OSHPD Level 3 and consist of various medical support service such as urgent care, physical therapy, medical specialties, plastics, pharmacy, and patient exam space

Knight Cancer Research Building

OREGON HEALTH & SCIENCE UNIVERSITY

LOCATION

Portland, OR

SIZE

300,000 square feet

SERVICES

Mechanical Engineering
Electrical Engineering
Building Performance Analysis
Technology Design
Architectural Lighting Design (LUMA)

CERTIFICATIONS

LEED Platinum, Architecture 2030

SPECIAL FEATURES

- Wet Labs, bio-computing, research support space, vivarium, conference center, parking, and retail areas
- A cascading air system saves energy by reusing conditioned air from office spaces in the lab as makeup air for the required exhaust
- Variable speed lab exhaust fans respond to exterior wind conditions and reduce energy use
- Heat recovery chiller and air-side heat recovery
- LED lighting technology
- Pursuing 35% energy efficiency
- Pursuing EUI of 99 kBTU/sf/yr

Kaiser Permanente Bellevue Campus Infrastructure Master Plan

LOCATION

Bellevue, WA

SIZE

275,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

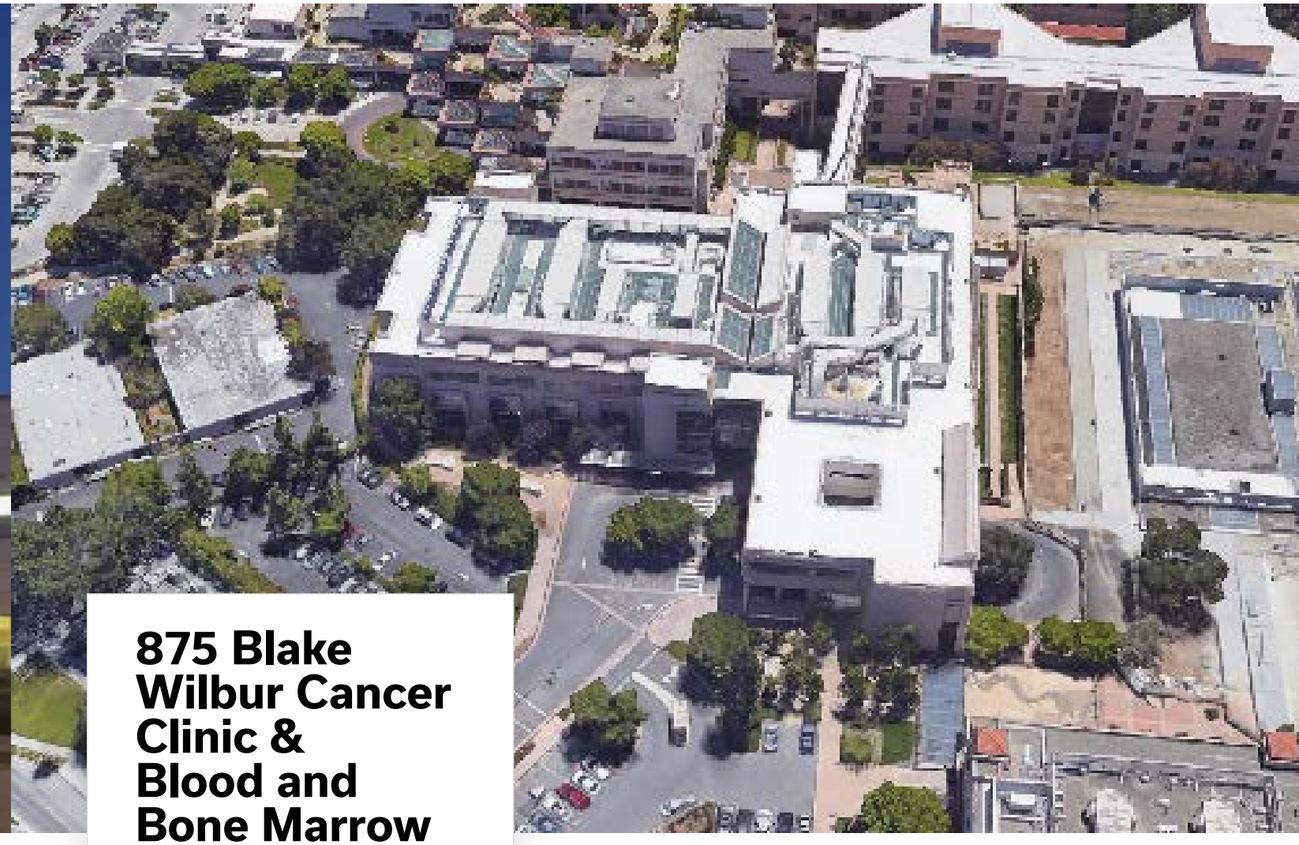
Technology Design

Building Performance Analysis

Lighting Upgrade

SPECIAL FEATURES

- The purpose of this project is to increase the building performance in three categories: deferred maintenance, existing operational issues, and energy reduction
- In order to evaluate the best solutions for the project objectives, PAE reviewed the existing conditions, observed the installed systems onsite, analyzed the Energy 350 report dated 10/19/2021, performed calculations and a data analysis exercise from 2 years worth of BMS data, and finally created an energy model to validate the solutions against energy performance
- Project included providing measures for costing, and an an energy model to demonstrate savings for each measure
- Project included reducing the energy from 200 to 90



875 Blake Wilbur Cancer Clinic & Blood and Bone Marrow Transplant

LOCATION

Palo Alto, CA

SIZE

13,800 square feet

SERVICES

Technology Design

SPECIAL FEATURES

- 9-story medical office building (MOB) with two new clinics within an existing space on the second floor
- New backbone data cabling connecting the new TDR, and horizontal data cabling connecting telecom service outlets to the new TDR
- Level 3 HCAI level facility supporting with cancer and blood and bone marrow transplant clinics

580 Dubuque Office and Lab

LOCATION

South San Francisco, CA

SIZE

492,750 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing 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

LABORATORY EXPERIENCE

Samaritan Hospital Moses Lake

LOCATION

Moses Lake, WA

SIZE

175,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

Technology Design

Architectural Lighting Design (LUMA)

CERTIFICATIONS

All Electric

SPECIAL FEATURES

- EUI target of 150 compared to an average EUI of 275 for hospitals in the Pacific Northwest per the UW IDL Target 100
- All-electric for heating and cooling
- Decoupling heating and cooling from ventilation to minimize reheat mimicking active 4-pipe beams to heat and cool the patient rooms, emergency department, and B-occupancy areas
- Heat recovery chiller
- Water-cooled kitchen equipment to take advantage of the heat rejection
- Greenfield hospital

Portland International Airport, Terminal Core Redevelopment

LOCATION

Portland, OR

SIZE

776,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

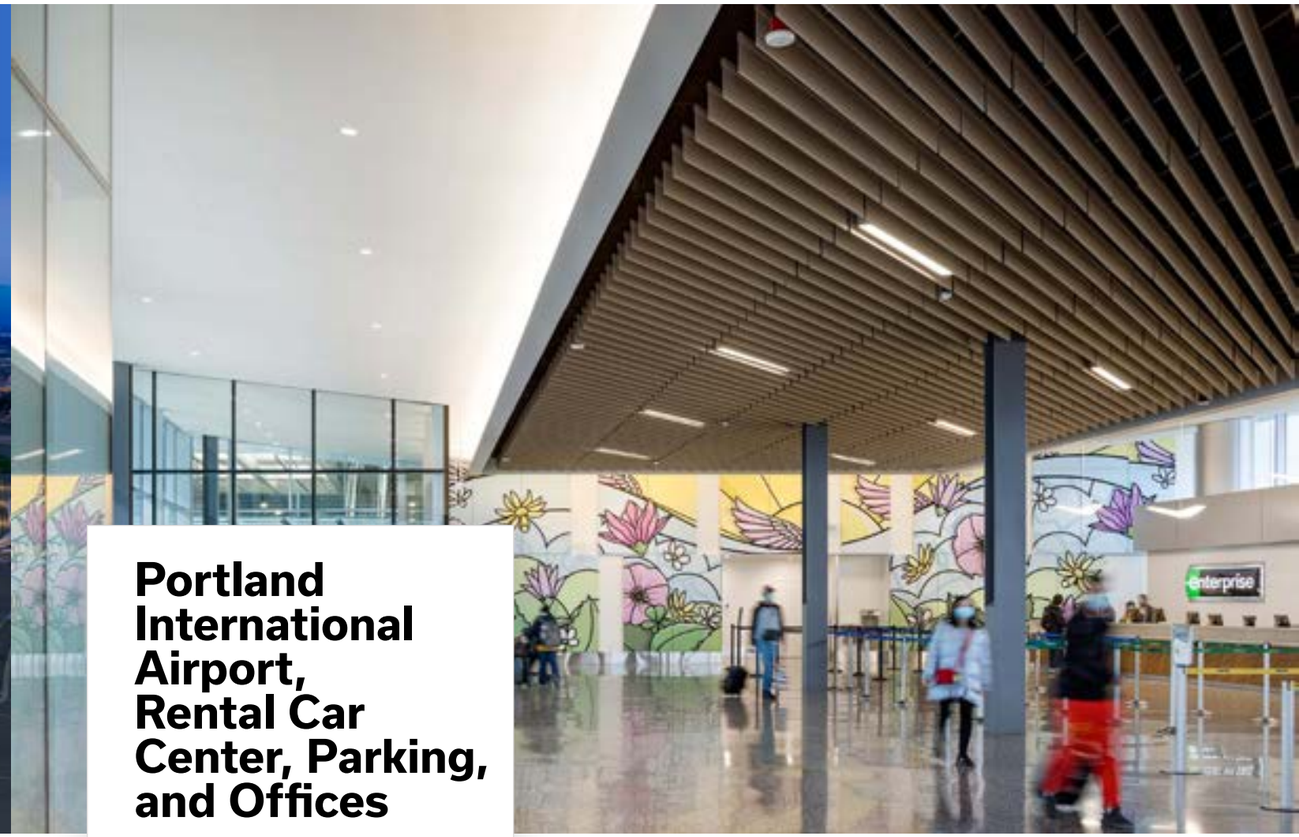
Fire Protection

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



Portland International Airport, Rental Car Center, Parking, and 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

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

- 65% less energy used for technology than a building of the same kind
- 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)
- Genetec Security Center to provide access control and video monitoring of all major areas of the building to protect the building and the occupants
- State of the art audiovisual system
- Telecommunications system infrastructure pathways and cabling to support latest information technology data network design

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 (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

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

COMMERCIAL OFFICE EXPERIENCE

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

- Telecommunications system infrastructure pathways and cabling to support base building's operation data network and future commercial tenants' telecommunications service needs and data network systems
- Multi-path and redundant communications service entry points for all access providers to serve each tower independently from two diverse service entry paths
- Complete video surveillance, access control, intrusion alarm and digital video recording with local monitoring of all security systems from a security operations center

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
- Telecommunications system infrastructure pathways and cabling to support base building operation and provide future readiness of the building for a distributed telecommunications infrastructure to support major anchor tenant(s) at the tower
- Multi-path and redundant communications service entry points for all access providers to serve the tower independently from two diverse service entry paths
- Complete video surveillance, access control, intrusion alarm and digital video recording with local monitoring of all security systems from a security operations center

419 Occidental

LOCATION

Seattle, WA

SIZE

99,400 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

SUSTAINABILITY

LEED Platinum

SPECIAL FEATURES

- The seven-story historical tenant improvement contains food service in the basement and level one and office spaces in the rest of the building
- Design of the MEP core and shell design along with high-performance capabilities with respect to thermal comfort, water, and energy efficiency

Meta Windsurfer

LOCATION

Burlingame, CA

SIZE

800,000 square feet

5 buildings

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Technology Design

Architectural Lighting Design (LUMA)

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- Multi-building campus
- Tenant improvement design occurred concurrently with the base building core & shell construction phase which required PAE to engage with the base building design team to implement infrastructure improvements to support the Facebook fit-out even before the core & shell construction was complete
- Fast-paced schedule

BUILDING SPACES

- Office space
- Specialty labs
- Food service areas
- Event space
- Miscellaneous amenities

COMMERCIAL OFFICE EXPERIENCE

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 in 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
- Re-zoning of base-building equipment wells serving multiple tenants
- PT structural design requiring tight MEPT coordination

BUILDING SPACES

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

Bush School Upper School

LOCATION
Seattle, WA

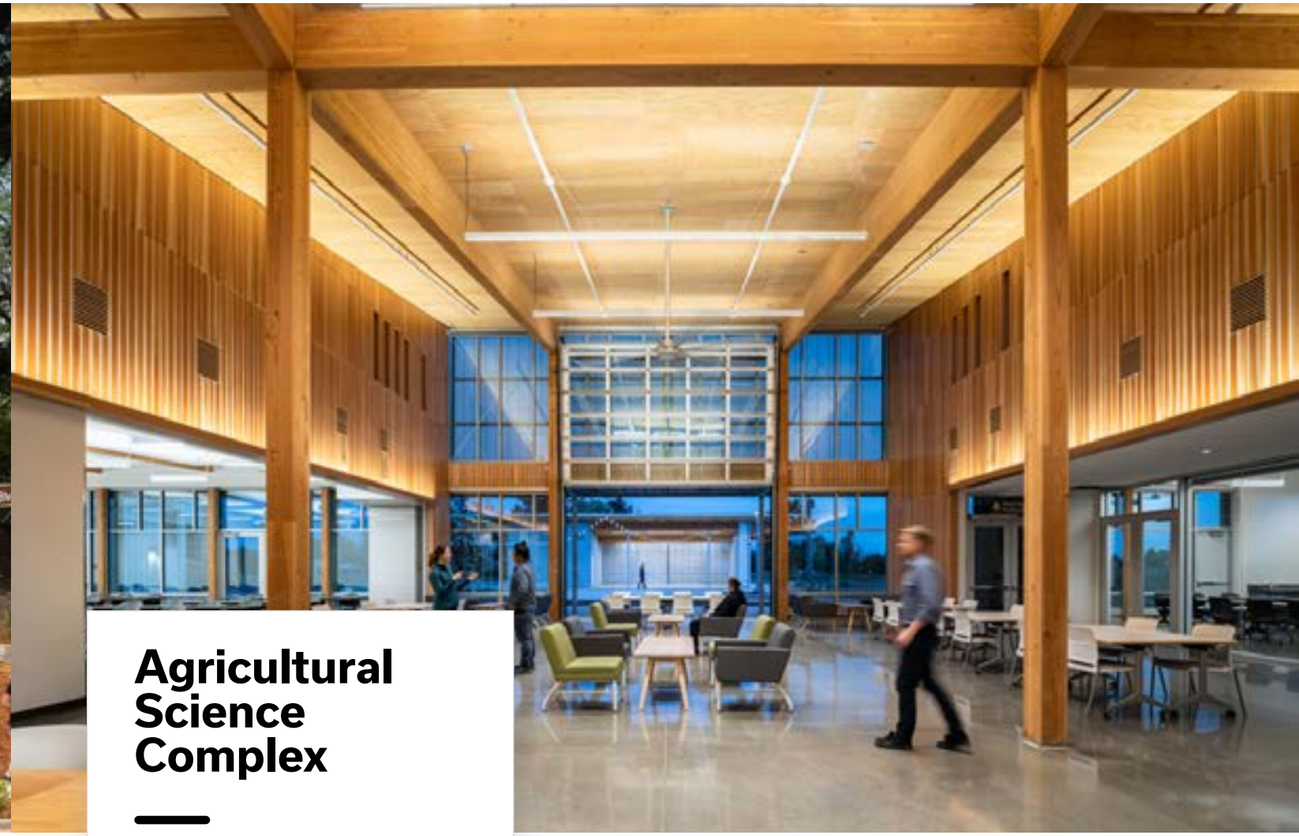
SIZE
20,000 square feet

SERVICES
Mechanical Engineering
Electrical Engineering
Plumbing Engineering
Building Performance Analysis
Technology Design
Architectural Lighting Design (LUMA)
Passive House Consulting

CERTIFICATIONS
Passive House
All-Electric
Net Zero Energy

SPECIAL FEATURES

- Projected EUI of 23 compared to typical EUI of 48.5 for schools
- Energy savings of 73% from code baseline
- Dedicated Outside Air System (DOAS) with heat recovery
- Air-to-water heat pump with electric boiler backup
- Passive heating and cooling help the building stay energy efficient and improve thermal comfort
- Large windows offer an abundance of natural light, ventilation, foster a sense of connection to the outdoors, and add a learning component through operability
- Outdoor learning laboratory adds hands-on learning component for the students
- Rooftop photovoltaic solar panel array



Agricultural Science Complex

CHEMEKETA COMMUNITY COLLEGE

LOCATION
Salem, OR

SIZE
15,000 square feet

SERVICES
Mechanical Engineering
Electrical Engineering
Plumbing Engineering
Technology Design

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

Behavioral Health Teaching Facility

UNIVERSITY OF WASHINGTON

LOCATION

Seattle, WA

SIZE

190,000 square feet

SERVICES

Electrical Engineering

Technology Design

SPECIAL FEATURES

- 6-story building with 150 patient rooms, clinical and administrative space, and ground floor visitor amenities
- The facility features 75 long-term civil commitment beds, 25 geropsychiatric beds, and 50 licensed med-surgery beds with the capacity to treat patients with psychiatric diagnoses and/or substance use disorders
- The building also will include a 24/7 telehealth consultation program, a procedural area for electroconvulsive therapy, and neuromodulation to support patients' commitment to community-based living and healthcare, as well as space to conduct comprehensive workforce training and development for behavioral health and general health care providers

Hayward Field Expansion

UNVERSITY OF OREGON

LOCATION

Eugene, OR

SIZE

277,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Fire Protection

Technology Design

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

Meta Willow Village

LOCATION

Menlo Park, CA

SIZE

59 acres; 1,735 residential units
200 key hotel
1.75M square feet office
125,000 square feet retail

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Sustainable District Planning

Technology Design

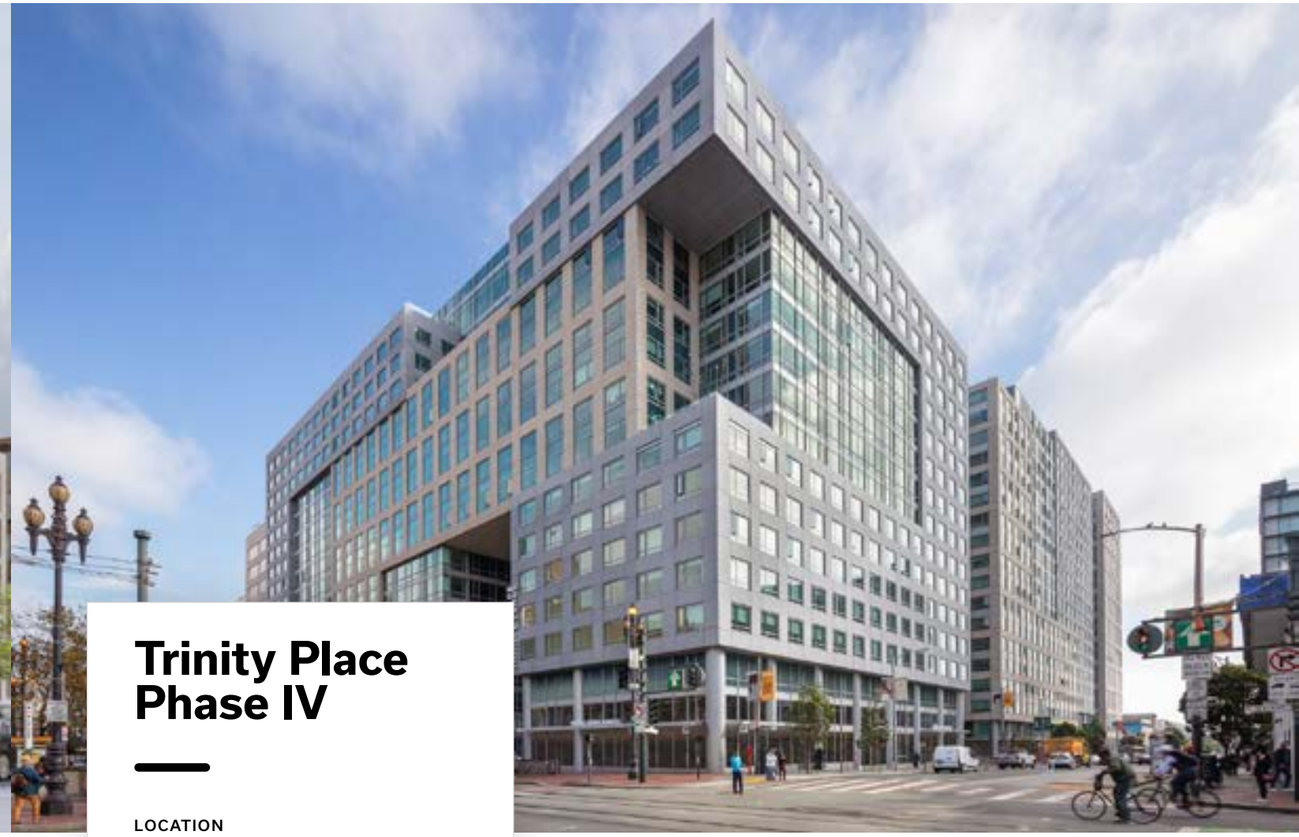
Architectural Lighting Design (LUMA)

CERTIFICATIONS

Pursuing LEED Gold

SPECIAL FEATURES

- Mixed-use development that includes multi-family housing, neighborhood serving retail, parks, hotel, and securitized office campus district for Meta employees
- Comprised of 12 parcels; PAE has provided campus master planning and is currently involved in full design of 4 of the parcels
- Parcel 2: 6-story 590,000 square feet, 327 residential units
- Parcel 5: 7-story 283,000 square feet, 247 residential units
- Parcel 6: 7-story 242,000 square feet, 177 residential units
- Parcel 7: 6-story 92,000 square feet, 120 affordable senior 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

Menlo Park Community Center

LOCATION

Menlo Park, CA

SIZE

40,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Building Performance Analysis

Renewable Energy Systems

Technology Design

SPECIAL FEATURES

— 3-story facility comprises of a gymnasium, youth center, reception, senior center, ballroom, full-service kitchen, multi-purpose space, offices, classrooms, library, roof-top terrace, and two outdoor swimming pools and associated pool shed

— Pursuing all-electric building design to eliminate on-site carbon emissions

Beaverton Public Safety Center

LOCATION

Beaverton, OR

SIZE

72,000 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Renewable Energy Systems

Technology Design

Architectural Lighting Design (LUMA)

CERTIFICATION

All Electric

SPECIAL FEATURES

— All-electric building

— 300 kW solar photovoltaic array

— 1 MWh / 250 kW battery storage system microgrid

— Level IV seismic resiliency same as hospitals and fire stations

— 6.5 EUI with PV, 25.7 EUI without PV compared to 41.3 EUI typical of a 24-hour public safety building in Portland built to code

CalSTRS Headquarters Expansion

LOCATION

West Sacramento, CA

SIZE

275,000 square feet office

250,000 square feet parking

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Building Performance Analysis

Renewable Energy Systems

Technology Design

Architectural Lighting Design (LUMA)

CERTIFICATIONS

Pursuing Living Building Petal Certification

Pursuing LEED Platinum

Pursuing Net Zero Energy

Pursuing WELL Building

SPECIAL FEATURES

- CalSTRS is the world's largest educator-only pension fund, and the expansion will accommodate the organization's planned growth.
- This expansion, is one of only a few sustainably designed office spaces near the downtown area.
- Amenity spaces include: assembly space, food services, and daycare, and fitness centers.
- To achieve the project's Net Zero Energy and WELL Building sustainability standards, the designs include electric vehicle charging stations, low flow plumbing fixtures.
- CalSTRS is dedicated to generating electricity onsite with PVs and is targeting net zero source-energy use.

The Young Black Professionals Workforce Housing

LOCATION

Portland, OR

SIZE

YBP Ankeny: 19,369 square feet

YBP Holgate: 34,145 square feet

SERVICES

Mechanical Engineering

Electrical Engineering

Plumbing Engineering

Technology Design

SPECIAL FEATURES

- Two affordable workforce housing developments that aim to be a central home for young Black professionals in the AEC Professional Apprenticeship program. The project's investor program will also provide a more direct pathway to ownership and building wealth
- Modular apartment units fabricated offsite
- The developments include YBP Ankeny, a five-story building with 41 studio apartments, and YBP Holgate, also five stories and with 75 apartments, both with community spaces
- The design focuses on occupant comfort and aims to be all-electric for a low utilities cost

PAE

Steve Kelly RCDD
Principal

503.226.2921
steve.kelly@pae-engineers.com

151 SW 1st Avenue, Suite 300
Portland , OR 97204