

UNION CITY FIRE STATION #3

Green Fire Station Goes for Gold



When firefighters respond

to a call, they often put their health and sometimes their lives on the line to protect people, animals, property and the environment. So when the City of Union City,

California, set out to build a new fire station, it seemed only fitting that the facility be a green building designed to conserve resources and protect the health and safety of its occupants.

Union City's four fire stations respond to approximately 4,500 calls a year, providing a wide variety of emergency and non-emergency services to this city of 74,000 residents, located east of the San Francisco Bay in Alameda County. The newest facility, Fire Station #3, was built on a remediated brownfield site adjacent to a city park, water pumping station and housing development.

The building was constructed with durable, low-maintenance materials that will hold up well over time, including steel framing and a brick veneer façade. The standing-seam metal roof is topped with electricity-producing solar panels, the first photovoltaic system on a civic building in Union City. Three double-deep, drive-through apparatus bays allow the station's ladder trucks and engines to pull into the building from the rear rather than backing in from the street. The fire station includes seven two-person dormitory rooms that average 213-square-feet each, a kitchen, dining room with an adjacent patio, two offices, dayroom, locker and shower room, fitness room and laundry room.

COST

\$6.5 million

LOCATION

33942 Seventh Street
Union City, California

PARCEL SIZE

0.82 acres

BUILDING SIZE

10,446 sq. ft.

LANDSCAPE SIZE

5,000 sq. ft.

BUILDING TYPE

Emergency Services

COMPLETION DATE

June 2009

OWNER/DEVELOPER

City of Union City

ARCHITECT & LEED DOCUMENTATION

GLASS ARCHITECTS
Santa Rosa, California

LANDSCAPE ARCHITECT

Warnecke Rosekrans
San Francisco, California

GENERAL CONTRACTOR

John Plane Construction
Brisbane, California

CONSTRUCTION MANAGER

Anchor Engineering
Lafayette, California

LANDSCAPE CONSTRUCTION

CONTRACTOR

Pom's Landscaping
Half Moon Bay, California

BAY-FRIENDLY LANDSCAPE RATER

Sentient Landscape, Inc.
Sebastopol, California

FUNDAMENTAL & ENHANCED

COMMISSIONING + LEED ADVISORY

KEMA Services, Inc.
Oakland, California

CONTACT FOR MORE INFO

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As the design of the fire station progressed, Union City officials raised the bar on the project's green building goals. Although the original aim was to meet the basic LEED Certified standards, the project team now anticipates the building will receive Gold certification, the second highest in the four-tier LEED green building rating system. The landscaping, which has been designated a Bay-Friendly Rated Landscape, was designed to reduce outdoor water use, improve stormwater runoff quality and keep landscape waste to a minimum. StopWaste.Org provided an \$80,000 grant to Union City to help fund the cost of seeking LEED certification and Bay-Friendly qualification.

■ WHAT MAKES IT GREEN ■

IMPROVED INDOOR ENVIRONMENTAL QUALITY

Daylighting. In the daytime, natural light illuminates most of the facility, reducing electric lighting energy use and creating more pleasant living and working conditions for the firefighters. "You can walk throughout the building during the day and see what you're doing without turning on a single light," said Eric Glass of Glass Architects, the firm that designed the building. Even infrequently occupied spaces are daylit, with tubular skylights brightening hallways, the locker room and the apparatus bay.

Indoor Air Quality. "The firefighters are exposed to pretty unhealthy conditions when fighting fires," said Glass. To help ensure healthier conditions back at the station, the facility has a vehicle exhaust system that keeps carcinogenic diesel exhaust out of the living quarters. When a vehicle's engine is started, diesel exhaust is vented outside via a hose connected to the tailpipe. As the vehicle is driven out of the apparatus bay, the hose remains connected, releasing only when the vehicle exits the bay. After returning from a call, a firefighter reattaches the hose to the tailpipe before driving into the apparatus bay. An air barrier in the walls between the apparatus bay and the living quarters and smoke gasketing around the doors further protects indoor air quality. Low-VOC paints, adhesives and sealants were used during construction; interior finishes include low-emitting carpeting and composite wood products with no added formaldehyde.

GREEN at a GLANCE

SUSTAINABLE SITES

- Redevelopment of brownfield site
- Stormwater runoff quality improved with bioswales and secondary underground filtration system
- Cool roof materials and high albedo, light-colored concrete pavement reduce heat island effect

WATER EFFICIENCY

- Outside water use reduced by 58% compared to similar conventional landscape (see Bay-Friendly section)
- Low-flow showers and faucets and high efficiency toilets reduce indoor water use by 35% compared to similar conventional building

ENERGY & CLIMATE CHANGE

- 27-kilowatt photovoltaic system offsets approximately 19% of building's energy use
- Green power purchased from renewable energy sources
- Building designed to exceed Title 24-2005 by 32%
- High density fiberglass insulation installed in walls (R21) and ceiling (R38)
- Operable windows with low-e2 argon-filled glazing and aluminum-clad wood frames provide greater insulation and solar control
- Aluminum grille awnings shade some windows
- Energy-efficient HVAC system uses water-source heat pumps and small cooling tower



GREEN at a GLANCE

- Efficient T8 fluorescent lamps installed with occupancy sensors
- At least 75% of occupied spaces provided with daylight and 90% with views; corridors, locker rooms and apparatus bay also daylight
- Enhanced commissioning conducted to verify performance of energy-consuming systems

MATERIALS & RESOURCES

- 75% of construction and landscaping debris diverted from landfill
- 20% of materials used contain recycled content, including flyash in concrete, structural steel, fiberglass insulation, ceramic tile in apparatus bay and in other locations, carpet tiles, natural linoleum, rubber athletic flooring, and casework interiors made with agrifiber board
- 29% of materials made by local manufacturers, including concrete masonry, brick veneer, exterior cast stone and drywall

INDOOR ENVIRONMENTAL QUALITY

- Construction indoor air quality management plan followed to protect worker and occupant health
- Used low-VOC adhesives, sealants and paints, low-emitting carpeting, and composite wood products with no added urea formaldehyde
- Living quarters protected from diesel exhaust with dedicated vehicle exhaust system, air barrier in apparatus bay walls, and smoke gaskets around doors
- Stainless steel floor grilles at entrances reduce tracked-in contaminants
- Nighttime interior lighting and wake-up alert system designed for better health, safety and productivity

ENERGY & CLIMATE CHANGE

Energy-Saving Envelope Strategies. Fire Station #3 was designed to exceed California's Building Energy Efficiency Standards (commonly known as Title 24) by 35 percent. The building has higher levels of insulation than required by code, with R21 fiberglass insulation in the walls and R38 above the ceiling. Low-e2 glass in the windows keeps out more of the sun's heat than standard low-e glazing. Exterior horizontal sun shades mounted over many of the windows further reduce solar heat gain. On the roof, the white PVC membrane on the low-slope portion and the standing-seam metal surface on the pitched portion are cool roof products that reflect heat away from the building, which reduces air conditioning energy use.

Energy-Saving & Renewable Energy Systems. The fire station's 27-kilowatt photovoltaic system will meet roughly 19 percent of the station's electricity demand. The building's heating, ventilation and air conditioning (HVAC) system includes water-source heat pumps and a small cooling tower. "It's a very efficient system," said Glass. "It's atypical of buildings this size. Cooling towers are typically used on larger-scale projects where there's a central plant." The project team specified this system because of its efficiency and because it provides good zoning capability, allowing temperatures to be controlled separately in each dorm room and in other heating and cooling zones throughout the station. Abundant daylighting throughout most of the building, combined with efficient T8 fluorescent lamps controlled with occupancy sensors, further reduce energy use.



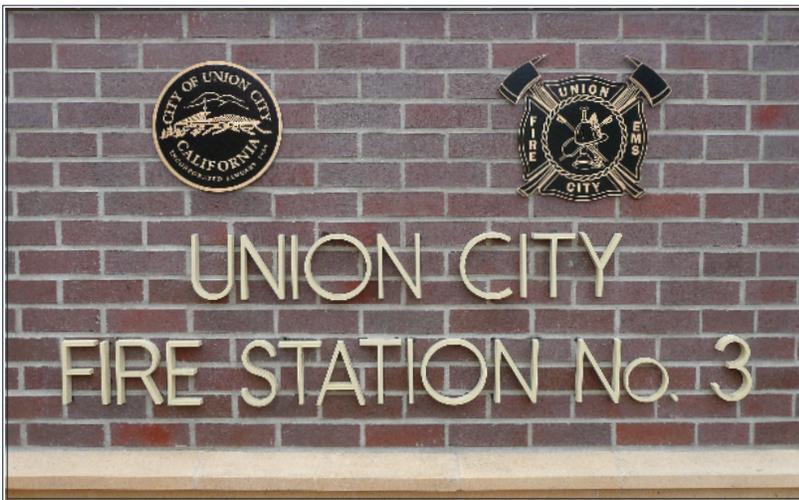
■ Bay-Friendly Landscaping Practices ■

Fire Station #3 sits on a small site donated to Union City by the developer of an adjacent residential subdivision. The building and pavement take up most of the site, leaving relatively little room for landscaping. But even the smallest garden or landscape can be environmentally friendly, as this Bay-Friendly Rated Landscape demonstrates.

PROTECTING WATER QUALITY

The project includes a number of strategies designed to help protect local water quality. “One of the things that’s unique about fire stations is that the firefighters and the apparatus are exposed to contaminants,” said Glass. When the apparatus is hosed off outside, residue from fires and other pollutants can wash into the storm drain, enter local waterways and eventually flow into the Bay. To prevent this, Fire Station #3 has a special diversion system that keeps apparatus wash water out of the storm sewer. When a firefighter turns on a hose to wash vehicles, the system automatically diverts the drain pipe from the storm drain to the sanitary sewer drain.

To improve stormwater runoff quality before it flows into storm drains, two filtration systems were installed. Runoff from the building and pavement first enters a bioswale, where the soil filters out some contaminants. The runoff then enters a secondary underground filtration system, where it is further cleaned before flowing into the storm drain.



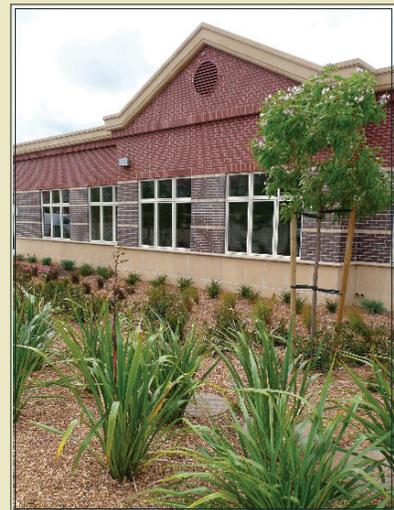
BAY-FRIENDLY at a GLANCE

LANDSCAPE LOCALLY

- Thorough site analysis conducted; data collected and incorporated into design included regional and site-specific climate and cultural requirements, soil type, wind and water patterns, and community interface
- After completion of building construction and rough grading activities, laboratory soil analysis conducted to obtain recommendations for organic soil amendments and fertilizers

LANDSCAPE FOR LESS TO THE LANDFILL

- To reduce labor costs and plant waste, plant species installed will not require shearing and will grow to mature size within space allotted
- Recycled flyash displaced 30% of cement in the landscape concrete
- 100% of compost and mulch produced from urban plant waste
- 75% of landscape waste diverted from landfills



BAY-FRIENDLY at a GLANCE

NURTURE THE SOIL

- Compacted soil aerated to a depth 8 inches
- Compost and natural soil amendments used to bring soil organic content to 5%
- Fertilizers prohibited by Organic Materials Research Institute were not used

CONSERVE WATER

- 100% of the selected plant species require infrequent or occasional water
- No turf installed
- High efficiency irrigation system includes drip and bubbler emitters
- Smart irrigation controller adjusts watering schedules based on daily weather conditions
- Irrigation submeter tracks water use and helps to identify potential system malfunctions

CONSERVE ENERGY

- More than 75% of landscape products produced within 150 miles of site

PROTECT AIR & WATER QUALITY

- Use of synthetic pesticides prohibited during installation and ongoing maintenance; corn gluten pre-emergent herbicide and other natural pesticide alternatives specified
- Landscape planter bioswales treat roof and paving runoff

CREATE WILDLIFE HABITAT

- More than 30 distinct species planted to increase biodiversity on the 5,000 sq. ft. site



PROTECTING AIR QUALITY

Conventional rooftops and asphalt pavement absorb the sun's heat, which increases the surrounding air temperature. This phenomenon, known as the heat island effect, and can drive up air conditioning energy use, increase smog and harm people and wildlife. Planting shade trees is a common method for keeping buildings and hardscape cooler. But for this constricted site, large trees weren't an option because they could obstruct the ladder trucks' and engines' access to the apparatus bay. Instead, the site was planted with smaller trees and shrubs that won't have large canopies—and won't create as much cooling shade—when they mature. To reduce heat build up on the site, Glass Architects took a different approach, specifying light-colored concrete for all the pavement instead of heat-absorbing black asphalt. In addition, the building's roofs are surfaced with heat-reflecting cool roof products.