

What have we learned from LEED Fire Station Design



TERRALOGOS
ECO ARCHITECTURE, PC

General Principles

It takes commitment, focus and a Project Team willing to look at new options to successfully design and construct a sustainable or LEED-rated Fire Station, District Police Station or Emergency Medical Service (EMS) Center. TerraLogos would like to share some of our research in designing and building LEED rated stations in this “What We Have Learned” Report. We have found that the most successful projects focus their design effort toward the creation of more sustainable, healthy and durable facilities that work to significantly conserve water and save energy.

TerraLogos engages multiple stakeholders including the Fire Chief or Police Chief, fire fighters, the design and construction team, the local jurisdiction and local citizens to achieve “buy-in” for the creation of a “green” station that is an integral part of the community and lives more gently with its natural environment.



Photo: ©

Water Conservation

Water is, naturally, the fire fighter’s best friend. Fire fighters employ water not only to combat flames, but for washing fire fighting apparatus and hosing down equipment bays. An average sized, 3-Bay fire station will use millions of gallons of water each year at the station itself! In an era of climate concerns and rising energy costs, some sensible, even revolutionary changes in the culture of water usage are emerging.

LEED projects are now mandated to save 20% in potable water usage, through the new Water Efficiency Pre-requisite. Compliance provides considerable savings in taxpayer dollars, as well, in reduced costs for water supply,



Water Storage & Parking lot water management

treatment and sewage. We encourage Project Teams, including fire chiefs and fire fighters, to be creative in identifying critical water conservation strategies and find innovative ways to recycle potable water within the station.

Ideas for Water Conservation Strategies

- Use a separate meter to track the fire station’s water use, to distinguish usage from the local jurisdiction’s general operations.
- Establish innovative water conservation and recycling strategies for regular operational use. For example, hold competitions that challenge staff to do more with less water.
- Install low-flow fixtures, such as (toilets, shower heads, hoses?)
- In tanker trucks, use make up water from bioretention ponds, which can be constructed as part of storm water management. Or use water collected from roofs into cisterns.
- Collect rainwater for use in grey-water recycling systems to flush toilets, hose down driveways and to wash selected equipment (treated and not subject to daylight).
- Design the landscape to collect storm water, using drought tolerant plant materials and trees to provide cooling shade.
- Design parking lots with pervious paving, or to drain to bio-retention type plantings.

Energy and Site Considerations



Station #40: Fairfax, Virginia

Fire stations are year-round, 24/7 operations, and serve as homes to fire fighters working extended shifts. Fire fighters deserve healthy, comfortable living quarters while serving the community. We encourage design strategies that create a more pleasant work environment, and quiet living quarters while saving energy. There is an energy pre-requisite in the LEED rating system that requires a minimum 10% energy savings over an ASHRAE 90.1 baseline standard. Savings in the use of natural daylighting to reduce lighting and power loads, efficient equipment bay heating and passive solar design are frequently employed in LEED stations.

Historically, traditional fire stations present challenges to green building. Generally located on independent sites of several acres, fire stations often require large paving and roof areas. Low maintenance landscaping is preferred, if any. Fire stations rarely utilize the energy saving potential of the building orientation on the site. In some communities, visible green strategies may seem unfamiliar, and inconsistent with the established neighborhood aesthetics.

Yet there are many examples of LEED certified or green fire stations designed to blend in with the community. The USGBC lists over 30 LEED certified fire stations across the county, and more are being certified every month.

What we have to offer

Even before the LEED rating system was established, TerraLogos: eco architecture worked with Project Teams to design greener fire stations in the Baltimore-Washington metro region. We understand the challenges, and we provide sustainable solutions to help fire stations and their communities conserve resources, save money and earn the prestige of a LEED rating. If you would like more information on our Sustainable Design Consulting or LEED Coordination services, please contact our office at office@terralogos.com. We look forward to discussing your project with you.



LEED Fire Station Design

Case Study

Our most recent Fire Station LEED Coordination project is the new 15,000 SF Ft. Belvoir Emergency Service Center, designed by Zivic and Hurdle Architects of Fairfax, VA. The project is being constructed by Grunley Corporation on a 6.15 acre extension of the US Army Ft. Belvoir Post. We expect to achieve a LEED NCv2.2 Silver rating for this project.

As the LEED Coordinator, TerraLogos led the entire Project Team through our LEED Introductory Workshop and a series of brainstorming sessions. Empowered with an understanding of the LEED purpose and process, the team- including the architect, engineers, owner and fire fighters- worked together to identify 35 achievable LEED credits. The team agreed that before the design is complete, they must together:

- Determining a realistic baseline for all water uses;
- Considering energy saving design options such as passive solar design, day lighting, views, renewable energy sources and building envelope design;

- Determining where innovative programs and practices can be applied;

TerraLogos is committed to helping the Ft. Belvoir Project Team select the most appropriate and cost effective sustainable strategies, not only to secure a LEED Silver rating, but to ensure a healthy, cost efficient and high performance fire station.



Ft. Belvoir Fire Station, Rendering by Zivic & Hurdle Architects



Los Angeles Fire Station No. 83
Photo: USGBC Website

Los Angeles Fire Station No. 83, Encino CA, LEED certified Station No.83: RRM Design Group

- Skylights flood the engine bays with natural daylight, saving energy
- Exhaust control systems improve workplace conditions by directly venting the vehicle exhaust from the space
- Water use reduction of 36% by using reduced flow features.
- Durable long lasting finishes

Livermore-Pleasanton Fire Department Station No. 4, LEED Gold certification: RRM design group

- Building orientation to take advantage of passive solar orientation and predominant wind directions
- Passive alternative energy systems incorporating photovoltaic panels
- Water retention ponds for filtering of surface drainage run-off
- Use of recycled building materials
- Indoor water use reduced by 32%
- 75% of the spaces have natural daylight



Livermore-Pleasanton Fire Department Station No. 4 - Photo: USGBC Website