USGBC PROJECT PROFILE

FIRE STATION #22
TUCSON, AZ

133,930,742% energy savings

358,249% water savings

324% carbon emissions avoided

LEED® Facts

Fire Station #22

Tucson, AZ

LEED for New Construction v2.2
Certification awarded June 20, 2008

Gold	**40**
Sustainable Sites	7/14
Water Efficiency	3/5
Energy & Atmosphere	11/17
Materials & Resources	5/13
Indoor Environmental Quality	10/15
Innovations & Design	4/5

**Out of a possible 69 points*

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Fire Station #22

PROJECT BACKGROUND

As the city of Tucson continues its rapid growth, the Tucson Fire Department has been expanding its capabilities to keep pace. Located at the southern edge of the city , Fire Station #22 is situated to protect the industrial park as well as the burgeoning residential population nearby. The project began designing phase in 2005 and construction was completed in early August 2007. Fire Station #22 was awarded LEED® Gold by USGBC in June of 2008. This was the first building owned by the City of Tucson to go through the LEED Certification process since the City mandated that all new construction it undertakes shall be at least LEED Silver. The project team found that given the City's high standards for construction, the additional cost of achieving LEED Silver was insignificant.

SUSTAINABLE STRATEGIES

- **Sustainable Sites**: By limiting the development footprint to a small portion of the site, Fire Station #22 was able to retain over 80% of the site as undisturbed desert, preserving open space and protecting habitat for native species.
- **Water Efficiency**: Pre-development run-off rates were maintained through the use of the detention area, promoting aquifer recharge and plant growth, and minimizing any downstream erosion that can be caused by increased storm water flow.
- **Energy and Atmosphere**: The building's orientation is a result of functional requirements for a fire station but is also influenced by the requirements of passive solar design. Also, roof elements are sloped to protect against the sun's heat.
- **Materials & Resources**: At various phases of construction dumpsters for metals, inert materials, cardboard, and trash were present on the construction site, thus allowing 75% of construction waste to be recycled.
- **Indoor Environmental Quality**: All paints, coatings, adhesives, and sealants used inside Fire Station #22 were chosen to have very low levels of volatile organic compounds, a leading cause of sick building syndrome.
- **Innovation and Design**: Fire Station #22 meets ASHRAE Standard 55, which specifies air temperature for most people's comfort. Fans throughout the building allow the thermostats to be set warmer. Operable windows around the perimeter save energy when the weather is nice.

MEASURABLE RESULTS

- Energy Savings (cost and percentages): $30,742 savings - 46.4%
- Water Savings(gallons and percentages-please indicate predicted or actual):
  - Irrigation: 257,951 gallons saved, 81.7% (predicted)
  - Plumbing: 100,298 gallons saved, 43.9% (predicted)
- Other (please indicate predicted or actual): 76% construction waste diverted from landfill.
- A combination of strategies results in a building that uses 40% less water than normal. The project used a drip irrigation system to avoid wasting the water that evaporates. This design means an 82% savings on potable water use for irrigation.
- The energy simulation predicted a use of 103 kBtu/year per square foot, an energy savings of 46.4% over a building designed strictly according to the ASHRAE Standard 90.1-2004.
- More than 20% of construction materials were extracted and manufactured locally, including concrete block, drywall, and concrete.

SUSTAINABLE DESIGN CHALLENGES

Evacuated Tube Solar hot water collectors and Solar PV panels are utilized as sources of onsite renewable energy. The apparatus bays collect heat from the south facing weathering steel standing seam metal roof to passively heat the apparatus bays during the winter. Energy consumption is further reduced by use of dual pane windows with low-e coatings, enhanced building envelope insulation, north-south building orientation, overhangs, natural daylighting, occupancy and daylight sensors, as well as energy efficient mechanical equipment.

PROJECT TEAM

Owner: City of Tucson
Architect: Welman Sperides Mickelberg Architects
Civil Engineer: Dowl Engineers
Commissioning Agent: TestMarcx
Contractor: Sundt Construction
Landscape Architect: Sage Landscape Architecture
MEP Engineer: PH Mechanical Engineering
Structural Engineer: Schneider and Associates
Electrical Engineer: Monrad Engineering
Project Size: 15,600 SF
Total Project Cost: $3,900,000
Cost Per Square Foot: $250
Photographs courtesy of: Ross Cooperthwaite

2030 CHALLENGE:

Energy Savings: 1,339 MBtu/yr Carbon Emissions Avoided: 324 tons/yr Size: 15,600 SF 46% less energy use (so we use 54% of what we used to) Assumptions: 1 ton = 2000 lbs. 1MBtu = 1000KBtu 100% Energy used = 2910.9MBtu. Then 54% actual usage = 1571.9 MBtu

ABOUT LEED

The LEED® green building certification system is the national benchmark for the design, construction, and operations of high-performance green buildings. Visit the U.S. Green Building Council's Web site at www.usgbc.org

ARIZONA CHAPTER
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