

# Graduate Lighting Case Study

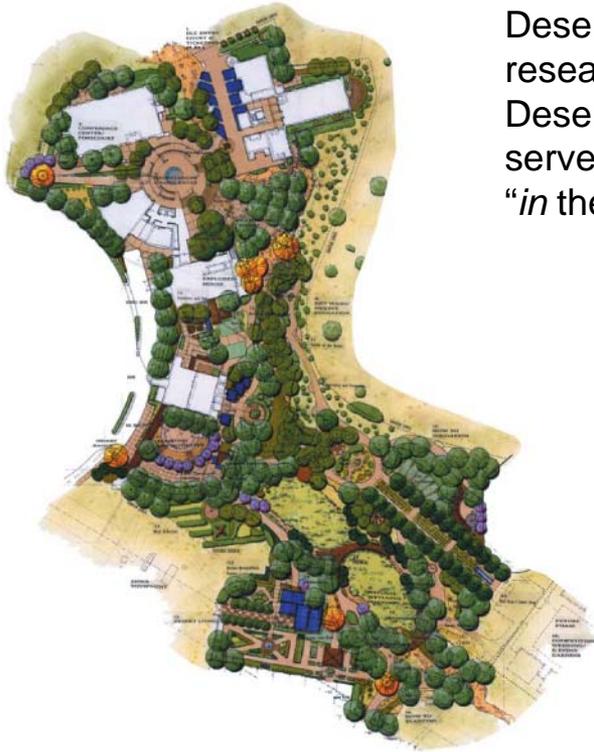


**Desert Living Center**  
AT THE SPRINGS PRESERVE

**Architect:** Lucchesi, Galati Architects, Inc.

**Consultants:** AldrichPears Associates  
Natural Systems International  
Harris Consulting Engineers





- Located within the 180-acre Las Vegas Springs Preserve, the Desert Living Center is an action-based public outreach and applied research facility designed to “promote sustainable life in the Mojave Desert.” Through dynamic, ongoing education programs, the Center serves as a catalyst for individual and community change from being “*in the desert*” to being “*of the desert*.”

- Five accompanying acres of conservation gardens demonstrate desert-appropriate water and energy-conserving design solutions by applying current knowledge and technologies. Garden exhibits are used to further Mojave education, conservation and protection, planting design, landscape lighting, and “how to” areas for irrigation and planting.

- Also included is a constructed wetland for treatment of all gray and black water for the entire Las Vegas Springs Preserve site, to be reused in the Desert Living Center toilets and gardens.

- The Desert Living Center and Gardens is pursuing LEED™ Platinum Certification with specific objectives related to the categories of Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality.

DLC INFORMATION FROM JEFF ROBERTS, AIA, LUCCHESI, GALATI ARCHITECTS, INC.

# Desert Living Center

AT THE SPRINGS PRESERVE





The Springs Preserve buildings are designed to achieve certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, a rating system that assesses a building's ability to meet sustainability goals.

The green building techniques featured at the Springs Preserve save money and natural resources. They also raise awareness of the newest breakthroughs in sustainable design.

The Desert Living Center includes:

- Rammed-earth walls utilizing local materials
- Window design maximizing natural daylight use
- Recycled materials minimizing new resource demand
- Passive cooling and renewable heating of buildings
- Reclaimed water to reduce tap water needs
- Electrical energy created by solar array panels

The Desert Living Center is seeking a platinum rating, the highest rating awarded for incorporating sustainability measures in all aspects of design.

[http://www.springspreserve.org/html/dlc\\_leed.html](http://www.springspreserve.org/html/dlc_leed.html)

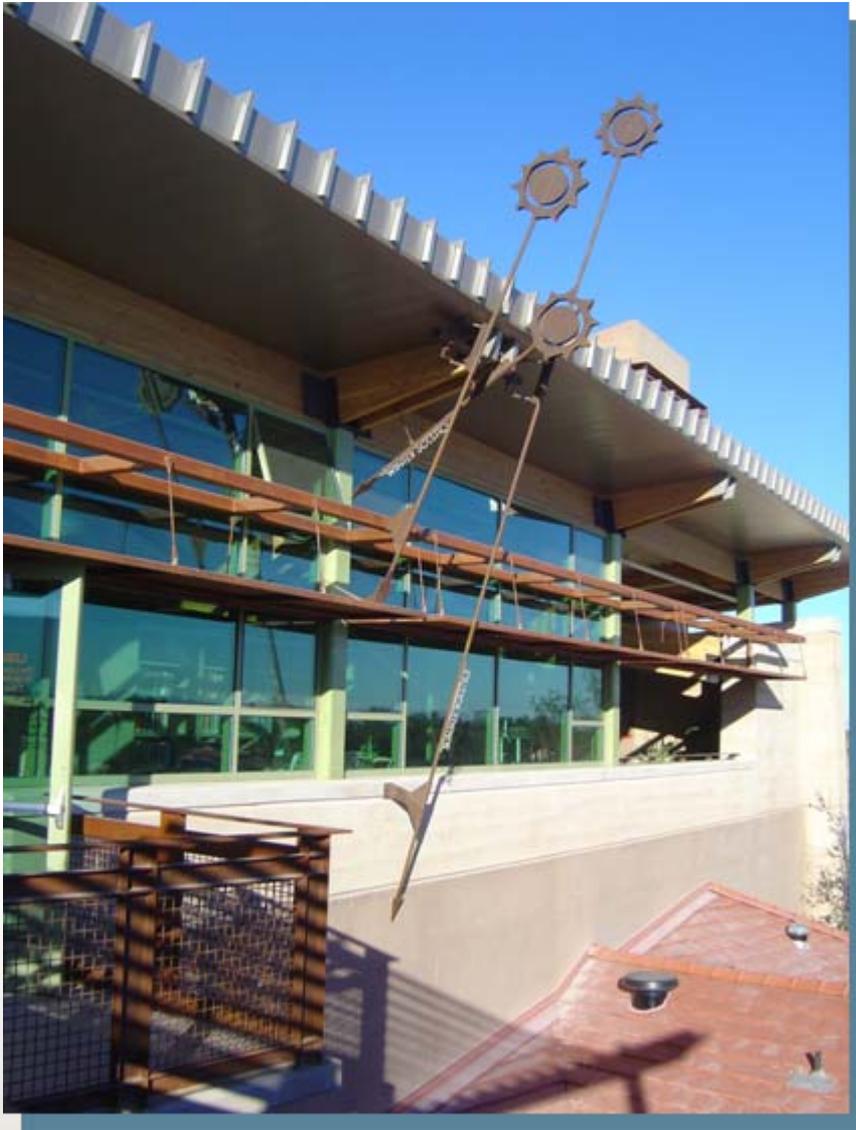
Desert Living Center  
AT THE SPRINGS PRESERVE



## The design strategies for each area of concern for a platinum rating are addressed as follows:

- **Sustainable Sites**: Bike racks and alternate fuel stations are provided. Light-colored roofing and paving materials reduce heat islands. Exterior lighting is directional to walk paths.
- **Water Efficiency**: All landscape was designed to be water-efficient. All black and gray water on-site is treated and reused on-site in the gardens and building toilets. Waterless urinals and water-efficient fixtures are used.
- **Energy & Atmosphere**: Mechanical heating and cooling systems were designed to achieve a 40% to 50% reduction in energy use. Mechanical systems are free of HCFC's and Halons. Photovoltaics and solar water heating are used to reduce fossil fuel energy use.
- **Materials & Resources**: Building materials were chosen that include high-recycled content and are locally sourced. Some materials are rapidly renewable, and wood used on the project comes from certified forests. The buildings have individual recycling areas and the project has a recycling center.
- **Indoor Environmental Quality**: All materials had to meet VOC limits. The buildings utilize individual occupant controls for control of thermal, ventilation, and lighting systems. All occupied spaces provide daylight and views.





**Architectural Sustainable Research Library**  
**South Facade**

**DESERT LIVING CENTER**

**CASE STUDY:**

Architectural Sustainable  
Research Library

**Lighting Strategy:**

Natural Daylighting

**Desert Living Center**  
**AT THE SPRINGS PRESERVE**



## Natural Daylighting:

The Architectural Sustainable Research Library takes advantage of natural daylighting in its design by walls of glass on the north and south sides to let light into the large open space.

Long roof overhangs block the high angled summer sun rays from direct infiltration.

A light shelf on the south side helps spread the low angled winter sun into the space.



Architectural Sustainable Research Library  
Daylit Interior



North Façade



Desert Living Center  
AT THE SPRINGS PRESERVE

## Natural Ventilation:

When the temperature in the space rises, operable windows automatically open to help cool the space naturally, with no HVAC systems required.

According to volunteers working in the library, the space is always very comfortable and seems to work flawlessly even in the hot summer heat.



North Facade



Operable Windows



## Evaporative Cooling Towers:

Evaporative cooling towers on each end of the building draw cold air down and into the space during warm days, cooling the interior of the library, and the exterior container garden balcony.



Daylight Interior



Container Garden Balcony

**Desert Living Center**  
AT THE SPRINGS PRESERVE



## Electric Lighting:

When daylighting is not adequate during the day, sensors automatically turn on the interior electric lighting. According to Ms. Delores, weekly volunteer in the library, the electric lighting is never on when there is an abundance of daylight in the space, and when they are on, they have sensors that turn them off when there is no movement in the room.

There are 4 different types of electric lights in the space:



(3)- Ceiling Fans

Each ceiling fan houses an incandescent bulb and is run purely off of solar power and only turns on when exterior lighting reaches a certain level.



(8)- Hanging Lights

Compact Fluorescent Bulbs

(4)- Recessed Cans

Compact Fluorescent Bulbs



(24)- Hanging Lights

T8



## Significance of The Architectural Sustainable Research Library:

The Desert Living Center is a great precedent, showing residents and visitors of Las Vegas how you can live sustainable in a desert setting.

The Architectural Sustainable Research Library exhibits how natural daylighting can work positively in a space, and how other sustainable strategies, like natural ventilation and evaporative cooling towers, can maximize the benefits of a naturally daylit space.

The building itself is also sustainable, as it is constructed by the rammed earth construction process using local Las Vegas materials which results in an appealing stratified look to the exterior of the building.



**Desert Living Center**  
AT THE SPRINGS PRESERVE