

6 | SUSTAINABLE DEVELOPMENT

The Vision Plan Area's natural setting creates both opportunities and constraints for new development. For example, Coachella's year-round sunshine makes it possible to generate solar power; it also requires extra attention to the ventilation and insulation in new buildings, so that people can feel comfortable without incurring high utility costs for air conditioning.

This chapter explains how development in the Vision Plan Area can respond appropriately to the natural environment. By following the guidelines in this chapter, new buildings and neighborhoods can save money for their occupants by reducing energy costs, and they can create distinctive new places that draw upon Coachella's unique qualities.

Developers can provide even more environmental benefits by obtaining LEED (Leadership in Energy and Environmental Design) certification for new buildings. LEED's Green Building Rating System provides comprehensive guidelines for evaluating the environmental performance of new commercial, civic and multi-family residential buildings. Guidelines are also being developed for other types of buildings, as well as for new neighborhoods.



Energy Production and Conservation

New buildings in the Vision Plan Area can take advantage of Coachella's desert climate by generating much of their electricity on-site. They can also be designed so people can stay cool during hot weather without depending entirely on their air conditioners.

Energy Production

The Plan Area's new buildings can draw upon the ample sunshine to generate solar power. In the near future, it may also become practical to use small, roof-mounted wind turbines to create electricity.

Solar Power

Photovoltaic, or solar, panels offer a simple, low-maintenance way to reduce energy costs. The expense of installing solar panels is often covered in part by State and federal tax credits, and the panels can pay for themselves over time by reducing electricity bills.

Most solar power installations use roof-mounted panels, oriented toward the sun, to create electricity. Newer installations sometimes use less-visible materials, including:

- ◆ Small solar panels that mount flush with a roof in place of shingles
- ◆ Solar canopies that serve as awnings over doorways
- ◆ Thin-film photovoltaic cells that are applied to windows, providing transparency and sunlight even as they generate power

Other solar panels heat water for kitchen and bathroom hot water, as well as swimming pools and spas.

Wind Power

Today, most wind-generated power is captured using tall windmills, installed in large groups on hillsides. However, several companies have begun to make small windmills and wind turbines that can be mounted on the roof of a building. These devices are just a few feet high and are extremely quiet or even silent, but they can generate hundreds of kilowatts of electricity each year.

Few of these small windmills and wind turbines have been installed in the United States. However, they are commercially available and developers should consider including them as part of new development.

Energy Conservation

The design of a building's site, including the building's location on the site and its north-south orientation, can help reduce the amount of energy needed to heat and cool the building. A building can also incorporate materials and ventilation systems that reduce the need for mechanical heating and cooling.

Site Planning

Traditional desert architecture includes features that are designed to keep a building's inhabitants cool. For example, rooms in a house are oriented so that the prevailing breeze blows through them, ensuring that they can be cross-ventilated. Also, traditional desert buildings are often arranged around a courtyard, and cooler air sinks into the courtyard at night, lowering the temperature during the day. New buildings can follow these principles of site planning regardless of their architectural style.

The landscaping on a site can reduce a building's need for air conditioning. If trees or shrubs are placed so that they shade the building during the day, less heat will be absorbed through the building's walls. Buildings can take advantage of passive solar features

like awnings and overhangs that block the sun during the summer but let the sun in to heat buildings during the winter.

Insulation and Thermal Mass

To keep temperatures cool inside during hot weather, a building's walls and roof should have much more insulation than the minimum amount required by building codes. For example, in a residential building with a wood frame, using 2-by-6-inch boards for the frame instead of traditional 2-by-4 boards creates more space in the walls for insulation.

Buildings can also be designed with walls that have a high thermal mass, meaning that they can absorb a great deal of heat from outside and minimize the amount of heat that radiates into the building. Traditional adobe buildings, for example, have a much higher thermal mass than modern buildings. These building materials also have a high thermal mass:

- ◆ Masonry
- ◆ Concrete blocks
- ◆ Foam blocks with concrete reinforcement

Other design features that keep heat out of buildings include light-colored finishes and roofing materials, which reflect heat instead of absorbing it, and awnings or roof overhangs, which provide shade and keep direct sunlight off of windows.

Green Roofs

Green roofs offer another method for lowering a building's temperature during hot weather. A green roof is created by placing an impermeable barrier on top of a flat roof; covering the barrier with a special type of engineered soil; and planting shallow-rooted vegetation in the soil. The barrier keeps the roof watertight, and the engineered soil, which is lighter than regular potting soil, helps the plants thrive.

Green roofs help to keep buildings cool by adding both insulation and thermal mass to the roof. They also absorb rain during storms, reducing the amount of stormwater that runs off from the building site. Finally, a well-designed, attractively landscaped green roof can serve as a shared open space for a building's occupants.

Ventilation Systems

When a building heats up, one way to cool it down is to let the hot air rise to the top of the room, then expel it from the building. At night, when temperatures are often lower outside than indoors, some new ventilation systems can remove hot air from indoors and replace it with cooler air from outside. Buildings can also be designed to use stack ventilation. In this system, a taller projection from the building, called the stack, allows heat to rise out of the building and exit through the top of the stack.

Building Materials and Construction Practices

New buildings should use materials and construction practices that reduce the amount of waste created by the building's construction. For example, by using pre-constructed roof trusses, wall frames and other elements, builders can reduce the amount of scrap material that they create on a construction site. Any scrap or debris from a construction project should be sorted and recycled, so that it can be put to a useful purpose instead of buried in a landfill. When buildings are demolished, the building materials should also be sorted and recycled.

Building materials should be durable, so they will last for many years instead of requiring costly and wasteful replacement in a decade. Builders should also use recycled or sustainably-harvested sources whenever possible. For example, recycled plastic lumber provides a durable alternative to wooden lumber for decks, play equipment and some structural purposes.

Neighborhood Design

A neighborhood needs more than green buildings to minimize its environmental impacts. For example, the neighborhood's overall design needs to provide opportunities for walking and bicycling, so that people can get around in ways that create less pollution. Most of the neighborhood design principles in this Vision Plan, such as the mixing of land uses and the creation of a high-quality pedestrian realm, will also make the Vision Plan Area more sustainable.

In addition, several organizations that represent developers, town planners and the environmental community are working together to develop a rating system for certifying that a neighborhood meets environmentally superior development practices. The rating sys-

tem, called "LEED for Neighborhood Development" (LEED-ND), will be similar to the LEED guidelines for green buildings. The LEED-ND working group has already published a draft version of the rating system, and principles contained in the Vision Plan correspond to many of the development practices that would earn points in this system. In the future, once the rating system has been finalized, developers should consider obtaining LEED-ND certification for their projects.

Water and Wastewater

Coachella's dry climate makes it essential to consider how water will be provided and managed in the Vision Plan Area. By using landscaping and plumbing practices that minimize water use, as well as capturing stormwater and treated wastewater, developers can make the most of a scarce resource.

Reducing Water Use

Because Coachella relies on groundwater aquifers for its water supply, new development in the Plan Area should avoid using more water than necessary, so that

the aquifers will not be depleted more quickly than they can be replenished.

New landscaping should incorporate plants that are compatible with hot, dry climates. Many of these plants are native to California and the Coachella Valley, and others come from similarly dry climates, including the southwestern United States. These plants require much less irrigation than plants that are native to wetter climates and they can create striking yards and gardens that relate well to a dry climate.

Low-flow water fixtures, including faucets, toilets and showers, have become vastly more effective in recent years and many new models perform better than standard fixtures. New development in the Plan Area should always reduce water use by providing low-flow or very-low-flow water fixtures.

Reclaiming Wastewater

If wastewater is treated thoroughly enough to remove almost all of its pollutants, it can be reclaimed and reused for many different purposes, including:

- ◆ Irrigation of lawns, landscaping and crops

- ◆ Industrial processes
- ◆ Toilet flushing in commercial buildings

Many cities have plumbing systems that include separate pipes for reclaimed water so that the water can be distributed to landscaped public spaces, front yards and commercial buildings throughout the city. When water and sewer services are extended to the Vision Plan Area, they should be designed to include plumbing for reclaimed water, and developers should take advantage of this resource. Some buildings can include graywater systems that capture kitchen and bath water, settle it and reuse it for landscaping.

Managing Stormwater

Instead of funneling stormwater into drainage canals, new development should capture and store some of that resource for landscaping uses, such as watering plants or filling fountains. On a small scale, new single-family homes could include small cisterns to collect stormwater runoff from their roofs and use the stormwater in their yards and gardens. Larger buildings could do the same, or they could include green roofs, planted with desert-native vegetation, that will absorb stormwater instead of shedding it.

When stormwater cannot be captured, it should be allowed to drain into the soil instead of running into stormwater facilities. Paved surfaces, such as parking lots, should use permeable pavers, turf blocks or other materials that allow stormwater to percolate into the ground. Streets can also incorporate these systems along gutters. Small-scale drainage channels can be integrated into the Plan Area's trail network, so that stormwater is distributed throughout the area and allowed to drain into the ground.

Capturing stormwater runoff and allowing it to drain into the soil will reduce the need for new stormwater detention areas. However, where detention areas are still necessary, they should be designed to provide usable public space during dry weather. For example, a large, gently-sloped basin planted with turf grasses could also serve as a playing field. A basin with steeper sides could be located in a neighborhood's center and paved with permeable materials; along with landscaping and seating around the edges, these changes transform the detention basin into a public plaza.

