SUSTAINABILITY GUIDELINES

University Hills is committed to creating a sustainable, resource-efficient community. To that end, this Specific Plan addresses sustainable and green building practices for the individual building as well as overall community design. The desire to achieve sustainability is particularly manifested in the level of commitment in the clubhouse and Attached Residential areas. As detailed later in this section, the land owner is committed to ensuring that the clubhouse and Attached Residential areas incorporate green building features.

These Sustainability Guidelines are organized into six major topic areas:

- Site Design and Community Planning
- Green Infrastructure
- Landscaping
- Building-Level Sustainability
- Resource Conservation
- Construction Practices: Erosion and Dust Control
- Commitment to Sustainable Building Practices

A *Sustainability Resource Guide* offering a consolidated list of providers and entities that offer sustainability programs immediately relevant to the University Hills Specific Plan can be found at the end of this chapter.

Intent and Application

These guidelines are intended to contribute to the development of a sustainable and resource-efficient community, exceeding what would be achieved from standard compliance with the current Uniform, International, and National Building Codes, and City and County ordinances. Development within University Hills will occur from a perspective that sees current local, state, and national requirements as a starting point rather than an ultimate goal.

These guidelines apply to all development within University Hills and establish a framework that will be used to evaluate how proposed developments meet the objectives for sustainable development. It is incumbent upon project applicants to demonstrate how they will comply with these guidelines through the development review process.

Sustainability

Sustainability is "meeting the needs of the present without compromising the ability of future generations to meet their own needs," as generally defined by the 1987 Bruntland Report of the United Nations World Commission on Environment and Development.

Incorporating sustainable design from the earliest stages has benefits for both the builder and future occupants. Many sustainable design principles have minimal cost impacts if incorporated early in the design phase, and initial costs can frequently be offset by reduced construction time and long-term operations and maintenance savings. In addition, sustainable neighborhood design and green homes are a desirable amenity for many potential home buyers who are often willing to pay a premium to

The pursuit of already established sustainable best management practices, such as LEED, ComfortWise, and EnergyStar Home, is strongly encouraged for all construction, but only required for construction in the Attached Residential, faculty housing, and clubhouse areas. These certification programs guarantee the achievement of a minimum performance standard. For maximum flexibility, the master developer and builders will implement sustainable building and development practices most appropriate to the specific context within University Hills. In any event, these and other programs can serve as a framework for environmentally sensitive development. For a list of additional providers and entities that offer green building and sustainability programs, see the Sustainability Resource Guide provided at the end of this chapter.

Plan natural pedestrian or multiuse trails throughout the community. This bioswale trail demonstrates how green infrastructure and natural drainage provides opportunities for pedestrian and recreational amenities along with minimizing

As other programs and standards evolve, the University Hills Sustainability Guidelines may evolve as well to ensure that the goal of sustainability is met. In some cases, topics and issues are described in general terms to allow for the incorporation of new technologies as they are developed.

These Sustainability Guidelines are based upon overarching and measurable performance standards. There are a number of ways to meet the performance standards and these guidelines include both required measures and flexible Best Management Practices (BMPs).

Overarching Performance Standards

Development in University Hills shall comply with the following Performance Standards:

- All buildings shall exceed Title 24 standards (2005) for energy efficiency by 15%
- Development in University Hills shall reduce potable water consumption for irrigation by 25%, as calculated from a mid-summer baseline case.
- Development in University Hills shall use15% less potable water then the baseline calculated for a typical building (not including irrigation).

Clustering homes utilizes land efficiently and reduces site disturbance, freeing space for recreational uses and common open space that enhance the community.

Site Design and Community Planning

There are many sustainable development practices relating to site design and community planning that can be implemented from the early stages of a project. Some of the most cost-efficient and cost-saving sustainable development practices are implemented at a large scale, and thus afford benefits throughout the whole community. Measures as simple as orienting sites and lots to take full advantage of the sun for daylighting can be

achieved with little or no cost impact. Development in University Hills will generate innovative and context-sensitive design solutions that lay a framework of sustainability for the entire life of the project and enhance residents' quality of life.

- Required–Cluster homes and other nonresidential buildings to reduce site disturbance and preserve land for other uses such as open space, parks, or recreation, as represented in Figure 2-9, *University Hills Land Plan*.
- Required–As shown in Figure 2-9, limit the reach of construction activities and minimize development footprints.
- Suggested BMP–As feasible, orient buildings so that the long axis of the building is oriented east–west to maximize the opportunity for north- and south-facing windows. Sunlight entering through north-facing windows provides indirect, diffused light with low heat gain for the building, reducing cooling costs during summer months. Also, minimizing the area of roof and wall facing west reduces the amount of solar radiation absorbed during the summer season. In addition, south-facing windows are a key design feature for winter months as they receive about 90 percent of optimal winter solar heat gain, reducing energy needed for heating and cooling.
- Required–Plan streets and lot layouts on an east–west axis, as represented in Figure 2-9, *University Hills Land Plan*, so that shading of streets and homes by trees is maximized. Shading reduces the heating of pavement and buildings by the sun, thereby reducing the trapping of heat by paved areas and the energy needed for cooling interiors. An east–west street layout also maximizes the opportunity for optimal building orientation for passive solar techniques, with the long axis of the building oriented east–west.
- Suggested BMP–Increase tree canopy and place trees strategically to reduce energy demand for adjacent buildings, enhance roadway safety, and provide for a more aesthetically pleasing environment.
- Suggested BMP–Allow narrow streets to reduce paved area and make them easier to shade by trees.
- Required–Incorporate walking and bicycling paths, as represented on Figure 3-11, *Trails, Parks, and Open Space Plan*, to provide transportation alternatives and contribute to a healthy lifestyle. Ensure connections and access for pedestrian and bicycle paths to nonresidential uses and recreational facilities.

Bioswales are an effective green infrastructure technique that serves a dual purpose; they not only provide a cost-effective alternative to traditional stormwater drainage systems.

Permeable paving materials allow water and air to filter through to the ground underneath, reducing stormwater runoff and

Green Infrastructure

Embracing an approach to green infrastructure is intended to counterbalance the effects of more traditional land development patterns and associated infrastructure that often fragments and degrades natural open spaces and ecosystems with minimal consideration to long-term sustainability. Green infrastructure integrates natural systems, and capitalizes on opportunities for creating multipurpose systems, thereby using land and resources more efficiently.

Implementing green infrastructure and related methods for watershed management improves water quality, conserves water, and reduces runoff volumes as well as peak flows and durations. In addition to these direct benefits to the watershed, implementing such methods also benefits the quality and availability of biological habitat, provides energy conservation by reducing the heat trapping and impervious areas of typical land development, and can be aesthetically pleasing.

- Required–Collect rainwater on site through the use of stormwater management practices such as the incorporation of infiltration basins and bioswales.
- Required–As shown on Figure 2-9, *University Hills Land Plan*, maintain natural drainage corridors to provide open space buffers for wildlife, vegetative cover for wildlife movement, and infrastructure systems for drainage and ground water recharge.
- Suggested BMP–Grade property to divert stormwater flow to permeable areas, following natural drainage contours to the greatest extent possible.
- Suggested BMP–Where applicable, create curb cuts to allow stormwater flows to drain to permeable or landscaped areas.
- Suggested BMP–Where possible, use pervious or open grid paving for driveways, walkways, plazas, and parking areas. Implement small-scale design features throughout the development, such as "Hollywood" or dual-track driveways for single-family homes.
- Suggested BMP–Use pervious paving materials wherever possible to reduce the negative effects of stormwater runoff and to facilitate groundwater recharge.
- Suggested BMP–Utilize bioswales, particularly with native or drought-tolerant grasses, to collect and filter water runoff.

Parking lots constructed of permeable paving materials and permeable paving products that allow for turf or other plant materials to grow are examples of methods for reducing stormwater runoff and the need for standard drainage

Landscaping

Sustainable landscaping practices and techniques help promote water conservation and reduce water demand as well as help to control water and irrigation costs. Efficient irrigation techniques help reduce water demand while sustainable landscape design can lead to the reduction of the heat-island effect (the absorption of solar heat in paved surfaces), improved environmental habitat, and reduced overall maintenance and replacement cost.

- Required–Install high efficiency, xeriscape irrigation systems to reduce the amount of water devoted to landscaped areas, such as drip and bubbler irrigation and low-angle, low-flow nozzles on sprayheads.
- Required–Install and correctly program automated irrigation systems to reduce water use.
- Required–Install properly programmed EvapoTranspiration (ET) based controllers on homeowner's properties, which are weather based controllers with greater efficiency. In addition, supply homeowners with information on how to properly program their controller using the Metropolitan Water District's guidelines as a reference tool.
- Required–Install moisture sensors and other similar irrigation technology to ensure that landscaping is watered only as needed.
- Required–Employ the use of water budgets for landscape irrigation to monitor and regulate outdoor water usage.
- Required–Plant selection should be based on species that are drought tolerant, heat resistant, and hardy. Native plant material should also be closely examined and considered for most landscape areas. Sources of reference for such plant materials can be obtained from the Metropolitan Water District and the California Department of Water Resources. Plant selection should strive to use up to 75 percent water-wise/drought-tolerant, native, or Mediterranean plant materials.
- Required–Prohibit the use of large turf areas in landscaping by substituting water-conserving native groundcovers or perennial grasses, shrubs, and trees.
- Required–Landscaped areas installed by individual builders shall not exceed 20 percent turf. For example, landscaped common areas within cluster or attached residential areas would use a combination of drought-tolerant landscaping and xeriscaping to reduce turf areas

An example of the type of landscaping that would be

to no more than 20 percent. Exceptions include open space parks and similar recreation areas in which open grass areas are a planned amenity.

- Required–Turf shall not be planted on slopes and in irregularly shaped areas, with the exception of no-mow grasses, to avoid oversaturation that might harm the structural integrity of slope. Instead, plant material that can be used for erosion control should be used.
- Required–Trails shall be constructed of pervious materials such as decomposed granite or existing earth.
- Required–Group plants with similar water requirements together, a technique known as hydrozoning. A plant reference is available from the California Department of Water Resources.
- Suggested BMP–Increase tree cover in developed areas to reduce solar heat gain into buildings and to reduce the amount of heat absorbed by paved areas. In general, plant drought-tolerant or native tree species around and near buildings, walls, windows, and paved areas. Plant deciduous trees on the south side of buildings to allow for increased solar heat gain in winter months (reducing energy needed for heating interiors) and shading in summer months (reducing energy needed for cooling interiors).
- Suggested BMP–Provide ample tree cover (e.g. 50% parking shade coverage within 10 years) in parking lots for shading and to reduce the amount of heat absorbed by paved parking areas. Evergreen trees that provide year-round shade are particularly useful for minimizing absorption of heat.
- Required–Minimize disruption of and preserve existing trees and plants on site throughout the planning, design, development, and construction processes.
- Suggested BMP–Mulch planting beds and apply compost and environmentally friendly fertilizers to promote healthy topsoil, maximize plant growth, and reduce plant replacement. This will also reduce the need for longer or more frequent irrigation run times.

Building-Level Sustainability

There are many sustainable building practices and techniques that offer safe and healthy living environments. Materials and actions that improve indoor

air quality and the comfort of homes as well as reduce the impacts of light pollution are critical to community health and well-being.

Building Materials

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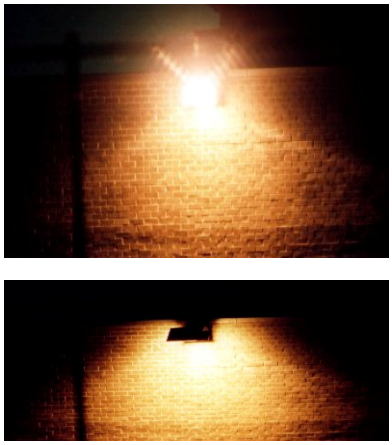
- Suggested BMP–Use 20 percent locally manufactured and produced building materials, defined as materials manufactured or produced within a 500-mile radius of the project.
- Suggested BMP–Strive to utilize a minimum of 50 percent sustainable and recycled wood for wood building components and flooring materials, such as engineered or FSC-certified wood (Forest Stewardship Council).
- Suggested BMP–Strive to utilize rapidly renewable or recycled building materials and products for at least 5 percent of the total value of materials. Flooring alternatives like bamboo, wheatboard, and cork are rapidly renewable materials. Linoleum, exposed concrete, and recycled-content ceramic tiles are also desirable materials.
- Suggested BMP–Encourage the installation of insulation with at least 75 percent recycled content, such as cellulose, newspaper, or recycled cotton.

Indoor/Outdoor Air Quality

- Required–Use only flooring and insulation products that are low emitters of volatile organic compounds (VOC) and formaldehyde.
- Required–Use only low- and zero-VOC paints, finishes, adhesives, caulks, and other substances to improve indoor air quality and reduce the harmful health effects of off-gassing.
- Suggested BMP–All homes should use only gas fireplaces to minimize smoke from wood burning fireplaces and pollutants (e.g. CO, NO, and VOC's).

Lighting

- Required–Reduce light pollution by avoiding outdoor lighting where it is not needed and providing adequate as opposed to excessive lighting.
- Required–Utilize shielded fixtures, avoiding overhead lighting of areas such as walkways.



Reduce light pollution (top) by installing lighting fixtures that direct light downward or only where it is needed (bottom).

- Required–Provide low-contrast lighting, and use low-voltage fixtures and energy-efficient bulbs, such as compact fluorescent (CFL) and light emitting diode (LED) bulbs.
- Required–Use automated occupancy sensors in non-residential buildings that automatically shut off lights when rooms are unoccupied.
- Required–Direct outdoor lighting downward and include this restriction in the HOA/CC&Rs.
- Required–Flashing lights, except for those related to public safety or intended to warn of potential public hazard or danger, are prohibited.
- Required–Design lighting plans to be sensitive to the planned CSUSB observatory on nearby Badger Hill. Follow guidelines suggested by the International Dark Sky Association (www.darksky.org). Factors to be considered in sensitive lighting design include those listed above as well as the mounting height of the lighting luminaire above the ground, the horizontal spacing of one pole to the next, and the cutoff angle of the luminaire. Include nighttime lighting restrictions in the HOA/CC&Rs.

Energy-Efficient Appliances and Fixtures

- Required–Install water and energy saving fixtures and appliances, such as showerheads, toilets, washing machines, clothes dryers, refrigerators, and dishwashers certified as EnergyStar compliant.
- Required–Use only high efficiency toilets and waterless urinals to reduce water usage.
- Suggested BMP–Install built-in recycling centers in homes next to trash bins to offer convenient and clean methods for separating recyclables from trash.
- Required–Install re-circulating hot water systems to reduce the need to heat water, or tankless water heaters that heat water as needed instead of storing hot water in tanks, thus reducing standby energy use.
- Required–Utilize a minimum insulation value of R30 in cielings.
- Required–Install programmable thermostats in all units.
- Required–Assure solar access for energy collection along locations such as roofs, walls, and patio/window overhangs.

Building Envelope

- Suggested BMP–As practical, design windows that are taller and start closer to the ceiling to optimize daylighting of interiors.
- Suggested BMP–Consider installing light shelves, architectural features that bounce light further into interiors, to optimize daylighting.
- Suggested BMP–As practical, utilize external shading strategies, such as protection of glazed fenestration, eyebrows, and appropriately sized eave overhangs.
- Suggested BMP–Install architectural features that increase daylighting, such as light shelves that bounce light farther into interior spaces, to reduce the need for additional electrical light.
- Required–Install radiant barriers to reduce summer heat gain and winter heat loss. Radiant barriers consist of a highly reflective material, such as aluminum, that prevents radiant heat from being absorbed by the interior of the home.
- Required–Use natural ventilation techniques, such as operable windows, to take advantage of airflow for cooling interiors, reducing the amount of energy needed for cooling.
- Suggested BMP–Consider the use of "cool roofs," which are painted with a highly reflective coating or employ light-colored materials, or "green roofs," vegetated areas on roofs that contain plants in engineered soil, to cool building interiors and increase stormwater retention.

Resource Conservation

Actions that increase water and energy efficiency and conserve resources offer tremendous cost savings to both builders and future residents. Through techniques such as building design that maximizes shading and insulation, high performance HVAC systems, and use of natural daylighting, a substantial reduction in energy use can be achieved. The use of high performance appliances and irrigation systems that minimize water and energy use can substantially impact the amount of resources that flow into and out of the community.

Water

- Required–Install only low water consumption, EnergyStar-compliant appliances and fixtures.

- Required–Install only sensor operated faucets in nonresidential buildings.
- Suggested BMP–Install dual flush or other toilets using less than 1.6 GPF.
- Suggested BMP–Install waterless urinals in nonresidential buildings.
- Suggested BMP–Install faucets and showerheads using 2.5 GPM or less.
- Required–Use water-saving landscaping techniques, such as drip irrigation systems and drought tolerant plant species. (For a more detailed list of water-saving techniques and practices see the Landscaping section of this chapter.)

Energy

- Required–Use methods of energy conservation. For residential units, consider incorporating techniques outlined in Southern California Gas Company's Builder Resource Guide and other applicable resources. Also, consider appropriate solar building orientation to augment efforts toward energy conservation.
- Required–Install only energy-efficient windows, such as models with spectrally selective low-e glass and with wood, vinyl, or fiberglass frames.
- Suggested BMP–Consider designing homes to facilitate and accommodate photovoltaic cells for solar electric power, and ensure solar access for these homes. Solar-heated hot water is one efficient way to reduce energy needed for household activities.
- Suggested BMP–Distribute hot water efficiently through homes, minimizing the distance between hot water heaters and fixtures.
- Required–Install only energy-efficient lighting products, such as compact fluorescent bulbs.
- Required–Incorporate building materials that take advantage of heat storage or thermal mass to reduce energy needed for heating and cooling interiors. Materials such as concrete, masonry, and wallboard store heat absorbed during the day and slowly release it throughout the evening, thereby moderating indoor temperatures over a 24-hour period.
- Suggested BMP–Encourage participation in energy efficiency rebate programs offered by utility providers and government agencies.

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Heating, Ventilation and Air Conditioning (HVAC)

- Required–Design and install HVAC systems according to the standards provided by the Air Conditioning Contractors of America (ACCA) handbooks or other comparable high-performance HVAC standards.
- Required–Install sealed-combustion/sealed-duct furnaces and water heaters for increased efficiency and indoor air quality.
- Required–Install only EnergyStar-qualified ceiling fans to circulate air, improve comfort, and reduce the demand on heating and cooling systems.

Construction Practices: Erosion and Dust Control, Materials Reuse and Landfill Diversion

There are many ways to reduce the impact of construction practices on the site, surrounding areas, and the environment in general. Integrating salvaged or refurbished materials from the site back into the project is an effective and cost-efficient way to minimize resources needed for transporting materials during the construction process. Using salvaged or refurbished materials also contributes to landfill diversion, thus reducing the amount of material created during the construction process that is transported to landfills.

- Suggested BMP–Strive to exceed the landfill diversion requirements of AB 939, which requires at least 50 percent diversion of materials generated during construction.

In addition, soil erosion and fugitive dust can negatively impact the project site and surrounding areas during construction phases. Soil, cement wash, asphalt, oil, and other hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and flow untreated into local waterways. Although erosion and dust resulting from construction practices are already regulated by San Bernardino County's National Pollutant Discharge Elimination System (NPDES) permit program and the South Coast Air Quality Management District's (SCAQMD) Rule 403 regarding fugitive dust, it is encouraged that all construction practices in University Hills strive to retain the integrity of the land beyond what is required by local, state, and federal regulations.

Many measures can be followed to reduce soil erosion and the release of particulates into the air. See the SCAQMD's Rule 403 for required dust control measures. Also, refer to the information provided through the San Bernardino County Stormwater Pollution Prevention program, as well as other local agencies, for best management practices to reduce construction impacts on soil, air, and water quality.

Beyond these required practices, individual builders in University Hills are required to develop an Erosion Control Plan tailored to the specific site context, and exceeding the referenced standards. An Erosion Control Plan that addresses erosion control and stormwater management, and their interrelationship is optimal. Several strategies to be addressed in an Erosion Control Plan that exceeds minimum standards include:

- Statement of erosion control and stormwater control objectives
- Comparison of postdevelopment stormwater runoff conditions with predevelopment conditions
- Description of all temporary and permanent erosion control and stormwater control measures implemented on the project site
- Description of the type and frequency of maintenance activities required for the chosen erosion control methods

Commitment to Sustainable Building Practices

To reinforce the commitment to sustainable building practices, all construction within the Attached Residential, faculty housing, and clubhouse areas is required to achieve LEED certification. LEED certification must be achieved prior to issuance of the certificate of occupancy for the first building.

At the Specific Plan level, it is not possible to pinpoint the exact measures that will be used; however, LEED includes a flexible menu of options that can be used to achieve certification. This menu will be used to achieve the most cost effective and appropriate systems/features for University Hills. The LEED certification process involves an independent review of all construction and building plans to verify the chosen approaches.

Trip Reduction

In addition to the energy efficiency that can be realized through building design, fixtures, and appliances, University Hills includes several features

that are intended to reduce the number of vehicular trips. This has many benefits, including reduced congestion and pollution levels. The following features are discussed in other sections of the Specific Plan but are highlighted here to reinforce the commitment to sustainability embodied in University Hills.

- Development in University Hills is limited to 42 percent of the total site. Development is concentrated near the clubhouse, recreational amenities, and CSUSB, which will help reduce the need to use the car.
- Class II bicycle parking will be provided at the clubhouse and onsite parks,
- The onsite trail system promotes non-vehicular access throughout the project and to offsite destinations.
- The clubhouse at University Hills is only ¾ mile to the transit station at CSUSB. This transit station is the end of Omnitrans BRT line, a major regional transit hub.
- The developer has committed to allowing transit passes and materials to be sold/available at the clubhouse.
- The developer has also committed to working with Omnitrans and CSUSB to accommodate shuttle service in University Hills. A potential route and stops have been offered through this Specific Plan.

Sustainability Resource Guide

This table presents a consolidated list of available programs, resources, and potential funding sources to assist the master developer and individual builders in implementing the sustainability guidelines presented in this Section. Since the programs and efforts of the various agencies and providers that serve the University Hills community may change over time, it is encouraged to check with the relevant entity for current programming and incentives.

Table 5-1 Sustainability Resource Guide

Provider	Program	Description	For More Information
Energy			
Southern California Edison (SCE)	Sustainable Communities Program	For multiple building and/or mixed-use projects. Provides design assistance, training, education, and financial incentives relating to energy efficiency, demand response, and self-generation.	www.sce.com
SCE and Southern California Gas Company	Savings By Design	For nonresidential projects. Provides design assistance, energy analysis, and financial incentives.	www.socalgas.com/business
Southern California Gas Company	Advanced Home Program (Part of ENERGY STAR New Homes Program)	For residential projects. Offers financial incentives through either a performance-based or measure-based approach.	http://www.socalgas.com/construction/ahp/ http://www.sce.com/RebatesandSavings/
California Energy Commission	New Solar Homes Partnership (NSHP)	For new residential construction. Financial incentives for production homes with solar panels as a standard feature and that exceed Title 24 by 15%.	www.gosolarcalifornia.ca.gov/nshp
Infrastructure			
No current programs; see policies and strategies outlined earlier in this chapter. Also see resource listed below.			
Fuscoe Engineering and City of Irvine Redevelopment Dept.	Sustainable Travelways Guidelines	Guidelines for street development created in partnership with the Orange County Fire Authority for the Great Park Community.	http://www.cityofirvine.org/depts/cd/redevelopment/
Water and Wastewater			
Metropolitan Water District	California Friendly Homes; California Friendly Landscape	General provisions and design standards for residential landscaping.	www.bewaterwise.com
Building Level			
U.S. Green Building Council	LEED (Leadership in Energy and Environmental Design)	Sustainable community and building-level rating system.	www.usgbc.org
U.S. Department of Energy	ENERGY STAR	Certifies homes and products for energy efficiency.	www.energystar.gov

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