

SUSTAINABILITY AND GREEN URBANISM

Introduction

Nationally and internationally, a groundswell is underway to establish planning, architecture, engineering, construction and maintenance practices that value ecological sustainability and environmental health as hallmarks of performance. Referred to as Green or Sustainable Building, this emerging discipline strives to create a built environment that is economically, socially and ecologically responsible. As an early adopter of green building principles and practices, the City of Austin achieved international recognition at the 1992 United Nations Earth Summit for its Green Builder Program – the first in the world – and has maintained its preeminence in the field throughout the last decade.

The Mueller community is planned as a demonstration of Austin Energy's Green Building Program for sustainable development. By embracing and implementing fundamental tenets of sustainable development and green building, Mueller will become an example of low-impact development. More than an optimization of any single component, sustainable design and construction represents the integration of materials and methods that, together, define how a community's values are reflected and how its physical environment is manifested.

The Mueller community offers a spectrum of unique opportunities to successfully apply Green Building and New Urbanism strategies simultaneously. This combination of strategies can be described as "Green Urbanism" – the coordinated merging of environmental protection, economic prosperity, community cohesion and aesthetic beauty – sustainable over many generations, and valued as a focal point of the larger city. Among Mueller's signature green urbanism objectives are:

Mueller is planned as a demonstration of sustainable development, combining principles of new urbanism with green building design.



Protecting Air Quality: Air quality is a priority indicator of environmental quality. Exposure to high levels of ground level ozone can result in impaired lung function, and can exacerbate asthma, chronic bronchitis, and emphysema. Strategies to reduce ground level ozone begin with reducing reliance on the automobile and gas-powered landscape and maintenance equipment – both significant nitrogen oxide (NO_x) sources – and curbing volatile organic compound (VOC) emissions by specifying and using low-emitting materials, such as interior and exterior paints, finishes, adhesives and sealants. Mueller's extensive vegetation, tree planting, and open space preservation interlaced throughout the community will augment these source reduction strategies by functioning as the community's lungs to filter the air and lower ambient temperatures.

Mitigating Urban Heat Island: Caused by large expanses of unshaded, heat absorbing impervious surfaces, the urban heat island effect takes its toll on urban environments, especially in regions like Austin, characterized by long, hot summers. By increasing ground level temperatures, sometimes by as much as 10°F, the urban heat island effect also increases a building's cooling load, contributes to conditions favorable for ground level ozone formation, and lessens comfort associated with outside activity. Through sensible hydrologic, landscape, and building approaches, urban heat island effect can be substantially reduced.

Protecting the Night Sky: Minimizing light pollution from urban areas is an important goal of green urbanism. Light pollution can be defined as over-illumination or poorly controlled artificial illumination that directs light and glare to areas where it is not needed, such as upward into the night sky. This problem, common in all urban areas, is an inefficient use of energy and has been shown to adversely impact the daily cycles and behaviors of plants and animals such as the migrating patterns of birds and the reproductive behavior of many species. In addition, light pollution minimizes urban dwellers' ability to see and appreciate the beauty of the night sky. Light pollution will be minimized at Mueller through the use of shielded light standards that direct light downward, and through vegetative cover that reduces reflective paved surfaces.

Creating Green Buildings: Green buildings are designed to be environmentally and socially responsible, economically profitable, and healthy and productive places for people to live and work. Given that an estimated 90 percent of our time is spent indoors, attention to the indoor environment is a fundamental precept of green building. Similarly, attention to building-related decisions that affect the outdoor or ambient environment and the public health, through the building's life cycle, while recognizing consequences on the local, regional and global scales, also merits significant weight. As basic tenets, green buildings take advantage of:

- Climatic design principles for heating, cooling and daylight to offset reliance on fossil fuels;
- Long-lasting, low-maintenance materials and products with attention to recycled-content, renewable, non-toxic, low-emitting, and regionally-sourced and manufactured materials and products when performance meets or exceeds basic requirements
- Resource efficient practices such as right-sizing mechanical equipment, choosing low-flow water fixtures and drought resistant landscaping, minimizing finish materials, installing renewable energy and rainwater harvesting systems; and
- Low-impact construction and operations by recycling construction site debris; restricting use of toxic pesticides, herbicides and other persistent chemical treatments associated with landscape maintenance, pest control and/or materials manufacture; and installing site features which can help to treat stormwater run-off and increase the community's water retention capacity (e.g., green roofs, permeable paving, water absorptive soils).

By adopting locally-and nationally-recognized green building standards to guide and certify performance, the Mueller community will further Austin's role as a leader in green building initiatives. Green Urbanism will be implemented at three distinct levels within Mueller: Green Community Design, Green Buildings and Green Infrastructure.

Achieving Sustainability Standards at Mueller

Green Community Design

The opportunity to transform an industrialized brownfield site like Mueller into a thriving urban community brings together new urbanist practices and sustainable development strategies. Brownfield remediation and restoration has emerged as a highly effective way of restoring undervalued properties, often located within an urban core's desired development district. This transposition results in a more productive use of the land resource, taking advantage of existing infrastructure surrounding the site, and enhancing environmental and social benefits associated with reduced auto dependence and suburban sprawl.

Green Buildings

Green Building addresses the environmental, social and economic issues of constructing and maintaining buildings over many generations. Numerous sustainable or green building programs have emerged in recent years to guide projects towards their sustainable design goals. Locally, the City of Austin, through Austin Energy, has developed the internationally award winning Green Building Program applicable to both residential and commercial buildings. Nationally, the U.S. Green Building Council has developed the Leadership in Energy and Environmental Design (LEED®) guidelines for commercial buildings and more recently, for sector- and functionally-specific sectors, such as existing buildings and retail. Both these guidelines consist of specific building strategies that can be employed to reduce environmental burdens and life-cycle costs of buildings, and enhance human health and productivity.

For the Mueller community, buildings will follow Austin Energy Green Building Program guidelines or the U.S. Green Building Council's LEED® program. Single-family and any duplex residential development will be required to achieve a Three-Star minimum entry level under the Green Building Program, while multi-family (three or more family units), and institutional, office and single tenant retail structures greater than 25,000 gross square feet, will be required to achieve either a minimum Two-Star rating under Austin Energy's Green Building Program, or Certified rating under the U.S. Green Building Council's LEED® program. All buildings will be encouraged to surpass these minimums, incorporating as many LEED® and Austin Energy Green Building strategies as are practicable, particularly those that reinforce the signature Green Urbanism themes.

GREEN BUILDING GUIDELINES

Office, Single Tenant Retail, Institutional Buildings greater than 25,000 gross square feet: will achieve LEED® Certified certification and/or achieve a minimum Two-Star rating under Austin Energy Green Building Program.

Multi-Family Residential Buildings with three or more units: will also achieve LEED® Certified certification and/or achieve a minimum Two-Star rating under Austin Energy Green Building Program.

Single-Family and Duplex Residential Buildings: will follow the Austin Energy Green Building Program guidelines and attain a minimum rating of Three Stars. Builders are encouraged to exceed this standard to achieve Four and Five Star ratings.

Builders and developers are encouraged to exceed these standards.

Green Infrastructure

Mueller infrastructure embodies principles of resource efficiency, attention to context and scale, and environmental, social and economic responsibility. Because of its context, Mueller immediately benefits from three significant green infrastructure elements:

- *City of Austin Reclaimed Water:* In an effort to lessen dependence on treated potable water for non-potable uses at the municipal scale, the City of Austin's Water and Wastewater Department has designed and constructed a "purple pipe" reclaimed water system, with networks distributed throughout the City. Planned for installation along Mueller's northern boundary on 51st Street, the reclaimed water system will serve as the primary source of irrigation water for many of Mueller's public open spaces and streetscapes, and potentially for commercial uses within the employment centers and the Town Center.
- *Austin Energy Combined Heat & Power Station:* Austin Energy has been an innovator in bringing to the marketplace highly efficient modular combined heat and power systems. One of these systems, including chilled water distribution, is planned to be installed on the campus of the Dell Children's Medical Center of Central Texas, and will be available to serve adjacent commercial and multi-family developments in the Northwest Quadrant and the Town Center. By operating at more than 60 percent efficiency, the Combined Heat and Power system represents a substantial reduction of greenhouse gas (carbon dioxide) and other chemical and particulate emissions associated with fossil fuel combustion and soften the economic challenges associated with projected price increases for fossil fuels.
- *Community Stormwater Treatment:* Similarly, Mueller's stormwater treatment system has been designed to manage 100 percent of the stormwater on-site through a series of drainage and landscape features, including water catchment and water quality wet ponds, which also serve as public amenities. Complementary strategies employed by builders and developers within the community, including rainwater catchment systems, greenroofs, pervious and porous paving systems, generous open space, vegetative filter strips, landscaping and tree plantings, will contribute to the reduction of stormwater rate and quantity, while also providing media for filtering stormwater contaminants. These will serve as hydrological absorptive systems at all scales.

EXAMPLES OF DEVELOPMENT STRATEGIES AT DIFFERENT PROJECT SCALES

	ENERGY	LANDSCAPE	HYDROLOGY	MATERIALS
Building/Lot Scale	Thermally-protected foundation/soil heat/cool storage	Roof/patio/wall vegetative systems for climatic and hydrologic control	Roof water harvesting, rain gardens and multi-sized containerized plant/cisterns & increase soils water retention capacity	Specify durable, non-toxic, low maintenance pre-manufactured building elements
Neighborhood Scale	Modularized neighborhood heating/cooling storage systems	Streetscapes and neighborhood park systems linked as continuous neighborhood shade and light attenuating strategies	Disconnected impervious surfaces	Specify non-toxic surface treatments (pavement, roofs, walls) with high reflectance and high emissivity
Development Scale		Interspersed vegetation to reduce heat island and take advantage of cooling southeasterly breezes over water features	Necklaced water collecting systems around entire development	Balance heat-absorbing massive materials with non-heat retaining materials