

SMART GROWTH GUIDELINES FOR SUSTAINABLE



DESIGN & DEVELOPMENT

A PROJECT OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY
SMART GROWTH IMPLEMENTATION ASSISTANCE PROGRAM &

THE CONNECTICUT CAPITOL REGION COUNCIL OF GOVERNMENTS

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JONATHAN ROSE COMPANIES LLC
WALLACE ROBERTS AND TODD

SMART GROWTH GUIDELINES FOR SUSTAINABLE DESIGN AND DEVELOPMENT

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Many organizations and individuals contributed to the preparation of these Guidelines and the companion report, Together We Can Grow Better: Smart Growth for a Sustainable Connecticut Capitol Region. The staff from the U.S. Environmental Protection Agency's Smart Growth Program and the Connecticut Capitol Region Council of Governments were instrumental to shaping the project and provided key insight on issues at the local, regional, state and federal levels. Other contributors during the planning process include local municipalities in the Connecticut capitol region, Connecticut state agencies, and not-for-profit entities focused on smart growth, quality, affordable housing, and green building. The multiple entities from the public, private and not-for-profit sectors are provided below.

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Founded in 1970, EPA leads the nation's environmental science, research, education and assessment efforts. The mission of the Environmental Protection Agency is to protect human health and the environment. EPA's Smart Growth Program helps communities improve their development practices by working with local, state, and national experts to discover and encourage successful, environmentally-sensitive development strategies.

For more information: <http://www.epa.gov/smartgrowth>

CAPITOL REGION COUNCIL OF GOVERNMENTS

The Capitol Region Council of Governments (CRCOG) is the largest of Connecticut's 15 regional planning organizations. CRCOG was established under the Connecticut General Statutes in 1978 as a voluntary association of municipal governments serving the City of Hartford and 28 surrounding suburban and rural communities. CRCOG is governed by the chief elected officials of the 29 metro Hartford municipalities. The region is 760 square miles in size and houses approximately 741,303 residents. CRCOG is dedicated to expanding the concept of voluntary cooperation among its member municipalities as the means to successfully respond to many of the region's pressing governmental and public challenges. CRCOG members recognize that the future of individual municipalities is tied to the future of the region as a whole and have collaborated for more than 30 years on a wide range of projects.

For more information: <http://www.crcog.org/index.html>

ABOUT THE AUTHORS

Jonathan Rose Companies is a green real estate policy, planning, development, owner's representative, and investment firm whose mission is to repair the fabric of communities while preserving the land around them. The firm works with cities, not-for-profit organizations and private clients to develop creative solutions to real estate challenges. A leading green urban solutions provider, we understand buildings, neighborhoods, cities, regions, and the nation as complex, adaptive, and interdependent systems. Our goal is to help metropolitan regions become more resilient, competitive, and equitable. We believe that our integrated, multi-disciplinary approach to policy and practice is the key to achieving transformative change. Founded in 1989 by Jonathan F.P. Rose as a mission-based practice, the firm is recognized for its ability to achieve visionary goals through practical strategies and affordable green urban solutions. Jonathan Rose Companies has offices in the East Coast, Southwest, and Rocky Mountain regions.

For more information: <http://www.rosecompanies.com>

Wallace Roberts and Todd is a collaborative practice of city and regional planners, urban designers, landscape architects, and architects who create vibrant, imaginative, and sustainable places at many scales. Our work reinforces the integrity of cities and regions and seeks to enhance their quality of life—whether retaining a community's identity and sense of place, promoting more sustainable suburban patterns, protecting urban communities from sprawl, integrating nature into urban patterns, or revitalizing city centers. Successful plans give tangible expression to the aspirations and values of citizens, and we employ a range of techniques to engage community members so that the planning process reflects their priorities and builds consensus. Urban design is the crucial middle scale between large-scale planning and the design of individual sites. Urban design frameworks organize and guide the efforts of designers and developers of public space and individual private parcels so that these works contribute to the larger collective task of community building. We believe that development patterns are most successful when they acknowledge the vital function of public space networks, environmental systems, building typologies, and the many economic factors that affect them.

For more information: <http://www.wrtdesign.com>



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INTRODUCTION &

According to the U.S. Census Bureau, population in the United States is projected to grow from 305 million in 2009 to 439 million people in 2050, and an estimated 89 million homes and 190 billion square feet of new offices, institutions, stores, and other non-residential buildings will be built. That means that approximately two-thirds of total development on the ground in 2050 will have been built between now and then, which creates great opportunities and responsibilities to develop in a manner that addresses the resiliency of our communities to respond to the impacts of a changing climate and resource demand and production equitably and sustainably.¹ This major increase in population and development presents

several critical opportunities for communities, regions, and states to grow smarter; invest in existing communities and infrastructure, and green their existing and future building stock. However, without a coordinated local, regional, and national commitment to green and sustainable development and infrastructure practices to support transit-oriented development in smart locations, costs associated with energy consumption and demand, natural resource and open space depletion, as well as greenhouse gas emissions will continue to escalate at unprecedented rates.

Many communities and regions around the country are looking for ways to grow smarter that use less land and energy; provide safe,

¹ "Leadership in a New Era, Nelson, A.C., Journal of the American Planning Association, Vol. 72, no. 4, 2006, pp. 393-409

affordable housing options for people of all incomes and ages, and support transportation options such as walking, biking, and public transit. A recent study suggests that increasing numbers of Americans are seeking to live in locations that offer walkability, more transportation choices, and a mix of housing, retail, jobs, and neighborhood services.²

Investing in existing buildings, neighborhoods, and infrastructure that supports walkable communities connected to transit, can increase economic competitiveness for communities and regions. As we plan for the future of communities, the economics of development will need to consider the fact that many Americans currently cannot afford to live near where they work, and are spending excessive amounts of time and their limited incomes on transportation, primarily owning and driving cars. In addition, homes that are not energy or water efficient also translate to more money spent on high energy and water bills. A comprehensive planning approach that integrates the location of development with neighborhood and building design to create walkable, transit-served neighborhoods will mean that households with varying income levels will have access to more jobs in the region because they do not need a car, and businesses will have access to more workers.

Smart growth and green building are also critical if this country is committed to reducing its impact on global climate change. Combined, buildings and transportation currently make up about 71 percent of the country's greenhouse gas emissions.³ By investing in our communities and regions with homes that are closer to jobs, retail, civic centers, and neighborhood services, and by creating walkable neighborhoods, we will help to reduce the amount of driving and the greenhouse gas emissions that result. Making our buildings and infrastructure more energy efficient further

2 "2007 Growth and Transportation Survey" National Association of Realtors and Smart Growth America, 2007.

3 2009 EPA Greenhouse Gas Inventory, <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>

contributes to these reductions. Several strategies to achieve energy savings and greenhouse gas emissions reductions are proposed in this publication.

A SUSTAINABLE APPROACH TO HOUSING AND DEVELOPMENT

Green building strategies create more energy efficient homes, which directly translates into significant savings in housing costs. However, a comprehensive planning and policy approach that identifies smart locations for development, design of mixed-use, walkable neighborhoods, and green building strategies will have the broadest impact on creating economically viable and sustainable development patterns in our country. According to the U.S. Department of Housing and Urban Development (HUD), "the average American household now spends 34 percent of their annual income on housing and 18 percent on transportation – the combined total of 52 percent of their budgets is wrapped up in these two largest expenses". While this country has experienced lower housing costs in suburban and rural locations, transportation costs are higher; "and the combination of housing and transportation averages 57 percent for working families in the metropolitan area". The study cited by HUD, also found that "households in a centrally located neighborhood, with access to mass transit, only spent 34 percent of their income on the same costs".⁴ With nearly 50 percent of people living in rural places within the bounds of metropolitan statistical areas, an integrated planning approach that spaces jurisdictional boundaries is needed.⁵

Successfully addressing the challenges and opportunities of growing smarter and building greener will require that communities collaborate with each other, as well as with regional, state, and federal agencies and organizations. The

4 The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice, http://www.brookings.edu/reports/.../01_affordability_index.aspx

5 American Housing Survey for the United States: 2007, <http://www.census.gov/prod/2008pubs/h150-07.pdf>

infrastructure and economic stability of our communities are tied to what happens at the regional and state levels, and vice versa. For example, providing a regional public transit system is a critical element of the regional infrastructure system that requires coordination between local municipalities, regional authorities, and state and federal agencies. Making sure that these decisions yield benefits for households—in the form of greater choice, lower combined housing and transportation costs, and healthier communities—also strengthens local economies. To accomplish these multiple outcomes, agencies must collaborate to efficiently share information and resources and to appropriately target programs, policies, and resources.

In Connecticut, the Capitol Region Council of Governments (CRCOG) partnered with the U.S. Environmental Protection Agency (EPA) to address these challenges—many of which are shared by communities and regions around the country. CRCOG collaborated with EPA’s Smart Growth Program to identify tools and strategies for implementing a state affordable housing program, HOMEConnecticut,⁶ to grow smarter, ensure healthy and affordable housing, and support long-term economic competitiveness at the local and regional levels. The EPA and CRCOG

hired a team of experts, which included urban designers from Wallace Roberts & Todd and real estate planning and development advisors from Jonathan Rose Companies. The guidelines in this document are a result of that collaboration and will help guide development in the 29 urban, suburban, and rural municipalities that make up the Connecticut Capitol Region.

These guidelines were developed for communities in Connecticut and around the country striving to get development and future growth that result in stronger neighborhoods, protected open space and watersheds, and healthier and more affordable homes. The guidelines are also applied to site-level conceptual plans for development that are featured in a companion report, *Together We Can Grow Better: Smart Growth for a Sustainable Region*. That report analyzes four types of development that represent many of the challenges and opportunities faced by communities:

- Infill redevelopment in an existing residential neighborhood;
- Greyfield redevelopment of a dead shopping center in a retail corridor;
- Infill development in a functioning but underused shopping center; and
- Development in a rural context adjacent to a village center.

⁶ Authorized in 2007, the HOMEConnecticut program (Public Act 07-4) creates incentives for municipalities to establish land use regulations that allow higher density residential development with affordable housing requirements. The legislation authorized \$4 million for technical assistance and planning grants to towns, non-profit developers, housing assistance organizations, and regional planning agencies and for zoning and building permit incentive payments.



Highlands' Garden Village Mixed-Use and Mixed-Income Community - Denver, Colorado
Jonathan Rose Companies

OVERVIEW&

PURPOSE OF THE GUIDELINES FOR SUSTAINABLE DESIGN & DEVELOPMENT

These guidelines can help individuals, organizations, and agencies involved in the planning, design, and development of homes, neighborhoods, and communities. They are intended mainly for local government officials who are at the forefront of making decisions on land use, site and neighborhood design, housing, green building, development agreements, and public-private partnerships. Municipal planners, engineers, commissioners, council members, and others must grapple with making the right decisions on projects of all sizes as they strive to make their communities more livable and sustainable. These guidelines can provide a framework to help

these local decision-makers guide development, preserve open space, provide housing that is affordable and energy efficient, and create neighborhoods that are enjoyable and walkable.

These guidelines are also a resource for regional and state officials responsible for the allocation of state and federal resources. Funding for regional infrastructure—roads, transit, sewers, water, etc.—is usually allocated at the state level but has a significant impact on the way regions and communities grow. These guidelines demonstrate the connections between infrastructure investments and land use and development decisions and can help identify projects, features of projects, or broader areas that warrant more targeted state investment.

The guidelines are also for designers, developers, advocates, and builders of attractive buildings and neighborhoods, as well as those who are interested in developing homes and neighborhoods that respond to changing demographics and market demands. They offer important considerations on how to generate long-lasting value from land use and development decisions, including location, orientation and layout, composition and character, and green building materials and design.

Finally, these guidelines are intended to help residents who want to more effectively participate in the development of their neighborhoods and towns. This document provides a framework for them to engage with the local government and developers in siting, planning, designing, and developing high-quality projects that create great places.

GUIDELINES VERSUS CRITERIA

The guidelines were developed with the specific intent of providing strategies for decision-makers and practitioners involved in policy-making, planning, and development of our buildings, neighborhoods, and communities. They are not intended to be prescriptive or to offer uniform, rigid metrics or benchmarks, but rather to provide a comprehensive overview of how to approach equitable, sustainable neighborhood building.

These guidelines differ from, but complement, other certification programs that contain comprehensive criteria to achieve a certain standard of sustainability. Certification programs such as the Enterprise Green Communities, the U.S. Department of Energy and EPA's ENERGY STAR, and the U.S. Green Building Council's LEED certification systems (USGBC LEED) include specific requirements that the developer or homebuilder must meet in order to qualify for certification. These programs provide standards that agencies, individuals, and organizations can use to establish benchmarks and measure

outcomes. They have also helped to popularize green building and design not only in the real estate and development industries, but also with residents, property owners and business tenants. While some programs focus on green homes or developments (such as ENERGY STAR, USGBC LEED-Homes, and the National Association of Home Builders Green Building Program), other programs (such as Green Communities and USGBC LEED-Neighborhood Development) emphasize the creation of green neighborhoods. (See Resources – Certification Programs for access to further information).

The ways in which communities use these programs vary widely. Some local and state governments have begun to require that projects meet green certification thresholds as part of a policy strategy to reduce greenhouse gas emissions. Other jurisdictions have incorporated elements of these green programs into their land use ordinances and building codes. The guidelines in this document provide a framework for the basic considerations for mixed-income, mixed-use, sustainable development. This publication also includes a list of resources that illustrate how the design guidelines could be incorporated into municipal land use regulations.

HOW TO USE THE GUIDELINES

The guidelines offer strategies that are appropriate for each scale of development—region, neighborhood, and building. Regional strategies establish the foundation for determining highest and best land use patterns that achieve better environmental and economic benefits. Neighborhood strategies lay the groundwork for livability, equity, good design, and marketability. Building strategies ensure that structures include green, energy-efficient design that reduces costs and improves the quality and durability of the built environment.

Site Location: The site location criteria can be used as a checklist for prospective development sites. They provide focused guidance for the most critical decisions that planners and policy-makers can make to help reduce the impacts of development patterns on climate change, natural resources and ecological systems, reduce household costs and living expenses, and more efficiently use limited public resources to build regional infrastructure.

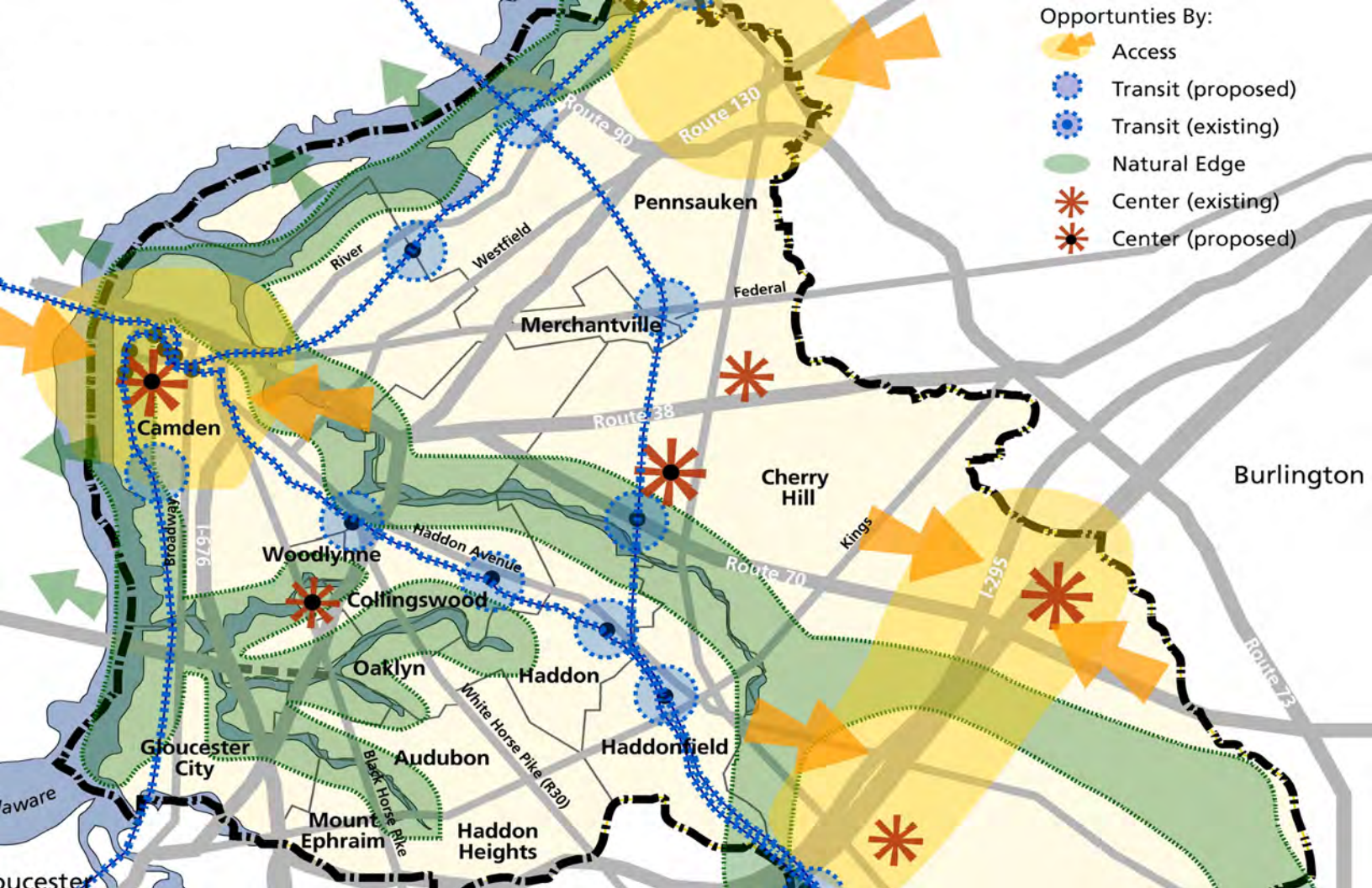
Neighborhood Plan: The neighborhood planning guidelines are more detailed, matching the scale of decisions that can be made at the block and neighborhood scale to create livable, equitable, and diverse communities. The guidelines include a list of strategies that could be considered for each project. They may not all apply, but they will add beauty and market value to projects, as well as enhance and preserve environmental features that create a sense of place.

Design and Construction: The design and construction guidelines are the most detailed. They focus on the building and site infrastructure-scale design decisions and strategies that can help reduce energy and water consumption, improve air quality, and create green infrastructure

systems. Implementation of the strategies will vary depending on site conditions, availability of materials, capacity of local designers and builders, and other reasons. However, all the strategies should be considered as a menu of opportunities to create high-performance buildings in well-designed neighborhoods in smart locations.

Community participation in these issues is critical and should be integrated from the start into all development and land use planning and policy activities at the regional and local levels. These guidelines will provide residents with tools to identify and advocate for smart growth projects in their region, town, or city so they can more effectively participate in the planning process.

The economic and quality of life advantages communities gain from using smart growth and green building strategies are increasingly evident. As the market demand for energy-efficient homes and more affordable, sustainable neighborhoods increases, the capacity of local builders, designers, and suppliers will grow to meet that demand. The result will be well-designed communities that contribute to a stronger local economy, healthier residents, and a more environmentally sound approach to growth.



Example Regional Transit Planning Analysis
Wallace Roberts & Todd, LLC

PROSPEROUS, SMART GROWTH LOCATIONS

Planning at the regional scale is the first critical step in creating livable communities. Locating development on underused, vacant, abandoned, or contaminated land in existing towns and cities reduces development pressure on rural or prime agricultural lands. These sites, typically infill sites or parcels adjacent to existing development, are often the cornerstones catalyzing further private investment in other underused properties nearby.

The benefits of this approach are many. For example, revitalizing neighborhoods and downtown districts strengthens the municipal tax base and prods communities to improve existing infrastructure. A regional analysis of development opportunities

highlights new ways to increase accessibility to employment centers, reduce the time and energy residents spend commuting, and improve air and water quality. Complementary land preservation and conservation strategies at the regional scale identify vulnerable lands and help protect them from development, which focuses local and regional market forces on existing neighborhoods. Combining revitalization strategies with land preservation policies work together to strengthen the vitality and economic viability of mixed-use town centers and neighborhoods.

Local governments, planners, developers, and others who are involved in selecting and approving

sites for future development make their decisions based on many considerations. The guidelines on the following pages can be the foundation upon which to base location decisions for residential, commercial, mixed-use, or other development to achieve long-term economic and sustainable development objectives. Key regional strategies for locating development and making land-use policy are:

- Natural Resources Preservation
- Environmentally Sensitive Areas Protection
- Existing Development and Infrastructure Connections
- Transportation and Transit Systems Access
- Community-Oriented Services Proximity



THE LINK BETWEEN VEHICLE MILES TRAVELED (VMT) AND CLIMATE CHANGE

Transportation accounts for 1/3 of CO₂ emissions in the United States.¹ Transportation related CO₂ reduction efforts can be understood as a three-legged stool. The first leg is fuel efficiency, the second leg is developing cleaner, lower carbon fuels, and the third leg is the reduction of vehicle miles traveled (VMT).

To date, most policy attention has been paid to the first two legs of the stool, the gains of which have been canceled out by the additional VMT growth attributed to ongoing conventional development patterns. If current development patterns do not change, VMT in the United States will experience a rise of 48% by 2030 and 102% by 2050.² By creating walkable compact communities connected to local and regional transit, Smart Growth development can effectively slow the growth in VMT by significantly reducing the need to drive.

¹ "Growing Cooler; The Evidence on Urban Development and Climate Change" ULI, Washington DC, 2008

² *Ibid*

PROSPEROUS SMART GROWTH LOCATIONS

| OBJECTIVES | GUIDELINES |
|--|---|
| NATURAL RESOURCES PRESERVATION | |
| Preserve and protect farmland, natural resources and habitat | <p>Locate the development on a site that does not have:</p> <ul style="list-style-type: none"> - Wetlands, water bodies or land within 100 feet of these areas - Prime agricultural soils - Unique or prime forest soils - Threatened or endangered species habitat - Aquifer recharge areas |
| ENVIRONMENTALLY SENSITIVE AREAS PROTECTION | |
| Protect environmentally sensitive areas | <p>Locate the development on land that does not have:</p> <ul style="list-style-type: none"> - Steep slopes greater than 15% - 100-year floodplains - Highly erodible soils |
| Enhance and protect the ecology of natural systems | Establish a mandatory no-development buffer at wetlands, floodplains, lakes, rivers, and estuaries |
| EXISTING DEVELOPMENT & INFRASTRUCTURE CONNECTIONS | |
| Capitalize on existing infrastructure | Locate the development on a site that has access to existing roads, water, sewers and other infrastructure and is within or contiguous to existing development |
| Redevelop and restore value of contaminated or under-utilized land | To the greatest extent possible, locate the project on a greyfield (underused or abandoned site), brownfield (underused or abandoned site with real or perceived environmental contamination), or other adaptive reuse/infill site |
| Minimize reliance on private septic systems | Discourage development on sites where private septic systems will be required, both because of the costs of maintenance and typical system failures, and because of the large lot size required to service the systems |
| TRANSPORTATION AND TRANSIT SYSTEMS ACCESS | |
| Encourage transit and other alternatives to single occupancy cars, reduce total congestion, vehicle miles traveled, household transportation costs, and greenhouse gas emissions | <p>Locate the development on a site that is served by or within walking distance of public transit or other alternative transportation, such as:</p> <ul style="list-style-type: none"> - Bus - Train (light rail, heavy rail, tram) - Ferry - Bike lanes and designated bike routes - Car share |

PROSPEROUS SMART GROWTH LOCATIONS

| OBJECTIVES | GUIDELINES |
|---|---|
| COMMUNITY-ORIENTED SERVICES PROXIMITY | |
| Support community health by encouraging walking and biking and reducing driving | Locate the development on a site that is served by or is within 15 minutes walking distance of community-oriented services, such as: <ul style="list-style-type: none">- Grocery store- Convenience store- Civic, community and educational facilities- Cultural and entertainment facilities- Child care- Job centers- Health clinic (medical or dental)- Post office- Pharmacy- Laundry/ dry cleaner- Police or fire station- Place of worship- Public park and recreational facility |



Highlands' Garden Village, Co-housing - Denver, Colorado
Jonathan Rose Companies

NEIGHBORHOOD PLAN - PLACEMAKING &

Desirable neighborhoods that offer a good quality of life and maintain lasting value for residents are not only located in convenient areas (see previous section) but also include well-designed buildings, streets, and infrastructure. Good neighborhoods are sustainable and maintain enduring value for their inhabitants. They provide good quality housing opportunities for people at all stages of life, from young to old, and with different income levels. Good neighborhoods are memorable and have clear, identifiable boundaries, connections to surrounding places, parks and civic spaces, a diversity of uses and housing types, and create a cohesive sense of place.

These neighborhood-scale guidelines contribute to creating walkable neighborhoods, pedestrian friendly streets, and thriving, diverse, healthy communities. There are exciting opportunities within these guidelines to be creative. Green design and development strategies, such as those listed in this document, can be used to create neighborhoods that are environmentally sensitive and vibrant, attractive places. For example, trees along streets are aesthetically pleasing, protect and shade pedestrians, cool the ambient air temperature, and slow and retain water as part of a stormwater management system.

The guidelines work together to achieve high-quality neighborhood design in these areas:

- Neighborhood Fabric and Composition
- Community Streets
- Nature and Open Space
- Equity, Diversity, and Affordability



Gateway Crossing - Hagerstown, MD¹ Placemaking in Practice

A former neighborhood of industrial lands and public housing sites in Western Maryland, this neighborhood revitalization effort created place by reinterpreting historic workforce housing that supported the railroad industry at the turn of the 20th century. A series of neighborhood parks and community centers were all placed within 1/4-mile walking radius.

The mixed-income redevelopment is designed to integrate well into an existing historic neighborhood, while providing energy efficient homes that are LEED for Home qualified. Due to the rocky soil conditions in this community along the foothills of the Appalachian Mountains, the site development balanced density with large areas reserved for stormwater infiltration in front yards and in the parks.

¹ Wallace Roberts & Todd, LLC

NEIGHBORHOOD PLAN - PLACEMAKING

| OBJECTIVES | GUIDELINES |
|------------|------------|
|------------|------------|

NEIGHBORHOOD FABRIC AND COMPOSITION

| | |
|---|---|
| Encourage walking and reduce vehicle miles traveled by mixing uses and densities | Incorporate a diverse mix of uses within the development, or locate housing within a 15-minute walk of commercial and retail districts within diverse, community-oriented services |
| Maximize density levels to create optimal nodes of activity | <p>Exceed existing density patterns or requirements for a residential and mixed-use development. Suggested minimum densities for new residential construction:</p> <ul style="list-style-type: none"> - Six (6) units per acre for detached/semi-detached houses - Ten (10) units per acre for townhomes - Twenty (20) units per acre for apartments |
| Minimize the negative impact of car parking and encourage healthy modes of transportation | <p>Design car parking areas so that they are not the primary visual components of the neighborhood character by:</p> <ul style="list-style-type: none"> - Providing opportunities for shared parking between structures - Reducing parking ratio requirements in areas served by public transit - Providing preferred or discounted parking for carpools, vanpools and low-emitting, fuel-efficient vehicles - Providing designated street parking for car-sharing service - Limiting and screening parking and loading areas to the side and/or rear of buildings - Providing bike racks and walking amenities (water fountains, benches, etc) near entrances at points of destination |
| Maximize opportunities for passive solar heating and cooling | For new street blocks or buildings, take advantage of natural solar heating and cooling by orienting the longer side of the street grid and/or buildings along the east-west axis |

COMMUNITY STREETS

| | |
|--|--|
| Calm traffic and create desirable, pedestrian friendly, safe streets | <p>Design safe, pedestrian-friendly streets by including elements, such as:</p> <ul style="list-style-type: none"> - Wide sidewalks on both sides of the street (4 feet minimum width on residential blocks, 8 feet minimum width on non-residential or mixed-use blocks) - Street furniture (e.g., benches, street lamps) - Trees and other landscaping - Street curb bulb-outs - Adequate space for transit stops/shelters - <i>Woonerfs</i> (streets that give legal priority to pedestrians and cyclists) - Narrower streets to reduce speeds and impervious surfaces |
|--|--|

NEIGHBORHOOD PLAN - PLACEMAKING

| OBJECTIVES | GUIDELINES |
|--|--|
| COMMUNITY STREETS | |
| Create bike-friendly streets | Create a bike-friendly environment with continuous, and if possible, separated bike lanes that connect to a larger bike network, bike parking, and easily accessible bike racks |
| Maximize neighborhood connectivity | Connect new streets, sidewalks and bike lanes to the existing street grid and surrounding neighborhoods, districts, and transportation network |
| Enliven street frontages | Support a pedestrian-friendly street pattern by: <ul style="list-style-type: none"> - Orienting buildings toward the street and sidewalk with front facades and entrances facing a public space but not a parking area - Locating front building facades near the front property line - Zoning for pedestrian-oriented uses at the ground level (e.g., retail, community services such as libraries and community centers, etc.,) |
| Beautify streets with trees and green infrastructure practices | Encourage the use of green infrastructure practices as standard practice for roads and public rights-of-way. For example, provide street trees on both sides of streets between the street and sidewalk. Use appropriate (drought tolerant) tree species and ensure the trees have the correct soils and root and growth space to thrive |
| NATURE AND OPEN SPACE | |
| Create or enhance green open space networks | Design green open space so that it is connected to existing green open space networks within or adjacent to site boundaries |
| Conserve natural resources | Preserve and restore natural resources through compact conservation design |
| Maximize access to parks and recreational areas | Include and/or provide direct access to parks and recreational areas |
| Maximize access to local food sources | Provide access to local food and opportunities for food production, by: <ul style="list-style-type: none"> - Zoning or CC&Rs (covenants, conditions and restrictions) that allow for growing produce on residential property - Dedicating open space for a community garden in the development - Locating the project near a farmers' market. - Planting edible landscapes as part of landscaping plans |

NEIGHBORHOOD PLAN - PLACEMAKING

| OBJECTIVES | GUIDELINES |
|--|--|
| EQUITY, DIVERSITY AND AFFORDABILITY | |
| Encourage housing type, tenure, and income diversity | Exceed the affordability requirements of applicable local and/or state programs, and: <ul style="list-style-type: none">- Include a mix of housing types, tenures, income targeting and density patterns- Establish zoning regulations that allow accessory units |
| Create environments usable by all people, to the greatest extent possible, without the need for adaptation or specialization | To the greatest extent possible, incorporate the following universal design strategies: <ul style="list-style-type: none">- One zero-step entrance, at the front, back or side of the house- At least 32 inches of clear passage space for all main floor doors, including bathrooms- At least a half bath, preferably a full bath, on the main floor- Incorporate universal design strategies in the design of the residential units (Universal Design Resources^{1,2}) <hr/> <p>1 Center for Inclusive Design and Environmental Access, http://www.ap.buffalo.edu/idea/Home/index.asp</p> <p>2 Center for Neighborhood Technology Housing and Transportation Affordability Index, http://www.cnt.org/tcd/ht</p> |



Othello Station at New Holly - Seattle, WA
Wallace Roberts & Todd, LLC with WRT/Solomon ETC

GREEN BUILDING & INFRASTRUCTURE

Green building techniques make new and existing buildings healthier, more durable, and more energy and water efficient. Buildings are healthier when they are designed to improve the indoor air quality, thereby reducing incidence of asthma and other respiratory diseases. Also, more durable buildings consider the lifecycle of materials, selecting efficient, recycled, or recyclable construction and finish materials and using construction methods that extend their functional life, reduce cost, and reduce waste. These materials, appliances, and techniques not only conserve resources, they also reduce household energy and water costs.

These techniques are within the reach of both experienced green builders and those that are just beginning to incorporate sustainability, energy efficiency, and compact design into their construction practice and business model. In the guidelines below, experienced builders may recognize similarities with other green building certification programs, such as the Enterprise Green Communities Program, the U.S. Green Building Council LEED programs, and EPA's ENERGY STAR ratings for homes, appliances, and fixtures.

In some municipalities, developers and builders may have varying levels of capacity or knowledge in green construction and design, or may be

located in areas with limited access to green materials. In these cases, these Green Building and Infrastructure Guidelines can serve as a list of sustainable construction methods and materials to consider. Policy makers might use this list as a good starting point in working with local builders who may have little to no experience in green building to both build capacity and establish low cost, high impact, accessible green building methods. In areas where builders have experience and capacity to design and construct green buildings, policy makers might set minimum standards or program certifications and offer incentives to project developers that exceed them.

Using cost-effective methods to create high-performance building envelopes advance local green building capacity and help households to save money on energy costs. The following strategies may serve as a menu of options that can be incorporated in various combinations into the design and construction strategy for building green to independently and cumulatively increase building and neighborhood efficiency and sustainability.

The Guidelines focus on energy and water efficiencies, but also include simple green building methods. The list is not a detailed specification, nor does it reflect EPA national green building guidance that is under development. EPA's ENERGY STAR Qualified Homes Program contains more complete information, checklists, best practices and technical resources for the design and construction of energy-efficient homes. Please refer to the Resources-Certification Program section of this document to access these resources. The Green Building and Infrastructure Guidelines are organized as follows:

- High-Performance Buildings
- Green Building Materials
- Sustainable and Indigenous Landscaping
- Green Infrastructure
- Green Construction Best Practices
- Green Operations and Maintenance



Highlands' Garden Village - Denver, CO Green Building in Practice

Highlands' Garden Village, developed by Jonathan Rose Companies, is a mixed-use transit oriented development on the site of a former amusement park. The community's range of housing types and price points demonstrate that smaller, infill sites can accommodate diversity, and also enhance economic and social viability. By combining residential with office and neighborhood serving retail uses, residents have the opportunity to live, work and shop within a few minutes walk of each other.

The village is an early example of the extensive use of green building and planning techniques at the neighborhood and building scale. The single-family homes exceed ENERGY STAR program requirements. All of the buildings incorporate recycled materials, LOW-VOC products, and energy efficient windows. The neighborhood's road beds are constructed from concrete recycled directly on site from the demolition of the amusement park. The landscaping consists of water-conserving native plants and special efforts were made to keep many of the site's existing trees. All of the community buildings are powered with alternative energy sources.

GREEN BUILDING & INFRASTRUCTURE

| OBJECTIVES | GUIDELINES |
|------------|------------|
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HIGH-PERFORMANCE BUILDINGS

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| <p>Create high-performance residential projects to reduce household water consumption, water utility costs, and protect natural water supply</p> | <p>Use durable, water-efficient fixtures, such as EPA WaterSense labeled products¹</p> <ul style="list-style-type: none"> - Showerheads with a flow of less than 2 gallons per minute (gpm) - Sink faucets with a flow of less than 2 gpm - Toilets that use less than 1.6 gallons per flush (gpf) - Urinals that are waterless or use less than 1 gpf |
| <p>Create high-performance residential projects to reduce household energy consumption, energy utility costs, and greenhouse gas emissions</p> | <ul style="list-style-type: none"> - Use Technical Resources: Guidelines for ENERGY STAR Qualified New Homes¹ - Identify ENERGY STAR partners to design and build the homes¹ - Identify Home Energy Rater to verify ENERGY STAR checklists¹ |
| <p>Design and construct sound building envelope</p> | <ul style="list-style-type: none"> - Complete Thermal Bypass Inspection Checklist - Complete Quality Framing Checklist - Install ENERGY STAR qualified or better windows and doors |
| <p>Design and install high-performance heating/ventilation/air conditioning system</p> | <ul style="list-style-type: none"> - Complete HVAC Quality Installation Contractor Checklist - Complete HVAC Quality Installation Rater Checklist - Specify and install ENERGY STAR HVAC equipment - Install ENERGY STAR qualified thermostat (except for zones with radiant heat) - Install ENERGY STAR ceiling fans |
| <p>Design water efficient plumbing system</p> | <ul style="list-style-type: none"> - Use demand pumping, manifold, or core layout hot water distribution system |
| <p>Specify and install energy efficient appliances and lighting</p> | <ul style="list-style-type: none"> - Install ENERGY STAR refrigerators, dishwashers, and clothes washers/dryers - Use ENERGY STAR Advanced Lighting Package, and/or install ENERGY STAR bulbs in 80% of sockets¹ |
| <p>Specify construction methods that ensure healthy indoor air quality</p> | <ul style="list-style-type: none"> - Use EPA's Indoor airPLUS¹ - Complete Indoor Air Quality Checklist - Complete Water-Managed Construction Checklist |
| <p>Create high-performance commercial/ mixed-use projects to reduce household water consumption, water utility costs, and protect natural water supply</p> | <p>Design buildings using the ASHRAE Advanced Energy Design Guides¹</p> |

¹ See Resources section under "Certification Programs"

GREEN BUILDING & INFRASTRUCTURE

| OBJECTIVES | GUIDELINES |
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GREEN BUILDING MATERIALS

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| <p>Use materials and products that are environmentally preferable and safer for occupant health</p> | <p>To the greatest extent possible, use materials that have minimized environmental and health impacts over their lifecycle:</p> <ul style="list-style-type: none"> - Use recycled or recyclable building and finish materials - Use locally available, indigenous materials and/or products that have been certified under a trusted green program - Use healthier and durable materials. Some flooring options include: <ul style="list-style-type: none"> - Living Areas and Bedrooms: Suggested materials include wood harvested from a certified sustainably managed forest, salvaged or reclaimed woods, cork (a fast growing, renewable material), and carpets certified to the NSF-140 standard.¹ - Entryway, Kitchen, Laundry Room, and other Wet Areas: avoid moisture absorbing flooring. Suggested materials include ceramic tile, linoleum, rubber, sealed concrete - Basement: avoid moisture absorbing flooring. Suggested material includes exposed slab with low-VOC stain - Bedrooms: Suggested materials include those suggested for Living Areas, natural fiber area rugs or Green Label carpet - To facilitate reuse at the end of a product or building's life, consider using nails and screws instead of adhesives when practicable. - More environmentally preferable materials and methods can be found in the model green construction specifications at: www.wbdg.org/design/greenspec.php |
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SUSTAINABLE & INDIGENOUS LANDSCAPING

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| <p>Reduce maintenance requirements and costs, water consumption, and negative environmental impacts</p> | <ul style="list-style-type: none"> - Limit the use of turf grass and install native, drought-tolerant ground cover or other landscaping to replace lawns. Reduce areas maintained by greenhouse gas-emitting maintenance equipment - Design landscapes to be low maintenance and require little or no fertilizers, pesticides, or watering except for when they are first established - Select and install plants that are appropriate to the site's soils and micro-climate and require little or minimal irrigation, fertilization, and chemical management (pesticides). If irrigation is required, design system to EPA WaterSense standards.¹ |
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¹ See Resources section under "Certification Programs"

GREEN BUILDING & INFRASTRUCTURE

| OBJECTIVES | GUIDELINES |
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GREEN INFRASTRUCTURE

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| <p>Incorporate stormwater management practices as part of neighborhood design features and amenities</p> | <ul style="list-style-type: none"> - Use green infrastructure and low-impact development techniques to manage runoff on-site, such as bioswales, pervious pavement, green roofs, tree plantings, bio-filtration, cisterns, and stream daylighting - To the extent practicable, minimize impervious surfaces by using gravel, permeable pavers, open grid pavers, and similar pervious surfaces for driveways, parking lots, and other areas that would usually be paved - Encourage green infrastructure practices in landscaping features, such as community gardens, rain gardens and large canopy trees - Locate deciduous trees and other plant materials to provide shading in summer and solar access in winter, as well as to provide stormwater management for any impervious areas on site |
| <p>Mitigate heat island impacts</p> | <ul style="list-style-type: none"> - Use ENERGY STAR qualified or other highly reflective roof products - Use paving materials with high solar reflectance - Select and install street trees, and/or preserve existing trees, to shade sidewalks and hard surface areas |

GREEN CONSTRUCTION BEST PRACTICES

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| <p>Control soil erosion and sedimentation</p> | <ul style="list-style-type: none"> - Implement local or state erosion and sedimentation controls during construction using EPA's Stormwater Best Management Practices¹ |
| <p>Redevelop brownfield sites using ecologically innovative and responsible environmental remediation and abatement practices</p> | <ul style="list-style-type: none"> - Conduct an environmental assessment that meets the requirements of the local or state environmental protection agency. If applicable, employ EPA's Green Remediation Best Management Practices¹ - Use EPA Steps to Lead-Safe Renovation, Repair and Painting¹ |
| <p>Reduce excess construction waste and make recycling easy</p> | <ul style="list-style-type: none"> - Whenever possible, use building technologies, materials and finishes that minimize finishing on-site - Place recycling bins on construction site for recyclable/reusable waste materials that can be diverted from landfills |

¹ See Resources section under "Certification Programs"

GREEN BUILDING & INFRASTRUCTURE

| OBJECTIVES | GUIDELINES |
|--|--|
| GREEN ENERGY PRODUCTION & SUPPLY | |
| Encourage on-site production and use of renewable energy sources | <ul style="list-style-type: none">- Install non-polluting, renewable energy generation technologies such as solar, wind, or geothermal- Alternatively, consider designing and wiring the development to accommodate renewable energy sources, such as photovoltaic cells, in the future |
| Enhance on-site energy production with off-site renewable energy sources | <ul style="list-style-type: none">- Purchase household energy from renewable resources that may be available from the local utility/energy provider |
| GREEN OPERATIONS & MAINTENANCE | |
| Ensure that ongoing operations and maintenance practices promote green and healthy living by developing operations and orientation manuals | <ul style="list-style-type: none">- Building maintenance manual¹- Homeowner / Renter green guide¹- Homeowner / Renter green orientation¹ |

¹ See Resources section under "Green Development, Neighborhood, and Building Resources"



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RESOURCES

This section provides a reference list of certification programs and resources for readers who are interested in obtaining additional information on planning or certifying neighborhoods and buildings that are healthy, walkable, diverse in uses and incomes, and environmentally responsible. In addition to certification programs, there is also a list of leading entities in the fields of smart growth, neighborhood design, and green building.

SMART GROWTH PLANNING, DEVELOPMENT AND DESIGN RESOURCES

Federal Agencies

Federal agencies provide a wide range of resources as well as grants, loans, and advisory services. Establishing long-term relationships with government agencies is important, particularly

in projects that promote smart growth and energy-efficient development and design. Regular research on key websites helps provide access to new resources, funding notifications, and policy initiatives at the federal level. For example, as an extension of its work supporting community development and affordable housing, HUD joined with EPA and DOT in the Partnership for Sustainable Communities to facilitate integrated planning to help American families gain better access to affordable housing, more transportation options, and lower transportation costs.

Some key federal agencies are:

U.S. Environmental Protection Agency (EPA)
www.epa.gov

Office of Administrator; Office of Policy Economics and Innovation, Smart Growth Program
www.epa.gov/smartgrowth

Office of Air and Radiation
www.epa.gov/oar

Office of Environmental Justice
www.epa.gov/compliance/environmentaljustice/index.html

Office of Solid Waste and Emergency Response
www.epa.gov/swerrims

Office of Water
www.epa.gov/OW

U.S. Department of Energy (DOE)
www.energy.gov

U.S. Department of Energy Center of Excellence for Sustainable Development
www.smartcommunities.ncat.org

U.S. Department of Housing and Urban Development (HUD)
www.hud.gov

U.S. Department of Housing and Urban Development (HUD) – Community Planning and Development Green Homes and Communities
www.hud.gov/offices/cpd/about/conplan/greenhomes.cfm

U.S. Department of Transportation (DOT)
www.dot.gov

U.S. Department of Transportation (DOT) Federal Transit Administration Transit and Environmental Sustainability
www.fta.dot.gov/planning/planning_environment_8510.html

U.S. Department of Transportation (DOT) – Federal Transit Administration Transit-Oriented Development
www.fta.dot.gov/planning/planning_environment_6932.html

U.S. Department of Agriculture (USDA)
www.usda.gov

U.S. Department of Agriculture – Sustainable Development
<http://www.usda.gov/oce/sustainable/funding.htm>

Centers for Disease Control and Prevention (CDC)
www.cdc.gov

Centers for Disease Control and Prevention (CDC) – Healthy Communities Program
www.cdc.gov/healthycommunitiesprogram

Regional Organizations

Metropolitan Planning Organizations (MPO) and Regional Council of Governments that plan, research, and support smart growth and green development patterns are often sources of information. Therefore, it is important to learn about your local regional planning organizations. They are frequently members of the National Association of Regional Councils and/or the American Metropolitan Planning Organizations. For more information on these groups or to find your regional organization, visit their websites at:

American Metropolitan Planning Organization
www.ampo.org

National Association of Regional Councils
www.narc.org

Professional Associations

Professional associations are excellent resources for identifying experienced project teams and researching best practices in green design, as well as potential planning and design grant opportunities. Some key professional associations are:

American Planning Association
www.planning.org

American Institute of Architects
www.aia.org

Building Owners and Managers Association
International
www.boma.org

National Association of Homebuilders
www.nahbgreen.org

Urban Land Institute
www.uli.org

Associations for Public Agencies and Officials

These associations provide resources for public officials and staff to help them create more opportunities for smart growth development, community revitalization, energy-efficient infrastructure, transportation options, and community development to address climate change.

International City/ County Management
Association (ICMA)
www.icma.org

ICLEI – Local Governments for Sustainability
www.iclei.org

Local Government Commission
www.lgc.org

National Association of Counties (NACo)
www.naco.org

National Governors Association – Environment,
Energy & Natural Resources Best Practices
www.nga.org/portal/site/nga

U.S. Conference of Mayors – Mayors Climate
Protection Center
www.usmayors.org/climateprotection

Certification Programs

Green certification and rating programs provide standards for measuring and evaluating a type of building product, such as residential or commercial buildings, or large-scale, multi-phased projects with several buildings. These programs include certain prerequisites and criteria to be addressed as part of the project assessment process. Most programs are based on a point system that evaluates a project's location, context, design, construction, and operation to determine the project's eligibility for certification. Some key certification programs include:

American Society of Heating, Refrigerating
and Air-Conditioning Engineers (ASHRAE) –
Advanced Energy Design Guides
www.ashrae.org/technology/page/938

ENERGY STAR Program – A Joint Program of
the EPA and DOE
[www.energystar.gov/index.cfm?c=new_homes.
hm_index](http://www.energystar.gov/index.cfm?c=new_homes.hm_index)

ENERGY STAR Qualified Homes (Checklists,
Technical Resources, Specifications, etc)
[www.energystar.gov/index.cfm?c=bldrs_lenders_
raters.homes_guidelns](http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.homes_guidelns)

ENERGY STAR Partners (Find or become a
Partner)
www.energystar.gov/index.cfm?c=partners.pt_index

[www.energystar.gov/index.cfm?c=fixtures.alp_
consumers](http://www.energystar.gov/index.cfm?c=fixtures.alp_consumers)

U.S. Environmental Protection Agency (EPA)
www.epa.gov

EPA Indoor airPLUS
www.epa.gov/indoorairplus/

EPA National Menu of Best Practices
cfpub.epa.gov/npdes/stormwater/menuofbmps

EPA Steps to Lead-Safe Renovation, Repair and Painting
www.epa.gov/lead/pubs/renovation.htm

EPA WaterSense
www.epa.gov/WaterSense

EPA Smart Growth Code Auditing
www.epa.gov/smartgrowth/scorecards/index.htm

Enterprise Green Communities
www.enterprisegreencommunitiesonline.org

Enterprise Green Communities Templates
www.greencommunitiesonline.org/tools/resources/index.asp#t1

NSF International - Sustainable Building Product Standards
<http://www.nsf.org/business/sustainability>

National Association of Home Builders – National Green Building Program
www.nahbgreen.org

U.S. Green Building Council – Leadership in Energy and Environmental Design (LEED)
www.usgbc.org

Green Development, Neighborhood, and Building Resources

These resources provide tools to create development plans and policies that build well-designed, green communities. The following list includes key organizations involved in smart growth, green building and sustainable

development. Also noted in this list are special program areas that these organizations have developed.

Center for Inclusive Design and Environmental Access
Program Area: Visitability Booklet (pdf)
www.ap.buffalo.edu/idea/Home/index.asp

Center for Neighborhood Technology
www.cnt.org
Program Area: Housing and Transportation Affordability Index
www.cnt.org/tcd/ht

Center for Universal Design
www.design.ncsu.edu/cud
Program Area: Universal Design in Community Planning
www.design.ncsu.edu/cud/about_ud/udincommunity.html

Congress for the New Urbanism
www.cnu.org
Program Area: Achieving Sustainability from Building to Region
www.cnu.org/Intro_to_new_urbanism

Global Green USA
www.globalgreen.org
Program Area: Green Building Resource
www.globalgreen.org/greenurbanism

Leadership for Healthy Communities
www.leadershipforhealthycommunities.org
Program Area: Active Living
www.leadershipforhealthycommunities.org/component?option=com_advancedtags/view/tag/id,2/Itemid,74

Lincoln Land Institute of Land Policy
www.lincolninst.edu
Program Area: Visualizing Density
www.lincolninst.edu/subcenters/visualizing-density/

National Complete Streets Coalition
www.completestreets.org
Program Area: Complete Street Fundamentals
www.completestreets.org/complete-streets-fundamentals

Natural Resources Defense Council
www.nrdc.org
Program Area: Smart Growth
www.nrdc.org/smartgrowth/default.asp

Playbook for Green Buildings and Neighborhoods – Strategic Local Climate Solutions
www.greenplaybook.org

Project for Public Spaces
www.pps.org

Reconnecting America – Center for Transit-Oriented Development
www.reconnectingamerica.org

Sierra Club USA
www.sierraclub.org
Program Area: Cool Cities
www.coolcities.us
Program Area: Clean Energy Solutions
www.sierraclub.org/energy

Smart Growth America
www.smartgrowthamerica.org

Smart Growth Leadership Institute – A Project of Smart Growth America
www.sgli.org
Smart Growth Network
www.smartgrowth.org/sgn/default.asp

Smart Growth Online – A Service of the Smart Growth Network
www.smartgrowth.org

Sustainable Communities Network – Linking Cities to Resources and to One Another
www.sustainable.org
Sustainable Sites Initiative – Sustainable Landscapes
www.sustainableplaces.org

Urban Advantage – Envisioning Urbanism
www.urban-advantage.com

The Urban Land Institute
www.uli.org
Program Area: Smart Growth Alliance Information Network
www.uli.org/CommunityBuilding/Smart%20Growth%20Alliances.aspx
Program Area: Regional Leadership and Cooperation – Smart Growth
www.uli.org/CommunityBuilding/RegionalLeadershipandCooperation/Smart%20Growth.aspx

Walk Score – Find a Walkable Place to Live
www.walkscore.org



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