

PROMOTING
SUSTAINABLE
DEVELOPMENT
PRACTICES IN KANSAS CITY



RECOMMENDED ZONING & DEVELOPMENT CODE AMENDMENTS

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INTRODUCTION

In only a few short years, the City of Kansas City, Mo., has established itself as a leader in the area of environmental sustainability. Government leaders have directed that sustainability be integrated into all aspects of city operations. The mayor, city council and city manager are working together to incorporate “green” into the culture of all city operations. By promoting the triple bottom line goals of environmental quality, social equity and economic vitality, policies enacted by the mayor and city council and implemented by the city manager and staff are having a significant impact.

One example of the city’s ongoing commitment to promoting sustainable practices was the recent adoption of a new zoning and development code. The new code—the first comprehensive revision of zoning and land development regulations in over 50 years—includes several sustainability-related enhancements.

This report is a continuation of that effort and provides further evidence of the city’s “green” commitment. Guided by a citizen advisory committee, the report focuses on ensuring that the zoning and development code does even more to promote sustainable development practices. It examines ways in which Kansas City’s zoning and development code can be updated to better accommodate energy conservation and sustainable development practices. It focuses on the removal of unintended regulatory barriers and possible code amendments that will further promote the city’s sustainability goals.

Existing “Green” Code Elements

Stream Buffer Regulations

The stream buffer regulations included in the new zoning and development code are a highly visible and important example of the types of green solutions to come out of the development code update. These regulations require no-build and limited development buffer areas along most stream corridors in the city. The new regulations help reduce the amount of stormwater entering creeks, and help to preserve water quality by filtering storm runoff that does enter waterways. Maintaining natural buffer areas along stream corridors helps reduce erosion and expensive repairs to infrastructure.

Landscaping Regulations

The new zoning and development code includes new requirements for landscaping and tree planting. Besides the obvious aesthetic benefits of these new regulations, they also help improve air quality; filter stormwater runoff; and reduce noise, glare and heat.

Parking and Transportation

There are a number of ways in which the new zoning and development code reduces automobile dependency and auto-related carbon emissions.

- For the first time, bicycle parking requirements have been added to the city’s development regulations.

- The new regulations completely eliminate vehicle parking requirements for areas within the downtown core area.
- Partial vehicle parking exemptions are granted for uses within 500 feet of rapid transit stops, and in an effort to curtail provision of excessive parking near rapid transit investments, the ordinance imposes maximum limits on parking near rapid stops.
- Partial vehicle parking exemptions are provided for uses in pedestrian-oriented shopping areas.
- The city planning and development director is authorized to approve alternative compliance parking plans for shared parking, off-site parking, special facilities for cyclists, valet parking, transportation demand management programs and transit accessibility.
- The ordinance's traffic impact study requirements expressly require that such studies consider bicycle, pedestrian and transit modes of transportation.
- The code includes new provisions designed to incentivize open space and conservation-style development through provision of density bonuses and reductions in lot area and setback requirements. By promoting such "clustered" development, the regulations can help reduce infrastructure and utility extension costs as well as the amount of paving and pervious area within subdivisions.
- Mixed-use development is allowed and encouraged throughout the new code's business and commercial districts, which will help further reduce travel demands and CO₂ emissions.
- The Master Planned Development (MPD) district included in the new code promotes mixed-use, live/work units, cluster development, preservation of natural resources, etc.
- Connectivity requirements were added to the subdivision design standards to help promote non-motorized transportation connections and reduced vehicle travel.
- "Neighborhood-serving retail" uses are allowed within residential districts with special use approval, allowing residents to walk to nearby retail.

Land Use and Zoning Standards

Beyond the more obvious and visible green provisions in the new code, the land use and zoning standards themselves will play an important role in advancing the city's green solutions agenda.

WATER



Water is one of Kansas City’s most valuable resources and one of the most important drivers of the city’s overall sustainability efforts. One example of the city’s commitment to addressing flooding and water quality challenges is the *Wet Weather Solutions Program*, which has three key goals:

1. minimizing loss of life and injury and reducing property damage due to flooding;
2. improving water quality;
3. maximizing economic, social and environmental benefits.

This section explores water-related issues and a range of development practices that can help in realization of Kansas City’s water-related sustainability goals.

Riparian Buffers

Riparian buffers are permanently preserved natural vegetative areas adjacent to streams, lakes, ponds and wetlands. Vegetated riparian buffers help improve stream health and water quality by:

- providing natural filtration of nutrients and sediments from stormwater runoff;
- stabilizing stream banks and shorelands to prevent soil erosion; and
- providing habitat and wildlife corridors, as well as open space recreation opportunities.

Riparian buffers also help separate people and structures from flooding hazards, thereby protecting human life and property.

Existing Regulations/Potential Issues

Kansas City adopted a stream buffer ordinance in August 2008. It prohibits development in floodplains, while focusing on preserving adjacent riparian buffers through development controls, low-impact development provisions and incentives. These regulations—codified in Article 88-415 of the zoning and development code—address stormwater management and natural resource protection by requiring riparian buffers or setbacks along streams. The regulations promote environmental quality, while also providing flexibility and incentives for affected property owners, namely in the form of density bonuses for those who pursue “conservation development” practices (see the following section). Nonresidential development within protected stream corridors is also eligible for increased building height and off-street parking reductions.

The stream buffer regulations are a highly visible and important example of the types of green solutions to come out of the 2008 zoning and development code update. Maintaining natural buffer areas along stream corridors helps reduce erosion and expensive repairs to infrastructure that often are funded by PIAC.

WATER

Recommended Action

The city's existing stream buffer regulations are innovative and effective. No further amendments are recommended at this time.

Open Space and Conservation Developments

Open space and conservation developments are subdivisions or other development projects in which lots and development areas are clustered in one or more compact areas with the remainder of the tract left as permanently protected open space. The purpose of conservation development regulations is to protect natural resources while allowing at least the same level of density allowed as part of a conventional (non-conservation) development design. Conservation development regulations help preserve open space (including farmland), filter stormwater runoff, reduce flooding, provide habitat and wildlife corridors and promote recreational opportunities and improved community health. By clustering development, they also allow more compact and less costly networks of roads and utilities.

Existing Regulations/Potential Issues

Article 88-410 of the zoning and development code includes new provisions designed to incentivize open space and conservation-style development through density bonuses and flexible (reduced) lot area and setback requirements. By promoting such

“clustered” development, the regulations will help reduce infrastructure and utility extension costs as well as the amount of paving and impervious area within subdivisions.

Recommended Action

No amendments to the open space and conservation development regulations are recommended.

Rainwater Harvesting/Reuse

Rainwater harvesting refers to the practices of using rain barrels, cisterns and storage tanks to



Rainwater harvesting can be part of Kansas City’s “green solutions” approach to managing water, which aims to keep rainwater where it falls.



collect and store rainwater for various uses, including irrigating plants. Rain barrels are most often used for individual residences, while cisterns have both residential and commercial applications. Initial runoff volume (first flush) is retained by rain barrels and cisterns, ranging from approximately 50 gallons to several thousand for a large cistern.

Capturing rainwater decreases the volume and flow rate of rooftop-generated stormwater runoff and provides a source of chemically untreated “soft water” for gardens and other non-potable needs, free of most sediment and dissolved salts. When used throughout a watershed or stormwater collection basin, rain barrels and cisterns can modestly impact the peak stormwater flow rate. For this reason, rainwater capture can be viewed as an extension of the city’s “green solutions” approach

to managing water, which aims to keep rainwater where it falls.

Existing Regulations/Potential Issues

Section 88-820-12 of the zoning and development code identifies features allowed to encroach into required setbacks. Features such as arbors, trellises and air conditioning units are allowed to encroach into required setbacks, but household rain barrels are not expressly addressed.

Recommended Action

The zoning and development code should be amended to expressly allow rain barrels to encroach into required zoning setbacks.

WATER



Sample Ordinances and Information Sources

Santa Fe County, NM, Ordinance 2003-6

Santa Fe County's [rainwater harvesting](#) includes residential and commercial regulations. Residences with 2,500 square feet of heated area or less must utilize rain barrels, cisterns, or other catchment basins and residences 2,500 square feet of heated area and greater must install an active rainwater catchment system comprised of cisterns that are buried or partially buried, hold 1.15 gallons of rainwater per square foot of residential heated area (adjusted based on landscaping) and water landscaping using a pump and drip irrigation system connected to cisterns. Commercial rainwater harvesting systems must use cisterns that are buried, partially

buried, or enclosed within an insulated building/structure and hold 1.5 gallons per square foot of roofed area (adjusted based on landscaping).

HarvestH2O.com

This [website](#) is a clearinghouse for information about rainwater harvesting. The site includes a [listing of sample rainwater harvesting ordinances](#) and regulations.

Bioretention (Bioswales and Rain Gardens)

Bioretention areas are a recognized best management practice (BMP) for stormwater management and have long been promoted by Kansas City's *Wet Weather Solutions Program*. They are typically small, landscaped basins that filter stormwater run-

Bioretention has long been promoted by Kansas City's *Wet Weather Solutions Program*.



off and may be used as an alternate or supplement to conventional stormwater detention basins.

Bioretention areas filter pollutants from stormwater as the water seeps through mulch, soil and gravel layers and releases the filtered water into the ground. The areas can be sized to detain and infiltrate stormwater that would otherwise flow into the storm drainage system and into natural bodies of water. Bioretention is suitable for commercial and residential areas to filter run-off from roofs, driveways, roads and parking lots. The practice is a key part of Kansas City's "green solutions" approach to managing stormwater.

Existing Regulations/Potential Issues

The city's stormwater management rules are part of the [*Standards, Specifications, and Design Criteria*](#)

and the adopted [*Manual of Best Management Practices for Stormwater Quality*](#).

Recommended Action

Investigate ways to incentivize greater use of bioretention in parking lots. Update Chapter 52 of the city code (Parking Stations) to expressly allow bioretention in parking lots.

Green Roofs

A "green roof" is a roof that is partially or completely covered with plants that help slow and reduce stormwater runoff. Green roofs typically include a structurally sound roof, waterproofing and root barrier, drainage layer, permeable fabric, a growing medium/soil and vegetation. There are two types of green roof systems. Lightweight "extensive" roofs feature hardy succulent plants

WATER

and are appropriate retrofits to existing buildings. Heavier “intensive” green roof systems feature thicker growing media to support deep-rooted vegetation. Green roofs can be installed on most flat roofs if they are constructed to accommodate the structural load.

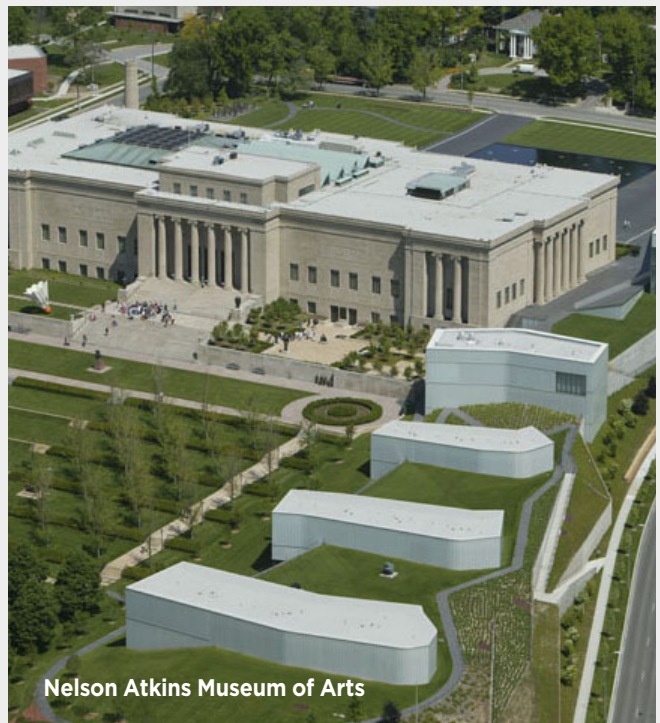
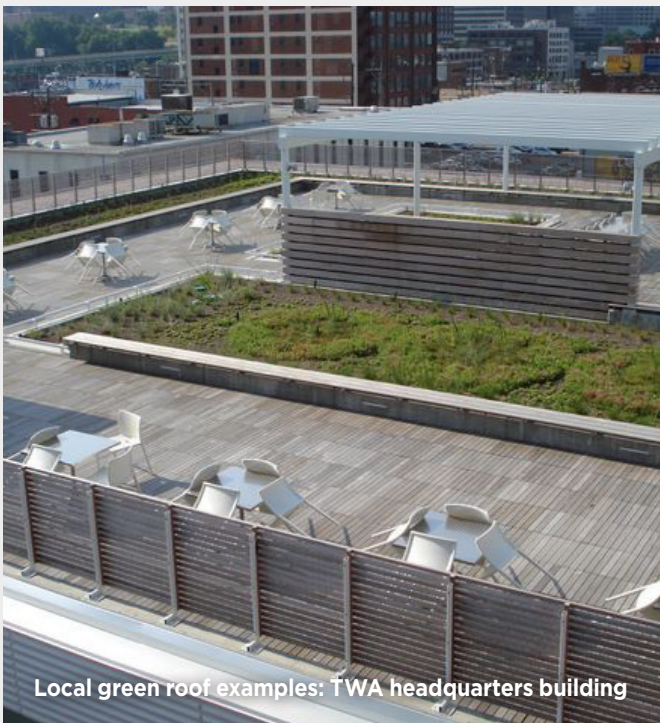
Conventional roofs absorb and retain heat and increase stormwater runoff. A green roof has numerous benefits to building owners and the broader community when compared to a conventional roof, including the following:

- Lower rate and quantity of stormwater runoff

- Reduced urban heat island effect
- Lower energy costs for heating and cooling
- Increased longevity of roofing materials
- Habitat for birds, insects and wildlife
- Accessible garden space
- Increased value of space with views of or access to green roofs

Existing Regulations/Potential Issues

There are no green roof regulations in Kansas City’s zoning and development code.



Recommended Action

No action is recommended at this time.

Sample Ordinances and Information Sources

Portland, OR: [Ecoroof Zoning Code, Title 33, Section 33.510.10](#)

The Portland Zoning Code gives density bonuses for developments within the city's central district that provide green roofs. The amount of density bonus depends on the ecoroof (green roof) coverage in relation to the building footprint and is as follows:

- 10% to 30% coverage earns 1 square foot of

additional floor area per square foot of ecoroof

- 30% to 60% coverage earns 2 square feet per square foot of ecoroof
- 60% coverage or greater earns 3 square feet per square foot of ecoroof

Toronto, Ontario: [Green Roof Bylaw, Toronto Municipal Code Chapter 492](#)

The Toronto Bylaw applies to new residential, commercial and institutional permit applications made after January 31, 2010 and will apply to new industrial development as of April 30, 2012. The green roof coverage requirement depends on the size of the building. The table below shows how the green roof requirement ranges from 20-60 percent of available roof space for commercial, institutional and residential development. Available roof space is defined as the total roof area minus areas designated for renewable energy, private terraces and residential outdoor amenity space.

Gross Floor Area (Size of Building)	Coverage of Available Roof Space (Size of Green Roof)
2,000-4,999 m ²	20%
5,000-9,999 m ²	30%
10,000-14,999 m ²	40%
15,000-19,999 m ²	50%
20,000 m ² or greater	60%



Multi-color permeable concrete and green roof, Kansas City Zoo polar bear exhibit.

WATER



Permeable (porous) paving examples (L to R): concrete, asphalt, concrete, concrete.



Permeable Pavement

Permeable paving refers to paving materials—typically concrete or stone—that promote absorption of rain and snowmelt. Depending on soil conditions permeable pavement can be very effective in reducing the quantity of surface runoff, particularly for small to moderate-sized storms. It also reduces the runoff pollutants associated with storm events. Even in areas where soil types do not drain well, permeable pavements can be combined with subsurface drainage systems such as pipe underdrains or stormwater infiltration trenches, to slow runoff and reduce stress on stormwater management systems.

Existing Regulations/Potential Issues

Section 88-420-15-O of the zoning and development code provides the city planning and development director authority to permit the permeable

pavement “for special events or for seasonal peak parking demands or overflows in patronage of the principal use or uses.” Permeable pavement is otherwise addressed by the [*Standards, Specifications, and Design Criteria*](#) and the adopted [*Manual of Best Management Practices for Stormwater Quality*](#).

Recommended Action

No further action is recommended at this time.

Off-street Parking Requirements

Off-street parking regulations establish minimum requirements for provision of on-site parking spaces, typically by requiring a certain number of vehicle parking stalls per dwelling unit or increment of floor space. Excessive requirements for off-street parking can lead to the over-development of parking infrastructure, which increases impervious

Reducing the size of parking lots can help control stormwater runoff and the “heat island effect.”



cover and stormwater runoff and drives up the cost of development.

“Right-sized” minimum parking ratios can help reduce impervious surfaces, which reduces stormwater runoff and the heat island effect caused by the sun’s heating of large paved areas.

Existing Regulations/Potential Issues

When the zoning and development code was prepared, significant reductions were made in minimum off-street parking requirements and several new provisions were added to the standards to ensure greater flexibility.

The new regulations completely eliminate vehicle parking requirements for areas within the (DC) downtown core area and within the Crossroads area. Partial vehicle parking exemptions are granted for

uses within 500 feet of rapid transit stops and in an effort to curtail provision of excessive parking near rapid transit investments, the ordinance includes maximum limits on parking near rapid stops. Partial vehicle parking exemptions are also provided for uses in pedestrian-oriented shopping areas.

Under the terms of the code, the city planning and development director is authorized to approve alternative compliance parking plans for shared parking, off-site parking, the provision of special facilities for cyclists, valet parking, transportation demand management programs, transit accessibility and permeable pavement.

Recommended Action

No additional amendments are recommended at this time.

LAND USE, TRANSPORTATION & MOBILITY



Higher density, mixed-use development patterns make walking, cycling and transit more viable.

Land use and transportation policies have a direct and profound effect on energy use and the resulting production of greenhouse gases. Clearly, realization of Kansas City's long-term energy conservation and broader sustainability goals will require a more integrated approach to land use and transportation planning in the city. This section focuses on practices that will help promote a more vibrant, connected and multi-modal city.

Mixed-Use

Mixed-use development refers to the practice of including residential and nonresidential uses in a single building or within a single development or neighborhood area. Mixed-use development patterns offer residents the ability to work, shop and have access to entertainment, recreation and other services within walking distance of where they live and/or work. Mixed-use patterns reduce the need to drive from place to place and make walking, cycling and transit use more viable as alternative forms of transportation. The higher densities typically found in mixed-use area also reduces development pressure on natural resources and farmland.

Existing Regulations/Potential Issues

The new zoning and development code accommodates and promotes mixed-use development in several ways:

- The business, commercial and downtown zoning district regulations were revised

to allow mixed-use development in all districts.

- Density limits have been removed and allowable building heights have been increased for vertical mixed-use buildings, thereby providing a regulatory incentive to build mixed-use (as opposed to single-purpose) buildings.
- Master Planned Development (MPD) district provisions have been added to promote mixed-use through available density bonuses and highly flexible development standards.
- Neighborhood-serving retail uses are allowed by special use permit in all residential zoning districts.

In addition to accommodating mixed-use development, all of these changes help promote non-motorized transportation options and help reduce CO₂ emissions.

Recommended Action

The city should consider using the area plan update process as an additional means of promoting compact, walkable mixed-use development patterns in all areas of the city. No additional changes to the zoning and development code are recommended at this time.

LAND USE, TRANSPORTATION & MOBILITY



Sample Ordinances and Information Sources

LEED 2009 for Neighborhood Development: Neighborhood Pattern and Design (Prerequisite 2 and Credits 3 and 4)

Mixed-use development is recognized as a vitally important sustainable development practice under [LEED](#).

National Association of Home Builders

The National Association of Home Builders advocates the accommodation and encouragement of [mixed-use and compact development](#) through various means, including incentives for increased densities.

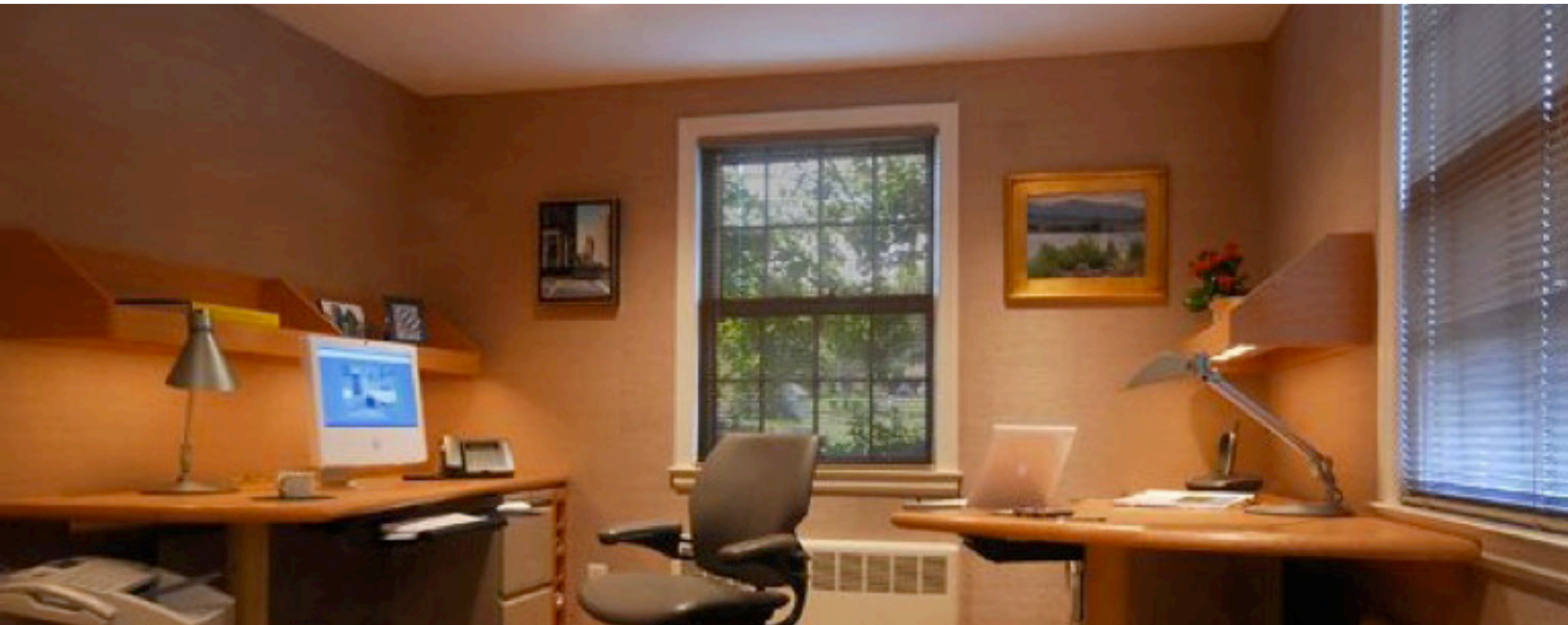
Oregon Commercial and Mixed-Use Development Code Handbook

The [Oregon handbook](#) is comprehensive and richly illustrated. It contains useful background information, model ordinance ideas and recommended design guidelines.

Home Occupations

The term “home occupation” refers to work or business activities carried out within a dwelling unit by one or more residents of the dwelling unit. Zoning regulations allowing individuals to work in their homes can help reduce transportation demands and CO₂ emissions, improve air quality and encourage small business growth.

Allowing home occupations helps reduce transportation demands and CO₂ emissions, improve air quality and encourage small business growth.



Existing Regulations/Potential Issues

Sec. 88-305-04 of the city's zoning and development code includes provisions allowing home-based business and work activities under specified conditions. Home occupations are limited to the residents of the dwelling and no more than two clients or customers may be present at any time. Other restrictions also apply.

Recommended Action

By allowing many types of work-at-home and business activities, the zoning and development code's regulations are generally supportive of home occupations, although the city may want to consider eliminating the prohibition on non-resident employ-

ees. Many modern home occupation ordinances allow up to one or two outside employees.

Sample Ordinances and Information Sources

Lee's Summit, MO

The Lee's Summit unified development ordinance allows up to one non-resident employee in association with allowed home occupations (See [Sec. 8.090](#)).

Tucson, Arizona

Tucson requires administrative review of proposed home occupations. The city also requires that applicants sign an affidavit acknowledging their agreement to comply with applicable [zoning regulations](#).

LAND USE, TRANSPORTATION & MOBILITY

Berkeley, California

Berkeley's [ordinance](#) is noteworthy because it contains separate regulations and approval procedures for "low-impact" and "moderate-impact" home occupations. Low-impact uses are allowed upon issuance of a business license ([business license application](#)).

Accessory Dwelling Units

An accessory dwelling unit (ADU) is a self-contained, secondary dwelling unit created on a lot that is occupied by a detached house. Such units, which are sometime referred to as "granny flats," "mother-in-law units" or "accessory apartments," include separate kitchen, sleeping and bathroom facilities. They may be attached (i.e., separate living space within a primary dwelling) or detached from the primary house on the lot.



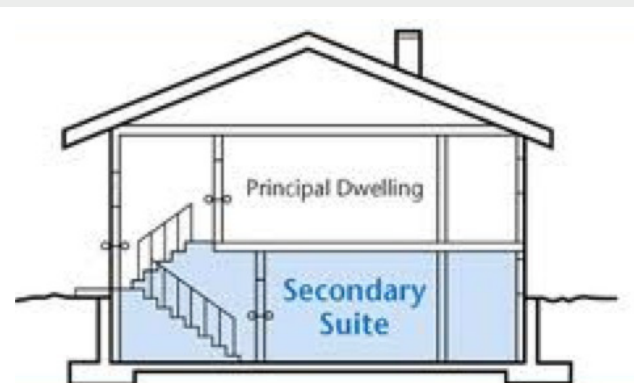
Accessory dwelling units help to promote more compact development patterns, which results in more efficient use of land, energy, water and materials. The compact size of ADUs can help promote increased energy efficiency, and accessory units can provide lower cost housing options, as well as facilitating "aging in place."

Existing Regulations/Potential Issues

The Kansas City zoning and development code does not allow accessory dwelling units, although "carriage houses" are allowed in very limited circumstances (See Sec. 88-305-05).

Recommended Action

Consider expanding the range of ADU housing options available in Kansas City by relaxing the existing carriage house development standards or



Accessory dwelling units: internal to main dwelling (above) and detached (left)

Infill development takes advantage of existing infrastructure and community amenities.

adding new ADU regulations that could, for example, be applied in new subdivisions (as opposed to infill sites).

Sample Ordinances and Information Sources

Santa Cruz, California

Santa Cruz's [Accessory Dwelling Unit Manual](#) was created to assist homeowners with the process of developing an ADU. It includes relevant zoning, design standards and building codes. It also showcases prototype ADU designs. Although not available online, the city has also produced an ADU Plan Sets Book containing seven ADU prototype concepts designed by Northern California architects. The city's actual ADU regulations can be viewed [here](#).



Arlington, Virginia

Arlington's website includes an entire [webpage](#) of background information that will be useful for local governments considering amendments to their ordinances.

Bloomington, Minnesota

Bloomington's new [home occupation](#) allow only attached ADUs, which is a relatively conservative approach that may appeal to some local governments.

Infill Development

Infill development makes use of vacant or underdeveloped sites within built-up areas and thereby takes advantage of existing infrastructure and community amenities. Even in areas that are largely built-out, vacant and developable infill sites are common.



LAND USE, TRANSPORTATION & MOBILITY



Area plan updates can be used to promote compact, walkable infill development opportunities.

They include older shopping centers, industrial areas, former railyards and other underutilized or abandoned property.

Infill development reduces the need for new water and sewer lines, roads, schools and other public facilities needed to support development. The redevelopment of urban areas reduces development pressure on natural lands and farmland and can help reduce urban sprawl. Infill development can invigorate the vitality and economy of neighboring areas, improve property values and enhance quality of life.

Existing Regulations/Potential Issues

There are no provisions in the zoning and development code that expressly addresses infill development, although many of the code's provisions have an influence on infill development. The UR (Urban Redevelopment) zoning district, for instance, is a special purpose zoning classification that provides much flexibility for redevelopment and infill projects (See Sec. 88-260). The NC/O (Neighborhood Conservation Overlay) district can also be used to promote compatible infill development in established neighborhoods (See Sec. 88-225). The set-back averaging provisions of Sec. 88-820-09 also help to provide additional flexibility for infill development by allowing use of contextual front setbacks for new projects.

Recommended Action

The city should use the area plan update process as an additional means of promoting compact, walkable infill development opportunities in older areas of the city. No additional changes to the zoning and development code are recommended at this time.

Transit-Oriented Development

Transit-oriented development (TOD) mixes land uses and increases density around transit centers, train stations and frequent-service bus stops. It is focused on facilitating transit accessibility and pedestrian/cyclist comfort to boost ridership and reduce automobile traffic, while also expanding housing and shopping choices. TODs are typically focused on areas within one quarter to one-half mile of a major transit facility. They are designed as compact, walkable neighborhoods, with pedestrian/cyclist access and connectivity as the highest priority.

Similar to mixed-use developments, TODs provide residents with the ability to live, work, shop and access services within walking distance of their homes as well as access the larger metropolitan area through public transit. TODs increase transportation choice and reduce vehicle use, traffic congestion, air pollution and energy consumption. The higher densities typically allowed within TODs also reduces development pressure on natural lands and farmland and can help reduce auto-dependent urban sprawl into such areas.

LAND USE, TRANSPORTATION & MOBILITY



Existing Regulations/Potential Issues

Transit-oriented development principles are embedded in many of the zoning and development code's provisions. The mixed-use development provisions described on [page 15](#) of this report and the pedestrian-oriented overlay district of Sec. 88-230 are prime examples.

The code also includes special parking regulations for areas near rapid transit stops, such as the bus rapid transit stops along MAX routes. These regulations (See Sec. 88-420-04-J) provide significant reductions in minimum off-street parking requirements and establish *maximum* parking allowances for retail sales uses. Finally, Sec. 420-15-N authorizes office parking reductions of up to 25% for uses located within 500 feet of some transit stops.

Recommended Action

Amend the special parking regulations of Sec. 88-420-04-J to apply within 1,000 feet of rapid transit stops, up from the current 500-foot radius. The area plan update process should be used as an additional means of promoting compact, walkable transit-oriented development opportunities in Kansas City.

Sample Ordinances and Information Sources

Chicago Metropolitan Agency for Planning (CMAP)

CMAP's TOD [webpage](#) contains useful information on TOD design strategies, as well as descriptions of several TODs within the Chicago region.

TOD principles are embedded in many of the zoning and development code's existing provisions.



Regional Transportation Authority (RTA)

RTA maintains an [online list](#) of Chicago region and national TOD resources.

Prince George's County, Maryland: Mixed-use Zone

The county's new [mixed-use](#) zone is intended to promote the type of compact communities that embody the best principles of *Smart Growth* and transit-oriented development. The regulations represent a kind of form-based zoning toolkit for creation of different types of mixed-use, TOD centers.

Travel Demand Management

Travel demand management (TDM) strategies focus on reducing vehicle traffic, particularly during peak travel times, thereby getting the maximum capacity possible out of existing transportation infrastructure. TDM can involve a wide variety of measures used by large employers to reduce the number of vehicle trips made by employees. These reductions in vehicle use have the benefit of reduced traffic congestion, air pollution and energy consumption.

Existing Regulations/Potential Issues

Section 88-420-15-M gives the planning and development director the authority to reduce minimum parking requirements by up to 50% for large employers that institute TDM programs, which can

LAND USE, TRANSPORTATION & MOBILITY



include the appointment of a transportation coordinator, widespread use of off-peak work schedules, preferred parking spaces for carpool vehicles and cash or other incentives for employees who commute by transit, walking or cycling.

Recommended Action

No additional changes to the zoning and development code are recommended at this time.

Sample Ordinances and Information Sources

Bloomington, Minnesota

The City of Bloomington's [TDM ordinance](#) requires certain large developments and

redevelopments to implement programs that encourage employees to reduce single occupancy vehicle trips to help relieve traffic congestion, allow parking flexibility and reduce air pollution. Property owners subject to the TDM ordinance must submit an [Annual Status Report](#) form each year. This information is used by the city to determine if a good faith effort has been made to implement approved TDM strategies.

Cambridge, Massachusetts

Cambridge's [parking and transportation demand management](#) (PTDM) program authorizes use of several demand management measures, including:

Street connectivity helps promote clean air and carbon reduction goals.

- Employee transit pass subsidies
- Market-rate parking fees
- Shuttle buses
- Bicycle parking and showers/lockers for cyclists
- Guaranteed ride home
- Car/vanpool matching
- Bus shelters
- Transit information
- Hiring of local residents
- On-site TDM coordinator
- Priority/discounted HOV (high-occupancy vehicle) parking

Connectivity

“Connectivity” refers to the connectedness of a street and roadway network. A street network that is not well connected can limit people’s ability to travel in the most direct path, increase travel distances, require larger intersections to move vehicular traffic and add to congestion on major streets. Street connectivity helps advance clean air and carbon reduction goals.

Existing Regulations/Potential Issues

Sec. 88-405-10-B of the zoning and development code requires that streets in new subdivisions connect with existing streets and to future street extensions in abutting areas that are likely to be developed in the future.

Recommended Action

No additional changes to the zoning and development code are recommended at this time. See “Walkability” section ([page 26](#)) for a discussion of recommended amendment to enhance non-motorized (pedestrian, cyclist, wheelchair, etc.,) network connectivity.



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Sample Ordinances and Information Sources

Kentucky Transportation Cabinet, Division of Planning: Street Connectivity—Zoning and Subdivision Model Ordinance

This [model ordinance](#), prepared by the state’s transportation agency, contains helpful introductory information and relevant commentary.

Virginia Department of Transportation: Secondary Street Acceptance Requirements

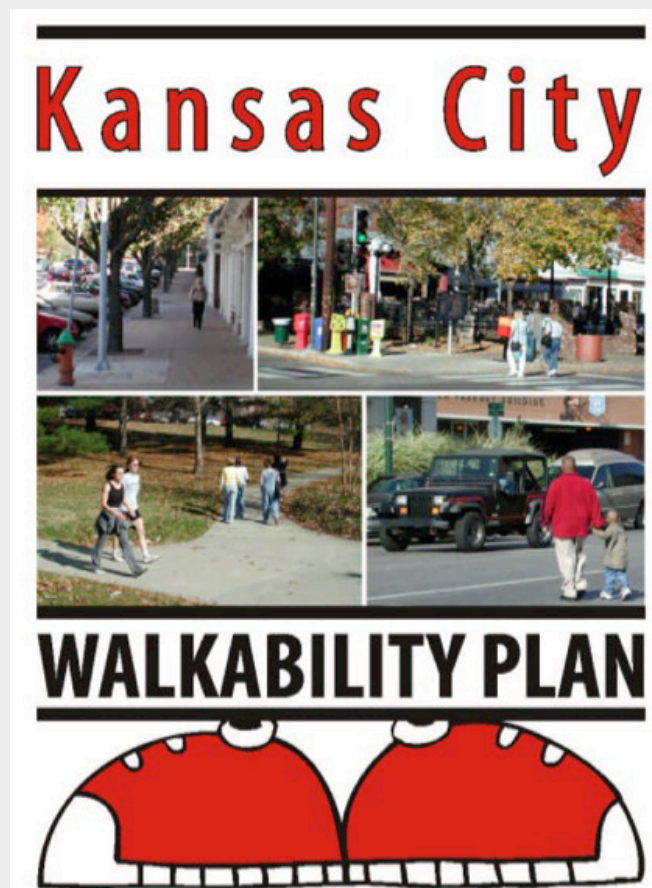
Virginia has state-mandated requirements for connectivity, which are codified as part of VDOT’s [secondary street acceptance requirements](#). The Virginia system uses a connectivity ratio to measure connectedness. In recognition of the various contexts in which the requirements are imposed, the regulations establish different minimum standards for “Compact,” “Suburban” and “Rural” areas of the state.

LEED 2009 for Neighborhood Development: Neighborhood Pattern and Design Prerequisite 3: Connected and Open Community

Connectivity is a prerequisite for [LEED](#) certification. Part of the requirement is based on having at least 140 intersections of public roads and walks per square mile.

Walkability

Daily physical activity is an important part of staying healthy and fit. It also reduces the risk of many chronic diseases, including high blood pressure, diabetes and cancer. Of all the types of physical activity that people have to choose from, walking is by far the easiest, most accessible and lowest-impact exercise available. Walking is safe, simple and affordable and does not require practice



Walkable environments help reduce traffic congestion, improve quality of life and (in shopping areas) promote greater economic vitality.

or equipment. The design and configuration of streets, blocks, lots, sidewalks, alleys and driveways have a direct effect on a person's ability and inclination to make some or all of the trips in their daily routine on foot rather than by car. The key is to create places where walking is a safe, convenient and appealing transportation option for as many people as possible.

Walkable environments support public health objectives by encouraging daily physical activity. They also help reduce traffic congestion, improve quality of life and (in shopping areas) promote greater economic vitality.

Existing Regulations/Potential Issues

The existing zoning and development code includes several provisions related to walkability and non-motorized transportation facility connectivity.

- Sec. 88-405-06-B generally limits residential subdivisions with a density of 4+ units per acre to maximum block lengths of 600 feet. (The planning and development director is authorized to allow longer block lengths in some cases and is authorized to require additional non-motorized transportation connectivity features when longer blocks are allowed).
- Sec. 88-405-10-A. requires pedestrian circulation layouts in new subdivisions to conform to relevant plans for the area, including the city's *Walkability Plan*.
- Sec. 88-405-10-C generally limits cul-de-sacs to a maximum length of between 600 and 1,320 feet. As with block lengths, the planning and development director is authorized to require additional non-motorized transportation connectivity features when cul-de-sacs are longer than 600 feet.
- The street cross-section standards of 88-405-10-F. (1)(b) speak to the importance of "pedestrian zones" on all streets.
- Sec. 88-420-14-E requires safe, visible access "to and through" large surface parking lots (i.e., pedestrian walkways and refuge islands; traffic calming; "pods").
- Traffic impact study requirements now expressly require that such studies consider bicycle, *pedestrian* and transit modes (Sec. 88-440).

In addition to these zoning and development code provisions, the city's consideration of street vacation requests always includes consideration of the possible effects on pedestrian and bicycle connectivity.

Recommended Action

The zoning and development code should be amended to include general pedestrian connection regulations. The code should also be amended to

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provide greater certainty regarding developer obligations to address supplemental non-motorized transportation and emergency vehicle access connections when long blocks or cul-de-sacs are used.

Sample Ordinances and Information Sources

Ferndale, MI: Complete Streets Ordinance

Ferndale’s [ordinance](#), adopted in 2010, requires that the city adopt a “non-motorized transportation network plan.” According to the ordinance, until the plan is adopted:

...the Planning Commission shall review all street plans prior to the adoption of the non-motorized plan, and all public street projects or public street reconstruction projects in the city shall be designed to safely accommodate all users of the right-of-way, including pedestrians, people requiring mobility aids, bicyclists and drivers and passengers of transit vehicles, trucks, automobiles and motorcycles...

Nashville, TN: Walkable Subdivisions

Nashville’s subdivision regulations include an entire chapter ([Chapter 5](#)) devoted to walkable subdivision design standards.

On-Site Facilities for Cyclists

The most important factors influencing an individual’s decision to commute by bicycle are distance and the presence of safe cycling routes. The provision of sheltered, secure bicycle storage areas and changing/shower rooms is also very important. Providing short-term bicycle parking areas (i.e., bike racks) also provides a necessary “amenity” for those who use bicycles as a quick and convenient mode of transportation.

Providing on-site facilities for cyclists promotes bicycling, thereby reducing automobile travel (VMT) and associated adverse impacts (e.g., congestion, carbon emission and depletion of fossil fuel resources). Promoting cycling and other alternative modes of transportation also supports public health objectives.

Existing Regulations/Potential Issues

The existing zoning and development code include short-term and long-term bicycle parking requirements, as well as authority for the planning and development director to reduce vehicle parking requirements for developments that make special provisions to accommodate cycling commuters (See Sec. 88-420-09 and Sec. 88-420-15-K).

Recommended Action

The zoning and development code should be amended to add bicycle sharing stations to the list of

example cyclist facilities that deserve consideration for a motor vehicle parking reduction.

Low-Emission and Fuel-Efficient Vehicles

Through advances in technology, a wider range of “green” vehicles is available in the market. These include low-emission vehicles that produce lower levels of exhaust and fuel-efficient vehicles that have an increased ratio of mileage to the amount of fuel. The vehicles in this category currently include electric, hybrid and alternative fuel vehicles. Increased use of these types of vehicles may lead to reductions in air pollution and lower demand for fossil fuels.

Existing Regulations/Potential Issues

There are no provisions in the zoning and development code aimed at encouraging low-emission or fuel-efficient vehicles.

Recommended Action

No action is recommended at this time.

Sample Ordinances and Information Sources

LEED for New Construction and Major Renovations, Sustainable Sites Credit 4.3: Alternative Transportation – Low Emitting and Fuel Efficient Vehicles

This [LEED](#) credit specifies use of at least one of the following options:

Option 1

Provide low-emitting and fuel-efficient vehicles for 3% of Full-Time Equivalent (FTE) occupants AND provide preferred parking for these vehicles.

Option 2

Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total vehicle parking capacity of the site.

Option 3

Install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site (liquid or gaseous fueling facilities must be separately ventilated or located outdoors).

San Jose, CA, Zoning Ordinance

In Table 20-215 of [Chapter 20.90 - Parking & Loading](#), the city provides requirements for how many “clean air vehicle” parking spaces are needed based on the overall quantity of parking spaces required.

Ferndale, MI: Hybrid-High Mileage Vehicle Parking

[Chapter 18, Article VIII](#) of the Ferndale ordinance provides encouragement for the use of hybrid and fuel efficient vehicles in the form of free parking on all city streets and municipal

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parking lots. An owner needs to register their vehicle and pay an \$8 registration fee. Oak Park, Illinois also recently adopted an ordinance that provides free village parking permits for electric cars.

Electric Vehicle Charging Stations

An electric vehicle charging station, also known as an electric recharging point, charging point, EVSE (Electric Vehicle Supply Equipment), or EVCE (Electric Vehicle Charging Equipment) supplies electricity for recharging electric vehicles or plug-in hybrid vehicles. While most electric vehicles can be charged through a standard wall socket, some charging stations support faster charging through higher voltages and currents, requiring specialized connections and dedicated equipment.

The federal government, automakers and power companies are working to establish a national network of power stations to recharge electric cars. Nearly 10,000 public and commercial stations have already been installed under this initiative.

Residential or (home-based) charging stations also need to be considered. Most homes will require upgrades to at least 80 to 100 amps. At least one national homebuilder—KB Homes—is offering a “pre-wiring” option for vehicle charging stations. Supporting increased use of electric vehicles will reduce emissions and air pollution as well as

dependency on fossil fuels. See also the [“Low-Emission and Fuel-Efficient Vehicles”](#) section of this report.

Existing Regulations/Potential Issues

The existing zoning and development code does not address electric vehicle charging stations, which could result in confusion about where and under what conditions they are allowed.



The average car burns enough gas idling in two minutes to travel one mile.

Recommended Action

The zoning and development code should be amended to expressly allow private (restricted-access) electric vehicle charging stations in all zoning districts and public-access charging stations as an accessory use to allowed nonresidential uses.

Idling Restrictions

Idling refers to the practice of operating a motor vehicle engine while the vehicle is stationary. While occasionally necessary, idling produces no real benefits and can be a cause for concern, especially when it occurs near vulnerable populations. Idling can be reduced through public awareness campaigns or actual restrictions on idling. Such restrictions can be enacted throughout a jurisdiction or focused on sensitive areas. Additionally, municipalities can create policies to restrict the idling of municipal vehicles.

An idling vehicle can consume more gas than it takes to restart it, and, according to the EPA, the average car burns enough gas idling in two minutes to travel one mile. Unnecessary idling can cause health risks and reduce air quality through increased carbon dioxide emissions.

Existing Regulations/Potential Issues

There are no directly relevant provisions in Kansas City codes or ordinances. In 2010, however, the city council approved a resolution declaring the city as a “no idling zone.” (Resolution No. 100245).

See also [KC Idle-Free](#), a Kansas City *Sustainable Skyline* initiative.

Recommended Action

Jurisdictions that have or are attempting to address the negative impacts of idling vehicles have typically pursued or at least started with public information campaigns such as the ones mentioned above. Other jurisdictions have adopted idling restrictions as part of vehicle/traffic codes. The zoning and development code should also be amended to require that no-idling signs be posted in off-street loading area and at drive-through facilities.

Information Sources and Recommended Amendments

EPA

The Environmental Protection Agency (EPA) has prepared a [compilation of anti-idling regulations](#). The site contains examples of idling restrictions and guidelines from communities throughout the U.S.

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Improving energy conservation practices and promoting greater use of renewable energy resources can help reduce air pollution and greenhouse gases and foster a more energy-independent and sustainable Kansas City. This section focuses on the role of zoning and development regulations in accommodating and promoting the use of renewable energy sources and conserving energy.

Solar Collectors and Solar Panels

Solar collectors and solar panels are an integral part of most active solar heating systems and solar energy production systems.

- Active solar heating systems are used to convert sunlight to heat that can be used for space heating and hot water. These types of solar systems use solar collectors, typically mounted on a south-facing building element, to directly heat fluids or air.
- Photovoltaic (PV) systems generate electricity from sunlight using solar cells. PV systems typically rely on roof-, pole-, wall- or ground-mounted solar panels, but PV technology is rapidly evolving. As a result of such advances, PV modules are now being produced that resemble traditional roof shingles and very thin coatings applied to windows.
- Solar thermal electric systems convert the sun's heat to electricity using concentrating solar power technology (CSP). CSPs are

large, utility-scale facilities that use mirrors to focus sunlight onto a “receiver” or solar panel. Receivers transfer the heat to a system that generates electricity.

Active solar heating systems and solar energy production technologies help reduce carbon emissions associated with conventional electricity generation. On-site solar energy production reduces energy costs by decreasing reliance on fossil fuel-based energy sources. Property owners that produce more energy than needed for on-site demand can receive credit for excess energy that is fed back into the power grid through a practice known as “net metering.”

Existing Regulations/Potential Issues

There are currently no provisions in the zoning and development code addressing solar collectors or solar panels.

Recommended Action

The zoning and development code should be amended to expressly allow solar collectors/panels and to address zoning regulations that apply to district- and utility-scale solar electricity generation systems.

Solar Access

Solar energy systems require direct access to sunlight to operate effectively and efficiently. While new technologies, falling prices and government incentives have significantly improved the efficacy and

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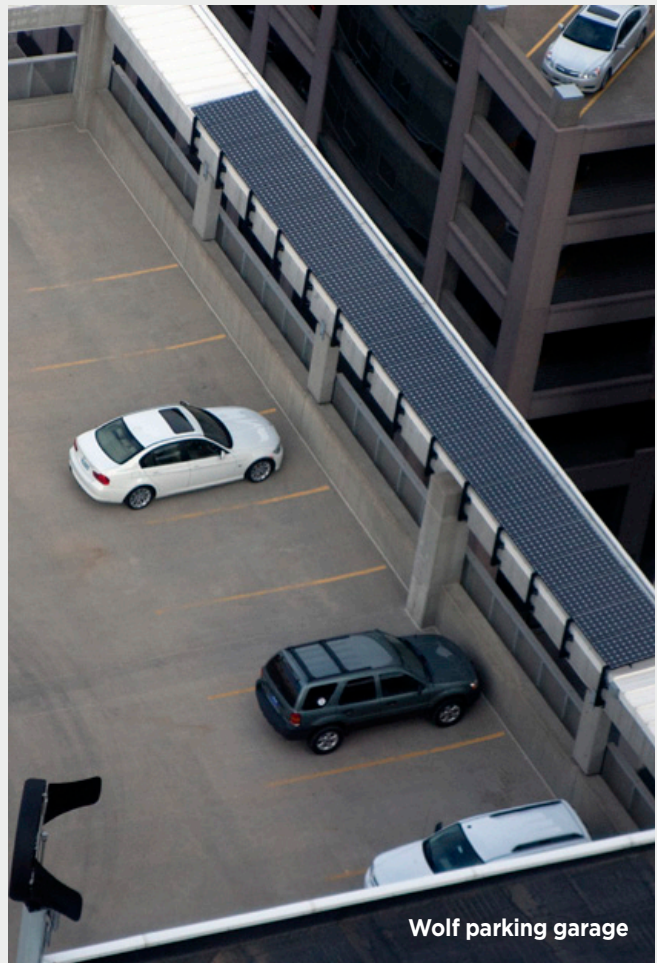
financial feasibility of small-scale solar power, some property owners may be reluctant to invest in solar energy systems because of the fear that a neighbor will erect a structure or grow a tree on nearby property that blocks direct access to sunlight.

U.S. courts have not generally recognized access to sunlight as a right to be protected under the

law. As a result, some state and local governments have stepped in to enact laws and regulations that prevent landowners from constructing buildings or installing landscaping and other improvements that unreasonably blocks sunlight access to abutting lots.



Solar panels, City Hall



Wolf parking garage

Existing Regulations/Potential Issues

There are currently no provisions in Kansas City codes or ordinances that protect solar access right of property owners who have or plan to invest in solar energy technology.

Recommended Action

Some local governments have established procedures allowing property owners who invest in solar energy systems to register solar access rights (or privileges) with the city and receive some measure of protection from future construction and landscaping that might diminish their access to sunlight. Under Iowa state law, if a solar panel user is unable to negotiate a voluntary solar access easement with a neighbor, the local government can compel the neighbor to sell an easement for its fair market value. Iowa law also grants municipalities the right to issue ordinances prohibiting subdivisions from including restrictive covenants that limit the use of solar collectors.

In Missouri, the right to use solar energy is a property right, but eminent domain may not be used to obtain such property rights. Easements obtained for the purpose of construction, reconstruction, remodeling or acquisition of a solar energy system must be created in writing and are subject to the same conveyance and instrument recording requirements as other easements. Solar easements are considered negative easements and cannot be

acquired by prescription; they must be negotiated expressly ([See R.S. Mo. § 442.012](#)).

The following sample ordinance provisions and sources provide information on the practices of other local governments.

Prairie du Sac, WI: [Solar Access \(Tile 10, Chapter 8, Code of Ordinances\)](#)

Prairie du Sac's solar access regulations authorize property owners to apply for a permit, which if granted, prohibits the installation of structures or vegetation on neighboring properties from casting shade on the permit holder's solar energy devices.

Santa Barbara, CA: [Solar Access Ordinance \(Ch. 28.11, Santa Barbara Municipal Code\)](#)

Santa Barbara's solar access ordinance establishes height limitations in residential zoning districts to "provide a balance between solar rights and development rights."

Clackamas County, OR: [Solar Balance Point/Infill Ordinance \(§1018, Zoning and Development Ordinance\)](#)

The county's zoning and development ordinance includes a "solar balance point/infill ordinance" that establishes a solar access review procedure for new structures on existing lots. Clackamas County also has an ordinance that helps to

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ensure that land is subdivided so that buildings can be oriented to maximize solar access (See “Building (Solar) Orientation,” below).

Clackamas County, OR: [Solar Access Permit Ordinance](#) (\$1019, Zoning and Development Ordinance)

These provisions are similar to Prairie du Sac’s, although they focus on preventing shading from vegetation. The ordinance authorizes property owners to apply for a permit, which if granted, prohibits vegetation on neighboring properties from casting shade on the permit holder’s solar features.

Solar America Board for Codes and Standards

See the [Solar America Board for Codes and Standards](#) for a comprehensive review of solar access law in the United States, as well as a model solar access statute.

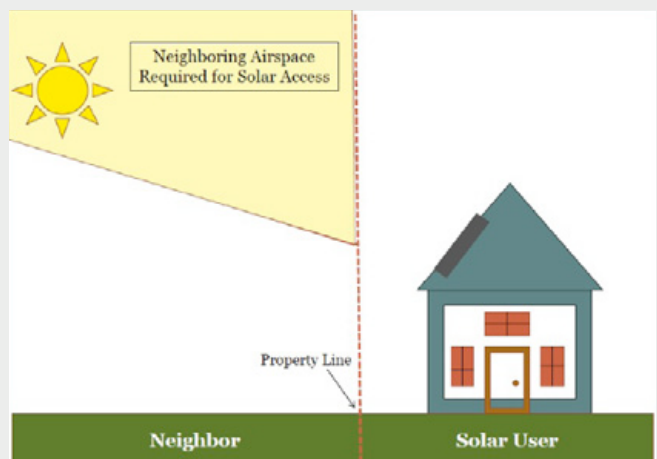
San Francisco [Solar Map](#)

The San Francisco Department of the Environment maintains an interactive solar map showing where and how many solar panels are installed on houses in San Francisco. The site includes many features, including a search tool that can identify how much roof surface exists on existing houses and the estimated cost to maximize the solar energy potential of those roofs. This type of Google Map-based tool is relatively

easy to create and would be a useful way for local governments to track solar energy installations as well as monitor solar access issues.

Building (Solar) Orientation

From a passive solar design standpoint, the optimal shape and orientation of buildings is generally one that is elongated along an east/west axis, so that the longer end of the building faces south. This in turn ensures minimum exposure to the building’s east and west sides, the more difficult sides to shade due to the lower angle of the sun in the morning and afternoon. The east and west sides can be protected from the sun with vegetation or solar shading.



Solar access controls help prevent buildings and vegetation from blocking sunlight access to abutting lots.

A building's shape, orientation and window placement can help reduce total energy use by 30% or more.

Solar orientation can be optimized through proper orientation of lots in new subdivisions and of new buildings on existing lots. Solar-optimized building orientation can maximize opportunities for passive solar heating, natural ventilation and daylighting. In most parts of the U.S., making a building the right shape, properly placing its windows and pointing it in the right direction can help reduce a building's total energy use by 30 to 40%.

Existing Regulations/Potential Issues

There are no provisions in Kansas City codes or ordinances that address (solar) building orientation.

Recommended Action

Encourage or require subdivision/development designs that maximize the solar orientation of lots and buildings.

Sample Ordinances and Information Sources

Some local governments require a minimum percentage of lots in larger subdivisions to be solar-oriented (i.e., longer east-west axis to provide more exposure to sun).

Portland, OR: [Solar Access Regulations](#)

Portland's guidelines are applied during the subdivision process. They state that:

- A. On streets that are within 30 degrees of a true east-west axis (see Figure 639-1), the

narrowest lots should be:

1. Interior lots on the south side of the street (see Figure 639-2); and
 2. Corner lots on the north side of the street (see Figure 639-3).
- B. On streets that are within 30 degrees of a true north-south axis, the widest lots should be interior lots on the east or west side of the street (see Figure 639-4).

Fig. 639-1, Axes within 30° of North-South and East-West

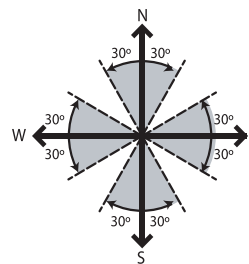


Fig. 639-3, Corner lots on North side of street

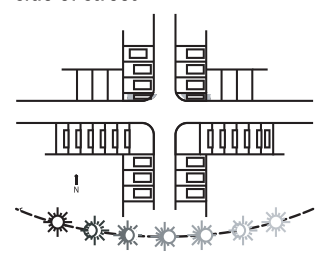


Fig. 639-2, Interior lots on South side of street

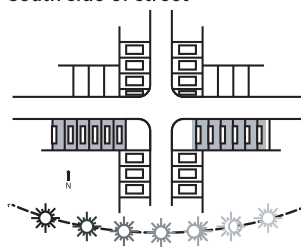
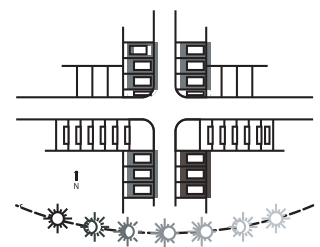


Fig. 639-4, Interior lots on East and West side of street



Portland, OR Solar Access Regulations

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Clackamas County, OR: [Solar Access Ordinance for New Development](#) (§1017, Zoning and Development Ordinance)

The purpose of Clackamas County's solar access ordinance for new development is to ensure that land is subdivided so that buildings can be oriented to maximize solar access and to minimize shade on adjoining properties (from both structures and trees).

Multnomah County, OR: [Solar Access Provisions for New Development](#) (§11.15.6805, Zoning Ordinance)

Multnomah County's solar access provisions include building orientation requirements that are similar to Clackamas County's. The ordinance also includes a variety of other solar-related zoning and development-related provisions.

Newark, DE: [Design Standards for Energy Conservation and/or Solar Access](#) (Subdivisions, Chapter 27, Appendix XI)

This is an example of ordinance language that *promotes and encourages* (as opposed to mandating) solar-oriented subdivision design.

LEED 2009 for Neighborhood Development, Green Infrastructure and Buildings Credit 10: Solar Orientation

[LEED](#) contains solar orientation credit language that could be adapted to an ordinance provision.

Solar Shades

Prior to the advent of mechanical cooling, buildings often included awnings and other solar shading techniques like deep inset windows. Although such techniques generally fell out of fashion, new exterior shading devices have been developed that save energy, improve user comfort in warm months and reduce glare. As the amount of glass in buildings has increased, exterior solar shading has become an increasingly important tool to combat solar heat gain, reduce glare and improve occupant comfort.

Solar shading is a passive solar design technique that presents a long-term solution to reducing energy consumption associated with the cooling of buildings. Sun shade devices can reduce peak energy loads and thus, conserve energy at times when it is most valuable, expensive and polluting. When mounted on a building's exterior, solar shades can decrease air conditioning loads and lower room temperatures in uncooled spaces.

Unlike interior curtains or shades, exterior solar shading devices do not obstruct views (from



windows) or impede airflow through open windows. As a result, they permit daylighting and passive, natural ventilation.

Existing Regulations/Potential Issues

There are no provisions in Kansas City's zoning and development code that address solar shading devices, which is not surprising since they pose few real issues. One possible concern is that external solar shades could raise zoning setback issues for buildings situated close to lot lines.

Recommended Action

Zoning and development code Sec. 88-820-12 identifies features allowed to encroach into required setbacks. Awnings and canopies are allowed to encroach, but modern solar shades are not expressly addressed. The zoning and development code should be amended to specifically allow such devices.

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Light Shelves

Windows and skylights provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the occupied spaces of a building. Windows receive a large amount of energy from the sun, which is often “wasted” on a single area. Although direct sunlight can be a nuisance if concentrated in one spot, it can be extremely useful if distributed throughout a room. The light from windows can be extended into the interior of larger spaces through the use of light shelves and

skylights. Modern light shelves bounce visible light upwards towards the ceiling, which helps reflect it deeper into the interior of a room.

Light shelves can be installed on the interior or exterior of a building. Exterior light shelves also serve as shading devices, preventing solar gain from entering the building. External and internal light shelves mounted on south- and west-facing windows can redistribute light, provide natural brightness to the building and reduce the need for daytime (incandescent and fluorescent) overhead lighting.

Light shelves and skylights can reduce a building's energy demands by making greater use of natural sunlight for lighting purposes.



Light shelves and skylights can reduce a building's energy demands by making greater use of natural sunlight for lighting purposes. Light shelves can also help reduce solar gain associated with direct sunlight coming through a building's windows, thereby reducing summer cooling demands.

Existing Regulations/Potential Issues

There are no provisions in Kansas City codes or ordinances that expressly address light shelves, which is not surprising since they pose few real issues. One possible concern is that external light

shelves could raise zoning setback issues for buildings situated close to lot lines.

Recommended Action

Zoning and development code Sec. 88-820-12 identifies features allowed to encroach into required setbacks. Awnings and canopies are allowed to encroach, but light shelves are not expressly addressed. The zoning and development code should be amended to expressly allow such devices.

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Wind turbine, Wolf parking garage

Wind Energy

Wind Energy Systems are devices that convert wind energy into usable thermal, mechanical, or electrical energy, including windmills and wind turbines and supporting equipment such as generators, alternators, inverters and batteries. Small wind energy systems are geared generally toward producing electricity for on-site consumption. Owners of wind energy systems receive credit for any excess energy that is fed back into the electric grid through what is known as “net metering.”

Large, utility-scale wind turbines generally provide bulk power to the electrical grid.

The use of wind energy can reduce carbon emissions associated with conventional electric generation plants. As with all on-site renewable energy production strategies, wind energy conservation helps energy costs by decreasing reliance on fossil fuel-based energy sources.

Existing Regulations/Potential Issues

There are no provisions in Kansas City’s zoning and development code that address solar shading devices.

Recommended Action

Zoning and development code Sec. 88-820-13-B identifies features allowed to extend above applicable zoning district height limits. Current exemptions include flagpoles, antennas, towers, chimneys, building mechanical equipment and many other features. This section could be amended to allow windmills and wind energy devices to also exceed applicable height limits.

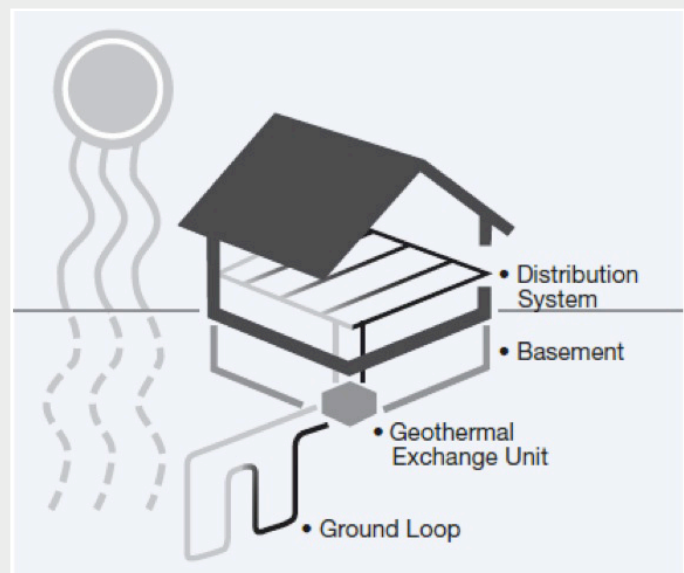
Geothermal Energy

Geothermal energy is derived from heat that is continually produced far below the earth’s crust in a layer of hot and molten rock. This results in a steady supply of milder heat at relatively shallow depths below ground, from ten to a few hundred feet in most locations. Geothermal heat pumps (also known as ground-source heat pumps and geothermal heat exchange systems) use the thermal energy of the ground or groundwater to provide residential space conditioning and/or domestic water heating. During the winter, fluid is circulated through pipes in the ground, drawing heat stored in the earth and carrying it into the residence. In the summer, the system reverses,

taking heat from the building and depositing it in the cooler ground.

There are two basic types of geothermal heat pump systems: “closed loop” and “open loop” systems. Closed loop systems, which can be horizontal, vertical or pond/lake type designs, use a continuous loop of buried pipe as a heat exchanger, circulating a heat transfer fluid through the buried or underwater pipes. Open loop systems use groundwater from a well as a heat source in the winter and a heat sink in the summer.

According to the [Missouri Department of Natural Resources](#), geothermal heating and cooling



Geothermal Heat Exchange System

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systems use 25 to 50% less electricity than conventional systems, which means lower utility bills and greatly reduced greenhouse gas emissions because of the decreased reliance on fossil fuel-derived energy.

Existing Regulations/Potential Issues

There are no provisions in the zoning and development code that address geothermal energy systems. The State of Missouri has extensive [regulations](#) governing the installation and permitting of geothermal heat pump systems.

Recommended Action

Address possible zoning issues through a zoning and development code text amendment that expressly allows (and defines) geothermal heat exchange systems as an accessory use.

Exterior Insulation

Applying insulation on the exterior walls of an existing building is a relatively easy and effective way to substantially improve the R-value (i.e., resistance to heat flow) of existing walls without interrupting occupancy or requiring expensive building renovations. Creative techniques for application of exterior insulation are currently being developed in Canada, Europe and the United States. Some techniques can have the added value of creating an air barrier, which can help reduce a building's energy use. Exterior

application of insulation to existing buildings has become commonplace in Europe and could become more prevalent in the U.S., as energy prices continue to climb.

Insulation helps reduce the need for heating and cooling, which saves non-renewable resources and reduces carbon emissions.

Existing Regulations/Potential Issues

While there are currently no provisions in Kansas City's zoning and development code that expressly address the use of exterior insulation, the existing regulations could pose a potential obstacle to use of exterior insulation. Zoning and development code Sec. 88-820-12, for example, identifies features allowed to encroach into required setbacks, but the provisions make no allowance for exterior insulation. That means if a building were already situated at the minimum setback line, adding exterior insulation would violate zoning setback requirements. Additionally, the floor area measurements section of the zoning and development code (Sec. 88-820-07-A) specifies that floor area is measured from the exterior faces of the exterior walls or from the center line of walls separating two buildings, which, at least theoretically, discourages super-insulation of exterior walls.

Recommended Action

Both the setback encroachment and floor area measurement provisions mentioned above should be amended to be more accommodating of double-skin facades and exterior insulation retrofits.

FOOD SUPPLY



Ensuring that people have access to healthy, safe and affordable food is a basic tenet of sustainability. This section describes current and possible future efforts aimed at increasing access to local food sources.

Local Food Production

Strategies aimed at increasing access to local food sources have several sustainability benefits. They help:

- increase the availability of fresh (typically healthful) foods, especially to lower income residents and underserved communities;
- reduce energy use and the negative environmental effects of industrialized food production, transportation and distribution;
- ensure that food sources are available in times of emergency or crisis; and
- support efforts to preserve open space and preservation of agricultural land.

The zoning and development code was amended in 2010 to expressly permit household gardens, community gardens, market farms and community-supported agriculture uses. The new regulations address where such uses may be located, where on-site sales are allowed and several other relevant issues.

Existing Regulations/Potential Issues

After nearly eight months of work by staff and interested citizens, the Kansas City zoning and development code was amended in June 2010 to expressly permit several crop-based “urban agriculture” uses, namely “home gardens,” “community gardens” and “community-supported agriculture.” As a result of this work, the code now classifies home gardens and community gardens as uses permitted as of right in all zoning districts. Community-supported agriculture uses are permitted as of right in the R-80 district and all nonresidential districts. CSA require special use approval in all other residential zoning districts. Use standards are in place to ensure that allowed urban agriculture uses do not have significant adverse impacts, particularly in residential neighborhood settings (See [Urban Agriculture Amendments](#)).



FOOD SUPPLY



The 2010 zoning amendments addressed only the growing of crops, including the ability to sell or distribute crops on residentially zoned property and have shareholders, apprentices, employees, or volunteers work on the site. Animal related agriculture (e.g., the keeping of hens, bees and other animals) is regulated by the Animal Code (Chapter 14 of the Kansas City code of ordinances).

Recommended Action

Consider allowing community garden space to be used to satisfy parkland dedication requirements. This action will require coordination with the parks and recreation department.

Sample Ordinances and Information Sources

Missoula Zoning Ordinance: Landscape Area Requirements for Multi-family Development

As in many jurisdictions, Missoula requires landscaping on the site of multi-family residential development. Missoula's zoning ordinance is unusual, however, to the extent that it expressly allows garden space to be counted toward satisfying general site landscaping requirements ([§20.065.020.C](#)).

Evanston, IL: [Backyard Hens and Beekeeping](#)

The City of Evanston has amended its code in recent years to allow both beekeeping and the raising of hens.

The zoning and development code was amended in June 2010 to expressly permit several crop-based “urban agriculture” uses.



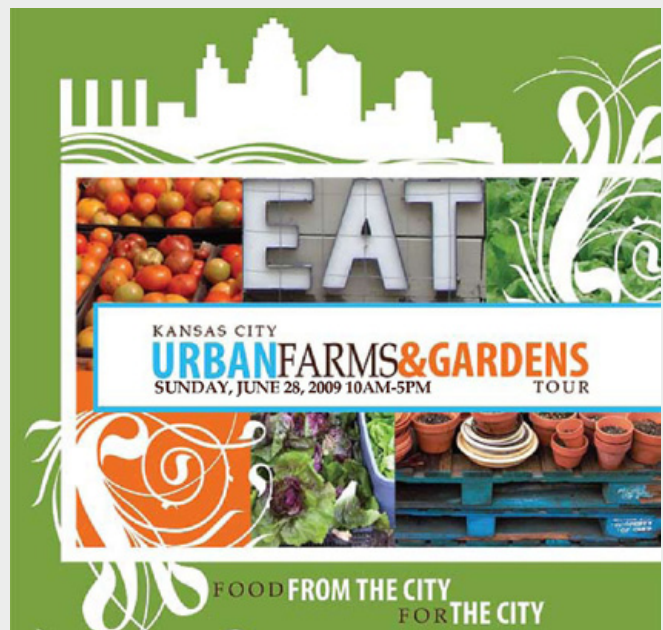
Salt Lake City, UT: [Chicken Ordinance](#) and [Beekeeping Ordinance](#)

Salt Lake City changed its ordinances in 2010 to relax restrictions and allow residential chicken coops and beekeeping. Residents who qualify are now permitted to raise chickens for the purpose of eggs and bees for the purpose of honey. See also the city’s birds and bees [webpage](#).

Cleveland, OH: [Chickens and Bees Ordinance](#)

Cleveland passed its chicken and beekeeping ordinance in 2009 as part of its efforts to enhance the city’s urban character and make it more competitive by creating dense, mixed-use urban clusters made more desirable by proximity to such open space uses as urban gardens and urban farms.

See also, [How U.S. Cities are Using Zoning to Support Urban Agriculture](#) (Land Stewardship Project).



SUPPLEMENTAL RECOMMENDATIONS



Over the course of the past several months, the project advisory group has identified and discussed several important sustainability-related issues, some of which can be influenced by zoning and development regulations and others that are beyond the scope of the zoning and development code. This section addresses those non-development code issues and includes a series of general recommendations for city council's consideration.

Stormwater Utility Fees

As a short-term recommendation, the advisory group recommends that the Water Service Department provide additional clarification about how stormwater utility fee credits can be obtained and how such credits are calculated. As a longer-term strategy, the group recommends that the stormwater utility fee program be updated to better support the city's sustainability objectives and its efforts to address needed stormwater-related improvements. The update should focus as well on the fee credit structure, which should be revised to provide more effective incentives for capture and on-site use of stormwater.

Downspout Disconnection

The advisory group recommends that the Water Service Department (and other city agencies) continue to promote the disconnection of downspouts from sewer systems (combined with proper on-site, low-impact management strategies), particularly in combined (storm-sanitary) sewer areas. Ideas for consideration should include additional

educational materials, reminders to homeowners at the time of water service initiation and stormwater utility fee surcharges to cover those instances in which downspouts remain connected.

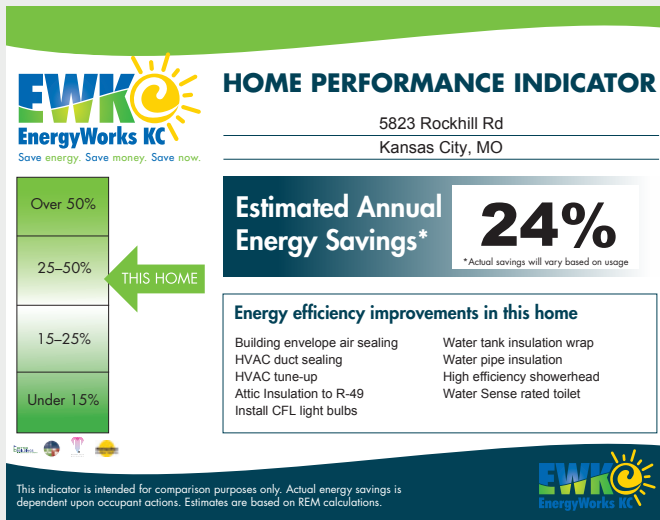
Water Rates

The advisory group recommends that the city explore using water rate policies to help encourage water conservation and associated energy use. Among the alternatives that should be studied are inverted block rates, which charge more as consumption increases and seasonal rate structures that charge more when demand is highest and water is less plentiful.

Energy Cost Disclosures

In order to help homebuyers make informed decisions about purchases (and to create an incentive for energy upgrades to existing homes), the advisory group recommends that the city require point-of-sale disclosure of energy costs to prospective purchasers for previously owned homes. This could be implemented at very little cost by simply requiring disclosure of past natural gas and electricity billings for a specified time period (perhaps 2-3 years to level out the effects of weather variations). Such a program would complement the city's efforts to require higher energy efficiency in new construction through updates to the city's energy codes and it could be implemented in concert with an education/outreach program for local realtors, lenders and real estate appraisers.

SUPPLEMENTAL RECOMMENDATIONS



Kansas City has recently begun supplying energy performance indicator labels to customers of the EnergyWorks KC program. These labels (sample above) provide an estimate of potential annual energy savings as a result of energy efficiency improvements present within the building.

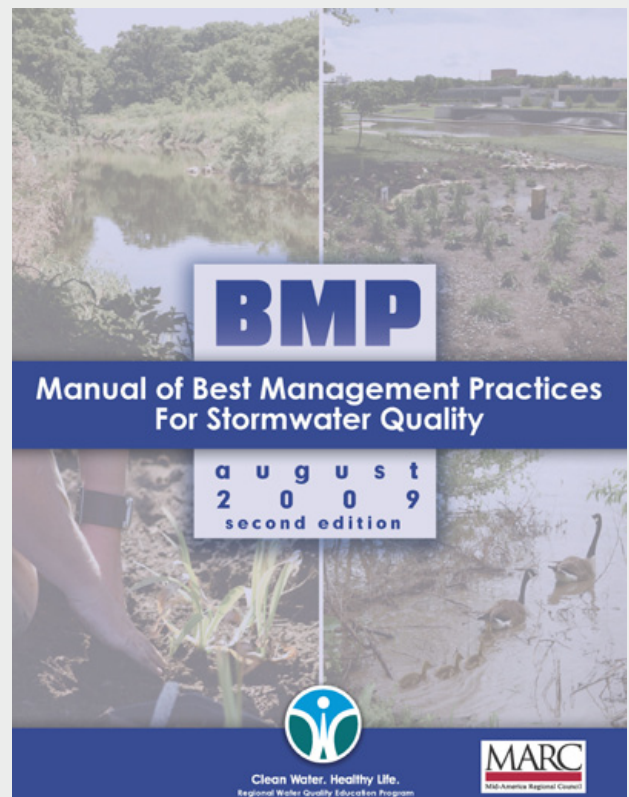
Green Infrastructure Standards

The advisory group recommends that the city continue its leadership role in the area of green infrastructure by demonstrating appropriate green solutions. The project at AA/Waukomis/72nd was cited as an example. New RFPs, according to the advisory group, should include language requiring green innovation in future public works projects. Once these green infrastructure solutions have been beta-tested in the field, they should be translated into alternative engineering standards so

that private developers, too, can more easily make greener choices.

Sustainable Development Guide and Checklist

Resolutions and ordinances that are presented to the mayor and city council for consideration now include factsheets that ask “how does this contribute to a sustainable Kansas City?” In a similar vein, the project advisory group recommends creation of a “Sustainable Development Guide and Checklist” that would provide guidance to





Green infrastructure project: AA/Waukomis/72nd

developers regarding the types of sustainable development features that the city considers desirable in proposed economic development projects. As the name implies, this would be a “guide,” not regulatory requirement for any specific level of sustainability or environmental performance.

Completion of the guide and checklist for each proposed project would provide additional information for consideration by elected and appointed officials as they consider the merits of proposed projects. For projects requesting city financial incentives/assistance, the guide could establish a recommended higher level of sustainability

performance that should be demonstrated in order to meet the city’s goal of employing innovative strategies to “develop sustainable, healthy communities where all prosper.”

“Green” Project Permitting

Reducing the duration of development permitting processes can provide dividends to developers in the form of decreased financing costs. Through such incentive programs, qualifying green buildings are given priority reviews over other applications, often with guaranteed review times. Expedited permitting is a very common green building/sustainable development incentive used

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by local governments. Although its efficacy as an incentive may be limited in Kansas City due to previous efforts to streamline the permitting process, the advisory group supports creation of a “green” permit process.

Discussions to-date have focused on offering a green permit process that offers a turn-around time that takes half as long as a “standard” permit. No additional fee would be charged. As the group’s discussion revealed, the real challenge of establishing an expedited green permit process is in establishing the qualifying criteria for eligibility.

Information on similar local government programs is provided below:

Bellingham, WA: Expedited Permit Process for Green Buildings

In 2010 the City of Bellingham launched a pilot program to encourage and support green building projects by reducing building permit review time for certified green projects and assigning them special green project staff expeditors. The pilot program, which is locally referred to as the “Bin-Bump-Up” program, decrease standard permit review times for eligible projects by one “bump.” For example, a project that typically would be eligible for 28-day review is “bumped-up” to a seven-day review. Qualified green projects are also eligible to work with the city’s new Green Project Review Team, to identify potential

code conflicts between the project’s concepts and city building codes. See Bellingham’s [Green Building & Sustainable Development Incentives Website](#) for more information.

Chicago, IL

The City of Chicago’s [Green Permit Program](#) provides developers and owners with an incentive to build green by streamlining the permit process timeline for projects that are designed to maximize indoor air quality and conserve energy and resources. Projects that have been accepted into program can receive permits in 15-30 business days. Projects that meet the most stringent sustainability guidelines can also qualify for a reduced (out-sourced, consultant) permit review fees of up to \$25,000.

Acceptance into the city’s Green Permit Program is contingent on meeting one of two tiers of Green Building Certification:

- Commercial projects and large residential/mixed-use projects must earn various levels of certification for their respective LEED (Leadership in Energy and Environmental Design) rating system.
- Small residential projects must earn a two-star or greater rating under the [Chicago Green Homes](#) program.

The advisory group supports creation of an expedited “green” permit process.

Northbrook, IL: Green Building Initiative, Permit Fee Rebate for LEED

Northbrook adopted its Green Building Initiative [ordinance](#) in 2008. Under the voluntary program, builders who construct new buildings or remodel an existing building to LEED standards are eligible for incentives. The incentives include permit fee rebates, expedited permitting and review over all other non-enrolled applicants and recognition from the village. Fee rebates of 10, 20, 30 and 40% are offered to projects that obtain Certified, Silver, Gold or Platinum status, respectively.

Issaquah, WA: Sustainable Building Incentives

The City of Issaquah places a high priority on protecting the natural environment through sustainable development practice. To promote such practices, the city offers several incentives and has prepared guides to [residential](#) and [commercial](#) building incentives that are available to local builders and developers. The incentives include water utility rebates, energy rebates, technical assistance and expedited permit reviews.

Green Project Review Team

The green project review team concept calls for the city to establish a designated staff team to help guide qualifying green or sustainable projects through the development review process and

assist developers of sustainable projects in obtaining needed project approvals and permits. As with the recommended green permit process, one of the key issues to be addressed would be defining what constitutes a qualifying “green project.”

Water Quality Improvement Thresholds

Currently, city regulations do not establish thresholds for when water quality-related improvements are required as part of development or permit requests. The result is that property owners are often required to make or install water quality improvements even in situations in which such improvements provide little tangible water quality benefit. This advisory group recommendation calls for the city’s regulations to be revised to establish a basic threshold standard for when such improvements are required or establish exemptions identifying when they are not required. The City of Lenexa, for example, does not require water quality improvements as part of projects that are not increasing the amount of on-site impervious cover.

Local Recognition Program

The U.S. Green Building Council and its Leadership in Energy and Environmental Design (LEED) program is the most well-known accreditation or certification program for green buildings and sustainable developments. Several communities around the country use LEED certification as a method to

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confirm that projects are sustainable and some link incentives to achievement of various LEED levels (e.g., Certified, Silver, Gold, Platinum). An alternative approach is to have planners and inspectors review and confirm that a project has incorporated sustainable features based on approved *local* green building criteria.

The City of Austin, for example, has one of the nation's longest running [green building programs](#). Key components of the program are online specific rating systems that allow professionals to not only rate or rank a project's sustainable features, but also track and coordinate projects. Single and multi-family residential projects as well as commercial project have separate rating systems and guide books with detailed standards.

