

# Building Construction

## Background

### Problems and Opportunities

Commercial and residential buildings use 40% of the energy consumption in the U.S. including 70% of the electric utility use according to the Department of Energy.<sup>28</sup>

A study conducted for the Nebraska Energy Office in 2009 concluded that implementation of an Advanced Energy Code for Nebraska would result in cost savings to building owners, energy savings in terms of utility demand, and a reduction in pollutants to the air and waterways in the state.<sup>29</sup> In addition building construction can generate a significant amount of waste material, much of which could be minimized, reused or recycled.<sup>30 31</sup> ,

Environmental impacts in building construction relate to energy and resource consumption, disposal of waste products, exposure to harmful substances which occur in the production of building components, during the construction process, and throughout the lifecycle of the building (heating, electricity use, carpet cleaning etc.). The Building Construction Advisory Group focused on the need to reduce those environmental impacts from new construction as well as from building renovation. Green building design and retrofitting provide opportunities to increase energy efficiency, and to incorporate alternative energy sources such as geothermal or solar where the site and building design can accommodate them. “Life cycle assessments” can be used to save on long-term costs by designing conservation of water and materials into the construction and operation of buildings.

The Rocky Mountain Institute says that “The goal of green building is to coordinate such interconnected issues as site and building design, energy and water efficiency, resource-efficient construction, lighting and mechanical design, and building ecology, and optimize all these aspects in an integrated design.”<sup>32</sup>

The Building Construction Advisory Group also recognized that Omaha’s existing buildings are a valuable resource—they provide character to the city and its neighborhoods and they represent a significant amount of “embodied energy”—the energy already expended in the materials and construction of the existing buildings.

Retrofitting existing buildings to improve energy conservation is the most significant opportunity for reducing energy consumption in the community.) It has been estimated that for the average American homeowner, efficiency retrofits will result in 20-40 percent annual energy savings.<sup>33</sup> The economic benefits to Omaha’s residents and businesses will be considerable and are especially significant to lower income families where the cost of energy for a home takes a proportionately higher amount of income. The Building Construction Advisory Group emphasized striving for “regenerative” design—aiming for a beneficial effect that goes beyond minimizing impacts by incorporating processes that integrate human needs with the natural processes. Regenerative design creates opportunities to restore, renew or revitalize a building’s own sources of energy and materials to create sustainable systems. The benefits may include clean water, clean air, production of food, energy conservation and energy production.<sup>34 35</sup>

Building sites—the land upon which buildings are constructed—relate to sprawling development patterns and the consumption of arable land, changes in stormwater infiltration that increase flooding, erosion of soil resulting from removal of protective vegetative cover, and transformation into landscapes with high energy and water requirements for maintenance. Using opportunities for land conservation practices such as infill development locations and increased development density on sites in proximity to transit routes and stops will further Omaha’s sustainable community goals for minimizing consumption of land. Building orientation for passive solar design, landscaping for energy conservation, on-site storm water management, and urban agriculture are some of the components in sustainable building construction that would benefit Omaha by reducing energy demand, minimizing flooding and other stormwater damage, and reducing the public cost of removing pollutants in stormwater.<sup>37</sup>

### *Issues and Directions*

The Building Construction Advisory Group and comments from the public identified the following issues and directions:

- ❖ New expectations for sustainable building practices are needed in the market. Create market changes through demand based on a critical level of community awareness and understanding and through practices such as recycling construction waste.
- ❖ Local information and resources on the benefits of energy savings and occupants’ health are needed for both residential and commercial construction.
- ❖ Financial incentives may be necessary to start the momentum that should eventually become general practice; tax breaks or reduced fees may be appropriate initially.
- ❖ Publicly funded projects and projects receiving public incentives such as TIF projects should be required to meet a higher standard.
- ❖ Regenerative buildings should be the goal. This requires a “whole systems” approach to building design and construction. This means integrating the systems within a structure such as energy and material use, water and wastewater, structural design and so forth, so that the building itself can provide for such needs as energy, food, clean air, and clean water.
- ❖ The conservation value of existing buildings and neighborhoods needs to be recognized when making development decisions.

### *Concepts*

The Building Construction Advisory Group used the following concepts to develop the overall statement, measurements, goals, objectives, and strategies contained in the following sections:

- ❖ Maximize the functional, economic, and cultural value of existing buildings and sites and improve their environmental performance.
- ❖ Create regenerative communities that produce renewable energy; feed people; promote clean water; improve health; incorporate waste into the nutrient cycle and demonstrate sustainable living.
- ❖ Minimize waste through the reuse and recycling of building materials, packaging and yard waste.
- ❖ Create places where active transportation and pedestrian activity are a priority while promoting techniques such as infill development, increased density, and mixed uses.

## *Building Construction Overall Statement*

Omaha seeks to lead the nation through innovative building construction, renovation, and maintenance approaches that create a “regenerative community” designed to have a net positive and affordable impact on Omaha’s environment, economy, culture and quality of life. Omaha will accomplish this vision by:

- ❖ Maximizing the use of existing structures and developed land by making the maintenance, renovation and reuse of those properties its first priority.
- ❖ Encouraging building design, construction and renovation techniques that efficiently use materials, land, water and energy in both construction techniques and long-term operations.
- ❖ Promoting the reuse and recycling of building materials, packaging and yard waste.
- ❖ Ensuring that all buildings provide safe, healthy living and working environments.
- ❖ Promoting, creating and maintaining attractive, inspiring and productive places that enhance the quality of life in the city.
- ❖ Creating buildings and landscapes that produce food, support clean energy and improve air and water quality.
- ❖ Creating places where active transportation and pedestrian activity are a priority and personal vehicles are accommodated.
- ❖ Encouraging the development of mixed-use buildings.
- ❖ Providing tools, resources and education to encourage the private sector to achieve the goals and objectives of the plan.

## *Measurements*

41% of energy consumption today is from residential and commercial buildings. A recent report prepared by McKinsey Global Energy and Materials finds that holistic investments in energy efficiency could result in a reduction of end-use energy consumption of approximately 23% of projected demand by 2020. The potential Return On Investment (ROI) on residential energy efficiency improvements is between 12.5 – 30% (Chicago Climate Action Plan).

With this in mind, Omaha will:

1. Meet the goal of the AIA (American Institute of Architects) 2030 Challenge to achieve carbon-neutral buildings by 2030 through commitment to a philosophy of adoption of progressive codes and standards that achieve the following targets:

### Non-Residential:

- a. Beginning as soon as possible all new buildings and major renovations shall be designed using sound building science practices to meet an energy consumption performance standard of 24% more efficient than the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1 – 2007 requirements.
- b. Annually renovate a minimum of 5% of the city’s 2010 building area to meet an energy consumption performance standard of 24% more efficient than ASHRAE 90.1 – 2007 requirements.
- c. The energy consumption performance standard for all new buildings and major renovations shall be progressively increased by an average of 4% annually to achieve net-zero energy use by 2030.

Residential:

- a. Beginning as soon as possible all new construction and major renovations shall be designed using sound building science practices to meet an energy consumption performance standard of a minimum Home Energy Rating System (HERS) index of 70.
- b. Annually renovate a minimum of 5% of the city's existing homes to meet an energy consumption performance standard of a minimum HERS index of 70.
- c. The energy consumption performance standard for all new construction and major renovations shall be progressively increased to achieve net-zero energy use by 2030.

These targets may be accomplished by implementing innovative sustainable design strategies, generating on-site renewable power and/or purchasing (20% maximum) renewable energy.

2. Ensure that all new buildings and major renovations shall be designed through sound building science practices to achieve 40% of the total possible points on the Leadership in Energy and Environmental Design (LEED) 2009 checklist for items unrelated to Energy and Atmosphere points. A LEED Accredited Professional must verify points submitted at the time of building permit application.
3. Reduce construction waste contributions to landfills from building construction, demolition, and renovation to an amount that approaches zero by 2020.
4. Develop a timeline and systematic monitoring system to determine progress toward achieving the strategies outlined in the plan. The City will:
  - a. Work with the AIA, USGBC, local colleges and universities, utilities, City, State and other interested groups to develop and monitor a set of indicators and benchmarks for achieving the goals of the plan.
  - b. Establish a Committee similar to the State's Council of Economic Advisors to review the data on a bi-annual basis and issue a report on the City's progress toward achieving the goals and to recommend steps to meet the benchmarks and measurements set in the plan.

## *Building Construction Goal Summary*

### NON-RESIDENTIAL – RENOVATION

Take full advantage of the city's building resources and tools to maximize the functional, economic, and cultural value of existing buildings and sites and to improve their environmental performance.

### NON-RESIDENTIAL – NEW CONSTRUCTION

The design of new non-residential building projects will result in sustainable structures and sites that efficiently use land, materials, energy, and water while they also inspire creativity, increase productivity, and enhance the quality of life in the city.

### RESIDENTIAL – RENOVATION / NEW CONSTRUCTION

Promote the renovation and construction of healthy residential properties that minimize waste and the consumption of energy and water. Create “regenerative” residential communities that produce renewable energy, feed people, promote clean water, improve health, incorporate waste into the nutrient cycle and demonstrate sustainable living.

### BUILDING SITES – RESIDENTIAL / NON-RESIDENTIAL

Minimize the consumption of land and maximize the sustainability of building sites through effective use of techniques such as infill development, increased density, building orientation, landscaping, storm water retention, urban agriculture and other sustainable practices.

### NON-RESIDENTIAL - RENOVATION

Take full advantage of the city's existing building resources, by maximizing the use of existing buildings and improving their environmental performance.

#### Objectives:

1. Develop community-wide demonstration projects and educational efforts that increase awareness of the value of existing buildings among building owners, designers and users.
  - 1.1. Work with governmental agencies, utility companies and local corporations to take the lead in demonstrating the benefits of reusing and renovating existing structures and sites.
  - 1.2. Work with local utility companies and institutions to facilitate the distribution of information from their demonstration projects.
  - 1.3. Gather information on best practices regarding the preservation and renovation of existing buildings and analyze their effectiveness under local conditions.
  - 1.4. Identify feasible, cost-effective programs for utilizing existing buildings and develop a “business case” for preservation and renovation.
  - 1.5. Work with organizations such as AIA, AGC, BOMA and IFMA to develop a database of existing buildings and track building performance using various construction and operation techniques. Share the information with building occupants, as well as owners, and develop a feedback loop regarding best practices within the design community.
  - 1.6. Expand current efforts to educate designers about new technologies, programs and tools to improve energy efficiency in existing buildings and reduce the cost of renovation.
  - 1.7. Share information on best practices with property owners and managers.
  - 1.8. Work to eliminate the disconnect that occurs between the builders and facility managers within an organization or company to ensure that buildings are operated and maintained correctly.

- 1.9. Ensure that there is a feedback loop from facility managers to building designers regarding the costs associated with the operation and management of a facility so that adjustments can be made and factored into future building designs.
- 1.10. Develop a “lay person” guide to rehabilitating existing structures and make the information available to the public through a variety of media, including the Internet, local Permit and Inspection Offices.
2. Encourage property owners to reuse and rehabilitate their existing structures.
  - 2.1. Develop funding sources that incentivize renovation of existing non-residential buildings.
  - 2.2. Implement incentives for building renovation, such as density bonuses, façade improvement programs, modified permit fee structures, utility company credits, accelerated approval processes, etc. for buildings that follow defined guidelines or other sustainability benchmarks. Review and adopt specific standards in conjunction with implementing any such incentives.
  - 2.3. Develop a Property Assessed Clean Energy (PACE) bond process for non-residential properties that reduces energy and building maintenance costs and allow the loans to be repaid through property taxes.
  - 2.4. Encourage utility companies to continue to provide and expand financial incentives for improved efficiencies. Consider the development of loan programs or reduced rates tied to energy efficiencies.
  - 2.5. Encourage financial arrangements between building owners and tenants that allows both parties to benefit from improvements that result in reduced energy consumption and building maintenance expenses.
  - 2.6. The City should work with architects and property owners to develop a methodology for determining when a building should be preserved and when it should be replaced. The methodology should include considerations for such things as historic importance, context, City development plans, impacts on transportation and transit, the cost of retrofitting versus new construction, energy impacts of saving versus replacing, etc.
  - 2.7. Require the City and encourage other public agencies to analyze the benefits and costs associated with the reuse and renovation of existing public buildings and sites before approving funds for demolition and new construction.
  - 2.8. Provide funding for the renovation of existing City facilities and document the benefits of renovation in lieu of new construction.
3. Remove impediments in existing codes and procedures to sustainable renovations of existing non-residential buildings.

- 3.1. Implement the City's Urban Development Policy by modifying the code to allow for a waiver of the application fee for Zoning Board of Appeals (ZBA) cases east of 42nd Street when the applicant is sent to the ZBA by the Planning Board and/or City Council in lieu of applying for a re-zoning and when the application is tied to sustainable building renovations.
4. Continue to update the City's codes to incorporate the latest provisions for energy efficiency and healthy buildings. Ensure that building renovation projects mitigate potential health hazards.
  - 4.1. Incorporate the strategies related to energy efficiency and healthy buildings contained in Non-Residential – New Construction, Objective 4 in the renovation of non-residential buildings.
  - 4.2. Ensure that owners and contractors continue to work with the City and County to ensure that buildings are renovated according to the City and County requirements for lead, asbestos and other environmental hazards.
  - 4.3. Ensure that the City continues to require an environmental assessment that outlines the hazards of the site and includes a plan for abatement before work is done on “brown field” sites.
5. Take a holistic approach to renovation by including the site when analyzing the cost effectiveness of plans for the renovation and reuse of existing buildings and land.
  - 5.1. Consider the full value of an existing building, such as its historic character, transportation related benefits and other similar issues, not just the “cost” of the building.
  - 5.2. Consider the location of a facility and its proximity to public transit options when considering the construction of a new building versus the reuse and renovation of an existing structure.
  - 5.3. Ensure that public funding for infrastructure improvements supports the reuse of the city's existing building stock.
  - 5.4. Ensure that the full cost of site improvements such as transportation-related improvements and maintenance are considered and fairly assessed when evaluating the reuse of an existing structure versus new construction.
6. Facilitate the reuse and recycling of building materials. Minimize their disposal to landfills and ensure the use of proper disposal techniques.
  - 6.1. Review existing regulations for demolition debris landfill operations and ensure that they are adequate to control potential adverse environmental impacts and that they encourage recycling over land filling.
  - 6.2. Review current fees for demolition debris landfill operations and determine if they cover the costs associated with permitting and monitoring.

- 6.3. Work with local non-profit agencies and materials re-use agents to facilitate the reuse of building materials and fixtures from buildings slated for demolition.
- 6.4. Provide financial and regulatory incentives for building material recycling.
7. Encourage property owners to modify their operation and maintenance practices to improve the overall environmental performance of their buildings.
  - 7.1. Work with utility companies and local governmental agencies to develop programs and financial incentives to educate and facilitate improvements to building operation and maintenance practices.

### NON-RESIDENTIAL – NEW CONSTRUCTION

The design of new non-residential building projects will result in sustainable structures and sites that minimize the use of land, materials, energy, and water while they also inspire creativity, increase productivity, and enhance the quality of life in the city.

#### Objectives:

1. Minimize the use of energy, building materials and other resources in the construction and operation of new buildings.
  - 1.1. Ensure that the City works with the development industry to develop or identify performance standards that achieve the following:
    - ❖ Minimize the amount of materials needed for the structure without sacrificing safety.
    - ❖ Reduce the time and energy required to construct a building.
    - ❖ Minimize grading, site preparation and the transportation of soil by fitting buildings to their site.
    - ❖ Reduce building material transportation costs and energy consumption by using local materials.
    - ❖ Minimize the use of water on the construction site.
    - ❖ Minimize the creation of waste materials and allow for their reuse whenever possible.
    - ❖ Reduce the “heat island” effect from rooftops and sites.
    - ❖ Control storm water runoff and improve water quality.
  - 1.2. Develop a citywide building material recycling program that results in the recycling of 100% of all waste building materials by 2020.
  - 1.3. Encourage the use of LEED standards or other sustainability benchmarks in the design of new buildings and require that they be used in City buildings.

- 1.4. Investigate and resolve building code issues related to the use of “gray-water” systems. Incorporate “gray-water” systems into new construction.
  - 1.5. Require that all new buildings have a plan for reducing the heat gain associated with a new building that includes the use of such techniques as “green roofs”, added landscaping, shade structures, reflective surfaces, etc.
  - 1.6. Encourage the use of green roofs, green walls, rainwater harvesting and other similar techniques to reduce the volume of stormwater runoff, improve water quality, reduce water consumption, reduce energy demands, reduce the urban heat island effect and air pollution, and provide other aesthetic, environmental, and quality of life benefits.
  - 1.7. Develop local guidelines for new buildings that encourage techniques for reducing energy use such as higher levels of insulation, greater building mass, high ceilings, “day lighting”, shade screens, canopies, natural ventilation, ceiling fans and the integration of indoor and outdoor spaces.
  - 1.8. Ensure that building managers are trained to operate and maintain sustainable building features.
2. Encourage the use of renewable and sustainable energy systems in new buildings.
    - 2.1. Work with colleges, universities and utility companies to develop standards for solar, wind and other sustainable energy systems within the city.
    - 2.2. Work with government, utility companies and others to develop incentives for the use of renewable and sustainable energy systems and make existing utility, state, and national level incentives available to developers and the public.
    - 2.3. Update City codes as needed to incorporate the use of sustainable energy system technology.
    - 2.4. Work with OPPD on energy inter-connect standards.
    - 2.5. Educate designers, builders and industry experts on renewable energy.
    - 2.6. Encourage the use of geo-thermal heating and cooling systems.
3. Locate new non-residential buildings so as to improve the overall livability and quality of life in the city.
    - 3.1. Arrange buildings and sites in ways that facilitate and encourage pedestrian activity, mass transit, bicycles and other modes of transportation while still accommodating the automobile.
4. Continue to update the City’s codes to incorporate the latest provisions for energy efficiency and healthy buildings.

- 4.1. Ensure that new buildings provide for adequate ventilation and healthy indoor air quality as per ASHRAE standards.
- 4.2. Adopt an energy code that meets or exceeds Energy Star guidelines and regularly update the code as new energy regulations are developed.
- 4.3. Work with the local designers, engineers and building trade groups to educate them on the new requirements and integrate the new codes into their projects.
- 4.4. Ensure that the City is able to quickly and accurately review plans and perform on-site inspections of energy efficiency and environmental standards not just non-life/safety items.
- 4.5. Work with surrounding jurisdictions to create uniformity in codes among jurisdictions.
5. Revise codes to encourage the construction of mixed-use buildings and sites.
  - 5.1. Eliminate code provisions and conflicts that discourage the construction of mixed-use buildings and work with designers to facilitate the design and approval of mixed-use building plans. (plumbing, electrical, mechanical, and zoning codes)
  - 5.2. Develop plan submittal and review procedures that ensure that the ultimate configuration of a mixed-use building is considered in the initial plan submittal and review so that potential issues such as access and venting can be addressed up-front.
  - 5.3. Continue the creation of Neighborhood Conservation and Enhancement (NCE) Districts as a means to facilitate rehabilitation and infill development by replacing existing “suburban” zoning regulators that may discourage redevelopment with regulators appropriate to the neighborhood.
6. Ensure that designers, contractors and building officials are knowledgeable regarding sustainability design, construction, inspection and code requirements.
  - 6.1. Work with the AIA, USGBC, ASCE, ASLA, colleges, universities, utilities, and other similar groups to provide local education and training programs in sustainable construction practices and codes for architects, landscape architects, contractors and inspectors.
7. Provide incentives to encourage the use of sustainable building practices.
  - 7.1. Provide tax or other financial incentives for the construction of LEED certified buildings or buildings otherwise certified as meeting the goals of this element through a defined methodology or measurement regime. Review and adopt specific standards in conjunction with implementing any such incentives.
8. Manage the consumption of land for new non-residential construction by ensuring that new commercial construction is closely tied to actual market demand.

- 8.1. Address the fact that the amount of land allocated for new commercial development currently exceeds the actual market demand resulting in vacant and underdeveloped commercial structures and sites. The City should review the current commercial acreage allocations in the Future Land Use Element of the Master Plan with the development community to determine how best to achieve an appropriate mix of commercial land and how to redevelop vacant and underdeveloped commercial sites. The City should work with the development community to determine if allowing an increase in multi-family units at commercial intersections can help reduce the oversupply of commercial land while also increasing the market for existing commercial development.

### RESIDENTIAL – RENOVATION / NEW CONSTRUCTION

Promote the renovation and construction of healthy residential properties that minimize waste and the consumption of energy and water while also encouraging the production of food and power. Create “regenerative” residential communities that produce energy, feed people, clean water, improve health, incorporate waste into the nutrient cycle and demonstrate sustainable living.

#### Objectives:

1. Reduce potable residential water usage and encourage maximizing the reuse of a residential property’s “gray water.”
  - 1.1. Encourage the use of gray water irrigation systems and remove barriers that limit their use on individual or community-scale residential sites.
  - 1.2. Encourage the design and redesign of residential landscapes that require less irrigation with a goal of eliminating the use of potable water for residential irrigation.
  - 1.3. Encourage the use of Native and Ecologically Well Adapted Non-Invasive Plant (NEWANIP) species that require less water on residential sites.
  - 1.4. Take steps to eliminate the use of potable water for residential toilets.
2. Encourage reductions in energy consumption and the use of renewable energy generation systems on residential properties.
  - 2.1. Incorporate the strategies related to energy efficiency contained in Non-Residential – New Construction, Objective 4 in the construction and renovation of residential buildings.
  - 2.2. Expand local utility company, State Energy Office, and City programs that encourage residential weatherization improvements.
  - 2.3. Provide incentives such as Energy Savings loan programs and Energy Efficient Mortgages and “on-bill” financing to allow homeowners to utilize the savings from energy efficiency improvements to finance improvements that reduce energy use.
  - 2.4. Encourage the use of Energy Efficient Mortgages that factor reduced energy costs into a buyer’s ability to pay for higher mortgage loans.

- 2.5. Work with the real estate industry to develop a measurement methodology and then institute a policy to include the HERS index on every home listed in the Multiple Listing Service (MLS) and educate real-estate agents, loan officers, and appraisers on the value of the HERS index.
  - 2.6. Identify and promote ways that landlords and tenants can benefit from energy saving investments in residential rental properties.
  - 2.7. Work with local utilities to take advantage of smart grid technologies.
  - 2.8. Incorporate the strategies related to renewable and sustainable energy systems contained in Non-Residential – New Construction, Objective 2 in the construction and renovation of residential buildings.
3. Encourage the preservation and rehabilitation of existing residential structures.
    - 3.1. Educate the public on techniques and methods of building maintenance to ensure that homes remain healthy, functional, energy efficient and weather tight.
    - 3.2. Expand funding for City rehabilitation programs and code enforcement efforts to reduce blighted housing conditions and preserve existing housing.
    - 3.3. Pursue additional financial incentives for the preservation of existing housing.
    - 3.4. Work with local and national organizations that promote historic preservation and energy efficiency to educate homeowners and promote sustainable historic homes.
4. Provide financial and regulatory incentives for sustainable initiatives, including building material and packaging reuse and recycling.
    - 4.1. Work with local non-profit agencies to encourage the reuse of building materials and fixtures from buildings slated for demolition.
    - 4.2. Develop a citywide building material recycling program that approaches the recycling of 100% of all waste building materials by 2020.
    - 4.3. Develop programs for the environmentally responsible disposal of non-reusable, non-recyclable, construction materials such as obsolete windows, broken drywall, crushed plaster, old cellulose insulation, etc.
5. Design and build healthy residential structures and mitigate potential health hazards in building renovation projects.
    - 5.1. Incorporate the strategies related to adequate ventilation and healthy indoor air quality contained in Non-Residential – New Construction, Objective 4 in the construction and renovation of residential buildings.

- 5.2. Ensure adequate ventilation and allow for fresh air exchange in weather-tight structures.
- 5.3. Inspect buildings constructed prior to 1978 for potential lead and asbestos hazards prior to renovation. The owner and contractor must work with the City and County to ensure that the building is renovated according to the City and County requirements for lead and asbestos abatement.
- 5.4. Ensure that City codes provide for adequate ventilation as outlined in documents such as the “Healthy Homes Principles.”
6. Educate the public and residential industry professionals on building science “best practices” for residential energy efficiency, water usage, and on-going maintenance.
  - 6.1. Provide information to homeowners on how to properly landscape their yard to provide summer shade and allow winter sun while also blocking winter winds and allowing for summer breezes.
  - 6.2. Create partnerships among the utility companies, the City, universities, community college, State Energy Office, industry professionals and homebuilders to develop educational materials and programs for homeowners.
  - 6.3. Create an inventory of Best Practices, including information on cost/benefit comparisons.
  - 6.4. Develop a sustainability guide for homeowners and make it available to homeowners and residential industry professionals through a variety of channels.
  - 6.5. Undertake a series of demonstration projects that build on current efforts to construct and retrofit energy efficient and regenerative homes and expand the effort to include multi-family and renter occupied housing.
  - 6.6. Develop innovative home monitoring systems and educational programs using new technologies such as iPhone applications, dashboard technologies and social networking sites to allow for real-time feedback and information exchanges on energy saving activities and techniques.
7. Promote residential food production and eliminate barriers that discourage it.
  - 7.1. Work with the County Extension Service and community garden groups, such as City Sprouts, to promote residential gardening within the city.
  - 7.2. Encourage the use of edible plants in residential landscaping.
  - 7.3. Educate the public and raise awareness of the benefits of residential gardening.
  - 7.4. Encourage residential composting and develop a curbside composting pick up program.

- 7.5. Review and revise, if needed, City codes that may restrict the production of certain types of livestock that are appropriate for urban settings.

### BUILDING SITES – RESIDENTIAL / NON-RESIDENTIAL

Minimize the consumption of undeveloped land and maximize the sustainability of building sites through effective use of techniques such as infill development, increased density, building orientation, landscaping, storm water retention, urban agriculture and other sustainable practices.

#### Objectives:

1. Encourage infill development and the reuse of existing sites and public infrastructure.
  - 1.1. Provide incentives for the use of infill sites for the construction of new facilities.
  - 1.2. Identify funding for acquisition of vacant properties in blighted areas for redevelopment.
2. Encourage well-designed higher density development patterns and educate the public on the benefits of such a development pattern.
  - 2.1. Provide for higher density development incentives that follow the “recently-adopted” City urban design standards.
  - 2.2. Ensure that adequate open space is provided for higher density projects.
  - 2.3. Develop a speaker’s bureau to provide information and educate the public on the benefits of well-designed higher density development.
3. Reduce building energy consumption by considering the site characteristics and opportunities in the design and placement of the building and adjacent plantings.
  - 3.1. Plan, whenever possible, a building’s orientation to maximize the use of solar energy, to minimize the impact of summer sun and winter winds, to take advantage of summer breezes and to minimize grading.
  - 3.2. Plant trees strategically in order to provide shade for buildings during the summer while allowing for sun to penetrate the building in the winter. Ensure that plantings do not compromise solar energy and heating systems.
  - 3.3. Plant trees to serve as a windbreak during the winter without inhibiting the flow of summer winds through the building.
  - 3.4. Consider building placement opportunities for taking advantage of the flow of cool air from a wooded hillside at night.
  - 3.5. Consider the use of earth embankments against one or more walls of a building.

- 3.6. Update and enforce code provisions that protect solar access.
  - 3.7. Continue to enhance Omaha's "urban forest" in order to reduce the urban heat island effect, improve air quality, reduce storm water runoff and add to the attractiveness of the city.
  - 3.8. Promote the use of a wide variety of native and ecologically well-adapted tree species to minimize tree losses due to disease and insect damage.
4. Reduce water consumption from irrigation of building sites.
    - 4.1. Require the use Native and Ecologically Well Adapted Non-Invasive Plant (NEWANIP) species, storm water retention basins and efficient irrigation systems in the majority of a building's landscaped areas.
    - 4.2. Limit the use of plant materials that require extensive irrigation.
5. Reduce the amount of a building site devoted to automobile parking and access in order to minimize land consumption and limit the "heat-island" effect. Provide for alternative energy vehicles.
    - 5.1. Encourage the use of shared parking and parking management plans that reduce the amount of parking associated with a project.
    - 5.2. Consider the use of caps for parking associated with various building types.
    - 5.3. Allow for the use of vegetative paving systems for overflow parking or, if instituted, parking stalls above the cap in places such as recreational facilities where the overflow parking will not be used in the winter.
    - 5.4. Modify City codes to allow for narrower driveway and roadway widths within project sites.
    - 5.5. Establish and enforce new landscaping standards that result in added interior and perimeter landscaping as new development and redevelopment occur.
    - 5.6. Provide for electric vehicle recharging stations within parking facilities and structures.
6. Optimize the on-site retention and re-use of storm water generated from building sites.
    - 6.1. Encourage the use of narrower streets and driveways and the use of permeable paving surfaces for drive, parking and sidewalk areas.
    - 6.2. Install "re-usable" permeable paving systems such as brick or granite pavers when possible.
    - 6.3. Utilize techniques such as rain gardens and open drainage systems to reduce the volume and speed of runoff entering the storm drainage system and to improve water quality.

- 6.4. Encourage the use of green infrastructure to reduce storm water volumes and assist in meeting federal CSO mandates and develop incentives for their use. In addition, work with the EPA on its lead soil abatement program to incorporate CSO related storm water runoff management practices into the re-grading and re-landscaping of affected properties.
- 6.5. Provide for rain water “harvesting” in the City code and encourage the retention and reuse of storm water on site.
- 6.6. Ensure that storm water and erosion controls are installed and maintained according to the City’s guidelines during construction. Follow all local, Federal and State environmental protection guidelines during construction.
- 6.7. Ensure that City staff levels are adequate so that storm water site plan reviews and on-site inspections occur in a timely manner.
7. Design sites to reduce the need for personal vehicles, encourage pedestrian access and promote the use of bicycles and mass transit.
  - 7.1. Design sites and projects to allow for easy mass transit access to the site and for easy access by pedestrians.
  - 7.2. Provide for dedicated bus rapid transit access where appropriate within projects.
8. Minimize the amount of land and vegetation disturbed for building construction and site improvements.
  - 8.1. Develop site plans that minimize the amount of grading required to develop the site. Balance “cut and fill” so as to limit the need to transport soil on or off the site.
  - 8.2. Conserve topsoil during grading operations and limit soil compaction.
  - 8.3. Ensure that erosion control plans meet City requirements and that they are installed and maintained properly during and after construction.
  - 8.4. Ensure that City staff levels are adequate so that plan reviews and on-site inspections occur in a timely manner. Continue to require that engineers or landscape architects responsible for preparing plans and overseeing site work certify that erosion controls were installed and maintained properly.
  - 8.5. Require that tree and vegetation protection plans are prepared and approved by the City prior to construction and that the plans are followed and protections are maintained during construction.
9. Minimize off-site environmental impacts associated with dust, erosion, siltation, odors, light and noise.

- 9.1. Continue to enforce City regulations related to dust, erosion, siltation, odors and noise. Ensure that City staffing levels are adequate to ensure timely compliance checks.
  - 9.2. Develop a “dark sky,” City lighting ordinance that directs light away from the sky and onto the site area that needs lighting. Also consider increased limits on the amount of light that is allowed to cross property lines.
10. Encourage the use of urban sites for agricultural production, reduce the need to haul “yard waste,” and reduce chemical pollution.
    - 10.1. Encourage personal and community gardens through the use of funding for programs such as City-Sprouts.
    - 10.2. Encourage on-site composting by providing educational materials and instruction on composting techniques.
    - 10.3. Encourage the use of non-toxic landscape chemicals and natural pest controls.
11. Promote the establishment of renewable/alternative energy generation and management systems (e.g., geothermal, solar, wind, co-generation, smart grid, etc.) on a district and neighborhood scale.
    - 11.1. Coordinate with utilities and design professionals to identify opportunities and evaluate the potential for neighborhood/district-scale energy generation.
    - 11.2. Investigate the feasibility for renewable/alternative energy systems when creating neighborhood and redevelopment plans.
    - 11.3. Provide for renewable/alternative energy systems in common areas of new residential, mixed use/commercial, and industrial development. Establish design standards for those systems.
    - 11.4. Work with utilities to create strategies that will ensure appropriate operation and management of district/neighborhood energy systems.
    - 11.5. Encourage the use of the district energy concept in existing neighborhoods as well as new developments.