Chapter 6

Green Recommendations for Historic Rehabilitation and Urban Infill

Preface:

Across the country a need is growing for decisions to be made that are both environmentally responsible and beneficial to our economy, our health, and our well-being. For those in the development and design service professions, this means developing and designing in a way that is more energy efficient and environmentally sensitive. There are many technologies being developed that will help in this effort. This section of recommendations will describe ways in which historic rehabilitation and urban infill projects can incorporate green building principles.

What is sustainability?

Sustainable development is defined by the United Nations as meeting "the needs of the present without compromising the ability of future generations to meet their own needs." One of the most important ways sustainability can be implemented today is through historic preservation, rehabilitation, and adaptive re-use of existing buildings. Thus the simple fact that Lafayette has so many historic aspects is a great and admirable step towards sustainability.

The United States Green Building Council (USGBC) is leading the way in bringing industry leaders together to promote the production of buildings and sites that are sustainable both inside and out. The USGBC has developed a rating system known as LEED (Leadership in Energy and Environmental Design). The standards in LEED are not legal requirements in any way, but provide a basis for building green. A project that follows the standards in LEED will prove to be valuable for the environment, economically efficient, and beneficial to human health, well-being and quality of life. Currently there are standards for new construction, existing buildings, commercial interiors, core and shell projects, homes, and neighborhood development. There are some historic restoration/ major renovation projects that have obtained LEED certification, but only by applying the standards found in the new construction section. The recommendations in this section will aid in applying LEED concepts as well as finding other innovative approaches to creating a sustainable, efficient and environmentally sensitive future for the wonderful historic buildings, neighborhoods, and districts of Lafayette.

For more information:

Visit the United States Green Building Council (USGBC) at http://www.usgbc.org.

Who should use this section?

The ideas and principles discussed in the following sections can be implemented on nearly every historic rehabilitation project. There are simple things that can be done by homeowners to improve the energy efficiency and water conservation of their home. Contractors and developers can benefit from implementing such ideas as well. Often the things discussed in this section are no more than smart practices that will result in a better return on investments, higher building occupant satisfaction, and a structure that will stand the test of time. When architects are involved, they should be made aware of the need for such sustainable practices. Incorporating sustainable concepts in the design and contractual phase of a project increases the potential for success and can serve to better ensure that the practices are actually implemented.

The Choice of Historical Character versus Sustainable Approach

Inevitably there will be times when the historical character of a building will conflict with some LEED principles for sustainability. The choice will have to be made as to whether it is more important to retain the character of the structure or to enhance the performance of the building. Generally it is recommended that when important architectural and visual attributes are in danger of being compromised, the historical character should be retained. However, when cases arise where the original construction system or later mitigation measures are failing and the important historic character will not be deteriorated, it is recommended that green practices be utilized. Such instances must be dealt with on a case by case basis, considering such historical aspects as architectural detail, unique identifying features, cultural relevance, site history, etc.

The purpose of this section is to look at ways those in charge of construction sites can be aware of the waste being produced. About 40% of total solid waste produced in the US is from construction and demolition. It is important to reduce the amount of waste sent to **landfills** that can contaminate groundwater and invade valuable green space. There are many ways to reduce the waste from a construction site which in turn can reduce the need for new or expanded **landfills**.

Waste Management Plan

Waste management plans can be costly to create and abide by, however, they can also result in significant savings during construction. **Recycling** is found to be cost-effective when **landfill tipping fees** exceed $50 per ton. Furthermore, a well thought out waste management plan can dramatically reduce the amount of materials hauled away from or into a site, thereby lessening truck traffic that could disturb a neighborhood.

Factors that contribute to waste production include:
- overpackaging–contamination
- improper storage–mishandling
- ordering errors–poor planning
- breakage

On-Site Recycling

On-site **recycling** of construction materials, site debris and demolition wastes should be promoted throughout the entire construction process. Creative thought should be given to what from the specific site can be recycled, reused on the site or **salvaged** for other projects. Some **salvaged** items such as light fixtures, lumber, and other materials could be donated to charitable organizations like Habitat for Humanity.

To aid in **recycling**, a specific area on the site should be delineated for waste **recycling**. The **recycling** area should be selected to avoid the contamination of **stormwater runoff** and protect stored recyclables from the elements. This area should include bins that are easily accessible and well labeled. This will enable workers to conveniently recycle as they work. Workers should also be trained on the importance of **recycling** and salvaging materials as well as the proper way in which to do so. Project managers should get feedback on the **recycling** process, assess the progress and make any necessary changes.

Recyclable Construction Materials
- Land clearing debris
- Plywood, OSB, & Particle Board
- Asphaltic Concrete
- Bricks
- Rigid Foam Insulation
- Paint
- Carpet & Carpet Pad
- Polystyrene
- Cardboard, Paper, & Packaging
- Clean dimensional wood
- Concrete
- Concrete Masonry Units
- Gypsum Wallboard
- Asphalt Shingles
- Window Glass
- Plastic Film
- High Density Polyethylene (HDPE)

Salvage and Reuse

Reusing as much of an existing building as possible is the best way to minimize waste produced on an historic site. Consequently, reusing existing materials reduces the need for new materials that require extraction, processing, and transportation. All of which have aspects that are less than environmentally sensitive. Using **salvaged** materials from another building or site is also beneficial in that it can save some initial costs of construction materials. **Salvaged** materials can also add architectural detail and unique character to a building. Because of recovering and refurbishing costs some **salvaged** items may be more expensive than new materials. However, they are often of better and more durable quality than new materials.

Some Useful Salvaged Materials

- Beams
- Wood Flooring
- Doors and Frames
- Furniture
- Various Masonry Products
- Ironwork
- Architectural Ornamentation
- Posts
- Wood Paneling
- Cabinetry
- Brick
- Mantels
- Light Fixtures

All **salvaged** materials should be researched for durability, performance, code-compliance, structural integrity and energy and environmental considerations. Asbestos, lead paint, pesticides and rot should also be concerns when dealing with **salvaged** materials.

Resources:

www.recycle.net/exchange
www.metrokc.goc/hazwaste/imex/exchanges.html
www.greenguide.com/exchange/search.html

Recycled Content Materials

There is a growing number of recycled content materials, meaning products that are manufactured and contain recycled material. This obviously would be more desirable than purchasing new materials that were completely extracted and manufactured with no recycled content. Materials containing recycled content include steel, aluminum, concrete, masonry, acoustic tile, paint, carpet, ceramic tile, and insulation. These products are generally of equal quality to products containing virgin materials and can be used easily. Recycled content materials should be checked for air emissions issues, like those found in some synthetic products such as plastic, polyester, and rubber.

Regional Materials and Products

When new materials are used, it is best to purchase these materials from local and regional merchants. This has two sustainable benefits. First it reduces the transportation costs that are incurred from importing goods from some distance, and second, it benefits the local and regional economy. The USGBC suggests trying to find as many materials as possible within a 500 mile radius of the project site. Purchasing materials that are extracted and manufactured within this proximity helps retain capital for the community and creates a more stable tax base and a healthier local economy. Furthermore, the use of local and regional materials is more likely to relate to the original character of the historic projects. It is likely that most of the material used in the original construction of such building came from within the region. Plus these materials are more likely to stand up to the local climate and conditions than imported materials.

Rapidly Renewable Materials

Another smart practice when deciding and purchasing materials for historic rehabilitation projects is to specify and use rapidly renewable materials. Rapidly renewable resources are materials "that substantially replenish themselves faster than traditional extraction demand and do not result in significant biodiversity loss, increase erosion, air quality impacts, and that are sustainably managed" (LEED 204). Rapidly renewable resources minimize the depletion of raw materials and other resources, are economical, environmentally friendly, and require less labor. Some rapidly renewable materials may be more expensive now, but as they become more commonly used, their price should drop and become less than conventional materials.

Some Rapidly Renewable Materials

- Flooring: Bamboo, Natural Linoleum, Cork
- Panels/ Partitions: Wheatboard, Sunflower Seed Board, Bamboo
- Cabinetry/ Fittings: Wheatboard, Strawboard, Soy Bean Composite, Bamboo
- Insulation: Cotton, Strawbale, Soy-based Foam

Section 3: Recycling

Post-Occupancy Recycling

Recycling should not end with the **recycling** done during the construction process. Whatever the project may be, a plan should be developed for ongoing **recycling** on site by building occupants and residents. Such a plan for ongoing **recycling** will reduce future waste produced on the site that would otherwise be dumped in **landfills**. This plan should begin with a designated place for the users to collect, separate, and store recyclables. This place should be easily accessible and convenient for the users and accommodate the maximum number of occupants for the building, whether residential or commercial. Occupants are less likely to recycle if the task becomes burdensome or costly.

At minimum, the plan should allow for the **recyclin**g of paper, glass, plastics, and metals. Just one ton of recycled paper saves 17 trees as well as 3 cubic yards of **landfill** space. Recycled aluminum requires only 5% of the energy needed to produce virgin aluminum from raw material. With such significant figures, it is obvious that **recycling** is the environmental and sustainable thing to do. It would also be advantageous for neighborhoods to develop **recycling** programs. This could include a central collection location or strategy for pick-up of recyclables or even educational opportunities to promote more and better **recycling** practices.

Section 4: Certified Wood

The forests of this world are important natural resources that support many organisms and greatly affect air and water quality. **FSC**-Certified Forest Products are products manufactured with wood from **FSC**-certified forests. The **FSC** certifies products that are produced from a process that adheres to their standards. These products come from forests that are sustainably managed to maintain the integrity and health of the forest. Purchasing **FSC**-certified products promotes such forestry stewardship and should be encouraged at every opportunity. There are many products available made from wood that comes from endangered forests. Such practices are not sustainable and should not be supported or promoted.

Resources:

www.certifiedwood.org
www.smartwood.org

Section 5: Energy Performance

In the United States, buildings are responsible for more that 30% of the total energy load and about 60% of electricity use. Most of our energy is a product of fossil fuels and the burning of fuels like coal and oil release pollutants that contribute to global warming. Energy use can be easily and substantially reduced and will prove to reduce operations costs and pollutants while increasing comfort and economic savings. When investigating the energy load of a building, it is beneficial to look at the building's energy performance as a whole since so many aspects are interrelated. For example, factors such as natural ventilation and insulation will have an impact on the air conditioning performance.

Commissioning

The first step in increasing energy efficiency is to evaluate the current system. **Commissioning** is a process in which the system can be evaluated and ensures maximum energy efficiency with minimal environmental impact. **Commissioning** activities should be started in the planning and pre-design phases to evaluate the owner's energy requirements. During the construction document and building phases, systems should be performance tested. This process should end with owner acceptance and a warranty period. For existing structure with operating systems, current energy use should be determined and compared to the systems optimal performance under ideal operating conditions. Once the system is understood, strategies should be developed to upgrade to more efficient and modern systems that are not "energy hogs." It will be important to educate building occupants and maintenance personnel as to proper and optimal system operations.

Topics to be Addressed by the **Commissioning** Process

- General purpose of the system
- Use of Owner's and Maintenance Manuals
- Review of control drawings and schematics
- Start-up, normal operations, shutdown, unoccupied operations, seasonal transitions, manual operation, controls set-up and programming, troubleshooting and alarms
- Interactions with other systems, adjustments and optimizing methods for energy efficiency, relevant health and safety concerns
- Adjustments and optimizing methods for energy conservation
- Special maintenance and replacement sources
- Tenant interaction issues
- Discussion of environmentally responsible factors of the system

Harvest Free Energy

There are simple ways in which historic buildings can harvest free energy. In many cases, the building is probably already designed and equipped to take advantage of such resources. First, consider where the building is oriented in relation to sunlight, shade and natural air circulation. Being thoughtful and creative with how you can utilize the natural characteristics of the site can be an easy and beneficial way to reduce energy use. For example, sky lights and windows can be restored to their original functioning state and used to provide sunlight during the daytime hours, reducing the need for electric light usage. Architectural overhangs found on many historic buildings can provide shade for windows in the summer, reducing heating that may be caused by solar penetration. These same overhangs will likely permit heat penetration in the winter when the sun is lower in the sky.

Along with windows, some historic buildings were designed to naturally ventilate the interior spaces. Restoring such amenities will allow building occupants the opportunity to ventilate the building with natural air. This can reduce the dependence on air conditioning especially during times of the year when the outside air is at a comfortable temperature or when the night air is cool but the days are hot.

Energy Benefits from Landscaping

Landscaping is another way that energy use can be reduced. Strategically chosen and placed trees can shade the sides of a building that tend to gain heat from exposure to the sun. Conversely in the winter after the leaves have fallen, sun can get through the branches and help heat the building. Plants can also be used to create wind breaks that can somewhat reduce the amount of heat needed in the winter. Consideration should also be given to existing trees that are in good condition that may already be providing some of these energy-saving benefits.

On-Site Renewable Energy

Some owners may be interested in renewable energy sources. This can include solar, wind and biomass power but do require additional equipment for operation. Renewable energy is superior to many of the current energy sources like coal, nuclear, oil, and natural gas. The conventional sources of energy have many negative environmental impacts including air and water pollution and natural resource destruction and depletion.

While there are cases where small wind systems have been used to power homes and small businesses, the more common energy source that could be used in this area is solar power. Sunlight can be converted directly into electricity using either photovoltaic (PV) panels or Building Integrated Photo Voltaics (BIPV). BIPVs are incorporated into various elements of a building like the roof, cladding or windows. It is fairly new to the market and will likely have a high initial cost to the consumer. Even PV panels may prove to be too costly to most owners, though the production cost of such technologies is quickly decreasing. It could become a logical and affordable solution in the very near future.

Local Resources:

Purdue University Engineering Projects in Community Service
http://epics.ecn.purdue.edu/hcna/

Other Resources

Energy Efficient Building Association
www.eeba.org

American Council for an Energy Efficient Economy
www.aceee.org

U.S. Department of Energy's Energy Efficiency and Renewable Energy Group
www.eren.doe.gov

U.S. Department of Energy Photovoltaics Program
www.eren.doe.gov/pv

National Center for Photovoltaics
www.nrel.gov/ncpv/

The American Wind Energy Association
www.awea.org

The American Bioenergy Association
www.biomass.org

Section 6: Water Usage

On a daily basis, Americans withdraw one fourth of the United States' renewable fresh water resource. This water is used in daily activities then deposited back into the natural water systems, though often treated and polluted. In addition, water is also drawn from underwater aquifers where water levels in some places have dropped more that 100 feet since the 1940s. Annually, the United States is extracting 3,700 billion gallons of water more than we return to the natural water systems. Some measures have already been taken to reduce water use as seen in the fact that U.S. industries are now using 36% less water that they did in 1950. There is still much that can be done in historic buildings to reduce the amount of water used.

Benefits of Using Less Water:
- Lower water use fees
- Lower sewage volumes needing treatment
- Energy use reductions
- Chemical use reductions
- Lower capacity charges and limits

Water Efficient Landscaping

While irrigation is not as needed in the Midwest as much as in hotter and dryer regions, there are still ways to be smart about irrigation use when is comes to saving water. Many people use **potable water** to water and irrigate their plants, lawns and gardens. While this is common practice, it is wasteful, especially when it is so easy to incorporate strategies that use non-**potable water** for irrigation or at least reduce the amount of **potable water** used. Sources of non-**potable water** include captured rainwater runoff from building roofs and **graywater** from building systems. Capturing and reusing rainwater can be the simplest way and can often be creatively done by homeowners and building occupants. It should be noted however, that unless the roofing material is metal, clay, or concrete-based, the runoff water will need to be filtered before reuse. This can be accomplished with a combination of grated screens and paper filters. There may also be other potential uses depending on the mineral and acidic content of the rainwater. It is wise to check with the local health code departments before fully implementing rainwater collection and reuse where there could be a risk of contaminating public drinking water supplies.

When irrigation systems are required, it is much more efficient to use drip systems. **Drip irrigation** gets water directly to the soil and thus more directly to the plants' roots. Furthermore, drip systems eliminate unnecessary over-spray and water loss to evaporation.

Xeriscaping

Xeriscaping is a growing trend that is making great strides toward reducing the need for irrigation in designed landscapes. **Xeriscaping** is the practice of using native plant species that require little or no watering. It is solely based on the principle that native plants can survive on their own in their native climates. These landscapes not only require less water but also less maintenance.

Resources:

WaterWiser: The Water Efficiency Clearinghouse
www.waterwiser.org

The Irrigation Association
www.irrigation.org

Water Efficient Landscaping
http://extension.missouri.edu/explore/agguides/hort/g06912.htm

Indoor Water Reduction

Conventional wastewater systems and those likely to be found in many historic buildings require a large volume of **potable water** to transport waste to the city's wastewater treatment facilities. There are ways to reduce the amount of water needed to carry out these tasks that both reduce the need for utility provided water and can reduce the amount of runoff produced on a site.

Methods of Reducing **Potable water** Use:

- Use **graywater** from sinks, showers, etc. to flush toilets and urinals
- Harvest water from roof and site runoff for use in toilets and urinals
- Faucet Aerators
- Low-Flush toilets
- Toilet Displacement Devices
- Low-Flow Showerheads
- Pressure Reduction
- Automatic Controls
- Dry Fixtures – like **composting toilets** and **waterless urinals**
- User habits and practices

Low-flow fixtures are probably the simplest and most affordable means of reducing **potable water** usage. However, it would also be beneficial to educate users as to more efficient ways to use the system and regulate their water use habits. If users simply give consideration to how much water they use they are likely to find ways on their own to reduce **potable water** use. Before installing a **graywater** system local health codes should be consulted. Permits and regulations may limit the types of systems and the extent to which **graywater** can be used.

Resources:

U.S. EPA Water-Saving Tips
www.epa.gov/OW/you/chap3.html

Section 7: Light Pollution Reduction

Especially in urban settings, light trespass can become a major and highly visible problem. Lighting is imperative for providing illumination outdoors along sidewalks, parking lots, streets, and community/ public places. The goal of these recommendations is to keep the light for a particular site limited to the boundaries of the site, increase night sky visibility, and decrease the impact of lighting on nocturnal environments.

Benefits of **Light pollution** Reduction:
- Visual access to the night sky
- Minimal impact on nocturnal habitats
- Reduced lighting costs
- Reduced energy costs
- Avoid intrusive lighting of neighboring properties

Methods of **Light pollution** Reduction:
- Only light areas required for safety, access, and identification
- Use down-lighting for landscape elements rather than uplighting
- Use exterior lighting with minimal upward light shine
- Use lighting accessories such as glare shields
- Develop a lighting plan to determine only the necessary **footcandles**
- Consult a lighting professional
- Use low energy consuming lighting products
- Photo sensitive lighting
- Limit usage to times when site is occupied

One of the simplest ways to reduce **light pollution** is to turn the lights off when they are not needed. This may mean having street light on a timer so that they shut off during the late night hours when people are generally not out. It can also involve ensuring that the lights are working properly and only during the nighttime hours. Lights that mistakenly burn during the day are simply wasting energy and money.

Resources:

The International Dark-Sky Association
www.darksky.org

Section 8: Reduction of Heat Islands

Heat islands are the cause of artificially rising temperatures in urban areas. Some cities experience a **heat island** affect of 10 degrees or more compared to surrounding suburban and rural areas. Such rising temperatures creates a need for an increased load on cooling equipment which means a larger energy load for building operations.

Heat island effects are also harmful to habitats, wildlife and migrations corridors. Increasing temperatures can affect plants and animals that can not thrive in areas with higher temperatures. Fortunately there are measures that can be taken to reduce this effect in urban settings.

Shade Requirements

Using shade trees in the landscape is one of the primary ways to provide the cooling effect of shade to urban sites. The city already has requirements as to tree spacing and species requirements for various site situations. Where possible, exceeding these shade requirements would further help reduce the **heat island** effects. Many of the surfaces that retain the most heat are found along streets and parking lots. Street trees and parking lot islands are the most common ways to provide shade for these surfaces. During the landscape design phase, planting should also be planned that will shade the hot (south facing) side of buildings.

Reflective Surfaces

Besides shading, simply using materials and colors that reflect light and heat instead of absorb it will serve to reduce **heat island** effects. There are many products available for roofing that have increased visible reflectance, however it is more important to find the products that have been tested for solar reflectance. Tests for solar reflectance will ensure that a wider range of wavelengths are reflected, reducing more solar gain than just tests for visible reflectance. Such roofing may include membrane or metal roofing, both of which can be coated with a light color to increase solar reflectivity.

Paving materials that have solar reflectivity are harder to find but there are still some options available. Mineral based paving, found in the most common and conventional paving in use today, has a low solar reflectivity. There are coatings and integral colorants that are becoming available for use in parking surfaces that do increase solar reflectance. When these aren't affordable or allowable, consider decreasing the pavement surface and increasing the amount of perviousness to reduce the amount of low reflective pavement present on the site. This will also increase runoff infiltration.

Resources:

Color Matters
www.colormatters.com

Alternative Parking

Obviously the cause of so much non-reflective and **impervious** pavement in cities today is the need for parking and parking lots. It would be advantageous to find alternatives to typical surface parking lots.

Alternatives for Surface Parking Lots:
- Parking garages with green roofs
- Underground parking
- Structurally shaded parking
- Parking space within a building

Section 9: Stormwater Management

Before there were any paved surfaces or buildings, where did rainwater go after it fell to the earth? Most of it evaporated or was absorbed by plants and the soil before it ever had a chance to drain back to the natural bodies of water. So much of modern development brings a harmful impact to the water systems of this earth. Every time an **impervious** surface is built, it increases the rate and amount of **stormwater runoff** that is produced from the site. This in turn increases the pollutants and silt carried to streams and rivers that affect water quality and natural habitats. Furthermore, as runoff increases, flow rates of rivers and their tributaries increase which impacts the frequency and magnitude of flood events. There are a multitude of measures that can be implemented to reduce the runoff from a site and this section will begin to look at some of the possible solutions.

Pervious Surfaces

Pervious Surfaces are surfaces that allow **stormwater runoff** to infiltrate into the subsurface. Most pavements used in streets, sidewalks, and parking lots today are considered **impervious**. The following list of materials can create pervious surfaces for commonly encountered situations.

Pervious Materials:
- Porous asphalt
- Porous concrete
- Grass and plastic grid system
- Concrete grids with grass
- Concrete grids with gravel
- Pavers with airspace between modules
- Crushed stone

Bioswales

Bioswales are planted drainage ways that allow for slower infiltration of stormwater. The vegetation planted in a bioswale will help filter pollutants and silt from **stormwater runoff** so any that flows back into the natural waterways is much less contaminated. Bioswales can also become amenities to a site if plants are chosen not only for their filtration and absorption qualities but also for their color, texture, and form.

Green Roofs

Green Roofs are becoming more and more popular. A green roof can look as simple as a building with grass on top or as complex as a rooftop garden for people to relax in and enjoy. Whatever the vegetation, the plants found on green roofs hold stormwater and eventually release a portion of it back into the atmosphere through evapotransporation. Green roofs also provide insulation benefits to buildings as well as aesthetic attraction. There is a lot involved in green roof construction and maintenance, but they have been estimated to have a longer life span and require less maintenance than conventional roofs.

Section 10:
Landscape Strategies

Resources:

Purdue University
http://www.hort.purdue.edu/ext/garden_pubs.html

Home Gardening

Home Gardening is one of the most sustainable practices in which a homeowner can engage. It is a great source of organic produce that can save money, grant a sense of personal satisfaction and independence, and provide valuable food for human consumption. Communities could take advantage of the surplus that many home growers inevitably have by organizing a group that sells the surplus at the local farmer's market. This would help raise money that could be used to make improvements within the community to improve the quality of life for the residents.

A couple of vegetables that are common and easy for home gardeners are tomatoes and cucurbits. Tomatoes are one of the most popular home grown vegetables. They can grow in a variety of soils, only need to be spaced about 1-1/2 to 2 feet apart, and prefer to be grown vertically, which helps save space. Cucurbits are warm season crops that grow best during seasons of warm night and days. They typically require lots of space but can be grown vertically by training vines onto vertical structures to save space. Cucurbits include cucumbers, muskmelons, watermelons, pumpkins, squash, and gourds. Other potential home garden options include:

- beans
- okra
- peppers
- herbs

Composting

Composting is a way in which individuals can recycle organic matter from their home and daily waste. Nature recycles everything from debris to waste and remains. Composting is a way of using and mimicking nature that can be a money saving measure, is beneficial for home gardening, and reduces the waste that would otherwise end up in a **landfill** or incinerator. The organic matter in the soil produced from compost can improve plant growth by amending the soil, adding water and nutrient-holding ability, and supplying vital nutrients.

There are many things a typical homeowner can include in their home compost. Any organic yard waste has potential, including grass clippings, leaves, weeds, and dead garden plant remains. Woody plants should generally be left out of the compost but when chipped or shredded they can be used as mulch or pathway material. Kitchen scraps that can be used include wastes that do not contain meat, bones or fatty foods. There are many variations on strategies for composting. Research should be done for specific materials that can be composted and what strategy is best for individual homeowners.

Resources:

http://cwmi.css.cornell.edu/smallscalecomposting.htm

Promote wildlife habitats

Promoting wildlife habitats is another way that landscape planting can promote sustainability. Providing environments for birds, butterflies, and other wildlife is a small way of reversing the negative impact that urban development has on nature. Coming in contact with these beautiful creatures also enriches a person's life by bringing part of nature back. Many native plants are natural attractors of the local and regional wildlife.