

URBAN ECOLOGY SUSTAINABILITY

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INTEGRATED SUSTAINABLE DESIGN

Consistent with the Eco-City Charter, the Plan recommends sustainability measures based on the following:

- Neighborhood sustainability and high performance buildings;
- Effective use of water resources;
- Energy utilization and conservation;
- Green Infrastructure; and
- Transportation.

The Plan is based on the principle that urban development and natural ecosystems need not be mutually exclusive, nor are people and their activities separate from nature. In addition to implementing progressive elements at a neighborhood scale, the Plan also recommends improvements for individual buildings to increase efficiency and reduce resource consumption. The Plan also includes aspirational goals, because the Plan recognizes that implementing the vision will occur over a 20 to 30 year period.

A. PLAN AREA GOALS:

I. Neighborhood Sustainability and High Performance Buildings

The Plan is recommending that the redevelopment sites be subject to an overall environmental site certification such as LEED-ND or comparable. Buildings and infrastructure will be designed to be better integrated with the environment by capturing sunlight, allowing rainwater infiltration and conveyance, and reducing water and energy consumption through a certification such as LEED or comparable.

In addition, new buildings and sites should express the environmental elements through visually green approaches such as sunscreens, green walls, and integrated stormwater elements.

II. Effective use of water resources

The Plan recommends a Stormwater Master Plan to decrease stormwater runoff, and improve water quality. The Plan is also recommending the installation of low-flow or ultra-low flow water fixtures such as toilets, lavatory sinks, and showers in new units and encouraging retrofits in the existing older units and buildings as the buildings are renovated.

III. Energy utilization and conservation

The Plan recommends that new buildings focus on reducing the carbon footprint greenhouse gas emissions, on-site energy generation and increased used of renewable energy.

IV. Green Infrastructure

Permeable paving will be installed in the sidewalks, and parallel parking. In addition, tree wells will be designed to accommodate stormwater and water infiltration. These systems will help manage the detention and treatment of stormwater.

V. Transportation. Land Use and Other Sustainable Elements

No sustainability plan can be effective without including an urban mix of uses, street layout, and multi-modal transportation modes (car share services, bike share, electric vehicle docking stations), high capacity transit, etc. which are discussed in the Plan.





B. POTENTIAL STRATEGIES:

The Plan recommends that future development consider the following:

I. Neighborhood Sustainability and High Performance Buildings:

1. **Salvage and recycle construction waste:** By salvaging and recycling construction waste, a significant amount of debris will be diverted from landfills and could support local reuse businesses. Salvageable or recyclable materials may include cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet, insulation, doors, windows, trim materials, fixtures and hardware.
2. **Prefabrication:** Fabricating construction installations and welding steel in the controlled environment of a shop and delivering complete systems to the construction site helps to reduce the amount of equipment and number of construction vehicles needed, therefore reducing emissions. Prefabrication also allows more material reuse and generates less waste, aiding in lowering the carbon footprint associated with construction.
3. **Sustainable Footprints:** The Plan is encouraging footprint sizes and ceiling heights that will encourage different uses over the lifespan of the buildings.
4. **Site Disturbance – Grading:** Redevelopment should, to the extent possible, minimize land disturbance, preserve natural areas, and minimize grading.
5. **Recycled content:** Incorporating recycled content in building materials will reduce the need to extract virgin material, not only lowering Beauregard’s carbon footprint, but also helping to reduce demand for virgin materials. Recycled content could include both post-consumer material (waste material generated by households or commercial activity) and pre-consumer material (material that is diverted from the waste stream during the manufacturing process). In addition to using recycled content in building materials, recycled materials could be used where feasible for roadways, sidewalks, pavers, water retention tanks, piping for water and, sanitary sewer.
6. **Regional materials:** Much of the greenhouse gas emissions associated with building materials is due to the burning of fuel during transportation. Using locally extracted and supplied materials limits greenhouse gas emissions.

7. **Certified wood:** Using certified wood supports and encourages environmentally responsible forest management and helps ensure that virgin resources remain available for generations to come. Such materials include bamboo, wool, cotton insulation, agrifiber, linoleum wheat board, strawboards, and cork. To the extent practicable, rapidly renewable materials will be used.
8. **Roofs:** Roofs are recommended to have more than one use such as open space, a green roof, power generation, etc.

II. Effective Use of Water Resources:

1. **Stormwater Master Plan:** The Plan requires strategies to minimize stormwater runoff, reuse what is generated as a resource, and provide for mechanisms to improve water quality. This is an overall strategy that will incorporate the principles inherent in the items listed below.
2. **Stream Restoration:** The Plan recommends water quality improvements, drainage improvements, riparian buffer restoration and stream improvements that will improve water quality. The stream system will be the focal environmental element within this planning area. Redevelopment that capitalizes on Resource Protection Areas (RPAs) buffer restoration/ stabilization with natural stream improvements of Turkey Run, and possibly portions of Holmes Run, which will enable enjoyment for citizens, more diverse animal habitat, and greater functionality to the stream system.
3. The redevelopment will be required to meet the Virginia Storm Water Regulations for new development and/or the provisions of the Environmental Management Ordinance (Chesapeake Bay Preservation Act) whichever is more stringent at the time of approval. The goal is to have the efficiency of all BMPs be 40 percent or greater.
4. **Stormwater Pond:** The provision of a level II stormwater pond near Holmes Run will provide efficient and economical stormwater detention. The pond is required to be integrated into the design of the park.
5. **Utilize low-flow or ultra low-flow fixtures:** The installation of low-flow or ultra low-flow water fixtures such as toilets, lavatory sinks, and showers in new units and encouraging retrofits in the existing units as they are renovated produces the benefit of a reduction in potable water use. The life cycle benefits are far more reaching. This one action reduces the diversion of freshwater from our streams for potable water usage, the reduction of energy consumption to convert freshwater to potable water, the reduction in energy use to purify the potable water after use,





and the reduction in contaminants in the ultimate receiving water. This generates savings in energy, more effective natural resource use, and the cost of converting the resource at each life-cycle stage: an all-around reduction in the City's carbon footprint.

6. **Rainwater capture:** Rainwater can be captured and reused for irrigation, and indoor plumbing needs as well. This reduces the demand for potable water and has concomitant energy and cost savings.
7. **Grey water:** Wastewater generated from domestic sources such as sinks, showers, and laundry machines composes 50-80% of all wastewater produced. Under-the-counter systems could be installed to direct wastewater from bathroom sinks to adjacent toilets for flushing. Laundry facilities using nontoxic biodegradable detergents could also be connected to cisterns for irrigation.

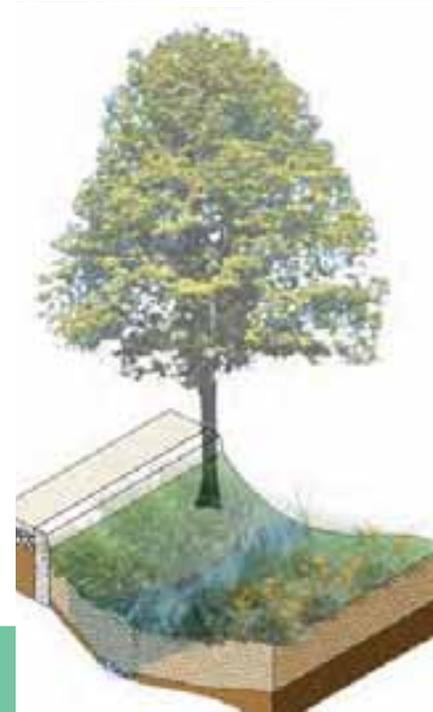
III. Energy utilization and conservation

8. **Lighting efficiency:** Because natural daylight is the most efficient lighting strategy, new buildings will be constructed to maximize daylight exposure in both private and commons areas. Though the latter makes up only a small fraction of the building's total area, common areas are typically responsible for using nearly half of the building's lighting energy because the lights are on at all times. Common area lighting control will respond to daylight and human occupancy to ensure that artificial lighting is used only when needed.
9. **Exterior Lighting:** Exterior lighting efficiency could be improved by utilizing exterior building lighting such as light emitting diodes (LED), or other energy-efficient technology. The Plan should focus on the "Dark Skies" principle.
10. **Energy Efficient Designs:** Lessen energy usage as much as practically and economically feasible through energy-efficient design of new buildings.
11. **Renewable Energy:** Apply innovative and renewable energy technologies including geothermal and solar (for heating or electricity generation) energy.
12. **District Energy System:** Assess and, if feasible, encourage district energy systems that centrally, or in a distributed manner, provide cooling and heating needs for groups of area buildings, and that employ cogeneration technology to increase the system thermal efficiency.

13. **Electrical Vehicle Infrastructure:** Provide infrastructure for accommodating the use of electrical vehicles which are anticipated to increase with time.

C. ASPIRATIONAL GOALS

In addition to the sustainability goals and strategies, the Plan also aims to encourage innovative methods for reducing consumption of natural resources. It is imperative that as building systems and materials continue to be improved during the course of the Plan's 20 to 30 year build-out, a process be in place to implement these new and emerging technologies to ensure that Beauregard continues to reduce its environmental impact. The Plan requires the submission of a Sustainability Plan, to evaluate site-wide and building specific sustainability measures. In addition, as part of the Sustainability Plan, the more progressive and innovative goals such as those outlined below could be considered consistent with the City's Green Building Policy.



URBAN ECOLOGY SUSTAINABILITY REQUIREMENTS

- 6.1 Require the submission of a Sustainability Plan for each neighborhood. Each development will be required to meet the City's Green Building Policy in effect at the time of such development. Therefore, an overall sustainability plan is not necessary and would cause unnecessary additional expense.
- a. All new development will subject to LEED-ND or comparable.
 - b. All new buildings will be subject to the City's Green building policy at the time of approval of the development special use permit approval for each building(s) and/or block.
 - c. New buildings and the site should express the environmental elements such as sunscreens, green walls, and integrated stormwater elements.
 - d. The majority of roofs are required to have more than one use such as open space, a green roof, power generation etc.
 - e. Encourage building footprint sizes and ceiling heights that will encourage different uses over the lifespan of the building.
 - f. Require the provision of low or ultra- low flow plumbing fixtures for all new development.
 - g. New public streets will incorporate green elements and stormwater management which will be integrated as part of the design of the street. The final design parameters for the streets will be part of the Urban Design Standards and Guidelines.
 - h. Install LED or comparable efficiency lighting that will also be dark skies compliant.
 - i. All new development will explore compliance with the potential strategies for implementing the goals of the Plan which shall consist of the following:
 - i. Salvage and Recycle Construction waste.
 - ii. Prefabrication
 - iii. Minimize land disturbance
 - iv. Recycled Content
 - v. Regional Materials
 - vi. Certified Wood
 - vii. Efficient use of water resources
 - j. Remove impervious surfaces within the resource protection areas as part of the associated redevelopment.
- 6.2 To the extent that stormwater facilities are coordinating multiple properties, require the submission of a comprehensive Stormwater Master Plan. The stormwater plan shall be updated with each building as part of the development review process. The Plan shall include the provision of a level II stormwater pond near Holmes Run which will provide efficient and economical stormwater detention to protect against flooding and act as a BMP to improve water quality. Combined with additional park land, high quality landscaping as well as an aquatic shelf for safety and planting to discourage geese, this feature provides functionality as well as aesthetics to the area. The pond is required to be integrated into the design of the park.
- 6.3 Require stream restoration/stabilization of Turkey Run and of a portion of Holmes Run as part of the restoration of the Greenway.

- 6.4 The development will meet the Virginia Storm Water Regulations for new development and/or the provisions of the Environmental Management Ordinance (Chesapeake Bay Preservation Act) in accordance with Article XIII of the City of Alexandria Zoning Ordinance for Storm Water Quality and Quantity, whichever is more stringent at the time of preliminary plan submittal. In any case, the goal is to have the efficiency of all BMPs be 40% or greater. No grandfathering shall be allowed.

ASPIRATIONAL GOALS

In addition to the requirements of the Plan, the Plan recommends aspirational goals to achieve the vision of the Plan during the 20 to 30 year build-out of the Plan. The goals should consist of the following:

- a. District Energy Systems
- b. Cogeneration
- c. Renewable Energy such as geothermal and/or solar
- d. Photovoltaics
- e. Rainwater capture
- f. Grey water use
- g. Green Building requirements consistent with Eco-City goals.

