EPA Region 4 White Paper on Sustainable Design and Green Building for Resilient and Adaptable Communities

An increase in intense weather patterns are having devastating effects on communities throughout the United States and the world. Natural and man-made disasters coupled with a concern for dwindling non-renewable resources has influenced communities to rethink building standards and planning efforts to build smarter, more resilient, and more sustainable communities. The concepts of resilience, sustainability, and climate change adaptation have become a growing concern for communities around the world, and especially in the Southern and Southeastern United States. These three concepts are inter-related (see figure 1). The first step to including resiliency and sustainability in community planning and ordinances is to define sustainability, resilience, and adaptation, in order to provide a starting point for communities looking into these concepts.

Adaptation is a change in thinking and behavior in response to natural influences. Specifically, adaptation involves changing the way we build and grow our communities in response to weather patterns and climate change by recognizing historic patterns and designing according to changes in those patterns. Adaptation strategies can be implemented prior to events in anticipation of what could occur to avoid potential future problems. In many cases, events that have already occurred can also serve as driving forces for change in the community planning and ordinance structure.

Resilience is a community's ability to withstand and rebuild after natural or man-made hazards and disasters in a time- and cost-effective manner. Like adaptation, resilience anticipates future needs and focuses on durability in the face of disasters. Engineering resilience involves efforts like designing durable structures; ecological resilience involves planning and communication for organizations, businesses, and people to recover quickly from disaster. Ecological resilience may take the form of a community shelter, while engineering resilience may take the form of stricter building standards with regards to durable, long-lasting, reinforced structures to withstand whatever disaster may be faced.

Sustainability is an overarching concept, which ties adaptation and resilience together. The Brundtland Commission, convened by the United Nations in 1983, defined sustainable development as "development which meets the needs of the present without compromising the

ability of future generations to meet their own needs.[1]" Sustainability takes into account adapting to our changing environment and focusing on resilience in communities through the use of renewable resources both in material selection, use, and disposal and in energy considerations. Another key component of sustainability is that through better ecological, economic and social information and integration we can *sustain* our communities and ensure that they are intact for generations to come.

From a built environment perspective, sustainability challenges local officials to integrate local ecology into the design and construction of buildings within their community, to minimize non-renewable energy consumption, to use environmentally preferable products, to protect and conserve water resources, enhance indoor air quality, and to improve long term operation and maintenance practices. Through the carefully planned and designed interaction of the built and natural environs, local officials can dramatically reduce the impact of natural disasters. Due to the sometimes competing interests of reducing the environmental impact of the built environment with building more resilient structures and infrastructure, and adapting to potential events like sea level rise and severe weather patterns, a balance must be found between adapting to our changing climate, building resiliently to withstand future disasters, and appropriately using resources (economic and natural) to make sure future generations are able to do the same.

[1] "Our Common Future: From One Earth to One World - A/42/427 Annex, Overview." UN Documents: Gathering a Body of Global Agreements. NGO Committee on Education. Web. 8 July 2011. <http://www.un-documents.net/ocf-ov.htm>.

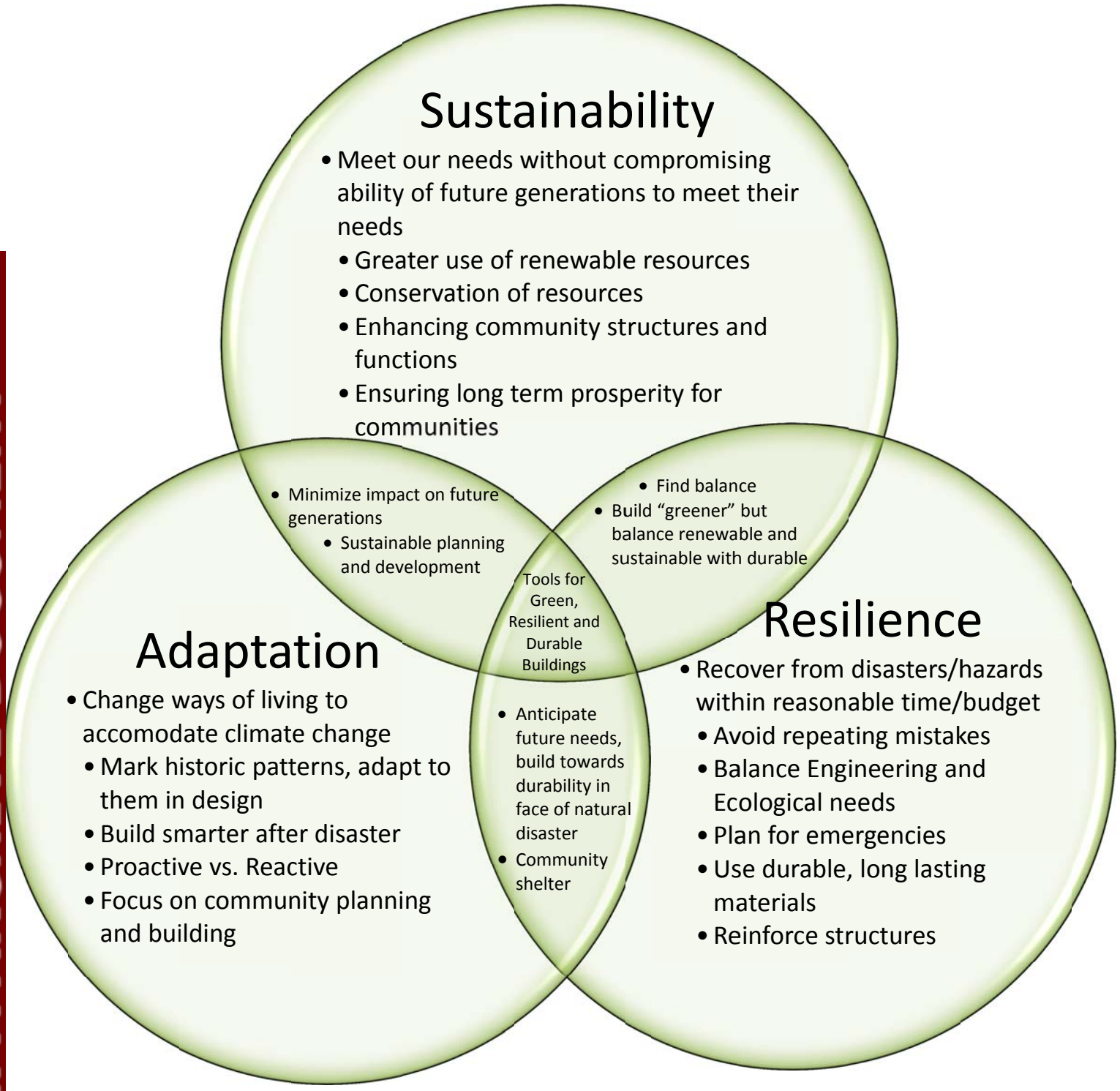

Figure 1: Sustainability, Adaptation, and Resilience

How do resilience, adaptation and sustainability relate to EPA's Sustainable Design and Green Building Toolkit?

- The Sustainable Design and Green Building Toolkit for Local Governments (www.epa.gov/region4/recycle/green-building-toolkit.pdf) is designed to assist local governments in identifying and removing permitting barriers to sustainable design and green building practices. It provides a resource for communities interested in conducting their own internal evaluation of how local codes/ordinances either facilitate or impede their vision for a sustainable built environment, including the design, construction, renovation, and operation and maintenance of a building and its immediate site.

  The Toolkit contains an Assessment Tool, a Resource Guide, and an Action Plan for implementing changes to the permitting process. The Assessment Tool is designed for local governments to review their permitting process and identify barriers or resistance to sustainable design practices.

  Integrating sustainability, resilience and adaptation into building codes of ordinances offers local officials with an opportunity to help standardize the durability of both new and existing construction. The questions below were developed to begin the thought process for looking at resilience and sustainability in your city's planning and building processes.

  - How does your city understand and interpret the concepts of resilience and coastal adaptation?
  - Have you conducted any vulnerability assessments or emergency planning in your local government that would address resiliency/adaptation issues?
    - If so, where do these plans/discussions get housed and how does it get reflected in policy?
    - How is it discussed with the public?
    - What specific resilience issues does your city consider of utmost importance?
    - How are these reflected in the city's planning process?
  - If vulnerabilities have been identified, through a formal assessment or otherwise, have these vulnerabilities been taken into account in developing your unified ordinance?
  - Were there any codes/ordinances already in place which addressed these vulnerabilities (e.g., storm water ordinances, hurricane/storm surge building guidelines, emergency access rights of way)?
  - Are there obvious places where your codes of ordinances are inconsistent with the results of your emergency planning efforts?