



**STORRS**  
RETHINK MAIN STREET  
**CENTER**

## DESIGN GUIDELINES FOR A SUSTAINABLE COMMUNITY



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**Note:**

This section on each page is devoted to illustrating principles of smart growth and strategies for sustainable development.



## Section I: Introduction

### Vision for a Sustainable Village

Sustainable development has been defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs—a long term approach. Such a definition embraces an effort to curtail pollution and conserve energy and encourages a broad strategy of balancing the creation of sustainable human communities with the protection and preservation of natural resources. In the context of development, pursuit of these goals involves determining what kind of development should occur, where it should occur, and how it should relate to the surrounding networks of human communities and natural ecosystems. Creating a lasting sense of community and meaningful existence that is tied to the environment will ultimately determine whether a neighborhood, development, or town will endure the test of time. It is a premise of the Storrs Center project that the creation of livable, sustainable places depends upon the relationship of the project to surrounding neighborhoods, to the Town of Mansfield, to the University of Connecticut, and to the natural environment and landscape. As so many of today's historical towns and cities illustrate, one of the most effective ways to limit the imprint of man upon the land—and use resources wisely—is to focus on creating communities that endure as appealing places to live, work, learn and play.

### Applying Principles of Sustainability to the Creation of a New Town Plan

A sustainable strategy is essential to the creation of any vital, lasting and livable community. Sustainable development begins with the recognition of the fundamental interrelationship of social, environmental, and economic considerations. A sustainable approach must start at the largest scale in decisions about where and what to build and should pervade the planning and construction processes down to the smallest details. The result is a well defined sense of place. An organic interrelationship with the surrounding physical and cultural

environment will afford the longevity, livability, and vitality to make the project an enduring success.

A sustainable project demands that people and nature be allowed to exist together in a healthy and mutually supportive way. This approach also recognizes the relatively short life of human beings and their built environment in the midst of the natural environment; for a place to endure for generations, it must recognize the impact of man on the natural environment. As with historical examples, a successful town plan establishes these principles from the beginning, creating fundamental relationships to the land as well as a framework that can adapt organically over time to modification, renovation, changing occupants, and changing uses, as well as the occasional replacement of building components. With the passage of time, a good town plan should embody a vision of efficient land use and natural resource protection together with a focus on the value of the public realm that will convey an enduring and sustainable sense of place.

### Objectives of the Sustainability Program

#### Storrs Center Guidelines for Smart Growth and Sustainable Development

The sustainability program of Storrs Center is based on principles of Smart Growth and Sustainable Development practices, including preservation of open space and critical ecosystems, using land resources efficiently, encouraging redevelopment of previously developed areas within existing communities, and creating desirable neighborhoods with a compelling sense of place. The Storrs Center development will be a compact, walkable, efficient, and diverse community. Compact planning strategies and mixed-use neighborhood and building designs will facilitate stakeholder participation, minimize the use of natural resources and the construction of new infrastructure, reduce dependence on cars, and preserve valuable



**Foster distinctive, attractive communities with a strong sense of place\***

Smart growth encourages communities to craft a vision and set standards for development and construction which respond to community values of architectural beauty and distinctiveness, as well as expanded choices in housing and transportation.



\* From "SmartGrowthOnline"



## Section I: Introduction



### Create Walkable neighborhoods\*

Walkable communities are desirable places to live, work, learn, and play, and therefore a key component of smart growth.



\* From "SmartGrowthOnline"

existing natural landscape features such as the wetland and wooded upland areas. A predictable, fair, and cost effective development process will be created through open communication between private and public sector participants. Storrs Center will be developed with consideration for the community's long term economic, social, and ecological potential and values.

Together with the approved design guidelines and master plan, the sustainability guidelines are intended to provide a cohesive and comprehensive approach to the development of Storrs Center. As enumerated in the Municipal Development Plan, the sustainability guidelines have been designed to address several key areas of sustainable building practices. These categories include:

- **Project Siting and Intelligent Land Use**

Storrs Center will be designed as a compact, pedestrian friendly, mixed-use development that is sensitive to the existing communities and environmental conditions. Based on surveys of adjacent neighborhoods and studies of existing biodiversity, the project will be developed in order to minimize impact on existing land and create opportunities for connection with established neighborhoods and institutions. Greenfield sites will be protected to the greatest extent possible by focusing construction and higher occupant densities in areas of previous development with established infrastructure. The natural landscape, especially wetlands and other areas important to the existing ecosystems, will be restored, preserved, and used to establish meaningful limits on development sites. Properly scaled and carefully designed streetscapes will foster a pedestrian friendly environment, minimizing automobile usage and associated deleterious environmental effects.

- **Improving Site Resource Management**

Development of the Conceptual Master Plan will focus on the conservation of potable water and the careful management of

stormwater runoff. Requirements for the use of native and adapted plantings (needing little or no irrigation), efficient appliances, and low-flow plumbing fixtures throughout the development will be utilized to reduce potable water consumption. Site-wide, EPA-approved stormwater management practices and limitations on the development area will be used to reduce the development's stormwater impacts on the area's water resources. Individual projects will be required to mitigate potential soil erosion and sedimentation through plans to reduce stormwater runoff during the construction process.

- **Conserving Materials and Resources in the Construction Process**

Designs that utilize materials containing recycled content will be required for all building projects. Construction waste and building occupant waste will be reduced through development of Construction Waste Management Plans and designated Building Recycling Areas for all projects within the community. The use of some locally manufactured products will be required to minimize energy consumption related to delivery while supporting the local economy.

- **Improving Energy Efficiency**

Buildings will be required to include energy efficiency measures (EEMs) to reduce their total energy consumption. Commissioning (i.e., third party review) of building systems will be required to ensure that EEMs have been designed and installed correctly, and are operating at targeted levels of efficiency.

- **Enhance Indoor Environmental Quality**

Building materials used indoors will be limited to those with minimal volatile organic compound (VOC) emissions. Construction detailing requirements will be used to ensure that indoor air contaminants are not transferred between units or interconnected buildings. "Green" operations and maintenance plans will

## Section I: Introduction

be required of building owners to enhance indoor environmental air quality on an ongoing basis.

- **Create Healthy, Vital Neighborhoods for Sustainable Living**

Storrs Center will be comprised of compact, mixed-use, pedestrian-oriented neighborhoods that foster strong civic qualities and a shared sense of place. The public realm will be designed to facilitate and support human interactions and relationships, ranging from civic and musical events, shared shopping experiences, to the common use of public spaces and simple places to meet. New infrastructure will be organically connected to the existing communities, civic and public institutions, and natural resources. Site design will provide a visual and experiential cohesion between new neighborhoods and existing areas. Natural resources such as sunlight, landscaping and trees, and views to the conservation areas will be maximized to enhance the presence of natural rhythms and “green” in daily life.

The development of Storrs Center as a sustainable community cannot be expected to happen by chance, however, but rather by a process that involves evaluation, planning, and the creation of guidelines. This document serves to define the sustainable principles and practices by which Storrs Center will be designed and constructed:

- Section II of the document defines the Standards and Guidelines that inform the development’s Master Plan and apply to the construction of the project’s infrastructure and public spaces.
- Section III defines the Standards and Guidelines that apply to the design and construction of individual buildings and private spaces within the development.

### evolution of the Sustainability guidelines

The fields of sustainable development and “green” building are changing rapidly. Innovations in planning theory, technology and building systems are taking place on a regular basis as industries adapt to changing demands on natural resources and global warming. These guidelines have been developed as a means to proactively address these critical issues. They use principles of planning and environmental stewardship as well as innovative building systems and technology to create smarter solutions for future growth and development. While the guidelines are intended to strike a balance between advanced green building practices and economic considerations, they are also intended to be flexible and to adapt to the innovations in the construction field that continue to improve what can be achieved within reasonable economic parameters. The guidelines represent a vision for the future and are not intended to be a static document. As new technology and systems are developed and become more affordable, the guidelines should be updated to incorporate new thinking, information and technology.



#### Compact urban fabric\*

The most ecological built urban fabric is one that is compact (but human scale), with buildings that are connected to one another along the street, accommodating a mix of uses. These contiguous buildings create a continuous wall along the street façade and enclose public space. They form blocks of buildings perforated by alleyways and usable inner courtyards that allow air and sunlight to enter interior areas of the block and that provide outdoor areas suitable for toddlers' play, children's ball games, outdoor restaurants, gardens and trees.



\* From liveablecities.org



# Section II: MASTER PLANNING standards and GUIDELINES



## Mix land uses\*

Smart growth supports the integration of mixed land uses to communities as a critical component of achieving better places to live.



\* From "SmartGrowthOnline"

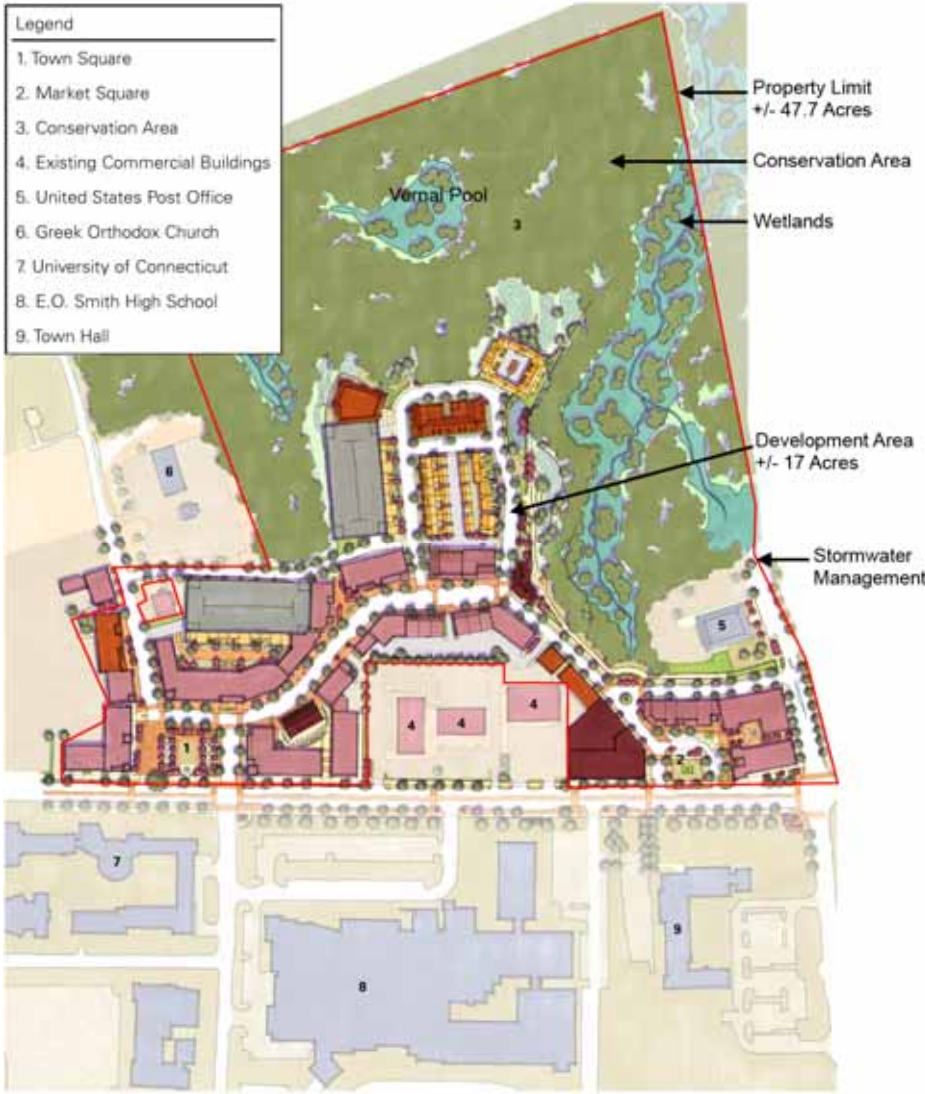
## How to use the master planning standards and guidelines

The following Master Planning Standards and Guidelines (the Guidelines) describe the environmental and community-centered principles that have informed and continue to shape the Storrs Center Conceptual Master Plan. In addition, the Guidelines establish the baseline criteria for both the master planning and public realm construction within the new neighborhoods that comprise Storrs Center. The planning of new neighborhoods involves broad decisions beyond the limits of individual building envelopes, ranging from the selection and use of land for development, to the type and mix of uses proposed, to the types of materials used in the creation of public areas. Each of these decisions has implications for the environment, for the management of our resources, and for the community and its ability to endure the test of time. These guidelines provide a framework through which to approach the broad master planning process in a manner that focuses on long term sustainability at the macro level.

The Master Planning site design and construction requirements are defined in Categories 1-3 of this section. When submitting the neighborhood master plan for town review, planners must include a narrative description or checklist indicating how the plan addresses each of the Categories included in these Guidelines.

The first two Categories of this section identify many of the principles that have already been applied in the initial planning for Storrs Center in the Conceptual Master Plan that has been included in the Special Design District Map Amendment. Accordingly, the required narrative description explaining how the Master Planning Standards and Guidelines apply to the Conceptual Master Plan is included in this document for both Categories 1 and 2.

Category 3 includes site specific components related to the construction of the public realm. A separate submission and verification process accompanies these Site Specific components, which are included in Section IV: FORMS FOR BUILDING STANDARDS/ GUIDELINES. Future modifications to the Storrs Center Master Plan should be undertaken in keeping with the initial principles of sustainable site planning as described in the Guidelines.



Conceptual Land Use Plan



## Section II: MASTER PLANNING standards and GUIDELINES

### MASTER PLANNING STANDARDS and GUIDELINES

#### Category MP-1: Conservation and Land Use Efficiency Guidelines

The following strategies shall be implemented to: 1) protect conservation areas established by the Storrs Center Conceptual Master Plan, including open land, woodlands, wetland/ riparian areas, and natural systems; 2) develop and restore previously compromised areas through sensitive, compact, pedestrian-friendly, and community focused development; and 3) connect the areas of new development to existing neighborhoods, open spaces, and public/cultural resources.

#### 1.1 Protection of Limited Land and Environmental Resources

##### 1.1.1 Preserve Open Space and Conserve Natural Habitat

- Preserve the division between conserved and developed land: Contain development to the approximately 17 acre area consisting of previously developed and significantly degraded areas east of Storrs Road (Route 195), as defined by the Storrs Center Conceptual Master Plan (SCCMP).
- Cluster dense commercial, retail and municipal development in the Main Street District located at existing Storrs Road (Route 195) between Mansfield Road and South Eagleville Road.
- Locate less dense residential development to the East, to buffer the Conservation Area as defined by the SCCMP.

##### 1.1.2 Protect Existing and Fragile Ecosystems

- Conservation Area: No development (other than established low-impact paths) will occur within the Conservation Area defined by the Storrs Center Con-

ceptual Master Plan—including the uplands, wetlands, and woodlands. The Conservation Area shall be maintained as an unspoiled, natural wildlife habitat.

- Protect endangered and/or threatened flora and fauna as defined by the Storrs Center Biodiversity and Botanical Surveys and protected by the SCCMP.
- Minimize pollution caused by traffic by using traffic calming techniques (such as on-street parking) and distribute traffic on streets to discourage speeding, stop/go driving, and unnecessary breaking and revving up.

##### 1.1.3 Concentrate Development to Allow for Farmland /Rural Preservation

- Create areas of higher density development to allow for conservation of a greater area of land (see Storrs Center Design Guidelines for intended density descriptions).

##### 1.1.4 Reduce Stormwater Pollution

- Create an Erosion and Sedimentation Plan during construction to minimize loss of topsoil by stormwater erosion and wind, reduce the sedimentation of storm sewers and surrounding water bodies, and reduce airborne pollution.
- Strip, stockpile and reuse existing on-site topsoil; during construction, store topsoil in shallow layers.
- Provide stormwater treatment Best Management Practices (BMPs) to reduce the transport of Total Suspended Solids (TSS) by 80%. Use U.S. EPA or State of Connecticut stormwater BMP data to define TSS removal rates.
- Use biologically-based and innovative stormwater management features such as filtering systems, bioswales, bioretention basins, and vegetated swales.



**Preserve open space, farmland, natural beauty and critical environmental areas\***

Open space preservation supports smart growth goals by bolstering local economies, preserving critical environmental areas, improving our communities' qualities of life, and guiding new growth into existing communities.



\* From "SmartGrowthOnline"

## Section II: MASTER PLANNING standards and GUIDELINES



### Strengthen and direct development towards existing communities\*

Smart growth directs development towards existing communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer, and conserve open space and irreplaceable natural resources on the urban fringe.



\* From "SmartGrowthOnline"

#### 1.1.5 Manage Stormwater Run-off on Site to Protect the Surrounding Environment

- Implement a stormwater management plan that prevents the post-development discharge rate from exceeding the pre-development discharge rate (based on the 1.5 year, 24 hour peak discharge rate). The plan should include Best Management Practices (BMPs) that:
  - Minimize runoff (and contamination of surrounding water bodies) by retaining the **maximum** amount of stormwater at the site.
  - Maximize natural groundwater and aquifer recharge.
  - Enhance the natural stormwater bioremediation process.
  - Protect and enhance unique site ecosystems, including the vernal pool and wetland basins on a prioritized basis of quality and value.
- Minimize the use of impervious surfaces to reduce run-off and future infrastructure costs; maximize porous surfaces (i.e., pervious paving systems such as HDPE (plastic) grids, concrete paving with large voids, etc).
- Reverse the ongoing deterioration of open areas due to existing runoff through an improved site drainage strategy.
- Provide structured and underground parking to minimize impervious parking lot areas. Refer to the Storrs Center Design Guidelines for parking design requirements.

#### 1.1.6 Protect and Improve Wetland Habitat

- Do not develop within 50' of the northern and southern wetland corridors or within 100' of the vernal

pool. Provide buffers for the surrounding riparian and woodland areas at the eastern portion of the site. Boundaries are defined by the SCCMP.

- Development of the wetland areas shall be contained to the areas designated as 'significantly degraded' by the SCCMP.
- Create a buffer for the protected wetland areas and surrounding ecosystems through the development of less dense residential projects at the eastern portion of the site.

#### 1.2 Encourage the Re-Use of Previously Developed Land

##### 1.2.1 Encourage the development of adjacent or infill sites that increase efficiency of land usage

- To the greatest extent possible, locate development on the following types of sites (listed in descending order of desirability):
  - A previously developed site;
  - An infill site;
  - A site adjacent to existing development.

##### 1.2.2 Maximize the use of previously developed property and brownfield sites

- Locate the majority of development on land that is documented as contaminated (i.e., in ASTM E1527 "Phase I" reports or ASTM E1903-97 "Phase II" reports) or has already been compromised.
- Remediate site contamination such that the controlling public authority approves the protective measures and/or clean-up as effective, safe and appropriate for the future use of the site.

##### 1.2.3 Concentrate new development close to existing infrastructure and development

- To the greatest extent possible, develop sites that have



## Section II: MASTER PLANNING standards and GUIDELINES

access to existing infrastructure **before** developing sites that require construction of new or modified infrastructure (i.e. , roads, sewers, utilities, etc.).

- Design development areas to minimize the construction of new infrastructure and maximize the use of shared infrastructure.
- Concentrate commercial and civic functions along existing Storrs Road (Route 195) near areas of existing development to lessen the need for intra-village vehicular traffic.
- Provide convenient connection points between the new Storrs Center downtown and the existing Mansfield street network.

### 1.2.4 Use the Development Process to Improve Existing Environmental Conditions

- Work directly with immediate neighbors and/or local public officials to assess existing sources of pollution on the development site or in adjacent neighborhoods, and identify opportunities to jointly improve environmental conditions in existing and new developments.
- Establish ongoing means for communication between the developer and the community throughout the design and construction process.

### 1.3 Connect to Existing Resources, Uses, and Infrastructure

#### 1.3.1 Establish connectivity to surrounding neighborhoods and uses

- Design and build project such that there are through-streets that tie into the existing street system or grid.
- Promote and maintain the new commercial core or hub (Main Street) to act as a much needed and well defined ‘center’ of civic activity for the surrounding neighborhoods.

- Locate development close to existing public commercial and civic facilities to lessen the need for intra-village vehicular traffic (thereby reducing air pollution and potential for ground-level smog). These facilities include but are not limited to:
  - The Mansfield Town Hall and Board of Education Office
  - University of Connecticut at Storrs Fine Arts Center
  - E. O. Smith High School
  - The Community Center
- Promote access to the existing Town of Mansfield, which serves as a regional cultural center, and offers accessibility to a wide variety of museum, music and theatre programs, and educational and religious facilities.
- Cluster infrastructure and commercial buildings to the east of Route 195 (Storrs Road) to provide immediate access to neighboring developed areas.

#### 1.3.2 Connect to nearby environmental resources and green spaces

- Promote use of Mansfield Hollow State Park for leisure activities, such as hiking, fishing, picnicking, etc.
- Provide low-impact connections to woodlands that are ecologically contiguous with the Joshua’s Trust Open Space tract.

#### 1.3.3 Maximize transportation options and connection to existing transport systems

- Use mix of uses and concentration of development area to promote single trip visits to Storrs Center so that visitors who drive can undertake various activities and shopping in one place without dependence upon additional car trips.



### Provide a variety of transportation choices\*

Providing people with more choices in housing, shopping, communities, and transportation is a key aim of smart growth.



\* From “SmartGrowthOnline”



## Section II: MASTER PLANNING standards and GUIDELINES



### Mix uses, rather than segregating them\*

Designs like dwelling units placed above shops, and streets with a mix of stores, offices, and housing are a basic feature of these cities and towns.



\* From Sierra Club "Stop Sprawl" Website

- Concentrate development and particularly commercial and retail activity close to Storrs Road so that surrounding institutional, cultural, and residential uses, including the University of Connecticut, the Mansfield Town Hall, and Community Center are within easy walking distance. Maximize accessibility by those within walking distance.
- Subject to participation by service providers, allow for the incorporation of existing bus routes and shuttle routes, including the Willimantic bus system and the University bus system, as well as regional transportation providers. Accommodate possible stops at key locations along Storrs Road and within the project. Bus stops and shelters should provide easy access for bus users along current routes and should allow for growth of those systems to include more, new stops in the vicinity of Storrs Center.
- Develop plans for bicycle routes along the Storrs Road corridor connecting existing Mansfield bicycle routes with the Main Street area and the University. Use traffic calming strategies in the planning of Storrs Center streets so that they are friendly to bicyclists, automobiles, and pedestrians alike. Provide ample bike parking areas throughout the Main Street and Storrs Center area.
- Provide adequate signage and advertisement for public transportation stops and routes, bus routes, and parking areas.

### **Storrs Center: Application of Category MP-1 Principles**

The goal of the Storrs Center project is to create a mixed-use village at the crossroads of the town of Mansfield and the University of Connecticut that is environmentally sound. As noted in the attached map of proposed land uses, the site represents an assemblage of parcels amounting to approximately 45 acres. In order to ensure the

creation of a vital, sustainable development, Storrs Center Alliance ("Alliance") began the planning process by completing in-depth studies of existing urban conditions and existing biodiversity (i.e., vegetation, watercourses, and herpetology) within the development and adjoining areas. As a result of these studies, the Alliance determined that most of the development parcel—approximately two-thirds of the site - should remain protected as a conservation zone, including both upland and wetland areas. These initial steps and decisions formed the basis for the present strategy of creating and implementing guidelines for the sustainable development of the village center and the entire surrounding site.

The developed area of the new village will occupy approximately 17 acres of the overall site adjacent to and immediately east of Storrs Road (corresponding to Item 1.1.1 of the Guidelines). Construction will be largely concentrated on a previously developed portion of the site (1.1.3), thereby preserving much of the undisturbed land and the existing ecology—particularly two wetland basins, a vernal pool, and the plant and animal life they support (1.1.2). The approximate 17 acre core development area will be comprised of two basic land use categories—mixed use and residential use (1.2.2). The densest areas of development are located along the "Main Street" commercial corridor, currently Storrs Road/Route 195 (1.2.1 & 1.2.3). One intent of this layout, which places the compact, commercial mixed use district on the western edge of the property and the less dense residential zone to the east, is to buffer the conservation area from the more intense uses of the commercial zone (1.1.6).

The plan anticipates that two small portions of the wetlands, now significantly degraded, may be developed; however the overall plan for conservation is to reverse the current deterioration of the conservation areas through the use of more effective site drainage strategies. The development will be designed with catch basins, off-line oil-grit separators, detention and groundwater recharge sys-



## Section II: MASTER PLANNING standards and GUIDELINES

and pollutants (1.1.4 & 1.1.5). Further, Storrs Center Alliance is proposing to work in conjunction with the immediate neighbors to reduce existing pollutant sources from the surrounding properties and roads, the existing Post Office drainage system, and the town athletic fields parking lot, which currently impact the headwater of two watercourses as well as the vernal pool (1.2.4).

Storrs Center is designed to be a village organically connected to its natural and rural environment. The new “Main Street” will be an accessible precinct within a five minute walking distance of UConn, the town hall, the adjacent community center, and E.O. Smith High School. The Town Square neighborhood will be located across from the University of Connecticut School of Fine Arts and will help create a dialogue between town center and the University. The surrounding stores, offices, and cultural resources will ensure that the Town Square becomes a primary destination for the region. The Village Street, a secondary commercial area, will form a common connector linking all the new neighborhoods to the existing Mansfield street network (1.3.1). Simultaneously, the conservation area will be an asset to the experience of life in the developed area and a constant reminder of the landscape that is characteristic of this region of Connecticut. The layout and massing of the commercial mixed use zone and the residential mixed use zone will allow building occupants significant views to the conservation area, thereby visually connecting the village to this preserved natural environment. The plan also provides limited access points from the developed area to quiet, low impact paths within the upland areas, offering local residents and visitors an opportunity to enjoy this natural preserve on foot as an integral part of the village experience (1.3.2).

### **Category MP-2: Creating Compact, Livable, Connected Communities**

The following strategies should be implemented to improve the quality of public space and the interrelationship between private

and public spaces in order to promote a level of community and civic ownership. The benefits of community ownership and civic pride include: 1) Enhancing the vitality of neighborhood; 2) Creating a community that appeals to a broader range of participants; and 3) Creating a community that will endure in time and foster new growth and change within the existing framework.

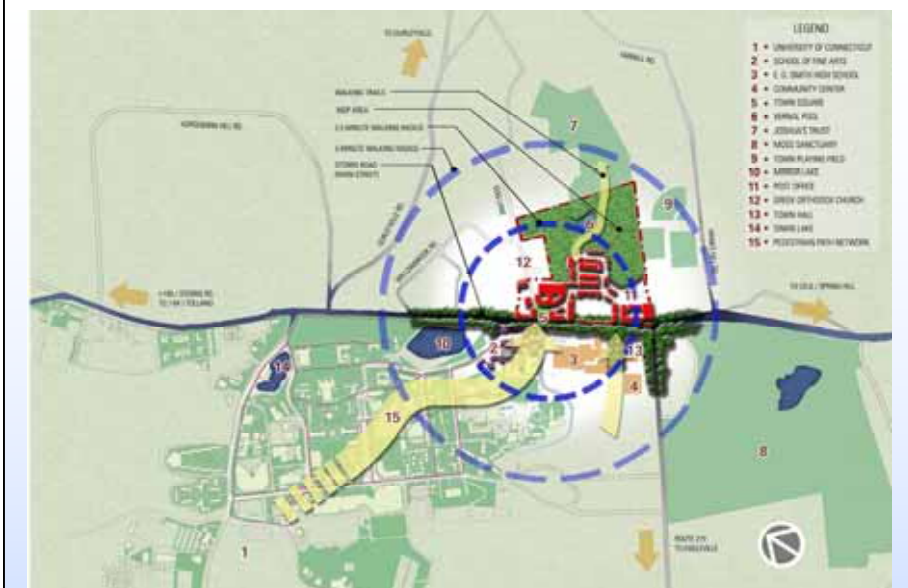
#### 2.1 Create Livable Communities

##### 2.1.1 Use Compact Planning to Maximize the Efficient Use of Land and Infrastructure

- To the extent feasible, locate the project on a site served by existing water and sewer infrastructure (replacement or other on-location improvements to existing infrastructure are considered “existing”).
- Design a street system that emphasizes connectivity between the neighborhoods. Include two-way, one-way, and pedestrian lanes.
- Design the project to provide connections— within a five minute walking distance— to the Storrs Center downtown and adjoining precincts (i.e., the University, the woodlands, town hall, the high school)

##### 2.1.2 Mix Uses for Efficient Land Use, Minimized Daily Driving

- Provide or identify at least four of the following neighborhood amenities either within the project or within a 1/2 mile distance from the project perimeter: police/fire station; bank; post office; place of worship; park; library; school; convenience store; laundry/dry cleaner; other retail; medical/dental office; office or major employment center; stand-alone pharmacy; restaurant; supermarket; community or civic center.
- Provide a mix of mutually interdependent uses (i.e., residential, commercial, civic, retail) within a five to



#### **Minimize daily driving\***

Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.



\* From the *Charter of the New Urbanism*



## Section II: MASTER PLANNING standards and GUIDELINES



**Create range of housing opportunities and choices\***



Providing quality housing for people of all income levels is an integral component in any smart growth strategy.

\*From "SmartGrowthOnLine"

ten minute walking radius.

2.1.3 Provide a range of housing types and sizes for various income levels and home types

- Include a variety of housing sizes and types in the project or within ¼ mile of the project. Types may include: Duplex or Townhouse Large to Small; Multifamily Dwelling in Non-Elevator Building; Multifamily Dwelling in Elevator Building; Live/Work Large to Small; Accessory Unit Large to Small; and others as defined by the Simpson Diversity Index and applicable code.

Refer to the Storrs Center Design Guidelines for descriptions of applicable housing types and locations.

2.1.4 Provide people with choices in housing, shopping, and transportation

- Promote development of commercial, retail, and residential projects at a variety of scales.

Refer to the Storrs Center Design Guidelines for regulated uses, building scales, and density requirements.

2.1.5 Create walkable neighborhoods for less dependence on cars

- Provide a mix of traffic-free pedestrian courts and passages to help maintain good air quality and provide safe pedestrian areas.
- Scale road and sidewalk widths to accommodate a variety of small-town activity.
- Design buildings with front facades that are oriented towards public space (i.e., street, square, plaza).
- Design the mixed-use and commercial buildings so that they are contiguous to the public sidewalks and so that there is strong connectivity between interior commercial uses and adjacent exterior space. Encourage occupation of exterior space for commercial use

and transparency of storefronts to emphasize the interplay between interior and exterior space.

Refer to the Storrs Center Design Guidelines for specific street and sidewalk width requirements.

2.1.6 Encourage Efficient Parking with Minimal Focus on the Presence of Parking Areas

- Limit parking in residential areas by issuing resident vehicle stickers.
- Minimize parking lot size by having multiple uses/properties share spaces.
- Use structured and underground parking to minimize the size and visibility of parking areas.
- Locate parking to the sides and rears of buildings and integrate landscape features to minimize unshaded impervious surfaces and visibility.
- Provide parallel parking along the streets to enhance vibrant street life.

Refer to Storrs Center Design Guidelines for specific parking requirements.

2.2 Public Realm

2.2.1 Architecture

- Shops and businesses shall front directly on to sidewalks (see 2.1.5 above). No parking lots will be located in front of primary facades.
- Residential facades shall typically present front rooms and porches to the street frontage. Garages shall be located at the rear of the lot away from the primary street frontage.
- Perimeter buildings shall be designed to provide views or 'vistas' to the natural environment beyond the village to maintain the rural character.

Refer to the Storrs Center Design Guidelines for additional architectural requirements.



## Section II: MASTER PLANNING standards and GUIDELINES

### 2.2.2 Streets and Sidewalk Design

- Streets and sidewalks shall be used as the organizer and collector of community life. The street systems will promote connectivity of neighborhoods and respond sensitively to topographical and environmental conditions.
- Streets shall be narrow and be lined with trees, parked cars, and traffic calming devices to discourage speeding.
- Pedestrian or bicycle ways shall connect local destinations and neighborhood centers.
- Sidewalks shall enable and invite walking along all streets within the project.
- Street and sidewalk designs shall be consistent and appropriate to the character of the neighborhoods (e.g., wider at commercial areas, narrower at residential areas).
- Street shall be provided with native or adapted shade trees, street furniture, trash and recycling receptacles, and pedestrian lighting to promote an active street life during the day and evening.

Refer to Storrs Center Design Guidelines for neighborhood descriptions and for specific street design requirements.

### 2.2.3 Scale and Massing

- The scale of development shall support the creation of cohesive neighborhood precincts and an active street life.
- Planning will encourage the development of a “traditional town center” concept in scale and character appropriate for Mansfield.

Refer to Storrs Center Design Guidelines for neighborhood descriptions and for specific scale and massing requirements.

### 2.2.4 Open Space/Parks

- Provide open spaces of a pedestrian oriented, civic nature throughout the development, including sidewalks, squares, parks, and public spaces.
- Distribute pocket parks, gardens, terraces, and public seating areas throughout the development area. Provide a variety of parks, gardens, and seating areas, including along street edges.
- Provide pedestrian connections between park spaces, preferably tree-lined and shady to give shelter.
- Plan perimeter views or ‘vistas’ to the natural environment beyond the town center to maintain the rural character.
- Design multi-use/multi-purpose open spaces, such as playgrounds or playing fields adjacent to community gardens.
- Provide connective cover for wildlife.

### **Storrs Center: Application of Category MP-2 Principles**

The concept for Storrs Center is the creation of a village with a Main Street, a town square, streets and lanes supporting mixed uses, and a residential area buffering a conservation area. The overall concept for this project is based on the principle of the street as the organizer and collector of community life—bringing people together and providing them with opportunities to gain access to one another and to what they have to offer. This village of neighborhoods will be designed to take advantage of and reinforce the existing Mansfield street system (2.1.1).

The new, walkable downtown will situate civic, educational, commercial, and cultural activities in a coherent, accessible collection of smaller neighborhoods. Storrs Road, from Mansfield Road (the entrance to the university) to South Eagleville Road, will be the main street of town. Storrs Road will be tree-lined and will draw together the civic and commercial life of the town into one place. The



### **Build on a human scale\***

Neighborhoods built on a smaller and more intimate scale contribute to more livable communities. From narrow streets to homes pulled closer together to lively retail businesses that people walk to, these areas provide real community.



\* From Sierra Club “Stop Sprawl” Website



## Section II: MASTER PLANNING standards and GUIDELINES



### Public spaces\*

Town centers should provide public places and civic amenities, including small parks and civic buildings.



\* From Sierra Club

Town Square precinct, a translation of the traditional green, will be the place where the Mansfield community, the University, and the larger community from Connecticut and beyond will find common ground. The streetscape will include shade trees, tables, benches for seating, trash and recycling receptacles, pedestrian lighting, and paved and grassed areas to encourage the community to congregate in the town square, informally and for markets, festivals, fairs and cultural events. The intent is to ring the square with year-round activity, supported by broad sidewalks, streets and on-street parking. A new village street, parallel to the Main Street (Storrs Road), will create a precinct for retail and commercial activity of a more specialized character than is found elsewhere. Linking the streets will be a grid of lanes—narrow connectors that may either be two way, one way streets or pedestrian paths. These will also provide opportunities for additional retail stores and the opportunity to open the rear of properties on Storrs Road to the project area as a whole (2.1.2 & 2.1.5).

A variety of housing types will be provided across the site. Buildings in the mixed use zone, which will be located along Storrs Road and the village street, will combine residential with retail, office, and restaurant uses in a variety of forms. The residential zone, located east of the village street, will be developed as a multi-family residential neighborhood that allows for home office uses and building services associated with the residential uses. In all, Storrs Center will be composed of four distinct neighborhoods—Town Square, Village Street, Market Square, and Residential area. Each neighborhood will be defined by its unique combination of uses and housing types, from the densely packed five story mixed-use buildings along the Main Street (Storrs Road) to the lower density townhouses in the Residential District (2.1.3, 2.1.4, & 2.2.1).

The street system proposed in this plan emphasizes connectivity and combines straight and segmental elements that respond to topographical, environmental, and construction contingencies. Where ve-

hicle traffic is envisioned, parking is planned and will be encouraged on the streets, contributing to the availability of convenient parking spaces and to a sense of traffic-calming in pedestrian-oriented areas that have concentrated street-front commercial activity (2.2.2). The various forms and spaces in the street system produced by these responses become special places—the centers of neighborhoods or the entrances to neighborhoods within the town fabric. Slightly widened and reconfigured to accommodate increased traffic flow, Storrs Road (the Main Street District) will be designed with broad sidewalks, added parallel parking, and clearly defined pedestrian zones that will help calm traffic and improve safety. The interior streets within the mixed use village will feature sidewalks that allow for small cafés and other on-street activities, creating a more intimate, cohesive neighborhood character (2.2.2 & 2.2.3).

Open spaces will be provided throughout the project to encourage civic uses. Streets and sidewalks, pocket parks, and small plazas and terraces, all activated through furniture, plantings, and appropriate lighting, will contribute to the varied experience of the public realm. The Town Square will become the main public space in Storrs Center, surrounded by prominent buildings on three sides. The dimensions of the space and the scale of the surrounding buildings will provide a prominent sense of place, strong visual connections across the space, and an orientation towards a lively commercial and civic experience at the street level. Smaller seating areas, public spaces, gardens, and terraces will be located in the interior of the project and will be designed at a scale appropriate to their particular neighborhood and location. Site furnishings, lighting, landscaping, and materials will be used to enhance the experience of these various spaces, including the broad sidewalks lining the streets (2.2.4).

### **Category MP-3: Constructing a Sustainable Public Realm (Site Specific Guidelines)**

Objective: Within the public realm development areas, retain and



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protect natural site assets, including soil, wetland corridors, and vegetation. Protect air and water quality through sustainable planning and construction initiatives.

### 3.1. Sustainable Site Development

#### 3.1.1 Erosion and Sedimentation Control

- Design and implement a Construction Sedimentation and Erosion Control Plan, specific to the project, which conforms to U.S. EPA Document No. EPA 832/R-92/005 (Sept. 1992), *Storm Water Management for Construction Activities*, Chapter 3. The plan shall meet the following objectives:
  - Prevent loss of soil during construction by storm-water runoff and/or wind erosion (including protecting topsoil by stockpiling for reuse).
  - Prevent sedimentation of storm sewer and receiving streams.
  - Prevent polluting the air with dust and particulate matter.
- Provide permanent control measures to protect all water sources and bodies from sedimentation and pollution attributable to the project development (i.e., the north and south stream corridors and associated wetland areas, vernal pool, and other natural drainage systems).

#### 3.1.2 Reduced Site Disturbance

##### Design Guidelines:

- Where the site has not been 100% previously developed:
  - To the greatest extent possible, do not develop or disturb land that has not been previously developed.
  - Avoid work in areas defined as environmentally sensitive by the Storrs Center Master Plan, including buffer zones that protect natural resources

and habitats (i.e., the north and south stream corridors and associated wetland areas, vernal pool, and natural drainage systems).

- Avoid work near natural site assets (e.g., existing trees to be protected). When work is necessary in proximity to natural site assets, provide protection for the natural area and minimize intrusion.
- Whenever possible, use natural, planted slopes rather than retaining walls. The maximum allowable non-retained slope is 1:1.

##### Construction Guidelines:

- Restore areas adjacent to the construction of buildings and infrastructure following completion of the work.
- Phase grading operations to match area disturbed within immediate area of development.
- Phase construction and site work to minimize disturbed areas.
- Minimize equipment emissions and noise. Use low-sulfur diesel fuels for construction vehicles (sulfur content less than 30 parts per million).
- Employ environmentally considered maintenance practices (i.e., oil changing, tire washes, equipment logs etc.).
- Identify all existing trees to remain and provide protection of the tree and root system (i.e., with construction fencing, temporary tree boxes, etc.)
- If the project is not located on a site that is 100% previously developed, adhere to the following guidelines during construction:
  - Identify limits of the building area through the creation of building footprint zones. Familiarize all contractors with these limits.



##### **environment\***

Many of our current environmental challenges—air and water pollution, global warming, habitat fragmentation and conversion—are due in part to the way we have built our neighborhoods, communities, and metropolitan areas during the past half-century.



\* From "SmartGrowthOnLine"



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### design\*

Smart growth creates communities that offer health, social, economic, and environmental benefits for all. It achieves this by promoting resource-efficient building and community designs, green building practices, low-impact development, and mixed-use and walkable neighborhoods.



\* From "SmartGrowthOnLine"

- Limit site disturbance in areas not previously developed, including earthwork and clearing of vegetation, to 40 feet beyond the building footprint zone perimeter, 10 feet beyond primary roadway curbs, walkways, and main utility trenches, and 25 feet beyond constructed areas with permeable surfaces (e.g., pervious paving areas, stormwater detention facilities, playing fields, etc.) that require additional staging areas.

### 3.1.3 Light Pollution Control

For shared portions of the project or public or common areas, design exterior lighting to meet the following criteria:

- Limit exterior lighting to only those areas where it is required for safety and comfort.
- Provide the appropriate level of safety and utility through low-level, uniform and controlled exterior lighting. Lighting power densities shall not exceed ASHRAE/IESNA Standard 90.1-2007 Addendum "I" for the classified zone, as defined by the Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments (RP-33). *Note: Refer to Storrs Center Design Guidelines when establishing the project's exterior lighting types.*
- Employ the use of lower-height (approximately 15' tall maximum) low-power streetlamps rather than taller, high-power light sources; where appropriate, use building-mounted fixtures with timers or automatic shut-off mechanisms.
- Eliminate all up-lighting and unshielded fixtures (i.e., spotlights) unless required for worker or public safety.
- Exterior light fixtures with more than 3500 initial

lamp lumens must meet the "Full Cutoff" classification as defined by IESNA (no light distribution above 90 degrees).

- Exterior light fixtures with more than 1000 initial lamp lumens must be shielded so the lamp itself is not directly visible.
- Minimize light trespass and spill between properties and uses; avoid unnecessary spill of light into surrounding conservation areas.

### 3.1.4 Heat Island Effect

For shared portions of the project or public or common areas, all paving systems (i.e., roadways, parking lots, plazas, walkways, etc.) shall comply with the following **tree shading** requirement:

- Within 7 years of project completion, at least 30% of the pavement area shall be shaded, using June 21st at noon as the reference time to demonstrate shading. *Note: compliance is demonstrated through site shading plans, submitted prior to construction. See Submittals and Verification section below.*
- Alternatively, for impervious paving other than public roadways, one or more of the following three options may be substituted in lieu of tree shading:
  - Use light-colored/high-albedo materials with a reflectance of 0.3 or greater for at least 30% of the impervious surfaces.
  - Place a minimum of 50% of parking spaces underground or within structured parking.
  - Use an open-grid pavement system (less than 60% impervious) for a minimum of 50% of the paved surfaces.

### 3.1.5 Efficient Irrigation and Native or Adapted Site Landscaping and Vegetation



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For common or public landscaped areas, reduce potable water consumption for irrigation through the following measures:

- Prohibit plant materials listed as invasive or noxious weed species. For at least half of the planted area, utilize indigenous or adapted plants that can survive on the natural rainfall cycle and which require minimal or no fertilizers, herbicides, or pesticides. (Temporary irrigation may be used until the plants become established.) Sod grass is not considered an adapted plant, but other grasses, such as buffalo grass, are considered adapted plants. See Storrs Center Design Guidelines for a list of preferred tree species.
- Where irrigation systems are installed, reduce potable water use by one or both of the following measures:
  - Install micro-irrigation systems utilizing 50% or less water than a regular irrigation system, based on a calculated mid-summer baseline case. Such efficient irrigation systems are equipped with sensors and timers to reduce water waste.
  - Irrigate with captured rain water from an approved type of cistern or rain water collector.
- Select plant species that thrive in spite of the native deer population.

### 3.1.6 Alternative Energy

- Alternative energy should be used where physically viable and economically beneficial. Systems to consider include photovoltaic panels (to generate electricity) and solar thermal systems (to generate hot water). Federal and state incentive programs are often available, depending on the system type and size. Systems can be roof-mounted, wall mounted, or site mounted (where space is available). “Building-

integrated” photovoltaic (PV) systems are also increasingly available. Examples include products such as PV shingles, slates, and standing seam panels, which can be integrated with standard roofing products, and PV glazing panels, which can be integrated in a storefront glazing system. PV and solar thermal systems require direct solar access for extended periods—careful planning is required to ensure that installations are properly oriented (direct southern exposure being optimum) and are not compromised by shading from adjacent buildings or vegetation.

- Where larger system installations are not viable, the use of smaller, load-specific alternative energy systems is encouraged. For example, photovoltaic panels can be integrated with battery-powered signage lighting or low-level site lighting.

### 3.1.7 Reduction and Treatment of Stormwater Runoff

- Design and implement a project-specific stormwater management system in coordination with the Storrs Center Alliance Master Plan’s stormwater reduction and treatment Best Management Practices (BMPs) and long-term management system (e.g., catch basins, oil-grit separators, and underground detention and recharge systems).

### 3.2. ***Submission /Verification***

Project teams are required to submit the following verification items for public realm construction projects:

- 3.2.1 ***Initial Checklist and Application Form:*** At the time of building permit application, teams must submit to the Master Developer a completed copy of the **Storrs Center Building Guidelines Checklist** (Civil/Site version), accompanied by a signed **Application Form**. These



### Community quality of life\*

Smart growth offers a framework to build community and help create and preserve a sense of place. It does this through housing and transportation choices, urban green spaces, recreational and cultural attractions, and policies and incentives that promote mixed-use neighborhoods.



\* From “SmartGrowthOnline”



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### Take advantage of compact building design\*

Smart growth provides a means for communities to incorporate more compact building design as an alternative to conventional, land consumptive development.



\* From "SmartGrowthOnLine"

documents are included under Part IV of this manual.

3.2.2 *Final Checklist and Application Form:* At the time of application for Certificate of Occupancy, teams must submit to the Master Developer a finalized version of the **Storrs Center Building Guidelines Checklist** (Civil/Site version), updated to reflect any changes from the previous submission and accompanied by a signed **Final Building Certification Form**. These documents are included under Part IV of this manual.

3.2.3 *Additional verification submittals:* Specific submittals corresponding to the individual requirements of Category MP-3 are defined below. These submittals should be kept on file by the development teams, as they may be requested by other agencies. The submittals include items such as project drawings, specifications, product cut sheets, project photographs, calculations, and other items that verify how the Sustainable Public Realm criteria were implemented in the final constructed project.

- Item 3.1.1, Erosion and Sedimentation Control: Provide the "Erosion and Sedimentation Control Plan" (i.e., drawings or specifications). Provide photographs, taken periodically during construction, of erosion and sedimentation control measures installed.
- Item 3.1.2, Reduced Site Disturbance (Design measures): Provide site plans highlighting areas not previously developed, and demonstrating site protection measures implemented.
- Item 3.1.2, Reduced Site Disturbance (Construction measures): Provide site plan that delineates limit of construction and staging areas. Provide photographs, taken periodically during construction, of soil and tree protection measures. Provide verification of low sulfur diesel used for construction vehicles.

- Item 3.1.3, Light Pollution Control: Provide documentation (e.g., drawings, specifications, cut sheets, calculations) illustrating the site lighting design, and demonstrating conformance with applicable performance criteria.
- Item 3.1.4, Heat Island Effect: Provide site plans, specifications, material cut sheets, calculations, and shading diagrams demonstrating compliance with performance criteria.
- Item 3.1.5, Efficient Irrigation and Native or Adapted Site Landscaping and Vegetation: Provide landscaping/planting plan, planting list, irrigation plan, and irrigation calculations demonstrating compliance with performance criteria.
- Item 3.1.6, Alternative Energy: Provide statement noting the alternative energy systems considered. If no systems are implemented, provide explanation of the analysis used to ascertain the applicability of the systems considered. If systems were installed, provide drawings, specifications, and/or cut sheets for the products employed.
- Item 3.1.7, Reduction and Treatment of Stormwater Runoff: Provide stormwater management plan and backup documentation illustrating BMPs and points of connection with Storrs Center stormwater collection and conveyance system.



## Section III: Building standards and guidelines

### HOW TO USE THE BUILDING STANDARDS AND GUIDELINES

#### Applicability

As presented in the previous sections, the Storrs Center project has been conceived and planned using sustainable design concepts and “green building” principles. To extend the sustainability concept down to the level of each building lot, all projects developed in the Center will be required to meet specific green building standards that result in tangible and/or measurable performance and environmental benefits. The **Storrs Center Building Standards** (SCBS) are organized in a similar fashion to the U.S. Green Building Council’s LEED® Rating System with sections on Site Issues, Water Use and Management, Energy Conservation, Indoor Environmental Quality, and Materials. While many of the SCBS requirements are similar to LEED, they tend to be more straightforward and prescriptive in approach, making them generally more accommodating to smaller projects than LEED. In addition, the SCBS include a smaller and more focused set of criteria than LEED, thereby simplifying the overall process.

While there are no formal registration or certification procedures associated with the Storrs Center Building Standards (as there are in LEED projects), project teams will be required to submit the following verification items:

1. At the time of building permit application, teams must submit to the Master Developer a completed copy of the **Storrs Center Building Guidelines Checklist** (include Civil/Site and/or Building Construction forms, depending on applicability), accompanied by a signed **Application Form**. These documents are included under Part IV of this manual.
2. At the time of application for Certificate of Occupancy, teams must submit to the Master Developer a finalized

version of the **Storrs Center Building Guidelines Checklist** (updated to reflect any changes from the previous submission), accompanied by a signed **Final Building Certification Form**. These documents are included under Part IV of this manual.

3. Additional verification submittals, as defined in the SCBS, should be kept on file by the development teams, as they may be requested by other agencies. These additional submittals include items such as project drawings, specifications, product cut sheets, project photographs, material calculations, and other items that verify how the building criteria were implemented in the final constructed project.

### STORRS CENTER BUILDING STANDARDS (SCBS)

The following criteria are required for all Storrs Center projects. Where an item includes multiple compliance options, at least one of the options must be implemented to demonstrate compliance.

#### Category BC-1: Site Issues

Strategies to preserve the quality of the immediate project environs at each project site shall be instigated at all Storrs Center development as follows:

1. Effective stormwater management strategies shall be instituted:
  - 1.1 Reduce run-off of stormwater and sedimentation to nearby water bodies in accordance with [EPA Document No. 832/R-92-005](#).
2. Avoid creating heat islands:
  - 2.1 Roofs:
    - 2.1.1 For flat membrane roofs provide light-colored membrane on min. 75% of the roof area (excluding area



#### Change street design and relationships of buildings\*

People-friendly streets have some common characteristics. They are narrower, and they lessen the overwhelming presence of speeding vehicles with trees, parked cars, and other traffic calming devices. Shops and businesses front directly onto sidewalks, while any parking lots lie behind. Houses present front rooms and verandas, rather than a line of garages, onto the streets.



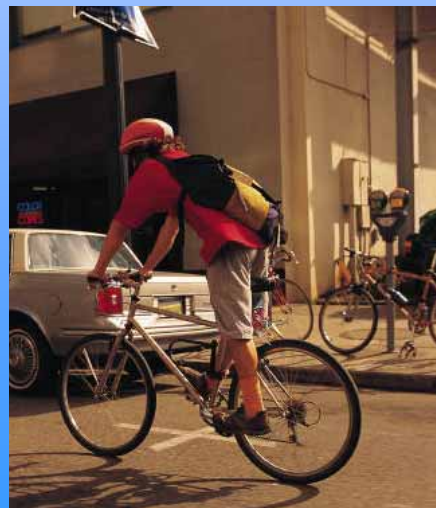
\* From Sierra Club “Stop Sprawl” Website

## Section III: Building standards and guidelines



### health\*

Smart growth reduces health threats from air and water pollution and indoor air contaminants through resource-efficient building design and offering transportation options such as mass transit, bike lanes, and pedestrian walkways. These engage residents and workers in a more active, healthy lifestyle.



\* From "SmartGrowthOnLine"

occupied by skylights and mechanical equipment). Light-colored roof pavers can also be used toward meeting this requirement.

- 2.1.2 For flat, ballasted roofs provide light-colored ballast. Light-colored roof pavers can also be used toward meeting this requirement.
- 2.1.3 For shingled sloped roofs, use shingles that are not predominantly black or dark grey in color. Shingles shall have a minimum reflectivity of 0.2.
- 2.1.4 For steel roofs, do not use galvanized steel.
- 2.2 Sidewalk and Parking Lot Pavement:
  - 2.2.1 Do not use black asphalt surfacing unless shading is provided by trees or plantings. Within 5 years of project completion at least 30% of the pavement area shall be shaded (use June 21<sup>st</sup> at noon as the reference time for demonstrating shading). *Note: compliance is demonstrated through site shading plans, submitted prior to construction. See Submittals/Verification section below.*
  - 2.2.2 Use alternatives to black asphalt. The following materials are acceptable:
    - 2.2.2.1 asphalt with light-colored aggregates, asphalt with white binder,
    - 2.2.2.2 light-colored concrete, using light-colored aggregates and/or light-colored Portland cement,
    - 2.2.2.3 light-colored pavers,
    - 2.2.2.4 permeable paving
3. Avoid night sky pollution
  - 3.1 Exterior light fixtures with more than 3500 initial lamp lumens must meet the "Full Cutoff" classification as defined by IESNA (no light distribution above 90 degrees).
  - 3.2 Exterior light fixtures with more than 1000 initial lamp lumens must be shielded so the lamp itself is not directly visible.

### Submission/Verification

Provide the following to confirm compliance with requirements:

1. Provide project site drawings and a written description of measures implemented to minimize run-off and sedimentation indicating compliance with EPA Document No. 832/R-92-005. Indicate approach to infiltrate rain water into ground (e.g., dry wells, pervious surfaces) or approach utilizing vegetated swales, retention ponds, etc.
2. Provide a plan indicating:
  - type(s) of roofing used
  - type(s) of pavement usedIf black asphalt is used, provide a site plan demonstrating the anticipated paving area that will be shaded from trees and other plantings five years after project completion, on June 21st at 12:00 pm.
3. Provide a description of lighting strategies at building exteriors and grounds along with a schedule of exterior light fixtures. Provide photometrics and cut-off/shielding data to confirm the fixtures meet the stated requirements.

### Category BC-2: Water Use and Management

Strategies shall be implemented to conserve water resources, as follows:

1. Water-efficient Plumbing Fixtures: Use either the Performance Approach or Prescriptive Approach listed below:
  - 1.1 Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation). The baseline shall meet the requirements of the Energy Policy Act of 1992 and subsequent rulings by the Department of Energy, requirements of the Energy Policy Act of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code



## Section III: Building standards and guidelines

or International Plumbing Code as to fixture performance. Calculations are based on estimated occupant usage and shall include only the following fixtures and fixture fittings (as applicable to the building): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves (see [http://www.wbdg.org/design/water\\_conservation.php](http://www.wbdg.org/design/water_conservation.php) for requirements).

*This calculation excludes cooling tower make-up water, dishwashers and clothes washers, and irrigation.*

Strategies that can be followed to achieve this goal include, but are not limited to the following:

- waterless urinals in common areas and maintenance areas of public, commercial and corporate buildings
- low-flow urinals (0.5 – 0.6 GPF)
- low-flow aerators (0.5 – 1.5 GPM) at 80 PSI at lavatory, kitchen and pantry faucets and janitorial sinks
- spring-loaded (metered) lavatories
- lavatories with motion sensors (electronic)
- low-flow aerators at showerheads (1.5 – 2.0 GPM) at 80 PSI
- low-flow toilets (1.4 GPF or less)
- dual-flush toilets

1.2 Prescriptive Approach: The following prescriptive options may be used to demonstrate 20% water savings. All plumbing fixture criteria listed under each option apply unless otherwise noted.

### Commercial Building Option 1

- 0.5 GPM aerators at all lavatory faucets
- Infrared motion sensors at all lavatory faucets

### Commercial Building Option 2

- All toilets OR urinals must meet the following criteria :
  - Toilets: either dual flush or low-flow (1.4 GPF or less)

- Urinals: either 0.5 GPF or waterless
- 1.5 GPM aerators at all lavatory faucets
- Infrared motion sensors at all lavatory faucets

### Residential Building

- 1.8 GPM aerators for all showerheads
- 1.5 aerators for all GPM bathroom faucets

2. Specify Energy Star for all major appliances supplied by the developer/builder in order to ensure compliance with Energy Star efficiency standards for water, electricity and gas consumption.
3. Conserve water needed for irrigation.
  - 3.1 Prohibit plant species listed as invasive or noxious weed species. For at least half of the planted area, utilize indigenous or adapted plants which can survive on the natural rainfall cycle. (Irrigation may still need to be used until the plants become established.) Sod grass is not considered an adapted plant, but other grasses, such as buffalo grass, are considered adapted plants.
  - 3.2 Reduce potable water use for irrigation:
    - 3.2.1 Install micro-irrigation systems utilizing 50% or less water than a regular irrigation system, based on a calculated mid-summer baseline case. Such an efficient irrigation system is equipped with sensors and timers to reduce water waste; and/or
    - 3.2.2 Irrigate with rain water, from an approved type of cistern or rain water collector.

### **Submission/Verification**

Provide the following documentation to confirm compliance with requirements:

1. For 20% reduction in potable water:
  - A schedule of baseline plumbing fixtures used listing EPAAct-



### **economics\***

Smart growth encourages community-based small business investment and development, adds to the variety of local employment opportunities, and helps attract new businesses and industries. More efficient government services are key to this, as are public and private investments that focus on quality of life improvements.



\* From "SmartGrowthOnLine"

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### housing\*

Smart growth promotes housing options for diverse lifestyles and socio-economic levels. It does this through mixed-use, affordable housing and compact development that revitalizes neighborhoods and provides an alternative to automobile-dependent communities.



\* From "SmartGrowthOnLine"

1992 maximum flow rates and additional applicable standards set forth in Category BC-2, paragraph 1.1.

- A list of dry fixtures and/or low-flow fixtures used on the project to achieve levels of conservation beyond EPAct-1992 and additional applicable standards set forth in Category BC-2, paragraph 1.1.
  - Include descriptions and cut-sheets of fixtures used, and flow-rates, together with a calculation indicating percentage of water conserved compared to the baseline.
2. List of all major appliances installed, with indication of Energy Star rating.
  3. Irrigation Water Conservation: List native plants which are acclimatized to the northeast climate and able to survive on rainfall water alone.
    - Provide a declaration that no permanent irrigation system using potable water has been installed, or
    - A description of the water conserving micro-irrigation system installed, or
    - A description of the storm water irrigation system, along with manufacturer's data, cut sheets and photographs of the installation, or
    - Both of the last two items, if both strategies are utilized.

### **Category BC-3: Energy Conservation**

Methods shall be implemented to ensure that building systems are highly efficient, and that they operate at their intended performance. The list below is based to a large extent on the requirements of the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) publication "Advanced Energy Design Guide for Small Buildings":

1. Comply with the following prescriptive requirements:



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Element	Component	Minimum Requirement		Comments
Roof	Insulation entirely above deck	R-20 c.i.		
Roof	Attic – wood framing	R-38		
Roof	Structural Insulated Panel	R-20		
Wall	Mass (HC > 7 Btu/ft <sup>2</sup> )	Either on winter-cold or winter-warm surface of masonry: R-10 c.i.		
Wall	Steel framed	R-19		
Wall	Wood framed and other	R-19		
Wall	Below-grade walls (if occupied)	R-19		
Door	Swinging	U-0.70		
Door	Non-swinging	U-0.50		
Vertical Glazing	Thermal transmittance	U-0.36		
Vertical Glazing	Solar heat gain coefficient (SHGC)	S, E, W	N only	
		0.39	0.46	
Skylight	Percent of roof area	3%	>3%	
Skylight	Thermal transmittance	U-0.69	U-0.52	
Skylight	Solar heat gain coefficient (SHGC)	0.39		
Interior Lighting	Lighting power density (LPD)	10% lower LPD than ASHRAE Standard 90.1-99		
Interior Lighting	Light source (linear fluorescent)	90 mean lumens/watt		
Interior Lighting	Ballast	Electronic ballast		



#### Respect for precedents\*

The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.



\* From the *Charter of the New Urbanism*

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A livable community

People need livable communities and a high quality of life. The attractiveness of older small towns and a scattering of newer developments demonstrate the appeal of certain characteristics. Lively downtown areas, streets designed for pedestrians as much as autos, a scale and pattern of development that allows us to meet everyday needs by walking, are all key factors in ensuring cities provide a high quality of life.



Element	Component	Minimum Requirement	Comments
Floor	Steel framed	R-30, when exposed to unconditioned space	
Floor	Wood framed and other	R-30, when exposed to unconditioned space	
Slab	Unheated	None	
Slab	Heated	R-10 for 36 in.	
Slab	Vapor barrier	Install minimum 15 mm thick, low permeance plastic vapor barrier under slab	
Interior Lighting	Daylighting Controls	Option to use either: 1) Multiple switching of fixtures, or lamps within fixtures, to allow perimeter lighting to be controlled separately from interior lighting. 2) Dimmable ballasts controlled by photosensors at perimeter lighting, to allow automatic daylight dimming.	Required only in spaces 1000 SF in area or larger, with at least one perimeter wall having a window-to-wall ratio of 25% or more.  Daylighting controls are strongly encouraged for perimeter spaces under 1000 SF, such as private offices.
HVAC	Air conditioner (0-65 MBtuh)	13.0 SEER	
HVAC	Air conditioner (>65-135 MBtuh)	11.0 EER/11.4 IPLV	
HVAC	Air conditioner (>135-240 MBtuh)	10.8 EER/11.2 IPLV	
HVAC	Air conditioner (>240 MBtuh)	10.0 EER/10.4 IPLV	
HVAC	Gas furnace (0-225 MBtuh - SP)	High-low flame, 80% AFUE or E <sub>t</sub>	
HVAC	Gas furnace (0-225 MBtuh - Split)	Modulating flame, 90% AFUE or E <sub>t</sub>	



Section III: Building standards and guidelines

Element	Component	Minimum Requirement		Comments
HVAC	Gas furnace (>225 MBtuh)	High-low flame, 80% E <sub>c</sub>		
HVAC	Heat pump (0-65 MBtuh)	13.0 SEER/7.7 HSPF		
HVAC	Heat pump (>65-135 MBtuh)	10.6 EER/11.0 IPLV/3.2 COP		
HVAC	Heat pump (>135 MBtuh)	10.1 EER/11.0 IPLV/3.1 COP		
Central plant	Boiler (<1 MMBtu)	gas-fired, 83% efficient, condensing, high-low flame		
Central plant	Boiler (>1 MMBtu)	gas-fired, 93% efficient, condensing, modulating flame		
Central plant	Chiller	5% more efficient than ASHRAE Standard 90.1-99, Table 6.2.1C		
Ventilation	Outdoor air damper	Motorized control, where required		
Ventilation	Demand control	CO <sub>2</sub> sensors in assembly spaces		
Ducts	Friction rate	0.08 in. w.c./100 feet		
Ducts	Sealing	Seal class B		
Ducts	Location	Interior only		
Ducts	Insulation level	R-6		
Service Water Heating	Gas storage	90% E <sub>t</sub>		
Service Water Heating	Gas instantaneous	0.81 EF or 81% E <sub>t</sub>		
Service Water Heating	Electric storage 12 kW	EF > 0.99 – 0.0012xVolume		
Service Water Heating	Pipe insulation	d<1½ in.	d≥1½ in.	
		1 in.	1½ in.	



Alternatives to Sprawl

Sprawl is low-density development beyond the edge of service and employment, which separates where people live from where they shop, work, recreate, and educate—thus requiring cars to move between zones. Historical town centers provide alternatives to sprawl in the form of livable communities with a focus on civic life.



## Section III: Building standards and guidelines



### Shared use\*

A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.



\* From the *Charter of the New Urbanism*

2. As an alternative to the prescriptive approach of Paragraph 1 above, a performance-based approach can be used. Provide energy efficiency measures that result in a regulated energy cost no higher than that for a building that complies with Paragraph 1. Regulated energy cost excludes elevators, plug loads, cooking, lighting within apartments, and exterior lighting. See the Submittals/Verification section below for additional details on this approach.
3. Ground-source heat pump systems (geo-thermal): select commercial developments may elect to utilize a ground source heat pump system for heating and cooling as part of a performance-based approach. In these cases the water loop tie-in and wells must be pre-installed or specifically pre-approved by the Master Developer. The extent of ground-source systems will be determined based on feasibility analysis, including system comparisons, economic feasibility, the availability of groundwater, and the availability of space to locate the well fields.
4. To ensure proper installation and functionality, commissioning of the HVAC systems is required according to the ASHRAE publication “Advanced Energy Design Guide for Small Buildings.” A Commissioning Authority must be retained for each project who will be the primary responsible party for the tasks listed in items 4.1—4.11 below. The Commissioning Authority can be either:
  - 4.1 Review the owner’s project requirements and the designers’ basis-of-design documentation for completeness and clarity. The information provided by the design team for review should include project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
  - 4.2 Develop project-specific quality assurance/commissioning (QA/CX) specifications for building envelope, electrical, mechanical, and plumbing systems that will be verified during the delivery of the project. The specifications will incorporate QA/CX activities into the construction process and provide a clear understanding to all participants of their specific roles, responsibilities, and effort. The Guide specifications will be incorporated into the construction documents (CDs) by the designers.
  - 4.3 Conduct one design review of the 100% complete construction documents. The review will focus on ensuring the design is consistent with the owner’s project requirements and the designers’ basis of design, and that all construction requirements are clear and well coordinated. It is also intended to ensure that the specifications describe the roles and responsibilities of all parties to the commissioning process so that contractors have a clear understanding of their responsibilities.
    - 4.3.1 Prepare a report identifying concerns and opportunities, and use it in working with the owner and designers to develop a collaboration that will ensure delivery of a high quality building that performs as intended.
    - 4.3.2 Provide a report to the collaborators that tracks issues to resolution.
  - 4.4 Conduct a meeting to discuss review comments and adjudicate issues with the design team and issue a final report illustrating the disposition of each issue raised. Use the report to verify, during construction site visits, that issues were corrected.
  - 4.5 If a pre-bid meeting is held with bidding contractors, participate in it to emphasize the inclusion of commissioning and describe the commissioning process for the specific project.
  - 4.6 Prepare the QA/CX Plan, including prefunctional check-



## Section III: Building standards and guidelines

lists, and conduct a meeting with the project team to ensure understanding of QA/CX procedures, roles, and responsibilities, and to establish a tentative schedule of QA/CX activities.

- 4.7 Review submittal information for systems being commissioned and provide appropriate comments to team. Based on the submittal information, develop functional test procedures that will be used to verify system performance and distribute to the team.
- 4.8 Conduct at least two site visits during construction to observe construction techniques and to identify issues that may affect performance. Review issues with appropriate team members at end of site visit in accordance with established communication protocols and issue one report per visit documenting findings. Establish and maintain an issues log for tracking issues identified.
- 4.9 Direct and witness functional testing and document results. Issues identified will be documented in the issues log and tracked to resolution. General contractor will schedule functional testing activities and ensure that responsible parties needed for verification are present.
- 4.10 Review operation and maintenance (O&M) information to ensure warranty requirements and preventive maintenance information are included in the documentation along with a copy of the owner's project requirements and basis-of-design information.
- 4.11 Witness training of Operations & Maintenance staff to help ensure O&M staff understands systems and their operation, warranty responsibilities, and preventive maintenance requirements.

### ***Submission/Verification***

Provide the following:

1. A filled-in checklist (see Appendix A), indicating which of the

requirements of the Guidelines have been met.

- Provide design documents indicating pertinent plans, facades, sections and details.
  - For all energy-saving strategies used, provide cut sheets. Document alternative energy sources, if used. (Examples: Photovoltaics, solar DHW, biomass and/or methane gas, green purchased energy.)
2. Calculations demonstrating compliance with the energy conservation requirements using the performance approach, if this path of compliance is used. Create two energy models of the building: one with the prescriptive requirements of Paragraph 1 (referred to as the baseline), and one with the energy—efficiency features of the actual design. Using LEED 2.1 NC methods, demonstrate that the regulated energy cost of the design is no higher than the regulated energy cost of the baseline.
    - Provide design documents indicating pertinent plans, facades, sections and details
    - For all energy-saving strategies used, provide cut sheets. Document alternative energy sources, if used. (Examples: Photovoltaics, solar DHW, biomass and/or methane gas, green purchased energy.)
  3. Design drawings verifying tie-in to the ground-source heat pump system, where required by the Master Developer.
  4. Commissioning Report for HVAC Systems

### **Category BC-4: Indoor Environmental Quality**

1. Design and build airtight construction for multifamily residential buildings and mixed use facilities to reduce air infiltration and also to reduce the transfer of contaminants (e.g., tobacco smoke, odors) among units. Utilize all techniques listed below:
  - 1.1 For steel stud walls (1) between apartments and (2) between apartments and corridors



### **Accommodating automobiles\***

In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.



\* From the *Charter of the New Urbanism*

## Section III: Building standards and guidelines



### Streets and squares\*

Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.



\* From the *Charter of the New Urbanism*

- 1.1.1 Provide felt or other suitable fibrous material or caulking along or under bottom track and along the top track to create an airtight assembly.
    - 1.1.2 Provide plastic boxes to create airtight enclosure for switches, receptacles and electric boxes OR caulk and seal around these electric outlets.
  - 1.2 For exterior walls constructed of steel studs with insulation in-between and with exterior sheathing (e.g., gypsum board or plywood)
    - 1.2.1 Provide felt or other suitable fibrous material under the bottom track and above the top track
    - 1.2.2 Provide plastic boxes to create airtight enclosure for switches, receptacles and electric boxes OR caulk and seal around these electric outlets.
    - 1.2.3 Provide vapor-permeable air barrier at exterior sheathing OR build sheathing as air barrier (e.g., tongue & groove gypsum board with joints taped).
  - 1.3 For exterior masonry cavity walls provide one of the following:
    - 1.3.1 Locate rigid insulation to the winter-cold surface of the inner wythe of masonry. Apply an air barrier applied to the winter-cold side of inner wythe of masonry. The air barrier need not be vapor-permeable.
    - 1.3.2 Locate semi-rigid mineral fiber insulation on the winter-warm surface of the inner wythe of masonry, pin-impelled. Position 2.5" steel stud wall towards the room, without placing any insulation in it. Apply a vapor-permeable air-barrier on the winter-cold surface of the inner wythe of masonry.
  - 1.4 Seal
    - 1.4.1 all pipe penetrations
    - 1.4.2 around exhaust grilles in bathrooms and kitchens.
  - 1.5 For slabs
    - 1.5.1 Install minimum 15 millimeter thick, low permeance plastic vapor barrier under slabs.
2. Test for Radon in all buildings within a suitable time after building is enclosed. If the gas is present, implement a plan for the continuous dissipation of the gas, according to EPA guidance documents.
3. Limit carbon monoxide exposure from garages that are part of the buildings.
  - 3.1 Do not run air supply or air return ducts for the building through the garage.
  - 3.2 For walls and ceilings between the garage and inhabited spaces follow the requirements of Paragraph 1 in Category BC-4 above.
  - 3.3 If the garage exhaust is power-vented, bring vent to rooftop in airtight, negatively-pressurized enclosure.
4. Design the building to meet all requirements of the ASHRAE Standard 62.
5. Develop and enforce a Construction Indoor Air Quality (IAQ) Management Plan to ensure that construction practices do not contaminate building systems and air quality for future occupants.
6. Specify low-emitting materials that are in compliance with the following national standards intended to improve the Indoor Air Quality:
  - 6.1 *Adhesives and Sealants* – Use South Coast Air Quality Management District Rule 1168 Standard (current version, <http://www.aqmd.gov/rules/reg/reg11/r1168.pdf>). Review Material Safety Data Sheets (MSDS) and Technical Data Sheets for each product to determine if the volatile organic content (VOC) content meets the Standard.
  - 6.2 *Paints and Coatings* – Use Green Seal GS-11 and GC-03 ([www.greenseal.org/standards.htm#environmental](http://www.greenseal.org/standards.htm#environmental)) Standards. Review Material Safety Data Sheets (MSDS) and Technical Data Sheets for each product to determine if the



## Section III: Building standards and guidelines

VOC content meets the Standard. Review the chemical composition of each product to determine if any of the banned or restricted chemicals listed in the Standard are present. Reject any product not in compliance with the Standard.

6.3 *Carpets and Carpet Systems* – Use Carpet and Rug Institute’s ‘Green Label Plus’ IAQ Testing Program ([www.carpet-rug.org](http://www.carpet-rug.org)) Standard. Specify carpets and carpet systems that have been tested by an independent laboratory in accordance with the CRI protocol and have been granted a Green Label Plus certification. (This information may be found on the CRI website, where all certified products are listed). Carpet adhesive must be in compliance with the SCAQMD Rule 1168, as indicated above.

6.4 *Composite Wood and Agrifiber Materials*— The following composite wood and agrifiber materials (plywood, particle board, chipboard, MDF, OSB, agri-boards, etc.) shall be free of added Urea Formaldehyde (UF). Specify products that are made with alternative bonding agents. Review Material Safety Data Sheets (MSDS) and Technical Data Sheets for each product to determine if the product contains ‘added’ UF. Note: All wood products in this category contain and emit naturally occurring urea formaldehyde, a carcinogen. The objective is to avoid installing products with *additional* amounts of UF. Use of Phenol Formaldehyde, which does not out-gas at room temperature, is acceptable. The requirement applies to the following products:

6.4.1 All interior plywood,

6.4.2 Millwork substrates for 50% of millwork (calculation performed by price).

Wood doors are recommended but not required to be free of added urea formaldehyde.

7. Design multifamily residential buildings and mixed use facilities to provide acoustical comfort.

### 7.1 Air-borne Sound

7.1.1 Residential Spaces. Per the International Building Code (IBC), walls, partitions, and floor/ceiling assemblies separating dwelling units from each other or from public or service areas shall have a sound transmission class (STC) of not less than 50 (45 if field tested) when tested in accordance with ASTM E90. At Storrs Center, the airtight construction requirements of Category BC-4 (Item 1), combined with the IBC STC requirement provide a synergistic opportunity to reduce energy use, minimize contaminant transfer among spaces, and reduce air borne sound transmission.

7.1.2 Commercial Spaces. For Storrs Center projects, the STC 50 requirements shall be extended to include walls, demising partitions, and floor/ceiling assemblies separating different commercial tenants and/or different commercial use types.

7.1.3 Windows. If the window-to-wall ratio of any exterior wall in a residential unit is greater than 50%, the windows units at said wall shall have an STC rating of not less than 35.

### 7.2 Structure-borne Sound.

7.2.1 Residential Spaces. Per the International Building Code (IBC), floor/ceiling assemblies between dwelling units or between a dwelling unit and a public or service area within the structure shall have an impact insulation class (IIC) of not less than 50 (45 if field tested) when tested in accordance with ASTM E492.

7.2.2 Commercial Spaces. For Storrs Center projects, the IIC 50 requirements shall be extended to include all floor/ceiling assemblies in mixed-use or multi-tenant commercial and commercial/residential buildings.

8. Develop a set of guidelines for ‘green housekeeping’ to establish



### Architecture and landscape\*

Architecture and landscape design should grow from local climate, topography, history, and building practice.



\* From the *Charter of the New Urbanism*

## Section III: Building standards and guidelines



### Civic buildings\*

Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.



\* From the *Charter of the New Urbanism*

and maintain good IAQ within the buildings. The document shall include:

- 8.1 Low-impact Cleaning and Maintenance guidelines. Develop a comprehensive list of readily available low-impact, environmentally benign cleaning materials and accompanying cleaning procedures.
- 8.2 An Integrated Pest Management (IPM) plan to limit access of pests (rodents) to the buildings during and after construction, and to prevent the colonization of insect-type pests (cockroaches, silver fish, ants, moths, etc) within the buildings.

### ***Submission/Verification***

Provide the following documentation to confirm compliance with requirements:

1. Airtightness:
  - Drawings indicating details and assemblies described in Items 1.1—1.5 of Category BC-4.
  - For multifamily residences, results of blower door test results for airtightness, per LEED requirements.
2. The results of the Radon test and, if the gas was found to be present, submit evidence of mitigation as well as retesting results confirming that radon has been reduced per EPA requirements.
3. Drawings indicating measures taken to achieve airtight construction between garage and building (drawings), as well as CO alarm in adjacent inhabited spaces.
4. Submit a copy of the letter signed by the engineer stating that the requirements of the current version of ASHRAE 62 and any relevant addenda have been met. If the building is in the public domain, indicate measures taken to minimize exposure to Environmental Tobacco Smoke (ETS). List any monitoring systems

or devices included to assist in maintaining high IAQ.

### 5. Construction IAQ Management Plan

- Provide a copy of the completed Construction IAQ Management Plan indicating all measures taken to protect the building fabric and IAQ for future occupants.
- Provide a minimum of 18 dated photographs per building, taken on several occasions at different times, illustrating installation of protective measures.
- Provide a schedule of filters used, their type and rating, along with dates of filter changes. Install final filter change on completion of construction work, immediately prior to occupancy.

### 6. Indoor Air Quality:

- *Adhesives and Sealants*—Submit name and manufacturer of each product used, along with MSDS and Technical Data Sheets as back-up.
- *Paints and Coatings* – Submit name and manufacturer of each product used, along with MSDS and Technical Data Sheets as back-up.
- *Carpets and Carpet Systems* – Submit name and manufacturer of each carpet product used (carpet, cushion, tiles, etc) along with CRI certification number.
- Composite Wood Materials (plywood, particle board, chipboard, MDF, OSB, agri-boards, etc.). Submit name and manufacturer of each composite wood or agri-board product used along with MSD and Technical Data Sheets as back-up. Alternatively submit appropriate manufacturer's certification that the product contains no *added* UF.

### 7. Acoustical Comfort Requirements:

- For Residential Spaces, provide drawings of applicable wall, partition, and floor/ceiling assemblies demonstrat-



## Section III: Building standards and guidelines

ing that such assemblies achieve an STC rating of 50 or better. Drawings of floor/ceiling assemblies shall also demonstrate that such assemblies achieve an IIC rating of 50 or better.

- For residential units where the window-to-wall ratio of an exterior wall exceeds 50%, provide cut sheets of the window units or a letter from the window unit manufacturer, that clearly demonstrate an STC rating of not less than 35 for each unit used.
- For Commercial Spaces, provide drawings of applicable wall, partition, and floor/ceiling assemblies demonstrating that such assemblies achieve an STC rating of 50 or better. Drawings of floor/ceiling assemblies in mixed-use or multi-tenant commercial and commercial/residential buildings shall also demonstrate that such assemblies achieve an IIC rating of 50 or better.

8. Copies of the Green Housekeeping Guidelines' and Integrated Pest Management Plan to be used for all public building cleaning and maintenance procedures and pest management.

### **Category BC-5: Materials**

1. Promote materials conservation and reduced landfill waste by providing a dedicated recycling storage area centrally located on the ground floor or basement level of each building or at a shared location easily accessible to multiple buildings.
  - 1.1 The recycling facility must be large enough to sort, separate and temporarily store recyclable materials.
  - 1.2 It shall be easily accessible to the building population(s) and to the loading dock or recyclables pick-up point.
2. Reduce construction, demolition, and land clearing waste by developing a 'Construction Waste Management Plan' to be included in the specifications in accordance with the requirements of the developer and the Town of Mansfield's Solid Waste Regu-

lations. The plan should address construction waste as well as consumer recyclables. If available locally, it is recommended that demolition materials be processed by a local recycling service. A sample Construction Waste Management Plan suitable for use at Storrs Center is available from the Master Developer.

3. Use materials with a combination of post-consumer and pre-consumer recycled content. Use either the Performance or Prescriptive Approach listed below.
  - 3.1 Performance Approach: The value of the recycled-content materials shall constitute at least 10% of the total value of the project materials.
  - 3.2 Prescriptive Approach: The following prescriptive approach may be used to demonstrate 10% recycled content. All items in the list apply unless the material type is not included in the project.
    - 75% of the cast-in-place concrete, in aggregate, shall contain 15% flyash or blast furnace slag as a replacement for Portland cement.
    - Steel reinforcing bar shall contain at least 75% recycled content.
    - Structural steel sections shall contain at least 50% recycled content.
    - Fiberglass building insulations (batt and semi-rigid) shall contain at least 20% recycled content.
    - Gypsum wallboard shall contain, in aggregate, at least 25% recycled content.
    - Acoustic ceiling tiles shall contain at least 50% recycled content.
    - Carpet: In commercial buildings carpet shall contain, in aggregate, at least 15% recycled content. In residential buildings, carpet shall contain, in aggregate, at least 15% recycled content, OR carpet pad shall contain at least 75% recycled content.



### **diversity\***

Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.



\* From the *Charter of the New Urbanism*

## Section III: Building standards and guidelines



### mixed uses embedded in neighborhoods\*

Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.



\* From the *Charter of the New Urbanism*

4. Use regionally-manufactured materials that are produced/ assembled within 500 miles of the project site. Use either the Performance or Prescriptive Approach listed below.

4.1 Performance Approach: The value of the regionally-manufactured materials shall constitute at least 30% of the total value of the project materials.

4.2 Prescriptive Approach: The following prescriptive approach may be used to demonstrate 30% regionally-manufactured materials. All items in the list apply, unless the material type is not included in the project.

- All asphalt paving
- All cast-in-place concrete
- All fill material (crushed stone, etc.)
- At least 75% of plant materials
- At least 75% of concrete masonry units
- At least 50% of brick, stone, and precast concrete
- At least 50% of gypsum wallboard
- At least 50% of acoustical ceiling tiles
- At least 25% of ceramic tiles

### ***Submission/Verification***

Provide the following documentation to confirm compliance with requirements.

Note: HVAC equipment and central cooling/heating plant may not be used in any of the cost calculations.

1. Recycling: Indicate on plans the area set aside as a recycling facility.
2. Provide a copy of the completed Construction Waste Management Plan. A sample Construction Waste Management Plan suitable for use at Storrs Center is available from the Master Developer.

3. If the Performance Approach is used for recycled-content and/or regionally-manufactured materials, use 45% of the total project cost as the baseline for materials cost. Provide a matrix of all project materials, based on the LEED 2.2 methodology, to demonstrate that a minimum of 10% of the project's material value consists of post- and pre-consumer recycled materials, and/or that a minimum of 30% of the project's material value consists of regionally-manufactured products. Note: Steel products including structural, framing, reinforcement bars, doors, windows, studs, etc. may be assumed to have a minimum of 25% post-consumer recycled content.

4. As back-up to either the Performance or Prescriptive Approach for recycled-content and regionally-manufactured materials, provide product cut sheets or letters from the product manufacturers indicating the recycled content of the material and the place of manufacture.



## Section iv: forms for building standards/guidelines

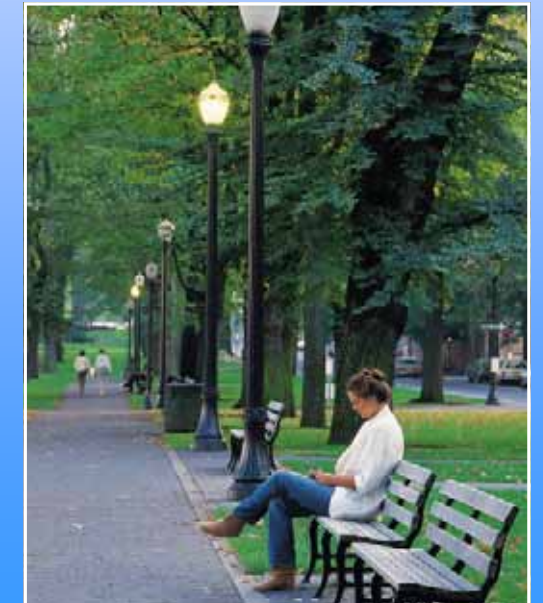
The following reporting forms summarize the various categories, requirements and options of the Storrs Center Sustainable Building Standards in a checklist format. For each category included in the forms, project teams are required to check-off the items that apply to their project (left column), and also identify the drawings, specifications, and other documents they have developed to demonstrate compliance with the standards (right column). Project teams should refer to the Building Standards to review which of the listed items are requirements, and which are options. Required items are those with which building plans must be reasonably consistent. Separate checklist forms are available in 8 1/2 x 11 format from the Master Developer.

At the time of building permit application, teams must submit to the Master Developer a completed copy of the **Storrs Center Building Guidelines Checklist** (include Civil/Site and/or Building Construction forms, depending on applicability), accompanied by a signed **Application Form**. These documents are included under Part IV of this manual. At the time of application for Certificate of Occupancy, teams must submit to the Master Developer a finalized version of the **Storrs Center Building Guidelines Checklist** (updated to reflect any changes from the previous submission), accompanied by a signed **Final Building Certification Form**. These documents are included under Part IV of this manual. Additional verification submittals, as defined in the SCBS, should be kept on file by the development teams, as they may be requested by other agencies. These additional submittals include items such as product cut sheets, project photographs, material calculations, and other items that verify how the building criteria were implemented in the final constructed project.



### Public parks\*

A range of parks, from tot-lots and village greens to ball fields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.



\* From the *Charter of the New Urbanism*

Section iv: forms for building standards/guidelines



Create community\*

Development patterns can either inhibit or contribute to the establishment of strong communities and neighborhoods. Creation of cohesive communities should be a high priority.



\* From BuildingGreen.com

Storrs Center Building Guidelines Checklist: Civil and Site Construction (Page 1 of 3)

Sustainable Site Development

Erosion and Sedimentation Control (both measures required):

- ☐ Erosion and Sedimentation Control Plan
- ☐ Permanent control measures to prevent sedimentation /pollution

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Reduced Site Disturbance (check all that apply):

Demonstrated through:

Design Guidelines:

For projects not located on a site that is 100% previously developed:

- ☐ No disturbance of land not previously developed
- ☐ No/minimal work in areas defined as environmentally sensitive
- ☐ Restoration of a previously developed site area

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

For all projects:

- ☐ Use natural, planted slopes instead of retaining walls
- ☐ Comply with Site-related sections of Building Standards and Design Guidelines

Construction Guidelines:

- ☐ Restore areas adjacent to the construction of buildings and infrastructure
- ☐ Phase grading operations to match areas disturbed
- ☐ Phase construction to minimize disturbed areas
- ☐ Minimize equipment noise and emissions/Use low-sulfur vehicles
- ☐ Use environmentally-considered maintenance practices
- ☐ Provide root system protection for remaining trees

For projects located on a site that is 100% previously developed:

- ☐ Identify limits of the building area via building footprint zones
- ☐ Limit site disturbance to prescribed zones around bldg footprint, etc.



Section iv: forms for building standards/guidelines

Storrs Center Building Guidelines Checklist: Civil and Site Construction (Page 2 of 3)

Light Pollution Control (check all that apply):

- ☐ Exterior light levels/uniformity ratios meet IESNA RP-33-99
- ☐ No up-lighting and unshielded fixtures (with exceptions for security)
- ☐ Design complies with lighting guidelines of Section 3
- ☐ Environmental zone based on Storrs Center Design Guidelines
- ☐ Appropriate light levels for safety and utility
- ☐ Exterior lighting limited only to areas where required
- ☐ Light trespass and spill minimized
- ☐ More low-power streetlamps used (vs. fewer high-power fixtures)

Heat Island Effect (check all that apply):

- ☐ Impervious paving systems comply with shading requirements
- ☐ Light-colored/high-albedo materials with reflectance  $\geq 0.3$ , OR open grid pavement for 30% of non-roof impervious surfaces
- ☐ 50% of parking spaces underground or in structured parking
- ☐ Open-grid pavement (<50% impervious) for 50% streets, parking, etc.
- ☐ Impervious paving complies with Storrs Center Design Guidelines
- ☐ Shade trees comply with Storrs Center Design Guidelines

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Locate building to minimize environmental impact\*

Cluster building or build attached units to preserve open space and wild-life habitats. Avoid especially sensitive areas, including wetlands, and keep roads and service lines short. Leave the most pristine areas untouched, and look for areas that have been previously damaged to build on. Seek to restore damaged ecosystems.



\* From BuildingGreen.com

Section iv: forms for building standards/guidelines



Encourage in-fill and mixed-use development\*

In-fill development that increases density is inherently better than building on undeveloped (greenfield) sites. Mixed-use development, in which residential and commercial uses are intermingled, can reduce automobile use and help to create healthy communities.



\* From BuildingGreen.com

Storrs Center Building Guidelines Checklist: Civil and Site Construction (Page 3 of 3)

Efficient Irrigation and Native/Adapted Site Landscaping and Vegetation

- ☐ Potable water for irrigation meets criteria of Storrs Building Standards
- ☐ Native plants used that require no irrigation
- ☐ Plant species that thrive in spite of deer population

Alternative Energy (check all that apply):

- ☐ Alternative energy sources considered (list system types and, if no systems used, provide assessment)
- ☐ Alternative energy sources incorporated (list system types)

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Reduction and Treatment of Stormwater Runoff

- ☐ Stormwater systems coordinate with Storrs Center Alliance Master Plan

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Section iv: forms for building standards/guidelines

Storrs Center Building Guidelines Checklist: Building Construction (Page 1 of 6)

Site Issues

Stormwater Management Strategies (check all that apply):

- ☐ Erosion and Sedimentation Control Plan (required)

Heat Islands: Roofs (check all that apply):

- ☐ Flat roof, light colored membrane/pavers (75%)
- ☐ Flat ballasted roof, light-colored ballast
- ☐ Flat roof, vegetated roof system (50%)
- ☐ Sloped, shingled roof, shingles that are not black or dark grey
- ☐ Steel roof, light-colored paint

Heat Islands: Sidewalk and Parking Lot Pavement

(check all that apply):

- ☐ Trees/plantings to shade 30% of pavement
- ☐ Asphalt with light-colored aggregates
- ☐ Asphalt with white binder
- ☐ Light-colored concrete, using light-colored aggregates and/or light-colored Portland cement
- ☐ Light-colored pavers
- ☐ Permeable paving

Night Sky Pollution:

- ☐ Exterior light fixtures (>3,500 lumens): full cutoff
- ☐ Exterior light fixtures (>1,000 lumens): shielded

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

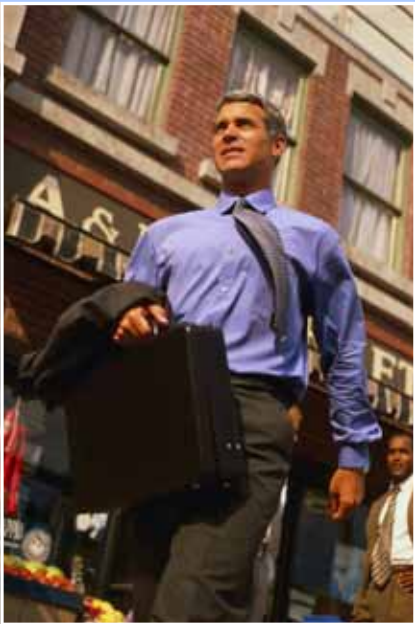
Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Minimize automobile dependence\*

Locate buildings to provide access to public transportation, bicycle paths, and walking access to basic services. Commuting can also be reduced by working at home—consider home office needs with layout and wiring.



\* From BuildingGreen.com

Section iv: forms for building standards/guidelines



Places for people\*

Smart growth can create great places to live, work and play.



\* From "SmartGrowthOnLine"

Storrs Center Building Guidelines Checklist: Building Construction (Page 2 of 6)

Water Use and Management

20% Water Use Reduction (check all that apply):

- ☐ Waterless urinals
- ☐ Low-flow urinals (0.5 - 0.6 GPF)
- ☐ Low-flow faucet aerators (0.5 - 1.5 GPM)
- ☐ Spring-loaded (metered) lavatories
- ☐ Lavatories with motion sensors (electronic)
- ☐ Low-flow aerators at showerheads (2.0 GPM or less)
- ☐ Low-flow toilets (1.4 GPF or less)
- ☐ Dual-flush toilets

Demonstrated through:

- ☐ Drawings (List):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Water -Conserving Appliances (check all that apply):

- ☐ Energy Star dishwashers
- ☐ Energy Star clothes washers

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Conserve Water needed for Landscaping:  
Plant Selection

- ☐ Indigenous or adapted plants for at least 50% of planted areas

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Conserve Water needed for Landscaping:  
Irrigation Systems (check all that apply):

- ☐ Micro-irrigation systems
- ☐ Rain water collected and used for irrigation

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Section iv: forms for building standards/guidelines

Storrs Center Building Guidelines Checklist: Building Construction (Page 3 of 6)

Energy Conservation

Energy-Efficiency Measures (EEMs):

- ☐ Prescriptive EEMs implemented per "Appendix A" Table
- ☐ Energy Cost Budget, using computer simulations

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Commissioning of HVAC Systems

- ☐ Review the owner's project requirements & designers' basis-of-design
- ☐ Develop project-specific quality assurance/CX specifications
- ☐ Conduct design review of the 100% complete CDs
- ☐ Conduct a meeting to discuss review CX comments
- ☐ Participate in the pre-bid meeting on commissioning
- ☐ Prepare prefunctional checklists and the QA/CX plan
- ☐ Review submittal information for systems being commissioned
- ☐ Conduct two site visits during construction
- ☐ Direct and witness functional testing and document results
- ☐ Review operation and maintenance information
- ☐ Witness training of O&M staff

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Provide responsible on-site water management\*

Design landscapes to absorb rainwater runoff (stormwater) rather than having to carry it off-site in storm sewers. In arid areas, rooftop water catchment systems should be considered for collecting rainwater and using it for landscape irrigation.



\* From BuildingGreen.com

Section iv: forms for building standards/guidelines



Safety and security\*

The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.



\* From the *Charter of the New Urbanism*

Storrs Center Building Guidelines Checklist: Building Construction (Page 4 of 6)

Indoor Environmental Quality

Airtight Construction, Multi-family Residential Buildings

(Utilize all techniques listed, unless otherwise noted):

For interior steel stud walls between apartments and corridors:

- ☐ Felt/fibrous mtrl. or caulking at bottom track and at top track
- ☐ Airtight enclosures or caulk at switches and receptacles

For exterior steel stud walls w/cavity insul. & ext. sheathing:

- ☐ Felt/fibrous material or caulking at bottom track and at top track
- ☐ Airtight enclosures or caulk at switches and receptacles
- ☐ Vapor-permeable air barrier at exterior sheathing OR sheathing built as air barrier

For Masonry cavity walls (provide one of the following systems):

- ☐ Locate rigid/semirigid insulation to the winter-cold surface of the masonry. Apply an air barrier to the winter-cold side of the masonry (the air barrier need not be vapor-permeable).
- ☐ Locate semirigid mineral fiber insulation on winter-warm surface of the masonry, pin-impelled. Position 2.5" steel stud wall towards the room without insulation. Apply vapor-permeable air-barrier on the winter-cold surface of the masonry.

At pipes and grilles:

- ☐ Seal all pipe penetrations at walls, floors, ceilings
- ☐ Seal around exhaust grilles in bathrooms and kitchens

At slabs:

- ☐ Install minimum 15 mm thick, low permeance plastic vapor barrier under slab

Radon (check all that apply):

- ☐ Radon testing, test date \_\_\_\_\_
- ☐ Radon gas dissipation system

Demonstrated through:

- ☐ Drawings (list): \_\_\_\_\_
- ☐ Specifications (list): \_\_\_\_\_
- ☐ Other (list): \_\_\_\_\_
- ☐ Final Verification: \_\_\_\_\_

Demonstrated through:

- ☐ Drawings (list): \_\_\_\_\_
- ☐ Specifications (list): \_\_\_\_\_
- ☐ Other (list): \_\_\_\_\_
- ☐ Final Verification: \_\_\_\_\_



Section iv: forms for building standards/guidelines

Storrs Center Building Guidelines Checklist: Building Construction (Page 5 of 6)

Carbon Monoxide (check all that apply):

- ☐ No building air supply or return ducts run through garage
- ☐ For power-vented garage exhaust, vent runs to rooftop in airtight, negatively pressurized enclosure
- ☐ Walls & ceilings between garage & inhabited space meet airtight construction guidelines

Ventilation Design:

- ☐ Building designed to meet reqmnts. of ASHRAE Standard 62

Construction IAQ Management Plan:

- ☐ Const. IAQ Management Plan developed and implemented

Low-emitting Materials (all items required):

- ☐ Low-VOC adhesives and sealants - SCAQMD Rule 1168
- ☐ Low-VOC paints and coatings (Green Seal GS-11, GC-03)
- ☐ Low-emitting carpets (CRI Green Label Plus Program)
- ☐ No added urea formaldehyde for:
  - All interior plywood
  - 50% of millwork substrates
  - Wood doors (optional)

Guidelines for "Green Houskeeping" (all items required):

- ☐ Low-impact cleaning and maintenance agents and processes
- ☐ Low-toxicity pest management controls (IPM)

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Value site resources\*

Early in the siting process, carry out a careful site evaluation: solar access, soils, vegetation, water resources, important natural areas, etc. and let this information guide the design.



\* From BuildingGreen.com



Section iv: forms for building standards/guidelines



Provide the benefits of town-like density\*

Well-planned, town-like mixed-use development gives vibrant communities and opportunities for walking on errands. It allows cost-effective public transit.



\* From Sierra Club “Stop Sprawl” Website

Storrs Center Building Guidelines Checklist: Building Construction (Page 6 of 6)

Materials

Recycling Strategies:

- ☐ Recycling facility provided which is:
  - centrally located on ground floor or basement level
  - large enough to sort, separate, and temporarily store recyclable material
  - easily accesible to building population and to loading dock or recyclables pick-up point

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Construction Waste Management Plan:

- ☐ Construction Waste Management Plan developed and implemented which:
  - addresses waste reduction and recycling of land clearing, demolition/construction waste and consumer recyclables
  - is in accordance with the developer's requirements
  - is in accordance with the Town of Mansfield's Solid Waste Regulations

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Recycled-Content (RC) Materials:

- ☐ In aggregate, project contains 10% combined post-consumer and pre-consumer RC materials

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:

Regionally- Manufactured Materials:

- ☐ In aggregate, project contains 30% regionally-manufactured materials (within 500 miles of the project site)

Demonstrated through:

- ☐ Drawings (list):
- ☐ Specifications (list):
- ☐ Other (list):
- ☐ Final Verification:



Section iv: forms for buildings and Sitework standards/guidelines

Storrs Center Building Standards Application Form

The attached **Storrs Center Building Guidelines Checklists** represent the measures to be implemented to comply with the Storrs Center “Green” Building Standards.

Provide either:  
Name and Location of Building or Site/Civil Permit Type

Architect of Record, Engineer of Record  
or LEED Accredited Professional

Date



planning for the future\*

Robbed of the impromptu social interaction in community life that can accompany autonomous walking and biking to school in a "city of short distances" children are failing to develop a sense that they are included in their community .

We must make cities that are worthy of a child's affection, in which they can feel at home, and find "their special places"; it should be possible for children to get to know their city inside out, to "hold their city in the palm of their hand". They are, after all, the ones who will inherit the city, and become responsible for its future.



\* From liveablecities.org

Section iv: forms for buildings and Sitework standards/guidelines



The town square\*

The square that functions as a market place in the morning, a place for outdoor cafes and restaurants through the afternoon and evening, quiet and peaceful on some days, and on other days the setting for festivals, street musicians and theatrical performances, a ceremonial civic stage, and a playground for children—this is a square that brings all the diverse members of the community together in one place.



\* From liveablecities.org

Storrs Center Building Standards Final Certification Form

The attached **Storrs Center Building Guidelines Checklists** represent the measures that have been implemented to comply with the Storrs Center “Green” Building Standards.

Provide either:  
Name and Location of Building or Site/Civil Permit Type

Architect of Record, Engineer of Record,  
or LEED Accredited Professional

Date



## Section v: sources

### Reading List

*Climatic Building Design: Energy-Efficient Building Principles and Practices.* Donald Watson and Kenneth Labs. Published by McGraw-Hill Book Company, 1993.

*Environmental Building News.* This monthly newsletter is full of clear, concise information on environmental design and construction.  
[www.buildinggreen.com](http://www.buildinggreen.com)

*Green Developments CD-ROM 2.0.* Rocky Mountain Institute, 2001.

*Greening the Building and the Bottom Line: Increasing Productivity Through Energy-Efficient Design.* William D. Browning and Joseph J. Romm, Rocky Mountain Institute, 1994.

*The HOK Guidebook to Sustainable Design:* Sandra F. Mendler, AIA and William Odell, AIA. Published by John Wiley & Sons, 2000.

*How Buildings Learn.* Stewart Brand. Published by Viking Penguin, 1994. Discusses how buildings adapt over time. Photos of case studies are used throughout to show before/after states of buildings. Design principles are described for creating an adaptable/flexible building.

*LEED (Leadership in Energy and Environmental Design) Green Building Rating System: Version 2.0.* US Green Building Council (USGBC), Rev 2002. [www.usgbc.org](http://www.usgbc.org)

*A Pattern Language.* Christopher Alexander, et al. Published by Oxford University Press, 1977.



### Sustainable planning\*

Modern planning proposed the concept of "single function zoning", separating the varied functions and activities of the city. This principle (except for extreme situations of industrial contamination) has now been shown to have disastrous consequences for social sustainability as well as ecological sustainability.

We need smaller, more cellular cities with clear green boundaries, centers and focal points. The view, or the idea of the city as a whole – or the neighborhood as a whole – should provide a sense of pleasure.



\* From [liveablecities.org](http://liveablecities.org)