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United States Environmental Protection Agency

Sustainable Design and Green Building Toolkit

FOR LOCAL GOVERNMENTS

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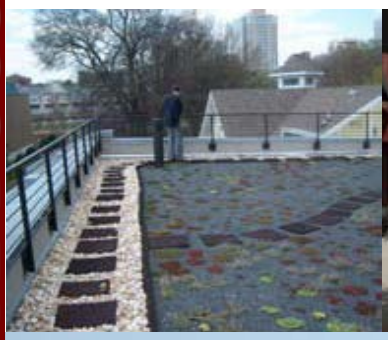

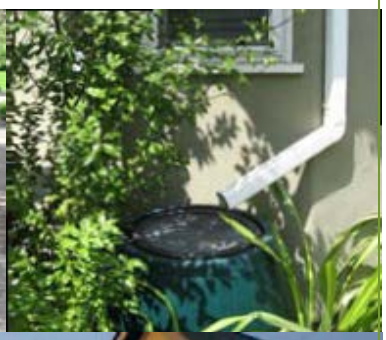

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Disclaimer

The *Sustainable Design and Green Building Toolkit for Local Governments* (Toolkit) is not intended to provide guidance on local government codes/ordinances. The information here, however, can help communities evaluate their existing codes/ordinances and apply the information to create more environmentally, economically, and socially sustainable communities. The U.S. Environmental Protection Agency (EPA) cannot attest to the accuracy of non-EPA Web sites provided in the Toolkit. Providing references to non-EPA Web sites, companies, services, or products does not constitute an endorsement by EPA or any of its employees of the sponsors of the site or the information or products presented. Furthermore, EPA does not accept any responsibility for the opinions, ideas, data, or products presented at non-EPA Web sites, or guarantee the validity of the information provided.

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Introduction

The process of designing, developing, and inhabiting the built environment has a profound influence on a community's economy, environment, and quality of life. In the United States, buildings account for approximately 36 percent of total energy consumption, 30 percent of greenhouse gas emissions, 13 percent of water use and approximately 170 million tons per year of construction and demolition (C&D) debris. Buildings also contain indoor air that can be 100 times more polluted than outside air.[1] Additionally, unsustainable building practices can have unintended social and economic consequences including sprawl, degraded local air quality, loss of farmland and open space, and health impacts due to decreased physical activity and access to healthy food. Sustainable design for the built environment challenges local officials, planners, developers, and architects to examine the connections between their buildings, the environment, and their communities. The goal is to integrate local ecology into design and construction, to reduce natural resource impacts, minimize non-renewable energy consumption, use environmentally preferable products, protect and conserve water resources, enhance indoor environmental quality, and improve operation and maintenance practices.[2]

Sustainable design includes considering not only how buildings and the surrounding site are constructed, but also where they are constructed. The Environmental Protection Agency (EPA) has many resources for local governments and the real estate industry on smart growth: compact, walkable, mixed-use development that takes advantage of existing infrastructure and protects critical natural lands. For more information on smart growth and its many environmental, economic, and social benefits, see: www.epa.gov/smartgrowth/. Also see *Essential Smart Growth Fixes for Urban and Suburban Zoning Codes* for information on how to address zoning code barriers to more sustainable development practices: www.epa.gov/smartgrowth/essential_fixes.htm

Local governments control and shape the built environment with a regulatory system that includes codes and ordinances. Communities trying to encourage sustainable design may find that their existing regulatory system presents barriers to developers wanting to use sustainable design and green building technologies and techniques. For instance, a community facing an extended drought may have a tree planting ordinance that does not specify ecologically preferable or native trees. This ordinance creates a situation where development may require irrigation in a climate where water is scarce.[3] Another type of barrier is when developers interested in green technologies or techniques have to obtain variances from codes/ordinances to implement sustainable design practices. The need to obtain variances can be more costly, time consuming, and less transparent; therefore, requiring more resources to build green. For example, communities with groundwater codes/ordinances that prohibit the installation of new wells may find geothermal heat pump wells difficult to permit. Another impediment to green building and sustainable design can occur when the code/ordinance requires a conventional system alongside the green infrastructure practice. This barrier can potentially increase costs by requiring redundant systems. For example, builders installing permeable pavers, which allow the ground to absorb the stormwater instead of letting it run offsite, may also still require the installation of curbs and pipes because the community's codes/ordinances do not provide allowances for new technologies, techniques or systems.

[1] EPA Green Building Workgroup. Buildings and their Impact on the Environment: A Statistical Summary. 2009 http://www.epa.gov/greenbuilding/pubs/gbstats.pdf

[2] Williams, Daniel E. Sustainable Design: Ecology, Architecture, and Planning. New Jersey: Wiley, 2007.

[3] Hitch, Christopher. Presentation. Smith National, Community Development Symposium in Brookfield, Wisconsin. 2008

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As the previous examples illustrate, making regulatory improvements to encourage sustainable design requires a holistic examination of the entire permitting process. Such an approach can help prevent unintended consequences of regulatory fixes that could make another aspect of sustainable design impractical or unworkable. Local governments need the appropriate information and resources to help evaluate their full suite of design and development regulations to identify and remove permitting barriers that inhibit sustainable site design and green buildings in their communities.

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Overview of the Sustainable Design and Green Building Toolkit for Local Governments

The U.S. Environmental Protection Agency (EPA) developed the *Sustainable Design and Green Building Toolkit for Local Governments* (Toolkit) to assist local governments in identifying and removing barriers to sustainable design and green building within their permitting process. This Toolkit addresses the codes/ordinances that would affect the design, construction, renovation, and operation and maintenance of a building and its immediate site. There are two sections to the Toolkit. The first section is an Assessment Tool and Resource Guide. The second section is a guide to developing an Action Plan for implementing changes within a community's permitting process.

Section 1: Assessment Tool and Resource Guide

Assessment Tool

The goal of the Assessment Tool is to help the user better understand how a jurisdiction's current codes/ordinances and permitting process might allow or disallow sustainable design and green building practices. The Assessment Tool is designed for local governments to review their permitting process and identify barriers to sustainable design. The assessment will also help communities identify sustainable construction practices that are permissible but nevertheless face resistance within the current permitting process. The Assessment Tool can be completed using the print version or by using an Excel Spreadsheet. (insert link to Excel tool here)
The Assessment Tool is divided into the following five categories, which were chosen because they have the greatest potential to reduce a building's environmental impact and remove the most commonly encountered code/ordinance barriers to sustainable design:

- **Sustainable Sites and Responsible Land Use Development:** addresses site development and minimizing the building's impact on the surrounding environment.
- **Materials and Resource Conservation:** addresses minimizing waste from the construction site and using green materials during construction.
- **Energy Conservation and Atmospheric Quality:** addresses energy conservation, promoting the use of renewable and waste energy, and minimizing the building's impact on air quality and the atmosphere.
- **Water Efficiency, Conservation, and Management:** addresses the building's water consumption and minimizing its impact on water quality.
- **Indoor Environmental Air Quality:** addresses technologies or techniques that improve indoor air quality (IAQ).

Resource Guide

The Resource Guide is provided after each of the five categories and contains links to resources that will help communities learn more about each category in the Assessment Tool. Additionally, the Resource Guide provides users with information that can aid in making codes/ordinances more compatible or supportive of sustainable design and green building. If green tools and techniques are not permitted or encouraged, this information can help local governments implement changes to allow these techniques.

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Section 2: Creating an Action Plan

The Action Plan can help communities implement necessary regulatory and permitting changes to allow for more sustainable design. The framework presented for the Action Plan is just one of many pathways to implementing changes in local permitting processes. The framework was based on collaborative decision making, change management, and communication techniques and by evaluating best practices from other local communities. There are six steps to the Action Plan: (1) establishing priorities, (2) conducting an internal situation assessment, (3) conducting an external situation assessment, (4) designing the plan, (5) implementing the plan, and (6) conducting an evaluation.

Who Should Use the Toolkit

The Toolkit was specifically developed with local governments in mind, but it can also be used by members of the development community, local government "green teams," and other building professionals.

How the Toolkit Can Help

Users can use the toolkit to conduct a guided assessment of the codes/ordinances associated with design and construction. Once the assessment is complete, the user will have an understanding of where the permitting system allows or incentivizes, or disallows and create barriers to, sustainable design and green building practices. The Resource Guide provides links to documents, tools and techniques which can help the user identify ways to overcome barriers. The Action Plan provided in Section 2 can help the user design an approach for implementing the necessary regulatory and permitting changes to allow for more sustainable design. In doing so, the user can find ways to encourage developers, contractors, and design professionals to plan for and use sustainable design tools and techniques.

How the Assessment Tool and Resource Guide Work

Assessment Tool

The Assessment Tool is divided into the following five categories which were chosen because they have the greatest potential to reduce a building's environmental impact and remove the most commonly encountered code/ordinance barriers to sustainable design:

- Sustainable Sites and Responsible Land Use Development.
- Materials and Resource Conservation.
- Energy Conservation and Atmospheric Quality.
- Water Efficiency, Conservation, and Management.
- Indoor Environmental Air Quality.

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Each category is then divided into subcategories which comprise various green initiatives that relate to the five categories. Each of these green initiatives has an objective and a rationale that explains the importance of the subcategory. The rationale also gives the user background information about the green initiative and a brief description of why it is important. Underneath the subcategory the Toolkit is then divided into six columns:

Column 1: "Overarching Questions"

These are high-level thematic questions that address the green initiatives and help provide direction on the importance of the sustainable design and green building subcategory.

Columns 2 &3: "Specific Questions" and "Potential Tools and Techniques"

The specific questions relate to the sustainable design and green building category and subcategory, and provide greater detail on the overarching questions. The local government will assess its codes/ordinances based on these specific questions. Underneath the specific question examples of sustainable design and green building tools and techniques that can be implemented to achieve the intent of each subcategory. This column can also be a guide to identify which sections of the community's codes/ordinances should be evaluated. The tools and techniques provided in this column are not designed to be definitive or exhaustive, but rather are illustrative of common approaches that local governments might use to achieve a particular sustainable design objective.

Column 4: "Assessment of Specific Questions"

Once the codes/ordinances are reviewed, Column 2 will ask for answers to the specific questions, which relate to the tools and techniques. The user will determine if the sustainable design and green building approaches addressed by the specific questions are:

- Required by code/ordinance.
- Incentives provided.
- Expressly allowed.
- Code/ordinance silent, but typically approved.
- Code/ordinance silent, but not typically approved (or approved only under special circumstances).
- Expressly prohibited.

The more specific questions that fall under "required by code/ordinance" and "incentives provided," the more one would expect to see that sustainable design practices, tools, and techniques are being implemented in the community. Conversely, if a greater number of specific questions fall under "code/ordinance silent, but not typically approved" and "expressly prohibited," this could indicate the barriers that hamper sustainable design implementation in the community. A community that is seeking to expand green buildings within its jurisdiction would want to have many of the answers to the specific questions fall under "required by code/ordinance" or "incentives provided." Please see Figure 1 for an example of the Assessment Tool.

Column 5: "Do Requirements Come from State or County?"

This column is designed to help the user designate if the specific question, tool, or technique is referenced in county or state code. This designation is important as it helps identify areas within the permitting system that could be changed more easily than others. For example, a municipality could have an easier time working on changes to the permitting system that is under the county's purview than those changes that are under the state's purview. By

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completing this column, the user can easily track how many "Yellow" and "Red" actions are designated by local or state regulations.

Column 6: "Code/Ordinance Reference"

As a user completes the assessment, it may be helpful to keep track of the questions, tools, and/or techniques and where they originate in the code. This column allows the user to note where in the code the question, tool, and/or technique is found for future reference. Often, to complete the full assessment, multiple individuals across departments will need to review the assessment questions. The ability to provide a quick cross reference in the assessment tool can aid in this type of review.

FIGURE 1: ***Example of the structure and information presented in the Assessment Tool***

Sustainable Design and Green Building

D. Water Efficiency, Conservation and Management

D.1 Water Reduction and Innovative Plumbing Systems

Objective: To increase water efficiency and conserve water within buildings by utilizing innovative plumbing systems.

Rationale: Increasing water efficiency and conserving water reduces water bills and leaves more water in the rivers, lakes and other freshwater sources. Water conservation also reduces the burden on municipal water supply and wastewater systems, saves energy from reduced amounts of water pumped, treated and distributed, and reduces wastewater treatment collection.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Allow for water use reduction through innovative plumbing systems and individual metering?	Efficient shower heads, faucets, toilets, or urinals, waterless urinals and composting toilet systems.	Is the use of high efficient and innovative plumbing fixtures and fittings encouraged?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

Throughout the Assessment Tool there are areas to tally the number of green, yellow, and red answers that were given to each specific question. These can be found at the end of each subcategory (upper right hand corner) and then again at the end of each category (bottom of the page). These tally areas are provided to help keep track of the number of green, yellow, and red answers that were given throughout the Assessment Tool. Please refer to the "How to Complete the Assessment Tool and Resource Guide" section of this document for more information on how to interpret your results.

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Resource Guide

The Resource Guide follows each of the five categories and contains links to resources that will help communities learn more about each subcategory in the Assessment Tool. The organization of the guide is as follows:

- Any quoted explanations for a trade association or referenced document were taken directly from the source information Web site.
- Any resource listed under "Other Information" provides general guidance on the sustainable design objective. All other resources are specific to the sustainable design subcategory.
- A general green building resources category is included at the end of the Assessment Tool and Resource Guide (Section F). This section provides the user with general green building resources (not specific to the items in the Assessment Tool) and resources that discuss the compliance and verification of green technologies.

How to Complete The Assessment Tool and Resource Guide

(insert link to Excel tool here)

To complete the assessment, local officials are encouraged to do the following:

1. For each subcategory, read through the sustainable design objective, rationale, and overarching question. There may be a number of overarching questions for each subcategory.

2. Review the specific questions for the subcategory and identify segments of the local codes/ordinances that might address these questions. If a specific question is not applicable to the community skip the question and move on to the next one.

3. Each specific question leads to a series of potential tools and techniques that are associated with the specific question. These are some of the tools and techniques the local government may have used in its codes/ordinances. This list can also be a guide for which sections of the community's codes/ordinances should be evaluated. Keep in mind that this list is not exhaustive.

4. Under the assessment of specific questions, assess the specific question and tools and techniques based on where local regulations lie on the flexibility/specificity spectrum and choose one of the following selections:

   - Required by code/ordinance.
   - Incentives provided.
   - Expressly allowed.
   - Code/ordinance silent, but typically allowed.
   - Code/ordinance silent, but not typically approved.
   - Expressly prohibited.

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5. If there are specific questions that are not included in the table, add them to the appropriate subcategory and provide the assessment. Likewise, feel free to add tools and techniques that the community uses to address the specific question.

6. While the assessment does not provide a score or grade, it does offer to the user an indication of potential areas for improvement. Green (required by code/ordinance or incentives provided) indicates that the community is doing well in encouraging sustainable design through its codes/ordinances and should continue. Yellow (expressly allowed or code/ordinance silent, but typically allowed) indicates that there is room for improvement within the existing permitting process. Red (code/ordinance silent, but not typically approved or expressly prohibited) indicates that the community may want to identify the cause of the barrier(s) and remove it from the process. Prior to beginning the assessment, all people who are responsible for completing the assessment should develop a common understanding of how "Yellow" may be interpreted and applied. It is important that the assessment reflects a consistent interpretation of those types of questions, tools and/or techniques that may inhibit sustainable design and green building.

7. Fill in the tally areas at the end of each subcategory and category to keep track of the number of green, yellow, and red answers that were given throughout the Assessment Tool.

8. Using the green, yellow, and red tally areas as a guide, review the Resource Guide for suggestions to overcome potential barriers to sustainable design. A community that wants to expand sustainable design practices in its jurisdiction will want to have the majority of the sustainable design subcategories fall under "required by code/ordinance" or "incentives provided." The goal is to "Get to Green!"

9. Next, the user can designate if the specific question, tool, or technique for the yellow and red coded items, are referenced in the county or state code. This designation is important as it helps identify areas within the permitting system that could be changed more easily than others. For example, a municipality could have an easier time working on changes to the permitting system under the county's purview than those changes under the state's purview. By completing this column, the user can easily track how many "Yellow" and "Red" actions are designated by local or state regulations.

10. As a user completes the assessment, it may be helpful to keep track of the questions, tools, and/or techniques and where they originate in the code. The user can note where in the code the questions, tools, and/or techniques are found for future reference. Often, to complete the full assessment, multiple individuals across departments will need to review the assessment questions. The ability to provide a quick cross reference in the assessment tool can aid in this type of cross-departmental review.

11. The final step is to develop an Action Plan to remove the identified potential barriers to sustainable design.

How to Develop an Action Plan

Once the assessment is complete, the final step is to create an Action Plan to address the major focus areas identified during the assessment. These focus areas will most likely be the areas identified as either red or yellow. An Action Plan can provide a pathway for implementing change within a community's codes/ordinances. The detailed steps for creating an Action Plan are in Section 2. The framework presented in Section 2 is just one of many possible approaches to organize the community's course of action. In general, to promote change, communities will need to ask the following questions:

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- Is the local government looking for opportunities to encourage sustainable design?
- Are policy or regulatory decisions consistent with the sustainability mission and vision of the community?
- Who are the local government champions, civic leaders, built environment professionals, and civic groups that can help address permitting barriers?
- Have the local government officials taken any green building code/ordinance training?
- Do the local government staff and officials have green building related training and/or experience with approving alternative technologies?
- How does the local government synthesize and share information on permitting decisions? Is the review of plans internal or contracted out?

The answers to these questions will influence the community's next steps after completing the assessment and developing a more complete picture of where there may be opportunities for improvement in the permitting processes. Hard questions may remain on how to create the necessary system changes that would remove the barriers to further sustainable design in the community.

Like traditional construction, final approval of a sustainably designed building and the surrounding site is subject to the local official's evaluation. The Assessment Tool, Resource Guide, and Action Plan can assist local governments in identifying and removing barriers to sustainable design and green building within their permitting process. Removing these barriers can help local officials encourage stewardship of the natural environment and promote greater quality of life within a community.

Future Topics That Could Be Addressed With The Assessment Guide

Please note that the sustainable design aspects currently listed in the Toolkit (e.g. Sustainable Sites and Responsible Land Use Development, Materials and Resource Conservation, etc.) are not all-inclusive. Additional topics that could be addressed by local governments within the framework of this Toolkit include Community Gardens, Complete Streets and Neighborhood Connectivity, Disaster Resiliency and Adaptability, and Sustainability and Historic Preservation. Each of these topics requires a different set of questions, tools and techniques that are not presented in this Toolkit. However, each of these topics has been raised by local governments as important factors making local communities more resilient economically, culturally, and ecologically. Each of these topics is briefly explored in Appendix A, and other resources are offered for users interested in adding these components to their assessment methodology. These topics may be explored in greater detail in future versions of the Toolkit.

Section 1: Sustainable Design Permitting Assessment Tool and Resource Guide

Before beginning the Assessment Tool, it may be helpful to answer the following questions to gain a better understanding of the current local context and how these factors contribute to the outcome of the assessment and next steps:

- Have the most recent model codes/ordinances been adopted? Which ones (list the most common)?
- If model codes/ordinances are in place, are they enforced?

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- If model codes/ordinances are not in place, are the existing codes/ordinances highly prescriptive or is there room, or requirement, for interpretation?
- If there is room for interpretation, is there a policy that supports and defines parameters for interpretation?
- Is there periodic review of codes/ordinances? If so, by whom?
- Is there a clear process for variances? Who has the authority to grant variances, and is the granting of a variance a rare or common activity?

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A. Sustainable Sites and Responsible Land Use Development

A.1 Site Development and Preservation of Natural Areas

Objective: To conserve or restore natural areas to reduce the impact of development on natural systems, including minimizing the built-upon area footprint.

Rationale: Natural areas protect water and air quality, provide wildlife habitat and recreational areas, protect human health, and connect people to nature.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for preservation or protection of critical natural resources such as: streams, wetlands, floodplains, critical wildlife habitat, steep slopes, and drinking water sources?	Buffer ordinances. Buffer design requirements (width, vegetation, maintenance). Stormwater credits.	Do the codes/ordinances provide for a river and stream buffer to protect water quality and habitat in streams and rivers?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Buffer ordinances. Buffer design requirements (width, vegetation, maintenance). Stormwater credits.	Do the codes/ordinances for the river and stream buffer include lakes, wetlands and coastal waters to protect water quality and habitats in these waters?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Buffer ordinances. Buffer design requirements. Restoration guidelines.	Are there replacement or restoration requirements for buffer disturbances when it is absolutely necessary to disturb the vegetated buffer?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Source water protection ordinances. Setback requirements. Zoning	Are there drinking water sources protection requirements to ensure the	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	approaches. Protection practices (e.g., double wall underground storage tanks).	source of drinking water will not be adversely impacted by the project?	R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
	Floodplain protection ordinance. Floodplain protection mitigation and restoration. Floodplain zoning incentives.	Are there floodplain protection requirements to protect and/or restore the floodplain?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Steep slope or mountain ridge protection ordinances. Steep slope or mountain ridge protection incentives. Stormwater credits.	Are there steep slope or mountain ridge protection requirements to protect slopes from uses that may endanger the community?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Provide for open space preservation such as natural land preservation, green space creation, or conservation developments and cluster designs for new and re-development?	Open space ordinances. Maximum grading allowance. Flexible setbacks. Imperviousness limits. Impact fee reductions. Building height variance. Zoning approaches such as transfer development rights.	Is there a standard for natural resource preservation or green space creation to provide connected natural environments and provide passive recreation opportunity?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Conservation development criteria or ordinances. Cluster development	Are conservation developments and/or cluster designs allowed in order to	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	criteria or ordinances. Zoning approaches. Incentives such as: variance in building height restriction, shared driveways, expedited permit review, reduced fees, etc.	protect and connect natural environments?	R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
Protect existing trees, such as dense tree canopies, specimen trees, and important community trees?	Tree ordinances. Tree removal permits. Street tree designs. Tree credits. Replacement ratios. Stormwater or landscape credits.	Are there requirements for tree preservation to provide urban habitat for wildlife, provide cooling effect for pavement and rooftops, reduce stormwater runoff, and provide for cleaner air?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Allow modified street and/or driveway design to minimize natural resource destruction?	Green street ordinances. Context sensitive street designs. Utilities consolidated on one side of street. Stormwater or landscape credits.	Is there flexibility in street and driveway design for reduced street or driveway widths, reduced sidewalks (one side only) on residential or other low-use streets to reduce the amount of impervious pavement?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Permeable pavement information. Stormwater credits.	Is there flexibility in design material such that permeable pavements or	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
		pavers are accepted on residential or other low use streets or driveways to provide for stormwater infiltration?	R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
	Modified curb and gutter designs. Stormwater or landscape credits.	Are modified curb or gutters systems such as swale only, reverse curbs, or curb cuts with rain gardens, etc. allowed to provide for stormwater infiltration and evaporation?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Modified cul-de-sac designs. Permeable pavement information. Stormwater credits.	Are modified cul-de-sac designs allowed to provide for reduced impervious pavement?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Allow modified parking requirements to minimize natural resource destruction?	Green parking ordinances. Green parking designs. Maximum parking limit. Parking study examples. Stormwater credits. Parking fee structure to encourage public transportation.	Are requirements in place that allow for reduced parking requirements, credit for shared parking or street parking, or under-structure parking to result in reduced impervious pavement?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION A.1 TOTALS G: _____ Y: _____ R: _____					

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A.2 Promote Infill and Redevelopment

Objective: To reduce development on natural lands by providing options for redevelopment and infill in areas with existing infrastructure.

Rationale: Communities can realize a significant reduction in regional stormwater runoff if they take advantage of underused properties such as abandoned or underutilized shopping centers. Redevelopment in these areas takes advantage of existing roads and utility infrastructure which can mean that the local government will not have to spend as much to maintain new infrastructure in the future. This leaves large areas of open space undeveloped.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Differentiate requirements for infill and redevelopment versus new development to minimize natural resource destruction and provide energy economies?	Density bonus incentives. Streamline permitting. Special tax zones or increment finance districts. Mixed use development ordinances and criteria.	Are there requirements in place to encourage infill or redevelopment in areas with existing infrastructure (i.e., provide expedited permit review, reduced fees, cost sharing) to reduce the need for new road and water infrastructure?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Establish urban growth boundaries to discourage development in farmlands and forests?	Urban growth boundary ordinances. Purchase of Development Rights Program. Agricultural Conservation Easement.	Are there established urban growth boundaries such as large lot or agricultural only zoning outside urban boundaries to keep the urban area compact and allow the rural areas to have fewer impervious surfaces?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

SECTION A.2 TOTALS

G: _____ Y: _____ R: _____

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A.3 Construction Phase Pollutant Control

Objective: To reduce construction phase pollution by controlling soil erosion, sedimentation, and airborne dust during site development.

Rationale: Water quality can be degraded by excessive erosion from stormwater runoff and airborne dust at construction sites when the land cover (vegetation) is removed and bare soil is exposed to rain and wind. Additionally, materials used at construction sites such as petroleum, herbicides, solvents, and concrete washout can enter the waterways during rain events unless properly controlled.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for erosion and sediment controls (E&SC) during the construction phase?	E&SC ordinance meeting EPA's numeric effluent limitation guidelines. E&SC best management practices (BMPs) based on EPA's numeric effluent limitation guidelines. E&SC best management manuals based on EPA's numeric effluent limitation guidelines. Third party inspection requirements.	Are there E&SC requirements for land disturbing activities to reduce the excessive erosion and sedimentation from land disturbing activities?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	E&SC incentives. Surety or bonding requirements.	Are there incentives for developers that are high performers in E&SC, such as streamlined permitting, fewer inspections, etc. to encourage highly successful E&SC site management?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Clearing and grading ordinance. Construction phasing requirements that	Are there clearing and grading requirements that limit the amount of exposed soil on the construction	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	immediately cover exposed soil on the construction site.	site to reduce the potential for erosion and sedimentation?	R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
Provide for control of other pollutants at the construction site such as petroleum, herbicides, solvents, and concrete washout to prevent migration of the associated pollutants into waterways?	Good housekeeping requirements. Petroleum containment and disposal specifications. Concrete washout containment and disposal specifications. Solvent handling and disposal specifications. Herbicides/ pesticide/ fungicide handling/ disposal specifications. Construction debris containment and disposal specifications.	To prevent migration of pollutants to waterways, are there requirements for: • Petroleum containment on the construction site? • Concrete washout containment on the construction site? • Solvents handling? • Herbicides, pesticides, fungicides handling? • Construction debris handling?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Provide for control of dust to protect air quality?	Dust management specifications.	Are there requirements for dust management on the construction site to prevent offsite migration of dust and other pollutants?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Provide for lower emission construction equipment to protect air quality?	Clean diesel specifications in municipal projects. Clean construction initiatives.	Are there requirements for the construction equipment to be fitted with clean diesel equipment or alternative fuels to reduce greenhouse gas emissions?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
SECTION A.3 TOTALS G: _____ Y: _____ R: _____					

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A.4 Post-Construction Stormwater Management

Objective: To maintain the predevelopment hydrology of the development site with regard to the temperature, rate, volume, and duration of flow.

Rationale: In the natural environment, rain falls and is quickly absorbed by trees, other vegetation, and the ground. Runoff occurs only during large rainfall events. Traditional development practices cover large areas of the ground with impervious surfaces such as roads, driveways, sidewalks, and buildings, reducing the interception and infiltration of rainfall and causing excessive stormwater runoff rates and volumes that result in stream scour, habitat degradation, and local flooding.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for the maintenance of predevelopment hydrology for new and redevelopment projects?	Post-construction stormwater management ordinances. Post-construction best management practice specifications (e.g., green roofs, rain gardens, wet ponds). Redevelopment incentives. Retrofitting incentives.	Is there a post-construction control code/ ordinance or requirements in the codes/ ordinances?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Stormwater design manuals. Energy Independence and Security Act (EISA) Section 438 Guidance. Redevelopment incentives. Retrofitting incentives.	Do the codes/ordinances provide for maintaining pre-development hydrology?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Stormwater design manuals. Post-construction best management practice specifications	Is there a stormwater design manual or are there design specifications in the codes/ ordinances?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question			Do Requirements Come from State or Country?	Code/ Ordinance Reference
	(e.g., green roofs, rain gardens, wet ponds).		R	❑	Code/ordinance silent, but not typically approved		
				❑	Expressly prohibited		
	Redevelopment incentives. Retrofitting incentives. Post-construction stormwater credits.	Are there incentives for redevelopment projects in the codes/ ordinances?	G	❑	Required by code/ordinance	☐ Yes, State ☐ Yes, County ☐ No	
				❑	Incentives provided		
			Y	❑	Expressly allowed		
				❑	Code/ordinance silent, but typically allowed		
			R	❑	Code/ordinance silent, but not typically approved		
				❑	Expressly prohibited		
Provide for green streets and alleys options?	Permeable pavement specifications. Green street design incentives.	Are there options for green streets or alleys in the codes/ ordinances which allow for reduced width streets, permeable pavements, substitution of curb and gutter with swales, reverse curbs, curb cuts, rain gardens, etc.? Are there incentives for redevelopment to reduce the need for new streets?	G	❑	Required by code/ordinance	☐ Yes, State ☐ Yes, County ☐ No	
				❑	Incentives provided		
			Y	❑	Expressly allowed		
				❑	Code/ordinance silent, but typically allowed		
			R	❑	Code/ordinance silent, but not typically approved		
				❑	Expressly prohibited		
Provide for green parking options?	Permeable pavement specifications. Green parking design incentives.	Are there options for green parking lots including permeable pavements, rain gardens, substitution of curb and gutter systems as above?	G	❑	Required by code/ordinance	☐ Yes, State ☐ Yes, County ☐ No	
				❑	Incentives provided		
			Y	❑	Expressly allowed		
				❑	Code/ordinance silent, but typically allowed		

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
		Are there maximum parking requirements versus minimum parking requirements to discourage overbuilding parking? Is shared parking an option?	R ❑ Code/ordinance silent, but not typically approved ❑ Expressly prohibited		
SECTION A.4 TOTALS G: _____ Y: _____ R: _____					

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A.5 Heat Island Effect

Objective: To reduce heat islands created by large areas of pavement and/or rooftops for protection of human health and the environment.

Rationale: Rooftops, roads, parking lots and other paved surfaces absorb and retain heat, leading to an increase in air temperatures in the immediate area. Higher air temperatures contribute to higher energy costs for air conditioning, compromise human health, and increase air pollution.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for reducing the creation of heat islands in new and re-development projects?	Green roof specifications. Green parking specifications. Green street specifications. Incentives for reducing heat islands. Low reflectance roof coverings. Permeable pavement specifications.	Are there requirements to minimize the heat generated from rooftops, parking areas, streets, and driveways?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Tree specifications, such as native species lists, placement guides, maintenance requirements, canopy requirements, etc.	Are there incentives for maintaining or restoring tree canopies?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION A.5 TOTALS G: _____ Y: _____ R: _____					

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A.6 Light Pollution Reduction

Objective: To improve night skies visibilities, minimize light trespass, and reduce night light impacts on flora and fauna.

Rationale: Light pollution is misdirected or misused light that wastes energy by allowing light to escape into the night sky. Light pollution can also reduce visibility and therefore safety and security at night. It can also harm nocturnal wildlife and ecosystems (e.g., sea turtles moving towards outdoor lights rather than the moonlit ocean). Outside lighting should be directed only to the space that needs to be lit for public safety.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for reducing light pollution impacts such as reducing sky-glow and light trespass?	Dark or night skies ordinances. Outdoor lighting codes/ ordinances. Light levels or SmartCodes. Simple guidelines for lighting regulations.	Do the codes/ ordinances require reduction in sky-glow and light trespass, including design criteria such as illumination cone maximums, automatic timing devices, low reflectance surface requirements, spotlight limitations?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Outdoor lighting codes/ordinances. Light levels or SmartCodes. Simple guidelines for lighting regulations.	Do the codes/ ordinances have maximum rather than minimum outdoor lighting requirements to reduce the impacts on night skies, light trespass, and wildlife?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

SECTION A.6 TOTALS

G: _____ Y: _____ R: _____

SECTION A TOTALS

G: _____ Y: _____ R: _____

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A.1. Site Development and Preservation of Natural Areas

Buffer Information

- **EPA Guide on Aquatic Buffer Ordinances** – Includes model ordinance language, example ordinances, and supporting documentation. http://www.epa.gov/owow/nps/ordinance/buffers.htm
- **The Stormwater Manager's Resource Center** – Links to assorted model ordinances including stream buffers. This Web site has a stormwater manual builder that includes providing credits for site development activities like buffer preservation. http://www.stormwatercenter.net/
- **Carl Vinson Institute of Government, University of Georgia** – Guidance for local governments on developing scientifically defensible riparian buffers. http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf
- **EPA: Riparian Buffer Widths, Vegetative Cover, and Nitrogen Removal Effectiveness: A Review of Current Science and Regulation** – Guide on riparian buffer widths, vegetative cover and nitrogen removal effectiveness. nepis.**epa**.gov/Exe/ZyPURL.cgi?Dockey=2000O182.txt
- **North Carolina State University Riparian Buffers: What are They and How do They Work?** – General information on riparian buffer systems. http://www.soil.ncsu.edu/publications/BMPs/buffers.html
- **Virginia Cooperative Extension Services: Understanding the Science Behind Riparian Forest Buffers: Planning, Establishment, and Maintenance** – Guidelines for planning, establishment, and maintenance of riparian buffers. http://www.pubs.ext.vt.edu/420/420-155/420-155.html

Source Water Protection Information

- **EPA Guide on Source Water Protection Ordinances** – Includes model language, examples, and supporting documentation. http://www.epa.gov/nps/ordinance/sourcewater.htm
- **EPA Guide on Local Planning and Regulatory Approaches to Source Water Protection** – Identifies ways that local entities can plan for and implement source water protection. Contains links to technical guidances, funding, best management practice tools and resources. http://cfpub.epa.gov/safewater/sourcewater/sourcewater.cfm?action=Protection#
- **EPA Guide on Source Water Protection Practices** – Includes topics on managing underground storage tanks. http://cfpub.epa.gov/safewater/sourcewater/sourcewater.cfm?action=Publications&view=filter&document_type_id=103

Floodplain Protection Information

- **No Adverse Impact Floodplain Management Tool, Association of State Floodplain Managers** – "Offers local governments a way to prevent the worsening of flooding and other negative impacts on the community." http://www.floods.org/index.asp?menuID=460
- **Association of State Floodplain Managers, State and Local Resources** – An organization for professionals involved in floodplain management, flood hazard mitigation, flood preparedness, and flood warning and recovery." http://www.floods.org/
- **Federal Emergency Management Agency (FEMA) Floodplain Management Requirements** – Information and model ordinances for the National Flood Insurance Program. http://www.fema.gov/plan/prevent/floodplain/index.shtm

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- **FEMA Floodplain Management Tools** – Strategies and tools to maintain or restore floodplain resources. http://training.fema.gov/EMIWeb/edu/docs/fmpcp/Chapter%209%20-%20Strategies%20and%20Tools%20to%20Maintain%20or%20Restore.pdf
- **Virginia Department of Conservation and Recreation Floodplain Management Regulations** – Example regulation. http://www.dcr.virginia.gov/dam_safety_and_floodplains/fpregs.shtml
- **Urban Drainage and Flood Control District: Urban Drainage Criteria Manual Volume 3** – Provides guidance for the selection and design of stormwater quality best management practices and guidelines that could be adopted into local code. http://www.udfcd.org/downloads/down_critmanual.htm

Steep Slope Protection Information

- **Town of Somers, New York** – Example ordinance language. http://landuse.law.pace.edu/landuse/documents/laws/reg2/SomersNYSteepSlopesPro.doc
- **Western North Carolina's Land of Sky Regional Council** – Guidance and initiative on mountain ridge and steep slope protection. This document has been cited by the National Association of County Planners (NACHP) as a useful resource in county planning. http://landofsky.org/planning/p_mountain_ridge_steep_slope.htm
- **Mountain Ridge and Steep Slope Protection** – "A report compiled by a broad-based stakeholder group in western North Carolina which describes the problems associated with development in steep mountainous areas." http://www.countyplanning.org/mountain-ridge-and-steep-slope-protection-strategics-431/
- **Center for Environmental Excellence** – American Association of State Highway and Transportation Officials (AASHTO) guide for roadside management of steep slopes. http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/10_13.aspx

Open Space Information

- **EPA Guide and Model Ordinance for Open Space Protection** – "Alternative site planning technique that concentrates dwelling units in a compact area to reserve undeveloped space elsewhere on the site. In this technique, lot sizes, setbacks, and frontage distances are minimized to allow for open space." http://www.epa.gov/owow/nps/ordinance/openspace.htm
- **St. Louis County, MO Planning and Zoning Strategies for Water Quality Protection** – Includes information on Planned Unit Development (PUD) performance criteria, overlay zoning, conservation subdivision ordinance, infill redevelopment, floodplain ordinance, conservation easements, and tree preservation. http://www.cityofbn.com/downloads/PZManualFinalDraft.pdf
- **Open Space Residential Design** – Web site provides model open space design ordinances, case studies, and information. http://greenneighborhoods.org/index.html
- **Chicago's Open Space Impact Fee Ordinance Fact Sheet** – Open space impact fees are charges imposed as a condition of building permit approval for new residential development. http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Buildings%2fContent&deptMainCategoryOID=-536901233&entityName=Buildings&topChannelName=Dept&contentOID=536988877&contenTypeName=COC_EDITORIAL
- **EPA Smart Growth and Open Space Conservation** – Numerous tools and technical resources to help communities become more proactive in conservation planning. http://epa.gov/smartgrowth/openspace.htm

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- **Context Sensitive Design** – "A collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions." www.contextsensitivesolutions.org/

Tree Protection and Ordinances Information

- **Duerksen and Snyder**, *Nature-Friendly Communities: Habitat Protection and Land Use Planning*, (Island Press 2005).
- **City Trees: Sustainability Guidelines and Best Practices –** Guidelines that identify a comprehensive approach to locating, planting, and caring for trees by integrating complimentary best practices. http://www.cleanwatermn.org/Documents/MS4%20toolkit%20files/Post%20construction%20stormwater%20management/Brochures%20&%20manuals/Forests/City%20trees%20manual.pdf
- **American Forests Guide to Setting Urban Tree Canopy Goals** – "General goal guidelines based on geographic and climate conditions and land use categories." http://www.americanforests.org/?s=Urban+Tree+Canopy+Goals&x=0&y=0
- **Center for Watershed Protection Urban Watershed Forestry Manual Part 3** – Provides detailed guidance on urban tree planting that is applicable at both the development site and the watershed scale. http://www.cwp.org/categoryblog/98-forestry.html
- **Duerksen and Richman**, *Tree Conservation Ordinances*, American Planning Assn. PAS Report No. 446 (1993) Zoning Practice: Tree Preservation (American Planning Assn. July 2006).
- **Trees for Green Streets** – Describes the role of street trees in managing stormwater and includes detailed color drawings of the trees that best perform this function in the Portland metropolitan area. http://www.metro-region.org/index.cfm/go/by.web/id=26337
- **Portland, OR, Tree Preservation on Your Land Division Site –** Tree preservation information guide. http://www.sustainableportland.org/shared/cfm/image.cfm?id=72545
- **Chapel Hill Tree Protection Ordinance –** Example of local government tree protection ordinance; includes a tree canopy measurement template and guidance on measuring tree canopy. http://www.townofchapelhill.org/index.aspx?page=879
- **Center for Urban Forest Research, U.S. Forest Service –** Provides research information on the benefits of urban trees. http://www.fs.fed.us/psw/programs/cufr/
- **Portland, OR Stormwater Fee** – Portland's Clean River Rewards Program gives a discount for trees over 15 feet tall. http://www.portlandonline.com/bes/index.cfm?c=43444&#types

Green Streets and Parking Information

- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **EPA Managing Wet Weather with Green Infrastructure: Municipal Handbook** – Provides information on design, local examples, and implementation hurdles and lessons learned: http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf
- **EPA Wetlands, Oceans, and Watersheds Green Street Initiatives Around the United States** – Provides examples and resources on different green street initiatives throughout the U.S. http://www.epa.gov/owow/podcasts/greenstreetsusa.html

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- **Portland, OR, Zoning Ordinance** – "Eliminates minimum parking requirements in the central city district and for sites located within 500' of a high-capacity transit station. The city's zoning ordinance specifies maximum parking requirements for areas outside the central city district, which vary depending on the use and the distance from a light rail station." http://www.portlandonline.com/shared/cfm/image.cfm?id=53320
- **Chattanooga Zoning Regulations (Art. V. 1705)** – Parking reduction standard in Chattanooga, TN. http://www.chattanooga.gov/city_council/code/41%20--%20code%20appendix%20b%20-%20zoning%20ordinance.pdf
- **City and County of San Francisco Municipal Code Planning Code (Art. 1.5 Sec. 166)** – Shared parking standards. http://www.municode.com/Resources/gateway.asp?pid=14139&sid=5
- **EPA Parking Spaces/Community Places** – Report describing approaches "to help communities explore new, flexible parking policies that can encourage growth and balance parking needs with their other goals. The EPA developed this guide for local government officials, planners, and developers in order to: demonstrate the significance of parking decisions in development patterns; illustrate the environmental, financial, and social impact of parking policies; describe strategies for balancing parking with other community goals; and provide case studies of places that are successfully using these strategies." http://www.epa.gov/smartgrowth/parking.htm
- **California's Parking Cash-Out Law, California Air Resources Board** – "State law requires certain employers who provide subsidized parking for their employees to offer cash allowance in lieu of a parking space… The intent of the law is to reduce vehicle commute trips by offering employees the option of "cashing out" their subsidized parking space and taking transit, biking, walking, or carpooling to work." http://www.arb.ca.gov/planning/tsaq/cashout/cashout.htm
- **EPA Green Streets** – Outlines green street initiatives throughout the U.S. www.epa.gov/owow/podcasts/greenstreetsusa.html
- **Low Impact Development (LID) Center Green Streets –** Highlights significant Green Highways and Green Streets programs as examples and guidance for communities and institutions that are developing green infrastructure strategies. http://www.lowimpactdevelopment.org/greenstreets/

Permeable Pavements Information

- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **EPA Porous Asphalt Pavement**: Provides information on design and effectiveness, and links to several resources: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=135&minmeasure=5
- **North Carolina State University** – Permeable pavement research. http://www.bae.ncsu.edu/info/permeable-pavement/
- **University of Central Florida** – Permeable pavement research. http://www.stormwater.ucf.edu/research_publications.asp

General Sustainable Site Design Information

- **The Stormwater Manager's Resource Center** – Links to assorted fact sheets for guidance on land planning, land conservation, aquatic buffers, better site design (BSD), E&SC, stormwater management practices, stream restoration practices, non-stormwater discharges, and pollution prevention; and ordinance selector for model ordinances for aquatic resource protection including post-construction stormwater management, stream buffer ordinances, illicit detection and elimination measures, E&SC requirements,

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open space design zoning controls, Operation and Maintenance criteria for stormwater practices, and groundwater protection ordinances. http://www.stormwatercenter.net/

- **EPA Polluted Runoff (Nonpoint Source Pollution) LID** – "LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible." http://www.epa.gov/nps/lid/
- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **Georgia Stormwater Management Manual Volume 2: Technical Handbook – "A technical engineering handb**ook for implementing stormwater management measures for new development and redevelopment." See Chapters 1-4 on stormwater management planning and design, stormwater hydrology, structural stormwater controls, and stormwater drainage system design. http://www.georgiastormwater.com/
- **EPA Managing Wet Weather with Green Infrastructure Handbook Series** – Includes the Water Quality Scorecard, Funding Options, Retrofit Policies (for stormwater programs), Green Streets, Rainwater Harvesting, and Incentive Mechanisms Handbooks. http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm#municipalhandbook
- **Center for Watershed Protection BSD Resources** – BSD techniques seek to minimize negative impacts of new development on water resources like low-impact development, environmentally-sensitive design, and green infrastructure. Resources related to BSD techniques, development code recommendations, and local incentives to adopt BSD. http://www.cwp.org/Resource_Library/Better_Site_Design/index.htm
- **The Green Buildings Guide: Tools for Local Governments to Promote Site Sustainability** – By West Coast Environmental Law. See Section 2: Regulatory and Policy Tools to Increase Green Building Design and Practices in the Private Sector. http://wcel.org/resources/publication/green-buildings-guide-tools-local-governments-promote-site-sustainability
- **EPA Essential Smart Growth Fixes for Urban and Suburban Zoning Codes** – "Essential Fixes" addressing the most common barriers local governments face in implementing smart growth and actions that the community could take to overcome each barrier. Communities can apply parts of fixes or multiple fixes or entirely overhaul their codes. http://www.epa.gov/smartgrowth/essential_fixes.htm
- **Sustainable Sites Initiative Guidelines and Performance Benchmarks 2009** – The document "aims to describe benchmarks that are based on sustainable outcomes rather than on strict prescriptions and specific technology, thereby encouraging innovation, inspiring a change in thinking, and providing flexibility." The document includes numerous case studies and appendices with guidance tables and worksheets. http://www.sustainablesites.org/report/Guidelines%20and%20Performance%20Benchmarks_2009.pdf

Other Information

Additional information may be available from these organizations and initiatives dedicated to sustainable site development.

- **Urban Land Institute (ULI)** – ULI is a nonprofit research and education organization that promotes responsible land use and development by publishing resources, recognizing advances in policy and practice, and finding solutions for land use challenges. http://www.uli.org/
- **Congress for New Urbanism (CNU)** – CNU promotes walkable, neighborhood-based development as an alternative to sprawl. http://www.cnu.org
- **Smart Growth Network** – The Smart Growth Network seeks "to improve development practices in neighborhoods, communities, and regions across the U.S. It is a forum for: raising public awareness of how

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growth can improve quality of life; promoting smart growth best practices; developing and sharing information, innovative policies, tools, and ideas; and cultivating strategies to address barriers to and advance opportunities for smart growth." http://www.smartgrowth.org/

- **Sustainable Sites Initiative** – "An interdisciplinary effort by the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center and the U.S. Botanic Garden to create voluntary national guidelines and performance benchmarks for sustainable land design, construction and maintenance practices." http://www.sustainablesites.org/
- **American Planning Association** – The American Planning Association is an independent, not-for-profit educational organization that provides leadership in the development of vital communities by advocating excellence in community planning, promoting education and citizen empowerment, and providing the tools and support necessary to meet the challenges of growth and change. Requires membership. http://planning.org
- **Local Government Commission** – The Local Government Commission assists local governments in establishing and nurturing the key elements of livable communities: a healthier human and natural environment, a more sustainable economy, an actively engaged populace, and an equitable society. Requires membership. http://lgc.org

A.2. Promote Infill and Redevelopment

Infill and Redevelopment Information

- **EPA Essential Smart Growth Fixes for Urban and Suburban Zoning Codes** – "Essential Fixes" addressing the most common barriers local governments face in implementing smart growth and actions that the community could take to overcome each barrier. Communities can apply parts of fixes or multiple fixes or entirely overhaul their codes. http://www.epa.gov/smartgrowth/essential_fixes.htm
- **EPA Protecting Water Resources with Higher-Density Development** – EPA explores the impacts of high- and low-density development on water resources. Modeled are "three scenarios of different densities at three scales: one-acre level, lot level, and watershed level and at three different time series [building] out examples to examine the premise that lower-density development is always better for water quality… Findings indicate that lower-density development may not always be the preferred strategy for protecting water resources." http://www.epa.gov/smartgrowth/water_density.htm
- **Smart Growth Toolkit** – Smart Growth Leadership Institute's toolkit to help communities untangle the thicket of policies and procedures that get in the way of implementing smart growth strategies. http://www.sgli.org/toolkit/smart-growth-toolkit/
- **US Green Building Council LEED-ND** -- integrates principles of smart growth, urbanism and green building into the first national system for neighborhood design: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222
- **Portland OR, Metro Regional Government Urban Growth Boundary** – Oregon law that mandates that each city or metropolitan area in the state has an urban growth boundary that separates urban land from rural land. http://www.metro-region.org/index.cfm/go/by.web/id/277
- **Lexington-Fayette County, KY, Purchase of Development Rights Program** – The first Agricultural Conservation Easement program by a local government in the Commonwealth of Kentucky. www.lexingtonky.gov/index.aspx?page=497
- **American Farmland Trust –** A National View of Agricultural Farmland Easements. http://www.farmland.org/

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- **Phoenix, AZ, Infill Incentives, Policy Link** – Infill housing program ordinance. http://www.ci.phoenix.az.us/BUSINESS/infilpgm.html

Other Information

- **Smart Growth Network** – The Smart Growth Network seeks "to improve development practices in neighborhoods, communities, and regions across the U.S. It is a forum for: raising public awareness of how growth can improve quality of life; promoting smart growth best practices; developing and sharing information, innovative policies, tools, and ideas; and cultivating strategies to address barriers to and advance opportunities for smart growth." http://www.smartgrowth.org/

A.3. Construction Phase Pollutant Control

E&SC Information

- **National Pollutant Discharge Elimination System (NPDES) Construction Site Stormwater Runoff Control BMPs –** Resources for construction site stormwater runoff control. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4
- **EPA Model Ordinances to Protect Local Resources: E&SC** – Includes a model ordinance as well as ordinances drafted in various jurisdictions and supporting materials. http://www.epa.gov/owow/NPS/ordinance/
- **Center for Watershed Protection Information on E&SC** – Resources are related to Stormwater Management. http://www.cwp.org/your-watershed-101/stormwater-management.html
- **The Stormwater Manager's Resource Center** – Model E&SC ordinances. http://www.stormwatercenter.net/

Clean Diesel and Air Emissions Information

- **EPA Clean Construction USA –** The Web site is part of the National Clean Diesel Campaign (NCDC), an innovative program designed to promote the reduction of diesel emissions from construction equipment and vehicles. http://www.epa.gov/cleandiesel/documents/420f05012.pdf
- **EPA Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites** – EPA technology primer for the remediation of contaminated sites. http://www.cluin.org/download/remed/Green-Remediation-Primer.pdf

A.4. Post Construction Stormwater Management

Stormwater BMP Information

- **EPA NPDES National Menu of Stormwater BMPs for Post-Construction –** Presents innovative practices to treat, store, and infiltrate runoff onsite before it can affect water bodies downstream. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5
- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **EPA Polluted Runoff (Nonpoint Source Pollution) LID** – Contains LID fact sheets and reports, design and guidance manuals, and other resources. http://www.epa.gov/nps/lid/
- **EPA Managing Wet Weather with Green Infrastructure Handbook Series** – Includes Water Quality Scorecard, Funding Options, Retrofit Policies [for stormwater programs], Green Streets, Rainwater

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Harvesting, and Incentive Mechanisms Handbooks. http://www.dep.wv.gov/WWE/Programs/stormwater/MS4/guidance/handbooks/Pages/default.aspx

- **Center for Watershed Protection (CWP) Stormwater Management –** Contains resources for Post-Construction Guidance, Other National/Regional Guidance, CDs, State Stormwater Manuals, Practice Articles, and Links. http://www.cwp.org/your-watershed-101/stormwater-management.html
- **The Stormwater Manager's Resource Center** – See links to: assorted fact sheets for guidance on land planning, land conservation, aquatic buffers, BSD, E&SC, stormwater management practices, stream restoration practices, non-stormwater discharges, and pollution prevention; and ordinance selector for model ordinances for aquatic resource protection including post-construction stormwater management, stream buffer ordinances, illicit detection and elimination measures, E&SC requirements, open space design zoning controls, operation and maintenance criteria for stormwater practices, and groundwater protection ordinances. http://www.stormwatercenter.net/
- **Georgia Stormwater Management Manual Volume 2: Technical Handbook** – "A technical engineering handbook for implementing stormwater management measures for new development and redevelopment." See Chapters 1-4 on stormwater management planning and design, stormwater hydrology, structural stormwater controls, and stormwater drainage system design. http://www.georgiastormwater.com/
- **EPA Using Smart Growth Techniques as Stormwater BMPs** – "To help communities that have adopted smart growth policies and plans recognize the water benefits of those smart growth techniques and suggest ways to integrate those policies into stormwater planning and compliance." http://www.epa.gov/smartgrowth/stormwater.htm
- **Center for Watershed Protection BSD Resources** – BSD techniques seek to minimize negative impacts of new development on water resources like low-impact development, environmentally-sensitive design, and green infrastructure. Contains resources related to BSD techniques, development code recommendations, and local incentives to adopt BSD. http://www.cwp.org/documents/cat_view/77-better-site-design-publications.html
- **Center for Watershed Protection Restoration and Watershed Stewardship** – Presents material on stream repair, riparian and upland pervious area restoration, residential stewardship, and municipal housekeeping. http://www.cwp.org/Resource_Library/Restoration_and_Watershed_Stewardship/index.htm

Green Roof Information

- **Reducing Urban Heat Islands: Compendium of Strategies, Green Roofs Chapter:** Coves green roof types, benefits and costs of green roofs, and green roof initiatives: http://www.epa.gov/hiri/resources/pdf/GreenRoofsCompendium.pdf
- **Green Roofs for Healthy Cities** – U.S. non-profit, green roof industry association. http://www.greenroofs.org/
- **Cool Roofs Rating Council** – Independent, non-profit organization that maintains a third-party rating system for radiative properties of roof surfacing materials. http://www.coolroofs.org/
- **Green Grid Green Roof Systems** – Innovative green roof system. http://www.greengridroofs.com/
- Guide specifications: http://www.greengridroofs.com/pdf_docs/B-GG-2%20Spec%20Sheet.pdf
- System specifications: http://www.greengridroofs.com/specs/systemspecs.htm
- **Green Roof Legislation, Policy, and Tax Incentives**: Site tracks green roof policy at the local, state, and national level. http://myplantconnection.com/green-roofs-legislation.php
- **Portland, OR, City Resolution** – Passed in 2005; requires all new city-owned facilities to include an ecoroof with 70 percent coverage and high reflectance, ENERGY STAR-rated roof material on remaining

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surface area; or ENERGY STAR material when that is impractical. http://www.portlandonline.com/shared/cfm/image.cfm?id=112682

Rainwater Harvest/Reuse Information

- **American Rainwater Catchment Systems Association (ARCSA)** – Rainwater Harvesting Resources and Publications. http://www.arcsa.org/content.asp?pl=6&contentid=6
- **Collecting and Utilizing Rainfall Runoff: A Homeowner's Manual of Ideas for Harvesting Rainwater** http://www.tjswcd.org/RooftopManual.pdf
- **Tucson, AZ Commercial Rainwater Harvesting Ordinance** – First city in the U.S. to require rainwater harvesting for 50 percent of landscape water demand. http://cms3.tucsonaz.gov/ocsd/sustainability-rainwater
- **EPA's Managing Wet Weather with Green Infrastructure: Municipal Handbook** – Sample rainwater harvesting policies and documents to help local officials implement green infrastructure in their communities. http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_harvesting.pdf

Rain Gardens and Tree Technologies Information

- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **North Carolina State University** – Bioretention research. http://www.bae.ncsu.edu/topic/bioretention/overview.html

Permeable Pavements Information

- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **EPA Porous Asphalt Pavement**: Provides information on design and effectiveness, and links to several resources: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=135&minmeasure=5
- **North Carolina State University** – Permeable pavement research. http://www.bae.ncsu.edu/info/permeable-pavement/
- **University of Central Florida** – Permeable pavement research. http://www.stormwater.ucf.edu/research_publications.asp

Green Streets and Parking Information

- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **EPA Managing Wet Weather with Green Infrastructure: Municipal Handbook** – Provides information on design, local examples, and implementation hurdles and lessons learned: http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf
- **EPA Wetlands, Oceans, and Watersheds Green Street Initiatives Around the United States** – Provides examples and resources on different green street initiatives throughout the U.S. http://www.epa.gov/owow/podcasts/greenstreetsusa.html

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- **Portland, OR, Zoning Ordinance** – "Eliminates minimum parking requirements in the central city district and for sites located within 500' of a high-capacity transit station. The city's zoning ordinance specifies maximum parking requirements for areas outside the central city district, which vary depending on the use and the distance from a light rail station." http://www.portlandonline.com/shared/cfm/image.cfm?id=53320
- **Chattanooga Zoning Regulations (Art. V. 1705)** – Parking reduction standard in Chattanooga, TN. http://www.chattanooga.gov/city_council/code/41%20--%20code%20appendix%20b%20-%20zoning%20ordinance.pdf
- **City and County of San Francisco Municipal Code Planning Code (Art. 1.5 Sec. 166)** – Shared parking standards. http://www.municode.com/Resources/gateway.asp?pid=14139&sid=5
- **EPA Parking Spaces/Community Places** – Report describing approaches "to help communities explore new, flexible parking policies that can encourage growth and balance parking needs with their other goals. The EPA developed this guide for local government officials, planners, and developers in order to: demonstrate the significance of parking decisions in development patterns; illustrate the environmental, financial, and social impact of parking policies; describe strategies for balancing parking with other community goals; and provide case studies of places that are successfully using these strategies." http://www.epa.gov/smartgrowth/parking.htm
- **California's Parking Cash-Out Law, California Air Resources Board** – "State law requires certain employers who provide subsidized parking for their employees to offer cash allowance in lieu of a parking space… The intent of the law is to reduce vehicle commute trips by offering employees the option of "cashing out" their subsidized parking space and taking transit, biking, walking, or carpooling to work." http://www.arb.ca.gov/planning/tsaq/cashout/cashout.htm
- **EPA Green Streets** – Outlines green street initiatives throughout the U.S. www.epa.gov/owow/podcasts/greenstreetsusa.html
- **Low Impact Development (LID) Center Green Streets –** Highlights significant Green Highways and Green Streets programs as examples and guidance for communities and institutions that are developing green infrastructure strategies. http://www.lowimpactdevelopment.org/greenstreets/

Other Information

- **Army Corps of Engineers: Site Design Checklist and LID Calculations Worksheet –** For developments with stormwater management facilities located in waters and/or wetlands. http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/LID/LIDsite_2007.pdf
- **Nonpoint Education for Municipal Officials (NEMO): Addressing Imperviousness in Plans, Site Design and Land Use Regulations** – Technical Paper. http://nemo.uconn.edu/publications/tech_papers/tech_paper_1.pdf
- **Center for Watershed Protection Post-Construction Stormwater Model Ordinance** – Released in 2008. Menu of code language for local and regional government agencies.
- http://www.cwp.org/documents/cat_view/76-stormwater-management-publications/90-managing-stormwater-in-your-community-a-guide-for-building-an-effective-post-construction-program.html
- **General Requirements and Policies Stormwater Management Manual, City of Portland, OR** – "Outlines pollution reduction, flow control, and destination/disposal requirements, explains the rules for connecting existing systems, and differentiates public and private stormwater management systems. This chapter also discusses the City's policies regarding the protection of open drainageways… [and] identifies special circumstances that may make it impractical to implement on-site pollution reduction or flow control to the standards specified in this manual." http://www.portlandonline.com/bes/index.cfm?c=35122&a=55769

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A.5. Heat Island Effect

General Heat Island Information

- **EPA Reducing Heat Islands: Compendium of Strategies** – "Describes mitigation measures that communities can take to address the negative impact of urban heat islands." Includes information on heat island basics, trees and vegetation, green roofs, cool roofs, cool pavements, and heat island reduction activities. http://www.epa.gov/heatisland/resources/compendium.htm
- **Heat Island Mitigation Impact Screening Tool (MIST)** – "Intended to provide qualitatively accurate assessments of the likely impacts of heat island mitigation strategies averaged at the city-scale." http://www.heatislandmitigationtool.com/
- **EPA Excessive Heat Events Guidebook** – "Highlights best practices that have been employed to save lives during excessive heat events in different urban areas and provides a menu of options that officials can use to respond to these events in their communities." http://www.epa.gov/heatisland/about/heatguidebook.html

Green Roof Information

- **Reducing Urban Heat Islands: Compendium of Strategies, Green Roofs Chapter:** Coves green roof types, benefits and costs of green roofs, and green roof initiatives: http://www.epa.gov/hiri/resources/pdf/GreenRoofsCompendium.pdf
- **Green Roofs for Healthy Cities** – U.S. non-profit, green roof industry association. http://www.greenroofs.org/
- **Cool Roofs Rating Council** – Independent, non-profit organization that maintains a third-party rating system for radiative properties of roof surfacing materials. http://www.coolroofs.org/
- **Green Grid Green Roof Systems** – Innovative green roof system. http://www.greengridroofs.com/
- Guide specifications: http://www.greengridroofs.com/pdf_docs/B-GG-2%20Spec%20Sheet.pdf
- System specifications: http://www.greengridroofs.com/specs/systemspecs.htm
- **Green Roof Legislation, Policy, and Tax Incentives**: Site tracks green roof policy at the local, state, and national level. http://myplantconnection.com/green-roofs-legislation.php
- **Portland, OR, City Resolution** – Passed in 2005; requires all new city-owned facilities to include an ecoroof with 70 percent coverage and high reflectance, ENERGY STAR-rated roof material on remaining surface area; or ENERGY STAR material when that is impractical. http://www.portlandonline.com/shared/cfm/image.cfm?id=112682

Green Streets and Parking Information

- **EPA Green Infrastructure Web Page –** Provides basic information on green infrastructure along with tools, case studies, contacts and more. http://water.epa.gov/infrastructure/greeninfrastructure
- **EPA Managing Wet Weather with Green Infrastructure: Municipal Handbook** – Provides information on design, local examples, and implementation hurdles and lessons learned: http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf
- **EPA Wetlands, Oceans, and Watersheds Green Street Initiatives Around the United States** – Provides examples and resources on different green street initiatives throughout the U.S. http://www.epa.gov/owow/podcasts/greenstreetsusa.html

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- **Portland, OR, Zoning Ordinance** – "Eliminates minimum parking requirements in the central city district and for sites located within 500' of a high-capacity transit station. The city's zoning ordinance specifies maximum parking requirements for areas outside the central city district, which vary depending on the use and the distance from a light rail station." http://www.portlandonline.com/shared/cfm/image.cfm?id=53320
- **Chattanooga Zoning Regulations (Art. V. 1705)** – Parking reduction standard in Chattanooga, TN. http://www.chattanooga.gov/city_council/code/41%20--%20code%20appendix%20b%20-%20zoning%20ordinance.pdf
- **City and County of San Francisco Municipal Code Planning Code (Art. 1.5 Sec. 166)** – Shared parking standards. http://www.municode.com/Resources/gateway.asp?pid=14139&sid=5
- **EPA Parking Spaces/Community Places** – Report describing approaches "to help communities explore new, flexible parking policies that can encourage growth and balance parking needs with their other goals. The EPA developed this guide for local government officials, planners, and developers in order to: demonstrate the significance of parking decisions in development patterns; illustrate the environmental, financial, and social impact of parking policies; describe strategies for balancing parking with other community goals; and provide case studies of places that are successfully using these strategies." http://www.epa.gov/smartgrowth/parking.htm
- **California's Parking Cash-Out Law, California Air Resources Board** – "State law requires certain employers who provide subsidized parking for their employees to offer cash allowance in lieu of a parking space… The intent of the law is to reduce vehicle commute trips by offering employees the option of "cashing out" their subsidized parking space and taking transit, biking, walking, or carpooling to work." http://www.arb.ca.gov/planning/tsaq/cashout/cashout.htm
- **EPA Green Streets** – Outlines green street initiatives throughout the U.S. www.epa.gov/owow/podcasts/greenstreetsusa.html
- **Low Impact Development (LID) Center Green Streets –** Highlights significant Green Highways and Green Streets programs as examples and guidance for communities and institutions that are developing green infrastructure strategies. http://www.lowimpactdevelopment.org/greenstreets/

Tree Protection and Ordinances Information

- **Duerksen and Snyder**, *Nature-Friendly Communities: Habitat Protection and Land Use Planning*, (Island Press 2005).
- **City Trees: Sustainability Guidelines and Best Practices –** Guidelines that identify a comprehensive approach to locating, planting, and caring for trees by integrating complimentary best practices. http://www.cleanwatermn.org/Documents/MS4%20toolkit%20files/Post%20construction%20stormwater%20management/Brochures%20&%20manuals/Forests/City%20trees%20manual.pdf
- **American Forests Guide to Setting Urban Tree Canopy Goals** – "General goal guidelines based on geographic and climate conditions and land use categories." http://www.americanforests.org/?s=Urban+Tree+Canopy+Goals&x=0&y=0
- **Center for Watershed Protection Urban Watershed Forestry Manual Part 3** – Provides detailed guidance on urban tree planting that is applicable at both the development site and the watershed scale. http://www.cwp.org/categoryblog/98-forestry.html
- **Duerksen and Richman**, *Tree Conservation Ordinances*, American Planning Assn. PAS Report No. 446 (1993) Zoning Practice: Tree Preservation (American Planning Assn. July 2006).
- **Trees for Green Streets** – Describes the role of street trees in managing stormwater and includes detailed color drawings of the trees that best perform this function in the Portland metropolitan area. http://www.metro-region.org/index.cfm/go/by.web/id=26337

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- **Portland, OR, Tree Preservation on Your Land Division Site –** Tree preservation information guide. http://www.sustainableportland.org/shared/cfm/image.cfm?id=72545
- **Chapel Hill Tree Protection Ordinance –** Example of local government tree protection ordinance; includes a tree canopy measurement template and guidance on measuring tree canopy. http://www.townofchapelhill.org/index.aspx?page=879
- **Center for Urban Forest Research, U.S. Forest Service –** Provides research information on the benefits of urban trees. http://www.fs.fed.us/psw/programs/cufr/
- **Portland, OR Stormwater Fee** – Portland's Clean River Rewards Program gives a discount for trees over 15 feet tall. http://www.portlandonline.com/bes/index.cfm?c=43444&#types

A.6. Light Pollution Reduction

Light Pollution Reduction Information

- **International Dark-Sky Association** – Information on preserving the nighttime environment through quality outdoor lighting. http://www.darksky.org
- **Outdoor Lighting Code Handbook** – Discusses issues relative to outdoor lighting codes, their effectiveness, implementation, and enforcement. "Pattern code" included, to be modified for each community's needs. http://www.darkskysociety.org/handouts/idacodehandbook.pdf
- **Simple Guidelines for Lighting Regulations** – For small communities, urban neighborhoods, and subdivisions. http://docs.darksky.org/Codes/SimpleGuidelines.pdf
- **Light Levels SmartCode Module** – Supplements the Center for Applied Transect Studies SmartCode. http://transect.org/docs/LightLevels.pdf
- **Illuminating Engineering Society of North America (IES)** – Recognized technical authority on illumination. Its objective has been to communicate information on all aspects of good lighting practice to its members, to the lighting community, and to consumers, through a variety of programs, publications, and services. http://www.ies.org

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B. Materials and Resource Conservation

B.1 Construction, Renovation, and Demolition Materials Management

Objective: To prevent C&D materials from being disposed in waste facilities; to redirect recyclable and/or reusable materials to appropriate uses.

Rationale: C&D waste management reduces building costs, saves resources, conserves energy, and protects the environment.

Overarching Question(s): Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Reduce the amount of C&D materials, including renovation materials, being disposed in landfills? Promote the reuse and recycling of C&D and renovation materials?	C&D ordinances requiring minimum recycling by percent or weight. Waste management plan requirement. Deconstruction requirements in demolition permit or separate deconstruction permits. Building permits include C&D materials diversion deposit or bond. Building material bans at city or county waste disposal facilities. Renovation ordinance requiring minimum recycling when the projects exceed a certain value or size.	Is there a requirement specifying a diversion (from landfilling) rate for C&D or renovation materials?	G ☐ Required by code/ordinance G ☐ Incentives provided Y ☐ Expressly allowed Y ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved R ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Waste management plan	Is there a requirement for a waste	G ☐ Required by code/ordinance G ☐ Incentives provided	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question(s): Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	requirement.	management plan to be prepared?	Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
	Policy for on-site grinding and reuse of materials (e.g., concrete, drywall, clean wood, other). Number of C&D boxes allowed on a site. Allowances for stockpiling C&D materials on the site. Requirement for contractor personnel training or certification in C&D management. Waste management plans.	Do the requirements for the construction site allow for the reuse and recycling of C&D materials, e.g., concrete, drywall, clean wood (ground as mulch), other?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION B.1 TOTALS G: _____ Y: _____ R: _____					

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B.2 Building Reuse

Objective: To reuse existing building structures and shells to conserve resources, reduce waste and reduce environmental impacts of new construction.

Rationale: Repairing a building rather than tearing it down saves natural resources and energy and prevents pollution that might take place as a byproduct of extraction, manufacturing, and transportation of virgin materials. Building reuse also avoids creating solid waste that could end up in landfills.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Allow adaptive reuse of existing buildings?	Rehab or reuse ordinance for older buildings. Pedestrian oriented developments or transit orientated development districts. Mixed use or density allowances. Adaptive reuse ordinance. Voluntary clean-up programs. Tax increment finance districts.	Is the redevelopment and reuse of existing buildings encouraged?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Historic preservation ordinance. Adaptive reuse, or sustainable design, of historic buildings policy.	Are there allowances for green renovations or technologies that retain the historic character of registered historic properties or resources?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION B.2 TOTALS G: _____ Y: _____ R: _____					

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B.3 Material Reuse

Objective: To reuse materials and products to reduce demand for virgin materials and reduce waste, thereby lessening impacts associated with the extraction and processing of virgin resources.

Rationale: Reusing building materials creates many economic, environmental, and social benefits, including reducing construction costs, reducing the consumption of new resources, and minimizing landfill waste and pollution.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Promote the utilization of reused building materials?	Historic preservation ordinance. Adaptive reuse, or sustainable design, of historic buildings policy.	Does the historic preservation ordinance allow for reused or recycled-content building materials during renovation projects?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Green building program or ordinance with minimum reuse requirements for new construction.	Are there provisions in place that encourage materials reuse?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Provide for the reuse of materials during all phases of the building's life?	Requirement that buildings be designed or constructed to accommodate recycling by building occupants. Requirement to provide for the storage of discarded lamps, batteries, and other items which may require special disposal practices in the jurisdiction.	Does the building or site design include a specific area(s) to allow for collection and/or sorting of recyclable materials and materials that require special handling for disposal (i.e., should not be disposed of in the municipal solid waste stream)?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

SECTION B.3 TOTALS

G: _____ Y: _____ R: _____

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B.4 Material Selection

Objective: To consider the impacts of a product throughout its lifecycle to select materials with the lowest environmental impacts.

Rationale: Selecting environmentally preferable building materials can reduce construction costs and environmental impacts that result from the extraction, processing, and transportation of virgin materials. These materials can also reduce the depletion of finite raw materials and encourage environmentally responsible resource management.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Promote the use of environmentally responsible materials?	Green building program or ordinance with minimum post consumer recycled content requirements. Requiring use of the Comprehensive Procurement Guidelines (CPG) and Electronic Product Environmental Assessment Tool (EPEAT) for local government acquisitions. Certified wood products requirements.	Is there a local government building procurement policy that promotes the use of environmentally responsible materials that: • are based on a renewable source • contain recycled content • are energy efficient (in manufacture and/or in usage) • durable • readily recyclable and/or reusable upon decommissioning • water conserving, mold/mildew resistant • emit minimal emissions (in manufacturing process and/or in usage) • are of low toxicity • require/allow healthful maintenance (doesn't require harmful sealants/coatings) • are affordable • locally sourced, within 500 miles, when possible.	G ☐ Required by code/ ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION B.4 TOTALS G: _____ Y: _____ R: _____					

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SECTION B ALL TOTALS
G: _____ Y: _____ R: _____

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B.1. Construction, Renovation, and Demolition Materials Management

Materials Management Information

- **WasteCap Resource Solutions: C&D Specification: Construction Waste Management (CWM) Plan Materials** – WasteCap "provides waste reduction and recycling assistance to businesses." http://www.wastecapwi.org/services/construction-and-demolition-specifications/
- **The Associated General Contractors of America Recycling Toolkit** – Resources for contractors to recycle C&D waste generated or to use C&D waste in construction. Includes specs and also organizations that offer databases to search for recyclers. http://www.agc.org/cs/recycling_toolkit
- **Smart Growth Online CWM Handbook** – By National Association for Home Builders. http://www.smartgrowth.org/library/articles.asp?art=15
- **CalRecycle C&D Debris Recycling** – Site provides information on ordinances, specifications, and the C&D recyclers database (to find facilities that collect specific materials): http://www.calrecycle.ca.gov/ConDemo/
- **American Institute of Architects (AIA) CWM** – Provides an overview of the term as well as established techniques, emerging trends, CWM as an integrated approach, resources, strategies, and relative case studies. http://wiki.aia.org/Wiki%20Pages/Construction%20Waste%20Management.aspx
- **The Associated General Contractors of America Recycling Toolkit** – Resources for contractors to recycle C&D waste generated or to use C&D waste in construction. Includes specs and also organizations that offer databases to search for recyclers. http://www.agc.org/cs/recycling_toolkit
- **Construction Materials Recycling Association (CMRA)** http://www.cdrecycling.org/
- Concrete: www.concreterecycling.org
- Drywall: www.drywallrecycling.org
- Shingles: www.shinglerecycling.org

B.2. Building Reuse

Building Reuse Information

- **City of Los Angeles: Adaptive Reuse Handbook, Second Ed., Feb. 2006** – The Adaptive Reuse Ordinance, first passed in 1999, incentivizes reuse of buildings. Includes the Los Angeles Conservancy's "Incentives for Preserving Historic Buildings." http://www.scag.ca.gov/housing/pdfs/summit/housing/Adaptive-Reuse-Book-LA.pdf
- **Leadership in Energy and Environmental Design (LEED) for Core & Shell Green Building Rating System** – "Covers base building elements such as structure, envelope and the heating, ventilating, and air conditioning system. LEED for Core & Shell is designed to be complementary to the LEED for Commercial Interiors rating system, as both rating systems establish green building criteria for developers, owners, and tenants. The rating system acknowledges the limitations of developers in a speculatively developed building and encourages the implementation of green design and construction practices in areas over which the developer has control." http://www.usgbc.org/DisplayPage.aspx?CMSPageID=295
- **EPA Lifecycle Construction Resource Guide** – Introduces lifecycle construction and discusses issues of deconstruction, materials reuse, design for deconstruction, and lifecycle construction resources. http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1009HH1.txt

US EPA ARCHIVE DOCUMENT

- **National Trust for Historic Preservation** – "The National Trust for Historic Preservation provides leadership, education, advocacy, and resources to save America's diverse historic places and revitalize our communities." www.preservationnation.org/

B.3. Material Reuse

Material Reuse Information

- **The Associated General Contractors of America Recycling Toolkit** – Resources for contractors to recycle C&D waste generated or to use C&D waste in construction. Includes specs and also organizations that offer databases to search for recyclers. http://www.agc.org/cs/recycling_toolkit
- **Building Materials Reuse Association –** Facilitates building deconstruction and the recycling/reuse of building materials. www.bmra.org/
- **EPA Environmental Technology Verification Program: Materials Management and Remediation Center** – "Verifies performance of materials management technologies… and technologies to remediate contaminated land and ground water." http://www.epa.gov/etv/center-mmr.html
- **CalRecycle –** Database of sources for recycled/salvaged building materials. http://www.calrecycle.ca.gov/Reuse/Links/Building.htm
- **EPA Using Recycled Industrial Materials in Buildings –** Informational sheet discussing "the use of recycled industrial materials in buildings as an alternative to virgin materials and building products." http://www.epa.gov/osw/conserve/imr/pdfs/recy-bldg.pdf
- Old to New: Design Guide, Salvaged Building Materials in New Construction, 3rd Edition (2002) – "Provides architects with practical information to encourage and facilitate the use of salvaged building materials in typical new construction projects." http://www.rdhbe.com/database/files/sb4c3df2819dd71%281%29.pdf

B.4. Material Selection

Certified Products Information

- **BIFMA/E3 Sustainability Standard for Furniture** – Consensus-based method to evaluate the sustainable attributes of furniture products across the product lifespan. http://www.bifma.org/standards/
- **Cradle to Cradle Certification** – Criteria certifies Basic, Silver, Gold, or Platinum levels for "environmentally intelligent design." www.c2ccertified.com/
- **GREENGUARD Certification for Low-Emitting Products** – GREENGUARD Environmental Institute establishes "performance based standards to define goods with low chemical and particle emissions for use indoors, primarily building materials, interior furnishings, furniture, cleaning and maintenance products, and electronic equipment." The site includes adhesives and sealants; wood-based and non-wood-based construction materials; insulation; paints and coatings; and wall finishes. http://www.greenguard.org/
- **Forest Stewardship Council (FSC)** – "A certification system that provides internationally recognized standard-setting, trademark assurance and accreditation services to companies, organizations, and communities interested in responsible forestry." http://www.fsc.org/
- **Sustainable Forestry Initiative** – Certification program based on principles and measures that promote sustainable forest management and consider all forest values. SFI labels on a product, ensures that wood or paper products come from responsible sources. http://www.sfiprogram.org/

US EPA ARCHIVE DOCUMENT

- **Science Certification Systems (SCS) Certified Products Database** – Search for certified green building products by category, manufacturer, certification program, or conformance. Also see additional information on FSC and SCS Certification programs and Recycled & Material Content. http://www.scscertified.com/products/
- **International Code Council's (ICC) Evaluation Services** – Provides interpretations and acceptance of new products that occur in the market place. www.icc-es.org/
- **ICC's Sustainable Attributes Verification and Evaluation™ Program (SAVE™)** – SAVE™ was created exclusively for verifying and evaluating green products. http://saveprogram.icc-es.org/
- **EPA CPG program** – "The CPG program is authorized by Congress under Section 6002 of the Resource Conservation and Recovery Act (RCRA) and Executive Order 13423. EPA is required to designate products that are or can be made with recovered materials, and to recommend practices for buying these products. Once a product is designated, procuring agencies are required to purchase it with the highest recovered material content level practicable." http://www.epa.gov/epawaste/conserve/tools/cpg/index.htm
- **EPA Using Recycled Industrial Materials in Buildings** – Informational sheet discussing "the use of recycled industrial materials in buildings as an alternative to virgin materials and building products." http://www.**epa**.gov/osw/conserve/imr/pdfs/recy-bldg.pdf
- **EPA Lifecycle Construction Resource Guide** – Introduces lifecycle construction and discusses issues of deconstruction, materials reuse, design for deconstruction, and lifecycle construction resources. www.nepis.epa.gov/Exe/ZyPURL.cgi?Docky=P1009HH1.txt
- **NSF/ANSI 140 Sustainability Assessment for Carpet** – Consensus- based standard by which to evaluate and certify sustainability of carpet products across their entire product life cycle: http://www.nsf.org/business/sustainability/product_carpet.asp
- **NSF/ANSI 226 Sustainability Assessment for Commercial Furnishings Fabric --** Consensus- based standard by which to evaluate and certify sustainability of commercial furnishings fabric products across their entire product life cycle: http://www.nsf.org/business/sustainability/product_furnishings_fabric.asp
- **NSF/ANSI 342 Sustainability Assessment for Wall coverings** – Consensus- based standard by which to evaluate and certify sustainability of wall coverings products across their entire product life cycle: http://www.nsf.org/business/sustainability/su_nsf_342_wall_coverings_insert.pdf
- **Old to New: Design Guide, Salvaged Building Materials in New Construction, 3rd Edition (2002) –** "Provides architects with practical information to encourage and facilitate the use of salvaged building materials in typical new construction projects."

  http://www.rdhbe.com/database/files/sb4c3df2819dd71%281%29.pdf
- **SCS Recycled and Material Content** – "SCS provides material content certification assessment services to manufacturers offering products made from recycled or biodegradable materials." See information on the certification program, the SCS Recycled Content Standard, as well as Certified Biodegradable, No Added Formaldehyde, No Added Urea Formaldehyde, Recycled & Material Content Products. http://www.scscertified.com/products/
- **Alameda County, CA Waste Management Authority Green Building Materials Resource Guide** – Building materials directory. http://www.stopwaste.org/docs/Resource_Guide.pdf
- **California Integrated Waste Management Board** – Database for searching Recycled Content Building Products by product type. http://www.calrecycle.ca.gov/RCP/Product.asp?VW=CAT&CATID=257
- **EPEAT** – "EPEAT is a system that helps purchasers evaluate, compare and select electronic products based on their environmental attributes. The system currently covers desktop and laptop computers, thin clients, workstations and computer monitors." http://www.epeat.net/

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- **UL 100 Sustainability Requirements for Gypsum Board and Panels** -- Consensus- based standard by which to evaluate and certify sustainability of gypsum board and panel across their entire product life cycle: http://www.ul.com/global/eng/pages/solutions/standards/accessstandards/catalogofstandards/standard/?id=100_1

Straw Bale Wall Information

- **Earthen Plastered Wall Passes ASTM E-119 –** 1-hour fire resistance test of a non-load bearing straw bale wall. http://www.dcat.net/about_dcat/current/Non-Bearing_Clay_Wall.pdf
- **Cement Stucco Wall Passes ASTM E-119-05 –** 2-hour fire resistance test of a non-load bearing wheat straw bale wall. http://www.dcat.net/about_dcat/current/Cement_Stucco_Wall.pdf
- **City of Boulder, CO Ordinance 5891: Amending Ch 10-5 B.R.C. 1981 –** Concerns Alternative Building Materials, Including Adobe and Straw Bale Construction and Recycled Lumber. http://www.dcat.net/about_dcat/current/Boulder_Straw_Bale_Code.pdf

ASTM Committees Standards – Recycled Industrial Materials

- **ASTM Committee C01 Cement** – Develops specifications, test methods, recommended practices, and terminology for hydraulic cements including portland, natural, pozzolanic, masonry, and slag cements, and modifications and combinations during manufacture of the cements; and investigates the properties of hydraulic cements and promotes the improvement and uniformity of testing these materials. http://www.astm.org/COMMIT/COMMITTEE/C01.htm
- **ASTM Committee C09 Concrete and Concrete Aggregates** – Has jurisdiction over 160 standards published in the Annual Book of ASTM Standards, Volume 04.02. These standards, together with the standards developed by ASTM Committee C01 on Cement and committees of the American Concrete Institute, are essential to the construction of civil infrastructure. http://www.astm.org/COMMIT/COMMITTEE/C09.htm
- **ASTM Committee C11 Gypsum and Related Building Materials and Systems** – Develops specifications, test methods, and applications in the gypsum and related product industries. http://www.astm.org/COMMIT/COMMITTEE/C11.htm?L+C11store
- **ASTM Committee D04 Road and Paving Materials** – Has jurisdiction over 200 standards, published in the Annual Book of ASTM Standards, Volume 4. These standards are essential to the construction and maintenance of highways, and other transportation construction. http://www.astm.org/COMMIT/COMMITTEE/D04.htm
- **ASTM Committee C12 Mortars and Grouts for Unit Masonry** – Has jurisdiction over 15 standards, published in the Annual Book of ASTM Standards, Volume 04.05. These standards are essential to the industry of mortar used with masonry units, including burned clay, shale, sand-lime, concrete, and stone. http://www.astm.org/COMMIT/COMMITTEE/C12.htm
- **ASTM Committee E50 Environmental Assessment, Risk Management and Corrective Action** – Has jurisdiction over 35 standards published in the Annual Book of ASTM Standards, Volume 11.04. These standards are essential to corrective action, pollution prevention, and beneficial use. http://www.astm.org/COMMIT/COMMITTEE/E50.htm

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- **ASTM Committee D34 Waste Management** – Has jurisdiction over 125 standards published in the Annual Book of ASTM Standards, Volume 11.04. These standards are essential to all aspects addressing the generation, storage, transportation, treatment, recovery, and disposal of wastes generated from industrial, commercial, residential, and institutional sources. http://www.astm.org/COMMIT/COMMITTEE/D34.htm

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C. Energy Conservation and Atmospheric Quality

C.1 Optimized Energy Performance

Objective: To improve the building's energy performance by optimizing the energy use within the building.

Rationale: Optimizing a building's energy performance will reduce economic impacts associated with high intensity energy use and excessive energy use and reduce environmental impacts such as greenhouse gas emissions.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Promote improved, climate-based, energy performance standards?	ENERGY STAR Qualified Homes Program Requirements. Ordinance requiring meeting or exceeding the most recent residential model energy code/ ordinance, such as the International Energy Conservation Code (IECC).	Do ordinances allow for residential building energy-related systems to be installed, calibrated, and perform according to the most up-to-date model code or standard, or better?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Ordinance requiring meeting or exceeding the most recent model energy code, such as American Society of Heating, Refrigerating, and Air-Conditioning Engineers' (ASHRAE) Energy Standard for Buildings Except Low-Rise Residential Buildings, Standard 90.1 or the IECC. ENERGY STAR	Do ordinances allow for commercial building energy-related systems to be installed, calibrated, and perform according to the most up-to-date model code or standard or better? Additional things to consider: • Are performance-based compliance options allowed to be less efficient than prescriptive	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	Commercial Building Requirements. Enhanced energy provisions of the International *green* Construction Code (I*g*CC) or ASHRAE 189.1.	options? • Are there incentives to build smaller or use less energy per square foot of building area? • Are there incentives to construct buildings which are more energy efficient than the minimum requirements of the jurisdiction?			
Ensure that the energy performance requirements are being met post-construction or renovation?	ENERGY STAR Qualified Homes Program Checklist. ENERGY STAR Energy Design Guidance Checklist. Require third-party building inspection of equipment, insulation, ductwork, etc. prior to completion of the building. Require diagnostic testing to assure proper installation and verification by a certified Home Energy Rating System (HERS) rater. Require verification of energy performance for commercial use during change of occupant or tenant, and during re-sale,	Are checklists, certification, field testing and/or verification required to ensure that energy performance standards are met? Additional things to consider: • Is third party energy code enforcement allowed? • Is third party energy code enforcement performed?	G ☐ Required by code/ordinance G ☐ Incentives provided Y ☐ Expressly allowed Y ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved R ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	through specified audits and other material. ENERGY STAR Target Finder in Commercial Buildings.				
Facilitate energy consumption measurements in order to provide building managers with the tools to identify and explain increases or decreases in energy use, draw energy consumption trends, determine future energy use when planning changes in the business, diagnose specific areas of wasted energy, develop performance targets for energy management programs, and manage their energy consumption?	Ordinances requiring measurement devices with remote communication ability, providing daily energy profiles. Ordinances providing for submetering of large or significant loads in commercial buildings. Ordinances providing for submetering of individual apartments in multi-family buildings and submetering of individual tenants in commercial buildings.	Do codes/ordinances exist which provide for ongoing accountability of building energy consumption over time (exception: buildings or portions of buildings used as residential)?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Provide energy specifications for specific water features in commercial and residential buildings?	Heating element specifications. Circulating pump motors and filtration pump motors specifications. Cooling tower specifications.	Are there provisions in place which address energy features of public and private swimming pools, fountains, and spas?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Eliminate unnecessary light pollution and conserve energy?	Dark skies or night skies ordinances. Adoption of the newest energy codes.	Are specific requirements in place (e.g., maximum allowed lumens per square foot for each lighting	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
		zone) for outdoor lighting as it pertains to: building and structures; recreational areas; parking lot lighting; landscape lighting; billboards and other signage; street lighting?	R ❑ Code/ordinance silent, but not typically approved ❑ Expressly prohibited		
SECTION C.1 TOTALS G: _____ Y: _____ R: _____					

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C.2 On-Site Renewable Energy

Objective: To encourage the use of on-site renewable energy to reduce the economic and environmental impacts associated with fossil fuel use.

Rationale: On-site renewable energy generation can produce significant economic, energy, and environmental benefits. On-site renewable energy reduces energy costs by decreasing a building's susceptibility to fossil fuel price volatility. On-site renewable energy also reduces greenhouse gas and other air emissions.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for the use of on-site renewable energy?	Provisions for solar, wind, geothermal, low-impact hydro, biomass, or bio-gas strategies.	Are renewable energy technologies allowable under existing local ordinances? Examples include: trees ordinances that limit solar, burn ordinances that limit biomass projects, structural height limitations that impact solar, prohibitions on the use of groundwater in geothermal projects, structural restrictions for small scale wind generation and large scale wind generation, etc.	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Historic preservation ordinance. Sustainable design of historic buildings policy.	Are there allowances for using renewable energy technologies at registered historic properties or resources?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Net-metering policy or ordinance.	If net-metering is allowed in the state, is it encouraged by the local community?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
			R ❑ Code/ordinance silent, but not typically approved ❑ Expressly prohibited		
SECTION C.2 TOTALS G: _____ Y: _____ R: _____					

US EPA ARCHIVE DOCUMENT

C.3 Atmospheric Quality Protection

Objective: To reduce the use of ozone-depleting chemicals and minimize the generation of greenhouse gases, particulate matter, and other air toxics.

Rationale: Enhanced refrigerant management will minimize the emissions of compounds that contribute to ozone depletion. Using clean construction practices reduces energy costs and consumption and also minimizes the generation of air toxics.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Protect atmospheric quality by reducing the use of ozone-depleting refrigerants, and the generation of other air pollutants and greenhouse gases?	Restrictions on Chlorofluorocarbon (CFC) - based refrigerants. Restrictions on ozone-depleting substances in fire suppression systems.	Are restrictions on ozone-depleting substances in place for Heating Air-Conditioning Ventilation and Refrigeration (HVAC-R) systems?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Verified diesel retrofit technologies. Local government construction contract specification requirements, e.g., vehicle emissions, dust control, idle reduction policies.	Are clean construction practices encouraged?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	ENERGY STAR appliances. Heating element specifications.	Are high efficiency appliances encouraged or required?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

SECTION C.3 TOTALS

G: _____ Y: _____ R: _____

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SECTION C ALL TOTALS

G: _____ Y: _____ R: _____

US EPA ARCHIVE DOCUMENT

C.1. Optimized Energy Performance

General Energy Code Information

- **U.S. Department of Energy (DOE) Energy Efficiency & Renewable Energy (EERE) Building Energy Code Program (BECP)** – "Works with other government agencies, state and local jurisdictions, national code organizations, and industry to promote stronger building energy codes and help states adopt, implement, and enforce those codes." Provides resources on national model energy codes. http://www.energycodes.gov/
- **DOE EERE – Technical Assistance to States** – "Specialized technical assistance to the states in the form of economic analysis, code comparisons, webcast training, and compliance material development requested by states to help them adopt, upgrade, implement, and enforce their building energy codes." http://www.energycodes.gov/publications/general/BECP_Assistance_table.pdf
- **Building Codes Assistance Project (BCAP)** – "Delivers state-based code advocacy on behalf of the DOE's BECP; serves as clearinghouse on energy code information; develops resources to support code compliance; and provides energy code trainings and workshops." http://bcap-energy.org/
- **BCAP's Online Code Environment & Advocacy Network (OCEAN)** – "An interactive, web-based resource designed to share lessons learned, best practices, educational resources and key facts as they relate to building energy code adoption and implementation." http://bcap-ocean.org/
- **Best Practices for State Building Energy Code Policy: Improving Energy Efficiency through Building Energy Codes Policy – "**Top five best practice policy measures States and municipalities can use to incorporate and enhance current model energy codes into local laws." http://www.energycodes.gov/why_codes/
- **MA Optional Stretch Energy Code** – As Appendix to MA building code (threshold question of does the organization's local jurisdiction have authority to exceed any state requirements?) IECC 2009 Codes with Appendix. http://www.mass.gov/eea/docs/doer/green-communities/grant-program/stretch-code-qa-feb10-2011.pdf
- **Boulder, CO HERS Rating Home Code**:
  - Requires that a bigger home will need a better score. http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8444&Itemid=22
  - Boulder adopts 2006 IECC for residential and community building efficiency = HERS Index of 100. http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=207&Itemid=2173
  - HERS certificate required for Certificate of Occupancy. http://www.sustainablybuilt.com/hers.html
  - Adopt energy policies in Database of State Incentives for Renewable Energy (DSIRE). http://www.dsireusa.org/
  - Federal Incentives/Policies for Renewables and Efficiency. http://www.dsireusa.org/incentives/index.cfm?state=us&re=1&EE=1
- **Washington, D.C. Building Code of 2008** – Adopts Energy Efficient Codes Coalition 30 percent Solution; performance path of 30 percent solution begins on p. 382. http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=DC07R

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Energy Rating Information

- **ENERGY STAR**– "Includes a variety of "tried-and-true" energy-efficient features that contribute to improved building quality and tenant comfort, and lowers energy demand and reduces air pollution." http://www.energystar.gov/
- **Residential Energy Services Network (RESNET) –** Includes information on energy audits and rating processes, and also includes a directory to certified energy auditors and raters and qualified contractors and builders. http://www.resnet.us/
- **HERS Rating –** "A home energy rating involves an analysis of a home's construction plans and onsite inspections. Based on the home's plans, the Home Energy Rater uses an energy efficiency software package to perform an energy analysis of the home's design. This analysis yields a projected, pre-construction HERS Index." http://www.resnet.us/home-energy-ratings

Energy Consumption Monitoring Information

- **Berkeley, CA, Residential Energy Conservation Ordinance** – First city in the nation to require efficiency upgrades for residential buildings at the point of sale; requires homes to meet CA Title 24 Energy Code requirements when improvements valued at $50K or more are made. Before the transfer of title can occur, the seller must have an energy inspection to verify performance. http://www.ci.berkeley.ca.us/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Residential%20Energy%20Conservation%20Ordinance%20Compliance%20Guide%202008.pdf
- **California Assembly Bill 1065** – Standards to progressively reduce energy consumption from offsite sources. http://info.sen.ca.gov/pub/09-10/bill/asm/ab_1051-1100/ab_1065_bill_20100104_amended_asm_v97.pdf
- **District of Columbia Bill 17-0492 The Clean and Affordable Energy Act of 2008** – Washington, D.C. law requiring ENERGY STAR benchmarking of all government buildings. http://www.greenplaybook.org/resources/whats_new/post4/category6.htm

Energy Efficiency Incentive Information

- **Green Building Incentives** – offered through the state of Indiana, Duke Energy, South Central Indiana Rural Electrical Membership Corporation (REMC), and the city of Bloomington. http://bloomington.in.gov/green-building-incentives
- **DSIRE** – A comprehensive source of information on state, local, utility, and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the DOE, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council. http://www.dsireusa.org/
- **U.S. Green Building Council (USGBC)** – Green building incentive strategies. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2078

Light Pollution Reduction Information

- **International Dark-Sky Association** – Information on preserving the nighttime environment through quality outdoor lighting. http://www.darksky.org

US EPA ARCHIVE DOCUMENT

- **Outdoor Lighting Code Handbook** – Discusses issues relative to outdoor lighting codes, their effectiveness, implementation, and enforcement. "Pattern code" included, to be modified for each community's needs. http://www.darkskysociety.org/handouts/idacodehandbook.pdf
- **Simple Guidelines for Lighting Regulations** – For small communities, urban neighborhoods, and subdivisions. http://docs.darksky.org/Codes/SimpleGuidelines.pdf
- **Light Levels SmartCode Module** – Supplements the Center for Applied Transect Studies SmartCode. http://transect.org/docs/LightLevels.pdf
- **IES** – Recognized technical authority on illumination. Its objective has been to communicate information on all aspects of good lighting practice to its members, to the lighting community, and to consumers, through a variety of programs, publications, and services. http://www.ies.org

Other Information

- **ENERGY STAR** – A joint program of the EPA and the DOE. Provides information regarding energy efficient products and practices. http://www.energystar.gov/
- **EPA's Clean Energy Information Resources Database (CEIRD)** – Describes key resources and documents relevant to the National Action Plan for Energy Efficiency. http://cfpub.epa.gov/ceird/index.cfm?fuseaction=napee.search_js
- **DOE EERE** – EERE programs on biomass, building technologies, federal energy management, geothermal technologies, hydrogen, fuel cells, and infrastructure technologies, industrial technologies, solar energy technologies, wind and hydropower technologies, and weatherization. http://www.eere.energy.gov/
- **ASHRAE** – ASHRAE "advances heat, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education." http://www.ashrae.org
- **DSIRE** – "Comprehensive source of information on state, local, utility, and federal incentives and policies that promote renewable energy, and energy efficiency. http://www.dsireusa.org/
- **American Council for an Energy Efficient Economy** – A non-profit dedicated to advancing energy efficiency as a means of promoting economic prosperity, energy security, and environmental protection. www.aceee.org
- **Alliance to Save Energy** – The Alliance to Save Energy is a non-profit coalition of business, government, environmental, and consumer leaders. http://ase.org/
- **American Council for an Energy-Efficient Economy** – Nonprofit that does technical and policy analysis, works with companies and organizations, advises policymakers and managers, and promotes energy-efficiency education. Publications for purchase. http://aceee.org/
- **DOE EERE Building Technologies Program** – "Partners with the private sector, state and local governments, national laboratories, and universities to improve efficiency of building and the equipment, components, and systems within them. The program supports research and development activities and provides tools, guidelines, training, and access to technical and financial resources." http://www1.eere.energy.gov/buildings/index.html

C.2. On-Site Renewable Energy

Wind Energy Information

- **American Wind Energy Association (AWEA)** – AWEA promotes wind energy as a clean source of electricity for consumers around the world. www.awea.org/

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- **National Renewable Energy Laboratory (NREL) Wind Systems Integration** – NREL provides studies and resources for the integration of wind power into traditional utility systems as well as state wind resource maps for the assessment of local wind. http://www.nrel.gov/wind/systemsintegration/
- **Eagle County, CO, Performance-Based Permitting System** – Awards points for producing wind energy. http://www.eaglecounty.us/
- **Nevada, IA Zoning Regulations** – "Allow small Wind Energy Conversion Systems (WECS) by right in the industrial districts and by special use permit in all other districts, subject to performance standards. WECS are exempt from the general height restricts of the zone districts, but height is limited through a use standard." http://www.ci.nevada.ia.us/default.php

Solar Energy Information

- **American Solar Energy Society –** The American Solar Energy Society is the nation's leading association of solar professionals and advocates. www.ases.org
- **DOE, Building America Best Practices for High-Performance Technologies: Solar Thermal and Photovoltaic (PV) Systems** – The Rocky Mountain Land Use Institute states that "in the last five years, advances in technology have resulted in PV systems that can be installed in some roofing systems to make them nearly invisible – providing an alternative to traditional panels in areas where aesthetics are of significant concern (e.g. historic districts)." http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/41085.pdf
- **Gresham, OR, Development Code, Solar Access Standard** – See Appendix 8: Solar Access; also A8.02 for Exceptions to Setback Requirements for Solar Energy Collecting Structures. http://greshamoregon.gov/city/city-departments/planning-services/development-planning/template.aspx?id=3586
- **City of Berkeley, CA ,Title 23 (Zoning Ordinance) Section 23D.04.** – Lot and development standards including solar energy equipment standards. http://www.ci.berkeley.ca.us/uploadedFiles/Clerk/Level_3_-_BMC/BMC-Part2--032508.pdf
- **Pullman, WA, Development Code, Planned Residential Development Section 17.107 –** Incentives for solar access. http://www.law.du.edu/documents/rmlui/sustainable-development/SolarAccess.pdf
- **Teton County, WY, Solar Access Regulations** – Registration of the right to solar access as a property right. http://clerk1.state.wy.us/plan/docs/ComprehensivePlan/Resolutions/Solar.pdf
- **DSIRE Solar: Electric and Thermal** – A comprehensive source of information on state, local, utility, and federal incentives and policies that promote the adoption of solar technologies. http://www.dsireusa.org/solar/index.cfm?ee=1&RE=1&spf=1&st=1
- **Inspector Guidelines for PV Systems –** These guidelines provide a framework for the permitting and inspection of PV systems. http://irecusa.org/wp-content/uploads/2010/07/PV-Field-Inspection-Guide-June-2010-F-1.pdf

Geothermal Energy Information

- **GeoExchange Geothermal Heat Pump Consortium** – Partnership between the DOE, EPA, the nation's electric utilities, and the GeoExchange heat pump industry. Find a geothermal manufacturer/contractor by state or province. http://www.geoexchange.org

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On-site Generation and Interconnection to the Utility Grid Information

- **Standards Board of the Institute for Electrical and Electronics Engineers, Inc. (IEEE) Standard 1547** – "Standard for Interconnecting Distributed Resources with Electric Power Systems." http://grouper.ieee.org/groups/scc21/dr_shared/. This standard has several components:
  - IEEE 1547.1 2005 Standard for Conformance Tests Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems.
  - IEEE 1547.2 Application Guide for IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems.
  - IEEE 1547.3 2007 Guide For Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems.
  - IEEE P1547.4 Draft Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems.
- **The Federal Energy Regulatory Commission (FERC)** – Has issued standard procedures and a standard interconnection agreement for the interconnection of generators to the power grid. The rules differ depending on whether the generator is larger or smaller than 20 megawatts. www.ferc.gov/industries/electric/indus-act/gi.asp
- **The DSIRE Database** – Lists state interconnection rules. www.dsireusa.org/
- **California Rule 21** – Standards for interconnection of distributed energy resources. www.energy.ca.gov/distgen/interconnection/california_requirements.html
- **DOE Federal Energy Management Program (FEMP) Interconnection and Permitting Guide** – The Interconnection and Permitting Guide is designed to assist Federal energy managers in navigating through the wealth of interconnection and permitting information available on the Internet. http://www1.eere.energy.gov/femp/technologies/derchp_ipg.html

Renewable Energy Information

- **American Council on Renewable Energy (ACORE)** – "ACORE is an organization of member companies and institutions that are dedicated to moving renewable energy into the mainstream of America's economy, ensuring the success of the renewable energy industry while helping to build a sustainable and independent energy future for the nation." www.acore.org
- **Green-e** – Certifies renewable energy generators to promote retail, green electricity. http://www.green-e.org/

Offsite Renewable Energy – Green Power Information

- **EPA Green Power Partnership** – Voluntary program supporting the organizational procurement of green power by offering expert advice, technical support, tools, and resources. http://www.epa.gov/greenpower/
- **DOE: The Green Power Network** – Information network on the green power market including green power providers, product offerings, consumer protection issues, policies affecting green power markets, as well as a reference library. http://apps3.eere.energy.gov/greenpower/
- **Green Power Locators by state:**
  - EPA. http://www.epa.gov/greenpower/pubs/gplocator.htm
  - Green Power Network. http://apps3.eere.energy.gov/greenpower/buying/buying_power.shtml

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Other Information

- **ASHRAE** – ASHRAE "Advances heat, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education." http://www.ashrae.org
- **DOE Energy Efficiency & Renewable Energy** – Programs on biomass, building technologies, federal energy management, geothermal technologies, hydrogen, fuel cells, and infrastructure technologies, industrial technologies, solar energy technologies, wind and hydropower technologies, and weatherization. http://www.eere.energy.gov/

C.3. Atmospheric Quality Protection

Atmospheric Quality Protection Information

- **EPA Significant New Alternatives Policy (SNAP) Program** – "Evaluates and regulates substitutes for the ozone-depleting chemicals that are being phased out under the stratospheric ozone protection provisions of the Clean Air Act (CAA)." http://www.epa.gov/ozone/snap/index.html
- **EPA Clean Construction USA** – "Clean Construction USA, part of the NCDC, is an innovative program designed to promote the reduction of diesel emissions from construction equipment and vehicles." http://www.epa.gov/cleandiesel/documents/420f10018.pdf
- **EPA's Sample Construction Air Quality Language and Specifications** – "A compilation of language used in contracts, codes, laws, rules and other measures for addressing air quality issues, particularly diesel emissions, from construction equipment and other diesel sources." http://www.epa.gov/ttnamti1/files/ambient/pm25/qa/QA-Handbook-Vol-II.pdf
- **Retrofitting Strategies –** Discusses strategies to reduce emissions from construction equipment.http://www.mass.gov/dep/air/diesel/conretro.pdf
- **EPA Verified Technologies –** Lists the diesel retrofit technologies that EPA has approved for use in engine retrofit programs. http://www.epa.gov/cleandiesel/technologies/retrofits.htm
- **EPA's Cleaner Diesel Makes Good Business Sense** – Low cost ways to cleaner construction. www.epa.gov/otaq/diesel/documents/420f08008.pdf
- **ENERGY STAR** – Locate ENERGY STAR appliances. www.energystar.gov

Other Information

- **ASHRAE** – ASHRAE "advances heat, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education." http://www.ashrae.org

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D. Water Efficiency, Conservation and Management

D.1 Water Reduction and Innovative Plumbing Systems

Objective: To increase water efficiency and conserve water within buildings by using innovative plumbing systems.

Rationale: Increasing water efficiency and conserving water reduces water bills and leaves more water in rivers, lakes, and other freshwater sources. Water conservation also reduces the burden on municipal water supply and wastewater systems; saves energy from reduced amounts of water pumped, treated, and distributed; and reduces wastewater treatment collection.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Allow for water use reduction through innovative plumbing systems and individual metering?	Requirement for WaterSense homes. Incentives, such as rebate programs or property tax forgiveness. Upgrade plumbing code for high efficiency fixtures. Composting toilet information.	Is the use of high efficient and innovative plumbing fixtures and fittings, such as WaterSense labeled, encouraged to reduce water consumption?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Revise code for multi-family buildings. Water metering information.	Are there provisions in place that encourage individual metering in multifamily units to reduce water consumption?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Air conditioning condensate water reuse. Upgrade plumbing code.	Is the reuse of air conditioning condensate water encouraged to reduce unnecessary use of potable water?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	Rainwater harvesting model ordinances. Rainwater harvesting plan requirements.	Is the use of rainwater harvesting systems allowed within the community for outdoor irrigation to reduce unnecessary use of potable water? Is the water from rainwater systems allowed for indoor use such as toilet flushing to reduce unnecessary use of potable water?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION D.1 TOTALS G: _____ Y: _____ R: _____					

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D.2 Innovative Wastewater Treatment

Objective: To reduce wastewater generation and potable water demand while increasing the local aquifer recharge.

Rationale: Treating wastewater more effectively and efficiently reduces the amount of wastewater generated. Also, reducing the water sent to on-site wastewater treatment systems may improve the overall process performance by reducing the hydraulic loading and, in some cases, providing a more stable wastewater flow.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question		Do Requirements Come from State or Country?	Code/ Ordinance Reference
Promote the infiltration of wastewater onsite?	Constructed wetlands information. Innovative wastewater reuse.	Are natural systems, like constructed wetlands or other innovative infiltration systems, encouraged as a means to infiltrate treated wastewater onsite?	G	☐ Required by code/ordinance ☐ Incentives provided	☐ Yes, State ☐ Yes, County ☐ No	
			Y	☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed		
			R	☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
	Packaged biological nutrient removal systems. High efficiency filtration systems. Non-traditional septic tanks.	Are publicly owned decentralized and/or innovative on-site wastewater treatment systems encouraged to capture or reuse reclaimed wastewater?	G	☐ Required by code/ordinance ☐ Incentives provided	☐ Yes, State ☐ Yes, County ☐ No	
			Y	☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed		
			R	☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		

SECTION D.2 TOTALS

G: _____ Y: _____ R: _____

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D.3 Water Efficient Landscaping and Landscaping Irrigation

Objective: To reduce or eliminate the use of potable water or natural water resources for landscape maintenance.

Rationale: Water-efficient landscaping offers many economic and environmental benefits that can include lower water bills, decreased energy use, reduced irrigation water use, reduced landscaping and labor maintenance, and conservation of natural resources and preservation of habitat. When irrigation is needed, water-efficient irrigation offers many environmental and economic benefits over traditional irrigation.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Limit the use of water resources for a building's landscape maintenance?	Grouping plants according to their water needs, or using native and low-water-use or drought resistant plants. Xeriscaping ordinances that, when possible, include the state-adopted plant species list.	Is there a requirement for using plants that will reduce the use of water for landscape maintenance?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Limiting turf areas to those needed for practical uses.	Are there limitations to the amount of turf area around a building's perimeter?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
Limit the use of potable water resources to irrigate a building's landscape?	Rainwater ordinances. Grey water ordinances. Reclaimed wastewater information. Upgrade plumbing code. Incentives such as tax reductions, rebates.	Are alternatives to using potable water for outside irrigation, such as rainwater, grey water, and reclaimed wastewater, encouraged?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	WaterSense labeled irrigation systems.	Is the use of high efficiency irrigation systems (such	G: ☐ Required by code/ordinance ☐ Incentives provided	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
		moisture sensors, drip vs. spray) encouraged?	Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed		
			R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
SECTION D.3 TOTALS G: _____ Y: _____ R: _____					

SECTION D ALL TOTALS
G: _____ Y: _____ R: _____

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D.1. Water Use Reduction and Innovative Plumbing Systems

Water Reduction Incentive Information

- **Green Building Incentives** – Offered through the state of Indiana, Duke Energy, South Central Indiana REMC, and the city of Bloomington. http://bloomington.in.gov/green-building-incentives
- **USGBC** – Green building incentive strategies. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2078

Composting Toilets Information

- **EPA Water Efficiency Technology Fact Sheet** – Fact sheet on composting toilets. http://water.epa.gov/aboutow/owm/upload/2005_07_14_comp.pdf
- **Composting Toilet World** – An organization dedicated to providing reliable information on composting toilets. http://www.compostingtoilet.org/

Water Efficiency and Metering Information

- **EPA Water Efficiency & Conservation** – Program guide to water efficiency. http://www.epa.gov/waterinfrastructure/wec_wp.htm
- **EPA Cases in Water Conservation –** How efficiency programs help water utilities save water and avoid costs. http://www.epa.gov/owm/water-efficiency/docs/utilityconservation_508.pdf
- **EPA Top Ten Water Management Techniques** – Top 10 water management techniques that have proven helpful in managing water use at facilities throughout the EPA. http://www.epa.gov/greeningepa/water/techniques.htm

Rainwater Harvest/Reuse Information

- **EPA's Rainwater Harvesting Handbook** – Managing wet weather with green infrastructure. http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm
- **Tucson and Southern Arizona Water Harvesting Resources** – Rain Water Harvesting and Grey Water Reuse Resources. http://watershedmg.org/sites/default/files/docs/raingraywaterrev.pdf
- **Tucson, AZ, Rainwater Collection and Distribution Requirements, Ordinance 10597, 2008** – Requires offset of 50 percent for landscape water demand using harvested rainwater. http://www.ci.tucson.az.us/water/docs/rainwaterord.pdf
- **ARCSA** – Rainwater Harvesting Resources and Publications. http://www.arcsa.org/content.asp?contentid=6
- **Collecting and Utilizing Rainfall Runoff: A Homeowner's Manual of Ideas for Harvesting Rainwater** – A manual that highlights different rainwater harvesting techniques. http://www.dcr.virginia.gov/documents/stmrainharv.pdf
- **Tucson, AZ Commercial Rainwater Harvesting Ordinance** – First city in the U.S. to require rainwater harvesting for 50 percent of landscape water demand. http://scotie.sonoraninstitute.org/component/content/article/25-tucson-az-commercial-rainwater-harvesting-ordinance.html
- **EPA's Managing Wet Weather with Green Infrastructure: Municipal Handbook** – Sample rainwater harvesting policies and documents to help local officials implement green infrastructure in their communities. http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

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Greywater Regulation Information

- **AZ Greywater Law** – Three-tiered law (requirements designated by <400 gallons per day (gpd), >400 gpd, and >3,000 gpd categorization) permits use in new construction and remodels. http://oasisdesign.net/greywater/law/improve/ImprovementsToGWlaws.pdf
- **Tucson, AZ, Residential Greywater Ordinance 10579, 2008** – Effective June, 1, 2010. For new single family and duplex residential units, install segregated drains for greywater and blackwater plumbing fixtures to allow future greywater distribution systems. http://www.ci.tucson.az.us/water/docs/graywaterord.pdf

Other Information

- **WaterSense** – An EPA-sponsored partnership program, including WaterSense labeled homes that seeks to protect the future of the nation's water supply by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices. http://www.epa.gov/watersense/
- **Alliance for Water Efficiency (AWE) –** See latest information documents, template of suggested maximum water use thresholds and the standards (such as ASTM, WaterSense). http://www.allianceforwaterefficiency.org/
- **EPA Protecting Water Resources with Smart Growth** – "Offers specific ideas on how techniques for smarter growth can be used to protect their water resources." Section I focuses on smart growth techniques at the regional level and Section II on site level techniques of local governments for the minimization of impacts of new development on water resources. http://www.epa.gov/smartgrowth/water_resource.htm
- **EPA Growing Toward More Efficient Water Use: Linking Development, Infrastructure, and Drinking Water Policies** – Three sections detail: land use decisions and water systems, smart growth can help communities reduce costs and conserve water, and policy options to better manage water demand. http://www.epa.gov/smartgrowth/water_efficiency.htm

D.2. Innovative Wastewater Treatment

Innovative Wastewater Treatment Information

- **Innovative Treatment Technologies for Wastewater and Water Reuse –** EPA research to addresses the dynamic requirements for improved water quality and the growing demands for safe and reliable reclaimed wastewater and stormwater. http://www.epa.gov/awi/res_technologies.html
- **EPA Office of Wastewater Management –** Municipal technologies for wastewater and stormwater assistance such as constructed wetlands and decentralized systems. http://www.epa.gov/owm/mtb/
- **Living Machine at the Oberlin College Environmental Studies Center in Ohio** – Flow trends and oxygen trends graphed daily, tour of the installed system, and general wastewater treatment information. http://www.oberlin.edu/sustainability/portfolio/buildings_and_grounds.html
- **Omega Center for Sustainable Living Machine** – Called "The Eco-Machine." http://eomega.org/sites/default/files/OCSL_FAQ.pdf

D.3. Water-Efficient Landscaping and Landscape Irrigation

Water Efficient Landscaping Information

- **Sustainable Sites Initiative: The Case for Sustainable Landscapes** – Considered a companion volume to the larger report The Sustainable Sites Initiative: Guidelines and Performance Benchmarks 2009, cited in

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Sustainable Sites category.
http://www.sustainablesites.org/report/The%20Case%20for%20Sustainable%20Landscapes_2009.pdf

- **EPA GreenScapes** – "Cost-efficient and environmentally friendly solutions for landscaping; encouraging holistic decisions regarding waste generation and disposal and the associated impacts on land, water, air, and energy use." Regional info and online calculating tools available.
http://www.epa.gov/epawaste/conserve/rrr/greenscapes/index.htm
- **Georgia Xeriscape Guide** – A guide to developing water-wise landscaping.
http://pubs.caes.uga.edu/caespubs/pubs/PDF/B1073.pdf

Landscape Irrigation Information

- **Tucson, AZ, Rainwater Collection and Distribution Requirements, Ordinance 10597, 2008** – Requires offset of 50 percent for landscape water demand using harvested rainwater.
http://www.ci.tucson.az.us/water/docs/rainwaterord.pdf
- **Georgia Xeriscape Guide** – A guide to developing water-wise landscaping.
http://pubs.caes.uga.edu/caespubs/pubs/PDF/B1073.pdf

Rainwater Harvest/Reuse Information

- **Tucson and Southern Arizona Water Harvesting Resources** – Rain Water Harvesting and Grey Water Reuse Resources. http://watershedmg.org/sites/default/files/docs/raingraywaterrev.pdf
- **Tucson, AZ, Rainwater Collection and Distribution Requirements, Ordinance 10597, 2008** – Requires offset of 50 percent for landscape water demand using harvested rainwater.
http://www.ci.tucson.az.us/water/docs/rainwaterord.pdf
- **EPA's Rainwater Harvesting Handbook** – Managing wet weather with green infrastructure.
http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm
- **ARCSA** – Rainwater Harvesting Resources and Publications.
http://www.arcsa.org/content.asp?contentid=6
- **A Homeowner's Manual of Ideas for Harvesting Rainwater** – A manual that highlights different rainwater harvesting techniques. http://www.dcr.virginia.gov/documents/stmrainharv.pdf
- **Tucson, AZ Commercial Rainwater Harvesting Ordinance** – First city in the U.S. to require rainwater harvesting for 50 percent of landscape water demand.
http://scotie.sonoraninstitute.org/component/content/article/25-tucson-az-commercial-rainwater-harvesting-ordinance.html
- **EPA's Managing Wet Weather with Green Infrastructure: Municipal Handbook** – Sample rainwater harvesting policies and documents to help local officials implement green infrastructure in their communities. http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

Greywater Regulation Information

- **AZ Greywater Law** – Three-tiered law (requirements designated by <400 gpd, >400 gpd, and >3,000 gpd categorization) permits use in new construction and remodels.
http://oasisdesign.net/greywater/law/improve/ImprovementsToGWlaws.pdf
- **Tucson, AZ, Residential Greywater Ordinance 10579, 2008** – Effective June, 1, 2010. For new single family and duplex residential units, install segregated drains for greywater and blackwater plumbing

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fixtures to allow future greywater distribution systems.
http://www.ci.tucson.az.us/water/docs/graywaterord.pdf

Other Information

- **Watershed Management Group** – Non-profit AZ-based group that provides information and resources on Water Harvesting, Sustainable Landscaping, Water Quality, and Stormwater. http://watershedmg.net/

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E. Indoor Environmental Air Quality

E.1 Minimum Air Quality Performance

Objective: To establish minimum IAQ performance to enhance the IAQ in a building.

Rationale: Enhancing IAQ increases the comfort, health, and overall wellbeing of the occupants. This in turn increases productivity, decreases absenteeism, reduces health care claims and minimizes remediation.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Provide for healthy indoor environmental air quality?	Residential: Most recent American National Standards Institute (ANSI)/ASHRAE Standard, such as 62.2. Indoor airPLUS Construction Specifications for homes. Commercial: Most recent ANSI/ASHRAE Standard, such as 62.1 or 2009 International Mechanical Code ventilation rates. System-level design outdoor airflow rates calculated based on the zone-level design outdoor airflow rates.	Are there minimum ventilation requirements that are protective of IAQ while minimizing energy loss?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Minimum particulate matter filter ratings required. Permanent entryway track-off systems. Indoor airPLUS Construction Specifications for homes.	Are there requirements for controlling indoor particulate matter?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question			Do Requirements Come from State or Country?	Code/ Ordinance Reference
	Smoking bans inside the building. Minimum setbacks of designated smoking areas from the building entrance.	Are smoking bans in place?	G	☐	Required by code/ordinance	☐ Yes, State ☐ Yes, County ☐ No	
				☐	Incentives provided		
			Y	☐	Expressly allowed		
				☐	Code/ordinance silent, but typically allowed		
			R	☐	Code/ordinance silent, but not typically approved		
				☐	Expressly prohibited		
	Outdoor air delivery monitoring device requirements. Installation of ozone-removing filters in areas with high levels of outdoor ozone. Preventing air flow from garage into the building. Vapor barriers when indicated. Radon control systems or barriers when indicated. Indoor airPLUS Construction Specifications for homes.	Is outdoor air delivered in a manner that promotes occupant health?	G	☐	Required by code/ordinance	☐ Yes, State ☐ Yes, County ☐ No	
				☐	Incentives provided		
			Y	☐	Expressly allowed		
				☐	Code/ordinance silent, but typically allowed		
			R	☐	Code/ordinance silent, but not typically approved		
				☐	Expressly prohibited		
SECTION E.1 TOTALS G: _____ Y: _____ R: _____							

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E.2 Low Emitting Materials

Objective: To reduce the number of indoor air contaminants that could be irritating, harmful, or odorous to building occupants.

Rationale: Low-emitting materials release fewer Volatile Organic Compounds (VOCs) and other harmful chemicals into the air. These chemicals are found in higher concentrations indoors and can cause a variety of different health problems, such as eye, nose, and throat irritation; headaches; and kidney and liver damage.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Minimize occupant exposure to potentially irritating, harmful, or odorous air contaminants?	Minimum adhesives, sealant, paints and coatings emission requirements (as determined by applicable standards, such as California/ Department of Homeland Security/ Environmental Health Laboratory Branch-R-174 (CA/DHS/EHLB/R-174), Green Seal Standard GS-11, South Coast Air Quality Management District (SCAQMD) Rule 1113, or Green Seal Standard GC-36). Carpet, adhesives, and cushion qualify for Carpet and Rug Institute (CRI) Green Label Plus or Green Label testing program. Indoor airPLUS Construction Specifications for homes.	Are low-emitting materials encouraged for adhesives, sealants, paints, coatings, and aerosols?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Minimum floor covering emission	Are low-emitting materials	G ☐ Required by code/ordinance ☐ Incentives provided	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	requirements (as determined by applicable standards, such as CA/DHS/ EHLB/R-174). Indoor airPLUS Construction Specifications for homes.	encouraged for floor coverings?	Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited		
	Minimum composite wood and agrifiber product emission requirements (as determined by applicable standards, such as California Air Resource Board's regulation, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions for Composite Wood Products or CA/DHS/EHLB/R-174). Certified low-formaldehyde pressed wood materials used. Indoor airPLUS Construction Specifications for homes.	Are low-emitting materials encouraged for composite material?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Minimum office furniture system and seating emission requirements (as determined by applicable standards, such as ANSI/Business and Institutional Furniture Manufacturer's Association (BIFMA) Standard M7.1). Indoor airPLUS Construction Specifications for homes.	Are low-emitting materials encouraged for office furniture systems and seating?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

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Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
	Minimum ceiling and wall system emission requirements (as determined by applicable standards, such as CA/DHS/ EHLB/R-174). Indoor airPLUS Construction Specifications for homes.	Are low-emitting materials encouraged for ceiling and wall systems?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Foundation joints and penetrations sealed, including air-tight sump covers. Corrosion-proof rodent or bird screens installed at all openings that cannot be fully sealed (e.g., attic vents).	Is building design that minimizes pest exposure encouraged?	G: ☐ Required by code/ordinance ☐ Incentives provided Y: ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R: ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
SECTION E.2 TOTALS G: _____ Y: _____ R: _____					

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E.3 Moisture Control

Objective: To prevent moisture from entering the building system through the exterior shell of the building; planned holes, such as windows, light switches, and electrical outlets; and unplanned gaps and leaks due to poor building design or construction.

Rationale: Moisture entering the building is the primary reason for building deterioration. Controlling moisture can increase the building's durability and longevity. Furthermore, moisture problems can lead to mold and other biological pollutants that can harm health. A variety of moisture control features, including improved control condensation and better roof, wall, and foundation drainage, can minimize these health risks.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Protect the building and occupants from moisture damage?	Ordinance requiring construction plans that include protecting absorptive materials from moisture damage during construction and installation. Indoor airPLUS Construction Specifications for homes.	Do construction requirements mitigate moisture damage?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	
	Air barriers. Housewraps. Capillary breaks below concrete slabs and in crawlspaces. Building continuous drainage planes behind exterior cladding, properly flashed to foundation. Damp or water-proof foundation walls. Insulated basement and foundation walls. Window and door openings and roof or wall intersections fully flashed. Indoor airPLUS Construction Specifications for homes.	Are provisions or technologies in place to mitigate moisture-related problems?	G ☐ Required by code/ordinance ☐ Incentives provided Y ☐ Expressly allowed ☐ Code/ordinance silent, but typically allowed R ☐ Code/ordinance silent, but not typically approved ☐ Expressly prohibited	☐ Yes, State ☐ Yes, County ☐ No	

SECTION E.3 TOTALS

G: _____ Y: _____ R: _____

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SECTION E ALL TOTALS

G: _____ Y: _____ R: _____

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E.1. Minimum Air Quality Performance

Air Quality Performance Information

- **EPA Indoor airPLUS** – "Created to help builders meet the growing consumer preference for homes with improved IAQ." Available construction specifications focus on seven areas, including "the careful selection of and installation of moisture control systems; heating, ventilating, and air-conditioning systems; combustion-venting systems; radon resistant construction; and low-emitting building materials." http://epa.gov/indoorairplus/index.html
- **EPA Building Air Quality: A Guide for Building Owners and Facility Managers** – Provides practical suggestions on preventing, identifying, and resolving IAQ problems in public and commercial buildings. http://www.epa.gov/iaq/largebldgs/pdf_files/iaq.pdf
- **EPA Healthy Indoor Environmental Protocols for Home Energy Upgrades**—Guidance to protect IAQ while installing home energy upgrades: http://www.epa.gov/iaq/homes/retrofits.html
- **EPA The Inside Story: A Guide to Indoor Air Quality** – A booklet on reducing the risk from existing sources of indoor air pollution and to prevent new problems from occurring. http://nepis.**epa**.gov/Exe/ZyPURL.cgi?Dockey=000003M1.txt
- **Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction** – Trade association that publishes voluntary technical standards and manuals that address many areas of the sheet metal industry. Requires membership. http://www.smacna.org/

Other Information

- **ASHRAE** – ASHRAE "advances heat, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education." http://www.ashrae.org
- **SMACNA** – Voluntary technical standards and manuals. http://www.smacna.org/
- **The American Nonsmokers' Rights Foundation –** Contains a database of U.S. tobacco control laws and ordinances. www.no-smoke.org

E.2. Low Emitting Material

Low-Emitting Materials Information

- **CRI Recommended IAQ Specifications** – For carpet floor covering adhesive, and carpet cushion. http://www.carpet-rug.org/documents/technical_bulletins/9902_Carpet_and_IAQ.pdf
- **GREENGUARD Certification for Low-Emitting Products** – GREENGUARD Environmental Institute established "performance based standards to define goods with low chemical and particle emissions for use indoors, primarily building materials, interior furnishings, furniture, cleaning and maintenance products, and electronic equipment" – includes adhesives and sealants; wood-based and non-wood-based construction materials; insulation; paints and coatings; and wall finishes. http://www.greenguard.org/
- **Green Label** – Advanced certification for carpet and adhesive products by the CRI that ensures carpets cushions and adhesive products have low VOC emissions. CRI also developed the Green Label Plus program. http://www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-label-plus/index.cfm

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- **Green Seal** – Certifies products including electric chillers, paints and coatings, windows and doors, floor finishes and strippers institutional/industrial cleaners, etc. Find certified products and services on the site. http://www.carpet-rug.org/
- **EPA SNAP** – "EPA's program to evaluate and regulate substitutes for the ozone-depleting chemicals that are being phased out under the stratospheric ozone protection provisions of the CAA. http://www.epa.gov/ozone/snap/index.html
- **EPA Indoor airPLUS** – "Created to help builders meet the growing consumer preference for homes with improved IAQ." Available construction specifications focus on seven areas, including "the careful selection of and installation of moisture control systems; heating, ventilating, and air-conditioning systems; combustion-venting systems; radon resistant construction; and low-emitting building materials." See Section 6: Low-Emission Materials. http://epa.gov/indoorairplus/index.html
- **SCS: IAQ** – "SCS offers three IAQ certification programs as part of its ongoing efforts to improve the environmental performance of building products: Indoor Advantage, Indoor Advantage Gold, and FloorScore." Site includes information on IAQ standards and references, a Certification Manual, as well as lists of certified IAQ products. http://www.scscertified.com/gbc/indoor_air_quality.php
- **SCAQMD** – SCAQMD "is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties, the smoggiest region of the U.S. We are committed to protecting the health of residents, while remaining sensitive to businesses." http://www.aqmd.gov/
- **BIFMA/E3 Sustainability Standard for Furniture** – Consensus-based method to evaluate the sustainable attributes of furniture products across the product lifespan: http://www.bifma.org/standards/
- **CRI** – Green Label programs for carpets and adhesives. http://www.carpet-rug.org/

E.3. Moisture Control

Moisture Control Information

- **EPA Indoor airPLUS** – "Created to help builders meet the growing consumer preference for homes with improved IAQ." Available construction specifications focus on seven areas, including "the careful selection of and installation of moisture control systems; heating, ventilating, and air-conditioning systems; combustion-venting systems; radon resistant construction; and low-emitting building materials." http://epa.gov/indoorairplus/index.html

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F. General Green Building Resources

This section includes comprehensive green and sustainable codes and standards that are intended for mandatory adoption and enforcement by building departments, and address many of the practices recommended in this document. Note that these mandatory codes and standards are indirectly, and sometimes directly, driven by voluntary programs including, but not limited to, LEED and local government green building ordinances.

ASHRAE:

- **ASHRAE Standard 189.1** – Standard for the Design of High-Performance Green Buildings – Except Low-Rise Residential Buildings: http://www.ashrae.org/resources--publications/bookstore/standard-189-1
- **ASHRAE 90.1** - Provides minimum requirements for energy efficiency: http://www.trane.com/COMMERCIAL/EnergyIaqEnvironment/8_4_1_IESNAStandard.aspx

USGBC

- **USGBC –** Offers green building rating standards for new commercial construction and major renovations, residential construction and major renovations, and new construction standards for specific building types. Also offers LEED-ND, which integrates the principles of smart growth, urbanism and green building into the first national system for neighborhood design: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222
- **The Playbook for Green Buildings + Neighborhoods** – Provides local governments with guidance and resources to rapidly advance green buildings, neighborhoods, and infrastructure. www.greenplaybook.org/
- **Roadmap to Sustainable Government Buildings** – This document guides government staff and officials in the development of a green building program based on the USGBC's LEED rating system. http://www.usgbc.org/ShowFile.aspx?DocumentID=5486
- **USGBC's Course Catalog –** Green building education. www.usgbc.org/CourseCatalog/CourseCatalog.aspx
- **LEED Integration Guides** – Including "The Paid-From-Savings Guide to Green Existing Buildings" and "Green Office Guide: Integrating LEED into your Leasing Process." http://www.usgbc.org/Store/PublicationsList_New.aspx?CMSPageID=1518

International Code Council (ICC)

- The International Green Construction Code, I*g*CC, which also references ICC-700 and ASHRAE 189.1 and is applicable to residential and commercial construction: http://www.iccsafe.org/cs/igcc/Pages/default.aspx
- **Code Adoption Resources** – Including Code Adoption Toolkit downloads. "Briefing papers on technical issues, samples of ordinances, endorsements and support materials from national organizations." http://www.iccsafe.org/gr/Pages/resources.aspx
- **ICC Green Resources Center** – Includes sections of resources for Green Building Design Tools and Resources and Green Building Program/Initiative Development Tools and Information. http://www.iccsafe.org/Communities/Green/Pages/ResourceCenter.aspx
- **ICC Communities of Interest** – The community exists as a meeting place for ICC members who share common interests in the environmental impact of the buildings and in creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition. http://www.iccsafe.org/Communities/Pages/default.aspx

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National Home Builders Association

- **NAHB/ICC-700-2008 National Green Building Standard** – Defines green building for single and multifamily homes, residential remodeling projects and site development projects. http://www.nahbgreen.org/ngbs/default.aspx

Green Tools

- **Whole Building Design Guide** – The goal of the guide is to create a successful high-performance building by applying an integrated design and team approach to the project during the planning and programming phases. www.wbdg.org/
- **Resource for General Green Technologies: The National Association of Home Builders Research Center** – Created the ToolBase Services with funding from Housing and Urban Development Authority. Here, green technologies and practices are detailed to include summaries, manufacturers, resources specific to the method, where the technologies or practice lies in terms of code acceptance, as well as alternative methods. http://www.toolbase.org/ToolbaseResources/level3.aspx?BucketID=2&CategoryID=17
- **BCAP Code Builder Tool** – "Provides info on advanced codes, explains terminology, references current practice of specific measures, and provides info on applicability. The Code Builder also serves as a clearinghouse for next-generation code changes – including advances and green measures used in high performance homes." For each area of the code builder (ventilation, insulation, etc.), there is a section called "Policy Options" that shows examples of a jurisdiction's code that has gone further in the "green" arena. Code officials can reference the wording regarding specific areas of interest. http://www.resnet.us/blog/bcap-unveils-code-builder-tool-on-advanced-codes/
- **The Chartered Institution of Building Services Engineers (CIBSE): Sustainability Tool** – Offers assistance on the following issues: energy and CO_2 emissions, water use, adapting buildings for climate change, flood risk, sustainable drainage systems, transport, ecology and biodiversity, pollution, health and wellbeing, waste, lifecycle impacts of materials and equipment, local environment, and community. http://sustain.cibse.org/
- **California Integrated Waste Management Board Sustainable Building Tool Kit** – Research studies. http://www.ciwmb.ca.gov/GreenBuilding/Toolkit.htm#Research

Government Resources

- **USGBC Government Resources –** State and local laws referencing, incorporating, and incentivizing LEED**.** www.usgbc.org/government
- **USGBC Public Policy Search** – "Search for existing public policies based on numerous criteria. Such as level of government, date of passage, location, type of building, and LEED rating system." http://www.usgbc.org/PublicPolicy/SearchPublicPolicies.aspx?PageID=1776
- **USGBC Government Initiatives and Guidelines –** Links to resources collected by USGBC staff and members to facilitate green building research. www.usgbc.org/DisplayPage.aspx?CMSPageID=76#12
- **LEED Public Policies** – Government resources. www.usgbc.org/government
  - Federal Initiatives. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#federal
  - State Initiatives. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#state
  - Municipal/City/County Initiatives. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#local
  - School Initiatives: Higher Education. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#highered

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- School Initiatives: K-12. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#K-12

- **Green Building Incentive Strategies** – Financial or structural incentive strategies. http://www.usgbc.org/ShowFile.aspx?DocumentID=6248
  - **The District of Columbia City Council Enacted Legislation** – Requires all new government buildings to go green. By 2012, all new buildings larger than 50,000 square feet—public or private—must conform to green standards. http://www.greenbuildinglawupdate.com/articles/codes-and-regulations/city/
  - **New Mexico Executive Order 2006-001** – Requires all new state buildings and major renovations meet The 2030 Challenge's call for a 50 percent reduction in fossil-fuel energy consumption from what traditional buildings use by using a LEED-based system. http://energycodesocean.org/policy-action-tool/Level-II
  - **San Jose City Council Green Building Ordinance** – Adopted on June 23, 2009. Establishes requirements for new, private sector construction. New commercial or industrial buildings 25,000 square feet or greater must achieve LEED Silver certification. New residential construction with 10 or more units must achieve be LEED Certified or be GreenPoint Rated. New residential construction over 75 feet must be LEED Certified. New commercial and industrial buildings under 25,000 sq ft and new residential buildings with less than 10 units must complete the LEED checklist. Projects requiring LEED certification must pay the Green Building Refundable Deposit fees prior to a building permit being issued to ensure that the building will achieve the green building requirements. http://www.sanjoseca.gov/clerk/Agenda/20090623/20090623_0702ord.pdf
  - **Seattle, Washington City Council Bill 115524** – Amended the Land Use Code to allow a developer to build at a higher density than is normally allowed under the code, so long as the developer can certify that the building will be rated LEED Silver or its equivalent. The amendment applies only to buildings in downtown commercial districts.http://energycodesocean.org/sites/default/files/Level%20II%20Seattle%20Ordinance%20LEED.pdf
  - **The South Carolina Legislature House Bill 3034** – "Requires that all state-owned and state-funded construction greater than 10,000 ft^2 and any major renovation projects of greater than fifty percent of total building space or value achieve LEED-NC Silver certification or comparable standard. With a focus on energy efficiency, the legislation specifically requires a minimum of four credits earned in Energy & Atmosphere Credit 1, "Optimize Energy Performance." http://www.aceee.org/sector/state-policy/south-carolina/building-requirements

- **Creating Communities of Change: What We Learned in the Codes Forest** – Presentation by David Eisenberg, Director of the Development Center for Appropriate Technology for the West Coast Green Conference in 2007. http://www.dcat.net/resources/communitiesofchange_w-notes.pdf

- **California Green Building Standards Code** –, California has adopted the nation's first Green Building Standards Code. http://ag.ca.gov/globalwarming/pdf/green_building.pdf

- **Chicago Green Permitting Program** – By Chicago Department of Construction and Permits. If accepted into the program it would create an expedited permit process. The more green building elements in the project plans, the shorter the timeline to obtain a permit. Commercial projects must earn various levels of certification within the appropriate LEED system; smaller residential projects must earn a two-star rating under the Chicago Green Homes program (checklist-based system for measuring green building elements developed by the Chicago Department of Environment). In addition, many projects must apply certain strategies or technologies selected from a list of menu items that enhance sustainability, expand affordability, stimulate economic development, and increase accessibility. 3-tier benefit system based on qualities of plans; advanced tiers for higher percent green roof in commercial category. http://www.iccsafe.org/Communities/Green/Documents/Chicago_GreenPermitBrochure.pdf

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- **Washington, D.C.'s Clean and Affordable Energy Act (Bill 17-0492) 2008** – "Requires commercial property owners to generate an Energy Star efficiency 'score' for their buildings that would then be made available to the public by the District Department of the Environment (DDOE). Establishes Sustainable Energy Utility Advisory Board. Establishes renewable energy incentive program. Established Sustainable Energy and Energy Assistance Trust Funds." http://www.dccouncil.washington.dc.us/
- **State of Minnesota Green Building Guidelines –** Beginning on July 1, 2010 all Minnesota State bonded projects, new and substantially renovated, that have not already started the Schematic Design Phase on August 1, 2009 will be required to meet the Minnesota Sustainable Building 2030 (SB 2030) energy standards. http://www.msbg.umn.edu/
- **Green Communities –** Resource for Green Residential Standards and Guidance. http://www.greencommunitiesonline.org/
- **Green Communities: Self-Certification Process** – Written to be based on affordable housing communities. "The first national green building program focused entirely on affordable housing. Launched by Enterprise in fall 2004, Green Communities is designed to help developers, investors, builders and policymakers make the transition to a greener future for affordable housing." http://www.greencommunitiesonline.org/
    - **Green Communities Criteria** – Explanations and organization of the standard. http://www.practitionerresources.org/cache/documents/666/66641.pdf
    - **Green Single Family Rehab Specifications** – Guide specifications for reference to meet mandatory and optional 2008 Green Communities Criteria. http://www.greencommunitiesonline.org/tools/resources/green_rehab_specs_gci_2008_criteria_final.pdf
- **Green Point Rating System** – Residential, voluntary rating system developed by Build It Green, a nonprofit organization of California. Rating systems for both single and multifamily new homes and existing homes are to be updated every three years to reflect changes to California Building Energy Efficiency Standards. http://www.builditgreen.org/greenpoint-rated

Compliance and Verification of Green Technologies Information

- **Washington, D.C.'s Green Building Act of 2006** – Requires commercial projects to verify compliance through a District agency or a third party. http://www.dccouncil.washington.dc.us/
- **Washington, D.C.'s Clean and Affordable Energy Act (Bill 17-0492) 2008** – "Requires commercial property owners to generate an Energy Star efficiency 'score' for their buildings that would then be made available to the public by the DDOE. Establishes Sustainable Energy Utility Advisory Board. Establishes renewable energy incentive program. Established Sustainable Energy and Energy Assistance Trust Funds." http://www.dccouncil.washington.dc.us/
- **DOE Pacific Northwest National Laboratory Building Cost and Performance Metrics: Data and Collection Protocol** – For Building Cost and Performance Metric indicators. http://www1.eere.energy.gov/femp/pdfs/datacollectionprotocol.pdf

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Section 2: Creating an Action Plan

The purpose of an Action Plan is to help a community implement necessary regulatory and permitting changes to allow for greater sustainable design. After completing the Assessment Tool and reviewing the Resources Guide, local government should have an understanding of where there are opportunities for improvement in its regulations. The framework presented for the Action Plan is just one of many pathways to implementing changes in local permitting processes. The framework was developed using approaches based on collaborative decision making, change management, communication techniques, and by evaluating best practices from other local communities. There are six steps to the Action Plan: (1) establishing priorities, (2) conducting an internal situation assessment, (3) conducting an external situation assessment, (4) designing the plan, (5) implementing the plan, and (6) conducting an evaluation. The six steps are detailed below.

The Action Plan Roadmap

STEP 1: Establish Priorities

The Toolkit helped identify areas where codes/ordinances could be changed to implement sustainable design practices within a community. Now that these categories have been identified an Action Plan can be developed. The first step in creating an Action Plan is to list and prioritize all of the potential areas for improvement. The questions below can help identify which areas of a community's codes/ordinances to tackle first.

- Are the potential changes predominantly in one category (e.g., Energy Conservation and Atmospheric Quality) or are they randomly distributed (e.g., in all categories A-E)?
  - Are the potential changes mostly Red or Yellow, as indicated by the assessment of the specific questions? How many "Reds" versus "Yellows" are there?
- How many changes can the local government potentially handle at a given time? To answer this question consider whether:
  - The local government has a large enough staff to develop and implement the changes.
  - The local government has the resources needed to develop and implement the changes.
  - The staff has the technical expertise required to make the changes within each of the five Categories.
  - It is more efficient to "bundle" the changes or implement them one-by-one over time.
- How many potential changes are identified as under county or state jurisdiction? Codes adopted from the County may be easier to influence and change rather than codes adopted from state regulations.

Once a preliminary prioritized list is developed, the next step is to assess the local government's internal capability for moving the change(s) through the permitting process. The next two steps in developing the Action Plan deal with managing the expectations of internal and external stakeholders.

STEP 2: Internal Situation Assessment: Current Permitting Process

This section assists the local government in identifying the internal stakeholders that will be affected by the permitting change. These stakeholders can include: department staff, department management, administrative staff, department decision-making teams, and any other internal organization that will be affected by the regulatory and permitting change. Identifying these individuals will allow the most relevant stakeholders to be involved in the change process and will also aid in getting complete buy-in from all internal parties. The following questions, though not exhaustive, should be considered to gain a better understanding of the current internal conditions, and how they will impact making code/ordinance updates:

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- What departments and/or committees will be affected by code/ordinance changes?
  - Who are the specific people that would be directly affected?
  - What are their roles during the permitting process?
  - How would the proposed changes impact their roles or require that they change the way they currently conduct their jobs?
- What additional data are needed to make decisions on potential permitting changes to adopt code/ordinance changes?
- Would the information sharing process or internal structure, e.g., the inter-departmental dynamics that dictate how permits are currently issued and enforced, need to be modified to accommodate the potential permitting changes?
- What level of internal support does the local government have for permitting changes?
  - Are there staff "champions" within appropriate departments or committees?
  - Are there management support and management "champions?"
- To what extent are the changes consistent with the local government's policies, mission, or vision on sustainable design? Or, would the proposed changes be creating a new local government focus on sustainability? Who would be driving that change?
- How often are permitting changes (related to sustainable design) proposed and supported internally?
  - Is this the first time this issue (or these issues) has been raised or have other efforts been attempted? What was the result?
    - If the permitting change was successfully implemented, what factors contributed to the internal support (e.g., low cost, relative ease of adoption, low impact on staff time and resources)?
    - If the permitting change was not successfully implemented, what factors contributed to the internal opposition (e.g. high cost, relative difficulty of adoption, high impact on staff time and resources)?
- To what extent can the proposed permitting changes be tried on a limited scale (e.g., first start with commercial development) before scaling up revised codes/ordinances for other development sectors (e.g., residential)?
  - Would small scale application hurt or help promote the proposed changes?

STEP 3: External Situation Assessment: Current Permitting Process

This section deals with external decisions and processes that need to be understood and managed to allow for permitting changes that would support and increase sustainable design in a local government. Specifically, this section will deal with identifying and talking with external stakeholders, obtaining stakeholder opinion, determining affected interests, issue management, and consensus building processes.

- From the departments, committees, or individuals affected by code/ordinance changes in Step 1, which of these has a strong interest from outside entities? The questions below can help answer this question:
  - Is there a high level of elected officials' (e.g., city council) interest, engagement, and/or oversight?
  - Are there frequent conversations with non-profit groups, developers, builders, etc. around the affected department(s) and/or issue(s)?
  - Is the department or the specific issue being addressed a frequent recipient of praise or concern from external parties?

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- How effective is the local government's ability to communicate with external parties:
  - Shares information in a timely manner?
  - Shares easily understandable information—the right amount and the right format?
  - Knows how to make a compelling case for change?
  - Understands expectations from the various external stakeholder groups?
- What additional data are needed to make decisions on potential regulatory changes from an external perspective?
  - Are these data needs similar to internal needs?
- What level of external support does the local government have for the proposed regulatory changes?
  - From elected officials?
  - From the permittees or affected community—developers, builders, owners, etc.?
  - From non-governmental and civic organizations—e.g., local watershed groups, local historic preservation society, etc.?
  - From civic leaders and the general public—is this an issue that has been raised with the public before?
    - Is this an issue the public will actively care about?
    - Does the local government need active public support for this permitting change to occur?
- To what extent are the changes consistent with the community's elected officials' policies, mission, or vision on sustainable design?
- How often are regulatory changes (related to sustainable design) proposed and supported externally?
  - What factors contributed to the external support? These could include whether:
    - An elected official was a visible or vocal champion.
    - The permittee or affected community was a visible or vocal champion.
    - There was visible public support.
    - The change was low cost or cost neutral for the local government.
    - There was little organizational change needed.
    - The impacts on local government staff and resources were minimal.
- Have other local governments of similar size, geographic location, etc., adopted similar regulatory changes?
  - Is it helpful to external parties to know that the proposed regulatory or permitting process changes have been implemented elsewhere?
  - Is it helpful to external parties to know that the community would be the "first" (e.g., in the area, state, region, etc.) to implement, change, or try something new?
- What is the timing of the potential regulatory change?
  - Where is the community's local government in terms of the political process:
    - Are the elected officials up for re-election or new to the local government?
    - Is the change being proposed during a busy or slow regulatory season?

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- Is the change occurring during a period of high economic growth or slow economic growth?
- Would a small scale application of proposed changes hurt or help promote the proposed changes within the local government?
- Would a broader program (e.g., a sustainable design or green permitting program) hurt or help promote greater sustainable design in the community?

STEP 4: Designing the Action Plan

Identify Strengths, Weaknesses, Opportunities, and Issues

To create an effective Action Plan, the local government needs to know the strengths, weaknesses, and opportunities for change. An effective Action Plan indicates that local government staff believes the changes can make a positive difference, the local officials are supportive of change, the external stakeholders—from builders, to civic groups, to the general public—are supportive of the changes, and the local community benefits. Potential issues need to be identified up-front in the process. The local government should consider which sustainable design practices will most likely be met with resistance in the community and by whom. For example, if the local government knows a particular trade association has not typically been supportive of some sustainable design elements, a conversation should be started with them early on in the process. It is difficult to anticipate and foresee every possible issue up-front in the process; however, taking the time to think through potential issues can be beneficial in managing and addressing potential stakeholder expectations and concerns.

This section builds on the information gathered through completion of the internal assessment and external assessment. Based on Steps 2 and 3 the user now knows the relative strengths (e.g., internal and external champions), weaknesses (e.g., need for additional data), potential opportunities (e.g., strong developer support, slow economic growth), and potential issues (e.g., a trade association who has been known to oppose certain permitting changes) for implementing changes.

Develop a Sustainable Design and Green Building Team

The next component of the Action Plan is to form a Sustainable Design and Green Building Team.[4] Depending on the size of the jurisdiction, the organization should have one point person or a small core group who can begin formulating the Action Plan and coordinating activities within the jurisdiction. The team could consist solely of local government staff, although in a few jurisdictions where community interest in sustainable design is widespread, the team could also include a volunteer task force of local building professionals and representatives of community groups. Potential members of the Sustainable Design and Green Building Team could include:

- Staff members who work in key related functions or departments within the local government and were identified in Step 1;
- Staff from additional departments, if they are needed, such as city architect, fire department, public works, public health, affordable housing, and legal; and
- "Green teams" already working in the community.

Getting involvement from these key staff and community members will help streamline communication and pave the way for internal support for the proposed permitting changes. Keeping in mind that some members of the team may be active, while others may wish just to be kept informed, the responsibilities of the team could include the following:

- Interest in the topic and commitment to implementing changes in the permitting system that would foster greater sustainable design;

[4] This section has been adapted from: Build It Green™. City Roadmap for Creating a Green Building Program. June 2006. http://www.scag.ca.gov/rcp/ewg/pdf/localgreen/Green%20building_Roadmap_051606.pdf

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- Examination of opportunities and resources for sustainable design, which could be incorporated into permitting changes;
- Development of goals, policies, and objectives of the potential changes; and
- Presentation of draft proposals to appropriate bodies.

Define the Program Elements of Potential Code/Ordinance Changes

The next component of the Action Plan is to use the Sustainable Design and Green Building Team to define the program elements of potential code/ordinance changes.

1. *Analyze the market and identify stakeholders potentially affected by proposed permitting changes*

This section[5] should build on some of the preliminary analysis completed under Step 3. In Step 3, the user identified segment(s) of the community that would be affected by the proposed permitting changes. This analysis is crucial and will help ensure that the proposed changes move through the permitting system in an effective and efficient manner. Also, the stakeholder involvement and communication plans must be tailored to the specific motivations and needs of the various constituencies. As the user is putting together the list of potential stakeholders these questions should be considered for each group or entity:

- Who do the stakeholders represent (e.g., large developer, independent owner, management company) and their potential for involvement (e.g., substantive participant versus observer)?
- What level of support might the local government expect from the person or entity?
- How knowledgeable are they about sustainable design and the proposed permitting change(s)?
- What market signals currently exist for sustainable design? Does the local government see these changing in the next 3–5 years? How will this impact the stakeholders?

Finally, the local government should identify the types of current projects in the permitting approval pipeline and what projects can be expected in the future. This should help determine the types of sectors that could be impacted by the proposed permitting changes. The local government should make sure that the list is as comprehensive as possible. The following list of potential sectors should be modified to suit the local government's needs:

- Residential new construction
- Residential remodeling
- Commercial construction
- Multi-family versus single-family
- Civic buildings
- Historic buildings
- Utilities
- Management companies
- Realtors
- Landscapers
- Architects

[5] This section has been adapted from: Build It Green™. City Roadmap for Creating a Green Building Program. June 2006. http://www.scag.ca.gov/rcp/ewg/pdf/localgreen/Green%20building_Roadmap_051606.pdf

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The better the local government can address the needs of the key stakeholder groups, the more rapidly the proposed changes will be accepted and/or supported. One of the local government's goals could be to provide a framework that enables each stakeholder group to bring their expertise and skills to the table for successful collaboration.

2. Define the scope of the permitting change

This section assists communities in detailing the nuts and bolts of the permitting changes they are trying to implement. The market analysis from above and the following questions could help in developing the program design:

- Is the local government trying to pilot a small scale initiative or make wholesale changes?
- Is the local government trying a phased approach over time, which may include performance-based measures that change over time?
- Does the program change typical enforcement procedures?
- Is this a required, voluntary, or incentives provided program?
- Is the local government trying to implement a sustainable design/green design program?
- What are the expected costs and revenues associated with the program?
- Does the proposed change rely on third-party certification, inspection, etc.?
- Might the jurisdiction be better advised to adopt, or possibly modify, some of the currently available green and sustainable building codes/ordinances and standards to reach their green goals?
- Consider:
  - If adopting codes/ordinances that need to be enforced, these should be written as mandatory. Mandatory programs ensure that green practices will be implemented, the impact of the built environment on the natural environment will be reduced, and environmental goals will be met.
    - If a mandatory program is initiated, should it be applicable to public sector buildings only?
    - Are any of the available green building programs and standards suitable for application to the private sector on a mandatory basis?
    - Some examples of codes/ordinances and standards which are written in language suitable for mandatory adoption include: I*g*CC; ASHRAE 189.1; and, the ICC-700 National Green Building Standard.
    - Sustainable design programs and rating systems which are intended to be administered on a voluntary basis should not be adopted as mandatory.
    - Are there departmental practices (e.g., within the departments of health or public works), which are not addressed by the adopted code/ordinance or standard; and, if so, can these changes be used to suggest amendments to the codes/ordinances used by those other departments?

The scope of the local government's program will greatly impact the stakeholder engagement and communication plans that will need to be crafted.

3. Develop a Stakeholder Engagement and Communication Plan

To develop a stakeholder engagement and communication plan, the local government should start with each stakeholder identified earlier in the process and ask them to provide a bulleted list of what drives them to engage in a stakeholder process on sustainable design and green building and the related permitting changes. Then, based on that

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list, the local government should identify opportunities for engagement with that particular stakeholder for each phase of the permitting process. These phases include:

- Designing the permitting change(s) program,
- During the permitting change process, and
- Implementing the permitting change.

Next, the local government should craft a draft communication plan with key points on how to engage key stakeholders in the permitting process. This may be extremely helpful especially if new stakeholders exist, new relationships have to be forged, or to make sure that everyone on the Sustainable Design and Green Building Team has the same understanding of the permit change. The stakeholder engagement plan should also address local, state, and other applicable laws and regulations regarding public access to information and meetings.

For example: The local government is a locality interested in adding performance specifications for new residential construction in the local codes/ordinances. The Sustainable Design and Green Building Team should have identified the following key stakeholders: architects, developers, builders, licensed and approved performance assessors, and two council members. Without the buy-in of these stakeholders the local government will not be able to move forward. For each of these stakeholders the local government should identify what is important to them:

- Do they support the performance specifications, why or why not?
- What information should the local government provide them regarding performance specifications?
- What incentives could the local government use to get the stakeholders to support performance specifications, etc.?

Once these steps have been accomplished the local government has a foundation to determine the best ways to engage and communicate with each specific stakeholder group and develop targeted engagement and communication strategies.

The Sustainable Design and Green Building Team should then create a stakeholder engagement plan based on the identified stakeholders and needs. For each stakeholder, the team should assess:

- How to engage the stakeholder,
- When to engage the stakeholder, and
- Who is going to be responsible for communicating with the appropriate stakeholders.

Based on collaboration and stakeholder engagement frameworks, it is generally easier to work with stakeholders—including those who disagree with a position—if communication occurs early in the process, communication occurs consistently, and the local government gives stakeholders the opportunity to share their opinions. Again, local and state laws on public access and input should be at the forefront of discussions regarding stakeholder engagement.

The local government's stakeholder engagement plan should also include a communication strategy. This strategy should have key talking points that can be used with each relevant stakeholder group; it should identify who is responsible for communicating with the public, elected officials, press, etc. The communication strategy should include appropriate means of communication—web posting, public meetings, newspaper articles, presentations posted to online video sites, etc. Table 1 provides some initial starting points for each stakeholder group.[6] These

[6] This section has been adapted from: Build It Green™. City Roadmap for Creating a Green Building Program. June 2006. http://www.scag.ca.gov/rcp/ewg/pdf/localgreen/Green%20building_Roadmap_051606.pdf

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generic short bullets on sustainable design and green building will need to be developed more broadly into talking points and be tailored for the local government's specific permit process changes and the sustainable design and green building concept or area the local government is trying to address. An integral piece of the communication strategy should be education. For any stakeholder, including the public, who may not be familiar either with the permitting process or sustainable design, the team will have to carefully determine what, how, when, and who should provide the education, and the resources it will take to provide this education.

Table 1: ***Key Stakeholder Values Regarding Sustainable Design and Green Building***

Government	• Increase economic development and community vitality • Improve the jurisdiction's reputation • Add value to the local built environment • Increase citizen satisfaction and retention • Provide public and professional education • Enhance public health and safety • Improve environmental compliance • Promote interdepartmental cooperation • Develop positive relationships with building industry • Comply with state requirements
Construction Industry	• Gain competitive marketing edge • Embrace unique educational opportunities • Provide higher quality, higher value product • Build positive relationships with government • Reduce legal exposure • Improve image
Building Owners	• Lower operating costs • Attain green seal of approval • Provide higher quality, higher value product • Reduce legal exposure • Increase property value • Improve resale potential
Home Owners	• Lower operating costs • Provide healthy, productive indoor environment • Increase property value • Increase resale potential • Increase pride of ownership
Building Occupants	• Lower operating costs • Live in a healthier indoor environment • Enjoy a higher quality of life • Be a steward of the environment
Affordable Housing Agencies and Nonprofits	• Provide housing that is truly affordable • Create sustainable communities • Support environmental equity • Reduce impacts

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Utility	• Reduce peak utility loads • Reduce emissions • Get recognition as environmental stewards • Meet utility restructuring requirements • Reduce resource consumption • Reduce stormwater runoff • Enhance water quality • Lower energy use for water processing/pumping

STEP 4: Implement the Plan

There is no one comprehensive permitting strategy for all local governments or communities. Each organization will know the government, public, and stakeholders best, but by completing Steps 1-3 the organization should have been able to remove or greatly minimize the obstacles for fostering greater sustainable design and green building practices. Below are some tips for the Sustainable Design and Green Building Team as they move forward with the permitting or regulatory changes.

Points to Consider—Permitting Changes for Sustainable Design and Green Building[7]

- Develop strong political backing, and gain support for funding, staffing, and other needed resources. Otherwise the regulatory and permitting changes will prove to be more difficult.
- Consider exploring the pros and cons of the permitting system and the sustainable design goal to be achieved. Should the sustainable design components be mandatory, voluntary, or phased-in? Should there be incentives and/or penalties to obtain compliance?
- Make use of the Resources Guide and other available information to understand other localities' sustainable design programs and codes/ordinances for possible use as models.
- Consider whether the Sustainable Design and Green Building team should take a "working group" approach and include elected officials, governmental staff members, developers and builders, and the public at large.
- Work with the appropriate commissions, committees, or boards and use their meetings as a platform for workshops and public participation.
- Conduct a "sustainability workshop" to illustrate how sustainable design and green building is connected to a host of related issues and help garner support from special interest groups.
- Identify certain issues of great import (e.g., quality of life) to special interests and groups and make sure that the regulatory and permitting changes speak to their needs and concerns.
- Select sustainable design and green building guidelines or standards that are appropriate for the organization's jurisdiction and that are regionally appropriate (e.g., climate, cultural, etc.).
- Consult with legal counsel to ensure that proposed guidelines or standards do not conflict with other state or local regulations. In the case of an ordinance, be sure that it is legally defensible.
- Consider whether the proposed changes call for the use of outside resources—e.g., third-party inspection of performance related specifications, certification, etc.

[7] This list was adapted from: Bruck, Peter. Developing Green Building Programs or Ordinances. *Building Safety Journal*. 5.4 (2007): 22-23 http://www.dcat.net/resources/bsj_aug07_greenfeature.pdf

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- Keep compliance thresholds realistic and try not to address them until the end of the development process.
- Keep the "triple-bottom line"—environment, economy, and social equity—in mind to ensure a sense of fairness for all parties.
- If necessary, determine how the program or code/ordinance will be staffed and funded.
- Make sure there are "champions" to shepherd the process and changes.

STEP 5: Evaluate

Implementing permitting changes may be straightforward or complex in the local government's jurisdiction. Hopefully, by implementing Steps 1-4, the local government should be able to reduce confusion, tension, or the length of deliberations surrounding the permitting change. Regardless of the path, permitting changes are not a static activity. Future innovations and improvements in sustainable design will continue to challenge the community's sustainable design codes/ordinances. Therefore, after one or two permitting changes are successfully through the local government process, it is best to evaluate if the permitting change was effective in fostering the desired sustainable design features in the community.

After the permitting change has been implemented for some period of time, or the program has become stable, it is helpful to conduct an evaluation to determine if the change or program is working as planned and what corrections may be necessary. The evaluation should determine how the change or program is working, whether it is working the way the local government intended, whether it is being implemented effectively, and if the permitting change process worked effectively and efficiently overall. This information can in turn be used to make program improvements and generate lessons learned for the future. The following are the basic steps that could help in evaluating the change/program:

1. Collect Data.

   - Conduct informal interviews with the stakeholder groups identified in Steps 2-3 via focus group meetings (how do they feel about the permitting change, do they understand it, do they support and why or why not?).
   - Review documents like permit applications (e.g., are sustainable design and green building projects being permitted quicker and with fewer variances; is there an increase in the number of permit applications using the tool/technique implemented in the permitting change?).
   - Review written and verbal feedback (e.g., have there been articles in the press, what is the public perception; are builders and constituents happier and have they voiced opinions in public hearings or other forums?).
   - Review physical evidence (e.g., are more sustainable design projects being built and are operated and maintained as permitted?).

2. Analyze the Data.[8]

   - What happened with the permitting change over time, including: stakeholders, activities, conditions, perceptions of the program's results?
   - How closely did the permitting change track with what the local government intended?
   - Were the improvements or goals of the permitting change achieved (pre-permit change conditions versus post-permit change conditions)?

[8] The list was adapted from: Weiss, Carol. Evaluation, Second ed. New Jersey: Prentice Hall, 1997. See Figure 12-1, page 273.

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- Is the observed change due to the permitting changes? Can other explanations be ruled out?
- What was the value of the improvements? Are they apparent to others? Can they be quantified (this could include reduced permit transactions, reduced staff review time, improvement in customer satisfaction, increased revenue, and reduced environmental impacts of the permit change)?
- What were the unexpected events, outcomes, and/or effects?
- What do the findings imply for future modifications and permit changes?
- What were the lessons learned and how do they impact either broadening the permit changes or their transferability within the community (scale up of a pilot program) or beyond?

3. Tell the Story

To tell the story, the local government should think about the reporting needs of the local government and what information could help meet those needs. The local government should also think about the various stakeholders identified in Steps 2 and 3: what was important to them, what types of questions did they ask, and what do they want to know and when? The local government should also consider what reporting format would be best to tell the story.

Typically, the findings from an evaluation are documented in a report but this may or may not be the appropriate communication tool for the audience the local government is trying to reach. For example, if the user knows that department heads internal to the local government were very interested in the permitting change, they may want to brief them periodically and prepare an evaluation presentation that includes the questions the user is trying to answer regarding the permitting change, a summary of the data collected, a review of the data analysis, and how the user plans to use the results to change or modify the current program or future permitting changes.

If the public is very interested in the permitting change, the local government may want to conduct a public meeting or forum with a presentation and have a prepared paper to distribute. Regardless of how the organization presents the evaluation study, decisions will have to be made on how to act on the recommendations. Revising the internal and external situation assessment in Steps 2 and 3 may provide some guidance on how best to proceed.

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Appendix A: Additional Topics for Inclusion In The Toolkit Assessment

Community Gardens:

Community gardens are places where residents can gather to contribute to local agriculture, safety, and the economy through the cultivation of plants, vegetables and fruits. Community gardens are increasingly playing a larger role in civic, public health, economic and environmental improvements in communities throughout the United States. There are some code and zoning issues that many communities are contending with to allow for public use of lands for local agriculture.

For example, some communities that have been using an "Adopt-A-Lot" policy, which allows for the interim use of public and private property for community benefit. This policy provides a special no-fee city permit and an expedited land use approval process that allows normal zoning regulations and requirements (e.g., those concerning parking) to be waived. The policy contributes to city beautification, decreases code violations, and increases space for community gardens.[9]

The City of Knoxville, Tennessee has a Community Garden Toolkit, which includes helpful steps for community leaders to begin the process of assessing suitable parcels for community gardens and understanding the local zoning laws. http://www.cityofknoxville.org/boards/food/toolkit.pdf

The Local Government Commission has also created a fact sheet for local governments on the benefits of community gardens and how local governments can work with interested citizens to identify opportunities to develop community gardens as appropriate.
http://www.lgc.org/freepub/docs/community_design/fact_sheets/community_gardens.pdf

Complete Streets and Neighborhood Connectivity:
Complete Streets are designed so that they can serve all residents in a community. Complete Streets help restore an age-friendly network of smaller-scale streets so that the youngest and oldest residents can safely move around the community. One of the techniques that communities can apply to help create Complete Streets is to implement 'traffic-calming' strategies to reduce speed and improve safety in existing neighborhoods so that they work for all users: walkers, bikers, drivers, and transit users.

The National Complete Streets Coalition has compiled many resources to help local governments weigh options and considerations to implement complete streets. Complete Streets can be achieved through a variety of policies: ordinances and resolutions; rewrites of design manuals; inclusion in comprehensive plans; internal memos from directors of transportation agencies; policies adopted by city and county councils; and executive orders from elected officials. The following are some examples of how state and local governments have implemented complete streets in their communities:

- The State of Minnesota and the cities of Seattle, WA and DeSoto, MO **passed legislation** to require complete streets within their jurisdictions.

[9] Taken from City of Escondido, California: http://www.escondido.org/adopt-a-lot-program.aspx

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- City Councils in North Little Rock, AR and Missoula, MT **adopted resolutions**, setting a guiding principle for city staff to include all users in transportation projects.
- An **executive order** was issued by the Governor of Delaware, directing the Department of Transportation to accommodate all users on state projects.
- The Miami Valley Regional Planning Commission and the city of Baldwin Park, CA have **created internal policies** that guide staff in creating complete streets.
- El Paso, TX incorporated Complete Streets into its **comprehensive plan**, as did Scottsdale, AZ and Champaign, IL.
- The Massachusetts Department of Transportation undertook a major **rewrite of its design manual**, incorporating complete streets principles throughout — and won several national awards for their effort. Charlotte, NC rewrote its design guidance and instituted a new, transparent way to make decisions regarding roadway design.

Resources:

DOWNLOAD: *Complete Streets Local Policy Workbook* **(.pdf)**
DOWNLOAD: *Complete Streets Policy Analysis 2011* **(.pdf)**
DOWNLOAD: *Complete Streets: Policy & Implementation brochure* **(.pdf)**[10]

Disaster Resilience and Adaptability

More communities throughout the country are looking at their codes and ordinances to ensure that their buildings promote resilient communities, which are capable of bouncing back from all types of disasters. Integrating sustainability, resilience and adaptation into building codes of ordinances offers local officials with an opportunity to help standardize the durability of both new and existing construction. The questions below were developed to begin the thought process for looking at resilience and sustainability in your city's planning and building processes:

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

The Federal Emergency Management Agency and other state emergency preparedness offices are compiling information to help communities develop appropriate plans and strategies to cope with disasters and prepare the built environment so that they are capable of withstanding disasters.
Resource: http://www.fema.gov/pdf/privatesector/building_science_private_sector_v2.pdf

[10] http://www.smartgrowthamerica.org/complete-streets/changing-policy

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Sustainability and Historic Preservation

Older and historic buildings make up more than half of the existing buildings in the United States. Retention and adaptive reuse of these buildings preserves the materials, embodied energy, and human capital already expended in their construction. The reuse of historic buildings is one of the most beneficial "green" practices, and stresses the importance and value of historic preservation in the overall promotion of sustainability.[11] The National Trust for Historic Preservation notes that "… planners are beginning to recognize the sustainable and embodied energy aspects of rehabilitating and preserving historic buildings. They are incorporating preservation policy recommendations into downtown master plans, not just identifying where the most important historic buildings are located. Planning policies may include a new or strengthened preservation ordinance that restricts the demolition of historic resources or new design guidelines that recommend green and sustainable design improvements." [12] Some common historic preservation and environmental concerns occasionally clash, usually over issues involving windows, solar panels or, less often, exterior insulation.

There are many resources that can help local governments incorporate sustainability into historic preservation, and many of the resources focus on tools and techniques. Local governments who choose to ensure that historic preservation guidelines support incorporation of sustainability tools and techniques should work with the state historic preservation offices and consult with the resources below to optimize the permitting process to create an economic and regulatory structure that encourages sustainability and preservation.

Resources for integrating Sustainability and Historic Preservation (the resources in the shaded box have been taken from the South Carolina State Historic Preservation Office):

National Park Service - Sustainability includes many informative resources on energy efficiency and new technologies as well as case studies and research.

National Park Service - Weatherizing and Improving the Energy Efficiency of Historic Buildings

National Park Service - Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings (PDF, 2.1 MB)

National Park Service - Preservation Brief 3 - Conserving Energy in Historic Buildings

Advisory Council on Historic Preservation - Sustainability and Historic Federal Buildings (PDF, 2 MB)

National Trust for Historic Preservation- Sustainability
Provides additional links on Sustainability Research, Case Studies, as well as Green Home Tips. The Trust's 2011 report **The Greenest Building: Quantifying the Environmental Value of Building Reuse** provides the most comprehensive analysis to date of the potential environmental benefit of building reuse

National Trust for Historic Preservation - Weatherization Guide for Older and Historic Buildings Offers homeowners a one-stop resource with the latest information about how to make their home energy-efficient without compromising the historic character of their home

Whole Building Design Guide – Sustainable Historic Preservation Provides extensive information and links on a wide range of preservation, sustainability, and building-related guidance, criteria, and technology

"What Replacement Windows Can't Replace: The Real Cost of Removing Historic Windows"

[11] South Carolina State Historic Preservation Office: http://shpo.sc.gov/tech/Pages/sustain.aspx

[12] http://www.preservationnation.org/information-center/sustainable-communities/sustainability/green-lab/

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Walter Sedovic & Jill H. Gotthelf, APT Bulletin: The Journal of Preservation Technology, Volume 36, April 2005

"How Changes to LEED Will Benefit Existing and Historic Buildings" Barbara A. Campagna, AIA, LEED AP

"That Old Building May Be the Greenest on the Block" AIArchitect, February 8, 2008

"Sustainability, Smart Growth, and Historic Preservation" Speech by Donovan D. Rypkema, Principal of PlaceEconomics, 2007

Green Recommendations for Historic Rehabilitation and Urban Infill (PDF) Wabash Valley Trust for Historic Preservation (Indiana)

The Environmental and Energy Conservation Benefits of the Maryland Historic Tax Credit Program (PDF) This 2009 report quantifies the environmental impacts resulting from historic preservation tax credit projects

Energy Efficiency, Renewable Energy and Historic Preservation: A Guide for Historic District Commissions (PDF, 3.7 MB) Clean Air-Cool Planet, 2009

The 2007 National Conference of State Historic Preservation Officers' (NCSHPO) Annual Meeting included a squaretable discussion on Leadership in Energy and Environmental Design (LEED). PowerPoint presentations addressing preservation and sustainability are accessible below:

Sustainability and Historic Preservation: Lessons Learned (PPT-PDF) National Park Service, Technical Preservation Services

The Sustainable Preservation Coalition: Determining a Joint "Green Strategy" (PPT-PDF)

USGBC/LEED and Historic Buildings (PPT-PDF) US Green Building Council

National Park Service - Sustainability includes many informative resources on energy efficiency and new technologies as well as case studies and research.

National Park Service -Weatherizing and Improving the Energy Efficiency of Historic Buildings

National Park Service -Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings (PDF, 2.1 MB)

National Park Service -Preservation Brief 3 - Conserving Energy in Historic Buildings

Advisory Council on Historic Preservation - Sustainability and Historic Federal Buildings (PDF, 2 MB)

National Trust for Historic Preservation- Sustainability Provides additional links on Sustainability Research, Case Studies, as well as Green Home Tips. The Trust's 2011 report **The Greenest Building: Quantifying the Environmental Value of Building Reuse** provides the most comprehensive analysis to date of the potential environmental benefit of building reuse

National Trust for Historic Preservation - Weatherization Guide for Older and Historic Buildings Offers homeowners a one-stop resource with the latest information about how to make their home energy-efficient without compromising the historic character of their home

Whole Building Design Guide – Sustainable Historic Preservation Provides extensive information and links on a wide range of preservation, sustainability, and building-related guidance, criteria, and technology

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"What Replacement Windows Can't Replace: The Real Cost of Removing Historic Windows" Walter Sedovic & Jill H. Gotthelf, APT Bulletin: The Journal of Preservation Technology, Volume 36, April 2005

"How Changes to LEED Will Benefit Existing and Historic Buildings" Barbara A. Campagna, AIA, LEED AP

"That Old Building May Be the Greenest on the Block" AIArchitect, February 8, 2008

"Sustainability, Smart Growth, and Historic Preservation" Speech by Donovan D. Rypkema, Principal of PlaceEconomics, 2007

Green Recommendations for Historic Rehabilitation and Urban Infill (PDF) Wabash Valley Trust for Historic Preservation (Indiana)

The Environmental and Energy Conservation Benefits of the Maryland Historic Tax Credit Program (PDF) This 2009 report quantifies the environmental impacts resulting from historic preservation tax credit projects

Energy Efficiency, Renewable Energy and Historic Preservation: A Guide for Historic District Commissions (PDF, 3.7 MB) Clean Air-Cool Planet, 2009

The 2007 National Conference of State Historic Preservation Officers' (NCSHPO) Annual Meeting included a square table discussion on Leadership in Energy and Environmental Design (LEED). PowerPoint presentations addressing preservation and sustainability are accessible below:

Sustainability and Historic Preservation: Lessons Learned (PPT-PDF) National Park Service, Technical Preservation Services

The Sustainable Preservation Coalition: Determining a Joint "Green Strategy" (PPT-PDF)

USGBC/LEED and Historic Buildings (PPT-PDF) US Green Building Council

"Thinking of Greening your Historic Rowhouse?" Municipal Art Society of New York. October 2012. http://mas.org/thinking-of-greening-your-historic-rowhouse/

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Appendix B: How The Toolkit Was Created

Three resources were used to develop the Green Principles and Objectives as well as identify potential green technologies or techniques. These included:

- LEED 2009 Green Building Rating System for New Construction and Major Renovations;[13]
- Draft *Ig*CC Version 1.0;[14]and
- ASHRAE 189.1 Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings.[15]

These resources were selected because they contain a comprehensive overview of sustainable design principles and objectives; are meaningful to architects, developers and local government officials; include relevant technologies or techniques; and have been extensively researched and reviewed.

The Resource Guide was developed by conducting extensive research on other green assessment tools, reference documents, and case studies. These resources range from EPA-developed informational assessments, to resources compiled by green building organizations, to materials developed by state and local governments and other institutions. The Resource Guide is not designed to be a definitive list of resources but was developed to give local officials a quick reference guide to additional resources on a given sustainable design topic. It is a one-stop-shop for information that would otherwise be very time consuming and costly for a local government official to assemble.

EPA also solicited input from green building experts, code officials, and other building experts to help create the Toolkit. In March 2009, EPA hosted a workshop in Atlanta titled *Overcoming Barriers to Green Permitting: Tools for Local Governments*. The workshop consisted of permitting professionals, smart growth and green building experts, developers, builders, lawyers, and other building professionals. During the workshop, these professionals discussed barriers to green development and other topics related to sustainable building design and construction. [16] The information gathered during the workshop established the need for a permitting assessment document and compendium of resources to help local government officials identify barriers to sustainable building design.

To test the effectiveness of the Toolkit, EPA conducted a pilot with the city of Roswell, Georgia.[17] The city reviewed the Toolkit and provided helpful feedback on needed improvements. In addition to participating in the pilot project, Roswell presented its goals for greening its building code/ordinances during the March 2009 *Overcoming Barriers to Green Permitting: Tools for Local Governments* workshop. After the workshop, EPA and

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[13] LEED was developed by the USGBC as a system that defines, measures and ultimately rates green buildings. The LEED 2009 Green Building Rating System for New Construction and Major Renovations defines a set of performance standards that certify that the design and construction of buildings of all sizes and uses promote environmentally sound, healthy and economically advantageous building practices. http://www.usgbc.org/LEED. USGBC. LEED 2009 for New Construction and Major Renovations. 2009. http://www.usgbc.org/ShowFile.aspx?DocumentID=5546

[14] *IgCC* Public Version 1.0 applies to all phases of construction and alteration and outlines green code standards. The I*g*CC also contains references to the ICC-700 National Green Building Standard and includes ASHRAE 189.1 as an alternative compliance path. ICC. Draft *IgCC*, September 3, 2009. www.iccsafe.org/cs/igcc/Pages/default.aspx

[15] The USGBC; the ASHRAE; and the IES have developed a new ASHRAE/USGBC/IES minimum standard for high performance green building. www.ashrae.org/greenstandard

[16] ICC has launched a Green Communities of Interest site. This community exists as a meeting place for ICC members who share common interests in the environmental impact of the buildings and in creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition. Members of the community have opportunities to participate in discussions on green building, network, and develop professional contacts and access news, information, and resources. Participants in the March 2009 workshop expressed interest in having such a space for sharing information and lessons learned. For more information about this community please see: http://www.iccsafe.org/Communities/Green/Pages/default.aspx

[17] For more information about the City of Roswell Community Development, see: http://www.roswellgov.com/index.aspx?NID=95

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the city of Roswell also partnered to conduct a Lean Kaizen[18] event to improve the city's Land Disturbance Permit process. The goal of the Lean event was to help minimize permit re-work, encourage better permit applications, and improve staff morale, customer service, and deployment of services. The event provided a solid foundation for the potential development of the city's Green Permit Track by helping to determine if incentives such as reduced permit review times and process fees could be offered to developers who pursue sustainable design. Both the pilot and the Lean event were used to fine tune the Toolkit.

[18] Originally developed in the manufacturing sector, Lean is a business model and collection of methods that eliminates non-value added activity or "waste" while delivering high-quality products on time and at least cost. EPA's interest in Lean methods, as well as Six Sigma quality improvement methods, stems from identifying the environmental wastes associated with manufacturing and administrative processes in government and service sectors.

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Appendix C: Registrants List – Overcoming Barriers to Green Permitting Workshop

Overcoming Barriers to Green Permitting: Tools for Local Governments Workshop
Southface Energy Institute: Atlanta, GA
Thursday, March 19 – Friday, March 20, 2009

Registered Participant List
Townsend Bailey, Sustainable Atlanta
Jay V. Bassett, EPA
Karen Bandhauer, EPA
Jonathan Boyer, Farr Associates
Corey Buffo, EPA
Tim Carter, University of Georgia
Lowell Chambers, City of Atlanta
Alice Champagne, City of Roswell
Christopher Choi, Region 5
Scott Ledford, ICF International
Jim Durrett, Livable Communities Coalition
David Eisenberg, Development Center for Appropriate Technology
Jane Fowler, Southeast Watershed Forum
Mary Ann Gerber, EPA
Larry Hedges, Georgia Environmental Protection Division
Jon D. Johnston, EPA
Joseph Krewer, Georgia Department of Community Affairs
Matthew LeGrant, Government of the District of Columbia
Don Liotta, Outside the Box Construction
Ibrahim Maslamani, City of Atlanta
Cliff Majersik, Institute for Market Transformation
Ryan Meres, Georgia Department of Community Affairs
Sally Mills, City of Atlanta
Ted Miltiades, Georgia Department of Community Affairs
Kevin Nelson, EPA
Robert Reed, Southface Energy Institute
Elizabeth Oswald, EPA
Matt Robbins, EPA
Lucy M. Rowland, Athens-Clarke County, Georgia
Ken Sandler, EPA
Shari Shapiro, Obermayer Rebmann Maxwell & Hippell LLP
Jeremy Sigmon, U.S. Green Building Council
Daniel K. Slone, McGuireWoods LLP
Steve Smith, EPA
Robin Snyder, Alliance to Save Energy, Building Codes Assistance Project
Lee Sobel, EPA
Brad Townsend, City of Roswell
Scott Turk, Troup County, Georgia
Liz Upchurch, Tennessee Valley Authority
Michelle Vincent, Georgia Environmental Protection Division
Danelle Volpe, City of Roswell

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Appendix D: List of Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ACORE	American Council on Renewable Energy
AIA	American Institute of Architects
A.P.	Accredited Professional
ANSI	American National Standards Institute
ARCSA	American Rainwater Catchment Systems Association
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
AWE	Alliance for Water Efficiency
AWEA	American Wind Energy Association
BCAP	Building Codes Assistance Project
BECP	Building Energy Code Program
BIFMA	Business and Institutional Furniture Manufacturer's Association
BMPs	Best Management Practices
BSD	Better Site Design
C&D	Construction and Demolition
CA/DHS/EHLB/R-174	California/Department of Health Services/ Environmental Health Laboratory Branch R-174[19]
CAA	Clean Air Act
CEIRD	Clean Energy Information Resources Database
CFC	Chlorofluorocarbon
CMRA	Construction Materials Recycling Association
CNU	Congress for New Urbanism
CPG	Comprehensive Procurement Guidelines
CRI	Carpet and Rug Institute
CWM	Construction Waste Management
DDOE	District Department of the Environment
DOE	U.S. Department of Energy
DSIRE	Database of State Incentives for Renewable Energy
E&SC	Erosion and Sediment Control
EERE	Energy Efficiency & Renewable Energy
EISA	Energy Independence Security Act
EPA	U.S. Environmental Protection Agency
EPEAT	Electronic Product Environmental Assessment Tool
FEMA	Federal Emergency Management Agency
FEMP	Federal Energy Management Program
FERC	Federal Energy Regulatory Commission
FSC	Forest Stewardship Council
gpd	Gallons Per Day

[19] This is the California Standard Practice for the testing of volatile organic emissions from various sources using small-scale environmental chambers.

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HERS	Home Energy Rating System
HVAC-R	Heating, Ventilation, Air Conditioning and Refrigeration
IAQ	Indoor Air Quality
ICC	International Code Council
IECC	International Energy Conservation Code
IEEE	Institute for Electrical and Electronics Engineers
IES	Illuminating Engineering Society
I*g*CC	International *green* Construction Code
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
MIST	Heat Island Mitigation Impact Screening Tool
MSD	Metropolitan St. Louis Sewer District
NACHP	National Association of County Planners
NAHB	National Association of Homebuilders
NCDC	National Clean Diesel Campaign
NEMO	Nonpoint Education for Municipal Officials
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
OCEAN	Online Code Environment and Advocacy Network
PICP	Permeable Interlocking Concrete Pavements
PUD	Planned Unit Development
PV	Photovoltaic
RCRA	Resource Conservation and Recovery Act
REMC	Rural Electrical Membership Corporation
RESNET	Residential Energy Service Network
SAVE™	Sustainable Attributes Verification and Evaluation™
SCAQMD	South Coast Air Quality Management District
SCS	Science Certification Systems
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SNAP	Significant New Alternatives Policy
ULI	Urban Land Institute
USGBC	U.S. Green Building Council
VOC	Volatile Organic Compounds
WECS	Wind Energy Conversion Systems

The intent is to continually revise, update, and expand the information provided here. Please send comments, feedback, or suggestions to the EPA project managers, Steve Smith at smith.steved@epa.gov or 404-562-8501, or Suganthi Simon, at simon.suganthi@epa.gov or 404-562-9384.

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