

EXISTING ENDORSEMENT AND RATING SYSTEMS FOR “SMART” DEVELOPMENT

With Reference to Best Development Practices



**An Analysis by Laura Bruce and Kaid Benfield, NRDC
For the LEED-ND Core Committee
Spring 2004**



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LEED-ND has at its disposal a number of local, regional and state systems that establish criteria for new development as a prerequisite for bestowing endorsement or other benefits on those that qualify. These systems are of varying types and sophistication, but all incorporate at least some guidelines for what constitutes “good” development. In some cases, the criteria may be suitable for being adapted or borrowed for LEED-ND. This analysis presents an overview of a sampling of systems and an issue-by-issue discussion of the approaches taken.

In our research, we have attempted to review a number of types of systems, but we have not attempted to be exhaustive. We have no doubt overlooked some good ones, and we welcome analyses by others that can supplement this one.

In addition to the criteria within these systems, we also reviewed literature on best development practices as best we could within our limited budget. For the most part, these practices are captured sufficiently within the standards that we present and do not need other elaboration. For those who want to go deeper, at the end of each section we list references to some of the best practices literature that can supplement what is in the systems. In one case where we found the existing standards to be lacking on an important issue, we recite some of what we found in the best practices literature.

For an excellent brief overview of the ways in which development practices derived from new urbanism can produce environmental benefits, see *The Environmental Effects of New Urbanism*, by our core committee colleague Eliot Allen, included with this paper as Appendix D. The Charter of the New Urbanism, the founding document for CNU, is itself an articulated overview of best practices for placemaking, and we include it as well, as Appendix E.

As we proceed to the analysis of evaluation systems, the first of many notes of caution that we must sound for the committee is that this was a particularly difficult exercise because of the wide variation in the approaches taken by the systems (and practices) we reviewed. The categories were structured differently; the standards ranged from overly vague to overly precise; the terminology and use of language was inconsistent not only from one system to another but even within the same systems; and so on. Trying to make something cohesive and parallel out of this murky soup is the equivalent of comparing apples not only to oranges but also to toasters and gorillas. Bear with us. Nevertheless, we believe there is much useful information in these systems for the committee to draw from.

Where a system we reviewed has little to offer on a given issue, we generally omit it from that section of the analysis.



Martin Luther King Historic District, Atlanta.

I. TYPES OF EXISTING SYSTEMS

In this paper, we present information on some fourteen evaluation systems from the following sources:

- City of Austin Smart Growth Matrix (ended July 2003 but still very useful)
- CNU/EPA Smart Scorecard
- Greenbelt Alliance (San Francisco Bay Area)
- Housing Action Coalition – Santa Clara (CA) Valley
- LEED – Sustainable Sites Credits (from LEED version 2.0)
- Maryland Smart Growth Score Card
- Minnesota’s Smart Growth Criteria for Evaluating Capital Budget Requests
- Proposed New Jersey Smart Growth Tax Credit
- Sierra Club Smart Growth Questionnaire
- Triangle (Raleigh, NC) Smart Growth Coalition
- Urban Ecology (Oakland, CA) – Infill Development Endorsement
- Vermont Smart Growth Collaborative, Housing Endorsement Program
- Vital Communities (VT) – Housing Coalition Endorsement Guidelines
- Washington (DC) Smart Growth Alliance

As noted, the systems present a wide diversity of types and approaches. We describe them below in rough categories ranging from the least to most detailed. We also include a discussion of the fundamental question, “how do the systems define what developments or other proposals they evaluate?”

For the committee's reference, a more complete overview of the systems we reviewed is included as Appendix A.¹ In the case of two systems we believe to be particularly useful, we reproduce them in whole for the committee's convenience.

Generalized Systems

- Vital Communities – Housing Coalition Endorsement Guidelines
- Minnesota's Smart Growth Criteria for Evaluating Capital Budget Requests
- Sierra Club Questionnaire

These systems pose questions, request measurements, and offer guidelines, but do not establish specific or detailed criteria. The Vital Communities and Minnesota systems are the most qualitative. The Minnesota criteria asks evaluators to assign a project an overall plus, minus, neutral or N/A effect on several issues, although methods for drawing such a conclusion are left to the user. The Sierra Club questionnaire asks a series of predominantly yes/no questions. There is no consistency regarding whether a yes or a no response indicates smart growth, but a reader grounded in the subject would have little difficulty discerning which is which. These systems tend not to be very lengthy, although they do raise the right issues.

Threshold Criteria Coupled With Generalized Guidance

- Housing Action Coalition – Santa Clara Valley
- Greenbelt Alliance

Each of these systems has basic requirements that a development or project must meet in order to be favored. For the Housing Action Coalition, for example, there are requirements for size and density. Similarly, the Greenbelt Alliance has transit, density and size minimum requirements followed by more general guidelines.

¹ As noted above, we did not attempt to find and evaluate all such systems, nor could we within our budget. One system that we did review, for example – the CNU/EPA Smart Scorecard – itself makes reference to seven rating systems from Austin, Texas, Boulder, Colorado, Chula Vista, California, Fort Collins, Colorado, Montgomery County, Maryland, and Westminster, Colorado. Of these, we reviewed only the Austin system. Because the Smart Scorecard derives many of its features from these other systems, however, some of their ideas are captured in our analysis.

Threshold Criteria Coupled with Checklist or Rating System

- Maryland Smart Growth Score Card
- Washington (D.C.) Smart Growth Alliance
- Urban Ecology –Infill Development Endorsement
- CNU/EPA Smart Scorecard

These systems often have more stringent minimums and always involve more complex systems for examining non-required criteria. The Washington system has “pre-qualifying standards” that are fairly general and qualitative. However the checklist that follows goes into a fair amount of detail. Assessors look for “a preponderance of positive answers.” Urban Ecology also employs a checklist that is intended to provide guidance in addition to seven basic requirements. The Maryland system has a three part “eligibility screen” followed by criteria that may each be rated N/A, poor, fair, good, or excellent. The CNU/EPA Scorecard includes a fairly detailed set of questions to reveal whether a project has “excellent,” “preferred,” “acceptable,” or only “minimal” smart growth features, along with a yes/no checklist on some factors.

Numerical Scoring Systems

- Triangle Smart Growth Coalition
- Vermont Smart Growth Collaborative, Housing Endorsement Program
- LEED – Sustainable Sites
- City of Austin Smart Growth Matrix

These systems use points rather than checklists or other rating systems to evaluate Smart Growth. Point systems may be mixed with threshold criteria, as in the case of the Triangle Smart Growth Coalition, which sets forth minimum requirements and then assigns points to other criteria. The Coalition, however, does not set the minimum number of points required for endorsement. The Vermont program also has a pre-requisite: “Does the location have easy access to jobs, services, transportation, and grocery stores?” If this is the case, the program then assigns point values ranging from one to five for various criteria. A proposal must receive 15 points for endorsement. Of these 15 points, one must be in answer to the threshold question. Bonus questions are neutral; these points cannot count toward the required 15 but may increase the score beyond this point. Points are subtracted in certain cases.

The LEED and Austin systems use scoring to determine different levels of endorsement or certification. The LEED Sustainable Sites criteria, which are intended to compose a portion of the larger LEED rating system for commercial buildings (and, eventually, housing), contribute to the four levels of LEED certification, although buildings are not required to generate any points in the Sustainable Sites section after they have met the

prerequisite.² (Because LEED-ND will undoubtedly depart from the Sustainable Sites Criteria in some respects, an important task for our committee and others within the USGBC framework will be to sort out the relationships and hierarchy among the various LEED products that address overlapping issues.)

The Austin Matrix is weighted and has three levels of recognition. Although the system was discontinued in 2003, we include it because of its sophistication. We believe its criteria to be of high value to LEED-ND, and we are distributing full copies to the committee separately from this report.

The Proposed New Jersey Smart Growth Tax Credit

The New Jersey legislative proposal for a smart-growth tax credit is a special case. It outlines detailed prerequisites in order for a development to earn the basic tax credit, and then provides additional tax reductions if further requirements are met. A complete description of the New Jersey proposal is included in Appendices B and C.

Defining “Development” for Eligibility

One very basic and important issue for LEED-ND may be to define the size and/or type of development we want to be eligible for certification. The systems we surveyed vary widely on this issue, ranging from encompassing even a single building to being limited to developments with 50 or more units. Some do not speak to the issue at all. The following sorts of limitations and definitions are used:

- Infill projects only (Triangle Smart Growth Coalition, Urban Ecology)
- Residential only (Vital Communities)
- Residential and mixed use (Housing Action Coalition, Proposed NJ Smart Growth Tax Credit, Vermont Smart Growth Collaborative)
- Residential, commercial and mixed use (Greenbelt Alliance, Washington Smart Growth Alliance, City of Austin, Minnesota Criteria, Maryland Scorecard, CNU/EPA Smart Scorecard)



Dudley Street, Boston.

² The various LEED product lines and stages and development for each present a moving target for trying to recite what the standards are at a given moment. For this review we used the rating system, reference guide, and project checklist for Version 2.0 (June 2001).

- Projects requiring a connection to state funding (Minnesota Criteria, Maryland Scorecard³)
- Minimum size (Housing Action Coalition – 50 units, Greenbelt Alliance – 20 units, Vermont Smart Growth Collaborative – 10 units)

³ The Maryland Scorecard applies to “any major capital project,” including developments with assistance from housing and community development funds, business and economic development funds, environmental funds (e.g., for water treatment), or general services funds (state leases, acquisitions, or improvement).



Infill development at the Eastgate Mall, Chattanooga.

II. LOCATION ISSUES

No issue is more fundamental to the principles of smart growth than a development's location. Existing models provide guidelines both for requiring or rewarding location in favored areas (e.g., brownfields, within existing urban areas, near transit) and for precluding or discouraging location in undesirable areas (e.g., outside urban boundaries, on sensitive habitat).

Favored Locations Generally

(Note: Locational issues specifically related to transit and infrastructure are discussed separately below. We also flesh out the brownfields issue in a bit more detail below.)

Vermont Smart Growth Collaborative, Housing Endorsement Program

This program awards points for projects that meet certain locational criteria. While none is strictly mandatory, developments must qualify for 15 or more points (out of 30 potentially available) in order to qualify for endorsement. Location characteristics can provide as many as 5 of the required 15 points.

Infill and brownfield projects in existing towns are the most favored, followed by other sites within existing towns or “growth centers.” Points are available to these categories as follows:

- An infill or brownfield project “within an existing town or growth center” (5 points). An “existing growth center” is defined by the state’s Department of Housing and Community Affairs as “an area designated by a community in its municipal plan and/or designated by a regional planning commission in its

- regional plan to accommodate a significant amount of growth anticipated by a community over the next twenty years.”
- Within an existing town or growth center (4 points).⁴
 - Within a designated new growth center and could meet housing needs of town and region (3 points).
 - Within walking distance of or adjacent to an existing town center or growth center (2 points).
 - In a logical growth area that could become a growth center and that could meet housing needs for the town and region (1 point).

In addition, two bonus points (that, oddly, cannot be counted as part of the 15 points needed to pass) are awarded if the project uses a brownfield site outside an existing town center or existing growth center.

LEED – Sustainable Sites

The LEED Sustainable Sites criteria do not weigh location heavily in the overall evaluation, but they do give some preference to brownfields. (We discuss the issue of brownfields a bit more in a separate section, below.) In particular, credit may be earned by:

- Developing on a site classified as a brownfield by the US Environmental Protection Agency
- Following the EPA’s Sustainable Redevelopment of Brownfields Program requirements

Documentation is required.

City of Austin Smart Growth Matrix

The Austin program takes an approach similar to that in Vermont in that it awards points for a range of desirable sites and prioritizes them, making more points available for those it deems the most desirable. It uses a different vocabulary, however, and also takes advantage of locally designated smart-growth areas. In this case, downtown is the most favored location, followed by sites within designated “smart growth corridors” in the

⁴ These terms are not precisely defined in the documents we reviewed. However, Vermont law defines a new town center, a designated downtown, and a village center. A new town center is “the area planned for or developing as a community’s central business district, composed of compact, pedestrian-friendly, multistory, and mixed use development that is characteristic of a traditional downtown, supported by planned or existing urban infrastructure, including curbed streets with sidewalks and on-street parking, stormwater treatment, sanitary sewers and public water supply”. A designated downtown is a “district delineated by the municipality and designated by the downtown development board under section 2793”. A village center is defined as “a traditional center of the community, typically comprising a cohesive core of residential, civic, religious, and commercial buildings, arranged along a main street and intersecting streets. Industrial uses may be found within or immediately adjacent to these centers”.

“urban core.” (In addition, to be eligible for consideration, a project must not conflict with Neighborhood Plans.)

- Projects located downtown are eligible for 25 points (out of 705 total; a bonus, discussed below, is awarded for transit proximity; downtown projects are also excluded from some public participation requirements)
- Projects not downtown but in the urban core and within one lot deep of a Smart Growth Corridor are eligible for 16 points
- Projects elsewhere in the urban core are eligible for 12 points
- Projects outside the urban core but within city limits, and within the city’s “Desired Development Zone” (the central part of the city and areas to the east, north and south) and within one lot deep in a Smart Growth Corridor (or park-and-ride) are eligible for 9 points
- Projects elsewhere within a DDZ are eligible for 3 points
- Additional “location risk” points are awarded to projects that are in areas of economic need (12 points) or that are the first of their kind in a geographic area (30 points). Second and third projects of a kind can receive partial points.

Proposed New Jersey Smart Growth Tax Credit

The pending tax-credit legislation in New Jersey differs from the Vermont and Austin systems in that it does not use a point system. Instead, it sets clear criteria for eligibility based on site conformity to state planning policy, specifically the New Jersey State Development and Redevelopment Plan. In particular, a building or development must be located in one of the following areas:

- Planning Areas 1, 2 or 5b of the State Plan
- Designated centers, as determined by the State Planning Commission
- Additional municipalities or portions of municipalities that the New Jersey Office of Smart Growth determines to conform to the State plan or smart growth principles

Maryland Smart Growth Score Card

Like the proposed New Jersey legislation, Maryland’s scorecard requires that a project’s location conform to state planning law, in this case by being located within a Priority Funding Area (PFA) as defined by the state’s smart-growth law. PFAs comprise specific municipalities slated for growth, land within the Baltimore Beltway, land within the Maryland portion of the (Washington) Capital Beltway, and enterprise zones. County authorities may designate PFAs by defining growth boundaries. In addition, the scorecard favors the following:

- Locations near existing development
- Brownfields
- Sites that receive state funds for development or redevelopment

Other Systems

The others generally favor the same sorts of locations as do those above, but with less specificity. Some are noteworthy for LEED-ND because of certain differences in vocabulary or nuance:

- Consistency with comprehensive plans (Minnesota criteria)
- Near major employment center (Urban Ecology)
- Reuses parking lots, vacant lots, empty buildings, industrial sites, or historic sites (Urban Ecology)
- Converts a suburban mall into a mixed-use development (Urban Ecology)
- Redevelopment or renovation (Washington DC Smart Growth Alliance)
- Connects to a neighborhood, community or town center (Washington DC Smart Growth Alliance)
- Suggest allowance for adjustment to conform to land-use planning (NRDC model tax credit)

Transit Proximity

Most of the systems either require or strongly favor sites near public transit, with location within ¼ mile of bus service or within ½ mile of rail transit service as a common standard. Some go further and define a minimum level of frequency needed to meet the criterion, and the proposed New Jersey tax legislation awards varying credit for varying levels of service.

Housing Action Coalition – Santa Clara Valley (CA)

The project should adhere to the following:

- ½ mile from major transit service (rail or bus stop served by more than 6 buses or trains per hour at peak times. Includes yet-to-be-built light rail stations.)
- Within 2 miles of major transit service if ongoing shuttle buses are provided
- Documentation: the coalition requests that a map of the project with the location of bus and rail stations as well as frequency of service be provided in the application for endorsement.



Public square and transit stop in Portland.

Greenbelt Alliance (CA)

Basically, the same criteria: a project must be located within ½ mile (10-minute walk) of a major transit service (rail or bus stop serviced by 6 or more buses per hour during peak hours). The project could also be within ¼ mile of a potential future transit stop in a historic town center. The location of rail and bus stops and frequency should be noted in plans submitted to the alliance for review.

Triangle Smart Growth Coalition (NC)

Site should be within ½ mile of a proposed rail station (at present, the Triangle area does not have rail transit) or within ¼ mile of an existing or proposed bus stop, transfer point, or station.

Vermont Smart Growth Collaborative, Housing Endorsement Program

As part of a larger section on transportation options, discussed below in the context of design criteria, the program awards credit for being located on a transit route, within ¼ mile of a transit stop, or within ¼ mile of a bike/pedestrian path.

LEED – Sustainable Sites

As part of a larger section on transportation, awards a point for site development within ½ mile of a commuter rail, light rail or subway station or within ¼ mile of 2 or more bus lines.

Washington (D.C.) Smart Growth Alliance

The project should be within a ½ mile of a “public transit option.”

Urban Ecology – Infill Development Endorsement

A project must be located within ¼ mile of a downtown area or ½ mile of a current or planned transit stop that is serviced at least 6 times per hour during peak hours.

Documentation: Urban Ecology requires a description of the type and frequency of transit service available within ½ mile to pedestrians.

CNU/EPA Smart Scorecard

This system rates a location less than a 5-minute walk from transit (of any sort) as “excellent,” and a location 6-10 minutes away as “preferred.”

City of Austin Smart Growth Matrix

Austin’s system provides credit for the following locations near transit:

- Downtown developments within a one-block radius of a CMTA bus stop (20 points)
- Developments within Desired Development Zones served by park-and-ride facilities (9 points)

In addition, all developments must be consistent with transit station area plans when such plans become available

Proposed New Jersey Smart Growth Tax Credit

This system does not have the strongest minimum requirements, but it has the greatest specificity and complexity. It also uses a mathematical formula for awarding extra credit for locations with above-minimum transit service, in rough proportion to the estimated energy savings accruing from reduced auto use. In particular, to be considered for the basic 4% tax credit, a development’s location must exhibit at least one of the following:

- Adequate bus transit service defined as at least one bus stop within ¼ mile radius of geographic center of the development. The station must provide a minimum service of at least one bus per hour, 18 hours per day, 7 days per week or 30 times per weekday and 15 times per weekend day.
- Adequate rail transit service defined as at least one rail or light rail stop within ½ mile radius of geographic center of the development. The station must provide a minimum service of at least 5 trains during weekday peak hours (5:30am to 10:30am and 3:30pm to 8:30pm).
- Adequate ferry transit service defined as at least one ferry stop within ½ mile radius of geographic center of the development. The station must provide a minimum service of at least 5 ferries during weekday peak hours.

The New Jersey system also specifies that, for a transit stop to qualify for the above analysis, pedestrians must be able to access it without impediment.

In addition to the base 4% tax credit, developments may earn an additional 1.4% credit if the area is serviced by transit that provides more than the minimum frequency of service. The chart below outlines the potential additional credit values for transit.

Total Cumulative Rides Available ⁵	Additional Credit Percentage
60-124	.2%
125-249	.4%
250-499	.6%
500-999	.8%
1,000+	1.4%

Note: NRDC’s model State Smart-Growth Tax Credit, based on the New Jersey proposal and designed to be used in other states, notes that local transit use patterns (particularly in locations with less transit infrastructure than New Jersey) may make it advisable that these criteria be modified “in consultation with state transportation experts.”

Proximity to Infrastructure and Existing Development

Several systems contain provisions requiring or rewarding locations that can be served by existing roads, water, sewer, etc. systems, without the need for extensions. Most are not very detailed.

Proposed New Jersey Smart Growth Tax Credit

To be eligible for a tax credit, developments must not involve either of the following:

- Sanitary sewer line extension over 1,000 feet, unless sited for service prior to enactment of the tax credit legislation
- Septic system

Vermont Smart Growth Collaborative, Housing Endorsement Program

This system awards credit for locations that use existing infrastructure:

- 1 point for site that is serviced by public water or sewage disposal facilities
- 2 points for site that is serviced by both public water and sewage disposal facilities.

⁵ “Total Cumulative Rides Available” is the sum of the number of rides available by bus within ½ mile radius of the geographic center of a development; the number of rides available by rail or light rail within a ½ mile radius of the geographic center of a development, multiplied by the average number of cars on each train; and the number of rides available by ferry within ½ mile of the geographic center of a development, multiplied by 3.

Housing Action Coalition – Santa Clara Valley

To qualify, a project must be located within an existing “urban service area” (an area that a city provides with services or plans to provide with services in the near future) as noted in a city’s general plan.

CNU/EPA Smart Scorecard

Projects adjacent to existing roads, water and sewer service qualify as “excellent” and those within 1/3 mile qualify as “preferred.”

Minnesota’s Smart Growth Criteria for Evaluating Capital Budget Requests

A project will be favored if it is consistent with the following:

- Takes advantage of existing public investments, such as transportation, housing, schools, utilities, and telecommunications
- Does not require new infrastructure investments outside of trade or population centers

Triangle Smart Growth Coalition (NC)

A project must be within 400 ft (approximately 1 city block) of an existing collector or arterial street. Exceptions are made for exemplary designs with high levels of affordability and/or context compatibility.

Maryland Smart Growth Score Card

The scorecard examines whether infrastructure exists with ½ mile of the project and whether there is adequate school and road capacity.

Vital Communities (VT) – Housing Coalition Endorsement Guidelines

Generally a project’s location should have access to existing public water and sewer lines and be within or adjacent to an existing or new town center.

Washington (D.C.) Smart Growth Alliance

This system provides guidelines for jurors to consider when evaluating applicants. A pre-qualifying criterion is that the site must be within an existing or planned public water and sewer service. In addition, new development should support existing schools.

Sierra Club

Location questions ask whether the development is economically connected to existing communities.

Brownfields

Because of the special interest in brownfields redevelopment, we are highlighting this issue with its own subsection. Unfortunately, while several of the systems do favor brownfields sites for development, they do not offer much detailed guidance. Neither does the best practices literature: its focus is almost entirely on how to perform brownfields cleanup rather than on the post-cleanup development.

Proposed New Jersey Smart Growth Tax Credit

Development on brownfield sites receives a tax credit of 0.5 percent of allowable costs in addition to that earned by meeting the other smart-growth criteria. In addition, by locating in a brownfield, projects can be exempt from certain location requirements and can be located in or within 100 ft of a critical slope area, within the 100-yr floodplain, or within 1,000 ft of the mean high-water mark for a saltwater body.

The proposal defines “brownfield” by reference to state law. NRDC’s Model Smart Growth Tax Credit, based on the New Jersey proposal, defines “brownfield site” as “any former or current commercial or industrial site that is currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a hazardous substance, a hazardous waste, or a pollutant.”



Waterfront Park on former brownfield in Trenton, New Jersey.

LEED Sustainable Sites

One point is awarded for rehabilitating a brownfield site, where there is real or perceived contamination. To achieve this, developers must use a site classified by and remediated according to EPA's Sustainable Redevelopment of Brownfields Program. Also suggests that developers research tax incentives and property cost savings associated with brownfields. Technologies recommended include pump-and-treat, bioreactors, land farming, and in-situ remediation. The developer should develop a remediation plan.

Minnesota Smart Growth Criteria

One of the suggestions for achieving good stewardship of land and natural resources is to use a brownfield site, defined as "a polluted site available for reuse in economic development, job creation or some other community amenity, after appropriate cleanup has taken place."

Maryland Smart Growth Scorecard

Whether the location is a brownfield site is one of the two location criteria that this system considers.

Urban Ecology Infill Development Project Endorsement Standards

In the project summary, developers are asked if the project uses a brownfield site. The checklist, which is meant to guide citizens and developers rather than evaluate projects, asks if the project involves cleaning up a brownfield in the section on ecological design.

Vermont Smart Growth Collaborative

Projects can receive five points for infill or brownfield development within an existing town center or growth center. Two bonus points can be earned for developing a brownfield site outside an existing town center or growth center.

Greenbelt Alliance

Commercial (non-residential) developments are encouraged to use brownfield sites.

Disfavored Locations

The sophisticated plans all exclude or disfavor locations in environmentally sensitive areas.

Proposed New Jersey Smart Growth Tax Credit

The New Jersey proposal specifies a number of locations that are not eligible for the credit, taking advantage of definitions in federal and/or state law when possible:



Mountaintop sprawl in California.

- Pinelands National Reserve, unless the site is within a Pinelands Regional Growth Area or Pinelands Town as designated in the Pinelands Comprehensive Management Plan
- Public parkland
- Within 1,000 ft of critical habitat within public parkland. Critical habitat areas are established by the state Department of Environmental Protection and are biologically diverse areas where the habitat of endangered or threatened plants or animals is located
- In or within 300 ft of a coastal or freshwater wetland, as defined by state law.⁶
- In or within 100 ft of a critical slope area. (A critical slope area is defined as an area with a greater than 15% change in elevation over the same horizontal distance (15% slope) or an erodibility factor k of greater than .4, as determined by the Natural Resources Conservation Service of the U.S. Department of Agriculture.) *This requirement does not apply if the site is a brownfield or within a highly urbanized area*
- Within the 100 year floodplain, *unless the site is a brownfield or within a highly urbanized area*
- Within 1,000 ft of the mean high-water mark for a body of saltwater, *unless the site is a brownfield or within a highly urbanized area*
- Within a water supply deficit area as defined by the State Water Supply Plan. An exception is made for developments with fewer than 20 residential units and non-residential units that cumulatively will use less than 10,000 gallons of water per

⁶ Section 2 of P.L.1970, c.272 (C.13:9A-2) and section 2 of P.L. 1987, c.156 (C.13:9B-3).

day. A second exception is made for developments that have a water use plan approved by the Department of Environmental Protection.

- Brownfield and “highly urban area” exceptions – A brownfield is defined under state law as a former or current industrial site that is currently vacant or underutilized that is, or is suspected to be, contaminated by hazardous waste, a hazardous substance, or a pollutant. A “highly urbanized area” is one that has at least 30% impervious surface within 1,000 ft of the perimeter of the development or has been deemed “built out” by the Commissioner of Community Affairs.

Triangle Smart Growth Coalition (NC)

This system includes threshold criteria regarding environmental sensitivity that in some cases, as in the New Jersey proposal, reference federal and state law. In particular, the development cannot disturb the following:

- Wetlands and streams in the National Wetlands Inventory, on USGS maps, or on maps from the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture
- Watersheds, and particularly “critical area of water supply” watersheds
- Endangered and threatened species and critical habitat defined by the state’s Natural Heritage Program
- Steep slopes (greater than 15%)
- Cultural resources (architectural and archeological)
- Significantly, there is an *exception to these requirements where designs are exemplary in mitigating* negative effects.

Vermont Smart Growth Collaborative, Housing Endorsement Program

The section on Environmental Quality contains provisions that add or subtract credit in the following circumstances:

- Credit (one point) is awarded if the project is not located within a floodplain (except if allowed by zoning), rare or endangered species habitat, natural area, wetland, or critical wildlife habitat
- Credit is subtracted (-3) points if a project is located in one of these areas, but one point may be earned back if efforts are made to mitigate impacts.
- Project should be consistent with a municipal open space plan (Bonus question, one point)
- Credit will also be subtracted if the project is on prime agricultural land as defined by the USDA Soil Conservation Service or within a block of conserved farms unless in a growth center, planned extension of a growth center, or proposed growth center. *Exceptions may be made for farm labor housing.*

Maryland Smart Growth Score Card

The section on Environmental Protection provides the following guidelines for evaluation:

- Avoid developing on wetlands, streams, shorelines and related buffer areas
- Avoid developing on working agricultural or forest lands
- Avoid developing on slopes greater than 15%
- Avoid highly erodible, unstable soils, or on floodplains
- Protect habitat for threatened or endangered species

Washington (DC) Smart Growth Alliance

Most of this system's guidelines on conservation and ecology relate to on-site actions by the developer, but a few relate, at least in part, to location:

- Avoid steep slopes (15%) and erodible, unstable soils
- Connect open-space areas
- Reduce air pollution by location and design

Minnesota's Smart Growth Criteria for Evaluating Capital Budget Requests

Generally, projects should maintain or enhance natural systems and resources. They should be located to be consistent with the following goals:

- Protect farmland
- Protect natural systems including waters, wetlands, forests and prairies
- Do not harm recreation areas such as parks, wildlife areas and natural reserves

Vital Communities – Housing Coalition Endorsement Guidelines

When it is impossible to locate a project within an existing town center, efforts should be made to minimize impact on natural resources identified in local or state plans, and on the following:

- Prime agricultural land
- Critical habitat and ecologically-sensitive areas
- Scenic areas

Greenbelt Alliance (CA)

Precludes endorsement of development within the greenbelt or a natural resource area.

Some References for Best Practices on Location

Despite the importance of location to environmental performance and social and economic objectives, it does not enjoy a robust literature on best practices, compared to that for development design and environmental management. That may be because the strongest market for best-practices handbooks are practitioners approaching a site whose location has been predetermined. Nevertheless, here are a few:

Dana Beach, *Coastal Sprawl: The Effects of Urban Design on Aquatic Ecosystems in the United States*, Report for the Pew Oceans Commission, 2002, especially pp. 11-12 (Interpreting the Ten Percent Rule) and 13-16 (Strategies and Tools: Regional Scale).

Mark A. Benedict and Edward T. McMahon, *Green Infrastructure: Smart Conservation for the 21st Century*, Sprawl Watch Clearinghouse Monograph Series (available from the Conservation Fund), undated.

Benfield, Raimi & Chen, *Once There Were Greenfields*, Natural Resources Defense Council, 1999, especially pp. 44-45 (Building Communities to Reduce Traffic), 76-78 (Saving Open Space With Smart Growth) 84-87 (Strategies for Improving Water Quality), 138-149 (Some Guiding Principles for Nonsprawling Land Use).

Peter Calthorpe, *The Next American Metropolis*, especially “Guiding Principles,” pp. 62 (Relationship to Transit and Circulation), 67-73 (Distribution of TODs; Redevelopable and Infill Sites; New Growth Areas; Regional Form; Criteria for New Towns; Open Space Resource Protection; Urban Growth Boundaries).

Reid Ewing, *Best Development Practices*, American Planning Association, 1996, especially pp. 17-51 (Best Land Use Practices) and 95-104 (Best Environmental Practices).

III. DESIGN ISSUES

If a development is situated in an environmentally preferable location, a number of design factors must then be considered to determine if it qualifies as “smart.” The most basic of these is density or compactness, since it is the spread-out nature of sprawl that causes much of the environmental damage. Nearly all of the existing rating systems have some criteria regarding

density, though more of them speak to residential density than to commercial density. Some systems also provide criteria relating to cultural resources or design affecting community features. Some also reward good on-site transportation features (i.e., beyond transit proximity), such as sidewalks and street connectivity.



Bethesda Row, Maryland.

Density

In general, the systems’ density criteria are presented in order from the more simple to the more complex, with two subjective systems presented last. Note the wide variation among the systems on what constitutes an acceptable density:

Vital Communities (VT) – Housing Coalition Endorsement Guidelines

The Coalition takes a straightforward approach. In order for the Coalition to endorse a project, it must meet one of the following minimum densities:

- Net density of 10 to 25 units per acre for multi-family
- Net density of 8 to 10 units per acre for single-family

In addition, building heights should also be at least the zoning minimum.

Greenbelt Alliance (CA)

This system also takes a straightforward approach, but with an important and broad exception. The Greenbelt Alliance will consider endorsing a project if it meets certain density requirements:

- 20 units per net acre for residential and mixed-use development

- Below 20 units per net acre if “above average” for the location and similar in character to surrounding neighborhood.

In general, a project must also be a certain minimum size (20 units), although smaller projects will be considered if the project has an exemplary design or other benefit.

Housing Action Coalition – Santa Clara Valley (CA)

The HAC system is conceptually similar to the Greenbelt Alliance system, but it includes a tougher standard for developments near rail transit. In general, the Housing Action Coalition will support projects of 50 units or more if they achieve a certain density depending on location:

- Basic minimum of 14 units per acre
- Fewer than 14 units per acre if above norm for location or warranted by other site-specific conditions
- 20 units per acre if within ½ mile walk of rail transit station

City of Austin Smart Growth Matrix

The Austin system eschews prerequisite minimums in favor of a scoring system. The criteria set a higher standard for downtown locations than for others. This system also includes criteria for commercial buildings based on floor area ratio. In particular, a project can receive a maximum of 24 points (705 total possible points within the rating system) by reaching the following threshold levels:

- 7 to 12 dwelling units per acre within a “Smart Growth Corridor”
- 12 to 25 units per acre in downtown
- .35 FAR within a Smart Growth Corridor
- .5 FAR in downtown

A residential or commercial development would earn 12 points by satisfying the residential or commercial criteria. A mixed-use project could earn 24 points by satisfying both.

LEED – Sustainable Sites

These criteria also do not require a minimum per se but provide scoring credit for properties meeting a standard based on a mathematical formula. Buildings can earn one point (out of 69 possible points for the rating system as a whole) for being located in a high-density area and increasing or conforming to the density of the surrounding area as defined below. The criteria are designed for commercial buildings:

- Minimum density of 60,000 sq. feet per acre, approximately the equivalent of a two-story downtown development
- The density radius equals 3 times the square root of the property in square feet. Creating a circle from the center of the site according to the density radius will

define the area that it is to be considered the “surrounding area” for density comparisons.⁷

Vermont Smart Growth Collaborative, Housing Endorsement Program

This is also a points-based system, but it rewards higher densities with more points. In particular, a project’s density may earn it up to 3 of the 15 points required for endorsement (and of the 30 points theoretically available). The minimum required to earn a density point is strikingly low, at 4 units per acre.

Points are awarded for density on the following scale:

- 1 point for a density of 4 units per acre
- 2 points for a density of 10 units per acre
- 3 points for a density of 20 units per acre

Proposed New Jersey Smart Growth Tax Credit

This system is a hybrid, with a fixed but relatively low minimum, and extra credit for densities higher than the minimum, allotted by mathematical formula.⁸ Note all the exclusions for what constitutes part of the residential acreage.

- Average density for residential development of 6 dwelling units per residential acre. Residential acreage is calculated net public open spaces, public sidewalks or public roads. For residential areas, residential acreage will be the building footprints plus associated driveways, yards and parking areas except parallel on-street parking. For mixed-use areas, residential acreage will be a percentage of the building footprints equal to the percentage of interior space devoted to residential use plus associated driveways, yards and the percentage of associated parking areas used by residents.
- Higher densities can increase the value of the tax credit by as much as 60 percent. Up to 2.4% above the base 4% of allowable costs credit may be earned for higher density according to the chart below:

⁷ Your mathematically and conceptually challenged authors will leave it to others to understand this one. It (and a few others above and below) does, however, beg a more general and fundamental question for the core committee to address: how technical, precise, and/or mathematical do we want our standards to be?

⁸ The extra credit is intended to be roughly proportional to the additional energy savings from reduced automobile use at higher densities.

Dwelling Units per Residential Acre	Additional Credit Percentage
7 – 10	.2%
11 – 17	.4%
18 – 29	1.2%
30 – 39	2.0%
40 or higher	2.4%

CNU/EPA Smart Scorecard

This system provides guidelines for rating projects as “excellent,” “preferred,” “acceptable,” or “minimal.” While in general only the “excellent” and “preferred” categories have relevance for LEED-ND, we show the other categories as well for density, because this system is a bit more stringent than some of the others on this factor. It is also notable that the system rates residential projects on gross rather than net density, and it separates commercial property into two categories, with office property subject to more stringent guidelines than retail.

For residential property (gross density including right of way and open space):

- Excellent – 14 units/acre
- Preferred – 10-13 units per acre
- Acceptable – 7-9 units/acre
- Minimal – 4-6 units/acre

For office property (FAR excluding structured parking and right of way):

- Excellent - >1.0 FAR
- Preferred - .76-1.0 FAR
- Acceptable - .51-.75 FAR
- Minimal - .4-.5 FAR

For retail property (FAR excluding structured parking and right of way):

- Excellent - >.75 FAR
- Preferred - .46-.75 FAR
- Acceptable - .36-.45 FAR
- Minimal - .3-.35 FAR

Maryland Smart Growth Score Card

The Maryland scorecard is relatively weak on density, tied to the low minimums for “priority funding areas” in the state’s smart-growth legislation. The system’s eligibility screen requires that the following standards be met:

- 3.5 units per acre of buildable land for residential, or a .2 floor area ratio for commercial.

- Within a Priority Funding Area (PFA) under Maryland law.⁹

The system adds some functional but highly subjective density criteria. If a project passes these requirements and others relating to location, the scorecard rates projects from “poor” to “excellent” on the following:

- Residential projects should have “adequate” density
- Commercial and retail single use and mixed use projects should have “adequate” density
- If project is within ½ mile of transit, density must be able to support transit service
- If transit may be extended in the future, density should be at a “transit ready” level.

Washington (D.C.) Smart Growth Alliance

This system is a hybrid. Its basic criteria are subjective, if somewhat performance-oriented. But it also includes numerical density “guidelines” for various categories and locations of development. The guidelines suggest that endorsement can be given for projects ranging from as low as 4 units per acre in rural areas to a threshold requiring a minimum of 25 units per acre, a multi-family configuration, and commercial FARs of 1.5 to 3.0 near rail transit stations.

Generally, a project must have sufficient density to support mixed uses, walkability, and public transit. To achieve this, the project should follow as many of the criteria outlined below as possible:

- Net density should exceed the density of the surrounding area. (Net density is defined as the concentration of buildings, including total volume within a given area, excluding land for streets, public playgrounds and open space.)
- Sufficient density to promote mixed-use, walking, biking, use of civic space, public transit, reduced single-occupancy vehicle use.
- If project is within ½ mile of fixed-rail station, it should be dense enough in comparison with surrounding areas to support 12- to 18-hour activity
- If an infill project is farther than ½ mile from a fixed-rail station, it should be dense enough in comparison with the surrounding area to enliven the area, support public transportation, and make use of existing infrastructure
- If the project is suburban, residential density should be enough to support some retail, employment, civic uses, increased public transportation, and mixed-uses. (Residential density is measured in dwelling units per acre. Non-residential density is measured in floor/area ratio.)

⁹ These are locally designated growth areas. For areas to be eligible for PFA designation, the law requires a minimum average density of 2.0 units per acre in areas designated as currently residential or zoned for development. For new growth beyond currently built or zoned areas, the minimum average density must be 3.5 units per acre.

- If the project is in a rural/village/small town area, it should be dense enough to enhance and support existing development and use existing infrastructure
- Guideline typical minimum densities are provided in the table below:

Location	Residential Guidelines	Commercial Guidelines
Within ½ mile of fixed-rail station	Multifamily, 25 dwelling units per acre	Between 1.5 and 3 FAR. Highest densities concentrated at rail station.
Farther than ½ mile from fixed-rail station	Single family detached units, 5 units per acre. Mixed housing, 7 units per acre. Single family attached, 15 units per acre. Multifamily attached, 25 units per acre.	1 FAR
Suburban areas	7 dwelling units per acre.	.5 FAR
Rural/village/small town areas	4 dwelling units per acre.	No density target.

Mix of Uses

Most rating systems establish diversity of uses within a project as a desirable component, and one on which developments should be evaluated. Few of them back that up with much specificity, however. Moreover, it must be noted that, for the purposes of LEED-ND, we may not want to require that a development have



Corner store mixed with affordable housing.

internally mixed uses if it adds diversity to a pre-existing area with an imbalance of uses (e.g., we may want to reward a residential-only development that locates within a commercial area or vice versa).

With only a couple of exceptions, this is not an issue on which existing systems are of much value.

City of Austin Smart Growth Matrix

This scoring system is a special case. It essentially (if not explicitly) takes a big-picture approach and expands the concept of mixed use to reward development projects that provide balance within the development, within individual buildings, within neighborhoods, and even within the region. It is novel among systems in that it rewards developments that include a “regional draw.” Eligibility for points varies according to location:

- The system rewards downtown location of regional attractions, and it also recognizes the need to balance existing downtown uses with additional housing. For downtown projects, 15 points (705 total possible points) are given for having a regional draw such as retail, entertainment, or a cultural center. 20 points are given for creating more than 200 new housing units.
- For projects in the urban core but outside downtown, 4 points are given for having a regional draw. Again, 20 points are given for creating more than 200 new housing units. And 12 points are given for incorporating a variety of housing types (apartments, row houses, single-family).
- For Traditional Neighborhood Projects, 9 points are given for incorporating a variety of housing types. 9 points are given for meeting Traditional Neighborhood Development (TND) codes and ordinances. 9 points are given for creating a town center with neighborhood retail.

Within individual buildings, each use must take up at least 20% of the space of the building when considering mix of uses. The following point system applies:

- 20 points for including residential above the first floor
- 15 points for street level pedestrian use
- 15 points for two uses
- 25 points for three uses

CNU/EPA Smart Scorecard

The Scorecard’s checklist system includes the following “possible measures” to qualify a project as “excellent”:

- For residential projects, adjacent to shopping, schools, daycare, or recreation centers
- For commercial projects, adjacent to housing, restaurants, or entertainment

- Provides 4 new types of uses, such as employment, housing, retail, civic, educational, cultural, recreation, or neighborhood retail, to an existing neighborhood
- Provides uses that generate street-level pedestrian activity for more than 18 hours per day
- Provides street-level uses that generate more than 600 users/day
- Includes 3 “vertically mixed” uses

The following are suggested to qualify a project as “preferred”:

- For residential projects, within 1/3 mile of shopping, schools, daycare, or recreation centers
- For commercial projects, within 1/3 mile of housing, restaurants, or entertainment
- Provides 3 new types of uses, such as employment, housing, retail, civic, educational, cultural, recreation, or neighborhood retail, to an existing neighborhood
- Provides uses that generate street-level pedestrian activity for 13-18 hours per day
- Provides street-level uses that generate 400-500 users/day
- Includes 3 uses within a project, even if not “vertically mixed”



Small infill development in Chicago places condominiums above stores.

Washington (D.C.) Smart Growth Alliance

The Alliance’s system provides more specificity than most as to what the goals should be, but it stops short of creating measures to determine whether the goals are met. In particular, the following are guidelines for creating a sufficient mix of uses:

- Generally, a project should create a “balance of jobs, housing and services”
- If the project is within ½ mile of a fixed rail station, a project should balance existing jobs, housing and services.
- If the project is farther than ½ mile from a fixed rail station it should create an internal mix of residential and commercial uses.
- A project should also promote vertical integration or more than one use per building

Proposed New Jersey Smart Growth Tax Credit

Additional tax credit beyond the base of 4% may be awarded for developments that mix residential with up to 75% of interior square footage of commercial space, office space, retail space, or other non-residential use approved by the Department of Community Affairs.

Maryland Smart Growth Score Card

This system seeks (without specific criteria) to reward both adding a richer mix to existing neighborhood uses as well as providing an internal mix within a development. Projects are rated poor to excellent on the following:

- Mix of land use including residential, retail, office/commercial, public buildings, public space, and entertainment
- For small infill or single use projects, adding to mix of uses within ¼ mile
- Uses are physically mixed within the project or the adjacent neighborhood

Vermont Smart Growth Collaborative, Housing Endorsement Program

This scoring system offers a bonus point for residential developments that include “uses besides housing” at the site. These may include recreational, community, commercial, or social service facilities.

Greenbelt Alliance (CA)

Creating a mix of uses is one of the goals of the alliance. The Alliance defines the concept as including developments that combine residential with commercial, retail, education, childcare, entertainment or recreation uses. There are no specifics.

Best Practices on Mixing Uses

Although the systems we reviewed had little specificity to offer regarding standards for mixing uses, the issue receives a fair amount of discussion and articulation in the literature for practitioners. The list of best practices on mixing uses, below, may help the committee’s thinking. As a caution, please note that not all of the practices are easily translated into standards and that some are intended as ideals rather than minimums. In addition, as with the standards we recite from the existing rating systems for the other issues, not all are consistent with each other. Note also the variation in specificity. While there are many sources, we draw here from four of the better-known ones.

- Contribute to the area’s jobs-housing balance. (Ewing)

- Mix land uses at the finest grain the market will bear and include civic uses in the mix. (Ewing)
- Phase convenience shopping and recreational opportunities to keep pace with housing. (Ewing)
- Concentrate commercial development in compact centers or districts rather than spreading it out in strips. (Ewing)
- Make shopping centers and business parks into all-purpose activity centers. (Ewing)
- Many activities of daily living should occur within walking distance. (CNU)
- Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk to them. (CNU)
- A range of parks, from tot-lots and village greens to ballfields and community gardens, should be distributed within neighborhoods. (CNU)
- Each transit-oriented development (TOD) must have a mixed-use core commercial area located adjacent to the transit stop. At a minimum, the core area should provide convenience retail and local-serving offices. (Calthorpe)
- TOD residential areas should include housing that is within a convenient walking distance from core commercial areas. (Calthorpe)
- The following is a preferred mix of land uses, by percent of land area within a TOD: for a “neighborhood TOD,” 10-15% public, 10-40% commercial, 50-80% housing; for an “urban TOD,” 5-15% public, 30-70% commercial, 20-60% housing. (Calthorpe)
- Each neighborhood should provide a relatively balanced mix of housing, working, shopping, recreation, and institutional uses. While a perfect balance is rarely possible, large parcels containing a single use should be prohibited. (Duany)
- Each neighborhood center should contain some retail space. A corner store/café (subsidized if necessary) should be provided in all neighborhoods of at least 300 residences and/or jobs. (Duany)
- Each neighborhood should contain some office space. Ideally, there should be approximately as much office space in the neighborhood as there are office workers living in the neighborhood, and most of this space should be located at or near the center, where it has easy access to retail and transit. In addition to office buildings, offices can be located above stores, and in live/work buildings. (Duany)

References:

Peter Calthorpe, *The Next American Metropolis*, Princeton Architectural Press, 1993.

Congress for the New Urbanism, *Charter of the New Urbanism*, McGraw-Hill, 2000.

Duany Plater-Zyberk & Company, *Onondaga County Settlement Plan: Traditional Neighborhood Guidelines* (2001).

On-Site Transportation Features and Connectivity

In addition to a project's location with regard to transportation infrastructure, several systems include criteria relating to on-site characteristics within a development such as street design, parking, and pedestrian and bicycle accessibility. On this subject, the existing systems provide a very rich and detailed menu of measures and standards.



Roads to nowhere.

City of Austin Smart Growth Matrix

Under the category of Multi-Modal Transportation Elements (with 134 points potentially available), the following involve on-site design:

Streetscape/sidewalk treatment for Maximum Pedestrian Comfort

- Controlled crossings (12 points)
- 12 foot clear sidewalk along street frontage (9 points)
- Street trees (minimum 4 inch caliper, 30 foot overhead canopy on all sides) (9 points)
- Maintain alleys or extend pedestrian street grid network (9 points)
- Continue existing sidewalk network (6 points)
- First floor within 18 inches of street level (3 points)
- On-street parking along street frontages (3 points)
- Small scale pavement (pavers or scoring) (3 points)
- Rain protection (awnings, arcades) (3 points)
- Pedestrian scale lighting on sidewalks (3 points)

Alternative Pedestrian and Bicycle Access

- Pedestrian network linking buildings and streetscape sidewalks (8 points)
- Bike racks (1:10), bike lockers (1:50) (6 points)
- Locker rooms, showers, dressing rooms (4 points)
- Bike linkages (4 points)
- Access to uninterrupted greenbelt trails (4 points)
- Office, retail, or residential facing creek (4 points)

Building and parking features:

- Structured or underground parking (12 points)
- Build to right of way (no setback) (12 points)
- Retail at ground floor of structured parking (9 points)
- Minimal curb cuts (6 points)
- Façade divided into 30 foot increments (6 points)
- Rear parking (6 points)
- Shared parking (3 points)
- Building oriented to sidewalk (3 points)
- No drive-throughs (3 points)

In addition, 20 points are available for projects that coordinate with transit by providing facilities for bus or rail transfers, cooperating with the Capital Metro Transit Authority (CMTA) for the City of Austin, and demonstrating consistency with a Transit Node Plan and Corridor Plan.

Triangle Smart Growth Coalition

This system seeks to encourage new developments to create or fit within a multimodal regional transportation network that links with existing residential, commercial, recreational, and employment areas. This is a scoring system.

Up to 10 points (out of 90 potentially available) may be earned in the category of “Connectivity and Parking.” Parking elements that qualify include the following:

- Fewer than minimum number of parking spaces required by zoning
- On-street parking counted towards minimum requirement if possible
- For large sites, parking in design of buildings as underground or deck facilities
- For small sites, minimize view of parking from street by planting or building screens and placing parking at rear or side of buildings
- Use of shared parking in mixed-use areas

Points may be earned for Connectivity with the following:

- Continue or improve upon existing street/sidewalk network
- Minimal automobile/pedestrian conflict points
- Minimal number of curb cuts
- Complete pedestrian system that connects to adjacent neighborhoods

In addition, the section on “Integrated Land Use and Transportation” (20 points out of 90 available), which is concerned primarily with proximity and coordination with regional transportation infrastructure, provides one guideline relevant to on-site matters:

- For large projects, a transportation demand management plan should be created to minimize reliance on car trips to and from the site.

CNU/EPA Smart Scorecard

This checklist provides a number of references to on-site transportation features and connectivity. Most are not detailed, but some are. Among the “possible measures” to consider are the following.

Parking:

- Parking in structures rather than on the surface (>75% for an “excellent” rating, 50-75% for “preferred”)
- Parking facilities behind rather than in front of buildings

Walkability:

- Detached residential sidewalks
- Commercial sidewalks 6 feet wide or wider
- Landscaping and lighting along sidewalks
- Pedestrian connectivity to civic, cultural, and shopping destinations

Alternative modes:

- Bus stops with bike racks and lockers, good walkways, and posted information
- Bike trails
- Shared riding services

Street pattern:

- Continuation of existing neighborhood street pattern into new project
- Street network on a grid system (100% on the grid for “excellent,” 75-99% for “preferred”)
- Short block lengths (less than 400 feet for “excellent,” 400-500 for “preferred”)

Proposed New Jersey Smart Growth Tax Credit

To be eligible for the tax credit, a development must meet certain neighborhood design criteria including criteria relating to streets, sidewalks, and parking.

Regarding parking, spaces available within the development must not exceed local zoning requirements. An additional 0.1% can be added if the development gets approval to build (and builds) 50% or less of the parking that local zoning requires.

In addition, any new streets and sidewalks built as part of the development must meet the following minimum standards:

- No more than 1 new cul-de-sac per 4 new intersections
- At least 50% of new intersections and crossings must have traffic controls or traffic calming measures

- Street width less than 42 feet or 10 feet per lane of car traffic, 4 feet per bicycle lane,¹⁰ 7 feet per parking lane.
- New streets must have no more than 2 car lanes, 2 bicycle lanes, and 2 parking lanes.
- Sidewalks at least 4 feet wide in front of all buildings and along all streets connecting buildings

In addition to the 4% base tax credit, 0.1% will be added to developments with less than 10% of developed land (excluding open spaces) dedicated to parking spaces, garages and driveways.

LEED – Sustainable Sites

Up to 4 points can be earned for the following features:

- Suitable means for securing bicycles and convenient changing/shower facilities for use by 5% or more of building occupants
- Alternative-fuel stations for 3% of the total vehicle parking capacity (stations must be ventilated or outdoors)
- Parking capacity at or below that specified in local zoning
- Preferred parking for carpools or vanpools that are capable of serving 5% of building occupants.
- For rehabilitation projects, no new parking and provide preferred parking for carpools or vanpools that are capable of serving 5% of building occupants.



Smart transportation in Los Angeles.

In order to meet these requirements, developments should survey future occupants to identify transportation needs. Commercial buildings should be sited near amenities such as bike racks and public transit stations. Commercial buildings should share facilities such as parking lots.

Vermont Smart Growth Collaborative, Housing Endorsement Program

A project can earn 2 points (30 potentially available, 15 required to pass) by improving transportation options. One point can be earned for each of the following:

- Project integrates with a public street network

¹⁰ The principal author of the proposed New Jersey legislation assures the authors of this paper that the intention is to allow for feet for each direction of bicycle traffic. In any event, because of the transportation benefits, we may want to consider minimum rather than maximum standards for width of bike lanes.

- Project provides access to shops, services, and jobs by more than one mode of transportation. (This can be achieved by being located on a transit route, within ¼ mile of a transit stop, or within ¼ mile of a bike/pedestrian path.)
- Project creates a logical traffic flow for vehicles and pedestrians
- Project minimizes paving and visible parking lots by using narrow streets, short driveways, non-surface parking, and visually obscured parking.

Urban Ecology – Infill Development Endorsement

Generally, to qualify for endorsement, the project design must encourage walking and bicycling and should include traffic calming elements or streetscape improvements. More specifically, the section on Pedestrian Design indicates that a project should include these design elements:

- Traffic calming
- New sidewalks that connect with neighboring network
- Safe and accessible intersections and sidewalks
- Clearly marked crossings and pedestrian paths near non-residential areas
- Human scale for buildings, public spaces, and streets
- Engaging facades, ground floor retail, and windows and doors facing street
- Trees, human-scale lighting, and benches along sidewalks
- Landscaping, not concrete barriers, along walkways
- Minimize visual impact of parking areas

In the guidelines for Transportation, the system includes some on-site infrastructure guidelines, giving preference to projects with the following:

- Parking ratio is less than 1:1 spaces per unit
- Parking is less than zoning requires
- Car sharing or car rental is available
- Residential/retail uses share parking
- Provide or charge for parking separate from residential units
- Provide bicycle amenities
- Include other features (not defined) to reduce dependence on cars

Washington (D.C.) Smart Growth Alliance

This system favors developments with the following attributes:

- Pedestrian/Bike paths that are well lit, landscaped, independent of road system, and connected with neighboring communities or other paths
- Internal circulation and non-auto transportation should be promoted and enhanced by design (sidewalk network, landscaping, traffic calming)
- Minimize street widths and off-street parking by design, shared parking, transportation management
- Reduced parking if within ½ mile of transit.
- Structured parking available at transit stop

- Connect with external vehicular, transit, bicycle, and pedestrian networks
- Where there is traffic congestion, the project should employ transportation demand management techniques and provide incentives for transit use

Maryland Smart Growth Score Card

This system asks the evaluator to rate the following pedestrian features from poor to excellent:

- Pedestrian and/or transit friendly features are available or will be provided
- Sidewalks along streets have been included or improved
- Parking is designed to be pedestrian friendly
- Improved, clearly defined paths link buildings and/or uses (bonus)
- Internal paths, bikeways and sidewalks are connected with neighboring networks (bonus)

Beyond pedestrian features, the following should be rated poor to excellent:

- Frequently visited uses are safely accessible without a car
- Public transit service available
- Existing or planned transit facility near the project (accessible without a car)
- Road system connects to and extends external road system at multiple locations
- Project's internal road system is interconnected (without cul-de-sacs) or project is located on an existing interconnected street system
- Increased and/or improved transportation choices (including automobiles)

Sierra Club

Among the transportation features, this system includes several related to on-site design:

- All streets have a sidewalk on at least one side that connects with other transportation systems (bike paths, transit stops)
- Bike lanes within the project
- Project is a part of a transportation management association
- Project invests in innovative alternatives such as clean-fuel buses or carpool pickup lots.

Greenbelt Alliance

One of the goals of the alliance is to promote innovative community design. This includes creating accessible, pedestrian-oriented spaces and a mix of housing types that attract residents of different ages and household types. The alliance favors developments with the following characteristics:

- Integrated street plans, sidewalks and bicycle/pedestrian paths that improve access to services and public transit.
- Reduced surface parking, reduced visual impact of parking, or shared parking

Community and Culture

Some systems go well beyond factors tied directly to the pollution or resource conservation issues that we normally think of as “environmental” and also create incentives for design that respects or furthers issues of culture and community character. The most common of these are historic preservation and design that helps foster, for lack of a better phrase, “sense of place.” It is not clear to what extent we may want LEED-ND to address these issues, but we include them here for the committee’s consideration.



Downtown Athens, Georgia.

(Note: Some systems also address community issues in ways that go beyond design, such as with regard to inclusion of affordable housing or community participation in the planning process. We discuss these issues in a separate “social issues” section, below. The lines separating factors relating to the environment from those relating to community, or those relating to design from those relating to process can be difficult to draw, but for the sake of breaking a massive project down into manageable pieces we are attempting to do so. There is some overlap.)

Triangle Smart Growth Coalition

One of the “threshold criteria” for the coalition is that cultural resources, both architectural and archaeological, must not be disturbed by development.

In addition, one of the general goals of the coalition is to create walkable communities through design that goes beyond the provision of pedestrian amenities in a “transportation” sense. Up to 20 points (of 90 potentially available in all categories) are available if the site achieves a walkable scale:

- Density minimum (see density analysis, above)
- Core area within a 5 to 10 minute walk from all points in the site
- “Appropriate” building size and street orientation
- Transitions between areas with different densities
- Buildings oriented to the street and minimal setbacks from sidewalk

An additional 10 points can be earned in a section entitled “Enhanced Civic Realm” if the following are achieved:

- Site plan protects and re-uses historic structures
- Incorporates existing architectural styles and building types
- Varies facades.
- Provides community space for pedestrians (ex. Parks, plazas, streetscapes)

In the Greenspace and Environmental Sensitivity section (20 points), a few characteristics relate to design and community features:

- Connections to parks, greenways, and plazas enhanced by community facilities
- Access to open spaces
- Hierarchy of public spaces from public to private

In the Integrated Land Uses and Transportation Facilities section (20 points), credit may be awarded for a project location or design that allows a person to walk to a range of complementary uses within ¼ mile of the site, so that daily needs can be met with a 5-10 minute walk.

City of Austin Smart Growth Matrix

One of the three baseline eligibility requirements is that projects that propose demolition or modification of historic buildings must undergo a review.

The main section that deals with design concerns focuses on improving quality of life. The first category in this section is “Urban Design” with 44 points available (705 total possible). It awards credit for the following:

Building façade treatment

- Approximately 30 ft increments (4 points)
- Variety and human scale (4 points)
- 50% glass at street level (4 points)
- Clearly defined entrances every 50 feet (4 points)

Compatibility with surrounding area

- Appropriate massing (4 points)
- Appropriate height (4 points)
- Rear building treatment (2 points)
- Mechanical equipment screened (2 points)

Accessible outdoor public space

- More than 500 sq. ft. (4 points)
- Table and chairs provided (2 points)
- Landscaped with trees (2 points)
- Pedestrian scaled lighting, minimum 3 foot-candles (2 points)
- Adjacent to Greenway or street (2 points)

- Outdoor public art (4 points)

CNU/EPA Smart Scorecard

Linking sustainability with variety, this checklist instructs users to look for a number of indicators of architectural diversity:

- Projects with 20 or more units should “have more than one building type and/or façade option”
- Locally-owned businesses should be included
- Densities should “range from 20-50% of overall median density in project”¹¹
- Varied setbacks
- Varied residential lot sizes, with at least 15% of the development devoted to lots under 4500 square feet each
- Civic facilities and amenities, such as daycare, teen or senior centers, and cultural facilities



Highlands' Garden Village, Denver.

The system also incorporates a number of possible measures in the category of “community context and site design”:

- Preservation and re-use of at least 75% of an existing structure
- Use of existing neighborhood styles and building types
- Use of local historic building materials, style, and/or design
- Façade treatment that breaks down massing and “articulates depth, verticality and street edge”
- Scale and mass of buildings that relate to neighborhood structures
- Continuation of existing neighborhood street pattern into new project

Washington (D.C.) Smart Growth Alliance

This jury-based system enumerates a number of design factors for jurors to consider:

- Design should be high quality
- Design should draw from character of existing development
- Project should be integrated with existing development
- Project should be visually pleasing
- Streetscape should be inviting, attractive, pedestrian-oriented, and safe

¹¹ This is a curious (or at least curiously phrased) indicator, since a variety of densities would have to range both below and *above* the median in order to achieve the median.

- Public open space and public civic space should be available
- Parking design should be pedestrian accessible and create a minimum visual impact

In addition, the section on “Community Assets” includes these recommendations:

- Fulfill the goals of an approved community revitalization or development plan
- Improve quality of life through parks, schools, civic sites
- Enhance arts community by building exhibit space, theaters, or studios
- Connect open spaces with external open spaces
- Preserve and reuse historic structures and sites

Housing Action Coalition – Santa Clara Valley

Innovative community design is one of the general goals of the coalition. Site design should create walkable, accessible neighborhoods with a mix of housing types and residents from various age groups, income brackets and household types. Specifically the coalition favors the following:

- Quality design and construction
- Appropriate design that blends with existing neighborhoods
- Pedestrian-friendly design that promotes social interaction and an urban feel including innovative parking design
- Plan for transit use and access

Vermont Smart Growth Collaborative, Housing Endorsement Program

In the section on “Concentrated Development,” a project can earn two points if it strengthens the “community feel” of a neighborhood by such measures as increasing walkability, incorporating parks, or preserving historic resources.

The system also promotes “Human Scale” by awarding credit for the following:

- Architecturally blend project with surrounding development (1 point)
- Promote a sense of community through community spaces and buildings (1 point)
- Increase connectivity with surrounding areas by public spaces and design (1 point)

The section on “Environmental Quality” also provides credit for some community-oriented features:

- Project is consistent with a municipal open space plan and provides access or links to parks, greenways, and trails (1 bonus point)
- Project offers green space in a densely settled area or is within walking distance (1/4 mile) of a park (1 bonus point).

Urban Ecology – Infill Development Endorsement

Urban Ecology’s checklist provides that a project should reuse historic buildings or apply local architectural styles. Applicants for endorsement are asked to comment on whether any local, state or national historic landmarks will be destroyed by new growth.

More specifically, the section on “Pedestrian Design” looks for these design elements (in addition to those noted above with regard to transportation):

- Human scale for buildings, public spaces, and streets
- Engaging facades, ground floor retail, and windows and doors facing street
- Trees, human-scale lighting, and benches along sidewalks
- Landscaping, not concrete barriers, along walkways
- Minimize visual impact of parking areas

And the section on “Community Integration” includes the following:

- Incorporate local architectural styles or renew older, run-down neighborhoods
- Reuse or renovate historic buildings
- Provide accessible public parks or open spaces
- Visually divide large buildings

Maryland Smart Growth Score Card

This system asks the evaluator to look for these community features:

- Building orientation contributes to creating an edge along the street
- Community centers, recreational facilities, parks, plazas, open spaces or other public spaces
- Public spaces located within ½ mile of site.
- Local architectural style from design codes or significant existing buildings applied to new growth
- Reuses or rehabilitates existing structures
- Protects and/or reuses historic structures
- Follows local government’s comprehensive plan or other applicable plan
- Open spaces available to the public within the site (bonus)

Sierra Club

These criteria specify that a project should have a “human scale” and suggest these measures:

- Ratio of building height to street width
- Crosswalks and lights for crossing
- Houses placed close to the street.

In addition, projects should include community features such as:

- Libraries, museums, government buildings

- Cultural amenities (above) at or near the community center
- Farmers markets, cultural events, childcare, senior care, or other community activities or services.

Some References for Best Practices on Design

As noted, the literature on good design practices is relatively robust. With the exception of the issue of mixing uses, discussed above, we believe those practices are captured sufficiently for the purposes of this sampling in the various standards. For those who want to go deeper, we recommend the following sources:

Constance E. Beaumont, *Better Models for Superstores*, National Trust for Historic Preservation, 1997.

Peter Calthorpe, *The Next American Metropolis*, Princeton Architectural Press, 1993 (all).

Congress for the New Urbanism, *Charter of the New Urbanism*, McGraw-Hill, 2000, especially pp. 71-119 (Neighborhood, District, and Corridor) and 121-175 (Block, Street, and Building).

Dan Costello, *The Returning City: Historic Preservation and Transit in the Age of Civic Renewal*, Federal Transit Administration/National Trust for Historic Preservation, 2003

Duany Plater-Zyberk & Company, *Onondaga County Settlement Plan: Traditional Neighborhood Guidelines* (2001) (all).

Andres Duany et al., *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream*, especially pp. 245-252 (The Traditional Neighborhood Development Checklist).

Reid Ewing, *Best Development Practices*, American Planning Association, 1996, especially pp. 17-51 (Best Land Use Practices), 53-93 (Best Transportation Practices), 95-104 (Best Environmental Practices), and 133-142 (Best Housing Practices).

Reid Ewing, *Pedestrian- and Transit-Friendly Design: A Primer for Smart Growth*, Smart Growth Network, undated.

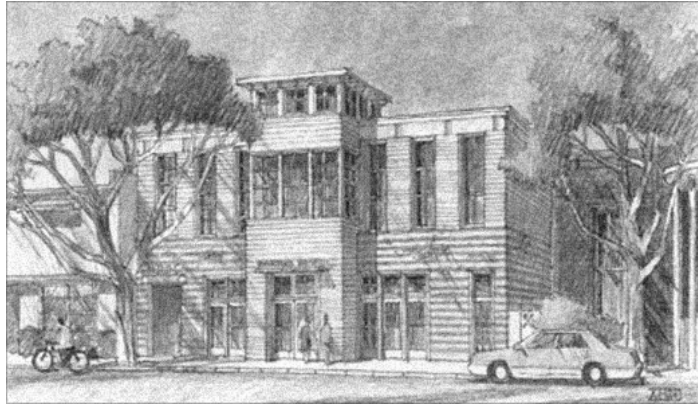
Northeast-Midwest Institute and Congress for the New Urbanism, *Strategies for Successful Infill Development*, 2001, especially pp. 25-37 (Design Strategies for Successful Infill).

Urban Land Institute, *Ten Principles for Reinventing America's Suburban Strips*, 2001.

IV. ON-SITE ENVIRONMENTAL MANAGEMENT

Research demonstrates that much of a development's environmental performance is related to its location, particularly with respect to a region's center or to important subcenters, and with respect to important regional assets such as transportation infrastructure,

watersheds, and natural resources. But environmental quality can be influenced within a development as well, by measures that mitigate or avoid impacts related to pollution and resource consumption. Some of the systems we examined include incentives for such measures.



NRDC's platinum-certified Santa Monica Office.

We should caution, however, that for the purposes of LEED-ND we should approach these models only with some sophistication: some measures to reduce stormwater runoff, for example, may be more appropriate in a rural setting than in an urban infill situation, because they can work to inhibit the densities (particularly gross densities) that are appropriate to increase the overall environmental performance of an infill site. This may be an area in which the New Urbanist “transect” concept is helpful; the proposed New Jersey system goes part way toward such a nuanced approach, but the LEED Sustainable Sites criteria that we reviewed do not.

These categories overlap somewhat.

Energy and Resource Conservation

The systems that address this issue generally reference existing LEED or Energy Star standards for green buildings. The proposed New Jersey tax credit also incorporates a detailed set of alternative standards, and the Austin system allows applicants to qualify by participating in a locally based program in lieu of LEED certification. The LEED Sustainable Sites group added a separate standard on roofing practices to reduce heat islands. Other systems addressed these issues more generally.

Vermont Smart Growth Collaborative, Housing Endorsement Program

Bonus credit is awarded if project's homes qualify for an Energy Star rating by earning 5 stars or 86 points on the Home Energy Rating System for new construction, or 4 stars or 80 points for pre-existing buildings.

Proposed New Jersey Smart Growth Tax Credit

To qualify for the tax credit, buildings or developments must be either LEED-certified or meet a set of green building standards specified in the tax credit legislation. These requirements span five pages and are too detailed to summarize here. A summary and complete outline of the tax credit proposal is included with this paper as appendices B and C.

The requirements address the following categories:

- Energy efficiency
- Water efficiency
- Indoor air quality
- Wood use
- Durability
- Construction waste
- Recycled and reused content
- Stormwater management

If a project is LEED-certified, it can earn additional credit, the amount depending on the level of LEED certification:

- 0.5% Certified
- 1.0% Silver
- 1.5% Gold
- 2.0% Platinum

City of Austin Smart Growth Matrix

35 points (out of 705 potentially available points) can be earned for using sustainable building practices. Buildings may qualify by being LEED-certified or participating in a locally based green building program. LEED-certified buildings may earn from 10 to 25 points for certification, depending on the level of recognition within the LEED rating system.

For the local program participation, buildings can earn points as outlined below:

- One star multi-family (5)
- Two star multi-family or one star commercial (10)
- Three star multi-family or two star commercial (15)
- Four star multi-family or three star commercial (20)

- Five star multi-family or four star commercial (25)

In addition, buildings can earn 10 points by participating in a locally based Green Choice Renewable Energy Program that allows communities to purchase energy from renewable sources.

CNU/EPA Smart Scorecard

In its section on environmental quality, this system suggests the following measures:

- Recycle materials from demolition of pre-existing structure(s) on site
- Recycle surplus materials from new construction
- Establish recycling program with site occupants
- Maximize energy efficiency of buildings, using LEED standards as benchmarks
- Use green building materials, with reference to NAHB program
- Use energy conservation equipment, systems, and/or programs
- Consider solar access in site design

LEED – Sustainable Sites

LEED incorporates a sophisticated set of criteria for all sorts of green building practices. We did not review the full LEED system, but the Sustainable Sites criteria include a credit for reduction of heat islands through roof landscaping and design in order to minimize impact on microclimate and habitat. To earn the credit, 50% of a roof must be vegetated or 75% must possess the following characteristics:

- ENERGY STAR compliance
- High reflectance
- High emissivity (initial reflectance of at least .65 with ASTM E903 or at least .9 with ASTM 408)

(Note: NRDC's model smart-growth tax credit suggests that heat island criteria might vary from one region to another to account for variation in local climate.)

Urban Ecology – Infill Development Endorsement

The following are guidelines for endorsement:

- Minimize energy consumption by using high insulation, solar energy, and other design and operation options
- Use or generate alternative energy
- Incorporate green materials, recycled materials, or certified sustainable forest products

Maryland Smart Growth Score Card

This checklist provides that energy and natural resources should be conserved in the following ways:

- Projects should use green building design techniques
- Projects should relieve pressure on natural resources on- or offsite
- On-site natural resources should be protected in perpetuity (bonus)
- Degraded environmental resources should be improved (bonus)

Systems that make reference to energy and resource conservation in much more general ways:

- Minnesota's criteria for evaluating capital budget requests (best management practices)
- Vital Communities (energy-saving equipment, materials, methods and designs should be employed)
- Washington (D.C.) Smart Growth Alliance (Minimize construction waste and use recycled materials. Use "sustainable design techniques" to conserve energy)
- Santa Clara Housing Action Coalition (includes reduced energy consumption as a goal)

Water Use and Management

A few systems contain specific guidelines on water conservation and/or management.

Proposed New Jersey Smart Growth Tax Credit

If the project is located within a "water supply deficit area" as designated in the state's water supply plan, it is ineligible for the tax credit unless:

- The Department of Environmental Protection has approved a water use plan; *or*
- The development contains fewer than 20 residential units *and*
- Non-residential units will cumulatively use fewer than 10,000 gallons of water per day.

The tax credit also requires buildings to conform to the following water efficiency standards:

- Showerhead: 2.0 gallons per minute.
- Faucet: 1.0 gallon per minute.
- Toilet flush: 1.6 gallons



Porous pavement at Seaside.

- For commercial buildings, the drift rate of cooling towers must be less than 1%

Projects planned *on undeveloped land of four or more acres* must use stormwater management measures to meet at least one of the following requirements:

- Post-development runoff volume does not exceed pre-development runoff volume. (Runoff volume is defined as the 1.5-year, 24-hour peak discharge rate.)
- First inch of runoff or 80% of 100-year runoff from impervious surfaces must be treated for total suspended solids, total phosphorous, and total nitrogen

LEED – Sustainable Sites

This system contains both prerequisites and non-mandatory credits that earn points towards certification. It is a prerequisite that projects control erosion and sedimentation during construction. In particular, the project must conform to a site sediment and erosion control plan that follows EPA or local standards, whichever are more thorough.¹²

The objectives are:

- Limit soil loss by storm water run-off and/or wind during construction. Includes stockpiling topsoil for reuse.
- Prevent sedimentation of sewers and streams and/or air pollution by dust and particulates.

The system suggests achieving these objectives by proper planning and other strategies such as:

- Temporary and permanent seeding
- Mulching
- Earth dikes
- Silt fencing
- Sediment traps
- Sediment basins

Credits 6.1 and 6.2 discuss stormwater management. To earn 1 point, Credit 6.1 requires:

- No net increase in the rate and quantity of stormwater runoff
- If initial imperviousness is greater than 50%, reduce rate and quantity of stormwater run-off by 25%¹³

Credit 6.2 allows developments to earn 1 point for the following:

- Remove 80% of average annual post development total suspended solids
- Remove 40% of average annual post development total phosphorous¹⁴

¹² The system references Storm Water Management for Construction Activities, EPA Document No. EPA-832-R-92-005, Chapter 3.

¹³ This would appear to discourage development that adds impervious rooftops or pavement on infill or brownfield sites.

¹⁴ The credit recommends following Best Management Practices outlined in EPA's Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters (EPA 800-B-92-002 1/93).

Technologies and strategies for earning these credits are listed in the system, including these:

- Promote infiltration
- Use garden roofs and pervious paving
- Reuse stormwater for non-potable uses such as landscape irrigation, toilet and urinal flushing, and custodial uses.
- Install mechanical or natural treatment systems such as wetlands, vegetated filter strips, and bioswales

The Sustainable Sites criteria also incorporate in the section on ecosystem and land conservation a number of incentives to add vegetation to a project or reduce the development footprint. These incentives are also relevant to stormwater management but they are discussed in the section below.

Washington (D.C.) Smart Growth Alliance

This system takes a more general approach. In the section on Environment, jurors are encouraged to apply two criteria related to water use and quality:

- Incorporate natural or engineered solutions to prevent or reduce existing nonpoint source pollution within a single, small watershed (see Ecosystem and Land Conservation analysis).
- Use sustainable design techniques to conserve and protect water.

In addition to the above, four systems incorporate water-management criteria in a more general way, giving preference to development that incorporates best management practices for stormwater management and/or water conservation:

- Triangle Smart Growth Coalition
- Minnesota's criteria for evaluating capital budget requests
- Washington Smart Growth Alliance
- CNU/EPA Smart Scorecard (conservation through graywater, xeriscaping, drip irrigation)

Other On-Site Environmental Issues

This category is a catch-all, incorporating but not limited to measures relating to landscaping and ecological management.

LEED – Sustainable Sites

Credits 5.1 and 5.2 also are a part of an “Ecosystem and Land Conservation” section. Credit 5.1 (1 point) discusses mitigating environmental effects. For the credit to be earned on previously developed sites, 50% of the remaining open area should be restored with native or adapted vegetation. On greenfields, developments should limit site disturbance, including disturbance caused by erecting earthworks and clearing vegetation, to the following places:

- 40 feet beyond building perimeter
- 5 feet beyond primary roadway curbs, walkways and utility trenches
- 25 feet beyond pervious paving areas

For Credit 5.2 (1 point), developments may earn the credit by reducing their footprint (includes buildings, access roads and parking) by exceeding zoning requirements for open space by 25%.¹⁵

These credits can be earned by following strategies as described below:

- Site survey and master plan
- Select suitable location and design
- Stacking
- Underground parking
- Shared facilities
- Clear construction boundaries
- Restore degraded areas to natural state

Credit 7.1 (1 point) deals with landscape and design elements intended to reduce impact on microclimate and human and wildlife habitat. (Credit 7.2, discussed in a section above, deals with techniques to minimize the impact of roofs on ecosystems). Credit 7.1 allows credit for meeting one of the following standards:

- Provide shade within 5 years on at least 30% of non-roof impervious surfaces
- Use “light-colored/high-albedo” materials with a reflectance of at least .3 for 30% of the site’s non-roof impervious surfaces
- Place a minimum of 50% of parking spaces underground.
- Use an open-grid pavement system with a net impervious area of less than 50% for at least 50% of parking lot area

Credit 8.1 (1 point) discusses reducing impact on the nocturnal environment by eliminating light trespass from buildings. The system allows credit for the following:

- Lighting not in excess of recognized engineering standards¹⁶
- Exterior and interior lighting designed so that zero direct-beam illumination exits the site.

¹⁵ Again, these criteria could be applied to discourage building out to urban densities that could maximize overall environmental performance.

¹⁶ The standard refers to the Illuminating Engineering Society of North America (IESNA)’s foot-candle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments.

Triangle Smart Growth Coalition

Projects can earn up to 20 points by following these recommendations for Greenspace and Environmental Sensitivity:

- Provide public access to open spaces and natural features
- Protect, preserve or restore natural features, particularly if incorporated in local or regional plans.

Washington (D.C.) Smart Growth Alliance

One of the goals of this system is to provide guidelines for protecting, conserving or mitigating damage to open spaces, water, air, and ecosystems. In the section on “environment,” jurors reviewing proposed development are encouraged to consider these sustainable design features:

- Protect or mitigate damage to wetlands, forests, agricultural lands, aquifer recharge areas and unfragmented ecosystems
- Protect or create stream and river buffers
- Avoid steep slopes (15%) and erodible, unstable soils
- Prevent or reduce existing nonpoint source pollution within a single, small watershed (included in Water analysis)
- Protect or restore habitat, particularly that of threatened or endangered species
- Connect open-space areas
- Reduce air pollution by location and design
- Protect existing trees
- Use sustainable design techniques to conserve and protect water, energy, air quality and land within the project (included in Water and Energy analyses)

Urban Ecology – Infill Development Endorsement

To be considered, a project must have no significant, ecological impact that cannot be mitigated. Preferably, a project would restore natural habitat. Specifically, a project should try to follow the following guidelines:

- Integrate natural elements such as creeks, existing trees and land forms
- Restore natural habitat and vegetation
- Clean up a contaminated industrial site (brownfield)
- Landscape with native plants that require minimum irrigation



Native vegetation that never needs to be watered.

- Use natural drainage or permeable ground cover

CNU/EPA Smart Scorecard

The section on environmental quality suggests (in addition to those mentioned above) the following possible measures:

- Protect, preserve, and/or restore any on-site natural features (e.g., wetlands, riparian corridors, watersheds, steep slopes, grasslands, prairies, etc.)
- Create and maintain buffers around natural areas
- Use local/regional vegetation

Sierra Club

The section on open space protection and critical habitat-sensitive design asks projects to examine open space, connections, and protective measures by responding to the following:

- How does the project restore, enhance, protect, or affect recreational and natural open spaces?
- Is a large percentage of natural area, wetlands, farm or forestland kept intact?
- Was native vegetation used?
- Do undisturbed greenways, greenbelts, floodplains, and other measures preserve wildlife habitat?
- Are there guarantees for future protection or improvement of green spaces? (Measures such as land acquisition programs, conservation zoning and agricultural protection or zoning are suggested.)
- Is a large percentage of the development covered by impervious surfaces?
- Were wetlands harmed or created?
- Were stormwater and construction site pollution runoff plans enacted?

References for Best Practices on Environmental Management

Dana Beach, *Coastal Sprawl: The Effects of Urban Design on Aquatic Ecosystems in the United States*, Report for the Pew Oceans Commission, 2002, especially pp. 11-12 (Interpreting the Ten Percent Rule), 16-20 (Strategies and Tools: Neighborhood Scale), and 20-21 (Strategies and Tools: Site Scale).

Peter Calthorpe, *The Next American Metropolis*, Princeton Architectural Press, 1993, especially pp. 72-76 (Guidelines for Ecology and Habitat).

Center for Watershed Protection, *Smart Site Practices for Redevelopment and Infill Projects*, 2001.

Reid Ewing, *Best Development Practices*, American Planning Association, 1996, especially pp. 105-132 (Best Environmental Practices).

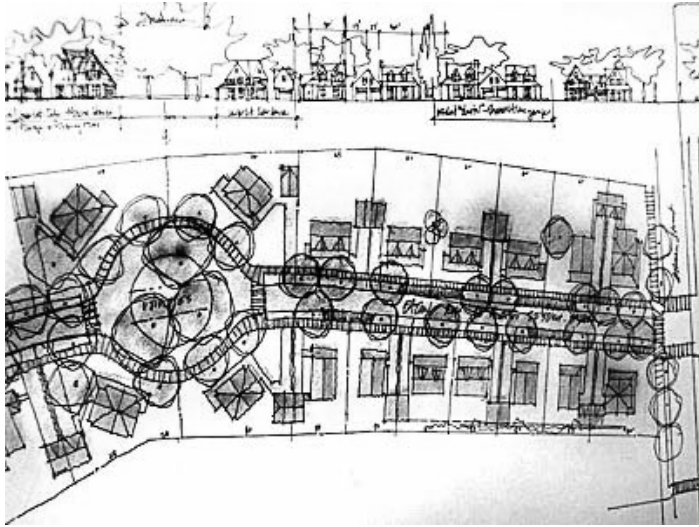
Robert Hsin, *Guidelines and Principles for Sustainable Community Design*, Florida A&M School of Architecture, 1996, especially Ch. 5.2 (Site).

Tom Schueler, *Site Planning for Urban Stream Protection*, Metropolitan Washington Council of Governments and Center for Watershed Protection, 1995 (all).

Southface Energy Institute, *Sustainable Design, Construction, and land Development: Guidelines for the Southeast*, Oak Ridge National Laboratory, 2000 (best practices on sustainable land use planning, sustainable site development, and sustainable buildings).

V. SOCIAL ISSUES

The terms “smart growth” and “sustainability” embrace more than environmental concepts. While it is unclear to what extent, if any, the core committee will want to include social indicators in the rating system for LEED-ND, several systems we examined do so. In this section, we present what those systems have to offer on the subjects of housing affordability, community participation in planning, the economic viability of development, and employment opportunities. As always, we also present some best practices references for further reading.



Plan for affordable housing in New Haven.

Housing Affordability

City of Austin Smart Growth Matrix

This system awards points for the provision of affordable units in the following categories:

- 15 points for developments with 20% of their housing units set aside for families with incomes at or below 80% of the area’s median family income
- 25 points for developments with 20% of their units set aside for families with incomes at or below 60% of the area’s median family income

Urban Ecology – Infill Development Endorsement

This system favors developments with one or more of the following attributes:

- At least 20% of housing units are affordable to occupants at or below 80% area median income¹⁷
- A range of housing types and price
- Secondary units, such as “granny flats”
- Americans with Disabilities Act (ADA) accessible units

¹⁷ Applicants must submit documentation of the number of total units, number of low-income (80% AMI) units, number of very-low income (50% AMI) units, and number of moderate-income (120% AMI) units.

Vermont Smart Growth Collaborative, Housing Endorsement Program

This system awards up to three bonus points for affordability:

- 1 bonus point for providing affordable housing in predominantly upper/ middle income area and/or contribute to balance of affordable housing in the region.
- 1 point for providing diversity in type and price of housing within the area.
- 1 point for providing diversity within the development.

Washington (D.C.) Smart Growth Alliance

To be endorsed, projects must be “community assets,” a concept that may be furthered by providing affordable housing. More specifically, if housing is included in the development, there should be a mix of housing types for a range of incomes. 10 to 15% of the housing should be affordable (not defined). In addition, the development should strive to retain or relocate existing businesses and residents.

Greenbelt Alliance

Affordability to different income groups is one of the goals of this endorsement program. Housing and mixed-use projects must try to be affordable for moderate- to low- and very low-income households as discussed in San Francisco’s plan for affordable housing.

The alliance makes recommendations such as designating a fixed percentage of the housing units or land as affordable or taking advantage of California’s density bonus for affordability: local governments are required to grant density bonuses of at least 25 percent, plus additional incentive(s) or equivalent concession/incentives, to developers who construct at least 20% of their units for lower income households, 10% for very low-income households, or 50% for senior citizens.

Housing Action Coalition – Santa Clara Valley

One of the goals of the coalition is to promote affordable housing. Affordability is defined as

- Homeless Housing – affordable to households at or below 35% of area median income
- Rental Housing – affordable to households with incomes up to 80% of area median income
- Ownership Housing – affordable to households with incomes up to 120% of area median income

Maryland Smart Growth Score Card

The Maryland scorecard asks for the following:

- Various housing types
- For small, infill or single-use projects, evidence that they will contribute to diversity of housing prices in the area
- Housing types and prices that are physically mixed within the project or immediate area
- Planning and funding for relocated businesses and/or residents

Vital Communities – Housing Coalition Endorsement Guidelines

Affordability is included in the guidelines in the following ways:

- Diversity of housing unit costs
- Housing affordable to households earning below 120 percent of the area median income¹⁸
- Ensure long-term affordability
- Include lifecycle housing, housing for all ages

CNU/EPA Smart Scorecard

This system suggests that at least 20% of housing units should be priced for persons with incomes from 80-100% of the average median income.

Systems with minimal or no mention of affordability

- LEED Sustainable Sites
- Proposed New Jersey Smart Growth Tax Credit
- Triangle Smart Growth Coalition¹⁹
- Minnesota Criteria for Evaluating Capital Budgets
- Sierra Club²⁰

¹⁸ Ownership units should be priced below \$175,000 and two-bedroom rental units should be priced below \$900/month (Vermont dollars).

¹⁹ In the guidelines, the system notes that the Coalition lacks the expertise to incorporate affordability into the certification program.

²⁰ The Minnesota and Sierra Club systems do mention the issue briefly.

Community Outreach and Involvement

Most of the systems we reviewed strongly favored developments that were planned in meaningful consultation with citizens in the community in which they were located.

CNU/EPA Smart Scorecard

This system suggests six possible measures to demonstrate good collaboration with community and civic interests:

- Pre-design meeting with neighbors and/or city staff
- Conceptual design meeting with neighbors and adjacent property holders
- Participation in neighborhood association (through neighborhood mechanisms for parking, maintenance, etc.)
- Contact with city staff in all key agencies
- Provide computer model of project
- Identify community objectives that are met by the proposed project



Public participation in the planning process.

City of Austin Smart Growth Matrix

This system awards credit for community involvement in a number of ways. Interestingly, it values community involvement more highly for neighborhoods outside the downtown area and values consultation with the area's design commission more highly for downtown projects:

- 75 points for having dialogue with and support of adjacent neighborhoods if project is located outside of downtown, 35 points if downtown
- 10 points for presentation and unconditional endorsement of plans by the design commission for projects outside downtown, 50 points if downtown
- 25 points for presentation and unconditional endorsement of plans by historic landmark commission, 50 points for landmark commission endorsement if historically zoned buildings or buildings within a historic district are involved

Vermont Smart Growth Collaborative, Housing Endorsement Program

Up to two points are available in this category:

- 1 point for efforts to involve the community in project design and development
- 1 bonus point for involving future occupants

Triangle Smart Growth Coalition

One of this system's mandatory threshold criteria is that the developer must make good-faith efforts to communicate with the surrounding neighborhood and city staff, including taking the following actions:

- Pre-design meetings with key city agencies
- Conceptual design meeting with neighbors, including adjacent property owners and owners' associations
- Incorporate existing small area plans and community objectives

Washington (D.C.) Smart Growth Alliance

This system establishes four mostly subjective criteria for evaluating public participation:

- Provide meaningful community participation during planning and review
- Resolve concerns and needs of local groups
- Develop a community participation plan
- Gather written support from community

Maryland Smart Growth Score Card

Among the points stressed by this system are the following:

- Citizens and stakeholders should be consulted early in the planning process.
- Stakeholder concerns should be documented and addressed formally.
- Innovative tools should be used to reach stakeholders and create dialogue.
- The project should provide opportunities for training and education within the community.
- The project should respond to identified community needs.

Minnesota's Smart Growth Criteria for Evaluating Capital Budget Requests

This system specifies that the project should be the result of citizen participation and should increase choices that communities have for transportation, housing, jobs, education and other amenities. The project should be consistent with local plans that were created with input from citizen, business, and environmental and civic interest groups.

Urban Ecology – Infill Development Endorsement

This system provides that the project's sponsor must make an effort to do community outreach and address local concerns. It should involve the public early. Applicants must submit steps taken to reach the community and resolve issues, along with list of interested parties. It must also submit a schedule documenting public involvement including hearings.

Systems with brief mention of public involvement

- Housing Action Coalition, Santa Clara (Projects should submit a schedule of public hearings and locations along with a list of interested parties, supporters and opponents as part of the request for endorsement.)
- Greenbelt Alliance (The alliance favors projects that have attempted to address local concerns. Projects should submit a timetable for public hearings and a list of supporters and opponents.)

Jobs and Economic Viability

A number of the systems include measures with regard to employment, jobs/housing balance, and/or a project's economic viability and value to a community.

Minnesota's Smart Growth Criteria for Evaluating Capital Budget Requests

This system addresses economic issues in a number of ways:

- General - Asks if the project is a net positive for the economy, including if the life-cycle benefits are greater than the costs and if the project will encourage new economic growth rather than just relocating economic activity. Life-cycle analyses include economic, environmental and social costs and benefits over the course of the project's existence.
- Employment - The system asks if the project will maintain or improve the jobs and housing balance of the affected area.
- Accountability - The system asks whether the project will increase, diminish, or have no effect on "state and local accountability for the costs and consequences of development decisions."
- Funding – The system asks whether the project leverages "investment and resources from nonprofit, private and other public sources (local, regional, state, federal)."

City of Austin Smart Growth Matrix

The Austin system awards credit for support of local business:

- 12 points available for providing space for locally owned business
- 12 additional points if the project “supports or builds local music/film industry.”
- 6 points for using local contractors or architects

Sierra Club

Questions include the following:

- Whether the development is economically connected to existing communities
- Whether the development contributes to the economic vitality of a city center or neighborhood center
- Whether there are businesses nearby or within the development that provide a variety of job types

Washington (D.C.) Smart Growth Alliance

Jurors are instructed that a project should bring economic benefit such as attracting jobs to the area, and help to provide a balance of jobs/housing/services.

Systems With a Brief Mention of One of These Issues

- Greenbelt Alliance (jobs/housing balance)
- Maryland Scorecard (jobs/housing balance)
- Vermont Smart Growth Collaborative (1 point for good access to jobs)
- Urban Ecology (favors housing for employees of local business)

Some References for Best Practices on Social Issues

The potential range of references for recommendations and best practices on social issues is vast, if not always precise. The following works provide some useful perspective, particularly on issues of public process and housing diversity.

Duany Plater-Zyberk & Company, *Onondaga County Settlement Plan: Traditional Neighborhood Guidelines*, 2001, especially pp. 33-34 (inclusive, affordable, and subsidized housing) and 40-41 (TND checklist on housing).

Reid Ewing, *Best Development Practices*, American Planning Association, 1996, especially pp. 145-156 (affordable and mixed-income housing).

Local Initiatives Support Corporation, *Mapping for Change: Using Geographic Information Systems for Community Development*, 2002

National Neighborhood Coalition, *Smart Growth for Neighborhoods: Affordable Housing and Regional Vision*, 2001.

Northeast-Midwest Institute and Congress for the New Urbanism, *Strategies for Successful Infill Development*, 2001, especially pp. 39-45 (mixed-income and mixed-use development) and 53-66 (community consensus and involvement).

Smart Growth Network, *Getting to Smart Growth: 100 Policies for Implementation*, 2002, especially pp. 77-85 (Community and Stakeholder Collaboration).

Appendix A

Summary of Smart Growth and Infill Development Endorsement Programs

Hannah Stutzman, Natural Resources Defense Council

City of Austin Smart Growth Matrix

<http://www.ci.austin.tx.us/smartgrowth/matrix.htm>

The City of Austin's smart growth rating matrix is based on the city's three smart growth goals:

1. Determine where and how Austin grows
2. Improve quality of life
3. Enhance the tax base

The matrix provides detailed criteria with which to rate and score proposed projects within Austin's Desired Development Zone. To be rated a project must, 1) not conflict with the neighborhood plan for the area, 2) not already be receiving smart growth incentives, and 3) have already completed the review process if it proposes modification or demolition of historic structures. The scoring system is described below.

The matrix's three major sections, based on the goals above, are further broken down into sub-sections with very specific scoring criteria. Criteria for Goal #1 relate to location relative to smart growth corridors and transit stops; consistency with transit area plan; density; provision of mixed uses and varied housing stock; and neighborhood planning. Goal #2 includes points for provision of public, accessible outdoor space; alternative pedestrian and bicycle access; building facades; affordability; environmental impact of construction; allowing space for local businesses; and locating in an area of economic need. Tax base enhancement (Goal #3) has only one criterion and makes up a very small percentage of the total possible points.

Application Process:

1. Applicant self-scores the project and submits application. City staff assemble a project team which informally scores the project to allow discussion with applicant and to ensure that the applicant understands the criteria. Projects that score at the highest two levels may qualify for an expedited review.
2. On receiving the site plan approval, the applicant submits a formal matrix application. The review team scores the project, determines its tax value, and develops an incentive package. Formal review must be completed within 90 days of site plan approval.
3. City staff obtain city council approval and sign a contract with the applicant.
4. City staff provide fee waivers or reimburse fees already paid and monitor construction for contract fulfillment.

Scoring:

A fixed number of points are available for each criterion on the matrix. Projects scoring at or above certain thresholds are eligible for financial incentives because of their contribution to Austin's smart growth goals. The breakdown of points and possible incentives are as follows:

0 - 250 points: None

251 - 335 points: 50% of all applicable city fees waived

336 - 420 points: Eligible for an incentive package not to exceed the net present value of the project's property taxes generated over a 5 year period. Can include up to 100% of city fees waived, utility charges, and the planned cost of infrastructure.

421 – 705 points: Same as above, but not to exceed 10-year tax value.

CNU/EPA Smart Scorecard

In January 2002, Will Flessig and Vickie Jacobsen, in collaboration with the Congress for the New Urbanism and EPA's smart growth office, developed a scorecard to assist local officials, developers, investors, neighborhood groups and designers make better project-level decisions to achieve smart-growth objectives. The Scorecard is a flexible offering of "possible measures" in several categories from which communities may choose and elect to emphasize as the wish. Some of the criteria allow scoring in a four-level hierarchy comprising "excellent," "preferred," "acceptable," and "minimal." Others are presented as yes/no questions.

The Scorecard's categories include the following:

- Proximity to existing/future development and infrastructure
- Mix and balance of uses
- Site optimization and compactness
- Accessibility and mobility choices
- Community context and site design
- Fine-grained block, pedestrian and park network
- Environmental quality
- Diversity
- Re-use and redevelopment options
- Process collaboration and predictability of decisions

Housing Action Coalition – Santa Clara Valley (CA)

http://www.svmg.org/Committees/Housing/Housing_Action_Coalition/HAC_Criteria.cfm

Housing Action Coalition is a committee of the Silicon Valley Manufacturing Group. HAC works on legislation, housing advocacy, and education to ensure "affordable, well-constructed and appropriately located housing in Santa Clara County." Their goal is to increase the amount of housing stock, particularly affordable housing, in the county while meeting a variety of community goals including reducing air pollution and energy consumption, enhancing transit, preserving open space, and improving the economy.

Developers requesting endorsement submit a map and description of the development including planned uses, nearest transit, proposed prices, and a list of interested parties both supporting and opposing the development. The proposal is evaluated against six criteria:

1. *Location*: Must be within an existing urban service area and within ½ mile of major transit service or job center or ¼ mile of a future transit stop. If provisions are made for a shuttle service, it may be within two miles of a transit stop.
2. *Density*: Overall density should be at least 14 units per acre. The coalition will consider lower density projects in areas where the project's density is significantly greater than the norm.
3. *Affordability*: HAC prefers projects that increase the supply of affordable housing and they define affordability in the following way:
 - a. Homeless Housing: affordable to households at or below 35% of area median income
 - b. Rental Housing: affordable to households with an income up to 80% of area median income
 - c. Ownership Housing: affordable to households with an income up to 120% of area median income
4. *Design*: Pedestrian friendly, promotes social interaction, transit access, innovative parking, and shows "other principles of urban village design"
5. *Size*: Generally projects should be at least 50 units
6. *Safety*: Developers should have a history of compliance with local, state, and federal laws

Endorsed projects receive a letter of support and may receive additional letters from individual HAC members and organizations. They may also receive active advocacy of the project, including testimony at public hearings by a HAC representative or HAC members representing their individual organizations.

Greenbelt Alliance (SF Bay Area)

http://www.greenbelt.org/whatwedo/prog_cdt_developers.html#benefits

Greenbelt Alliance is a land conservation and urban planning non-profit in the San Francisco Bay Area. They offer a compact development endorsement program that reviews proposed residential, mixed-use, and commercial projects. Programs are reviewed according to a general set of criteria – there is no specific point or rating system.

Greenbelt generally endorses projects after the Draft Environmental Impact Report is prepared, however, they occasionally "conceptually" endorse a project prior to completion of the report if it requires support early in the review process.

Residential and Mixed-Use projects have the most defined criteria. These are:

1. *Location*: Must be within an existing urban area and not in the regional greenbelt or other natural resource area

2. *Reduce Auto Dependency*: Must be located within ½ mile of major transit service or ¼ mile of historic town center that could be a future transit location
3. *Minimum Density Requirement*: At least 20 units per net acre, lower density may be endorsed if density is significantly higher than surrounding neighborhood
4. *Affordable Housing*: Effort to include affordable housing
5. *Pedestrian Friendly*
6. *Size*: At least 20 units, smaller projects considered depending on staff capacity
7. *Community Input*

Commercial Projects

Greenbelt Alliance emphasizes mixed-use projects, but they also consider commercial projects that “demonstrate efficient and innovative design, pedestrian orientation, integration with public transit, and meet one or more of the following goals”

1. Supports downtown revitalization
2. Re-use of brownfield
3. Supports “clean industry”
4. Not sprawl inducing
5. Addresses local or subregional jobs/housing imbalance

Benefits of Endorsement:

Greenbelt Alliance issues an official letter of support. They may also issue a news release about the benefits of the project, as well as advocating for the project at hearings and other public forums.

Minnesota’s Smart Growth Criteria for Evaluating Capital Budget Requests

<http://www.mnplan.state.mn.us/pdf/2000/eqb/smart.pdf>

This set of criteria is intended as means to evaluate state capital bonding investments in Minnesota in the context of the Ventura Administration’s smart growth principles. The criteria are to be applied to individual projects that will result in new construction, rather than entire programs. According to the *St. Paul Legal Ledger* on 11/5/99, the criteria are “just one of a number of screening tools” rather than regulations with power to determine whether or not a project may be funded or given incentives.

The Administration’s four smart growth principles are:

1. *Stewardship*: Use land and natural resources wisely and sustain them for the future
2. *Efficiency*: Make more efficient, integrated public investments in housing, transportation, schools, utilities, information infrastructure, and other public services
3. *Choice*: Give communities smart growth options and choices
4. *Accountability*: Reinforce responsibility and accountability for development decisions

A checklist with more specific criteria based on these principles is provided and the project is rated based on whether or not it provides a net contribution to smart growth, has a negative effect, a neutral effect, or is not applicable.

Proposed New Jersey Smart Growth Tax Credit

This proposed program, developed by NRDC and pending before the state legislature, provides a New Jersey state tax credit for 4% of allowable development costs (excluding land) for developments that meet specified location and design criteria. Developments may earn up to 7% additional credit by meeting optional criteria. The guidelines include two sections defining the smart growth aspects of the project - location and neighborhood design criteria. A third section defines the green building requirements; as an alternate path to compliance, however, developments that qualify for Silver, Gold or Platinum certification under the LEED Green Building Rating System are exempt from these criteria.

The New Jersey tax credit program and the Austin smart growth matrix are the only endorsement programs that offer direct financial incentives, and criteria for both are more specific than other programs which tend to offer fairly broad guidelines. Rather than assigning points, the New Jersey program asks developers to meet all required criteria to receive the 4% credit. Those who go beyond the requirements (for example, a brownfield redevelopment or providing a greater than required level of transit service) are eligible for additional tax credits.

Only residential and mixed-use developments planned for areas specified in the New Jersey State Plan or by the Office of Smart Growth are eligible. Building on locations that require a sewer line extension of 1,000 feet or greater that have not already been approved for service before the date of the tax credit, or building on environmentally sensitive lands (for example, Barrier Islands or Pinelands National Reserve) disqualifies the project. The outline designates specific requirements for density, transit service, street and sidewalk construction, and parking. The tax credit guidelines give more attention to green building than any other endorsement program – while LEED certification wins a project additional points in the Austin rating matrix, it is not required. The tax credit requirements do not address, as Austin’s matrix does in detail, building facades, provisions for public spaces and bikeways, and providing space for local business.

NRDC has also developed a model smart growth tax credit, based on the New Jersey proposal, which is adaptable to other states.

Sierra Club Smart Growth Questionnaire

In 2000, the Sierra Club produced a report highlighting good and bad examples of development from each state. The report differs from other endorsement programs considered here in that the criteria were used to seek out both the exemplary and the very bad, and projects were nominated by local Sierra Club chapters and other allied groups,

rather than submitted by developers hoping to receive recognition or support during the planning process. This is the only program that is national rather than regional in scope. Despite these differences, the criteria are similar to those in other programs.

The questionnaire asked nominators to respond to about 40 questions - they can be broken down into the following topics:

1. *Location*: Urban, suburban or rural; proximity transit and existing roadways
2. *Open Space Protection*: Maintenance of critical habitats (i.e. wetlands); open space protection; stormwater management; native vegetation
3. *Land Use Planning*: A mix of workplaces, homes, shopping, daycare and public places
4. *Transportation Planning*: Expanding pedestrian and transit choices; safety
5. *Community Revitalization*: Affordable housing; access to jobs; convenient to civic institutions

Triangle Smart Growth Coalition (Raleigh NC)

<http://www.tricc.org/SDCP.pdf>

Based in Raleigh, North Carolina, the TCC is an alliance of businesses, individuals, and organizations, whose mission is, “to promote public policy that encourages a balance among economic growth, development, the environment, and community needs while protecting the rights and interests of property owners.” TCC offers a smart growth certification program for infill or redevelopment projects and supports “a development pattern that is sustainable, amenable to walking and mass transit, reduces vehicle miles traveled, uses our land and natural resources wisely, and accommodates a diversity of people, housing types and jobs.”

The Certification Program Team evaluates developers’ proposals based on descriptions and plans for the project. If approved, they are presented to the Triangle Smart Growth Coalition (TSGC) for final approval. Upon approval the TSGC provides a letter of endorsement for developers to use at hearings and, depending on availability, staff or volunteers will testify at hearings on behalf of the project.

Eligibility for consideration is determined by three factors:

1. *Location*: Project must be within 400 feet of an existing collector or arterial street
2. *Neighborhood Contact*: Developer must have made “substantial” effort to contact city and the public about the project
3. *Environmental Sensitivity*: Must not disturb environmentally sensitive land, including, wetlands, critical water supply areas, cultural resources, endangered habitat areas, or steep slopes

If a project meets the requirements, it is evaluated using TSGC’s guidelines (listed here), each of which are have four to five subguidelines. Although available points are listed for each guideline, there doesn’t seem to be a formal scoring system. The guidelines are:

1. Walkable Scale
2. Connectivity
3. Parking
4. Greenspace and Environmental Sensitivity
5. Enhanced Civic Realm
6. Integrated Land Uses and Transportation Facilities

They note that they would like to include affordable housing, but lack the expertise to develop those criteria and invite suggestions.

Urban Ecology (Oakland CA) – Infill Development Endorsement

<http://www.urbanecology.org/cities/cities.intro.html#endorse>

Urban Ecology is an Oakland based non-profit interested in sustainable cities that endorses local infill developments. Along with project plans and descriptions, developers submit a worksheet describing the project's smart growth features. For endorsement, Urban Ecology requires the following:

1. *Location:* Located in urban setting or within an urban growth boundary
2. *Compactness & Mixed-Use:* A net density of at least 25 units per acre
3. *Housing Choice:* 20% of residential units affordable to those at or below 80% of the median income
4. *Pedestrian Design:* Encourages walking and biking
5. *Transportation Choice:* Located within ¼ mile of downtown or ½ mile of transit stop with current or planned service levels of at least six vehicles per hour during the peak period
6. *Ecological Design:* No significant unmitigatable ecological impacts or environmental hazards
7. *Community Integration:* Good faith effort to do community outreach and address local concerns

Each category includes further criteria, only required criteria are included here. Approved projects receive letters of endorsement. Urban Ecology provides a project review checklist with more detailed criteria under the same headings intended for use by citizens, governments or developers during the project planning process. They also produce a list of Bay Area Infill Developers. Inclusion on the list does not imply endorsement of all of a developer's projects, but the list is meant as tool to connect cities and community organizations with good developers and to educate governments, citizens, and other developers.

Vital Communities (VT) – Housing Coalition Endorsement Guidelines

<http://www.vitalcommunities.org/connections/community/Article.cfm?ArtID=68>

Vital Signs is a non-profit community organization based in White River Junction, Vermont that works on housing, agriculture, and transportation. The group's Housing Coalition has drafted guidelines for a "workforce housing endorsement program." They define workforce housing as "rental and ownership housing units which are priced to be

affordable to households with incomes at or below 120% of the area median income. For 2002, that amount is approximately \$60,000.” The purpose is to increase availability of housing that is both affordable and consistent with smart growth principles.

The guidelines are fairly general and include:

1. *Location:* Within a town center, with public water and sewer and transit service where possible. Projects should not be located in agricultural land, critical habitat, or identified scenic areas.
2. *Site Use:* Offer a mix of housing choices and include “lifecycle housing,” which enables all ages to live in the housing community.
3. *Project Design:* At a scale appropriate for surrounding area, at a density of 10-20 units per acre for multi-family and 4-6 units per acre for single family. Minimize impact of cars and enhance bike and pedestrian access, and encourage shared community spaces.

If endorsed, then the Housing Coalition will provide an endorsement letter and “actively work with the local community to create project support.”

Vermont Smart Growth Collaborative, Housing Endorsement Program
http://www.vtsprawl.org/Initiatives/sgcollaborative/sgcollaborative_temporary.htm#housingendorsement

The collaborative – a group of 10 Vermont nonprofits interested in smart growth – offers endorsements to developers with proposals for smart growth developments of 10 units or more to assist them in overcoming zoning regulations or NIMBY opposition. Approved projects will receive a certificate of endorsement that may be submitted with applications for government approval or used for public education. Applicants must submit a site plan, map, and project schedule along with the coalition’s project endorsement worksheet. Projects are evaluated against a fairly detailed list of criteria, however, the project material doesn’t state a specific score required for endorsement. The criteria are based on eight general principles which are:

1. Maintains development pattern of compact village or urban center separated from rural land uses.
2. Mixed use centers at appropriate scale
3. Transportation choices
4. Protects environmental and historic resources
5. Supports farming and forest industries
6. Availability of public utilities and services
7. Supports downtown business, particularly locally owned businesses
8. Supports social equity

Washington (D.C.) Smart Growth Alliance

The Alliance, a collaboration of Urban Land Institute Washington, the Coalition for Smarter Growth, the Greater Washington Board of Trade, the Chesapeake Bay Foundation, and the Metropolitan Builders Council, has a Smart Growth Recognition

Program to honor projects that contribute to the Washington region's ability to "accommodate growth in a manner that achieves economic, environmental, and quality-of-life objectives." The program's intent is to be highly selective, evaluating programs against very comprehensive criteria and only recognizing those on the "cutting edge of smart growth."

The criteria are presented as a checklist – at a minimum, the development must meet all five of the basic criteria as well as demonstrating the developer's track record of high-quality projects. Each section below includes up to ten specific questions. Rather than a formal scoring system, projects are required to have a "preponderance of positive answers" to be recognized. Chosen projects receive a letter of recognition from the SGA. The criteria are:

1. *Location:* The project should be in an area where growth is desirable.
2. *Density, Design and Diversity of Uses:*
 - a. *Density:* Project should have overall moderate to high density.
 - b. *Design:* Design of the project should be of high quality and should respect the visual character of the surrounding area.
 - c. *Diversity:* Mixed-use projects are preferred, and the project should at least add to the mix of uses in its surrounding areas.
 - d. *Affordable housing:* If the project has a residential component, a mix of housing for all income levels is encouraged.
3. *Transportation, Mobility and Accessibility:* The project should offer alternatives designed to reduce dependency on single-occupancy vehicle use.
4. *Environment:* The project should be sensitive to existing environmental features and protect natural resources where feasible. If possible, sustainable design features should be incorporated into the project
5. *Community Assets:*
 - a. *Benefits:* A range of benefits should be considered
 - b. *Participation:* The developer should encourage substantial community participation during the development process

Appendix B

SMART GROWTH TAX CREDIT FOR NEW JERSEY

CREDIT SUMMARY

(Corresponding with 9/25/03 outline of criteria)

The tax credit percentage refers to the percentage of allowable development costs, excluding the cost of land. Allowable costs of individual projects will be capped on a per square foot for commercial development, and on a per unit basis for residential development. The total amount allocated statewide for tax credits will also be capped.

BASE CREDIT FOR MEETING ALL REQUIREMENTS: 4.0%

Additional credit available in Part I

0.5% for mixed use developments	0.5%
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Additional credit available in Part II

0.5% for redeveloping brownfields	0.5%
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Additional credit available in Part III

0.2% - 2.4% for increased density multiplier	
0.2% - 1.4% for increased transit density multiplier	
0.1% for parking structures that cover less than ten percent of lot	
0.1% for less parking than zoning requires	
	up to 4.0%

Additional credit available in Part IV

0.5% for LEED™ Certified projects	
1.0% for LEED™ Silver projects	
1.5% for LEED™ Gold certification	
2.0% for LEED™ Platinum certification	
	up to 2.0%

<u>TOTAL MAXIMUM CREDIT AVAILABLE</u>	<u>11.0%</u>
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SMART GROWTH TAX CREDIT FOR NEW JERSEY

DETAILED OUTLINE OF CRITERIA *

(For SB 2502 & AB 3846, as introduced.)

The purpose of this tax credit is to encourage more environmentally and economically sustainable development and construction in New Jersey. If established, application for this tax credit will be voluntary. No development is prohibited or mandated as part of the tax credit program.

A tax credit for 4% of allowable development costs (excluding the cost of land) shall be available for developments in New Jersey that meet all criteria set forth in the following outline. Up to an additional 7% credit can be earned by meeting the optional criteria specified. The total funds available are capped at no more than \$20 million for the first year of the program, with an option to increase that amount to no more than \$50 million per year in subsequent years.

The Smart Growth criteria below (Part I – III) specify the smart growth aspects of what would be required to qualify a development for the tax credit. These include the types of development eligible, the locations where developments would be eligible, and the neighborhood design features that will be required in order to ensure that developments are safer, friendlier to pedestrians and bicyclists, and better served by transit.

The Green Building criteria below (Part IV) specify the green building aspects of what would be required to qualify a development for the tax credit. These include building design and landscaping techniques that will help minimize the development's impacts on human health and the environment—both initially and over the development's lifetime.

The program will be administered by the New Jersey Department of Community Affairs (DCA), in consultation with the New Jersey Department of Environmental Protection (DEP), and the Division of Taxation of the New Jersey Department of Treasury, according to the procedures specified (Part V).

* The section numbering in this outline does not correspond with the section numbering in the legislation. This outline is formatted to explain the actual criteria themselves as clearly as possible.

Part I. Types of Development Eligible

The tax credit shall be available to owners and developers of both residential and mixed-use developments. There is no minimum number of units or acres required to qualify for the tax credit. An additional 0.5% credit will be available for mixed-use developments.

- Residential developments may include single and/or multifamily homes.
- To qualify for additional credit, mixed-use developments must include a residential component, and must consist of no more than 75% by square footage of any single type of use.
- Distinct use types include, but are not limited to: residential, commercial office space, and retail.

Part II. Location Criteria

A. Eligible Areas

The tax credit shall be available to developments in Planning Areas 1 and 2 and Designated Centers set forth in the New Jersey State Plan, and within other areas that the Office of Smart Growth has determined are conforming to the State Plan, unless they are disqualified by any of the provisions specified below in Part IIC.

- If DEP promulgates a map which designates areas within the state to which development is best directed (known currently as the “BIG” map), then the areas designated for development on that map (currently known as the “greenlight” areas) will be used as the base of eligibility instead of the land defined by the criteria described here in Parts IIA and IIC, but the proximity-to-transit criteria described in Part IID will still be required.

If the development is located in a water supply deficit area, designated by DEP’s Statewide Water Supply Plan, and includes more than 20 residential units or commercial units that use 10,000 gallons of water a day or more, then the development’s water use plan must be pre-approved by DEP.

B. Extra Credit Areas

An additional 0.5% credit will be available for developments on brownfield sites.

C. Environmentally Sensitive Areas

The tax credit shall not be available to developments that:

1. require a sanitary sewer line extension of 1000 feet or greater; or septic systems.
 - i. A sewer line extension of 1000 feet or greater will not disqualify the development if it is sited in an area that has been approved for sewer service prior to the effective date of the tax credit legislation.
2. are sited in the Pinelands National Reserve, unless the site is within a Regional Growth Area or Pinelands Town designated in the Pinelands Comprehensive Management Plan.

3. are sited in public parkland, or within 1000 feet of critical habitat sites within public parkland.
4. are sited on wetlands, or within 300 feet of wetlands.
5. are sited in critical slope areas, or 100 feet of such areas, *unless* the area is already highly urbanized, or the site is a previously developed site on DEP's list of brownfields and known contaminated sites.
6. are sited within the 100-year floodplain, *unless* the area is already highly urbanized, or the site is a previously developed site on DEP's list of brownfields and known contaminated sites.
7. are sited within 1000 feet of a coastline, *unless* the area is already highly urbanized, or the site is a previously developed site on DEP's list of brownfields and known contaminated sites.
 - Wetlands, critical slope areas, and other natural features used as criteria are defined precisely in the draft legislation. On a site-by-site basis, DEP will have the authority to interpret these definitions.
 - Highly urbanized areas are defined either as 1) areas where 30% or more of the ground within 1,000 feet of the perimeter of a development site consists of impervious surfaces, or 2) in a municipality designated as "built out" according to guidelines to be specified by DCA.

D. Proximity to Transit

Additionally, to qualify for a tax credit a development must meet *at least one* of the following three requirements regarding transit accessibility:

- Distance will be measured as the crow flies between the geographic center of the development and the transit stop, as long as there are no physical impediments that prevent pedestrians from walking from the development to the transit stop.
 - Transit stops may be along either intercity or intracity routes.
1. Bus. The distance from the development to a bus transit stop with adequate service shall not exceed ¼ mile.
 - Bus transit stops that serve more than one route or routes in more than one direction will be defined as a discrete stop for each directional route of service; i.e., if a location has one bus per hour heading in one direction, and one bus available in that same hour heading in the other direction, this will count as one bus per hour at two separate stops.
 - Adequate bus service is defined as: one bus at least every 60 minutes 18 hours per day, 7 days per week or 30 times per weekday and 15 per weekend day.

(OR)

2. Rail. The distance from the development to a rail or light rail stop with adequate service shall not exceed ½ mile.
 - Rail transit stops that serve more than one route or routes in more than one direction will be defined as a discrete stop for each directional route of service; i.e., if a location has one train per hour heading in one direction, and one train available in that same hour heading in the other direction, this will count as one train per hour at two separate stops.
 - Adequate rail service is defined as: at least 5 trains per weekday peak period. Peak periods are weekdays from 5:30 a.m. to 10:30 a.m. and 3:30 p.m. to 8:30 p.m.

(OR)

3. Ferry. The distance from the development to a rail, light rail, or ferry transit stop with adequate service shall not exceed ½ mile.
 - Ferry transit stops that serve more than one route or routes in more than one direction will be defined as a discrete stop for each directional route of service; i.e., if a location has one ferry per hour heading in one direction, and one ferry available in that same hour heading in the other direction, this will count as one ferry per hour at two separate stops.
 - Adequate ferry service is defined as: at least 5 ferries per weekday peak period. Peak periods are weekdays from 5:30 a.m. to 10:30 a.m. and 3:30 p.m. to 8:30 p.m.

For developments with better than required transit service, the base 4% credit shall be multiplied by a transit density factor based on the total daily transit rides available, according to the following table. This total is defined as the number of buses, light rail trains, rail trains, and ferries stopping within ½ mile of the development on weekdays. To account for differences in the capacities of different transit modes in this calculation, the number of rides available on light rail trains or rail trains shall be multiplied by the number of train cars on each train. The number of rides available on ferries shall be multiplied by three.

Total rides available per weekday	Multiplier	Additional Credit (as % of allowable costs)
60 – 124	1.05	0.2%
125 – 249	1.10	0.4%
250 – 499	1.15	0.6%
500—99	1.20	0.8%
1000 or more	1.35	1.4%

Part III. Neighborhood Design Criteria

A. Density

Average residential density for all residential developments shall be 6 or more dwelling units per residential acre.

- Only the acreage devoted to residential use will be included in this calculation.

For developments with higher than required density, the base 4% credit available shall be multiplied by the following factor based on average density of dwelling units per acre according to the following table:

Dwelling Units per Acre	Multiplier	Additional Credit (as % of allowable costs)
7 – 10	1.05	0.2%
11 – 17	1.10	0.4%
18 – 29	1.30	1.2%
30 – 39	1.50	2.0%
40 or higher	1.60	2.4%

B. Streets and Sidewalks

- a. The number of parking spaces associated with the development may not exceed the number required by the parking ratios specified in the local code. An additional 0.1% credit may be earned if less than 10% of the developed lot will be used for parking areas, garages, and driveways. An additional 0.1% credit may be earned for securing a variance from applicable parking ratio requirements in order to allow 50% or less parking than is usually required.
 - The goal of devoting 10% or less of the developed lot to parking can be achieved either because more parking than that is not required, or by constructing multilevel or underground parking.
- b. Developments that are large enough in scale to warrant the creation of new streets shall be designed such that:
 1. No more than 1 cul-de-sac shall be constructed for every 4 intersections within the development.
 2. At least 50% of intersections and crossings are equipped with traffic controls or traffic calming measures.
 3. The average width of pavement of new streets shall not exceed 42 feet total, including 10 feet allowed per lane of motor vehicle traffic, 7 feet allowed per lane of on-street parking, and 4 feet allowed per designated bike lane. No more than 2 lanes of motor vehicle traffic are allowed. No more than 2 lanes of on-street parallel parking are allowed.

4. Sidewalks must be provided in front of all buildings and along all streets that connect buildings within the development. Sidewalks must be at least 4 feet wide.

Part IV. Green Building Criteria

Applicants are exempt from criteria in Part IV if projects qualify as Certified, Silver, Gold, or Platinum under the LEED™ Green Building Rating System which is currently available for some types of buildings other than single-family homes, or the upcoming LEED-Residential program for single-family homes, when available. This will be worth 0.5%, 1%, 1.5%, or 2% additional credit respectively for Certified, Silver, Gold, and Platinum certification.

Unless otherwise certified as meeting LEED™ standards, all buildings constructed will be subject to regulations and standards regarding green building products and practices, to be adopted by DCA, in consultation with DEP. Standards shall include, at a minimum:

A. Energy Efficiency

1. Single-family homes shall meet the standards of the New Jersey Energy Star Homes program. For multifamily residential, commercial and mixed-use buildings, energy use shall be no greater than 65% of the energy use permitted by the New Jersey energy code.
2. Equipment, including appliances and at least 40% of high-use light fixtures provided by developer shall meet Energy Star standards where such standards exist.
 - Equipment and appliances include refrigerators, and any dishwashers, washing machines, or other appliances installed for which Energy Star standards exist.

B. Building Materials – Recycling and Reuse

Minimum percentages of recycled content and renewable source material shall be specified.

C. Wood Use

1. Buildings using wood frames will be required to incorporate specific framing techniques to ensure efficient wood use.
2. Old-growth timber and tropical wood, with the exception of recycled wood and tropical wood certified in accordance with the protocol of the Forestry Stewardship Council (FSC), may not be used.

D. Heat Island Reduction

1. Roofs shall be comprised of Energy Star labeled roof products, except where solar panels or roof gardens are installed.
2. At least 50%, by square footage, of non-roof impervious materials, including driveways, parking areas, walkways and plazas, shall be light-colored or covered with specified coatings that improve reflectance.

E. Water Efficiency

1. Showerheads shall not exceed 2.0 gpm.
2. Faucets shall not exceed 1 gpm.
3. Toilet flush volume shall not exceed 1.6 gallons.
4. For commercial buildings with cooling towers, cooling tower drift rate shall not exceed 1%.

F. Heating and Cooling

Central air conditioning refrigerant charge and airflow shall be within 10% of manufacturer recommendations.

G. Durability

1. Roofs must have a 40-year warranty.
2. Insulated windows must have a 10-year warranty.
3. For buildings with overhangs, at least 80% of full attic/roof-slope insulation R-value shall extend to over outside of exterior walls.
4. Head casing flashing shall be installed for all windows and exterior doors.

H. Indoor Air Quality

1. Interior paints shall contain 100 grams or less per liter of volatile organic compounds (VOCs).
2. Sealants and adhesives used for interior applications should contain no more than 250 grams per liter of VOCs.
3. The VOC and other potentially harmful chemical component of any carpets installed shall be within the limits set forth in the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.

4. If adhesives are necessary, the VOC and other potentially harmful chemical component content of the adhesives shall be within the limits set forth in the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. If carpet cushions are used, they must meet or exceed the standards used by the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.
5. Installation of carpets will be prohibited in the areas of the building most conducive to the growth of mold, including basements, entryways, bathrooms, and kitchens.
6. Space heating and water heating equipment shall meet requirements, including the following: only direct-vent or closed combustion or power vented space heating and water heating equipment shall be used; vent-free space heating or water heating equipment is prohibited and wood stoves must have ducted combustion air.
7. Carbon monoxide detectors shall be installed consistent with Consumer Product Safety Commission recommendations in buildings. At a minimum, one shall be installed for every 500 square feet of interior space.
8. Foundations of residential units shall be constructed according to the following requirements, unless the design requirements are not appropriate to the building type or site characteristic, in which case alternative plans to ensure dry basements must be provided:
 - a. Foundation shall have continuous footing drain with stone covered with filter fabric, drained to daylight or to sealed sump pump system.
 - b. Foundation must have porous backfill material.
 - c. Vapor retarder must be directly under slab.
 - d. Exterior of below grade foundation must be waterproofed.
9. Every building must have a ventilation system and in commercial units, ventilation system sizing shall conform to ASHRAE G2-2001.
10. Enclosed parking areas must be completely air sealed from other buildings.

I. Construction Waste

A plan for construction waste shall be prepared that provides for the separation of materials that are reusable or recyclable.

J. Stormwater Management

Developments of parcels of undeveloped land of 4 acres or more shall employ stormwater management measures in order to meet at least one of the following requirements:

1. Post-development runoff volume of the development's land area shall not exceed pre-development runoff.
2. The first inch or 80% of 100-year runoff produced by the development's land area shall be treated for total suspended solids (TSS), total phosphorous (TP), and total nitrogen (TN).

Part V. Procedures

- A. DCA, in consultation with DEP, will issue guidelines and forms for the application process.
- B. DCA, in consultation with DEP, will issue specific guidelines and requirements for green building practices and products, as well as methodology by which applicants shall demonstrate compliance with such criteria.
- C. In order to file for a tax credit, applicants must obtain 1) a location certificate, 2) a credit reservation certificate, and 3) an eligibility certificate. The location certificate shall certify that the development meets the location criteria, and may be obtained before the taxpayer buys the property in question. The credit reservation certificate shall certify that the taxpayer has shown that the development is likely to qualify for the tax credit. The eligibility certificate shall certify that the development is in compliance with all required criteria.
- D. Applicants must obtain third party certification of compliance by an architect or engineer certified by DCA or a DCA-authorized agent, and applicants must submit applications to DCA. The certifying architect or engineer will be held responsible for any wrongful certifications.
- E. DCA will issue tax credit certificate to an applicant with notice to the Division of Taxation of the New Jersey Department of Treasury.
- F. A tax credit shall equal 4% of allowable development costs, with a higher percentage allocated if the development has met credit certain optional criteria.
- G. An applicant shall collect tax credit over at least a 5-year period.
- H. Application for the tax credit is available for a 7-year period only.

THE ENVIRONMENTAL EFFECTS OF NEW URBANISM **Evaluation and Measurement**

Eliot Allen, AICP
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When properly designed and located, new urbanism has great potential to produce environmental benefits when compared to conventional development. This paper offers an overview of major environmental relationships between the new urbanism and environmental performance criteria common to urban and regional growth.

Table 1 presents a taxonomy of new urbanist features affecting the environment such as density, mix of uses, and regional setting, along with the potential magnitude of their impacts on various environmental performance criteria. This framework suggests two sources of benefits: 1) new urbanist features that directly reduce adverse environmental effects in comparison to conventional development; and 2) new urbanist settings that enable environmental technologies that might otherwise be less feasible with conventional development. Accommodating growth through the new urbanism may not only help mitigate the negative impacts of growth but also foster environmental technology advancements and business opportunities.

Not all new urbanist projects will have the full range of environmental impacts implied in Table 1. The applicability and magnitude of each element will be highly site-specific. However, the matrix illustrates the types of issues that designers and regulators should consider when evaluating new urbanist proposals, especially in comparison to business-as-usual or conventional designs. Such assessments are increasingly feasible with information technology such as geographic information systems (GIS) and computer modeling of resource-specific impacts, such as air pollutant emissions. Assistance from these kinds of tools can enable a project's impacts to be gauged quickly and efficiently as part of a community planning process.

Such environmental measurements can be advantageous for all stakeholders. Designers can use them to optimize project performance. Developers can use them to distinguish their projects in the marketplace. And regulators can use them to evaluate progress toward environmental goals.

Land

One major environmental benefit of the new urbanism is reduced impact to land resources. Compact development patterns with above-average densities consume substantially less acreage on a per capita basis than conventional development. A U.S. EPA study in Dallas found that a mixed-use project of 600 dwellings, 300,000 square feet of offices, and 100,000 square feet of retail space required 225 acres of land at typical

suburban densities versus 100 acres with a more compact design at an inner city infill site.

Beyond the consumption of land generally, new urbanist principles also favor the protection of agriculture and forestry resources, open space, and sensitive areas such as wetlands and wildlife habitat. An American Farmland Trust study of California's Central Valley found that even modest compact growth could reduce agricultural land conversion by 53 percent, from one million to 474,000 acres, when compared against conventional development patterns.

New urbanist principles also promote the adaptive reuse of abandoned or underused urban sites, which avoids the substantial environmental disturbance associated with raw land development and, in the case of development of contaminated brownfields, also accelerates environmental remediation.

Air

The air quality and climate change benefits of the new urbanism are potentially as important as land impacts. This is because of the new urbanism's strong influence on two major sources of air pollutant and greenhouse gas emissions: transportation and buildings. In the transportation sector, the new urbanism's emphasis on transportation choices leads to fewer vehicle trips and reduced vehicle miles traveled. For example, the Denver Regional Air Quality Council estimates that high-density, mixed-use development with gridded streets and pedestrian-oriented site design can cumulatively reduce daily vehicle trips and vehicle miles traveled by as much as 7 percent and 10 percent, respectively. Other research, taking into account additional factors such as location and transit access, suggests even greater differences. These reductions translate directly into lower pollutant and greenhouse gas emissions: the California Air Resources Board has estimated that, in comparison to conventional suburban development, new urbanist densities and mixed uses can reduce annual household travel-related emissions of carbon monoxide from 700 lbs. to 400 lbs., and nitrogen oxides from 55 lbs. to 30 lbs.

This is not to say that new urbanism will always and uniformly produce positive air quality impacts. Dense infilling can sometimes create or exacerbate air pollution "hot spots" that occur as a result of heavy traffic congestion. Also, new urbanist projects that are "parachuted" into peripheral suburbs that lack pedestrian and transit connections may degrade air quality because of continued auto dependence by the larger number of households accommodated within the denser new urbanist project. One of the benefits of measuring projects during local planning processes is identifying and avoiding such detrimental effects.

In the buildings sector, the new urbanism will reduce emissions as a result of lower energy use attributable to higher densities, as explained below under Energy. This air quality and climate change benefit is local in the case of on-site fuel combustion, such as through the use of natural gas heating systems, and regional in the case of electricity generation at regional power plants.

The new urbanism also creates favorable settings for accelerating the use of clean-fuel vehicles. To the extent that new urbanist projects emphasize short travel distances generally, and transit in particular, clean-fuel technologies are made more feasible by the economies of scale where larger numbers of travelers are concentrated in smaller areas. Examples include fuel-cell powered buses that need high ridership patronage to be cost-effective, and electric vehicles that can be more technically viable when used over short travel distances.

Water

The water resource benefits of the new urbanism potentially include less domestic consumption, reduced storm runoff, protected groundwater recharge, better surface water quality, and several enabled technologies. Less water consumption results from higher density designs with smaller residential parcels and reduced landscape irrigation requirements. For example, a University of Washington study of 500 Seattle-area households found that 6,500 sq.ft. traditional-style parcels use 60 percent less water than 16,000 sq.ft. suburban parcels.

Another water benefit is the ability of new urbanist designs to reduce per capita imperviousness, which, in turn, reduces storm runoff volume and protects groundwater recharge. A U.S. EPA study in Atlanta found conventional suburban development creating 0.28 acres of imperviousness per dwelling unit compared against a new urbanist design of 0.03 acres/dwelling unit. Off-street parking imperviousness alone can be reduced by as much as 50 percent in a mixed-use new urbanist project versus a conventional one because of shared space and non-auto patronage. Less runoff minimizes downstream flooding hazards, mitigates stream warming from elevated runoff temperatures, and significantly reduces the transport of non-point source pollutants. This latter benefit was confirmed in a Charleston, South Carolina study that found low-density development to be almost three times as polluting as higher density development. Reduced imperviousness also protects groundwater recharge, and, in turn, municipal water supplies and ecosystems such as wetlands.

Surface water quality can also be enhanced by the new urbanism through its emphasis on non-auto travel. Since a significant amount of nitrogen deposited in surface waters comes from atmospheric deposition, less auto use translates into reduced pollution of nearby water bodies. A major regional strategy for reversing Lake Tahoe pollution in Nevada is a new urbanist emphasis on compact village-style development relying on walking and transit rather than auto travel. Through economies of scale that derive from higher densities and mixed-uses, new urbanism can also help enable such water efficiency technologies as greywater reuse, rain harvesting, and alternative wastewater treatment methods.

Energy

The air quality and climate change benefits described above come primarily from less energy use that can be expected in new urbanist projects. The largest savings come from

travel mode shifting from automobiles to walking, biking, and transit, and from substantially shorter travel distances for remaining auto use. The classic Peter Newman and Jeffrey Kenworthy study *Cities and Automobiles Dependence* calculated that transportation fuel consumption per capita declines by one-half to two-thirds as urban densities rise from four to twelve persons per acre.

Less energy is also used in the building sector as a result of higher densities that create more common walls, which thereby reduce space-heating losses. According to U.S. DOE data, space-heating requirements can be as much as 20 percent less on a square foot basis for dwellings in multi-unit buildings compared to detached structures.

The new urbanism can also save energy embodied in construction materials. According to University of North Carolina research, attached dwellings have an average of 750,000 Btu per sq.ft. of embodied energy in their construction materials versus 790,000 Btu for detached dwellings. Embodied savings can be even larger when infrastructure is evaluated on a per capita basis, e.g. a one-block street segment embodying 100 million Btu serving eight households in a conventional design versus 20 households in a new urbanist design.

Of the environmental technologies enabled by the new urbanism, perhaps the greatest opportunities exist in the energy sector. For example, high-density, mixed-use neighborhoods create an ideal setting for district heating and cooling. This type of central plant system can be as much as 25 percent more efficient than individual building systems, and even more so if cogeneration of electricity is included. The new urbanist concentration of activities also facilitates what is known as “distributed” generation, where small power plants are located close to concentrated customer loads, cutting electric distribution losses by 50 percent or more. Alternative supply sources, such as solar energy and fuel cells, are also helped through the economies of scale provided by compact, dense development and by the peak demand diversity of mixed-uses.

Environmental Evaluation Tools

The ability to measure environmental impacts of new urbanist projects is improving rapidly along with general advancements in information technologies. Designers and developers increasingly prepare plans using computer-aided design (CAD) software, creating an electronic description of a project that, in turn, can be assessed by other software. Some communities are beginning to use GIS models such as INDEX, What If, and CommunityViz to gauge land-use and urban design impacts, and transportation demand models such as Transcad ® to evaluate travel impacts. Air pollutant and greenhouse gas emissions can be estimated with software such as EPA’s MOBILE program and the Internal Council for Local Environmental Initiatives’ CO2 accounting model. Embodied energy and other environmental characteristics of construction materials can be evaluated using the National Institute of Standards’ Building for Environmental and Economic Sustainability (BEES) software.

These various elements can be integrated into a single comprehensive assessment as illustrated in Figure 1, where a conventional subdivision design in Kamloops, British Columbia is compared against a new urbanist alternative using INDEX software to score key design and environmental indicators. These and other tools can become powerful devices for evaluating alternative concepts, communicating their relative merits to the public, helping iterate to a preferred design, and equally important, evaluating as-built performance to determine if estimated benefits are actually achieved once a project is occupied and functioning.

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Charter of the New Urbanism

The Congress for the New Urbanism views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building challenge.

We stand for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy.

We recognize that physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent and supportive physical framework.

We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.

We represent a broad-based citizenry, composed of public and private sector leaders, community activists, and multidisciplinary professionals. We are committed to reestablishing the relationship between the art of building and the making of community, through citizen-based participatory planning and design.

We dedicate ourselves to reclaiming our homes, blocks, streets, parks, neighborhoods, districts, towns, cities, regions, and environment.

We assert the following principles to guide public policy, development practice, urban planning, and design:

The region: Metropolis, city, and town

1. Metropolitan regions are finite places with geographic boundaries derived from topography, watersheds, coastlines, farmlands, regional parks, and river basins. The metropolis is made of multiple centers that are cities, towns, and villages, each with its own identifiable center and edges.
2. The metropolitan region is a fundamental economic unit of the contemporary world. Governmental cooperation, public policy, physical planning, and economic strategies must reflect this new reality.

3. The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farmland and nature are as important to the metropolis as the garden is to the house.
4. Development patterns should not blur or eradicate the edges of the metropolis. Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.
5. Where appropriate, new development contiguous to urban boundaries should be organized as neighborhoods and districts, and be integrated with the existing urban pattern. Noncontiguous development should be organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.
6. The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.
7. Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.
8. The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.
9. Revenues and resources can be shared more cooperatively among the municipalities and centers within regions to avoid destructive competition for tax base and to promote rational coordination of transportation, recreation, public services, housing, and community institutions.

The neighborhood, the district, and the corridor

1. The neighborhood, the district, and the corridor are the essential elements of development and redevelopment in the metropolis. They form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution.
2. Neighborhoods should be compact, pedestrian-friendly, and mixed-use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.
3. Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.
4. Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.

5. Transit corridors, when properly planned and coordinated, can help organize metropolitan structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.
6. Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.
7. Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.
8. The economic health and harmonious evolution of neighborhoods, districts, and corridors can be improved through graphic urban design codes that serve as predictable guides for change.
9. A range of parks, from tot-lots and village greens to ballfields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.

The block, the street, and the building

1. A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.
2. Individual architectural projects should be seamlessly linked to their surroundings. This issue transcends style.
3. The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.
4. In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.
5. Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.
6. Architecture and landscape design should grow from local climate, topography, history, and building practice.
7. Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.
8. All buildings should provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource-efficient than mechanical systems.
 8. Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

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