IS A SUSTAINABLE URBANISM POSSIBLE IN XXI CENTURY AMERICA?

The use of LEED® and LAND systems as sustainability indicators: The example of the design of a new downtown for Mansfield, CT

Prepared by Tomas Delgado, for the Hixon Center of Urban Ecology at Yale University

Abstract

The rapid growth of the built environment has been pointed out as one of the major challenges to sustainability in the US. Low density "sprawling" neighborhoods represent the most undesired form of urban growth both for the waste of land and energy they cause, as well as for the lack of a "sense of place" they promote among their inhabitants. Several critiques to such type of urbanization have being heard since the last decades of the XXth century, causing in turn a reaction, in the form of new urban design approaches such as "Smart Growth" and "New Urbanism". The town of Seaside, the quintessential example of New Urbanism represents a major progress: more contained communities, walkable distances to most services and a recognizable place where people can meet and interact; but this project is far from constituting a sustainable solution. The new design of a downtown for Mansfield, Connecticut seems to be a step closer toward a sustainable urbanism. From the construction standpoint, the quest for sustainability has been pursued through the creation of several "green index" systems, of which the most widely accepted is the LEED® green building rating system. Some critiques to such rating system include its incomplete scope in order to reach true sustainability. A new rating system, the "LAND code" is being developed by The School of Forestry and Environmental Studies at Yale University, which when finished, would complement several land use aspects not considered at LEED®. Some differences are the way both rating systems deal with Water, Vegetation and Landscape Ecology. A possible way of developing the LAND code in the future may include a point system to compare environmental performance to pre-existing ecological processes.

Keywords

Sprawl; Urban growth; Sense of place; New Urbanism; Smart Growth; LEED®; LAND Code; Yale; Seaside; Mansfield; Environmental Performance; Ecological Processes.

Introduction

During a great part of the summer of 2005, while working for the architectural firm Herbert Newman and Partners, I had the unique opportunity of participating in the design process of a new downtown for Mansfield, Storrs, Connecticut. Knowing that this project had unique characteristics when compared to most typical urban developments, I decided to conduct a research on what are the biggest environmental impacts of urbanization, how are they currently being addressed and how would this new project would constitute an advance in that realm.

I was particularly interested in knowing whether if any progress was being achieved at all regarding overall sustainability of new urban developments in the United States, especially after so many years of disastrous years of sprawling growth. I thought it would be interesting to compare this project with other "sustainable" urban initiatives, and to find out what are the major ways to determine such elusive sustainability.

Have we learned from the past? Are we doing better now? How can we measure environmental performance? These are the questions that lay at the core of my research. I wonder what caused our current urban environmental crisis in the first place and if there is a light of hope for the future.

Sprawl

A simple economic equation has been changing the American Landscape for over half a century. The phenomenon, known as "Urban Sprawl" is quickly turning cheaper rural land into ever-growing and highly priced residential and commercial suburbs. Defined as *"…the expansive, rapid, and sometimes reckless, growth of a greater metropolitan area, traditionally suburbs (or exurbs) over a large area*" by Wikipedia, this suburbanization of America implies lower than traditional population densities and, for several authors, is the cause not only of innumerable environmental evils but also of alienation among its inhabitants.

I found tons of publications which list the consequences of this phenomenon and show scary projections and statistics. I will therefore not make my own list here, but I'd like to recommend, to the curious reader, the outstanding work done by me colleague Amy Shatzkin at Yale University's Hixon Center for Urban Ecology. In her paper "*Sprawling towards Climate Change. Connecting US patterns of Land Development to Greenhouse Gas Emissions"* she provides us with an excellent description of all the characteristics of Urban Sprawl, especially those relating it to the raising levels of Greenhouse Gas Emissions in the country.

The other negative side of suburbs, its lack of a "sense of place" has been extensively analyzed by James Howard Kunstler in his books "The geography of nowhere" and "Home from nowhere". He even goes as far as affirming that suburban lifestyle is a cause of moral decadence, making a call for more traditional approaches in urban design: in particular, for the renaissance of Main Street and the mixed-use neighborhood. His is probably the most heard of voice among the theorists of the New Urbanism, and his ideas are central to the intellectual frame of this movement.

New Urbanism and Smart Growth

The reactions against Sprawl have been incubating during the last few decades, gaining strength over the turn of the century. The term "Smart Growth" was formulated in reference to smarter strategies that can fix the problems caused by urban sprawl. As defined by Michael Levitt, from US EPA, "*Smart growth is about being good stewards of our communities and of our rural lands, parks, and forests. It is about ensuring that the best of the past is preserved, while creating new communities that are attractive, vital, and enduring*". The 10 principles of Smart Growth, in the eyes of the US EPA are:

1. Mixed Land Uses
2. Take advantage of compact building design.
3. Create a range of housing opportunities and choices.
4. Create walkable neighborhoods.
5. Foster distinctive, attractive communities with a strong sense of place.
6. Preserve open space, farmland, natural beauty and critical environmental areas.
7. Strengthen and direct development towards existing communities.
8. Provide a variety of transportation choices.
9. Make development decisions predictable, fair and cost effective.
10. Encourage community and stakeholder collaboration in development decisions.

How are these principles translated into actual practice? Most developments that follow them, can be categorized within the framework of the New Urbanism movement, as described by the Congress for the New Urbanism. Founded in 1993, this organization groups a number of architectural practitioners, real estate developers and town officials that claim to incorporate Smart Growth measures into their daily practices. Their foundational charter is a clarifying document in respect to their overall goals:

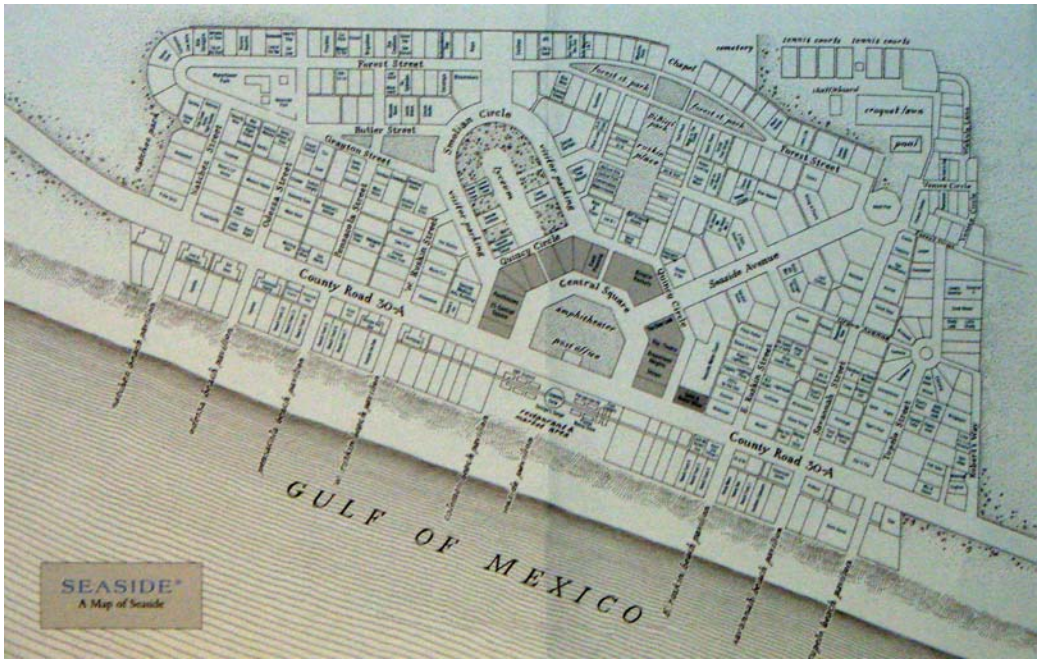
"The Congress for the New Urbanism views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building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

For further reading about the formation, principles and practices of this new movement, I recommend "*The New Urbanism. Toward an architecture of community*" by Peter Katz; where the history and principles of this movement are clearly explained, and an array of examples are depicted, illustrated with wonderful images.
While addressing most of sprawl environmental and functional problems, usually New Urbanism projects show a strong affiliation to traditional and classical styles of architecture, in my opinion, unjustified and often out of place. The Congress for New Urbanism, an organization clearly modeled after the CIAM (congrès internationaux d'architecture moderne) of the early XXth century, besides its explicit declaration that their intentions transcend styles, seems to be particularly focused on combating the type of architecture the CIAM predicated. Especially in the writings of J. H. Kunstler, Leon Krier and the architect Andres Duany, the attack on modern architecture and urbanism is evident. A sense of nostalgia of an idealized past is always present in the discourse and imagery of the New Urbanism, as opposed to the abstract, clear shapes of the international style.
But, how is it translated into actual constructed form? There are hundreds of new towns already built, and many more currently under way. For most authors, Seaside is the emblematic symbol of this new age.

Seaside, Florida

One of the early and probably the most renowned urban projects that represent the ideals of the New Urbanism is the town of Seaside in northwestern Florida. During my research this name came up every time I looked on literature regarding New Urbanism and approaches to solve the problems caused by urban sprawl, so I decided to visit the town and to get my own impression: how the town works, what does it look like and what is the feeling of actually being there.

It is basically a high-end beach resort, where most people don't live but spend their vacations. This trend seems to be changing; the Seaside Institute has data indicating that the percentage of permanent population is growing in this town, especially among retired citizens. What is nice about this town, is its orientation towards the Gulf of Mexico coast. A pedestrian path parallel to the beach features retail, restaurants and a sort of amenities that enrich public life; the scale is humane and the overall experience quite enjoyable.



Seaside Master Plan – by the Seaside Institute

Further on, at the heart of the map, there is a central square consisting of a green parcel, modeled as an outdoor theater where public events take place. Surrounding the green, there is a wide street and parking lot, where most of the public and commercial buildings occur. The rest of the town is residential, mostly made up of huge mansions isolated on their lots, generally designed on a hybrid style that owes a big deal to a nostalgic picture of an ideal and distant (in time and space) New England colonial style. All what they exude in pretentiousness is what they lack in authenticity.


Seaside Green – photo by Tomas Delgado


Pedestrian Alley – photo by Tomas Delgado

Post office – photo by Tomas Delgado

Typical Seaside house – photo by Tomas Delgado

Perhaps the most interesting spot in the whole development is Ruskin Place, a green secondary square. Surrounded by retail, above which collective housing takes place, featuring a unique spot of higher density in a relaxing and social atmosphere.

Collective housing and amenities at Ruskin Place

Typical retail at Ruskin Place – photos by Tomas Delgado

Regarding sustainable aspects of this new development, it is still far from proposing a solution when compared to a typical sprawling development. Perhaps its slightly higher density and the fact that most retails and public buildings are located within a radius of 5 minute walk are the only advance in respect to a more conventional development. But on the other side, several aspects speak poorly of its environmental performance: It was developed on a Greenfield, far from any major urban center or from any type of public transportation; priority is still given to the car instead to the pedestrian (even though the developers claim the opposite): wide streets on a medium to low density, extensive parking lots open to the sky, etc.; it is the kingdom of the extensive imperviously paved surfaces, with little shadow from planted trees, a major trigger for urban heat island, under the merciless sun of Florida; the architecture has little or no consideration at all to the site: the orientation of the building were not considered in the design, in the use of passive solar energy, very often buildings leave huge surfaces exposed to direct sun,

without a single relieving shadow, even when featuring dark colors….every aspect necessary for a huge heat gain in a constantly hot climate!! all the job is left to the air conditioners. In a way, Seaside still represents a typical example of the American glorification for the onerous waste of energy.


Typical urban and building design with high environmental impact on Seaside – photos by Tomas Delgado

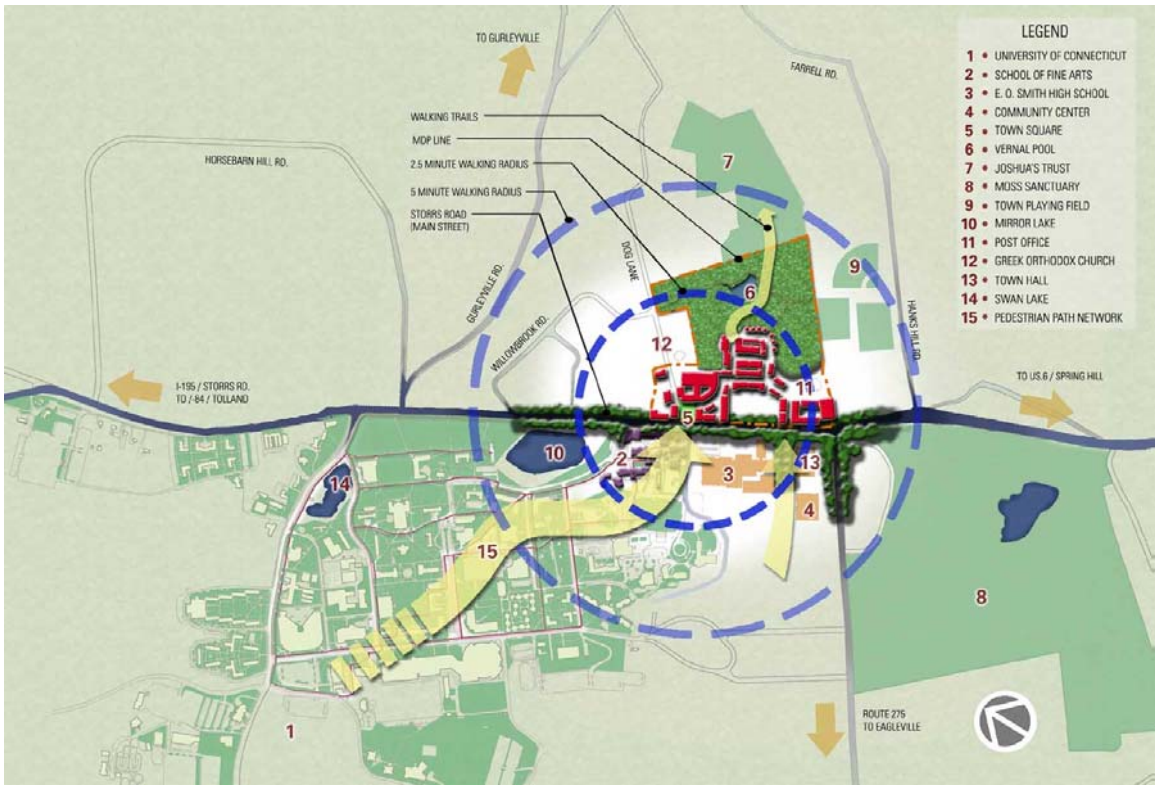
After my visit to Seaside, while in the highway driving a burning car that had been all day standing under the sun in a parking lot, I could not help but to wonder why the term "sustainable communities" is often used as synonymous for New Urbanism projects, in special referring to the myriad of resorts that are spotting the map of Florida.
But I don't want to take it hard against Seaside; this town undoubtedly represents a major step from conventional developments and we should be just and consider that this is but one of the earliest examples of this new trend. Hopefully with time and through accumulating experience, newer developments will get closer to sustainable results.

A new downtown for Mansfield in Storrs, CT

Storrs is the home of the University of Connecticut. It is located some 20-30 minutes outside the state capital city of Hartford. During several years, this University has kept expanding and so has the community of the town of Mansfield, in Storrs. The aspect the town is acquiring, is that of large isolated institutional, commercial and residential buildings distributed through the landscape, without a recognizable central point. Despite its growing populations, especially among students, there is not a viable option of retail and/or entertainment. A big deal of the thousands of resident students leave town on weekends, to find recreation in the nearby casinos (Foxwood and Mohegan Sun) or other urban centers. Perhaps this lack of amenities constitutes a deterrent for Uconn to become a desirable destiny for most students and faculty, despite its high levels of educational and research resources.
An urgent need for a true urban center has been the trigger for the constitution of the so called "Mansfield Downtown Partnership", of which the University is a major player, but that also includes several neighbors, local merchants and town officials. Their Agenda, as stated in their official website is to:

- Develop a community green space
- Business retention and attraction
- Marketing and promotion
- Improve traffic flow and parking
- Real estate development and improvements
- Public improvements, i.e., streetscape, signage

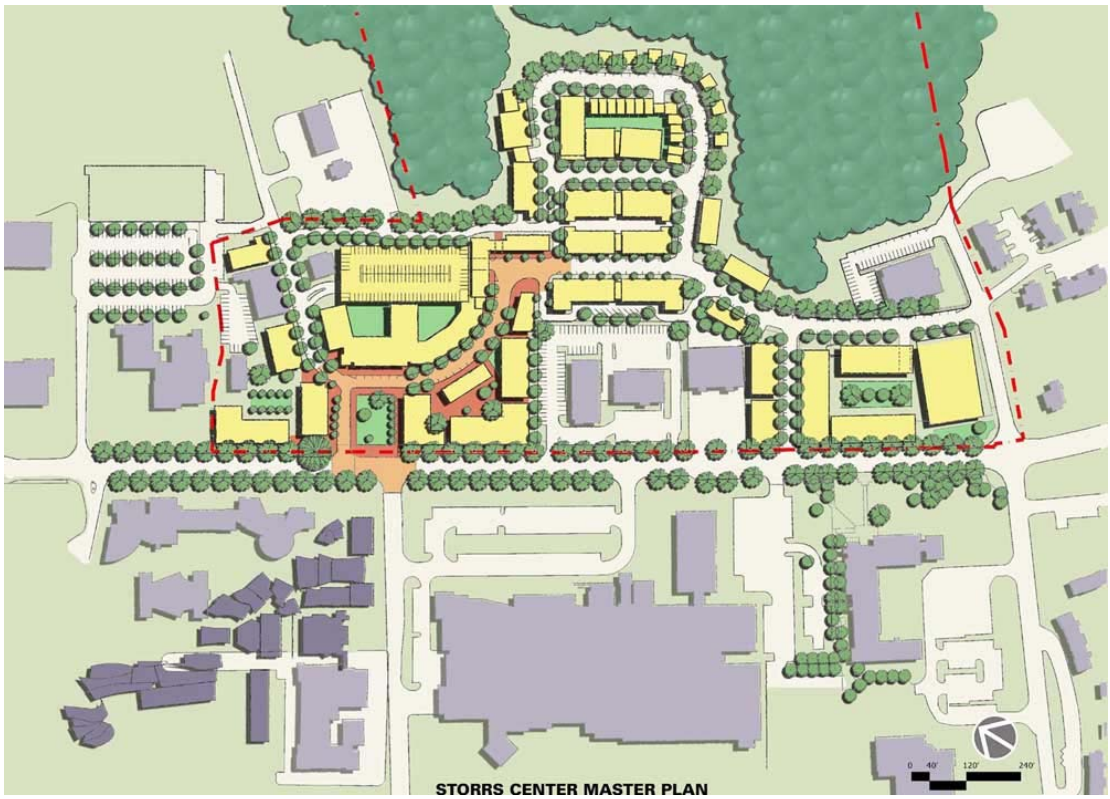
The architectural firm Herbert Newman and Partners has been hired to design a master plan for this new development. In the words the partner-in-charge of this project, Richard Munday, the aim of this project is to create a high density mixed use area with a strong focal point on the new town green. The new development will be contained within a distance no more than five minutes of pedestrian walk, and the town green is to be placed in a position from which the big bulk of the University campus is also located no farther than a five minute walk.



Context map of the proposed downtown Mansfield – by Herbert Newman and Partners

When asked about the environmental aspects of the project, the architect responded that environmental concerns were central from the beginning of the process, not only on the architect's side but also the community explicitly expressed its intention of building the new downtown in the most environmentally friendly way as possible. For Munday, the creation of a certain critical mass enough to hold population from daily long-distance commuting is crucial for the environmental performance, as well as the fact of assigning more than half of the property as conservation area.

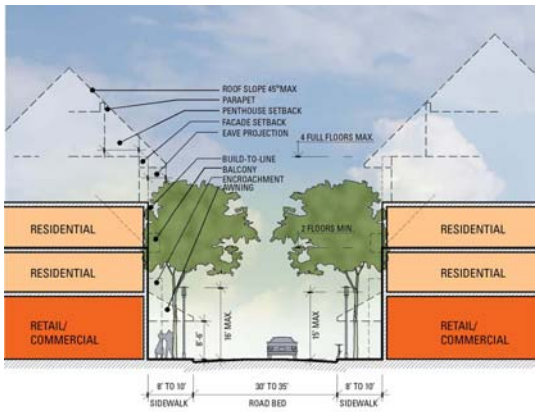
Proposed Land Use Plan and zoning by Herbert Newman and Partners



Proposed Master Plan by Herbert Newman and Partners

A further analysis of the proposed plan, reveals a higher hierarchy given to the pedestrian over vehicular traffic: a parking garage will collect most automobiles, leaving the streets free for the pedestrians to circulate and reducing to a minimum the amount of open to sky parking lots. All retail and amenities are concentrated along the so called "Village Street", contained within a high density mixed-use zone, therefore holding most population density within a small radius of action for their daily activities. Such disposition encourages pedestrian over vehicular flow.

Current aspect of Main Street (Storrs Road)



Proposed Village Street Section by HSNP

Another important aspect of this project, as remarked by Richard Munday, is the continuous participation of the community throughout the whole process. The partnership kicked off the idea, and every single step has been taken per request or through approval of the community, in periodical public audiences. Last observation by Munday, is that the master plan looks to accommodate to existing site conditions, following terrain configurations rather than imposing a "blank sheet". Comparing to existing documentation, I also noticed that most of the construction will take place over previously developed parcel, mostly for low density commercial and industrial settings, leaving untouched the bulk of pristine forested land.

From the Developers' standpoint, there were always been a predisposition towards an environmentally friendly approach. Among other considerations, a century-old white oak will be saved as an emblematic gateway to the new development; in the same manner, the diagram was adapted to save an old farm stone wall, which is being currently used as habitat/refuge by a diverse local wildlife. Macon Toledano, the project manager at Leyland Alliance (the developer), also explained me a revolutionary method to deal with rain-water runoff in the project: such waters will not be left to go straight in the forest wetlands, or conducted out of the site. Instead, rain waters will be conducted to tanks built specially for this purpose under the residential buildings, only to be slowly drained later to the wetlands, after they have been properly cooled and filtered. Local species of deciduous trees will extensively be planted on streets to regulate different solar energy inputs and requirements through seasonal variation.

A superficial analysis of this project, for the reasons exposed above, seems to portrait a huge advance from the Seaside scheme in regards to environmental performance. But can, we somehow measure the environmental performance of a development through some more precise way?

LEED® and LAND

Ever since environmental issues became a world wide concern, several methods have been developed to measure environmental performance of new construction and developments, given that the industry of constructions appears to be one of the top sources of environmental degradation.
Public and private organizations took developed methods for green building performance measurements, such as the HOK guidelines for sustainable construction, the BRE Environmental Assessment methods, the Minnesota Sustainable Design guideline and several others.
For the past few years, the LEED® (Leadership in Environmental and Energy Design) developed by the US Green Building Council seems to be the one gaining a more broad acceptance by the public and the construction industry in the United States and it is also becoming increasingly implemented elsewhere abroad. It is organized as a green point system through a checklist. The aspects taken into account are:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation and Design Process

There have been innumerable critiques to this point system, nevertheless it is still one of the best and most developed methods the professionals can count on when it comes to measure the environmental implications of their projects. The first impression one gets, is the high importance given to indoor quality, the use of potentially hazardous chemicals and energy rationalization. Major land use approaches, major large area conservation and ecology seem not to be considered, other than a brief introduction to the topic on the "Sustainable Sites" section.
In 2003, the Yale School of Forestry and Environmental Studies launched a project called "The Land and Natural Development (LAND) Code", with the purpose to issue a code for sustainable development that addresses aspects not contained within the LEED ® system, or enhancing some of the existing. In the words of the authors: "*Our goal in creating LAND code has been to create a practical path for developing a site in line with natural processes…the LAND code will eventually cover many kinds of sites, from greenfields to redeveloped urban brownfields and converted farm fields*".
Their project is still on progress, therefore a final outcome has not yet been issued; but looking at the pre-publication draft, we can have a hint on their approach. It was organized around the following chapters:

- Water quality and hydrology guidelines.
- Air Pollution and Micrometeorology guidelines.
- Plant Ecology and population/community ecology guidelines.
- On-site Energy and transportation guidelines.
- Environmental Engineering guidelines.

- Industrial Ecology guidelines.
- Economics guidelines.
- Law guidelines.

While still in progress, this work seems to be much more comprehensive that the one proposed by the US Green Building Council. It includes several aspects not contained in LEED ® and both approaches differ in some points.

Water, Vegetation and Landscape Ecology

At this point, going through both documents may be too extensive, so a few examples on how they differ or complement each other and how can they help to propose design principles can be very enlightening.
Take water management for instance; LEED® focuses on creating water efficient landscaping, water use reduction (mostly advising water efficient fixtures) and Innovative Wastewater technologies, focusing and reducing the load of waste water generated. LAND in turn, proposes to emulate natural the flow of water as close as possible as pre-existing conditions, minimizing the degree of chemical and thermal pollution before it joins the aquifer and becomes available to living organisms.
In regards of vegetation, little is specified on LEED ®, other than its use to mitigating urban heat island effect or recommending the use of water efficient species. Land, on the other hand, proposes also the use of local species, to prevent the dispersion of invasives and to provide food and shelter to local wildlife, acting in a way as conservation within the urban fringe.
Finally, Landscape Ecology aspects are not even mentioned at all in LEED®. LAND proposes the use of these principles to minimize the impacts of urban developments on ecosystems. The recommendations include the preservation of ecologically sensitive areas, the creation of buffers around critical habitat and providing landscape scale connectivity to address ecosystem fragmentation typical of most urban environments.

Conclusion

A major reaction against the consequences of sprawl is taking place indeed. Enormous progress is constantly being achieved through the formulation of sustainable principles, such as those of Smart Growth, New Urbanism, and LEED ® green building rating system. The actual practices of architecture, construction and urbanism are also constantly enhancing their environmental performance in time, from the early sprawling developments, through New Urbanism towns like Seaside and finally to the later Mansfield Downtown project. But there is still room for improvement, as the environmental sciences are a complex field and the state-of-the-art sciences are in constant evolution. The LAND code appears to be a reasonable method for assessing environmental performance, but it is still being developed and lacking an accurate point system for measurement. Perhaps a way can be comparing on a percentage basis the ecological performance of urban developments to those of a comparable pristine natural area of same geographical-geological conditions; perhaps the measurement can be done an actual NPP (net primary production) as net grams of carbon accumulated per year, on

weight of dry biomass per unit area, on biodiversity, on accountable measurements of water and nutrient flows, etc. Yes, there is room for improvement, and more research and development has to be done; fortunately the conditions and incentives are already in place and we can hope to see a "cradle to cradle" (See McDonnough's publications) practice of architecture and urbanism within our lifetimes; it is, before it's too late.

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EPA. *About Smart Growth*. US Environmental Protection Agency. *http://www.epa.gov/smartgrowth/about_sg.htm#what_is_sg*

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