# Technical Guidance Manual for Sustainable Neighborhoods

## How to Use the LEED for Neighborhood Development Rating System to Evaluate and Amend Local Plans, Codes, and Policies

U.S. GREEN BUILDING COUNCIL
USGBC

LAND USE LAW CENTER
PACE LAW SCHOOL

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# U.S. GREEN BUILDING COUNCIL FOREWORD

LEED, or Leadership in Energy and Environmental Design, is redefining the way we think about the places where we live, work and learn. One of the unexpected surprises we have encountered in our work on the LEED for Neighborhood Development rating system (LEED-ND) is the sheer level of interest and variety of ways that local governments have leveraged LEED-ND as a sustainability tool. It is no surprise given the insatiable desire on the part of elected officials, planning staff, public housing agencies, other local government departments, and concerned stakeholders to bring green development to their communities. In addition to the environmental benefits, the economic and social benefits of this type of development are increasingly well documented.

The LEED-ND rating system aligns the principles of smart growth, New Urbanism, and green building into a set of national standards for green planning and design at the neighborhood scale. As a result, the rating system represents the next evolution in the development of LEED and aims to push both the public and private sectors to look beyond the individual building to the larger community, recognizing that a building is only as green as its surroundings. LEED-ND allows local governments to achieve market transformation at a greater rate than ever before by making the "greenness" of a building as much about where it is as what it is. As our cities continue to thrive and our regions continue to urbanize, tools such as LEED-ND will play an ever meaningful role in creating livable communities.

To provide impactful guidance to local governments in how to incorporate LEED-ND into their plans, regulations, and development process, it became clear that we needed a partner. This idea started over a breakfast of beignets and good coffee in New Orleans during a conference and grew into a real project when we secured funding. The Land Use Law Center staff has brought great passion and insight into the research and writing of this technical guidance manual and the accompanying floating zone ordinance. Both the Center and USGBC staff have all learned a great deal about the role sustainability metrics can play in land use planning and we are excited to see what you do with this information as you work hard to enact change in your communities. We invite you to reach out to us and share your stories of how your community applied LEED-ND principles so we in turn can help future sustainability efforts in similar communities.

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# LAND USE LAW CENTER FOREWORD

There are approximately 40,000 local governments in the United States. These localities, through their land use authority, determine and regulate where private development goes and how it is constructed. Municipalities adopt land use plans and zoning ordinances that determine human settlement patterns, which, in turn, dictate consequential matters such as dependency on automobiles for almost all day-to-day transportation needs (i.e., vehicle miles traveled), fossil fuel burned, carbon emission, energy consumed by buildings, impervious coverage, flooding and stormwater runoff, potable water consumption, surface water pollution, ground water supplies, and whether our neighborhoods are livable. These matters are reflected in the LEED for Neighborhood Development rating system, a voluntary program that provides substantial guidance for developers who wish to develop projects in smart locations that are designed to create connected neighborhoods and are comprised of green buildings and infrastructure.

About 85 percent of greenhouse gas emissions in the U.S. are carbon dioxide, much of which is caused by the buildings and land use patterns that local land use plans and regulations regulate and approve. Vehicle trips and miles travelled have increased dramatically in the past three decades as development patterns have spread out, consuming land at much greater rates than the rate of population growth. Today, buildings emit 35 percent of carbon dioxide in the United States. Personal vehicles are responsible for 17 percent of total emissions. Current undeveloped landscapes sequester 15 percent of carbon dioxide emissions. All told, where we build and how we build relates directly to more than 66 percent of net $CO_2$ emissions in the United States. Where the buildings that house and employ our growing population are located, how energy conserving they are, and how far our growing population must travel from one to the other will greatly affect carbon dioxide emissions and determine how vulnerable new development will be to sea level rise and natural disasters that accompany climate change.

Sustainable neighborhood development, as defined by the LEED-ND rating system, focuses on shaping land and economic development to have a lighter impact on the environment, including, but not limited to, climate change mitigation and adaptation. Sustainable neighborhood development uses fewer raw materials; avoids consuming wetlands and water bodies; consumes less energy; emits less carbon dioxide; lessens stormwater runoff; reduces ground and surface water pollution; and creates healthier places for living, working, and recreating.

The Census Bureau reports that the nation's population will increase by 100 million by mid-century, which will require millions of new homes and billions of square feet of non-residential development. Two-thirds of the buildings in use in 2050 will be built between now and then. How buildings are constructed, how they are arranged on the land, and how human settlement patterns are shaped are critical to our success in curbing the causes of climate change and creating a livable human environment. This technical manual responds to this challenge; it contains a step-by-step approach to incorporating LEED-ND criteria—its prerequisites and credits—into local land use plans, regulations, and policies.

We value the partnership we created with the USGBC in developing this document as a comprehensive description of best practices for codifying the most advanced and effective methods of achieving sustainability at the neighborhood level. The leadership, staff, peer reviewers, and editors on their side provided us with many valuable insights essential for this task. The countless hours we spent with them discussing strategies and techniques for achieving sustainability through amendments to local plans, regulations, protocols, and capital budgets truly paid off. Together, we were able to take a program that was developed to guide private sector developers and turn it in to useful standards for municipal adoption. We look forward to your comments and stories as you put this manual to use.

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# LEED FOR NEIGHBORHOOD DEVELOPMENT PRIMER


The U.S. Green Building Council (USGBC), the Congress for the New Urbanism (CNU), and the Natural Resources Defense Council (NRDC) jointly developed the LEED for Neighborhood Development (LEED-ND) rating system based on the combined principles of smart growth, New Urbanism, and green infrastructure and building. Like the other LEED rating systems, LEED-ND is a voluntary program designed to evaluate and guide the design and construction of development projects. However, LEED-ND expands the definition of "green building" to include projects at a district scale, with greater consideration for project location. Additionally, the LEED-ND rating system addresses environmental, economic, and equity concerns.

A national standard for green neighborhood planning and design, the LEED-ND rating system emphasizes site selection, design, and construction elements to bring buildings and infrastructure together on a district scale and relate the neighborhood to its local and regional context. The LEED-ND rating system is divided into the following credit categories: Smart Location and Linkage (SLL), Neighborhood Pattern and Design (NPD), and Green Infrastructure and Buildings (GIB). The SLL category emphasizes project location on connected and previously developed sites with existing infrastructure, near transit, and away from important natural resources. NPD recognizes compact, walkable, vibrant, mixed-use neighborhoods with good connections to nearby communities. Finally, the GIB category recognizes building and infrastructure performance at the district scale that reduces energy and water use, encourages historic preservation, and minimizes waste.

The LEED-ND rating system consists of prerequisites that all projects must meet and a set of credits, from which each project can choose to earn enough points for certification. Each prerequisite and credit has a general statement of intent followed by specific performance thresholds or prescriptive measures. To earn LEED-ND certification, an applicant project must satisfy all of the prerequisites and qualify for a minimum number of points to attain the project ratings listed below.

LEED-ND

LEED-ND certifications are awarded according to the following scale:

| | |
|---|---|
| Certified | 40–49 points |
| Silver | 50–59 points |
| Gold | 60–79 points |
| Platinum | 80 points and above |

**LEED® 2009**
for Neighborhood Development

| | |
|---|---|
| **Total Possible Points**** | **110*** |
| Smart Location & Linkage | 27 |
| Neighborhood Pattern & Design | 44 |
| Green Infrastructure & Buildings | 29 |

** Out of a possible 100 points + 10 bonus points*

*** Certified 40+ points, Silver 50+ points, Gold 60+ points, Platinum 80+ points*

| | |
|---|---|
| Innovation & Design Process | 6 |
| Regional Priority Credit | 4 |

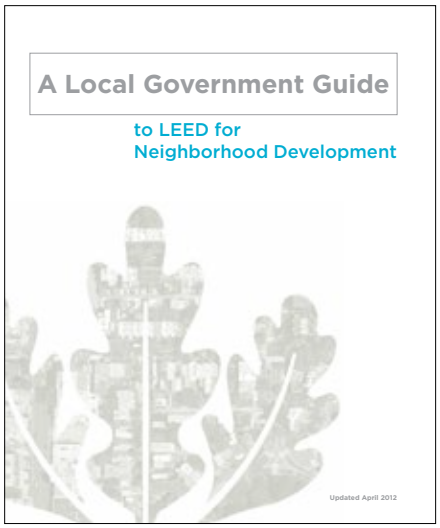
The LEED-ND certification process is available to projects at all phases of development, with different awards based on development phase. Any time before the entitlement process begins or prior to a project earning half of its land-use entitlements, a successful project is awarded a letter stating that it has earned conditional approval of a LEED-ND plan from the USGBC. After it is fully entitled by public authorities but no more than 75 percent constructed, the project can earn a pre-certified plan certificate. Finally, when the project is complete, namely when certificates of occupancy are issued, the project can apply to be considered a LEED-ND Certified Neighborhood Development. If successful, a plaque for public display at the project site is issued and the project is listed as certified on the USGBC website.

The green building and neighborhood development field is growing and changing daily. New technologies and products are introduced regularly into the marketplace, and innovative designs and practices are proving their effectiveness. As a result, the LEED rating systems and reference guides evolve as well. Currently, USGBC updates the rating systems every few years. The next version of LEED for Neighborhood Development, which will be part of LEED v4, is expected in late 2013. The next version will not include many major technical changes, but any local government that references LEED-ND criteria in its local plans, laws or policy should revisit this language with each new version of the rating system.

For more detailed information on eligible project types and a fuller account of the benefits of the rating system, please see the introductory material in the LEED for Neighborhood Development Rating System, the LEED Reference Guide for Green Neighborhood Development, and the program's website: new.usgbc.org/leed/rating-systems/neighborhoods.

# INTRODUCTION & USER'S GUIDE

The Land Use Law Center at Pace Law School, in conjunction with the USGBC, prepared this Technical Guidance Manual for Sustainable Neighborhoods for elected officials, local planners, and other professionals who work with municipalities to create sustainable neighborhoods. This manual uses two sources for its recommended strategies. First, the manual relies upon prerequisites and credits contained in the 2009 Edition of the LEED-ND rating system. Second, it draws on the experience of municipalities that used LEED-ND to reform their comprehensive plans, land development regulations, and infrastructure planning to achieve sustainability goals. To gather this information, center staff visited, researched, and had extensive correspondence with planners in more than 60 municipalities.[1]




This Introduction and User's Guide summarizes the manual in a matrix that links the manual's strategies to the LEED-ND prerequisites and credits they reference. It then explains how readers should use the manual, describes important issues planners should consider before implementing manual strategies, and presents steps to help municipalities embark on successful sustainable community development initiatives.

Traditional U.S. land use codes have resulted in separated land uses and low-density sprawl that contribute to increased greenhouse gas emissions through vehicles miles travelled, building energy consumption, increased potable water consumption, ground and surface water pollution, and loss of natural resources, among other environmental and social consequences. Local governments can combat these ills by adopting plans and regulations reflecting a more sustainable land use pattern.

As a national standard for green neighborhood design, the LEED-ND rating system is a powerful tool available to local governments that want to support and encourage sustainable development within their communities. For example, the U.S. Department of Housing and Urban Development (HUD) uses LEED-ND to score grant applications and requires LEED ND certification for recipients of certain grants.

USGBC's Local Government Guide to LEED for Neighborhood Development suggests ways local governments can use LEED-ND to achieve sustainability goals through direct project involvement and by setting goals and making commitments, removing regulatory and policy barriers to LEED-ND, providing incentives for green development, and offering technical assistance and education for LEED-ND projects.

This manual builds on the *Local Government Guide's* recommendations, providing guidance on how to evaluate local plans and land use regulations for sustainability. It drills deep into the LEED-ND rating system to demonstrate ways municipalities can integrate criteria from LEED-ND's prerequisites and credits directly into local planning, regulatory, and policy initiatives. Most importantly, the manual facilitates this process by presenting the information in a format that mirrors most local plans and codes.

# MANUAL SUMMARY

The sections of this manual are designed to parallel a typical municipality's land development plans, regulations, and related policies. It begins by presenting strategies to integrate LEED-ND criteria into local planning policies as expressed in comprehensive plans and special area plans. It then presents strategies for incorporating LEED-ND criteria into traditional zoning code sections, site plan and subdivision regulations, and other land use development standards, including building and related codes. Finally, it introduces strategies for including LEED-ND criteria in non-regulatory initiatives, streamlining the project review and approval process, and providing incentives and assistance for sustainable neighborhood development.

Each section references the prerequisites and credits of the 2009 LEED-ND rating system and presents local best practice examples and illustrative case studies. The following matrix presents the manual's content in its entirety and links its strategies to the LEED-ND prerequisites and credits they reference.

1 For the purposes of this Manual, the term "municipality" describes a local political jurisdiction within a state, including counties with the jurisdiction necessary to use the techniques in this manual.

This Matrix presents prerequsites and credits from the LEED 2009 for Neighborhood Development Rating System that are referenced in the manual's recommended strategies. LEED-ND prerequisites (p) and credits (c) are organized within three credit categories: Smart Location and Linkage (SLL), Neighborhood Pattern and Design (NPD), and Green Infrastructure and Buildings (GIB). See the LEED for Neighborhood Development Primer above for more information about LEED-ND and its credit categories.

| Manual Sections & Numbered Strategies | Prerequisites and Credits from the LEED-ND Rating System |
|---|---|
| **I. Integrating LEED for Neighborhood Development into Local Plans** | |
| **Comprehensive Plan Elements** | |
| **1.1** Land Use | SLLp1, SLLp2, SLLp3, SLLp4, SLLp5, SLLc1,SLLc5, NPDp1,NPDp2, NPDc1, NPDc2, NPDc3, NPDc4, NPDc13 |
| **1.2** Public Facilities | SLLc2, NPDc11, GIBp1, GIBp2, GIBp3, GIBc1, GIBc2, GIBc3, GIBc4, GIBc5, GIBc9, GIBc13, GIBc14, GIBc15 |
| **1.3** Transportation and Circulation | SLLp1, SLLc3, SLLc4, NPDp1, NPDp3, NPDc1, NPDc5, NPDc6, NPDc7, NPDc8, NPDc14, GIBc9, GIBc13, GIBc15 |
| **1.4** Housing | SLLc1, NPDc4 |
| **1.5** Civic Services | NPDc3, NPDc9, NPDc10, NPDc15, GIBc16 |
| **1.6** Natural and Historic Resources | SLLp2, SLLp3, SLLp5, SLLc6, SLLc7, SLLc8, SLLc9, GIBp4, GIBc4, GIBc5, GIBc6, GIBc7, GIBc8, GIBc17 |
| **1.7** Economic Development | SLLp4, SLLc5, NPDc13 |
| **II. Incorporating LEED for Neighborhood Development into Traditional Zoning Code Elements** | |
| **Use, Density, and Bulk & Area Requirements** | |
| **2.1** Mixed Uses | SLLp1, SLLc5, NPDc3 |
| **2.2** Housing Variety | NPDc4, |
| **2.3** Agricultural Uses | SLLp4 |
| **2.4** Energy Utilities | GIBc11, GIBc12 |
| **2.5** Home Occupations | SLLc5, NPDc3, NPDc4 |
| **2.6** Accessory Dwelling Units | NPDp2, NPDc2, NPDc4 |
| **2.7** Produce Gardens and Greenhouses | NPDc13 |
| **2.8** Greater Development Densities | NPDp2, NPDc2 |
| **2.9** Smaller Lot Sizes | NPDp2, NPDc2 |
| **2.10** Taller Building Heights | NPDp1, NPDp2, NPDc1, NPDc2 |
| **2.11** Reduced Building Setbacks | NPDp1, NPDc1, NPDc5, |
| **Parking & Loading** | |
| **2.12** Reduced Off-Street Parking Spaces | NPDc5, NPDc8 |
| **2.13** Shared Parking | NPDc5 |
| **2.14** Shared-Use Vehicle Parking and Preferential Parking Allowances | NPDc5, NPDc8 |
| **2.15** Project-Level Transportation Demand Management | NPDc8 |
| **2.16** Below-Grade or Structured Parking | NPDc5 |
| **2.17** Loading Dock and Driveway Access Point Placement | NPDp1, NPDc1 |
| **2.18** Off-Street Bicycle Parking | SLLc4, NPDc5 |

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|---|---|
| **III. Incorporating LEED for Neighborhood Development into Site Plan and Subdivision Regulations** | |
| **Street Design & Transportation** | |
| **3.1** Sustainable Pavement | GIBc9, GIBc15 |
| **3.2** Energy-Efficient Traffic and Street Lights | GIBc13 |
| **3.3** Street Connectivity | NPDp3, NPDc6 |
| **3.4** Transit Access | SLLp1, SLLc3, NPDc8 |
| **3.5** Bicycle Network and Parking | SLLc4, NPDc5, NPDc15 |
| **3.6** Green Streets | NPDc14, GIBc9 |
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| **3.8** Walkable Sidewalks and Driveways | NPDp1, NPDc1, NPDc15 |
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| **4.2** Building Entries at Minimum Intervals | NPDc1 |
| **4.3** Ground-Floor Retail | NPDc1 |
| **4.4** Transparent and Interesting Façades | NPDc1 |
| **4.5** Elevated Finished Floors | NPDc1 |
| **4.6** Garage, Service Bay, and Parking Lot Location and Design | NPDp1 |

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|---|---|
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| **4.8** Mandatory Inclusionary Zoning | SLLc1, NPDc4 |
| **4.9** Zoning Incentives to Encourage Affordable Housing | SLLc1, NPDc4 |
| **Construction Waste Management Regulations** | |
| **4.10** Construction Waste Management | GIBc16 |
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| **4.11** Accessibility and Usability | NPDc11 |
| **4.12** Green Buildings | GIBp1, GIBc1 |
| **4.13** Green Roofs and High-Reflectance Roofs | GIBc9 |
| **4.14** Rainwater Collection | GIBc4 |
| **4.15** Graywater Systems | GIBc4, GIBc14 |
| **4.16** Water-Efficient Plumbing Fixtures | GIBp3, GIBc3, |
| **4.17** Energy-Efficient Buildings | GIBp2, GIBc2 |
| **4.18** Street Widths and Fire Safety | NPDp1, NPDc1 |
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| **Capital Improvement Plans** | |
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| **5.2** Transit Facilities | NPDc7 |
| **5.3** Infrastructure Improvements | SLLp1, SLLc3, SLLc4, NPDp1, NPDp3, NPDc1, NPDc5, NPDc6, NPDc8, NPDc9, NPDc10, NPDc14,NPDc15, GIBc4, GIBc8, GIBc9, GIBc13, GIBc15 |
| **5.4** Green Public Buildings | NPDp1, NPDc1, NPDc11, GIBp1, GIBp2, GIBp3, GIBc1, GIBc2, GIBc3, GIBc4, GIBc9, GIBc14 |
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| **5.6** Comprehensive Waste Management | GIBc16 |
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| | |
|---|---|
| **6.10** Technical Assistance | |
| **6.11** Educational Incentives | |
| **6.12** Marketing Incentives | |

**When using this manual, planners should keep in mind two important issues:**

- **State and local variations:** In general, this manual strives to outline a leadership standard for sustainable neighborhood community development nationally. Planners should understand, however, that although the manual's guidance is based on typical local authority and code structure, authority to implement the manual's strategies varies by state. Where states and municipalities adopt standards that reach beyond LEED-ND criteria, those practices may provide a more appropriate reference point.
- **Community appropriateness:** Planners should assess the manual's strategies carefully within the context of local conditions in their municipalities. Although the manual explains and gives implementation advice for each strategy, municipal staff and planners should implement only those strategies that are appropriate for their community.

# HOW TO USE THIS MANUAL

This manual can be used as a guide to facilitate sustainable neighborhood development generally, or to support or encourage LEED-ND projects within a jurisdiction. Depending on their goals, planners can use this manual in several ways.

## Audit & Amend Existing Plans & Codes

First, a municipality can use this manual as a tool to evaluate its existing plans, codes, and policies systematically against the LEED-ND criteria embodied in the manual's recommended strategies. This manual aids this auditing process because it breaks apart the standards contained within LEED-ND's prerequisites and credits and redistributes them into the structure of a typical local plan and code. With this step of the evaluation completed, planners simply need to compare the portion of this manual corresponding to their own plan or code section and determine whether that section allows for the strategies presented in the manual. This evaluation would highlight how well the municipality's land development plans, codes, and policies promote sustainable development, as well as any barriers that make it onerous, costly, or even impossible to undertake (see the Bellingham, Washington case study). Alternatively, a municipality can use this manual and the LEED-ND rating system to evaluate existing neighborhoods to inform future planning and zoning efforts (see the Syracuse, New York case study). Because the manual's organization will not mirror every local code exactly, planners and attorneys should compare the manual's table of contents to their entire municipal code to identify where they coincide prior to performing this evaluation.

### LAS VEGAS, NEVADA

The Las Vegas Planning and Development Department completed an audit of the city's zoning code using LEED-ND standards to identify ways the city could incorporate sustainable development into its zoning. The resulting internal report, entitled "Code Audit for barriers (or opportunities) for sustainability in accordance with the Planning Commission/City Council Workshop on Sustainability – Recommendation No. 8," identified code barriers to sustainability and proposed changes to the code. The recommended changes included adding a policy for adaptive reuse of historic buildings, requiring post-construction best management practices for site plans, allowing greater building heights for green buildings in certain commercial and industrial zones, allowing a more diverse range of building materials and alternative roofing methods, adding greater flexibility in solar panel regulations, and amending parking standards to encourage alternative transportation, reduce impervious surfaces, minimize parking, and require more landscaping.

## BABYLON, NEW YORK

Babylon created the Wyandanch Hamlet Plan, which calls for pedestrian orientation and mixed uses within the traditional downtown setting of the town's Wyandanch Hamlet area. To implement this plan, the town drafted a form-based code and then used LEED-ND to evaluate the draft code. As a result of the evaluation, planners adjusted standards for streets, building heights, and mixed-income and affordable housing. Planners also used LEED-ND to help translate sustainability goals from the Wyandanch Hamlet Plan into discrete standards within the code and incorporated LEED-ND prerequisite criteria into the code to ensure compliance with mandatory LEED-ND standards. Wyandanch Rising, a LEED-ND Certified Plan, has since begun construction in downtown Wyandanch.

## Case Study: Bellingham, Washington

Guided by a strong state growth management act, the city of Bellingham, Washington, encourages development of urban centers or villages through a process that involves neighborhood planning followed by adoption of an Urban Village zoning district. Bellingham's Comprehensive Plan directs future growth toward compact urban villages, maps potential urban villages, and requires the city to make necessary regulatory changes for these urban villages (see plan chapter 2, part 9, A-C). Further, the comprehensive plan requires the development of a master plan for each proposed urban village and lists potential elements that each master planning process should consider, including mixed uses, design standards to maintain neighborhood character and livability, proximity to transit, pedestrian and bicycle facilities, open/public space, parking requirements, density requirements, etc. Finally, the comprehensive plan requires the use of LEED-ND as a tool to measure the long-term sustainability of a proposed master plan for each urban center or village.

After a master plan is completed, the city establishes development regulations for the urban village in Chapter 20.37 of Bellingham's Land Use Development Code, rezoning the area as an Urban Village zoning district. When adopted for a particular land area, this designation regulates for mixed uses; appropriate densities; infrastructure requirements; and other zoning, design, and development standards established in the area's master plan. Since adopting its comprehensive plan, Bellingham has planned and designated zoning for two urban villages, including the Samish Way Urban Village.

At the Sehome Neighborhood Association's request, the city created a master plan for the Samish Way Urban Village in accordance with the Comprehensive Plan. After it was completed, an internal, multidisciplinary team of city staff and outside experts completed a LEED-ND analysis, using the rating system. Planning, public works, water, parks, and other city agency staff served on this team. The team scored the master plan against each prerequisite and credit in the pilot version of the LEED-ND rating system and used a geographic information system (GIS) to help score credits that required more detailed calculations. From this analysis, "it appears this urban village could achieve at least a LEED-ND Silver rating if constructed as envisioned" because it is an infill project served by existing infrastructure; has almost no environmentally sensitive areas; and includes plans for a compact street grid with better connectivity, frequent bus service, bike and pedestrian pathways, walkable streets, and mixed-uses, among other sustainability features. Following this analysis, city staff made some adjustments to the subarea plans to make them more sustainable. (continued)

### Case Study: Bellingham, Washington (continued)

After completing the planning process, the city adopted this master plan into the Sehome Neighborhood Plan, a part of the Comprehensive Plan (see Bellingham, WA, ordinance no. 2009-11-069). Concurrently with the planning process, the city developed implementing land regulations and adopted into the Land Use Development Code the "Samish Way Urban Village," which includes specific development standards from the subarea plan. The city completed a similar master planning process, LEED-ND evaluation, and Urban Village code designation for the city's Fountain District (see ordinance no. 2010-10-057).

## Establish a New Comprehensive Approach

The manual also can be used to establish a comprehensive approach to sustainable neighborhood development using the integrated set of techniques embodied in LEED-ND. Through this approach, a municipality can overhaul its land development plans, regulations, and policies completely and create entirely new land development plans and codes. Municipalities interested in this option should consider whether a form based code,[2] a unified development code[3] or a hybrid containing both types of standards are appropriate mechanisms for this process.

### CHEYENNE, WYOMING

Cheyenne used the LEED-ND rating system to help craft its new Unified Development Code (UDC), a comprehensive revision of the city's current subdivision regulations, zoning ordinance, and design guidelines. The LEED-ND rating system helped planners translate broad sustainability language from the comprehensive plan PlanCheyenne into the UDC. In an internal process, planning staff reviewed the LEED-ND rating system to identify technical criteria and concepts implementable in the UDC. After completing the first UDC draft, planning staff conducted an internal audit to identify sections of the new code that lacked strategies from the LEED-ND rating system and other best practice documents. Through this process, planning staff added criteria from LEED-ND prerequisites to the UDC and incorporated LEED-ND strategies into the UDC's standards for Mixed-Use Residential, Commercial Activity Centers, and Employment Districts, adding detailed specifications for lot frontage, setbacks, building heights, and lot coverage that promote walkable urban environments. In addition, the zoning classifications include Public Districts, a special purpose district with no minimum parking requirement (see UDC sections 5.4.4-5.4.6 & 5.6.1).

## Target Specific Areas

If a comprehensive approach is unworkable, a municipality instead may decide to identify neighborhoods within its community that are appropriate for sustainable development (see Strategy 1.1 Land Use below for guidance on how to identify such areas using LEED-ND) and apply strategies solely to those target areas through a special area plan, new zoning district, or some other mechanism, such as flexible zoning.

Special area plans (also referred to as small area plans, sector plans, master plans, or specific plans) can address conditions unique to targeted areas and present sustainable neighborhood development planning strategies suited to these conditions (see the Boston, Massachusetts case study).

2 For a definition of and more information about form based codes, *see* Form Based Codes Institute, What Are Form-Based Codes?; and *see* H. William Freeman, *A New Legal Landscape for Planning and Zoning: Using Form-Based Codes to Promote New Urbanism and Sustainability,* 36 Michigan Real Property Review 117 (2009).

3 For a definition of and more information about unified development codes, *see* American Planning Association, Growing Smart Legislative Guidebook: Model Statutes for Planning and the Management of Change, Commentary: Uniform Development Standards.

## CHAMPAIGN, ILLINOIS

In 2007, Champaign adopted the Curtis Road Interchange Master Plan, a special area plan that calls for mixed uses, a walkable environment, and other sustainable development features. To implement the master plan, Champaign created and applied three new zoning districts: the Urban Neighborhood-Residential, Urban Neighborhood–Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C). See City of Champaign, IL, code sections 37-146 to -148 & -329 to -329.3. City planners used the LEED-ND pilot rating system to help implement master plan goals within these three districts. Design requirements for these districts create on-the-ground implementation of LEED-ND principles and criteria. For example, developments must include , hidden garage entrances, bicycle facilities for certain office and nonresidential commercial buildings, minimum street connectivity, a transit hub and transit amenities, street trees, streets oriented to maximize solar access, building entries abutting streets or pedestrian walkways, minimum transparency for façades, and minimum energy efficiency for buildings.

## BOSTON, MASSACHUSETTS

Boston used the LEED-ND rating system to guide the recommendations and implementation actions in the Columbia Point Master Plan, a special area plan for its Columbia Point neighborhood. During this planning process, city planners reviewed the LEED-ND prerequisites and credits and developed master plan requirements in alignment with LEED-ND criteria. The plan integrates LEED-ND into its planning language, and the plan's strategies emulate the LEED-ND rating system. The plan document uses a green leaf icon to highlight which specific master plan elements support LEED-ND criteria.

Aerial view of existing conditions at Columbia Point.
Source: Boston Redevelopment Authority

With flexible zoning techniques such as overlay zones,[4] floating zones,[5] or planned unit development (PUD) zones[6] municipalities can implement the manual's individual strategies without complete overhauls or piecemeal amendments to existing plans and regulations (see the Cleveland, Ohio case study and Austin, Texas case study). Such flexible zoning techniques

4 For a definition of and more information about overlay zones, *see* John Nolon, Well Grounded: Using Local Land Use Authority to Achieve Smart Growth, 209-213 (2001).

5 For a definition of and more information about floating zones, *see* LULC and USGBC, Neighborhood Development Floating Zone: A Model Ordinance to Foster Green Community Development (2012).

6 For a definition of and more information about PUDs, *see* Julian Conrad Juergensmeyer and Thomas E. Roberts, Land Use Planning and Development Regulation Law §§ 7.17 – 7.22 (2d ed.); and *see* American Planning Association, Growing Smart Legislative Guidebook: Model Statutes for Planning and the Management of Change, Commentary: Planned Unit Development.

incentivize sustainable development because they can provide predictability, reduce the cost of sustainable development for developers, and avoid the need for precedent-setting variances. For an example of a model overlay zone that directly incorporates LEED-ND standards, see Criterion Planners' LEED-ND Planners Guide and Model Ordinance. For more information about floating zones generally and how to implement LEED-ND criteria using a floating zone, see the Neighborhood Development Floating Zone: A Model Ordinance to Foster Green Community Development.

### AUSTIN, TEXAS

Austin approved a PUD zoning district for the Mueller Community project that is located on a former airport site near downtown. The city used the PUD process because the underlying zoning would not accommodate the development as proposed in the project's master plan. This PUD district eliminated floor area ratios, added a minimum lot width and length, added a maximum impervious cover requirement, and included building height and setback requirements that reflect the dense urban nature of the project. The Mueller Community is a LEED-ND Certified Plan at the silver level under the pilot version of the rating system.

### WASHINGTON, D.C.

Washington, D.C., approved a PUD zone for Chancellor's Row, a LEED-ND development project. After negotiations with the project's developer, the city's Zoning Commission updated the PUD's required amenities to include LEED-ND compliance but did not require certification (see Washington, DC, Case 07-27A). As a result of the flexibility this approach provides, several other D.C. projects have sought LEED-ND voluntarily through the PUD process, such as the mixed-use development The Yards, and Solea Condominiums.

# GETTING STARTED

When embarking upon an initiative to foster sustainable community development using this manual, municipalities should take care to shape an implementation process that focuses the effort, considers all options and contingencies, and includes all interested parties.

## Establish a Policy

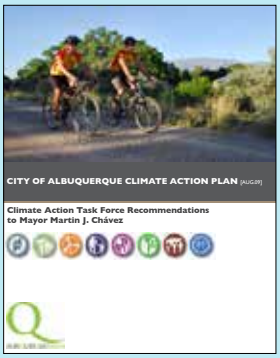
Municipalities should begin by framing the general goals and overarching structure of their process for considering this manual's strategies. This can be done in a number of ways ranging from an executive order or council resolution, to something as specific as a sustainability or climate action plan. Similarly, a municipality can establish such policy through its comprehensive plan by describing emerging issues worthy of further consideration, such as sustainable neighborhood development and LEED-ND, to investigate as specific needs arise (see the Branford, Connecticut, best practice below). Establishing a policy will display a commitment to sustainable development, help the community make decisions and focus on specific goals, build a legal foundation for the regulations that will implement the policy, and lay the groundwork for using the LEED-ND rating system to guide future development.

### CINCINNATI, OHIO

Cincinnati created a Climate Protection Action Plan which recommends an incentive program that would make funding for Cincinnati's neighborhood community councils contingent upon a council completing a baseline evaluation of its neighborhood using the LEED-ND rating system. The plan further recommends that, after a neighborhood completes this baseline evaluation, the city should adopt a Neighborhood Quality Review Overlay zone that requires a building permit applicant to present to the community council a project's effect on the neighborhood's baseline level and secure council approval. In addition, the plan recommends allowing variances from any underlying regulations for buildings within the zone, as well as relaxing parking requirements.

### ALBUQUERQUE, NEW MEXICO

In August 2009, Albuquerque's Climate Action Task Force provided the mayor with a proposed Climate Action Plan. The draft plan examines the gap between the city's desired growth and the type of development presently happening as a result of existing regulations and policies. It recommends an 80 percent reduction in greenhouse gas emissions by 2050. To achieve this goal, the plan recommends amending ordinances, sector plans, and master plans using LEED-ND. It also suggests incentives for achieving LEED-ND certification or for incorporating a range of sustainability strategies found in the rating system, including increased density and well-developed transit corridors.




### BRANFORD, CONNECTICUT

Branford's 2008 comprehensive plan includes creating sustainable neighborhoods as the "Emerging Issue" within its Housing component. The Branford plan notes the growing interest in green buildings and communities and introduces the LEED-ND rating system as an example of existing sustainable development standards. Further, the plan suggests consideration of regulatory or tax incentives for projects that integrate green concepts into a development project and lists actions to create green neighborhoods. These actions include monitoring LEED-ND and the evolution of standards for green developments and neighborhoods, as well as considering creating incentives for housing that is developed under this rating system.

## Form a Task Force

Task forces, committees, or similar groups can guide the process by exploring possible sustainability initiatives, including the feasibility of the manual's strategies, gathering pertinent information, and making recommendations to the mayor and local legislative body. Such teams help to guide efforts, increase buy-in, provide varying insights, serve as a sounding board, and act as a champion of the initiative throughout the process. Depending upon how the group is constituted and its assignment, it also can implement tasks that might otherwise fall on the shoulders of an overworked municipal planner. For example, the group

may evaluate existing regulations, plans, and policies using the LEED-ND rating system, as embodied in the manual's strategies, to identify and eliminate barriers to sustainable neighborhood development. Alternatively, it may use LEED-ND and the manual's strategies to evaluate a new sustainability initiative, such as a recent planning effort or new zoning code, upon its completion.

### CLEVELAND, OHIO

Cleveland created its Green Team to remedy existing barriers to LEED-ND projects within its codes and policies. The Mayor's executive staff assembled the team from LEED-ND project managers and municipal infrastructure staff, as well as staff from the Cleveland City Planning Commission, Division of Engineering, Department of Building and Housing, Public Works Department, Department of Law, and local utilities. The team met monthly and held topical workshops to identify and reconcile roadblocks. In addition, the team educated city officials from different departments and facilitated communication between project teams and city agencies.

### WASHINGTON, D.C.

The Washington, D.C., Office of Planning established a Zoning Review Taskforce to help guide its three-year comprehensive zoning code revision process, which began in 2009. With representatives from each Council Ward, the Zoning Commission, the Board of Zoning Adjustment, the National Capital Planning Commission, and building and land use organizations, the taskforce convened monthly to consider ways to increase sustainability within the district's neighborhoods. The taskforce studied a sustainability diagnosis of the city's zoning ordinance prepared by outside experts, as well as the Sustainability Recommendations for Zoning Review Taskforce created by the Office of Planning and a public working group. Following this, the taskforce sent its recommendations, entitled Proposed Amendments to Zoning Regulations – Sustainability, to the Zoning Commission, which drafted new zoning based on these recommendations to submit to the Planning Commission. One recommendation suggested that the city "require new development of large tracts of undeveloped land to meet environmental standards equivalent to the LEED-ND program." Additionally, the zoning review process proposed zoning text amendments that promote aspects of LEED-ND as benefits and amenities for PUDs.

### CRANSTON, RHODE ISLAND

Cranston established its Green Building Commission by resolution in May 2010. The city council established the commission to study "green initiatives" and develop recommendations that the council could enact by ordinance to enhance sustainability within the city. In November 2010, the commission submitted its Report of the Cranston Green Building Commission to the city council, which included recommendations regarding energy projects, green buildings, the urban tree canopy, greening operations, and innovative revenue bonding mechanisms for funding public and private energy projects in the city. The report recommends that Cranston use the LEED-ND rating system as a guide for project implementation and land development in the city's new zoning ordinance and subdivision regulations.

## Engage Citizens

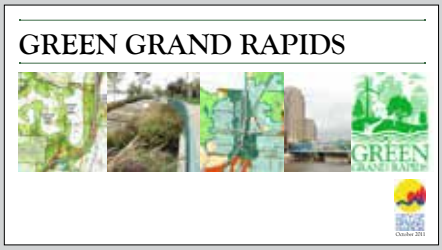
Finally, municipalities should engage citizens early in the process to build support for sustainable neighborhood development initiatives that use LEED-ND in accordance with the manual's strategies (see the Grand Rapids, Michigan case study).

### Case Study: Grand Rapids, Michigan

Grand Rapids is a leader in the Midwest for promoting regional sustainability and LEED certification programs. The city took three major steps to promote a sustainable Grand Rapids: Plan Grand Rapids, Zone Grand Rapids, and Green Grand Rapids.

In 2002, Grand Rapids adopted a new master plan, Plan Grand Rapids, which included principles of sustainable development. The plan aimed to "produce a city with livable, viable neighborhoods, vibrant business districts, and a transportation system to serve both while protecting the city and region's valued natural resources." The Grand Rapids Planning Department undertook a citizen engagement process that included initial visioning, neighborhood and business outreach meetings, a concept plan and workbook, an alternatives feasibility analysis and development of design guidelines, and review and re-visioning of a draft master plan. This process lasted from 2000 to 2002 and consisted of 250 meetings involving 3,000 citizens.

In 2007, the Green Grand Rapids initiative was formed to update Plan Grand Rapids. The group used a citizen engagement process similar to the process used in 2002. Green Grand Rapids represented the third step to address city-wide topics raised by citizens, including parks and recreation, connections, natural systems, the Grand River, and local food. The City Commission adopted the Green Grand Rapids plan as an amendment to the 2002 Grand Rapids Master Plan in October 2011.




Grand Rapids implemented the plan through its new zoning ordinance, passed in 2007. Among other concepts and standards, the city used the draft LEED-ND criteria and smart growth principles as a basis for its new zoning. The zoning code requires criteria from LEED-ND, such as compact development and transportation efficiency. Other zoning code requirements include minimizing site disturbance during construction and management of stormwater runoff rates and treatment. Together, the plan and zoning code eliminate barriers to LEED-ND requirements and establish a framework that allows development projects to achieve certification.

Using the implementation process described above in concert with the recommendations of this manual, local governments successfully can evaluate and amend their existing plans, codes, and policies using the LEED-ND rating system.

# I. INTEGRATING LEED FOR NEIGHBORHOOD DEVELOPMENT INTO LOCAL PLANS

Local governments can facilitate sustainable neighborhood development by incorporating LEED-ND intent language and criteria[7] into planning goals and actions contained in comprehensive plans or special area plans (also known as small area plans, master plans, or specific plans). In most states, local land development regulations must conform to the local comprehensive or master plan. Where this is the case, municipalities should amend their plans using the comprehensive plan strategies listed below before amending their land development regulations as recommended in the manual (see II. Incorporating LEED-ND into Traditional Zoning Code Elements, III. Incorporating LEED-ND into Site Plan and Subdivision Regulations, and IV. Incorporating LEED-ND into Supplemental Development Standards). If a municipality is not prepared to regulate immediately but wants to lay the policy foundation for future sustainable neighborhood development initiatives, it should implement these strategies as well.

The comprehensive plan strategies listed below show how to integrate LEED-ND principles into typical comprehensive plan elements, which include land use, public facilities, transportation and circulation, housing, civic services, natural and historic resources, and economic development. Each comprehensive plan strategy lists related LEED-ND prerequisites and credits, presents planning goals developed using intent language from those LEED-ND prerequisites and credits, and describes planning actions[8] that derive from the specific LEED-ND criteria in those prerequisites and credits (see following comprehensive plan strategy example).

## COMPREHENSIVE PLAN ELEMENTS

Although this section of the manual uses typical comprehensive plan elements to organize LEED-ND planning goals and actions into strategies, a local government can choose to arrange these goals and actions in many different ways within its comprehensive plan or special area plans based on its unique planning objectives. This section is organized by LEED-ND planning goals. The goals are accompanied by planning actions to consider derived from specific LEED-ND criteria and the related LEED-ND prerequisites or credits.

GOAL(S): Planning goal(s) created using LEED-ND intent language

Action(s): Planning action(s) derived from specific LEED-ND criteria

Related LEED-ND Prerequisite or Credit

Many of the recommended planning goals and actions overlap with general planning goals, such as smart growth, active communities, and complete streets goals. Prior to implementing the comprehensive plan strategies, municipalities should review the manual in its entirety and identify the sustainable neighborhood development techniques most relevant to local conditions. To lay a policy foundation for regulatory amendments that implement these techniques and to support LEED-ND projects, municipalities should incorporate corresponding planning principles into appropriate comprehensive plan elements and special area plans using the following comprehensive plan strategies.

### Comprehensive Plan Strategies:

- Land Use Element: encourage sustainable land use
- Public Facilities Element: apply green development principles to new and existing public facilities
- Transportation and Circulation Element: provide sustainable transportation and circulation infrastructure
- Housing Element: create sustainable housing
- Civic Services Element: provide improved access to civic, waste disposal, and recreational services
- Natural and Historic Resources Element: protect natural and historic resources
- Economic Development Element: support green economic development initiatives

7 Each LEED-ND prerequisite and credit has a general statement of intent followed by specific performance thresholds or prescriptive measures.

8 The term "planning actions" refers to a combination of the strategies and implementation measures typically found in a comprehensive plan.

# 1.1 LAND USE

Amend the land use element of your comprehensive plan using the following goals and planning actions to:

- Ensure appropriate locations for redevelopment and new development, (which this manual refers to collectively as *development projects*),
- Promote diverse land uses,
- Encourage compact development,
- Promote building at a pedestrian friendly scale,
- Construct building frontage that encourages walking,
- Maximize solar access,
- Encourage on-site renewable energy sources, and
- Support district heating and cooling systems.

## Sustainable Location & Linkage

To site future development in sustainable locations, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.[9]

**GOALS: Encourage redevelopment of existing communities with infrastructure, reduce vehicle trips, increase walking and bicycling, reduce adverse environmental and public health effects, and conserve natural and financial resources.**

**Actions:**

- Locate future development within sites served by existing water and wastewater infrastructure or within a legally adopted, publicly owned, planned water and wastewater service area.
- Locate future development on:
  - Infill sites bordered almost entirely by previously developed sites altered through paving, construction, or land use that requires regulatory permitting,
  - Previously developed sites,
  - Sites adjacent to existing street connectivity,
  - Sites near transit with high transit service, and
  - Sites near many existing neighborhood uses (see LEED-ND Diverse Use Appendix).
- Prioritize public infrastructure repairs, improvements and enhancements in existing neighborhoods with additional development capacity.
- Incentivize private infill development.

**Related LEED-ND Prerequisite and Credit:**

- *SLL Prerequisite 1, Smart Location*
- *SLL Credit 1, Preferred Locations*

**GOAL: Protect important natural resources from development.**

**Actions:**

- Locate future development away from:
  - Habitat for imperiled species and ecological communities,
  - Wetlands and water bodies,
  - Important agricultural soils, and
  - Floodplains.

9 For more information about identifying sustainable locations and lands eligible for LEED-ND, *see* Eliot Allen, AICP, Criterion Planners, Locating LEED-ND Eligible Lands, A Guide for City and County Planners.

**Related LEED-ND Prerequisites:**

- *SLL Prerequisite 2, Imperiled Species and Ecological Communities Conservation*
- *SLL Prerequisite 3, Wetland and Water Body Conservation*
- *SLL Prerequisite 4, Agricultural Land Conservation*
- *SLL Prerequisite 5, Floodplain Avoidance*

## Diverse Land Uses

To encourage mixed land uses, access to jobs, a range of housing types, and produce garden growing space, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Create an appealing street environment to promote walking.**

**Action:**

- Allow ground-floor retail, live-work spaces, and ground-floor dwelling units along street façades.

**Related LEED-ND Credit:**

- *NPD Credit 1, Walkable Streets, optional item (l)*

**GOAL: Group land uses in accessible neighborhoods and regional centers to reduce vehicle miles traveled and encourage walking, biking, and transit use.**

**Action:**

- Allow a variety of uses such as food retail, community-serving retail, services, and civic/community facilities within a walking distance of nearby residences.

**Related LEED-ND Credit:**

- *NPD Credit 3, Mixed-Use Neighborhood Centers*

**GOAL: Encourage balanced communities with a diversity of uses and employment opportunities.**

**Actions:**

- Locate residential development and affordable housing within a walk distance of existing jobs.
- Locate employment opportunities within a walk distance of nearby transit and residences.
- Allow or expand home occupations to include appropriate professional offices, community-serving retail, and services.

**Related LEED-ND Credit:**

- *SLL Credit 5, Housing & Jobs Proximity*

Aerials of Boise and San Francisco showing a range of housing types
Source: © 2009 Alex S. MacLean/Landslides

**GOAL: Promote equitable communities with residents from a wide range of economic levels, household sizes, and age groups.**

**Action:**

- Allow a range of housing types in zoning, such as multifamily housing, live-work spaces, accessory dwelling units, clustered housing with party walls.

**Related LEED-ND Credit:**

- *NPD Credit 4, Mixed-income Diverse Communities*

**GOALS: Promote community-based food production, improve nutrition through access to fresh produce, and reduce negative environmental effects of large-scale industrialized agriculture.**

**Actions:**

- Allow produce garden growing space, greenhouses, and related facilities as accessory uses.
- Establish covenants, conditions, and restrictions, or other deed restrictions, that do not prohibit produce garden growing space and greenhouses in residential yards, balconies, patios, or rooftops.
- Support community gardens through a municipal program.

**Related LEED-ND Credit:**

- *NPD Credit 13, Local Food Production*

## Compact Land Uses

To promote compact development, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Conserve land, support transit, promote walkability and transit efficiency, and improve public health by encouraging daily physical activity.**

**Actions:**

- Allow greater residential and nonresidential densities around transit and in other specific areas where your community wishes to create a service rich, walkable environment.
- Reduce minimum lot sizes in appropriate residential zones.
- Allow taller minimum or maximum building heights in appropriate zones.
- Employ bonus zoning or density incentives to allow greater development densities in exchange for sustainable neighborhood development amenities.

**Related LEED-ND Prerequisite and Credit:**

- *NPD Prerequisite 2 and Credit 2, Compact Development*

## Building at a Pedestrian Scale

To create a pedestrian friendly street wall, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Promote walking by providing a safe and comfortable street environment.**

**Actions:**

- Allow buildings heights that enhance the pedestrian realm.
- Eliminate or reduce building setbacks to create a sense of enclosure for pedestrians.

**Related LEED-ND Prerequisite and Credit:**

- *NPD Prerequisite 1, Walkable Streets, item (b)*
- *NPD Credit 1, Walkable Streets, optional items (a), (b), (c), & (m)*


Pedestrian realm in downtown Asheville, NC
Source: Sophie Lambert

## Building Design Standards

To create a safe and interesting pedestrian environment along streets, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Promote walking by providing a safe and appealing street environment for pedestrians.**

**Actions:**

- Place principal functional building entries on front façades that face a public space, such as a street, park or plaza.
- Place building entries at frequent intervals along streets and sidewalks.
- Include ground-floor retail in nonresidential and mixed-use projects.
- Install clear glass façades for ground-level retail, service, or trade uses.
- Limit blank walls along building façades.
- Keep ground-level retail, service, and trade windows visible and unshuttered at night.
- Establish covenants, conditions, and restrictions, or other deed restrictions, to ensure the maintenance of visible/unshuttered windows along ground-level retail, service or trade uses in perpetuity.
- Build elevated finished floors for ground-floor residential units.

**Related LEED-ND Prerequisite and Credit:**

- *NPD Prerequisite 1, Walkable Streets, item (a)*
- *NPD Credit 1, Walkable Streets, optional items (d), (e), (f), (g), (h), (l), (k)*

## Renewable Energy & District Heating and Cooling

To promote renewable energy and energy efficient development, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans. A municipality could adopt these planning goals and actions as a separate element in their comprehensive plan.

**GOAL: Encourage energy efficiency through passive and active solar strategies.**

**Action:**

- Orient blocks and buildings to maximize solar access.

**Related LEED-ND Credit:**

- *GIB Credit 10, Solar Orientation*

**GOAL: Encourage on-site renewable energy production and reduce adverse environmental and economic impacts associated with fossil fuels.**

**Action:**

- Allow on-site renewable energy generation systems, such as solar, wind, geothermal, hydroelectric, or biomass in zoning regulations.

**Related LEED-ND Credit:**

- *GIB Credit 11, On-Site Renewable Energy Sources*

**GOAL: Encourage energy-efficient neighborhoods.**

**Actions:**

- Allow district heating and cooling (DHC) systems as accessory uses or as specially permitted uses in appropriate zoning districts.
- Encourage DHC through bonus zoning provisions.

**Related LEED-ND Credit:**

- *GIB Credit 12, District Heating & Cooling*

City of Vancouver Neighborhood Energy Utility serving Southeast False Creek neighborhood
Source: Christopher Porter

## Case Study: Boston, Massachusetts

Although located within two miles of downtown Boston and near transit, the Columbia Point peninsula, home to several cultural and educational institutions and over 3,000 residents in the Harbor Point community, is cut off from adjacent neighborhoods and lacks internal connectivity and walkable streets. In response to a proposal for a ten acre development within Columbia Point, the Boston Redevelopment Authority (BRA), the city's planning and economic development agency, initiated a master planning process for Columbia Point to guide this and other development.

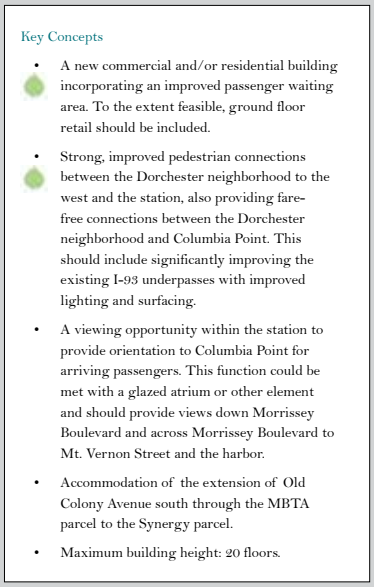
The planning process began with the formation of a Task Force to advise the BRA. Mayor Thomas M. Menino selected the 17 Task Force members based on community nominations. The Task Force held almost 20 regular working sessions open to the general public and sponsored four community-wide meetings to engage the public in the master planning process. Other agencies, such as Boston's Transportation Department, Parks & Recreation Department, Public Works Department, and the Massachusetts Bay Transportation Authority, participated in the planning process, to which all stakeholders contributed. After this extensive process, the BRA released a draft master plan in July 2009, for which both the Task Force and community members provided feedback. After these comments were incorporated, the BRA Board of Directors approved the final Columbia Point Master Plan on June 16, 2011.

The Columbia Point Master Plan aims to better connect Columbia Point with the city and create a vibrant pedestrian realm. To accomplish this, sustainability became a central theme of the master plan, which features "orientation around transit, a new network of walkable streets, the focus on compact, mixed-use neighborhoods, and an emphasis on non-automobile transportation." BRA staff


consulted LEED-ND during the drafting process and matched master plan recommendations to requirements within the LEED-ND rating system (pilot version). In addition, BRA staff assessed the master plan's level of sustainability by evaluating it using the pilot version of the rating system. Based on these analyses, it appears that multiple building developments that meet the master plan's recommendations can reasonably achieve LEED-ND Gold by earning 63 out of 110 points. The master plan uses a leaf symbol to identify planning policies and implementation actions that support LEED-ND criteria. For example, the Land Use and Urban Design chapter presents recommendation principles to provide a mix of residential and commercial uses and "develop a familiar street and block pattern, with attractive streetscapes, active street frontages and buildings that reinforce the scale of the streets and blocks." Additionally, the master plan includes objectives to integrate roof gardens and increase local food sourcing, as well as implementation actions to designate sites for farmers' markets and community gardens and allow patio and balcony and roof vegetable gardens as of right. The master plan further aims to reduce dependency on the electrical transmission grid by using on-site renewable energy generation in new development and creating district heating and cooling facilities with cogeneration. Implementation actions to support these objectives include requiring projects larger than one million square feet to study the feasibility of including a centralized, cogeneration district heating and cooling plant and using on-site, renewable energy generation technologies to generate at least five percent of the annual energy consumption. (continued)

## Case Study: Boston, Massachusetts (Continued)

According to the master plan, projects within Columbia Point must be LEED-ND certified at the silver level at minimum with gold as a goal. Under Boston Zoning Article 37, Boston's Green Building Law, the city requires that all buildings over 50,000 square feet be LEED certifiable to the most appropriate LEED building rating system and that all multi-building projects be LEED-ND certifiable. Under project-specific master plan and planned development area permits and related agreements, the city is able to pursue higher project specific LEED-ND and green building outcomes.



Key Concepts

- A new commercial and/or residential building incorporating an improved passenger waiting area. To the extent feasible, ground floor retail should be included.
- Strong, improved pedestrian connections between the Dorchester neighborhood to the west and the station, also providing fare-free connections between the Dorchester neighborhood and Columbia Point. This should include significantly improving the existing I-93 underpasses with improved lighting and surfacing.
- A viewing opportunity within the station to provide orientation to Columbia Point for arriving passengers. This function could be met with a glazed atrium or other element and should provide views down Morrissey Boulevard and across Morrissey Boulevard to Mt. Vernon Street and the harbor.
- Accommodation of the extension of Old Colony Avenue south through the MBTA parcel to the Synergy parcel.
- Maximum building height: 20 floors.

# 1.2 PUBLIC FACILITIES

Amend the public facilities element of your comprehensive plan using the following goals and planning actions to:

- Provide green retrofitted, renovated and new public utilities,
- Build green municipal buildings, and
- Prioritize brownfield development for municipal facilities.

## Green Utilities

To retrofit, renovate, and construct utilities using sustainable infrastructure, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Reduce adverse environmental impacts from energy used to operate public infrastructure.**

**Action:**

- Install energy-efficient utility equipment, such as water and wastewater pumps.

**Related LEED-ND Credit:**

- *GIB Credit 13, Infrastructure Energy Efficiency*

**GOAL: Reduce environmental impacts associated with extracting and processing virgin materials.**

**Action:**

- Use recycled content or reclaimed materials in utility infrastructure.

**Related LEED-ND Credit:**

- *GIB Credit 15, Recycled Content in Infrastructure*

**GOAL: Limit or eliminate the use of potable water and other natural water resources.**

**Action:**

- Install technologies in sewage utilities to treat and convey water for nonpotable uses.

**Related LEED-ND Credit:**

- *GIB Credit 4, Water-Efficient Landscaping*

## Green Municipal Buildings

To retrofit or construct green municipal buildings, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Encourage the design, construction, and retrofitting of buildings that utilize green building practices.**

**Action:**

- Require that buildings be constructed in accordance with green building code provisions as described in *Strategy 4.12 Green Buildings below.*

**Related LEED-ND Prerequisite and Credit:**

- *GIB Prerequisite 1, Certified Green Building*
- *GIB Credit 1, Certified Green Buildings*

**GOAL: Reduce heat islands to minimize effects on the microclimate and habitat.**

**Action:**

- Construct roofs using high-reflectance roofing materials and vegetation.

**Related LEED-ND Credit:**

- *GIB Credit 9, Heat Island Reduction*

**GOALS: Limit or eliminate potable and natural water use, reduce pollution from wastewater, and encourage water reuse.**

**Actions:**

- Include rainwater collection systems on buildings to collect water for landscape irrigation.
- Incorporate graywater systems into buildings that retain and recycle wastewater on-site for uses that do not require potable water.

**Related LEED-ND Credits:**

- *GIB Credit 4, Water-Efficient Landscaping*
- *GIB Credit 14, Wastewater Management*

**GOALS: Reduce effects on natural water resources and reduce burdens on community water supply and wastewater systems.**

**Action:**

- Install plumbing fixtures and fixture fittings in buildings that meet water efficiency standards.

**Related LEED-ND Prerequisite and Credit:**

- *GIB Prerequisite 3, Minimum Building Water Efficiency*
- *GIB Credit 3, Building Water Efficiency*

**GOAL: Reduce air, water, and land pollution and adverse environmental effects associated with building energy consumption.**

Action:

- Construct buildings that meet energy efficiency standards.

**Related LEED-ND Prerequisite and Credit:**

- *GIB Prerequisite 2, Minimum Building Energy Efficiency*
- *GIB Credit 2, Building Energy Efficiency*

**GOAL: Extend the life cycle of existing building stock to conserve resources, reduce waste, and reduce adverse environmental effects associated with new buildings.**

Action:

- Consider reusing existing habitable building stock before new construction.

**Related LEED-ND Credit:**

- *GIB Credit 5, Existing Building Reuse*


Reuse of an existing building at The Brewery, Milwaukee, WI
Source: Meghan Bogaerts

## Brownfields Redevelopment

To promote brownfield cleanup and redevelopment, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

Brownfield site in Winston-Salem, NC
Source: Sophie Lambert

**GOAL: Encourage the reuse of environmentally contaminated land to reduce pressure on undeveloped land.**

**Actions:**

- Remediate and reuse brownfield sites.
- Prioritize brownfield remediation when siting new public facilities.
- Locate new public facilities in high priority redevelopment areas, such as areas on the EPA's National Priorities List and within the Federal Empowerment Zone.

**Related LEED-ND Credit:**

- *SLL Credit 2, Brownfields Redevelopment*

# 1.3 TRANSPORTATION AND CIRCULATION

Amend the transportation and circulation element of your comprehensive plan using the following goals and planning actions to:

- Use sustainable pavement technologies,
- Install energy-efficient traffic and street lights,
- Improve street connectivity,
- Enhance transit facilities and access,
- Provide a bicycle network and parking,
- Create green streets,
- Establish pedestrian friendly streets,
- Reduce off-street parking, and
- Implement transportation demand management.

## Sustainable Pavement

To encourage sustainable pavement technologies, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Reduce heat islands to minimize effects on microclimates and human and wildlife habitat.**

**Action:**

- Install high-reflectance pavement and pervious open-grid pavement systems in developments.

**Related LEED-ND Credit:**

- *GIB Credit 9, Heat Island Reduction*

**GOAL: Reduce the adverse environmental effects of extracting and processing virgin materials.**

**Action:**

- Use recycled content to build roadways, parking lots, sidewalks, unit paving, and curbs, among other road infrastructure.

**Related LEED-ND Credit:**

- *GIB Credit 15, Recycled Content in Infrastructure*

## Energy-Efficient Lights

To promote energy-efficient transportation infrastructure, incorporate the following goal and planning action into your municipality's comprehensive plan and special area plans.

**GOAL: Reduce adverse environmental effects from energy used to operate public infrastructure.**

**Action:**

- Install energy-efficient traffic and street lights.

**Related LEED-ND Credit:**

- *GIB Credit 13, Infrastructure Energy Efficiency*

## Street Connectivity

To enhance street connectivity, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Increase street and sidewalk connectivity to better connect the community at large, increase transportation efficiency, and improve public health by encouraging daily physical activity.**

**Actions:**

- Create street networks that form a grid of continuous and interconnected streets, alleys, and pedestrian and bicycle paths.
- Ensure street networks have enough through intersections and short enough block lengths to accommodate pedestrians and bicycles.
- Limit dead end and gated streets.

**Related LEED-ND Prerequisite and Credit:**

- *NPD Prerequisite 3, Connected and Open Community*
- *NPD Credit 6, Street Network*

## Transit Facilities and Access

To improve transit facilities and access, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Encourage transit use and reduce driving.**

**Actions:**

- Identify and create new transit stops.
- Provide safe, convenient, and comfortable waiting shelters at current and future transit stops.
- Provide bicycle storage at current and future transit stops.
- Create information kiosks or signs for current and future transit stops.

**Related LEED-ND Credit:**

- *NPD Credit 7, Transit Facilities*

**GOALS: Encourage development near public transit, reduce vehicle miles traveled, and reduce adverse environmental and public health effects associated with motor vehicle use.**

**Actions:**

- Locate residential dwelling units and nonresidential building entrances within a walk distance of transit stops.
- Provide sufficient weekday and weekend trips at these transit stops for these users.

**Related LEED-ND Prerequisite and Credit:**

- *SLL Prerequisite 1, Smart Location*
- *SLL Credit 3, Reduced Auto Dependence*

## Bicycle Network & Parking

To encourage bicycling within your community, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.


Off-street bicycle parking, Washington, DC
Source: U.S. Green Building Council

**GOALS: Promote bicycling, reduce vehicle miles traveled, and support public health by encouraging physical activity.**

Actions:

- Create bicycle networks of on-street lanes, as well as off-street paths and trails that connect to one another.
- Provide off-street bicycle parking and shower/changing facilities.
- Go beyond SLLc4 and NPDc5 criteria and provide on-street bicycle parking.

Related LEED-ND Credits:

- *SLL Credit 4, Bicycle Network & Storage*
- *NPD Credit 5, Reduced Parking Footprint*

## Green Streets

To create green streets, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Encourage walking, bicycling, and transit use; slow traffic; reduce the heat island effect; improve air quality; increase evapotranspiration; and reduce building cooling loads.**

Actions:

- Plant street trees along both sides of streets at frequent intervals.
- Shade non-roof hardscape using trees, canopies, solar photovoltaic panels, vine pergolas, awnings, trellises, or other open structures.

**Related LEED-ND Credits:**

- *NPD Credit 14, Tree-Lined & Shaded Street*
- *GIB Credit 9, Heat Island Reduction*

## Walkable Streets

To establish pedestrian friendly streets, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Create safe, appealing, and comfortable street environments for walking, reduce vehicle miles traveled, support public health.**

Actions:

- Construct streets with narrower widths that enhance the pedestrian realm.
- Create continuous, wide sidewalks or equivalent all-weather walking provisions that lead to all important destinations along both sides of streets.
- Prohibit or discourage garage and service bay areas between primary structures and major streets.
- Prevent driveway access points along major streets where possible and restrict at-grade driveway crossings with sidewalks.
- Provide sufficient on-street parking.
- Design motor vehicle speeds for safe pedestrian and bicycle travel by lowering speed limits and implementing other traffic control and calming measures.

**Related LEED-ND Prerequisite and Credit:**

- *NPD Prerequisite 1, Walkable Streets, items (b), (c), (d)*
- *NPD Credit 1, Walkable Streets, optional items (i), (j), (m), (n), (o), (p)*

## Reduced Off-Street Parking

To reduce off-street parking, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Increase pedestrian orientation of developments, minimize adverse environmental effects of parking facilities, and encourage walking/biking.**

Actions:

- Eliminate or reduce required amount of off-street parking spaces.
- Locate off-street parking at side or rear of buildings.
- Require, allow, or encourage shared off-street parking spaces among adjacent land uses in zoning.
- Require, incentivize, or encourage below-grade or structured off-street parking that is screened from public view.

**Related LEED-ND Credit:**

- *NPD Credit 5, Reduced Parking Footprint*

## Transportation Demand Management

To encourage more efficient use of transportation infrastructure, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Reduce energy consumption, vehicle pollution, and adverse public health effects by encouraging multimodal travel.**

Actions:

- Create and implement a comprehensive municipal transportation demand management program and encourage developments to do the same.
- Provide and publicize subsidized transit passes.
- Require developer-sponsored private transit service for developments.
- Require the dedication of some off-street parking as shared-use vehicle parking spaces.
- Reduce off-street parking requirements to facilitate unbundling of parking spaces from dwelling units.

**Related LEED-ND Credits:**

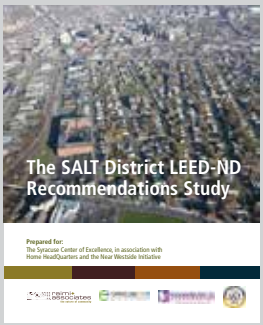
- NPD Credit 5, *Reduced Parking Footprint*
- NPD Credit 8, *Transportation Demand Management*

### NASHVILLE, TENNESSEE

Nashville's Downtown Community Plan (DCP) includes a vehicular circulation objective to improve street connectivity and manage access by creating new streets and alleys. The DCP also presents a goal to encourage bicycling. Objectives supporting this goal include installing bicycle pavement markings on streets designated as bicycle routes and providing adequate, covered bicycle parking. A transit goal in the DCP encourages transit use by making it safe, efficient and convenient. Transit objectives include providing "appropriate lighting, seating, shelter, trash cans and public art at transit stops, making them easily visible and accessible." Finally, the DCP includes a goal to provide parking "in a manner that does not diminish the liveliness of the street and is sensitive to the pedestrian environment." Supporting objectives include discouraging new surface parking lots; encouraging underground, structured parking; locating active, first-floor uses in above-ground structured parking; providing on-street parking; encouraging shared parking and parking reductions in zoning; and minimizing impervious surfaces. Nashville implemented the DCP by adopting the Downtown Code to foster sustainable neighborhoods. The city recognized the need for rezoning to allow neighborhood developments in its downtown after needing to award variances for LEED-ND and similar projects.

## CASE STUDY: Syracuse, New York

Located west of downtown in the Near Westside neighborhood, the city of Syracuse's SALT District (Syracuse, Art, Life and Technology) began experiencing industrial decline and urban disinvestment in the 1950s. In an effort to revitalize the area, several organizations, including the Near Westside Initiative, the Syracuse Center of Excellence (SyracuseCoE), the UPSTATE center at Syracuse University's School of Architecture, and Home HeadQuarters Inc., have partnered to assess the neighborhood's potential for redevelopment and create the Near Westside Neighborhood Plan.




Aerial of the Near Westside neighborhood in Syracuse, NY
Source: Bob Reece

SyracuseCoE jumpstarted this process when it decided to use the LEED-ND rating system to evaluate the existing SALT District neighborhood and identify priorities for reinvestment and retrofit. SyracuseCoE hired the urban planning firm Raimi + Associates to direct this evaluation process. Raimi + Associates produced the SALT District LEED-ND Recommendations Study (LEED-ND Study), which assesses the SALT District using LEED-ND, identifies the neighborhood's assets and challenges, and presents recommendations for future neighborhood improvements. For the neighborhood assessment, the partners examined the rating system and then measured the existing conditions against LEED-ND criteria, using GIS records supplemented with field studies and inquiries to local agencies to determine how the existing SALT District scored under LEED-ND. Next, the partners identified the SALT District's assets and challenges by determining where the neighborhood performed either well or poorly under the rating system. SALT District strengths include its infill location; reuse of existing structures; and proximity to diverse uses, jobs, transit, and open space. Weaknesses include insufficient pedestrian and bike networks, surface parking lots fronting sidewalks, uncoordinated stormwater management, vacant lots, and high poverty and unemployment. The partners then convened city staff, community members, experts, and consultants in a formal charrette process to generate recommendations that elicit more LEED-ND points and best practices for the neighborhood. In addition to the LEED-ND study, Raimi + Associates coordinated the SALT District's LEED-ND application to the U.S. Green Building Council, which resulted in a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system.

After this, the Near Westside Initiative and UPSTATE began the planning process for the Near Westside Neighborhood Plan, which involves monthly meetings of interested citizens. The draft plan implements LEED-ND study recommendations for improved circulation networks. In particular, the draft plan calls for dedicated bike lanes along two streets that bisect the neighborhood in both directions, pedestrian crosswalks, and street trees. The draft plan also envisions relinking a street by removing existing structures and parking. The resulting street would include on-street parking. Additionally, the city of Syracuse is engaged in a comprehensive rezoning process that will result in zoning changes for the SALT District. The new zoning will allow mixed uses as well as bulk and area requirements that support an urban style development.

# 1.4 HOUSING

Amend the housing element of your comprehensive plan using the following goals and planning actions to:

- Provide affordable housing options, and
- Prioritize green residential buildings.

## Affordable Housing

To promote affordable housing options, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Promote socially equitable and engaging communities by enabling residents from a wide range of economic levels, household sizes, and age groups to live in a community.**

**Actions:**

- Provide new rental and for-sale dwelling units priced for households earning below the area median income.
- Maintain rental units at affordable levels for an extended period of time.
- Locate new housing in high-priority redevelopment areas.
- Consider incentivizing affordable housing through bonus zoning or density incentives.

**Related LEED-ND Credits:**

- *SLL Credit 1, Preferred Locations*
- *NPD Credit 4, Mixed-Income Diverse Communities*

## Green Residential Development

To encourage green residential buildings, apply the goals and planning actions listed above in *Strategy 1.2 Public Facilities, Green Municipal Buildings* here as well. Additionally, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Enable the widest spectrum of people, regardless of age or ability, to more easily participate in community life.**

**Actions:**

- Design public and private residential buildings to meet universal design requirements.
- Design, construct, or retrofit public rights-of-way and travel routes in accordance with official accessibility guidelines.

**Related LEED-ND Credit:**

- *NPD Credit 11, Visitability & Design*

### BOSTON, MASSACHUSETTS

The Columbia Point Master Plan for the Columbia Point peninsula in Boston includes a recommendation principle to "provide housing for a full range of income groups and household types, such as housing for families, seniors and disabled persons." Related objectives include ensuring that a majority of new development is housing, at least 30 percent of all new housing is owner-occupied, a wide range of housing types and unit sizes are built, and at least 20 percent of all new housing is affordable to a range of incomes at and below 100 percent of the area median income. Implementation actions support these objectives in part by requiring residential developers to report on a project's consistency with the objectives and by requiring the Boston Redevelopment Authority (BRA) to work with developers to locate and secure funding for affordable units. The BRA drafted the Columbia Point Master Plan after consulting the pilot version of the LEED-ND rating system.

# 1.5 CIVIC SERVICES

Amend the civic services element of your comprehensive plan using the following goals and planning actions to:

- Increase emergency service access,
- Provide better access to schools,
- Enhance public open space access, and
- Improve solid waste management.

## Emergency Service Access

To expand access to emergency services, incorporate the following goal and planning action into your municipality's comprehensive plan and special area plans.

**GOAL: Improve access to a multitude of services, which can include emergency services, in neighborhood and regional centers.**

**Action:**

- Integrate police, fire, and medical services with other residential and nonresidential uses.

**Related LEED-ND Credit:**

- *NPD Credit 3, Mixed-Use Neighborhood Centers*

## Access to Schools

To encourage better access to schools, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

Lakelands Park Middle School, Gaithersburg, MD
Source: BeyondDC, Creative Commons

**GOALS: Promote community interaction and engagement by integrating schools into the neighborhood and support students' health by encouraging walking and bicycling to school.**

**Actions:**

- Build residences within a walk distance of schools.
- Connect neighborhoods to schools with a complete network of sidewalks on both sides of the street, bicycle lanes, and traffic calming measures.

**Related LEED-ND Credit:**

- *NPD Credit 15, Neighborhood Schools*

## Open Space Access

To provide increased access to public open space, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Improve physical and mental health and social capital and facilitate social networking, civic engagement, physical activity, and time spent outdoors.**

**Actions:**

- Locate civic or public passive-use space, such as a square, park, paseo, or plaza, and public recreational facilities within a walk distance of nearby residences and nonresidential building entrances.
- To alleviate pressure on existing public spaces, provide open space for residents of new developments.[10]

**Related LEED-ND Credits:**

- *NPD Credit 9, Access to Civic and Public Space*
- *NPD Credit 10, Access to Recreation Facilities*

## Solid Waste Management

To improve management of solid waste, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Reduce the volume of waste deposited in landfills and promote the proper disposal of hazardous wastes.**

**Actions:**

- Provide a recycling and reuse center and maintain recycling containers at frequent intervals along mixed-use blocks.
- Maintain a drop-off facility for hazardous office and household wastes.
- Provide a composting station.
- Recycle or salvage construction waste and implement construction waste management plans for developments.

**Related LEED-ND Credit:**

- *GIB Credit 16, Solid Waste Management Infrastructure*

10 To support these goals and planning actions, consult the Center for Disease Control's LEED-ND and Healthy Neighborhoods: An Expert Panel Review, which found that integrating physical activity into residents' daily lives by placing a variety of open spaces and parks close to work and home reduces the risk of obesity, heart disease and hypertension.

### MINNEAPOLIS, MINNESOTA

In 2010, the Citizens for a Loring Park Community (CLPC) in Minneapolis released LEED for Neighborhood Development and the Loring Park Neighborhood, which explored the possibility of certifying a section of neighborhood under the LEED-ND system. This study reports how CLPC and its partners used the LEED-ND rating system as a basic framework to collect data and build an inventory of the neighborhood's sustainability assets. In addition, CLCP used LEED-ND guidelines to evaluate Loring Park's sustainability strengths and weaknesses on a neighborhood and district scale. The LEED-ND study makes recommendations for sustainable development within Loring Park and "is intended to provide a useful resource in designing neighborhood initiatives and for the master planning process."

Eitel Building in Loring Park neighborhood
Source: Payton Chung

Following this, CLPC initiated the Loring Park Neighborhood Master Plan process using the LEED-ND study as guidance. Chapter four of the draft plan recommends policies to enhance public access to Loring Park by improving pedestrian crossings at key points; installing and maintaining a continuous sidewalk along the park's edge; improving park entries with wayfinding, public art, and landscaping; and upgrading interactive sport and play facilities, among other policies. Further, chapter five of the draft plan includes a goal to achieve a 3:1 recycling to waste ratio from total waste volume collected. Strategies to achieve this goal include a zero waste goal for park events; adding recycling and trash bins, reducing waste bin size while increasing recycling bin size; improving recycling services; and establishing residential composting programs and organic waste processors at multi-unit buildings.

## 1.6 NATURAL AND HISTORIC RESOURCES

Amend the resource protection element of your comprehensive plan using the following goals and planning actions to:

- Conserve important habitat,
- Protect and conserve wetlands, water bodies, and potable water sources,
- Avoid developing floodplains,
- Preserve steep slopes,
- Protect historic resources,
- Protect landscaping and trees, and
- Preserve night sky access.

## Habitat Conservation

To conserve habitat for imperiled species and ecological communities, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Conserve imperiled species and ecological communities and protect and restore native plants and wildlife habitat.**

Actions:

- Guide development away from habitat for imperiled species and ecological communities. Where this is not possible, implement conservation plans to protect habitat.
- Place buffers around significant habitat and prevent development from disturbing these areas.
- Restore predevelopment native ecological communities using native plants, and protect and maintain these areas.
- Implement long-term management plans for new or existing native habitats and their buffers.

**Related LEED-ND Prerequisite and Credits:**

- *SLL Prerequisite 2, Imperiled Species and Ecological Communities Conservation*
- *SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation*
- *SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies*
- *SLL Credit 9, Long-term Conservation Management of Habitat or Wetlands and Water Bodies*

## Water Protection/Conservation

To protect wetlands, water bodies, and other water sources and conserve potable water, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Preserve water quality, natural hydrology, habitat, and biodiversity; conserve and restore wetlands and water bodies.**

Actions:

- Guide development away from wetlands and water bodies.
- Place buffers around wetlands and water bodies and prevent development from disturbing these areas.
- Restore predevelopment wetlands and water bodies and protect and maintain these areas.
- Implement long-term management plans for new or existing wetlands and water bodies and their buffers.

**Related LEED-ND Prerequisite and Credits:**

- *SLL Prerequisite 3, Wetland and Water Body Conservation*
- *SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation*
- *SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies*
- *SLL Credit 9, Long-term Conservation Management of Habitat or Wetlands and Water Bodies*

**GOALS: Reduce pollution and hydrologic instability from stormwater, reduce flooding, promote aquifer recharge, and improve water quality.**

Action:

- Require stormwater management plans that emulate natural hydrologic conditions and use infiltration, evapotranspiration, and other best management practices to prevent stormwater runoff.

**Related LEED-ND Credit:**

- *GIB Credit 8, Stormwater Management*

**GOAL: Reduce pollution from construction activities.**

**Action:**

- Require erosion and sedimentation control plans for construction activities that limit soil erosion, waterway sedimentation, and airborne dust generation.

**Related LEED-ND Prerequisite:**

- *GIB Prerequisite 4, Construction Activity Pollution Prevention*

**GOAL: Limit or eliminate the use of potable and other natural water resources for landscape irrigation.**

**Action:**

- Reduce water consumption for outdoor landscape irrigation using water-efficient strategies, such as water-efficient plant species and irrigation technologies.

**Related LEED-ND Credit:**

- *GIB Credit 4, Water-Efficient Landscaping*

## Floodplain Avoidance

To protect floodplains, incorporate the following goals and planning action into your municipality's comprehensive plan and special area plans.

**GOALS: Protect life and property, promote open space and habitat conservation, and enhance water quality and natural hydrological systems.**

**Actions:**

- Guide development away from floodplains.
- Follow and strengthen federal requirements that regulate building on floodplains.

**Related LEED-ND Prerequisite:**

- *SLL Prerequisite 5, Floodplain Avoidance*

## Steep Slope Protection

To preserve steep slopes, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Minimize erosion to protect habitat and reduce stress on water systems.**

**Actions:**

- Limit and avoid development on steep slopes.
- Restore previously developed slope areas with native and noninvasive plants.
- Protect existing and restored steep slopes in perpetuity using covenants, conditions, and restrictions or other deed restrictions.

**Related LEED-ND Credit:**

- *SLL Credit 6, Steep Slope Protection*

## Historic Preservation

To preserve historic resources, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Encourage the preservation and adaptive use of historic buildings and cultural landscapes; extend the life cycle of existing building stock to conserve resources, reduce waste, and reduce adverse environmental effects associated with new buildings.**

Actions:

- Prevent the demolition of historic buildings and alterations to the community's cultural landscape without approval from a local historic preservation review board or landmarks commission.
- Rehabilitate historic buildings in accordance with rehabilitation standards.

**Related LEED-ND Credits:**

- *GIB Credit 5, Existing Building Reuse*
- *GIB Credit 6, Historic Resource Preservation & Adaptive Reuse*

## Landscape Preservation

To protect existing landscaping and pervious surfaces, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Preserve existing noninvasive trees, native plants, and pervious surfaces.**

Actions:

- Locate development footprints and construction impact zones within previously developed areas where possible.
- Preserve and protect important trees during construction projects.
- Establish covenants, conditions, and restrictions, or other deed restrictions, to protect undisturbed areas and preserved trees on project sites in perpetuity.

**Related LEED-ND Credit:**

- *GIB Credit 7, Minimized Site Disturbance in Design & Construction*

## Night Sky Access

To secure night sky access, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Minimize light trespass, reduce sky-glow to increase night sky access, reduce glare to improve nighttime visibility, and reduce adverse impacts on wildlife.**

Actions:

- Implement exterior luminaires that have fixture-integrated lighting controls and that minimize light trespass, backlight and glare.
- Establish covenants, conditions, and restrictions, or other deed restrictions, to ensure night sky access through adherence to light trespass and uplight requirements in perpetuity.

**Related LEED-ND Credit:**

- *GIB Credit 17, Light Pollution Reduction*

### CHEYENNE, WYOMING

Planning staff in Cheyenne used the LEED-ND rating system to translate broad sustainability language from PlanCheyenne, the city's comprehensive plan, into a Unified Development Code. PlanCheyenne includes principles and policies to preserve historic districts and cultural resources through restoring historic buildings, enhancing historic preservation programs, and protecting significant archaeological and cultural sites. Strategies and actions to implement these include designating landmark buildings; developing a joint historic preservation commission with the county; developing design guidelines for historic districts; and creating local incentives for historic preservation. Further, PlanCheyenne presents principles and policies to prioritize conservation for and limited development of natural resources areas and to conserve water and protect water quality. Supporting strategies and actions include providing incentives and revising the code to limit or discourage development in significant natural areas, such as floodplains, steep slopes, wetlands and stream corridors.

## 1.7 ECONOMIC DEVELOPMENT

Amend the economic development element of your comprehensive plan using the following goals and planning actions to:

- Improve access to jobs,
- Facilitate local agriculture,
- Promote local food production, and
- Encourage green commercial buildings.

### Improved Access to Jobs

To improve access to employment opportunities, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Encourage balanced communities with a diversity of employment opportunities.**

**Actions:**

- Locate residential development and affordable housing near existing jobs.
- Locate nonresidential development near existing transit and residences.

**Related LEED-ND Credit:**

- *SLL Credit 5, Housing & Jobs Proximity*

## Agricultural Land Protection

To facilitate local agricultural production, incorporate the following goal and planning actions into your municipality's comprehensive plan and special area plans.

**GOAL: Preserve irreplaceable agricultural resources.**

**Actions:**

- Protect prime and unique or soils of state significance within the community.
- Guide growth away from agricultural areas by encouraging infill development, development near transit, or development in a development rights receiving area under a farmland protection program.
- Adopt zoning that allows agriculture, secondary farm uses and farm-related structures.
- Use conservation easements to mitigate loss of agricultural soils.

**Related LEED-ND Prerequisite:**

- *SLL Prerequisite 4, Agricultural Land Conservation*

## Local Food Production

To encourage local food production, incorporate the following goals and planning actions into your municipality's comprehensive plan and special area plans.

**GOALS: Promote community-based food production, support preservation of small farms producing a wide variety of crops, and increase the economic value and production of farmlands and community gardens.**

**Actions:**

- Establish a community garden program.
- Support nearby community-supported agriculture programs.
- Facilitate and support local farmers' markets throughout the community.

**Related LEED-ND Credit:**

- *NPD Credit 13, Local Food Production*

## Green Commercial Buildings

To encourage green commercial buildings, apply the goals and planning actions listed above in *Strategy 1.2 Public Facilities, Green Municipal Buildings* here as well.

### CHEYENNE, WYOMING

Cheyenne's comprehensive plan, PlanCheyenne, aims to maintain the city's ranching and agricultural heritage. Supporting policies, strategies and actions include removing code barriers to agricultural activities by revising zoning to protect agricultural and rural lands from inappropriate sprawl and expanding opportunities for agricultural-related businesses, such as stables and road-side stands, on rural properties. After drafting PlanCheyenne, city planning staff used the LEED-ND rating system to translate its broad sustainability language into a Unified Development Code.

# II. INCORPORATING LEED FOR NEIGHBORHOOD DEVELOPMENT INTO TRADITIONAL ZONING CODE ELEMENTS

Organized by the zoning elements traditionally included in zoning codes throughout the country, this section of the manual uses LEED-ND to identify where localities can make changes to their zoning regulations to facilitate sustainable neighborhood development. Over time, many local legislatures have updated outmoded zoning laws to permit mixed-use, compact neighborhoods and encourage smart growth and sustainability. This section shows municipalities how they can incorporate LEED-ND criteria into their existing zoning district regulations, including:

**A.** Land use, density, and bulk and area requirements, and

**B.** Parking and loading requirements.

## USE, DENSITY, AND BULK & AREA REQUIREMENTS

Use, density, and bulk and area requirements in traditional zoning district regulations may conflict with sustainable neighborhood development techniques as embodied in LEED-ND criteria. In particular, these requirements may inhibit mixed uses, compact development, taller buildings, and reduced building setbacks. After using the LEED-ND locational prerequisites to identify areas appropriate for sustainable neighborhood development (see Strategy 1.1 Land Use above), municipalities should identify the zoning districts that govern these areas and analyze the applicable use regulations, density requirements, and bulk and area schedules to identify potential barriers to the strategies below. If barriers exist, the following strategies show planners how to amend these requirements using LEED-ND criteria to facilitate sustainable neighborhood development.

### Use, Density, and Bulk & Area Strategies:

- Allow a wider range of permitted land uses
- Authorize a greater variety of housing
- Allow agricultural uses
- Permit energy utilities as a principal use
- Authorize a variety of home occupations
- Allow accessory dwelling units
- Allow produce gardens and greenhouses as-of-right
- Allow greater development densities
- Use smaller minimum lot sizes
- Permit taller buildings
- Reduce setback requirements

- SLL Prerequisite 1, Smart Location
- SLL Prerequisite 4, Agricultural Land Conservation
- SLL Credit 5, Housing and Jobs Proximity
- NPD Prerequisite 1, Walkable Streets, items (b) & (d)
- NPD Prerequisite 2, Compact Development
- NPD Credit 1, Walkable Streets, optional items (a), (b), (c), (l), & (m)
- NPD Credit 2, Compact Development
- NPD Credit 3, Mixed-Use Neighborhood Centers
- NPD Credit 4, Mixed-Income Diverse Communities
- NPD Credit 5, Reduced Parking Footprint
- NPD Credit 13, Local Food Production
- GIB Credit 11, On-Site Renewable Energy Sources
- GIB Credit 12, District Heating and Cooling

# 2.1 MIXED USES

Traditional zoning districts that generally separate land uses and favor single-family residences on large lots contribute to sprawl. These districts inhibit mixed uses and access to services and jobs as embodied in SLL Prerequisite 1, Smart Location (SLLp1), NPD Credit 3, Mixed-Use Neighborhood Centers (NPDc3), SLL Credit 5, Housing and Jobs Proximity (SLLc5).

## Diverse Uses and Services

SLLp1 Option 4 requires projects to include a residential component and locate near existing neighborhood shops, uses, and facilities such that the project boundary is within a quarter-mile walk distance of at least five diverse uses, or such that the project's geographic center is within half-mile walk distance of at least seven diverse uses. Similarly, NPDc3 requires that 50 percent of a project's dwelling units occur within a quarter-mile walk distance from at least four diverse uses. The credit awards more points incrementally for up to 19 or more diverse uses. In addition, NPDc3 requires that a project's diverse uses include at least one from each of four use categories listed in the rating system's Appendix.

Using SLLp1 and NPDc3 criteria and the diverse uses Appendix, amend the use regulations in appropriate zoning districts to allow as-of-right a wide range of compatible mixed uses as principal uses. Allow, or where appropriate exceed, the following uses:

- food retail such as a supermarket or other food store with produce;
- community-serving retail such as clothing or department stores, convenience stores, farmers' markets, hardware stores, and pharmacies;
- services such as banks, health clubs, hair care, laundry, and restaurants; and
- civic and community facilities such as adult/ senior care, child care, community centers, cultural and educational facilities, entertainment venues, places of worship, clinics, police and fire stations, a post office, libraries, parks, and social services.

Mix of uses in Bethesda Row, Bethesda, MD
Source: Federal Realty

Where concerns about impacts on surrounding residences exist, allow these diverse uses by special use (or conditional use) permit to ensure that applicants meet required conditions that minimize these impacts.

## Housing & Jobs Proximity

When making these changes, ensure principal uses provide ample employment opportunities for surrounding residents, including those in affordable housing, in accordance with SLLc5. Options 1 and 2 of SLLc5 require projects with a residential component equaling at least 30 percent of total building square footage to locate the project's geographic center or boundary within a half mile walk distance from a minimum number of existing full-time-equivalent jobs. SLLc5 Option 1 also requires projects to satisfy the requirements necessary to earn at least one point under Option 2 in NPD Credit 4, Mixed-Income Diverse

Communities (NPDc4), thus ensuring that jobs are present near affordable housing options (see Strategies 4.8 Mandatory Inclusionary Zoning and 4.9 Zoning Incentives to Encourage Affordable Housing for more information). SLLc5 Option 3 requires projects with a non-residential component equaling at least 30 percent of total building square footage to locate the project's geographic center or boundary on an infill site within a half-mile walk distance of an existing rail transit, ferry, or tram stop and within a half-mile walk distance of a minimum number of existing dwelling units.

### NASHVILLE, TENNESSEE

For an example of a municipality that permits mixed uses within a zoning district, consult Nashville's Downtown Code (DTC) and Plan. After having to award variances for LEED-ND and similar projects, Nashville developed the Downtown Code (DTC) to foster sustainable neighborhoods. DTC section III divides the downtown into four Use Areas and provides Use Tables that list a variety of residential, institutional, educational, commercial, transportation, recreation, and entertainment uses, among others, that are permitted by right within the four Use Areas.

## 2.2 HOUSING VARIETY

Communities that offer a variety of housing sizes and types help limit the development footprint, support compact development, and create a complete, equitable community serving households of differing incomes. NPD Credit 4, Mixed-Income Diverse Communities (NPDc4), awards varying amounts of points to projects that provide a minimum amount of housing variety. NPDc4 Option 1 requires projects to include a sufficient variety of housing sizes and types such that the total variety of planned and existing housing within the project achieves a Simpson Diversity Index score greater than 0.5. To assess residential diversity, NPDc4 Option 1 uses several housing categories.

**These include:**

- detached residences,
- duplexes or townhouses,
- multiunit buildings of varying heights (with and without elevators),
- live-work spaces, and
- accessory dwelling units (see Table 2 in NPDc4).

This option awards up to two more points for increased scores on the index.

Live work units in North Greenwich, London
Source: European Institute for Sustainable Transport, Creative Commons

To facilitate compact development and affordable housing, amend use regulations in appropriate zoning districts to include a wider range of housing types as permitted land uses. These can include two-family and multifamily housing of a variety of types, manufactured homes, live-work spaces, accessory dwelling units, elderly cottages, and clustered housing on smaller lots with party walls. This enables the housing developers to build more affordable housing types through cost efficiencies associated with smaller units, as well as the spread of land, infrastructure, approval, and carrying costs among a larger number of units. also makes an affordable housing zoning requirement or incentive more feasible (see Strategies 4.8 Mandatory Inclusionary Zoning and 4.9 Zoning Incentives to Encourage Affordable Housing for more information).

## 2.3 AGRICULTURAL USES

Zoning may designate farmland for development, thereby creating an incentive to repurpose it for other uses. When zoning fails to list agricultural uses as permitted uses, farm buildings and operations become discouraged nonconforming uses and operation, expansion, or changes require variances or special use permits that can be hard to obtain.

This contradicts SLL Prerequisite 4, Agricultural Land Conservation (SLLp4), which aims to preserve agricultural resources and protect prime and unique soils on farmland and forestland from development. SLLp4 prohibits projects from locating within a state or locally designated agricultural preservation district unless they conform to requirements for development within the district. In addition, SLLp4 requires projects to meet one of several other location requirements:

- not locating on prime and unique soils or soils of state significance,
- locating on an infill site,
- locating near transit,
- locating in a development rights receiving area under a farmland protection program, and
- mitigating the loss of any prime or unique soils through the purchase of easements determined by the density of the project.

Your municipality should amend its zoning code to create one or more districts for existing farmland with prime, unique, or significant soils. These agricultural districts should permit all forms of agriculture as principal uses, as well as farm equipment sheds, barns and other secondary farm uses as as-of-right accessory uses. Non-farmland uses can be allowed in these zoning districts but should be subject to conditions that minimize negative impacts on farm uses and operations. Consult soil surveys and maps from the U.S. Department of Agriculture's Natural Resources Conservation Service to identify prime and unique soils or soils of state significance within your community.

A municipality can make several other changes to its land development regulations to promote and protect agricultural land uses, including allowing roadside stands by right and farm-related housing by special permit in agricultural zones, subject to appropriate conditions. Further, the subdivision ordinance can be amended to require review of the potential impacts of new subdivisions on productive farmland and nearby farm operations. Also, consider adding innovative zoning provisions to encourage agricultural uses, including a conservation easement requirement, transfer of development rights provisions, or incentive zoning.

## 2.4 ENERGY UTILITIES

Many municipalities have amended their zoning ordinances to allow onsite renewable energy systems, but this is the exception, not the rule. This can inhibit on-site renewable energy and district energy systems, which GIB Credit 11, On-Site Renewable Energy Sources (GIBc11) and GIB Credit 12, District Heating and Cooling (GIBc12) promote, respectively.

### On-Site Renewable Energy Sources

On-site renewable energy systems reduce fossil fuel use and associated greenhouse gas emissions, improve outdoor environmental quality, and reduce water pollution. These systems may generate cost savings through utility rebates, incentive programs, future energy savings, and net metering, in which excess energy is sold back to the utility. GIBc11 requires projects to incorporate on-site, nonpolluting renewable energy generation with production capacity of at least five percent of a project's annual electrical and thermal energy cost.

In order to facilitate these systems within your community, amend the use regulations within appropriate zoning districts to permit on-site renewable energy generation systems as principal or accessory uses. Also, add on-site renewable energy

equipment to a table or list of permitted encroachments into yards and required setbacks. As appropriate, allow as-of-right the following systems:

- solar power,
- solar thermal,
- wind energy,
- biomass thermal,
- biofuel-based electrical,
- geothermal heating,
- geothermal electric,
- small-scale or micro hydroelectric power, and
- wave and tidal power.

Wind turbines on mixed-use building at Dockside Green, Victoria, BC
Source: Martin Tessler for Busby Perkins + Will Architects

Alternatively, if your community is concerned about safety issues associated with energy utilities, consider allowing these on-site energy generation systems as special uses within appropriate zoning districts. Consult implementation guidance in the LEED-ND reference guide when making these changes.

## District Heating and Cooling Systems

While typically used for downtowns, university campuses, or healthcare facilities, district heating and cooling systems have potential for use at the district-scale for developments projects. Although district heating and cooling systems are best suited to projects with large amounts of building square footage, some smaller projects with a few buildings in a single block can use these systems or connect to existing systems.

Seattle Steam Company heating district provides steam to 175 downtown businesses
Source: Jason Brackins, Creative Commons

District heating and cooling systems are thermal energy networks that distribute hot water, chilled water, or steam from a single energy source, or multiple plants in some instances, to multiple recipients via underground pipes. The district energy supply may come from a conventional boiler or chiller, geothermal wells, a water body, or waste heat captured from industrial processes or electrical generation (combined heat and power). District heating and cooling systems capitalize on the complementary energy load patterns of buildings with different energy needs, limiting waste heat and transmission line losses, thereby reducing emission of greenhouse gases and other air pollutants. GIBc12 requires that 80 percent of a project's annual heating and cooling consumption be provided by a district heating and cooling system.

To facilitate energy-efficient neighborhoods, amend use regulations in appropriate zoning districts to allow district heating and cooling systems as principal or accessory as-of-right uses. Allow buildings that derive heating or cooling consumption or both from a district heating and cooling system for space conditioning and water heating. Further, allow district energy system components that achieve an energy efficiency performance of at least a 10 percent better than the American Society of Heating, Refrigeration and Air-Conditioning Engineers' (ASHRAE) ANSI/ASHRAE/IESNA Standard 90.1-2007. If safety concerns preclude these amendments, consider allowing these buildings and systems as specially permitted uses in appropriate zoning districts instead. In addition, your municipality may encourage these districts by amending appropriate zoning districts to include bonus zoning provisions that waive zoning requirements or provide additional development densities for developers who cooperate among themselves to adopt district energy system technologies (see Strategy 6.5 Bonus Zoning or Density Incentives below).

When considering whether to allow on-site energy systems, consult with legal counsel to determine whether your municipality has authority to regulate renewable energy and district heating and cooling systems. Many states directly regulate these systems under their public utility statutes, and these systems are sometimes subsidiaries of those utilities. Also, some states preempt regulation of building systems. These states may prohibit local regulations that govern plumbing, electrical, energy, and heating facilities in individual buildings, as discussed below in *IV. Incorporating LEED-ND into Supplemental Development Standards, Development Standards for Buildings, Energy, Plumbing, and Fire Safety* (*Strategies 4.11 to 4.18*). If your municipality has authority to implement this strategy and makes these zoning amendments, consider updating building codes to allow these systems, as well as utility transmission sharing across multiple properties.

### NEW YORK CITY, NEW YORK

In New York City zoning for the Willets Point Redevelopment Project in Queens, a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system, allows a cogeneration power plant by special permit. The Board of Standards and Appeals may permit a combined heat and power cogeneration plant that is not greater than 100,000 square feet provided the plant "maximize[s] electric and thermal cogeneration system efficiency to the greatest extent feasible," the applicant submits a detailed energy analysis that demonstrates this efficiency, and the plant primarily will serve the Special Willets Point District (see New York City, NY, zoning code section 124-17).

## 2.5 HOME OCCUPATIONS

Home occupations, or businesses conducted within residential units, provide municipalities with a mechanism for increasing access to services and employment opportunities within a zoning district. Home occupation regulations can help support NPD Credit 3, Mixed-Use Neighborhood Centers (NPDc3), NPD Credit 4, Mixed-Income Diverse Communities (NPDc4), and SLL Credit 5, Housing and Jobs Proximity (SLLc5).

NPDc3 requires increased access to mixed uses and services (see Strategy 2.1 Mixed Uses above), and NPDc4 requires a minimum diversity of housing types, awarding incrementally more points for greater levels of housing diversity. NPDc4 includes large and small live-work spaces in its eligible housing categories. Finally, Options 1 and 2 of SLLc5 require projects with a residential component equaling at least 30 percent of total building square footage to locate the project's geographic center or boundary within a half-mile walk distance from a minimum number of existing full-time-equivalent jobs.

Amend use regulations in appropriate zoning districts to allow greater flexibility in home occupations. Where possible, allow specific professional offices, along with limited commercial services such as beauty parlors, dressmaking, and day care. Generally, professional occupations such as accounting, legal and medical services, financial advising, music schools, and travel agencies are appropriate home occupations. These professional home occupations should meet certain conditions, including minimal signage, parking, and number of employees. To retain more control over home occupations, consider allowing them by special use permit with specific standards that certain occupational uses must meet.

### NAPA COUNTY, CALIFORNIA

In Napa County, the draft residential zoning districts for Napa Pipe (Napa Pipe—Mixed Use Residential and Napa Pipe—Mixed Use Residential Waterfront) allow home occupations without a use permit subject to the rules and regulations the county adopted for home occupations generally (see Draft Napa County, CA, code sections 18.66.080 & code section 18.104.090). The Napa Pipe project is a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system.

## 2.6 ACCESSORY DWELLING UNITS

An accessory dwelling unit is a subordinate dwelling unit that is attached to a principal building or contained in a separate structure on the same property as the principal unit. When authorized by zoning laws, accessory dwelling units increase development densities and support NPD Prerequisite 2 and Credit 2, Compact Development (NPDp2, NPDc2), which require medium to high-density development (see Strategy 2.8 Greater Development Densities below for more information).

Additionally, accessory dwelling units support and help projects achieve criteria embodied in NPD Credit 4, Mixed-Income Diverse Communities (NPDc4). NPDc4 rewards diversity within housing types to enable residents from a wide range of economic levels, household sizes, and age groups to live in a community. Option 1 of NPDc4 requires a project's total variety of planned and existing housing sizes and types to achieve a Simpson Diversity Index score greater than 0.5, using the housing categories listed within the credit's criteria. The housing categories include both large and small accessory dwelling units.

Accessory dwelling unit, Vermillion development, Huntersville, NC
Source: Brett VA, Creative Commons

To achieve more compact development and provide more affordable housing, amend the use regulations within relevant zoning districts to allow accessory dwelling units in areas selected for sustainable neighborhood development. In appropriate zoning districts, allow accessory dwelling units as-of-right in an existing garage, carriage house, basement, or former servants' quarters. To retain more control over these units, consider allowing owners to apply for a special use permit to create an accessory residential unit.

### HERCULES, CALIFORNIA

Hercules' Waterfront District Master Plan, a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system, is the prevailing zoning document for the city's Waterfront and Hercules Bayfront. The Waterfront District Master Plan permits an accessory dwelling unit over the garage for Building Type I-C, a one- or two-story house (see plan section 3.6).

### NASHVILLE, TENNESSEE

Section III of Nashville's Downtown Code (DTC) permits accessory apartments by right throughout the downtown. After having to award variances for LEED-ND and similar projects, Nashville adopted the DTC to foster sustainable neighborhoods.

## 2.7 PRODUCE GARDENS AND GREENHOUSES

A zoning district's use regulations can impede local food production if they do not allow produce garden growing areas and greenhouses as-of-right where appropriate. In part to improve nutrition through increased access to fresh produce, NPD Credit 13, Local Food Production (NPDc13), rewards projects that allow produce growing areas and greenhouses. Option 1 of NPDc13 requires a project to provide a minimum amount of permanent and viable growing space or related facilities based on project density. This option also requires projects to provide solar access, fencing, watering systems, garden bed enhancements (such as raised beds), secure storage space for tools, and pedestrian access for these spaces.

Amend the use regulations in appropriate zoning districts to allow produce gardens and greenhouses as accessory uses in front, side and rear yards, balconies, patios and rooftops within appropriate zoning districts. Your community can accomplish this by adding produce gardens and greenhouses to the list of permitted accessory uses as incidental and subordinate to the principal use. If your community wishes to control these uses further, it can allow gardens and greenhouses as accessory uses by special use permit and subject them to additional restrictions.

Urban farming in High Point development, Denver, CO
Source: Brett VA, Creative Commons

Community Garden in Chinatown, Seattle, WA
Source: Jess J, Creative Commons

Additionally, further amend use regulations in appropriate zoning districts to allow neighborhood growing space or community gardens. Appropriate as-of-right accessory uses for this primary use include small-scale renewable energy systems, watering systems, and storage facilities.

## 2.8 GREATER DEVELOPMENT DENSITIES

Existing zoning standards may not allow the development densities required to achieve NPD Prerequisite 2, Compact Development (NPDp2) and earn points under Credit 2, Compact Development (NPDc2). Where appropriate, your community should amend the use and density standards in zoning districts targeted for sustainable neighborhood development to allow increased densities in locations better suited for reduced automobile dependence. When amending density requirements, consult with local water and sewer department staff to coordinate increased development densities with the municipality's water and sewage capacities.

Refer to the requirements in NPDp2 and NPDc2 when amending density standards. For targeted neighborhoods that fall outside a walk distance to transit, amend underlying zoning to allow an overall residential density of at least seven dwelling units per acre of buildable land available[11] for residential uses and an overall FAR of at least 0.50 for all nonresidential development. For areas within a walk distance of transit service,[12] amend the density standards in the underlying zoning districts to allow an overall residential density of at least 12 dwelling units per acre of buildable land available for residential uses and an overall FAR of at least 0.80 for nonresidential development. Neighborhoods are within a walk distance of transit if 50 percent of dwelling units and nonresidential building entrances (inclusive of existing buildings) are within a quarter mile of planned or existing bus or street car stops or within a half mile of planned or existing bus rapid transit stops, light or heavy rail stations, or ferry terminals. NPDp2 requires the above minimum development densities when these transit stops in aggregate offer 76 weekday trips and 50 weekend daily trips.

11 LEED-ND defines "buildable land" to exclude public rights-of-way and land excluded from development by codified law or LEED-ND prerequisites.

12 Transit service must meet or exceed the 2-point threshold in Option 1 of SLL Credit 3, Locations with Reduced Automobile Dependence (SLLc3).

NPDc2 awards up to six additional points for incremental increases of residential and nonresidential densities. To help development projects achieve NPDc2, amend zoning for targeted neighborhoods to allow even greater development densities. When amending zoning to allow greater development densities, consult design guidance for context-sensitive increases in density. Such guidance explains how to make compact development more attractive given the context of the surrounding community.

### BOZEMAN, MONTANA

Bozeman adopted the Story Mill Neighborhood Growth Policy Amendment to rezone the Story Mill Neighborhood site, an intended LEED-ND pilot project, from a mix of "Business Park," "Suburban Residential," "Industrial" and "Residential" zoning districts to "Neighborhood Commercial" on 6.9 acres; "Community Commercial" on 4.4 acres; "Residential" on 88 acres; and "Parks, Open Space, & Recreation" on 3.3 acres. These changes allowed the developer to increase the density to up to 25 dwelling units per acre.

### STAMFORD, CONNECTICUT

Similarly, Stamford adopted the South End Redevelopment District, South (SRD-S) and South End Redevelopment District, North (SRD-N) zoning districts to facilitate Harbor Point, a LEED-ND Certified Plan at the gold level under the pilot version of the rating system. These districts allow 50 dwelling units per acre with a total residential floor area maximum (see Stamford, CT, zoning regulation sections 9(J)(5)(c) & 9(K)(5)(c)). Stamford's Transportation Center Design District (TCDD), which the city adopted to facilitate the Harbor Point Gateway development, allows a FAR of 3.0 for all structures within the development, with residential floor area comprising not less than 40 percent of the combined floor area (see section 9(BB)(5)(a)).

## 2.9 SMALLER LOT SIZES

Another method of increasing density is to reduce minimum lot sizes in residentially zoned areas. The larger the minimum lot size, the less density allowed or realized. Without lowering minimum lot sizes in some zoning districts, it would be impossible to achieve increased residential densities as required by, or necessary to achieve, points under NPD Prerequisite 2 (NPDp2) and NPD Credit 2 (NPDc2), Compact Development. Consequently, developers may be forced to seek area variances for lot size.

The density requirements and corresponding minimum lot sizes for single-family residential zoning districts in areas targeted for sustainable neighborhood development must allow at least the development densities outlined in NPDp2. NPDp2 requires minimum residential densities ranging from at least 7 to 12 dwelling units per acre of buildable land available for residential uses (see Strategy 2.8 Greater Development Densities above). After selecting an area for sustainable neighborhood development, determine whether the minimum lot size requirements in the relevant zoning district(s) will allow the required residential densities and amend them accordingly.

Smaller lot sizes in King Farm, Rockville, MD
Source: Brett VA, Creative Commons

To enable NPDp2 minimum development densities for single-family residential development, the minimum lot size requirement must be approximately 6,000 square feet or less. For single-family residential development on single lots within a walk distance to transit service, minimum lot sizes must be approximately 3,600 square feet or less. While multifamily zoning districts generally do not reference minimum lot sizes, the lot sizes can be larger to accommodate the increased density.

To enable greater residential densities as embodied in NPDc2, amend the minimum lot size requirements in relevant zoning districts to allow even smaller lots. Design experts can advise on solutions that allow smaller homes to complement the character of the surrounding neighborhood. For instance, multifamily housing configured to appear as large single-family homes can introduce density and affordable housing into affluent larger lot neighborhoods without being apparent. Also, consider maximizing buildable square footage by adjusting minimum or maximum height requirements for the district (see Strategy 2.10 Taller Building Heights below).

### CHEYENNE, WYOMING

Cheyenne used the LEED-ND rating system to evaluate its Unified Development Code, which allows minimum lot sizes of 3,500 square feet for duplexes and 2,500 square feet for townhomes in its medium-density residential MR-1 and high-density residential H-R1 zones; 2,000 square feet for townhomes in its high-density residential H-R2 and neighborhood residential NR-2 zones, and 1,600 square feet townhomes in its neighborhood residential NR-3 zone (see UDC Table 5-2).

### CINCINNATI, OHIO

Cincinnati's Planning Department granted an area variance for The Arbors, a conditionally approved LEED-ND plan at the certified level under the pilot version of the rating system. The original zoning for The Arbors was R3, which called for single-family detached homes on a minimum lot size of 5,000 square feet. Developers were unable to meet LEED-ND density requirements with this lot size in place. The area variance allowed developers to build at a greater density by reducing the minimum lot size to 4,500 square feet. In addition, zoning called for a 14-foot wide side yard, but developers were able to secure another area variance that allowed a reduction in side yard width to six feet.

## 2.10 TALLER BUILDING HEIGHTS

One hundred years ago, building heights of four stories or more were common even in very small towns everywhere in the country. Since then, however, building height limits as low as two stories in suburban settings have become widespread. These standards pose limits on density that can preclude the development of walkable, compact neighborhoods and prevent projects from meeting LEED-ND minimum building height-to-street-width-ratio criteria and development density criteria.

Item (b) in NPD Prerequisite 1, Walkable Streets (NPDp1), requires a minimum building height-to-street-width ratio of 1:3 for at least 15 percent of existing and new street frontage within and bordering a project. This requirement results in a minimum of one foot of building height for every three feet of street width, measured from façade to façade. Additionally, 100 percent of existing and new nonmotorized rights-of-way included in the 15 percent calculation must achieve a ratio of 1:1. When measuring street width from the façade to just the street centerline, the equivalent minimum building-height-to-street-centerline ratios are 1:1.5 for streets and 1:0.5 for nonmotorized rights-of-way. Optional item (m) in NPD Credit 1, Walkable

Streets (NPDc1), builds on this, requiring the same minimum ratios for at least 40 percent of a project's street frontage. A zoning district's building height requirements also hinder or help projects achieve NPD Prerequisite 2 and Credit 2, Compact Development (NPDp2, NPDc2). Both NPDp2 and NPDc2 require a minimum number of dwelling units per acre for residential development, as well as FAR requirements for nonresidential components (see Strategy 2.8 Greater Development Densities above).

In order to facilitate greater building heights, amend the bulk and area schedules in appropriate zoning districts to allow or encourage taller buildings. Calculate maximum allowable heights or minimum heights for those zoning districts by applying the above height-to-street-width ratios to existing street widths or planned street widths within these areas. To determine planned street widths, consult the street width requirements in your municipality's site plan and subdivision regulations and amend these as well if necessary (see Strategy 3.7 Street Widths that Enhance Streetscape below).

When amending minimum or maximum building heights, your community also should reduce minimum setbacks in order to facilitate the sense of enclosure and pedestrian scale embodied in the building-height-to-street-width ratio. *Strategy 2.11 Reduced Building Setbacks* below provides implementation guidance. As your community plans these changes, create a task force of local engineering, sanitation, water, and traffic staff or consultants to ensure that street width, height, and setback requirements coordinate with other professional standards.

### OAKLAND, CALIFORNIA

To allow greater building heights, Oakland rezoned its MacArthur BART Transit Village to allow a maximum height of 45 feet for all buildings and other facilities and up to 55 feet provided certain criteria are met (see Oakland, CA, code section 17.97.150). Previous zoning allowed maximum building heights between 35 and 40 feet (see code sections 17.28.140 & 17.44.160). Furthermore, Oakland recently adopted height maximums that allow taller buildings in downtown and along commercial corridors where increased density (height) was appropriate. The MacArthur BART Transit Village is conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system.

## 2.11 REDUCED BUILDING SETBACKS

Existing setback requirements may not result in the pedestrian friendly street wall, sidewalk proximity, and minimum property line distances encouraged by NPD Prerequisite 1 and Credit 1, Walkable Streets (NPDp1, NPDc1). NPDc1 optional item (a) instructs projects to place at least 80 percent of the total linear feet of street-facing building façades no less than 25 feet from the property line. NPDc1 optional item (b) instructs projects to place at least 50 percent of street-facing façades no less than 18 feet from the property line. In addition, NPDc1 optional item (c) requires 50 percent of the total linear feet of mixed-use and nonresidential street-facing building façade to be within one foot of a sidewalk or its equivalent. Finally, item (b) in NPDp1 and optional item (m) in NPDc1 require a certain amount street frontage within projects to meet a minimum building-height-to-street-width ratio (see Strategy 2.10 Taller Building Heights above for more information).

Buildings with no setback from the street
Source: Payton Chung, Creative Commons


Retail strip set back from the street
Source: Snap Man, Creative Commons

To create a pedestrian friendly, walkable environment, eliminate setbacks in zoning districts selected for sustainable neighborhood development to allow buildings at the property line. If setbacks are necessary, they should not be more than 18 to 25 feet from property lines. For mixed-use and nonresidential streets consider requiring at least 50 percent of building facades to be within one foot of any sidewalk or its equivalent. When reducing setbacks to facilitate the pedestrian friendly street wall encouraged by NPDp1 item (b) and NPDc1 optional item (m), amend building heights as well and consult with municipal staff and other experts to ensure coordination with local engineering, sanitation, water, and traffic standards (see Strategy 2.10 Taller Building Heights above).

Additionally, reduced or no front yard setbacks enable building placement closer to the street, which frees space in the rear for parking located behind or under a building. If serviced by alleys, service bays or garages can be located on a building's secondary façade. This helps projects achieve item (d) in NPD Prerequisite 1, Walkable Streets (NPDp1), and NPD Credit 5, Reduced Parking Footprint (NPDc5). NPDp1 item (d) requires that no more than 20 percent of street frontages within a project are faced directly by garage and service bay openings. NPDc5 requires new nonresidential buildings and multiunit residential buildings either to have no off-street parking lots or to locate off-street surface parking lots at the rear or side of the building.

### STAMFORD, CONNECTICUT

The two South End Redevelopment Districts, South (SRD-S) and North (SRD-N), that Stamford adopted to facilitate the Harbor Point project require that all buildings be setback not less than five feet from any public street right-of-way or not less than 15 feet from any established curb line, whichever is greater (see City of Stamford, CT, zoning regulation sections 9(J)(5)(d) & 9(K)(5)(d)). The provision allows the Zoning Board to reduce or waive this requirement based on sound urban design principles. Harbor Point is a LEED-ND Certified Plan at the gold level under the pilot version of the rating system.

# PARKING & LOADING

The LEED-ND rating system does not explicitly address parking ratios and loading standards; however, these zoning requirements may inhibit sustainable neighborhood development techniques embodied in LEED-ND criteria. Fixed parking ratios and loading standards often result in large off-street parking lots and structures that encourage automobile dependence, as well as loading and service docks that interfere with the pedestrian realm.

When reviewing zoning district regulations that govern areas selected for sustainable neighborhood development (see Strategy 1.1 Land Use above), planners should evaluate existing parking and loading requirements, assess whether they conflict with the below strategies, and finally amend such requirements to incorporate relevant LEED-ND criteria as described below.

**Parking & Loading Strategies:**

- Reduce or eliminate off-street parking requirements
- Set maximum off-street parking requirements
- Locate off-street parking at side or rear of buildings
- Incentivize or require shared parking spaces
- Require shared-use vehicle parking and preferential parking allowances
- Encourage project-level transportation demand management programs
- Encourage below-grade or structured parking
- Minimize loading and parking interference with pedestrian environment
- Require off-street bicycle parking

- SLL Credit 4, Bicycle Network and Storage
- NPD Prerequisite 1, Walkable Streets, item (d)
- NPD Credit 1, Walkable Streets, optional item (p)
- NPD Credit 5, Reduced Parking Footprint
- NPD Credit 8, Transportation Demand Management

## 2.12 REDUCED OFF-STREET PARKING SPACES

Zoning codes typically define minimum number of parking spaces for specific types of land uses. These requirements often fragment the streetscape, creating an environment where surface parking lots dominate area adjacent to the sidewalk and roadway, with buildings set far back from the sidewalk. Such arrangements discourage people from walking and accommodate traffic flow and parking at the expense of all else. Such requirements also may prevent projects from meeting criteria in NPD Credit 5, Reduced Parking Footprint (NPDc5). NPDc5 allows projects to achieve one point by building no off-street parking lots for new nonresidential buildings and multiunit residential buildings or locating off-street surface parking lots at the rear or side of the buildings. Alternatively, projects may attain the NPDc5 point by using no more than 20 percent of the total development footprint area for all new off-street surface parking facilities, with no individual surface parking lot larger than two acres.

To increase pedestrian orientation and reduce adverse environmental effects associated with parking facilities, determine how much parking is actually necessary for specific uses within zoning districts targeted for sustainable neighborhood development. Make this determination by conducting an inventory or audit of actual parking demand (relative to capacity of existing lots and structures) and considering existing transit options, available public parking, access to diverse uses, future project marketability, and your community's goal to increase transit efficiency. In general, fewer parking spaces are necessary in mixed-use neighborhoods where residents, employees and business patrons share the same parking spaces, using them at different times of the day and different days of the week. Additionally, fewer spaces are required where walking or biking is a more viable transportation option. Following this study, amend the parking requirements in appropriate zoning districts to reduce parking space requirements using NPDc5 criteria.

Parking behind Main Street in Northampton, MA
Source: Pioneer Valley Local First

Where possible, eliminate off-street parking minimums altogether to enable projects within targeted districts to provide only that parking which is absolutely necessary for project viability. Where parking minimums or maximums are needed, prohibit off-street surface parking lots that collectively cover more than 20 percent of the total development footprint and that are individually larger than two acres, as required in NPDc5. Additionally, require, where feasible, that off-street parking be located preferably in the rear but if necessary at the side of the principal buildings on a site and away from all street frontage. While side parking lots are preferable to parking lots between the sidewalk and building, side parking lots still interrupt the street frontage and reinforce automobile use.

Reduced parking requirements also make it easier for projects to achieve Option 5 in NPD Credit 8, Transportation Demand Management (NPDc8). NPDc8 Option 5 requires projects to sell or rent parking spaces separately from 90 percent of the project's dwelling units or nonresidential square footage. This unbundling of parking spaces from dwelling units and nonresidential square footage results in fewer built parking spaces because it provides a strong financial incentive for building occupants to avoid using parking spaces. However, this is only possible if the amount of parking required for such uses in these zones is reduced from the outset. Additionally, it is increasingly common for municipalities to waive parking requirements for a given amount of square footage for commercial and office uses in specified districts. For an example, see City of Evanston, IL, code section 6-16-1-4.

### NASHVILLE, TENNESSEE

Nashville developed its Downtown Code to encourage sustainable neighborhoods after needing to award variances for LEED-ND and similar projects. Section IV of the Downtown Code explicitly states that "[n]o parking is required within the boundary of the DTC."

### HERCULES, CALIFORNIA

In Hercules, the Waterfront District Master Plan, the prevailing zoning document for Hercules Bayfront, permits off-street parking only within the rear 37 feet of each lot for building types I-A, I-B, and I-C, all one- or two-story houses (see plan section 3.6). Hercules Bayfront is a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system.

### CHAMPAIGN, ILLINOIS

Champaign developed its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) using the LEED-ND pilot rating system. Design requirements for these districts limit commercial off-street parking lots to 85 percent of minimum parking requirements in Article VII of the city's code (see City of Champaign, IL, code section 37-329.3). Further, developments may not locate commercial and multifamily residential off-street parking lots between the front of the building and the street.

## 2.13 SHARED PARKING

Shared parking is appropriate in neighborhoods where patrons or residents of nearby or adjacent uses have peak parking needs at different times of the day. For example, shared parking spaces may serve retail uses during the day and an adjacent apartment building at night. Shared parking reduces the number of parking spaces required to accommodate multiple adjacent land uses and can help projects attain the NPD Credit 5, Reduced Parking Footprint (NPDc5), criteria for reducing the development footprint of surface parking facilities (see Strategy 2.12 Reduced Off-Street Parking Spaces above).

To reduce parking requirements as described in *Strategy 2.12 Reduced Off-Street Parking Spaces*, a municipality has the option to explicitly permit, require or encourage shared parking where possible. The code also can allow a reduction in the minimum parking requirement for uses in a development when shared parking spaces (in an adequate quantity to serve all uses) are available in off-street parking facilities. Planners also should consider requiring a joint use agreement between users to formalize a shared parking arrangement. When drafting these changes, consult the Urban Land Institute's Shared Parking report as a

guideline for estimating parking demand for mixed-use buildings, sites and districts. Prior to pursuing this strategy, planners or qualified experts should perform parking studies of any district selected for sustainable neighborhood development and incorporate those studies into a formally adopted plan.

### CHAMPAIGN, ILLINOIS

In its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C), Champaign requires developments to design parking areas to be shared with other uses, especially those with differing peak parking times (see City of Champaign, IL, code section 37-329.3). Prior to recording the final plat, developers must obtain all necessary easements and licenses for shared parking. The city consulted the LEED-ND pilot rating system while developing the UN-R, UN-AC, and UN-C districts for its Curtis Road Interchange.

## 2.14 SHARED-USE VEHICLE PARKING AND PREFERENTIAL PARKING ALLOWANCES

Shared-use vehicle parking provisions and preferential parking allowances can contribute to reduced off-street parking and help projects achieve NPD Credit 5, Reduced Parking Footprint (NPDc5) and NPD Credit 8, Transportation Demand Management (NPDc8). Shared-use vehicle parking accommodates vehicles shared between multiple users. Option 4 in NPDc8 requires projects to locate 50 percent of the dwelling units and nonresidential building entrances within a quarter-mile walk distance of at least one vehicle in a vehicle-sharing program and dedicate parking spaces to vehicle-sharing members. Similarly, NPDc5 requires projects to provide a minimum amount of carpool or shared-use vehicle parking spaces.


Electric vehicle car share, Paris, France
Source: Ehpien, Creative Commons

To further reduce off-street parking, amend the parking requirements in appropriate zoning districts to explicitly permit or require shared-use vehicle parking in tandem with a reduced parking requirement as mentioned above in *Strategy 2.12 Reduced Off-Street Parking Spaces*. As in NPDc5, these shared parking provisions should require the dedication of 10 percent of the total automobile parking spaces for each nonresidential and mixed-use building on the site for carpools or shared-use vehicle parking. Further, these provisions should require that these dedicated parking spaces be placed within 200 feet of building entrances and be marked with signs.

Additionally, where appropriate, amend parking requirements to require that developers provide preferential parking allowances for carpools, vanpools, electric, and hybrid vehicles within existing or new parking lots. Prior to drafting these changes, conduct parking studies and planning as described above in *Strategy 2.13 Shared Parking*.

### CLEVELAND, OHIO

In part to facilitate several LEED-ND projects, Cleveland's Planning Commission is developing a "Green Design Overlay (GDO) District" zoning amendment (City of Cleveland, OH, draft code chapter 341A). The proposed GDO District includes supplemental Green Design Guidelines for this potential Design Review District. The guidelines would reduce the typical minimum off-street parking requirement by 50 percent for applicants who demonstrate availability of shared parking, on-street parking, or alternative transportation options (draft code section 341A.05(a)(3)(A)).

## 2.15 PROJECT-LEVEL TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM) programs increase transportation efficiency by employing strategies to reduce automobile use within a designated area. Because TDM programs reduce parking needs, their implementation justifies reduced parking requirements. Using criteria from NPD Credit 8, Transportation Demand Management (NPDc8) Option 1, amend parking requirements in appropriate zoning districts to allow reduced off-street parking, as described above in *2.12 Reduced Off-Street Parking Spaces*, when the developer creates a TDM program that reduces a project's weekday peak-period motor vehicle trips by at least 20 percent compared with a baseline case. Require TDM programs to achieve this reduction using:

- parking cash out programs that offer cash equivalent payments to commuters who use alternate transportation in lieu of their free parking spaces,
- flextime or flexible work hours to avoid peak commute times,
- ride sharing and a ride matching systems,
- pedestrian and bicycle promotion policies,
- occasional subsidized rides home for alternate transportation commuters,
- car-free programs, or
- reduced public parking.

Require developers to consult with a qualified transportation professional with TDM experience to determine baseline trip rates, future traffic projections, and potential traffic reductions from TDM strategies using resources from the Institute for Transportation Engineers (ITE) or other government transportation agencies.

## 2.16 BELOW-GRADE OR STRUCTURED PARKING

Below-grade and structured parking removes parking from the public eye, allows the use of limited available land for pedestrian-oriented uses, and decreases the visual dominance of the automobile. To encourage this, NPD Credit 5, Reduced Parking Footprint (NPDc5), exempts underground garages beneath habitable space and multistory structured parking from the NPDc5 requirement for parking placement in relation to buildings, maximum acreage, and maximum development footprint area of off-street surface parking facilities (see Strategy 2.12 Reduced Off-Street Parking Spaces above).

Despite increased project costs associated with below-grade and structured parking, your municipality should incentivize or, when reasonable and physically possible, require such parking in appropriate zoning districts. Where possible, amend parking requirements in zoning districts selected for sustainable neighborhood development to require off-street parking below grade, integrated within buildings or structured ramps, behind active uses, and screened from the view of public streets, such as by lining the first floor with retail uses. Further, amend parking requirements to prevent structured parking from occupying street level space, especially near sidewalks. Ground-level parking decks diminish the pedestrian experience, reducing walkability.

### NEW YORK CITY, NEW YORK

New York City adopted the Special Willets Point District as the zoning for the Willets Point Redevelopment Project in Queens, a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system. This district requires off-street parking to be entirely below the level of any street or publically available open space upon which the parking structure fronts (see New York City, NY, zoning code section 124-51).

## 2.17 LOADING DOCK AND DRIVEWAY ACCESS POINT PLACEMENT

Municipalities regulate loading docks in zoning regulations or site plan standards. When these requirements allow loading dock placement on a building's primary street frontage, they disrupt the pedestrian environment and conflict with item (d) in NPD Prerequisite 1, Walkable Streets (NPDp1). NPDp1 item (d) requires that no more than 20 percent of the street frontages within a project are faced directly by garage and service bay openings. Prohibit location of loading docks and service bays between a primary structure and major streets where other loading location options exist. In addition, loading provisions should include screening requirements except in limited circumstances.

Parking requirements also control driveway and parking structure access points, which can disrupt the pedestrian realm when located on major street frontage. Optional item (p) in NPD Credit 1, Walkable Streets (NPDc1), addresses this problem by requiring at-grade crossings with driveways to account for no more than ten percent of the length of sidewalks within the project. In areas where a community wants to foster sustainable neighborhood development, it can amend parking requirements to prohibit access points along major streets where other driveway location options exist.

### NASHVILLE, TENNESSEE

After having to award variances for LEED-ND and similar projects, Nashville developed the Downtown Code (DTC) to foster sustainable neighborhoods. DTC section IV requires public streets, pedestrian corridors, and open spaces to be shielded from view of loading docks, berths, or similar spaces, including, but not limited to, service entrances and maintenance areas. In addition, DTC section IV requires loading facilities to be located along an alley, an interior property line or internally within the property. Further, service elements, such as loading docks and trash collection locations, should not be accessible from primary streets unless it is the only frontage, and service facilities should be fully screened at all times. DTC section IV lists several screening methods.

## 2.18 OFF-STREET BICYCLE PARKING

Although it is becoming more common in newly revised parking ordinances and standards, many older zoning codes do not include bicycle parking and storage requirements, and new multifamily and nonresidential development typically does not include these amenities. In contrast, SLL Credit 4, Bicycle Network and Storage (SLLc4), and NPD Credit 5, Reduced Parking Footprint (NPDc5), both require projects to provide bicycle parking and facilities in order to promote bicycling, encourage transportation efficiency, and support public health.

Amend the parking requirements for appropriate zoning districts to require a minimum amount of secure, enclosed bicycle storage spaces and bicycle rack parking spaces for multiunit residential buildings, retail spaces, and other nonresidential buildings. Consult SLLc4 and NPDc5 to determine the exact amount of bicycle storage and parking spaces to provide for each of these uses. Parking requirements should require bike racks that are visible from any main entry, located within 100 feet of

main entries, served with night lighting, and protected from damage from nearby vehicles. Further, these requirements should mandate that retail and nonresidential buildings provide a minimum number of shower and changing facilities based on the amount of workers using the building.

### CLEVELAND, OHIO

Cleveland's Planning Commission is developing a "Green Design Overlay (GDO) District" zoning amendment to assist several LEED-ND projects (City of Cleveland, OH, draft code chapter 341A). The Green Design Guidelines in the GDO District zoning amendment would require secure bicycle parking for multifamily residences, mixed-use buildings, and commercial and institutional buildings located within any GDO District (draft code section 341A.05).

### CHAMPAIGN, ILLINOIS

Champaign consulted the LEED-ND pilot rating system while developing the Urban Neighborhood Activity Center and Urban Neighborhood Corporate zoning districts (UN-AC and UN-C) for its Curtis Road Interchange. Design requirements for the UN-AC and UN-C districts include bicycle facility standards (see City of Champaign, IL, code section 37-329.3). For office buildings of larger than 50,000 gross square feet and non-residential commercial uses of larger than 75,000 gross square feet, developers must provide showers and locker room facilities for use by employees. Developers must provide one locker (3'H x 1'W x 1'D) per required covered bicycle parking space and one shower room, accessible by either sex, for every five required covered parking spaces. The city requires varying amounts of bicycle parking for office and non-residential commercial uses (see code section 37-359).

## Case Study: Berkeley, California

In 2005, the City of Berkeley and the University of California, Berkeley began a Downtown Area Plan (DAP) initiative to revitalize the city's downtown into a sustainable, livable and vibrant area and to shape university development plans. The partners implemented an extensive community-based planning process that began with the City Council appointing a 21-member Downtown Area Plan Advisory Committee (DAPAC) to provide direction for a draft DAP. The city held almost 200 public meetings and workshops with the DAPAC, its subcommittees, the Planning Commission, other commissions, and City Council to develop the DAP. At the beginning of this process, city staff, with the help of planning experts, held several symposiums to educate DAPAC members about sustainable development and related planning principles. The DAPAC and its subcommittees identified issues the DAP should address, determined policies the DAP should include, reviewed preliminary drafts of the DAP, and sent recommendations to the Planning Commission and City Council in 2007. Using these recommendations as a foundation, the Planning Commission drafted a DAP that allowed greater building heights around transit. After a failed DAP in 2009[13] and a ballot measure passed with large community support for the DAP in 2010, the Planning Commission drafted a new DAP that City Council adopted in March 2012.

The 2012 DAP allows for greater density and more flexible height limitations around regional transit, in addition to mixed-uses, transportation demand management, urban design that promotes walkability, open and public space improvements, and stormwater management, among other strategies. City staff drafted the Commercial Downtown Mixed Use District (C-DMU) zoning (City of Berkeley, CA, municipal code chapter 23E.68) to implement the 2012 DAP, and City Council adopted the C-DMU in May 2012. In this process, planners incorporated urban design metrics from the LEED-ND rating system. For example, the city added zoning restrictions on blank walls and requirements for street-level windows in accordance with criteria in NPD Credit 1, Walkable Streets. The zoning also requires one bicycle parking space for every 2,000 square feet of commercial gross floor area. These bicycle parking spaces must be located in either a locker or in a rack suitable for secure locks. In addition, planners found the LEED-ND rating system helpful to cite as an authoritative source for the sustainable neighborhood development criteria that they wished to include in the C-DMU.

13 In May 2009, the City Council adopted the DAP by resolution but rescinded the plan when the requisite number of signatures were obtained to force a referendum on the plan due to concerns over building heights and sustainable development incentives. *See* Berkeley, CA, resolution no. 64,581-N.S.

# III. INCORPORATING LEED FOR NEIGHBORHOOD DEVELOPMENT INTO SITE PLAN AND SUBDIVISION REGULATIONS

This section of the manual shows localities how to incorporate LEED-ND criteria into site plan and subdivision regulations. Because site plan and subdivision regulations both contain development standards that the planning board or commission uses to review development proposals, the manual discusses them together. Traditionally, these regulations do not incorporate site design standards related to sustainability issues; however, localities increasingly use such standards and procedures to achieve sustainability at the site and building level. This section focuses on this trend, presenting on-site requirements derived from LEED-ND criteria that municipalities can add to their site plan and subdivision regulations to facilitate sustainable development district-wide. These recommended on-site requirements include standards for:

**A.** Street design and transportation,

**B.** Stormwater management and green utilities,

**C.** Sustainable site features,

**D.** Sustainable construction standards,

**E.** Specifications to protect natural resources, and

**F.** Conditions and exactions that facilitate sustainable neighborhoods.

Prior to implementing these standards, localities should consult municipal counsel to ensure that they may include these standards in site plan and subdivision regulations under state law. Municipalities that prefer to limit these strategies to areas targeted for sustainable neighborhood development should employ these requirements using overlay zoning or other flexible zoning techniques discussed in the manual's *Introduction & User's Guide*.

## STREET DESIGN & TRANSPORTATION

Traditionally, site plan and subdivision regulations include on-site requirements that govern street widths, pavement, curbs, sidewalks, and driveways, among other street features. Municipalities should compare their existing street design and transportation requirements to the sustainable street design techniques presented in the strategies below to identify any conflicts and use these strategies to incorporate LEED-ND criteria related to transportation infrastructure into these requirements.

### Street Design & Transportation Strategies:

- Require sustainable pavement
- Install energy-efficient traffic and street lights
- Improve street connectivity
- Increase transit access
- Provide a bicycle network and parking
- Create green streets
- Establish street widths that enhance streetscape
- Build walkable sidewalks and driveways
- Provide on-street parking
- Implement lower traffic speeds and traffic-calming measures

- SLL Prerequisite 1, Smart Location
- SLL Credit 3, Locations with Reduced Automobile Dependence
- SLL Credit 4, Bicycle Network and Storage
- NPD Prerequisite 1, Walkable Streets, items (b), (c) & (d)
- NPD Prerequisite 3, Connected and Open Community
- NPD Credit 1, Walkable Streets, optional items (i), (j), (m), (n), (o) & (p)
- NPD Credit 5, Reduced Parking Footprint
- NPD Credit 6, Street Network
- NPD Credit 8, Transportation Demand Management
- NPD Credit 14, Tree-Lined and Shaded Streets
- NPD Credit 15, Neighborhood Schools
- GIB Credit 9, Heat Island Reduction
- GIB Credit 13, Infrastructure Energy Efficiency
- GIB Credit 15, Recycled Content in Infrastructure

# 3.1 SUSTAINABLE PAVEMENT

Sustainable pavement technologies include high-reflectance, permeable, and recycled content pavement materials that help reduce the heat island effect, stormwater runoff, and adverse environmental effects associated with use of virgin materials. Typically, site plan and subdivision regulations have minimal pavement requirements. These include specifications for thickness and durability or composition. Municipalities can update these regulations to support sustainable pavement technologies.

## High-Reflectance & Open Grid Pavement

Permeable pavers in High Point, Seattle, WA
Source: Brett VA, Creative Commons

Amend the pavement standards in your community's site plan and subdivision regulations to allow or require retrofitted or new transportation infrastructure with high-reflectance pavement and pervious open-grid pavement systems in accordance with GIB Credit 9, Heat Island Reduction (GIBc9). GIBc9 requires that 50 percent of a project's non-roof hardscape be constructed using heat-reducing strategies such as paving materials with a solar reflectance index (SRI) of at least 29 or open-grid pavement systems that are at least 50 percent pervious or both. SRI quantifies the reflectivity of materials by measuring the pavement's ability to reject solar heat; materials with the highest SRI values are the coolest choices. Open-grid systems provide structural capacity for vehicle traffic while providing permeability and infiltration benefits for stormwater runoff. Non-roof hardscape appropriate for these technologies include roads, sidewalks, courtyards, parking lots, parking structures, and driveways.

## Recycled Content Pavement

Also amend pavement standards to allow or require retrofitted or new pavement made of recycled content or reclaimed materials as in GIB Credit 15, Recycled Content in Infrastructure (GIBc15). GIBc15 requires at least 50 percent of the total mass of infrastructure materials to consist of postconsumer recycled content, in-place reclaimed materials, and half of any pre-consumer recycled content used. This applies to infrastructure materials for roadways, parking lots, sidewalks, unit paving, and curbs, as well as base and sub-base materials for this infrastructure. When drafting this amendment consult GIBc15 for recycled content definitions and calculations for total recycled content and percentage of recycled content. Also, consult ISO/IEC$_{14021}$, Environmental Labels and Declarations—Self-Declared Environmental Claims (Type II Environmental Labeling). This standard specifies requirements for self-declared environmental product claims, gives qualifications for the use of selected terms in these claims, and describes evaluation and verification methods for these claims. Prior to making any of these changes, discuss pavement requirements with your municipality's street engineers and consultants. Be sure to coordinate these techniques with existing thickness, durability, and safety requirements for pavement.

### LAS VEGAS, NEVADA

The regulatory design standards for Symphony Park, a LEED-ND pilot project in Las Vegas, include sustainable pavement standards. The Streetscape and Open Space section of the Symphony Park Design Standards require that pavement in pedestrian areas be constructed of light colored, radiation-reflective material to counter heat absorption (see design standards section 2.1.1).

## 3.2 ENERGY-EFFICIENT TRAFFIC AND STREET LIGHTS

Often, local transportation policies include traffic and street light requirements. These requirements are relevant for site plan and subdivision developments that involve public/private partnerships with developers. Requirements for energy-efficient traffic and street lights help reduce pollution and carbon emissions associated with energy use and support GIB Credit 13, Infrastructure Energy Efficiency (GIBc13). GIBc13 requires the installation of infrastructure (including traffic lights and street lights) that achieves a 15 percent annual energy reduction below an estimated baseline energy use for this infrastructure.

Amend your community's street design and transportation regulations using GIBc13 criteria to require or encourage retrofitted or new energy-efficient traffic and street lights in each development project. Consult GIBc13 guidance in the LEED Reference Guide for Neighborhood Development to calculate a baseline using the lowest-first-cost models for traffic and street lights within your community. Then identify energy-efficient models and calculate their total expected energy use. Amend street design regulations to require the use of several models that achieve at least a 15 percent reduction in energy use over the baseline, using the equation provided in GIBc13 guidance. Additionally, consider allowing any other traffic and street lights that applicants can prove also meet this energy reduction requirement.

## 3.3 STREET CONNECTIVITY

Street connectivity refers to the number of publicly accessible street intersections per square mile, including street intersections with dedicated alleys, transit rights-of-way, and nonmotorized rights-of-way such as trails. This definition excludes intersections leading only to culs–de-sac and intersections where one must enter and exit through the same intersection, as well as any intersections beyond that point. Increased street connectivity between and within neighborhoods makes walking and biking more attractive, relieves traffic congestion, and makes services, public spaces, and transportation options more accessible through direct routes.

Amend your municipality's street design and transportation requirements to require retrofitted and new street networks that form a grid of continuous and interconnected streets and alleys. These networks should provide multiple direct connections between residences, employment, and local destinations such as parks, schools, and neighborhood or commercial centers. Additionally, require street networks to connect site plan and subdivision developments to existing developments through intra- and inter-neighborhood connections. To accomplish this, include minimum spacing and connectivity requirements as presented in NPD Prerequisite 3, Connected and Open Community (NPDp3) and NPD Credit 6, Street Network (NPDc6).

NPDp3 requires a project to have internal connectivity that is at least 140 intersections per square mile, all of which must be publicly accessible. NPDp3 further requires at least one through-street or nonmotorized right-of-way intersecting or terminating at the project boundary at least every 800 feet, or at existing or abutting street intervals and intersections, whichever is the shorter distance. Similarly, NPDc6 requires that a project have a through-street or nonmotorized right-of-way intersecting or terminating at the project boundary at least every 400 feet or at existing abutting street intervals and intersections, whichever is the shorter distance. NPDc6 also requires a pedestrian or bicycle through-connection in at least 90 percent of any new culs-de-sac. The credit further requires internal connectivity or connectivity within a quarter-mile of the project boundary, or both, to be more than 300 street intersections per square mile.

Aerial view of street grid in downtown Portland, OR
Source: Sam Beebe, Creative Commons

Limit or discourage dead end streets and gated street entryways. Where streets cannot be networked, supplement the area with a system of pedestrian and bicycle paths to ensure direct and continuous connectivity with major destinations and transit stops. Require on-site pedestrian walkway systems that separate pedestrians from vehicles using sidewalks or paseos. Require well-marked pedestrian crossings, and provide site amenities that offer safety and comfort, which can include shade, drinking fountains, and benches. When drafting these requirements, consider sketch planning techniques and travel forecasting models to estimate demand, spacing, and capacity needs, as well as walkability criteria (see the Institute of Transportation Engineers' and the Congress for the New Urbanism's Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, chapter 3,

Urban Corridor Thoroughfare Planning for Walkable Urban Areas). Prior to making these amendments, overhaul existing transportation plans to support connectivity requirements. Ensure that the thoroughfare plans and policies in your municipality's comprehensive plan include goals, objectives and strategies to improve street connectivity (see Strategy 1.3 Transportation and Circulation, Street Connectivity).

### CHAMPAIGN, ILLINOIS

Champaign consulted the LEED-ND pilot rating system while developing the Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) for its Curtis Road Interchange. To provide efficient and safe connections to pedestrians, bicyclists and vehicles, design requirements for these districts require each development to provide street connectivity of at least 140 intersections per square mile (see City of Champaign, IL, code section 37-329.3). To ensure proper flow and breaks in the roadways, these design requirements establish minimum and maximum block face lengths of 200 and 600 feet, respectively. Only public streets and up to 20 percent of multi-use or pedestrian connections may be included when complying with these requirements. In the UN-AC and UN-C districts, if a block face exceeds 400 feet, the development must provide a lighted, mid-block pedestrian pass through to connect opposite sides of the block face.

## 3.4 TRANSIT ACCESS

Sufficient access to transit facilities, such as bus stops or rail stations, helps reduce carbon emissions, decrease the need for road infrastructure, and encourages walking and bicycling. Because of this, Option 3 in SLL Prerequisite 1, Smart Location (SLLp1), SLL Credit 3, Locations with Reduced Automobile Dependence (SLLc3), and Option 3 in NPD Credit 8, Transportation Demand Management (NPDc8), all encourage transit access.

To increase access to transit within your community, amend your municipality's site plan and subdivision regulations to require integration of transit facilities into plans and plats in accordance with municipal policies and escrowing funds for construction. For appropriate neighborhoods, include minimum distances between residences and transit stops and consult criteria in SLLp1 and SLLc3 when drafting these changes. At a minimum, require development projects to locate at least 50 percent of dwelling units and nonresidential building entrances within a quarter-mile walk distance of bus or streetcar stops, or within a half-mile walk distance of bus rapid transit stops, light or heavy rail stations, or ferry terminals.

Work with the local or regional transit agency to increase transit service levels. Transit service should meet weekday and weekend trip minimums as presented in SLLp1 Option 3. To provide even greater access to transit, work with the transit agency to require higher weekday and weekend trip minimums as presented in SLLc3. SLLc3 allows projects larger than 125 acres to meet its requirements despite locating fewer dwelling units and nonresidential building entrances near transit stops, as long as the distance-compliant uses also achieve NPDp2 and uses beyond the distance are served by SLLp1 Option 3-compliant planned transit service.

Phoenix light rail
Source: Michelle Dyer, Creative Commons

Finally, amend site plan and subdivision regulations using criteria from NPDc8 Option 3. Require the provision of a year-round, developer-sponsored private transit service (with vans, shuttles, or buses) from at least one central point in the project to other major transit facilities and destinations. This transit service should provide at least

45 daily weekday trips and 30 daily weekend trips. Further, require covered transit stop shelters with seating and illumination, as well as secure bicycle racks adequate to meet projected demand.

### CHAMPAIGN, ILLINOIS

Champaign developed its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) using the LEED-ND pilot rating system. Design requirements for these districts require the development of a transit hub to accommodate three stacking bus spaces, two car share spaces, and 50 bicycle parking spaces (see City of Champaign, IL, code section 37-329.3). Future developments in these districts must provide bus access and amenities such as shelters based on planned bus routes and development density.

### STAMFORD, CONNECTICUT

Zoning regulations for the Harbor Point development in Stamford require "the applicant [to] implement and insure the ongoing maintenance and operation of a jitney transit system providing convenient service to the Transportation Center and downtown shopping and entertainment locations . . ." (see Stamford, CT, zoning regulation sections 9(J)(5)(i) & 9(K)(5)(h)). Harbor Point is a LEED-ND Certified Plan at the gold level under the pilot version of the rating system.

## 3.5 BICYCLE NETWORK AND PARKING

Traditionally, site plan and subdivision regulations do not require any bicycle network or parking. Recently, however, more communities are embracing bicycling as a way to reduce vehicle miles traveled. SLL Credit 4, Bicycle Network and Storage (SLLc4), NPD Credit 5, Reduced Parking Footprint (NPDc5), and NPD Credit 15, Neighborhood Schools (NPDc15), all promote transportation and public health by encouraging bicycle networks or parking.

### Bicycle Network

SLLc4 requires an existing bicycle network within a quarter-mile bicycling distance of the project boundary. The project boundary must:

- be at least five continuous miles in length,
- connect a residential project to a school or employment center within a three miles bicycling distance, or
- connect to at least 10 diverse uses within three miles from the project boundary.

NPDc15 requires streets connecting residential areas to a school site to feature bicycle lanes or traffic-calming measures. Further, projects that include schools must ensure that cyclists can reach building entrances easily without crossing bus zones, parking entrances, and student drop-off areas.

Separated bike lane, Washington, DC
Source: Payton Chung, Creative Commons

To encourage bicycling within your community, amend your municipality's street design and transportation standards to require an on-site bicycle network using criteria in SLLc4 and NPDc15. The required network should connect to existing municipal systems and off-street trail systems. The network also should connect buildings to nearby major destinations, such as neighborhood and commercial centers, parks, schools, and transit, as well as bicycle facilities. The bicycle system can consist of on-street lanes, off-street trails, and low-speed streets. On-street bicycle lanes normally are placed adjacent to the roadway within the shoulder or two to three feet of a curb. These lanes should include signage and striping for safety. For more information about bicycle lanes on major thoroughfares, see chapter 9 of the Institute of Transportation Engineers' and the Congress for the New Urbanism's Designing Walkable Urban Thoroughfares: A Context Sensitive Approach. Off-street trail systems are placed in a separate right-of-way (12-30 feet wide). Low-speed streets are designed for a target speed of 25 miles per hour or slower. On-street bicycle lanes must be at least five feet wide, and off-street trails must be at least eight feet wide for a two-way path and at least five feet wide for a one-way path.

### On-Street Bicycle Parking

Although SLLc4 and NPDc5 only include criteria for off-street bicycle parking related to use (see Strategy 2.18 Off-Street Bicycle Parking), consider also requiring the developer to install on-street bicycle parking, such as permanent bicycle racks, to provide adequate parking at bicycle destinations throughout a development project. Bicycle parking requirements can dictate where bicycle parking is located, security and protection measures, a minimum number of parking spaces, and bicycle rack construction materials and dimensions. On-street bicycle parking should not block the pedestrian path of travel or inhibit universal accessibility. Further, it should allow clearance for users to dismount and circulate and should provide two points of contact with a bicycle frame.

## 3.6 GREEN STREETS

Site plan and subdivision regulations can include requirements for street trees on streets and within parking lots. Trees and shade generally encourage multimodal transportation, reduce building cooling loads, diminish heat islands, and help projects achieve NPD Credit 14, Tree-Lined and Shaded Streets (NPDc14) and GIB Credit 9, Heat Island Reduction (GIBc9).

To create green streets, amend street design and transportation requirements in site plan and subdivision regulations to require street trees along existing and new streets using criteria in NPDc14. Require development projects to provide trees along both sides of at least 60 percent of new and existing streets, between the vehicle travel way and walkway, at intervals averaging no more than 40 feet. Alternatively, require that shade from trees or other structures cover at least 40 percent of the length of sidewalks within or contiguous to the development. These trees should provide shade within 10 years of installation. Use the estimated crown diameter (the width of the shade if the sun is directly above the tree) to calculate the shaded area. Further, require an expert determination that planting details are appropriate, taking into account tree species, root medium, and planter strip width and soil volume. Ensure that invasive species are not included in plantings by instructing the expert to consult the USDA or the state agricultural extension service when making this determination.

Also require site plan and subdivision developments to shade a certain percentage of nonroof hardscape using criteria from GIBc9. Nonroof hardscape includes roads, sidewalks, courtyards, parking lots, parking structures, and driveways. Development projects could accomplish required shading using a tree canopy (within 10 years of landscape installation) or open structures, such as those supporting solar photovoltaic panels, canopied walkways, and vine pergolas, all with a solar reflectance index (SRI) of at least 29. Other open structures include awnings and trellises.

Bioswale, Portland, OR
Source: Sophie Lambert

When drafting tree planting standards, consider requiring deciduous trees that would allow buildings to benefit from solar heat gain during winter months. Also, consider requiring the use of native and adapted species to reduce the need for irrigation, chemical fertilizers, and chemical pesticides and prohibit or limit the use of invasive species and species with nuisance fruits or flowers. When possible, require developers to retain existing street trees or transplant trees from construction zones. Also, require tree plantings in any planned street medians and center islands. Work with an expert to incorporate best practices for stormwater management to ensure that street trees will infiltrate and evapotranspire stormwater, and require the use graywater or treated wastewater for irrigation. When making all of these amendments, consult with appropriate municipal staff to consider above and underground utility placement and maintenance issues.

## CHAMPAIGN, ILLINOIS

In its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C), Champaign requires developments to provide one tree for every 50 feet of frontage along public streets and private access drives (see City of Champaign, IL, code section 37-329.3). The city consulted the LEED-ND pilot rating system while developing the UN-R, UN-AC, and UN-C districts for its Curtis Road Interchange.

## CLEVELAND, OHIO

In part to facilitate several LEED-ND projects, Cleveland's Planning Commission is developing a "Green Design Overlay (GDO) District" zoning amendment (City of Cleveland, OH, draft code chapter 341A). The draft GDO District includes requirements to reduce the heat island effect. These require projects to place at least 50 percent of off-street parking spaces under cover (draft code section 341A.05(a)(3)(C)). Roofs used to shade parking must achieve a solar reflectance index (SRI) of at least 29. Alternatively, a project can achieve compliance by using one of three strategies for at least 50 percent of a site's hardscape area:

1. creating shade through high-reflectance roof overhangs or tree canopies,
2. installing paving materials with an SRI of at least 29, or
3. installing an open-grid or permeable pavement system that facilitates on-site infiltration of stormwater.

For surface parking lots, projects can achieve compliance by planting at least one deciduous tree for every ten parking spaces, with each tree being at least one inch in caliper at the time of planting (see draft code section 341A.05(a)(3)(C)(i)).

## 3.7 STREET WIDTHS THAT ENHANCE STREETSCAPE

Wide streets (greater than 60 feet according to the Institute of Transportation Engineers' and the Congress for the New Urbanism's Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, chapter 9, Lane Width) and lanes encourage higher traffic speeds and detract from a comfortable pedestrian environment. Although the LEED-ND rating system does not include street width criteria, local street width standards may conflict with the building-height-to-street-width criteria in NPD Prerequisite 1 and Credit 1, Walkable Streets (NPDp1, NPDc1). NPDp1 and NPDc1 encourage building locations close to the street and building heights that provide a sense of enclosure to the public realm.

Item (b) in NPD Prerequisite 1, Walkable Streets (NPDp1), requires a minimum building height-to-street-width ratio of 1:3 for at least 15 percent of existing and new street frontage within and bordering a project. This requirement results in a minimum of one foot of building height for every three feet of street width, measured from façade to façade. Additionally, 100 percent of existing and new nonmotorized rights-of-way included in the overall 15 percent calculation must achieve a ratio of 1:1. When measuring street width from the façade to just the street centerline, the equivalent minimum building-height-to-street-centerline ratios are 1:1.5 for streets and 1:0.5 for nonmotorized rights-of-way. Optional item (m) in NPD Credit 1, Walkable Streets (NPDc1), builds on this, requiring the same minimum ratios for at least 40 percent of a project's street frontage.

To enhance the streetscape and slow traffic within development projects, amend street design and transportation standards to require retrofitted or new streets with narrower lane widths (10 to 12 feet) for walkable, lower-speed urban thoroughfares such as arterials and collectors (see chapter 9 of *Designing Walkable Urban Thoroughfares*, Lane Width). For example, consider requiring 10 to 11 foot lanes for streets and avenues and up to 12 foot lanes for boulevards as recommended by Douglas Farr in Sustainable Urbanism: Urban Design with Nature. Consult resources such as this and *Designing Walkable Urban Thoroughfares* when making these changes. Such regulations can narrow streets by requiring wide sidewalks, bollards or planters, on-site parking, and bicycle lanes. When selecting lane widths consider the following factors: target speed, the types of vehicles that will use the lane, the available right of way, and the width of adjacent bicycle lanes and on-street parking. Additionally, work with municipal traffic engineers to create street width standards that allow safety vehicles, such as fire trucks and ambulances, to pass safely around turns at an accelerated speed while keeping streets as narrow as possible. (See Strategy 4.18 Street Widths and Fire Safety.)

## 3.8 WALKABLE SIDEWALKS AND DRIVEWAYS

A comprehensive network of continuous, uninterrupted, and unobstructed sidewalks allows pedestrians to reach their destinations safely by foot. To improve walkability and transportation efficiency, NPD Prerequisite 1 and Credit 1, Walkable Streets (NPDp1, NPDc1), and NPD Credit 15, Neighborhood Schools (NPDc15), include criteria for continuous sidewalks or equivalent walking provisions.

### Wide, Continuous Sidewalks

To encourage walking within your community, amend the sidewalk requirements in your site plan and subdivision regulations using criteria in NPDp1 item (c) and NPDc1 optional item (j). Where appropriate, require retrofitted or new sidewalks, or all-weather-surface footpaths, that are continuous along both sides of a street or frontage. Sidewalks should be at least eight feet wide on retail or mixed-use blocks and at least four feet wide on all other blocks. Also, amend site plan and subdivision regulations to ensure that sidewalks lead directly, continuously, and safely to all important destinations, such as schools, parks, and neighborhood and commercial centers. This further contributes to transportation efficiency and helps projects achieve NPDc15, which requires streets within or bordering a project boundary that lead from residential areas to a school site to have a complete network of sidewalks on both sides and safe crossings.

Inviting pedestrian environment in Washington, DC
Credit: via Flickr user Dewitah

### Minimized Driveway Crossings on Sidewalks

In addition, amend your municipality's site plan and subdivision regulations to restrict the number of potential points of conflict between pedestrians (using sidewalks) and vehicles (using a driveway that crosses sidewalk). NPDp1 item (d) requires that no more than 20 percent of street frontages within a project are faced directly by garage and service bay openings. Similarly, NPDc1 optional item (p) limits sidewalk intrusions by allowing crossings with existing or new driveways along no more than 10 percent of the sidewalk length within a project. Limit sidewalk intrusions by minimizing, consolidating, or eliminating driveways in appropriate areas that will draw pedestrian activity. Going beyond NPDc1 optional item (p), consider requiring sidewalk appearance and elevation to be maintained across driveways and driveway aprons that do not extend into sidewalks (see the Institute of Transportation Engineers' and the Congress for the New Urbanism's Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, chapter 8, Driveway Crossing Principles and Considerations).

#### CHEYENNE, WYOMING

Planning staff from Cheyenne used the LEED-ND rating system to translate broad sustainability language from PlanCheyenne, the city's comprehensive plan, into a Unified Development Code (UDC), a comprehensive revision of the city's previous subdivision regulations, zoning ordinances, and design guidelines. The UDC requires all development sites to "include direct pedestrian connections and circulation routes at the same or greater frequency as is provided by streets, driveways, and internal access streets" and requires minimum sidewalk widths that range from six to 12 feet (see UDC section 6.2.3(c)).

## 3.9 ON-STREET PARKING

On-street parking protects pedestrians on a sidewalk from vehicles on the street, increases street activity, and reduces the need for off-street parking, which consumes buildable land, requires driveways, and interrupts sidewalks. To increase access to on-street parking in your community, amend your municipality's street design and transportation requirements to require a minimum amount of on-street parking using optional item (i) in NPD Credit 1, Walkable Streets (NPDc1). Where possible, require projects to provide on-street parking along a minimum of 70 percent of both sides of all existing and new streets. Calculate the percentage of on-street parking by dividing the length of street designated for parking by the total length of the curb along each street, including curb cuts, driveways, and intersection radii. Corner bulb-outs (within 24 feet of the intersection), transit stops, and motorcycle or bicycle parking may be counted as designated for parking in this calculation.

Prior to making this amendment, assess how much on-street parking is required. This amount depends on street characteristics, traffic capacity, and access needs for adjacent land uses. When drafting these requirements, consider parallel or angled parking, accessibility requirements, metered parking to enforce time limits, appropriate parking lane widths, and spacing requirements for trees, poles, fire hydrants, bus stops, curb cuts, driveways and intersection radii (see the Institute of Transportation Engineers' and the Congress for the New Urbanism's Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, chapter 9, On-Street Parking Configuration and Width).

## 3.10 LOWER TRAFFIC SPEEDS AND TRAFFIC-CALMING MEASURES

Lower traffic speeds promote multimodal transportation by enhancing safety for pedestrian and bicycle travel. Traffic-calming measures contribute to lower traffic speeds through street design and engineering criteria that help attain an intended target speed. Optional items (n) and (o) in NPD Credit 1, Walkable Streets (NPDc1), require maximum target speeds for certain street types to encourage lower traffic speeds, while NPD Credit 15, Neighborhood Schools (NPDc15), requires streets leading from a residential area to a school site to have bicycle lanes or traffic-calming measures.

## Lower Traffic Speeds

Some state traffic safety laws and transportation laws give local legislative bodies authority to establish traffic laws upon the advice of local safety and planning departments. In order to create a more pedestrian- and bicycle-friendly environment, use this authority to require lower traffic speeds in development projects by amending your municipality's site plan and subdivision regulations using criteria in NPDc1 optional items (n) and (o). Where appropriate, require a 20-mile-per-hour speed limit for existing and new residential streets, and require a 25-mile-per-hour speed limit for existing and new nonresidential or mixed-use streets. Exempt from this requirement the through-lanes of a multilane boulevard if separated from access lanes by medians and if pedestrian crosswalks are installed across the boulevard at intervals no greater than 800 feet. In addition, lower your municipality's standard speed limits for existing roads.

## Traffic-Calming Measures

Further amend site plan and subdivision requirements to include traffic-calming measures that ensure these lower traffic speeds are met. Require that existing and new streets be designed for multiple users, including pedestrians, bicycles, transit vehicles, trucks and cars. In addition, require narrow rights-of-way, narrow lane widths, on-street parking, and intersections spaced no more than 800 feet apart (see Strategies 3.3 Street Connectivity, 3.7 Street Widths that Enhance Streetscape, and 3.9 On-Street Parking above). Travel lane widths should be no greater than 11 feet and parallel parking lane widths no greater than eight feet. Mandate the use of textured paving materials; medians and median landscaping; and roadside and curb treatments such as bulb-outs, street furniture and other landscaping elements. For streets leading from residential areas to school sites, control traffic by requiring on-street parking, street trees, narrow streets, clearly marked crosswalks, controlled intersections, and caution signs. Consult the Institute of Transportation Engineers' technical standards for additional design speed information.

Traffic calming measures
Source: Payton Chung, Creative Commons

### CHEYENNE, WYOMING

Cheyenne used the LEED-ND rating system to translate broad sustainability language from PlanCheyenne, the city's comprehensive plan, into a Unified Development Code (UDC). Street design standards in the UDC's Subdivision Section list maximum speed limits for several different street design types (see UDC section 4.3.4). The UDC applies the street design type entitled "Street" to streets with a highly connected street network within or adjacent to mixed uses, neighborhood/community centers and urban neighborhoods. "Streets" must be designed for speeds of 20 MPH with a 20 MPH speed limit. The street design type entitled "Neighborhood Street" is applied to collector or local streets within or adjacent to urban neighborhoods and urban transition neighborhoods with highly connected street networks. "Neighborhood Streets" also must be designed for speeds of 20 miles per hour with a posted speed limit of 20 miles per hour as well.

# STORMWATER MANAGEMENT & UTILITIES

Site plan and subdivision regulations may include on-site standards for stormwater management and utilities. The below strategies present how to incorporate LEED-ND criteria into site plan and subdivision regulations to enhance sustainability within a municipality's stormwater and utility infrastructure. Municipalities should compare these strategies to existing stormwater management and utility requirements to ensure they do not inhibit sustainability objectives. Where appropriate, municipalities should amend these requirements using the below strategies.

**Stormwater Management & Utility Strategies:**

- Implement sustainable stormwater management infrastructure
- Establish green utility requirements

- GIB Credit 4, Water-Efficient Landscaping
- GIB Credit 8, Stormwater Management
- GIB Credit 13, Infrastructure Energy Efficiency
- GIB Credit 15, Recycled Content in Infrastructure

## 3.11 SUSTAINABLE STORMWATER MANAGEMENT INFRASTRUCTURE

Impervious surfaces, such as pavement, increase runoff and prevent stormwater from infiltrating the soil. This causes flooding that transfers nutrients, sediments, and contaminants into surface water where they degrade water quality. Conventional off-site stormwater controls (i.e., stormwater ponds and collection and treatment systems) often fail to protect water bodies adequately. In contrast, on-site solutions capture and deal with stormwater where it originates. On-site systems use natural tools like vegetation and soil to minimize the impervious area footprint, retain stormwater, and allow runoff to be treated, infiltrate soil or evapotranspirate through vegetation. On-site solutions include:

- minimized building footprint and impervious coverage,
- preservation of natural areas,
- porous pavement or pavers,
- bioretention systems,
- rainwater cisterns, and
- vegetated filter strips, among others.

To reduce stormwater runoff, amend your municipality's site plan and subdivision regulations to require that each development project create and submit for approval a stormwater management plan, using criteria from GIB Credit 8, Stormwater Management (GIBc8). These plans must require development projects to retain on-site the total volume of rainfall that occurs during an 80th to 95th percentile rainfall event through infiltration, evapotranspiration, or reuse. Plans should measure rainfall volume based on development footprint, impervious surfaces, and pollution generating pervious surfaces. Consult GIBc8 criteria and guidance in the LEED-ND Reference Guide when drafting this mandate. Additionally, these plans must meet this retention maximum using on-site solution best management practices (BMPs) selected from the Washington State Department of Ecology's *Stormwater Management Manual for Western Washington, Volume V, Runoff Treatment* (2005 edition). Further, plans should ensure compliance with state and federal regulations, including the federal stormwater management program for municipal separate storm sewer systems (MS4s) under the Clean Water Act. Finally, plans should include season-specific maintenance that ensures continuous performance, as well as BMPs (except cisterns) designed to drain down within 72 hours. When implementing this strategy, municipalities should keep in mind that costs associated with meeting stormwater management requirements may require lower development densities to reduce impervious coverage. This may, in some instances, conflict with desired development densities.

### MILWAUKEE, WISCONSIN

Milwaukee implements Storm Water Management Regulations that helped the Brewery project achieve the maximum of five possible points under the LEED-ND pilot rating system (see City of Milwaukee, WI, code of ordinances chapter 120). The regulations require stormwater measures for new developments that include mandatory reductions in runoff release rates and runoff discharge quality control criteria. In addition, the regulations require developers to prepare a stormwater management plan with mandatory best management practices listed within the regulations. The Brewery is a certified LEED-ND plan at the platinum level under the pilot version of the rating system.

## 3.12 GREEN UTILITIES

Utilities can consume significant amounts of energy and virgin materials for construction and operation. GIB Credit 13, Infrastructure Energy Efficiency (GIBc13), and GIB Credit 15, Recycled Content in Infrastructure (GIBc15), aim to reduce utility infrastructure energy use and increase recycled and reclaimed materials in utility infrastructure, respectively. Additionally, sewage utilities can help conserve potable water by providing water treated for non-potable uses, as encouraged in GIB Credit 4, Water-Efficient Landscaping (GIBc4). Municipalities can amend their site plan and subdivision regulations to require the construction and operation of green utilities using criteria from GIBc13, GIBc15 and GIBc4.

### Utility Energy Efficiency

To increase energy efficiency in your community, amend your municipality's site plan and subdivision regulations to require retrofitted or new energy-efficient utility equipment. Require development projects to install water and wastewater pumps and utility systems that achieve a 15 percent annual energy reduction below an estimated baseline energy use for this infrastructure in accordance with GIBc13. Consult GIBc13 guidance in the LEED Reference Guide for Neighborhood Development to calculate a baseline using the lowest-first-cost models for infrastructure components. Then identify energy-efficient models and calculate their total expected energy use. Amend utility regulations to require the use of several models that achieve at least a 15 percent reduction in energy use over the baseline, using the equation provided in GIBc13 guidance.

### Recycled and Reclaimed Content in Utilities

Additionally, amend utility standards to require retrofitted or new infrastructure materials composed of recycled content or reclaimed materials as in GIBc15. For at least 50 percent of the total mass of utility infrastructure materials, require development projects to use postconsumer recycled content, in-place reclaimed materials, and half of any pre-consumer recycled content used. Utility infrastructure materials include water retention tanks and vaults and their base and sub-base materials; sanitary sewers and water piping; and stormwater systems. When drafting this amendment consult GIBc15 for recycled content definitions and calculations for total recycled content and percentage of recycled content. Also, consult ISO/IEC14021, Environmental Labels and Declarations—Self-Declared Environmental Claims (Type II Environmental Labeling), which specifies requirements for self-declared environmental product claims, gives qualifications for the use of selected terms in these claims, and describes evaluation and verification methods for these claims.

### Non-Potable Water from Sewage Utilities

Finally, amend site plan and subdivision regulations to require retrofitted and new sewage utilities that employ technologies to provide water treated and conveyed for nonpotable uses, such as landscaping. This conserves potable water and supports GIB Credit 4, Water-Efficient Landscaping (GIBc4). GIBc4 requires the reduction of water consumption for outdoor landscape irrigation by 50 percent from a calculated midsummer baseline case using a combination of strategies, including use of water treated and conveyed by a public agency specifically for nonpotable uses. Such regulations must comply with the standards

required in any state and regional health or environmental permitting systems. Similarly, GIB Credit 14, Wastewater Management (GIBc14), requires projects to retain, treat, and reuse wastewater generated by the project on-site. For more information about standards your municipality can adopt to manage wastewater, see Strategy 4.15 Graywater Systems.

# SITE FEATURES

Site plan and subdivision regulations may regulate site features such as landscaping, site lighting, solar access, and the development footprint of development projects. The strategies presented below show planners how to incorporate more sustainable site features into site plan and subdivision regulations using relevant LEED-ND criteria. Municipalities should compare their current regulations to these strategies to identify any conflicts and amend these regulations accordingly.

**Site Feature Strategies:**

- Implement water-efficient landscaping
- Install site lighting that reduces light pollution
- Protect undisturbed impervious coverage
- Establish solar-oriented blocks to maximize solar access

- GIB Credit 4, Water-Efficient Landscaping
- GIB Credit 7, Minimized Site Disturbance in Design and Construction
- GIB Credit 10, Solar Orientation
- GIB Credit 17, Light Pollution Reduction

## 3.13 WATER-EFFICIENT LANDSCAPING

Water-efficient landscaping reduces the use of potable and natural water. Amend site plan and subdivision regulations to require water-efficient landscaping using criteria from GIB Credit 4, Water-Efficient Landscaping (GIBc4). GIBc4 requires projects to reduce water consumption for outdoor landscape irrigation by 50 percent from a calculated midsummer baseline case using water-efficient strategies. These strategies include water-efficient plant species, plant density and microclimate factor, and irrigation efficiency. Consider requiring planned water-use zones; shadow profiles of landscape areas; and a landscaping site map that shows, among other things, topography and sun and wind exposure. Require the use of climate-tolerant native or adaptive plants, mulch, and water-efficient irrigation technology. Consult GIBc4 implementation guidance in the LEED Reference Guide for Neighborhood Development for more information when drafting these standards.

### CHEYENNE, WYOMING

Cheyenne used the LEED-ND rating system to evaluate its new Unified Development Code (UDC). The UDC includes landscape standards for site plan developments (see UDC section 6.3). These standards base landscape material requirements on a point system that favors trees, shrubs and ground cover that require less than one inch of supplemental watering per week during hot, dry periods. The system also favors native grass. Further, the landscape standards specify that "tree species selection should reflect species historically found in the neighborhood." In addition, the city's landscape standards require species diversity, prohibit extensive monocultures, and compel developers to install automatic irrigation systems with automatic controllers. These systems must irrigate a landscaped area with similar site, slope, soil conditions, and plant watering needs.

## 3.14 LIGHT POLLUTION REDUCTION

In order to minimize light trespass, improve night sky access, and minimize glare and adverse effects on wildlife, amend your municipality's site plan or subdivision regulations to add site lighting requirements that mandate lighting controls using criteria in GIB Credit 17, Light Pollution Reduction (GIBc17). Require that at least 50 percent of external luminaires in residential areas have fixture-integrated lighting controls. These controls must use motion sensors to reduce light levels by at

least 50 percent when no activity is detected for 15 minutes. Further, require automatic controls that turn off exterior lighting in shared areas during the day and when unnecessary at night. Exterior lighting in shared areas must meet total exterior lighting power allowance requirements that vary by development density in GIBc17 defined lighting zones (see GIBc17 Table 1 and Table 3). In addition, require shared areas to meet maximum allowable trespass and uplight requirements that vary by lighting zone (see GIBc17 Table 2) or to use only luminaries meeting both backlight and glare requirements in GIBc17 Table 4. Consult both GIBc17 criteria and guidance in the LEED Reference Guide for Neighborhood Development when drafting these standards.

## 3.15 BUILDING LOCATION AND IMPERVIOUS COVERAGE

Limiting the development footprint and construction impact zone to previously developed land preserves existing site features and prevents harm to undeveloped areas, including nearby wildlife habitat, plant communities, wetlands, and water bodies. To preserve existing vegetation and pervious surfaces, amend your municipality's site plan and subdivision regulations using criteria in GIB Credit 7, Minimized Site Disturbance in Design and Construction (GIBc7). Require development projects to locate 100 percent of the development footprint and construction impact zone within previously developed areas. Where this is not possible, require development projects to leave undisturbed a minimum amount of previously undeveloped land at the development site. Increase the required amount of undisturbed land as development density decreases according GIBc7 Table 1. Exclude from density calculations any land preserved by codified law or designated as nonbuildable in your community's comprehensive plan. Consult GIBc7 criteria and guidance in the LEED Reference Guide for Neighborhood Development when drafting this on-site requirement.

## 3.16 SOLAR ORIENTATION

Building orientation affects natural lighting and passive heating within a building, as well as a building's ability to avoid overheating and utilize photovoltaic or other solar power sources. To encourage cost-effective, energy-efficient measures within development projects, amend your municipality's site plan and subdivision regulations to encourage and, where appropriate, require building orientation that maximizes solar access for development projects. Use criteria in GIB Credit 10, Solar Orientation (GIBc10), to guide your community's definition for solar-oriented lots or blocks. This definition should encourage long buildings and blocks that face true north or true south.

GIBc10 Option 1 only applies to projects with at least 13 dwelling units per acre or a floor-area ratio (FAR) of at least 1.0. For these projects, GIBc10 Option 1 requires at least 75 percent of blocks to have one axis within plus or minus 15 degrees of geographical east-west and the east-west lengths of those blocks to be at least as long as the north-south lengths of the blocks. Option 2 requires at least 75 percent of a project's total building square footage to be designed and oriented such that one axis of each qualifying building is at least 1.5 times longer than the other, and the longer axis is within 15 degrees of geographical east-west. The length-to-width ratio applies only to walls enclosing conditioned spaces. Additionally, the surface area of equator-facing vertical surfaces and slopes of building roofs must not be more than 25 percent shaded at the time of initial occupancy, measured on the winter solstice. Consult GIBc10 implementation guidance in the LEED-ND Reference Guide to determine which building orientation strategies are appropriate within your community. When making these changes, do not require solar orientation at the expense of other considerations such as street connectivity (see Strategy 3.3 Street Connectivity above).

### CLEVELAND, OHIO

Cleveland's draft "Green Design Overlay (GDO) District" zoning amendment will support several LEED-ND projects within the city (City of Cleveland, OH, draft code chapter 341A). The GDO District includes Green Design Guidelines that require buildings and site features to be "oriented, wherever practical, to take advantage of solar orientation. This may include building orientation to use passive and active solar energy, natural ventilation and other passive heating and cooling strategies, as well as the location of parking areas to the north side of buildings to enable partial shading of pavement and the incorporation of landscape features to optimize passive heating and cooling effects" (draft code section 341A.05(a)(7)).

### CHAMPAIGN, ILLINOIS

Champaign developed its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) using the LEED-ND pilot rating system. Design requirements for these districts direct building and street layout to account for sun angles, prevailing winds, shade, and other factors to save energy costs (see City of Champaign, IL, code section 37-329.3). Additionally, at least 25 percent of the total street length must be "set 15 percent off axis."

# CONSTRUCTION STANDARDS

Preparing a site for construction and the placement of structures on the land can result in adverse environmental impacts that impede project sustainability. Construction standards in site plan and subdivision regulations can help mitigate these impacts significantly. The strategies listed below show how to incorporate LEED-ND criteria for tree preservation, construction activity pollution prevention, site disturbance, and heat island reduction into construction standards in site plan and subdivision regulations. Municipalities should compare these strategies to existing construction standards to ensure they do not inhibit sustainable construction practices. Where appropriate, municipalities should amend existing construction standards using the below strategies.

**Construction Standard Strategies:**

- Prevent soil erosion and sedimentation
- Preserve and protect trees
- Limit construction impact zones

- GIB Prerequisite 4, Construction Activity Pollution Prevention
- GIB Credit 7, Minimized Site Disturbance in Design and Construction

## 3.17 SOIL EROSION AND SEDIMENTATION

Soil loss and erosion from "clearing and grubbing" practices during construction degrades water quality, destroys valuable soil nutrients, disrupts ecosystems, harms aquatic life and wildlife, depreciates property values, and is costly to remedy. To reduce construction-related pollution, amend your municipality's site plan and subdivision regulations to include provisions that prevent soil erosion, waterway sedimentation, and airborne dust generation using criteria in GIB Prerequisite 4, Construction Activity Pollution Prevention (GIBp4).

If not already required by state or local law, compel applicants to create and implement an erosion and sedimentation control (ESC) plan for construction activities. The ESC must incorporate practices to control erosion and sedimentation in runoff from the entire construction site. These best management practices (BMPs) include phasing, seeding, grading, mulching, filter socks, stabilized site entrances, and preservation of existing vegetation. Require applicants to choose BMPs from the Washington State Department of Ecology's *Stormwater Management Manual for Western Washington, Volume II, Construction Stormwater Pollution Prevention* (2005 edition) or a locally approved equivalent, whichever is more stringent. BMPs must comply with all federal and state erosion and sedimentation control regulations. ESCs should list BMPs and describe how they will meet soil loss, sedimentation, and pollution prevention objectives listed in GIBp4. Further, ESCs should describe how the development project will preserve vegetation and mark clearing limits, establish and delineate construction access, control flow rates, install sediment controls, stabilize soils, protect slopes, protect drain inlets, stabilize channels and outlets, control pollutants, control dewatering, and maintain BMPs.

Consider requiring or encouraging applicants to use a licensed civil engineer to identify erosion-prone areas and soil stabilization measures. The ESC should be incorporated into construction drawings and specifications, with clear instructions regarding responsibilities, scheduling, and inspections. When drafting this regulation, confer with your locality's conservation board or environmental advisory body and consult GIBp4 criteria and guidance in the LEED-ND Reference Guide, which includes common strategies for controlling erosion and sedimentation.

## 3.18 TREE PRESERVATION AND PROTECTION

Tree and vegetation destruction leads to barren and unsightly conditions, adversely affects a community's character, and increases urban temperatures. To reduce these impacts, amend your municipality's site plan and subdivision regulations to include tree preservation and protection requirements. These requirements compel applicants to maintain or replace on-site trees in accordance with set standards. Use criteria in GIB Credit 7, Minimized Site Disturbance in Design and Construction (GIBc7), when drafting these standards.

For all development projects, require a survey of the site to identify trees in good or excellent condition, heritage or champion trees of special importance to the community, all trees larger than six inches in diameter at breast height (dbh), and any invasive tree species that threaten other trees on site. Require applicants to conduct this survey using an International Society of Arboriculture (ISA)-certified arborist and a government forester as described in GIBc7. Further require applicants to preserve:

- heritage and champion trees whose dbh exceeds 50 percent of the state champion dbh for the species,
- at least 75 percent of noninvasive trees larger than 18 inches dbh, and
- 25 percent of all noninvasive trees larger than 12 inches dbh if deciduous and six inches dbh if coniferous.

Tree condition ratings should be based on an ISA-certified arborist's assessment using ISA-approved measures.

Finally, require applicants to work with an ISA-certified arborist to submit a plan to maintain and protect these trees during construction. The plan must require protective fencing located one foot for each one-inch caliper from the trunk or at the tree drip line, whichever is larger. The plan also should specify that any necessary trenching or other disturbance within the protected zone must be performed by hand. Further, the plan should prohibit any permanent excavations greater than three feet deep within 15 feet from a protected tree's drip line and require the removal of any invasive vegetation that threatens protected trees. When crafting this standard, consult with any municipal foresters or tree advisory council.

### CHAMPAIGN, ILLINOIS

While developing the Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) for its Curtis Road Interchange, Champaign consulted the LEED-ND pilot rating system. Design requirements for these three districts aim "to avoid adverse impacts on existing natural features, drainage, erosion, water quality, and energy conservation" (see City of Champaign, IL, code section 37-329.3). Specifically, Requirement 6.7 requires development projects to protect significant trees of good health "from damage during construction and from future land uses in a development whenever possible."

## 3.19 CONSTRUCTION IMPACT ZONES

Construction activities can harm undeveloped areas, including wildlife habitat, plant communities, wetlands, and water bodies. To preserve a development's existing site features, amend your municipality's site plan and subdivision regulations to designate construction impact zones for development projects using criteria in GIB Credit 7, Minimized Site Disturbance in Design and Construction (GIBc7). Construction impact zone standards preserve a development site's pervious surfaces by limiting how much previously undeveloped land a project's construction zone may include. To preserve all previously existing pervious surfaces, require that construction impact zones include only previously developed land. If this is not possible, require construction impact zones that limit disturbance to a minimum of:

- 40 feet beyond the building perimeter;
- 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter;
- 15 feet beyond street curbs and main utility branch trenches; and
- 25 feet beyond constructed areas with pervious surfaces (such as pervious paving areas, stormwater retention facilities, and playing fields) that require additional staging areas to limit compaction in the constructed zone.

Require applicants to mark construction and disturbance boundaries clearly and note these site protection requirements in site plans and construction documents, as applicable. Further, require applicants to delineate lay-down, recycling, and disposal areas; use paved areas for staging activities; and establish penalties for any destruction of protected areas outside of construction boundaries. Because this standard's effectiveness will depend on effective enforcement, consult with your municipality's enforcement officials when drafting it.

# NATURAL RESOURCE PRESERVATION

Site plan and subdivision regulations may control development impacts on natural resources. To ensure that development projects preserve natural resources adequately, municipalities should evaluate their existing site plan and subdivision regulations using the below strategies, which present how to incorporate LEED-ND criteria related to natural resource protection into site plan and subdivision regulations. To eliminate any conflicts and protect natural resources as appropriate, municipalities should amend their site plan and subdivision regulations using the following strategies.

**Natural Resource Preservation Strategies:**

- Avoid developing floodplains
- Conserve and restore wetlands and water bodies
- Protect steep slopes
- Conserve and restore sensitive habitat

To justify these amendments and withstand court challenges, municipalities should conduct advanced planning and empirical studies. Further, these new provisions should impose the least burden necessary to achieve environmental protection.

- SLL Prerequisite 2, Imperiled Species and Ecological Communities Conservation
- SLL Prerequisite 3, Wetland and Water Body Conservation
- SLL Prerequisite 5, Floodplain Avoidance
- SLL Credit 6, Steep Slope Protection
- SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation
- SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies
- SLL Credit 9, Long-Term Conservation Management of Habitat or Wetlands and Water Bodies

## 3.20 FLOODPLAIN AVOIDANCE

Floodplains lay adjacent to water bodies and provide temporary storage of floodwaters, rich soils, water quality protection, and important wildlife habitat. The federal government encourages state and local regulation of floodplains, and some states mandate adoption of local floodplain regulations. To adequately protect the floodplain environment both in your community and downstream, amend your municipality's site plan and subdivision regulations to ensure development projects adequately avoid floodplains. Use criteria from SLL Prerequisite 5, Floodplain Avoidance (SLLp5), to make these changes.

Require development projects to avoid building within a 100-year high- or moderate-risk floodplain as defined and mapped by the Federal Emergency Management Agency (FEMA) or a state or local floodplain management agency, whichever is more recent. Where this is not possible, allow development only on portions of the site not within the floodplain, within previously developed portions, or within a nonconveyance area of river or coastal floodplain without storm surge potential where compensatory storage is used in accordance with a FEMA-approved mitigation plan. Further require compliance with the National Flood Insurance Program (NFIP) requirements for any portion of the site that lies within a floodplain. Also require the design and construction of critical facilities to ensure they will be protected and operable during a 500-year event, as defined by FEMA. Critical facilities include hospitals, water and sewage treatment facilities, emergency centers, and fire or police stations. When drafting these regulations, consult with NFIP minimum floodplain and development requirements and guidelines, as well as the relevant local, regional, or state floodplain management agency.

# 3.21 WETLAND AND WATER BODY CONSERVATION

Wetlands and water bodies recharge and purify surface and underground water, provide hydrological stability, control flooding and stormwater, eliminate pollution, control erosion, and support animal and plant life. Historically, many wetlands and water bodies have been destroyed or are in danger of destruction due to road or building construction, dredging, grading and filling. If authorized by state law, amend your community's site plan and subdivision regulations to protect wetlands and water bodies in accordance with SLL Prerequisite 3, Wetland and Water Body Conservation (SLLp3), SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation (SLLc7), SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies (SLLc8), and SLL Credit 9, Long-Term Conservation Management of Habitat or Wetlands and Water Bodies (SLLc9).

Wetlands at Prairie Crossing, Grayslake, IL
Source: Payton Chung, Creative Commons

Require development projects to conserve all wetlands, water bodies, land within 50 feet of wetlands, and land within 100 feet of water bodies. Developers should limit manmade changes to these areas beyond minor improvements such as bicycle and pedestrian pathways, restoration activities, small structures, grade changes for public access, public access clearings, hazardous tree removal, and brownfield remediation activities. If a comprehensive stormwater management plan is adopted for the development, as detailed in GIB Credit 8, Stormwater Management (GIBc8), consider allowing modifications beyond minor improvements in buffer lands according to SLLp3 Table 1.

Some communities may want to pursue additional protections for wetlands and waterbodies. In accordance with SLLc7, consider requiring applicants to conduct or compile assessments of water body and wetland functions using a qualified biologist. After this, applicants should assign appropriate buffers (not less than 100 feet for water bodies and 50 feet for wetlands) based on these assessments and manage these features to ensure pre-development condition or better for a minimum of three years after build out. In line with SLLc8, your municipality may want to require the restoration of predevelopment water bodies and wetlands at the development site in an area equal to or greater than 10 percent of the development footprint. If pursuing this, direct applicants to work with a qualified biologist to ensure the restoration of predevelopment hydrology, and require the maintenance of these areas for at least three years after restoration is completed.

Finally, as in SLLc9, consider requiring development projects to implement a long-term (at least 10-year) management plan for on-site water bodies, wetlands and their buffers. Applicants must create a guaranteed funding source for this management plan. In addition, applicants must use a qualified biologist or professional to write the management plan and to conduct or evaluate ongoing management. Management plans should list biological objectives, maintenance procedures, implementation costs, funding sources, potential threats the proposed development poses to water resources within conservation areas, and measures to reduce these threats. When drafting wetland and water body conservation regulations, consult criteria for SLLp3, SLLc7, SLLc8, and SLLc9, as well as guidance in the LEED Reference Guide for Neighborhood Development. Also refer to local, state and federal wetland and water body conservation laws to ensure compliance.

## Case Study: Cleveland, Ohio

To facilitate energy and material conservation, sustainable design, and neighborhood development, including LEED-ND projects, the Cleveland City Planning Commission (Commission) is developing a "Green Design Overlay (GDO) District" zoning amendment that incorporates green design guidelines (City of Cleveland, OH, draft code chapter 341A). Under the proposed amendment, the city must designate any new GDO district together with a Design Review District enacted under Chapter 341 of Cleveland's zoning code. Once designated, a GDO District would exist on the city's zoning map as an overlay district that applies in conjunction with underlying zoning. The Commission would establish or use an existing Local Design Review Advisory Committee to advise the Commission after the Committee reviews building permit applications in accordance with guidelines of the GDO district and the Design Review Districts.

The proposed GDO district zoning amendment includes supplemental Green Design Guidelines (draft code section 341A.05). With the help of experts, Cleveland's Sustainability Office and the Commission developed these design guidelines, which emulate several LEED-ND prerequisites and credits. For example, the General Conservation section of these design guidelines require protection of habitat, endangered species, wetlands, and floodplains much like the SLL prerequisites and credits that protect natural resources (draft code section 341A.05(a)(1)). The habitat provisions require applicants to protect habitat for endangered or threatened species on any previously undeveloped land within the project site. A " . . . project must comply with or exceed local standards for endangered or threatened species protection," and applicants must submit a site map to the Ohio Department of Natural Resources' Natural Heritage Program to determine whether endangered species exist on site. Natural Heritage Program staff will use Natural Heritage Database surveys to make this determination. To protect on-site wetlands, these provisions require projects to "comply with or exceed U.S. Army Corps of Engineers and State of Ohio EPA standards for wetlands protection." Projects must be "permitted/certified in accordance with applicable federal and state law" and "[p]rojects that are within Watercourse Protective Zone Districts as defined by the City of Cleveland must comply with all guidelines that apply to those districts." Finally, the floodplain provisions forbid projects from developing "within the 100-year floodplain as determined by the Federal Emergency Management Agency."

Aerial of the Flats, Cleveland, OH
Source: FitchDnld, Creative Commons

The GDO district will facilitate Cleveland's LEED for Neighborhood Development Pilot Program. For this initiative, the city assists the development of three LEED-ND pilot projects: the Flats East Bank, Saint Luke's, and Upper Chester projects. The Flats East Bank project is a conditionally approved LEED-ND plan at the certified level under the pilot version of the rating system, and the St. Luke's project is a LEED-ND Certified Plan at the silver level under the pilot version. The Upper Chester and Saint Luke's projects served as the GDO district's impetus because, in both projects, developers do not have complete control over all private property within the project sites. In particular, the Saint Luke's project needs the GDO district to earn points under LEED-ND credits that reward conditions in the area surrounding the project. St. Luke's is an effort by public and private partners to redevelop the former St. Luke's Medical Center and revitalize the surrounding neighborhood, which includes a new school and library as well as existing homes. The GDO district will help project teams document for certification review that those parcels within the LEED-ND project boundaries but outside of the developers' control will adhere to the LEED-ND standards.

## 3.22 STEEP SLOPE PROTECTION

Often associated with rock outcrops, shallow soils, bedrock fractures, and groundwater seeps, steep slopes are sensitive landforms that create microclimates for diverse plants, animals, and other organisms. Steep slope alteration can cause erosion; sedimentation; landslides; the pollution of aquifers and surface waters; and the destruction of vegetation, wildlife habitats, and scenic resources. To avoid these impacts, amend your municipality's site plan and subdivision regulations in accordance with SLL Credit 6, Steep Slope Protection (SLLc6).

The regulations should require development projects to avoid areas with existing slopes greater than 15 percent or to avoid disturbing these existing slopes. For previously developed sites with slopes greater than 15 percent, require development projects to restore the slope area with native plants or noninvasive adapted plants according to SLLc6 Table 1. Regulations should prohibit all development projects from disturbing slopes greater than 40 percent or any land within 50 feet horizontally of the top of the slope and 75 feet horizontally from the toe of the slope. In addition, regulations should limit development on previously undeveloped sites to no more than 40 percent of slopes between 25 and 40 percent and no more than 60 percent of slopes between 15 and 25 percent. Your municipality should confer with a soil engineering consultant with expertise in steep slopes when preparing these regulations. Also, use terrain computer models, and consult SLLc6 guidance in the LEED-ND Reference Guide to ensure your community adopts appropriate steep slope regulations.

## 3.23 SENSITIVE HABITAT CONSERVATION

Sensitive habitat areas provide the elements that species need to survive: temperature, water, soil, sunlight, food sources, places of refuge, and safe reproduction areas. Land development and other disturbances destroy habitats, isolate remaining habitats, and prevent species migration between habitats. Habitat degradation, fragmentation, and loss are responsible for the majority of the endangered and threatened species listed under the federal Endangered Species Act (ESA). To conserve sensitive habitat, amend your municipality's site plan and subdivision regulations in accordance with SLL Prerequisite 2, Imperiled Species and Ecological Communities Conservation (SLLp2), SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation (SLLc7), SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies (SLLc8), and SLL Credit 9, Long-Term Conservation Management of Habitat or Wetlands and Water Bodies (SLLc9).

Prior to development of a site, the municipality should direct applicants to consult with the state Natural Heritage Program and state fish and wildlife agency to determine whether the site contains or is likely to contain threatened, endangered, or imperiled species as defined by the ESA, any relevant state endangered species act, or NatureServe. If site conditions indicate such species or ecological communities could be present, require applicants to perform biological surveys during appropriate seasons using accepted methodologies and a qualified biologist. If necessary, comply with an approved habitat conservation plan under the ESA for each identified species or ecological community. Alternatively, allow the applicant to work with an expert to create and implement a conservation plan that complies with SLLp2 Option 3.

Where appropriate, amend your community's site plan and subdivision regulations to further protect sensitive habitat that have been identified. The regulations should prohibit any disturbance of significant habitat, including any buffer area around the habitat. Require the applicant to maintain significant habitat in predevelopment condition or better for a minimum of three years after build out. Further, as stated in SLLc8, consider requiring the restoration of predevelopment native ecological communities in an area equal to or greater than 10 percent of the development footprint for at least three years after restoration is completed. Finally, in accordance with SLLc9, consider requiring development projects to implement a long-term (at least 10-year) management plan for on-site native habitats and their buffers completed by a qualified biologist or professional. To accomplish this, applicants should create a guaranteed funding source for ongoing management. Management plans should list biological objectives, maintenance procedures, implementation costs, funding sources, potential threats the proposed development poses to habitat within conservation areas, and measures to reduce these threats. When drafting sensitive habitat conservation regulations, consult criteria for SLLp2, SLLc7, SLLc8, and SLLc9, as well as guidance in the LEED Reference Guide for Neighborhood Development.

### HERCULES, CALIFORNIA

Hercules' Waterfront District Master Plan, a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system, is the prevailing zoning document for the city's Waterfront and Hercules Bayfront. This plan acknowledges the critical nature of open space and notes that the city's General Plan and zoning ordinances require protection of the sensitive habitats surrounding the District (see plan section 2.2).

# CONDITIONS ON SITE PLAN AND SUBDIVISION APPROVALS

When approving a site plan or subdivision application, the local review board is authorized to impose permit conditions that are related to compliance with site plan or subdivision requirements. After amending your municipality's site plan and subdivision regulations according to the strategies above, planning staff can recommend that the review board attach conditions to site plan and subdivision approvals as necessary to achieve these sustainable neighborhood development objectives. The following strategies can serve as conditions of development approval to help achieve a sustainable neighborhood.

**Strategies for Conditions on Site Plan and Subdivision Approvals:**

- Purchase conservation easements to preserve natural resources
- Establish covenants, conditions, and restrictions (CC&R) or other binding documents that ensure certain sustainable neighborhood characteristics

- SLL Prerequisite 2, Imperiled Species and Ecological Communities Conservation
- SLL Credit 6, Steep Slope Protection
- SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation
- SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies
- NPD Credit 1, Walkable Streets, optional item (h)
- NPD Credit 13, Local Food Production
- GIB Credit 7, Minimized Site Disturbance in Design and Construction
- GIB Credit 17, Light Pollution Reduction

## 3.24 CONSERVATION EASEMENTS

In several places, the LEED-ND rating system uses conservation easements to ensure preservation of important natural resources in perpetuity. SLL Prerequisite 2, Imperiled Species and Ecological Communities Conservation (SLLp2), requires projects that will affect imperiled species or ecological communities to work with specified experts to create a conservation plan. Among other strategies, a conservation easement protecting the identified habitat and buffer area can be donated or sold to an accredited land trust or public agency. If the project cannot protect any portion of the habitat or buffer in perpetuity, the applicant must quantify the project's effects on the habitat and buffer and protect another habitat of similar or better quality, on-site or off-site, by donating or selling a conservation easement on it. Similarly, SLL Credit 7, Site Design for Habitat or Wetland and Water Body Conservation (SLLc7), requires projects to protect significant habitat, wetlands, and water bodies, as well as their buffer areas, and SLL Credit 8, Restoration of Habitat or Wetlands and Water Bodies (SLLc8), requires the restoration and protection of predevelopment native ecological communities, wetlands, and water bodies on a project site.

Your municipality's review board should, where appropriate, condition a project's approval upon the applicant filing a conservation easement, or other restrictive covenant, on the land records. The property owner would then deed an interest in the land, the conservation easement, to a qualified public agency or private land trust. That entity should hold the interest and enforce its restrictions against the transferring owner and all subsequent owners of the land. This conservation easement should prevent alteration of natural or man-made features that are inconsistent with their preservation. Most states have adopted some form of the Uniform Conservation Easement Code. Consult with local counsel to confirm that your municipality can use conservation easements as described above.

## 3.25 COVENANTS, CONDITIONS, AND RESTRICTIONS

When a development is governed by a homeowners' association (HOA), a condominium association, a co-op board, or otherwise restricted by covenants, conditions, and restrictions (CC&R), the municipality may want to include certain requirements in the CC&Rs that are imposed in the deeds taken by individual landowners. Several LEED-ND credits include criteria directing projects to establish CC&Rs, or other deed restrictions, to ensure the existence of certain sustainable neighborhood characteristics in perpetuity.

SLL Credit 6, Steep Slope Protection (SLLc6), Option 2 requires projects on previously developed sites with slopes over 15 percent to restore the slope area and develop CC&R, development agreements, or other binding documents to protect the specified steep slope areas in perpetuity. SLLc6 Option 3 requires the same for projects on undeveloped sites with slopes greater than 15 percent. Optional item (h) in NPD Credit 1, Walkable Streets (NPDc1), requires CC&R or other binding documents to stipulate that any ground-level retail, service, or trade windows must be kept visible (e.g., unshuttered) at night. NPD Credit 13, Local Food Production (NPDc13), requires projects to establish CC&R or other forms of deed restrictions that do not prohibit the growing of produce in project areas, including greenhouses, any portion of residential front, rear, or side yards; or balconies, patios, or rooftops. Option 2 in GIB Credit 7, Minimized Site Disturbance in Design and Construction (GIBc7), requires projects to leave undisturbed any undeveloped portion of the project site and stipulate in CC&R or other binding documents that the undisturbed area will be protected from development in perpetuity. GIBc7 also requires projects to survey the trees on a project site and develop a plan to preserve and protect certain trees during construction. Following this, projects must stipulate in CC&R or other binding documents that the undisturbed area of the preserved trees will be protected from development in perpetuity. Finally, GIB Credit 17, Light Pollution Reduction (GIBc17), requires CC&R or other binding documents to require continued adherence to the credit's light trespass and uplight requirements.

To ensure that development projects comply with these sustainability features, your municipality's local review board, where appropriate, should condition approval upon the applicant's agreement to establish CC&Rs in accordance with the above LEED-ND credits. Also, the review board should evaluate CC&Rs to ensure they do not obstruct other important sustainable neighborhood features and condition approval upon the removal of these conflicts. HOAs or equivalent entities cannot create CC&Rs that violate a condition placed on a development's approval. Ensure enforcement of and compliance with all conditions by requiring the applicant to submit CC&Rs prior to issuance of the Certificate of Occupancy.

# OPEN SPACE & INFRASTRUCTURE EXACTIONS

Municipalities may require site plan and subdivision applicants to set aside on-site open space for public use or to provide certain infrastructure facilities off-site in exchange for development approvals. When these exactions solely serve the needs of the development project's residents and users, few legal issues are raised. To ensure that your municipality's site plan and subdivision regulations facilitate access to public space and sustainable infrastructure, implement the following strategies.

**Open Space & Infrastructure Exaction Strategies:**

- Require or request on-site public open space
- Impose sustainable infrastructure exactions where appropriate

- NPD Prerequisite 1, Walkable Streets, item (a)
- NPD Credit 9, Access to Civic and Public Spaces
- NPD Credit 10, Access to Recreation Facilities

## 3.26 PUBLIC ACCESS TO ON-SITE OPEN SPACE

Open space requirements in land development regulations enhance the pedestrian realm and help increase access to public space, major goals in NPD Prerequisite 1, Walkable Streets (NPDp1), NPD Credit 9, Access to Civic and Public Spaces (NPDc9), and NPD Credit 10, Access to Recreation Facilities (NPDc10). Item (a) in NPDp1 requires principal functional entries on 90 percent of new building frontage to face a public space, such as a street, square, park, paseo, or plaza. NPDp1 item (a) dictates that these public spaces must be at least 50 feet wide at a point perpendicular to each entry. Similarly, NPDc9 requires projects to locate 90 percent of planned and existing dwelling units and nonresidential building entrances within a quarter-mile walk distance of a civic passive-use space that is at least a 1/6-acre in area. For projects larger than seven acres, NPDc9 requires the median size of civic or passive-use spaces within or contiguous to the project to be at least a half acre. Finally, NPDc10 requires

projects to locate 90 percent of new and existing dwelling units and nonresidential building entrances within a half-mile walk distance of a publicly accessible outdoor recreation facility at least one acre in area or a publicly accessible indoor recreational facility of at least 25,000 square feet. NPDc10 requires outdoor recreation facilities to include physical improvements such as "tot lots," swimming pools, and sports fields.

Plaza in Portland, OR
Source: Sophie Lambert

Although the LEED-ND rating system does not directly require public open space within project areas, open space dedication requirements can help provide lands adjacent to a project with access to public space and help a project achieve the above prerequisites and credits, as well as NPD Prerequisite 2, Compact Development (NPDp2), and NPD Credit 2, Compact Development (NPDc2). NPDp2 and NPDc2 reward developers for achieving increased development densities but count developer-provided parks as buildable land unless required by codified law.

To provide adequate access to public space within your community, amend your site plan and subdivision regulations to require that development projects dedicate an amount of land to open space that is proportional to the associated increase in population from the development. Similarly, amend appropriate zoning district regulations to require a minimum amount of protected open space. These regulations may authorize the reviewing body to condition any development approval on design and layout changes that are reasonably related to the prevention of environmental damage or to the preservation of nearby open space and natural resources. Consult local counsel to assess your municipality's authority to impose these standards. A developer may argue that open space required through an exaction is intended for the benefit of the general public beyond the development project's occupants and claim that this requirement is beyond the municipality's legal authority or is an unconstitutional exaction. If any doubt exists, pursue a voluntary agreement with the developer instead.

### OAKLAND, CALIFORNIA

The MacArthur BART Transit Village in Oakland is a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system. In 2008, Oakland rezoned the MacArthur BART Transit Village project area to S-15 Transit Oriented Development with a text amendment to adjust open space requirements (see City of Oakland, CA, code section 17.97).[14] These require that each lot containing residential facilities provide a minimum of 75 square feet of open space per regular dwelling unit, plus 50 square feet of open space per efficiency dwelling unit. This open space may consist of private open space, public ground-floor plazas, widened sidewalks, rooftop open space, courtyards, and off-site open space. The open space requirements further prescribe dimensions for contiguous open space and require that on-site, public usable open space be accessible to all dwelling units, that open space surfaces be usable and consist of appropriate material, that open space be free of obstructions, and that at least 10 percent of usable open spaces include landscaping enhancement and user amenities. This amended open space requirement mirrors the regulations for high-rise residential projects in downtown Oakland where a higher density is encouraged.

Village Drive, MacArthur Bart Transit Village, Oakland, CA
Source: Oakland CEDA

## 3.27 INFRASTRUCTURE EXACTIONS

Municipalities can impose conditions on developers to provide certain types of on-site and off-site infrastructure improvements. Localities routinely require developers to provide on-site streets, curbs, gutters, sidewalks, and other walking and biking paths. In addition, they may require developers to provide facilities for stormwater management or utilities. These infrastructure requirements can help municipalities ensure sustainable street design and transportation, on-site stormwater management, and green utilities, as well as help projects achieve the LEED-ND prerequisites and credits featured above in *III. Incorporating LEED-ND into Site Plan and Subdivision Regulations; Street Design & Transportation* (*Strategies* 3.1 to 3.10) and *Stormwater Management & Utilities* (*Strategies* 3.11 to 3.12).

Planning staff can recommend to its review board that such exactions be applied during the project review and approval process. Your municipality also may require off-site infrastructure improvements. In the case of large developments that have an impact beyond the project borders, your municipality legally can require, for example, a turn lane or traffic signal in a nearby street or downstream floodway improvements. Required off-site improvements must be commensurate with the project's impact on the community. Prior to imposing infrastructure exactions, consult local counsel to ensure the exactions meet these criteria.

14 In 2011, Oakland repealed the text amendment, code section 17.97.170, in its entirety.

# IV. INCORPORATING LEED FOR NEIGHBORHOOD DEVELOPMENT INTO SUPPLEMENTAL DEVELOPMENT STANDARDS

In addition to zoning, site plan, and subdivision regulations, municipalities can use supplemental development standards to enhance sustainability in neighborhoods. These regulations can appear in one or more articles of the zoning code or be adopted as stand-alone ordinances. Additionally, municipalities must enforce building and related codes that typically are adopted as state law and that may or must be adopted and enforced locally.

This section of the manual shows municipalities how to incorporate LEED-ND criteria into supplemental development standards they can use to further facilitate sustainable neighborhood development. These include:

**A.** Design standards that enhance walkability,

**B.** Regulations that protect historic districts and landmarks,

**C.** Standards that facilitate affordable housing,

**D.** Regulations that control the management of construction waste, and

**E.** Code elements that foster sustainability in buildings, energy systems, plumbing, and fire safety.

## DESIGN STANDARDS

The strategies listed below show how to incorporate LEED-ND criteria for pedestrian friendly building design into zoning or other land development regulations. When implementing these strategies, municipalities should consult with legal counsel to ensure that laws establishing urban design standards are detailed enough to avoid legal attacks alleging they are void because they are not specific. Additionally, these laws must specify an enforcement mechanism, and municipalities should adopt a plan containing clear, descriptive policies that support the design standards prior to codifying them (see I. Integrating LEED-ND into Local Plans above).

### Design Standard Strategies:

- Place building entries on front façades
- Build entries that occur at minimum intervals
- Position ground-floor retail along street-level façades
- Install clear glass, doors, and unshuttered windows along ground-level façades
- Build elevated finished floors for ground-level dwelling units
- Locate garage, service bay, and parking lots behind buildings

- NPD Prerequisite 1, Walkable Streets, items (a) & (d)
- NPD Credit 1, Walkable Streets, optional items (d), (e), (f), (g), (h), (k) & (l)

## 4.1 BUILDING ENTRIES ON FRONT FAÇADES

Building with entries oriented toward parking lots or structures and away from sidewalks and pedestrian routes discourage people from walking to access such buildings. In contrast, buildings that offer pedestrians access directly from street frontage encourage walking and foster interaction with the pedestrian realm. To facilitate building entries on front façades, enact design standards using criteria from item (a) in NPD Prerequisite 1, Walkable Streets (NPDp1). The standards should require 90 percent of new building frontage to have a principal functional entry on the front façade that faces a public space. Public spaces include streets, squares, parks, paseos, or plazas, but not parking lots. These entries should connect to sidewalks or equivalent provisions for walking. When drafting this requirement, consult NPDp1 guidance in the LEED-ND Reference Guide regarding buildings with multiple façades and corner entries connecting two façades.

Building entrances in Old Town Alexandria, VA
Source: Sophie Lambert

### STAMFORD, CONNECTICUT

Harbor Point in Stamford is a LEED-ND Certified Plan at the gold level under the pilot version of the rating system. Zoning for Harbor Point requires new buildings to "have major frontages and entrances on major streets and open spaces" that "meet the sidewalk" and have no "publicly inaccessible spaces between the façade and the sidewalk" (see Stamford, CT, zoning regulation sections 9(J)(6)(f)(4) & 9(K)(6)(d)(4)).

### CHAMPAIGN, ILLINOIS

Champaign developed its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) using the LEED-ND pilot rating system. Design requirements for these districts direct all buildings to "have at least one building entrance oriented toward an abutting internal or perimeter street with on-street parking, or toward an on-site pedestrian walkway connected to a public sidewalk or toward a common open space" (see City of Champaign, IL, code section 37-329.3).

## 4.2 BUILDING ENTRIES AT MINIMUM INTERVALS

Optional items (d) and (e) in NPD Credit 1, Walkable Streets (NPDc1), require building entries at minimum intervals along streets and sidewalks to create a more interesting, varied and safer pedestrian environment. Incorporate this design standard within your community's zoning district regulations. Where appropriate, amend these regulations to require buildings with functional entries that occur at an average of 75 feet or less along nonresidential or mixed-use buildings or blocks. Functional entries are those that encourage pedestrians to enter or exit the building from a street or other public space. Service entries, emergency exits, nonfunctioning doors, secondary side doors, and doors facing alleys, parking lots or other nonpublic spaces are not functional entries. Consult NPDc1 guidance for items (d) and (e) in the LEED-ND Reference Guide when drafting this design standard.

### HERCULES, CALIFORNIA

Hercules' Waterfront District Master Plan, a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system, is the prevailing zoning document for the city's Waterfront and Hercules Bayfront. The Plan requires a distance of 50 feet or less between ground-floor building entries along the Bayfront Boulevard Main Street mixed-use area, which includes retail or commercial areas along the street level (see plan section 4.0; Waterfront Master Plan Initiative, Chapter 1 in Exhibit 1).

Rendering of Bayfront Blvd, Hercules, CA
Source: Hercules Bayfront, LLC

This building entry requirement also applies to the Main Street Transition Zone, a mixed use area serving as a transition to the surrounding residential areas, and the Clubhouse Center Zone, a mixed-use area that provides flexibility so residential and commercial uses will be created in conjunction with the rehabilitation of the existing historic structures in the zone.

## 4.3 GROUND-FLOOR RETAIL

Ground-floor retail adds interest and destinations to the pedestrian realm. Optional item (l) in NPD Credit 1, Walkable Streets (NPDc1), requires a minimum amount of ground-floor retail for nonresidential and mixed-use projects. Using this criterion, your municipality can amend zoning districts to require at least 50 percent of office buildings in nonresidential or mixed-use developments to include ground-floor retail along 60 percent of the length of the street-level façade. In addition, zoning can require all mixed-use buildings to include ground-floor retail, live-work spaces, or ground-floor dwelling units along at least 60 percent of the street-level façade. The street-level façade calculation should include all street frontages and driveways, entryways, service entries, and similar areas. It is important for planners to confer with their municipality's economic development staff, retail consultants, and commercial leasing agents to ensure that this amount of retail is marketable. It may be difficult to determine market demand and ascertain whether this amount of retail development is supportable within your community. Where market demand is low or uncertain, your municipality should adopt a less stringent requirement or, in some cases, none at all.

### AURORA, COLORADO

Aurora's Sustainable Use Neighborhoods (SUN) design standards govern the Horizon Uptown, a conditionally approved LEED-ND plan at the certified level under the pilot version of the rating system. The standards include a requirement that ground floors "be activated with a variety of dynamic uses" that include "retail, restaurants, outdoor eating, and public uses" (see City of Aurora, CO, code section 146-923).

## 4.4 TRANSPARENT AND INTERESTING FAÇADES

Ground-level façades help define neighborhood character. They offer a sense of safety and comfort when they provide a clear view into retail and other nonresidential space, help avoid great expanses of blank walls, and provide unshuttered windows, especially at night. Optional items (f), (g), and (h) in NPD Credit 1, Walkable Streets (NPDc1), contain criteria to help projects achieve these design standards. To encourage a clear view into shops and other retail spaces, your municipality can amend zoning regulations using criteria from NPDc1 optional item (f). The regulations can require that all ground-level retail, service, and trade uses that face a public space have clear glass on at least 60 percent of their façades between three and eight feet above grade.

In addition, the regulations can impose a limit on blank walls along building façades in accordance with NPDc1 optional item (g). Specifically, the zoning regulations can require each façade that abuts a sidewalk to limit blank walls without doors or windows to no more than 40 percent of the façade (or 50 feet, whichever is less). Other design concepts that can break up blank walls include landscaping, murals, articulation of the wall plane, and street furniture. Finally, using criteria from NPDc1 optional item (h), the regulations can require that ground-level retail, service or trade windows be kept visible and unshuttered at night. Security bars over windows are consistent with this design standard if they allow a view of interior spaces.

Bethesda Row sidewalk, Bethesda, MD
Source: Federal Realty

### CHAMPAIGN, ILLINOIS

Champaign consulted the LEED-ND pilot rating system while developing the Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) for its Curtis Road Interchange. Design requirements for the UN-AC district include minimum transparency requirements for façades facing the right-of-way or other common area (see City of Champaign, IL, code section 37-329.3). For façades between the height of three feet and eight feet above the walkway grade, at least 60 percent of linear frontage must comprise windows or glass entrances.

## 4.5 ELEVATED FINISHED FLOORS

Elevated ground floors provide privacy for ground-floor residential units. Optional item (k) in NPD Credit 1, Walkable Streets (NPDc1) encourages this. Using criteria from NPDc1 optional item (k), your municipality should amend appropriate zoning district regulations to require at least 50 percent of ground-floor dwelling units to have an elevated finished floor no less than 24 inches above sidewalk grade. When making this amendment, harmonize this design standard with *Strategy 4.11 Accessibility and Usability*.

### NASHVILLE, TENNESSEE

After having to award variances for LEED-ND and similar projects in its downtown, Nashville developed the Downtown Code (DTC) to foster sustainable neighborhoods. DTC section IV requires all stoop frontage to provide a first floor elevation of between 18 inches to five feet from grade. Below-grade basement spaces and accessory dwelling units should be exempt from this requirement.

## 4.6 GARAGE, SERVICE BAY, AND PARKING LOT LOCATION AND DESIGN

Garage openings, service bays, and surface parking lots create an unpleasant environment and potential safety hazard for pedestrians. In contrast, item (d) in NPD Prerequisite 1, Walkable Streets (NPDp1), limits these intrusions on the pedestrian walking experience. Your municipality should amend its zoning regulations using NPDp1 item (d) to require no more than 20 percent of street frontages within a project to be faced directly by garage, service bay openings, or surface parking lots. Where possible, also require that parking structures and lots be designed and placed in locations where visibility from active areas is reduced. Although not addressed in NPDp1 item (d), the regulations can include requirements for architectural elements that enhance the parking structure and break up its mass, as well as parking structure design that blocks the visibility of vehicle headlights from outside the structure.

### STAMFORD, CONNECTICUT

Stamford adopted the South End Redevelopment District, South (SRD-S) and South End Redevelopment District, North (SRD-N) zoning districts to facilitate Harbor Point, a LEED-ND Certified Plan at the gold level under the pilot version of the rating system. Architectural design standards in the SRD-S and SRD-N zones require that all parking structures be ". . . covered and integrated into the development behind active uses at the pedestrian level or screened from sensitive pedestrian level views . . ." (see Stamford, CT, zoning regulation section 9(J)(6)(f)(7)).

### CHAMPAIGN, ILLINOIS

In its Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C), Champaign requires developments to locate garage entrances to the side or rear of a building (see City of Champaign, IL, code section 37-329.3). The city consulted the LEED-ND pilot rating system while developing the UN-R, UN-AC, and UN-C districts for its Curtis Road Interchange.

# HISTORIC DISTRICT REGULATION & LANDMARK PRESERVATION

Historic buildings, landmarks, and cultural landscapes are assets that contribute to a community's aesthetic value and sense of place. These historic resources help educate the public about a community's historic significance and reduce adverse environmental impacts associated with new construction. *Strategy 4.7 Historic Districts & Landmark Designation* below shows local governments how to protect these resources by adopting an historic district regulation or landmark preservation law that uses and supports LEED-ND criteria related to historic preservation and existing building reuse.

- GIB Credit 5, Existing Building Reuse
- GIB Credit 6, Historic Resource Preservation and Adaptive Reuse

## 4.7 HISTORIC DISTRICTS & LANDMARK DESIGNATION

Historic district regulations and landmark preservation ordinances establish a comprehensive effort to respect a community's historic and cultural properties while recognizing these resources as an economic and community development engine that might require change. These local regulations preserve these resources and minimize the negative aesthetic impacts of development projects on important historic buildings, districts, landmarks, and landscapes through a design review approval process. GIB Credit 5, Existing Building Reuse (GIBc5), and GIB Credit 6, Resource Preservation and Adaptive Reuse (GIBc6), support this by prohibiting LEED-ND projects with at least one historic building or cultural landscape present on the site from demolishing any historic building(s), or portions thereof, or from altering any cultural landscape(s). Both credits grant an exception only if a local historic preservation review board or its equivalent approves the demolition or alteration. Under GIBc6, if a project will rehabilitate a historic building, it must do so in accordance with local or federal rehabilitation standards, whichever is more restrictive.

Historic buildings in Macon, GA
Source: Jennie Nolon Blanchard

To avoid conflicts, be sure to coordinate historic district regulations and landmark preservation laws with your municipality's green building initiatives. Historic district regulations may conflict with requirements regulating visitability and universal design for people of diverse ability; rain barrels or other rainwater capturing technology; high-reflectance and vegetated roofs; and on-site renewable energy generation systems; as well as other green building, building energy efficiency, and building water efficiency standards. In historic districts, such conflicts may impact a LEED-ND project's ability to achieve the first three GIB prerequisites, as well as GIB Credit 4, Water-Efficient Landscaping, GIB Credit 9, Heat Island Reduction, and GIB Credit 11, On-Site Renewable Energy, among others.

### MILWAUKEE, WISCONSIN

Milwaukee designated The Brewery as a historic district in accordance with the city's historic preservation ordinance (see City of Milwaukee, WI, Resolution No. 85-586 & code section 320-21(9)(e). Preservation guidelines for the Pabst Brewery Historic District protect a concentration of industrial buildings from the 19th and early 20th centuries. These guidelines require developers to avoid removing wood and metal architectural features that are essential to maintaining building character and appearance or changing existing window and door fenestration. In addition, the guidelines allow no changes to existing trim or ornamentation, except for restoration, and require new construction to match existing height, scale, mass, and materials established by buildings in the district. To accommodate green building features, the guidelines allow the addition of dormers, skylights and solar collector panels to roof surfaces if they are not visible from the street. The Brewery is a conditionally approved LEED-ND plan at the platinum level under the pilot version of the rating system.

# AFFORDABLE HOUSING

Together, the costs of housing and transportation consume a large portion of low- and moderate-income household earnings. To alleviate this, municipalities can adopt zoning or other land development regulations that help provide affordable housing stock. The strategies listed below show local governments how to do this using LEED-ND criteria for mixed-income diverse communities.

**Affordable Housing Strategies:**

- Require affordable housing
- Provide incentives that encourage affordable housing development

- SLL Credit 1, Preferred Locations
- NPD Credit 4, Mixed-Income Diverse Communities

## 4.8 MANDATORY INCLUSIONARY ZONING

To promote socially equitable communities, NPD Credit 4, Mixed-Income Diverse Communities (NPDc4), and SLL Credit 1, Preferred Locations (SLLc1) both encourage housing for households of differing incomes. NPDc4 Option 2 rewards projects that include a proportion of new rental or for-sale dwelling units that are made available to households earning a certain percentage of the area median income (AMI) as established by the US Department of Housing and Urban Development (HUD). Further, NPDc4 Option 2 requires maintenance of rental units at affordable levels for a minimum of 15 years. NPDc4 awards up to three points for projects that meet NPDc4 Option 2, as well as an additional point for projects that earn at least two points under both Options 1 and 2.

SLLc1 Option 3 requires projects to earn at least two points under NPDc4 Option 2 and to locate in one of the following high-priority redevelopment areas:

- EPA National Priorities List
- Federal Empowerment Zone
- Federal Enterprise Community
- Federal Renewal Community
- Department of Justice Weed and Seed Strategy Community
- Department of the Treasury Community Development Financial Institutions Fund Qualified Low-Income Community (a subset of the New Markets Tax Credit Program)
- The U.S. Department of Housing and Urban Development's Qualified Census Tract (QCT) or Difficult Development Area (DDA)

To help create equitable neighborhoods, municipalities can mandate the inclusion of rental and for-sale dwelling units as affordable housing. When making these changes, consult NPDc4 Table 3, which awards varying amounts of points to projects that provide between five and 25 percent of rental dwelling units priced up to between 60 and 80 percent of AMI. NPDc4 Table 3 also awards points to projects that provide between five and 15 percent of for-sale dwelling units priced up to between 100 and 120 percent of AMI. These LEED-ND parameters represent a national threshold; when creating inclusionary zoning, your municipality should tailor these thresholds to regional or local equivalencies. When drafting affordable housing zoning requirements, use federally established median income guidelines to determine AMI, and consult pricing calculations in NPDc4 implementation guidance in the LEED-ND Reference Guide.

### STAMFORD, CONNECTICUT

Stamford adopted the South End Redevelopment District, South (SRD-S) and South End Redevelopment District, North (SRD-N) zoning districts to facilitate Harbor Point, a LEED-ND Certified Plan at the gold level under the pilot version of the rating system. New developments within these zoning districts must offer at least 10 percent of the total number of dwelling units for sale or rent at below market rate. The rate is based on the most current statistics of median family income for the Stamford Standard Metropolitan Statistical Area (SMSA) as published and periodically revised by the U.S. Dept. of Housing and Urban Development (see Stamford, CT, zoning regulation sections 7.4(C)(1), 9(J)(5)(j) & 9(K)(5)(i).

## 4.9 ZONING INCENTIVES TO ENCOURAGE AFFORDABLE HOUSING

If mandating inclusionary zoning is not possible in your municipality, consider adopting incentives to encourage affordable housing. Using criteria in NPD Credit 4, Mixed-Income Diverse Communities (NPDc4), and SLL Credit 1, Preferred Locations (SLLc1), zoning regulations can be amended to award additional density to developers who provide affordable housing units if authorized by state law. Alternatively, consider waiving certain area, height, parking, or other requirements in exchange for these affordable dwelling units (for more information about these incentives, see Strategy 6.5 Bonus Zoning or Density Incentives below). When drafting this amendment, include review and approval procedures, indicate which incentives may be awarded, and identify the affordable housing types eligible for these incentives. Consult the housing categories listed in NPDc4 Table 2 when selecting eligible housing types.

Finally, in some states, municipalities have authority to encourage affordable housing by abating local taxes, providing mortgage financing, acquiring and disposing of property, and providing infrastructure for housing built by non-profit and other developers under public-private partnerships. For more information about incentives municipalities may adopt, see VI. Project Streamlining and LEED-ND Incentives & Assistance below.

### NASHVILLE, TENNESSEE

After needing to award variances for LEED-ND and similar projects, Nashville developed the Downtown Code (DTC) to foster sustainable neighborhoods. The city incorporated a Bonus Height Program in its DTC that allows additional building height in Downtown Nashville in exchange for workforce housing (see DTC section IV). Qualifying developments must reserve workforce housing "for ownership or rental by households with incomes below the specified percentage of the current Average Median Income (AMI) in Davidson County as determined by [the city's Metropolitan Development Housing Agency]." Prior to final site plan review, the developer must execute an agreement, restrictive covenant, or other binding restriction on land use that preserves affordability for a required period.

# CONSTRUCTION WASTE MANAGEMENT REGULATIONS

Construction waste consists of materials such as concrete and other masonry, wood, metal, drywall, and plastic and makes up a significant percentage of the waste stream. These materials can be deconstructed for reuse or recycling. *Strategy 4.10 Construction Waste Management* below shows municipalities how to accomplish this using LEED-ND criteria for solid waste management infrastructure to create construction waste management standards.

- GIB Credit 16, Solid Waste Management Infrastructure

## 4.10 CONSTRUCTION WASTE MANAGEMENT

To reduce the volume of waste deposited in landfills and decrease demand for new construction materials, amend your land use regulations by adding construction waste management standards that require developers to deconstruct buildings and recycle construction waste. When drafting these standards, use criteria in GIB Credit 16, Solid Waste Management Infrastructure (GIBc16). Require developers to recycle or salvage at least 50 percent of nonhazardous construction and demolition debris, such as cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet, and insulation. Further, require development project applicants to create and implement a construction waste management plan. This plan should identify materials to divert from disposal and designate construction site areas for segregated or commingled recyclable materials. The plan should create a tracking system for recycling efforts and identify construction haulers and recyclers to handle the designated materials. Additionally, the plan should educate jobsite personnel about the waste management system and create a recording system for waste haul receipts, waste management reports, and other records to verify recycling and reuse of diverted materials. Finally, the plan should take appropriate measures to avoid contamination of designated materials. Construction waste management requirements for development projects are most effective when coordinated with a comprehensive municipal waste management policy and program that facilitates these requirements (see Strategy 5.6 Comprehensive Waste Management).

### OAKLAND, CALIFORNIA

Oakland adopted Construction and Demolition Debris Waste Reduction and Recycling Requirements that align closely with GIBc16 (see City of Oakland, CA, code chapter 15.34). It requires all new construction, demolition, and sizeable addition or alteration projects in Oakland to reuse or recycle 100 percent of all asphalt and concrete materials, as well as 65 percent of all other materials. In order to obtain a building permit, applicants for development approvals must submit a Waste Reduction and Recycling Plan (WRRP) that indicates how a project will reuse or recycle its construction and demolition debris. The WRRP must include the estimated amount of generated debris; the estimated amount of reused, recycled, or discarded materials; and the reuse, recycling, and disposal facilities the project will use. In addition, the developer must submit a summary report prior to final inspection approval or certificate of occupancy issuance. This waste reduction ordinance may help LEED-ND projects in Oakland meet GIBc16 criteria.

# DEVELOPMENT STANDARDS FOR BUILDINGS, ENERGY, PLUMBING, AND FIRE SAFETY

States typically adopt model codes to regulate building systems and parts.[15] In many states, local governments are responsible for enforcing these state codes and must obtain state approval to adopt stricter provisions. A few states preempt local adoption of stricter code standards altogether.[16] However, many states give communities an opportunity to adopt more restrictive provisions and enforcement measures.[17] Thus, in some states it may be difficult for local governments to require building system, mechanical, and plumbing standards that incorporate LEED-ND criteria or LEED Building Design & Construction criteria that are more restrictive than established model code standards. Despite this, many local governments are incorporating green building criteria into their building codes. For more information about adopting green building requirements or enhancing energy codes beyond the strategies in this manual, consult the following sources, among others:

- Going Beyond Code
- Developing Green Building Programs: A Step-By-Step Guide for Local Governments
- Building Energy Codes Resource Guide for Policy Makers
- Building Energy Codes 101

The strategies listed below show how to incorporate LEED-ND criteria for universal design, green buildings, building energy and water efficiency, water-efficient landscaping, heat island reduction, and wastewater management into building and related codes. Municipalities should compare these strategies to their current building codes to ensure existing code standards do not inhibit sustainable building practices. If this evaluation uncovers conflicts with certain LEED-ND criteria and the municipality legally may not amend its building codes, it is possible that projects within that locality may struggle to meet certain LEED prerequisites or achieve certain credits. Nevertheless, most LEED prerequisites are consistent with modern codes, and developers are free to exceed but not contradict code standards. Thus, in the majority of cases, developers can achieve LEED criteria. Where developers can exceed code standards voluntarily, the municipality should encourage this by providing various incentives (see VI. Project Streamlining and LEED-ND Incentives & Assistance below). Where a municipality has direct authority to strengthen its applicable codes or may do so after receiving state permission, it should amend its building and related codes using the following strategies.

**Building, Energy, Plumbing, and Fire Code Strategies:**

- Create universally accessible and usable buildings
- Construct green buildings
- Implement green roofs and high-reflectance roofs
- Allow rainwater collection devices
- Enable graywater systems
- Install water-efficient plumbing fixtures
- Construct energy-efficiency buildings
- Allow narrow street widths in fire code standards

- NPD Prerequisite 1, Walkable Streets, item (b)
- NPD Credit 1, Walkable Streets, optional item (m)
- NPD Credit 11, Visitability and Universal Design
- GIB Prerequisite 1, Certified Green Building
- GIB Prerequisite 2, Minimum Building Energy Efficiency
- GIB Prerequisite 3, Minimum Building Water Efficiency
- GIB Credit 1, Certified Green Buildings
- GIB Credit 2, Building Energy Efficiency
- GIB Credit 3, Building Water Efficiency
- GIB Credit 4, Water-Efficient Landscaping
- GIB Credit 9, Heat Island Reduction
- GIB Credit 14, Wastewater Management

15 There are exceptions to this rule. The following states have not adopted one or more of the statewide building and related codes: AZ DE ND ME MS MO, SD, and WY. To determine if a municipality in these states has the authority to adopt codes, seek legal counsel.

16 The following five states have adopted statewide building, energy, and plumbing codes but do not allow municipalities to amend any of these codes: CT, KS, SC, MN, and TN.

17 The following states and DC have adopted statewide building, energy, and plumbing codes and authorize municipalities to exceed one or more of these codes: AL, AK, AR, CA, CO, DC, FL, GA, HI, ID, IL, IN, IA, KY, LA, MD, MI, MT, NC, NE, NV, NH, NJ, NM, NY, OH, OK, OR, PA, RI, TX, UT, VA, VT, WA, WI, and WV.

## 4.11 ACCESSIBILITY AND USABILITY

To increase building access for people of diverse abilities within your community, amend the accessible and usable building requirements in the applicable building or accessibility code using the accessible and usable building requirements referenced in NPD Credit 11, Visitability and Universal Design (NPDc11). Require at least 20 percent of the dwelling units (and not less than one) in single dwelling unit buildings and multiunit buildings with two or three dwelling units to be designed in accordance with the accessible and usable building requirements in the International Code Council and American National Standards Institute's ICC/ANSI A117.1, Type C, Visitable Unit. For multiunit buildings with four or more dwelling units, require at least 20 percent of the dwelling units (and not less than one) to meet the universal design requirements listed in NPDc11 or comply with accessibility requirements for noncompliant rights-of-way listed in NPDc11 Option 2.

Some communities may need to renovate public infrastructure, such as sidewalks and intersection crossings, to make it more accessible for people with disabilities. To accomplish this, amend your municipality's infrastructure policies for public rights-of-way or accessible travel routes in accordance with NPDc11 Option 2. Require that all rights-of-way and travel routes be designed, constructed, or retrofitted to comply with the Accessibility Guidelines in the Americans with Disabilities Act (for private sector and local and state government facilities) or the Architectural Barriers Act (for federally funded facilities). Additionally, the ADA-ABA Accessibility Guidelines can provide requirements for retrofitting travel routes in a jurisdiction, planning district, or new project. Note that NPDc11 Option 2 is only applicable to LEED-ND projects with only nonresidential components or residential components not within the scope of Option 1.

### Case Study: Austin, Texas

The Mueller Community, a LEED-ND Certified Plan at the silver level under the pilot version of the rating system, is located near downtown Austin on the 700-acre site of the former Robert Mueller Municipal Airport. Following the relocation of the airport, the City of Austin appointed the Robert Mueller Municipal Airport Advisory Group in 1997. This group created a set of redevelopment goals, which included revitalization of east Austin, housing choice diversity, and sustainability. The city hired ROMA Design Group to prepare a Reuse and Redevelopment Plan, which the City Council adopted in 2000. The plan calls for a compact and interactive development pattern, reasonably priced housing, public open space, pedestrian ways, a street network that addresses mobility needs, and utility and infrastructure improvements that promote sustainability. In 2002, the city selected Catellus Development Corporation as the Master Developer for Mueller and began working with Catellus to refine the plan, generating the Mueller Design Book in 2004.

The Mueller Design Book is an updated Master Plan that promotes connectivity, neighborliness, activity, authenticity, sustainability, and livability. The Design Book provides guidelines for mixed-use residential neighborhoods, a mixed-use commercial center, a regional mixed-use retail complex, parks and open spaces, landscaping and streetscapes, green infrastructure, and green building. Additionally, the Design Book requires all project dwelling units to meet City of Austin S.M.A.R.T. Housing Standards for visitability because the project is publically funded within the meaning of Austin's Accessibility in Housing Constructed with Public Funds requirement (see chapter 2 of the design book, Neighborhood Buildings: Character, Materials and Treatments, and City of Austin, TX, code section 5-1-132). This will ensure the Mueller project's single-family homes, duplexes, and triplexes are designed in a manner consistent with the standards for ICC.ANSI A117.1 Type C Visitable Units. (continued)

### Case Study: Austin, Texas (continued)

New townhomes in Mueller, Austin, TX
Source: Garreth Wilcock

In 2004, the city entered into a Master Development Agreement (MDA) with Catellus. Adopted by the City Council in 2004, the MDA incorporates the Design Book and makes Catellus responsible for ensuring that proposed projects comply with these guidelines. The Design Book supplements zoning provisions in the Mueller Planned Unit Development (PUD), as well as the Mueller Master Community Covenants. The city adopted PUD zoning for Mueller in 2004 because the existing zoning did not allow the envisioned development. The PUD includes density, building height, setbacks, lot size, and impervious cover requirements that reflect the dense urban nature of the project and allows redevelopment according to the Design Book. The community covenants require the New Construction Council to approve proposed buildings within Mueller only after ensuring they comply with Design Book guidelines. Further, developers are required to comply with the city's Green Building Rating System or achieve LEED certification. Green building certification requirements, coupled with the Design Book's sustainability measures, enabled the project to become a LEED-ND Certified Plan at the silver level under the pilot version of the rating system.

## 4.12 GREEN BUILDINGS

GIB Prerequisite 1, Certified Green Building (GIBp1), encourages green building practices by requiring developers to design, construct or retrofit and obtain LEED certification for one whole building within the project. Alternatively, GIBp1 allows developers to obtain certification through a green building rating system that requires review by independent, impartial, third-party certifying bodies as defined by ISO/IEC$_{17021}$. GIB Credit 1, Certified Green Buildings (GIBc1), builds on this, requiring projects with 10 or fewer habitable buildings to do the same for at least one more building, earning up to five points for five buildings. For projects of all sizes, GIBc1 awards up to five points for the design, construction, retrofit, and certification of a percentage of the total project building square footage beyond GIBp1.

To encourage high-performance building design and construction, amend your municipality's building code to include green building code provisions. Consult the International Green Construction Code (IgCC) and ASHRAE Standard 189.1, which provide a comprehensive set of commercial green building requirements. Where possible, adopt appropriate IgCC standards as an overlay to your municipality's existing building code. Broadly supported, the IgCC is the first regulatory framework to recognize an entire set of risks not addressed in other codes.

## 4.13 GREEN ROOFS AND HIGH-REFLECTANCE ROOFS

Vegetated or green roofs are specially designed rooftop gardens or lawns that improve air and water quality, help retain stormwater, create habitat, improve building efficiency, offer a longer roof life, and even provide aesthetic benefits. High-reflectance roofs consist of light-colored roofing materials that remain cool throughout the day by reflecting sunlight and rejecting solar heat. GIB Credit 9, Heat Island Reduction (GIBc9), encourages these technologies. GIBc9 Option 2 requires the use of roofing materials with a minimum solar reflectance index (SRI) value for at least 75 percent of a project's new roof area. A qualifying roof with a low slope (≤ 2:12) must have an SRI of at least 78, and a qualifying roof with a steep slope (> 2:12)

must have an SRI of at least 29. Projects also may achieve GIBc9 Option 2 by installing vegetated roofs for at least 50 percent of the new roof area or by combining SRI-compliant and vegetated roofs providing they satisfy the GIBc9 Option 3 equation.

To reduce the heat island effect within your community, amend your municipality's building code to include vegetated and high-reflectance roof provisions. Consult International Green Construction Code (IgCC) Section 404.3 and ASHRAE Standard 189.1 Section 5.3.2.3, which both provide model standards for vegetated and high-reflectance roofs that municipalities can adopt. When making these changes, update engineering and load bearing requirements for green roof installations.

Vegetated roof
Source: Payton Chung, Creative Commons

Zoning ordinances also can include provisions for high-reflectance roofs and vegetated roofs. A municipality can incentivize green roof systems by exempting them from a building's gross floor area calculation while allowing limited access and enjoyment of the roof by a building's occupants (see City of Cambridge, MA, zoning ordinance section 22.30). Because municipalities may regulate these roofing types in the building code or zoning ordinance, determine where your municipality can best accommodate these standards and take care to ensure that they do not conflict with existing regulations. For a more comprehensive discussion of potential amendments to the zoning code, see II. Incorporating LEED-ND into Traditional Zoning Code Elements.

### NASHVILLE, TENNESSEE

Nashville drafted its Downtown Code (DTC) to encourage sustainable neighborhood development after having to award variances for LEED-ND and similar projects. DTC section IV requires new or resurfaced roofs to use a roofing material with an SRI of 29 or greater for roof slopes above 2:12 or SRI of 78 for roofs with slopes less than or equal to 2:12.

## 4.14 RAINWATER COLLECTION

Rainwater collection technologies capture stormwater for reuse, conserving potable water resources. GIB Credit 4, Water-Efficient Landscaping (GIBc4), requires projects to reduce water consumption for outdoor landscape irrigation by 50 percent from a calculated baseline using strategies that include use of captured rainwater. In contrast, some local building codes require that downspouts connect to drains only, inhibiting rainwater collection. In order to increase water efficiency within your community and allow projects to achieve criteria in GIBc4, amend your building code to permit rainwater collection. Consult 2012 International Green Construction Code (IgCC) Section 707, Rainwater Collection and Distribution Systems, for model standards your municipality can adopt.

Rainwater collection technologies also will require changes to the plumbing code to allow the use of captured rainwater (see Strategy 4.15 Graywater Systems below). When amending your locality's plumbing code, consult 2012 IgCC Section 707, as well as section 505 of the 2010 Green Plumbing and Mechanical Code Supplement (GPMCS) for similar code guidance for rainwater catchment systems.

### CLEVELAND, OHIO

To facilitate several LEED-ND projects, Cleveland altered its building code to allow connections directly to rain barrels through the City's Downspout Disconnection Program. The city amended the code to allow any other materials approved by the city's Chief of Buildings.

## 4.15 GRAYWATER SYSTEMS

Graywater consists of wastewater produced from baths, showers, sinks, dishwashers, and washing machines. Graywater systems recycle water on-site, which then is used for uses that do not require potable water, such as landscape irrigation and toilets. GIB Credit 4, Water-Efficient Landscaping (GIBc4), requires projects to reduce water consumption for outdoor landscape irrigation by 50 percent from a calculated baseline using strategies that include use of recycled wastewater. Similarly, GIB Credit 14, Wastewater Management (GIBc14), requires projects to retain at least 25 percent of the average annual wastewater generated by the project on-site. GIBc14 further requires projects to reuse that wastewater in place of potable water and awards an additional point to projects that retain and reuse 50 percent of the average annual wastewater. To satisfy GIBc14, projects must provide on-site treatment to a quality required by state and local regulations for the proposed reuse.


Graywater system in NRDC headquarters, Santa Monica, CA
Source for image: Grey Crawford

To conserve potable water within your community and enable projects to achieve criteria in GIBc4 and GIBc14, amend your municipality's plumbing code to include graywater system provisions. When making these changes, consult Section 708, Graywater Systems, in the 2012 International Green Construction Code (IgCC). Also, consult the Chapter 16 of the 2009

Uniform Plumbing Code, sections 502 to 504 of the 2010 Green Plumbing and Mechanical Code Supplement (GPMCS), and Chapter 13 of the 2012 International Plumbing Code (IPC) for similar code guidance for graywater use. If necessary, amend the water quality standards in your municipality's health code to allow graywater reuse in a variety of ways.

### NEW YORK CITY, NEW YORK

The Willets Point Redevelopment Project in the Borough of Queens in New York City is a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system. The Willets Point Design Guidelines, which supplement zoning for Willets Point, present building specific strategies to attain sustainable water management. These include reusing high-quality treated wastewater within each building and constructing buildings with separate potable and nonpotable water supply lines to connect with different usage needs. These strategies are possible due to Appendix C of the New York City Plumbing code, which governs water recycling (graywater) systems. Appendix C allows graywater collection from storm water capture systems, condensate reclamation systems, the lavatories of public restrooms, and approved wastewater treatment systems. Graywater may be reused for flushing toilets and urinals, cooling tower makeup, and irrigation systems located in the same lot as the water recycling systems.

## 4.16 WATER-EFFICIENT PLUMBING FIXTURES

Water-efficient plumbing fixtures reduce burdens on water supplies and wastewater systems. To accomplish this, GIB Prerequisite 3, Minimum Building Water Efficiency (GIBp3), requires a project's nonresidential, mixed-use and multifamily residential buildings of four stories or more that are new or undergoing major renovations to achieve minimum water efficiency. Under GIBp3, indoor water usage in these buildings must be an average 20 percent less than in baseline buildings. Further, GIBp3 requires 90 percent of a project's new single-family residential buildings and multiunit residential buildings of three stories or fewer to use a combination of fixtures to earn three points under LEED for Homes 2008 Water Efficiency Credit 3, Indoor Water Use. Building on this, GIB Credit 3, Building Water Efficiency (GIBc3), requires indoor water usage that is an average 40 percent less than baseline buildings for the project's nonresidential, mixed-use, and multifamily residential buildings of four stories or more that are new or undergoing major renovations. GIBc3 also requires 90 percent of a project's new single-family residential buildings and multiunit residential buildings of three stories or fewer to use a combination of fixtures that would earn five points under LEED for Homes 2008 Water Efficiency Credit 3.

To conserve potable water within your community, amend your municipality's plumbing code to include water efficiency performance standards for fixtures and fixture fittings, especially toilets, urinals, lavatory faucets, showers, kitchen sink faucets, and pre-rinse spray valves. When amending the plumbing code, consult the fixture performance standards in Section 702, Fixtures, Fittings, Equipment and Appliances, of the 2012 International Green Construction Code (IgCC), as well as LEED for Homes 2008 Water Efficiency Credit 3.

### AUSTIN, TEXAS

The Mueller community, a LEED-ND Certified Plan at the silver level under the pilot version of the rating system, is located near downtown Austin. The Mueller Design Book supplements the project's zoning provisions and outlines four signature green urbanism objectives including Creating Green Buildings. According to the Design Book, one basic element of green building is taking advantage of resource efficient practices such as choosing low-flow water fixtures. The Design Book requires buildings to achieve certain minimum ratings under either the Austin Energy Green Building (AEGB) rating system or under the U.S. Green Building Council's LEED® NC program. AEGB requires both multifamily residential and commercial buildings to utilize high efficiency plumbing fixtures and requires single-family homes to install ENERGY STAR qualified appliances/fixtures and toilets that are EPA WaterSense-approved models (see AEGB Multifamily Guidebook Basic Requirement 8, Commercial Guidebook Basic Requirement 5 & Guide to the Single-Family Home Rating Basic Requirements 12 and 13). Multifamily buildings complying with the minimum AEGB requirements can achieve a minimum of 3 credits under the LEED for Homes 2008 WE Credit 3 High Efficiency Fixtures and Fittings, and AEGB compliant single-family homes can achieve a number of LEED for Homes WE Credits.

## 4.17 ENERGY-EFFICIENT BUILDINGS

Energy efficiency standards help limit fossil fuel usage and its harmful environmental effects, including air pollution and greenhouse gas emissions. To encourage design and construction of energy-efficient buildings, GIB Prerequisite 2, Minimum Building Energy Efficiency (GIBp2), requires projects to document minimum building energy efficiency for 90 percent of the building floor area in a project's nonresidential, mixed-use, and multiunit residential buildings of four or more stories that are new or undergoing major renovations, as well as new single-family residential buildings and multiunit residential buildings three stories or fewer. GIB Credit 2, Building Energy Efficiency (GIBc2), goes beyond this, requiring even greater minimum building energy efficiency for 90 percent of a project's building floor area.

Use criteria in GIBp2 and GIBc2 to enhance your municipality's energy code. Amend the energy code to achieve at least a 10 percent improvement over ANSI/ASHRAE/IESNA Standard 90.1-2007 for new nonresidential, mixed-use and multiunit residential (four or more stories) buildings, which would match GIBp2 criteria. To exceed this, consider requiring or incentivizing up to a 26 percent improvement for these new building types in accordance with GIBc2. In addition, require at least a five percent improvement over ANSI/ASHRAE/IESNA Standard 90.1-2007 for these building types undergoing major renovations as in GIBp2. Consider exceeding this by requiring or incentivizing up to a 22 percent improvement for major renovations of these building types in accordance with GIBc2. When drafting these amendments, consult the 2009 International Energy Conservation Code (IECC), which references ANSI/ASHRAE/IESNA Standard 90.1-2007.

Further, amend the energy code to achieve ENERGY STAR or equivalent criteria for new single-family residential buildings and multiunit residential buildings of three stories or fewer. Alternatively, require these buildings to achieve a Home Energy Rating System (HERS) index score of at least 75. Municipalities also can incorporate ENERGY STAR guidelines for residential buildings into their codes, requiring thermal envelope efficiency, electrical savings, superior ventilation, and equipment efficiency requirements.

### CHAMPAIGN, ILLINOIS

Champaign consulted the LEED-ND pilot rating system while developing the Urban Neighborhood-Residential, Urban Neighborhood-Activity Center, and Urban Neighborhood-Corporate districts (UN-R, UN-AC, and UN-C) for its Curtis Road Interchange. Design requirements for these districts require commercial buildings to exceed the code's energy efficiency requirements by at least 40 percent (see City of Champaign, IL, code section 37-329.3). Single-family and duplex homes must exceed the code's energy efficiency requirements by at least 30 percent.

## 4.18 STREET WIDTHS AND FIRE SAFETY

Fire codes often include street width standards that allow emergency vehicles and fire trucks to pass safely around turns at an accelerated speed. Wide streets degrade the pedestrian environment and may inhibit projects from achieving the building-height-to-street-width criteria in NPD Prerequisite 1 and Credit 1, Walkable Streets (NPDp1, NPDc1), which provide a sense of enclosure to the public realm.

To enhance the streetscape within development projects while addressing the need to provide adequate access for emergency vehicles, amend your municipality's fire code to allow narrower street widths in consultation with local fire officials. Consult the Institute of Transportation Engineers' and the Congress for New Urbanism's Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, chapter 9, Design Considerations, for recommendations to achieve both of these objectives. These recommendations include ensuring high levels of street connectivity to provide alternative routes for emergency vehicles and providing mountable median and shoulder curbs. For more information about NPDp1 and NPDc1 criteria, as well as street width standards in site plan and subdivision regulations, see Strategy 3.7 Street Widths that Enhance Streetscape.

### AUSTIN, TEXAS

Austin adopted by reference the 2009 Edition of the International Fire Code but made several amendments to this code (see City of Austin, TX, code section 25-12-171). Under the Austin Fire Code, fire access roads must have a width of at least 25 feet except in the case of approved security gates in accordance with Section 503.6 and the city's Fire Protection Criteria Manual (see code section 503.2.1). However, the fire code allows a narrower street width when it is appropriate for dedicated city streets, it is not in a location requiring aerial apparatus to fight and extinguish a fire, and the street has an adequate turning radius for emergency service vehicles. These fire code requirements enable the project design guidelines to incorporate street widths of less than 25 feet in the Mueller community, a LEED-ND Certified Plan at the silver level under the pilot version of the rating system. The fire code also allows a narrower street width when a street is part of a system of interconnected public and private roads or driveways that provide multiple pathways for emergency vehicles to access the structures served by the roadway system and any fire vehicle blocking the roadway does not create a dead-end road longer than 150 feet. In the case of a divided street, the fire code allows a narrower street width when appropriate for dedicated city streets where each lane is at least 15 feet wide.

# V. INCLUDING LEED FOR NEIGHBORHOOD DEVELOPMENT IN NON-REGULATORY INITIATIVES

This section of the manual focuses on non-regulatory initiatives municipalities can use to achieve and encourage sustainable neighborhood development techniques that they cannot or do not wish to address through land development regulations. This section shows municipalities how to include LEED-ND criteria in:

**A.** Capital improvement plans, and

**B.** Internal policies and non-regulatory programs.

## CAPITAL IMPROVEMENT PLANS

A municipality may require a development project to provide the infrastructure necessary to mitigate the project's impacts on the community. Beyond this, the municipality must provide and bear the cost of needed infrastructure itself. Where local governments wish to retrofit, renovate, or install infrastructure or facilities that will contribute to a neighborhood's sustainability but cannot or do not wish to impose these costs on developers, they can amend their capital improvement plans to accommodate these improvements. The strategies below present ways local governments can do this using LEED-ND criteria that are associated with public infrastructure, facilities, and services. Municipalities should compare their existing capital improvement plans to these strategies and identify any conflicts. Where possible within economic constraints, municipalities should remove any conflicts and amend the plans using the strategies below.

### Capital Improvement Plan Strategies:

- Prioritize brownfield cleanup and redevelopment
- Improve transit facilities
- Provide infrastructure improvements
- Encourage green building techniques in public buildings

- SLL Prerequisite 1, Smart Location
- SLL Credit 2, Brownfields Redevelopment
- SLL Credit 3, Locations with Reduced Automobile Dependence
- SLL Credit 4, Bicycle Network and Storage
- NPD Prerequisite 1, Walkable Streets, items (b), (c) & (d)
- NPD Prerequisite 3, Connected and Open Community
- NPD Credit 1, Walkable Streets, optional items (i), (j), (m), (n), (o) & (p)
- NPD Credit 5, Reduced Parking Footprint
- NPD Credit 6, Street Network
- NPD Credit 7, Transit Facilities
- NPD Credit 9, Access to Civic and Public Spaces
- NPD Credit 10, Access to Recreation Facilities
- NPD Credit 14, Tree-Lined and Shaded Streets
- NPD Credit 15, Neighborhood Schools
- GIB Credit 4, Water-Efficient Landscaping
- GIB Credit 8, Stormwater Management
- GIB Credit 9, Heat Island Reduction
- GIB Credit 13, Infrastructure Energy Efficiency
- GIB Credit 15, Recycled Content in Infrastructure

# 5.1 BROWNFIELD CLEANUP AND REDEVELOPMENT

Brownfields are abandoned, idled, or underused industrial or commercial land parcels where redevelopment or reuse is complicated by real or perceived environmental contamination from pollutants such as hazardous waste or petroleum products. Brownfield cleanup and redevelopment eliminates environmental threats, alleviates development pressures on green space, places development density closer to urban centers where brownfields typically are located, and helps generate property tax revenue from formerly abandoned sites. SLL Credit 2, Brownfields Redevelopment (SLLc2), encourages these benefits. SLLc2 awards one point to a project that locates on a site that is documented as contaminated or on a site defined as a brownfield by a local, state, or federal government agency. SLLc2 Option 1 further requires projects to remediate site contamination with approval from the controlling public authority. SLLc2 Option 2 awards projects two points for achieving the requirements in Option 1 and locating in one of the listed high-priority redevelopment areas.

Frequently, developers are reluctant to redevelop brownfields because of the high investigation and cleanup costs, as well as potential liability that may be imposed upon them under federal environmental laws. To help overcome this, your municipality should amend its capital improvement plan to prioritize brownfield remediation when providing public infrastructure, services, and facilities. Where possible, site public facilities and infrastructure in the high-priority redevelopment areas listed in SLLc2 Option 1. Leverage these investments with funds available from state and local agencies. Developers may wish to contribute to these expenses to make their projects financially feasible and to expedite their approval. Additionally, your municipality could gain title to brownfield land and issue a request for proposals (RFP) for a sustainable neighborhood redevelopment project. If your municipality pursues this option, take care to avoid assuming cleanup liability.

### VICTORIA, BRITISH COLUMBIA

Victoria issued an RFP for the Dockside Lands, a 12-acre brownfield site. The RFP used "Triple Bottom Line" accounting (focused on value according to social, environmental, and economic criteria), a philosophy that LEED-ND embodies. Applicants proposed potential land uses, density, and community amenities for the site, and the city scored proposals based on how well they achieved the Triple Bottom Line. This process resulted in Dockside Green, a LEED-ND Certified Plan at the platinum level under the pilot version of the rating system.

### Case Study: Las Vegas, Nevada

The Symphony Park Project, a LEED-ND pilot project that achieved certified plan status at the gold level, is located in downtown Las Vegas, which is governed by the Downtown Centennial Plan (DCP). The DCP relaxes development standards in the downtown area, including parking, setbacks, height, and lot coverage requirements. It supports compact, mixed-use development by changing suburban standards to urban development standards, allowing combined uses and requiring the City Council's case-by-case review of development standards. Las Vegas' comprehensive plan Las Vegas Master Plan 2020 references and incorporates the DCP and other special area plans. In addition, City Council adopted into Las Vegas' zoning code the DCP-O Downtown Centennial Plan Overlay District, which sets DCP-O boundaries coterminous with DCP boundaries, adopts DCP design standards, and relaxes zoning standards in accordance with the DCP (see Las Vegas, NV, code section 19.06.060). The overlay district also incorporates by reference future adopted design standards for sub-districts within DCP-O and the DCP. (continued)

### Case Study: Las Vegas, Nevada (continued)

Rendering of Symphony Park, Las Vegas, NV
Source: Newland Communities

The Symphony Park District falls within the Parkway Center District in the DCP and DCP-O. Originally, the Parkway Center site consisted of Union Pacific freight rail yards, the center of Las Vegas' former industrial area. After the rails shut down, the city divided the old rail yard, a brownfield site, into ten parcels, including the Symphony Park parcel. In 2000, the city acquired the Symphony Park parcel to redevelop it and drive further redevelopment in its downtown. In 2005, Newland Communities (Newland), previously selected by the city to be the Development Manager for the Symphony Park project, created the Symphony Park Master Plan (SPP), which strives to facilitate visual, physical, and social connectivity at the pedestrian scale; create authentic neighborhoods; integrate uses; create a high-quality public realm; and generate a model for urban infill sustainability. In addition, Newland conducted design workshops to create the Symphony Park Design Standards, which provide detailed guidance for developers to achieve these principles, outlining a parcel-specific program and massing for each block. City Council committed to this very prescriptive approach. The design standards provide specifications for streetscapes, parking, stormwater management, a pedestrian open space system, building massing and relationship with the street, storefront design, and ground-floor activity.

City Council approved the SPP and design standards in 2006 and also amended the Downtown Centennial Plan to reference the design standards by making them mandatory in DCP's Symphony Park District. Additionally, City Council incorporated the design standards into the DCP-O Downtown Centennial Plan Overlay District by making them part of the development standards applicable to Symphony Park in the Parkway Center District (see Las Vegas, NV, ordinance no. 5874, bill no. 2006-68). The DCP-O supersedes the underlying zoning at the project area by applying both DCP standards and the design standards for Symphony Park.

A team led by Newland compared the design standards to LEED-ND criteria and confirmed that the SPP and design standards would make certification easy to attain. The city agreed to pursue certification for Symphony Park under the LEED-ND pilot program. The team made a slight change to the design standards to meet additional LEED-ND requirements and incorporated LEED-ND criteria for bus stops. Further design standards that match up with LEED-ND requirements include brownfield, infill, walkability, public space, connectivity, and transit standards. In addition, the design standards require all buildings within Symphony Park to achieve LEED for New Construction certification at the certified level.

## 5.2 TRANSIT FACILITIES

To improve access to transit within your community, amend your municipality's capital improvement plan to retrofit and renovate existing and new transit facilities. When making these changes, consult NPD Credit 7, Transit Facilities (NPDc7). Local governments should collaborate with the local or regional transportation agency that serves their jurisdiction and is a portal to federal funding. That joint effort would identify new and existing transit locations to install amenities for transit users. These include covered, partially enclosed shelters with seating and illumination, as well as secure bicycle racks with two-point support systems for locking. Also install new benches, kiosks, bulletin boards, and signs. At each public transit stop, signs should display transit maps and route information, transit schedules, and fare information. To finance these facilities, your municipality might need to leverage its contribution with state and federal funding for transit infrastructure.

### HERCULES, CALIFORNIA

Hercules is building an Intermodal Transit Center for the Hercules Bayfront project. This transit center will offer train, ferry, and bus service at one waterfront location. The new transit center includes track improvements, signals, a center-boarding platform, and station structure. In addition, the transit center provides trails and paths for pedestrian and bicycle access. Hercules Bayfront is a conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system.

## 5.3 INFRASTRUCTURE IMPROVEMENTS

A municipality's capital improvement plan can implement the sustainable infrastructure and related LEED-ND criteria discussed in the context of private sector development above in *III. Incorporating LEED-ND into Site Plan and Subdivision Regulations; Street Design & Transportation* (*Strategies* 3.1 to 3.10), *Stormwater Management & Utilities* (*Strategies* 3.11 to 3.12), and *Open Space & Infrastructure Exactions* (*Strategies* 3.26 to 3.27). This can include requirements for retrofitted or new sustainable transportation infrastructure, on-site stormwater management, green utilities, and open space.

To add sustainable infrastructure improvements that will serve your entire community beyond a specific development project, amend your capital improvement plan to provide sustainable infrastructure where new or retrofitted infrastructure is needed. For public transportation projects, require permeable pavement, energy-efficient traffic and street lights, street and pathway connectivity, increased transit access, bicycle networks and parking, street trees, narrower street widths, wider sidewalks with fewer interruptions, and on-street parking for cars. For more information about each of these transportation strategies, see III. Incorporating LEED-ND into Site Plan and Subdivision Regulations, Street Design & Transportation (Strategies 3.1 to 3.10) above. Also, amend your plan to include stormwater management technologies such as natural area preservation, porous pavement, bioretention systems, and rain water cisterns in your municipal stormwater system. For new and retrofitted utilities, amend the plan to require the installation of energy-efficient municipal utility equipment. Further provide municipal utility components composed of recycled content or reclaimed materials, and equip new sewage utilities with technologies that will allow them to provide water treated and conveyed for nonpotable uses, such as landscaping. See Strategies 3.11 Sustainable Stormwater Management Infrastructure and 3.12 Green Utilities for more information. Finally, amend your municipality's capital improvement plan to include facilities that will increase access to public open space (see Strategy 3.26 Public Access to On-Site Open Space). If authorized under state law, consider funding these improvements within separate water, sewer or other legal districts.

### WEST SACRAMENTO, CALIFORNIA

West Sacramento's Bridge District Infrastructure Project supports the Bridge District Development, a sustainable neighborhood development project that will seek LEED-ND silver certification (see the Bridge District Implementation Strategy). The city is using sustainable infrastructure strategies to install Bridge District infrastructure, such as new roadway segments and utilities, including sewer, water, storm drainage, and commercial utilities. These strategies include permeable pavers, tree wells and planters, infiltration basins along sidewalks, and recycled concrete material used in street construction. Additionally, the city is building a river walk trail for the Bridge District.

### OBERLIN, OHIO

Oberlin purchased a courtyard of the East College Street Project, a LEED-ND pilot project. The city then reestablished the courtyard as a private park and installed a stormwater retention system in the area. These investments helped the project earn several LEED-ND points.

### MONTRÉAL, QUÉBEC

Montréal is building a park and paths along its waterfront to service the Pointe Nord neighborhood, which was awarded LEED-ND Certified Plan status at the gold level under the pilot version of the rating system. The city's green master plan for this neighborhood includes plans for this park, which exists outside the neighborhood's boundaries.

Rendering of plaza at Pointe Nord
Source: Proment

## 5.4 GREEN PUBLIC BUILDINGS

A municipality's capital improvement plan can apply the green building strategies and related LEED-ND criteria discussed in the context of private sector development above in *IV. Incorporating LEED-ND into Supplemental Development Standards, Development Standards for Buildings, Energy, Plumbing, and Fire Safety* (*Strategies* 4.11 to 4.18). To encourage high-performance building design and construction in public buildings, your municipality should amend its capital improvement plan to prioritize green building techniques for new or retrofitted municipal buildings and facilities, as well as publicly funded housing. Your municipality should consider passing

a resolution or executive order to set goals and standards for greening municipal or municipally funded projects. Further, your municipality should encourage its public housing authority to prioritize green building strategies and tie LEED-ND certification to the competitive bid process or grants for future public housing projects. When creating these policies, consult the manual's green building strategies for private development mentioned above.

**CHICAGO, ILLINOIS**

In January 2010, the Chicago Housing Authority (CHA) issued an RFQ seeking a master developer for the multi-year, multi-phase revitalization of the Julia C. Lathrop Homes, a historic 35-acre public housing complex located in Chicago's near-northwest side. The RFQ prioritized sustainable affordability and required the redevelopment to achieve LEED-ND certification at the gold or platinum level.

# INTERNAL POLICIES & NON-REGULATORY PROGRAMS

Internal policies guide municipal projects, infrastructure development, and operations. Local governments can establish internal policies and employ non-regulatory programs to encourage sustainable neighborhood development. The strategies in this subsection demonstrate ways municipalities can incorporate LEED-ND criteria in non-regulatory programs.

**Non-regulatory Policy and Programmatic Strategies:**

- Create a transportation demand management program
- Develop a comprehensive waste management program
- Encourage local food production
- Support infill development
- Encourage existing building stock reuse
- Increase pedestrian and bicycle access to schools

- SLL Prerequisite 1, Smart Location
- SLL Credit 1, Preferred Locations
- NPD Credit 8, Transportation Demand Management
- NPD Credit 13, Local Food Production
- NPD Credit 15, Neighborhood Schools
- **GIB Credit 5, Existing Building Reuse**
- GIB Credit 16, Solid Waste Management Infrastructure

## 5.5 TRANSPORTATION DEMAND MANAGEMENT

To reduce automobile trips and associated energy consumption and pollution, create a municipal program using criteria from NPD Credit 8, Transportation Demand Management (NPDc8). This can involve adopting a transportation demand management program, providing transit passes for residents, supporting private transit service, and creating a vehicle-sharing program.

### Transportation Demand Management Program

Adopt a program to manage transportation demand within your community using criteria from NPDc8 Option 1. Your local transportation authority can create and implement a comprehensive transportation demand management (TDM) program that reduces weekday peak-period motor vehicle trips by at least 20 percent compared with a baseline case. Common TDM strategies include:

- parking cash out programs that offer cash equivalent payments to commuters who use alternate transportation in lieu of their free parking spaces;
- flextime or flexible work hours to avoid peak commute times;

- ride sharing and ride matching systems;
- pedestrian and bicycle promotion policies;
- occasional subsidized rides home for alternate transportation commuters; car-free programs; and
- reduced public parking.

The TDM plan should be prepared in consultation with a qualified transportation professional with TDM experience. The Institute for Transportation Engineers (ITE) and government transportation agencies offer data to help local governments determine baseline trip rates, future traffic projections, and potential traffic reductions.

### Transit Pass Program

In addition, provide transit passes for residents of sustainable neighborhoods using criteria from NPDc8 Option 2. Provide transit passes subsidized to at least half of the regular price that are valid for at least one year, and publicize this program to targeted residents.

### Private Transit Service

If your community cannot require developer-sponsored transit as in Strategy 3.4 Transit Access above, have your local board negotiate with developers during the approval process to provide this year-round, private transit service voluntarily in accordance with NPDc8 Option 3. Where possible, encourage developers to provide vans, shuttles, or buses from at least one central point in the project to other major transit facilities and destinations. This service should provide at least 45 daily weekday trips and 30 daily weekend trips. Negotiate for covered transit stop shelters with seating and illumination, as well as secure bicycle racks adequate to meet projected demand.

### Vehicle-Sharing Program

Finally, create a municipal vehicle-sharing program using criteria from NPDc8 Option 4. Working with a car sharing company or with a municipally owned fleet, create a vehicle-sharing program that provides cars for municipal staff use or for rent to municipal residents who pay a membership fee or at hourly rates. If renting to residents, locate at least one shared vehicle within a quarter-mile walk distance of any area targeted for sustainable neighborhood development. If the targeted area has more than 100 dwelling units or employees and has a minimum transit service of 60 daily weekday trips and 40 daily weekend trips, provide at least one additional vehicle for every 100 dwelling units or employees. If the targeted area has more than 100 dwelling units or employees but does not meet these transit service frequencies, provide at least one additional vehicle and parking space for every 200 dwelling units or employees. Using signage and other means, publicize the vehicle-sharing program to residents in these areas.

## 5.6 COMPREHENSIVE WASTE MANAGEMENT

In order to reduce the volume of waste deposited in landfills, GIB Credit 16, Solid Waste Management Infrastructure (GIBc16), requires projects to meet at least four of the five following requirements:

1. provide at least one recycling or reuse station,
2. offer at least one drop-off point for hazardous office or household wastes,
3. provide at least one compost station,
4. establish a minimum amount of recycling containers on every mixed-use or nonresidential block, and
5. recycle or salvage at least 50 percent of nonhazardous construction and demolition debris and develop and implement a construction waste management plan.

Additionally, GIBc16 allows projects to achieve requirements (1) through (3) by locating in a jurisdiction with collection services. Your municipality should use GIBc16 criteria to create a comprehensive waste management program that offers recycling, hazardous waste, composting, and construction waste services.

Trash and recycling receptacles, Austin, TX
Source: Sophie Lambert

Establish a comprehensive recycling center dedicated to the collection, separation and storage of materials for recycling. Ensure that this center, at a minimum, takes paper, corrugated cardboard, glass, plastic, and metals. To support this center, provide recycling containers adjacent to trash receptacles on every mixed-use block or at least every 800 feet. Install receptacles marked with clear signage to discourage contamination and designed to withstand the elements. In addition, create a secure hazardous waste disposal facility that collects hazardous wastes such as paints, solvents, oil, and batteries. Also, establish a composting program dedicated to the collection and composting of food and yard wastes. Finally, develop a construction and demolition debris program that recycles or salvages nonhazardous construction and demolition debris. This program would make possible and support construction waste requirements for development projects (see Strategy 4.10 Construction Waste Management above for more information).

Your municipality should partner with developers to coordinate these programs with drop-off stations located within development projects. Negotiate this partnership with applicants during the project review and approval process. Existing municipal waste management programs will encourage developers to dedicate on-site space to corresponding waste drop-off stations during this process.

### NAPA COUNTY, CALIFORNIA

A conditionally approved LEED-ND plan at the gold level under the pilot version of the rating system, the Napa Pipe Project in Napa County received a point under GCT Credit 19, Comprehensive Waste Management (GCTc19), for its comprehensive waste management plan. Existing services and policies in Napa County were crucial for earning this point. Napa County offers many residents curbside yard waste collection and operates two facilities that compost yard wastes, organic waste from winemaking, food waste, manure, and chipped wood. Napa County collects composting waste from a residential food composting drop-off and offers a food composting waste pick up service for businesses. Further, Napa County offers workshops and support resources to help home composters. To earn a point under GCTc19, the Napa Pipe Project included two compost centers at community gardens, provided two recycling centers, and included residential recycling in the trash pick-up routine. Further, the project committed to creating a plan for post-collection disposal or reuse of materials and likely will rely on Napa County policies and services to implement this plan.

## 5.7 LOCAL FOOD PRODUCTION

Sourcing food locally produces fewer transportation and storage emissions and helps to sustain the competitiveness of small and organic farms. Option 1 in NPD Credit 13, Local Food Production (NPDc13), supports this by requiring projects to dedicate a minimum amount of permanent and viable growing space and related facilities based on project density. NPDc13 Option 1 allows projects to satisfy this requirement using established community gardens outside the project boundary but within a half-mile walk distance of the project's geographic center if the garden otherwise meets all of the option requirements. NPDc13 Option 2 requires projects to purchase shares in a community-supported agriculture (CSA) program located within 150 miles of the project site for at least 80 percent of the project's dwelling units for two years. Lastly, NPDc13 Option 3 requires that the project's geographic center be within a half-mile walk distance of an existing or planned farmers' market that operates at least once weekly for at least five months annually and sells only items grown within 150 miles of the project site.

To support local food production and enable projects to meet these LEED-ND criteria, implement policies for your municipality that encourage produce garden growing areas, community gardens, community-supported agriculture programs, and farmers' markets that sell locally grown produce.

## Produce Garden Growing Space

Develop informal planning board protocols to encourage the establishment of produce garden growing areas during the approval process (see Strategy 6.4 Internal Project Review Standards below for more information). During this process, encourage development projects with residential components to dedicate a minimum amount of permanent and viable growing space and related facilities based on project density as described in NPDc13 Table 1. Additionally, urge applicants to provide solar access, fencing, watering systems, garden bed enhancements, secure storage space for tools, and pedestrian access for these spaces. Encourage applicants to locate the growing space within project areas most suitable for gardens, and ensure that the growing spaces are owned and managed by an entity that includes development occupants.

## Community Gardens & CSAs

In addition, establish a community garden program by dedicating public space for public gardens and partnering with a local experts and organizations to create a garden sharing system. The community garden program should include a permitting process for participating community members, as well as an operations and maintenance program. If your municipality is located near CSAs, adopt policies to support them and ensure long-term viability. Policies that encourage CSAs include property tax exemptions and general municipal support through programming and education initiatives (see VI. Project Streamlining and LEED-ND Incentives & Assistance below). Also, ensure that your municipality's zoning allows CSAs by adopting agricultural zoning districts where appropriate (see Strategy 2.3 Agricultural Uses above).

## Farmers' Markets

Finally, facilitate a farmers' market within your community by ensuring existing local laws allow this use and, ideally, dedicating public space for this purpose, dedicating staff time to organizing a farmers' market with local experts, and lending assistance with advertising and marketing through municipal publications and its website (see VI. Project Streamlining and LEED-ND Incentives & Assistance below). When developing a community garden or farmers' market, consult with local parks and recreation staff.

Union Square Greenmarket, New York, NY
Source: Pace University, Land Use Law Center

### PORTLAND, OREGON

Portland's Community Garden Program created 35 community gardens throughout the city (see Portland, OR, code section 3.80.020). A citizen interested in becoming a community gardener must submit a Garden Plot Request Form indicating garden preferences. In addition, Portland allows private parties to obtain special permits to utilize unused parkland for urban agriculture or gardening purposes. Portland's community garden program may help LEED-ND projects in Portland earn a point under NPDc13.

### SEATTLE, WASHINGTON

Seattle created a program that provides public land suitable for hosting farmers' markets. ordinance no. 123090 streamlined approvals for this process and lowered permitting fees for farmers' markets (also see Seattle Multidepartmental Administrative Rule MDAR 09-01). Like Portland's community garden program, Seattle's farmers' market policies may help LEED-ND projects in Seattle to earn a point under NPDc13.

## 5.8 INFILL AND RELATED DEVELOPMENT

The LEED-ND rating system defines infill sites as those bordered almost entirely by previously developed sites altered through paving, construction, or land use that requires regulatory permitting. Sites bordered by lands with a minimum street connectivity or number of intersections per square mile are infill sites as well. Development of infill sites reduces development pressures on greenspace and places new development near existing infrastructure and services. To encourage this, Option 1 in SLL Prerequisite 1, Smart Location (SLLp1), requires projects to locate on an infill site. Option 1 in SLL Credit 1, Preferred Locations (SLLc1), rewards projects with points for four site types. Redevelopment projects that are constructed on a previously developed infill site are awarded the most points, followed by projects built on an undeveloped infill site.

Similarly, Option 2 in SLLp1 requires projects to locate on a site adjacent to previously developed land that has at least 90 intersections per square mile. These intersections must be within a half-mile distance of a contiguous segment of the project boundary that is adjacent to previous development. In addition, SLLp1 Option 2 requires a through-street or nonmotorized right-of-way to intersect the project boundary at least every 600 feet on average, and at least every 800 feet, connecting it with existing streets or rights-of-way outside the project. Building on this, Option 2 in SLL Credit 1, Preferred Locations (SLLc1), awards points to projects that have additional existing connectivity within a half mile of the project boundary. The credit awards one point for 200 to 250 intersections per square mile and up to five points for 400 or more.

To facilitate development on and adjacent to infill and previously developed sites, adopt internal policies that prioritize public infrastructure repairs, improvements, and enhancements in existing neighborhoods with additional development capacity. Use SLLp1 and SLLc1 criteria and the LEED-ND definition for infill to identify infill sites within your community. Following this, adopt a policy statement using SLLp1 and SLLc1 criteria that requires the location of future municipal offices and facilities on infill sites, previously developed sites, sites adjacent to previously developed parcels, and sites adjacent to previously developed land that meets the connectivity requirements in SLLp1 and SLLc1. Further, adopt policies to incentivize private development on these types of parcels (see VI. Project Streamlining and LEED-ND Incentives & Assistance below). For example, consider simplifying procedures for site plan approvals or waiving requirements such as a traffic impact analyses for applicants who build on these infill or related sites.

## 5.9 EXISTING BUILDING STOCK REUSE

The reuse of existing building stock conserves resources, reduces waste, and diminishes adverse environmental effects associated with materials manufacturing and transport. To encourage existing building stock reuse, GIB Credit 5, Existing Building Reuse (GIBc5), requires projects to reuse existing habitable building stock by achieving the greater of the following two benchmarks:

- 50 percent of one existing building structure and envelope, or
- 20 percent of the total existing building stock.

To encourage building stock reuse and assist projects with achieving GIBc5, adopt a policy statement requiring the reuse of building stock, structure and envelope for municipal facilities and adopt incentives to encourage private development to do the same (see VI. Project Streamlining and LEED-ND Incentives & Assistance below). Further, evaluate your municipality's building codes using GIBc5 criteria to identify and remove potential barriers to building stock reuse. Also, develop informal planning board protocols to encourage building stock reuse during the approval process; see Strategy 6.4 Internal Project Review Standards below

for more information. Finally, consider adopting an official demolition permit system. Require redevelopments in appropriate zoning districts to obtain a permit for any building demolition unless the reuse is economically infeasible, incompatible with the new development, inefficient, or contaminated. To avoid discouraging redevelopment, the permit system should not require overly burdensome amounts of reuse.

## 5.10 PEDESTRIAN AND BICYCLE ACCESS TO SCHOOLS

Better connectivity between residences and schools improves community interaction and engagement and promotes healthy and active lifestyles for students. NPD Credit 15, Neighborhood Schools (NPDc15), promotes this by requiring projects with a residential component of at least 30 percent of the project's total building square footage to locate at least 50 percent of its dwelling units within a half-mile walk distance of an elementary or middle school building entrance or within a one-mile walk distance of a high school building entrance. NPDc15 further requires streets within or bordering a project boundary that lead from dwelling units to a school site to have a complete network of sidewalks on both sides. Also, these streets must feature bicycle lanes, traffic control, or traffic calming measures.

To increase the number of students who can walk or bike to school, planning staff should work with school district planners to develop policies that favor school location near existing and planned neighborhoods. These policies should provide bike and pedestrian access to and from schools and existing neighborhoods, projected redevelopments, and new developments. During the approval process, your local board should negotiate with developers to provide public amenities that better connect schools and neighborhoods. Additionally, your municipality could create a community-wide pedestrian or bicycle plan that addresses sidewalk and bicycle path connectivity with schools and should ensure that its plans for transportation infrastructure address connectivity between schools and their surrounding community (see Strategy 5.3 Infrastructure Improvements). When developing these policies, consult resources from the National Center for Safe Routes to School.

# VI. PROJECT STREAMLINING AND LEED FOR NEIGHBORHOOD DEVELOPMENT INCENTIVES & ASSISTANCE

This section of the Manual describes procedures, incentives, and assistance municipalities can implement to support sustainable neighborhood development and LEED-ND projects either in conjunction with or in lieu of the regulatory methods discussed above. These techniques include:

**A.** Project approval process streamlining, and

**B.** Incentives and assistance programs.

## PROJECT REVIEW AND APPROVAL PROCESS STREAMLINING

Often, the local project review and approval process can be long, cumbersome, and difficult to navigate. Such difficulties may discourage sustainable neighborhood development projects or, in some cases, create a barrier to LEED-ND certification. The typical review process also involves the public late in the process when the constrained applicant is less likely to adjust a proposed project to accommodate citizens' concerns. To avoid these pitfalls and encourage sustainable neighborhood development, municipalities should streamline the project review and approval process using the following strategies.

**Project Approval Process Strategies:**

- Design a clear roadmap of the review process
- Provide expedited review for sustainable development projects
- Include community outreach and involvement in project reviews
- Implement internal project review standards

■ NPD Credit 12, Community Outreach and Involvement

### 6.1 CLEAR ROADMAP OF THE REVIEW PROCESS

The project review and approval process can be difficult for developers to navigate. In addition to the steps that the primary review board must follow, the process may include other boards and agencies that must review, comment on, or approve some aspect of the project. For example, local law may require review by an architectural review board to ensure compliance with legislated architectural or design standards, or it may require a conservation board to advise and help the planning board ensure preservation of natural resources. In addition, the municipality may include supplementary steps in the process. Despite this complexity, many municipalities do not provide the public adequate information describing how this complicated process works.

To assist sustainable neighborhood development applicants through this complicated process, create a roadmap of your municipality's project review and approval process that clearly outlines all of these steps. This roadmap should document all review procedures clearly, include approval sequences for applications, note where to submit applications, explain the agencies' responsibilities, define key terms, and use clear terminology. In addition, indicate how specific local agencies or departments may participate in decision making or provide data for a proposed project. For example, to allow pervious paving materials for several LEED-ND projects, the City of Cleveland, Ohio, authorized its building director to approve materials other than asphalt or concrete during the review process.

Further, highlight in this roadmap where opportunities exist for increased community outreach and involvement (see Strategy 6.3 Community Outreach and Involvement below for more information). Prior to reviewing an application, consult with the developer about how to comply with each step and work with each board or agency.

## 6.2 EXPEDITED REVIEW

The typical project review and approval process can be time-consuming and costly to developers. In contrast, an expedited review process encourages sustainable neighborhood development projects by saving developers money and helps projects meet LEED-ND certification timelines. LEED-ND projects are registered and their applications reviewed under one of three LEED-ND certification stages, which vary based on to what extent a project has achieved its land use entitlements from public authorities. This LEED-ND c ertification process sets specified timelines and includes expiration policies. For more information, see the LEED Certification Policy Manual for Projects Registered Under LEED for Neighborhood Development.

Because they often include several buildings, LEED-ND projects may have significantly longer entitlement and construction periods. The registration and application review processes operate differently and are quite lengthy for such projects. To accommodate LEED-ND certification process deadlines and encourage sustainable neighborhood developments, your municipality should streamline its project review and approval process and award expedited reviews to projects that incorporate sustainable practices. Give these projects priority status and require review boards to take final action within a short period of time. Complete review for small projects within 90 days of a completed application, and consider allowing more time for review of more complex projects.

### SAN DIEGO, CALIFORNIA

San Diego is one of many communities that now award expedited permit processing and allowances for deviations to regulations to any green or sustainable building project, due to intense community enthusiasm for green projects. The city has awarded expedited review to two LEED-ND pilot projects within its jurisdiction.

### SARASOTA COUNTY, FLORIDA

Similarly, Sarasota County adopted Resolution No. 2006-174, a green development incentive resolution that provides fast-track permitting for Developments of Critical Concern (DOCC), such as amendments to sector plans, rezone and special exception petitions, site and development plans, and building permit applications for those developments that meet standards for green buildings or green developments. In particular, Sarasota County awards expedited review to developers who have demonstrated a commitment to achieving LEED-ND certification.

### BERKELEY, CALIFORNIA

Berkeley's Green Pathway ordinance provides expedited permitting for certain development projects within the city's Commercial Downtown Mixed Use District (C-DMU) (see City of Berkeley, CA, code sections 23B.34 & 23E.68). While drafting the C-DMU, city planners incorporated urban design metrics from the LEED-ND rating system. Under the Green Pathway ordinance, development projects qualify for expedited review if they exceed C-DMU green building requirements and provide additional public benefits. For example, qualified projects must not impact historical resources, must provide affordable housing, and must comply with street wall façade standards that enhance the pedestrian realm, among other requirements. If they comply with Green Pathway requirements and Downtown Design Guidelines, buildings below 75 feet in height (excluding hotels and buildings with more than 100 dwelling units) will be approved as a matter of right with a Zoning Certificate. The Design Review Committee must take final action on a project within 90 days from the application date. For qualified buildings over 75 feet in height, the Zoning Adjustments Board must take final action no later than 210 days after the application is complete, provided that this time limit is extended as necessary to comply with the state environmental review law. These projects receive priority status to meet the expedited review requirements.

## 6.3 COMMUNITY OUTREACH AND INVOLVEMENT

The local review board must provide public notice and a public hearing for every proposed development under review. State zoning enabling legislation typically includes rules regarding who must be notified and when relative to a public hearing. Traditionally such hearings are held only at the end of the review process. By that time, late in the process, the developer would have invested substantial time, money, and energy in the proposal and may resist changes suggested by the public. Today it is common for municipalities and developers of innovative projects to collaborate and seek out public feedback on a proposed project much earlier in the process. A municipality can require developers to participate in these early public outreach events.

Land Use Leadership Alliance training program on community engagement, Hudson Valley, NY
Source: Pace University, Land Use Law Center

Amend your municipality's review procedures to include process steps using criteria in NPD Credit 12, Community Outreach and Involvement (NPDc12). NPDc12 encourages community member involvement in project design, planning, and decision making. At the beginning of project design, applicants can be required to host a meeting with community members and municipal staff to solicit and document input on the proposed project. Ideally applicants also would host a multi-day, public design charrette or interactive workshop to prepare conceptual plans and drawings. Charrette participants should include nearby property owners, residents, business owners, and workers. After the charrette, the applicants can be encouraged to modify the project's conceptual design based on this input or explain why they refrained from making changes. Finally, establish an ongoing means for communication between the applicant and community throughout the design and construction phases, such as follow-up meetings and workshops.

## Case Study: Milwaukee, Wisconsin

Bioswale at The Brewery, Milwaukee, WI
Source: Sophie Lambert

Established in 1844, the Pabst Brewery brewed beer for over a century in the northwest corner of downtown Milwaukee. The Brewery closed in 1996, leaving its historic buildings vacant across six city blocks, encompassing over 20 acres of land. In 2006, businessman and philanthropist Joseph Zilber purchased the Brewery complex, created the Brewery Design & Development Team (Design Team), and committed monetary and professional resources to its redevelopment. To secure further funding and resources, including tax increment financing, The Brewery LLC entered a private/public partnership with the City of Milwaukee. Soon after, the partners began a planning effort to redevelop the Brewery as a catalyst for change in an otherwise economically depressed urban neighborhood. In spring 2006, the Design Team conducted a LEED-ND Feasibility Charrette and determined that LEED-ND certification at the Brewery was possible because of its infill location, proximity to existing services, and planned sustainable features, such as stormwater management and historic building preservation. The developer applied for the LEED-ND pilot program and conducted an EcoCharette involving business and community leaders to brainstorm sustainable scenarios for the project. The Design Team and city developed a set of Sustainability Guidelines as a result of these charrettes. The Sustainability Guidelines incorporate LEED-ND and LEED-NC measurement tools and criteria and include categories for performance management, site design and planning, water management, energy, materials + resources, indoor environmental quality, human aspects, construction administration and operations, and maintenance. In particular, the guidelines feature historic building preservation and an aggressive stormwater management program that captures, contains and treats stormwater throughout the site using bioswales and porous pavement with underground detention capabilities.

In December 2006, the city's Common Council adopted the Brewery Project Development Incentive Zone (DIZ) Overlay District to better facilitate development within the Brewery (see City of Milwaukee, WI, zoning code section 295-1007). The Brewery DIZ has requirements for building placement; building design and historical compatibility; access, circulation, and parking; site improvements; and signage. These requirements correspond with LEED-ND criteria. In addition, the council amended the DIZ in 2008 to include the Sustainability Guidelines. Now all projects within the Brewery DIZ must comply both with the DIZ guidelines and the Sustainability Guidelines. The Brewery is now a conditionally approved LEED-ND plan at the platinum level under the pilot version of the rating system.

Rear façade of Blue Ribbon Lofts, The Brewery, Milwaukee, WI
Source: The Brewery

## 6.4 INTERNAL PROJECT REVIEW STANDARDS

At the outset of the project review and approval process, your municipality should encourage applicants to adhere to an internal list of sustainability standards. Include on this list sustainable neighborhood development strategies from this manual. In particular, include those that your municipality cannot or chooses not to mandate. Develop an internal protocol for reviewing these standards with applicants. Early in the design phase, planning staff should meet with an applicant to examine these internal standards. During this meeting, staff should communicate clearly to the applicant that the municipality favors sustainable neighborhood developments and that adherence to the internal standards likely will improve a project and help it move smoothly through the project review and approval process. It is the developer's choice in these cases whether to comply or not, as the law only requires applicants to meet legislated standards. Any attempt to impose these recommended standards might violate the developer's substantive rights during the review process.

### WHITE PLAINS, NEW YORK

White Plains developed a Coordinated Review Sustainability Checklist that it reviews with applicants during the initial project design phase. During this review, the city communicates to developers that it will look favorably upon projects that meet criteria in the checklist. The criteria include orientation to the City's TransCenter, pedestrian friendly sidewalks, on-site recycling, construction waste management, and traffic management planning. The checklist also includes selected LEED-NC criteria. Similar checklists could include criteria from LEED-ND as identified in this manual.

# INCENTIVES & ASSISTANCE

When a municipality cannot or chooses not to require certain sustainable neighborhood development techniques, it may offer incentives and assistance to motivate developers to implement these strategies voluntarily. For example, local governments can use incentive and assistance programs to encourage brownfield remediation, redevelopment of infill or previously developed sites, and reuse of existing building stock, (see Strategies 5.1 Brownfield Cleanup and Redevelopment, 5.8 Infill and Related Development, and 5.9 Existing Building Stock Reuse). To encourage these and other sustainability techniques presented in this Manual, municipalities should implement the following strategies.

**Incentive & Assistance Strategies:**

- Allow bonus zoning or density incentives
- Offer tax increment financing
- Provide property tax abatements
- Award fee waivers
- Contribute direct financial assistance
- Provide technical assistance
- Offer educational incentives
- Deliver marketing incentives

## 6.5 BONUS ZONING OR DENSITY INCENTIVES

Developers may seek to create a sustainable neighborhood or achieve points under LEED-ND credits, such as NPD Credit 1, Walkable Streets (NPDc1) SLL Credit 4, Bicycle Network and Storage (SLLc4), NPD Credit 4, Mixed-Income Diverse Communities (NPDc4), or NPD Credit 7, Transit Facilities (NPDc7), by including pedestrian friendly street environments, bicycle networks and storage, affordable housing, and connections to transit. Sometimes the economics of a project will not sustain these and other sustainability features. By allowing developers to build beyond maximum development densities in local zoning, they can earn additional profits and use these to achieve sustainable development amenities and earn LEED-ND credits.

Assess whether your state authorizes municipalities to adopt bonus or incentive zoning ordinances. If so, amend your municipality's zoning code to include bonus zoning or density incentives that allow developers to build at greater densities than otherwise permitted or to adjust certain bulk requirements like height or required parking spaces in exchange for satisfying performance standards. These performance standards may include affordable housing, achieving compact, walkable development, or providing community benefits like a pocket park. When drafting this amendment, indicate the zoning districts in which bonuses may be awarded and provide a procedure for applying zoning incentives to specific parcels and proposed development projects. The procedure should include specific incentives that may be granted to an applicant; the community benefits that an applicant must provide; how the bonus should be calculated and by whom; application requirements; and standards for reviewing, approving, and imposing conditions on an application. Consult with local counsel to ensure that zoning incentives comply with any requirements listed in the state enabling statute. These may require a zoning map designation, sufficient service capacity to absorb additional development, and insignificant environmental impacts. Before drafting these standards, conduct research to determine the markets or regional submarkets in which these density bonuses will be most effective.

## Case Study: Nashville, Tennessee

The Gulch neighborhood in Downtown Nashville is a 13.45 acre project that achieved LEED-ND Certified Plan status at the silver level under the pilot version of the rating system. The Gulch project adaptively reused existing and historic structures while incorporating contemporary infill. After receiving height variances for new buildings, the Gulch project achieved LEED-ND points for diversity of uses and housing types, as well as walkable streets. After awarding such variances for the Gulch and similar development projects, the city recognized the community's desire for more distinct, cohesive, and sustainable neighborhoods in Downtown Nashville and sought to relax the restrictive land use regulations in this area. In February 2010, Nashville adopted a new Downtown Code (DTC), which accomplishes this goal and implements the 2007 Downtown Community Plan.

The Downtown Community Plan of 2007 (DCP) presents detailed neighborhood design plans for each of the sixteen neighborhoods within Downtown Nashville. It establishes guiding principles for public and private investment and provides specific recommendations, goals and objectives, and design standards for each neighborhood to implement the community's vision for future growth. Generally, the DCP provides new opportunities for growth in a manner that preserves and enhances the best of urban life through added density where appropriate, and a mixture of uses and street-level activity that adds to the vitality of the urban experience.

The Gulch, Nashville, TN
Source: Joseph A, Creative Commons

The DTC generally supports LEED-ND criteria by promoting urban infill, transit-oriented design, brownfield redevelopment, and better urban design by allowing for greater building heights and more density. In addition, LEED-ND certification for the Gulch project encouraged Metro Planning Department staff to consider LEED-ND when crafting specific DTC incentives for green building practices. For example, the DTC's Bonus Height Program (BHP) allows additional building height in Downtown Nashville in exchange for public benefit contributions such as pre-certification of LEED silver, gold and platinum for individual buildings; pre-certification of a LEED-ND plan; the integration of pervious surfaces into site design and building design; the provision of publicly-accessible open space, workforce housing, civil support space, underground parking structures, and above-ground parking structures lined with habitable space. Every property within a qualifying (continued)

### Case Study: Nashville, Tennessee (continued)

LEED-ND neighborhood may utilize the bonus height, which varies depending upon the subdistrict where the project is located. After providing a binding commitment to provide one of the specified public benefits mentioned above, a development project may build within the restrictions of the applicable Downtown Code Subdistrict up to the Bonus Height Maximum established by schedule within the BHP. Further, the BHP allows developers to compound multiple height bonuses and transfer BHP development rights to another site within the Downtown Code. The city's Planning Commission must certify compliance with BHP provisions prior to issuance of a building permit.

## 6.6 TAX INCREMENT FINANCING

Tax increment financing (TIF) is a development tool that uses incremental increases in tax revenue generated by development to finance upfront investments and spur redevelopment projects. To foster public improvements that support sustainable neighborhood developments within your community, implement a TIF mechanism to help fund needed infrastructure and related development costs as authorized by state statute. Do this by following these steps:

- Determine the current property tax revenue within the targeted development area,
- Borrow money through the sale of tax increment bonds or tax increment bond anticipation notes,
- Use this money to finance public improvements such as lighted streetscapes or pocket parks in the designated area, and
- Once the project is complete, use the incremental increase in tax revenue generated by the new development to repay the bonds or notes.

### OBERLIN, OHIO

Oberlin contributed $1.4 million in tax increment financing for the East College Street Project, a LEED-ND pilot project, to renovate an existing road, build a new road that intersects the project site, extend water lines, and upgrade sewer lines. These investments helped the project earn LEED-ND points under several credits, including NPD Credit 9, Access to Civic and Public Space, and GIB Credit 4, Water-Efficient Landscaping, GIB Credit 8, Stormwater Management, and GIB Credit 14, Wastewater Management.

### AURORA, COLORADO

Aurora established an $89.6 million tax increment financing package for Horizon Uptown, a conditionally approved LEED-ND plan at the certified level under the pilot version of the rating system. The city used these funds to build a public school and a Community Shared Services Building. This community building includes a recreation center, aquatic center, library, job skill and employment center, cultural facilities, and a pedestrian friendly town center.

## 6.7 PROPERTY TAX ABATEMENTS

Offer property tax abatements to incentivize sustainable neighborhood development techniques and projects. In exchange for sustainable amenities, allow a qualifying developer to pay only a percentage of the full property tax. Do this by exempting the developer from taxation on the increased value of property due to development or by reducing property taxes by a certain amount. Increase this percentage over time until full property taxes are paid for the development. Municipalities that use this incentive may benefit from increased sales tax revenue associated with the development if the benefiting properties are retail and the state shares sales taxes with local governments.

### CLEVELAND, OHIO

In order to stimulate investment in redevelopment, Cleveland created its Residential Tax Abatement Program, which offers 100 percent property tax abatement for increased property value associated with new residential development and eligible rehabilitation of residential properties (see City of Cleveland, OH, Community Reinvestment Area Program Residential Tax Abatement Single and Two Family Structures). The tax abatement lasts between 10 and 15 years and varies depending upon the type of project constructed. Starting in 2010, developers now are required to meet one of several green building compliance methods (LEED Silver, Enterprise Green Communities, NAHB National Green Building Standard Gold, or Energy Star) to receive this property tax abatement. LEED-ND certification is one way of satisfying this requirement.

## 6.8 FEE WAIVERS, REDUCTIONS, AND AVOIDANCE

To encourage the provision of public amenities, especially those your community cannot require, offer fee waivers, reductions, rebates, or reimbursements for projects that exhibit sustainable features such as infill development. Apply these incentives to fees your municipality charges, such as building permit fees, impact fees, or fees charged by a certifying organization, such as the Green Building Certification Institute (GBCI). GBCI is the certification body for USGBC's LEED rating systems. In addition, award these incentives for projects that achieve sustainable development features beyond what land development regulations require.

### SAN ANTONIO, TEXAS

San Antonio passed an ordinance that extends fee reductions and waivers to infill projects, transit-oriented developments in all of the city's Tax Increment Reinvestment Zones (areas where TIFs are also available), and other areas of the city that are targeted for redevelopment (see City of San Antonio, TX, ordinance no. 2010-02-04-0084). The ordinance reduces or waives San Antonio Water System fees, public works fees, planning and development services department fees, and capital improvement management fees. A LEED-ND project likely would be eligible for fee reductions or waivers under this ordinance.

## 6.9 DIRECT FINANCIAL ASSISTANCE

Support sustainable neighborhood development by offering projects pursuing LEED-ND certification with direct financial assistance to pay for features the development projects otherwise could not afford to build. For example, consider funding retrofitted or new water and sewage infrastructure, renovated or new transit facilities, brownfield remediation, or public open space expansions.

### ST. LOUIS PARK, MINNESOTA

St. Louis Park joined with Metropolitan Council and the Minnesota Department of Employment and Economic Development to provide $30 million in direct financing for the Excelsior & Grand project. This Certified Neighborhood Development under the pilot version of the rating system is a mixed-use, transit-oriented, and pedestrian friendly redevelopment project. Excelsior & Grand features affordable housing, bus transit, sustainable infrastructure, shared parking spaces, and a public green.

## 6.10 TECHNICAL ASSISTANCE

Planners can help usher sustainable development projects through their municipality's project review process by serving as a point of contact or ombudsman who can coordinate between all local departments and agencies and the developer's needs. The planning department also can lead an integrated team of design and permitting staff for sustainable neighborhood developments. For these projects, facilitate and coordinate land use and building permit review, as well as complex code issues. Such assistance helps interpret regulations and identify code constraints and the need for code changes. In addition, consider offering expert assistance with implementing sustainable development techniques and strategies. Once projects enter the local approval process, consult with legal counsel to ensure municipal technical assistance is consistent with state and federal ethics and due process requirements.

### CLEVELAND, OHIO

Cleveland created a Green Team of municipal staff and experts that held topical workshops to provide technical assistance for several LEED-ND projects. The Green Team facilitated communication between developers and city staff. Additionally, the team identified conflicts between LEED-ND criteria and local regulations and policies and worked to eliminate them.

## 6.11 EDUCATIONAL INCENTIVES

Provide educational incentives to disseminate information and educate your community about sustainable neighborhood development. Offer workshops, educational programs, and communication networks. Because your municipality's website is an important educational resource for the public, devote a page on this website to sustainable neighborhoods. Through this webpage, offer a range of publications, fact sheets, resource guides and other web resources regarding sustainable development strategies and financial incentives available from your state government, the federal government, utility companies, and other agencies. Operate this webpage as an information center where residents and developers can learn about sustainable development principles and access information about rating systems that impart sustainable products, materials, and strategies. Additionally, after adopting land development regulations and policies to facilitate sustainable neighborhood development, educate potential developers about these initiatives. For example, consider providing developers with an informational checklist of the LEED-ND points a development possibly could achieve if located in areas within the municipality that are targeted for sustainable neighborhood development.

### HUNTINGTON BEACH, CALIFORNIA

Huntington Beach's Downtown Specific Plan No. 5 prominently advertises its compatibility with LEED-ND. In January 2010, Huntington Beach adopted the Downtown Specific Plan, which serves as the regulatory tool that the city will use to implement its General Plan. In its introduction, the Downtown Specific Plan defines sustainable design concepts, explains their benefits and introduces the LEED-ND rating system (plan section 1.6.3). After this, the specific plan lists "selected sustainable design criteria developed for the LEED-ND process that are supported by th[e] Specific Plan." This sustainable design criteria includes encouraging development within and near existing neighborhoods or public transportation infrastructure; conserving natural resources; promoting neighborhoods that are physically connected to each other; encouraging green building practices; preserving existing tree canopy, native vegetation, and pervious surfaces; and use of recycled materials.

## 6.12 MARKETING INCENTIVES

Provide marketing assistance to developers who build sustainable neighborhood developments within your community. Include these developers on an official participant list that is posted on your municipality's website with hyperlinks to involved businesses. Disseminate this participant list through pamphlets as well. Also, provide free outdoor signage, press releases, directory listings, and promotional materials demonstrating the benefits of sustainable neighborhood development. Finally, consider creating a green business or neighborhood challenge or competition that provides marketing for sustainable businesses. Create an award to bestow upon the challenge winner and feature the winner on your website. Alternatively, create a seal of approval or recognition sign to present to sustainable neighborhood development projects generally.

### SEATTLE, WASHINGTON

Seattle's Office of Sustainability and Environment maintains a green building resources website that features case studies highlighting successful, sustainably built projects, such as the South Lake Union neighborhood, which includes the South Lake Urban Center, a LEED-ND Certified Plan under the pilot version of the rating system. Additionally, Seattle collaborated with the Cascadia Region Green Building Council to host a 2008 LEED for Neighborhood Development Regional Summit, which engaged LEED-ND pilot project participants and policy makers to share challenges, best practices, and lessons learned. The summit aimed "to catalyze collaboration and change to push the market forward and encourage development of more sustainable neighborhoods." The summit also featured South Lake Union Urban Center and Thornton Place, another LEED-ND pilot project in Seattle.

# CONCLUSION

Local governments use their land use authority to determine where development is located and how it is constructed. Local land use plans and regulations establish human settlement patterns that determine the number of vehicle miles travelled, energy consumed by buildings, impervious coverage, potable water consumption, and whether neighborhoods are livable. Local governments can address these considerations by adopting land use plans and regulations that support sustainable neighborhood development.

The LEED-ND rating system establishes a national standard for green neighborhood design and provides a blueprint for local governments that want to build sustainable neighborhoods within their communities. To aid in this process, this manual shows planners how to integrate LEED-ND criteria directly into local land development plans, regulations, and policies. In addition to this manual, localities interested in implementing sustainable land use practices should review the wide array of sustainability literature available to municipalities. For a sampling of this literature, planners should consult sustainability resources for local governments available from the following sources, among others:

- American Planning Association
- Congress for the New Urbanism
- Environmental Protection Agency, Office of Sustainable Communities
- ICLEI—Local Governments for Sustainability
- National Complete Streets Coalition
- Natural Resources Defense Council
- Smart Growth America
- Sustainable Cities Institute at the National League of Cities
- Urban Land Institute

# LEED® 2009
for Neighborhood Development

| | |
|---|---|
| **Total Possible Points**** | **110*** |
| **Smart Location & Linkage** | **27** |
| **Neighborhood Pattern & Design** | **44** |
| **Green Infrastructure & Buildings** | **29** |

** Out of a possible 100 points + 10 bonus points*

*** Certified 40+ points, Silver 50+ points, Gold 60+ points, Platinum 80+ points*

| | |
|---|---|
| **Innovation & Design Process** | **6** |
| **Regional Priority Credit** | **4** |

LEED-ND

**usgbc.org/nd**