

Section 3

Planning for Green Streets

Planning for Green Streets



HUNTINGTON, VERMONT: A Town Meeting with public engagement.

Planning plays a significant role in whether or not communities create well-designed streets that attract residents, businesses, and visitors. Green Streets offer opportunities for communities to address water quality goals while creating public spaces that deliver social and economic value, as well as protecting resources and reconnecting natural ecological processes. To successfully launch a Green Streets initiative, communities should follow a thoughtful planning process to determine goals, encourage engagement, assess conditions, and identify opportunities.

3.1 EXPRESS A VISION AND DEVELOP GOALS

At the outset of developing a Green Streets plan or program, craft a clear vision that expresses why a Green Streets plan is important in your community. There are no shortage of opportunities to introduce Green Street design into the built environment, whether as retrofits or in new development. But Green Streets design principles also recognize that there is no ‘one size fits all’ approach to identifying the type of improvements that can foster multimodal travel, establish a sense of place, and mitigate stormwater.

To inspire the community, begin by showing the multiple benefits of Green Streets demonstrated through local case studies. Paint a picture of what the project area will be like when work is complete. Outline realistic and quantifiable goals that manage both the project expectations throughout the process and evaluate the project once it is complete. Remember that the project outcomes should align with the identified vision and goals.

3.2 ENGAGE COMMUNITY AND STAKEHOLDERS

Ultimately, a local Green Streets initiative should reflect the vision and goals developed through a community-driven process that engages the public and requires the involvement of key stakeholders. The community engagement process should be coordinated with local, regional, and state partners, local business leaders, and community members to build community buy-in and support for the infrastructure projects. These projects should engage the public and stakeholders from the start and can include multiple innovative outreach activities such as charrettes, surveys, local events, pop-up events, interactive mapping, and demonstration projects.

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Key stakeholders will vary based on the project's vision and context. Potential stakeholders to consider include:

- **Public Works or VT Agency of Transportation (VTrans)** – Municipal public works departments or town highway departments need to be involved when anything is being proposed within the municipal public right-of-way. If the project involves work in a state highway right-of-way, then the VTrans District Maintenance staff should be contacted. Public works officials and District staff will be aware of existing infrastructure within the project area - such as above and below ground utilities, and the potential impacts of the project work. Maintenance staff will also know whether they have the capacity, skills and budget to maintain changes within travel lanes, sidewalks and public parking areas.
- **Business Community** – The local business community, chamber of commerce, and individual property owners need to be involved to allow opportunities for input and to address any concerns. In downtowns, Green Street investments should not compete with business storefronts. Storefront façades welcome customers, provide for display of merchandise, and denote that a commercial district exists.
- **Public Safety** – Any change in the width of travel lanes or medians may require changes in practices for emergency service providers. Consult these providers, including the police and fire departments, during the planning and design processes.
- **Adjacent Landowners** – Projects in the public right-of-way will affect neighboring land. Green Street design teams should consider and value input from adjacent landowners and address their concerns before the design of a project.
- **Local Boards** – Involve the town Selectboard and Planning Commission, and staff representatives of the local government responsible for the development of municipal policy and its implementation and associated funding. Additionally, local Conservation Commissions, Natural Resource

Boards, and Tree Committees are excellent groups that encourage community participation around the protection of water resources and tree care. The town-appointed tree warden can provide valuable information on the suitability and maintenance of green infrastructure practices that involve trees.

- **State/Regional Planners and Agency Staff** – Any proposal or plan that might have an environmental impact or be proposed on or adjacent to state-owned property or a state highway must involve state officials. For example, a project may require a state stormwater permit or other state permit review. Many village Main Streets are on state highways and rights-of-ways and will need early coordination with VTrans staff. In addition, staff at the Agency of Natural Resources can offer valuable input and information about stormwater management, wildlife habitat, tree selection, and invasive species. Likewise, at the regional level, the Regional Planning Commission staff can provide input and technical assistance regarding water quality, applicable regulations, or financial resources.
- **Community at Large** – Given that local residents often bear the cost of infrastructure improvements and long-term maintenance, gather their input and listen carefully to their concerns.

3.3 CONSULT LOCAL, REGIONAL, AND STATE PLANS

Town Plans and Capital Budgets

Town or municipal plans are a basis for decision-making and community investment in local infrastructure including the transportation systems, land use decisions, and natural resource protection. They play a significant role in the ability of communities to continue maintaining infrastructure, attract residents and businesses, or support community goals by including policy documents that inform funding opportunities. The municipal plan and capital budget serves as a long-term guide, a basis for community programs and taxpayer investment, a basis for municipal regulatory action, a source of information about the community, and a source for community standards in regulatory proceedings at the state and regional levels.

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ST. ALBANS, VERMONT: A tour of Main Street stormwater improvements.

While much of Vermont is rural in nature, careful analysis of local policies and issues that relate to villages, downtowns, and neighborhoods can provide meaningful insight into community priorities. It is not unusual for a community to identify enhancement of streetscaping through green space and improved pedestrian access within the village as a goal in a town plan. During plan updates, identify opportunities to include goals that support the vision of Green Streets. Communities also use regulations to implement green infrastructure investments through zoning, subdivision regulations, and low impact development management standards. See [Vermont's Green Infrastructure Toolkit](#) for model language.

Downtown and Village Center Master Plans

Master plans present a community-driven vision of the built environment for a downtown/village center/neighborhood/street. Master plans engage the community in a process to evaluate ways to enhance their community through improved connectivity, rehabilitation of buildings, or redevelopment of sites, and the introduction or improvement of streets, parks, and open space. Frequently, these plans are illustrative in nature and offer detailed Green Street strategies for improvements to both the public realm and for private sector development. Master plans are action-oriented and lay out a strategic implementation plan for both short-term and long-term public and private (Green Streets) investments in the downtown, village center, or neighborhood.

Regional Plans

Vermont's 11 Regional Planning Commissions develop comprehensive plans that include an analysis of the regional transportation system, future regional land uses, infrastructure, and facilities. Regional Plans may have specific information regarding transportation improvement projects or areas in need of specific stormwater-related improvements. Additionally, many Regional Plans include policies supportive of Complete Streets concepts that are relevant to Green Streets implementation.

Regional Plans are required to address a number of natural resource issues in each region, including water quality, flood resiliency, and forests. Examine these plans for indicators of areas with significant water quality and quantity problems or for any basin-wide planning initiatives. Regional Planning Commissions are a valuable resource and are able to provide data, mapping, and guidance with regard to regional transportation infrastructure, flood resiliency, and water quality protection.

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See [Vermont Association of Planning and Development Agencies](#) for a list of Vermont's Regional Planning Commissions.

Watershed, Stormwater, and River Plans

Municipalities engage in various planning efforts focused on assessing and protecting water resources that should be consulted.

River Corridor Plans written by the [Vermont Department of Environmental Conservation \(DEC\)](#) focus on the current conditions in the streams, brooks, and rivers and associated goals for preservation, protection, and restoration. They also include goals for management and the effect of land uses within the corridor.

Stormwater Master Plans are developed for dozens of [Vermont towns](#). These documents provide details regarding areas of concern, optimal locations for stormwater management, a ranked list of projects based on cost and pollutant reduction potential, and often include partial designs on promising projects.

Tactical Basin Plans, also written by [Vermont DEC](#), guide all work in a watershed, integrating priority items from complementary plans, including River Corridor Plans, Stormwater Master Plans, Backroads Inventories, and Agricultural Environmental Assessments.

Project Definition or Scoping Studies

Project definition studies, also called scoping studies, are often undertaken when a transportation need is first identified but before a preferred alternative is defined, selected, or funding is identified. If a municipality intends on using state and federal transportation funds to implement a project, it is highly recommended they undertake a project definition study. The Vermont Agency of Transportation (VTrans) funds a wide variety of projects to maintain and improve Vermont's transportation infrastructure, ranging from simple and low-cost projects to those that are more complex and costly. The VTrans Project Definition guidebook addresses how project definition may be applied in different situations, rather than prescribing a 'one-size-fits-all' approach to every project. The guidebook also provides room for flexibility to apply innovative methods and adapt to changing needs.

The project definition process includes the following steps:

- Developing the project purpose and need;
- Identifying the project context; identifying alternatives;
- Developing evaluation criteria and process;
- Selecting a preferred alternative and providing a rationale for its selection; and
- Involving stakeholders in the process. For details of the process see the [VTrans Project Definition Process Guidebook](#).

VERMONT PLANNING RESOURCES:

Agency of Commerce and Community Development
accd.vermont.gov/community-development

Vermont's Green Infrastructure Toolkit
vpic.info/GreenInfrastructureToolkit.html

Vermont Association of Planning and Development Agencies
vapda.org

Vermont Department of Environmental Conservation (DEC)
dec.vermont.gov/

VTrans Project Definition Process Guidebook
vtrans.vermont.gov/sites/aot/files/highway/documents/publications/ProjectDefinitionProcessGuidebook2017.pdf

Tactical Basin Planning
dec.vermont.gov/watershed/map/basin-planning

Stormwater Maps and Stormwater Master Plans
dec.vermont.gov/watershed/cwi/manage/idde

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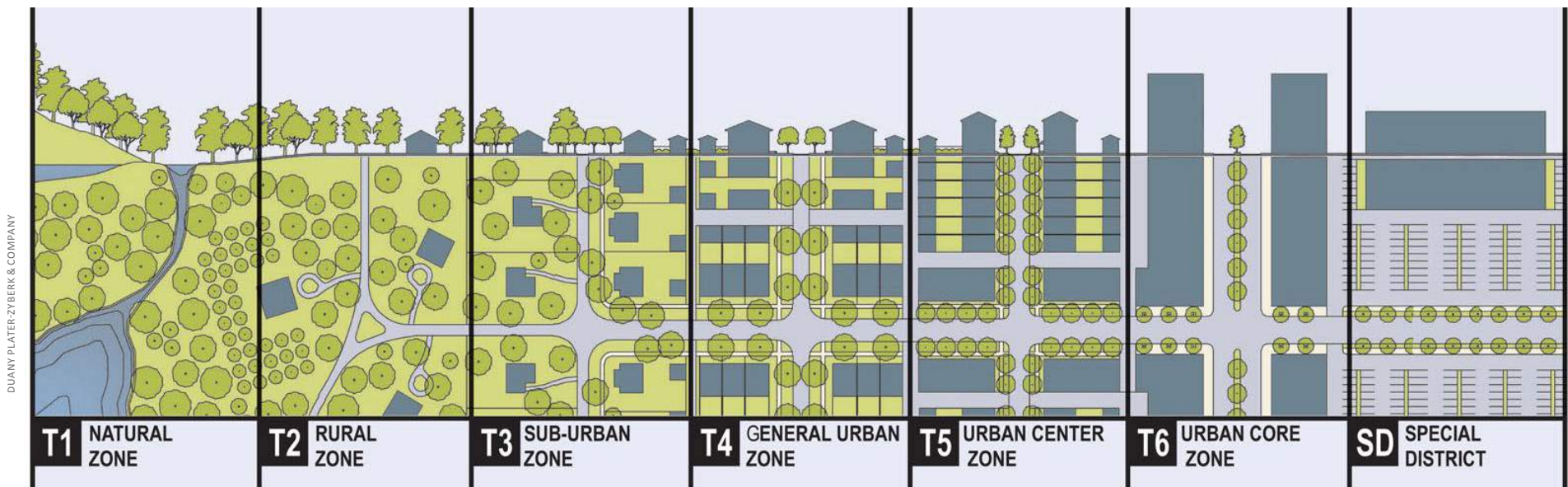
3.4 UNDERSTAND THE LOCAL CONTEXT

One of the key principles of Green Streets is understanding the local context. Green Streets recognizes that there is no ‘one-size-fits-all’ approach to identifying the type of improvements that can foster multimodal travel, establish a sense of place, or mitigate stormwater. For example, sidewalks work well in urban centers, but in very rural areas a wide shoulder might be more appropriate. Vermonters value the diversity and contrast between the working and natural landscapes and vibrant downtowns and village centers. The urban-to-rural transect is an illustration of this range of contexts, and can be a useful tool in planning and design.

Determine Street Type

The typology and function of a street should be considered when evaluating its Green Street potential. Any Green Streets infrastructure proposed in the right-of-way must consider effects on existing streets and users. Consider the following elements:

- **What type of street is it?** While adding vegetated swales or curb extensions to a side street may be the appropriate tool to use in areas where traffic calming is warranted, reducing travel lanes and providing landscaped medians might be better suited on an arterial road.
- **What is the street’s jurisdiction?** In general, the numbered routes are state-controlled, but there are numerous exceptions. Major routes through downtowns or villages often shift to local control within the village boundaries – called Class I Town Highways. If the state owns and maintains the street, early and frequent coordination with VTrans and the District Office is essential.
- **What is the role of the street in the transportation network?** Determining the volume and mix of traffic is essential. Is there heavy through-traffic, or is it a low volume side street? Is it a Main Street or major freight route? What are existing bicycle and pedestrian patterns? A road that receives a significant amount of truck traffic may need to allow for wider turning



RURAL TO URBAN DEVELOPMENT TRANSECT

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vehicles and would benefit from more road-to-sidewalk buffer than a quiet neighborhood street. The level of traffic congestion is also necessary to understand, as there may be opportunities to reduce or change the number of lanes to better suit current travel patterns, freeing up paved area in the process.

- **What are the road's needs to maintain public safety?** Depending on the type of street, maintenance needs will vary. If the street is a main artery for emergency services, it's expected to be plowed quickly during winter storm events and this may necessitate larger equipment that could conflict with Green Street elements. Safe access of public safety vehicles also needs to be considered.

Determine Maintenance Capacity

The incorporation of Green Streets principles into the urban environment inevitably triggers a need to understand the local context, not only in terms of the location or type of system, but also the available capacity to maintain infrastructure over the long-term. A Green Street will inevitably fail if there is confusion over who is responsible for maintaining the infrastructure. Local knowledge and maintenance expertise involved early in the planning process are essential to the success of Green Streets projects.

3.5 IDENTIFY GREEN STREET AND PARKING LOT OPPORTUNITIES

There is no shortage of opportunities for introducing Green Streets into the built environment. The key is having the vision to identify these opportunities in both retrofit conditions and new development/redevelopment. One of the greatest opportunities in implementing Green Street projects is to look at the current built environment and to capitalize on inefficient use of space.

Identify Inefficiently Designed Streets and Parking Lots

One of the first questions a designer or builder should ask themselves about their project is: Has the impervious area from streets, parking lots, and/or buildings been minimized? From a design perspective, there are several practical strategies

to reduce these areas. However, what makes sense from a design perspective may conflict with current policy. Design and policy must work together to achieve site-specific Green Streets goals. A carefully thought out site plan will often yield the space for green infrastructure that fits seamlessly with the other site uses. This holds true for new streets, parking lots, and buildings, but is especially evident when designing street and parking lot retrofit projects.

Efficient Design of Streets

Many streets are wider than necessary. Consider narrowing travel lanes down to the Vermont State Standards width of 10-11 feet (or less depending on neighborhood context) for urban and village principal arterials only or allowing more options for narrow street widths based on variable venues. Narrowing streets reduces impervious area and new development infrastructure costs, and contributes to traffic calming in pedestrian-oriented areas. The saved space also makes room for decentralized Green Stormwater Infrastructure techniques. Consider these questions when evaluating street width:

- **Can a travel lane on multi-lane streets be eliminated?** Many four-lane arterial streets can be placed on a “road diet” to allow for two travel lanes and a center turn lane.
- **Can the size or number of on-street parking spaces be reduced in favor of increased landscape area along a street?**
- **Are there existing zones marked “no parking” that can be consolidated into landscaped space designed to capture stormwater?**
- **Are there road shoulders next to travel lanes that could be converted into landscape areas?**

Exploring a “yes” answer to these questions can often yield landscape space for Green Stormwater Infrastructure, as well as create space for bike lanes, wider sidewalks, and a more balanced and vibrant streetscape.

GREEN STREET OPPORTUNITIES



▲ Plaza spaces can utilize selective green spaces and pervious paving to manage stormwater.



▲ Arterial roads with existing landscape strips can be redesigned to capture runoff.



▲ Angled parking spaces in town centers often have underutilized space that can be transformed into green space



▲ Streets with on-street parking can utilize either pervious paving and/or stormwater planters to manage runoff.



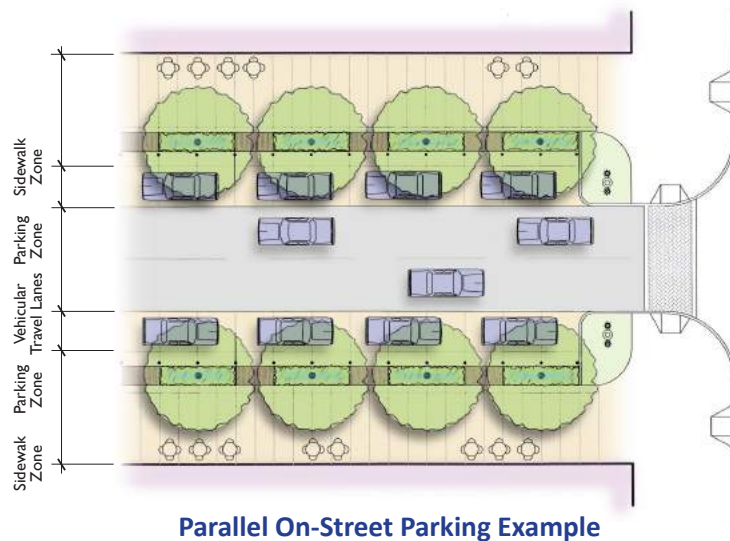
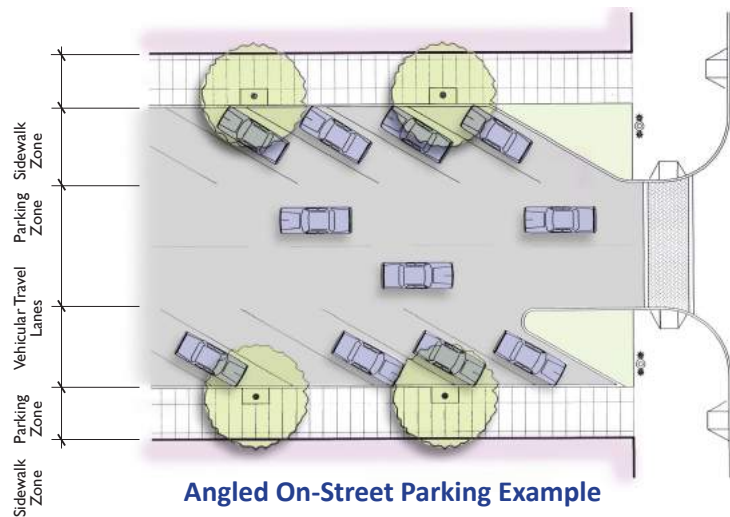
▲ Red zones designated as no parking can also be transformed into green space used to capture runoff.



▲ Residential landscape strips and parking zones that are not heavily used can be retrofitted with larger rain gardens for stormwater management.

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ON-STREET PARKING OPPORTUNITIES



The illustrations above compare the existing condition of using 30 degree angled on-street parking with that of a redesigned condition using parallel parking. By switching from an angled to parallel parking configuration, considerable space can be made available for wider sidewalks, more landscaping, and stormwater management with only minimal loss of on-street parking.



▲ Angled parking configurations, such as this example along Main Street in downtown Burlington, consumes vast amount of space and can often create a bleak pedestrian/retail environment.



▲ This downtown main street has opted for increased landscaping, wider sidewalks, and fewer parallel parking spaces to help activate the retail scene.

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MONTPELIER, VERMONT: A parking lot swale in autumn.

Efficient Design of Parking Lots

There are an estimated 800 million parking spaces in the United States. Many of those spots exist in expansive paved lots with uninterrupted impervious cover. Green infrastructure can be incorporated to moderate summer temperatures, improve safety, enhance aesthetics, and provide valuable stormwater treatment services. Parking lot retrofits can be accommodated with some simple adjustments:

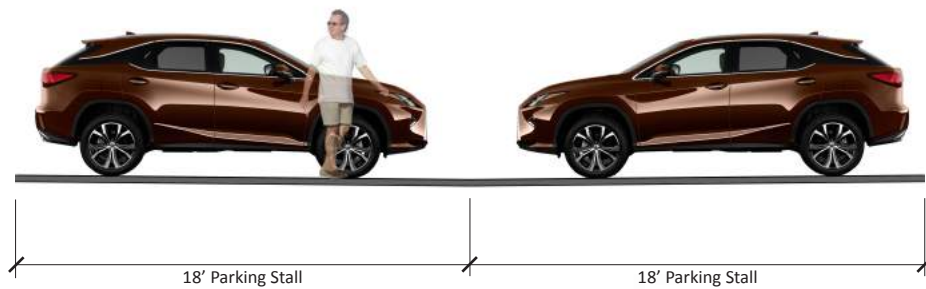
- **Remove or adjust parking minimums in your town bylaws.** This will reduce the size and number of excessively large lots, freeing up more space for green and multifunctional elements.
- **Specify a 15-foot parking stall length and a 22-foot driving aisle in your town's municipal code.** These dimensions are adequate for modern vehicles but smaller than conventional standards.
- **Incentivize the use of pervious parking surfaces.** Particularly to address the needs of large event spaces and malls where maximum use is rare but necessary.

Balancing Green and Gray

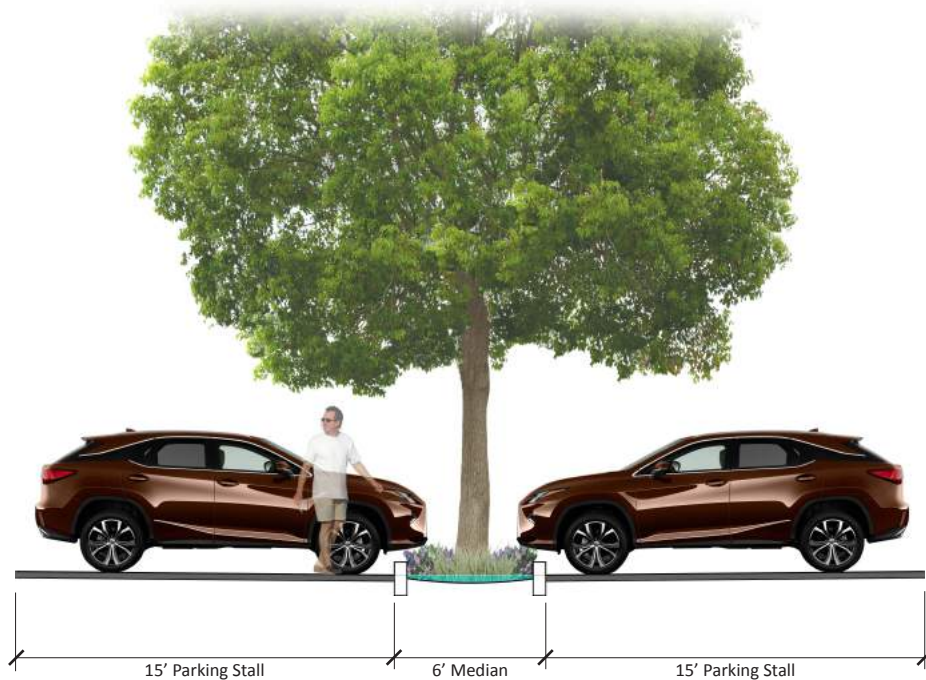
Once a street or parking lot has been designed to be as spatially efficient as possible, the savings of space converted into green infrastructure may still not be enough to manage the desired amount of stormwater runoff. In these cases, decisions will need to be made to balance green and gray infrastructures. Adding green infrastructure can often conflict with the need for on-street or storefront parking, sidewalk space, emergency vehicle access, or maintenance needs. The best Green Street and parking lot designs should provide a balance. Given that many town streets are designed primarily for vehicular travel and on-street parking, with little or no green space, and parking lots are often oversized, some level of compromise will be necessary to design a truly balanced condition. Some parking loss might be acceptable or even desirable if the overall street or parking lot condition has a stronger aesthetic appeal due to increased landscape area and enhanced pedestrian spaces, or increased stormwater management potential. Studies have shown that greening of business districts increases community pride and positive perception of an area, drawing customers to the businesses.

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PARKING LOT OPPORTUNITIES



▲ This typical cross section illustrates a conventional parking lot condition with 18 feet long parking stalls.



▲ This cross section shows how a 15 feet parking stall can help create room for landscaping used for stormwater management. Note that the parked cars in both scenarios are placed in the same place and fit within reduced length the parking stalls.



▲ This parking lot in Middlebury shows how over-sized parking stalls create more impervious area and wasted space.



▲ This parking lot at Middlebury College is efficiently designed to maximize the amount of landscape and trees on the site.

PARKING LOT OPPORTUNITIES



▲ *Parking stalls that are not heavily utilized can be converted into landscaped areas designed to capture runoff*



▲ *Existing lawn areas can be transformed into rain gardens that capture and treat runoff prior to entering the storm drain system.*



▲ *Overly long parking stalls can be shortened to allow for landscaped space at the front of vehicles to capture runoff.*



▲ *Some parking lot layouts are quite inefficient with excessive asphalt areas supporting only a few parking spaces. They can be redesigned to yield more landscaped space.*



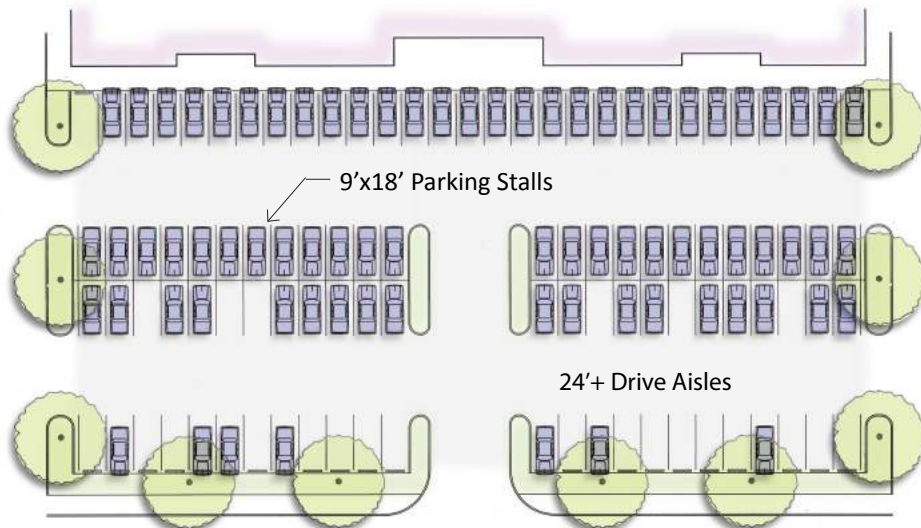
▲ *Existing parking lots often are completely paved with no landscaping and poor pedestrian circulation.*



▲ *Even well-used parking lots sometimes have existing landscaped space that can be redesigned to capture runoff.*

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PARKING LOT OPPORTUNITIES



Oversized Parking Lot Dimensions



Efficient Parking Lot Dimensions



KEVIN ROBERT PERRY

▲ This parking lot in Vermont has little interior landscaping and has oversized parking aisles.



LES VICTOIRES DU PAYSAGE

▲ This parking lot example in France significantly increases pervious surfaces and landscaping within the parking lot, provides for safe pedestrian circulation, and manages runoff on site.

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3.6 MULTIPLE SHADES OF GREEN

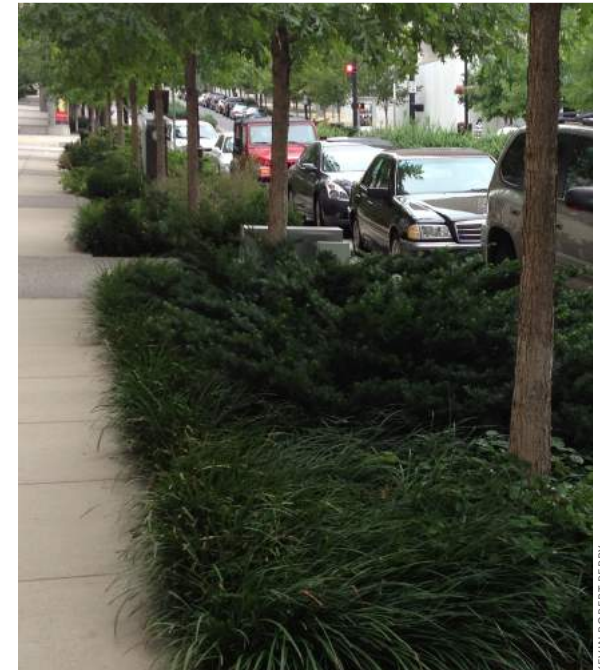
Green Streets vary according to the site and do not all fit into one definition. For the purposes of this guide, they include streets and parking lots designed with a landscape or paving system that slows, captures, filters, and infiltrates stormwater runoff while supporting mobility and providing comfort and security for all users. The degree to which a project takes the Green Streets approach can vary based on goals, available resources, and space constraints.

We can think of green streets as having various levels of sustainability ranging from simple Level 1 designs to the most complex Level 5 designs. The boldest Green Street designs intertwine stormwater management with the tenants of livability and placemaking. They are primarily related to streets, not parking lots. New and redevelopment projects offer more opportunities to achieve a higher level of site integration. Other projects - especially retrofits - might only be able to achieve minimal green design due to site constraints or existing policy restrictions. Regardless of challenges, the most important consideration is to always strive to reach the highest level of green design possible.



LEVEL 1

LEVEL 1 is simply an increase in the amount of vegetation along a street and reducing the area of impervious surfaces.



LEVEL 2

LEVEL 2 design features a street or parking lot with substantial landscape areas and a system of broad canopy trees to capture rainfall. There may be no dedicated stormwater treatment measures, but on days with minimal rainfall, most stormwater may be captured within the tree canopy, soil, and landscaping.

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KEVIN ROBERT PERRY

LEVEL 3

LEVEL 3 design represents the most common perception of a Green Street or Green Parking Lot in which some type of stormwater treatment measure (e.g., vegetated swale, planter, rain garden, etc.) actively captures and manages surface runoff at its source.



KEVIN ROBERT PERRY

LEVEL 4

LEVEL 4 design not only encompasses the attributes of Levels 1, 2, and 3, but also provides a direct emphasis on alternative transportation options, such as walking, biking, or use of buses or trains.



MARTHA SCHWARTZ

LEVEL 5

LEVEL 5 design is the most effective level of Green Street design, and is the most challenging to achieve. This comprehensive approach allows stormwater to be managed within the entire street envelope and begins to blur the line between public and private space. Stormwater from private driveways and buildings can be managed within the public right-of-way, and stormwater from the street is filtered in available landscape spaces on private property.

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LANCASTER, NEW YORK: Pervious Pavement and no-curb landscape median.

3.7 KEEP IT SIMPLE

Just as Green Streets can be multiple shades of green, they can also have multiple levels of complexity. Identify those projects that are simple and low-cost, then rank them as high-priority. Too often, very complex green infrastructure projects are built first, leaving small “low-tech” projects with little funding capital to implement. Simple, low-cost Green Street projects might include modification of underutilized spaces that already receive stormwater. Examples include conversion of an on-street parking zone with an existing drain inlet into a stormwater curb extension or the addition of street trees to an existing lawn strip along a residential neighborhood street. These solutions rely on simple regrading or replanting, minimal hardscape improvements, and little or no alteration of the existing stormwater system.

3.8 A PLAN OF ACTION

Identifying your vision, goals, and objectives, and understanding how these relate to the local context is essential to developing a plan of action. Equally as important is identifying the barriers to implementation including physical and environmental constraints, skepticism, land ownership, maintenance considerations, and funding. Transforming a street into a Green Street or parking lot, or a community to fully embracing Green Street principles does not need to be an all-or-nothing all-at-once approach, but can include several short, medium, and long-term actions that ultimately move to the (re)design of streets and parking lots. The plan should be realistic, with phasing based on feasibility and funding.

Planning for Green Streets



BURLINGTON, VERMONT: A vegetated swale between a bike path and parking lot.

RICHARD AMORE



Welcome to a Beautiful & Functional Wetland



You are viewing a constructed wetland that treats stormwater runoff and harbors urban wildlife. To capture, filter, and absorb stormwater, engineers looked to nature's original water quality treatment system—the wetland.

This wetland is hard at work, even between storms. The plants at the bottom filter pollutants. The aquatic plants host tiny microbes that pull out phosphorus, nitrates, and other chemicals and break them down. Dense root mats offer plentiful places for the cleaning microbes to live. The many kinds and forms of plants provide micro-habitats for small animals, birds, insects, and amphibians. Watch how this wetland flourishes as it cleans stormwater runoff and protects our Lake Champlain. Celebrate the ways people and nature come together for a common good.

Help Prevent Runoff

Lake Champlain supplies our drinking water. You can help stop polluted stormwater from running off of roofs, parking areas, paved surfaces, and entering our lake. Be smart about runoff.



This wetland started with careful construction and the planting of many kinds of vegetation that help filter water while supporting wildlife.

BURLINGTON, VERMONT: A wetland adjacent to a bike path.

RICHARD A. WORE

