Planning for Sustainable Landscaping & Low-Impact Development (LID)

Step One: Evaluate Your Site
Taking stock of different features of your site will help you understand how water moves around your property and which particular LID strategies might help you better manage stormwater runoff from your property.

If you're doing new construction, your evaluation will need to be much more complete. You'll likely need help from professionals involved in planning your utilities and wastewater systems.

Here are some features of your site that you'll want to understand better. Make a simple map of your site so you can mark these features. Or, mark them on construction plans or on photos.

- **Topography:** Understanding the three-dimensional lay of your land is a good starting point to consider your possibilities and look out for potential concerns. Your terrain will affect how water flows and drains across the property. Sudden changes in elevation might be places where natural springs occur—often seasonally. Sunken areas may have seasonal water and might have different soils than other parts of your property. If you have steep slopes on your site, you need to ensure that they remain stable with a healthy cover of trees and shrubs.

  In evaluating your topography, be sure you note where your house is placed (or where you're considering placing it) and how drainage and slopes might affect it.

- **Water:** As you begin assessing your topography, you'll start to get a sense of how water flows and drains on your site. Understanding your water flow will help you decide what kinds of LID projects will help you and where you can place different drainage systems. Make note of:
  - How and where your roof, driveway and other hard surfaces drain during rainstorms.
  - Obvious standing water (wetlands, seasonal or year-round streams, ponds).
  - Natural springs, which can be identified by spongy ground or the presence of moisture-loving vegetation, such as skunk cabbage, buttercups, willows, or salmonberries.
  - Other water coming onto your property, such as from drainage ditches, swales, or runoff from developments up hill from you.
  - Saturated soils or seasonally wet spots, which will be spongy or mucky to walk through during winter (at least), and are usually in depressions in the ground.

  In evaluating your site's water, check with your local water utility to see if your property is in a wellhead protection area or near one. There are usually regulations that govern what you can do if you're in proximity to a drinking-water source. Additionally, the staff from the drinking-water-protection office might be able to help you with your LID project or might have information about incentive programs.

- **Soils:** The soils on your property are critical for absorbing stormwater. Your soils hold the key to many LID options, including landscaping, pervious paving systems, and rain gardens. The more information you can gather about your soils, the more you will understand the range of LID choices available to you. If you're doing new construction, you will likely be required to gather detailed information about your soils, including possibly a report from a specialist.
If you’ve done any gardening on your site, you might have a general sense of your soil, such as how rocky or sandy it is, or if it has a lot of clay. To do many LID strategies, you’ll need to have some detailed but simple information about your soil. Fortunately, there are easy tests that almost anyone can do:

- **Shovel test:** If you can’t get a shovel in the ground with moderate force, you either have terribly compacted soils or most of your topsoil has been removed during development.

- **Hand-textural analysis or ribbon test:** This simple test helps you determine about how much clay, sand, and silt your soil contains. This information tells you how quickly water drains through and how available nutrients are to your plants. This test can be done in minutes with a small soil sample using just your hand and a little water. See the resources section for a step-by-step guide to doing this test.

- **Simple pit test:** Dig a two-feet wide by two-feet deep by two-feet long hole and fill it at least halfway full of water. Track how fast water drains. At one-half inch per hour, your drainage is adequate to do a lot of LID practices, and one-inch per hour is great! If your soil drains less than one-half inch per hour, you can still do many LID practices, but you might want to seek help from a soil expert, such as from your conservation district or extension office, to give you more details about your soil. If you dig your test pit during the dry months, fill and drain the hole three times to simulate wet-weather conditions.

- **Soil analysis:** Check with the staff at your local conservation district or extension office to see if they offer free or low-cost soil analyses. They’ll give you instructions for gathering samples, and their reports will tell you more precisely what kinds of soils you have, how much organic matter is present, and even some information about nutrients.

- **Soil surveys:** Natural Resources Conservation Service produces soil surveys, which are available on the Internet, at your library, or directly from your local conservation district or NRCS office. However, soil survey information is usually general. Another problem with soil surveys is that soils often get disrupted or removed during development, so the surveys might tell you what kinds of soils used to be on your site, not necessarily what’s there now.

Other soil tips:

- **Test for different soils:** If you have changes in topography or vegetation, you should check to see if the soils under those spots are different than other areas on your site.

- **Clay:** You might find ribbons of clay here and there, which is different than wide expanses of clay. If you have soils that are mostly clay, you will have to add a lot of organic matter to your soils to be able to absorb most of your stormwater on your property.

- **Groundwater:** Keep an eye out for signs of perched groundwater or a high water table. While digging your test pit described above, look out for rust-colored veins or steel-gray patches. If you see these signs, you might want to consult with a specialist, such as a soil scientist or hydrologist, to provide details about potential underlying drainage problems in your soil, or the limits to on-site infiltration of stormwater. If water starts pouring into your hole while you’re digging, it’s a sure sign you have perched groundwater or a high water table, but this might only happen during winter. Depending on the depth, perched groundwater might limit your site’s ability to absorb stormwater, especially through a rain garden.

- **Organic matter** is an important part of healthy soils. It also holds on to a lot of water and releases it slowly after rainstorms. Most visual tests, such as pit tests or ribbon tests, won’t give you good information about how much organic matter your soil contains. An undisturbed forest, for example, will have a lot of organic matter in the soil from the years of leaves and other materials decomposing in the soil. Section 2 will offer details for how and when to increase organic matter in your soil.

- **Vegetation:** Documenting the existing plants on your site is the next step in your site evaluation.

  - **Mature vegetation:** Take note of big trees and shrubs, along with healthy layers of low-growing shrubs and groundcovers. Places with mature vegetation on your property will likely have soils rich in organic matter and will already be doing a lot to absorb stormwater on site. Mature vegetation might include native plants, but non-native plants are great as long as they aren’t weeds!

  - **Planting beds:** These areas might include landscaped areas where the soils have been built up with new topsoil or compost. Planting beds absorb some stormwater, but not as much as mature vegetation. Sometimes you can modify existing planting beds to be LID features, such as rain gardens or more expansive, layered planting areas.

  - **Lawn areas:** Lawns don’t usually absorb stormwater effectively, especially where underlying soils were removed and compacted during construction or they have not been well amended with organic matter. Some lawn spaces are good candidates for creating LID areas, such as rain gardens, pervious patios, or expanded, layered landscaping.
- **Invasive plants**: Invasive plants are those that will try to take over an area so nothing else can grow. You will need to remove these before you can install appropriate, sustainable plantings. Some invasive plants of concern: English ivy, Scot's broom, Himalayan blackberry, traveler's joy (*Clematis vitalba*), Japanese (and other) knotweed, some varieties of butterfly bush, herb Robert, and field bindweed. The resources section includes guides to help you identify your invasive plants and get tips for removing them.

- **Hard surfaces**: Your map should note paved or highly compacted areas where stormwater can't absorb, including:
  - Structures with roofs
  - Sidewalks or walkways
  - Driveways
  - Patios or other paved or mortared surfaces

- **Wildlife value/potential**: If your site is completely cleared, it may be hard to imagine the potential to attract wildlife such as birds, butterflies, small mammals, and amphibians. But even a small lot can provide habitat in just a few years with the right plants in place. If you have connections to other greenways—a neighbor’s yard with mature vegetation, or a nearby park, for instance—the potential to attract wildlife is even greater.

  If you already have mature vegetation, you’ll want to take note of some of the animals already using the space so that your development plans don’t disrupt important habitat and so your LID practices can enhance it.

**Next steps**: Now that you know what your site conditions are, let’s look at the specific LID options that might be good choices for you!

**Step Two: Identify Options & Benefits**

In evaluating your property, you might have identified many areas where you can put LID into practice. As you consider the LID options outlined in Section 2, keep in mind what will work best on your property based on your site evaluation.

Many LID options can have multiple benefits. For example, in addition to absorbing stormwater on your property, you could see these additional benefits:
- Privacy and noise screens (planting trees and shrubs, for instance).
- Healthier, disease-resistant plants and improved health for your family (building soils with compost and avoiding pesticides).
- Birds and butterflies using your yard throughout the year (planting in layers, avoiding pesticides).
- Drainage kept away from your house foundation and basement (directing downspouts to rain garden).
- No more messy puddles during winter storms (permeable paving techniques).

**Step Three: Make an Action Plan**

Once you’ve made a list of LID techniques appropriate for your site, you’ll need to figure out how and when to do your projects. Your action plan should:
- Prioritize projects.
- Define a realistic timeframe for each project.
- Establish a budget.
- Identify steps necessary to complete each project.

If you’re doing **new construction** or an **addition** on your home, your plan will be clearly defined by your construction schedule. Bear in mind that there may be more steps in making sure your LID goals are met, including bringing your contractor or planning officials up to speed on your LID plans.

If you’re doing retrofits on your current home, your timeframe may be determined by natural replacement opportunities, such as when a roof or driveway needs to be repaired or replaced.

Most opportunities for making modifications will depend on your own schedule and resources. Make lists of what you have and what you’ll need. For example:
- Labor (your own, hours offered by family and friends, and hired help).
- Tools (your own and those you can borrow).
- Transportation of materials (such as stones or soil).
Materials (such as compost, soil, plants, pavers, roofing systems).
Expertise (which could be free from public and non-profit groups or bought from professional designers, installers, and other experts).

As you develop your plan, keep these tips in mind:

**Don't box yourself in:** Make sure you maintain access for any part of your project that might require heavy equipment. That might mean prioritizing your "to-do" list so that you finish disruptive projects before activities such as planting.

**Time:** Many LID projects can be done quickly, especially with some help from friends and family. Other projects may take longer and require you to plan carefully, especially when working with contractors and permitting agencies. To avoid feeling crunched for time, build reasonable time lines into your plan (and remember that almost all projects usually take longer than you imagine they will).

**Budget:** Even if you're on a limited budget, you can still do many LID strategies.
- Some public agencies offer grants and other incentives for residential LID—check with your city or county.
- Many LID techniques are low-cost or save you money. Eliminating pesticides and conserving water will save money. Improving your soils and planting in layers can be done for little cost (see resources for ideas).
- Some public agencies and non-profit environmental organizations help residents try LID techniques by offering advice and sometimes tools and materials.
- Some public agencies offer funding to residents willing to do LID projects that can be models for others.
- Some LID projects, such as green roofs, may cost more up front but will save money over time.
- You can enlist the help of friends and family members to tackle some do-it-yourself projects. Ask other friends to help prepare food to keep the workers fueled all day. You'll be surprised by how much you can accomplish with good planning and a team of committed friends for a day!