

FIGURE 6: The Importance of Maintaining Natural Drainage Patterns When Developing a Property

This illustration shows a well planned property developed in a way that minimizes negative impacts. The amount of grass lawn is minimized and a full shoreline buffer is maintained. A rain garden is used to capture and infiltrate stormwater from the house. The house was built on natural grades and does not include extensive impervious areas or site grading. The intermittent stream channel is protected and stormwater is managed from the narrow gravel driveway through sheet flow into a narrow infiltrative area.

This illustration shows the same property developed in a way that maximizes negative impacts to Lake George. No shoreline buffer was maintained and the hillside was cleared for a large grass lawn. The lawn required extensive grading, which compacted soils and produced large volumes of stormwater. The house location required extensive grading and filling and a large impervious area, which will channel stormwater onto the grass slope and down to the lake. The wide driveway required extensive grading with riprap to stabilize the banks. The intermittent stream on the property was filled during the grading for the large lawn.

Plan Your Site Carefully

Whether building a house on a ridge overlooking Lake George or expanding a house on the lakeside, it's important to plan and design your property to maintain natural drainage patterns and treat stormwater onsite close to its source.

Decisions on where to place a driveway, how much grass lawn to maintain, whether or not to maintain or plant a vegetated shoreline or stream buffer, the number of trees kept on a property, and the amount of impervious area have a major impact on the health of Lake George. Poor development and land use practices significantly increase stormwater runoff that eventually enters Lake George and its tributaries. On the other hand, negative impacts to the lake can be minimized through careful site planning.

The most effective management practices to reduce negative impacts on Lake George are established at the beginning of the development process, during the planning phase (see Figure 6). That's when a series of decisions can be made to limit overall disturbance on the site, conserve and restore vegetation and soil, maintain natural drainage patterns, minimize impervious surfaces and manage stormwater properly.

The three most important actions to consider at the beginning of site development are:

1. Maintain natural drainage patterns;
2. Minimize and disconnect impervious surfaces; and,
3. Manage and infiltrate stormwater onsite as close to its source as possible.

Maintain Natural Drainage Patterns

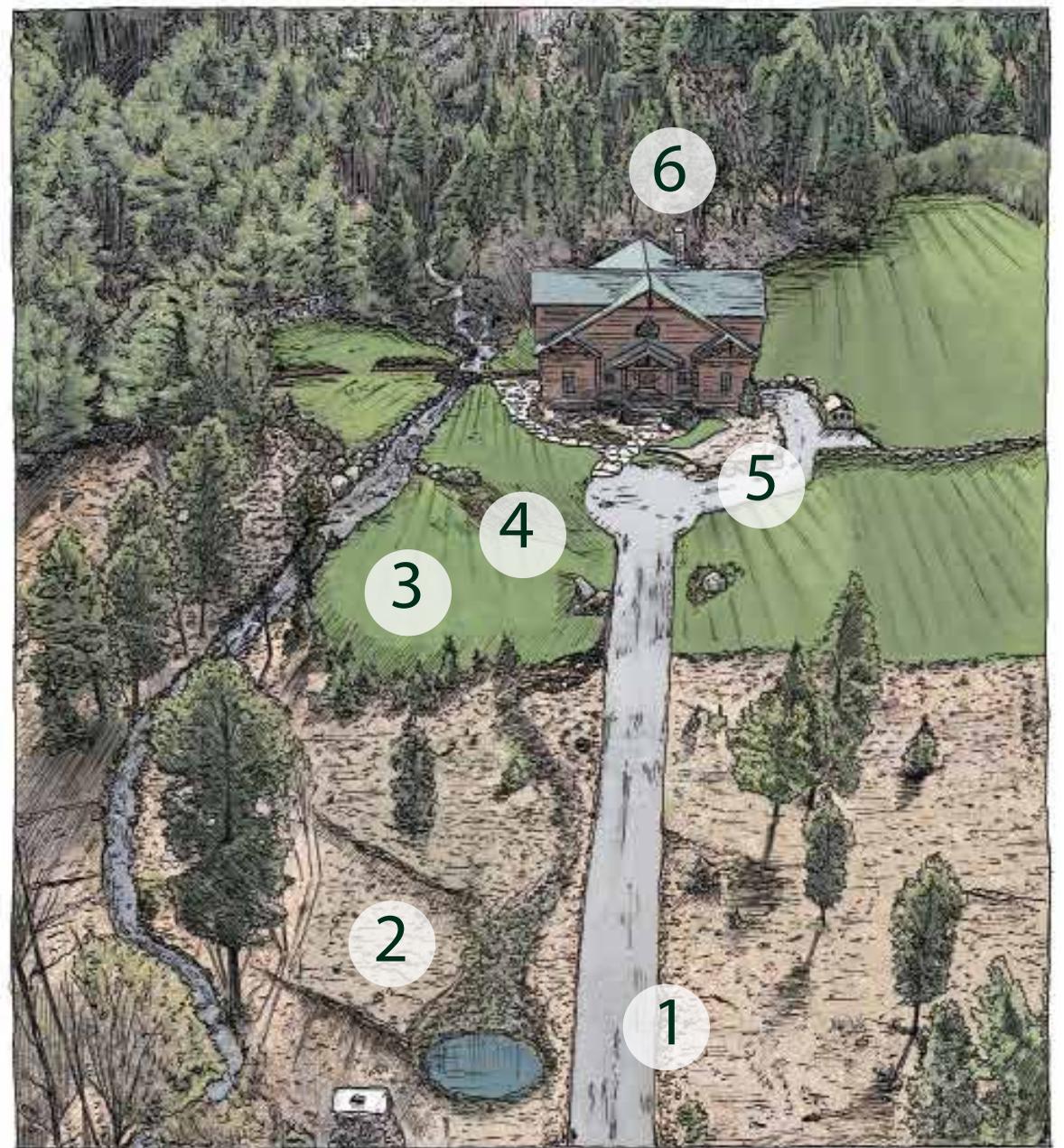
When developing a site, it's important to maintain the original drainage patterns that allow the natural processes of infiltration to reduce stormwater runoff. The natural hydrology of a property, or the way water flows through a site on its journey toward a stream, wetland or lake, changes once a building, septic system, driveway or lawn is constructed. A natural forest produces almost no stormwater runoff because of porous soils, layered surfaces of trees and plants, and the contours of the natural forest floor that soak up the water. The water is then filtered through the ground before it travels to nearby tributaries, which eventually empty into Lake George.

KEY MESSAGES:

1. The most effective management practices to reduce negative impacts on Lake George are established at the beginning of the development process, during the planning phase.
2. Development significantly increases stormwater runoff that eventually enters Lake George. Impacts to the lake can be minimized through careful site planning.
3. When developing a site, it's important to maintain the original drainage patterns that allow the natural process of infiltration to reduce stormwater runoff.
4. When a property is altered through grading and the removal of trees, soil and other plants, there is a marked increase in the amount and rate of stormwater pollution.
5. Retaining a minimum of two-thirds of mature forest cover and natural soil on



Well designed



Poorly designed

- 1 Driveways should follow natural topography as shown on the well designed site.
- 2 Rain gardens control stormwater runoff close to the source, rather than one large stormwater pond with reduced treatment, larger disturbance, and greater overflow potential.

- 3 Stream buffers should be maintained as shown in the well designed site. This is different from the channelized stream with riprap banks and no buffer in the poorly designed site.
- 4 Natural forest is important. The well designed property maintained the majority of its natural forest.

- 5 Impervious surfaces around the house should be minimized and disconnected. The well designed property does this, the other does not. Total roof impervious areas should also be minimized.
- 6 Houses should be located to minimize impacts to critical resources and natural drainage areas on a site. The well designed site locates the house far from the stream, the other does not.

FIGURE 7: Differences in Site Design

These illustrations contrast the differences in property design and development.

The most effective management practices to reduce any negative impacts on Lake George are established at the beginning of the development process, during the planning phase.

A key element in developing a property that will have the least impact on the lake is keeping the existing topography intact as much as possible. When a property is altered through grading and the removal of trees, soil and other plants, the natural infiltration system is compromised. The result is a marked increase in the amount and rate of stormwater runoff.

To maintain natural drainage patterns that minimize stormwater runoff, a landowner should:

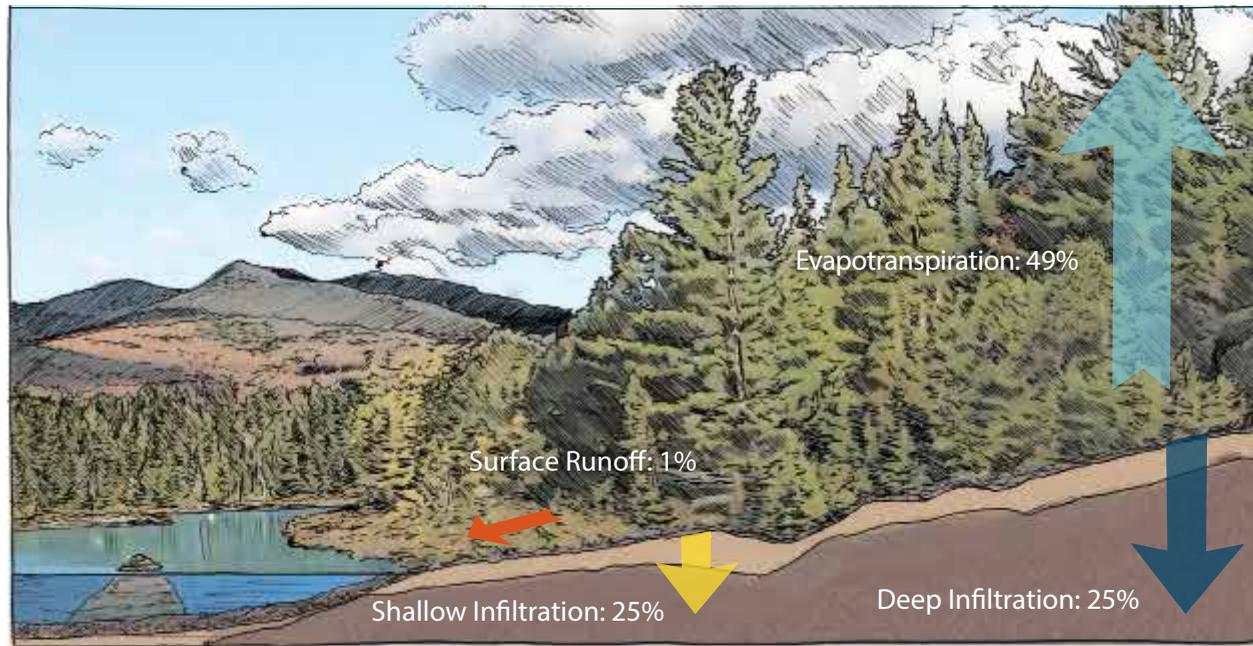
- > Identify and maintain natural water flow patterns on the property.
- > Protect existing physical features, such as closed depressed areas, springs, swales and wetlands. This will retain the benefits of natural infiltration of stormwater and preserve habitat that supports birds and wildlife.
- > Avoid mass clearing and grading so that most of the mature trees on the site are preserved. Retaining a minimum of two-thirds of mature forest cover and natural soil on a property is a good place to start in an ideal development plan.
- > In the design process, incorporate rain gardens that capture rainfall, much of which then evaporates or is infiltrated instead of becoming stormwater runoff. See pages 20–21 to learn more about rain gardens.
- > Maintain intermittent streams so that they continue to function. Protect these stream channels with natural vegetated buffers. Buffers can include existing plants onsite and/or new plantings.
- > Avoid stream crossings as these remove natural vegetated buffers.
- > Maintain natural topography and minimize excavation; when necessary grade with gentle slopes.
- > Minimize major cuts and fills.

Minimize and Separate Impervious Surfaces

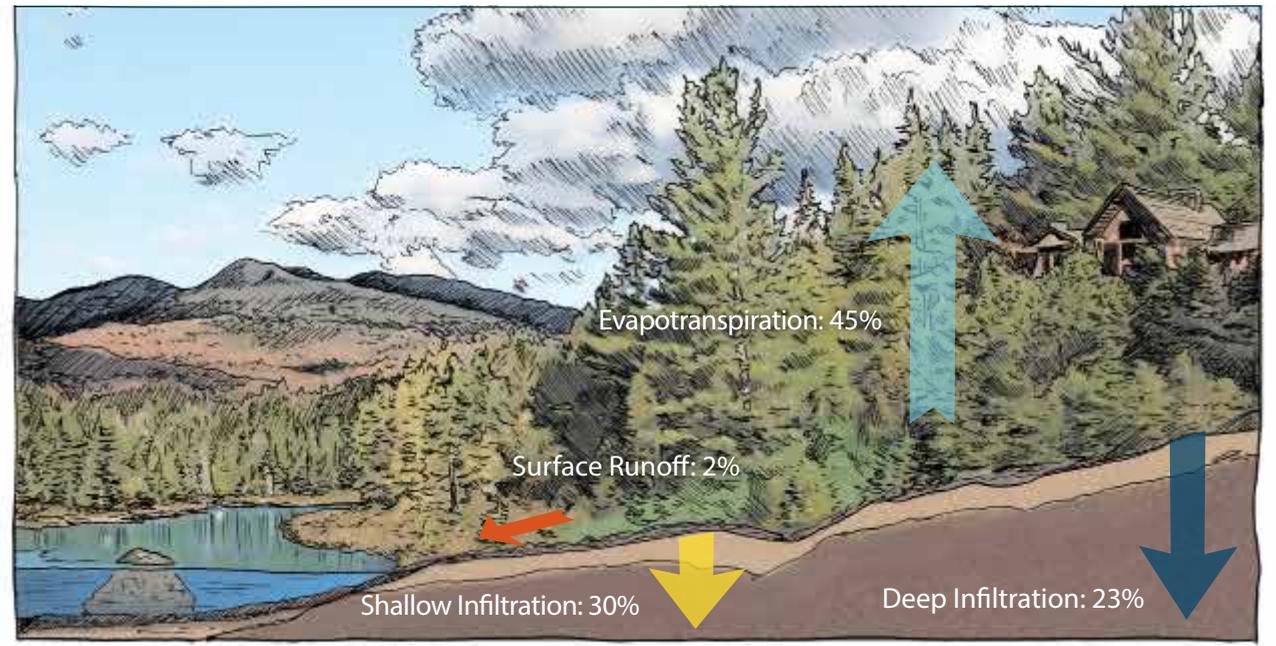
Impervious surfaces on a property, such as driveways, roofs, patios and compacted grass lawns, are the biggest contributors to the problem of stormwater runoff. Impervious surfaces prevent water from infiltrating into the ground. Pavement materials seal the soil surface, preventing rainwater infiltration and natural groundwater regeneration. Impervious surfaces increase stormwater that negatively affects Lake George. Figure 8 (next page) illustrates the effect of site development on stormwater runoff.

Minimizing the use of impervious surfaces and maximizing the amount of permeability on a site allows the land's natural processes to reduce runoff. There are several ways to accomplish this:

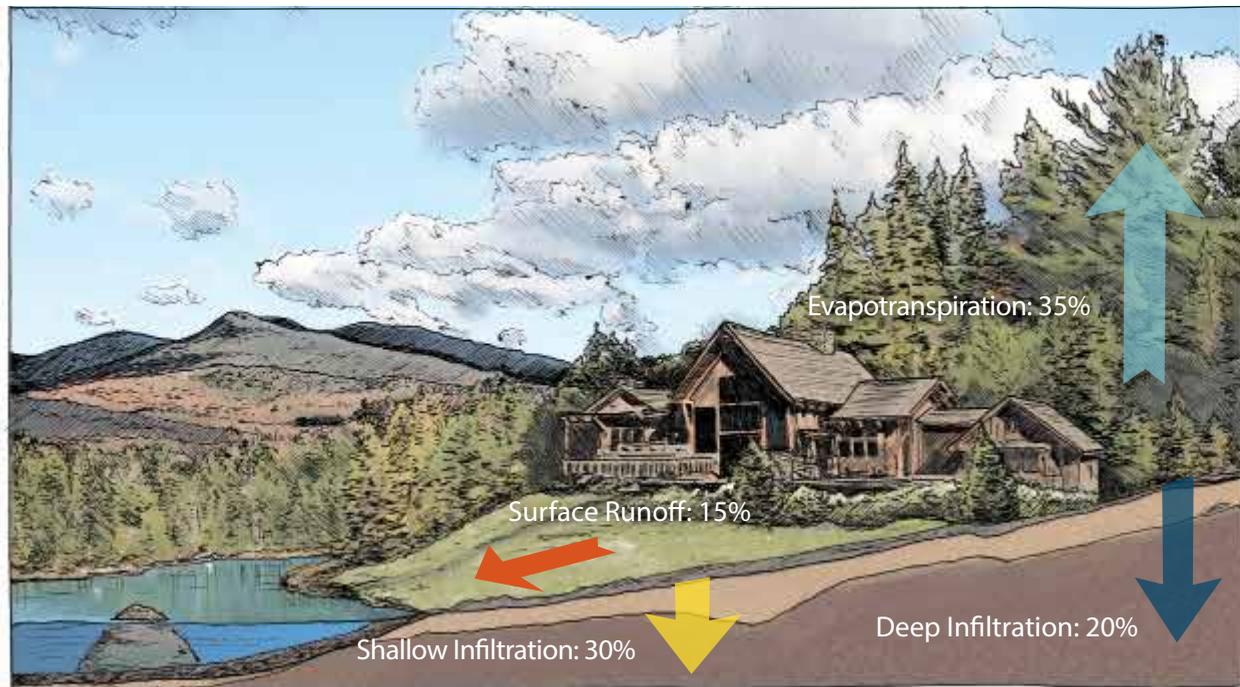
- > Design effectively. House type, shape and size all impact the amount of roof imperviousness. Vertical house construction is favored over a horizontal layout to reduce a building's footprint and minimize its impact.
- > Minimize width, length and total area of pavement on your property.
- > Utilize common driveways to reduce impervious surface area and unnecessary grading and disturbance.
- > Minimize grass lawns, which are much less effective for promoting infiltration of stormwater than natural forested areas. Lawns often consist of compacted soil with shallow grass roots, which limit infiltration.
- > Separate and disconnect impervious surfaces (e.g., direct downspouts onto vegetated surfaces to reduce runoff and mimic natural hydrologic patterns).
- > Utilize pervious surfaces, such as grass pavers, plastic soil reinforcement, and pervious pavement to reduce runoff.



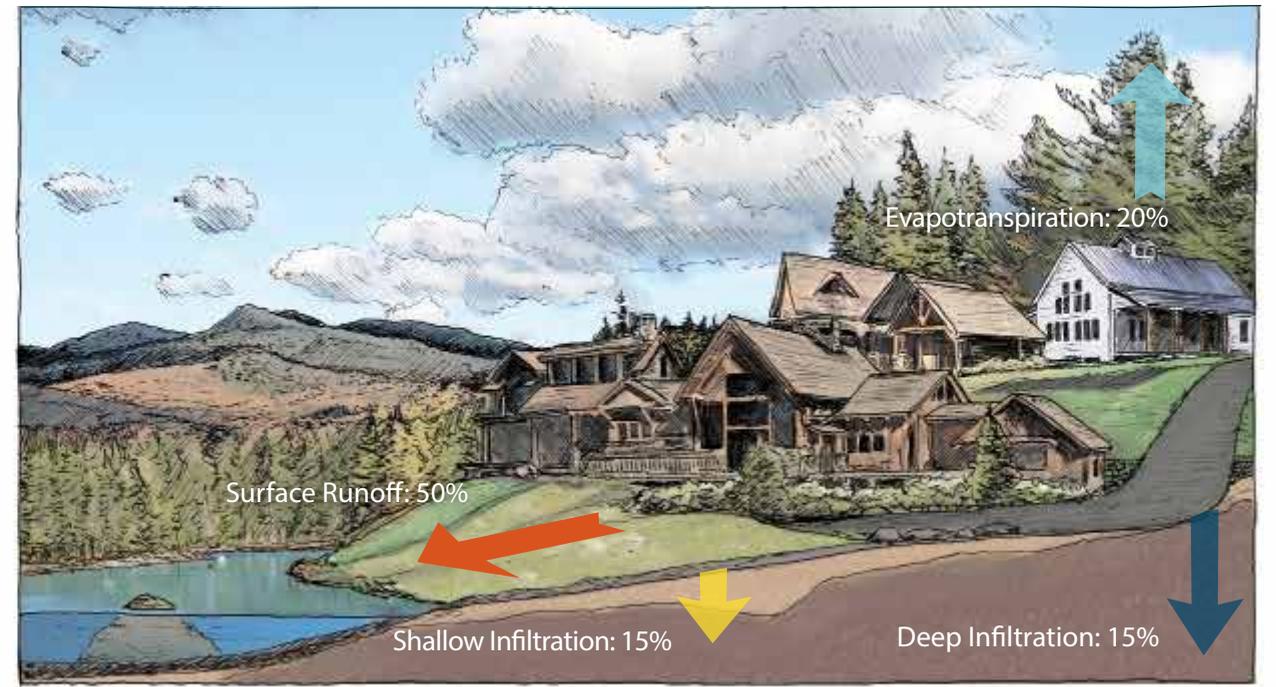
natural



minimal impact



LARGE impact



Extensive Impact

FIGURE 8: DEVELOPMENT INCREASES STORMWATER RUNOFF

As development increases on a site, the amount of stormwater runoff generated also increases. These illustrations show the increase in stormwater runoff under different development scenarios.

Manage Stormwater Close to the Source

Stormwater gathers volume as it travels, picking up debris, fertilizers, chemicals and other pollutants that are then dumped into the lake. One of the best ways to limit stormwater pollution to Lake George is to manage stormwater close to its source. There are a variety of ways that stormwater can be effectively managed onsite that do not disrupt the use and enjoyment of your property:

The water quality, which makes Lake George splendid, is integrally related to property values and the high quality of life we have long enjoyed.

- > Utilize small-scale practices such as rain gardens (small vegetated areas with infiltratable soils) and bioswales rather than large ponds.
- > Locate stormwater management structures, such as rain gardens or infiltration trenches, on soil that will easily soak up water.
- > Create direct flows from small swales to vegetated areas.
- > Create a landscape that slows stormwater flows, thereby increasing the time stormwater stays onsite. Slow movement of water mimics runoff patterns of an undisturbed forest landscape.
- > Avoid soil compaction. If the natural soil has been disturbed, amend it with compost and organic material to enhance hydrologic benefits.
- > Maximize the treatment of stormwater through infiltration practices consisting of rain gardens, infiltration trenches, swales and drywells. Locations of stormwater controls are determined through site evaluations, including soil investigations, and should maximize separation to surface waters to the greatest extent practicable for optimum treatment.
- > Know the stormwater controls incorporated on your property and how they function. Similar to septic systems, maintenance is required on all stormwater controls, primarily consisting of the removal of sediment and leaf debris. Property owners should request this information from their consultants when obtaining permits. For existing development, new owners should contact municipal departments or the Lake George Park Commission for stormwater control information including construction and maintenance requirements.

Design to Protect

Good site planning considers the protection of Lake George in the design of a house or other building and its amenities. Evaluating what a site can support and its limitations is the first step in careful planning that takes into account the health and beauty of the lake. The water quality, which makes Lake George splendid, is integrally related to property values and the high quality of life we have long enjoyed. 💧



Joe Pye Weed