

Soaking It All In

Restoring healthy soil in urban construction



By Dean Young

In our efforts to manage the impact of development on our urban waterways, we typically focus on impermeable surfaces such as roofs and pavement that prevent precipitation from soaking into the ground or being intercepted and evaporated by plants. However, studies show that when landscaped areas in our cities such as yards, parks and sports fields are built on poor-quality, compacted soil, these areas can contribute 40% to 60% of the total storm water runoff.

Healthy soil provides important storm water management functions such as infiltration and storage, nutrient absorption, sediment filtration, pollutant decomposition, and moderation of stream flows and temperatures. It also supports vigorous plant and tree growth, which intercepts rain, returning much of it to the atmosphere.

Conventional construction practices—which involve mass stripping and stockpiling of site topsoil in large mounds for long periods of time—result in the compaction of topsoil, radically changing its structure and water-holding capacity. The soil is depleted of beneficial organisms that cannot survive the anoxic conditions of the topsoil mounds.

Post-construction, typically less than 30% of what is stripped—a layer of only 10 to 15 cm—is reapplied to landscaped areas. Often no measures are taken to reverse compaction of the underlying subsoil caused by construction equipment traffic and storage of building materials.

These changes to soil structure, biology and organic matter content and the effects of compaction can cause landscaped areas to function similar to impervious surfaces. This makes the standard practice of directing roof drainage to them less effective than it could be at reducing urban runoff and contaminant loads to receiving waters. Furthermore, poorer-quality planting environments are produced, requiring more irrigation, fertilizer and effort to

re-establish and maintain vegetation and urban tree canopy.

With the release of a new best practices guide on preserving and restoring healthy soil, the Toronto and Region Conservation Authority (TRCA) hopes to foster change in construction industry practices and municipal standards. The TRCA guide recommends improved topsoil stripping and storage practices to produce higher-quality stockpiles, doubling the depth of topsoil typically specified for landscaped areas and minimum standards for organic matter content and uncompacted soil depth.

Recommended approaches to restoring healthy soil functions involve reversing compaction through the use of subsoiling or tilling equipment, and incorporating compost and mulch to increase organic matter content. Every 1% of organic matter in a 30-cm-deep topsoil can hold up to 16 liters of plant-available water per square meter. Compost also has soil-binding properties that act like glue, aggregating and holding soil particles together and making the soil more resistant to erosion. Studies show that these practices can reduce the volume of runoff produced by a landscaped area by 75% to 90%, reducing the impacts of urbanization on the local water cycle and improving the health of urban waterways.

A copy of the guidance document, "Preserving and Restoring Healthy Soil: Best Practices for Urban Construction," including templates for developing a soil management plan for your site, can be downloaded from the Sustainable Technologies Evaluation Program website (www.sustainabletechnologies.ca). **SWS**

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