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Soil Profile Rebuilding (SPR) – Questions and Answers

What is Soil Profile rebuilding?

Urban development often results in stripped and compacted soils that cannot sustainably support trees and landscapes and can provide little in terms of environmental benefits. Soil Profile Rebuilding is a cost-effective technique that can help rehabilitate these soils to provide documented increases in tree growth and ecosystem services such as carbon sequestration and stormwater management. It also reactivates biological activity in the soil, restoring it to a living medium, preparing it for productive use for the owner and our ecosystem. Restored soils can improve growth of trees, food gardens, native plant gardens, and even turfgrass.

More information can be found here: https://www.urbanforestry.frec.vt.edu/SRES/

A schematic example and visual representation of this work can be found at the end of this document.

How can I limit work needed for SPR?

A project can reduce its requirement for SPR by limiting the amount of disturbance on the site. This includes protecting trees to be retained. The urban forester assigned to your project can help you find opportunities to reduce disturbance and protect trees.

What are the basic steps of soil profile rebuilding?

They are very easy, just follow the complete specifications, which are, broadly:

1. Remove all construction debris, gravel, and soils with oil or concrete contaminants.
2. Apply compost
3. Scoop to 24” depth and dump from several feet above the soil
4. Grade and add topsoil
5. Stabilize with planting, seed, straw, mulch, sod, etc.

How should I prepare for Soil profile rebuilding?

Get familiar with the Soil Profile Rebuilding (SPR) plan. Your Urban Forester can help you understand your plan, and talk you through the process.

1. Plan your construction sequence so that soil profile rebuilding can be done.
    - Where access may be limited as areas are built, plan your construction sequence for each area, so that construction access, including repeated foot traffic, is complete.
    - At the end of construction, back out of each area, preventing recompaction.
    - Use equipment with adequate reach, so they can work from still-compacted areas or other work areas.
2. Order or pick up Compost and Topsoil. Consider using our sourcing list to ensure compliance with the specifications: https://www.arlingtonva.us/files/sharedassets/public/building/documents/compost-topsoil-sources.pdf . Note that soil composition can change over time from any vendor depending upon source material. Always ask for a test report for the material you are purchasing.
3. Follow the specifications and sequence above
4. Cordon off the SPR area, and proceed to the next area

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Can I drive on rebuilt soil?

Not directly, but with plywood or other compaction prevention mats, one can drive small equipment without significant risk of recompaction. Many small pieces of equipment with turf tires or with tracks have low ground pressure (below 4 Pounds per Square Inch (PSI)), and their use may limit compaction. If you are unsure, check with your assigned urban forester.

Compaction accidentally occurred. What can I do?

Compaction from smaller equipment might be remediated by a running tilling equipment over the top layer. More severe compaction may require re-mixing of soil. If the topsoil layer was already applied, do not reapply a topsoil layer at the end. Mix this layer in with the rest.

What if I need to plant trees after performing SPR?

Use nursery ball carts to carry trees to locations needed for planting.

What about installing sod over an SPR area?

Follow your E&S plan. If you or the client chose sod, install right after the topsoil installation step and move in wheeled or motorized track carts. Prior to watering, hand-rolling sod with a water filled drum is permitted.

How should I manage my grades with SPR?

Plan for the subgrade to be a minimum of 1" higher after several good rains or watering. We recommend watering with a hose to get the grade to settle. Plan time into your construction for soils to settle and dry. The soil should be firm underfoot but not dry.

Adding soil may elevate the grade. Plan for this change wherever SPR is being applied, including any sod you may install.

My grades seem to be very lumpy. What should I do?

You can hand till or rake prior to adding topsoil. You can also smooth the grades with the teeth of a low-ground-pressure machine bucket prior to installing the topsoil, if the machine can reach the area without recompacting the soil. Do not use the bottom of the bucket, as this will recompact the soil and undo the work. Rototilling is also acceptable.

What will staff look for?

- Soil and compost reports (or receipts from approved vendors).
- Photos of the process (compost installation, tilling, and topsoil installation)
- Compaction on-site, using a soil compaction tester. The penetrometer can be "soil compaction tester" with a ¾ inch cone tip and a 30" long probe. The penetrometer readings should be within 100-200 psi to the full depth of the installed soil. Below 100 psi soil becomes increasingly unstable and will settle excessively. Above 250 psi root growth is limited with fewer, shorter and low growing roots.

Figure 1: Using a soil penetrometer

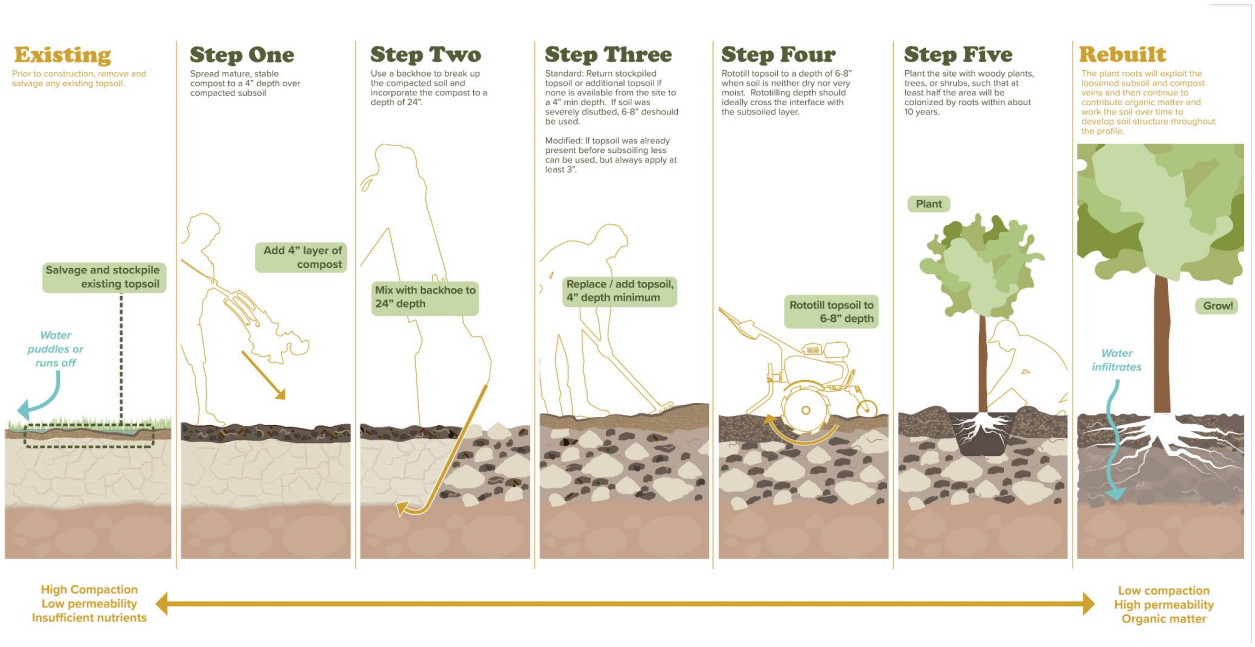

Figure 2. Soil Profile Rebuilding sequence. Source: Tree People Los Angeles

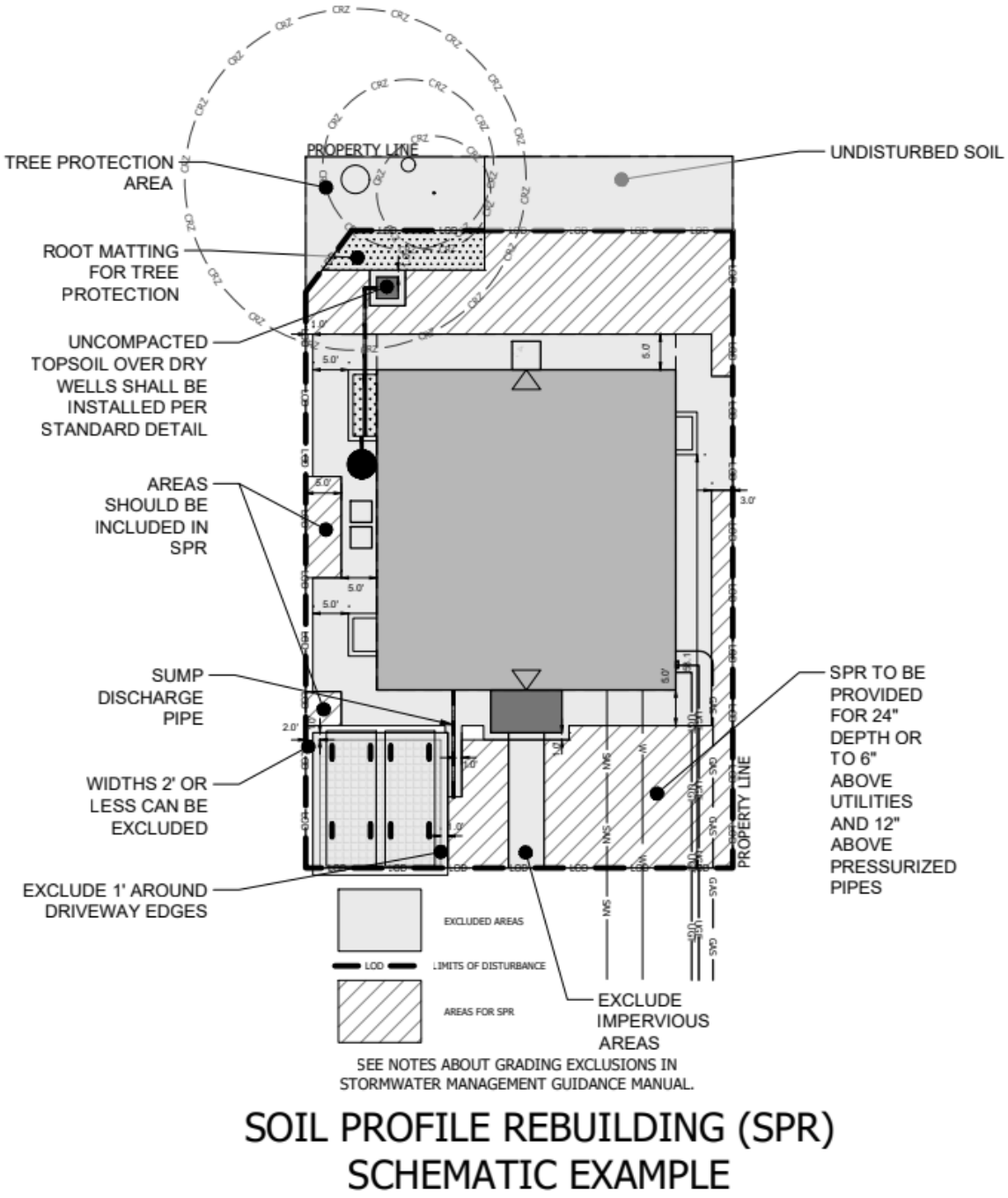

Figure 3: Schematic example of soil profile rebuilding plan