



# South End Gardens

a greener urban landscape

## Beautiful Urban Gardens Start with Healthy Soil

At South End Gardens, we are committed to improving the soil health of our clients' gardens. Healthy soils provide the foundation for beautiful gardens. When plants are grown in high quality soils, they grow to their full potential. Healthy garden soils have high biological activity of beneficial soil microorganisms, such as bacteria and fungi, leading to natural cycling of nutrients that plants use for growth. Good soil structure is another critical aspect of healthy soils, leading to suitable soil aeration and drainage. Maintaining healthy soils can also lead to using less fertilizer and water and increase the sustainability of a garden.

Unlike rural environments, where soils are naturally more uniform, soils in urban environments are the product of human intervention. As an urban landscape is developed, humans redistribute soils from different sources, making urban soils a patchwork of many different soil types. Basic aspects of soils, such as organic matter content and soil compaction are highly variable from one city block to another. This unpredictability can pose a challenge to urban gardeners trying to establish and maintain a healthy soil.

High variation of soil quality is especially the case in the South End of Boston. Most of the South End is built on a former tidal marsh, so all of the soils in the parks and gardens of the South End have been imported from lands surrounding Boston. Since the mid-1800s, as parcels of land have changed owners, soils have been subjected to different uses, resulting in a mosaic of many different soil types (*Refer to photo of 20 different soils*). Just as the communities of the South End are diverse, so too are the soil types of the South End.

At South End Gardens, we are using a scientific approach to understand our urban soils to improve garden health of our clients' gardens. We've collected data on a diversity of soil types throughout the South End to understand the existing variation in soil properties (*Refer to soil data*). As we develop a garden plan with our clients, we use soil testing to assess the health of each client's garden. We measure properties such as organic matter, soil pH and nutrient availability. In settings where soils are used for growing vegetables, we also test for unsafe levels of heavy metals. Based on these results, we can accurately improve soil health in order to ensure sustainable and beautiful gardens.



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## Soil Properties of South End Soils (values given are the ranges observed):

### Soil pH: 4.1 to 7.7

*Soil pH can range from 0-14, with 7 being a neutral pH. Soil pH is important to consider for some plants that prefer acidic (low pH, below 7) or basic (high pH, above 7). For example, azaleas prefer a soil pH around 5.5.*

### organic matter (%): 3.5 to 40

*The amount of organic matter in soil can affect the structure of a garden soil which in turn affects the aeration and drainage of soil. Organic matter also affects the activity of soil microorganisms that cycle nutrients in soil. A healthy garden soil generally has an organic matter content of 8-10%. Plots in the South End that haven't been actively used as gardens for many years may need addition of organic matter in the form of compost.*

### soil weight (grams of soil per 5 cubic centimeters of space): 2.16 to 6.14

*Soil weight is a measure of soil compaction. Highly compacted soils will have a high soil weight. Soils with high compaction lead to poor root growth due to limited aeration and drainage. Soils in the South End that are along sidewalks and in high traffic areas tend to be highly compacted and need to be amended.*

### nitrogen (as nitrate) (parts per million or ppm): 1 to 265

*Nitrogen is one major soil nutrient that plants need for growth. Nitrate is one form of nitrogen that is easily available to plants in the soil and is most commonly measured in soil tests. Nitrate levels between 20 and 30 ppm are generally sufficient for most garden plants, but the amount of nitrogen needed for a healthy garden is dependent on the types of plants being grown. Nitrate levels in soils also vary considerably throughout a growing season.*

### phosphorus (parts per million or ppm): 5 to 53

*Phosphorus is another critical nutrient that plants need for growth. Phosphate is the main form of phosphorus used by plants. In healthy soils with good nutrient availability, phosphorus levels generally range from 15-30 ppm.*

### lead (parts per million or ppm): 1 to 81

*Lead in soil can be taken up by plants and pose a risk to people if these plants are grown to be eaten. Background lead concentrations in natural soils range from 7 to 20 ppm. Lead levels above this range are a result of contamination from human activity. High lead levels are common in older metropolitan areas such as Boston, where lead was commonly used in paint and fuels.*

*Because most of the buildings in the South End are made of brick or concrete and have not been painted, lead levels in the soils of the South End are generally low. But any time a gardener is interested in growing plants for food, they should have their soils tested for lead and other heavy metals.*