



Soil & Plant Laboratory, Inc

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San Jose Office
November 20, 2013
Report 13-316-0053

Rebar
3330 20th Street
San Francisco, CA 94110

Attn: Jake Voit

RE: Frogtown Farm, St. Paul, MN

Background

The sample received on November 15, 2013 was identified as site soil from an area where new vegetable beds and orchards are being installed and need fertilizer and amendment recommendations. The sample was analyzed for horticultural suitability, fertility and physical characteristics. The results of the analyses are attached.

Analytical Results and Comments

The reaction of the soil is slightly alkaline at a pH of 7.6. This is slightly above the range preferred by most plants, including vegetables. Soil sulfur is recommended to help decrease the pH to a more favorable range. Soil sulfur works slowly and only to the depth incorporated. Salinity (ECe), sodium and boron levels are safely low. The SAR value shows soluble sodium is adequately balanced by calcium and magnesium; this balance is important for soil structure quality and how it relates to water infiltration in this soil.

According to the USDA Soil Classification, the less than 2mm fraction of this soil is classified as a sandy loam. Organic content is moderate at 3.5% dry weight. The 16.5% gravel present classifies this soil as gravelly. Based on this information the estimated infiltration rate is 0.31 inch per hour. Infiltration rates may vary due to differences in compaction across the site.

In terms of soil fertility, nitrogen, potassium, sulfate and magnesium are low and phosphorus is fair. Calcium is sufficient for proper plant nutrition. Of the micronutrients; copper is abundant but not problematically so, and zinc, manganese and iron are sufficient.

Recommendations

Nitrogen, phosphorus, potassium, magnesium and sulfate fertilizers are recommended. A composted greenwaste amendment is also recommended to help improve soil nutrient holding capacity and porosity. Composted greenwaste will provide additional phosphorus and potassium as well as additional micronutrients.

To Prepare for Mass Planting:

Drainage of the root zone should be improved by first loosening the top 10 inches of any undisturbed or compacted soil. The following materials should then be evenly spread and thoroughly blended with the top 6 inches of soil to form a homogenous layer:



<u>Amount / 1000 Square Feet</u>	
3 cubic yards	Composted Greenwaste*
8 pounds	Soil Sulfur
6 pounds	Blood Meal (12-0-0)
10 pounds	Feather Meal (12-0-0)
10 pounds	Steamed Bone Meal (3-15-0)*
7 pounds	Potassium Sulfate (0-0-50)*
5 pounds	Magnesium Sulfate (Epsom Salts)

*The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270 lbs. dry weight of organic matter per cubic yard of amendment. If a composted greenwaste amendment is chosen that contains a significant amount of phosphorus, potassium or magnesium, the steamed bone meal, potassium sulfate or magnesium sulfate should be reduced or omitted.

To Prepare Backfill For Trees and Shrubs:

- Excavate planting pits at least twice as wide as the diameter of the rootball.
- Soil immediately below the root ball should be left undisturbed to provide support but the sides and the bottom around the side should be cultivated to improve porosity.
- The top of the rootball should be at or slightly above final grade.
- The top 12 inches of backfill around the sides of the rootball of trees and shrubs may consist of the above amended soil or may be prepared as follows:

5 parts	Site Soil
1 part	Composted Greenwaste*

Uniformly blended with:

<u>Amount per Cubic Yard</u>	
1/3 pound	Soil Sulfur
1/3 pound	Blood Meal (12-0-0)
1/2 pound	Feather Meal (12-0-0)
1/2 pound	Steamed Bone Meal (3-15-0)*
1/3 pound	Potassium Sulfate (0-0-50)*
1/4 pound	Magnesium Sulfate (Epsom Salts)

- Backfill below 12 inches required for 24 inch box or larger material should not contain the composted greenwaste, soil sulfur, blood meal or feather meal but should still contain the steamed bone meal, potassium sulfate and magnesium sulfate at the recommended per cubic yard rate.
- Ideally a weed and turf free zone should be maintained just beyond the diameter of the planting hole. A 2-4 inch deep layer of coarse mulch can be placed around the tree or shrub. Mulch should be kept a minimum 4 inches from the trunk.
- Irrigation of new plantings should take into consideration the differing texture of the rootball substrate and surrounding soil matrix to maintain adequate moisture during this critical period of establishment.

Maintenance

An annual application of composted greenwaste should be enough to keep phosphorus, potassium and most micronutrients supplied. Approximately 1/2 cubic yard per 100 square feet should be enough. This is equivalent to spreading a 2 inch layer before incorporation and should be thoroughly incorporated to a depth of 6-8 inches. Typically this is not a significant source of nitrogen and that will be the nutrient that you need to replenish most often. Some options of organic nitrogen fertilizers that can be incorporated along with the compost would be Blood Meal (12-0-0), Feather Meal (12-0-0), Soybean or Cotton Seed Meal (7-1-1).



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Page-3
Rebar
Report 13-316-0053

If we can be of any further assistance, please feel free to contact us.

Annmarie Lucchesi
Emailed 4 Pages: jvoit@arteka.com

Rebar
3330 20th Street

San Francisco CA 94110



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4741 E. Hunter Ave, Suite A Anaheim, CA 92807 714-282-8777 (phone) 714-282-8575 (fax)
www.soilandplantlaboratory.com

Project : Frogtown Farm
St. Paul, MN

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Page : 1 of 1

COMPREHENSIVE SOIL ANALYSIS

Sample Description - Sample ID	Half Sat %	pH	ECe dS/m	NO ₃ -N ppm	NH ₄ -N ppm	PO ₄ -P ppm	K ppm	Ca ppm	Mg ppm	Cu ppm	Zn ppm	Mn ppm	Fe ppm	Organic % dry wt.	Lab No.
	TEC	Qual Lime		Sufficiency Factors											
Site Soil	16	7.6	0.5	4	4	13	46	1540	114	3.8	5.6	9	74	3.5	25126
	86	None		0.3	0.7	0.4	1.1	0.6	3.4	1.3	0.9	1.7			

Saturation Extract Values						SAR	Gravel %		Percent of Sample Passing 2 mm Screen					USDA Soil Classification	Lab No.
Ca meq/L	Mg meq/L	Na meq/L	K meq/L	B ppm	SO ₄ meq/L		Coarse 5 - 12	Fine 2 - 5	Sand			Silt .002-.05	Clay 0-.002		
								Very Coarse 1 - 2	Coarse 0.5 - 1	Med. to Very Fine 0.05 - 0.5					
3.0	0.9	0.8	0.1	0.03	1.1	0.6	7.5	9.0	10.0	21.6	43.6	15.3	9.4	Gravelly Sandy Loam	25126

Sufficiency factor (1.0=sufficient for average crop) below each nutrient value. N factor based on 200 ppm constant feed. SAR = Sodium adsorption ratio. Half Saturation %=approx field moisture capacity. Nitrogen(N), Potassium(K), Calcium(Ca) and Magnesium(Mg) by sodium chloride extraction. Phosphorus(P) by sodium bicarbonate extraction. Copper(Cu), Zinc(Zn), Manganese(Mn) & Iron(Fe) by DTPA extraction. Sat. ext. method for salinity (ECe as dS/m), Boron (B), Sulfate(SO₄), Sodium(Na). Gravel fraction expressed as percent by weight of oven-dried sample passing a 12mm(1/2 inch) sieve. Particle sizes in millimeters. Organic percentage determined by Walkley-Black or Loss on Ignition.

* LOW, SUFFICIENT, HIGH