

## Soils in Los Alamos County

vary depending on where you live, so get a soil test!

The parent material of all Los Alamos County soils is Bandelier Tuff (95%). The average top soil is 5-12 inches thick and the sub soil is 5-20 inches thick. The sub soil is predominantly clay which becomes denser the deeper you dig. Beneath the soil layers is tuff.

Most soils in White Rock have high pH – over 7. Top soils vary in thickness and the base layers are dense clay (often referred to as caliche). Most soil textures are sandy clay loam.

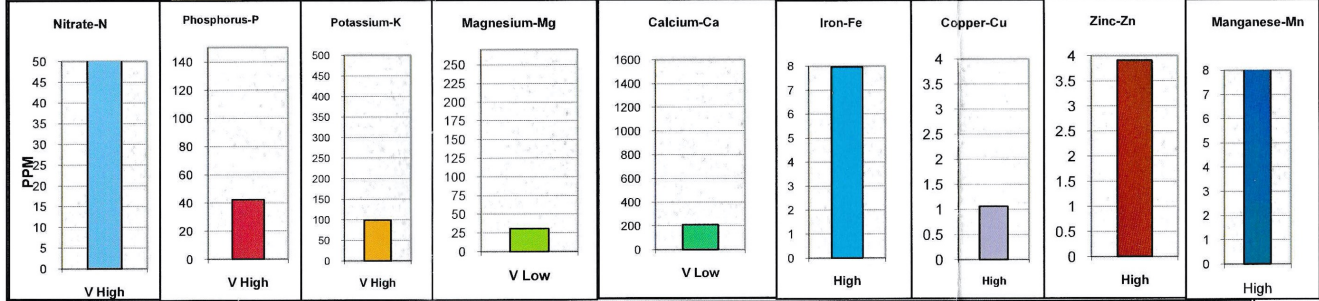
Soil texture in the townsite and Barranca and North Mesa vary with elevation. Pine needles are acidic and using them as compost is a good way to lower pH. You would think that lots which were originally forest will be less alkaline. However the soil report from Rosmarie Frederickson (Western area) gives sandy clay loam with a pH of 7.5. Ronnie Moss (North community) and Nancy Nunnelley (North Mesa) also report alkaline soil.



**N.M.S.U.-Soil Test Interpretation Report vs 4.09 - (590 Nutrient Management Jobsheet)**

<b>County:</b> Los Alamos	<b>Field ID:</b> Veg. Walker	<b>Crop Rotation:</b>
<b>Client Name:</b> Robert Walker	<b>Record #:</b>	<b>Acres:</b> 0.01 <b>Irr. Water (acin/ac):</b> 36
<b>Address:</b> 305 Donna Los Alamos, NM	<b>Planner Name:</b> Robert Walker	<b>Form Notes:</b> Veg. Garden - tomato, beans, lettuce, squash, cucumbers, chile
<b>Zip Code:</b> 87544	<b>Date:</b> 5/6/2009	<b>Depth increment (in):</b> 6
<b>Phone:</b> 505-672-9749	<b>Sodium Adsorb. Ratio:</b> 0.6 <b>ESP:</b> 0.00	
<b>Note:</b> E.C.-Electrical Conductivity or Saltiness, O.M.-Organic Matter, and ESP-Exchangeable Sodium %.		

Samp. ID (#)	pH (#)	E.C. (mmhos/cm)	Soil Texture (class)	O. M. (%)	NO <sub>3</sub> -N (ppm)	P (ppm)	K (ppm)	Mg (meq/l)	Ca (meq/l)	Na (meq/l)	Cu (ppm)	Zn (ppm)	Mn (ppm)	Fe (ppm)
AC20639	7.1	1.66	Sandy Clay Loam	3.4	59.3	42.2	99.0	2.8	11.6	1.6	1.1	3.9	8.8	8.0
<b>Crop to grow:</b> Vegetables, General				<b>Yield Goal:</b> N/A	lbs/ac	P <sub>2</sub> O <sub>5</sub> (lbs/ac)	K <sub>2</sub> O (lbs/ac)	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
					217	189	233	31	209	1	2	8	17	16



	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Mg	Ca	Fe	Cu	Zn	Mn
	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
<b>Recommended Nutrient Rate:</b>	0	0	0	0	0	0	0	0	0
<b>Organic Nutrient Source (Liquid or Solid Manure):</b>	0	0	0						
<b>Irrigation Water Credits (ppm NO<sub>3</sub>-N):</b>	0								
<b>Other Nutrient Sources (Standing Legume Crop.):</b>									
<b>Supplemental Nutrient Rate:</b>	0	0	0	0	0	0	0	0	0
<b>Available Nutrients &gt; Crop Requirements:</b>	NO	NO	NO	NO	NO	NO	NO	NO	NO

<b>General Note:</b>	No Nutrients Needed. Or, in the case of no crop specified, more information is needed to make management suggestions.	<b>Specific Notes:</b>	Sufficient fertility. Apply additional N only if lower leaves start to turn yellow during vegetative growth. Water appropriately and mulch to conserve water.
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**EC Note:** Very Low | No limitations      **Gypsum Recom:** 0 lbs/ac or 0 lbs/1000 ft<sup>2</sup>

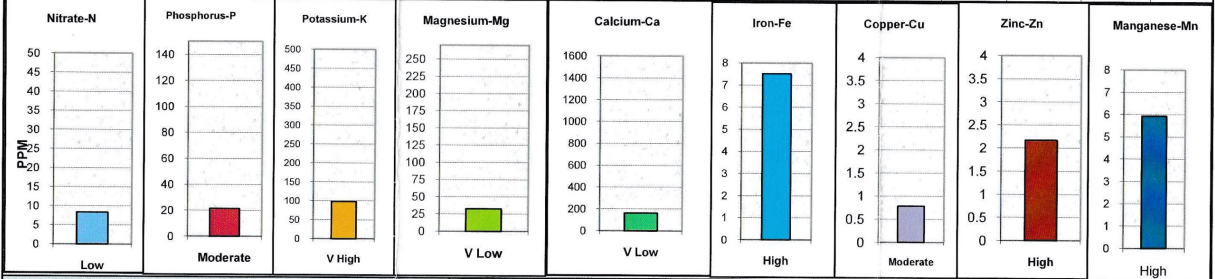
Robert P. Flynn, Ph.D. Agronomy and Soils cc: Los Alamos County Extension Agent	<b>Suggested Fertilizer Blend</b>	0 lbs/ac	0.0 lbs Total Needed
	<b>Total Blend (lbs/ac):</b> 0	0 lbs/ac	0.0 lbs Total Needed
	<b>Blend Cost (\$/ac):</b> \$0.00	0 lbs/ac	0.0 lbs Total Needed
<b>Client Signature:</b>	<b>Planner Signature:</b>	N-P205-K20 G 0% 0% 0%	<b>0.0 Tt Blend (lbs)</b>

**Fertilizer Cost Note:** Default costs are from NASS 10yr ave. ending 2001. Actual cost need local material cost and application charges. (See fert cost tab).

### N.M.S.U.-Soil Test Interpretation Report vs 4.09 - (590 Nutrient Management Jobsheet)

County: Los Alamos	Field ID: Flower Walker	Crop Rotation:	
Client Name: Robert Walker	Record #: <span style="background-color: red; color: white; padding: 2px;">Save To Farm Sum</span>	Acres: 0.01	Irr. Water (acin/ac): 36
Address: 305 Donna	Planner Name: Robert Walker	Form: Various Perennials & annuals rose, peony, posetnan, Sppirea, sanp dust, miller... Etc....	
Zip Code: 87544	Date: 5/6/2009	Depth increment (in): 6	Sodium Adsorb. Ratio: 0.9    ESP: 0.07
Phone: 505-672-9749	Note: E.C.-Electrical Conductivity or Saltness, O.M.-Organic Matter, and ESP-Exchangeable Sodium %.		

Samp. ID (#)	pH (#)	E.C. (mmhos/cm)	Soil Texture (class)	O. M. (%)	NO <sub>3</sub> -N (ppm)	P (ppm)	K (ppm)	Mg (meq/l)	Ca (meq/l)	Na (meq/l)	Cu (ppm)	Zn (ppm)	Mn (ppm)	Fe (ppm)
AC20640	7.3	1.35	Sandy Clay Loam	2.7	8.4	21.4	98.0	3.0	9.0	2.2	0.8	2.2	5.9	7.5
Crop to grow: Perennial flowers & Shrubs					lbs/ac	P <sub>2</sub> O <sub>5</sub> (lbs/ac)	K <sub>2</sub> O (lbs/ac)	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
Yield Goal: N/A					97	96	231	32	162	2	2	4	12	15



Nutrient Recommendation:		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Mg	Ca	Fe	Cu	Zn	Mn
		lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac	lbs/ac
<b>Recommended Nutrient Rate:</b>		120	60	0	2.5	0	0	0	0	0
Organic Nutrient Source (Liquid or Solid Manure):		0	0	0						
Irrigation Water Credits (ppm NO <sub>3</sub> -N):		0								
Other Nutrient Sources (Standing Legume Crop.):										
<b>Supplemental Nutrient Rate:</b>		120	60	0	3	0	0	0	0	0
<b>Available Nutrients &gt; Crop Requirements:</b>		NO	NO	NO	NO	NO	NO	NO	NO	NO

<b>General Note:</b> Fertilization dependent on species.	<b>Specific Notes:</b> Consider a blend of products below or similar and apply during vegetative growth phase. Sufficient micronutrients. May substitute ammonium sulfate for urea at roughly twice the rate.
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EC Note: Very Low    No limitations	Gypsum Recom: 0 lbs/ac or 0 lbs/1000 ft <sup>2</sup>	
Robert P. Flynn, Ph.D. Agronomy and Soils cc: Los Alamos County Extension Agent	<b>Suggested Fertilizer Blend</b>	238 lbs/ac    Urea 45% N    1.6 lbs Total Needed
	<b>Total Blend (lbs/ac):</b>	354    115-52-0 (MAP)    0.8 lbs Total Needed
	<b>Blend Cost (\$/ac):</b>	\$124.85    0 lbs/ac    0.0 lbs Total Needed
<b>Client Signature:</b>	<b>Planner Signature:</b>	N-P205-K20 G    34%    17%    0% <b>2.4 Tt Blend (lbs)</b>
<b>Fertilizer Cost Note:</b> Default costs are from NASS 10yr ave. ending 2001. Actual cost need local material cost and application charges. (See fert cost tab).		

## Soil Report Results and Recommendations

**pH:** The lowest reading 7.1 from the Walker's vegetable area and the highest 7.7 in Doris Thielmann's vegetable area.

**Texture:** Sandy Clay Loam

**Nitrogen:** Low

**Potassium:** High

**Organic Matter:** Low

Recommendations: Add compost, other organic material and sources of nitrogen.



## **Soil Adjustments:**

Use your soil report to choose soil amendments. If your soil is low in nitrogen, compost will provide a nitrogen boost. testimonials:

- “The most common amendments I use is compost and worm casting. All organic, of course. I don't buy any compost. I make them using vermicomposting, drum composting, bokashi (anaerobic fermentation), and just burying the kitchen waste in the ground.” (From Kok Heong McNaughton, central LA)
- “FALL: We add a layer of heavy self-made nitro compost each fall, leaving any healthy, dried, organic matter, and turn it into the entire garden, water, then we usually add a layer of apricot leaves. Water again and overwinter, watering occasionally if too dry. SPRING: We have had our best success by adding some mushroom compost into the pre-watered hole while transplanting purchases into the flower or vegetable garden. This year I will be using worm castings, too, for aphid control. I believe that leaving or adding pea-sized bits of tuff have helped my gardens, too, for water and air trapping, and just overall anti-compaction.”(From Vicky Ricketts, Barranca)

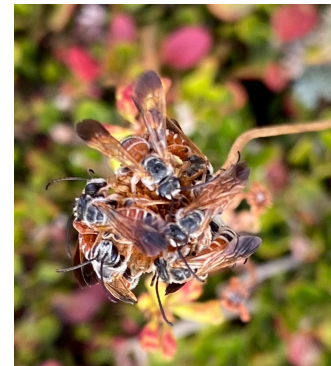
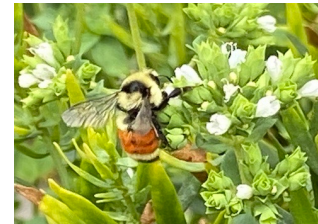
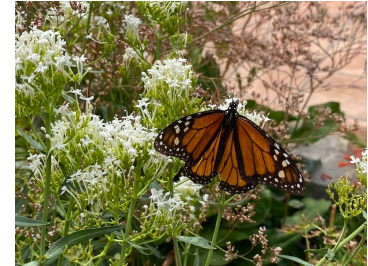
**Soil Adjustments:** always check NPK before adding commercial products.

Use your soil report to choose soil amendments: testimonials:

- “I put manure on the roses and tomatoes, Ammonium Sulfate ( 21% nitrogen + 24% sulfur, pH 5 or 6) on the trees every spring and fall. Compost takes a long time so on Mary Zemach's long -ago advice, I dig many small holes in my vegetable garden area and put peels, and melon rinds, eggshells, and bits of vegetables and coffee grounds in them and cover them back up.” (From Nancy Nunnelley)
- “I plant dahlias on my front bed every year (along with nasturtiums on the surrounds of the bed). Every year after I take out the old dahlia roots (I replant new ones every year) I dig up the soil a little bit and add a whole bag of Yum Yum mix, dig that in a little and leave it sit all winter. Then, in early May, I plant new dahlias and nasturtiums and the bed is ready to go. I really am sold on Yum Yum Mix.” (From Bev Cooper, WR)
- “Years ago a mentor, Kay Morris, shared this homemade fertilizer recipe and I’ve used it ever since: 4 parts cottonseed meal (NPK 6-0-4) good acidifier: 1 part alfalfa meal or pellets (NPK 3-1-2), 1/4 part kelp meal (for 60 minerals).” (From Denise George, WR). (These are the main components of Yum Yum Mix — but YYM adds phosphate which is good if you need it.)

## Soil is not everything

- Sun exposure and wind exposure create microclimates.
- Rain water is the best; capture and direct it to plantings. Water from LA water system is alkaline.
- Use resources: books, gardeners living in your neighborhood, be careful of what you read on the WEB.
- Don't be afraid to experiment.
- Plant natives where appropriate to attract pollinators.
- NPK is not everything either — good soil needs organic matter and micronutrients.



## What is Iron Chlorosis and What Causes it?

[https://extension.usu.edu/pests/ipm/notes\\_orn/list-treesshrubs/iron-chlorosis](https://extension.usu.edu/pests/ipm/notes_orn/list-treesshrubs/iron-chlorosis)

- Iron chlorosis is a yellowing of plant leaves caused by iron deficiency. Yellow leaves with a network of dark green veins indicate a lack of chlorophyll, the green pigment responsible for photosynthesis. Any reduction in chlorophyll during the growing season can reduce plant growth and vigor. In severe cases, or if iron chlorosis persists over several years, individual limbs or the entire plant may die.
- Plants that are native to high pH (alkaline) soils usually don't suffer from iron chlorosis, either because they tend to be very efficient in their use of iron or they can obtain more iron from the soil than non-native or poorly adapted plants.



Chlorotic Leaves

The causes of iron chlorosis are complex and not entirely understood. Many reactions govern iron availability and make iron chemistry in soil complex. Iron chlorosis frequently occurs in soils that are alkaline (pH greater than 7.0). Even though there typically is plenty of iron in these soils, the high soil pH causes chemical reactions that make the iron solid and unavailable to plant roots. Such iron will be tied up indefinitely unless soil conditions change. This explains why rusty nails or iron shavings do not correct iron deficiency: iron released by these materials immediately forms solids that are unavailable to plants. High potassium levels also contribute to iron chlorosis as it prevents take up of nutrients.

## Chlorosis Treatments



Chelated iron means **the iron is “captured” by a chemical, called a chelate, that protects it.** As long as the iron is protected, it can be used by the plant. Once the iron is “let go,” it is no longer protected. In our soils and water, if left unprotected, the iron can no longer be used by the plant.

The only chelate that works well under high pH soil conditions is one containing the FeEDDHA molecule. All other chelates currently on the market are ineffective at pH greater than 7.2

Use chelates in spring before growth begins. Sprinkle dry chelate on the soil surface and irrigate in, or dissolve in water and apply to soil around the base of plants. Chelates can also be applied in holes around the drip line of affected vegetation. Iron chelates are quite effective as foliar sprays.

A 0.5% solution of ferrous sulfate applied to foliage also provides some control and is less expensive. A 0.5% solution is formulated by dissolving 2 ounces of ferrous sulfate (20 to 22% iron) in 3 gallons of water. Foliage should be sprayed in the evening or on a cool, cloudy day to prevent leaf burning. Add a few drops of liquid soap to help the solution adhere to the leaves. Repeated applications of foliar sprays may be needed if chlorosis symptoms persist or as new foliage appears.

<b>Highly susceptible</b>	<b>Moderately susceptible</b>	<b>Moderately tolerant</b>
Silver maple	Aspen	Ash
Red maple	Beech	Boxelder
Amur or Ginnala Maple	Amur or Ginnala Maple	Most oaks
River Birch	Birch	Catalpa
Pin oak	Cherry	Kentucky coffeetree
Sweetgum	Horsechestnut	Cottonwood, poplars
Dawn redwood	Magnolia	Elms
Berries	Most maples	Ginkgo
Grapes	Mountain-ash	Hackberry
	London planetree	Hawthorn
	Most shrubs	Honeylocust
	Most conifers	Linden basswood
	Most fruit trees	Norway and Canyon maples
		Grasses

## Vegetables for Alkaline Soils

<https://harvesttotable.com/vegetable-crop-soil-ph-tolerances/>

1. Asparagus (6.0-8.0)
2. Beans, pole (6.0-7.5)
3. Beet (6.0-7.5)
4. Brussels Sprouts (6.0-7.5)
5. Carrot (5.5-7.0)
6. Cauliflower (5.5-7.5)
7. Garlic (5.5-8.0)
8. Kale (6.0-7.5)
9. Pea, sweet (6.0-7.5)
10. Pumpkin (5.5-7.5)
11. Peppers (5.5-7.0)
12. Rhubarb (6.5-7.0)
13. Spinach (6.0-7.5)
14. Crookneck Squash (6.0-7.5)
15. Tomato (5.5-7.5)

Many perennials grow in alkaline soils.  
Check LAMG data base for suggestions

<http://lamgonline.org>



**Shrub choices for an area with alkaline soil might include:**

- Apache Plume
- Buddleia (Butterfly Bush)
- Caryopteris (Blue Mist Spirea)
- Cotoneaster
- Currant
- Forsythia
- Hibiscus (Rose of Sharon)
- Lilac
- Physocarpus (Ninebark)
- Mountain Mahogany
- Amerlanchier (Serviceberry)
- Shrub Roses
- Rugosa Roses
- Philadelphus (Mock Orange)
- Pygmy Pea Shrub
- Sumac
- Viburnum
- Weigela



## Instant Quality Soil and Gopher Deterrence via Raised Beds

