crop care associates, inc.

Pankauski/Drum Canyon
c/o: Tierramar Vineyard Mgmt.
P.O. Box 580
Buellton, CA 93427

March 28, 2016

BASELINE SOIL ANALYSIS FOR VINEYARD DEVELOPMENT
Drum Canyon
Project #16-022

On February 25, 2016 (8) backhoe pits were evaluated at the above site. The soil was described and profile logs were recorded. Twenty eight (28) samples were taken from horizons at the sites and submitted for analysis of physical and chemical characteristics. The Soil Profile Logs for the backhoe pits and Lab Data Sheets for all samples are included as part of this report. Eight (8) samples from the surface horizons at the sites were submitted for nematode screening.

The objective of this study is to determine the suitability of land for winegrape production and recommend amendments and soil management activities for development of vineyards.

Soil pit locations in longitude and latitude (units of decimal degrees) were recorded using a Geo-Positioning System (GPS) unit and were used to plot the soil sites on the attached photographic map.

Soil Color

The color of undisturbed samples from each soil horizon was determined with Munsell Soil Color Charts and the English designations of color on the Soil Profile Logs conforms with the internationally recognized system of color communication.

Soil Types and Textures

Soil Texture – the relative proportion of sand, silt, and clay – was estimated using the hand-feel method at the site and the saturation percentage laboratory method.

- Based upon Saturation Percentage, the texture of the surface soil were all sandy loam except:

• Site 1	Loam
• Site 7	Loam
• Site 8	Loam

- The texture of the subsurface horizons were also sandy loam and loam except:

• Site 3	Clay loam	Below 40"
• Site 4	Clay	32"-46"
• Site 8	Clay	Below 47"
*Site 3	Sand	18"-34"

Rust Mottles result from decomposition of organic matter under anaerobic conditions of low or no oxygen. The anaerobic condition is due to the utilization of all available oxygen by microorganisms and the poor transport of atmospheric oxygen into the area of decomposition due to a high water content in the pores that blocks the easy movement of oxygen where it is needed. Mottles are commonly found in soils that are seasonally very wet (near saturation) for an extended period of time, and thus experience poor drainage.

- None reported.

Gravel: Moderate (20-40%) amounts of gravel are considered favorable for grapevines, because roots are able to exploit the soil/gravel interface to extend deeper into the soil profile. The gravel content of each horizon is listed in parenthesis under the texture in the Soil Profile Logs.

Soil Physical Structure

Soil Structure is the organization of the soil particles into aggregates. Structure is the degree of aggregation of the soil particles. It provides the soil strength to resist deformation and compaction. The consolidation (friability/deformability) is the hardness or tightness of the soil and how easily it is penetrated by a knife or roots. Soil becomes less friable and harder as its moisture content decreases.

- The structure of the surface soil was favorable at all sites.

- The structure in the subsurface soil was favorable or acceptable at all sites except:

• Site 3	Massive below 48"
• Site 4	Massive below 32"
• Site 5	Massive below 32"-46"
• Site 6	Massive below 16"
• Site 7	Massive 20"-59"

- The consolidation of the surface soil was weak at all sites except:

• Site 1	Moderate

- The consolidation of the subsurface soil was moderate at all sites except:

• Site 3	Strong below 48"
• Site 4	Strong below 32"
• Site 6	Strong below 16"
• Site 7	Strong 20"-59"

- The rooting density of native grasses, weeds was generally weak.

Soil Chemistry and Vine Nutrition

Soil Balance: The pH is the relative measure of soil acidity, with a value of pH 7.0 being neutral, below 7.0 acid and above 7.0 being alkaline. Generally, problems related to soil pH become more serious for grapes as the pH drops below 5.5 or goes above 7.8. Phosphorous becomes increasingly bound to the soil surface and less available for plant uptake as the pH drops below 5.5. Potassium becomes increasingly susceptible to leaching as the pH decreases especially below pH 5.2. Hydrogen (H) becomes more prevalent on the cation exchange complex (CEC) as pH values fall.

- The pH of the acidic soils ranged from slight to extreme acidity.

- These soil pH values will require some preplant, pre tillage lime additions, but the amounts will be low given the light, sandy soil textures of the top 36".

Chemical Hazards:

- **Electrical Conductivity (EC)** of the soil is an indicator of the concentration of all soluble salts in the soil. Elevated levels of salts in the soil are an indicator of high-salt irrigation water, poor drainage or both.
    - The electrical conductivity is generally satisfactory in the expected rootzones.
    - Higher sodium at 40" and below at:
        - Site 3
        - Site 4
- **Sodium Adsorption Ratio (SAR)** is the relative concentration of sodium on the cation exchange complex. As sodium begins to predominate on the exchange sites, it can cause dispersion (destruction) of soil aggregates and greatly reduce infiltration due to reduction in the average pore size. Water moves much faster through large pores than through the same volume of small pores. Therefore, a moderate (5-6) to high (7-10) SAR is an indicator of limited soil drainage.
    - The SAR was satisfactory in the expected rootzones, but was elevated at depth at:
        - Site 3 Below 34"
        - Site 4 Below 32"
        - Site 6 Below40"
        - Site 7 Below 55"
        - Site 8 Below 47"
- **Boron (B):** Boron is an essential plant nutrient, however the concentration range from deficient to toxic levels is rather narrow. Deficiency symptoms in young vines should be monitored in bloom-time and pre-veraison petiole samples. If found deficient, foliar applications of small doses of boron can be incorporated into other spray programs.
    - Boron levels (saturated paste extraction) for toxicity considerations is satisfactorily low.
    - The boron levels at all sites are low for vine nutritional considerations and could be expected to induce mild deficiency symptoms.

- Boron deficiencies are readily addressed with a pre-bloom foliar or soil applied fertilizer.

Cation Balance: Cations are positively charged ions (elements), which are attracted to the negatively charged soil surfaces. The cation exchange capacity (CEC) is the sum total of these negatively charged sites per volume of soil. The CEC represents the major nutrient holding capacity of the soil. Generally, the CEC increases with increases in clay and/or organic matter content.

The concentrations of the cations that make up the CEC can be indexed into ratios to determine their balance relative to one another. Unbalanced relationships can indicate a propensity for deficiencies in these nutrients or flag a potential problem with trace nutrients. Unbalanced relationships can result in slow growth and a tendency towards potassium deficiencies. Magnesium percentage above 50% of the soil Cation Exchange Capacity (CEC) will be reflected in slowed vine growth and K deficiency symptoms. It is desirable for the soil cation balance to reflect a Ca:Mg ratio of 3:1 or higher and for the calcium percentage to be above 60%.

- Calcium magnesium (Ca:Mg) ratios are unbalanced at:

    - Site 6
    - Site 7
    - Site 8

- Potassium magnesium (K:Mg) ratios are unbalanced.

Organic Matter (OM%): Organic matter provides many of the essential plant nutrients in a slow release formulation. It also supplies negatively charged sites that contribute to the CEC, which in turn holds many of the plant nutrients in forms that are readily available to plants. Soil OM also plays a role in improving soil structure and water and gas transport. About 1-1.5% of the soil's OM is naturally decomposed each year and should be replaced on an annual or biannual basis through recycling vineyard residues, and/or application of organic manures or composts, and/or cover-cropping.

- Organic matter content is low, but about as expected for the soil type.

- *<u>Recommendation:</u> Prior to final disking, broadcast composted manure + green matter at 4 tons per acre.*

Nitrate Nitrogen (NO_3-N): Nitrate nitrogen is a product of microbial decay of soil organic matter (as well as from mineral fertilizer applications), and because it is negatively charged, it is not held by the cation exchange capacity (CEC). Consequently, it is very mobile in the soil solution and is readily leached from the rootzone. Soil nitrate levels are rather temporal and can change rapidly following rainfall or irrigation.

- Nitrate levels are satisfactory for vine establishment.

- A vineyard fertilization program should be developed based on bloom-time petiole analysis coupled with veraison petiole analysis.

Phosphorus (P): Extractable (plant available) soil phosphorus is that associated with the mineral fraction of the soil. However, some phosphorus is also associated with the organic matter fraction of the soil, and it becomes available as the organic matter slowly decomposes throughout the growing season.

- Phosphorus levels are satisfactory for vine establishment.

Potassium (K): Extractable potassium is that washed from the soil surfaces. However, additional soil potassium is usually sandwiched in the mineral inter-layer space and becomes slowly available as the easily available levels decrease.

- Potassium levels are generally satisfactory. Low at:

  - Site 3
  - Site 6
  - Site 7
  - Site 8

- These sites will be improved with preplant composting, but as extractable K levels (reserve) are low, post establishment K fertilization will be necessary.

Zinc (Zn): As soil zinc readings are notoriously poor indicators of potential Zn deficiencies, we suggest using visual observation of suspected Zn problems coupled with lab tissue analysis before adding Zn.

- Zinc levels are low.
- After 6" of new growth a foliar spray(s) will be desirable in year 1.

- Petiole analysis should be taken in year 2 and pre-bloom foliar fertilizer applications should be initiated if found deficient.

Soil Borne Pests

One soil sample was taken from the surface 0”-18” at each site, composited with soil samples of the same area, and submitted for nematode screening.

The nematode screening results are time and location specific, and repeated sampling will not necessarily recover the same species or quantities. The following nematodes were recovered in the samples (already adjusted for 50% extraction efficiency):

Site	Nematodes ID	Nematodes/ Kg soil
1	Stubby Root	8
2	Stunt	10
3	Stunt	8
4	NPN	
5	Stubby Root	4
6	Stunt	4
7	NPN	
8	Dagger XA	

Dagger XA (Xiphinema americanum) nematode can feed on grapevine roots, but has not been proven to cause significant damage on its own, in mature vines populations in the 100's may cause some damage to young vines with immature root systems.

Stubby Root and Stunt nematodes are not considered harmful to grape vines.

NPN= No plant parasitic nematodes found.

Summary & Activities List

The submittals and Soil Profile Logs indicate soils, though acidic, can be amended and made suitable for winegrape production. The issue with sodium appears to be too deep to be of significant concern and with pre deep tillage and amending with gypsum should result in the sodium leaching even deeper. Irrigation water quality should be examined for both sodium and chloride.

Prior to preplant ripping to 30", broadcast gypsum (100% calcium sulfate equivalent) at 5 tons per acre at Sites 1 and 2 and at 7 tons per acre at Sites 6, 7 and 8.

Apply lime (100% calcium carbonate equivalent) at 2 tons per acre, broadcast, at Sites 3, 4 and 8 and at 4 tons per acre broadcast, at Sites 6 and 7.

Prior to final disking and layout, broadcast composted manure and green matter at 4 tons per acre over all areas to be planted.

No preplant fumigation for nematodes appears warranted.

1103P rootstocks appear quite suitable for these somewhat elevated Total Salt subsoils.

A water source should be selected and an ag water analysis conducted.

<u>Disclaimer</u>

The conclusions and/or recommendations included in this report are based upon the data and information available to Crop Care Associates, Inc. at the time this report was prepared. Therefore, all conclusions and recommendations are time and site specific and are directed to the specific and stated need of the addressed client only. Crop Care Associates, Inc. assumes no liability for the use of this data or recommendations by any other party. While all laboratory analyses are believed to be reliable, they are not guaranteed by Crop Care Associates, Inc.

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SOIL ANALYSIS REPORT

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Ranch: PANKAUSKI/DRUM CANYON

			Texture	Salinity & Permeability								Nutrients					Extractable Cations					Ratios		T/ac-6"	%
	Sample				mmho/cm	meq/l	meq/l	meq/l		ppm	Free	ppm	ppm	ppm	ppm	meq/100g	Percentage of CEC							Lime	Organic
Site	Depth (in)		Sat%	pH	ECe	Ca	Mg	Na	SAR	B	Lime	NO_3-N	P	K	Zn	CEC	Ca	Mg	K	Na	H	Ca/Mg	K/Mg	Reqmt	Matter
OPEN FLDS - SITE 1	0	18	37	6.1	0.6	2.1	1.1	2.7	2.1	0.16	0	9.8	39	130	0.4	15.1	62	21	2	3	12	3.0	0.11	0.0	1.4
"	18	42	30	5.8	0.3	0.9	0.6	1.3	1.5	0.09	0	4.5	23	94	0.1	14.4	61	22	2	3	12	2.7	0.07	0.0	0.9
"	42	66	30	5.9	0.3	1.2	0.8	1.3	1.3	0.09	0	3.1	13	72	0.1	9.7	58	31	2	3	7	1.9	0.06	0.0	0.5
SITE 2	0	18	33	6.0	0.5	1.6	0.7	2.2	2.1	0.09	0	8.3	20	97	0.3	13.8	64	21	2	4	10	3.1	0.09	0.0	1.3
"	18	42	47	5.8	0.3	1.0	0.5	1.3	1.5	0.06	0	3.5	17	100	0.1	13.5	62	24	2	3	8	2.6	0.08	0.0	0.7
"	42	66	26	6.0	0.4	1.3	0.8	2.0	1.9	0.08	0	2.2	12	72	0.1	8.9	57	30	2	4	7	1.9	0.07	0.0	0.4
SITE 3	0	18	25	5.4	0.3	0.8	0.7	1.0	1.2	0.09	0	4.0	32	69	0.6	9.9	49	25	2	2	22	1.9	0.07	0.0	1.5
"	19	34	18	5.2	0.2	0.5	0.3	1.1	1.7	0.05	0	3.8	35	49	0.1	8.3	36	39	2	5	19	0.9	0.04	0.0	0.5
"	34	40	45	5.9	2.0	2.2	4.1	13.7	7.7	0.06	0	5.2	18	128	0.1	20.6	30	49	2	13	6	0.6	0.03	0.0	0.6
"	40	68	58	5.7	4.4	5.9	12.9	28.7	9.4	0.12	0	2.9	151	139	0.2	26.3	26	46	1	18	8	0.6	0.03	0.1	0.5
SITE 4	0	18	27	5.3	0.6	1.4	1.2	2.4	2.1	0.12	0	2.9	37	112	0.1	9.7	46	24	3	4	23	1.9	0.12	0.4	1.4
"	18	32	23	5.0	0.4	0.7	0.7	2.5	3.0	0.06	0	5.4	39	47	0.1	8.9	35	33	1	6	25	1.0	0.04	1.0	0.7
"	32	46	69	5.7	2.4	2.3	4.4	18.1	10.0	0.09	0	3.0	5	152	0.1	30.5	28	48	1	16	7	0.6	0.03	0.0	0.6
"	46	67	47	7.0	4.0	3.8	8.1	29.7	12.2	0.12	0	2.1	2	96	0.1	17.0	27	48	1	24	0	0.5	0.03	0.0	0.3
SITE 5	0	16	25	6.4	0.4	1.1	0.6	1.0	1.1	0.12	0	3.7	36	468	0.3	7.7	54	17	15	2	11	3.2	0.90	0.0	1.0
"	16	32	26	5.8	1.7	7.2	4.3	4.0	1.7	0.10	0	2.8	34	198	0.2	8.1	57	20	6	3	14	2.8	0.31	0.0	0.9
"	32	46	26	5.6	0.7	2.0	1.7	3.1	2.3	0.12	0	3.1	70	89	0.1	9.5	49	33	2	4	12	1.5	0.07	0.0	0.4
"	46	65	26	5.8	0.6	1.7	1.7	3.5	2.7	0.10	0	3.3	78	70	0.1	9.6	45	37	2	5	11	1.2	0.05	0.0	0.3
SITE 6	0	16	24	4.8	0.4	0.8	0.8	1.5	1.6	0.08	0	2.0	67	48	0.2	8.9	34	34	1	3	27	1.0	0.04	0.9	0.8
"	16	40	43	4.5	0.6	1.0	1.0	3.4	3.5	0.09	0	4.2	117	131	0.2	22.3	25	46	2	6	22	0.6	0.03	4.3	0.5
Desired Levels for Grapes				6.5 to7.5	Below 1.5				Below 5	0.2 to1.0		2 to 20	8+	100+	1.0+		60 to80	12 to20	3 to7+	Below 6	Below 8	2 to 10	0.1 to 0.4		

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SOIL ANALYSIS REPORT SUPPLEMENT

Laboratory No.	145407			***Reported:***	3/9/2016
Client:	TIERRAMAR V.M.	***Project No.***	16-022	***Received:***	3/3/2016
Ranch:	PANKAUSKI/DRUM CANYON				

		Extractable Cations										Tons/Acre-ft	Inches/foot of soil	%	PARTICLE SIZE ANALYSIS			
	Sample	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	**Gypsum needed to**	**Water-holding**	**Active**	**%**	**%**	**%**	
Site	*Depth (in)*	**Ca**	**Mg**	**K**	**Na**	**H**	**Mn**	**Fe**	**Cu**	**Al**	**Ni**	**raise Ca to 60%**	**Capacity**	**Lime**	**Sand**	**Silt**	**Clay**	**Classification**
OPEN FLDS - SITE 1	0 18	1885	378	130	120	18	2.7	28	0.6				1.5					
"	18 42	1761	392	94	96	18	0.8	19	0.4				1.2					
"	42 66	1129	362	72	66	7	0.3	11	0.2			0.4	1.2					
SITE 2	0 18	1774	352	97	115	13	1.9	34	0.5				1.3					
"	18 42	1678	399	100	105	11	0.8	18	0.5				1.9					
"	42 66	1018	321	72	77	7	0.2	14	0.3			0.4	1.1					
SITE 3	0 18	965	301	69	48	22	7.2	62	1.0			1.9	1					
"	19 34	593	397	49	97	15	2.9	64	1.0			3.4						
"	34 40	1237	1213	128	635	13	0.3	31	1.0			10.3	1.8					
"	40 68	1364	1477	139	1095	22	0.4	95	1.2			15.0	2.3					
SITE 4	0 18	907	289	112	80	22	4.6	52	0.5			2.2	1.1					
"	18 32	616	361	47	118	22	1.2	66	0.5	9		3.8	0.9					
"	32 46	1722	1768	152	1094	22	0.1	24	0.9			16.2	2.6					
"	46 67	906	1000	96	931	0	0.0	5	0.8			9.5	1.9					
SITE 5	0 16	842	161	468	29	9	2.0	25	0.3			0.7	1					
"	16 32	919	197	198	59	11	1.9	27	0.3			0.4	1.1					
"	32 46	927	385	89	82	11	0.2	56	0.3			1.8	1.1					
"	46 65	870	430	70	111	11	0.1	19	0.3			2.4	1.1					
SITE 6	0 16	604	371	48	69	24	9.3	137	0.8	16		3.9	1					
"	16 40	1135	1235	131	301	48	1.1	277	1.1	83		12.9	1.7					

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			Texture	Salinity & Permeability								Nutrients					Extractable Cations					Ratios		T/ac-6"	%
	Sample				mmho/cm	meq/l	meq/l	meq/l		ppm	Free	ppm	ppm	ppm	ppm	meq/100g	Percentage of CEC							Lime	Organic
Site	Depth (in)		Sat%	pH	ECe	Ca	Mg	Na	SAR	B	Lime	NO_3-N	P	K	Zn	CEC	Ca	Mg	K	Na	H	Ca/Mg	K/Mg	Reqmt	Matter
SITE 6	40	64	29	4.4	1.7	1.6	3.3	11.5	7.3	0.07	0	2.6	124	110	0.2	20.0	24	43	1	12	20	0.6	0.03	2.2	0.4
SITE 7	0	18	40	5.0	0.3	0.7	0.7	1.2	1.5	0.09	0	2.8	36	61	0.2	10.5	34	35	1	3	27	1.0	0.04	0.0	1.1
"	20	44	38	4.5	1.0	1.2	2.2	7.0	5.4	0.08	0	2.1	301	79	0.2	16.8	23	42	1	8	26	0.6	0.03	2.6	0.4
"	59	65	31	4.8	0.9	0.8	1.2	6.1	6.1	0.07	0	3.3	145	62	0.5	16.8	30	41	1	9	18	0.7	0.02	0.7	0.3
SITE 8	0	18	39	5.5	0.2	0.8	0.6	1.1	1.4	0.09	0	4.7	105	83	0.5	16.2	51	32	1	3	14	1.6	0.04	0.0	1.6
"	18	42	48	4.9	0.2	0.4	0.3	1.2	2.1	0.08	0	3.8	294	143	0.1	30.3	37	42	1	5	15	0.9	0.03	1.0	0.5
"	47	69	65	4.7	1.2	1.4	1.7	8.9	7.1	0.12	0	3.3	131	200	0.5	38.6	35	43	1	11	10	0.8	0.03	4.4	0.4
Desired Levels for Grapes				6.5 to7.5	Below 1.5				Below 5	0.2 to1.0		2 to 20	8+	100+	1.0+		60 to80	12 to20	3 to7+	Below 6	Below 8	2 to 10	0.1 to 0.4		

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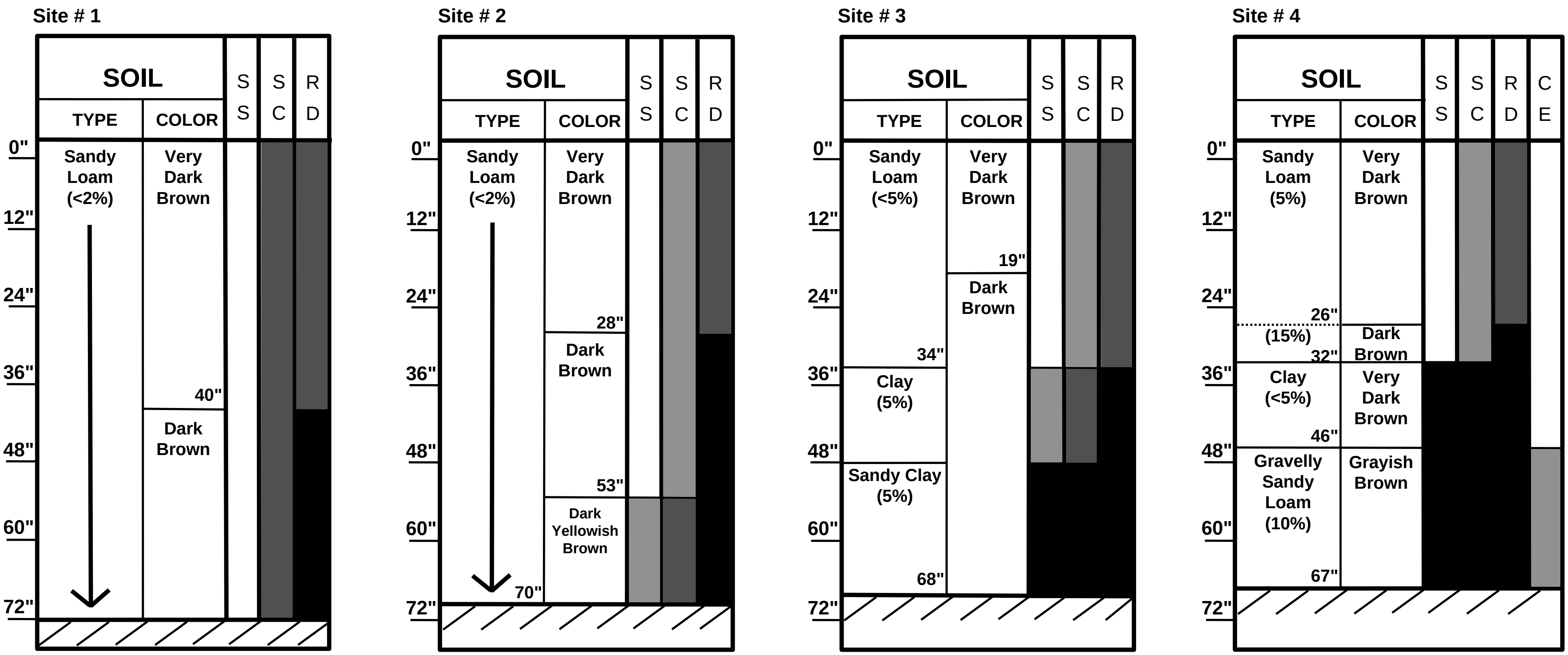
	Sample	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	**Gypsum needed to**	**Water-holding**	**Active**	%	%	%	
Site	*Depth (in)*	**Ca**	**Mg**	**K**	**Na**	**H**	**Mn**	**Fe**	**Cu**	**Al**	**Ni**	**raise Ca to 60%**	**Capacity**	**Lime**	**Sand**	**Silt**	**Clay**	**Classification**
SITE 6	40 64	961	1047	110	534	40	1.9	87	0.7	76		12.0	1.2					
SITE 7	0 18	702	445	61	63	29	2.9	55	0.6	10		4.6	1.6					
"	20 44	779	853	79	302	44	0.3	61	0.9	103		10.4	1.6					
"	59 65	1014	845	62	359	31	1.3	70	1.0	55		8.4	1.3					
SITE 8	0 18	1658	625	83	94	22	3.6	86	0.7			2.5	1.6					
"	18 42	2259	1529	143	378	44	0.4	213	0.8	53		11.5	1.9					
"	47 69	2685	2013	200	971	40	0.8	59	1.9	49		16.3	2.5					



Site # 1

* N 34.63458 W 120.28219
* Fine subangular blocky structure 0-72".
* 25-50% soil moisture 0-11", 50-75% 11-40", 25-50% 40-72".

Site # 2

* N 34.63252 W 120.28295
* Fine subangular blocky structure 0-70".
* 50-75% soil moisture 0-28", 25-50% 28-70".

Site # 3

* N 34.63373 W 120.28061
* Fine subangular blocky structure 0-34", medium angular blocky 34-48", massive 48-68".
* Rounded clay 1/4-3" dia. 34-68".
* 25-50% soil moisture 0-34", 50-75% 34-68".

Site # 4

* N 34.63263 W 120.27923
* Fine subangular blocky structure 0-32", massive 32-67".
* Round sandy loam 1/8-3/4" dia. 0-26", 1/8-3" dia. 26-32", gravels 1/8-1" dia. 46-67".
* 50-75% soil moisture 0-26", 25-50% 26-32", 50-75% 32-46", dry soil 46-67".

NOTE: (##%) = Estimated percent non-soil (pebbles, gravel, cobble or rock).

LEGEND:

		Favorable	Acceptable	Poor	Very Poor	Mostly Rock
*SS-	Soil Structure	Favorable	Acceptable	Poor	Massive/V.Poor	NA
*SC-	Soil Consolidation	None	Weak	Moderate	Strong	NA
*RD-	Rooting Density	Strong	Moderate	Weak	None	NA
*RM-	Rust Mottles	None	Few (0-5%)	Common (6-20%)	Many (>20%)	NA
*CE-	Soil Cementation	None	Weak	Moderate	Strong	NA

SOIL PROFILE LOG

TIERRAMAR VINEYARD MGT

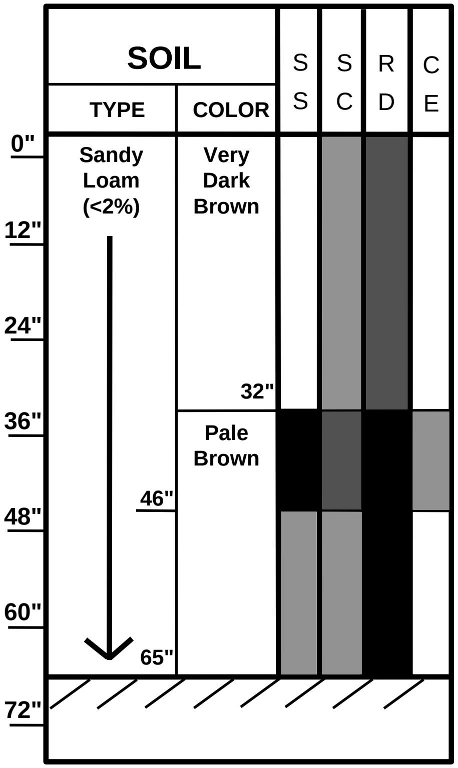
PANKAUSKI/DRUM CANYON

Data By: JDM	Project No: 16-022
Drawn By: SEG	Date: 2-25-16

Soil Sample By: [X] Backhoe Pit [ ] Hand Auger

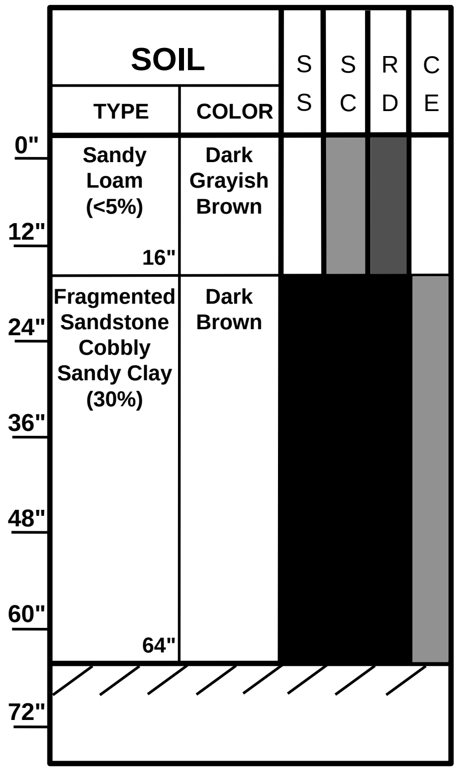
CROP CARE ASSOCIATES, INC.
851 Napa Valley Corporate Way, Suite E
Napa, Ca. 94558 Phone: (707)258-2998

Site # 5



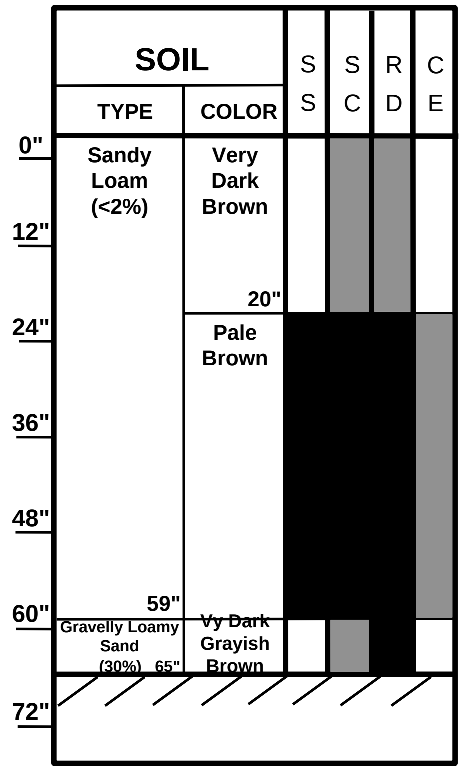
* N 34.63172 W 120.28119
* Fine subangular blocky structure 0-32", massive 32-46", fine subangular blocky 46-65".
* 25-50% soil moisture 0-65".

Site # 6



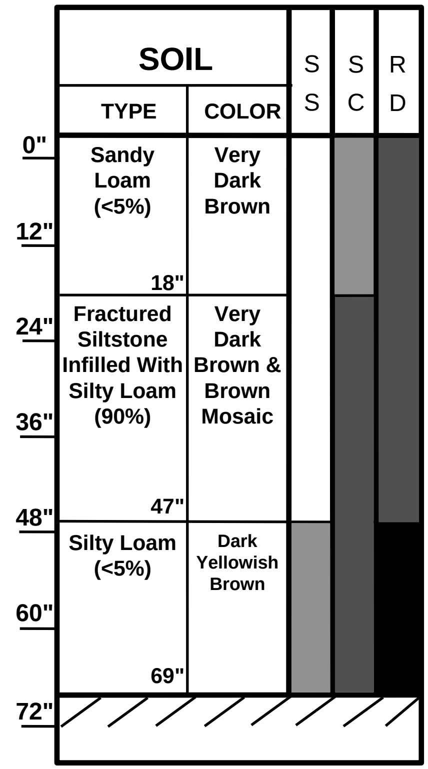
* N 34.63103 W 120.28112
* Medium subangular blocky structure 0-16", massive 16-64".
* Cobbles 1/8-6" dia. 16-64".
* Dry soil 0-64".

Site # 7



* N 34.63176 W 120.27917
* Fine subangular blocky structure 0-20", massive 20-59", granular 59-65".
* Rounded gravels 1/8-2" dia. 59-65".
* 25-50% soil moisture 0-65".

Site # 8



* N 34.63056 W 120.27966
* Medium subangular blocky structure 0-18", skeletal fine subangular blocky 18-47", fine subangular blocky 47-69".
* Dry soil 0-69".

NOTE: (##%) = Estimated percent non-soil (pebbles, gravel, cobble or rock).

LEGEND:

		Favorable	Acceptable	Poor	Very Poor	Mostly Rock
*SS-	Soil Structure	Favorable	Acceptable	Poor	Massive/V.Poor	NA
*SC-	Soil Consolidation	None	Weak	Moderate	Strong	NA
*RD-	Rooting Density	Strong	Moderate	Weak	None	NA
*CE-	Soil Cementation	None	Weak	Moderate	Strong	NA

SOIL PROFILE LOG

TIERRAMAR VINEYARD MGT

PANHAVSKI

Data By: JDM	Project No: 16-022
Drawn By: SEG	Date: 2-25-16

Soil Sample By: ☒ Backhoe Pit ☐ Hand Auger

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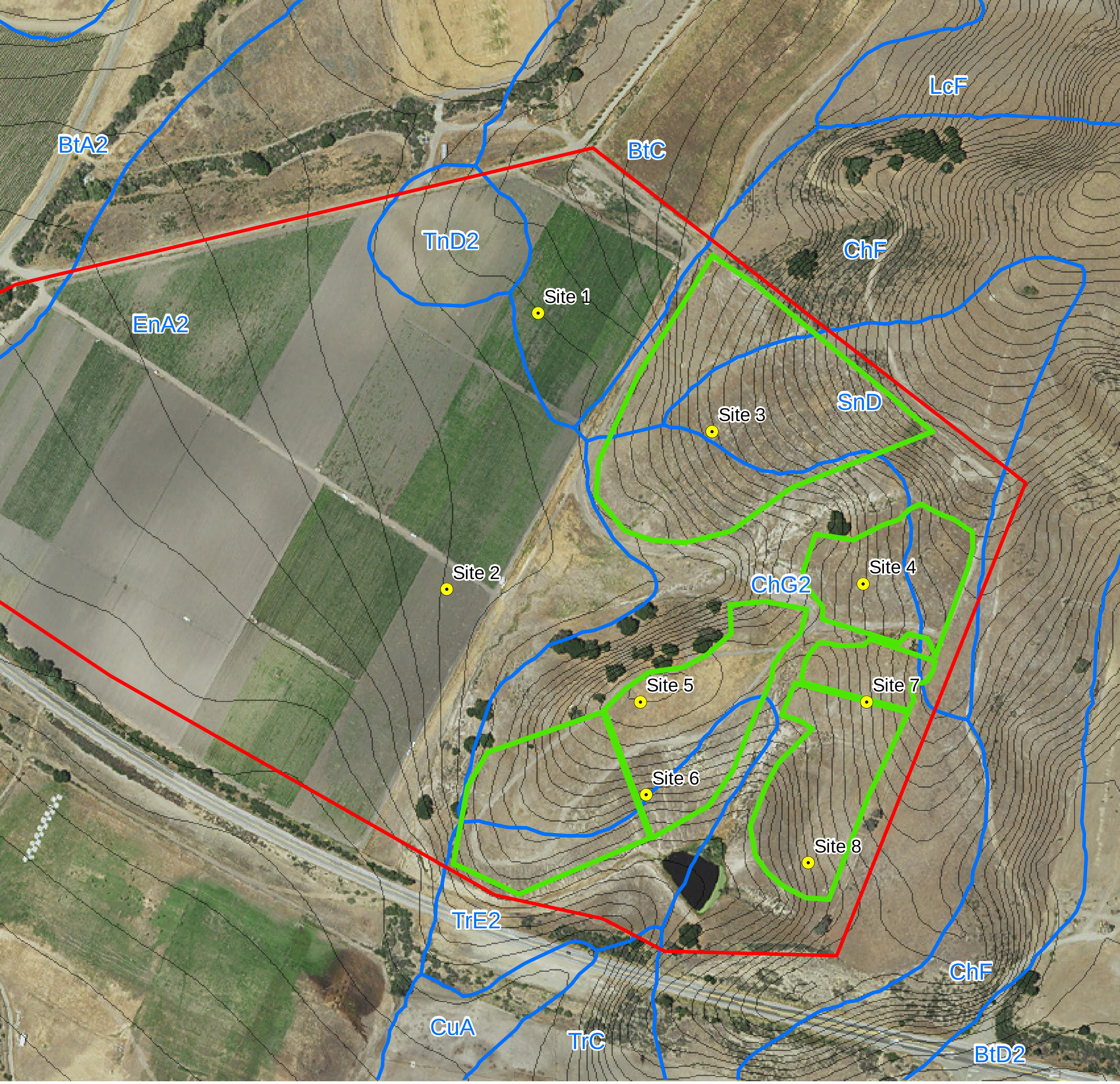


Tierramar Vineyard Management
Pankauski Property
Drum Canyon Road, Buellton
Project #16-022

Santa Barbara County Soil Series 672

- BtA2 Botella clay loam, 0-2% slopes, eroded
- BtC Botella clay loam, 2-9% slopes
- ChF Chamise shaly loam, 15-45% slopes
- ChG2 Chamise shaly loam, 30-75% slopes, eroded
- EnA2 Elder shaly loam, 0-2% slopes, eroded
- SnD Santa Ynez gravelly fine sandy loam, 9-15% slopes
- TnD2 Tierra sandy loam, 9-15% slopes, eroded
- TrC Tierra loam, 2-9% slopes
- TrE2 Tierra loam, 15-30% slopes, eroded
- TsF Tierra clay loam, 15-45% slopes

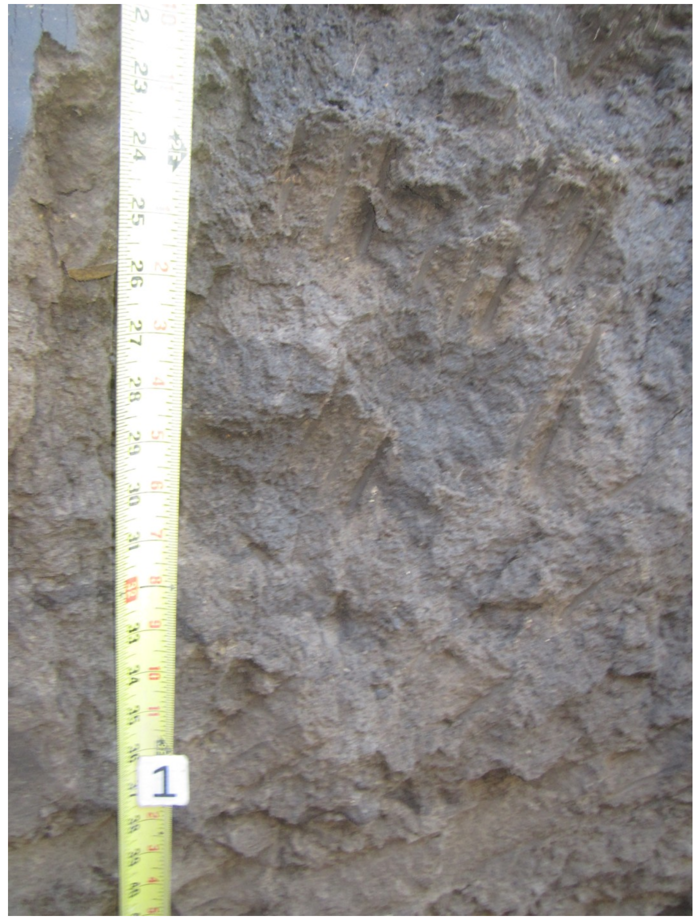
- Site
- Property Boundary (approximate)
- Proposed Blocks
- 5 ft Elevation Contour

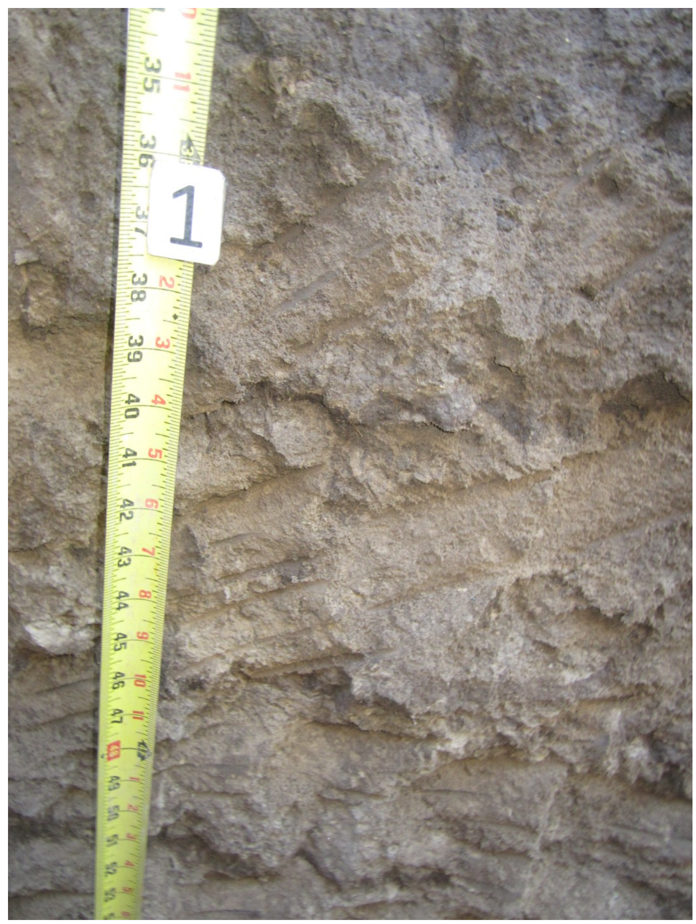
N
W
E
S

350 175 0 350
Feet

NAIP Orthophoto: 2014
Prepared by Crop Care Associates, Inc.
6795 Washington St., Yountville, CA 94599
phone: (707) 944-2998 fax: (707) 944-2163

Pankauski Vineyard
N
24 Acres
1 Acre
1 Acre
9 Acres
House 2
Winery
Shop
House 2
3 Acres
2 Acres
4 Acres
4 Acres
3 Acres
Tasting Room
51 Plantable Acres
Reisling
Carignan
Gruner
Gamay
Chardonnay
Grenache
Pinot_Noir
Syrah
Mourvedre
Structure
0 50 100 200 300
Yards





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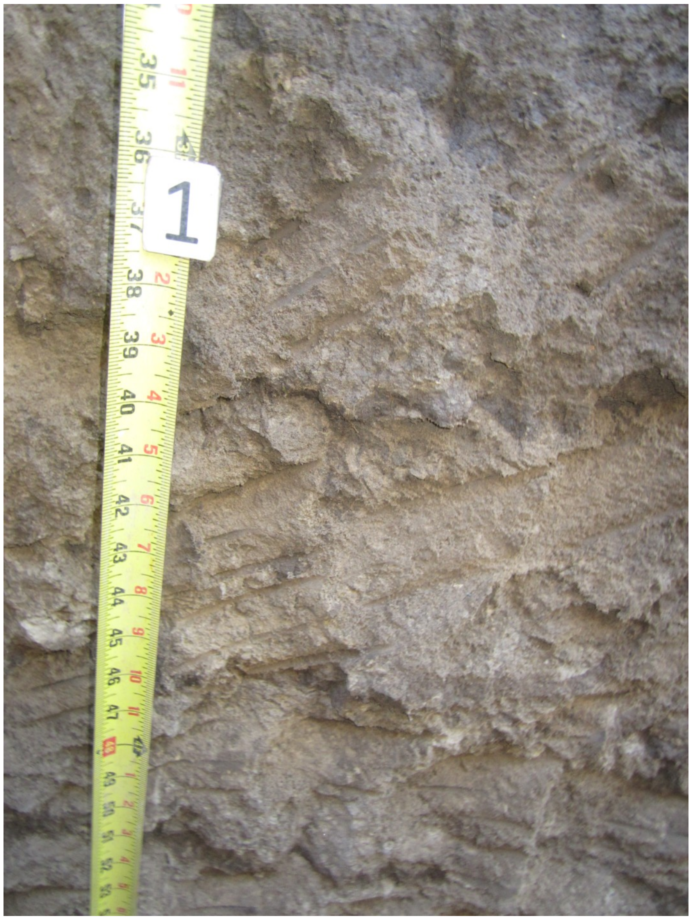

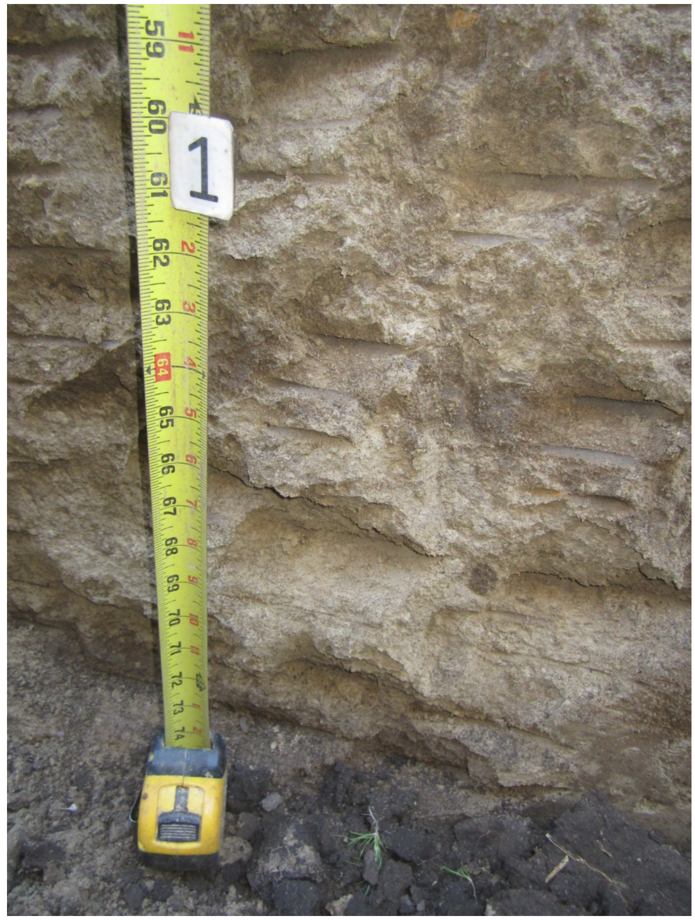

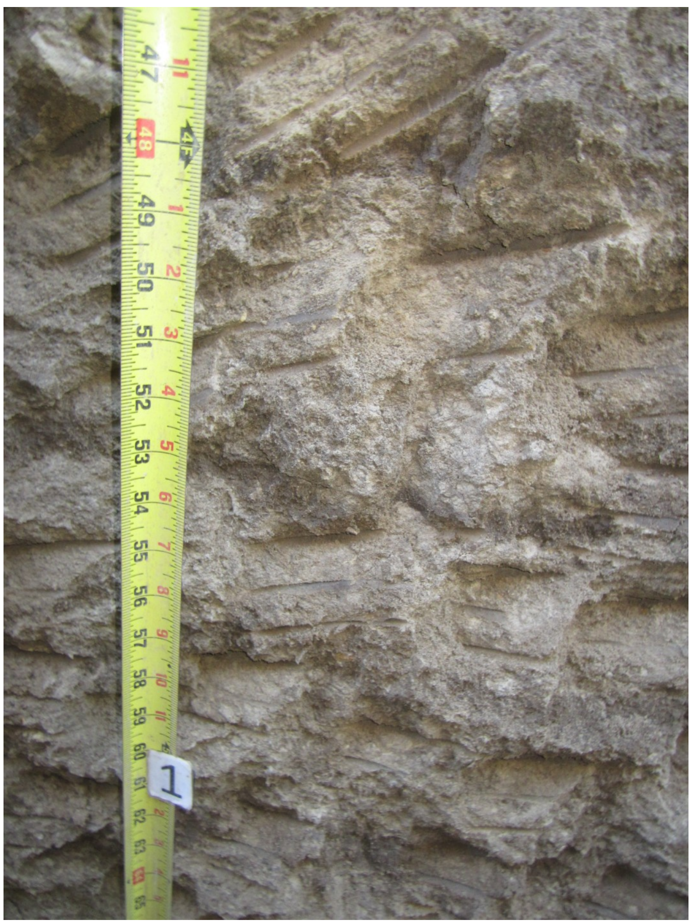

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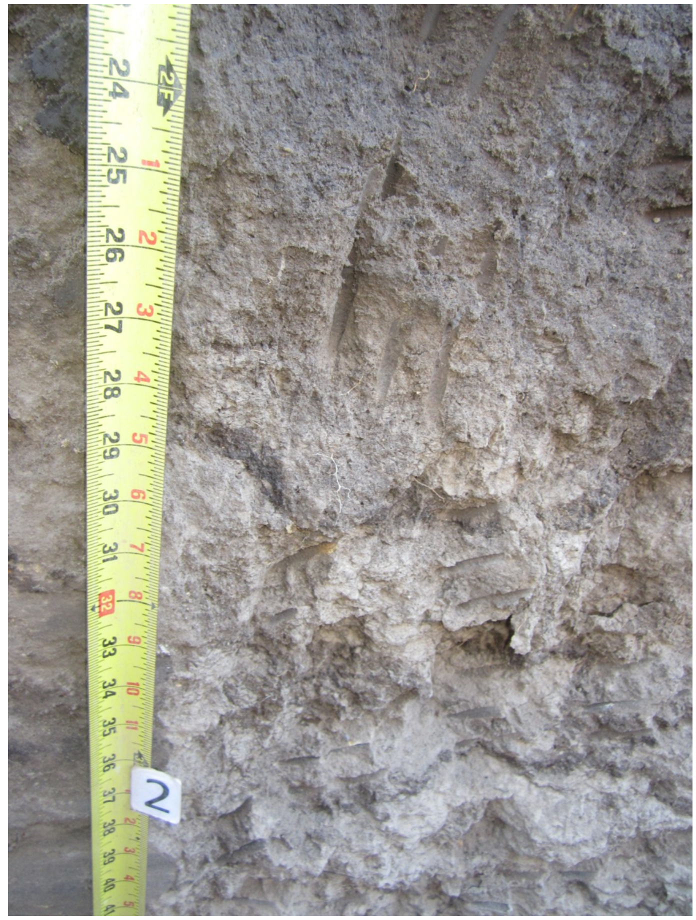

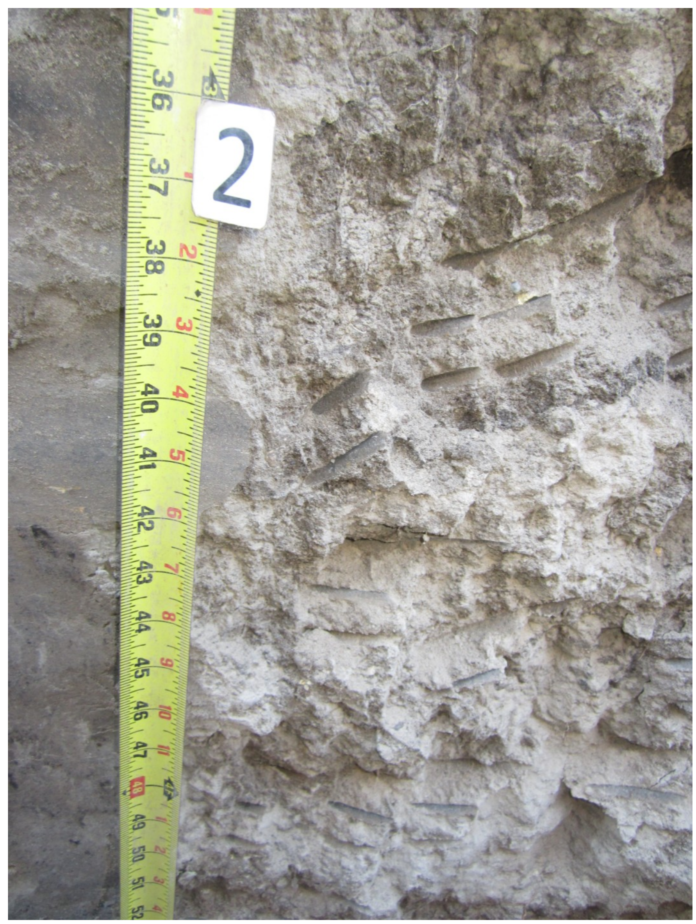

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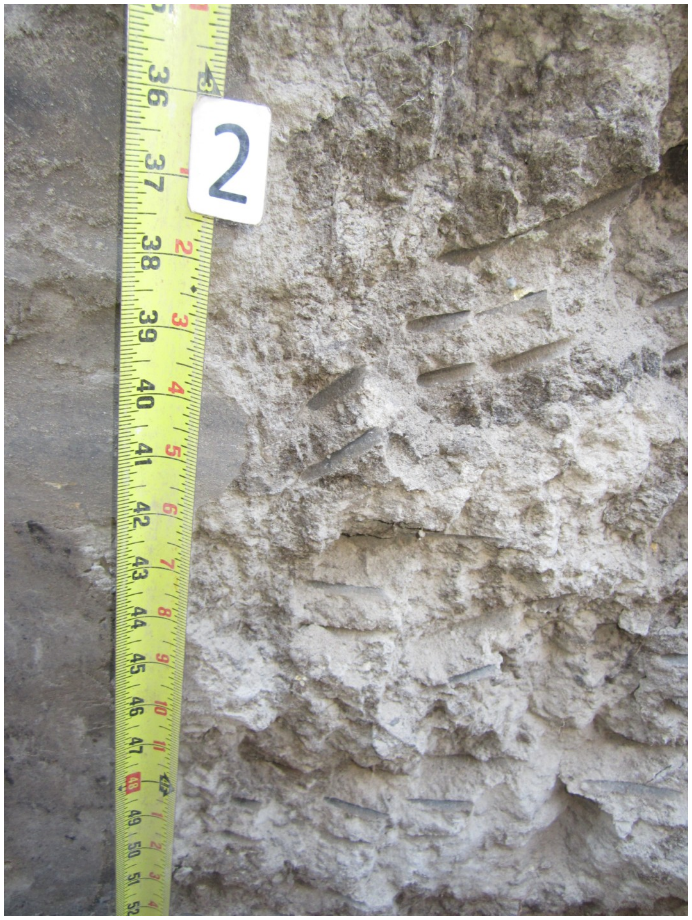

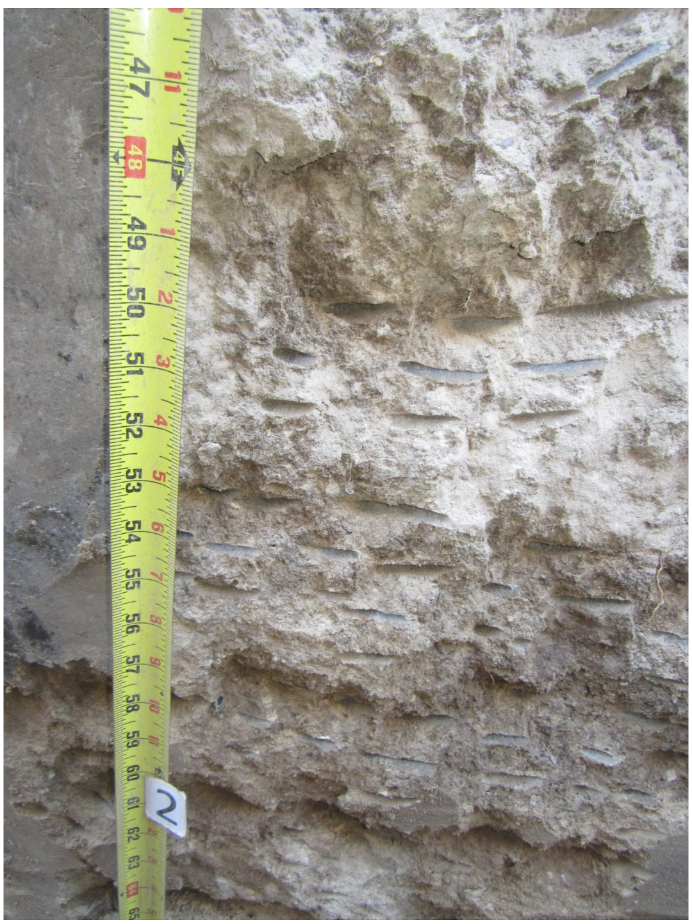

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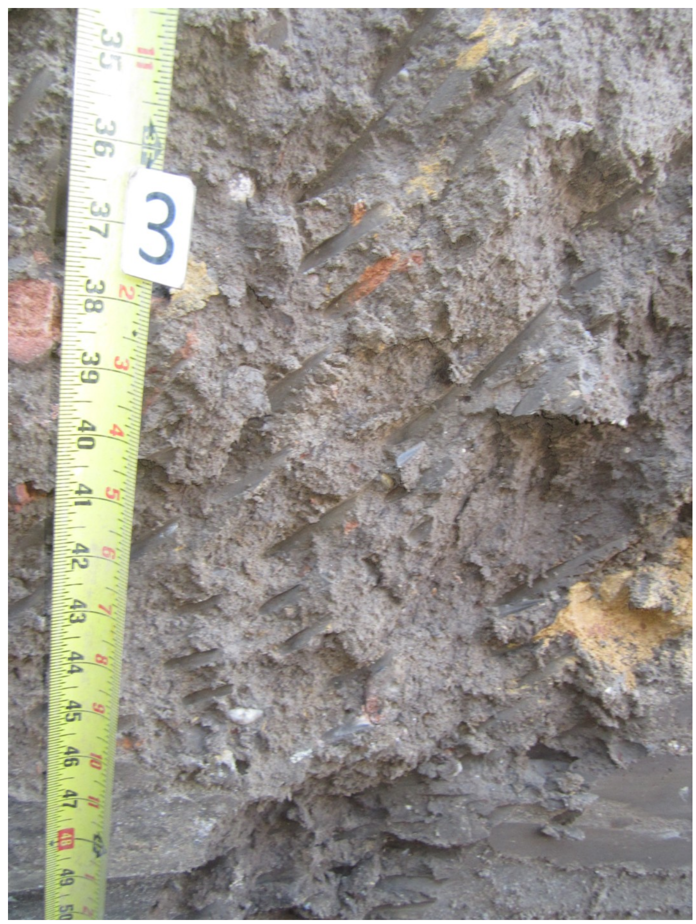

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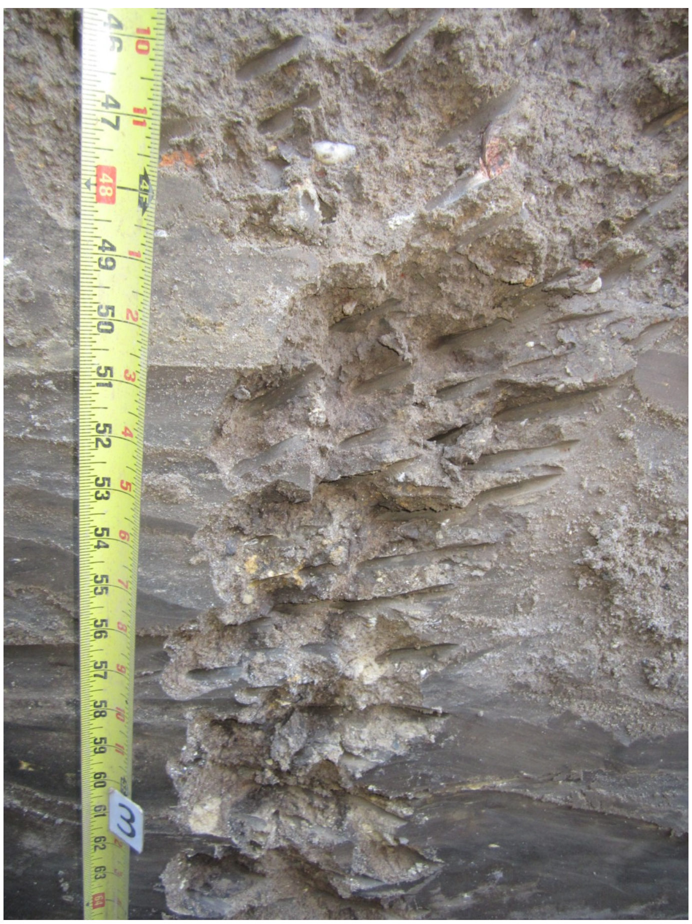

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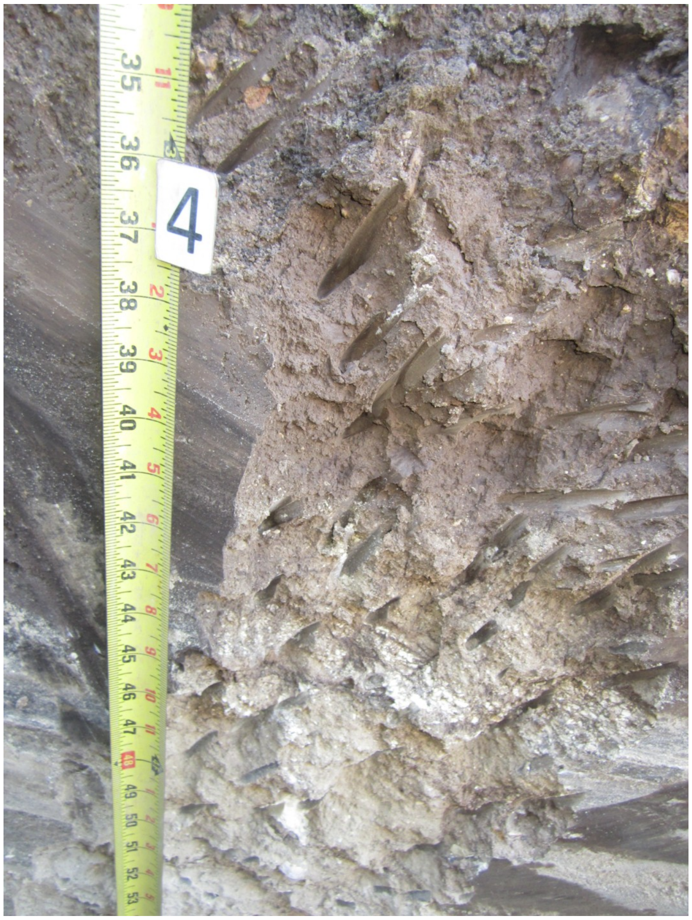

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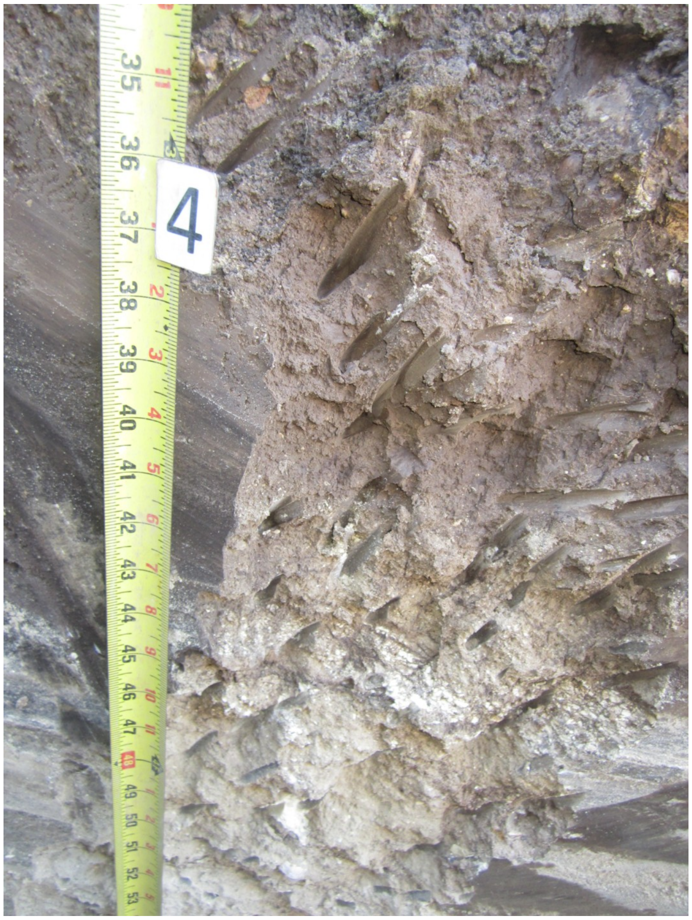

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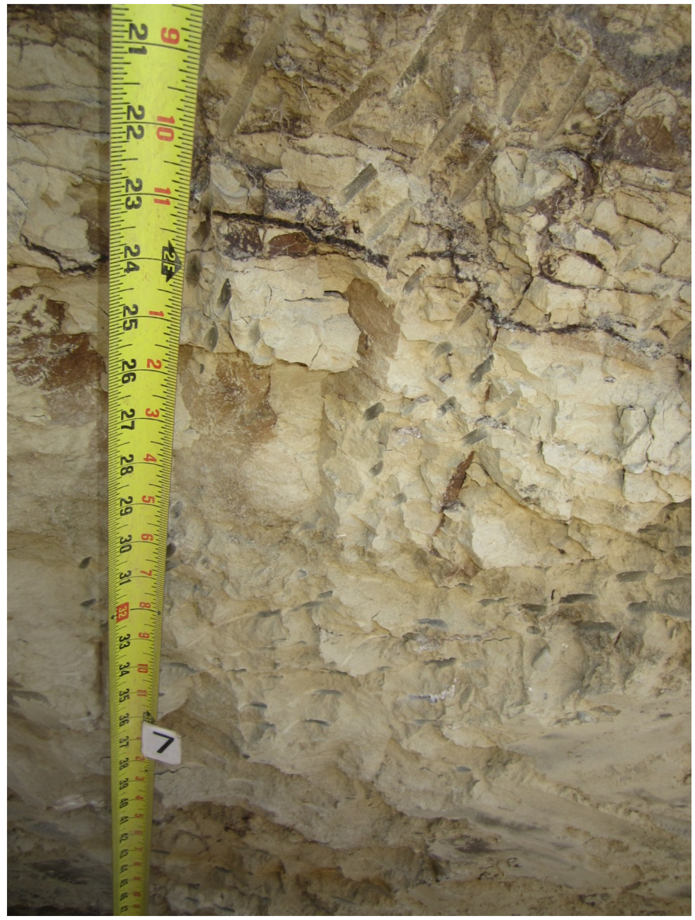

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