

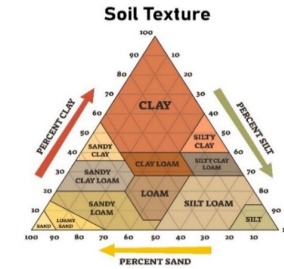
TABLE 1: Soil Report

Client	Civitas		
Operator	Bonanza Creek	Date	17-May-23
Location ID - Name	CPW South Side	Ward	20230512
Type	Well, Tank Battery, Roads, Reference		

SOIL SAGE

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Soil Profile				Physical Properties			Texture Hydro	Location Ref
Location	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Partical Size				
				Sand %	Silt %	Clay %		
Soil - 14.1	0	6	6	44	26	30	Clay Loam	331380-Well
Soil - 14.2	6	12	6	46	27	27	Sandy Clay Loam	
Soil - 14.3	12	18	6	62	21	17	Sandy Loam	
Soil - 14.4	18	24	6	72	17	11	Sandy Loam	
Site Average				56	23	21		



Location	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Sand %	Silt %	Clay %	Texture Hydro	Location Ref
Soil - 2 REF	0	10	10	63	16	21	Sandy Clay Loam	MU3
Soil - 4 REF	0	8	8	45	28	27	Loam	MU3
Soil - 6.1 REF	0	6	6	35	24	41	Clay	MU3
Soil - 6.2 REF	6	12	6	47	24	29	Sandy Clay Loam	MU3
Soil - 6.3 REF	12	18	6	60	21	19	Sandy Loam	MU3
Soil - 6.4 REF	18	24	6	86	9	5	Loamy Sand	MU3
Soil - 11.1 REF	0	6	6	53	28	19	Sandy Loam	MU3
Soil - 11.2 REF	6	12	6	51	26	23	Sandy Clay Loam	MU3
Soil - 11.3 REF	12	18	6	50	26	24	Sandy Clay Loam	MU3
Soil - 11.4 REF	18	24	6	80	9	11	Sandy Loam	MU3
Soil - 16.1 REF	0	6	6	66	14	20	Sandy Loam	MU3
Soil - 16.2 REF	6	12	6	76	13	11	Sandy Loam	MU3
Soil - 16.3 REF	12	18	6	79	10	11	Sandy Loam	MU3
Soil - 16.4 REF	18	24	6	76	8	16	Sandy Loam	MU3
Site Ref Average				62	18	20		

Soil Profile				Chemical Properties				Organic Matter (LOI) %	SAR
Location	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	pH Sat Paste	ECe mmhos/cm	CEC meq/100g	Excess Lime		
Soil - 14.1	0	6	6	7.6	3.39	26.9	LOW	2.3	3.7
Soil - 14.2	6	12	6	7.6	2.74	26.8	LOW	2	3.4
Soil - 14.3	12	18	6	7.8	1.97	18.5	LOW	1	3
Soil - 14.4	18	24	6	7.8	1.39	15.7	LOW	0.8	2.6
Site Average				7.7	2.4	22.0		1.5	3.2

	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	pH Sat Paste	ECe mmhos/cm	CEC meq/100g	Excess Lime	Organic Matter (LOI) %	SAR
Soil - 2 REF	0	10	10	8.2	3.4	20.9	NONE	2.2	14.2
Soil - 4 REF	0	8	8	7.2	7.74	21.5	NONE	5.9	10.7
Soil - 6.1 REF	0	6	6	8	1.74	28.2	LOW	4.7	4.6
Soil - 6.2 REF	6	12	6	8.4	2.23	31.2	HIGH	2.7	12.6
Soil - 6.3 REF	12	18	6	8.4	5.47	30	HIGH	1.1	15.7
Soil - 6.4 REF	18	24	6	8.1	1.25	10.4	LOW	0.6	4
Soil - 11.1 REF	0	6	6	5.8	2.93	9.7	NONE	3.6	16
Soil - 11.2 REF	6	12	6	8	11.26	34	HIGH	1.9	32.9
Soil - 11.3 REF	12	18	6	8.6	14.86	37.9	HIGH	1.2	50.1
Soil - 11.4 REF	18	24	6	8.5	9.64	25.6	HIGH	0.5	29
Soil - 16.1 REF	0	6	6	6.6	0.75	10.6	NONE	2.6	0.3
Soil - 16.2 REF	6	12	6	7.1	0.42	7	NONE	1	0.5
Soil - 16.3 REF	12	18	6	7.7	0.37	9	NONE	0.9	0.5
Soil - 16.4 REF	18	24	6	7.9	0.74	21.6	LOW	1	1.2

Site Ref Average **7.8** **4.49** **21.3** **2.1** **13.7**

Location	Soil Profile			Extraction Method			Nitrate - N	Nitrate-N	Phosphorus	Potassium	
				KCL	M3	NH4OAc					
	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Nitrate-N	Phosphorus P	Potassium K					
				ppm	ppm	ppm	Lbs/A	ppm	ppm	ppm	
Soil - 14.1	0	6	6	77.2	62	299	139	0-12	70.15	55	271
Soil - 14.2	6	12	6	63.1	48	243	114	12-24	22.25	21.5	93.5
Soil - 14.3	12	18	6	20.4	23	100	37				
Soil - 14.4	18	24	6	24.1	20	87	43				
Site Average				#REF!	#REF!	#REF!	#REF!				

	Top Depth (in)	Bottom Depth	Soil Thickness	Potassium				Nitrate - N	Nitrate-N	Phosphorus	Potassium
		(in)	(in)	Nitrate-N	Phosphorus P	K	P			K	
				ppm	ppm	ppm	Lbs/A	ppm	ppm	ppm	
Soil - 2 REF	0	10	10	1.3	66	703	4				
Soil - 4 REF	0	8	8	3.1	95	694	7				
Soil - 6.1 REF	0	6	6	43.4	59	399	78	0-12	30	40	294.5
Soil - 6.2 REF	6	12	6	16.6	21	190	30	12-24	2.3	9	49
Soil - 6.3 REF	12	18	6	1.8	5	58	3				
Soil - 6.4 REF	18	24	6	2.8	13	40	5				
Soil - 11.1 REF	0	6	6	48.9	92	378	88	0-12	31.45	57.5	349
Soil - 11.2 REF	6	12	6	14	23	320	25	12-24	2.7	7.5	162.5
Soil - 11.3 REF	12	18	6	4.2	9	221	8				
Soil - 11.4 REF	18	24	6	1.2	6	104	2				
Soil - 16.1 REF	0	6	6	21.5	83	244	39	0-12	14.85	59	193.5
Soil - 16.2 REF	6	12	6	8.2	35	143	15	12-24	7.15	20	110
Soil - 16.3 REF	12	18	6	5.9	30	151	11				
Soil - 16.4 REF	18	24	6	8.4	10	69	15				

Site Ref Average

133926524

				Plant Available									
Soil Profile				NH4OAc	NH4OAc	NH4OAc	Hot Water	Ca-NO3	M3	AB-DTPA			
	Bottom Depth	Soil Thickness		Calcium	Magnesium	Sodium			Sulfate	Copper	Iron	Manganese	Zinc
Location	Top Depth (in)	(in)	(in)	Ca	Mg	Na	Boron B	Chloride Cl	S	Cu	Fe	Mn	Zn
				ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Soil - 14.1	0	6	6	4059	512	358	1.58	123.6	86.1	6.14	12.7	2.7	6.11
Soil - 14.2	6	12	6	4187	490	273	1.47	101.1	95.6	5.99	20.5	3.3	5.33
Soil - 14.3	12	18	6	2893	366	179	0.82	93.6	59.4	2.47	14.4	4.7	2.36
Soil - 14.4	18	24	6	2475	291	144	0.74	70.2	50.5	2.25	12.1	4.3	2.13
Site Average				3404	415	239	1	97.1	72.9	4.21	14.9	3.8	3.98

Reference	Top Depth (in)	Bottom Depth (in)	Soil Thickness (in)	Calcium	Magnesium	Sodium	Boron B	Chloride Cl	Sulfate S	Copper Cu	Iron Fe	Manganese Mn	Zinc Zn
				Ca	Mg	Na							
				ppm	ppm	ppm							
Soil - 2 REF	0	10	10	1756	726	979	6.08	145.6	150.6	0.99	7.7	5	0.81
Soil - 4 REF	0	8	8	1958	648	1046	4.09	527.1	500.2	0.9	10.6	4.8	2.29
Soil - 6.1 REF	0	6	6	3062	1091	642	6.14	52.9	62.3	7.33	8.6	4	3.59
Soil - 6.2 REF	6	12	6	3751	990	845	7.03	73.2	110.7	2.36	8.9	3.9	1.29
Soil - 6.3 REF	12	18	6	3671	848	1017	4.19	163.6	445.9	0.94	9.6	3.4	0.33
Soil - 6.4 REF	18	24	6	1530	245	133	0.96	36.9	85.8	0.53	7.2	2	0.57
Soil - 11.1 REF	0	6	6	855	216	611	1.41	97.6	55.8	0.92	68.1	14.9	2.29
Soil - 11.2 REF	6	12	6	3887	438	2328	3.47	181.1	999.9	0.52	9.2	3.4	0.5
Soil - 11.3 REF	12	18	6	3796	581	3107	3.58	230.1	1357	0.58	5.2	2	0.17
Soil - 11.4 REF	18	24	6	2803	472	1695	1.62	110.6	642.2	0.31	5.7	1.4	0.14
Soil - 16.1 REF	0	6	6	1519	280	18	0.85	26.5	14.3	4.46	32.8	4.2	6.61
Soil - 16.2 REF	6	12	6	1008	177	19	0.57	3.7	6.5	3.88	10.6	4.6	2.16
Soil - 16.3 REF	12	18	6	1426	162	23	0.55	2.1	10.1	1.72	6.7	2.9	0.89
Soil - 16.4 REF	18	24	6	3748	284	72	0.68	21.9	33.3	0.69	5.5	2.6	0.45
Site Ref Average				2484	511	895	2.94	119.5	319.6	1.87	14.0	4.2	1.58

SOIL REPORT

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Terms Defined

pH	A measure of the acidity or basicity (alkalinity) of a soil. pH is defined as the negative logarithm (base 10) of the activity of hydronium ion in a solution
ECe	The Electrical Conductivity of a saturated soil Extract that measures salinity
Alkalinity	Alkalinity indicates a solution's power to react with acid and buffer its pH - the power to keep its pH from changing. The higher the Alkalinity, the higher the buffering capacity against pH change.
CEC - Cation Exchange Capacity	The measure of how many cations can be retained on soil particle surfaces.
CEC Ranges	
Range 11-50	High Clay, more lime to correct a given pH, greater capacity to hold nutrients, physical effects of high clay content, high water-holding capacity
Range 1-10	High Sand, Nitrogen and potassium leaching, less lime to correct a given pH, physical effects of high sand content, low water-holding capacity

Optimal pH range for plant growth

6.0 -7.0

Typical Soil Concentrations sufficient for plant growth

Reference Key

Low

Medium

High

Optimal

Neutral

No Reference

Analytical Error

Typical Soil Concentrations sufficient for plant growth

Element	Symbol	mg/kg	percent	Relative number
		ppm		of atoms
Nitrogen	N	15,000	1.5	1,000,000
Potassium	K	10,000	1	250,000
Calcium	Ca	5,000	0.5	125,000
Magnesium	Mg	2,000	0.2	80,000
Phosphorus	P	2,000	0.2	60,000
Sulfur	S	1,000	0.1	30,000
Chlorine	Cl	100	--	3,000
Iron	Fe	100	--	2,000
Boron	B	20	--	2,000
Manganese	Mn	50	--	1,000
Zinc	Zn	20	--	300
Copper	Cu	6	--	100
Molybdenum	Mo	0.1	--	1
Nickel	Ni	0.1	--	1

Notes

- Root Formation
- Chlorophyll Formation
- Proteins & NPK Uptake
- Chlorophyll catalyst
- Absorption Calcium
- Photosynthesis & Respiration - correlated with %OM
- Fixation of Organic Nitrogen

Source: E.Epstein, 1965