

Engineering Interpretations

Engineering Index Properties

This table gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey areas. Most soils have layers of contrasting properties within the upper 5 to 6 feet. Information in this table includes depth, USDA texture, Unified and AASHTO Classification, rock fragments larger than 3 inches, percentage passing designated sieves, liquid limit, and plasticity index.

Properties

DEPTH to the upper and lower boundaries of each layer is indicated.

TEXTURE is given in the standard terms used by the USDA. The terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. (Textural terms are defined in Chapter 4, Soil Survey Manual or in the glossary of most soil survey reports) If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

UNIFIED CLASSIFICATION SYSTEM classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content.

AASHTO CLASSIFICATION is the system adopted by the American Association of State Highway and Transportation Officials. It classifies soils according to those properties that affect roadway construction.

ROCK FRAGMENTS, 3 to 10 inches and greater than 10 inches in diameter, are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

PERCENTAGE (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven dry weight. The sieves, numbers 4, 10, 40, and 200, have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

LIQUID LIMIT AND PLASTICITY INDEX (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area, or from nearby areas, and on field examination.

This subsection includes:

- (a) **Engineering Index Properties**

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth In	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid	Plas-	
				Unified	AASHTO	>10	3-10	4	10	40	200	limit	ticity	
						inches	inches							index
40007:														
Eldorado-----	A1	0-8	GR-L	CL, ML, SC, SM	A-2, A-4	0-5	0-10	55-80	50-75	45-70	30-50	20-30	2-10	
	A2	8-13	GRV-SIL, CB-L	GC	A-2, A-4	0-5	0-30	40-75	35-70	30-70	25-65	20-30	2-10	
	Bt1	13-33	CBV-CL, GRX- SICL	GC	A-2, A-2-6	0-5	5-40	25-65	20-60	20-60	15-55	30-40	10-20	
	2Bt2	33-60	CB-C, GRX-SICL, CBV-C	GC	A-2, A-6, A-7	0-15	0-35	35-65	30-60	25-60	20-55	40-60	15-30	
40008:														
Parsons-----	A	0-8	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	7-15	
	E	8-16	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	7-15	
	Btg1	16-31	C, SICL, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	80-95	40-70	20-40	
	Btg2	31-60	C, SICL, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	80-95	40-70	15-40	
44000:														
Cherokee-----	Ap	0-7	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15	
	Eg	7-13	SIL	CL	A-6, A-4	0	0	100	100	90-100	70-100	20-35	5-15	
	Btg	13-32	C, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-70	15-40	
	2Btg2	32-52	SICL, C, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	85-95	35-70	15-40	
	2BCg	52-70	SICL, C, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	85-95	35-70	15-40	
46001:														
Verdigris-----	A	0-20	SIL	CL	A-4, A-6	0	0	100	100	90-100	70-90	25-40	9-15	
	Bw	20-60	SIL, SICL	CL	A-4, A-6, A-7	0	0	100	100	90-100	70-95	30-45	9-20	
46002:														
Hepler-----	Ap	0-9	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15	
	E	9-16	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15	
	Btg	16-60	SIL, SICL	CL	A-6, A-7	0	0	100	100	90-100	70-95	35-45	15-20	
66001:														
Dameron-----	Ap	0-9	SIL	CL	A-6	0	0-1	95-100	90-100	85-100	70-95	25-40	10-20	
	A	9-15	SIL, SICL	CL	A-6	0	0-1	95-100	90-100	85-100	70-95	30-40	15-25	
	Bw1	15-24	GRV-SICL, GR- SICL, GRV-CL	CL, GC, SC	A-2-6, A-6	0	0-15	35-75	25-70	25-70	20-65	30-40	10-25	
	Bw2	24-72	SICL	CL	A-6	0	0-1	85-100	75-100	70-100	45-95	25-40	10-20	
	Bw3	72-80	GRX-CL	GC	A-2-6	0	0	25-30	20-25	20-25	15-20	30-40	10-20	
70000:														
Bona-----	Ap	0-6	GR-SIL	CL, GC, GC- GM, SC	A-4	0	0-5	55-80	50-75	45-75	35-70	20-30	5-10	
	A	6-18	GR-SIL, GRV-SIL	GC, GC-GM	A-1-b, A-2, A-4	0	0-10	30-65	25-60	20-55	15-50	25-30	5-10	
	Bt1	18-24	GRX-SIL, GRX- SICL	GC	A-2-6, A-2-7	0	0-15	20-40	15-35	10-30	5-20	25-45	10-20	
	2Bt2	24-30	GRV-C, GRV-SIC	GM	A-2-7, A-7	0	0-5	35-55	30-50	25-45	20-40	55-70	20-30	
	3Bt3	30-72	C, SIC	MH	A-7	0	0-5	80-100	75-100	70-95	65-90	55-70	20-30	
	3R	72-80	UWB			---	---	---	---	---	---	---	---	
70006:														
Credon-----	Ap	0-8	SIL	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	85-100	70-90	20-40	2-15	
	Bt	8-27	SICL, SIC, C	CL	A-7	0	0	90-100	85-100	80-100	75-85	35-50	15-25	
	2Btx	27-37	GR-SICL, GRV- SIL	GC	A-2, A-6, A-7	0	0-5	35-65	30-60	30-60	20-50	30-45	10-25	
	3Bt	37-60	GRV-C, CBX-C, GR-C, C	CH, GC, SC	A-2, A-7	0	0-55	45-95	40-90	35-90	30-80	55-80	30-60	

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth In	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10 inches	3-10 inches	sieve number--				limit	ticity
								4	10	40	200		
70043:													
Rock outcrop----	R	0-60	UWB										
70044:													
Sonsac-----	A	0-4	GR-SIL	CL, CL-ML	A-4, A-6	0-5	0-15	55-80	50-75	50-70	40-60	20-35	5-15
	BE	4-13	GRV-SIL, GRX-SIL, CBV-SIL	GC	A-2-4, A-2-6, A-4, A-6	0-15	0-50	30-55	25-50	20-50	15-40	15-40	5-20
	Bt	13-22	GRX-SIL, GRV-SICL, GRV-SIL, CBV-SICL, CBX-SICL	GC, GM	A-7, A-2-7, A-2-6	0-8	0-55	40-75	35-70	30-65	25-60	30-70	10-35
	2Bt	22-37	GR-C, CBV-C, GRV-SIC	GC, MH, GM	A-7, A-2-7	0-8	0-55	30-80	25-75	25-70	20-65	150-70	20-45
	2R	37-80	UWB										
Moko-----	A1	0-6	GR-SIL	GC	A-6	0-5	0-15	55-80	50-75	45-70	35-65	25-45	10-20
	A2	6-14	CNV-SICL, CNV-CL, FLV-SIL, CNV-SIL, GRV-SICL	CL, GC, SC	A-6, A-7	0-10	0-70	50-90	45-85	45-80	40-80	25-45	10-25
	R	14-80	UWB										
70045:													
Keeno-----	A	0-6	GR-SIL	CL, CL-ML, GC	A-2-4, A-4	0	0-15	55-90	50-85	30-80	30-65	15-30	5-10
	Bt	6-19	GRX-SICL, GRV-SICL	GC	A-2-6, A-6	0	0-35	25-55	20-50	20-45	20-45	30-40	10-20
	Btx	19-29	GRX-SICL, GRX-SIL, GR-SIL	CL, GC, SC	A-2-6, A-6	0	10-60	30-70	25-65	20-65	20-55	30-40	10-20
	2Bt	29-60	GRX-SIC, GRV-SIC, GRX-C, GRV-C	CH, CL, GC, SC	A-2-7, A-7	0	0-40	30-75	25-70	25-55	20-55	40-65	20-45
70047:													
Wanda-----	Ap	0-15	SIL	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	80-95	65-90	25-35	5-15
	Bt1	15-26	SICL, GR-SICL	CL	A-4, A-6, A-7	0	0	75-100	70-95	65-95	55-90	30-45	9-25
	Bt2	26-44	GR-SICL, SICL	CL, GC	A-6, A-7	0	0-5	55-90	50-85	50-80	45-70	35-45	10-25
	2Bt3	44-60	GR-SIC, GRV-SIC, GR-SICL	CL, CH, GC, SC	A-2-7, A-7, A-6	0-2	0-5	35-80	30-75	30-70	25-65	35-60	10-30
70048:													
Alsup-----	A	0-5	SIL	CL-ML, CL	A-4, A-6	0-5	0-5	80-100	75-100	70-100	60-90	25-40	5-20
	E	5-14	GR-SIL, L	CL	A-4, A-6	0-5	0-10	75-100	70-100	65-100	45-90	25-40	8-20
	BE	14-24	GRV-SIL, GR-SIL	CL	A-2-6, A-7	0	0-15	30-85	25-80	25-75	20-70	30-50	10-30
	2Bt	24-50	SIC, C, SICL	CH, CL	A-7	0	0-5	80-100	75-100	75-100	65-95	40-60	25-40
	2Cr	50-60	WB										
73000:													
Pomme-----	Ap	0-7	SIL	CL, CL-ML	A-4, A-6	0	0-5	80-100	75-95	65-95	50-90	25-35	5-15
	Bt1	7-19	SICL, GR-SIL, GR-SICL, CL	CL	A-4, A-6, A-7-6	0	0-10	70-95	65-90	50-85	50-75	35-45	8-20
	2Bt2	19-57	GRV-SICL, CBV-SICL	GC	A-2, A-6, A-7-6	0	0-30	35-55	30-50	25-45	20-40	40-50	15-25
	3Bt3	57-86	GRX-C, CBV-C	GC	A-2-7, A-7-6	0	0-45	15-45	15-45	15-45	15-40	50-70	25-40
73008:													
Viraton-----	Ap	0-6	SIL	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	70-95	65-85	20-30	5-11
	Bt	6-21	SIL, GR-SICL, SICL	CL	A-4, A-6	0	0-5	60-100	55-100	50-95	50-90	25-35	8-15
	2Btx	21-30	GRV-SIL, GRV-SICL, GR-SIL	CL, GC	A-2, A-4, A-6	0	0-15	35-65	30-60	25-60	25-50	25-35	8-15
	3Bt	30-60	GRV-C, GRX-C, GRX-SIC, GRX-	GC, CH	A-2-6, A-6, A-7	0	0-30	25-80	20-75	15-70	15-65	35-65	15-35

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth In	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid	Plas-	
				Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200	limit	ticity	
						Pct	Pct					Pct	index	
73010:														
Wilderness-----	Ap	0-6	GR-SIL	CL-ML, CL, GC	A-2-4, A-4	0	0-10	55-85	50-75	45-70	30-65	20-30	5-10	
	E	6-11	GR-SIL	CL-ML, GC, CL	A-2-4, A-4	0	0-10	55-85	50-75	45-70	30-65	20-30	5-10	
	Bt	11-25	GRV-SICL, GRX- SICL, GRV-SIL	GC	A-2-6, A-6	0-5	0-15	25-55	20-50	15-45	15-40	25-40	10-20	
	Btx	25-32	GRV-SIL, GRV- SICL, GRX-SIL	GC, GC-GM	A-1, A-2-4, A-2-6	0-5	0-20	25-50	20-45	15-40	10-35	20-40	5-15	
	2Bt	32-60	GR-C, C, GRV-C	CH, CL, GC	A-7	0	0-10	30-75	25-70	25-65	25-60	45-60	25-30	
73031:														
Gerald-----	Ap	0-11	SIL	CL, CL-ML	A-4	0	0	95-100	85-100	80-95	75-90	20-30	6-10	
	E	11-16	SIL	CL, CL-ML	A-4	0	0	95-100	85-100	80-95	75-90	20-30	6-10	
	Bt	16-33	SIC, SICL, GR- SICL	CH, CL	A-7, A-6	0	0-5	80-100	75-100	75-90	70-85	35-55	20-30	
	2Btx	33-49	SICL, GR-SICL, GRV- SICL, GRX- SICL	CL, GM, ML	A-7, A-2, A-6	0	0-40	35-90	30-85	30-80	25-75	40-60	12-30	
	3Bt	49-77	CB-C, GRV-C, GRV- SICL, GRX- SIC, CB-SICL	GC	A-2, A-7	0	15-40	35-85	30-80	30-75	25-70	40-65	15-35	
73059:														
Pomme-----	Ap	0-8	SIL	CL, CL-ML	A-4, A-6	0	0-5	80-100	75-100	65-95	50-90	20-30	5-11	
	Bt	8-26	SICL, GR-SIL, GR- SICL, CL, SIL	CL	A-4, A-6	0	0-10	70-95	65-90	50-85	50-75	25-40	9-20	
	2Bt	26-44	GRV-SICL, CBV- SICL, GR-L, GRV-L	GC	A-2, A-6, A- 7-6	0	0-30	25-65	25-60	25-50	20-40	30-45	13-25	
	3Bt	44-72	GRX-C, CBV-C, GR- C	GC, CL	A-7-6, A-2, A-6	0	0-45	20-75	20-70	20-65	15-55	30-70	15-40	
73065:														
Wilderness-----	A	0-7	CBV-SIL	CL-ML, GC, SC, SC-SM	A-4	0	20-40	60-85	55-80	50-75	45-60	15-30	5-15	
	Bt	7-23	GRV-SIL, GRX- SICL	GC, SC	A-2-6, A-6, A-2-4	0-5	0-20	25-70	20-55	15-55	15-45	20-40	5-20	
	Btx	23-33	GRV-SIL, GRV- SICL, GRX-CL	GC, GC-GM	A-1, A-2-4, A-2-6	0-10	0-30	15-60	10-45	10-45	5-35	20-40	5-20	
	2Bt	33-70	GRV-SIC, GRV-C, GRX- SIC, C	GC, CH	A-2-6, A-7	0-10	0-30	35-90	30-85	25-80	20-70	25-70	15-30	
73075:														
Hobson-----	Ap	0-4	L	CL, CL-ML	A-4, A-6	0	0	90-100	90-100	80-90	60-65	20-30	5-12	
	E	4-8	L	CL, CL-ML	A-4, A-6	0	0	90-100	90-100	80-90	60-65	20-30	5-12	
	Bt	8-19	SCL, CL, L	CL, SC	A-4, A-6	0	0	85-100	85-100	70-95	45-75	25-40	5-15	
	2Btx	19-40	GR-CL, CL, FSL, L	CL, GC, GC- GM, SC-SM	A-4, A-6	0	0-10	55-100	50-100	50-95	40-75	20-35	5-15	
	3Bt	40-72	GRV-SCL, GRV- CL, CL	GC, GC-GM, CL	A-1, A-6, A- 4, A-2	0	0-10	40-100	35-100	30-95	20-75	25-40	5-15	
74625:														
Hartville-----	Ap	0-6	SIL	CL, ML	A-4, A-6	0	0	95-100	90-100	90-100	85-100	30-40	7-20	
	BE	6-10	SICL, SIL	CL	A-6, A-7	0	0	95-100	90-100	90-100	85-95	35-50	10-25	
	Bt	10-31	SIC, SICL	CL, CH	A-7	0	0	95-100	90-100	90-100	85-95	45-60	20-40	
	2Bt	31-60	SIC, C, SICL	CH, CL	A-7	0	0-5	90-100	85-100	80-100	70-95	45-60	20-40	

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-	
				Unified	AASHTO	>10 inches	3-10 inches	sieve number--				limit	ticity	
								4	10	40	200			Pct
		In					Pct	Pct					Pct	
74641:														
Secesh-----	Ap	0-8	SIL	ML	A-4	0	0	85-100	80-100	75-95	60-90	20-30	NP-10	
	Ba	8-14	SICL, SIL	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	70-100	60-95	25-35	5-15	
	Bt	14-24	GR-SICL, GR- SIL, L	CL, GC, SC	A-6	0	0-5	65-95	55-90	30-75	25-65	30-40	10-20	
	2Bt	24-60	SICL, GRV-CL, GR-SICL, GR-CL	CL, GC, SC	A-6	0	0-20	55-95	50-90	50-85	40-75	30-40	10-20	
75378:														
Sturkie-----	Ap	0-8	SIL	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-100	75-95	20-30	5-15	
	Bw	8-53	SIL, SICL	CL	A-4, A-6	0	0	95-100	90-100	85-100	75-95	20-40	9-15	
	C	53-72	SIL, SICL	CL	A-4, A-6	0	0	95-100	90-100	85-100	75-95	20-40	9-15	
99000.														
Pits, quarries														
99001.														
Water														
99004:														
Kanima-----	A	0-8	CNV-SIL	GC	A-6, A-2-6	0	0-10	40-55	35-50	35-50	30-40	30-40	12-20	
	C	8-60	CNV-SIL, GRV- SICL, GRV-L, CNV-SIL	GC	A-2, A-4, A-6	0	0-10	30-55	25-50	20-50	15-40	30-40	8-20	