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Table of

Saturated Hydraulic Conductivity (XKSAT) Estimated Values

Green and Ampt Parameters

Of the

Soil Survey of Gila Bend – Ajo Area, Arizona, Parts of Maricopa and Pima Counties

January 23, 2004

By

Amir Motamedi, P.E.
John Holmes, CFM

Flood Control District
of Maricopa County

INTEROFFICE MEMORANDUM

Date: 1/23/04

To: File

From: Amir M. Motamedi, P.E.
John W. Holmes, CFM

Subject: Soil Survey of Gila Bend-Ajo, Arizona

The Drainage Design Manuals for Maricopa County, Volume I, Hydrology, 1995 (Hydrology Manual) contains appendices that estimate the Green and Ampt parameters for three soil surveys in Maricopa County. The same parameters for the Gila Bend area, however, were not included in the Manual since NRCS did not have published data for this area at the time.

Natural Resources Conservation Service (NRCS) published the Soil Survey for Gila Bend-Ajo areas in May 1997. An un-published manuscript of the general soils in this area was in circulation prior to this date, and was the source of soil data for numerous studies, including the Gila Bend Area Flood Insurance Study.

In order to maintain consistency among studies, the Hydrology and Hydraulics Branch of the Flood Control District has made an effort to estimate the Green and Ampt parameters for the Gila Bend-Ajo area using the same assumptions and methodologies as the Hydrology Manual, the results of which are as follows.

Source: The source of the soil data is the "Soil Survey of Gila Bend-Ajo, Arizona, Parts of Maricopa and Pima Counties, United States Department of Agriculture, Natural Resources Conservation Service, Issued May 1997."

Methodology: As much as possible, the methodology described in Appendix A of the Hydrology Manual has been followed. First, the Saturated Hydraulic Conductivity (xksat) for the *Soil Series* was determined (see pages 113 – 139 of the soil survey and Table 1 attached). This required some judgment to determine the controlling layer for each soil series. The xksat for that control layer was then determined using the texture of that soil layer, and referring to Table 4.2 of the Hydrology Manual. Certain adjustments were applied to the textural class when the layer was given a prefix of "sandy, very sandy, gravelly, very gravelly, extremely gravelly, etc". (see Hydrology Manual, Appendix A).

The *Soil Map Units* 1 through 67 are described in the Soil Survey based on the percentage of *Soil Series* within the *Soil Map Unit*. The xksat for the *Soil Map Unit* then is the logarithmically averaged xksat value of its constituent *Soil Series* areas (see Hydrology Manual, Appendix A).

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Spreadsheet: A spreadsheet (Table 2) was utilized to automate some of the Log averaging. The calculations in the spreadsheet were hand checked for 6 of the *Soil Map Units* for accuracy. The hand checked calculations are attached.

Results: Table 2 contains the results of this study.

Discussion: Due to the fact that this is one of the latest in the series of Soil Surveys by NRCS, it uses the most up-to-date data and methodology available to them. However, subtle differences in description of similar soils in adjoining studies sometimes results in rather large differences in the xksat values. As an example, Soil Map Unit **Antho-Valencia** has an xksat value of 0.39 inches/hour, while the Soil Map Unit **Denure-Why** complex has an xksat value of 0.81 inches/hour. The two soils are apparently the same soil units, despite the differences in their name, separated by 20 years in survey dates. Part of the problem lies in our (FCD's) assumption to bump the soil textural class by one level if the soil is described as "gravelly", "very Gravelly" or "Extremely Gravelly". This becomes more apparent when the Soil Unit is Loamy or Loamy Sand (double or triples the xksat values). Based on my limited experience, the soil scientists disagree on what effect gravel has on the xksat. Some would suggest it increases the conductivity, while others suggest the conductivity is reduced due to tortuosity.

Recommendation: Even though small changes in xksat values do not affect the peak flows greatly, it can be a major factor in determining volumes of flow. Design of on-line and off-line basins, Dams and Flood Retarding Structures can be dramatically affected. Furthermore, we do not know of any volume-frequency studies that may help the Hydrologist calibrate his/her study against. It is recommended that NRCS and other pertinent agencies be contacted in order to better define the effect of gravel on the Saturated Hydraulic Conductivity estimates.

Enclosure: Study Results, Tables

Cc: Tom R. Loomis, P.E., R.L.S., Special Projects Branch Manager
Steve Waters, Flood Warning Branch Manager

NRCS Soil Survey for Gila Bend-Ajo Area, Arizona
Calculations for Saturated Hydraulic Conductivity (XKSAT) in in/hr
Refer to Example in Appendix A, Drainage Design Manual for Maricopa County
Flood Control District of Maricopa County, 1992 Revision and up
Data Compiled by Amir M. Motamedi, H&H Branch, FCDMC
Data entered by Mona Merkevicius, Engineering Division, FCDMC

LOVH checked 5/22 ✓
SDW checked 5/30 ✓

#	Soil Series	Cntrl Horizon	Soil Texture	XKSAT (in/hr)	Surface Characteristics	Depth to impervious/semi pervious horizon (inches)	Rock Fragment (%)
1	Agualt	Ap1-0 to 5	very fine sandy loam	0.25	n/a	none	1% pebble
2	Ajo	BAt-3 to 8	very gravelly sandy clay loam	0.1	60-90% is covered by pebbles and cobbles.	Indurated, lime cemented hardpan at 32 to 60	50% Pebble
3	Ajolito	Btk1-1 to 5	very gravelly fine sandy loam	0.4	80-100% is covered by darkly varnished, water rounded pebbles.	Petro-calcic Horizon at 6 to 20	40% Rounded Pebble
4	Akela	C-2 to 12	extremely gravelly loam	0.4	50-90% is covered with pebbles, cobbles and stones.	Lithic Contact at 4 to 20	50% Pebble 10% Cobble
5	Carrizo	A-0 to 9	very gravelly sandy loam	1.2	1-80% is covered with pebbles and cobbles.	Stratified	50 Pebble
6	Cavelt	A-0 to 4	gravelly sandy loam	0.4	25-55% is covered with pebbles and pan fragments.	Indurated Hardpan of lime cemented fine sand at 13 to 43	25% Pebbles
7	Cherioni	Bk1-2 to 6	very gravelly fine sandy loam	0.4	40-95% is covered with pebbles, cobbles, hardpan fragments and stones.	Indurated hardpan at 5 to 18, Basalt bedrock at 7 to 24	45% Pebbles
8	Chuckawalla	Bt1-1 to 6	gravelly loam	0.4	85-100% is covered with darkly varnished, closely packed pebbles.	Calcic Horizon at depth of 10 to 18	none
9	Cipriano	Bk 2 to 10	very gravelly sandy loam	1.2	50-90% is covered with pebbles, cobbles, stones and hardpan fragments.	depth to indurated hard pan is 6 to 20	45% fine pebbles
10	Comobabi	Bt-1 to 10	extremely cobbly sandy loam	1.2	50-90% is covered with cobbles and pebbles.	depth to cemented hardpan ranges from 7 to 20	40% cobble, 35% pebbles
11	Coolidge	Bw-2 to 21	very fine sandy loam	0.25	2-50% is covered with pebbles.	calcic horizon is at a depth of 21 to 40	5% pebbles
12	Cuerda	A-0 to 5	stratified loam	0.25	5% is covered with pebbles.	none	2% pebbles
13	Dateland	Bw-3 to 38	very fine sandy loam	0.25	0-15% is covered with pebbles.	none	5% pebbles
14	Denure	A-0 to 4	very gravelly sandy loam	1.2	15-50% is covered with pebbles.	none	40% fine pebbles
15	Gachado	Bt-1 to 6	very gravelly sandy clay loam	0.1	50-95% is covered with pebbles and cobbles.	depth to volcanic rock is 5 to 20 inches.	50% pebbles
16	Gadsden	An2-1 to 4	silty clay loam	0.04	1/2 inch wide cracks to a depth of 20 inches when dry	none	none
17	Garzona	BA-2 to 6	very gravelly loam	0.4	70-90% is covered with stones, cobbles, and pebbles.	depth to unweathered basalt is 12 to 20,	5% cobble, 40% pebble
18	Gilman	A-0 to 5	very fine sandy loam	0.25	stratified	none	less than 15% gravel
19	Glenbar	Cnyz1-2 to 6	silty clay loam	0.04	Less than 1% is covered with pebbles.	none	none
20	Growler	Btkz1-2 to 7	fine sandy loam	0.25	85-100% is covered with darkly varnished, closely packed pebbles.	A calcic horizon is at a depth of 10 to more than 40	10% pebble
21	Gunsight	Bk1-1 to 6	very gravelly sandy loam	1.2	25-90% is covered with pebbles and cobbles.	A calcic horizon is at a depth of 5 and 30	50% pebbles
22	Harqua	Ap-0 to 6	fine sandy loam	0.25	5-40% is covered with pebbles and pan fragments.	none	5% pebbles
23	Hyder	Bk-1 to 7	extremely gravelly sandy loam	1.2	50-90% is covered with pebbles, cobbles, and stones.	none	75% pebbles and cemented rock
24	Indio	A-0 to 12	silt loam	0.15	n/a	none	less than 1%
25	Kofa	Cnz-3 to 21	silty clay loam	0.04	1/2 wide cracks 20 inches deep when dry	none	none
26	Lagunita	A-0 to 11	stratifies loamy sand	1.2	n/a	none	less than 10% gravel
27	Laposa	Bw-1 to 15	very channery sandy loam	1.2	35-70% is covered with schist channers.	depth to paralithic is 20 to 36, depth to lithic is 30 to 45	50% channers
28	Mohall	Ap1-0 to 6	loam	0.25	1-25% is covered with Pebbles.	depth to calcic horizon ranges from 20 to 40 inches	2% fine pebbles
29	Momoli	Bw-2 to 15	very gravelly sandy loam	1.2	35-85% is covered with pebbles	none	35% pebbles
30	Pinamt	Btk1-3 to 9	very gravelly clay loam	0.06	45-85% is covered with pebbles and cobbles.	depth to calcic horizon ranges from 18 to 36	25% pebble, 10% cobble
31	Pompeii	B-3 to 9	very gravelly sandy loam	1.2	60-90% covered with pebbles, cobbles and stones.	depth to hardpan ranges from 6 to 20 inches	45% pebbles
32	Quilotosa	Bw-2 to 6	extremely gravelly coarse sandy loam	1.2	45-95% covered with pebbles, cobbles, stones and boulders.	depth to weathered bedrock is 4-16, unweathered is 9 -20.	65% pebbles
33	Rillito	Bw-2 to 9	sandy loam	0.4	35-80% is covered with pebbles.	depth to calcic horizon ranges from 5 to 40	10% pebbles
34	Ripley	Czn-2 to 10	silt loam	0.15	finley stratified	none	none
35	Rosita	C1-3 to 29	loamy fine sand	0.8***	n/a	none	less than 2% gravel
36	Schenco	Bw-1 to 7	very channery sandy clay loam	0.1	50-90% is covered with schist channers	depth to weathered schist 10 to 20, unweathered 12 to 30	50% channers
37	Tremant	Bw-1 to 8	fine sandy loam	0.25	15-60% is covered with pebbles.	depth to calcic horizon ranges from 14 to more than 30	5% pebbles
38	Tucson	Ap-2 to 8	loam	0.25	15% is covered with pebbles	depth to calcic horizon is 6 to 20	2% fine pebbles
39	Vaiva	Bt-2 to 6	very gravelly sandy clay loam	0.1	50-90% is covered with pebbles, cobbles and stones.	depth to weathered bedrock 4 to 16, unweathered 7 to 20	45% pebbles
40	Vint	C1-3 to 10	loamy fine sand	0.8 ***	n/a	startified	none
41	Welton	Bw-3 to 10	sandy loam	0.4	1-60% is covered with pebbles.	some have calcic horizon at depth of 30 to more than 40	10% pebbles and pan fragments
42	Why	A-0 to 4	sandy loam	0.4	startified	none	10% fine pebbles
43	Winkle	Bk1-2 to 9	extremely cobbly loam	0.4	50-85% is covered with pebbles, cobbles and stones.	depth to lime indurated hardpan is 10 to 20 inches	50% cobbles, 20% pebbles

*** Loamy "Fine" Sand was bumped down 1/2 texture class, half way betweem loamy sand and sandy loam.

Table 1

1Gilabend

Soil																							
									XKSAT for												SOIL AVG	AREA
	Major Soil 1	%area	Major Soil 2	% area	Major soil 3	% area	Minor soil 1	% area	Minor Soil 2	% area	Minor Soil 3	% area	Minor Soil 4	% area	Minor Soil 5	% area	Minor Soil 6	% area	Minor Soil 7	% area		CHECK
1	0.25	40	0.15	40	1	0	1.2	5	0.25	5	0.15	5	0.8	5	1	0	1	0	1	0	**0.23**	100.0000
2	0.25	40	0.15	40	1	0	0.25	4	0.04	4	0.15	4	1.2	4	0.8	4	1	0	1	0	**0.21**	100.0000
3	0.1	25	1.2	25	1.2	25	1.2	6.25	1.2	6.25	0.06	6.25	1.2	6.25	1	0	1	0	1	0	**0.53**	100.0000
4	0.4	92	1	0	1	0	0.4	8	1	0	1	0	1	0	1	0	1	0	1	0	**0.40**	100.0000
5	1.2	65	0.25	20	1	0	1.2	3.75	1.2	3.75	0.4	3.75	0.25	3.75	1	0	1	0	1	0	**0.79**	100.0000
6	1.2	65	1.2	25	1	0	0.4	2.5	1.2	2.5	1.2	2.5	1.2	2.5	1	0	1	0	1	0	**1.17**	100.0000
7	0.4	90	1	0	1	0	0.8	3.3	0.25	3.3	1.2	3.3	1	0	1	0	1	0	1	0	**0.42**	99.9000
8	1.2	60	0.25	25	1	0	1.2	3	1.2	3	0.8	3	0.4	3	0.8	3	1	0	1	0	**0.77**	100.0000
9	1.2	47	1.2	17	1	0	1.2	12	0.4	12	1.2	12	1	0	1	0	1	0	1	0	**1.05**	100.0000
10	1.2	60	1.2	15	1	0	1.2	3.6	1.2	3.6	0.4	3.6	0.4	3.6	1.2	3.6	0.1	3.6	1.2	3.6	**1.01**	100.2000
11	0.4	60	1.2	30	1	0	1.2	5	0.8	5	1	0	1	0	1	0	1	0	1	0	**0.61**	100.0000
12	0.25	40	0.4	25	1.2	15	0.25	6.67	0.15	6.67	0.15	6.67	1	0	1	0	1	0	1	0	**0.33**	100.0100
13	0.25	77	1	0	1	0	0.25	5.75	1.2	5.75	1.2	5.75	1.2	5.75	1	0	1	0	1	0	**0.33**	100.0000
14	0.25	60	0.25	30	1	0	1.2	5	0.25	5	1	0	1	0	1	0	1	0	1	0	**0.27**	100.0000
15	0.25	50	1.2	35	1	0	0.25	2.5	1.2	5	0.4	2.5	0.4	2.5	1.2	2.5	1	0	1	0	**0.50**	100.0000
16	1.2	80	1	0	1	0	0.25	10	0.4	10	1	0	1	0	1	0	1	0	1	0	**0.92**	100.0000
17	1.2	70	1	0	1	0	1.2	5	0.4	5	0.25	5	1.2	5	0.4	5	1.2	5	1	0	**0.99**	100.0000
18	1.2	45	1.2	30	1	0	1.2	5	0.25	5	1.2	5	0.4	5	1.2	5	1	0	1	0	**1.05**	100.0000
19	1.2	55	0.4	20	1	0	0.25	5	0.25	5	0.25	5	0.4	5	0.4	5	1	0	1	0	**0.68**	100.0000
20	1.2	55	0.25	25	1	0	1.2	2.86	0.25	2.86	0.25	2.86	0.4	2.86	0.25	2.86	1.2	2.86	0.4	2.86	**0.67**	100.0200
21	1.2	40	0.4	25	0.4	15	0.25	4	1.2	4	0.4	4	1.2	4	1.2	4	1	0	1	0	**0.70**	100.0000
22	1.2	60	0.4	20	1	0	1.2	6.67	0.4	6.67	0.25	6.67	1	0	1	0	1	0	1	0	**0.81**	100.0100
23	Dumps/Pits	No data																			**NO DATA**	NO DATA
24	0.04	90	1	0	1	0	0.04	10	1	0	1	0	1	0	1	0	1	0	1	0	**0.04**	100.0000
25	0.04	50	0.04	30	1	0	0.04	4	0.15	4	1.2	4	0.15	4	0.8	4	1	0	1	0	**0.06**	100.0000
26	0.4	56.25	0.4	25	1	0	0.4	18.75	1	0	1	0	1	0	1	0	1	0	1	0	**0.40**	100.0000
27	0.25	75	1	0	1	0	0.25	5	0.15	5	0.04	5	0.8	5	0.25	5	1	0	1	0	**0.24**	100.0000
28	0.25	75	1	0	1	0	0.25	12.5	0.15	12.5	1	0	1	0	1	0	1	0	1	0	**0.23**	100.0000
29	0.04	80	1	0	1	0	0.04	6.67	0.25	6.67	0.15	6.67	1	0	1	0	1	0	1	0	**0.05**	100.0100
30	0.04	80	1	0	1	0	0.04	6.67	0.25	6.67	0.15	6.67	1	0	1	0	1	0	1	0	**0.05**	100.0100
31	0.25	40	1.2	35	1	0	0.4	4.17	1.2	4.17	1.2	4.17	0.4	4.17	0.4	4.17	0.8	4.17	1	0	**0.55**	100.0200
32	0.25	50	0.4	35	1	0	1.2	2.5	0.25	2.5	1.2	2.5	0.25	2.5	0.25	2.5	0.4	2.5	1	0	**0.32**	100.0000
33	1.2	55	0.4	35	1	0	0.1	2.5	1.2	2.5	1.2	2.5	1.2	2.5	1	0	1	0	1	0	**0.77**	100.0000
34	1.2	40	0.4	35	1	0	1.2	4.17	1.2	4.17	0.4	4.17	1.2	4.17	1.2	4.17	0.4	4.17	1	0	**0.75**	100.0200
35	1.2	50	1.2	25	1	0	0.4	6.25	1.2	6.25	1.2	6.25	1.2	6.25	1	0	1	0	1	0	**1.12**	100.0000
36	1.2	45	0.06	35	1	0	0.4	4	1.2	4	1.2	4	0.4	4	1.2	4	1	0	1	0	**0.39**	100.0000
37	1.2	45	0.4	35	1.2	15	0.4	0.83	1.2	0.83	0.25	0.83	1.2	0.83	1.2	0.83	0.4	0.83	1	0	**0.79**	99.9800
38	0.25	75	1	0	1	0	0.4	4.17	1.2	4.17	0.25	4.17	0.8	4.17	0.25	4.17	0.4	4.17	1	0	**0.29**	100.0200
39	0.25	42.11	0.4	42.11	1	0	1.2	5.26	0.25	5.26	0.4	5.26	1	0	1	0	1	0	1	0	**0.34**	100.0000
40	1.2	36.53	0.1	30.27	1.2	15.66	0.4	4.38	0.1	4.38	0.4	4.38	1.2	4.38	1	0	1	0	1	0	**0.46**	99.9800
41	0.15	75	1	0	1	0	0.25	5	0.04	5	0.15	5	0.8	5	0.15	5	1	0	1	0	**0.16**	100.0000
42	0.15	75	1	0	1	0	0.25	8.33	0.04	8.33	0.15	8.33	1	0	1	0	1	0	1	0	**0.14**	99.9900
43	1.2	50	0.8	35	1	0	0.25	5	1.2	5	0.15	5	1	0	1	0	1	0	1	0	**0.87**	100.0000
44	0.25	75	1	0	1	0	0.25	4.17	0.25	4.17	0.25	4.17	0.25	4.17	0.4	4.17	0.25	4.17	1	0	**0.25**	100.0200
45	0.25	75	1	0	1	0	0.25	8.33	0.25	8.33	0.4	8.33	1	0	1	0	1	0	1	0	**0.26**	99.9900
46	0.25	85	1	0	1	0	0.4	5	0.25	5	0.4	5	1	0	1	0	1	0	1	0	**0.26**	100.0000
47	0.04	80	1	0	1	0	0.25	6.67	0.25	6.67	0.4	6.67	1	0	1	0	1	0	1	0	**0.06**	100.0100
48	0.25	80	1	0	1	0	0.25	4	0.25	4	1.2	4	0.25	4	0.4	4	1	0	1	0	**0.27**	100.0000
49	1.2	50	1.2	25	1	0	0.06	6.25	0.4	6.25	0.1	6.25	0.4	6.25	1	0	1	0	1	0	**0.74**	100.0000
50	1.2	50	1.2	30	1	0	1.2	4	0.25	4	0.25	4	1.2	4	1.2	4	1	0	1	0	**1.06**	100.0000
51	1.2	50	1.2	25	1	0	1.2	4.17	0.06	4.17	1.2	4.17	1.2	4.17	0.1	4.17	1.2	4.17	1	0	**0.95**	100.0200

Table 2

52	1.2	51.85	1.2	25.93	1	0	1.2	3.7	0.06	3.7	1.2	3.7	1.2	3.7	0.1	3.7	1.2	3.7	1	0	**0.98**	99.9800
53	1.2	40	1.2	20	1.2	15	0.1	4.17	1.2	4.17	1.2	4.17	1.2	4.17	0.06	4.17	0.4	4.17	1	0	**0.91**	100.0200
54	1.2	80	1	0	1	0	0.1	6.67	1.2	6.67	0.1	6.67	1	0	1	0	1	0	1	0	**0.86**	100.0100
55	Riverwash	No data																			**NO DATA**	NO DATA
56	1.2	58.33	1	0	1	0	0.4	6.94	0.1	6.94	1.2	6.94	1.2	6.94	1.2	6.94	1.2	6.94	1	0	**0.94**	99.9700
57	0.8	40	1.2	30	1	0	0.25	6	0.4	6	1.2	6	0.4	6	0.4	6	1	0	1	0	**0.76**	100.0000
58	0.1	43.75	1.2	25	1	0	1.2	6.25	0.1	6.25	1.2	6.25	1.2	6.25	1.2	6.25	1	0	1	0	**0.35**	100.0000
59	0.25	80	1	0	1	0	0.25	2.86	1.2	2.86	0.25	2.86	0.25	2.86	1.2	2.86	0.4	2.86	0.25	2.86	**0.28**	100.0200
60	0.25	80	1	0	1	0	1.2	6.67	0.25	6.67	0.25	6.67	1	0	1	0	1	0	1	0	**0.28**	100.0100
61	0.1	50	1.2	25	1	0	1.2	6.25	1.2	6.25	0.06	6.25	1.2	6.25	1	0	1	0	1	0	**0.29**	100.0000
62	0.1	73.68	1.2	21.05	1	0	1.2	5.26	1	0	1	0	1	0	1	0	1	0	1	0	**0.19**	99.9900
63	0.8	75	1	0	1	0	0.15	8.33	1.2	8.33	0.15	8.33	1	0	1	0	1	0	1	0	**0.63**	99.9900
64	0.4	75	1	0	1	0	0.25	12.5	0.25	12.5	1	0	1	0	1	0	1	0	1	0	**0.36**	100.0000
65	0.8	60	0.8	20	1	0	0.25	6.67	0.25	6.67	0.25	6.67	1	0	1	0	1	0	1	0	**0.63**	100.0100
66	0.4	100	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	**0.40**	100.0000
67	0.4	50	1.2	25	1	0	1.2	4.17	1.2	4.17	0.25	4.17	1.2	4.17	0.25	4.17	0.4	4.17	1	0	**0.58**	100.0200

Table 2 (cont')

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL XKSAT COMPUTED Amm DATE 7/10/03

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Soil Unit 1 Agualt & Ripley Soils

Major Soil	Agualt	40%	variable, assumed equal proportion
	Ripley	40%	
Minor Soils	Carrizo, Gilman, Indio, Vint	20% (5% each)	

Soil Unit 2 Agualt & Ripley Soils, Saline-Sodic

Major Soil	Agualt	40%	Variable, assumed equal proportion
	Ripley	40%	
Minor Soils	Gilman, Glenbar, Indio, Lagunita, Vint	20% (4% each)	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

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Soil Unit 3 Ajo - Gunsight - Pompeii Complex

Major Soils	Ajo	25%
	Gunsight	25%
	Pompeii	25%
Minor Soils	Quilotosa, Momoli, Pinamt, Carrizo	25% (6.25% each)

Soil Unit 4 Akela - Rock outcrop Complex

			normalize
Major Soils	Akela	55%	$55/(100-40) = 92\%$
	Rock outcrop	40%	
Minor Soils	Winkle	8%	

Soil Unit 5 Carrizo - Dateland complex

Major Soils	Carrizo bench	45%	combine Carrizo Bench + Carrizo, no hydrologic difference
	Dateland	20%	
	Carrizo	20%	
Minor Soils	Momoli, Denure, Why, Cuerda	15%	(3.75% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL Xksat COMPUTED AMM DATE 7/10/03

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Soil Unit 7, Cherioni Very Cobbly fine Sandy loam

Major Soil Cherioni 90%

Minor Soil

basalt (moderate Infilt)
Cherioni less Gravell
Carrizo
} 10% (3.3% each)

Soil Unit 8 Cherioni - Coolidge Complex

Major Soil Cherioni (on basalt flow) 60%

Coolidge 25%

Minor Soil

Denure
Cipriano
Rositas
Why
basalt (moderate Infit
} 15% (~~5~~ 3% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/ Ajo Soil Survey PAGE ____ OF ____

DETAIL xksat COMPUTED Amm DATE 5/30/03

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Soil Unit 6 Carrizo- Momoli Complex

Major Soils Carrizo 65%

Momoli 25%

Minor Soils (Why, Lagunita, Denure, Carrizo) 10%

Soil Unit 9 Cipriano- Hyder- Rock outcrop

major Soil Cipriano 40% (47%)

Hyder 15% (17%)

Rock O.C. 15%

minor Soils (Carrizo, Cherioni, momoli) 30% (36%) or 12% each 36

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend Soil Survey PAGE ____ OF ____

DETAIL Xksat Values COMPUTED AMM DATE 5/22/03

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Soil Unit: 10 Cipriano - Momoli Complex

Major	Cipriano	60%
	Momoli	15%
Minor	Denure, Gunsight, Rillito, Cherioni, Quilatosa, Vaiva, Carrizo	25% (3.6% each)

Soil Unit 14: Dateland - Cuerda complex

Major	Dateland	60%
	Cuerda	30%
Minor	Denure, Mohal	10% (5% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL Xksat Values COMPUTED AMM DATE 5/21/03

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Soil Unit 20 Denur-Coolidge Complex

Major Soil

Denur	55%
Coolidge	25%

Minor Soils

Carrizo, Cuerda, Mohall, why, Dateland, Momoli, Rillito	20% (2.86% each)

Soil Unit 21 Denur-Rillito-Why Complex

Major Soils

Denur	40%
Rillito	25%
Why	15%

Minor Soils

Coolidge, Momoli, Chuckawalla, Gunsight, Carrizo	20% (4% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL Xksat values COMPUTED Amm DATE 5/29/03

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Soil Unit 24 : Gadsden Clay Loam

Major Soil	Gadsden	90%	(not specified, I had to deduce)
minor Soil	Glenbar	10%	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/ Ajo Soil Survey PAGE ____ OF ____

DETAIL Xksat Values COMPUTED AMM DATE 5/21/03

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Soil Unit 22: Denur-Why complex

Major Soils	Denur	60%
	Why	20%
Minor Soils	Momoli, Rillito, Cuerda	20% (6.67% each)

Soil Unit 36 Gun sight – Pinament complex

Major Soils	Gunsight	45%
	Pinament	35%
Minor Soils	Chuckawalla, Cipriano, Momoli, Rillito, Carrizo	20% (4% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL Xk sat values COMPUTED Amm DATE 5/21/03

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Soil Unit 37: Gunsight, Rillito, Carrizo Complex

Major	Gunsight	45%
	Rillito	35%
	Carrizo	15%

Minor

Chuckawalla
Cipriano
Coolidge
Denur
Momoli
Why

10% (1.67% each)

→ Make it 5% not what the book has. (0.83% each)

Soil Unit 48: Mohall Complex

Major Soil	Mohall	80%

Minor Soil

Coolidge
Dateland
Denure
Cuerda
Why

20% (4% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/ Ajo Soil Survey PAGE ____ OF ____

DETAIL Xksat Values COMPUTED AMM DATE 5/29/03

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Soil Unit 46: Mohall Loam, occassionally flooded

major Soil Mohall loam 85% (not mentioned, I had to deduce)

minor Soil Welton, mohall, Why } 15% (5% each)

Soil Unit 47: mohall clay loam

major soil Mohall clay loam 80% (not specified, I had to deduce)

minor soils Tremant, Tucson, Welton } 20% (6.67% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL Xksat Values COMPUTED Amm DATE 5/21/03

CHECKED BY ____ DATE ____

Soil Unit 49 Momoli - Carrizo Extremely gravelly sand

Major Soils	Momoli	50%
	Carrizo	25%
Minor Soils	Pinamt, Rillito, Viva, Why	25% (6.25% each)

Soil Unit 51 Momoli - Comobabi association

Major	Momoli	50%
	Comobabi	25%
Minor	Gunsight, Pinamt, Cipriano, Quilotosa, Vaiva, Carrizo	25% (4.17% each)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/ Ajo Soil Survey PAGE ____ OF ____

DETAIL xksat Values COMPUTED AMM DATE 5/21/02

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Soil Unit 54 Quilotosa Rock-out crop

			normalize
Major	Quilatosa	60%	$60/_{100-25} = 80\%$
	Rock out crop	25%	
Minor	Vaiva, Laposa, Schenco	15% (5% each)	$15/_{75} = 20\%$ (6.67 each)

Soil Unit 66 Why Gravelly fine Sandy loam

Major	Why	100%

Soil unit 67 Why-Carrizo Complex

Major	Why	~~30%~~ 50%
	Carrizo	25%
minor	Carrizo, Denur, Growler, Momoli, Cuerda, Why	25% (4.17% each)

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PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL xksat COMPUTED Amm DATE 7/10/03

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Soil Unit 11 Coolidge Complex

				x ksat.
Major Soil	Coolidge → (gravelly very fine sandy loam)	60%	↑ 1 text. class	.40
	Coolidge → (loamy fine sand)	30%	↑ 2 text class	1.2
Minor Soil	Denure, Rosita	10% (5% each)		

Soil Unit 12 Cuerda-Why-Lagunita complex

Major Soil	Cuerda	40%
	Why	25%
	Lagunita	15%
Minor Soil	Agualt, Indio, Ripley	20% (6.67% ea.)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL x Ksat values COMPUTED JWH DATE 12-19-03

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Soil Unit 13 Dateland very fine sandy loam

Major soil Dateland 77%

Minor soil Agualt, Denure, Momoli, Carrizo } 23% or 5.75% ea

Soil Unit 15 Dateland-Denure fine sandy loams

Major soil Dateland 50%

Denure 35%

Minor soils Moholl, Carrizo, bench, Carrizo, on floodplains, Why, Dateland, Denure } 15% or (2.5% ea)

Dateland, Denure } w/ sand + gravel

Dateland (w/ sand & gravel) increased 1 texture class

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ____ OF ____

DETAIL x Ksat values COMPUTED JWH DATE 12/20/03

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Soil Unit 16 Denure Sandy Loam

Major Soil Denure 80%

Minor Soils Dateland 10%
Wellton 10%

Soil Unit 17 Denure gravelly fine sandy loam

Major Soil Denure 70%

Minor Soils Momoli
Rillito
Tremant
Carrizo-bench
Why
Denure - similar to... underlain w/ sand/gravel
} 30% (5% ea.)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL xKsat values COMPUTED JWH DATE 6/13/03

CHECKED BY ___ DATE ___

Soil Unit 38 - Harqua fine sandy loam

Major Soils - Harqua 75%

Minor Soils - Cavelt
Denure
Mohall
Rositas
Tremant
Harqua-sand
incl. 1 texture class (x Ksat)

} 25% (4.17% ea.)

Soil Unit 39 - Harqua-Cavelt complex

			normality
Major Soils -	Harqua	40%	42.11
	Cavelt	40%	42.11

Minor Soils - Denure
Tucson
Wellton
(Rock outcrop)

} 20%

normality

$\frac{5}{100-5}$ = 5.26% ea minor soil

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL Ksat values COMPUTED JWH DATE 12/19/03

CHECKED BY ___ DATE ___

Soil Unit 40 - Hyder - Gachado - Gunsight
extremely gravelly sandy loam

			Normalized
major Soils -	Hyder	35%	36.53%
	Gachado	29%	30.27%
	Gunsight	15%	15.66%

minor Soils - Cherioni
Vaiva
(Rock outcrop)
Chuckawalla
Carrizo

21% normalized (4.38% ea)

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PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL Ksat values COMPUTED JWH DATE 12/13/03

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Soil Unit 41 - Indio silt loam

Major Soil - Indio 75%

Minor Soils - Gilman
Glenbar
Ripley
Vint
Indio w/ toxic salts
} 25% (5% ea.)

Soil Unit 42 - Indio silt loam - saline-sodic

Major Soil - Indio 75%

Minor Soils - Gilman
Glenbar
Ripley
} 25% (8.33% ea)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL Xksat values COMPUTED 12/19/03 DATE JWH

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Soil Unit 43 - Lagunita-Vint Complex

Major Soil - Lagunita 50%

Vint 35%

Minor Soils - Agualt, Carrizo, Ripley } 15% (5% ea.)

Soil Unit 44 - Mohall fine sandy loam

Major soils - Mohall 75%

Minor Soils - Mohall-occ. flooded, Growler, Tremant, Tucson, Wellton, Mohall w/toxic salts } 25% (4.17% ea.)

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL X Ksat values COMPUTED JWH DATE 12/13/03

CHECKED BY ___ DATE ___

Soil Unit 52 – Momoli - Como babi association

			normalized
Major Soils -	Momoli 50%	$\frac{50}{100-3.57}$ =	51.85%
	Como babi 25%	$\frac{25}{100-3.57}$ =	25.93%
Minor Soils -	Gunsight		
	Pinamt		
	Cipriano		
	Quilotosa	25%	Normalized (3.7 ea.)
	Vaiva		
	Carrizo		
	Rock-outcrop		

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ___ OF ___

DETAIL X Ksat values COMPUTED JWH DATE 12/12/03

CHECKED BY ___ DATE ___

Soil Unit 53 - Quilotosa - Momoli - Carrizo Complex

major Soils - Quilotosa 40%

Momoli 20%

Carrizo 15%

Minor Soils - Vaiva, Cipriano, Comobabi, Gunsight, Pinamt, Rillito } 25% (4.17% ea)

Soil Unit 55 - River wash

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ___ OF ___

DETAIL X/Ksat values. COMPUTED JWH DATE 12/12/03

CHECKED BY ___ DATE ___

Soil Unit 56 - Rock Outcrop - Hyder complex

Major Soils - Rock outcrop 40% normalized

Hyder 35% $\frac{35}{100-40} = 58.33\%$

Minor Soils - Cherioni, Gachado, Laposa, Gunsight, Momoli, Carrizo } 25% = 41.67% (6.94% ea) normalized

Soil Unit 57 - Rositas - Denure loamy fine sands

Major Soils - Rositas 40%

Denure 30%

Minor Soils - Coolidge, Rositas - (w/ limy layer), Gunsight, Wellton, Why } 30% (6% ea.)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL XKsat values COMPUTED JWH DATE 12/19/03

CHECKED BY ___ DATE ___

Soil Unit 23 Damps - Pits

Soil Unit 25 Gadsden and Kofa silty clay loams, Saline-sodic

major soils Gadsden 50%

Kofa 30%

Minor Soils Glenbar, Indio, Lagunita, Ripley, Vint } 20% (4% ea)

Soil Unit 26 Garzona-Rock outcrop-Winkel Complex 15-65% slope

			Normalize
Major Soils	Garzona	45%	$45/(100-20) = 56.25\%$
	Winkel	20%	$20/(100-20) = 25\%$
	Rock-outcrop	20%	
Minor Soils	Akela	18.75%	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ___ OF ___

DETAIL x Ksat values COMPUTED JWH DATE 12/13/03

CHECKED BY ___ DATE ___

Soil Unit 34 Gunsight Chuckawalla complex

Major Soils - Gunsight 40%

Chuckawalla 35%

Minor Soils - Denure
Comobabi
Rillito
Momoli
Carrizo
Whx
} 25% (4.17% ea.)

Soil Unit 35 - Gunsight-Cipriano complex

Major Soils - Gunsight 50%

Cipriano 25%

Minor Soils - Rillito
Denure
Momoli
Carrizo
} 25% (6.25% ea.)

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PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL X Ksat Values COMPUTED JWH DATE 12/19/03

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Soil Unit 45 - Mohall loam

Major Soil - Mohall 75%

Minor Soils - Tremant, Tucson, Wellton } 25% (8.33% ea.)

Soil Unit 50 - Momoli - Carrizo, bench, very gravelly sandy loams

major Soils - Momoli 50%

Carrizo 30%

minor Soils - Denure, Growler, Tremant, Carrizo - on washes, Denure - w/ sand & gravel - underlain } 20% (4% ea.)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ___ OF ___

DETAIL x Ksat values COMPUTED JWH DATE 12/19/03

CHECKED BY ___ DATE ___

Soil Unit 18 Denure-Carrizo, bench, gravelly fine sandy loams

Major Soils Denure 45%

Carrizo 30%

Minor Soils

Momoli, Tremant — on fan terraces

Carrizo, Why — in washes

Denure

} 25% (5% ea.)

Soil Unit 19 Denure Cavelt complex

Major Soils Denure 55%

Cavelt 20%

Minor Soils

Coolidge

Harqua

Tucson

Wellton

Rositas w/ clay substratum (bumped down ½ text. class = .4

} 25% (5% ea.)

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Soil Survey PAGE ___ OF ___

DETAIL x Ksat values COMPUTED JWH DATE 12/10/03

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Soil Unit 62 - Vaiva - Quilotosa extremely stony Sandy Loams

			normalized
Major Soils - Vaiva	70%	$\frac{70}{100-5}$ =	73.68%
Quilotosa	20%	$\frac{20}{100-5}$ =	21.05%
Minor Soils - Gunsight, Rock outcrop	10% =		5.26% normalized

Soil Unit 63 - Vint very fine sandy loam

Major Soil - Vint 75%

Minor Soils - Indio, Lagunita, Ripley } 25% (8.33% ea)

Soil Unit 64 - Wellton Loam

Major Soil - Wellton 75%

Minor Soils - Mohall, Tucson } 25% (12.5% ea)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Soil Survey PAGE ___ OF ___

DETAIL X/Ksat values COMPUTED JWH DATE 12/10/03

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Soil Unit 65 - Wellton Complex

Major Soil - Wellton very gravelly fine sandy loam - 60%
(inc. ½ text. class)

- Wellton Loamy fine sand 20%
(Also, inc. ½ text class)

Minor Soils - Mohall - occ. flooded
Growler
Mohall - on fan terraces
} 20% (6.67% ea)

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PROJECT _____ PAGE ____ OF ____

DETAIL _____ COMPUTED _____ DATE ____

_____ CHECKED BY _____ DATE ____

following 2 examples

are random hand calcs

to check spread sheet.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend - Ajo Area Soils PAGE 1 OF ____

DETAIL Soil Complex COMPUTED AMM DATE 5/19/03

XKSAT / Check CHECKED BY ____ DATE ____

Map Unit 10: Cipriano - Momoli Complex

This map unit is on fan terraces dissected by Shallow flood-plains.

Major Soils

Cipriano Very Gravelly Sandy Loam	60%
Momoli Very Gravelly Sandy Loam	15%

Minor Soils

Denur Gravelly Sandy Loam	3.6% each
Gunsight Very Gravelly Sandy Loam	
Rillito Sandy loam	
Cherrioni Very Gravelly Sandy Loam	
Quilotosa Ext. Gravelly Sandy Loam	
Vaiva Very Gravelly Sandy Clay loam	
Carrizo Very Gravelly Sandy Loam	

$$XKSAT = \text{Alog}\Big[0.6(\log 1.2) + 0.15(\log 1.2) + .036(\log 1.2) + 0.036(\log 1.2) + .036(\log .4) + 0.036(\log 1.2) + 0.036(\log 1.2) + 0.036(\log .06) + 0.036(\log 1.2)$$

XKSAT = 1.04 in/hr.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend / Ajo Area Soil PAGE ____ OF ____

DETAIL Soil Complex COMPUTED AMM DATE 5/30/03

Xksat / check CHECKED BY ____ DATE ____

Soil Unit 54 Quilotosa Rock out crop

Major Quilotosa 60%

Rock outcrop 25%

Minor Vaiva, Laposa, Schenco } 15% (5% each)

since the map unit contains Rock outcrop, the soil % must be normalized.

Quilotosa = 60/100-25 = 80%

Minor soils = 15/100-25 = 20% (or 6.67% each)

In table 4.2, extremely gravelly coarse sandy loam will be assigned Xksat value for loamy Sand (1.2 in/hr)

$$XKSAT = ALOG\left[0.8(Log\,1.2) + .0667(Log\,0.1) + 0.0667(Log\,1.2) + 0.0667(Log\,0.1)\right]$$

$$xksat = ALOG\left[0.0633 - 0.0667 + 0.00528 - 0.0667\right]$$

$$xksat = 0.861 \text{ in/hr}$$

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PROJECT _____ PAGE ____ OF ____

DETAIL _____ COMPUTED _____ DATE ____

Hand Calcs - XKSAT CHECKED BY J. Holmes DATE ____

4 more random examples

of hand calcs to check

spreadsheet.

J. Holmes

12-22-03

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Hand Calcs PAGE ___ OF ___

DETAIL Gila Bend / Ajo Area Soils COMPUTED ___ DATE 12-19-03

XKSAT CHECK CHECKED BY JOHN H. DATE ___

Map Unit 15 - Dateland - Denure fine sandy loams - saline - sodic

this map unit is found on stream terraces adjacent to the Gila River.

Major Soils - Dateland 50% (very fine sandy loam)

Denure 35% (very gravelly sandy loam)

Minor Soils - Moholl - Loam

Carrizo, bench (very gravelly sandy loam)

Carrizo, on floodplains (very gravelly sandy loam)

Why (sandy loam) inc. 1 text class

Dateland (very fine sandy loam) w/ sand gravel

Denure (very gravelly sandy loam)

} 15% (2.5 ea.)

$$XKsat = A \log\left[.50(\log .25) + .35(\log 1.2) + .025(\log .25) + .05(\log 1.2) + .025(\log 0.4) + .025(\log .4) + .025(\log 1.2)\right]$$

$$= .4985 \simeq .50$$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Area Soils PAGE ___ OF ___

DETAIL Hand Calcs. COMPUTED ___ DATE ___

XKSAT CHECK. CHECKED BY John H. DATE 12-22-03

Map Unit #31 - Growler - Momoli complex 1-3% slope

Major Soils - Growler - fine sandy loam (40%)

Momoli - Very gravelly sandy loam (35%)

Minor Soils - Chuckawalla - gravelly loam.

Gunsight - very gravelly sandy loam.

Carrizo - Very gravelly sandy loam.

Why - Sandy loam.

Growler - fine sandy loam w/ gravelly sand - (XKsat increased 1 text. class.)

Why - Sandy loam w/ gravel. (XKsat increased .5 text. class

25% or (4.17% eo)

$$XKsat = A \log [.4(\log .25) + .35(\log 1.2) + .0417(\log .4) + .0417(\log 1.2) + .0417(\log 1.2) + .0417(\log .4) + .0417(\log .4) + .0417(\log .8)]$$

$$= .549 \simeq \underline{.55}$$

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PROJECT Gila Bend/Ajo Area Soils PAGE ___ OF ___

DETAIL Hand Calcs COMPUTED ___ DATE ___

XKSAT CHECK CHECKED BY J. Holmes DATE 12-12-03

Map Unit # 43 - Lagunita - Vint Complex

Major Soils - Lagunita - Stratified loamy sand - 50%

Vint - loamy fine sand - 35%

Minor Soils - Agualt - Very fine sandy loam 5%

Carrizo - Very gravelly sandy loam 5%

Ripley - Silt loam. 5%

$$XKSAT = A \log [.5(\log 1.2) + .35(\log .8) + .05(\log .25) + .05(\log 1.2) + .05(\log .15)]$$

$$= .8676 \simeq .87$$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Gila Bend/Ajo Area Soils PAGE ___ OF ___

DETAIL Hand Calcs COMPUTED ___ DATE ___

XKSAT CHECK CHECKED BY J. Holmes DATE 12-22-03

Map Unit #60 - Tucson loam

Major Soil - Tucson - loam. 80%

Minor Soils - Denure - very gravelly sandy loam 6.67%

Mohall - loam 6.67%

Tremant - fine sandy loam 6.67%

$$XKsat = A \log [.8(\log .25) + .0667(\log 1.2) + .0667(\log .25) + .0667(\log .25)] = .2775 \approx \underline{.28}$$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Waterman Wash PAGE ____ OF ____

DETAIL Discrepancies COMPUTED AMM DATE ____

Soil Surveys / SCS CHECKED BY ____ DATE ____

Examin the XKSAT discrepancies between two soil Surveys:

1. "Soil Survey of Maricopa County, Arizona, Central Part, United States Dept. of Agriculture, Soil Conservation Service, Sep 1977."
2. "Soil Survey of Gila Bend-Ajo Area, Arizona, Parts of Maricopa & Pima Counties, United States Dept. of Agriculture, Soil Conservation Service, May 1997."

* Observations: The two studies were published 20 years apart. Only one person (Rudy D. Schurig) is common to both studies.

* Lets examine two soil units (AM in central & 22 in Gila-Bend/Ajo survey).
  - AM has Xksat value of 0.39, v.s. 0.81 in/hr for Soil unit 22.
  - To the best of my knowledge, both use same methodology.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL _____ COMPUTED _____ DATE ____

_____ CHECKED BY _____ DATE ____

★ AM, Antho-Valencia Association, defined as 40% Antho Sandy Loam, 40% Valencia Sandy Loam. Minor Soils include Coolidge Sandy loam, Mohal Sandy loam and Gilman fine Sandy Loam. Sandy Loam has Xksat value of 0.4 in/hr, so the Xksat of 0.39 in/hr in the manual makes sense.

★ 22, just to the south of AM, this soil unit was defined as Denur-Why complex. This unit is

- 60% Denur [defined as very gravelly sandy Loam]
- 20% Why [defined as stratified Sandy Loam]
- additionally, minor soils of Momoli, Rillito and Cuerda are included very gravelly Sandy loam to Stratified Loam].

Sine the term "very gravelly" bumps up the Sandy loam (.4) to Loamy Sand (1.2), the Xksat average of 0.81 does make sense.

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DETAIL xksat COMPUTED AMM DATE ____

Spot Check Comparison CHECKED BY ____ DATE ____

Compare soil xksat new v.s. Gila Bend FIS.

G.B.	xksat	New	xksat
321	0.4	21	0.70
323	0.5	10	1.01
322	0.97	54	0.86
327	1.2	49	0.74
325	1.2	6	
324	0.84	34	
335	0.63	58	
317	0.59	9	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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_____ CHECKED BY _____ DATE ____

- To gravel or not to gravel: Existance of "very extremly" gravel in the Pedon seems to effect the xksat value by a factor of 3 (.4 ⟶ 1.2). The Central Part Survey does not use the adjectives (see Carrizo Series for example) as much as the later study. Additionally, there are definition changes (see Cherioni) where earlier survey calls the top horizon as "very gravelly loam" while later survey calls it "very gravelly fine sandy loam".

Gila Bend FIS

TABLE S-2

SUMMARY
of
GREEN-AMPT PARAMETERS BY SCS MAP UNIT

SCS Soil Map Unit	XKSAT (Unadj)	PSIF	DTHETA (Dry)	DTHETA (Normal)	RTIMP	Slope Range (%)	Terrain Class
324	0.84	3.26	0.35	0.28	0%	1-15	Valley
325	1.20	2.40	0.35	0.30	0%	0-3	Valley
326	1.20	2.40	0.35	0.30	15%	1-15	Hillslope
327	1.20	2.40	0.35	0.30	0%	1-10	Valley
328	0.48	4.11	0.35	0.26	0%	5-15	Hillslope
329	0.25	3.50	0.35	0.25	0%	0-3	Valley
330	0.28	3.66	0.35	0.25	0%	0-3	Valley
331	0.40	4.30	0.35	0.25	0%	1-5	Valley
333	0.82	3.30	0.35	0.28	0%	0-3	Valley
334	0.84	3.26	0.35	0.28	0%	1-15	Valley
335	0.63	3.75	0.35	0.26	19%	10-55	Mountain
336	0.40	4.30	0.35	0.25	0%	0-3	Valley
337	0.40	4.30	0.35	0.25	0%	25-65	Mountain
338	0.49	4.09	0.35	0.26	10%	1-25	Hillslope
339	0.17	5.98	0.39	0.25	0%	0-1	Valley
340	0.66	3.68	0.35	0.27	0%	3-25	Hillslope
341	0.55	3.94	0.35	0.26	0%	1-10	Valley
342	0.58	3.87	0.35	0.26	18%	3-25	Hillslope
345	0.51	4.04	0.35	0.26	0%	25-55	Mountain
346	0.07	8.28	0.28	0.15	0%	0-3	Valley
347	EVAL	0.00	0.00	0.00	EVAL	N/A	Valley
401	0.40	4.30	0.35	0.25	20%	15-65	Mountain
402	0.40	4.30	0.35	0.25	40%	15-65	Mountain
Valley	0.25	3.50	0.35	0.25	0%	0-15	Valley
Mountain	0.02	9.40	0.20	0.10	10%	15-75	Mountain

TABLE S-2

SUMMARY
of
GREEN-AMPT PARAMETERS BY SCS MAP UNIT

SCS Soil Map Unit	XKSAT (Unadj)	PSIF	DTHETA (Dry)	DTHETA (Normal)	RTIMP	Slope Range (%)	Terrain Class
100	0.57	3.90	0.35	0.26	0%	1-10	Valley
101	0.25	3.50	0.35	0.25	0%	0-3	Valley
102	0.28	3.66	0.35	0.25	0%	0-3	Valley
200	0.22	4.43	0.37	0.25	0%	0-1	Valley
201	0.22	4.43	0.37	0.25	0%	0-1	Valley
216	1.20	2.40	0.35	0.30	0%	0-1	Valley
222	0.25	3.50	0.35	0.25	0%	0-1	Valley
224	0.25	3.50	0.35	0.25	0%	0-1	Valley
226	0.25	3.50	0.35	0.25	0%	0-1	Valley
228	0.25	3.50	0.35	0.25	0%	0-1	Valley
231	0.04	8.20	0.25	0.15	0%	0-1	Valley
232	0.04	8.20	0.25	0.15	0%	0-1	Valley
233	0.04	8.20	0.25	0.15	0%	0-1	Valley
234	0.49	4.09	0.35	0.26	0%	1-3	Valley
236	0.17	5.98	0.39	0.25	0%	0-1	Valley
249	0.51	4.04	0.35	0.26	0%	0-1	Valley
254	0.25	3.50	0.35	0.25	0%	0-1	Valley
257	0.28	3.66	0.35	0.25	0%	0-1	Valley
260	0.28	3.66	0.35	0.25	0%	0-1	Valley
263	0.56	3.92	0.35	0.26	0%	1-3	Valley
264	0.44	4.21	0.35	0.25	0%	0-1	Valley
265	0.53	3.99	0.35	0.26	0%	0-1	Valley
266	0.44	4.21	0.35	0.25	0%	0-3	Valley
267	0.28	3.66	0.35	0.25	0%	0-3	Valley
269	0.84	3.26	0.35	0.28	0%	1-3	Valley
270	0.17	5.98	0.39	0.25	0%	0-1	Valley
271	1.20	2.40	0.35	0.30	0%	1-3	Valley
272	1.20	2.40	0.35	0.30	0%	1-3	Valley
273	1.20	2.40	0.35	0.30	0%	1-3	Valley
274	0.53	3.99	0.35	0.26	0%	0-1	Valley

TABLE S-2

SUMMARY
of
GREEN-AMPT PARAMETERS BY SCS MAP UNIT

SCS Soil Map Unit	XKSAT (Unadj)	PSIF	DTHETA (Dry)	DTHETA (Normal)	RTIMP	Slope Range (%)	Terrain Class
275	0.28	3.66	0.35	0.25	0%	0-1	Valley
276	0.22	4.43	0.37	0.25	0%	0-1	Valley
277	0.02	9.40	0.20	0.10	0%	0-1	Valley
278	0.43	4.23	0.35	0.25	0%	0-1	Valley
279	0.02	9.40	0.20	0.10	0%	0-1	Valley
280	0.04	8.20	0.25	0.15	0%	0-1	Valley
281	0.43	4.23	0.35	0.25	0%	0-1	Valley
282	0.02	9.40	0.20	0.10	0%	0-1	Valley
284	0.28	3.66	0.35	0.25	0%	0-1	Valley
285	0.04	8.20	0.25	0.15	0%	0-1	Valley
287	0.22	4.43	0.37	0.25	0%	0-1	Valley
288	0.22	4.43	0.37	0.25	0%	0-1	Valley
290	0.35	4.03	0.35	0.25	0%	0-1	Valley
291	0.50	4.06	0.35	0.26	0%	0-1	Valley
295	0.44	4.21	0.35	0.25	0%	0-3	Valley
296	0.28	3.66	0.35	0.25	0%	0-1	Valley
297	0.16	6.29	0.40	0.25	0%	0-1	Valley
299	0.27	3.61	0.35	0.25	0%	0-1	Valley
301	0.50	4.06	0.35	0.26	0%	1-3	Valley
303	EVAL	0.00	0.00	0.00	EVAL	N/A	Valley
306	0.40	4.30	0.35	0.25	10%	3-10	Hillslope
307	0.40	4.30	0.35	0.25	15%	1-15	Hillslope
310	1.20	2.40	0.35	0.30	0%	1-15	Valley
312	0.91	3.09	0.35	0.28	0%	1-15	Valley
313	0.80	3.35	0.35	0.28	0%	1-15	Valley
316	1.20	2.40	0.35	0.30	0%	N/A	Valley
317	0.59	3.85	0.35	0.26	15%	15-65	Mountain
321	0.40	4.30	0.35	0.25	0%	1-5	Valley
322	0.97	2.95	0.35	0.29	26%	15-55	Mountain
323	0.50	4.06	0.35	0.26	0%	1-7	Valley