K Value = 0.28

R = 150

TABLE 2B

SOIL LOSSES IN CUBIC YARDS PER ACRE PER YEAR

Soil Textures - fsl, gfsl, gls, gs, gsl, lfs, ls, sl

KKLS X 0.70

PERCENT SLOPE	SLOPE LENGTH IN FEET 50	75	100	125	150	200	250	300	350	400	450	500	550	600	650	700	800	900	1000
1.00	3	3	4	4	5	6	6	7	8	8	9	9	9	10	10	11	11	12	13
2.00	4	5	6	7	8	9	10	11	12	12	13	14	15	15	16	17	18	19	20
3.00	6	8	9	10	1	13	14	15	17	18	19	20	21	22	23	24	25	27	28
4.00	9	10	12	13	15	17	19	21	23	24	26	27	28	29	31	32	34	36	38
5.00	11	14	16	17	19	22	25	27	29	31	33	35	37	38	40	41	44	47	49
6.00	14	17	20	22	24	28	31	34	37	39	42	44	46	48	50	52	56	59	62
7.00	17	21	24	27	30	34	38	42	45	48	51	54	56	59	61	64	68	72	76
8.00	21	25	29	32	36	41	46	50	54	58	62	65	68	71	74	77	82	87	92
9.00	24	30	34	38	42	49	54	60	64	69	73	77	81	84	88	91	97	103	109
10.00	28	35	40	45	49	57	63	70	75	80	85	90	94	98	102	106	114	120	127
11.00	33	40	46	52	57	66	73	80	87	93	98	104	109	114	118	123	131	139	147
12.00	38	46	53	59	65	75	84	92	99	106	113	119	125	130	135	141	150	159	168
13.00	43	52	60	67	74	85	95	104	113	121	128	135	141	148	154	159	170	181	191
14.00	48	59	68	76	83	96	107	118	127	136	144	152	159	166	173	179	192	204	215
15.00	54	66	76	85	93	107	120	131	142	152	161	170	178	186	193	201	215	228	240
16.00	60	73	84	94	103	119	133	146	158	169	179	189	198	207	215	223	239	253	267
17.00	66	81	93	104	114	132	148	162	175	187	198	209	219	229	238	247	264	280	295
18.00	73	89	103	115	126	145	162	178	192	205	218	230	241	252	262	272	290	308	325
19.00	80	97	113	126	138	159	178	195	210	225	239	252	264	276	287	298	318	338	356
20.00	87	106	123	137	150	174	194	213	230	246	260	275	288	301	313	325	347	368	388
22.22	104	127	147	165	180	208	233	255	275	294	312	329	345	361	375	389	416	442	465
25.00	128	157	181	202	221	256	286	313	338	362	384	404	424	443	461	478	511	543	572
28.57	162	198	229	256	281	324	362	397	429	458	486	512	537	561	584	606	648	687	725
33.33	214	262	302	338	370	428	478	524	566	605	641	676	709	741	771	800	855	907	956
40.00	298	366	422	472	517	597	667	731	790	844	895	944	990	1034	1076	1117	1194	1266	1335
50.00	452	553	639	714	782	903	1010	1106	1195	1277	1355	1428	1498	1565	1628	1690	1807	1916	2020
66.67	777	952	1099	1229	1346	1555	1738	1904	2057	2199	2332	2458	2578	2693	2803	2908	3109	3298	3476
100.00	1692	2072	2392	2675	2930	3383	3783	4144	4476	4785	5075	5350	5611	5860	6100	6330	6767	7177	7566

K Value = 0.43

R = 150

TABLE 2B

SOIL LOSSES IN CUBIC YARDS PER ACRE PER YEAR

Soil Textures - fsl, gfsl, gls, gs, gsl, lfs, ls, sl

RKLS X 0.70

PERCENT SLOPE	SLOPE LENGTH IN FEET 50	75	100	125	150	200	250	300	350	400	450	500	550	600	650	700	800	900	1000
1.00	4	5	6	7	8	9	10	11	12	12	13	14	14	15	16	16	17	19	20
2.00	7	8	10	11	12	14	15	17	18	19	20	21	22	23	24	25	27	29	30
3.00	10	12	14	15	17	19	22	24	26	27	29	31	32	34	35	36	39	41	43
4.00	13	16	18	21	23	26	29	32	35	37	39	41	43	45	47	49	52	55	58
5.00	17	21	24	27	29	34	38	42	45	48	51	54	56	59	61	63	68	72	76
6.00	21	26	30	34	37	43	48	52	56	60	64	67	71	74	77	80	85	90	95
7.00	26	32	37	41	45	52	58	64	69	74	78	83	87	91	94	98	105	111	117
8.00	31	39	45	50	55	63	70	77	83	89	94	100	104	109	114	118	126	134	141
9.00	37	46	53	59	65	75	83	91	99	106	112	118	124	129	135	140	149	158	167
10.00	44	53	62	69	76	87	98	107	115	123	131	138	145	151	157	163	174	185	195
11.00	50	62	71	80	87	101	113	123	133	143	151	159	167	175	182	189	202	214	225
12.00	58	71	82	91	100	115	129	141	153	163	173	182	191	200	208	216	231	245	258
13.00	65	80	93	103	113	131	146	160	173	185	196	207	217	227	236	245	262	278	293
14.00	74	90	104	116	128	147	165	180	195	208	221	233	244	255	266	276	295	313	329
15.00	82	101	117	130	143	165	184	202	218	233	247	261	273	285	297	308	330	350	369
16.00	92	112	130	145	159	183	205	224	242	259	275	290	304	317	330	343	366	389	410
17.00	101	124	143	160	175	203	227	248	268	287	304	320	336	351	365	379	405	430	453
18.00	111	137	158	176	193	223	249	273	295	315	334	353	370	386	402	417	446	473	499
19.00	122	150	173	193	212	244	273	299	323	346	367	386	405	423	440	457	489	518	546
20.00	133	163	189	211	231	267	298	327	353	377	400	422	442	462	481	499	533	566	596
22.22	160	196	226	253	277	320	357	391	423	452	479	505	530	554	576	598	639	678	715
25.00	196	241	278	310	340	393	439	481	520	555	589	621	651	680	708	735	786	833	878
28.57	249	305	352	393	431	498	556	609	658	704	746	787	825	862	897	931	995	1056	1113
33.33	328	402	464	519	569	657	734	804	869	929	985	1038	1089	1137	1184	1229	1313	1393	1468
40.00	458	561	648	725	794	917	1025	1123	1213	1296	1375	1449	1520	1588	1653	1715	1833	1945	2050
50.00	694	850	981	1097	1201	1387	1551	1699	1835	1962	2081	2193	2300	2403	2501	2595	2774	2943	3102
66.67	1194	1462	1688	1887	2068	2387	2669	2924	3158	3376	3581	3775	3959	4135	4304	4467	4775	5065	5339
100.00	2598	3182	3674	4108	4500	5196	5809	6364	6874	7348	7794	8216	8617	9000	9367	9721	10392	11022	11619

K Value = 0.64

R = 150

TABLE 2B

SOIL LOSSES IN CUBIC YARDS PER ACRE PER YEAR

Soil Textures - fsl, gfsl, gls, gs, gsl, lfs, ls, sl

RKLS X 0.70

PERCENT SLOPE	SLOPE LENGTH IN FEET 50	75	100	125	150	200	250	300	350	400	450	500	550	600	650	700	800	900	1000
1.00	6	8	9	10	11	13	15	16	17	18	19	21	22	22	23	24	26	28	29
2.00	10	12	14	16	17	20	23	25	27	29	30	32	33	35	36	38	40	43	45
3.00	14	18	20	23	25	29	32	35	38	41	43	46	48	50	52	54	58	61	64
4.00	19	24	28	31	34	39	44	48	51	55	58	62	65	67	70	73	78	83	87
5.00	25	31	36	40	44	50	56	62	67	71	76	80	84	87	91	94	101	107	113
6.00	32	39	45	50	55	63	71	78	84	90	95	100	105	110	114	119	127	135	142
7.00	39	48	55	62	67	78	87	95	103	110	117	123	129	135	140	146	156	165	174
8.00	47	57	66	74	81	94	105	115	124	133	141	148	155	162	169	175	187	199	210
9.00	56	68	79	88	96	111	124	136	147	157	167	176	184	192	200	208	222	236	248
10.00	65	79	92	103	112	130	145	159	172	184	195	205	215	225	234	243	260	275	290
11.00	75	92	106	119	130	150	168	184	198	212	225	237	249	260	270	281	300	318	335
12.00	86	105	121	136	149	172	192	210	227	243	258	271	285	297	309	321	343	364	384
13.00	97	119	138	154	169	195	218	239	258	275	292	308	323	337	351	364	390	413	436
14.00	110	134	155	173	190	219	245	269	290	310	329	347	364	380	395	410	439	465	490
15.00	123	150	173	194	212	245	274	300	324	347	368	388	407	425	442	459	491	520	548
16.00	136	167	193	216	236	273	305	334	361	386	409	431	452	472	492	510	545	579	610
17.00	151	185	213	238	261	302	337	369	399	427	452	477	500	522	544	564	603	640	674
18.00	166	203	235	262	287	332	371	406	439	469	498	525	550	575	598	621	664	704	742
19.00	182	223	257	287	315	364	407	445	481	514	545	575	603	630	656	680	727	771	813
20.00	198	243	281	314	344	397	444	486	525	561	595	628	658	687	715	742	794	842	887
22.22	238	291	336	376	412	476	532	583	629	673	714	752	789	824	858	890	951	1009	1064
25.00	292	358	413	462	506	585	654	716	773	827	877	924	969	1012	1054	1094	1169	1240	1307
28.57	370	454	524	586	641	741	828	907	980	1047	1111	1171	1228	1283	1335	1386	1481	1571	1656
33.33	489	599	691	773	847	977	1093	1197	1293	1382	1466	1545	1621	1693	1762	1829	1955	2074	2186
40.00	682	835	965	1079	1182	1364	1525	1671	1805	1929	2046	2157	2262	2363	2460	2552	2729	2894	3051
50.00	1032	1264	1460	1632	1788	2065	2308	2529	2731	2920	3097	3265	3424	3576	3722	3863	4129	4380	4617
66.67	1777	2176	2513	2809	3077	3553	3973	4352	4701	5025	5330	5618	5893	6155	6406	6648	7107	7538	7946
100.00	3867	4736	5468	6114	6697	7734	8646	9472	10231	10937	11600	12228	12825	13395	13942	14468	15467	16405	17293

TABLE 3

Erosion-index values for average annual rainfall, probability values of annual rainfall and magnitudes of single storms.

Erosion-Index Values

For

Rhode Island Conservation Districts

Average Annual Rainfall	Probability One Year in		Magnitude of single storm exceeding once in		
(R)	5	30	5 Yrs.	10 Yrs.	20 Yrs.
150	167	232	52	68	83

FIGURE 1

Erosion-index distribution curve for Rhode Island

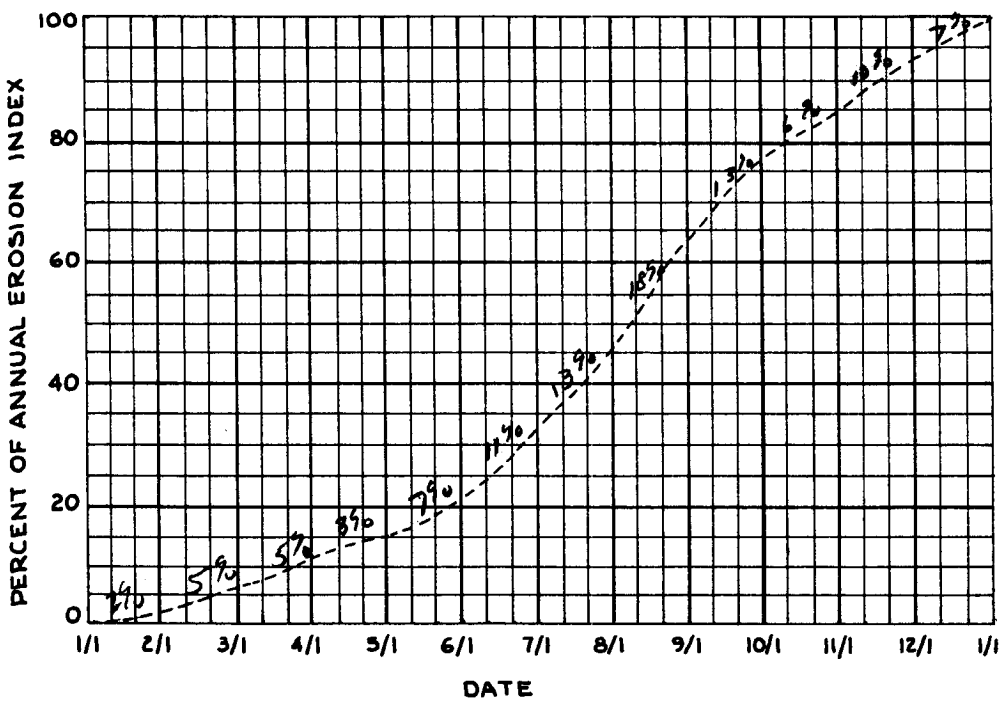

TABLE 4

THE EFFECTIVENESS OF GROUND COVERS FOR EROSION CONTROL

Kind of Cover	Soil Loss Reduction Compared to Bare Soil
Permanent grasses 1/	99%
Perennial ryegrass	95%
Annual ryegrass	90%
Small grains	95%
Millet or sudangrass	95%
Field Bromegrass	97%
Grass sod	99%
Hay mulch (2 tons per acre)	98%
Corn stalks (4 tons per acre)	98%
Woodchips (6 tons per acre) 2/	94%
Wood cellulose fiber (1-3/4 tons per acre) 2/	90%
Fiberglass (1,000 pounds per acre) 2/	95%
Asphalt emulsion (1,250 gallons per acre) 2/	98%

1/ Values of grasses and small grains are based on established stands.

2/ Values based on research in progress. For In-Service use only.

EXAMPLES SHOWING HOW THE UNIVERSAL SOIL LOSS
EQUATION IS USED TO ESTIMATE
SOIL LOSSES FROM CONSTRUCTION SITES

Assumptions:

A disturbed area of 15 acres near Charlestown, Rhode Island. The soil is Charlton and the B horizon is exposed. The average slope is 8% and the length of slope is 400 feet.

Problem 1. Determine the estimated soil loss from this site if it remains unprotected for one year.

Refer to Table 1 and determine that the K value for the B horizon of Charlton fine sandy loam is 0.43. Note that the K values are not always the same for the B and C horizons of some soils. Next refer to Soil Loss Table 2B and determine that the soil loss is 89 cubic yards per acre per year. Multiply 89 cubic yards by 15 acres to find the average soil per year from this site. It is 1335 cubic yards.

Quantities not included in Table 2 may be estimated by interpolating between gradients and slope lengths or by solving the equation RKLS X weight factor per cubic yard X acres. In this case, it is 150 X 0.43 X 2.0 X 0.70 (0.70 is the weight factor used to convert soils with the following textures from tons to cubic yards: fsl, gfsl, gls, gs, gsl, lfs, ls, and sl; 0.87 is the conversion factor for gl, gsil, l, sic, sicl, sil and vfsl) X 15 equals 1350 cubic yards.

Problem 2. Determine the soil losses from this site during the period from June 1 to October 1.

Refer to Figure 1 and find the percent of erosive storms (EI value) for this period. On June 1 it is 20% and on October 1 it is 77%, a difference of 57%. This indicates that 57% of the erosive storms for a year normally occur during this period. In problem 1 we determined the average annual loss to be 1335 cubic yards. Fifty-seven percent of 1335 cubic yards is 711, the amount of soil that would be lost between June 1 and October 1.

Problem 3. Calculate the estimated soil loss from the site when the erosive rainfall exceeds the average annual rainfall (R) and is equal to the maximum five-year frequency.

An adjustment of the annual (R) value of 150 is necessary. Refer to the second column of Table 3 and note that the EI value for a probability of one year in five for Southern Rhode Island Conservation District is 167. The losses will therefore exceed the average annual loss. To determine the losses divide the EI value of 166 by 150 and multiply the average annual loss by the quotient; i.e. 167 ÷ 150 = 1.11 X 1335 cubic yards per acre of 1482 cubic yards from the 15-acre site. Similarly, the losses from a rainstorm with a probability of one year in 20 would be 232 ÷ 150 X 1335 = 1.54 X 1335 = 2056 cubic