APPENDIX B

PARAMETERS USED FOR SURFACE PATHWAY RELEASE AND RISK CALCULATIONS

TABLE B-1
AVERAGE VALUES OF SOIL ERODIBILITY FACTOR (K) FOR USE IN THE UNIVERSAL SOIL LOSS EQUAITON (USLE)

Average Soil Type	K Value (tons/acre)
Silt loam Loam Sandy clay loam	0.4
Silty clay loam Clay Clay loam	0.3
Fine sandy loam	0.2
Loamy sand Silt loam	0.1
Gravelly loam	0.1

Source: Wischmeier and Smith (1978)

TABLE B-2
VALUES OF TOPOGRAPHIC FACTOR (LS) FOR USE IN THE USLE.

% Slope	Slope Length (feet)											
	25	**50**	**75**	**100**	**150**	**200**	**300**	**400**	**500**	**600**	**800**	**1,000**
0.2	0.060	0.069	0.075	0.080	0.086	0.092	0.099	0.105	0.110	0.114	0.121	0.126
0.5	0.073	0.083	0.090	0.096	0.104	0.110	0.119	0.126	0.132	0.137	0.145	0.152
0.8	0.086	0.098	0.107	0.113	0.123	0.130	0.141	0.149	0.156	0.162	0.171	0.179
2	0.133	0.163	0.185	0.201	0.227	0.248	0.280	0.305	0.326	0.344	0.376	0.402
3	0.190	0.233	0.264	0.287	0.325	0.354	0.400	0.437	0.466	0.492	0.536	0.573
4	0.230	0.303	0.357	0.400	0.471	0.528	0.621	0.697	0.762	0.820	0.920	1.01
5	0.268	0.379	0.464	0.536	0.656	0.758	0.928	1.07	1.20	1.31	1.52	1.69
6	0.336	0.476	0.583	0.673	0.824	0.952	1.17	1..35	1.50	1.65	1.90	2.13
8	0.496	0.701	0.859	0.992	1.21	1.41	1.72	1.98	2.22	2.43	2.81	3.14
10	0.685	0.968	1.19	1.37	1.68	1.94	2.37	2.74	3.06	3.36	3.87	4.33
12	0.903	1.28	1.56	1.80	2.21	2.55	3.13	3.61	4.04	4.42	5.11	5.71
14	1.15	1.62	1.99	2.30	2.81	3.25	3.98	4.59	5.13	5.62	6.49	7.26
16	1.42	2.01	2.46	2.84	3.48	4.01	4.92	5.68	6.35	6.95	8.03	8.98
18	1.72	2.43	2.97	3.43	4.21	4.86	5.95	6.87	7.68	8.41	9.71	10.9
20	2.04	2.88	3.53	4.08	5.00	5.77	7.07	8.16	9.12	10.0	11.5	12.9

Source: Wischmeier and Smith (1978)

$LS = (\lambda/ 72.6)^m \times (65.41 \sin^2\theta + 4.56 \sin\theta + 0.065)$, where λ = slope length in feet; m = 0.2 for slopes <1%, 0.3 for 1-3% slopes, 0.4 for 3.5 - 4.5% slopes, 0.5 for 5% and steeper slopes; and θ = angle of slope. For other combinations of slope length and steepness interpolate between adjacent values.

TABLE B-3
VALUES OF THE COVER FACTOR (C) FIVE MANAGEMENT PRACTICES FOR USE IN THE USLE

Practice	C Factor
Land reclamation	0.6
Agricultural	0.5
Dedicated disposal	1.0
Forest application	0.6
Distribution and marketing	0.4

Source: Wischmeier and Smith (1978)

TABLE B-4
VALUES OF THE SUPPORT PRACTICE FACTOR (P^A) FOR USE IN THE USLE

Practice	Land Slope (percent)				
	1.1 - 2.0	2.1 - 7.0	7.1 - 12	12.1 - 18.0	18.1 - 24.0
	(Factor P)				
Contouring (P_c)	0.60	- 0.50	0.60	0.80	0.90
Contour strip cropping (P_sc)[b]					
R-R-M-M_1	0.30	0.25	0.30	0.40	0.45
R-W-M-M	0.30	0.25	0.30	0.40	0.45
R-R-W-M	0.45	0.38	0.45	0.60	0.68
R-W	0.52	0.44	0.52	0.70	0.90
R-O	0.60	0.50	0.60	0.80	0.90
Contour listing or ridge planting (P_{cl})	0.30	0.25	0.30	0.40	0.45
Contour terracing (P_t)[c]	[d]0.6/√n	0.5/√n	0.6/√n	0.8/√n	0.9/√n
No support practice	1.0	1.0	1.0	1.0	1.0

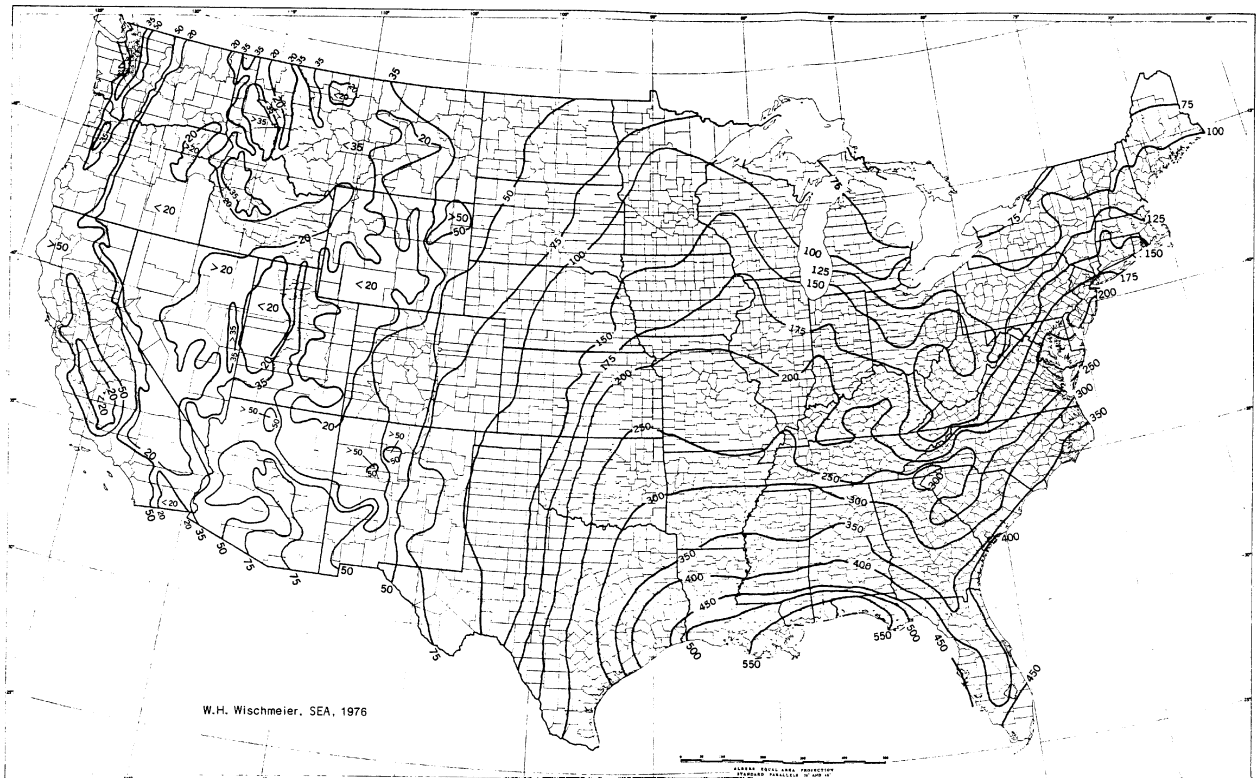
[a] Control of Water Pollution From Cropland, Vol. I, A Manual for Guideline Development, U.S. Environmental Protection Agency, Athens, GA. EPA-600/2-75-026a.

[b] R = rowcrop, W = fall-seeded grain, O = spring-seeded grain, M = meadow. The crops are grown in rotation and so arranged on the field that rowcrop strips are always separated by meadow or winter-grain strip.

[c] These P_t values estimate the amount of soil eroded to the terrace channels and are used for conservation planning. For prediction of off-field sediment, the P_t values are multiplied by 0.2.

[d] n = number of approximately equal-length intervals into which the field slope is divided by the terraces. Tillage operations must be parallel to the terraces.

FIGURE B-1
AVERAGE VALUES OF RAINFALL EROSIVITY (R) FOR USE IN THE USLE



[Source: Wischmeier and Smith (1978)

TABLE B-5
PARAMETERS USED TO CALCULATE PASQUILL-GIFFORD Σ_z

		σ_z(meters) = ax^b (x in km)	
Pasquill Stability Category	x (km)	a	b
A*	<.10	122.800	0.94470
	0.10 - 0.15	158.080	1.05420
	0.16 - 0.20	170.220	1.09320
	0.21 - 0.25	179.520	1.12620
	0.26 - 0.30	217.410	1.26440
	0.31 - 0.40	258.890	1.40940
	0.41 - 0.50	346.750	1.72830
	0.51 - 3.11	453.850	2.11660
	>3.11	**	**
B*	<.20	90.673	0.93198
	0.21 - 0.40	98.483	0.98332
	>0.40	109.300	1.09710
C*	All	61.141	0.91465
D	<.30	34.459	0.86974
	0.31 - 1.00	32.093	0.81066
	1.01 - 3.00	32.093	0.64403
	3.01 - 10.00	33.504	0.60486
	10.01 - 30.00	36.650	0.56589
	>30.00	44.053	0.51179

* If the calculated value of σ_z exceed 5000 m, σ_z is set to 5000 m.
** σ_z is equal to 5000 m.

TABLE B-5
PARAMETERS USED TO CALCULATE PASQUILL-GIFFORD Σ_z (Continuned)

		σ_z(meters) = ax^b (x in km)	
Pasquill Stability Category	x (km)	a	b
E	<.10	24.260	0.83660
	0.10 - 0.30	23.331	0.81956
	0.31 - 1.00	21.628	0.75660
	1.01 - 2.00	21.628	0.63077
	2.01 - 4.00	22.534	0.57154
	4.01 - 10.00	24.703	0.50527
	10.01 - 20.00	26.970	0.46713
	20.01 - 40.00	35.420	0.37615
	>40.00	47.618	0.29592
F	<.20	15.209	0.81558
	0.21 - 0.70	14.457	0.78407
	0.71 - 1.00	13.953	0.68465
	1.01 - 2.00	13.953	0.63227
	2.01 - 3.00	14.823	0.54503
	3.01 - 7.00	16.187	0.46490
	7.01 - 15.00	17.836	0.41507
	15.01 - 30.00	22.651	0.32681
	30.01 - 60.00	27.074	0.27436
	>60.00	34.219	0.21716

TABLE B-6
COEFFICIENTS USED TO CALCULATE LATERAL VIRTUAL DISTANCES FOR PASQUILL-GIFFORD DISPERSION RATES

$$x_y = \left(\frac{\sigma_{yo}}{p} \right)^{1/q}$$

Pasquill Stability Category	p	q
A	209.14	0.890
B	154.46	0.902
C	103.26	0.917
D	68.26	0.919
E	51.06	0.921
F	33.92	0.919

FIGURE B-2
THRESHOLD FRICTION VELOCITY

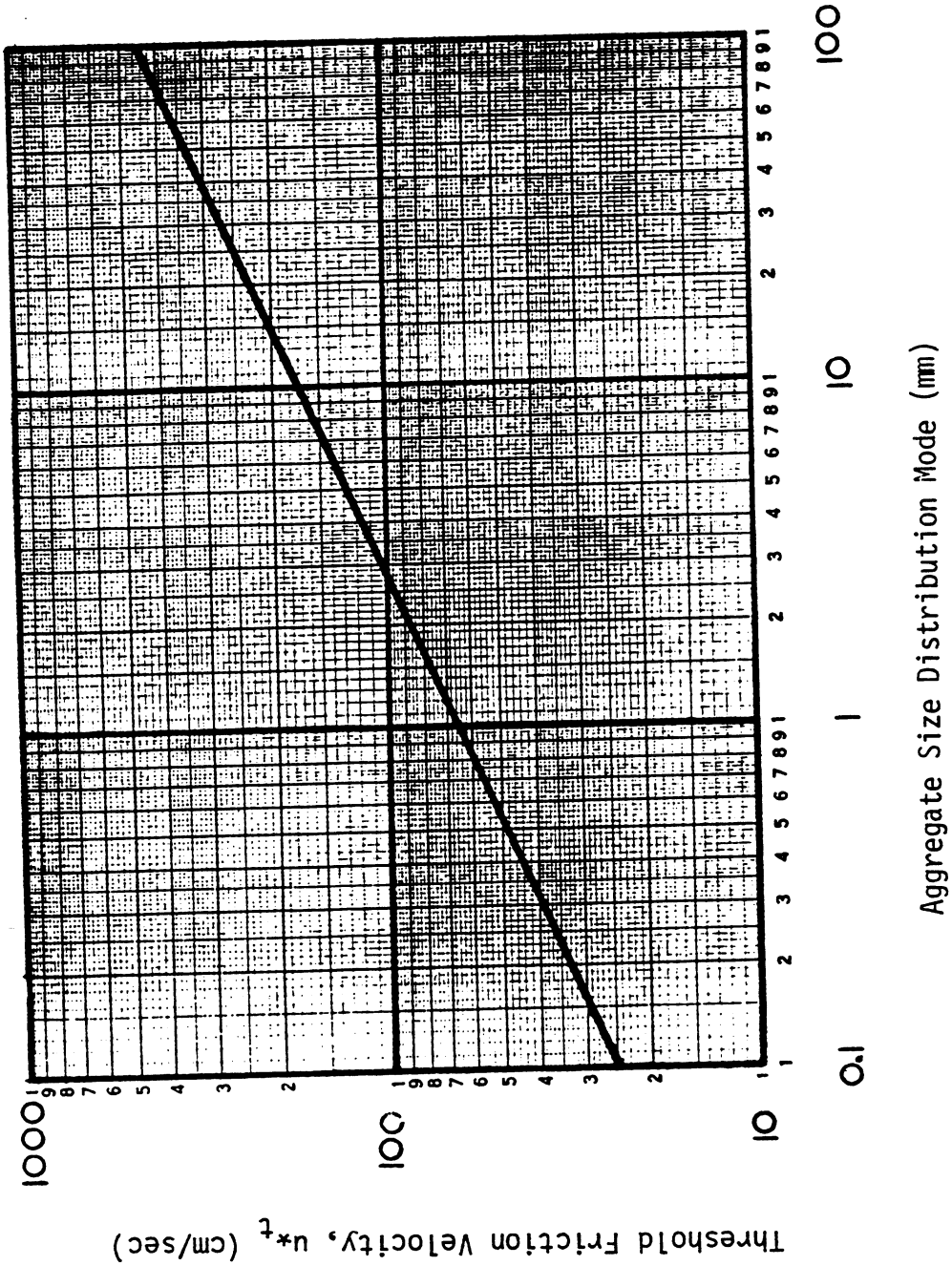


FIGURE B-3
ROUGHNESS HEIGHT

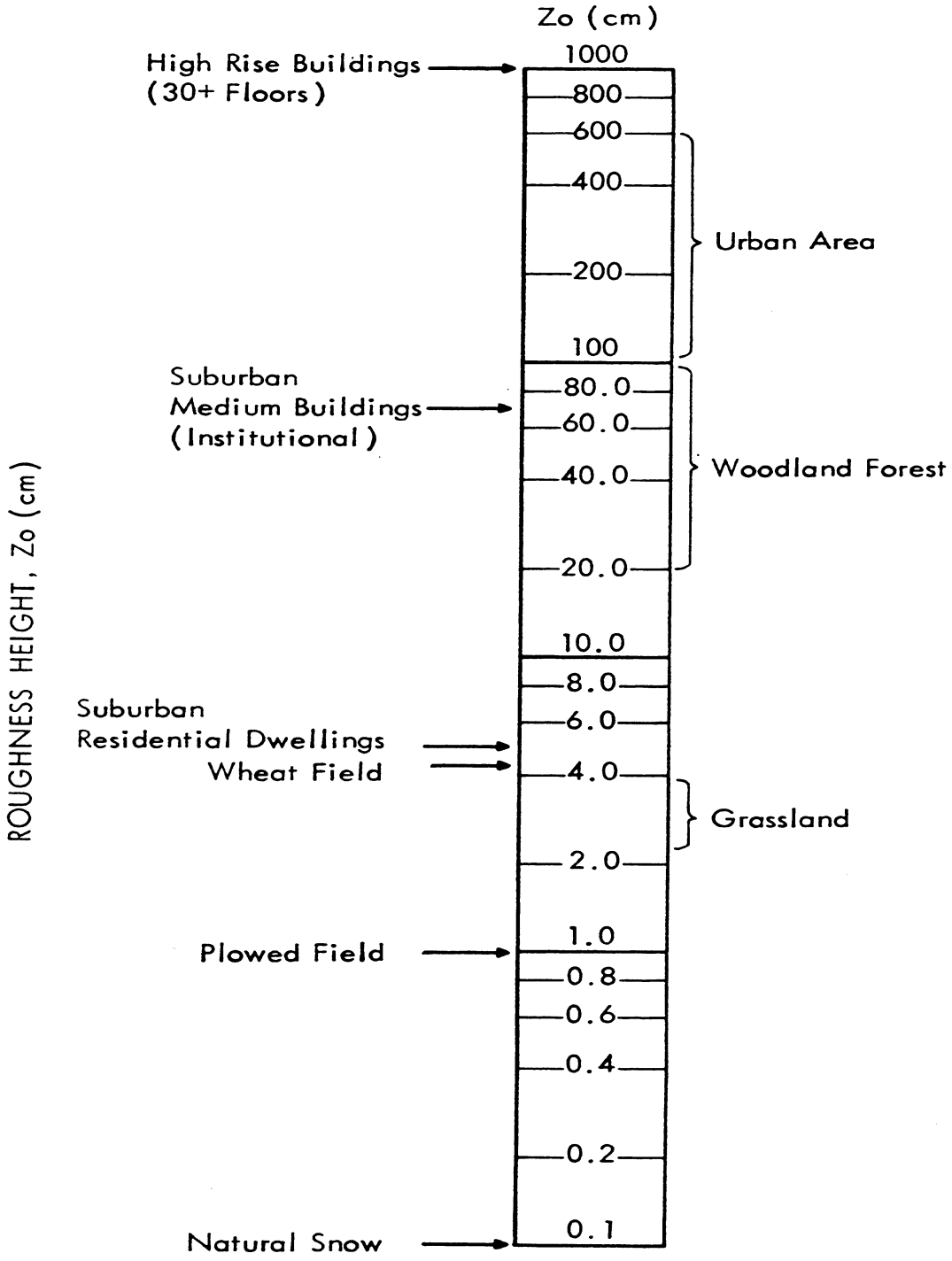


FIGURE B-4
ROUGHNESS HEIGHT

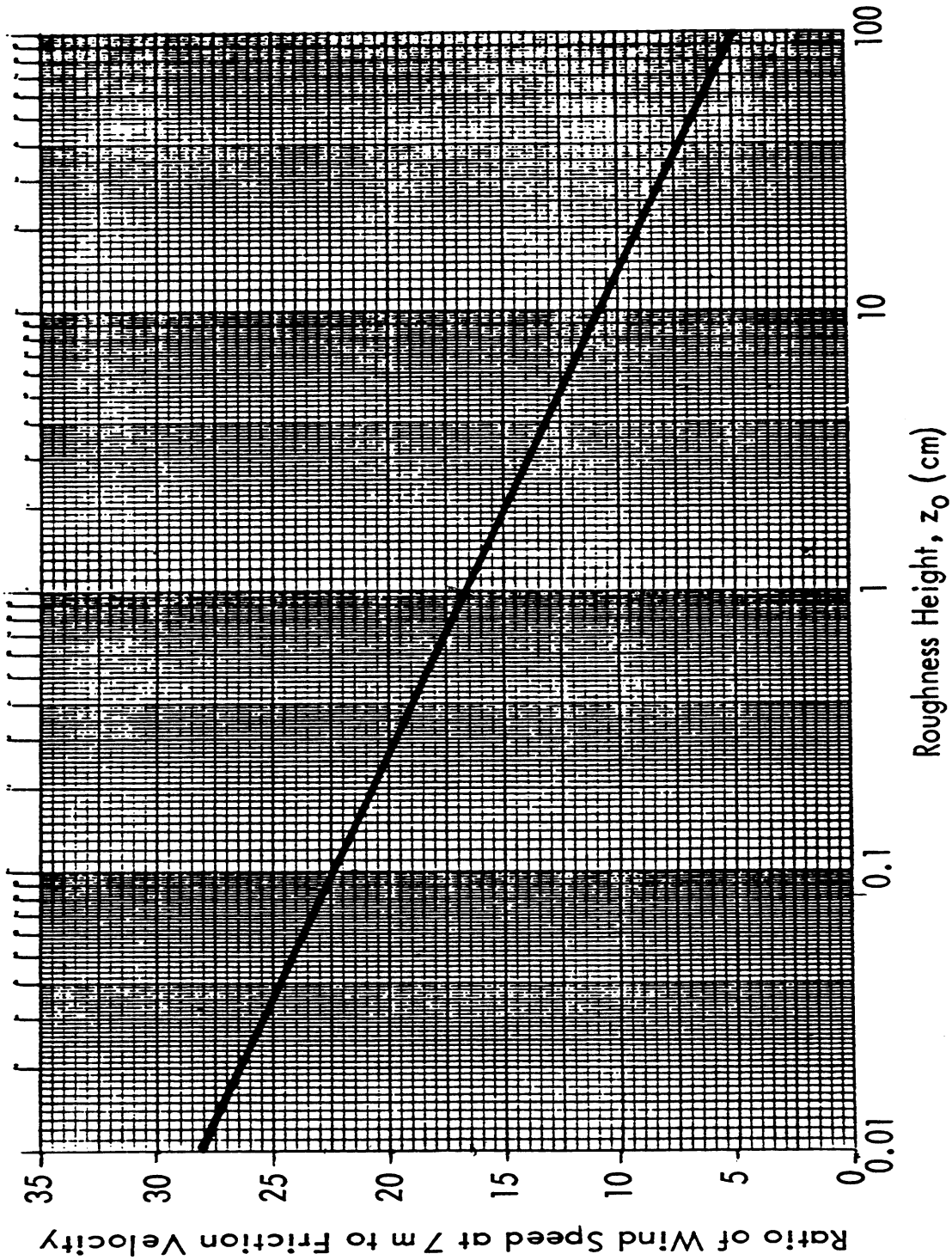


FIGURE B-5
FUNCTION F(X) NEEDED IN EQUATION 2-9

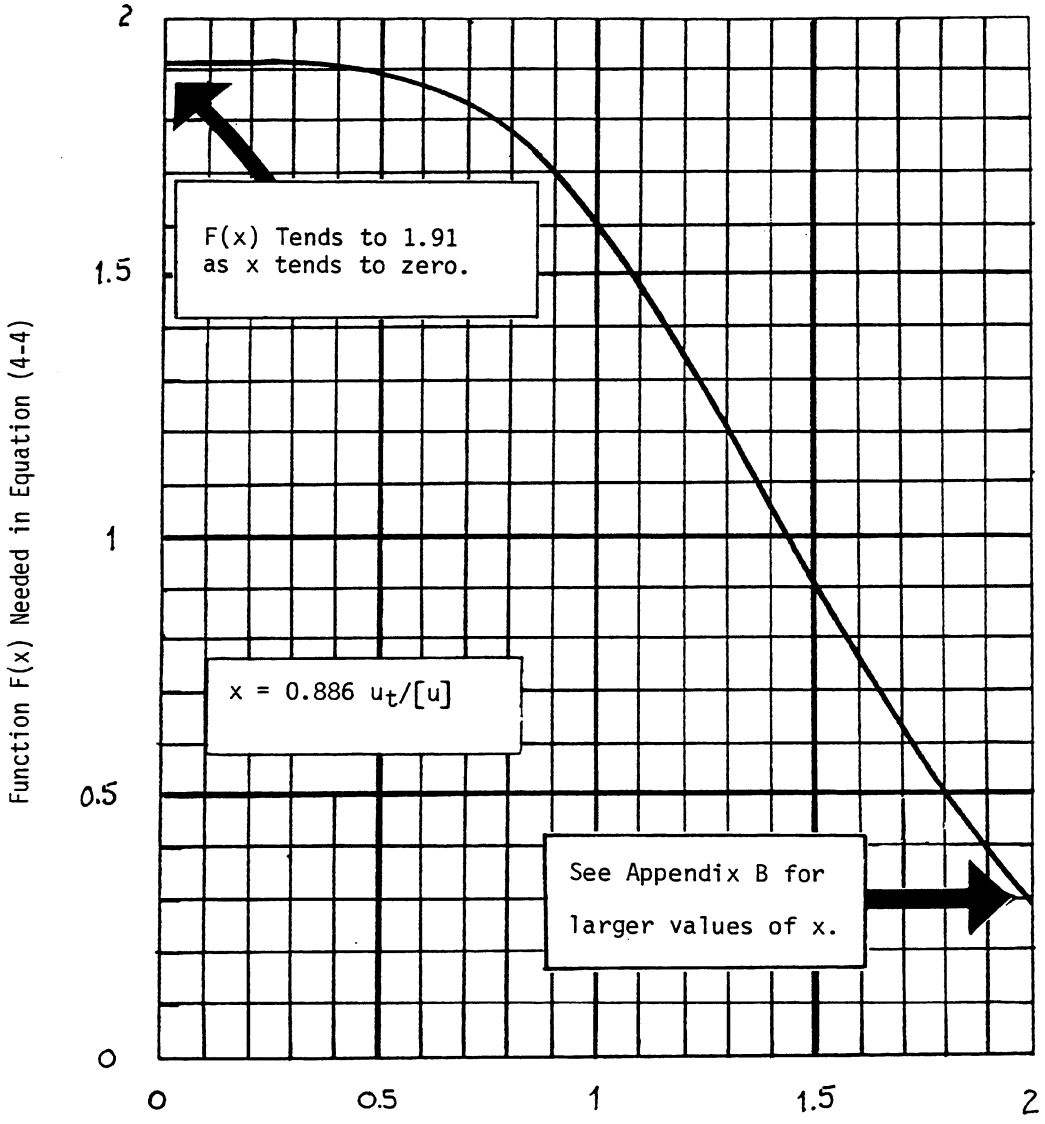
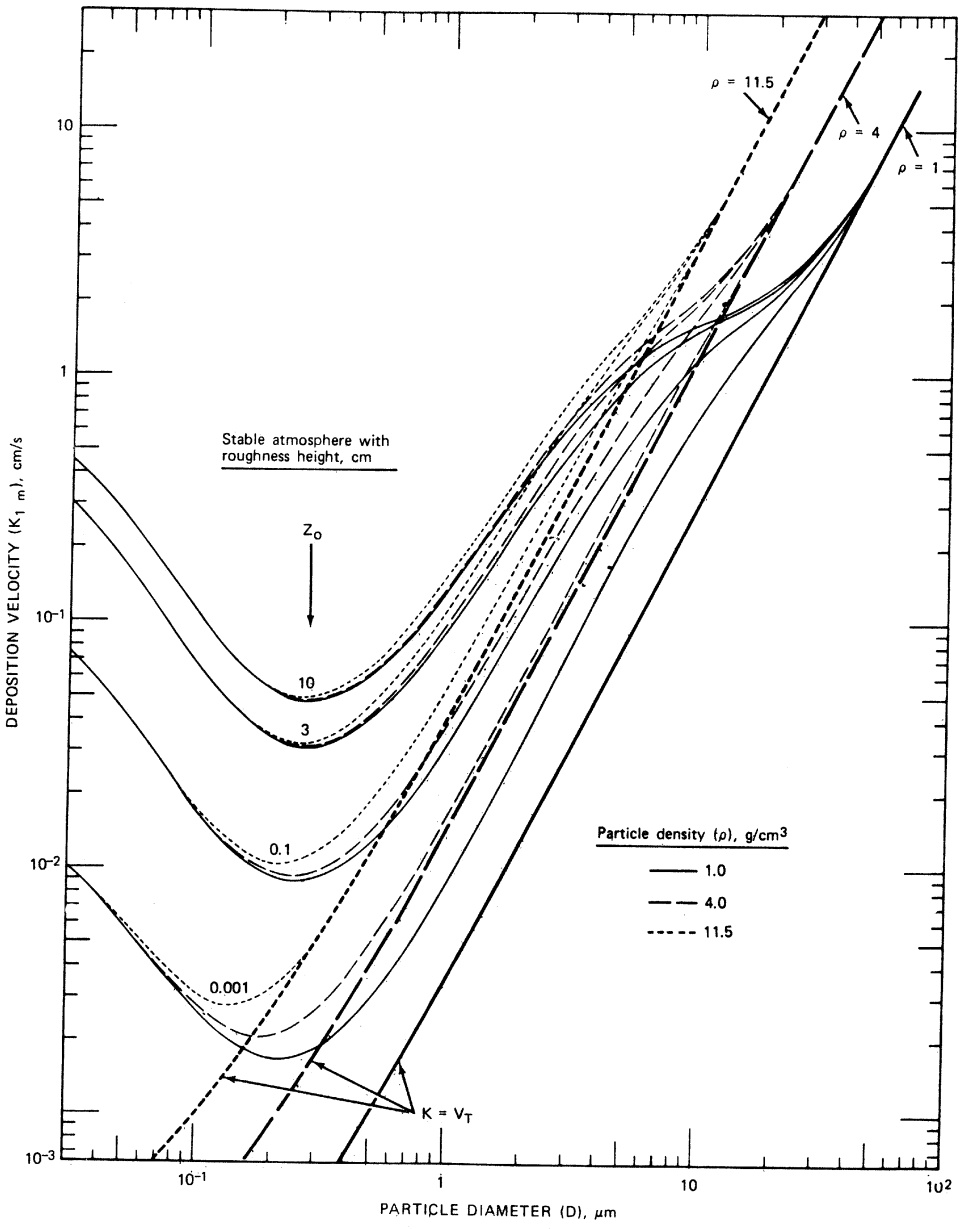


FIGURE B-6
DEPOSITION AND RESUSPENSION FROM "ATMOSPHERIC SCIENCE AND POWER PRODUCTION", 1984 U.S. Department of Energy, DOE/TIC-27601 (DE84005177)



Predicted deposition velocities at 1 m for $u_* = 50$ cm/s and particle densities of 1, 4, and 11.5 g/cm^3