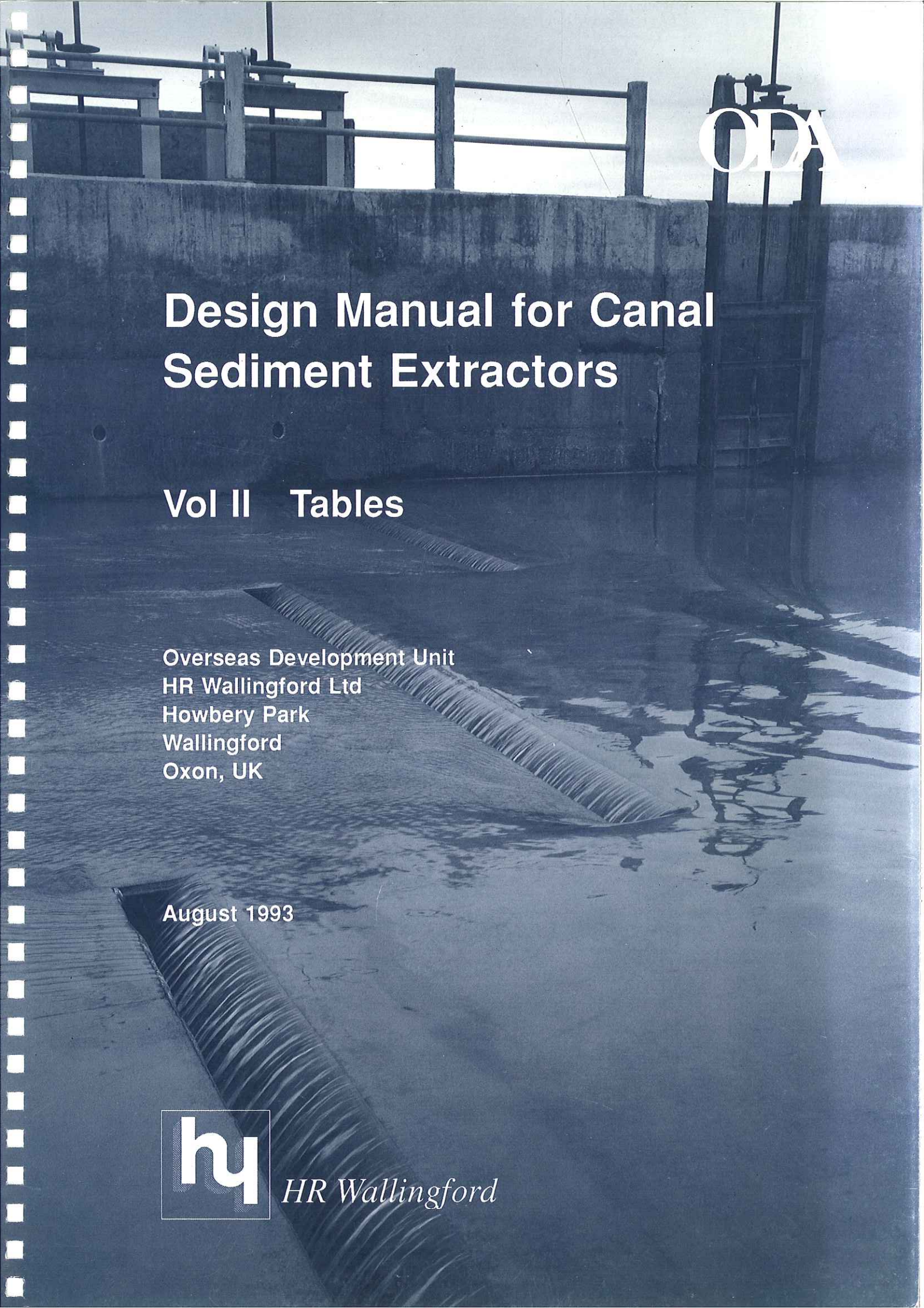

Design Manual for Canal Sediment Extractors

Vol II Tables

Overseas Development Unit
HR Wallingford Ltd
Howbery Park
Wallingford
Oxon, UK

August 1993

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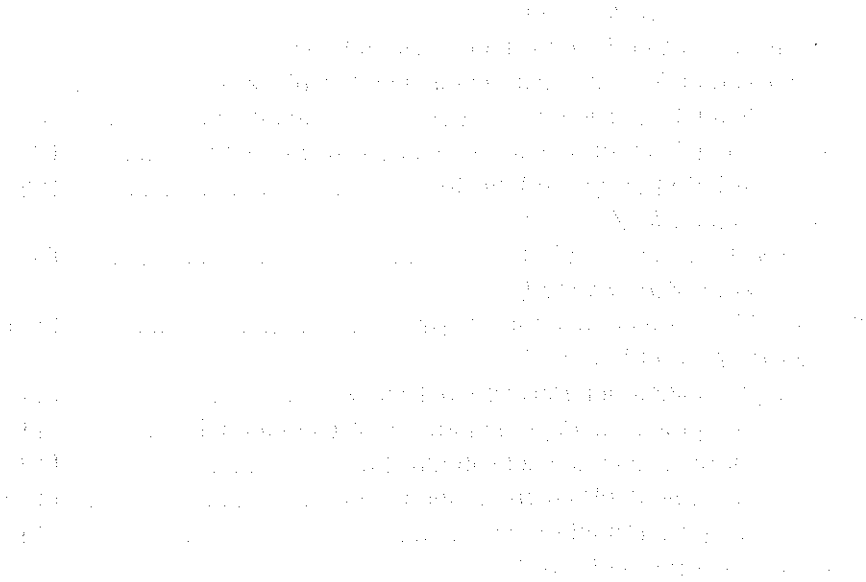

Tables for predicting trapping efficiency

Example of linear interpolation between tables

To find the predicted trapping efficiency of an extractor in a canal with:

Flow per m width, q = 1.4m²/s
Froude number, Fr = 0.22
D_{50} bed sediment size = 0.283mm, and
D_{50}/D_{10} = 1.89.

In this example the trapping efficiency is calculated at an extraction ratio of 5%. The four tables, Table 4.5(b), 4.5(c), 4.6(b) and 4.6(c) are required. We start with Table 4.5(b), D_{50} = 0.25mm and D_{50}/D_{10} = 1.5.

The actual conditions of q = 1.4m²/s and Fr = 0.22 are straddled by q = 1.0m²/s and q = 1.5m²/s, and Fr = 0.20 and Fr = 0.25. The four predictions of trapping efficiency for these two pairs of values range from 30% to 35%. Linear interpolation between these values will not significantly increase the accuracy so a value of 32% is taken (discharge per m width is much nearer 1.5m²/s than 1.0m²/s so these values are taken, then Froude number is slightly nearer 0.20 than 0.25 so 32% is chosen).

Similarly from Tables 4.5(c), 4.6(b) and 4.6(c) we get the following efficiencies.

D_{50}	D_{50}/D_{10} ratio	
size	1.50	2.00
0.25mm	32%	23%
0.3mm	38%	27%

Taking D_{50} = 0.25mm first, and interpolating between D_{50}/D_{10} = 1.50 and D_{50}/D_{10} = 2.00:

$$\alpha = \frac{1.89 - 1.50}{2.00 - 1.50} = 0.78$$

efficiency $= \alpha * 23 + (1 - \alpha) * 32$
$= 0.78 * 23 + 0.22 * 32 = 25.0\%$

Similarly for D_{50} = 0.3mm

$$\alpha = \frac{1.89 - 1.50}{2.00 - 1.50} = 0.78$$

efficiency $= 0.78 * 27 + 0.22 * 38 = 29.4\%$

Finally interpolating between D_{50} = 0.25m and 0.3mm

$$\alpha = \frac{0.283 - 0.25}{0.30 - 0.25} = 0.66$$

efficiency $= 0.66 * 29.4 + 0.34 * 25.0 = 27.9\%$

This is rounded to 28%.

Prediction tables using bed material sediment sizes

Table 4.1(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	25	23	21	20	19	17	17	16	16	15	15	14	14	14
	R=10%	43	39	37	35	33	31	30	29	28	28	27	26	26	25
	R=15%	57	52	49	46	45	42	41	40	39	38	37	37	36	35
	R=20%	66	62	59	56	54	52	50	49	48	47	46	45	44	44
	R=25%	74	69	67	64	62	60	58	57	56	55	54	53	52	51
0.15	R= 5%	18	17	17	16	16	15	14	14	14	13	13	13	12	12
	R=10%	32	31	30	29	28	27	26	26	25	25	24	24	23	23
	R=15%	44	42	41	40	39	38	37	36	35	35	34	34	33	32
	R=20%	53	52	51	49	48	47	46	45	44	43	43	42	41	40
	R=25%	61	60	58	57	56	54	53	53	52	51	50	50	49	48
0.20	R= 5%	16	16	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	29	28	28	27	26	25	25	24	24	23	23	22	22	21
	R=15%	40	39	38	37	37	35	35	34	33	33	32	32	31	30
	R=20%	49	48	47	46	45	44	43	42	42	41	40	40	39	38
	R=25%	56	56	55	54	53	52	51	50	49	48	48	47	46	46
0.25	R= 5%	15	15	14	14	13	13	13	12	12	12	11	11	11	11
	R=10%	27	27	26	25	25	24	23	23	23	22	22	21	21	20
	R=15%	38	37	36	35	35	34	33	32	32	31	31	30	30	29
	R=20%	46	46	45	44	43	42	41	41	40	39	39	38	38	37
	R=25%	54	53	53	52	51	50	49	48	48	47	46	46	45	44
0.30	R= 5%	14	14	14	13	13	12	12	12	12	11	11	11	11	10
	R=10%	26	25	25	24	24	23	22	22	22	21	21	20	20	20
	R=15%	36	35	35	34	33	32	32	31	31	30	30	29	29	28
	R=20%	45	44	43	43	42	41	40	39	39	38	38	37	36	36
	R=25%	52	52	51	50	49	48	47	47	46	45	45	44	43	43
0.35	R= 5%	14	13	13	13	12	12	12	11	11	11	11	10	10	10
	R=10%	25	24	24	23	23	22	22	21	21	20	20	20	19	18
	R=15%	35	34	34	33	32	31	31	30	30	29	29	28	27	27
	R=20%	43	43	42	41	41	40	39	38	38	37	37	36	35	34
	R=25%	51	50	50	49	48	47	46	45	45	44	44	43	42	41
0.40	R= 5%	13	13	12	12	12	11	11	11	11	10	10	10	9	9
	R=10%	24	24	23	23	22	22	21	21	20	20	19	19	18	18
	R=15%	34	33	33	32	31	31	30	29	29	28	28	27	26	25
	R=20%	42	42	41	40	40	39	38	37	37	36	36	35	34	33
	R=25%	50	49	49	48	47	46	45	45	44	43	43	42	40	39
0.45	R= 5%	13	12	12	12	12	11	11	11	10	10	10	9	9	9
	R=10%	23	23	23	22	22	21	21	20	20	19	19	18	17	17
	R=15%	33	32	32	31	31	30	29	29	28	28	27	26	25	24
	R=20%	41	41	40	39	39	38	37	37	36	35	34	33	32	32
	R=25%	49	48	48	47	46	45	44	44	43	42	41	40	39	38
0.50	R= 5%	12	12	12	11	11	11	11	10	10	10	9	9	9	8
	R=10%	23	22	22	22	21	21	20	20	19	18	18	17	17	16
	R=15%	32	32	31	31	30	29	29	28	28	27	26	25	24	24
	R=20%	41	40	39	39	38	37	36	36	35	34	33	32	31	31
	R=25%	48	47	47	46	45	44	44	43	42	41	40	39	38	37
0.55	R= 5%	12	12	12	11	11	11	10	10	10	9	9	9	8	8
	R=10%	22	22	22	21	21	20	20	19	19	18	17	17	16	16
	R=15%	32	31	31	30	30	29	28	27	27	26	25	24	24	23
	R=20%	40	39	39	38	38	37	36	35	34	33	32	32	31	30
	R=25%	47	47	46	45	45	44	43	42	41	40	39	38	37	36

Table 4.1(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	19	18	17	16	16	15	14	14	14	13	13	13	12	12
	R=10%	34	32	31	29	28	27	26	25	25	24	24	23	23	22
	R=15%	45	43	41	40	38	37	36	35	34	33	33	32	32	31
	R=20%	54	51	50	48	47	45	44	43	43	42	41	41	40	39
	R=25%	61	59	57	56	54	52	51	50	50	49	48	48	47	46
0.15	R= 5%	15	15	14	14	14	13	13	12	12	12	12	11	11	11
	R=10%	28	27	26	25	25	24	23	23	22	22	22	21	21	20
	R=15%	38	37	36	35	34	33	33	32	32	31	30	30	29	29
	R=20%	46	45	44	43	43	41	41	40	40	39	38	38	37	37
	R=25%	53	52	52	51	50	49	48	47	47	46	45	45	44	44
0.20	R= 5%	14	14	13	13	13	12	12	11	11	11	11	11	10	10
	R=10%	25	25	24	24	23	22	22	21	21	21	20	20	20	19
	R=15%	35	34	34	33	32	31	31	30	30	29	29	28	28	27
	R=20%	43	42	42	41	40	39	39	38	38	37	36	36	35	35
	R=25%	50	50	49	48	48	47	46	45	45	44	43	43	42	42
0.25	R= 5%	13	13	12	12	12	11	11	11	11	10	10	10	10	10
	R=10%	24	23	23	22	22	21	21	20	20	20	19	19	19	18
	R=15%	33	33	32	32	31	30	29	29	29	28	28	27	27	26
	R=20%	41	41	40	39	39	38	37	37	36	36	35	35	34	34
	R=25%	48	48	47	47	46	45	44	44	43	43	42	42	41	41
0.30	R= 5%	12	12	12	12	11	11	11	10	10	10	10	10	9	9
	R=10%	23	22	22	22	21	21	20	20	19	19	19	19	18	18
	R=15%	32	31	31	30	30	29	29	28	28	27	27	27	26	25
	R=20%	40	39	39	38	38	37	36	36	35	35	34	34	33	32
	R=25%	47	47	46	45	45	44	43	43	42	41	41	41	40	39
0.35	R= 5%	12	12	11	11	11	11	10	10	10	10	10	9	9	9
	R=10%	22	22	21	21	21	20	19	19	19	19	18	18	17	17
	R=15%	31	31	30	30	29	28	28	27	27	27	26	26	25	24
	R=20%	39	38	38	37	37	36	35	35	34	34	33	33	32	31
	R=25%	46	45	45	44	44	43	42	42	41	41	40	40	38	38
0.40	R= 5%	12	11	11	11	11	10	10	10	10	9	9	9	9	8
	R=10%	21	21	21	20	20	19	19	19	18	18	17	17	16	16
	R=15%	30	30	29	29	28	28	27	27	26	26	25	25	24	23
	R=20%	38	37	37	36	36	35	35	34	34	33	32	32	31	30
	R=25%	45	44	44	43	43	42	41	41	40	40	39	38	37	36
0.45	R= 5%	11	11	11	11	10	10	10	10	9	9	9	9	8	8
	R=10%	21	21	20	20	20	19	19	18	18	17	17	16	16	15
	R=15%	30	29	29	28	28	27	27	26	26	25	24	24	23	22
	R=20%	37	37	36	36	35	34	34	34	33	32	31	31	30	29
	R=25%	44	44	43	43	42	41	41	40	40	39	38	37	36	35
0.50	R= 5%	11	11	11	10	10	10	10	9	9	9	8	8	8	8
	R=10%	20	20	20	19	19	19	18	18	17	17	16	16	15	15
	R=15%	29	29	28	28	27	27	26	25	25	24	24	23	22	22
	R=20%	37	36	36	35	35	34	33	33	32	31	30	30	29	28
	R=25%	44	43	43	42	42	41	40	39	39	37	37	36	35	35
0.55	R= 5%	11	10	10	10	10	10	9	9	9	8	8	8	8	8
	R=10%	20	20	19	19	19	18	18	17	17	16	16	15	15	15
	R=15%	28	28	28	27	27	26	25	25	24	23	23	22	22	21
	R=20%	36	36	35	35	34	33	33	32	31	30	30	29	28	28
	R=25%	43	42	42	41	41	40	39	38	38	37	36	35	35	34

Table 4.1(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	16	15	15	14	14	13	12	12	12	11	11	11	11	11
	R=10%	28	27	26	25	24	23	23	22	22	21	21	21	20	20
	R=15%	38	37	36	35	34	32	31	31	31	30	29	29	28	28
	R=20%	47	45	44	43	42	40	39	39	38	37	37	37	36	36
	R=25%	54	52	51	50	49	47	46	46	45	44	44	43	43	42
0.15	R= 5%	13	13	13	12	12	11	11	11	11	10	10	10	10	10
	R=10%	24	23	23	22	22	21	21	20	20	20	19	19	19	18
	R=15%	33	32	32	31	31	30	29	29	28	28	27	27	27	26
	R=20%	41	40	40	39	38	37	37	36	36	35	35	34	34	33
	R=25%	48	47	46	46	45	44	43	43	43	42	41	41	40	40
0.20	R= 5%	12	12	12	11	11	11	10	10	10	10	10	10	9	9
	R=10%	22	22	21	21	21	20	20	19	19	19	18	18	18	17
	R=15%	31	30	30	29	29	28	28	27	27	26	26	26	25	25
	R=20%	39	38	38	37	36	36	35	35	34	34	33	33	32	32
	R=25%	45	45	44	44	43	42	42	41	41	40	40	40	39	39
0.25	R= 5%	11	11	11	11	10	10	10	10	10	9	9	9	9	9
	R=10%	21	21	20	20	20	19	19	18	18	18	18	17	17	17
	R=15%	30	29	29	28	28	27	27	26	26	26	25	25	25	24
	R=20%	37	37	36	36	35	34	34	34	33	33	32	32	32	31
	R=25%	44	43	43	43	42	41	41	40	40	39	39	38	38	38
0.30	R= 5%	11	11	11	10	10	10	10	9	9	9	9	9	9	8
	R=10%	20	20	20	19	19	18	18	18	18	17	17	17	16	16
	R=15%	29	28	28	27	27	26	26	26	25	25	25	24	24	23
	R=20%	36	36	35	35	34	34	33	33	32	32	31	31	31	30
	R=25%	43	42	42	41	41	40	40	39	39	38	38	38	37	36
0.35	R= 5%	11	10	10	10	10	9	9	9	9	9	9	8	8	8
	R=10%	20	19	19	19	18	18	18	17	17	17	17	16	16	15
	R=15%	28	28	27	27	26	26	25	25	25	24	24	23	23	22
	R=20%	35	35	34	34	34	33	32	32	32	31	31	30	29	29
	R=25%	42	42	41	41	40	39	39	38	38	38	37	37	36	35
0.40	R= 5%	10	10	10	10	9	9	9	9	9	9	8	8	8	8
	R=10%	19	19	19	18	18	18	17	17	17	16	16	16	15	15
	R=15%	27	27	27	26	26	25	25	24	24	24	23	23	22	22
	R=20%	35	34	34	33	33	32	32	31	31	30	30	29	29	28
	R=25%	41	41	40	40	39	39	38	38	38	37	36	36	35	34
0.45	R= 5%	10	10	10	9	9	9	9	9	8	8	8	8	8	7
	R=10%	19	18	18	18	18	17	17	17	16	16	15	15	15	14
	R=15%	27	26	26	26	25	25	24	24	24	23	22	22	21	21
	R=20%	34	34	33	33	32	32	31	31	30	30	29	28	28	27
	R=25%	41	40	40	39	39	38	38	37	37	36	35	35	34	33
0.50	R= 5%	10	10	9	9	9	9	9	8	8	8	8	8	7	7
	R=10%	18	18	18	18	17	17	17	16	16	15	15	15	14	14
	R=15%	26	26	26	25	25	24	24	23	23	22	22	21	21	21
	R=20%	33	33	33	32	32	31	31	30	30	29	28	28	27	27
	R=25%	40	40	39	39	38	38	37	36	36	35	34	34	33	33
0.55	R= 5%	10	9	9	9	9	9	8	8	8	8	8	7	7	7
	R=10%	18	18	18	17	17	17	16	16	15	15	15	14	14	14
	R=15%	26	26	25	25	25	24	23	23	22	22	21	21	20	20
	R=20%	33	33	32	32	32	31	30	29	29	28	28	27	27	26
	R=25%	40	39	39	38	38	37	36	36	35	34	34	33	33	32

Table 4.2(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.12 wmm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	36	33	29	26	24	22	21	20	20	19	18	18	17	17
	R=10%	58	53	48	44	42	39	37	36	35	34	33	32	31	30
	R=15%	72	67	61	57	55	51	49	48	47	45	44	44	42	42
	R=20%	81	77	71	67	64	61	59	58	57	55	54	53	52	51
	R=25%	87	83	78	75	72	69	67	65	64	63	62	61	60	59
0.15	R= 5%	24	23	22	21	20	19	18	17	17	16	16	16	15	15
	R=10%	40	39	38	36	35	33	32	31	31	30	29	29	28	27
	R=15%	53	51	50	48	47	45	44	43	42	41	40	40	39	38
	R=20%	63	61	60	58	57	55	53	52	52	50	50	49	48	47
	R=25%	70	69	68	66	64	62	61	60	59	58	57	57	56	55
0.20	R= 5%	20	20	19	18	18	17	16	16	16	15	15	14	14	14
	R=10%	36	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=15%	48	46	46	44	43	42	41	40	39	38	38	37	36	35
	R=20%	57	56	55	54	53	51	50	49	49	48	47	46	45	44
	R=25%	65	64	63	62	61	59	58	57	56	55	54	54	53	52
0.25	R= 5%	19	18	18	17	17	16	15	15	15	14	14	14	13	13
	R=10%	33	32	32	31	30	29	28	27	27	26	26	25	25	24
	R=15%	45	44	43	42	41	40	39	38	37	36	36	35	34	34
	R=20%	54	53	52	51	50	49	48	47	46	45	45	44	43	42
	R=25%	62	61	60	59	58	57	56	55	54	53	52	52	51	50
0.30	R= 5%	18	17	17	16	16	15	15	14	14	14	13	13	13	12
	R=10%	31	31	30	29	29	28	27	26	26	25	25	24	23	23
	R=15%	43	42	41	40	40	38	37	36	36	35	34	34	33	32
	R=20%	52	51	51	49	49	47	46	45	45	44	43	42	42	41
	R=25%	60	59	58	57	56	55	54	53	52	51	51	50	49	48
0.35	R= 5%	17	16	16	15	15	14	14	14	13	13	13	12	12	12
	R=10%	30	29	29	28	28	26	26	25	25	24	24	23	23	22
	R=15%	41	40	40	39	38	37	36	35	35	34	33	33	32	31
	R=20%	50	50	49	48	47	46	45	44	43	42	42	41	40	39
	R=25%	58	57	57	56	55	53	52	52	51	50	49	49	48	47
0.40	R= 5%	16	16	15	15	14	14	13	13	13	12	12	12	11	11
	R=10%	29	28	28	27	27	26	25	24	24	23	23	23	22	21
	R=15%	40	39	39	38	37	36	35	34	34	33	32	32	31	30
	R=20%	49	48	48	47	46	44	44	43	42	41	41	40	39	37
	R=25%	57	56	55	54	54	52	51	50	50	49	48	48	46	45
0.45	R= 5%	15	15	15	14	14	13	13	13	12	12	12	11	11	10
	R=10%	28	28	27	26	26	25	24	24	23	23	22	21	20	20
	R=15%	39	38	38	37	36	35	34	33	33	32	31	30	29	28
	R=20%	48	47	46	45	45	43	43	42	41	40	40	39	37	36
	R=25%	56	55	54	53	52	51	50	49	49	48	47	46	44	43
0.50	R= 5%	15	15	14	14	14	13	13	12	12	12	11	11	10	10
	R=10%	27	27	26	26	25	24	24	23	23	22	21	20	20	19
	R=15%	38	37	37	36	35	34	33	33	32	31	30	29	28	27
	R=20%	47	46	45	45	44	43	42	41	41	39	38	37	36	35
	R=25%	55	54	53	52	51	50	49	49	48	47	45	44	43	42
0.55	R= 5%	15	14	14	14	13	13	12	12	12	11	11	10	10	10
	R=10%	27	26	26	25	25	24	23	23	22	21	20	20	19	18
	R=15%	37	36	36	35	34	33	33	32	31	30	29	28	27	26
	R=20%	46	45	45	44	43	42	41	40	39	38	37	36	35	34
	R=25%	54	53	52	51	51	49	48	48	47	45	44	43	42	40

Table 4.2(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	27	24	23	21	20	18	18	17	17	16	16	15	15	14
	R=10%	44	40	38	36	34	32	31	30	29	29	28	27	27	26
	R=15%	57	52	50	47	46	43	42	41	40	39	38	38	37	36
	R=20%	66	61	59	56	55	52	51	50	49	48	47	46	45	45
	R=25%	73	68	66	63	62	60	58	57	56	55	54	54	53	52
0.15	R= 5%	19	19	18	17	17	16	15	15	15	14	14	14	13	13
	R=10%	33	32	32	30	30	28	28	27	27	26	25	25	24	24
	R=15%	45	43	42	41	40	39	38	37	37	36	35	35	34	33
	R=20%	53	52	51	50	49	48	46	46	45	44	44	43	42	41
	R=25%	61	59	59	57	56	55	54	53	52	52	51	50	49	49
0.20	R= 5%	17	17	16	16	15	15	14	14	14	13	13	13	12	12
	R=10%	30	29	29	28	27	26	26	25	25	24	24	23	23	22
	R=15%	41	40	39	38	38	36	36	35	34	34	33	33	32	31
	R=20%	49	49	48	47	46	45	44	43	43	42	41	41	40	39
	R=25%	57	56	55	54	54	52	51	51	50	49	49	48	47	47
0.25	R= 5%	16	15	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	28	28	27	26	26	25	24	24	24	23	23	22	22	21
	R=15%	39	38	37	36	36	35	34	33	33	32	32	31	31	30
	R=20%	47	46	46	45	44	43	42	42	41	40	40	39	38	38
	R=25%	55	54	53	52	52	50	50	49	48	48	47	46	46	45
0.30	R= 5%	15	15	14	14	14	13	13	12	12	12	12	11	11	11
	R=10%	27	26	26	25	25	24	23	23	23	22	22	21	21	20
	R=15%	37	36	36	35	35	33	33	32	32	31	31	30	30	29
	R=20%	46	45	44	44	43	42	41	40	40	39	38	38	37	37
	R=25%	53	52	52	51	50	49	48	47	47	46	46	45	44	44
0.35	R= 5%	14	14	14	13	13	12	12	12	12	11	11	11	11	10
	R=10%	26	26	25	24	24	23	23	22	22	21	21	21	20	19
	R=15%	36	35	35	34	33	32	32	31	31	30	30	29	28	28
	R=20%	44	44	43	42	42	41	40	39	39	38	37	37	36	35
	R=25%	52	51	50	50	49	48	47	46	46	45	45	44	43	42
0.40	R= 5%	14	13	13	13	13	12	12	12	11	11	11	10	10	10
	R=10%	25	25	24	24	23	22	22	22	21	21	20	20	19	18
	R=15%	35	34	34	33	33	32	31	30	30	29	29	28	27	26
	R=20%	43	43	42	41	41	40	39	38	38	37	37	36	35	34
	R=25%	50	50	49	48	48	47	46	45	45	44	44	43	41	40
0.45	R= 5%	13	13	13	12	12	12	11	11	11	11	10	10	10	9
	R=10%	24	24	24	23	23	22	21	21	21	20	19	19	18	18
	R=15%	34	33	33	32	32	31	30	30	29	29	28	27	26	25
	R=20%	42	42	41	40	40	39	38	38	37	36	35	34	33	32
	R=25%	50	49	48	48	47	46	45	45	44	43	42	41	40	39
0.50	R= 5%	13	13	12	12	12	11	11	11	11	10	10	10	9	9
	R=10%	24	23	23	23	22	21	21	21	20	19	19	18	17	17
	R=15%	33	33	32	32	31	30	30	29	29	27	27	26	25	24
	R=20%	41	41	40	40	39	38	37	37	36	35	34	33	32	31
	R=25%	49	48	48	47	46	45	44	44	43	42	41	40	39	38
0.55	R= 5%	13	12	12	12	12	11	11	11	10	10	9	9	9	9
	R=10%	23	23	23	22	22	21	21	20	19	19	18	18	17	16
	R=15%	33	32	32	31	31	30	29	28	28	27	26	25	24	24
	R=20%	41	40	40	39	38	37	37	36	35	34	33	32	31	31
	R=25%	48	47	47	46	46	45	44	43	42	41	40	39	38	37

Table 4.2(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	21	20	19	17	17	16	15	14	14	14	13	13	13	12
	R=10%	35	33	32	30	29	28	27	26	26	25	24	24	23	23
	R=15%	46	44	42	40	39	38	36	36	35	34	34	33	32	32
	R=20%	55	53	51	49	48	46	45	44	43	42	42	41	40	40
	R=25%	62	60	58	56	55	53	52	51	50	49	49	48	47	47
0.15	R= 5%	16	16	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	29	28	27	26	26	25	24	24	23	23	22	22	21	21
	R=15%	39	38	37	36	35	34	33	33	32	32	31	31	30	30
	R=20%	47	46	45	44	43	42	41	41	40	40	39	39	38	37
	R=25%	54	53	52	51	50	49	48	48	47	47	46	45	45	44
0.20	R= 5%	15	14	14	13	13	13	12	12	12	11	11	11	11	11
	R=10%	26	25	25	24	24	23	23	22	22	21	21	21	20	20
	R=15%	36	35	34	34	33	32	32	31	31	30	30	29	29	28
	R=20%	44	43	43	42	41	40	39	39	38	38	37	37	36	36
	R=25%	51	50	50	49	48	47	46	46	45	45	44	44	43	42
0.25	R= 5%	14	13	13	13	12	12	12	11	11	11	11	11	10	10
	R=10%	25	24	24	23	23	22	22	21	21	20	20	20	19	19
	R=15%	34	33	33	32	32	31	30	30	29	29	28	28	28	27
	R=20%	42	41	41	40	40	39	38	37	37	36	36	36	35	34
	R=25%	49	48	48	47	47	46	45	44	44	43	43	42	42	41
0.30	R= 5%	13	13	12	12	12	11	11	11	11	10	10	10	10	10
	R=10%	24	23	23	22	22	21	21	20	20	20	19	19	19	18
	R=15%	33	32	32	31	31	30	29	29	28	28	28	27	27	26
	R=20%	41	40	40	39	38	37	37	36	36	35	35	35	34	33
	R=25%	48	47	47	46	45	44	44	43	43	42	42	41	41	40
0.35	R= 5%	12	12	12	12	11	11	11	11	10	10	10	10	9	9
	R=10%	23	22	22	22	21	21	20	20	19	19	19	19	18	17
	R=15%	32	31	31	30	30	29	28	28	28	27	27	27	26	25
	R=20%	40	39	39	38	37	37	36	35	35	35	34	34	33	32
	R=25%	47	46	46	45	44	43	43	42	42	41	41	40	39	38
0.40	R= 5%	12	12	12	11	11	11	10	10	10	10	10	9	9	9
	R=10%	22	22	21	21	21	20	20	19	19	19	18	18	17	17
	R=15%	31	30	30	30	29	28	28	27	27	27	26	25	25	24
	R=20%	39	38	38	37	37	36	35	35	34	34	33	33	32	31
	R=25%	46	45	45	44	43	43	42	41	41	41	40	39	38	37
0.45	R= 5%	12	11	11	11	11	10	10	10	10	9	9	9	9	8
	R=10%	22	21	21	20	20	20	19	19	19	18	17	17	16	16
	R=15%	30	30	29	29	28	28	27	27	27	26	25	25	24	23
	R=20%	38	37	37	36	36	35	35	34	34	33	32	31	31	30
	R=25%	45	44	44	43	43	42	41	41	40	39	39	38	37	36
0.50	R= 5%	11	11	11	11	10	10	10	10	9	9	9	9	8	8
	R=10%	21	21	20	20	20	19	19	18	18	17	17	16	16	16
	R=15%	30	29	29	28	28	27	27	26	26	25	24	24	23	23
	R=20%	37	37	36	36	35	35	34	34	33	32	31	31	30	29
	R=25%	44	44	43	43	42	41	41	40	40	38	38	37	36	35
0.55	R= 5%	11	11	11	10	10	10	10	9	9	9	8	8	8	8
	R=10%	21	20	20	20	19	19	18	18	17	17	16	16	15	15
	R=15%	29	29	28	28	28	27	26	26	25	24	24	23	22	22
	R=20%	37	36	36	35	35	34	33	33	32	31	30	30	29	28
	R=25%	44	43	43	42	42	41	40	39	39	38	37	36	35	35

Table 4.2(d) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	18	17	16	15	15	14	13	13	13	12	12	12	12	11
	R=10%	31	30	29	27	26	25	24	24	23	23	22	22	21	21
	R=15%	42	40	38	37	36	34	33	33	32	32	31	31	30	30
	R=20%	50	48	46	45	44	42	41	41	40	39	39	38	38	37
	R=25%	57	55	53	52	51	49	48	47	47	46	46	45	44	44
0.15	R= 5%	15	14	14	13	13	12	12	12	12	11	11	11	11	10
	R=10%	26	25	25	24	23	23	22	22	21	21	21	20	20	19
	R=15%	35	34	34	33	32	31	31	30	30	29	29	29	28	28
	R=20%	43	42	42	41	40	39	38	38	37	37	36	36	35	35
	R=25%	50	49	48	48	47	46	45	45	44	44	43	43	42	42
0.20	R= 5%	13	13	13	12	12	11	11	11	11	11	10	10	10	10
	R=10%	24	23	23	22	22	21	21	20	20	20	19	19	19	18
	R=15%	33	32	32	31	31	30	29	29	28	28	27	27	27	26
	R=20%	40	40	39	39	38	37	37	36	36	35	35	34	34	34
	R=25%	47	47	46	45	45	44	43	43	43	42	41	41	41	40
0.25	R= 5%	12	12	12	12	11	11	11	10	10	10	10	10	9	9
	R=10%	22	22	22	21	21	20	20	20	19	19	19	18	18	18
	R=15%	31	31	30	30	29	29	28	28	27	27	27	26	26	25
	R=20%	39	38	38	37	37	36	35	35	35	34	34	33	33	32
	R=25%	46	45	45	44	44	43	42	42	41	41	40	40	39	39
0.30	R= 5%	12	12	11	11	11	10	10	10	10	10	9	9	9	9
	R=10%	22	21	21	21	20	20	19	19	19	18	18	18	17	17
	R=15%	30	30	29	29	28	28	27	27	27	26	26	25	25	25
	R=20%	38	37	37	36	36	35	35	34	34	33	33	33	32	31
	R=25%	45	44	44	43	43	42	41	41	40	40	39	39	39	38
0.35	R= 5%	11	11	11	11	10	10	10	10	10	9	9	9	9	8
	R=10%	21	21	20	20	20	19	19	18	18	18	18	17	17	16
	R=15%	29	29	29	28	28	27	27	26	26	25	25	25	24	23
	R=20%	37	36	36	35	35	34	34	33	33	33	32	32	31	30
	R=25%	44	43	43	42	42	41	40	40	40	39	39	38	37	37
0.40	R= 5%	11	11	11	10	10	10	10	9	9	9	9	9	8	8
	R=10%	20	20	20	19	19	19	18	18	18	17	17	17	16	16
	R=15%	29	28	28	27	27	26	26	26	25	25	24	24	23	23
	R=20%	36	36	35	35	34	34	33	33	32	32	31	31	30	29
	R=25%	43	42	42	41	41	40	40	39	39	38	38	37	36	35
0.45	R= 5%	11	10	10	10	10	10	9	9	9	9	9	8	8	8
	R=10%	20	20	19	19	19	18	18	18	17	17	16	16	15	15
	R=15%	28	28	27	27	27	26	26	25	25	24	24	23	22	22
	R=20%	35	35	35	34	34	33	33	32	32	31	30	30	29	28
	R=25%	42	42	41	41	40	40	39	39	38	37	37	36	35	35
0.50	R= 5%	10	10	10	10	10	9	9	9	9	8	8	8	8	8
	R=10%	20	19	19	19	18	18	18	17	17	16	16	16	15	15
	R=15%	28	27	27	26	26	26	25	25	24	23	23	22	22	21
	R=20%	35	35	34	34	33	33	32	32	31	30	30	29	28	28
	R=25%	42	41	41	40	40	39	39	38	37	36	36	35	34	34
0.55	R= 5%	10	10	10	10	10	9	9	9	8	8	8	8	8	7
	R=10%	19	19	19	18	18	18	17	17	16	16	15	15	15	14
	R=15%	27	27	27	26	26	25	25	24	24	23	22	22	21	21
	R=20%	34	34	34	33	33	32	32	31	30	29	29	28	28	27
	R=25%	41	41	40	40	39	39	38	37	37	36	35	35	34	33

Table 4.3(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	54	47	44	37	34	30	29	27	26	25	24	23	23	22
	R=10%	78	70	68	58	55	50	48	46	45	43	42	41	39	38
	R=15%	89	83	81	72	69	64	61	59	58	56	55	54	52	51
	R=20%	94	90	88	81	78	73	71	69	68	66	65	64	62	61
	R=25%	97	94	93	87	84	80	78	77	75	74	72	71	70	69
0.15	R= 5%	32	31	29	28	27	25	24	23	22	22	21	20	20	19
	R=10%	53	50	49	47	45	42	41	40	39	38	37	36	35	34
	R=15%	66	64	62	60	58	55	54	53	52	50	49	48	47	46
	R=20%	76	73	72	70	68	65	64	63	62	60	59	58	57	56
	R=25%	82	80	79	77	75	73	71	70	70	68	67	66	65	64
0.20	R= 5%	27	26	26	24	24	22	21	21	20	20	19	19	18	17
	R=10%	46	44	43	42	41	39	38	37	36	35	34	33	32	32
	R=15%	59	58	56	55	53	51	50	49	48	47	46	45	44	43
	R=20%	69	67	66	64	63	61	60	59	58	57	56	55	54	53
	R=25%	76	75	74	72	71	69	68	67	66	65	64	63	62	61
0.25	R= 5%	25	24	23	22	22	21	20	19	19	18	18	17	17	16
	R=10%	42	41	40	39	38	36	35	34	34	33	32	31	30	30
	R=15%	55	54	53	51	51	49	48	47	46	45	44	43	42	41
	R=20%	65	64	63	61	60	58	57	56	55	54	53	52	51	50
	R=25%	72	71	71	69	68	66	65	64	63	62	61	60	59	58
0.30	R= 5%	23	22	22	21	20	19	19	18	18	17	17	16	16	15
	R=10%	40	39	38	37	36	35	34	33	32	31	30	30	29	28
	R=15%	53	51	51	49	48	47	45	44	44	43	42	41	40	39
	R=20%	62	61	60	59	58	56	55	54	53	52	51	51	49	48
	R=25%	70	69	68	67	66	64	63	62	61	60	59	58	57	56
0.35	R= 5%	22	21	21	20	19	19	18	17	17	16	16	16	15	15
	R=10%	38	37	36	35	35	33	32	31	31	30	29	29	28	27
	R=15%	51	50	49	48	47	45	44	43	42	41	40	40	39	38
	R=20%	60	59	58	57	56	55	53	52	52	51	50	49	48	47
	R=25%	68	67	66	65	64	63	61	60	60	58	58	57	56	55
0.40	R= 5%	21	20	20	19	19	18	17	17	16	16	15	15	15	14
	R=10%	37	36	35	34	33	32	31	30	30	29	28	28	27	26
	R=15%	49	48	47	46	45	43	42	42	41	40	39	38	37	36
	R=20%	59	58	57	56	55	53	52	51	50	49	48	48	47	45
	R=25%	66	66	65	64	63	61	60	59	58	57	56	55	54	53
0.45	R= 5%	20	20	19	18	18	17	17	16	16	15	15	15	14	13
	R=10%	35	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=15%	48	47	46	45	44	42	41	40	40	39	38	37	36	34
	R=20%	57	56	56	54	53	52	51	50	49	48	47	46	45	43
	R=25%	65	64	63	62	61	60	59	58	57	56	55	54	52	51
0.50	R= 5%	19	19	18	18	17	17	16	16	15	15	14	14	13	12
	R=10%	34	34	33	32	31	30	29	29	28	27	27	26	24	23
	R=15%	46	45	45	44	43	41	40	39	39	38	37	36	34	33
	R=20%	56	55	54	53	52	51	50	49	48	47	46	45	43	41
	R=25%	64	63	62	61	60	59	57	57	56	55	54	52	50	49
0.55	R= 5%	19	18	18	17	17	16	16	15	15	14	14	13	12	12
	R=10%	33	33	32	31	31	29	28	28	27	26	25	24	23	22
	R=15%	45	44	44	43	42	40	39	39	38	37	35	34	33	32
	R=20%	55	54	53	52	51	50	49	48	47	46	44	43	41	40
	R=25%	63	62	61	60	59	58	56	56	55	54	52	51	49	47

Table 4.3(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	39	37	32	29	27	25	23	22	22	21	20	20	19	18
	R=10%	59	57	51	47	44	41	39	38	37	36	35	34	33	32
	R=15%	71	69	63	59	56	53	51	50	49	47	46	46	44	44
	R=20%	79	77	72	68	65	62	60	59	58	57	56	55	54	53
	R=25%	85	83	78	75	72	69	68	66	65	64	63	62	61	60
0.15	R= 5%	26	25	24	23	22	21	20	19	19	18	18	17	17	16
	R=10%	43	41	40	38	37	35	34	34	33	32	31	31	30	29
	R=15%	55	53	52	50	49	47	46	45	44	43	42	42	41	40
	R=20%	64	62	61	59	58	56	55	54	53	52	51	51	50	49
	R=25%	71	69	68	66	65	63	62	61	61	60	59	58	57	56
0.20	R= 5%	22	22	21	20	20	19	18	18	17	17	16	16	15	15
	R=10%	38	37	36	35	34	33	32	31	31	30	29	29	28	27
	R=15%	50	48	48	46	46	44	43	42	42	41	40	39	38	38
	R=20%	59	58	57	55	55	53	52	51	51	49	49	48	47	46
	R=25%	66	65	64	63	62	60	59	59	58	57	56	55	54	54
0.25	R= 5%	21	20	19	19	18	17	17	16	16	16	15	15	14	14
	R=10%	35	35	34	33	32	31	30	29	29	28	28	27	26	26
	R=15%	47	46	45	44	43	42	41	40	40	39	38	37	36	36
	R=20%	56	55	54	53	52	51	50	49	48	47	47	46	45	44
	R=25%	63	62	62	61	60	58	57	56	56	55	54	53	52	52
0.30	R= 5%	19	19	18	18	17	17	16	16	15	15	14	14	14	13
	R=10%	33	33	32	31	31	30	29	28	28	27	26	26	25	25
	R=15%	45	44	43	42	42	40	39	39	38	37	36	36	35	34
	R=20%	54	53	52	51	51	49	48	47	47	46	45	44	44	43
	R=25%	61	60	60	59	58	57	56	55	54	53	52	52	51	50
0.35	R= 5%	18	18	18	17	17	16	15	15	15	14	14	14	13	13
	R=10%	32	32	31	30	30	28	28	27	27	26	25	25	24	24
	R=15%	43	42	42	41	40	39	38	37	37	36	35	35	34	33
	R=20%	52	51	51	50	49	48	47	46	45	44	44	43	42	42
	R=25%	60	59	58	57	56	55	54	53	53	52	51	51	50	49
0.40	R= 5%	18	17	17	16	16	15	15	14	14	14	13	13	13	12
	R=10%	31	31	30	29	29	27	27	26	26	25	25	24	23	22
	R=15%	42	41	41	40	39	38	37	36	36	35	34	34	33	32
	R=20%	51	50	50	49	48	46	46	45	44	43	43	42	41	40
	R=25%	58	58	57	56	55	54	53	52	52	51	50	49	48	47
0.45	R= 5%	17	17	16	16	15	15	14	14	14	13	13	12	12	11
	R=10%	30	30	29	28	28	27	26	25	25	24	24	23	22	21
	R=15%	41	40	40	39	38	37	36	35	35	34	33	33	31	30
	R=20%	50	49	48	47	47	45	45	44	43	42	42	41	39	38
	R=25%	57	56	56	55	54	53	52	51	51	50	49	48	46	45
0.50	R= 5%	16	16	16	15	15	14	14	13	13	13	12	12	11	11
	R=10%	29	29	28	28	27	26	25	25	24	24	23	22	21	20
	R=15%	40	39	39	38	37	36	35	35	34	33	32	31	30	29
	R=20%	49	48	47	46	46	45	44	43	42	41	40	39	38	37
	R=25%	56	55	55	54	53	52	51	50	50	49	47	46	45	44
0.55	R= 5%	16	16	15	15	14	14	13	13	13	12	12	11	11	10
	R=10%	29	28	28	27	26	25	25	24	24	23	22	21	20	20
	R=15%	39	38	38	37	36	35	34	34	33	32	31	30	29	28
	R=20%	48	47	47	46	45	44	43	42	42	40	39	38	36	35
	R=25%	55	55	54	53	52	51	50	50	49	47	46	45	43	42

Table 4.3(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	31	28	25	23	22	20	19	19	18	17	17	16	16	16
	R=10%	49	45	41	38	37	34	33	32	31	30	30	29	28	28
	R=15%	61	57	53	50	48	45	44	43	42	41	40	39	38	38
	R=20%	69	65	61	58	56	54	52	51	50	49	49	48	47	46
	R=25%	75	72	68	65	63	61	59	58	58	56	56	55	54	53
0.15	R= 5%	21	20	20	19	18	17	17	16	16	15	15	15	14	14
	R=10%	36	35	34	32	31	30	29	29	28	27	27	27	26	25
	R=15%	46	45	44	43	42	40	40	39	38	37	37	36	35	35
	R=20%	55	54	53	51	50	49	48	47	47	46	45	45	44	43
	R=25%	62	61	60	58	58	56	55	54	54	53	52	52	51	50
0.20	R= 5%	19	18	18	17	16	16	15	15	15	14	14	14	13	13
	R=10%	32	31	31	30	29	28	27	27	26	26	25	25	24	24
	R=15%	43	42	41	40	39	38	37	37	36	35	35	34	33	33
	R=20%	51	50	49	48	48	46	46	45	44	44	43	42	42	41
	R=25%	58	57	56	56	55	54	53	52	52	51	50	49	49	48
0.25	R= 5%	17	17	16	16	15	15	14	14	14	13	13	13	12	12
	R=10%	30	29	29	28	28	27	26	25	25	24	24	24	23	23
	R=15%	40	40	39	38	37	36	36	35	35	34	33	33	32	32
	R=20%	49	48	47	47	46	45	44	43	43	42	41	41	40	39
	R=25%	56	55	54	54	53	52	51	50	50	49	48	48	47	46
0.30	R= 5%	16	16	15	15	15	14	14	13	13	13	12	12	12	12
	R=10%	29	28	28	27	26	25	25	24	24	23	23	23	22	22
	R=15%	39	38	38	37	36	35	34	34	33	33	32	32	31	30
	R=20%	47	46	46	45	44	43	42	42	41	41	40	40	39	38
	R=25%	54	53	53	52	52	50	50	49	48	48	47	47	46	45
0.35	R= 5%	15	15	15	14	14	13	13	13	13	12	12	12	11	11
	R=10%	28	27	27	26	25	25	24	24	23	23	22	22	21	21
	R=15%	37	37	36	36	35	34	33	33	32	32	31	31	30	29
	R=20%	46	45	45	44	43	42	41	41	40	40	39	39	38	37
	R=25%	53	52	52	51	50	49	48	48	47	47	46	46	45	44
0.40	R= 5%	15	15	14	14	14	13	13	12	12	12	12	11	11	10
	R=10%	27	26	26	25	25	24	23	23	23	22	22	21	20	20
	R=15%	37	36	35	35	34	33	32	32	31	31	30	30	29	28
	R=20%	45	44	44	43	42	41	40	40	39	39	38	38	36	35
	R=25%	52	51	51	50	49	48	47	47	46	46	45	45	43	42
0.45	R= 5%	14	14	14	13	13	13	12	12	12	11	11	11	10	10
	R=10%	26	25	25	24	24	23	23	22	22	21	21	20	19	19
	R=15%	36	35	35	34	33	32	32	31	31	30	30	29	28	27
	R=20%	44	43	43	42	41	40	40	39	39	38	37	36	35	34
	R=25%	51	50	50	49	48	47	47	46	46	45	44	43	42	41
0.50	R= 5%	14	14	13	13	13	12	12	12	12	11	11	10	10	10
	R=10%	25	25	24	24	23	23	22	22	21	21	20	19	19	18
	R=15%	35	34	34	33	33	32	31	31	30	29	28	28	27	26
	R=20%	43	42	42	41	41	40	39	38	38	37	36	35	34	33
	R=25%	50	49	49	48	48	47	46	45	45	44	43	42	41	40
0.55	R= 5%	14	13	13	13	12	12	12	11	11	11	10	10	9	9
	R=10%	25	24	24	23	23	22	22	21	21	20	19	19	18	17
	R=15%	34	34	33	33	32	31	31	30	29	28	27	27	26	25
	R=20%	42	42	41	41	40	39	38	38	37	36	35	34	33	32
	R=25%	49	49	48	48	47	46	45	45	44	43	42	41	40	39

Table 4.3(d) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	27	24	22	20	19	18	17	17	16	15	15	15	14	14
	R=10%	44	39	37	34	33	31	30	29	28	27	27	26	26	25
	R=15%	55	50	47	45	43	41	40	39	38	37	37	36	35	35
	R=20%	63	58	56	53	51	49	48	47	46	45	45	44	43	43
	R=25%	70	65	62	60	58	56	55	54	53	52	52	51	50	50
0.15	R= 5%	19	18	17	17	16	15	15	15	14	14	14	13	13	13
	R=10%	32	31	30	29	28	27	27	26	26	25	25	24	24	23
	R=15%	42	41	40	39	38	37	36	35	35	34	34	33	33	32
	R=20%	50	49	48	47	46	45	44	44	43	42	42	41	40	40
	R=25%	57	56	55	54	53	52	51	50	50	49	49	48	47	47
0.20	R= 5%	17	16	16	15	15	14	14	13	13	13	13	12	12	12
	R=10%	29	28	28	27	26	25	25	24	24	23	23	23	22	22
	R=15%	39	38	37	37	36	35	34	34	33	32	32	32	31	30
	R=20%	47	46	45	45	44	43	42	42	41	40	40	39	39	38
	R=25%	54	53	52	52	51	50	49	49	48	47	47	46	45	45
0.25	R= 5%	15	15	15	14	14	13	13	13	12	12	12	12	11	11
	R=10%	27	27	26	26	25	24	24	23	23	22	22	22	21	21
	R=15%	37	36	36	35	34	33	33	32	32	31	31	30	30	29
	R=20%	45	44	44	43	42	41	41	40	40	39	38	38	37	37
	R=25%	52	51	51	50	49	48	47	47	46	46	45	45	44	44
0.30	R= 5%	15	14	14	14	13	13	12	12	12	12	11	11	11	11
	R=10%	26	25	25	25	24	23	23	22	22	21	21	21	20	20
	R=15%	35	35	34	34	33	32	32	31	31	30	30	29	29	28
	R=20%	43	43	42	42	41	40	39	39	38	38	37	37	36	36
	R=25%	50	50	49	49	48	47	46	46	45	45	44	44	43	43
0.35	R= 5%	14	14	13	13	13	12	12	12	11	11	11	11	11	10
	R=10%	25	25	24	24	23	22	22	22	21	21	20	20	20	19
	R=15%	34	34	33	33	32	31	31	30	30	29	29	29	28	27
	R=20%	42	42	41	41	40	39	38	38	37	37	36	36	35	35
	R=25%	49	49	48	47	47	46	45	45	44	44	43	43	42	41
0.40	R= 5%	13	13	13	13	12	12	12	11	11	11	11	10	10	10
	R=10%	24	24	24	23	23	22	21	21	21	20	20	20	19	18
	R=15%	34	33	33	32	31	31	30	30	29	29	28	28	27	26
	R=20%	41	41	40	40	39	38	38	37	37	36	36	35	34	33
	R=25%	48	48	47	47	46	45	44	44	43	43	42	42	41	40
0.45	R= 5%	13	13	13	12	12	12	11	11	11	11	10	10	9	9
	R=10%	24	23	23	22	22	21	21	21	20	20	19	19	18	17
	R=15%	33	32	32	31	31	30	29	29	29	28	27	27	26	25
	R=20%	41	40	40	39	38	38	37	36	36	35	35	34	33	32
	R=25%	47	47	46	46	45	44	44	43	43	42	41	41	39	39
0.50	R= 5%	13	12	12	12	12	11	11	11	11	10	10	10	9	9
	R=10%	23	23	22	22	22	21	20	20	20	19	19	18	17	17
	R=15%	32	32	31	31	30	29	29	28	28	27	26	26	25	24
	R=20%	40	39	39	38	38	37	36	36	35	34	34	33	32	31
	R=25%	47	46	46	45	45	44	43	43	42	41	40	39	38	38
0.55	R= 5%	12	12	12	12	11	11	11	11	10	10	9	9	9	9
	R=10%	23	22	22	21	21	20	20	20	19	18	18	17	17	16
	R=15%	31	31	31	30	30	29	28	28	27	26	26	25	24	24
	R=20%	39	39	38	38	37	36	36	35	35	33	33	32	31	30
	R=25%	46	46	45	45	44	43	43	42	41	40	39	39	37	37

Table 4.3(e) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	19	17	16	15	15	14	13	13	12	12	12	12	11	11
	R=10%	32	29	28	26	25	24	23	23	23	22	22	21	21	20
	R=15%	42	39	37	35	34	33	32	32	31	30	30	30	29	29
	R=20%	50	46	45	43	42	41	40	39	39	38	37	37	36	36
	R=25%	57	53	52	50	49	47	46	46	45	44	44	43	43	42
0.15	R= 5%	14	14	13	13	13	12	12	11	11	11	11	11	10	10
	R=10%	25	24	24	23	23	22	21	21	21	20	20	20	19	19
	R=15%	34	33	32	32	31	30	30	29	29	28	28	28	27	27
	R=20%	41	41	40	39	39	38	37	37	36	36	35	35	34	34
	R=25%	48	47	47	46	45	44	44	43	43	42	42	41	41	40
0.20	R= 5%	13	12	12	12	12	11	11	11	11	10	10	10	10	10
	R=10%	23	22	22	22	21	21	20	20	20	19	19	19	18	18
	R=15%	31	31	31	30	29	29	28	28	28	27	27	26	26	26
	R=20%	39	38	38	37	37	36	36	35	35	34	34	33	33	33
	R=25%	45	45	44	44	43	43	42	42	41	41	40	40	39	39
0.25	R= 5%	12	12	12	11	11	11	10	10	10	10	10	10	9	9
	R=10%	22	21	21	21	20	20	19	19	19	18	18	18	18	17
	R=15%	30	30	29	29	28	28	27	27	27	26	26	26	25	25
	R=20%	37	37	37	36	36	35	34	34	34	33	33	33	32	32
	R=25%	44	43	43	43	42	41	41	40	40	40	39	39	38	38
0.30	R= 5%	11	11	11	11	11	10	10	10	10	9	9	9	9	9
	R=10%	21	21	20	20	20	19	19	18	18	18	18	17	17	17
	R=15%	29	29	28	28	28	27	26	26	26	25	25	25	24	24
	R=20%	36	36	36	35	35	34	34	33	33	32	32	32	31	31
	R=25%	43	42	42	42	41	40	40	40	39	39	38	38	38	37
0.35	R= 5%	11	11	11	10	10	10	10	10	9	9	9	9	9	8
	R=10%	20	20	20	19	19	19	18	18	18	17	17	17	17	16
	R=15%	28	28	28	27	27	26	26	26	25	25	25	24	24	23
	R=20%	36	35	35	34	34	33	33	32	32	32	31	31	31	30
	R=25%	42	42	41	41	40	40	39	39	39	38	38	37	37	36
0.40	R= 5%	11	11	10	10	10	10	9	9	9	9	9	9	8	8
	R=10%	20	20	19	19	19	18	18	18	17	17	17	16	16	16
	R=15%	28	27	27	27	26	26	25	25	25	24	24	24	23	22
	R=20%	35	35	34	34	33	33	32	32	32	31	31	30	30	29
	R=25%	41	41	41	40	40	39	39	38	38	38	37	37	36	35
0.45	R= 5%	10	10	10	10	10	9	9	9	9	9	8	8	8	8
	R=10%	19	19	19	18	18	18	17	17	17	17	16	16	15	15
	R=15%	27	27	27	26	26	25	25	25	24	24	23	23	22	22
	R=20%	34	34	34	33	33	32	32	31	31	31	30	30	29	28
	R=25%	41	40	40	40	39	39	38	38	37	37	36	36	35	34
0.50	R= 5%	10	10	10	10	9	9	9	9	9	8	8	8	8	8
	R=10%	19	19	18	18	18	17	17	17	17	16	16	15	15	15
	R=15%	27	26	26	26	25	25	25	24	24	23	23	22	22	21
	R=20%	34	33	33	33	32	32	31	31	31	30	29	29	28	28
	R=25%	40	40	40	39	39	38	38	37	37	36	35	35	34	34
0.55	R= 5%	10	10	10	9	9	9	9	9	8	8	8	8	8	7
	R=10%	19	18	18	18	18	17	17	17	16	16	15	15	15	14
	R=15%	26	26	26	25	25	25	24	24	23	23	22	22	21	21
	R=20%	33	33	33	32	32	31	31	30	30	29	29	28	28	27
	R=25%	40	39	39	39	38	38	37	37	36	35	35	34	34	33

Table 4.4(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	80	76	67	57	54	45	41	39	38	36	34	33	31	30
	R=10%	95	93	88	80	77	67	63	61	59	57	55	54	52	51
	R=15%	99	98	95	90	88	80	77	74	73	71	69	68	66	64
	R=20%	100	99	98	95	94	88	85	83	82	80	78	77	75	74
	R=25%	100	100	99	98	97	92	90	89	88	86	85	84	82	81
0.15	R= 5%	48	45	43	40	38	35	33	32	31	30	29	28	27	26
	R=10%	71	67	65	62	60	56	54	53	51	50	49	48	46	45
	R=15%	83	80	78	75	73	70	68	66	65	64	62	61	60	59
	R=20%	90	88	86	83	82	79	77	76	75	74	72	71	70	69
	R=25%	94	92	91	89	88	85	84	83	82	81	79	79	77	76
0.20	R= 5%	39	38	36	34	33	31	30	29	28	27	26	26	25	24
	R=10%	61	59	57	55	54	51	50	48	47	46	45	44	43	42
	R=15%	74	72	71	69	67	65	63	62	61	60	58	58	56	55
	R=20%	83	81	80	78	77	75	73	72	71	70	69	68	66	65
	R=25%	88	87	86	85	83	81	80	79	78	77	76	75	74	73
0.25	R= 5%	35	34	33	31	30	29	28	27	26	25	24	24	23	22
	R=10%	56	54	53	51	50	48	47	45	45	43	42	41	40	39
	R=15%	69	68	67	65	64	62	60	59	58	57	56	55	53	52
	R=20%	79	77	76	75	74	72	70	69	68	67	66	65	63	62
	R=25%	85	84	83	81	81	79	77	76	76	74	73	72	71	70
0.30	R= 5%	32	31	31	29	29	27	26	25	25	24	23	22	22	21
	R=10%	53	51	50	49	48	46	44	43	42	41	40	39	38	37
	R=15%	66	65	64	62	61	59	58	57	56	54	53	52	51	50
	R=20%	76	75	74	72	71	69	68	67	66	64	63	62	61	60
	R=25%	82	81	81	79	78	77	75	74	73	72	71	70	69	68
0.35	R= 5%	31	30	29	28	27	26	25	24	23	22	22	21	21	20
	R=10%	50	49	48	47	46	44	42	41	41	39	38	38	37	36
	R=15%	64	62	62	60	59	57	56	55	54	52	51	50	49	48
	R=20%	74	72	72	70	69	67	66	65	64	62	61	60	59	58
	R=25%	80	79	79	77	76	75	73	72	72	70	69	68	67	66
0.40	R= 5%	29	28	28	27	26	24	24	23	22	22	21	20	20	19
	R=10%	48	47	46	45	44	42	41	40	39	38	37	36	35	34
	R=15%	62	61	60	58	57	55	54	53	52	51	50	49	47	47
	R=20%	72	71	70	68	67	65	64	63	62	61	60	59	57	56
	R=25%	79	78	77	76	75	73	72	71	70	69	68	67	65	64
0.45	R= 5%	28	27	27	25	25	23	23	22	21	21	20	20	19	18
	R=10%	47	46	45	44	43	41	39	39	38	37	36	35	34	33
	R=15%	60	59	58	57	56	54	52	51	51	49	48	47	46	45
	R=20%	70	69	68	67	66	64	62	61	61	59	58	57	56	55
	R=25%	77	76	76	74	73	72	70	69	68	67	66	65	64	63
0.50	R= 5%	27	26	26	25	24	23	22	21	21	20	19	19	18	17
	R=10%	45	44	44	42	41	39	38	37	37	36	35	34	33	31
	R=15%	59	58	57	55	54	52	51	50	49	48	47	46	45	43
	R=20%	69	68	67	65	64	62	61	60	59	58	57	56	54	53
	R=25%	76	75	74	73	72	70	69	68	67	66	65	64	63	61
0.55	R= 5%	26	25	25	24	23	22	21	21	20	19	19	18	17	16
	R=10%	44	43	42	41	40	38	37	36	36	35	34	33	31	30
	R=15%	58	56	56	54	53	51	50	49	48	47	46	45	43	41
	R=20%	67	66	66	64	63	61	60	59	58	57	56	55	52	50
	R=25%	75	74	73	72	71	69	68	67	66	65	64	63	60	58

Table 4.4(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	65	56	50	46	40	35	33	32	31	29	28	27	26	25
	R=10%	85	77	71	67	60	55	52	51	49	47	46	45	44	43
	R=15%	92	87	82	78	73	67	65	63	62	60	59	58	56	55
	R=20%	96	92	88	85	80	76	73	72	71	69	68	67	65	64
	R=25%	98	95	92	90	86	82	80	78	77	76	75	74	72	72
0.15	R= 5%	38	35	34	32	31	29	27	27	26	25	24	24	23	22
	R=10%	58	55	53	51	49	47	45	44	43	42	41	40	39	38
	R=15%	70	67	66	64	62	59	58	57	56	54	53	53	51	50
	R=20%	78	76	74	72	71	68	67	66	65	64	63	62	61	60
	R=25%	84	82	80	79	77	75	74	73	72	71	70	69	68	67
0.20	R= 5%	32	31	30	28	27	26	25	24	24	23	22	22	21	20
	R=10%	50	49	48	46	45	43	42	41	40	39	38	37	36	35
	R=15%	63	61	60	58	57	55	54	53	52	51	50	49	48	47
	R=20%	72	70	69	68	66	65	63	62	62	60	60	59	57	57
	R=25%	78	77	76	74	73	72	70	70	69	68	67	66	65	64
0.25	R= 5%	29	28	27	26	25	24	23	22	22	21	21	20	19	19
	R=10%	47	45	44	43	42	40	39	39	38	37	36	35	34	33
	R=15%	59	58	57	56	54	53	51	51	50	49	48	47	46	45
	R=20%	68	67	66	65	64	62	61	60	59	58	57	56	55	54
	R=25%	75	74	73	72	71	69	68	67	67	65	65	64	63	62
0.30	R= 5%	27	26	25	24	24	23	22	21	21	20	19	19	18	18
	R=10%	44	43	42	41	40	39	37	37	36	35	34	34	33	32
	R=15%	56	55	54	53	52	51	49	49	48	47	46	45	44	43
	R=20%	66	65	64	63	62	60	59	58	57	56	55	54	53	52
	R=25%	72	72	71	70	69	67	66	65	65	63	63	62	61	60
0.35	R= 5%	25	25	24	23	23	21	21	20	20	19	19	18	17	17
	R=10%	42	41	41	39	39	37	36	35	35	34	33	32	31	31
	R=15%	54	54	53	51	51	49	48	47	46	45	44	44	42	42
	R=20%	64	63	62	61	60	58	57	56	55	54	53	53	52	51
	R=25%	71	70	69	68	67	66	65	64	63	62	61	60	59	58
0.40	R= 5%	24	23	23	22	22	21	20	19	19	18	18	17	17	16
	R=10%	41	40	39	38	37	36	35	34	33	32	32	31	30	30
	R=15%	53	52	51	50	49	47	46	46	45	44	43	42	41	40
	R=20%	62	61	60	59	58	57	56	55	54	53	52	51	50	50
	R=25%	69	68	68	67	66	64	63	62	62	61	60	59	58	57
0.45	R= 5%	23	23	22	21	21	20	19	19	18	18	17	17	16	15
	R=10%	39	39	38	37	36	35	34	33	32	31	31	30	29	28
	R=15%	51	51	50	49	48	46	45	44	44	43	42	41	40	39
	R=20%	61	60	59	58	57	55	54	54	53	52	51	50	49	47
	R=25%	68	67	67	65	65	63	62	61	60	59	58	58	57	55
0.50	R= 5%	22	22	21	21	20	19	18	18	18	17	17	16	15	15
	R=10%	38	38	37	36	35	34	33	32	31	31	30	29	28	27
	R=15%	50	49	49	48	47	45	44	43	43	42	41	40	38	37
	R=20%	60	59	58	57	56	54	53	52	52	51	50	49	47	46
	R=25%	67	66	65	64	63	62	61	60	59	58	57	57	55	53
0.55	R= 5%	22	21	21	20	19	19	18	17	17	17	16	15	14	14
	R=10%	37	37	36	35	34	33	32	31	31	30	29	28	26	25
	R=15%	49	48	48	47	46	44	43	42	42	41	40	38	37	35
	R=20%	59	58	57	56	55	53	52	51	51	50	49	47	45	44
	R=25%	66	65	64	63	62	61	60	59	58	57	56	55	53	51

Table 4.4(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	50	44	40	35	32	29	27	26	25	24	23	22	22	21
	R=10%	70	63	60	54	50	46	44	42	41	40	39	38	37	36
	R=15%	80	74	71	65	62	57	55	54	53	51	50	49	48	47
	R=20%	86	81	78	73	70	66	64	62	61	60	59	58	57	56
	R=25%	90	86	83	79	76	72	70	69	68	67	66	65	64	63
0.15	R= 5%	30	29	28	26	25	24	23	22	22	21	20	20	19	19
	R=10%	48	46	44	43	41	39	38	37	37	35	35	34	33	32
	R=15%	59	57	56	54	53	51	49	48	48	47	46	45	44	43
	R=20%	67	65	64	63	61	59	58	57	57	55	55	54	53	52
	R=25%	74	72	71	69	68	66	65	64	64	62	62	61	60	59
0.20	R= 5%	26	25	24	23	22	21	21	20	20	19	18	18	17	17
	R=10%	42	41	40	39	38	36	35	34	34	33	32	32	31	30
	R=15%	53	52	51	50	49	47	46	46	45	44	43	42	41	41
	R=20%	62	61	60	59	58	56	55	54	54	53	52	51	50	49
	R=25%	69	67	67	65	65	63	62	61	61	60	59	58	57	57
0.25	R= 5%	24	23	22	21	21	20	19	19	18	18	17	17	16	16
	R=10%	39	38	37	36	36	34	33	33	32	31	31	30	29	29
	R=15%	50	49	49	47	47	45	44	44	43	42	41	41	40	39
	R=20%	59	58	57	56	55	54	53	52	52	51	50	49	48	48
	R=25%	66	65	64	63	62	61	60	59	59	58	57	56	56	55
0.30	R= 5%	22	21	21	20	20	19	18	18	17	17	16	16	16	15
	R=10%	37	36	36	35	34	33	32	31	31	30	29	29	28	27
	R=15%	48	47	47	46	45	44	43	42	41	40	40	39	38	37
	R=20%	57	56	55	54	54	52	51	51	50	49	48	48	47	46
	R=25%	64	63	62	61	61	59	58	58	57	56	55	55	54	53
0.35	R= 5%	21	20	20	19	19	18	17	17	17	16	16	15	15	15
	R=10%	36	35	34	33	33	31	31	30	29	29	28	28	27	26
	R=15%	47	46	45	44	44	42	41	40	40	39	38	38	37	36
	R=20%	55	55	54	53	52	51	50	49	49	48	47	46	45	45
	R=25%	62	62	61	60	59	58	57	56	56	55	54	54	53	52
0.40	R= 5%	20	20	19	19	18	17	17	16	16	15	15	15	14	14
	R=10%	34	34	33	32	32	30	30	29	29	28	27	27	26	25
	R=15%	45	45	44	43	42	41	40	39	39	38	37	37	36	35
	R=20%	54	53	53	52	51	50	49	48	47	46	46	45	44	44
	R=25%	61	60	60	59	58	57	56	55	55	54	53	52	52	51
0.45	R= 5%	19	19	18	18	17	17	16	16	15	15	15	14	14	13
	R=10%	33	33	32	31	31	30	29	28	28	27	26	26	25	24
	R=15%	44	44	43	42	41	40	39	38	38	37	36	36	35	34
	R=20%	53	52	52	51	50	49	48	47	46	45	45	44	43	42
	R=25%	60	59	59	58	57	56	55	54	54	53	52	52	50	49
0.50	R= 5%	19	18	18	17	17	16	16	15	15	15	14	14	13	12
	R=10%	33	32	31	30	30	29	28	27	27	26	26	25	24	23
	R=15%	43	43	42	41	40	39	38	38	37	36	36	35	33	32
	R=20%	52	51	51	50	49	48	47	46	46	45	44	43	41	40
	R=25%	59	58	58	57	56	55	54	53	53	52	51	50	49	47
0.55	R= 5%	18	18	17	17	16	16	15	15	15	14	14	13	12	12
	R=10%	32	31	31	30	29	28	27	27	26	26	25	24	23	22
	R=15%	42	42	41	40	40	38	37	37	36	36	34	33	32	31
	R=20%	51	50	50	49	48	47	46	45	45	44	43	42	40	39
	R=25%	58	57	57	56	55	54	53	53	52	51	50	49	47	46

Table 4.4(d) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	43	37	35	30	28	25	24	23	22	21	20	20	19	19
	R=10%	61	55	53	46	44	40	39	38	37	35	34	34	33	32
	R=15%	72	66	64	58	55	51	50	48	47	46	45	44	43	43
	R=20%	79	74	72	66	63	60	58	57	56	54	54	53	52	51
	R=25%	84	79	77	72	69	66	65	64	63	61	60	60	59	58
0.15	R= 5%	26	25	24	23	22	21	20	19	19	18	18	17	17	16
	R=10%	42	40	39	38	37	35	34	33	33	32	31	30	30	29
	R=15%	53	51	50	49	47	46	44	44	43	42	41	41	40	39
	R=20%	61	59	58	57	56	54	53	52	52	51	50	49	48	48
	R=25%	67	66	65	64	63	61	60	59	58	57	57	56	55	55
0.20	R= 5%	23	22	21	20	20	19	18	18	17	17	16	16	16	15
	R=10%	37	36	36	34	34	32	32	31	30	30	29	29	28	27
	R=15%	48	47	46	45	44	43	42	41	41	40	39	39	38	37
	R=20%	56	55	54	53	53	51	50	50	49	48	47	47	46	45
	R=25%	63	62	61	60	59	58	57	57	56	55	54	54	53	52
0.25	R= 5%	21	20	20	19	18	18	17	17	16	16	15	15	15	14
	R=10%	35	34	33	32	32	31	30	29	29	28	27	27	26	26
	R=15%	45	44	44	43	42	41	40	39	39	38	37	37	36	35
	R=20%	54	53	52	51	51	49	48	48	47	46	46	45	44	44
	R=25%	60	60	59	58	57	56	55	55	54	53	53	52	51	51
0.30	R= 5%	20	19	19	18	17	17	16	16	15	15	15	14	14	14
	R=10%	33	32	32	31	30	29	29	28	28	27	26	26	25	25
	R=15%	44	43	42	41	41	39	39	38	37	37	36	36	35	34
	R=20%	52	51	51	50	49	48	47	46	46	45	44	44	43	42
	R=25%	59	58	57	57	56	55	54	53	53	52	51	51	50	49
0.35	R= 5%	19	18	18	17	17	16	15	15	15	14	14	14	13	13
	R=10%	32	31	31	30	29	28	28	27	27	26	25	25	24	24
	R=15%	42	41	41	40	39	38	37	37	36	36	35	35	34	33
	R=20%	50	50	49	48	48	47	46	45	45	44	43	43	42	41
	R=25%	57	57	56	55	55	54	53	52	52	51	50	50	49	48
0.40	R= 5%	18	17	17	16	16	15	15	15	14	14	14	13	13	13
	R=10%	31	30	30	29	28	27	27	26	26	25	25	24	24	23
	R=15%	41	40	40	39	38	37	36	36	35	35	34	34	33	32
	R=20%	49	49	48	47	47	45	45	44	44	43	42	42	41	40
	R=25%	56	56	55	54	54	52	52	51	51	50	49	49	48	47
0.45	R= 5%	17	17	16	16	16	15	14	14	14	13	13	13	12	12
	R=10%	30	29	29	28	28	27	26	26	25	25	24	24	23	22
	R=15%	40	39	39	38	37	36	36	35	35	34	33	33	32	31
	R=20%	48	48	47	46	46	45	44	43	43	42	41	41	40	38
	R=25%	55	55	54	53	53	52	51	50	50	49	48	48	47	45
0.50	R= 5%	17	16	16	15	15	14	14	14	13	13	13	12	12	11
	R=10%	29	29	28	27	27	26	25	25	25	24	23	23	22	21
	R=15%	39	39	38	37	37	36	35	34	34	33	33	32	30	30
	R=20%	47	47	46	46	45	44	43	42	42	41	41	40	38	37
	R=25%	54	54	53	53	52	51	50	49	49	48	48	47	45	44
0.55	R= 5%	16	16	15	15	15	14	14	13	13	13	12	12	11	11
	R=10%	29	28	28	27	26	25	25	24	24	23	23	22	21	20
	R=15%	38	38	37	37	36	35	34	34	33	32	31	31	29	29
	R=20%	47	46	46	45	44	43	42	42	41	40	39	38	37	36
	R=25%	54	53	53	52	51	50	49	49	48	47	46	45	44	43

Table 4.5(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	89	88	85	76	69	60	53	50	48	45	43	42	40	38
	R=10%	99	98	97	94	89	82	76	73	71	68	66	65	62	61
	R=15%	100	100	100	98	96	92	87	85	83	81	79	78	76	74
	R=20%	100	100	100	99	98	96	93	91	90	88	87	86	84	83
	R=25%	100	100	100	100	99	98	96	95	94	93	92	91	90	89
0.15	R= 5%	65	60	55	51	48	45	42	41	40	38	37	36	34	33
	R=10%	86	82	78	74	71	67	65	63	62	60	58	57	56	54
	R=15%	94	91	88	85	83	80	78	77	75	73	72	71	70	68
	R=20%	98	96	94	92	90	88	86	85	84	82	81	80	79	78
	R=25%	99	98	97	95	94	92	91	90	89	88	87	87	85	84
0.20	R= 5%	50	48	46	44	42	39	38	37	36	34	33	32	31	30
	R=10%	72	70	69	66	64	61	59	58	57	55	54	53	52	50
	R=15%	84	82	81	79	78	75	73	72	71	69	68	67	66	64
	R=20%	91	89	88	87	86	83	82	81	80	79	78	77	75	74
	R=25%	95	94	93	92	91	89	88	87	86	85	84	83	82	81
0.25	R= 5%	45	43	42	40	38	36	35	34	33	32	31	30	29	28
	R=10%	67	65	64	62	60	58	56	55	54	52	51	50	49	47
	R=15%	80	78	77	75	74	72	70	69	68	66	65	64	63	61
	R=20%	87	86	85	83	82	81	79	78	77	76	75	74	72	71
	R=25%	92	91	90	89	88	87	85	85	84	83	82	81	80	79
0.30	R= 5%	41	40	39	37	36	34	33	32	31	30	29	28	27	26
	R=10%	63	61	60	59	57	55	53	52	51	50	49	48	46	45
	R=15%	76	75	74	72	71	69	67	66	65	64	62	61	60	59
	R=20%	84	83	82	81	80	78	77	76	75	74	72	72	70	69
	R=25%	90	89	88	87	86	85	83	83	82	81	80	79	78	77
0.35	R= 5%	39	37	36	35	34	32	31	30	29	28	27	27	26	25
	R=10%	60	59	58	56	55	53	51	50	49	48	47	46	44	43
	R=15%	74	73	72	70	69	67	65	64	63	61	60	59	58	57
	R=20%	82	81	81	79	78	76	75	74	73	71	70	69	68	67
	R=25%	88	87	87	85	85	83	82	81	80	79	78	77	76	75
0.40	R= 5%	37	36	35	33	32	31	30	29	28	27	26	26	25	24
	R=10%	58	57	56	54	53	51	49	48	47	46	45	44	43	42
	R=15%	72	70	70	68	67	65	63	62	61	60	59	58	56	55
	R=20%	81	80	79	77	76	75	73	72	71	70	69	68	66	65
	R=25%	87	86	85	84	83	82	80	79	78	77	76	75	74	73
0.45	R= 5%	35	34	33	32	31	30	28	28	27	26	25	25	24	23
	R=10%	56	55	54	53	51	49	48	47	46	45	43	43	41	40
	R=15%	70	69	68	66	65	63	62	60	60	58	57	56	55	54
	R=20%	79	78	77	76	75	73	72	70	70	68	67	66	65	64
	R=25%	85	85	84	83	82	80	79	78	77	76	75	74	73	72
0.50	R= 5%	34	33	32	31	30	29	27	27	26	25	24	24	23	22
	R=10%	55	54	53	51	50	48	46	45	45	43	42	41	40	39
	R=15%	68	67	66	65	64	62	60	59	58	57	56	55	53	52
	R=20%	78	77	76	75	74	72	70	69	68	67	66	65	63	63
	R=25%	84	83	83	82	81	79	78	77	76	75	74	73	71	70
0.55	R= 5%	33	32	31	30	29	28	27	26	25	24	24	23	22	21
	R=10%	53	52	51	50	49	47	45	44	43	42	41	40	39	37
	R=15%	67	66	65	64	62	60	59	58	57	55	54	53	52	50
	R=20%	77	76	75	73	72	70	69	68	67	66	64	64	62	60
	R=25%	83	82	82	80	79	78	77	76	75	73	72	72	70	68

Table 4.5(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	79	76	70	60	56	46	43	40	39	37	36	35	33	32
	R=10%	93	92	88	80	77	67	64	61	60	57	56	54	53	51
	R=15%	98	97	94	89	87	79	76	73	72	70	68	67	65	64
	R=20%	99	99	97	94	92	86	83	81	80	78	77	76	74	73
	R=25%	100	99	99	96	95	90	88	87	86	84	83	82	81	80
0.15	R= 5%	51	47	44	41	39	37	35	34	33	31	31	30	29	28
	R=10%	72	67	65	62	60	57	55	53	52	51	50	49	47	46
	R=15%	82	79	77	74	72	69	67	66	65	64	62	61	60	59
	R=20%	89	86	84	82	80	78	76	75	74	73	72	71	69	68
	R=25%	92	90	89	87	85	83	82	81	80	79	78	77	76	75
0.20	R= 5%	41	39	38	36	35	33	31	30	30	29	28	27	26	25
	R=10%	61	59	58	56	54	52	50	49	48	47	46	45	44	43
	R=15%	73	71	70	68	67	65	63	62	61	60	59	58	57	56
	R=20%	81	79	78	77	75	73	72	71	70	69	68	67	66	65
	R=25%	86	85	84	83	82	80	79	78	77	76	75	74	73	72
0.25	R= 5%	37	35	34	33	32	30	29	28	28	27	26	25	24	24
	R=10%	56	55	54	52	51	49	48	46	46	44	43	43	41	40
	R=15%	69	67	66	65	64	62	60	59	58	57	56	55	54	53
	R=20%	77	76	75	73	73	71	70	68	68	67	66	65	63	62
	R=25%	83	82	81	80	79	77	76	75	75	74	73	72	71	70
0.30	R= 5%	34	33	32	31	30	28	27	27	26	25	24	24	23	22
	R=10%	53	52	51	50	49	47	45	44	44	42	41	41	39	39
	R=15%	66	65	64	62	61	59	58	57	56	55	54	53	52	51
	R=20%	74	73	73	71	70	69	67	66	66	64	63	63	61	60
	R=25%	80	80	79	78	77	75	74	74	73	72	71	70	69	68
0.35	R= 5%	32	31	30	29	28	27	26	25	25	24	23	23	22	21
	R=10%	51	50	49	48	47	45	44	43	42	41	40	39	38	37
	R=15%	64	62	62	60	59	58	56	55	54	53	52	51	50	49
	R=20%	73	71	71	69	68	67	66	65	64	63	62	61	60	59
	R=25%	79	78	77	76	75	74	73	72	71	70	69	68	67	66
0.40	R= 5%	30	30	29	28	27	26	25	24	24	23	22	22	21	20
	R=10%	49	48	47	46	45	43	42	41	40	39	38	38	37	36
	R=15%	62	61	60	59	58	56	55	54	53	52	51	50	49	48
	R=20%	71	70	69	68	67	65	64	63	62	61	60	59	58	57
	R=25%	77	77	76	75	74	72	71	70	70	69	68	67	66	65
0.45	R= 5%	29	28	28	27	26	25	24	23	23	22	21	21	20	20
	R=10%	48	47	46	45	44	42	41	40	39	38	37	36	35	35
	R=15%	60	59	59	57	56	54	53	52	51	50	49	49	47	46
	R=20%	69	68	68	67	66	64	63	62	61	60	59	58	57	56
	R=25%	76	75	75	74	73	71	70	69	68	67	66	66	64	64
0.50	R= 5%	28	28	27	26	25	24	23	22	22	21	21	20	20	19
	R=10%	46	45	45	43	42	41	40	39	38	37	36	35	35	33
	R=15%	59	58	57	56	55	53	52	51	50	49	48	47	46	45
	R=20%	68	67	67	65	64	63	61	61	60	59	58	57	56	54
	R=25%	75	74	74	72	72	70	69	68	67	66	65	64	63	62
0.55	R= 5%	27	27	26	25	24	23	22	22	21	21	20	20	18	18
	R=10%	45	44	44	42	41	40	39	38	37	36	35	35	33	31
	R=15%	58	57	56	55	54	52	51	50	49	48	47	46	44	43
	R=20%	67	66	65	64	63	62	60	59	59	57	57	56	54	52
	R=25%	74	73	73	71	71	69	68	67	66	65	64	64	61	60

Table 4.5(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	60	54	48	42	38	33	30	29	28	27	26	25	24	23
	R=10%	79	73	67	61	57	50	47	46	45	43	42	41	40	39
	R=15%	87	83	77	72	68	61	59	57	56	54	53	52	51	50
	R=20%	92	88	84	79	75	69	67	65	64	63	62	61	59	59
	R=25%	94	92	88	84	81	75	73	72	71	69	68	67	66	65
0.15	R= 5%	35	33	31	29	28	26	25	24	24	23	22	22	21	21
	R=10%	52	50	48	46	45	42	41	40	39	38	37	37	36	35
	R=15%	63	61	59	57	56	54	52	51	50	49	48	48	47	46
	R=20%	71	69	67	65	64	62	61	60	59	58	57	57	55	55
	R=25%	77	75	73	72	71	69	67	66	66	65	64	63	62	62
0.20	R= 5%	29	28	27	26	25	24	23	22	22	21	20	20	19	19
	R=10%	46	44	43	42	41	39	38	37	37	36	35	34	33	33
	R=15%	57	55	54	53	52	50	49	48	48	47	46	45	44	43
	R=20%	65	64	63	61	60	59	58	57	56	55	54	54	53	52
	R=25%	71	70	69	68	67	65	64	64	63	62	61	61	60	59
0.25	R= 5%	26	25	25	24	23	22	21	21	20	20	19	19	18	18
	R=10%	42	41	40	39	38	37	36	35	35	34	33	32	32	31
	R=15%	53	52	51	50	49	48	47	46	46	45	44	43	42	41
	R=20%	62	60	60	59	58	57	55	55	54	53	52	52	51	50
	R=25%	68	67	66	65	65	63	62	62	61	60	59	59	58	57
0.30	R= 5%	24	24	23	22	22	21	20	20	19	19	18	18	17	17
	R=10%	40	39	38	37	37	35	34	34	33	32	32	31	30	30
	R=15%	51	50	49	48	48	46	45	45	44	43	42	42	41	40
	R=20%	59	59	58	57	56	55	54	53	52	52	51	50	49	49
	R=25%	66	65	65	64	63	62	61	60	60	59	58	57	56	56
0.35	R= 5%	23	23	22	21	21	20	19	19	18	18	17	17	16	16
	R=10%	38	38	37	36	35	34	33	32	32	31	30	30	29	29
	R=15%	49	49	48	47	46	45	44	43	43	42	41	40	39	39
	R=20%	58	57	56	55	55	53	52	52	51	50	49	49	48	47
	R=25%	64	64	63	62	62	60	59	59	58	57	57	56	55	54
0.40	R= 5%	22	22	21	21	20	19	18	18	18	17	17	16	16	15
	R=10%	37	36	36	35	34	33	32	31	31	30	29	29	28	28
	R=15%	48	47	47	46	45	44	43	42	41	40	40	39	38	38
	R=20%	57	56	55	54	54	52	51	50	50	49	48	48	47	46
	R=25%	63	63	62	61	60	59	58	58	57	56	55	55	54	53
0.45	R= 5%	21	21	20	20	19	18	18	17	17	16	16	16	15	15
	R=10%	36	35	35	34	33	32	31	31	30	29	29	28	27	27
	R=15%	47	46	46	45	44	43	42	41	40	40	39	38	37	37
	R=20%	55	55	54	53	52	51	50	50	49	48	47	47	46	45
	R=25%	62	62	61	60	59	58	57	57	56	55	54	54	53	52
0.50	R= 5%	21	20	20	19	19	18	17	17	17	16	16	15	15	14
	R=10%	35	34	34	33	32	31	30	30	29	29	28	27	26	25
	R=15%	46	45	45	44	43	42	41	40	40	39	38	38	36	35
	R=20%	54	54	53	52	51	50	49	49	48	47	46	46	45	43
	R=25%	61	61	60	59	59	57	56	56	55	54	54	53	52	50
0.55	R= 5%	20	20	19	19	18	17	17	16	16	16	15	15	14	13
	R=10%	34	34	33	32	32	30	30	29	29	28	27	27	25	24
	R=15%	45	44	44	43	42	41	40	39	39	38	37	36	35	34
	R=20%	54	53	52	51	51	49	48	48	47	46	46	45	43	42
	R=25%	60	60	59	58	58	56	56	55	54	53	53	52	50	49

Table 4.5(d) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	45	37	33	30	26	24	22	21	21	20	19	19	18	17
	R=10%	63	55	50	46	41	38	36	35	34	33	32	31	31	30
	R=15%	73	65	60	57	52	48	46	45	44	43	42	41	40	40
	R=20%	80	73	68	65	60	56	54	53	52	51	50	49	48	48
	R=25%	85	78	74	71	66	62	61	60	59	58	57	56	55	55
0.15	R= 5%	25	24	23	22	21	19	19	18	18	17	17	16	16	16
	R=10%	39	38	37	35	34	33	32	31	30	30	29	29	28	27
	R=15%	50	48	47	45	44	42	41	41	40	39	39	38	37	37
	R=20%	57	56	54	53	52	50	49	49	48	47	47	46	45	45
	R=25%	64	62	61	60	59	57	56	55	55	54	53	53	52	52
0.20	R= 5%	21	21	20	19	19	18	17	17	16	16	15	15	15	14
	R=10%	35	34	33	32	31	30	29	29	28	28	27	27	26	26
	R=15%	45	44	43	42	41	40	39	39	38	37	37	36	35	35
	R=20%	53	52	51	50	49	48	47	46	46	45	45	44	43	43
	R=25%	59	58	57	56	56	55	54	53	53	52	51	51	50	50
0.25	R= 5%	19	19	18	18	17	17	16	16	15	15	15	14	14	14
	R=10%	32	32	31	30	30	29	28	27	27	26	26	25	25	24
	R=15%	42	41	41	40	39	38	37	37	36	36	35	35	34	34
	R=20%	50	49	49	48	47	46	45	45	44	44	43	43	42	41
	R=25%	56	56	55	55	54	53	52	52	51	50	50	49	49	48
0.30	R= 5%	18	18	17	17	16	16	15	15	15	14	14	14	13	13
	R=10%	31	30	30	29	28	28	27	26	26	25	25	25	24	24
	R=15%	40	40	39	39	38	37	36	36	35	35	34	34	33	32
	R=20%	48	48	47	46	46	45	44	44	43	42	42	41	41	40
	R=25%	55	54	54	53	53	52	51	50	50	49	49	48	47	47
0.35	R= 5%	17	17	17	16	16	15	15	14	14	14	13	13	13	12
	R=10%	30	29	29	28	28	27	26	25	25	25	24	24	23	23
	R=15%	39	39	38	37	37	36	35	35	34	34	33	33	32	32
	R=20%	47	47	46	45	45	44	43	42	42	41	41	40	40	39
	R=25%	54	53	53	52	52	51	50	49	49	48	48	47	46	46
0.40	R= 5%	17	16	16	16	15	15	14	14	14	13	13	13	12	12
	R=10%	29	28	28	27	27	26	25	25	24	24	23	23	23	22
	R=15%	38	38	37	37	36	35	34	34	33	33	32	32	31	31
	R=20%	46	46	45	44	44	43	42	42	41	40	40	40	39	38
	R=25%	53	52	52	51	51	50	49	48	48	47	47	46	46	45
0.45	R= 5%	16	16	15	15	15	14	14	13	13	13	13	12	12	12
	R=10%	28	28	27	26	26	25	25	24	24	23	23	23	22	21
	R=15%	37	37	36	36	35	34	34	33	33	32	32	31	31	30
	R=20%	45	45	44	44	43	42	41	41	40	40	39	39	38	37
	R=25%	52	51	51	50	50	49	48	48	47	46	46	46	45	44
0.50	R= 5%	16	15	15	15	14	14	13	13	13	12	12	12	11	11
	R=10%	27	27	26	26	25	25	24	24	23	23	22	22	21	20
	R=15%	37	36	36	35	35	34	33	33	32	31	31	31	30	29
	R=20%	45	44	44	43	42	41	41	40	40	39	39	38	37	36
	R=25%	51	51	50	50	49	48	47	47	47	46	45	45	44	43
0.55	R= 5%	15	15	15	14	14	13	13	13	12	12	12	11	11	11
	R=10%	27	26	26	25	25	24	24	23	23	22	22	21	20	20
	R=15%	36	36	35	34	34	33	32	32	32	31	30	30	29	28
	R=20%	44	43	43	42	42	41	40	40	39	39	38	37	36	35
	R=25%	51	50	50	49	48	47	47	46	46	45	45	44	43	42

Table 4.6(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	94	93	92	89	84	71	66	60	57	54	51	50	47	46
	R=10%	100	99	99	99	97	91	87	82	80	76	74	73	70	69
	R=15%	100	100	100	100	99	97	95	92	90	88	86	85	83	82
	R=20%	100	100	100	100	100	99	98	96	95	93	92	91	90	89
	R=25%	100	100	100	100	100	100	99	98	97	96	96	95	94	93
0.15	R= 5%	78	72	69	61	58	53	50	49	47	45	43	42	41	39
	R=10%	94	91	89	83	80	76	73	71	70	68	66	65	63	62
	R=15%	98	97	96	92	90	87	85	84	82	81	79	78	77	76
	R=20%	99	99	98	96	95	93	92	90	90	88	87	86	85	84
	R=25%	100	100	99	98	97	96	95	94	94	93	92	91	90	90
0.20	R= 5%	60	57	55	52	50	47	45	43	42	40	39	38	37	36
	R=10%	82	79	77	75	73	70	67	66	65	63	62	61	59	58
	R=15%	91	89	88	86	85	82	80	79	78	77	75	74	73	72
	R=20%	96	94	93	92	91	89	88	87	86	85	84	83	82	81
	R=25%	98	97	96	95	95	93	92	92	91	90	89	89	88	87
0.25	R= 5%	53	51	49	47	45	43	41	40	39	38	37	36	34	33
	R=10%	75	74	72	70	68	65	64	62	61	60	58	57	56	55
	R=15%	86	85	84	82	81	79	77	76	75	73	72	71	70	69
	R=20%	92	91	91	89	88	87	85	84	84	82	81	81	79	78
	R=25%	96	95	94	93	93	91	91	90	89	88	87	87	86	85
0.30	R= 5%	49	47	46	44	43	40	39	38	37	35	34	34	32	31
	R=10%	71	70	68	66	65	63	61	60	59	57	56	55	53	52
	R=15%	83	82	81	79	78	76	75	73	72	71	70	69	67	66
	R=20%	90	89	88	87	86	84	83	82	82	80	79	78	77	76
	R=25%	94	93	93	92	91	90	89	88	87	86	86	85	84	83
0.35	R= 5%	46	44	43	42	40	38	37	36	35	34	33	32	31	30
	R=10%	68	67	66	64	63	60	59	57	56	55	54	53	51	50
	R=15%	81	80	79	77	76	74	72	71	70	69	68	67	65	64
	R=20%	88	87	87	85	84	83	81	81	80	78	77	76	75	74
	R=25%	93	92	91	90	90	88	87	87	86	85	84	83	82	81
0.40	R= 5%	44	42	41	40	39	37	35	34	33	32	31	30	29	29
	R=10%	66	65	63	62	61	58	57	55	54	53	52	51	49	48
	R=15%	79	78	77	75	74	72	71	69	68	67	66	65	63	62
	R=20%	87	86	85	84	83	81	80	79	78	77	76	75	73	72
	R=25%	91	91	90	89	89	87	86	85	85	83	82	82	80	79
0.45	R= 5%	42	41	40	38	37	35	34	33	32	31	30	29	28	27
	R=10%	64	63	62	60	59	57	55	54	53	51	50	49	48	47
	R=15%	77	76	75	74	73	70	69	68	67	65	64	63	62	60
	R=20%	85	84	84	82	82	80	78	77	76	75	74	73	72	71
	R=25%	90	90	89	88	87	86	85	84	83	82	81	80	79	78
0.50	R= 5%	40	39	38	37	36	34	33	32	31	30	29	28	27	26
	R=10%	62	61	60	59	57	55	53	52	51	50	49	48	46	45
	R=15%	76	75	74	72	71	69	67	66	65	64	63	62	60	59
	R=20%	84	83	82	81	80	78	77	76	75	74	73	72	70	69
	R=25%	90	89	88	87	86	85	84	83	82	81	80	79	78	77
0.55	R= 5%	39	38	37	36	35	33	32	31	30	29	28	27	26	26
	R=10%	61	60	59	57	56	54	52	51	50	49	47	47	45	44
	R=15%	74	73	72	71	70	68	66	65	64	63	61	60	59	58
	R=20%	83	82	81	80	79	77	76	75	74	73	71	71	69	68
	R=25%	89	88	87	86	85	84	83	82	81	80	79	78	77	76

Table 4.6(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	86	84	82	75	67	59	52	49	47	44	43	41	39	38
	R=10%	97	96	95	91	86	80	73	70	68	66	64	63	60	59
	R=15%	99	99	98	96	93	89	84	82	80	78	76	75	73	72
	R=20%	100	100	99	98	97	94	90	88	87	85	84	83	81	80
	R=25%	100	100	100	99	98	96	93	92	91	90	89	88	86	85
0.15	R= 5%	63	58	54	50	47	44	42	40	39	37	36	36	34	33
	R=10%	83	79	75	71	68	65	63	61	60	58	57	56	54	53
	R=15%	91	88	85	82	80	77	75	74	72	71	70	69	67	66
	R=20%	95	93	91	88	87	84	83	81	81	79	78	77	76	75
	R=25%	97	96	94	92	91	89	88	87	86	85	84	83	82	81
0.20	R= 5%	49	47	45	43	41	39	37	36	35	34	33	32	31	30
	R=10%	70	68	66	64	62	59	58	57	56	54	53	52	51	49
	R=15%	81	79	78	76	74	72	70	69	68	67	66	65	64	63
	R=20%	87	86	85	83	82	80	79	78	77	76	75	74	73	72
	R=25%	91	90	89	88	87	86	84	84	83	82	81	80	79	79
0.25	R= 5%	44	42	41	39	38	36	35	34	33	32	31	30	29	28
	R=10%	65	63	62	60	58	56	55	53	53	51	50	49	48	47
	R=15%	76	75	74	72	71	69	67	66	66	64	63	62	61	60
	R=20%	84	82	82	80	79	77	76	75	74	73	72	71	70	69
	R=25%	88	87	87	86	85	83	82	81	81	80	79	78	77	76
0.30	R= 5%	41	39	38	37	36	34	32	32	31	30	29	28	27	26
	R=10%	61	60	58	57	56	54	52	51	50	49	48	47	46	45
	R=15%	73	72	71	70	68	67	65	64	63	62	61	60	59	58
	R=20%	81	80	79	78	77	75	74	73	72	71	70	69	68	67
	R=25%	86	85	85	84	83	82	80	80	79	78	77	76	75	74
0.35	R= 5%	38	37	36	35	34	32	31	30	29	28	27	27	26	25
	R=10%	58	57	56	55	54	52	50	49	48	47	46	45	44	43
	R=15%	71	70	69	67	66	65	63	62	61	60	59	58	57	56
	R=20%	79	78	77	76	75	74	72	71	71	69	68	67	66	65
	R=25%	85	84	83	82	81	80	79	78	77	76	75	75	73	73
0.40	R= 5%	36	35	35	33	32	31	30	29	28	27	26	26	25	24
	R=10%	56	55	54	53	52	50	49	47	47	45	44	44	42	41
	R=15%	69	68	67	66	65	63	62	60	60	58	57	56	55	54
	R=20%	77	76	76	75	74	72	71	70	69	68	67	66	65	64
	R=25%	83	82	82	81	80	79	78	77	76	75	74	73	72	71
0.45	R= 5%	35	34	33	32	31	30	28	28	27	26	25	25	24	23
	R=10%	55	54	53	51	50	48	47	46	45	44	43	42	41	40
	R=15%	67	66	66	64	63	61	60	59	58	57	56	55	54	53
	R=20%	76	75	74	73	72	71	69	68	68	66	65	65	63	62
	R=25%	82	81	81	80	79	77	76	75	75	74	73	72	71	70
0.50	R= 5%	34	33	32	31	30	28	27	27	26	25	25	24	23	22
	R=10%	53	52	51	50	49	47	46	45	44	43	42	41	40	39
	R=15%	66	65	64	63	62	60	59	58	57	56	55	54	52	51
	R=20%	75	74	73	72	71	69	68	67	66	65	64	63	62	61
	R=25%	81	80	80	79	78	76	75	74	74	72	71	71	70	69
0.55	R= 5%	33	32	31	30	29	28	27	26	25	24	24	23	22	21
	R=10%	52	51	50	49	48	46	45	44	43	42	41	40	39	37
	R=15%	65	64	63	62	61	59	58	57	56	54	53	53	51	50
	R=20%	74	73	72	71	70	68	67	66	65	64	63	62	61	59
	R=25%	80	79	79	78	77	75	74	73	72	71	70	70	69	67

Table 4.6(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	70	67	64	54	48	40	37	35	34	32	31	30	29	28
	R=10%	86	84	82	73	67	59	56	53	52	50	49	47	46	45
	R=15%	93	91	90	82	78	70	67	65	63	62	60	59	58	56
	R=20%	96	95	94	88	84	77	75	73	71	70	68	67	66	65
	R=25%	98	97	96	91	88	83	80	78	77	76	75	74	72	71
0.15	R= 5%	45	40	39	36	34	32	30	29	29	27	27	26	25	24
	R=10%	64	59	57	54	52	49	48	46	45	44	43	42	41	40
	R=15%	75	70	68	65	63	61	59	58	57	56	55	54	53	52
	R=20%	82	77	75	73	71	69	67	66	65	64	63	63	62	61
	R=25%	86	82	81	78	77	75	74	73	72	71	70	69	68	67
0.20	R= 5%	35	34	33	31	30	28	27	27	26	25	24	24	23	22
	R=10%	53	51	50	48	47	45	44	43	42	41	40	40	39	38
	R=15%	64	63	62	60	59	57	55	55	54	53	52	51	50	49
	R=20%	72	71	70	68	67	65	64	63	62	61	60	60	59	58
	R=25%	77	76	75	74	73	71	70	70	69	68	67	67	66	65
0.25	R= 5%	32	31	30	29	28	26	25	25	24	23	23	22	21	21
	R=10%	49	48	47	45	44	43	42	41	40	39	38	38	37	36
	R=15%	60	59	58	57	56	54	53	52	51	50	50	49	48	47
	R=20%	68	67	66	65	64	63	62	61	60	59	58	58	57	56
	R=25%	74	73	73	71	71	69	68	68	67	66	65	65	64	63
0.30	R= 5%	29	29	28	27	26	25	24	23	23	22	21	21	20	20
	R=10%	46	45	44	43	42	41	40	39	38	37	36	36	35	34
	R=15%	58	57	56	55	54	52	51	50	50	49	48	47	46	45
	R=20%	66	65	64	63	62	61	60	59	58	57	57	56	55	54
	R=25%	72	71	71	70	69	68	67	66	65	64	64	63	62	61
0.35	R= 5%	28	27	26	26	25	24	23	22	22	21	20	20	19	19
	R=10%	44	43	43	42	41	39	38	38	37	36	35	35	34	33
	R=15%	56	55	54	53	52	51	50	49	48	47	46	46	45	44
	R=20%	64	63	62	62	61	59	58	58	57	56	55	54	53	53
	R=25%	70	70	69	68	67	66	65	64	64	63	62	62	61	60
0.40	R= 5%	27	26	25	24	24	23	22	21	21	20	20	19	19	18
	R=10%	43	42	41	40	40	38	37	36	36	35	34	33	33	32
	R=15%	54	53	53	52	51	49	48	47	47	46	45	44	43	43
	R=20%	63	62	61	60	60	58	57	56	56	55	54	53	52	51
	R=25%	69	68	68	67	66	65	64	63	63	62	61	60	59	59
0.45	R= 5%	26	25	24	24	23	22	21	21	20	19	19	19	18	18
	R=10%	42	41	40	39	38	37	36	35	35	34	33	32	32	31
	R=15%	53	52	51	51	50	48	47	46	46	45	44	43	42	42
	R=20%	61	61	60	59	58	57	56	55	54	53	53	52	51	50
	R=25%	68	67	67	66	65	64	63	62	62	61	60	59	58	58
0.50	R= 5%	25	24	24	23	22	21	20	20	20	19	18	18	17	17
	R=10%	41	40	39	38	37	36	35	34	34	33	32	32	31	30
	R=15%	52	51	50	49	49	47	46	45	45	44	43	42	41	40
	R=20%	60	60	59	58	57	56	55	54	53	53	52	51	50	49
	R=25%	67	66	66	65	64	63	62	61	61	60	59	58	57	56
0.55	R= 5%	24	23	23	22	22	21	20	19	19	18	18	18	17	16
	R=10%	40	39	38	37	36	35	34	34	33	32	31	31	30	29
	R=15%	51	50	49	48	48	46	45	44	44	43	42	42	40	39
	R=20%	60	59	58	57	56	55	54	53	53	52	51	50	49	47
	R=25%	66	66	65	64	63	62	61	60	60	59	58	57	56	55

Table 4.6(d) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	54	51	45	37	35	29	27	26	25	24	23	22	21	21
	R=10%	72	69	62	55	52	45	42	41	40	38	37	36	35	34
	R=15%	81	79	73	65	63	55	53	51	50	49	47	47	45	45
	R=20%	86	84	79	72	70	63	60	59	58	57	55	55	54	53
	R=25%	90	88	84	78	76	69	67	65	64	63	62	61	60	59
0.15	R= 5%	31	29	28	26	25	23	22	22	21	20	20	19	19	18
	R=10%	47	44	43	41	40	38	36	35	35	34	33	33	32	31
	R=15%	57	55	53	51	50	48	47	46	45	44	43	43	42	41
	R=20%	65	63	61	59	58	56	55	54	53	52	51	51	50	49
	R=25%	71	69	67	65	64	62	61	60	60	59	58	58	57	56
0.20	R= 5%	26	25	24	23	22	21	20	20	19	19	18	18	17	17
	R=10%	40	39	38	37	36	35	34	33	33	32	31	31	30	29
	R=15%	50	49	48	47	46	45	44	43	43	42	41	41	40	39
	R=20%	58	57	56	55	54	53	52	51	51	50	49	49	48	47
	R=25%	64	64	63	62	61	59	59	58	57	57	56	55	55	54
0.25	R= 5%	23	22	22	21	21	20	19	18	18	17	17	17	16	16
	R=10%	37	36	36	35	34	33	32	31	31	30	30	29	28	28
	R=15%	47	47	46	45	44	43	42	41	41	40	39	39	38	38
	R=20%	55	54	54	53	52	51	50	49	49	48	48	47	46	46
	R=25%	62	61	60	59	59	58	57	56	56	55	54	54	53	52
0.30	R= 5%	22	21	21	20	19	18	18	17	17	17	16	16	15	15
	R=10%	35	35	34	33	33	31	31	30	30	29	28	28	27	27
	R=15%	45	45	44	43	43	41	41	40	40	39	38	38	37	36
	R=20%	53	53	52	51	51	49	49	48	48	47	46	46	45	44
	R=25%	60	59	59	58	57	56	55	55	54	54	53	52	52	51
0.35	R= 5%	21	20	20	19	18	18	17	17	16	16	16	15	15	14
	R=10%	34	33	33	32	31	30	30	29	29	28	27	27	26	26
	R=15%	44	43	43	42	41	40	39	39	38	38	37	37	36	35
	R=20%	52	51	51	50	49	48	48	47	46	46	45	45	44	43
	R=25%	59	58	57	57	56	55	54	54	53	52	52	51	51	50
0.40	R= 5%	20	19	19	18	18	17	16	16	16	15	15	15	14	14
	R=10%	33	32	32	31	31	29	29	28	28	27	27	26	26	25
	R=15%	43	42	42	41	40	39	38	38	37	37	36	36	35	34
	R=20%	51	50	50	49	48	47	46	46	45	45	44	44	43	42
	R=25%	57	57	56	56	55	54	53	53	52	51	51	50	50	49
0.45	R= 5%	19	19	18	18	17	16	16	16	15	15	15	14	14	14
	R=10%	32	31	31	30	30	29	28	27	27	26	26	26	25	24
	R=15%	42	41	41	40	39	38	38	37	37	36	35	35	34	34
	R=20%	50	49	49	48	47	46	46	45	45	44	43	43	42	41
	R=25%	57	56	56	55	54	53	52	52	51	51	50	50	49	48
0.50	R= 5%	18	18	18	17	17	16	16	15	15	14	14	14	13	13
	R=10%	31	31	30	30	29	28	27	27	26	26	25	25	24	24
	R=15%	41	41	40	39	39	38	37	36	36	35	35	34	34	32
	R=20%	49	49	48	47	47	46	45	44	44	43	42	42	41	40
	R=25%	56	55	55	54	53	52	52	51	51	50	49	49	48	47
0.55	R= 5%	18	17	17	17	16	16	15	15	14	14	14	14	13	12
	R=10%	31	30	30	29	28	27	27	26	26	25	25	24	23	23
	R=15%	40	40	39	39	38	37	36	36	35	35	34	34	32	31
	R=20%	48	48	47	47	46	45	44	44	43	42	42	41	40	39
	R=25%	55	54	54	53	53	52	51	50	50	49	49	48	47	46

Table 4.7(a) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.35mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	97	96	95	94	92	82	75	71	66	61	58	56	54	52
	R=10%	100	100	100	100	99	96	93	90	86	83	81	79	77	75
	R=15%	100	100	100	100	100	99	98	96	94	92	91	90	88	87
	R=20%	100	100	100	100	100	100	99	99	98	96	95	95	94	93
	R=25%	100	100	100	100	100	100	100	99	99	98	98	97	97	96
0.15	R= 5%	89	82	77	72	66	60	57	55	54	51	49	48	46	45
	R=10%	98	96	94	91	87	82	80	78	76	74	72	71	69	68
	R=15%	100	99	98	97	94	91	90	89	88	86	85	84	82	81
	R=20%	100	100	99	99	98	96	95	94	93	92	91	90	89	89
	R=25%	100	100	100	100	99	98	97	97	96	96	95	94	94	93
0.20	R= 5%	68	65	62	59	57	53	51	49	48	46	45	44	42	41
	R=10%	88	86	84	81	79	76	74	72	71	69	68	67	65	64
	R=15%	95	94	92	91	89	87	85	84	83	82	81	80	78	77
	R=20%	98	97	96	95	94	93	92	91	90	89	88	88	86	86
	R=25%	99	99	98	98	97	96	95	95	94	93	93	92	91	91
0.25	R= 5%	60	58	56	54	52	49	47	46	44	43	42	41	39	38
	R=10%	82	80	78	76	74	72	70	69	67	66	64	63	62	60
	R=15%	91	90	89	87	86	84	82	81	80	79	78	77	76	74
	R=20%	95	95	94	93	92	91	90	89	88	87	86	85	84	83
	R=25%	98	97	97	96	95	94	94	93	93	92	91	91	90	89
0.30	R= 5%	56	54	52	50	48	46	44	43	42	40	39	38	37	36
	R=10%	78	76	75	73	71	69	67	66	65	63	62	61	59	58
	R=15%	88	87	86	85	83	81	80	79	78	77	76	75	73	72
	R=20%	94	93	92	91	90	89	88	87	86	85	84	83	82	81
	R=25%	96	96	95	95	94	93	92	92	91	90	90	89	88	87
0.35	R= 5%	52	50	49	47	46	44	42	41	40	38	37	36	35	34
	R=10%	75	73	72	70	69	66	65	63	62	61	59	58	57	56
	R=15%	86	85	84	83	81	79	78	77	76	75	73	72	71	70
	R=20%	92	91	91	90	89	87	86	85	85	83	82	81	80	79
	R=25%	95	95	94	94	93	92	91	90	90	89	88	87	86	86
0.40	R= 5%	50	48	47	45	44	42	40	39	38	37	36	35	34	33
	R=10%	72	71	70	68	67	64	63	61	60	59	57	56	55	54
	R=15%	84	83	82	81	80	78	76	75	74	73	71	71	69	68
	R=20%	91	90	89	88	87	86	85	84	83	82	81	80	79	78
	R=25%	94	94	93	93	92	91	90	89	89	88	87	86	85	84
0.45	R= 5%	48	46	45	43	42	40	39	38	37	35	34	34	32	31
	R=10%	70	69	68	66	65	63	61	60	59	57	56	55	53	52
	R=15%	83	81	81	79	78	76	75	74	73	71	70	69	67	66
	R=20%	90	89	88	87	86	85	83	82	82	80	79	78	77	76
	R=25%	94	93	93	92	91	90	89	88	88	87	86	85	84	83
0.50	R= 5%	46	45	44	42	41	39	37	36	35	34	33	32	31	30
	R=10%	68	67	66	64	63	61	59	58	57	56	54	53	52	51
	R=15%	81	80	79	78	77	75	73	72	71	70	68	67	66	65
	R=20%	88	88	87	86	85	83	82	81	80	79	78	77	76	75
	R=25%	93	92	92	91	90	89	88	87	87	85	85	84	83	82
0.55	R= 5%	44	43	42	41	40	38	36	35	34	33	32	31	30	29
	R=10%	67	66	65	63	62	60	58	57	56	54	53	52	50	49
	R=15%	80	79	78	77	75	73	72	71	70	68	67	66	65	63
	R=20%	88	87	86	85	84	82	81	80	79	78	77	76	75	73
	R=25%	92	91	91	90	89	88	87	86	86	84	84	83	82	81

Table 4.7(b) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.35mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s): 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	91	89	88	85	80	68	62	57	55	51	49	48	45	44
	R=10%	98	98	98	97	94	86	82	78	76	72	71	69	67	65
	R=15%	100	99	99	99	98	94	91	88	86	83	82	81	79	77
	R=20%	100	100	100	100	99	97	95	93	91	90	88	87	86	85
	R=25%	100	100	100	100	100	98	97	95	95	93	92	92	90	90
0.15	R= 5%	73	68	65	58	55	50	48	46	45	43	42	41	39	38
	R=10%	90	87	84	78	76	72	69	68	66	64	63	62	60	59
	R=15%	96	94	92	88	86	83	81	79	78	77	75	74	73	72
	R=20%	98	97	96	93	91	89	88	86	85	84	83	82	81	80
	R=25%	99	98	98	96	94	93	92	91	90	89	88	88	87	86
0.20	R= 5%	57	54	52	50	48	45	43	41	40	39	38	37	36	35
	R=10%	77	74	73	71	69	66	64	63	62	60	59	58	56	55
	R=15%	87	85	83	82	80	78	76	75	74	73	72	71	69	68
	R=20%	92	90	89	88	87	85	84	83	82	81	80	79	78	77
	R=25%	95	94	93	92	91	90	89	88	87	86	86	85	84	83
0.25	R= 5%	50	49	47	45	44	41	40	38	38	36	35	34	33	32
	R=10%	71	70	68	66	65	62	61	59	58	57	56	55	53	52
	R=15%	82	81	80	78	77	75	73	72	71	70	69	68	67	65
	R=20%	88	87	86	85	84	82	81	80	80	78	78	77	76	75
	R=25%	92	91	91	90	89	88	87	86	85	84	84	83	82	81
0.30	R= 5%	47	45	44	42	41	39	37	36	35	34	33	32	31	30
	R=10%	67	66	65	63	62	59	58	57	56	54	53	52	51	50
	R=15%	79	78	77	75	74	72	71	70	69	68	66	66	64	63
	R=20%	86	85	84	83	82	80	79	78	78	76	75	75	73	72
	R=25%	90	89	89	88	87	86	85	84	84	83	82	81	80	79
0.35	R= 5%	44	42	41	40	39	37	35	35	34	33	32	31	30	29
	R=10%	65	63	62	61	59	57	56	55	54	52	51	50	49	48
	R=15%	77	75	75	73	72	70	69	68	67	66	64	64	62	61
	R=20%	84	83	82	81	80	79	78	77	76	75	74	73	72	71
	R=25%	89	88	87	87	86	84	84	83	82	81	80	79	78	78
0.40	R= 5%	42	41	39	38	37	35	34	33	32	31	30	30	28	28
	R=10%	63	61	60	59	58	56	54	53	52	51	50	49	47	46
	R=15%	75	74	73	72	70	69	67	66	65	64	63	62	61	59
	R=20%	82	82	81	80	79	77	76	75	74	73	72	71	70	69
	R=25%	88	87	86	85	85	83	82	81	81	80	79	78	77	76
0.45	R= 5%	40	39	38	37	36	34	33	32	31	30	29	28	27	27
	R=10%	61	60	59	57	56	54	53	51	51	49	48	47	46	45
	R=15%	73	72	71	70	69	67	66	65	64	62	61	60	59	58
	R=20%	81	80	80	78	78	76	75	74	73	72	71	70	69	68
	R=25%	86	86	85	84	84	82	81	80	80	78	78	77	76	75
0.50	R= 5%	39	38	37	35	34	33	32	31	30	29	28	27	27	26
	R=10%	59	58	57	56	55	53	51	50	49	48	47	46	45	44
	R=15%	72	71	70	69	68	66	64	63	62	61	60	59	58	57
	R=20%	80	79	78	77	76	75	73	72	72	70	69	69	67	66
	R=25%	86	85	84	83	83	81	80	79	78	77	76	76	75	74
0.55	R= 5%	37	36	36	34	33	32	31	30	29	28	27	27	26	25
	R=10%	58	57	56	54	53	51	50	49	48	47	46	45	44	43
	R=15%	71	70	69	67	66	64	63	62	61	60	59	58	57	56
	R=20%	79	78	77	76	75	74	72	71	71	69	68	68	66	65
	R=25%	85	84	83	82	82	80	79	78	77	76	75	75	74	73

Table 4.7(c) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.35mm
Sediment size ratio D_{50}/D_{10} = 2.0

(Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	76	74	73	67	59	51	44	42	40	37	36	35	33	32
	R=10%	91	89	88	84	77	71	63	61	59	56	55	53	52	50
	R=15%	96	95	94	91	86	81	74	72	70	68	66	65	63	62
	R=20%	98	97	97	95	91	87	81	79	77	75	74	73	71	70
	R=25%	99	99	98	97	94	90	86	84	82	81	80	79	77	76
0.15	R= 5%	54	50	46	42	40	37	35	34	33	32	31	30	29	28
	R=10%	72	69	64	61	59	56	54	52	51	50	49	48	46	45
	R=15%	82	79	75	72	70	67	65	64	63	61	60	60	58	57
	R=20%	88	86	82	79	77	75	73	72	71	70	69	68	67	66
	R=25%	91	90	86	84	82	80	79	78	77	76	75	74	73	72
0.20	R= 5%	41	39	38	36	35	33	32	31	30	29	28	27	26	26
	R=10%	60	58	56	55	53	51	49	48	47	46	45	44	43	42
	R=15%	71	69	68	66	65	62	61	60	59	58	57	56	55	54
	R=20%	78	76	75	74	72	70	69	68	68	66	66	65	64	63
	R=25%	83	81	81	79	78	76	75	75	74	73	72	71	71	70
0.25	R= 5%	37	36	35	33	32	30	29	28	28	27	26	26	25	24
	R=10%	55	54	52	51	50	48	47	46	45	44	43	42	41	40
	R=15%	66	65	64	62	61	60	58	57	57	56	55	54	53	52
	R=20%	74	73	72	70	69	68	67	66	65	64	63	63	62	61
	R=25%	79	78	78	76	76	74	73	72	72	71	70	69	68	68
0.30	R= 5%	34	33	32	31	30	29	28	27	26	25	25	24	23	23
	R=10%	52	51	50	49	48	46	45	44	43	42	41	40	39	38
	R=15%	63	62	61	60	59	58	56	55	55	54	53	52	51	50
	R=20%	71	70	69	68	68	66	65	64	64	62	62	61	60	59
	R=25%	77	76	75	75	74	72	71	71	70	69	68	68	67	66
0.35	R= 5%	32	31	31	29	29	27	26	26	25	24	24	23	22	22
	R=10%	50	49	48	47	46	44	43	42	41	40	39	39	38	37
	R=15%	61	60	60	58	57	56	55	54	53	52	51	50	49	48
	R=20%	69	68	68	67	66	64	63	63	62	61	60	59	58	57
	R=25%	75	75	74	73	72	71	70	69	69	68	67	66	65	64
0.40	R= 5%	31	30	29	28	27	26	25	25	24	23	23	22	21	21
	R=10%	48	47	46	45	44	43	42	41	40	39	38	38	37	36
	R=15%	60	59	58	57	56	54	53	52	52	51	50	49	48	47
	R=20%	68	67	66	65	65	63	62	61	61	59	59	58	57	56
	R=25%	74	73	73	72	71	70	69	68	67	66	66	65	64	63
0.45	R= 5%	30	29	28	27	26	25	24	24	23	22	22	21	21	20
	R=10%	47	46	45	44	43	42	40	40	39	38	37	36	36	35
	R=15%	58	57	57	56	55	53	52	51	50	49	49	48	47	46
	R=20%	67	66	65	64	63	62	61	60	59	58	57	57	56	55
	R=25%	73	72	72	71	70	69	68	67	66	65	65	64	63	62
0.50	R= 5%	29	28	27	26	26	24	23	23	22	22	21	21	20	19
	R=10%	45	45	44	43	42	40	39	39	38	37	36	36	35	34
	R=15%	57	56	56	54	54	52	51	50	49	48	48	47	46	45
	R=20%	65	65	64	63	62	61	60	59	58	57	56	56	55	54
	R=25%	72	71	71	70	69	68	67	66	65	64	64	63	62	61
0.55	R= 5%	28	27	26	25	25	24	23	22	22	21	20	20	19	19
	R=10%	44	44	43	42	41	39	38	38	37	36	35	35	34	33
	R=15%	56	55	55	53	53	51	50	49	48	47	47	46	45	44
	R=20%	65	64	63	62	61	60	59	58	57	56	55	55	54	53
	R=25%	71	70	70	69	68	67	66	65	64	63	63	62	61	60

Table 4.7(d) Predicted trapping efficiencies (from bed material grading)

D_{50} bed sediment size = 0.35mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	61	59	56	47	42	36	32	30	29	28	27	26	25	24
	R=10%	78	76	74	65	59	53	48	46	45	43	42	41	40	39
	R=15%	86	85	83	75	70	63	59	57	55	54	53	52	50	49
	R=20%	91	90	88	82	77	71	67	65	63	62	61	60	58	57
	R=25%	93	93	91	86	82	76	73	71	69	68	67	66	65	64
0.15	R= 5%	40	35	33	31	29	27	26	25	24	23	23	22	22	21
	R=10%	57	51	49	46	45	43	41	40	39	38	37	37	36	35
	R=15%	67	62	60	57	55	53	52	51	50	49	48	47	46	46
	R=20%	74	69	67	65	63	61	60	59	58	57	56	55	54	54
	R=25%	80	75	73	71	69	67	66	65	64	63	63	62	61	60
0.20	R= 5%	30	29	28	27	26	24	23	23	22	21	21	20	20	19
	R=10%	46	44	43	42	41	39	38	37	36	36	35	34	34	33
	R=15%	56	55	54	52	51	49	48	48	47	46	45	45	44	43
	R=20%	64	62	62	60	59	57	56	56	55	54	54	53	52	51
	R=25%	70	68	68	66	65	64	63	62	62	61	60	60	59	58
0.25	R= 5%	27	26	25	24	24	22	22	21	21	20	20	19	19	18
	R=10%	42	41	40	39	38	37	36	35	35	34	33	33	32	31
	R=15%	53	51	51	49	49	47	46	46	45	44	44	43	42	41
	R=20%	60	59	59	57	57	55	54	54	53	52	52	51	50	50
	R=25%	67	66	65	64	63	62	61	60	60	59	58	58	57	56
0.30	R= 5%	25	24	24	23	22	21	21	20	20	19	19	18	18	17
	R=10%	40	39	38	37	36	35	34	34	33	32	32	31	30	30
	R=15%	50	49	49	48	47	46	45	44	44	43	42	41	41	40
	R=20%	58	57	57	56	55	54	53	52	52	51	50	50	49	48
	R=25%	64	64	63	62	61	60	60	59	58	58	57	56	56	55
0.35	R= 5%	24	23	23	22	21	20	20	19	19	18	18	17	17	16
	R=10%	38	38	37	36	35	34	33	33	32	31	31	30	29	29
	R=15%	49	48	47	46	46	44	44	43	42	41	41	40	39	39
	R=20%	57	56	55	54	54	53	52	51	50	50	49	48	48	47
	R=25%	63	62	62	61	60	59	58	58	57	56	56	55	54	54
0.40	R= 5%	23	22	22	21	20	20	19	18	18	17	17	17	16	16
	R=10%	37	36	36	35	34	33	32	32	31	30	30	29	29	28
	R=15%	47	47	46	45	44	43	42	42	41	40	40	39	38	38
	R=20%	55	55	54	53	53	51	51	50	49	49	48	47	47	46
	R=25%	62	61	61	60	59	58	57	57	56	55	55	54	53	53
0.45	R= 5%	22	21	21	20	20	19	18	18	17	17	17	16	16	15
	R=10%	36	35	35	34	33	32	31	31	30	30	29	29	28	27
	R=15%	46	46	45	44	44	42	41	41	40	39	39	38	38	37
	R=20%	54	54	53	52	52	50	50	49	48	48	47	46	46	45
	R=25%	61	60	60	59	58	57	56	56	55	54	54	53	53	52
0.50	R= 5%	21	21	20	20	19	18	18	17	17	16	16	16	15	15
	R=10%	35	34	34	33	32	31	31	30	30	29	28	28	27	27
	R=15%	45	45	44	43	43	41	41	40	39	39	38	38	37	36
	R=20%	53	53	52	51	51	50	49	48	48	47	46	46	45	44
	R=25%	60	59	59	58	58	56	56	55	54	54	53	53	52	51
0.55	R= 5%	21	20	20	19	19	18	17	17	16	16	16	15	15	14
	R=10%	34	34	33	32	32	31	30	29	29	28	28	27	27	26
	R=15%	45	44	43	42	42	41	40	39	39	38	37	37	36	35
	R=20%	53	52	51	51	50	49	48	47	47	46	45	45	44	43
	R=25%	59	59	58	57	57	56	55	54	54	53	52	52	51	50

Prediction tables using suspended material sediment sizes

Table 4.8(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	25	23	21	20	19	17	17	16	16	15	15	14	14	14
	R=10%	43	39	37	35	33	31	30	29	28	28	27	26	26	25
	R=15%	57	52	49	46	45	42	41	40	39	38	37	37	36	35
	R=20%	66	62	59	56	54	52	50	49	48	47	46	45	44	44
	R=25%	74	69	67	64	62	60	58	57	56	55	54	53	52	51
0.15	R= 5%	18	17	17	16	16	15	14	14	14	13	13	13	12	12
	R=10%	32	31	30	29	28	27	26	26	25	25	24	24	23	23
	R=15%	44	42	41	40	39	38	37	36	35	35	34	34	33	32
	R=20%	53	52	51	49	48	47	46	45	44	43	43	42	41	40
	R=25%	61	60	58	57	56	54	53	53	52	51	50	50	49	48
0.20	R= 5%	16	16	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	29	28	28	27	26	25	25	24	24	23	23	22	22	21
	R=15%	40	39	38	37	37	35	35	34	33	33	32	32	31	30
	R=20%	49	48	47	46	45	44	43	42	42	41	40	40	39	38
	R=25%	56	56	55	54	53	52	51	50	49	48	48	47	46	46
0.25	R= 5%	15	15	14	14	13	13	13	12	12	12	11	11	11	11
	R=10%	27	27	26	25	25	24	23	23	23	22	22	21	21	20
	R=15%	38	37	36	35	35	34	33	32	32	31	31	30	30	29
	R=20%	46	46	45	44	43	42	41	41	40	39	39	38	38	37
	R=25%	54	53	53	52	51	50	49	48	48	47	46	46	45	44
0.30	R= 5%	14	14	14	13	13	12	12	12	12	11	11	11	11	10
	R=10%	26	25	25	24	24	23	22	22	22	21	21	20	20	20
	R=15%	36	35	35	34	33	32	32	31	31	30	30	29	29	28
	R=20%	45	44	43	43	42	41	40	39	39	38	38	37	36	36
	R=25%	52	52	51	50	49	48	47	47	46	45	45	44	43	43
0.35	R= 5%	14	13	13	13	12	12	12	11	11	11	11	10	10	10
	R=10%	25	24	24	23	23	22	22	21	21	20	20	20	19	18
	R=15%	35	34	34	33	32	31	31	30	30	29	29	28	27	27
	R=20%	43	43	42	41	41	40	39	38	38	37	37	36	35	34
	R=25%	51	50	50	49	48	47	46	45	45	44	44	43	42	41
0.40	R= 5%	13	13	12	12	12	11	11	11	11	10	10	10	9	9
	R=10%	24	24	23	23	22	22	21	21	20	20	19	19	18	18
	R=15%	34	33	33	32	31	31	30	29	29	28	28	27	26	25
	R=20%	42	42	41	40	40	39	38	37	37	36	36	35	34	33
	R=25%	50	49	49	48	47	46	45	45	44	43	43	42	40	39
0.45	R= 5%	13	12	12	12	12	11	11	11	10	10	10	9	9	9
	R=10%	23	23	23	22	22	21	21	20	20	19	19	18	17	17
	R=15%	33	32	32	31	31	30	29	29	28	28	27	26	25	24
	R=20%	41	41	40	39	39	38	37	37	36	35	34	33	32	32
	R=25%	49	48	48	47	46	45	44	44	43	42	41	40	39	38
0.50	R= 5%	12	12	12	11	11	11	11	10	10	10	9	9	9	8
	R=10%	23	22	22	22	21	21	20	20	19	18	18	17	17	16
	R=15%	32	32	31	31	30	29	29	28	28	27	26	25	24	24
	R=20%	41	40	39	39	38	37	36	36	35	34	33	32	31	31
	R=25%	48	47	47	46	45	44	44	43	42	41	40	39	38	37
0.55	R= 5%	12	12	12	11	11	11	10	10	10	9	9	9	8	8
	R=10%	22	22	22	21	21	20	20	19	19	18	17	17	16	16
	R=15%	32	31	31	30	30	29	28	27	27	26	25	24	24	23
	R=20%	40	39	39	38	38	37	36	35	34	33	32	32	31	30
	R=25%	47	47	46	45	45	44	43	42	41	40	39	38	37	36

Table 4.8(b) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	32	28	27	22	21	19	18	17	17	16	16	15	15	14
	R=10%	51	46	43	38	35	33	31	30	30	29	28	27	27	26
	R=15%	63	58	55	49	46	43	42	41	40	39	38	37	36	36
	R=20%	71	66	64	58	55	52	50	49	48	47	46	46	45	44
	R=25%	77	73	71	65	62	59	58	56	56	54	53	53	52	51
0.15	R= 5%	20	19	18	18	17	16	15	15	15	14	14	14	13	13
	R=10%	34	33	32	31	30	28	27	27	26	26	25	25	24	24
	R=15%	45	43	42	41	40	38	37	37	36	35	35	34	34	33
	R=20%	53	52	51	49	48	47	46	45	44	44	43	42	42	41
	R=25%	60	59	58	57	56	54	53	52	52	51	50	50	49	48
0.20	R= 5%	17	17	16	16	15	15	14	14	14	13	13	13	12	12
	R=10%	30	29	29	28	27	26	26	25	25	24	24	23	23	22
	R=15%	40	39	39	38	37	36	35	35	34	33	33	32	32	31
	R=20%	49	48	47	46	46	44	43	43	42	42	41	40	40	39
	R=25%	56	55	54	53	53	51	51	50	49	49	48	47	47	46
0.25	R= 5%	16	15	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	28	27	27	26	26	25	24	24	23	23	22	22	22	21
	R=15%	38	37	37	36	35	34	34	33	33	32	31	31	30	30
	R=20%	46	46	45	44	44	42	42	41	41	40	39	39	38	38
	R=25%	53	53	52	51	51	50	49	48	48	47	46	46	45	45
0.30	R= 5%	15	15	14	14	14	13	13	12	12	12	12	11	11	11
	R=10%	27	26	26	25	25	24	23	23	23	22	22	21	21	20
	R=15%	37	36	35	35	34	33	32	32	31	31	30	30	29	29
	R=20%	45	44	44	43	42	41	40	40	39	39	38	38	37	37
	R=25%	52	51	51	50	49	48	48	47	46	46	45	45	44	43
0.35	R= 5%	14	14	14	13	13	13	12	12	12	11	11	11	11	11
	R=10%	26	25	25	24	24	23	23	22	22	21	21	21	20	20
	R=15%	35	35	34	34	33	32	31	31	31	30	30	29	29	28
	R=20%	44	43	42	42	41	40	39	39	38	38	37	37	36	36
	R=25%	51	50	50	49	48	47	46	46	45	45	44	44	43	43
0.40	R= 5%	14	14	13	13	13	12	12	12	11	11	11	11	10	10
	R=10%	25	25	24	24	23	22	22	21	21	21	20	20	20	19
	R=15%	34	34	33	33	32	31	31	30	30	29	29	28	28	27
	R=20%	43	42	42	41	40	39	39	38	38	37	36	36	35	34
	R=25%	50	49	49	48	47	46	46	45	45	44	43	43	42	41
0.45	R= 5%	13	13	13	12	12	12	11	11	11	11	11	10	10	10
	R=10%	24	24	24	23	23	22	21	21	21	20	20	20	19	18
	R=15%	34	33	33	32	32	31	30	30	29	29	28	28	27	26
	R=20%	42	41	41	40	39	38	38	37	37	36	36	35	34	33
	R=25%	49	48	48	47	46	45	45	44	44	43	43	42	41	40
0.50	R= 5%	13	13	12	12	12	11	11	11	11	11	10	10	9	9
	R=10%	24	23	23	22	22	21	21	21	20	20	19	19	18	18
	R=15%	33	32	32	31	31	30	29	29	29	28	27	27	26	25
	R=20%	41	40	40	39	39	38	37	37	36	36	35	34	33	32
	R=25%	48	47	47	46	46	45	44	44	43	42	42	41	40	39
0.55	R= 5%	13	12	12	12	12	11	11	11	11	10	10	10	9	9
	R=10%	23	23	22	22	22	21	20	20	20	19	19	18	17	17
	R=15%	32	32	31	31	30	30	29	29	28	27	27	26	25	24
	R=20%	40	40	39	39	38	37	37	36	36	35	34	33	32	31
	R=25%	47	47	46	46	45	44	43	43	43	42	41	40	39	38

Table 4.8(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	39	33	29	26	23	21	20	19	18	18	17	17	16	16
	R=10%	56	49	45	42	38	35	33	32	31	30	29	29	28	28
	R=15%	67	60	56	52	48	45	43	42	41	40	39	39	38	37
	R=20%	74	68	64	60	56	53	51	50	49	48	47	47	46	45
	R=25%	80	74	70	66	63	59	58	57	56	55	54	53	52	52
0.15	R= 5%	22	21	20	19	19	17	17	16	16	15	15	15	14	14
	R=10%	36	34	34	32	31	30	29	28	28	27	27	26	26	25
	R=15%	46	45	44	42	41	40	39	38	38	37	36	36	35	34
	R=20%	54	52	51	50	49	48	47	46	45	45	44	44	43	42
	R=25%	61	59	58	57	56	54	53	53	52	51	51	50	50	49
0.20	R= 5%	19	18	18	17	17	16	15	15	15	14	14	14	13	13
	R=10%	32	31	30	29	29	28	27	27	26	26	25	25	24	24
	R=15%	42	41	40	39	38	37	36	36	35	35	34	34	33	33
	R=20%	50	49	48	47	46	45	44	44	43	43	42	42	41	40
	R=25%	56	55	55	54	53	52	51	51	50	49	49	48	48	47
0.25	R= 5%	17	17	17	16	16	15	14	14	14	13	13	13	13	12
	R=10%	30	29	29	28	27	26	26	25	25	24	24	23	23	23
	R=15%	39	39	38	37	37	36	35	35	34	33	33	32	32	31
	R=20%	47	46	46	45	45	44	43	42	42	41	41	40	39	39
	R=25%	54	53	53	52	51	50	50	49	49	48	47	47	46	46
0.30	R= 5%	16	16	16	15	15	14	14	13	13	13	13	12	12	12
	R=10%	28	28	27	27	26	25	25	24	24	23	23	23	22	22
	R=15%	38	37	37	36	35	35	34	33	33	32	32	31	31	30
	R=20%	46	45	45	44	43	42	42	41	41	40	39	39	38	38
	R=25%	52	52	51	51	50	49	48	48	47	47	46	46	45	45
0.35	R= 5%	16	15	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	27	27	26	26	25	24	24	23	23	23	22	22	21	21
	R=15%	37	36	36	35	35	34	33	32	32	31	31	31	30	29
	R=20%	44	44	43	43	42	41	41	40	40	39	39	38	37	37
	R=25%	51	51	50	50	49	48	47	47	46	46	45	45	44	44
0.40	R= 5%	15	15	14	14	14	13	13	13	12	12	12	12	11	11
	R=10%	26	26	26	25	25	24	23	23	23	22	22	21	21	21
	R=15%	36	35	35	34	34	33	32	32	31	31	30	30	29	29
	R=20%	44	43	43	42	41	40	40	39	39	38	38	37	37	36
	R=25%	50	50	49	49	48	47	46	46	46	45	44	44	43	43
0.45	R= 5%	15	14	14	14	13	13	12	12	12	12	11	11	11	10
	R=10%	26	25	25	24	24	23	23	22	22	21	21	21	20	20
	R=15%	35	35	34	33	33	32	31	31	31	30	30	29	29	28
	R=20%	43	42	42	41	41	40	39	39	38	38	37	37	36	35
	R=25%	49	49	49	48	47	46	46	45	45	44	44	43	43	42
0.50	R= 5%	14	14	14	13	13	12	12	12	12	11	11	11	10	10
	R=10%	25	25	24	24	23	23	22	22	21	21	21	20	19	19
	R=15%	34	34	33	33	32	31	31	30	30	29	29	29	28	27
	R=20%	42	42	41	40	40	39	38	38	38	37	36	36	35	34
	R=25%	49	48	48	47	47	46	45	45	44	44	43	43	41	40
0.55	R= 5%	14	13	13	13	13	12	12	12	11	11	11	10	10	10
	R=10%	25	24	24	23	23	22	22	21	21	21	20	20	19	18
	R=15%	34	33	33	32	32	31	30	30	30	29	28	28	27	26
	R=20%	41	41	40	40	39	38	38	37	37	36	36	35	34	33
	R=25%	48	48	47	47	46	45	45	44	44	43	42	42	40	39

Table 4.9(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	36	33	29	26	24	22	21	20	20	19	18	18	17	17
	R=10%	58	53	48	44	42	39	37	36	35	34	33	32	31	30
	R=15%	72	67	61	57	55	51	49	48	47	45	44	44	42	42
	R=20%	81	77	71	67	64	61	59	58	57	55	54	53	52	51
	R=25%	87	83	78	75	72	69	67	65	64	63	62	61	60	59
0.15	R= 5%	24	23	22	21	20	19	18	17	17	16	16	16	15	15
	R=10%	40	39	38	36	35	33	32	31	31	30	29	29	28	27
	R=15%	53	51	50	48	47	45	44	43	42	41	40	40	39	38
	R=20%	63	61	60	58	57	55	53	52	52	50	50	49	48	47
	R=25%	70	69	68	66	64	62	61	60	59	58	57	57	56	55
0.20	R= 5%	20	20	19	18	18	17	16	16	16	15	15	14	14	14
	R=10%	36	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=15%	48	46	46	44	43	42	41	40	39	38	38	37	36	35
	R=20%	57	56	55	54	53	51	50	49	49	48	47	46	45	44
	R=25%	65	64	63	62	61	59	58	57	56	55	54	54	53	52
0.25	R= 5%	19	18	18	17	17	16	15	15	15	14	14	14	13	13
	R=10%	33	32	32	31	30	29	28	27	27	26	26	25	25	24
	R=15%	45	44	43	42	41	40	39	38	37	36	36	35	34	34
	R=20%	54	53	52	51	50	49	48	47	46	45	45	44	43	42
	R=25%	62	61	60	59	58	57	56	55	54	53	52	52	51	50
0.30	R= 5%	18	17	17	16	16	15	15	14	14	14	13	13	13	12
	R=10%	31	31	30	29	29	28	27	26	26	25	25	24	23	23
	R=15%	43	42	41	40	40	38	37	36	36	35	34	34	33	32
	R=20%	52	51	51	49	49	47	46	45	45	44	43	42	42	41
	R=25%	60	59	58	57	56	55	54	53	52	51	51	50	49	48
0.35	R= 5%	17	16	16	15	15	14	14	14	13	13	13	12	12	12
	R=10%	30	29	29	28	28	26	26	25	25	24	24	23	23	22
	R=15%	41	40	40	39	38	37	36	35	35	34	33	33	32	31
	R=20%	50	50	49	48	47	46	45	44	43	42	42	41	40	39
	R=25%	58	57	57	56	55	53	52	52	51	50	49	49	48	47
0.40	R= 5%	16	16	15	15	14	14	13	13	13	12	12	12	11	11
	R=10%	29	28	28	27	27	26	25	24	24	23	23	23	22	21
	R=15%	40	39	39	38	37	36	35	34	34	33	32	32	31	30
	R=20%	49	48	48	47	46	44	44	43	42	41	41	40	39	37
	R=25%	57	56	55	54	54	52	51	50	50	49	48	48	46	45
0.45	R= 5%	15	15	15	14	14	13	13	13	12	12	12	11	11	10
	R=10%	28	28	27	26	26	25	24	24	23	23	22	21	20	20
	R=15%	39	38	38	37	36	35	34	33	33	32	31	30	29	28
	R=20%	48	47	46	45	45	43	43	42	41	40	40	39	37	36
	R=25%	56	55	54	53	52	51	50	49	49	48	47	46	44	43
0.50	R= 5%	15	15	14	14	14	13	13	12	12	12	11	11	10	10
	R=10%	27	27	26	26	25	24	24	23	23	22	21	20	20	19
	R=15%	38	37	37	36	35	34	33	33	32	31	30	29	28	27
	R=20%	47	46	45	45	44	43	42	41	41	39	38	37	36	35
	R=25%	55	54	53	52	51	50	49	49	48	47	45	44	43	42

Table 4.9(b) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	48	40	35	31	27	24	22	22	21	20	19	19	18	17
	R=10%	68	59	54	50	44	40	38	37	36	34	33	32	31	31
	R=15%	79	71	66	62	56	51	49	48	47	45	44	43	42	41
	R=20%	86	79	74	70	65	60	58	57	56	54	53	52	51	50
	R=25%	90	84	80	76	71	67	65	64	63	61	60	59	58	57
0.15	R= 5%	26	24	23	22	21	20	19	18	18	17	17	16	16	16
	R=10%	42	40	38	37	36	34	33	32	31	30	30	29	28	28
	R=15%	53	51	50	48	47	45	43	43	42	41	40	40	39	38
	R=20%	62	60	58	57	56	53	52	51	51	49	49	48	47	47
	R=25%	69	67	65	64	63	61	59	58	58	57	56	55	55	54
0.20	R= 5%	22	21	20	19	19	18	17	17	16	16	15	15	15	14
	R=10%	36	35	34	33	32	31	30	30	29	28	28	27	27	26
	R=15%	47	46	45	44	43	42	41	40	39	39	38	37	36	36
	R=20%	56	55	54	53	52	50	49	49	48	47	46	46	45	44
	R=25%	63	62	61	60	59	58	57	56	55	54	54	53	52	51
0.25	R= 5%	20	19	18	18	17	17	16	16	15	15	14	14	14	13
	R=10%	33	33	32	31	30	29	29	28	28	27	26	26	25	25
	R=15%	44	43	43	42	41	40	39	38	38	37	36	36	35	34
	R=20%	53	52	51	50	49	48	47	47	46	45	45	44	43	42
	R=25%	60	59	59	58	57	55	55	54	53	52	52	51	50	50
0.30	R= 5%	18	18	17	17	16	16	15	15	15	14	14	14	13	13
	R=10%	32	31	30	30	29	28	27	27	26	26	25	25	24	24
	R=15%	42	42	41	40	39	38	37	37	36	35	35	34	34	33
	R=20%	51	50	49	49	48	47	46	45	45	44	43	43	42	41
	R=25%	58	57	57	56	55	54	53	52	52	51	50	50	49	48
0.35	R= 5%	17	17	17	16	16	15	15	14	14	14	13	13	13	12
	R=10%	30	30	29	29	28	27	26	26	25	25	24	24	23	23
	R=15%	41	40	40	39	38	37	36	36	35	34	34	33	33	32
	R=20%	49	49	48	47	47	45	45	44	43	43	42	41	41	40
	R=25%	57	56	55	55	54	53	52	51	51	50	49	49	48	47
0.40	R= 5%	17	16	16	15	15	14	14	14	13	13	13	13	12	12
	R=10%	29	29	28	28	27	26	25	25	25	24	24	23	23	22
	R=15%	40	39	39	38	37	36	35	35	34	33	33	32	32	31
	R=20%	48	48	47	46	46	44	43	43	42	42	41	40	40	39
	R=25%	55	55	54	53	53	52	51	50	50	49	48	48	47	46
0.45	R= 5%	16	16	15	15	15	14	14	13	13	13	12	12	12	11
	R=10%	29	28	28	27	26	25	25	24	24	23	23	23	22	21
	R=15%	39	38	38	37	36	35	34	34	33	33	32	32	31	30
	R=20%	47	47	46	45	45	43	43	42	41	41	40	40	39	38
	R=25%	54	54	53	52	52	51	50	49	49	48	47	47	46	45
0.50	R= 5%	16	15	15	14	14	14	13	13	13	12	12	12	11	11
	R=10%	28	27	27	26	26	25	24	24	23	23	22	22	21	20
	R=15%	38	37	37	36	35	34	34	33	33	32	31	31	30	29
	R=20%	46	46	45	44	44	43	42	41	41	40	39	39	37	36
	R=25%	54	53	52	52	51	50	49	48	48	47	46	46	44	43
0.55	R= 5%	15	15	15	14	14	13	13	13	12	12	12	11	11	10
	R=10%	27	27	26	26	25	24	24	23	23	22	22	21	20	20
	R=15%	37	37	36	35	35	34	33	32	32	31	31	30	29	28
	R=20%	46	45	44	44	43	42	41	41	40	39	39	38	36	35
	R=25%	53	52	52	51	50	49	48	48	47	46	46	45	43	42

Table 4.9(c) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	50	46	40	34	32	26	24	23	23	21	21	20	19	19
	R=10%	69	65	58	51	48	42	39	38	37	36	35	34	33	32
	R=15%	78	75	69	62	59	52	50	48	47	46	45	44	43	42
	R=20%	84	81	76	69	67	60	58	56	56	54	53	52	51	50
	R=25%	88	86	81	75	73	67	64	63	62	61	60	59	58	57
0.15	R= 5%	28	26	25	24	23	21	20	20	19	19	18	18	17	17
	R=10%	44	41	40	38	37	35	34	33	32	32	31	30	30	29
	R=15%	54	52	50	48	47	45	44	43	43	42	41	40	40	39
	R=20%	62	60	58	56	55	54	52	51	51	50	49	49	48	47
	R=25%	68	66	65	63	62	60	59	58	58	57	56	55	55	54
0.20	R= 5%	23	22	22	21	20	19	18	18	18	17	17	16	16	15
	R=10%	38	37	36	34	34	32	31	31	30	30	29	29	28	27
	R=15%	48	47	46	45	44	42	42	41	40	39	39	38	38	37
	R=20%	56	55	54	53	52	51	50	49	48	48	47	46	46	45
	R=25%	62	61	61	59	59	57	56	56	55	54	54	53	52	52
0.25	R= 5%	21	20	20	19	19	18	17	17	16	16	16	15	15	14
	R=10%	35	34	33	32	32	31	30	29	29	28	28	27	26	26
	R=15%	45	44	43	42	42	41	40	39	39	38	37	37	36	35
	R=20%	53	52	51	51	50	49	48	47	47	46	45	45	44	43
	R=25%	60	59	58	57	57	55	55	54	54	53	52	52	51	50
0.30	R= 5%	20	19	19	18	18	17	16	16	16	15	15	15	14	14
	R=10%	33	32	32	31	30	29	29	28	28	27	26	26	25	25
	R=15%	43	42	42	41	40	39	38	38	37	36	36	35	35	34
	R=20%	51	50	50	49	48	47	46	46	45	45	44	43	43	42
	R=25%	58	57	57	56	55	54	53	53	52	51	51	50	50	49
0.35	R= 5%	19	18	18	17	17	16	16	15	15	15	14	14	14	13
	R=10%	32	31	31	30	29	28	28	27	27	26	26	25	25	24
	R=15%	42	41	41	40	39	38	37	37	36	35	35	34	34	33
	R=20%	50	49	49	48	47	46	45	45	44	43	43	42	42	41
	R=25%	56	56	55	55	54	53	52	52	51	50	50	49	48	48
0.40	R= 5%	18	18	17	17	16	16	15	15	14	14	14	13	13	13
	R=10%	31	30	30	29	28	27	27	26	26	25	25	24	24	23
	R=15%	41	40	39	39	38	37	36	36	35	35	34	34	33	32
	R=20%	49	48	47	47	46	45	44	44	43	42	42	41	41	40
	R=25%	55	55	54	54	53	52	51	51	50	49	49	48	48	47
0.45	R= 5%	17	17	17	16	16	15	15	14	14	14	13	13	13	12
	R=10%	30	29	29	28	28	27	26	26	25	25	24	24	23	23
	R=15%	40	39	39	38	37	36	35	35	34	34	33	33	32	32
	R=20%	48	47	47	46	45	44	43	43	42	42	41	41	40	39
	R=25%	54	54	53	53	52	51	50	50	49	49	48	48	47	46
0.50	R= 5%	17	16	16	16	15	15	14	14	14	13	13	13	12	12
	R=10%	29	29	28	27	27	26	25	25	25	24	24	23	23	22
	R=15%	39	38	38	37	36	35	35	34	34	33	33	32	31	30
	R=20%	47	46	46	45	44	43	43	42	42	41	40	40	39	38
	R=25%	54	53	53	52	51	50	50	49	49	48	47	47	46	45
0.55	R= 5%	16	16	16	15	15	14	14	14	13	13	13	12	12	11
	R=10%	28	28	28	27	26	26	25	24	24	24	23	23	22	21
	R=15%	38	38	37	36	36	35	34	34	33	33	32	32	30	29
	R=20%	46	46	45	44	44	43	42	42	41	40	40	39	38	37
	R=25%	53	52	52	51	51	50	49	48	48	47	47	46	45	44

Table 4.9(d) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.12mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	51	48	44	36	33	28	26	24	24	23	22	21	20	20
	R=10%	68	65	61	53	49	43	40	39	38	36	35	35	34	33
	R=15%	77	75	71	63	60	53	50	49	48	46	45	45	43	43
	R=20%	83	81	77	70	67	60	58	56	55	54	53	52	51	51
	R=25%	87	85	82	75	73	66	64	63	62	60	59	59	58	57
0.15	R= 5%	30	28	26	25	24	22	21	21	20	19	19	18	18	17
	R=10%	45	42	41	39	38	36	35	34	33	32	32	31	31	30
	R=15%	56	52	51	49	48	46	45	44	43	42	42	41	40	40
	R=20%	63	60	58	56	55	54	52	52	51	50	49	49	48	47
	R=25%	69	66	64	63	62	60	59	58	57	57	56	55	55	54
0.20	R= 5%	24	24	23	22	21	20	19	19	18	18	17	17	17	16
	R=10%	38	37	36	35	34	33	32	32	31	30	30	29	29	28
	R=15%	48	47	46	45	44	43	42	41	41	40	39	39	38	38
	R=20%	56	55	54	53	52	51	50	49	49	48	47	47	46	45
	R=25%	62	61	60	59	58	57	56	56	55	54	54	53	53	52
0.25	R= 5%	22	21	21	20	20	19	18	18	17	17	16	16	16	15
	R=10%	36	35	34	33	33	31	31	30	30	29	28	28	27	27
	R=15%	45	44	44	43	42	41	40	40	39	38	38	37	37	36
	R=20%	53	52	51	51	50	49	48	47	47	46	46	45	44	44
	R=25%	59	58	58	57	56	55	55	54	54	53	52	52	51	51
0.30	R= 5%	21	20	20	19	19	18	17	17	16	16	16	15	15	14
	R=10%	34	33	33	32	31	30	29	29	28	28	27	27	26	26
	R=15%	43	43	42	41	41	40	39	38	38	37	37	36	35	35
	R=20%	51	50	50	49	49	47	47	46	46	45	44	44	43	43
	R=25%	57	57	56	56	55	54	53	53	52	52	51	51	50	49
0.35	R= 5%	20	19	19	18	18	17	16	16	16	15	15	15	14	14
	R=10%	33	32	31	31	30	29	28	28	27	27	26	26	25	25
	R=15%	42	41	41	40	40	39	38	37	37	36	36	35	34	34
	R=20%	50	49	49	48	47	46	46	45	45	44	43	43	42	42
	R=25%	56	56	55	55	54	53	52	52	51	51	50	50	49	48
0.40	R= 5%	19	18	18	17	17	16	16	15	15	15	14	14	14	13
	R=10%	31	31	30	30	29	28	28	27	27	26	26	25	25	24
	R=15%	41	41	40	39	39	38	37	36	36	35	35	34	34	33
	R=20%	49	48	48	47	47	45	45	44	44	43	43	42	41	41
	R=25%	55	55	54	54	53	52	51	51	50	50	49	49	48	48
0.45	R= 5%	18	18	17	17	16	16	15	15	15	14	14	14	13	13
	R=10%	31	30	30	29	28	28	27	26	26	25	25	25	24	24
	R=15%	40	40	39	38	38	37	36	36	35	35	34	34	33	32
	R=20%	48	47	47	46	46	45	44	43	43	42	42	41	41	40
	R=25%	54	54	54	53	52	51	51	50	50	49	48	48	47	47
0.50	R= 5%	18	17	17	16	16	15	15	15	14	14	14	13	13	13
	R=10%	30	29	29	28	28	27	26	26	25	25	24	24	24	23
	R=15%	39	39	38	38	37	36	36	35	35	34	33	33	32	32
	R=20%	47	47	46	45	45	44	43	43	42	42	41	41	40	39
	R=25%	54	53	53	52	52	51	50	49	49	48	48	47	47	46
0.55	R= 5%	17	17	16	16	16	15	15	14	14	14	13	13	12	12
	R=10%	29	29	28	28	27	26	26	25	25	24	24	24	23	22
	R=15%	39	38	38	37	37	36	35	34	34	33	33	32	31	30
	R=20%	47	46	46	45	44	43	43	42	42	41	40	40	39	38
	R=25%	53	53	52	51	51	50	49	49	48	48	47	47	46	45

Table 4.10(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	54	47	44	37	34	30	29	27	26	25	24	23	23	22
	R=10%	78	70	68	58	55	50	48	46	45	43	42	41	39	38
	R=15%	89	83	81	72	69	64	61	59	58	56	55	54	52	51
	R=20%	94	90	88	81	78	73	71	69	68	66	65	64	62	61
	R=25%	97	94	93	87	84	80	78	77	75	74	72	71	70	69
0.15	R= 5%	32	31	29	28	27	25	24	23	22	22	21	20	20	19
	R=10%	53	50	49	47	45	42	41	40	39	38	37	36	35	34
	R=15%	66	64	62	60	58	55	54	53	52	50	49	48	47	46
	R=20%	76	73	72	70	68	65	64	63	62	60	59	58	57	56
	R=25%	82	80	79	77	75	73	71	70	70	68	67	66	65	64
0.20	R= 5%	27	26	26	24	24	22	21	21	20	20	19	19	18	17
	R=10%	46	44	43	42	41	39	38	37	36	35	34	33	32	32
	R=15%	59	58	56	55	53	51	50	49	48	47	46	45	44	43
	R=20%	69	67	66	64	63	61	60	59	58	57	56	55	54	53
	R=25%	76	75	74	72	71	69	68	67	66	65	64	63	62	61
0.25	R= 5%	25	24	23	22	22	21	20	19	19	18	18	17	17	16
	R=10%	42	41	40	39	38	36	35	34	34	33	32	31	30	30
	R=15%	55	54	53	51	51	49	48	47	46	45	44	43	42	41
	R=20%	65	64	63	61	60	58	57	56	55	54	53	52	51	50
	R=25%	72	71	71	69	68	66	65	64	63	62	61	60	59	58
0.30	R= 5%	23	22	22	21	20	19	19	18	18	17	17	16	16	15
	R=10%	40	39	38	37	36	35	34	33	32	31	30	30	29	28
	R=15%	53	51	51	49	48	47	45	44	44	43	42	41	40	39
	R=20%	62	61	60	59	58	56	55	54	53	52	51	51	49	48
	R=25%	70	69	68	67	66	64	63	62	61	60	59	58	57	56
0.35	R= 5%	22	21	21	20	19	19	18	17	17	16	16	16	15	15
	R=10%	38	37	36	35	35	33	32	31	31	30	29	29	28	27
	R=15%	51	50	49	48	47	45	44	43	42	41	40	40	39	38
	R=20%	60	59	58	57	56	55	53	52	52	51	50	49	48	47
	R=25%	68	67	66	65	64	63	61	60	60	58	58	57	56	55
0.40	R= 5%	21	20	20	19	19	18	17	17	16	16	15	15	15	14
	R=10%	37	36	35	34	33	32	31	30	30	29	28	28	27	26
	R=15%	49	48	47	46	45	43	42	42	41	40	39	38	37	36
	R=20%	59	58	57	56	55	53	52	51	50	49	48	48	47	45
	R=25%	66	66	65	64	63	61	60	59	58	57	56	55	54	53
0.45	R= 5%	20	20	19	18	18	17	17	16	16	15	15	15	14	13
	R=10%	35	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=15%	48	47	46	45	44	42	41	40	40	39	38	38	36	34
	R=20%	57	56	56	54	53	52	51	50	49	48	47	47	45	43
	R=25%	65	64	63	62	61	60	59	58	57	56	55	55	52	51
0.50	R= 5%	19	19	18	18	17	17	16	16	15	15	14	14	13	12
	R=10%	34	34	33	32	31	30	29	29	28	27	27	26	24	23
	R=15%	46	45	45	44	43	41	40	39	39	38	37	36	34	33
	R=20%	56	55	54	53	52	51	50	49	48	47	46	45	43	41
	R=25%	64	63	62	61	60	59	57	57	56	55	54	52	50	49
0.55	R= 5%	19	18	18	17	17	16	16	15	15	14	14	13	12	12
	R=10%	33	33	32	31	31	29	28	28	27	26	25	24	23	22
	R=15%	45	44	44	43	42	40	39	39	38	37	35	34	33	32
	R=20%	55	54	53	52	51	50	49	48	47	46	44	43	41	40
	R=25%	63	62	61	60	59	58	56	56	55	54	52	51	49	47

Table 4.10(b) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	63	59	53	43	40	33	30	28	27	26	25	24	23	22
	R=10%	82	79	73	64	60	51	48	46	44	42	41	40	39	38
	R=15%	90	88	84	75	72	63	60	58	56	54	53	52	50	49
	R=20%	95	93	89	83	80	72	68	66	65	63	62	61	59	58
	R=25%	97	96	93	87	85	78	75	73	72	70	69	68	66	65
0.15	R= 5%	36	33	31	29	27	25	24	23	23	22	21	21	20	19
	R=10%	55	51	49	46	44	42	40	39	38	37	36	36	35	34
	R=15%	66	63	61	58	56	54	52	51	50	49	48	47	46	45
	R=20%	75	71	69	66	65	63	61	60	59	58	57	56	55	54
	R=25%	80	77	75	73	72	69	68	67	66	65	64	63	62	61
0.20	R= 5%	28	27	26	25	24	23	22	21	21	20	19	19	18	18
	R=10%	45	44	43	41	40	38	37	36	35	34	34	33	32	32
	R=15%	57	56	54	53	51	50	49	47	47	46	45	44	43	42
	R=20%	66	64	63	62	60	58	57	56	56	55	54	53	52	51
	R=25%	72	71	70	68	67	66	65	64	63	62	61	61	60	59
0.25	R= 5%	25	24	24	23	22	21	20	20	19	19	18	18	17	17
	R=10%	41	40	39	38	37	36	35	34	34	33	32	31	30	30
	R=15%	53	52	51	50	49	47	46	45	45	44	43	42	41	40
	R=20%	62	61	60	59	58	56	55	54	54	53	52	51	50	49
	R=25%	69	68	67	66	65	63	62	61	61	60	59	58	57	57
0.30	R= 5%	23	23	22	21	21	20	19	19	18	18	17	17	16	16
	R=10%	39	38	37	36	36	34	33	33	32	31	30	30	29	29
	R=15%	50	49	49	48	47	45	44	44	43	42	41	41	40	39
	R=20%	59	58	58	56	56	54	53	52	52	51	50	49	48	48
	R=25%	66	65	65	64	63	61	61	60	59	58	57	57	56	55
0.35	R= 5%	22	21	21	20	20	19	18	18	17	17	16	16	16	15
	R=10%	37	36	36	35	34	33	32	31	31	30	29	29	28	27
	R=15%	49	48	47	46	45	44	43	42	42	41	40	39	38	38
	R=20%	58	57	56	55	54	53	52	51	50	49	49	48	47	46
	R=25%	65	64	63	62	61	60	59	58	58	57	56	55	54	54
0.40	R= 5%	21	21	20	19	19	18	17	17	17	16	16	15	15	15
	R=10%	36	35	35	34	33	32	31	30	30	29	28	28	27	27
	R=15%	47	46	46	45	44	43	42	41	40	39	39	38	37	37
	R=20%	56	55	55	54	53	51	50	50	49	48	47	47	46	45
	R=25%	63	63	62	61	60	59	58	57	56	56	55	54	53	53
0.45	R= 5%	20	20	19	19	18	17	17	16	16	16	15	15	14	14
	R=10%	35	34	34	33	32	31	30	29	29	28	28	27	26	26
	R=15%	46	45	45	44	43	42	41	40	39	38	38	37	36	36
	R=20%	55	54	54	53	52	50	49	49	48	47	46	46	45	44
	R=25%	62	61	61	60	59	58	57	56	55	54	54	53	52	52
0.50	R= 5%	20	19	19	18	18	17	16	16	16	15	15	15	14	13
	R=10%	34	33	33	32	31	30	29	29	28	27	27	26	26	25
	R=15%	45	44	44	43	42	41	40	39	38	38	37	36	36	34
	R=20%	54	53	52	52	51	49	48	48	47	46	45	45	44	43
	R=25%	61	60	60	59	58	57	56	55	54	54	53	52	51	50
0.55	R= 5%	19	19	18	18	17	16	16	16	15	15	14	14	13	13
	R=10%	33	32	32	31	30	29	29	28	27	27	26	26	25	24
	R=15%	44	43	43	42	41	40	39	38	38	37	36	36	34	33
	R=20%	53	52	52	51	50	49	48	47	46	45	45	44	43	41
	R=25%	60	59	59	58	57	56	55	54	54	53	52	52	50	48

Table 4.10(c) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	61	59	57	48	42	36	32	30	29	27	26	25	24	23
	R=10%	79	77	75	67	60	53	49	46	45	43	42	41	39	38
	R=15%	87	86	84	77	71	64	60	57	56	54	53	52	50	49
	R=20%	91	90	89	83	78	72	67	65	64	62	61	60	59	58
	R=25%	94	93	92	87	83	77	73	71	70	68	67	66	65	64
0.15	R= 5%	40	35	33	30	29	27	26	25	24	23	22	22	21	21
	R=10%	57	52	49	47	45	42	41	40	39	38	37	36	35	35
	R=15%	68	63	60	57	56	53	52	51	50	49	48	47	46	45
	R=20%	75	71	68	65	64	61	60	59	58	57	56	56	54	54
	R=25%	81	76	74	71	70	68	66	65	65	64	63	62	61	61
0.20	R= 5%	30	28	28	26	25	24	23	22	22	21	20	20	19	19
	R=10%	46	44	43	42	40	39	38	37	36	35	35	34	33	32
	R=15%	56	55	54	52	51	49	48	48	47	46	45	45	44	43
	R=20%	64	63	62	60	59	58	57	56	55	54	53	53	52	51
	R=25%	70	69	68	67	66	64	63	63	62	61	60	60	59	58
0.25	R= 5%	27	26	25	24	23	22	21	21	20	20	19	19	18	18
	R=10%	42	41	40	39	38	37	36	35	34	33	33	32	31	31
	R=15%	53	52	51	49	49	47	46	45	45	44	43	43	42	41
	R=20%	61	60	59	58	57	55	54	54	53	52	52	51	50	49
	R=25%	67	66	65	64	63	62	61	61	60	59	58	58	57	56
0.30	R= 5%	25	24	23	23	22	21	20	20	19	19	18	18	17	17
	R=10%	40	39	38	37	36	35	34	33	33	32	31	31	30	29
	R=15%	50	49	49	48	47	46	45	44	43	42	42	41	40	40
	R=20%	58	57	57	56	55	54	53	52	52	51	50	49	49	48
	R=25%	65	64	63	63	62	61	60	59	59	58	57	56	56	55
0.35	R= 5%	23	23	22	21	21	20	19	19	18	18	17	17	16	16
	R=10%	38	37	36	36	35	34	33	32	32	31	30	30	29	28
	R=15%	48	48	47	46	45	44	43	43	42	41	40	40	39	38
	R=20%	57	56	55	54	54	52	52	51	50	49	49	48	47	47
	R=25%	63	63	62	61	60	59	58	58	57	56	56	55	54	54
0.40	R= 5%	22	22	21	20	20	19	18	18	18	17	17	16	16	15
	R=10%	37	36	35	34	34	33	32	31	31	30	29	29	28	28
	R=15%	47	46	46	45	44	43	42	41	41	40	39	39	38	37
	R=20%	55	55	54	53	53	51	50	50	49	48	48	47	46	46
	R=25%	62	61	61	60	59	58	57	57	56	55	55	54	53	53
0.45	R= 5%	21	21	20	20	19	18	18	17	17	17	16	16	15	15
	R=10%	36	35	34	34	33	32	31	30	30	29	29	28	27	27
	R=15%	46	45	45	44	43	42	41	40	40	39	39	38	37	37
	R=20%	54	54	53	52	52	50	49	49	48	47	47	46	45	45
	R=25%	61	60	60	59	58	57	56	56	55	54	54	53	52	52
0.50	R= 5%	21	20	20	19	19	18	17	17	17	16	16	15	15	15
	R=10%	35	34	34	33	32	31	30	30	29	28	28	27	27	26
	R=15%	45	44	44	43	42	41	40	40	39	38	38	37	36	36
	R=20%	53	53	52	51	51	49	49	48	47	47	46	45	45	44
	R=25%	60	59	59	58	58	56	56	55	54	54	53	52	52	51
0.55	R= 5%	20	20	19	19	18	17	17	16	16	16	15	15	15	14
	R=10%	34	33	33	32	31	30	30	29	28	28	27	27	26	25
	R=15%	44	44	43	42	42	40	40	39	38	38	37	37	36	35
	R=20%	53	52	51	51	50	49	48	47	47	46	45	45	44	43
	R=25%	59	59	58	57	57	56	55	54	54	53	52	52	51	50

Table 4.10(d) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	60	59	57	52	45	39	33	31	30	28	27	26	25	24
	R=10%	77	75	74	69	62	55	49	47	45	43	42	41	40	39
	R=15%	85	84	82	79	72	66	59	57	56	54	53	52	50	49
	R=20%	89	88	87	84	78	73	67	65	63	61	60	59	58	57
	R=25%	92	91	91	88	83	78	73	71	69	67	66	66	64	63
0.15	R= 5%	40	38	34	31	30	28	26	25	25	24	23	23	22	21
	R=10%	57	54	50	47	45	43	41	40	39	38	37	37	36	35
	R=15%	67	65	60	57	55	53	52	51	50	49	48	47	46	46
	R=20%	74	72	67	65	63	61	59	58	58	56	56	55	54	54
	R=25%	79	77	73	71	69	67	66	65	64	63	62	62	61	60
0.20	R= 5%	31	29	28	27	26	25	24	23	23	22	21	21	20	20
	R=10%	46	44	43	42	41	39	38	37	37	36	35	35	34	33
	R=15%	56	55	54	52	51	49	48	48	47	46	45	45	44	43
	R=20%	64	62	61	60	59	57	56	55	55	54	53	53	52	51
	R=25%	69	68	67	66	65	63	62	62	61	60	60	59	59	58
0.25	R= 5%	28	27	26	25	24	23	22	22	21	20	20	19	19	18
	R=10%	42	41	40	39	38	37	36	35	35	34	33	33	32	31
	R=15%	52	51	51	49	49	47	46	46	45	44	44	43	42	41
	R=20%	60	59	58	57	56	55	54	54	53	52	52	51	50	49
	R=25%	66	65	64	63	63	62	61	60	60	59	58	58	57	56
0.30	R= 5%	26	25	24	23	23	22	21	20	20	19	19	18	18	17
	R=10%	40	39	38	37	37	35	35	34	33	33	32	32	31	30
	R=15%	50	49	49	48	47	46	45	44	44	43	42	42	41	40
	R=20%	58	57	56	55	55	54	53	52	52	51	50	50	49	48
	R=25%	64	63	63	62	61	60	59	59	58	57	57	56	55	55
0.35	R= 5%	24	23	23	22	22	21	20	19	19	18	18	18	17	17
	R=10%	38	38	37	36	35	34	33	33	32	32	31	30	30	29
	R=15%	48	48	47	46	46	44	44	43	42	41	41	40	40	39
	R=20%	56	56	55	54	53	52	52	51	50	50	49	48	48	47
	R=25%	62	62	61	60	60	59	58	57	57	56	56	55	54	54
0.40	R= 5%	23	22	22	21	21	20	19	19	18	18	17	17	17	16
	R=10%	37	36	36	35	34	33	32	32	31	31	30	30	29	28
	R=15%	47	46	46	45	44	43	42	42	41	40	40	39	39	38
	R=20%	55	54	54	53	52	51	50	50	49	48	48	47	47	46
	R=25%	61	61	60	59	59	58	57	56	56	55	55	54	53	53
0.45	R= 5%	22	22	21	21	20	19	19	18	18	17	17	16	16	16
	R=10%	36	35	35	34	33	32	32	31	30	30	29	29	28	28
	R=15%	46	46	45	44	44	42	42	41	40	40	39	39	38	37
	R=20%	54	53	53	52	52	50	50	49	48	48	47	47	46	45
	R=25%	60	60	59	59	58	57	56	56	55	54	54	53	53	52
0.50	R= 5%	22	21	21	20	19	19	18	18	17	17	16	16	16	15
	R=10%	35	35	34	33	33	32	31	30	30	29	29	28	27	27
	R=15%	45	45	44	43	43	42	41	40	40	39	38	38	37	36
	R=20%	53	52	52	51	51	50	49	48	48	47	46	46	45	44
	R=25%	60	59	59	58	57	56	55	55	54	54	53	53	52	51
0.55	R= 5%	21	20	20	19	19	18	18	17	17	16	16	16	15	15
	R=10%	34	34	33	33	32	31	30	30	29	28	28	27	27	26
	R=15%	44	44	43	43	42	41	40	39	39	38	38	37	36	36
	R=20%	52	52	51	51	50	49	48	47	47	46	46	45	44	43
	R=25%	59	58	58	57	57	55	55	54	54	53	52	52	51	50

Table 4.10(e) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	58	57	56	53	51	41	38	34	32	30	29	28	27	26
	R=10%	73	72	71	69	66	56	53	48	46	44	43	42	41	40
	R=15%	80	79	78	77	75	65	62	57	56	54	52	51	50	49
	R=20%	85	84	83	82	80	71	69	64	63	60	59	58	57	56
	R=25%	88	87	87	86	84	76	74	69	68	66	65	64	63	62
0.15	R= 5%	44	40	39	34	32	30	28	27	27	26	25	24	24	23
	R=10%	59	54	53	48	46	43	42	41	40	39	38	38	37	36
	R=15%	68	63	62	57	55	53	51	50	50	49	48	47	46	46
	R=20%	74	70	69	64	62	60	58	58	57	56	55	54	54	53
	R=25%	79	75	74	69	68	65	64	63	63	62	61	60	60	59
0.20	R= 5%	33	32	30	29	28	27	25	25	24	24	23	22	22	21
	R=10%	47	45	44	43	42	40	39	38	38	37	36	36	35	34
	R=15%	56	54	53	52	51	49	48	48	47	46	45	45	44	44
	R=20%	63	61	60	59	58	56	55	55	54	54	53	52	52	51
	R=25%	68	67	65	64	64	62	61	61	60	59	59	58	58	57
0.25	R= 5%	29	29	28	27	26	25	24	23	23	22	22	21	21	20
	R=10%	43	42	41	40	39	38	37	36	36	35	35	34	33	33
	R=15%	52	51	50	49	48	47	46	46	45	45	44	44	43	42
	R=20%	59	58	57	56	56	54	54	53	53	52	51	51	50	50
	R=25%	64	64	63	62	61	60	60	59	59	58	57	57	56	56
0.30	R= 5%	27	27	26	25	24	23	23	22	22	21	21	20	20	19
	R=10%	41	40	39	38	38	36	36	35	35	34	33	33	32	32
	R=15%	50	49	48	48	47	46	45	44	44	43	43	42	42	41
	R=20%	57	56	55	55	54	53	52	52	51	51	50	50	49	48
	R=25%	62	62	61	60	60	59	58	58	57	57	56	56	55	55
0.35	R= 5%	26	25	25	24	23	22	22	21	21	20	20	19	19	18
	R=10%	39	38	38	37	36	35	35	34	34	33	32	32	31	31
	R=15%	48	48	47	46	46	45	44	43	43	42	42	41	40	40
	R=20%	55	55	54	54	53	52	51	51	50	50	49	49	48	47
	R=25%	61	61	60	59	59	58	57	57	56	56	55	55	54	54
0.40	R= 5%	25	24	24	23	22	22	21	20	20	19	19	19	18	18
	R=10%	38	37	37	36	35	34	34	33	33	32	31	31	30	30
	R=15%	47	47	46	45	45	44	43	42	42	41	41	40	40	39
	R=20%	54	54	53	53	52	51	50	50	49	49	48	48	47	47
	R=25%	60	60	59	59	58	57	57	56	56	55	54	54	53	53
0.45	R= 5%	24	23	23	22	22	21	20	20	19	19	18	18	17	17
	R=10%	37	36	36	35	35	34	33	32	32	31	31	30	30	29
	R=15%	46	46	45	44	44	43	42	42	41	40	40	40	39	38
	R=20%	53	53	52	52	51	50	50	49	49	48	47	47	46	46
	R=25%	59	59	58	58	57	56	56	55	55	54	54	53	53	52
0.50	R= 5%	23	23	22	22	21	20	20	19	19	18	18	18	17	17
	R=10%	36	36	35	34	34	33	32	32	31	31	30	30	29	28
	R=15%	45	45	44	44	43	42	41	41	40	40	39	39	38	38
	R=20%	53	52	52	51	51	50	49	48	48	47	47	46	46	45
	R=25%	59	58	58	57	57	56	55	55	54	54	53	53	52	51
0.55	R= 5%	23	22	22	21	21	20	19	19	18	18	17	17	17	16
	R=10%	36	35	35	34	33	32	32	31	31	30	29	29	28	28
	R=15%	45	44	44	43	43	42	41	40	40	39	39	38	38	37
	R=20%	52	51	51	50	50	49	48	48	47	47	46	46	45	45
	R=25%	58	57	57	57	56	55	54	54	54	53	52	52	51	51

Table 4.11(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	80	76	67	57	54	45	41	39	38	36	34	33	31	30
	R=10%	95	93	88	80	77	67	63	61	59	57	55	54	52	51
	R=15%	99	98	95	90	88	80	77	74	73	71	69	68	66	64
	R=20%	100	99	98	95	94	88	85	83	82	80	78	77	75	74
	R=25%	100	100	99	98	97	92	90	89	88	86	85	84	82	81
0.15	R= 5%	48	45	43	40	38	35	33	32	31	30	29	28	27	26
	R=10%	71	67	65	62	60	56	54	53	51	50	49	48	46	45
	R=15%	83	80	78	75	73	70	68	66	65	64	62	61	60	59
	R=20%	90	88	86	83	82	79	77	76	75	74	72	71	70	69
	R=25%	94	92	91	89	88	85	84	83	82	81	79	79	77	76
0.20	R= 5%	39	38	36	34	33	31	30	29	28	27	26	26	25	24
	R=10%	61	59	57	55	54	51	50	48	47	46	45	44	43	42
	R=15%	74	72	71	69	67	65	63	62	61	60	58	58	56	55
	R=20%	83	81	80	78	77	75	73	72	71	70	69	68	66	65
	R=25%	88	87	86	85	83	81	80	79	78	77	76	75	74	73
0.25	R= 5%	35	34	33	31	30	29	28	27	26	25	24	24	23	22
	R=10%	56	54	53	51	50	48	47	45	45	43	42	41	40	39
	R=15%	69	68	67	65	64	62	60	59	58	57	56	55	53	52
	R=20%	79	77	76	75	74	72	70	69	68	67	66	65	63	62
	R=25%	85	84	83	81	81	79	77	76	76	74	73	72	71	70
0.30	R= 5%	32	31	31	29	29	27	26	25	25	24	23	22	22	21
	R=10%	53	51	50	49	48	46	44	43	42	41	40	39	38	37
	R=15%	66	65	64	62	61	59	58	57	56	54	53	52	51	50
	R=20%	76	75	74	72	71	69	68	67	66	64	63	62	61	60
	R=25%	82	81	81	79	78	77	75	74	73	72	71	70	69	68
0.35	R= 5%	31	30	29	28	27	26	25	24	23	22	22	21	21	20
	R=10%	50	49	48	47	46	44	42	41	41	39	38	38	37	36
	R=15%	64	62	62	60	59	57	56	55	54	52	51	50	49	48
	R=20%	74	72	72	70	69	67	66	65	64	62	61	60	59	58
	R=25%	80	79	79	77	76	75	73	72	72	70	69	68	67	66
0.40	R= 5%	29	28	28	27	26	24	24	23	22	22	21	20	20	19
	R=10%	48	47	46	45	44	42	41	40	39	38	37	36	35	34
	R=15%	62	61	60	58	57	55	54	53	52	51	50	49	47	47
	R=20%	72	71	70	68	67	65	64	63	62	61	60	59	57	56
	R=25%	79	78	77	76	75	73	72	71	70	69	68	67	65	64
0.45	R= 5%	28	27	27	25	25	23	23	22	21	21	20	20	19	18
	R=10%	47	46	45	44	43	41	39	39	38	37	36	35	34	33
	R=15%	60	59	58	57	56	54	52	51	51	49	48	47	46	45
	R=20%	70	69	68	67	66	64	62	61	61	59	58	57	56	55
	R=25%	77	76	76	74	73	72	70	69	68	67	66	65	64	63
0.50	R= 5%	27	26	26	25	24	23	22	21	21	20	19	19	18	17
	R=10%	45	44	44	42	41	39	38	37	37	36	35	34	33	31
	R=15%	59	58	57	55	54	52	51	50	49	48	47	46	45	43
	R=20%	69	68	67	65	64	62	61	60	59	58	57	56	54	53
	R=25%	76	75	74	73	72	70	69	68	67	66	65	64	63	61
0.55	R= 5%	26	25	25	24	23	22	21	21	20	19	19	18	17	16
	R=10%	44	43	42	41	40	38	37	36	36	35	34	33	31	30
	R=15%	58	56	56	54	53	51	50	49	48	47	46	45	43	41
	R=20%	67	66	66	64	63	61	60	59	58	57	56	55	52	50
	R=25%	75	74	73	72	71	69	68	67	66	65	64	63	60	58

Table 4.11(b) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	77	75	73	69	60	50	43	40	38	35	34	33	31	30
	R=10%	92	91	90	87	80	71	63	60	58	55	53	52	50	48
	R=15%	97	96	95	94	89	81	75	72	70	67	65	64	62	61
	R=20%	98	98	98	97	93	88	82	80	78	75	74	73	71	70
	R=25%	99	99	99	98	96	92	87	85	83	81	80	79	77	76
0.15	R= 5%	53	50	45	41	38	35	33	32	31	29	29	28	27	26
	R=10%	73	71	66	60	58	54	52	50	49	48	46	46	44	43
	R=15%	84	81	77	72	70	66	64	63	62	60	59	58	56	55
	R=20%	89	88	84	80	77	74	73	71	70	69	68	67	66	65
	R=25%	93	92	89	85	83	80	79	78	77	75	74	74	72	72
0.20	R= 5%	39	37	36	34	33	31	29	28	28	27	26	25	24	24
	R=10%	59	56	55	53	51	49	47	46	45	44	43	42	41	40
	R=15%	71	68	67	65	63	61	59	58	58	56	55	54	53	52
	R=20%	78	76	75	73	72	70	68	67	67	65	64	64	62	62
	R=25%	84	82	81	79	78	76	75	74	73	72	71	71	69	69
0.25	R= 5%	35	33	32	31	30	28	27	26	26	25	24	24	23	22
	R=10%	53	52	51	49	48	46	44	43	43	41	41	40	39	38
	R=15%	65	64	63	61	60	58	57	56	55	54	53	52	51	50
	R=20%	74	72	71	70	69	67	66	65	64	63	62	61	60	59
	R=25%	80	78	77	76	75	74	72	72	71	70	69	68	67	66
0.30	R= 5%	32	31	30	29	28	26	25	25	24	23	23	22	21	21
	R=10%	50	49	48	46	45	44	42	41	41	40	39	38	37	36
	R=15%	62	61	60	58	58	56	54	54	53	52	51	50	49	48
	R=20%	71	69	69	67	66	65	64	63	62	61	60	59	58	57
	R=25%	77	76	75	74	73	72	71	70	69	68	67	66	65	64
0.35	R= 5%	30	29	28	27	26	25	24	24	23	22	22	21	20	20
	R=10%	48	47	46	44	44	42	41	40	39	38	37	37	36	35
	R=15%	60	59	58	56	56	54	53	52	51	50	49	48	47	46
	R=20%	68	67	67	65	65	63	62	61	60	59	58	57	56	55
	R=25%	75	74	73	72	72	70	69	68	67	66	66	65	64	63
0.40	R= 5%	29	28	27	26	25	24	23	23	22	21	21	20	20	19
	R=10%	46	45	44	43	42	40	39	38	38	37	36	35	34	34
	R=15%	58	57	56	55	54	52	51	50	50	48	48	47	46	45
	R=20%	67	66	65	64	63	62	60	60	59	58	57	56	55	54
	R=25%	73	73	72	71	70	69	68	67	66	65	64	64	62	62
0.45	R= 5%	27	27	26	25	24	23	22	22	21	21	20	20	19	18
	R=10%	44	44	43	42	41	39	38	37	37	36	35	34	33	33
	R=15%	56	56	55	54	53	51	50	49	48	47	46	46	45	44
	R=20%	65	65	64	63	62	60	59	58	58	56	56	55	54	53
	R=25%	72	71	71	70	69	67	66	66	65	64	63	62	61	60
0.50	R= 5%	26	26	25	24	24	22	22	21	21	20	19	19	18	18
	R=10%	43	42	42	41	40	38	37	36	36	35	34	33	32	32
	R=15%	55	54	54	53	52	50	49	48	47	46	45	45	44	43
	R=20%	64	63	63	62	61	59	58	57	56	55	54	54	53	52
	R=25%	71	70	70	69	68	66	65	64	64	63	62	61	60	59
0.55	R= 5%	25	25	24	23	23	22	21	20	20	19	19	18	18	17
	R=10%	42	41	41	40	39	37	36	35	35	34	33	33	32	31
	R=15%	54	53	53	51	51	49	48	47	46	45	44	44	43	42
	R=20%	63	62	62	61	60	58	57	56	55	54	54	53	52	51
	R=25%	70	69	69	68	67	65	64	64	63	62	61	60	59	58

Table 4.11(c) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.8 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	74	72	71	68	65	51	47	42	39	36	35	34	32	31
	R=10%	88	87	86	84	82	70	66	60	57	54	52	51	49	48
	R=15%	94	93	93	91	90	80	76	71	68	65	64	62	61	59
	R=20%	97	96	96	95	94	86	83	78	76	73	71	70	69	67
	R=25%	98	98	97	97	96	90	87	83	81	79	77	76	75	74
0.15	R= 5%	57	51	48	42	39	36	34	33	32	30	29	28	27	27
	R=10%	75	69	67	60	57	53	51	50	49	47	46	45	44	43
	R=15%	84	79	77	71	68	64	62	61	60	58	57	56	55	54
	R=20%	89	85	83	78	75	72	70	69	68	67	66	65	64	63
	R=25%	92	89	87	83	81	77	76	75	74	73	72	71	70	69
0.20	R= 5%	41	38	37	35	34	31	30	29	28	27	26	26	25	24
	R=10%	58	56	54	52	51	48	47	46	45	44	43	42	41	40
	R=15%	69	67	65	63	62	59	58	57	56	55	54	53	52	51
	R=20%	76	74	72	71	70	67	66	65	64	63	62	62	61	60
	R=25%	81	79	78	76	75	73	72	71	71	70	69	68	67	67
0.25	R= 5%	35	34	33	32	30	29	28	27	26	25	25	24	23	23
	R=10%	52	51	50	48	47	45	44	43	42	41	41	40	39	38
	R=15%	63	62	61	59	58	56	55	54	54	53	52	51	50	49
	R=20%	71	70	69	67	66	65	64	63	62	61	60	60	59	58
	R=25%	77	76	75	73	72	71	70	69	69	68	67	66	66	65
0.30	R= 5%	33	31	31	29	29	27	26	25	25	24	23	23	22	22
	R=10%	49	48	47	46	45	43	42	41	41	40	39	38	37	36
	R=15%	60	59	58	57	56	54	53	53	52	51	50	49	48	48
	R=20%	68	67	66	65	64	63	62	61	60	59	59	58	57	56
	R=25%	74	73	72	71	71	69	68	68	67	66	65	65	64	63
0.35	R= 5%	31	30	29	28	27	26	25	24	24	23	22	22	21	21
	R=10%	47	46	45	44	43	42	41	40	39	38	37	37	36	35
	R=15%	58	57	56	55	54	53	52	51	50	49	49	48	47	46
	R=20%	66	65	64	64	63	61	60	60	59	58	57	57	56	55
	R=25%	72	71	71	70	69	68	67	66	66	65	64	63	62	62
0.40	R= 5%	29	28	28	27	26	25	24	23	23	22	21	21	20	20
	R=10%	45	45	44	43	42	40	39	39	38	37	36	36	35	34
	R=15%	56	56	55	54	53	52	51	50	49	48	47	47	46	45
	R=20%	65	64	63	62	61	60	59	58	58	57	56	55	54	54
	R=25%	71	70	69	69	68	67	66	65	64	64	63	62	61	61
0.45	R= 5%	28	27	27	26	25	24	23	22	22	21	21	20	20	19
	R=10%	44	43	43	41	41	39	38	38	37	36	35	35	34	33
	R=15%	55	54	54	53	52	50	49	49	48	47	46	46	45	44
	R=20%	63	62	62	61	60	59	58	57	57	56	55	54	53	52
	R=25%	70	69	68	68	67	66	65	64	63	62	62	61	60	60
0.50	R= 5%	27	26	26	25	24	23	22	22	21	21	20	20	19	19
	R=10%	43	42	41	40	40	38	37	37	36	35	34	34	33	32
	R=15%	54	53	53	52	51	49	48	48	47	46	45	45	44	43
	R=20%	62	62	61	60	59	58	57	56	56	55	54	53	52	52
	R=25%	69	68	67	67	66	65	64	63	62	62	61	60	59	59
0.55	R= 5%	26	25	25	24	23	22	22	21	21	20	19	19	18	18
	R=10%	42	41	41	40	39	37	36	36	35	34	34	33	32	32
	R=15%	53	52	52	51	50	48	47	47	46	45	44	44	43	42
	R=20%	61	61	60	59	58	57	56	55	55	54	53	52	51	51
	R=25%	68	67	67	66	65	64	63	62	62	61	60	59	58	58

Table 4.11(d) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	72	70	69	67	64	54	47	44	40	37	35	34	33	31
	R=10%	86	85	84	83	81	71	65	62	57	54	52	51	49	48
	R=15%	92	91	91	89	88	80	74	72	68	65	63	61	60	59
	R=20%	95	95	94	93	92	86	81	78	75	72	70	69	68	66
	R=25%	97	96	96	95	95	89	85	83	80	77	76	75	73	72
0.15	R= 5%	60	53	48	44	40	36	34	33	32	31	30	29	28	27
	R=10%	77	70	65	62	57	53	51	50	49	47	46	45	44	43
	R=15%	85	79	75	72	67	63	61	60	59	58	57	56	55	54
	R=20%	90	85	81	78	74	71	69	68	67	65	64	64	63	62
	R=25%	93	88	85	83	79	76	74	73	73	71	70	70	69	68
0.20	R= 5%	41	39	37	35	34	32	31	30	29	28	27	26	26	25
	R=10%	58	56	54	52	50	48	47	46	45	44	43	42	41	40
	R=15%	68	66	64	62	61	59	57	56	55	54	54	53	52	51
	R=20%	75	73	71	69	68	66	65	64	63	62	62	61	60	59
	R=25%	80	78	77	75	74	72	71	70	69	69	68	67	66	66
0.25	R= 5%	36	35	34	32	31	29	28	28	27	26	25	25	24	23
	R=10%	52	51	50	48	47	45	44	43	42	41	41	40	39	38
	R=15%	62	61	60	59	58	56	55	54	53	52	51	51	50	49
	R=20%	70	68	68	66	65	64	63	62	61	60	60	59	58	57
	R=25%	75	74	73	72	71	70	69	68	67	67	66	65	65	64
0.30	R= 5%	33	32	31	30	29	28	27	26	25	25	24	23	23	22
	R=10%	49	48	47	46	45	43	42	41	41	40	39	38	37	37
	R=15%	59	58	58	56	55	54	53	52	51	51	50	49	48	47
	R=20%	67	66	65	64	63	62	61	60	60	59	58	57	56	56
	R=25%	73	72	71	70	69	68	67	67	66	65	65	64	63	62
0.35	R= 5%	31	30	29	28	28	26	25	25	24	23	23	22	22	21
	R=10%	47	46	45	44	43	42	41	40	39	38	38	37	36	35
	R=15%	57	56	56	55	54	52	51	51	50	49	48	48	47	46
	R=20%	65	64	63	62	62	60	59	59	58	57	57	56	55	54
	R=25%	71	70	69	69	68	67	66	65	65	64	63	63	62	61
0.40	R= 5%	30	29	28	27	27	25	24	24	23	23	22	22	21	20
	R=10%	45	44	44	43	42	40	40	39	38	37	37	36	35	34
	R=15%	56	55	54	53	53	51	50	50	49	48	47	47	46	45
	R=20%	63	63	62	61	61	59	58	58	57	56	55	55	54	53
	R=25%	69	69	68	67	67	66	65	64	64	63	62	62	61	60
0.45	R= 5%	29	28	27	26	26	24	24	23	23	22	21	21	20	20
	R=10%	44	43	42	42	41	39	38	38	37	36	36	35	34	33
	R=15%	55	54	53	52	51	50	49	48	48	47	46	46	45	44
	R=20%	62	62	61	60	59	58	57	57	56	55	54	54	53	52
	R=25%	68	68	67	66	66	65	64	63	63	62	61	61	60	59
0.50	R= 5%	27	27	26	25	25	24	23	22	22	21	21	20	20	19
	R=10%	43	42	42	41	40	38	38	37	36	35	35	34	33	33
	R=15%	53	53	52	51	50	49	48	47	47	46	45	45	44	43
	R=20%	61	61	60	59	59	57	56	56	55	54	54	53	52	51
	R=25%	67	67	66	66	65	64	63	62	62	61	60	60	59	58
0.55	R= 5%	27	26	25	25	24	23	22	22	21	21	20	20	19	19
	R=10%	42	41	41	40	39	38	37	36	35	35	34	33	33	32
	R=15%	53	52	51	50	50	48	47	47	46	45	44	44	43	42
	R=20%	60	60	59	58	58	56	56	55	54	53	53	52	51	51
	R=25%	67	66	66	65	64	63	62	61	61	60	59	59	58	57

Table 4.11(e) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	69	67	66	64	63	59	50	45	44	39	37	36	34	33
	R=10%	82	81	80	78	77	74	66	61	60	54	52	51	49	48
	R=15%	88	87	86	85	84	81	75	70	69	64	62	60	58	57
	R=20%	91	91	90	89	88	86	80	76	75	70	68	67	65	64
	R=25%	94	93	93	92	91	89	84	80	80	75	73	72	71	70
0.15	R= 5%	61	58	52	46	44	38	36	34	33	32	31	30	29	28
	R=10%	76	73	67	61	59	53	50	49	48	47	46	45	44	43
	R=15%	83	81	76	70	68	62	60	59	58	56	55	55	54	53
	R=20%	87	86	81	76	74	69	67	65	65	63	63	62	61	60
	R=25%	90	89	85	80	79	74	72	71	70	69	68	68	67	66
0.20	R= 5%	45	41	39	37	35	33	32	31	30	29	28	28	27	26
	R=10%	60	56	54	51	50	48	46	45	45	44	43	42	41	41
	R=15%	69	65	63	61	59	57	56	55	54	53	53	52	51	50
	R=20%	75	71	69	67	66	64	63	62	61	61	60	59	58	58
	R=25%	80	76	74	72	71	70	68	68	67	66	66	65	64	64
0.25	R= 5%	37	36	35	33	32	31	29	29	28	27	27	26	25	25
	R=10%	52	50	49	48	47	45	44	43	43	42	41	40	39	39
	R=15%	61	59	58	57	56	55	54	53	52	51	51	50	49	49
	R=20%	67	66	65	64	63	62	61	60	60	59	58	58	57	56
	R=25%	72	71	70	69	69	67	66	66	65	64	64	64	63	62
0.30	R= 5%	34	33	32	31	30	29	28	27	27	26	25	25	24	23
	R=10%	49	48	47	46	45	43	42	42	41	40	39	39	38	37
	R=15%	58	57	56	55	54	53	52	51	51	50	49	49	48	47
	R=20%	65	64	63	62	61	60	59	59	58	57	57	56	55	55
	R=25%	70	69	68	68	67	66	65	64	64	63	63	62	62	61
0.35	R= 5%	32	31	31	30	29	28	27	26	26	25	24	24	23	22
	R=10%	47	46	45	44	43	42	41	40	40	39	38	38	37	36
	R=15%	56	55	54	53	53	51	51	50	49	49	48	48	47	46
	R=20%	63	62	61	60	60	59	58	57	57	56	56	55	54	54
	R=25%	68	67	67	66	66	65	64	63	63	62	62	61	60	60
0.40	R= 5%	31	30	29	29	28	27	26	25	25	24	23	23	22	22
	R=10%	45	44	44	43	42	41	40	39	39	38	37	37	36	35
	R=15%	54	54	53	52	51	50	50	49	49	48	47	47	46	45
	R=20%	61	61	60	59	59	58	57	56	56	55	55	54	53	53
	R=25%	67	66	66	65	65	64	63	62	62	61	61	60	60	59
0.45	R= 5%	30	29	28	27	27	26	25	24	24	23	23	22	21	21
	R=10%	44	43	43	42	41	40	39	38	38	37	36	36	35	34
	R=15%	53	53	52	51	51	49	49	48	48	47	46	46	45	44
	R=20%	60	60	59	58	58	57	56	56	55	54	54	53	52	52
	R=25%	66	65	65	64	64	63	62	62	61	60	60	59	59	58
0.50	R= 5%	29	28	28	27	26	25	24	24	23	22	22	21	21	20
	R=10%	43	42	42	41	40	39	38	37	37	36	36	35	34	34
	R=15%	52	52	51	50	50	49	48	47	47	46	45	45	44	43
	R=20%	60	59	58	58	57	56	55	55	54	54	53	52	52	51
	R=25%	65	65	64	64	63	62	61	61	60	60	59	59	58	57
0.55	R= 5%	28	27	27	26	25	24	24	23	23	22	21	21	20	20
	R=10%	42	41	41	40	39	38	37	37	36	35	35	34	34	33
	R=15%	51	51	50	50	49	48	47	46	46	45	45	44	43	43
	R=20%	59	58	58	57	56	55	55	54	54	53	52	52	51	50
	R=25%	64	64	64	63	62	61	61	60	60	59	59	58	57	57

Table 4.11(f) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 3.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	66	65	64	62	61	58	55	49	45	42	38	37	35	34
	R=10%	78	77	77	75	74	72	69	63	59	57	52	51	49	48
	R=15%	84	84	83	82	81	79	77	71	68	65	61	60	58	56
	R=20%	88	87	87	86	85	84	81	77	73	71	67	66	64	63
	R=25%	91	90	90	89	88	87	85	81	78	76	72	71	69	68
0.15	R= 5%	60	58	56	49	44	39	37	35	34	33	32	31	30	29
	R=10%	73	72	70	63	58	53	51	49	48	47	46	45	44	43
	R=15%	80	79	77	71	67	62	59	58	57	56	55	54	53	52
	R=20%	84	83	82	76	73	68	66	64	63	62	61	61	60	59
	R=25%	87	86	85	80	77	72	71	69	68	67	67	66	65	64
0.20	R= 5%	45	44	41	38	36	34	33	32	31	30	29	29	28	27
	R=10%	59	58	54	51	50	48	46	45	45	44	43	42	41	41
	R=15%	67	66	63	60	58	56	55	54	54	53	52	51	51	50
	R=20%	73	72	69	66	65	63	62	61	60	59	59	58	58	57
	R=25%	77	76	73	71	70	68	67	66	66	65	64	64	63	62
0.25	R= 5%	38	37	36	34	33	32	31	30	29	28	28	27	26	26
	R=10%	51	50	49	48	47	45	44	43	43	42	41	41	40	39
	R=15%	60	58	57	56	55	54	53	52	52	51	50	50	49	48
	R=20%	66	65	64	63	62	60	59	59	58	58	57	57	56	55
	R=25%	71	70	69	68	67	66	65	64	64	63	63	62	62	61
0.30	R= 5%	35	34	34	32	31	30	29	28	28	27	26	26	25	25
	R=10%	48	47	47	45	45	43	42	42	41	40	40	39	39	38
	R=15%	57	56	55	54	53	52	51	51	50	49	49	48	48	47
	R=20%	63	62	62	61	60	59	58	58	57	56	56	55	55	54
	R=25%	68	67	67	66	65	64	64	63	63	62	62	61	61	60
0.35	R= 5%	34	33	32	31	30	29	28	27	27	26	25	25	24	24
	R=10%	46	46	45	44	43	42	41	41	40	39	39	38	37	37
	R=15%	55	54	54	53	52	51	50	50	49	48	48	47	47	46
	R=20%	61	61	60	59	59	58	57	56	56	55	55	54	54	53
	R=25%	67	66	65	65	64	63	63	62	62	61	61	60	60	59
0.40	R= 5%	32	31	30	30	29	28	27	26	26	25	24	24	23	23
	R=10%	45	44	44	43	42	41	40	39	39	38	38	37	36	36
	R=15%	54	53	52	52	51	50	49	49	48	47	47	46	46	45
	R=20%	60	59	59	58	58	57	56	56	55	55	54	54	53	52
	R=25%	65	65	64	64	63	62	62	61	61	60	60	59	59	58
0.45	R= 5%	31	30	29	29	28	27	26	25	25	24	24	23	23	22
	R=10%	44	43	43	42	41	40	39	39	38	37	37	36	36	35
	R=15%	52	52	51	51	50	49	48	48	47	47	46	46	45	44
	R=20%	59	58	58	57	57	56	55	55	54	54	53	53	52	52
	R=25%	64	64	64	63	62	62	61	61	60	60	59	59	58	58
0.50	R= 5%	30	29	29	28	27	26	25	25	24	24	23	23	22	21
	R=10%	43	42	42	41	40	39	39	38	37	37	36	36	35	34
	R=15%	52	51	50	50	49	48	48	47	47	46	45	45	44	44
	R=20%	58	58	57	57	56	55	55	54	54	53	52	52	51	51
	R=25%	64	63	63	62	62	61	60	60	59	59	58	58	57	57
0.55	R= 5%	29	28	28	27	26	25	25	24	24	23	22	22	21	21
	R=10%	42	41	41	40	40	39	38	37	37	36	35	35	34	34
	R=15%	51	50	50	49	49	48	47	46	46	45	45	44	44	43
	R=20%	58	57	57	56	56	55	54	53	53	52	52	51	51	50
	R=25%	63	63	62	62	61	60	60	59	59	58	58	57	57	56

Table 4.12(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	89	88	85	76	69	60	53	50	48	45	43	42	40	38
	R=10%	99	98	97	94	89	82	76	73	71	68	66	65	62	61
	R=15%	100	100	100	98	96	92	87	85	83	81	79	78	76	74
	R=20%	100	100	100	99	98	96	93	91	90	88	87	86	84	83
	R=25%	100	100	100	100	99	98	96	95	94	93	92	91	90	89
0.15	R= 5%	65	60	55	51	48	45	42	41	40	38	37	36	34	33
	R=10%	86	82	78	74	71	67	65	63	62	60	58	57	56	54
	R=15%	94	91	88	85	83	80	78	77	75	73	72	71	70	68
	R=20%	98	96	94	92	90	88	86	85	84	82	81	80	79	78
	R=25%	99	98	97	95	94	92	91	90	89	88	87	87	85	84
0.20	R= 5%	50	48	46	44	42	39	38	37	36	34	33	32	31	30
	R=10%	72	70	69	66	64	61	59	58	57	55	54	53	52	50
	R=15%	84	82	81	79	78	75	73	72	71	69	68	67	66	64
	R=20%	91	89	88	87	86	83	82	81	80	79	78	77	75	74
	R=25%	95	94	93	92	91	89	88	87	86	85	84	83	82	81
0.25	R= 5%	45	43	42	40	38	36	35	34	33	32	31	30	29	28
	R=10%	67	65	64	62	60	58	56	55	54	52	51	50	49	47
	R=15%	80	78	77	75	74	72	70	69	68	66	65	64	63	61
	R=20%	87	86	85	83	82	81	79	78	77	76	75	74	72	71
	R=25%	92	91	90	89	88	87	85	85	84	83	82	81	80	79
0.30	R= 5%	41	40	39	37	36	34	33	32	31	30	29	28	27	26
	R=10%	63	61	60	59	57	55	53	52	51	50	49	48	46	45
	R=15%	76	75	74	72	71	69	67	66	65	64	62	61	60	59
	R=20%	84	83	82	81	80	78	77	76	75	74	72	72	70	69
	R=25%	90	89	88	87	86	85	83	83	82	81	80	79	78	77
0.35	R= 5%	39	37	36	35	34	32	31	30	29	28	27	27	26	25
	R=10%	60	59	58	56	55	53	51	50	49	48	47	46	44	43
	R=15%	74	73	72	70	69	67	65	64	63	61	60	59	58	57
	R=20%	82	81	81	79	78	76	75	74	73	71	70	69	68	67
	R=25%	88	87	87	85	85	83	82	81	80	79	78	77	76	75
0.40	R= 5%	37	36	35	33	32	31	30	29	28	27	26	26	25	24
	R=10%	58	57	56	54	53	51	49	48	47	46	45	44	43	42
	R=15%	72	70	70	68	67	65	63	62	61	60	59	58	56	55
	R=20%	81	80	79	77	76	75	73	72	71	70	69	68	66	65
	R=25%	87	86	85	84	83	82	80	79	78	77	76	75	74	73
0.45	R= 5%	35	34	33	32	31	30	28	28	27	26	25	25	24	23
	R=10%	56	55	54	53	51	49	48	47	46	45	43	43	41	40
	R=15%	70	69	68	66	65	63	62	60	60	58	57	56	55	54
	R=20%	79	78	77	76	75	73	72	70	70	68	67	66	65	64
	R=25%	85	85	84	83	82	80	79	78	77	76	75	74	73	72
0.50	R= 5%	34	33	32	31	30	29	27	27	26	25	24	24	23	22
	R=10%	55	54	53	51	50	48	46	45	45	43	42	41	40	39
	R=15%	68	67	66	65	64	62	60	59	58	57	56	55	53	52
	R=20%	78	77	76	75	74	72	70	69	68	67	66	65	63	63
	R=25%	84	83	83	82	81	79	78	77	76	75	74	73	71	71
0.55	R= 5%	33	32	31	30	29	28	27	26	25	24	24	23	22	21
	R=10%	53	52	51	50	49	47	45	44	43	42	41	40	39	37
	R=15%	67	66	65	64	62	60	59	58	57	55	54	53	52	50
	R=20%	77	76	75	73	72	70	69	68	67	66	64	64	62	60
	R=25%	83	82	82	80	79	78	77	76	75	73	72	72	70	68

Table 4.12(b) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	85	84	82	80	77	65	57	53	49	45	42	41	39	37
	R=10%	96	96	95	94	92	84	78	74	69	65	63	61	59	57
	R=15%	99	99	98	98	97	92	87	84	80	77	75	73	71	70
	R=20%	100	99	99	99	99	95	92	90	87	84	82	81	79	78
	R=25%	100	100	100	100	99	97	95	93	91	89	87	86	85	84
0.15	R= 5%	72	64	59	54	49	44	41	40	38	37	35	34	33	32
	R=10%	89	83	79	74	69	64	61	60	58	56	55	54	52	51
	R=15%	95	91	88	84	80	76	73	72	71	69	67	66	65	64
	R=20%	98	95	93	90	87	83	81	80	79	77	76	75	74	73
	R=25%	99	97	95	93	91	88	86	85	84	83	82	81	80	79
0.20	R= 5%	50	47	45	43	41	38	36	35	34	33	32	31	30	29
	R=10%	70	68	65	63	61	58	56	55	53	52	51	50	49	48
	R=15%	81	79	77	74	73	70	68	67	66	65	63	63	61	60
	R=20%	87	85	84	82	80	78	76	75	74	73	72	71	70	69
	R=25%	91	90	88	87	86	84	82	81	81	80	79	78	77	76
0.25	R= 5%	43	42	40	38	37	35	33	32	32	31	30	29	28	27
	R=10%	63	61	60	58	56	54	53	51	50	49	48	47	46	45
	R=15%	75	73	72	70	69	66	65	64	63	62	61	60	59	58
	R=20%	82	81	80	78	77	75	74	73	72	71	70	69	68	67
	R=25%	87	86	85	84	83	81	80	79	78	77	76	76	75	74
0.30	R= 5%	40	38	37	36	34	33	31	31	30	29	28	27	26	26
	R=10%	59	58	57	55	54	52	50	49	48	47	46	45	44	43
	R=15%	71	70	69	67	66	64	63	62	61	60	59	58	56	55
	R=20%	79	78	77	75	74	73	71	71	70	69	68	67	66	65
	R=25%	84	83	82	81	80	79	78	77	76	75	75	74	73	72
0.35	R= 5%	37	36	35	34	33	31	30	29	28	27	27	26	25	24
	R=10%	56	55	54	53	51	50	48	47	47	45	44	43	42	41
	R=15%	68	67	66	65	64	62	61	60	59	58	57	56	55	54
	R=20%	77	75	75	74	73	71	70	69	68	67	66	65	64	63
	R=25%	82	81	81	80	79	77	76	76	75	74	73	72	71	70
0.40	R= 5%	35	34	33	32	31	30	29	28	27	26	25	25	24	23
	R=10%	54	53	52	51	50	48	47	46	45	44	43	42	41	40
	R=15%	66	65	65	63	62	60	59	58	57	56	55	54	53	52
	R=20%	75	74	73	72	71	69	68	67	67	65	64	64	62	62
	R=25%	81	80	79	78	77	76	75	74	73	72	71	71	70	69
0.45	R= 5%	34	33	32	31	30	29	27	27	26	25	25	24	23	23
	R=10%	53	51	51	49	48	47	45	44	44	42	41	41	40	39
	R=15%	65	64	63	62	61	59	58	57	56	55	54	53	52	51
	R=20%	73	72	72	71	70	68	67	66	65	64	63	62	61	60
	R=25%	80	79	78	77	76	75	74	73	72	71	70	70	68	68
0.50	R= 5%	32	32	31	30	29	28	27	26	25	24	24	23	22	22
	R=10%	51	50	49	48	47	45	44	43	42	41	40	40	38	38
	R=15%	63	63	62	60	60	58	56	55	55	54	53	52	51	50
	R=20%	72	71	70	69	69	67	66	65	64	63	62	61	60	59
	R=25%	78	78	77	76	75	74	73	72	71	70	69	68	67	66
0.55	R= 5%	31	31	30	29	28	27	26	25	24	24	23	22	22	21
	R=10%	50	49	48	47	46	44	43	42	41	40	39	39	38	37
	R=15%	62	61	60	59	58	57	55	54	54	52	51	51	50	49
	R=20%	71	70	69	68	67	66	65	64	63	62	61	60	59	58
	R=25%	77	77	76	75	74	73	72	71	70	69	68	67	66	65

Table 4.12(c) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	80	79	77	75	74	70	61	55	52	46	44	42	39	38
	R=10%	92	91	90	89	88	85	78	73	70	64	61	59	57	55
	R=15%	96	95	95	94	93	91	86	82	80	74	72	70	68	66
	R=20%	98	98	97	97	96	95	91	87	85	81	78	77	75	74
	R=25%	99	99	98	98	98	97	93	90	89	85	83	82	80	79
0.15	R= 5%	72	70	63	55	53	45	42	40	39	37	36	35	33	32
	R=10%	87	85	80	72	70	62	59	57	56	54	53	52	51	50
	R=15%	93	91	87	81	79	72	70	68	67	65	64	63	62	61
	R=20%	96	95	92	87	85	79	76	75	74	73	71	71	69	68
	R=25%	97	96	94	90	89	83	81	80	79	78	77	76	75	74
0.20	R= 5%	54	49	46	43	41	39	37	36	35	33	32	32	30	30
	R=10%	71	67	63	60	58	56	54	53	52	50	49	49	47	47
	R=15%	80	76	73	70	69	66	65	63	63	61	60	60	58	58
	R=20%	85	82	79	77	75	73	72	71	70	69	68	68	66	66
	R=25%	89	86	84	82	80	79	77	76	76	75	74	73	72	72
0.25	R= 5%	44	42	40	39	37	35	34	33	32	31	30	30	29	28
	R=10%	61	59	57	56	54	52	51	50	49	48	47	46	45	44
	R=15%	71	69	68	66	65	63	62	61	60	59	58	57	56	55
	R=20%	77	76	75	73	72	70	69	68	68	67	66	65	64	64
	R=25%	82	81	80	78	78	76	75	74	74	73	72	71	71	70
0.30	R= 5%	40	39	38	36	35	33	32	31	30	29	29	28	27	26
	R=10%	57	55	54	53	52	50	49	48	47	46	45	44	43	42
	R=15%	67	66	65	63	62	61	60	59	58	57	56	56	54	54
	R=20%	74	73	72	71	70	68	67	66	66	65	64	64	63	62
	R=25%	79	78	77	76	75	74	73	72	72	71	70	70	69	68
0.35	R= 5%	38	36	35	34	33	31	30	30	29	28	27	27	26	25
	R=10%	54	53	52	51	50	48	47	46	45	44	44	43	42	41
	R=15%	65	63	63	61	61	59	58	57	56	55	55	54	53	52
	R=20%	72	71	70	69	68	67	66	65	64	64	63	62	61	60
	R=25%	77	76	76	75	74	73	72	71	71	70	69	69	68	67
0.40	R= 5%	36	35	34	33	32	30	29	28	28	27	26	26	25	24
	R=10%	52	51	50	49	48	47	46	45	44	43	42	42	41	40
	R=15%	63	62	61	60	59	58	57	56	55	54	53	53	52	51
	R=20%	70	69	69	68	67	66	65	64	63	62	62	61	60	59
	R=25%	76	75	74	74	73	72	71	70	70	69	68	67	67	66
0.45	R= 5%	34	33	33	31	31	29	28	27	27	26	25	25	24	23
	R=10%	51	50	49	48	47	45	44	44	43	42	41	40	39	39
	R=15%	61	60	60	59	58	56	56	55	54	53	52	52	51	50
	R=20%	69	68	67	66	66	64	64	63	62	61	60	60	59	58
	R=25%	74	74	73	72	72	71	70	69	69	68	67	66	66	65
0.50	R= 5%	33	32	31	30	29	28	27	27	26	25	24	24	23	23
	R=10%	49	48	48	47	46	44	43	43	42	41	40	39	38	38
	R=15%	60	59	59	58	57	55	54	54	53	52	51	51	50	49
	R=20%	68	67	66	66	65	64	63	62	61	60	60	59	58	57
	R=25%	74	73	72	72	71	70	69	68	68	67	66	66	65	64
0.55	R= 5%	32	31	30	29	29	27	26	26	25	24	24	23	23	22
	R=10%	48	47	47	46	45	43	42	42	41	40	39	39	38	37
	R=15%	59	58	58	57	56	54	53	53	52	51	50	50	49	48
	R=20%	67	66	66	65	64	63	62	61	60	59	59	58	57	56
	R=25%	73	72	72	71	70	69	68	67	67	66	65	65	64	63

Table 4.12(d) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.25mm
Sediment size ratio $D_{50}/D10$ = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	76	75	73	72	70	67	65	59	54	49	46	43	40	39
	R=10%	88	87	86	85	83	81	79	74	70	65	62	59	56	54
	R=15%	92	92	91	90	89	88	86	82	78	74	71	68	65	64
	R=20%	95	95	94	93	93	91	90	86	83	80	77	74	72	71
	R=25%	97	96	96	95	95	94	93	89	87	84	81	79	77	76
0.15	R= 5%	69	68	66	58	53	47	43	41	39	38	37	36	34	33
	R=10%	83	81	80	74	68	63	58	56	55	53	52	51	50	49
	R=15%	89	88	87	81	77	72	68	66	64	63	62	61	60	59
	R=20%	92	91	90	86	82	78	74	72	71	70	69	68	67	66
	R=25%	94	94	93	89	86	82	79	77	76	75	74	73	72	71
0.20	R= 5%	55	51	49	44	42	39	37	36	35	34	33	32	31	31
	R=10%	70	66	64	59	57	54	53	52	51	49	48	48	47	46
	R=15%	78	75	73	68	66	64	62	61	60	59	58	58	57	56
	R=20%	83	80	79	74	73	70	69	68	67	66	65	65	64	63
	R=25%	87	84	83	79	77	75	74	73	73	72	71	70	70	69
0.25	R= 5%	45	43	41	39	38	36	35	34	33	32	31	30	29	29
	R=10%	59	57	56	54	53	51	50	49	48	47	46	46	45	44
	R=15%	68	67	65	64	63	61	59	59	58	57	56	56	55	54
	R=20%	74	73	72	70	69	68	66	66	65	64	64	63	62	61
	R=25%	79	77	76	75	74	73	72	71	71	70	69	69	68	67
0.30	R= 5%	41	39	38	37	36	34	33	32	31	30	29	29	28	27
	R=10%	55	54	53	52	51	49	48	47	46	45	45	44	43	42
	R=15%	64	63	62	61	60	59	58	57	56	55	55	54	53	53
	R=20%	71	70	69	68	67	66	65	64	63	63	62	61	61	60
	R=25%	76	75	74	73	72	71	70	70	69	68	68	67	67	66
0.35	R= 5%	38	37	36	35	34	32	31	30	30	29	28	28	27	26
	R=10%	53	52	51	50	49	47	46	46	45	44	43	43	42	41
	R=15%	62	61	60	59	58	57	56	55	55	54	53	53	52	51
	R=20%	69	68	67	66	65	64	63	63	62	61	61	60	59	59
	R=25%	74	73	72	71	71	70	69	68	68	67	67	66	65	65
0.40	R= 5%	36	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=10%	51	50	49	48	47	46	45	44	44	43	42	42	41	40
	R=15%	60	59	59	58	57	56	55	54	54	53	52	52	51	50
	R=20%	67	66	66	65	64	63	62	62	61	60	60	59	58	58
	R=25%	72	72	71	70	70	69	68	67	67	66	66	65	64	64
0.45	R= 5%	35	34	33	32	31	30	29	28	28	27	26	26	25	24
	R=10%	50	49	48	47	46	45	44	43	43	42	41	40	40	39
	R=15%	59	58	58	57	56	55	54	53	53	52	51	51	50	49
	R=20%	66	65	65	64	63	62	61	61	60	59	59	58	57	57
	R=25%	71	71	70	69	69	68	67	67	66	65	65	64	64	63
0.50	R= 5%	34	33	32	31	30	29	28	27	27	26	25	25	24	24
	R=10%	48	48	47	46	45	44	43	42	42	41	40	40	39	38
	R=15%	58	57	57	56	55	54	53	52	52	51	50	50	49	48
	R=20%	65	64	64	63	62	61	61	60	59	59	58	57	57	56
	R=25%	70	70	69	69	68	67	66	66	65	65	64	64	63	62
0.55	R= 5%	33	32	31	30	29	28	27	27	26	25	25	24	24	23
	R=10%	48	47	46	45	44	43	42	42	41	40	39	39	38	37
	R=15%	57	56	56	55	54	53	52	52	51	50	50	49	48	47
	R=20%	64	63	63	62	62	61	60	59	59	58	57	57	56	55
	R=25%	70	69	69	68	67	66	66	65	65	64	63	63	62	62

Table 4.12(e) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 3.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	73	72	71	69	68	65	63	61	57	50	48	45	41	39
	R=10%	84	83	82	81	80	78	77	75	71	65	62	60	56	54
	R=15%	89	88	88	87	86	84	83	82	79	73	71	68	64	63
	R=20%	92	92	91	90	90	88	87	86	83	78	76	74	71	69
	R=25%	94	94	93	92	92	91	90	89	87	82	80	78	75	74
0.15	R= 5%	67	65	64	62	56	48	44	42	40	38	37	36	35	34
	R=10%	79	78	77	75	70	63	58	56	54	52	51	51	49	48
	R=15%	85	84	84	82	77	71	67	65	63	61	60	60	58	57
	R=20%	89	88	88	86	82	76	73	71	69	68	67	66	65	64
	R=25%	91	91	90	89	85	80	77	75	74	73	72	71	70	69
0.20	R= 5%	58	52	49	46	43	40	38	37	36	35	34	33	32	31
	R=10%	72	66	63	60	57	53	52	51	50	49	48	47	46	46
	R=15%	79	74	71	68	65	62	61	60	59	58	57	56	55	55
	R=20%	83	79	77	74	71	68	67	66	66	64	64	63	62	62
	R=25%	87	83	81	78	76	73	72	71	71	70	69	68	68	67
0.25	R= 5%	46	43	42	40	38	37	35	34	33	32	32	31	30	29
	R=10%	60	57	55	53	52	50	49	48	48	47	46	45	44	44
	R=15%	68	65	64	62	61	59	58	57	57	56	55	55	54	53
	R=20%	74	71	70	68	67	66	65	64	63	62	62	61	61	60
	R=25%	78	76	74	73	72	71	70	69	69	68	67	67	66	66
0.30	R= 5%	41	40	39	37	36	34	33	32	32	31	30	30	29	28
	R=10%	54	53	52	51	50	48	47	46	46	45	44	44	43	42
	R=15%	63	62	61	60	59	57	56	56	55	54	54	53	52	52
	R=20%	69	68	67	66	65	64	63	62	62	61	61	60	59	59
	R=25%	73	72	72	71	70	69	68	68	67	67	66	66	65	65
0.35	R= 5%	39	38	37	35	34	33	32	31	31	30	29	28	28	27
	R=10%	52	51	50	49	48	47	46	45	45	44	43	43	42	41
	R=15%	60	60	59	58	57	56	55	54	54	53	52	52	51	51
	R=20%	67	66	65	64	64	62	62	61	61	60	59	59	58	58
	R=25%	72	71	70	69	69	68	67	67	66	66	65	65	64	63
0.40	R= 5%	37	36	35	34	33	32	31	30	29	29	28	27	27	26
	R=10%	50	49	49	48	47	46	45	44	43	43	42	42	41	40
	R=15%	59	58	57	56	56	55	54	53	53	52	51	51	50	50
	R=20%	65	64	64	63	62	61	61	60	60	59	59	58	57	57
	R=25%	70	70	69	68	68	67	66	66	65	65	64	64	63	63
0.45	R= 5%	36	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=10%	49	48	47	47	46	45	44	43	43	42	41	41	40	39
	R=15%	58	57	56	56	55	54	53	52	52	51	51	50	49	49
	R=20%	64	63	63	62	62	61	60	59	59	58	58	57	56	56
	R=25%	69	69	68	67	67	66	65	65	65	64	63	63	62	62
0.50	R= 5%	34	33	33	32	31	30	29	28	28	27	26	26	25	25
	R=10%	48	47	47	46	45	44	43	42	42	41	40	40	39	38
	R=15%	57	56	55	55	54	53	52	52	51	50	50	49	48	48
	R=20%	63	62	62	61	61	60	59	59	58	57	57	56	56	55
	R=25%	68	68	67	67	66	65	65	64	64	63	63	62	62	61
0.55	R= 5%	33	33	32	31	30	29	28	28	27	26	26	25	25	24
	R=10%	47	46	46	45	44	43	42	42	41	40	40	39	38	38
	R=15%	56	55	55	54	53	52	52	51	50	50	49	49	48	47
	R=20%	62	62	61	61	60	59	59	58	58	57	56	56	55	55
	R=25%	68	67	67	66	66	65	64	64	63	63	62	62	61	60

Table 4.12(f) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 3.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	71	70	69	67	66	64	62	61	59	53	48	46	42	40
	R=10%	81	80	80	79	78	76	75	73	72	66	62	60	56	54
	R=15%	86	86	85	84	83	82	81	80	79	74	70	68	64	62
	R=20%	90	89	88	88	87	86	85	84	83	78	75	74	70	68
	R=25%	92	91	91	90	90	88	88	87	86	82	79	78	74	73
0.15	R= 5%	65	64	63	61	59	49	47	43	41	39	38	37	35	35
	R=10%	77	76	75	73	72	63	60	56	54	52	51	50	49	48
	R=15%	83	82	81	80	78	70	68	64	62	60	59	59	57	57
	R=20%	86	86	85	84	83	76	73	70	68	67	65	65	64	63
	R=25%	89	88	88	87	86	79	77	74	73	71	70	70	69	68
0.20	R= 5%	60	54	50	47	44	40	38	37	36	35	34	34	33	32
	R=10%	72	67	64	60	57	53	51	50	50	48	48	47	46	45
	R=15%	79	74	71	68	65	61	60	59	58	57	56	56	55	54
	R=20%	83	79	76	74	70	67	66	65	64	63	63	62	61	61
	R=25%	86	83	80	78	75	72	71	70	69	68	68	67	66	66
0.25	R= 5%	48	44	42	40	39	37	36	35	34	33	32	32	31	30
	R=10%	61	57	55	53	52	50	49	48	47	46	46	45	44	44
	R=15%	68	64	63	61	60	58	57	56	56	55	54	54	53	52
	R=20%	74	70	69	67	66	64	63	63	62	61	61	60	60	59
	R=25%	78	74	73	72	71	69	68	68	67	66	66	66	65	64
0.30	R= 5%	42	40	39	38	37	35	34	33	32	32	31	30	29	29
	R=10%	54	52	52	50	49	48	47	46	46	45	44	44	43	42
	R=15%	62	60	60	59	58	56	55	55	54	54	53	52	52	51
	R=20%	68	66	66	65	64	63	62	61	61	60	59	59	58	58
	R=25%	72	71	70	69	69	68	67	66	66	65	65	64	64	63
0.35	R= 5%	39	38	37	36	35	33	32	32	31	30	30	29	28	28
	R=10%	51	50	50	49	48	46	46	45	44	44	43	42	42	41
	R=15%	59	59	58	57	56	55	54	54	53	52	52	51	51	50
	R=20%	65	65	64	63	62	61	61	60	60	59	58	58	57	57
	R=25%	70	69	69	68	67	66	66	65	65	64	64	63	63	62
0.40	R= 5%	37	36	36	34	34	32	31	31	30	29	29	28	27	27
	R=10%	50	49	48	47	46	45	44	44	43	43	42	42	41	40
	R=15%	58	57	56	56	55	54	53	53	52	51	51	50	50	49
	R=20%	64	63	63	62	61	60	60	59	59	58	58	57	57	56
	R=25%	69	68	68	67	66	66	65	64	64	63	63	63	62	62
0.45	R= 5%	36	35	34	33	33	31	30	30	29	28	28	27	27	26
	R=10%	48	48	47	46	46	44	44	43	42	42	41	41	40	39
	R=15%	57	56	55	55	54	53	52	52	51	51	50	50	49	48
	R=20%	63	62	62	61	60	59	59	58	58	57	57	56	56	55
	R=25%	68	67	67	66	66	65	64	64	63	63	62	62	61	61
0.50	R= 5%	35	34	33	32	32	30	30	29	29	28	27	27	26	25
	R=10%	47	47	46	45	45	44	43	42	42	41	40	40	39	39
	R=15%	56	55	54	54	53	52	51	51	51	50	49	49	48	48
	R=20%	62	61	61	60	60	59	58	58	57	57	56	56	55	55
	R=25%	67	66	66	65	65	64	64	63	63	62	62	61	61	60
0.55	R= 5%	34	33	33	32	31	30	29	28	28	27	26	26	25	25
	R=10%	46	46	45	44	44	43	42	42	41	40	40	39	38	38
	R=15%	55	54	54	53	53	52	51	50	50	49	49	48	48	47
	R=20%	61	61	60	59	59	58	58	57	57	56	56	55	54	54
	R=25%	66	66	65	65	64	64	63	63	62	62	61	61	60	60

Table 4.13(a) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	94	93	92	89	84	71	66	60	57	54	51	50	47	46
	R=10%	100	99	99	99	97	91	87	82	80	76	74	73	70	69
	R=15%	100	100	100	100	99	97	95	92	90	88	86	85	83	82
	R=20%	100	100	100	100	100	99	98	96	95	93	92	91	90	89
	R=25%	100	100	100	100	100	100	99	98	97	96	96	95	94	93
0.15	R= 5%	78	72	69	61	58	53	50	49	47	45	43	42	41	39
	R=10%	94	91	89	83	80	76	73	71	70	68	66	65	63	62
	R=15%	98	97	96	92	90	87	85	84	82	81	79	78	77	76
	R=20%	99	99	98	96	95	93	92	90	90	88	87	86	85	84
	R=25%	100	100	99	98	97	96	95	94	94	93	92	91	90	90
0.20	R= 5%	60	57	55	52	50	47	45	43	42	40	39	38	37	36
	R=10%	82	79	77	75	73	70	67	66	65	63	62	61	59	58
	R=15%	91	89	88	86	85	82	80	79	78	77	75	74	73	72
	R=20%	96	94	93	92	91	89	88	87	86	85	84	83	82	81
	R=25%	98	97	96	95	95	93	92	92	91	90	89	89	88	87
0.25	R= 5%	53	51	49	47	45	43	41	40	39	38	37	36	34	33
	R=10%	75	74	72	70	68	65	64	62	61	60	58	57	56	55
	R=15%	86	85	84	82	81	79	77	76	75	73	72	71	70	69
	R=20%	92	91	91	89	88	87	85	84	84	82	81	81	79	78
	R=25%	96	95	94	93	93	91	91	90	89	88	87	87	86	85
0.30	R= 5%	49	47	46	44	43	40	39	38	37	35	34	34	32	31
	R=10%	71	70	68	66	65	63	61	60	59	57	56	55	53	52
	R=15%	83	82	81	79	78	76	75	73	72	71	70	69	67	66
	R=20%	90	89	88	87	86	84	83	82	82	80	79	78	77	76
	R=25%	94	93	93	92	91	90	89	88	87	86	86	85	84	83
0.35	R= 5%	46	44	43	42	40	38	37	36	35	34	33	32	31	30
	R=10%	68	67	66	64	63	60	59	57	56	55	54	53	51	50
	R=15%	81	80	79	77	76	74	72	71	70	69	68	67	65	64
	R=20%	88	87	87	85	84	83	81	81	80	78	77	76	75	74
	R=25%	93	92	91	90	90	88	87	87	86	85	84	83	82	81
0.40	R= 5%	44	42	41	40	39	37	35	34	33	32	31	30	29	29
	R=10%	66	65	63	62	61	58	57	55	54	53	52	51	49	48
	R=15%	79	78	77	75	74	72	71	69	68	67	66	65	63	62
	R=20%	87	86	85	84	83	81	80	79	78	77	76	75	73	72
	R=25%	91	91	90	89	89	87	86	85	85	83	82	82	80	79
0.45	R= 5%	42	41	40	38	37	35	34	33	32	31	30	29	28	27
	R=10%	64	63	62	60	59	57	55	54	53	51	50	49	48	47
	R=15%	77	76	75	74	73	70	69	68	67	65	64	63	62	60
	R=20%	85	84	84	82	82	80	78	77	76	75	74	73	72	71
	R=25%	90	90	89	88	87	86	85	84	83	82	81	80	79	78
0.50	R= 5%	40	39	38	37	36	34	33	32	31	30	29	28	27	26
	R=10%	62	61	60	59	57	55	53	52	51	50	49	48	46	45
	R=15%	76	75	74	72	71	69	67	66	65	64	63	62	60	59
	R=20%	84	83	82	81	80	78	77	76	75	74	73	72	70	69
	R=25%	90	89	88	87	86	85	84	83	82	81	80	79	78	77
0.55	R= 5%	39	38	37	36	35	33	32	31	30	29	28	27	26	26
	R=10%	61	60	59	57	56	54	52	51	50	49	47	47	45	44
	R=15%	74	73	72	71	70	68	66	65	64	63	61	60	59	58
	R=20%	83	82	81	80	79	77	76	75	74	73	71	71	69	68
	R=25%	89	88	87	86	85	84	83	82	81	80	79	78	77	76

Table 4.13(b) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 1.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	91	89	88	86	85	80	70	63	62	54	51	48	46	44
	R=10%	98	98	97	97	96	94	88	83	81	74	72	69	67	65
	R=15%	100	99	99	99	99	98	94	91	90	85	82	80	78	77
	R=20%	100	100	100	100	100	99	97	95	94	90	89	87	85	84
	R=25%	100	100	100	100	100	100	98	97	97	94	92	91	90	89
0.15	R= 5%	83	80	72	64	61	52	49	47	45	43	42	40	39	37
	R=10%	95	94	89	83	81	73	69	67	66	64	62	61	59	58
	R=15%	98	98	95	91	89	83	80	79	78	76	74	73	72	70
	R=20%	99	99	98	95	94	89	87	86	85	83	82	81	80	79
	R=25%	100	100	99	97	96	93	91	90	89	88	87	86	85	84
0.20	R= 5%	64	57	54	50	48	45	43	41	40	38	37	37	35	34
	R=10%	83	77	74	71	68	65	63	62	60	59	58	57	55	54
	R=15%	91	86	84	81	80	77	75	74	73	71	70	69	68	67
	R=20%	95	91	90	88	86	84	83	81	81	79	78	78	76	75
	R=25%	97	94	93	92	90	89	87	87	86	85	84	83	82	82
0.25	R= 5%	51	49	47	45	44	41	39	38	37	36	35	34	33	32
	R=10%	71	69	68	66	64	61	59	58	57	56	55	54	52	51
	R=15%	82	80	79	77	76	73	72	71	70	68	67	66	65	64
	R=20%	88	86	85	84	83	81	80	79	78	77	76	75	74	73
	R=25%	92	91	90	89	88	86	85	84	84	82	82	81	80	79
0.30	R= 5%	47	45	44	42	40	38	37	36	35	34	33	32	31	30
	R=10%	67	65	64	62	60	58	57	55	55	53	52	51	50	49
	R=15%	78	77	76	74	73	71	69	68	67	66	65	64	63	62
	R=20%	85	84	83	81	80	79	78	76	76	75	74	73	72	71
	R=25%	89	88	88	86	86	84	83	82	82	81	80	79	78	77
0.35	R= 5%	44	42	41	39	38	36	35	34	33	32	31	30	29	28
	R=10%	64	62	61	59	58	56	55	53	53	51	50	49	48	47
	R=15%	75	74	73	71	70	68	67	66	65	64	63	62	61	60
	R=20%	83	81	81	79	79	77	76	75	74	73	72	71	70	69
	R=25%	87	87	86	85	84	83	82	81	80	79	79	78	77	76
0.40	R= 5%	41	40	39	38	36	35	33	33	32	31	30	29	28	27
	R=10%	61	60	59	58	56	54	53	52	51	50	49	48	46	45
	R=15%	73	72	71	70	69	67	66	65	64	62	61	61	59	58
	R=20%	81	80	79	78	77	75	74	73	73	71	70	70	68	68
	R=25%	86	85	84	84	83	81	80	80	79	78	77	76	75	74
0.45	R= 5%	40	38	38	36	35	33	32	31	31	29	29	28	27	26
	R=10%	59	58	57	56	55	53	51	50	49	48	47	46	45	44
	R=15%	71	70	70	68	67	65	64	63	62	61	60	59	58	57
	R=20%	79	78	78	77	76	74	73	72	71	70	69	68	67	66
	R=25%	85	84	83	82	82	80	79	79	78	77	76	75	74	73
0.50	R= 5%	38	37	36	35	34	32	31	30	30	28	28	27	26	25
	R=10%	58	57	56	54	53	51	50	49	48	47	46	45	44	43
	R=15%	70	69	68	67	66	64	63	62	61	60	59	58	57	56
	R=20%	78	77	76	75	74	73	72	71	70	69	68	67	66	65
	R=25%	84	83	82	81	81	79	78	77	77	76	75	74	73	72
0.55	R= 5%	37	36	35	34	33	31	30	29	29	28	27	26	25	25
	R=10%	56	55	54	53	52	50	49	48	47	46	45	44	43	42
	R=15%	69	68	67	66	65	63	62	61	60	58	57	57	55	54
	R=20%	77	76	75	74	74	72	71	70	69	68	67	66	65	64
	R=25%	83	82	81	80	80	78	77	76	76	75	74	73	72	71

Table 4.13(c) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 2.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	86	84	83	82	80	77	74	67	62	57	52	49	46	44
	R=10%	95	94	94	93	92	90	88	83	79	75	70	67	64	62
	R=15%	98	98	97	97	96	95	94	90	87	83	80	77	74	72
	R=20%	99	99	99	98	98	97	96	94	91	89	85	83	81	79
	R=25%	100	99	99	99	99	98	98	96	94	92	89	87	85	84
0.15	R= 5%	79	77	75	67	61	54	49	47	45	43	41	40	39	37
	R=10%	91	90	89	83	78	72	67	64	63	61	59	58	56	55
	R=15%	96	95	94	90	86	81	77	74	73	71	70	69	67	66
	R=20%	98	97	97	94	91	86	83	81	80	78	77	76	75	74
	R=25%	99	98	98	96	93	90	87	85	84	83	82	81	80	79
0.20	R= 5%	64	59	57	50	48	44	42	41	40	38	37	36	35	34
	R=10%	80	76	74	68	65	62	60	59	58	56	55	54	53	52
	R=15%	87	84	83	77	75	72	71	69	68	67	66	65	64	63
	R=20%	92	89	88	83	81	79	77	76	75	74	73	73	72	71
	R=25%	94	92	91	87	86	83	82	81	81	80	79	78	77	76
0.25	R= 5%	51	49	47	45	43	41	39	38	37	36	35	34	33	32
	R=10%	68	66	64	62	61	58	57	55	54	53	52	51	50	49
	R=15%	77	75	74	72	71	69	67	66	65	64	63	63	62	61
	R=20%	83	82	80	79	78	76	74	74	73	72	71	70	69	69
	R=25%	87	86	85	83	82	81	80	79	78	77	77	76	75	75
0.30	R= 5%	46	45	43	41	40	38	37	36	35	34	33	32	31	30
	R=10%	63	62	61	59	58	55	54	53	52	51	50	49	48	47
	R=15%	73	72	71	69	68	66	65	64	63	62	61	61	60	59
	R=20%	79	78	77	76	75	73	72	72	71	70	69	69	68	67
	R=25%	84	83	82	81	80	79	78	77	77	76	75	75	74	73
0.35	R= 5%	43	42	41	39	38	36	35	34	33	32	31	31	30	29
	R=10%	60	59	58	56	55	54	52	51	51	49	49	48	47	46
	R=15%	70	69	68	67	66	64	63	62	62	61	60	59	58	57
	R=20%	77	76	75	74	73	72	71	70	70	69	68	67	66	65
	R=25%	82	81	80	79	79	78	77	76	75	75	74	73	72	72
0.40	R= 5%	41	40	39	37	36	34	33	33	32	31	30	29	28	28
	R=10%	58	57	56	55	54	52	51	50	49	48	47	46	45	44
	R=15%	68	67	66	65	65	63	62	61	60	59	58	58	57	56
	R=20%	75	74	74	73	72	71	70	69	68	67	67	66	65	64
	R=25%	80	80	79	78	78	76	75	75	74	73	73	72	71	71
0.45	R= 5%	39	38	37	36	35	33	32	31	31	30	29	28	27	27
	R=10%	56	55	54	53	52	51	49	49	48	47	46	45	44	43
	R=15%	67	66	65	64	63	62	61	60	59	58	57	57	55	55
	R=20%	74	73	72	72	71	70	69	68	67	66	65	65	64	63
	R=25%	79	78	78	77	76	75	74	74	73	72	72	71	70	70
0.50	R= 5%	38	37	36	35	34	32	31	30	30	29	28	27	27	26
	R=10%	55	54	53	52	51	49	48	47	47	46	45	44	43	42
	R=15%	65	65	64	63	62	61	60	59	58	57	56	55	54	54
	R=20%	73	72	71	70	70	68	68	67	66	65	64	64	63	62
	R=25%	78	78	77	76	76	74	74	73	72	71	71	70	69	69
0.55	R= 5%	37	36	35	34	33	31	30	30	29	28	27	27	26	25
	R=10%	54	53	52	51	50	48	47	46	46	45	44	43	42	41
	R=15%	65	64	63	62	61	60	59	58	57	56	55	55	53	53
	R=20%	72	71	70	70	69	68	67	66	65	64	64	63	62	61
	R=25%	77	77	76	75	75	74	73	72	72	71	70	69	68	68

Table 4.13(d) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 2.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	81	80	79	77	76	73	72	69	66	58	54	52	46	44
	R=10%	91	91	90	89	88	86	85	83	81	73	70	68	63	60
	R=15%	95	95	94	94	93	92	91	89	87	81	78	76	72	70
	R=20%	97	97	97	96	95	94	94	93	91	86	83	82	78	76
	R=25%	98	98	98	97	97	96	96	95	94	89	87	86	82	81
0.15	R= 5%	75	74	72	70	65	55	51	47	45	43	41	40	39	38
	R=10%	87	86	85	83	79	70	67	63	61	59	57	56	55	54
	R=15%	92	92	91	89	86	79	75	72	70	68	67	66	65	64
	R=20%	95	94	94	93	90	84	81	78	76	75	73	73	71	70
	R=25%	97	96	96	95	93	87	85	82	81	79	78	78	76	76
0.20	R= 5%	68	60	56	53	48	44	42	41	40	38	37	36	35	34
	R=10%	82	75	71	68	64	60	58	57	56	54	53	52	51	50
	R=15%	88	83	79	77	73	69	67	66	66	64	63	62	61	61
	R=20%	92	87	84	82	78	75	74	73	72	71	70	69	68	68
	R=25%	94	90	87	86	83	80	79	78	77	76	75	75	74	73
0.25	R= 5%	53	49	47	45	43	41	39	38	37	36	35	34	33	32
	R=10%	68	64	62	60	58	56	55	54	53	52	51	50	49	48
	R=15%	77	73	71	69	68	66	64	63	63	62	61	60	59	59
	R=20%	82	78	77	75	74	72	71	70	70	69	68	67	66	66
	R=25%	86	83	81	80	79	77	76	75	75	74	73	73	72	71
0.30	R= 5%	46	44	43	42	40	38	37	36	35	34	33	32	31	31
	R=10%	61	59	58	57	56	54	52	52	51	50	49	48	47	47
	R=15%	70	68	67	66	65	63	62	61	61	60	59	59	58	57
	R=20%	76	75	74	73	72	70	69	68	68	67	66	66	65	64
	R=25%	80	79	78	77	77	75	74	74	73	73	72	71	71	70
0.35	R= 5%	43	42	41	39	38	36	35	34	34	33	32	31	30	29
	R=10%	58	57	56	55	54	52	51	50	49	48	47	47	46	45
	R=15%	67	66	65	64	63	62	61	60	59	58	58	57	56	56
	R=20%	73	73	72	71	70	69	68	67	67	66	65	65	64	63
	R=25%	78	77	77	76	75	74	73	73	72	71	71	70	70	69
0.40	R= 5%	41	40	39	37	36	35	34	33	32	31	31	30	29	28
	R=10%	56	55	54	53	52	51	49	49	48	47	46	46	45	44
	R=15%	65	64	64	63	62	60	59	59	58	57	57	56	55	54
	R=20%	72	71	70	69	69	68	67	66	65	65	64	64	63	62
	R=25%	77	76	75	74	74	73	72	72	71	70	70	69	69	68
0.45	R= 5%	39	38	37	36	35	34	33	32	31	30	30	29	28	27
	R=10%	55	53	53	52	51	49	48	48	47	46	45	45	44	43
	R=15%	64	63	62	61	61	59	58	58	57	56	56	55	54	53
	R=20%	70	70	69	68	68	66	66	65	65	64	63	63	62	61
	R=25%	75	75	74	74	73	72	71	71	70	70	69	68	68	67
0.50	R= 5%	38	37	36	35	34	33	32	31	30	29	29	28	27	27
	R=10%	53	52	52	51	50	48	47	47	46	45	44	44	43	42
	R=15%	63	62	61	60	60	58	57	57	56	55	55	54	53	52
	R=20%	69	69	68	67	67	66	65	64	64	63	62	62	61	60
	R=25%	74	74	73	73	72	71	70	70	69	69	68	68	67	66
0.55	R= 5%	37	36	35	34	33	32	31	30	30	29	28	27	27	26
	R=10%	52	51	51	50	49	47	46	46	45	44	43	43	42	41
	R=15%	62	61	60	59	59	57	57	56	55	54	54	53	52	52
	R=20%	68	68	67	67	66	65	64	63	63	62	61	61	60	59
	R=25%	74	73	73	72	71	70	70	69	69	68	67	67	66	66

Table 4.13(e) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 3.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	78	77	76	74	73	71	69	68	66	61	55	52	48	45
	R=10%	88	87	87	85	85	83	82	80	79	75	70	66	63	60
	R=15%	92	92	91	90	90	88	87	87	86	82	77	74	71	68
	R=20%	95	94	94	93	93	92	91	90	89	86	82	80	77	74
	R=25%	96	96	96	95	95	94	93	92	92	89	86	84	81	79
0.15	R= 5%	72	71	70	68	66	56	52	49	46	43	42	41	39	38
	R=10%	84	83	82	81	79	71	66	63	60	58	56	55	54	53
	R=15%	89	88	88	87	85	78	74	71	69	67	65	64	63	62
	R=20%	92	91	91	90	89	83	80	77	75	73	71	70	69	68
	R=25%	94	94	93	92	91	86	83	81	79	77	76	75	74	73
0.20	R= 5%	67	64	58	53	50	45	43	41	40	39	38	37	36	35
	R=10%	80	77	72	67	64	59	57	56	55	53	52	52	50	50
	R=15%	86	84	79	75	73	68	65	64	64	62	61	61	60	59
	R=20%	89	88	84	80	78	73	72	71	70	69	68	67	66	66
	R=25%	92	90	87	83	82	78	76	75	75	74	73	72	71	71
0.25	R= 5%	53	50	47	45	43	41	39	38	37	36	35	35	34	33
	R=10%	67	64	61	59	57	55	54	53	52	51	50	49	48	47
	R=15%	75	72	69	67	66	64	63	62	61	60	59	59	58	57
	R=20%	80	78	75	73	72	70	69	68	67	66	66	65	65	64
	R=25%	83	82	79	77	76	75	74	73	72	72	71	71	70	69
0.30	R= 5%	46	45	43	42	40	38	37	36	35	34	34	33	32	31
	R=10%	60	58	57	56	55	53	51	51	50	49	48	48	47	46
	R=15%	68	66	65	64	63	62	60	60	59	58	58	57	56	56
	R=20%	74	72	71	70	69	68	67	66	66	65	64	64	63	63
	R=25%	78	77	76	75	74	73	72	71	71	70	70	69	69	68
0.35	R= 5%	43	42	41	40	38	37	35	35	34	33	32	32	31	30
	R=10%	57	56	55	53	52	51	50	49	49	48	47	46	45	45
	R=15%	65	64	63	62	61	60	59	58	58	57	56	56	55	54
	R=20%	71	70	70	69	68	66	66	65	65	64	63	63	62	62
	R=25%	76	75	74	73	73	72	71	70	70	69	69	68	68	67
0.40	R= 5%	41	40	39	38	37	35	34	33	33	32	31	31	30	29
	R=10%	55	54	53	52	51	50	49	48	47	46	46	45	44	44
	R=15%	63	62	62	61	60	59	58	57	57	56	55	55	54	53
	R=20%	69	69	68	67	66	65	65	64	64	63	62	62	61	60
	R=25%	74	73	73	72	71	71	70	69	69	68	68	67	67	66
0.45	R= 5%	40	39	38	36	36	34	33	32	32	31	30	30	29	28
	R=10%	53	52	52	51	50	48	48	47	46	45	45	44	43	43
	R=15%	62	61	60	60	59	58	57	56	56	55	54	54	53	52
	R=20%	68	67	67	66	65	64	64	63	63	62	61	61	60	60
	R=25%	73	72	72	71	71	70	69	69	68	68	67	67	66	65
0.50	R= 5%	38	37	37	35	35	33	32	31	31	30	29	29	28	27
	R=10%	52	51	51	50	49	48	47	46	45	45	44	43	42	42
	R=15%	61	60	59	59	58	57	56	55	55	54	54	53	52	52
	R=20%	67	66	66	65	65	64	63	62	62	61	61	60	59	59
	R=25%	72	71	71	70	70	69	68	68	67	67	66	66	65	65
0.55	R= 5%	37	36	36	34	34	32	31	31	30	29	29	28	27	27
	R=10%	51	50	50	49	48	47	46	45	45	44	43	43	42	41
	R=15%	60	59	59	58	57	56	55	55	54	53	53	52	51	51
	R=20%	66	66	65	64	64	63	62	62	61	61	60	59	59	58
	R=25%	71	71	70	70	69	68	68	67	67	66	66	65	64	64

Table 4.13(f) Predicted trapping efficiencies (from suspended material grading)

D_{50} suspended sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 3.5 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	75	74	73	72	71	69	67	66	65	62	57	53	49	46
	R=10%	85	84	84	83	82	80	79	78	77	75	71	67	63	60
	R=15%	90	89	89	88	87	86	85	84	83	82	78	74	71	68
	R=20%	92	92	91	91	90	89	88	88	87	86	82	79	77	74
	R=25%	94	94	93	93	92	91	91	90	90	88	85	83	80	78
0.15	R= 5%	70	69	68	66	65	59	52	50	47	44	42	41	39	38
	R=10%	81	80	79	78	77	72	66	64	61	57	56	54	53	52
	R=15%	86	85	85	84	83	79	73	71	69	66	64	63	62	61
	R=20%	89	89	88	87	87	83	78	77	74	71	70	69	68	67
	R=25%	92	91	91	90	89	86	82	80	78	76	74	73	72	72
0.20	R= 5%	65	64	61	53	51	45	43	41	40	39	38	37	36	35
	R=10%	77	76	74	67	64	58	56	55	54	53	52	51	50	49
	R=15%	83	82	80	74	72	66	64	63	62	61	60	59	58	58
	R=20%	87	86	84	79	77	72	70	69	68	67	66	66	65	64
	R=25%	90	89	87	82	81	76	75	74	73	72	71	71	70	69
0.25	R= 5%	53	51	49	45	43	41	40	38	38	36	36	35	34	33
	R=10%	66	64	62	58	56	54	53	52	51	50	49	49	48	47
	R=15%	74	72	70	66	65	62	61	60	60	59	58	57	57	56
	R=20%	79	77	75	72	70	68	67	67	66	65	64	64	63	63
	R=25%	82	81	79	76	75	73	72	71	71	70	69	69	68	68
0.30	R= 5%	46	45	43	42	41	39	37	36	36	35	34	33	32	32
	R=10%	59	57	56	55	54	52	51	50	49	48	48	47	46	46
	R=15%	67	65	64	63	62	60	59	58	58	57	57	56	55	55
	R=20%	72	71	70	69	68	66	65	65	64	64	63	63	62	61
	R=25%	76	75	74	73	72	71	70	70	69	69	68	68	67	67
0.35	R= 5%	43	42	41	40	39	37	36	35	34	33	33	32	31	31
	R=10%	56	55	54	53	52	50	49	48	48	47	46	46	45	44
	R=15%	64	63	62	61	60	59	58	57	57	56	55	55	54	54
	R=20%	69	68	68	67	66	65	64	64	63	62	62	62	61	60
	R=25%	74	73	72	72	71	70	69	69	68	68	67	67	66	66
0.40	R= 5%	42	40	39	38	37	35	35	34	33	32	32	31	30	30
	R=10%	54	53	52	51	50	49	48	47	47	46	45	45	44	43
	R=15%	62	61	60	59	59	57	57	56	56	55	54	54	53	53
	R=20%	68	67	66	66	65	64	63	63	62	62	61	61	60	59
	R=25%	72	72	71	70	70	69	68	68	67	67	66	66	65	65
0.45	R= 5%	40	39	38	37	36	34	33	33	32	31	31	30	29	29
	R=10%	53	52	51	50	49	48	47	46	46	45	44	44	43	42
	R=15%	61	60	59	58	58	57	56	55	55	54	54	53	52	52
	R=20%	67	66	65	64	64	63	62	62	61	61	60	60	59	59
	R=25%	71	71	70	69	69	68	67	67	67	66	66	65	65	64
0.50	R= 5%	39	38	37	36	35	33	33	32	31	31	30	29	28	28
	R=10%	51	50	50	49	48	47	46	46	45	44	44	43	42	42
	R=15%	59	59	58	57	57	56	55	54	54	53	53	52	51	51
	R=20%	65	65	64	64	63	62	62	61	61	60	60	59	58	58
	R=25%	70	70	69	69	68	67	67	66	66	65	65	65	64	63
0.55	R= 5%	38	37	36	35	34	33	32	31	31	30	29	29	28	27
	R=10%	50	50	49	48	47	46	45	45	44	44	43	42	42	41
	R=15%	59	58	57	57	56	55	54	54	53	53	52	52	51	50
	R=20%	65	64	64	63	62	62	61	60	60	59	59	58	58	57
	R=25%	69	69	69	68	68	67	66	66	65	65	64	64	63	63

Prediction tables for a uniform sediment size grading

(Used for calculating the size grading of bed sediment downstream from an extractor)

Table 4.14(a) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.10mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	25	23	21	20	19	17	17	16	16	15	15	14	14	14
	R=10%	43	39	37	35	33	31	30	29	28	28	27	26	26	25
	R=15%	57	52	49	46	45	42	41	40	39	38	37	37	36	35
	R=20%	66	62	59	56	54	52	50	49	48	47	46	45	44	44
	R=25%	74	69	67	64	62	60	58	57	56	55	54	53	52	51
0.15	R= 5%	18	17	17	16	16	15	14	14	14	13	13	13	12	12
	R=10%	32	31	30	29	28	27	26	26	25	25	24	24	23	23
	R=15%	44	42	41	40	39	38	37	36	35	35	34	34	33	32
	R=20%	53	52	51	49	48	47	46	45	44	43	43	42	41	40
	R=25%	61	60	58	57	56	54	53	53	52	51	50	50	49	48
0.20	R= 5%	16	16	15	15	14	14	13	13	13	12	12	12	12	11
	R=10%	29	28	28	27	26	25	25	24	24	23	23	22	22	21
	R=15%	40	39	38	37	37	35	35	34	33	33	32	32	31	30
	R=20%	49	48	47	46	45	44	43	42	42	41	40	40	39	38
	R=25%	56	56	55	54	53	52	51	50	49	48	48	47	46	46
0.25	R= 5%	15	15	14	14	13	13	13	12	12	12	11	11	11	11
	R=10%	27	27	26	25	25	24	23	23	23	22	22	21	21	20
	R=15%	38	37	36	35	35	34	33	32	32	31	31	30	30	29
	R=20%	46	46	45	44	43	42	41	41	40	39	39	38	38	37
	R=25%	54	53	53	52	51	50	49	48	48	47	46	46	45	44
0.30	R= 5%	14	14	14	13	13	12	12	12	12	11	11	11	11	10
	R=10%	26	25	25	24	24	23	22	22	22	21	21	20	20	20
	R=15%	36	35	35	34	33	32	32	31	31	30	30	29	29	28
	R=20%	45	44	43	43	42	41	40	39	39	38	38	37	36	36
	R=25%	52	52	51	50	49	48	47	47	46	45	45	44	43	43
0.35	R= 5%	14	13	13	13	12	12	12	11	11	11	11	10	10	10
	R=10%	25	24	24	23	23	22	22	21	21	20	20	20	19	18
	R=15%	35	34	34	33	32	31	31	30	30	29	29	28	27	27
	R=20%	43	43	42	41	41	40	39	38	38	37	37	36	35	34
	R=25%	51	50	50	49	48	47	46	45	45	44	44	43	42	41
0.40	R= 5%	13	13	12	12	12	11	11	11	11	10	10	10	9	9
	R=10%	24	24	23	23	22	22	21	21	20	20	19	19	18	18
	R=15%	34	33	33	32	31	31	30	29	29	28	28	27	26	25
	R=20%	42	42	41	40	40	39	38	37	37	36	36	35	34	33
	R=25%	50	49	49	48	47	46	45	45	44	43	43	42	40	39
0.45	R= 5%	13	12	12	12	12	11	11	11	10	10	10	9	9	9
	R=10%	23	23	23	22	22	21	21	20	20	19	19	18	17	17
	R=15%	33	32	32	31	31	30	29	29	28	28	27	26	25	24
	R=20%	41	41	40	39	39	38	37	37	36	35	34	33	32	32
	R=25%	49	48	48	47	46	45	44	44	43	42	41	40	39	38
0.50	R= 5%	12	12	12	11	11	11	11	10	10	10	9	9	9	8
	R=10%	23	22	22	22	21	21	20	20	19	18	18	17	17	16
	R=15%	32	32	31	31	30	29	29	28	28	27	26	25	24	24
	R=20%	41	40	39	39	38	37	36	36	35	34	33	32	31	31
	R=25%	48	47	47	46	45	44	44	43	42	41	40	39	38	37
0.55	R= 5%	12	12	12	11	11	11	10	10	10	9	9	9	8	8
	R=10%	22	22	22	21	21	20	20	19	19	18	17	17	16	16
	R=15%	32	31	31	30	30	29	28	27	27	26	25	24	24	23
	R=20%	40	39	39	38	38	37	36	35	34	33	32	32	31	30
	R=25%	47	47	46	45	45	44	43	42	41	40	39	38	37	36

Table 4.14(b) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.15mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	54	47	44	37	34	30	29	27	26	25	24	23	23	22
	R=10%	78	70	68	58	55	50	48	46	45	43	42	41	39	38
	R=15%	89	83	81	72	69	64	61	59	58	56	55	54	52	51
	R=20%	94	90	88	81	78	73	71	69	68	66	65	64	62	61
	R=25%	97	94	93	87	84	80	78	77	75	74	72	71	70	69
0.15	R= 5%	32	31	29	28	27	25	24	23	22	22	21	20	20	19
	R=10%	53	50	49	47	45	42	41	40	39	38	37	36	35	34
	R=15%	66	64	62	60	58	55	54	53	52	50	49	48	47	46
	R=20%	76	73	72	70	68	65	64	63	62	60	59	58	57	56
	R=25%	82	80	79	77	75	73	71	70	70	68	67	66	65	64
0.20	R= 5%	27	26	26	24	24	22	21	21	20	20	19	19	18	17
	R=10%	46	44	43	42	41	39	38	37	36	35	34	33	32	32
	R=15%	59	58	56	55	53	51	50	49	48	47	46	45	44	43
	R=20%	69	67	66	64	63	61	60	59	58	57	56	55	54	53
	R=25%	76	75	74	72	71	69	68	67	66	65	64	63	62	61
0.25	R= 5%	25	24	23	22	22	21	20	19	19	18	18	17	17	16
	R=10%	42	41	40	39	38	36	35	34	34	33	32	31	30	30
	R=15%	55	54	53	51	51	49	48	47	46	45	44	43	42	41
	R=20%	65	64	63	61	60	58	57	56	55	54	53	52	51	50
	R=25%	72	71	71	69	68	66	65	64	63	62	61	60	59	58
0.30	R= 5%	23	22	22	21	20	19	19	18	18	17	17	16	16	15
	R=10%	40	39	38	37	36	35	34	33	32	31	30	30	29	28
	R=15%	53	51	51	49	48	47	45	44	44	43	42	41	40	39
	R=20%	62	61	60	59	58	56	55	54	53	52	51	51	49	48
	R=25%	70	69	68	67	66	64	63	62	61	60	59	58	57	56
0.35	R= 5%	22	21	21	20	19	19	18	17	17	16	16	16	15	15
	R=10%	38	37	36	35	35	33	32	31	31	30	29	29	28	27
	R=15%	51	50	49	48	47	45	44	43	42	41	40	40	39	38
	R=20%	60	59	58	57	56	55	53	52	52	51	50	49	48	47
	R=25%	68	67	66	65	64	63	61	60	60	58	58	57	56	55
0.40	R= 5%	21	20	20	19	19	18	17	17	16	16	15	15	15	14
	R=10%	37	36	35	34	33	32	31	30	30	29	28	28	27	26
	R=15%	49	48	47	46	45	43	42	42	41	40	39	38	37	36
	R=20%	59	58	57	56	55	53	52	51	50	49	48	48	47	45
	R=25%	66	66	65	64	63	61	60	59	58	57	56	55	54	53
0.45	R= 5%	20	20	19	18	18	17	17	16	16	15	15	15	14	13
	R=10%	35	35	34	33	32	31	30	29	29	28	27	27	26	25
	R=15%	48	47	46	45	44	42	41	40	40	39	38	38	36	34
	R=20%	57	56	56	54	53	52	51	50	49	48	47	47	45	43
	R=25%	65	64	63	62	61	60	59	58	57	56	55	55	52	51
0.50	R= 5%	19	19	18	18	17	17	16	16	15	15	14	14	13	12
	R=10%	34	34	33	32	31	30	29	29	28	27	27	26	24	23
	R=15%	46	45	45	44	43	41	40	39	39	38	37	36	34	33
	R=20%	56	55	54	53	52	51	50	49	48	47	46	45	43	41
	R=25%	64	63	62	61	60	59	57	57	56	55	54	52	50	49
0.55	R= 5%	19	18	18	17	17	16	16	15	15	14	14	13	12	12
	R=10%	33	33	32	31	31	29	28	28	27	26	25	24	23	22
	R=15%	45	44	44	43	42	40	39	39	38	37	35	34	33	32
	R=20%	55	54	53	52	51	50	49	48	47	46	44	43	41	40
	R=25%	63	62	61	60	59	58	56	56	55	54	52	51	49	47

Table 4.14(c) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.20mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	80	76	67	57	54	45	41	39	38	36	34	33	31	30
	R=10%	95	93	88	80	77	67	63	61	59	57	55	54	52	51
	R=15%	99	98	95	90	88	80	77	74	73	71	69	68	66	64
	R=20%	100	99	98	95	94	88	85	83	82	80	78	77	75	74
	R=25%	100	100	99	98	97	92	90	89	88	86	85	84	82	81
0.15	R= 5%	48	45	43	40	38	35	33	32	31	30	29	28	27	26
	R=10%	71	67	65	62	60	56	54	53	51	50	49	48	46	45
	R=15%	83	80	78	75	73	70	68	66	65	64	62	61	60	59
	R=20%	90	88	86	83	82	79	77	76	75	74	72	71	70	69
	R=25%	94	92	91	89	88	85	84	83	82	81	79	79	77	76
0.20	R= 5%	39	38	36	34	33	31	30	29	28	27	26	26	25	24
	R=10%	61	59	57	55	54	51	50	48	47	46	45	44	43	42
	R=15%	74	72	71	69	67	65	63	62	61	60	58	58	56	55
	R=20%	83	81	80	78	77	75	73	72	71	70	69	68	66	65
	R=25%	88	87	86	85	83	81	80	79	78	77	76	75	74	73
0.25	R= 5%	35	34	33	31	30	29	28	27	26	25	24	24	23	22
	R=10%	56	54	53	51	50	48	47	45	45	43	42	41	40	39
	R=15%	69	68	67	65	64	62	60	59	58	57	56	55	53	52
	R=20%	79	77	76	75	74	72	70	69	68	67	66	65	63	62
	R=25%	85	84	83	81	81	79	77	76	76	74	73	72	71	70
0.30	R= 5%	32	31	31	29	29	27	26	25	25	24	23	22	22	21
	R=10%	53	51	50	49	48	46	44	43	42	41	40	39	38	37
	R=15%	66	65	64	62	61	59	58	57	56	54	53	52	51	50
	R=20%	76	75	74	72	71	69	68	67	66	64	63	62	61	60
	R=25%	82	81	81	79	78	77	75	74	73	72	71	70	69	68
0.35	R= 5%	31	30	29	28	27	26	25	24	23	22	22	21	21	20
	R=10%	50	49	48	47	46	44	42	41	41	39	38	38	37	36
	R=15%	64	62	62	60	59	57	56	55	54	52	51	50	49	48
	R=20%	74	72	72	70	69	67	66	65	64	62	61	60	59	58
	R=25%	80	79	79	77	76	75	73	72	72	70	69	68	67	66
0.40	R= 5%	29	28	28	27	26	24	24	23	22	22	21	20	20	19
	R=10%	48	47	46	45	44	42	41	40	39	38	37	36	35	34
	R=15%	62	61	60	58	57	55	54	53	52	51	50	49	47	47
	R=20%	72	71	70	68	67	65	64	63	62	61	60	59	57	56
	R=25%	79	78	77	76	75	73	72	71	70	69	68	67	65	64
0.45	R= 5%	28	27	27	25	25	23	23	22	21	21	20	20	19	18
	R=10%	47	46	45	44	43	41	39	39	38	37	36	35	34	33
	R=15%	60	59	58	57	56	54	52	51	51	49	48	47	46	45
	R=20%	70	69	68	67	66	64	62	61	61	59	58	57	56	55
	R=25%	77	76	76	74	73	72	70	69	68	67	66	65	64	63
0.50	R= 5%	27	26	26	25	24	23	22	21	21	20	19	19	18	17
	R=10%	45	44	44	42	41	39	38	37	37	36	35	34	33	31
	R=15%	59	58	57	55	54	52	51	50	49	48	47	46	45	43
	R=20%	69	68	67	65	64	62	61	60	59	58	57	56	54	53
	R=25%	76	75	74	73	72	70	69	68	67	66	65	64	63	61
0.55	R= 5%	26	25	25	24	23	22	21	21	20	19	19	18	17	16
	R=10%	44	43	42	41	40	38	37	36	36	35	34	33	31	30
	R=15%	58	56	56	54	53	51	50	49	48	47	46	45	43	41
	R=20%	67	66	66	64	63	61	60	59	58	57	56	55	52	50
	R=25%	75	74	73	72	71	69	68	67	66	65	64	63	60	58

Table 4.14(d) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.25mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	89	88	85	76	69	60	53	50	48	45	43	42	40	38
	R=10%	99	98	97	94	89	82	76	73	71	68	66	65	62	61
	R=15%	100	100	100	98	96	92	87	85	83	81	79	78	76	74
	R=20%	100	100	100	99	98	96	93	91	90	88	87	86	84	83
	R=25%	100	100	100	100	99	98	96	95	94	93	92	91	90	89
0.15	R= 5%	65	60	55	51	48	45	42	41	40	38	37	36	34	33
	R=10%	86	82	78	74	71	67	65	63	62	60	58	57	56	54
	R=15%	94	91	88	85	83	80	78	77	75	73	72	71	70	68
	R=20%	98	96	94	92	90	88	86	85	84	82	81	80	79	78
	R=25%	99	98	97	95	94	92	91	90	89	88	87	87	85	84
0.20	R= 5%	50	48	46	44	42	39	38	37	36	34	33	32	31	30
	R=10%	72	70	69	66	64	61	59	58	57	55	54	53	52	50
	R=15%	84	82	81	79	78	75	73	72	71	69	68	67	66	64
	R=20%	91	89	88	87	86	83	82	81	80	79	78	77	75	74
	R=25%	95	94	93	92	91	89	88	87	86	85	84	83	82	81
0.25	R= 5%	45	43	42	40	38	36	35	34	33	32	31	30	29	28
	R=10%	67	65	64	62	60	58	56	55	54	52	51	50	49	47
	R=15%	80	78	77	75	74	72	70	69	68	66	65	64	63	61
	R=20%	87	86	85	83	82	81	79	78	77	76	75	74	72	71
	R=25%	92	91	90	89	88	87	85	85	84	83	82	81	80	79
0.30	R= 5%	41	40	39	37	36	34	33	32	31	30	29	28	27	26
	R=10%	63	61	60	59	57	55	53	52	51	50	49	48	46	45
	R=15%	76	75	74	72	71	69	67	66	65	64	62	61	60	59
	R=20%	84	83	82	81	80	78	77	76	75	74	72	72	70	69
	R=25%	90	89	88	87	86	85	83	83	82	81	80	79	78	77
0.35	R= 5%	39	37	36	35	34	32	31	30	29	28	27	27	26	25
	R=10%	60	59	58	56	55	53	51	50	49	48	47	46	44	43
	R=15%	74	73	72	70	69	67	65	64	63	61	60	59	58	57
	R=20%	82	81	81	79	78	76	75	74	73	71	70	69	68	67
	R=25%	88	87	87	85	85	83	82	81	80	79	78	77	76	75
0.40	R= 5%	37	36	35	33	32	31	30	29	28	27	26	26	25	24
	R=10%	58	57	56	54	53	51	49	48	47	46	45	44	43	42
	R=15%	72	70	70	68	67	65	63	62	61	60	59	58	56	55
	R=20%	81	80	79	77	76	75	73	72	71	70	69	68	66	65
	R=25%	87	86	85	84	83	82	80	79	78	77	76	75	74	73
0.45	R= 5%	35	34	33	32	31	30	28	28	27	26	25	25	24	23
	R=10%	56	55	54	53	51	49	48	47	46	45	43	43	41	40
	R=15%	70	69	68	66	65	63	62	60	60	58	57	56	55	54
	R=20%	79	78	77	76	75	73	72	70	70	68	67	66	65	64
	R=25%	85	85	84	83	82	80	79	78	77	76	75	74	73	72
0.50	R= 5%	34	33	32	31	30	29	27	27	26	25	24	24	23	22
	R=10%	55	54	53	51	50	48	46	45	45	43	42	41	40	39
	R=15%	68	67	66	65	64	62	60	59	58	57	56	55	53	52
	R=20%	78	77	76	75	74	72	70	69	68	67	66	65	63	63
	R=25%	84	83	83	82	81	79	78	77	76	75	74	73	71	71
0.55	R= 5%	33	32	31	30	29	28	27	26	25	24	24	23	22	21
	R=10%	53	52	51	50	49	47	45	44	43	42	41	40	39	37
	R=15%	67	66	65	64	62	60	59	58	57	55	54	53	52	50
	R=20%	77	76	75	73	72	70	69	68	67	66	64	64	62	60
	R=25%	83	82	82	80	79	78	77	76	75	73	72	72	70	68

Table 4.14(e) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.30mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	94	93	92	89	84	71	66	60	57	54	51	50	47	46
	R=10%	100	99	99	99	97	91	87	82	80	76	74	73	70	69
	R=15%	100	100	100	100	99	97	95	92	90	88	86	85	83	82
	R=20%	100	100	100	100	100	99	98	96	95	93	92	91	90	89
	R=25%	100	100	100	100	100	100	99	98	97	96	96	95	94	93
0.15	R= 5%	78	72	69	61	58	53	50	49	47	45	43	42	41	39
	R=10%	94	91	89	83	80	76	73	71	70	68	66	65	63	62
	R=15%	98	97	96	92	90	87	85	84	82	81	79	78	77	76
	R=20%	99	99	98	96	95	93	92	90	90	88	87	86	85	84
	R=25%	100	100	99	98	97	96	95	94	94	93	92	91	90	90
0.20	R= 5%	60	57	55	52	50	47	45	43	42	40	39	38	37	36
	R=10%	82	79	77	75	73	70	67	66	65	63	62	61	59	58
	R=15%	91	89	88	86	85	82	80	79	78	77	75	74	73	72
	R=20%	96	94	93	92	91	89	88	87	86	85	84	83	82	81
	R=25%	98	97	96	95	95	93	92	92	91	90	89	89	88	87
0.25	R= 5%	53	51	49	47	45	43	41	40	39	38	37	36	34	33
	R=10%	75	74	72	70	68	65	64	62	61	60	58	57	56	55
	R=15%	86	85	84	82	81	79	77	76	75	73	72	71	70	69
	R=20%	92	91	91	89	88	87	85	84	84	82	81	81	79	78
	R=25%	96	95	94	93	93	91	91	90	89	88	87	87	86	85
0.30	R= 5%	49	47	46	44	43	40	39	38	37	35	34	34	32	31
	R=10%	71	70	68	66	65	63	61	60	59	57	56	55	53	52
	R=15%	83	82	81	79	78	76	75	73	72	71	70	69	67	66
	R=20%	90	89	88	87	86	84	83	82	82	80	79	78	77	76
	R=25%	94	93	93	92	91	90	89	88	87	86	86	85	84	83
0.35	R= 5%	46	44	43	42	40	38	37	36	35	34	33	32	31	30
	R=10%	68	67	66	64	63	60	59	57	56	55	54	53	51	50
	R=15%	81	80	79	77	76	74	72	71	70	69	68	67	65	64
	R=20%	88	87	87	85	84	83	81	81	80	78	77	76	75	74
	R=25%	93	92	91	90	90	88	87	87	86	85	84	83	82	81
0.40	R= 5%	44	42	41	40	39	37	35	34	33	32	31	30	29	29
	R=10%	66	65	63	62	61	58	57	55	54	53	52	51	49	48
	R=15%	79	78	77	75	74	72	71	69	68	67	66	65	63	62
	R=20%	87	86	85	84	83	81	80	79	78	77	76	75	73	72
	R=25%	91	91	90	89	89	87	86	85	85	83	82	82	80	79
0.45	R= 5%	42	41	40	38	37	35	34	33	32	31	30	29	28	27
	R=10%	64	63	62	60	59	57	55	54	53	51	50	49	48	47
	R=15%	77	76	75	74	73	70	69	68	67	65	64	63	62	60
	R=20%	85	84	84	82	82	80	78	77	76	75	74	73	72	71
	R=25%	90	90	89	88	87	86	85	84	83	82	81	80	79	78
0.50	R= 5%	40	39	38	37	36	34	33	32	31	30	29	28	27	26
	R=10%	62	61	60	59	57	55	53	52	51	50	49	48	46	45
	R=15%	76	75	74	72	71	69	67	66	65	64	63	62	60	59
	R=20%	84	83	82	81	80	78	77	76	75	74	73	72	70	69
	R=25%	90	89	88	87	86	85	84	83	82	81	80	79	78	77
0.55	R= 5%	39	38	37	36	35	33	32	31	30	29	28	27	26	26
	R=10%	61	60	59	57	56	54	52	51	50	49	47	47	45	44
	R=15%	74	73	72	71	70	68	66	65	64	63	61	60	59	58
	R=20%	83	82	81	80	79	77	76	75	74	73	71	71	69	68
	R=25%	89	88	87	86	85	84	83	82	81	80	79	78	77	76

Table 4.14(f) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.35mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	97	96	95	94	92	82	75	71	66	61	58	56	54	52
	R=10%	100	100	100	100	99	96	93	90	86	83	81	79	77	75
	R=15%	100	100	100	100	100	99	98	96	94	92	91	90	88	87
	R=20%	100	100	100	100	100	100	99	99	98	96	95	95	94	93
	R=25%	100	100	100	100	100	100	100	99	99	98	98	97	97	96
0.15	R= 5%	89	82	77	72	66	60	57	55	54	51	49	48	46	45
	R=10%	98	96	94	91	87	82	80	78	76	74	72	71	69	68
	R=15%	100	99	98	97	94	91	90	89	88	86	85	84	82	81
	R=20%	100	100	99	99	98	96	95	94	93	92	91	90	89	89
	R=25%	100	100	100	100	99	98	97	97	96	96	95	94	94	93
0.20	R= 5%	68	65	62	59	57	53	51	49	48	46	45	44	42	41
	R=10%	88	86	84	81	79	76	74	72	71	69	68	67	65	64
	R=15%	95	94	92	91	89	87	85	84	83	82	81	80	78	77
	R=20%	98	97	96	95	94	93	92	91	90	89	88	88	86	86
	R=25%	99	99	98	98	97	96	95	95	94	93	93	92	91	91
0.25	R= 5%	60	58	56	54	52	49	47	46	44	43	42	41	39	38
	R=10%	82	80	78	76	74	72	70	69	67	66	64	63	62	60
	R=15%	91	90	89	87	86	84	82	81	80	79	78	77	76	74
	R=20%	95	95	94	93	92	91	90	89	88	87	86	85	84	83
	R=25%	98	97	97	96	95	94	94	93	93	92	91	91	90	89
0.30	R= 5%	56	54	52	50	48	46	44	43	42	40	39	38	37	36
	R=10%	78	76	75	73	71	69	67	66	65	63	62	61	59	58
	R=15%	88	87	86	85	83	81	80	79	78	77	76	75	73	72
	R=20%	94	93	92	91	90	89	88	87	86	85	84	83	82	81
	R=25%	96	96	95	95	94	93	92	92	91	90	90	89	88	87
0.35	R= 5%	52	50	49	47	46	44	42	41	40	38	37	36	35	34
	R=10%	75	73	72	70	69	66	65	63	62	61	59	58	57	56
	R=15%	86	85	84	83	81	79	78	77	76	75	73	72	71	70
	R=20%	92	91	91	90	89	87	86	85	85	83	82	81	80	79
	R=25%	95	95	94	94	93	92	91	90	90	89	88	87	86	86
0.40	R= 5%	50	48	47	45	44	42	40	39	38	37	36	35	34	33
	R=10%	72	71	70	68	67	64	63	61	60	59	57	56	55	54
	R=15%	84	83	82	81	80	78	76	75	74	73	71	71	69	68
	R=20%	91	90	89	88	87	86	85	84	83	82	81	80	79	78
	R=25%	94	94	93	93	92	91	90	89	89	88	87	86	85	84
0.45	R= 5%	48	46	45	43	42	40	39	38	37	35	34	34	32	31
	R=10%	70	69	68	66	65	63	61	60	59	57	56	55	53	52
	R=15%	83	81	81	79	78	76	75	74	73	71	70	69	67	66
	R=20%	90	89	88	87	86	85	83	82	82	80	79	78	77	76
	R=25%	94	93	93	92	91	90	89	88	88	87	86	85	84	83
0.50	R= 5%	46	45	44	42	41	39	37	36	35	34	33	32	31	30
	R=10%	68	67	66	64	63	61	59	58	57	56	54	53	52	51
	R=15%	81	80	79	78	77	75	73	72	71	70	68	67	66	65
	R=20%	88	88	87	86	85	83	82	81	80	79	78	77	76	75
	R=25%	93	92	92	91	90	89	88	87	87	85	85	84	83	82
0.55	R= 5%	44	43	42	41	40	38	36	35	34	33	32	31	30	29
	R=10%	67	66	65	63	62	60	58	57	56	54	53	52	50	49
	R=15%	80	79	78	77	75	73	72	71	70	68	67	66	65	63
	R=20%	88	87	86	85	84	82	81	80	79	78	77	76	75	73
	R=25%	92	91	91	90	89	88	87	86	86	84	84	83	82	81

Table 4.14(g) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.40mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	98	98	97	96	95	91	83	79	75	68	65	62	60	58
	R=10%	100	100	100	100	100	99	96	94	93	88	86	84	82	80
	R=15%	100	100	100	100	100	100	99	98	98	95	94	93	91	90
	R=20%	100	100	100	100	100	100	100	100	99	98	97	97	96	95
	R=25%	100	100	100	100	100	100	100	100	100	99	99	98	98	98
0.15	R= 5%	94	90	86	80	75	67	63	61	59	57	55	53	51	50
	R=10%	100	99	97	95	92	87	84	83	81	79	78	76	74	73
	R=15%	100	100	99	99	97	95	93	92	91	90	88	87	86	85
	R=20%	100	100	100	100	99	98	97	96	96	95	94	93	92	92
	R=25%	100	100	100	100	100	99	98	98	98	97	97	96	96	95
0.20	R= 5%	78	72	69	65	63	59	56	54	53	51	50	48	47	45
	R=10%	94	90	89	86	84	81	79	77	76	74	73	72	70	69
	R=15%	98	96	95	94	93	91	89	88	87	86	85	84	83	82
	R=20%	99	99	98	97	96	95	94	94	93	92	91	91	90	89
	R=25%	100	99	99	99	98	98	97	97	96	96	95	95	94	93
0.25	R= 5%	66	64	62	59	57	54	52	50	49	47	46	45	43	42
	R=10%	86	85	83	81	80	77	75	74	72	71	69	68	67	65
	R=15%	94	93	92	91	90	88	86	85	85	83	82	81	80	79
	R=20%	97	97	96	95	95	93	92	92	91	90	89	89	88	87
	R=25%	99	98	98	98	97	96	96	95	95	94	94	93	92	92
0.30	R= 5%	61	59	58	55	54	51	49	47	46	45	44	43	41	40
	R=10%	83	81	80	78	76	74	72	71	70	68	67	66	64	63
	R=15%	92	91	90	88	87	85	84	83	82	81	80	79	78	76
	R=20%	96	95	95	94	93	92	91	90	90	88	88	87	86	85
	R=25%	98	98	97	97	96	95	95	94	94	93	92	92	91	90
0.35	R= 5%	58	56	54	52	51	48	47	45	44	43	41	41	39	38
	R=10%	80	78	77	75	74	71	70	68	67	66	64	63	62	60
	R=15%	90	89	88	86	85	84	82	81	80	79	78	77	75	74
	R=20%	95	94	93	92	92	90	89	89	88	87	86	85	84	83
	R=25%	97	97	96	96	95	94	94	93	93	92	91	91	90	89
0.40	R= 5%	55	53	52	50	49	46	45	43	42	41	40	39	37	36
	R=10%	77	76	75	73	72	69	68	66	65	64	62	61	60	58
	R=15%	88	87	86	85	84	82	81	80	79	77	76	75	74	73
	R=20%	93	93	92	91	90	89	88	87	87	86	85	84	83	82
	R=25%	96	96	96	95	94	93	93	92	92	91	90	89	88	88
0.45	R= 5%	53	51	50	48	47	45	43	42	41	39	38	37	36	35
	R=10%	75	74	73	71	70	68	66	65	64	62	61	60	58	57
	R=15%	86	86	85	83	82	80	79	78	77	76	74	74	72	71
	R=20%	92	92	91	90	89	88	87	86	85	84	83	83	81	80
	R=25%	96	95	95	94	94	93	92	91	91	90	89	88	87	86
0.50	R= 5%	51	49	48	47	45	43	41	40	39	38	37	36	35	34
	R=10%	74	72	71	69	68	66	64	63	62	60	59	58	56	55
	R=15%	85	84	83	82	81	79	78	77	76	74	73	72	71	69
	R=20%	92	91	90	89	88	87	86	85	84	83	82	81	80	79
	R=25%	95	94	94	93	93	92	91	90	90	89	88	87	86	85
0.55	R= 5%	49	48	47	45	44	42	40	39	38	37	36	35	34	33
	R=10%	72	71	70	68	67	64	63	62	60	59	58	57	55	54
	R=15%	84	83	82	81	80	78	76	75	74	73	72	71	69	68
	R=20%	91	90	89	88	88	86	85	84	83	82	81	80	79	78
	R=25%	94	94	94	93	92	91	90	89	89	88	87	86	85	84

Table 4.14(h) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.50mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	99	99	99	99	98	97	95	90	86	82	76	73	69	67
	R=10%	100	100	100	100	100	100	100	99	97	96	93	91	89	87
	R=15%	100	100	100	100	100	100	100	100	99	99	98	97	96	95
	R=20%	100	100	100	100	100	100	100	100	100	100	99	99	98	98
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
0.15	R= 5%	98	97	96	91	85	78	74	71	68	66	64	62	59	58
	R=10%	100	100	100	99	97	94	91	90	88	86	85	84	82	80
	R=15%	100	100	100	100	99	98	97	96	95	94	93	93	91	90
	R=20%	100	100	100	100	100	99	99	98	98	97	97	97	96	95
	R=25%	100	100	100	100	100	100	100	99	99	99	99	98	98	98
0.20	R= 5%	88	85	82	76	73	68	65	63	62	59	58	56	54	53
	R=10%	98	97	95	92	91	88	86	84	83	81	80	79	77	76
	R=15%	100	99	99	97	97	95	94	93	92	91	90	90	88	87
	R=20%	100	100	100	99	99	98	97	97	96	96	95	95	94	93
	R=25%	100	100	100	100	99	99	99	98	98	98	97	97	97	96
0.25	R= 5%	77	74	72	69	67	63	60	59	57	55	54	53	51	49
	R=10%	93	91	90	88	87	84	82	81	80	78	77	76	74	73
	R=15%	98	97	96	95	94	93	92	91	90	89	88	87	86	85
	R=20%	99	99	98	98	97	97	96	95	95	94	94	93	92	92
	R=25%	100	100	99	99	99	98	98	98	97	97	97	96	96	95
0.30	R= 5%	71	69	67	64	62	59	57	55	54	52	51	50	48	47
	R=10%	89	88	87	85	83	81	79	78	77	75	74	73	72	70
	R=15%	96	95	94	93	92	91	90	89	88	87	86	85	84	83
	R=20%	98	98	97	97	96	95	95	94	94	93	92	92	91	90
	R=25%	99	99	99	98	98	98	97	97	97	96	96	95	95	94
0.35	R= 5%	67	65	63	61	59	56	54	53	52	50	49	48	46	45
	R=10%	87	85	84	82	81	79	77	76	75	73	72	71	69	68
	R=15%	94	93	93	92	91	89	88	87	86	85	84	84	82	81
	R=20%	97	97	97	96	95	94	94	93	93	92	91	90	89	89
	R=25%	99	99	98	98	98	97	97	96	96	95	95	94	94	93
0.40	R= 5%	64	62	60	58	57	54	52	51	50	48	47	46	44	43
	R=10%	84	83	82	80	79	77	75	74	73	71	70	69	67	66
	R=15%	93	92	91	90	89	88	87	86	85	84	83	82	80	79
	R=20%	97	96	96	95	95	93	93	92	92	91	90	89	88	87
	R=25%	98	98	98	97	97	96	96	95	95	95	94	94	93	92
0.45	R= 5%	61	59	58	56	55	52	50	49	48	46	45	44	42	41
	R=10%	82	81	80	79	77	75	73	72	71	70	68	67	66	64
	R=15%	92	91	90	89	88	87	85	84	84	82	81	80	79	78
	R=20%	96	95	95	94	94	93	92	91	91	90	89	88	87	86
	R=25%	98	98	97	97	97	96	95	95	94	94	93	93	92	91
0.50	R= 5%	59	58	56	54	53	50	49	47	46	45	43	42	41	40
	R=10%	81	80	79	77	76	73	72	71	70	68	67	66	64	63
	R=15%	90	90	89	88	87	85	84	83	82	81	80	79	78	77
	R=20%	95	95	94	93	93	92	91	90	90	89	88	87	86	85
	R=25%	97	97	97	96	96	95	95	94	94	93	92	92	91	90
0.55	R= 5%	58	56	55	53	51	49	47	46	45	43	42	41	40	39
	R=10%	79	78	77	76	74	72	70	69	68	66	65	64	63	61
	R=15%	90	89	88	87	86	84	83	82	81	80	79	78	76	75
	R=20%	95	94	94	93	92	91	90	89	89	88	87	86	85	84
	R=25%	97	97	96	96	96	95	94	94	93	92	92	91	90	90

Table 4.14(i) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.60mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	99	99	99	98	97	94	88	86	82	77	74
	R=10%	100	100	100	100	100	100	100	100	99	98	98	96	93	92
	R=15%	100	100	100	100	100	100	100	100	100	100	100	99	98	97
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	99	99	98	97	94	88	82	78	76	73	70	69	66	64
	R=10%	100	100	100	100	99	98	96	94	93	91	90	89	87	85
	R=15%	100	100	100	100	100	100	99	98	98	97	96	96	95	94
	R=20%	100	100	100	100	100	100	100	99	99	99	98	98	98	97
	R=25%	100	100	100	100	100	100	100	100	100	100	99	99	99	99
0.20	R= 5%	96	92	89	85	80	75	72	70	69	66	64	63	60	59
	R=10%	100	99	98	97	95	92	90	89	88	87	85	84	83	81
	R=15%	100	100	100	99	98	97	96	96	95	94	94	93	92	91
	R=20%	100	100	100	100	100	99	99	98	98	98	97	97	96	96
	R=25%	100	100	100	100	100	100	99	99	99	99	99	98	98	98
0.25	R= 5%	86	81	79	76	73	70	67	65	64	61	60	59	57	55
	R=10%	97	95	94	92	91	89	87	86	85	83	82	81	80	78
	R=15%	99	99	98	97	97	96	95	94	93	92	92	91	90	89
	R=20%	100	100	99	99	99	98	98	97	97	96	96	96	95	94
	R=25%	100	100	100	100	99	99	99	99	99	98	98	98	97	97
0.30	R= 5%	78	76	74	71	69	66	63	62	60	58	57	56	54	52
	R=10%	93	92	91	90	88	86	84	83	82	81	80	79	77	76
	R=15%	98	97	97	96	95	94	93	92	92	91	90	89	88	87
	R=20%	99	99	99	98	98	97	97	96	96	95	95	95	94	93
	R=25%	100	100	99	99	99	99	98	98	98	98	97	97	97	96
0.35	R= 5%	74	72	70	68	66	62	61	59	58	56	54	53	51	50
	R=10%	91	90	89	87	86	84	82	81	80	79	77	77	75	74
	R=15%	97	96	96	95	94	93	92	91	90	89	88	88	87	86
	R=20%	99	98	98	98	97	97	96	96	95	95	94	94	93	92
	R=25%	99	99	99	99	99	98	98	98	98	97	97	97	96	96
0.40	R= 5%	71	69	67	65	63	60	58	57	55	54	52	51	49	48
	R=10%	89	88	87	85	84	82	80	79	78	77	76	75	73	72
	R=15%	96	95	94	93	93	92	91	90	89	88	87	86	85	84
	R=20%	98	98	98	97	97	96	95	95	94	94	93	93	92	91
	R=25%	99	99	99	99	98	98	98	97	97	97	96	96	95	95
0.45	R= 5%	68	66	65	63	61	58	56	55	54	52	50	49	48	46
	R=10%	87	86	85	84	83	80	79	78	77	75	74	73	71	70
	R=15%	95	94	93	93	92	90	89	89	88	87	86	85	84	83
	R=20%	98	97	97	96	96	95	95	94	94	93	92	92	91	90
	R=25%	99	99	99	98	98	98	97	97	97	96	96	95	95	94
0.50	R= 5%	66	64	63	61	59	56	54	53	52	50	49	48	46	45
	R=10%	86	85	84	82	81	79	77	76	75	74	72	71	70	68
	R=15%	94	93	93	92	91	89	88	88	87	86	85	84	83	82
	R=20%	97	97	96	96	95	95	94	93	93	92	91	91	90	89
	R=25%	99	98	98	98	98	97	97	96	96	96	95	95	94	93
0.55	R= 5%	64	62	61	59	57	55	53	52	50	49	47	46	45	44
	R=10%	84	83	82	81	80	78	76	75	74	72	71	70	68	67
	R=15%	93	92	92	91	90	88	87	87	86	85	84	83	81	80
	R=20%	97	96	96	95	95	94	93	93	92	91	91	90	89	88
	R=25%	98	98	98	98	97	97	96	96	96	95	94	94	93	93

Table 4.14(j) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 0.80mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	100	100	100	99	99	99	98	95	92	90	85
	R=10%	100	100	100	100	100	100	100	100	100	100	100	99	98	97
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	100	100	100	99	99	96	92	91	87	83	80	79	76	74
	R=10%	100	100	100	100	100	100	99	99	98	96	95	94	93	92
	R=15%	100	100	100	100	100	100	100	100	100	99	99	98	98	97
	R=20%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.20	R= 5%	99	99	98	94	92	86	82	80	78	76	74	72	70	68
	R=10%	100	100	100	99	99	97	96	95	94	93	92	91	89	88
	R=15%	100	100	100	100	100	99	99	98	98	98	97	97	96	95
	R=20%	100	100	100	100	100	100	100	100	99	99	99	99	98	98
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
0.25	R= 5%	95	93	91	86	83	79	77	75	73	71	69	68	66	64
	R=10%	100	99	99	97	96	94	93	92	91	90	89	88	87	85
	R=15%	100	100	100	99	99	98	98	97	97	96	96	95	94	94
	R=20%	100	100	100	100	100	99	99	99	99	98	98	98	98	97
	R=25%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
0.30	R= 5%	88	86	84	81	79	75	73	71	70	67	66	64	63	61
	R=10%	98	97	96	95	94	92	91	90	89	88	87	86	84	83
	R=15%	99	99	99	98	98	97	97	96	96	95	94	94	93	92
	R=20%	100	100	100	99	99	99	99	98	98	98	98	97	97	97
	R=25%	100	100	100	100	100	100	99	99	99	99	99	99	99	98
0.35	R= 5%	84	82	80	77	75	72	70	68	67	65	63	62	60	59
	R=10%	96	95	94	93	92	90	89	88	87	86	85	84	82	81
	R=15%	99	98	98	98	97	96	96	95	95	94	93	93	92	91
	R=20%	100	100	99	99	99	99	98	98	98	97	97	97	96	96
	R=25%	100	100	100	100	100	99	99	99	99	99	99	98	98	98
0.40	R= 5%	81	79	77	74	72	69	67	66	64	62	61	60	58	56
	R=10%	94	94	93	91	90	89	87	86	85	84	83	82	81	80
	R=15%	98	98	98	97	96	95	95	94	94	93	92	92	91	90
	R=20%	99	99	99	99	99	98	98	97	97	97	96	96	96	95
	R=25%	100	100	100	100	99	99	99	99	99	98	98	98	98	97
0.45	R= 5%	78	76	74	72	70	67	65	64	62	60	59	58	56	55
	R=10%	93	92	91	90	89	87	86	85	84	83	82	81	79	78
	R=15%	98	97	97	96	96	95	94	93	93	92	91	91	90	89
	R=20%	99	99	99	98	98	98	97	97	97	96	96	95	95	94
	R=25%	100	100	100	99	99	99	99	99	98	98	98	98	97	97
0.50	R= 5%	76	73	72	70	68	65	63	62	61	59	57	56	54	53
	R=10%	92	91	90	89	88	86	85	84	83	81	80	79	78	76
	R=15%	97	97	96	96	95	94	93	93	92	91	90	90	89	88
	R=20%	99	99	98	98	98	97	97	97	96	96	95	95	94	94
	R=25%	100	99	99	99	99	99	99	98	98	98	98	97	97	97
0.55	R= 5%	73	72	70	68	66	64	62	60	59	57	56	55	53	51
	R=10%	91	90	89	88	87	85	83	82	82	80	79	78	76	75
	R=15%	96	96	96	95	94	93	92	92	91	90	90	89	88	87
	R=20%	99	98	98	98	98	97	96	96	96	95	95	94	94	93
	R=25%	99	99	99	99	99	99	98	98	98	98	97	97	97	96

Table 4.14(k) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 1.00mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m_2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	100	100	100	100	100	100	99	99	98	95	93
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	100	100	100	100	100	99	98	96	94	91	87	85	82	81
	R=10%	100	100	100	100	100	100	100	100	99	99	98	97	96	95
	R=15%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.20	R= 5%	100	100	99	99	97	94	89	87	85	82	80	79	76	75
	R=10%	100	100	100	100	100	99	98	97	97	96	95	94	93	92
	R=15%	100	100	100	100	100	100	100	99	99	99	99	98	98	97
	R=20%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25	R= 5%	99	97	96	94	90	86	83	81	80	78	76	74	72	71
	R=10%	100	100	100	99	98	97	96	95	95	94	93	92	91	90
	R=15%	100	100	100	100	100	99	99	99	98	98	98	97	97	96
	R=20%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
0.30	R= 5%	95	93	90	87	85	82	79	78	76	74	72	71	69	67
	R=10%	100	99	98	97	97	95	94	93	93	92	91	90	89	88
	R=15%	100	100	100	99	99	99	98	98	98	97	97	96	96	95
	R=20%	100	100	100	100	100	100	99	99	99	99	99	99	98	98
	R=25%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
0.35	R= 5%	90	88	86	84	82	79	76	75	73	71	69	68	66	65
	R=10%	98	98	97	96	95	94	93	92	91	90	89	88	87	86
	R=15%	100	99	99	99	99	98	98	97	97	96	96	95	95	94
	R=20%	100	100	100	100	100	99	99	99	99	99	98	98	98	97
	R=25%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
0.40	R= 5%	87	85	84	81	79	76	74	72	71	69	67	66	64	63
	R=10%	97	96	96	95	94	92	91	91	90	88	88	87	86	85
	R=15%	99	99	99	98	98	97	97	97	96	96	95	95	94	93
	R=20%	100	100	100	99	99	99	99	99	99	98	98	98	97	97
	R=25%	100	100	100	100	100	100	100	99	99	99	99	99	99	99
0.45	R= 5%	84	83	81	78	77	74	72	70	69	67	65	64	62	61
	R=10%	96	95	95	94	93	91	90	89	88	87	86	85	84	83
	R=15%	99	99	98	98	98	97	96	96	95	95	94	94	93	92
	R=20%	100	100	99	99	99	99	99	98	98	98	98	97	97	96
	R=25%	100	100	100	100	100	100	99	99	99	99	99	99	99	98
0.50	R= 5%	82	80	79	76	75	72	70	68	67	65	64	62	60	59
	R=10%	95	94	94	93	92	90	89	88	87	86	85	84	83	82
	R=15%	99	98	98	97	97	96	96	95	95	94	94	93	92	92
	R=20%	100	99	99	99	99	99	98	98	98	97	97	97	96	96
	R=25%	100	100	100	100	100	99	99	99	99	99	99	99	98	98
0.55	R= 5%	80	78	77	75	73	70	68	66	65	63	62	61	59	57
	R=10%	94	93	93	92	91	89	88	87	86	85	84	83	82	80
	R=15%	98	98	97	97	97	96	95	95	94	94	93	92	91	91
	R=20%	99	99	99	99	99	98	98	98	97	97	97	96	96	95
	R=25%	100	100	100	100	99	99	99	99	99	99	98	98	98	98

Table 4.14(I) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 1.50mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	100	100	100	100	100	100	100	100	100	98	97	96	93	91
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.20	R= 5%	100	100	100	100	100	99	98	96	95	92	90	89	86	85
	R=10%	100	100	100	100	100	100	100	100	100	99	98	98	97	97
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25	R= 5%	100	100	100	99	98	96	93	91	89	87	86	84	82	81
	R=10%	100	100	100	100	100	100	99	99	98	98	97	97	96	95
	R=15%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.30	R= 5%	100	99	98	97	94	91	89	87	86	84	82	81	79	77
	R=10%	100	100	100	100	99	99	98	98	97	96	96	95	94	94
	R=15%	100	100	100	100	100	100	100	99	99	99	99	99	98	98
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.35	R= 5%	98	97	95	93	91	88	86	85	83	81	80	78	76	75
	R=10%	100	100	99	99	99	98	97	97	96	95	95	94	93	92
	R=15%	100	100	100	100	100	99	99	99	99	99	98	98	98	97
	R=20%	100	100	100	100	100	100	100	100	100	100	99	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.40	R= 5%	95	94	92	90	89	86	84	82	81	79	77	76	74	73
	R=10%	99	99	99	98	98	97	96	96	95	94	94	93	92	91
	R=15%	100	100	100	100	100	99	99	99	99	98	98	98	97	97
	R=20%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.45	R= 5%	93	92	90	88	87	84	82	80	79	77	75	74	72	71
	R=10%	99	99	98	98	97	96	95	95	94	93	92	92	91	90
	R=15%	100	100	100	99	99	99	99	98	98	98	97	97	97	96
	R=20%	100	100	100	100	100	100	100	99	99	99	99	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
0.50	R= 5%	91	90	89	87	85	82	80	78	77	75	74	72	70	69
	R=10%	98	98	98	97	96	95	94	94	93	92	92	91	90	89
	R=15%	100	100	99	99	99	99	98	98	98	97	97	97	96	96
	R=20%	100	100	100	100	100	100	99	99	99	99	99	99	99	98
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
0.55	R= 5%	90	88	87	85	83	80	78	77	75	74	72	71	69	67
	R=10%	98	98	97	96	96	95	94	93	92	91	91	90	89	88
	R=15%	100	99	99	99	99	98	98	98	97	97	97	96	96	95
	R=20%	100	100	100	100	100	99	99	99	99	99	99	99	98	98
	R=25%	100	100	100	100	100	100	100	100	100	100	100	99	99	99

Table 4.14(m) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 2.00mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	100	100	100	100	100	100	100	100	100	100	100	99	97	97
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.20	R= 5%	100	100	100	100	100	100	100	99	99	97	96	94	92	90
	R=10%	100	100	100	100	100	100	100	100	100	100	100	99	99	98
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25	R= 5%	100	100	100	100	100	99	98	96	95	93	91	90	88	87
	R=10%	100	100	100	100	100	100	100	100	99	99	99	98	98	97
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.30	R= 5%	100	100	100	99	98	96	94	92	91	90	88	87	85	83
	R=10%	100	100	100	100	100	100	99	99	99	98	98	97	97	96
	R=15%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.35	R= 5%	100	99	98	98	96	93	92	90	89	87	86	84	82	81
	R=10%	100	100	100	100	100	99	99	98	98	97	97	97	96	95
	R=15%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.40	R= 5%	98	98	97	95	94	91	90	88	87	85	83	82	80	79
	R=10%	100	100	100	99	99	99	98	98	97	97	96	96	95	94
	R=15%	100	100	100	100	100	100	100	99	99	99	99	99	99	98
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.45	R= 5%	97	96	95	93	92	90	87	86	85	83	81	80	78	77
	R=10%	100	100	99	99	99	98	97	97	97	96	95	95	94	93
	R=15%	100	100	100	100	100	100	99	99	99	99	99	99	98	98
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.50	R= 5%	96	94	93	92	90	88	86	84	83	81	80	78	77	75
	R=10%	99	99	99	99	98	98	97	96	96	95	95	94	93	93
	R=15%	100	100	100	100	100	99	99	99	99	99	98	98	98	98
	R=20%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.55	R= 5%	94	93	92	90	89	86	84	83	82	80	78	77	75	74
	R=10%	99	99	99	98	98	97	96	96	95	95	94	93	92	92
	R=15%	100	100	100	100	99	99	99	99	99	98	98	98	98	97
	R=20%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 4.14(n) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 3.00mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.20	R= 5%	100	100	100	100	100	100	100	100	100	100	99	99	98	96
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25	R= 5%	100	100	100	100	100	100	100	100	99	98	97	96	94	93
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.30	R= 5%	100	100	100	100	100	99	99	98	97	95	94	93	91	90
	R=10%	100	100	100	100	100	100	100	100	100	100	99	99	99	98
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.35	R= 5%	100	100	100	100	99	98	97	96	95	93	92	91	89	88
	R=10%	100	100	100	100	100	100	100	100	99	99	99	99	98	98
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.40	R= 5%	100	100	100	99	98	96	95	94	93	91	90	89	87	86
	R=10%	100	100	100	100	100	100	99	99	99	99	98	98	98	97
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.45	R= 5%	100	99	99	98	97	95	94	92	91	89	88	87	85	84
	R=10%	100	100	100	100	100	99	99	99	99	98	98	97	97	97
	R=15%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.50	R= 5%	99	98	98	97	96	94	92	91	90	88	87	86	84	82
	R=10%	100	100	100	100	99	99	99	98	98	98	97	97	96	96
	R=15%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.55	R= 5%	98	97	97	96	95	93	91	90	88	87	85	84	82	81
	R=10%	100	100	100	99	99	99	98	98	98	97	97	97	96	95
	R=15%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 4.14(o) Predicted trapping efficiencies (from uniform material grading)

D_{50} sediment size = 5.00mm
Sediment size ratio D_{50}/D_{10} = 1.0 (Efficiencies tabulated as percentages)

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.15	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.20	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25	R= 5%	100	100	100	100	100	100	100	100	100	100	100	100	99	98
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.30	R= 5%	100	100	100	100	100	100	100	100	100	99	99	98	97	96
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.35	R= 5%	100	100	100	100	100	100	100	99	99	98	97	96	95	94
	R=10%	100	100	100	100	100	100	100	100	100	100	100	100	99	99
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.40	R= 5%	100	100	100	100	100	99	99	98	98	97	96	95	94	92
	R=10%	100	100	100	100	100	100	100	100	100	100	100	99	99	99
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.45	R= 5%	100	100	100	100	100	99	98	97	97	95	95	94	92	91
	R=10%	100	100	100	100	100	100	100	100	100	99	99	99	99	99
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.50	R= 5%	100	100	100	99	99	98	97	96	96	94	93	92	91	89
	R=10%	100	100	100	100	100	100	100	100	99	99	99	99	98	98
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.55	R= 5%	100	100	100	99	98	97	96	95	95	93	92	91	89	88
	R=10%	100	100	100	100	100	100	100	99	99	99	99	99	98	98
	R=15%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=20%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	R=25%	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table for predicting adaption lengths

Table 5.1 Predicted adaption lengths (predicted adaption lengths in meters)

Discharge per m width (m^2/s)	Froude Number	D_{50} sediment sizes (in suspension) (mm) : 0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.15	0.17	0.20	0.25	0.30	0.35	0.40
0.4	Fr=0.1	303	216	160	121	99	83	71	55	46	31	22	17	13	11
	Fr=0.2	344	258	200	160	130	109	92	68	53	39	26	20	14	12
	Fr=0.3	354	267	208	167	137	115	97	73	57	42	28	21	17	14
	Fr=0.4	360	272	213	171	141	118	101	76	60	44	30	22	17	14
0.6	Fr=0.1	478	351	266	205	163	131	109	84	68	47	33	25	20	17
	Fr=0.2	522	393	306	244	200	167	141	106	83	61	41	30	24	21
	Fr=0.3	536	405	316	254	209	175	149	112	88	65	44	32	25	21
	Fr=0.4	544	412	323	260	214	180	153	116	91	67	46	34	27	22
0.8	Fr=0.1	653	482	369	289	232	189	157	113	91	72	44	34	27	23
	Fr=0.2	701	528	412	330	270	226	191	143	112	83	56	41	32	27
	Fr=0.3	718	544	426	342	281	236	200	151	119	88	59	44	35	28
	Fr=0.4	729	553	434	350	288	242	206	156	123	91	62	46	36	30
1.0	Fr=0.1	828	614	471	372	300	247	206	149	115	89	56	43	34	29
	Fr=0.2	881	665	519	416	341	285	242	182	142	105	71	52	41	34
	Fr=0.3	902	683	535	431	354	297	253	191	150	111	75	56	44	36
	Fr=0.4	915	695	545	440	362	304	259	196	155	115	78	58	46	37
1.2	Fr=0.1	1003	747	575	454	368	304	255	186	143	106	67	52	41	35
	Fr=0.2	1062	802	626	502	412	344	293	220	173	127	86	63	50	41
	Fr=0.3	1086	823	645	519	428	358	305	230	181	134	91	68	53	44
	Fr=0.4	1102	837	657	530	437	367	313	237	187	139	94	70	55	45
1.5	Fr=0.1	1266	946	731	580	470	389	327	242	186	135	85	65	52	44
	Fr=0.2	1334	1008	788	632	519	435	369	278	218	161	109	81	63	52
	Fr=0.3	1363	1034	811	653	538	452	385	291	229	170	115	85	67	55
	Fr=0.4	1383	1051	826	666	550	462	394	299	236	175	119	88	70	57
2.0	Fr=0.1	1707	1278	991	789	643	533	450	333	259	189	128	88	70	59
	Fr=0.2	1791	1354	1059	851	699	586	498	376	295	218	147	109	86	71
	Fr=0.3	1828	1387	1089	878	723	607	518	392	309	229	155	115	91	75
	Fr=0.4	1853	1409	1108	895	739	621	531	402	318	236	161	119	94	77
2.5	Fr=0.1	2150	1613	1251	998	815	678	573	426	331	242	162	126	89	74
	Fr=0.2	2249	1703	1333	1071	881	738	628	474	373	276	187	138	109	90
	Fr=0.3	2294	1742	1368	1104	910	764	652	494	390	289	196	146	115	95
	Fr=0.4	2325	1770	1392	1125	929	782	668	507	400	298	203	151	119	98
3.0	Fr=0.1	2596	1950	1515	1209	988	823	697	520	405	296	199	149	109	90
	Fr=0.2	2708	2051	1607	1293	1064	891	759	573	451	334	226	168	132	109
	Fr=0.3	2762	2099	1649	1331	1098	922	787	596	471	350	237	176	139	115
	Fr=0.4	2798	2131	1678	1356	1121	943	806	612	483	360	245	182	144	118
4.0	Fr=0.1	3489	2626	2044	1635	1338	1115	946	708	554	406	273	203	163	125
	Fr=0.2	3631	2753	2158	1738	1432	1201	1023	773	609	451	306	227	179	147
	Fr=0.3	3702	2816	2214	1787	1475	1240	1059	803	634	471	321	238	188	155
	Fr=0.4	3748	2857	2251	1821	1506	1268	1084	823	651	485	330	246	194	160
5.0	Fr=0.1	4387	3306	2577	2064	1690	1411	1197	897	703	518	347	258	205	173
	Fr=0.2	4558	3458	2713	2186	1801	1512	1290	975	768	570	387	287	227	186
	Fr=0.3	4645	3536	2781	2247	1856	1561	1333	1011	799	594	405	301	238	195
	Fr=0.4	4702	3586	2827	2288	1893	1595	1364	1037	820	611	416	310	245	202
6.0	Fr=0.1	5289	3989	3112	2494	2045	1709	1451	1088	853	629	424	313	248	207
	Fr=0.2	5489	4166	3270	2636	2173	1825	1557	1178	928	689	468	348	274	226
	Fr=0.3	5591	4258	3352	2709	2238	1883	1609	1221	965	718	489	364	287	236
	Fr=0.4	5659	4318	3405	2757	2282	1923	1646	1251	991	738	503	375	296	244
8.0	Fr=0.1	7100	5361	4187	3361	2759	2307	1961	1475	1157	854	577	427	337	279
	Fr=0.2	7358	5590	4390	3542	2921	2454	2094	1586	1252	930	632	470	371	305
	Fr=0.3	7490	5708	4497	3638	3007	2532	2165	1644	1300	968	659	491	388	319
	Fr=0.4	7596	5788	4568	3701	3065	2584	2212	1684	1334	995	679	506	399	329
10.0	Fr=0.1	8922	6741	5270	4233	3477	2910	2476	1864	1464	1082	731	543	428	353
	Fr=0.2	9235	7021	5517	4454	3675	3089	2637	1998	1578	1174	797	593	468	386
	Fr=0.3	9397	7166	5648	4571	3781	3185	2724	2070	1638	1220	831	619	489	403
	Fr=0.4	9554	7285	5737	4650	3852	3249	2783	2119	1680	1254	856	638	504	415

Tables for vortex tube design

Table 7.1 Design table for vortex tubes. Tube length = 2m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
0.10	H_{loss} =	1.54	0.33	0.12	0.06	0.03	0.02	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	5.4	5.7	4.7	3.8	3.1	2.6	2.2	1.9	1.7	1.5	1.4
0.12	H_{loss} =	2.22	0.48	0.17	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	7.3	7.7	6.3	5.0	4.1	3.4	2.9	2.5	2.2	1.9	1.7
0.14	H_{loss} =	3.02	0.65	0.24	0.11	0.07	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	9.5	10.0	8.2	6.4	5.2	4.2	3.6	3.1	2.7	2.4	2.1
0.16	H_{loss} =	3.95	0.85	0.31	0.15	0.09	0.06	0.04	0.03	0.02	0.02	0.01
	D_{90max}=	12.0	12.7	10.3	8.0	6.4	5.2	4.4	3.7	3.2	2.8	2.5
0.18	H_{loss} =	5.00	1.08	0.39	0.19	0.11	0.07	0.05	0.04	0.03	0.02	0.02
	D_{90max}=	14.9	15.7	12.6	9.8	7.8	6.3	5.2	4.4	3.8	3.4	3.0
0.20	H_{loss} =	6.17	1.33	0.48	0.23	0.14	0.09	0.06	0.05	0.03	0.03	0.02
	D_{90max}=	18.0	19.0	15.3	11.8	9.3	7.5	6.2	5.2	4.5	3.9	3.5
0.22	H_{loss} =	7.46	1.61	0.59	0.28	0.16	0.11	0.07	0.05	0.04	0.03	0.03
	D_{90max}=	21.5	22.7	18.2	14.1	11.0	8.8	7.3	6.1	5.2	4.6	4.0
0.24	H_{loss} =	8.88	1.91	0.70	0.34	0.19	0.13	0.09	0.06	0.05	0.04	0.03
	D_{90max}=	25.3	26.7	21.4	16.5	12.8	10.3	8.4	7.1	6.0	5.2	4.6
0.26	H_{loss} =	10.42	2.24	0.82	0.40	0.23	0.15	0.10	0.08	0.06	0.05	0.04
	D_{90max}=	29.5	31.1	24.8	19.1	14.8	11.8	9.7	8.1	6.9	5.9	5.2
0.28	H_{loss} =	12.09	2.60	0.95	0.46	0.27	0.17	0.12	0.09	0.07	0.05	0.04
	D_{90max}=	30.0	35.9	28.6	21.9	17.0	13.5	11.0	9.2	7.8	6.7	5.9
0.30	H_{loss} =	13.88	2.99	1.09	0.53	0.30	0.20	0.14	0.10	0.08	0.06	0.05
	D_{90max}=	30.0	40.9	32.6	24.9	19.3	15.3	12.4	10.3	8.7	7.5	6.6
0.35	H_{loss} =	18.89	4.07	1.48	0.72	0.41	0.27	0.19	0.14	0.11	0.08	0.07
	D_{90max}=	30.0	45.0	43.8	33.4	25.7	20.3	16.4	13.6	11.4	9.8	8.5
0.40	H_{loss} =	24.67	5.31	1.93	0.94	0.54	0.35	0.24	0.18	0.14	0.11	0.09
	D_{90max}=	30.0	45.0	56.8	43.1	33.2	26.1	21.0	17.3	14.5	12.4	10.7
0.45	H_{loss} =	31.22	6.72	2.45	1.19	0.69	0.44	0.31	0.23	0.18	0.14	0.11
	D_{90max}=	30.0	45.0	60.0	54.2	41.6	32.6	26.2	21.5	18.0	15.3	13.2
0.50	H_{loss} =	38.54	8.30	3.02	1.47	0.85	0.55	0.38	0.28	0.22	0.17	0.14
	D_{90max}=	30.0	45.0	60.0	66.5	51.0	39.9	32.0	26.2	21.9	18.6	16.0
0.60	H_{loss} =	55.50	11.95	4.35	2.11	1.22	0.79	0.55	0.41	0.31	0.25	0.20
	D_{90max}=	30.0	45.0	60.0	75.0	72.7	56.8	45.4	37.1	30.9	26.1	22.4
0.70	H_{loss} =	75.54	16.27	5.92	2.87	1.66	1.07	0.75	0.55	0.43	0.34	0.28
	D_{90max}=	30.0	45.0	60.0	75.0	90.0	76.8	61.3	50.0	41.5	35.0	29.9
0.80	H_{loss} =	98.67	21.24	7.74	3.75	2.17	1.40	0.98	0.72	0.56	0.44	0.36
	D_{90max}=	30.0	45.0	60.0	75.0	90.0	99.8	79.6	64.8	53.7	45.2	38.6
0.90	H_{loss} =	124.88	26.89	9.79	4.75	2.74	1.77	1.24	0.91	0.70	0.56	0.46
	D_{90max}=	30.0	45.0	60.0	75.0	90.0	105.0	100.3	81.6	67.5	56.8	48.5
1.00	H_{loss} =	154.17	33.19	12.09	5.87	3.39	2.19	1.53	1.13	0.87	0.69	0.56
	D_{90max}=	30.0	45.0	60.0	75.0	90.0	105.0	120.0	100.4	83.0	69.8	59.5
1.20	H_{loss} =	222.01	47.80	17.41	8.45	4.87	3.15	2.20	1.62	1.25	0.99	0.81
	D_{90max}=	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	118.9	99.8	85.0

Table 7.2 Design table for vortex tubes. Tube length = 3m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m_3/s)		Tube diameters (m)										
		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4
0.10	H_{loss}=	0.30	0.10	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00
	D_{90max}=	1.72	1.83	1.71	1.54	1.37	1.23	1.11	1.01	0.93	0.85	0.74
0.12	H_{loss}=	0.44	0.15	0.06	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	2.17	2.32	2.16	1.93	1.71	1.53	1.37	1.24	1.13	1.04	0.90
0.14	H_{loss}=	0.60	0.20	0.09	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	2.68	2.87	2.66	2.36	2.09	1.85	1.65	1.49	1.35	1.24	1.06
0.16	H_{loss}=	0.78	0.26	0.11	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	3.23	3.47	3.21	2.84	2.49	2.20	1.95	1.75	1.59	1.45	1.23
0.18	H_{loss}=	0.99	0.33	0.15	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	3.85	4.14	3.82	3.37	2.94	2.58	2.28	2.04	1.84	1.67	1.41
0.20	H_{loss}=	1.22	0.41	0.18	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	4.5	4.9	4.5	3.9	3.4	3.0	2.6	2.3	2.1	1.9	1.6
0.22	H_{loss}=	1.47	0.49	0.22	0.12	0.07	0.05	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	5.2	5.7	5.2	4.6	3.9	3.4	3.0	2.7	2.4	2.2	1.8
0.24	H_{loss}=	1.75	0.58	0.26	0.14	0.08	0.05	0.04	0.03	0.02	0.02	0.01
	D_{90max}=	6.0	6.5	6.0	5.2	4.5	3.9	3.4	3.0	2.7	2.4	2.0
0.26	H_{loss}=	2.06	0.68	0.30	0.16	0.10	0.06	0.05	0.03	0.03	0.02	0.01
	D_{90max}=	6.9	7.5	6.8	5.9	5.1	4.4	3.8	3.4	3.0	2.7	2.2
0.28	H_{loss}=	2.39	0.79	0.35	0.19	0.11	0.07	0.05	0.04	0.03	0.02	0.02
	D_{90max}=	7.8	8.5	7.7	6.7	5.7	4.9	4.3	3.8	3.4	3.0	2.5
0.30	H_{loss}=	2.74	0.91	0.40	0.21	0.13	0.09	0.06	0.04	0.03	0.03	0.02
	D_{90max}=	8.8	9.5	8.7	7.5	6.4	5.5	4.8	4.2	3.7	3.3	2.7
0.35	H_{loss}=	3.73	1.24	0.55	0.29	0.18	0.12	0.08	0.06	0.05	0.04	0.02
	D_{90max}=	11.4	12.5	11.4	9.8	8.3	7.1	6.1	5.3	4.7	4.2	3.4
0.40	H_{loss}=	4.87	1.62	0.72	0.38	0.23	0.15	0.11	0.08	0.06	0.05	0.03
	D_{90max}=	14.5	15.9	14.4	12.4	10.5	8.9	7.6	6.6	5.8	5.1	4.1
0.45	H_{loss}=	6.17	2.05	0.91	0.48	0.29	0.19	0.14	0.10	0.08	0.06	0.04
	D_{90max}=	18.0	19.7	17.9	15.3	12.9	10.9	9.3	8.1	7.0	6.2	5.0
0.50	H_{loss}=	7.61	2.53	1.12	0.60	0.36	0.24	0.17	0.12	0.10	0.08	0.05
	D_{90max}=	21.9	24.0	21.7	18.5	15.6	13.2	11.2	9.6	8.4	7.4	5.9
0.60	H_{loss}=	10.96	3.65	1.62	0.86	0.52	0.34	0.24	0.18	0.14	0.11	0.07
	D_{90max}=	30.9	33.9	30.7	26.1	21.8	18.3	15.5	13.3	11.5	10.1	8.0
0.70	H_{loss}=	14.92	4.96	2.20	1.17	0.71	0.47	0.33	0.24	0.19	0.15	0.10
	D_{90max}=	41	45	41	34	29	24	20	17	15	13	10
0.80	H_{loss}=	19.49	6.48	2.87	1.53	0.92	0.61	0.43	0.32	0.24	0.19	0.13
	D_{90max}=	45	59	53	45	37	31	26	22	19	16	13
0.90	H_{loss}=	24.67	8.21	3.64	1.93	1.17	0.77	0.54	0.40	0.31	0.24	0.16
	D_{90max}=	45	60	67	56	47	39	33	28	24	21	16
1.00	H_{loss}=	30.45	10.13	4.49	2.39	1.44	0.95	0.67	0.49	0.38	0.30	0.20
	D_{90max}=	45	60	75	69	57	48	40	34	29	25	19
1.20	H_{loss}=	43.85	14.59	6.46	3.44	2.07	1.37	0.96	0.71	0.55	0.43	0.29
	D_{90max}=	45	60	75	90	82	68	57	48	41	36	27
1.40	H_{loss}=	59.69	19.85	8.80	4.68	2.82	1.86	1.31	0.97	0.75	0.59	0.40
	D_{90max}=	45	60	75	90	105	93	78	66	56	48	37
1.60	H_{loss}=	77.96	25.93	11.49	6.11	3.69	2.43	1.71	1.27	0.97	0.77	0.52
	D_{90max}=	45	60	75	90	105	120	101	85	73	63	48
1.80	H_{loss}=	98.67	32.82	14.54	7.74	4.67	3.08	2.17	1.60	1.23	0.98	0.66
	D_{90max}=	45	60	75	90	105	120	128	108	92	79	60

Table 7.3 Design table for vortex tubes. Tube length = 4m

Total head loss across tube (in m) ,H_{loss}, and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m) 0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.6
0.12	H_{loss}=	0.14	0.06	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00
	D_{90max}=	1.08	1.14	1.12	1.05	0.98	0.91	0.84	0.78	0.73	0.65	0.58
0.14	H_{loss}=	0.19	0.08	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.29	1.37	1.33	1.25	1.16	1.07	0.99	0.92	0.86	0.75	0.67
0.16	H_{loss}=	0.25	0.10	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.51	1.61	1.56	1.47	1.35	1.25	1.15	1.06	0.99	0.86	0.77
0.18	H_{loss}=	0.31	0.13	0.07	0.04	0.02	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.74	1.86	1.81	1.69	1.56	1.43	1.32	1.22	1.13	0.98	0.87
0.20	H_{loss}=	0.39	0.16	0.08	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	2.00	2.13	2.07	1.93	1.78	1.63	1.49	1.37	1.27	1.10	0.97
0.22	H_{loss}=	0.47	0.20	0.10	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	2.26	2.42	2.35	2.19	2.01	1.83	1.68	1.54	1.42	1.23	1.08
0.24	H_{loss}=	0.56	0.24	0.12	0.07	0.04	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	2.55	2.73	2.65	2.46	2.25	2.05	1.87	1.71	1.58	1.36	1.19
0.26	H_{loss}=	0.65	0.28	0.14	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	2.84	3.06	2.96	2.75	2.51	2.28	2.08	1.90	1.74	1.49	1.30
0.28	H_{loss}=	0.76	0.32	0.16	0.09	0.06	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	3.16	3.40	3.30	3.05	2.78	2.52	2.29	2.09	1.91	1.63	1.42
0.30	H_{loss}=	0.87	0.37	0.19	0.11	0.07	0.05	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	3.49	3.77	3.65	3.37	3.07	2.77	2.52	2.29	2.09	1.78	1.54
0.35	H_{loss}=	1.18	0.50	0.25	0.15	0.09	0.06	0.04	0.03	0.03	0.02	0.01
	D_{90max}=	4.4	4.8	4.6	4.2	3.8	3.5	3.1	2.8	2.6	2.2	1.9
0.40	H_{loss}=	1.54	0.65	0.33	0.19	0.12	0.08	0.06	0.04	0.03	0.02	0.02
	D_{90max}=	5.4	5.9	5.7	5.2	4.7	4.2	3.8	3.4	3.1	2.6	2.2
0.45	H_{loss}=	1.95	0.83	0.42	0.24	0.15	0.10	0.07	0.06	0.04	0.03	0.02
	D_{90max}=	6.6	7.2	6.9	6.3	5.7	5.1	4.5	4.1	3.7	3.1	2.6
0.50	H_{loss}=	2.41	1.02	0.52	0.30	0.19	0.13	0.09	0.07	0.05	0.03	0.02
	D_{90max}=	7.8	8.6	8.2	7.5	6.7	6.0	5.4	4.8	4.3	3.6	3.0
0.60	H_{loss}=	3.47	1.47	0.75	0.43	0.27	0.18	0.13	0.10	0.08	0.05	0.03
	D_{90max}=	10.7	11.7	11.3	10.3	9.2	8.1	7.2	6.4	5.8	4.7	4.0
0.70	H_{loss}=	4.72	2.00	1.02	0.59	0.37	0.25	0.18	0.13	0.10	0.07	0.05
	D_{90max}=	14.1	15.5	14.9	13.5	12.0	10.6	9.4	8.3	7.4	6.0	5.0
0.80	H_{loss}=	6.17	2.61	1.33	0.77	0.48	0.33	0.23	0.18	0.14	0.09	0.06
	D_{90max}=	18.0	19.8	19.0	17.2	15.3	13.5	11.8	10.5	9.3	7.5	6.2
0.90	H_{loss}=	7.80	3.31	1.68	0.97	0.61	0.41	0.30	0.22	0.17	0.11	0.08
	D_{90max}=	22.4	24.7	23.7	21.4	19.0	16.7	14.6	12.9	11.5	9.2	7.5
1.00	H_{loss}=	9.64	4.09	2.07	1.20	0.76	0.51	0.37	0.27	0.21	0.14	0.10
	D_{90max}=	27.4	30.1	28.9	26.1	23.1	20.2	17.7	15.6	13.8	11.0	9.0
1.20	H_{loss}=	13.88	5.88	2.99	1.72	1.09	0.74	0.53	0.39	0.30	0.20	0.14
	D_{90max}=	38.7	42.7	40.9	37.0	32.6	28.5	24.9	21.9	19.3	15.3	12.4
1.40	H_{loss}=	18.89	8.01	4.07	2.34	1.48	1.00	0.72	0.54	0.41	0.27	0.19
	D_{90max}=	52	57	55	49	43	38	33	29	25	20	16
1.60	H_{loss}=	24.67	10.46	5.31	3.06	1.93	1.31	0.94	0.70	0.54	0.35	0.24
	D_{90max}=	60	74	71	64	56	49	43	37	33	26	21
1.80	H_{loss}=	31.22	13.24	6.72	3.87	2.45	1.66	1.19	0.89	0.69	0.44	0.31
	D_{90max}=	60	75	90	81	71	62	54	47	41	32	26
2.00	H_{loss}=	38.54	16.34	8.30	4.78	3.02	2.05	1.47	1.10	0.85	0.55	0.38
	D_{90max}=	60	75	90	99	87	76	66	58	50	39	32

Table 7.4 Design table for vortex tubes. Tube length = 5Σm

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.6	1.8
0.16	H_{loss}=	0.10	0.05	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00
	D_{90max}=	0.91	0.96	0.95	0.92	0.87	0.83	0.78	0.74	0.66	0.60	0.54
0.18	H_{loss}=	0.13	0.06	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.03	1.09	1.08	1.04	0.99	0.94	0.88	0.83	0.74	0.67	0.61
0.20	H_{loss}=	0.16	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.16	1.23	1.22	1.17	1.11	1.05	0.99	0.93	0.83	0.74	0.67
0.22	H_{loss}=	0.19	0.09	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.30	1.37	1.36	1.31	1.24	1.17	1.10	1.03	0.91	0.82	0.74
0.24	H_{loss}=	0.23	0.11	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.44	1.52	1.51	1.45	1.37	1.29	1.21	1.13	1.00	0.89	0.81
0.26	H_{loss}=	0.27	0.13	0.07	0.05	0.03	0.02	0.02	0.01	0.01	0.00	0.00
	D_{90max}=	1.58	1.68	1.67	1.60	1.51	1.42	1.33	1.24	1.09	0.98	0.88
0.28	H_{loss}=	0.31	0.15	0.09	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.73	1.85	1.83	1.76	1.66	1.55	1.45	1.35	1.19	1.06	0.95
0.30	H_{loss}=	0.36	0.18	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.00
	D_{90max}=	1.89	2.02	2.00	1.92	1.81	1.69	1.58	1.47	1.29	1.14	1.02
0.35	H_{loss}=	0.48	0.24	0.13	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	2.32	2.48	2.46	2.35	2.21	2.06	1.91	1.78	1.55	1.36	1.22
0.40	H_{loss}=	0.63	0.31	0.18	0.11	0.07	0.05	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	2.78	2.98	2.96	2.82	2.64	2.46	2.28	2.11	1.83	1.60	1.42
0.45	H_{loss}=	0.80	0.40	0.22	0.14	0.09	0.06	0.05	0.03	0.02	0.01	0.01
	D_{90max}=	3.29	3.54	3.51	3.34	3.12	2.89	2.67	2.47	2.13	1.86	1.64
0.50	H_{loss}=	0.99	0.49	0.27	0.17	0.11	0.08	0.06	0.04	0.03	0.02	0.01
	D_{90max}=	3.85	4.14	4.10	3.90	3.64	3.37	3.10	2.86	2.45	2.13	1.87
0.60	H_{loss}=	1.42	0.70	0.39	0.24	0.16	0.11	0.08	0.06	0.04	0.03	0.02
	D_{90max}=	5.1	5.5	5.5	5.2	4.8	4.4	4.1	3.7	3.2	2.7	2.4
0.70	H_{loss}=	1.93	0.96	0.54	0.33	0.22	0.15	0.11	0.08	0.05	0.04	0.03
	D_{90max}=	6.5	7.1	7.0	6.6	6.1	5.6	5.2	4.7	4.0	3.4	2.9
0.80	H_{loss}=	2.53	1.25	0.70	0.43	0.28	0.20	0.14	0.11	0.07	0.05	0.03
	D_{90max}=	8.2	8.9	8.8	8.3	7.7	7.0	6.4	5.8	4.9	4.1	3.6
0.90	H_{loss}=	3.20	1.58	0.89	0.55	0.36	0.25	0.18	0.14	0.09	0.06	0.04
	D_{90max}=	10.0	10.9	10.8	10.2	9.4	8.6	7.8	7.1	5.9	5.0	4.3
1.00	H_{loss}=	3.95	1.95	1.09	0.67	0.44	0.31	0.23	0.17	0.11	0.07	0.05
	D_{90max}=	12.0	13.1	13.0	12.2	11.3	10.3	9.3	8.4	7.0	5.9	5.0
1.20	H_{loss}=	5.68	2.81	1.58	0.97	0.64	0.45	0.33	0.25	0.15	0.10	0.07
	D_{90max}=	16.7	18.3	18.1	17.0	15.6	14.2	12.8	11.6	9.5	8.0	6.7
1.40	H_{loss}=	7.74	3.83	2.15	1.32	0.87	0.61	0.44	0.33	0.21	0.14	0.10
	D_{90max}=	22.2	24.4	24.1	22.7	20.8	18.8	17.0	15.3	12.5	10.4	8.7
1.60	H_{loss}=	10.10	5.00	2.80	1.72	1.14	0.79	0.58	0.44	0.27	0.18	0.13
	D_{90max}=	28.6	31.4	31.1	29.2	26.7	24.1	21.7	19.5	15.9	13.1	11.0
1.80	H_{loss}=	12.79	6.33	3.55	2.18	1.44	1.00	0.73	0.55	0.34	0.23	0.17
	D_{90max}=	35.8	39.3	38.9	36.5	33.4	30.1	27.1	24.3	19.8	16.3	13.6
2.00	H_{loss}=	15.79	7.82	4.38	2.69	1.78	1.24	0.90	0.68	0.42	0.29	0.21
	D_{90max}=	43	48	47	44	40	36	33	29	24	19	16
2.20	H_{loss}=	19.10	9.46	5.30	3.26	2.15	1.50	1.09	0.83	0.51	0.35	0.25
	D_{90max}=	52	58	57	53	49	44	39	35	28	23	19
2.40	H_{loss}=	22.73	11.25	6.31	3.88	2.56	1.78	1.30	0.98	0.61	0.41	0.30
	D =	62	68	67	63	58	52	47	42	33	27	23

Table 7.5 Design table for vortex tubes. Tube length = 6m

Total head loss across tube (in m) ,H_{loss},
and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m) 0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.6	1.8	2.0
0.24	H_{loss}=	0.11	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	0.95	1.00	1.00	0.98	0.95	0.90	0.86	0.78	0.71	0.65	0.60
0.26	H_{loss}=	0.13	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.04	1.09	1.09	1.07	1.03	0.99	0.94	0.85	0.77	0.71	0.65
0.28	H_{loss}=	0.15	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.13	1.18	1.19	1.16	1.12	1.07	1.02	0.92	0.83	0.76	0.70
0.30	H_{loss}=	0.17	0.09	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.22	1.28	1.29	1.26	1.21	1.16	1.10	0.99	0.90	0.81	0.75
0.35	H_{loss}=	0.23	0.13	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.46	1.54	1.55	1.51	1.45	1.38	1.31	1.18	1.06	0.96	0.88
0.40	H_{loss}=	0.30	0.17	0.10	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.72	1.82	1.83	1.78	1.71	1.62	1.54	1.37	1.23	1.11	1.01
0.45	H_{loss}=	0.39	0.21	0.13	0.08	0.06	0.04	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	2.00	2.12	2.13	2.07	1.98	1.88	1.78	1.58	1.41	1.27	1.15
0.50	H_{loss}=	0.48	0.26	0.16	0.10	0.07	0.05	0.04	0.02	0.01	0.01	0.01
	D_{90max}=	2.29	2.44	2.45	2.38	2.28	2.16	2.03	1.80	1.60	1.44	1.30
0.60	H_{loss}=	0.69	0.38	0.23	0.15	0.10	0.07	0.05	0.03	0.02	0.02	0.01
	D_{90max}=	2.95	3.15	3.16	3.07	2.93	2.77	2.60	2.29	2.02	1.80	1.62
0.70	H_{loss}=	0.93	0.51	0.31	0.20	0.14	0.10	0.07	0.04	0.03	0.02	0.02
	D_{90max}=	3.69	3.95	3.97	3.85	3.66	3.45	3.23	2.82	2.48	2.20	1.96
0.80	H_{loss}=	1.22	0.67	0.41	0.26	0.18	0.13	0.10	0.06	0.04	0.03	0.02
	D_{90max}=	4.5	4.8	4.9	4.7	4.5	4.2	3.9	3.4	3.0	2.6	2.3
0.90	H_{loss}=	1.54	0.85	0.51	0.33	0.23	0.16	0.12	0.07	0.05	0.03	0.03
	D_{90max}=	5.4	5.8	5.9	5.7	5.4	5.1	4.7	4.1	3.5	3.1	2.8
1.00	H_{loss}=	1.90	1.05	0.63	0.41	0.28	0.20	0.15	0.09	0.06	0.04	0.03
	D_{90max}=	6.4	6.9	7.0	6.8	6.4	6.0	5.6	4.8	4.1	3.6	3.2
1.20	H_{loss}=	2.74	1.51	0.91	0.59	0.40	0.29	0.21	0.13	0.09	0.06	0.04
	D_{90max}=	8.8	9.5	9.5	9.2	8.7	8.1	7.5	6.4	5.5	4.8	4.2
1.40	H_{loss}=	3.73	2.06	1.24	0.80	0.55	0.39	0.29	0.18	0.12	0.08	0.06
	D_{90max}=	11.4	12.4	12.5	12.0	11.4	10.6	9.8	8.3	7.1	6.1	5.3
1.60	H_{loss}=	4.87	2.69	1.62	1.05	0.72	0.51	0.38	0.23	0.15	0.11	0.08
	D_{90max}=	14.5	15.8	15.9	15.3	14.4	13.4	12.4	10.5	8.9	7.6	6.6
1.80	H_{loss}=	6.17	3.40	2.05	1.33	0.91	0.65	0.48	0.29	0.19	0.14	0.10
	D_{90max}=	18.0	19.6	19.7	19.0	17.9	16.6	15.3	12.9	10.9	9.3	8.1
2.00	H_{loss}=	7.61	4.20	2.53	1.64	1.12	0.80	0.60	0.36	0.24	0.17	0.12
	D_{90max}=	21.9	23.9	24.0	23.1	21.7	20.1	18.5	15.6	13.2	11.2	9.6
2.20	H_{loss}=	9.21	5.08	3.06	1.98	1.36	0.97	0.72	0.44	0.29	0.20	0.15
	D_{90max}=	26.2	28.6	28.8	27.7	26.0	24.1	22.1	18.6	15.6	13.3	11.4
2.40	H_{loss}=	10.96	6.04	3.65	2.36	1.62	1.16	0.86	0.52	0.34	0.24	0.18
	D_{90max}=	30.9	33.7	33.9	32.7	30.7	28.4	26.1	21.8	18.3	15.5	13.3
2.60	H_{loss}=	12.87	7.09	4.28	2.77	1.90	1.36	1.01	0.61	0.40	0.28	0.21
	D_{90max}=	36.0	39.3	39.6	38.1	35.7	33.0	30.3	25.4	21.3	18.0	15.4
2.80	H_{loss}=	14.92	8.23	4.96	3.21	2.20	1.57	1.17	0.71	0.47	0.33	0.24
	D_{90max}=	41	45	45	43	41	38	34	29	24	20	17
3.00	H_{loss}=	17.13	9.44	5.70	3.69	2.52	1.81	1.34	0.81	0.53	0.38	0.28
	D_{90max}=	47	51	52	50	47	43	39	33	27	23	20
3.50	H_{loss}=	23.32	12.85	7.76	5.02	3.44	2.46	1.83	1.10	0.73	0.51	0.38
	D_{90max}=	64	70	70	67	63	58	53	44	37	31	26

Table 7.6 Design table for vortex tubes. Tube length = 7m

Total head loss across tube (in m) ,H_{loss}, and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.6	1.8	2.0	2.2
0.35	H_{loss}=	0.13	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.02	1.07	1.08	1.07	1.04	1.01	0.93	0.85	0.78	0.72	0.67
0.40	H_{loss}=	0.16	0.10	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.19	1.25	1.26	1.24	1.21	1.17	1.07	0.98	0.90	0.83	0.77
0.45	H_{loss}=	0.21	0.12	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.36	1.43	1.45	1.43	1.39	1.34	1.23	1.12	1.02	0.94	0.87
0.50	H_{loss}=	0.26	0.15	0.10	0.07	0.05	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.55	1.63	1.65	1.62	1.58	1.52	1.39	1.26	1.15	1.05	0.97
0.60	H_{loss}=	0.37	0.22	0.14	0.10	0.07	0.05	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.94	2.05	2.08	2.05	1.98	1.90	1.73	1.57	1.42	1.30	1.19
0.70	H_{loss}=	0.50	0.30	0.19	0.13	0.09	0.07	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	2.38	2.52	2.55	2.51	2.43	2.33	2.11	1.90	1.72	1.56	1.42
0.80	H_{loss}=	0.66	0.39	0.25	0.17	0.12	0.09	0.05	0.03	0.02	0.02	0.01
	D_{90max}=	2.86	3.04	3.08	3.03	2.93	2.80	2.53	2.26	2.04	1.84	1.67
0.90	H_{loss}=	0.83	0.50	0.32	0.21	0.15	0.11	0.07	0.04	0.03	0.02	0.02
	D_{90max}=	3.39	3.61	3.66	3.59	3.47	3.31	2.98	2.66	2.38	2.14	1.94
1.00	H_{loss}=	1.03	0.61	0.39	0.26	0.19	0.14	0.08	0.05	0.04	0.03	0.02
	D_{90max}=	3.96	4.23	4.28	4.21	4.06	3.87	3.47	3.08	2.75	2.47	2.23
1.20	H_{loss}=	1.48	0.88	0.56	0.38	0.27	0.20	0.12	0.07	0.05	0.04	0.03
	D_{90max}=	5.3	5.6	5.7	5.6	5.4	5.1	4.6	4.0	3.6	3.2	2.9
1.40	H_{loss}=	2.01	1.20	0.77	0.52	0.37	0.27	0.16	0.10	0.07	0.05	0.04
	D_{90max}=	6.7	7.2	7.3	7.2	6.9	6.6	5.8	5.1	4.5	4.0	3.6
1.60	H_{loss}=	2.63	1.57	1.00	0.68	0.48	0.35	0.21	0.13	0.09	0.07	0.05
	D_{90max}=	8.4	9.1	9.2	9.0	8.7	8.2	7.3	6.3	5.6	4.9	4.4
1.80	H_{loss}=	3.33	1.99	1.27	0.86	0.61	0.44	0.26	0.17	0.12	0.08	0.06
	D_{90max}=	10.4	11.2	11.3	11.1	10.6	10.1	8.9	7.7	6.7	5.9	5.3
2.00	H_{loss}=	4.11	2.45	1.57	1.06	0.75	0.55	0.32	0.21	0.14	0.10	0.08
	D_{90max}=	12.5	13.5	13.7	13.4	12.8	12.1	10.6	9.2	8.0	7.0	6.2
2.20	H_{loss}=	4.97	2.97	1.90	1.28	0.90	0.66	0.39	0.25	0.17	0.13	0.10
	D_{90max}=	14.8	16.0	16.2	15.9	15.2	14.4	12.6	10.9	9.5	8.3	7.3
2.40	H_{loss}=	5.92	3.53	2.26	1.52	1.08	0.79	0.46	0.30	0.21	0.15	0.11
	D_{90max}=	17.4	18.8	19.1	18.7	17.9	16.9	14.7	12.7	11.0	9.6	8.4
2.60	H_{loss}=	6.95	4.14	2.65	1.79	1.26	0.93	0.54	0.35	0.24	0.18	0.13
	D_{90max}=	20.1	21.8	22.1	21.7	20.7	19.5	17.0	14.7	12.7	11.1	9.7
2.80	H_{loss}=	8.05	4.80	3.07	2.07	1.47	1.07	0.63	0.41	0.28	0.20	0.15
	D_{90max}=	23.1	25.0	25.4	24.9	23.8	22.4	19.5	16.8	14.5	12.6	11.0
3.00	H_{loss}=	9.25	5.52	3.53	2.38	1.68	1.23	0.73	0.47	0.32	0.23	0.18
	D_{90max}=	26.3	28.5	29.0	28.4	27.1	25.5	22.2	19.1	16.5	14.3	12.5
3.50	H_{loss}=	12.59	7.51	4.80	3.24	2.29	1.68	0.99	0.64	0.44	0.32	0.24
	D_{90max}=	35.3	38.3	38.9	38.1	36.4	34.2	29.7	25.5	21.9	18.9	16.5
4.00	H_{loss}=	16.44	9.81	6.27	4.23	2.99	2.19	1.29	0.83	0.57	0.42	0.32
	D_{90max}=	45	49	50	49	47	44	38	32	28	24	21
4.50	H_{loss}=	20.80	12.41	7.93	5.36	3.78	2.78	1.63	1.05	0.73	0.53	0.40
	D_{90max}=	57	62	63	61	59	55	48	41	35	30	26
5.00	H_{loss}=	25.68	15.32	9.79	6.61	4.67	3.43	2.01	1.30	0.90	0.65	0.49
	D_{90max}=	70	76	77	76	72	68	59	50	43	37	32
6.00	H_{loss}=	36.99	22.06	14.10	9.52	6.73	4.93	2.90	1.87	1.29	0.94	0.71
	D =	100	109	111	108	103	97	84	71	61	52	45

Table 7.7 Design table for vortex tubes. Tube length = 8m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		0.8	0.9	1.0	1.1	1.2	1.4	1.6	1.8	2.0	2.2	2.4
0.45	H_{loss}=	0.12	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	1.01	1.05	1.06	1.06	1.04	0.98	0.91	0.85	0.79	0.73	0.69
0.50	H_{loss}=	0.15	0.10	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.13	1.18	1.20	1.19	1.17	1.10	1.02	0.95	0.88	0.82	0.76
0.60	H_{loss}=	0.22	0.14	0.09	0.06	0.05	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.40	1.46	1.48	1.47	1.45	1.36	1.26	1.16	1.07	0.99	0.92
0.70	H_{loss}=	0.30	0.19	0.13	0.09	0.06	0.04	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	1.68	1.77	1.80	1.78	1.75	1.63	1.51	1.39	1.27	1.18	1.09
0.80	H_{loss}=	0.39	0.24	0.16	0.11	0.08	0.05	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	2.00	2.10	2.13	2.12	2.07	1.93	1.78	1.63	1.49	1.37	1.27
0.90	H_{loss}=	0.49	0.31	0.21	0.14	0.11	0.06	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	2.33	2.46	2.50	2.48	2.42	2.26	2.07	1.89	1.73	1.58	1.46
1.00	H_{loss}=	0.60	0.38	0.26	0.18	0.13	0.07	0.05	0.03	0.02	0.02	0.01
	D_{90max}=	2.69	2.84	2.89	2.87	2.80	2.60	2.38	2.17	1.97	1.81	1.66
1.20	H_{loss}=	0.87	0.55	0.37	0.26	0.19	0.11	0.07	0.05	0.03	0.02	0.02
	D_{90max}=	3.49	3.70	3.77	3.74	3.65	3.37	3.07	2.77	2.52	2.29	2.09
1.40	H_{loss}=	1.18	0.75	0.50	0.35	0.25	0.15	0.09	0.06	0.04	0.03	0.03
	D_{90max}=	4.4	4.7	4.8	4.7	4.6	4.2	3.8	3.5	3.1	2.8	2.6
1.60	H_{loss}=	1.54	0.98	0.65	0.46	0.33	0.19	0.12	0.08	0.06	0.04	0.03
	D_{90max}=	5.4	5.8	5.9	5.8	5.7	5.2	4.7	4.2	3.8	3.4	3.1
1.80	H_{loss}=	1.95	1.24	0.83	0.58	0.42	0.24	0.15	0.10	0.07	0.06	0.04
	D_{90max}=	6.6	7.0	7.2	7.1	6.9	6.3	5.7	5.1	4.5	4.1	3.7
2.00	H_{loss}=	2.41	1.53	1.02	0.71	0.52	0.30	0.19	0.13	0.09	0.07	0.05
	D_{90max}=	7.8	8.4	8.6	8.5	8.2	7.5	6.7	6.0	5.4	4.8	4.3
2.20	H_{loss}=	2.91	1.85	1.24	0.86	0.63	0.36	0.23	0.15	0.11	0.08	0.06
	D_{90max}=	9.2	9.9	10.1	10.0	9.7	8.8	7.9	7.0	6.2	5.6	5.0
2.40	H_{loss}=	3.47	2.20	1.47	1.03	0.75	0.43	0.27	0.18	0.13	0.10	0.08
	D_{90max}=	10.7	11.5	11.7	11.6	11.3	10.3	9.2	8.1	7.2	6.4	5.8
2.60	H_{loss}=	4.07	2.58	1.73	1.21	0.88	0.51	0.32	0.22	0.15	0.12	0.09
	D_{90max}=	12.4	13.3	13.6	13.4	13.0	11.8	10.5	9.3	8.3	7.3	6.6
2.80	H_{loss}=	4.72	2.99	2.00	1.40	1.02	0.59	0.37	0.25	0.18	0.13	0.10
	D_{90max}=	14.1	15.2	15.5	15.3	14.9	13.5	12.0	10.6	9.4	8.3	7.4
3.00	H_{loss}=	5.42	3.43	2.30	1.61	1.17	0.67	0.43	0.29	0.21	0.15	0.12
	D_{90max}=	16.0	17.2	17.6	17.4	16.9	15.3	13.6	12.0	10.6	9.4	8.3
3.50	H_{loss}=	7.38	4.68	3.13	2.19	1.59	0.92	0.58	0.39	0.28	0.21	0.16
	D_{90max}=	21.3	22.9	23.4	23.2	22.5	20.3	18.0	15.8	13.9	12.3	10.9
4.00	H_{loss}=	9.64	6.11	4.09	2.86	2.07	1.20	0.76	0.51	0.37	0.27	0.21
	D_{90max}=	27.4	29.5	30.1	29.8	28.9	26.1	23.1	20.2	17.7	15.6	13.8
4.50	H_{loss}=	12.20	7.73	5.17	3.62	2.63	1.51	0.96	0.65	0.46	0.35	0.27
	D_{90max}=	34.2	36.9	37.8	37.4	36.2	32.7	28.8	25.2	22.1	19.4	17.1
5.00	H_{loss}=	15.06	9.54	6.38	4.47	3.24	1.87	1.18	0.80	0.57	0.43	0.33
	D_{90max}=	41	45	46	45	44	39	35	30	26	23	20
6.00	H_{loss}=	21.68	13.74	9.19	6.43	4.67	2.69	1.70	1.15	0.82	0.62	0.48
	D_{90max}=	59	64	65	65	63	56	50	43	38	33	29
7.00	H_{loss}=	29.51	18.70	12.51	8.75	6.35	3.66	2.31	1.57	1.12	0.84	0.65
	D_{90max}=	80	87	89	88	85	76	67	58	51	44	39
8.00	H_{loss}=	38.54	24.43	16.34	11.43	8.30	4.78	3.02	2.05	1.47	1.10	0.85
	D_{90max}=	104	113	115	114	111	99	87	76	66	58	50

Table 7.8 Design table for vortex tubes. Tube length = 9m

Total head loss across tube (in m) ,H_{loss}, and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		0.9	1.0	1.1	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
0.60	H_{loss}=	0.14	0.09	0.06	0.05	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.07	1.11	1.13	1.13	1.09	1.03	0.97	0.90	0.84	0.79	0.74
0.70	H_{loss}=	0.18	0.12	0.09	0.06	0.03	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	1.27	1.32	1.35	1.34	1.30	1.22	1.14	1.07	1.00	0.93	0.87
0.80	H_{loss}=	0.24	0.16	0.11	0.08	0.05	0.03	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.49	1.55	1.58	1.58	1.52	1.43	1.33	1.24	1.15	1.08	1.01
0.90	H_{loss}=	0.30	0.20	0.14	0.10	0.06	0.04	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	1.72	1.80	1.83	1.83	1.76	1.65	1.54	1.42	1.32	1.23	1.15
1.00	H_{loss}=	0.38	0.25	0.17	0.13	0.07	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.96	2.06	2.10	2.09	2.01	1.89	1.75	1.62	1.50	1.39	1.30
1.20	H_{loss}=	0.54	0.36	0.25	0.18	0.10	0.06	0.04	0.03	0.02	0.02	0.01
	D_{90max}=	2.50	2.63	2.68	2.68	2.57	2.40	2.22	2.04	1.88	1.74	1.61
1.40	H_{loss}=	0.74	0.49	0.34	0.25	0.14	0.09	0.06	0.04	0.03	0.02	0.02
	D_{90max}=	3.10	3.27	3.34	3.33	3.19	2.97	2.73	2.51	2.30	2.12	1.96
1.60	H_{loss}=	0.96	0.64	0.44	0.32	0.18	0.11	0.08	0.05	0.04	0.03	0.02
	D_{90max}=	3.77	3.99	4.07	4.06	3.88	3.60	3.30	3.02	2.76	2.53	2.33
1.80	H_{loss}=	1.22	0.81	0.56	0.41	0.23	0.14	0.10	0.07	0.05	0.04	0.03
	D_{90max}=	4.5	4.8	4.9	4.9	4.6	4.3	3.9	3.6	3.3	3.0	2.7
2.00	H_{loss}=	1.50	1.00	0.69	0.50	0.28	0.18	0.12	0.08	0.06	0.05	0.04
	D_{90max}=	5.3	5.6	5.8	5.8	5.5	5.1	4.6	4.2	3.8	3.5	3.2
2.20	H_{loss}=	1.82	1.21	0.84	0.61	0.34	0.21	0.14	0.10	0.07	0.06	0.04
	D_{90max}=	6.2	6.6	6.7	6.7	6.4	5.9	5.4	4.9	4.4	4.0	3.7
2.40	H_{loss}=	2.17	1.44	1.00	0.72	0.41	0.25	0.17	0.12	0.09	0.07	0.05
	D_{90max}=	7.2	7.6	7.8	7.8	7.4	6.8	6.2	5.6	5.0	4.6	4.2
2.60	H_{loss}=	2.54	1.69	1.17	0.85	0.48	0.30	0.20	0.14	0.10	0.08	0.06
	D_{90max}=	8.2	8.7	8.9	8.9	8.5	7.8	7.0	6.4	5.7	5.2	4.7
2.80	H_{loss}=	2.95	1.96	1.36	0.98	0.56	0.35	0.23	0.16	0.12	0.09	0.07
	D_{90max}=	9.3	9.9	10.2	10.1	9.6	8.8	8.0	7.2	6.5	5.8	5.3
3.00	H_{loss}=	3.38	2.25	1.56	1.13	0.64	0.40	0.27	0.19	0.14	0.11	0.08
	D_{90max}=	10.5	11.2	11.5	11.4	10.9	9.9	9.0	8.1	7.3	6.5	5.9
3.50	H_{loss}=	4.61	3.06	2.13	1.53	0.87	0.54	0.36	0.25	0.19	0.14	0.11
	D_{90max}=	13.8	14.8	15.1	15.1	14.3	13.1	11.8	10.5	9.4	8.5	7.6
4.00	H_{loss}=	6.02	4.00	2.78	2.00	1.14	0.71	0.47	0.33	0.25	0.19	0.15
	D_{90max}=	17.6	18.8	19.3	19.3	18.2	16.6	14.9	13.3	11.9	10.7	9.6
4.50	H_{loss}=	7.61	5.06	3.52	2.53	1.44	0.89	0.60	0.42	0.31	0.24	0.19
	D_{90max}=	21.9	23.5	24.1	24.0	22.7	20.7	18.5	16.5	14.7	13.2	11.8
5.00	H_{loss}=	9.40	6.25	4.34	3.13	1.77	1.10	0.74	0.52	0.38	0.29	0.23
	D_{90max}=	26.7	28.6	29.4	29.3	27.7	25.2	22.5	20.1	17.9	15.9	14.3
6.00	H_{loss}=	13.53	9.00	6.25	4.50	2.55	1.59	1.06	0.75	0.55	0.42	0.33
	D_{90max}=	37.8	40.6	41.7	41.6	39.2	35.6	31.8	28.3	25.1	22.3	19.9
7.00	H_{loss}=	18.42	12.25	8.51	6.13	3.48	2.16	1.44	1.02	0.75	0.57	0.45
	D_{90max}=	50	54	56	56	52	47	42	37	33	29	26
8.00	H_{loss}=	24.06	16.00	11.11	8.00	4.54	2.83	1.89	1.33	0.98	0.75	0.59
	D_{90max}=	66	70	72	72	68	62	55	49	43	38	34
9.00	H_{loss}=	30.45	20.24	14.06	10.13	5.75	3.58	2.39	1.69	1.24	0.95	0.75
	D_{90max}=	83	89	91	91	86	78	69	61	54	48	42
10.00	H_{loss}=	37.60	24.99	17.36	12.51	7.09	4.41	2.95	2.08	1.53	1.17	0.92
	D_{90max}=	102	109	112	112	106	96	85	75	66	59	52

Table 7.9 Design table for vortex tubes. Tube length = 10m

Total head loss across tube (in m) ,H_{loss}, and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		1.0	1.1	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8
0.70	H_{loss}=	0.12	0.08	0.06	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.00	1.04	1.06	1.05	1.01	0.96	0.91	0.86	0.81	0.76	0.72
0.80	H_{loss}=	0.16	0.11	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	1.16	1.21	1.23	1.22	1.17	1.11	1.05	0.99	0.93	0.87	0.83
0.90	H_{loss}=	0.20	0.14	0.10	0.06	0.03	0.02	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.33	1.39	1.41	1.40	1.35	1.27	1.20	1.12	1.06	0.99	0.93
1.00	H_{loss}=	0.25	0.17	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.51	1.57	1.60	1.59	1.53	1.44	1.35	1.27	1.19	1.11	1.05
1.20	H_{loss}=	0.36	0.25	0.18	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.89	1.98	2.02	2.00	1.92	1.81	1.69	1.58	1.47	1.38	1.29
1.40	H_{loss}=	0.48	0.33	0.24	0.13	0.08	0.05	0.04	0.03	0.02	0.02	0.01
	D_{90max}=	2.32	2.43	2.48	2.46	2.35	2.21	2.06	1.91	1.78	1.66	1.55
1.60	H_{loss}=	0.63	0.44	0.31	0.18	0.11	0.07	0.05	0.04	0.03	0.02	0.02
	D_{90max}=	2.78	2.92	2.98	2.96	2.82	2.64	2.46	2.28	2.11	1.96	1.83
1.80	H_{loss}=	0.80	0.55	0.40	0.22	0.14	0.09	0.06	0.05	0.03	0.03	0.02
	D_{90max}=	3.29	3.46	3.54	3.51	3.34	3.12	2.89	2.67	2.47	2.29	2.13
2.00	H_{loss}=	0.99	0.68	0.49	0.27	0.17	0.11	0.08	0.06	0.04	0.03	0.03
	D_{90max}=	3.85	4.05	4.14	4.10	3.9 0	3.64	3.37	3.10	2.86	2.64	2.45
2.20	H_{loss}=	1.19	0.82	0.59	0.33	0.20	0.13	0.09	0.07	0.05	0.04	0.03
	D_{90max}=	4.4	4.7	4.8	4.8	4.5	4.2	3.9	3.6	3.3	3.0	2.8
2.40	H_{loss}=	1.42	0.98	0.70	0.39	0.24	0.16	0.11	0.08	0.06	0.05	0.04
	D_{90max}=	5.1	5.4	5. 5	5.5	5.2	4.8	4.4	4.1	3.7	3.4	3.2
2.60	H_{loss}=	1.67	1.15	0.83	0.46	0.28	0.19	0.13	0.10	0.07	0.06	0.04
	D_{90max}=	5.8	6.1	6.3	6.2	5.9	5.5	5.0	4.6	4.2	3.9	3.6
2.80	H_{loss}=	1.93	1.34	0.96	0.54	0.33	0.22	0.15	0.11	0.08	0.07	0.05
	D_{90max}=	6.5	6.9	7.1	7.0	6.6	6.1	5.6	5.2	4.7	4.3	4.0
3.00	H_{loss}=	2.22	1.53	1.10	0.62	0.38	0.25	0.17	0.13	0.10	0.07	0.06
	D_{90max}=	7.3	7.7	7.9	7.9	7.4	6.9	6.3	5.8	5.3	4.8	4.4
3.50	H_{loss}=	3.02	2.09	1.50	0.84	0.52	0.34	0.24	0.17	0.13	0.10	0.08
	D_{90max}=	9.5	10.1	10.4	10.3	9.7	8.9	8.2	7.4	6.7	6.1	5.6
4.00	H_{loss}=	3.95	2.73	1.95	1.09	0.67	0.44	0.31	0.23	0.17	0.13	0.11
	D_{90max}=	12.0	12.8	13.1	13.0	12.2	11.3	10.3	9.3	8.4	7.7	7.0
4.50	H_{loss}=	5.00	3.45	2.47	1.39	0.85	0.56	0.39	0.29	0.22	0.17	0.13
	D_{90max}=	14.9	15.8	16.3	16.1	15.1	13.9	12.6	11.4	10.3	9.4	8.5
5.00	H_{loss}=	6.17	4.26	3.05	1.71	1.05	0.69	0.48	0.35	0.27	0.21	0.17
	D_{90max}=	18.0	19.2	19.7	19.5	18.4	16.8	15.3	13.8	12.5	11.3	10.2
6.00	H_{loss}=	8.88	6.14	4.40	2.46	1.51	1.00	0.70	0.51	0.38	0.30	0.24
	D_{90max}=	25.3	27.0	27.8	27.5	25.8	23.6	21.4	19.3	17.3	15.6	14.2
7.00	H_{loss}=	12.09	8.35	5.98	3.35	2.06	1.36	0.95	0.69	0.52	0.41	0.33
	D_{90max}=	33.9	36.2	37.3	36.9	34.6	31.6	28.6	25.7	23.1	20.8	18.8
8.00	H_{loss}=	15.79	10.91	7.82	4.38	2.69	1.78	1.24	0.90	0.68	0.53	0.42
	D_{90max}=	43	46	48	47	44	40	36	33	29	26	24
9.00	H_{loss}=	19.98	13.81	9.89	5.54	3.41	2.25	1.57	1.14	0.86	0.67	0.54
	D_{90max}=	55	58	60	59	56	51	46	41	37	33	30
10.00	H_{loss}=	24.67	17.05	12.21	6.84	4.21	2.77	1.93	1.41	1.07	0.83	0.66
	D_{90max}=	67	72	74	73	69	62	56	50	45	40	36
12.00	H_{loss}=	35.52	24.55	17.58	9.85	6.06	3.99	2.79	2.03	1.54	1.20	0.96
	D_{90max}=	96	103	106	105	98	90	81	72	64	58	52

Table 7.10 Design table for vortex tubes. Tube length = 11m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m) 1.1	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
0.80	H_{loss}=	0.11	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00
	D_{90max}=	0.94	0.97	1.00	0.98	0.94	0.90	0.86	0.81	0.77	0.73	0.69
0.90	H_{loss}=	0.14	0.10	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.07	1.11	1.13	1.11	1.07	1.02	0.97	0.92	0.87	0.82	0.78
1.00	H_{loss}=	0.17	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	1.21	1.25	1.28	1.26	1.21	1.15	1.09	1.03	0.97	0.92	0.87
1.20	H_{loss}=	0.24	0.17	0.10	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.49	1.55	1.59	1.56	1.50	1.42	1.34	1.26	1.19	1.12	1.06
1.40	H_{loss}=	0.33	0.24	0.13	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.81	1.88	1.93	1.89	1.81	1.72	1.61	1.52	1.43	1.34	1.26
1.60	H_{loss}=	0.43	0.31	0.17	0.10	0.07	0.05	0.03	0.03	0.02	0.02	0.01
	D_{90max}=	2.15	2.24	2.30	2.25	2.15	2.03	1.91	1.79	1.68	1.57	1.48
1.80	H_{loss}=	0.55	0.39	0.22	0.13	0.09	0.06	0.04	0.03	0.02	0.02	0.02
	D_{90max}=	2.52	2.63	2.70	2.64	2.52	2.38	2.23	2.08	1.95	1.82	1.71
2.00	H_{loss}=	0.67	0.48	0.27	0.16	0.11	0.07	0.05	0.04	0.03	0.02	0.02
	D_{90max}=	2.91	3.05	3.13	3.07	2.92	2.75	2.57	2.40	2.24	2.09	1.96
2.20	H_{loss}=	0.82	0.58	0.32	0.20	0.13	0.09	0.06	0.05	0.04	0.03	0.02
	D_{90max}=	3.34	3.50	3.60	3.52	3.35	3.15	2.93	2.73	2.54	2.37	2.22
2.40	H_{loss}=	0.97	0.69	0.38	0.23	0.15	0.11	0.08	0.06	0.04	0.03	0.03
	D_{90max}=	3.80	3.98	4.10	4.01	3.81	3.57	3.32	3.09	2.87	2.67	2.49
2.60	H_{loss}=	1.14	0.81	0.45	0.27	0.18	0.12	0.09	0.07	0.05	0.04	0.03
	D_{90max}=	4.3	4.5	4.6	4.5	4.3	4.0	3.7	3.5	3.2	3.0	2.8
2.80	H_{loss}=	1.32	0.94	0.52	0.32	0.21	0.14	0.10	0.08	0.06	0.05	0.04
	D_{90max}=	4.8	5.1	5.2	5.1	4.8	4.5	4.2	3.9	3.6	3.3	3.1
3.00	H_{loss}=	1.52	1.08	0.60	0.37	0.24	0.16	0.12	0.09	0.07	0.05	0.04
	D_{90max}=	5.4	5.6	5.8	5.7	5.4	5.0	4.7	4.3	4.0	3.7	3.4
3.50	H_{loss}=	2.06	1.47	0.82	0.50	0.32	0.22	0.16	0.12	0.09	0.07	0.06
	D_{90max}=	6.9	7.3	7.5	7.3	6.9	6.4	5.9	5.5	5.0	4.7	4.3
4.00	H_{loss}=	2.70	1.92	1.07	0.65	0.42	0.29	0.21	0.16	0.12	0.10	0.08
	D_{90max}=	8.6	9.1	9.4	9.2	8.7	8.0	7.4	6.8	6.2	5.7	5.3
4.50	H_{loss}=	3.41	2.43	1.35	0.82	0.54	0.37	0.27	0.20	0.15	0.12	0.10
	D_{90max}=	10.6	11.2	11.6	11.3	10.6	9.8	9.0	8.3	7.6	7.0	6.4
5.00	H_{loss}=	4.21	3.01	1.67	1.01	0.66	0.46	0.33	0.25	0.19	0.15	0.12
	D_{90max}=	12.8	13.5	14.0	13.6	12.8	11.8	10.9	9.9	9.1	8.3	7.6
6.00	H_{loss}=	6.07	4.33	2.40	1.46	0.95	0.66	0.48	0.36	0.28	0.22	0.18
	D_{90max}=	17.8	18.8	19.5	19.0	17.8	16.5	15.1	13.7	12.5	11.4	10.4
7.00	H_{loss}=	8.26	5.89	3.27	1.99	1.30	0.90	0.65	0.49	0.37	0.30	0.24
	D_{90max}=	23.6	25.1	26.0	25.3	23.7	21.9	20.0	18.2	16.5	15.0	13.7
8.00	H_{loss}=	10.78	7.69	4.27	2.60	1.70	1.17	0.85	0.63	0.49	0.39	0.31
	D_{90max}=	30.4	32.3	33.6	32.6	30.6	28.1	25.7	23.3	21.2	19.2	17.5
9.00	H_{loss}=	13.65	9.74	5.41	3.29	2.15	1.48	1.07	0.80	0.62	0.49	0.40
	D_{90max}=	38.1	40.5	42.1	40.9	38.3	35.2	32.1	29.1	26.4	23.9	21.8
10.00	H_{loss}=	16.85	12.02	6.67	4.06	2.65	1.83	1.32	0.99	0.76	0.61	0.49
	D_{90max}=	46	49	51	50	46	43	39	35	32	29	26
12.00	H_{loss}=	24.26	17.31	9.61	5.85	3.82	2.63	1.90	1.43	1.10	0.87	0.71
	D_{90max}=	66	70	73	71	66	61	55	50	45	41	37
14.00	H_{loss}=	33.02	23.56	13.08	7.96	5.19	3.59	2.59	1.94	1.50	1.19	0.96
	D_{90max}=	90	95	99	96	90	83	75	68	61	55	50

Table 7.11 Design table for vortex tubes. Tube length = 12m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.5
1.00	H_{loss}=	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	0.99	1.04	1.05	1.02	0.99	0.95	0.90	0.86	0.82	0.78	0.69
1.20	H_{loss}=	0.17	0.09	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	1.22	1.28	1.29	1.26	1.21	1.16	1.10	1.04	0.99	0.94	0.83
1.40	H_{loss}=	0.23	0.13	0.08	0.05	0.03	0.02	0.0 2	0.0 1	0.0 1	0.01	0.01
	D_{90max}=	1.46	1.54	1.55	1.51	1.45	1.38	1.31	1.24	1.18	1.11	0.98
1.60	H_{loss}=	0.30	0.17	0.10	0.07	0.04	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	1.72	1.82	1.83	1.78	1.71	1.62	1.54	1.45	1.37	1.30	1.14
1.80	H_{loss}=	0.39	0.21	0.13	0.08	0.06	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	2.00	2.12	2.13	2.07	1.98	1.88	1.78	1.68	1.58	1.49	1.30
2.00	H_{loss}=	0.48	0.26	0.16	0.10	0.07	0.05	0.04	0.03	0.02	0.02	0.01
	D_{90max}=	2.29	2.44	2.45	2.38	2.28	2.16	2.03	1.92	1.80	1.70	1.48
2.20	H_{loss}=	0.58	0.32	0.19	0.12	0.08	0.06	0.05	0.03	0.03	0.02	0.01
	D_{90max}=	2.61	2.78	2.79	2.72	2.59	2.45	2.31	2.17	2.04	1.92	1.66
2.40	H_{loss}=	0.69	0.38	0.23	0.15	0.10	0.07	0.05	0.04	0.03	0.03	0.02
	D_{90max}=	2.95	3.15	3.16	3.07	2.93	2.77	2.60	2.44	2.29	2.15	1.85
2.60	H_{loss}=	0.80	0.44	0.27	0.17	0.12	0.08	0.06	0.05	0.04	0.03	0.02
	D_{90max}=	3.31	3.54	3.55	3.45	3.29	3.10	2.91	2.72	2.55	2.39	2.05
2.80	H_{loss}=	0.93	0.51	0.31	0.20	0.14	0.10	0.07	0.06	0.04	0.04	0.02
	D_{90max}=	3.69	3.95	3.97	3.85	3.66	3.45	3.23	3.02	2.82	2.64	2.26
3.00	H_{loss}=	1.07	0.59	0.36	0.23	0.16	0.11	0.08	0.06	0.05	0.04	0.03
	D_{90max}=	4.1	4.4	4.4	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.5
3.50	H_{loss}=	1.46	0.80	0.48	0.31	0.21	0.15	0.11	0.09	0.07	0.06	0.03
	D_{90max}=	5.2	5.6	5.6	5.4	5.2	4.8	4.5	4.2	3.9	3.6	3.1
4.00	H_{loss}=	1.90	1.05	0.63	0.41	0.28	0.20	0.15	0.11	0.09	0.07	0.05
	D_{90max}=	6.4	6.9	7.0	6.8	6.4	6.0	5.6	5.2	4.8	4.5	3.7
4.50	H_{loss}=	2.41	1.33	0.80	0.52	0.35	0.25	0.19	0.14	0.11	0.09	0.06
	D_{90max}=	7.8	8.5	8.5	8.2	7.8	7.3	6.7	6.2	5.8	5.4	4.5
5.00	H_{loss}=	2.97	1.64	0.99	0.64	0.44	0.31	0.23	0.18	0.14	0.11	0.07
	D_{90max}=	9.4	10.2	10.2	9.9	9.3	8.7	8.0	7.4	6.9	6.4	5.3
6.00	H_{loss}=	4.28	2.36	1.42	0.92	0.63	0.45	0.34	0.26	0.20	0.16	0.10
	D_{90max}=	12.9	14.0	14. 1	13.6	12.8	11.9	11.0	10.2	9.4	8.6	7.1
7.00	H_{loss}=	5.83	3.21	1.94	1.26	0.86	0.62	0.46	0.35	0.28	0.22	0.14
	D_{90max}=	17.1	18.6	18.7	18.1	17.0	15.8	14.5	13.3	12.3	11.3	9.2
8.00	H_{loss}=	7.61	4.20	2.53	1.64	1.12	0.80	0.60	0.46	0.36	0.29	0.18
	D_{90max}=	21.9	23.9	24.0	23.1	21.7	20.1	18.5	17. 0	15.6	14.3	11.7
9.00	H_{loss}=	9.64	5.31	3.21	2.07	1.42	1.02	0.76	0.58	0.46	0.37	0.23
	D_{90max}=	27.4	29.8	30.0	28.9	27.1	25.1	23.1	21.1	19.4	17.7	14.4
10.00	H_{loss}=	11.90	6.56	3.96	2.56	1.75	1.26	0.93	0.72	0.56	0.45	0.28
	D_{90max}=	33.4	36.5	36.7	35.3	33.1	30.7	28.1	25.8	23.6	21.6	17.4
12.00	H_{loss}=	17.13	9.44	5.70	3.69	2.52	1.81	1.34	1.03	0.81	0.65	0.41
	D_{90max}=	47	51	52	50	47	43	39	36	33	30	24
14.00	H_{loss}=	23.32	12.85	7.76	5.02	3.44	2.46	1.83	1.40	1.10	0.89	0.56
	D_{90max}=	64	70	70	67	63	58	53	49	44	40	32
16.00	H_{loss}=	30.45	16.79	10.13	6.56	4.49	3.21	2.39	1.83	1.44	1.16	0.73
	D_{90max}=	83	90	91	88	82	76	69	63	57	52	42
18.00	H_{loss}=	38.54	21.25	12.82	8.30	5.68	4.07	3.02	2.32	1.82	1.47	0.92
	D_{90max}=	104	114	115	111	103	95	87	80	72	66	53

Table 7.12 Design table for vortex tubes. Tube length = 13m

Total head loss across tube (in m) ,H_{loss}, and maximum allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m) 1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.5
1.00	H_{loss} =	0.12	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	0.80	0.86	0.88	0.88	0.86	0.83	0.80	0.76	0.73	0.70	0.63
1.20	H_{loss} =	0.17	0.09	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	0.97	1.05	1.08	1.07	1.04	1.01	0.96	0.92	0.88	0.84	0.75
1.40	H_{loss} =	0.23	0.13	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.15	1.25	1.28	1.27	1.24	1.19	1.14	1.09	1.04	0.99	0.88
1.60	H_{loss} =	0.30	0.17	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	1.34	1.46	1.50	1.49	1.45	1.40	1.33	1.27	1.21	1.15	1.02
1.80	H_{loss} =	0.38	0.21	0.13	0.08	0.05	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.54	1.69	1.74	1.72	1.67	1.61	1.54	1.46	1.39	1.32	1.16
2.00	H_{loss} =	0.47	0.26	0.16	0.10	0.07	0.05	0.04	0.03	0.02	0.02	0.01
	D_{90max}=	1.76	1.93	1.98	1.97	1.91	1.84	1.75	1.66	1.57	1.49	1.31
2.20	H_{loss} =	0.57	0.31	0.19	0.12	0.08	0.06	0.04	0.03	0.03	0.02	0.01
	D_{90max}=	1.99	2.18	2.25	2.23	2.17	2.08	1.97	1.87	1.77	1.68	1.47
2.40	H_{loss} =	0.68	0.37	0.22	0.14	0.10	0.07	0.05	0.04	0.03	0.02	0.02
	D_{90max}=	2.23	2.45	2.53	2.51	2.43	2.33	2.21	2.09	1.98	1.87	1.63
2.60	H_{loss} =	0.80	0.44	0.26	0.17	0.11	0.08	0.06	0.05	0.04	0.03	0.02
	D_{90max}=	2.48	2.74	2.83	2.80	2.72	2.60	2.46	2.33	2.20	2.08	1.81
2.80	H_{loss} =	0.93	0.51	0.30	0.20	0.13	0.09	0.07	0.05	0.04	0.03	0.02
	D_{90max}=	2.75	3.04	3.14	3.12	3.02	2.88	2.73	2.58	2.43	2.29	1.99
3.00	H_{loss} =	1.06	0.58	0.35	0.22	0.15	0.11	0.08	0.06	0.05	0.04	0.02
	D_{90max}=	3.03	3.36	3.47	3.44	3.33	3.18	3.01	2.84	2.67	2.51	2.17
3.50	H_{loss} =	1.45	0.79	0.48	0.31	0.21	0.15	0.11	0.08	0.06	0.05	0.03
	D_{90max}=	3.79	4.23	4.38	4.34	4.19	3.99	3.77	3.54	3.33	3.12	2.68
4.00	H_{loss} =	1.89	1.04	0.62	0.40	0.27	0.19	0.14	0.11	0.08	0.07	0.04
	D_{90max}=	4.6	5.2	5.4	5.3	5.2	4.9	4.6	4.3	4.1	3.8	3.2
4.50	H_{loss} =	2.39	1.31	0.79	0.51	0.34	0.24	0.18	0.14	0.11	0.09	0.05
	D_{90max}=	5.6	6.3	6.5	6.5	6.2	5.9	5.6	5.2	4.9	4.5	3.8
5.00	H_{loss} =	2.95	1.62	0.97	0.62	0.42	0.30	0.22	0.17	0.13	0.11	0.07
	D_{90max}=	6.6	7.5	7.8	7.7	7.4	7.0	6.6	6.2	5.7	5.4	4.5
6.00	H_{loss} =	4.25	2.33	1.40	0.90	0.61	0.43	0.32	0.24	0.19	0.15	0.09
	D_{90max}=	9.0	10.2	10.7	10.5	10.1	9.6	9.0	8.4	7.8	7.2	6.0
7.00	H_{loss} =	5.79	3.17	1.90	1.22	0.83	0.59	0.44	0.33	0.26	0.2 1	0.13
	D_{90max}=	11.8	13.5	14.0	13.9	13.3	12.6	11.7	10.9	10.1	9.4	7.8
8.00	H_{loss} =	7.56	4.15	2.49	1.60	1.09	0.77	0.57	0.43	0.34	0.27	0.17
	D_{90max}=	15.0	17.2	17.9	17.7	17.0	16.0	14.9	13.8	12.8	11.8	9.8
9.00	H_{loss} =	9.57	5.25	3.15	2.02	1.37	0.98	0.72	0.55	0.43	0.34	0.21
	D_{90max}=	18.7	21.3	22.3	22.0	21.1	19.9	18.5	17.1	15.8	14.6	12.0
10.00	H_{loss} =	11.81	6.48	3.88	2.50	1.70	1.21	0.89	0.68	0.53	0.42	0.26
	D_{90max}=	22.7	26.0	27.1	26.8	25.7	24.2	22.5	20.8	19.2	17.7	14.6
12.00	H_{loss} =	17.01	9.33	5.59	3.59	2.44	1.74	1.28	0.98	0.76	0.61	0.38
	D_{90max}=	32.0	36.8	38.4	38.0	36.4	34.2	31.8	29.4	27.1	24.9	20.3
14.00	H_{loss} =	23.15	12.70	7.61	4.89	3.32	2.36	1.74	1.33	1.04	0.83	0.51
	D_{90max}=	43	49	51	51	48	45	42	39	36	33	27
16.00	H_{loss} =	30.24	16.58	9.94	6.39	4.34	3.09	2.28	1.73	1.36	1.08	0.67
	D_{90max}=	55	64	67	66	63	59	55	51	46	43	35
18.00	H_{loss} =	38.28	20.99	12.58	8.09	5.50	3.91	2.88	2.19	1.72	1.37	0.85
	D_{90max}=	70	80	84	83	79	75	69	64	58	54	43

Table 7.13 Design table for vortex tubes. Tube length = 14m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.5	4.0
1.40	H_{loss}=	0.13	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.02	1.07	1.08	1.07	1.04	1.01	0.97	0.93	0.89	0.80	0.72
1.60	H_{loss}=	0.16	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.19	1.25	1.26	1.24	1.21	1.17	1.12	1.07	1.03	0.92	0.83
1.80	H_{loss}=	0.21	0.12	0.08	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	1.36	1.43	1.45	1.43	1.39	1.34	1.28	1.23	1.17	1.05	0.94
2.00	H_{loss}=	0.26	0.15	0.10	0.07	0.05	0.03	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.55	1.63	1.65	1.62	1.58	1.52	1.45	1.39	1.32	1.18	1.05
2.20	H_{loss}=	0.31	0.19	0.12	0.08	0.06	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.74	1.84	1.86	1.83	1.77	1.71	1.63	1.56	1.48	1.31	1.17
2.40	H_{loss}=	0.37	0.22	0.14	0.10	0.07	0.05	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	1.94	2.05	2.08	2.05	1.98	1.90	1.82	1.73	1.65	1.46	1.30
2.60	H_{loss}=	0.43	0.26	0.17	0.11	0.08	0.06	0.04	0.03	0.03	0.02	0.01
	D_{90max}=	2.16	2.28	2.31	2.27	2.20	2.11	2.02	1.92	1.82	1.61	1.42
2.80	H_{loss}=	0.50	0.30	0.19	0.13	0.09	0.07	0.05	0.04	0.03	0.02	0.01
	D_{90max}=	2.38	2.52	2.55	2.51	2.43	2.33	2.22	2.11	2.00	1.76	1.56
3.00	H_{loss}=	0.58	0.34	0.22	0.15	0.11	0.08	0.06	0.05	0.04	0.02	0.01
	D_{90max}=	2.62	2.78	2.81	2.76	2.67	2.56	2.44	2.31	2.19	1.92	1.70
3.50	H_{loss}=	0.79	0.47	0.30	0.20	0.14	0.10	0.08	0.06	0.05	0.03	0.02
	D_{90max}=	3.25	3.46	3.51	3.45	3.33	3.18	3.02	2.86	2.70	2.35	2.06
4.00	H_{loss}=	1.03	0.61	0.39	0.26	0.19	0.14	0.10	0.08	0.06	0.04	0.03
	D_{90max}=	3.96	4.23	4 .28	4.21	4.06	3.87	3.67	3.47	3.27	2.83	2.47
4.50	H_{loss}=	1.30	0.78	0.50	0.33	0.24	0.17	0.13	0.10	0.08	0.05	0.03
	D_{90max}=	4.7	5.1	5.1	5.1	4.9	4.6	4.4	4.1	3.9	3.3	2.9
5.00	H_{loss}=	1.61	0.96	0.61	0.41	0.29	0.21	0.16	0.13	0.10	0.06	0.04
	D_{90max}=	5.6	6.0	6.1	6.0	5.8	5.5	5.2	4.9	4.6	3.9	3.4
6.00	H_{loss}=	2.31	1.38	0.88	0.60	0.42	0.31	0.23	0.18	0.14	0.09	0.06
	D_{90max}=	7.6	8.1	8.3	8.1	7.8	7.4	6.9	6.5	6.1	5.2	4.4
7.00	H_{loss}=	3.15	1.88	1.20	0.81	0.57	0.42	0.32	0.25	0.20	0.12	0.08
	D_{90max}=	9.9	10.6	10.8	10.6	10.1	9.6	9.0	8.4	7.9	6.7	5.7
8.00	H_{loss}=	4.11	2.45	1.57	1.06	0.75	0.55	0.41	0.32	0.26	0.16	0.10
	D_{90max}=	12.5	13.5	13.7	13.4	12.8	12.1	11.4	10.6	9.9	8.3	7.0
9.00	H_{loss}=	5.20	3.10	1.98	1.34	0.95	0.69	0.52	0.41	0.32	0.20	0.13
	D_{90max}=	15.4	16.7	16.9	16.6	15.9	15.0	14.0	13.1	12.2	10.2	8.6
10.00	H_{loss}=	6.42	3.83	2.45	1.65	1.17	0.86	0.65	0.50	0.40	0.24	0.16
	D_{90max}=	18.7	20.2	20.6	20.1	19.3	18.2	17.0	15.9	14.7	12.3	10.3
12.00	H_{loss}=	9.25	5.52	3.53	2.38	1.68	1.23	0.93	0.73	0.58	0.35	0.23
	D_{90max}=	26.3	28.5	29.0	28.4	27.1	25.5	23.9	22.2	20.6	17.1	14.3
14.00	H_{loss}=	12.59	7.51	4.80	3.24	2.29	1.68	1.27	0.99	0.78	0.48	0.32
	D_{90max}=	35.3	38.3	38.9	38.1	36.4	34.2	32.0	29.7	27.5	22.7	18.9
16.00	H_{loss}=	16.44	9.81	6.27	4.23	2.99	2.19	1.66	1.29	1.02	0.63	0.42
	D_{90max}=	45	49	50	49	47	44	41	38	35	29	24
18.00	H_{loss}=	20.80	12.41	7.93	5.36	3.78	2.78	2.10	1.63	1.30	0.79	0.53
	D_{90max}=	57	62	63	61	59	55	51	48	44	36	30
20.00	H_{loss}=	25.68	15.32	9.79	6.61	4.67	3.43	2.59	2.01	1.60	0.98	0.65
	D_{90max}=	70	76	77	76	72	68	63	59	54	44	37
22.00	H_{loss}=	31.08	18.54	11.85	8.00	5.65	4.15	3.14	2.44	1.94	1.18	0.79
	D_{90max}=	84	92	93	91	87	82	76	71	65	53	44

Table 7.14 Design table for vortex tubes. Tube length = 15m

Total head loss across tube (in m) ,H_{loss}, and maximun allowable D_{90} sediment size (in mm) , $D_{90}max$

Discharge through tube (m^3/s)		Tube diameters (m) 1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.5	4.0
1.40	H_{loss}=	0.13	0.07	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	0.85	0.91	0.93	0.93	0.92	0.89	0.86	0.83	0.80	0.73	0.67
1.60	H_{loss}=	0.16	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	0.98	1.05	1.08	1.08	1.06	1.03	1.00	0.96	0.92	0.84	0.76
1.80	H_{loss}=	0.21	0.12	0.08	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.00
	D_{90max}=	1.11	1.20	1.23	1.23	1.21	1.17	1.14	1.09	1.05	0.95	0.86
2.00	H_{loss}=	0.26	0.15	0.10	0.06	0.05	0.03	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.26	1.35	1.39	1.39	1.37	1.33	1.28	1.23	1.18	1.06	0.96
2.20	H_{loss}=	0.31	0.18	0.12	0.08	0.06	0.04	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.40	1.51	1.56	1.56	1.53	1.49	1.43	1.38	1.32	1.18	1.06
2.40	H_{loss}=	0.37	0.22	0.14	0.09	0.07	0.05	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	1.56	1.68	1.74	1.74	1.70	1.65	1.59	1.53	1.46	1.31	1.17
2.60	H_{loss}=	0.43	0.26	0.16	0.11	0.08	0.06	0.04	0.03	0.03	0.02	0.01
	D_{90max}=	1.72	1.86	1.92	1.92	1.88	1.83	1.76	1.69	1.61	1.44	1.29
2.80	H_{loss}=	0.50	0.30	0.19	0.13	0.09	0.07	0.05	0.04	0.03	0.02	0.01
	D_{90max}=	1.89	2.05	2.11	2.12	2.07	2.01	1.93	1.85	1.77	1.57	1.40
3.00	H_{loss}=	0.57	0.34	0.22	0.15	0.10	0.07	0.06	0.04	0.03	0.02	0.01
	D_{90max}=	2.07	2.25	2.32	2.32	2.27	2.20	2.11	2.02	1.93	1.71	1.53
3.50	H_{loss}=	0.78	0.46	0.30	0.20	0.14	0.10	0.08	0.06	0.05	0.03	0.02
	D_{90max}=	2.54	2.77	2.87	2.87	2.81	2.71	2.60	2.48	2.36	2.09	1.85
4.00	H_{loss}=	1.02	0.61	0.39	0.26	0.18	0.13	0.10	0.08	0.06	0.04	0.02
	D_{90max}=	3.06	3.35	3.47	3.47	3.40	3.28	3.14	2.99	2.84	2.49	2.20
4.50	H_{loss}=	1.29	0.77	0.49	0.33	0.23	0.17	0.13	0.10	0.08	0.05	0.03
	D_{90max}=	3.64	3.99	4.14	4.14	4.05	3.90	3.73	3.55	3.37	2.94	2.58
5.00	H_{loss}=	1.60	0.95	0.60	0.41	0.28	0.21	0.16	0.12	0.10	0.06	0.04
	D_{90max}=	4.3	4.7	4.9	4.9	4.8	4.6	4.4	4.2	3.9	3.4	3.0
6.00	H_{loss}=	2.30	1.37	0.87	0.58	0.41	0.30	0.23	0.17	0.14	0.08	0.05
	D_{90max}=	5.7	6.3	6.5	6.5	6.4	6.1	5.8	5.5	5.2	4.5	3.9
7.00	H_{loss}=	3.13	1.86	1.18	0.79	0.56	0.41	0.31	0.24	0.19	0.11	0.07
	D_{90max}=	7.3	8.1	8.5	8.5	8.2	7.9	7.5	7.1	6.7	5.7	4.9
8.00	H_{loss}=	4.08	2.43	1.54	1.04	0.73	0.53	0.40	0.31	0.24	0.15	0.10
	D_{90max}=	9.2	10.2	10.7	10.7	10.4	10.0	9.4	8.9	8.4	7.1	6.1
9.00	H_{loss}=	5.17	3.07	1.95	1.31	0.92	0.67	0.51	0.39	0.31	0.19	0.12
	D_{90max}=	11.3	12.6	13.1	13.1	12.8	12.2	11.6	10.9	10.3	8.7	7.4
10.00	H_{loss}=	6.38	3.79	2.41	1.62	1.14	0.83	0.63	0.48	0.38	0.23	0.15
	D_{90max}=	13.6	15.2	15.9	15.9	15.5	14.8	14.0	13.2	12.4	10.5	8.9
12.00	H_{loss}=	9.19	5.46	3.47	2.33	1.64	1.20	0.90	0.70	0.55	0.33	0.22
	D_{90max}=	19.0	21.3	22.3	22.3	21.7	20.7	19.6	18.4	17.2	14.5	12.2
14.00	H_{loss}=	12.51	7.43	4.73	3.18	2.23	1.63	1.23	0.95	0.75	0.45	0.30
	D_{90max}=	25.3	28.4	29.8	29.8	28.9	27.6	26.1	24.5	22.9	19.2	16.2
16.00	H_{loss}=	16.34	9.71	6.18	4.15	2.92	2.13	1.60	1.24	0.98	0.59	0.39
	D_{90max}=	32.6	36.7	38.4	38.4	37.3	35.6	33.6	31.5	29.4	24.6	20.7
18.00	H_{loss}=	20.68	12.29	7.82	5.25	3.69	2.69	2.03	1.57	1.24	0.75	0.49
	D_{90max}=	40	46	48	48	46	44	42	39	36	30	25
20.00	H_{loss}=	25.53	15.17	9.65	6.48	4.56	3.32	2.50	1.93	1.53	0.92	0.61
	D_{90max}=	50	56	59	59	57	54	51	48	45	37	31
22.00	H_{loss}=	30.89	18.35	11.67	7.84	5.51	4.02	3.03	2.34	1.85	1.12	0.74
	D_{90max}=	60	68	71	71	69	66	62	58	54	45	37

Table 7.15 Design table for vortex tubes. Tube length = 16m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		1.6	1.8	2.0	2.2	2.4	2.6	2 .8	3.0	3.5	4.0	4.5
1.80	H_{loss}=	0.12	0.08	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.00	0.00
	D_{90max}=	1.01	1.05	1.06	1.06	1.04	1.01	0.98	0.95	0.86	0.79	0.72
2.00	H_{loss}=	0.15	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.13	1.18	1.20	1.19	1.17	1.14	1.10	1.06	0.97	0.88	0.80
2.20	H_{loss}=	0.18	0.12	0.08	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.00
	D_{90max}=	1.26	1.32	1.34	1.33	1.30	1.27	1.23	1.18	1.07	0.97	0.89
2.40	H_{loss}=	0.22	0.14	0.09	0.06	0.05	0.03	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.40	1.46	1.48	1.47	1.45	1.40	1.36	1.31	1.18	1.07	0.97
2.60	H_{loss}=	0.25	0.16	0.11	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.54	1.61	1.64	1.63	1.59	1.55	1.49	1.44	1.30	1.17	1.06
2.80	H_{loss}=	0.30	0.19	0.13	0.09	0.06	0.05	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	1.68	1.77	1.80	1.78	1.75	1.69	1.63	1.57	1.42	1.27	1.15
3.00	H_{loss}=	0.34	0.21	0.14	0.10	0.07	0.05	0.04	0.03	0.02	0.01	0.01
	D_{90max}=	1.84	1.93	1.96	1.95	1.91	1.85	1.78	1.71	1.54	1.38	1.25
3.50	H_{loss}=	0.46	0.29	0.20	0.14	0.10	0.07	0.06	0.05	0.03	0.02	0.01
	D_{90max}=	2.25	2.37	2.40	2.39	2.33	2.26	2.17	2.08	1.86	1.67	1.50
4.00	H_{loss}=	0.60	0.38	0.26	0.18	0.13	0.10	0.07	0.06	0.04	0.02	0.02
	D_{90max}=	2.69	2.84	2.89	2.87	2.80	2.71	2.60	2.49	2.22	1.97	1.77
4.50	H_{loss}=	0.76	0.48	0.32	0.23	0.16	0.12	0.09	0.07	0.04	0.03	0.02
	D_{90max}=	3.18	3.37	3.43	3.40	3.32	3.20	3.07	2.94	2.60	2.30	2.05
5.00	H_{loss}=	0.94	0.60	0.40	0.28	0.20	0.15	0.12	0.09	0.05	0.04	0.02
	D_{90max}=	3.71	3.94	4.01	3.97	3.88	3.74	3.58	3.42	3.01	2.66	2.36
6.00	H_{loss}=	1.36	0.86	0.57	0.40	0.29	0.22	0.17	0.13	0.08	0.05	0.04
	D_{90max}=	4.9	5.2	5.3	5.3	5.1	4.9	4.7	4.5	3.9	3.5	3.0
7.00	H_{loss}=	1.84	1.17	0.78	0.55	0.40	0.30	0.23	0.18	0.11	0.07	0.05
	D_{90max}=	6.3	6.7	6.8	6.8	6.6	6.3	6.0	5.7	5.0	4.3	3.8
8.00	H_{loss}=	2.41	1.53	1.02	0.71	0.52	0.39	0.30	0.24	0.14	0.09	0.06
	D_{90max}=	7.8	8.4	8.6	8.5	8.2	7.9	7.5	7.1	6.2	5.4	4.7
9.00	H_{loss}=	3.05	1.93	1.29	0.90	0.66	0.49	0.38	0.30	0.18	0.12	0.08
	D_{90max}=	9.6	10.3	10.5	10.4	10.1	9.7	9.2	8.7	7.5	6.5	5.6
10.00	H_{loss}=	3.76	2.39	1.60	1.12	0.81	0.61	0.47	0.37	0.22	0.14	0.10
	D_{90max}=	11.5	12.4	12.6	12.5	12.1	11.6	11.1	10.4	9.0	7.7	6.7
12.00	H_{loss}=	5.42	3.43	2.30	1.61	1.17	0.87	0.67	0.53	0.32	0.21	0.14
	D_{90max}=	16.0	17.2	17.6	17.4	16.9	16.2	15.3	14.5	12.4	10.6	9.1
14.00	H_{loss}=	7.38	4.68	3.13	2.19	1.59	1.19	0.92	0.72	0.43	0.28	0.20
	D_{90max}=	21.3	22.9	23.4	23.2	22.5	21.5	20.3	19.2	16.3	13.9	11.9
16.00	H_{loss}=	9.64	6.11	4.09	2.86	2.07	1.55	1.20	0.94	0.56	0.37	0.26
	D_{90max}=	27.4	29.5	30.1	29.8	28.9	27.6	26.1	24.6	20.9	17.7	15.1
18.00	H_{loss}=	12.20	7.73	5.17	3.62	2.63	1.97	1.51	1.19	0.71	0.46	0.32
	D_{90max}=	34.2	36.9	37.8	37.4	36.2	34.5	32.7	30.7	26.1	22.1	18.8
20.00	H_{loss}=	15.06	9.54	6.38	4.47	3.24	2.43	1.87	1.47	0.88	0.57	0.40
	D_{90max}=	41	45	46	45	44	42	39	37	31	26	22
22.00	H_{loss}=	18.22	11.54	7.72	5.40	3.92	2.94	2.26	1.78	1.06	0.69	0.48
	D_{90max}=	50	54	55	55	53	50	48	45	38	32	27
24.00	H_{loss}=	21.68	13.74	9.19	6.43	4.67	3.50	2.69	2.12	1.26	0.82	0.58
	D_{90max}=	59	64	65	65	63	60	56	53	45	38	32
26.00	H_{loss}=	25.44	16.12	10.79	7.55	5.48	4.10	3.16	2.49	1.48	0.97	0.68
	D =	69	75	77	76	73	70	66	62	52	44	37

Table 7.16 Design table for vortex tubes. Tube length = 18m

Total head loss across tube (in m) ,H_{loss},
and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.5	4.0	4.5	5.0
2.20	H_{loss} =	0.11	0.08	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.00	0.00
	D_{90max}=	0.97	1.01	1.02	1.02	1.01	0.99	0.96	0.89	0.82	0.76	0.70
2.40	H_{loss} =	0.14	0.09	0.06	0.05	0.03	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.07	1.11	1.13	1.13	1.11	1.09	1.06	0.98	0.90	0.83	0.77
2.60	H_{loss} =	0.16	0.11	0.07	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.17	1.22	1.23	1.23	1.22	1.19	1.16	1.07	0.98	0.90	0.83
2.80	H_{loss} =	0.18	0.12	0.09	0.06	0.05	0.03	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.27	1.32	1.35	1.34	1.33	1.30	1.26	1.16	1.07	0.98	0.90
3.00	H_{loss} =	0.21	0.14	0.10	0.07	0.05	0.04	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.38	1.44	1.46	1.46	1.44	1.41	1.37	1.26	1.15	1.06	0.97
3.50	H_{loss} =	0.29	0.19	0.13	0.10	0.07	0.05	0.04	0.02	0.02	0.01	0.01
	D_{90max}=	1.66	1.74	1.77	1.76	1.74	1.70	1.65	1.51	1.38	1.26	1.15
4.00	H_{loss} =	0.38	0.25	0.17	0.13	0.09	0.07	0.06	0.03	0.02	0.01	0.01
	D_{90max}=	1.96	2.06	2.10	2.09	2.06	2.01	1.95	1.78	1.62	1.47	1.34
4.50	H_{loss} =	0.48	0.32	0.22	0.16	0.12	0.09	0.07	0.04	0.03	0.02	0.01
	D_{90max}=	2.29	2.41	2.45	2.45	2.41	2.35	2.28	2.08	1.88	1.70	1.55
5.00	H_{loss} =	0.59	0.39	0.27	0.20	0.15	0.11	0.09	0.05	0.03	0.02	0.02
	D_{90max}=	2.65	2.78	2.84	2.83	2.79	2.72	2.63	2.39	2.15	1.94	1.76
6.00	H_{loss} =	0.85	0.56	0.39	0.28	0.21	0.16	0.12	0.07	0.05	0.03	0.02
	D_{90max}=	3.43	3.62	3.70	3.69	3.63	3.53	3.41	3.08	2.76	2.47	2.23
7.00	H_{loss} =	1.15	0.77	0.53	0.38	0.28	0.22	0.17	0.10	0.06	0.04	0.03
	D_{90max}=	4.3	4.6	4.7	4.7	4.6	4.5	4.3	3.9	3.4	3.1	2.7
8.00	H_{loss} =	1.50	1.00	0.69	0.50	0.37	0.28	0.22	0.13	0.08	0.06	0.04
	D_{90max}=	5.3	5.6	5.8	5.8	5.7	5.5	5.3	4.7	4.2	3.7	3.3
9.00	H_{loss} =	1.90	1.27	0.88	0.63	0.47	0.36	0.28	0.16	0.11	0.07	0.05
	D_{90max}=	6.4	6.8	7.0	7.0	6.9	6.6	6.4	5.7	5.0	4.5	4.0
10.00	H_{loss} =	2.35	1.56	1.08	0.78	0.58	0.44	0.35	0.20	0.13	0.09	0.06
	D_{90max}=	7.7	8.2	8.4	8.3	8.2	7.9	7.6	6.8	6.0	5.3	4.7
12.00	H_{loss} =	3.38	2.25	1.56	1.13	0.84	0.64	0.50	0.29	0.19	0.13	0.09
	D_{90max}=	10.5	11.2	11.5	11.4	11.2	10.9	10.4	9.2	8.1	7.1	6.2
14.00	H_{loss} =	4.61	3.06	2.13	1.53	1.14	0.87	0.68	0.40	0.25	0.18	0.13
	D_{90max}=	13.8	14.8	15.1	15.1	14.8	14.3	13.7	12.1	10.5	9.2	8.0
16.00	H_{loss} =	6.02	4.00	2.78	2.00	1.49	1.14	0.89	0.52	0.33	0.23	0.17
	D_{90max}=	17.6	18.8	19.3	19.3	18.9	18.2	17.5	15.4	13.3	11.6	10.1
18.00	H_{loss} =	7.61	5.06	3.52	2.53	1.88	1.44	1.12	0.66	0.42	0.29	0.21
	D_{90max}=	21.9	23.5	24.1	24.0	23.5	22.7	21.7	19.1	16.5	14.3	12.5
20.00	H_{loss} =	9.40	6.25	4.34	3.13	2.32	1.77	1.39	0.81	0.52	0.36	0.26
	D_{90max}=	26.7	28.6	29.4	29.3	28.7	27.7	26.5	23.2	20.1	17.3	15.1
22.00	H_{loss} =	11.37	7.56	5.25	3.78	2.81	2.15	1.68	0.98	0.63	0.43	0.31
	D_{90max}=	32.0	34.3	35.2	35.2	34.4	33.2	31.7	27.8	24.0	20.7	17.9
24.00	H_{loss} =	13.53	9.00	6.25	4.50	3.35	2.55	1.99	1.17	0.75	0.51	0.37
	D_{90max}=	37.8	40.6	41.7	41.6	40.6	39.2	37.5	32.8	28.3	24.3	21.1
26.00	H_{loss} =	15.88	10.56	7.33	5.28	3.93	3.00	2.34	1.37	0.88	0.60	0.44
	D_{90max}=	44	47	47	48	48	47	45	43	38	32	28
28.00	H_{loss} =	18.42	12.25	8.51	6.13	4.55	3.48	2.71	1.59	1.02	0.70	0.51
	D_{90max}=	50	54	56	56	54	52	50	44	37	32	28
30.00	H_{loss} =	21.15	14.06	9.76	7.03	5.23	3.99	3.12	1.82	1.17	0.80	0.58
	D_{90max}=	58	62	64	64	62	60	57	50	43	37	32

Table 7.17 Design table for vortex tubes. Tube length = 20m

Total head loss across tube (in m) ,H_{loss},
and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		2.0	2.2	2.4	2.6	2.8	3.0	3.5	4.0	4.5	5.0	5.5
2.60	H_{loss} =	0.10	0.07	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	0.92	0.96	0.97	0.98	0.97	0.95	0.90	0.84	0.78	0.73	0.68
2.80	H_{loss} =	0.12	0.08	0.06	0.04	0.03	0.03	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	1.00	1.04	1.06	1.06	1.05	1.03	0.98	0.91	0.84	0.78	0.73
3.00	H_{loss} =	0.14	0.10	0.07	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.00
	D_{90max}=	1.08	1.12	1.14	1.14	1.13	1.12	1.05	0.98	0.91	0.84	0.78
3.50	H_{loss} =	0.19	0.13	0.09	0.07	0.05	0.04	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.29	1.34	1.36	1.37	1.35	1.33	1.25	1.16	1.07	0.99	0.92
4.00	H_{loss} =	0.25	0.17	0.12	0.09	0.07	0.05	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.51	1.57	1.60	1.60	1.59	1.56	1.47	1.35	1.25	1.15	1.06
4.50	H_{loss} =	0.31	0.22	0.15	0.11	0.09	0.07	0.04	0.02	0.02	0.01	0.01
	D_{90max}=	1.74	1.82	1.86	1.86	1.84	1.81	1.69	1.56	1.43	1.32	1.22
5.00	H_{loss} =	0.39	0.27	0.19	0.14	0.11	0.08	0.05	0.03	0.02	0.01	0.01
	D_{90max}=	2.00	2.09	2.13	2.13	2.11	2.07	1.93	1.78	1.63	1.49	1.37
6.00	H_{loss} =	0.56	0.38	0.27	0.20	0.15	0.12	0.07	0.04	0.03	0.02	0.02
	D_{90max}=	2.55	2.67	2.72	2.73	2.70	2.65	2.46	2.25	2.05	1.87	1.71
7.00	H_{loss} =	0.76	0.52	0.37	0.28	0.21	0.16	0.09	0.06	0.04	0.03	0.02
	D_{90max}=	3.16	3.32	3.39	3.40	3.36	3.30	3.05	2.78	2.52	2.29	2.09
8.00	H_{loss} =	0.99	0.68	0.49	0.36	0.27	0.21	0.12	0.08	0.05	0.04	0.03
	D_{90max}=	3.85	4.05	4.14	4.15	4.10	4.02	3.71	3.37	3.04	2.75	2.50
9.00	H_{loss} =	1.25	0.86	0.62	0.46	0.35	0.27	0.15	0.10	0.07	0.05	0.04
	D_{90max}=	4.6	4.9	5.0	5.0	4.9	4.8	4.4	4.0	3.6	3.3	2.9
10.00	H_{loss} =	1.54	1.07	0.76	0.56	0.43	0.33	0.19	0.12	0.08	0.06	0.04
	D_{90max}=	5.4	5.7	5.9	5.9	5.8	5.7	5.2	4.7	4.2	3.8	3.4
12.00	H_{loss} =	2.22	1.53	1.10	0.81	0.62	0.48	0.28	0.17	0.12	0.08	0.06
	D_{90max}=	7.3	7.7	7.9	8.0	7.9	7.7	7.0	6.3	5.6	5.0	4.5
14.00	H_{loss} =	3.02	2.09	1.50	1.11	0.84	0.65	0.37	0.24	0.16	0.11	0.09
	D_{90max}=	9.5	10.1	10.4	10.4	10.3	10.0	9.1	8.2	7.2	6.4	5.7
16.00	H_{loss} =	3.95	2.73	1.95	1.44	1.09	0.85	0.49	0.31	0.21	0.15	0.11
	D_{90max}=	12.0	12.8	13.1	13.2	13.0	12.7	11.5	10.3	9.1	8.0	7.2
18.00	H_{loss} =	5.00	3.45	2.47	1.83	1.39	1.08	0.62	0.39	0.27	0.19	0.14
	D_{90max}=	14.9	15.8	16.3	16.3	16.1	15.7	14.2	12.6	11.1	9.8	8.7
20.00	H_{loss} =	6.17	4.26	3.05	2.26	1.71	1.33	0.77	0.48	0.33	0.23	0.18
	D_{90max}=	18.0	19.2	19.7	19.8	19.5	19.0	17.2	15.3	13.5	11.8	10.5
22.00	H_{loss} =	7.46	5.16	3.69	2.73	2.07	1.61	0.93	0.59	0.40	0.28	0.21
	D_{90max}=	21.5	22.9	23.6	23.7	23.3	22.7	20.6	18.2	16.0	14.1	12.4
24.00	H_{loss} =	8.88	6.14	4.40	3.25	2.46	1.91	1.10	0.70	0.47	0.34	0.25
	D_{90max}=	25.3	27.0	27.8	27.9	27.5	26.7	24.2	21.4	18.8	16.5	14.5
26.00	H_{loss} =	10.42	7.20	5.16	3.81	2.89	2.24	1.29	0.82	0.55	0.40	0.30
	D_{90max}=	29.5	31.4	32.3	32.4	32.0	31.1	28.1	24.8	21.8	19.1	16.8
28.00	H_{loss} =	12.09	8.35	5.98	4.42	3.35	2.60	1.50	0.95	0.64	0.46	0.34
	D_{90max}=	33.9	36.2	37.3	37.4	36.9	35.9	32.4	28.6	25.0	21.9	19.2
30.00	H_{loss} =	13.88	9.59	6.87	5.07	3.85	2.99	1.72	1.09	0.74	0.53	0.39
	D_{90max}=	38.7	41.3	42.6	42.7	42.1	40.9	37.0	32.6	28.5	24.9	21.9
35.00	H_{loss} =	18.89	13.05	9.35	6.91	5.24	4.07	2.34	1.48	1.00	0.72	0.54
	D_{90max}=	52	55	57	57	56	55	49	43	38	33	29
40.00	H_{loss} =	24.67	17.05	12.21	9.02	6.84	5.31	3.06	1.93	1.31	0.94	0.70
	D_{90max}=	67	72	74	74	73	71	64	56	49	43	37

Table 7.18 Design table for vortex tubes. Tube length = 25m

Total head loss across tube (in m) ,H_{loss}, and maximun allowable D_{90} sediment size (in mm) , D_{90max}

Discharge through tube (m^3/s)		Tube diameters (m)										
		2.4	2.6	2.8	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5
4.00	H_{loss} =	0.12	0.09	0.07	0.05	0.03	0.02	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	0.89	0.93	0.95	0.96	0.95	0.92	0.87	0.83	0.78	0.74	0.70
4.50	H_{loss} =	0.15	0.11	0.08	0.06	0.04	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	1.01	1.05	1.08	1.09	1.08	1.04	0.99	0.94	0.88	0.83	0.78
5.00	H_{loss} =	0.19	0.14	0.10	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.13	1.18	1.21	1.23	1.22	1.17	1.11	1.05	0.99	0.93	0.87
6.00	H_{loss} =	0.27	0.20	0.15	0.11	0.06	0.04	0.03	0.02	0.01	0.01	0.01
	D_{90max}=	1.40	1.46	1.50	1.52	1.51	1.45	1.37	1.29	1.21	1.13	1.07
7.00	H_{loss} =	0.36	0.27	0.20	0.15	0.09	0.05	0.03	0.02	0.02	0.01	0.01
	D_{90max}=	1.69	1.77	1.82	1.85	1.83	1.76	1.66	1.55	1.45	1.35	1.27
8.00	H_{loss} =	0.47	0.35	0.26	0.20	0.11	0.07	0.05	0.03	0.02	0.02	0.01
	D_{90max}=	2.00	2.10	2.16	2.19	2.18	2.09	1.96	1.83	1.71	1.59	1.49
9.00	H_{loss} =	0.60	0.44	0.33	0.25	0.14	0.09	0.06	0.04	0.03	0.02	0.02
	D_{90max}=	2.34	2.46	2.54	2.57	2.55	2.44	2.29	2.13	1.98	1.84	1.72
10.00	H_{loss} =	0.74	0.54	0.41	0.31	0.18	0.11	0.07	0.05	0.04	0.03	0.02
	D_{90max}=	2.70	2.85	2.94	2.98	2.96	2.82	2.64	2.46	2.28	2.11	1.96
12.00	H_{loss} =	1.07	0.78	0.59	0.45	0.25	0.16	0.10	0.07	0.05	0.04	0.03
	D_{90max}=	3.51	3.71	3.83	3.89	3.86	3.67	3.43	3.17	2.93	2.70	2.50
14.00	H_{loss} =	1.45	1.06	0.80	0.61	0.34	0.21	0.14	0.10	0.07	0.05	0.04
	D_{90max}=	4.4	4.7	4.9	4.9	4.9	4.6	4.3	4.0	3.7	3.4	3.1
16.00	H_{loss} =	1.90	1.39	1.04	0.80	0.45	0.28	0.18	0.13	0.09	0.07	0.05
	D_{90max}=	5.5	5.8	6.0	6.1	6.1	5.7	5.3	4.9	4.5	4.1	3.8
18.00	H_{loss} =	2.40	1.76	1.32	1.01	0.57	0.35	0.23	0.16	0.12	0.09	0.07
	D_{90max}=	6.6	7.0	7.3	7.4	7.3	7.0	6.4	5.9	5.4	4.9	4.5
20.00	H_{loss} =	2.96	2.17	1.63	1.25	0.70	0.43	0.28	0.20	0.14	0.11	0.09
	D_{90max}=	7.9	8.4	8.7	8.9	8.8	8.3	7.7	7.0	6.4	5.8	5.3
22.00	H_{loss} =	3.58	2.62	1.97	1.51	0.85	0.52	0.34	0.24	0.17	0.13	0.10
	D_{90max}=	9.3	9.9	10.3	10.5	10.4	9.8	9.0	8.2	7.5	6.8	6.2
24.00	H_{loss} =	4.27	3.12	2.34	1.80	1.01	0.62	0.41	0.29	0.21	0.16	0.12
	D_{90max}=	10.8	11.5	12.0	12.2	12.1	11.4	10.5	9.6	8.7	7.9	7.2
26.00	H_{loss} =	5.01	3.66	2.75	2.11	1.18	0.73	0.48	0.33	0.24	0.18	0.14
	D_{90max}=	12.4	13.3	13.8	14.1	13.9	13.1	12.1	11.0	10.0	9.0	8.2
28.00	H_{loss} =	5.81	4.25	3.19	2.45	1.37	0.84	0.56	0.39	0.28	0.21	0.17
	D_{90max}=	14.2	15.2	15.8	16.1	16.0	15.0	13.8	12.5	11.3	10.3	9.3
30.00	H_{loss} =	6.67	4.88	3.66	2.81	1.58	0.97	0.64	0.45	0.33	0.25	0.19
	D_{90max}=	16.1	17.2	17.9	18.3	18.1	17.0	15.6	14.2	12.8	11.6	10.5
35.00	H_{loss} =	9.07	6.64	4.99	3.83	2.15	1.32	0.87	0.61	0.44	0.33	0.26
	D_{90max}=	21.4	22.9	23.9	24.4	24.1	22.7	20.8	18.8	17.0	15.3	13.8
40.00	H_{loss} =	11.85	8.67	6.51	5.00	2.80	1.72	1.14	0.79	0.58	0.44	0.34
	D_{90max}=	27.5	29.5	30.8	31.4	31.1	29.2	26.7	24.1	21.7	19.5	17.6
45.00	H_{loss} =	15.00	10.98	8.24	6.33	3.55	2.18	1.44	1.00	0.73	0.55	0.43
	D_{90max}=	34.4	37.0	38.5	39.3	38.9	36.5	33.4	30.1	27.1	24.3	21.9
50.00	H_{loss} =	18.52	13.55	10.18	7.82	4.38	2.69	1.78	1.24	0.90	0.68	0.53
	D_{90max}=	42	45	47	48	47	44	40	36	33	29	26
60.00	H_{loss} =	26.66	19.52	14.66	11.25	6.31	3.88	2.56	1.78	1.30	0.98	0.77
	D_{90max}=	60	64	67	68	67	63	58	52	47	42	37

Table 7.19 Design table for vortex tubes. Tube length = 30m

Total head loss across tube (in m), H_{loss}, and maximun allowable D_{90} sediment size (in mm), $D_{90}max$

Discharge through tube (m^3/s)		Tube diameters (m)										
		3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
6.00	H_{loss}=	0.11	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00
	D_{90max}=	0.95	1.00	1.00	0.98	0.95	0.90	0.86	0.82	0.78	0.75	0.71
7.00	H_{loss}=	0.15	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.00
	D_{90max}=	1.13	1.18	1.19	1.16	1.12	1.07	1.02	0.97	0.92	0.87	0.83
8.00	H_{loss}=	0.19	0.11	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.31	1.38	1.39	1.36	1.30	1.24	1.18	1.12	1.06	1.01	0.96
9.00	H_{loss}=	0.25	0.14	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.01
	D_{90max}=	1.51	1.60	1.60	1.56	1.50	1.43	1.35	1.28	1.21	1.15	1.09
10.00	H_{loss}=	0.30	0.17	0.10	0.07	0.04	0.03	0.02	0.02	0.01	0.01	0.01
	D_{90max}=	1.72	1.82	1.83	1.78	1.71	1.62	1.54	1.45	1.37	1.30	1.23
12.00	H_{loss}=	0.44	0.24	0.15	0.09	0.06	0.05	0.03	0.03	0.02	0.02	0.01
	D_{90max}=	2.17	2.31	2.32	2.26	2.16	2.05	1.93	1.82	1.71	1.62	1.53
14.00	H_{loss}=	0.60	0.33	0.20	0.13	0.09	0.06	0.05	0.04	0.03	0.02	0.02
	D_{90max}=	2.68	2.85	2.87	2.79	2.66	2.51	2.36	2.22	2.09	1.96	1.85
16.00	H_{loss}=	0.78	0.43	0.26	0.17	0.11	0.08	0.06	0.05	0.04	0.03	0.02
	D_{90max}=	3.23	3.46	3.47	3.37	3.21	3.03	2.84	2.66	2.49	2.34	2.20
18.00	H_{loss}=	0.99	0.54	0.33	0.21	0.15	0.10	0.08	0.06	0.05	0.04	0.03
	D_{90max}=	3.85	4.12	4.14	4.02	3.82	3.59	3.37	3.14	2.94	2.75	2.58
20.00	H_{loss}=	1.22	0.67	0.41	0.26	0.18	0.13	0.10	0.07	0.06	0.05	0.04
	D_{90max}=	4.5	4.8	4.9	4.7	4.5	4.2	3.9	3.7	3.4	3.2	3.0
22.00	H_{loss}=	1.47	0.81	0.49	0.32	0.22	0.16	0.12	0.09	0.07	0.06	0.05
	D_{90max}=	5.2	5.6	5.7	5.5	5.2	4.9	4.6	4.2	3.9	3.7	3.4
24.00	H_{loss}=	1.75	0.97	0.58	0.38	0.26	0.19	0.14	0.11	0.08	0.07	0.05
	D_{90max}=	6.0	6.5	6.5	6.3	6.0	5.6	5.2	4.8	4.5	4.2	3.9
26.00	H_{loss}=	2.06	1.13	0.68	0.44	0.30	0.22	0.16	0.12	0.10	0.08	0.06
	D_{90max}=	6.9	7.4	7.5	7.2	6.8	6.4	5.9	5.5	5.1	4.7	4.4
28.00	H_{loss}=	2.39	1.32	0.79	0.51	0.35	0.25	0.19	0.14	0.11	0.09	0.07
	D_{90max}=	7.8	8.4	8.5	8.2	7.7	7.2	6.7	6.2	5.7	5.3	4.9
30.00	H_{loss}=	2.74	1.51	0.91	0.59	0.40	0.29	0.21	0.16	0.13	0.10	0.09
	D_{90max}=	8.8	9.5	9.5	9.2	8.7	8.1	7.5	6.9	6.4	5.9	5.5
35.00	H_{loss}=	3.73	2.06	1.24	0.80	0.55	0.39	0.29	0.22	0.18	0.14	0.12
	D_{90max}=	11.4	12.4	12.5	12.0	11.4	10.6	9.8	9.0	8.3	7.7	7.1
40.00	H_{loss}=	4.87	2.69	1.62	1.05	0.72	0.51	0.38	0.29	0.23	0.19	0.15
	D_{90max}=	14.5	15.8	15.9	15.3	14.4	13.4	12.4	11.4	10.5	9.6	8.9
45.00	H_{loss}=	6.17	3.40	2.05	1.33	0.91	0.65	0.48	0.37	0.29	0.23	0.19
	D_{90max}=	18.0	19.6	19.7	19.0	17.9	16.6	15.3	14.0	12.9	11.8	10.9
50.00	H_{loss}=	7.61	4.20	2.53	1.64	1.12	0.80	0.60	0.46	0.36	0.29	0.24
	D_{90max}=	21.9	23.9	24.0	23.1	21.7	20.1	18.5	17.0	15.6	14.3	13.2
60.00	H_{loss}=	10.96	6.04	3.65	2.36	1.62	1.16	0.86	0.66	0.52	0.42	0.34
	D_{90max}=	30.9	33.7	33.9	32.7	30.7	28.4	26.1	23.9	21.8	20.0	18.3
70.00	H_{loss}=	14.92	8.23	4.96	3.21	2.20	1.57	1.17	0.90	0.71	0.57	0.47
	D_{90max}=	41	45	45	43	41	38	34	31	29	26	24

Tables used in tunnel extractor design

Example of linear interpolation in Table 8.1

Let : X_T = 2,200ppm, D_{50} = 0.27mm , Q_T = 3.4m^3/s, and the tunnel width 1.73m

Use Table 8.1(d) and 8.1(e). These values are straddled by:

X_T	= 2,000ppm and 5,000 pm
D_{50}	= 0.2mm and 0.3mm
Q_T	= 3m^3/s and 4m^3/s
Tunnel width	= 1.6m and 1.8m

For X_T = 2,000ppm, width = 1.6 m and Q_T = 3m^3/s, the ratio, R_t, is obtained from:

$$\alpha = \frac{D_{50} - D_{50\,less}}{D_{50\,more} - D_{50\,less}}$$

$$\alpha = \frac{0.27 - 0.20}{0.30 - 0.20} = 0.70$$

and $$R_t = \alpha * ratio_{more} + (1-\alpha) * ratio_{less}$$

$$= 0.70 * 0.93 + 0.30 * 1.13 = 0.99$$

Similarly, for X_T = 2,000ppm, width = 1.6m and Q_T = 4m^3/s

α	= 0.70
R_t	= 0.70 * 1.16 + 0.3 * 1.44 = 1.24

We now interpolate between these values for R_t:

$$\alpha = \frac{3.4m^3/s - 3m^3/s}{4m^3/s - 3m^3/s} = 0.40$$

$$R_t = 0.40 * 1.24 + 0.60 * 0.99 = 1.09$$

Repeating the calculations above with a tunnel width of 1.8m we get:

$$R_t = 0.40 * 0.99 + 0.60 * 0.79 = 0.87$$

Now interpolating between values for width = 1.6m and 1.8m

$$\alpha = \frac{1.73 - 1.60}{1.80 - 1.60} = 0.65$$

$$R_t = 0.65 * 0.87 + 0.35 * 1.09 = 0.95$$

All of the above calculations are repeated for X_T = 5,000ppm, finally giving R_t = 0.76

Interpolating between values for X_T = 2,000ppm and 5,000ppm:

$$\alpha = \frac{2,200 - 2,000}{5,000 - 2,000} = 0.067$$

$$R_t(overall) = 0.067 * 0.76 + 0.933 * 0.95 = 0.94$$

Tables for predicting depth in partially blocked tunnel

(Ratio of tunnel height, h_t, to width, b, is predicted)

Table 8.1(a) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 200ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm 0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	2.07	1.60	1.43	1.33	1.26	1.20	1.11	1.04	0.92	0.82	0.76	0.76	0.75	0.74	0.73
	3	3.01	2.27	2.01	1.85	1.73	1.65	1.52	1.40	1.22	1.09	1.01	1.01	1.00	1.00	0.98
	4	3.94	2.94	2.55	2.32	2.18	2.07	1.87	1.75	1.51	1.34	1.22	1.23	1.23	1.22	1.21
	5	4.86	3.57	3.08	2.79	2.61	2.44	2.24	2.07	1.76	1.56	1.43	1.43	1.43	1.45	1.44
	7	6.68	4.83	4.11	3.70	3.40	3.20	2.86	2.66	2.24	1.94	1.80	1.82	1.83	1.84	1.84
	10	9.36	6.65	5.58	4.93	4.54	4.22	3.76	3.45	2.87	2.50	2.29	2.32	2.34	2.35	2.37
	15	13.82	9.58	7.90	6.92	6.31	5.78	5.10	4.63	3.79	3.28	2.99	3.03	3.10	3.13	3.16
1.6	2	1.57	1.23	1.10	1.03	0.98	0.94	0.87	0.82	0.72	0.65	0.60	0.59	0.59	0.58	0.57
	3	2.27	1.74	1.54	1.43	1.34	1.28	1.18	1.11	0.97	0.87	0.80	0.80	0.79	0.79	0.77
	4	2.96	2.23	1.96	1.79	1.68	1.60	1.48	1.37	1.19	1.05	0.97	0.97	0.98	0.97	0.96
	5	3.65	2.71	2.35	2.16	2.01	1.91	1.73	1.62	1.39	1.23	1.13	1.14	1.14	1.14	1.13
	7	5.01	3.65	3.13	2.84	2.63	2.46	2.25	2.07	1.76	1.55	1.43	1.43	1.43	1.45	1.45
	10	7.02	5.02	4.25	3.77	3.49	3.28	2.91	2.70	2.27	1.98	1.82	1.85	1.84	1.85	1.85
	15	10.31	7.18	6.00	5.31	4.82	4.50	4.00	3.63	3.00	2.60	2.37	2.41	2.46	2.46	2.47
1.8	2	1.23	0.97	0.88	0.82	0.79	0.75	0.70	0.66	0.59	0.53	0.49	0.49	0.48	0.47	0.46
	3	1.78	1.37	1.22	1.14	1.08	1.03	0.95	0.89	0.78	0.70	0.65	0.65	0.64	0.64	0.63
	4	2.31	1.76	1.55	1.43	1.35	1.28	1.18	1.11	0.96	0.86	0.80	0.80	0.79	0.79	0.78
	5	2.84	2.12	1.87	1.71	1.61	1.53	1.39	1.31	1.13	1.00	0.93	0.93	0.93	0.93	0.92
	7	3.88	2.87	2.47	2.25	2.09	1.98	1.79	1.67	1.43	1.25	1.16	1.17	1.18	1.18	1.17
	10	5.43	3.91	3.33	3.01	2.78	2.61	2.35	2.17	1.84	1.61	1.48	1.50	1.51	1.52	1.51
	15	8.01	5.63	4.69	4.19	3.85	3.58	3.21	2.91	2.40	2.11	1.93	1.98	4.00	2.01	2.01
2.0	2	1.00	0.79	0.72	0.68	0.64	0.62	0.58	0.55	0.49	0.44	0.41	0.40	0.40	0.39	0.38
	3	1.43	1.11	0.50	0.93	0.88	0.84	0.79	0.74	0.65	0.59	0.54	0.54	0.54	0.53	0.52
	4	1.86	1.43	1.26	1.16	1.10	1.05	0.98	0.92	0.80	0.71	0.66	0.66	0.66	0.65	0.64
	5	2.28	1.73	1.52	1.40	1.32	1.24	1.16	1.08	0.93	0.84	0.77	0.77	0.77	0.77	0.76
	7	3.10	2.31	2.01	1.83	1.71	1.62	1.49	1.37	1.18	1.05	0.97	0.97	0.97	0.98	0.97
	10	4.34	3.16	2.68	2.43	2.27	2.13	1.93	1.79	1.53	1.34	1.24	1.24	1.25	1.25	1.25
	15	6.37	4.51	3.81	3.39	3.13	2.94	2.61	2.37	2.01	1.76	1.62	1.65	1.66	1.67	1.67
2.5	2	0.64	0.51	0.47	0.44	0.43	0.41	0.39	0.37	0.33	0.30	0.28	0.27	0.27	0.26	0.26
	3	0.91	0.72	0.65	0.61	0.58	0.56	0.52	0.50	0.44	0.40	0.37	0.37	0.36	0.36	0.35
	4	1.17	0.91	0.82	0.77	0.73	0.70	0.65	0.61	0.54	0.48	0.45	0.45	0.44	0.44	0.43
	5	1.44	1.10	0.98	0.91	0.86	0.83	0.77	0.72	0.63	0.57	0.52	0.52	0.52	0.52	0.51
	7	1.94	1.47	1.29	1.19	1.13	1.07	0.99	0.92	0.80	0.71	0.66	0.66	0.66	0.66	0.65
	10	2.70	2.01	1.73	1.59	1.49	1.39	1.28	1.20	1.03	0.91	0.84	0.85	0.85	0.85	0.84
	15	3.94	2.85	2.44	2.20	2.04	1.92	1.74	1.60	1.36	1.19	1.11	1.12	1.13	1.13	1.13
3.0	3	0.64	0.51	0.46	0.44	0.42	0.40	0.38	0.36	0.32	0.29	0.27	0.27	0.26	0.26	0.25
	4	0.81	0.65	0.58	0.54	0.52	0.50	0.47	0.44	0.39	0.35	0.33	0.33	0.32	0.32	0.31
	5	0.99	0.78	0.70	0.65	0.62	0.59	0.55	0.52	0.46	0.42	0.38	0.38	0.38	0.38	0.37
	7	1.34	1.03	0.91	0.84	0.80	0.76	0.70	0.67	0.58	0.52	0.49	0.48	0.48	0.48	0.47
	10	1.85	1.39	1.22	1.12	1.05	1.00	0.92	0.86	0.75	0.67	0.61	0.62	0.62	0.61	0.61
	15	2.68	1.96	1.69	1.55	1.44	1.36	1.23	1.15	0.99	0.88	0.81	0.82	0.82	0.82	0.82
	20	3.51	2.53	2.16	1.95	1.79	1.70	1.54	1.41	1.19	1.06	0.98	0.98	1.00	1.00	1.00
4.0	4	0.46	0.37	0.34	0.32	0.31	0.30	0.28	0.27	0.24	0.22	0.20	0.20	0.20	0.19	0.19
	5	0.56	0.45	0.40	0.38	0.37	0.35	0.33	0.31	0.28	0.25	0.23	0.23	0.23	0.23	0.22
	7	0.75	0.59	0.53	0.50	0.47	0.45	0.42	0.40	0.35	0.32	0.30	0.29	0.29	0.29	0.28
	10	1.03	0.79	0.70	0.65	0.62	0.59	0.55	0.52	0.45	0.41	0.38	0.38	0.38	0.37	0.37
	15	1.48	1.11	0.97	0.89	0.84	0.80	0.74	0.69	0.60	0.53	0.50	0.50	0.50	0.50	0.49
	20	1.93	1.42	1.23	1.12	1.05	0.98	0.91	0.85	0.73	0.64	0.60	0.61	0.60	0.60	0.60
	30	2.79	2.01	1.70	1.55	1.44	1.35	1.22	1.13	0.97	0.85	0.79	0.80	0.80	0.81	0.81
5.0	5	0.36	0.30	0.27	0.26	0.24	0.24	0.22	0.21	0.19	0.17	0.16	0.16	0.16	0.15	0.15
	7	0.48	0.39	0.35	0.33	0.32	0.30	0.29	0.27	0.24	0.22	0.20	0.20	0.20	0.20	0.19
	10	0.66	0.51	0.46	0.43	0.41	0.40	0.37	0.35	0.31	0.28	0.26	0.26	0.26	0.25	0.25
	15	0.94	0.72	0.64	0.59	0.56	0.54	0.50	0.47	0.41	0.36	0.34	0.34	0.34	0.34	0.33
	20	1.22	0.92	0.80	0.74	0.69	0.66	0.61	0.57	0.50	0.44	0.41	0.42	0.42	0.41	0.41
	30	1.76	1.28	1.11	1.01	0.94	0.89	0.82	0.76	0.65	0.58	0.54	0.55	0.55	0.55	0.55
	50	2.80	1.99	1.68	1.51	1.39	1.31	1.18	1.09	0.92	0.82	0.75	0.77	0.77	0.78	0.78
7.0	5	0.19	0.16	0.15	0.14	0.13	0.13	0.12	0.12	0.11	0.10	0.09	0.09	0.09	0.09	0.08
	7	0.26	0.21	0.19	0.18	0.17	0.17	0.16	0.15	0.13	0.12	0.11	0.11	0.11	0.11	0.11
	10	0.34	0.27	0.25	0.24	0.22	0.22	0.20	0.19	0.17	0.16	0.15	0.15	0.14	0.14	0.14
	15	0.49	0.38	0.34	0.32	0.31	0.29	0.27	0.26	0.23	0.21	0.19	0.19	0.19	0.19	0.19
	20	0.62	0.48	0.43	0.40	0.38	0.36	0.34	0.31	0.28	0.25	0.23	0.23	0.23	0.23	0.23
	30	0.89	0.67	0.58	0.54	0.51	0.49	0.45	0.42	0.36	0.33	0.31	0.31	0.31	0.31	0.30
	50	1.40	1.02	0.88	0.80	0.75	0.70	0.64	0.60	0.52	0.46	0.43	0.43	0.44	0.44	0.43

Table 8.1(b) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 500ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm 0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	1.86	1.37	1.18	1.08	1.02	0.96	0.88	0.83	0.71	0.64	0.60	0.60	0.60	0.60	0.60
	3	2.69	1.92	1.64	1.49	1.38	1.31	1.19	1.11	0.94	0.84	0.79	0.80	0.80	0.80	0.81
	4	3.52	2.47	2.08	1.87	1.72	1.63	1.46	1.35	1.15	1.02	0.94	0.96	0.96	0.97	0.99
	5	4.34	3.01	2.51	2.23	2.06	1.93	1.73	1.59	1.35	1.18	1.10	1.12	1.13	1.14	1.15
	7	5.93	4.02	3.31	2.94	2.67	2.47	2.22	2.01	1.69	1.47	1.36	1.39	1.41	1.42	1.43
	10	8.31	5.54	4.49	3.88	3.52	3.26	2.87	2.61	2.14	1.85	1.71	1.75	1.79	1.81	1.85
	15	12.28	7.93	6.33	5.44	4.86	4.46	3.85	3.48	2.83	2.40	2.22	2.28	2.32	2.36	2.41
1.6	2	1.41	1.05	0.91	0.84	0.79	0.76	0.70	0.65	0.57	0.51	0.48	0.48	0.48	0.48	0.48
	3	2.04	1.48	1.27	1.15	1.08	1.02	0.93	0.87	0.75	0.67	0.62	0.63	0.63	0.63	0.64
	4	2.65	1.89	1.60	1.45	1.34	1.26	1.15	1.06	0.92	0.81	0.75	0.77	0.77	0.78	0.78
	5	3.25	2.28	1.93	1.72	1.60	1.50	1.36	1.24	1.06	0.93	0.87	0.89	0.90	0.90	0.91
	7	4.47	3.05	2.54	2.25	2.07	1.93	1.73	1.59	1.34	1.17	1.08	1.11	1.12	1.13	1.14
	10	6.23	4.16	3.41	3.01	2.73	2.51	2.25	2.04	1.70	1.47	1.37	1.40	1.42	1.43	1.46
	15	9.18	6.01	4.79	4.17	3.73	3.45	3.01	2.73	2.24	1.93	1.77	1.82	1.84	1.87	1.92
1.8	2	1.11	0.83	0.73	0.68	0.64	0.61	0.56	0.53	0.46	0.42	0.39	0.39	0.39	0.39	0.39
	3	1.60	1.17	1.01	0.93	0.86	0.82	0.76	0.70	0.61	0.55	0.51	0.52	0.52	0.52	0.52
	4	2.07	1.48	1.28	1.16	1.08	1.02	0.93	0.87	0.75	0.67	0.62	0.62	0.63	0.63	0.63
	5	2.54	1.80	1.53	1.37	1.28	1.20	1.10	1.01	0.87	0.77	0.71	0.72	0.73	0.74	0.74
	7	3.47	2.41	2.01	1.79	1.66	1.55	1.38	1.27	1.08	0.96	0.89	0.91	0.92	0.93	0.93
	10	4.85	3.26	2.70	2.37	2.18	2.03	1.81	1.65	1.39	1.20	1.12	1.14	1.16	1.17	1.19
	15	7.08	4.70	3.77	3.31	2.99	2.75	2.39	2.20	1.82	1.56	1.44	1.48	1.51	1.52	1.57
2.0	2	0.90	0.68	0.60	0.56	0.53	0.50	0.47	0.44	0.39	0.35	0.33	0.33	0.33	0.33	0.33
	3	1.29	0.95	0.83	0.76	0.72	0.68	0.62	0.59	0.51	0.46	0.43	0.43	0.43	0.43	0.43
	4	1.67	1.21	1.04	0.95	0.88	0.84	0.77	0.71	0.62	0.56	0.52	0.52	0.53	0.53	0.53
	5	2.03	1.46	1.25	1.13	1.05	0.99	0.90	0.84	0.72	0.64	0.60	0.61	0.61	0.61	0.61
	7	2.77	1.94	1.63	1.47	1.36	1.26	1.15	1.06	0.91	0.80	0.74	0.76	0.77	0.77	0.78
	10	3.86	2.65	2.19	1.95	1.77	1.66	1.49	1.37	1.15	1.01	0.93	0.96	0.96	0.97	0.98
	15	5.67	3.77	3.07	2.69	2.42	2.26	2.00	1.82	1.51	1.32	1.21	1.25	1.27	1.28	1.29
2.5	2	0.58	0.45	0.40	0.37	0.35	0.34	0.32	0.30	0.26	0.24	0.22	0.22	0.22	0.22	0.22
	3	0.82	0.62	0.54	0.50	0.48	0.45	0.42	0.40	0.35	0.31	0.29	0.30	0.30	0.30	0.29
	4	1.06	0.78	0.68	0.63	0.59	0.56	0.52	0.48	0.42	0.38	0.35	0.36	0.36	0.36	0.36
	5	1.29	0.94	0.81	0.74	0.69	0.66	0.60	0.57	0.49	0.44	0.41	0.42	0.42	0.42	0.42
	7	1.75	1.25	1.06	0.96	0.89	0.85	0.77	0.71	0.61	0.55	0.51	0.52	0.52	0.53	0.53
	10	2.42	1.69	1.42	1.27	1.17	1.10	1.00	0.92	0.79	0.69	0.64	0.66	0.66	0.67	0.68
	15	3.52	2.39	1.96	1.74	1.60	1.49	1.32	1.22	1.02	0.90	0.83	0.85	0.87	0.88	0.89
3.0	3	0.57	0.44	0.39	0.36	0.34	0.33	0.30	0.29	0.25	0.23	0.22	0.22	0.22	0.22	0.21
	4	0.73	0.55	0.49	0.45	0.42	0.41	0.38	0.35	0.31	0.28	0.26	0.26	0.26	0.26	0.26
	5	0.89	0.66	0.57	0.53	0.50	0.48	0.44	0.41	0.36	0.32	0.30	0.30	0.31	0.31	0.31
	7	1.20	0.87	0.75	0.68	0.64	0.60	0.56	0.52	0.45	0.40	0.38	0.38	0.39	0.39	0.39
	10	1.65	1.18	0.50	0.90	0.84	0.79	0.71	0.67	0.57	0.51	0.47	0.48	0.48	0.49	0.49
	15	2.40	1.66	1.38	1.22	1.13	1.06	0.96	0.88	0.75	0.66	0.62	0.63	0.63	0.64	0.65
	20	3.12	2.12	1.74	1.54	1.40	1.32	1.17	1.07	0.91	0.80	0.74	0.75	0.77	0.78	0.79
4.0	4	0.42	0.32	0.29	0.27	0.25	0.24	0.23	0.21	0.19	0.17	0.16	0.16	0.16	0.16	0.16
	5	0.51	0.38	0.34	0.32	0.30	0.29	0.27	0.25	0.22	0.20	0.19	0.19	0.19	0.19	0.19
	7	0.68	0.50	0.44	0.41	0.38	0.36	0.34	0.31	0.28	0.25	0.23	0.23	0.24	0.24	0.24
	10	0.92	0.67	0.58	0.53	0.50	0.47	0.43	0.40	0.35	0.31	0.29	0.29	0.30	0.30	0.30
	15	1.33	0.94	0.80	0.72	0.67	0.63	0.57	0.53	0.46	0.41	0.38	0.39	0.39	0.39	0.40
	20	1.72	1.19	1.00	0.89	0.83	0.78	0.70	0.65	0.56	0.49	0.46	0.46	0.47	0.48	0.48
	30	2.49	1.68	1.39	1.22	1.12	1.05	0.93	0.86	0.72	0.64	0.59	0.60	0.62	0.62	0.63
5.0	5	0.33	0.25	0.23	0.21	0.20	0.19	0.18	0.17	0.15	0.14	0.13	0.13	0.13	0.13	0.13
	7	0.44	0.33	0.29	0.27	0.26	0.25	0.23	0.21	0.19	0.17	0.16	0.16	0.16	0.16	0.16
	10	0.59	0.44	0.39	0.35	0.33	0.32	0.29	0.28	0.24	0.22	0.20	0.21	0.21	0.21	0.21
	15	0.85	0.61	0.52	0.48	0.45	0.42	0.39	0.36	0.31	0.28	0.26	0.27	0.27	0.27	0.27
	20	1.09	0.77	0.66	0.59	0.55	0.52	0.47	0.44	0.38	0.34	0.32	0.32	0.32	0.33	0.33
	30	1.56	1.08	0.90	0.81	0.75	0.69	0.63	0.58	0.50	0.44	0.41	0.42	0.42	0.43	0.43
	50	2.50	1.67	1.35	1.19	1.09	1.01	0.90	0.83	0.69	0.60	0.56	0.58	0.59	0.59	0.61
7.0	5	0.18	0.14	0.12	0.12	0.11	0.11	0.10	0.10	0.09	0.08	0.07	0.07	0.07	0.07	0.07
	7	0.23	0.18	0.16	0.15	0.14	0.14	0.13	0.12	0.11	0.10	0.09	0.09	0.09	0.09	0.09
	10	0.31	0.24	0.21	0.19	0.18	0.18	0.16	0.15	0.14	0.12	0.12	0.12	0.12	0.12	0.12
	15	0.44	0.33	0.28	0.26	0.25	0.24	0.22	0.20	0.18	0.16	0.15	0.15	0.15	0.15	0.15
	20	0.56	0.41	0.35	0.32	0.30	0.29	0.26	0.25	0.22	0.19	0.18	0.18	0.19	0.19	0.19
	30	0.80	0.56	0.48	0.43	0.41	0.38	0.35	0.32	0.28	0.25	0.23	0.24	0.24	0.24	0.24
	50	1.25	0.86	0.72	0.64	0.59	0.55	0.50	0.46	0.39	0.35	0.32	0.33	0.34	0.34	0.34

Table 8.1(c) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 1000ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm 0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	1.71	1.19	1.02	0.92	0.85	0.81	0.74	0.68	0.59	0.53	0.49	0.50	0.51	0.51	0.52
	3	2.47	1.69	1.41	1.26	1.16	1.09	0.97	0.90	0.77	0.68	0.64	0.65	0.66	0.67	0.68
	4	3.22	2.15	1.77	1.57	1.42	1.34	1.18	1.10	0.93	0.82	0.76	0.78	0.80	0.81	0.82
	5	3.96	2.60	2.13	1.87	1.70	1.58	1.40	1.29	1.08	0.94	0.88	0.90	0.92	0.93	0.94
	7	5.41	3.49	2.80	2.42	2.20	2.03	1.79	1.62	1.35	1.17	1.08	1.12	1.14	1.16	1.18
	10	7.61	4.80	3.75	3.24	2.87	2.63	2.30	2.08	1.71	1.46	1.36	1.40	1.43	1.45	1.49
	15	11.15	6.85	5.30	4.48	3.97	3.59	3.07	2.76	2.23	1.88	1.75	1.81	1.84	1.88	1.93
1.6	2	1.30	0.92	0.79	0.72	0.67	0.63	0.58	0.54	0.47	0.42	0.39	0.40	0.40	0.41	0.41
	3	1.87	1.29	1.09	0.98	0.90	0.85	0.77	0.71	0.62	0.54	0.51	0.52	0.53	0.53	0.54
	4	2.43	1.65	1.36	1.21	1.12	1.04	0.94	0.87	0.74	0.66	0.61	0.63	0.63	0.64	0.65
	5	2.99	2.00	1.64	1.45	1.32	1.23	1.11	1.02	0.86	0.75	0.70	0.72	0.73	0.74	0.75
	7	4.08	2.67	2.16	1.87	1.71	1.58	1.40	1.28	1.07	0.93	0.87	0.89	0.91	0.92	0.94
	10	5.70	3.62	2.89	2.48	2.24	2.07	1.81	1.64	1.36	1.17	1.08	1.12	1.14	1.16	1.19
	15	8.34	5.16	4.03	3.43	3.06	2.78	2.41	2.16	1.77	1.51	1.40	1.44	1.47	1.50	1.53
1.8	2	1.02	0.74	0.63	0.58	0.54	0.51	0.47	0.44	0.39	0.34	0.32	0.33	0.33	0.33	0.34
	3	1.47	1.03	0.87	0.78	0.73	0.69	0.62	0.58	0.50	0.45	0.42	0.43	0.43	0.44	0.44
	4	1.90	1.30	1.09	0.98	0.90	0.85	0.77	0.71	0.60	0.54	0.50	0.51	0.52	0.53	0.53
	5	2.33	1.58	1.30	1.16	1.06	0.99	0.90	0.83	0.70	0.62	0.58	0.59	0.60	0.61	0.61
	7	3.18	2.10	1.70	1.50	1.37	1.26	1.13	1.04	0.88	0.76	0.71	0.73	0.75	0.76	0.77
	10	4.41	2.86	2.29	1.99	1.78	1.65	1.46	1.33	1.11	0.96	0.89	0.91	0.93	0.95	0.97
	15	6.48	4.07	3.19	2.73	2.42	2.24	1.93	1.76	1.44	1.24	1.15	1.18	1.21	1.24	1.27
2.0	2	0.83	0.60	0.52	0.48	0.44	0.42	0.39	0.37	0.32	0.29	0.27	0.28	0.28	0.28	0.28
	3	1.18	0.84	0.71	0.65	0.60	0.57	0.52	0.49	0.42	0.37	0.35	0.36	0.36	0.36	0.37
	4	1.53	1.06	0.89	0.80	0.74	0.69	0.63	0.59	0.51	0.45	0.42	0.43	0.44	0.44	0.45
	5	1.87	1.28	1.07	0.94	0.87	0.82	0.74	0.68	0.59	0.52	0.48	0.49	0.50	0.51	0.52
	7	2.54	1.69	1.40	1.22	1.12	1.05	0.93	0.86	0.73	0.64	0.60	0.62	0.63	0.63	0.64
	10	3.52	2.29	1.86	1.62	1.47	1.36	1.19	1.10	0.92	0.81	0.75	0.76	0.79	0.80	0.82
	15	5.17	3.27	2.59	2.23	2.00	1.84	1.61	1.45	1.20	1.04	0.97	0.99	1.02	1.04	1.06
2.5	2	0.53	0.40	0.35	0.32	0.30	0.29	0.27	0.25	0.22	0.20	0.19	0.19	0.19	0.19	0.19
	3	0.76	0.55	0.47	0.43	0.40	0.38	0.35	0.33	0.29	0.26	0.24	0.25	0.12	0.25	0.25
	4	0.97	0.69	0.58	0.53	0.50	0.47	0.43	0.40	0.35	0.31	0.29	0.30	0.30	0.30	0.30
	5	1.19	0.83	0.70	0.63	0.58	0.55	0.50	0.46	0.40	0.36	0.34	0.34	0.35	0.35	0.35
	7	1.60	1.09	0.90	0.81	0.75	0.69	0.63	0.58	0.50	0.44	0.41	0.42	0.43	0.44	0.44
	10	2.21	1.47	1.20	1.06	0.96	0.90	0.81	0.74	0.63	0.56	0.52	0.53	0.54	0.55	0.56
	15	3.21	2.07	1.66	1.46	1.31	1.21	1.07	0.98	0.82	0.71	0.67	0.69	0.70	0.71	0.73
3.0	3	0.53	0.39	0.34	0.31	0.29	0.28	0.26	0.24	0.21	0.19	0.18	0.18	0.18	0.18	0.19
	4	0.68	0.49	0.42	0.38	0.36	0.34	0.31	0.29	0.26	0.23	0.22	0.22	0.22	0.22	0.22
	5	0.82	0.58	0.50	0.45	0.42	0.40	0.36	0.34	0.30	0.26	0.25	0.25	0.26	0.26	0.26
	7	1.10	0.76	0.64	0.58	0.54	0.50	0.46	0.43	0.37	0.33	0.31	0.31	0.32	0.32	0.32
	10	1.52	1.03	0.85	0.76	0.69	0.65	0.59	0.54	0.46	0.41	0.38	0.39	0.40	0.40	0.41
	15	2.19	1.44	1.17	1.03	0.93	0.87	0.78	0.71	0.60	0.53	0.49	0.50	0.52	0.52	0.53
	20	2.86	1.84	1.47	1.28	1.16	1.07	0.95	0.87	0.72	0.63	0.59	0.60	0.62	0.63	0.64
4.0	4	0.39	0.29	0.25	0.23	0.22	0.21	0.19	0.18	0.16	0.14	0.13	0.14	0.14	0.14	0.14
	5	0.47	0.34	0.29	0.27	0.25	0.24	0.22	0.21	0.18	0.16	0.15	0.16	0.16	0.16	0.16
	7	0.62	0.44	0.38	0.34	0.32	0.30	0.28	0.26	0.23	0.20	0.19	0.20	0.20	0.20	0.20
	10	0.85	0.59	0.50	0.45	0.42	0.39	0.35	0.33	0.29	0.26	0.24	0.24	0.25	0.25	0.25
	15	1.22	0.82	0.68	0.60	0.56	0.52	0.47	0.43	0.37	0.33	0.31	0.32	0.32	0.32	0.33
	20	1.57	1.04	0.85	0.75	0.69	0.64	0.57	0.53	0.45	0.39	0.37	0.38	0.38	0.39	0.40
	30	2.27	1.46	1.17	1.02	0.93	0.85	0.76	0.69	0.58	0.50	0.47	0.48	0.49	0.50	0.52
5.0	5	0.31	0.23	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.11	0.11	0.11	0.11	0.11	0.11
	7	0.40	0.29	0.25	0.23	0.22	0.21	0.19	0.18	0.16	0.14	0.13	0.13	0.14	0.14	0.14
	10	0.55	0.39	0.33	0.30	0.28	0.26	0.24	0.23	0.20	0.18	0.17	0.17	0.17	0.17	0.17
	15	0.78	0.53	0.45	0.40	0.38	0.35	0.32	0.30	0.26	0.23	0.21	0.22	0.22	0.22	0.23
	20	1.00	0.68	0.56	0.50	0.46	0.43	0.39	0.36	0.31	0.27	0.26	0.26	0.27	0.27	0.27
	30	1.44	0.94	0.77	0.68	0.61	0.57	0.51	0.47	0.40	0.35	0.33	0.34	0.34	0.35	0.35
	50	2.28	1.44	1.15	0.99	0.89	0.82	0.73	0.66	0.55	0.48	0.45	0.46	0.47	0.48	0.49
7.0	5	0.16	0.12	0.11	0.10	0.10	0.09	0.09	0.08	0.07	0.07	0.06	0.06	0.06	0.06	0.06
	7	0.21	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.08	0.08	0.08	0.08	0.08
	10	0.29	0.21	0.18	0.17	0.16	0.15	0.14	0.13	0.11	0.10	0.10	0.10	0.10	0.10	0.10
	15	0.40	0.29	0.24	0.22	0.21	0.20	0.18	0.17	0.15	0.13	0.12	0.13	0.13	0.13	0.13
	20	0.52	0.36	0.30	0.27	0.25	0.24	0.22	0.20	0.18	0.16	0.15	0.15	0.15	0.15	0.16
	30	0.73	0.50	0.41	0.37	0.34	0.32	0.29	0.27	0.23	0.20	0.19	0.19	0.20	0.20	0.20
	50	1.15	0.75	0.61	0.54	0.48	0.45	0.41	0.37	0.32	0.28	0.26	0.26	0.27	0.28	0.28

Table 8.1(d) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 2000ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm 0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	1.56	1.05	0.86	0.77	0.70	0.67	0.60	0.56	0.48	0.42	0.40	0.41	0.42	0.42	0.43
	3	2.26	1.47	1.19	1.05	0.96	0.89	0.80	0.73	0.62	0.54	0.51	0.53	0.53	0.55	0.56
	4	2.94	1.88	1.50	1.31	1.18	1.10	0.97	0.89	0.74	0.65	0.61	0.63	0.64	0.66	0.67
	5	3.61	2.26	1.79	1.55	1.38	1.28	1.14	1.03	0.86	0.75	0.70	0.72	0.74	0.75	0.78
	7	4.95	3.04	2.35	2.01	1.79	1.64	1.43	1.30	1.06	0.92	0.86	0.89	0.90	0.93	0.96
	10	6.92	4.13	3.16	2.66	2.34	2.13	1.84	1.65	1.35	1.15	1.06	1.11	1.14	1.16	1.20
	15	10.17	5.91	4.42	3.67	3.21	2.87	2.45	2.17	1.75	1.48	1.37	1.42	1.46	1.49	1.53
1.6	2	1.19	0.81	0.67	0.60	0.56	0.52	0.47	0.44	0.38	0.34	0.32	0.32	0.33	0.34	0.34
	3	1.71	1.13	0.93	0.82	0.75	0.69	0.63	0.58	0.50	0.44	0.41	0.42	0.43	0.44	0.45
	4	2.21	1.44	1.16	1.02	0.93	0.86	0.77	0.70	0.59	0.52	0.49	0.50	0.52	0.52	0.53
	5	2.71	1.73	1.38	1.20	1.09	1.01	0.89	0.82	0.69	0.60	0.56	0.58	0.59	0.60	0.62
	7	3.72	2.30	1.80	1.56	1.39	1.28	1.13	1.02	0.85	0.74	0.69	0.71	0.73	0.74	0.76
	10	5.19	3.14	2.41	2.06	1.83	1.67	1.45	1.30	1.07	0.92	0.86	0.89	0.90	0.92	0.96
	15	7.61	4.48	3.37	2.80	2.46	2.24	1.93	1.72	1.39	1.18	1.09	1.14	1.17	1.19	1.24
1.8	2	0.94	0.65	0.54	0.49	0.45	0.42	0.39	0.36	0.31	0.28	0.26	0.27	0.27	0.28	0.28
	3	1.34	0.90	0.74	0.66	0.60	0.57	0.51	0.47	0.41	0.36	0.34	0.35	0.35	0.36	0.36
	4	1.74	1.14	0.93	0.82	0.75	0.69	0.62	0.57	0.48	0.43	0.40	0.42	0.42	0.43	0.44
	5	2.13	1.37	1.10	0.97	0.87	0.82	0.73	0.67	0.56	0.49	0.46	0.47	0.48	0.49	0.51
	7	2.90	1.81	1.44	1.24	1.12	1.04	0.92	0.83	0.70	0.61	0.57	0.58	0.60	0.61	0.63
	10	4.04	2.47	1.92	1.64	1.45	1.34	1.17	1.06	0.88	0.76	0.71	0.73	0.75	0.76	0.79
	15	5.90	3.49	2.67	2.24	1.96	1.80	1.54	1.39	1.14	0.97	0.90	0.93	0.96	0.98	1.01
2.0	2	0.76	0.53	0.45	0.40	0.38	0.35	0.32	0.30	0.26	0.23	0.22	0.23	0.23	0.23	0.24
	3	1.09	0.73	0.61	0.54	0.50	0.47	0.43	0.40	0.34	0.30	0.28	0.29	0.30	0.30	0.31
	4	1.40	0.93	0.76	0.67	0.61	0.57	0.52	0.48	0.41	0.36	0.34	0.35	0.36	0.36	0.37
	5	1.71	1.11	0.90	0.80	0.72	0.67	0.61	0.56	0.47	0.42	0.39	0.40	0.41	0.42	0.43
	7	2.32	1.48	1.17	1.02	0.93	0.86	0.76	0.69	0.58	0.51	0.48	0.49	0.50	0.51	0.53
	10	3.22	2.00	1.57	1.34	1.20	1.11	0.97	0.88	0.73	0.64	0.59	0.61	0.63	0.64	0.66
	15	4.70	2.82	2.17	1.84	1.63	1.48	1.29	1.15	0.94	0.82	0.76	0.78	0.81	0.83	0.85
2.5	2	0.49	0.35	0.30	0.27	0.25	0.24	0.22	0.21	0.18	0.16	0.15	0.16	0.16	0.16	0.16
	3	0.69	0.48	0.40	0.36	0.34	0.32	0.29	0.27	0.23	0.21	0.20	0.20	0.21	0.21	0.21
	4	0.89	0.61	0.50	0.45	0.41	0.39	0.35	0.32	0.28	0.25	0.23	0.24	0.25	0.25	0.26
	5	1.09	0.72	0.59	0.53	0.49	0.45	0.41	0.38	0.33	0.29	0.27	0.28	0.28	0.29	0.29
	7	1.46	0.95	0.77	0.68	0.61	0.57	0.52	0.47	0.40	0.35	0.33	0.34	0.35	0.35	0.36
	10	2.02	1.28	1.02	0.88	0.80	0.73	0.65	0.60	0.50	0.44	0.41	0.43	0.44	0.44	0.46
	15	2.93	1.79	1.40	1.19	1.07	0.99	0.87	0.79	0.65	0.57	0.53	0.54	0.56	0.57	0.59
3.0	3	0.49	0.34	0.29	0.26	0.24	0.23	0.21	0.20	0.17	0.16	0.15	0.15	0.15	0.15	0.16
	4	0.62	0.43	0.36	0.32	0.30	0.28	0.26	0.24	0.21	0.19	0.17	0.18	0.18	0.18	0.19
	5	0.75	0.51	0.42	0.38	0.35	0.33	0.30	0.28	0.24	0.21	0.20	0.21	0.21	0.21	0.22
	7	1.01	0.67	0.55	0.49	0.44	0.42	0.38	0.35	0.30	0.26	0.25	0.25	0.26	0.26	0.27
	10	1.38	0.90	0.72	0.63	0.57	0.53	0.48	0.44	0.37	0.33	0.30	0.32	0.32	0.33	0.34
	15	2.00	1.25	0.99	0.85	0.77	0.71	0.63	0.57	0.48	0.42	0.39	0.40	0.41	0.42	0.43
	20	2.60	1.59	1.24	1.06	0.94	0.87	0.76	0.69	0.58	0.50	0.46	0.48	0.49	0.50	0.52
4.0	4	0.36	0.25	0.21	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.11	0.11	0.11	0.12	0.12
	5	0.43	0.30	0.25	0.23	0.21	0.20	0.18	0.17	0.15	0.13	0.13	0.13	0.13	0.13	0.14
	7	0.57	0.39	0.33	0.29	0.27	0.25	0.23	0.21	0.18	0.16	0.15	0.16	0.16	0.16	0.17
	10	0.78	0.52	0.42	0.38	0.34	0.32	0.29	0.27	0.23	0.20	0.19	0.20	0.20	0.21	0.21
	15	1.11	0.72	0.58	0.51	0.46	0.43	0.38	0.35	0.30	0.26	0.24	0.25	0.26	0.26	0.27
	20	1.44	0.90	0.72	0.62	0.56	0.52	0.46	0.42	0.36	0.31	0.29	0.30	0.31	0.32	0.32
	30	2.07	1.26	0.99	0.84	0.76	0.69	0.61	0.55	0.46	0.40	0.37	0.38	0.40	0.40	0.42
5.0	5	0.28	0.20	0.17	0.16	0.14	0.14	0.13	0.12	0.10	0.09	0.09	0.09	0.09	0.09	0.09
	7	0.37	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.11	0.11	0.11	0.11	0.11	0.12
	10	0.50	0.34	0.28	0.25	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.14	0.14	0.14	0.14
	15	0.71	0.47	0.38	0.34	0.31	0.29	0.26	0.24	0.21	0.18	0.17	0.18	0.18	0.18	0.19
	20	0.92	0.59	0.48	0.42	0.38	0.35	0.31	0.29	0.25	0.22	0.20	0.21	0.21	0.22	0.22
	30	1.31	0.81	0.65	0.56	0.51	0.47	0.42	0.38	0.32	0.28	0.26	0.27	0.28	0.28	0.29
	50	2.08	1.25	0.96	0.82	0.72	0.67	0.58	0.53	0.44	0.38	0.35	0.36	0.37	0.38	0.40
7.0	5	0.15	0.11	0.09	0.09	0.08	0.08	0.07	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05
	7	0.20	0.14	0.12	0.11	0.10	0.10	0.09	0.08	0.07	0.07	0.06	0.06	0.06	0.07	0.07
	10	0.26	0.18	0.16	0.14	0.13	0.12	0.11	0.11	0.09	0.08	0.08	0.08	0.08	0.08	0.08
	15	0.37	0.25	0.21	0.19	0.17	0.16	0.15	0.14	0.12	0.11	0.10	0.10	0.10	0.11	0.11
	20	0.47	0.32	0.26	0.23	0.21	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.12	0.13	0.13
	30	0.67	0.44	0.35	0.31	0.28	0.26	0.23	0.22	0.18	0.16	0.15	0.16	0.16	0.16	0.17
	50	1.04	0.65	0.52	0.44	0.40	0.37	0.33	0.30	0.25	0.22	0.20	0.21	0.22	0.22	0.23

Table 8.1(e) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 5000ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm														
		0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	1.38	0.88	0.70	0.61	0.55	0.51	0.46	0.42	0.36	0.31	0.29	0.31	0.31	0.32	0.33
	3	2.00	1.22	0.96	0.82	0.74	0.68	0.60	0.55	0.46	0.40	0.38	0.39	0.40	0.41	0.42
	4	2.60	1.54	1.19	1.02	0.91	0.83	0.73	0.66	0.55	0.48	0.45	0.46	0.48	0.48	0.50
	5	3.19	1.87	1.43	1.20	1.06	0.97	0.85	0.76	0.63	0.54	0.51	0.53	0.54	0.56	0.58
	7	4.35	2.49	1.86	1.55	1.36	1.23	1.06	0.95	0.77	0.67	0.63	0.65	0.67	0.69	0.71
	10	6.07	3.37	2.47	2.04	1.77	1.60	1.36	1.20	0.97	0.83	0.76	0.81	0.83	0.85	0.88
	15	8.89	4.82	3.44	2.77	2.39	2.13	1.80	1.56	1.26	1.07	0.98	1.03	1.06	1.08	1.13
1.6	2	1.06	0.68	0.55	0.48	0.43	0.41	0.36	0.33	0.29	0.25	0.24	0.25	0.25	0.26	0.26
	3	1.51	0.94	0.74	0.64	0.58	0.53	0.47	0.44	0.37	0.32	0.30	0.32	0.32	0.33	0.34
	4	1.97	1.19	0.93	0.80	0.71	0.65	0.58	0.53	0.44	0.38	0.36	0.37	0.38	0.39	0.41
	5	2.40	1.43	1.10	0.94	0.84	0.77	0.67	0.60	0.50	0.44	0.41	0.43	0.44	0.45	0.46
	7	3.27	1.90	1.44	1.20	1.06	0.96	0.84	0.75	0.62	0.54	0.50	0.52	0.54	0.55	0.57
	10	4.57	2.57	1.91	1.58	1.37	1.24	1.07	0.96	0.77	0.67	0.62	0.65	0.67	0.68	0.71
	15	6.66	3.62	2.65	2.15	1.86	1.67	1.41	1.25	1.01	0.85	0.78	0.83	0.85	0.87	0.91
1.8	2	0.84	0.54	0.44	0.39	0.35	0.33	0.29	0.28	0.23	0.21	0.20	0.20	0.21	0.21	0.22
	3	1.19	0.75	0.59	0.52	0.47	0.43	0.39	0.36	0.30	0.27	0.25	0.26	0.27	0.27	0.28
	4	1.54	0.94	0.74	0.64	0.58	0.53	0.47	0.43	0.36	0.32	0.30	0.31	0.32	0.32	0.34
	5	1.88	1.13	0.88	0.76	0.68	0.62	0.55	0.49	0.42	0.36	0.34	0.35	0.36	0.37	0.38
	7	2.56	1.50	1.15	0.97	0.86	0.79	0.69	0.62	0.51	0.44	0.42	0.43	0.44	0.46	0.47
	10	3.55	2.03	1.52	1.26	1.11	1.01	0.87	0.77	0.64	0.55	0.51	0.53	0.55	0.56	0.58
	15	5.18	2.86	2.09	1.72	1.48	1.35	1.15	1.02	0.82	0.70	0.65	0.68	0.70	0.72	0.75
2.0	2	0.68	0.45	0.36	0.32	0.29	0.28	0.25	0.23	0.20	0.18	0.17	0.17	0.18	0.18	0.18
	3	0.96	0.61	0.49	0.43	0.39	0.36	0.32	0.30	0.25	0.22	0.21	0.22	0.22	0.23	0.23
	4	1.24	0.77	0.61	0.53	0.48	0.44	0.39	0.36	0.30	0.27	0.25	0.26	0.27	0.27	0.28
	5	1.52	0.93	0.72	0.62	0.56	0.52	0.46	0.42	0.35	0.30	0.29	0.30	0.30	0.31	0.32
	7	2.04	1.22	0.94	0.80	0.70	0.65	0.57	0.52	0.43	0.37	0.35	0.36	0.37	0.38	0.40
	10	2.84	1.64	1.23	1.04	0.92	0.84	0.72	0.65	0.53	0.46	0.43	0.45	0.46	0.47	0.49
	15	4.14	2.30	1.70	1.40	1.22	1.11	0.95	0.85	0.69	0.59	0.55	0.57	0.59	0.60	0.63
2.5	2	0.44	0.29	0.24	0.22	0.20	0.19	0.17	0.16	0.14	0.12	0.12	0.12	0.12	0.13	0.13
	3	0.62	0.40	0.33	0.29	0.26	0.25	0.22	0.21	0.18	0.16	0.15	0.15	0.16	0.16	0.16
	4	0.79	0.51	0.41	0.35	0.32	0.30	0.27	0.25	0.21	0.19	0.18	0.18	0.19	0.19	0.20
	5	0.96	0.60	0.48	0.42	0.38	0.35	0.31	0.28	0.24	0.21	0.20	0.21	0.21	0.22	0.22
	7	1.29	0.79	0.62	0.53	0.48	0.44	0.39	0.35	0.30	0.26	0.24	0.25	0.26	0.27	0.28
	10	1.78	1.06	0.81	0.69	0.61	0.56	0.49	0.45	0.37	0.32	0.30	0.31	0.32	0.33	0.34
	15	2.58	1.48	1.11	0.93	0.82	0.74	0.65	0.58	0.47	0.41	0.38	0.40	0.41	0.42	0.44
3.0	3	0.44	0.29	0.24	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11	0.11	0.12	0.12	0.12
	4	0.55	0.36	0.29	0.26	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.13	0.14	0.14	0.15
	5	0.67	0.43	0.35	0.30	0.27	0.25	0.23	0.21	0.18	0.16	0.15	0.16	0.16	0.16	0.17
	7	0.90	0.56	0.44	0.38	0.35	0.32	0.28	0.26	0.22	0.19	0.18	0.19	0.19	0.20	0.20
	10	1.23	0.74	0.58	0.50	0.44	0.41	0.36	0.33	0.27	0.24	0.23	0.23	0.24	0.25	0.25
	15	1.76	1.03	0.79	0.67	0.59	0.54	0.47	0.43	0.35	0.30	0.29	0.30	0.30	0.31	0.32
	20	2.29	1.30	0.98	0.82	0.72	0.65	0.57	0.51	0.42	0.36	0.34	0.35	0.36	0.37	0.38
4.0	4	0.32	0.21	0.18	0.16	0.14	0.14	0.12	0.11	0.10	0.09	0.08	0.09	0.09	0.09	0.09
	5	0.38	0.25	0.21	0.18	0.17	0.16	0.14	0.13	0.11	0.10	0.09	0.10	0.10	0.10	0.10
	7	0.51	0.33	0.26	0.23	0.21	0.20	0.17	0.16	0.14	0.12	0.11	0.12	0.12	0.13	0.13
	10	0.69	0.43	0.34	0.30	0.27	0.25	0.22	0.20	0.17	0.15	0.14	0.15	0.15	0.15	0.16
	15	0.98	0.60	0.46	0.40	0.35	0.32	0.29	0.26	0.22	0.19	0.18	0.19	0.19	0.20	0.20
	20	1.27	0.75	0.58	0.48	0.43	0.40	0.35	0.32	0.26	0.22	0.21	0.22	0.22	0.23	0.24
	30	1.83	1.04	0.78	0.66	0.58	0.53	0.46	0.41	0.34	0.29	0.27	0.28	0.29	0.30	0.31
5.0	5	0.25	0.17	0.14	0.12	0.11	0.11	0.10	0.09	0.08	0.07	0.07	0.07	0.07	0.07	0.07
	7	0.33	0.22	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.08	0.09	0.09	0.09
	10	0.45	0.29	0.23	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10	0.10	0.11	0.11	0.11
	15	0.63	0.39	0.31	0.27	0.24	0.22	0.20	0.18	0.15	0.13	0.13	0.13	0.13	0.14	0.14
	20	0.81	0.49	0.38	0.33	0.30	0.27	0.24	0.22	0.18	0.16	0.15	0.16	0.16	0.16	0.17
	30	1.16	0.68	0.52	0.44	0.39	0.35	0.31	0.28	0.23	0.20	0.19	0.19	0.20	0.21	0.21
	50	1.83	1.03	0.76	0.63	0.56	0.50	0.43	0.39	0.32	0.27	0.26	0.26	0.27	0.28	0.29
7.0	5	0.13	0.09	0.08	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04
	7	0.18	0.12	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05
	10	0.24	0.16	0.13	0.11	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06
	15	0.33	0.21	0.17	0.15	0.14	0.13	0.11	0.10	0.09	0.08	0.07	0.08	0.08	0.08	0.08
	20	0.42	0.27	0.21	0.18	0.17	0.15	0.14	0.19	0.11	0.09	0.09	0.09	0.09	0.09	0.10
	30	0.59	0.36	0.28	0.24	0.22	0.20	0.18	0.16	0.13	0.12	0.11	0.11	0.12	0.12	0.13
	50	0.93	0.54	0.41	0.35	0.31	0.28	0.25	0.22	0.18	0.16	0.15	0.16	0.16	0.16	0.17

Table 8.1(f) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 10,000ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm 0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	1.27	0.76	0.59	0.50	0.45	0.42	0.37	0.34	0.28	0.25	0.23	0.24	0.25	0.25	0.27
	3	1.81	1.06	0.80	0.68	0.60	0.55	0.48	0.44	0.36	0.32	0.30	0.31	0.32	0.33	0.34
	4	2.36	1.34	1.00	0.84	0.74	0.67	0.58	0.52	0.43	0.37	0.35	0.37	0.38	0.38	0.40
	5	2.89	1.61	1.19	0.99	0.87	0.79	0.68	0.60	0.49	0.43	0.40	0.42	0.43	0.44	0.46
	7	3.93	2.14	1.55	1.26	1.10	0.98	0.85	0.75	0.61	0.52	0.48	0.51	0.53	0.54	0.56
	10	5.49	2.89	2.06	1.66	1.42	1.26	1.07	0.94	0.76	0.65	0.60	0.63	0.65	0.67	0.70
	15	8.07	4.10	2.83	2.26	1.93	1.70	1.42	1.23	0.97	0.83	0.76	0.79	0.83	0.85	0.89
1.6	2	0.96	0.59	0.46	0.40	0.36	0.33	0.29	0.27	0.23	0.20	0.19	0.20	0.20	0.21	0.22
	3	1.38	0.81	0.63	0.53	0.47	0.44	0.38	0.35	0.29	0.26	0.24	0.25	0.25	0.26	0.27
	4	1.78	1.03	0.78	0.66	0.58	0.53	0.46	0.42	0.35	0.30	0.28	0.29	0.30	0.31	0.33
	5	2.18	1.24	0.93	0.77	0.68	0.61	0.53	0.48	0.40	0.35	0.32	0.34	0.35	0.36	0.37
	7	2.96	1.63	1.19	0.99	0.87	0.78	0.67	0.60	0.49	0.42	0.39	0.41	0.42	0.44	0.45
	10	4.14	2.19	1.59	1.28	1.12	1.00	0.85	0.75	0.61	0.52	0.48	0.50	0.52	0.54	0.56
	15	6.02	3.12	2.19	1.75	1.48	1.33	1.12	0.98	0.77	0.66	0.61	0.64	0.67	0.68	0.71
1.8	2	0.77	0.47	0.37	0.32	0.29	0.27	0.24	0.22	0.19	0.17	0.16	0.16	0.17	0.17	0.18
	3	1.09	0.65	0.50	0.43	0.39	0.35	0.31	0.29	0.24	0.21	0.20	0.21	0.21	0.22	0.23
	4	1.40	0.81	0.63	0.53	0.47	0.43	0.38	0.34	0.29	0.25	0.23	0.24	0.25	0.26	0.27
	5	1.71	0.98	0.74	0.62	0.55	0.50	0.44	0.40	0.33	0.29	0.27	0.28	0.29	0.29	0.31
	7	2.32	1.28	0.96	0.80	0.69	0.63	0.55	0.49	0.40	0.35	0.33	0.34	0.35	0.36	0.37
	10	3.22	1.73	1.27	1.04	0.90	0.81	0.69	0.62	0.50	0.43	0.40	0.42	0.43	0.44	0.46
	15	4.69	2.45	1.73	1.39	1.21	1.07	0.91	0.80	0.64	0.54	0.51	0.53	0.55	0.56	0.59
2.0	2	0.62	0.39	0.31	0.27	0.24	0.22	0.20	0.19	0.16	0.14	0.13	0.14	0.14	0.14	0.15
	3	0.88	0.53	0.42	0.36	0.32	0.30	0.26	0.24	0.20	0.18	0.17	0.17	0.18	0.18	0.19
	4	1.13	0.67	0.52	0.44	0.39	0.36	0.31	0.29	0.24	0.21	0.20	0.21	0.21	0.22	0.23
	5	1.37	0.80	0.61	0.52	0.46	0.42	0.37	0.33	0.28	0.24	0.23	0.23	0.24	0.38	0.26
	7	1.86	1.05	0.79	0.66	0.58	0.53	0.46	0.41	0.34	0.29	0.27	0.29	0.29	0.30	0.32
	10	2.58	1.41	1.04	0.85	0.75	0.67	0.58	0.51	0.42	0.36	0.34	0.35	0.36	0.37	0.39
	15	3.74	1.98	1.41	1.15	1.00	0.89	0.75	0.67	0.54	0.46	0.43	0.45	0.46	0.47	0.49
2.5	2	0.40	0.26	0.21	0.18	0.17	0.15	0.14	0.13	0.11	0.10	0.09	0.10	0.10	0.10	0.10
	3	0.57	0.35	0.28	0.24	0.22	0.20	0.18	0.17	0.14	0.06	0.12	0.12	0.13	0.13	0.13
	4	0.72	0.44	0.35	0.29	0.27	0.25	0.22	0.20	0.17	0.15	0.14	0.14	0.15	0.15	0.16
	5	0.88	0.53	0.41	0.35	0.31	0.28	0.25	0.23	0.19	0.17	0.16	0.17	0.17	0.17	0.18
	7	1.18	0.69	0.52	0.44	0.39	0.35	0.31	0.28	0.23	0.21	0.19	0.20	0.21	0.21	0.22
	10	1.62	0.91	0.68	0.57	0.50	0.45	0.40	0.35	0.29	0.25	0.24	0.25	0.26	0.26	0.27
	15	2.34	1.27	0.93	0.76	0.67	0.59	0.51	0.45	0.37	0.32	0.30	0.31	0.32	0.33	0.35
3.0	3	0.40	0.25	0.20	0.18	0.16	0.15	0.13	0.12	0.10	0.09	0.09	0.09	0.09	0.10	0.10
	4	0.51	0.32	0.25	0.21	0.19	0.18	0.16	0.15	0.13	0.11	0.10	0.11	0.11	0.11	0.12
	5	0.61	0.37	0.29	0.25	0.23	0.21	0.18	0.17	0.14	0.13	0.12	0.12	0.13	0.13	0.13
	7	0.82	0.49	0.37	0.32	0.28	0.26	0.23	0.21	0.18	0.15	0.14	0.15	0.16	0.16	0.16
	10	1.11	0.64	0.49	0.41	0.36	0.33	0.29	0.26	0.22	0.19	0.18	0.18	0.19	0.19	0.20
	15	1.60	0.89	0.66	0.55	0.48	0.44	0.38	0.34	0.28	0.24	0.22	0.23	0.24	0.25	0.25
	20	2.08	1.13	0.82	0.68	0.59	0.53	0.46	0.41	0.33	0.28	0.27	0.28	0.29	0.29	0.30
4.0	4	0.29	0.19	0.15	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.07	0.07	0.07	0.07
	5	0.35	0.22	0.18	0.15	0.14	0.13	0.12	0.11	0.09	0.08	0.07	0.08	0.08	0.08	0.09
	7	0.47	0.29	0.22	0.19	0.17	0.16	0.14	0.13	0.11	0.10	0.09	0.09	0.10	0.10	0.10
	10	0.63	0.38	0.29	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.12	0.12	0.12	0.13
	15	0.90	0.52	0.39	0.33	0.29	0.27	0.23	0.21	0.17	0.15	0.14	0.15	0.15	0.16	0.16
	20	1.15	0.64	0.48	0.40	0.35	0.32	0.28	0.25	0.21	0.18	0.17	0.17	0.18	0.18	0.19
	30	1.65	0.89	0.66	0.54	0.47	0.42	0.36	0.32	0.26	0.23	0.21	0.22	0.22	0.23	0.24
5.0	5	0.23	0.15	0.12	0.10	0.10	0.09	0.08	0.07	0.06	0.06	0.05	0.05	0.06	0.06	0.06
	7	0.31	0.19	0.15	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.07	0.07	0.07	0.07
	10	0.41	0.25	0.20	0.17	0.15	0.14	0.12	0.11	0.09	0.08	0.08	0.08	0.08	0.09	0.09
	15	0.58	0.34	0.26	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.10	0.11	0.11	0.11
	20	0.74	0.43	0.32	0.27	0.24	0.22	0.19	0.17	0.14	0.13	0.12	0.12	0.13	0.13	0.13
	30	1.05	0.59	0.43	0.36	0.32	0.29	0.25	0.22	0.18	0.16	0.15	0.15	0.16	0.16	0.17
	50	1.65	0.88	0.64	0.52	0.45	0.41	0.35	0.31	0.25	0.21	0.20	0.21	0.21	0.22	0.23
7.0	5	0.12	0.08	0.07	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03
	7	0.16	0.11	0.08	0.07	0.07	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	10	0.22	0.14	0.11	0.09	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05
	15	0.30	0.19	0.14	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.07
	20	0.39	0.23	0.18	0.15	0.14	0.13	0.11	0.10	0.08	0.07	0.07	0.07	0.07	0.08	0.08
	30	0.54	0.31	0.24	0.20	0.18	0.16	0.14	0.13	0.11	0.09	0.09	0.09	0.09	0.10	0.10
	50	0.84	0.47	0.35	0.29	0.25	0.23	0.20	0.18	0.14	0.13	0.12	0.12	0.13	0.13	0.13

Table 8.1(g) Predicted ratios of tunnel height/tunnel width in partially blocked tunnels

Sediment concentration = 20,000ppm

Tunnel Width (m)	Tunnel Discharge (m^3/s)	D_{50} bed sediment size in mm 0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	6.0	8.0
1.4	2	1.15	0.66	0.75	0.42	0.37	0.34	0.30	0.27	0.22	0.19	0.18	0.19	0.20	0.21	0.21
	3	1.65	0.91	0.67	0.56	0.49	0.45	0.38	0.35	0.29	0.25	0.23	0.24	0.25	0.26	0.27
	4	2.14	1.15	0.84	0.69	0.60	0.54	0.46	0.42	0.34	0.29	0.27	0.29	0.30	0.31	0.32
	5	2.62	1.38	0.99	0.81	0.70	0.63	0.54	0.48	0.39	0.34	0.31	0.33	0.34	0.35	0.36
	7	3.56	1.82	1.29	1.04	0.89	0.80	0.67	0.59	0.47	0.41	0.38	0.39	0.41	0.43	0.44
	10	4.98	2.47	1.70	1.35	1.15	1.02	0.85	0.74	0.59	0.50	0.47	0.49	0.50	0.52	0.54
	15	7.25	3.47	2.35	1.84	1.54	1.35	1.11	0.96	0.76	0.64	0.59	0.62	0.64	0.66	0.69
1.6	2	0.88	0.51	0.39	0.33	0.30	0.27	0.24	0.22	0.18	0.16	0.15	0.16	0.16	0.17	0.17
	3	1.26	0.71	0.53	0.44	0.39	0.35	0.31	0.28	0.23	0.20	0.19	0.20	0.20	0.21	0.22
	4	1.62	0.88	0.65	0.54	0.47	0.43	0.37	0.33	0.27	0.24	0.22	0.23	0.24	0.25	0.26
	5	1.97	1.06	0.77	0.63	0.55	0.50	0.43	0.38	0.31	0.27	0.25	0.27	0.27	0.28	0.29
	7	2.69	1.40	1.00	0.81	0.69	0.62	0.53	0.47	0.38	0.33	0.31	0.32	0.33	0.34	0.36
	10	3.73	1.88	1.32	1.05	0.90	0.80	0.67	0.59	0.47	0.41	0.38	0.39	0.41	0.42	0.44
	15	5.45	2.63	1.80	1.41	1.19	1.06	0.88	0.76	0.61	0.51	0.47	0.50	0.52	0.53	0.56
1.8	2	0.70	0.41	0.32	0.27	0.24	0.22	0.20	0.18	0.15	0.13	0.12	0.13	0.13	0.14	0.14
	3	0.99	0.56	0.42	0.36	0.32	0.29	0.25	0.23	0.19	0.17	0.16	0.16	0.17	0.17	0.18
	4	1.27	0.71	0.53	0.44	0.39	0.35	0.30	0.27	0.23	0.19	0.18	0.19	0.20	0.21	0.21
	5	1.55	0.84	0.62	0.52	0.45	0.41	0.35	0.32	0.26	0.22	0.21	0.22	0.23	0.23	0.24
	7	2.09	1.11	0.80	0.66	0.57	0.51	0.44	0.38	0.32	0.27	0.26	0.27	0.28	0.28	0.30
	10	2.91	1.49	1.05	0.85	0.72	0.65	0.55	0.48	0.39	0.34	0.31	0.33	0.34	0.35	0.36
	15	4.21	2.08	1.44	1.14	0.96	0.86	0.72	0.63	0.50	0.43	0.39	0.41	0.43	0.44	0.46
2.0	2	0.57	0.34	0.26	0.22	0.20	0.19	0.16	0.15	0.13	0.11	0.11	0.11	0.11	0.12	0.12
	3	0.80	0.46	0.35	0.30	0.26	0.24	0.21	0.19	0.16	0.14	0.13	0.14	0.14	0.15	0.15
	4	1.03	0.58	0.43	0.36	0.32	0.29	0.26	0.23	0.19	0.17	0.16	0.16	0.17	0.17	0.18
	5	1.25	0.69	0.51	0.42	0.38	0.34	0.29	0.26	0.22	0.19	0.18	0.19	0.19	0.20	0.21
	7	1.68	0.90	0.66	0.54	0.47	0.43	0.36	0.33	0.27	0.23	0.22	0.23	0.23	0.24	0.25
	10	2.33	1.21	0.86	0.69	0.60	0.54	0.46	0.41	0.33	0.28	0.26	0.28	0.29	0.29	0.31
	15	3.37	1.69	1.18	0.94	0.80	0.71	0.60	0.53	0.42	0.36	0.33	0.35	0.36	0.37	0.39
2.5	2	0.37	0.23	0.18	0.15	0.14	0.13	0.11	0.10	0.09	0.08	0.07	0.08	0.08	0.08	0.08
	3	0.52	0.31	0.24	0.20	0.18	0.17	0.15	0.13	0.11	0.10	0.09	0.10	0.10	0.10	0.11
	4	0.66	0.38	0.29	0.25	0.22	0.20	0.18	0.16	0.13	0.12	0.11	0.11	0.12	0.12	0.13
	5	0.80	0.46	0.34	0.29	0.26	0.23	0.20	0.18	0.15	0.13	0.13	0.13	0.13	0.14	0.14
	7	1.07	0.59	0.44	0.36	0.32	0.29	0.25	0.22	0.19	0.16	0.15	0.16	0.16	0.17	0.18
	10	1.47	0.79	0.57	0.47	0.41	0.36	0.32	0.28	0.23	0.20	0.19	0.19	0.20	0.21	0.22
	15	2.11	1.08	0.78	0.62	0.54	0.48	0.41	0.36	0.29	0.25	0.23	0.24	0.25	0.26	0.27
3.0	3	0.37	0.22	0.17	0.15	0.13	0.12	0.11	0.10	0.08	0.07	0.07	0.07	0.07	0.08	0.08
	4	0.46	0.28	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.09	0.08	0.09	0.09	0.09	0.09
	5	0.56	0.32	0.25	0.21	0.19	0.17	0.15	0.13	0.11	0.10	0.09	0.10	0.10	0.10	0.11
	7	0.75	0.42	0.32	0.26	0.23	0.21	0.18	0.17	0.14	0.12	0.11	0.12	0.12	0.13	0.13
	10	1.02	0.56	0.41	0.34	0.30	0.27	0.23	0.21	0.17	0.15	0.14	0.14	0.15	0.15	0.16
	15	1.45	0.77	0.55	0.45	0.39	0.35	0.30	0.27	0.22	0.19	0.18	0.18	0.19	0.19	0.20
	20	1.88	0.97	0.69	0.56	0.48	0.43	0.36	0.32	0.26	0.22	0.21	0.22	0.22	0.23	0.24
4.0	4	0.27	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.06	0.05	0.05	0.06	0.06	0.06
	5	0.32	0.19	0.15	0.13	0.11	0.11	0.09	0.08	0.07	0.06	0.06	0.06	0.06	0.07	0.07
	7	0.43	0.25	0.19	0.16	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.07	0.08	0.08	0.08
	10	0.58	0.33	0.24	0.21	0.18	0.17	0.14	0.13	0.11	0.09	0.09	0.09	0.09	0.10	0.10
	15	0.81	0.44	0.33	0.27	0.24	0.22	0.19	0.17	0.14	0.12	0.11	0.12	0.12	0.12	0.13
	20	1.04	0.56	0.41	0.33	0.29	0.26	0.22	0.20	0.16	0.14	0.13	0.14	0.14	0.15	0.15
	30	1.50	0.77	0.55	0.44	0.38	0.34	0.29	0.26	0.21	0.18	0.17	0.17	0.18	0.18	0.19
5.0	5	0.21	0.13	0.10	0.09	0.08	0.07	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.05	0.05
	7	0.28	0.17	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.06	0.06
	10	0.38	0.22	0.17	0.14	0.12	0.11	0.10	0.09	0.07	0.07	0.06	0.06	0.07	0.07	0.07
	15	0.52	0.30	0.22	0.19	0.16	0.15	0.13	0.12	0.09	0.08	0.08	0.08	0.08	0.09	0.09
	20	0.67	0.37	0.27	0.22	0.20	0.18	0.15	0.14	0.11	0.10	0.09	0.10	0.10	0.10	0.11
	30	0.95	0.51	0.37	0.30	0.26	0.23	0.20	0.18	0.14	0.12	0.12	0.12	0.13	0.13	0.13
	50	1.50	0.76	0.53	0.43	0.36	0.32	0.28	0.24	0.19	0.17	0.15	0.16	0.17	0.17	0.18
7.0	5	0.11	0.07	0.06	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03
	7	0.15	0.09	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03
	10	0.20	0.12	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	1	0.28	0.16	0.12	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05
	0	0.35	0.20	0.15	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.06	0.06	0.06	0.06
	30	0.49	0.27	0.20	0.17	0.15	0.13	0.11	0.10	0.08	0.07	0.07	0.07	0.07	0.08	0.08
	50	0.76	0.40	0.29	0.24	0.21	0.18	0.16	0.14	0.11	0.10	0.09	0.09	0.10	0.10	0.11

Table for predicting headloss in tunnels

Table 8.2 Predicted head losses in tunnels

(Head losses are tabulated in mm per m)

Tunnel Width (m)	Tunnel Discharge (m^3/s)	Ratio Tunnel Height / Tunnel Width : .10	.12	.14	.16	.18	.20	.25	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.8	2.0
1.4	2	***	***	***	***	853	601	290	162	66	34	20	13	9	6	5	4	3	2	2	1	1	1
	3	***	***	***	***	***	***	652	364	149	76	44	28	19	14	11	8	6	5	4	3	2	2
	4	***	***	***	***	***	***	***	647	264	134	79	50	35	25	19	14	11	9	8	5	4	3
	5	***	***	***	***	***	***	***	***	413	210	123	79	54	39	29	23	18	14	12	8	6	5
	7	***	***	***	***	***	***	***	***	809	412	241	154	106	76	57	44	35	28	23	17	12	10
	10	***	***	***	***	***	***	***	***	***	840	491	315	216	156	117	90	72	58	48	34	25	19
	15	***	***	***	***	***	***	***	***	***	***	***	709	486	350	263	203	161	130	108	76	57	44
1.6	2	***	***	943	601	405	286	139	78	32	16	9	6	4	3	2	2	1	1	1	1	0	0
	3	***	***	***	***	912	644	312	174	71	36	21	14	9	7	5	4	3	3	2	1	1	1
	4	***	***	***	***	***	***	554	310	127	65	38	24	17	12	9	7	6	5	4	3	2	2
	5	***	***	***	***	***	***	866	485	198	101	59	38	26	19	14	11	9	7	6	4	3	2
	7	***	***	***	***	***	***	***	950	389	199	116	75	51	37	28	21	17	14	11	8	6	5
	10	***	***	***	***	***	***	***	***	794	405	237	152	104	75	57	44	35	28	23	16	12	9
	15	***	***	***	***	***	***	***	***	***	912	534	343	235	170	127	98	78	63	52	37	28	21
1.8	2	***	825	488	312	211	149	72	41	17	9	5	3	2	2	1	1	1	1	0	0	0	0
	3	***	***	***	702	474	335	163	91	38	19	11	7	5	4	3	2	2	1	1	1	1	0
	4	***	***	***	***	843	596	290	162	67	34	20	13	9	6	5	4	3	2	2	1	1	1
	5	***	***	***	***	***	932	452	254	104	53	31	20	14	10	7	6	5	4	3	2	2	1
	7	***	***	***	***	***	***	887	497	204	104	61	39	27	20	15	11	9	7	6	4	3	2
	10	***	***	***	***	***	***	***	***	417	213	125	80	55	40	30	23	18	15	12	9	6	5
	15	***	***	***	***	***	***	***	***	938	480	281	181	124	90	67	52	41	33	28	20	15	11
2.0	2	857	458	272	174	118	83	41	23	9	5	3	2	1	1	1	1	0	0	0	0	0	0
	3	***	***	611	391	265	188	91	51	21	11	6	4	3	2	2	1	1	1	1	0	0	0
	4	***	***	***	695	471	333	162	91	38	19	11	7	5	4	3	2	2	1	1	1	1	0
	5	***	***	***	***	736	521	254	142	59	30	18	11	8	6	4	3	3	2	2	1	1	1
	7	***	***	***	***	***	***	497	279	115	59	35	22	15	11	8	6	5	4	3	2	2	1
	10	***	***	***	***	***	***	***	570	235	120	71	45	31	23	17	13	10	8	7	5	4	3
	15	***	***	***	***	***	***	***	***	528	270	159	102	70	51	38	29	23	19	16	11	8	6
2.5	2	246	132	79	51	34	24	12	7	3	1	1	1	0	0	0	0	0	0	0	0	0	0
	3	554	298	178	114	77	55	27	15	6	3	2	1	1	1	0	0	0	0	0	0	0	0
	4	985	530	316	203	138	98	48	27	11	6	3	2	1	1	1	1	1	0	0	0	0	0
	5	***	828	493	317	215	153	75	42	17	9	5	3	2	2	1	1	1	1	1	0	0	0
	7	***	***	967	621	422	299	146	83	34	18	10	7	5	3	2	2	2	1	1	1	1	0
	10	***	***	***	***	861	611	299	168	70	36	21	14	9	7	5	4	3	3	2	1	1	1
	15	***	***	***	***	***	***	672	379	157	81	47	31	21	15	11	9	7	6	5	3	2	2
3.0	3	201	109	65	42	28	20	10	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0
	4	358	193	116	74	51	36	18	10	4	2	1	1	1	0	0	0	0	0	0	0	0	0
	5	559	302	181	116	79	56	28	16	6	3	2	1	1	1	0	0	0	0	0	0	0	0
	7	***	592	354	228	155	110	54	31	13	7	4	2	2	1	1	1	1	0	0	0	0	0
	10	***	***	722	465	317	225	111	62	26	13	8	5	4	3	2	1	1	1	1	1	0	0
	15	***	***	***	***	712	507	249	141	58	30	18	11	8	6	4	3	3	2	2	1	1	1
	20	***	***	***	***	***	901	442	250	104	53	31	20	14	10	8	6	5	4	3	2	2	1
4.0	4	73	40	24	15	11	8	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	114	62	37	24	16	12	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	7	224	122	73	47	32	23	11	6	3	1	1	1	0	0	0	0	0	0	0	0	0	0
	10	457	248	149	96	66	47	23	13	5	3	2	1	1	1	0	0	0	0	0	0	0	0
	15	***	559	336	217	148	106	52	30	12	6	4	2	2	1	1	1	1	0	0	0	0	0
	20	***	993	597	386	263	188	93	53	22	11	7	4	3	2	2	1	1	1	1	0	0	0
	30	***	***	***	868	592	422	208	118	49	26	15	10	7	5	4	3	2	2	2	1	1	1
5.0	5	34	18	11	7	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7	66	36	22	14	10	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	10	134	73	44	29	20	14	7	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0
	15	302	165	99	64	44	31	16	9	4	2	1	1	1	0	0	0	0	0	0	0	0	0
	20	537	293	177	114	78	56	28	16	7	3	2	1	1	1	0	0	0	0	0	0	0	0
	30	***	659	398	258	176	126	62	35	15	8	5	3	2	1	1	1	1	1	0	0	0	0
	50	***	***	***	715	490	350	173	98	41	21	13	8	6	4	3	2	2	2	1	1	1	1
7.0	5	5	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7	10	6	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10	21	12	7	5	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	15	48	26	16	10	7	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	20	86	47	28	18	13	9	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	30	193	106	64	42	29	20	10	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0
	50	535	294	178	116	79	57	28	16	7	4	2	1	1	1	1	0	0	0	0	0	0	0

Tables for setting elevation of tunnel roof

Table 8.3(a) Elevation of tunnel roof . Sediment size 0.1mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.11	0.14	0.16	0.19	0.23	0.28	0.32	0.35	0.41	0.47	0.52	0.62	0.71
	R=10%	0.18	0.23	0.28	0.32	0.41	0.49	0.56	0.62	0.74	0.85	0.95	1.13	1.30
	R=15%	0.25	0.32	0.39	0.44	0.57	0.68	0.78	0.88	1.05	1.20	1.35	1.61	1.85
	R=20%	0.31	0.41	0.49	0.56	0.73	0.87	1.00	1.12	1.34	1.54	1.73	2.07	2.39
	R=25%	0.37	0.49	0.58	0.67	0.87	1.05	1.21	1.35	1.63	1.87	2.10	2.52	2.91
0.15	R= 5%	0.08	0.10	0.12	0.13	0.17	0.20	0.23	0.25	0.30	0.34	0.38	0.45	0.52
	R=10%	0.14	0.17	0.21	0.24	0.30	0.36	0.41	0.46	0.54	0.62	0.70	0.84	0.96
	R=15%	0.19	0.24	0.29	0.33	0.42	0.50	0.58	0.65	0.78	0.89	1.00	1.20	1.38
	R=20%	0.24	0.31	0.36	0.42	0.54	0.65	0.74	0.83	1.00	1.15	1.29	1.55	1.79
	R=25%	0.28	0.37	0.44	0.51	0.65	0.78	0.90	1.01	1.22	1.40	1.57	1.89	2.18
0.20	R= 5%	0.06	0.08	0.09	0.11	0.13	0.16	0.18	0.20	0.24	0.27	0.30	0.36	0.42
	R=10%	0.11	0.14	0.17	0.19	0.24	0.29	0.33	0.37	0.44	0.50	0.56	0.68	0.78
	R=15%	0.15	0.19	0.23	0.27	0.34	0.41	0.47	0.52	0.63	0.72	0.81	0.97	1.12
	R=20%	0.19	0.25	0.30	0.34	0.44	0.52	0.60	0.68	0.81	0.94	1.05	1.26	1.46
	R=25%	0.23	0.30	0.36	0.41	0.53	0.64	0.73	0.82	0.99	1.14	1.28	1.54	1.78
0.25	R= 5%	0.05	0.07	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.23	0.26	0.31	0.35
	R=10%	0.09	0.12	0.14	0.16	0.20	0.24	0.28	0.31	0.37	0.43	0.48	0.57	0.66
	R=15%	0.13	0.16	0.20	0.22	0.29	0.35	0.40	0.45	0.53	0.62	0.69	0.83	0.96
	R=20%	0.16	0.21	0.25	0.29	0.37	0.45	0.51	0.58	0.69	0.80	0.90	1.08	1.24
	R=25%	0.20	0.25	0.30	0.35	0.45	0.54	0.63	0.70	0.85	0.98	1.10	1.32	1.52
0.30	R= 5%	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.18	0.20	0.22	0.27	0.31
	R=10%	0.08	0.10	0.12	0.14	0.18	0.21	0.24	0.27	0.33	0.37	0.42	0.50	0.58
	R=15%	0.11	0.14	0.17	0.20	0.25	0.30	0.35	0.39	0.47	0.54	0.61	0.73	0.84
	R=20%	0.14	0.18	0.22	0.25	0.33	0.39	0.45	0.51	0.61	0.70	0.79	0.95	1.10
	R=25%	0.17	0.22	0.27	0.31	0.40	0.48	0.55	0.62	0.74	0.86	0.96	1.16	1.35
0.35	R= 5%	0.04	0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.16	0.18	0.20	0.24	0.28
	R=10%	0.07	0.09	0.11	0.12	0.16	0.19	0.22	0.24	0.29	0.33	0.38	0.46	0.53
	R=15%	0.10	0.13	0.15	0.18	0.23	0.27	0.31	0.35	0.42	0.48	0.55	0.66	0.76
	R=20%	0.13	0.16	0.20	0.23	0.29	0.35	0.40	0.45	0.54	0.63	0.71	0.86	0.99
	R=25%	0.15	0.20	0.24	0.27	0.36	0.43	0.49	0.55	0.67	0.77	0.87	1.05	1.22
0.40	R= 5%	0.04	0.05	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.16	0.18	0.22	0.26
	R=10%	0.06	0.08	0.10	0.11	0.14	0.17	0.20	0.22	0.26	0.31	0.35	0.42	0.48
	R=15%	0.09	0.12	0.14	0.16	0.20	0.25	0.28	0.32	0.38	0.44	0.50	0.60	0.70
	R=20%	0.12	0.15	0.18	0.20	0.26	0.32	0.37	0.41	0.50	0.58	0.65	0.78	0.91
	R=25%	0.14	0.18	0.22	0.25	0.32	0.39	0.45	0.50	0.61	0.71	0.80	0.96	1.12
0.45	R= 5%	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.15	0.17	0.21	0.24
	R=10%	0.06	0.07	0.09	0.10	0.13	0.16	0.18	0.20	0.25	0.28	0.32	0.39	0.45
	R=15%	0.08	0.11	0.13	0.15	0.19	0.23	0.26	0.29	0.35	0.41	0.46	0.56	0.65
	R=20%	0.11	0.14	0.16	0.19	0.24	0.29	0.34	0.38	0.46	0.53	0.60	0.73	0.84
	R=25%	0.13	0.17	0.20	0.23	0.30	0.36	0.41	0.47	0.56	0.65	0.74	0.89	1.03
0.50	R= 5%	0.03	0.04	0.04	0.05	0.07	0.08	0.09	0.10	0.12	0.14	0.16	0.19	0.22
	R=10%	0.05	0.07	0.08	0.09	0.12	0.15	0.17	0.19	0.23	0.26	0.30	0.36	0.42
	R=15%	0.08	0.10	0.12	0.14	0.17	0.21	0.24	0.27	0.33	0.38	0.43	0.52	0.60
	R=20%	0.10	0.13	0.15	0.17	0.23	0.27	0.31	0.35	0.43	0.50	0.56	0.68	0.78
	R=25%	0.12	0.15	0.18	0.21	0.28	0.33	0.39	0.43	0.53	0.61	0.69	0.83	0.96
0.55	R= 5%	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.18	0.21
	R=10%	0.05	0.06	0.08	0.09	0.11	0.14	0.16	0.18	0.21	0.25	0.28	0.34	0.39
	R=15%	0.07	0.09	0.11	0.13	0.16	0.20	0.23	0.26	0.31	0.36	0.40	0.49	0.57
	R=20%	0.09	0.12	0.14	0.16	0.21	0.26	0.30	0.33	0.40	0.47	0.53	0.64	0.74
	R=25%	0.11	0.14	0.17	0.20	0.26	0.31	0.36	0.41	0.49	0.57	0.64	0.78	0.90

Table 8.3(b) Elevation of tunnel roof . Sediment size 0.15mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.10	0.14	0.17	0.19	0.25	0.29	0.33	0.37	0.44	0.50	0.55	0.65	0.74
	R=10%	0.17	0.23	0.28	0.33	0.42	0.51	0.58	0.65	0.77	0.88	0.98	1.17	1.34
	R=15%	0.24	0.32	0.39	0.45	0.59	0.70	0.81	0.90	1.08	1.24	1.39	1.66	1.90
	R=20%	0.30	0.41	0.49	0.57	0.74	0.89	1.02	1.15	1.37	1.58	1.77	2.12	2.44
	R=25%	0.36	0.49	0.59	0.69	0.89	1.07	1.23	1.38	1.66	1.91	2.14	2.57	2.96
0.15	R= 5%	0.08	0.11	0.13	0.14	0.18	0.21	0.24	0.27	0.31	0.36	0.40	0.47	0.54
	R=10%	0.14	0.18	0.22	0.25	0.31	0.37	0.43	0.47	0.56	0.65	0.72	0.86	0.99
	R=15%	0.19	0.25	0.30	0.34	0.44	0.52	0.60	0.67	0.80	0.92	1.03	1.23	1.41
	R=20%	0.24	0.31	0.37	0.43	0.55	0.66	0.76	0.85	1.02	1.17	1.32	1.58	1.82
	R=25%	0.29	0.37	0.45	0.52	0.67	0.80	0.92	1.03	1.24	1.43	1.60	1.92	2.22
0.20	R= 5%	0.07	0.08	0.10	0.11	0.14	0.17	0.19	0.21	0.25	0.29	0.32	0.38	0.43
	R=10%	0.11	0.15	0.17	0.20	0.25	0.30	0.34	0.38	0.45	0.52	0.58	0.69	0.80
	R=15%	0.16	0.20	0.24	0.27	0.35	0.42	0.48	0.54	0.64	0.74	0.83	0.99	1.14
	R=20%	0.20	0.25	0.30	0.35	0.45	0.54	0.62	0.69	0.83	0.95	1.07	1.28	1.48
	R=25%	0.24	0.31	0.36	0.42	0.54	0.65	0.75	0.84	1.01	1.16	1.30	1.57	1.81
0.25	R= 5%	0.06	0.07	0.08	0.09	0.12	0.14	0.16	0.18	0.21	0.24	0.27	0.32	0.36
	R=10%	0.10	0.12	0.14	0.17	0.21	0.25	0.29	0.32	0.38	0.44	0.49	0.59	0.68
	R=15%	0.13	0.17	0.20	0.23	0.30	0.36	0.41	0.46	0.55	0.63	0.71	0.85	0.97
	R=20%	0.17	0.22	0.26	0.30	0.38	0.46	0.52	0.59	0.71	0.81	0.91	1.10	1.26
	R=25%	0.20	0.26	0.31	0.36	0.46	0.55	0.64	0.72	0.86	0.99	1.11	1.34	1.55
0.30	R= 5%	0.05	0.06	0.07	0.08	0.10	0.12	0.14	0.15	0.18	0.21	0.23	0.28	0.32
	R=10%	0.08	0.11	0.13	0.14	0.18	0.22	0.25	0.28	0.33	0.38	0.43	0.51	0.59
	R=15%	0.12	0.15	0.18	0.20	0.26	0.31	0.36	0.40	0.48	0.55	0.62	0.74	0.85
	R=20%	0.15	0.19	0.22	0.26	0.33	0.40	0.46	0.52	0.62	0.71	0.80	0.96	1.11
	R=25%	0.18	0.23	0.27	0.31	0.40	0.49	0.56	0.63	0.75	0.87	0.98	1.18	1.36
0.35	R= 5%	0.04	0.05	0.06	0.07	0.09	0.11	0.12	0.14	0.16	0.18	0.21	0.25	0.28
	R=10%	0.07	0.09	0.11	0.13	0.16	0.19	0.22	0.25	0.30	0.34	0.38	0.46	0.53
	R=15%	0.10	0.13	0.16	0.18	0.23	0.28	0.32	0.36	0.43	0.49	0.55	0.66	0.77
	R=20%	0.13	0.17	0.20	0.23	0.30	0.36	0.41	0.46	0.55	0.64	0.72	0.86	1.00
	R=25%	0.16	0.20	0.24	0.28	0.36	0.43	0.50	0.56	0.68	0.78	0.88	1.06	1.22
0.40	R= 5%	0.04	0.05	0.06	0.06	0.08	0.10	0.11	0.12	0.15	0.17	0.19	0.22	0.26
	R=10%	0.07	0.08	0.10	0.12	0.15	0.18	0.20	0.23	0.27	0.31	0.35	0.42	0.49
	R=15%	0.09	0.12	0.14	0.16	0.21	0.25	0.29	0.32	0.39	0.45	0.50	0.61	0.70
	R=20%	0.12	0.15	0.18	0.21	0.27	0.32	0.37	0.42	0.50	0.58	0.65	0.79	0.91
	R=25%	0.14	0.18	0.22	0.25	0.33	0.40	0.46	0.51	0.62	0.71	0.80	0.97	1.12
0.45	R= 5%	0.03	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.13	0.15	0.17	0.21	0.24
	R=10%	0.06	0.08	0.09	0.11	0.14	0.16	0.19	0.21	0.25	0.29	0.32	0.39	0.45
	R=15%	0.09	0.11	0.13	0.15	0.19	0.23	0.27	0.30	0.36	0.41	0.46	0.56	0.65
	R=20%	0.11	0.14	0.17	0.19	0.25	0.30	0.34	0.39	0.46	0.54	0.60	0.73	0.84
	R=25%	0.13	0.17	0.20	0.23	0.30	0.36	0.42	0.47	0.57	0.66	0.74	0.89	1.04
0.50	R= 5%	0.03	0.04	0.05	0.05	0.07	0.08	0.09	0.10	0.12	0.14	0.16	0.19	0.22
	R=10%	0.06	0.07	0.09	0.10	0.12	0.15	0.17	0.19	0.23	0.27	0.30	0.36	0.42
	R=15%	0.08	0.10	0.12	0.14	0.18	0.21	0.25	0.28	0.33	0.38	0.43	0.52	0.61
	R=20%	0.10	0.13	0.15	0.18	0.23	0.28	0.32	0.36	0.43	0.50	0.56	0.68	0.79
	R=25%	0.12	0.16	0.19	0.22	0.28	0.34	0.39	0.44	0.53	0.61	0.69	0.83	0.97
0.55	R= 5%	0.03	0.04	0.04	0.05	0.06	0.08	0.09	0.10	0.12	0.13	0.15	0.18	0.21
	R=10%	0.05	0.07	0.08	0.09	0.12	0.14	0.16	0.18	0.22	0.25	0.28	0.34	0.39
	R=15%	0.07	0.09	0.11	0.13	0.17	0.20	0.23	0.26	0.31	0.36	0.41	0.49	0.57
	R=20%	0.09	0.12	0.14	0.17	0.21	0.26	0.30	0.33	0.40	0.47	0.53	0.64	0.74
	R=25%	0.11	0.15	0.18	0.20	0.26	0.32	0.36	0.41	0.50	0.57	0.65	0.78	0.91

Table 8.3(c) Elevation of tunnel roof . Sediment size 0.2mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.09	0.13	0.16	0.19	0.25	0.30	0.34	0.38	0.45	0.52	0.57	0.68	0.77
	R=10%	0.16	0.22	0.28	0.33	0.43	0.52	0.59	0.66	0.79	0.91	1.01	1.20	1.38
	R=15%	0.22	0.31	0.39	0.45	0.60	0.71	0.82	0.92	1.10	1.27	1.42	1.69	1.94
	R=20%	0.29	0.39	0.49	0.57	0.75	0.90	1.04	1.17	1.40	1.61	1.80	2.16	2.48
	R=25%	0.35	0.47	0.58	0.69	0.90	1.08	1.25	1.40	1.68	1.94	2.18	2.61	3.01
0.15	R= 5%	0.09	0.11	0.13	0.15	0.19	0.22	0.25	0.28	0.33	0.37	0.41	0.49	0.56
	R=10%	0.14	0.19	0.22	0.25	0.32	0.38	0.44	0.49	0.58	0.66	0.74	0.88	1.01
	R=15%	0.20	0.25	0.30	0.35	0.45	0.53	0.61	0.68	0.82	0.93	1.05	1.25	1.44
	R=20%	0.24	0.32	0.38	0.44	0.56	0.68	0.78	0.87	1.04	1.20	1.34	1.60	1.85
	R=25%	0.29	0.38	0.46	0.52	0.68	0.81	0.93	1.05	1.26	1.45	1.62	1.95	2.25
0.20	R= 5%	0.07	0.09	0.10	0.12	0.15	0.17	0.20	0.22	0.26	0.29	0.33	0.39	0.44
	R=10%	0.12	0.15	0.18	0.20	0.26	0.31	0.35	0.39	0.46	0.53	0.59	0.71	0.81
	R=15%	0.16	0.21	0.25	0.28	0.36	0.43	0.49	0.55	0.66	0.75	0.85	1.01	1.16
	R=20%	0.20	0.26	0.31	0.36	0.46	0.55	0.63	0.70	0.84	0.97	1.09	1.30	1.50
	R=25%	0.24	0.31	0.37	0.43	0.55	0.66	0.76	0.85	1.02	1.18	1.32	1.59	1.83
0.25	R= 5%	0.06	0.07	0.09	0.10	0.12	0.15	0.16	0.18	0.22	0.25	0.28	0.33	0.37
	R=10%	0.10	0.13	0.15	0.17	0.22	0.26	0.30	0.33	0.39	0.45	0.50	0.60	0.69
	R=15%	0.14	0.17	0.21	0.24	0.30	0.36	0.42	0.47	0.56	0.64	0.72	0.86	0.99
	R=20%	0.17	0.22	0.26	0.30	0.39	0.46	0.53	0.60	0.72	0.82	0.93	1.11	1.28
	R=25%	0.21	0.26	0.32	0.36	0.47	0.56	0.65	0.73	0.87	1.00	1.13	1.35	1.56
0.30	R= 5%	0.05	0.06	0.07	0.08	0.11	0.13	0.14	0.16	0.19	0.21	0.24	0.28	0.32
	R=10%	0.09	0.11	0.13	0.15	0.19	0.22	0.26	0.29	0.34	0.39	0.44	0.52	0.60
	R=15%	0.12	0.15	0.18	0.21	0.27	0.32	0.36	0.41	0.49	0.56	0.63	0.75	0.87
	R=20%	0.15	0.19	0.23	0.26	0.34	0.41	0.47	0.52	0.63	0.72	0.81	0.97	1.12
	R=25%	0.18	0.23	0.28	0.32	0.41	0.49	0.57	0.64	0.76	0.88	0.99	1.19	1.37
0.35	R= 5%	0.04	0.06	0.07	0.07	0.09	0.11	0.13	0.14	0.17	0.19	0.21	0.25	0.29
	R=10%	0.08	0.10	0.12	0.13	0.17	0.20	0.23	0.26	0.30	0.35	0.39	0.47	0.54
	R=15%	0.11	0.14	0.16	0.18	0.24	0.28	0.32	0.36	0.44	0.50	0.56	0.67	0.78
	R=20%	0.13	0.17	0.20	0.24	0.30	0.36	0.42	0.47	0.56	0.65	0.73	0.87	1.01
	R=25%	0.16	0.21	0.25	0.28	0.37	0.44	0.51	0.57	0.68	0.79	0.89	1.07	1.23
0.40	R= 5%	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.15	0.17	0.19	0.23	0.26
	R=10%	0.07	0.09	0.10	0.12	0.15	0.18	0.21	0.23	0.28	0.32	0.35	0.42	0.49
	R=15%	0.10	0.12	0.15	0.17	0.21	0.26	0.29	0.33	0.40	0.45	0.51	0.61	0.71
	R=20%	0.12	0.16	0.19	0.21	0.27	0.33	0.38	0.43	0.51	0.59	0.66	0.79	0.92
	R=25%	0.15	0.19	0.22	0.26	0.33	0.40	0.46	0.52	0.62	0.72	0.81	0.97	1.12
0.45	R= 5%	0.04	0.05	0.05	0.06	0.08	0.09	0.10	0.12	0.14	0.16	0.17	0.21	0.24
	R=10%	0.06	0.08	0.09	0.11	0.14	0.16	0.19	0.21	0.25	0.29	0.33	0.39	0.45
	R=15%	0.09	0.11	0.13	0.15	0.20	0.23	0.27	0.30	0.36	0.42	0.47	0.56	0.65
	R=20%	0.11	0.14	0.17	0.20	0.25	0.30	0.35	0.39	0.47	0.54	0.61	0.73	0.85
	R=25%	0.13	0.17	0.21	0.24	0.31	0.37	0.42	0.48	0.57	0.66	0.74	0.90	1.04
0.50	R= 5%	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.20	0.23
	R=10%	0.06	0.07	0.09	0.10	0.13	0.15	0.17	0.20	0.23	0.27	0.30	0.36	0.42
	R=15%	0.08	0.10	0.12	0.14	0.18	0.22	0.25	0.28	0.34	0.39	0.44	0.53	0.61
	R=20%	0.10	0.13	0.16	0.18	0.23	0.28	0.32	0.36	0.43	0.50	0.56	0.68	0.79
	R=25%	0.12	0.16	0.19	0.22	0.28	0.34	0.39	0.44	0.53	0.61	0.69	0.84	0.97
0.55	R= 5%	0.03	0.04	0.05	0.05	0.07	0.08	0.09	0.10	0.12	0.14	0.15	0.18	0.21
	R=10%	0.05	0.07	0.08	0.09	0.12	0.14	0.16	0.18	0.22	0.25	0.28	0.34	0.40
	R=15%	0.08	0.10	0.11	0.13	0.17	0.20	0.23	0.26	0.31	0.36	0.41	0.49	0.57
	R=20%	0.10	0.12	0.15	0.17	0.22	0.26	0.30	0.34	0.41	0.47	0.53	0.64	0.74
	R=25%	0.12	0.15	0.18	0.21	0.27	0.32	0.37	0.41	0.50	0.58	0.65	0.78	0.91

Table 8.3(d) Elevation of tunnel roof . Sediment size 0.3mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.08	0.11	0.14	0.18	0.25	0.31	0.36	0.40	0.48	0.54	0.60	0.72	0.81
	R=10%	0.15	0.20	0.26	0.31	0.43	0.52	0.61	0.68	0.82	0.94	1.05	1.25	1.43
	R=15%	0.21	0.28	0.36	0.43	0.59	0.72	0.84	0.94	1.13	1.30	1.46	1.74	2.00
	R=20%	0.28	0.36	0.46	0.55	0.74	0.91	1.06	1.19	1.43	1.64	1.84	2.21	2.54
	R=25%	0.34	0.44	0.56	0.67	0.89	1.09	1.26	1.42	1.71	1.97	2.22	2.66	3.07
0.15	R= 5%	0.08	0.11	0.14	0.16	0.20	0.23	0.27	0.30	0.35	0.39	0.44	0.52	0.59
	R=10%	0.13	0.19	0.23	0.26	0.34	0.40	0.46	0.51	0.61	0.69	0.77	0.92	1.05
	R=15%	0.19	0.26	0.31	0.36	0.46	0.55	0.63	0.71	0.84	0.96	1.08	1.29	1.48
	R=20%	0.23	0.32	0.39	0.45	0.58	0.69	0.80	0.89	1.07	1.23	1.37	1.64	1.89
	R=25%	0.28	0.38	0.46	0.53	0.69	0.83	0.96	1.07	1.29	1.48	1.66	1.99	2.29
0.20	R= 5%	0.08	0.09	0.11	0.13	0.16	0.19	0.21	0.23	0.27	0.31	0.35	0.41	0.47
	R=10%	0.12	0.16	0.19	0.21	0.27	0.32	0.37	0.41	0.48	0.55	0.62	0.73	0.84
	R=15%	0.17	0.21	0.25	0.29	0.37	0.44	0.51	0.57	0.68	0.78	0.87	1.04	1.19
	R=20%	0.21	0.27	0.32	0.37	0.47	0.56	0.65	0.72	0.86	0.99	1.11	1.33	1.53
	R=25%	0.25	0.32	0.38	0.44	0.56	0.68	0.78	0.87	1.04	1.20	1.35	1.62	1.86
0.25	R= 5%	0.06	0.08	0.09	0.11	0.13	0.15	0.18	0.19	0.23	0.26	0.29	0.34	0.39
	R=10%	0.10	0.13	0.16	0.18	0.23	0.27	0.31	0.34	0.41	0.47	0.52	0.62	0.71
	R=15%	0.14	0.18	0.22	0.25	0.32	0.38	0.43	0.48	0.57	0.66	0.74	0.88	1.01
	R=20%	0.18	0.23	0.27	0.31	0.40	0.48	0.55	0.61	0.73	0.84	0.95	1.13	1.30
	R=25%	0.21	0.27	0.32	0.37	0.48	0.57	0.66	0.74	0.89	1.02	1.15	1.38	1.59
0.30	R= 5%	0.06	0.07	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.22	0.25	0.30	0.34
	R=10%	0.09	0.12	0.14	0.16	0.20	0.23	0.27	0.30	0.35	0.41	0.45	0.54	0.62
	R=15%	0.12	0.16	0.19	0.22	0.27	0.33	0.38	0.42	0.50	0.58	0.64	0.77	0.89
	R=20%	0.16	0.20	0.24	0.27	0.35	0.42	0.48	0.54	0.64	0.74	0.83	0.99	1.14
	R=25%	0.18	0.24	0.28	0.33	0.42	0.50	0.58	0.65	0.78	0.90	1.01	1.21	1.39
0.35	R= 5%	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.17	0.20	0.22	0.26	0.30
	R=10%	0.08	0.10	0.12	0.14	0.17	0.21	0.24	0.26	0.32	0.36	0.40	0.48	0.55
	R=15%	0.11	0.14	0.17	0.19	0.24	0.29	0.33	0.37	0.45	0.51	0.58	0.69	0.79
	R=20%	0.14	0.18	0.21	0.24	0.31	0.37	0.43	0.48	0.57	0.66	0.74	0.89	1.02
	R=25%	0.16	0.21	0.25	0.29	0.38	0.45	0.52	0.58	0.70	0.80	0.90	1.08	1.25
0.40	R= 5%	0.04	0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.16	0.18	0.20	0.24	0.27
	R=10%	0.07	0.09	0.11	0.12	0.16	0.19	0.21	0.24	0.28	0.33	0.37	0.44	0.50
	R=15%	0.10	0.13	0.15	0.17	0.22	0.26	0.30	0.34	0.41	0.47	0.52	0.63	0.72
	R=20%	0.13	0.16	0.19	0.22	0.28	0.34	0.39	0.43	0.52	0.60	0.67	0.81	0.93
	R=25%	0.15	0.19	0.23	0.26	0.34	0.41	0.47	0.53	0.63	0.73	0.82	0.99	1.14
0.45	R= 5%	0.04	0.05	0.06	0.06	0.08	0.10	0.11	0.12	0.14	0.16	0.18	0.22	0.25
	R=10%	0.07	0.08	0.10	0.11	0.14	0.17	0.20	0.22	0.26	0.30	0.33	0.40	0.46
	R=15%	0.09	0.12	0.14	0.16	0.20	0.24	0.28	0.31	0.37	0.43	0.48	0.57	0.66
	R=20%	0.11	0.15	0.18	0.20	0.26	0.31	0.36	0.40	0.48	0.55	0.62	0.74	0.86
	R=25%	0.14	0.18	0.21	0.24	0.31	0.38	0.43	0.49	0.58	0.67	0.75	0.91	1.05
0.50	R= 5%	0.04	0.04	0.05	0.06	0.07	0.09	0.10	0.11	0.13	0.15	0.17	0.20	0.23
	R=10%	0.06	0.08	0.09	0.10	0.13	0.16	0.18	0.20	0.24	0.28	0.31	0.37	0.43
	R=15%	0.08	0.11	0.13	0.15	0.19	0.22	0.26	0.29	0.34	0.40	0.44	0.53	0.61
	R=20%	0.11	0.14	0.16	0.19	0.24	0.29	0.33	0.37	0.44	0.51	0.57	0.69	0.79
	R=25%	0.13	0.16	0.20	0.22	0.29	0.35	0.40	0.45	0.54	0.62	0.70	0.84	0.97
0.55	R= 5%	0.03	0.04	0.05	0.05	0.07	0.08	0.09	0.10	0.12	0.14	0.16	0.19	0.21
	R=10%	0.06	0.07	0.08	0.10	0.12	0.15	0.17	0.19	0.22	0.26	0.29	0.35	0.40
	R=15%	0.08	0.10	0.12	0.14	0.17	0.21	0.24	0.27	0.32	0.37	0.41	0.50	0.58
	R=20%	0.10	0.13	0.15	0.17	0.22	0.27	0.31	0.35	0.41	0.48	0.54	0.64	0.75
	R=25%	0.12	0.15	0.18	0.21	0.27	0.32	0.37	0.42	0.51	0.58	0.65	0.79	0.91

Table 8.3(e) Elevation of tunnel roof . Sediment size 0.4mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.08	0.11	0.13	0.15	0.23	0.29	0.35	0.40	0.49	0.56	0.62	0.74	0.84
	R=10%	0.15	0.20	0.24	0.28	0.41	0.50	0.61	0.69	0.83	0.96	1.07	1.28	1.47
	R=15%	0.21	0.28	0.34	0.40	0.57	0.69	0.84	0.95	1.15	1.32	1.48	1.77	2.04
	R=20%	0.28	0.36	0.44	0.51	0.72	0.88	1.05	1.19	1.44	1.67	1.87	2.25	2.59
	R=25%	0.34	0.44	0.54	0.63	0.87	1.06	1.26	1.43	1.73	2.00	2.25	2.70	3.11
0.15	R= 5%	0.07	0.10	0.14	0.16	0.21	0.24	0.28	0.31	0.36	0.41	0.46	0.54	0.61
	R=10%	0.13	0.18	0.23	0.26	0.34	0.41	0.47	0.52	0.62	0.71	0.79	0.94	1.08
	R=15%	0.18	0.24	0.31	0.36	0.47	0.56	0.65	0.72	0.86	0.99	1.11	1.32	1.51
	R=20%	0.23	0.31	0.39	0.45	0.59	0.70	0.81	0.91	1.09	1.25	1.40	1.67	1.93
	R=25%	0.27	0.37	0.46	0.54	0.70	0.84	0.97	1.09	1.31	1.50	1.69	2.02	2.33
0.20	R= 5%	0.08	0.10	0.12	0.13	0.17	0.20	0.22	0.24	0.29	0.33	0.36	0.42	0.48
	R=10%	0.12	0.16	0.19	0.22	0.28	0.33	0.38	0.42	0.50	0.57	0.64	0.76	0.86
	R=15%	0.17	0.22	0.26	0.30	0.38	0.46	0.52	0.58	0.70	0.80	0.89	1.06	1.22
	R=20%	0.21	0.27	0.32	0.37	0.48	0.57	0.66	0.74	0.88	1.01	1.13	1.36	1.56
	R=25%	0.25	0.32	0.39	0.44	0.57	0.69	0.79	0.89	1.06	1.22	1.37	1.64	1.89
0.25	R= 5%	0.07	0.08	0.10	0.11	0.14	0.16	0.18	0.20	0.24	0.27	0.30	0.35	0.40
	R=10%	0.11	0.14	0.16	0.19	0.24	0.28	0.32	0.35	0.42	0.48	0.53	0.64	0.73
	R=15%	0.15	0.19	0.22	0.25	0.32	0.39	0.44	0.49	0.59	0.67	0.75	0.90	1.03
	R=20%	0.18	0.23	0.28	0.32	0.41	0.49	0.56	0.63	0.75	0.86	0.96	1.15	1.33
	R=25%	0.21	0.28	0.33	0.38	0.49	0.58	0.67	0.75	0.90	1.04	1.16	1.40	1.61
0.30	R= 5%	0.06	0.07	0.08	0.10	0.12	0.14	0.16	0.17	0.21	0.23	0.26	0.31	0.35
	R=10%	0.09	0.12	0.14	0.16	0.20	0.24	0.28	0.31	0.36	0.42	0.46	0.55	0.63
	R=15%	0.13	0.16	0.19	0.22	0.28	0.34	0.38	0.43	0.51	0.59	0.66	0.79	0.90
	R=20%	0.16	0.20	0.24	0.28	0.36	0.43	0.49	0.55	0.65	0.75	0.84	1.01	1.16
	R=25%	0.19	0.24	0.29	0.33	0.43	0.51	0.59	0.66	0.79	0.91	1.02	1.23	1.41
0.35	R= 5%	0.05	0.06	0.07	0.08	0.10	0.12	0.14	0.15	0.18	0.21	0.23	0.27	0.31
	R=10%	0.08	0.11	0.13	0.14	0.18	0.21	0.24	0.27	0.32	0.37	0.41	0.49	0.56
	R=15%	0.11	0.14	0.17	0.20	0.25	0.30	0.34	0.38	0.46	0.52	0.59	0.70	0.81
	R=20%	0.14	0.18	0.22	0.25	0.32	0.38	0.44	0.49	0.58	0.67	0.75	0.90	1.04
	R=25%	0.17	0.22	0.26	0.30	0.38	0.46	0.53	0.59	0.71	0.81	0.91	1.10	1.27
0.40	R= 5%	0.05	0.06	0.07	0.07	0.09	0.11	0.12	0.14	0.16	0.19	0.21	0.24	0.28
	R=10%	0.08	0.10	0.11	0.13	0.16	0.19	0.22	0.25	0.29	0.33	0.37	0.45	0.51
	R=15%	0.10	0.13	0.16	0.18	0.23	0.27	0.31	0.35	0.41	0.47	0.53	0.64	0.73
	R=20%	0.13	0.16	0.20	0.22	0.29	0.34	0.39	0.44	0.53	0.61	0.68	0.82	0.94
	R=25%	0.15	0.20	0.23	0.27	0.35	0.42	0.48	0.54	0.64	0.74	0.83	1.00	1.15
0.45	R= 5%	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.15	0.17	0.19	0.22	0.25
	R=10%	0.07	0.09	0.10	0.12	0.15	0.18	0.20	0.22	0.27	0.31	0.34	0.41	0.47
	R=15%	0.09	0.12	0.14	0.16	0.21	0.25	0.28	0.32	0.38	0.44	0.49	0.58	0.67
	R=20%	0.12	0.15	0.18	0.21	0.26	0.32	0.36	0.41	0.49	0.56	0.63	0.75	0.87
	R=25%	0.14	0.18	0.22	0.25	0.32	0.38	0.44	0.49	0.59	0.68	0.76	0.92	1.06
0.50	R= 5%	0.04	0.05	0.05	0.06	0.08	0.09	0.10	0.12	0.14	0.16	0.17	0.21	0.23
	R=10%	0.06	0.08	0.09	0.11	0.14	0.16	0.19	0.21	0.25	0.28	0.32	0.38	0.43
	R=15%	0.09	0.11	0.13	0.15	0.19	0.23	0.26	0.29	0.35	0.40	0.45	0.54	0.62
	R=20%	0.11	0.14	0.17	0.19	0.24	0.29	0.34	0.38	0.45	0.52	0.58	0.70	0.80
	R=25%	0.13	0.17	0.20	0.23	0.29	0.35	0.41	0.46	0.55	0.63	0.71	0.85	0.98
0.55	R= 5%	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.19	0.22
	R=10%	0.06	0.07	0.09	0.10	0.13	0.15	0.17	0.19	0.23	0.26	0.29	0.35	0.40
	R=15%	0.08	0.10	0.12	0.14	0.18	0.21	0.24	0.27	0.33	0.38	0.42	0.50	0.58
	R=20%	0.10	0.13	0.15	0.18	0.23	0.27	0.31	0.35	0.42	0.48	0.54	0.65	0.75
	R=25%	0.12	0.16	0.19	0.21	0.28	0.33	0.38	0.43	0.51	0.59	0.66	0.80	0.92

Table 8.3(f) Elevation of tunnel roof . Sediment size 0.8mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.08	0.11	0.13	0.15	0.20	0.24	0.28	0.33	0.44	0.52	0.61	0.77	0.90
	R=10%	0.15	0.20	0.24	0.28	0.36	0.43	0.51	0.59	0.77	0.91	1.05	1.32	1.53
	R=15%	0.22	0.28	0.34	0.40	0.52	0.62	0.73	0.84	1.08	1.27	1.46	1.82	2.11
	R=20%	0.28	0.37	0.44	0.51	0.67	0.81	0.94	1.08	1.37	1.61	1.85	2.29	2.66
	R=25%	0.34	0.45	0.54	0.62	0.81	0.98	1.15	1.32	1.66	1.94	2.22	2.74	3.19
0.15	R= 5%	0.06	0.08	0.10	0.13	0.19	0.24	0.29	0.33	0.40	0.45	0.50	0.60	0.68
	R=10%	0.12	0.15	0.19	0.23	0.33	0.41	0.49	0.55	0.66	0.76	0.85	1.01	1.16
	R=15%	0.17	0.22	0.26	0.32	0.45	0.56	0.66	0.75	0.91	1.04	1.17	1.39	1.60
	R=20%	0.22	0.28	0.34	0.41	0.57	0.70	0.83	0.94	1.13	1.30	1.46	1.75	2.02
	R=25%	0.26	0.34	0.42	0.50	0.68	0.84	0.99	1.12	1.35	1.56	1.75	2.10	2.42
0.20	R= 5%	0.06	0.09	0.11	0.14	0.18	0.22	0.25	0.27	0.32	0.36	0.40	0.47	0.53
	R=10%	0.10	0.15	0.19	0.23	0.30	0.36	0.41	0.45	0.54	0.62	0.69	0.81	0.93
	R=15%	0.14	0.21	0.25	0.31	0.40	0.48	0.55	0.62	0.74	0.85	0.95	1.13	1.29
	R=20%	0.18	0.26	0.32	0.38	0.50	0.60	0.69	0.77	0.93	1.06	1.19	1.42	1.63
	R=25%	0.22	0.31	0.38	0.45	0.59	0.71	0.82	0.92	1.11	1.27	1.43	1.71	1.96
0.25	R= 5%	0.06	0.09	0.11	0.12	0.16	0.18	0.21	0.23	0.27	0.30	0.33	0.39	0.44
	R=10%	0.10	0.15	0.18	0.20	0.26	0.30	0.35	0.39	0.46	0.52	0.58	0.68	0.78
	R=15%	0.14	0.19	0.23	0.27	0.35	0.41	0.47	0.53	0.63	0.72	0.80	0.95	1.09
	R=20%	0.18	0.24	0.29	0.33	0.43	0.51	0.59	0.66	0.79	0.90	1.01	1.21	1.39
	R=25%	0.21	0.28	0.34	0.40	0.51	0.61	0.70	0.79	0.94	1.08	1.21	1.45	1.67
0.30	R= 5%	0.06	0.08	0.10	0.11	0.14	0.16	0.18	0.20	0.23	0.26	0.29	0.34	0.38
	R=10%	0.10	0.13	0.15	0.18	0.22	0.26	0.30	0.33	0.39	0.45	0.50	0.59	0.68
	R=15%	0.13	0.17	0.21	0.24	0.30	0.36	0.41	0.46	0.55	0.62	0.70	0.83	0.95
	R=20%	0.17	0.21	0.26	0.29	0.38	0.45	0.52	0.58	0.69	0.79	0.88	1.05	1.21
	R=25%	0.20	0.25	0.30	0.35	0.45	0.54	0.62	0.69	0.83	0.95	1.06	1.27	1.46
0.35	R= 5%	0.06	0.07	0.09	0.10	0.12	0.14	0.16	0.17	0.20	0.23	0.25	0.30	0.34
	R=10%	0.09	0.12	0.14	0.16	0.20	0.23	0.27	0.30	0.35	0.40	0.44	0.53	0.60
	R=15%	0.12	0.16	0.19	0.21	0.27	0.32	0.37	0.41	0.48	0.55	0.62	0.74	0.85
	R=20%	0.15	0.19	0.23	0.26	0.34	0.40	0.46	0.51	0.61	0.70	0.79	0.94	1.08
	R=25%	0.18	0.23	0.27	0.31	0.40	0.48	0.55	0.62	0.74	0.85	0.95	1.14	1.31
0.40	R= 5%	0.05	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.18	0.20	0.23	0.27	0.30
	R=10%	0.08	0.11	0.12	0.14	0.18	0.21	0.24	0.27	0.31	0.36	0.40	0.47	0.54
	R=15%	0.11	0.14	0.17	0.19	0.24	0.29	0.33	0.37	0.44	0.50	0.56	0.67	0.77
	R=20%	0.14	0.17	0.21	0.24	0.30	0.36	0.42	0.47	0.56	0.64	0.71	0.85	0.98
	R=25%	0.16	0.21	0.25	0.28	0.36	0.43	0.50	0.56	0.67	0.77	0.86	1.03	1.19
0.45	R= 5%	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.19	0.21	0.24	0.28
	R=10%	0.08	0.10	0.11	0.13	0.16	0.19	0.22	0.24	0.29	0.33	0.36	0.43	0.50
	R=15%	0.10	0.13	0.15	0.17	0.22	0.26	0.30	0.34	0.40	0.46	0.51	0.61	0.70
	R=20%	0.13	0.16	0.19	0.22	0.28	0.33	0.38	0.43	0.51	0.58	0.65	0.78	0.90
	R=25%	0.15	0.19	0.23	0.26	0.33	0.40	0.46	0.51	0.61	0.71	0.79	0.95	1.09
0.50	R= 5%	0.04	0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.15	0.17	0.19	0.22	0.25
	R=10%	0.07	0.09	0.10	0.12	0.15	0.18	0.20	0.22	0.26	0.30	0.34	0.40	0.46
	R=15%	0.09	0.12	0.14	0.16	0.20	0.24	0.28	0.31	0.37	0.42	0.47	0.57	0.65
	R=20%	0.12	0.15	0.18	0.20	0.26	0.31	0.35	0.39	0.47	0.54	0.61	0.73	0.83
	R=25%	0.14	0.18	0.21	0.24	0.31	0.37	0.42	0.47	0.57	0.65	0.73	0.88	1.01
0.55	R= 5%	0.04	0.05	0.06	0.06	0.08	0.09	0.11	0.12	0.14	0.16	0.17	0.21	0.23
	R=10%	0.07	0.08	0.10	0.11	0.14	0.16	0.19	0.21	0.25	0.28	0.31	0.37	0.43
	R=15%	0.09	0.11	0.13	0.15	0.19	0.23	0.26	0.29	0.34	0.39	0.44	0.53	0.61
	R=20%	0.11	0.14	0.16	0.19	0.24	0.29	0.33	0.37	0.44	0.50	0.56	0.68	0.78
	R=25%	0.13	0.16	0.20	0.22	0.29	0.34	0.39	0.44	0.53	0.61	0.68	0.82	0.95

Table 8.3(g) Elevation of tunnel roof . Sediment size 1.0mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.08	0.11	0.13	0.15	0.20	0.24	0.27	0.31	0.39	0.49	0.59	0.72	0.89
	R=10%	0.15	0.20	0.24	0.28	0.36	0.44	0.50	0.57	0.71	0.87	1.03	1.26	1.53
	R=15%	0.22	0.29	0.34	0.40	0.52	0.63	0.72	0.82	1.01	1.23	1.43	1.75	2.10
	R=20%	0.28	0.37	0.44	0.51	0.67	0.81	0.94	1.06	1.30	1.57	1.82	2.22	2.65
	R=25%	0.34	0.45	0.54	0.63	0.82	0.99	1.14	1.29	1.58	1.90	2.19	2.67	3.18
0.15	R= 5%	0.07	0.08	0.10	0.12	0.17	0.23	0.27	0.33	0.40	0.46	0.52	0.61	0.70
	R=10%	0.12	0.15	0.19	0.22	0.31	0.39	0.46	0.55	0.67	0.77	0.87	1.03	1.18
	R=15%	0.17	0.22	0.26	0.31	0.43	0.55	0.63	0.75	0.91	1.05	1.18	1.41	1.62
	R=20%	0.22	0.28	0.34	0.39	0.55	0.69	0.80	0.93	1.14	1.32	1.48	1.78	2.04
	R=25%	0.26	0.34	0.41	0.48	0.66	0.83	0.96	1.11	1.35	1.57	1.77	2.12	2.44
0.20	R= 5%	0.05	0.08	0.11	0.13	0.18	0.22	0.25	0.28	0.33	0.38	0.42	0.49	0.56
	R=10%	0.10	0.14	0.18	0.21	0.30	0.36	0.42	0.47	0.55	0.63	0.70	0.84	0.95
	R=15%	0.14	0.19	0.25	0.29	0.40	0.49	0.56	0.63	0.75	0.86	0.96	1.15	1.32
	R=20%	0.18	0.25	0.31	0.36	0.50	0.61	0.70	0.79	0.94	1.08	1.21	1.45	1.66
	R=25%	0.22	0.30	0.38	0.44	0.59	0.72	0.83	0.93	1.12	1.29	1.45	1.73	1.99
0.25	R= 5%	0.06	0.09	0.11	0.13	0.16	0.19	0.22	0.24	0.28	0.32	0.35	0.41	0.46
	R=10%	0.10	0.14	0.18	0.20	0.26	0.31	0.35	0.40	0.47	0.53	0.59	0.70	0.80
	R=15%	0.14	0.19	0.23	0.27	0.35	0.42	0.48	0.54	0.64	0.73	0.82	0.97	1.11
	R=20%	0.17	0.24	0.29	0.34	0.44	0.52	0.60	0.67	0.80	0.92	1.03	1.23	1.41
	R=25%	0.21	0.28	0.34	0.40	0.52	0.62	0.71	0.80	0.96	1.10	1.23	1.47	1.69
0.30	R= 5%	0.06	0.08	0.10	0.11	0.14	0.17	0.19	0.21	0.24	0.27	0.30	0.35	0.40
	R=10%	0.10	0.13	0.16	0.18	0.23	0.27	0.31	0.34	0.41	0.46	0.51	0.61	0.69
	R=15%	0.13	0.18	0.21	0.24	0.31	0.37	0.42	0.47	0.56	0.64	0.71	0.85	0.97
	R=20%	0.17	0.22	0.26	0.30	0.38	0.46	0.53	0.59	0.70	0.80	0.90	1.07	1.23
	R=25%	0.20	0.26	0.31	0.35	0.46	0.54	0.63	0.70	0.84	0.96	1.08	1.29	1.48
0.35	R= 5%	0.06	0.08	0.09	0.10	0.12	0.15	0.16	0.18	0.21	0.24	0.26	0.31	0.35
	R=10%	0.09	0.12	0.14	0.16	0.20	0.24	0.27	0.30	0.36	0.41	0.45	0.54	0.61
	R=15%	0.12	0.16	0.19	0.22	0.28	0.33	0.37	0.42	0.50	0.57	0.63	0.75	0.86
	R=20%	0.15	0.20	0.23	0.27	0.34	0.41	0.47	0.52	0.62	0.72	0.80	0.96	1.10
	R=25%	0.18	0.23	0.28	0.32	0.41	0.49	0.56	0.63	0.75	0.86	0.96	1.15	1.32
0.40	R= 5%	0.06	0.07	0.08	0.09	0.11	0.13	0.15	0.16	0.19	0.21	0.23	0.28	0.31
	R=10%	0.09	0.11	0.13	0.15	0.18	0.22	0.25	0.27	0.32	0.37	0.41	0.49	0.55
	R=15%	0.11	0.14	0.17	0.20	0.25	0.30	0.34	0.38	0.45	0.51	0.57	0.68	0.78
	R=20%	0.14	0.18	0.21	0.24	0.31	0.37	0.42	0.47	0.56	0.65	0.72	0.87	0.99
	R=25%	0.16	0.21	0.25	0.29	0.37	0.44	0.51	0.57	0.68	0.78	0.87	1.05	1.20
0.45	R= 5%	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.15	0.17	0.19	0.21	0.25	0.28
	R=10%	0.08	0.10	0.12	0.13	0.17	0.20	0.22	0.25	0.29	0.34	0.37	0.44	0.51
	R=15%	0.10	0.13	0.16	0.18	0.23	0.27	0.31	0.34	0.41	0.47	0.52	0.62	0.71
	R=20%	0.13	0.16	0.19	0.22	0.28	0.34	0.39	0.43	0.52	0.59	0.66	0.79	0.91
	R=25%	0.15	0.19	0.23	0.26	0.34	0.40	0.46	0.52	0.62	0.71	0.80	0.96	1.11
0.50	R= 5%	0.05	0.06	0.07	0.07	0.09	0.11	0.12	0.13	0.16	0.18	0.19	0.23	0.26
	R=10%	0.07	0.09	0.11	0.12	0.15	0.18	0.21	0.23	0.27	0.31	0.34	0.41	0.47
	R=15%	0.10	0.12	0.14	0.16	0.21	0.25	0.28	0.32	0.38	0.43	0.48	0.58	0.66
	R=20%	0.12	0.15	0.18	0.21	0.26	0.31	0.36	0.40	0.48	0.55	0.61	0.74	0.85
	R=25%	0.14	0.18	0.21	0.24	0.31	0.37	0.43	0.48	0.58	0.66	0.74	0.89	1.02
0.55	R= 5%	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.12	0.14	0.16	0.18	0.21	0.24
	R=10%	0.07	0.08	0.10	0.11	0.14	0.17	0.19	0.21	0.25	0.29	0.32	0.38	0.43
	R=15%	0.09	0.11	0.13	0.15	0.19	0.23	0.26	0.29	0.35	0.40	0.45	0.54	0.62
	R=20%	0.11	0.14	0.17	0.19	0.24	0.29	0.33	0.37	0.45	0.51	0.57	0.69	0.79
	R=25%	0.13	0.17	0.20	0.23	0.29	0.35	0.40	0.45	0.54	0.62	0.69	0.83	0.96

Table 8.3(h) Elevation of tunnel roof . Sediment size 1.5mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.09	0.11	0.13	0.15	0.20	0.24	0.28	0.31	0.38	0.43	0.49	0.64	0.80
	R=10%	0.16	0.20	0.24	0.28	0.37	0.44	0.51	0.57	0.69	0.80	0.91	1.16	1.41
	R=15%	0.22	0.29	0.35	0.40	0.52	0.63	0.73	0.82	0.99	1.15	1.30	1.64	1.98
	R=20%	0.28	0.37	0.45	0.52	0.67	0.81	0.94	1.06	1.28	1.48	1.68	2.10	2.52
	R=25%	0.35	0.45	0.54	0.63	0.82	0.99	1.15	1.30	1.57	1.81	2.05	2.55	3.05
0.15	R= 5%	0.07	0.09	0.10	0.12	0.15	0.19	0.23	0.28	0.36	0.44	0.52	0.64	0.73
	R=10%	0.12	0.16	0.19	0.22	0.28	0.34	0.42	0.50	0.62	0.75	0.87	1.06	1.22
	R=15%	0.17	0.22	0.27	0.31	0.40	0.49	0.59	0.69	0.86	1.03	1.19	1.44	1.67
	R=20%	0.22	0.28	0.34	0.40	0.52	0.63	0.75	0.88	1.09	1.29	1.48	1.80	2.09
	R=25%	0.26	0.35	0.42	0.48	0.63	0.76	0.91	1.06	1.31	1.54	1.77	2.15	2.49
0.20	R= 5%	0.06	0.07	0.09	0.10	0.17	0.20	0.26	0.29	0.35	0.40	0.44	0.52	0.59
	R=10%	0.10	0.13	0.16	0.18	0.28	0.34	0.42	0.47	0.57	0.66	0.73	0.87	1.00
	R=15%	0.14	0.18	0.22	0.26	0.38	0.47	0.56	0.64	0.77	0.89	1.00	1.19	1.36
	R=20%	0.18	0.24	0.29	0.33	0.48	0.58	0.70	0.79	0.96	1.11	1.24	1.49	1.71
	R=25%	0.22	0.29	0.35	0.41	0.57	0.70	0.83	0.94	1.14	1.32	1.48	1.77	2.04
0.25	R= 5%	0.05	0.07	0.10	0.12	0.17	0.20	0.23	0.25	0.30	0.34	0.37	0.44	0.50
	R=10%	0.09	0.13	0.16	0.19	0.27	0.32	0.37	0.41	0.49	0.56	0.62	0.74	0.84
	R=15%	0.12	0.17	0.22	0.26	0.36	0.43	0.50	0.56	0.66	0.76	0.85	1.01	1.16
	R=20%	0.16	0.22	0.28	0.32	0.44	0.54	0.62	0.69	0.82	0.95	1.06	1.27	1.45
	R=25%	0.19	0.26	0.33	0.39	0.52	0.63	0.73	0.82	0.98	1.13	1.26	1.51	1.74
0.30	R= 5%	0.06	0.08	0.10	0.12	0.15	0.18	0.20	0.22	0.26	0.29	0.32	0.38	0.43
	R=10%	0.09	0.13	0.16	0.19	0.24	0.29	0.33	0.36	0.43	0.49	0.54	0.64	0.73
	R=15%	0.13	0.17	0.21	0.25	0.32	0.38	0.44	0.49	0.58	0.66	0.74	0.88	1.01
	R=20%	0.16	0.21	0.26	0.31	0.40	0.47	0.54	0.61	0.72	0.83	0.93	1.11	1.27
	R=25%	0.19	0.25	0.31	0.36	0.47	0.56	0.64	0.72	0.86	0.99	1.11	1.32	1.52
0.35	R= 5%	0.06	0.08	0.10	0.11	0.13	0.16	0.18	0.20	0.23	0.26	0.28	0.33	0.37
	R=10%	0.10	0.12	0.15	0.17	0.22	0.25	0.29	0.32	0.38	0.43	0.48	0.57	0.64
	R=15%	0.13	0.16	0.20	0.23	0.29	0.34	0.39	0.44	0.52	0.59	0.66	0.78	0.89
	R=20%	0.15	0.20	0.24	0.28	0.35	0.42	0.49	0.54	0.65	0.74	0.83	0.99	1.13
	R=25%	0.18	0.24	0.28	0.33	0.42	0.50	0.58	0.64	0.77	0.88	0.99	1.18	1.36
0.40	R= 5%	0.06	0.07	0.09	0.10	0.12	0.14	0.16	0.17	0.20	0.23	0.25	0.30	0.33
	R=10%	0.09	0.12	0.14	0.15	0.20	0.23	0.26	0.29	0.34	0.39	0.43	0.51	0.58
	R=15%	0.12	0.15	0.18	0.20	0.26	0.31	0.35	0.39	0.47	0.53	0.59	0.71	0.81
	R=20%	0.14	0.18	0.22	0.25	0.32	0.38	0.44	0.49	0.58	0.67	0.75	0.89	1.02
	R=25%	0.17	0.22	0.26	0.30	0.38	0.46	0.52	0.58	0.70	0.80	0.90	1.07	1.23
0.45	R= 5%	0.06	0.07	0.08	0.09	0.11	0.13	0.14	0.16	0.18	0.21	0.23	0.27	0.30
	R=10%	0.08	0.11	0.12	0.14	0.18	0.21	0.24	0.26	0.31	0.35	0.39	0.46	0.53
	R=15%	0.11	0.14	0.16	0.19	0.24	0.28	0.32	0.36	0.43	0.49	0.54	0.64	0.74
	R=20%	0.13	0.17	0.20	0.23	0.30	0.35	0.40	0.45	0.53	0.61	0.69	0.82	0.94
	R=25%	0.16	0.20	0.24	0.27	0.35	0.42	0.48	0.54	0.64	0.73	0.82	0.98	1.13
0.50	R= 5%	0.05	0.06	0.07	0.08	0.10	0.12	0.13	0.14	0.17	0.19	0.21	0.24	0.28
	R=10%	0.08	0.10	0.11	0.13	0.16	0.19	0.22	0.24	0.29	0.32	0.36	0.43	0.49
	R=15%	0.10	0.13	0.15	0.17	0.22	0.26	0.30	0.33	0.39	0.45	0.50	0.60	0.68
	R=20%	0.12	0.16	0.19	0.21	0.27	0.32	0.37	0.41	0.49	0.57	0.63	0.76	0.87
	R=25%	0.14	0.18	0.22	0.25	0.32	0.39	0.44	0.50	0.59	0.68	0.76	0.91	1.05
0.55	R= 5%	0.05	0.06	0.07	0.08	0.09	0.11	0.12	0.13	0.15	0.17	0.19	0.23	0.26
	R=10%	0.07	0.09	0.11	0.12	0.15	0.18	0.20	0.22	0.26	0.30	0.33	0.40	0.45
	R=15%	0.09	0.12	0.14	0.16	0.20	0.24	0.28	0.31	0.36	0.42	0.47	0.55	0.63
	R=20%	0.12	0.15	0.17	0.20	0.25	0.30	0.35	0.39	0.46	0.53	0.59	0.70	0.81
	R=25%	0.13	0.17	0.21	0.24	0.30	0.36	0.41	0.46	0.55	0.63	0.71	0.85	0.98

Table 8.3(i) Elevation of tunnel roof . Sediment size 2.0mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.09	0.11	0.14	0.16	0.20	0.24	0.28	0.32	0.38	0.44	0.49	0.59	0.69
	R=10%	0.16	0.20	0.25	0.28	0.37	0.44	0.51	0.58	0.70	0.81	0.91	1.09	1.28
	R=15%	0.22	0.29	0.35	0.40	0.53	0.63	0.73	0.83	1.00	1.15	1.30	1.57	1.83
	R=20%	0.29	0.37	0.45	0.52	0.68	0.82	0.95	1.07	1.29	1.49	1.68	2.03	2.37
	R=25%	0.35	0.45	0.55	0.63	0.83	1.00	1.15	1.30	1.57	1.82	2.05	2.48	2.89
0.15	R= 5%	0.07	0.09	0.10	0.12	0.16	0.19	0.22	0.25	0.33	0.41	0.48	0.61	0.73
	R=10%	0.12	0.16	0.19	0.22	0.28	0.34	0.40	0.45	0.58	0.71	0.82	1.03	1.22
	R=15%	0.17	0.22	0.27	0.31	0.40	0.49	0.56	0.64	0.81	0.99	1.13	1.41	1.67
	R=20%	0.22	0.29	0.35	0.40	0.52	0.63	0.73	0.82	1.04	1.25	1.43	1.78	2.09
	R=25%	0.27	0.35	0.42	0.49	0.63	0.76	0.88	1.00	1.26	1.50	1.71	2.12	2.49
0.20	R= 5%	0.06	0.07	0.09	0.10	0.13	0.19	0.23	0.26	0.35	0.41	0.46	0.55	0.62
	R=10%	0.10	0.13	0.16	0.18	0.24	0.32	0.39	0.44	0.57	0.67	0.75	0.90	1.03
	R=15%	0.14	0.19	0.22	0.26	0.34	0.45	0.54	0.61	0.77	0.90	1.01	1.22	1.39
	R=20%	0.18	0.24	0.29	0.33	0.44	0.57	0.67	0.76	0.96	1.12	1.26	1.51	1.74
	R=25%	0.22	0.29	0.35	0.40	0.53	0.68	0.81	0.91	1.14	1.33	1.50	1.80	2.07
0.25	R= 5%	0.05	0.06	0.08	0.11	0.15	0.20	0.23	0.26	0.31	0.35	0.39	0.46	0.52
	R=10%	0.09	0.11	0.14	0.18	0.25	0.32	0.38	0.42	0.51	0.58	0.64	0.76	0.87
	R=15%	0.12	0.16	0.20	0.25	0.34	0.43	0.50	0.57	0.68	0.78	0.87	1.04	1.19
	R=20%	0.16	0.21	0.25	0.31	0.42	0.53	0.62	0.70	0.84	0.97	1.08	1.29	1.49
	R=25%	0.19	0.25	0.31	0.37	0.50	0.63	0.73	0.83	1.00	1.15	1.29	1.54	1.77
0.30	R= 5%	0.04	0.07	0.09	0.12	0.16	0.19	0.21	0.23	0.27	0.31	0.34	0.40	0.45
	R=10%	0.08	0.12	0.15	0.19	0.25	0.30	0.34	0.37	0.44	0.51	0.56	0.66	0.76
	R=15%	0.11	0.16	0.20	0.25	0.33	0.39	0.45	0.50	0.60	0.68	0.76	0.91	1.04
	R=20%	0.14	0.20	0.25	0.30	0.40	0.48	0.55	0.62	0.74	0.85	0.95	1.13	1.30
	R=25%	0.17	0.24	0.30	0.36	0.47	0.57	0.65	0.73	0.88	1.01	1.13	1.35	1.55
0.35	R= 5%	0.06	0.08	0.10	0.11	0.14	0.17	0.19	0.21	0.24	0.27	0.30	0.35	0.39
	R=10%	0.09	0.12	0.15	0.18	0.22	0.26	0.30	0.33	0.40	0.45	0.50	0.59	0.67
	R=15%	0.12	0.16	0.20	0.23	0.30	0.35	0.40	0.45	0.53	0.61	0.68	0.80	0.92
	R=20%	0.15	0.20	0.24	0.28	0.36	0.43	0.50	0.56	0.66	0.76	0.85	1.01	1.16
	R=25%	0.17	0.23	0.29	0.33	0.43	0.51	0.59	0.66	0.79	0.90	1.01	1.21	1.39
0.40	R= 5%	0.06	0.08	0.09	0.10	0.13	0.15	0.17	0.19	0.22	0.24	0.27	0.31	0.35
	R=10%	0.09	0.12	0.14	0.16	0.20	0.24	0.27	0.30	0.36	0.40	0.45	0.53	0.60
	R=15%	0.12	0.15	0.18	0.21	0.27	0.32	0.36	0.41	0.48	0.55	0.61	0.73	0.83
	R=20%	0.14	0.19	0.23	0.26	0.33	0.39	0.45	0.50	0.60	0.69	0.77	0.91	1.05
	R=25%	0.17	0.22	0.26	0.30	0.39	0.47	0.53	0.60	0.71	0.82	0.92	1.09	1.26
0.45	R= 5%	0.06	0.07	0.08	0.09	0.12	0.14	0.15	0.17	0.19	0.22	0.24	0.28	0.32
	R=10%	0.09	0.11	0.13	0.15	0.19	0.22	0.25	0.27	0.32	0.37	0.41	0.48	0.55
	R=15%	0.11	0.14	0.17	0.19	0.25	0.29	0.33	0.37	0.44	0.50	0.56	0.66	0.76
	R=20%	0.14	0.17	0.21	0.24	0.30	0.36	0.41	0.46	0.55	0.63	0.70	0.84	0.96
	R=25%	0.16	0.20	0.24	0.28	0.36	0.43	0.49	0.55	0.65	0.75	0.84	1.00	1.15
0.50	R= 5%	0.05	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.18	0.20	0.22	0.26	0.29
	R=10%	0.08	0.10	0.12	0.14	0.17	0.20	0.23	0.25	0.30	0.34	0.37	0.44	0.50
	R=15%	0.11	0.13	0.16	0.18	0.23	0.27	0.31	0.34	0.41	0.46	0.52	0.61	0.70
	R=20%	0.13	0.16	0.19	0.22	0.28	0.33	0.38	0.43	0.51	0.58	0.65	0.77	0.89
	R=25%	0.15	0.19	0.23	0.26	0.33	0.40	0.45	0.51	0.60	0.69	0.78	0.93	1.07
0.55	R= 5%	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.24	0.27
	R=10%	0.08	0.10	0.11	0.13	0.16	0.19	0.21	0.23	0.27	0.31	0.35	0.41	0.47
	R=15%	0.10	0.12	0.15	0.17	0.21	0.25	0.29	0.32	0.38	0.43	0.48	0.57	0.65
	R=20%	0.12	0.15	0.18	0.21	0.26	0.31	0.36	0.40	0.47	0.54	0.60	0.72	0.83
	R=25%	0.14	0.18	0.21	0.24	0.31	0.37	0.42	0.47	0.56	0.65	0.72	0.87	0.99

Table 8.3(j) Elevation of tunnel roof . Sediment size 3.0mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.09	0.12	0.14	0.16	0.21	0.25	0.29	0.32	0.39	0.44	0.50	0.60	0.69
	R=10%	0.16	0.21	0.25	0.29	0.37	0.45	0.52	0.58	0.70	0.81	0.92	1.10	1.28
	R=15%	0.23	0.29	0.35	0.41	0.53	0.64	0.74	0.83	1.01	1.16	1.31	1.58	1.83
	R=20%	0.29	0.38	0.45	0.52	0.68	0.82	0.95	1.07	1.30	1.50	1.69	2.04	2.36
	R=25%	0.35	0.46	0.55	0.64	0.83	1.00	1.16	1.31	1.58	1.83	2.06	2.49	2.89
0.15	R= 5%	0.07	0.09	0.11	0.12	0.16	0.19	0.22	0.25	0.30	0.34	0.39	0.53	0.67
	R=10%	0.12	0.16	0.19	0.22	0.29	0.35	0.40	0.45	0.54	0.63	0.71	0.94	1.15
	R=15%	0.17	0.23	0.27	0.31	0.41	0.49	0.57	0.64	0.77	0.90	1.02	1.31	1.59
	R=20%	0.22	0.29	0.35	0.40	0.52	0.63	0.73	0.82	1.00	1.15	1.31	1.67	2.01
	R=25%	0.27	0.35	0.42	0.49	0.64	0.77	0.89	1.00	1.21	1.41	1.59	2.02	2.41
0.20	R= 5%	0.06	0.07	0.09	0.10	0.13	0.16	0.19	0.22	0.31	0.37	0.43	0.56	0.65
	R=10%	0.10	0.13	0.16	0.18	0.24	0.29	0.34	0.40	0.53	0.62	0.72	0.91	1.06
	R=15%	0.14	0.19	0.23	0.26	0.34	0.41	0.48	0.56	0.72	0.85	0.98	1.23	1.43
	R=20%	0.18	0.24	0.29	0.33	0.43	0.52	0.61	0.71	0.91	1.07	1.23	1.53	1.77
	R=25%	0.22	0.29	0.35	0.41	0.53	0.64	0.74	0.86	1.09	1.28	1.47	1.81	2.10
0.25	R= 5%	0.05	0.06	0.08	0.09	0.12	0.18	0.21	0.25	0.32	0.37	0.42	0.49	0.56
	R=10%	0.09	0.12	0.14	0.16	0.22	0.29	0.35	0.41	0.51	0.60	0.67	0.80	0.91
	R=15%	0.13	0.16	0.20	0.23	0.31	0.40	0.47	0.55	0.69	0.80	0.90	1.07	1.23
	R=20%	0.16	0.21	0.25	0.29	0.39	0.50	0.59	0.68	0.85	0.99	1.11	1.33	1.53
	R=25%	0.19	0.25	0.30	0.35	0.47	0.60	0.71	0.81	1.00	1.17	1.31	1.58	1.81
0.30	R= 5%	0.04	0.06	0.07	0.10	0.14	0.19	0.22	0.25	0.29	0.33	0.37	0.43	0.48
	R=10%	0.08	0.10	0.13	0.16	0.23	0.30	0.35	0.39	0.47	0.53	0.59	0.70	0.80
	R=15%	0.11	0.14	0.18	0.22	0.31	0.39	0.46	0.52	0.62	0.71	0.79	0.94	1.08
	R=20%	0.14	0.18	0.22	0.28	0.38	0.48	0.56	0.64	0.76	0.88	0.98	1.17	1.34
	R=25%	0.17	0.22	0.27	0.33	0.45	0.57	0.66	0.75	0.90	1.03	1.16	1.39	1.60
0.35	R= 5%	0.04	0.07	0.09	0.10	0.15	0.18	0.20	0.22	0.26	0.29	0.33	0.38	0.43
	R=10%	0.07	0.11	0.14	0.17	0.23	0.28	0.32	0.35	0.42	0.47	0.53	0.62	0.71
	R=15%	0.10	0.15	0.19	0.22	0.30	0.37	0.42	0.47	0.56	0.64	0.71	0.84	0.96
	R=20%	0.13	0.18	0.23	0.27	0.37	0.45	0.51	0.57	0.68	0.79	0.88	1.05	1.20
	R=25%	0.16	0.22	0.27	0.32	0.43	0.52	0.60	0.68	0.81	0.93	1.04	1.24	1.43
0.40	R= 5%	0.05	0.07	0.09	0.11	0.14	0.16	0.18	0.20	0.24	0.26	0.29	0.34	0.38
	R=10%	0.08	0.11	0.14	0.17	0.21	0.25	0.29	0.32	0.38	0.43	0.48	0.56	0.63
	R=15%	0.11	0.15	0.19	0.22	0.28	0.33	0.38	0.42	0.50	0.58	0.64	0.76	0.87
	R=20%	0.13	0.18	0.23	0.26	0.34	0.41	0.47	0.52	0.62	0.71	0.80	0.95	1.08
	R=25%	0.16	0.21	0.27	0.31	0.40	0.48	0.55	0.62	0.74	0.84	0.94	1.13	1.29
0.45	R= 5%	0.05	0.08	0.09	0.10	0.13	0.15	0.17	0.18	0.21	0.24	0.26	0.31	0.34
	R=10%	0.08	0.11	0.14	0.16	0.20	0.23	0.26	0.29	0.34	0.39	0.43	0.51	0.58
	R=15%	0.11	0.15	0.18	0.20	0.26	0.31	0.35	0.39	0.46	0.53	0.58	0.69	0.79
	R=20%	0.13	0.18	0.21	0.25	0.32	0.38	0.43	0.48	0.57	0.65	0.73	0.87	0.99
	R=25%	0.15	0.21	0.25	0.29	0.37	0.44	0.51	0.57	0.68	0.77	0.87	1.03	1.19
0.50	R= 5%	0.06	0.07	0.09	0.10	0.12	0.14	0.15	0.17	0.19	0.22	0.24	0.28	0.31
	R=10%	0.08	0.11	0.13	0.15	0.18	0.21	0.24	0.27	0.32	0.36	0.40	0.47	0.53
	R=15%	0.11	0.14	0.17	0.19	0.24	0.28	0.32	0.36	0.43	0.48	0.54	0.64	0.73
	R=20%	0.13	0.17	0.20	0.23	0.29	0.35	0.40	0.44	0.53	0.60	0.67	0.80	0.92
	R=25%	0.15	0.20	0.23	0.27	0.34	0.41	0.47	0.52	0.62	0.72	0.80	0.96	1.10
0.55	R= 5%	0.06	0.07	0.08	0.09	0.11	0.13	0.14	0.15	0.18	0.20	0.22	0.26	0.29
	R=10%	0.08	0.10	0.12	0.14	0.17	0.20	0.23	0.25	0.29	0.33	0.37	0.43	0.49
	R=15%	0.10	0.13	0.15	0.18	0.22	0.26	0.30	0.33	0.39	0.45	0.50	0.59	0.68
	R=20%	0.12	0.16	0.19	0.21	0.27	0.32	0.37	0.41	0.49	0.56	0.63	0.75	0.85
	R=25%	0.14	0.18	0.22	0.25	0.32	0.38	0.44	0.49	0.58	0.67	0.75	0.89	1.02

Table 8.3(k) Elevation of tunnel roof . Sediment size 4.0mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.09	0.12	0.14	0.16	0.21	0.25	0.29	0.32	0.39	0.45	0.51	0.61	0.70
	R=10%	0.16	0.21	0.25	0.29	0.38	0.45	0.52	0.59	0.71	0.82	0.92	1.11	1.29
	R=15%	0.23	0.30	0.36	0.41	0.54	0.65	0.75	0.84	1.01	1.17	1.32	1.59	1.84
	R=20%	0.29	0.38	0.46	0.53	0.69	0.83	0.96	1.08	1.30	1.51	1.70	2.05	2.38
	R=25%	0.35	0.46	0.55	0.64	0.84	1.01	1.17	1.32	1.59	1.84	2.07	2.50	2.90
0.15	R= 5%	0.07	0.09	0.11	0.13	0.16	0.19	0.22	0.25	0.30	0.35	0.39	0.47	0.56
	R=10%	0.12	0.16	0.19	0.22	0.29	0.35	0.40	0.45	0.55	0.63	0.71	0.86	1.01
	R=15%	0.18	0.23	0.27	0.32	0.41	0.50	0.57	0.65	0.78	0.90	1.01	1.23	1.44
	R=20%	0.22	0.29	0.35	0.41	0.53	0.64	0.74	0.83	1.00	1.16	1.30	1.58	1.85
	R=25%	0.27	0.35	0.43	0.49	0.64	0.77	0.89	1.01	1.22	1.41	1.59	1.92	2.25
0.20	R= 5%	0.06	0.08	0.09	0.10	0.13	0.16	0.19	0.21	0.26	0.33	0.40	0.50	0.63
	R=10%	0.10	0.13	0.16	0.19	0.24	0.29	0.34	0.38	0.46	0.58	0.68	0.85	1.04
	R=15%	0.15	0.19	0.23	0.26	0.34	0.41	0.48	0.54	0.65	0.80	0.94	1.16	1.41
	R=20%	0.19	0.24	0.29	0.34	0.44	0.53	0.61	0.69	0.84	1.02	1.19	1.46	1.76
	R=25%	0.22	0.29	0.35	0.41	0.53	0.64	0.74	0.84	1.02	1.23	1.42	1.74	2.09
0.25	R= 5%	0.05	0.07	0.08	0.09	0.12	0.14	0.19	0.23	0.29	0.36	0.42	0.51	0.58
	R=10%	0.09	0.12	0.14	0.16	0.21	0.26	0.32	0.38	0.48	0.59	0.67	0.82	0.94
	R=15%	0.13	0.16	0.20	0.23	0.30	0.36	0.44	0.52	0.65	0.79	0.90	1.09	1.26
	R=20%	0.16	0.21	0.25	0.29	0.38	0.46	0.56	0.66	0.81	0.98	1.11	1.35	1.56
	R=25%	0.19	0.25	0.30	0.35	0.46	0.56	0.68	0.79	0.96	1.15	1.31	1.59	1.84
0.30	R= 5%	0.05	0.06	0.07	0.08	0.13	0.17	0.20	0.25	0.30	0.35	0.39	0.45	0.51
	R=10%	0.08	0.10	0.12	0.14	0.21	0.28	0.33	0.39	0.47	0.55	0.61	0.72	0.83
	R=15%	0.11	0.15	0.18	0.20	0.29	0.37	0.44	0.52	0.63	0.73	0.81	0.97	1.11
	R=20%	0.14	0.19	0.22	0.26	0.37	0.46	0.54	0.63	0.77	0.89	1.00	1.20	1.37
	R=25%	0.17	0.22	0.27	0.31	0.44	0.55	0.64	0.75	0.91	1.05	1.18	1.41	1.62
0.35	R= 5%	0.04	0.05	0.07	0.10	0.14	0.18	0.21	0.23	0.28	0.31	0.34	0.40	0.45
	R=10%	0.07	0.09	0.12	0.16	0.22	0.28	0.32	0.36	0.43	0.49	0.55	0.65	0.74
	R=15%	0.10	0.13	0.17	0.21	0.29	0.37	0.42	0.48	0.57	0.65	0.73	0.87	0.99
	R=20%	0.13	0.17	0.21	0.26	0.36	0.45	0.52	0.59	0.70	0.80	0.90	1.07	1.23
	R=25%	0.16	0.20	0.25	0.31	0.42	0.52	0.61	0.69	0.82	0.95	1.06	1.27	1.46
0.40	R= 5%	0.04	0.06	0.08	0.10	0.14	0.17	0.19	0.21	0.25	0.28	0.31	0.36	0.41
	R=10%	0.07	0.10	0.13	0.16	0.22	0.26	0.30	0.33	0.39	0.45	0.50	0.58	0.66
	R=15%	0.09	0.14	0.18	0.21	0.28	0.34	0.39	0.44	0.52	0.59	0.66	0.79	0.90
	R=20%	0.12	0.17	0.22	0.26	0.35	0.42	0.48	0.54	0.64	0.73	0.82	0.97	1.11
	R=25%	0.14	0.20	0.25	0.30	0.40	0.49	0.56	0.63	0.75	0.86	0.96	1.15	1.32
0.45	R= 5%	0.05	0.07	0.09	0.11	0.14	0.16	0.18	0.20	0.23	0.26	0.28	0.33	0.36
	R=10%	0.08	0.10	0.14	0.16	0.21	0.24	0.27	0.31	0.36	0.41	0.45	0.53	0.60
	R=15%	0.10	0.14	0.18	0.21	0.27	0.32	0.36	0.40	0.48	0.54	0.61	0.72	0.82
	R=20%	0.12	0.17	0.22	0.25	0.32	0.39	0.44	0.49	0.59	0.67	0.75	0.89	1.02
	R=25%	0.15	0.20	0.25	0.29	0.38	0.45	0.52	0.58	0.69	0.79	0.89	1.06	1.21
0.50	R= 5%	0.05	0.08	0.09	0.10	0.13	0.15	0.16	0.18	0.21	0.23	0.26	0.30	0.33
	R=10%	0.08	0.11	0.13	0.15	0.19	0.22	0.25	0.28	0.33	0.38	0.42	0.49	0.55
	R=15%	0.10	0.14	0.17	0.20	0.25	0.29	0.33	0.37	0.44	0.50	0.56	0.66	0.75
	R=20%	0.12	0.17	0.20	0.24	0.30	0.36	0.41	0.46	0.54	0.62	0.69	0.82	0.94
	R=25%	0.14	0.20	0.24	0.27	0.35	0.42	0.48	0.54	0.64	0.73	0.82	0.98	1.12
0.55	R= 5%	0.06	0.07	0.09	0.10	0.12	0.14	0.15	0.17	0.19	0.21	0.23	0.27	0.31
	R=10%	0.08	0.11	0.13	0.14	0.18	0.21	0.24	0.26	0.31	0.35	0.38	0.45	0.51
	R=15%	0.10	0.14	0.16	0.18	0.23	0.27	0.31	0.35	0.41	0.47	0.52	0.61	0.70
	R=20%	0.12	0.16	0.19	0.22	0.28	0.33	0.38	0.43	0.51	0.58	0.64	0.77	0.88
	R=25%	0.14	0.19	0.22	0.26	0.33	0.39	0.45	0.50	0.60	0.68	0.76	0.91	1.04

Table 8.3(I) Elevation of tunnel roof . Sediment size 6.0mm

Elevations of the dividing streamline above canal bed are given in metres

Froude Number	Extraction Ratio	Discharges per m width of canal (m^2/s) : 0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0
0.10	R= 5%	0.09	0.12	0.14	0.17	0.21	0.26	0.29	0.33	0.40	0.46	0.51	0.62	0.71
	R=10%	0.16	0.21	0.26	0.30	0.38	0.46	0.53	0.60	0.72	0.83	0.93	1.13	1.30
	R=15%	0.23	0.30	0.36	0.42	0.54	0.65	0.75	0.85	1.02	1.18	1.33	1.61	1.86
	R=20%	0.29	0.38	0.46	0.53	0.69	0.84	0.97	1.09	1.32	1.52	1.71	2.07	2.39
	R=25%	0.36	0.46	0.56	0.65	0.84	1.02	1.18	1.32	1.60	1.85	2.09	2.52	2.92
0.15	R= 5%	0.07	0.09	0.11	0.13	0.17	0.20	0.23	0.26	0.31	0.35	0.40	0.48	0.55
	R=10%	0.13	0.16	0.20	0.23	0.30	0.36	0.41	0.46	0.55	0.64	0.72	0.87	1.00
	R=15%	0.18	0.23	0.28	0.32	0.42	0.50	0.58	0.65	0.79	0.91	1.02	1.23	1.43
	R=20%	0.23	0.29	0.35	0.41	0.53	0.64	0.74	0.84	1.01	1.17	1.32	1.59	1.84
	R=25%	0.27	0.36	0.43	0.50	0.65	0.78	0.90	1.02	1.23	1.42	1.60	1.93	2.23
0.20	R= 5%	0.06	0.08	0.09	0.11	0.14	0.17	0.19	0.21	0.26	0.29	0.33	0.41	0.54
	R=10%	0.11	0.14	0.16	0.19	0.25	0.30	0.34	0.38	0.46	0.53	0.60	0.74	0.94
	R=15%	0.15	0.19	0.23	0.27	0.35	0.42	0.48	0.54	0.65	0.75	0.85	1.04	1.30
	R=20%	0.19	0.24	0.29	0.34	0.44	0.53	0.62	0.69	0.84	0.97	1.09	1.34	1.64
	R=25%	0.23	0.30	0.36	0.41	0.54	0.65	0.75	0.84	1.02	1.18	1.33	1.62	1.97
0.25	R= 5%	0.05	0.07	0.08	0.09	0.12	0.14	0.17	0.19	0.23	0.31	0.38	0.46	0.59
	R=10%	0.09	0.12	0.14	0.16	0.21	0.26	0.30	0.33	0.41	0.52	0.63	0.76	0.94
	R=15%	0.13	0.17	0.20	0.23	0.30	0.36	0.42	0.47	0.57	0.72	0.85	1.04	1.26
	R=20%	0.16	0.21	0.26	0.29	0.38	0.46	0.53	0.60	0.73	0.91	1.06	1.29	1.56
	R=25%	0.20	0.26	0.31	0.36	0.46	0.56	0.65	0.73	0.89	1.09	1.27	1.54	1.85
0.30	R= 5%	0.05	0.06	0.07	0.08	0.11	0.13	0.17	0.21	0.27	0.33	0.39	0.48	0.55
	R=10%	0.08	0.11	0.13	0.15	0.19	0.23	0.29	0.35	0.44	0.53	0.62	0.75	0.86
	R=15%	0.11	0.15	0.18	0.21	0.27	0.32	0.40	0.47	0.59	0.71	0.82	0.99	1.15
	R=20%	0.15	0.19	0.23	0.26	0.34	0.41	0.50	0.59	0.73	0.88	1.01	1.22	1.41
	R=25%	0.17	0.23	0.27	0.32	0.41	0.50	0.60	0.70	0.87	1.04	1.19	1.44	1.66
0.35	R= 5%	0.04	0.06	0.07	0.08	0.11	0.16	0.18	0.23	0.29	0.33	0.37	0.43	0.49
	R=10%	0.07	0.10	0.12	0.13	0.19	0.26	0.30	0.35	0.44	0.51	0.58	0.68	0.78
	R=15%	0.10	0.13	0.16	0.19	0.26	0.34	0.40	0.47	0.58	0.67	0.76	0.90	1.03
	R=20%	0.13	0.17	0.21	0.24	0.32	0.43	0.49	0.58	0.71	0.82	0.93	1.11	1.27
	R=25%	0.16	0.21	0.25	0.29	0.39	0.50	0.58	0.68	0.83	0.97	1.09	1.30	1.50
0.40	R= 5%	0.04	0.05	0.06	0.08	0.13	0.17	0.20	0.23	0.27	0.31	0.34	0.39	0.44
	R=10%	0.07	0.09	0.11	0.14	0.20	0.26	0.31	0.35	0.41	0.47	0.52	0.62	0.70
	R=15%	0.10	0.12	0.15	0.19	0.27	0.34	0.40	0.45	0.54	0.62	0.69	0.82	0.94
	R=20%	0.12	0.16	0.19	0.24	0.33	0.42	0.49	0.55	0.66	0.76	0.85	1.01	1.16
	R=25%	0.15	0.19	0.23	0.28	0.39	0.49	0.57	0.64	0.77	0.89	0.99	1.19	1.36
0.45	R= 5%	0.04	0.05	0.08	0.09	0.14	0.17	0.19	0.21	0.25	0.28	0.31	0.36	0.40
	R=10%	0.06	0.08	0.12	0.15	0.21	0.25	0.29	0.32	0.38	0.43	0.48	0.57	0.64
	R=15%	0.09	0.12	0.16	0.19	0.27	0.33	0.38	0.42	0.50	0.57	0.63	0.75	0.86
	R=20%	0.11	0.15	0.20	0.24	0.33	0.40	0.46	0.51	0.61	0.70	0.78	0.93	1.06
	R=25%	0.13	0.18	0.24	0.28	0.38	0.46	0.53	0.60	0.71	0.82	0.91	1.09	1.25
0.50	R= 5%	0.04	0.07	0.08	0.11	0.14	0.16	0.18	0.20	0.23	0.26	0.28	0.33	0.37
	R=10%	0.06	0.10	0.13	0.15	0.20	0.24	0.27	0.30	0.35	0.40	0.44	0.52	0.59
	R=15%	0.08	0.13	0.16	0.20	0.26	0.31	0.35	0.39	0.46	0.53	0.59	0.69	0.79
	R=20%	0.11	0.16	0.20	0.24	0.31	0.37	0.43	0.47	0.56	0.65	0.72	0.86	0.98
	R=25%	0.13	0.19	0.23	0.28	0.36	0.43	0.50	0.55	0.66	0.76	0.85	1.01	1.16
0.55	R= 5%	0.05	0.07	0.09	0.10	0.13	0.15	0.17	0.18	0.21	0.24	0.26	0.30	0.34
	R=10%	0.08	0.11	0.13	0.15	0.19	0.22	0.25	0.28	0.33	0.37	0.41	0.48	0.55
	R=15%	0.10	0.14	0.17	0.19	0.24	0.29	0.33	0.36	0.43	0.49	0.55	0.65	0.73
	R=20%	0.12	0.16	0.20	0.23	0.29	0.35	0.40	0.44	0.53	0.60	0.67	0.80	0.91
	R=25%	0.14	0.19	0.23	0.26	0.34	0.40	0.46	0.52	0.62	0.71	0.79	0.94	1.08

Tables for escape channel design

Table 9.1 Escape channel design. Sediment size = 0.08mm

D_{50} bed sediment size = 0.08mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.43	0.40	0.38	0.34	0.32	0.29	0.27	0.24	0.23	0.22	0.20	0.18	0.17
	Depth =	0.51	0.57	0.62	0.72	0.81	0.94	1.04	1.22	1.36	1.47	1.72	1.92	2.23
	Width =	2.3	2.7	3.0	3.8	4.4	5.4	6.2	7.7	8.9	9.9	12.2	14.1	17.3
400	Slope =	0.50	0.47	0.44	0.40	0.37	0.34	0.32	0.29	0.27	0.25	0.23	0.22	0.20
	Depth =	0.48	0.53	0.58	0.67	0.75	0.87	0.97	1.14	1.27	1.38	1.61	1.79	2.09
	Width =	2.4	2.8	3.2	3.9	4.5	5.6	6.5	7.9	9.2	10.3	12.6	14.6	17.8
600	Slope =	0.63	0.58	0.55	0.50	0.47	0.42	0.39	0.35	0.33	0.31	0.28	0.26	0.24
	Depth =	0.43	0.48	0.52	0.61	0.68	0.79	0.87	1.00	1.10	1.19	1.36	1.50	1.72
	Width =	2.6	3.0	3.4	4.1	4.8	5.9	6.8	8.3	9.6	10.8	13.2	15.3	18.7
800	Slope =	0.73	0.68	0.64	0.58	0.53	0.48	0.45	0.40	0.38	0.35	0.32	0.30	0.27
	Depth =	0.40	0.44	0.47	0.54	0.60	0.69	0.76	0.87	0.96	1.03	1.19	1.31	1.50
	Width =	2.7	3.1	3.5	4.3	5.0	6.1	7.0	8.6	10.0	11.2	13.7	15.8	19.3
1000	Slope =	0.80	0.75	0.70	0.64	0.59	0.53	0.50	0.45	0.42	0.39	0.36	0.33	0.30
	Depth =	0.36	0.39	0.43	0.49	0.54	0.62	0.68	0.78	0.86	0.93	1.07	1.18	1.35
	Width =	2.8	3.2	3.6	4.4	5.1	6.3	7.2	8.9	10.2	11.4	14.0	16.1	19.7
1500	Slope =	0.96	0.90	0.85	0.77	0.71	0.64	0.60	0.54	0.50	0.48	0.43	0.40	0.37
	Depth =	0.29	0.32	0.35	0.40	0.44	0.51	0.56	0.64	0.71	0.77	0.88	0.97	1.08
	Width =	2.9	3.4	3.8	4.6	5.4	6.5	7.6	9.2	10.7	11.9	14.5	16.9	21.3
2000	Slope =	1.10	1.03	0.97	0.88	0.82	0.74	0.69	0.62	0.58	0.55	0.50	0.47	0.44
	Depth =	0.26	0.28	0.30	0.35	0.39	0.44	0.49	0.56	0.62	0.67	0.76	0.83	0.85
	Width =	3.0	3.5	3.9	4.8	5.5	6.7	7.8	9.5	10.9	12.2	15.0	17.6	25.4
3000	Slope =	1.34	1.24	1.18	1.06	1.00	0.91	0.85	0.77	0.72	0.70	0.66	0.64	0.62
	Depth =	0.21	0.23	0.25	0.29	0.32	0.38	0.42	0.49	0.55	0.58	0.59	0.60	0.62
	Width =	3.2	3.6	4.1	5.0	5.7	7.0	8.0	9.7	11.1	13.0	18.9	24.6	35.7
4000	Slope =	1.56	1.46	1.39	1.26	1.18	1.08	1.00	0.93	0.90	0.88	0.85	0.83	0.81
	Depth =	0.19	0.21	0.23	0.27	0.30	0.35	0.40	0.45	0.45	0.46	0.47	0.48	0.49
	Width =	3.2	3.7	4.2	5.1	5.8	7.1	7.9	10.3	13.5	16.5	24.0	31.3	45.4
6000	Slope =	1.99	1.86	1.77	1.61	1.49	1.39	1.35	1.30	1.27	1.25	1.21	1.19	1.09
	Depth =	0.17	0.19	0.21	0.25	0.29	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.41
	Width =	3.3	3.8	4.3	5.2	5.5	7.7	10.0	14.5	18.9	23.2	33.7	43.2	52.9
8000	Slope =	2.36	2.21	2.07	1.90	1.84	1.76	1.72	1.67	1.64	1.62	1.50	1.41	1.30
	Depth =	0.16	0.18	0.21	0.24	0.24	0.25	0.25	0.26	0.26	0.26	0.30	0.33	0.39
	Width =	3.4	3.9	4.1	5.1	6.7	9.8	12.7	18.5	24.1	29.5	37.4	43.2	52.9
10000	Slope =	2.68	2.46	2.39	2.27	2.21	2.14	2.09	2.04	1.96	1.87	1.72	1.6 2	1.48
	Depth =	0.16	0.19	0.19	0.20	0.20	0.21	0.21	0.21	0.23	0.25	0.29	0.32	0.37
	Width =	3.3	3.5	4.3	6.2	8.1	11.8	15.3	22.2	27.3	30.5	37.4	43.2	52.9
15000	Slope =	3.50	3.39	3.32	3.22	3.15	3.07	2.91	2.67	2.51	2.39	2.20	2.07	1.90
	Depth =	0.14	0.14	0.14	0.14	0.14	0.15	0.16	0.19	0.21	0.23	0.27	0.30	0.35
	Width =	3.7	4.9	6.0	8.7	11.4	16.5	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	4.44	4.34	4.27	4.16	4.01	3.68	3.46	3.17	2.98	2.85	2.61	2.46	2.26
	Depth =	0.11	0.11	0.11	0.11	0.12	0.14	0.16	0.18	0.20	0.22	0.25	0.28	0.33
	Width =	4.8	6.2	7.7	11.1	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	6.36	6.22	5.93	5.44	5.12	4.70	4.42	4.05	3.81	3.64	3.34	3.14	2.88
	Depth =	0.08	0.08	0.09	0.10	0.11	0.13	0.14	0.17	0.19	0.20	0.24	0.26	0.31
	Width =	6.7	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.2 Escape channel design. Sediment size = 0.09mm

D_{50} bed sediment size = 0.09mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.46	0.42	0.40	0.36	0.34	0.31	0.29	0.26	0.24	0.23	0.21	0.20	0.18
	Depth =	0.50	0.56	0.61	0.71	0.79	0.92	1.02	1.19	1.33	1.45	1.68	1.88	2.19
	Width =	2.3	2.7	3.1	3.8	4.4	5.4	6.3	7.7	8.9	10.0	12.3	14.2	17.4
400	Slope =	0.53	0.50	0.47	0.43	0.40	0.36	0.34	0.31	0.29	0.27	0.25	0.23	0.21
	Depth =	0.47	0.52	0.57	0.66	0.74	0.86	0.96	1.11	1.24	1.35	1.58	1.76	2.05
	Width =	2.5	2.8	3.2	3.9	4.6	5.6	6.5	8.0	9.2	10.3	12.7	14.6	17.9
600	Slope =	0.67	0.62	0.59	0.54	0.50	0.46	0.42	0.38	0.36	0.34	0.30	0.28	0.25
	Depth =	0.42	0.47	0.51	0.60	0.67	0.78	0.87	0.99	1.09	1.18	1.36	1.49	1.72
	Width =	2.6	3.0	3.4	4.1	4.8	5.9	6.8	8.4	9.7	10.8	13.3	15.3	18.8
800	Slope =	0.79	0.73	0.69	0.62	0.58	0.52	0.48	0.44	0.41	0.38	0.35	0.32	0.29
	Depth =	0.40	0.44	0.47	0.54	0.60	0.68	0.75	0.86	0.95	1.03	1.18	1.30	1.50
	Width =	2.7	3.1	3.5	4.3	5.0	6.1	7.1	8.7	10.0	11.2	13.7	15.8	19.3
1000	Slope =	0.87	0.81	0.76	0.69	0.64	0.58	0.53	0.48	0.45	0.42	0.38	0.36	0.32
	Depth =	0.36	0.39	0.42	0.49	0.53	0.61	0.68	0.78	0.86	0.92	1.06	1.17	1.35
	Width =	2.8	3.2	3.6	4.4	5.1	6.3	7.3	8.9	10.3	11.5	14.0	16.2	19.8
1500	Slope =	1.04	0.97	0.92	0.83	0.77	0.69	0.65	0.58	0.54	0.52	0.47	0.43	0.40
	Depth =	0.29	0.32	0.35	0.40	0.44	0.51	0.56	0.64	0.71	0.76	0.88	0.96	1.07
	Width =	2.9	3.4	3.8	4.6	5.4	6.6	7.6	9.3	10.7	11.9	14.6	16.9	21.5
2000	Slope =	1.19	1.11	1.05	0.95	0.88	0.80	0.74	0.67	0.63	0.59	0.54	0.50	0.48
	Depth =	0.26	0.28	0.30	0.35	0.38	0.44	0.49	0.56	0.62	0.66	0.76	0.81	0.83
	Width =	3.0	3.5	3.9	4.8	5.5	6.7	7.8	9.5	10.9	12.2	15.0	18.0	26.0
3000	Slope =	1.44	1.34	1.27	1.15	1.07	0.98	0.91	0.83	0.78	0.75	0.72	0.70	0.68
	Depth =	0.21	0.23	0.25	0.29	0.32	0.37	0.41	0.49	0.54	0.56	0.58	0.58	0.60
	Width =	3.2	3.6	4.1	5.0	5.7	7.0	8.0	9.7	11.1	13.3	19.3	25.1	36.5
4000	Slope =	1.67	1.57	1.49	1.36	1.27	1.16	1.08	1.00	0.97	0.95	0.92	0.90	0.87
	Depth =	0.19	0.21	0.23	0.27	0.30	0.35	0.40	0.43	0.44	0.45	0.46	0.46	0.48
	Width =	3.2	3.7	4.2	5.1	5.8	7.1	7.9	10.5	13.7	16.9	24.5	31.9	46.3
6000	Slope =	2.13	2.00	1.90	1.73	1.59	1.50	1.46	1.40	1.37	1.35	1.32	1.28	1.17
	Depth =	0.17	0.19	0.21	0.25	0.29	0.30	0.31	0.31	0.32	0.32	0.33	0.35	0.40
	Width =	3.3	3.8	4.3	5.1	5.5	7.8	10.2	14.8	19.3	23.7	34.4	43.2	52.9
8000	Slope =	2.54	2.38	2.22	2.06	1.99	1.91	1.86	1.81	1.78	1.75	1.62	1.52	1.40
	Depth =	0.16	0.18	0.21	0.23	0.23	0.24	0.24	0.25	0.25	0.26	0.29	0.33	0.38
	Width =	3.4	3.9	4.0	5.2	6.8	10.0	13.0	18.9	24.5	30.1	37.4	43.2	52.9
10000	Slope =	2.86	2.65	2.58	2.46	2.39	2.31	2.27	2.21	2.11	2.02	1.85	1.74	1.60
	Depth =	0.16	0.19	0.19	0.19	0.19	0.20	0.20	0.21	0.22	0.24	0.28	0.32	0.37
	Width =	3.2	3.5	4.4	6.3	8.3	12.0	15.7	22.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	3.78	3.67	3.60	3.48	3.42	3.32	3.13	2.87	2.70	2.58	2.36	2.22	2.04
	Depth =	0.13	0.13	0.14	0.14	0.14	0.14	0.16	0.19	0.21	0.23	0.26	0.29	0.34
	Width =	3.8	5.0	6.1	8.9	11.6	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	4.81	4.70	4.63	4.51	4.31	3.96	3.72	3.41	3.21	3.06	2.81	2.65	2.43
	Depth =	0.10	0.11	0.11	0.11	0.12	0.14	0.15	0.18	0.20	0.22	0.25	0.28	0.32
	Width =	4.9	6.4	7.8	11.3	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	6.89	6.69	6.38	5.85	5.51	5.05	4.75	4.36	4.11	3.92	3.59	3.38	3.10
	Depth =	0.08	0.08	0.09	0.10	0.11	0.13	0.14	0.17	0.18	0.20	0.23	0.26	0.30
	Width =	6.9	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.3 Escape channel design. Sediment size = 0.1mm

D_{50} bed sediment size = 0.10mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.48	0.45	0.43	0.39	0.36	0.33	0.31	0.28	0.26	0.24	0.22	0.21	0.19
	Depth =	0.50	0.55	0.60	0.70	0.78	0.90	1.01	1.17	1.31	1.42	1.66	1.85	2.15
	Width =	2.4	2.7	3.1	3.8	4.4	5.4	6.3	7.7	9.0	10.0	12.3	14.2	17.5
400	Slope =	0.57	0.53	0.50	0.45	0.42	0.38	0.36	0.33	0.30	0.29	0.26	0.25	0.22
	Depth =	0.46	0.51	0.56	0.65	0.72	0.84	0.94	1.09	1.22	1.33	1.55	1.73	2.02
	Width =	2.5	2.9	3.2	4.0	4.6	5.6	6.5	8.0	9.3	10.4	12.7	14.7	18.0
600	Slope =	0.71	0.66	0.63	0.57	0.53	0.48	0.45	0.41	0.38	0.36	0.32	0.30	0.27
	Depth =	0.42	0.46	0.51	0.59	0.66	0.77	0.85	0.99	1.09	1.18	1.35	1.49	1.71
	Width =	2.6	3.0	3.4	4.2	4.8	5.9	6.8	8.4	9.7	10.8	13.3	15.4	18.8
800	Slope =	0.84	0.78	0.74	0.67	0.62	0.56	0.52	0.47	0.43	0.41	0.37	0.34	0.31
	Depth =	0.39	0.43	0.47	0.54	0.59	0.68	0.75	0.86	0.95	1.02	1.18	1.30	1.49
	Width =	2.7	3.1	3.5	4.3	5.0	6.1	7.1	8.7	10.0	11.2	13.7	15.9	19.4
1000	Slope =	0.93	0.86	0.82	0.73	0.68	0.62	0.57	0.52	0.48	0.46	0.41	0.38	0.35
	Depth =	0.35	0.39	0.42	0.48	0.53	0.61	0.67	0.77	0.85	0.92	1.06	1.17	1.34
	Width =	2.8	3.2	3.6	4.4	5.1	6.3	7.3	8.9	10.3	11.5	14.1	16.2	19.9
1500	Slope =	1.12	1.04	0.98	0.89	0.82	0.74	0.69	0.63	0.58	0.55	0.50	0.47	0.43
	Depth =	0.29	0.32	0.35	0.40	0.44	0.50	0.56	0.64	0.70	0.76	0.87	0.95	1.06
	Width =	2.9	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.7	11.9	14.6	17.0	21.6
2000	Slope =	1.27	1.19	1.12	1.01	0.94	0.85	0.80	0.72	0.67	0.63	0.58	0.54	0.51
	Depth =	0.25	0.28	0.30	0.35	0.38	0.44	0.48	0.56	0.61	0.66	0.75	0.80	0.81
	Width =	3.0	3.5	3.9	4.8	5.5	6.8	7.8	9.5	11.0	12.2	15.1	18.4	26.5
3000	Slope =	1.54	1.44	1.36	1.23	1.15	1.04	0.98	0.89	0.83	0.81	0.77	0.75	0.73
	Depth =	0.21	0.23	0.25	0.29	0.32	0.36	0.41	0.48	0.54	0.55	0.56	0.57	0.58
	Width =	3.2	3.7	4.1	5.0	5.7	7.0	8.1	9.7	11.1	13.5	19.6	25.6	37.1
4000	Slope =	1.79	1.67	1.59	1.45	1.36	1.24	1.15	1.08	1.04	1.02	0.98	0.96	0.94
	Depth =	0.19	0.21	0.22	0.26	0.29	0.34	0.39	0.42	0.43	0.43	0.44	0.45	0.46
	Width =	3.2	3.7	4.2	5.1	5.9	7.1	7.9	10.7	14.0	17.2	25.0	32.5	47.1
6000	Slope =	2.28	2.13	2.03	1.84	1.70	1.61	1.56	1.51	1.47	1.45	1.41	1.36	1.25
	Depth =	0.17	0.19	0.20	0.25	0.29	0.29	0.30	0.30	0.31	0.31	0.32	0.34	0.40
	Width =	3.3	3.8	4.3	5.1	5.5	8.0	10.4	15.1	19.7	24.1	35.0	43.2	52.9
8000	Slope =	2.71	2.53	2.36	2.20	2.13	2.05	2.00	1.94	1.91	1.88	1.73	1.62	1.49
	Depth =	0.16	0.18	0.21	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.29	0.32	0.38
	Width =	3.4	3.9	4.0	5.3	7.0	10.1	13.2	19.2	25.0	30.5	37.4	43.2	52.9
10000	Slope =	3.04	2.84	2.76	2.64	2.57	2.49	2.44	2.38	2.26	2.15	1.98	1.86	1.71
	Depth =	0.16	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.22	0.24	0.28	0.31	0.36
	Width =	3.2	3.6	4.4	6.5	8.4	12.2	15.9	23.1	27.3	30.5	37.4	43.2	52.9
15000	Slope =	4.05	3.94	3.86	3.74	3.67	3.55	3.34	3.07	2.88	2.75	2.52	2.37	2.18
	Depth =	0.13	0.13	0.13	0.13	0.14	0.14	0.16	0.19	0.21	0.22	0.26	0.29	0.34
	Width =	3.9	5.1	6.3	9.1	11.8	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	5.17	5.05	4.98	4.85	4.60	4.22	3.97	3.65	3.43	3.27	3.00	2.83	2.59
	Depth =	0.10	0.10	0.10	0.11	0.12	0.14	0.15	0.18	0.20	0.21	0.25	0.28	0.32
	Width =	5.0	6.5	8.0	11.6	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	7.41	7.15	6.81	6.25	5.88	5.40	5.08	4.66	4.38	4.18	3.84	3.61	3.32
	Depth =	0.07	0.08	0.08	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.23	0.26	0.30
	Width =	7.0	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.4 Escape channel design. Sediment size = 0.12mm

D_{50} bed sediment size = 0.12mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.54	0.50	0.47	0.43	0.40	0.36	0.34	0.31	0.29	0.27	0.25	0.23	0.21
	Depth =	0.48	0.53	0.58	0.67	0.75	0.87	0.97	1.14	1.27	1.38	1.61	1.79	2.09
	Width =	2.4	2.8	3.1	3.8	4.5	5.5	6.4	7.8	9.0	10.1	12.4	14.3	17.6
400	Slope =	0.63	0.59	0.56	0.50	0.47	0.43	0.40	0.36	0.34	0.32	0.29	0.27	0.25
	Depth =	0.45	0.50	0.54	0.63	0.70	0.82	0.91	1.06	1.18	1.29	1.50	1.68	1.96
	Width =	2.5	2.9	3.2	4.0	4.6	5.7	6.6	8.1	9.3	10.4	12.8	14.8	18.1
600	Slope =	0.79	0.74	0.70	0.64	0.59	0.54	0.50	0.46	0.43	0.41	0.37	0.34	0.31
	Depth =	0.40	0.45	0.49	0.57	0.64	0.74	0.83	0.97	1.08	1.17	1.34	1.48	1.70
	Width =	2.6	3.1	3.4	4.2	4.9	6.0	6.9	8.4	9.7	10.9	13.3	15.4	18.9
800	Slope =	0.93	0.87	0.82	0.75	0.70	0.63	0.58	0.53	0.49	0.46	0.42	0.39	0.35
	Depth =	0.38	0.42	0.46	0.53	0.59	0.68	0.74	0.86	0.94	1.02	1.17	1.29	1.48
	Width =	2.7	3.2	3.5	4.3	5.0	6.2	7.1	8.7	10.1	11.3	13.8	15.9	19.5
1000	Slope =	1.05	0.97	0.92	0.83	0.77	0.69	0.65	0.58	0.54	0.51	0.46	0.43	0.39
	Depth =	0.35	0.39	0.42	0.48	0.53	0.61	0.67	0.77	0.85	0.91	1.05	1.16	1.32
	Width =	2.8	3.2	3.6	4.5	5.2	6.3	7.3	8.9	10.3	11.5	14.1	16.3	20.1
1500	Slope =	1.26	1.17	1.10	1.00	0.93	0.84	0.78	0.71	0.66	0.62	0.56	0.53	0.48
	Depth =	0.29	0.32	0.34	0.39	0.44	0.50	0.55	0.63	0.70	0.75	0.86	0.94	1.03
	Width =	3.0	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.7	12.0	14.7	17.1	22.5
2000	Slope =	1.44	1.34	1.26	1.14	1.06	0.96	0.90	0.81	0.76	0.72	0.65	0.62	0.59
	Depth =	0.25	0.28	0.30	0.34	0.38	0.44	0.48	0.55	0.61	0.66	0.75	0.77	0.78
	Width =	3.1	3.5	3.9	4.8	5.6	6.8	7.8	9.5	11.0	12.2	15.2	19.1	27.6
3000	Slope =	1.74	1.62	1.53	1.39	1.29	1.17	1.09	0.99	0.93	0.91	0.87	0.85	0.82
	Depth =	0.21	0.23	0.25	0.28	0.31	0.36	0.40	0.47	0.52	0.52	0.54	0.54	0.56
	Width =	3.2	3.7	4.1	5.0	5.8	7.0	8.1	9.7	11.3	13.9	20.2	26.4	38.3
4000	Slope =	2.00	1.87	1.78	1.62	1.52	1.38	1.28	1.21	1.18	1.15	1.11	1.09	1.06
	Depth =	0.18	0.20	0.22	0.26	0.29	0.34	0.39	0.40	0.41	0.42	0.43	0.43	0.44
	Width =	3.3	3.8	4.2	5.1	5.9	7.0	7.8	11.1	14.4	17.7	25.8	33.6	48.6
6000	Slope =	2.55	2.39	2.27	2.05	1.91	1.82	1.77	1.71	1.67	1.64	1.60	1.53	1.40
	Depth =	0.16	0.18	0.20	0.24	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.33	0.39
	Width =	3.4	3.9	4.3	5.0	5.6	8.2	10.7	15.6	20.3	24.9	36.1	43.2	52.9
8000	Slope =	3.03	2.81	2.63	2.48	2.40	2.32	2.26	2.20	2.16	2.11	1.93	1.82	1.67
	Depth =	0.15	0.18	0.21	0.21	0.22	0.22	0.23	0.23	0.24	0.24	0.28	0.32	0.37
	Width =	3.4	3.8	3.9	5.5	7.2	10.5	13.7	19.8	25.8	30.5	37.4	43.2	52.9
10000	Slope =	3.38	3.20	3.11	2.98	2.90	2.82	2.76	2.69	2.53	2.41	2.21	2.08	1.91
	Depth =	0.16	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.22	0.24	0.27	0.30	0.35
	Width =	3.1	3.7	4.6	6.7	8.7	12.6	16.5	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	4.57	4.45	4.37	4.24	4.16	3.98	3.74	3.43	3.23	3.08	2.83	2.66	2.44
	Depth =	0.12	0.12	0.13	0.13	0.13	0.14	0.16	0.18	0.20	0.22	0.26	0.28	0.33
	Width =	4.0	5.3	6.5	9.4	12.2	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	5.84	5.72	5.64	5.48	5.16	4.73	4.45	4.09	3.85	3.67	3.37	3.17	2.91
	Depth =	0.10	0.10	0.10	0.10	0.11	0.13	0.15	0.17	0.19	0.21	0.24	0.27	0.31
	Width =	5.1	6.7	8.2	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	8.40	8.01	7.64	7.01	6.59	6.05	5.69	5.22	4.91	4.69	4.30	4.05	3.72
	Depth =	0.07	0.08	0.08	0.10	0.11	0.12	0.14	0.16	0.18	0.19	0.23	0.25	0.29
	Width =	7.2	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.5 Escape channel design. Sediment size = 0.14mm

D_{50} bed sediment size = 0.14mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.59	0.55	0.52	0.47	0.44	0.40	0.37	0.34	0.31	0.30	0.27	0.25	0.23
	Depth =	0.47	0.52	0.56	0.66	0.73	0.85	0.95	1.11	1.23	1.34	1.57	1.75	2.04
	Width =	2.4	2.8	3.1	3.9	4.5	5.5	6.4	7.9	9.1	10.2	12.5	14.4	17.7
400	Slope =	0.69	0.64	0.61	0.55	0.52	0.47	0.44	0.40	0.37	0.35	0.32	0.30	0.27
	Depth =	0.43	0.48	0.53	0.61	0.68	0.80	0.89	1.03	1.15	1.26	1.47	1.64	1.91
	Width =	2.5	2.9	3.3	4.0	4.7	5.7	6.6	8.1	9.4	10.5	12.9	14.9	18.2
600	Slope =	0.86	0.81	0.77	0.70	0.65	0.59	0.55	0.50	0.47	0.45	0.40	0.38	0.34
	Depth =	0.39	0.44	0.48	0.56	0.62	0.72	0.81	0.94	1.05	1.15	1.33	1.47	1.69
	Width =	2.7	3.1	3.4	4.2	4.9	6.0	6.9	8.5	9.8	10.9	13.4	15.5	18.9
800	Slope =	1.02	0.95	0.90	0.82	0.77	0.69	0.65	0.58	0.54	0.51	0.46	0.43	0.39
	Depth =	0.37	0.41	0.45	0.52	0.58	0.67	0.74	0.85	0.94	1.01	1.16	1.28	1.47
	Width =	2.7	3.2	3.6	4.4	5.0	6.2	7.1	8.7	10.1	11.3	13.8	16.0	19.5
1000	Slope =	1.16	1.08	1.02	0.92	0.85	0.77	0.71	0.65	0.60	0.57	0.51	0.48	0.43
	Depth =	0.35	0.38	0.42	0.48	0.53	0.60	0.67	0.76	0.84	0.91	1.04	1.15	1.31
	Width =	2.8	3.3	3.6	4.5	5.2	6.3	7.3	9.0	10.3	11.6	14.1	16.3	20.2
1500	Slope =	1.39	1.29	1.22	1.10	1.03	0.93	0.86	0.78	0.73	0.69	0.62	0.58	0.54
	Depth =	0.29	0.32	0.34	0.39	0.43	0.50	0.55	0.63	0.69	0.75	0.86	0.94	1.00
	Width =	3.0	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.8	12.0	14.7	17.3	23.3
2000	Slope =	1.59	1.48	1.40	1.26	1.18	1.06	0.99	0.90	0.84	0.79	0.72	0.69	0.66
	Depth =	0.25	0.28	0.30	0.34	0.38	0.43	0.48	0.55	0.61	0.66	0.74	0.75	0.76
	Width =	3.1	3.5	3.9	4.8	5.6	6.8	7.8	9.6	11.0	12.3	15.3	19.8	28.6
3000	Slope =	1.93	1.79	1.70	1.54	1.43	1.30	1.21	1.09	1.03	1.00	0.96	0.94	0.91
	Depth =	0.21	0.23	0.25	0.28	0.31	0.36	0.39	0.46	0.50	0.50	0.52	0.52	0.54
	Width =	3.2	3.7	4.1	5.0	5.8	7.0	8.1	9.6	11.6	14.3	20.8	27.1	39.3
4000	Slope =	2.21	2.06	1.96	1.78	1.67	1.52	1.41	1.34	1.30	1.28	1.24	1.21	1.18
	Depth =	0.18	0.20	0.21	0.25	0.28	0.33	0.38	0.39	0.39	0.40	0.41	0.42	0.43
	Width =	3.3	3.8	4.2	5.1	5.9	7.0	7.8	11.4	14.8	18.2	26.5	34.5	50.0
6000	Slope =	2.80	2.63	2.50	2.24	2.11	2.01	1.96	1.89	1.85	1.83	1.78	1.68	1.55
	Depth =	0.16	0.18	0.20	0.24	0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.33	0.38
	Width =	3.4	3.9	4.3	4.9	5.8	8.4	11.0	16.0	20.9	25.6	37.1	43.2	52.9
8000	Slope =	3.33	3.08	2.89	2.75	2.66	2.57	2.51	2.45	2.41	2.32	2.13	2.00	1.84
	Depth =	0.15	0.18	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.24	0.28	0.31	0.36
	Width =	3.4	3.7	3.9	5.7	7.4	10.8	14.0	20.4	26.5	30.5	37.4	43.2	52.9
10000	Slope =	3.69	3.54	3.44	3.30	3.22	3.13	3.07	2.96	2.79	2.66	2.44	2.29	2.10
	Depth =	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.19	0.21	0.23	0.27	0.30	0.35
	Width =	3.0	3.8	4.7	6.8	8.9	13.0	16.9	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	5.07	4.94	4.85	4.71	4.63	4.38	4.12	3.78	3.56	3.39	3.11	2.93	2.69
	Depth =	0.12	0.12	0.12	0.12	0.13	0.14	0.15	0.18	0.20	0.22	0.25	0.28	0.32
	Width =	4.1	5.4	6.6	9.6	12.5	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	6.49	6.36	6.27	6.04	5.68	5.21	4.90	4.50	4.23	4.04	3.71	3.49	3.20
	Depth =	0.09	0.09	0.10	0.10	0.11	0.13	0.15	0.17	0.19	0.20	0.24	0.27	0.31
	Width =	5.3	6.9	8.4	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	9.34	8.82	8.41	7.71	7.26	6.66	6.27	5.75	5.41	5.16	4.74	4.46	4.09
	Depth =	0.07	0.07	0.08	0.09	0.10	0.12	0.14	0.16	0.18	0.19	0.22	0.25	0.29
	Width =	7.4	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.6 Escape channel design. Sediment size = 0.18mm

D_{50} bed sediment size = 0.18mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.68	0.63	0.60	0.54	0.51	0.46	0.43	0.39	0.36	0.35	0.31	0.29	0.27
	Depth =	0.45	0.50	0.54	0.63	0.70	0.82	0.91	1.06	1.18	1.29	1.50	1.68	1.96
	Width =	2.5	2.8	3.2	3.9	4.6	5.6	6.5	8.0	9.2	10.3	12.6	14.6	17.9
400	Slope =	0.80	0.74	0.70	0.64	0.60	0.54	0.51	0.46	0.43	0.41	0.37	0.35	0.32
	Depth =	0.42	0.46	0.50	0.59	0.65	0.76	0.85	0.99	1.11	1.21	1.41	1.57	1.83
	Width =	2.6	3.0	3.3	4.1	4.7	5.8	6.7	8.2	9.5	10.6	13.0	15.0	18.4
600	Slope =	1.00	0.93	0.89	0.81	0.75	0.68	0.64	0.58	0.54	0.52	0.47	0.44	0.40
	Depth =	0.38	0.42	0.46	0.53	0.60	0.69	0.78	0.90	1.01	1.10	1.28	1.43	1.68
	Width =	2.7	3.1	3.5	4.3	4.9	6.0	7.0	8.6	9.9	11.0	13.5	15.6	19.0
800	Slope =	1.18	1.10	1.05	0.95	0.89	0.81	0.76	0.69	0.64	0.60	0.55	0.51	0.46
	Depth =	0.35	0.39	0.43	0.50	0.56	0.65	0.73	0.84	0.93	1.00	1.15	1.27	1.46
	Width =	2.8	3.2	3.6	4.4	5.1	6.2	7.2	8.8	10.2	11.4	13.9	16.0	19.6
1000	Slope =	1.34	1.25	1.19	1.08	1.00	0.91	0.84	0.76	0.71	0.67	0.61	0.56	0.51
	Depth =	0.34	0.37	0.41	0.47	0.52	0.60	0.66	0.76	0.83	0.90	1.04	1.14	1.29
	Width =	2.8	3.3	3.7	4.5	5.2	6.4	7.4	9.0	10.4	11.6	14.2	16.4	20.5
1500	Slope =	1.64	1.52	1.44	1.30	1.21	1.09	1.02	0.92	0.86	0.81	0.74	0.69	0.65
	Depth =	0.28	0.31	0.34	0.39	0.43	0.49	0.54	0.62	0.69	0.74	0.85	0.92	0.95
	Width =	3.0	3.4	3.9	4.7	5.4	6.7	7.7	9.4	10.8	12.1	14.8	17.4	24.6
2000	Slope =	1.87	1.74	1.65	1.49	1.39	1.26	1.17	1.06	0.99	0.93	0.86	0.83	0.79
	Depth =	0.25	0.27	0.29	0.34	0.37	0.43	0.47	0.54	0.60	0.65	0.71	0.72	0.73
	Width =	3.1	3.6	4.0	4.9	5.6	6.8	7.9	9.6	11.0	12.3	16.2	21.0	30.3
3000	Slope =	2.27	2.12	2.00	1.81	1.69	1.53	1.42	1.28	1.22	1.19	1.14	1.12	1.08
	Depth =	0.20	0.23	0.24	0.28	0.31	0.35	0.39	0.46	0.47	0.47	0.48	0.49	0.50
	Width =	3.2	3.7	4.1	5.0	5.8	7.1	8.1	9.6	12.2	14.9	21.7	28.3	41.1
4000	Slope =	2.61	2.43	2.30	2.09	1.95	1.76	1.66	1.59	1.54	1.51	1.47	1.44	1.41
	Depth =	0.18	0.20	0.21	0.24	0.27	0.33	0.36	0.37	0.37	0.38	0.38	0.39	0.40
	Width =	3.3	3.8	4.2	5.1	5.9	6.9	8.2	11.9	15.5	19.0	27.6	36.0	52.2
6000	Slope =	3.27	3.07	2.92	2.60	2.49	2.38	2.32	2.25	2.20	2.17	2.09	1.97	1.81
	Depth =	0.16	0.17	0.19	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.29	0.32	0.37
	Width =	3.4	3.9	4.3	4.8	6.0	8.8	11.5	16.7	21.8	26.7	37.4	43.2	52.9
8000	Slope =	3.89	3.56	3.40	3.24	3.15	3.05	2.98	2.91	2.85	2.72	2.49	2.34	2.15
	Depth =	0.15	0.18	0.19	0.19	0.20	0.20	0.20	0.21	0.21	0.23	0.27	0.30	0.35
	Width =	3.4	3.6	4.1	5.9	7.7	11.2	14.7	21.3	27.3	30.5	37.4	43.2	52.9
10000	Slope =	4.33	4.17	4.07	3.91	3.82	3.72	3.65	3.46	3.26	3.11	2.85	2.68	2.46
	Depth =	0.15	0.16	0.16	0.16	0.16	0.17	0.17	0.19	0.21	0.22	0.26	0.29	0.34
	Width =	3.1	4.0	4.9	7.2	9.3	13.6	17.7	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	6.00	5.85	5.75	5.60	5.50	5.13	4.82	4.43	4.16	3.97	3.64	3.43	3.15
	Depth =	0.11	0.11	0.11	0.12	0.12	0.13	0.15	0.17	0.19	0.21	0.24	0.27	0.31
	Width =	4.3	5.6	6.9	10.1	13.1	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	7.70	7.55	7.45	7.07	6.65	6.10	5.74	5.27	4.95	4.73	4.34	4.08	3.75
	Depth =	0.09	0.09	0.09	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.23	0.26	0.30
	Width =	5.5	7.2	8.8	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	11.0	10.3	9.84	9.03	8.49	7.79	7.33	6.73	6.33	6.04	5.54	5.22	4.79
	Depth =	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.19	0.22	0.24	0.28
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.7 Escape channel design. Sediment size = 0.25mm

D_{50} bed sediment size = 0.25mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.82	0.76	0.72	0.66	0.61	0.56	0.52	0.47	0.44	0.42	0.38	0.36	0.32
	Depth =	0.42	0.47	0.51	0.60	0.66	0.77	0.86	1.00	1.12	1.22	1.42	1.59	1.85
	Width =	2.5	2.9	3.2	4.0	4.6	5.7	6.6	8.1	9.3	10.4	12.8	14.8	18.1
400	Slope =	0.96	0.90	0.85	0.77	0.72	0.66	0.61	0.56	0.52	0.50	0.45	0.42	0.38
	Depth =	0.39	0.44	0.48	0.56	0.62	0.72	0.81	0.94	1.05	1.14	1.33	1.49	1.74
	Width =	2.6	3.0	3.4	4.1	4.8	5.9	6.8	8.3	9.6	10.7	13.1	15.2	18.6
600	Slope =	1.21	1.13	1.07	0.98	0.91	0.83	0.78	0.71	0.66	0.63	0.57	0.54	0.49
	Depth =	0.36	0.40	0.43	0.51	0.56	0.66	0.73	0.86	0.96	1.04	1.22	1.36	1.59
	Width =	2.7	3.2	3.5	4.3	5.0	6.1	7.1	8.6	10.0	11.2	13.6	15.7	19.2
800	Slope =	1.43	1.34	1.27	1.15	1.08	0.98	0.92	0.84	0.78	0.74	0.68	0.63	0.57
	Depth =	0.33	0.37	0.41	0.47	0.53	0.62	0.69	0.80	0.90	0.98	1.14	1.26	1.43
	Width =	2.8	3.3	3.6	4.5	5.1	6.3	7.3	8.9	10.2	11.4	14.0	16.1	20.0
1000	Slope =	1.63	1.52	1.45	1.32	1.23	1.12	1.05	0.94	0.88	0.83	0.75	0.70	0.64
	Depth =	0.32	0.35	0.39	0.45	0.50	0.59	0.65	0.75	0.83	0.89	1.02	1.13	1.26
	Width =	2.9	3.3	3.7	4.5	5.2	6.4	7.4	9.1	10.5	11.7	14.3	16.6	20.9
1500	Slope =	2.03	1.89	1.79	1.62	1.50	1.36	1.27	1.14	1.07	1.01	0.92	0.86	0.82
	Depth =	0.28	0.31	0.33	0.38	0.42	0.49	0.54	0.62	0.68	0.74	0.84	0.88	0.90
	Width =	3.0	3.5	3.9	4.7	5.5	6.7	7.7	9.4	10.9	12.1	15.0	18.4	26.5
2000	Slope =	2.32	2.16	2.05	1.85	1.72	1.56	1.45	1.32	1.22	1.16	1.09	1.05	1.00
	Depth =	0.24	0.27	0.29	0.33	0.37	0.42	0.47	0.54	0.60	0.64	0.67	0.68	0.69
	Width =	3.1	3.6	4.0	4.9	5.6	6.9	7.9	9.7	11.0	12.3	17.4	22.6	32.6
3000	Slope =	2.82	2.63	2.49	2.25	2.10	1.90	1.76	1.61	1.55	1.51	1.45	1.41	1.37
	Depth =	0.20	0.22	0.24	0.28	0.30	0.35	0.39	0.44	0.44	0.45	0.45	0.46	0.47
	Width =	3.2	3.7	4.1	5.1	5.8	7.1	7.9	10.1	13.1	16.1	23.3	30.3	43.7
4000	Slope =	3.24	3.02	2.86	2.59	2.41	2.16	2.06	1.97	1.92	1.89	1.84	1.81	1.74
	Depth =	0.18	0.19	0.21	0.24	0.27	0.32	0.33	0.34	0.34	0.35	0.35	0.36	0.38
	Width =	3.3	3.8	4.2	5.2	5.9	6.8	8.6	12.6	16.4	20.2	29.3	38.1	52.9
6000	Slope =	4.01	3.76	3.56	3.20	3.09	2.97	2.89	2.81	2.76	2.72	2.57	2.42	2.22
	Depth =	0.15	0.17	0.18	0.23	0.23	0.23	0.24	0.24	0.25	0.25	0.27	0.31	0.36
	Width =	3.4	3.9	4.3	4.9	6.4	9.3	12.2	17.7	23.1	28.3	37.4	43.2	52.9
8000	Slope =	4.73	4.34	4.22	4.04	3.93	3.81	3.74	3.65	3.50	3.33	3.06	2.88	2.64
	Depth =	0.14	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.21	0.22	0.26	0.29	0.34
	Width =	3.3	3.5	4.3	6.3	8.2	11.9	15.5	22.5	27.3	30.5	37.4	43.2	52.9
10000	Slope =	5.36	5.18	5.06	4.88	4.78	4.65	4.58	4.25	4.00	3.82	3.50	3.30	3.02
	Depth =	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.18	0.20	0.22	0.25	0.28	0.33
	Width =	3.2	4.2	5.2	7.6	9.9	14.4	18.7	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	7.48	7.31	7.20	7.01	6.86	6.29	5.92	5.43	5.11	4.88	4.48	4.21	3.87
	Depth =	0.10	0.10	0.10	0.11	0.11	0.13	0.14	0.17	0.19	0.20	0.23	0.26	0.30
	Width =	4.6	6.0	7.3	10.7	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	9.63	9.46	9.33	8.67	8.16	7.49	7.05	6.47	6.08	5.80	5.33	5.01	4.60
	Depth =	0.08	0.08	0.08	0.09	0.11	0.12	0.14	0.16	0.18	0.19	0.22	0.25	0.29
	Width =	5.8	7.6	9.3	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	13.5	12.7	12.1	11.1	10.4	9.57	9.00	8.26	7.78	7.42	6.81	6.41	5.88
	Depth =	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.18	0.21	0.23	0.27
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.8 Escape channel design. Sediment size = 0.3mm

D_{50} bed sediment size = 0.3mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.91	0.85	0.80	0.73	0.68	0.62	0.58	0.53	0.49	0.47	0.42	0.40	0.36
	Depth =	0.41	0.46	0.50	0.58	0.64	0.75	0.84	0.97	1.09	1.18	1.38	1.54	1.80
	Width =	2.5	2.9	3.3	4.0	4.7	5.7	6.6	8.1	9.4	10.5	12.9	14.9	18.2
400	Slope =	1.07	1.00	0.95	0.86	0.80	0.73	0.68	0.62	0.58	0.55	0.50	0.47	0.43
	Depth =	0.38	0.43	0.46	0.54	0.60	0.70	0.78	0.91	1.02	1.11	1.29	1.44	1.69
	Width =	2.6	3.0	3.4	4.2	4.8	5.9	6.8	8.4	9.7	10.8	13.2	15.3	18.7
600	Slope =	1.35	1.26	1.20	1.09	1.02	0.93	0.87	0.79	0.74	0.70	0.64	0.60	0.54
	Depth =	0.35	0.39	0.42	0.49	0.55	0.64	0.71	0.83	0.93	1.01	1.18	1.32	1.54
	Width =	2.7	3.2	3.6	4.4	5.0	6.2	7.1	8.7	10.0	11.2	13.7	15.8	19.3
800	Slope =	1.59	1.49	1.41	1.29	1.20	1.10	1.02	0.93	0.87	0.83	0.76	0.71	0.64
	Depth =	0.32	0.36	0.39	0.46	0.51	0.60	0.67	0.78	0.87	0.95	1.11	1.24	1.42
	Width =	2.8	3.3	3.7	4.5	5.2	6.3	7.3	8.9	10.3	11.5	14.0	16.2	20.2
1000	Slope =	1.81	1.70	1.61	1.47	1.37	1.25	1.17	1.07	0.99	0.94	0.85	0.79	0.72
	Depth =	0.31	0.34	0.37	0.44	0.49	0.57	0.64	0.74	0.82	0.89	1.02	1.12	1.25
	Width =	2.9	3.3	3.7	4.6	5.3	6.5	7.4	9.1	10.5	11.7	14.3	16.7	21.2
1500	Slope =	2.29	2.13	2.02	1.82	1.70	1.53	1.43	1.29	1.20	1.14	1.03	0.98	0.93
	Depth =	0.28	0.31	0.33	0.38	0.42	0.48	0.53	0.61	0.68	0.73	0.83	0.86	0.87
	Width =	3.0	3.5	3.9	4.8	5.5	6.7	7.7	9.5	10.9	12.1	15.1	19.2	27.7
2000	Slope =	2.62	2.44	2.31	2.09	1.94	1.76	1.64	1.48	1.38	1.31	1.24	1.20	1.15
	Depth =	0.24	0.27	0.29	0.33	0.37	0.42	0.46	0.54	0.60	0.63	0.65	0.65	0.67
	Width =	3.1	3.6	4.0	4.9	5.6	6.9	7.9	9.6	11.0	12.5	18.1	23.5	34.0
3000	Slope =	3.18	2.96	2.80	2.54	2.37	2.14	1.98	1.83	1.77	1.72	1.65	1.61	1.57
	Depth =	0.20	0.22	0.24	0.27	0.30	0.35	0.40	0.42	0.43	0.43	0.44	0.45	0.45
	Width =	3.2	3.7	4.2	5.1	5.8	7.1	7.9	10.6	13.7	16.8	24.3	31.6	45.6
4000	Slope =	3.66	3.41	3.23	2.92	2.71	2.44	2.34	2.23	2.18	2.14	2.08	2.05	1.95
	Depth =	0.17	0.19	0.21	0.24	0.27	0.32	0.32	0.32	0.33	0.33	0.34	0.34	0.37
	Width =	3.3	3.8	4.3	5.2	5.8	6.9	9.0	13.0	16.9	20.8	30.2	39.3	52.9
6000	Slope =	4.49	4.21	3.96	3.61	3.49	3.35	3.28	3.18	3.13	3.09	2.88	2.71	2.49
	Depth =	0.15	0.16	0.18	0.22	0.22	0.22	0.23	0.23	0.24	0.24	0.27	0.30	0.35
	Width =	3.4	3.9	4.2	5.1	6.6	9.6	12.6	18.3	23.8	29.2	37.4	43.2	52.9
8000	Slope =	5.25	4.89	4.76	4.56	4.45	4.31	4.23	4.13	3.92	3.74	3.43	3.23	2.96
	Depth =	0.14	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.20	0.22	0.26	0.28	0.33
	Width =	3.2	3.6	4.4	6.5	8.4	12.3	16.0	23.2	27.3	30.5	37.4	43.2	52.9
10000	Slope =	6.03	5.84	5.72	5.53	5.41	5.28	5.19	4.77	4.48	4.28	3.92	3.69	3.39
	Depth =	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.17	0.19	0.21	0.25	0.27	0.32
	Width =	3.3	4.4	5.4	7.8	10.2	14.8	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	8.46	8.28	8.15	7.95	7.69	7.05	6.64	6.09	5.73	5.47	5.02	4.72	4.33
	Depth =	0.10	0.10	0.10	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.23	0.25	0.30
	Width =	4.7	6.2	7.6	11.0	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	10.9	10.7	10.6	9.72	9.15	8.39	7.90	7.25	6.82	6.50	5.97	5.62	5.16
	Depth =	0.08	0.08	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.19	0.22	0.24	0.28
	Width =	6.0	7.9	9.6	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	15.1	14.2	13.5	12.4	11.7	10.7	10.1	9.26	8.72	8.31	7.63	7.18	6.59
	Depth =	0.06	0.07	0.07	0.09	0.10	0.11	0.12	0.14	0.16	0.17	0.20	0.23	0.26
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.9 Escape channel design. Sediment size = 0.35mm

D_{50} bed sediment size = 0.35mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	0.99	0.93	0.88	0.80	0.75	0.68	0.63	0.58	0.54	0.51	0.46	0.43	0.40
	Depth =	0.40	0.44	0.48	0.56	0.63	0.73	0.81	0.95	1.06	1.15	1.35	1.50	1.75
	Width =	2.5	2.9	3.3	4.1	4.7	5.8	6.7	8.2	9.4	10.6	12.9	14.9	18.3
400	Slope =	1.17	1.09	1.04	0.94	0.88	0.80	0.75	0.68	0.64	0.60	0.55	0.51	0.47
	Depth =	0.37	0.41	0.45	0.53	0.59	0.68	0.76	0.89	0.99	1.08	1.26	1.41	1.65
	Width =	2.6	3.1	3.4	4.2	4.9	5.9	6.9	8.4	9.7	10.9	13.3	15.3	18.8
600	Slope =	1.48	1.38	1.31	1.19	1.11	1.01	0.95	0.86	0.81	0.77	0.70	0.65	0.60
	Depth =	0.34	0.38	0.41	0.48	0.53	0.62	0.70	0.81	0.91	0.99	1.15	1.29	1.51
	Width =	2.8	3.2	3.6	4.4	5.1	6.2	7.1	8.7	10.1	11.3	13.8	15.9	19.4
800	Slope =	1.75	1.63	1.55	1.41	1.32	1.20	1.12	1.02	0.96	0.91	0.83	0.78	0.71
	Depth =	0.32	0.35	0.38	0.45	0.50	0.58	0.65	0.76	0.85	0.93	1.08	1.21	1.39
	Width =	2.8	3.3	3.7	4.5	5.2	6.4	7.3	9.0	10.3	11.6	14.1	16.3	20.3
1000	Slope =	1.99	1.86	1.77	1.61	1.50	1.37	1.28	1.17	1.09	1.04	0.94	0.88	0.80
	Depth =	0.30	0.34	0.37	0.43	0.48	0.56	0.62	0.73	0.81	0.88	1.01	1.11	1.24
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.1	10.5	11.8	14.4	16.8	21.5
1500	Slope =	2.52	2.36	2.23	2.02	1.88	1.70	1.58	1.43	1.33	1.26	1.15	1.10	1.04
	Depth =	0.27	0.31	0.33	0.38	0.42	0.48	0.53	0.61	0.67	0.73	0.82	0.83	0.85
	Width =	3.0	3.5	3.9	4.8	5.5	6.7	7.8	9.5	10.9	12.2	15.3	19.8	28.7
2000	Slope =	2.90	2.70	2.55	2.31	2.15	1.95	1.81	1.64	1.53	1.46	1.38	1.34	1.29
	Depth =	0.24	0.27	0.29	0.33	0.36	0.42	0.46	0.54	0.59	0.62	0.63	0.64	0.65
	Width =	3.1	3.6	4.0	4.9	5.7	6.9	8.0	9.6	11.0	13.0	18.8	24.4	35.3
3000	Slope =	3.52	3.28	3.10	2.81	2.62	2.36	2.19	2.05	1.97	1.93	1.86	1.81	1.76
	Depth =	0.20	0.22	0.24	0.27	0.30	0.35	0.40	0.41	0.42	0.42	0.43	0.43	0.44
	Width =	3.2	3.7	4.2	5.1	5.9	7.0	7.8	10.9	14.2	17.4	25.2	32.7	47.3
4000	Slope =	4.05	3.77	3.57	3.24	2.99	2.72	2.62	2.50	2.43	2.39	2.32	2.28	2.14
	Depth =	0.17	0.19	0.21	0.24	0.27	0.31	0.31	0.31	0.32	0.32	0.33	0.33	0.37
	Width =	3.3	3.8	4.3	5.2	5.7	7.2	9.3	13.5	17.5	21.4	31.0	40.4	52.9
6000	Slope =	4.94	4.63	4.34	3.99	3.86	3.72	3.64	3.54	3.48	3.43	3.17	2.99	2.74
	Depth =	0.14	0.16	0.18	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.26	0.29	0.34
	Width =	3.4	3.9	4.1	5.2	6.8	9.9	12.9	18.8	24.4	30.0	37.4	43.2	52.9
8000	Slope =	5.74	5.41	5.26	5.06	4.94	4.79	4.71	4.59	4.31	4.11	3.78	3.55	3.26
	Depth =	0.14	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.20	0.22	0.25	0.28	0.33
	Width =	3.1	3.7	4.6	6.6	8.7	12.6	16.4	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	6.68	6.47	6.34	6.14	6.01	5.87	5.72	5.25	4.94	4.71	4.32	4.07	3.73
	Depth =	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.17	0.19	0.21	0.24	0.27	0.31
	Width =	3.4	4.5	5.5	8.0	10.5	15.2	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	9.39	9.19	9.06	8.84	8.46	7.77	7.31	6.71	6.31	6.02	5.52	5.20	4.77
	Depth =	0.09	0.10	0.10	0.10	0.11	0.12	0.14	0.16	0.18	0.19	0.22	0.25	0.29
	Width =	4.9	6.3	7.8	11.3	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	12.1	11.9	11.7	10.7	10.1	9.24	8.70	7.98	7.51	7.16	6.57	6.19	5.68
	Depth =	0.07	0.08	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.18	0.21	0.24	0.28
	Width =	6.2	8.1	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	16.6	15.6	14.9	13.7	12.9	11.8	11.1	10.2	9.60	9.16	8.40	7.91	7.26
	Depth =	0.06	0.07	0.07	0.08	0.09	0.11	0.12	0.14	0.16	0.17	0.20	0.22	0.26
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.10 Escape channel design. Sediment size = 0.4mm

D_{50} bed sediment size = 0.4mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	1.07	1.00	0.95	0.86	0.81	0.73	0.69	0.62	0.58	0.55	0.50	0.47	0.43
	Depth =	0.39	0.43	0.47	0.55	0.61	0.71	0.80	0.93	1.04	1.13	1.32	1.47	1.72
	Width =	2.6	3.0	3.3	4.1	4.7	5.8	6.7	8.2	9.5	10.6	13.0	15.0	18.4
400	Slope =	1.27	1.18	1.12	1.02	0.95	0.87	0.81	0.74	0.69	0.65	0.60	0.56	0.51
	Depth =	0.36	0.41	0.44	0.51	0.57	0.67	0.75	0.87	0.97	1.06	1.24	1.38	1.61
	Width =	2.7	3.1	3.4	4.2	4.9	6.0	6.9	8.5	9.8	10.9	13.3	15.4	18.8
600	Slope =	1.60	1.49	1.42	1.29	1.21	1.10	1.03	0.93	0.87	0.83	0.76	0.71	0.65
	Depth =	0.33	0.37	0.40	0.47	0.52	0.61	0.68	0.80	0.89	0.97	1.13	1.26	1.48
	Width =	2.8	3.2	3.6	4.4	5.1	6.2	7.2	8.8	10.1	11.3	13.8	15.9	19.5
800	Slope =	1.89	1.77	1.68	1.53	1.43	1.30	1.22	1.11	1.04	0.99	0.90	0.84	0.77
	Depth =	0.31	0.35	0.38	0.44	0.49	0.57	0.64	0.75	0.83	0.91	1.06	1.19	1.36
	Width =	2.9	3.3	3.7	4.5	5.2	6.4	7.4	9.0	10.4	11.6	14.2	16.3	20.5
1000	Slope =	2.15	2.01	1.91	1.74	1.63	1.48	1.39	1.27	1.18	1.13	1.03	0.96	0.88
	Depth =	0.29	0.33	0.36	0.42	0.47	0.54	0.61	0.71	0.79	0.87	1.01	1.10	1.21
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.2	10.6	11.8	14.4	16.9	22.1
1500	Slope =	2.73	2.56	2.43	2.20	2.05	1.85	1.73	1.56	1.45	1.38	1.26	1.21	1.15
	Depth =	0.27	0.30	0.33	0.38	0.42	0.48	0.53	0.61	0.67	0.73	0.80	0.81	0.83
	Width =	3.0	3.5	3.9	4.8	5.5	6.8	7.8	9.5	10.9	12.2	15.8	20.4	29.6
2000	Slope =	3.17	2.95	2.79	2.52	2.35	2.13	1.98	1.79	1.67	1.61	1.52	1.48	1.42
	Depth =	0.24	0.27	0.29	0.33	0.36	0.42	0.46	0.54	0.59	0.60	0.61	0.62	0.63
	Width =	3.1	3.6	4.0	4.9	5.7	6.9	8.0	9.6	11.0	13.4	19.4	25.2	36.4
3000	Slope =	3.84	3.58	3.39	3.07	2.86	2.57	2.39	2.25	2.18	2.13	2.05	2.00	1.95
	Depth =	0.20	0.22	0.24	0.27	0.30	0.35	0.40	0.40	0.41	0.41	0.42	0.42	0.43
	Width =	3.2	3.7	4.2	5.1	5.9	6.9	7.8	11.3	14.6	17.9	26.0	33.7	48.8
4000	Slope =	4.42	4.12	3.90	3.53	3.25	2.99	2.88	2.76	2.69	2.64	2.56	2.51	2.33
	Depth =	0.17	0.19	0.21	0.24	0.27	0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.36
	Width =	3.3	3.8	4.3	5.2	5.7	7.4	9.6	13.9	18.0	22.1	32.0	41.5	52.9
6000	Slope =	5.40	5.03	4.69	4.35	4.22	4.07	3.98	3.88	3.81	3.76	3.45	3.25	2.98
	Depth =	0.14	0.16	0.18	0.20	0.20	0.21	0.21	0.22	0.22	0.22	0.26	0.29	0.34
	Width =	3.4	3.9	4.0	5.3	7.0	10.1	13.2	19.2	25.0	30.5	37.4	43.2	52.9
8000	Slope =	6.20	5.90	5.75	5.53	5.40	5.25	5.16	4.98	4.69	4.47	4.11	3.86	3.55
	Depth =	0.15	0.15	0.16	0.16	0.16	0.16	0.17	0.18	0.20	0.21	0.25	0.28	0.32
	Width =	3.1	3.8	4.7	6.8	8.9	12.9	16.8	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	7.29	7.08	6.94	6.72	6.59	6.43	6.22	5.70	5.37	5.12	4.70	4.42	4.06
	Depth =	0.13	0.13	0.13	0.13	0.13	0.14	0.15	0.17	0.19	0.20	0.24	0.26	0.31
	Width =	3.5	4.6	5.6	8.2	10.7	15.6	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	10.3	10.1	9.93	9.69	9.20	8.44	7.94	7.29	6.86	6.54	6.00	5.65	5.19
	Depth =	0.09	0.09	0.09	0.10	0.10	0.12	0.14	0.16	0.18	0.19	0.22	0.25	0.29
	Width =	5.0	6.5	8.0	11.6	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	13.3	13.1	12.7	11.6	10.9	10.1	9.45	8.67	8.16	7.79	7.15	6.73	6.17
	Depth =	0.07	0.07	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.18	0.21	0.23	0.27
	Width =	6.3	8.3	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	18.1	17.0	16.2	14.9	14.0	12.8	12.1	11.1	10.4	9.95	9.14	8.60	7.89
	Depth =	0.06	0.07	0.07	0.08	0.09	0.11	0.12	0.14	0.16	0.17	0.20	0.22	0.25
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.11 Escape channel design. Sediment size = 0.45mm

D_{50} bed sediment size = 0.45mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	1.15	1.07	1.02	0.93	0.86	0.79	0.73	0.67	0.62	0.59	0.54	0.50	0.46
	Depth =	0.38	0.43	0.46	0.54	0.60	0.70	0.78	0.91	1.02	1.11	1.29	1.44	1.69
	Width =	2.6	3.0	3.3	4.1	4.7	5.8	6.7	8.3	9.5	10.7	13.0	15.1	18.4
400	Slope =	1.36	1.27	1.20	1.09	1.02	0.93	0.87	0.79	0.74	0.70	0.64	0.60	0.54
	Depth =	0.36	0.40	0.43	0.50	0.56	0.66	0.73	0.85	0.95	1.04	1.21	1.35	1.58
	Width =	2.7	3.1	3.5	4.2	4.9	6.0	6.9	8.5	9.8	11.0	13.4	15.5	18.9
600	Slope =	1.71	1.60	1.52	1.38	1.29	1.18	1.10	1.00	0.94	0.89	0.81	0.76	0.69
	Depth =	0.32	0.36	0.39	0.46	0.51	0.60	0.67	0.78	0.87	0.95	1.11	1.24	1.45
	Width =	2.8	3.2	3.6	4.4	5.1	6.2	7.2	8.8	10.2	11.4	13.9	16.0	19.5
800	Slope =	2.02	1.89	1.80	1.64	1.53	1.39	1.31	1.19	1.11	1.06	0.96	0.90	0.83
	Depth =	0.30	0.34	0.37	0.43	0.48	0.56	0.63	0.73	0.82	0.89	1.04	1.16	1.33
	Width =	2.9	3.3	3.7	4.5	5.2	6.4	7.4	9.0	10.4	11.6	14.2	16.4	20.6
1000	Slope =	2.31	2.16	2.05	1.87	1.75	1.59	1.49	1.36	1.27	1.21	1.10	1.04	0.96
	Depth =	0.29	0.32	0.35	0.41	0.46	0.53	0.60	0.70	0.78	0.85	0.99	1.09	1.18
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.2	10.6	11.8	14.5	17.0	22.7
1500	Slope =	2.93	2.74	2.60	2.37	2.22	2.00	1.87	1.69	1.57	1.49	1.37	1.32	1.26
	Depth =	0.26	0.29	0.32	0.37	0.42	0.48	0.53	0.61	0.67	0.72	0.79	0.80	0.81
	Width =	3.1	3.5	3.9	4.8	5.5	6.8	7.8	9.5	10.9	12.2	16.2	21.0	30.4
2000	Slope =	3.42	3.19	3.01	2.73	2.54	2.30	2.14	1.93	1.81	1.75	1.66	1.61	1.55
	Depth =	0.24	0.26	0.29	0.33	0.36	0.42	0.46	0.54	0.58	0.59	0.60	0.61	0.62
	Width =	3.1	3.6	4.0	4.9	5.7	6.9	8.0	9.6	11.2	13.8	19.9	25.9	37.4
3000	Slope =	4.15	3.87	3.66	3.32	3.09	2.78	2.59	2.45	2.37	2.32	2.24	2.19	2.13
	Depth =	0.20	0.22	0.24	0.27	0.30	0.35	0.39	0.39	0.40	0.40	0.41	0.42	0.43
	Width =	3.3	3.8	4.2	5.1	5.9	6.9	8.0	11.6	15.0	18.4	26.7	34.7	50.1
4000	Slope =	4.78	4.45	4.22	3.81	3.51	3.26	3.14	3.01	2.93	2.88	2.80	2.75	2.52
	Depth =	0.17	0.19	0.21	0.24	0.27	0.29	0.29	0.30	0.30	0.31	0.31	0.32	0.36
	Width =	3.3	3.8	4.3	5.2	5.6	7.6	9.8	14.3	18.5	22.7	32.9	42.7	52.9
6000	Slope =	5.83	5.41	5.03	4.71	4.57	4.41	4.32	4.20	4.13	4.05	3.71	3.49	3.21
	Depth =	0.14	0.16	0.18	0.19	0.20	0.20	0.21	0.21	0.21	0.22	0.26	0.29	0.33
	Width =	3.4	3.9	4.0	5.4	7.1	10.3	13.5	19.6	25.5	30.5	37.4	43.2	52.9
8000	Slope =	6.63	6.37	6.22	5.99	5.85	5.69	5.59	5.36	5.05	4.81	4.42	4.16	3.82
	Depth =	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.17	0.19	0.21	0.24	0.27	0.32
	Width =	3.0	3.9	4.8	6.9	9.1	13.2	17.2	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	7.88	7.66	7.51	7.28	7.14	6.97	6.69	6.14	5.78	5.51	5.06	4.76	4.37
	Depth =	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.17	0.19	0.20	0.23	0.26	0.30
	Width =	3.6	4.7	5.8	8.4	10.9	15.9	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	11.1	10.9	10.8	10.5	9.90	9.09	8.55	7.85	7.38	7.04	6.46	6.08	5.58
	Depth =	0.09	0.09	0.09	0.09	0.10	0.12	0.13	0.16	0.17	0.19	0.22	0.24	0.28
	Width =	5.1	6.6	8.1	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	14.4	14.2	13.6	12.5	11.8	10.8	10.2	9.34	8.79	8.38	7.69	7.24	6.65
	Depth =	0.07	0.07	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.18	0.21	0.23	0.27
	Width =	6.5	8.4	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	19.4	18.3	17.4	16.0	15.1	13.8	13.0	11.9	11.2	10.7	9.83	9.25	8.50
	Depth =	0.06	0.06	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.19	0.22	0.25
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.12 Escape channel design. Sediment size = 0.5mm

D_{50} bed sediment size = 0.5mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	1.22	1.14	1.08	0.98	0.92	0.84	0.78	0.71	0.66	0.63	0.57	0.54	0.49
	Depth =	0.38	0.42	0.45	0.53	0.59	0.69	0.77	0.90	1.00	1.09	1.27	1.42	1.66
	Width =	2.6	3.0	3.4	4.1	4.8	5.8	6.8	8.3	9.6	10.7	13.1	15.1	18.5
400	Slope =	1.44	1.35	1.28	1.16	1.09	0.99	0.92	0.84	0.79	0.75	0.68	0.64	0.58
	Depth =	0.35	0.39	0.43	0.50	0.55	0.64	0.72	0.84	0.94	1.02	1.19	1.33	1.55
	Width =	2.7	3.1	3.5	4.3	4.9	6.0	7.0	8.5	9.8	11.0	13.4	15.5	19.0
600	Slope =	1.82	1.70	1.62	1.47	1.38	1.25	1.17	1.07	1.00	0.95	0.87	0.81	0.74
	Depth =	0.32	0.36	0.39	0.45	0.50	0.59	0.66	0.77	0.86	0.93	1.09	1.22	1.42
	Width =	2.8	3.2	3.6	4.4	5.1	6.3	7.2	8.8	10.2	11.4	13.9	16.0	19.6
800	Slope =	2.15	2.02	1.91	1.74	1.63	1.48	1.39	1.27	1.19	1.13	1.03	0.96	0.88
	Depth =	0.30	0.33	0.36	0.42	0.47	0.55	0.62	0.72	0.80	0.88	1.02	1.14	1.30
	Width =	2.9	3.3	3.7	4.6	5.3	6.4	7.4	9.1	10.4	11.7	14.2	16.4	20.7
1000	Slope =	2.46	2.30	2.18	1.99	1.86	1.70	1.59	1.45	1.35	1.29	1.17	1.10	1.03
	Depth =	0.28	0.32	0.34	0.40	0.45	0.53	0.59	0.69	0.77	0.84	0.97	1.07	1.16
	Width =	2.9	3.4	3.8	4.7	5.4	6.6	7.6	9.2	10.6	11.9	14.5	17.0	23.2
1500	Slope =	3.12	2.92	2.77	2.53	2.37	2.15	2.00	1.81	1.68	1.59	1.48	1.42	1.36
	Depth =	0.26	0.29	0.32	0.37	0.41	0.48	0.53	0.60	0.67	0.72	0.77	0.78	0.80
	Width =	3.1	3.5	3.9	4.8	5.5	6.8	7.8	9.5	10.9	12.2	16.6	21.5	31.1
2000	Slope =	3.67	3.42	3.23	2.92	2.72	2.46	2.30	2.07	1.95	1.89	1.79	1.74	1.68
	Depth =	0.24	0.26	0.28	0.33	0.36	0.41	0.46	0.54	0.57	0.58	0.59	0.60	0.61
	Width =	3.1	3.6	4.0	4.9	5.7	7.0	8.0	9.5	11.5	14.1	20.4	26.5	38.3
3000	Slope =	4.45	4.15	3.93	3.56	3.32	2.97	2.79	2.65	2.56	2.51	2.42	2.37	2.31
	Depth =	0.20	0.22	0.23	0.27	0.30	0.35	0.38	0.39	0.39	0.40	0.40	0.41	0.42
	Width =	3.3	3.8	4.2	5.1	5.9	6.8	8.2	11.9	15.4	18.9	27.3	35.5	51.4
4000	Slope =	5.12	4.77	4.52	4.07	3.75	3.51	3.39	3.25	3.17	3.12	3.03	2.96	2.70
	Depth =	0.17	0.19	0.20	0.24	0.28	0.29	0.29	0.29	0.30	0.30	0.31	0.31	0.36
	Width =	3.3	3.8	4.3	5.1	5.5	7.8	10.1	14.6	19.0	23.3	33.7	43.2	52.9
6000	Slope =	6.16	5.77	5.37	5.05	4.90	4.74	4.64	4.52	4.45	4.32	3.97	3.73	3.42
	Depth =	0.14	0.16	0.19	0.19	0.19	0.20	0.20	0.20	0.21	0.22	0.25	0.28	0.33
	Width =	3.4	3.8	3.9	5.5	7.2	10.5	13.7	20.0	26.0	30.5	37.4	43.2	52.9
8000	Slope =	7.08	6.83	6.67	6.43	6.29	6.12	6.02	5.73	5.39	5.14	4.72	4.44	4.08
	Depth =	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.17	0.19	0.21	0.24	0.27	0.31
	Width =	3.0	3.9	4.8	7.1	9.2	13.4	17.5	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	8.45	8.22	8.06	7.82	7.68	7.50	7.15	6.56	6.17	5.89	5.40	5.08	4.67
	Depth =	0.12	0.12	0.12	0.13	0.13	0.13	0.14	0.16	0.18	0.20	0.23	0.26	0.30
	Width =	3.6	4.8	5.9	8.6	11.2	16.2	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	11.9	11.7	11.6	11.2	10.6	9.70	9.13	8.38	7.89	7.52	6.90	6.50	5.96
	Depth =	0.09	0.09	0.09	0.09	0.10	0.12	0.13	0.15	0.17	0.19	0.22	0.24	0.28
	Width =	5.2	6.7	8.3	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	15.5	15.2	14.6	13.4	12.6	11.5	10.9	9.97	9.38	8.95	8.22	7.73	7.10
	Depth =	0.07	0.07	0.07	0.09	0.10	0.11	0.13	0.15	0.16	0.18	0.21	0.23	0.27
	Width =	6.6	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	20.8	19.5	18.6	17.1	16.1	14.8	13.9	12.7	12.0	11.4	10.5	9.89	9.08
	Depth =	0.06	0.06	0.07	0.08	0.09	0.10	0.12	0.14	0.15	0.16	0.19	0.21	0.25
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.13 Escape channel design. Sediment size = 0.6mm

D_{50} bed sediment size = 0.6mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	1.36	1.27	1.21	1.10	1.02	0.93	0.87	0.79	0.74	0.70	0.64	0.60	0.55
	Depth =	0.36	0.41	0.44	0.51	0.57	0.67	0.75	0.87	0.97	1.06	1.23	1.38	1.61
	Width =	2.6	3.0	3.4	4.2	4.8	5.9	6.8	8.3	9.6	10.8	13.2	15.2	18.6
400	Slope =	1.60	1.50	1.42	1.29	1.21	1.10	1.03	0.94	0.88	0.83	0.76	0.71	0.65
	Depth =	0.34	0.38	0.41	0.48	0.54	0.63	0.70	0.82	0.91	0.99	1.16	1.29	1.51
	Width =	2.7	3.1	3.5	4.3	5.0	6.1	7.0	8.6	9.9	11.1	13.5	15.6	19.1
600	Slope =	2.03	1.90	1.80	1.64	1.53	1.40	1.31	1.19	1.11	1.06	0.97	0.90	0.82
	Depth =	0.31	0.34	0.38	0.44	0.49	0.57	0.64	0.74	0.83	0.91	1.06	1.18	1.38
	Width =	2.8	3.3	3.6	4.5	5.2	6.3	7.3	8.9	10.3	11.5	14.0	16.1	19.7
800	Slope =	2.40	2.25	2.13	1.94	1.82	1.66	1.55	1.41	1.32	1.26	1.15	1.07	0.98
	Depth =	0.29	0.32	0.35	0.41	0.46	0.54	0.60	0.70	0.78	0.85	1.00	1.11	1.26
	Width =	2.9	3.4	3.7	4.6	5.3	6.5	7.5	9.1	10.5	11.7	14.3	16.5	20.9
1000	Slope =	2.74	2.56	2.43	2.22	2.07	1.89	1.77	1.61	1.51	1.44	1.31	1.23	1.15
	Depth =	0.28	0.31	0.33	0.39	0.44	0.51	0.57	0.67	0.74	0.81	0.95	1.04	1.10
	Width =	3.0	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.7	11.9	14.6	17.2	23.8
1500	Slope =	3.48	3.26	3.09	2.82	2.64	2.41	2.26	2.04	1.90	1.80	1.68	1.62	1.55
	Depth =	0.25	0.28	0.31	0.36	0.40	0.47	0.52	0.60	0.67	0.72	0.75	0.76	0.78
	Width =	3.1	3.5	4.0	4.8	5.6	6.8	7.8	9.6	10.9	12.2	17.3	22.5	32.5
2000	Slope =	4.13	3.85	3.65	3.30	3.07	2.78	2.59	2.33	2.22	2.15	2.05	1.99	1.93
	Depth =	0.24	0.26	0.28	0.33	0.36	0.41	0.46	0.54	0.55	0.56	0.57	0.58	0.59
	Width =	3.2	3.6	4.1	5.0	5.7	7.0	8.0	9.5	12.0	14.7	21.3	27.6	40.0
3000	Slope =	5.02	4.68	4.43	4.01	3.74	3.34	3.18	3.02	2.93	2.87	2.78	2.72	2.63
	Depth =	0.20	0.22	0.23	0.27	0.30	0.36	0.37	0.37	0.38	0.38	0.39	0.40	0.41
	Width =	3.3	3.8	4.2	5.1	5.9	6.7	8.5	12.4	16.1	19.7	28.5	37.1	52.9
4000	Slope =	5.78	5.38	5.10	4.57	4.24	4.00	3.87	3.72	3.64	3.57	3.48	3.34	3.05
	Depth =	0.17	0.19	0.20	0.24	0.27	0.28	0.28	0.28	0.29	0.29	0.30	0.31	0.36
	Width =	3.3	3.9	4.3	5.0	5.6	8.1	10.5	15.2	19.8	24.3	35.1	43.2	52.9
6000	Slope =	6.90	6.37	6.00	5.76	5.57	5.36	5.25	5.12	5.04	4.84	4.44	4.18	3.84
	Depth =	0.13	0.16	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.21	0.25	0.28	0.32
	Width =	3.5	3.7	3.9	5.8	7.5	10.9	14.2	20.6	26.8	30.5	37.4	43.2	52.9
8000	Slope =	7.97	7.71	7.53	7.27	7.12	6.94	6.82	6.42	6.04	5.76	5.29	4.98	4.57
	Depth =	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.17	0.19	0.20	0.24	0.26	0.31
	Width =	3.1	4.1	5.0	7.3	9.5	13.9	18.1	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	9.54	9.29	9.12	8.86	8.70	8.51	8.01	7.35	6.92	6.60	6.05	5.70	5.23
	Depth =	0.11	0.12	0.12	0.12	0.12	0.12	0.14	0.16	0.18	0.19	0.23	0.25	0.29
	Width =	3.8	4.9	6.1	8.8	11.5	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	13.6	13.3	13.1	12.6	11.9	10.9	10.2	9.39	8.84	8.43	7.74	7.28	6.68
	Depth =	0.08	0.08	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.18	0.21	0.23	0.27
	Width =	5.3	7.0	8.5	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	17.6	17.1	16.3	15.0	14.1	12.9	12.2	11.2	10.5	10.0	9.21	8.67	7.96
	Depth =	0.07	0.07	0.07	0.09	0.09	0.11	0.12	0.14	0.16	0.17	0.20	0.22	0.26
	Width =	6.8	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	23.3	21.9	20.9	19.2	18.0	16.5	15.6	14.3	13.4	12.8	11.8	11.1	10.2
	Depth =	0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.19	0.21	0.24
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.14 Escape channel design. Sediment size = 0.7mm

D_{50} bed sediment size = 0.7mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	1.49	1.39	1.32	1.20	1.12	1.02	0.95	0.87	0.81	0.77	0.70	0.66	0.60
	Depth =	0.35	0.40	0.43	0.50	0.56	0.65	0.73	0.85	0.95	1.03	1.20	1.34	1.57
	Width =	2.6	3.0	3.4	4.2	4.8	5.9	6.8	8.4	9.7	10.8	13.2	15.3	18.7
400	Slope =	1.76	1.64	1.56	1.42	1.33	1.21	1.13	1.03	0.96	0.91	0.83	0.78	0.71
	Depth =	0.33	0.37	0.40	0.47	0.52	0.61	0.68	0.80	0.89	0.97	1.13	1.26	1.47
	Width =	2.7	3.1	3.5	4.3	5.0	6.1	7.0	8.6	9.9	11.1	13.6	15.7	19.1
600	Slope =	2.22	2.08	1.97	1.80	1.68	1.53	1.43	1.31	1.22	1.16	1.06	0.99	0.90
	Depth =	0.30	0.34	0.37	0.43	0.48	0.56	0.62	0.73	0.81	0.88	1.03	1.15	1.35
	Width =	2.8	3.3	3.7	4.5	5.2	6.3	7.3	8.9	10.3	11.5	14.0	16.2	19.8
800	Slope =	2.63	2.46	2.34	2.13	1.99	1.82	1.70	1.55	1.45	1.38	1.26	1.18	1.08
	Depth =	0.28	0.32	0.34	0.40	0.45	0.52	0.58	0.68	0.76	0.83	0.97	1.08	1.23
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.2	10.5	11.8	14.4	16.6	21.1
1000	Slope =	3.00	2.81	2.67	2.43	2.27	2.07	1.94	1.77	1.66	1.58	1.44	1.35	1.27
	Depth =	0.27	0.30	0.33	0.38	0.43	0.50	0.56	0.65	0.73	0.79	0.92	1.01	1.06
	Width =	3.0	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.7	12.0	14.7	17.3	24.4
1500	Slope =	3.81	3.57	3.39	3.09	2.90	2.64	2.48	2.26	2.10	2.00	1.88	1.82	1.74
	Depth =	0.25	0.27	0.30	0.35	0.39	0.46	0.51	0.60	0.67	0.71	0.73	0.74	0.76
	Width =	3.1	3.6	4.0	4.9	5.6	6.8	7.9	9.5	10.9	12.4	17.9	23.3	33.7
2000	Slope =	4.53	4.24	4.03	3.65	3.40	3.08	2.86	2.58	2.47	2.40	2.30	2.24	2.16
	Depth =	0.23	0.26	0.28	0.32	0.36	0.41	0.46	0.53	0.54	0.55	0.56	0.57	0.58
	Width =	3.2	3.6	4.1	5.0	5.7	7.0	7.9	9.6	12.4	15.2	22.0	28.6	41.4
3000	Slope =	5.56	5.18	4.91	4.44	4.12	3.70	3.55	3.38	3.28	3.22	3.12	3.05	2.92
	Depth =	0.19	0.21	0.23	0.27	0.30	0.35	0.36	0.36	0.37	0.37	0.38	0.39	0.41
	Width =	3.3	3.8	4.2	5.1	5.8	6.8	8.8	12.8	16.7	20.4	29.6	38.4	52.9
4000	Slope =	6.00	5.97	5.65	5.03	4.72	4.48	4.34	4.18	4.08	4.01	3.91	3.70	3.38
	Depth =	0.14	0.19	0.20	0.25	0.27	0.27	0.27	0.28	0.28	0.28	0.29	0.31	0.36
	Width =	3.4	3.9	4.3	4.9	5.8	8.4	10.9	15.8	20.6	25.2	36.4	43.2	52.9
6000	Slope =	7.59	6.96	6.60	6.31	6.14	6.00	5.88	5.72	5.59	5.33	4.89	4.61	4.23
	Depth =	0.13	0.16	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.21	0.24	0.27	0.32
	Width =	3.5	3.6	4.0	5.9	7.7	11.3	14.7	21.2	27.3	30.5	37.4	43.2	52.9
8000	Slope =	8.82	8.54	8.35	8.07	7.91	7.71	7.59	7.07	6.65	6.35	5.82	5.48	5.03
	Depth =	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.16	0.18	0.20	0.23	0.26	0.30
	Width =	3.2	4.2	5.1	7.5	9.8	14.2	18.5	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	10.6	10.3	10.1	9.85	9.68	9.37	8.82	8.09	7.61	7.26	6.67	6.27	5.76
	Depth =	0.11	0.11	0.11	0.12	0.12	0.12	0.14	0.16	0.18	0.19	0.22	0.25	0.29
	Width =	3.9	5.1	6.2	9.1	11.8	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	15.1	14.8	14.6	13.9	13.1	12.0	11.3	10.3	9.73	9.28	8.52	8.02	7.36
	Depth =	0.08	0.08	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.18	0.21	0.23	0.27
	Width =	5.5	7.1	8.8	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	19.5	18.9	18.0	16.5	15.5	14.2	13.4	12.3	11.6	11.1	10.1	9.54	8.76
	Depth =	0.06	0.07	0.07	0.08	0.09	0.11	0.12	0.14	0.16	0.17	0.20	0.22	0.26
	Width =	7.0	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	25.6	24.1	23.0	21.1	19.8	18.2	17.1	15.7	14.8	14.1	13.0	12.2	11.2
	Depth =	0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.18	0.20	0.24
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.15 Escape channel design. Sediment size = 0.8mm

D_{50} bed sediment size = 0.8mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	1.61	1.50	1.43	1.30	1.21	1.10	1.03	0.94	0.88	0.83	0.76	0.71	0.65
	Depth =	0.35	0.39	0.42	0.49	0.55	0.64	0.71	0.83	0.93	1.01	1.18	1.32	1.54
	Width =	2.6	3.1	3.4	4.2	4.9	6.0	6.9	8.4	9.7	10.9	13.3	15.3	18.8
400	Slope =	1.90	1.78	1.69	1.53	1.43	1.31	1.22	1.11	1.04	0.99	0.90	0.84	0.77
	Depth =	0.32	0.36	0.39	0.46	0.51	0.60	0.67	0.78	0.87	0.95	1.11	1.23	1.44
	Width =	2.7	3.2	3.5	4.3	5.0	6.1	7.1	8.7	10.0	11.2	13.6	15.7	19.2
600	Slope =	2.41	2.25	2.14	1.94	1.82	1.66	1.55	1.41	1.32	1.26	1.15	1.07	0.98
	Depth =	0.29	0.33	0.36	0.42	0.47	0.55	0.61	0.71	0.79	0.87	1.01	1.13	1.32
	Width =	2.9	3.3	3.7	4.5	5.2	6.4	7.3	9.0	10.3	11.5	14.1	16.2	19.9
800	Slope =	2.85	2.66	2.53	2.31	2.16	1.97	1.84	1.68	1.57	1.49	1.36	1.28	1.17
	Depth =	0.28	0.31	0.34	0.39	0.44	0.51	0.57	0.67	0.75	0.81	0.95	1.06	1.20
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.2	10.6	11.8	14.4	16.7	21.2
1000	Slope =	3.25	3.04	2.89	2.63	2.46	2.25	2.10	1.92	1.80	1.71	1.56	1.47	1.38
	Depth =	0.26	0.29	0.32	0.37	0.42	0.49	0.54	0.64	0.71	0.78	0.90	0.99	1.03
	Width =	3.0	3.5	3.9	4.7	5.4	6.6	7.7	9.3	10.8	12.0	14.8	17.4	24.9
1500	Slope =	4.13	3.87	3.68	3.35	3.14	2.86	2.68	2.44	2.29	2.19	2.07	2.00	1.92
	Depth =	0.24	0.27	0.29	0.34	0.38	0.45	0.50	0.59	0.66	0.70	0.71	0.72	0.74
	Width =	3.1	3.6	4.0	4.9	5.6	6.9	7.9	9.5	10.9	12.8	18.5	24.0	34.7
2000	Slope =	4.91	4.60	4.37	3.98	3.72	3.36	3.12	2.84	2.72	2.65	2.54	2.47	2.39
	Depth =	0.23	0.25	0.27	0.32	0.36	0.41	0.46	0.52	0.53	0.53	0.54	0.55	0.57
	Width =	3.2	3.7	4.1	5.0	5.7	7.0	7.9	9.9	12.8	15.7	22.7	29.6	42.7
3000	Slope =	6.00	5.66	5.36	4.85	4.49	4.07	3.91	3.73	3.63	3.56	3.45	3.38	3.19
	Depth =	0.14	0.21	0.23	0.27	0.30	0.34	0.35	0.36	0.36	0.36	0.37	0.38	0.41
	Width =	3.4	3.8	4.2	5.2	5.7	7.0	9.1	13.2	17.2	21.1	30.5	39.6	52.9
4000	Slope =	6.45	6.04	6.00	5.47	5.19	4.93	4.78	4.61	4.51	4.44	4.32	4.05	3.69
	Depth =	0.14	0.16	0.17	0.25	0.26	0.26	0.27	0.27	0.27	0.28	0.29	0.31	0.36
	Width =	3.4	3.9	4.4	4.8	6.0	8.6	11.3	16.3	21.2	26.0	37.4	43.2	52.9
6000	Slope =	8.24	7.52	7.21	6.90	6.72	6.52	6.40	6.25	6.08	5.81	5.32	5.01	4.59
	Depth =	0.13	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.19	0.21	0.24	0.27	0.31
	Width =	3.5	3.6	4.1	6.0	7.9	11.4	14.9	21.7	27.3	30.5	37.4	43.2	52.9
8000	Slope =	9.63	9.33	9.14	8.84	8.67	8.45	8.32	7.69	7.23	6.90	6.33	5.96	5.47
	Depth =	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.16	0.18	0.20	0.23	0.25	0.29
	Width =	3.3	4.3	5.3	7.7	10.0	14.6	19.0	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	11.6	11.3	11.1	10.8	10.6	10.2	9.59	8.80	8.28	7.90	7.25	6.82	6.26
	Depth =	0.11	0.11	0.11	0.11	0.11	0.12	0.13	0.16	0.17	0.19	0.22	0.24	0.28
	Width =	4.0	5.2	6.4	9.3	12.1	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	16.5	16.2	16.0	15.1	14.2	13.0	12.2	11.2	10.6	10.1	9.26	8.72	8.00
	Depth =	0.08	0.08	0.08	0.09	0.10	0.11	0.12	0.15	0.16	0.18	0.20	0.23	0.26
	Width =	5.6	7.3	9.0	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	21.4	20.5	19.6	17.9	16.9	15.5	14.6	13.4	12.6	12.0	11.0	10.4	9.53
	Depth =	0.06	0.07	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.19	0.22	0.25
	Width =	7.1	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	27.8	26.2	25.0	22.9	21.6	19.8	18.6	17.1	16.1	15.4	14.1	13.3	12.2
	Depth =	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.23
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.18 Escape channel design. Sediment size = 1.2mm

D_{50} bed sediment size = 1.2mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	2.04	1.91	1.81	1.65	1.54	1.40	1.31	1.19	1.12	1.06	0.97	0.91	0.83
	Depth =	0.32	0.36	0.39	0.46	0.51	0.60	0.67	0.78	0.87	0.95	1.10	1.23	1.44
	Width =	2.7	3.1	3.5	4.3	4.9	6.0	7.0	8.5	9.9	11.0	13.5	15.5	19.0
400	Slope =	2.41	2.26	2.14	1.95	1.82	1.66	1.55	1.42	1.33	1.26	1.15	1.08	0.98
	Depth =	0.30	0.34	0.37	0.43	0.48	0.56	0.62	0.73	0.81	0.89	1.04	1.16	1.35
	Width =	2.8	3.2	3.6	4.4	5.1	6.2	7.2	8.8	10.1	11.3	13.8	15.9	19.4
600	Slope =	3.06	2.86	2.72	2.48	2.32	2.11	1.98	1.80	1.69	1.60	1.46	1.37	1.25
	Depth =	0.28	0.31	0.34	0.39	0.44	0.51	0.57	0.67	0.74	0.81	0.95	1.06	1.23
	Width =	2.9	3.3	3.7	4.6	5.3	6.4	7.4	9.1	10.5	11.7	14.2	16.4	20.3
800	Slope =	3.62	3.39	3.22	2.94	2.75	2.51	2.35	2.14	2.01	1.91	1.74	1.63	1.51
	Depth =	0.26	0.29	0.31	0.37	0.41	0.48	0.54	0.63	0.70	0.76	0.89	0.99	1.10
	Width =	3.0	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.7	11.9	14.6	17.0	22.1
1000	Slope =	4.14	3.87	3.68	3.36	3.14	2.87	2.68	2.45	2.29	2.18	1.99	1.89	1.80
	Depth =	0.25	0.28	0.30	0.35	0.39	0.46	0.51	0.60	0.67	0.73	0.85	0.90	0.92
	Width =	3.0	3.5	3.9	4.8	5.5	6.7	7.7	9.4	10.9	12.1	14.9	18.3	26.6
1500	Slope =	5.27	4.94	4.69	4.28	4.01	3.66	3.43	3.12	2.93	2.83	2.70	2.62	2.53
	Depth =	0.23	0.25	0.27	0.32	0.36	0.42	0.47	0.56	0.62	0.63	0.64	0.65	0.67
	Width =	3.1	3.6	4.0	4.9	5.7	6.9	8.0	9.5	11.1	13.6	19.7	25.7	37.2
2000	Slope =	6.00	5.87	5.58	5.09	4.77	4.34	4.04	3.79	3.65	3.56	3.43	3.34	3.25
	Depth =	0.15	0.24	0.26	0.30	0.34	0.40	0.46	0.48	0.49	0.50	0.51	0.52	0.53
	Width =	3.3	3.7	4.1	5.0	5.8	6.9	7.7	10.8	14.1	17.3	25.0	32.5	47.0
3000	Slope =	6.96	6.53	6.21	6.00	5.81	5.44	5.25	5.03	4.90	4.82	4.68	4.58	4.18
	Depth =	0.14	0.16	0.17	0.20	0.31	0.32	0.33	0.33	0.34	0.34	0.35	0.36	0.41
	Width =	3.3	3.9	4.3	5.3	5.5	7.7	10.0	14.5	18.9	23.2	33.5	43.2	52.9
4000	Slope =	8.29	7.77	7.39	6.62	6.28	6.03	6.00	6.00	6.00	6.00	5.65	5.30	4.84
	Depth =	0.13	0.15	0.16	0.20	0.22	0.22	0.22	0.22	0.22	0.22	0.28	0.31	0.36
	Width =	3.4	3.9	4.4	4.9	5.9	8.7	11.6	17.3	22.9	28.5	37.4	43.2	52.9
6000	Slope =	10.5	9.66	9.42	9.06	8.85	8.60	8.45	8.26	7.83	7.47	6.86	6.45	5.94
	Depth =	0.13	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.18	0.20	0.23	0.25	0.30
	Width =	3.3	3.6	4.4	6.5	8.4	12.3	16.0	23.2	27.3	30.5	37.4	43.2	52.9
8000	Slope =	12.6	12.2	12.0	11.7	11.4	11.2	10.8	9.90	9.32	8.89	8.16	7.68	7.05
	Depth =	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.15	0.17	0.19	0.22	0.24	0.28
	Width =	3.5	4.6	5.7	8.3	10.8	15.6	19.3	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	15.2	14.9	14.6	14.3	14.0	13.1	12.4	11.3	10.7	10.2	9.34	8.79	8.07
	Depth =	0.10	0.10	0.10	0.10	0.10	0.11	0.13	0.15	0.17	0.18	0.21	0.23	0.27
	Width =	4.3	5.6	6.9	10.0	13.0	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	21.8	21.4	21.2	19.4	18.3	16.8	15.8	14.5	13.6	13.0	11.9	11.2	10.3
	Depth =	0.07	0.07	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.19	0.22	0.25
	Width =	6.0	7.9	9.6	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	28.1	26.4	25.2	23.1	21.8	20.0	18.8	17.2	16.2	15.5	14.2	13.4	12.3
	Depth =	0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.18	0.21	0.24
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	35.9	33.7	32.2	29.5	27.8	25.5	24.0	22.0	20.7	19.8	18.2	17.1	15.7
	Depth =	0.05	0.06	0.06	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.19	0.22
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.19 Escape channel design. Sediment size = 1.5mm

D_{50} bed sediment size = 1.5mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	2.33	2.18	2.07	1.88	1.76	1.60	1.50	1.36	1.28	1.21	1.11	1.04	0.94
	Depth =	0.31	0.35	0.38	0.44	0.49	0.58	0.64	0.75	0.84	0.91	1.07	1.19	1.39
	Width =	2.7	3.1	3.5	4.3	5.0	6.1	7.0	8.6	9.9	11.1	13.5	15.6	19.1
400	Slope =	2.75	2.57	2.45	2.23	2.08	1.90	1.78	1.62	1.52	1.44	1.31	1.23	1.12
	Depth =	0.29	0.33	0.35	0.41	0.46	0.54	0.60	0.70	0.79	0.86	1.00	1.12	1.31
	Width =	2.8	3.2	3.6	4.4	5.1	6.3	7.2	8.8	10.2	11.4	13.9	16.0	19.5
600	Slope =	3.49	3.27	3.11	2.83	2.65	2.41	2.26	2.06	1.93	1.84	1.67	1.57	1.44
	Depth =	0.27	0.30	0.32	0.38	0.42	0.49	0.55	0.64	0.72	0.78	0.92	1.02	1.18
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.1	10.5	11.7	14.3	16.5	20.5
800	Slope =	4.14	3.88	3.68	3.36	3.14	2.87	2.69	2.45	2.30	2.18	1.99	1.87	1.74
	Depth =	0.25	0.28	0.30	0.35	0.40	0.46	0.52	0.61	0.68	0.74	0.86	0.95	1.04
	Width =	3.0	3.5	3.9	4.7	5.4	6.6	7.6	9.3	10.8	12.0	14.7	17.2	22.8
1000	Slope =	4.73	4.43	4.21	3.84	3.59	3.28	3.07	2.80	2.63	2.50	2.28	2.18	2.08
	Depth =	0.24	0.27	0.29	0.34	0.38	0.44	0.49	0.58	0.64	0.70	0.82	0.85	0.87
	Width =	3.1	3.5	3.9	4.8	5.5	6.8	7.8	9.5	10.9	12.2	15.0	19.0	27.5
1500	Slope =	6.00	5.64	5.37	4.89	4.59	4.19	3.92	3.56	3.37	3.27	3.12	3.03	2.93
	Depth =	0.15	0.24	0.26	0.31	0.35	0.41	0.45	0.54	0.58	0.59	0.61	0.62	0.63
	Width =	3.3	3.6	4.1	5.0	5.7	7.0	8.0	9.5	11.5	14.1	20.4	26.6	38.6
2000	Slope =	6.26	6.00	6.00	5.82	5.46	4.96	4.62	4.37	4.22	4.13	3.99	3.90	3.80
	Depth =	0.15	0.17	0.18	0.29	0.33	0.39	0.45	0.46	0.46	0.47	0.48	0.49	0.50
	Width =	3.3	3.8	4.2	5.1	5.8	6.9	7.7	11.2	14.6	17.9	26.0	33.8	48.9
3000	Slope =	7.99	7.49	7.13	6.50	6.06	6.00	6.00	5.94	5.79	5.70	5.54	5.31	4.85
	Depth =	0.14	0.15	0.17	0.20	0.22	0.24	0.24	0.32	0.32	0.33	0.34	0.36	0.41
	Width =	3.4	3.9	4.3	5.3	5.9	7.7	10.4	15.3	19.9	24.4	35.3	43.2	52.9
4000	Slope =	9.52	8.92	8.48	7.55	7.27	7.00	6.84	6.66	6.54	6.46	6.17	6.00	5.61
	Depth =	0.13	0.14	0.16	0.20	0.20	0.21	0.21	0.22	0.22	0.22	0.24	0.26	0.36
	Width =	3.4	3.9	4.4	4.8	6.2	9.0	11.8	17.2	22.4	27.5	37.4	43.2	52.9
6000	Slope =	11.9	11.2	10.9	10.5	10.3	10.0	9.86	9.57	9.00	8.59	7.88	7.42	6.81
	Depth =	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.18	0.19	0.22	0.25	0.29
	Width =	3.2	3.7	4.6	6.7	8.8	12.8	16.6	23.7	27.3	30.5	37.4	43.2	52.9
8000	Slope =	14.6	14.2	14.0	13.6	13.3	13.0	12.4	11.4	10.7	10.2	9.38	8.83	8.10
	Depth =	0.11	0.11	0.11	0.11	0.12	0.12	0.13	0.15	0.17	0.18	0.21	0.24	0.27
	Width =	3.7	4.8	5.9	8.6	11.2	16.3	19.3	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	17.7	17.3	17.0	16.6	16.4	15.1	14.2	13.0	12.3	11.7	10.7	10.1	9.28
	Depth =	0.09	0.09	0.09	0.10	0.10	0.11	0.12	0.14	0.16	0.17	0.20	0.23	0.26
	Width =	4.4	5.8	7.1	10.4	13.5	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	25.4	25.0	24.3	22.3	21.0	19.3	18.1	16.7	15.7	15.0	13.7	12.9	11.9
	Depth =	0.07	0.07	0.07	0.08	0.09	0.10	0.12	0.13	0.15	0.16	0.19	0.21	0.25
	Width =	6.3	8.2	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	32.3	30.4	29.0	26.6	25.0	23.0	21.6	19.8	18.7	17.8	16.3	15.4	14.1
	Depth =	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.15	0.18	0.20	0.23
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	41.2	38.8	37.0	34.0	32.0	29.3	27.6	25.3	23.9	22.8	20.9	19.7	18.0
	Depth =	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.14	0.17	0.19	0.22
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.20 Escape channel design. Sediment size = 2mm

D_{50} bed sediment size = 2.0mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	2.76	2.58	2.45	2.23	2.09	1.90	1.78	1.62	1.52	1.44	1.31	1.23	1.12
	Depth =	0.30	0.33	0.36	0.42	0.47	0.55	0.61	0.72	0.80	0.87	1.02	1.14	1.33
	Width =	2.7	3.2	3.5	4.3	5.0	6.1	7.1	8.7	10.0	11.2	13.7	15.7	19.2
400	Slope =	3.26	3.05	2.90	2.64	2.47	2.25	2.11	1.92	1.80	1.71	1.56	1.46	1.33
	Depth =	0.28	0.31	0.34	0.40	0.44	0.52	0.58	0.67	0.75	0.82	0.96	1.07	1.25
	Width =	2.8	3.3	3.7	4.5	5.2	6.3	7.3	8.9	10.3	11.4	14.0	16.1	19.7
600	Slope =	4.15	3.88	3.69	3.36	3.15	2.87	2.69	2.45	2.30	2.18	1.99	1.87	1.71
	Depth =	0.25	0.28	0.31	0.36	0.40	0.47	0.53	0.62	0.69	0.75	0.88	0.98	1.12
	Width =	2.9	3.4	3.8	4.6	5.3	6.5	7.5	9.2	10.6	11.8	14.4	16.6	20.8
800	Slope =	4.92	4.61	4.38	3.99	3.74	3.41	3.19	2.91	2.73	2.60	2.37	2.23	2.09
	Depth =	0.24	0.27	0.29	0.34	0.38	0.44	0.49	0.58	0.65	0.70	0.82	0.91	0.97
	Width =	3.0	3.5	3.9	4.7	5.5	6.7	7.7	9.4	10.8	12.1	14.8	17.3	23.9
1000	Slope =	5.62	5.26	5.00	4.56	4.27	3.90	3.65	3.33	3.12	2.97	2.72	2.62	2.50
	Depth =	0.23	0.25	0.28	0.32	0.36	0.42	0.47	0.55	0.62	0.67	0.78	0.79	0.81
	Width =	3.1	3.5	4.0	4.8	5.6	6.8	7.8	9.6	11.0	12.2	15.2	19.8	28.8
1500	Slope =	6.29	6.00	6.00	5.82	5.46	4.98	4.67	4.24	4.04	3.93	3.76	3.67	3.56
	Depth =	0.16	0.17	0,18	0.30	0.33	0.39	0.43	0.52	0.54	0.55	0.56	0.57	0.59
	Width =	3.2	3.7	4.2	5.0	5.7	7.0	8.0	9.5	12.0	14.7	21.4	27.8	40.4
2000	Slope =	7.48	7.01	6.66	6.08	6.00	5.88	5.54	5.26	5.10	4.99	4.83	4.73	4.61
	Depth =	0.15	0.16	0.18	0.21	0.23	0.38	0.41	0.42	0.43	0.44	0.45	0.46	0.47
	Width =	3.3	3.8	4.2	5.1	5.9	6.8	8.1	11.7	15.3	18.7	27.2	35.4	51.2
3000	Slope =	9.55	8.96	8.52	7.78	7.20	6.66	6.48	6.27	6.14	6.05	6.00	6.00	5.87
	Depth =	0.13	0.15	0.16	0.19	0.22	0.25	0.25	0.25	0.26	0.26	0.26	0.27	0.41
	Width =	3.4	3.9	4.3	5.3	5.8	7.4	9.7	14.2	18.5	22.7	33.5	43.2	52.9
4000	Slope =	11.4	10.7	10.1	9.08	8.81	8.50	8.32	8.11	7.97	7.88	7.38	6.95	6.38
	Depth =	0.12	0.14	0.15	0.19	0.19	0.19	0.20	0.20	0.20	0.21	0.23	0.26	0.30
	Width =	3.4	4.0	4.3	5.0	6.5	9.5	12.4	18.1	23.6	28.9	37.4	43.2	52.9
6000	Slope =	14.0	13.5	13.2	12.8	12.5	12.2	12.0	11.4	10.8	10.3	9.44	8.88	8.15
	Depth =	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.17	0.18	0.22	0.24	0.28
	Width =	3.0	3.9	4.8	7.1	9.2	13.4	17.5	23.7	27.3	30.5	37.4	43.2	52.9
8000	Slope =	17.7	17.3	17.0	16.5	16.3	15.8	14.8	13.6	12.8	12.2	11.2	10.6	9.70
	Depth =	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.15	0.16	0.18	0.20	0.23	0.26
	Width =	3.8	5.0	6.2	9.0	11.8	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	21.5	21.0	20.8	20.3	19.7	18.1	17.0	15.6	14.7	14.0	12.9	12.1	11.1
	Depth =	0.08	0.09	0.09	0.09	0.09	0.11	0.12	0.14	0.16	0.17	0.20	0.22	0.25
	Width =	4.7	6.1	7.5	10.9	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	30.9	30.5	29.1	26.7	25.2	23.1	21.7	19.9	18.8	17.9	16.4	15.5	14.2
	Depth =	0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.24
	Width =	6.6	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	38.6	36.3	34.7	31.8	29.9	27.5	25.9	23.7	22.3	21.3	19.6	18.4	16.9
	Depth =	0.05	0.06	0.06	0.07	0.08	0.10	0.11	0.12	0.14	0.15	0.17	0.19	0.23
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	49.4	46.4	44.3	40.7	38.3	35.1	33.1	30.3	28.6	27.2	25.0	23.5	21.6
	Depth =	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.14	0.16	0.18	0.21
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.21 Escape channel design. Sediment size = 3mm

D_{50} bed sediment size = 3.0mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	3.51	3.28	3.12	2.84	2.66	2.42	2.27	2.06	1.93	1.84	1.68	1.57	1.43
	Depth =	0.28	0.31	0.34	0.40	0.44	0.51	0.57	0.67	0.75	0.82	0.95	1.07	1.25
	Width =	2.8	3.2	3.6	4.4	5.1	6.2	7.2	8.8	10.1	11.3	13.8	15.9	19.4
400	Slope =	4.15	3.89	3.69	3.37	3.15	2.87	2.69	2.45	2.30	2.18	1.99	1.87	1.70
	Depth =	0.26	0.29	0.32	0.37	0.41	0.48	0.54	0.63	0.70	0.77	0.90	1.00	1.17
	Width =	2.9	3.3	3.7	4.5	5.2	6.4	7.4	9.0	10.4	11.6	14.1	16.3	19.9
600	Slope =	5.28	4.95	4.70	4.29	4.01	3.66	3.43	3.13	2.93	2.79	2.54	2.39	2.19
	Depth =	0.24	0.27	0.29	0.34	0.38	0.44	0.49	0.58	0.64	0.70	0.82	0.92	1.05
	Width =	3.0	3.4	3.8	4.7	5.4	6.6	7.6	9.3	10.7	11.9	14.6	16.8	21.2
800	Slope =	6.00	5.87	5.58	5.09	4.77	4.35	4.08	3.72	3.49	3.32	3.03	2.86	2.71
	Depth =	0.17	0.25	0.27	0.32	0.36	0.42	0.46	0.54	0.61	0.66	0.77	0.85	0.87
	Width =	3.1	3.5	3.9	4.8	5.5	6.8	7.8	9.5	10.9	12.2	15.0	17.6	25.5
1000	Slope =	6.32	6.00	6.00	5.82	5.46	4.98	4.67	4.26	3.99	3.80	3.52	3.40	3.27
	Depth =	0.16	0.18	0.19	0.30	0.34	0.40	0.44	0.52	0.58	0.63	0.70	0.71	0.73
	Width =	3.1	3.6	4.1	4.9	5.6	6.9	7.9	9.6	11.1	12.3	16.2	21.1	30.7
1500	Slope =	8.07	7.57	7.19	6.57	6.15	6.00	5.95	5.44	5.24	5.11	4.92	4.80	4.67
	Depth =	0.15	0.16	0.18	0.21	0.23	0.27	0.41	0.48	0.49	0.49	0.51	0.51	0.53
	Width =	3.2	3.7	4.2	5.1	5.8	7.2	8.0	9.8	12.8	15.7	22.8	29.7	43.1
2000	Slope =	9.61	9.00	8.56	7.82	7.33	6.69	6.21	6.00	6.00	6.00	6.00	6.00	5.99
	Depth =	0.14	0.15	0.17	0.20	0.22	0.26	0.29	0.31	0.31	0.30	0.30	0.30	0.43
	Width =	3.3	3.8	4.2	5.2	6.0	7.2	8.0	11.1	14.9	18.6	27.8	36.8	52.9
3000	Slope =	12.3	11.5	11.0	9.95	9.18	8.73	8.51	8.26	8.11	8.00	7.83	7.52	6.90
	Depth =	0.13	0.14	0.15	0.18	0.21	0.22	0.22	0.23	0.23	0.24	0.24	0.26	0.30
	Width =	3.4	3.9	4.4	5.2	5.6	8.0	10.4	15.2	19.9	24.4	35.4	43.2	52.9
4000	Slope =	14.6	13.7	12.8	11.9	11.5	11.2	11.0	10.7	10.5	10.4	9.51	8.95	8.22
	Depth =	0.12	0.13	0.15	0.17	0.17	0.17	0.18	0.18	0.18	0.19	0.22	0.25	0.29
	Width =	3.5	4.0	4.1	5.3	7.0	10.2	13.3	19.4	25.3	30.5	37.4	43.2	52.9
6000	Slope =	18.3	17.7	17.4	16.9	16.5	16.2	15.9	14.8	13.9	13.2	12.2	11.4	10.5
	Depth =	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.15	0.16	0.18	0.21	0.23	0.27
	Width =	3.2	4.2	5.2	7.6	9.9	14.4	18.8	23.7	27.3	30.5	37.4	43.2	52.9
8000	Slope =	23.3	22.7	22.4	21.9	21.5	20.3	19.1	17.6	16.5	15.8	14.5	13.6	12.5
	Depth =	0.09	0.09	0.09	0.10	0.10	0.11	0.12	0.14	0.15	0.17	0.19	0.22	0.25
	Width =	4.1	5.4	6.7	9.7	12.6	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	28.3	27.8	27.4	26.8	25.4	23.3	21.9	20.1	18.9	18.0	16.6	15.6	14.3
	Depth =	0.08	0.08	0.08	0.08	0.09	0.10	0.11	0.13	0.15	0.16	0.19	0.21	0.24
	Width =	5.0	6.5	8.1	11.7	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	40.9	39.3	37.5	34.4	32.4	29.7	28.0	25.7	24.2	23.1	21.2	19.9	18.3
	Depth =	0.05	0.06	0.06	0.07	0.08	0.10	0.11	0.12	0.14	0.15	0.17	0.19	0.23
	Width =	7.1	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	49.8	46.8	44.7	41.0	38.6	35.4	33.3	30.6	28.8	27.5	25.2	23.7	21.8
	Depth =	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.14	0.17	0.18	0.21
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	63.6	59.8	57.1	52.4	49.3	45.3	42.6	39.1	36.8	35.1	32.2	30.3	27.9
	Depth =	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.11	0.12	0.13	0.15	0.17	0.20
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.22 Escape channel design. Sediment size = 4mm

D_{50} bed sediment size = 4.0mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s) : 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	4.16	3.89	3.70	3.37	3.15	2.87	2.69	2.45	2.30	2.18	1.99	1.87	1.70
	Depth =	0.27	0.30	0.32	0.38	0.42	0.49	0.55	0.64	0.72	0.78	0.91	1.02	1.19
	Width =	2.8	3.2	3.6	4.4	5.1	6.3	7.2	8.8	10.2	11.4	13.9	16.0	19.6
400	Slope =	4.93	4.62	4.39	4.00	3.74	3.41	3.20	2.92	2.73	2.60	2.37	2.22	2.03
	Depth =	0.25	0.28	0.30	0.35	0.39	0.46	0.52	0.60	0.67	0.73	0.86	0.96	1.12
	Width =	2.9	3.3	3.7	4.6	5.3	6.4	7.4	9.1	10.4	11.7	14.2	16.4	20.0
600	Slope =	6.00	5.88	5.59	5.09	4.77	4.35	4.08	3.72	3.49	3.32	3.03	2.84	2.62
	Depth =	0.17	0.25	0.28	0.32	0.36	0.42	0.47	0.55	0.62	0.67	0.79	0.87	0.99
	Width =	3.1	3.5	3.9	4.7	5.4	6.6	7.7	9.4	10.8	12.0	14.7	17.0	21.5
800	Slope =	6.60	6.19	6.00	6.00	5.68	5.18	4.85	4.43	4.15	3.95	3.61	3.43	3.27
	Depth =	0.16	0.18	0.20	0.22	0.34	0.40	0.44	0.52	0.58	0.63	0.74	0.79	0.81
	Width =	3.1	3.6	4.0	5.0	5.6	6.8	7.8	9.6	11.0	12.3	15.1	18.4	26.7
1000	Slope =	7.55	7.08	6.73	6.14	6.00	5.93	5.56	5.07	4.75	4.52	4.24	4.10	3.95
	Depth =	0.16	0.17	0.19	0.22	0.24	0.38	0.42	0.50	0.56	0.61	0.65	0.66	0.68
	Width =	3.2	3.6	4.1	5.0	5.7	6.9	8.0	9.7	11.1	12.4	17.0	22.1	32.2
1500	Slope =	9.65	9.04	8.60	7.85	7.35	6.71	6.29	6.00	6.00	6.00	5.95	5.82	5.66
	Depth =	0.14	0.16	0.17	0.20	0.22	0.26	0.29	0.34	0.34	0.34	0.47	0.48	0.49
	Width =	3.3	3.8	4.2	5.1	5.9	7.2	8.2	9.8	12.9	16.2	23.9	31.1	45.1
2000	Slope =	11.5	10.8	10.2	9.34	8.76	7.96	7.40	7.04	6.88	6.76	6.58	6.47	6.33
	Depth =	0.13	0.15	0.16	0.19	0.21	0.25	0.28	0.30	0.30	0.30	0.31	0.32	0.32
	Width =	3.3	3.8	4.3	5.2	6.0	7.2	8.0	11.3	14.8	18.2	26.5	34.6	50.1
3000	Slope =	14.7	13.8	13.1	11.8	11.0	10.6	10.3	10.1	9.88	9.76	9.55	9.00	8.26
	Depth =	0.12	0.14	0.15	0.18	0.20	0.21	0.21	0.21	0.22	0.22	0.22	0.25	0.29
	Width =	3.4	3.9	4.4	5.1	5.7	8.4	11.0	16.0	20.9	25.7	37.2	43.2	52.9
4000	Slope =	17.5	16.2	15.1	14.4	14.0	13.6	13.4	13.1	12.9	12.4	11.4	10.7	9.84
	Depth =	0.11	0.13	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.21	0.24	0.28
	Width =	3.5	3.9	4.0	5.6	7.4	10.8	14.0	20.4	26.6	30.5	37.4	43.2	52.9
6000	Slope =	22.1	21.5	21.1	20.5	20.2	19.7	19.2	17.7	16.6	15.9	14.6	13.7	12.6
	Depth =	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.14	0.16	0.17	0.20	0.22	0.26
	Width =	3.4	4.4	5.5	8.0	10.4	15.2	19.3	23.7	27.3	30.5	37.4	43.2	52.9
8000	Slope =	28.2	27.7	27.3	26.6	26.2	24.3	22.9	21.0	19.8	18.9	17.3	16.3	15.0
	Depth =	0.09	0.09	0.09	0.09	0.09	0.10	0.12	0.13	0.15	0.16	0.19	0.21	0.24
	Width =	4.4	5.7	7.0	10.2	13.3	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	34.5	33.9	33.4	32.3	30.4	27.9	26.2	24.1	22.6	21.6	19.8	18.7	17.1
	Depth =	0.07	0.07	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.23
	Width =	5.3	6.9	8.5	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	49.9	47.1	44.9	41.2	38.8	35.6	33.5	30.8	29.0	27.6	25.4	23.9	21.9
	Depth =	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.15	0.17	0.19	0.22
	Width =	7.4	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	59.6	56.1	53.5	49.1	46.2	42.4	39.9	36.6	34.5	32.9	30.2	28.4	26.1
	Depth =	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.16	0.18	0.21
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	76.1	71.6	68.3	62.7	59.0	54.2	51.0	46.8	44.1	42.0	38.6	36.3	33.4
	Depth =	0.05	0.05	0.05	0.06	0.07	0.08	0.09	0.11	0.12	0.13	0.15	0.17	0.19
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Table 9.23 Escape channel design. Sediment size = 6mm

D_{50} bed sediment size = 6.0mm

Slope : m per km
Depth : m
Bed width : m

Sediment Concentration (ppm)		Discharge (m^3/s): 0.6	0.8	1.0	1.5	2.0	3.0	4.0	6.0	8.0	10.0	15.0	20.0	30.0
300	Slope =	5.30	4.96	4.71	4.29	4.02	3.67	3.43	3.13	2.93	2.79	2.54	2.38	2.18
	Depth =	0.25	0.28	0.30	0.35	0.39	0.46	0.51	0.60	0.67	0.73	0.86	0.96	1.12
	Width =	2.9	3.3	3.7	4.5	5.2	6.3	7.3	8.9	10.3	11.5	14.1	16.2	19.8
400	Slope =	6.00	5.88	5.59	5.10	4.78	4.36	4.08	3.72	3.49	3.32	3.03	2.84	2.59
	Depth =	0.18	0.26	0.28	0.33	0.37	0.43	0.48	0.56	0.63	0.69	0.80	0.90	1.05
	Width =	3.0	3.4	3.8	4.6	5.3	6.5	7.5	9.2	10.5	11.8	14.4	16.5	20.2
600	Slope =	7.13	6.68	6.35	6.00	6.00	5.56	5.21	4.76	4.46	4.24	3.87	3.64	3.37
	Depth =	0.17	0.19	0.20	0.23	0.25	0.40	0.44	0.52	0.58	0.63	0.74	0.82	0.91
	Width =	3.1	3.5	4.0	4.8	5.6	6.7	7.7	9.4	10.9	12.1	14.8	17.2	22.3
800	Slope =	8.48	7.95	7.55	6.89	6.46	6.00	6.00	5.67	5.31	5.05	4.63	4.45	4.26
	Depth =	0.16	0.17	0.19	0.22	0.25	0.28	0.31	0.49	0.54	0.60	0.69	0.71	0.73
	Width =	3.1	3.6	4.0	4.9	5.7	6.9	8.0	9.6	11.1	12.3	15.3	19.6	28.5
1000	Slope =	9.70	9.09	8.64	7.89	7.39	6.75	6.33	6.00	6.00	5.78	5.51	5.35	5.17
	Depth =	0.15	0.16	0.18	0.21	0.23	0.27	0.30	0.35	0.38	0.57	0.58	0.59	0.61
	Width =	3.2	3.7	4.1	5.0	5.8	7.0	8.1	9.9	11.3	12.5	18.1	23.6	34.3
1500	Slope =	12.4	11.6	11.1	10.1	9.46	8.64	8.09	7.33	7.06	6.92	6.71	6.58	6.43
	Depth =	0.13	0.15	0.16	0.19	0.21	0.25	0.28	0.33	0.34	0.35	0.35	0.36	0.37
	Width =	3.3	3.8	4.2	5.1	5.9	7.2	8.3	9.8	12.4	15.3	22.3	29.1	42.3
2000	Slope =	14.8	13.8	13.2	12.0	11.3	10.2	9.60	9.26	9.05	8.92	8.70	8.56	8.33
	Depth =	0.13	0.14	0.15	0.18	0.20	0.24	0.26	0.27	0.27	0.27	0.28	0.29	0.30
	Width =	3.4	3.9	4.3	5.2	6.0	7.0	8.3	12.1	15.9	19.6	28.5	37.1	52.9
3000	Slope =	18.9	17.7	16.8	15.0	14.4	13.9	13.6	13.3	13.1	12.9	12.3	11.6	10.6
	Depth =	0.12	0.13	0.14	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.21	0.24	0.28
	Width =	3.4	4.0	4.4	4.9	6.2	9.0	11.8	17.2	22.4	27.5	37.4	43.2	52.9
4000	Slope =	22.5	20.5	19.6	18.9	18.5	18.0	17.7	17.3	16.8	16.0	14.7	13.8	12.7
	Depth =	0.11	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.17	0.20	0.23	0.26
	Width =	3.5	3.6	4.1	6.0	7.9	11.6	15.1	21.9	27.3	30.5	37.4	43.2	52.9
6000	Slope =	29.0	28.3	27.8	27.1	26.6	26.1	24.8	22.8	21.4	20.4	18.8	17.7	16.2
	Depth =	0.10	0.10	0.10	0.10	0.10	0.11	0.12	0.13	0.15	0.16	0.19	0.21	0.24
	Width =	3.6	4.8	5.9	8.6	11.2	16.3	19.3	23.7	27.3	30.5	37.4	43.2	52.9
8000	Slope =	37.2	36.5	36.0	35.3	34.2	31.4	29.5	27.1	25.5	24.3	22.3	21.0	19.3
	Depth =	0.08	0.08	0.08	0.08	0.08	0.10	0.11	0.13	0.14	0.15	0.18	0.20	0.23
	Width =	4.7	6.1	7.5	10.9	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
10000	Slope =	45.5	44.8	44.3	41.6	39.1	35.9	33.8	31.0	29.2	27.8	25.6	24.1	22.1
	Depth =	0.06	0.07	0.07	0.07	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.19	0.22
	Width =	5.7	7.4	9.1	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
15000	Slope =	64.5	60.7	57.9	53.1	50.0	45.9	43.2	39.6	37.3	35.6	32.7	30.8	28.2
	Depth =	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.16	0.18	0.21
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
20000	Slope =	76.8	72.2	68.9	63.2	59.5	54.6	51.4	47.2	44.4	42.4	38.9	36.6	33.6
	Depth =	0.05	0.05	0.06	0.06	0.07	0.08	0.09	0.11	0.12	0.13	0.15	0.17	0.20
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9
30000	Slope =	98.1	92.3	88.1	80.8	76.1	69.8	65.7	60.3	56.8	54.2	49.7	46.8	43.0
	Depth =	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.14	0.16	0.18
	Width =	7.5	8.6	9.7	11.8	13.7	16.7	19.3	23.7	27.3	30.5	37.4	43.2	52.9

Notes

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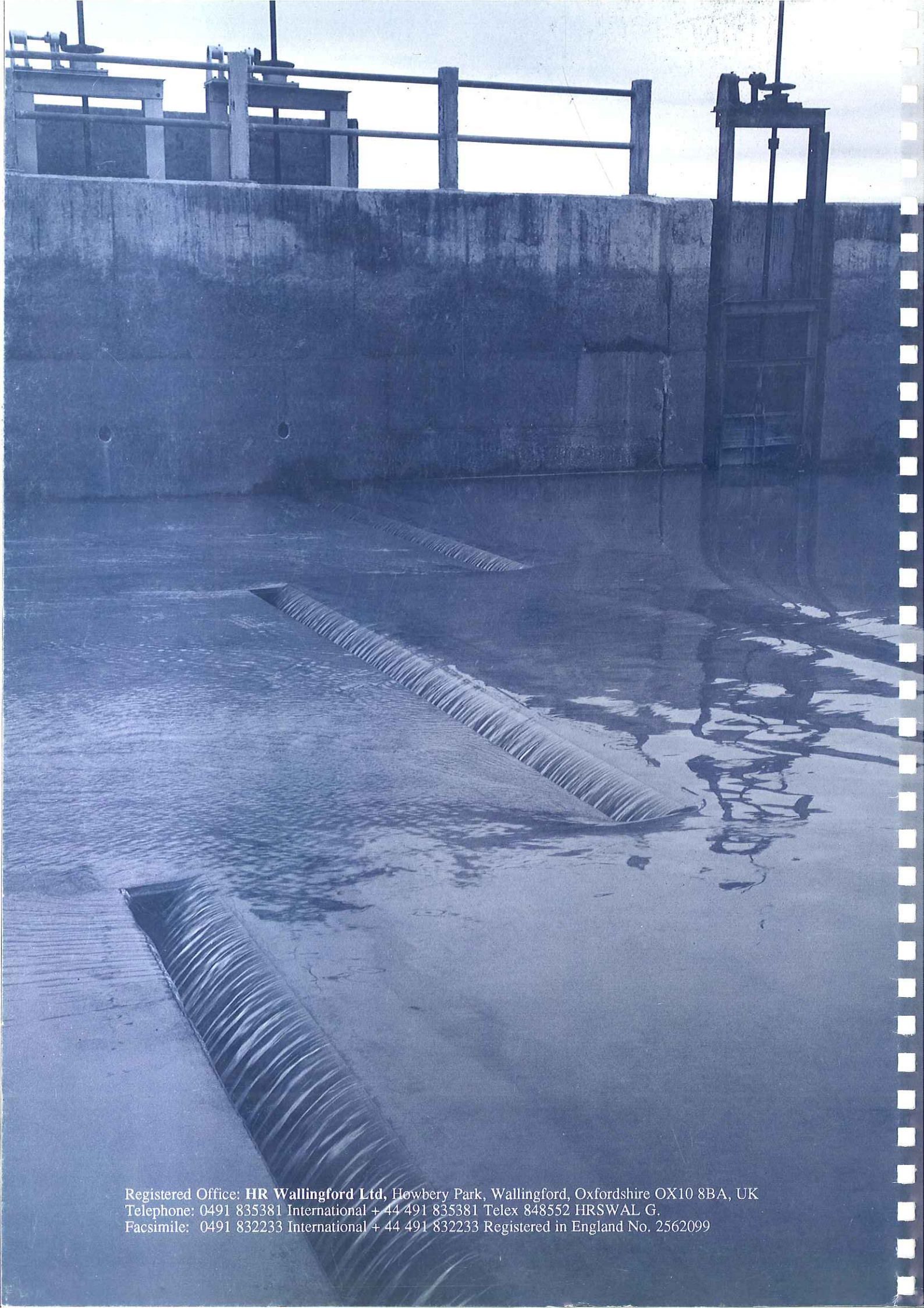

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