

BARNAWARTHA NORTH SOLAR FARM DRAINAGE STRATEGY

ADVERTISED PLAN

PRE-DEVELOPED FLOW

(see catchment plan)

The method of estimation of the stormwater runoff is the rational formula i.e. $Q = C.I.A/360$

A) COEFFICIENT OF RUNOFF

Pre developed flow runoff coefficient 0.30

B) CATCHMENT AREA

CATCHMENT	AREA (ha)
A	12.5
TOTAL	12.5

C) TIME OF CONCENTRATION

TIME OF CONCENTRATION	t (min)
to=	40
ts=	25
tc =	65

D) INTENSITY

Intensity for tc = 65

ARI 1 in	mm/hr
Q ₅	26.1
Q ₁₀	30.2
Q ₂₀	35.5
Q ₅₀	42.8
Q ₁₀₀	48.8

E) PREDEVELOPED FLOWS

ARI	m ³ /s
Q ₅	0.272
Q ₁₀	0.315
Q ₂₀	0.370
Q ₅₀	0.446
Q ₁₀₀	0.508

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BARNAWARTHA NORTH SOLAR FARM DRAINAGE STRATEGY

ADVERTISED PLAN

POST DEVELOPED FLOW

(see catchment plan)

The method of estimation of the stormwater runoff is the rational formula i.e. $Q = C.I.A/360$

A) COEFFICIENT OF RUNOFF

Pre developed flow runoff coefficient

0.45

B) CATCHMENT AREA

CATCHMENT	AREA (ha)
A	12.5
TOTAL	12.5

C) TIME OF CONCENTRATION

TIME OF CONCENTRATION	t (min)
to =	30
ts =	30
tc =	60

D) INTENSITY

Intensity for tc = 60

ARI 1 in	mm/hr
Q ₅	27.5
Q ₁₀	31.9
Q ₂₀	37.5
Q ₅₀	45.3
Q ₁₀₀	51.6

E) POSTDEVELOPED FLOWS

ARI	m ³ /s
Q ₅	0.430
Q ₁₀	0.498
Q ₂₀	0.586
Q ₅₀	0.708
Q ₁₀₀	0.806

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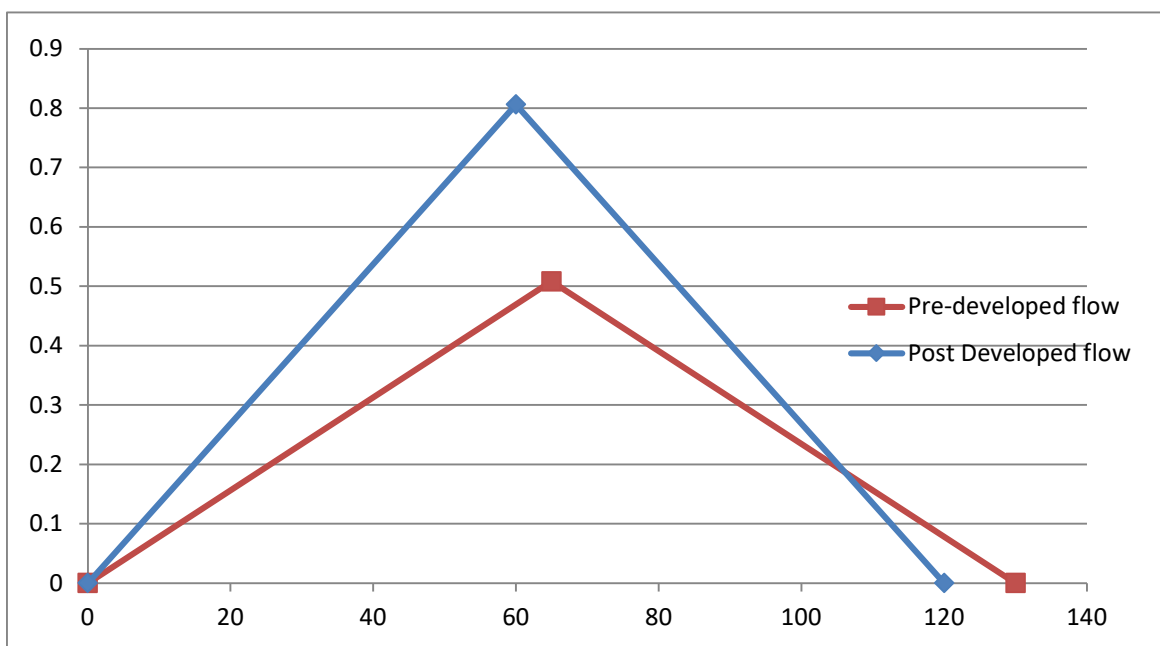
BARNAWARTHA NORTH SOLAR FARM DRAINAGE STRATEGY

RETENTION VOLUME REQUIRED

USING BOYD'S FORMULA

$$S_{MAX} = V_1(1 - Q_p/I_p)$$

	PRE-DEVELOPED FLOW Q_p	POST DEVELOPED FLOW I_p
Q (m3/s)	0.51	0.81
tc (min)	65	60



RETENTION VOLUME REQUIRED IS

1073 m3

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Pre	Q	
t	0	0
	65	0.508333333
	130	0

Post	Q	
t	0	0
	60	0.80625
	120	0

V1 = 2902.5

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Barnawartha - Rainfall Intensity Frequency Duration Table

Storm Duration (min)	Average Recurrence Interval							
	1	2	5	10	20	50	100	200
	Annual Exceedance Probability (%)							
	100	50	20	10	5	2	1	0.5
	Rainfall Intensity (mm/hour)							
5	53.2	70.2	95.6	112.3	134.1	164.3	188.8	214.9
6	49.7	65.6	89.2	104.7	124.9	152.9	175.6	199.8
7	46.8	61.7	83.8	98.3	117.2	143.3	164.6	187.1
8	44.4	58.5	79.4	93.1	110.1	135.6	155.6	176.8
9	42.3	55.7	75.5	88.4	105.1	128.6	147.6	167.7
10	40.4	53.2	72	84.3	100.3	122.5	140.5	159.6
11	38.8	51.1	69.1	80.9	96.2	117.4	134.6	152.8
12	37.3	49.1	66.3	77.6	92.2	112.5	129	146.4
13	36	47.3	63.9	74.7	88.7	108.2	124	140.7
14	34.7	45.7	61.6	72.1	85.6	104.3	119.5	135.6
15	33.6	44.2	59.6	69.6	82.7	100.7	115.4	130.8
16	32.6	42.9	57.7	67.4	80	97.5	111.6	126.5
17	31.7	41.7	56	65.5	77.7	94.6	108.3	122.7
18	30.8	40.4	54.3	63.5	75.3	91.6	104.9	118.8
19	30	39.4	52.9	61.8	73.2	89.1	101.9	115.5
20	29.2	38.4	51.5	60.1	71.2	86.6	99.1	112.2
21	28.5	37.4	50.2	58.6	69.3	84.3	96.5	109.2
22	27.8	36.5	48.9	57.1	67.6	82.2	94	106.4
23	27.2	35.7	47.9	55.8	66.1	80.3	91.9	103.9
24	26.6	34.9	46.7	54.5	64.4	78.3	89.5	101.3
25	26	34.1	45.7	53.2	63	76.5	87.5	98.9
26	25.5	33.4	44.7	52.1	61.6	74.9	85.6	96.8
27	24.9	32.7	43.8	51	60.3	73.2	83.7	94.6
28	24.5	32.1	43	50.1	59.2	71.8	82.1	92.8
29	24	31.6	42.1	49.1	58	70.4	80.4	90.9
30	23.6	31	41.3	48.1	56.9	69	78.8	89.1
31	23.2	30.4	40.6	47.3	55.8	67.8	77.4	87.4
32	22.8	29.9	39.8	46.4	54.8	66.5	75.9	85.7
33	22.4	29.4	39.1	45.6	53.8	65.2	74.5	84.2
34	22	28.9	38.5	44.8	52.9	64.1	73.2	82.7
35	21.7	28.4	37.9	44.1	52	63.1	72	81.3
36	21.3	28	37.3	43.3	51.1	62	70.8	79.9
37	21	27.6	36.7	42.7	50.4	61	69.7	78.6
38	20.7	27.1	36.1	42	49.6	60.1	68.6	77.4
39	20.4	26.7	35.6	41.4	48.8	59.1	67.5	76
40	20.1	26.3	35	40.7	48	58.1	66.3	74.8
41	19.8	26	34.6	40.2	47.4	57.4	65.4	73.8
42	19.6	25.6	34.1	39.6	46.7	56.5	64.5	72.7
43	19.3	25.3	33.6	39	46	55.7	63.5	71.7
44	19.1	25	33.2	38.5	45.4	55	62.7	70.7
45	18.8	24.6	32.7	38	44.8	54.2	61.8	69.7

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46	18.6	24.3	32.3	37.5	44.2	53.4	61	68.7
47	18.3	24	31.9	37	43.6	52.7	60.1	67.8
48	18.1	23.7	31.5	36.6	43.1	52.1	59.4	67
49	17.9	23.4	31.1	36.1	42.5	51.4	58.6	66.1
50	17.7	23.2	30.7	35.7	42	50.8	57.9	65.3
51	17.5	22.9	30.4	35.2	41.5	50.2	57.2	64.5
52	17.3	22.6	30	34.8	41	49.6	56.5	63.7
53	17.1	22.4	29.7	34.5	40.6	49	55.9	63
54	16.9	22.2	29.3	34.1	40.1	48.4	55.2	62.2
55	16.7	21.9	29	33.7	39.6	47.8	54.5	61.4
56	16.6	21.7	28.7	33.3	39.2	47.3	53.9	60.7
57	16.4	21.4	28.4	32.9	38.7	46.8	53.3	60
58	16.2	21.2	28.1	32.6	38.3	46.3	52.7	59.4
59	16	21	27.8	32.2	37.9	45.7	52.1	58.7
60	15.9	20.8	27.5	31.9	37.5	45.3	51.6	58.1
61	15.7	20.6	27.2	31.6	37.1	44.8	51	57.5
62	15.6	20.4	26.9	31.2	36.7	44.3	50.5	56.8
63	15.4	20.2	26.6	30.9	36.3	43.8	49.8	56.1
64	15.3	20	26.3	30.5	35.9	43.3	49.3	55.5
65	15.1	19.8	26.1	30.2	35.5	42.8	48.8	54.9
66	15	19.6	25.8	29.9	35.1	42.4	48.2	54.3
67	14.8	19.4	25.5	29.6	34.8	41.9	47.7	53.7
68	14.7	19.2	25.3	29.3	34.4	41.5	47.2	53.1
69	14.6	19	25.1	29	34.1	41.1	46.8	52.6
70	14.4	18.8	24.8	28.7	33.7	40.7	46.2	52
71	14.3	18.7	24.5	28.4	33.4	40.2	45.7	51.4
72	14.2	18.5	24.3	28.2	33.1	39.9	45.3	51
73	14	18.3	24.1	27.9	32.8	39.5	44.9	50.4
74	13.9	18.2	23.9	27.7	32.4	39.1	44.4	50
75	13.8	18	23.7	27.4	32.2	38.7	44	49.5
76	13.7	17.9	23.5	27.2	31.9	38.4	43.6	49
77	13.6	17.7	23.3	26.9	31.6	38	43.2	48.6
78	13.5	17.6	23.1	26.7	31.3	37.7	42.8	48.1
79	13.3	17.4	22.9	26.5	31	37.4	42.4	47.7
80	13.2	17.3	22.7	26.3	30.8	37	42.1	47.3
81	13.1	17.2	22.5	26	30.5	36.7	41.7	46.8
82	13	17	22.3	25.8	30.2	36.4	41.3	46.4
83	12.9	16.9	22.1	25.6	30	36.1	40.9	46
84	12.8	16.8	21.9	25.4	29.7	35.8	40.6	45.6
85	12.7	16.7	21.7	25.2	29.5	35.5	40.2	45.2
86	12.6	16.5	21.6	25	29.2	35.2	39.9	44.8
87	12.5	16.3	21.4	24.7	29	34.8	39.5	44.4
88	12.4	16.2	21.2	24.6	28.8	34.6	39.2	44.1
89	12.3	16.1	21	24.4	28.5	34.3	38.9	43.7
90	12.3	16	20.9	24.2	28.3	34	38.6	43.3
100	11.4	14.9	19.4	22.5	26.3	31.6	35.7	40.1
110	10.8	14	18.2	21	24.6	29.5	33.3	37.4
120	10.2	13.2	17.1	19.8	23.1	27.7	31.3	35.1
130	9.6	12.6	16.2	18.7	21.8	26.1	29.5	33.1
140	9.2	12	15.4	17.8	20.7	24.8	27.9	31.3

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150	8.8	11.4	14.7	16.9	19.7	23.5	26.5	29.7
160	8.4	10.9	14	16.2	18.8	22.5	25.3	28.3
170	8.1	10.5	13.4	15.5	18	21.5	24.2	27
180	7.8	10.1	12.9	14.9	17.3	20.6	23.2	25.9
200	7.2	9.4	12	13.8	16.1	19.1	21.5	24
220	6.8	8.8	11.2	12.9	15	17.8	20	22.3
240	6.4	8.3	10.6	12.1	14.1	16.7	18.7	20.9
260	6.1	7.9	10	11.5	13.3	15.8	17.7	19.7
280	5.8	7.5	9.5	10.9	12.6	14.9	16.7	18.6
300	5.5	7.2	9	10.4	12	14.2	15.8	17.7
320	5.3	6.9	8.6	9.9	11.5	13.6	15.1	16.9
340	5.1	6.6	8.3	9.5	11	13	14.5	16.1
360	4.9	6.4	8	9.1	10.5	12.4	13.9	15.4
380	4.7	6.1	7.6	8.8	10.1	11.9	13.3	14.8
400	4.6	5.9	7.4	8.5	9.7	11.5	12.8	14.3
420	4.4	5.7	7.1	8.2	9.4	11.1	12.4	13.7
440	4.3	5.6	6.9	7.9	9.1	10.7	11.9	13.3
460	4.2	5.4	6.7	7.7	8.8	10.4	11.6	12.8
480	4.1	5.2	6.5	7.4	8.6	10.1	11.2	12.4
540	3.7	4.8	6	6.9	7.9	9.2	10.3	11.4
600	3.5	4.5	5.6	6.4	7.3	8.6	9.5	10.6
660	3.3	4.2	5.2	6	6.8	8	8.9	9.8
720	3.1	4	4.9	5.6	6.4	7.5	8.3	9.2

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500

0.2

251.9

234.1

219.1

207

196.2

186.6

178.7

171.1

164.4

158.3

15.7

147.7

143.2

138.6

134.7

130.9

127.3

124.1

121.2

118

115.3

112.7

110.2

108

105.8

103.7

101.8

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97.9

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90

88.5

87

85.8

84.5

83.3

82.2

80.9

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36

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34.1
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