Date: **10/3/2016**

Catchment Information

Pre-development Catchment and Stream Properties

Reach	Overland			Natural Stream			
	Lo (m)	n*	So (%)	Ld (m)	n	Sd (m/m)	R (m)
AB	150.0	0.0275	3.00	134.0	0.035	0.011	0.32
AC	156.0	0.0275	2.00	189.0	0.035	0.049	0.32
AD	180.0	0.0275	3.00	156.0	0.035	0.053	0.32

Post-development Catchment and Chennel Properties

Reach	Overland			Natural Stream			
	Lo (m)	n*	So (%)	Ld (m)	n	Sd (m/m)	R (m)
AB	12.194	0.045	2.50	490.0	0.015	0.009	0.218
AC	12.194	0.045	2.50	356.0	0.015	0.024	0.225
AD	12.194	0.045	2.50	287.0	0.015	0.026	0.231

PRE-DEVELOPMENT		AB	AC	AD
Height of Drain (m)-D	=	0.60	0.60	0.60
Width of Drain (m)-B	=	0.900	0.900	0.900
Slide Slope, Z	=	0.5	0.5	0.5
Area of Drain (m^2)-A	=	0.720	0.720	0.720
Perimeter of Drain (m)-P	=	2.24	2.24	2.24

POST-DEVELOPMENT		AB	AC	AD
Height of Drain (m)-D	=	0.80	0.90	1.00
Width of Drain (m)-B	=	0.600	0.600	0.600
Slide Slope, Z	=	0	0	0
Area of Drain (m^2)-A	=	0.480	0.540	0.600
Perimeter of Drain (m)-P	=	2.20	2.40	2.60

Computer the Pre-Development Time of Concentration, tc

Calculate to & td :

$$to = \frac{107 \times n \times Lo^{(1/3)}}{So^{(1/5)}} \qquad td = \frac{n \times Ld}{60 \times R^{(2/3)} \times Sd^{(1/2)}}$$

Reach AB:-			Reach AC:-			Reach AD:-		
to =	12.6	minutes	to =	13.8	minutes	to =	13.3	minutes
td =	1.6	minutes	td =	1.1	minutes	td =	0.8	minutes
tc=to + td =	14.1	minutes	tc=to + td =	14.9	minutes	tc=to + td =	14.2	minutes

Thus, the pre-development tc = **14.9** minutes (the longest)

Computer the Post-Development Time of Concentration, tc

Reach AB:-			Reach AC:-			Reach AD:-		
to =	9.2	minutes	to =	9.2	minutes	to =	9.2	minutes
td =	3.6	minutes	td =	1.6	minutes	td =	1.2	minutes
tc=to + td =	12.8	minutes	tc=to + td =	10.8	minutes	tc=to + td =	10.4	minutes

Thus, the post-development tc = **12.8** minutes (the longest)

tc (pre) - tc (post) = **2.1** minutes (tc (post) is shorter than tc (pre)

Computer the rainfall intensity, i

The nearest rainfall station is STATION ID= SG SIMPANG AMPAT 5504035

Table 2.B1

λ	κ	Θ	η
62.089	0.22	0.402	0.785

Determine the pond outflow limits

Condition	Cpost	Cpre
ARI<10 yr	0.90	0.40
ARI>10 yr	0.95	0.50

CHECKING FOR THE PRE-DEVELOPMENT DISCHARGE

~ Pre-development Discharge

ARI (year)	Storm duration, d (in term of tc)	d (min)	i (mm/hr) (fig. AX3.8.1)	Cpre	A (ha)	Qpre (m3/s)
10	tc	14.9	135.00	0.40	2.12	0.32
50	tc	14.9	190.00	0.50	2.12	0.56
100	tc	14.9	210.00	0.50	2.12	0.62

The pre-development flows for ARI 10, 50, 100 are 0.32 m3/s, 0.56 m3/s and 0.62 m3/s.

Based on the On Site Detention Calculation attahced, the Permissible Site Discharge for all the ARI is 0.1198m3/s.

Checking Proposed systems of stormwater management to post development peak flow ARI at outlet.

ARI	Pre-Discahrge flow, m^3/s	Post-Peak Flow, m^3/s	Percentage, %
10	0.32	0.1198	-62.33
50	0.56	0.1198	-78.59
100	0.62	0.1198	-80.63