EVALUATION OF DRAINAGE CHANNELS ON PABUARAN ROAD CIBINONG DISTRICT OF BOGOR REGENCY

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ABSTRACT

Drainage can be generally defined as a technical measure to reduce excess water, whether from rain, seepage, or excess irrigation water from an area / land, so that the function of the area / land is not disturbed. This study aims to analyze, assess and evaluate the condition and capacity of the channel in the sub-district Pabuaran Road Bogor Cibinong District to discharge the flooding. Data and information used is primary data in the form of rainfall data from the Meteorology and Geophysics from the nearest irrigation hall as well as secondary data, the authors survey directly at the sites. In the flood discharge processing method using two methods of hydrograph Unit hydrograph Unit Synthetic Synthetic Nakayasu and ITB. The results of both methods is used the largest flood discharge. Getting the design flood discharge using Synthetic Unit Hydrograph ITB on Channel A of 6,434 m³ / sec. Analysis of the results of the calculation of the existing discharge chute, the discharge contained on Channel A of 2.10 m³ / sec and Channel B amounting to 0.21 m³ / sec limpas both channels experience. Alternative solutions to the problems that limpas channel or unsafe they are planning a new dimension channel.

Keywords: Drainage, Hydrology Analysis, Debit Flood Plan, ITB HSS, HSS Nakayasu

INTRODUCTION

Drainage is one of the basic facilities that are designed as a system to meet the needs of society and is an important component in urban planning (infrastructure planning in particular). Drainage is also interpreted as a way of disposal of unwanted excess water in an area, as well as ways alleviation consequences caused by excess water (1) (1. At the time of heavy rains Cibinong subdistrict, there are many locations that flood the roads by the water. As it happens precisely at Jalan Pabuaran area Pabuaran there are puddles caused by malfunction of the drainage channel with optimal because the clogged drainage channels and also does not function properly. According Suripin (2) in his book entitled Sustainable Urban Drainage System, drainage has the meaning drain, drain, remove, or diverting water. In general, the drainage water is defined as a series of buildings which serves to reduce or remove the excess water out of an area or land, so the land can function optimally.

Identification of the problem of the small dimension of the channel or not well ordered resulted not able to drain rainwater during heavy rainfall. Overflow of water during the rains, resulting in a puddle on a certain plateau as in Jl.Pabuaran.Terjadinya blockage of drainage channels due to siltation. The purpose of this study is Knowing the value of discharge runoff in drainage channels already ada. Mengevaluasi existing drainage channels to accommodate and drain discharge planning runoff. Mengetahui whether or not a new drainage channel dimensions in Pabuaran road.

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METHODOLOGY

Research The method of this research with case study approach, where the method used is descriptive quantitative and analytical aims to evaluate the condition of a given period as a basis for planning for the future based on the data collected, based on analysis of theoretical and empirical then pulled conclusion of results analysis that has been done.

Hydrological survey conducted to obtain data on hydrology, where the data relate to employment or hydrological analysis is used as a reference in planning capacity of drainage on Jalan Pabuaran Cibinong excl. The hydrological data needed to analyze hydrological, among others:

2.1 hydrological analysis

Hydrological data analysis to rainfall, there are several stages to achieve an optimal result. Before the stage of the analysis is done, firstly necessary supporting data that can help the process of analysis.

a. Rainfall intensity

The intensity of rainfall is the large amount of rain which is expressed in high rainfall or rainfall volume per unit time. The rainfall varies, depending on the duration and frequency of rainfall data processing it happened. For Rainfall intensity Rainfall be used statistical method of observation data duration of rainfall that occurred. If the data for each of rainfall data does not exist, it is necessary to empirically approach the maximum daily rainfall that occur each year.

b. Frequency analysis

Frequency analysis is a term that refers to the technique of analyzing the probability of occurrence of hydrological variables in the statistical scope (Ponce, 1989). This analysis is needed to determine the return period flood discharge with a specific plan. Of rainfall on average obtained from various stati

ons in the watershed is analyzed statistically to obtain the distribution pattern of rainfall data in accordance with the distribution pattern of rainfall data on average In fact that not all variants of a variable hydrological located or equal to the average value. Variation or dispersion is the high degree of leverage variance around the average value. How to measure the magnitude of dispersion is called dispersion measurement.

c. Analysis of flood discharge

To calculate how much of the maximum flood discharge that occurred on the road Pabuaran can use some methods, the scientific paper, the author uses two methods to determine the maximum flood discharge, which is a synthetic unit hydrograph Nakayasu and synthetic unit hydrograph ITB.

2.2 Analysis Hydraulics

Hydraulics is the study of the properties of liquids and examinations to obtain the formulas and laws liquid in equilibrium (stationary) and in motion. Hydraulics analysis sought to determine the flow capacity of the channel on the current condition of the flood plan from the previous studies and observations obtained. Hydraulics analysis performed on all channels to obtain the desired channel dimensions, namely the water level along the flow channel being reviewed.

a. Existing Drainage Channel Capacity Calculations

From the analysis of rainfall data processing calculations that have been obtained and are known in the maximum flood discharge Pabuaran way, we then analyzed the volume calculation on drainage channels in accordance with the hydrological data that has been obtained.

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b. *New Drainage Channel Capacity Calculations*

From the analysis of rainfall data processing calculations that have been obtained and are known in the maximum flood discharge Pabuaran way, we then do a comparison analysis of the calculation of the volume of existing drainage channels with the calculation of a new drainage channel in accordance with the hydrological data that has been obtained.

RESULTS AND DISCUSSION

The calculation below is the discharge of rain water during the 5 years is as follows:

3.1 *hydrological analysis*

a. *Rainfall intensity*

$$I = \left(\frac{129.59}{24} \right) \cdot \left(\frac{24}{1} \right)^{\frac{2}{3}} = 44.93 \text{ mm/jam}$$

Table 1 Maximum Daily Rainfall Data / year (mm / day)

	R2	R5	R10	R25	R50	R100
	112,16	129,59	140,55	153,90	163,66	173,20
1	38,88	44,93	48,73	53,35	56,74	60,04
2	24,50	28,30	30,70	33,61	35,74	37,83
3	18,69	21,60	23,43	25,65	27,28	28,87
4	15,43	17,83	19,34	21,17	22,52	23,83
5	13,30	15,36	16,66	18,25	19,40	20,54
6	11,78	13,61	14,76	16,16	17,18	18,18
7	10,63	12,28	13,32	14,58	15,50	16,41
8	9,72	11,23	12,18	13,34	14,18	15,01
9	8,99	10,38	11,26	12,33	13,11	13,88
10	8,38	9,68	10,50	11,49	12,22	12,94
11	7,86	9,08	9,85	10,79	11,47	12,14
12	7,42	8,57	9,30	10,18	10,82	11,46
13	7,03	8,13	8,81	9,65	10,26	10,86
14	6,69	7,73	8,39	9,18	9,77	10,34
15	6,39	7,39	8,01	8,77	9,33	9,87
16	6,12	7,08	7,67	8,40	8,94	9,46
17	5,88	6,80	7,37	8,07	8,58	9,08
18	5,66	6,54	7,09	7,77	8,26	8,74
19	5,46	6,31	6,84	7,49	7,97	8,43
20	5,28	6,10	6,61	7,24	7,70	8,15
21	5,11	5,90	6,40	7,01	7,45	7,89
22	4,95	5,72	6,21	6,80	7,23	7,65
23	4,81	5,56	6,02	6,60	7,02	7,42
24	4,67	5,40	5,86	6,41	6,82	7,22

Source: http://dataonline.bmkg.go.id/data_iklim on

b. *frequency analysis*

Following the calculation of the probability distribution of rainfall with Log Person III.

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Table 2 Distribution Selection Parameters

Distribution Type	Criteria	Score	Information
Normal	Cs=0	0,8573	not fulfilled
	Cv=3	0,1945	not fulfilled
Log Normal	Cs=3Cv+Cv ³ = 0.1412	0,3440	not fulfilled
	Ck = Cv ⁸ + 6Cv ⁶ + 15Cv ⁴ + 16Cv ² + 3	4,6195	not fulfilled
Gumbel	Cs = 1,14	0,8573	not fulfilled
	Ck = 5,40	5,5010	not fulfilled
Log Pearson Type III	Cs≠0	0,3440	fulfilled
	Atau selain nilai diatas	0,0348	fulfilled

Source: Analysis Calculation

c. Analysis of flood discharge

Analysis of Flood Discharge hydrograph Unit Plan with Nakayasu and ITB Unit hydrograph Nakayasu.

1. Unit hydrograph equation Nakayasu

$$Qp = \frac{c \cdot A \cdot Ro}{3,6(0.3Tp + T_{0.3})}$$

Rainwater flow calculations using formulas Hidrogran Nakayasu unit, the following is a calculation of rain water flow rate for channels A, is as follows:

Parameters - parameters required in the calculation as follows:

A channel characteristics include:

Luas Line (A total) = 0.33679 km²
Channel Length (L) = 0.42567 km

A channel characteristic coefficient (α) = 2

Netto rain Unit (Ro) = 1 mm / hour

Hydrograph parameters include:

Time concentration (Tg) = 0,4 + 0,058L
= 0.4 + 0.058. 0.42567
= 0.425 hours

Rain Length Standard (Tr) = 0.75 Tg
= 0.75 x 0.425
= 0.319 hours

T 0.3 = A x Tg
= 2 x 0.425
= 0.849 hours

Concentration time (Tp) = Tg + 0.8 Tr
= 0.425 + 0.8 x 0.319
= 0.680 hour

The peak discharge (Qp)

$$Qp = \frac{c \cdot A \cdot Ro}{3,6(0.3Tp + T_{0.3})} = \frac{1 \cdot 0.33679 \cdot 1}{3,6(0.3 \cdot 0.680 + 0.849)} = 0.089 \text{ m}^3/\text{det}$$

Basic flow (Qb)

$$Qb = 0.475 \times A \cdot 6444 \times D \cdot 9435$$

$$Qb = 0.475 \times 0.336790,6444 \times 0.42567 / 0.336790,9435$$

$$Qb = 0.0294 \text{ m}^3 / \text{s}$$

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Synthetic unit hydrograph curve equation is:

- a. Curved section of the rise for $0 \leq t \leq T_p$

$$Q_{\alpha} = Q_p = \left[\frac{t}{T_p} \right]^{2.4}$$

t (h)	Q (m ³ / s)
0	0,000
0.2	0,005
0.4	0,025
.680	0.089

- b. Curved section down

1. To $Q_d > Q_p$ 0.3 to $T_p \leq t \leq T_p + T_{0,3}$

$$Q_p = Q_p \cdot 0.3 \left(\frac{t - T_p}{T_{0,3}} \right)$$

t (h)	Q (m ³ / s)
1	0.056
1.2	0,042
1.4	0,032
1,529	0,027

2. To $0.3 Q_p > Q_d > 0.32 Q_p$ to $T_{0,3} \leq t \leq T_p + 1.5 + T_{0,3}$

$$Q_p = Q_p \cdot 0.3 \left(\frac{(t - T_p) + (0.5 - T_{0,3})}{1.5 T_{0,3}} \right)$$

t (h)	Q (m ³ / s)
2	.0171
2.2	.0141
2.4	.0117
2.6	.0097
2.8	.0080
2.802946476	.0080

3. To $0.32 Q_p > Q_d$ for $t \geq T_p + 1.5 + T_{0,3}$

$$Q_p = Q_p \cdot 0.3 \left(\frac{(t - T_p) + (0.5 - T_{0,3})}{2 T_{0,3}} \right)$$

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t (h)	Q (m3 / s)
3	0.006952
4	0.003422
5	0.001685
6	0.000829
7	0.000408
8	0.000201
9	0.000099
10	0.000049
11	0.000024
12	0.000012
13	0.000006
14	0.000003
15	0.000001
16	0.000001
17	0.000000
18	0.000000
19	0.000000
20	0.000000
21	0.000000
22	0.000000
23	0.000000
24	0.000000

Debit recapitulation Nakayasu flood hydrograph Plan:

Table 3 Recapitulation Debit flood hydrograph Plan Nakayasu

t (h)	Q (m3 / s)	Debit magnitude of each period (m3 / s)					
		R2	R5	R10	R25	R50	R100
0	0,000	.294	.294	.294	.294	.294	.294
0.2	0,005	0.529	.566	.589	0.617	.637	0.657
0.4	0,025	1,596	1,799	1,926	2,081	2,194	2,305
.680	0.089	5.087	5.832	6,301	6.871	7.288	7.696
1	0.056	4.516	5.173	5.585	6.088	6.455	6.814
1.2	0,042	4,158	4.759	5,136	5.596	5.932	6.261
1.4	0,032	3.746	4.283	4,620	5.031	5,331	5.625
1,529	0,027	3.374	3,852	4.153	4.519	4.787	5,050
2	0,017	2.433	2,765	2,974	3,229	3.415	3,597
2.2	0,014	1.953	2.211	2,373	2,570	2.714	2,856
2.4	0,012	1,604	1,807	1.935	2,091	2.205	2.316
2.6	0,010	1,343	1.506	1.609	1,733	1,825	1,914
2.8	0,008	1,132	1,262	1,344	1,444	1,517	1,588
2,803	0,008	1.055	1.174	1,248	1.339	1.405	1,470
3	0.007	0.958	1,062	1.127	1.206	1,264	1,320
4	0,003	0.744	.814	0.858	0.912	0.951	0,990
5	0,002	0.592	.639	0.668	0,703	0,729	0.755
6	0,001	.487	0,517	.536	0,559	0.576	0.593
7	0,000	0,407	0,425	0.436	.450	.460	0.469

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t (h)	Q (m3 / s)	Debit magnitude of each period (m3 / s)					
		R2	R5	R10	R25	R50	R100
8	0,000	.350	0.358	0.364	.371	0,375	.380
9	0,000	0.321	.326	0.328	0.332	0.334	.336
10	0,000	0.307	.309	0,311	0,312	0.314	0.315
11	0,000	0.301	0,302	0,302	0,303	0.304	0.304
12	0,000	0.297	.298	.298	.298	0,299	0,299
13	0,000	0.295	0,296	0,296	0,296	0,296	0,296
14	0,000	0.295	0.295	0.295	0.295	0.295	0.295
15	0,000	.294	.294	.294	.294	.294	.294
16	0,000	.294	.294	.294	.294	.294	.294
17	0,000	.294	.294	.294	.294	.294	.294
18	0,000	.294	.294	.294	.294	.294	.294
19	0,000	.294	.294	.294	.294	.294	.294
20	0,000	.294	.294	.294	.294	.294	.294
21	0,000	.294	.294	.294	.294	.294	.294
22	0,000	.294	.294	.294	.294	.294	.294
23	0,000	.294	.294	.294	.294	.294	.294
24	0,000	.294	.294	.294	.294	.294	.294

Source: Analysis Calculation

Figure 1 Debit flood hydrograph Unit Synthetic Methods Nakayasu

Source: Analysis Calculation

2. Hydrograph equation ITB unit

1. Synthetic Unit Hydrograph equation ITB

$$Q_p = \frac{R}{3.6T_p} \frac{A_{DAS}}{A_{HSS}}$$

2. Parameters - parameters required in the calculation as follows:

Watershed characteristics include:

Size Channel 7 (A total) = 0.33679 km

Channel Length (L) = 0.42567 km

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High Effective Precipitation (R) = 1mm / hr
Duration of rainfall unit (Tr) = 1 hour
The coefficient of time (Ct) = 1
Run Off coefficient (Cp) = 1
Alpha = 1
Size AhSS = 1,121

Hydrograph parameters include:

TL = $Ct \times 0.18225 \times L^{0.6}$
= $1 \times 0.18225 \times 0.425670,6$
= 0.109172 hours
Concentration time (Tp) = TL + 0.5 Tr
= 0.109172 + 0.5 x 1
= 0.609172 hours

The peak discharge (Qp)

$$Q_p = \frac{R}{3.6T_p} \frac{A_{DAS}}{A_{HSS}} = \frac{1}{3.6 \times 0.609172} \frac{0.33679}{1.121} = 0.137$$

Basic flow (Qb)

$$Q_b = 0.475 \times A^{.6444} \times D^{.9435}$$

$$Q_b = 0.475 \times 0.33679^{.6444} \times 0.42567^{.9435}$$

$$Q_b = 0.0294 \text{ m}^3 / \text{sec}$$

3. Synthetic Unit hydrograph flood discharge ITB:

Table 4 Debit flood hydrograph Synthetic ITB

T (h)	t	Q	A	Q
	T / Tp	Q / Qp		
0	0,000	0.0000	0,000	0,000
1	1,642	.7782	.6388	.1066
2	3.283	.2044	.3355	.0280
3	4.925	.0438	.1079	0.0060
4	6.566	.0089	.0293	0.0012
5	8.208	0.0018	.0073	0.0002
6	9.849	0.0004	0.0017	0.0000
7	11.491	0.0001	0.0004	0.0000
8	13.133	0.0000	0.0001	0.0000
9	14.774	0.0000	0.0000	0.0000
10	16.416	0.0000	0.0000	0.0000
11	18.057	0.0000	0.0000	0.0000
12	19.699	0.0000	0.0000	0.0000
13	21.340	0.0000	0.0000	0.0000

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14	22,982	0.0000	0.0000	0.0000
15	24.624	0.0000	0.0000	0.0000
16	26.265	0.0000	0.0000	0.0000
17	27.907	0.0000	0.0000	0.0000
18	29.548	0.0000	0.0000	0.0000
19	31.190	2,0E-13	0.0000	0.0000
20	32.831	4,0E-14	0.0000	5,4E-15
21	34.473	7,7E-15	0.0000	1,1E-15
22	36.115	1,5E-15	2,6844E-14	2,0E-16
23	37.756	2,9E-16	5,44189E-15	3,9E-17
24	39.398	5,6E-17	1,101E-15	7,7E-18

Source: Analysis Calculation

Recapitulation of the flood discharge plan Synthetic Unit Hydrograph ITB:

Table 5 Recapitulation Debit flood hydrograph Plan Synthetic ITB

t (h)	Q (m ³ / s)	Debit magnitude of each period (m ³ / s)					
		R2	R5	R10	R25	R50	R100
0	0,000	0,000	0,000	0,000	0,000	0,000	0,000
1	0.107	5.608	6.434	6.954	7.586	8.048	8.501
2	0,028	3,071	3.503	3,774	4,104	4.346	4.582
3	0,006	1,925	2,178	2,338	2,532	2,674	2.812
4	0,001	1,458	1,639	1,753	1.892	1,993	2,092
5	0,000	1,230	1,376	1,468	1,579	1,660	1,740
6	0,000	0.525	.561	.584	0.611	.631	0.651
7	0,000	0.343	.350	0.355	0.361	0,365	.369
8	0,000	0.304	0,305	0.306	0.307	0,308	.309
9	0,000	0,296	0,296	0,296	0.297	0.297	0.297
10	0,000	.294	.294	.294	.294	.294	.294
11	0,000	.294	.294	.294	.294	.294	.294
12	0,000	.294	.294	.294	.294	.294	.294
13	0,000	.294	.294	.294	.294	.294	.294
14	0,000	.294	.294	.294	.294	.294	.294
15	0,000	.294	.294	.294	.294	.294	.294
16	0,000	.294	.294	.294	.294	.294	.294
17	0,000	.294	.294	.294	.294	.294	.294
18	0,000	.294	.294	.294	.294	.294	.294
19	0,000	.294	.294	.294	.294	.294	.294
20	0.0000	.294	.294	.294	.294	.294	.294
21	1,05E-15	.294	.294	.294	.294	.294	.294
22	2,04E-16	.294	.294	.294	.294	.294	.294
23	3,95E-17	.294	.294	.294	.294	.294	.294
24	7,66E-18	.294	.294	.294	.294	.294	.294

Source: Analysis Calculation

DEBIT BANJIR HIDROGRAF SATUAN SINTETIK METODE ITB

Figure 2 Chart Debit flood hydrograph Unit Synthetic ITB
Source: Analysis Calculation

Recapitulation Debit flood hydrograph Plan Synthetic ITB

Periode T tahun	Debit Maksimum (m3/det)	
	Nakayasu	ITB
2	5,087	5,608
5	5,832	6,434
10	6,301	6,954
25	6,871	7,586
50	7,288	8,048
100	7,696	8,501

Source: Analysis Calculation

3.2 analysis Hydraulics

a. Dimension calculation Existing Channels

Here is the calculation for the channel A.

$$b = 0,92 \text{ m}$$

$$h = 0,65 \text{ m}$$

$$S = 0.014$$

Cross-sectional area (A):

$$A = b \times h$$

$$A = 0,92 \times 0,65 = 0,598 \text{ m}^2$$

Wet circumference (P)

$$P = b + 2 \cdot h$$

$$P = 0,92 + (2 \times 0,65) = 2.22 \text{ m}$$

Finger - the finger hydraulic (R):

$$R = \frac{A}{P}$$

$$R = \frac{0,598}{2.22} = 0,269 \text{ m}$$

The flow velocity (V);

$$n = 0,014$$

$$V = \frac{1}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$$

$$V = \frac{1}{0,014} 0,269^{\frac{2}{3}} \cdot 0,014^{\frac{1}{2}} = 3,51 \text{ m/dt}$$

$$Q_{sal} = A \times V = 0,598 \times 3,51 = 2,1 \text{ m}^3/\text{dt}$$

If $Q_{plan} < Q_{channel}$, So the drainage channel able to accommodate the flow of flood discharge, and declared safe. For channel B measures the same calculation as channel A.

Table 6 Calculation Existing Channel Dimensions

No.	b	h	S	A	P	R	n	V	Qsal	Qaliran	keterangan
Saluran	(m)	(m)		(m ²)	(m)	(m)		(m/dt)	(m ³ /det)	(m ³ /det)	
A	0,92	0,65	0,014	0,60	2,22	0,27	0,014	3,51	2,10	6,434	Limpas
B	0,43	0,25	0,014	0,11	0,93	0,12	0,014	1,99	0,21	6,434	Limpas

Source: Analysis Calculation

Existing Channels Figure 3 Dimensions

Source: Analysis Calculation

b. Calculations Dimension New Channel

Calculations are based on the discharge channel dimensions that must be accommodated by the channel (Q_s in m^3/s) greater than or equal to the discharge plan caused by rain plan (Q_T in m^3/s). Such conditions can be formulated by the following equation: $Q_s \geq Q_T$. Next will be the calculation of a new dimension to insecure channels, to determine the dimensions of the safe. Determination of the drainage channel dimensions done by trial and error or trial and error.

Information :

A = wet cross-sectional area (m²)

P = circumference of wet flow (m)

R = hydraulic radius (m)

V = flow velocity (m / sec)

W = high surveillance (m)

b = width of the base line (m)

y = high water level (m)

H = height of the channel (m)

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n = roughness manning

S = slope of the channel base

calculation:

Cross-sectional area (A):

$$A = b \times h$$

$$A = 1.3 \times 1.00 = 1.30 \text{ m}^2$$

Wet circumference (P)

$$P = b + 2 \cdot h$$

$$P = 1.3 + (2 \times 1) = 2.8 \text{ m}$$

Finger - the finger hydraulic (R):

$$R = \frac{A}{P}$$

$$R = \frac{1.3}{2.8} = 0.46 \text{ m}$$

The flow velocity (V);

$$n = 0.014$$

$$V = \frac{1}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$$

$$V = \frac{1}{0.014} 0.46^{\frac{2}{3}} \cdot 0.014^{\frac{1}{2}} = 5.05 \text{ m/dt}$$

Calculation of discharge channel plans (Q) located in the area around Jl Pabuaran Cibinong District of Bogor Regency can be calculated using the following formula:

controls:

$$Q_{\text{sal}} = A \times V = 1.30 \cdot 5.05 = 6.57 \text{ m}^3/\text{dt}$$

Table 7 Debit Relationship with surveillance channel High Wasters

debit Flood	High dike surveillance	High surveillance Couples
(M^3 / sec)	(M)	(M)
<0,50	0.4	0.2
0.50 to 1.50	0.5	0.20
1.50 to 5.00	0.6	0.25
5.00 to 10.00	0.75	0.30
10.00 to 15.00	0.85	0.40
> 15.00	1.00	0.50

source: Planning Criteria Section Channel KP-03, Standard

Based on the results of calculating the dimensions of the drainage channel with a channel cross-sectional area 1.30 m^2 wet so that the maximum discharge usually accommodated by drainage channels designed is $6.57 \text{ m}^3 / \text{s}$. Based on the above calculation, then used a method ITB in 5-year return period was $6,434 \text{ m}^3 / \text{s}$. Thus these dimensions can be used for drainage channels. (Sustainable Urban Drainage Systems Dr. Ir. Suripin, M.Eng)

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Dimension Calculation Table 8 New Channel

No.	b	h	S	A	P	R	n	V	Qsal	Qaliran	information
Channel	(M)	(M)		(M ²)	(M)	(M)		(M / sec)	(M ³ / s)	(M ³ / s)	
A	1.3	1	0,014	1.30	2.80	0.46	0014	5,05	6.57	6.434	secure
B	1.3	1	0,014	1.30	2.80	0.46	0014	5,05	6.57	6.434	secure

Source: Analysis Calculation

Figure 4 Dimensions New Channel

Source: Analysis Calculation

CONCLUSION

From the results of research and testing results are as follows:

1. The amount of rainfall in the study site plan for the 5 year return period based on the analysis of Gumbel method amounted to 135.16 mm / hour.
2. A channel capacity of the existing capacity for discharge by 2:10 m³ / sec. The capacity of the existing and B channels can accommodate the discharge of 0:21 m³ / sec
3. 5 year plan flood discharge in Channel A Jalan Pabuaran is 6,434 m³ / sec, while the 5 year plan of flood discharge in Channel B Street Pabuaran is 1,651 m³ / sec
4. The capacity of the existing channels can not accommodate the flood discharge plan. Then it will be normalized, or planning a new channel dimensions.
5. Dimensional channel A beginning sized Width B = 0.92 m height H = 0.86 m and height of water level h = 0.65 after checking the capacity to accommodate discharge plan then channel A must do change the dimension to width B = 1.3 m height H = 1.3 m and water level h = 1 m.

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