

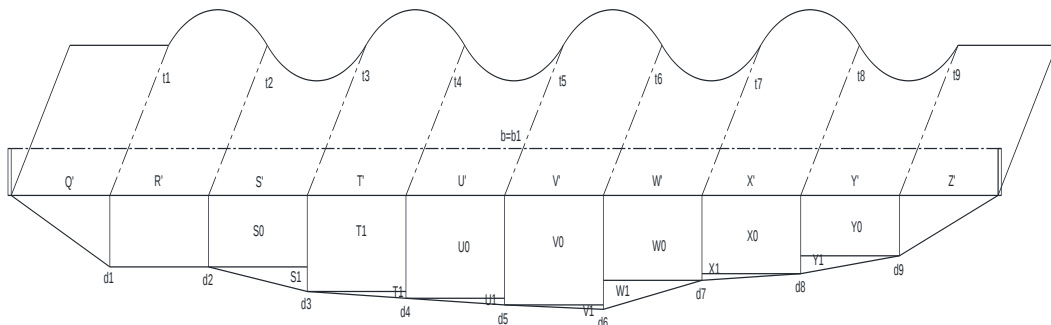
LAMPIRAN

1. Data Primer

a) Sungai Maros



Gambar L.1 Dokumentasi pengambilan data primer sungai Maros



Gambar L.2 Potongan penampang sungai Maros
(Sumber: Software Autodesk AutoCAD)

Tabel L.1 Data pengukuran kecepatan arus permukaan sungai Maros

Bola Tenis (Sampel 1)					Rata-rata
Kecepatan (detik)				Rata-rata	
t1a	18	t1b	17	17.5	7.85
t2a	10	t2b	10	10	
t3a	8	t3b	9	8.5	
t4a	7	t4b	6	6.5	
t5a	5	t5b	6	5.5	
t6a	6	t6b	7	6.5	
t7a	8	t7b	8	8	
t8a	7	t8b	6	6.5	
t9a	10	t9b	9	9.5	
Bola Plastik (Sampel 2)					Rata-rata
Kecepatan (detik)				Rata-rata	
t1a	16	t1b	14	15	7.55
t2a	10	t2b	9	9.5	
t3a	8	t3b	8	8	
t4a	7	t4b	6	6.5	
t5a	6	t5b	6	6	
t6a	7	t6b	7	7	
t7a	7	t7b	6	6.5	
t8a	7	t8b	8	7.5	
t9a	9	t9b	10	9.5	
Rata-rata Sampel 1+2				7.7	

(Sumber: Hasil pengukuran langsung)

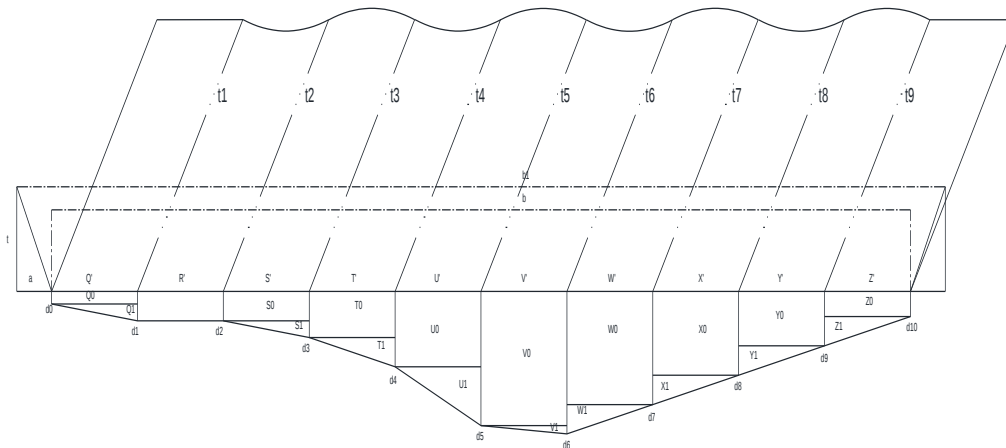
Tabel L.2 *Data pengukuran kedalaman sungai Maros*

Kedalaman Sungai (m)			
d1	3.2	d5	4.9
d2	3.2	d6	5.1
d3	4.3	d7	3.8
d4	4.6	d8	3.5
		d9	2.7

(Sumber: Hasil pengukuran langsung)

b) Sungai Tomalia

**Gambar L.3** *Dokumentasi pengambilan data primer sungai Tomalia*

Gambar L.4 Potongan Penampang sungai Tomalia

(Sumber: Software Autodesk AutoCAD)

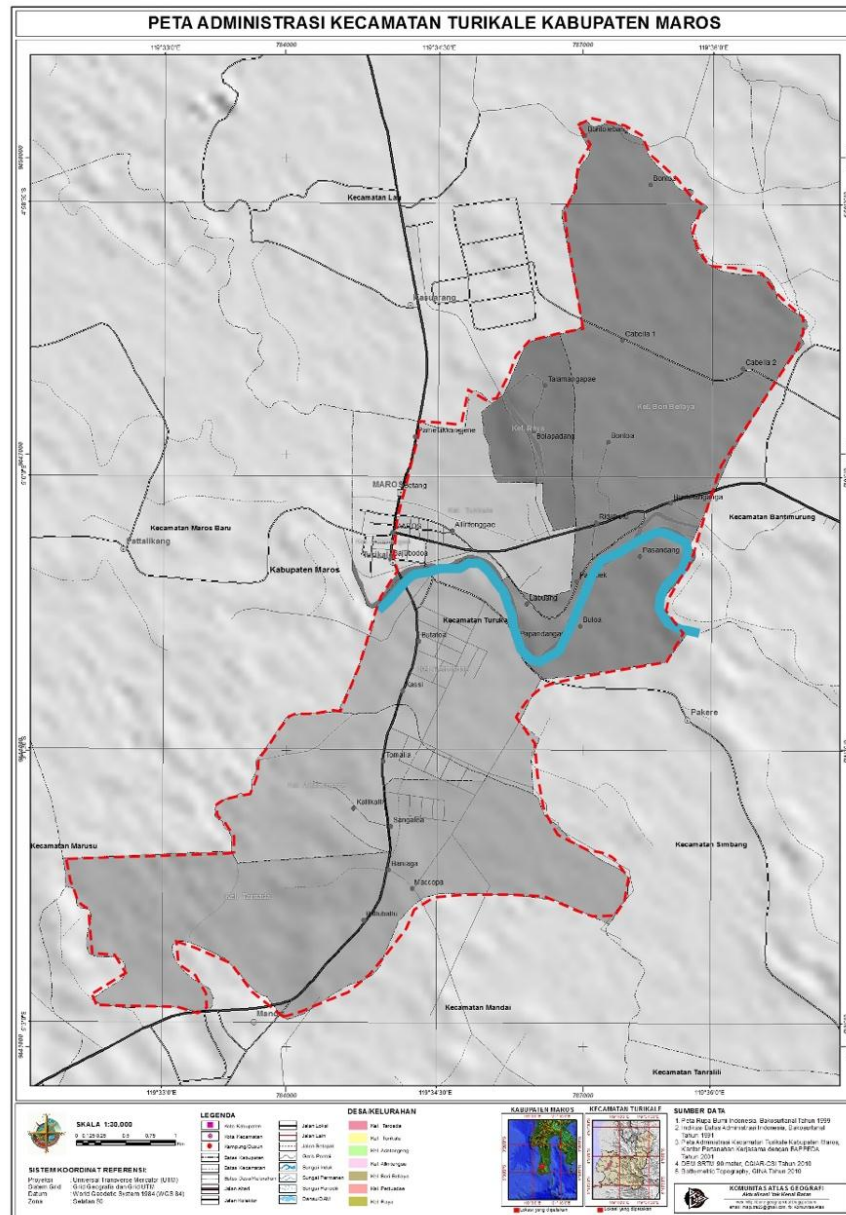
Tabel L.3 Data pengukuran kecepatan arus permukaan sungai Tomalia

Bola Tenis (Sampel 1)					Rata-rata
Kecepatan (detik)				Rata-rata	
t1a	75	t1b	69	72	51.8
t2a	72	t2b	70	71	
t3a	63	t3b	68	65.5	
t4a	62	t4b	59	60.5	
t5a	54	t5b	48	51	
t6a	52	t6b	55	53.5	
t7a	26	t7b	31	28.5	
t8a	43	t8b	39	41	
t9a	89	t9b	61	75	
Bola Plastik (Sampel 2)					Rata-rata
Kecepatan (detik)				Rata-rata	
t1a	94	t1b	82	88	58.6
t2a	89	t2b	81	85	
t3a	85	t3b	79	82	
t4a	81	t4b	75	78	
t5a	70	t5b	65	67.5	
t6a	49	t6b	37	43	
t7a	24	t7b	29	26.5	
t8a	55	t8b	49	52	
t9a	67	t9b	61	64	
Rata-rata Sampel 1+2					55.2

(Sumber: Hasil pengukuran langsung)

Panjang Sungai

Dari hasil pengukuran yang dilakukan diperoleh panjang Sungai Maros yang melewati kecamatan Turikale adalah 69,9 Km .



Gambar 4.3 Posisi Sungai Maros dalam Peta Adminstrasi KecamatanTurikale

Sumber: <https://petatematikindo.wordpress.com/>, diakses tanggal 15 Agustus 2024

Tabel L.4 Data pengukuran kedalaman sungai Tomalia

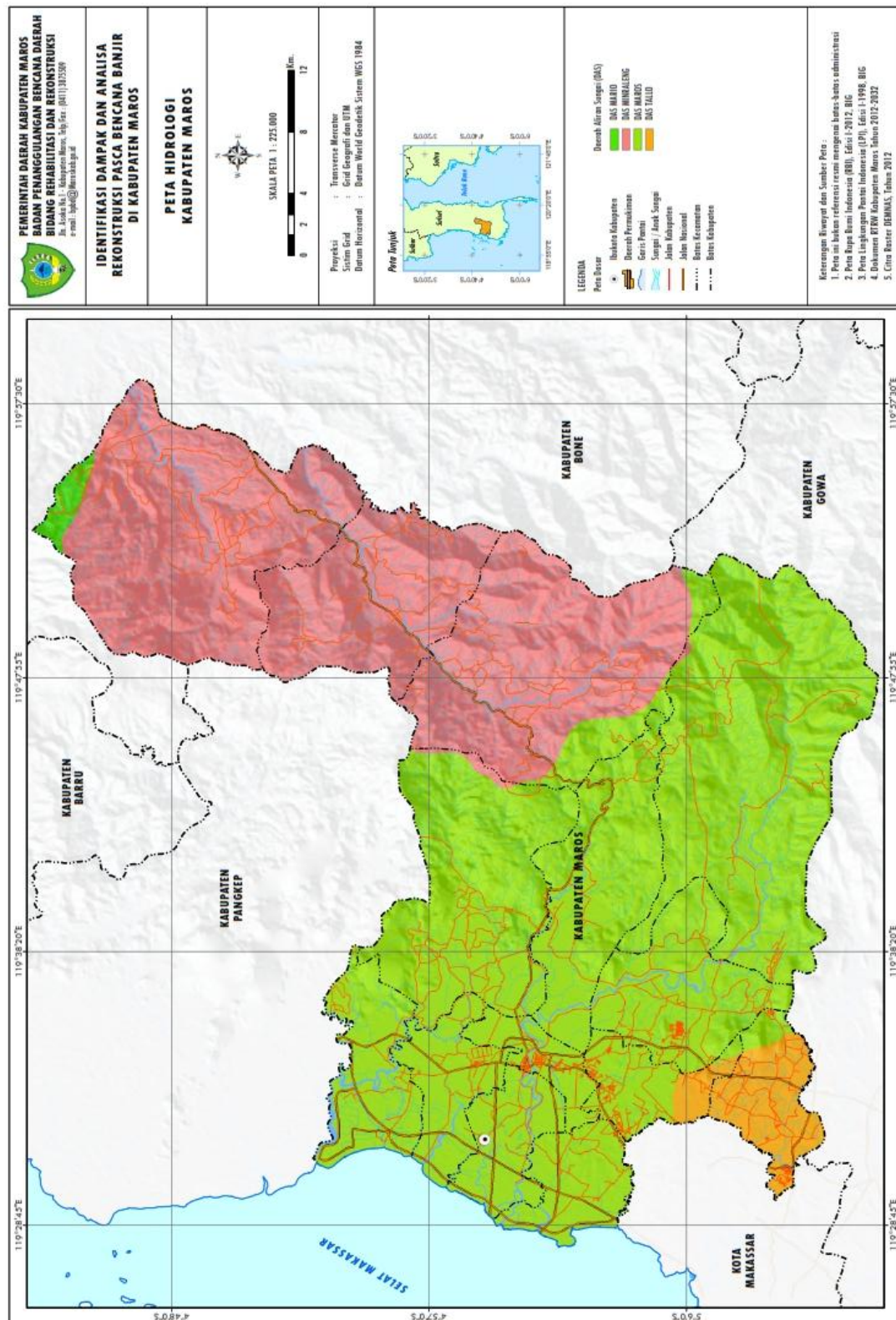
Kedalaman Sungai (m)			
d0	0.3	d5	3.2
d1	0.7	d6	3.4
d2	0.7	d7	2.7
d3	1.1	d8	2
d4	1.8	d9	1.3
		d10	0.6

(Sumber: Hasil pengukuran langsung)

2. Data Sekunder

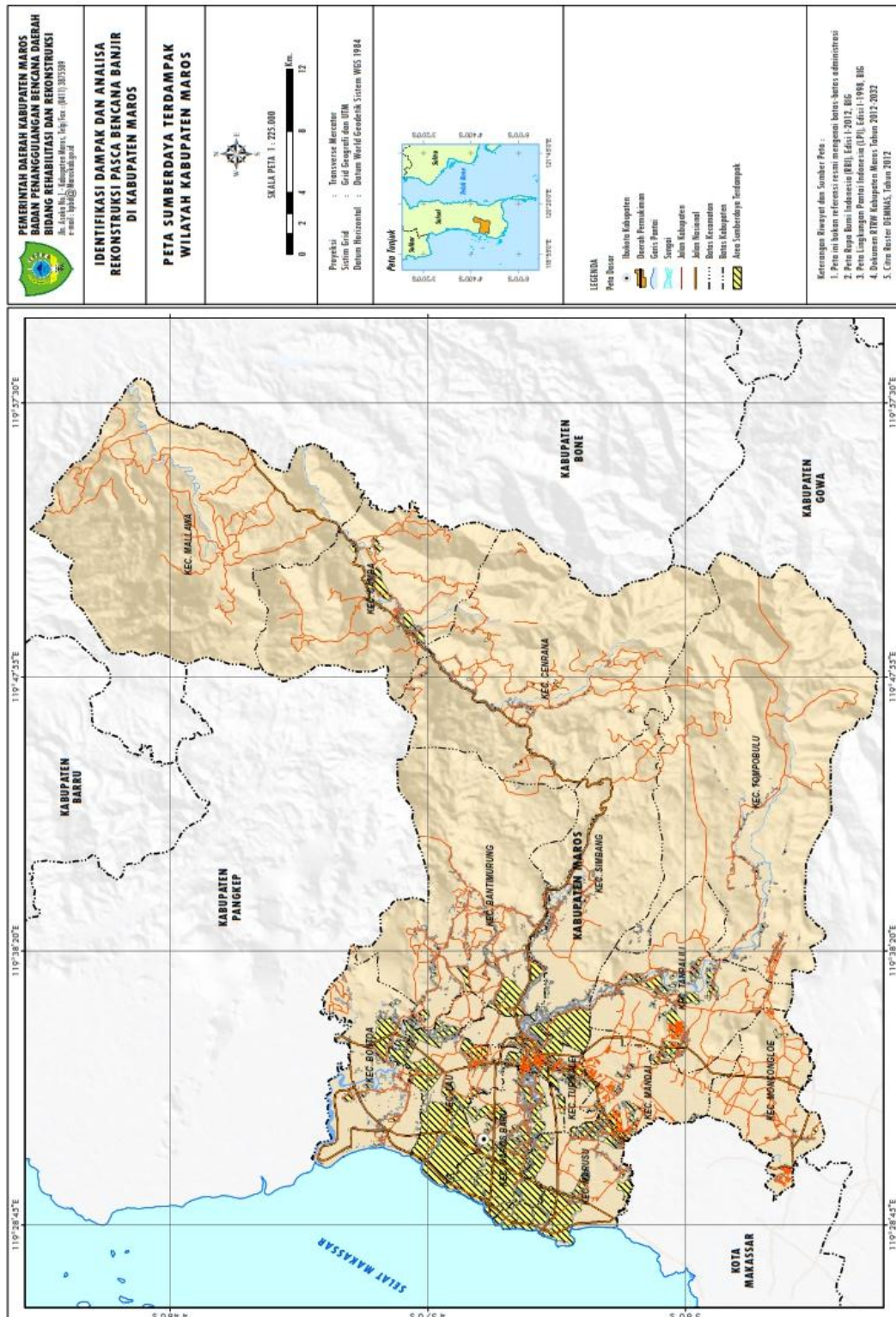
Tabel L.5 Data curah hujan harian max stasiun klimatologi maros 2011-2020

TAHU N	JANU ARI	FEBRU ARI	MARE T	APRIL	MEI	JUNI	JULI	
2013	127	89	124	50	132	34	50	
2014	99	115	107	70	72	8	1	
2015	84	75	110	53	47	25	16	
2016	127.6	59	79.7	115.6	37.4	14.6	23.6	
2017	114.9	87.8	120.6	95	39.9	34.4	-	
2018	49.5	93.8	96.9	46	52.4	29.7	24.8	
2019	73.5	91.8	44.6	113.1	42.1	40.6	10.2	
2020	150.1	80.9	93.6	55.7	43.5	37.3	21	
2021	133	66.6	39.8	58.7	25.4	61.1	4.3	
2022	136.5	99.5	105.7	25.1	71.8	23.7	23.7	
TAHU N	AGUS TUS	SEPTE MBER	OKTO BER	NOVEM BER	DESEM BER	MIN	MAX	RATA- RATA
2013	22	90	60	64	129	22	132	80.9
2014	-	-	58	91	112	1	115	73.3
2015	-	1	56	41	72	1	110	52.7
2016	4.2	-	-	54.8	145.6	4.2	145.6	66.2
2017	0	-	-	20.3	119	0	120.6	70.2
2018	4.7	25.2	87.7	43.8	127	4.7	127	56.8
2019	21.7	82.5	35.3	72.8	151.8	10.2	151.8	65.0
2020	1.4	5.5	56.9	58.9	105.8	1.4	150.1	59.2
2021	-	-	-	17.4	69	4.3	133	52.8
2022	5.5	28.5	60.9	72	135.7	5.5	136.5	65.7



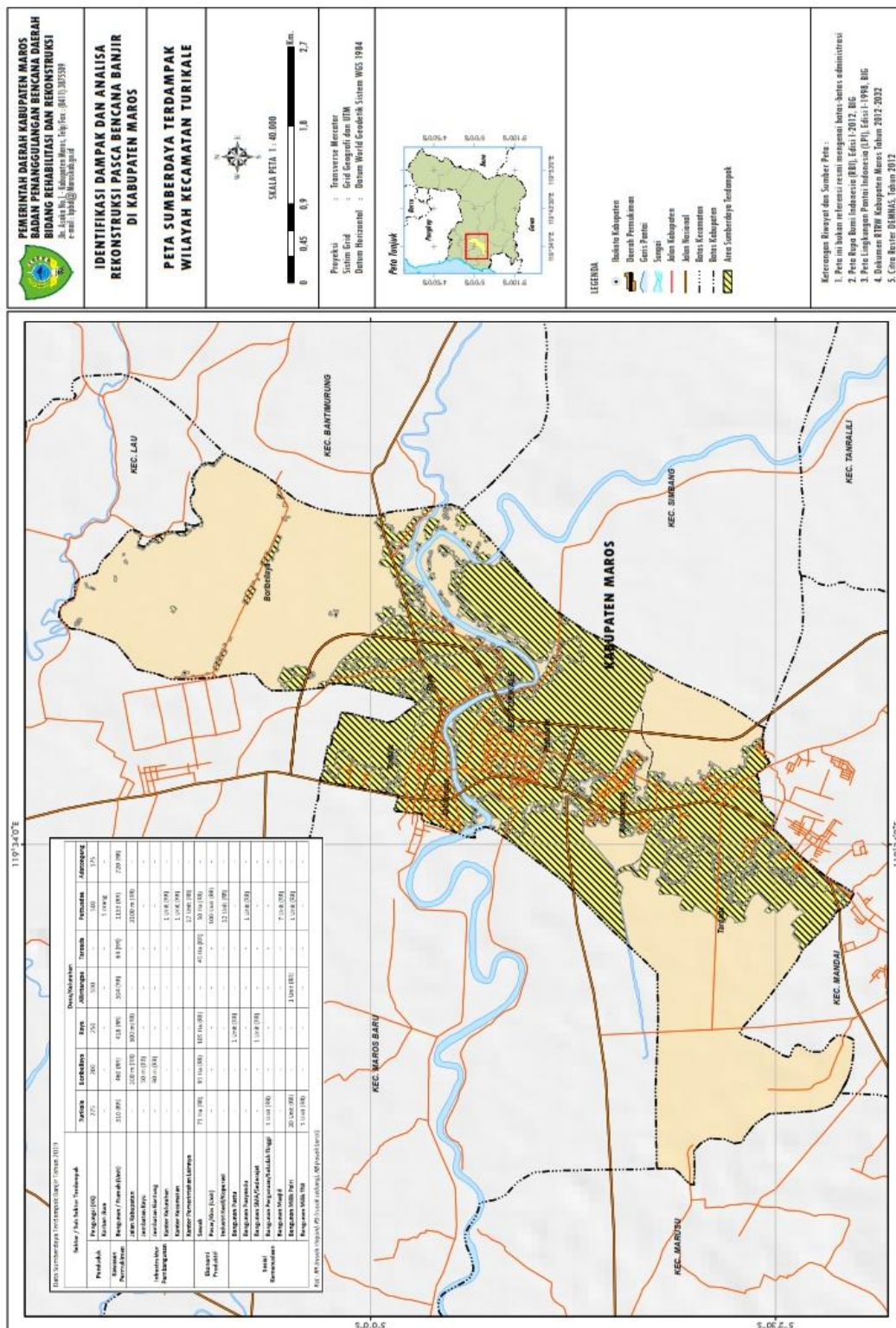
Gambar L.5 Peta hidrologi di kabupaten Maros

(Sumber: BPBD Kab. Maros)



Gambar L.6 *Peta Kawasan terdampak banjir Kab. Maros*

(Sumber: BPBD Kab. Maros)



Gambar L.7 Peta Kawasan terdampak banjir Kec. Turikale
(Sumber: BPBD Kab. Maros)

3. Hasil Analisis Frekuensi Curah Hujan Menggunakan Metode E.J.

Gumbel

Tabel L.6 Hasil perhitungan untuk memperoleh probabilitas curah hujan harian maksimal

TAHUN (n)	X_i (mm)	$\bar{X}$	$X_i - \bar{X}$	$(X_i - \bar{X})^2$	$(X_i - \bar{X})^3$	$(X_i - \bar{X})^4$
2011	132	132.16	-0.16	0.026	-0.0041	0.00066
2012	115	132.16	-17.2	294.5	-5053.0	86710.0
2013	110	132.16	-22.2	491.1	-10882.0	241145.4
2014	145.6	132.16	13.4	180.6	2427.7	32628.5
2015	120.6	132.16	-11.6	133.6	-1544.8	17857.9
2016	127	132.16	-5.2	26.6	-137.4	708.9
2017	151.8	132.16	19.6	385.7	7575.7	148787.3
2018	150.1	132.16	17.9	321.8	5773.9	103583.3
2019	133	132.16	0.8	0.7	0.6	0.5
2020	136.5	132.16	4.3	18.8	81.7	354.8
JUMLAH				1853.6	-1757.6	631776.7
				S	14.35	
				n	10	

(Sumber: Hasil Perhitungan)

Tabel L.8 Hubungan sampel (n) dengan Y_n dan S_n

Periode ulang	<i>Reduced variate</i>
2	0,3668
5	1,5004
10	2,2510
20	2,9709
25	3,1993
50	3,9028
100	4,6012
200	5,2969
250	5,5206
500	6,2149
1000	6,9087
5000	8,5188
10000	9,2121

(Sumber: Suripin, 2004)

Tabel L.8 Hubungan sampel (n) dengan Y_n dan S_n

Sampel	Y_n	S_n	Sampel	Y_n	S_n	Sampel	Y_n	S_n
10	0,4952	0,9496	41	0,544	1,1436	72	0,56	1,187
11	0,4996	0,9676	42	0,545	1,1458	73	0,56	1,188
12	0,504	0,9833	43	0,545	1,148	74	0,56	1,189
13	0,5035	0,9971	44	0,546	1,1499	75	0,56	1,19
14	0,51	1,0095	45	0,546	1,1519	76	0,56	1,191
15	0,5128	1,0206	46	0,547	1,1538	77	0,56	1,192
16	0,5157	1,0316	47	0,547	1,1557	78	0,56	1,192
17	0,5181	1,0411	48	0,548	1,1574	79	0,56	1,193
18	0,5202	1,0493	49	0,548	1,159	80	0,56	1,194
19	0,522	1,0565	50	0,549	1,1607	81	0,56	1,195
20	0,5236	1,0628	51	0,549	1,1623	82	0,57	1,195
21	0,5252	1,0696	52	0,549	1,1638	83	0,56	1,196
22	0,5268	1,0754	53	0,55	1,1658	84	0,56	1,197
23	0,5283	1,0811	54	0,55	1,1667	85	0,56	1,197
24	0,5296	1,0864	55	0,55	1,1181	86	0,56	1,199
25	0,5309	1,0915	56	0,551	1,1696	87	0,56	1,199
26	0,532	1,0861	57	0,551	1,1708	88	0,56	1,199
27	0,5332	1,1004	58	0,552	1,1721	89	0,56	1,2
28	0,5343	1,1047	59	0,552	1,1734	92	0,56	1,202
29	0,5353	1,1086	60	0,552	1,1747	93	0,56	1,203
30	0,5362	1,1124	61	0,553	1,1759	94	0,56	1,203
31	0,5371	1,1159	62	0,553	1,177	95	0,99	1,204
32	0,538	1,1193	63	0,553	1,1782	96	0,56	1,204
33	0,5388	1,1226	64	0,554	1,1793	97	0,56	1,205
34	0,5396	1,1255	65	0,554	1,1803	98	0,56	1,206
35	0,5402	1,1287	66	0,554	1,1814	99	0,56	1,206
36	0,541	1,1313	67	0,554	1,1824	100	0,56	1,207
37	0,5418	1,1339	68	0,555	1,1834			
38	0,5424	1,1363	69	0,555	1,1844			
39	0,543	1,1388	70	0,555	1,1854			
40	0,5436	1,1413	71	0,552	1,1854			

(Sumber: Suripin, 2004)

Tabel L.9 Hasil perhitungan hujan rencana periode tahunan dengan metode Gumbel

TAHUN (t)	Y_n	S_n	Y_t	K	S	$\bar{X}$	X_t/mm
10	0.4952	0.9496	2.251	1.849	14.35	132.16	158.69
25	0.5309	1.0915	3.1993	2.4447	14.35	132.16	167.24
50	0.549	1.1696	3.9028	2.8675	14.35	132.16	173.31
100	0.56	1.207	4.6012	3.3481	14.35	132.16	180.21

(Sumber: Hasil Perhitungan)

4. Hasil Analisis Frekuensi Curah Hujan Menggunakan Metode Log Pearson Type III

Tabel L.10 Transformasi data kedalam harga-harga logaritma

TAHUN	X_i	$Log X_i$	$\frac{Log X_i}{- \overline{Log X}}$	$(Log X_i - \overline{Log X})^2$	$(Log X_i - \overline{Log X})^3$	
2011	132	2.121	0.002	0.00000328540836	0.00000000596	
2012	115	2.061	-0.058	0.0033713725	-0.00019575376	
2013	110	2.041	-0.077	0.0059859121	-0.00046312210	
2014	146	2.163	0.044	0.0019713612	0.00008752846	
2015	121	2.081	-0.037	0.0013998114	-0.00005237262	
2016	127	2.104	-0.015	0.0002237310	-0.00000334649	
2017	152	2.181	0.063	0.0039075513	0.00024426264	
2018	150	2.176	0.058	0.0033199873	0.00019129544	
2019	133	2.124	0.005	0.0000259109	0.00000013189	
JUMLAH		21.188	0.000	0.0204769423	-0.00018698275	
					n	10
					$\overline{Log X}$	2.119
					S	0.002
					C _s	-1.4E-11

(Sumber: Hasil Perhitungan)

Tabel L.10 Nilai K terhadap C_s

Koefisien C_s atau G	Interval kejadian, tahun (periode ulang)							
	1,0101	1,2500	2	5	10	25	50	100
	Persentase peluang terlampaui (%)							
	99	80	50	20	10	4	2	1
3,0	-0,667	-0,636	-0,396	0,420	1,180	2,278	3,152	4,051
2,8	-0,714	0,666	0,384	0,460	1,210	2,275	3,114	3,973
2,6	-0,769	0,696	0,368	0,499	1,238	2,267	3,071	3,889
2,4	-0,832	0,725	0,351	0,537	1,262	2,256	3,023	3,800
2,2	-0,905	-0,752	-0,330	0,574	1,284	2,240	2,970	3,705
2,0	-0,990	-0,777	-0,307	0,609	1,302	2,219	2,912	3,605
1,8	-1,087	-0,799	-0,282	0,643	1,318	2,193	2,848	3,499
1,6	-1,197	-0,817	-0,254	0,675	1,329	2,163	2,780	3,388
1,4	-1,318	-0,832	-0,225	0,705	1,337	2,128	2,706	3,271
1,2	-1,449	-0,844	-0,195	0,732	1,340	2,087	2,626	3,149
1,0	-1,588	-0,852	-0,164	0,758	1,340	2,043	2,542	3,022
0,8	-1,733	-0,856	-0,132	0,780	1,336	1,993	2,453	2,891
0,6	-1,880	-0,857	-0,099	0,800	1,328	1,939	2,359	2,755
0,4	-2,029	-0,855	-0,066	0,816	1,317	1,880	2,261	2,615
0,2	-2,178	-0,850	-0,033	0,830	1,301	1,818	2,159	2,472
0,0	-2,326	-0,842	0,000	0,842	1,282	1,751	2,054	2,326
-0,2	-2,472	-0,830	0,033	0,850	1,258	1,680	1,945	2,178
-0,4	-2,615	-0,816	0,066	0,855	1,231	1,606	1,834	2,029
-0,6	-2,755	-0,800	0,099	0,857	1,200	1,528	1,720	1,880
-0,8	-2,891	-0,780	0,132	0,856	1,166	1,448	1,606	1,733
-1,0	-3,022	-0,758	0,164	0,852	1,128	1,366	1,492	1,588
-1,2	-3,149	-0,732	0,195	0,844	1,086	1,282	1,379	1,449
-1,4	-3,271	-0,705	0,225	0,832	1,041	1,198	1,270	1,318
-1,6	-3,388	-0,675	0,254	0,817	0,994	1,116	1,166	1,197
-1,8	-3,499	-0,643	0,282	0,799	0,945	1,035	1,069	1,087
-2,0	-3,605	-0,609	0,307	0,777	0,895	0,959	0,980	0,990
-2,2	-3,705	-0,574	0,330	0,752	0,844	0,888	0,900	0,905
-2,4	-3,800	-0,574	0,330	0,752	0,844	0,888	0,900	0,905
-2,6	-3,705	-0,537	0,351	0,725	0,795	0,823	0,830	0,832
-2,8	-3,973	-0,469	0,384	0,666	0,702	0,712	0,714	0,714
-3,0	-4,051	-0,420	0,396	0,636	0,660	0,666	0,666	0,667

(Sumber: Suripin, 2004)

Tabel L.11 Hasil perhitungan hujan rencana periode tahunan dengan metode Log Pearson Type III.

TAHUN (t)	K	S	$\overline{\text{Log } X}$	$\text{Log } X_t$	X_t
10	1.041	0.002	2.119	2.120887	132.095
25	1.198	0.002	2.119	2.121208	132.193
50	1.27	0.002	2.119	2.121355	132.238
100	1.318	0.002	2.119	2.121453	132.267

(Sumber: Hasil Perhitungan)

Tabel L.12 Hasil perhitungan hujan rencana periode tahunan dengan metode E.J. Gumbel dan Log Pearson type III.

TAHUN (n)	X_i (mm)	TAHUN PERIODE ULANG (t)	E.J. GUMBEL	Log Pearson Type III
2011	132	10	158.695	132.095
2012	115	25	167.244	132.193
2013	110	50	173.311	132.238
2014	146	100	180.209	132.267
2015	121			
2016	127			
2017	152			
2018	150			
2019	133			
2020	137			
JUMLAH	1322			

(Sumber: Hasil Perhitungan)

5. Hasil Analisa Chi-kuadrat dengan Metode E.J. Gumbel dan Log Pearson

Type III

Tabel L.13 *Tabel distribusi X^2*

α		0.1	0.05	0.025	0.01	0.005
db	1	2.70554	3.84146	5.02390	6.63489	7.87940
	2	4.60518	5.99148	7.37778	9.21035	10.59653
	3	6.25139	7.81472	9.34840	11.34488	12.83807
	4	7.77943	9.48773	11.14326	13.27670	14.86017
	5	9.23635	11.07048	12.83249	15.08632	16.74965
	6	10.64464	12.59158	14.44935	16.81187	18.54751
	7	12.01703	14.06713	16.01277	18.47532	20.27774
	8	13.36156	15.50731	17.53454	20.09016	21.95486
	9	14.68366	16.91896	19.02278	21.66605	23.58927
	10	15.98717	18.30703	20.48320	23.20929	25.18805
	11	17.27501	19.67515	21.92002	24.72502	26.75686
	12	18.54934	21.02606	23.33666	26.21696	28.29966
	13	19.81193	22.36203	24.73558	27.68818	29.81932
	14	21.06414	23.68478	26.11893	29.14116	31.31943
	15	22.30712	24.99580	27.48836	30.57795	32.80149
	16	23.54182	26.29622	28.84532	31.99986	34.26705
	17	24.76903	27.58710	30.19098	33.40872	35.71838
	18	25.98942	28.86932	31.52641	34.80524	37.15639
	19	27.20356	30.14351	32.85234	36.19077	38.58212
	20	28.41197	31.41042	34.16958	37.56627	39.99686
	21	29.61509	32.67056	35.47886	38.93223	41.40094
	22	30.81329	33.92446	36.78068	40.28945	42.79566
	23	32.00689	35.17246	38.07561	41.63833	44.18139
	24	33.19624	36.41503	39.36406	42.97978	45.55836
	25	34.38158	37.65249	40.64650	44.31401	46.92797
	26	35.56316	38.88513	41.92314	45.64164	48.28978
	27	36.74123	40.11327	43.19452	46.96284	49.64504
	28	37.91591	41.33715	44.46079	48.27817	50.99356
	29	39.08748	42.55695	45.72228	49.58783	52.33550
	30	40.25602	43.77295	46.97922	50.89218	53.67187

(Sumber: Thomas, Uji X^2)

Tabel L.14 Hasil perhitungan uji Chi-Kuadrat terhadap metode E.J. Gumbel.

TAHUN	X_t/mm	INTERVAL	O_i	E_i	$(O_i - E_i)$	$(O_i - E_i)^2$	$\frac{(O_i - E_i)^2}{E_i}$
10	158.6949	$0 < P \leq 0.25$	4	2.5	1.5	2.25	0.9
25	167.2441	$0.25 < P \leq 0.50$	3	2.5	0.5	0.25	0.1
50	173.3112	$0.50 < P \leq 0.75$	3	2.5	0.5	0.25	0.1
100	180.2091	$0.75 < P \leq 0.999$	0	2.5	-2.5	6.25	2.5
						χ^2	3.6

(Sumber: Hasil Perhitungan)

Tabel L.15 Hasil perhitungan uji Chi-Kuadrat terhadap metode Log Pearson Type III.

TAHUN	X_t/mm	INTERVAL	O_i	E_i	$(O_i - E_i)$	$(O_i - E_i)^2$	$\frac{(O_i - E_i)^2}{E_i}$
10	132.095	$0 < P \leq 0.25$	2	2.5	-0.5	0.25	0.1
25	132.193	$0.25 < P \leq 0.50$	2	2.5	-0.5	0.25	0.1
50	132.238	$0.50 < P \leq 0.75$	3	2.5	0.5	0.25	0.1
100	132.267	$0.75 < P \leq 0.999$	1	2.5	-1.5	2.25	0.9
						χ^2	1.2

(Sumber: Hasil Perhitungan)

Tabel L.16 Hasil perhitungan uji Chi-Kuadrat terhadap metode E.J. Gumbel dan Log Pearson Type III.

PERIODE ULANG	E.J. GUMBEL	LOG PEARSON TYPE III
10	158.6948647	132.09520
25	167.2440507	132.19275
50	173.3111844	132.23751
100	180.2091393	132.26735

(Sumber: Hasil Perhitungan)

6. Hasil Analisis Intensitas Curah Hujan Metode Van Breen dan Metode Hasper & Der Weduwen

Tabel L.17 Hasil perhitungan intensitas hujan dengan metode Van Breen

Durasi menit t	Intensitas Hujan Metode Van breen			
	10	25	50	100
	158.69	167.24	173.31	180.21
5	177.48	177.68	177.83	178.00
10	177.18	177.40	177.56	177.73
20	176.58	176.83	177.01	177.21
40	175.40	175.71	175.92	176.16
60	174.24	174.60	174.85	175.13
80	173.09	173.51	173.79	174.11
120	170.83	171.36	171.71	172.10
240	164.41	165.22	165.77	166.35

(Sumber: Hasil Perhitungan)

Tabel L.18 Hasil perhitungan intensitas hujan dengan metode Haspers dan Der Weduwen

Durasi menit (t)	E.J. Gumbel		R_i	R	I
	Periode Ulang	X_t			
5	10	158.69	98.13	16.82	201.90
10			118.48	28.36	170.16
20			137.79	45.51	136.52
40			152.55	68.04	102.06
60			158.69	83.11	83.11
80			162.07	94.27	70.70
120			165.66	110.06	55.03
240			169.50	135.05	33.76
5	25	167.24	100.29	17.20	206.35
10			122.33	29.28	175.69
20			143.67	47.45	142.34
40			160.26	71.48	107.22
60			167.24	87.59	87.59
80			171.09	99.52	74.64
120			175.21	116.41	58.20
240			179.63	143.12	35.78
5	50	173.31	101.75	17.45	209.34

10			124.97	29.91	179.48
20			147.76	48.80	146.40
40			165.70	73.91	110.86
60			173.31	90.76	90.76
80			177.52	103.25	77.44
120			182.03	120.94	60.47
240			186.89	148.91	37.23
5	100	180.21	103.33	17.72	212.60
10			127.88	30.61	183.67
20			152.34	50.31	150.94
40			171.86	76.66	114.98
60			180.21	94.38	94.38
80			184.84	107.52	80.64
120			189.83	126.12	63.06
240			195.21	155.54	38.88

(Sumber: Hasil Perhitungan)

7. Hasil Penentuan Metode Yang Digunakan Menggunakan Persamaan

Talbot, Sherman dan Ishiguro

a) Rumus Talbot

Tabel L.19 Hasil perhitungan Rumus Talbot → Metode Van Breen

Rumus Talbot → Metode Van breen						
Durasi Menit (t)	Periode Ulang (Tahun)	(*) I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	10	177.48	887.38	31497.85	157489.27	177.48
10		177.18	1771.77	31391.59	313915.95	177.18
20		176.58	3531.61	31180.68	623613.63	176.58
40		175.40	7016.00	30765.18	1230607.30	175.40
60		174.24	10454.12	30357.93	1821476.02	174.24
80		173.09	13846.87	29958.72	2396697.44	173.09
120		170.83	20499.83	29183.55	3502026.40	170.83
240		164.41	39458.19	27030.36	6487287.41	164.41
n → 8	Σ	1389.2 0	97465.77	241365.8 8	16533113.43	
	a		524748.6 7			
	b		2951.72			
Durasi Menit (t)	Periode Ulang (Tahun)	I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	25	177.68	888.42	31571.76	157858.78	177.68
10		177.40	1774.00	31470.67	314706.70	177.40
20		176.83	3536.66	31269.95	625398.95	176.83
40		175.71	7028.42	30874.22	1234968.89	175.71
60		174.60	10476.14	30485.96	1829157.68	174.60
80		173.51	13880.63	30104.98	2408398.28	173.51
120		171.36	20563.16	29364.13	3523695.58	171.36
240		165.22	39653.46	27298.56	6551653.61	165.22
n → 8	Σ	1392.3 2	97800.89	242440.2 2	16645838.46	
	a		553618.3 6			
	b		3110.74			
Durasi	Periode	I	$L \times t$	I^2	$I^2 \times t$	Talbot

Menit (t)	Ulang (Tahun)					I
5	50	177.83	889.16	31623.94	158119.68	177.83
10		177.56	1775.56	31526.21	315262.13	177.56
20		177.01	3540.18	31332.12	626642.42	177.01
40		175.92	7036.96	30949.28	1237971.09	175.92
60		174.85	10491.15	30573.41	1834404.47	174.85
80		173.79	13903.52	30204.34	2416347.52	173.79
120		171.71	20605.78	29485.99	3538318.30	171.71
240		165.77	39783.74	27478.23	6594774.62	165.77
$n \rightarrow 8$	Σ	1394.4 5	98026.05	243173.5 1	16721840.24	
	a		574143.6 8			
	b		3223.59			
Durasi Menit (t)	Periode Ulang (Tahun)	I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	100	178.00	889.99	31683.03	158415.14	178.00
10		177.73	1777.33	31588.86	315888.56	177.73
20		177.21	3544.11	31401.77	628035.36	177.21
40		176.16	7046.42	31032.54	1241301.76	176.16
60		175.13	10507.68	30669.79	1840187.64	175.13
80		174.11	13928.59	30313.37	2425069.38	174.11
120		172.10	20652.17	29618.90	3554268.49	172.10
240		166.35	39924.42	27672.91	6641498.60	166.35
$n \rightarrow 8$	Σ	1396.7 8	98270.70	243981.1 7	16804664.94	
	a		597517.2 5			
	b		3351.89			

(Sumber: Hasil Perhitungan)

Tabel L.20 Hasil perhitungan Rumus Talbot → Metode Hasper dan Der Weduwen

Rumus Talbot → Metode Hasper dan Der Weduwen						
Durasi Menit (t)	Periode Ulang (Tahun)	(*) I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	10	201.90	1009.50	40763.43	203817.15	189.24
10		170.16	1701.63	28955.36	289553.57	170.81
20		136.52	2730.37	18637.36	372747.13	142.95
40		102.06	4082.45	10416.52	416660.78	107.80
60		83.11	4986.60	6907.28	414436.72	86.52
80		70.70	5655.98	4998.45	399875.92	72.26
120		55.03	6603.72	3028.41	363409.51	54.34
240		33.76	8103.20	1139.96	273590.87	31.16
n → 8	Σ	853.25	34873.45	114846.76	2734091.65	
	a		8766.95			
	b		41.33			
Durasi Menit (t)	Periode Ulang (Tahun)	(*) I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	25	206.35	1031.73	42578.57	212892.85	194.23
10		175.69	1756.94	30868.26	308682.62	176.07
20		142.34	2846.84	20261.22	405224.50	148.33
40		107.22	4288.82	11496.22	459848.78	112.79
60		87.59	5255.24	7671.54	460292.43	90.99
80		74.64	5971.03	5570.81	445665.09	76.25
120		58.20	6984.51	3387.73	406528.13	57.59
240		35.78	8587.49	1280.29	307270.62	33.21
n → 8	Σ	887.81	36722.59	123114.66	3006405.02	
	a		9414.87			
	b		43.47			
Durasi Menit (t)	Periode Ulang (Tahun)	(*) I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	50	209.34	1046.71	43823.86	219119.30	197.64
10		179.48	1794.85	32214.75	322147.48	179.68
20		146.40	2928.00	21432.93	428658.53	152.05
40		110.86	4434.48	12290.38	491615.24	116.29
60		90.76	5445.88	8238.24	494294.36	94.14
80		77.44	6195.28	5997.11	479768.85	79.08

120		60.47	7256.41	3656.63	438795.84	59.92
240		37.23	8934.48	1385.85	332603.54	34.69
$n \rightarrow 8$	Σ	911.99	38036.08	129039.74	3207003.14	
	a		9887.85			
	b		45.03			
Durasi Menit (t)	Periode Ulang (Tahun)	(*) I	$L \times t$	I^2	$I^2 \times t$	Talbot I
5	100	212.60	1062.99	45197.99	225989.96	201.40
10		183.67	1836.66	33733.29	337332.89	183.68
20		150.94	3018.80	22782.96	455659.15	156.20
40		114.98	4599.30	13220.98	528839.21	120.22
60		94.38	5662.64	8907.07	534424.18	97.72
80		80.64	6450.91	6502.23	520178.55	82.31
120		63.06	7567.24	3976.61	477192.88	62.57
240		38.88	9332.35	1512.03	362886.71	36.39
$n \rightarrow 8$	Σ	939.15	39530.90	135833.16	3442503.53	
	a		10439.22			
	b		46.83			

(Sumber: Hasil Perhitungan)

b) Rumus Sherman

Tabel L.21 Hasil perhitungan Rumus Sherman → Metode Van Breen

Rumus <i>Sherman</i> → Metode <i>Van breen</i>							
Durasi Menit (<i>t</i>)	Periode Ulang (Tahun)	<i>I</i>	<i>Log I</i>	<i>Log t</i>	<i>Log t</i> ²	<i>Log t</i> × <i>Log I</i>	<i>Sherman I</i>
5	10	177.476	2.249	0.699	0.489	1.572	179.825
10		177.177	2.248	1.000	1.000	2.248	177.704
20		176.581	2.247	1.301	1.693	2.923	175.609
40		175.400	2.244	1.602	2.567	3.595	173.538
60		174.235	2.241	1.778	3.162	3.985	172.338
80		173.086	2.238	1.903	3.622	4.260	171.491
120		170.832	2.233	2.079	4.323	4.642	170.305
240		164.409	2.216	2.380	5.665	5.274	168.297
	n → 8	Σ	17.916	12.743	22.520	28.500	
		a	184.847				
		b	0.017				
Durasi Menit (<i>t</i>)	Periode Ulang (Tahun)	<i>I</i>	<i>Log I</i>	<i>Log t</i>	<i>Log t</i> ²	<i>Log t</i> × <i>Log I</i>	<i>Sherman I</i>
5	25	177.684	2.250	0.699	0.489	1.572	179.920
10		177.400	2.249	1.000	1.000	2.249	177.903
20		176.833	2.248	1.301	1.693	2.924	175.908
40		175.711	2.245	1.602	2.567	3.596	173.936
60		174.602	2.242	1.778	3.162	3.987	172.792
80		173.508	2.239	1.903	3.622	4.262	171.986
120		171.360	2.234	2.079	4.323	4.645	170.855
240		165.223	2.218	2.380	5.665	5.279	168.939
	n → 8	Σ	17.924	12.743	22.520	28.514	
		a	184.692				
		b	0.016				
Durasi Menit (<i>t</i>)	Periode Ulang (Tahun)	<i>I</i>	<i>Log I</i>	<i>Log t</i>	<i>Log t</i> ²	<i>Log t</i> × <i>Log I</i>	<i>Sherman I</i>
5	50	177.831	2.250	0.699	0.489	1.573	179.993
10		177.556	2.249	1.000	1.000	2.249	178.043
20		177.009	2.248	1.301	1.693	2.925	176.114
40		175.924	2.245	1.602	2.567	3.597	174.206
60		174.853	2.243	1.778	3.162	3.988	173.100

80		173.794	2.240	1.903	3.622	4.263	172.319
120		171.715	2.235	2.079	4.323	4.647	171.225
240		165.766	2.219	2.380	5.665	5.283	169.370
	$n \rightarrow 8$	Σ	17.930	12.743	22.520	28.524	
		a	184.603				
		b	0.016				

Durasi Menit (t)	Periode Ulang (Tahun)	I	$\log I$	$\log t$	$\log t^2$	$\log t \times \log I$	Sherman I
5	100	177.997	2.250	0.699	0.489	1.573	180.081
10		177.733	2.250	1.000	1.000	2.250	178.202
20		177.205	2.248	1.301	1.693	2.925	176.343
40		176.161	2.246	1.602	2.567	3.598	174.504
60		175.128	2.243	1.778	3.162	3.989	173.436
80		174.107	2.241	1.903	3.622	4.264	172.683
120		172.101	2.236	2.079	4.323	4.649	171.627
240		166.352	2.221	2.380	5.665	5.287	169.836
	$n \rightarrow 8$	Σ	17.936	12.743	22.520	28.535	
		a	184.520				
		b	0.015				

(Sumber: Hasil Perhitungan)

Tabel L.22 Hasil perhitungan Rumus Sherman → Metode Hasper dan Der Weduwen

Rumus <i>Sherman</i> → Metode <i>Hasper</i> dan <i>Der Weduwen</i>							
Durasi Menit (<i>t</i>)	Periode Ulang (Tahun)	<i>I</i>	<i>Log I</i>	<i>Log t</i>	<i>Log t</i> ²	<i>Log t</i> × <i>Log I</i>	<i>Sherman I</i>
5	10	201.900	2.305	0.699	0.489	1.611	234.500
10		170.163	2.231	1.000	1.000	2.231	171.248
20		136.519	2.135	1.301	1.693	2.778	125.057
40		102.061	2.009	1.602	2.567	3.218	91.325
60		83.110	1.920	1.778	3.162	3.413	75.986
80		70.700	1.849	1.903	3.622	3.520	66.692
120		55.031	1.741	2.079	4.323	3.619	55.490
240		33.763	1.528	2.380	5.665	3.638	40.522
	n → 8	Σ	15.718	12.743	22.520	24.028	
		a	486.551				
		b	0.454				
Durasi Menit (<i>t</i>)	Periode Ulang (Tahun)	<i>I</i>	<i>Log I</i>	<i>Log t</i>	<i>Log t</i> ²	<i>Log t</i> × <i>Log I</i>	<i>Sherman I</i>
5	25	206.346	2.315	0.699	0.489	1.618	240.644
10		175.694	2.245	1.000	1.000	2.245	176.913
20		142.342	2.153	1.301	1.693	2.802	130.060
40		107.220	2.030	1.602	2.567	3.253	95.615
60		87.587	1.942	1.778	3.162	3.454	79.867
80		74.638	1.873	1.903	3.622	3.564	70.293
120		58.204	1.765	2.079	4.323	3.670	58.715
240		35.781	1.554	2.380	5.665	3.698	43.165
	n → 8	Σ	15.877	12.743	22.520	24.303	
		a	491.610				
		b	0.444				
Durasi Menit (<i>t</i>)	Periode Ulang (Tahun)	<i>I</i>	<i>Log I</i>	<i>Log t</i>	<i>Log t</i> ²	<i>Log t</i> × <i>Log I</i>	<i>Sherman I</i>
5	50	209.341	2.321	0.699	0.489	1.622	244.800
10		179.485	2.254	1.000	1.000	2.254	180.808
20		146.400	2.166	1.301	1.693	2.817	133.544
40		110.862	2.045	1.602	2.567	3.276	98.635
60		90.765	1.958	1.778	3.162	3.481	82.614
80		77.441	1.889	1.903	3.622	3.595	72.851

120		60.470	1.782	2.079	4.323	3.704	61.018
240		37.227	1.571	2.380	5.665	3.739	45.068
	n → 8	Σ	15.984	12.743	22.520	24.489	
		a	494.726				
		b	0.437				

Durasi Menit (t)	Periode Ulang (Tahun)	I	Log I	Log t	Log t ²	Log t × Log I	Sherman I
5	100	212.598	2.328	0.699	0.489	1.627	249.333
10		183.666	2.264	1.000	1.000	2.264	185.117
20		150.940	2.179	1.301	1.693	2.835	137.441
40		114.983	2.061	1.602	2.567	3.301	102.043
60		94.377	1.975	1.778	3.162	3.512	85.729
80		80.636	1.907	1.903	3.622	3.628	75.762
120		63.060	1.800	2.079	4.323	3.742	63.650
240		38.885	1.590	2.380	5.665	3.784	47.257
	n → 8	Σ	16.102	12.743	22.520	24.693	
		a	497.829				
		b	0.430				

(Sumber: Hasil Perhitungan)

c) Rumus Ishiguro

Tabel L.23 Hasil perhitungan Rumus Ishiguro → Metode Van Breen

Rumus Ishiguro → Metode Van breen						
Durasi Menit (t)	Period e Ulang (Tahun)	(*) I	I ²	I × √t	I ² × √t	Ishiguro I
5	10	177.476	31497.855	396.849	70431.344	179.118
10		177.177	31391.595	560.282	99268.938	178.097
20		176.581	31180.682	789.692	139444.247	176.672
40		175.400	30765.183	1109.327	194576.099	174.696
60		174.235	30357.934	1349.621	235151.544	173.209
80		173.086	29958.718	1548.127	267958.920	171.975
120		170.832	29183.553	1871.370	319689.809	169.944
240		164.409	27030.364	2547.015	418752.602	165.532
n → 8	Σ	1389.196	241365.88 3	10172.28 4	1745273.503	
	a		28927.727			

	b		159.264			
Durasi Menit (t)	Period e Ulang (Tahun)	I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	<i>Ishiguro I</i>
5	25	177.684	31571.756	397.314	70596.593	179.247
10		177.400	31470.670	560.987	99518.996	178.276
20		176.833	31269.948	790.822	139843.457	176.922
40		175.711	30874.222	1111.292	195265.726	175.041
60		174.602	30485.961	1352.464	236143.241	173.625
80		173.508	30104.979	1551.902	269267.114	172.449
120		171.360	29364.130	1877.151	321667.926	170.511
240		165.223	27298.557	2559.620	422907.422	166.293
$n \rightarrow 8$	Σ	1392.320	242440.22 2	10201.55 1	1755210.474	
	a		30502.578			
	b		167.935			
Durasi Menit (t)	Period e Ulang (Tahun)	I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	<i>Ishiguro I</i>
5	50	177.831	31623.935	397.643	70713.269	179.342
10		177.556	31526.213	561.482	99694.638	178.404
20		177.009	31332.121	791.607	140121.506	177.096
40		175.924	30949.277	1112.641	195740.417	175.277
60		174.853	30573.408	1354.402	236820.598	173.907
80		173.794	30204.344	1554.461	270155.866	172.769
120		171.715	29485.986	1881.042	323002.792	170.892
240		165.766	27478.228	2568.029	425690.871	166.802
$n \rightarrow 8$	Σ	1394.447	243173.51 2	10221.30 7	1761939.957	
	a		31622.223			
	b		174.088			
Durasi Menit (t)	Period e Ulang (Tahun)	I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	<i>Ishiguro I</i>

5	100	177.997	31683.028	398.014	70845.404	179.453
10		177.733	31588.856	562.040	99892.734	178.551
20		177.205	31401.768	792.487	140432.977	177.290
40		176.161	31032.544	1114.137	196267.042	175.538
60		175.128	30669.794	1356.535	237567.202	174.216
80		174.107	30313.367	1557.263	271130.999	173.118
120		172.101	29618.904	1885.277	324458.838	171.306
240		166.352	27672.911	2577.111	428706.891	167.351
$n \rightarrow 8$	Σ	1396.784	$\frac{243981.17}{2}$	$\frac{10242.86}{4}$	1769302.088	
	a		32897.224			
	b		181.084			

(Sumber: Hasil Perhitungan)

Tabel L.24 Hasil perhitungan Rumus Ishiguro $\rightarrow$ Metode Hasper dan Der Weduwen

Rumus Ishiguro $\rightarrow$ Metode Hasper dan Der Weduwen						
Durasi Menit (t)	Periode Ulang (Tahun)	(*) I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	Ishiguro I
5	10	201.900	40763.430	451.461	91149.800	226.700
10		170.163	28955.357	538.102	91564.879	171.137
20		136.519	18637.356	610.530	83348.792	127.087
40		102.061	10416.520	645.493	65879.854	93.171
60		83.110	6907.279	643.768	53503.550	77.335
80		70.700	4998.449	632.357	44707.487	67.642
120		55.031	3028.413	602.835	33174.598	55.891
240		33.763	1139.962	523.059	17660.215	40.148
$n \rightarrow 8$	Σ	853.246	$\frac{114846.76}{5}$	4647.605	480989.174	
	a		646.729			
	b		0.617			
Durasi Menit (t)	Periode Ulang (Tahun)	I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	Ishiguro I
5	25	206.346	42578.569	461.403	95208.575	232.322
10		175.694	30868.262	555.592	97614.015	177.113

20		142.342	20261.225	636.572	90610.953	132.562
40		107.220	11496.220	678.122	72708.477	97.779
60		87.587	7671.541	678.449	59423.497	81.392
80		74.638	5570.814	667.582	49826.872	71.315
120		58.204	3387.734	637.596	37110.771	59.052
240		35.781	1280.294	554.320	19834.233	42.540
$n \rightarrow 8$	Σ	887.812	$\frac{123114.65}{8}$	4869.635	522337.393	

a	690.297
b	0.735

Durasi Menit (t)	Period e Ulang (Tahun)	I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	<i>Ishiguro I</i>
5	50	209.341	43823.859	468.102	97993.128	236.151
10		179.485	32214.748	567.580	101871.978	181.236
20		146.400	21432.927	654.720	95850.961	136.384
40		110.862	12290.381	701.153	77731.195	101.026
60		90.765	8238.239	703.061	63813.128	84.264
80		77.441	5997.111	692.653	53639.788	73.923
120		60.470	3656.632	662.417	40056.397	61.304
240		37.227	1385.848	576.718	21469.466	44.252
$n \rightarrow 8$	Σ	911.991	$\frac{129039.74}{5}$	5026.404	552426.041	

a	721.860
b	0.821

Durasi Menit (t)	Period e Ulang (Tahun)	I	I^2	$I \times \sqrt{t}$	$I^2 \times \sqrt{t}$	<i>Ishiguro I</i>
5	100	212.598	45197.993	475.384	101065.784	240.353
10		183.666	33733.289	580.804	106674.026	185.812
20		150.940	22782.957	675.025	101888.483	140.669
40		114.983	13220.980	727.213	83616.820	104.697
60		94.377	8907.070	731.043	68993.865	87.523
80		80.636	6502.232	721.234	58157.730	76.890
120		63.060	3976.607	690.791	43561.551	63.873
240		38.885	1512.028	602.401	23424.236	46.213
$n \rightarrow 8$	Σ	939.146	135833.15	5203.896	587382.496	

		6	
a		758.410	
b		0.919	

(Sumber: Hasil Perhitungan)

d) Perbandingan Metode Intensitas Curah Hujan Menggunakan Rumus *Talbot*,
Sherman Dan *Ishiguro*

➤ **Metode Van Breen**

Tabel L.25 Deviasi metode Van Breen periode ulang 10 tahun

Durasi t (Menit)	M. Van breen I	Persamaan Intensitas Curah Hujan			Deviasi		
		<i>Talbot</i>	<i>Sherman</i>	<i>Ishiguro</i>	<i>Talbot</i>	<i>Sherman</i>	<i>Ishiguro</i>
5	177.48	177.48	179.82	179.12	0.00	2.35	1.64
10	177.18	177.18	177.70	178.10	0.00	0.53	0.92
20	176.58	176.58	175.61	176.67	0.00	0.97	0.09
40	175.40	175.40	173.54	174.70	0.00	1.86	0.70
60	174.24	174.24	172.34	173.21	0.00	1.90	1.03
80	173.09	173.09	171.49	171.98	0.00	1.59	1.11
120	170.83	170.83	170.31	169.94	0.00	0.53	0.89
240	164.41	164.41	168.30	165.53	0.00	3.89	1.12
DEVIASI TOTAL					0.00	13.62	7.51
DEVIASI RATA-RATA					0.00	1.70	0.94

(Sumber: Hasil Perhitungan)

Tabel L.26 Deviasi metode Van Breen periode ulang 25 tahun

Durasi t (Menit)	M. Van breen I	Persamaan Intensitas Curah Hujan			Deviasi		
		<i>Talbot</i>	<i>Sherman</i>	<i>Ishiguro</i>	<i>Talbot</i>	<i>Sherman</i>	<i>Ishiguro</i>
5	177.68	177.68	179.92	179.25	0.00	2.24	1.56
10	177.40	177.40	177.90	178.28	0.00	0.50	0.88
20	176.83	176.83	175.91	176.92	0.00	0.93	0.09
40	175.71	175.71	173.94	175.04	0.00	1.77	0.67
60	174.60	174.60	172.79	173.63	0.00	1.81	0.98
80	173.51	173.51	171.99	172.45	0.00	1.52	1.06
120	171.36	171.36	170.86	170.51	0.00	0.50	0.85
240	165.22	165.22	168.94	166.29	0.00	3.72	1.07
DEVIASI TOTAL					0.00	12.99	7.15
DEVIASI RATA-RATA					0.00	1.62	0.89

(Sumber: Hasil Perhitungan)

Tabel L.27 Deviasi metode Van Breen periode ulang 50 tahun

Durasi t (Menit)	M. Van breen I	Persamaan Intensitas Curah Hujan			Deviasi		
		Talbot	Sherman	Ishiguro	Talbot	Sherman	Ishiguro
5	177.83	177.83	179.99	179.34	0.00	2.16	1.51
10	177.56	177.56	178.04	178.40	0.00	0.49	0.85
20	177.01	177.01	176.11	177.10	0.00	0.89	0.09
40	175.92	175.92	174.21	175.28	0.00	1.72	0.65
60	174.85	174.85	173.10	173.91	0.00	1.75	0.95
80	173.79	173.79	172.32	172.77	0.00	1.47	1.03
120	171.71	171.71	171.22	170.89	0.00	0.49	0.82
240	165.77	165.77	169.37	166.80	0.00	3.60	1.04
DEVIASI TOTAL					0.00	12.58	6.92
DEVIASI RATA-RATA					0.00	1.57	0.87

(Sumber: Hasil Perhitungan)

Tabel L.28 Deviasi metode Van Breen periode ulang 100 tahun

Durasi t (Menit)	M. Van breen I	Persamaan Intensitas Curah Hujan			Deviasi		
		Talbot	Sherman	Ishiguro	Talbot	Sherman	Ishiguro
5	178.00	178.00	180.08	179.45	0.00	2.08	1.46
10	177.73	177.73	178.20	178.55	0.00	0.47	0.82
20	177.21	177.21	176.34	177.29	0.00	0.86	0.08
40	176.16	176.16	174.50	175.54	0.00	1.66	0.62
60	175.13	175.13	173.44	174.22	0.00	1.69	0.91
80	174.11	174.11	172.68	173.12	0.00	1.42	0.99
120	172.10	172.10	171.63	171.31	0.00	0.47	0.80
240	166.35	166.35	169.84	167.35	0.00	3.48	1.00
DEVIASI TOTAL					0.00	12.15	6.68
DEVIASI RATA-RATA					0.00	1.52	0.83

(Sumber: Hasil Perhitungan)

➤ Metode Hasper dan Der Weduwen

Tabel L.29 Deviasi metode Hasper dan Der Weduwen periode ulang 10 tahun

Durasi t (Menit)	Hasper dan Der Weduwen I	Persamaan Intensitas Curah Hujan			Deviasi		
		Talbot	Sherman	Ishiguro	Talbot	Sherman	Ishiguro
5	201.90	189.24	234.50	226.70	12.66	32.60	24.80
10	170.16	170.81	171.25	171.14	0.64	1.09	0.97
20	136.52	142.95	125.06	127.09	6.44	11.46	9.43
40	102.06	107.80	91.32	93.17	5.74	10.74	8.89
60	83.11	86.52	75.99	77.33	3.41	7.12	5.78
80	70.70	72.26	66.69	67.64	1.56	4.01	3.06
120	55.03	54.34	55.49	55.89	0.69	0.46	0.86
240	33.76	31.16	40.52	40.15	2.60	6.76	6.38
DEVIASI TOTAL					33.73	74.23	60.17
DEVIASI RATA-RATA					4.22	9.28	7.52

(Sumber: Hasil Perhitungan)

Tabel L.30 Deviasi metode Hasper dan Der Weduwen periode ulang 25 tahun

Durasi t (Menit)	Hasper dan Der Weduwen I	Persamaan Intensitas Curah Hujan			Deviasi		
		Talbot	Sherman	Ishiguro	Talbot	Sherman	Ishiguro
5	206.35	194.23	240.64	232.32	12.12	34.30	25.98
10	175.69	176.07	176.91	177.11	0.37	1.22	1.42
20	142.34	148.33	130.06	132.56	5.99	12.28	9.78
40	107.22	112.79	95.62	97.78	5.57	11.61	9.44
60	87.59	90.99	79.87	81.39	3.40	7.72	6.20
80	74.64	76.25	70.29	71.32	1.61	4.34	3.32
120	58.20	57.59	58.72	59.05	0.61	0.51	0.85
240	35.78	33.21	43.17	42.54	2.57	7.38	6.76
DEVIASI TOTAL					32.24	79.36	63.74
DEVIASI RATA-RATA					4.03	9.92	7.97

(Sumber: Hasil Perhitungan)

Tabel L.31 Deviasi metode Hasper dan Der Weduwen periode ulang 50 tahun

Durasi t (Menit)	Hasper dan Der Weduwen I	Persamaan Intensitas Curah Hujan			Deviasi		
		Talbot	Sherman	Ishiguro	Talbot	Sherman	Ishiguro
5	209.34	197.64	244.80	236.15	11.70	35.46	26.81
10	179.48	179.68	180.81	181.24	0.20	1.32	1.75

20	146.40	152.05	133.54	136.38	5.65	12.86	10.02
40	110.86	116.29	98.63	101.03	5.42	12.23	9.84
60	90.76	94.14	82.61	84.26	3.38	8.15	6.50
80	77.44	79.08	72.85	73.92	1.64	4.59	3.52
120	60.47	59.92	61.02	61.30	0.55	0.55	0.83
240	37.23	34.69	45.07	44.25	2.54	7.84	7.02
DEVIASI TOTAL					31.09	83.00	66.29
DEVIASI RATA-RATA					3.89	10.37	8.29

(Sumber: Hasil Perhitungan)

Tabel L.32 Deviasi metode Hasper dan Der Weduwen periode ulang 100 tahun

Durasi t (Menit)	Hasper dan Der Weduwen I	Persamaan Intensitas Curah Hujan			Deviasi		
		Talbot	Sherman	Ishiguro	Talbot	Sherman	Ishiguro
5	212.60	201.40	249.33	240.35	11.20	36.73	27.76
10	183.67	183.68	185.12	185.81	0.02	1.45	2.15
20	150.94	156.20	137.44	140.67	5.26	13.50	10.27
40	114.98	120.22	102.04	104.70	5.24	12.94	10.29
60	94.38	97.72	85.73	87.52	3.34	8.65	6.85
80	80.64	82.31	75.76	76.89	1.67	4.87	3.75
120	63.06	62.57	63.65	63.87	0.49	0.59	0.81
240	38.88	36.39	47.26	46.21	2.49	8.37	7.33
DEVIASI TOTAL					29.70	87.11	69.20
DEVIASI RATA-RATA					3.71	10.89	8.65

(Sumber: Hasil Perhitungan)

e) Kesimpulan Metode Yang Digunakan

Tabel L.33 Deviasi antara data terukur dengan data hasil rencana

Periode Ulang (Tahun)	Metode <i>Van breen</i>			Metode <i>Hasper dan Der Weduwen</i>		
	<i>Talbot</i>	<i>Sherman</i>	<i>Ishiguro</i>	<i>Talbot</i>	<i>Sherman</i>	<i>Ishiguro</i>
10	0.00	1.70	0.94	4.22	9.28	7.52
25	0.00	1.62	0.89	4.03	9.92	7.97
50	0.00	1.57	0.87	3.89	10.37	8.29
100	0.00	1.52	0.83	3.71	10.89	8.65
Rata-rata	0.00	1.60	0.88	3.96	10.12	8.11

(Sumber: Hasil Perhitungan)

Tabel L.34 Hujan efektif tiap periode ulang hujan

PUH	Intensitas Hujan/jam	Koefisien	Hujan Efektif
10	174.24	0.75	130.68
25	174.60	0.75	130.95
50	174.85	0.75	131.14
100	175.13	0.75	131.35

(Sumber: Hasil Perhitungan)

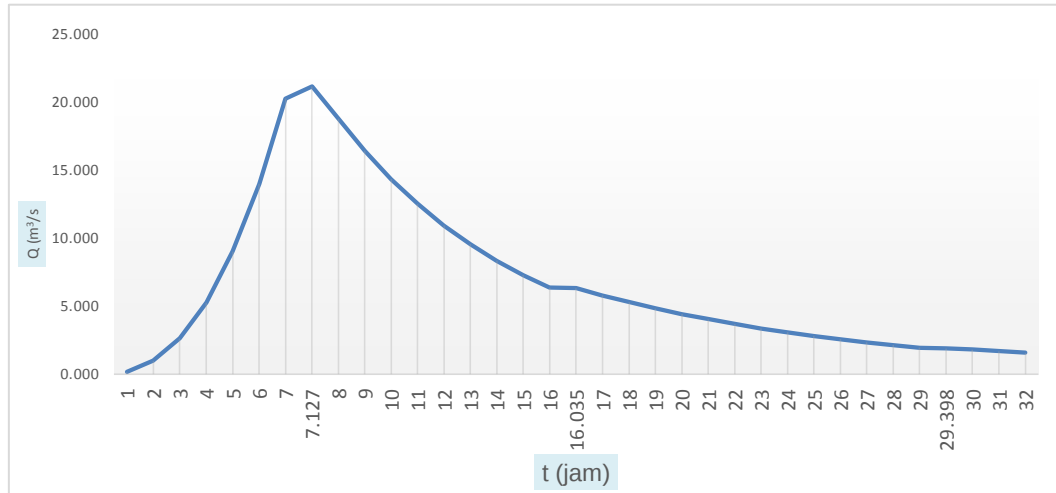
8. Hasil Analisis Debit Banjir Rencana

Tabel L.35 Perhitungan kenaikan dan penurunan debit banjir HSS Nakayasu

t (jam)	Rumus	Q (m ³ /s)
1	$Q_t = Q_p \left(\frac{t}{T_p} \right)^{2.4} \quad (2.38)$	0.190
2		1.002
3		2.651
4		5.288
5		9.034
6		13.994
7		20.259
7.127		21.150
8	$Q_t = Q_p \times 0.3^{\left(\frac{t-T_p}{T_{0.3}} \right)} \quad (2.39)$	18.795
9		16.419
10		14.344
11		12.530
12		10.946
13		9.563
14		8.354
15		7.298
16		6.375
16.035		6.345
17	$Q_t = Q_p \times 0.3^{\left(\frac{t-T_p+0.5T_{0.3}}{T_{0.3}} \right)} \quad (2.40)$	5.817
18		5.315
19		4.858
20		4.439
21		4.057
22		3.707
23		3.388
24		3.096
25		2.829
26		2.585
27		2.363
28		2.159
29		1.973
29.398		1.903
30	$Q_t = Q_p \times 0.3^{\left(\frac{t-T_p+1.5T_{0.3}}{2T_{0.3}} \right)} \quad (2.41)$	1.828
31		1.708
32		1.597

(Sumber: Hasil Perhitungan)

Grafik L.1 Debit banjir dengan HSS Nakayasu



(Sumber: Hasil Perhitungan)

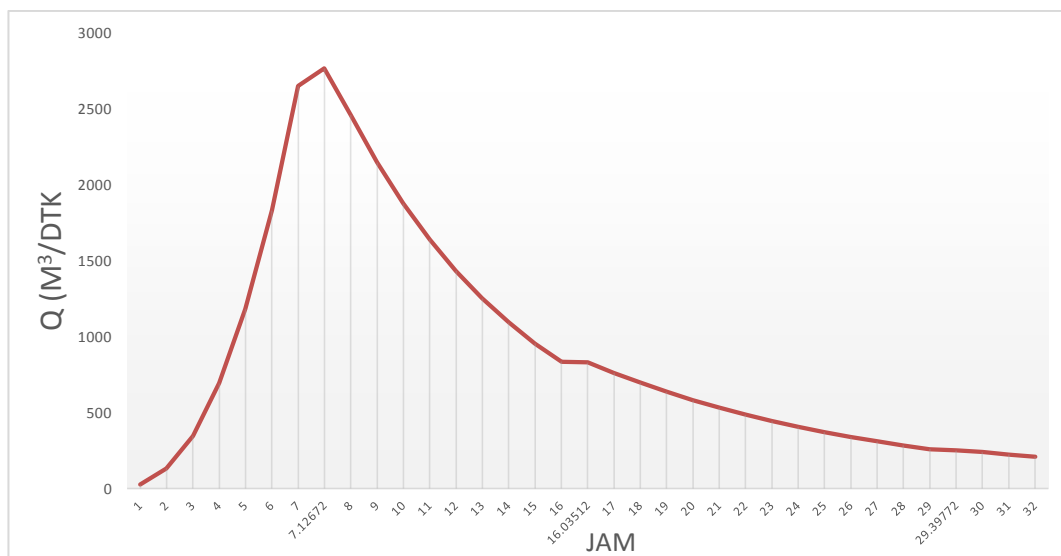
Tabel L.37 Analisis debit banjir periode 10, 25, 50, 100 tahun

Waktu (jam)	Q (m ³ /s)	PUH tahun Rencana (mm/jam)			
		10	25	50	100
		130.676	130.952	131.139	131.346
		Debit banjir (m ³ /s)			
1	0.190	24.807	24.859	24.895	24.934
2	1.002	130.931	131.207	131.395	131.602
3	2.651	346.467	347.196	347.694	348.242
4	5.288	691.058	692.513	693.506	694.598
5	9.034	1180.588	1183.075	1184.770	1186.636
6	13.994	1828.662	1832.514	1835.140	1838.030
7	20.259	2647.315	2652.891	2656.694	2660.878
7.12672	21.150	2763.794	2769.615	2773.585	2777.953
8	18.795	2456.113	2461.287	2464.815	2468.697
9	16.419	2145.623	2150.143	2153.224	2156.616
10	14.344	1874.383	1878.331	1881.023	1883.986
11	12.530	1637.432	1640.881	1643.233	1645.821
12	10.946	1430.436	1433.449	1435.503	1437.764
13	9.563	1249.607	1252.239	1254.033	1256.009
14	8.354	1091.637	1093.937	1095.504	1097.230
15	7.298	953.637	955.646	957.016	958.523

16	6.375	833.083	834.838	836.034	837.351
16.03512	6.345	829.138	830.885	832.075	833.386
17	5.817	760.101	761.702	762.793	763.995
18	5.315	694.610	696.073	697.071	698.169
19	4.858	634.762	636.099	637.011	638.014
20	4.439	580.071	581.293	582.126	583.043
21	4.057	530.092	531.208	531.970	532.808
22	3.707	484.419	485.439	486.135	486.901
23	3.388	442.681	443.614	444.249	444.949
24	3.096	404.540	405.392	405.973	406.612
25	2.829	369.684	370.463	370.994	371.578
26	2.585	337.832	338.544	339.029	339.563
27	2.363	308.724	309.375	309.818	310.306
28	2.159	282.125	282.719	283.124	283.570
29	1.973	257.817	258.360	258.730	259.137
29.39772	1.903	248.741	249.265	249.623	250.016
30	1.828	238.821	239.324	239.667	240.045
31	1.708	223.216	223.686	224.007	224.360
32	1.597	208.630	209.070	209.370	209.699
Rata - rata 24 jam		1101.769	1104.089	1105.672	1107.413

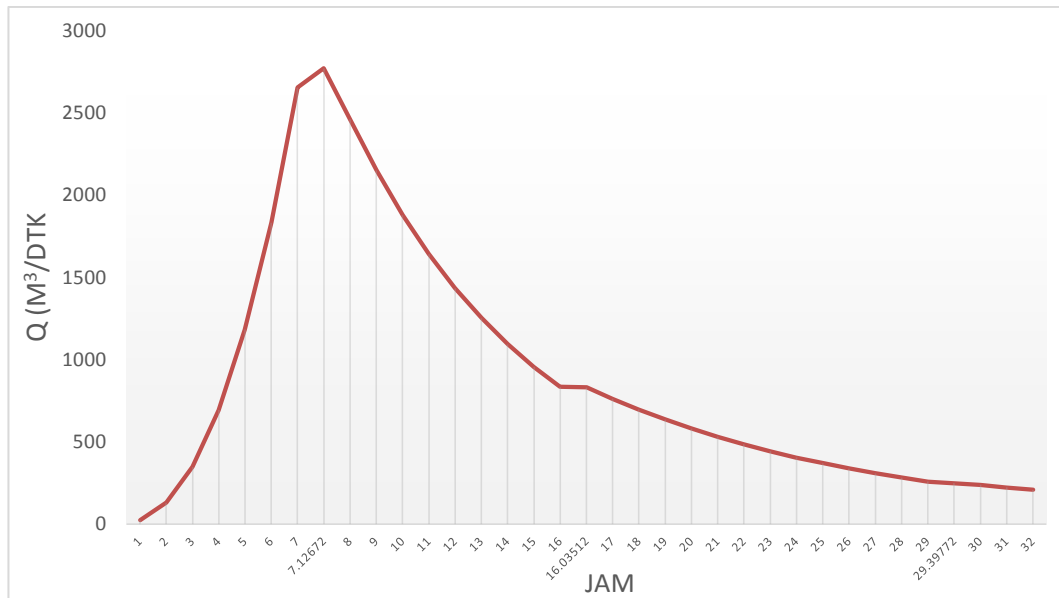
(Sumber: Hasil Perhitungan)

Grafik L.2 Debit banjir rencana periode 10 tahun



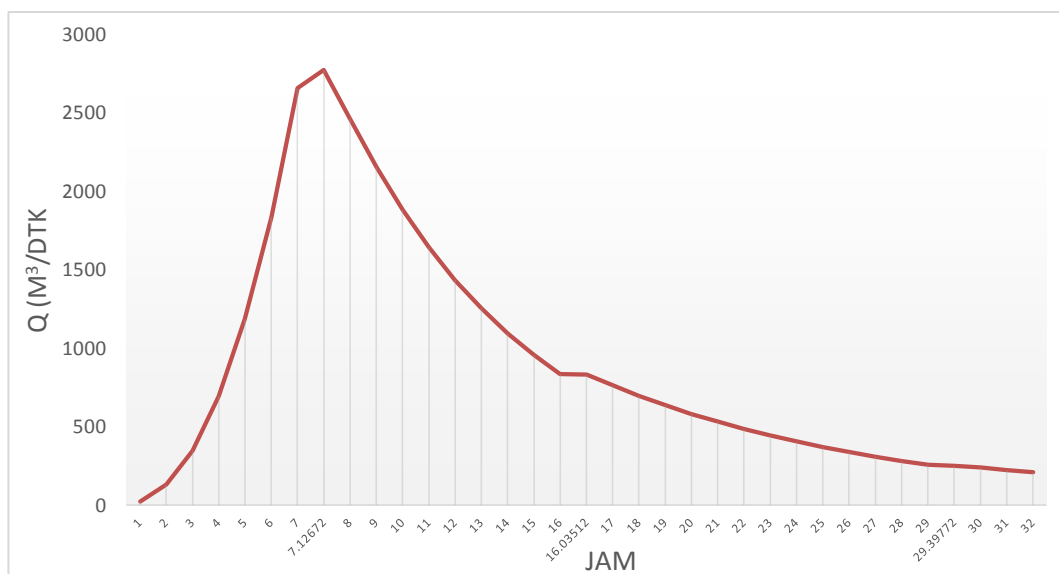
(Sumber: Hasil Perhitungan)

Grafik L.3 Debit banjir rencana periode 25 tahun



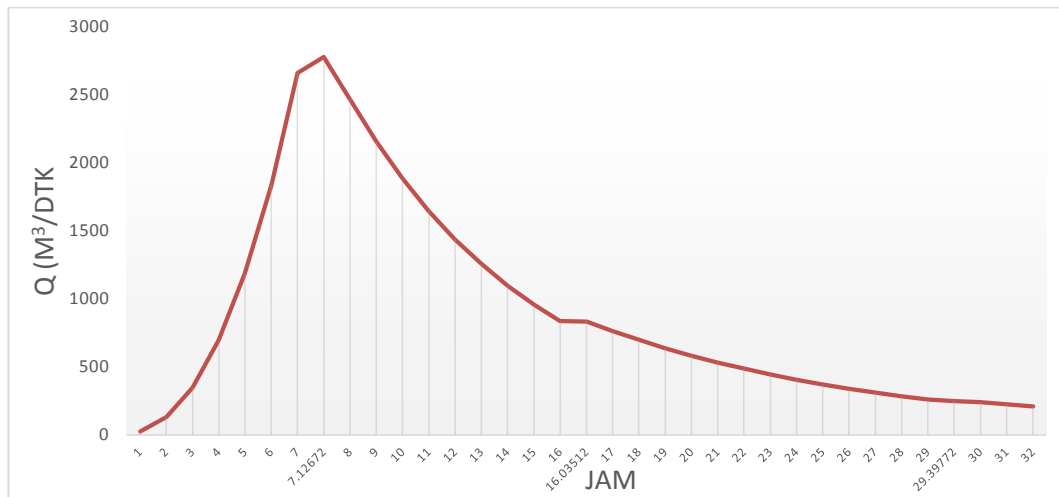
(Sumber: Hasil Perhitungan)

Grafik L.4 Debit banjir rencana periode 50 tahun



(Sumber: Hasil Perhitungan)

Grafik L.5 Debit banjir rencana periode 100 tahun



(Sumber: Hasil Perhitungan)