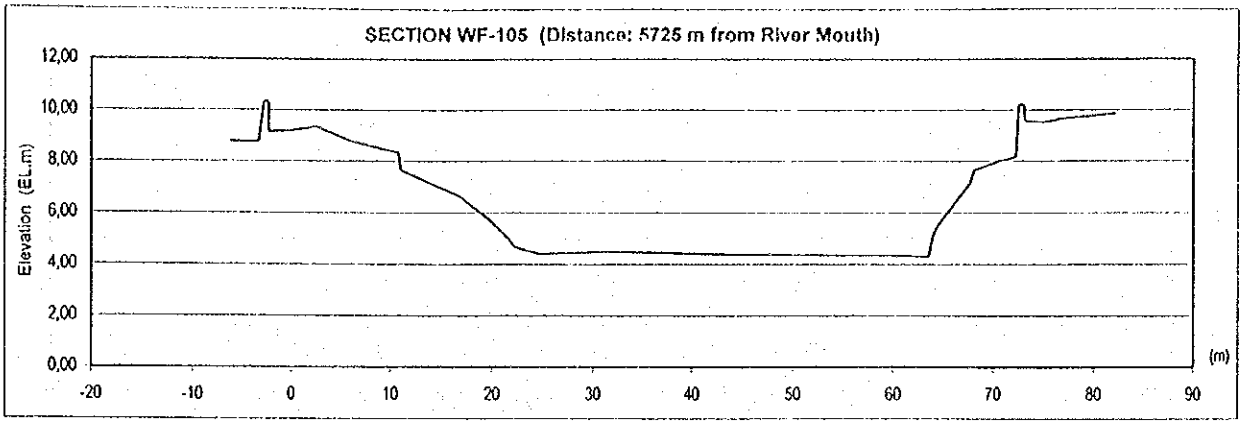
2.1.3 Garang River

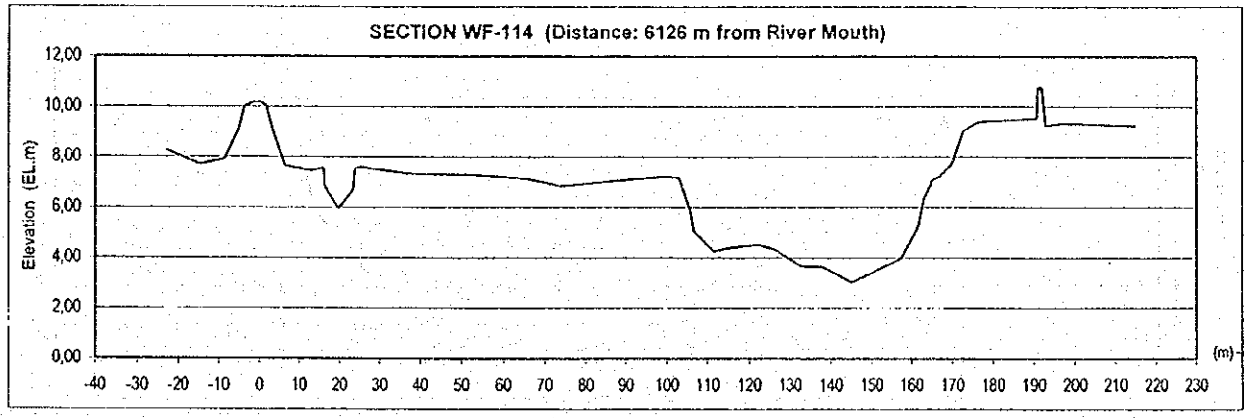
(1) River Cross Sections

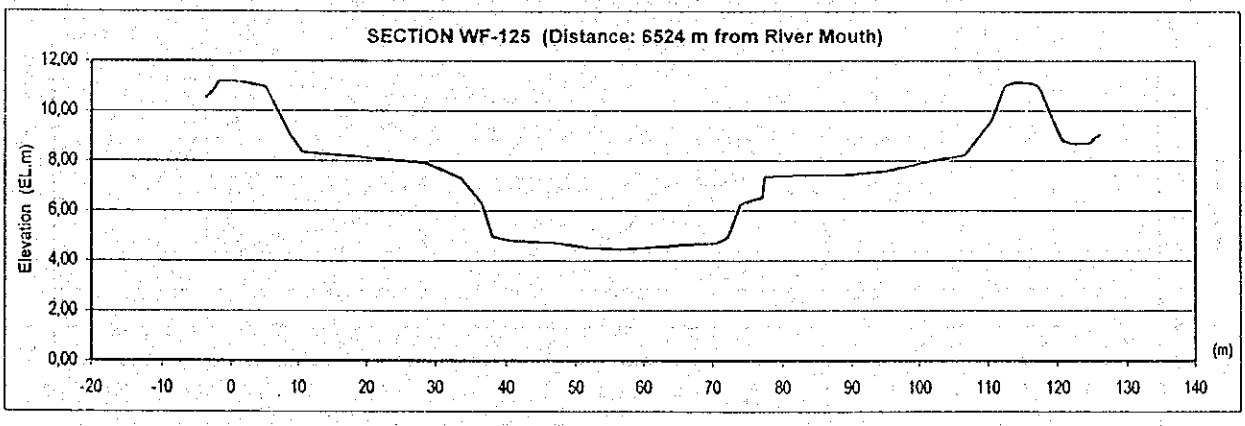
The typical cross sections of Garang River are shown in the following figures.

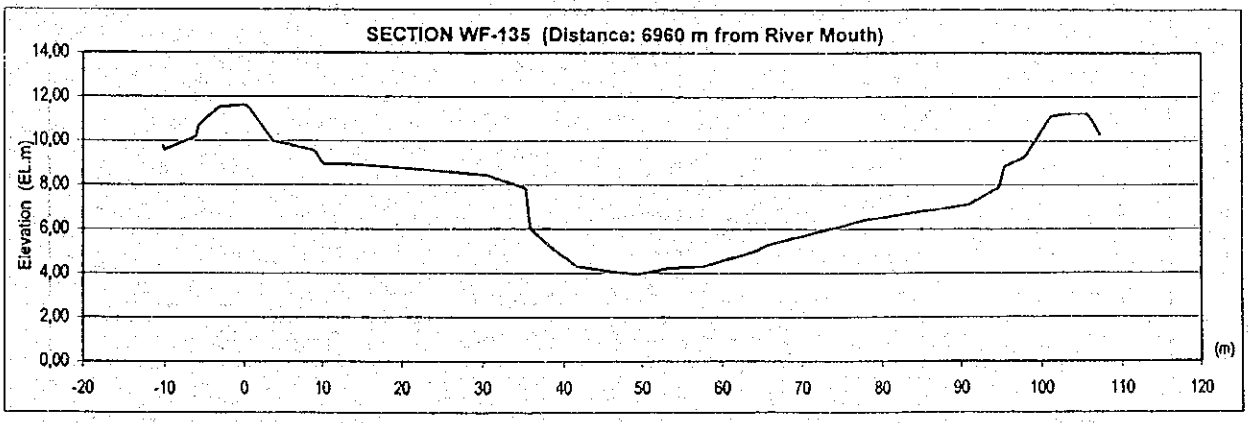
(2) River Flow Capacity

The flow capacity of channel was obtained based on the water level profile under several discharges. The calculation was done for the discharge of 300 m^3/s, 500 m^3/s, 700 m^3/s, 900 m^3/s, 1,000 m^3/s, 1,200 m^3/s. And, the water flow profiles and the chart of the flow capacity are shown in the following sheets.

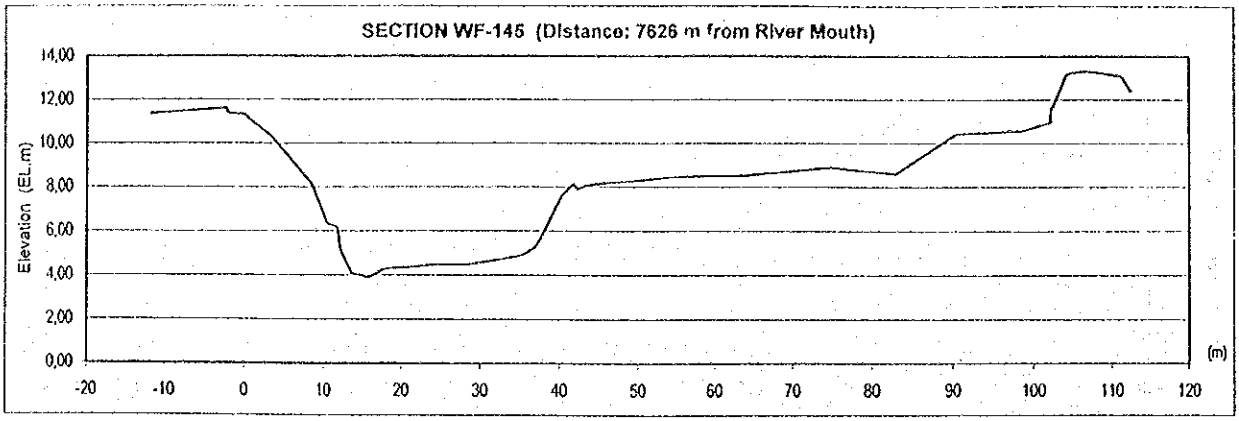


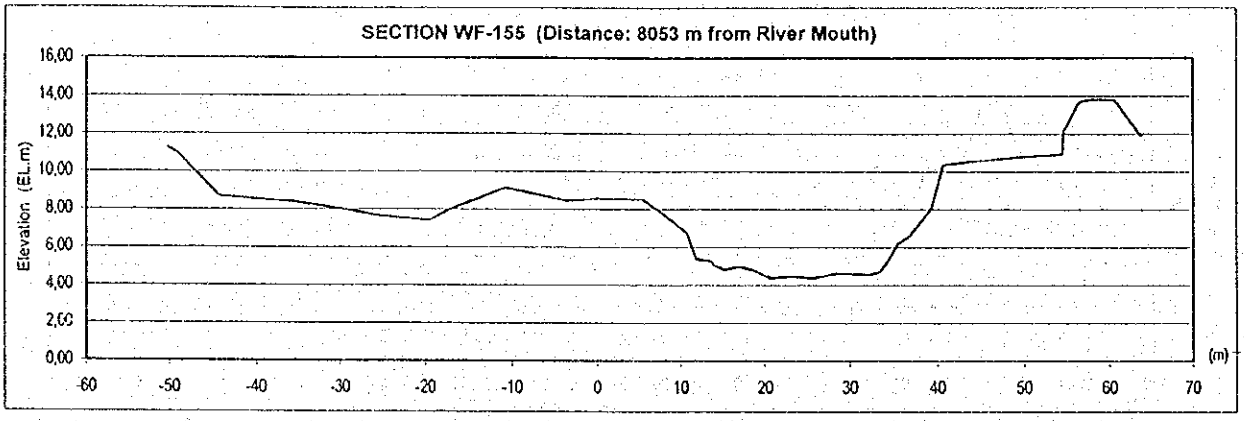


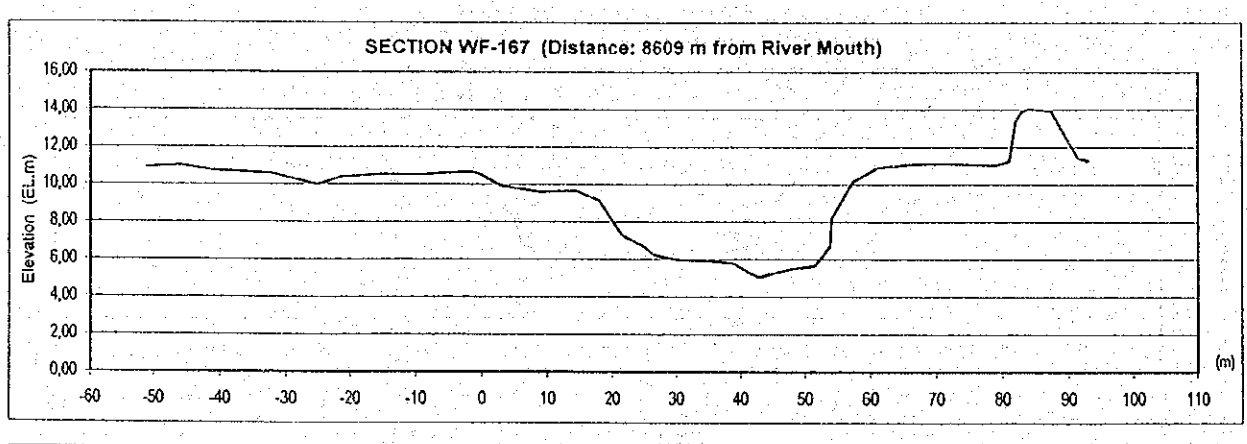


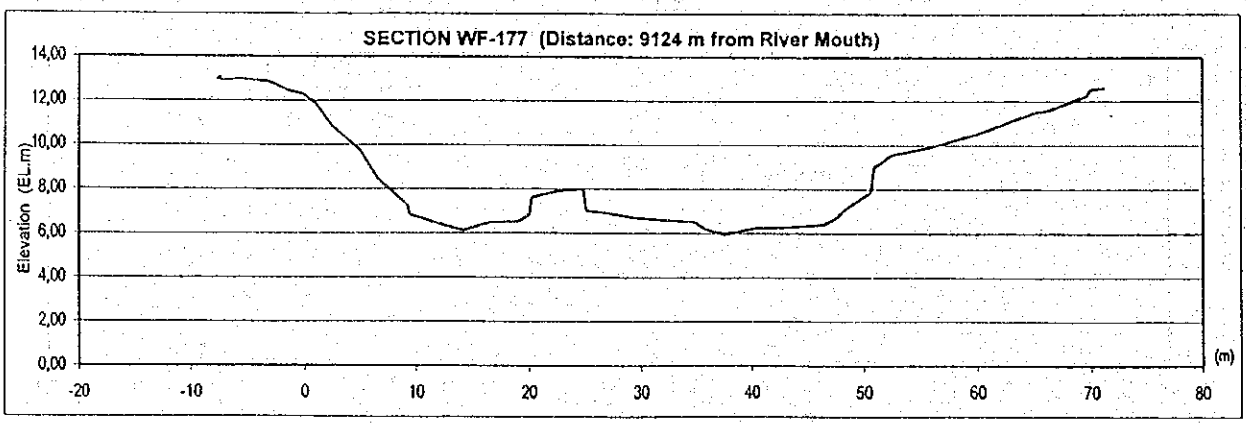


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig.
JAPAN INTERNATIONAL COOPERATION AGENCY	









THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig.
JAPAN INTERNATIONAL COOPERATION AGENCY	

GARANG RIVER FLOW CAPACITY CALCULATION (NON-UNIFORM STEADY FLOW

CASE NO.1

NO	D-NAME	H	A	R	B	V	N	Q	DX	FROUD	IE	TAU-0	U-*	HANT
1	WF-100	7.1	85.6	1.099	76.9	3.503	0.035	300	0	1.07E+00	1.33E-02	1427.86	37.787	
2	WF-101	7.934	179.7	2.95	77.5	1.669	0.035	300	49.8	3.11E-01	8.07E-04	233.29	15.274	
3	WF-102	7.976	177.6	2.88	80.5	1.689	0.035	300	54	3.18E-01	8.53E-04	240.67	15.513	
4	WF-103	8.03	185.2	2.839	81.1	1.619	0.035	300	51.1	3.07E-01	7.99E-04	222.35	14.911	
5	WF-104	8.072	183.2	3.002	70.8	1.637	0.035	300	58.4	3.02E-01	7.58E-04	223.08	14.936	
6	WF-105	8.107	181.5	3.149	60.3	1.653	0.035	300	50.6	2.98E-01	7.25E-04	223.72	14.957	
7	WF-106	8.131	175.1	3.308	57	1.714	0.035	300	47.4	3.01E-01	7.30E-04	236.61	15.382	
8	WF-107	8.165	172.3	3.357	59.5	1.742	0.035	300	52	3.04E-01	7.39E-04	243.17	15.594	
9	WF-108	8.231	191.9	3.287	60.9	1.563	0.035	300	54	2.75E-01	6.13E-04	197.31	14.047	
10	WF-109	8.223	167.8	3.349	51.3	1.787	0.035	300	43.2	3.12E-01	7.81E-04	256.33	16.01	
11	WF-110	8.256	166	3.63	45.6	1.807	0.035	300	49.5	3.03E-01	7.17E-04	255.03	15.97	
12	WF-111	8.337	199.1	3.583	60.9	1.507	0.035	300	48.3	2.54E-01	5.08E-04	178.2	13.349	
13	WF-112	8.387	239.6	3.639	67.4	1.252	0.035	300	32.9	2.10E-01	3.43E-04	122.41	11.064	
14	WF-113	8.43	310.4	3.251	95.3	0.966	0.035	300	39.5	1.71E-01	2.38E-04	75.7	8.7	
15	WF-114	8.446	337.4	2.931	121.6	0.889	0.035	300	34.9	1.66E-01	2.31E-04	66.32	8.144	
16	WF-115	8.463	395	2.483	164.5	0.759	0.035	300	30.5	1.54E-01	2.10E-04	51.13	7.15	
17	WF-116	8.473	397.2	2.209	181.1	0.755	0.035	300	40.1	1.62E-01	2.43E-04	52.58	7.251	
18	WF-117	8.45	251.9	1.859	423.8	1.191	0.035	300	41.4	2.79E-01	7.60E-04	138.5	11.768	
19	WF-118	8.501	313.1	1.753	304.5	0.958	0.035	300	38.3	2.31E-01	5.32E-04	91.4	9.561	
20	WF-119	8.525	345.9	2.283	197.9	0.867	0.035	300	37.7	1.83E-01	3.06E-04	68.56	8.28	
21	WF-120	8.54	361.5	2.167	176.5	0.83	0.035	300	38.2	1.80E-01	3.01E-04	63.9	7.994	
22	WF-121	8.515	244	2.28	149.5	1.23	0.035	300	38.4	2.60E-01	6.17E-04	137.91	11.744	
23	WF-122	8.555	280.6	2.301	150	1.069	0.035	300	37.8	2.25E-01	4.61E-04	103.92	10.194	
24	WF-123	8.549	234.3	2.018	127.8	1.28	0.035	300	32.3	2.88E-01	7.88E-04	155.74	12.48	
25	WF-124	8.553	207.2	2.146	118.7	1.448	0.035	300	30.9	3.16E-01	9.27E-04	195.05	13.966	
26	WF-125	8.563	191.8	2.747	84.9	1.564	0.035	300	32.8	3.01E-01	7.79E-04	209.62	14.478	
27	WF-126	8.589	182.8	3.067	78.6	1.641	0.035	300	51.6	2.99E-01	7.41E-04	222.55	14.918	
28	WF-127	8.642	195.2	2.915	98.2	1.537	0.035	300	49.9	2.88E-01	6.95E-04	198.52	14.09	
29	WF-128	8.701	230.6	2.591	127.1	1.301	0.035	300	39.1	2.58E-01	5.83E-04	147.98	12.165	
30	WF-129	8.76	322.9	2.887	127.3	0.929	0.035	300	38.4	1.75E-01	2.57E-04	72.77	8.531	
31	WF-130	8.73	225.9	2.058	219.1	1.328	0.035	300	29.5	2.96E-01	8.25E-04	166.43	12.901	
32	WF-131	8.723	185.3	2.855	97.6	1.619	0.035	300	45.5	3.06E-01	7.93E-04	221.9	14.896	
33	WF-132	8.793	233.8	2.621	151.9	1.283	0.035	300	30.7	2.53E-01	5.58E-04	143.33	11.972	
34	WF-133	8.804	218.2	2.496	155.6	1.375	0.035	300	37.4	2.78E-01	6.84E-04	167.24	12.932	
35	WF-134	8.79	179.9	2.885	84.5	1.668	0.035	300	41.7	3.14E-01	8.30E-04	234.61	15.317	
36	WF-135	8.876	209.1	3.267	81.4	1.435	0.035	300	72	2.54E-01	5.20E-04	166.55	12.905	
37	WF-136	8.85	162.8	3.021	86.2	1.843	0.035	300	58.2	3.39E-01	9.53E-04	282.1	16.796	
38	WF-137	8.955	168.6	2.547	96.1	1.779	0.035	300	89.7	3.56E-01	1.12E-03	278.31	16.683	
39	WF-138	9.096	250.5	3.3	74.3	1.197	0.035	300	72.5	2.11E-01	3.58E-04	115.63	10.753	
40	WF-139	9.118	237.6	2.434	100.1	1.262	0.035	300	61.8	2.59E-01	5.96E-04	142.23	11.926	
41	WF-140	9.183	324.6	2.575	123.7	0.924	0.035	300	61.6	1.84E-01	2.97E-04	74.82	8.65	
42	WF-141	9.151	210.4	2.707	110.3	1.426	0.035	300	59.1	2.77E-01	6.60E-04	175.05	13.231	
43	WF-142	9.17	179.2	3.337	67.3	1.674	0.035	300	86.4	2.93E-01	6.88E-04	225.09	15.003	
44	WF-143	9.18	156	3.545	51.5	1.923	0.035	300	73.1	3.26E-01	8.38E-04	291.29	17.067	
45	WF-144	9.191	141.7	3.644	57.8	2.117	0.035	300	56.2	3.54E-01	9.79E-04	349.58	18.697	
46	WF-145	9.306	172	3.147	94.6	1.744	0.035	300	45.9	3.14E-01	8.08E-04	249.25	15.787	
47	WF-146	9.248	136.2	3.662	42.3	2.202	0.035	300	36.2	3.68E-01	1.05E-03	377.69	19.434	
48	WF-147	9.366	165.2	3.412	64.8	1.816	0.035	300	42.4	3.14E-01	7.87E-04	263.04	16.219	
49	WF-148	9.403	164.9	3.763	47	1.819	0.035	300	50.3	3.00E-01	6.93E-04	255.4	15.981	
50	WF-149	9.402	145.4	3.587	67.6	2.063	0.035	300	58	3.48E-01	9.49E-04	333.73	18.268	
51	WF-150	9.451	150.1	3.942	60.2	1.999	0.035	300	41.5	3.22E-01	7.86E-04	303.54	17.422	
52	WF-151	9.47	145.5	3.224	54.6	2.062	0.035	300	33.4	3.67E-01	1.09E-03	345.64	18.591	
53	WF-152	9.499	145.5	3.126	53.8	2.062	0.035	300	26.5	3.73E-01	1.14E-03	349.2	18.687	
54	WF-153	9.603	174.4	3.395	56.9	1.72	0.035	300	40.9	2.98E-01	7.11E-04	236.41	15.375	
55	WF-154	9.637	174.5	3.267	70.8	1.72	0.035	300	45.8	3.04E-01	7.47E-04	239.27	15.468	
56	WF-155	9.696	188.5	3.034	91.2	1.591	0.035	300	51.8	2.92E-01	7.06E-04	209.94	14.489	
57	WF-156	9.65	143.8	3.468	46.1	2.086	0.035	300	54.5	3.58E-01	1.02E-03	345.2	18.579	
58	WF-157	9.731	152.2	3.173	61.9	1.971	0.035	300	56.1	3.53E-01	1.02E-03	317.22	17.811	
59	WF-158	9.826	176.4	3.23	96.3	1.701	0.035	300	50.2	3.02E-01	7.43E-04	235.02	15.33	
60	WF-159	9.79	141.7	3.31	55.9	2.118	0.035	300	48.6	3.72E-01	1.11E-03	361.28	19.007	
61	WF-160	9.845	139	3.582	49.3	2.158	0.035	300	59.6	3.64E-01	1.04E-03	365.45	19.117	
62	WF-161	9.888	141.8	3.486	47.9	2.116	0.035	300	32	3.62E-01	1.04E-03	354.33	18.824	
63	WF-162	9.975	153	3.44	46.2	1.961	0.035	300	56.4	3.38E-01	9.07E-04	305.8	17.487	
64	WF-163	10.007	146.7	3.437	47.1	2.046	0.035	300	52.3	3.52E-01	9.88E-04	332.86	18.244	
65	WF-164	10.072	155.6	2.751	72.6	1.928	0.035	300	38	3.71E-01	1.18E-03	318.31	17.841	
66	WF-165	10.043	130.9	3.321	46.4	2.292	0.035	300	39.6	4.02E-01	1.30E-03	422.59	20.557	
67	WF-166	10.135	150.2	3.224	48.8	1.997	0.035	300	23.9	3.55E-01	1.03E-03	324.01	18	
68	WF-167	10.199	159	3.373	56.3	1.887	0.035	300	45.1	3.28E-01	8.63E-04	285.09	16.885	
69	WF-168	10.277	181.9	3.16	81.3	1.649	0.035	300	44.5	2.96E-01	7.19E-04	222.54	14.918	
70	WF-169	10.259	150.7	3.485	51.3	1.991	0.035	300	55.1	3.41E-01	9.19E-04	313.97	17.719	
71	WF-170	10.313	152.5	3.449	64.7	1.968	0.035	300	53.4	3.38E-01	9.10E-04	307.61	17.539	
72	WF-171	10.367	154.3	3.409	61.8	1.944	0.035	300	55	3.36E-01	9.03E-04	301.52	17.364	
73	WF-172	10.437	166.4	3.298	76.4	1.803	0.035	300	49.5	3.17E-01	8.11E-04	262.16	16.191	
74	WF-173	10.505	178	3.367	83.7	1.686	0.035	300	63.1	2.93E-01	6.90E-04	227.6	15.086	
75	WF-174	10.538	175.7	3.4	116.4	1.707	0.035	300	52.6	2.96E-01	6.98E-04	232.67	15.253	
76	WF-175	10.627	227.9	3.276	96.5	1.317	0.035	300	51.1	2.32E-01	4.36E-04	140.1	11.836	
77	WF-176	10.616	194.8	3.251	73.2	1.54	0.035	300	41.9	2.73E-01	6.03E-04	192.13	13.861	
78	WF-177	10.628	181.3	3.402	57.5	1.655	0.035	300	49.3	2.87E-01	6.56E-04	218.53	14.783	
79	WF-178	10.716	233.7	2.867	77.1	1.284	0.035	300	55	2.42E-01	4.96E-04	139.23	11.799	
80	WF-179	10.737	222.7	2.872	87	1.347	0.035	300	58	2.54E-01	5.45E-04	153.26	12.38	

CASE NO.2

NO	D-NAME	H	A	R	B	V	N	Q	DX	FROUD	IE	TAU-0	U-*	HANT
1	WF-100	7.8	141.1	1.752	80.7	3.542	0.035	500	0	8.55E-01	7.28E-03	1249.62	35.35	
2	WF-101	8.38	214.8	3.23	79.9	2.327	0.035	500	49.8	4.14E-01	1.39E-03	439.94	20.975	
3	WF-102	8.461	217.2	3.181	82.4	2.302	0.035	500	54	4.12E-01	1.39E-03	432.56	20.798	
4	WF-103	8.554	228.1	3.183	82.7	2.192	0.035	500	51.1	3.93E-01	1.26E-03	392.12	19.802	
5	WF-104	8.616	223.7	3.359	78.1	2.235	0.035	500	58.4	3.90E-01	1.22E-03	400.51	20.013	
6	WF-105	8.659	216.3	3.602	66.3	2.311	0.035	500	50.6	3.89E-01	1.19E-03	418.4	20.455	
7	WF-106	8.694	208.1	3.724	65.6	2.403	0.035	500	47.4	3.98E-01	1.23E-03	447.13	21.146	
8	WF-107	8.758	208.4	3.79	62.2	2.399	0.035	500	52	3.94E-01	1.19E-03	443.21	21.053	
9	WF-108	8.871	230.7	3.799	62.8	2.167	0.035	500	54	3.55E-01	9.71E-04	361.41	19.011	
10	WF-109	8.833	197.5	3.819	57.3	2.531	0.035	500	43.2	4.14E-01	1.32E-03	492.13	22.184	
11	WF-110	8.885	194.9	4.224	46.3	2.566	0.035	500	49.5	3.99E-01	1.18E-03	489	22.113	
12	WF-111	9.048	240.3	4.139	64.8	2.081	0.035	500	48.3	3.27E-01	7.98E-04	323.78	17.994	
13	WF-112	9.135	285.8	4.287	70.2	1.749	0.035	500	32.9	2.70E-01	5.38E-04	226.16	15.039	
14	WF-113	9.222	385.7	3.988	96.7	1.296	0.035	500	39.5	2.07E-01	3.26E-04	127.23	11.28	
15	WF-114	9.251	434	3.612	124.2	1.152	0.035	500	34.9	1.94E-01	2.93E-04	103.86	10.191	
16	WF-115	9.281	528.6	3.222	166.5	0.946	0.035	500	30.5	1.68E-01	2.30E-04	72.72	8.528	
17	WF-116	9.294	544.6	2.961	182.7	0.918	0.035	500	40.1	1.70E-01	2.43E-04	70.46	8.394	
18	WF-117	9.254	332.6	1.706	628	1.503	0.035	500	41.4	3.68E-01	1.36E-03	227.06	15.069	
19	WF-118	9.339	427.6	2.003	418.5	1.169	0.035	500	38.3	2.64E-01	6.63E-04	130.2	11.41	
20	WF-119	9.37	471.5	2.806	260.7	1.061	0.035	500	37.7	2.02E-01	3.48E-04	95.72	9.784	
21	WF-120	9.391	512.2	2.94	178.6	0.976	0.035	500	38.2	1.82E-01	2.77E-04	79.86	8.936	
22	WF-121	9.363	371.9	2.834	152.5	1.344	0.035	500	38.4	2.55E-01	5.52E-04	153.31	12.382	
23	WF-122	9.397	407	2.947	150	1.229	0.035	500	37.8	2.29E-01	4.38E-04	126.39	11.242	

24	WF-123	9.383	342.5	2.728	130	1.46	0.035	500	32.3	2.82E-01	6.85E-04	183.14	13.533	
25	WF-124	9.38	306.3	2.781	120	1.632	0.035	500	30.9	3.13E-01	8.35E-04	227.43	15.081	
26	WF-125	9.356	260.4	3.32	87.8	1.92	0.035	500	32.8	3.37E-01	9.12E-04	296.61	17.222	
27	WF-126	9.382	245.7	3.413	93.3	2.035	0.035	500	51.6	3.52E-01	9.87E-04	330.14	18.17	
28	WF-127	9.473	277.7	3.231	105.1	1.8	0.035	500	49.9	3.20E-01	8.31E-04	263.16	16.222	
29	WF-128	9.556	339.4	3.086	127.9	1.473	0.035	500	39.1	2.68E-01	5.92E-04	179.01	13.379	
30	WF-129	9.615	431.5	3.489	129	1.159	0.035	500	38.4	1.98E-01	3.11E-04	106.26	10.308	
31	WF-130	9.559	291.4	2.001	298.4	1.716	0.035	500	29.5	3.88E-01	1.43E-03	280.52	16.749	
32	WF-131	9.542	237.4	3.226	126	2.106	0.035	500	45.5	3.75E-01	1.14E-03	360.46	18.986	
33	WF-132	9.702	372.6	2.76	156.5	1.342	0.035	500	30.7	2.58E-01	5.70E-04	154.11	12.414	
34	WF-133	9.723	369.3	2.583	179.9	1.354	0.035	500	37.4	2.69E-01	6.34E-04	160.38	12.664	
35	WF-134	9.645	248.2	3.207	95.3	2.014	0.035	500	41.7	3.59E-01	1.05E-03	330.34	18.175	
36	WF-135	9.747	274.7	3.607	116.1	1.82	0.035	500	72	3.06E-01	7.34E-04	259.34	16.104	
37	WF-136	9.749	240.6	3.265	89.6	2.078	0.035	500	58.2	3.67E-01	1.09E-03	349.46	18.694	
38	WF-137	9.888	265.9	2.757	128.5	1.881	0.035	500	89.7	3.62E-01	1.12E-03	302.76	17.4	
39	WF-138	10.003	319	3.615	87.1	1.567	0.035	500	72.5	2.63E-01	5.42E-04	192.14	13.861	
40	WF-139	10.048	332.7	3.207	149.1	1.503	0.035	500	61.8	2.68E-01	5.85E-04	183.86	13.56	
41	WF-140	10.126	442.2	3.412	126.6	1.131	0.035	500	61.6	1.96E-01	3.05E-04	101.93	10.096	
42	WF-141	10.091	314.8	3.172	115.6	1.588	0.035	500	59.1	2.85E-01	6.63E-04	206.07	14.355	
43	WF-142	10.066	239.6	3.694	131.1	2.087	0.035	500	86.4	3.47E-01	9.34E-04	338.13	18.388	
44	WF-143	10.023	191.9	4.087	63.5	2.605	0.035	500	73.1	4.12E-01	1.27E-03	509.69	22.576	
45	WF-144	10.025	174	4.243	74.6	2.873	0.035	500	56.2	4.46E-01	1.47E-03	612.23	24.743	
46	WF-145	10.283	238.1	3.175	147.2	2.1	0.035	500	46.9	3.76E-01	1.16E-03	360.07	18.976	
47	WF-146	10.14	175.2	4.164	68.6	2.854	0.035	500	36.2	4.47E-01	1.49E-03	607.68	24.651	
48	WF-147	10.368	230.3	3.781	86.1	2.171	0.035	500	42.4	3.57E-01	9.80E-04	363.14	19.056	
49	WF-148	10.349	203.1	4.496	53.7	2.462	0.035	500	50.3	3.71E-01	1.00E-03	440.97	20.999	
50	WF-149	10.348	183.4	4.123	97.4	2.727	0.035	500	58	4.29E-01	1.38E-03	556.67	23.594	
51	WF-150	10.415	186.9	4.432	78.2	2.676	0.035	500	41.5	4.06E-01	1.21E-03	523.26	22.875	
52	WF-151	10.51	202.4	3.896	57.3	2.47	0.035	500	33.4	4.00E-01	1.22E-03	465.46	21.575	
53	WF-152	10.544	202.8	3.774	60.9	2.466	0.035	500	26.5	4.06E-01	1.27E-03	468.9	21.654	
54	WF-153	10.666	235.1	4.201	59.5	2.127	0.035	500	40.9	3.32E-01	8.18E-04	336.63	18.348	
55	WF-154	10.732	250.9	3.726	83.7	1.993	0.035	500	45.8	3.30E-01	8.42E-04	307.43	17.534	
56	WF-155	10.815	279.7	3.158	126	1.788	0.035	500	51.8	3.21E-01	8.45E-04	261.59	16.174	
57	WF-156	10.673	186.7	4.05	56.7	2.678	0.035	500	54.5	4.25E-01	1.36E-03	540.31	23.245	
58	WF-157	10.816	208.6	3.909	90.3	2.396	0.035	500	56.1	3.87E-01	1.14E-03	437.67	20.92	
59	WF-158	10.968	257.4	3.4	179.7	1.942	0.035	500	50.2	3.37E-01	9.04E-04	301.15	17.354	
60	WF-159	10.889	198.1	3.85	77.7	2.523	0.035	500	48.6	4.11E-01	1.29E-03	487.77	22.086	
61	WF-160	10.951	193.9	4.002	76.1	2.579	0.035	500	59.6	4.12E-01	1.28E-03	503.02	22.428	
62	WF-161	10.978	189.7	4.046	62.9	2.635	0.035	500	32	4.19E-01	1.32E-03	523.17	22.873	
63	WF-162	11.076	197.8	4.174	52.8	2.527	0.035	500	56.4	3.95E-01	1.16E-03	476.19	21.822	
64	WF-163	11.129	195.7	4.279	59	2.555	0.035	500	52.3	3.95E-01	1.15E-03	482.7	21.97	
65	WF-164	11.301	251.9	3.417	86	1.985	0.035	500	38	3.43E-01	9.38E-04	314.14	17.724	
66	WF-165	11.269	214.5	3.415	122.6	2.331	0.035	500	39.6	4.03E-01	1.29E-03	433.12	20.812	
67	WF-166	11.299	214.4	3.541	115.9	2.332	0.035	500	23.9	3.96E-01	1.24E-03	428.46	20.699	
68	WF-167	11.367	221.2	3.929	75.9	2.26	0.035	500	45.1	3.64E-01	1.01E-03	388.57	19.712	
69	WF-168	11.504	280.2	3.439	87.1	1.784	0.035	500	44.5	3.07E-01	7.51E-04	253.23	15.913	
70	WF-169	11.421	207.4	4.007	65.3	2.411	0.035	500	55.1	3.85E-01	1.12E-03	439.47	20.964	
71	WF-170	11.507	217.6	3.825	110.3	2.297	0.035	500	53.4	3.75E-01	1.08E-03	405.18	20.129	
72	WF-171	11.571	220	3.94	86.7	2.272	0.035	500	55	3.66E-01	1.02E-03	392.46	19.811	
73	WF-172	11.666	242.5	3.615	116.2	2.062	0.035	500	49.5	3.47E-01	9.39E-04	332.67	18.239	
74	WF-173	11.74	253.4	3.728	146.3	1.973	0.035	500	63.1	3.26E-01	8.25E-04	301.36	17.36	
75	WF-174	11.773	245.5	3.51	213.5	2.037	0.035	500	52.6	3.47E-01	9.52E-04	327.65	18.101	
76	WF-175	11.919	355.6	3.789	124.6	1.406	0.035	500	51.1	2.31E-01	4.10E-04	152.21	12.338	
77	WF-176	11.888	289.1	4.057	80.6	1.729	0.035	500	41.9	2.74E-01	5.66E-04	225.12	15.004	
78	WF-177	11.873	254.1	4.292	66.7	1.968	0.035	500	49.3	3.03E-01	6.80E-04	286.05	16.913	
79	WF-178	11.995	331.1	2.578	116.5	1.51	0.035	500	55	3.00E-01	7.90E-04	199.64	14.13	
80	WF-179	12.037	340.5	3.878	96.9	1.468	0.035	500	58	2.38E-01	4.34E-04	164.76	12.836	

CASE NO.3

NO	D-NAME	H	A	R	B	V	N	Q	DX	FROUD	IE	TAU-0	U-*	HANT
1	WF-100	8.51	198.4	2.424	80.7	3.527	0.035	700	0	7.24E-01	4.68E-03	1112.03	33.347	
2	WF-101	8.928	258.7	3.603	81.1	2.706	0.035	700	49.8	4.55E-01	1.62E-03	573.49	23.948	
3	WF-102	9.031	264.5	3.583	83.7	2.646	0.035	700	54	4.47E-01	1.56E-03	549.36	23.438	
4	WF-103	9.137	276.2	3.585	84.4	2.535	0.035	700	51.1	4.28E-01	1.44E-03	504.02	22.45	
5	WF-104	9.202	268.8	3.737	85.6	2.605	0.035	700	58.4	4.30E-01	1.43E-03	524.81	22.909	
6	WF-105	9.243	257.3	4.018	75.5	2.721	0.035	700	50.6	4.34E-01	1.42E-03	559.02	23.644	
7	WF-106	9.294	251.6	4.032	83.7	2.782	0.035	700	47.4	4.43E-01	1.48E-03	583.93	24.165	
8	WF-107	9.35	245.2	4.227	64.7	2.855	0.035	700	52	4.44E-01	1.46E-03	605.01	24.597	
9	WF-108	9.49	268.3	4.295	64.6	2.609	0.035	700	54	4.02E-01	1.20E-03	502.83	22.424	
10	WF-109	9.409	225.5	4.263	63	3.104	0.035	700	43.2	4.80E-01	1.71E-03	713.23	26.706	
11	WF-110	9.471	221.7	4.777	46.9	3.157	0.035	700	49.5	4.62E-01	1.52E-03	710.62	26.657	
12	WF-111	9.72	279.2	4.663	68.6	2.507	0.035	700	48.3	3.71E-01	9.88E-04	451.64	21.252	
13	WF-112	9.837	329.2	4.895	72.9	2.126	0.035	700	32.9	3.07E-01	6.67E-04	319.7	17.88	
14	WF-113	9.968	456.5	4.682	98	1.533	0.035	700	39.5	2.26E-01	3.68E-04	168.71	12.989	
15	WF-114	10.009	524.9	4.254	126.6	1.334	0.035	700	34.9	2.07E-01	3.16E-04	131.77	11.479	
16	WF-115	10.05	654.1	3.916	168.3	1.07	0.035	700	30.5	1.73E-01	2.27E-04	87.23	9.34	
17	WF-116	10.064	683	3.666	184.3	1.025	0.035	700	40.1	1.71E-01	2.28E-04	81.77	9.043	
18	WF-117	10.014	408.8	1.562	820.7	1.713	0.035	700	41.4	4.38E-01	1.98E-03	303.47	17.42	
19	WF-118	10.128	535.4	2.239	525.9	1.307	0.035	700	38.3	2.79E-01	7.15E-04	156.83	12.523	
20	WF-119	10.163	589.3	3.297	319.7	1.188	0.035	700	37.7	2.09E-01	3.52E-04	113.8	10.668	
21	WF-120	10.188	653.3	3.662	180.6	1.072	0.035	700	38.2	1.79E-01	2.49E-04	89.42	9.456	
22	WF-121	10.157	492.5	3.404	155.3	1.421	0.035	700	38.4	2.46E-01	4.83E-04	161.22	12.697	
23	WF-122	10.187	525.4	3.568	150	1.332	0.035	700	37.8	2.25E-01	3.99E-04	139.44	11.809	
24	WF-123	10.167	444.2	3.412	130.4	1.576	0.035	700	32.3	2.73E-01	5.92E-04	198	14.071	
25	WF-124	10.157	399.6	3.431	120	1.752	0.035	700	30.9	3.02E-01	7.26E-04	244.23	15.628	
26	WF-125	10.105	326	3.881	90.6	2.147	0.035	700	32.8	3.48E-01	9.26E-04	352.26	18.769	
27	WF-126	10.124	304.7	3.736	107	2.298	0.035	700	51.6	3.80E-01	1.12E-03	408.42	20.209	
28	WF-127	10.244	354.3	3.525	111.5	1.976	0.035	700	49.9	3.36E-01	8.92E-04	307.92	17.548	
29	WF-128	10.343	439.5	3.542	128.7	1.593	0.035	700	39.1	2.70E-01	5.76E-04	199.75	14.133	
30	WF-129	10.401	531.3	4.042	130.5	1.318	0.035	700	38.4	2.09E-01	3.30E-04	130.84	11.438	
31	WF-130	10.321	351.5	1.948	371.2	1.991	0.035	700	29.5	4.56E-01	2.00E-03	381.25	19.526	
32	WF-131	10.293	285.2	3.566	152	2.455	0.035	700	45.5	4.15E-01	1.36E-03	473.43	21.758	
33	WF-132	10.529	498.8	2.887	160.7	1.403	0.035	700	30.7	2.64E-01	5.87E-04	166.03	12.885	
34	WF-133	10.555	506	2.662	201.9	1.383	0.035	700	37.4	2.71E-01	6.35E-04	165.75	12.874	
35	WF-134	10.432	311.2	3.503	105.3	2.25	0.035	700	41.7	3.84E-01	1.17E-03	400	20	
36	WF-135	10.54	334.4	3.917	147.6	2.093	0.035	700	72	3.38E-01	8.70E-04	333.75	18.269	
37	WF-136	10.565	311.3	3.485	92.6	2.249	0.035	700	58.2	3.85E-01	1.17E-03	400.35	20.009	
38	WF-137	10.726	353.3	2.946	157.5	1.982	0.035	700	89.7	3.69E-01	1.14E-03	328.81	18.133	
39	WF-138	10.82	380.7	3.9	98.6	1.839	0.035	700	72.5	2.98E-01	6.75E-04	257.91	16.059	
40	WF-139	10.888	418.4	3.904	193.3	1.673	0.035	700	61.8	2.71E-01	5.58E-04	213.4	14.608	
41	WF-140	10.974	548.3	4.163	129.3	1.277	0.035	700	61.6	2.00E-01	2.98E-04	121.62	11.028	
42	WF-141	10.935	408.6	3.591	120.4	1.713	0.035	700	59.1	2.89E-01	6.54E-04	230.07	15.168	
43	WF-142	10.87	293.8	4.015	188.3	2.383	0.035	700	86.4	3.80E-01	1.09E-03	428.87	20.709	
44	WF-143	10.756	223.2	4.558	73.9	3.137	0.035	700	73.1	4.69E-01	1.60E-03	712.38	26.69	
45	WF-144	10.741	201.7	4.757	89.1	3.47	0.035	700	56.2	5.08E-01	1.84E-03	859.52	29.318	
46	WF-145	11.148	296.7	3.199	193.8	2.359	0.035	700	46.9	4.21E-01	1.45E-03	453.4	21.293	
47	WF-146	10.92	209.3	4.602	91.6	3.345	0.035	700	36.2	4.98E-01	1.79E-03	807.45	28.416	
48	WF-147	11.25	287.7	4.106	104.9	2.433	0.035	700	42.4	3.84E-01	1.10E-03	443.82	21.067	
49	WF-148	11.161	235.8	5.126	59.6	2.968	0.035	700	50.3	4.19E-01	1.22E-03	613.38	24.767	
50	WF-149	11.159	215.9	4.583	122.9	3.242	0.035	700	58	4.84E-01	1.69E-03	759.74	27.563	
51	WF-150	11.237	218.2	4.849	93.6	3.208	0.035	700	41.5	4.65E-01	1.54E-03	730	27.019	

52	WF-151	11.415	252	4.482	59.6	2.778	0.035	700	33.4	4.19E-01	1.28E-03	561.8	23.702
53	WF-152	11.452	252.5	4.336	67.1	2.772	0.035	700	26.5	4.25E-01	1.33E-03	565.67	23.784
54	WF-153	11.586	287.6	4.9	61.7	2.434	0.035	700	40.9	3.51E-01	8.72E-04	418.67	20.461
55	WF-154	11.681	317.2	4.124	94.8	2.207	0.035	700	45.8	3.47E-01	9.02E-04	364.66	19.096
56	WF-155	11.783	358.4	3.265	156.1	1.953	0.035	700	51.8	3.45E-01	9.65E-04	308.69	17.57
57	WF-156	11.546	223.3	4.548	65.7	3.135	0.035	700	54.5	4.70E-01	1.60E-03	711.94	26.682
58	WF-157	11.748	257.1	4.541	114.7	2.723	0.035	700	56.1	4.08E-01	1.21E-03	537.39	23.182
59	WF-158	11.949	327.2	3.546	251.4	2.14	0.035	700	50.2	3.63E-01	1.04E-03	360.41	18.984
60	WF-159	11.831	246.6	4.313	96.3	2.839	0.035	700	48.6	4.37E-01	1.41E-03	594.45	24.381
61	WF-160	11.896	240.7	4.361	99	2.908	0.035	700	59.6	4.45E-01	1.45E-03	621.35	24.927
62	WF-161	11.904	230.5	4.522	75.7	3.038	0.035	700	32	4.56E-01	1.51E-03	669.83	25.881
63	WF-162	12.005	235.7	4.794	58.3	2.97	0.035	700	56.4	4.33E-01	1.34E-03	628.06	25.061
64	WF-163	12.078	237.2	4.991	69.1	2.952	0.035	700	52.3	4.22E-01	1.25E-03	612.04	24.739
65	WF-164	12.339	334.8	4.002	96.4	2.091	0.035	700	38	3.34E-01	8.43E-04	330.49	18.179
66	WF-165	12.302	286.4	3.461	188.7	2.444	0.035	700	39.6	4.20E-01	1.40E-03	474.22	21.777
67	WF-166	12.295	269.3	3.813	173.3	2.6	0.035	700	23.9	4.25E-01	1.39E-03	519.38	22.79
68	WF-167	12.364	274.4	4.404	92.6	2.551	0.035	700	45.1	3.88E-01	1.10E-03	476.48	21.828
69	WF-168	12.55	364.1	3.677	92	1.922	0.035	700	44.5	3.20E-01	7.98E-04	287.47	16.955
70	WF-169	12.413	255.7	4.453	77.3	2.737	0.035	700	55.1	4.14E-01	1.25E-03	546.76	23.383
71	WF-170	12.526	273.2	4.146	149.1	2.562	0.035	700	53.4	4.02E-01	1.21E-03	490.68	22.151
72	WF-171	12.596	276	4.392	108	2.536	0.035	700	55	3.87E-01	1.10E-03	471.45	21.713
73	WF-172	12.712	307.2	3.885	150.2	2.279	0.035	700	49.5	3.69E-01	1.04E-03	396.52	19.913
74	WF-173	12.791	317.7	4.035	199.6	2.203	0.035	700	63.1	3.50E-01	9.26E-04	366.03	19.132
75	WF-174	12.825	304.8	3.604	296.1	2.296	0.035	700	52.6	3.86E-01	1.17E-03	412.87	20.319
76	WF-175	13.018	464.4	4.226	148.6	1.507	0.035	700	51.1	2.34E-01	4.07E-04	168.7	12.988
77	WF-176	12.971	369.4	4.744	86.9	1.895	0.035	700	41.9	2.78E-01	5.52E-04	256.49	16.015
78	WF-177	12.935	316.1	5.052	74.6	2.214	0.035	700	49.3	3.15E-01	6.93E-04	343.06	18.522
79	WF-178	13.09	414.4	2.33	150.2	1.689	0.035	700	55	3.53E-01	1.13E-03	258.32	16.072
80	WF-179	13.152	442.7	4.74	105.3	1.581	0.035	700	58	2.32E-01	3.85E-04	178.66	13.366

CASE NO.4

NO	D-NAME	H	A	R	B	V	N	Q	DX	FROUD	IE	TAU-0	U.*	HANT
1	WF-100	9.03	240.4	2.912	80.8	3.743	0.035	900	0	7.01E-01	4.13E-03	1178.06	34.323	
2	WF-101	9.429	298.7	3.943	82.1	3.013	0.035	900	49.8	4.85E-01	1.79E-03	690.02	26.268	
3	WF-102	9.549	307.6	3.952	84.8	2.926	0.035	900	54	4.70E-01	1.68E-03	650.23	25.5	
4	WF-103	9.664	319.6	3.948	85.9	2.816	0.035	900	51.1	4.53E-01	1.56E-03	602.51	24.546	
5	WF-104	9.728	309.1	4.075	92.4	2.911	0.035	900	58.4	4.61E-01	1.60E-03	637	25.239	
6	WF-105	9.769	295.9	4.372	83.9	3.041	0.035	900	50.6	4.65E-01	1.59E-03	679.05	26.059	
7	WF-106	9.834	292.2	4.286	101.2	3.081	0.035	900	47.4	4.75E-01	1.67E-03	701.39	26.484	
8	WF-107	9.868	277.4	4.61	67	3.244	0.035	900	52	4.83E-01	1.68E-03	759.17	27.553	
9	WF-108	10.032	301.2	4.729	66.2	2.988	0.035	900	54	4.39E-01	1.38E-03	638.72	25.273	
10	WF-109	9.897	249.3	4.64	67.8	3.61	0.035	900	43.2	5.35E-01	2.06E-03	937.97	30.626	
11	WF-110	9.966	244.4	5.245	47.4	3.682	0.035	900	49.5	5.14E-01	1.82E-03	936.99	30.61	
12	WF-111	10.309	313.4	5.124	71.8	2.872	0.035	900	48.3	4.05E-01	1.14E-03	574.38	23.966	
13	WF-112	10.455	367.4	5.43	75.2	2.45	0.035	900	32.9	3.36E-01	7.70E-04	409.82	20.244	
14	WF-113	10.632	519.6	5.299	99.2	1.732	0.035	900	39.5	2.40E-01	3.98E-04	206.58	14.373	
15	WF-114	10.685	605.9	4.826	128.7	1.485	0.035	900	34.9	2.16E-01	3.31E-04	156.74	12.52	
16	WF-115	10.735	766	4.536	170	1.175	0.035	900	30.5	1.76E-01	2.25E-04	100.11	10.006	
17	WF-116	10.751	806.5	4.295	185.6	1.116	0.035	900	40.1	1.72E-01	2.19E-04	91.97	9.59	
18	WF-117	10.693	477	1.432	993.3	1.887	0.035	900	41.4	5.04E-01	2.70E-03	379.15	19.472	
19	WF-118	10.838	632.5	2.452	622.5	1.423	0.035	900	38.3	2.90E-01	7.50E-04	180.26	13.426	
20	WF-119	10.877	695.4	3.738	372.7	1.294	0.035	900	37.7	2.14E-01	3.54E-04	129.57	11.383	
21	WF-120	10.905	780.3	4.314	182.4	1.153	0.035	900	38.2	1.77E-01	2.32E-04	98.11	9.905	
22	WF-121	10.872	600.9	3.918	157.8	1.498	0.035	900	38.4	2.42E-01	4.45E-04	170.83	13.07	
23	WF-122	10.898	632.2	4.128	150	1.423	0.035	900	37.8	2.24E-01	3.75E-04	151.65	12.315	
24	WF-123	10.873	536	4.029	130.8	1.679	0.035	900	32.3	2.67E-01	5.39E-04	212.71	14.585	
25	WF-124	10.859	483.8	4.017	120	1.86	0.035	900	30.9	2.97E-01	6.64E-04	261.33	16.166	
26	WF-125	10.783	385.2	4.389	93.1	2.336	0.035	900	32.8	3.56E-01	9.30E-04	400.21	20.005	
27	WF-126	10.794	357.9	4.029	119.4	2.515	0.035	900	51.6	4.00E-01	1.21E-03	477.22	21.845	
28	WF-127	10.939	423.3	3.789	117.2	2.126	0.035	900	49.9	3.49E-01	9.37E-04	348.05	18.656	
29	WF-128	11.052	529.9	3.952	129.4	1.699	0.035	900	39.1	2.73E-01	5.66E-04	219.06	14.801	
30	WF-129	11.11	621.2	4.541	131.8	1.449	0.035	900	38.4	2.17E-01	3.42E-04	152.15	12.335	
31	WF-130	11.009	405.7	1.9	436.8	2.218	0.035	900	29.5	5.14E-01	2.56E-03	476.98	21.84	
32	WF-131	10.969	328.2	3.872	175.5	2.742	0.035	900	45.5	4.45E-01	1.52E-03	574.87	23.976	
33	WF-132	11.275	612.6	3	164.5	1.469	0.035	900	30.7	2.71E-01	6.11E-04	179.64	13.403	
34	WF-133	11.304	629.2	2.733	221.7	1.43	0.035	900	37.4	2.76E-01	6.56E-04	175.69	13.255	
35	WF-134	11.143	368.1	3.771	114.4	2.445	0.035	900	41.7	4.02E-01	1.25E-03	461.18	21.475	
36	WF-135	11.254	388.1	4.195	176.1	2.319	0.035	900	72	3.62E-01	9.73E-04	400.19	20.005	
37	WF-136	11.299	374.9	3.684	95.3	2.401	0.035	900	58.2	4.00E-01	1.24E-03	447.92	21.164	
38	WF-137	11.479	431.8	3.116	183.6	2.085	0.035	900	89.7	3.77E-01	1.17E-03	357.16	18.899	
39	WF-138	11.554	436.1	4.155	108.9	2.064	0.035	900	72.5	3.23E-01	7.81E-04	317.99	17.832	
40	WF-139	11.644	495.7	4.532	233.1	1.816	0.035	900	61.8	2.72E-01	5.38E-04	239.15	15.464	
41	WF-140	11.738	644	4.839	131.6	1.397	0.035	900	61.6	2.03E-01	2.92E-04	138.6	11.773	
42	WF-141	11.696	493.1	3.968	124.8	1.825	0.035	900	59.1	2.93E-01	6.50E-04	252.6	15.893	
43	WF-142	11.594	342.5	4.304	239.8	2.628	0.035	900	86.4	4.05E-01	1.21E-03	509.69	22.576	
44	WF-143	11.4	250.6	4.972	83.1	3.591	0.035	900	73.1	5.15E-01	1.86E-03	907.11	30.118	
45	WF-144	11.36	225.7	5.203	101.6	3.987	0.035	900	56.2	5.58E-01	2.16E-03	1101.45	33.188	
46	WF-145	11.923	349.2	3.22	235.6	2.577	0.035	900	46.9	4.59E-01	1.71E-03	539.93	23.236	
47	WF-146	11.608	239.4	4.989	112	3.76	0.035	900	36.2	5.38E-01	2.03E-03	993.09	31.513	
48	WF-147	12.039	339	4.396	121.7	2.655	0.035	900	42.4	4.05E-01	1.20E-03	516.55	22.728	
49	WF-148	11.873	264.5	5.678	64.7	3.402	0.035	900	50.3	4.56E-01	1.40E-03	778.92	27.909	
50	WF-149	11.869	244.4	4.985	145.3	3.682	0.035	900	58	5.27E-01	1.95E-03	952.97	30.87	
51	WF-150	11.953	245.5	5.213	107	3.666	0.035	900	41.5	5.13E-01	1.82E-03	930.32	30.501	
52	WF-151	12.22	296.1	5.002	61.7	3.039	0.035	900	33.4	4.34E-01	1.32E-03	648.39	25.463	
53	WF-152	12.258	296.8	4.835	72.6	3.033	0.035	900	26.5	4.41E-01	1.38E-03	652.99	25.554	
54	WF-153	12.404	334.3	5.52	63.7	2.692	0.035	900	40.9	3.66E-01	9.10E-04	492.27	22.187	
55	WF-154	12.525	376.1	4.478	104.7	2.393	0.035	900	45.8	3.61E-01	9.51E-04	417.14	20.424	
56	WF-155	12.644	428.5	3.36	182.9	2.1	0.035	900	51.8	3.66E-01	1.07E-03	353.6	18.804	
57	WF-156	12.314	255.5	4.985	73.7	3.522	0.035	900	54.5	5.04E-01	1.79E-03	871.75	29.525	
58	WF-157	12.573	300	5.101	136.3	3	0.035	900	56.1	4.24E-01	1.26E-03	627.52	25.05	
59	WF-158	12.82	389	3.676	315.1	2.314	0.035	900	50.2	3.86E-01	1.16E-03	416.37	20.405	
60	WF-159	12.664	289.4	4.723	112.8	3.11	0.035	900	48.6	4.57E-01	1.50E-03	692.05	26.307	
61	WF-160	12.73	282.1	4.679	119.2	3.19	0.035	900	59.6	4.71E-01	1.59E-03	730.55	27.029	
62	WF-161	12.719	266.3	4.94	87	3.38	0.035	900	32	4.86E-01	1.66E-03	805.24	28.377	
63	WF-162	12.818	268.8	5.336	63.2	3.348	0.035	900	56.4	4.63E-01	1.47E-03	770.24	27.753	
64	WF-163	12.911	273.6	5.616	77.9	3.29	0.035	900	52.3	4.44E-01	1.33E-03	731.02	27.037	
65	WF-164	13.255	408	4.519	105.6	2.206	0.035	900	38	3.32E-01	7.98E-04	353.3	18.796	
66	WF-165	13.212	349.7	3.501	247	2.574	0.035	900	39.6	4.39E-01	1.53E-03	523.73	22.885	
67	WF-166	13.177	317.8	4.053	224.1	2.832	0.035	900	23.9	4.49E-01	1.52E-03	603.74	24.571	
68	WF-167	13.247	321.5	4.824	107.4	2.799	0.035	900	45.1	4.07E-01	1.18E-03	556.74	23.595	
69	WF-168	13.477	438.4	3.888	96.4	2.053	0.035	900	44.5	3.33E-01	8.45E-04	321.74	17.937	
70	WF-169	13.288	298.4	4.847	87.9	3.016	0.035	900	55.1	4.38E-01	1.36E-03	645.11	25.399	
71	WF-170	13.426	322.3	4.429	183.5	2.793	0.035	900	53.4	4.24E-01	1.31E-03	570.11	23.877	
72	WF-171	13.502	325.5	4.792	126.8	2.765	0.035	900	55	4.04E-01	1.16E-03	544.44	23.333	
73	WF-172	13.637	364.4	4.124	180.2	2.469	0.035	900	49.5	3.89E-01	1.13E-03	456.54	21.367	
74	WF-173	13.721	374.5	4.307	246.7	2.403	0.035	900	63.1	3.70E-01	1.01E-03	426.05	20.641	
75	WF-174	13.755	357.3	3.687	369.1	2.519	0.035	900	52.6	4.19E-01	1.36E-03	493.03	22.204	
76	WF-175	13.992	560.7	4.613	169.8	1.605	0.035	900	51.1	2.39E-01	4.11E-04	185.8	13.631	
77	WF-176	13.931	440.6	5.352	92.4	2.043	0.035	900	41.9	2.82E-01	5.46E-04	286.37	16.923	
78	WF-177	13.874	371	5.723	81.6	2.426	0.035	900	49.3	3.24E-01	7.04E-04	394.9	19.872	
79	WF-178	14.063	488.5	2.11	180.2	1.842	0.035	900	55	4.05E-01	1.54E-03	317.65	17.823	

80	WF-179	14.146	533.9	5.508	112.8	1.686	0.035	900	58	2.29E-01	3.58E-04	193.13	13.897	

CASE NO.5

NO	D-NAME	H	A	R	B	V	N	Q	DX	FROUD	IE	TAU-0	U.*	HANT
1	WF-100	9.3	262.2	3.162	80.9	3.851	0.035	1010	0	6.92E-01	3.92E-03	1213.22	34.831	
2	WF-101	9.691	319.6	4.121	82.6	3.16	0.035	1010	49.8	4.97E-01	1.85E-03	747.84	27.347	
3	WF-102	9.819	330	4.145	85.4	3.061	0.035	1010	54	4.80E-01	1.72E-03	700.09	26.459	
4	WF-103	9.937	342.1	4.136	86.7	2.952	0.035	1010	51.1	4.64E-01	1.61E-03	651.88	25.532	
5	WF-104	10	330	4.25	95.8	3.06	0.035	1010	58.4	4.74E-01	1.67E-03	694.09	26.346	
6	WF-105	10.04	315.8	4.555	88.2	3.198	0.035	1010	50.6	4.79E-01	1.66E-03	740.6	27.214	
7	WF-106	10.112	313	4.417	110.3	3.226	0.035	1010	47.4	4.90E-01	1.76E-03	761.7	27.599	
8	WF-107	10.132	293.8	4.805	68.1	3.437	0.035	1010	52	5.01E-01	1.79E-03	840.57	28.993	
9	WF-108	10.308	317.9	4.949	67	3.177	0.035	1010	54	4.56E-01	1.47E-03	711.11	26.667	
10	WF-109	10.14	261.1	4.826	70.1	3.868	0.035	1010	43.2	5.62E-01	2.25E-03	1062.88	32.602	
11	WF-110	10.211	255.6	5.475	47.7	3.952	0.035	1010	49.5	5.40E-01	1.98E-03	1063.64	32.614	
12	WF-111	10.609	330.8	5.358	73.5	3.054	0.035	1010	48.3	4.21E-01	1.22E-03	639.67	25.292	
13	WF-112	10.771	386.9	5.703	76.4	2.61	0.035	1010	32.9	3.49E-01	8.19E-04	457.85	21.397	
14	WF-113	10.972	552	5.616	99.8	1.83	0.035	1010	39.5	2.47E-01	4.11E-04	226.12	15.037	
15	WF-114	11.032	647.5	5.12	129.8	1.56	0.035	1010	34.9	2.20E-01	3.38E-04	169.46	13.017	
16	WF-115	11.088	823.6	4.854	170.8	1.226	0.035	1010	30.5	1.78E-01	2.24E-04	106.64	10.327	
17	WF-116	11.105	870	4.619	186.3	1.161	0.035	1010	40.1	1.73E-01	2.15E-04	97.15	9.856	
18	WF-117	11.044	512.2	1.366	1082.5	1.972	0.035	1010	41.4	5.39E-01	3.14E-03	420.72	20.511	
19	WF-118	11.206	682.8	2.562	672.6	1.479	0.035	1010	38.3	2.95E-01	7.65E-04	191.97	13.855	
20	WF-119	11.246	750.4	3.967	400.2	1.346	0.035	1010	37.7	2.16E-01	3.53E-04	137.4	11.722	
21	WF-120	11.277	846.1	4.651	183.3	1.194	0.035	1010	38.2	1.77E-01	2.25E-04	102.47	10.123	
22	WF-121	11.242	657.1	4.184	159.1	1.537	0.035	1010	38.4	2.40E-01	4.29E-04	176.04	13.268	
23	WF-122	11.267	687.6	4.418	150	1.469	0.035	1010	37.8	2.23E-01	3.65E-04	157.86	12.564	
24	WF-123	11.239	583.6	4.349	131	1.731	0.035	1010	32.3	2.65E-01	5.17E-04	220.3	14.843	
25	WF-124	11.222	527.5	4.322	120	1.915	0.035	1010	30.9	2.94E-01	6.38E-04	270.22	16.438	
26	WF-125	11.134	416	4.653	94.4	2.428	0.035	1010	32.8	3.60E-01	9.30E-04	423.89	20.589	
27	WF-126	11.141	385.4	4.18	125.9	2.62	0.035	1010	51.6	4.09E-01	1.25E-03	511.69	22.621	
28	WF-127	11.3	459.1	3.926	120.2	2.2	0.035	1010	49.9	3.55E-01	9.57E-04	368.3	19.191	
29	WF-128	11.42	576.6	4.165	129.8	1.751	0.035	1010	39.1	2.74E-01	5.61E-04	228.89	15.129	
30	WF-129	11.477	667.9	4.799	132.5	1.512	0.035	1010	38.4	2.21E-01	3.46E-04	162.77	12.758	
31	WF-130	11.364	433.8	1.875	470.8	2.328	0.035	1010	29.5	5.43E-01	2.87E-03	527.75	22.973	
32	WF-131	11.319	350.4	4.031	187.6	2.882	0.035	1010	45.5	4.59E-01	1.59E-03	626.57	25.031	
33	WF-132	11.661	671.5	3.059	166.5	1.504	0.035	1010	30.7	2.75E-01	6.24E-04	187.06	13.677	
34	WF-133	11.692	692.9	2.77	231.9	1.458	0.035	1010	37.4	2.80E-01	6.69E-04	181.61	13.476	
35	WF-134	11.512	397.5	3.909	119	2.541	0.035	1010	41.7	4.11E-01	1.28E-03	491.89	22.179	
36	WF-135	11.623	416	4.34	190.8	2.428	0.035	1010	72	3.72E-01	1.02E-03	433.95	20.831	
37	WF-136	11.678	407.7	3.787	96.7	2.477	0.035	1010	58.2	4.07E-01	1.27E-03	472.6	21.739	
38	WF-137	11.868	472.3	3.203	197.1	2.139	0.035	1010	89.7	3.82E-01	1.19E-03	372.45	19.299	
39	WF-138	11.933	464.8	4.287	114.3	2.173	0.035	1010	72.5	3.35E-01	8.31E-04	348.99	18.681	
40	WF-139	12.035	535.6	4.857	253.7	1.886	0.035	1010	61.8	2.73E-01	5.30E-04	252.07	15.877	
41	WF-140	12.133	693.5	5.189	132.9	1.456	0.035	1010	61.6	2.04E-01	2.89E-04	147.09	12.128	
42	WF-141	12.089	536.8	4.163	127	1.882	0.035	1010	59.1	2.95E-01	6.48E-04	264.24	16.255	
43	WF-142	11.967	367.6	4.453	266.3	2.748	0.035	1010	86.4	4.16E-01	1.26E-03	550.86	23.47	
44	WF-143	11.727	264.5	5.182	87.7	3.818	0.035	1010	73.1	5.36E-01	1.99E-03	1011.17	31.799	
45	WF-144	11.671	237.8	5.426	107.9	4.248	0.035	1010	56.2	5.83E-01	2.32E-03	1232.65	35.109	
46	WF-145	12.322	376.2	3.232	257.1	2.685	0.035	1010	46.9	4.77E-01	1.85E-03	585.21	24.191	
47	WF-146	11.96	254.7	5.186	122.4	3.965	0.035	1010	36.2	5.56E-01	2.15E-03	1090.31	33.02	
48	WF-147	12.444	365.3	4.545	130.3	2.765	0.035	1010	42.4	4.14E-01	1.24E-03	553.9	23.535	
49	WF-148	12.234	279.1	5.958	67.3	3.619	0.035	1010	50.3	4.74E-01	1.49E-03	867.24	29.449	
50	WF-149	12.229	258.8	5.189	156.6	3.902	0.035	1010	58	5.47E-01	2.08E-03	1055.79	32.493	
51	WF-150	12.315	259.3	5.397	113.7	3.895	0.035	1010	41.5	5.36E-01	1.96E-03	1038.12	32.22	
52	WF-151	12.632	318.7	5.269	62.8	3.169	0.035	1010	33.4	4.41E-01	1.34E-03	692.95	26.324	
53	WF-152	12.671	319.4	5.091	75.4	3.162	0.035	1010	26.5	4.48E-01	1.40E-03	697.89	26.418	
54	WF-153	12.823	358.2	5.837	64.7	2.82	0.035	1010	40.9	3.73E-01	9.27E-04	530.04	23.023	
55	WF-154	12.957	406.2	4.659	109.7	2.486	0.035	1010	45.8	3.68E-01	9.73E-04	444.3	21.078	
56	WF-155	13.085	464.4	3.409	196.6	2.175	0.035	1010	51.8	3.76E-01	1.13E-03	377.32	19.425	
57	WF-156	12.704	271.9	5.207	77.7	3.715	0.035	1010	54.5	5.20E-01	1.87E-03	955.7	30.914	
58	WF-157	12.994	321.9	5.387	147.3	3.137	0.035	1010	56.1	4.32E-01	1.28E-03	674.06	25.963	
59	WF-158	13.265	420.6	3.742	347.6	2.401	0.035	1010	50.2	3.97E-01	1.22E-03	445.81	21.114	
60	WF-159	13.089	311.2	4.931	121.2	3.245	0.035	1010	48.6	4.67E-01	1.54E-03	742.7	27.253	
61	WF-160	13.155	303.2	4.84	129.5	3.332	0.035	1010	59.6	4.84E-01	1.66E-03	787.73	28.066	
62	WF-161	13.133	284.5	5.153	92.7	3.55	0.035	1010	32	5.00E-01	1.74E-03	876.08	29.599	
63	WF-162	13.23	285.6	5.611	65.6	3.537	0.035	1010	56.4	4.77E-01	1.54E-03	845.18	29.072	
64	WF-163	13.334	292	5.933	82.4	3.458	0.035	1010	52.3	4.54E-01	1.36E-03	793.13	28.162	
65	WF-164	13.722	445.3	4.782	110.2	2.268	0.035	1010	38	3.31E-01	7.82E-04	366.52	19.145	
66	WF-165	13.675	381.9	3.522	276.6	2.645	0.035	1010	39.6	4.50E-01	1.60E-03	551.82	23.491	
67	WF-166	13.626	342.6	4.176	250	2.948	0.035	1010	23.9	4.61E-01	1.58E-03	647.92	25.454	
68	WF-167	13.697	345.5	5.038	115	2.923	0.035	1010	45.1	4.16E-01	1.21E-03	598.44	24.463	
69	WF-168	13.95	476.3	3.995	98.7	2.12	0.035	1010	44.5	3.39E-01	8.69E-04	340.14	18.443	
70	WF-169	13.734	320.2	5.047	93.2	3.154	0.035	1010	55.1	4.49E-01	1.41E-03	696.38	26.389	
71	WF-170	13.884	347.3	4.573	201	2.908	0.035	1010	53.4	4.34E-01	1.37E-03	611.75	24.734	
72	WF-171	13.963	350.7	4.995	136.4	2.88	0.035	1010	55	4.12E-01	1.19E-03	582.57	24.136	
73	WF-172	14.109	393.6	4.245	195.5	2.566	0.035	1010	49.5	3.98E-01	1.17E-03	488.15	22.094	
74	WF-173	14.195	403.5	4.445	270.7	2.503	0.035	1010	63.1	3.79E-01	1.05E-03	457.49	21.389	
75	WF-174	14.228	384	3.73	406.3	2.63	0.035	1010	52.6	4.35E-01	1.47E-03	535.49	23.141	
76	WF-175	14.489	609.8	4.81	180.7	1.656	0.035	1010	51.1	2.41E-01	4.14E-04	195.07	13.967	
77	WF-176	14.42	476.9	5.663	95.3	2.118	0.035	1010	41.9	2.84E-01	5.45E-04	302.15	17.382	
78	WF-177	14.353	399	6.066	85.2	2.531	0.035	1010	49.3	3.28E-01	7.10E-04	421.79	20.538	
79	WF-178	14.561	526.4	1.998	195.6	1.919	0.035	1010	55	4.34E-01	1.79E-03	350.87	18.731	
80	WF-179	14.656	580.7	5.903	116.7	1.739	0.035	1010	58	2.29E-01	3.47E-04	200.92	14.175	

CASE NO.6

NO	D-NAME	H	A	R	B	V	N	Q	DX	FROUD	IE	TAU-0	U.*	HANT
1	WF-100	9.4	270.3	3.255	81	4.439	0.035	1200	0	7.86E-01	5.00E-03	1596.3	39.954	
2	WF-101	9.95	340.3	4.297	83.2	3.527	0.035	1200	49.8	5.44E-01	2.18E-03	918.37	30.305	
3	WF-102	10.111	354.3	4.353	86	3.387	0.035	1200	54	5.19E-01	1.98E-03	843.55	29.044	
4	WF-103	10.251	368	4.353	87.6	3.261	0.035	1200	51.1	4.99E-01	1.83E-03	781.97	27.964	
5	WF-104	10.319	354.6	4.456	99.9	3.384	0.035	1200	58.4	5.12E-01	1.91E-03	835.67	28.908	
6	WF-105	10.363	339.5	4.772	93.3	3.534	0.035	1200	50.6	5.17E-01	1.91E-03	890.64	29.844	
7	WF-106	10.453	338.7	4.577	121.3	3.543	0.035	1200	47.4	5.29E-01	2.02E-03	907.83	30.13	
8	WF-107	10.454	313.8	5.043	69.5	3.824	0.035	1200	52	5.44E-01	2.07E-03	1023.67	31.995	
9	WF-108	10.664	339.5	5.234	68.1	3.535	0.035	1200	54	4.94E-01	1.69E-03	864.02	29.394	
10	WF-109	10.424	274.9	5.045	72.9	4.365	0.035	1200	43.2	6.21E-01	2.70E-03	1333.47	36.517	
11	WF-110	10.507	269.1	5.755	48	4.459	0.035	1200	49.5	5.94E-01	2.36E-03	1331.93	36.496	
12	WF-111	11.029	355.1	5.686	75.8	3.38	0.035	1200	48.3	4.53E-01	1.38E-03	768.32	27.719	
13	WF-112	11.222	414.8	6.094	78.1	2.893	0.035	1200	32.9	3.74E-01	9.21E-04	550.06	23.453	
14	WF-113	11.472	599.5	6.081	100.7	2.002	0.035	1200	39.5	2.59E-01	4.42E-04	263.56	16.235	
15	WF-114	11.544	708.9	5.554	131.4	1.693	0.035	1200	34.9	2.29E-01	3.57E-04	194.23	13.936	
16	WF-115	11.61	908.8	5.326	172.1	1.32	0.035	1200	30.5	1.83E-01	2.30E-04	119.85	10.947	
17	WF-116	11.629	964.2	5.099	187.4	1.245	0.035	1200	40.1	1.76E-01	2.16E-04	108.03	10.394	
18	WF-117	11.565	564.5	1.266	1214.7	2.126	0.035	1200	41.4	6.03E-01	4.04E-03	501.41	22.392	
19	WF-118	11.761	758.6	2.728	748.1	1.582	0.035	1200	38.3	3.06E-01	8.04E-04	214.96	14.662	
20	WF-119	11.805	833.4	4.313	441.8	1.44	0.035	1200	37.7	2.22E-01	3.62E-04	152.91	12.366	
21	WF-120	11.84	945.8	5.161	184.7	1.269	0.035	1200	38.2	1.78E-01	2.21E-04	111.83	10.575	
22	WF-121	11.801	741.9	4.585	161.1	1.617	0.035	1200	38.4	2.41E-01	4.21E-04	189.06	13.75	
23	WF-122	11.826	771.3	4.857	150	1.556	0.035	1200	37.8	2.26E-01	3.61E-04	171.59	13.099	

24	WF-123	11.792	655.5	4.832	131.2	1.831	0.035	1200	32.3	2.66E-01	5.03E-04	238.01	15.428
25	WF-124	11.772	593.4	4.781	120	2.022	0.035	1200	30.9	2.95E-01	6.22E-04	291.44	17.072
26	WF-125	11.662	462.1	5.048	96.3	2.597	0.035	1200	32.8	3.69E-01	9.54E-04	471.92	21.724
27	WF-126	11.662	426.8	4.407	135.5	2.811	0.035	1200	51.6	4.28E-01	1.34E-03	578.75	24.057
28	WF-127	11.845	513.3	4.133	124.7	2.338	0.035	1200	49.9	3.67E-01	1.01E-03	408.87	20.221
29	WF-128	11.98	648	4.49	130.3	1.852	0.035	1200	39.1	2.79E-01	5.67E-04	249.59	15.798
30	WF-129	12.038	739.1	5.194	133.6	1.624	0.035	1200	38.4	2.28E-01	3.59E-04	182.73	13.518
31	WF-130	11.905	476.5	1.837	522.4	2.519	0.035	1200	29.5	5.94E-01	3.45E-03	621.72	24.934
32	WF-131	11.849	384.2	4.271	206	3.124	0.035	1200	45.5	4.83E-01	1.73E-03	721.92	26.869
33	WF-132	12.257	762.5	3.15	169.5	1.574	0.035	1200	30.7	2.83E-01	6.57E-04	202.83	14.242
34	WF-133	12.291	791.4	2.827	247.7	1.516	0.035	1200	37.4	2.88E-01	7.05E-04	195.2	13.971
35	WF-134	12.077	442.7	4.122	126.2	2.711	0.035	1200	41.7	4.27E-01	1.36E-03	550.09	23.454
36	WF-135	12.191	458.7	4.561	213.4	2.616	0.035	1200	72	3.91E-01	1.11E-03	495.39	22.257
37	WF-136	12.262	458.4	3.945	98.9	2.618	0.035	1200	58.2	4.21E-01	1.35E-03	520.77	22.82
38	WF-137	12.471	535.2	3.339	218	2.242	0.035	1200	89.7	3.92E-01	1.23E-03	403.81	20.095
39	WF-138	12.522	509.2	4.492	122.6	2.356	0.035	1200	72.5	3.55E-01	9.18E-04	404.02	20.1
40	WF-139	12.645	597.9	5.364	285.8	2.007	0.035	1200	61.8	2.77E-01	5.26E-04	276.26	16.621
41	WF-140	12.752	770.9	5.736	134.8	1.557	0.035	1200	61.6	2.08E-01	2.89E-04	162.52	12.748
42	WF-141	12.703	605	4.467	130.5	1.984	0.035	1200	59.1	3.00E-01	6.55E-04	286.82	16.936
43	WF-142	12.546	406.6	4.684	307.5	2.951	0.035	1200	86.4	4.36E-01	1.36E-03	624.86	24.997
44	WF-143	12.221	285.6	5.499	94.8	4.202	0.035	1200	73.1	5.72E-01	2.23E-03	1200.66	34.651
45	WF-144	12.134	255.7	5.758	117.3	4.694	0.035	1200	56.2	6.25E-01	2.62E-03	1475.51	38.412
46	WF-145	12.949	418.7	3.249	290.8	2.856	0.035	1200	46.9	5.08E-01	2.09E-03	665.83	25.804
47	WF-146	12.5	278.4	5.49	138.3	4.311	0.035	1200	36.2	5.88E-01	2.35E-03	1264.65	35.562
48	WF-147	13.083	406.9	4.781	143.9	2.949	0.035	1200	42.4	4.31E-01	1.32E-03	619.86	24.897
49	WF-148	12.793	301.6	6.391	71.3	3.978	0.035	1200	50.3	5.03E-01	1.63E-03	1023.77	31.996
50	WF-149	12.785	281.2	5.505	174.2	4.268	0.035	1200	58	5.81E-01	2.30E-03	1238.38	35.191
51	WF-150	12.876	280.7	5.682	124.2	4.275	0.035	1200	41.5	5.73E-01	2.21E-03	1229.58	35.065
52	WF-151	13.283	354.3	5.69	64.5	3.387	0.035	1200	33.4	4.54E-01	1.38E-03	771.22	27.771
53	WF-152	13.323	355.2	5.495	79.8	3.379	0.035	1200	26.5	4.60E-01	1.44E-03	776.64	27.868
54	WF-153	13.487	396.1	6.341	66.3	3.029	0.035	1200	40.9	3.84E-01	9.58E-04	595.29	24.398
55	WF-154	13.644	454.2	4.948	117.8	2.642	0.035	1200	45.8	3.79E-01	1.01E-03	491.76	22.176
56	WF-155	13.788	521.6	3.487	218.5	2.301	0.035	1200	51.8	3.94E-01	1.23E-03	419.07	20.471
57	WF-156	13.317	297.6	5.556	84	4.032	0.035	1200	54.5	5.47E-01	2.02E-03	1102.03	33.197
58	WF-157	13.663	356.7	5.84	164.8	3.364	0.035	1200	56.1	4.45E-01	1.32E-03	754.53	27.469
59	WF-158	13.975	471.1	3.848	399.6	2.547	0.035	1200	50.2	4.15E-01	1.32E-03	497.1	22.296
60	WF-159	13.764	345.9	5.263	134.5	3.469	0.035	1200	48.6	4.83E-01	1.61E-03	830.45	28.817
61	WF-160	13.83	336.6	5.097	145.8	3.565	0.035	1200	59.6	5.04E-01	1.78E-03	886.38	29.772
62	WF-161	13.788	313.3	5.49	101.8	3.83	0.035	1200	32	5.22E-01	1.86E-03	998.33	31.596
63	WF-162	13.881	312.1	6.045	69.5	3.845	0.035	1200	56.4	5.00E-01	1.65E-03	974.39	31.215
64	WF-163	14.004	321.3	6.435	89.4	3.734	0.035	1200	52.3	4.70E-01	1.43E-03	900.13	30.002
65	WF-164	14.469	505	5.204	117.7	2.376	0.035	1200	38	3.33E-01	7.67E-04	391.14	19.777
66	WF-165	14.416	433.5	3.555	324.1	2.768	0.035	1200	39.6	4.69E-01	1.73E-03	602.82	24.552
67	WF-166	14.345	382.2	4.372	291.4	3.14	0.035	1200	23.9	4.80E-01	1.69E-03	723.86	26.905
68	WF-167	14.416	383.8	5.38	127	3.126	0.035	1200	45.1	4.31E-01	1.27E-03	669.62	25.877
69	WF-168	14.708	537.2	4.168	102.3	2.234	0.035	1200	44.5	3.50E-01	9.12E-04	372.29	19.295
70	WF-169	14.446	354.9	5.367	101.8	3.381	0.035	1200	55.1	4.66E-01	1.49E-03	783.89	27.998
71	WF-170	14.618	387.3	4.804	229	3.098	0.035	1200	53.4	4.52E-01	1.45E-03	683.07	26.136
72	WF-171	14.701	391	5.321	151.7	3.069	0.035	1200	55	4.25E-01	1.24E-03	647.75	25.451
73	WF-172	14.864	440.4	4.44	220	2.725	0.035	1200	49.5	4.13E-01	1.25E-03	542.34	23.288
74	WF-173	14.955	449.9	4.667	309.2	2.667	0.035	1200	63.1	3.94E-01	1.12E-03	511.03	22.606
75	WF-174	14.987	426.9	3.797	465.9	2.811	0.035	1200	52.6	4.61E-01	1.63E-03	608.15	24.661
76	WF-175	15.288	688.8	5.128	198.1	1.742	0.035	1200	51.1	2.46E-01	4.20E-04	211.27	14.535
77	WF-176	15.206	535.2	6.161	99.9	2.242	0.035	1200	41.9	2.89E-01	5.45E-04	329.27	18.146
78	WF-177	15.121	443.9	6.615	90.9	2.703	0.035	1200	49.3	3.36E-01	7.21E-04	467.34	21.618
79	WF-178	15.365	587.6	1.816	220.3	2.042	0.035	1200	55	4.84E-01	2.31E-03	410.37	20.257
80	WF-179	15.483	656.6	6.543	122.9	1.828	0.035	1200	58	2.28E-01	3.34E-04	214.4	14.642

H-Q HYO

NO	D-NAME	H	Q
1	WF-100	9.4	0
		7.1	300
		7.8	500
		8.51	700
		9.03	900
		9.3	1010
		9.4	1200
2	WF-101	9.4	0
		7.934	300
		8.38	500
		8.928	700
		9.429	900
		9.691	1010
		9.95	1200
3	WF-102	9.4	0
		7.976	300
		8.461	500
		9.031	700
		9.549	900
		9.819	1010
		10.111	1200
4	WF-103	9.4	0
		8.03	300
		8.554	500
		9.137	700
		9.664	900
		9.937	1010
		10.251	1200
5	WF-104	9.4	0
		8.072	300
		8.616	500
		9.202	700
		9.728	900
		10	1010
		10.319	1200
6	WF-105	9.4	0
		8.107	300
		8.659	500
		9.243	700
		9.769	900
		10.04	1010
		10.363	1200
7	WF-106	9.4	0
		8.131	300
		8.694	500
		9.294	700
		9.834	900
		10.112	1010
		10.453	1200
8	WF-107	9.4	0
		8.165	300
		8.758	500
		9.35	700
		9.868	900
		10.132	1010
		10.454	1200
9	WF-108	9.4	0
		8.231	300
		8.871	500
		9.49	700
		10.032	900
		10.308	1010
		10.664	1200
10	WF-109	9.4	0
		8.223	300
		8.833	500
		9.409	700
		9.897	900
		10.14	1010
		10.424	1200
11	WF-110	9.4	0
		8.256	300
		8.885	500
		9.471	700
		9.966	900
		10.211	1010
		10.507	1200
12	WF-111	9.4	0
		8.337	300
		9.048	500
		9.72	700
		10.309	900
		10.609	1010
		11.029	1200
13	WF-112	9.4	0
		8.387	300
		9.135	500
		9.837	700
		10.455	900
		10.771	1010
		11.222	1200
14	WF-113	9.4	0
		8.43	300
		9.222	500
		9.968	700
		10.632	900
		10.972	1010
		11.472	1200
15	WF-114	9.4	0
		8.446	300
		9.251	500
		10.009	700
		10.685	900
		11.032	1010
		11.544	1200
16	WF-115	9.4	0
		8.463	300
		9.281	500
		10.05	700
		10.735	900
		11.088	1010
		11.61	1200
17	WF-116	9.4	0
		8.473	300
		9.294	500
		10.064	700
		10.751	900
		11.105	1010
		11.629	1200
18	WF-117	9.4	0
		8.45	300
		9.254	500
		10.014	700
		10.693	900
		11.044	1010
		11.565	1200

NO	D-NAME	H	Q
19	WF-118	9.4	0
		8.501	300
		9.339	500
		10.128	700
		10.838	900
		11.206	1010
		11.761	1200
20	WF-119	9.4	0
		8.525	300
		9.37	500
		10.163	700
		10.877	900
		11.246	1010
		11.805	1200
21	WF-120	9.4	0
		8.54	300
		9.391	500
		10.188	700
		10.905	900
		11.277	1010
		11.84	1200
22	WF-121	9.4	0
		8.515	300
		9.363	500
		10.157	700
		10.872	900
		11.242	1010
		11.801	1200
23	WF-122	9.4	0
		8.555	300
		9.397	500
		10.187	700
		10.898	900
		11.267	1010
		11.826	1200
24	WF-123	9.4	0
		8.549	300
		9.383	500
		10.167	700
		10.873	900
		11.239	1010
		11.792	1200
25	WF-124	9.4	0
		8.553	300
		9.38	500
		10.157	700
		10.859	900
		11.222	1010
		11.772	1200
26	WF-125	9.4	0
		8.563	300
		9.356	500
		10.105	700
		10.783	900
		11.134	1010
		11.662	1200
27	WF-126	9.4	0
		8.589	300
		9.382	500
		10.124	700
		10.794	900
		11.141	1010
		11.662	1200
28	WF-127	9.4	0
		8.642	300
		9.473	500
		10.244	700
		10.939	900
		11.3	1010
		11.845	1200
29	WF-128	9.4	0
		8.701	300
		9.556	500
		10.343	700
		11.052	900
		11.42	1010
		11.98	1200
30	WF-129	9.4	0
		8.76	300
		9.615	500
		10.401	700
		11.11	900
		11.477	1010
		12.038	1200

31	WF-130	9.4	0
		8.73	300
		9.559	500
		10.321	700
		11.009	900
		11.364	1010
		11.905	1200
32	WF-131	9.4	0
		8.723	300
		9.542	500
		10.293	700
		10.969	900
		11.319	1010
		11.849	1200
33	WF-132	9.4	0
		8.793	300
		9.702	500
		10.529	700
		11.275	900
		11.661	1010
		12.257	1200
34	WF-133	9.4	0
		8.804	300
		9.723	500
		10.555	700
		11.304	900
		11.692	1010
		12.291	1200
35	WF-134	9.4	0
		8.79	300
		9.645	500
		10.432	700
		11.143	900
		11.512	1010
		12.077	1200
36	WF-135	9.4	0
		8.876	300
		9.747	500
		10.54	700
		11.254	900
		11.623	1010
		12.191	1200
37	WF-136	9.4	0
		8.85	300
		9.749	500
		10.565	700
		11.299	900
		11.678	1010
		12.262	1200
38	WF-137	9.4	0
		8.955	300
		9.888	500
		10.726	700
		11.479	900
		11.868	1010
		12.471	1200
39	WF-138	9.4	0
		9.096	300
		10.003	500
		10.82	700
		11.554	900
		11.933	1010
		12.522	1200
40	WF-139	9.4	0
		9.118	300
		10.048	500
		10.888	700
		11.644	900
		12.035	1010
		12.645	1200
41	WF-140	9.4	0
		9.183	300
		10.126	500
		10.974	700
		11.738	900
		12.133	1010
		12.752	1200
42	WF-141	9.4	0
		9.151	300
		10.091	500
		10.935	700
		11.696	900
		12.089	1010
		12.703	1200
43	WF-142	9.4	0
		9.17	300
		10.066	500
		10.87	700
		11.594	900
		11.967	1010
		12.546	1200
44	WF-143	9.4	0
		9.18	300
		10.023	500
		10.756	700
		11.4	900
		11.727	1010
		12.221	1200
45	WF-144	9.4	0
		9.191	300
		10.025	500
		10.741	700
		11.36	900
		11.671	1010
		12.134	1200
46	WF-145	9.4	0
		9.306	300
		10.283	500
		11.148	700
		11.923	900
		12.322	1010
		12.949	1200
47	WF-146	9.4	0
		9.248	300
		10.14	500
		10.92	700
		11.608	900
		11.96	1010
		12.5	1200
48	WF-147	9.4	0
		9.366	300
		10.368	500
		11.25	700
		12.039	900
		12.444	1010
		13.083	1200
49	WF-148	9.4	0
		9.403	300
		10.349	500
		11.161	700
		11.873	900
		12.234	1010
		12.793	1200
50	WF-149	9.4	0
		9.402	300
		10.348	500
		11.159	700
		11.869	900
		12.229	1010
		12.785	1200
51	WF-150	9.4	0
		9.451	300
		10.415	500
		11.237	700
		11.953	900
		12.315	1010
		12.876	1200
52	WF-151	9.4	0
		9.47	300
		10.51	500
		11.415	700
		12.22	900
		12.632	1010
		13.283	1200
53	WF-152	9.4	0
		9.499	300
		10.544	500
		11.452	700
		12.258	900
		12.671	1010
		13.323	1200
54	WF-153	9.4	0
		9.603	300
		10.666	500
		11.586	700
		12.404	900
		12.823	1010
		13.487	1200
55	WF-154	9.4	0
		9.637	300
		10.732	500
		11.681	700
		12.525	900
		12.957	1010
		13.644	1200
56	WF-155	9.4	0
		9.696	300
		10.815	500
		11.783	700
		12.644	900
		13.085	1010
		13.788	1200
57	WF-156	9.4	0
		9.65	300
		10.673	500
		11.546	700
		12.314	900
		12.704	1010
		13.317	1200
58	WF-157	9.4	0
		9.731	300
		10.816	500
		11.748	700
		12.573	900
		12.994	1010
		13.663	1200
59	WF-158	9.4	0
		9.826	300
		10.968	500
		11.949	700
		12.82	900
		13.265	1010
		13.975	1200
60	WF-159	9.4	0
		9.79	300
		10.889	500
		11.831	700
		12.664	900
		13.089	1010
		13.764	1200
61	WF-160	9.4	0
		9.845	300
		10.951	500
		11.896	700
		12.73	900
		13.155	1010
		13.83	1200
62	WF-161	9.4	0
		9.888	300
		10.978	500
		11.904	700
		12.719	900
		13.133	1010
		13.788	1200
63	WF-162	9.4	0
		9.975	300
		11.076	500
		12.005	700
		12.818	900
		13.23	1010
		13.881	1200

64	WF-163	9.4	0
		10.007	300
		11.129	500
		12.078	700
		12.911	900
		13.334	1010
		14.004	1200

65	WF-164	9.4	0
		10.072	300
		11.301	500
		12.339	700
		13.255	900
		13.722	1010
		14.469	1200

66	WF-165	9.4	0
		10.043	300
		11.269	500
		12.302	700
		13.212	900
		13.675	1010
		14.416	1200

67	WF-166	9.4	0
		10.135	300
		11.299	500
		12.295	700
		13.177	900
		13.626	1010
		14.345	1200

68	WF-167	9.4	0
		10.199	300
		11.367	500
		12.364	700
		13.247	900
		13.697	1010
		14.416	1200

69	WF-168	9.4	0
		10.277	300
		11.504	500
		12.55	700
		13.477	900
		13.95	1010
		14.708	1200

70	WF-169	9.4	0
		10.259	300
		11.421	500
		12.413	700
		13.288	900
		13.734	1010
		14.446	1200

71	WF-170	9.4	0
		10.313	300
		11.507	500
		12.526	700
		13.426	900
		13.884	1010
		14.618	1200

72	WF-171	9.4	0
		10.367	300
		11.571	500
		12.596	700
		13.502	900
		13.963	1010
		14.701	1200

73	WF-172	9.4	0
		10.437	300
		11.666	500
		12.712	700
		13.637	900
		14.109	1010
		14.864	1200

74	WF-173	9.4	0
		10.505	300
		11.74	500
		12.791	700
		13.721	900
		14.195	1010
		14.955	1200

75	WF-174	9.4	0
		10.538	300
		11.773	500
		12.825	700
		13.755	900
		14.228	1010
		14.987	1200

76	WF-175	9.4	0
		10.627	300
		11.919	500
		13.018	700
		13.992	900
		14.489	1010
		15.288	1200

77	WF-176	9.4	0
		10.616	300
		11.888	500
		12.971	700
		13.931	900
		14.42	1010
		15.206	1200

78	WF-177	9.4	0
		10.628	300
		11.873	500
		12.935	700
		13.874	900
		14.353	1010
		15.121	1200

79	WF-178	9.4	0
		10.716	300
		11.995	500
		13.09	700
		14.063	900
		14.561	1010
		15.365	1200

80	WF-179	9.4	0
		10.737	300
		12.037	500
		13.152	700
		14.146	900
		14.656	1010
		15.483	1200

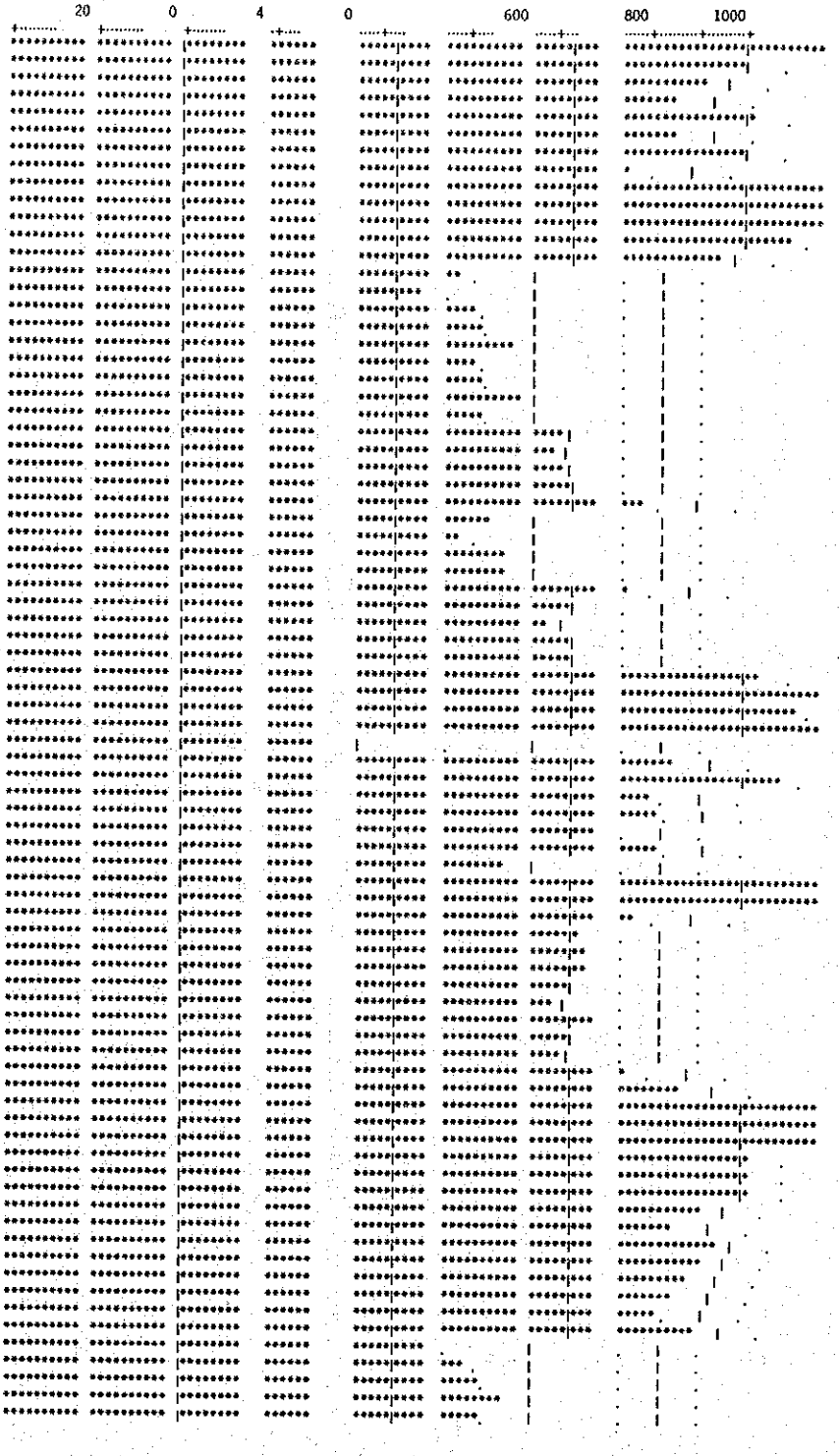
RYUKA NOU RYOKU HYO Freeboard = 1.0 m

NO	D-NAME	H	Q	NO	D-NAME	H	Q	NO	D-NAME	H	Q
1	WF-100	9.45	1301.1	2	WF-101	9.43	900.4	3	WF-102	9.42	847.9
4	WF-103	9.42	804.3	5	WF-104	9.77	916.5	6	WF-105	9.53	806
7	WF-106	9.84	902.3	8	WF-107	9.46	740.4	9	WF-108	10.83	1294.5
10	WF-109	11.7	2255.6	11	WF-110	11.8	2224.1	12	WF-111	10.5	969.2
13	WF-112	10.34	860.8	14	WF-113	9.46	560.1	15	WF-114	9.41	539.1
16	WF-115	9.61	581.4	17	WF-116	9.68	596.1	18	WF-117	9.79	637.6
19	WF-118	9.71	589.9	20	WF-119	9.76	594.2	21	WF-120	10	649.8
22	WF-121	9.74	590.7	23	WF-122	10.15	690	24	WF-123	10.07	673.5
25	WF-124	10.1	684.2	26	WF-125	10.11	701.3	27	WF-126	10.34	761.8
28	WF-127	9.91	609.2	29	WF-128	9.83	565.9	30	WF-129	10.11	622
31	WF-130	10.04	622.2	32	WF-131	10.46	747.2	33	WF-132	10.53	700.1
34	WF-133	10.43	667.8	35	WF-134	10.46	707.4	36	WF-135	10.52	694.6
37	WF-136	11.38	923	38	WF-137	12.25	1128.4	39	WF-138	11.83	979.4
40	WF-139	12.48	1147	41	WF-140	9.9	447.5	42	WF-141	11.35	806
43	WF-142	11.77	951.2	44	WF-143	11	772.8	45	WF-144	11.02	787.1
46	WF-145	11.31	739.7	47	WF-146	11.22	784.1	48	WF-147	10.94	625.9
49	WF-148	12.45	1081.4	50	WF-149	12.28	1026.8	51	WF-150	11.45	756.9
52	WF-151	11.5	719.9	53	WF-152	11.55	723.1	54	WF-153	11.7	726.3
55	WF-154	11.65	693	56	WF-155	11.66	672.7	57	WF-156	11.7	738
58	WF-157	11.79	709.6	59	WF-158	11.86	680.5	60	WF-159	12.04	747.9
61	WF-160	12.39	815.5	62	WF-161	13.23	1037.2	63	WF-162	13.25	1015.7
64	WF-163	13.52	1061.2	65	WF-164	13.3	910.3	66	WF-165	13.28	915.9
67	WF-166	13.25	917.5	68	WF-167	13.03	848.5	69	WF-168	13.07	809.1
70	WF-169	13.14	864.3	71	WF-170	13.21	849.7	72	WF-171	13.18	826.1
73	WF-172	13.19	800.2	74	WF-173	13.2	784.8	75	WF-174	13.45	831.7
76	WF-175	12.2	547.9	77	WF-176	12.3	572.1	78	WF-177	12.41	596.9
79	WF-178	12.7	624.9	80	WF-179	12.6	596.8				

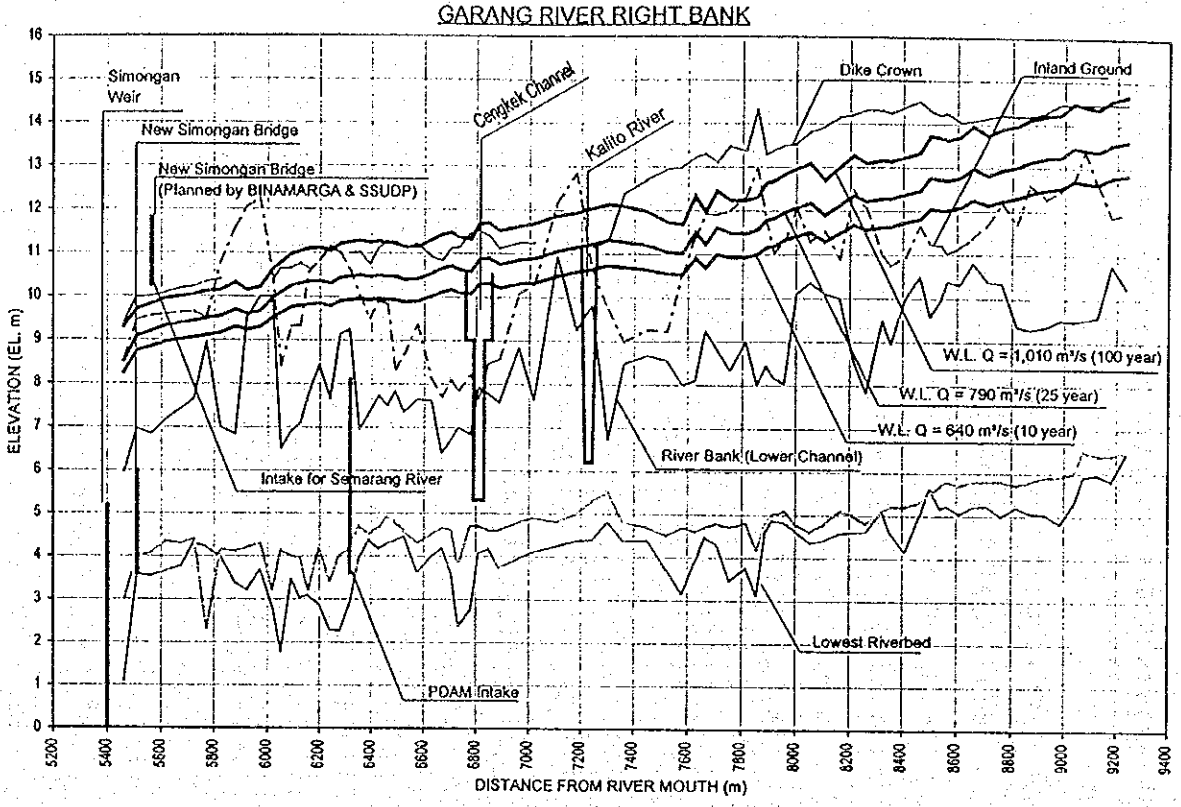
RYUKA NOU RYOKU HYO

Freeboard = 1.0 m

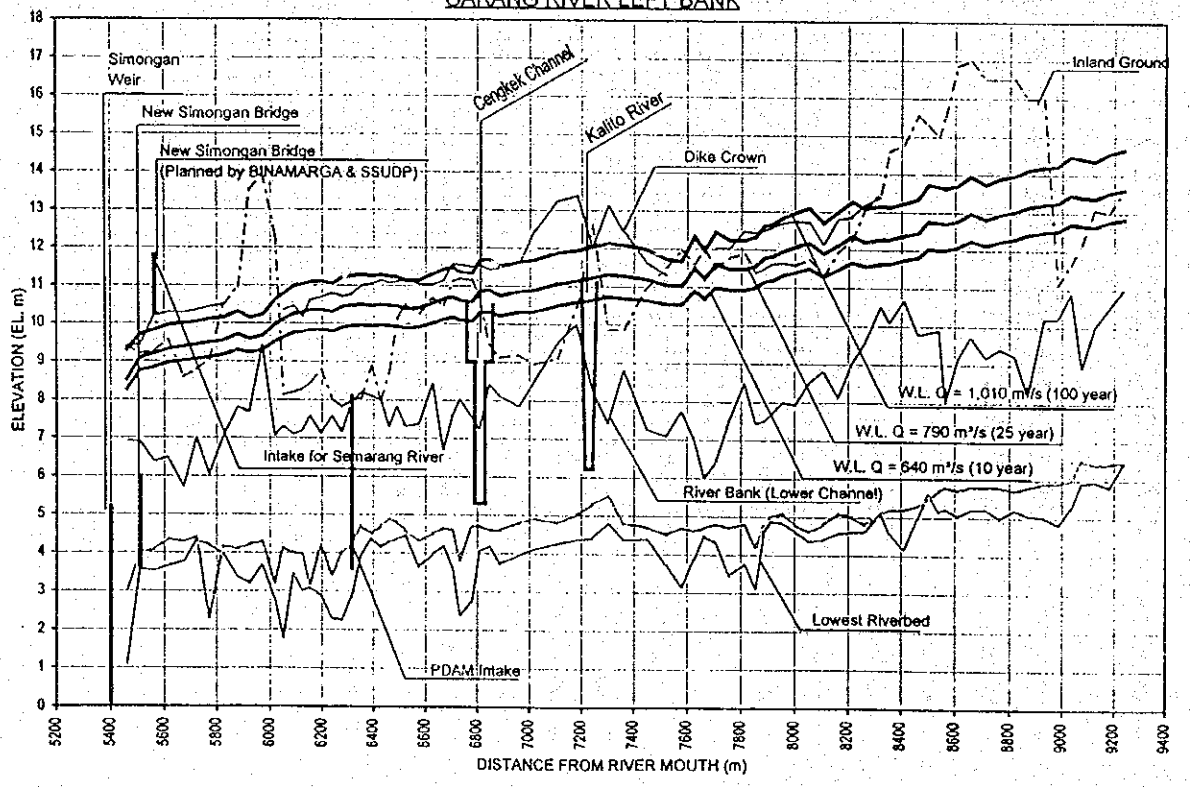
NO	D-NAME	Q
1	WF-100	1301.1
2	WF-101	900.4
3	WF-102	847.9
4	WF-103	804.3
5	WF-104	916.5
6	WF-105	806
7	WF-106	902.3
8	WF-107	740.4
9	WF-108	1294.5
10	WF-109	2255.6
11	WF-110	2224.1
12	WF-111	969.2
13	WF-112	860.8
14	WF-113	560.1
15	WF-114	539.1
16	WF-115	581.4
17	WF-116	596.1
18	WF-117	637.6
19	WF-118	589.9
20	WF-119	594.2
21	WF-120	649.8
22	WF-121	590.7
23	WF-122	690
24	WF-123	673.5
25	WF-124	684.2
26	WF-125	701.3
27	WF-126	761.8
28	WF-127	609.2
29	WF-128	565.9
30	WF-129	622
31	WF-130	622.2
32	WF-131	747.2
33	WF-132	700.1
34	WF-133	667.8
35	WF-134	707.4
36	WF-135	694.6
37	WF-136	923
38	WF-137	1128.4
39	WF-138	979.4
40	WF-139	1147
41	WF-140	447.5
42	WF-141	806
43	WF-142	951.2
44	WF-143	772.8
45	WF-144	787.1
46	WF-145	739.7
47	WF-146	784.1
48	WF-147	625.9
49	WF-148	1081.4
50	WF-149	1026.8
51	WF-150	756.9
52	WF-151	719.9
53	WF-152	723.1
54	WF-153	726.3
55	WF-154	693
56	WF-155	672.7
57	WF-156	738
58	WF-157	709.6
59	WF-158	680.5
60	WF-159	747.9
61	WF-160	815.5
62	WF-161	1037.2
63	WF-162	1015.7
64	WF-163	1061.2
65	WF-164	910.3
66	WF-165	915.9
67	WF-166	917.5
68	WF-167	848.5
69	WF-168	809.1
70	WF-169	864.3
71	WF-170	849.7
72	WF-171	826.1
73	WF-172	800.2
74	WF-173	784.8
75	WF-174	831.7
76	WF-175	547.9
77	WF-176	572.1
78	WF-177	596.9
79	WF-178	624.9
80	WF-179	596.8



GARANG RIVER RIGHT BANK



GARANG RIVER LEFT BANK



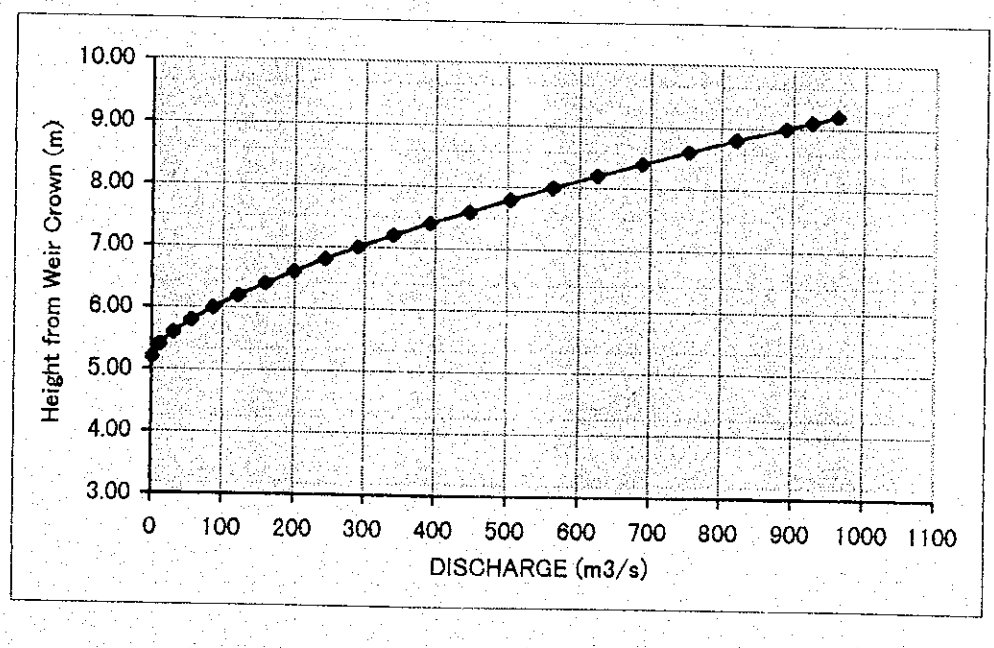
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig.
JAPAN INTERNATIONAL COOPERATION AGENCY	

(3) Water Level and Discharge at Existing Simongan Weir

Flood discharge capacity of the weir was estimated as follows:

Table 3.1.1 WATER LEVEL-DISCHARGE RELATION AT SIMONGAN WEIR

No.	Water Level EL(m)	Head h=H-5.2 (m)	Center Portion Q1 (m3/s) =1.57*64.6*h^1.5	Side Portion Q2 (m3/s) =1.8*10.4*h^1.5	Discharge Q=Q1+Q2 (m3/s)
1	5.20	0.00	0.0	0.0	0.0
2	5.40	0.20	9.1	1.7	10.7
3	5.60	0.40	25.7	4.7	30.4
4	5.80	0.60	47.1	8.7	55.8
5	6.00	0.80	72.6	13.4	86.0
6	6.20	1.00	101.4	18.7	120.1
7	6.40	1.20	133.3	24.6	157.9
8	6.60	1.40	168.0	31.0	199.0
9	6.80	1.60	205.3	37.9	243.2
10	7.00	1.80	244.9	45.2	290.1
11	7.20	2.00	286.9	52.9	339.8
12	7.40	2.20	331.0	61.1	392.0
13	7.60	2.40	377.1	69.6	446.7
14	7.80	2.60	425.2	78.5	503.7
15	8.00	2.80	475.2	87.7	562.9
16	8.20	3.00	527.0	97.3	624.3
17	8.40	3.20	580.6	107.2	687.7
18	8.60	3.40	635.8	117.4	753.2
19	8.80	3.60	692.8	127.9	820.6
20	9.00	3.80	751.3	138.7	890.0
21	9.10	3.90	781.1	144.2	925.3
22	9.20	4.00	811.4	149.8	961.1



2.2 Design Riverbed and Channel Hydraulics

The design riverbed profiles of West Floodway and Garang River are determined based on the following considerations.

(1) West Floodway

Fig. 2.2.1 shows the change of riverbed profile between 1991 and 1997. Distinctive changes are observed as the riverbed aggradation in the river mouth area and bed degradation in the midstream and upstream. The riverbed of the river mouth is raised by about 1.0 m from the previous riverbed. However, this sedimentation does not extend to the offshore seabed as can be seen from Fig. 2.2.2.

The existing riverbed in the midstream and upstream is lowered by about 0.5 m. This is due to the cutting off the sediment flow by Simongan Weir. Remarkable riverbed degradation due to the local scouring is found as well in immediately downstream portions of three bridges. As to the riverbed gradient, a flat or rather gentle slope except the reverse bed slope of river mouth area, is formed.

Taking the said existing riverbed profile into account, the design riverbed is studied through the comparison of the following three (3) alternatives.

Alternative	Riverbed Elevation at River Mouth	Design Riverbed Gradient	Riverbed Elevation at Simongan Weir
Case-1	EL. -2.00	Level to 1/2,650	EL. -0.67
Case-2	EL. -2.50	Level to 1/2,650	EL. -1.17
Case-3	EL. -3.00	Level to 1/2,650	EL. -1.67

As for the design elevation of floodplain, the height of 3.0 to 3.5 m from the design riverbed is employed to avoid frequent flood inundation of floodplain as shown in Fig. 2.2.4. With this design height, the floodplain will not submerged under the flood of 2-year return period or more for the whole channel stretches except lowermost portion near the river mouth. This proposed ground elevation is almost the same height as that of existing floodplain.

Based on the above riverbed profiles and channel cross sections (schematically shown in Fig. 2.2.3), the flood water level profiles for the above alternatives are estimated as shown in Fig. 2.2.4. The freeboard between the underside of each bridge

girder and the high water level is also estimated as follows:

Alternative	Name of Bridge	Underside elevation of Bridge Girder	Water Level	Freeboard
Case-1A	North Ring Road. Br.	EL. 2.52 m	EL. 1.41 m	1.11
	Railway Bridge	EL. 3.50 m	EL. 3.32 m	0.18
	National Road Bridge	EL. 4.14 m	EL. 3.65 m	0.49
Case-2A	North Ring Road. Br.	EL. 2.52 m	EL. 1.10 m	1.42
	Railway Bridge	EL. 3.50 m	EL. 2.98 m	0.52
	National Road Bridge	EL. 4.14 m	EL. 3.33 m	0.81
Case-3A	North Ring Road. Br.	EL. 2.52 m	EL. 0.85 m	1.67
	Railway Bridge	EL. 3.50 m	EL. 2.64 m	0.86
	National Road Bridge	EL.4.14 m	EL. 2.98 m	1.16

Case-1A:

Of the three alternatives the highest water level is obtained. It is almost the same elevation as the existing floodwall crest in the river stretches upstream from North Ring Road Bridge. Further, the freeboard between the water level and girders of Railway Bridge and National Road Bridge are rather small of 18 cm and 49 cm, respectively. As the results, the raising work of floodwall with big height and raising of two bridges are necessary. The impact on the existing river structures by channel excavation is negligible.

Case-2A:

The water level lower than the existing floodwall crest is obtained for the whole river stretch. The freeboard between water level and said bridge girders are 52 cm and 81 cm. The channel excavation is moderate with little impact on river structures.

Case-3A:

The lowest water level is obtained. However, channel excavation will affect most existing river structures and bridge foundations to a great deal. Further, the channel maintenance at river mouth will be difficult due to the heavy future sedimentation.

Judging from these advantages/disadvantages of each alternatives, Case-2A is preferred as the optimum river bed profile. As the results, the optimum longitudinal channel profile proposed is given as shown in Fig. 2.2.5.

(2) Garang Rive (Simongan Weir to Confluence with Kreo River)

Comparing the current riverbed profile in 1997 with that in 1991, there is no big changes in overall riverbed profile except the locally scoured portions found in riverbed profile in 1997 as shown in Fig. 2.2.1. This is caused by an excessive sand mining activity. Therefore, the design riverbed gradient of 1/1,250, which was adopted as the stable riverbed slope in the F/S, is still applicable.

There are two (2) alternatives conceived as to what riverbed elevation is employed for the bottom of new Simongan Weir. The design riverbed profiles of each alternatives are summarized in the table below.

Alternative	Riverbed Elevation at Simongan Weir	Design Riverbed Gradient	Head of Hydraulic Drop *3
Case-1B	EL. +1.50 *1	1/1,250	1.5 m
Case-2B	EL. +3.00 *2	1/1,250	-

*1 This is the average elevation of existing riverbed at Simongan Weir whose riverbed has been extremely lowered by local scouring.

*2 This is the elevation of the point 0.6 m lower than the original riverbed at Simongan Weir.

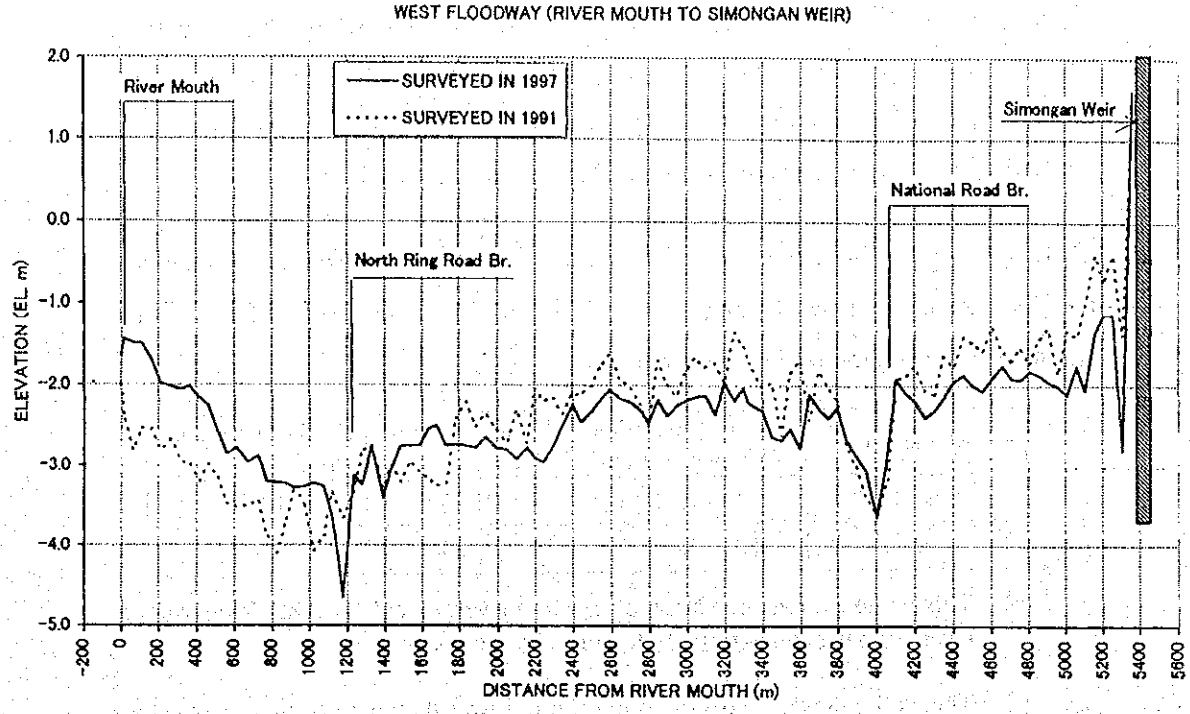
*3 Case-1B requires a hydraulic drop with the head of 1.5 m, while no hydraulic drops for Case-2B.

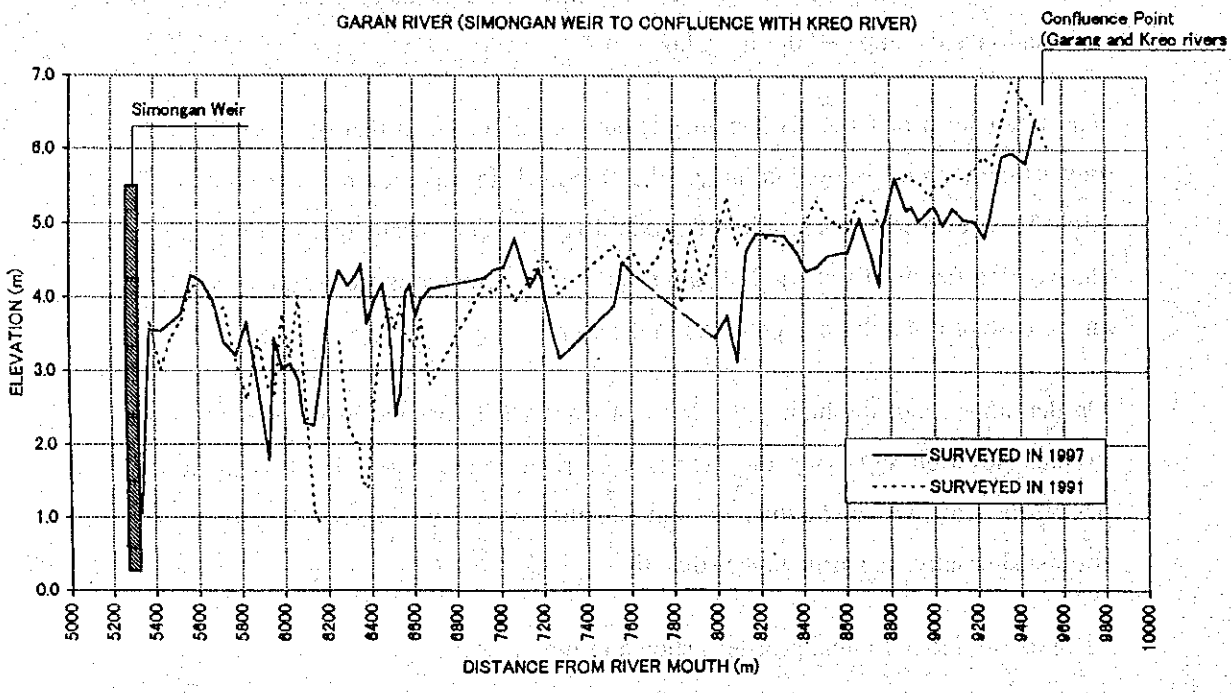
For these two cases, the flood water level profiles are estimated by non-uniform flow calculation and compared in Fig. 2.2.6.

The water level of Case-2B becomes about 2 m higher than that of Case-1B in the downstream stretches. Accordingly, the floodwall in this area can not confine the high flood level within a required freeboard level. This means that more raising of the existing floodwalls along the main river and its tributaries are required, resulting in increase of flood damage potential in the area.

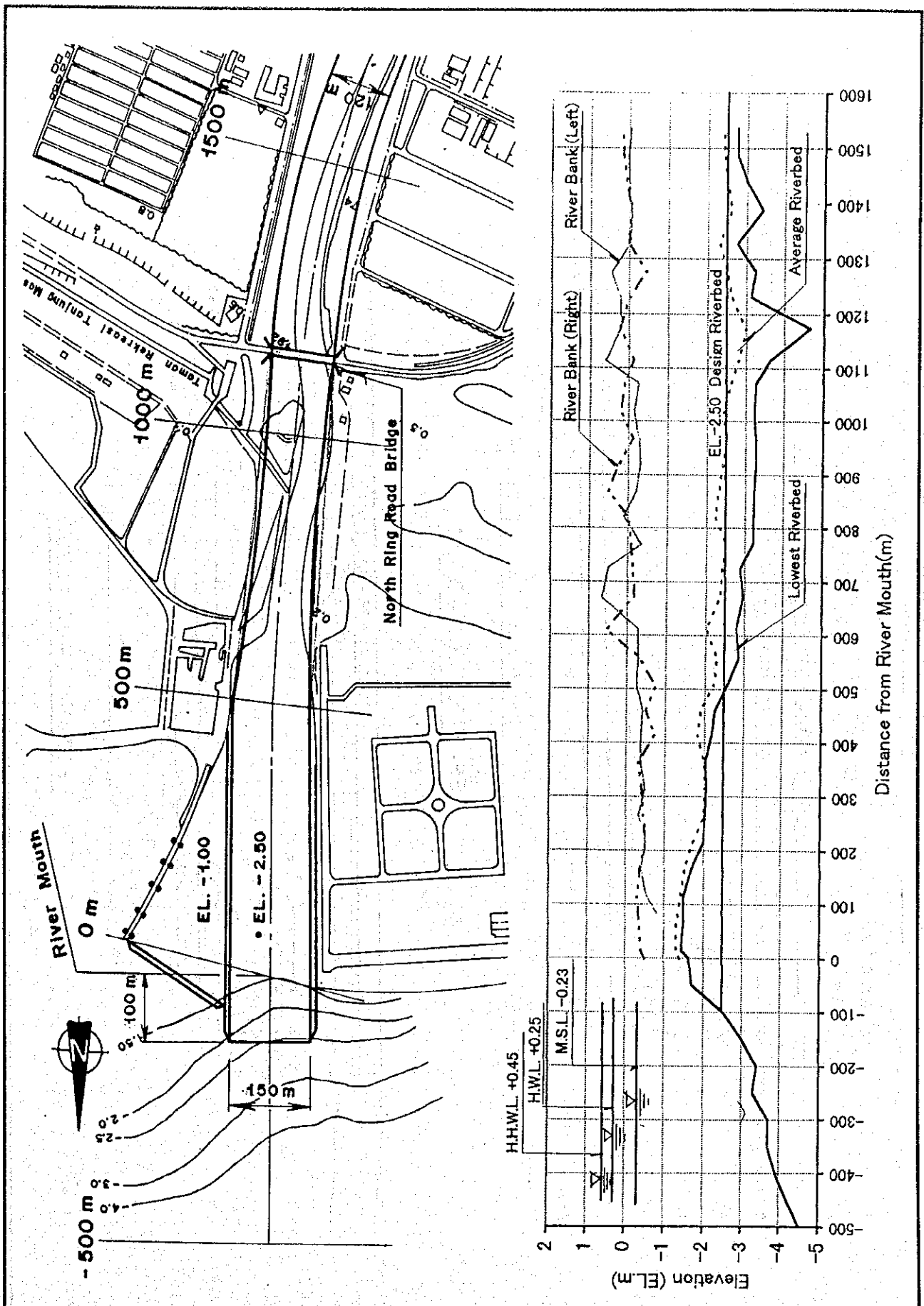
On the other hand, the high water level of Case-1B is lowered below the average ground elevation satisfying the premises of river improvement for Garang River. Therefore, Case-1B can be the most suitable alternative, even though the project cost for this alternative is a little higher than the.

The proposed longitudinal profile is shown in Fig. 2.2.7.

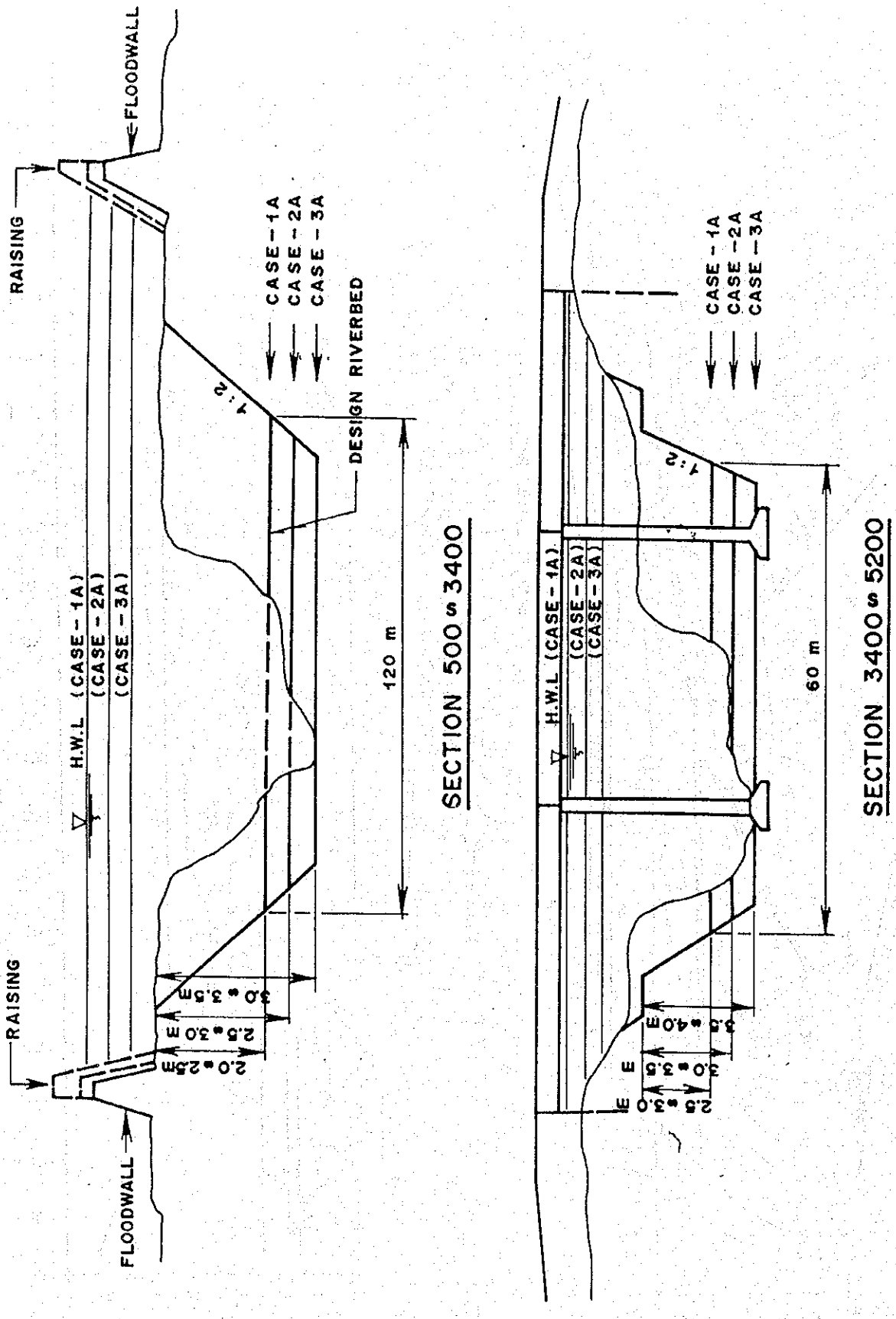




THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 1
JAPAN INTERNATIONAL COOPERATION AGENCY	

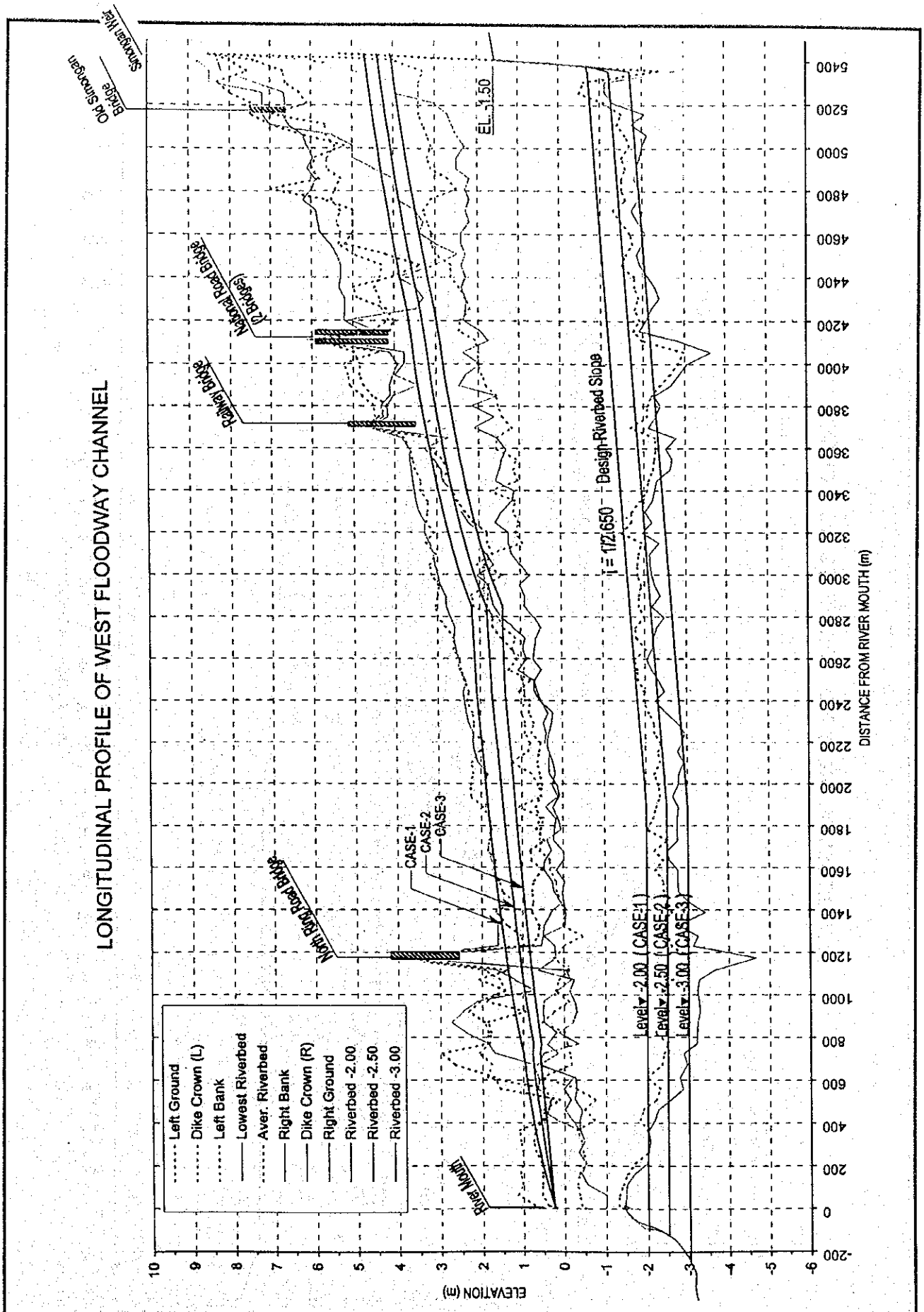


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 2
JAPAN INTERNATIONAL COOPERATION AGENCY	



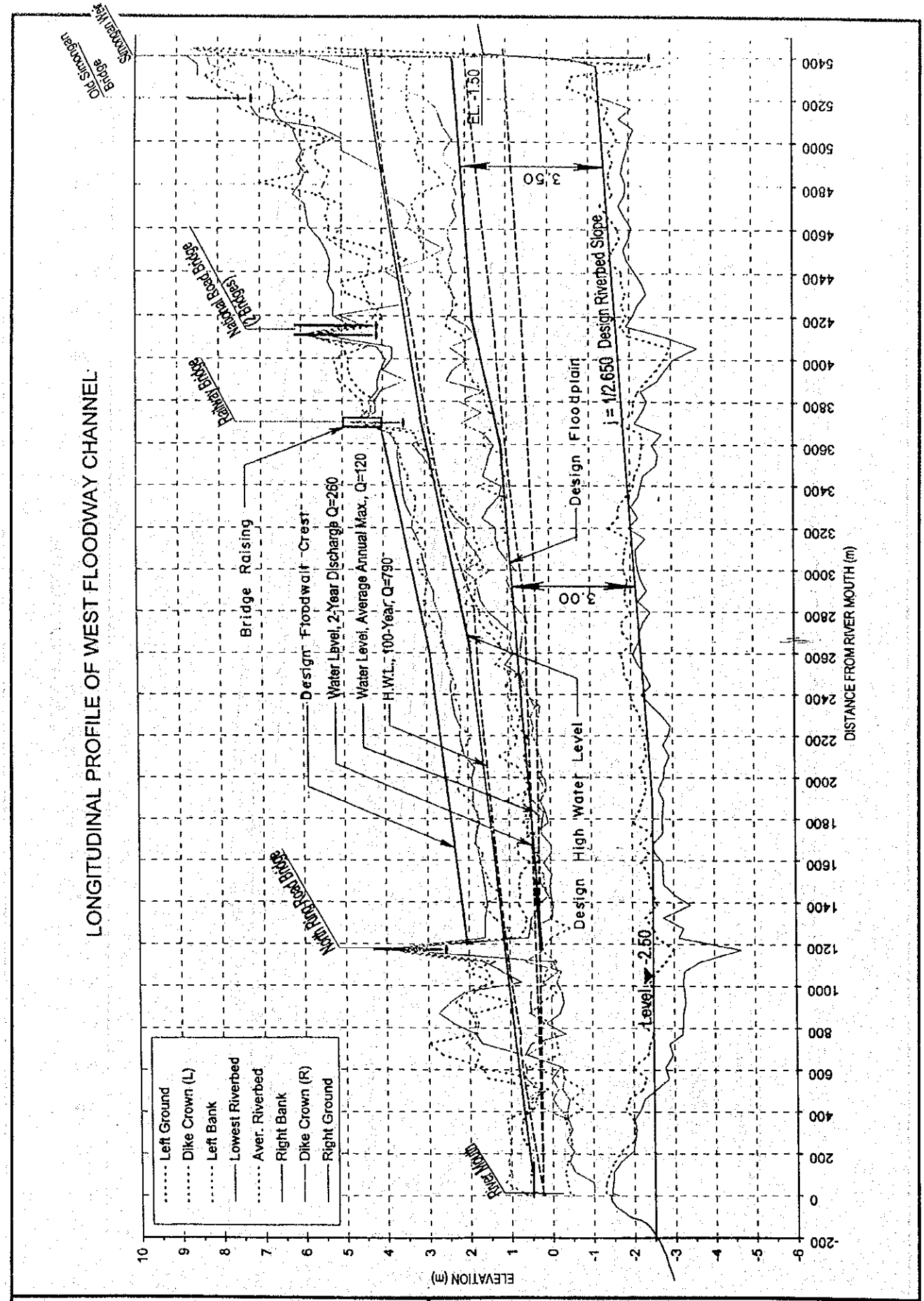
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 3
JAPAN INTERNATIONAL COOPERATION AGENCY	

2.2.3



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 4
JAPAN INTERNATIONAL COOPERATION AGENCY	

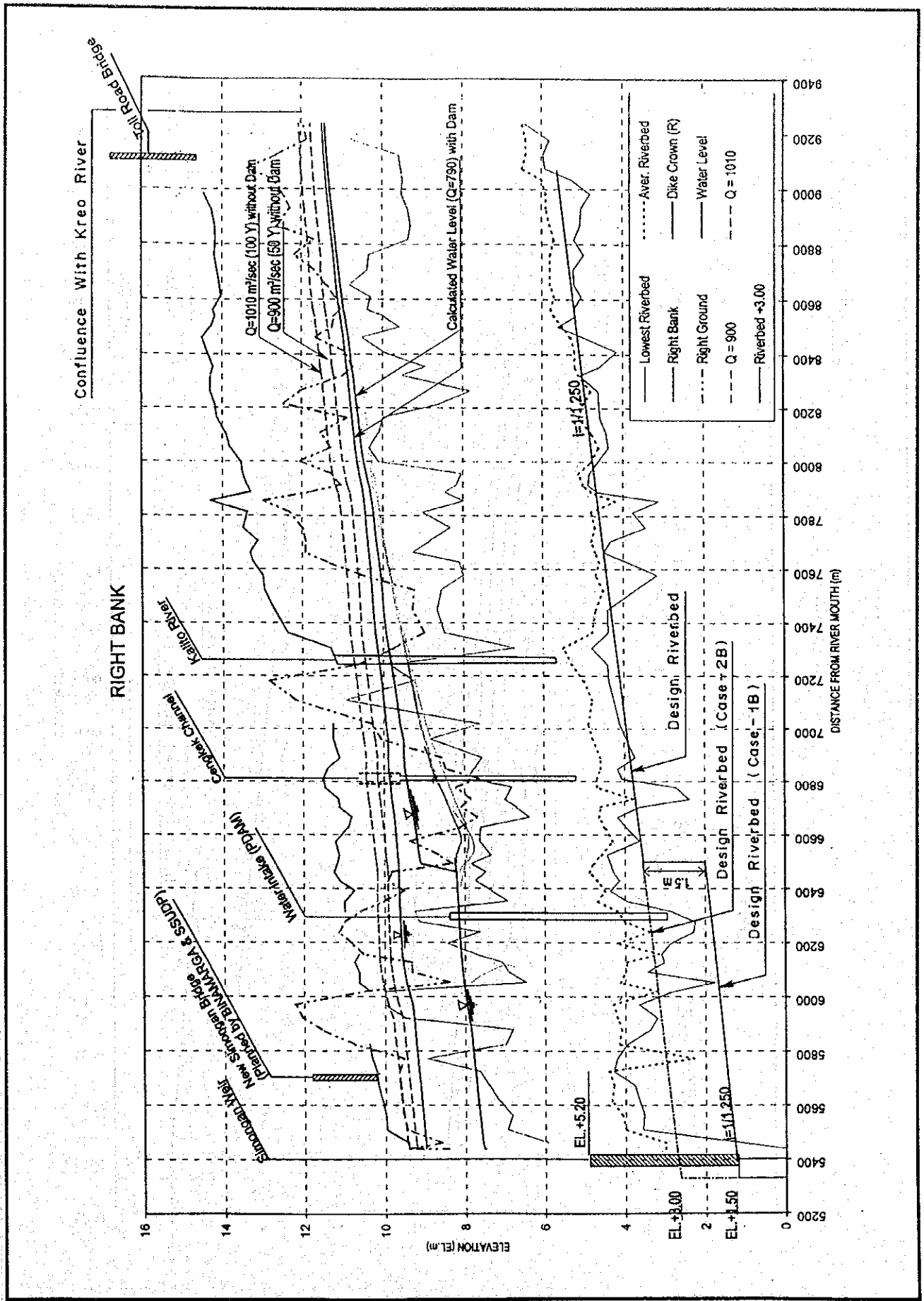
2.2.4



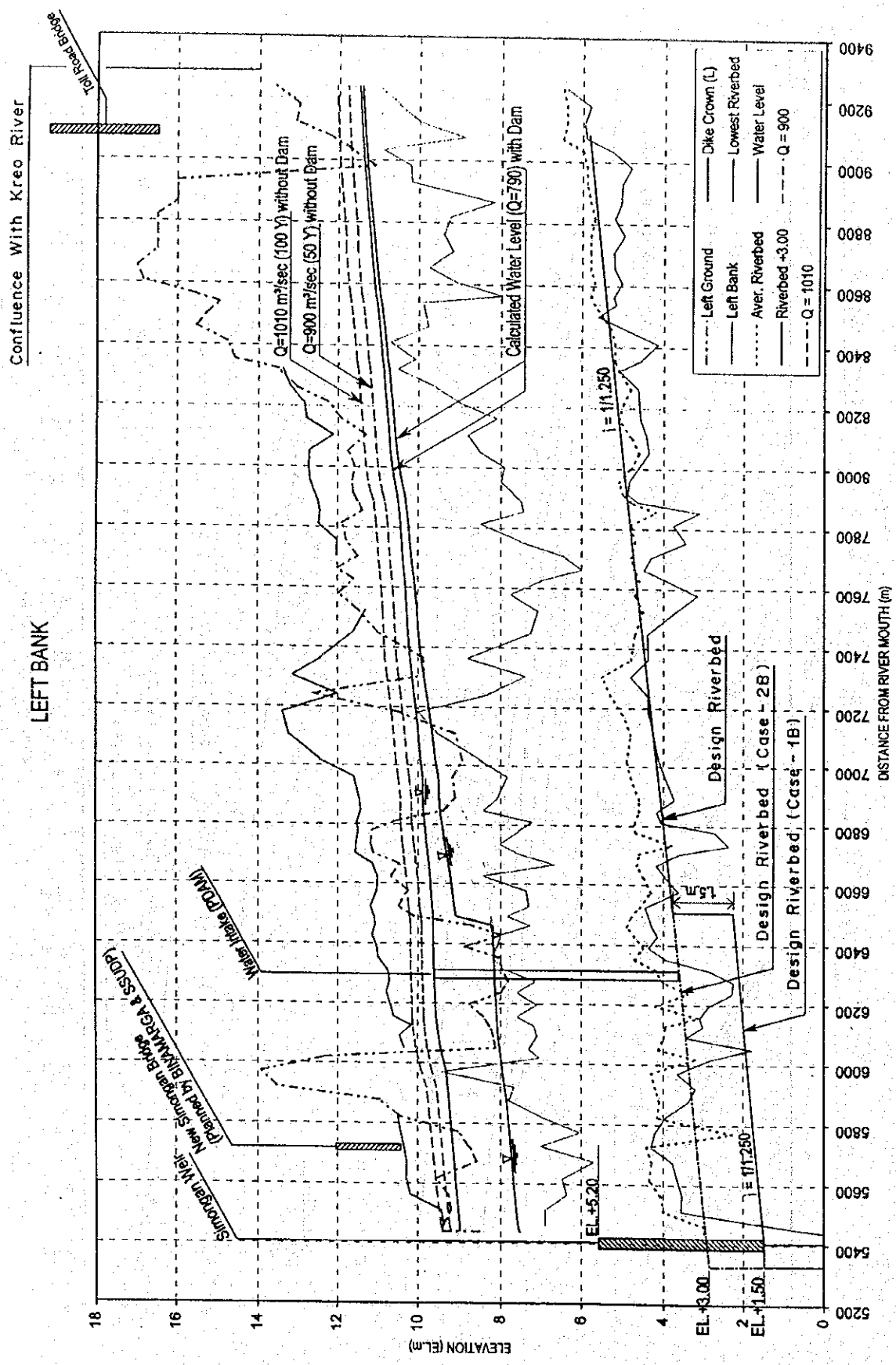
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

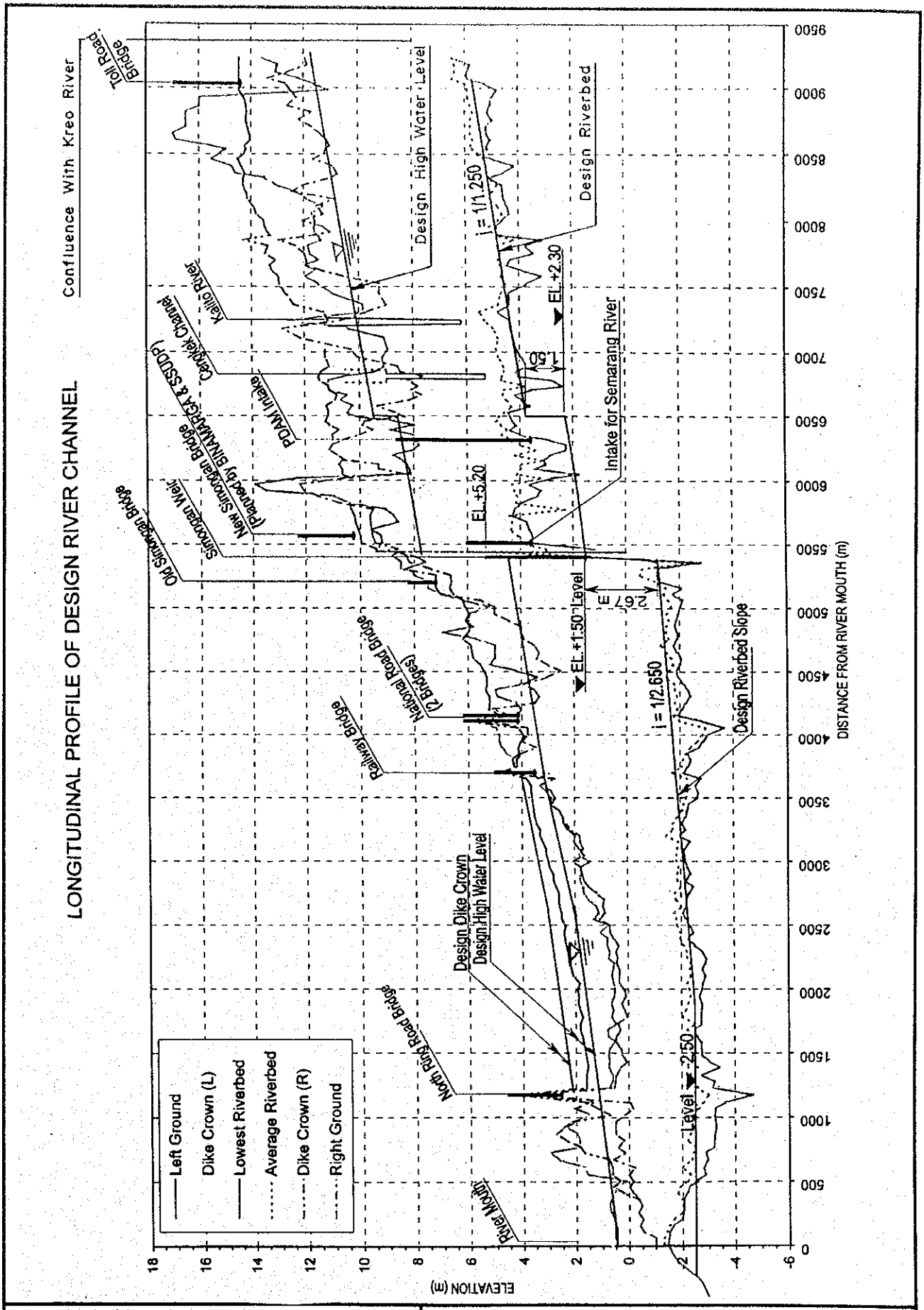
Fig. 2. 2. 5



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 6 (1/2)
JAPAN INTERNATIONAL COOPERATION AGENCY	



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 6 (2/2)
JAPAN INTERNATIONAL COOPERATION AGENCY	



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 2. 2. 7
JAPAN INTERNATIONAL COOPERATION AGENCY	

2.2.7

2.3 River Hydraulics on Design Channel

Water level profile was calculated for the design river channel as mentioned below.

2.3.1 Conditions on Calculation

(1) Uniform Flow Calculation

In principle, the design high water level profile is set based on the uniform flow calculation. This method is commonly applied for the river stretch of which water level is not affected by tide. As a uniform flow calculation method, the following Manning's Formula is used.

$$Q = \frac{1}{n} \times I^{1/2} \times R^{2/3} \times A$$

where;

Q	: design discharge (m^3/s)
n	: Manning's roughness coefficient
I	: gradient of river bed
R	: hydraulic radius (m)
A	: flow area (m^2)

(2) Non Uniform Flow Calculation

For the river channel where water level is influenced by the downstream water level, non-uniform flow method is employed to compute the water surface profile. The calculation equation is presented as follows:

$$\{H_2 + \frac{D_2}{2g}\left(\frac{Q_2}{A_2}\right)^2\} - \{H_1 + \frac{D_1}{2g}\left(\frac{Q_1}{A_1}\right)^2\} = h_e$$

$$h_e = \frac{1}{2}\{\frac{N_1^2}{A_1^2}\frac{Q_1^2}{R_1^{4/3}} + \frac{N_2^2}{A_2^2}\frac{Q_2^2}{R_2^{4/3}}\} \times \Delta X$$

Using Iida's Formula, coefficients; D,N and R are expressed below.

$$D = \alpha \cdot \frac{A^2 \int_0^B \frac{h^3}{n^3} d\xi}{\left(\int_0^B \frac{h^{5/3}}{n} d\xi\right)^3}, \quad N = \frac{\int_0^B h^{5/3} d\xi}{\int_0^B \frac{h^{5/3}}{n} d\xi}, \quad R = \left(\frac{1}{A}\int_0^B h^{5/3}\right)^{3/2}$$

where,

H : elevation of water level (m)

h_e : difference in water level between two sections

g : acceleration of gravity (9.8 m/s^2)

Q : discharge (m^3/s)

A : flow area (m^2)

ΔX : distance between two cross sections (m)

D : coefficient for correction

N : equivalent roughness coefficient for the whole cross sections

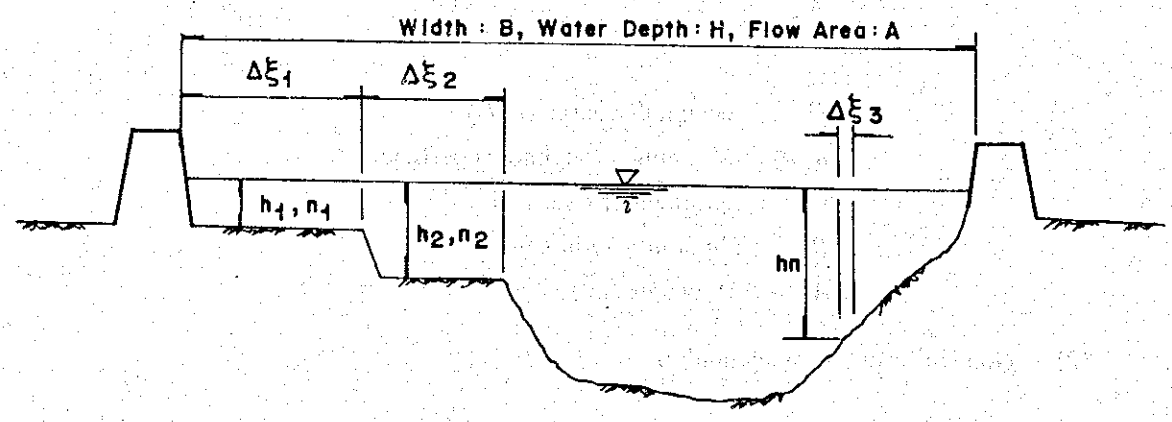
R : equivalent hydraulic depth for the whole cross sections

n : Manning's roughness coefficient for each cross section

α : energy coefficient (1.0)

B : river width subject to computation.

Suffix denotes the number of cross sections from downstream to upstream.



CHANNEL CROSS SECTION

(3) Roughness Coefficient

For the uniform and non-uniform flow calculation, the following Manning's roughness coefficient are used based on the recommended figures in "Flood Control Manual".

Low Water Channel (excavated)	0.030
Low Water Channel (existing)	0.033
Flood Plain (excavated) *1	0.035
Flood Plain (existing)	0.040
Channel with Lining (narrow channel)	0.025

*1 The flood plain here is referred to the bottom portion of high water channel.

(4) Design Tidal Level at River Mouth

The design tidal levels at the river mouth are determined based on the tidal data observed at Semarang Harbor. Since the tidal data observed in the past have been affected by land subsidence in the low lying area, the most recent data of April 1997 to August 1997, which are considered less affected, are used for the tidal analysis.

Kind of Water Level	Elevation (TTG)
Highest High Water Level (HHWL)	EL. +0.45 m
Mean High Water Level (MHWL)	EL. +0.25 m
Mean Sea Level (MSL)	EL. -0.23 m
Mean Low Water Level (MLWL)	EL. -0..70 m
Lowest Low Water Level (LLWL)	EL. -0..90 m

For the non-uniform flow calculation in the event of flooding, the mean high water level of EL. +0.250 m is used as the starting water level at the river mouth.

Table MAXIMUM AND MINIMUM VALUE OF TIDAL LEVEL IN THE LAST FIVE MONTHS

Months / Date	April. 1997		May. 1997		Jun . 1997		July . 1997		August . 1997		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
1	176	118	184	100	189	106	162	114	174	118	
2	174	105	182	94	184	109	162	106	178	124	
3	170	99	188	96	174	112	164	112	182	122	
4	176	95	176	100	168	110	156	105	180	120	
5	170	105	166	107	172	116	162	110	176	123	
6	174	96	160	110	177	126	169	117	166	121	
7	164	109	162	121	180	129	178	116	162	-	
8	160	114	152	117	180	121	182	124	158	120	
9	135	115	160	123	181	120	174	113	170	114	
10	143	116	166	128	184	116	176	115	166	117	
11	141	112	171	120	183	118	169	108	178	105	
12	154	110	168	116	177	112	176	123	174	107	
13	166	107	178	103	184	111	167	108	180	99	
14	164	82	179	100	182	113	172	122	170	91	
15	168	77	180	100	182	112	168	118	173	104	
16	167	102	175	100	177	124	164	115	102	102	
17	160	94	169	100	174	120	158	112	164	108	
18	156	91	165	96	178	120	158	108	160	116	
19	160	94	164	105	173	119	155	108	153	112	
20	161	111	153	104	172	117	170	109	149	116	
21	159	122	157	110	174	116	165	102	142	115	
22	159	122	153	111	175	118	168	111	152	114	
23	154	132	160	115	188	117	169	112	159	119	
24	154	125	167	110	187	124	170	112	165	111	
25	152	126	173	120	190	120	170	115	166	122	
26	164	126	174	116	188	119	177	112	164	116	
27	169	129	178	122	192	113	170	120	171	117	
28	179	123	182	108	179	112	185	116	167	112	
29	188	118	187	108	176	119	-	-	169	116	
30	179	102	186	104	-	-	-	-	172	113	
31	-	-	194	104	-	-	-	-	170	119	***Average***
Average	**163**	**109**	**171**	**109**	**180**	**117**	**168**	**113**	**165**	**114**	-
Max. Value	**188**	-	**194**	-	**192**	-	**185**	-	**182**	-	**188.2**
Min. Value	-	**77**	-	**94**	-	**106**	-	**102**	-	**91**	**94.0**

Note :

TIDAL DATA ** APRIL 1997 **

Unit : cm

TIME / DATE	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Aver.	Max.	Nin.	Difference
1	121	123	132	141	146	146	146	146	144	139	138	138	140	150	162	171	176	176	172	168	154	140	127	118	146	176	118	58
2	117	121	127	139	145	146	146	144	140	134	130	130	130	139	150	163	172	174	169	162	150	134	119	105	141	174	105	69
3	99	98	105	116	124	133	136	135	130	124	118	116	118	126	136	148	161	169	170	167	157	143	127	111	132	170	98	72
4	98	95	98	110	114	124	134	138	135	132	127	121	121	127	137	150	164	172	176	176	172	161	146	130	136	176	95	81
5	116	106	105	97	117	126	133	139	140	140	134	123	120	124	132	142	154	163	169	170	169	161	147	132	136	170	97	73
6	116	104	96	109	104	112	120	129	134	138	137	132	126	123	130	139	148	160	166	171	174	172	164	150	136	174	96	78
7	137	123	114	116	109	114	123	128	130	131	133	130	125	124	126	131	140	150	157	162	164	164	159	152	135	164	109	55
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30	114	110	121	133	133	137	137	136	134	131	131	134	142	151	162	171	177	179	173	164	144	124	110	102	140	179	102	77
Average																									137	164	109	55
Max.																										188		
Nin.																											77	

TIDAL DATA ** MAY 1997 **

Unit: cm

TIME / DATE	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Aver.	Max.	Min.	Difference
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2	94	96	103	112	123	134	143	144	142	138	135	133	135	142	153	164	175	182	182	176	165	149	130	113	140	182	94	88
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12	116	116	120	123	126	131	138	140	140	141	143	146	149	154	161	165	168	168	163	154	143	133	123	116	141	168	116	52
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16	100	107	112	126	139	150	156	154	154	152	150	150	154	160	166	173	175	175	170	159	143	127	113	102	144	175	100	75
17	100	100	106	118	132	144	150	150	149	146	144	144	146	151	159	164	169	165	161	154	146	128	113	104	139	169	100	69
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28	122	126	132	133	133	135	140	147	152	157	162	166	171	177	180	182	182	180	170	150	132	119	111	108	149	182	108	74
29	112	117	123	129	134	136	140	144	146	148	150	156	165	176	184	187	186	183	174	161	146	130	117	108	148	187	108	79
30	106	112	118	127	138	142	144	144	148	150	153	156	162	169	178	184	186	186	180	170	156	132	114	104	148	186	104	82
31	104	110	120	136	141	150	154	154	156	158	160	161	167	173	182	190	194	192	186	178	163	145	128	113	155	194	104	90
Aver.																									143	172	108	63
Max.																										194		
Min.																											94	

TIDAL DATA ** JUN 1997 **

Unit : cm

DATE \ TIME	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Aver.	Max.	Min.	Difference
1	106	112	119	129	141	154	163	165	163	160	160	161	164	168	174	181	186	189	187	179	167	150	133	119	155	189	106	83
2	109	108	115	125	138	150	161	170	170	166	161	158	159	162	165	170	177	184	184	180	171	158	142	126	155	184	108	76
3	116	112	117	122	134	149	162	170	174	174	170	165	163	164	165	165	167	171	173	173	169	161	146	130	155	174	112	62
4	118	110	112	117	125	137	150	161	168	169	169	165	162	160	158	158	158	159	160	160	156	150	143	134	148	169	110	59
5	125	117	116	119	126	136	145	154	164	170	172	171	169	166	164	162	160	158	157	155	152	148	144	139	150	172	116	56
6	134	128	126	128	132	140	148	155	164	170	175	177	176	175	173	170	166	162	158	154	150	146	142	138	154	177	126	51
7	134	130	129	129	134	141	147	154	162	167	173	178	180	180	179	176	172	166	158	151	145	138	133	130	154	180	129	51
8	128	126	124	125	130	138	147	154	160	166	170	175	177	180	180	180	178	174	164	152	141	132	125	121	152	180	121	59
9	121	123	124	126	130	138	145	154	156	162	168	174	179	181	182	182	180	175	165	153	143	134	126	120	152	182	120	62
10	116	118	121	124	130	137	147	156	162	167	170	174	179	182	184	184	182	179	170	158	146	135	125	120	153	184	116	68
11	118	120	124	128	137	136	144	152	158	161	165	170	175	180	183	183	182	180	176	161	148	135	125	118	152	183	118	65
12	112	112	118	124	130	135	141	147	152	156	158	160	164	168	172	176	177	176	172	163	148	134	123	114	147	177	112	65
13	111	114	120	128	136	144	152	157	162	164	165	168	170	175	178	182	184	183	179	171	157	140	126	116	153	184	111	73
14	113	115	121	128	137	147	154	159	162	165	166	166	168	173	177	180	182	180	176	168	157	142	127	117	153	182	113	69
15	112	114	118	124	132	143	152	159	163	164	166	167	168	172	175	178	181	182	179	174	165	154	141	130	155	182	112	70
16	124	124	124	130	141	151	161	168	170	168	168	168	169	171	174	176	177	177	174	168	159	148	137	128	156	177	124	53
17	121	120	124	130	141	153	164	172	174	170	165	160	159	159	162	165	168	168	166	162	154	146	135	126	153	174	120	54
18	120	121	126	134	144	157	168	176	178	175	170	167	164	164	165	168	168	168	166	160	154	145	136	126	155	178	120	58
19	119	120	125	132	143	152	162	168	173	172	168	165	161	159	158	157	157	156	154	151	145	138	130	123	150	173	119	54
20	117	116	120	128	136	146	156	164	170	172	172	170	168	165	164	160	158	155	152	148	144	138	131	125	149	172	116	56
21	119	116	116	121	128	136	147	157	164	172	174	174	171	168	166	164	161	157	154	150	146	140	134	130	149	174	116	58
22	124	120	118	123	131	140	149	157	164	171	175	176	175	172	170	167	162	156	150	146	140	134	128	124	149	176	118	58
23	121	118	117	120	128	140	150	158	165	173	180	185	188	188	186	182	176	169	161	155	149	142	136	131	155	188	117	71
24	130	128	126	124	126	132	142	151	158	164	172	180	184	187	185	180	174	168	158	149	145	140	134	130	153	187	124	63
25	130	130	130	130	132	136	144	150	157	164	170	176	184	188	190	190	186	178	168	156	142	133	125	120	155	190	120	70
26	119	120	122	125	126	128	137	145	151	155	162	169	176	184	187	188	185	180	172	160	147	135	128	127	151	188	119	69
27	126	128	134	139	143	147	165	162	168	172	174	176	179	185	190	192	190	186	178	163	147	130	118	113	159	192	113	79
28	112	115	119	126	133	138	141	143	149	152	152	156	162	167	171	174	179	178	173	165	152	136	124	118	147	179	112	67
29	119	120	128	140	150	157	162	164	161	162	156	154	153	160	166	172	174	176							154	176	119	57
30																												
Average																									152	180	117	63
Max.																										192		
Min.																											106	

TIDAL DATA ** JULY,AUGUST 1997 **

	September			August			July		
	Max	Min	Differ.	Max	Min	Differ.	Max	Min	Differ.
1	163	128		174	118	56	162	114	48
2	172	122		178	124	54	162	106	56
3	163	116		182	122	60	164	112	52
4	174	122		180	120	60	156	105	51
5				176	123	53	162	110	52
6				166	121	45	169	117	52
7				162	-	-	178	116	62
8				158	120	38	182	124	58
9				170	114	56	174	113	61
10				166	117	49	176	115	61
11				178	105	73	169	108	61
12				174	107	67	176	123	53
13				180	99	81	167	108	59
14				170	91	79	172	122	50
15				173	104	69	168	118	50
16				102	102	0	164	115	49
17				164	108	56	158	112	46
18				160	116	44	158	108	50
19				153	112	41	155	108	47
20				149	116	33	170	109	61
21				142	115	27	165	102	63
22				152	114	38	168	111	57
23				159	119	40	169	112	57
24				165	111	54	170	112	58
25				166	122	44	170	115	55
26				164	116	48	177	112	65
27				171	117	54	170	120	50
28				167	112	55	185	116	69
29				169	116	53	-	-	-
30				172	113	59	-	-	-
31				170	119	51	-	-	-
32				162	114	48	-	-	-
Aver.				165	114	51	168	113	55
Max.				182			185		
Min.					91			102	

2.3.2 West Floodway

(1) Water Level Profile

Since West Floodway is a tidal river of which riverbed slope is almost flat in the lower reaches, the steady uniform flow calculation is not applicable. Then, the non-uniform flow calculation presented in "Hydraulic Criteria" is applied to estimate the water level and the flow velocity of river channel.

Using the river cross-sections and longitudinal profile of the channel determined in the basic design, non-uniform flow calculation was conducted. When the design flood discharge of 790 m^3/s flows in the river channel, the water level and the flow velocity are calculated as shown in the following calculation sheets. The water level profile calculated and flow velocity are illustrated as well.

WEST FLOODWAY, STEADY NON-UNIFORM FLOW (LEVEL,-2.5,1/2650) b = 50 WF.75-UP
BASIC DATA

KUKAN-SU =13 ALPHA = 10 QO = 790.00 M3/S HO = .250 M ZO = -2.500 M

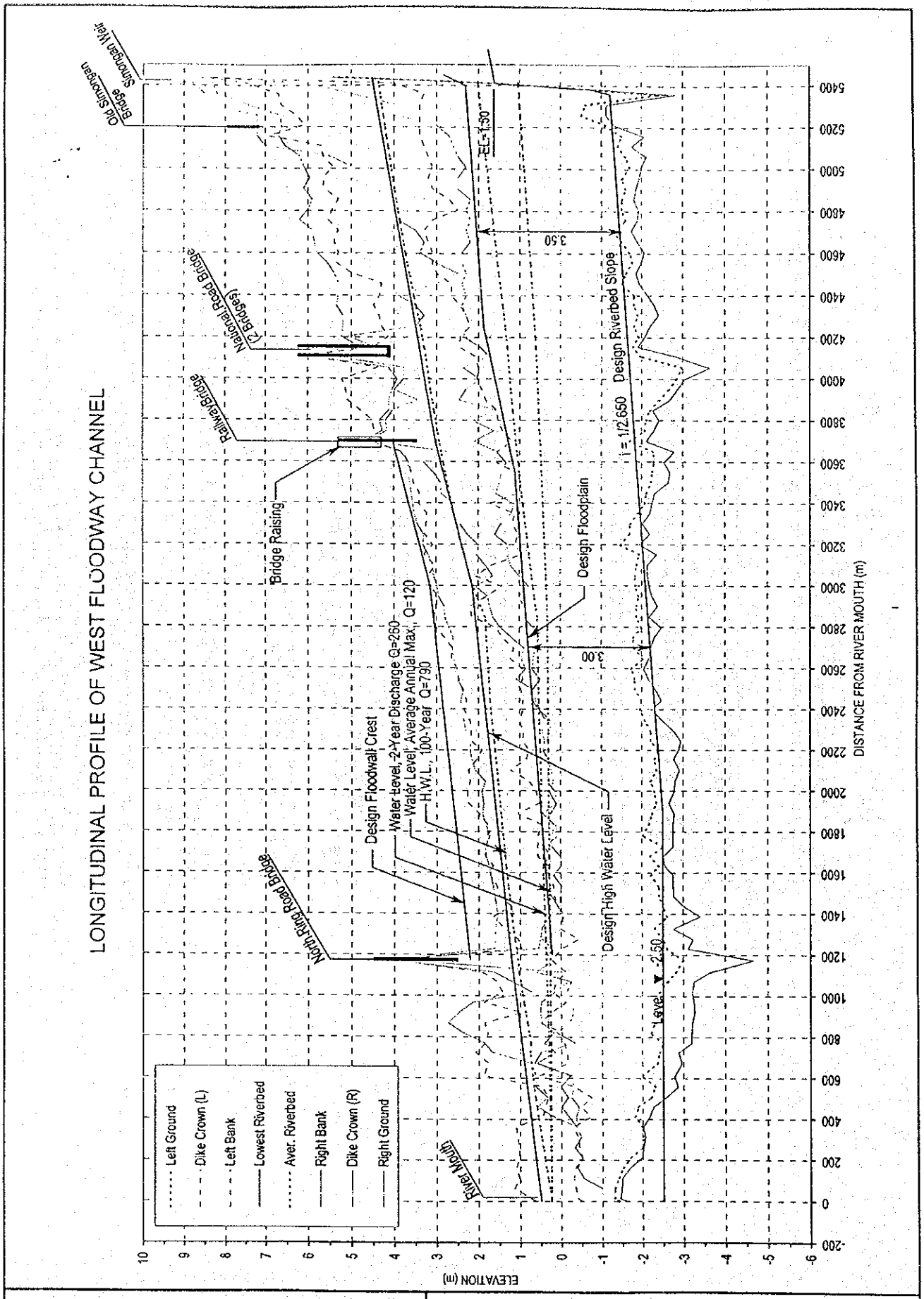
JCO = 0 KEY = 0 IPT = 0

KUKAN DATA

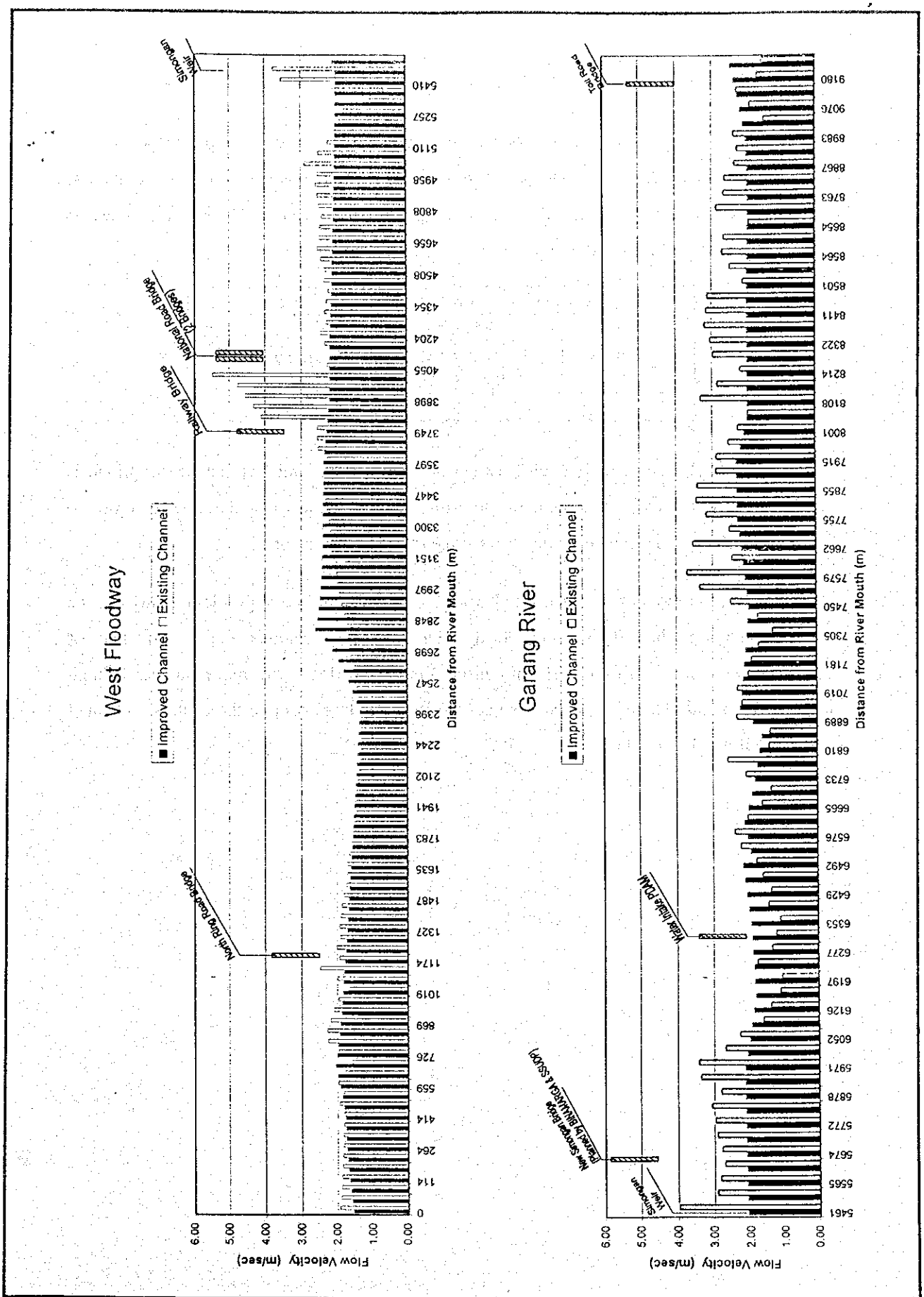
DANMEN NO.	BUNKATSU SUU	DANMEN KEIJYO	LOSS TYPE	SODO KEISU	KUKAN KYORI(M)	KASYO KOOBAI(1/I)	RAKUSA (M)	RYUNYU RYO(M3/S)
1 WF-9 -WF0	9	2 1	0	0.0324	413.7	999999	0	0
2 WF0 - WF5	5	2 1	0	0.031	258.96	999999	0	0
3 WF5 - WF14	9	2 1	0	0.0307	442.71	999999	0	0
4 WF14 -WF21	7	2 1	0	0.0306	371.14	999999	0	0
5 WF21 -WF29	8	2 1	0	0.0306	401.9	999999	0	0
6 WF29 -WF39	10	2 1	0	0.0308	509.15	2650	0	0
7 WF39 -WF47	8	2 1	0	0.0317	399.23	2650	0	0
8 WF47 -WF59	12	2 1	0	0.0317	600.23	2650	0	0
9 WF59 -WF63	4	2 1	0	0.031	200.01	2650	0	0
10 WF63 -WF69	6	2 1	0	0.0308	300.9	2650	0	0
11 WF69 -WF75	6	2 1	0	0.0305	305.77	2650	0	0
12 WF75 -WF95	20	2 1	0	0.0309	1006.84	2650	0	0
13 WF95 -WF99	4	2 1	0	0.0309	199.6	2650	0	0

NO.	H	A	R	V	N	Q	DX	FROUD	IE	Z	H-Z
WF-9 -WF0	.250*	427.63	2.635	1.847	0.0324	790	0	0.3621	9.85E-04	-2.5	2.75
+ 45.97	.300*	435.73	2.681	1.813	0.0324	790	45.97	0.3523	9.27E-04	-2.5	2.8
+ 91.93	.347*	443.26	2.724	1.782	0.0324	790	45.97	0.3435	8.77E-04	-2.5	2.847
+ 137.90	.392*	450.48	2.765	1.754	0.0324	790	45.97	0.3355	8.32E-04	-2.5	2.892
+ 183.87	.434*	457.26	2.803	1.728	0.0324	790	45.97	0.3282	7.93E-04	-2.5	2.934
+ 229.83	.474*	463.69	2.84	1.704	0.0324	790	45.97	0.3216	7.58E-04	-2.5	2.973
+ 275.80	.512*	470.74	2.864	1.678	0.0324	790	45.97	0.375	7.27E-04	-2.5	3.012
+ 321.77	.550*	478.97	2.864	1.649	0.0324	790	45.97	0.3566	7.02E-04	-2.5	3.05
+ 367.73	.586*	485.83	2.864	1.626	0.0324	790	45.97	0.3402	6.83E-04	-2.5	3.085
+ 413.70	.620*	491.6	2.864	1.607	0.0324	790	45.97	0.3254	6.67E-04	-2.5	3.119
WF0 - WF5	.620*	491.64	2.864	1.607	0.031	790	0	0.3253	6.10E-04	-2.5	3.119
+ 51.79	.654*	497.78	2.864	1.587	0.031	790	51.79	0.3162	5.95E-04	-2.5	3.154
+ 103.58	.688*	503.48	2.864	1.569	0.031	790	51.79	0.3077	5.82E-04	-2.499	3.187
+ 155.38	.720*	508.74	2.864	1.553	0.031	790	51.79	0.2998	5.70E-04	-2.499	3.219
+ 207.17	.752*	513.59	2.864	1.538	0.031	790	51.79	0.2925	5.59E-04	-2.499	3.251
+ 258.96	.782*	518.01	2.883	1.525	0.031	790	51.79	0.2857	5.45E-04	-2.499	3.282
WF5 - WF14	.692*	390.21	2.827	2.025	0.0307	790	0	0.3912	9.67E-04	-2.499	3.191
+ 49.19	.746*	397.86	2.827	1.986	0.0307	790	49.19	0.3795	9.30E-04	-2.499	3.246
+ 98.38	.798*	405.17	2.827	1.95	0.0307	790	49.19	0.3688	8.97E-04	-2.499	3.298
+ 147.57	.848*	411.96	2.875	1.918	0.0307	790	49.19	0.3593	8.48E-04	-2.499	3.347
+ 196.76	.894*	418.3	2.926	1.889	0.0307	790	49.19	0.3507	8.03E-04	-2.499	3.393
+ 245.95	.938*	424.21	2.975	1.862	0.0307	790	49.19	0.3429	7.64E-04	-2.499	3.437
+ 295.14	.979*	429.75	3.022	1.838	0.0307	790	49.19	0.3359	7.29E-04	-2.499	3.478
+ 344.33	1.018*	434.97	3.067	1.816	0.0307	790	49.19	0.3294	6.98E-04	-2.499	3.517
+ 393.52	1.055*	439.9	3.11	1.796	0.0307	790	49.19	0.3234	6.70E-04	-2.499	3.554
+ 442.71	1.091*	444.56	3.152	1.777	0.0307	790	49.19	0.3178	6.44E-04	-2.499	3.59
WF14 -WF21	1.091*	444.59	3.152	1.777	0.0306	790	0	0.3178	6.40E-04	-2.499	3.59
+ 53.02	1.128*	449.91	3.179	1.756	0.0306	790	53.02	0.3127	6.18E-04	-2.499	3.627
+ 106.04	1.164*	455.09	3.206	1.736	0.0306	790	53.02	0.3078	5.97E-04	-2.499	3.663
+ 159.06	1.198*	460.12	3.231	1.717	0.0306	790	53.02	0.3032	5.78E-04	-2.499	3.697
+ 212.08	1.232*	465.01	3.256	1.699	0.0306	790	53.02	0.2989	5.60E-04	-2.499	3.73
+ 265.10	1.264*	469.76	3.279	1.682	0.0306	790	53.02	0.2948	5.44E-04	-2.499	3.763
+ 318.12	1.295*	474.4	3.302	1.665	0.0306	790	53.02	0.2909	5.28E-04	-2.499	3.794
+ 371.14	1.326*	478.93	3.324	1.65	0.0306	790	53.02	0.2872	5.14E-04	-2.499	3.824
WF21 -WF29	1.326*	478.95	3.324	1.649	0.0306	790	0	0.2872	5.14E-04	-2.499	3.824
+ 50.24	1.354*	483.8	3.331	1.633	0.0306	790	50.24	0.284	5.02E-04	-2.498	3.852
+ 100.47	1.381*	488.63	3.339	1.617	0.0306	790	50.24	0.2809	4.91E-04	-2.498	3.88
+ 150.71	1.408*	493.43	3.346	1.601	0.0306	790	50.24	0.2778	4.80E-04	-2.498	3.907
+ 200.95	1.435*	498.19	3.353	1.586	0.0306	790	50.24	0.2749	4.69E-04	-2.498	3.933
+ 251.19	1.460*	502.91	3.359	1.571	0.0306	790	50.24	0.2721	4.59E-04	-2.498	3.959
+ 301.42	1.486*	507.61	3.366	1.556	0.0306	790	50.24	0.2693	4.50E-04	-2.498	3.984
+ 351.66	1.510*	512.27	3.372	1.542	0.0306	790	50.24	0.2666	4.40E-04	-2.498	4.008
+ 401.90	1.534*	516.91	3.378	1.528	0.0306	790	50.24	0.264	4.32E-04	-2.498	4.032
WF29 -WF39	1.534*	516.92	3.378	1.528	0.0308	790	0	0.264	4.37E-04	-2.498	4.032
+ 50.92	1.559*	521.87	3.323	1.514	0.0308	790	50.92	0.2637	4.38E-04	-2.479	4.038
+ 101.83	1.583*	526.87	3.271	1.499	0.0308	790	50.92	0.2633	4.39E-04	-2.46	4.043
+ 152.74	1.608*	531.91	3.222	1.485	0.0308	790	50.92	0.2628	4.40E-04	-2.44	4.048
+ 203.66	1.632*	536.99	3.175	1.471	0.0308	790	50.92	0.2622	4.40E-04	-2.421	4.054
+ 254.58	1.657*	542.11	3.131	1.457	0.0308	790	50.92	0.2616	4.40E-04	-2.402	4.059
+ 305.49	1.681*	547.25	3.089	1.444	0.0308	790	50.92	0.261	4.40E-04	-2.383	4.064
+ 356.41	1.706*	552.43	3.049	1.43	0.0308	790	50.92	0.2602	4.39E-04	-2.364	4.069
+ 407.32	1.730*	557.63	3.011	1.417	0.0308	790	50.92	0.2595	4.38E-04	-2.344	4.074
+ 458.24	1.754*	562.86	2.974	1.404	0.0308	790	50.92	0.2586	4.37E-04	-2.325	4.079
+ 509.15	1.778*	568.1	2.939	1.391	0.0308	790	50.92	0.2578	4.36E-04	-2.306	4.084
WF39 -WF47	1.778*	568.12	2.94	1.391	0.0317	790	0	0.2578	4.61E-04	-2.306	4.084
+ 49.90	1.790*	533.91	2.924	1.48	0.0317	790	49.9	0.275	5.26E-04	-2.287	4.077
+ 99.81	1.802*	500.04	2.908	1.58	0.0317	790	49.9	0.2943	6.04E-04	-2.268	4.071
+ 149.71	1.816*	466.45	2.892	1.694	0.0317	790	49.9	0.3162	7.00E-04	-2.249	4.065
+ 199.62	1.830*	433.13	2.875	1.824	0.0317	790	49.9	0.3414	8.18E-04	-2.231	4.061
+ 249.52	1.845*	399.9	2.856	1.975	0.0317	790	49.9	0.3708	9.68E-04	-2.212	4.057
+ 299.42	1.861*	366.89	2.836	2.153	0.0317	790	49.9	0.4054	1.16E-03	-2.193	4.054
+ 349.33	1.876*	333.9	2.812	2.366	0.0317	790	49.9	0.4471	1.42E-03	-2.174	4.051
+ 399.23	1.890*	300.76	2.783	2.627	0.0317	790	49.9	0.4985	1.77E-03	-2.155	4.045

WF47 -WF59	1.890	300.77	2.783	2.627	0.0317	790	0	0.4985	1.77E-03	-2.155	4.045
+ 50.02	1.990	307.52	2.88	2.569	0.0317	790	50.02	0.4791	1.62E-03	-2.136	4.126
+ 100.04	2.079	312.95	2.968	2.524	0.0317	790	50.02	0.4636	1.50E-03	-2.118	4.197
+ 150.06	2.161	317.36	3.05	2.489	0.0317	790	50.02	0.4509	1.41E-03	-2.099	4.26
+ 200.08	2.237	320.96	3.127	2.461	0.0317	790	50.02	0.4402	1.33E-03	-2.08	4.316
+ 250.10	2.307	323.88	3.2	2.439	0.0317	790	50.02	0.4311	1.27E-03	-2.061	4.368
+ 300.11	2.374	326.24	3.271	2.422	0.0317	790	50.02	0.4232	1.21E-03	-2.042	4.416
+ 350.13	2.436	328.12	3.339	2.408	0.0317	790	50.02	0.4164	1.17E-03	-2.023	4.46
+ 400.15	2.496	329.58	3.405	2.397	0.0317	790	50.02	0.4104	1.13E-03	-2.004	4.501
+ 450.17	2.554	330.66	3.47	2.389	0.0317	790	50.02	0.4051	1.09E-03	-1.985	4.539
+ 500.19	2.609	331.42	3.533	2.384	0.0317	790	50.02	0.4004	1.06E-03	-1.967	4.576
+ 550.21	2.662	331.88	3.596	2.38	0.0317	790	50.02	0.3962	1.03E-03	-1.948	4.61
+ 600.23	2.714	332.08	3.659	2.379	0.0317	790	50.02	0.3925	1.01E-03	-1.929	4.642
WF59 -WF63	2.714	332.08	3.659	2.379	0.031	790	0	0.3925	9.65E-04	-1.929	4.642
+ 50.00	2.763	333.12	3.706	2.372	0.031	790	50	0.3887	9.43E-04	-1.91	4.673
+ 100.00	2.811	333.98	3.751	2.365	0.031	790	50	0.3852	9.22E-04	-1.891	4.702
+ 150.01	2.858	334.68	3.797	2.36	0.031	790	50	0.382	9.04E-04	-1.872	4.73
+ 200.01	2.904	335.24	3.841	2.357	0.031	790	50	0.3791	8.87E-04	-1.853	4.757
WF63 -WF69	2.904	335.24	3.841	2.357	0.0308	790	0	0.3791	8.76E-04	-1.853	4.757
+ 50.15	2.949	336.28	3.887	2.349	0.0308	790	50.15	0.3754	8.57E-04	-1.834	4.783
+ 100.30	2.993	337.27	3.93	2.342	0.0308	790	50.15	0.3718	8.39E-04	-1.816	4.809
+ 150.45	3.036	338.22	3.971	2.336	0.0308	790	50.15	0.3683	8.23E-04	-1.797	4.833
+ 200.60	3.079	339.13	4.007	2.329	0.0308	790	50.15	0.365	8.09E-04	-1.778	4.857
+ 250.75	3.121	340.03	4.038	2.323	0.0308	790	50.15	0.3617	7.97E-04	-1.759	4.879
+ 300.90	3.162	340.91	4.059	2.317	0.0308	790	50.15	0.3586	7.87E-04	-1.74	4.902
WF69 -WF75	3.162	340.91	4.059	2.317	0.0305	790	0	0.3586	7.71E-04	-1.74	4.902
+ 50.96	3.198	338.52	4.007	2.334	0.0305	790	50.96	0.3648	7.96E-04	-1.721	4.918
+ 101.92	3.235	336.06	3.947	2.351	0.0305	790	50.96	0.3712	8.24E-04	-1.701	4.936
+ 152.88	3.274	333.57	3.883	2.368	0.0305	790	50.96	0.3777	8.55E-04	-1.682	4.956
+ 203.85	3.314	331.04	3.817	2.386	0.0305	790	50.96	0.3843	8.88E-04	-1.663	4.976
+ 254.81	3.355	328.51	3.751	2.405	0.0305	790	50.96	0.391	9.23E-04	-1.644	4.999
+ 305.77	3.399	325.98	3.685	2.423	0.0305	790	50.96	0.3978	9.60E-04	-1.624	5.023
WF75 -WF95	3.399	325.98	3.685	2.423	0.0309	790	0	0.3978	9.85E-04	-1.624	5.023
+ 50.34	3.453	329.04	3.713	2.401	0.0309	790	50.34	0.3926	9.57E-04	-1.605	5.058
+ 100.68	3.506	331.94	3.739	2.38	0.0309	790	50.34	0.3878	9.32E-04	-1.586	5.092
+ 151.03	3.557	334.72	3.764	2.36	0.0309	790	50.34	0.3833	9.08E-04	-1.567	5.124
+ 201.37	3.606	337.37	3.788	2.342	0.0309	790	50.34	0.379	8.87E-04	-1.548	5.155
+ 251.71	3.655	339.91	3.811	2.324	0.0309	790	50.34	0.375	8.66E-04	-1.529	5.184
+ 302.05	3.702	342.34	3.833	2.308	0.0309	790	50.34	0.3713	8.48E-04	-1.51	5.212
+ 352.39	3.748	344.68	3.854	2.292	0.0309	790	50.34	0.3677	8.30E-04	-1.491	5.239
+ 402.74	3.793	346.93	3.874	2.277	0.0309	790	50.34	0.3644	8.14E-04	-1.472	5.265
+ 453.08	3.836	349.09	3.894	2.263	0.0309	790	50.34	0.3612	7.98E-04	-1.453	5.29
+ 503.42	3.879	351.18	3.912	2.25	0.0309	790	50.34	0.3582	7.84E-04	-1.434	5.314
+ 553.76	3.921	353.19	3.93	2.237	0.0309	790	50.34	0.3553	7.70E-04	-1.415	5.337
+ 604.10	3.963	355.13	3.947	2.225	0.0309	790	50.34	0.3526	7.57E-04	-1.396	5.359
+ 654.45	4.003	357.01	3.964	2.213	0.0309	790	50.34	0.35	7.45E-04	-1.377	5.38
+ 704.79	4.043	358.83	3.98	2.202	0.0309	790	50.34	0.3475	7.34E-04	-1.358	5.401
+ 755.13	4.082	360.59	3.996	2.191	0.0309	790	50.34	0.3451	7.23E-04	-1.339	5.421
+ 805.47	4.120	362.29	4.011	2.181	0.0309	790	50.34	0.3428	7.13E-04	-1.32	5.441
+ 855.81	4.158	363.95	4.025	2.171	0.0309	790	50.34	0.3406	7.03E-04	-1.301	5.46
+ 906.16	4.195	365.55	4.039	2.161	0.0309	790	50.34	0.3385	6.93E-04	-1.282	5.478
+ 956.50	4.232	367.1	4.053	2.152	0.0309	790	50.34	0.3365	6.84E-04	-1.263	5.495
+ 1,006.84	4.268	368.62	4.066	2.143	0.0309	790	50.34	0.3346	6.76E-04	-1.244	5.513
WF95 -WF99	4.268	368.62	4.066	2.143	0.0309	790	0	0.3346	6.76E-04	-1.244	5.513
+ 49.90	4.304	370.07	4.079	2.135	0.0309	790	49.9	0.3327	6.68E-04	-1.226	5.529
+ 99.80	4.338	371.49	4.091	2.127	0.0309	790	49.9	0.331	6.60E-04	-1.207	5.545
+ 149.70	4.373	372.86	4.103	2.119	0.0309	790	49.9	0.3293	6.53E-04	-1.188	5.561
+ 199.60	4.407	374.2	4.115	2.111	0.0309	790	49.9	0.3276	6.45E-04	-1.169	5.576



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig.
JAPAN INTERNATIONAL COOPERATION AGENCY	



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig.
JAPAN INTERNATIONAL COOPERATION AGENCY	

(2) Water Level Rise by Bridge Pier

In connection with the bridge raising and construction of new piers, the piers of Railway Bridge may induce a rise in water level in the upstream channel. So, the rise of water level is estimated by using D'Aubuisson's formula. The result is shown in the table below together with the calculation conditions.

Calculation Condition		Result
Q	790 m^3/s	$\Delta h = 0.11$ m
H_1, B	4.8 m, 3.0 m x 2	
b_1, b_2	80.0 m, 74.0 m	
C^2	0.81	

The D.H.W.L in the stretch between Railway Bridge and National Road Bridge is determined with a tolerance of more than 0.11 m against calculated water level, so the D.H.W.L can confine the water stage raised by bridge piers.

Also, the piers of National Road Bridge may cause the same problem. However, the upstream channel from the bridge has a bigger channel depth than that of downstream. This channel can confine the design flood with more than 1.5 m high freeboard. Therefore, even if some rise in water level occurs, the upstream channel will not be affected.

(3) Pumping Station near North Ring Road Bridge and Water Level of West Floodway

To solve the drainage problem in Tanah Mas residential area which lies along the right bank of West Floodway (Drainage area : 127 ha), Semarang City formulated drainage system improvement including pump drainage into West Floodway. This pumping station is located at the lower end of Bulu River near the North Ring Road Bridge as shown in the following drawing. (Currently, Bulu River is connected to West Floodway by a box culvert laid under North Ring Road) According to the drainage plan, a pumping station with the total pump capacity of 3.0 m^3/s has been proposed as follows:

	Number and Capacity of Pump	Pump Operation
1	1.4 m^3/s 2 units Sub total 2.8 m^3/s	Rainy season only
2	0.1 m^3/s 2 units Sub total 0.2 m^3/s	Dry and Rainy seasons
3	Total 3.0 m^3/s	

To know the hydraulic impact on the flood flow in West Floodway, the Study Team estimated a rise in water level by non-uniform flow calculation. The calculation results are presented in the following calculation sheets. The estimated rise is as small as 5 mm which is negligible. Therefore, the Study Team judged that there is no hydraulic impact on the main river flow. The results are presented in the following calculation sheets.

** INPUT DATA ** PUMPING STAION Q=3.0 t/m3

* BAISIC DATA *

KUKAN-SU = 17 ALPHA = 1.00 Q0 = 793.00 M3/S H0 = .250 M Z0 = -2.500 M

JC0 = 0 KEY = 0 IPT = 0

* KUKAN DATA *

	DANMEN NO.	BUNKATSU SUU	DANMEN KEIJYO		LOSS TYPE	SODO KEISU	KUKAN KYORI (M)	KASYO KOOBAI (1/1)	RAKUSA (M)	RYUNYU RYO (M3/S)
1	WF-9 -WF0	9	2	1	0	.0300	413.70	999999.00	.000	.00
2	WF0 - WF4	4	2	1	0	.0310	208.96	999999.00	.000	.00
3	WF4 - WF14	10	2	1	0	.0307	492.71	999999.00	.000	.00
4	WF14 -WF21	7	2	1	0	.0306	371.14	999999.00	.000	.00
5	WF21 -WF29	8	2	1	0	.0306	401.90	999999.00	.000	.00
6	WF29 -WF39	10	2	1	0	.0311	509.15	2650.00	.000	.00
7	WF39 -WF42	3	2	1	0	.0317	149.23	2650.00	.000	.00
8	WF42 -WF53	11	2	1	0	.0317	550.00	2650.00	.000	.00
9	WF53 -WF59	6	2	1	0	.0317	300.00	2650.00	.000	.00
10	WF59 -WF63	4	2	1	0	.0312	200.01	2650.00	.000	.00
11	WF63 -WF69	6	2	1	0	.0310	300.90	2650.00	.000	.00
12	WF69 -WF72	3	2	1	0	.0307	155.77	2650.00	.000	.00
13	WF72 -WF73	1	2	1	0	.0305	50.00	2650.00	.000	.00
14	WF73 -WF75	2	2	1	0	.0305	100.00	2650.00	.000	.00
15	WF75 -WF76	1	2	1	0	.0300	50.00	2650.00	.000	.00
16	WF76 -WF95	19	2	1	0	.0310	956.84	2650.00	.000	.00
17	WF95 -WF99	4	2	1	0	.0310	199.60	2650.00	.000	.00

* KEIJYO DATA *

KUKAN	KEIJYO		B0 (R)	M1	N1	B1	B2	HP (B3)	M2	N2
1	2	1	150.000	2.000	2.000	50.000	40.000	2.000	2.000	.001
			150.000	2.000	2.000	10.000	10.000	2.200	2.000	2.000
2	2	1	150.000	2.000	2.000	10.000	10.000	2.200	2.000	2.000
			115.000	2.000	2.000	9.000	10.000	2.500	2.000	2.000
3	2	1	115.000	2.000	2.000	9.000	10.000	2.500	2.000	2.000
			115.000	2.000	2.000	9.000	5.000	2.700	2.000	2.000
4	2	1	115.000	2.000	2.000	9.000	5.000	2.700	2.000	2.000
			115.000	2.000	2.000	8.000	6.000	3.000	2.000	2.000
5	2	1	115.000	2.000	2.000	8.000	6.000	3.000	2.000	2.000
			115.000	2.000	2.000	9.000	25.000	3.000	2.000	2.000
6	2	1	115.000	2.000	2.000	9.000	25.000	3.000	2.000	2.000
			115.000	2.000	2.000	10.000	48.000	3.000	2.000	2.000
7	2	1	115.000	2.000	2.000	10.000	48.000	3.000	2.000	2.000
			115.000	2.000	2.000	6.000	18.000	3.000	2.000	2.000
8	2	1	115.000	2.000	2.000	6.000	18.000	3.000	2.000	2.000
			58.000	2.000	2.000	10.000	13.000	3.200	2.000	2.000
9	2	1	58.000	2.000	2.000	12.000	15.000	3.200	2.000	2.000
			58.000	2.000	2.000	7.000	8.000	3.300	2.000	2.000
10	2	1	58.000	2.000	2.000	7.000	8.000	3.300	2.000	2.000
			58.000	2.000	2.000	7.000	4.000	3.400	2.000	2.000
11	2	1	58.000	2.000	2.000	7.000	4.000	3.400	2.000	2.000
			58.000	2.000	2.000	10.000	7.000	3.500	2.000	2.000
12	2	1	58.000	2.000	2.000	10.000	7.000	3.500	2.000	2.000
			50.000	1.000	1.000	4.000	4.000	3.500	.500	.500
13	2	1	50.000	1.000	1.000	4.000	4.000	3.500	.500	.500
			50.000	1.000	1.000	4.000	4.000	3.500	.500	.500
14	2	1	50.000	1.000	1.000	4.000	4.000	3.500	.500	.500
			50.000	2.000	2.000	4.000	5.000	3.500	2.000	2.000
15	2	1	50.000	2.000	2.000	4.000	5.000	3.500	2.000	2.000
			50.000	2.000	2.000	8.000	6.000	3.500	2.000	2.000
16	2	1	50.000	2.000	2.000	8.000	6.000	3.500	2.000	2.000
			50.000	2.000	2.000	8.000	6.000	3.500	2.000	2.000
17	2	1	50.000	2.000	2.000	8.000	6.000	3.500	2.000	2.000
			50.000	2.000	2.000	8.000	8.000	3.500	2.000	2.000

* LOSS DATA *

KUKAN	LOSS TYPE	FL1	FL2

NO.	H	A	R	V	N	Q	DX	FROUD	IE	Z	H-Z
WF-9 -WF0	.250	494.56	1.967	1.603	.0300	793.00	.00	.3638	.9386E-03	-2.500	2.750
+ 45.97	.293	497.55	2.041	1.594	.0300	793.00	45.97	.3551	.8831E-03	-2.500	2.793
+ 91.93	.334	499.47	2.114	1.588	.0300	793.00	45.97	.3475	.8359E-03	-2.500	2.834
+ 137.90	.372	500.57	2.189	1.584	.0300	793.00	45.97	.3408	.7947E-03	-2.500	2.872
+ 183.87	.408	500.95	2.265	1.583	.0300	793.00	45.97	.3348	.7581E-03	-2.500	2.908
+ 229.83	.442	500.73	2.344	1.584	.0300	793.00	45.97	.3293	.7251E-03	-2.500	2.942

+ 275.80	.474	499.99	2.425	1.586	.0300	793.00	45.97	.3242	.6948E-03	-2.500	2.974
+ 321.77	.505	498.78	2.511	1.590	.0300	793.00	45.97	.3193	.6667E-03	-2.500	3.004
+ 367.73	.534	497.17	2.601	1.595	.0300	793.00	45.97	.3147	.6402E-03	-2.500	3.034
+ 413.70	.562	495.21	2.696	1.601	.0300	793.00	45.97	.3103	.6151E-03	-2.500	3.061
WF0 - WF4	.562	495.24	2.696	1.601	.0310	793.00	.00	.3103	.6566E-03	-2.500	3.061
+ 52.24	.584	470.55	2.692	1.685	.0310	793.00	52.24	.3267	.7288E-03	-2.500	3.083
+ 104.48	.608	445.81	2.687	1.779	.0310	793.00	52.24	.3451	.8136E-03	-2.499	3.107
+ 156.72	.633	420.97	2.681	1.884	.0310	793.00	52.24	.3658	.9156E-03	-2.499	3.133
+ 208.96	.661	395.99	2.673	2.003	.0310	793.00	52.24	.3893	.1039E-02	-2.499	3.160
WF4 - WF14	.661	395.91	2.673	2.003	.0307	793.00	.00	.3894	.1019E-02	-2.499	3.160
+ 49.27	.717	403.48	2.728	1.965	.0307	793.00	49.27	.3781	.9549E-03	-2.499	3.216
+ 98.54	.769	410.40	2.780	1.932	.0307	793.00	49.27	.3683	.9002E-03	-2.499	3.268
+ 147.81	.818	416.81	2.829	1.903	.0307	793.00	49.27	.3594	.8527E-03	-2.499	3.317
+ 197.08	.864	422.79	2.875	1.876	.0307	793.00	49.27	.3514	.8109E-03	-2.499	3.364
+ 246.35	.908	428.40	2.920	1.851	.0307	793.00	49.27	.3442	.7739E-03	-2.499	3.407
+ 295.63	.950	433.68	2.962	1.829	.0307	793.00	49.27	.3375	.7408E-03	-2.499	3.449
+ 344.90	.989	438.67	3.003	1.808	.0307	793.00	49.27	.3314	.7110E-03	-2.499	3.488
+ 394.17	1.027	443.40	3.042	1.788	.0307	793.00	49.27	.3257	.6840E-03	-2.499	3.526
+ 443.44	1.063	447.89	3.080	1.771	.0307	793.00	49.27	.3204	.6594E-03	-2.499	3.562
+ 492.71	1.098	452.17	3.116	1.754	.0307	793.00	49.27	.3155	.6368E-03	-2.499	3.597
WF14 -WF21	1.098	452.20	3.117	1.754	.0306	793.00	.00	.3154	.6325E-03	-2.499	3.597
+ 53.02	1.135	456.74	3.145	1.736	.0306	793.00	53.02	.3109	.6127E-03	-2.499	3.633
+ 106.04	1.169	461.15	3.171	1.720	.0306	793.00	53.02	.3066	.5942E-03	-2.499	3.668
+ 159.06	1.203	465.40	3.197	1.704	.0306	793.00	53.02	.3026	.5771E-03	-2.499	3.702
+ 212.08	1.236	469.50	3.222	1.689	.0306	793.00	53.02	.2987	.5612E-03	-2.499	3.735
+ 265.10	1.268	473.47	3.246	1.675	.0306	793.00	53.02	.2951	.5464E-03	-2.499	3.766
+ 318.12	1.299	477.32	3.270	1.661	.0306	793.00	53.02	.2917	.5326E-03	-2.499	3.797
+ 371.14	1.329	481.05	3.292	1.648	.0306	793.00	53.02	.2884	.5196E-03	-2.499	3.827
WF21 -WF29	1.329	481.07	3.292	1.648	.0306	793.00	.00	.2884	.5195E-03	-2.499	3.827
+ 50.24	1.358	487.43	3.277	1.627	.0306	793.00	50.24	.2853	.5092E-03	-2.498	3.857
+ 100.47	1.387	493.88	3.263	1.606	.0306	793.00	50.24	.2822	.4989E-03	-2.498	3.885
+ 150.71	1.415	500.37	3.249	1.585	.0306	793.00	50.24	.2792	.4887E-03	-2.498	3.914
+ 200.95	1.443	506.91	3.236	1.564	.0306	793.00	50.24	.2761	.4787E-03	-2.498	3.941
+ 251.19	1.470	513.50	3.225	1.544	.0306	793.00	50.24	.2731	.4687E-03	-2.498	3.968
+ 301.42	1.496	520.14	3.213	1.525	.0306	793.00	50.24	.2701	.4590E-03	-2.498	3.994
+ 351.66	1.522	526.81	3.203	1.505	.0306	793.00	50.24	.2671	.4494E-03	-2.498	4.020
+ 401.90	1.547	533.52	3.193	1.486	.0306	793.00	50.24	.2642	.4400E-03	-2.498	4.045
WF29 -WF39	1.547	533.53	3.193	1.486	.0311	793.00	.00	.2642	.4544E-03	-2.498	4.045
+ 50.92	1.572	536.92	3.167	1.477	.0311	793.00	50.92	.2636	.4536E-03	-2.479	4.051
+ 101.83	1.596	540.33	3.143	1.468	.0311	793.00	50.92	.2630	.4526E-03	-2.460	4.056
+ 152.74	1.621	543.76	3.119	1.458	.0311	793.00	50.92	.2623	.4515E-03	-2.440	4.061
+ 203.66	1.645	547.20	3.095	1.449	.0311	793.00	50.92	.2617	.4503E-03	-2.421	4.066
+ 254.58	1.669	550.65	3.073	1.440	.0311	793.00	50.92	.2610	.4490E-03	-2.402	4.071
+ 305.49	1.693	554.11	3.051	1.431	.0311	793.00	50.92	.2603	.4477E-03	-2.383	4.076
+ 356.41	1.717	557.57	3.029	1.422	.0311	793.00	50.92	.2597	.4463E-03	-2.364	4.081
+ 407.32	1.741	561.04	3.009	1.413	.0311	793.00	50.92	.2589	.4449E-03	-2.344	4.086
+ 458.24	1.765	564.52	2.989	1.405	.0311	793.00	50.92	.2582	.4434E-03	-2.325	4.090
+ 509.15	1.789	568.00	2.969	1.396	.0311	793.00	50.92	.2575	.4418E-03	-2.306	4.095
WF39 -WF42	1.789	568.02	2.969	1.396	.0317	793.00	.00	.2575	.4590E-03	-2.306	4.095

NO.	H	A	R	V	N	Q	DX	FROUD	fE	Z	H-Z
+ 49.74	1.807	555.49	3.086	1.428	.0317	793.00	49.74	.2582	.4557E-03	-2.287	4.094
+ 99.49	1.825	542.90	3.219	1.461	.0317	793.00	49.74	.2586	.4510E-03	-2.268	4.093
+ 149.23	1.842	530.24	3.371	1.496	.0317	793.00	49.74	.2586	.4447E-03	-2.250	4.092
WF42 -WF53	1.842	530.25	3.371	1.496	.0317	793.00	.00	.2586	.4447E-03	-2.250	4.092
+ 50.00	1.855	507.63	3.340	1.562	.0317	793.00	50.00	.2713	.4913E-03	-2.231	4.086
+ 100.00	1.869	485.24	3.308	1.634	.0317	793.00	50.00	.2851	.5446E-03	-2.212	4.081
+ 150.00	1.884	463.10	3.275	1.712	.0317	793.00	50.00	.3002	.6059E-03	-2.193	4.078
+ 200.00	1.901	441.18	3.241	1.797	.0317	793.00	50.00	.3167	.6770E-03	-2.174	4.076
+ 250.00	1.920	419.49	3.206	1.890	.0317	793.00	50.00	.3348	.7597E-03	-2.155	4.075
+ 300.00	1.940	397.97	3.169	1.993	.0317	793.00	50.00	.3548	.8573E-03	-2.136	4.076
+ 350.00	1.962	376.73	3.131	2.105	.0317	793.00	50.00	.3770	.9722E-03	-2.118	4.080
+ 400.00	1.987	355.72	3.091	2.229	.0317	793.00	50.00	.4016	.1109E-02	-2.099	4.085
+ 450.00	2.014	334.94	3.049	2.368	.0317	793.00	50.00	.4293	.1274E-02	-2.080	4.094
+ 500.00	2.044	314.37	3.005	2.522	.0317	793.00	50.00	.4605	.1475E-02	-2.061	4.105
+ 550.00	2.077	294.02	2.957	2.697	.0317	793.00	50.00	.4961	.1722E-02	-2.042	4.119
WF53 -WF59	2.089	298.93	2.889	2.653	.0317	793.00	.00	.4939	.1719E-02	-2.042	4.132
+ 50.00	2.185	304.24	2.988	2.607	.0317	793.00	50.00	.4770	.1586E-02	-2.023	4.208
+ 100.00	2.271	308.46	3.081	2.571	.0317	793.00	50.00	.4631	.1481E-02	-2.004	4.275
+ 150.00	2.350	311.83	3.169	2.543	.0317	793.00	50.00	.4515	.1396E-02	-1.986	4.335
+ 200.00	2.423	314.51	3.255	2.521	.0317	793.00	50.00	.4416	.1324E-02	-1.967	4.390
+ 250.00	2.492	316.63	3.338	2.504	.0317	793.00	50.00	.4330	.1264E-02	-1.948	4.440
+ 300.00	2.558	318.27	3.420	2.492	.0317	793.00	50.00	.4255	.1211E-02	-1.929	4.486
WF59 -WF63	2.558	318.27	3.420	2.492	.0312	793.00	.00	.4255	.1173E-02	-1.929	4.487
+ 50.00	2.620	320.64	3.475	2.473	.0312	793.00	50.00	.4188	.1131E-02	-1.910	4.530
+ 100.00	2.680	322.75	3.530	2.457	.0312	793.00	50.00	.4128	.1093E-02	-1.891	4.571
+ 150.01	2.737	324.64	3.583	2.443	.0312	793.00	50.00	.4073	.1060E-02	-1.872	4.609
+ 200.01	2.792	326.32	3.635	2.430	.0312	793.00	50.00	.4022	.1029E-02	-1.853	4.646
WF63 -WF69	2.792	326.32	3.635	2.430	.0310	793.00	.00	.4022	.1015E-02	-1.853	4.646
+ 50.15	2.851	330.87	3.638	2.397	.0310	793.00	50.15	.3965	.9867E-03	-1.835	4.685
+ 100.30	2.907	335.29	3.640	2.365	.0310	793.00	50.15	.3912	.9601E-03	-1.816	4.723
+ 150.45	2.962	339.61	3.641	2.335	.0310	793.00	50.15	.3862	.9356E-03	-1.797	4.759
+ 200.60	3.015	343.82	3.641	2.306	.0310	793.00	50.15	.3815	.9128E-03	-1.778	4.793
+ 250.75	3.067	347.92	3.640	2.279	.0310	793.00	50.15	.3770	.8916E-03	-1.759	4.825
+ 300.90	3.117	351.94	3.639	2.253	.0310	793.00	50.15	.3728	.8718E-03	-1.740	4.857
WF69 -WF72	3.117	351.94	3.639	2.253	.0307	793.00	.00	.3728	.8550E-03	-1.740	4.857
+ 51.92	3.120	325.38	3.707	2.437	.0307	793.00	51.92	.3980	.9758E-03	-1.720	4.841
+ 103.85	3.119	298.71	3.778	2.655	.0307	793.00	51.92	.4267	.1129E-02	-1.701	4.819
+ 155.77	3.108	271.87	3.841	2.917	.0307	793.00	51.92	.4601	.1333E-02	-1.681	4.789
WF72 -WF73	3.108	271.87	3.841	2.917	.0305	793.00	.00	.4601	.1316E-02	-1.681	4.789
+ 50.00	3.184	275.68	3.888	2.877	.0305	793.00	50.00	.4508	.1259E-02	-1.662	4.846

WF73 -WF75	3.184	275.68	3.888	2.877	.0305	793.00	.00	.4508	.1259E-02	-1.662	4.846
+ 50.00	3.297	295.39	3.900	2.685	.0305	793.00	50.00	.4252	.1092E-02	-1.643	4.941
+ 100.00	3.393	314.90	3.867	2.518	.0305	793.00	50.00	.4031	.9720E-03	-1.625	5.018
WF75 -WF76	3.393	314.90	3.867	2.518	.0300	793.00	.00	.4031	.9404E-03	-1.625	5.018
+ 50.00	3.462	326.72	3.770	2.427	.0300	793.00	50.00	.3938	.9037E-03	-1.606	5.068
WF76 -WF95	3.462	326.72	3.770	2.427	.0310	793.00	.00	.3938	.9649E-03	-1.606	5.068
+ 50.36	3.515	329.60	3.796	2.406	.0310	793.00	50.36	.3889	.9393E-03	-1.587	5.102
+ 100.72	3.567	332.35	3.822	2.386	.0310	793.00	50.36	.3844	.9157E-03	-1.568	5.135
+ 151.08	3.617	334.98	3.846	2.367	.0310	793.00	50.36	.3802	.8938E-03	-1.549	5.166
+ 201.44	3.666	337.50	3.869	2.350	.0310	793.00	50.36	.3762	.8735E-03	-1.530	5.196
+ 251.80	3.713	339.92	3.891	2.333	.0310	793.00	50.36	.3724	.8546E-03	-1.511	5.224
+ 302.16	3.760	342.24	3.912	2.317	.0310	793.00	50.36	.3689	.8370E-03	-1.492	5.251
+ 352.52	3.805	344.48	3.932	2.302	.0310	793.00	50.36	.3655	.8205E-03	-1.473	5.278
+ 402.88	3.849	346.63	3.952	2.288	.0310	793.00	50.36	.3623	.8050E-03	-1.454	5.303
+ 453.24	3.893	348.71	3.970	2.274	.0310	793.00	50.36	.3593	.7905E-03	-1.435	5.327

NO.	H	A	R	V	N	Q	DX	FROUD	IE	Z	H-Z
+ 503.60	3.935	350.71	3.989	2.261	.0310	793.00	50.36	.3564	.7768E-03	-1.416	5.351
+ 553.96	3.977	352.64	4.006	2.249	.0310	793.00	50.36	.3537	.7638E-03	-1.397	5.373
+ 604.32	4.018	354.51	4.023	2.237	.0310	793.00	50.36	.3511	.7516E-03	-1.378	5.395
+ 654.68	4.058	356.32	4.039	2.225	.0310	793.00	50.36	.3486	.7400E-03	-1.359	5.416
+ 705.04	4.097	358.08	4.055	2.215	.0310	793.00	50.36	.3462	.7290E-03	-1.340	5.437
+ 755.40	4.136	359.78	4.070	2.204	.0310	793.00	50.36	.3439	.7185E-03	-1.321	5.457
+ 805.76	4.174	361.42	4.084	2.194	.0310	793.00	50.36	.3417	.7086E-03	-1.302	5.476
+ 856.12	4.212	363.02	4.099	2.184	.0310	793.00	50.36	.3396	.6991E-03	-1.283	5.494
+ 906.48	4.249	364.57	4.112	2.175	.0310	793.00	50.36	.3376	.6901E-03	-1.264	5.512
+ 956.84	4.285	366.08	4.126	2.166	.0310	793.00	50.36	.3356	.6815E-03	-1.245	5.530
WF95 -WF99	4.285	366.08	4.126	2.166	.0310	793.00	.00	.3356	.6815E-03	-1.245	5.530
+ 49.90	4.323	368.68	4.128	2.151	.0310	793.00	49.90	.3332	.6714E-03	-1.226	5.548
+ 99.80	4.359	371.25	4.130	2.136	.0310	793.00	49.90	.3308	.6617E-03	-1.207	5.566
+ 149.70	4.395	373.78	4.132	2.122	.0310	793.00	49.90	.3285	.6524E-03	-1.188	5.583
+ 199.60	4.430	376.29	4.133	2.107	.0310	793.00	49.90	.3263	.6435E-03	-1.169	5.600