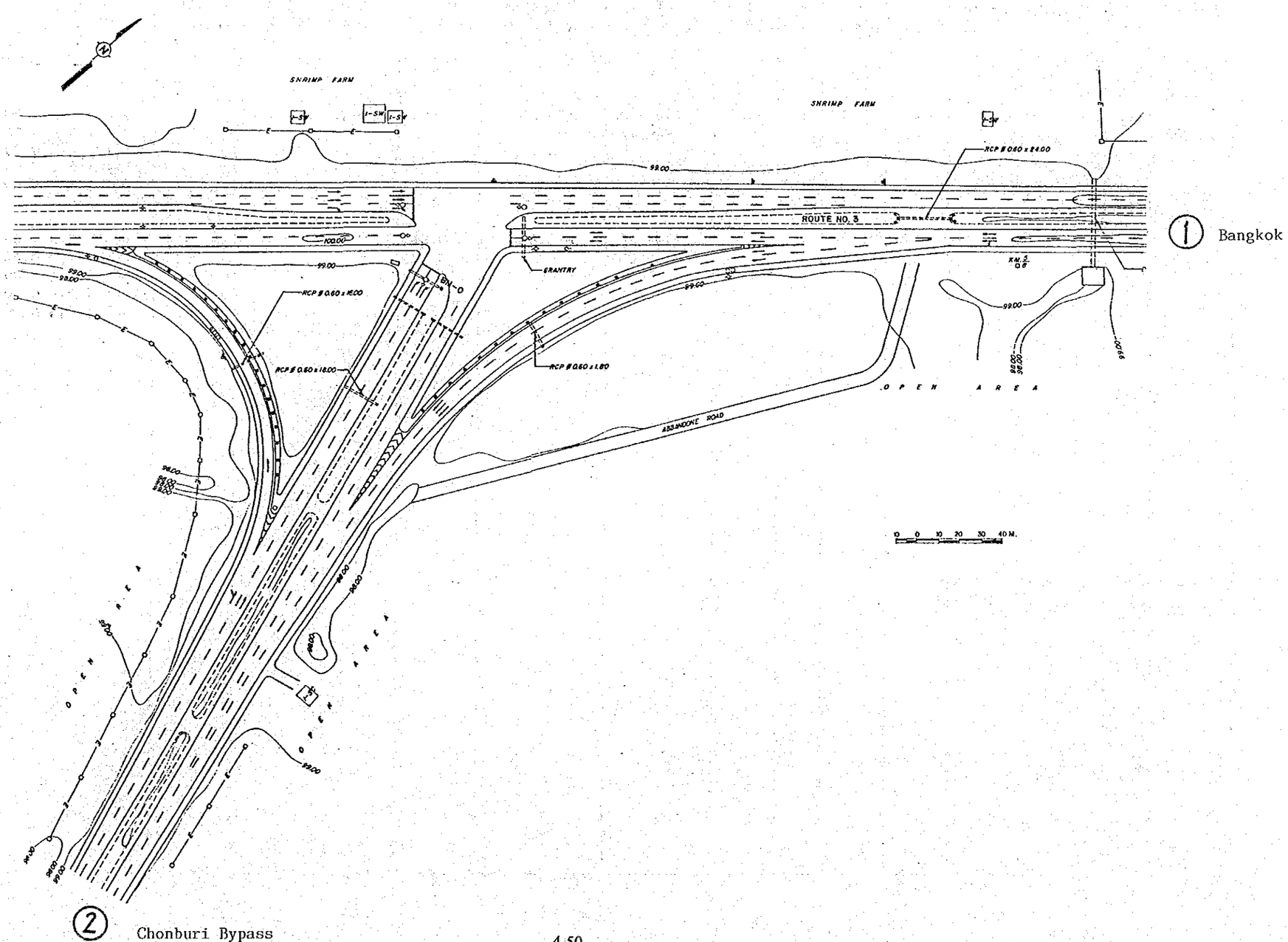
Appendix 4.2.22 TRAFFIC MOVEMENTS AT INTERSECTIONS
IS-1 ML-1 (RT. 3 CHON BURI BYPASS) BEGINNING POINT

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction (VPH) peak hour (11-12)

DIRECTION From	To	Year	MC	PC	LB	HB	LT	MT	HT	ADT
			Base Traffic Volume							
①	1	1988	0	0	0	0	0	0	0	0
	2	1988	8	47	0	2	51	62	293	455
	3	1988	45	260	21	68	328	23	19	719
	4	1988	0	0	0	0	0	0	0	0
	In	1988	53	307	21	70	379	85	312	1174
	Out	1988	62	190	16	48	335	85	343	1017
Total		1988	115	497	37	118	714	170	655	2191
②	1	1988	8	27	0	3	63	55	319	467
	2	1988	0	0	0	0	0	0	0	0
	3	1988	11	2	1	10	14	4	8	39
	4	1988	0	0	0	0	0	0	0	0
	In	1968	19	29	1	13	77	59	327	506
	Out	1988	13	49	0	10	68	62	301	490
Total		1988	32	78	1	23	145	121	628	996
③	1	1988	54	163	16	45	272	30	24	550
	2	1988	5	2	0	8	17	0	8	35
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	59	165	16	53	289	30	32	585
	Out	1988	56	262	22	78	342	27	27	758
Total		1988	115	427	38	131	631	57	59	1343
4	1	1988	0	0	0	0	0	0	0	0
	2	1988	0	0	0	0	0	0	0	0
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	0	0	0	0	0	0	0	0
	Out	1988	0	0	0	0	0	0	0	0
Total		1988	0	0	0	0	0	0	0	0

MC	PC	LB	HB	LT	MT	HT	ADT
Traffic Volume in 1994							
0	0	0	0	0	0	0	0
13	180	4	18	147	155	615	1119
71	421	33	104	488	34	26	1106
0	0	0	0	0	0	0	0
84	601	37	122	635	189	641	2225
97	412	29	87	570	190	686	1974
181	1013	66	209	1205	379	1327	4199
13	148	4	19	165	145	652	1133
0	0	0	0	0	0	0	0
17	3	1	15	21	6	12	58
0	0	0	0	0	0	0	0
30	151	5	34	186	151	664	1191
20	183	4	30	172	155	627	1171
50	334	9	64	358	306	1291	2362
84	264	25	68	405	45	34	841
7	3	0	12	25	0	12	52
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
91	267	25	80	430	45	46	893
88	424	34	119	509	40	38	1164
179	691	59	199	939	85	84	2057
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

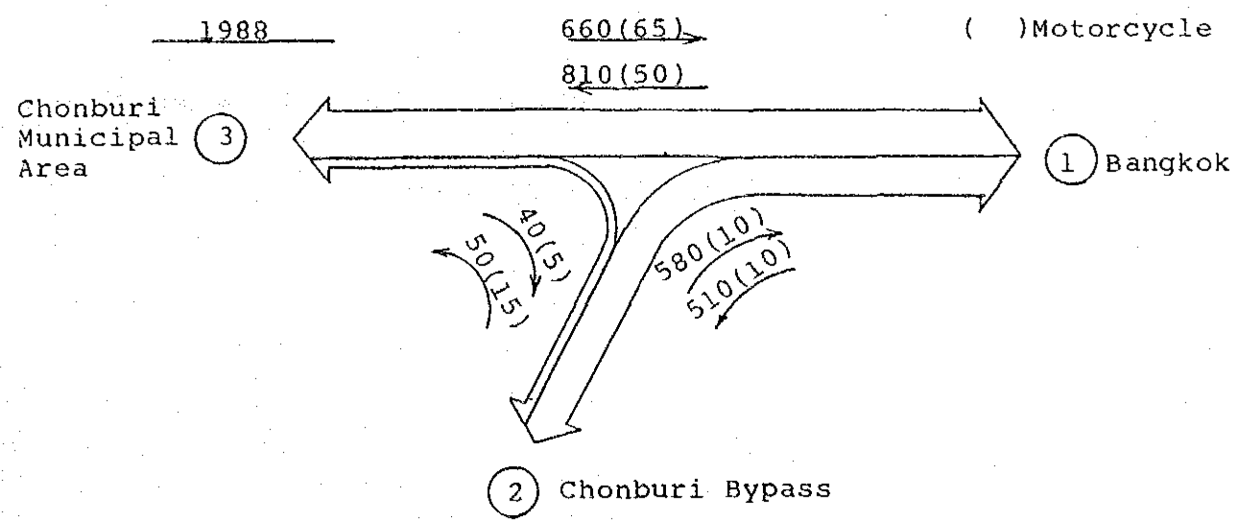
MC	PC	LB	HB	LT	MT	HT	ADT
Traffic Volume in 2000							
0	0	0	0	0	0	0	0
19	67	0	2	85	180	659	993
105	221	34	78	543	39	33	948
0	0	0	0	0	0	0	0
124	288	34	80	628	219	692	1941
144	189	25	55	555	220	747	1791
268	477	59	135	1183	439	1439	3732
19	50	0	3	105	168	705	1031
0	0	0	0	0	0	0	0
25	5	2	22	30	9	16	84
0	0	0	0	0	0	0	0
44	55	2	25	135	177	721	1115
30	72	0	19	120	180	675	1066
74	127	2	44	255	357	1396	2181
125	139	25	52	450	52	42	760
11	5	0	17	35	0	16	73
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
136	144	25	69	485	52	58	833
130	226	36	100	573	48	49	1032
256	370	61	169	1058	100	107	1865
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

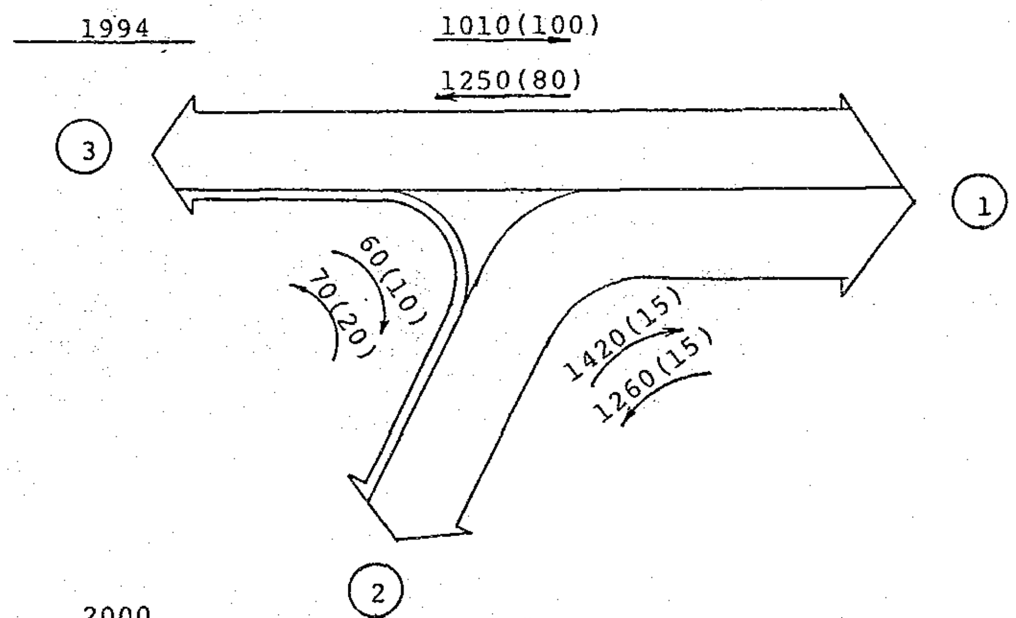
(3) Peak Hour Factor (PHF)

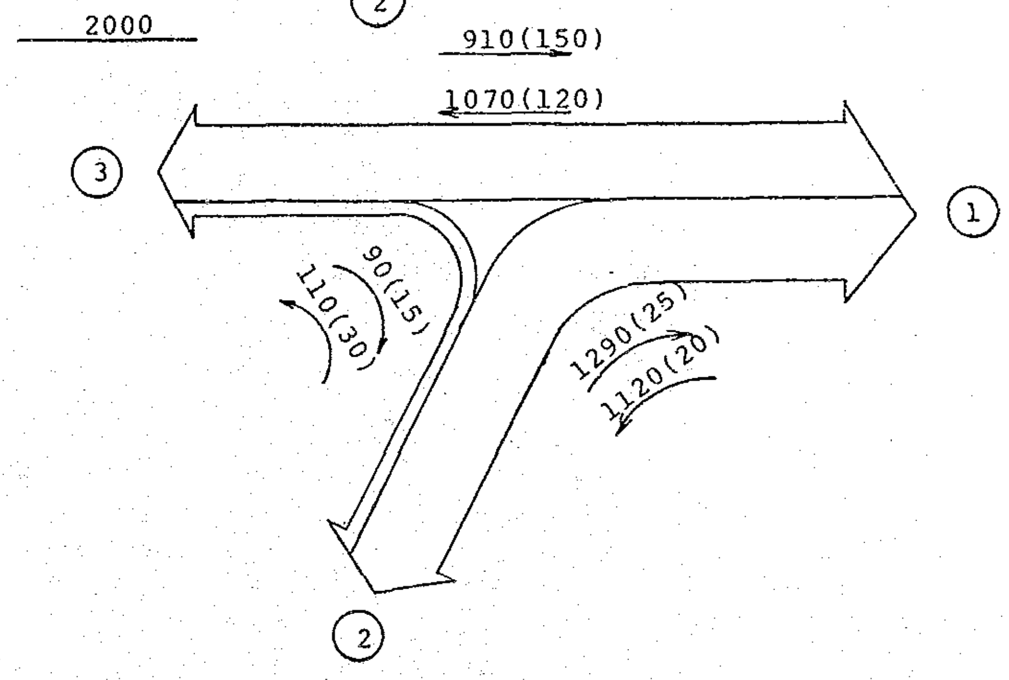
① 0.89
② 0.82
③ 0.84

(4) Hourly Peak Volumes (VPH)

( )Motorcycle

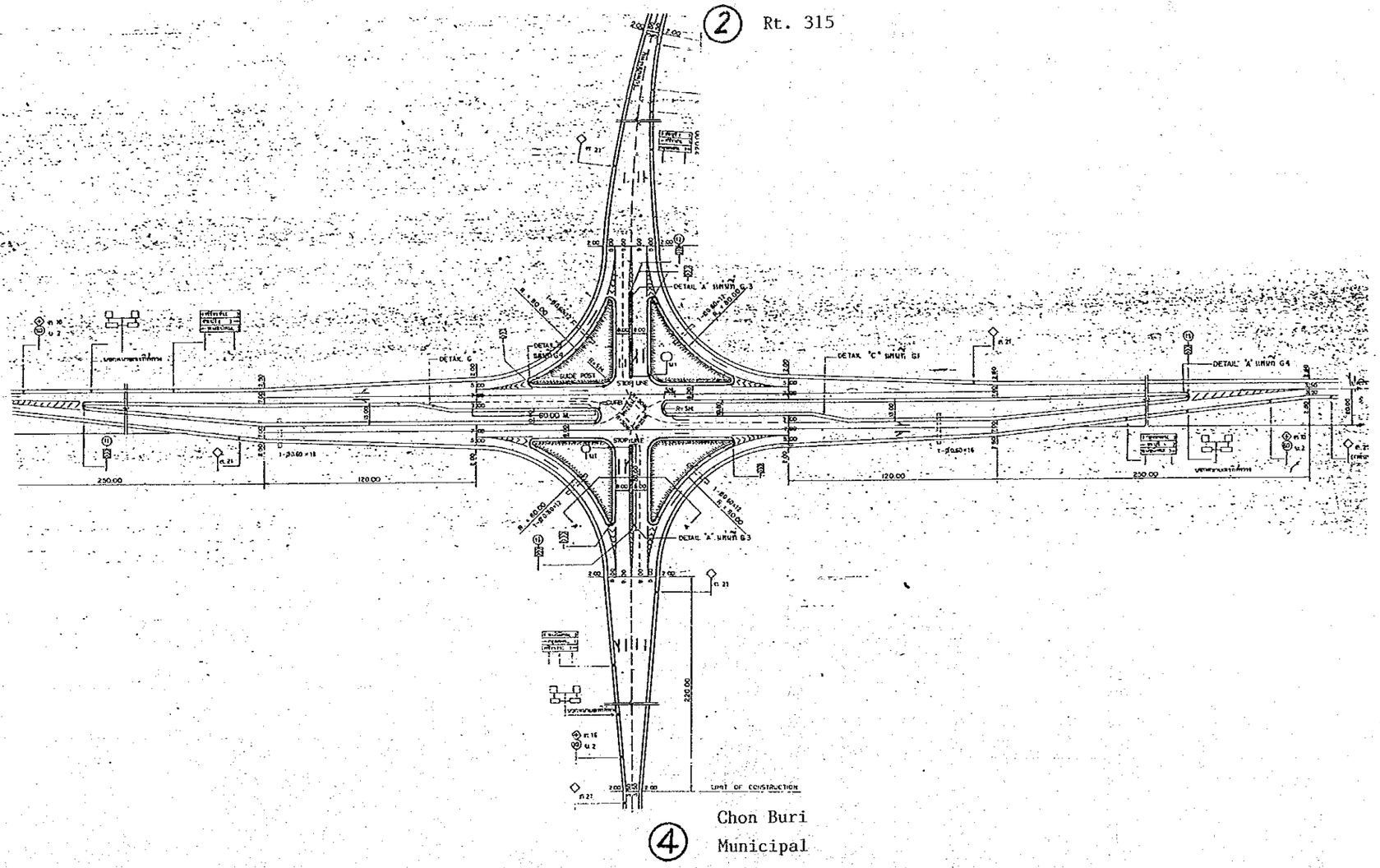






IS-2 ML-1 (RT. 3 CHON BURI BYPASS) RT. 315

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction (VPH) peak hour (15-16)

DIRECTION From	To	Year	MC	PC	LB	HB	LT	MT	HT	ADT
1	1	1988	0	0	0	0	0	0	0	0
	2	1988	13	4	2	0	17	2	3	28
	3	1988	7	29	4	3	68	50	359	513
	4	1988	6	1	1	0	14	7	14	37
	In	1988	26	34	7	3	99	59	376	578
	Out	1988	19	44	4	0	101	38	257	444
Total		1988	45	78	11	3	200	97	633	1022
2	1	1988	1	4	0	0	8	1	9	22
	2	1988	0	0	0	0	0	0	0	0
	3	1988	9	8	12	1	11	12	16	60
	4	1988	57	34	7	11	97	7	3	159
	In	1988	67	46	19	12	116	20	28	241
	Out	1988	76	47	20	11	174	21	22	295
Total		1988	143	93	39	23	290	41	50	536
3	1	1988	5	36	0	0	68	35	245	384
	2	1988	7	5	1	0	33	12	18	69
	3	1988	0	0	0	0	0	0	0	0
	4	1988	15	7	1	0	12	1	2	23
	In	1988	27	48	2	0	113	48	265	476
	Out	1988	19	41	17	4	92	64	376	594
Total		1988	46	89	19	4	205	112	641	1070
4	1	1988	13	4	4	0	25	2	3	38
	2	1988	56	38	17	11	124	7	1	198
	3	1988	3	4	1	0	13	2	1	21
	4	1988	0	0	0	0	0	0	0	0
	In	1988	72	46	22	11	162	11	5	257
	Out	1988	78	42	9	11	123	15	19	219
Total		1988	150	88	31	22	285	26	24	476

Traffic Volume in 1994							
MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
20	6	3	0	25	3	4	41
11	151	10	19	173	137	710	1200
10	2	1	0	21	11	20	55
41	159	14	19	219	151	734	1296
28	175	10	15	222	119	565	1106
69	334	24	34	441	270	1299	2402
1	6	0	0	12	1	13	32
0	0	0	0	0	0	0	0
14	13	19	1	16	18	22	89
89	55	11	17	144	11	4	242
104	74	30	18	172	30	39	363
119	77	31	17	258	32	30	445
223	151	61	35	430	62	69	808
7	163	4	15	173	115	548	1018
11	9	1	0	49	18	25	102
0	0	0	0	0	0	0	0
24	12	1	0	18	1	3	35
42	184	6	15	240	134	576	1155
29	170	30	20	208	158	733	1319
71	354	36	35	448	292	1309	2474
20	6	6	0	37	3	4	56
88	62	27	17	184	11	1	302
4	6	1	0	19	3	1	30
0	0	0	0	0	0	0	0
112	74	34	17	240	17	6	388
123	69	13	17	183	23	27	332
235	143	47	34	423	40	33	720

Traffic Volume in 2000							
MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
30	3	3	0	28	4	5	43
16	52	7	3	113	159	777	1111
14	1	1	0	24	12	25	63
60	56	11	3	165	175	807	1217
43	70	7	0	170	139	596	982
103	126	18	3	335	314	1403	2199
2	3	0	0	13	1	16	33
0	0	0	0	0	0	0	0
21	8	27	0	18	21	28	102
132	82	17	25	201	15	6	346
155	93	44	25	232	37	50	481
176	101	47	25	341	40	38	592
331	194	91	50	573	77	88	1073
11	64	0	0	116	134	575	889
16	5	1	0	56	21	32	115
0	0	0	0	0	0	0	0
35	7	1	0	21	1	4	34
62	76	2	0	193	156	611	1038
43	64	35	3	153	184	806	1245
105	140	37	3	346	340	1417	2283
30	3	7	0	41	4	5	60
130	93	43	25	257	15	1	434
6	4	1	0	22	4	1	32
0	0	0	0	0	0	0	0
166	100	51	25	320	23	7	526
181	90	19	25	246	28	35	443
347	190	70	50	566	51	42	969

(3) Peak Hour Factor (PHF)

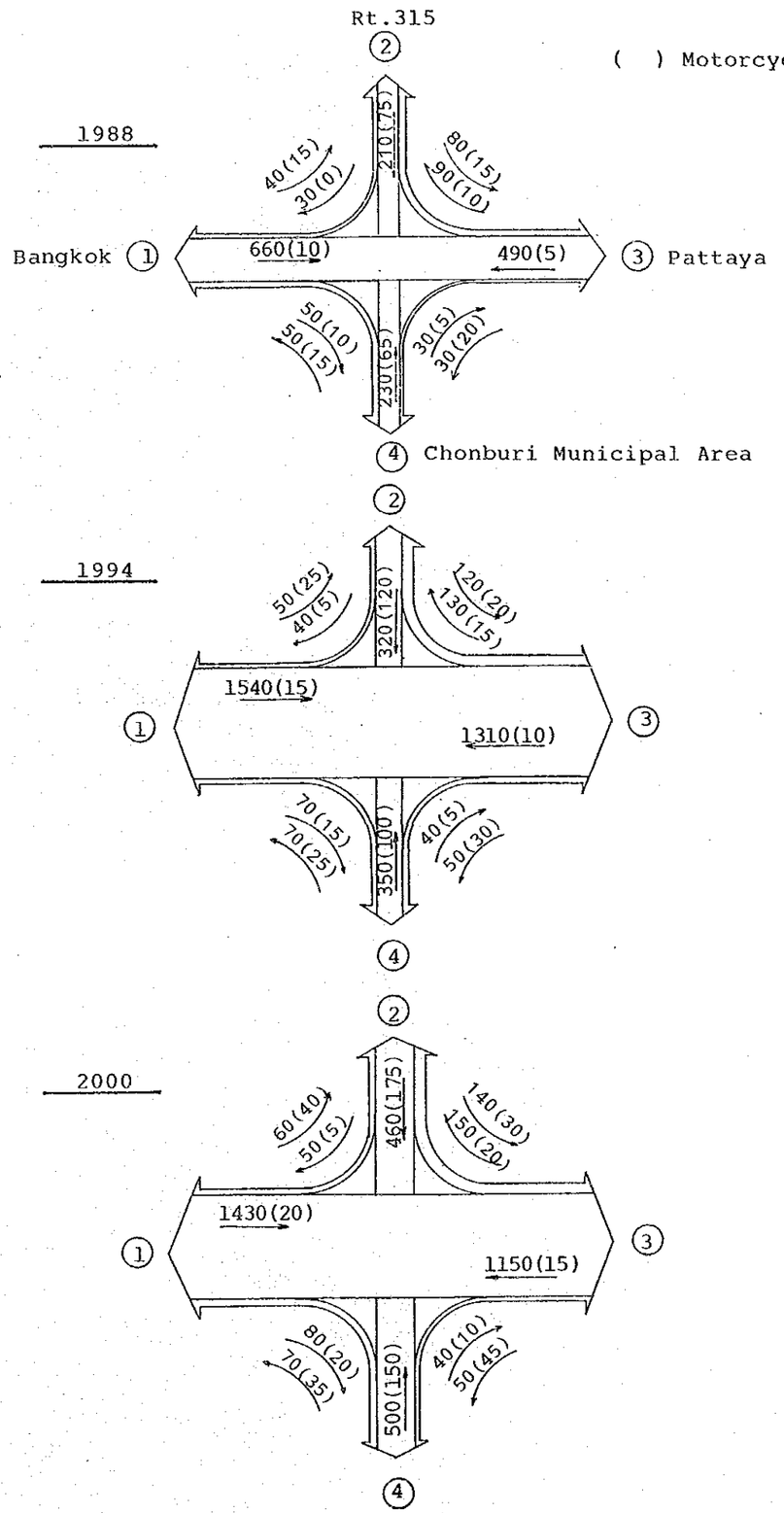
① 0.78

② 0.75

③ 0.78

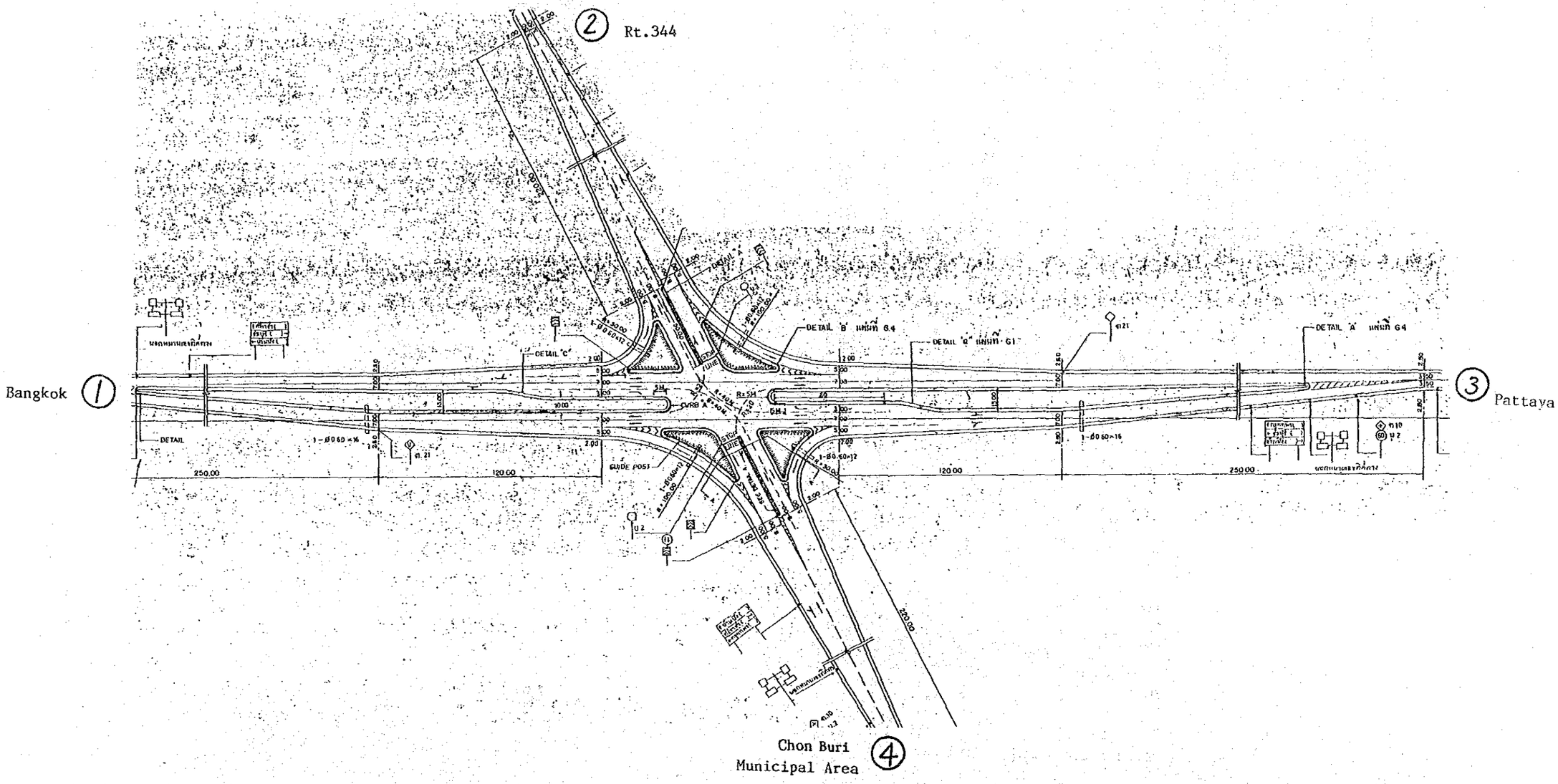
④ 0.87

(4) Hourly Peak Volumes (VPH)



IS-3 ML-1 (RT. 3 CHON BURI BYPASS) RT. 344

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction(VPH) peak hour (15-16)

DIRECTION From	To	Year	MC	PC	LB	HB	LT	MT	HT	ADT
		Base Traffic Volume								
(1)	1	1988	0	0	0	0	0	0	0	0
	2	1988	14	16	1	4	53	22	124	220
	3	1988	16	27	4	1	41	27	203	303
	4	1988	21	5	9	1	16	5	9	45
	In	1988	51	48	14	6	110	54	336	568
	Out	1988	29	47	21	4	99	33	255	459
	Total	1988	80	95	35	10	209	87	591	1027
(2)	1	1988	5	19	4	2	38	9	80	152
	2	1988	0	0	0	0	0	0	0	0
	3	1988	8	3	0	0	19	3	12	37
	4	1988	91	66	60	26	141	12	9	314
	In	1988	104	88	64	28	198	24	101	503
	Out	1988	101	79	69	29	202	29	162	570
	Total	1988	205	167	133	57	400	53	263	1073
(3)	1	1988	9	20	7	0	33	21	173	254
	2	1988	8	4	9	1	21	1	26	62
	3	1988	0	0	0	0	0	0	0	0
	4	1988	25	8	12	3	37	7	2	69
	In	1988	42	32	28	4	91	29	201	385
	Out	1988	52	38	8	1	106	33	223	409
	Total	1988	94	70	36	5	197	62	424	794
(4)	1	1988	15	8	10	2	28	3	2	53
	2	1988	79	59	59	24	128	6	12	288
	3	1988	28	8	4	0	46	3	8	69
	4	1988	0	0	0	0	0	0	0	0
	In	1988	122	75	73	26	202	12	22	410
	Out	1988	137	79	81	30	194	24	20	428
	Total	1988	259	154	154	56	396	36	42	838

MC	PC	LB	HB	LT	MT	HT	ADT
Traffic Volume in 1994							
0	0	0	0	0	0	0	0
21	26	1	6	79	33	176	321
25	148	10	16	132	103	488	897
33	9	14	1	24	7	13	68
79	183	25	23	235	143	677	1286
45	180	37	21	217	112	562	1129
124	363	62	44	452	255	1239	2415
7	31	6	3	56	14	113	223
0	0	0	0	0	0	0	0
13	5	0	0	29	4	17	55
142	107	95	39	209	18	13	481
162	143	101	42	294	36	143	759
157	127	108	43	301	42	230	851
319	270	209	85	595	78	373	1610
14	136	15	15	120	94	446	826
13	6	14	1	32	1	37	91
0	0	0	0	0	0	0	0
38	13	19	4	55	11	3	105
65	155	48	20	207	106	486	1022
82	166	16	16	230	111	517	1056
147	321	64	36	437	217	1003	2078
24	13	16	3	41	4	3	80
123	95	93	36	190	8	17	439
44	13	6	0	59	4	12	104
0	0	0	0	0	0	0	0
191	121	115	39	300	16	32	623
213	129	128	44	288	36	29	654
404	250	243	83	588	52	61	1277

MC	PC	LB	HB	LT	MT	HT	ADT
Traffic Volume in 2000							
0	0	0	0	0	0	0	0
32	16	1	0	91	38	221	367
37	60	9	0	70	121	501	761
49	5	19	0	28	9	16	77
118	81	29	0	189	168	738	1205
67	72	47	0	166	127	577	989
185	153	76	0	355	295	1315	2194
11	20	9	0	64	16	142	251
0	0	0	0	0	0	0	0
19	2	0	0	32	4	20	58
211	160	150	58	292	26	18	704
241	182	159	58	388	46	180	1013
234	161	167	54	393	51	289	1115
475	343	326	112	781	97	469	2128
21	44	16	0	55	106	431	652
19	2	20	0	36	1	44	103
0	0	0	0	0	0	0	0
57	5	28	1	62	11	4	111
97	51	64	1	153	118	479	866
121	67	18	0	180	129	535	929
218	118	82	1	333	247	1014	1795
35	8	22	0	47	5	4	86
183	143	146	54	266	12	24	645
65	5	9	0	78	4	14	110
0	0	0	0	0	0	0	0
283	156	177	54	391	21	42	841
317	170	197	59	382	46	38	892
600	326	374	113	773	67	80	1733

(3) Peak Hour Factor (PHF)

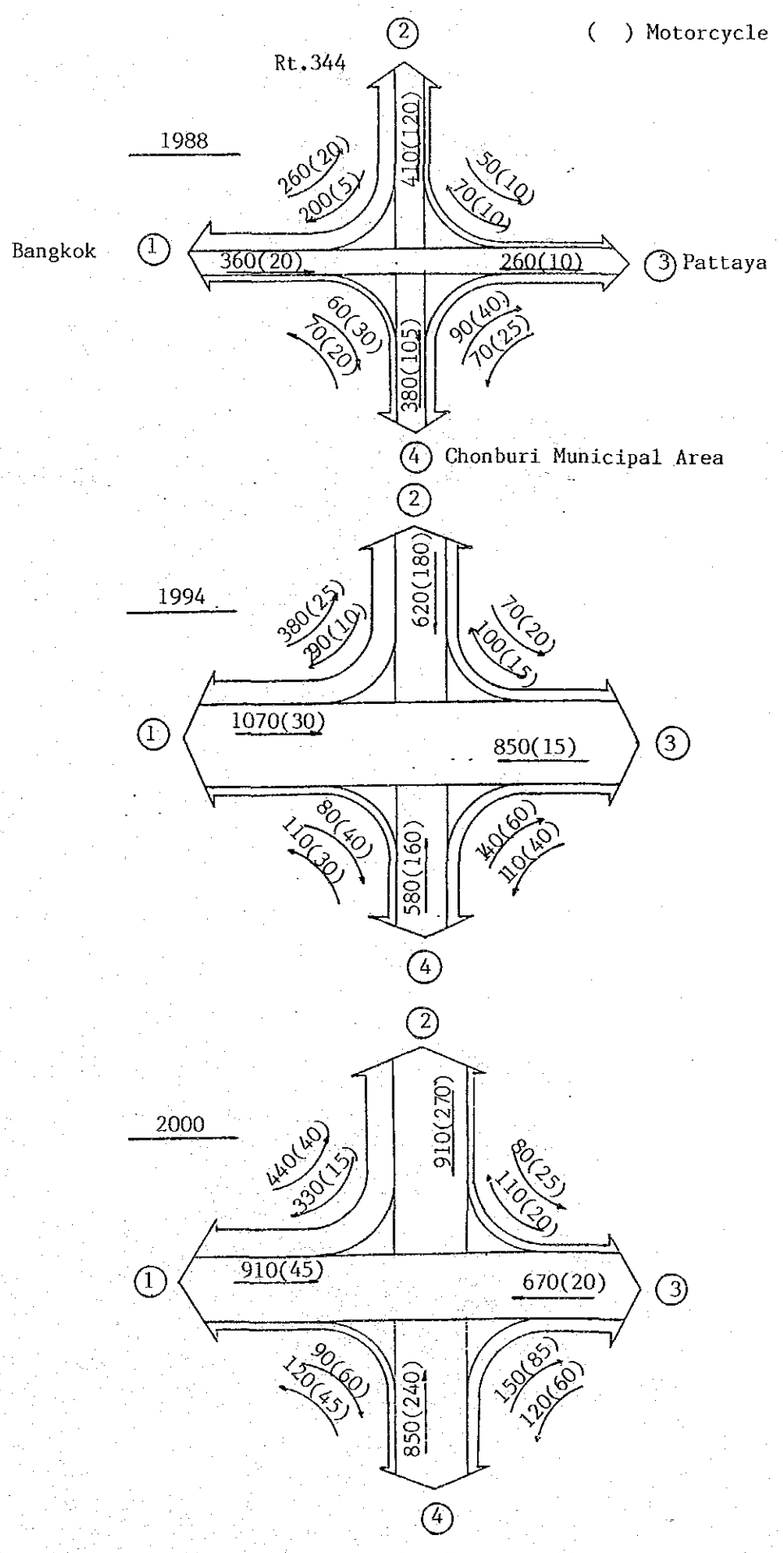
1 0.84

2 0.78

3 0.97

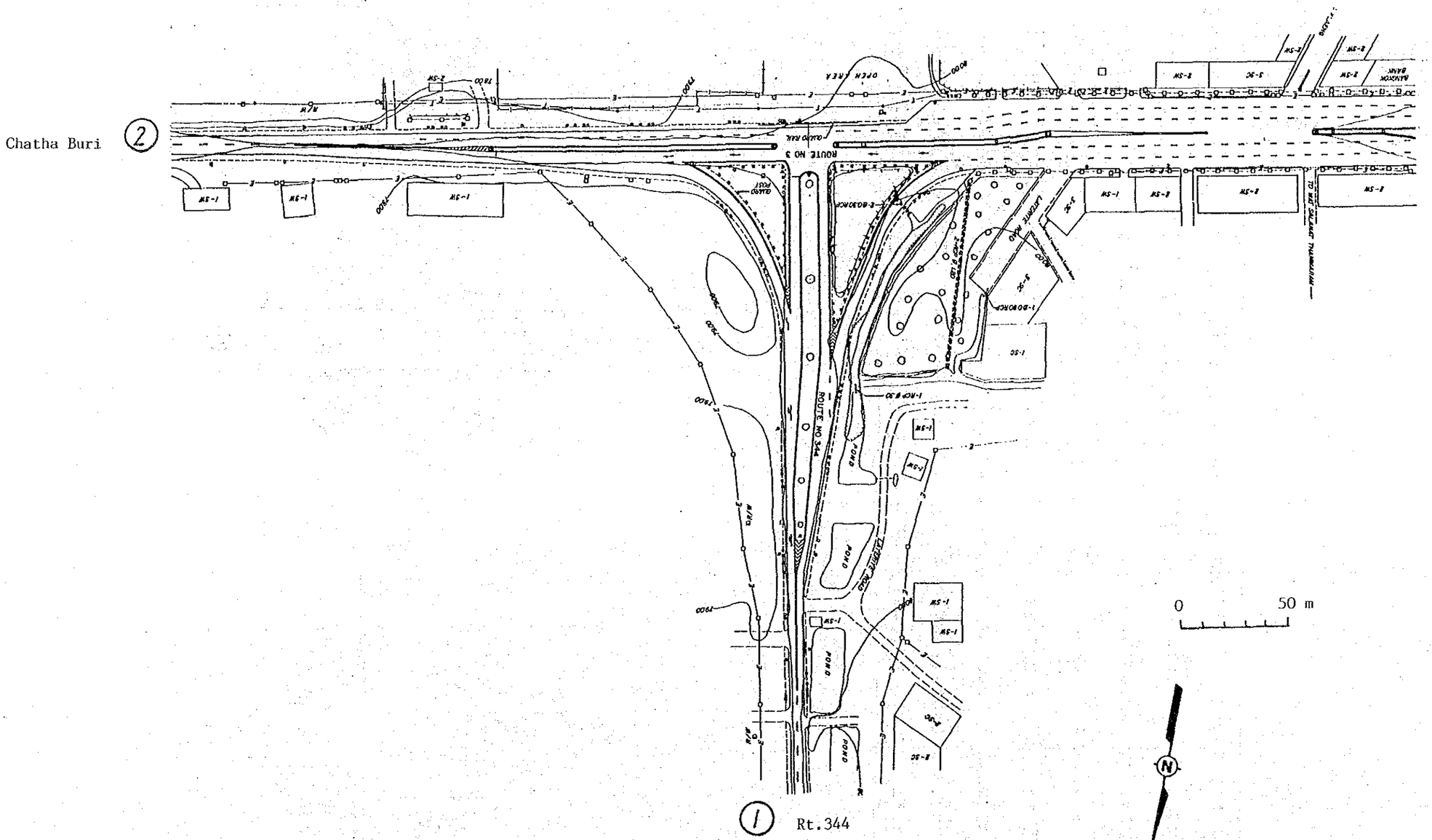
4 0.76

(4) Hourly Peak Volumes VPH)



IS-4 ML-4 (RT. 3 KLAENG – CHANTHABURI) KLAENG

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction (VPH) peak hour (8-9)

DIRECTION From	To	Year	Base Traffic Volume MC	PC	LB	HB	LT	MT	HT	ADT
(1)	1	1988	0	0	0	0	0	0	0	0
	2	1988	24	10	3	0	47	12	24	96
	3	1988	0	0	0	0	0	0	0	0
	4	1988	41	5	13	0	47	10	6	81
	In	1988	65	15	16	0	94	22	30	177
	Out	1988	66	13	14	6	109	16	28	186
	Total	1988	131	28	30	6	203	38	58	363
(2)	1	1988	17	7	3	3	48	7	15	83
	2	1988	0	0	0	0	0	0	0	0
	3	1988	0	0	0	0	0	0	0	0
	4	1988	104	26	28	3	166	25	31	279
	In	1988	121	33	31	6	214	32	46	362
	Out	1988	152	32	47	8	178	35	49	349
	Total	1988	273	65	78	14	392	67	95	711
3	1	1988	0	0	0	0	0	0	0	0
	2	1988	0	0	0	0	0	0	0	0
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	0	0	0	0	0	0	0	0
	Out	1988	0	0	0	0	0	0	0	0
	Total	1988	0	0	0	0	0	0	0	0
(4)	1	1988	49	6	11	3	61	9	13	103
	2	1988	128	22	44	8	131	23	25	253
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	177	28	55	11	192	32	38	356
	Out	1988	145	31	41	3	213	35	37	360
	Total	1988	322	59	96	14	405	67	75	716

Traffic Volume in 1994 MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
33	14	4	0	58	16	30	122
0	0	0	0	0	0	0	0
56	7	18	0	58	14	7	104
89	21	22	0	116	30	37	226
89	18	20	8	136	21	36	239
178	39	42	8	252	51	73	465
23	10	4	4	60	9	19	106
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
140	37	39	4	206	32	38	356
163	47	43	8	266	41	57	452
206	45	65	11	221	46	61	449
369	92	108	19	487	87	118	911
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
66	8	16	4	76	12	17	133
173	31	61	11	163	30	31	327
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
239	39	77	15	239	42	48	460
196	44	57	4	264	46	45	460
435	83	134	19	503	88	93	920

Traffic Volume in 2000 MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
45	19	6	0	78	21	38	162
0	0	0	0	0	0	0	0
76	10	24	0	78	18	9	139
121	29	30	0	156	39	47	301
123	25	27	12	183	27	45	319
244	54	57	12	339	66	92	620
32	13	6	6	81	12	24	142
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
192	52	52	6	278	43	49	480
224	65	58	12	359	55	73	622
281	62	88	14	298	61	77	600
505	127	146	26	657	116	150	1222
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
91	12	21	6	102	15	21	177
236	43	82	14	220	40	39	438
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
327	55	103	20	322	55	60	615
268	62	76	6	356	61	58	619
595	117	179	26	678	116	118	1234

(3) Peak Hour Factor (PHF)

(1) 0.94

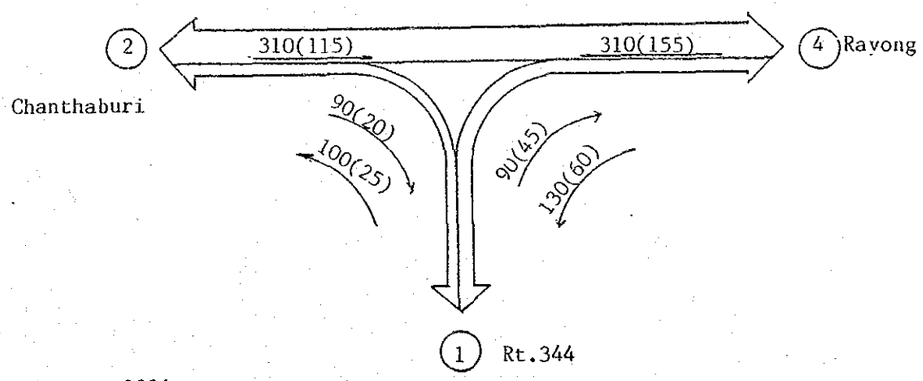
(2) 0.90

(3) 0.82

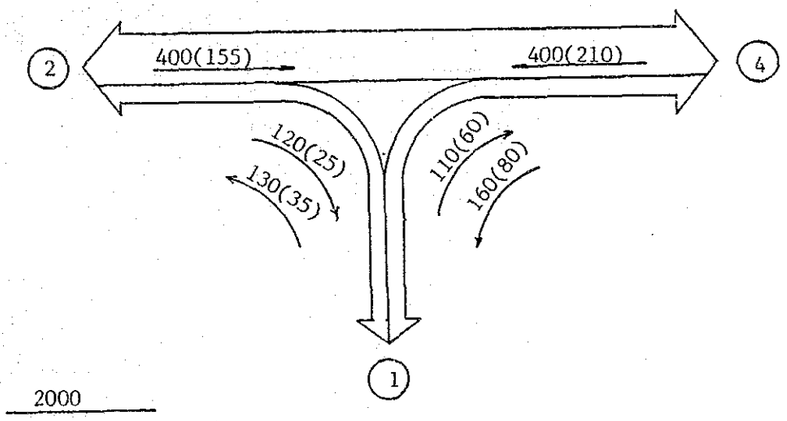
(4) Hourly Peak Volumes (HPV)

1988

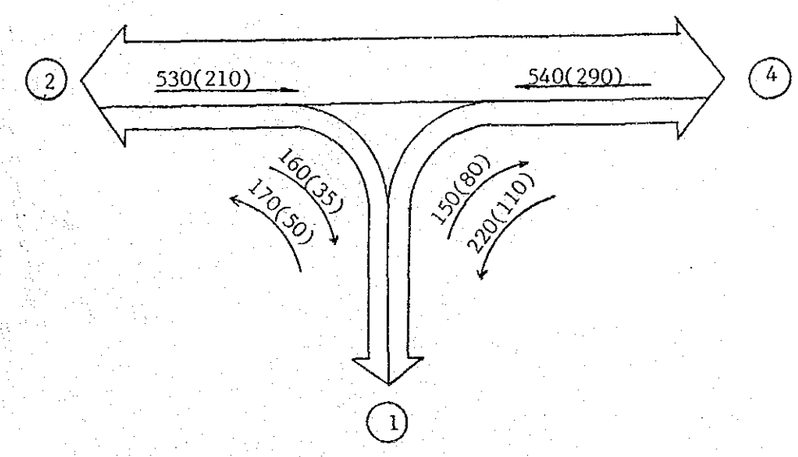
( ) Motorcycle



1994

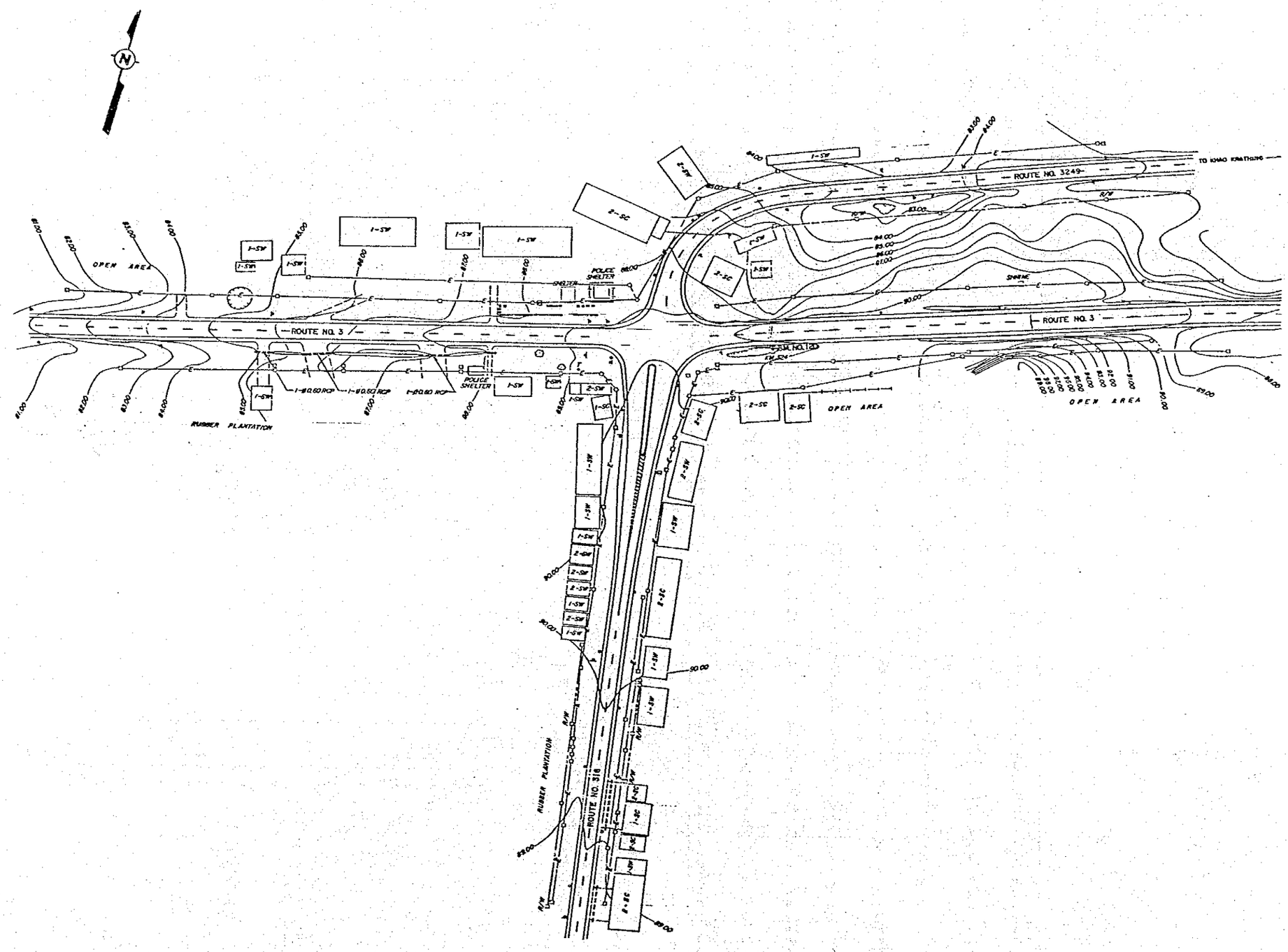


2000



IS-5 ML-4 (RT. 3 KLAENG – CHANTHABURI) CHANTHABURI

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction (VPH) peak hour (9-10)

DIRECTION From	To	Year	Base Traffic Volume MC	PC	LB	HB	LT	MT	HT	ADT
1	1	1988	0	0	0	0	0	0	0	0
	2	1988	6	2	3	1	24	1	1	32
	3	1988	4	7	13	1	28	10	15	74
	4	1988	6	1	0	0	12	3	0	16
	In	1988	16	10	16	2	64	14	16	122
	Out	1988	12	14	5	0	52	14	43	128
Total		1988	28	24	21	2	116	28	59	250
2	1	1988	4	5	3	0	15	1	1	25
	2	1988	0	0	0	0	0	0	0	0
	3	1988	39	22	31	8	107	11	1	180
	4	1988	30	6	12	0	50	1	0	69
	In	1988	73	33	46	8	172	13	2	274
	Out	1988	80	26	48	4	188	13	7	286
Total		1988	153	59	94	12	360	26	9	560
3	1	1988	6	9	1	0	30	12	42	94
	2	1988	32	20	32	3	107	10	5	177
	3	1988	0	0	0	0	0	0	0	0
	4	1988	7	0	0	0	9	3	5	17
	In	1988	45	29	33	3	146	25	52	288
	Out	1988	45	30	44	9	140	22	16	261
Total		1988	90	59	77	12	286	47	68	549
4	1	1988	2	0	1	0	7	1	0	9
	2	1988	42	4	13	0	57	2	1	77
	3	1988	2	1	0	0	5	1	0	7
	4	1988	0	0	0	0	0	0	0	0
	In	1988	46	5	14	0	69	4	1	93
	Out	1988	43	7	12	0	71	7	5	102
Total		1988	89	12	26	0	140	11	6	195

Traffic Volume in 1994 MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
8	3	4	1	30	1	1	40
5	10	19	1	36	14	19	99
8	1	0	0	15	4	0	20
21	14	23	2	81	19	20	159
16	20	6	0	65	18	54	163
37	34	29	2	146	37	74	322
5	7	4	0	19	1	1	32
0	0	0	0	0	0	0	0
54	32	45	10	136	15	1	239
41	8	18	0	63	1	0	90
100	47	67	10	218	17	2	361
110	37	70	5	238	18	8	376
210	84	137	15	456	35	10	737
8	13	1	0	38	16	53	121
44	29	47	4	136	14	6	236
0	0	0	0	0	0	0	0
9	0	0	0	12	4	6	22
61	42	48	4	186	34	65	379
62	43	64	11	178	30	20	346
123	85	112	15	364	64	85	725
3	0	1	0	8	1	0	10
58	5	19	0	72	3	1	100
3	1	0	0	6	1	0	8
0	0	0	0	0	0	0	0
64	6	20	0	86	5	1	118
58	9	18	0	90	9	6	132
122	15	38	0	176	14	7	250

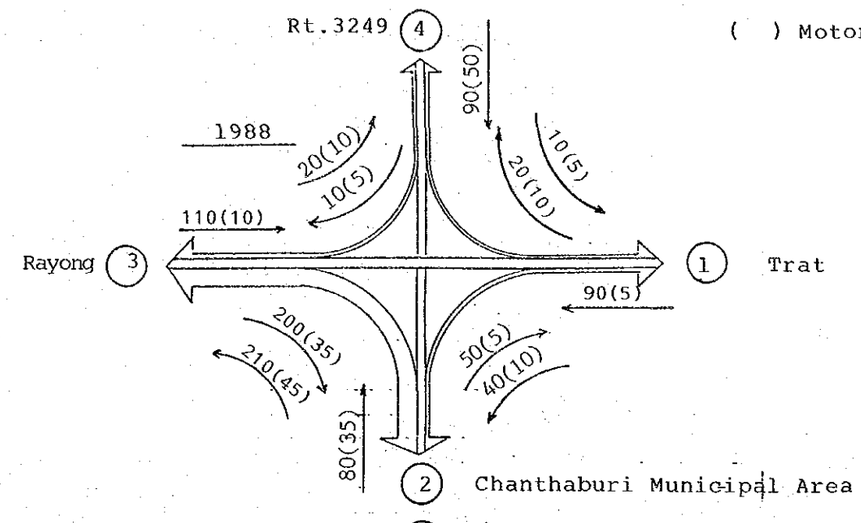
Traffic Volume in 2000 MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
12	4	6	1	41	1	1	54
7	13	25	1	48	18	25	130
12	1	0	0	20	6	0	27
31	18	31	2	109	25	26	211
23	28	8	0	88	23	71	218
54	46	39	2	197	48	97	429
7	10	6	0	26	1	1	44
0	0	0	0	0	0	0	0
74	45	61	14	183	19	1	323
56	12	24	0	85	1	0	122
137	67	91	14	294	21	2	489
152	51	94	7	321	23	10	506
289	118	185	21	615	44	12	995
12	18	1	0	51	21	70	161
61	40	53	6	183	18	8	318
0	0	0	0	0	0	0	0
13	0	0	0	16	5	8	30
86	58	64	6	250	45	86	509
85	59	88	15	240	38	26	464
171	117	150	21	490	83	112	973
4	0	1	0	11	1	0	13
79	7	25	0	97	4	1	134
4	1	0	0	9	1	0	11
0	0	0	0	0	0	0	0
87	8	26	0	117	6	1	158
81	13	24	0	121	13	8	179
168	21	50	0	238	19	9	337

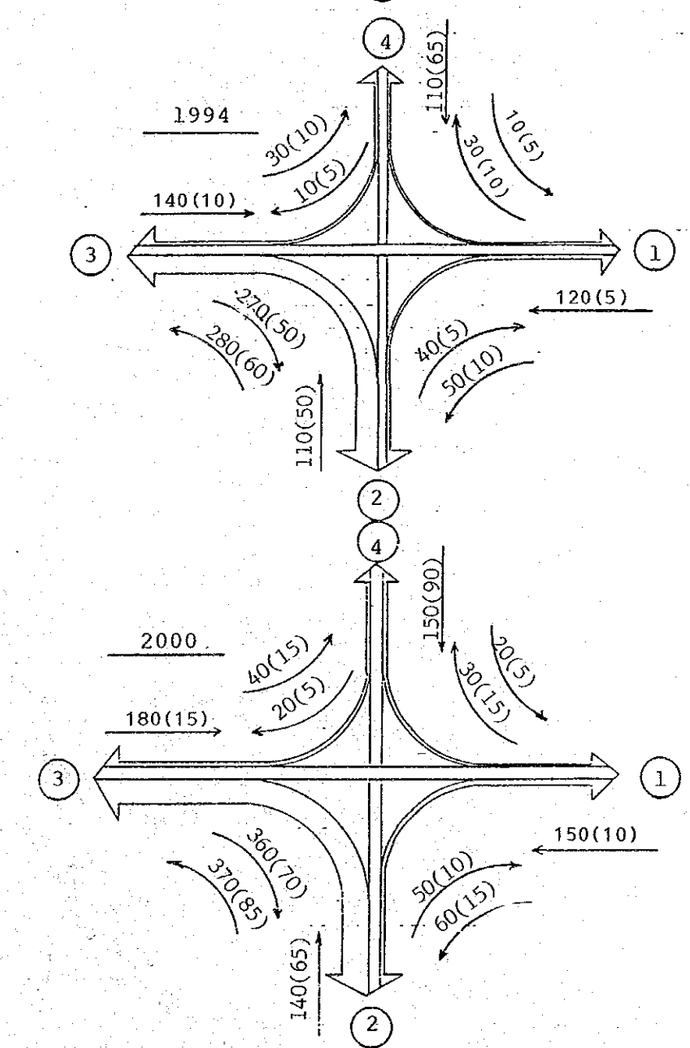
(3) Peak Hour Factor (PHF)

1	0.87
2	0.87
3	0.89
4	0.89

(4) Hourly Peak Volumes (VPH)

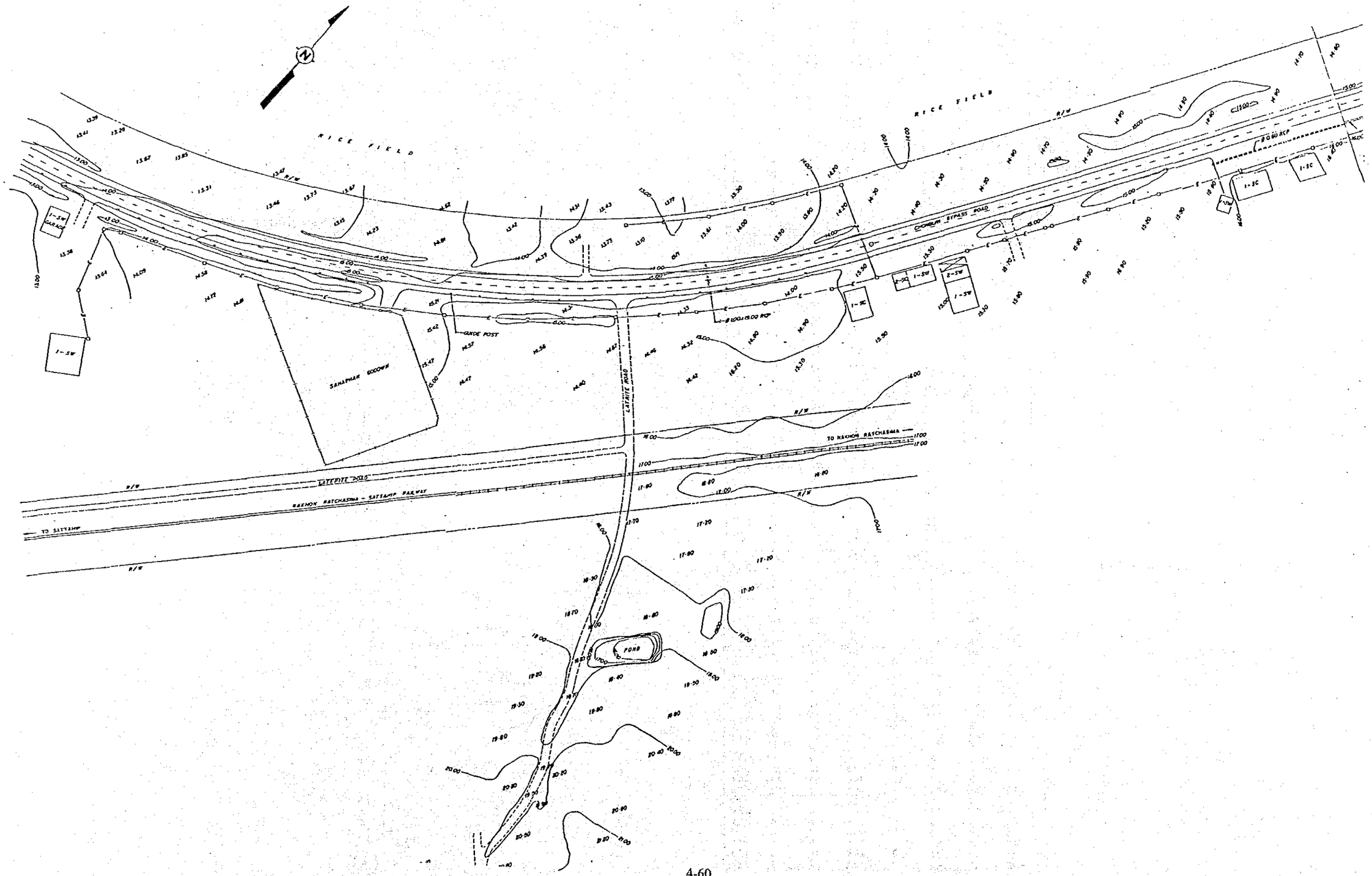
( ) Motorcycle



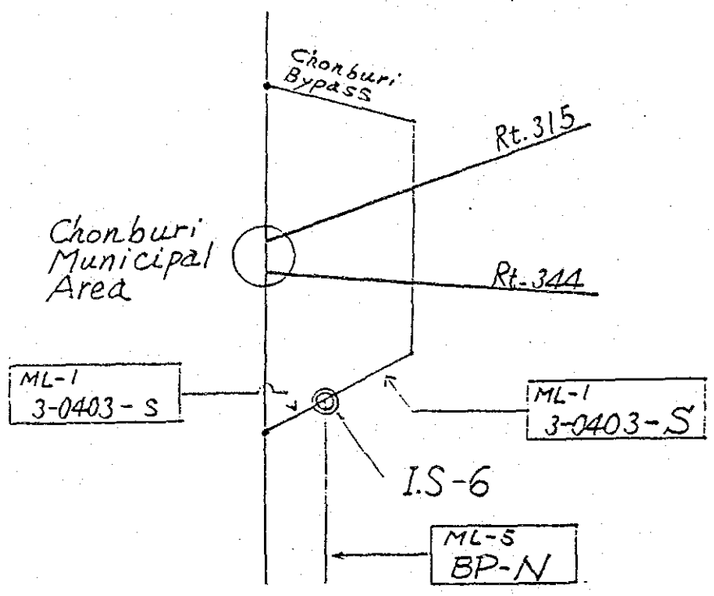


IS-6 ML-5 (CHONBURI – PATTAYA NEW HIGHWAY) BEGINNING POINT

(1) Existing Topography



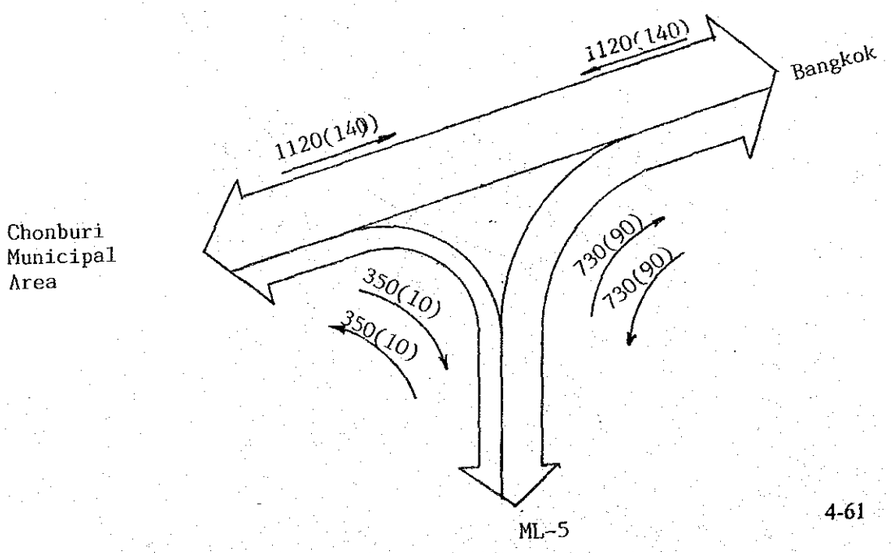
(2) ADT



TRAFFIC VOLUMES

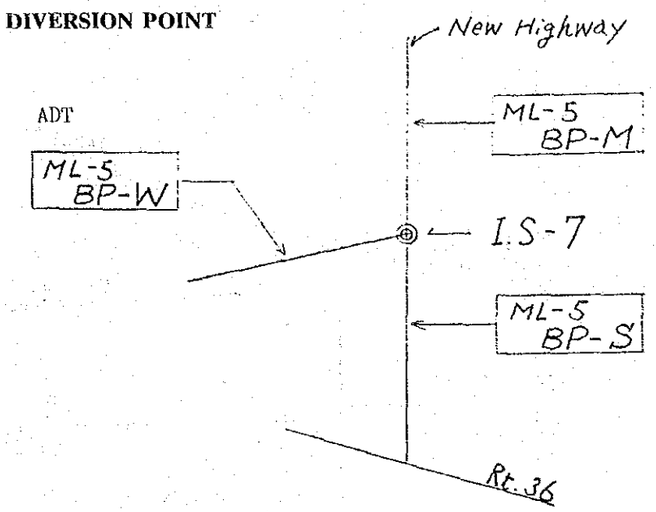
Proj. Code	Seciton	Traffic Volume in 1994							
		MC	PC	LB	HB	LT	MT	HT	ADT
ML-1	3-0403-S	(3181)	3409	946	475	5816	2363	12143	25152
	3-0403-s	(2337)	4235	1421	2048	5784	1178	8293	22959
ML-5	BP-N	(1700)	4522	1143	2115	4202	1599	3850	17431

(3) Hourly Peak Volumes (VPH)



IS-7 ML-5 (CHONBURI –PATTAYA NEW HIGHWAY) DIVERSION POINT

(1) ADT

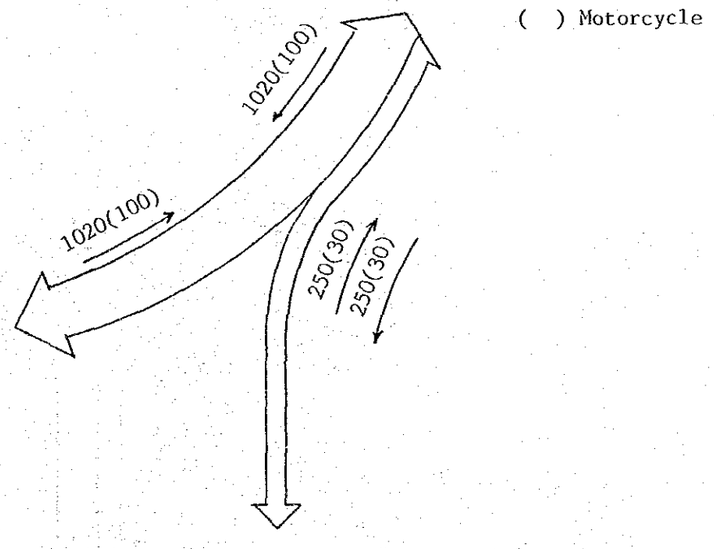


TRAFFIC VOLUMES

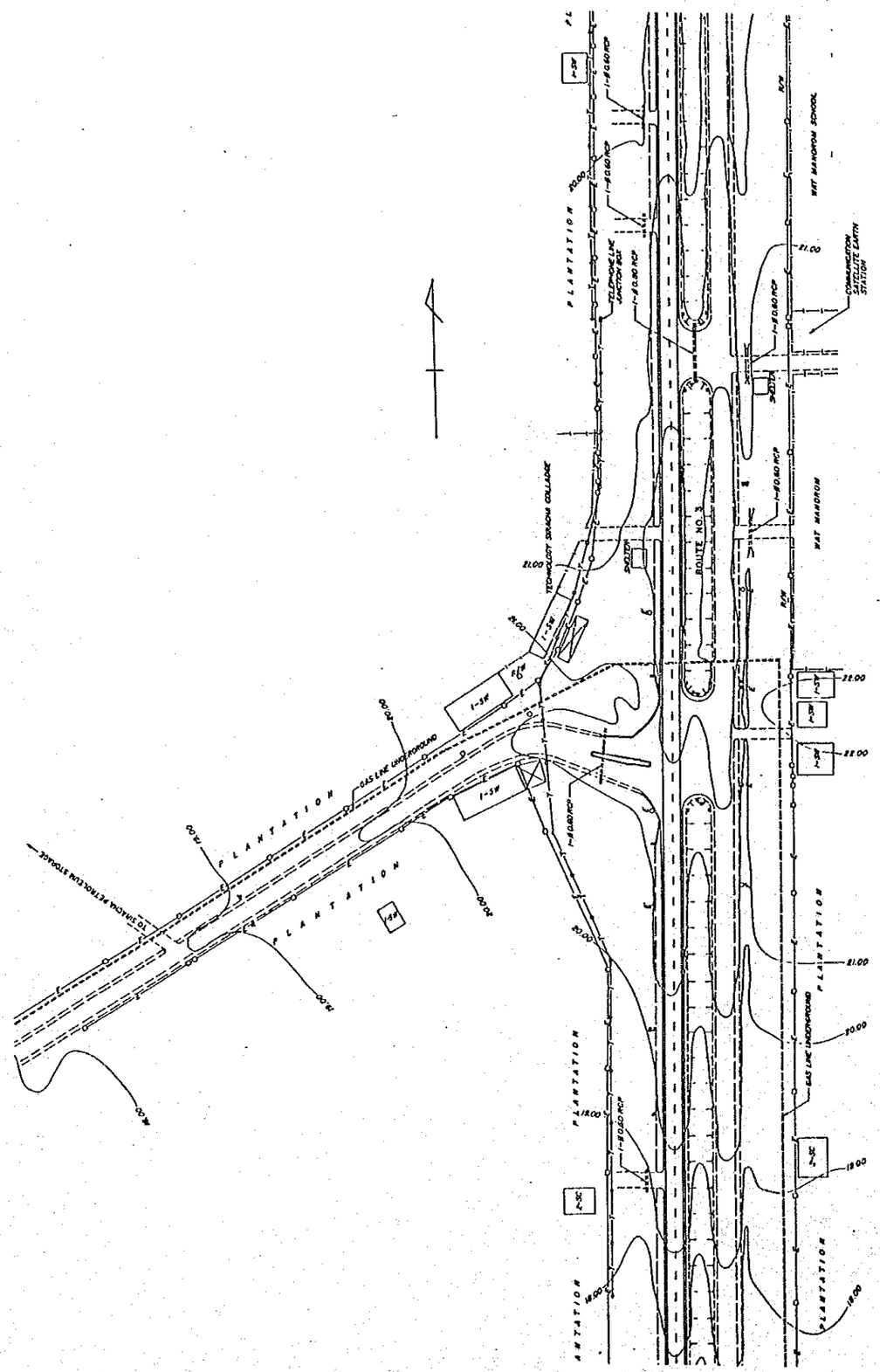
Proj. Code	Seciton	Traffic Volume in 2000							
		MC	PC	LB	HB	LT	MT	HT	ADT
ML-5	BP-M	(2487)	6750	1795	3063	5827	2389	5686	25510
	BP-S	(522)	423	87	810	1185	897	1655	5057
	BP-W	(1965)	6327	1708	2253	4642	1492	4031	20453

(2) Hourly Peak Volumes

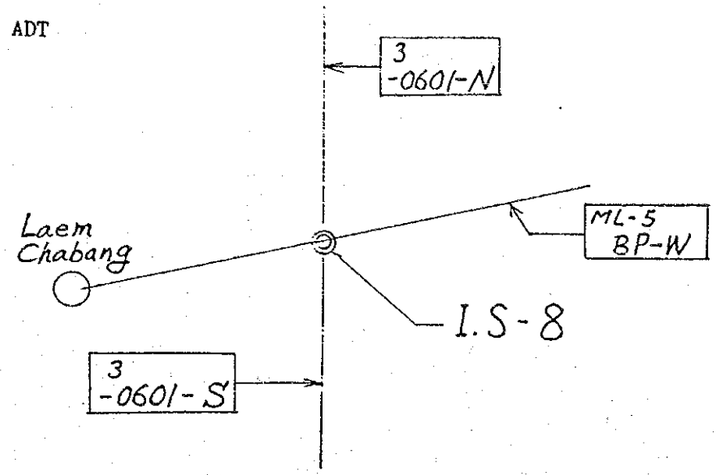
( ) Motorcycle



IS-8 ML-5 (CHONBURI – PATTAYA NEW HIGHWAY) LAEM CHABANG



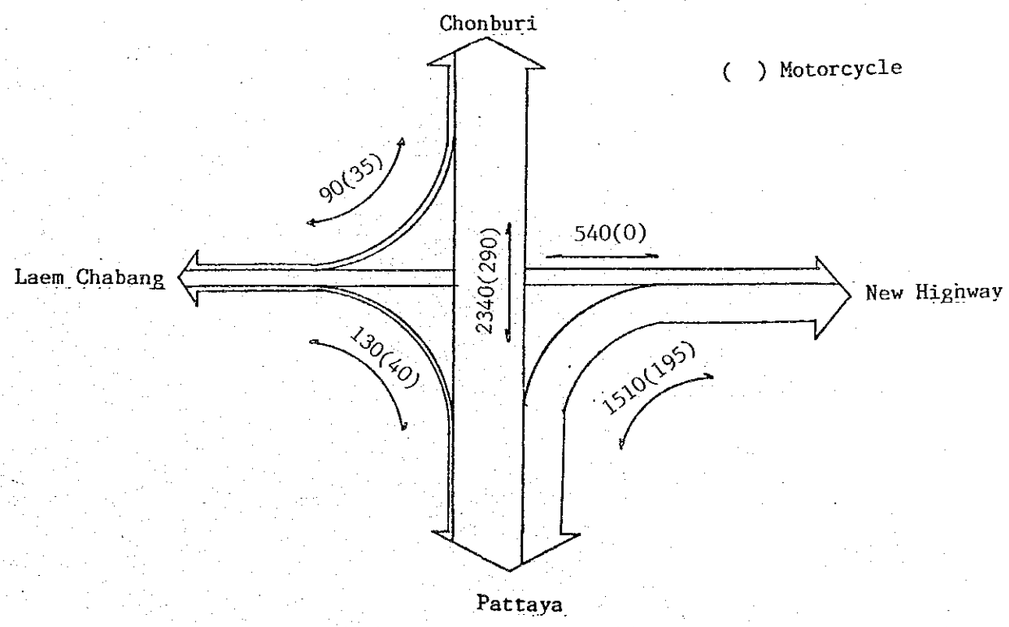
(1) ADT



TRAFFIC VOLUMES

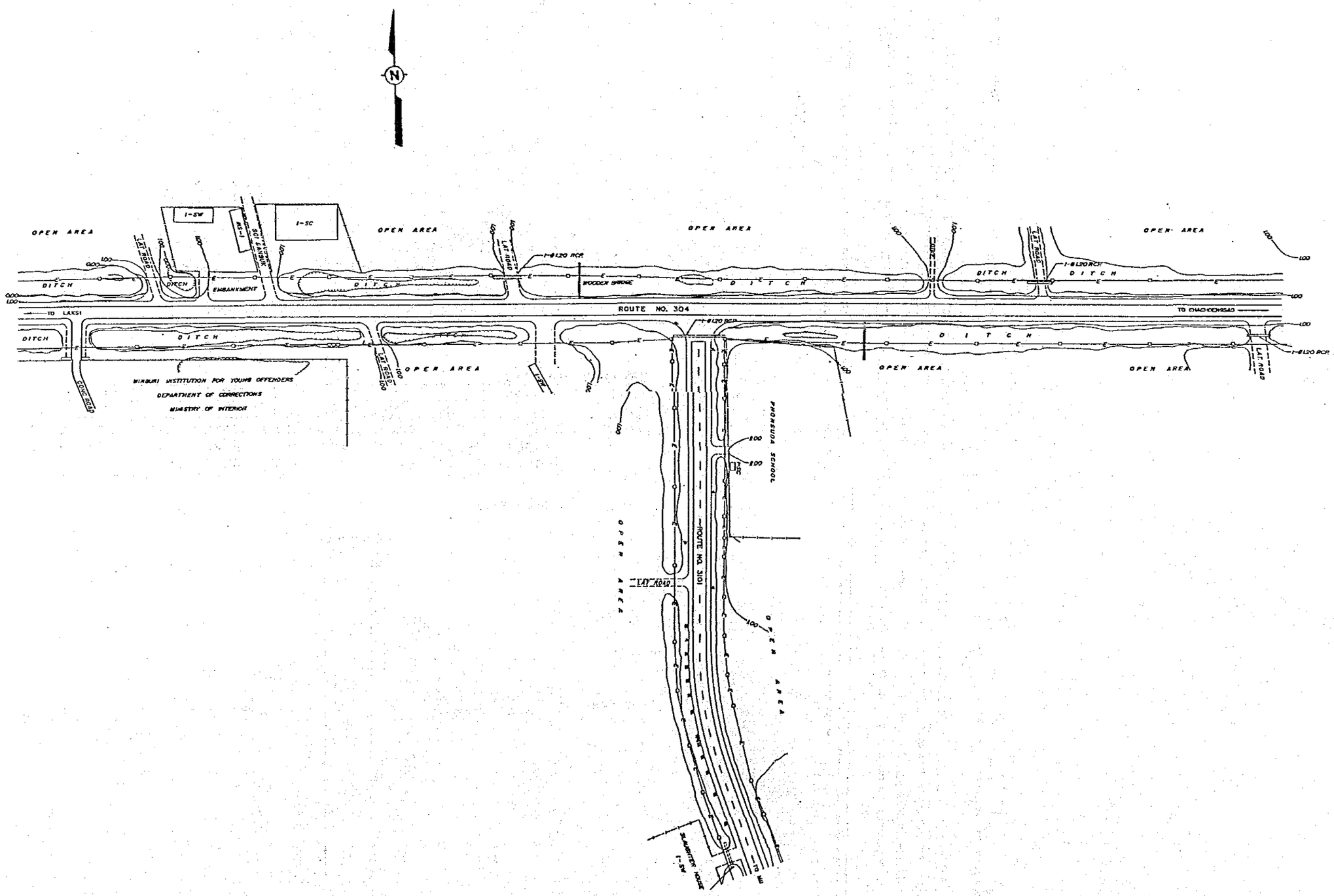
Proj. Code	Seciton	Traffic Volume in 2000							
		MC	PC	LB	HB	LT	MT	HT	ADT
ML-5	BP-W	(1965)	6327	1708	2253	4642	1492	4031	20453
	3-0601-N	(2934)	9177	3438	1459	5860	2017	1460	23411
	3-0601-S	(3611)	14196	4918	2476	5052	2698	545	29865

(2) Hourly Peak Volumes

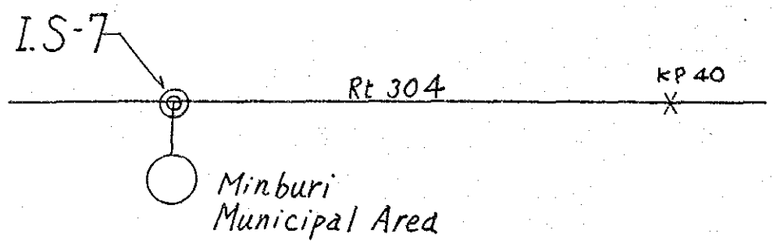


IS-9 ML-7 (RT. 304 MIN BURI –CHACHOENGSAO) MIN BURI

(1) Existing Intersection Geometry



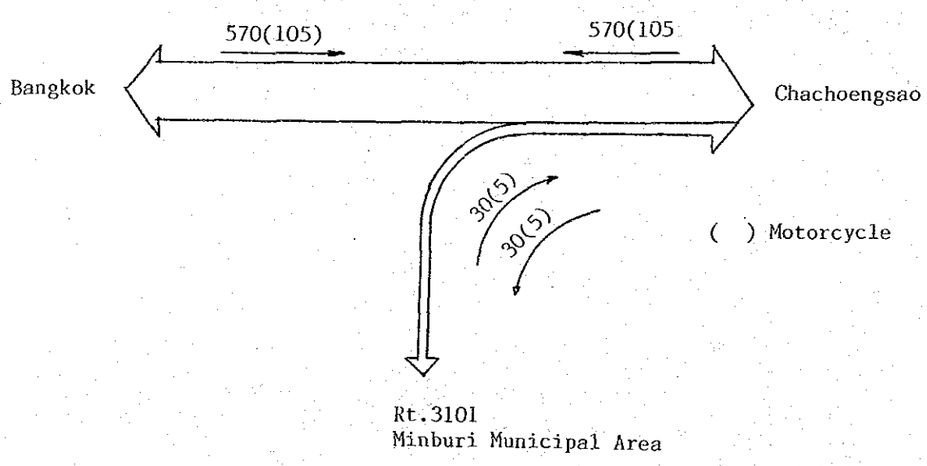
(2) ADT



VOLUMES

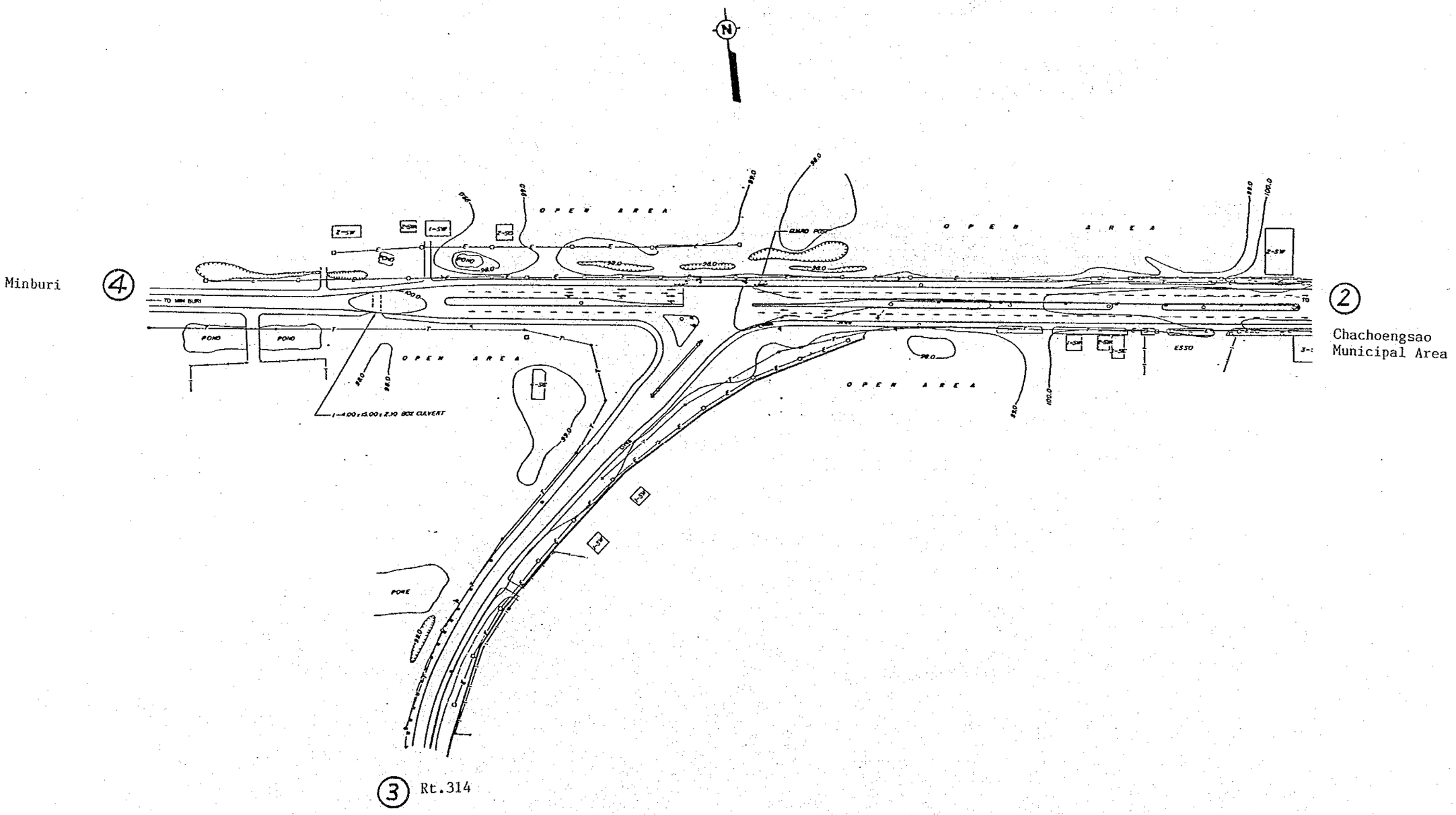
Section	Traffic Volume in 2000							
	MC	PC	LB	HB	LT	MT	HT	ADT
304-40KM	2440	3562	1889	1193	4082	1836	794	13356

(3) Hourly Peak Volumes (VPH)



IS-10 ML-7 (RT. 304 MIN BURI – CHACHOENGSAO) CHACHOENGSAO

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction peak hour (9-10)

DIRECTION From	To	Year	Base Traffic Volume MC	PC	LB	HB	LT	MT	HT	ADT
1	1	1988	0	0	0	0	0	0	0	0
	2	1988	0	0	0	0	0	0	0	0
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	0	0	0	0	0	0	0	0
	Out	1988	0	0	0	0	0	0	0	0
Total		1988	0	0	0	0	0	0	0	0
2	1	1988	0	0	0	0	0	0	0	0
	2	1988	0	0	0	0	0	0	0	0
	3	1988	20	29	21	21	58	12	27	168
	4	1988	32	21	16	11	102	19	5	174
	In	1988	52	50	37	32	160	31	32	342
	Out	1988	75	77	16	30	156	25	22	326
Total		1988	127	127	53	62	316	56	54	668
3	1	1988	0	0	0	0	0	0	0	0
	2	1988	24	24	6	15	66	10	15	136
	3	1988	0	0	0	0	0	0	0	0
	4	1988	1	2	0	0	10	3	21	36
	In	1988	25	26	6	15	76	13	36	172
	Out	1988	22	33	21	21	70	18	33	196
Total		1988	47	59	27	36	146	31	69	368
4	1	1988	0	0	0	0	0	0	0	0
	2	1988	51	53	10	15	90	15	7	190
	3	1988	2	4	0	0	12	6	6	28
	4	1988	0	0	0	0	0	0	0	0
	In	1988	53	57	10	15	102	21	13	218
	Out	1988	33	23	16	11	112	22	26	210
Total		1988	86	80	26	26	214	43	39	428

Traffic Volume in 1994 MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
27	41	30	27	74	16	35	223
44	30	23	14	128	25	6	226
71	71	53	41	202	41	41	449
104	110	23	38	197	34	27	429
175	181	76	79	399	75	68	878
0	0	0	0	0	0	0	0
33	34	8	19	83	14	19	177
0	0	0	0	0	0	0	0
1	3	0	0	13	4	26	46
34	37	8	19	96	18	45	223
30	46	30	27	89	24	42	258
64	83	38	46	185	42	87	481
0	0	0	0	0	0	0	0
71	76	15	19	114	20	8	252
3	5	0	0	15	8	7	35
0	0	0	0	0	0	0	0
74	81	15	19	129	28	15	287
45	33	23	14	141	29	32	272
119	114	38	33	270	57	47	559

Traffic Volume in 2000 MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
38	58	41	37	100	21	45	302
61	42	31	18	174	33	8	306
99	100	72	55	274	54	53	608
142	156	31	50	266	44	36	583
241	256	103	105	540	98	89	1191
0	0	0	0	0	0	0	0
45	48	11	25	112	18	25	239
0	0	0	0	0	0	0	0
1	4	0	0	17	6	34	61
46	52	11	25	129	24	59	300
42	65	41	37	120	32	55	350
88	117	52	62	249	56	114	650
0	0	0	0	0	0	0	0
97	108	20	25	154	26	11	344
4	7	0	0	20	11	10	48
0	0	0	0	0	0	0	0
101	115	20	25	174	37	21	392
62	46	31	18	191	39	42	367
163	161	51	43	365	76	63	759

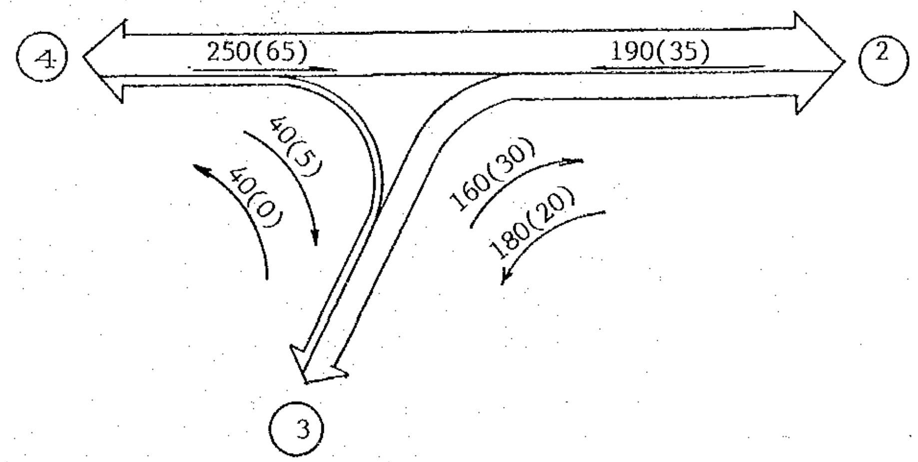
(3) Peak Hour Factor (HPF)

2	0.95
3	0.84
4	0.77

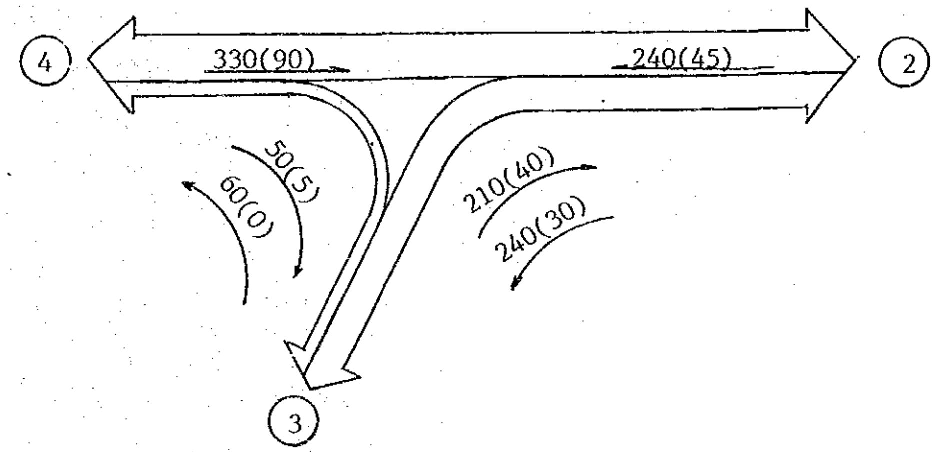
(4) Hourly Peak Volumes (HPV)

( ) Motorcycle

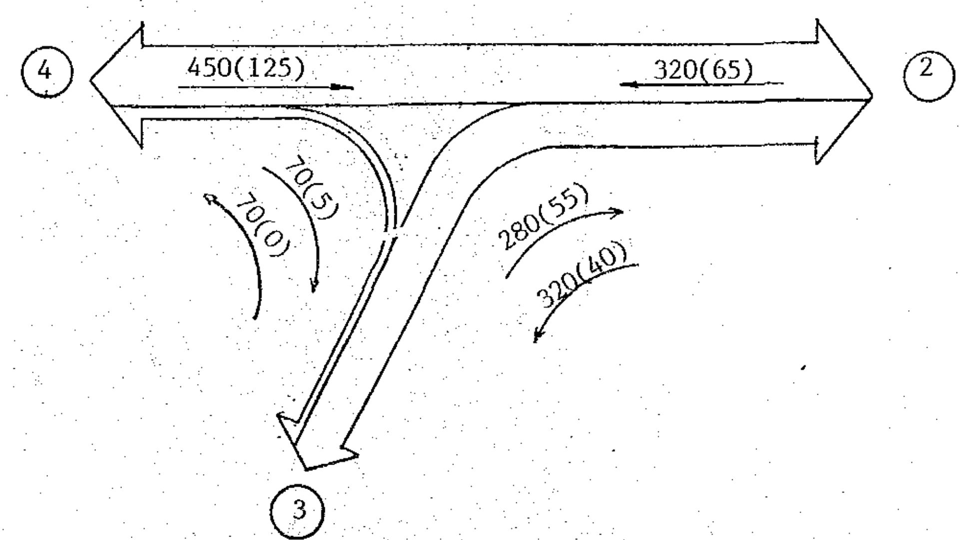
1988



1994

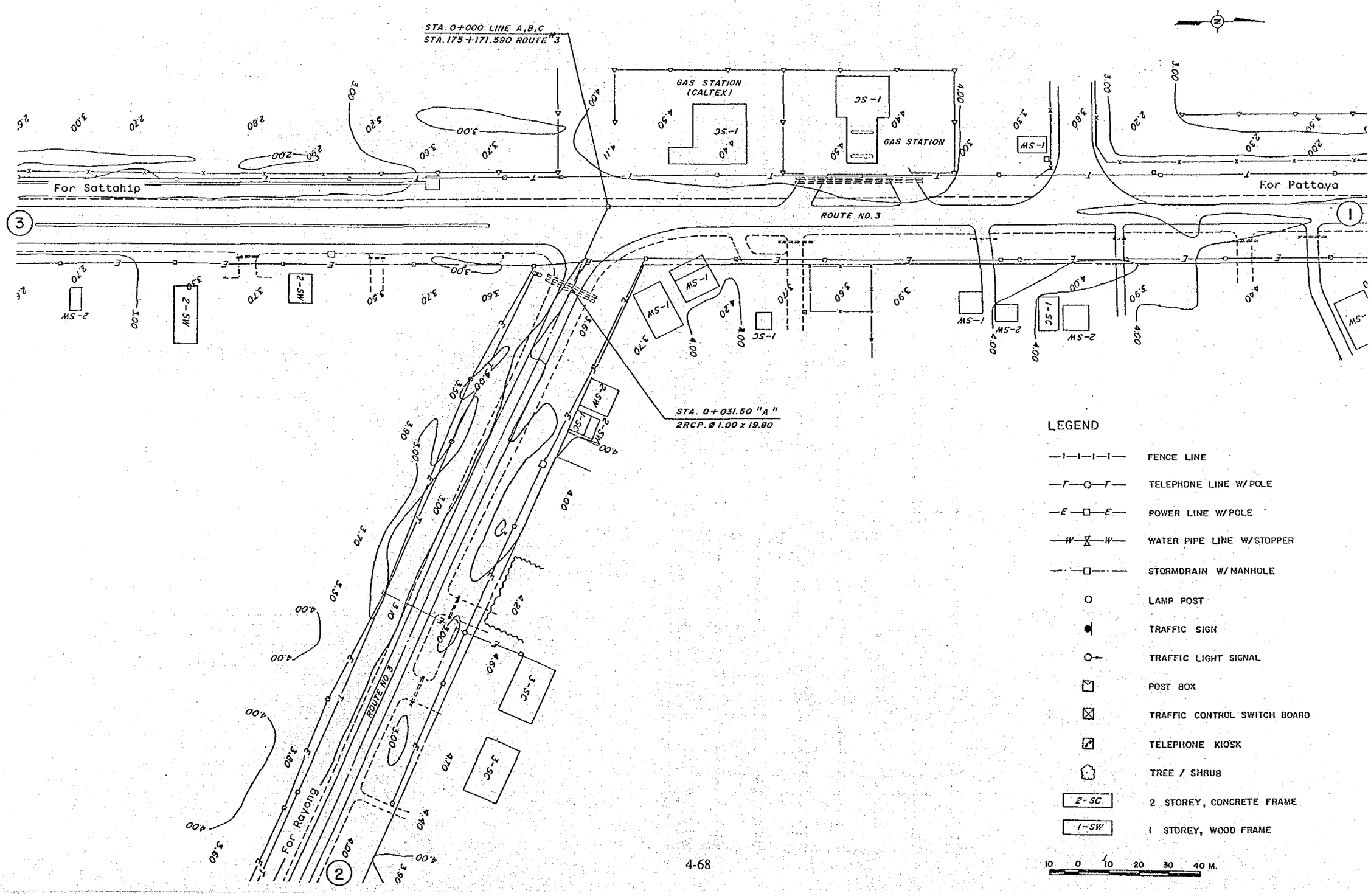


2000



IS-11 ML-3 (RT. 3 SATTAHIP –RAYONG) SATTAHIP

(1) Existing Intersection Geometry



(2) Hourly Traffic Volume by Direction Peak hour(7-8)

DIRECTION From	To	Year	MC	PC	LB	HB	LT	MT	HT	ADT
①	1	1988	0	0	0	0	0	0	0	0
	2	1988	155	47	26	16	62	2	12	165
	3	1988	181	55	105	15	43	4	2	224
	4	1988	0	0	0	0	0	0	0	0
	In	1988	336	102	131	31	105	6	14	389
	Out	1988	296	102	197	45	133	10	5	492
Total		1988	632	204	328	76	238	16	19	881
②	1	1988	155	51	25	19	74	7	5	181
	2	1988	0	0	0	0	0	0	0	0
	3	1988	20	15	10	1	8	0	0	34
	4	1988	0	0	0	0	0	0	0	0
	In	1988	175	66	35	20	82	7	5	215
	Out	1988	166	49	27	19	67	3	12	177
Total		1988	341	115	62	39	149	10	17	392
③	1	1988	141	51	172	26	59	3	0	311
	2	1988	11	2	1	3	5	1	0	12
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	152	53	173	29	64	4	0	323
	Out	1988	201	70	115	16	51	4	2	258
Total		1988	353	123	288	45	115	8	2	581
	1	1988	0	0	0	0	0	0	0	0
	2	1988	0	0	0	0	0	0	0	0
	3	1988	0	0	0	0	0	0	0	0
	4	1988	0	0	0	0	0	0	0	0
	In	1988	0	0	0	0	0	0	0	0
	Out	1988	0	0	0	0	0	0	0	0
Total		1988	0	0	0	0	0	0	0	0

Traffic Volume in 1994							
MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
235	70	41	22	95	3	16	247
274	83	167	21	66	5	3	345
0	0	0	0	0	0	0	0
509	153	208	43	161	8	19	592
449	154	314	62	204	13	6	753
958	307	522	105	365	21	25	1345
235	77	40	26	113	9	6	271
0	0	0	0	0	0	0	0
31	22	16	1	13	0	0	52
0	0	0	0	0	0	0	0
266	99	56	27	126	9	6	323
252	73	43	26	102	4	16	264
518	172	99	53	228	13	22	587
214	77	274	36	91	4	0	482
17	3	2	4	7	1	0	17
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
231	80	276	40	98	5	0	499
305	105	183	22	79	5	3	397
536	185	459	62	177	10	3	896
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

Traffic Volume in 2000							
MC	PC	LB	HB	LT	MT	HT	ADT
0	0	0	0	0	0	0	0
331	102	58	30	135	4	21	350
387	121	236	28	93	7	4	489
0	0	0	0	0	0	0	0
718	223	294	58	228	11	25	839
633	222	444	83	289	17	8	1063
1351	445	738	141	517	28	33	1902
331	111	57	35	160	12	8	383
0	0	0	0	0	0	0	0
43	32	22	1	18	0	0	73
0	0	0	0	0	0	0	0
374	143	79	36	178	12	8	456
355	107	61	36	145	5	21	375
729	250	140	72	323	17	29	831
302	111	387	48	129	5	0	680
24	5	3	6	10	1	0	25
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
326	116	390	54	139	6	0	705
430	153	258	29	111	7	4	562
756	269	648	83	250	13	4	1267
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

(3) Peak Hour Factor (PHF)

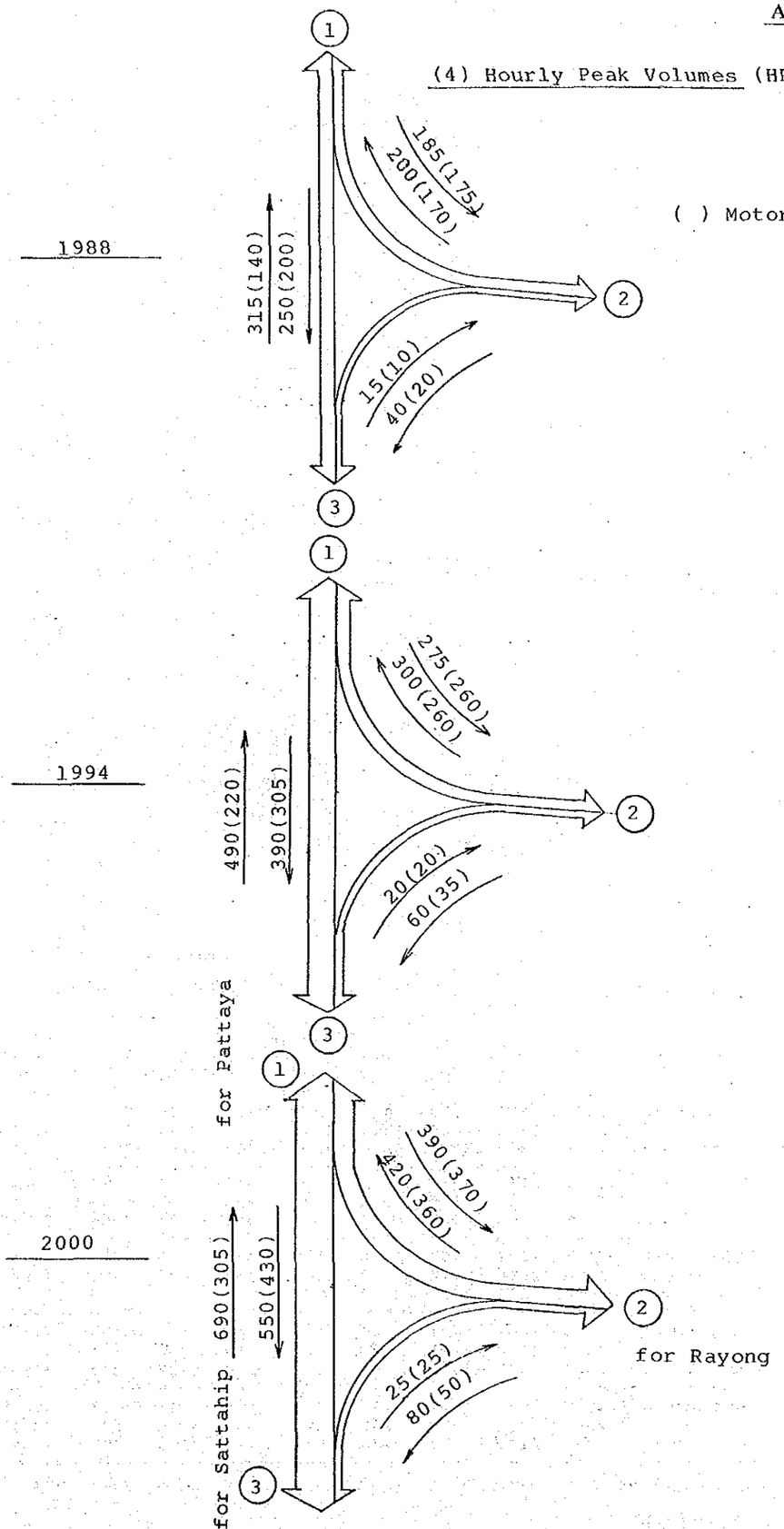
① 0.89

② 0.91

③ 0.98

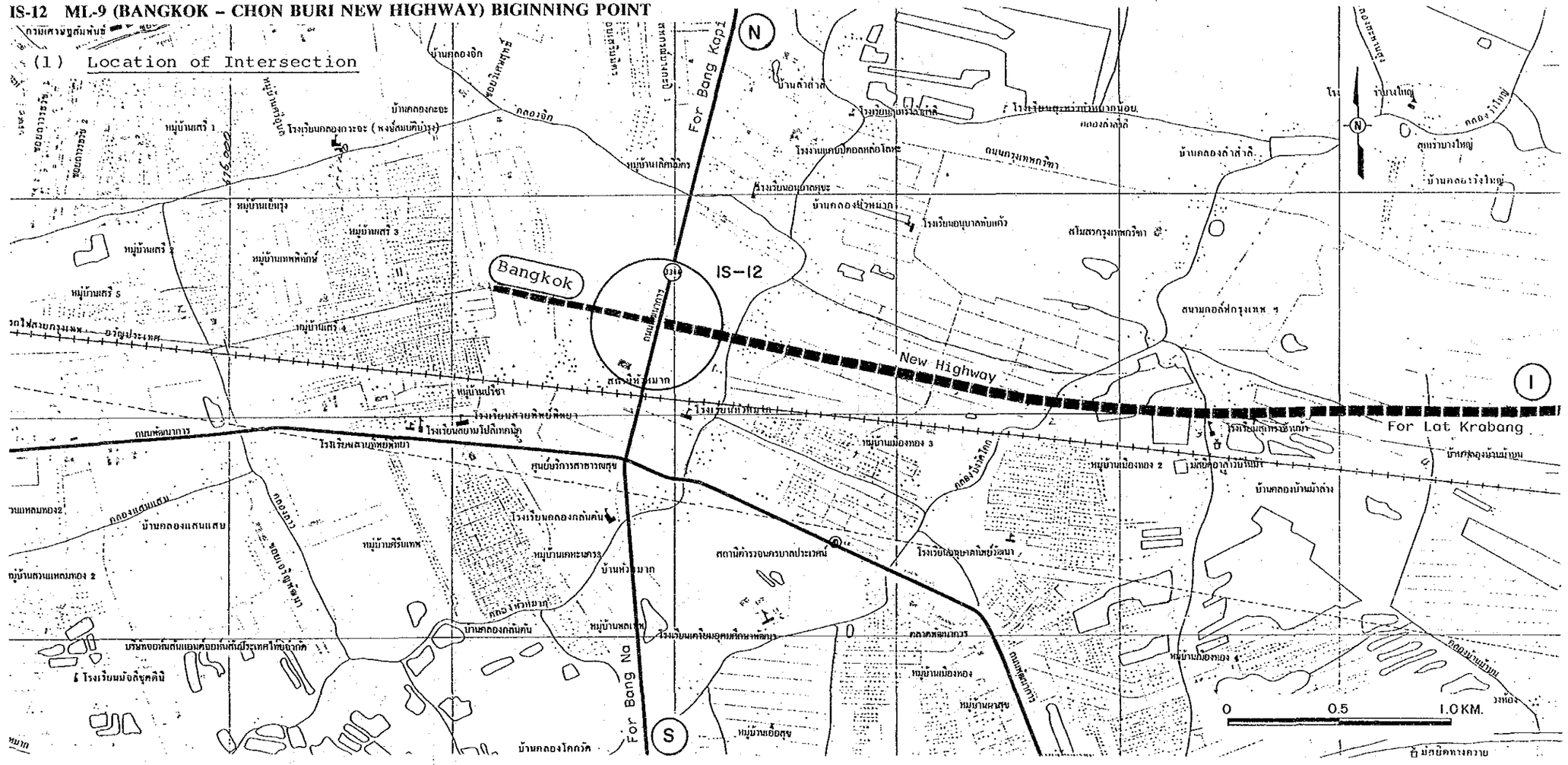
(4) Hourly Peak Volumes (HPV)

( ) Motorcycle



IS-12 ML-9 (BANGKOK – CHON BURI NEW HIGHWAY) BIGINNING POINT

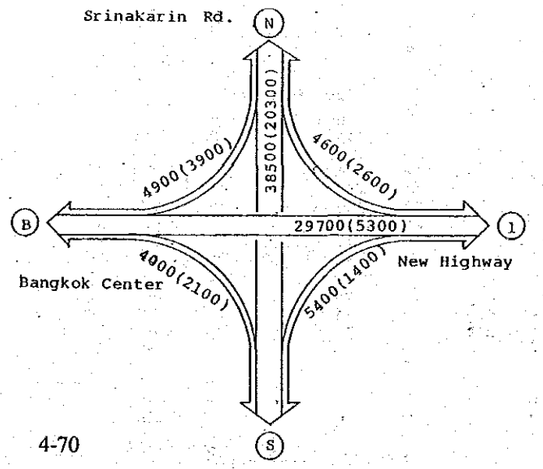
(1) Location of Intersection



(2) Traffic Volume by Vehicle Type (Unit:Vehicles/Day)

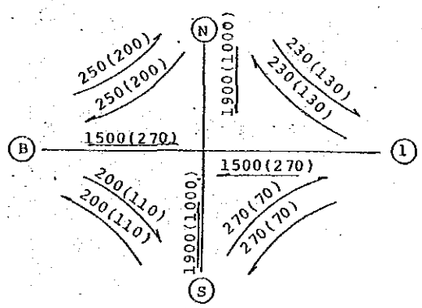
Project Code	Direction	Year	Traffic Volume MC	PC	LB	HB	LT	MT	HT	ADT
BKK Center		1994	3679	9498	817	1966	3803	2794	1906	20784
–		2000	5309	13855	1200	2708	5302	3944	2743	29752
Section (1)		2008	8300	22245	2011	3986	7867	5781	3962	45852
Srinakarin (N)		1994	2729	2967	2	46	331	5	33	3384
–		2000	3938	4332	3	63	462	8	47	4915
BKK Center		2008	6160	6955	5	94	686	11	68	7819
Srinakarin (N)		1994	1827	2407	16	118	473	59	106	3179
–		2000	2636	3512	24	162	659	86	151	4594
Section (1)		2008	4120	5638	39	239	978	121	219	7234
Srinakarin (S)		1994	1452	1996	18	120	444	64	109	2751
–		2000	2093	2911	26	165	619	93	155	3969
BKK Center		2008	3270	4675	42	243	919	132	225	6236
Srinakarin (S)		1994	972	1619	134	306	634	710	346	3749
–		2000	1401	2360	197	422	883	1000	500	5362
Section (1)		2008	2187	3790	330	621	1311	1466	721	8239
NEW HIGHWAY (1)			9346	19727	1421	3292	6844	5030	3394	39708
Srinakarin										

(3) Traffic Volume by Direction (ADT)



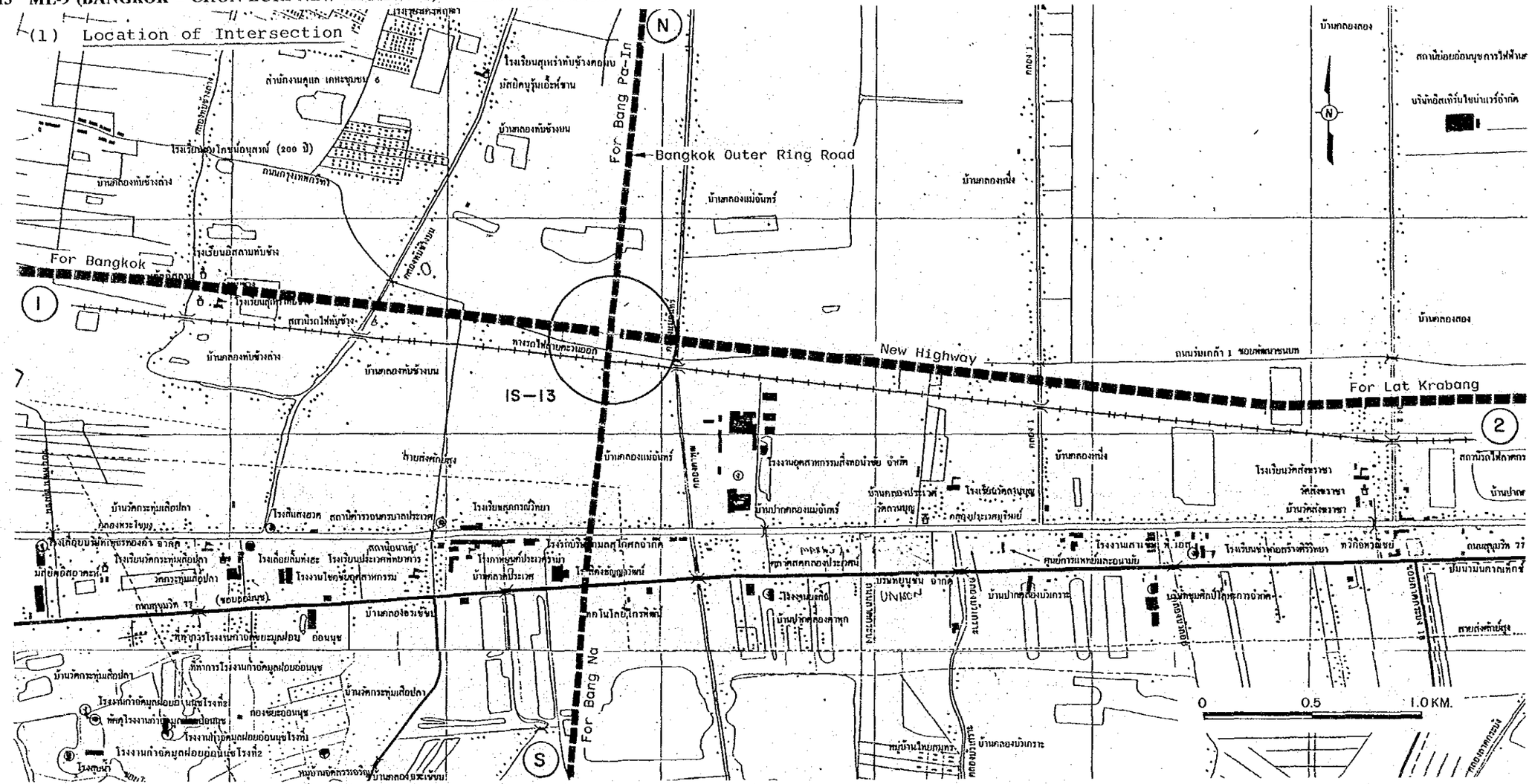
(4) Hourly Peak Volumes

( ) Motorcycle



IS-13 ML-9 (BANGKOK – CHON BURI NEW HIGHWAY) OUTER RING ROAD

(1) Location of Intersection



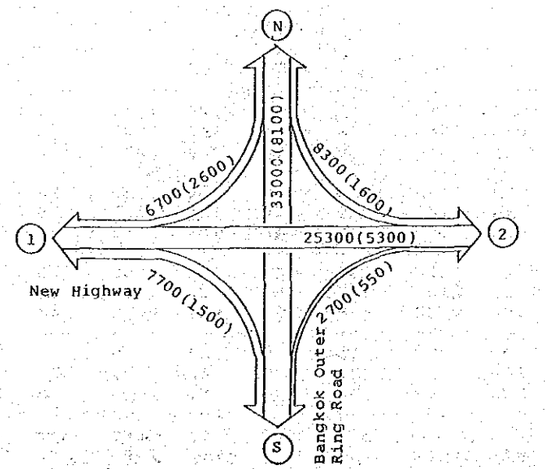
(2) Traffic Volume by Vehicle Type

(Unit:Vehicles/Day)

Project Code	Direction	Year	Traffic Volume MC	PC	LB	HB	LT	MT	HT	ADT
OuterRingR	(N)	1994	1795	3415	27	197	756	65	171	4631
–		2000	2592	4984	40	272	1054	93	244	6687
Section	(1)	2008	4058	8000	65	402	1562	132	356	10517
OuterRingR	(N)	1994	1099	2490	239	556	1090	840	609	5824
–		2000	1586	3631	351	765	1520	1185	876	8328
Section	(2)	2008	2478	5830	589	1126	2255	1740	1265	12805
OuterRingR	(S)	1994	1018	2307	222	514	1010	779	563	5395
–		2000	1469	3365	325	709	1408	1098	811	7716
Section	(1)	2008	2296	5402	546	1043	2089	1612	1172	11864
OuterRingR	(S)	1994	379	681	63	164	309	465	175	1857
–		2000	546	994	92	226	432	658	253	2655
Section	(2)	2008	851	1597	154	332	641	964	364	4052
NEW HIGHWAY			9346	19727	1421	3292	6844	5030	3394	39708
			7417	16003	1499	3302	6334	5682	3468	36288

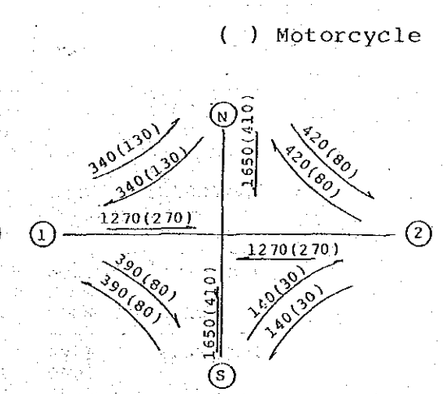
OuterRing

(3) Traffic Volume by Direction (ADT)



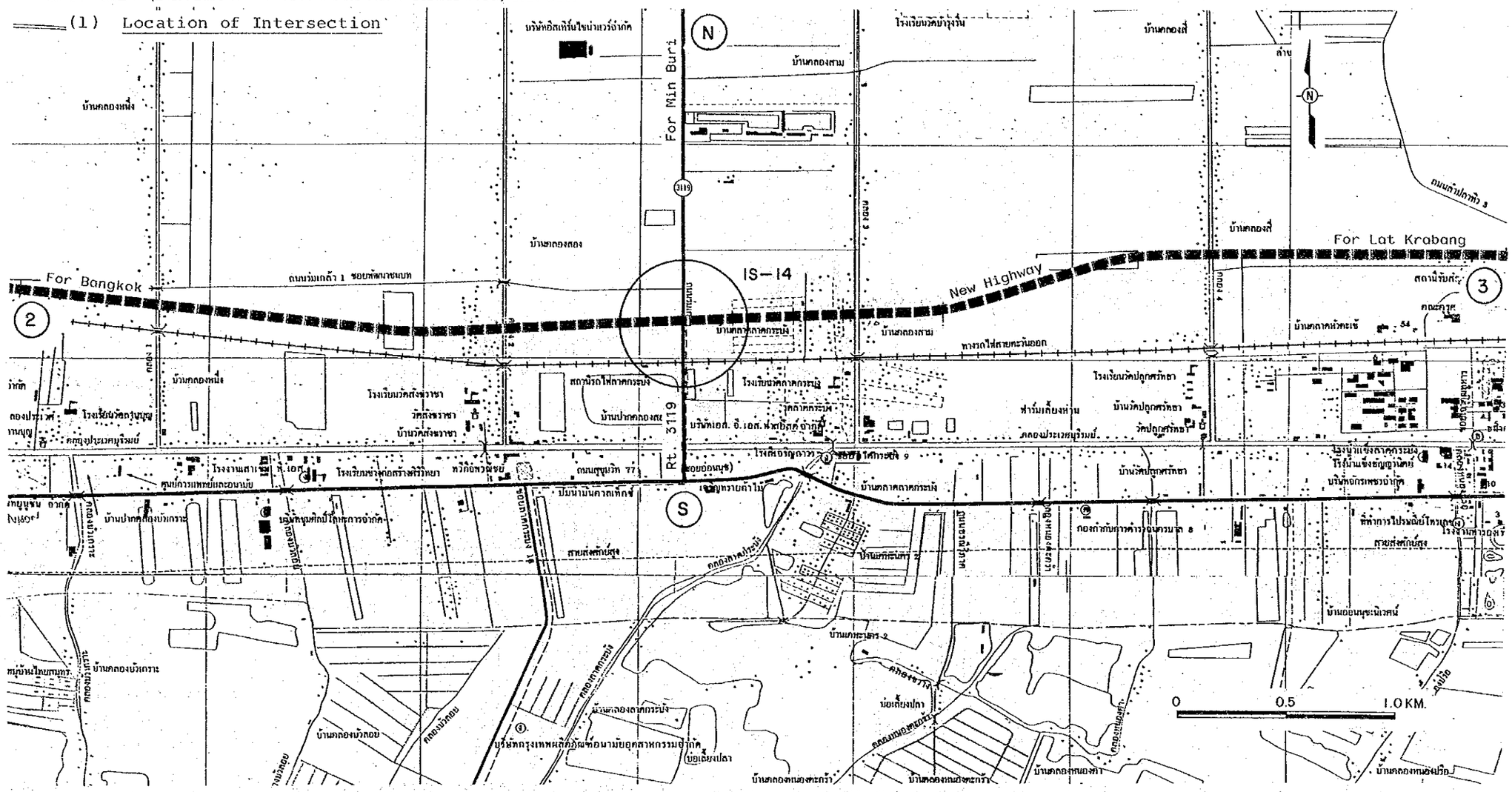
(4) Hourly Peak Volumes

( ) Motorcycle



IS-14 ML-9 (BANGKOK – CHON BURI NEW HIGHWAY) RT. 3119

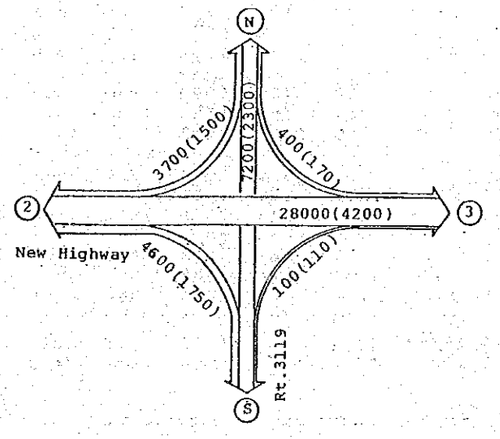
(1) Location of Intersection



(2) Traffic Volume by Vehicle Type (Unit:Vehicles/Day)

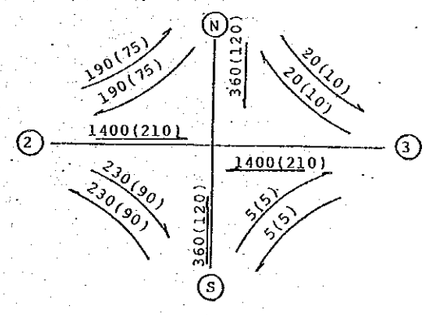
Project Code	Direction	Year	MC	PC	LB	HB	LT	MT	HT	ADT
R.3119	(N)	1994	1037	1070	0	19	87	1347	40	2563
–		2000	1509	1563	0	26	143	1905	70	3707
Section	(2)	2008	2378	2531	0	38	244	2807	118	5738
R.3119	(N)	1994	121	121	0	8	93	10	25	257
–		2000	174	177	0	10	129	13	36	365
Section	(3)	2008	270	283	0	15	189	19	52	558
R.3119	(S)	1994	1195	1497	100	113	390	1059	53	3212
–		2000	1736	2182	148	153	563	1499	88	4633
Section	(2)	2008	2729	3528	248	226	861	2212	144	7219
R.3119	(S)	1994	76	23	15	0	31	5	22	96
–		2000	109	34	23	0	43	7	32	139
Section	(3)	2008	169	54	38	0	63	10	45	210
NEW HIGHWAY	(2)		7417	16003	1499	3302	6334	5682	3468	36288
	(3)		4455	12469	1374	3133	5800	2299	3379	28454
3119			3980	3488	916	156	252	6223	257	11292

(3) Traffic Volume by Direction (ADT)



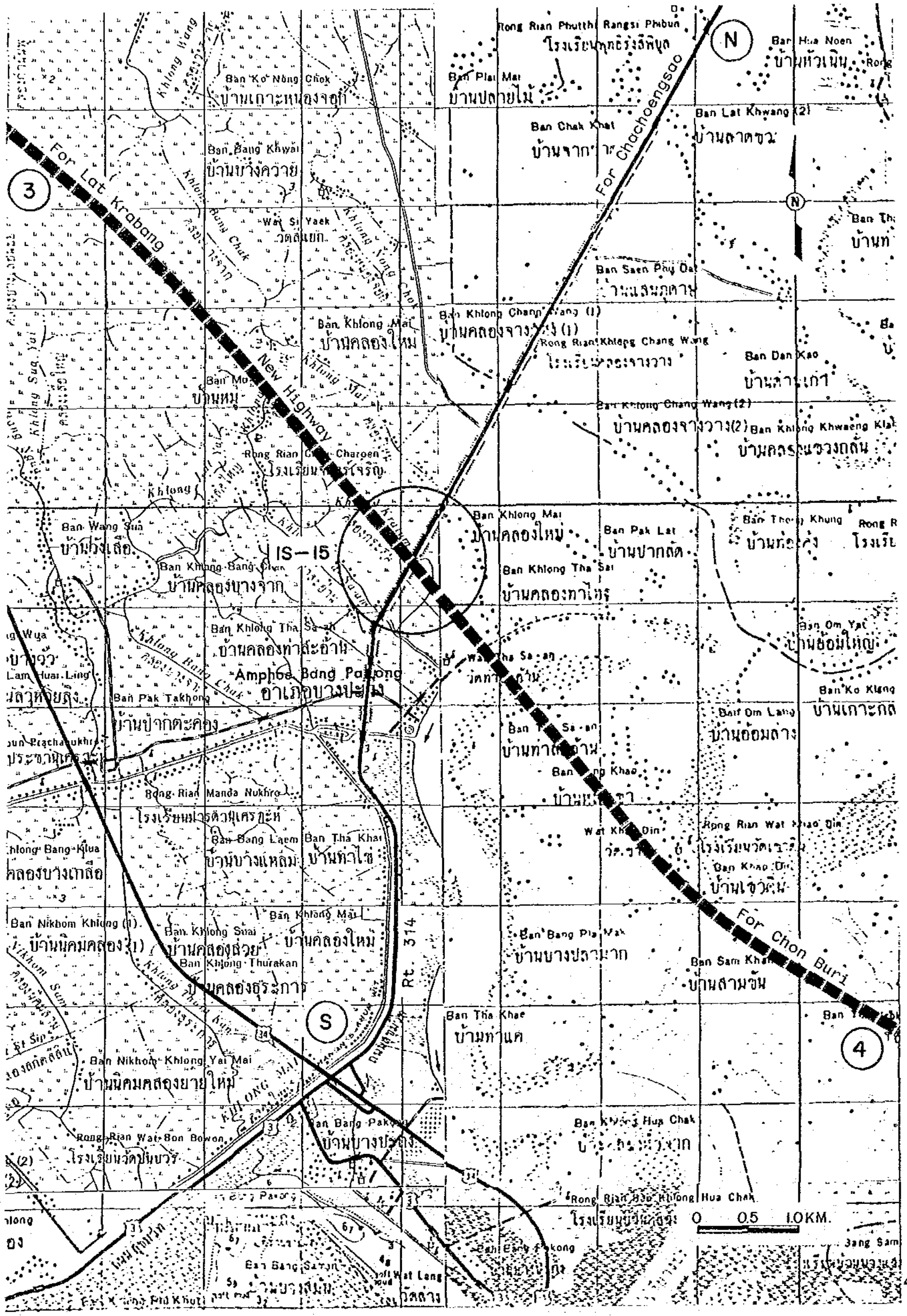
(4) Hourly Peak Volumes

( ) Motorcycle



IS-15 ML-9 (BANGKOK – CHON BURI NEW HIGHWAY) RT. 314

(1) Location of Intersection



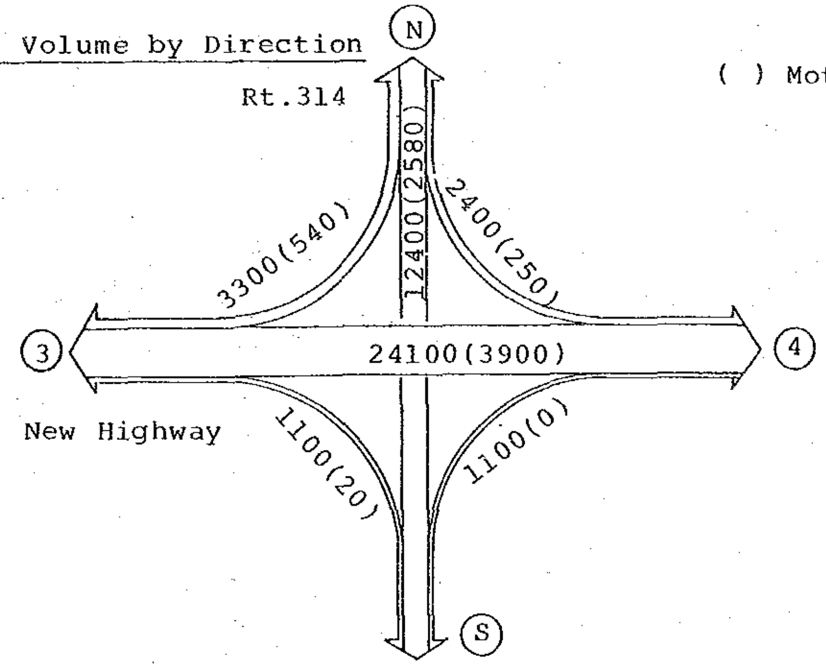
(2) Traffic Volume by Vehicle Type

(Unit: Vehicles/Day)

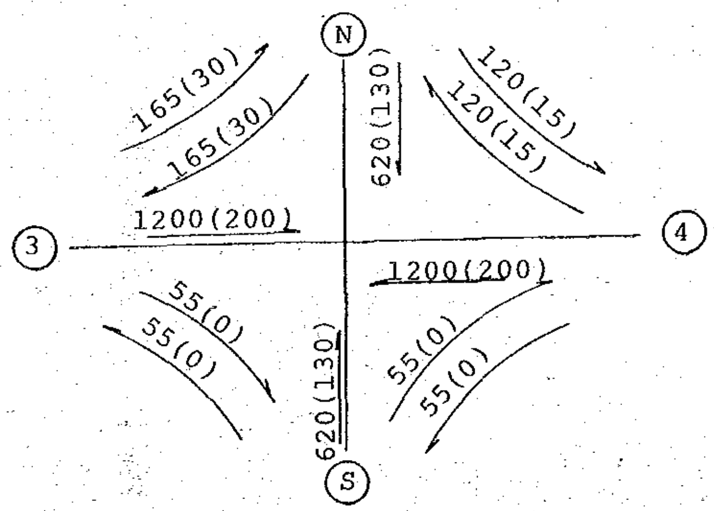
Project Code	Direction	Year	MC	PC	LB	HB	LT	MT	HT	ADT
R.314 Ⓢ	–	1994	0	0	0	319	0	552	58	929
		2000	17	0	0	245	0	764	93	1102
	Section ③	2008	354	0	0	100	0	1106	61	1267
R.314 Ⓢ	–	1994	167	241	12	0	197	0	0	450
		2000	0	705	63	0	321	0	0	1089
	Section ④	2008	0	1781	132	0	552	0	0	2465
R.314 Ⓝ	–	1994	379	515	534	77	541	282	355	2304
		2000	543	748	785	107	748	397	504	3289
	Section ③	2008	844	1204	1317	157	1103	583	726	5090
R.314 Ⓝ	–	1994	170	456	172	104	456	84	403	1675
		2000	252	683	271	153	637	120	569	2433
	Section ④	2008	408	1138	466	239	948	178	837	3806
NEW	③		4454	12469	1373	3133	5800	2299	3379	28453
HIGHWAY	④		4146	13109	922	2934	6010	1258	3351	27584
314			2575	3582	3154	764	5422	1136	3993	18051

(3) Traffic Volume by Direction (ADT)

( ) Motorcycle

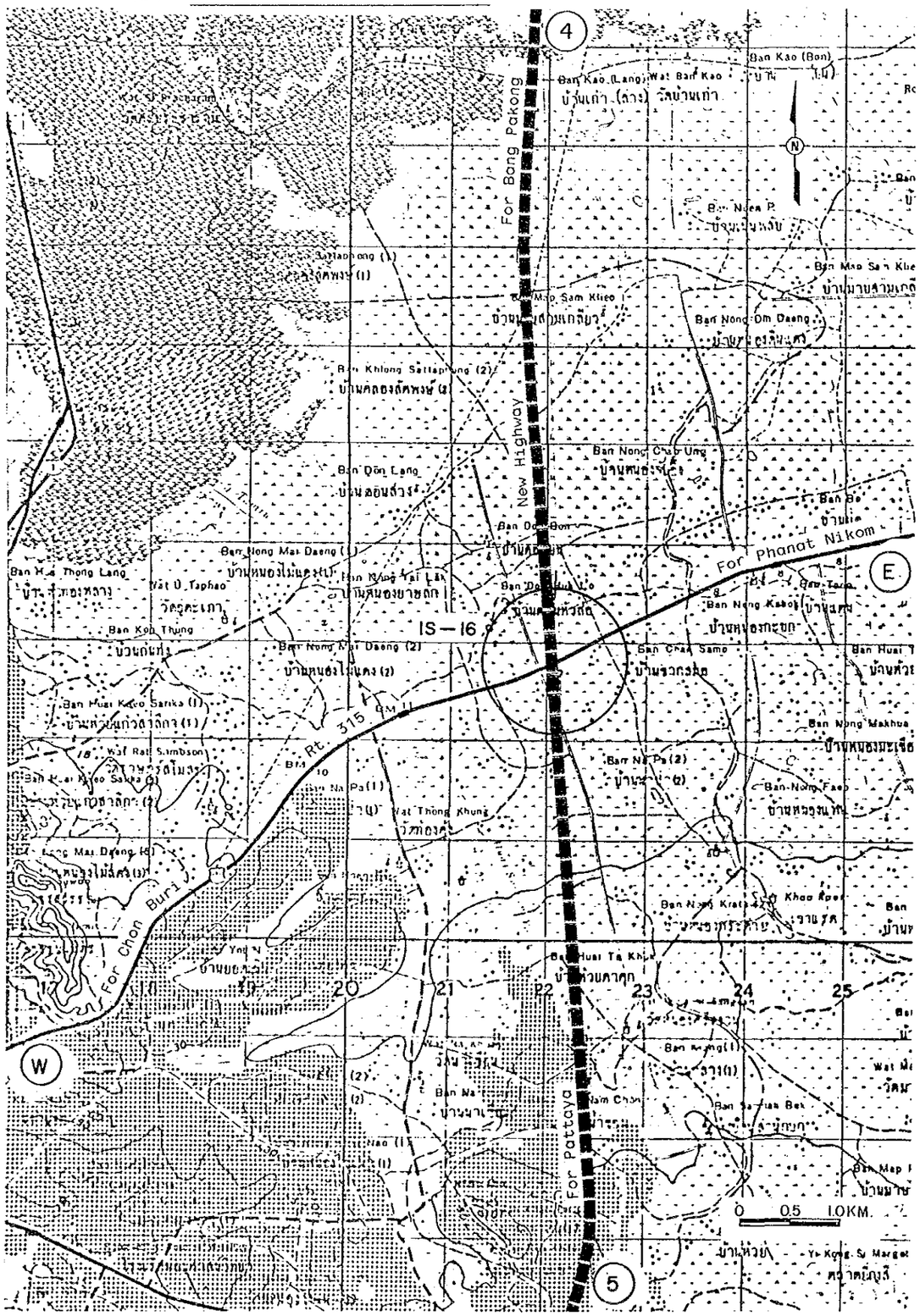


(4) Hourly Peak Volumes



IS-16 ML-9 (BANGKOK – CHON BURI NEW HIGHWAY) RT. 315

(1) Location of Intersection

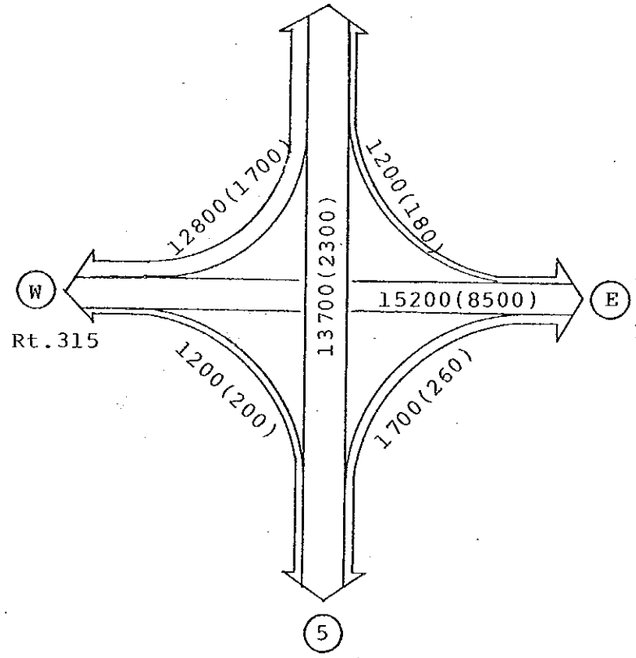


(2) Traffic Volume by Vehicle Type

(Unit: Vehicles/Day)

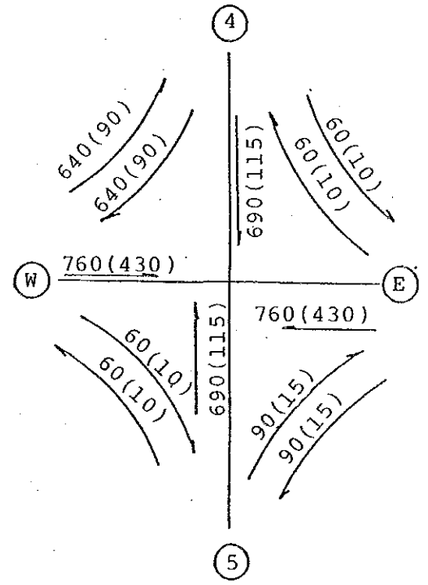
Project Code	Direction	Year	Traffic Volume							
			MC	PC	LB	HB	LT	MT	HT	ADT
	R.315 (W) – Section (4)	1994	1266	4236	131	362	2119	387	1470	8705
		2000	1721	6388	210	568	2968	556	2101	12791
		2008	2575	10716	355	920	4422	828	3118	20359
	R.315 (W) – Section (5)	1994	147	0	33	145	655	11	18	862
		2000	191	0	52	215	914	16	25	1222
		2008	268	0	90	336	1361	24	37	1848
	R.315 (E) – Section (4)	1994	135	434	0	113	140	24	81	792
		2000	182	650	0	167	196	35	114	1162
		2008	269	1083	0	262	292	52	168	1857
	R.315 (E) – Section (5)	1994	191	495	33	131	201	70	193	1123
		2000	257	741	52	193	282	101	271	1640
		2008	376	1235	90	303	420	151	399	2598
	NEW HIGHWAY (4)		4146	13109	922	2934	6010	1258	3351	27584
	(5)		2728	6812	816	2607	4042	784	1432	16493
	315		8904	3628	1580	1084	9806	953	875	17926

(3) Traffic Volume by Direction (ADT)



(4) Hourly Peak Volumes

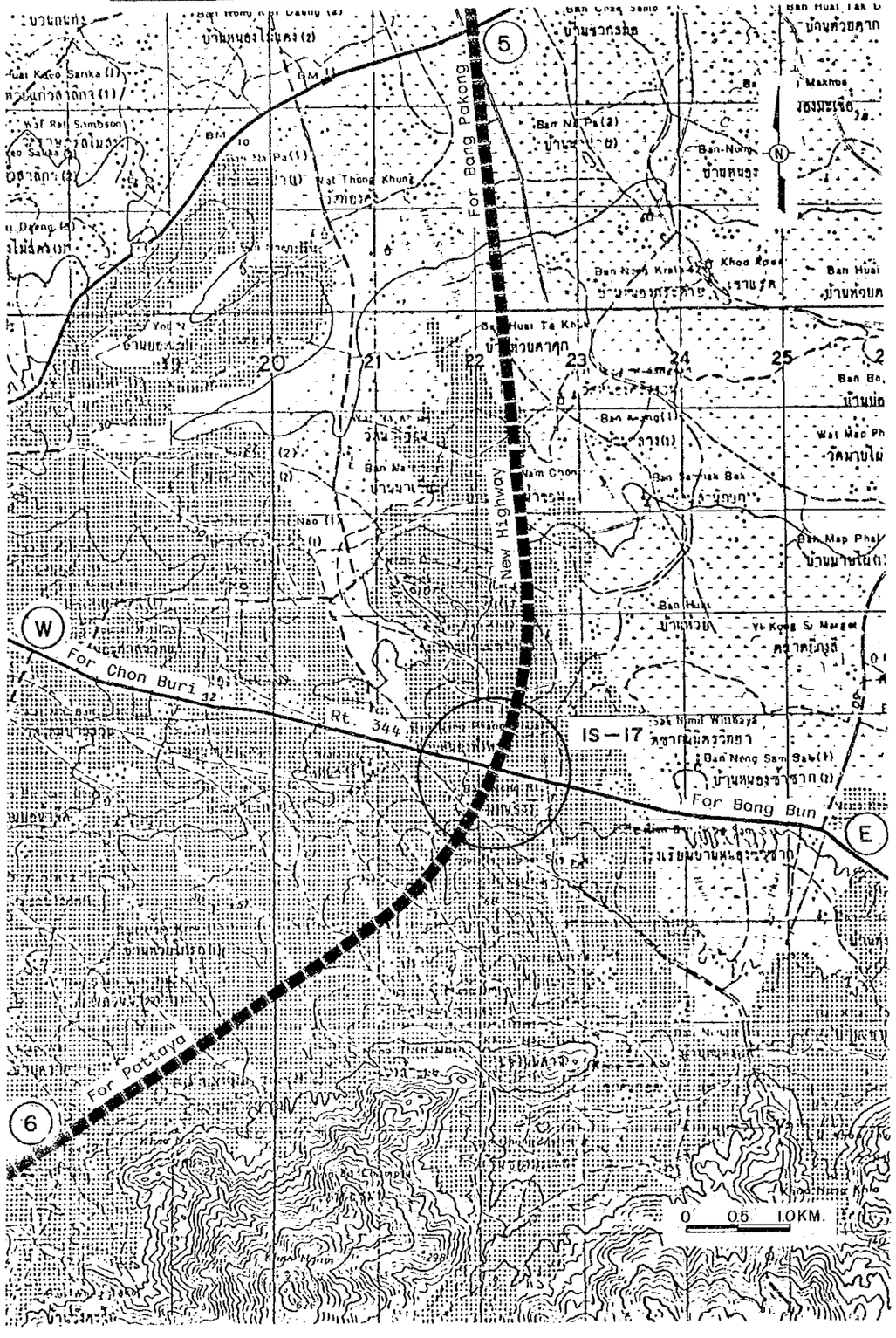
( ) Motorcycle



TRAFFIC MOVEMENT AT INTERSECTION

IS-17 ML-9 (BANGKOK – CHON BURI NEW HIGHWAY) RT. 344

(1) Location of Intersection

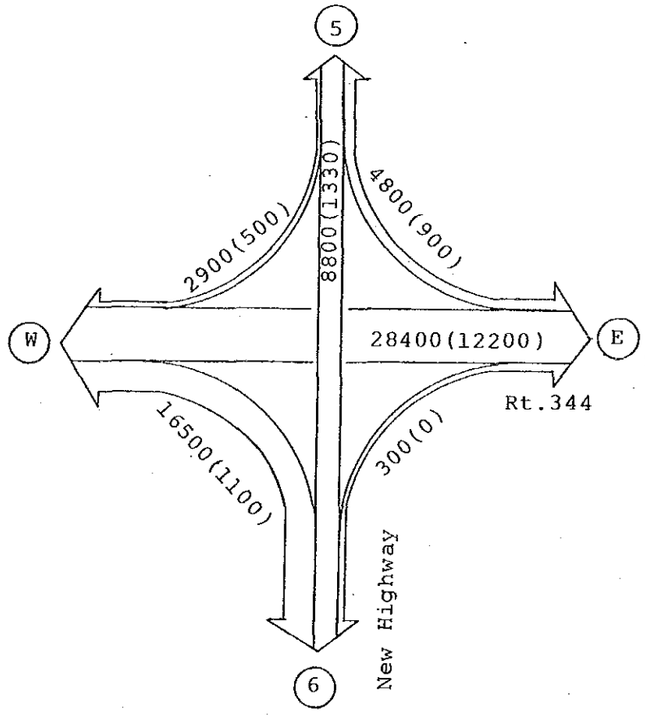


(2) Traffic Volume by Vehicle Type

(Unit:Vehicles/Day)

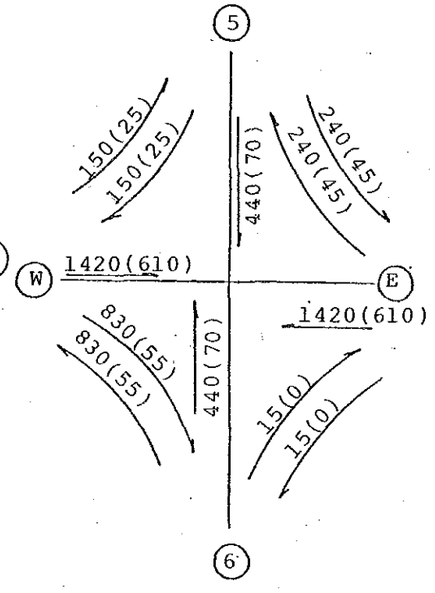
Project Code	Direction	Year	Traffic Volume MC	PC	LB	HB	LT	MT	HT	ADT
	R.344 (W)	1994	388	495	66	276	856	81	211	1985
	–	2000	522	741	104	408	1196	117	296	2862
	Section (5)	2008	765	1235	180	639	1781	175	436	4446
	R.344 (W)	1994	682	1534	734	1051	3259	1375	3564	11517
	–	2000	1118	2290	1153	1521	4518	1934	5034	16450
	Section (6)	2008	2002	3694	1991	2348	6711	2686	6891	24321
	R.344 (E)	1994	650	1124	51	472	1186	151	344	3328
	–	2000	879	1684	80	698	1657	216	487	4822
	Section (5)	2008	1298	2806	138	1093	2467	321	716	7541
	R.344 (E)	1994	3	49	7	28	86	3	2	175
	–	2000	5	73	10	41	120	4	3	251
	Section (6)	2008	7	121	18	64	178	7	5	393
NEW HIGHWAY 344	(5)		2728	6812	816	2607	4042	784	1432	16493
	(6)		2487	6750	1795	3063	5827	2389	5686	25510
			13089	6850	7054	1880	14491	1433	1767	33475

(3) Traffic Volume by Direction (ADT)



(4) Hourly Peak Volumes

( ) Motorcycle

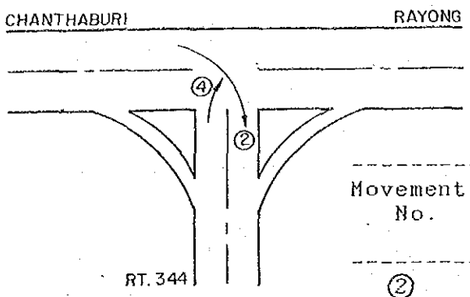


Phase I Projects

Appendix 4.2.23 ANALYSIS OF UNSIGNALIZED INTERSECTIONS

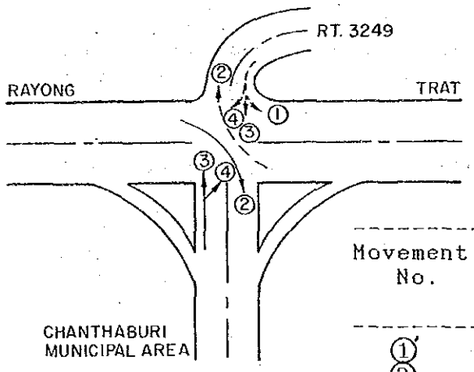
Remarks: LOS : Level of Service
* : Low Level of Service

IS-4 : ML-4 (Rt. 3 Klaeng – Chanthaburi), Klaeng



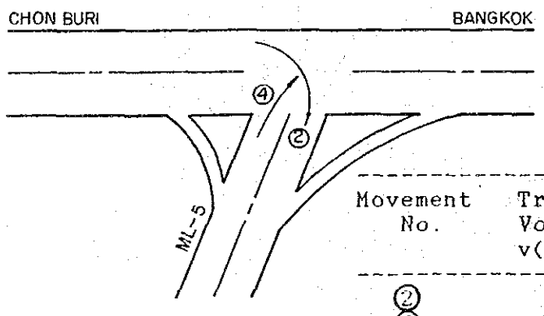
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	230	500	270	C
④	230	50	-	F*

IS-5 : ML-4 (Rt. 3 Klaeng – Chanthaburi), Chanthaburi



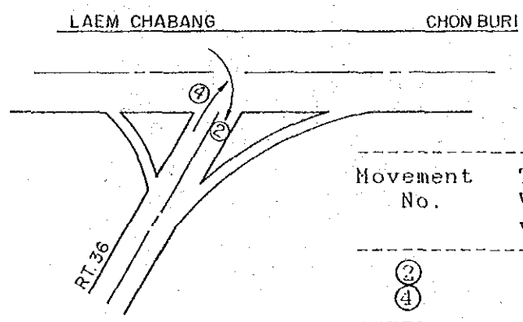
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
①	20	880	860	A
②	410	940	530	A
②'	40	860	820	A
③	170	190	20	E*
④	60	50	-	F*
③' + ④'	220	170	-	F*

IS-6 : ML-5 (Chon Buri – Pattaya New Highway), Beginning Point



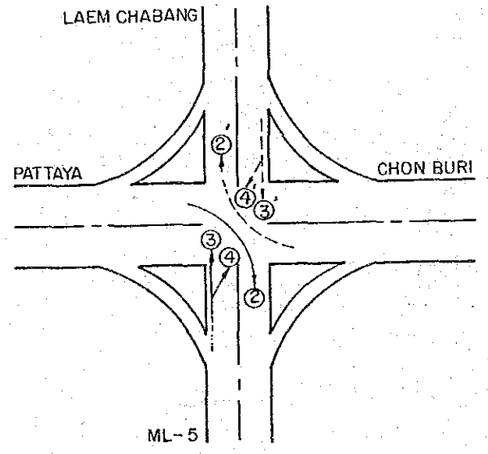
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	440	260	-	F*
④	970	0	-	F*

IS-7 : ML-5 (Chon Buri – Pattaya New Highway), Diversion Point



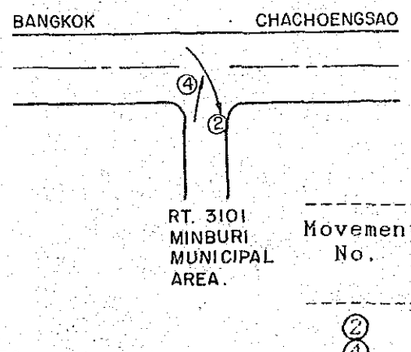
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	0	300	300	B
④	330	50	-	F*

IS-8 : ML-5 (Chon Buri – Pattaya New Highway), Laem Chabang



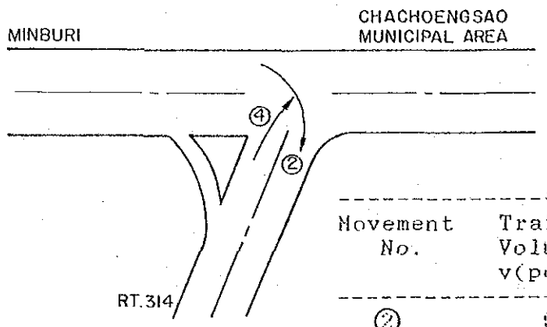
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	950	220	-	F*
②'	70	220	150	D*
③	0	0	-	
③'	400	0	-	F*
④	0	0	-	
④'	100	0	-	F*

IS-9 : ML-7 (Rt. 304 Min Buri – Chachoengsao)



Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	0	-	-	-
④	40	110	70	E*

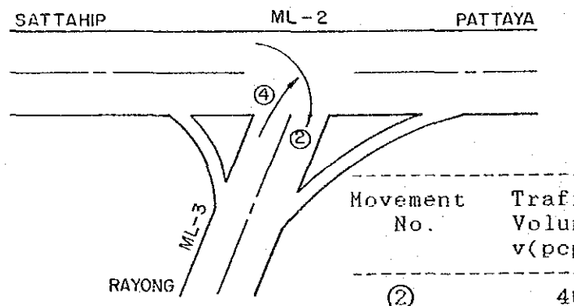
IS-10 : ML-7 (Min Buri – Chachoengsao), Chachoengsao



Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	90	840	750	A
④	170	200	30	E*

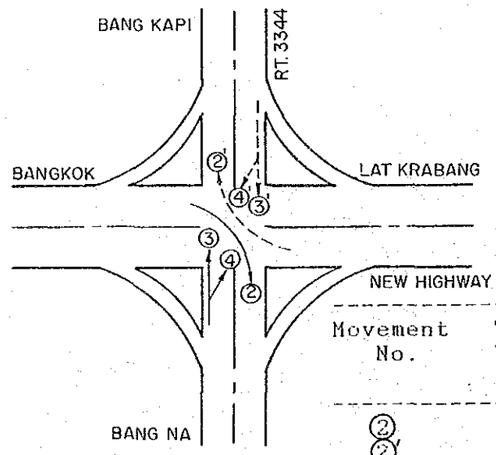
Phase II Projects

IS-11 : ML-3 (Rt. 3 Sattahip – Rayong), Sattahip



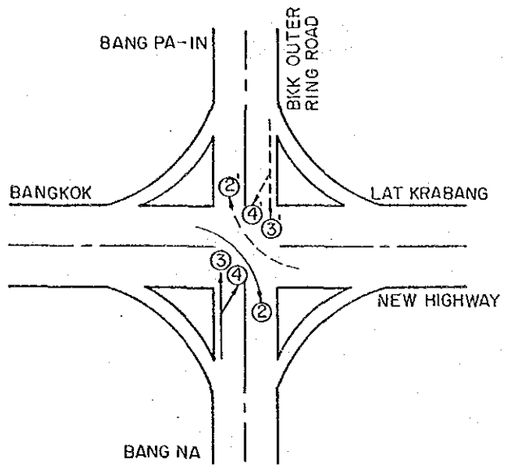
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	40	450	410	A
④	630	70	-	F*

IS-12 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 3344



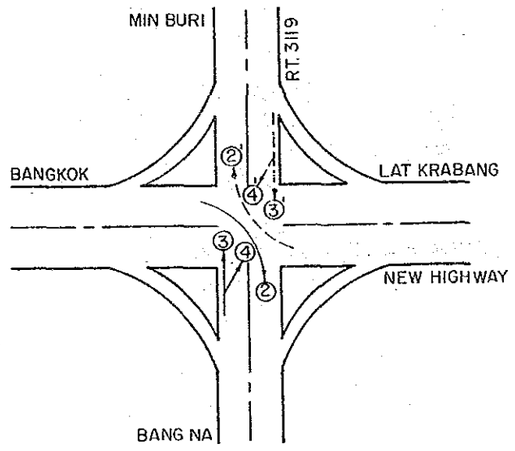
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	270	120	-	F*
②′	300	120	-	F*
③	2550	0	-	F*
③′	2550	0	-	F*
④	360	0	-	F*
④′	360	0	-	F*

IS-13 : ML-9 (Bangkok – Chon Buri New Highway), Bangkok Outer Ring Road



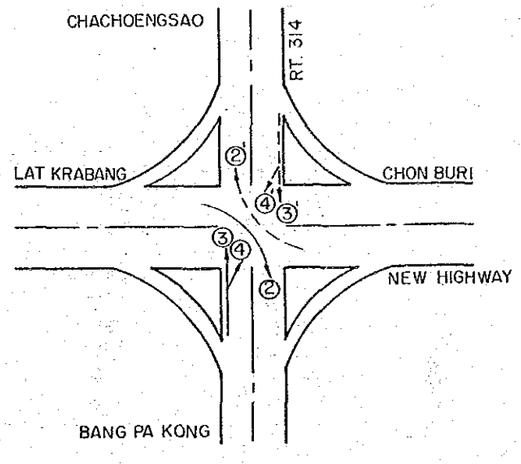
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	500	150	-	F*
②′	530	150	-	F*
③	2090	0	-	F*
③′	2090	0	-	F*
④	200	0	-	F*
④′	420	0	-	F*

IS-14 : ML-9 (Bangkok – Chon Buri Highway), Rt. 3119



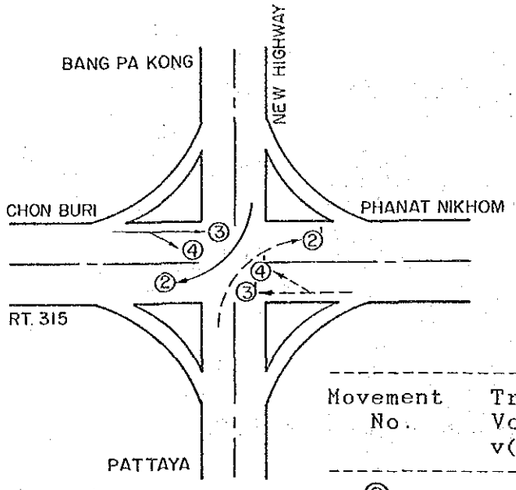
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	320	130	-	F*
②′	30	130	100	E*
③	530	0	-	F*
③′	530	0	-	F*
④	10	0	-	F*
④′	280	0	-	F*

IS-15 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 314



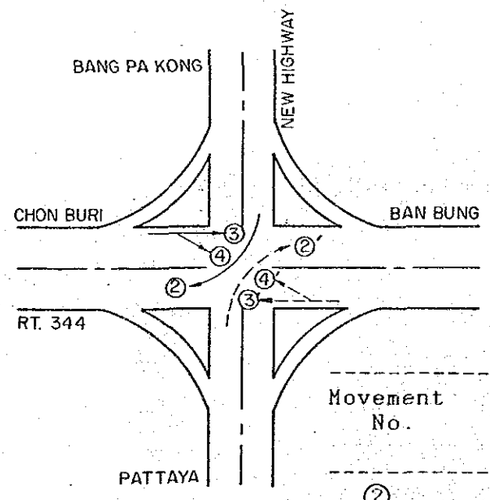
Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	80	180	100	D*
②′	150	180	30	E*
③	790	5	-	F*
③′	790	5	-	F*
④	60	0	-	F*
④′	200	0	-	F*

IS-16 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 315



Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	770	390	-	F*
②′	130	390	260	C
③	1070	0	-	F*
③′	1070	0	-	F*
④	430	0	-	F*
④′	80	0	-	F*

IS-17 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 344

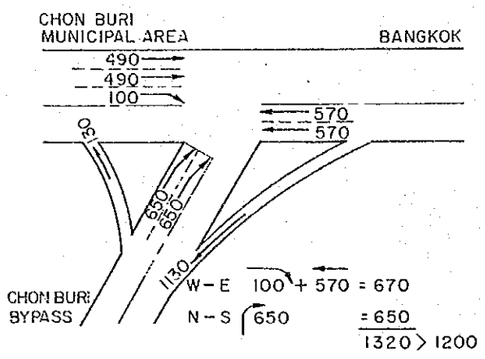


Movement No.	Traffic Volume v(pcph)	Capacity CSH (pcph)	CR (CSH-v) (pcph)	LOS
②	190	570	380	B
②′	20	570	550	A
③	1840	90	-	F*
③′	1840	90	-	F*
④	1130	0	-	F*
④′	300	0	-	F*

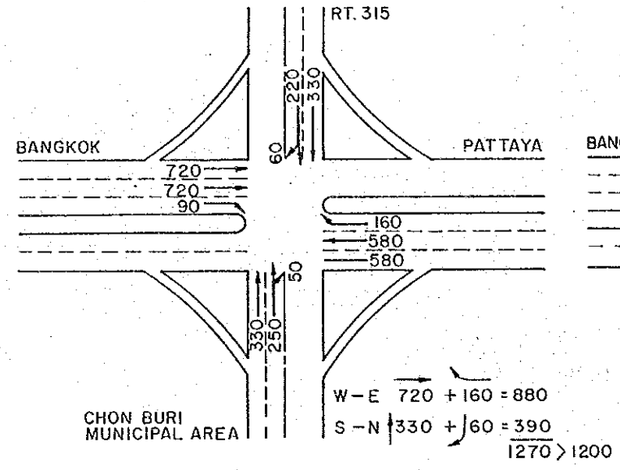
Appendix 4.2.24 ANALYSIS OF SIGNALIZED INTERSECTIONS

Phase I Project

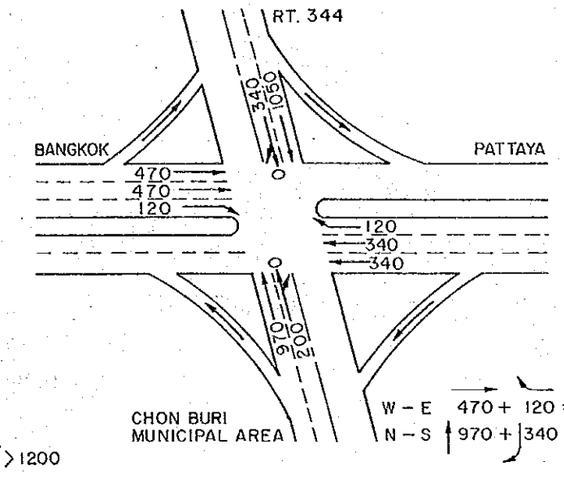
IS-1 : ML-1 (Rt. 3, Chon Buri Bypass), Beginning Point



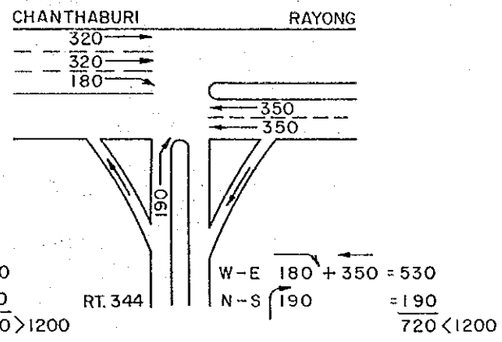
IS-2 : ML-1 (Rt. 3, Chon Buri Bypass), Rt. 315



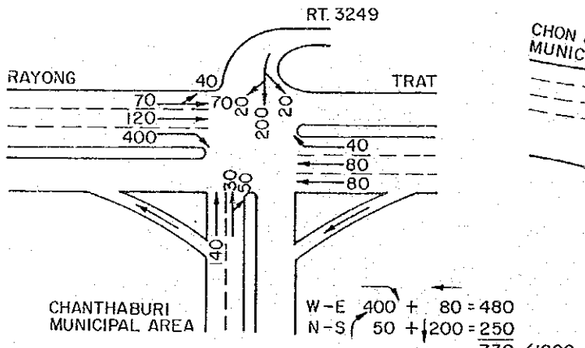
IS-3 : ML-1 (Rt. 3, Chon Buri Bypass), Rt. 344



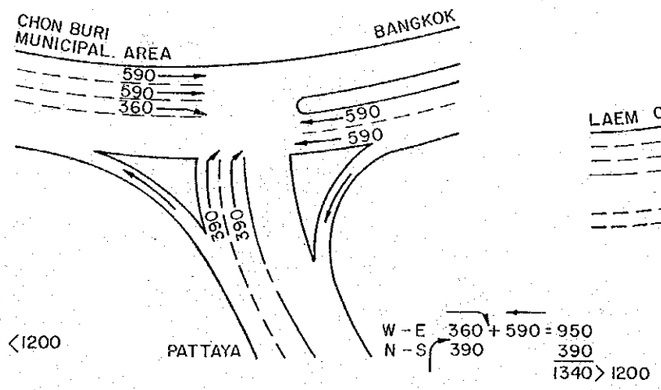
IS-4 : ML-1 (Rt. 3, Klaeng – Chanthaburi), Klaeng



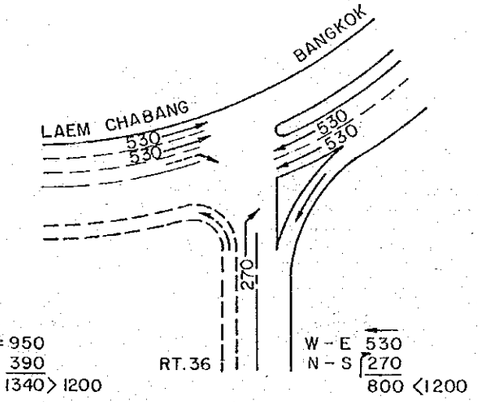
IS-5 : ML-4 (Rt. 3, Klaeng – Chanthaburi), Chanthaburi



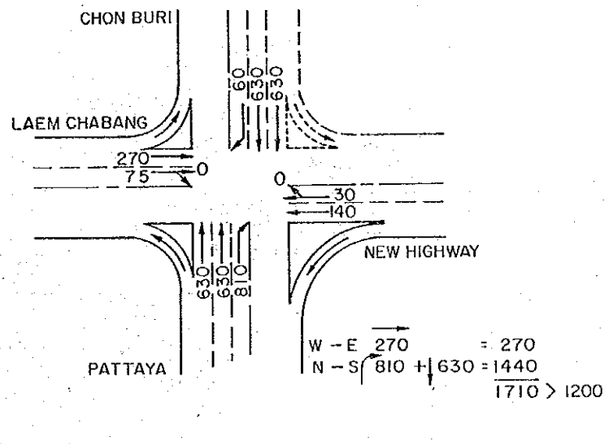
IS-6 : ML-5 (Chon Buri – Pattaya New Highway), Beginning Point



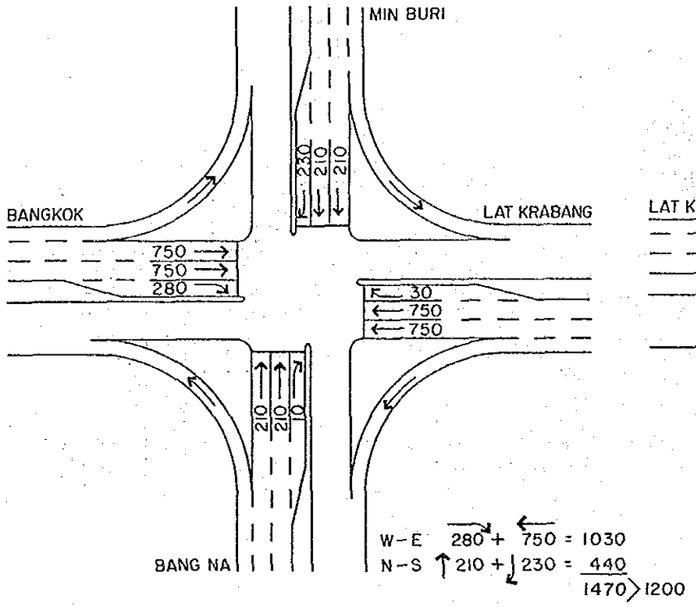
IS-7 : ML-5 (Chon Buri – Pattaya New Highway), Diversion Point



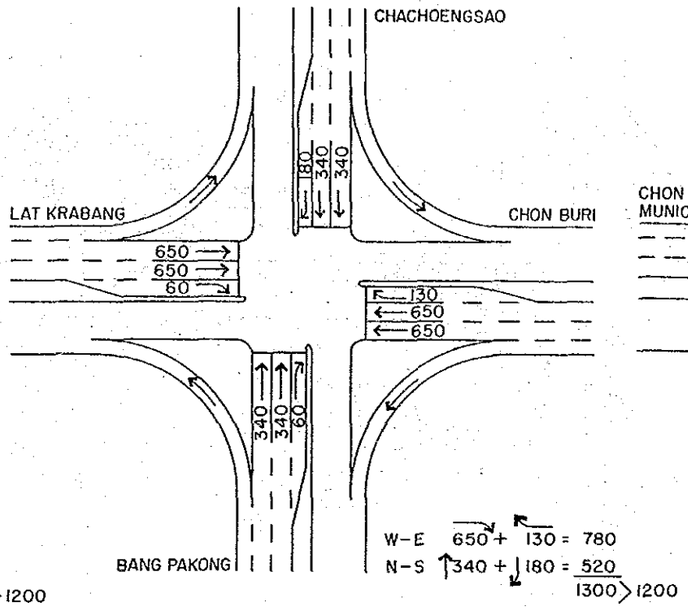
IS-8 : ML-5 (Chon Buri – Pattaya New Highway), Laem Chabang



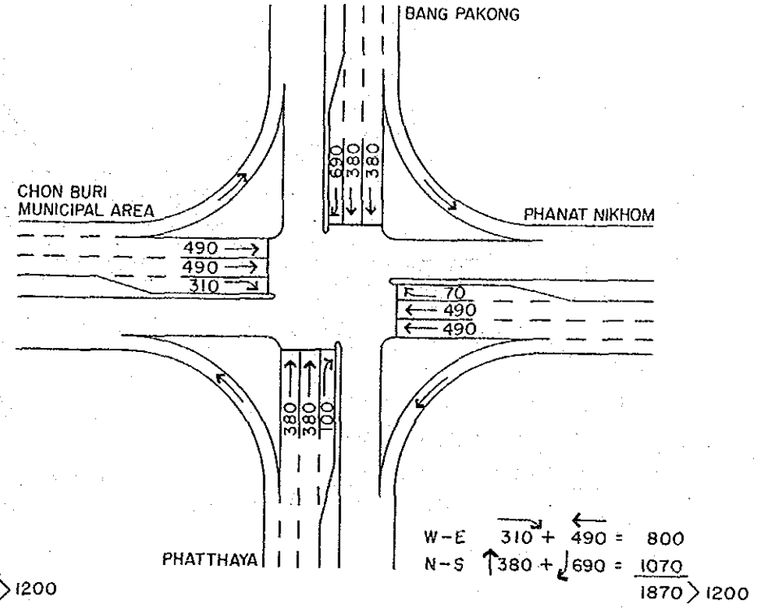
IS-14 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 3119



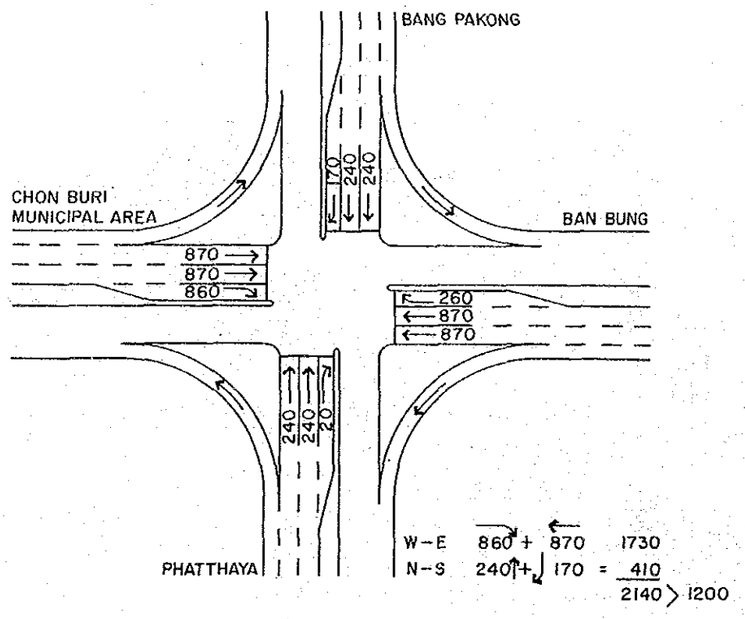
IS-15 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 314



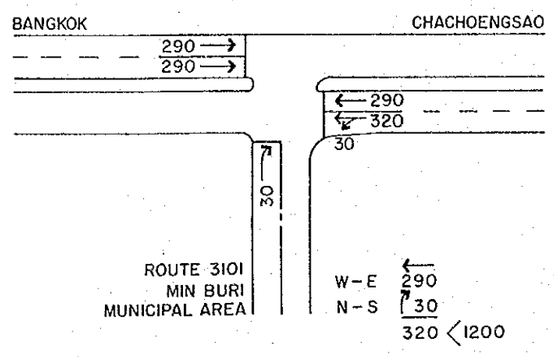
IS-16 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 315



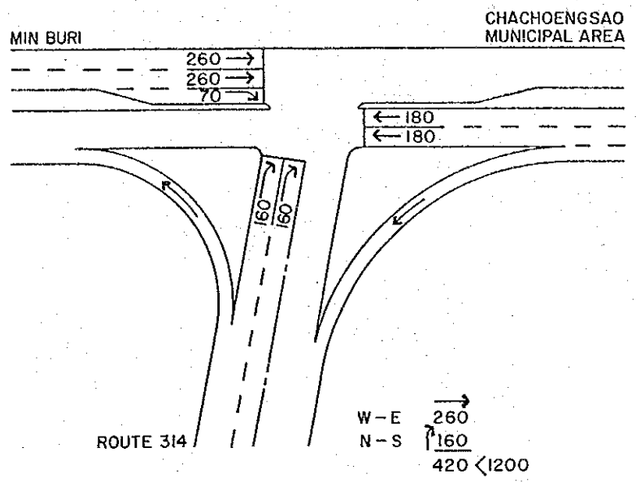
IS-17 : ML-9 (Bangkok – Chon Buri New Highway), Rt. 344



IS-9 : ML-7 (Rt. 304 Min Buri – Chachoengsao), Min Buri

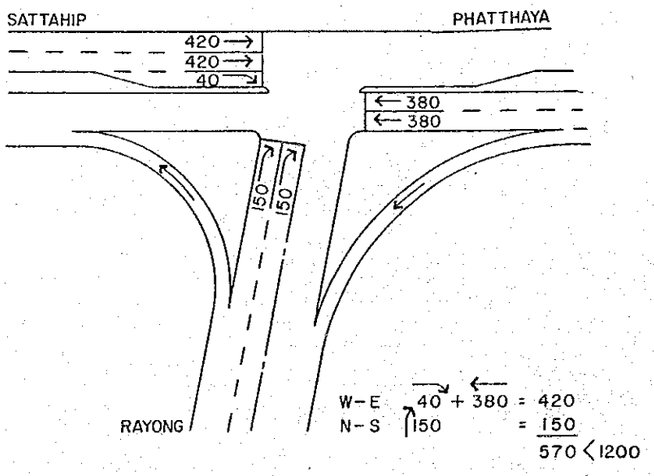


IS-10 : ML-7 (Rt. 304 Min Buri – Chachoengsao), Chachoengsao

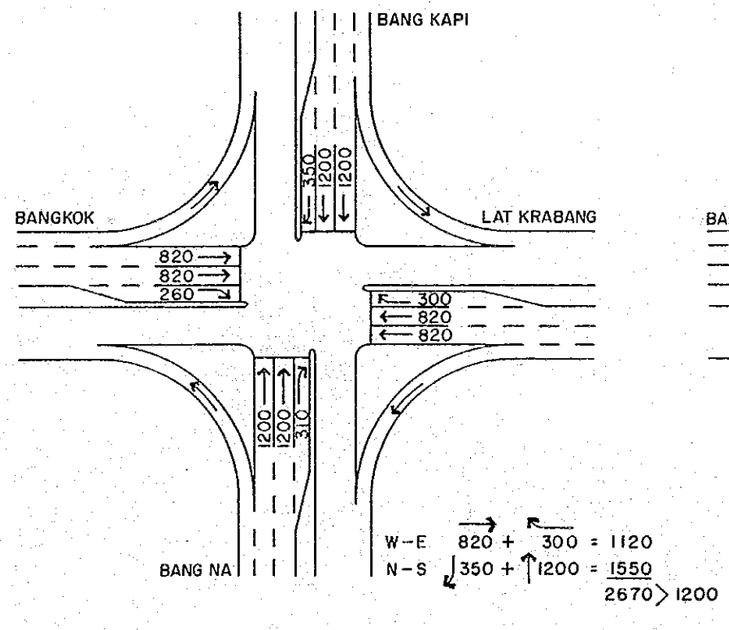


Phase II Project

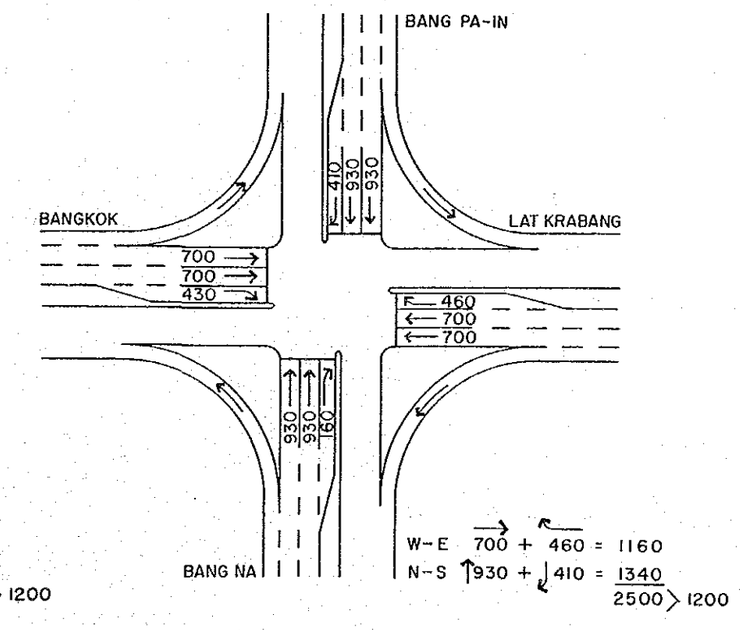
IS-11 : ML-3 (Rt. 3, Sattahip – Rayong), Beginning Point



IS-12 : ML-9 (Bangkok – Chon Buri New Highway), Beginning Point



IS-13 : ML-9 (Bangkok – Chon Buri New Highway), Bangkok Outer Ring Road



Appendix 5.2.1 MAINTENANCE BUDGET CALCULATION

Project Road No. ML-1 Na = 7100 Baht/km/year Km = 0.937
Existing Road Length = 13.60 km

Asphalt Pavement

Items		Existing		1994		2008	
		Condition	Factor	Condition	Factor	Condition	Factor
1. Surface/Base type	X1	AC	0	AC	0	AC	0
2. Subgrade CBR	X2	>6%	0	>6%	0	>6%	0
2. ADT	X3	13400	2.25	26800	2.25	49800	2.25
4. Service life (year)	X4	10	1.40	>12	1.80	>12	1.80
5. Pavement width (m)	X5	7	0.20	7	0.20	7	0.20
6. R-O-W width (m)	Y1	60	0.10	60	0.10	60	0.10
7. Shoulder,access,median width (m)	Y2	2.5	0.05	2.5	0.05	2.5	0.05
8. Traffic service operation topography	Y3	Grade 0-3%	0	Grade 0-3%	0	Grade 0-3%	0
9. Drainage topography	Y4	Grade 0-3%	0	Grade 0-3%	0	Grade 0-3%	0
10. Bridge quantity (m/km)	Y5	0	0	0	0	0	0
11. No. of lanes		2	-	2	-	2	-

Ka (Existing) = 1+0.5(0+0+2.25+1.40+0.20+0.10+0.05+0+0+0) = 3
Maintenance cost + overhead = 3x7100x0.93x1.27 = 25346 Baht/km/year
Total cost Existing = 25346x13.60 = 344716 Baht/year

Ka (1994) = 1+0.5(0+0+2.25+1.80+0.20+0.10+0.05+0+0+0) = 3.2
Maintenance cost + overhead = 3.2x7100x0.93x1.27 = 27036 Baht/km/year
Total cost (1994) = 27036x13.60 = 367697 Baht/year

Ka (2008) = 1+0.5(0+0+2.25+1.80+0.20+0.10+0.05+0+0+0) = 3.2
Maintenance cost + overhead = 3.2x7100x0.93x1.27 = 27036 Baht/km/year
Total cost (2008) = 27036x13.60 = 367697 Baht/year

Project Road No. ML-1 Nc = 5900 Baht/km/year Km = 1.000
Proposed Road Length = 13.60 km

Cement Concrete Pavement

Items		1994		2008	
		Condition	Factor	Condition	Factor
1. Surface condition	Z1	new	0	-NA-	-
2. Subgrade CBR	Z2	>6%	0	>6%	0
2. ADT	Z3	26800	1.34	49800	3.00
4. Pavement width (m)	Z4	7x2	1.33	7x2	1.33
5. R-O-W width (m)	Y1	60	0.10	60	0.10
6. Shoulder,access,median width (m)	Y2	2.5x2 1.5x2	0.05 0	2.5x2 1.5x2	0.01 0.05
7. Traffic service operation topography	Y3	0-3%	0	0-3%	0
8. Drainage topography	Y4	0-3%	0	0-3%	0
9. Bridge quantity (m/km)	Y5	0	0	0	0
10. No. of lanes		4	-	4	-

Kc (1994) = 1+0.5(0+0+1.34+1.33+0.10+0.05+0+0+0) = 2.41
Maintenance cost + overhead = 2.41x5900x1.000x1.27 = 18058 Baht/km/year
Total cost (1994) = 18058x13.6x2 = 419176 Baht/year

Kc (2008) = 1+0.5(0+3.00+1.33+0.10+0.05+0+0+0) = 3.24
Maintenance cost + overhead = 3.24x5900x1000x1.27 = 24277 Baht/km/year
Total cost (2008) = 24277x13.6x2 = 660334 Baht/year

Project Road No. ML-2 Na = 7100 Baht/km/year Km = 0.937
Existing Road Length = 27.27 km

Asphalt Pavement

Items		Existing		1994		2008	
		Condition	Factor	Condition	Factor	Condition	Factor
1. Surface/Base type	X1	AC	0	AC	0	AC	0
2. Subgrade CBR	X2	>6%	0	>6%	0	>6%	0
2. ADT	X3	4400	0.69	8800	1.64	17600	2.25
4. Service life (year)	X4	10	1.40	>12	1.80	>12	1.80
5. Pavement width (m)	X5	6.5	0.10	6.5	0.10	6.5	0.10
6. R-O-W width (m)	Y1	50	0.05	50	0.05	50	0.05
7. Shoulder,access,median width (m)	Y2	2.0	0	2.0	0	2.0	0
8. Traffic service operation topography	Y3	0-3.2%	0	0-3.2%	0	0-3.2%	0
9. Drainage topography	Y4	0-3.2%	0	0-3.2%	0	0-3.2%	0
10. Bridge quantity (m/km)	Y5	2.42	0	2.42	0	2.42	0
11. No. of lanes		2	-	2	-	2	-

Ka (Existing) = 1+0.5(0+0+0.69+1.40+0.10+0.05+0+0+0+0) = 2.12
Maintenance cost + overhead = 2.12x7100x0.937x1.27 = 17911 Baht/km/year
Total cost (Existing) = 17911x27.27 = 488433 Baht/year

Ka (1994) = 1+0.5(0+0+1.64+1.80+0.10+0.05+0+0+0+0) = 2.795
Maintenance cost + overhead = 2.795x7100x0.937x1.27 = 23614 Baht/km/year
Total cost (1994) = 23614x27.27 = 643953 Baht/year

Ka (2008) = 1+0.5(0+0+2.25+1.80++0.10+0.05+0+0+0+0) = 3.1
Maintenance cost + overhead = 3.1x7100x0.937x1.27 = 26191 Baht/km/year
Total cost (2008) = 26191x27.27 = 714228 Baht/year

Project Road No. ML-2 Na = 7100 Baht/km/year Km = 0.937
Proposed Road Length = 27.27 km

Asphalt Pavement

Items		1994		2008	
		Condition	Factor	Condition	Factor
1. Surface/Base type	X1	new	0	-NA-	-
2. Subgrade CBR	X2	>6%	0	>6%	0
2. ADT	X3	8800	0.69	17600	1.64
4. Service life (year)	X4	new	0	10	1.40
5. Pavement width (m)	X5	7x2	0.40	7x2	0.04
6. R-O-W width (m)	Y1	50	0.05	50	0.05
7. Shoulder,access,median width	Y2	2.5x2 1.5x2	0.05 0	2.5x2 1.5x2	0.05 0
8. Traffic service operation topography	Y3	0-3.2%	0	0-3.2%	0
9. Drainage topography	Y4	0-3.2%	0	0-3.2%	0
10. Bridge quantity (m/km)	Y5	3.98	0	3.98	0
11. No. of lanes		4	-	4	-

Ka (1994) = 1+0.5(0+0+0.69+0+0.40+0.05+0.05+0+0+0 = 1.595
Maintenance cost + overhead = 1.595x7100x0.937x1.27 = 13476 Baht/km/year
Total cost (1994) = 13476x27.27x2 = 734980 Baht/year

Ka (2008) = 1+0.5(0+0+1.64+1.40+0.05+0.05+0+0+0) = 2.77
Maintenance cost + overhead = 2.77x7100x0.937x1.27 = 23403 Baht/km/year
Total cost (2008) = 23403x27.27x2 = 1276398 Baht/year

Appendix 6.1.1 VARIATIONS IN FUEL CONSUMPTION

(Unit: liter/1000 km)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
Paved Road (Good Condition)								
20	33.0	138.0	156.0	197.0	311.2	156.0	197.0	342.3
30	32.0	108.1	122.2	160.4	284.2	122.2	160.4	312.6
40	31.4	95.5	107.9	147.8	264.5	107.9	147.8	290.9
50	31.7	89.7	101.4	160.4	284.2	101.4	160.4	312.6
60	33.2	86.2	97.5	178.0	326.1	97.5	178.0	358.6
70	35.6	85.4	98.2	202.6	380.9	98.2	202.6	418.9
80	39.0	88.6	102.0	243.9	438.1	102.0	243.9	481.8
90	-	94.3	-	-	-	-	-	-
Laterite Road (Good Condition)								
20	36.3	151.8	174.7	234.4	371.8	174.7	234.4	410.7
30	35.2	118.9	138.0	190.9	339.6	138.0	190.9	375.1
40	34.6	105.0	122.3	175.8	316.1	122.3	175.8	345.5
50	34.9	98.2	114.6	190.9	339.6	114.6	190.9	372.0
60	37.2	97.4	110.1	213.6	391.3	110.1	213.6	430.3
70	40.9	98.2	112.9	243.2	457.1	112.9	243.2	430.3
80	-	101.9	-	-	-	-	-	-
Laterite Road (Poor Condition)								
20	40.9	163.3	199.6	267.9	420.1	199.6	267.9	465.5
30	39.0	130.8	157.3	218.2	386.5	157.3	218.2	421.9
40	37.6	116.5	139.2	204.0	365.0	139.2	204.0	391.9
50	38.3	112.1	131.8	224.5	395.0	131.8	224.5	425.1

Appendix 6.1.2 VARIATIONS IN OIL CONSUMPTION

(Unit: liter/1000 km)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
Paved Road (Good Condition)								
20	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
30	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
40	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
50	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
60	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
70	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
80	0.1	0.5	0.7	1.4	2.0	0.7	1.4	2.0
90	-	0.5	-	-	-	-	-	-
Laterite Road (Good Condition)								
20	0.1	0.6	1.0	1.9	2.6	1.0	1.9	2.6
30	0.1	0.6	1.0	1.9	2.6	1.0	1.9	2.6
40	0.1	0.6	1.0	1.9	2.6	1.0	1.9	2.6
50	0.1	0.6	1.0	1.9	2.6	1.0	1.9	2.6
60	0.1	0.6	1.0	1.9	2.6	1.0	1.9	2.6
70	0.1	0.6	1.0	1.9	2.6	1.0	1.9	2.6
80	-	0.6	-	-	-	-	-	-
Laterite Road (Poor Condition)								
20	0.2	1.0	1.4	2.7	4.0	1.4	2.7	4.0
30	0.2	1.0	1.4	2.7	4.0	1.4	2.7	4.0
40	0.2	1.0	1.4	2.7	4.0	1.4	2.7	4.0
50	0.2	1.0	1.4	2.7	4.0	1.4	2.7	4.0

Appendix 6.1.3
Appendix 6.1.4

Appendix 6.1.3 TIRE CONSUMTPION BY ROAD TYPE

Road Type	M/C	P/C	L/B	M/B	H/B	L/T	M/T	H/T
Tire life (kilometres)								
Paved (Good Condition)	33,000	45,000	45,000	45,000	50,000	45,000	45,000	55,000
Laterite (Good Condition)	20,000	28,000	28,000	28,000	31,000	28,000	28,000	33,900
Laterite (Poor Condition)	9,000	13,000	13,000	13,000	14,000	13,000	13,000	15,600
Tire consumption (tyres per 1,000 kilometres)								
Paved (Good Condition)	0.061	0.089	0.089	0.133	0.120	0.089	0.133	0.182
Laterite (Good Condition)	0.100	0.143	0.143	0.214	0.194	0.143	0.214	0.295
Laterite (Poor Condition)	0.222	0.308	0.308	0.462	0.429	0.308	0.462	0.641

Appendix 6.1.4 INDICES OF TIRE CONSUMPTION ON DIFFERENT TYPES OF ROADS AND SPEEDS

(unit:%)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
Paved Road (Good Condition)								
16	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
24	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0
32	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0
40	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0
48	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
56	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
64	114.0	114.0	114.0	114.0	114.0	114.0	114.0	114.0
72	129.0	129.0	129.0	129.0	129.0	129.0	129.0	129.0
80	149.0	149.0	149.0	149.0	149.0	149.0	149.0	149.0
88				173.0	173.0	173.0	173.0	173.0
Laterite Roads (Good Condition)								
16	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
24	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
32	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
40	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0
48	142.0	142.0	142.0	142.0	142.0	142.0	142.0	142.0
56	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0
64	183.0	183.0	183.0	183.0	183.0	183.0	183.0	183.0
72	206.0	206.0	206.0	206.0	206.0	206.0	206.0	206.0
Laterite Roads (Poor Condition)								
16	169.0	169.0	169.0	169.0	169.0	169.0	169.0	169.0
24	172.0	172.0	172.0	172.0	172.0	172.0	172.0	172.0
32	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
40	186.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0
48	194.0	194.0	194.0	194.0	194.0	194.0	194.0	194.0
56	205.0	205.0	205.0	205.0	205.0	205.0	205.0	205.0

Appendix 6.1.5 MAINTENANCE COSTS BY ROAD TYPE (Unit: Baht/km)

Road Type	MC	PC	LB	MB	HB	LT	MT	HT
Paved Road (Good Condition)								
	0.138	0.470	0.311	0.630	0.924	0.352	0.630	0.608
Laterite Roads (Good Condition)								
	0.150	0.540	0.332	0.667	0.983	0.377	0.687	0.676
Laterite Roads (Poor Condition)								
	0.171	0.665	0.385	0.754	1.540	0.440	0.754	0.760

Appendix 6.1.6 INDICES OF MAINTENANCE CONSUMPTION ON DIFFERENT TYPES OF ROADS AND SPEEDS

(unit:%)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
Paved Road (Good Condition)								
16	113.0	108.0	109.0	109.0	132.0	109.0	132.0	132.0
24	103.0	98,0	99.0	99.0	115.0	99.0	115.0	115.0
32	92.0	89.0	90.0	90.0	94.0	90.0	94.0	94.0
40	87.0	83.0	87.0	87.0	83.0	87.0	83.0	83.0
48	85.0	81.0	85.0	85.0	79.0	85.0	79.0	79.0
56	89.0	85.0	90.0	90.0	85.0	90.0	85.0	85.0
64	92.0	90.0	95.0	95.0	90.0	95.0	90.0	90.0
72	100.0	96.0	100.0	100.0	100.0	100.0	100.0	100.0
80	104.0	100.0	105.0	105.0	111.0	105.0	111.0	111.0
88	109.0	105.0	110.0	110.0	122.0	110.0	122.0	122.0
Laterite								
16	136.0	130.0	136.0	136.0	178.0	136.0	178.0	178.0
24	124.0	118.0	124.0	124.0	155.0	124.0	155.0	155.0
32	110.0	107.0	113.0	113.0	127.0	113.0	127.0	127.0
40	104.0	100.0	109.0	109.0	112.0	109.0	112.0	112.0
48	101.0	97.0	106.0	106.0	107.0	106.0	107.0	107.0
56	107.0	102.0	113.0	113.0	115.0	113.0	115.0	115.0
64	112.0	108.0	119.0	119.0	122.0	119.0	122.0	122.0
72	120.0	115.0	125.0	125.0	135.0	125.0	135.0	135.0
Laterite								
16	203.0	194.0	207.0	207.0	264.0	207.0	264.0	264.0
24	185.0	176.0	183.0	183.0	230.0	183.0	230.0	230.0
32	166.0	160.0	171.0	171.0	183.0	171.0	183.0	183.0
40	157.0	149.0	165.0	165.0	166.0	165.0	166.0	166.0
48	151.0	146.0	162.0	162.0	158.0	162.0	158.0	158.0
56	160.0	153.0	171.0	171.0	170.0	171.0	170.0	170.0

Appendix 6.1.7 RELEVANT DATA FOR CAPITAL COSTS

(1) FINANCIAL AND ECONOMIC COST OF VEHICLES

Vehicle Type	Imported Parts Cost	CUSTOMS DUTIES (INC. TYRES)				Selling Price Financial Cost	Business & Municipal Taxes	Total Tax	Economic Cost	Financial Cost Less Tyres	Economic Cost Less Tyres
		Import Duty	Business Tax	Municipal Tax	Sub-Total of Tax						
MC	11,505	4,602	263	26	4,891	33,500	4,422	9,313	24,187	33,046	23,895
PC	83,035	92,999	2,872	287	96,158	470,000	155,100	251,258	218,742	465,610	215,052
LT	99,128	29,738	2,103	210	32,051	251,500	24,899	56,950	194,550	246,210	190,130
MB	220,565	22,056	3,959	396	26,411	489,500	48,461	74,872	414,628	471,335	399,424
HB	563,608	56,361	10,116	1,012	67,489	1,500,000	148,500	215,989	1,284,011	1,462,298	1,252,476
LT	99,128	29,738	2,103	210	32,051	245,500	24,305	56,356	189,144	240,210	184,724
MT	220,565	22,056	3,959	396	26,411	477,500	47,273	73,684	403,816	459,335	388,612
HT	642,013	64,201	11,523	1,152	76,876	999,000	98,901	175,777	823,223	956,342	787,550

(2) VEHICLE LIFE AT AVERAGE SPEEDS

(Years)

Road Type	MC	PC	LB	MB	HB	LT	MT	HT
Paved (Good Condition)	8	12	10	12	12	10	12	12
Laterite (Good Condition)	7	9	8	9	9	8	9	9
Laterite (Poor Condition)	6	6	5	6	6	5	6	6

(3) SALVAGE VALUES

(% of vehicle pr)

Road Type	MC	PC	LB	MB	HB	LT	MT	HT
Paved (Good Condition)	15	25	20	15	15	20	15	15
Laterite (Good Condition)	10	15	12	10	10	12	10	10
Laterite (Poor Condition)	5	5	5	5	5	5	5	5

(4) VARIATIONS IN VEHICLE LIFE WITH AVERAGE SPEEDS

(Year)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
Paved Roads (Good Condition)								
20	8.98	13.94	11.16	13.13	13.26	11.21	13.13	13.45
30	8.63	13.41	10.80	12.79	12.88	10.83	12.79	13.00
40	8.35	12.97	10.50	12.49	12.55	10.51	12.49	12.62
50	8.11	12.60	10.23	12.23	12.26	10.24	12.23	12.29
60	7.90	12.28	10.00	12.00	12.00	10.00	12.00	12.00
70	7.72	12.00	9.80	11.79	11.77	9.79	11.79	11.75
80	7.57	11.76	9.62	11.60	11.57	9.61	11.60	11.53
90	7.43	11.54	9.46	-	-	9.44	-	-
Laterite Road (Good Condition)								
20	7.61	9.87	8.70	9.53	9.71	8.73	9.53	9.68
30	7.33	9.53	8.43	9.30	9.44	8.44	9.30	9.38
40	7.10	9.24	8.20	9.09	9.20	8.21	9.09	9.12
50	6.91	9.00	8.00	8.91	9.00	8.00	8.91	8.89
60	6.74	8.79	7.83	8.75	8.82	7.82	8.75	8.70
70	6.60	8.61	7.68	8.61	8.66	7.67	8.61	8.53
80	6.47	8.45	7.54	8.48	8.52	7.53	8.48	8.38
Laterite Road (Poor Condition)								
20	6.21	6.10	5.15	6.14	6.16	5.15	6.14	6.18
30	6.00	5.91	5.00	6.00	6.00	5.00	6.00	6.00
40	5.83	5.76	4.88	5.88	5.86	4.87	5.88	5.85
50	5.68	5.63	4.77	5.77	5.74	4.76	5.77	5.78

(5) ANNUAL KILOMETRAGE

(unit: km)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
20	9,500	15,500	25,200	31,200	76,000	22,000	31,200	55,000
30	10,500	17,000	27,400	33,400	82,000	24,000	33,400	60,000
40	11,500	18,500	29,600	35,600	88,000	26,000	35,600	65,000
50	12,500	20,000	31,800	37,800	94,000	28,000	37,800	70,000
60	13,500	21,500	34,000	40,000	100,000	30,000	40,000	75,000
70	14,500	23,000	36,200	42,200	106,000	32,000	42,200	80,000
80	15,500	24,500	38,400	44,400	112,000	34,000	44,400	85,000
90	16,500	26,000	40,600	-	-	36,000	-	-

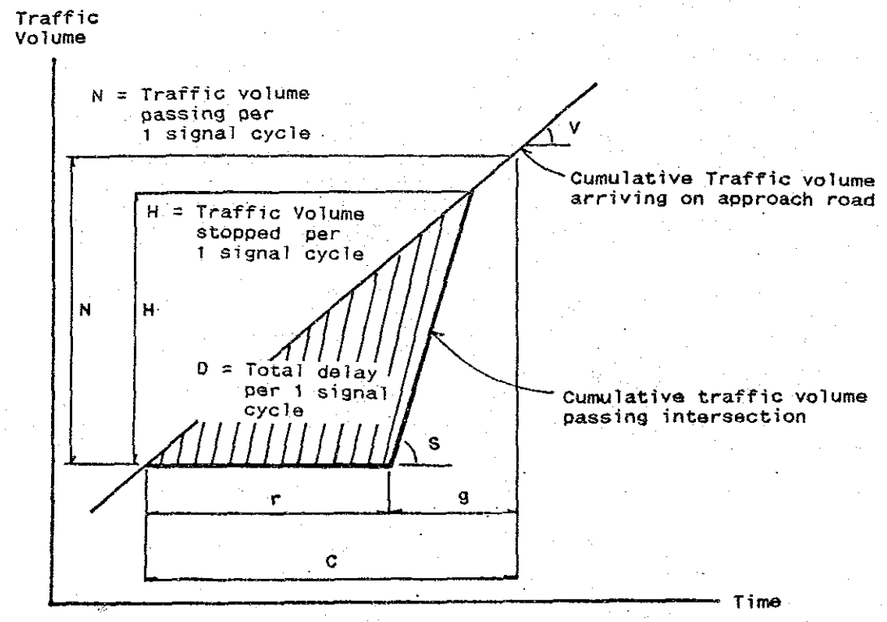
(6) VARIATIONS IN ANNUAL CAPITAL COST WITH AVERAGE SPEEDS

(Baht/Year)

Speed	MC	PC	LB	MB	HB	LT	MT	HT
Paved Roads (Good Condition)								
20	4,247	30,829	29,995	59,814	186,856	29,087	58,195	116,871
30	4,336	31,226	30,419	60,425	188,953	29,519	58,789	118,391
40	4,414	31,585	30,796	60,995	190,901	29,909	59,344	119,770
50	4,485	31,911	31,159	61,518	192,700	30,259	59,853	121,048
60	4,551	32,211	31,482	62,000	194,414	30,587	60,322	122,247
70	4,610	32,490	31,779	62,459	195,990	30,890	60,768	123,324
80	-	32,740	32,057	62,890	197,427	31,162	61,187	124,329
90	-	32,980	-	-	-	-	-	-
Laterite Road (Good Condition)								
20	4,753	36,452	34,764	70,113	217,748	33,713	68,215	137,135
30	4,860	37,086	35,367	71,012	220,938	34,339	69,090	139,388
40	4,956	37,666	35,915	71,876	223,946	34,870	69,931	141,471
50	5,039	38,178	36,419	72,653	226,587	35,383	70,686	143,424
60	5,118	38,650	36,869	73,372	229,075	35,847	71,386	145,123
70	5,187	39,075	37,283	74,025	231,380	36,250	72,021	146,712
80	-	39,469	-	-	-	-	-	-
Laterite Road (Poor Condition)								
20	5,534	50,412	50,164	93,222	291,675	48,737	90,699	183,000
30	5,665	51,509	51,248	94,691	296,923	49,790	92,128	186,703
40	5,777	52,428	52,163	96,004	301,753	50,757	93,405	189,958
50	5,882	53,266	53,045	97,264	306,084	51,617	94,631	191,544

Appendix 6.1.8 CALCULATION METHOD FOR INTERSECTING TRAFFIC VOLUME

A concept of traffic flow at signalized intersection is illustrated in the following figure, when vehicles uniformly distributed on the road.



Based on this concept, number of vehicles stopped and waited at signalized intersection are computed by using the following formula and assumptions:

$V < S$

$N = C \times V$

$$H = \frac{S \times V \times r}{S - V}$$

$$D = H \times r / 2 = \frac{S \times V \times r^2}{(S - V) * 2}$$

$V > S$

$N = C \times V$

$H = N$

$$D = \frac{R}{2}$$

where,

S : Saturation flow rate
V : Actual flow rate
g : Green time
r : Red time
C : Cycle time

- Signal cycle was assumed two minutes at every intersection.
- Red or green signal time ratio were assumed in proportion to saturation ratio of crossing roads.
- Saturation flow of intersection was assumed based on capacity flow rate of approach roads.

Appendix 6.1.9 ADDITIONAL COSTS DUE TO SPEED CHANGES

(unit: % of initial cost)

Initial Speed	MC	PC	LB	MB	HB	LT	MT	HT
16	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.003
24	0.002	0.002	0.002	0.002	0.004	0.002	0.004	0.006
32	0.004	0.004	0.004	0.004	0.005	0.004	0.005	0.009
40	0.005	0.005	0.005	0.006	0.008	0.005	0.008	0.013
48	0.007	0.007	0.007	0.008	0.010	0.007	0.010	0.018
56	0.009	0.009	0.010	0.011	0.013	0.010	0.013	0.024
64	0.012	0.012	0.012	0.015	0.017	0.012	0.017	0.032
72	0.015	0.015	0.016	0.019	0.022	0.016	0.022	0.041
80	0.019	0.019	0.020	0.023	0.027	0.020	0.027	0.051
88	0.023	0.023	0.024	0.028	0.033	0.024	0.033	0.064

Appendix 6.1.10 RELATIONSHIP BETWEEN AVERAGE TRAVEL SPEED AND FLOW

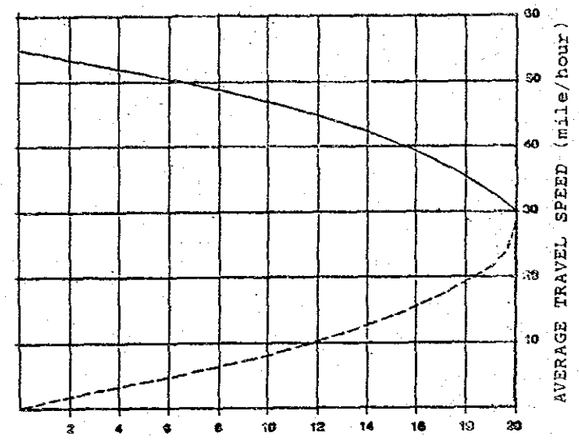


Figure 1 MULTILANE HIGHWAY

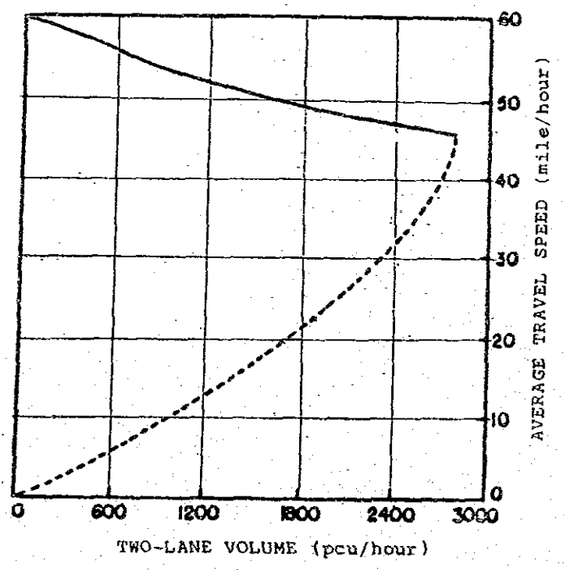


Figure 2 TWO-LANE HIGHWAY

Figure 1 and 2 obtained from Highway Capacity Manual show the relationship between the travel speed and traffic volume under the following ideal conditions:

- Level terrain
- Twenty feet lane width
- A minimum of 6 feet lateral clearance between the edge of travel lanes and obstructions at a roadside or in the median
- Passenger cars only in the traffic stream
- A divided highway cross section in a rural environment

As Figure 1 and 2 are affected by prevailing conditions that are not "ideal". In this study, adjustment factors to maximum traffic volume for heavy vehicles and development environment were considered by the projects as shown below:

Project	Adjustment Factors		
	Heavy Vehicles	Development Environment	
Ml-1	0.8	0.9	(0.8)
ML-2	0.8	0.9	
ML-4	0.8	1.0	
ML-5	0.8	1.0	(0.9)
ML-7	0.8	1.0	

Figure in parentheses show a conditon on Route 3.