

APPENDIX 5
ROAD NETWORK

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ROAD INVENTORY
Suburban Road (1/5)

Road Name	Road Length (km)	Pavement Type Surface Condition	ROW/Pavement Width No. of lane	Road Structure Alignment	Traffic Characteristics	Roadside Environment	Special Information	Future Plan
NR No. 1	Wat Phnom (km 0) Rotary (km 5.0) Outer Ring (km 12.5)	AC, Fair AC, Bad	4 - Lanes 2 - Lanes	Flat, Standard High Embankment (3-4m)	Congested with car/ motodop Not crowded except Br. & market. 25-30 Km/h	Urban, CBD Suburban; houses along road, rice field	Monivong Br. (2 lanes) Crowded Market area crowded with motodop/ remork/ cyclo	
NR No.2	Rotary (km 0) Junction/NR No.21 (km 4.5) Kandal City (km 5.7) Intersection (km 8.6) Junction/ORR (km 12.1)	AC, Good EaNR Noh/ gravel, Very bad AC, Bad AC, Fair, but very rough	4 - Lanes 2 - Lanes (one way) 11.8/ 7.0 m 12.7/ 7.7 m	Flat, Standard Flat, Standard Flat, Standard Flat, Standard	Congested with car/ motodop One way inside city Mixed traffic Few traffic	Urban, CBD Residential/ Commercial Residential/ Commercial Suburban/ rice field	One way operation Preak Hou Br. old/ too narrow	
NR No.3	Junction/NR No.4 (km 0) Bridge (km 10.7) Junction/ORR (km 12.1)	AC, Fair, but very rough gravel (river bank road)	10.0/ 5.5 m 10.0/ 5.5 m	Flat, Standard Flat, Standard	A few except new NR No.4 A few	Suburban/ rice field Suburban/ rice field		
NR No.4	Central Market (km 0) Inner RR (km 3.6) Intersection (km 5.6) Air Port (km 8.9) Junction/Rt.3 (km 11.6) Junction/ORR (km 13.4)	AC, Good AC, Good AC, Good AC, Good AC, Good	4 - Lanes 4 - Lanes 2 - Lanes 2 - Lanes 2 - Lanes	Flat, Standard Flat, Standard Flat, Standard Flat, Standard Flat, Standard	Heavy congested with bus/ car/ truck - do - - do - A little congest	Commercial/ Residential Urban, Factory - do - Suburban/ rice field - do -	Congested up to junction with NR No.3	
NR No.5	Rotary (km 0) Railway Crossing (km 4.7) Intersection (km 8.2) Junction/ORR (km 10.7)	AC, Fair AC, Fair but rough AC, Bad	2 - Lanes 2 - Lanes 2 - Lanes	Flat, Standard Flat, Standard Flat, Standard	Congested with car/ motodop Congested with motodop/ remork Many remork/ cyclo	Residential/ Commercial Residential/ Commercial Residential		
NR No.6	Bridge (km 0) Intersection (km 13.5)	AC, Good	10.0/ 6.7 m 2 - Lanes	High Embankment (2-3 m)	Stable flow with trucks/ minibus	Commercial (Restaurant) Residential	Chrouy Changva Br. a little crowded	
Toll Road	Central Market (km 0) Inner RR (km 3.4) Toll Entrance (km 5.8) Junction/NR No.4 (km 11.8)	AC, Bad AC, Bad AC, Fair/ Bad	4 - Lanes 2 - Lanes (under widening) 2 - Lanes	Flat, Standard Flat, Standard Flat, Standard	Congest with car/motodop Congest with truck/ car/ motodop Crowded due to cidefriction	Urban, CBD Commercial/ Industrial Commercial/ Residential	Bridge (2-lines) narrow Access to bridge narrow/ very rough	

ROAD INVENTORY
Suburban Road (2/5)

Road Name	Road Length (km)	Pavement Type Surface Condition	ROW/ Pavement Width No. of lane	Road Structure Alignment	Traffic Characteristics	Roadside Environment	Special Information	Future Plan
NR No.21 (River Side)	Junction/NR No.2 (km 0) Junction/ ORR (km 34)	AC, Very Bad (Under repair)	22.0/ 10 m (One way)	Flat, Standard	(Under repair)	Residential/ Commercial	One way operation	
NR No.21 (Inner Side)	Kandal City Junction/ ORR (km 0) (km 22)	AC, Very Bad (Under construction)	9.5/ 6.0 m	Flat, Standard	(Under construction)	Residential		
Outer Ring Road (ORR)	NR No.1 River (km 0) (km 8.4)	AC, Fair (3.4 Km) Earth (5.0 Km)	5.7 m (Narrow 2-lines)	Flat (Swampy)	Very few	Agriculture (rice field) Tiger Beer Factory	No road network formed	
	NR No.22 (River) NR No.2 (km 0) (km 2.8)	AC, Very Bad	9.5/ 5.5 m	Flat	Very few	Rural town (residential)		
	NR No.2 NR No. 3 (km 0) (km 11.5)	Gravel, Very Bad	8.0/ 7.3 m	Low Embankment (1 - 2m)	Very few	Agriculture (rice field)	Solid waste at road side Bridge collapsed (Detour)	
	NR No.4 Intersection NR No.5 (km 0) (km 6.3) (km 17.2)	Gravel, Very Bad Earth, Very Bad	19.0/ 7.0 m 10.0/ 7.0 m	Low Embankment (1-3 m) High Embankment (3-5 m)	Very few	Rice field Swampy/ pond	Toll Road	
	Inner Ring Road (IRR)	Junction/ NR No.2 (km 0) Junction/ Toll Road (km 4.8) Junction/ NR No.4 (km 8.0) Toll Section (km 11.7) Rotary (km 14.2)	AC, Very Bad AC, Very Bad AC, Destroyed	11.0/ 7.0 m 12.0/ 7.0 m 6.7 m	Low Embankment (2-3 m) Flat Low Embankment (2-3 m)	Congest with truck Truck/ motodop	Residential/ Light Industry Residential/ Light Industry Residential/ Light Industry	Many pump station Toll Road

ROAD INVENTORY
Suburban Road (3/5)

Road Name	Road Length (km)	Pavement Type Surface Condition	ROW/Pavement Width No. of lane	Road Structure Alignment	Traffics Characteristics	Roadside Environment	Special Information	Future Plan
Toul Kei Road	Rt. N ^o 3 (km 0)	Earth	5	Flat Embankment (h = 1 m)	Not crowded	Suburban / rice field	Culvert	
	(Km 1.8)		4					
	(Km 3.1)		5					
Trapang RumChek Road	Prey Sar Pagoda (km 4.3)	Laterite	11m	Flat Embankment (h=1:2m)	Congested with containers Not crowded	Suburban / freight port Rice field	Bridge (L=7.7m, W=4m) Culvert Culvert, Junction connect to National Road N ^o 3	
			8m					
			9m					
			10m					
			6m					
Trapang Krasang Road	Junction (km 4.700)	Laterite Earth	9m	Flat Embankment (H=1.5m) Flat	Not crowded	Suburban Houses a long the road / One Factory rice field	Rail Way Junction Culvert Minor Road (Muddily)	Can not go by car
			7m					
			4m					
			6.40m					
			7.00m					
Toul Sambo Road	Junction NR 3 (km 0.0)	Earth / Bad	8.00m			Suburban / houses a long road River / rice field Rice field	Dick Culvert Bridge riverside L=100, 3.5m Culvert Near river Bridge L=23m, W=3.5m Culvert Reinforce River Bank	
			4.00m					
			5.00m					
			(Km 0.1)					
			(Km 0.4)					
			(Km 3.0)					
			(Km 3.6)					
(Km 3.9)								
(Km 5.4)								
(Km 5.9)								
(Km 6.8)								
Junction Prey Sar (km 7.6)								

ROAD INVENTORY
Suburban Road (4/5)

Road Name	Road Length (km)	Pavement Type Surface Condition	ROW/ Pavement Width No. of lane	Road Structure Alignment	Traffic Characteristics	Roadside Environment	Special Information	Future Plan
Cheung Aek Rd	(km 0) (km 0.9) (km 1.8) (km 5.0) (km 5.7) (km 7.0)	Macadam? Very Bad Gravel, Bad Gravel, Bad	5/ 20 7 7	Flat Flat Flat	Few Few Few	Suburban/ residential Residential	Tree on both sides Damaged Wood	
Prey Sa Rd	(km 0) (km 1.2) (km 1.8) (km 3.5) (km 10.8)	Macadam? Very Bad Earth, Very bad Earth, Very bad Laterite/ gravel	3 – 4 W = 2.8 , L =21.5 7 7	Flat Flat H= 1.0 ~ 1.5 m Curves with small radii near villages	Few Few	Agriculture	Damaged	
Tumnop Boeng Tumpun Rd	(km 0) (km 1.2) (km 1.7) (km 3.1) (km 4.4)		13 15	H = 5 m			Pumping station	
Bayab Rd	(km 0) (km 2.8) (km 3.4) End (JCT with Dei Krotham Ta Ngom Rd (km 4.1)	Earth, Very Bad Laterite, Fair	7 8.5	Flat ~ H= 1.0 Flat	Few Few	Swamp/ residential Agriculture	Newly constructed	
North Ridge Rd	(km 0) International School Rd End (near Toll Rd) (km 1.5) (km 3.0)	Gravel, Fair	15	Flat	Few	Suburban		
International School Rd	(km 0) Inner Ring Rd. (km 1.8)	Gravel, Bad	10	Flat	Few	Suburban		

ROAD INVENTORY
Suburban Road (5/5)

Road Name	Road Length (km)	Pavement Type Surface Condition	ROW/ Pavement Width No. of lane	Road Structure Alignment	Traffic Characteristics	Roadside Environment	Special Information	Future Plan
Phnom Penh Thmei Rd	NR No. (km 0)	Gravel, Very Bad	11	Flat	Few	Suburban		
	Railroad Crossing (km 0.6)	Earth						
	Samdach Chea (km 3.0)	Earth	9	H= 1.0		Agriculture	Pipe culvert	
	Sim Rd (km 3.8)							
Irrigation Channel (km 6.6)		7.5						
Outer Ring Road (km 10.1)								

ROAD INVENTORY
Urban Road Pavement Condition

Chapter	Road Name & Number	Road Length (Km)	Pavement Type & Condition (Km)			ROW / Carriage Width / No of Lane			
			Good	Fair	Bad	ROW	Lane	Carriage Width	Side Walk
I-	Arterial Road:								
I. 1-	Radial Road:								
1.	Wat Phnom Roundabout	(Km 0.7)		Fair		13 m	2	9m	2m / 2m
2.	Preah Norodom Blvd. (41)	Wat Phnom (Km 0.0) ~ St. 114 (Km 0.3) ~ Foreign Trade Bank (Km 0.35) ~ Preah Suramarith Blvd. (Km 2.0) ~ St. 294 (Km 2.35) ~ Mao Tse Toung Blvd. (Km 3.5) ~ Kbal Thnal Roundabout (Km5.0)		Fair - - - -		26 m 30 m 30 m 30 m 29.7 m 30.5 m	4 4 4 4 4 4	14m 16m 15m 18m 19.7m 18.5m	6m / 6m 7m / 7m 7.5m / 7.5m 6m / 6m 4m / 6m 6m / 6m
3.	France Blvd. (47)	Wat Phnom (Km 0.0) ~ (Km 0.16) ~ (Km 0.88) ~ Junction St.74 (Km 1.1)		Fair - -		30 m 30 m 30 m	2 2 2	10m 10m 10m	10m / 10m 10m / 10m 10m / 10m
4.	Preah Monivong Blvd. (93)	Kbal Thnal Roundabout (Km 0.0) ~ Garden (Km 1.3) ~ St. 110 (Km 5.2) ~ St. 108 (Km 5.27) ~ Old Stadium Round (Km 6.7)		Fair - -	Bad	30 m 30m 30m 30m	6 4 6 6	18m 15m 18m 18m	6m / 6m 8m / 7m 6m / 6m 6m / 6m
5.	Russian Blvd. (110)	Preah Monivong Blvd. (Km 0.0) ~ Train Station (Km 0.16) ~ Garden (Km 0.4) ~ Garden (Km 1.28) ~ St. 225 (Km 1.6) ~ Mao Tse Toung Blvd. (Km1.84) ~ St. 261 (Km 2.40) ~ URPP (Km 3.20) ~ Junction 271 Blvd. (Km 3.36)	Good - - - - - - - -			20.4 m 27 m 27 m 23.4 m 24.5 m 24.5 m 27 m 34 m	2 4 4 4 4 4 4 4	9.4m 15m 15m 15m 15m 15m 15m 15m	5.5m / 5.5m 6m / 6m 6m / 6m 6m / 2.4m 6m / 3.5m 6m / 3.5m 9m / 3m 9m / 10m
6.	Kampuchea Krom Blvd. (128)	Russian Blvd. (Km 0.0) ~ St. 269 (Km 0.16) ~ St. 261 (Km 0.48) ~ St. 251 (Km 0.72) ~ St. 253 (Km 0.96) ~ Mao Tse Toung Blvd. (Km 1.30) ~ Nerhu Blvd. (Km 1.90) ~ Tchecoslovaquie Blvd.(Km 2.56) ~ Preah Monivong Blvd. (Km 3.35) ~ Center Market (Km 3.50)	Good - - - - - - - - -			30 m 30 m 30 m 30 m 30 m 30 m 30 m 30 m 30 m	4 4 4 4 4 4 4 4 4	18m 18m 18m 18m 18m 18m 18m 18m 18m	6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m
7.	Charles De Gaulle Blvd. (217) Preah Monireth Blvd. (217)	Central Market (Km 0.0) ~ Preah Monivong Blvd. (Km 0.25) ~ St. 169 (Km 1.20) ~ St. 215 (Km 1.92) ~ Mao Tse Toung Blvd. (Km 2.8) ~ Junction 271 Blvd. (Km 3.36)	Good		Bad - - -	29.6 m 29.4 m 30 m 30 m 37.2 m	4 4 4 4 4	18m 18m 18m 18m 18.5m	5.8m / 5.8m 5.8m / 5.6m 6m / 6m 6m / 6m 9.2m / 9.5m
I. 2-	Circular Arterial Road:								
1.	Preah Sisowath Blvd.(1)	Japan Bridge (Km 0.0) ~ Phnom Penh Port (Km 0.16) ~ (Km 0.48) ~ (Km 0.72) ~ St. 106(Km 1.6) ~ St. 108 (Km 1.7) ~ St. 154 (Km 2.4) ~ Royal Palace (Km 2.7) ~ Conference Center (Km 3.2) ~ Cabodiana Hotel (Km 3.6) ~ Sothearos Blvd. (Km 3.84)	Good - - - - - - - -			18.5 m 18.5 m 21 m 26 m 15 m 15 m 18 m 20.2 m 20.8 m 20 m	2 2 2 2 2 3 3 2 2 2	10m 10m 10m 20m 10m 10m 12m 10m 8m 8m	6m / 2.5m 6m / 2.5m 6m / 5m 6m / 6m 5m /Garden 5m /Garden 6m /Garden 5.2m / 5m 6.8m / 6m 6m / 6m
2.	Preah Sothearos Blvd. (3)	St. 154 (Km 0.0) ~ (Km 0.16) ~ National Museum (Km 0.32) ~ Royal Palace (Km 0.56) ~ National Assembly (Km 0.80) ~ (Km 1.12) ~ Preah Sihanouk Blvd. (Km 1.60) ~ Royal P.P Hotel (Km2.24) ~ Preaah Norodom Blvd. (Km 3.0)	Good - - - - -	Fair - Fair - - -		13 m 25.6 m 32 m 34 m 26 m 37.3 m 21.2 m 19 m	2 4 4 4 4 4 2 2	10m 18m 18m 18m 15m 29m 9m 9m	2m / 1m 4m / 3.6m 8m/Gard en 8m / 8m Garden / 5m 2.3m / 6m 4m / 8.2m 4m / 6m
3.	Toul Kok (70)	From Kim II Sung Blvd. (Km 0.0) ~ Rail Road (Km 0.80) ~ Old Stadium Round- (Km 1.75)			Bad -	11m 11m	2 2	7m 7m	4m / 4m 4m / 4m

4.	Tchecoslovaquie Blvd. (169)	Kang Hing Roundabout (Km 0.0) ~ Bak Touk High School (Km0.24) ~ St. 128 (Km 0.64) ~ St. 114 (Km 0.96)		fair	Bad -	40.5 m 30 m 30 m	4 4 4	18m 18m 18m	16m / 6.5m Garden/ 6m Garden /6m
5.	Jawaharlal Nerhu Blvd. (215)	Russian Blvd. (Km 0.0) ~ Olympic Roundabout (Km 1.4)	Good			30 m	4	18m	6m / 6m
6.	Mao Tse Toung Blvd. (245)	Russian Blvd. (Km 0.0) ~Kampuchea Krom Blvd.(Km 0.30) ~ Preah Monireth Blvd. (Km 2.0) ~ St. 163 (Km 3.60) ~ St. 105 (Km 4.20) ~ Preah Monivong Blvd. (Km 4.50) ~ Preah Norodom Blvd. (Km 5.10)	Good	Fair - - -	Bad 0.3 Bad 0.7	30 m 30 m 30 m 30 m 30 m 24 m	4 4 4 4 4 4	18m 18m 18m 18m 18m 12m	6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m 6m / 6m
7.	Kang Youthapol Khemarak Phoumin (271)	From Russian Blvd. (Km 0.0) ~ St. Tep Phan182 (Km 0.50) ~ Preah Monireth 217 (Km 3.10) ~ St. 173 (Km 4.60) ~ St. 163 (Km 5.75) ~ Preah Monivong Blvd. (Km 7.70)			Bad - - - -	11m 16m 17m 22m 18m	2 2 2 2 2	7m 10m 11m 14m 12m	2m / 2m 3m / 3m 3m / 3m 4m / 4m 3m / 3m
8.	Preah Sihanouk Blvd. (274)	Olympic Roundabout (Km 0.0) ~ Wat Mahamotrey (Km 1.0) ~ Sothearos Blvd. (Km 2.2)	Good -			29.5 m 29 m	4 4	18m 17m	5.5m / 6m 6m / 6m
9.	Kim II Sung Blvd. (289)	Russian Blvd. (Km 0.0) ~ I.T.C (Km 0.10) ~ Railroad (Km 0.20) ~ Toul Kok Round (Km 0.30) ~ 7 Makara Market (Km 0.60) ~ St. 516 (Km 1.50) ~T. Broadcasting tower (Km 1.70)		Fair - -	Bad - -	32.3 m 32.3 m 32.3 m 38 m 24.8 m 24.8 m	4 4 2 2 2 2	17m 17m 17m 10m 8m 8m	9.3m / 6m 9.3m / 6m 9.3m / 6m 14m / 14m 5.8m/11 m 5.8m/11 m
10.	Tralok Bek (598)	From Russian Blvd. (Km 0.0) ~ Rail Road (Km 0.50) ~ St. 315 (Km 0.60) ~ St. 337 (Km 1.80) ~ St. 355 (Km 3.50)	Good		Bad - -	24m 20m 16m 16m	2 2 2 2	8m 8m 8m 8m	8m / 8m 6m / 6m 4m / 4m 4m / 4m
11.	St. 355	From St. 598 (Km 0.0) ~ Kim II Sung Blvd.289 (Km 0.70)			Bad	20m	2	8m	6m / 6m
II-	Sub-Arterial Road:								
1.	St. Preah Ang Eng (13)	Preah Sisowath Blvd. (Km 0.0) ~St. Preah Ang Non(102) (Km 0.3) ~ St. 106 (Km 0.35) ~St. Preah Ang Doung110 (Km 0.5) ~St. Khemarak Pomin130 (Km 0.7) ~ St. Decko Damdin154 (Km 1.0) ~ St. 184 (Km 1.4).		Fair - Fair	Bad - Bad -	19.7 m 20.2 m 19.8 m 19.7 m 17 m 20.7 m	2 2 2 2 2 2	8.2m 8.2m 15m 11.5m 8m 8m	6m / 5.5m 6m / 6m 4.8/Mark et 4m / 4.2m 4m / 5m 6.2m / 6.5m
2.	St. Preah Ang Yukanthor (19)	St. Preah Suramarith (Km 0.0) ~ St. 240 (Km 0.4) ~St. Samdech Pann(214) (Km 0.65) ~St. 178 (Km 1.0) St. Decko Damdin(154) (Km 1.25) St. Khemarak Poumin130 (Km 1.6) St. Preah Ang Doung110 (Km 1.85) ~ St. 106 (Km 2.0) ~Wat Phnom Roundabout (Km 2.2)		Fair - Fair -	Bad Bad - - - -	14.7 m 14.3 m 14.5 m 14 m 14 m 14 m 20 m 18 m	2 2 2 2 2 2 2 2	8.5 m 8.5 m 8.5 m 8 m 8 m 10 m 8 m	3.5m / 2.7m 3.5m / 2.3m 3m / 3m 3m / 3m 3m / 3m 3m / 3m Garden 5m / 5m
3.	St. Pasteur (51)	From Wat Phnom Hill (Km 0.0) ~ St. 106 (Km 0.22) ~ St Kramoun Sar(114) (Km 0.44) ~St.Khemarak Pomin130 (Km0.65) ~ St.Dekcho Damdin154 (Km0.95) ~St. 178 (Km 1.4) ~ St. 214 (Km 1.6) ~ Preah Sihanouk Blvd. (Km 2.15) St. 213 (Km 2.5) ~ St. 380 (Km 3.2)		Fair - - - Fair -	Bad - -	15m 20m 19.5m 20.7m 19.7m 19.8m 20m 20.1m 19.5m	2 2 2 2 2 2 2 2 2	7.7m 8m 10m 10m 8m 8m 8m 11.5m 11.5m	3.5m / 3.8m 6m / 6m 4.7m / 4.8m 4.7m / 6m 6m / 5.7m 5.8m / 6m 6m / 6m 3.8m / 4.8m 4m / 4m
4.	St. Okha Hing Penn Bassac (61)	Central Market (Km 0.0) ~ Preah Ang Doung(110) (Km 0.2) ~ St. 106 (Km 0.4) ~ St. Daun Penh(92) (Km 0.6) ~ St. 84 (Km 1.2) ~ France Blvd. (Km 1.3)	Good	Fair - -	Bad -	19.5 m 20 m 19.9 m 20.2 m 20 m	2 2 2 2 2	8m 8m 8m 8m 8m	5.7m / 5.8m Garden 5.9m / 6m 6.2m / 6m 6m / 6m

5.	St. Trasak Phaem (63)	St. 466 (Km 0.0) ~ St. 462 (Km 0.08) ~ Mao Tse Toung Blvd. (Km 0.64) ~ Preah Sihanouk Blvd. (Km 1.92) ~ St. Samdach Pann214 (Km 2.48) ~ Central Market (3.44)		Fair	Bad - - - Bad	20 m 21 m 21 m 21 m 21 m	2 2 2 2 2	8m 10m 10m 10m 10m	6m / 6m 5.5m / 5.5m 5.5m / 5.5m 5.5m / 5.5m
6.	St. Oknha Nou Kan (105)	St. 432 (Km 0.0) ~ Mao Tse Toung Blvd. (Km 0.16) ~ St. 360 (Km 0.80) ~ St. 278 (Km 1.44) ~ Preah Sihanouk Blvd. (Km 1.60) ~ St. 242 (Km 1.76) ~ St. 182 (Km 2.32)			Bad - - - - -	19.2 m 17.2 m 19.4 m 15 m 14.3 m 16.6 m	1 1 1 1 1 1	6m 6m 12.4m 8m 8.8m 8.5m	4.7m/Can al 4.7m/Can al 2.5m / 4.5m 2.5m / 4.5m 2.5m / 3m 5.1m / 3m
7.	St. Ung Po Kun (109)	From Russian Blvd. (Km 0.0) ~Kampuchea Krom Blvd.(Km 0.25) ~ Preah Monireth Blvd. (Km 0.58) ~ Preah Monivong Blvd. (Km 0.83) ~ St. 81 (Km 0.90)		Fair -	Bad - Bad	20m 18m 16m 18m	2 2 2 2	8m 8m 10m 8m	6m / 6m 5m / 5m 3m / 3m 5m / 5m
8.	St. 113	From St. Oknha Tep Phan (Km 0.0) ~ St. Yougoslavie114 (Km 0.20) ~ Preah Sihanouk Blvd. (Km 0.70) ~ St. 310 (Km 1.30) ~ St. 360 (Km 1.60) ~ Mao Tse Toung Blvd. (Km 2.00)		Fair - -	Bad - - -	14.5m 14.5m 15m 14.5m 14.5m	2 2 2 2 2	10.5m 10.5m 10.5m 10m 10m	2m / 2m 2m / 2m 2m / 2.5m 2m / 2.5m 2m / 2.5m
9.	St. 114	Nerhu Blvd. (215) (Km 0.0) ~ Army Headquarter (Km0.32) ~ St. 109 (Km 0.96) ~ Preah Monivong Blvd. (Km 1.28) ~ Preah Norodom Blvd. (Km 1.88)	Good	Fair - -		20 m 20 m 20.3 m 20.3 m	2 2 2 2	8m 8m 8.3m 8.3m	Garden /6m Garden /6m Garden /6m Garden /6m
10.	St. Khemarak Phoumin (130)	Center Market (Km 0.0) ~ St. 51 (Km 0.16) ~ Preah Norodom Blvd. (Km 0.25) ~ St. 19 (Km 0.32) ~ St. Angkor (Km 0.80) ~ Preah Sisowath Blvd.(Km 0.9)		Fair - -	Bad - -	23.5 m 23.5 m 15 m 12 m 12 m	4 4 2 2 2	15.5m 15.5m 11m 8m 8m	4m / 4m 4m / 4m 2m / 4m 2m / 4m 2m / 4m
11.	St. Dekcho Damdin (154)	Preah Monivong Blvd. (Km 0.0) ~ St. Trasak Phaem63 (Km 0.26) ~ St. Pasteur51 (Km 0.50) ~ Preah Norodom Blvd. (Km 0.68) ~ St. Yukanthor19 (Km 0.83) ~ St. Preah Ang Eng13 (Km 1.10) ~ Preah Sothearos Blvd. (Km 1.30)		Fair - -	Bad - - -	18m 18m 18m 20m 20m 20m	2 2 2 2 2 2	8m 8m 8m 8m 8m 8m	5m / 5m 5m / 5m 5m / 5m 6m / 6m 6m / 6m 6m / 6m
12.	St. 161 St.Republique Populaire De Pologne(163)	Charles De Gaulle Blvd. (Km 0.0) ~ St. 182 (Km 0.16) ~ Roundabout (Km 0.48) ~ Preah Sihanouk Blvd. (Km 0.96) ~ Mao Tse Toung Blvd. (Km 2.24) ~ St. 470 (Km 3.05) ~ St. 271 (Km 3.68)		Fair - Fair - -	Bad - -	22 m 22 m 21.2 m 22.2 m 21.2 m 20 m	2 2 2 2 2 2	12m 12m 8m 9m 8.8m 10m	5m / 5m 5m / 5m 6.6m / 6.6m 6.6m / 6.6m 5.7m / 6.7m 5m / 5m
13.	St. Tep Phan (182)	Preah Monivong Blvd. (Km 0.0) ~ St. 107 (Km 0.16) ~ O Roessey Market (Km 0.40) ~ St. 141 (Km 0.48) ~ Olympic Stadium (Km 0.72) ~Kang Hing Roundabout(Km 0.80) ~ St. 211 (Km 1.05) ~ Nerhu Blvd. (Km 1.35) ~ Mao Tse Toung Blvd. (Km 2.10) ~ St. 257 (Km 22.75) ~ St. 265 (Km 3.20) ~ Junction 271 Blvd. (Km 3.40)		Fair - - - - - - - - - - -	Bad 0.03 Bad 0.02 Bad 0.05 Bad - - - -	24 m 26.2 m 23.8 m 21.6 m 19.9 m 18.9 m 21 m 27.4 m 24.8 m 18.3 m 18.8 m	2 4 2 2 2 2 2 2 2 2 2	12.2m 12.2m 12m 11.8m 12m 11m 12m 12m 9m 10m 10m	3.8m / 8m Market /8m 3.8m / 8m 3.8m/Sta d- 3.8m / 4.1m 3.8m / 4.1m 5m / 4m 7m / 8.4m 8.8m / 7m 3.8m / 4.5m 3.8m / 5m

14.	St. Keo Chea / St. Samdech Theamak Lethet Ouk (184)	Preah Monivong Blvd. (Km 0.0) ~ St. Trasak Phaem63 (Km 0.25) ~ St. Pasteur51 (Km 0.5) ~ Preah Norodom Blvd. (Km 0.7) St. Preah Ang Yukanthor19(Km 0.9) ~ St. Preah Ang Eng13 (Km 1.15) ~ Preah Sothearos Blvd. (Km 1.3) ~ Preah Sisowath Blvd. (Km 1.4)	Good	Fair - - -	Bad	19.5 m 14.2 m 14.2 m 20 m 20 m 20 m 20 m	2 2 2 2 2 2 2	8m 8m 8m 8m 8m 8m 8m	6m / 5.5m 3.1m / 3.1m 3.1m / 3.1m 6m / 6m 6m / 6m 6m /Garden
15.	St. Josep Brozito (214) St. Yougoslavie (214) St. Samdach Pann (214)	Preah Monivong Blvd. (Km 0.0) ~ Pologne 163 (Km 0.45) ~ Preah Monivong Blvd. (Km .90) ~ St. Trasak Phaem63 (Km 1.15) ~ St. Pasteur51 (Km 1.43) ~ Preah Norodom 41 (Km 1.65) ~Preah Ang Yukanthor (Km 1.90)		Fair - - -	Bad -	12m 12m 26m 26m 26m 42m	1 1 2 2 2 2	8m 8m 12m 12m 12m 12m	5m/Gard en Garden/5 m 7m / 7m 7m / 7m 7m / 7m 15m / 15m
16.	St. 315	St. 516 (Km 0.0) ~ St. 528 (Km 0.32) ~ (Km 0.40) ~ (Km 0.90) ~ St. 592 (Km 1.2) ~ St. 598 (Km 1.8)		Fair -	Bad - Bad	30 m 28 m 30 m 30 m 30 m	2 2 2 2 2	10m 8m 18m 12m 12m	12.8m/7. 2m 12.5m/7. 5m 6m / 6m 9.5m / 8.5m 9.5m / 8.5m
17.	St. 488 / St. 484	St. 430 (Km 0.0) St. 155 (Km 0.15) ~ Boeng Trabek Bridge (Km 0.75) ~ Preah Monivong Blvd. (Km 1.1)			Bad - -	18.6 m 18 m 14 m	2 2 2	8m 8m 8m	5.1m / 5.5m 5m / 5m 3m / 3m
18.	St. 592	Toul Kok Roundabout (Km 0.0) ~ St. 606 (Km 0.15) ~ St. 315 (Km 0.85) ~ St. 331 (Km 1.30) ~ St. 598 (Km 1.73)	Good - -		Bad	19.8 m 19.8 m 19.4 m 19.4 m	2 2 2 2	8m 8m 8m 8m	4.7m / 7.1m 4.7m / 7.1m 5.2m / 6.2m 5.2m / 6.2m
III-	Local Road:								
1.	St. Langka Pagoda (55)	Preah Sihanouk Blvd. (Km 0.0) ~ St. Samdach Pann 214 (Km 0.55)		Fair		18m	2	8m	5m / 5m
2.	St. Botum Soriyavong (75)	From St. 174 (Km 0.0) ~ St. 84 (Km 0.30) ~ St. 90 (Km 0.80)		Fair	Bad	15m 18m	2 2	8m 8m	3.5m / 3.5m 5m / 5m
3.	St. Oknha Dekchoey (76)	Preah Monivong Blvd. (Km 0.0) ~ France Blvd. (Km 0.15)		Fair		16m	2	8m	4m / 4m
4.	St. Nokor Reach (80)	Preah Monivong Blvd. (Km 0.0) ~ Preah Sisowath (Km 045)			Bad	15m	2	8m	3.5m / 3.5m
5.	Wath Koh (81)	From St. Kramou (Km 0.0) ~ St. 174 (Km 0.30)			Bad	14m	2	8m	3m / 3m
6.	Neary Klahan (84)	Preah Monivong Blvd. (Km 0.0) ~ St. 75 (Km 0.10) ~ St. 65 (Km 0.20) ~ France Blvd. (Km 0.30) ~ Preah Sisowath Blvd. (Km 0.55)		Fair Fair	Bad Bad	14m 14m 14m 14m	2 2 2 2	8m 8m 8m 8m	3m / 3m 3m / 3m 3m / 3m 3m / 3m
7.	Phsar Dek (88)	Preah Monivong Blvd. (Km 0.0) ~ Preah Sisowath Blvd. (Km 0.70)			Bad	14m	2	8m	3m / 3m
8.	Chivapol (90)	Preah Monivong Blvd. (Km 0.0) ~ St. Hing Pann 61 (Km 0.30) Preah Sisowath Blvd. (Km 0.75)	Good		Bad	16m 16m	2 2	8m 8m	4m / 4m 4m / 4m
9.	St. Daun Penh (92)	From Russian Blvd. (Km 0.0) ~ St. Hing Pann 61 (Km 0.30) ~ Wat Phnom Round- (Km 0.50)	Good	Fair		16m 16m	2 2	10m 10m	6m /Garden 6m /Garden
10.	Bakseichamkrong (94)	Wat Phnom Roundabout (Km 0.0) ~ Preah Sisowath Blvd. (Km 0.20)		Fair		22m	2	10m	6m / 6m
11.	St. Daun Penh (96)	From Russian Blvd. (Km 0.0) ~ St. Hing Pann 61 (Km 0.30) ~ Wat Phnom Round- (Km 0.50)		Fair -		16m 16m	2 2	10m 10m	Garden /6m Garden /6m
12.	St. Oknha Santhormok (98)	St.Preah Ang Yukanthor19 (Km 0.0) ~ Preah Sisowath Blvd. (Km 0.20)			Bad	17m	2	8m	5m / 4m
13.	St. 100	St. Preah Ang Eng 13 (Km 0.0) ~ Preah Sisowath Blvd. (Km 0.10)			Bad	14m	1	5m	5m / 4m
14.	St. Preah Ang Non	Preah Monivong Blvd. (Km 0.0) ~ St. Pasteur51 (Km 0.45) ~ St. Preah Ang Eng13 (Km 0.90) ~ Preah Sisowath Blvd. (Km 1.00)		Fair	Bad Bad	18m 18m 18m	2 2 2	8m 8m 8m	5m / 5m 5m / 5m 5m / 5m
15.	St. Seng Thuong (104)	St. Preah Ang Eng13 (Km 0.0) ~ Preah Sisowath Blvd. (Km 0.10)			Bad	16m	2	8m	4m / 4m
16.	St. Sok Hok (107)	From St. 118 (Km 0.0) ~ St. Tep Phan182 (Km 0.95) ~ St. Yougoslavie214 (Km 1.20) ~ Preah Sihanouk Blvd. (Km 1.65)		Fair -	Bad	19m 18m 18m	2 2 2	10m 8m 8m	4.5m / 4.5m 5m / 5m 5m / 5m

17.	St. Preah Ang Doung (110)	Preah Norodom Blvd. (Km 0.0) ~St. P Ang Yukanthor19 (Km 0.10) ~ St. Preah Ang Eng 13 (Km 0.35) ~ Preah Sisowath Blvd. (Km 0.55)			Bad - -	20.5 m 19.6 m 19.6 m	2 2 2	11m 11m 8m	4m / 5.5m 4m / 4.6m 6m / 5.6m
18.	St. 112	Nerhu Blvd.215 (Km 0.0) ~ St. 253 (Km 0.90)			Bad	12m	2	6m	3m / 3m
19.	St. Karlahamkong (118)	Preah Sisowath Blvd. (Km 0.0) ~ St. Preah Ang Eng13 (Km 0.40) ~ Preah Norodom Blvd. (Km 0.60) ~ Preah Monivong Blvd. (Km 1.20) ~ Tchecoslovaquie Blvd. (Km 2.0) ~ Nerhu 169 (Km 2.50) ~ St. 253 (Km 3.45)		Fair	Bad - Bad - -	16m 21m 18m 18m 18m 18m	2 2 2 2 2 2	8m 11m 8m 8m 8m 8m	4m / 4m 5m / 5m 5m / 5m 4m / 4m 4m / 4m 4m / 4m
20.	St. 120	From Central Market (Km 0.0) ~Preah Monivong Blvd. (Km 0.15) ~ St. 114 (Km 0.30)	Good	Fair		30.4 m 30 m	4 4	18m 18m	Gar- / 6.4m Petrol- / 6m
21.	St. 132	From St. 253 (Km 0.0) ~ St. 267 (Km 0.85) ~ St. 271 (Km 1.05)			Bad -	16m 2.5m	2 1	6m 2.5m	5m / 5m -
22.	St. 134	Moa Tse Toung Blvd. (Km 0.0) ~ Nerhu Blvd. 215 (Km 0.65) ~ Tchecoslovaquie169 (Km 1.10) ~ St. 109 (Km 1.65) ~ St. 107 (Km 1.85)			Bad - - -	17m 18m 18m 18m	2 2 2 2	7m 8m 8m 8m	5m / 5m 5m / 5m 5m / 5m 5m / 5m
23.	St. 139	From St. 118 (Km 0.0) ~Kampuchea Krom Blvd.(Km 0.15) ~ Preah Monireth Blvd. (Km 0.65) ~ St. 166 (Km 0.75)	Good 0.05Km		Bad - -	20m 18m 20m	2 2 2	12m 10m 12m	4m / 4m 4m / 4m 4m / 4m
24.	St. 143	From St. Tep Phan182 (Km 0.0) ~ St. Yougoslavie214 (Km 0.15) ~ Preah Sihanouk Blvd. (Km 0.60) ~ Mao Tse Toung Blvd. (Km1.90)		Fair	Bad -	18m 18m 18m	2 2 2	8m 8m 8m	5m / 5m 5m / 5m 5m / 5m
25.	St. 155	Mao Tse Toung Blvd. (Km 0.0) ~ St. 440 (Km 0.40) ~ St. 456 (Km 0.60) ~ St. 488 (Km 1.20)			Bad - -	21.1 m 14.2 m 14 m	2 2 2	9m 8m 8m	6.3m / 5.8m 3.2 / 3m 3m / 3m
26.	St. 160	Mao Tse Toung Blvd. (Km 0.0) ~ St. 271 (Km 1.20)			Bad	14m	2	7m	3.5m / 3.5m
27.	St. 173	Preah Sihanouk Blvd. (Km 0.0) ~ St. 284 (Km 0.15) ~ St. 271 (Km 1.65)		Fair	Bad	16m 16m	2 2	8m 8m	4m / 4m 4m / 4m
28.	St. 183	Mao Tse Toung Blvd. (Km 0.0) ~ St. 402 (Km 0.10) ~ St. 271 (Km 0.45)	Good		Bad	16m 16m	2 2	8m 8m	4m / 4m 4m / 4m
29.	St. 192	From St. 247 (Km 0.0) ~ St. 267 (Km 0.95)			Bad	12m	2	6m	3m / 3m
30.	St. 199	Preah Sihanouk Blvd. (Km 0.0) ~ Mao Tse Toung Blvd. (Km 0.87) ~ St. 430 (Km 1.20)			Bad -	18m 18m	2 2	8m 8m	5m / 5m 5m / 5m
31.	St. 202	From St. 219 (Km 0.0) ~ St. 267 (Km 1.60)			Bad	15m	2	8m	3.5m / 3.5m
32.	St. 205	From St. 430 (Km 0.0) ~ Preah Sihanouk Blvd. (Km 1.20)			Bad	16m	2	6m	5m / 5m
33.	St. 211	From St. 134 (Km 0.0) ~ St. Tep Phan 182 (Km 0.50) ~ St. 206 (Km 0.70) ~ Preah Monireth Blvd. (Km 0.85)		Fair	Bad Bad	18m 11m 13m	2 2 2	8m 7m 7m	5m / 5m 2m / 2m 3m / 3m
34.	St. 221	From St. 156 (Km 0.0) ~ Russian Blvd. (Km 0.65)			Bad	14m	2	8m	3m / 3m
35.	St. Sangkareach Tieng (222)	Preah Monivong Blvd. (Km 0.0) ~ St. Pasteur51 (Km 0.20) (Km 0.75)		Fair	Bad		2 2		
36.	St. 223	From St. 156 (Km 0.0) ~ Preah Monireth217 (Km 1.0)			Bad	13m	2	7m	3m / 3m
37.	St. 232	Preah Monivong Blvd. (Km 0.0) ~ St. 163 (Km 0.55)			Bad	14m	2	8m	3m / 3m
38.	St. 247	From St. 182 (Km 0.0) ~ St. 202 (Km 0.20) ~ St. 356 (Km 0.85)			Bad -	15m 13m	2 2	8m 6m	3.5m / 3.5m 3.5m / 3.5m
39.	St. 253	From Russian Blvd. (Km 0.0) ~ St. 230 (Km 1.30)			Bad	17m	2	8m	4.5m / 4.5m
40.	St. 255	From St. 230 (Km 0.0) ~ St. 282 (Km 0.65)			Bad	14m	2	8m	3m / 3m
41.	St. 286	From St. 173 (Km 0.0) ~ St. 193 (Km 0.1) ~ St. 199 (Km 0.30) Preah Monireth217 (Km 0.65)	Good		Bad Bad	12m 24m 16m	2 2 2	6m 12m 8m	3m / 3m 6m / 6m 4m / 4m
42.	St. 290	From St. 201 (Km 0.0) ~ Preah Monireth Blvd. (Km 0.30)			Bad	14m	2	8m	3m / 3m
43.	St. 296	From St. 201 (Km 0.0) ~ Preah Monireth Blvd. (Km 0.30)			Bad	16m	2	8m	4m / 4m
44.	St. 318	From St. 173 (Km 0.0) ~ Preah Monivong Blvd. (Km 0.85)			Bad	18m	2	8m	5m / 5m
45.	St. 328	From St. 173 (Km 0.0) ~ Preah Monireth Blvd. (Km 0.90)			Bad	18m	2	8m	5m / 5m
46.	St. 344	From St. 265 (Km 0.0) ~ St. 255 (Km 0.25)			Bad	16m	2	8m	4m / 4m

47.	St. 348	From St. 173 (Km 0.0) ~ St 205 (Km 0.90) ~ Preah Monireth Blvd. (Km 1.0)		Fair	Bad	18m 18m	2 2	8m 8m	5m / 5m 5m / 5m
48.	St. 370	From St. 21 (Km 0.0) ~ St. 63 (Km 0.65)			Bad	18m	2	8m	5m / 5m
49.	St. 378	From St. 121 (Km 0.0) ~ St. 95 (Km 0.45)			Bad	14m	2	8m	3m / 3m
50.	St. 380	From St. 63 (Km 0.0) ~ Preah Norodom Blvd. (Km 0.40)			Bad	16m	2	8m	4m / 4m
51.	St. 382	From St. 265 (Km 0.0) ~ St. 255 (Km 0.15)			Bad	16m	2	10m	3m / 3m
52.	St. 422	Preah Monivong Blvd. (Km 0.0) ~ Preah Norodom Blvd. (Km 0.55)		Fair		18m	2	8m	5m / 5m
53.	St. 430	Preah Monireth Blvd. (Km 0.0) ~ St. 123 (Km 3.36)			Bad	18m	2	8m	5m / 5m
54.	St. 432	From St. 173 (Km 0.0) ~ Preah Monivong Blvd. (Km 1.45)			Bad	14m	2	8m	3m / 3m
55.	Oknha Nhek Tioulong (466)	From St. 103 (Km 0.0) ~ Preah Monivong Blvd. (Km 0.20) ~ Preah Norodom Blvd. (Km 0.80)		Fair	Bad	16m 18m	2 2	8m 8m	4m / 4m 5m / 5m

A5.2 NATIONAL ROAD NETWORK

Among 23 provinces in the entire nation, there are five (5) provinces which are not served by the principal National Roads (NRs) with single-digit numbers; namely, Mondol Kiri, Rotanak Kiri, Preah Vhear, Otdar Meanchey and Pailin. These provinces are connected to the NR's with single-digit numbers via NRs with double-digit numbers, and, thus, indirectly served by the principal NRs.

Figure A 52-1 shows the National Road network in the area adjacent to the Study Area. All the principal NRs, except NR 7, are connected to Phnom Penh. NR 7 is not directly connected to Phnom Penh, but joins NR 6 at Skun, Kampong Cham Province, a city located about 55 km northeast of Phnom Penh, and NR 6 enters Phnom Penh with about 100 km travel distance from Skun. Thus, practically, all the principal NRs are centered in Phnom Penh. It may be said, therefore, traffic condition in the Phnom Penh area influences the economic or any other activities of the entire nation.

Table A 5-2-1 shows the population served, directly or indirectly, by the principal NRs. These principal NR's have been, and are being rehabilitated with assistance of the donors after the end of the Civil War. Accordingly, traffic volume on these NRs is expected to increase in the future, and, consequently, the traffic volume flowing into and flowing out the Study Area is also expected to increase.

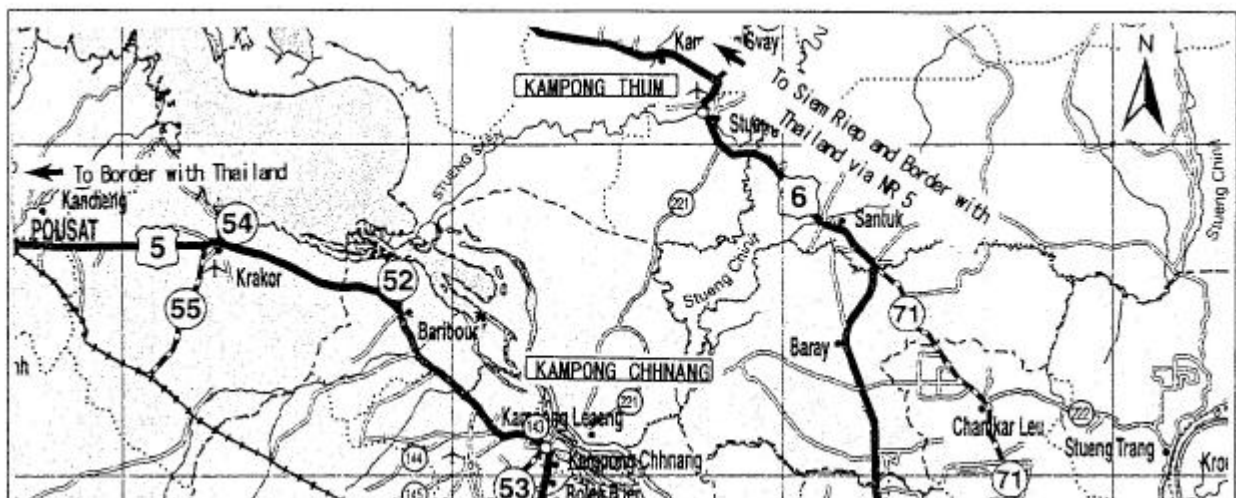
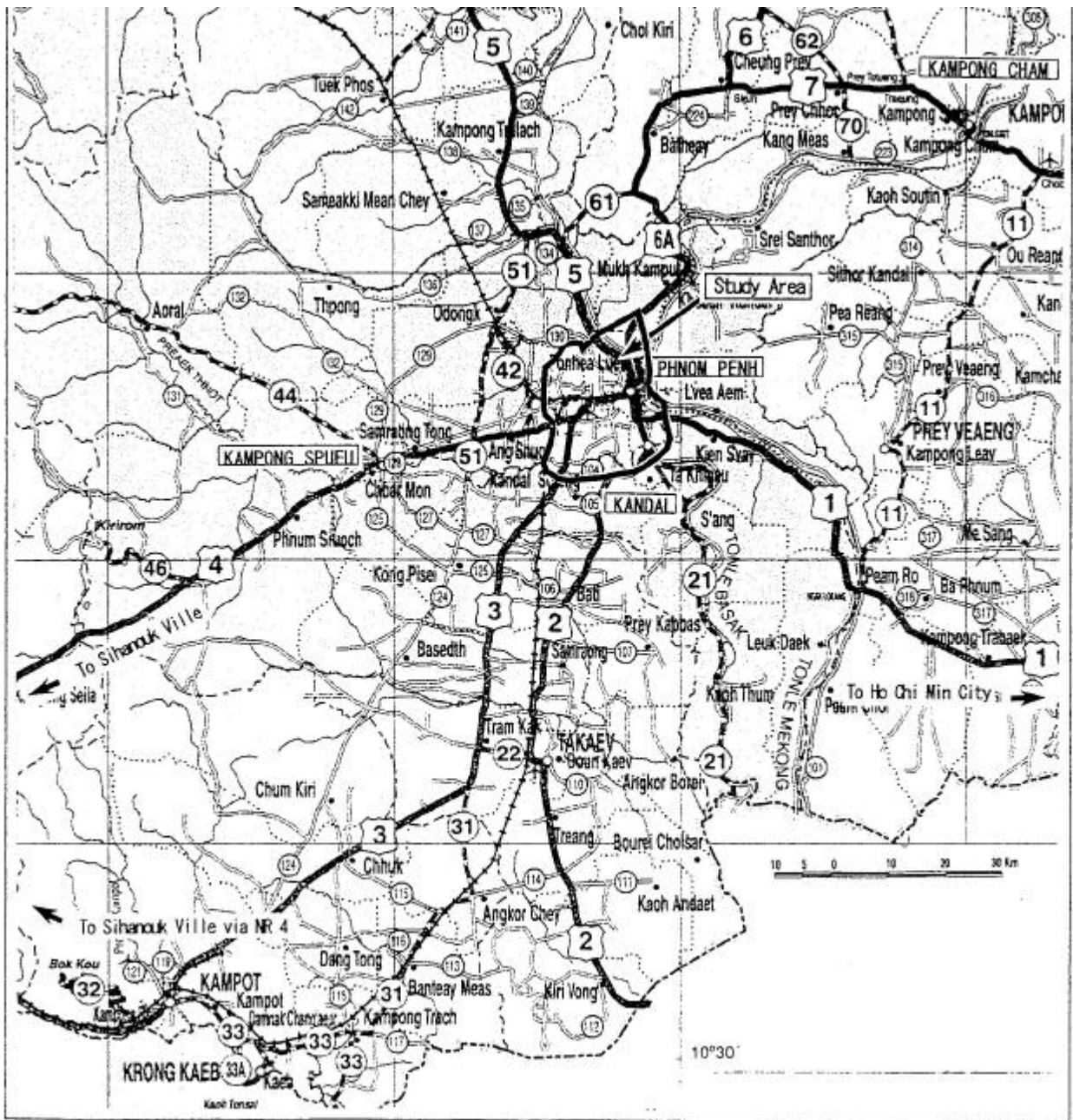


Figure A5.2-1 National Road Network in the Area Surrounding Phnom Penh

Table A5.2-1 Population Served by National Roads

NR No	Province Served by NR	Entire Population (1,000)	% Served by NR	Pop. Served by NR (1000)	Total	% of National Population (exclud MPP)
1	(Kandal)	1,075	15	161	1,585	15.27
	Prey Veng	946	100	946		
	Svay Rieng	478	100	478		
2	(Kandal)	1,075	25	269	822	7.91
	(Takeo)	790	70	553		
3	(Kandal)	1,075	12.5	134	1,094	10.53
	(Takeo)	790	30	237		
	(Kampong Spueu)	599	20	120		
	(Kampot)	528	100	528		
	(Krong Preah Sihanouk)	155	30	47		
	Krong Kaep	28	100	28		
4	(Kandal)	1,075	12.5	134	808	7.78
	(Kampong Spueu)	599	80	479		
	Kaoh Kong	132	100	132		
	(Krong Preah Sihanouk)	155	40	62		
5	(Kandal)	1,075	17.5	188	2,127	20.48
	Kampong Chhnang	417	100	417		
	Pousat	360	100	360		
	Bat Dambang	793	100	793		
	Palin	22	100	22		
	(Banteay Meanchey)	578	60	347		
6	(Kandal)	1,075	17.5	188	2,195	21.14
	(Kampong Cham)	1,608	20	322		
	Kampong Thum	569	100	569		
	Preah Vihear	119	100	119		
	Siem Riap	698	100	698		
	(Banteay Meanchey)	578	40	231		
	Otdar Meanchey	68	100	68		
	(Kampong Cham)	1,608	80	1,286		
Kratie	260	100	260			
Steung Traeng	81	100	81			
Mondol Kiri	32	100	32			
Rotanak Kiri	94	100	94			
(6+7)					(3,948)	(38.02)
Total				10,384	10,384	100.00

A5.3 LOCATION OF UNFAVORABLE HORIZONTAL ALIGNMENT

As for horizontal alignment roads in the Study Area have only few problems. Unfavorable horizontal curve is found (1) along NR 1, in front of Chbar Ampauv Market located adjacent to the east end of Preah Monivong Bridge, and (2) along the Inner Ring Road, about 50 meter north of the intersection with Samdach Monireth Street near a pumping station.

- (1) The section of NR 1 in front of Chbar Ampauv Market

This section has a kind of Z-shaped horizontal alignment and is hindering smooth flow of the traffic.



Figure A.5-3-1 Undesirable Horizontal Alignment in Front of the Chbar Ampauv Market on the East Side of Preah Monivong Bridge

- (2) The section of the Inner Ring Road in the north of its intersection with Samdach Monireth Street:

This section has S-shape alignment with small radii and, as a result, necessary sight distance is not secured. However, under the present circumstance, travel speed of the vehicles is limited by the poor surface condition and narrow width of the road, and this unfavorable alignment is not causing traffic hazard nor congestion. When the pavement will be improved and the vehicles will run at higher speed, this section can possibly be hazardous. Thus, careful examination of the alignment is necessary before the improvement.

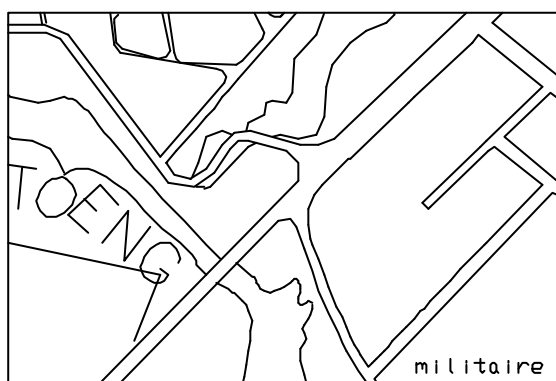


Figure A 5-3-2. Small-radius Curve of Inner Ring Road in the North of the Intersection with Samdach Monireth Blvd

A5.4 BRIDGE STRUCTURE AND CONDITIONS

There are 30 bridges in the Study Area according to the list of DPWT, MPP and DPWT of Kandal Province. Many of these bridges are severely damaged and are not capable of supporting the necessary load. The present conditions of these bridges were inspected by the Study Team. The locations of the bridges are shown in the main test. Figure A 5-4-1 shows the locations of the bridges in the Study Area. Table A5.4-1 summarizes the problems of the bridges.

(1) Bridges in the Urban Area

There are three (3) major bridges on the fringe of the urban area of Phnom Penh; Japan Bridge (Chruoy Changvar Br.), Monivong Bridge and Steung Mean Chey Bridge. All of these bridges are judged to be structurally in good conditions.

Japan Bridge was reconstructed in 1994 by Japan's grant aid, and is judged to be structurally in good condition.

Monivong Bridge is estimated to have been constructed shortly after Cambodia's independence from France in 1949. Special inspection of Monivong Br. was carried out by a joint team consisting of JICA Expert of MPWT, bridge engineer of MPWT, local consultant, the Study Team and the Counterpart engineers. The result of inspection showed that the bridge is structurally intact although it is about 40 years old.

No detailed data are available for **Steung Mean Chey Bridge**. With eye-inspection, the bridge is judged to be intact in structure although the width is not sufficient for the heavy traffic volume. Widening of the bridge or construction of a new bridge may become necessary in the future, not because of the structural deficiency but because of insufficient traffic capacity of the existing bridge.

In addition to those three major bridges, there are two (2) minor bridges in the urban area: one on St. 336 and other on St. 488. The both bridges are of tentative nature in structure, but catering the present traffic with little problem. In future, however, these bridges need improvement both in dimension and structure as the traffic volume increases and the vehicles become heavier.

(2) Bridges in the Suburban Area

Bridges on National Roads

There are nine (9) bridges along NR 6 in the Study Area. All of these bridges seem to have been designed and constructed in the same period because they have same structure. Basic structure of these bridges are reinforced concrete simple beam of 12 meter span with 9 .1 meter wide carriageway. The number of span varies from one to five depending on the necessary length of the bridge. According to the memory of the local people, these bridges were constructed in 1962. Despite considerable time after construction, these bridges are structurally in good condition. Problems of the bridges NR 2 and Outer Ring Road are summarized in Table A5.4-1.

Bridges on Municipal and Provincial Roads

Majority of the bridges on the Municipal roads are of temporary structure and in very bad conditions. Some of them can support only pedestrians and motorcycles. Almost all of the rest can carry only light motored-vehicles (passenger cars and light trucks with light or no cargo). They are hampering smooth transportation of people and goods. The rehabilitation/upgrading of these bridges are urgent need for the daily life of the citizens.

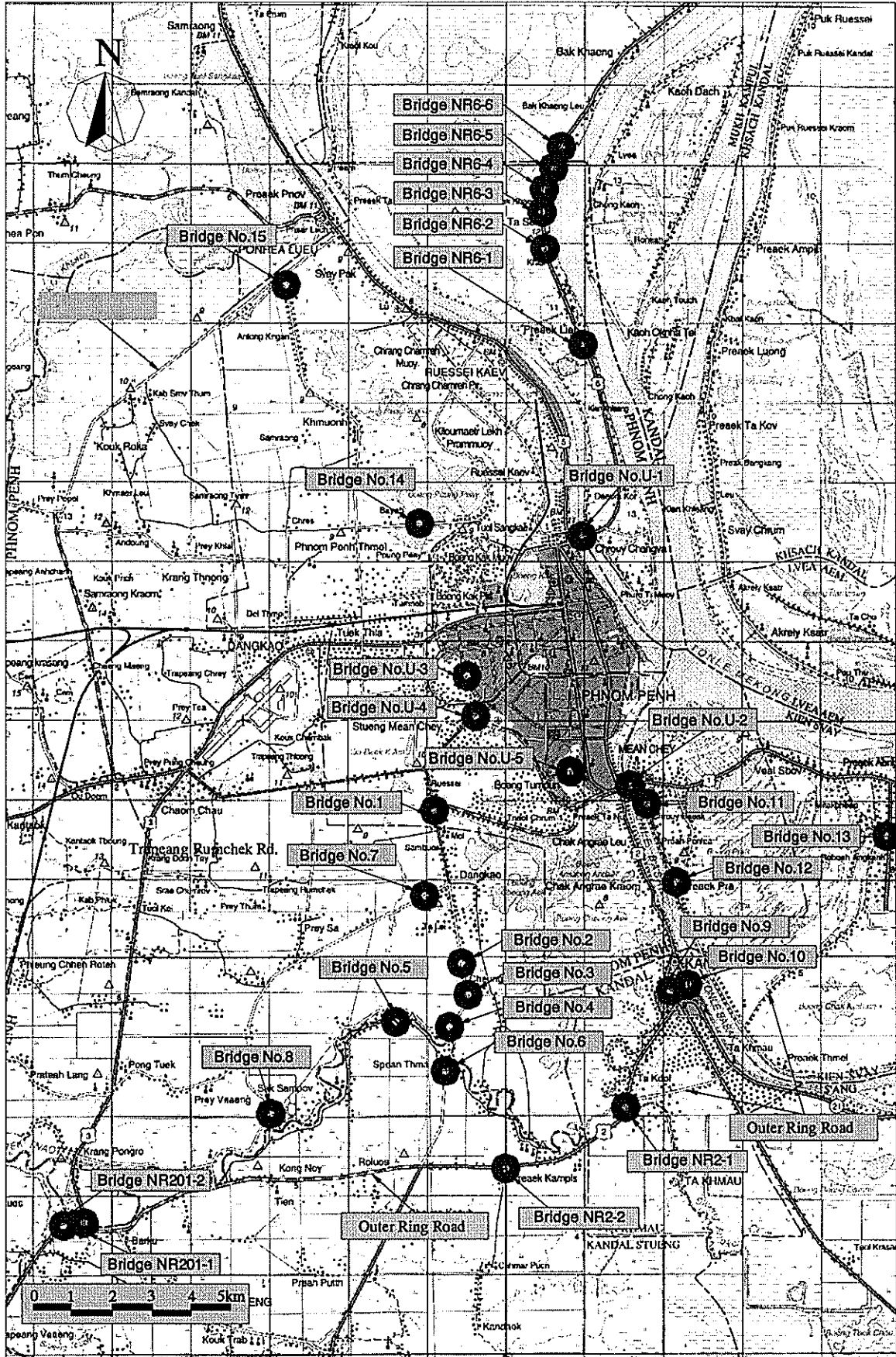


Figure A5.4-1 Location Map of Bridges

Table A5.4-1 Summary of Defective Bridges in the Study Area

(1) Urban Area

No.	Br. Name/ Location/Road	Problem	Remarks
U3	Steung Mean Chey	Too narrow; traffic bottleneck of the principal arterial road (Monireth Blvd)	
U4	Boeng Salang/ St. 336	Temporary structure	
U5	Boeng Trabaek/ St.484	Temporary structure	

(2) Suburban Area

(a) Municipal Roads

No	Location/Road	Problem	Remarks
1	Ruessei/Prey Sa Rd	Temporary structure; partly damaged; narrow (W = 4 m) Estimated load limit 5 tons	Substantial traffic volume; need urgent repair/ replacement
2	Cheung Aek 1	Temporary structure for both superstructure and substructure; can support only light vehicles; narrow (W = 4.2 m);	Entire structure is temporary; need urgent replacement
3	Cheung Aek 2	Temporary structure; narrow (W = 4 m); can support only light vehicles	Substructure is very old; need urgent replacement
4	Cheung Aek 3	Temporary wooden structure; can support only motorcycles and pedestrians	Need urgent replacement
5	Bakou 1	Temporary superstructure (W = 2 m: steel); old bridge was wider (5 m?); For motorcycles and pedestrians only	Present traffic volume low because of poor condition of other bridges?
6	Bakou 2	Super structure removed; access road used to be important road connecting NR and Monireth Blvd?	Only 2 piers and 1 abutment remains
7	Sambo	Severely damaged; narrow (W = 3 m); light vehicles only	Need urgent repair/ replacement
11	Russei Sros/ Preaek Pra Rd	Severely deteriorated; load limit 10 tons?; narrow (W = 5 m); traffic bottleneck	
12	Cham/Preaek Pra Rd	Temporary structure; deteriorated; narrow (W = 3 m); traffic bottleneck	Need urgent replacement
14	Bayab	Temporary structure; load limit 5 tons?	

(b) National Road and Outer Ring Road

No.	Br. Name/ Location/Road	Problem	Remarks
NR 2-1	Preaek Hor/NR 2	Narrow and old	Load limit 10 t ?
NR 2-2	Preaek Roteang/NR 2	Temporary structure ; Needs to be replaced by permanent structure	
NR201-1	Kompong Toul/ORR	Superstructure removed; presently detoured to the nearby dam	
NR201-2	Kompong Toul/ORR	Old bridge destroyed; a poor wooden bridge constructed	

A5.5 INTERSECTION WITH UNFAVORABLE CONFIGURATION

(1) General

Intersections often become traffic bottlenecks because the traffic of two or more roads meets at one place. When the geometry of an intersection is not favorable, traffic congestion there becomes severe.

The intersections in the Study Area, both in the urban and suburban area, generally have good geometry owing to flat topography and enough side clearance. However, the following problems can be pointed out.

- (a) Roundabout intersection with the central island of small diameter
- (b) Intersection with skewed intersecting angle
- (c) Intersection with more than four (4) legs

These types of intersections tend to have less traffic capacity than those with regular geometry. Presently, many of such intersections in Phnom Penh are not constituting bottlenecks owing to the mutual adjustment of the drivers. In the future, however, these intersections may become bottlenecks as the traffic volume will increase. Problems are described in the sections below.

(2) Roundabout Intersection

There are nine (9) roundabout intersections (RAI) in the urban area. There is one RAI in the suburban area which is located at the intersection of NRs 3 and 4.

When the central island of a RAI is large enough, such as 100 meters, sufficient weaving length is secured for the traffic and the traffic flow is smooth. Contrary, when the diameter of the central island is small, smooth flow of the traffic can not be attained.

Among those total ten (10) RAI's, four (Old Stadium RAI, Wat Phnom RAI, Victory Monument RAI and RAI of NRs 3 and 4) have the central islands with relatively large diameter, and are not imposing serious hindrance to the traffic.

Two RAI's on Street 163, one located near the Inner Ring Road and the other near the Olympic Stadium have central islands with small diameter ($D=10-15$ m?). However, these RAI's are not bottlenecks because the traffic volume passing them are relatively small.

Serious traffic congestion is seen at the remaining four RAI's, namely, three RAI's on Samdach Monireth/ Charles de Gaulle Blvd and one on the west side of Preah Monivong Bridge. Especially, at intersections of Samdach Monireth Blvd with Sihanouk/ Jawaharal Nerhu Blvd, the island is not only small in diameter but also located eccentric from the intersecting point of the center lines of the road. At the intersection of Samdach Monireth/ Charles de Gaulle Blvd with Oknha Tep Phan St., five legs are joining. Both of these configurations are the cause of the severe congestion. Figure A.5-5-1 shows the geometry of those intersections.

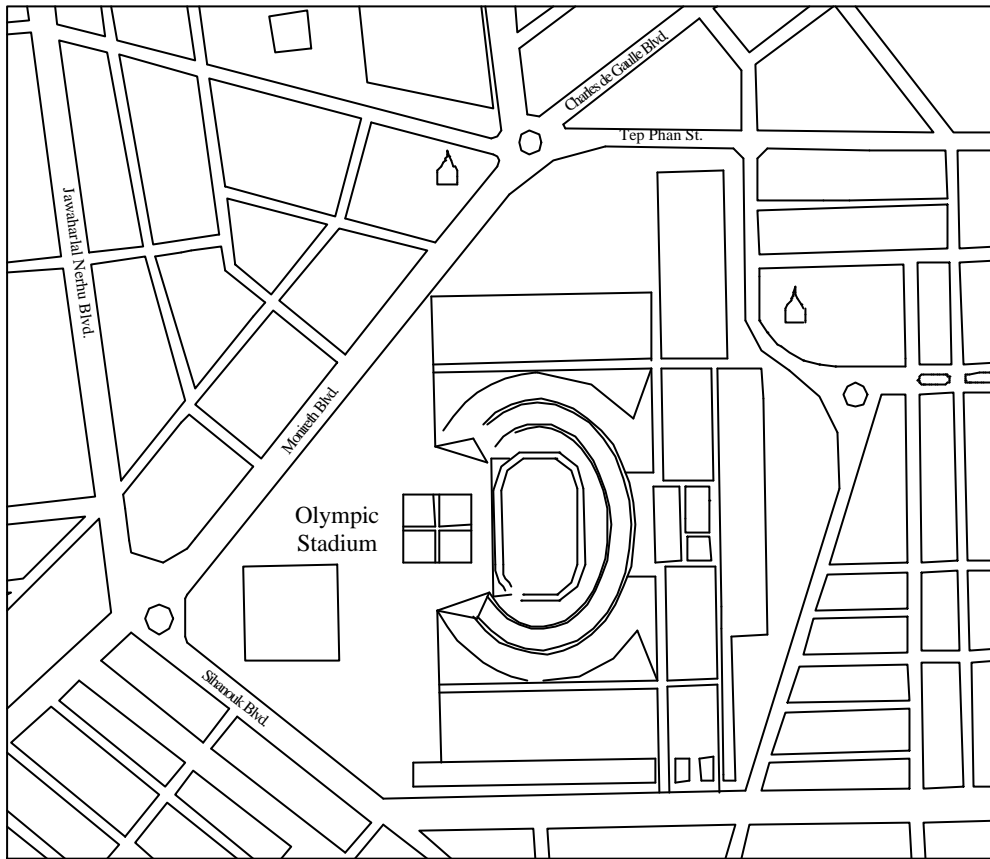


Figure A.5-5-1 Configuration of Two RAI's on Samdach Monireth/ Charles de Gaulle Blvd.

(3) Intersection with Skew Intersecting Angle

When two roads intersect at skew angle, the capacity of the intersection becomes smaller than the intersection with right angle. There are many intersections with skew angle along Monireth/ Charles de Gaulle Blvd. Among them most prominent example is the intersection with Monivong Blvd. Presently, left turn on Preah Monivong Blvd is prohibited at this intersection and, thus skew intersecting angle is not constituting main cause of traffic congestion. However, if this regulation of left turn will be lifted in the future, this skew angle may cause traffic congestion.

Another prominent example of skew intersection is the one on Preah Sihanouk Blvd with Street 199 near the Olympic Market. Because of its irregular geometry, this intersection is constituting one of the bottlenecks along Sihanouk Blvd.

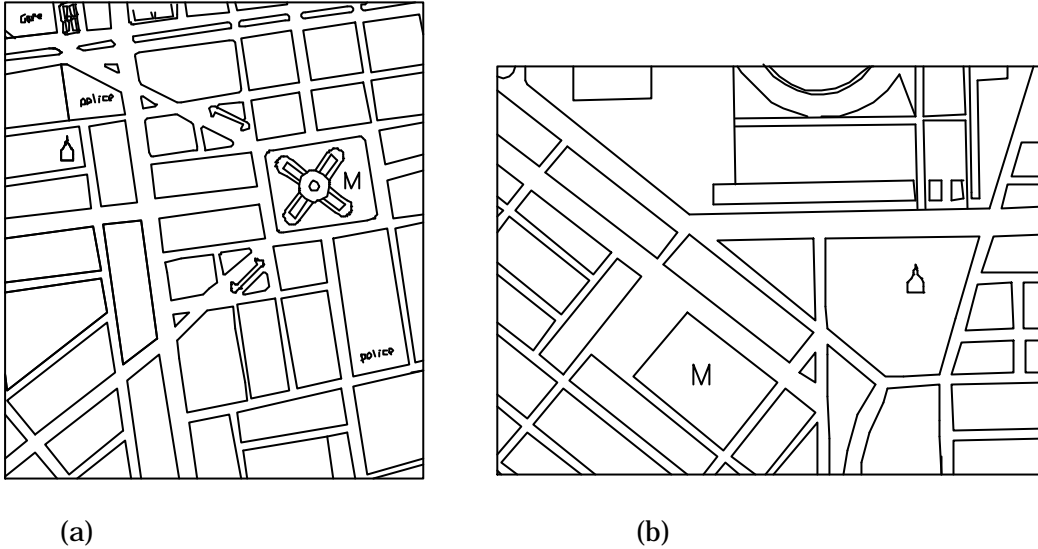


Figure A.5-5-2 Skewed Intersection of Monivong Blvd with Charles de Gaulle Blvd (a) and Sihanouk Blvd with St 199 (b)

(4) Intersections with More Than Four Legs

Most common type of intersection has four (4) “legs”. Next to 4-legged intersections, 3-legged intersections, usually either T-shaped or Y-shaped, are common. When an intersection has more than four legs, the flow of traffic passing the intersection becomes complex and the capacity of the intersection becomes smaller than those of 4-legged or 3-legged intersections. An example of 5-legged intersection is seen at the intersection of Charles de Gaulle Blvd with Tep Phan Street and Tcheoslovaquie Blvd. Together with the small diameter of the central island, 5-leg geometry makes this intersection one of the constantly congested spot in the City (Figure A. 5-5-1).

A5.6 CONCEPT OF LEVEL OF SERVICE

(1) Concept

The concept of “level of service (LOS)” is widely used to describe the quality of traffic flow on a road. LOS is usually classified into six (6) categories of A to F. Highway Capacity Manual (HCM) published by Transportation Research Board, USA describes traffic condition for each LOS for urban arterial street as follows:

LOS A describes primary free-flow operations at average travel speeds usually about 90 percent of the free-flow speed for the arterial classification. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersections is minimal.

LOS B represents reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the arterial classification. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tension.

LOS C represents stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the average free-flow speed for the arterial classification. Motorists will experience appreciable tension while driving.

LOS D borders on a range in which small increases in flow may cause substantial increases in delay and hence decreases in arterial speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volume, or some combination of these factors. Average travel speeds are about 40 percent of free-flow speed.

LOS E is characterized by significant delays and average travel speeds of one-third the free-flow speed or less. Such operations are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

LOS F characterizes arterial flow at extremely low speeds below one-third to one-fourth of the free-flow speed. Intersection congestion is likely at critical signalized locations, with high delays and extensive queuing. Adverse progression is frequently a contributor to this condition.

(2) LOS by Travel Speed

HCM gives examples of LOS by travel speed for urban arterials. Table A.5-6-1 shows these examples of LOS by travel speed.

Table A.5-6-1 LOS of Urban Arterial

Arterial Classification	I	II	III
Typical Free Flow Speed, mph (km/hr)	40 (64)	33 (53)	27 (43)
LOS	Average Travel Speed, mph (km/hr)		
A	≥35 (56)	≥30 (48)	≥25 (40)
B	≥28 (45)	≥24 (38)	≥19 (30)
C	≥22 (35)	≥18 (29)	≥13 (21)
D	≥17 (27)	≥14 (22)	≥9 (14)
E	≥13 (21)	≥10 (16)	≥7 (11)
F	13 (21)	10 (16)	7 (11)

“Arterial Classification” in the above table is defined as the table below.

Table 5.7.5 Arterial Classifications According to Their Functional and Design Categories

DESIGN CATEGORY	FUNCTIONAL CATEGORY	
	PRINCIPAL ARTERIAL	MINOR ARTERIAL
Typical suburban	I	II
Intermediate	II	II or III
Typical urban	II or III	III

The urban area of Phnom Penh is regarded as “typical urban”, and considering the dense development along the streets, “Classification III” is applied here.

(3) LOS by v/c Ratio

The ratio of traffic volume, v to the capacity of the road, c is also commonly used as an index for LOS, especially of freeways where the traffic is not affected by intersections and signals. As for urban streets, this index can be used to evaluate the degree of congestion on a uniform road section between two intersections.

In the calculation of v/c ratio in this Study, the following assumptions were adopted.

Table 5.7.3 Basic Assumption for Evaluating LOS

Basic Capacity	2,500 pcu/hour/lane
Pcu Conversion Factor	Motorcycle: 0.5 Cyclo/bicycle: 0.5 Heavy vehicle: 3.0

A5.7 COMPREHENSIVE EVALUATION OF LOS

The factors to evaluate LOS (Level Of Service) for major arterial streets are shown in a comprehensive manner in the figures in this Appendix. The figures also show the characteristics of traffic flow expected with the LOS and assessment of the LOS. In the figures, it is seen that the traffic condition on Monivong Blvd is approaching the unacceptable level.

Figure A5.7-1 Traffic Flow Characteristics of France & Norodom Blvd's

Location	Japan Bridge	Watt Phnom	Russie	St.130	St.136	St.184	Sihanouk	Mao Tse Toung	Montivong Bridge
Schematic Diagram									
Section Length (km)	1.00	0.25	0.25	0.30	0.45	0.95	1.30	1.50	
Road Width / Condition	10m (2-lane) Fair	14m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane), Fair	18.5m (4-lane), Fair	18.5m (4-lane), Fair	
Sidewalk Width / Condition	10m (both)	6m (both)	7m (both)	7m (both) Car Parking	7m (both) Car Parking	7m (both)	6m (both)	6m (both)	
Intersection / Control Type	5-legs Large Size Roundabout	4-legs Large Size Roundabout	4-legs Large Size Roundabout	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs Large Size Roundabout	4-legs Large Size Roundabout	4-legs 2-phase 4-signal	4-legs Small Size Roundabout
Daytime Traffic Volume (vehicle/12h)	10000 20000 30000 40000 50000 60000 70000	Motorbike Light Vehicle Cycle/Bicycle Heavy Vehicle							
Travel Speed (km/h)	40 30 20 10	North bound South bound							
V/C Ratio / Congestion Degree	1.5 1.0 0.5	South bound North bound							
Level of Service (by Speed)	F E D C B A	South bound North bound							
Flow Characteristics	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow
Assessment	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Figure A.5.7-2(a) Traffic Flow Characteristics of Monivong Blvd. (1)

Location	Japan Bridge	Confederation de la Rusasic	Kampuchea Krom de-Gaullie	Tap Phan	Sihanouk	Mao Tse Toung	
Schematic Diagram							
Section Length (km)	1.50	0.30	0.20	0.60	0.70	1.35	
Road Width / Condition	18m (4-lane) Fair	18m (4-lane) Fair	18m (4-lane) Fair	18m (4-lane) Fair	18m (4-lane) Fair	18m (4-lane) Fair	
Sidewalk Width / Condition	6m (both)	6m (both) Car Parking	6m (both) Car Parking	6m (both) Car Parking	6m (both) Car Parking	6m (both) Car Parking	
Intersection / Control Type	5-legs Roundabout	5-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	
Daytime Traffic Volume (vehic/e/12h)	Motorbike 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000	Light Vehicle 20,000 40,000 60,000 80,000 100,000 120,000 140,000 160,000 180,000 200,000	Cycle/Bicycle 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000	Heavy Vehicle 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000			
Travel Speed (km/h)	40	30	20	10			
V/C Ratio / Congestion Degree	1.5	1.0	0.5				
Level of Service (by Speed)	F	E	D	C	B	A	
Flow Characteristics	Stable Flow Stable Flow	Approaching Unstable Flow Stable Flow	Stable Flow Approaching Unstable Flow	Stable Flow Approaching Stable Flow	Approaching Unstable Flow Approaching Unstable Flow	Stable Flow Stable Flow	
Assessment	Acceptable	Marginal	Marginal	Marginal	Marginal	Acceptable	

Figure A5.7-2(b) Traffic Flow Characteristics of Monivong Blvd. (2)

Location	Top Phan	Sihanouk	Mao Teu Toeing	Inner Ring Road	Norodom	Monivong Bridge
Schematic Diagram						
Section Length (km)	0.70	1.35	1.80	0.26		
Road Width / Condition	18m (4-lane) Fair	18m (4-lane) Fair	18m (4-lane) Partially Poor			
Sidewalk Width / Condition	6m (both) Car Parking	6m (both) Bike/Car Parking	6m (both)			
Intersection / Control Type	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	3-legs No Control	4-legs Roundabout	
Daytime Traffic Volume (vehicle/12h)	Motorbike 15000 7500 15000 7500 15000 7500 15000 7500 15000 7500					
	Light Vehicle 2000 1000 2000 1000 2000 1000 2000 1000 2000 1000					
	Cycle/Bicycle 500 250 500 250 500 250 500 250 500 250					
	Heavy Vehicle 500 250 500 250 500 250 500 250 500 250					
Travel Speed (km/h)	40 30 20 10					
	South bound North bound					
V/C Ratio / Congestion Degree	1.5 1.0 0.5					
	North bound South bound					
Level of Service (by Speed)	F E D C B A					
	North bound South bound					
Flow Characteristics	Approaching Unstable Flow Unstable Flow Stable Flow	Approaching Unstable Flow Unstable Flow Stable Flow	Approaching Unstable Flow Unstable Flow Stable Flow	Approaching Unstable Flow Unstable Flow Stable Flow	Approaching Unstable Flow Unstable Flow Stable Flow	Approaching Unstable Flow Unstable Flow Stable Flow
Assessment	Marginal	Marginal	Acceptable	Acceptable	Acceptable	Marginal

Figure A.5.7-3 Traffic Flow Characteristics of Charles de Gaulle & Monireth Blvd's

Location	Central Market	Top Phan	Sibaouk	Mao Tse Toung	SL271
Schematic Diagram					
Section Length (km)	0.25	0.95	0.72	0.88	0.56
Road Width / Condition	18m (4-lane) Fair	18m (4-lane) Poor	18m (4-lane) Fair	18m (4-lane) Fair	18.5m (4-lane) Poor
Sidewalk Width / Condition	5.8m (both)	5.7m (both) Car Parking	6m (both) Bike / Car Parking	6m (both) Car Parking	9.35m (both)
Intersection / Control Type	4-legs 2-phase 4-signal	5-legs Small Size Roundabout	4-legs Irregular Shaped Roundabout	4-legs Small Size Roundabout	4-legs Non Control
Daytime Traffic Volume (vehicle/12h)	10000 7500 5000 2500 1000	Light Vehicle Motorbike Cyclo/Bicycle Heavy Vehicle			
Travel Speed (km/h)	40 30 20 10	N-E bound S-W bound			
V/C Ratio / Congestion Degree	1.5 1.0 0.5	N-E bound S-W bound			
Level of Service (by Speed)	F E D C B A	N-E bound S-W bound			
Flow Characteristics	Stable Flow	Approaching Unstable Flow	Stable Flow	Stable Flow	Approaching Unstable Flow
Assessment	Acceptable	Marginal	Acceptable	Acceptable	Marginal

Figure A5.7-4 Traffic Flow Characteristics of Angduong & Confederation de la Russie Blvd's

Location	Norodom	Montivong	St.109	Tcheco-Slovakie	Nerhu	Mao Tse Tung	SL271	Pochentong International Airport
Schematic Diagram								
Section Length (km)	0.60	0.30	0.50	0.50	0.70	1.40		
Road Width / Condition	16m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	15m (4-lane) Fair	
Sidewalk Width / Condition	6m (both)	5.8m (both)	6m (both)	6m (both)	4.2m (both)	9.35m (both)		
Intersection / Control Type	4-legs 2-phase 4-signal	5-legs 2-phase 5-signal	4-legs 4-phase Non Control	3-legs 3-phase Non Control	3-legs 3-phase Non Control	4-legs 2-phase 4-signal	5-legs 2-phase Non Control	
Daytime Traffic Volume (vehicle/12h)	15000 7000 15000	15000 7000 15000	15000 7000 15000	15000 7000 15000	15000 7000 15000	15000 7000 15000	15000 7000 15000	
Travel Speed (km/h)	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	
V/C Ratio / Congestion Degree	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	
Level of Service (by Speed)	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	
Flow Characteristics	Approaching Unstable Flow Approaching Unstable Flow	Free Flow Stable Flow	Free Flow Stable Flow	Free Flow Stable Flow	Free Flow Stable Flow	Free Flow Stable Flow	Free Flow Stable Flow	Stable Flow Stable Flow
Assessment	Marginal	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Figure A5.7-5 Traffic Flow Characteristics of Mao Tse Toung Blvd.

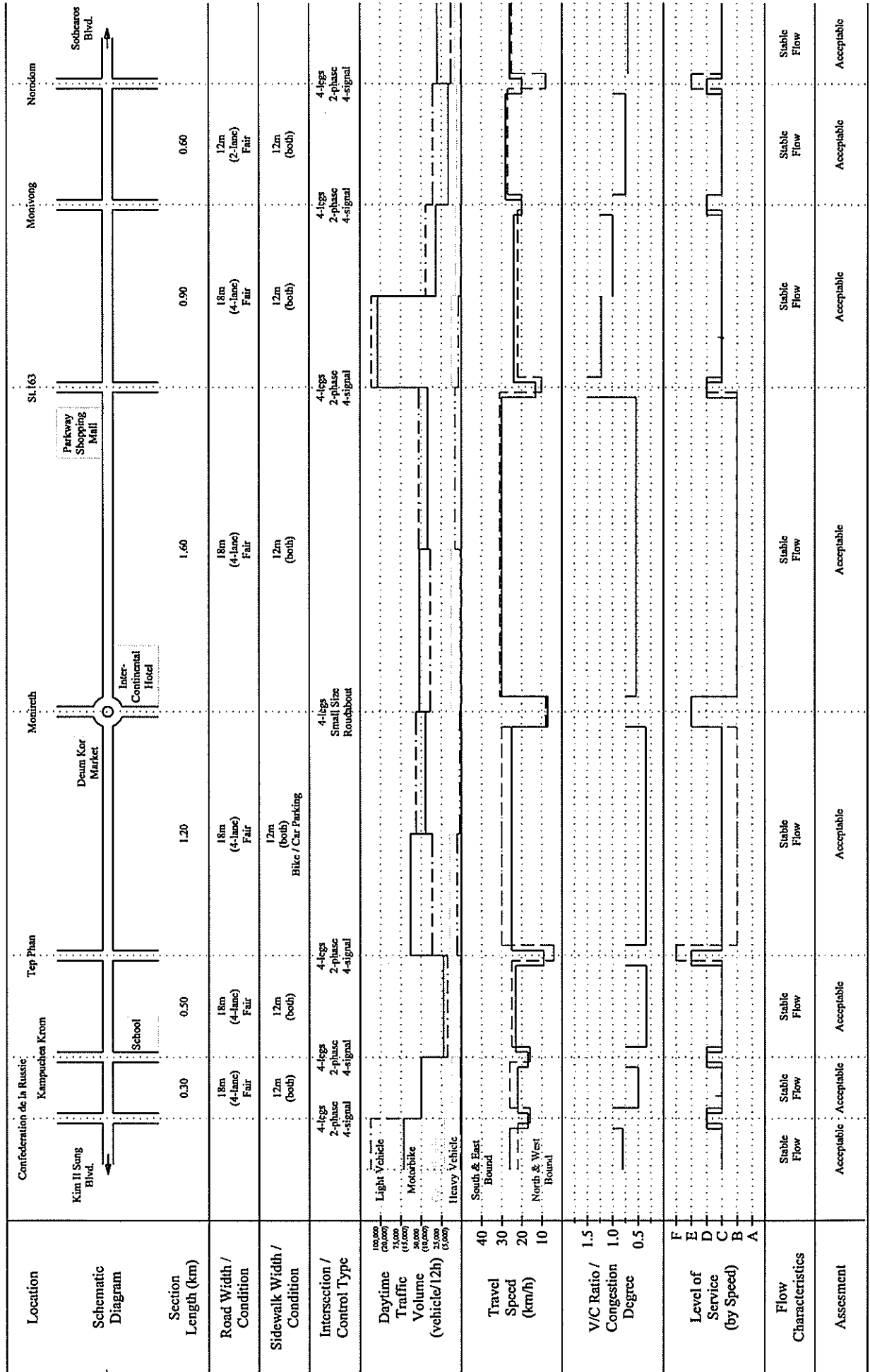


Figure A5.7-6 Traffic Flow Characteristics of Jawaharlal Nerhu & Sihanouk Blvd's

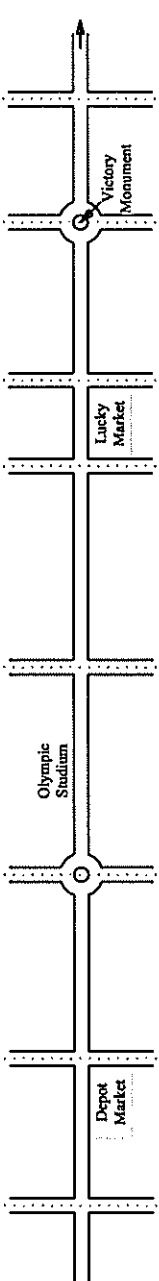
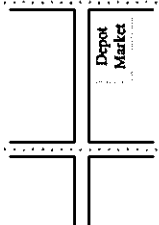
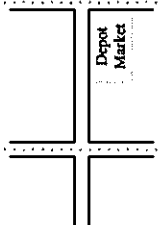
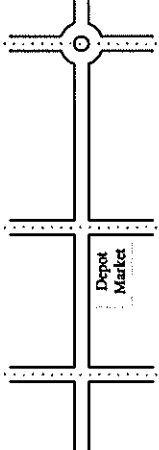
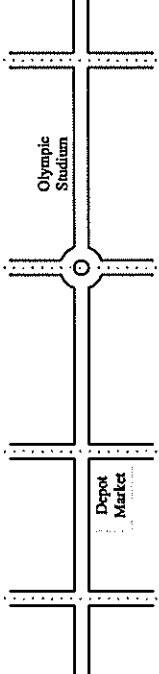
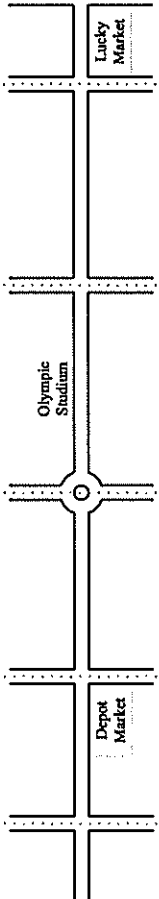
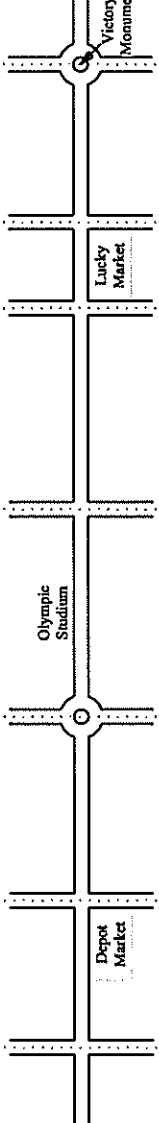
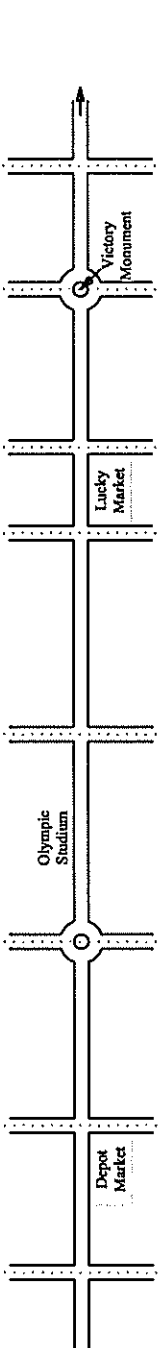
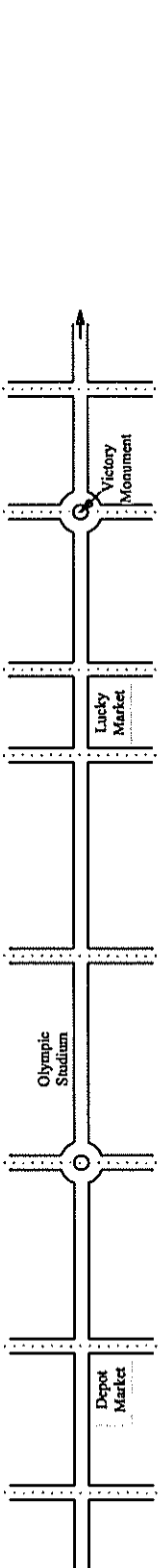
Location	Confederation de la Russie	Kampuchea Krom	Tep Phan	Monireb	SL163	Monivong	St.63	Norodom	Solhears
Schematic Diagram									
Section Length (km)	0.30	0.51	0.64	0.72	0.70	0.85	0.43		
Road Width / Condition	18m (4-lane) Fair	18m (4-lane) Fair	18m (4-lane) Fair	18.5m (4-lane) Fair	18.5m (4-lane) Fair	18.5m (4-lane) Fair	17m (4-lane) Fair		
Sidewalk Width / Condition	12m (both)	12m (both) Bike / Car Parking	12m (both)	11.5m (both) Fruit Shops Car Parking	12m (both) Bike / Car Parking	12m (both) Restaurants Car Parking	12m (both) Restaurants Car Parking	12m (both) Park	
Intersection / Control Type	3-legs No Control	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs Irregular Shaped Roundabout	4-legs 2-phase 4-signal	4-legs 2-phase 4-signal	4-legs Roundabout	4-legs No Control	
Daytime Traffic Volume (vehicle/12h)	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000	10,000 20,000 30,000 40,000
Travel Speed (km/h)	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10	40 30 20 10
V/C Ratio / Congestion Degree	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5	1.5 1.0 0.5
Level of Service (by Speed)	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A	F E D C B A
Flow Characteristics	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Approaching Unstable Flow	Stable Flow	Stable Flow
Assessment	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Marginal	Acceptable	Acceptable

Figure A5.7-7 Traffic Flow Characteristics of Preah Sisowath & Sothearos Blvd's

Location	Japan Perah Bridge Port	Preah Baksei Chamkrong 94	St.106 & 108	Deakho Damdin 154	St.184 SL178	Okeha Chhun 240	Preah Sihanouk 274	Preah Norodom
Schematic Diagram								
Section Length (km)	0.16	1.09	0.40	0.60	0.23	0.15	0.69	1.50
Road Width / Condition	10m	10m	10m	20m	10m	18m	15m	9m
Sidewalk Width / Condition	4.25m	6.0m (both)	6.0m (both)	5.5m (both)	1.5m	3.8m	8.0m	5.5m
Intersection / Control Type	3-legs No Control	3-legs No Control	3-legs No Control	4-legs No Control	4-legs No Control	4-legs No Control	4-legs No Control	4-legs 2-phase 4-signal
Daytime Traffic Volume (vehicle/12h)	10000 (2000) 7500 (1500) 5000 (1000) 2500 (500)							
	Motorbike Light Vehicle Cyclo/Bicycle Heavy Vehicle							
Travel Speed (km/h)	40 30 20 10							
	North bound South bound							
V/C Ratio / Congestion Degree	1.5 1.0 0.5							
	South bound North bound							
Level of Service	F E D C B A							
	North bound South bound							
Flow Characteristics	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow	Stable Flow
Assessment	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable