ខេ-ក្លូបិល ខនសាល់ធេន & អេនជីនារីង ឯ.ក

K-GLOBAL CONSULTANTS & ENGINEERING CO.,LTD

STUDY ON TRAFFIC IMPROVEMENT IN PHNOM PENH

OCTOBER 2024

Presentation Outline

I. Current Condition & Issues on Urban Transport in PP

II. Proposed Traffic Improvement Plan

I. Current Condition & Issues on Urban Transport in Phnom Penh

Urban Development

- Urban sprawl & population decrease in CBD (AAGR: CBD: -3.82%, Suburban + 2.43%)
- Transport infra. mega projects in suburban area (intl. airport, expressway, ring road 3)

Transport Infra. & Facilities

- Rapid increase of private veh. (1.8 times in 2021 compared to 2013), RHS veh. (1.5 times in 2017 compared to 2014)
- Privatized sidewalk, lack of bus stop/terminal, transit facilities and parking facilities

Institution & Regulation

- Absence of agreed transport master plan (Inconsistency with long-term budget plan)
- Absence of traffic management unit, transport planning and coordination agency

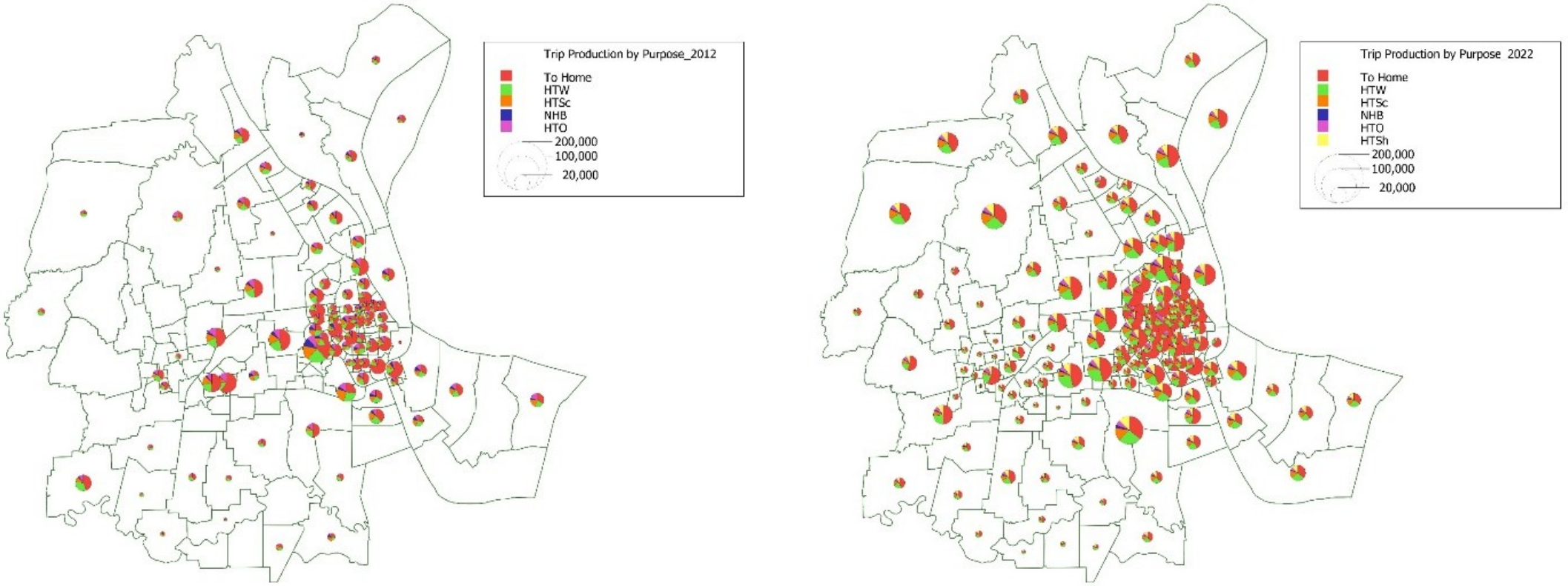
Transport Services

- Unreliable City Bus (low speed, frequency, punctuality), new transport service (RHS)
- Traffic congestion (Average speed 14.4km/h in 2022)

Source: JICA 2023, Final Report on Data collection Survey on Urban Transport in Phnom Penh

I. Current Condition & Issues on Urban Transport in Phnom Penh

Trip Production by Purpose in 2012 & 2022



Source: JICA 2023, Final Report on Data collection Survey on Urban Transport in Phnom Penh

- Total trip generation volume 5.6 millions in 2022 (4.3 million trips in 2012)
- To home trip shares 49%, followed by HTW (21%), HTSc (12%), HTSh (10%), Others

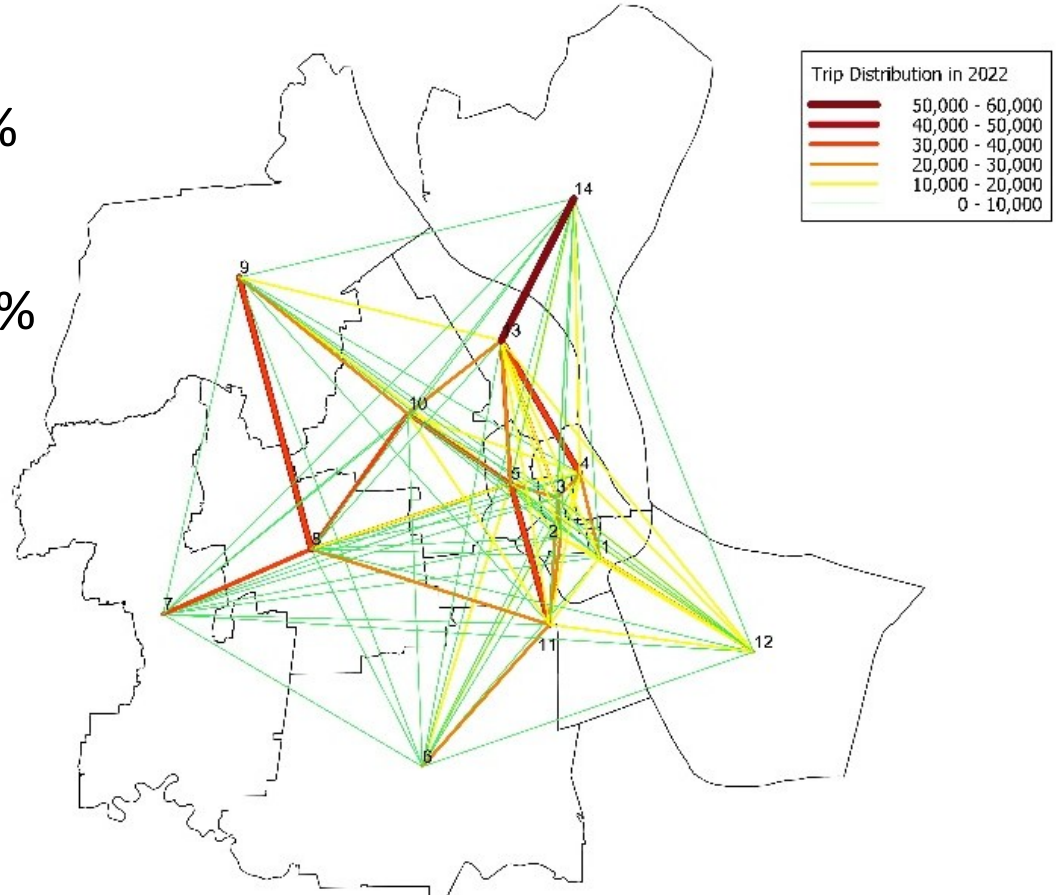
Estimated Congestion Cost: 5.6 mil x 69% x 0.5 USD= 1.93 mil USD

Only true cost (gasoline) while environmental impacts, mental health burden, and other impacts are not included.

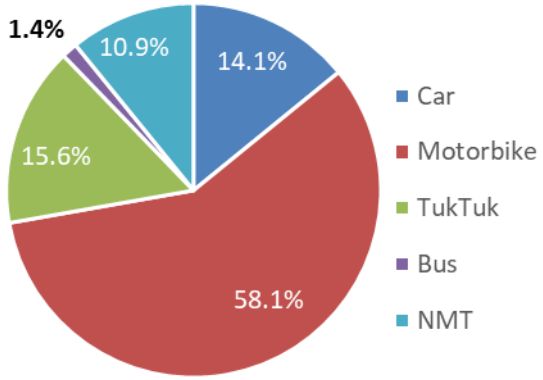
I. Current Condition & Issues on Urban Transport in Phnom Penh

- Trips share within CBD 22%
- Trips share between CBD and Suburban area 20%
- Trips shares within suburban area 58%
- Modal share of public transport is still limited 15%

Trip Distribution in 2022



Mode Share in 2022



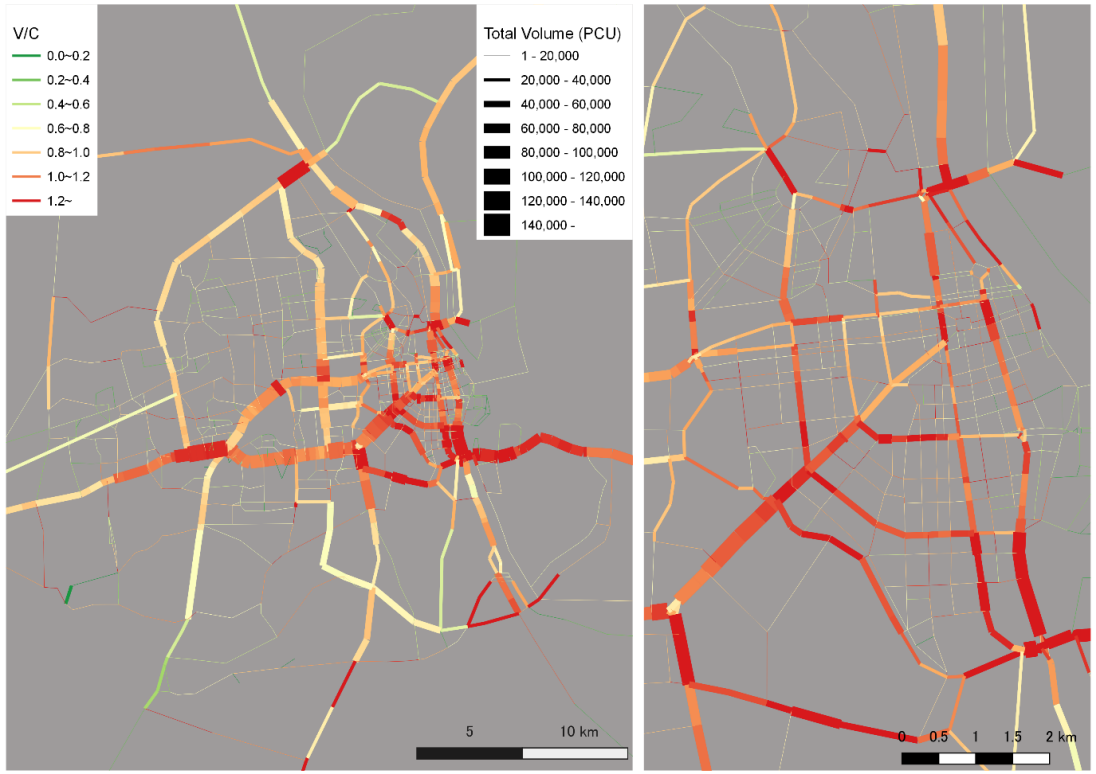
CBD: Chamkar Mon, Boeng Keng Kang, Doun Penh, 7 Makara, Toul Kork

Suburban: other Khans in PPCA

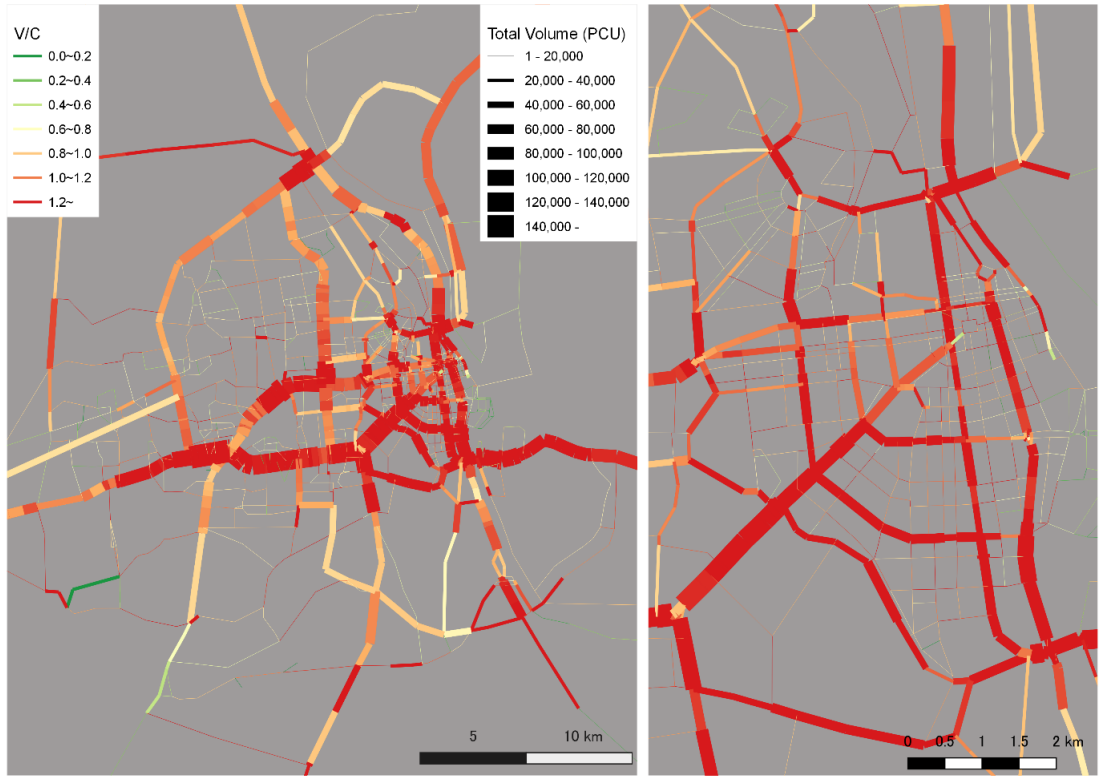
Source: JICA 2023, Final Report on Data collection Survey on Urban Transport in Phnom Penh

I. Current Condition & Issues on Urban Transport in Phnom Penh

Traffic Demand in 2022 (Validation)



Traffic Demand in 2035 (Do Nothing Scenario)



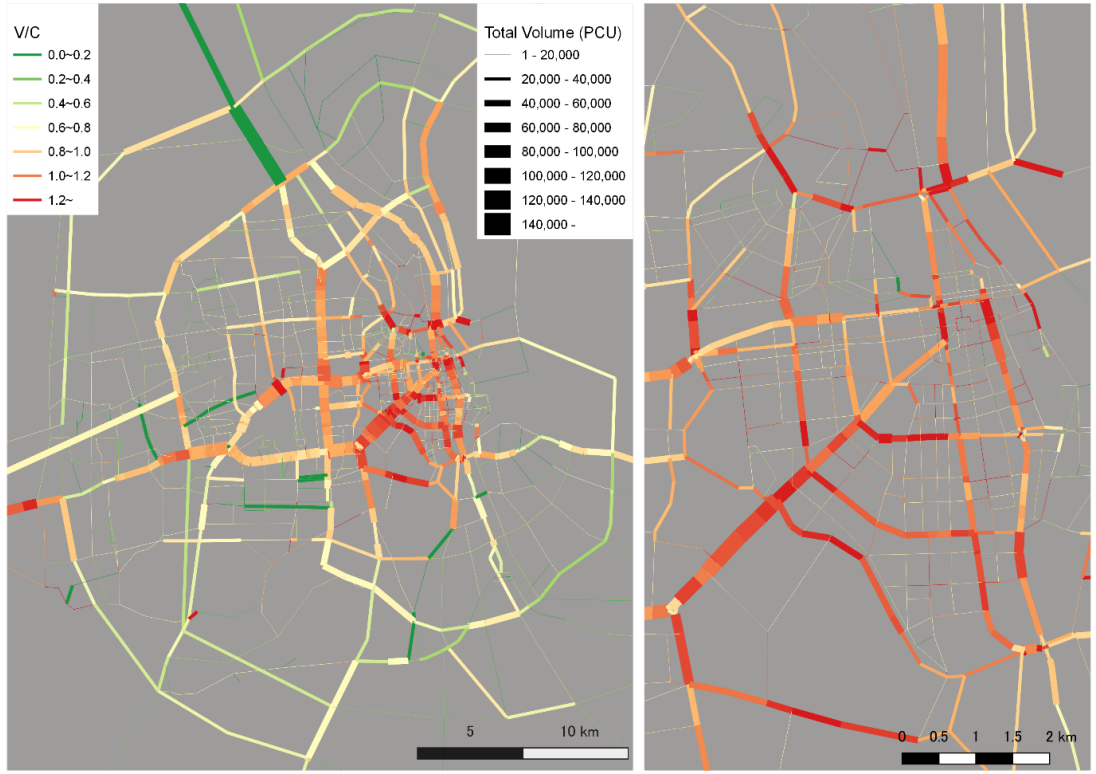
Source: JICA 2023, Final Report on Data collection Survey on Urban Transport in Phnom Penh

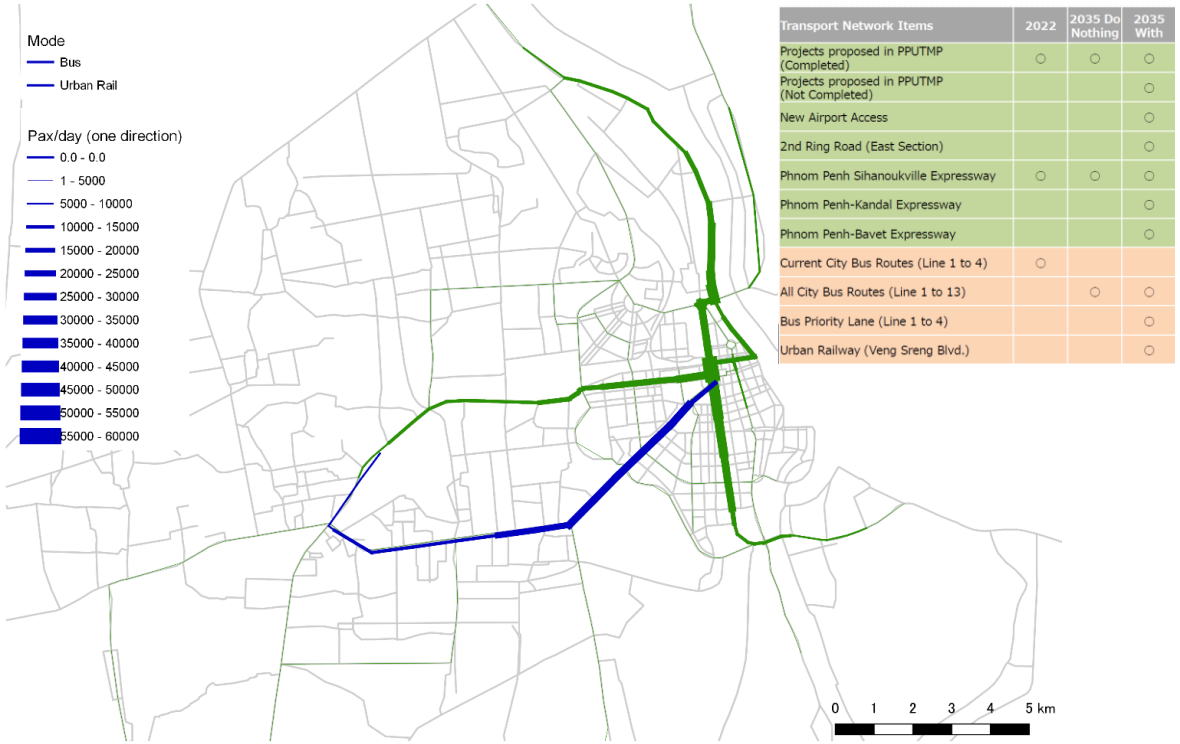
- Network assignment results of residents and non-resident OD by vehicle type
- Estimated average congestion ratio 69% (CBD 81%)

- Estimated average congestion ratio 93% (CBD 105%)
- Modal share of public transport is estimated only 2.1% of inter TAZ trip.

I. Current Condition & Issues on Urban Transport in Phnom Penh

Traffic Demand in 2035 (With Scenario)





Transport Network Items	2022	2035 Do Nothing	2035 With
Projects proposed in PPUTMP (Completed)	○	○	○
Projects proposed in PPUTMP (Not Completed)			○
New Airport Access			○
2nd Ring Road (East Section)			○
Phnom Penh Sihanoukville Expressway	○	○	○
Phnom Penh-Kandal Expressway			○
Phnom Penh-Bavet Expressway			○
Current City Bus Routes (Line 1 to 4)	○		
All City Bus Routes (Line 1 to 13)		○	○
Bus Priority Lane (Line 1 to 4)			○
Urban Railway (Veng Sreng Blvd.)			○

Source: JICA 2023, Final Report on Data collection Survey on Urban Transport in Phnom Penh

- Estimated average congestion ratio 51% (CBD 81%)
- Modal share of public transport is estimated at 8.6% of inter TAZ trip.



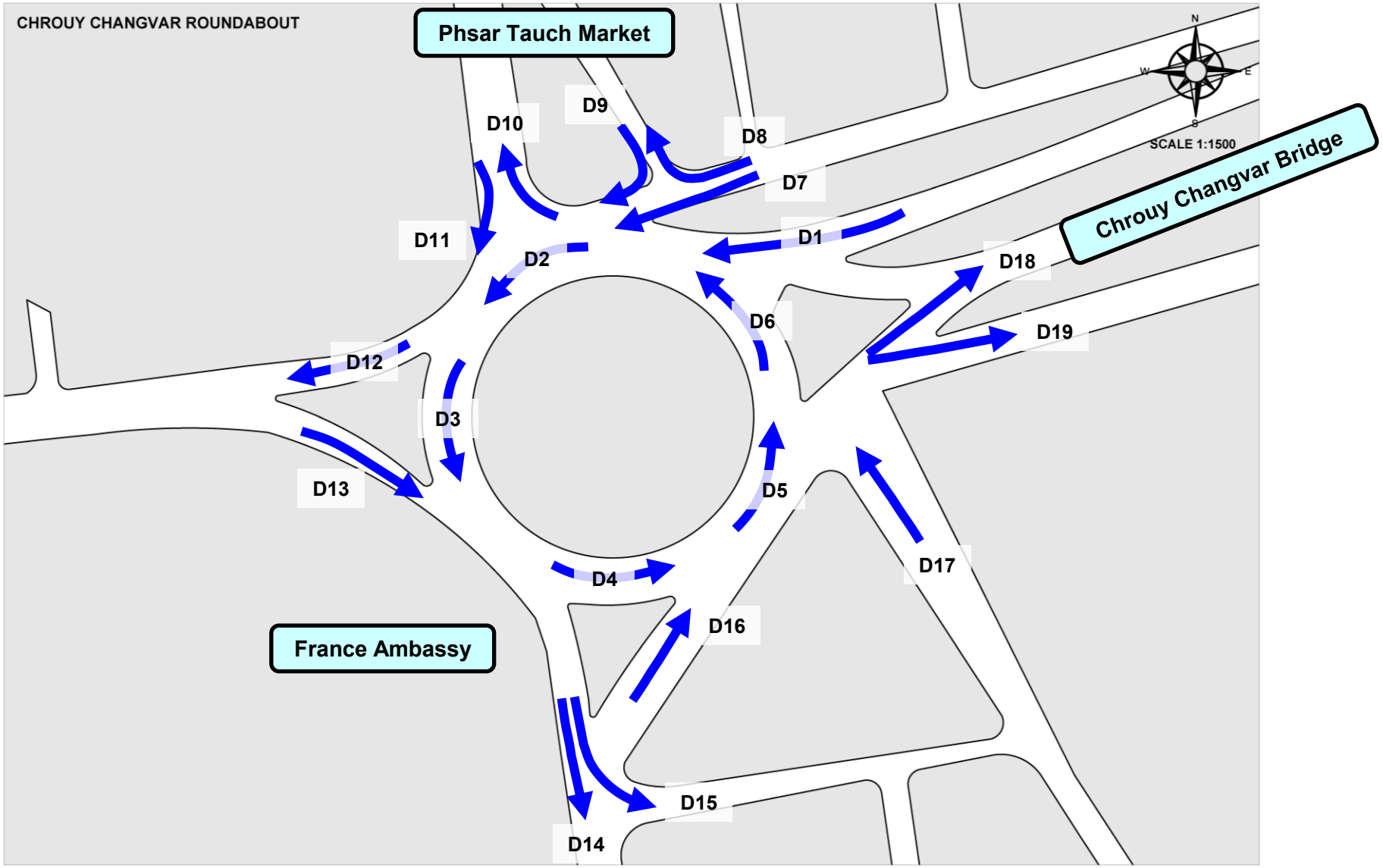


II. Proposed Traffic Improvement Plans

1. Chrouy Changvar Roundabout
2. Camko Roundabout
3. Road Safety Improvement in front of MLMUPC
4. Pre-feasibility Assessment on an Intelligent Transport System in Phnom Penh City

Chrouy Changvar Roundabout

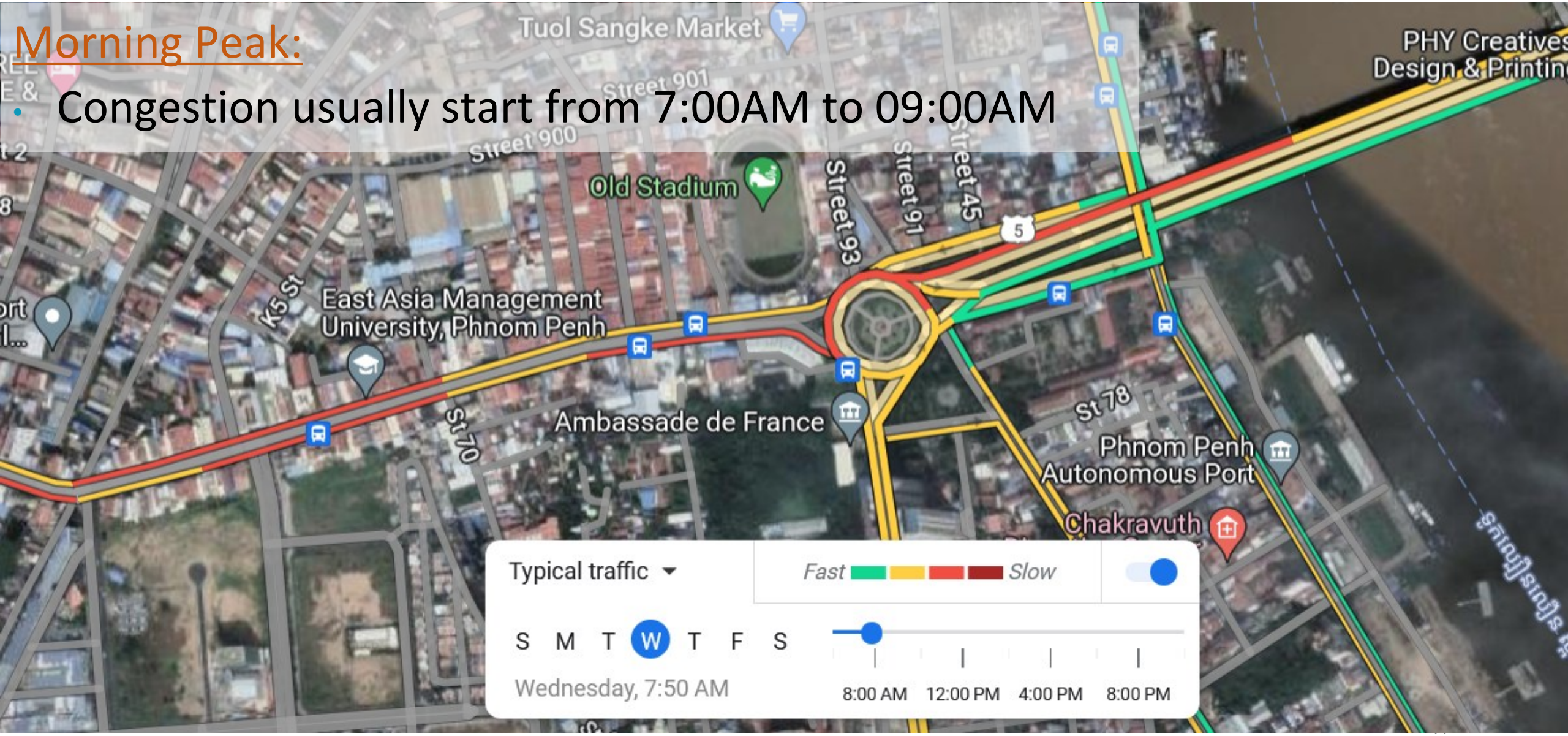
Geometry & Direction Flow



Current Traffic Situation

Morning Peak:

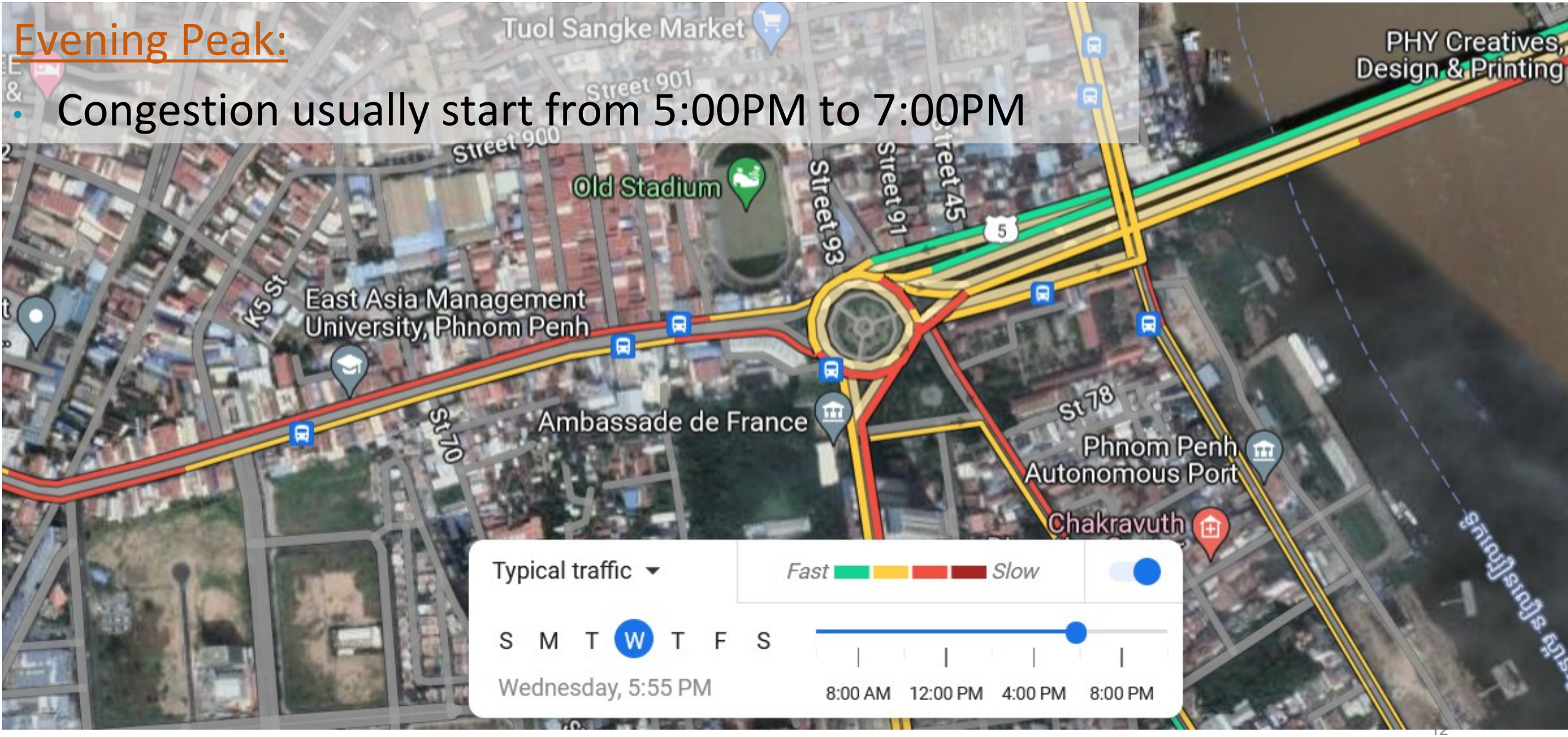
- Congestion usually start from 7:00AM to 09:00AM



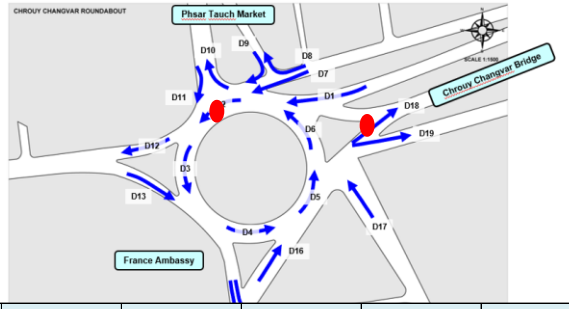
Current Traffic Situation

Evening Peak:

- Congestion usually start from 5:00PM to 7:00PM



Traffic Volume Data



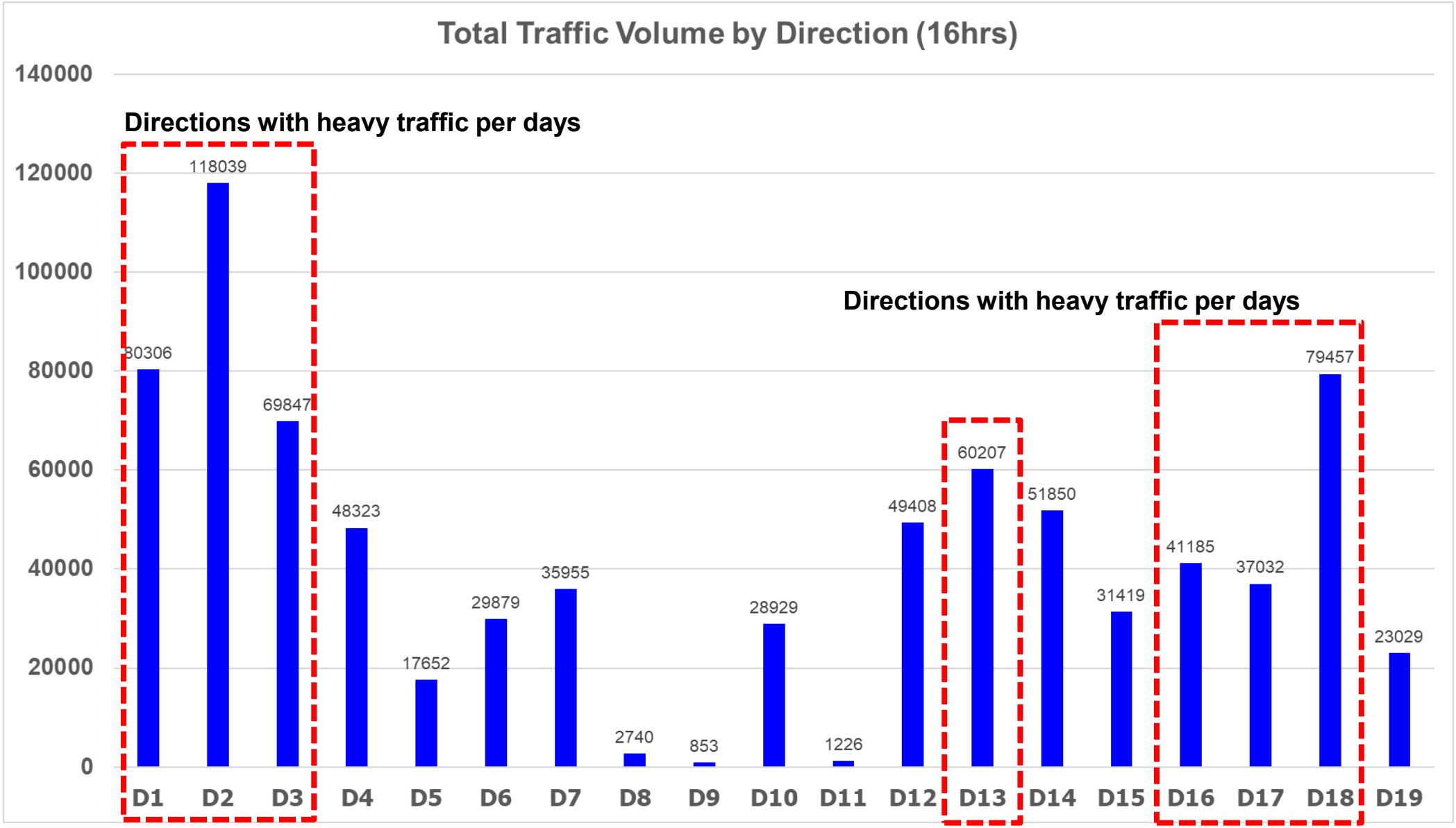
Direction			D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19
Type			All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types	All types
6:00	-	7:00	5089	7069	4371	2707	514	1017	1994	98	15	1046	88	2786	3403	2919	2151	1757	1615	3737	1322
7:00	-	8:00	7840	10830	6995	3967	728	1462	2958	226	59	1488	269	4102	6242	5310	3721	2196	2378	5610	1615
8:00	-	9:00	6335	8930	5722	3227	891	1424	2465	229	113	1405	92	3296	5075	3955	2716	2280	2109	4896	1329
9:00	-	10:00	4622	7318	4436	2773	1123	1866	2328	204	109	1606	53	2935	4197	3644	2206	2431	2130	4145	1341
10:00	-	11:00	4292	7087	4141	2613	1348	2042	2519	226	80	1839	67	3013	3882	3177	1984	2585	2210	3799	1406
11:00	-	12:00	4676	7208	4024	2916	1330	2219	2395	228	42	2121	86	3268	3617	3586	1688	2866	2829	4724	1763
12:00	-	13:00	4200	6820	4004	2983	1155	1935	2320	178	54	1689	68	2883	3499	2766	1744	2643	2236	4219	1674
13:00	-	14:00	4188	7012	4352	2955	1056	1702	2566	163	52	1494	57	2717	3521	3480	1829	2237	2127	4315	1460
14:00	-	15:00	4011	6625	4022	2704	1083	1804	2344	156	73	1601	58	2661	3205	3209	1992	2565	2267	4273	1370
15:00	-	16:00	4131	6615	3746	2474	1163	1833	2304	132	33	1684	65	2934	3181	3383	1553	2526	2427	4507	1303
16:00	-	17:00	5760	8422	4894	3366	1316	2257	2559	146	62	2212	59	3586	3929	3084	1986	3075	2888	5596	1728
17:00	-	18:00	7105	9946	5451	4528	1857	3102	2823	241	68	3161	62	4557	4567	3594	2249	4466	2961	8741	2021
18:00	-	19:00	5896	8056	4613	3852	1530	2400	2366	223	42	2646	53	3496	4149	2901	1945	3772	2922	8474	1736
19:00	-	20:00	4567	6504	3686	3091	1080	2004	2017	123	24	2108	58	2876	3297	2685	1791	2518	2366	5462	1315
20:00	-	21:00	4026	5342	2921	2529	933	1666	1306	101	22	1676	51	2472	2734	2441	1107	1983	1989	3860	934
21:00	-	22:00	3568	4255	2469	1638	545	1146	691	66	5	1153	40	1826	1709	1716	757	1285	1578	3099	712

***Traffic volume data hourly**

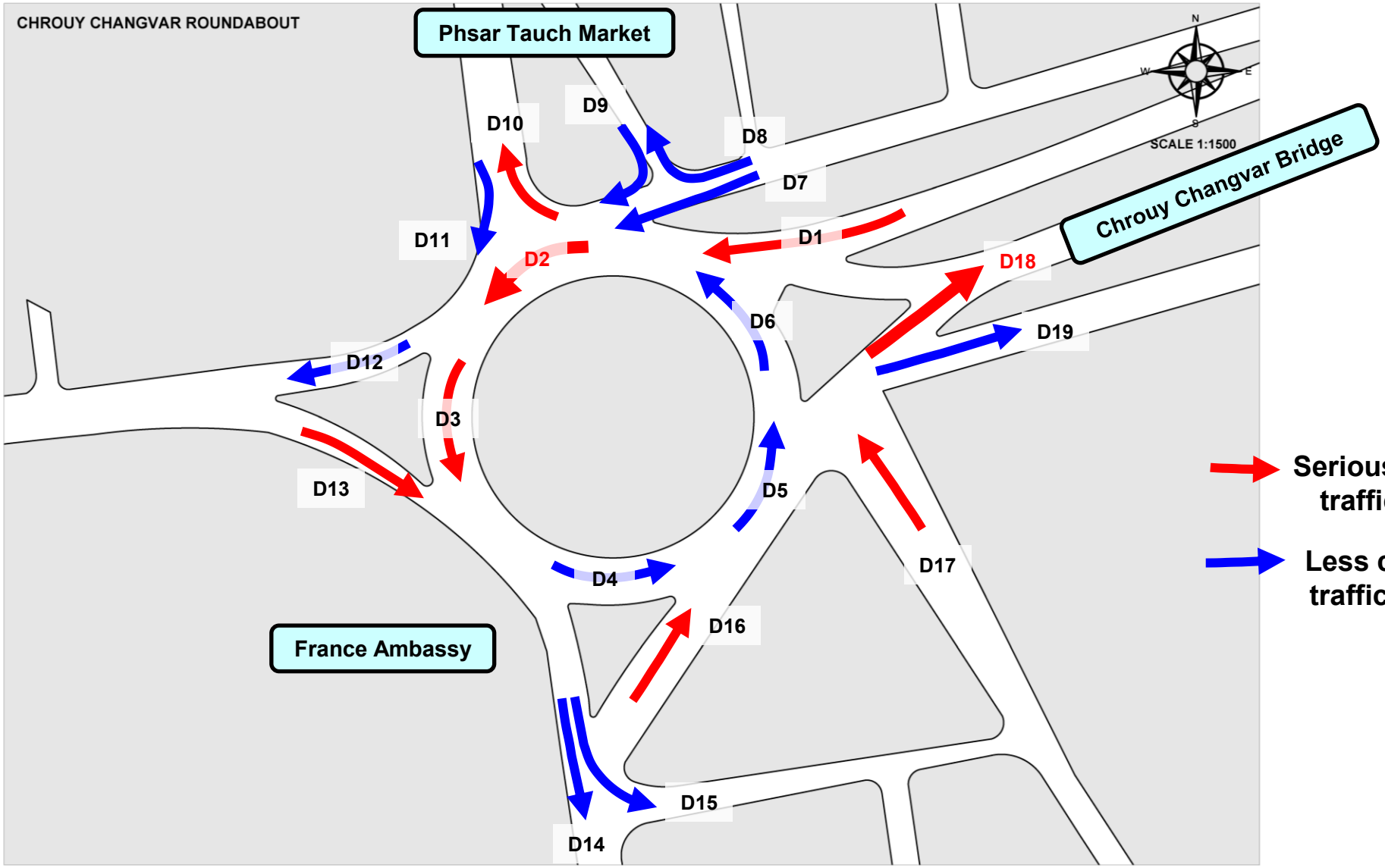
Lowest Volume **Highest Volume**

*Note: Traffic volume data was counted at 16 hours per day in March 2022.

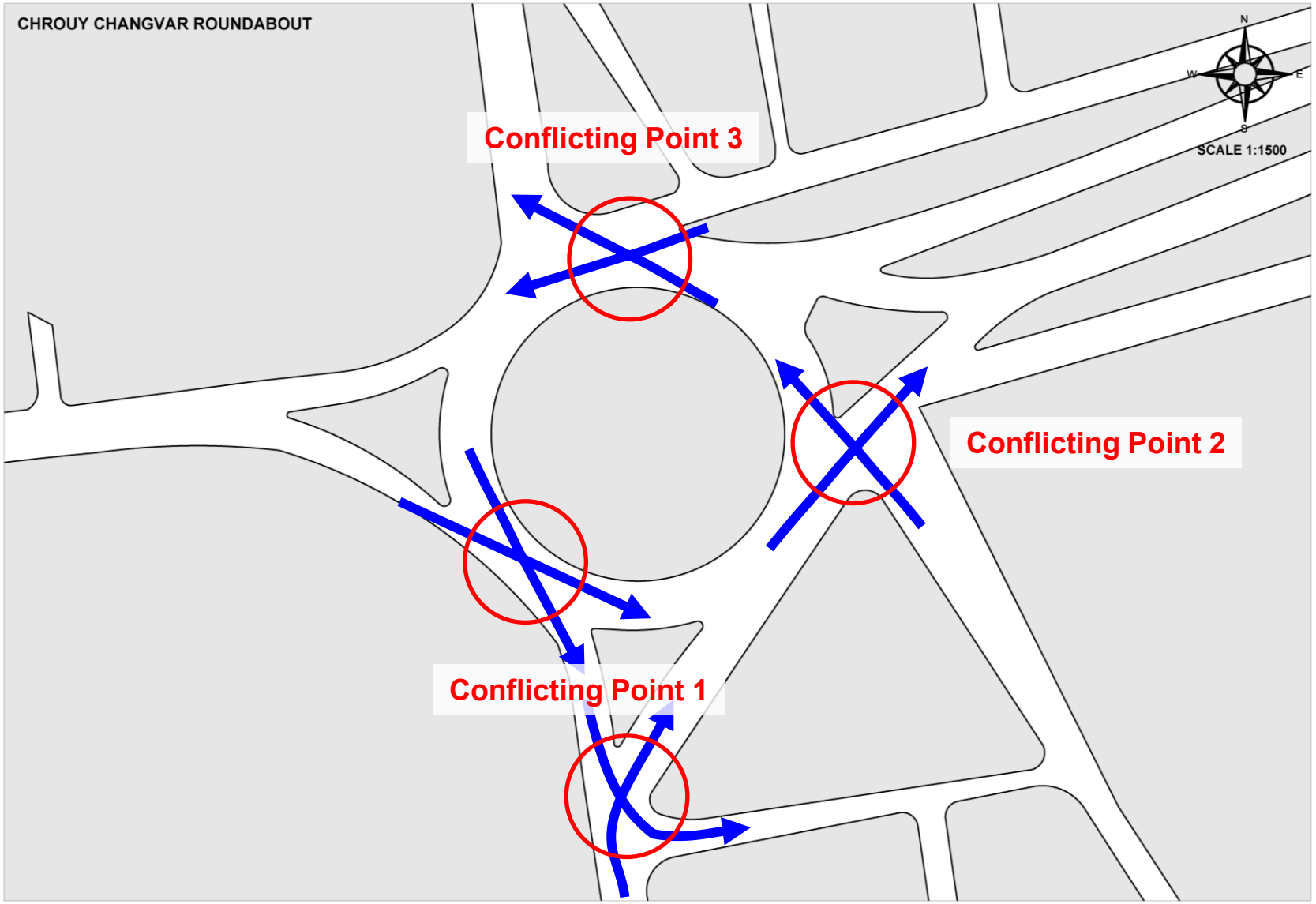
Traffic Volume Data



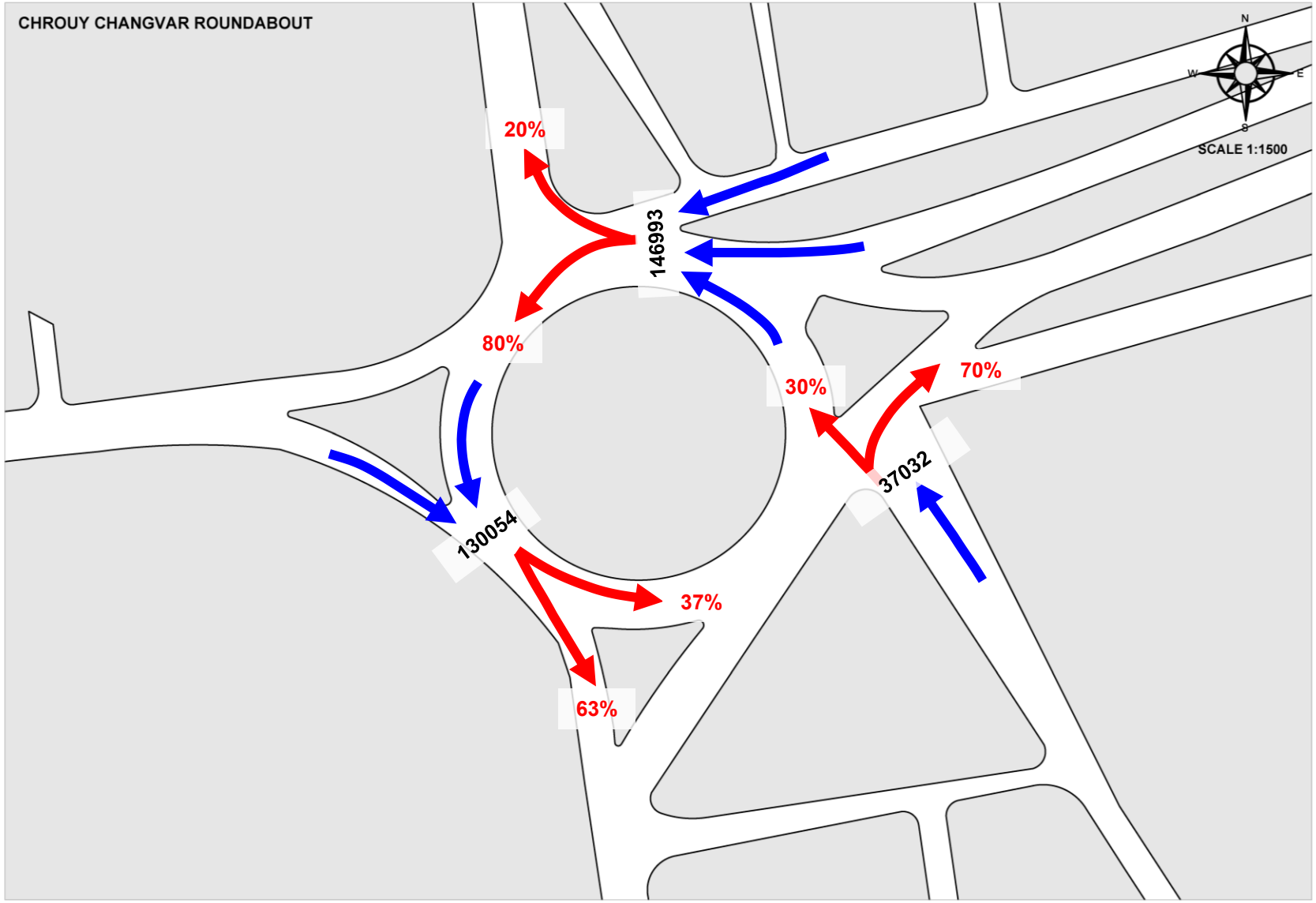
Traffic Situation Analysis



Traffic Situation Analysis



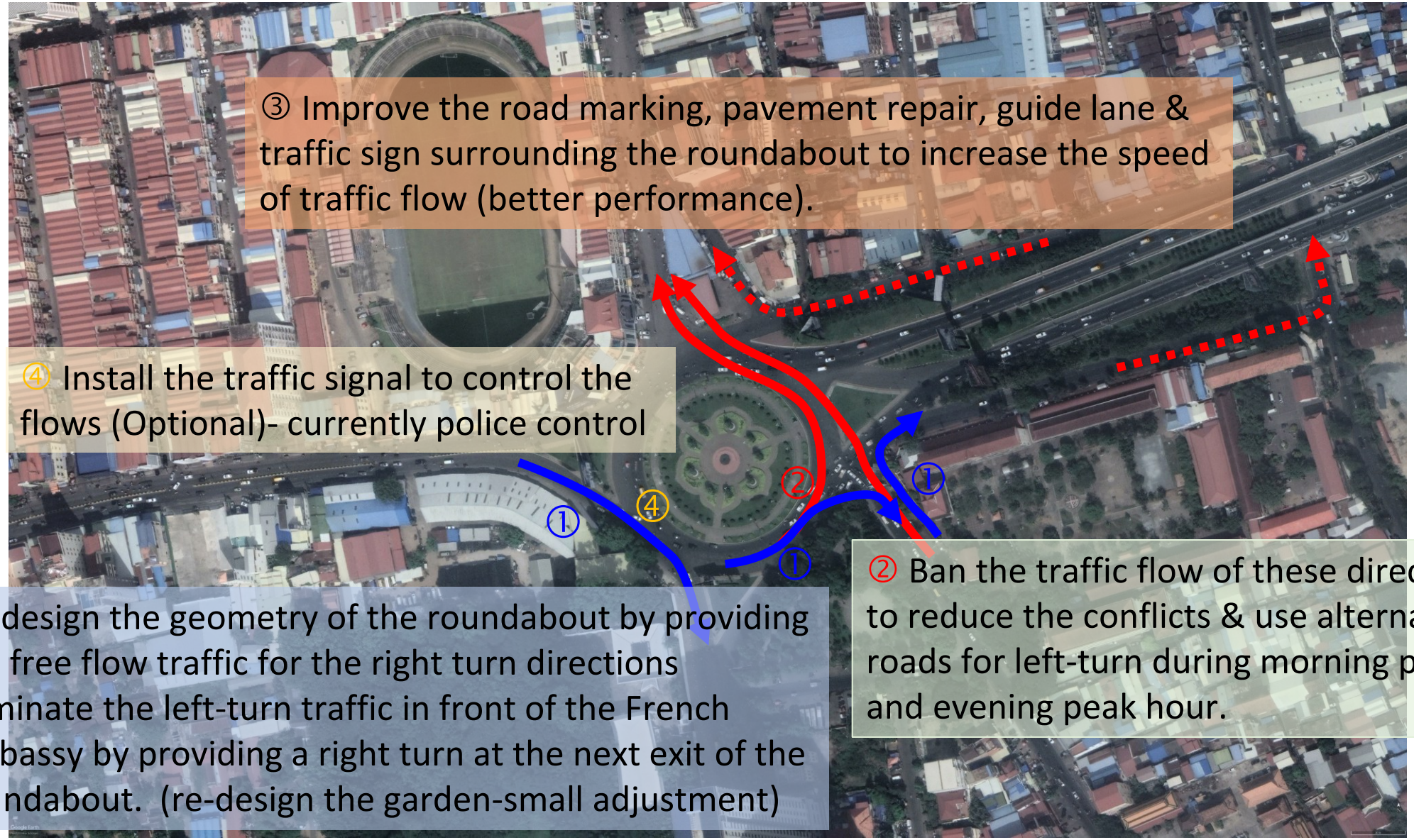
Traffic Situation Analysis



Proposed Traffic Improvement Plan (Small Scale)

1. Partially re-design the geometry of the roundabout by providing the free flow traffic for the right turn directions.
2. Partially ban the traffic flow of some directions to reduce the conflicts & use alternative roads nearby
3. Improve the road marking, guide lane & traffic sign
4. Install the traffic signal to control some directions (Optional)

Proposed Traffic Improvement Plan (Small Scale)

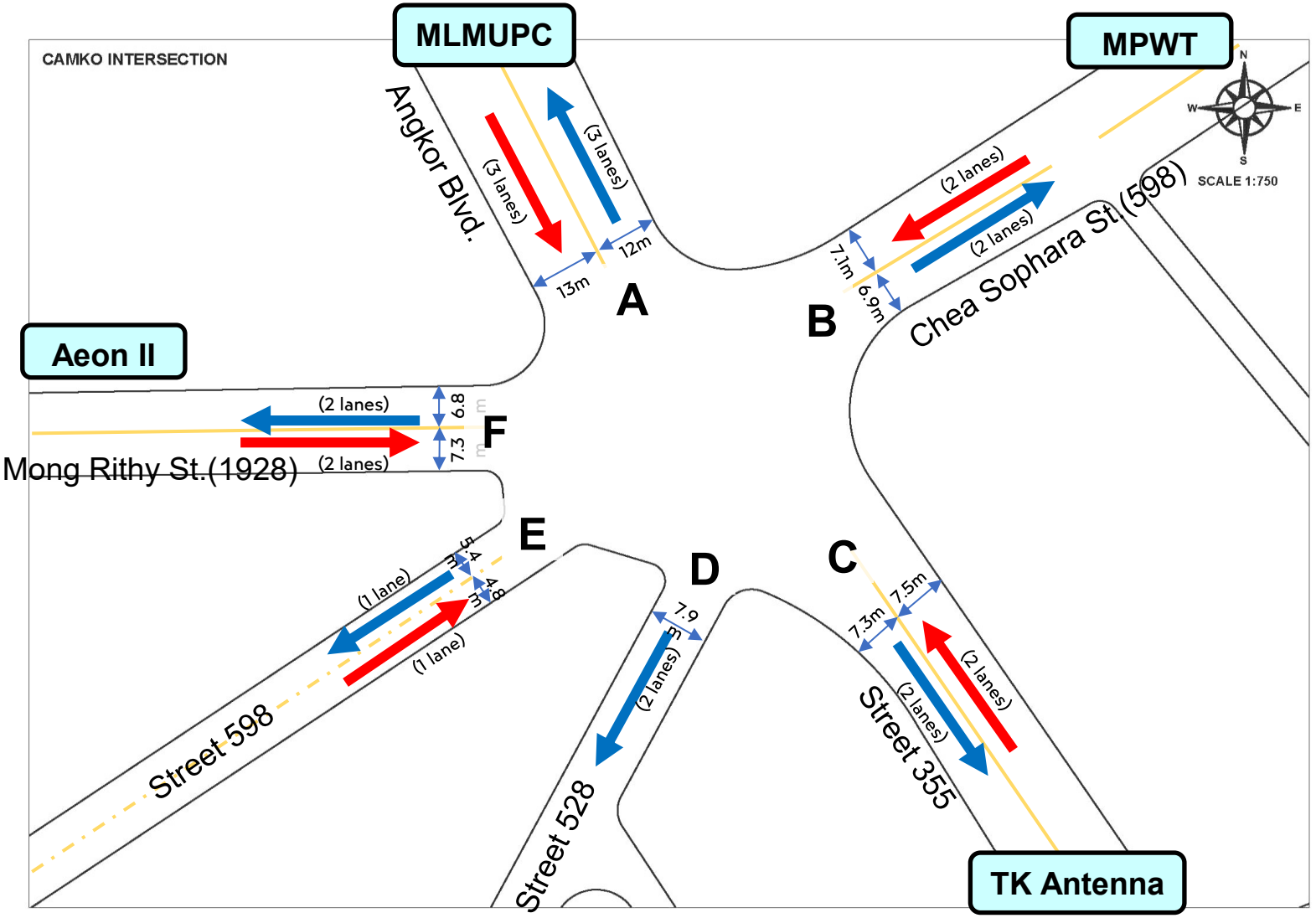


Budget Estimation

No.	Description	Quantity	Cost (USD)
1	Detail Design & Consultation fee (From Study, Design and Construction Supervision)	1	50,000.00
2	Construction works (Small scale improvement, pavement repair, road marking and signs,…etc.)	1	About 180,000.00 (Land acquisition is not included)
		Grand Total	**About 230,000.00**

Camko Roundabout

Geometry of Camko Intersection



Intersection Layout Plan

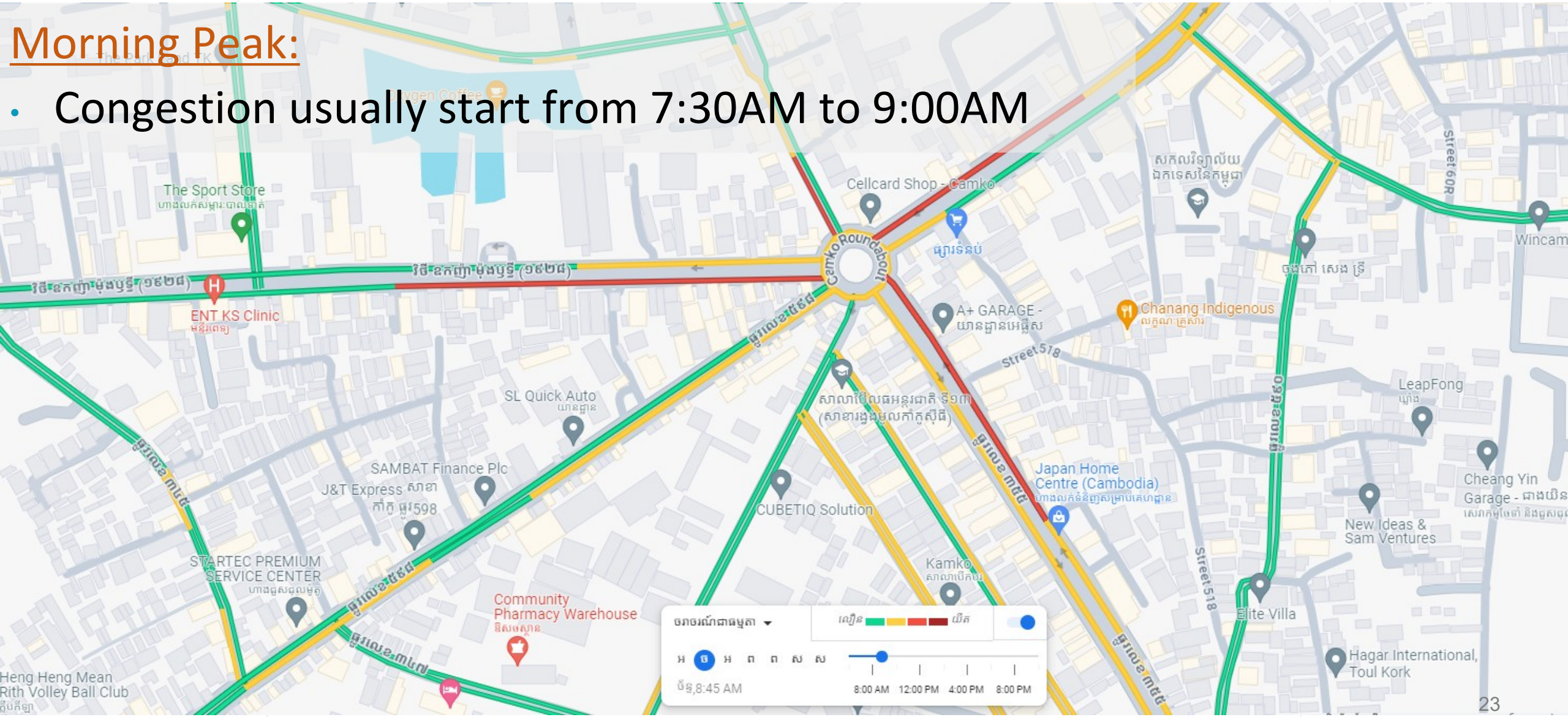
In Flow Traffic

Out Flow Traffic

Current Traffic Situation

Morning Peak:

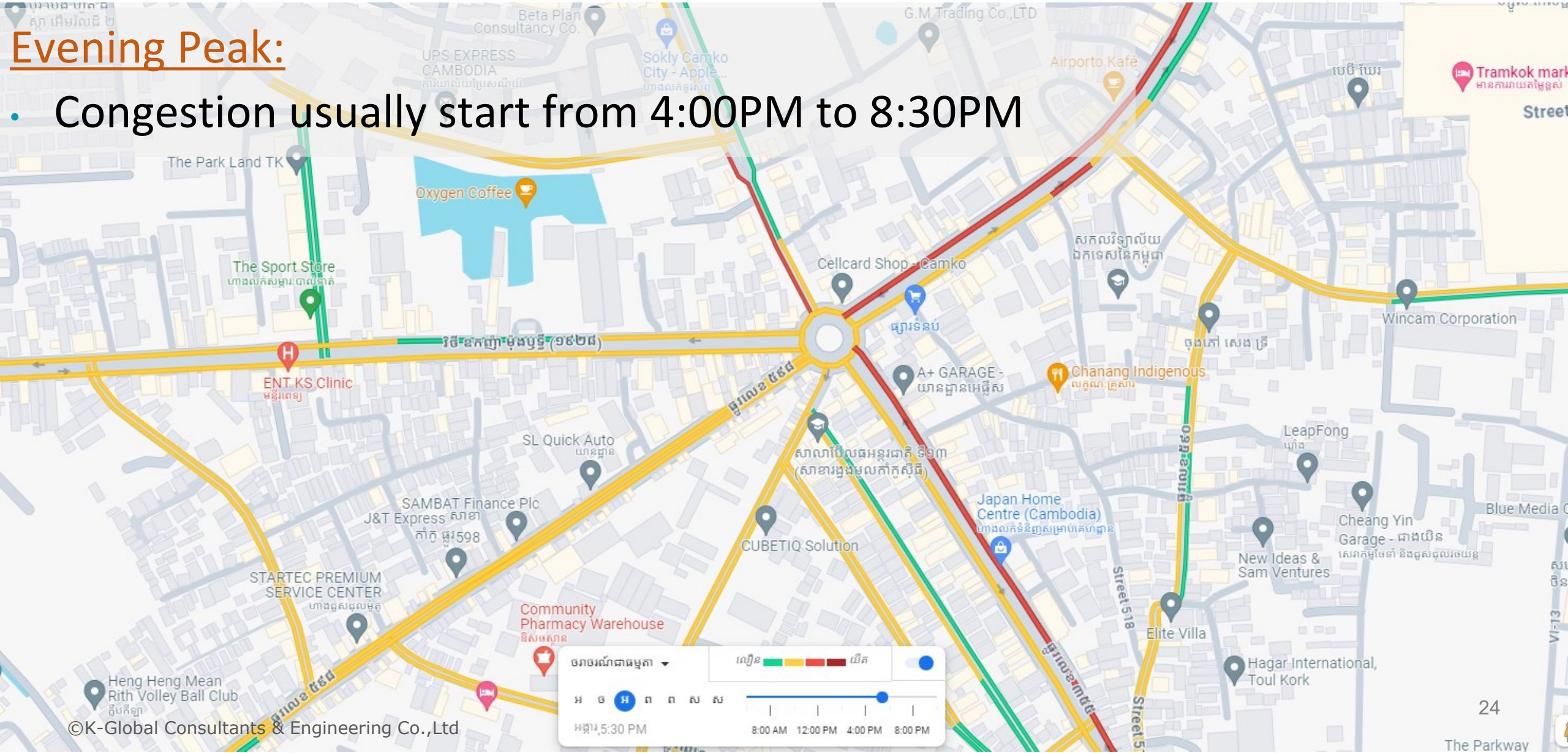
- Congestion usually start from 7:30AM to 9:00AM



Current Traffic Situation

Evening Peak:

- Congestion usually start from 4:00PM to 8:30PM



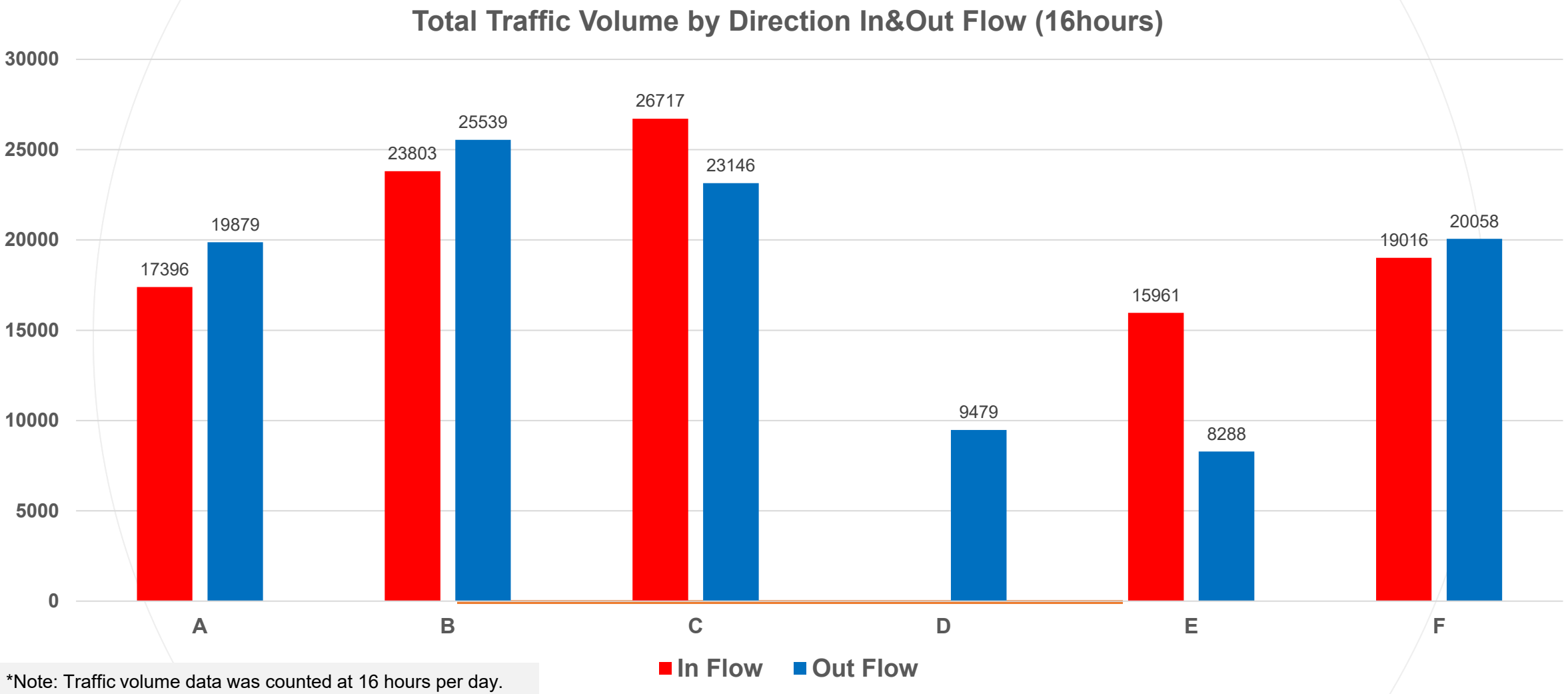
Traffic Volume Data

Direction			A				B				C				D		E				F			
Time			All Types		PCU		All Types		PCU		All Types		PCU		All Types	PCU	All Types		PCU		All Types		PCU	
			In Flow (A)	Out Flow (A)	In Flow (A)	Out Flow (A)	In Flow (B)	Out Flow (B)	In Flow (B)	Out Flow (B)	In Flow (C)	Out Flow (C)	In Flow (C)	Out Flow (C)	Out Flow (D)	Out Flow (D)	In Flow (E)	Out Flow (E)	In Flow (E)	Out Flow (E)	In Flow (F)	Out Flow (F)	In Flow (F)	Out Flow (F)
6:00	-	7:00	739	1176	440.1	519.4	1983	1398	923.9	631.85	1224	1321	630.5	813.55	773	353.35	962	489	440.05	280.75	1127	1083	588.65	512.95
7:00	-	8:00	1610	1600	1130.7	750.65	2288	2113	1170.55	1034.6	2111	2237	1115.1	1437.35	1173	733	1526	627	694	352.7	1693	1622	926.35	795.3
8:00	-	9:00	1278	1297	885.5	720.95	1701	1725	1077.85	1049.45	1716	1701	1018.05	1166.15	825	523.1	1159	503	650.5	352.15	1391	1269	886.4	747.85
9:00	-	10:00	1094	1256	841.95	747.2	1523	1624	1055.1	1033.75	1723	1402	1065.3	996.55	541	385.4	1013	471	582.7	376.2	1137	1254	773.75	818.85
10:00	-	11:00	1133	1195	843.2	693.65	1467	1534	1027.3	968.55	1760	1399	1097.7	1029.55	625	407.35	941	517	531.3	417.65	1157	1280	812.35	840.35
11:00	-	12:00	1040	1349	696.75	803.35	1443	1663	975.3	994.8	1870	1346	1161.1	936.3	604	350.4	1004	548	615.15	375.4	1134	1250	737.2	832.45
12:00	-	13:00	922	1264	650.8	783	1588	1574	1000.35	1057.25	1629	1264	1056.55	896	681	370.8	1084	590	619.45	388.4	1110	1147	797.6	715.6
13:00	-	14:00	995	1196	707.2	727.55	1565	1399	1031.15	984.55	1570	1362	1016.65	926.65	646	386.25	940	507	545.25	376.6	1143	1170	821.05	758.6
14:00	-	15:00	990	1180	738.55	758.45	1261	1272	940.55	900.9	1622	1358	1114.3	998.5	489	330.45	829	446	514.55	398.95	1126	1124	833.05	782.35
15:00	-	16:00	1044	1189	749.75	755.75	1415	1401	1024.55	961.3	1589	1404	1047.4	1049.15	491	294.4	867	456	523.9	366.65	1174	1204	895.45	849.95
16:00	-	17:00	1333	1360	882.9	867.85	1498	1744	981.2	999.1	1829	1577	1166.9	989.7	674	391.7	1087	573	594.55	410.65	1221	1435	761.65	876.8
17:00	-	18:00	1746	1675	1024.9	887.65	1869	2389	1052.5	1216.25	2185	2134	1179.35	1224.45	733	426.6	1489	644	745.8	375.6	1647	1920	890.85	983.3
18:00	-	19:00	1360	1677	820.55	959.5	1560	2117	908.25	1036.7	2109	1692	1239.7	1030.5	529	282.55	1190	673	588	377.75	1468	1630	785.2	921.25
19:00	-	20:00	904	1133	580.25	702.1	1225	1569	748.65	850.35	1588	1183	992.85	787.35	359	197.3	830	562	445.9	332.85	1040	1162	617.7	672.2
20:00	-	21:00	738	796	452.05	510.75	840	1229	560.25	709.1	1217	1012	818.65	661.75	215	130.8	627	403	372.7	256.35	861	848	516.15	537.65
21:00	-	22:00	470	536	284.05	368.65	577	788	448.35	486.5	975	754	716.7	536	121	69.9	413	279	256.95	182.85	587	660	405.6	517.7

***Traffic volume data hourly**

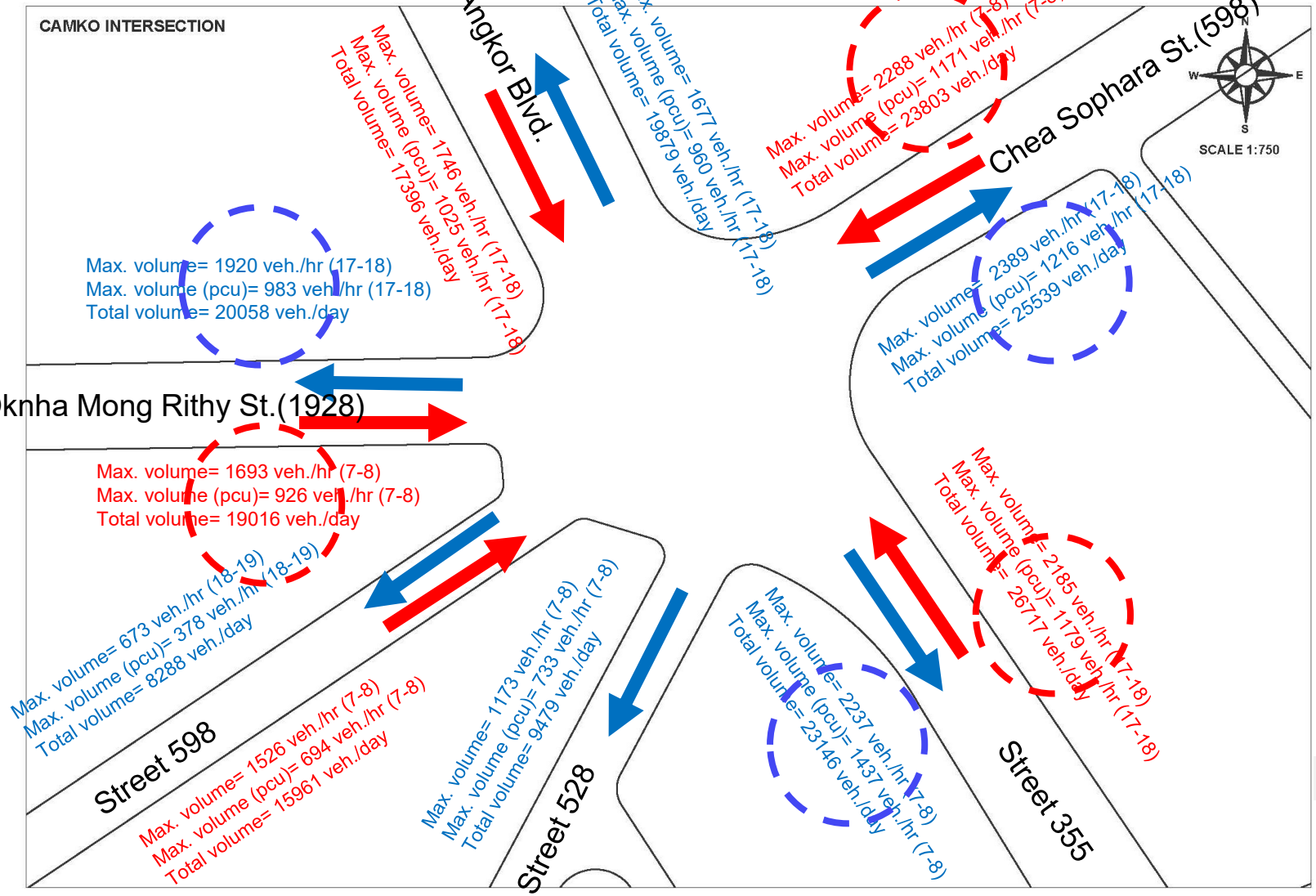
Lowest Volume **Highest Volume**

Traffic Volume Data



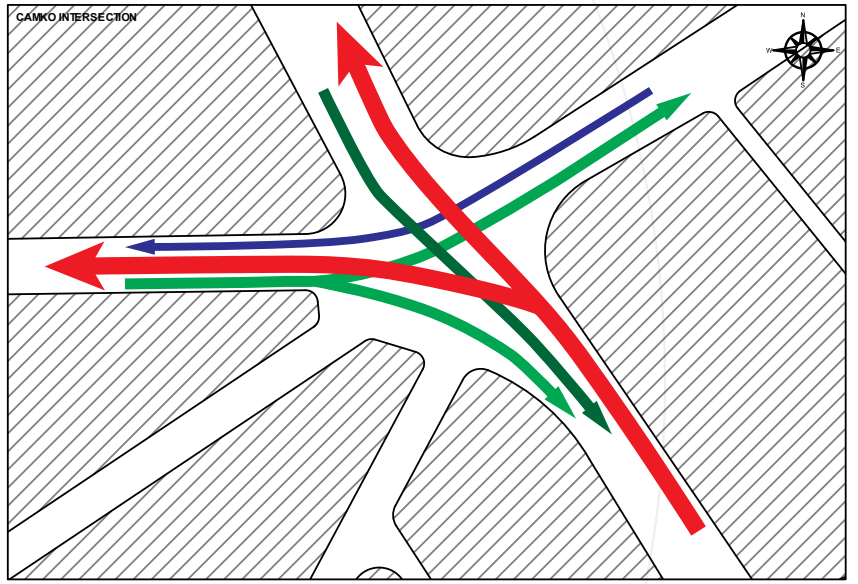
*Note: Traffic volume data was counted at 16 hours per day.

Traffic Volume Data & Analysis



Road capacity of through traffic = 1,800-2,000 pcu/lane/hr

Main Traffic Flows & Conflicting Directions



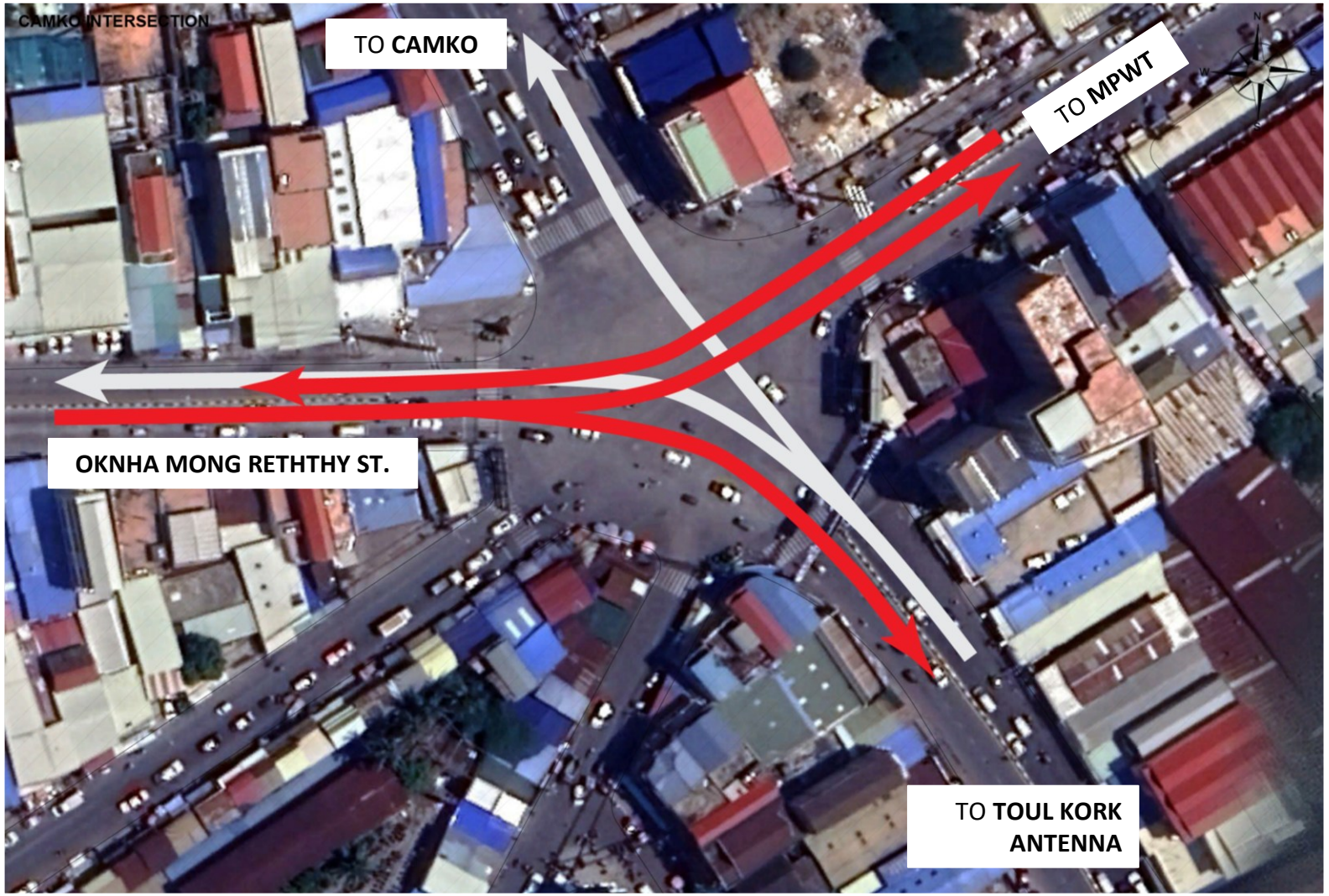
*Note: Traffic volume data was counted at 16 hours per day.

Proposed Traffic Improvement Plan (Short-term)

1. Improve the performance of the intersection by re-arranging the lane configuration and re design the traffic signal phase.
2. Install the traffic channelization to guide the drivers and improve the flow.
3. Increasing the road capacity by introducing “Dynamic Lane Control” during the peak hours.

But it cannot effectively solve the congestion since the traffic flow there are over the capacity of the intersection/roundabout and there are many conflicting directions. To cope with this issue, the main conflicting traffic directions must be set into free flow (Flyover or Underpass).

Proposed Traffic Improvement Plan (Long-term)



: FLYOVER

: UNDERGROUND

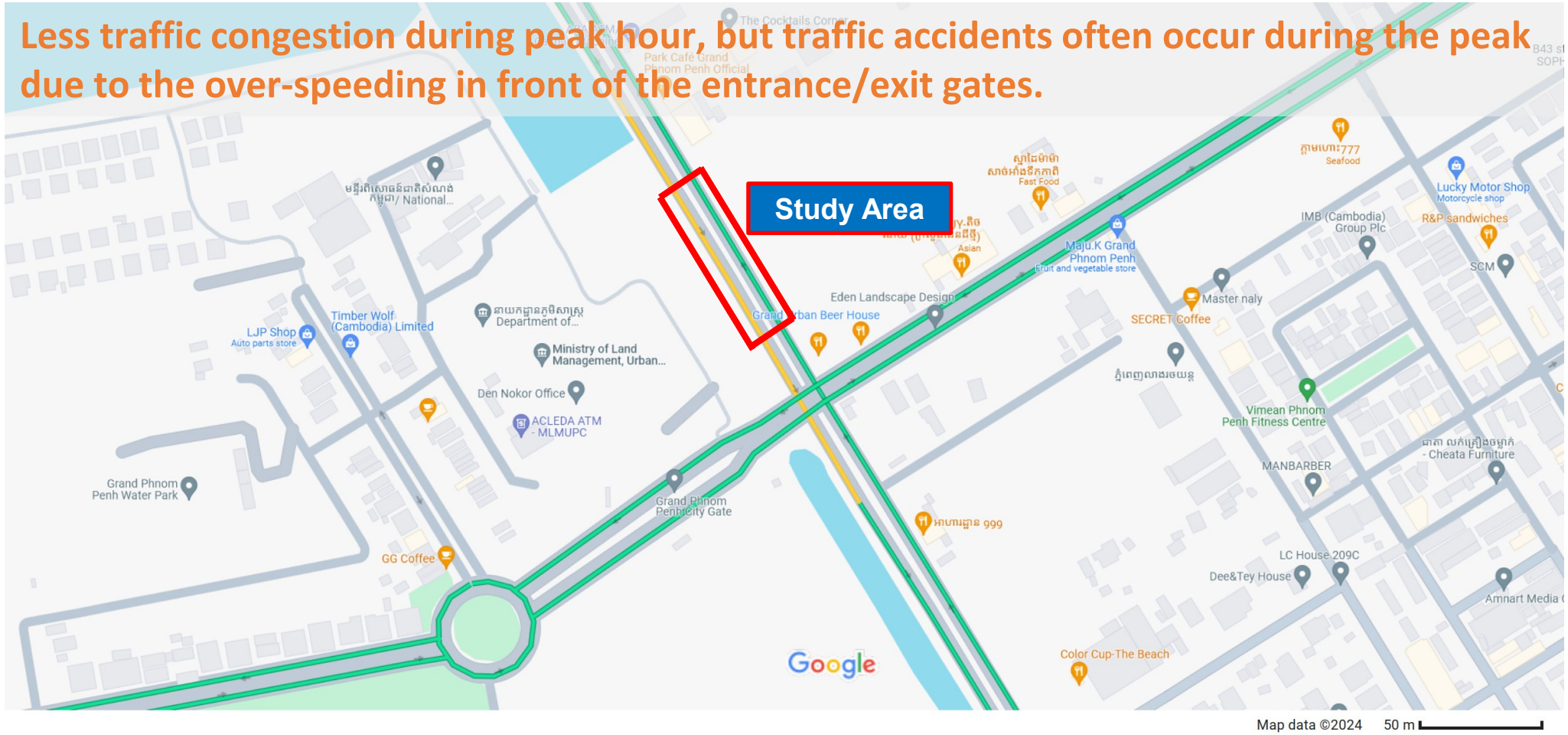
Budget Estimation

No.	Description	Quantity	Cost (USD)
1	Consultation & Conceptual Design Fee (Feasibility Study and Conceptual Design)	1	50,000.00
2	Construction works	1	To be estimated based on the actual structures

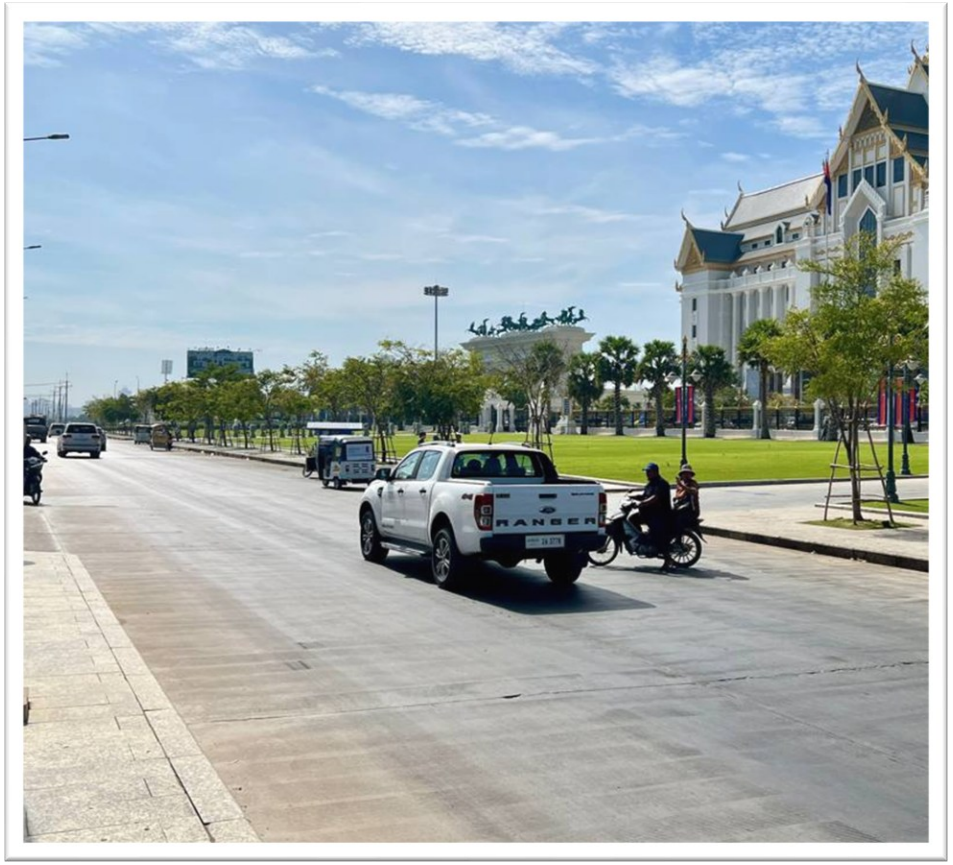
Road Safety Improvement in front of MLMUPC

Current Traffic Situation

Less traffic congestion during peak hour, but traffic accidents often occur during the peak due to the over-speeding in front of the entrance/exit gates.

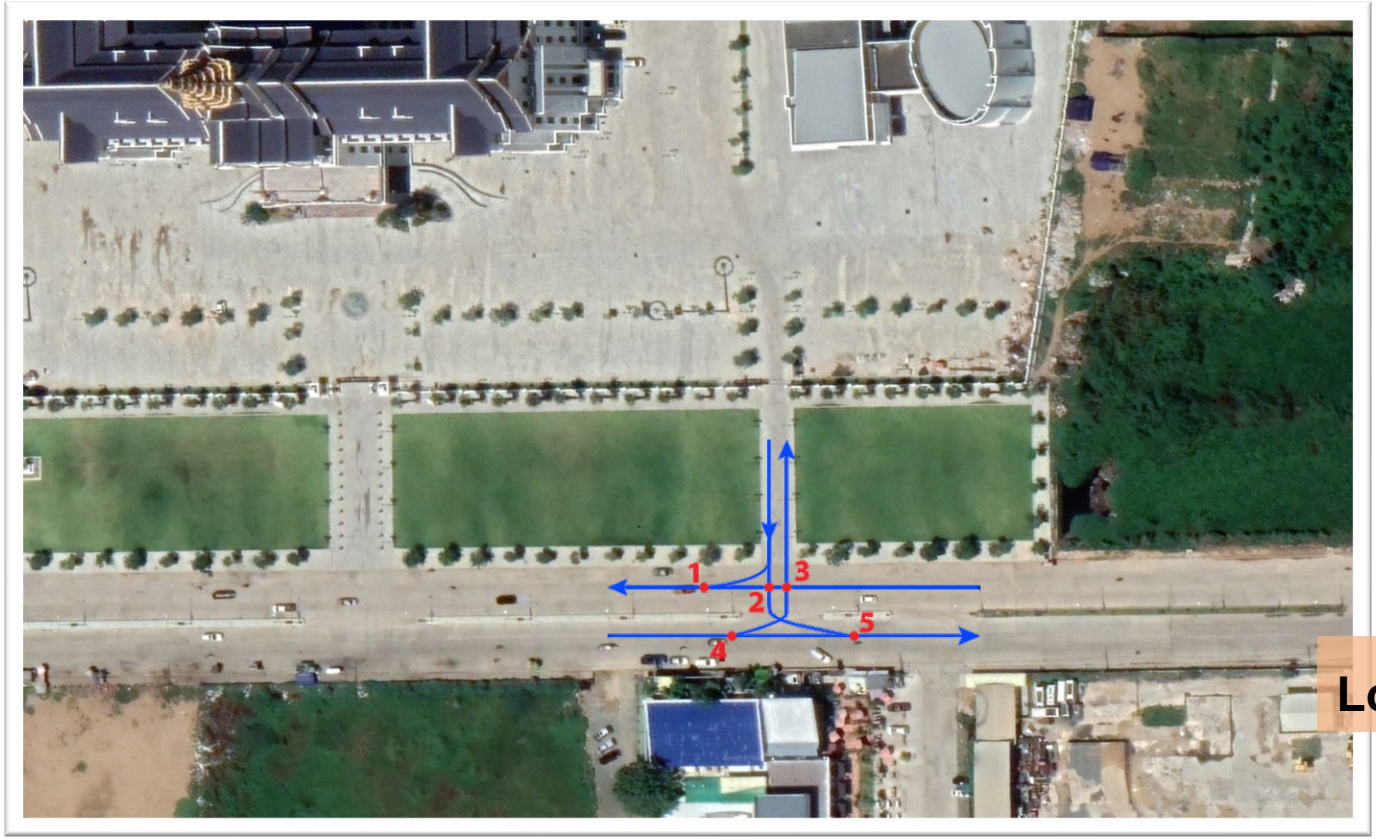


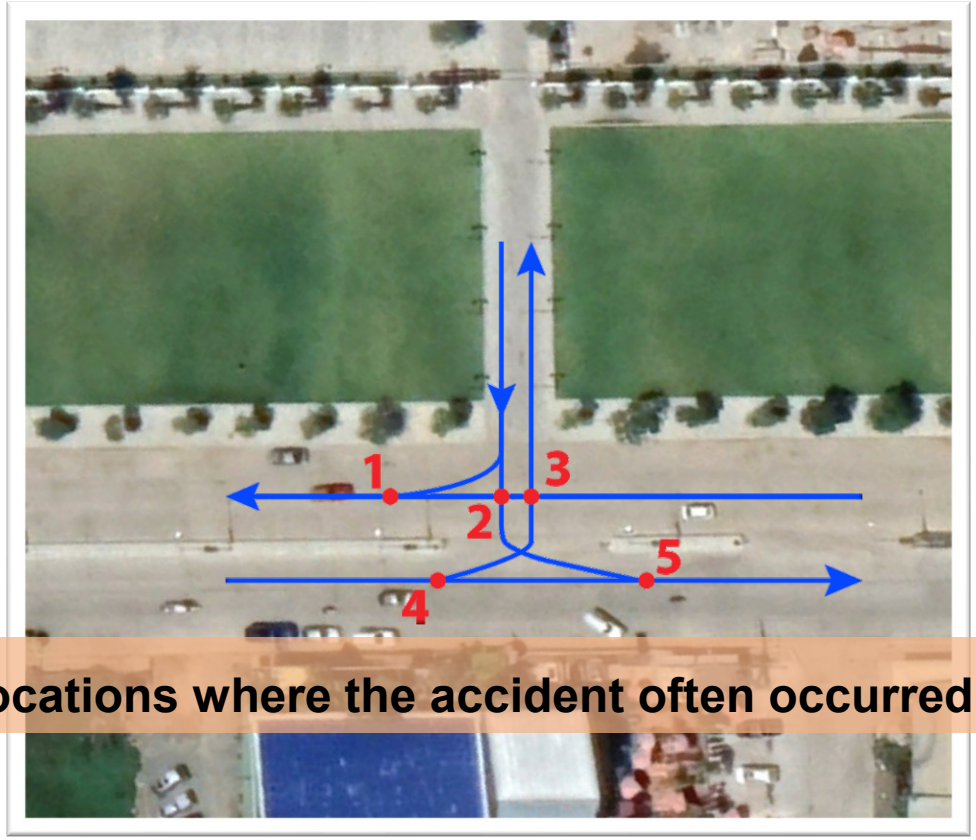
Current Traffic Situation



- The absence of traffic signs, road markings, other road safety measures, and the high speed of vehicles often causes the traffic accidents in front of the gates.
- According to the residents nearby, traffic accidents often happen during peak hours when the road users crossing the road to enter/exit the Ministry. About 5-10 time per month of traffic accidents in this area has been observed. Consequently, the urgent measures such as installation of traffic signs, road marking and enforcing speed limits, are vital for enhanced road safety.

Conflicting Point & Black Spot





Locations where the accident often occurred

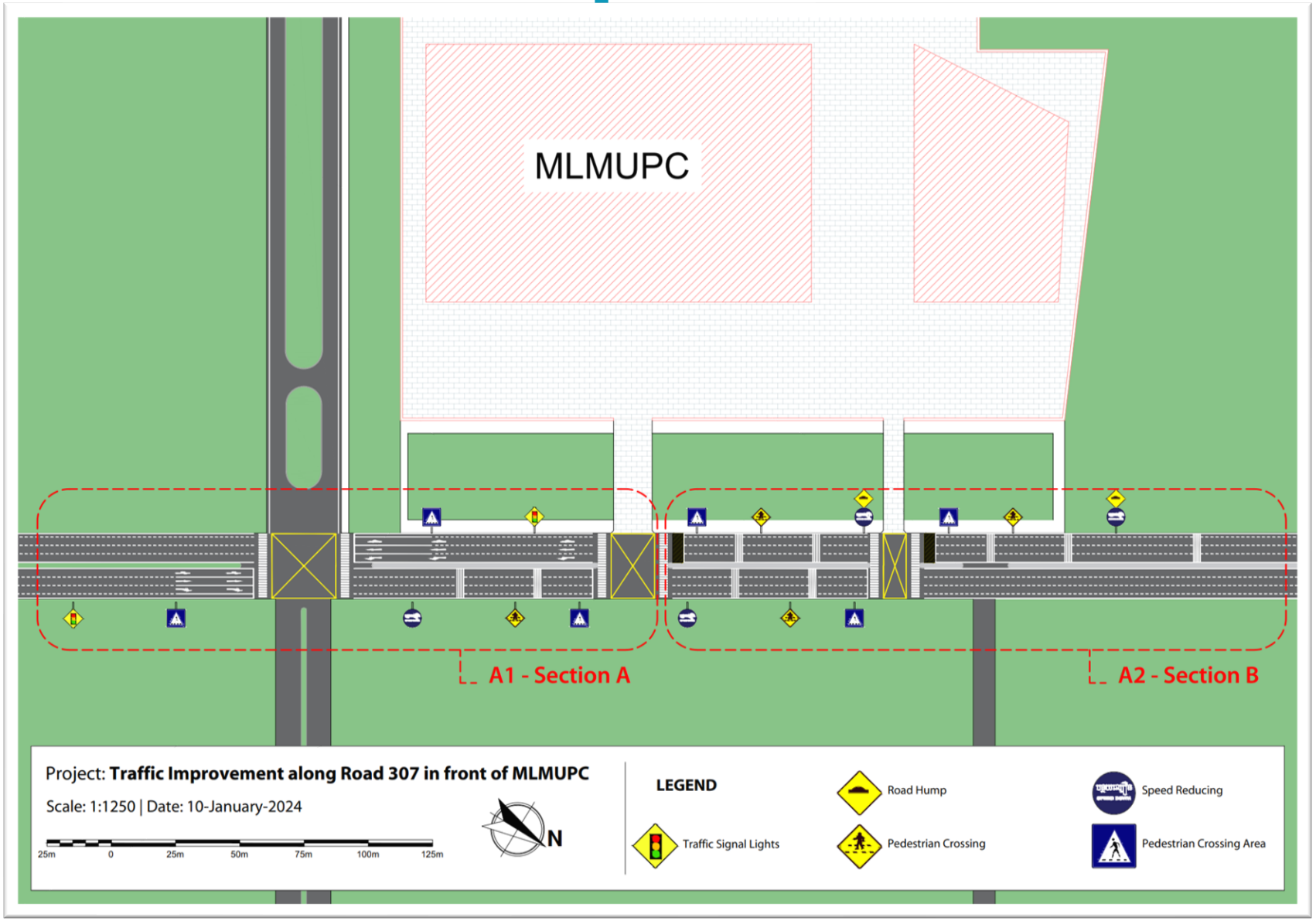
Proposed Traffic Improvement Plan

Enhance road safety in front of MLMUPC by:

1. Reducing/Enforcing the speed of vehicles
   - Speed hump to encourage drivers to reduce the speed.

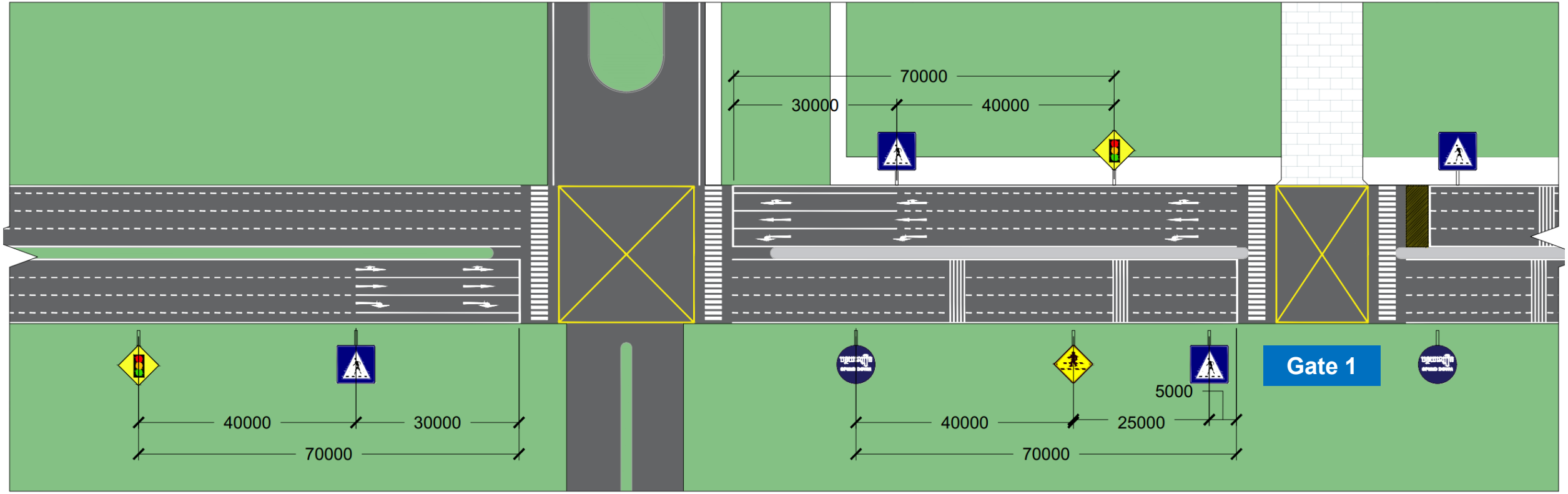
2. Installing the road safety devices
   - Lane Markings to guide drivers.
   - Crosswalks at appropriate locations near the ministry to enhance pedestrian safety.
   - Pedestrian Crossing Sign to increase driver awareness.
   - Rumble Strips to alert drivers to reduce speed.
   - Road Center Line to prevent lane departure and enhance safety.
   - Slow Down Signs to remind drivers to reduce their speed.

Proposed Traffic Improvement Plan



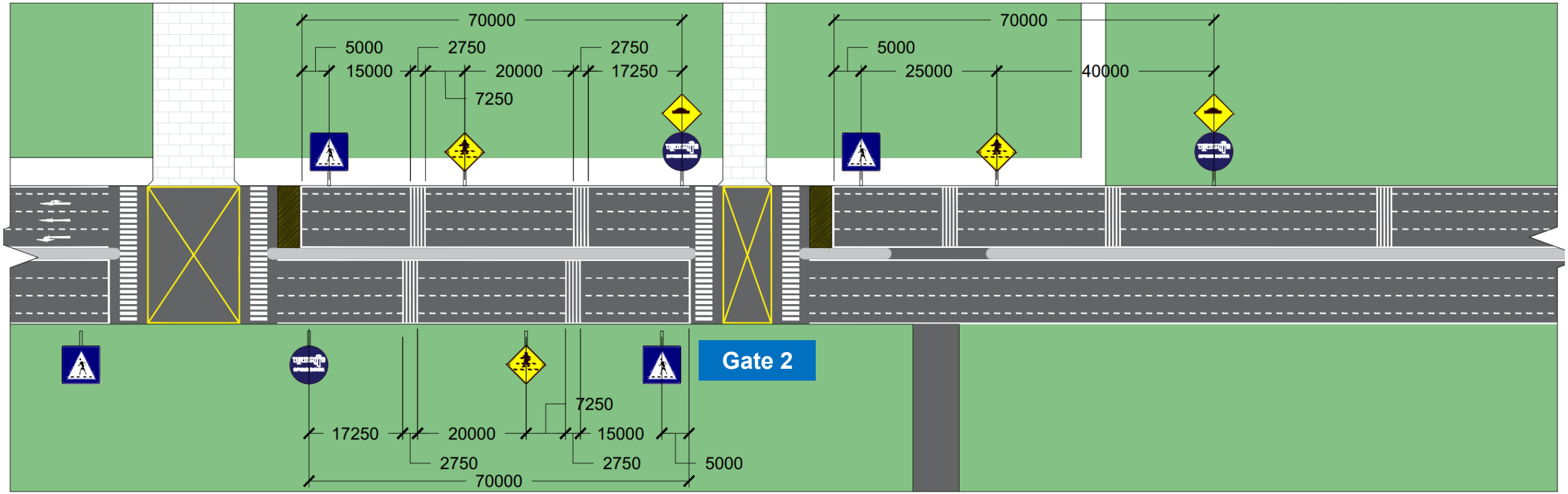
Proposed Traffic Improvement Plan

A1 - Section A

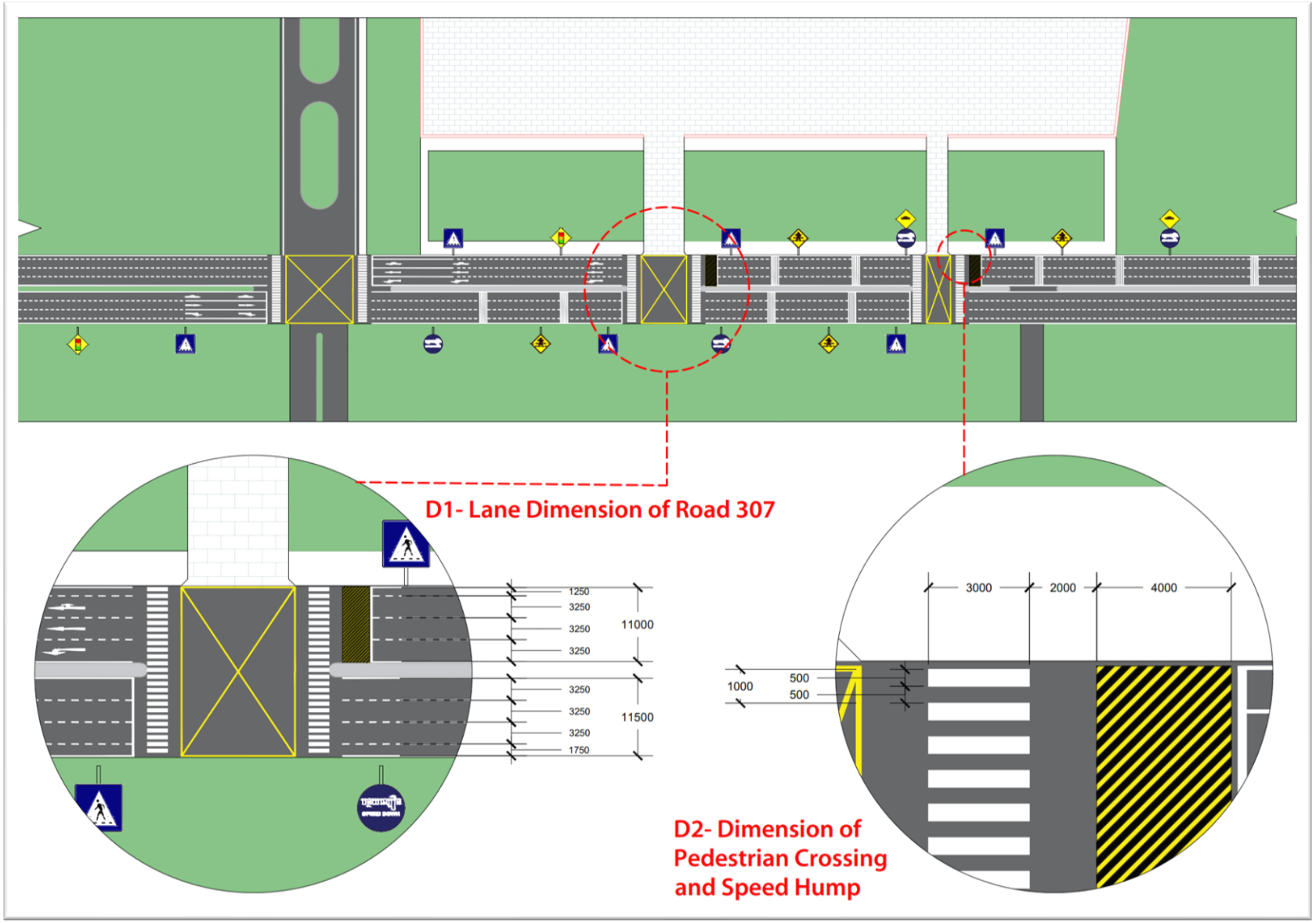


Proposed Traffic Improvement Plan

A2 - Section B



Proposed Traffic Improvement Plan



Budget Estimation

No.	Description	Unit	Quantity	Unit Price	Amount
I	**Consultation Fee**				
1	Design & Construction Supervision	LS	1	$ 15,000.00	$ 15,000.00
II.	**Construction Work**				
1	Road marking	m2	580	$ 20.00	$ 11,600.00
2	Arrow marking	pcs	15	$ 75.00	$ 1,125.00
3	Road sign	pcs	19	$ 180.00	$ 3,420.00
4	Pedestrian Crossing & Stop Line	m2	877	$ 15.00	$ 13,155.00
5	Road Center Line (Double Yellow Line)	m2	265	$ 15.00	$ 3,975.00
6	Rumble Strips (Width=12.0m)	m2	295	$ 30.00	$ 8,850.00
7	Speed Hump (Width=12.0m)	m2	196	$ 30.00	$ 5,880.00
				Grand Total=	**$ 63,005.00**

Next Study:

Pre-feasibility Assessment on an Intelligent Transport System in Phnom Penh City

The study will (1) review and recommend the tools of the Intelligent Transport System that are possible to implement in Phon Penh City to better improve the traffic management and the traffic flow in the City; (2) assess the technical, environmental, and financial feasibility of introducing CMS/VMS, smart illegal parking control, smart tools for traffic enforcement as a pilot project.

Changeable/Variable Message Signs (CMS/VMS)

Budget need to support for the pre-feasibility study: 45,000 USD

THANK YOU!

K-GLOBAL'S CONTACT

K-Global Consultants & Engineering

Email: info@k-globalconsult.com

Tel: +855 16 220 004

A better traffic, a happier city life….