

Agreement No. TD 54/2008

West Kowloon Reclamation Development Traffic Study

Executive Summary



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MVA Hong Kong Limited

EXECUTIVE SUMMARY

1. INTRODUCTION

- 1.1 The Transport Department (TD) carries out district-wide traffic studies from time to time to review the traffic conditions, identify road improvement schemes to ease the existing traffic problems and recommend major road works to meet the long-term traffic demand of the concerned districts. Continuous traffic studies ensure that enhancements are timely put in place to meet the future needs.
- 1.2 Apart from the existing Kowloon Station (Airport Express Line and Tung Chung Line), the on-going Kowloon Station (KOW) property developments (e.g. shopping mall, hotel, office, and residential buildings), and the newly opened Austin Station (Kowloon Southern Link) etc., some more substantial developments will appear in West Kowloon Reclamation Area (WKRA) within the next 20 years. These future developments would include West Kowloon Cultural District (WKCD), West Kowloon Terminus (WKT) of the Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) and its top-side property developments, and the developments above Austin Station (AUS). The existing and future developments in WKRA are illustrated in **Figure 1.1**. With the completion of these developments, WKRA will contain international, regional and territory-wide functions and will have a very important role in Hong Kong.
- 1.3 To equip WKRA for its future role, a good traffic and pedestrian system would be the primary need. In the light of this, TD appointed MVA Hong Kong Limited (MVA) to commission a traffic study “West Kowloon Reclamation Development Traffic Study” (WKRDTs) under Agreement No. TD54/2008. The Study was started in late May 2008 and was completed in December 2009.
- 1.4 The Study Area of the WKRDTs, covering 41 junctions including both minor and major ones bounded by Waterloo Road on the North and Nathan Road on the East, is delineated in **Figure 1.2**, and WKRA is the Focus Area of the Study. While the traffic model will forecast the traffic conditions of all these junctions within the Study Area, the road improvement schemes focus more the Focus Area. The furthest planning horizon of the Study is up to 2031 when the WKRA is expected to have been fully developed. The traffic situation will continually be monitored in future, especially after the implementation of the improvement measures proposed in this study for the identification and implementation of further improvement measures when it becomes necessary to do so.
- 1.5 The objectives of the Study were:
- to carry out a comprehensive traffic study to assess and identify traffic problems within the Study Area for 3 stages, i.e. (i) the short term stage - existing case, (ii) long term stage – upon full development and operation of various developments and transport infrastructures in WKRA, and (iii) interim stage – during the construction of WKCD and XRL.

- to recommend traffic schemes that are necessary to cope with the traffic conditions at three different stages of various developments and transport infrastructures in the Study Area; and
 - to formulate a Transport Plan with preliminary implementation programme for the Focus Area at the stage upon full development and operation of all planned developments and transport infrastructures in WKRA.
- 1.6 This Executive Summary is to summarise the proposed traffic and pedestrian schemes from the WKRDTs. In gist, to cope with the increasing traffic demand arising from the developments in the WKRA, including WKCD and the commissioning of WKT, major improvement works and traffic improvement schemes were suggested to increase the capacities of the road junctions in the Study Area for smoother traffic. As regards the major improvement works, the WKRDTs suggested segregating through traffic from local traffic by a multi-level road system. Such design connects the local road network directly to nearby major roads in the area, such as the West Kowloon Highway, West Kowloon Corridor, Western Harbour Crossing, and the future Central Kowloon Route, ensuring smooth and more direct accessibility to and through the WKRA. Traffic management schemes were also suggested to increase the capacities of road junctions for smoother traffic. These traffic management schemes would not involve large scale engineering works so that they could be implemented within a short period of time.
- 1.7 All the major improvement works and traffic management schemes can be in place by 2015 or shortly after 2015, and the traffic pressure in the district would be relieved. The reserved capacity (R.C.) at most junctions will be above 5% at all times during the day up to 2031, representing healthy conditions i.e. most vehicles will be able to clear the junction without waiting for more than one traffic signal cycle.
- 1.8 The only exceptions out of the 41 junctions studied are:
- J3 (Nathan Road / Waterloo Road Junction) and J24 (AUR / Cox's Road / Pine Tree Hill Road Junction) will experience congestions during peak hours in 2031 (R.C. < 0%). Both junctions are outside the Focus Area and close to the boundary of the Study Area. The R.C. at J3 will be reverted back to similar value as the existing situation (i.e. before completion of the proposed short term improvement discussed in para. 4.3). Improvement measures will be developed nearer the time having regards to actual traffic conditions and demand at the junction and future development/redevelopment of the nearby districts. The J24 is a local junction and will not have a wider impact to other junctions;
 - J5 (Yan Cheung Road / Ferry Street / Kansu Street Junction) and J19 (Nathan Road / AUR Junction) will operate with 0% < R.C. < 5% by 2031 when WKRA is fully developed. There will be occasional congestions during the peak hours by 2031. The traffic conditions will be monitored and improvement measures will be timely put in place nearer the time.
- 1.9 In addition to the analyses of road traffic situation, the WKRDTs has also examined the public transport facilities and pedestrian facilities for mainly the Focus Area and the

temporary traffic management schemes during the peak construction period of the WKRA. These are further elaborated in the corresponding paragraphs.

1.10 The general study approach/process is illustrated in **Figure 1.3**. The Study was carried out in 5 stages involving the following key tasks:

- Data Assembly and Survey - to collect relevant data and carry out traffic count/queue survey to quantify the existing traffic conditions and also provide data for base year model validation. Trip generation survey for various types of land uses were conducted to estimate the traffic impact of future developments in WKRA;
- Traffic Modelling and Forecasting - to build up a district transport model which covers all major roads and junctions in West Kowloon bounded by and including Waterloo Road on the North and Nathan Road on the East;
- Traffic Assessment and Problem Identification - by using the observed traffic flows/queue and future traffic forecast flows, traffic assessments were carried out to identify both existing and future traffic problems;
- Formulation and Evaluation of Traffic Improvement Schemes – to explore different road/pedestrian schemes and derive possible improvement schemes for various stages; and
- Integrated Implementation Plan - the preferred/selected improvement schemes for the three stages, were brought together into a Final Transport Plan and preliminary implementation programme was also recommended.

2. TRIP GENERATION RATE

- 2.1 In order to determine the likely traffic volume to be generated/attracted by the future developments, trip generation surveys were conducted at weekday morning and evening, Friday late evening, Saturday / Sunday / Public Holiday afternoon peak period. The trip generation surveys (classified traffic count and interview) were carried out for various development types including (i) residential, (ii) retail, (iii) office, (iv) hotel, (v) service apartment, (vi) performance venue, and (vii) museum.
- 2.2 In addition to the trip generation survey, the study also made reference to the trip generation rates of the following sources:
- Traffic Generation and Attraction Rates as stated in the Transport Planning and Design Manual published by TD; and
 - The other relevant reports including (i) Trip Generation Survey 2006, (ii) Traffic Impact Assessment Review for WKCD and (iii) Traffic Impact Assessment Study for the Different Land Use of Site A at West Kowloon Reclamation.
- 2.3 In the analysis of the trip generation rates for Residential, Retail, Office, Hotel & Service Apartment developments, only the data from the existing development sites with similar characteristics (i.e. class, location, no. of flat/total GFA, car parking ratio, accessibility to public transport) to that in WKRA were adopted to ensure that the results could reflect the likely situation in future WKRA. In order to ascertain the future capacity of the road network, more conservative assumptions or higher trip rates were adopted or assumed in some cases to project a higher estimated traffic demand in the WKRA.
- 2.4 For the Arts and Cultural Use developments in WKCD, the trip rate analyses are as below:
- Performance Venues –
 - i. The trip generation rates of each theatre/venue in WKCD were estimated based on the modal split obtained from interview survey at some existing events with higher class performance. The future trip rates were increased by 10% to reflect the possible higher income class/car ownership of the future audiences of the world class performance events;
 - ii. For AM commuting peak period on weekdays, it is anticipated that most of the performance venues would not have functions and a nominal total of 100 pcu/hr (IN and OUT), were assumed;
 - iii. For PM peak period on weekdays, the peak arising from performance venues should not totally coincide with the road network PM commuting peak. Even though there were some audience having dinner before the performance, this proportion would be captured by Retail trip rates. Nevertheless, to allow for the higher than expected demand, it was assumed that all the audience would arrive within two hours during the road network PM peak period; and

- iv. For Friday evening peak and Weekend peak, a more conservative (i.e. higher) estimation was adopted, i.e. all audience would arrive within an hour during the road network peak period.
- Museum – adopt the surveyed trip rates at Hong Kong Space Museum (the highest among the surveyed sites) for conservative reason.
 - Exhibition Centre – adopt the trip rates of Hong Kong Convention and Exhibition Centre (HKCEC) obtained during one of the most attractive events, which should be higher than the trip rate of the future “Art/Cultural” Exhibition Centre in WKCD i.e. should be a conservative assumption.
 - Communal Facilities – adopt the trip rates for Community Facilities from observed trip rates for this kind of facilities.
 - Other Arts and Cultural Uses – adopt the Office trip rates as these facilities should be similar to “Office Uses” in terms of trip rates.

Summary of Recommended Trip Rates and Future Trip Generation

- 2.5 The aforementioned recommended trip rates for different type of land use are summarised in **Table 2.1**, and the future trips generated by each of land use are presented in **Table 2.2**.

Table 2.1 Summary of Recommended Trip Rates

Development Location	Planned Land Uses		Seating Capacity (no. of seats)	Area (m ²)	No. of Units (no.)	Units of Trip Rates	Weekday		Friday		Saturday		Sunday					
							AM (08:30 – 09:30)		PM (17:45 – 18:45)		PM (19:00 – 20:00)		PM (14:00 – 15:00)		PM (14:00 – 15:00)			
							Gen.	Att.	Gen.	Att.	Gen.	Att.	Gen.	Att.	Gen.	Att.		
West Kowloon Cultural District (WKCD) ⁽¹⁾	Performing Arts Venue	Phase I	Mega Performance Venue	15,000	--	--	--	--	0.066	0.133	0.133	0.265	0.133	0.265	0.133	0.265		
			A Great Theatre	2,200	--	--	--	--	0.247	0.494	0.494	0.987	0.494	0.987	0.494	0.987		
			Two Medium-sized Theatres	800 each	--	--	--	--	0.274	0.548	0.548	1.097	0.548	1.097	0.548	1.097		
			Four Black box Theatres	250 each	--	--	--	--	0.216	0.432	0.432	0.864	0.432	0.864	0.432	0.864		
			A Concert Hall	2,000	--	--	--	--	0.247	0.494	0.494	0.987	0.494	0.987	0.494	0.987		
			A Chamber Music Hall	800	--	--	--	--	0.274	0.548	0.548	1.097	0.548	1.097	0.548	1.097		
			A Xiqu Centre (戲曲中心)	Performance Venue	1,400	--	--	--	--	--	0.274	0.548	0.548	1.097	0.548	1.097	0.548	1.097
				Small Theatre	400	--	--	--	--	--	0.216	0.432	0.432	0.864	0.432	0.864	0.432	0.864
				Piazza Areas	15,000 ⁽²⁾	30,000	--	--	--	--	0.066	0.133	0.133	0.265	0.133	0.265	0.133	0.265
		Phase II	A Great Theatre	1,900	--	--	--	--	0.247	0.494	0.494	0.987	0.494	0.987	0.494	0.987		
			Two Medium-sized Theatres	800 each	--	--	--	--	0.274	0.548	0.548	1.097	0.548	1.097	0.548	1.097		
		Museum Facilities and Exhibition Centre:	M+(Including Design, Moving Image, Popular Culture, Visual Arts)	--	Gross Floor Area: 61,950 (On-site Area)	--	pcu/hr/100 m ²	0	0	0.256	0.298	0.412	0.093	0.374	0.200	0.374	0.200	
			An Exhibition Centre	--	Net Operating Floor Area: 10,000	--		0.173	0.565	0.843	0.616	0.843	0.616	0.843	0.616	0.843	0.616	
		Other Arts and Cultural Uses		--	15,000	--		0.260	0.298	0.189	0.190	0.198	0.174	0.123	0.130	0.123	0.130	
	Communal Facilities		--	20,000	--		0.235	0.235	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115		
	Residential: Villa Houses		--	145,257	151 ⁽³⁾	pcu/hr/house	0.250	0.154	0.163	0.252	0.194	0.276	0.237	0.260	0.202	0.306		
	Residential: Apartments		--		1,089 ⁽³⁾	pcu/hr/flat	0.157	0.067	0.061	0.086	0.073	0.094	0.089	0.089	0.075	0.105		
	Hotel		--	56,000	700 ⁽⁴⁾	pcu/hr/unit	0.138	0.134	0.169	0.156	0.272	0.275	0.218	0.223	0.240	0.216		
	Office		--	107,683	--	pcu/hr/100 m ²	0.260	0.298	0.189	0.190	0.198	0.174	0.123	0.130	0	0		
	Retail, Dining & Entertainment		--	119,000	--	pcu/hr/100 m ²	0.073	0.157	0.464	0.435	0.441	0.608	0.417	0.570	0.683	0.579		
Property Development in Union Square ⁽⁵⁾	Residential		--	608,003	5,809	pcu/hr/flat	0.157	0.067	0.061	0.086	0.073	0.094	0.089	0.089	0.075	0.105		
	Retail		--	82,417	--	pcu/hr/100 m ²	0.073	0.157	0.464	0.435	0.441	0.608	0.417	0.570	0.683	0.579		
	Office		--	231,474 ⁽⁶⁾	--		0.260	0.298	0.189	0.190	0.198	0.174	0.123	0.130	0	0		
	Hotel		--	167,420 ⁽⁶⁾	996 ⁽⁶⁾	pcu/hr/unit	0.138	0.134	0.169	0.156	0.272	0.275	0.218	0.223	0.240	0.216		
	Service Apartment		--		606 ⁽⁶⁾		pcu/hr/unit	0.066	0.030	0.026	0.041	0.031	0.045	0.038	0.042	0.032	0.050	
Property Development in Site A ⁽⁷⁾	Retail		--	29,400	--	pcu/hr/100 m ²	0.073	0.157	0.464	0.435	0.441	0.608	0.417	0.570	0.683	0.579		
	Office		--	264,600	--		0.260	0.298	0.189	0.190	0.198	0.174	0.123	0.130	0	0		
Property Development in Site C ⁽⁸⁾	Residential		--	62,500	896	pcu/hr/flat	0.066	0.030	0.026	0.041	0.031	0.045	0.038	0.042	0.032	0.050		
	Retail		--	12,500	--	pcu/hr/100 m ²	0.073	0.157	0.464	0.435	0.441	0.608	0.417	0.570	0.683	0.579		
Property Development in Site D ⁽⁸⁾	Residential		--	77,500	900	pcu/hr/flat	0.074	0.031	0.029	0.049	0.034	0.054	0.042	0.051	0.036	0.060		
	Retail		--	15,500	--	pcu/hr/100 m ²	0.073	0.157	0.464	0.435	0.441	0.608	0.417	0.570	0.683	0.579		

- Notes:
- The seating capacities and the areas of the developments in WKCD are based on the information from the Brief of this Study and agreed by the relevant parties.
 - It is assumed that 1 seat occupies 2m².
 - Ratio of villa houses to apartments is assumed to be 1:3. The size of villa house and apartment are assumed to be 240 m² and 100 m² respectively
 - The average unit size for hotel is assumed to be 80 m².
 - The GFAs of the property developments and the total no. of residential flats in Union Square are based on the information from PlanD.
 - The most updated office GFA, hotel room no. and service apartment unit no. were received from PlanD on 12/12/08.
 - The most updated office and retail GFA were received from PlanD on 19/01/09.
 - It is understood that the no. of flats for Sites C and D are still being studied under the MTRCL's project "Kowloon South Link Property Development" (i.e. not confirmed yet). For the purpose of this study, it is necessary to make some reasonable assumptions at this stage. Since the total no. of flats of the two sites will not be comparable to the whole WKRA, in term of the potential total trip ends of the two sites in comparing with the total background flows, thus the above assumptions would be acceptable for this particular study, giving that the final no. of flats will not be available in coming months.

Table 2.2 Summary of Future Trip Generations of Local Developments

Development Location	Planned Land Uses		Seating Capacity (no. of seats)	Area (m ²)	No. of Units (no.)	Weekday		Friday		Saturday		Sunday				
						AM (08:30 – 09:30)		PM (17:45 – 18:45)		PM (19:00 – 20:00)		PM (14:00 – 15:00)		PM (14:00 – 15:00)		
						Gen.	Att.	Gen.	Att.	Gen.	Att.	Gen.	Att.	Gen.	Att.	
West Kowloon Cultural District (WKCD) ⁽¹⁾	Performing Arts Venue	Phase I	Mega Performance Venue	15,000	--	--	100	100	99	199	199	398	199	398	199	398
			A Great Theatre	2,200	--	--			54	109	109	217	109	217	109	217
			Two Medium-sized Theatres	800 each	--	--			44	88	88	175	88	175	88	175
			Four Black box Theatres	250 each	--	--			22	43	43	86	43	86	43	86
			A Concert Hall	2,000	--	--			49	99	99	197	99	197	99	197
			A Chamber Music Hall	800	--	--			22	44	44	88	44	88	44	88
			A Xiqu Centre (戲曲中心)	1,400	--	--			38	77	77	154	77	154	77	154
			Small Theatre	400	--	--			9	17	17	35	17	35	17	35
			Piazza Areas	15,000 ⁽²⁾	30,000	--			--	99	199	199	398	199	398	199
	Phase II	A Great Theatre	1,900	--	--	47	94	94	188	94	188	94	188			
		Two Medium-sized Theatres	800 each	--	--	44	88	88	175	88	175	88	175			
	Museum Facilities and Exhibition Centre:	M+(Including Design, Moving Image, Popular Culture, Visual Arts)	--	Gross Floor Area: 61,950 (On-site Area)	--	0	0	159	185	255	58	231	124	231	124	
		An Exhibition Centre	--	Net Operating Floor Area: 10,000	--	17	57	84	62	84	62	84	62	84	62	
	Other Arts and Cultural Uses			--	15,000	--	39	45	28	29	30	26	18	20	18	20
	Communal Facilities			--	20,000	--	47	47	23	23	23	23	23	23	23	23
Residential: Villa Houses			--	145,257	151 ⁽³⁾	38	23	25	38	29	42	36	39	30	46	
Residential: Apartments			--		1,089 ⁽³⁾	171	72	66	94	79	103	97	97	82	114	
Hotel			--	56,000	700 ⁽⁴⁾	97	94	118	109	190	193	153	156	168	151	
Office			--	107,683	--	280	321	204	205	213	187	132	140	0	0	
Retail, Dining & Entertainment			--	119,000	--	87	187	552	518	525	724	496	678	813	689	
Sub-total						876	945	1,787	2,317	2,484	3,527	2,326	3,449	2,506	3,339	
Property Development in Union Square ⁽⁵⁾	Residential		--	608,003	5,809	913	386	354	502	421	549	515	519	438	609	
	Retail		--	82,417	--	60	129	382	359	363	501	344	470	563	477	
	Office		--	231,474 ⁽⁶⁾	--	711	815	517	519	541	476	336	355	0	0	
	Hotel		--	167,420 ⁽⁶⁾	996 ⁽⁶⁾	173	168	212	196	342	345	274	280	301	271	
	Service Apartment		--		606 ⁽⁶⁾	60	27	23	37	28	41	34	38	29	45	
Sub-total						1,917	1,526	1,489	1,613	1,695	1,912	1,503	1,662	1,331	1,403	
Property Development in Site A ⁽⁷⁾	Retail		--	29,419	--	21	46	137	128	130	179	123	168	201	170	
	Office		--	264,600	--	765	877	556	559	582	512	362	382	0	0	
	Sub-total						786	923	693	687	712	691	485	550	201	170
Property Development in Site C ⁽⁸⁾	Residential		--	62,500	896	59	27	23	37	28	40	34	38	29	44	
	Retail		--	12,500	--	9	20	58	54	55	76	52	71	85	72	
	Sub-total						68	47	81	91	83	116	86	109	114	117
Property Development in Site D ⁽⁸⁾	Residential		--	77,500	900	66	27	26	44	31	48	38	46	32	54	
	Retail		--	15,500	--	11	24	72	67	68	94	65	88	106	90	
	Sub-total						78	52	98	112	99	143	103	134	138	143
Austin Station (AUS) of Kowloon Southern Link (KSL) ⁽⁹⁾						310	310	256	256	256	256	256	256	256	256	
West Kowloon Terminus (WKT) of Express Rail Link (XRL) ⁽⁹⁾						1,652	1,652	1,363	1,363	1,363	1,363	1,363	1,363	1,363	1,363	
Kowloon Station (KOW) of Airport Express Line (AEL) and Tung Chung Line (TCL) ⁽⁹⁾						500	500	500	500	500	500	500	500	500	500	
Total						6,187	5,955	6,266	6,938	7,193	8,507	6,622	8,024	6,409	7,291	

- Notes:
- The seating capacities and the areas of the developments in WKCD are based on the information from the Brief of this Study and agreed by the relevant parties.
 - It is assumed that 1 seat occupies 2m².
 - Ratio of villa houses to apartments is assumed to be 1:3 (see para. 7.6.4). The size of villa house and apartment are assumed to be 240 m² and 100 m² respectively.
 - The average unit size for hotel is assumed to be 80 m².
 - The GFAs of the property developments and the total no. of residential flats in Union Square are based on the information from PlanD.
 - The most updated office GFA, hotel room no. and service apartment unit no. were received from PlanD on 12/12/08. However, the trip generation of these three types of developments are still based on the original received / assumed numbers (i.e. office GFA = 273,364, hotel room no. = 1256 and service apartment unit no. = 910) for conservative reasons.
 - The most updated office and retail GFA were received from PlanD on 19/01/09. However, the trip generation of the office is still based on the original received numbers, i.e. office GFA = 294,185, for conservative reason.
 - It is understood that the no. of flats for Sites C and D are still being studied under the MTRCL's project "KSL Property Development" (i.e. not confirmed yet). For the purpose of this study, it is necessary to make some reasonable assumptions at this stage. Since the total no. of flats of the two sites will not be comparable to the whole WKR, in term of the potential total trip ends of the two sites in comparing with the total background flows, thus the above assumptions would be acceptable for this particular study, giving that the final no. of flats will not be available in coming months.
 - Data is based on the Transport Planning Final Report of MTRCL's NEX/2101 Express Rail Link Preliminary Design for West Kowloon Terminus.

3. EXISTING TRAFFIC CONDITION

- 3.1 The existing road network of the Study Area is illustrated in **Figure 3.1**. The existing roads in WKRA (the Focus Area) include Jordan Road (JOR), Lin Cheung Road (LCR), Canton Road (CAR), Wui Cheung Road (WCR), Austin Road West (AURW), Wui Man Road (WMR, formerly called "Road D1"), and Nga Cheung Road (NCR).
- 3.2 The WKRA road network not only serves the local developments but also the strategic through traffic. The through traffic from West Kowloon Highway (WKH), Western Harbour Crossing (WHC) and northern section of LCR to the southern area of Kowloon (e.g. Tsim Sha Tsui, Jordan, and Hung Hom) are currently using LCR, JOR, WCR, and AURW as the connections. Amongst these through routes, LCR-WCR corridor is the busiest one. According to the recent traffic survey, the peak amount of through traffic along this LCR-WCR corridor is over 1,300 pcu per hour in one direction. The estimated overall through traffic volume in WKRA is about 4,000 pcu per hour while the overall local traffic volume of WKRA is about 2,200 pcu per hour.
- 3.3 The WKRDTs had examined 38 existing key junctions. Due to the heavy traffic demand (contributed by both local and through traffic), traffic queue is often observed during peak hours at some busy junctions in WKRA, including the junctions of:
- LCR/JOR (J11)
 - JOR/CAR/Ferry Street (J12)
 - LCR/WCR (J14)
 - WCR/CAR (J15)
 - CAR/AUR/AURW (J18)
- 3.4 Outside the WKRA, some other existing junctions (in the Study Area) were identified as busy junctions too. They are:
- Nathan Road / Waterloo Road (J3)
 - Nathan Road / JOR (J13)
 - Nathan Road / AUR (J19)
 - CAR / Kowloon Park Drive (KPD) (J20)
- 3.5 The Study has examined various possible traffic improvement schemes for the identification of acceptable traffic management schemes to increase the capacities of these junctions for smoother traffic.

4. SHORT TERM IMPROVEMENT SCHEMES

4.1 To increase the capacities of the afore-mentioned busy junctions, WKRDTs recommended some short-term improvement schemes that would not involve large scale engineering works so that they could be implemented on site within a short period, e.g. say from few months to one or two years.

4.2 The details of these improvement schemes are listed in the following paragraphs.

J3 - Junction of Nathan Road / Waterloo Road

4.3 Heavy straight ahead traffic flow is observed at Nathan Road NB, it is proposed to provide an additional lane at Nathan Road northbound (NB) near the junction by setting back the kerblines alongside the southern Nathan Road and realigning the central divider as illustrated in **Figure 4.1** to provide 2 straight ahead lanes, 1 straight ahead and right-turn share lane, and 1 right-turn lane. The pedestrian crossing across Nathan Road was proposed to be changed from staggered crossing to straight crossing. The Method-of-Control (MOC) would also be revised as shown in **Figure 4.1**.

4.4 This improvement scheme could be carried out by Highways Department within short period.

J11 - Junction of JOR / LCR

4.5 The proposed improvement measures for the approaches of this junction are shown in **Figure 4.2** and the details are as follows:

- i. LCR NB: Remove the existing hatched marking at the approach to provide 1 left-turn lane and 3 straight ahead lanes. Widen the carriageway at the northern section of LCR NB to 3-lane width.
- ii. LCR southbound (SB): Provide an additional right-turn lane and change the road markings to provide 2 left-turn lanes, 3 straight ahead lanes, and 1 right-turn lane.
- iii. JOR east bound (EB): Revise the road marking to provide 1 left-turn lane, 1 left-turn and straight ahead share lane, 1 straight ahead lane, and 1 straight ahead and right-turn share lane to cope with the relocation of Jordan Public Transport Interchange (PTI) to To Wah Road.

4.6 The Items (i) and (iii) listed above has just been implemented on site recently. Construction works of Item (ii) is in progress.

J12 - Junction of JOR / Ferry Street / CAR

4.7 It is proposed to revise the road marking of Ferry Street SB to provide 1 left-turn and straight ahead shared lane, and 3 straight ahead lanes to enhance the capacity of the junction.

- 4.8 In addition, it is also proposed to ban the right-turning movement from JOR WB to Ferry Street NB, in order to minimise the signal lost time and hence increase the total signal green time for critical movements. With the proposed banning of the right turn, the 3 traffic lanes on JOR westbound (WB) would be assigned for 1 exclusive left-turn lane and 2 exclusive straight ahead lanes, as shown in **Figure 4.3**.
- 4.9 To cope with the proposed ban turn, it is proposed to widen the Emergency Vehicular Access (EVA) along the western side of the Austin Station (AUS) between JOR and WCR from 6m to 7.3m wide and change to a public road. Then it could divert the affected traffic to JOR WB, the widened EVA SB, WCR EB and then CAR NB. This diversion route is illustrated in **Figure 4.4**. No diversion into local roads is involved.
- 4.10 This scheme will be carried out under the construction of the XRL which is expected to commence in 2010.

J13 - Junction of Nathan Road / JOR

- 4.11 It is proposed to set back the kerb side for widening the carriageway of JOR EB at east of Nathan Road. The proposed widening would provide sufficient improvement to the capacity of the junction.
- 4.12 Further increase in the capacity of the junction could be achieved by banning the right-turn movement at Nathan Road SB for all vehicles except buses. By considering the current traffic circulation in the vicinity, the most reasonable diversion routing for the affected traffic would be Nathan Road SB, Public Square Street WB, Shanghai Street SB and JOR EB / WB as illustrated in **Figure 4.5**.
- 4.13 Diversion of bus routes is not necessary and it is proposed to convert the Nathan Road SB right-turn lane to "bus only" lane to further facilitate bus movements. The proposed junction layout is shown in **Figure 4.6**. It should be noted that given the sufficient additional capacity offered by the proposed widening of the junction, the proposed banning of right turn is not essential and could be subject to further deliberation and consideration.

J14 - Junction of LCR / WCR

- 4.14 It was proposed to set back LCR SB kerb side to provide channelising island. Along LCR NB, it was proposed to increase the length of flared section of the right-turn lane to enhance the right-turning capacity, and reduce the width of central reserve at the northern section of LCR to increase the capacity of straight ahead movement of LCR NB. In addition, the signal MOC would be modified to allow the discharge of the heavy left-turning movement (from LCR SB to WCR EB) in one more signal stage.
- 4.15 The improvement scheme is shown in **Figure 4.7**, and has just been implemented on site recently.

J18 - Junction of CAR / AUR / AURW

- 4.16 The section of AURW between LCR and CAR has already been changed from 1-way to 2-way operation. The traffic along this newly formed AURW EB could only turn left at its junction with CAR, as shown in **Figure 4.8**.
- 4.17 To improve the junction capacity, it was proposed to provide an additional traffic lane at CAR SB by shifting the central divider westward and the southern section of CAR NB was proposed to shift westward accordingly to cater for the additional CAR SB straight ahead lane. Also, the northwest corner would be set back to match the CAR NB straight ahead movement. The junction arrangement is shown in **Figure 4.9**.
- 4.18 This improvement scheme could be carried out by Highways Department within a short period of time.

J19 - Junction of Nathan Road / AUR

- 4.19 Taking into consideration that (i) there is currently no schedule for redeveloping the building at the southeast corner of the junction, (ii) the junction of AUR/Cox's Road/Pine Tree Hill Road would be overloaded by the additional diverted vehicles, and (iii) it is not possible to remove the trees due to environmental reasons, there is no practical short-term improvement schemes for this junction. The junction is currently working at an R.C. above 5%, indicating that most vehicles will be able to clear the junction without waiting for more than one traffic signal cycle.

J20 - Junction of CAR / KPD

- 4.20 The CAR SB straight ahead movement to KPD was the most critical traffic movement at the junction. In the light of this, it was proposed to revise the MOC to increase the green time for the SB straight ahead movement. The junction would be operated under a 4-stage MOC as presented in **Figure 4.10**.
- 4.21 This improvement scheme will be carried out by Highways Department within shortly.

Summary of the Junction Performance with Short Term Improvement Schemes

- 4.22 The summary of junction performance for the cases with and without short term improvement schemes of the above junctions are presented in **Table 4.1**.

Table 4.1 Junction Performance for the Cases with and without the Short Term Improvement Schemes

Junction No.	Junction Name	Junction Type ⁽²⁾	Reserve Capacity (R.C.) ¹ (%) / RFC			
			Without Improvement		With Improvement	
			AM	PM	AM	PM
J3	Nathan Road / Waterloo Road	S	3%	-4%	12%	9%
J11	JOR / LCR	S	-8%	-10%	25%	21%
J12	JOR / Ferry Street / CAR	S	-10%	-11%	51%	37%
J13	Nathan Road / JOR	S	10%	4%	19%	12%
J14	LCR / WCR	S	-15%	-11%	14%	25%
J15	CAR / WCR ⁽¹⁾	S	17%	34%	17%	34%
J18	CAR / AUR / AURW	S	8%	7%	12%	11%
J19	Nathan Road / AUR	S	8%	11%	8%	11%
J20	CAR / KPD	S	3%	26%	27%	26%

- Notes: 1. RC of J15 is affected by the diverted traffic flows arising from J12 improvement scheme. The revised RCs are the same for both schemes
2. S – Signal-control junction

4.23 It can be concluded from the above table that the capacities of all the busy junctions would be enhanced effectively by the proposed short term improvement scheme. All the junctions would operate with sufficient capacities after implementation of the short term improvement schemes.

¹ Reserved Capacity (R.C.) represents the remaining capacity expressed in percentage of total capacity available to take up additional traffic. An R.C. less than 0% indicates congestion. An R.C. greater than 5% indicates that most vehicles will be able to clear the junction without waiting for more than one traffic signal cycle. Greater RC indicates greater remaining capacity to receive more traffic.

5. FUTURE TRAFFIC CONDITION

- 5.1 The road network for the WKRA (the Focus Area) was originally planned in the late 1980s. Land uses were only indicative at that time and railway network plans were only tentative.
- 5.2 Plans for the Airport Railway were subsequently firmed up and the AEL/ TCL opened in 1998. West Rail was completed to Nam Cheong Station in 2002 and was now connected to Hung Hom Station by the recently opened KSL. The station locations and associated airspace development had shaped the transport network development.
- 5.3 The road network plans had been adjusted in recent years following the abandonment of plans for further reclamation at Kowloon Point. It was originally envisaged as the principal north-south route; LCR would be extended to join Salisbury Road running through the previously proposed Kowloon Point Reclamation. The scheme was no longer feasible as no reclamation would be allowed.
- 5.4 Before WKRDTS, the previous road network planning for WKRA was based on a largely at-grade network of major roads with high capacity signalised intersections, plus two infrastructure schemes;
- **LCR Underpass:** North-south underpass along LCR bypassing the junction of LCR/JOR.
 - **Scheme 6:** Elevated AURW Extension (Scheme 6) – extension of the elevated AURW over the WHC toll plaza and then connected to a road link at the western side of toll plaza heading to Hoi Po Road NB and Northern Section of LCR NB.
- 5.5 This previously planned road network (See **Figure 5.1**) was adopted as the Reference Future Road Network for WKRDTS. It also assumed the presence of the planned Central Kowloon Route (CKR) which would connect the WKRA with the proposed Kai Tak Development and East Kowloon. Together with the planned Trunk Road T2 and Lam Tin Tunnel at the eastern side of CKR, traffic to/from WKRA could access Kai Tak, East Kowloon, Tseung Kwan O conveniently in future without passing through the existing hinterland road network such as Waterloo Road, Jordan Road and Austin Road.
- 5.6 By taking into account all the future developments as shown in **Figure 1.1**, the peak hour local traffic volume of WKRA would be increased from approximately 2,200 pcu in 2008 to over 12,000 pcu in 2031. At the same time, the peak hour through traffic passing through WKRA would also increase from 4,000 pcu in 2008 to 6,400 pcu in 2031 approximately. The overall traffic growth of WKRA would be approximately 5% per annum on average.
- 5.7 Based on the above future traffic demand and the Reference Future Road Network, the 2031 traffic model was built up. The traffic forecast identified that without any enhancement to the Reference Future Road Network a lot of junctions within the Study Area would be overloaded, particularly the junctions in WKRA.

- 5.8 Most of the overloaded junctions in WKRA are laying along the ingress/egress routings to/from the local major developments. Thus, the overloaded junctions would affect the accessibilities of these developments including the time sensitive visitor/travellers to WKCD and WKT. Long traffic queues were found in some approaches of certain junctions, which would block back the upstream junctions if there would be no enhancement to the Reference Future Road Network. The WKRDTs has recommended a series of improvement schemes that can eliminate the congestion problem of these junctions and they are described in details in the following section.

6. LONG TERM IMPROVEMENT SCHEMES

- 6.1 To tackle the potential future traffic problems in WKRA, road improvement schemes should be designed to:
- Improve road capacity to Tsim Sha Tsui (TST) for through traffic;
 - Further improve the east-west movements in addition to CKR;
 - Improve individual problem junctions;
 - Segregate through traffic from local development traffic to ensure smooth accessibility for those time sensitive developments e.g. WKCD and WKT;
 - Provide more direct connections to nearby major roads, such as, the West Kowloon Highway, Western Harbour Crossing, and the future Central Kowloon Route to minimise the need for traffic to pass through the busy junctions; and
 - To enhance pedestrian movement among various major developments, particularly WKCD and WKT.
- 6.2 To achieve all the above principles within the limited road space in WKR, traffic should be handled by multi-level road system. In the light of this, WKRDTS proposed a Scheme D2 which includes two levels of underground road system. Apart from this Scheme D2, WKRDTS also recommended other long term improvement schemes. These long term improvement schemes were classified as two groups (i.e. "Core Scheme" and "Additional Schemes"). The details are described in the coming sections.

Core Schemes

- 6.3 "Core Schemes" are those improvement schemes that would be very likely feasible, without engineering difficulties or preliminary engineering feasibility studies had already been done. These schemes include:

Scheme D2 – LCR/AURW Underpass and Depressed Junction of LCR/AURW

- 6.4 A pair of "L shape" LCR-AURW Underpasses (two one-way two-lane tunnels) were proposed to connect from the north of JOR along and below LCR and AURW to the west of CAR. The junction of (J/O) LCR/AURW was proposed to be depressed at -2mPD level to allow a pedestrian deck above be established to connect WKT, Kowloon Station and Union Square Development (KUD), Austin Station (AUS), and WKCD. The LCR-AURW Corridor is the critical route serving through traffic and WKRA traffic. The layout of Scheme D2 is shown in **Figure 6.1**.
- 6.5 The primary objectives for the corridor are to provide following:
- WKT-WKCD pedestrian deck and potentially traffic free pedestrian connections between WKT-KUD-AUS-WKCD;
 - Through route for WHC/WKH/CKR – AURW/CAR;
 - Direct access to WKT, WKCD and KUD;

- Relieve WMR from through traffic to take up planned role as District distributor and serve frontages; and
 - Separation of traffic circulation for the main movements.
- 6.6 Ideally, the overall road network would be much more improved if the proposed LCR-AURW underpasses could extend further east/south to by-pass the critical junction of AUR/CAR. However, there are a lot of site constraints have been identified, e.g. the underneath KSL rail tracks, and other underground utilities, such that the east/south end have to be terminated at the immediate west of WMR at most.
- 6.7 As Scheme D2 is structurally connected with WKT, it would be undertaken by the XRL project.

Scheme E – Road link and Widening of Existing Bus-Only Ramp from WKH NB to Elevated JOR EB for Direct Connection from WHC NB to WKR

- 6.8 The scheme comprised a new at-grade road connection from the WHC NB toll plaza to the up-ramp to Elevated JOR, and a short road deck at the Elevated Junction of JOR /NCR. This scheme is proposed to enhance the accessibility from WKH to WKRA and TST. The scheme would be in operation in 2010. The layout of Scheme E is shown in **Figure 6.2**.
- 6.9 Scheme E would be undertaken by MTR's Kowloon Station Property Management.

Additional Schemes

- 6.10 The Additional Schemes are proposed to provide further improvements on top of the Core Schemes, but the feasibility of implementation of these schemes would subject to further engineering studies. These schemes consist of:

Scheme H – Upgrading Elevated NCR and Direct Connection to WKH via Hoi Po Road and Elevated JOR

- 6.11 Scheme H includes road widening on the Elevated NCR near its junction with Elevated structure JOR; and a new connection from Hoi Po Road to WKH as shown in **Figure 6.3**. This scheme could provide an alternative for local traffic from WKRA (particularly for KUD and WKCD) to NWNT, and hence relieve the traffic loading along the busy LCR.

Scheme I – New Link road from elevated NCR to WHC

- 6.12 Scheme I provides a U-turn down ramp from Elevated NCR NB to WHC SB outside the Cullinan. The layout of Scheme I is shown in **Figure 6.4**. Scheme I can allow fast and direct dispersion of traffic from WKCD after the end of any mega or big performance events. Also, the scheme could relieve the traffic loading at LCR.

Scheme J – WKH SB link to at grade NCR

- 6.13 Scheme J provides a more direct connection from WKH SB to NCR which have two levels of links connecting to the at-grade roundabout at JOR/NCR (for Kowloon Station, WKT, and Jordan) or to the elevated NCR (for KUD, and TST). The scheme would relieve the traffic loading at LCR. The layout of Scheme J is shown in **Figure 6.5**.

Scheme Q – CAR Underpass

- 6.14 Scheme Q - CAR Underpass (refer to **Figure 6.6**) provides an underpass along CAR N-S direction to bypass the junction of CAR/AUR/AURW. This scheme could allow free flow movement for CAR NB and SB traffic, so the delay for N-S traffic could be reduced and N-S capacity could be increased. As a result, the overall junction capacity could be enhanced.
- 6.15 In case the underpass was found infeasible in later stage e.g. feasibility study, further widening of the at-grade junction as shown in **Figure 6.7** would be a fallback option. Although free flow movement for N-S traffic would not be provided under this fallback option, this option will provide adequate capacity to meet the future demand without congestion.
- 6.16 Government will carry out engineering feasibility study for the Additional Schemes H, I, J, and Q.

Other Local Junction Improvement Schemes

- 6.17 Apart from the Core and Additional Schemes for WKRA, other local junction improvement schemes are also proposed for the 2031 road network in the hinterland area.

J1 - Hoi Wang Road/Lai Cheung Road

- 6.18 The junction would be modified from its existing layout under the CKR project, in which the roads within proximity of the western CKR portal would be modified accordingly. It was proposed to widen the WB approach of Lai Cheung Road to three lanes in order to improve the junction. **Figure 6.8** illustrates the scheme.

J5 - Kansu Street/Ferry Street/Yan Cheung Road

- 6.19 It was proposed to realign the Yan Cheung Road NB and Ferry Street NB approaches towards Ferry Street to enhance the discharge capacity. **Figure 6.9** shows the improvement scheme.

J12 - JOR / Ferry Street / CAR

- 6.20 In addition to the short term improvement scheme described in paras, 4.7 to 4.10 involving the banning of the right-turn from JOR WB to Ferry Street NB, it is proposed to widen the JOR EB exit arm from 2-lane width to 3-lane width by modifying the existing

pedestrian subway entrance/exit. **Figure 6.10** shows the proposed junction layout and signal method-of-control.

J38 - Ferry Street/Man Cheong Street/Saigon Street

6.21 The improvement scheme comprises banning the right-turn from Ferry Street NB to Saigon Street. The turning movement would be re-provisioned by diverting the traffic via Man Wai Street, Man Cheong Street NB and Man Cheong Street EB. The pedestrian crossing across Ferry Street would be relocated to the northern section of the junction to enhance the efficiency of the MOC. **Figure 6.11** shows the modified junction layout and the signal method-of-control.

Summary of the Junction Performance and Queue Lengths with Long Term Improvement Schemes

6.22 The summary of junction performance for the cases with and without long term improvement schemes (Core Schemes, Additional Schemes and Local Junction Improvement Schemes) are presented in **Table 6.1**.

Table 6.1 Junction Performance for the Cases with and without the Long Term Improvement Schemes

Junction No.	Junction Name		Junction Type	Reserve Capacity ² (%) / RFC			
				Without Improvement		With Improvement	
				AM	PM	AM	PM
J1	Hoi Wang Road / Lai Cheung Road		S	-4%	9%	24%	47%
J2	Ferry St / Lai Cheung Road / Waterloo Road		S	10%	15%	10%	14%
J3	Nathan Road / Waterloo Road		S	-5%	-4%	-5%	-4%
J4	Hoi Wang Road / NCR		S	40%	29%	41%	31%
J5	Yan Cheung Road / Ferry St / Kansu St		S	-29%	-36%	0%	1%
J6	Nathan Road / Kansu St / Gascoigne Road		S	14%	5%	14%	10%
J7	JOR / Hoi Po Road		S	20%	11%	14%	27%
J8	NCR (elevated) / JOR (elevated)		S	47%	33%	25%	32%
J9	NCR / JOR		R	0.424	0.380	0.502	0.376
J10	JOR / To Wah Road		P	0.198	0.209	0.211	0.210
J11	JOR / LCR		S	-5%	-4%	12%	15%
J12	JOR / Ferry Street / CAR		S	-27%	-30%	35%	33%
J13	Nathan Road / JOR		S	16%	14%	12%	11%
J14	Road D1(S) / WCR / WMR		S	1%	-6%	14%	30%
J15	CAR / WCR	Without Additional Schemes	S	11%	13%	N/A	N/A
		With CAR Underpass (Scheme Q)		N/A	N/A	18%	18%
		With CAR Widening		N/A	N/A	19%	22%
J16	NCR / AURW		R	0.37	0.33	0.24	0.19
J17	LCR / AURW		S	-7%	-16%	46%	11%

² Please refer to the footnotes under Table 4.1 for the interpretation of Reserve Capacity.

Table 6.1 Junction Performance for the Cases with and without the Long Term Improvement Schemes (Cont'd)

Junction No.	Junction Name		Junction Type	Reserve Capacity ³ (%) / RFC			
				Without Improvement		With Improvement	
				AM	PM	AM	PM
J18	CAR / AUR / AURW	Without Additional Schemes	S	-3%	-7%	N/A	N/A
		With CAR Underpass (Scheme Q)		N/A	N/A	34%	8%
		With CAR Widening		N/A	N/A	12%	8%
J19	Nathan Road / AUR		S	3%	31%	4%	26%
J20	CAR / KPD		S	7%	34%	7%	27%
J21	Salisbury Road / CAR		S	87%	98%	97%	79%
J22	Salisbury Road / KPD		S	36%	40%	38%	28%
J23	Salisbury Road / Nathan Road		S	15%	6%	26%	20%
J24	AUR / Cox's Road / Pine Tree Hill Road		S	-7%	-3%	-7%	-3%
J25	Nathan Road / Hill Wood Road		P	0.41	0.68	0.40	0.69
J26	JOR / Gascoigne Road		S	47%	3%	47%	13%
J27	CAR / Haiphong Road		S	56%	143%	50%	108%
J28	CAR / Peking Road		S	157%	368%	164%	313%
J29	Peking Road / KPD		S	57%	54%	57%	50%
J30	KPD / Middle Road		S	65%	81%	65%	95%
J31	Nathan Road / Kimberley Road		S	97%	77%	95%	75%
J32	Nathan Road / Granville Road		S	99%	107%	97%	103%
J33	Nathan Road / Cameron Road		F	N/A	N/A	N/A	N/A
J34	Nathan Road / Haiphong Road / Humphreys Avenue		S	56%	67%	57%	67%
J35	Nathan Road / Mody Road		F	N/A	N/A	N/A	N/A
J36	Nathan Road / Peking Road		S	170%	125%	169%	128%
J37	Nathan Road / Middle Road		P	0.51	0.85	0.51	0.86
J38	Ferry Street / Man Cheong Street / Saigon Street		S	-6%	25%	55%	19%
J39	Yan Cheung Road / Hoi Wang Road / Road D1A(N)		S	24%	-1%	28%	10%
J40	Road D1A(N) / JOR / Road D1A(S)		S	29%	-8%	13%	22%
J41	AURW / WMR		F	-37%	-37%	N/A	N/A

- Notes :
1. S – Signal-control junction
 2. P – Priority junction
 3. R – Roundabout
 4. F – Free-Flow junction
 5. N/A – Not Applicable
 6. Improvement schemes would alter traffic flow pattern at other junctions causing a change in R.C.

³ Please refer to the footnotes under Table 4.1 for the interpretation of Reserve Capacity.

- 6.23 With the long term improvement schemes, all junctions within the Focus Area will operate within capacity with a R.C. greater than 0%. For the existing developed area, majority will operate with R.C. >5% by 2031, i.e. most vehicles will be able to clear the junction without waiting for more than one traffic signal cycle representing quite a satisfactory situation. Only the J3 (Nathan Road / Waterloo Road Junction) will have congestion (R.C. <0%) by 2031 similar to the existing situation (before the completion of the short term measure described in para. 4.3). The J24 (AUR / Cox's Road / Pine Tree Hill Road Junction) is a local junction and the congestion will not have an impact to other junctions. These two junctions are near the boundary of the Study Area. We will consider improvement measures (if necessary) to these two junctions having regards to actual traffic conditions and demand at the junction and the future development/redevelopment of the nearby districts in future years. J5 (Yan Cheung Road / Ferry Street / Kansu Street Junction) and J19 (Nathan Road / AUR Junction) will operate with $0\% < \text{R.C.} < 5\%$ by 2031 when WKRA is fully developed. There will be occasional congestions during the peak hours by 2031. The traffic conditions will be monitored and improvement measures will be timely put in place nearer the time.
- 6.24 The Study has also examined the average traffic queues during peak hours at the critical locations within the Focus Area and found that they would be within the acceptable lengths (in the range of 10% to 70% of the length from upstream junctions) and would not cause blocking of junctions (upstream).
- 6.25 The proposed long term improvement schemes would achieve the objectives of segregating through traffic from local development traffic and providing direct connection to strategic highways. It would also provide a seamless pedestrian connection among developments by means of a large pedestrian deck along a section of Austin Road West. Most of the junctions within the Study Area would be operating with spare capacities, and most vehicles would be able to clear the junction without waiting for more than one traffic signal cycle.

7. FUTURE PUBLIC TRANSPORT INTERCHANGE IN WKRA

7.1 The existing public transport facilities within WKRA include:

- Railway – KOW with services of AEL and TCL
- Franchised Bus – Bus termini at KOW (KOW PTI), WCR (Jordan PTI) (was temporarily relocated to To Wah Road recently) and Cross Boundary Ferry Terminal (CFT PTI), and roadside bus stops along CAR, JOR, AURW and WHC Toll Plaza.
- GMB – GMB terminus at KOW, and roadside stops along CAR, JOR, WCR and AURW.
- Taxi – Taxi stands at KOW and CFT PTI.
- Non-franchised Bus – AEL Shuttles at KOW and Cross-boundary coach services at CFT PTI

7.2 In the interim period, the bus termini of the existing Jordan PTI and the other transport facilities for other modes such as coach and motor cycle parking spaces would be relocated to To Wah Road i.e. at the northeast of LCR/JOR junction. This temporary PTI would commence operation in early 2010.

7.3 It was proposed to relocate the permanent Jordan PTI to a site at immediate north of WKT after the completion of WKT. This relocated PTI would contain 10 numbers of saw-tooth bus bays and 2 GMB stops. Apart from the PTI, 30 nos. of coach parking spaces, 20 nos. of motorcycle parking spaces and a 20m general loading/unloading lay-by would also be provided in the PTI site.

7.4 After the completion of WKT and WKCD, the public transport facilities within the Focus Area (excluding WKCD) are illustrated in **Figure 7.1**, these include:

- Railway – KOW (AEL/TCL); AUS (KSL); and WKT (XRL);
- Franchised Bus – Bus termini at KOW (KOW PTI), Relocated Permanent Jordan PTI and CFT PTI, and roadside bus stops along CAR, JOR, AURW, WHC Toll Plaza; and WMR outside WKT (which should contain the bus stops for the bus routes at Jordan PTI);
- GMB – GMB terminus at KOW PTI and Permanent Jordan PTI; roadside stops along CAR, JOR, WCR, AURW and WMR outside WKT; and
- Taxi – Taxi stands at KOW, CFT PTI, and WKT and pick-up/setting down points at convenient locations.

7.5 It is anticipated that additional public transport facilities, such as taxi stands, coach pick-up/setting down points etc., would be provided within the WKCD to serve its users. This would be examined by WKCD studies when its Master Plan is developed.

8. FUTURE PEDESTRIAN FACILITIES

Proposed Future External Connections

8.1 The proposed future pedestrian connections between WKRA and Jordan / TST districts would be discussed below.

Connection to Jordan

8.2 Three east-west connections as indicated in **Figure 8.1** were identified to promote district level walking as well as connection to MTR Tsuen Wan Line, they are (1) JOR; (2) Bowring Street; and (3) AUR. The initial ideas, opportunities, and constraints for these three connections are described as follows:

- JOR link: Difficult to provide subway from an engineering perspective given the dense underground utilities there. Both footbridge and footpath/crossing improvements with intermittent entrances/exits are conceivable, but subject to further feasibility study and socio-political views in the neighbourhood.
- Bowring Street link: MTR unpaid subway between Jordan Station (JOS) and AUS is preferred at this stage, which allows MTR entry/exit/transfer movements as well as non-MTR public through walks with intermittent entrances/exits.
- AUR link: MTR unpaid subway with intermittent entrances/exits and/or at-grade walkway enhancement. However, in view of the heavy traffic along AUR, temporary traffic diversion during construction would be a substantial challenge.

8.3 Further investigation into the feasibility of the three possible pedestrian links is necessary. Based on information available during the study, it is expected that the Bowring Street link will provide better connection to areas at the east of the focus area as:

- i. the Bowring Street link is a centralized route for the focus area and, as a result, can most effectively serve all pedestrian traffic in the region;
- ii. the JOR link has a weaker connection to the rail-related demand, which are mainly more efficiently connected to the southern areas of the focus area; and
- iii. the AUR link can work more effectively if AURW becomes a one-way corridor, which may undermine road traffic desirability and local circulation efficiency. There would be significant traffic impact during construction.

Connection to TST

8.4 The constraints for providing continuous grade-separated pedestrian connection(s) from WKRA to TST are shown in **Figure 8.2** including:

- KSL Rail Alignment and utilities affecting the possibility of providing pedestrian subway
- Limited footpath width along CAR limiting the possibility to provide footbridge columns and landings

- The lack of internal walkway between CFT and Harbour City
 - The waterfront area of CFT being a restricted zone
 - Kowloon Park built at higher levels and blocking the direction to Nathan Road
- 8.5 In spite of the above constraints, it is found that a reserved subway connection at the southern end of AUS may further extend to connect with WKCD and TST (e.g. China HK City or further to Gateway) as shown in **Figure 8.3**. However, as the potential subway would pass through the site area of WKCD, detailed investigation for the said subway would be carried out under the coming WKCD study. It is noted that such requirement have already be added in the Study Brief of that Study.
- 8.6 As an alternative to the above subway connection, it is proposed to make use of the upgraded section of western CAR footpath outside WKCD and CFT to serve the pedestrian between WKRA and TST (see **Figure 8.3**).
- 8.7 In addition, it is understood that there is concern on the pedestrian connection between WKCD and Kowloon Park/TST Station of MTR Tsuen Wan Line. A possible pedestrian connection was proposed for further examination in the context of the Development Plan to be prepared by the consultants of the WKCD Authority in which there would be more information on the detailed land uses of the WKCD.

Proposed Future Internal Connections

- 8.8 The proposed internal (within the Focus Area) pedestrian connections are shown in **Figure 8.4** and details will be presented below.

WKCD

- at-grade connection to the bus stops at both side of WHC plaza
- elevated connection to the existing footbridge across toll plaza
- footbridges connecting to the southern side of KOW
- traffic free pedestrian deck at ground level for road scheme D2
- footbridge or subway connecting to AUS

WKT

- Three footbridges between WKT and KOW across LCR
- Pedestrian subway connecting the B1 level of WKT to KOW PTI
- Footbridge connecting to the permanent Jordan PTI at the north
- Two footbridges connecting to AUS across Road D1A(S) and WMR
- A subway connecting to AUS at concourse level
- Pedestrian subway connecting the WKT concourse to the WKT station car park beneath WKCD

KOW

- Connections from KOW to WKCD and WKT have been discussed in the above.
- Footbridge at the northern side of KOW, which could connect to the Public Cargo Working Area (PCWA) (via footpath of elevated JOR); permanent Jordan PTI; and CAR.
- If the PCWA would be removed and replaced with a park, a new footbridge was proposed parallel to the elevated JOR, which will directly connect to the future park.

AUS, Sites C & D

- Connections from AUS to WKT and WKCD have been discussed in the above.

8.9 With all the above proposed pedestrian connections, WKRA would have good external connections with adjoining districts and strong internal connections in-between the developments in WKRA.

9. TRANSPORT PLAN AND IMPLEMENTATION PROGRAMME**Summary of Selected/Preferred Traffic Scheme***Core Schemes*

9.1 Scheme D2 – LCR-AURW Underpass, Depressed Junction at LCR/AUR and Associate Junction Improvements

General Descriptions	<ul style="list-style-type: none"> • Can accommodate the current design concept of WKT, particularly the central grand at-grade pedestrian deck connecting with WKCD • Free pedestrian at-grade movement at LCR/AUR junction with traffic calming to control the minor traffic/pedestrian conflict at the car park egress route • Separate through traffic and local traffic to ensure the accessibilities of local developments • Improve the overall capacity of the road networks in the Focus Area • With queue management
Considerations	<ul style="list-style-type: none"> • Essential to WKT and to be constructed under the XRL project • Minor encroachment in the underground level of WKCD but the ground level pedestrian deck would be sufficient to compensate for the lost
Suggested Implementation Programme	<ul style="list-style-type: none"> • 2014/2015 before opening of WKT and WKCD Phase 1

9.2 Scheme E – KOW Scheme 4 (i.e. road link from WHC NB to JOR)

General Descriptions	<ul style="list-style-type: none"> • Can improve the connection from WHC to KOW and WKCD • Relieve the traffic pressure on LCR
Considerations	<ul style="list-style-type: none"> • Essential to KOW and WKCD • Has been gazetted and it is now proceeding with the statutory requirements.
Suggested Implementation Programme	<ul style="list-style-type: none"> • 2009/2010 to cope with opening of ICC and commencement of construction works of WKT and WKCD
Remark	<ul style="list-style-type: none"> • This scheme will be undertaken by private developer

Additional Schemes

9.3 Scheme H – Connection to WKH via elevated JOR and Hoi Po Road

General Descriptions	<ul style="list-style-type: none"> • Relieve the traffic loading on LCR NB • Avoid affecting PCWA or waterfront promenade • Avoid impact on WHC during construction
Considerations	<ul style="list-style-type: none"> • Need to widen elevated NCR • Engineering feasibility study should be proceeded as a follow-up action
Suggested Implementation Programme	<ul style="list-style-type: none"> • Desirable for completion before 2014/15, to accommodate the increased traffic volume arising from the WKT and WKCD (Phase 1) which would be opened in 2014/2015. • It is suggested that such programme would need to be ascertained at the next technical feasibility stage.

9.4 Scheme I – New link road from elevated NCR to WHC

General Descriptions	<ul style="list-style-type: none"> • Relieve the traffic loading on LCR NB
Considerations	<ul style="list-style-type: none"> • Should be considered only if Scheme H go ahead • Benefit to KOW and WKCD • For small car only • Should consider the safety at the merging point • Engineering feasibility study should be proceeded as a follow-up action
Suggested Implementation Programme	<ul style="list-style-type: none"> • Same as Scheme H

9.5 Scheme J – WKH SB link to at grade NCR

General Descriptions	<ul style="list-style-type: none"> • Relieve the traffic loading on LCR SB • Avoid affecting PCWA or waterfront promenade • Avoid impact on WHC during construction
Considerations	<ul style="list-style-type: none"> • Engineering feasibility study should be proceeded as a follow-up action
Suggested Implementation Programme	<ul style="list-style-type: none"> • Same as Scheme H

9.6 Scheme Q – CAR Underpass

General Descriptions	<ul style="list-style-type: none"> • Improve the capacity of CAR/AUR/AURW junction • Reduce delay for N-S traffic of the junction
Considerations	<ul style="list-style-type: none"> • Require modification of the pedestrian subway underneath CAR/AUR/AURW junction • Require encroachment into WKCD • Engineering feasibility should be investigated
Alternative Scheme	<ul style="list-style-type: none"> • Further widening of the at-grade junction could be a fallback option if underpass is found infeasible in the feasibility study (see para. 6.15).
Suggested Implementation Programme	<ul style="list-style-type: none"> • Desirable for completion before 2014/15, because (i) the construction of the underpass after completion of WKT and WKCD (Phase 1), i.e. 2014/15, would encounter more constraints and would cause continual inconvenience to public, and (ii) to cater for the increased traffic volume arising from WKT and WKCD.

9.7 It is noted that all the Additional Schemes are recommended to be implemented before 2014/15. However, in case that the Schemes H, I, J and Q could not be constructed/implemented in one go, it is recommended to implement Schemes H and J first, then Scheme Q, and finally Scheme I.

9.8 Since Schemes H and J could relieve the loading at LCR no matter there is LCR-AURW Underpass or not, the whole network could be benefited as long as these two schemes are available. Hence, Schemes H and J are put in top priority for improvement of the road network.

9.9 Scheme Q is proposed to locally improve the Junction of CAR/AUR/AURW. The locations benefited by Scheme Q would be relatively less than that in Schemes H and J; therefore Scheme Q could be implemented after Schemes H and J.

9.10 With regard to Scheme I, it would mainly serve the egress traffic from WKCD and ICC. In view of public benefit, Scheme I is recommended to put in the lowest priority among the four schemes.

Other Junction Improvement Schemes

9.11 Suggested Implementation programme are as follows:

Junction		General Descriptions	Suggested Implementation Programme
J1	Hoi Wang Road / Lai Cheung Road	To cope with CKR	2016
J5	Kansu Street / Ferry Street / Yan Cheung Road	Construction of CKR would likely affect the junction	2016
J11	LCR / JOR	Part of Scheme D2	2014/2015
J12	CAR / JOR / Ferry Street		2014/2015
J17	LCR / AURW	Part of Scheme D2	2014/2015
J18	CAR / AUR	Scheme Q	2014/2015
J38	Ferry Street / Man Cheong Street / Saigon Street		2014/2015
J39	Hoi Wang Road / Yan Cheung Road / Road D1A(N)	Construction of CKR would likely affect the junction	2016
J41	AURW / WMR	Part of Scheme D2	2014/2015

PTI Scheme

9.12 All the proposed PTI arrangements as discussed in **Chapter 7**, should cope with the opening of WKT and WKCD. Therefore, they are proposed to be implemented before 2014/2015.

Pedestrian Schemes

9.13 All the proposed Pedestrian Schemes as discussed in **Chapter 8** should cope with the opening of WKT and WKCD. Therefore, they are proposed to be implemented before 2014/2015.

10. INTERIM TRAFFIC CONDITION

10.1 It is anticipated that the period from 2010 to 2014 would be the most critical construction period in WKRA as the construction works of WKT, WKCD Phase 1, and Scheme D2 would be being carried out. Apart from short term and long term improvement scheme, WKRDTs also recommended some traffic requirements for this critical construction period.

General Requirements for Temporary Traffic Management Schemes (TTMS)

10.2 In view that the road network in WKRA is already very busy, closure of any road or even traffic lane without re-provisioning for construction works would be basically not acceptable from traffic point of view. The main principle for developing the TTMS is to maintain the original provisions of transport facilities including the number of traffic lanes, lane configurations and method of controls along roads and/or at junctions during construction.

10.3 For example, if any construction works would occupy part of the carriageway (i.e. traffic lanes), consideration shall be given to retain the traffic lane(s) or to set back the kerb/central divider as far as practicable for re-provision. Otherwise, the entire road/junction shall be shifted/displaced to cope with the construction arrangement.

10.4 For the works which would occupy footpaths, a minimum width of footpath shall be maintained or temporary decking shall be provided for retaining pedestrian movements during the construction. If footbridge is affected, temporary footbridge shall be constructed and opened for use prior to the demolition of the existing one in order to maintain a continuous pedestrian network and preserve the accessibility to the public transport facilities or other facilities.

10.5 Priorities should also be given to those TTMS which can secure efficient operations of public transport without undue delay.

10.6 Fire fighting and safety requirements shall be observed and complied with during construction.

Special Requirements During Construction

10.7 The traffic improvement at the junction of JOR/CAR as mentioned in Section 4.7 to 4.9 should be implemented at early stage.

10.8 Temporary barging points would be provided in WKCD area to minimise construction traffic volume along public road.

10.9 Road D1A(S) (or a temporary road with similar function) must be opened for traffic before suspend the section of WCR between LCR and WMR for the construction of WKT.

- 10.10 After suspended the above section of WCR and start the construction of the LCR-AURW underpass, it would become a big open-cut along the existing section of LCR between JOR and AURW. To maintain sufficient road capacity for through traffic, it would be necessary to shift the section of LCR between Yau Ma Tei Interchange and JOR from the original location eastward (to form a new junction with JOR and Road D1A(S)). Hence, the original through traffic route along LCR-WCR-CAR corridor could then be diverted to the new LCR(shifted)-Road D1A(S)-WCR-CAR corridor.