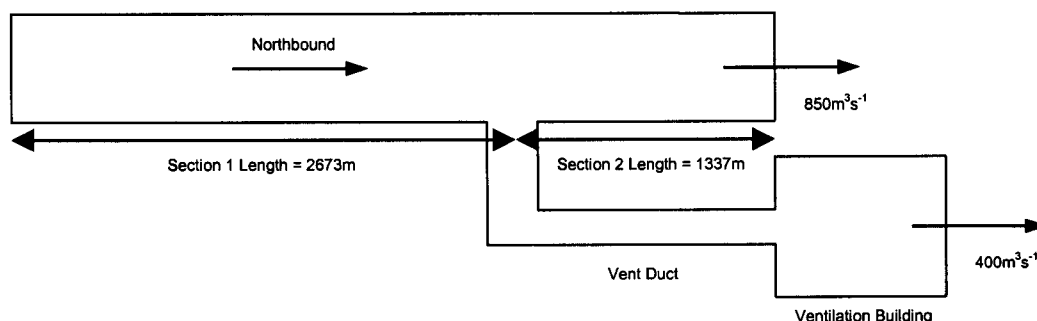


**Detailed Calculation of Traffic Emissions from Route 10 Northern Portal, Ventilation Building, and Toll Plaza**

***Tunnel Portal and Ventilation Buildings***

	NOx	RSP	CO	SO <sub>2</sub>	Reference
Total length of tunnel (m)	4010	4010	4010	4010	Route 10 EIA Final Assessment Report (Sep 2001)
Length of tunnel in section 1 (m)	2673	2673	2673	2673	Route 10 EIA Final Assessment Report (Sep 2001)
Length of tunnel in section 2 (m)	1337	1337	1337	1337	Route 10 EIA Final Assessment Report (Sep 2001)
Peak hourly traffic flow (northbound) (veh/hr)	4300	4300	4300	4300	DBL EIA Report Table 2.9
Total emissions (g/km/hr)	5977	751	11468	624	DBL EIA Report Table 2.9 to 2.13
Average emission rate (g/km/veh)	1.3900	0.1747	2.6670	0.1451	calculated
Total emission rates in section 1 (g/s)	4.4379	0.5576	8.5150	0.4633	calculated
Flowrate at vent building (m <sup>3</sup> /s)	400	400	400	400	Route 10 EIA Final Assessment Report (Sep 2001)
Flowrate at tunnel portal (m <sup>3</sup> /s)	850	850	850	850	Route 10 EIA Final Assessment Report (Sep 2001)
Emission rate through vent building (g/s)	1.4201	0.1784	2.7248	0.1483	calculated
Remaining emission rate in section 1 (g/s)	3.0178	0.3792	5.7902	0.3151	calculated
Total emission rate in section 2 (g/s)	2.2198	0.2789	4.2591	0.2317	calculated
Total emission rates through tunnel portal (g/s)	5.2376	0.6581	10.0493	0.5468	calculated
Coverison of NOx to NO2 (%)	20	N/A	N/A	N/A	calculated
Emission rates of NO2 through vent (g/s)	0.2840	N/A	N/A	N/A	calculated
Emission rates of NO2 through portal (g/s)	1.0475	N/A	N/A	N/A	calculated



***Toll Plaza***

With reference to Table 2.9 of the DBL EIA Report, for the northbound Route 10 traffic, the traffic composition is 62% car + 38% GV (out of which is 44% LGV + 56% HGV as stated in Table 2.8 of the DBL EIA Report), that is

Traffic composition = 62% car + 16.72% LGV + 21.28% HGV

Taking the idling NOx emission factors of 0.2, 0.5 and 2.0 g/min/vehicle for car, LGV and HGV respectively,

Composite idling NOx emission from Route 10 northbound traffic  
 = 62% x 0.2 + 16.72% x 0.5 + 21.28% x 2.0 = 0.6332 g/min/veh

Assuming the toll plaza queuing area of 30m by 50m with a capacity of about 80 vehicles,

Total NOx emission from the queuing area = 0.6332 x 80 / 60 = 0.8443 g/s  
 Therefore 20% of NOx emission = 0.1689 g/s or 1.13E-04 g/sq.m/s

Similarly for the Route 10 southbound traffic, the traffic composition is 46% car + 54% GV (out of which is 44% LGV + 56% HGV as stated in Table 2.8 of the DBL EIA Report), that is

Traffic composition = 46% car + 23.76% LGV + 30.24% HGV

Taking the idling NO<sub>x</sub> emission factors of 0.2, 0.5 and 2.0 g/min/vehicle for car, LGV and HGV respectively,

Composite idling NO<sub>x</sub> emission from Route 10 northbound traffic  
= 46% x 0.2 + 23.76% x 0.5 + 30.24% x 2.0 = 0.8156 g/min/veh

Assuming the toll plaza queuing area of 30m by 50m with a capacity of about 80 vehicles,

Total NO<sub>x</sub> emission from the queuing area = 0.8156 x 80 / 60 = 1.0875 g/s  
Therefore 20% of NO<sub>x</sub> emission = 0.2175 g/s or 1.45E-04 g/sq.m/s

For RSP, CO, and SO<sub>2</sub>, the emission rates for the above sources are estimated based on NO<sub>x</sub> emission rates estimated above and their ratio with the NO<sub>x</sub> emissions for the Route 10 open road emissions presented in Table 2.10 to 2.13 of the DBL EIA Report.

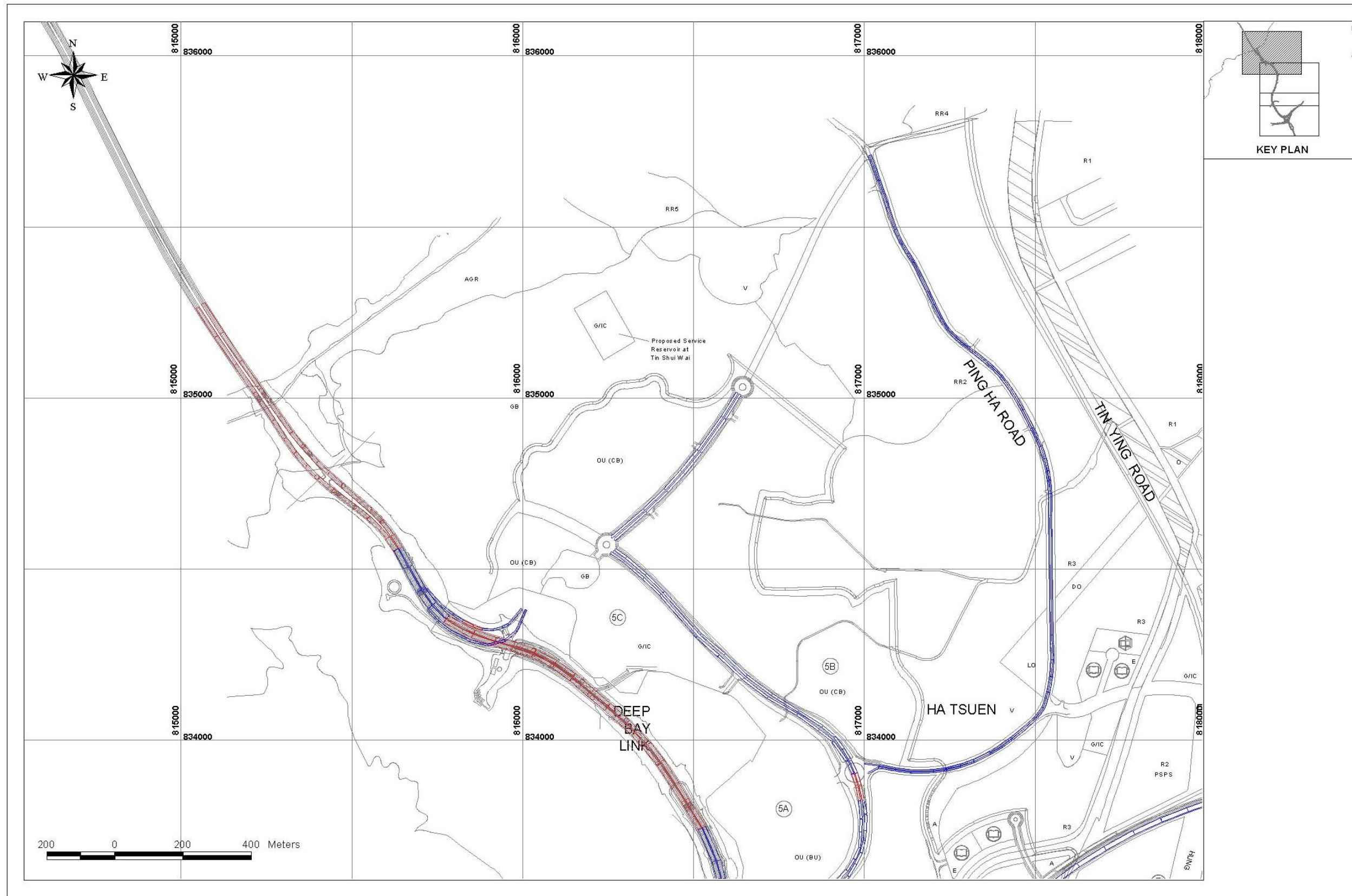


Figure A2B.1A Schematic Diagram of Road Network Modelled in Air Quality Impact Assessment

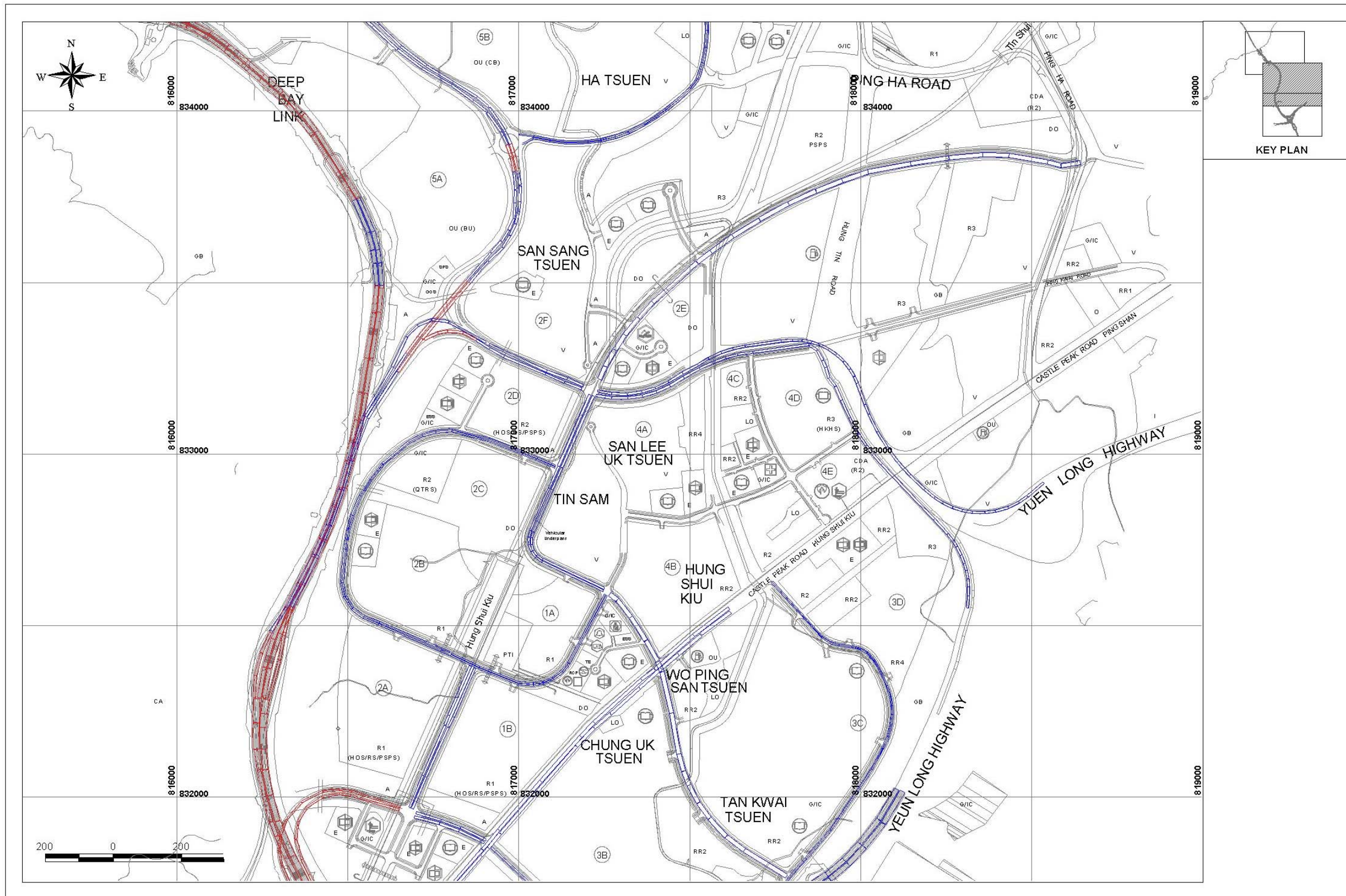


Figure A2B.1B Schematic Diagram of Road Network Modelled in Air Quality Impact Assessment

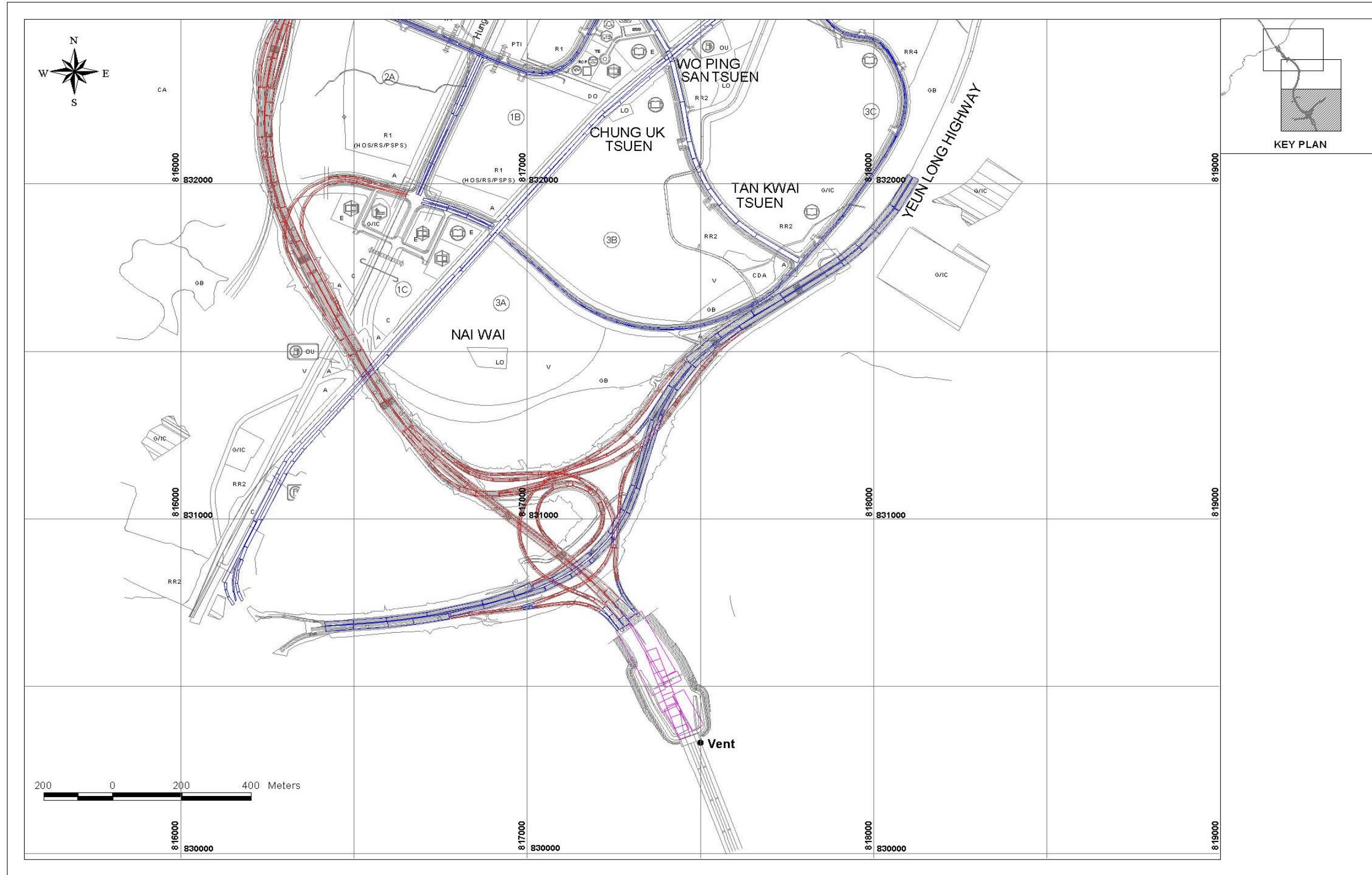


Figure A2B.1C Schematic Diagram of Road Network Modelled in Air Quality Impact Assessment