Appendix 3.2
Sensitivity Test

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Objectives

This appendix aims to show the assessment of the worst affected year within 15 years (year 2016 to 2030) after commencement of the Project at the end of Year 2015.

Emission factor

RSP and NO_2 are the critical air pollutants during the operation of the Project thus are selected to be the represent air pollutants in this vehicular emission assessment. The predicted RSP and NO_X emissions of the whole Hong Kong region from 2016 to 2030 are predicted by the EMFAC-HK Vehicle Emission Calculation Model (Ver. 2.5). The model provides the Vehicle Kilometres Travelled(VKT) for 16 types of vehicles and their daily emission from 2016 to 2030 (both inclusive).

Their emission factors (in unit ton per VKT) are calculated by the following equation:

Emission factor (ton /VKT) = total emission (ton/day) / traffic flow in HK (VKT/day)

The emission factors for the 16 types of vehicle are shown in **Figure A** and **B** for RSP and NO_X respectively. Refer to Transport Department Environmental Report 2011, over 99.9% of the taxis were LPG taxis. No emission of RSP from taxi is expected. Therefore, taxi is not included in **Figure A**.

Results indicated that the emission factors (ton/VKT) of each type of vehicle are decreasing from 2016 to 2030 due to the improvement of vehicular engine performance.

Figure A Emission Factors of RSP for different vehicles

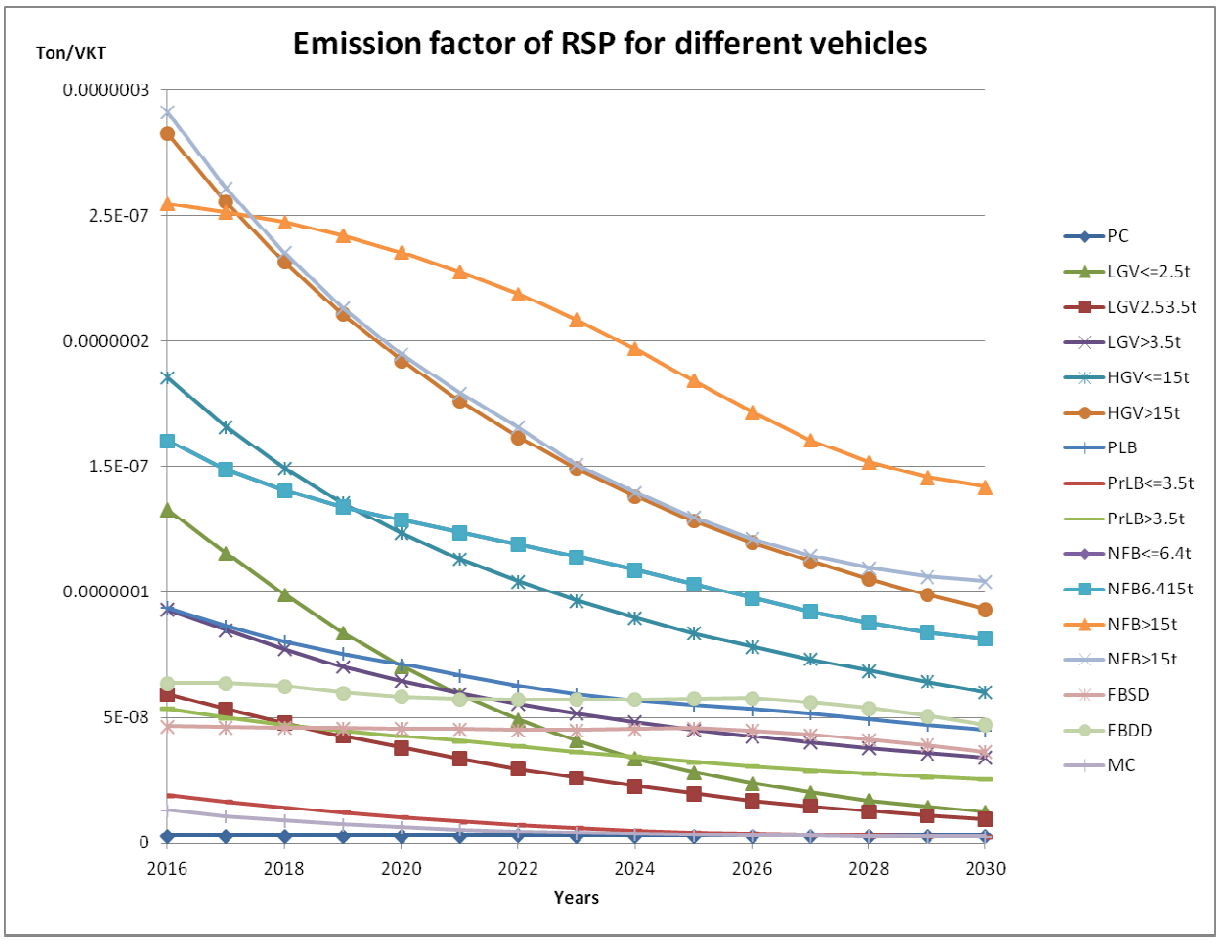
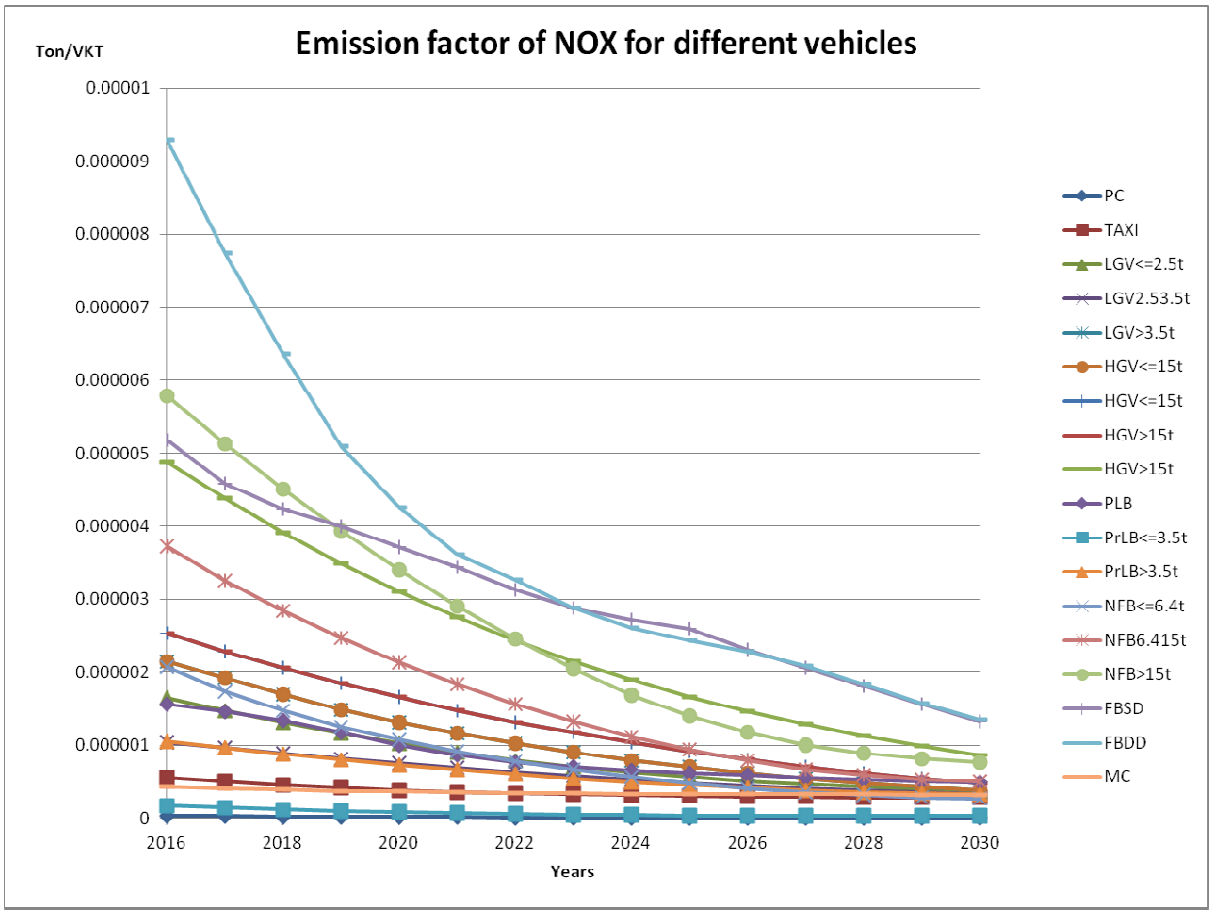


Figure B Emission Factors of NO_X for different vehicles



Total Vehicular Emission within the Study Area

The total emissions within the study area are calculated by the following equation:

*Vehicular emissions within the study area (ton/day) = Emission factor (ton/VKT) * VKT within the study area (VKT/day)*

The VKT within the study area can be found in **Appendix 3.3**.

The emissions rates from all vehicles within the study area are shown in **Figure C** and **D** for RSP and NO_X respectively.

This sensitivity test has taken into account the commencement of CKR starting from Year 2021 and the commencement of WKCD starting from Year 2017. The projected hourly traffic flows and vehicle compositions by the Project traffic consultant for the Year 2016, Year 2021, and Year 2030 are provided in Appendix 3.1. The traffic flow in Year 2021 and 2030 have included the traffic changes due to the operation of CKR. The traffic flows for internal roads of WKCD are compatible with year 2020 and year 2030 traffic data in the latest EIA report of WKCD as provided in table below.

Based on **Figure C** and **D**, year 2016 has the highest traffic emission within three epochs (2016, 2021and 2030). Therefore, 2016 is the worst case scenario of 15 years after commencement of the Project even with addition of the traffic due to the CKR project after Year 2020 and internal roads in WKCD development after Year 2016.

Road	VKT for WKCD Internal Roads in Year 2020															
	PC-TOT	TAXI-TOT	LGV<=2.5t-TOT	LGV2.5-3.5t-TOT	LGV>3.5t-TOT	HGV<=15t-TOT	HGV>15t-TOT	PLB-TOT	PrLB<=3.5t-TOT	PrLB>3.5t-TOT	NFB<=6.4t-TOT	NFB6.4-15t-TOT	NFB>15t-TOT	FBSD-TOT	FBDD-TOT	MC-TOT
A	657.6	409.7	1.0	54.4	44.2	1.0	22.1	0.0	0.7	3.1	12.9	9.2	97.9	0.0	0.0	9.2
B	1924.5	1183.0	13.8	151.0	124.2	18.6	59.8	0.0	6.4	21.8	47.7	43.8	199.7	0.0	0.0	40.0
C	989.9	614.1	1.4	77.3	65.3	1.4	35.0	0.0	0.9	4.1	17.5	17.5	272.8	0.0	0.0	14.7
D	415.7	259.2	0.6	38.2	26.9	0.6	15.0	0.0	0.3	3.2	10.4	6.2	0.6	0.0	0.0	7.0
E	445.0	274.1	0.6	35.8	25.9	0.6	14.1	0.0	0.3	3.4	8.2	8.0	1.4	0.0	0.0	7.0
F	779.4	482.6	2.3	61.7	52.9	3.4	26.3	0.0	0.7	7.2	21.2	18.7	135.0	0.0	0.0	16.2
G	771.3	475.8	1.0	58.3	49.0	1.0	13.2	0.0	0.5	1.5	12.7	10.3	1.0	0.0	0.0	9.8
Total VKT	5983.3	3698.5	20.7	476.8	388.4	26.6	185.6	0.0	9.8	44.2	130.5	113.7	708.4	0.0	0.0	104.0

Road	VKT for WKCD Internal Roads in Year 2030															
	PC-TOT	TAXI-TOT	LGV<=2.5t-TOT	LGV2.5-3.5t-TOT	LGV>3.5t-TOT	HGV<=15t-TOT	HGV>15t-TOT	PLB-TOT	PrLB<=3.5t-TOT	PrLB>3.5t-TOT	NFB<=6.4t-TOT	NFB6.4-15t-TOT	NFB>15t-TOT	FBSD-TOT	FBDD-TOT	MC-TOT
A	774.9	480.1	1.0	58.8	52.0	1.0	25.8	0.0	0.7	5.1	13.3	12.9	103.0	0.0	0.0	11.2
B	2397.4	1481.3	15.7	186.9	149.4	22.4	69.8	0.0	8.3	32.3	54.4	50.2	203.5	0.0	0.0	46.4
C	1148.6	723.6	1.4	99.8	74.1	1.8	40.5	0.0	0.9	9.2	20.7	17.9	270.9	0.0	0.0	15.2
D	440.2	274.1	0.6	38.6	28.6	1.4	16.6	0.0	0.3	3.4	10.6	10.4	0.6	0.0	0.0	8.6
E	478.7	295.8	0.6	38.6	28.6	0.6	15.0	0.0	0.5	4.2	10.7	8.2	2.2	0.0	0.0	7.2
F	799.4	495.7	2.3	62.8	54.2	4.5	27.5	0.0	0.7	7.2	21.2	19.8	135.0	0.0	0.0	16.2
G	786.5	482.7	1.0	58.3	49.5	1.0	13.2	0.0	0.5	1.5	12.7	10.3	1.0	0.0	0.0	9.8
Total VKT	6825.7	4233.2	22.6	543.7	436.5	32.8	208.4	0.0	11.9	62.8	143.5	129.8	716.3	0.0	0.0	114.6

Figure C RSP emission within the study area

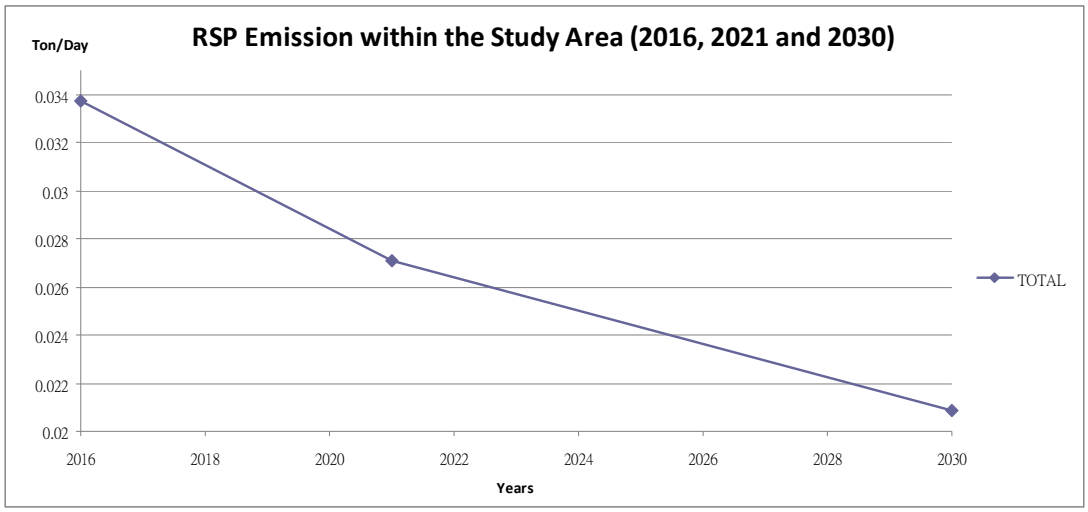


Figure D NO_X emission within the study area