

Appendix 4S

Sample Calculations of the NO₂ and RSP Results of ASRs

APPENDIX 4S SAMPLE CALCULATIONS OF THE NO₂ AND RSP RESULTS OF ASRS

1-hour average cumulative NO₂ concentration

As discussed in **Section 4.8.5.1**, the hourly meteorological data is used for the CALINE4 and ISCST3 modelling to simulate the NO_x and RSP dispersion from the emissions of the open roads and other point sources etc. at the ASRs. As mentioned in **Section 4.8.7.4**, the Ambient Ratio Method (ARM) of 20% has been adopted for the conversion of NO_x to NO₂. The background concentrations of NO₂ and RSP are 60.4 µg/m³ and 48.8 µg/m³ respectively. Therefore, the NO₂ and RSP dispersion at the ASRs could be obtained.

8760 results of 1-hour average cumulative NO₂ concentration could be obtained by:

1-hour average cumulative NO₂

$$= (\text{NO}_{x(\text{CALINE4})} + \text{NO}_{x(\text{ISCST3, chimney})} + \text{NO}_{x(\text{ISCST3, Cruise Terminal} + \text{KTTS})} + \text{NO}_{x(\text{ISCST3, helicopter})} + \text{NO}_{x(\text{ISCST3, concurrent projects})} + \text{NO}_{x(\text{ISCST3, T2})}) \times 20\% + \text{Background}$$

8760 results of 1-hour average cumulative RSP concentration could be obtained by:

1-hour average cumulative RSP

$$= (\text{RSP}_{(\text{CALINE4})} + \text{RSP}_{(\text{ISCST3, chimney})} + \text{RSP}_{(\text{ISCST3, Cruise Terminal} + \text{KTTS})} + \text{RSP}_{(\text{ISCST3, helicopter})} + \text{RSP}_{(\text{ISCST3, concurrent projects})} + \text{RSP}_{(\text{ISCST3, T2})}) + \text{Background}$$

Then the maximum value among the results of each ASR is obtained and presented in **Section 4**.

24-hour average cumulative NO₂ concentration

After the 8760 results of 1-hour average cumulative NO₂ and RSP concentrations obtained, 365 results of 24-hour average cumulative NO₂ and RSP concentrations can be obtained by averaging every 24 results of the 8760 1-hour average cumulative NO₂ and RSP concentrations. For example of KD1,

Hour	1-hour average NO ₂ concentration in µg/m ³							1-hour average Cumulative NO ₂ concentration in µg/m ³
	CALINE4	Chimney	Cruise Terminal + KTTS	Helicopter	Con-current Projects	VBs and Portals of Truck Road T2	Back-ground	
1	8.805	0.000	0.000	0.000	0.000	0.000	60.4	69.205
2	8.579	0.000	0.000	0.000	0.000	0.000	60.4	68.979
3	8.692	0.000	0.000	0.000	0.000	0.000	60.4	69.092
4	17.045	0.000	0.034	0.000	0.003	0.103	60.4	77.586
5	7.112	0.000	0.000	0.000	0.000	0.003	60.4	67.515
6	4.703	0.000	0.000	0.000	0.000	0.003	60.4	65.106
7	5.607	0.000	0.000	0.000	0.000	0.000	60.4	66.007
8	9.106	0.000	0.000	0.000	0.000	0.000	60.4	69.506
9	22.050	0.000	0.191	0.000	0.108	0.402	60.4	83.150
10	18.663	0.000	0.002	0.000	0.001	0.036	60.4	79.103
11	15.616	0.000	0.002	0.000	0.000	1.809	60.4	77.827
12	14.299	0.000	0.040	0.000	0.008	0.078	60.4	74.824
13	10.272	0.000	0.001	0.000	0.000	4.275	60.4	74.948
14	10.573	0.000	0.033	0.000	0.007	3.240	60.4	74.254

15	15.653	0.000	0.144	0.000	0.056	0.468	60.4	76.722
16	15.013	0.000	0.002	0.000	0.000	0.021	60.4	75.437
17	11.928	0.000	0.000	0.000	0.000	0.000	60.4	72.328
18	20.319	0.000	0.000	0.000	0.000	0.056	60.4	80.775
19	23.329	0.000	0.000	0.000	0.000	0.042	60.4	83.771
20	13.734	0.000	0.000	0.000	0.000	0.001	60.4	74.135
21	9.708	0.000	0.000	0.000	0.000	0.000	60.4	70.108
22	6.924	0.000	0.000	0.000	0.000	0.639	60.4	67.963
23	6.547	0.000	0.000	0.000	0.000	0.687	60.4	67.634
24	6.585	0.000	0.002	0.000	0.000	1.308	60.4	68.294
Average								73.095

Hour	1-hour average RSP concentration in $\mu\text{g}/\text{m}^3$							1-hour average Cumulative NO_2 concentration in $\mu\text{g}/\text{m}^3$
	CALINE4	Chimney	Cruise Terminal + KTTS	Helicopter	Concurrent Projects	VBs and Portals of Truck Road T2	Back-ground	
1	2.440	0.000	0.000	0.000	0.000	0.000	48.8	51.240
2	2.340	0.000	0.000	0.000	0.000	0.000	48.8	51.140
3	2.380	0.000	0.000	0.000	0.000	0.000	48.8	51.180
4	5.060	0.000	0.017	0.000	0.001	0.019	48.8	53.897
5	1.860	0.000	0.000	0.000	0.000	0.000	48.8	50.660
6	1.310	0.000	0.000	0.000	0.000	0.001	48.8	50.111
7	1.540	0.000	0.000	0.000	0.000	0.000	48.8	50.340
8	2.460	0.000	0.000	0.000	0.000	0.000	48.8	51.260
9	6.500	0.000	0.096	0.000	0.029	0.085	48.8	55.511
10	5.540	0.000	0.001	0.000	0.000	0.008	48.8	54.349
11	4.620	0.000	0.001	0.000	0.000	0.006	48.8	53.427
12	4.160	0.000	0.020	0.000	0.002	0.016	48.8	52.998
13	2.950	0.000	0.000	0.000	0.000	0.373	48.8	52.123
14	3.070	0.000	0.017	0.000	0.002	0.252	48.8	52.141
15	4.680	0.000	0.073	0.000	0.015	0.030	48.8	53.598
16	4.400	0.000	0.001	0.000	0.000	0.004	48.8	53.205
17	3.290	0.000	0.000	0.000	0.000	0.000	48.8	52.090
18	5.780	0.000	0.000	0.000	0.000	0.009	48.8	54.589
19	6.660	0.000	0.000	0.000	0.000	0.006	48.8	55.466
20	3.900	0.000	0.000	0.000	0.000	0.000	48.8	52.700
21	2.720	0.000	0.000	0.000	0.000	0.000	48.8	51.520
22	1.940	0.000	0.000	0.000	0.000	0.000	48.8	50.740
23	1.830	0.000	0.000	0.000	0.000	0.000	48.8	50.630
24	1.900	0.000	0.001	0.000	0.000	0.252	48.8	50.953
Average								52.328

As shown in the above tables, the result of 24-hour average cumulative NO_2 and RSP concentrations for Day 1 could be obtained. Similarly, the rest of the results of 24-hour average cumulative NO_2 and RSP concentrations could be obtained for each ASR. Then the maximum value among the results of each ASR is obtained and presented in **Section 4**.

Annual average cumulative NO₂ and RSP concentration

After the 8760 results of 1-hour average cumulative NO₂ and RSP concentrations obtained, the result of annual average cumulative NO₂ and RSP concentrations of each ASR is calculated by averaging the 8760 results of 1-hour average NO₂ and RSP concentrations.