

**APPENDIX 3E**  
**Calculation of Lion Rock Tunnel Portal Emission  
Factor**

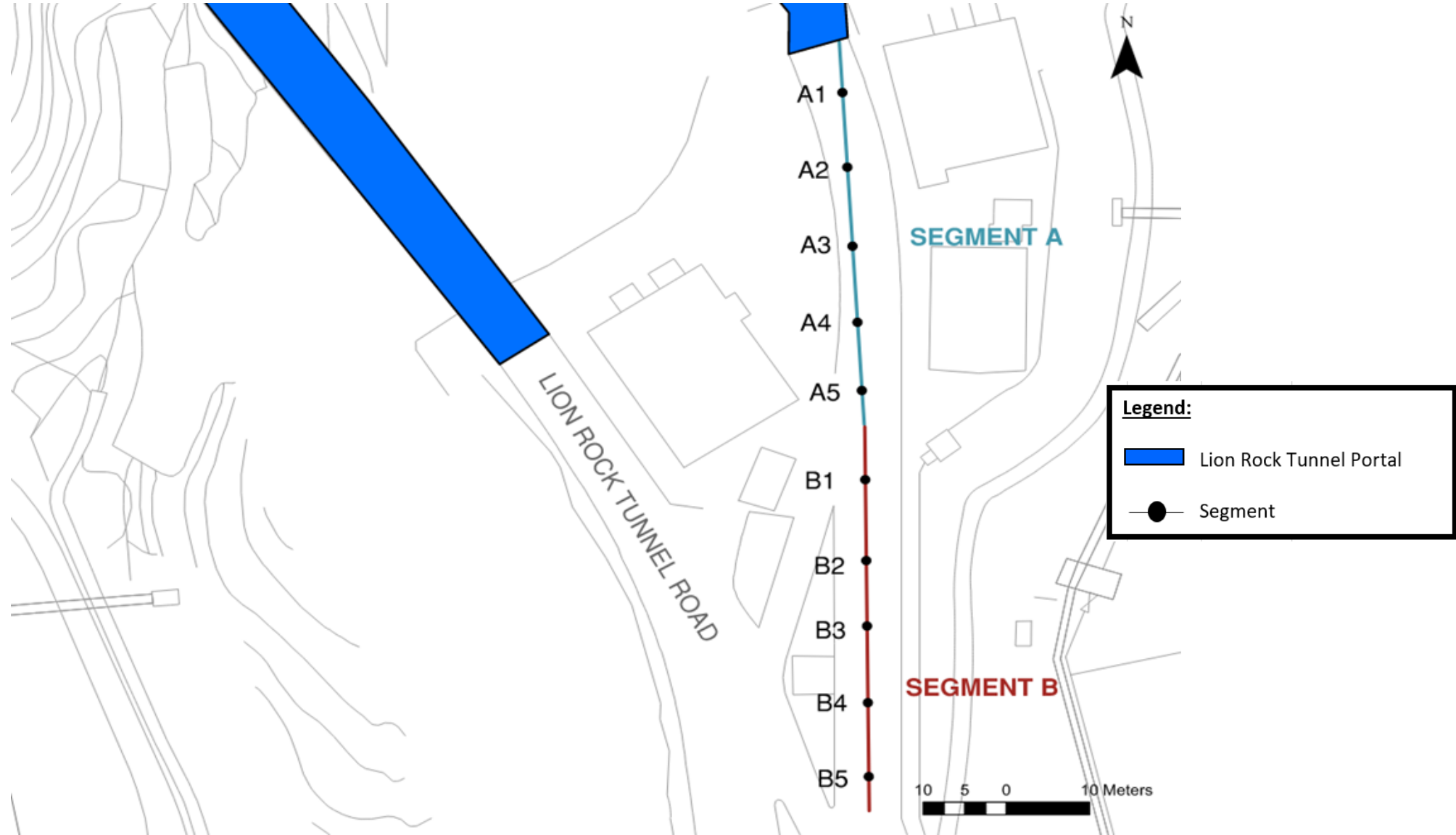
### Appendix 3E Calculation of Lion Rock Tunnel Portal Emission Factor

To calculate the composite emission factors at the portal, traffic flow of S58 will be used, the location of S58 can be found in Figure 3.2 of the EIA report. It is assumed traffic flow extends towards the enclosed portal of the Lion Rock Tunnel, and the entire Lion Rock Tunnel is 1400km.

S58 is the entry direction into the Lion Rock Tunnel

Travel Direction

Zone:	B	A	Lion Rock Tunnel
Length(m)	50	50	1400



## Appendix 3E Calculation of Lion Rock Tunnel Portal Emission Factor

### 2027 Peak Hourly Traffic Composition

Segment	PC	TAXI	LGV3	LGV4	LGV6	HGV7	HGV8	PLB	PV4	PV5	NFB6	NFB7	NFB8	FBSD	FBDD	MC	Total	Travel Speed (km/hr)
S58 (0800-0900)	67.7%	5.6%	0.1%	10.2%	0.8%	0.8%	3.9%	0.2%	0.2%	1.0%	0.4%	0.3%	0.6%	0.0%	4.1%	4.1%	3141	44

### EMFAC emission factor (g/km/veh)

Pollutant Name: RSP

Temperature: 9.9 C

Relative Humidity: 18%

Year 2022

Speed (km/hr)	PC	TAXI	LGV3	LGV4	LGV6	HGV7	HGV8	PLB	PV4	PV5	NFB6	NFB7	NFB8	FBSD	FBDD	MC	RSP E.F. (g/km/veh)	
44	0.0026	0	0.0172	0.0149	0.039	0.0387	0.0968	0.0168	0.0149	0.0285	0.0491	0.0479	0.208	0.1665	0.1474	0.0052		
E.F (g/km)	5.5276	0	0.0688	4.7829	1.014	0.9288	11.9064	0.1008	0.0745	0.855	0.6874	0.479	3.744	0	19.0146	0.676	1.59E-02	

Pollutant Name: FSP

Temperature: 9.9 C

Relative Humidity: 18%

Year 2022

Speed (km/hr)	PC	TAXI	LGV3	LGV4	LGV6	HGV7	HGV8	PLB	PV4	PV5	NFB6	NFB7	NFB8	FBSD	FBDD	MC	FSP E.F. (g/km/veh)	
44	0.0024	0	0.0158	0.0137	0.0359	0.0356	0.0891	0.0155	0.0137	0.0262	0.0451	0.044	0.1914	0.1531	0.1356	0.004		
E.F (g/km)	5.1024	0	0.0632	4.3977	0.9334	0.8544	10.9593	0.093	0.0685	0.786	0.6314	0.44	3.4452	0	17.4924	0.52	1.46E-02	

### Mass of Pollution

Emission rate of pollutant inside the tunnel = E.F x Traffic Flow x Length of Tunnel

Emission rate of RSP= 1.94E-02 g/s

Emission rate of FSP= 1.78E-02 g/s

For each "portal", two-thirds (2/3) and one-thirds (1/3) of the emitted mass are assumed to accumulate in the first and second 50 meters, respectively.

#### Segment A (first 50m)

Emission rate of RSP from the Full Enclosure= 1.29E-02 g/s  
 Emission rate of FSP from the Full Enclosure= 1.19E-02 g/s

#### Segment B (second 50m)

Emission rate of RSP from the Full Enclosure= 6.46E-03 g/s  
 Emission rate of FSP from the Full Enclosure= 5.94E-03 g/s

### Emission Factor for Each Volume Source

Given the width of the road is close to 10m, it is set that the number of identical volume source per 50m/10m = 5

#### RSP Emission Factor for Each Volume Source

Segment A (5 identical volume source) = 2.5853E-03 g/s  
 Segment B (5 identical volume source) = 1.2927E-03 g/s

#### FSP Emission Factor for Each Volume Source

Segment A (5 identical volume source) = 2.3741E-03 g/s  
 Segment B (5 identical volume source) = 1.1871E-03 g/s