

Report

on

Roadside Air Quality Assessment

at 46-54 Court Rd Fairfield NSW

Prepared

By

John Jiang

16 September 2024

Fairfield Developments No.1 Pty Ltd

30a Eva Street, Riverwood NSW 2210

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Client: Fairfield Developments No.1 Pty Ltd

Job No: EJ545	Version	Prepared by	Reviewed by	Submitted to Client	
Status				Copies	Date
Version	Draft	JJ	RJ	pdf e-mail	16/9/2024
Version	Final	JJ	-	Pdf e-mail	16/9/2024

EnvironOdour Australia Pty Ltd

Tel: 0419 886 999

Email: j.jiang@environodour.com.au

<https://www.environodour.com.au/>

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1 Background

EnvironOdour Australia (EnvironOdour) has been engaged by Fairfield Developments No.1 P/L to prepare a roadside air quality report for a proposed development at 46-54 Court Rd Fairfield NSW.

A roadside air quality report is required to evaluate the vehicle emissions from the classified road (The Horsley Drive) by the Fairfield City Council:

- (g) An air quality report was not submitted to demonstrate that the proposed development will not result in unacceptable impacts from vehicle emissions from The Horsley Drive, which is a classified road, and any required measures to ameliorate potential vehicle emissions. The consent authority cannot be satisfied as to the matter in section 2.119(2)(c) of SEPP T&I in the absence of an air quality report.

Transport for NSW developed the Roadside Air Quality Screening Tool (RAQST) in late 2023. RAQST helps to assess air quality impacts from vehicles using new or existing surface roads using a simple, screening model. The report describes the methodology for roadside air quality assessment and presents the results and conclusions.

2 Objectives

The scope of work will include the following tasks:

- Assess the roadside air quality from vehicles on the proposed development application using RAQST
- Present the assessment assumptions and conclusions
- Prepare the roadside air quality assessment report

3 Site description

The proposal seeks consent for a development outcome under an amended DA:

Demolition of existing structures and the construction of an 8-12 storeys mixed-use development consisting of 4 multi-storey buildings containing 290 residential developments (9 studio apartment, 92 x 1-bedroom apartments, 156 x 2-bedroom apartments and 37 x 3-bedroom apartments) and 1,413m² of commercial/retail floor space above 3 levels of basement car park and associated landscaping

The property boundary is marked with a yellow line in Figure 1. The Horsley Drive is classified as state road, which is a north-south road network connecting Fairfield to two key arterial road network including the Cumberland Highway to the north and The Hume Highway to the south, carrying an Annual Average Daily Traffic (AADT) of more than 20,000 vehicles, where mandatory requirements under the State Environmental Planning Policy (Transport and Infrastructure) 2021 apply.

The Horsley Drive generally carries 4 traffic lanes (two lanes in each direction) with clearway restriction between 6am - 7pm Monday to Friday and 9am –6pm Saturday, Sunday and Public Holidays along both sides of the street and school zone. It is signposted with a 40km/h speed limit applies during school zone hours.



Figure 1 Aerial view of the site and the road

4 Roadside Air Quality Screening

The Roadside Air Quality Screening Tool (RAQST) helps to assess air quality impact from surface roads using a simple, screening model. RAQST has been developed in Microsoft Excel and uses macros to perform the calculations. A manual is provided that explains how to use RAQST. The assumptions used for the proposed project are discussed here in the order of inputs to the RAQST.

4.1 General set up

The assessment year is selected as 2019 when the traffic data is available.

4.2 Road characteristic

The Horsley Drive has 3 lanes of traffic travelling in each direction.

The road type is selected as an arterial with an average speed of 60 km/h.

The road gradients (0%) in both directions were measured using Google Maps.

4.3 Traffic data

The traffic volume was acquired from the Roads and Maritime Services Traffic Volume Viewer. The permanent station is located on The Horsley Drive and 40m North of Fairfield Street, Fairfield (Station Id: 66240).

Annual Average Daily Traffic Volume (AADT) counts in 2019 was 19,009 vehicles in northbound traffic and 21,853 vehicles in southbound traffic. The monthly AADT in 2019 can be seen in Figure 2. The location maker shows the proposed site.

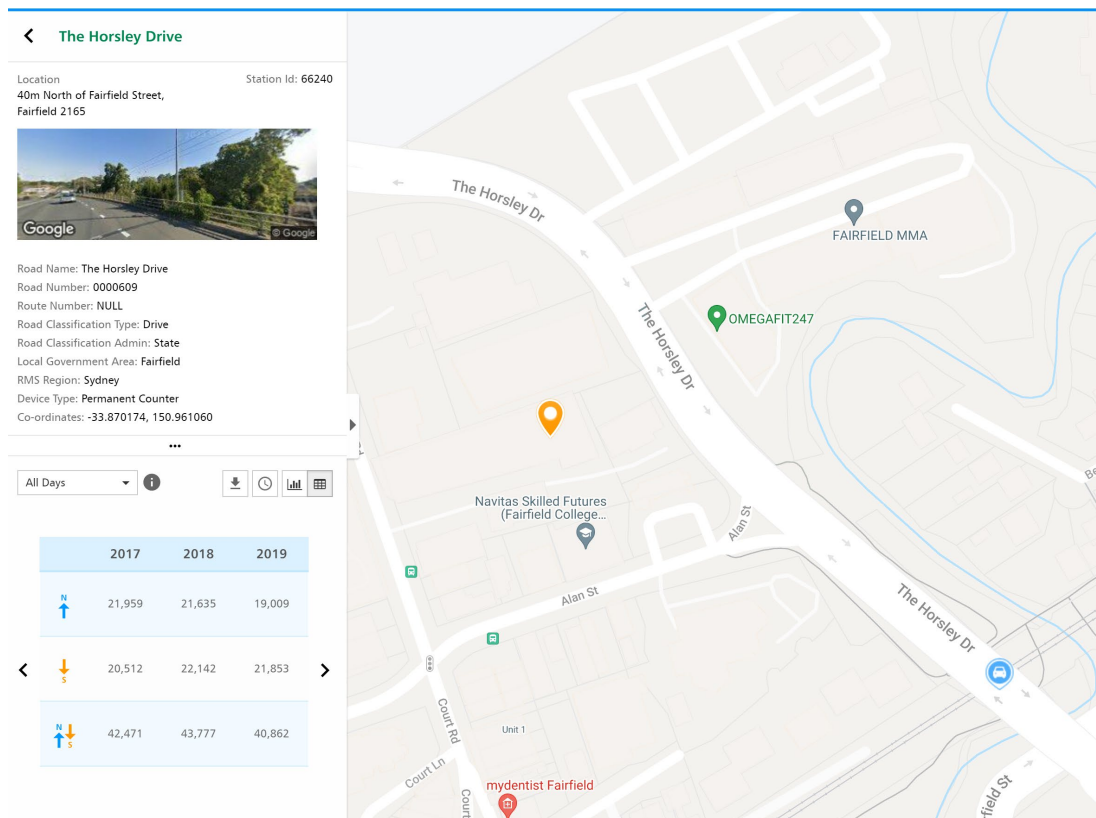


Figure 2 Historic AADT between 2017 - 2019

The level for the traffic composition data is selected as Level 3 which includes car, light commercial vehicle (LCV), heavy goods vehicle (HGV), bus and motorcycle vehicle types.

The Horsley Drive (66240) Data

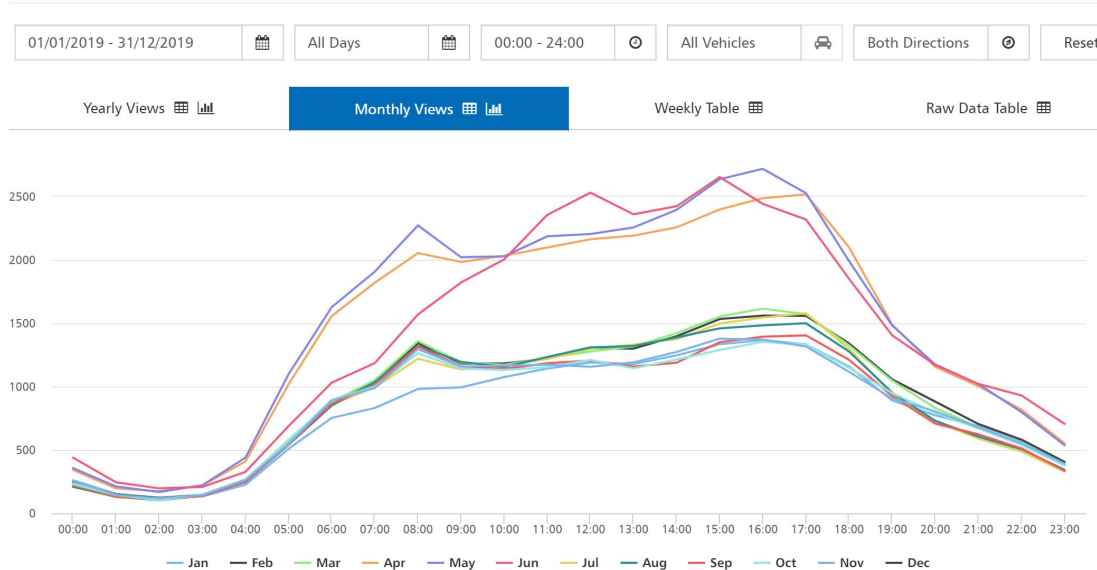
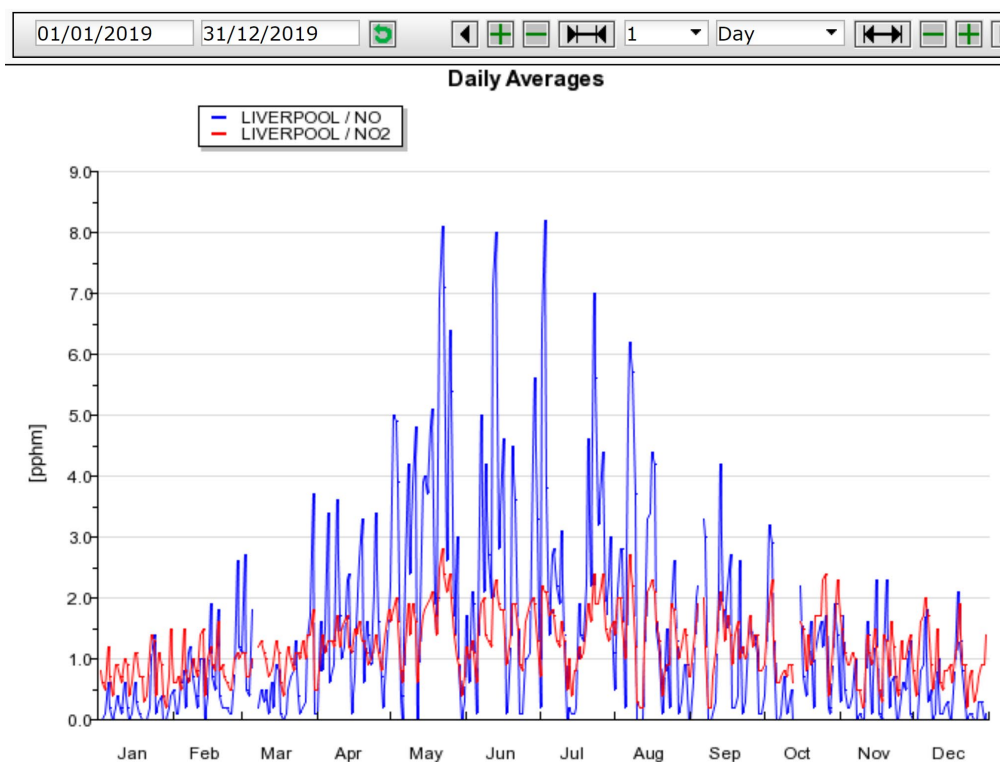


Figure 3 Monthly AADT in 2019

4.4 Background concentrations

The background concentrations for NO_x, PM₁₀ and PM_{2.5} at Liverpool roadside monitoring station have been downloaded from NSW Air Quality Monitoring Network.

Figure 4 NO_x hourly averages at Liverpool in 2019

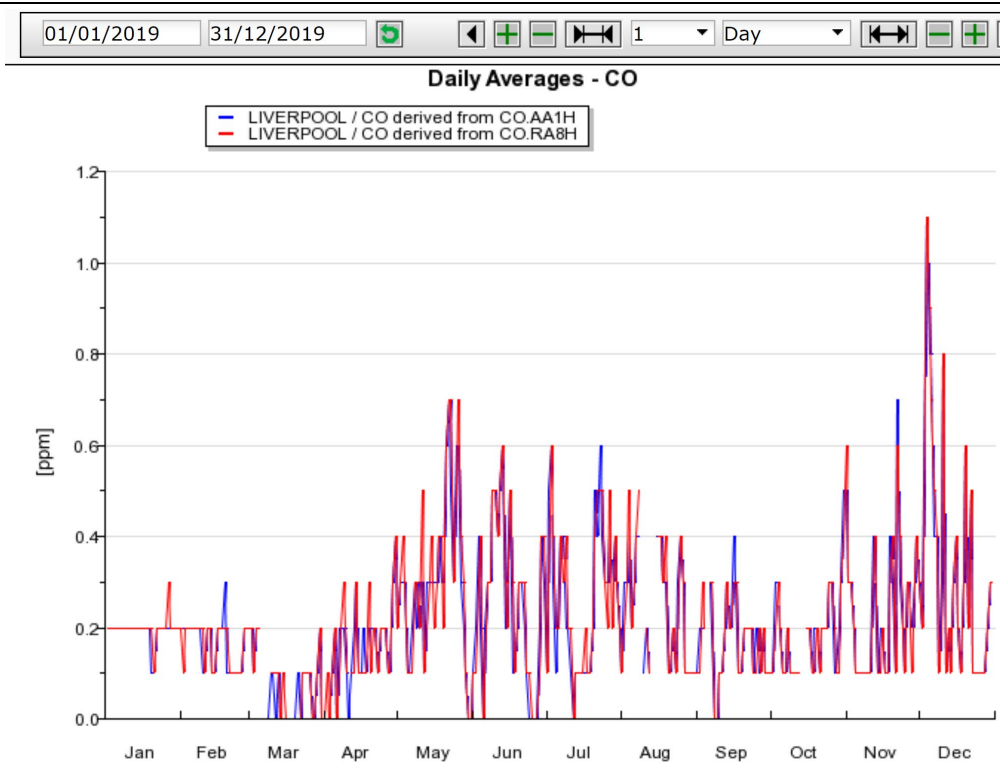


Figure 5 PM₁₀ and PM_{2.5} daily averages at Liverpool in 2019

Annual Averages

Date	LIVERPOOL NO annual average derived from 1h average [pphm]	LIVERPOOL NO2 annual average derived from 1h average [pphm]	LIVERPOOL PM10 annual average derived from 24h average [µg/m³]	LIVERPOOL PM2.5 annual average derived from 24h average [µg/m³]
2019	1.4	1.2	27.7	12.8
2020	1.3	1.1	20.8	9.1
2021	1.2	1.0	18.1	7.9
2022	1.1	0.8	14.6	5.5
2023	1.4	0.9	19.3	7.7

Figure 6 NO_x, PM₁₀ and PM_{2.5} annual averages at Liverpool between 2019 - 2023

The nearest receptor is about 5 meters away on ground level.

4.5 Summary

All the inputs for RAQST are shown in Figure 6.

User input

1. General set-up

† Changing parameters in bold will reset traffic data.

Assessment year†	2019
Electric vehicle projections	YES

2. Road characteristics

Lanes per direction†	3
Road type†	Arterial
Road gradient in direction A	0.0%
Median strip width (m)	0
Lane width (m)	3.5

3. Traffic data - general

Level for traffic composition†	Level 3
Fill with default composition†	YES
Traffic period†	AADT
Traffic speed (km/h)	60
Peak hour traffic as % of AADT†	10%

† Used to calculate peak-hour traffic if only AADT is known.

4. Traffic data - by lane

Direction	Lane	Road gradient	Traffic volume (annual - vpd)	Traffic composition (%) - L3				
				Car	LCV	HGV	Bus	MC
A	Lane A1 ►	0.0%	6,336	76.3	17.5	5.2	0.5	0.5
A	Lane A2 ►	0.0%	6,336	76.3	17.5	5.2	0.5	0.5
A	Lane A3 ►	0.0%	6,336	76.3	17.5	5.2	0.5	0.5
B	◄ Lane B3	0.0%	7,284	76.3	17.5	5.2	0.5	0.5
B	◄ Lane B2	0.0%	7,284	76.3	17.5	5.2	0.5	0.5
B	◄ Lane B1	0.0%	7,284	76.3	17.5	5.2	0.5	0.5

5. Background concentrations

(a) Values from DPE monitoring stations (2021 only)

Background site for NO _x	LIVERPOOL
Background site for PM ₁₀	LIVERPOOL
Background site for PM _{2.5}	LIVERPOOL
1-hour metric for NO _x	Maximum
24-hour metric for PM ₁₀	Maximum
24-hour metric for PM _{2.5}	Maximum

(b) User-defined values (overrides DPE data)

Apply user-defined values			YES
	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
1-hour	123.3	-	-
24-hour	-	27.7	12.8
Annual	22.6	8.9	4.1

6. Closest receptor

Distance from kerb of lane A1 (m)	5
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Figure 7 Inputs screen for RAQST

4.6 RAQST results

RAQST has been designed only for the first-pass screening of air quality impact in connection with road projects when preparing an environmental impact assessment for or on behalf of Transport for NSW. RAQST does not provide accurate air quality assessments but rather uses worst-case scenarios to determine whether or not more detailed assessment is required.

The results of roadside air quality screening assessment comply with all air quality criteria at the proposed development site.

The air emission results are shown in Appendix 1.

Results - concentrations at receptor

Pollutant	Averaging period	Air quality criterion (µg/m³)	Predicted concentration (µg/m³)			Predicted concentration as % of criterion			Compliance of total with criterion	Total <90% of criterion	Impact assessment result
			Background	Road	Total	Background	Road	Total			
NO _x	1-hour	-	123.3	222.4	345.7	Not applicable			Not applicable		
	Annual	-	22.6	44.5	67.1						
NO ₂	1-hour	164	Not applicable		143.3	Not applicable		87%	Yes	Yes	Not applicable
	Annual	31	14.0	13.2	27.3	45%	43%	88%	Yes	Yes	Moderate
PM ₁₀	24-hour	50	27.7	6.6	34.3	55%	13%	69%	Yes	Yes	Not applicable
	Annual	25	8.9	2.6	11.5	36%	10%	46%	Yes	Yes	Slight
PM _{2.5}	24-hour	25	12.8	4.3	17.1	51%	17%	69%	Yes	Yes	Not applicable
	Annual	8	4.1	1.7	5.8	51%	22%	73%	Yes	Yes	Moderate
Summary											
Complies with all air quality criteria.											
Potential impact is moderate.											
Recommendation											
Seek advice on whether a detailed assessment should be conducted.											

Figure 8 Results screen for RAQST

5 Conclusion

The proposed development application has been assessed using RAQST by Transport for NSW. The roadside air quality impact assessment confirms that the air quality at the proposed development site conforms with all air quality criteria. On the basis of this screen test approach, the potential impact of the project is moderate.

6 References

NSW EPA 2022, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Environment Protection Authority, September 2022.

Transport for NSW, Roadside air quality screening tool guideline, Version 1.0, October 2023

Clean Air Society of Australia and New Zealand (CASANZ) Good Practice Guide for the Assessment and Management of Air Pollution from Road Transport Projects (CASANZ Guide).

Appendix 1. Air emission results

Results - emissions

Direction	Lane	Period:	Day					Period:	Day				
		Weighted average vehicle emission rate for period (g/vehicle-km)					Average traffic emission rate for period (g/km/day)						
		NO _x	PM ₁₀	PM _{2.5}	CO ₂ (exhaust)	CO ₂ (equivalent)	NO _x	PM ₁₀	PM _{2.5}	CO ₂ (exhaust)	CO ₂ (equivalent)		
A	Lane A1 ►	0.68	0.04	0.03	198.03	202.15	431.14	25.43	16.86	125,473.20	128,079.47		
A	Lane A2 ►	0.68	0.04	0.03	198.03	202.15	431.14	25.43	16.86	125,473.20	128,079.47		
A	Lane A3 ►	0.68	0.04	0.03	198.03	202.15	431.14	25.43	16.86	125,473.20	128,079.47		
B	◄ Lane B3	0.68	0.04	0.03	198.03	202.15	495.65	29.23	19.38	144,246.65	147,242.87		
B	◄ Lane B2	0.68	0.04	0.03	198.03	202.15	495.65	29.23	19.38	144,246.65	147,242.87		
B	◄ Lane B1	0.68	0.04	0.03	198.03	202.15	495.65	29.23	19.38	144,246.65	147,242.87		
For all lanes		0.68	0.04	0.03	198.03	202.15	2,780.35	163.99	108.70	809,159.53	825,967.01		
		Weighted average emission rate					Total emission rate						