

36 Air quality

36.1 Introduction

This section describes the existing air quality conditions, examines the potential effects of the Port Wakefield Road Upgrade on these conditions and recommends adoption of the management measures identified in Part D, Section 21.

An air quality assessment was undertaken to determine the effects of Port Wakefield Road Upgrade on the existing air quality of the study area and to determine if any air quality criteria and guidelines would be exceeded in the future at any sensitive receptors.

Refer to Part D, Section 21 for information on the legislative and policy requirements, existing environment air quality criteria, modelling methodology, and construction effects and mitigation measures.

36.2 Effects of the project on the existing environment

36.2.1 Sensitive receptors

Inspection of the alignment of the proposed Port Wakefield Road Upgrade was made to identify sensitive receptors close to the roadway. The results are provided for the four major sections of the proposed upgrade:

- Section 1: Salisbury Highway to Ryans Road
- Section 2: Ryans Road to Bolivar Road
- Section 3: Bolivar Road to Burton Road
- Section 4: Burton Road to Northern Expressway connection.

Section 1: Salisbury Highway to Ryans Road

There are no sensitive receptors close to the roadway between Port Wakefield Road and Globe Derby Park. The land to the west of the road is wetlands or salt crystallisation pans. The land to the east of the road is mostly wetlands apart from the new residential estate of Mawson Lakes. No existing houses in Mawson Lakes are within 200 m of the road and future houses will be at least 100 m from the roadway.

Spectators at Globe Derby Park are more than 300 m from the road; the land to the west of the road is mostly orchards or rural land uses in relatively small blocks. There are five rural houses with small orchards approximately 50 to 100 m west of the roadway. All the land to the east of the road is used for commercial purposes with no houses.

In summary, sensitive receptors in this section are 50 m to the west of the roadway, and 100 m to the east of the roadway.

Section 2: Ryans Road to Bolivar Road

The White Horse Inn, at the junction with Hodgson Drive, has accommodation units with the verandah being 43 m from the existing roadway.

Most of the land to the east is used for commercial purposes (e.g. truck yards, storage, gardening supplies and caravan sales). A substantial renewal of the commercial area can be anticipated in the decade following the construction of the Northern Expressway and Port Wakefield Road Upgrade.

There is a small residential zone adjacent to the road between Victoria Drive and Little Para River. The eight houses in Swallow Crescent back onto the eastern side of the road with the fences being only 17 m from the edge of the present roadway. Houses further to the north, in Willowbank Place and Lakeside Drive, are 50 m from the roadway.

In summary, sensitive receptors in this section are 43 m and 60 m to the west of the roadway, and 17 m and 50 m to the east of the roadway.

Section 3: Bolivar Road to Burton Road

The land to the west of the road comprises a caravan park and the buffer zone around the Bolivar Wastewater Treatment Plant. The caravan park is protected by a 2 m high partly-vegetated berm, with the fence being 24 m west of the roadway. At the intersection of Jobson Road, there is a house with the outer fence being 15 m from the roadway.

Most of the land to the east is residential. There are long sections of houses adjacent to the eastern side of the road. Eight houses opposite the caravan park in Henry Street, Bolivia Crescent, General Drive and Brazil Drive back onto the eastern side of the road with the fences being 17 m from the edge of the present roadway. Other houses (e.g. Lakeside Drive) are 50 m from the road.

The rest of the land to the east is used for rural or commercial purposes and there are no sensitive receptors within 100 m of the road.

In summary, sensitive receptors in this section are 15 m and 24 m to the west of the roadway, and 17 m, 50 m and 100 m to the east of the roadway.

Section 4: Burton Road to Northern Expressway connection

From the Burton Road intersection north to the connection with the Northern Expressway, the land is mostly rural with scattered houses either side of Port Wakefield Road. Several of these houses are very close to the roadway.

To the west, there are houses as close as 6 m (two houses), 6.5 m (one house) and 7 m (one house). To the east, there is one house at 6.5 m from the roadway.

In summary, sensitive receptors in this section are 6 m, 6.5 m and 7 m to the west of the roadway, and 6.5 m to the east of the roadway.

36.2.2 Air quality model predictions for Port Wakefield Road

The currently approved version of the Victorian EPA regulatory near-road model (AusRoads) was used to predict the effect on air quality of traffic from Port Wakefield Road.

The AusRoads model predicts the peak concentrations of each contaminant at various distances from the roadway, including the background level. The resulting concentration pattern has been predicted for various sections along the roadway. Highest concentrations are predicted to occur on the roadway, with concentrations returning to near background levels approximately 100 m from the centre of the road. The decline in concentrations is much the same on each side of the road, but not completely symmetrical because of the local wind patterns from different directions.

For Port Wakefield Road, there are several sections to be considered in the modelling. For the most northern section, the traffic volume is lowest (36,300 vehicles per day [vpd] predicted for 2021) but the sensitive receptors are very close to the roadway. Table 36.1 lists the predicted peak concentrations of each contaminant at 6 m from the roadway. It can be seen that the peak concentrations for all contaminants are lower than the air quality criteria. All predicted peak concentrations in 2021 are less than those predicted in 2011. It should be noted, however, that a small increase in traffic (above the modelled levels) would potentially cause concerns for PM2.5 (annual average) and, at slightly higher volumes, for nitrogen dioxide. Due to the level of accuracy of the model, nitrogen dioxide, PM10 and PM2.5 may approach or exceed the NEPM limits

Table 36.1

Model predictions at the nearest receptor at 6 m ($\mu\text{g}/\text{m}^3$)

Substance	Averaging period	Background level (without NExy) 2011	Predicted peak concentration at 6 m (with NExy)		NEPM limits	Will meet NEPM limits at nearest sensitive receptor
			2011	2021		
Nitrogen dioxide	1-hour	20	193	145	228	Yes
	Annual	8	15.3	13.5	57	Yes
Carbon monoxide	8-hour	120	1,308	1,038	10,440	Yes
PM10	24-hour	29	36.7	34	50	Yes
PM2.5	24-hour	8	13.4	11.5	25	Yes
	Annual	4.9	6.7	6.0	8	Yes
Benzene	Annual	1	1.7	1.3	9	Yes
Formaldehyde	24-hour	6	6.3	6.2	49	Yes
BaP	Annual	0.00019	0.00021	0.00019	0.00030	Yes
Toluene	24-hour	8	11.0	9.5	3,770	Yes
	Annual	3	4.0	3.5	380	Yes
Xylenes	24-hour	11	12.9	12.0	1,085	Yes
	Annual	2	2.6	2.3	870	Yes

For the central section of Port Wakefield Road (between Ryans Road and Burton Road), the traffic volume is higher (57,000 vpd predicted for 2021) but the sensitive receptors are further from the roadway (17 m). Table 36.2 lists the predicted peak concentrations of each contaminant at 17 m from the roadway. It can be seen that the peak concentrations for all contaminants are lower than the air quality criteria.

Table 36.2

Model predictions at the nearest receptor at 17 m ($\mu\text{g}/\text{m}^3$)

Substance	Averaging period	Background level (without NExy) 2011	Predicted peak concentration at 17 m (with NExy)		NEPM limits	Will meet NEPM limits at nearest sensitive receptor
			2011	2021		
Nitrogen dioxide	1-hour	20	142	107	228	Yes
	Annual	8	13.8	12.3	57	Yes
Carbon monoxide	8-hour	120	1,060	829	10,440	Yes
PM10	24-hour	29	35.1	32.8	50	Yes
PM2.5	24-hour	8	12.2	10.7	25	Yes
	Annual	4.9	6.1	5.6	8	Yes
Benzene	Annual	1	1.5	1.3	9	Yes
Formaldehyde	24-hour	6	6.3	6.2	49	Yes
BaP	Annual	0.00019	0.00020	0.00019	0.00030	Yes
Toluene	24-hour	8	10.4	9.2	3,770	Yes
	Annual	3	3.8	3.4	380	Yes
Xylenes	24-hour	11	12.5	11.8	1,085	Yes
	Annual	2	2.5	2.3	870	Yes

Based on the modelling predictions, it is concluded that the upgrade to Port Wakefield Road (with the predicted future traffic volumes) will not cause adverse air quality effects near the sensitive receptors.

36.3 Environmental management

36.3.1 Measures to minimise effects during operation

The air quality assessment for Port Wakefield Road indicated that the upgrade will not cause adverse air quality effects near the roadway and NEPM criteria will be met at the nearest sensitive receptors. Therefore, measures to minimise air quality effects during operation will not be required.

36.4 Conclusion

The Port Wakefield Road Upgrade will provide adequate fit for purpose capacity to 2016. Based on the air quality modelling predictions all NEPM limits will be met at the nearest sensitive receiver.

Beyond 2016, further improvement to the link between the Northern Expressway and Salisbury Highway will be required. A comprehensive air quality assessment will be carried out as part of the future project to determine the appropriate management measures.