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Mr Laura Gerrie
Sydney Harbour Foreshore Authority
65 Harrington Street
THE ROCKS NSW 2000

Re: Air Quality assessment – proposed Darling Walk Development

Dear Laura,

This letter report provides the results of dispersion modelling of the Cross City Tunnel ventilation stack and the potential impacts on the proposed building at Darling Walk.

We will prepare a more formal report in due course however this letter provides you with a preliminary summary of the results and the implications for the proposed development.

Background to the study

Holmes Air Sciences undertook the air quality assessment during the Environmental Impact phase of the Cross City Tunnel project and has undertaken subsequent modelling studies to determine the potential impact of the ventilation stack on future buildings in the vicinity of the stack. Part of the Minister for Planning's Approval Condition 274 for the project was that for any future building, a protocol would need to be developed to allow an assessment of the impact of both the ventilation stack plume on any proposed building and the potential for the building to affect dispersion of the plume. The study presented here addresses both aspects of the condition.

Modelling was undertaken using AUSPLUME version 6, assuming the Appoved Design of the ventilation stack and emission rates based on predicted rather than actual traffic volume through the tunnel. This presents a more pessimistic outcome but is required as the traffic could eventually reach the levels predicted for the Environmental Impact Assessment (EIA) and the subsequent studies. Meteorological data from Goat Island was used as in the EIA.

Modelling was undertaken for carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter less than 10 micrometres in diameter (PM_{10}). An impact zone was defined which took account of the possible background concentrations of the various pollutants to ensure compliance with the respective air quality goals. The prescribed concentrations are based on current air quality goals, they are as follows:

- Carbon monoxide – 20 milligrams per cubic metre (mg/m^3) 1-hour maximum. This assumes a background level of 10 mg/m^3 to achieve the goal of 30 mg/m^3.

- Nitrogen dioxide – 150 micrograms per cubic metre ($\mu g/m^3$) 1-hour maximum, assuming that 20% of the total emissions of oxides of nitrogen are nitrogen dioxide. This assumes a background of 96 $\mu g/m^3$ to achieve the goal of 246 $\mu g/m^3$.
- Particulate matter less than 10 microns in diameter (PM_{10}) – 10 $\mu g/m^3$ 24-hour average. This assumes a background of 40 $\mu g/m^3$ to achieve the goal of 50 $\mu g/m^3$. It is also consistent with the change in PM10 concentration which is typically used to assess epidemiological health impacts.

Modelling was undertaken for the two building designs shown in **Figure 1** referred to as "Arc Massing" and "Wedge Massing". Modelling was undertaken at elevated receptors at heights from ground-level to 145 metres above ground level. The area where the goals are exceeded is shown in red. There are no predicted exceedances at ground level or at any existing building locations at elevated receptors.

Conclusions

In brief, the main conclusions that can be drawn from the results of the modelling are as follows:

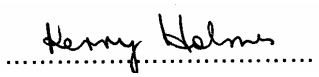
1. There are no predicted exceedances of any air quality goals at the proposed buildings for either configuration.

2. There is very little change in the behaviour of the plume under the influence of either building configuration. (This is based on comparison with previous modelling of the stack emissions without the building present, **Holmes Air Sciences, 2004**)

3. There is little difference between the two building configurations in terms of the impacts on the plume or the impacts of the plume on the buildings.

In summary, the proposed building could be developed in either configuration without significant impacts in terms of air quality.

Yours faithfully,
Holmes Air Sciences



Kerry Holmes PhD
Director

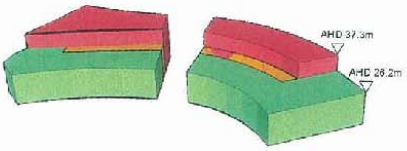
References

Holmes Air Sciences (2004)

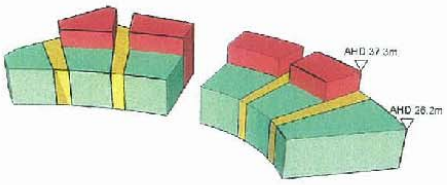
"Draft: Cross City Tunnel Buffer Analysis" prepared by Holmes Air Sciences for the RTA NSW, March 2004

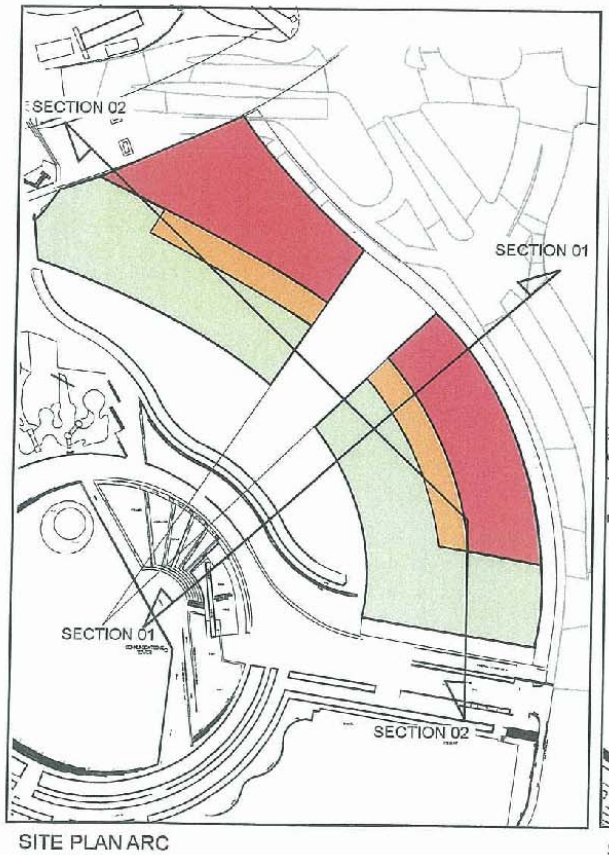
DARLING WALK MASSING

ARC MASSING:

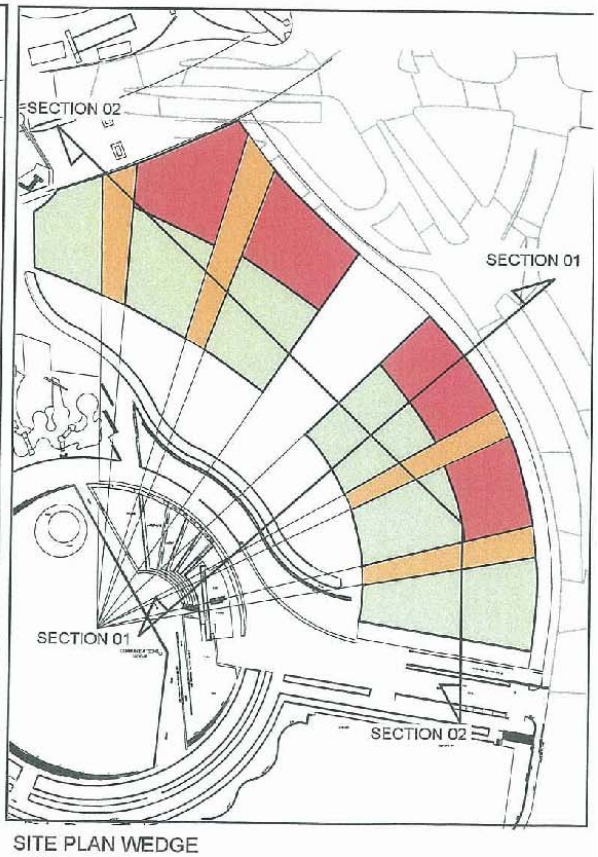


WEDGE MASSING:





SITE PLAN ARC
1:2000 @ A4



SITE PLAN WEDGE
1:2000 @ A4

SECTION 1:

SECTION 1:

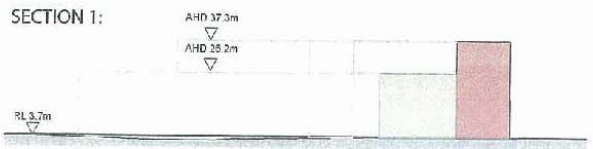


Figure 1