



Memorandum

3 June 2021

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| To | Urbis | | |
| Copy to | Avenor, Generate Property Group | | |
| From | GHD | Tel | +61 2 92397695 |
| Subject | Response to Submissions - Air quality | Job no. | 12527976 |

1 Introduction

GHD Pty Ltd (GHD) been commissioned by Atlassian (the Applicant) to prepare this addendum memorandum in response to the issues raised in by government agencies, community organisation groups and the public during the public exhibition of the proposed Atlassian Central State Significant Development (**SSD**) application (SSD-10405) in relation to the site at 8-10 Lee Street, Haymarket.

The application was placed on public exhibition from 16th December 2020 to 3rd February 2021.

This report has been prepared to respond to the issues raised by City of Sydney and NSW EPA, as reproduced in Table 1.

Table 1 Relevant issues raised in submissions

| Comment | Location of Response within this document |
|--|---|
| City of Sydney comment Item 41 | |
| The air quality assessment identifies potential adverse impacts of diesel emissions from idling trains at Central Station on the natural ventilation strategy for the building. Providing natural ventilation to the hostel rooms is imperative to ensure the development achieves the sustainability outcomes stated within the EIS. It is recommended that further analysis be undertaken to assess the impact of idling trains on the future occupants of the building. | Section 2 |
| NSW EPA comment item B | |
| Air quality Assessment (AQA) | Section 3 |
| The EPA notes that that AQA has adopted a qualitative approach to assess potential air quality impacts. The EPA has reviewed the AQA and considers that it does not provide adequate information to enable the EPA to accurately assess the air quality impacts associated with operation of the proposal. The EPA | |

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Comment

Location of Response within this document

recommends that the AQA be revised to provide further information on the following:

a) Emissions

- Table 14 in Appendix A of the AQA provides the emission concentrations of the diesel generators for NO_x, CO, HC and PM. The EPA recommends that Table 14 be updated to also include emission concentrations for SO₂, PAHs and VOCs.
- The EPA recommends that the proponent justify the proposed backup power source, and detail the alternative options considered.
- Section 6.2 of the AQA provides a list of recommended mitigation measures to minimise potential air quality impacts during operation. The EPA recommends that the proponent provide further details to demonstrate that all reasonable and feasible emission controls have been considered to prevent or minimise air pollution from operation of the generators.

b) Model scenarios

- The EPA recommends that the AQA include a more robust assessment of the generator testing regime for all possible hours of operation and present the impacts at identified receptors in accordance with the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2016).
- The EPA recommends that the AQA revise the normal and worst-case operational model scenarios to assess the potential impacts of operating the emergency generators during testing and maintenance, and for extended periods during emergencies. The AQA should provide justification for the frequency and length of emergency operation modelled.
- The EPA recommends that the AQA include an evaluation of the number of hours in a year, if any, that exceedances of the ground level concentrations at nearby receptors are predicted to occur for the worst-case scenario including generator operation.

c) Impact assessment criteria exceedances

- The EPA recommends that the AQA include contour plots for all pollutants for all modelled scenarios. Predicted impacts at the identified receptors should be presented in the AQA that includes highest increments and highest background air quality with the corresponding hourly background or increment.
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2 Response to City of Sydney comment Item 41

GHD has undertaken a high-level investigation into potential emissions from idling diesel locomotives at Central station. The assessment is undertaken although potentially not applicable depending on the roll out of the Regional Rail Fleet Project where the NSW Government has begun a project to replace the aging NSW regional rail fleet with new diesel-electric hybrid technology trains. The first new trains are expected to be running from 2023, with the full fleet coming into service progressively.

The assessment was undertaken based on the following assumptions:

- Idling locomotive details were sourced from Sydney Terminal Weekdays Non-Electric Services timetable provided by Transport Sydney Trains (via email from Ashok Muthayya)
- Dispersion modelling was undertaken using the AUSPLUME model. AUSPLUME was driven by a synthetic 'METSAMP' dataset containing a full range of worst-case meteorological conditions
- 3 XPT locomotives were modelled to idle simultaneously (located on platforms 1, 2 and 3). The location of the locomotive exhaust stacks was determined by visual inspection during a site visit to central station.
- The XPT trains are only located at central station for certain hours of the day, and even less frequent when three are there at once so modelling is conservative
- In the absence of specific locomotive emission factors, locomotive emissions were calculated based on sampling undertaken on NR121 class locomotives provided in *Diesel Locomotives Fuel Efficiency & Emissions Testing (prepared for NSW EPA, ABMARC, 2016)*. Idling alternator power output power was sourced from Lilley W. B., (1996), *Quantification and Dispersion Modelling of Diesel Locomotive Emissions, Thesis*. A locomotive exhaust vent discharge velocity of 1 m/s was adopted to account for low flows and exhaust vent caps.
- Building wake effects from the Central station building and the project site were accounted for by using the BPIP PRIME algorithm.
- A 500 m by 500 m receptor grid centred on the project with spacing of 10 m was used. The model was iterated for receptor grids at ground level, 10 m, 20 m, 30 m, 40 m, 50 m and 60 m above ground level
- A 100% conversion rate of NO_x to NO₂ was conservatively assumed in accordance with Method 1 outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2016)*
- Natural ventilation of the project occurs via the north-eastern corner, northern and western facades only. The nearest operable windows to the idling locomotives was identified to be the YHA accommodation located at a height of approximately 20 metres above the Central station platform level.

The modelling predicted compliance with the air quality assessment criteria for all pollutants. The predicted incremental maximum 1 hour concentration at the worst-case natural ventilation façade



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(YHA accommodation located approximately 15 metres from the rail corridor and 20 metres above Central station platform height) are provided in Table 2.

Predicted results decrease above this 20 metre height above the platform height, meaning that potential impacts for building floors above the hostel would likely be less.

Table 2 Predicted incremental maximum 1 hour concentration at natural ventilation façade ($\mu\text{g}/\text{m}^3$)

| Pollutant | Predicted incremental maximum 1 hour concentration at natural ventilation façade ($\mu\text{g}/\text{m}^3$) |
|-------------------|---|
| NO ₂ | 50 |
| CO | 8.7 |
| THC | 5.2 |
| PM ₁₀ | 1.2 |
| SO ₂ | 1.4 |
| PM _{2.5} | 1.2 |

The worst-case pollutant with respect to potentially exceeding the criteria was identified to be NO₂. A review of background NO₂ concentrations recorded at the Cook and Phillip Department of Planning, Industry & Environment monitoring station (nearest station) identified a maximum 1 hour NO₂ concentration of 86.5 $\mu\text{g}/\text{m}^3$ for the most recent calendar year, 01/01/2020 to 01/01/2021. Therefore the worst-case cumulative 1 hour NO₂ concentration was calculated to be 136.5 $\mu\text{g}/\text{m}^3$ (approximately 55% of the assessment criteria which is 246 $\mu\text{g}/\text{m}^3$).

In addition, GHD note the following observations and comments:

- XPT trains and idling power cars were observed at Central Station on platforms 1, 2 and 3 on Monday 3rd May 2021 between 1947 PM and 2042 PM. Diesel fume and smoke was observed from power cars, however more so from one power car at the XPT train on platform 3.
- Wind fields and dispersion around the station are complex, with platform awnings and buildings influencing flow. Fume and smoke was evident on platform 1, 2 and 3 however it could not be determined if this is noticeable offsite. These structures would increase dispersion in some instances which may result in lower offsite impacts.
- Modelling undertaken using NR class locomotive emission data shows that emissions from locomotives reduce significantly with distance (and height) and unless there have been any complaints (smoke or odour or fume) from adjacent landowners, receptors or the community, it is considered unlikely that emissions from locomotives would adversely impact the air quality for the proposed development.



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- GHD has requested the study required by NSW Transport - PRP Audit of the air performance of locomotives as required in their Environmental Protection Licence – this condition required that exhaust emissions from the NSW rail network XPT locomotives be monitored (back in 2010). This data would determine how representative the emission rates used in this study were.
- It is likely XPT power cars with known higher emissions and smoke would be phased out first as part of the roll out of the Regional Rail Fleet Project which commences in 2023.

3 Response to NSW EPA comment item B

It is understood that a revised back up power system has been proposed subsequent to the preparation of the AQA (GHD, 2020). An UPS (Uninterruptible Power Supply) battery backup as a supplement for any potential downtime would replace the previously proposed backup generators (reference: Electrical Design Memo (Stantec, 2021) supplied as Attachment 1). A basement 1 UPS and level 6 UPS is proposed. The properties of each UPS as provided in Stantec (2021) are listed below:

- The basement 1 UPS would be connected to MSB-2 (Main Switch Board 2) for essential services and one essential lift. It would have a backup power capacity of 100 kVA (equivalent to 20 minutes which is double the possible down time by Ausgrid CBD SAIDI statistics).
- The level 6 UPS would be connected to essential DB (distribution boards) on level 6 for remainder of essential lifts, allocation of power for tenant and YHA. It would have a backup power capacity of 600 kVA (equivalent to 20 minutes which is double the possible down time by Ausgrid CBD SAIDI statistics).

Consequently, emissions to air from the backup power system are no longer anticipated. Additional assessment is not required at this stage.

It is noted that there is a need for a diesel generator to support the YHA which doesn't currently have an allocated space. This has not yet been assessed as the generator specifications and location are not yet known. A study of potential emissions should be undertaken once this is known and suitability of the location and any mitigation measures can be recommended if required.

4 Limitations

This report has been prepared by GHD for Vertical First Pty Ltd and may only be used and relied on by Vertical First Pty Ltd for the purpose agreed between GHD and the Vertical First Pty Ltd as set out in section 2 of this report.

GHD otherwise disclaims responsibility to any person other than Vertical First Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.



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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1 to 3 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Vertical First Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Regards

A handwritten signature in blue ink, appearing to read 'Evan Smith', is written over a light blue rectangular background.

Evan Smith

Technical Director – Air Quality



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Attachment 1 – Electrical Design Memo (Stantec, 2021)

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Enquiries: Peter Mizza
Project No: 45474

To: Atlassian Design Team

Document: EL-ME-009

From: Peter Mizza

Date: 31-03-2021

Subject: Atlassian Building Central –Back-up power - UPS

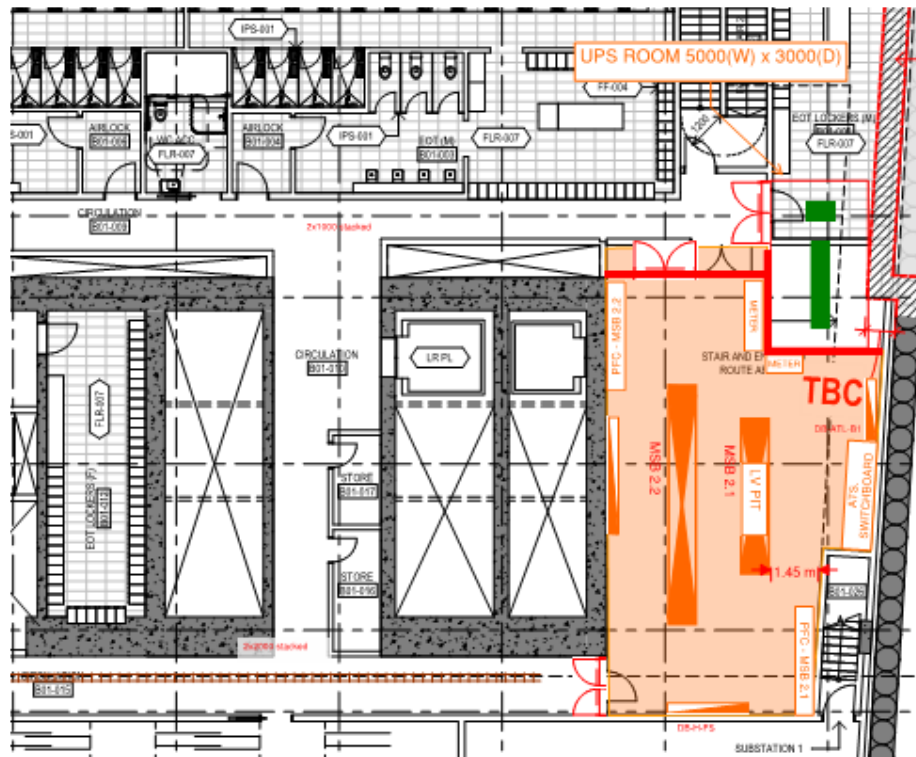
Following a review of the Premium Grade options, and review of electrical memo EL-ME-008, this memo has been prepared to outline the parameters for a UPS battery backup as a supplement for any potential downtime in power within the building. The developed option has UPS installations on Basement 1 and Level 6.

Basement 1 UPS

The Basement 1 UPS backs up the emergency services within the building.

- Connected to MSB-2 for essential services and one essential lift.
- Power backup capacity 100kVA
- Back up time – 20 minutes, based on double the time the possible down time by Ausgrid CBD SAIDI statistics.

The floor area required for this UPS is shown in the sketch below:



Basement 1 – new UPS room location

Level 6 UPS

The Level 6 UPS backs up the emergency services within the building.

- Connected to essential DB on Level 6 for remainder of essential lifts, allocation of power for tenant and YHA.
- Power backup capacity 600kVA
- Back up time – 20 minutes, based on double the time the possible down time by Ausgrid CBD SAIDI statistics.

The floor area required for this UPS is shown in the sketch below:

