Stantec

Memo

Project:	Waterloo Over Station Development (Central Precinct)	**Project No:**	46198
To:	Patrick Garland	**Date:**	5 February 2020
From:	Brandon Notaras		

RE: Response to Submissions – City of Sydney – Item 34

The purpose of this technical memorandum is to respond to the City of Sydney comments on the SSD DA submission for SSD-10439 (Central Precinct). Specifically, this memo responds to item 34 of the City of Sydney submission (the Flux Consultants peer review).

The responses have been tabulated on the next page for each corresponding comment within the peer review. In addition to these responses, additional information has been provided such as:

- Further detailed convergence graph showing additional iterations
- Velocity contour and vector graphs requested
- Further detailed acoustic ventilator sketch showing exact dimensions of components to be provided

The changes made to the acoustic ventilator design have resulted in a reduced pressure drop across the ventilator, from 3.331 Pa to 3.129 Pa. because of the increased effective open area for the internal grille, shown in the further detailed acoustic ventilator design.

Yours sincerely

Stantec Australia Pty Ltd

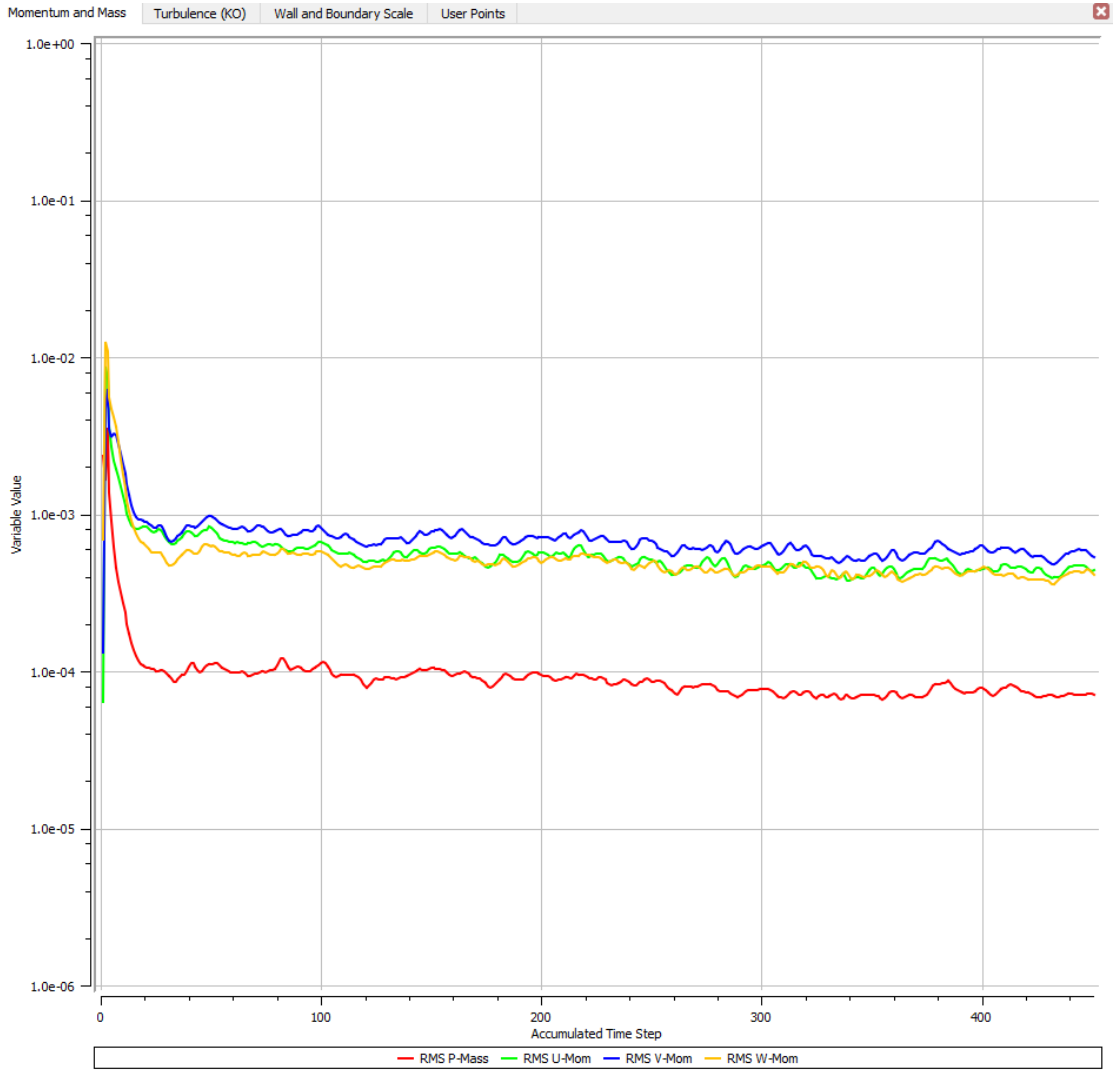
Brandon Notaras
Associate – Acoustics, Noise & Vibration

Comment No.	Description	WL Developer Response
1	The report does not verify that non-acoustically treated unobstructed windows opening of sufficient size are provided to meet the balance of the 5% of habitable range served guided by ADG. This is a necessary aspect of an alternative ventilation system and must be demonstrated to comply with the performance pathway.	The WL Developer confirms that non-acoustically treated unobstructed windows opening of sufficient size are provided to meet the balance of the 5% of habitable range served by the ADG.
2	The method of calculating the performance of the flyscreen is not described.	The flyscreen has been modelled as a function of its geometry. It should be noted the diameter of the yarn used in the flyscreen is 0.25mm, and the strands cannot be effectively modelled this thin (feasibly within CFD). Therefore, the strands are modelled with an increased diameter of 10mm diameter, and a spacing between strands to provide an equivalent free area of approximately 60% (this is 8% lower than the quoted geometric free area value quoted I the product specification). In addition to this, it should be noted that either geometry will not produce a significant difference in turbulence because the flow is generally laminar through this element and there are no significant changes in flow direction at this location. This is unlike the louvres, given they impinge the flow.
3	A convergence graph is shown for the key variable residual errors. The graph is presented at 300 iterations. It is assumed this is also the timestamp at which the results are taken. The graph shows some initial instability in the calculations, and we recommend additional iterations to confirm that the solution has converged.	Figure 1 within this memo presents the convergence graph with additional iterations requested. Convergence graph provided within the Noise & Vibration Impact Assessment consisted of an extra instability peak because of additional runs that were used to initiate the final run. For the convergence graph provided in Figure 1, we haven't needed to run the model in this manner given it is an update of the original model. The additional iterations confirmed the solution had converged, given the outcome did not change.
4	Results of the CFD calculations are shown for pressures but not airflows or velocity vectors. Airflow plots would add considerable weight and provide confidence to the results.	Velocity contours and velocity vector graphs are presented in Figure 2 and Figure 3 in this document, respectively. The graphs demonstrate the outcome of the modelling has not changed, and provide confidence to the results.

5	The various functional components are dimensioned in the drawing, and a percentage open nominated for each. The diagram is not clear about whether the percentage open quoted is applied as a geometric opening or equivalent area for ventilation The latter is required and should be correctly specified.	Given the components are modelled as a function of their geometry, the specification of an equivalent area for ventilation is not relevant if we are selecting the components listed in the documentation. To provide flexibility in design for alternative component selection, the WL Developer will specify an equivalent area for ventilation for comparison amongst products.
6	Additional component selections are published after the diagram to complete the specification. The damper specified is wrongly orientated for the design and is also incompatible in dimensions. The internal plan dimension allowed within the plenum for the damper is 125mm. However, the specified two-blade damper (which is to be mounted on its side) is 170mm. If the damper were to be installed in the space drawn, the effective open area would reduce significantly, as would the plenum's performance.	The internal dimension within the acoustic ventilator allowed for the damper has been increased to 170mm. This has effectively increased the effective open area given the spacing between the two blades has increased. The damper is still mounted on its side.
7	Insect mesh is specified with a relatively high 68% open and is supported by a geometric free area calculation based on a Cyclone brand insect screen. As noted in the prior section, it is not clear how this has been translated into aerodynamic performance for the CFD modelling of total plenum resistance. We also note these figures quoted does not allow for air increase in resistance for the build-up of dust and dirt.	See response to Item 2 above for flyscreen modelling techniques. Any significant dust and dirt build-up should be managed and cleaned by the occupant. It is not reasonable to expect the air to flow through the flyscreen if it is blocked by dust and dirt. In addition to this, the roughness applied to the flyscreen boundaries is similar to that of dust and dirt.
8	The internal grille open area allowance appears to be reasonable, subject to architectural acceptability, but the table of dimensions is erroneously published from an unrelated project. The grille referenced is too wide to fit within the plenum specified.	The internal grille width has been updated to be 150mm wide in the further detailed acoustic ventilator sketch provided.
9	The specification of alternative natural ventilation requirements does not address how a resident will control or close the plenum or internal access for cleaning and routine maintenance.	Maintenance and cleaning will be conducted through the access panel shown on the further detailed acoustic ventilator sketch, in addition to the internal grille being removeable.

Further Detailed Convergence Graph

Figure 1: Updated convergence graph



Velocity Contour and Vector Graphs

Figure 2: Velocity contour map – acoustic ventilator (in plan)

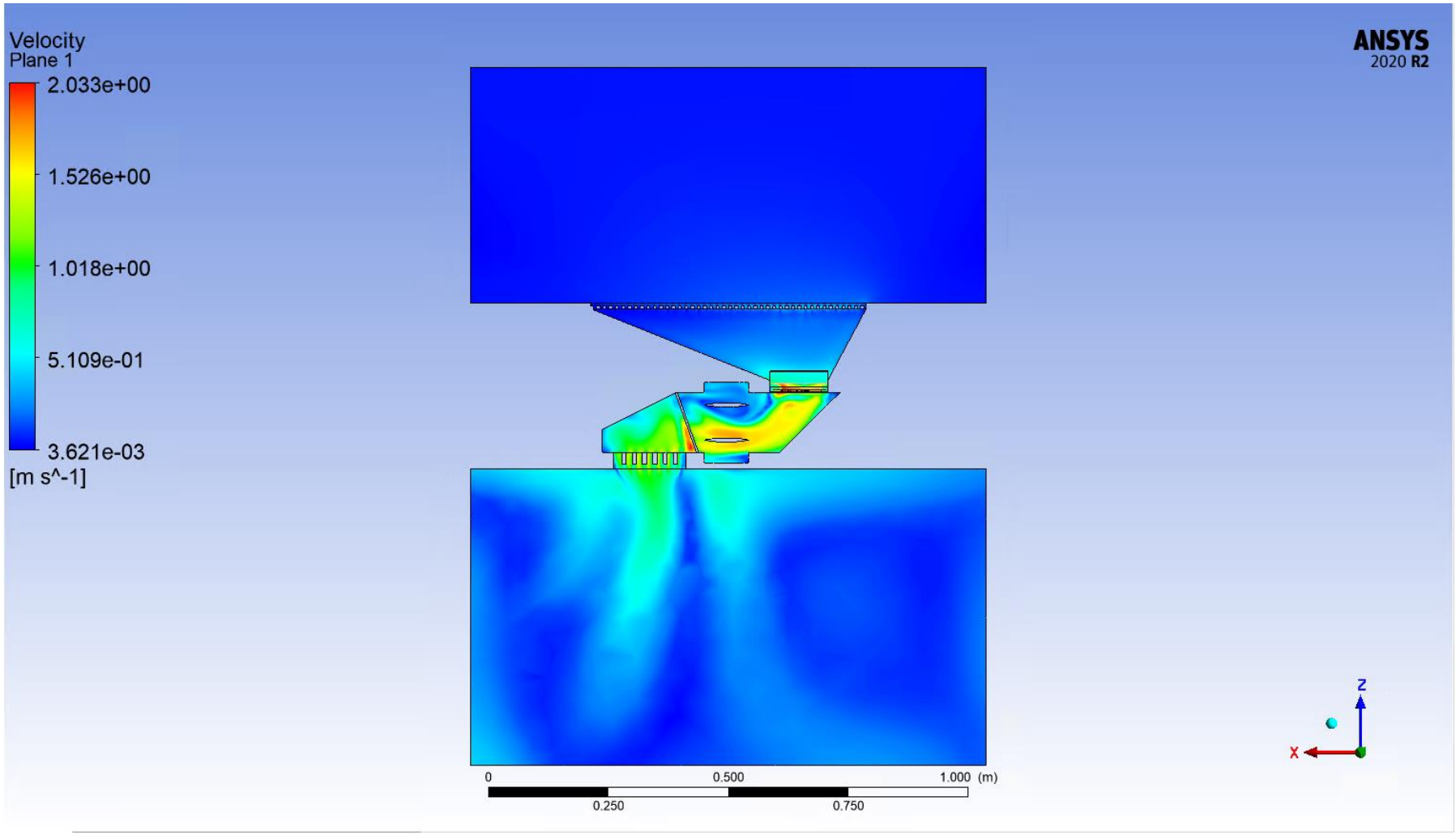
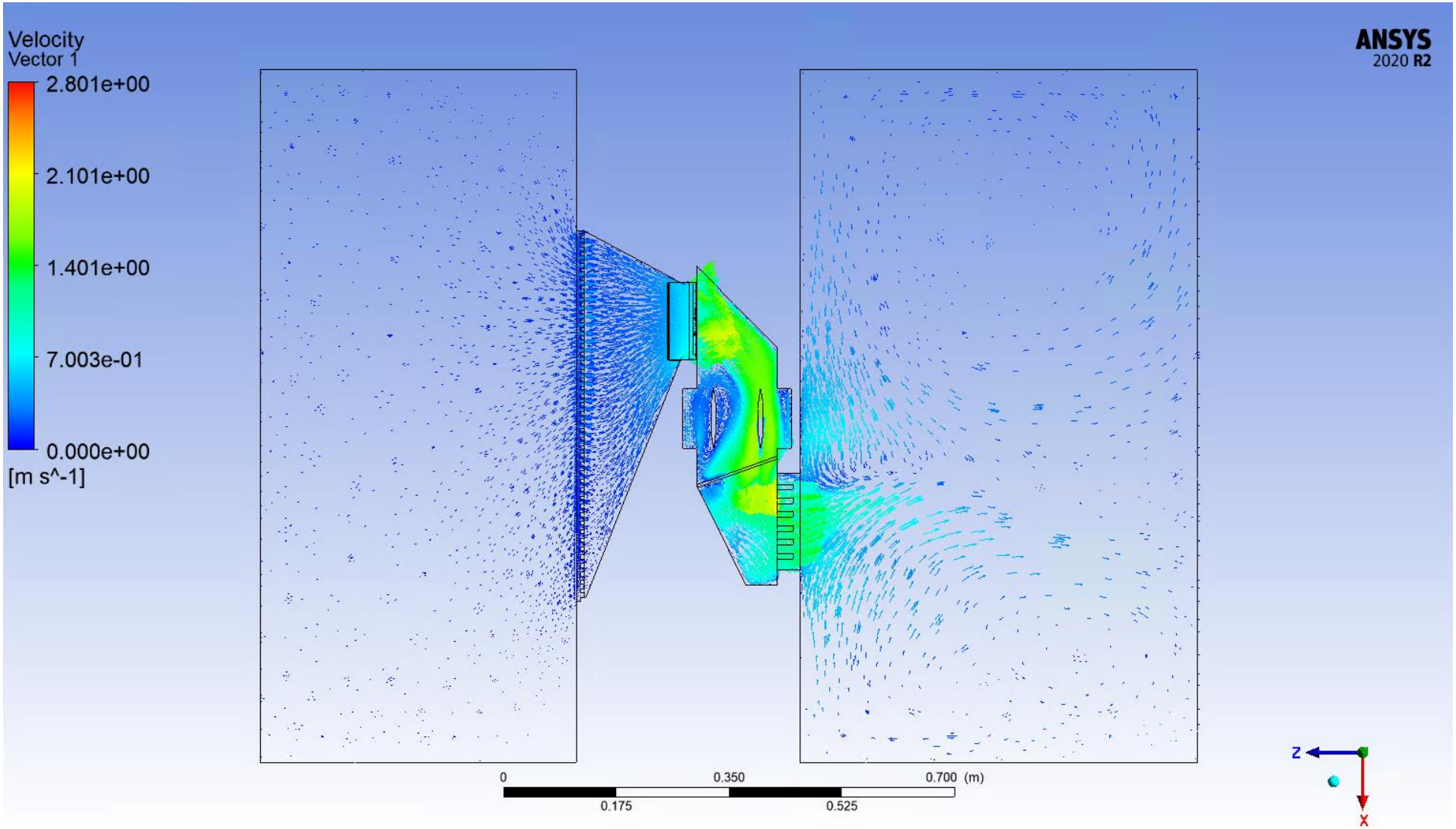
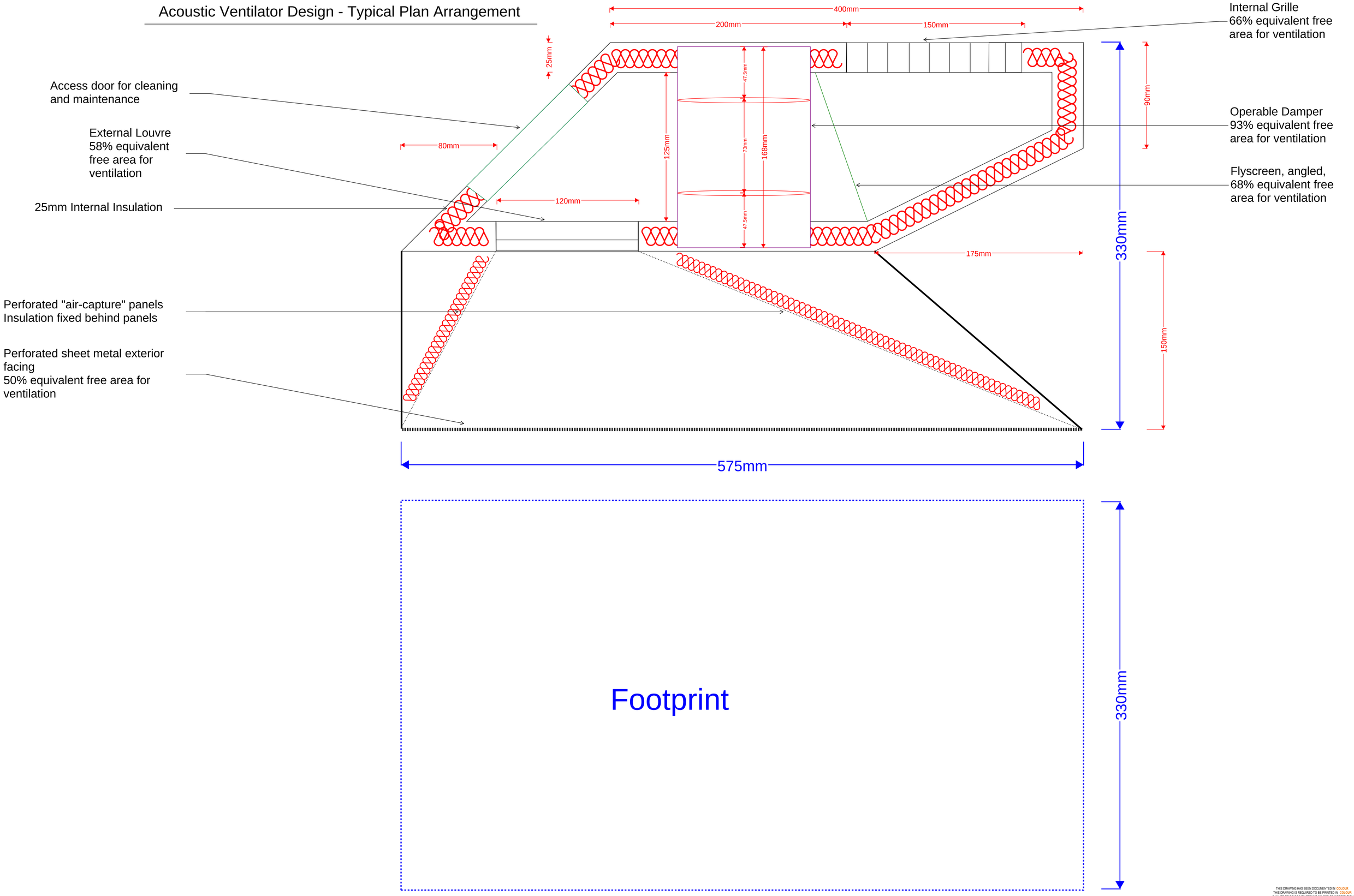


Figure 3: Velocity vector map – acoustic ventilator (in plan)



Further Detailed Acoustic Ventilator Sketch

Acoustic Ventilator Design - Typical Plan Arrangement



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REV	DESCRIPTION	DRAWN	APP'D	DATE
004	Response to City of Sydney Submission	BN	BN	21/01/21
003	Draft DA Issue	BN	BN	29/06/20
002	Milestone Package 2	BN	BN	22/05/20
001	Milestone Package 1	BN	BN	1/04/20

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac
ARCHITECT/CLIENT

WATERLOO OVER STATION DEVELOPMENT
PROJECT

ACOUSTIC NATURAL VENTILATION DESIGN - DETAIL SHEET 1
TITLE

Stantec

PRELIMINARY
NOT FOR CONSTRUCTION
Acoustics, Noise & Vibration

SCALE @ A0	PROJECT No	DRAWING No	REV
1:1	46198	BLD2-AC-NV-D1	004