Evacuation Modelling of Stadia using MassMotion

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ARUP

Outline

I. Project description

II. About the location – Allianz Stadium

III. Software
   a) MassMotion
   b) Modelling Results

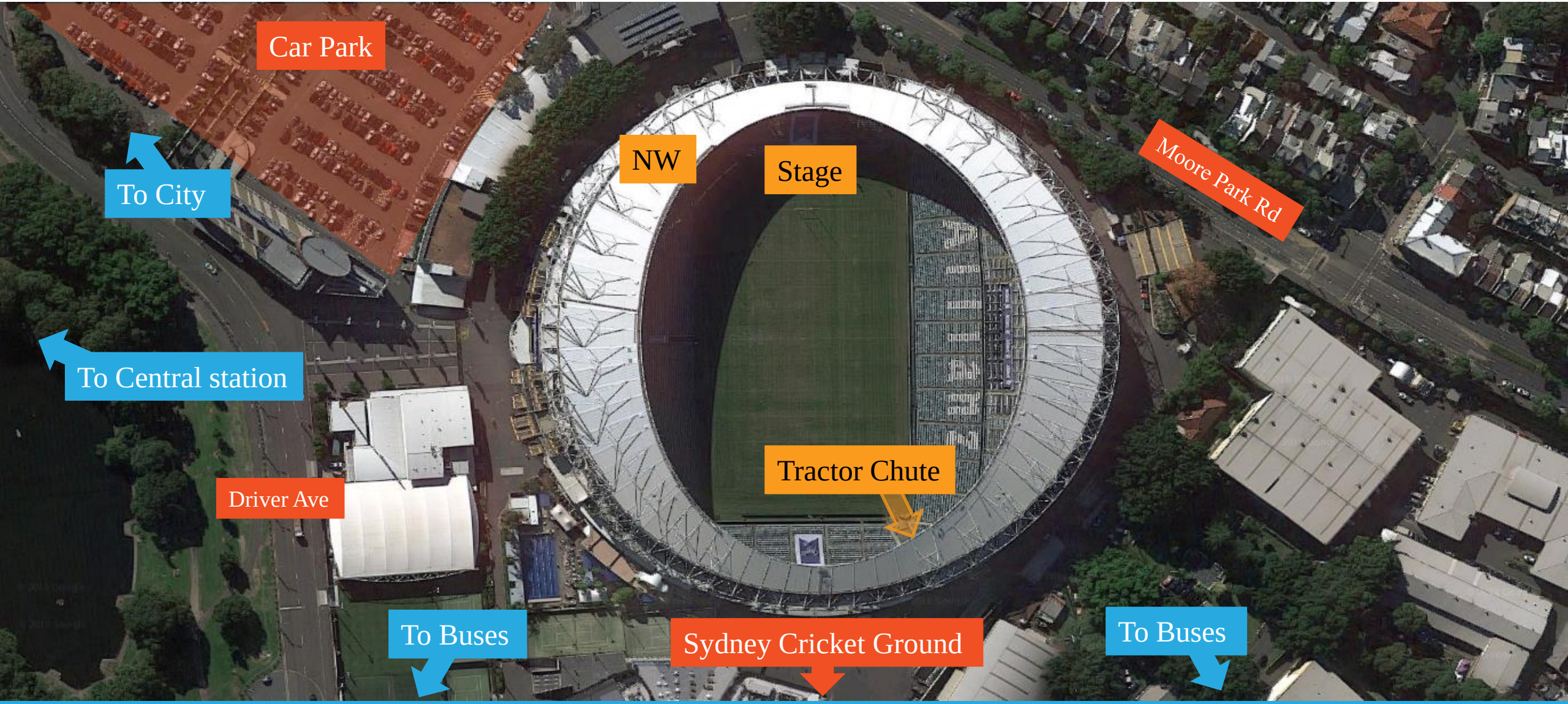
IV. Concert
   a) Real-life observations

V. Key Findings & recommendations

Project description

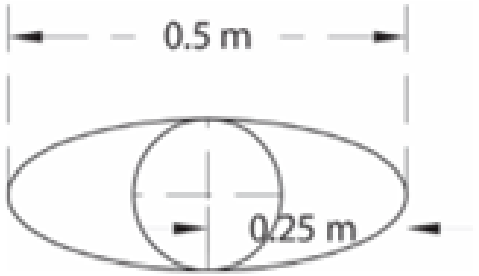
About the location – Allianz Stadium

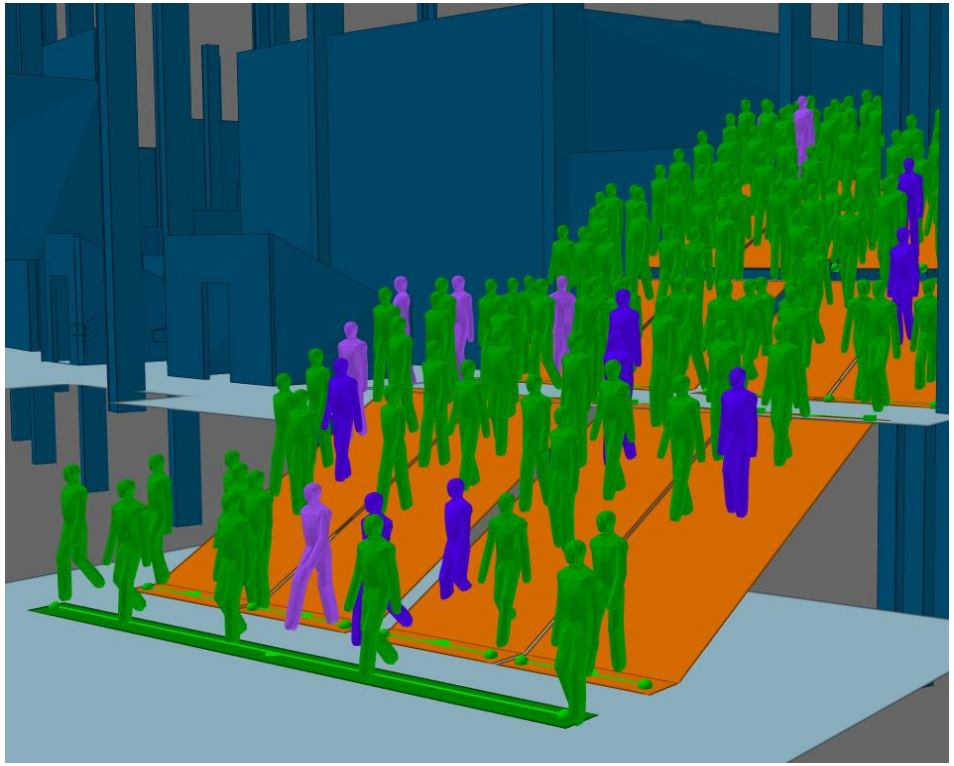
Stadium Concert Layout



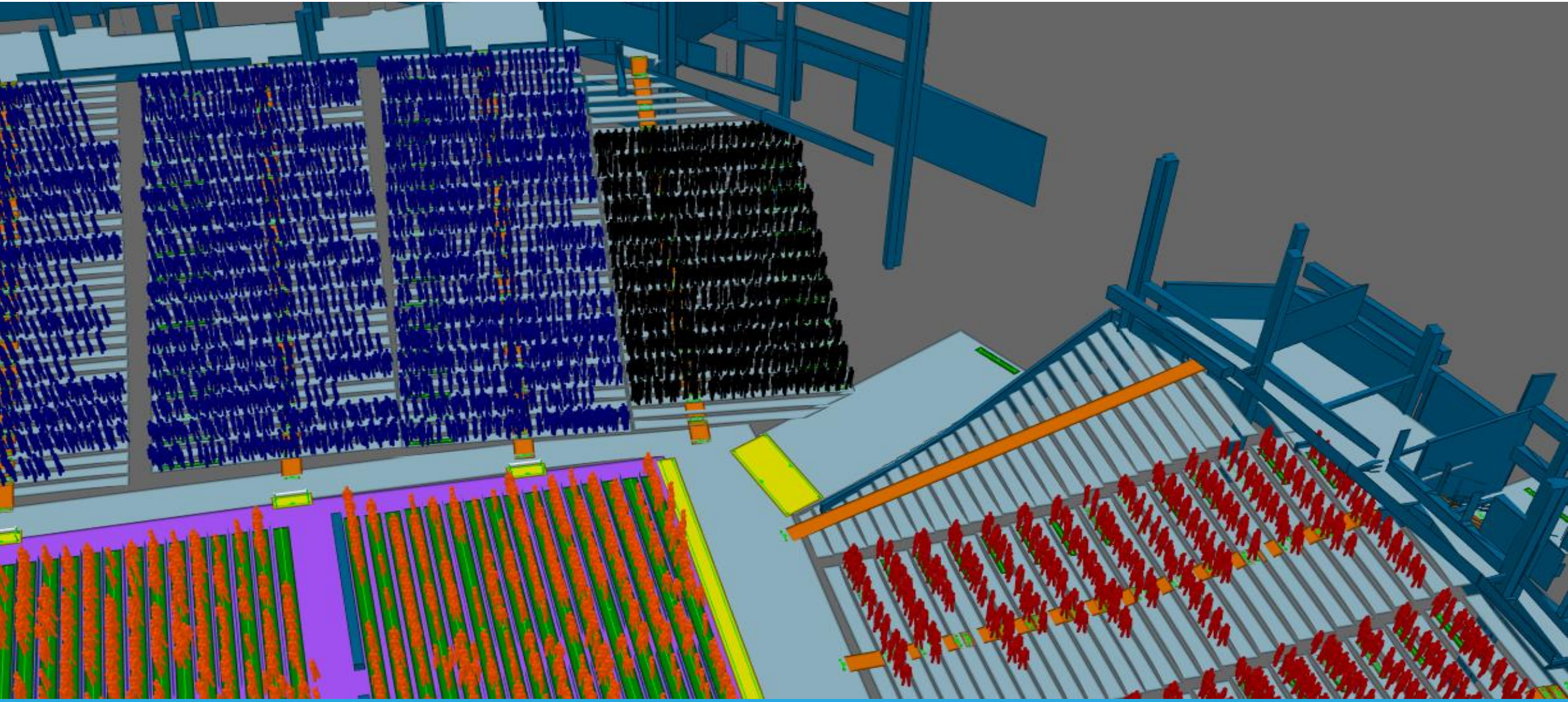
MassMotion – Inputs and assumptions

- Simultaneous evacuation
- Agent speed
  - Normal distribution
  - Fruin’s pedestrian planning & design
- Agent dimensions
- Maximum population
- Disabled access





Construction of Model



Acceptance Criteria

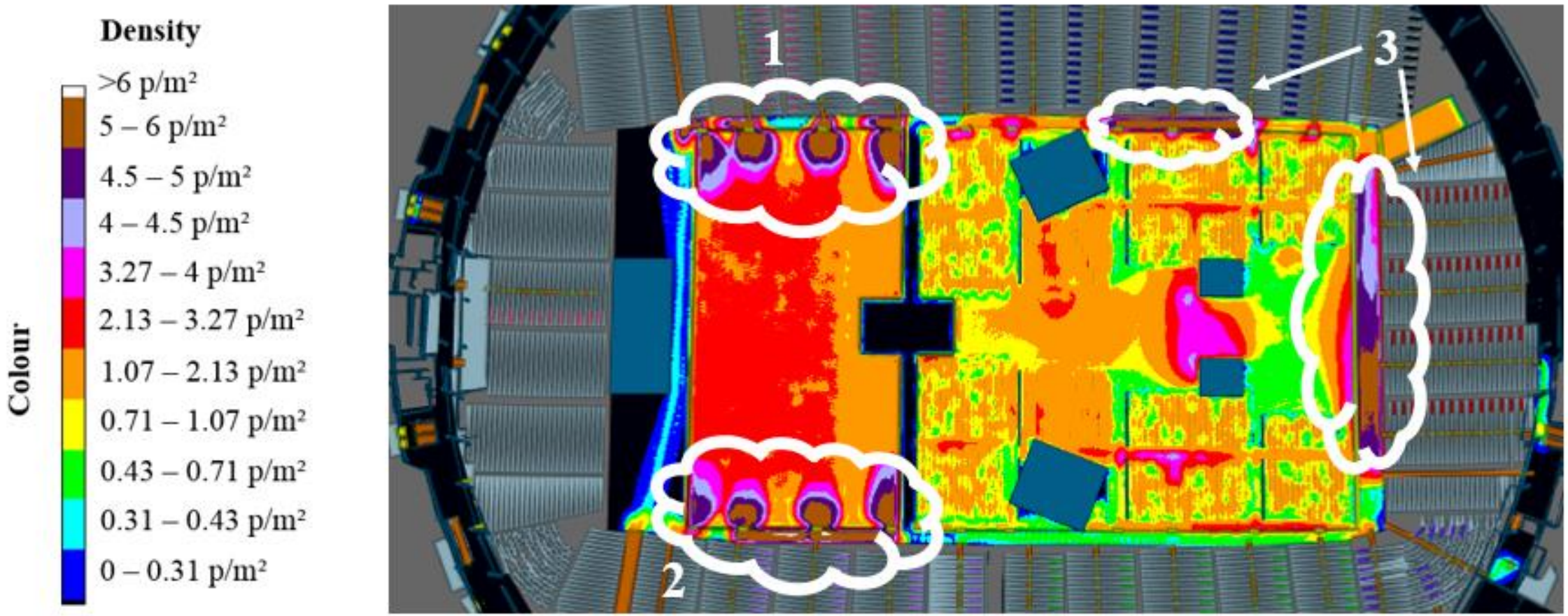
Queuing Times | Densities | Green Guide

Max time queuing → 8 mins

Density limit → 4 people/m^2

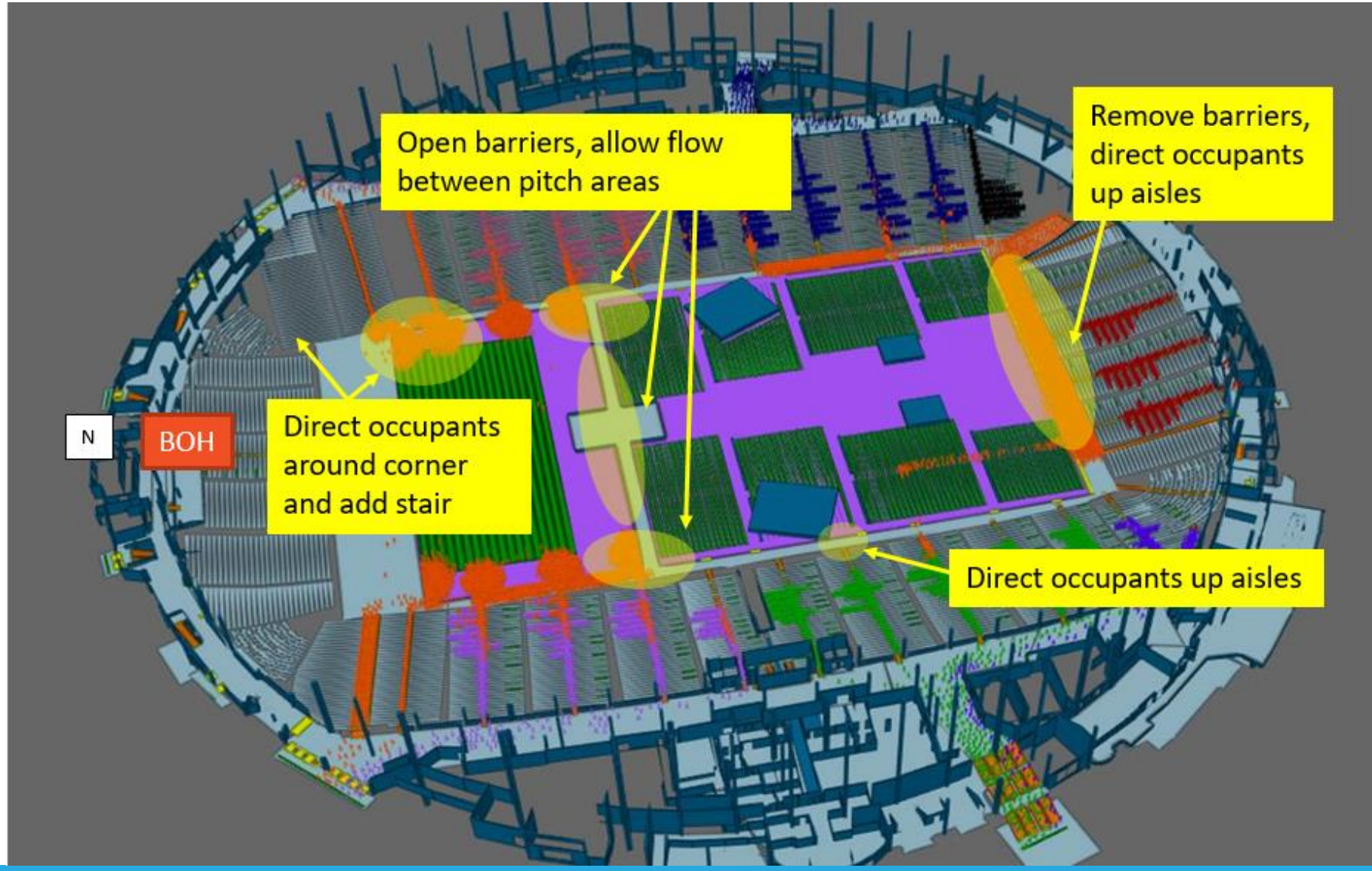
Results – MassMotion

Results


Density
>6 p/m²
5 – 6 p/m²
4.5 – 5 p/m²
4 – 4.5 p/m²
3.27 – 4 p/m²
2.13 – 3.27 p/m²
1.07 – 2.13 p/m²
0.71 – 1.07 p/m²
0.43 – 0.71 p/m²
0.31 – 0.43 p/m²
0 – 0.31 p/m²
Colour
1
2
3

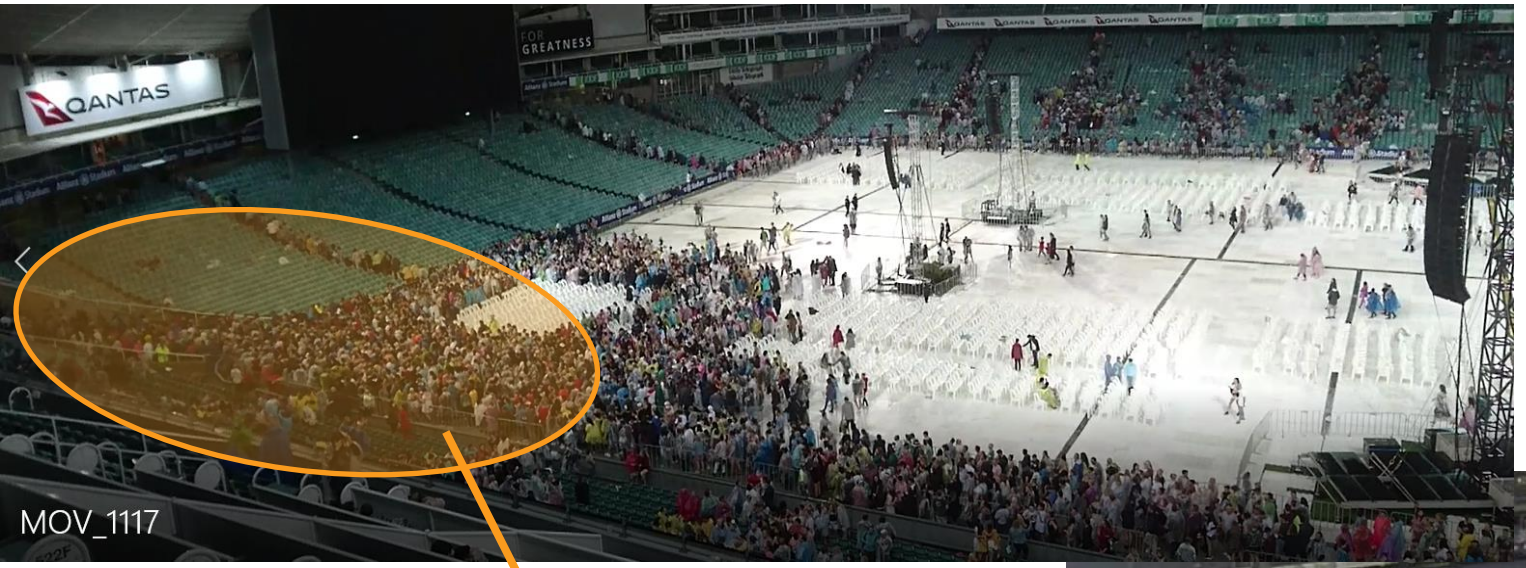
Recommendations

1. More exit width
    i. Additional stair
2. Use aisles
3. Open up barriers



End of Concert Egress

Observations - Human Behaviour

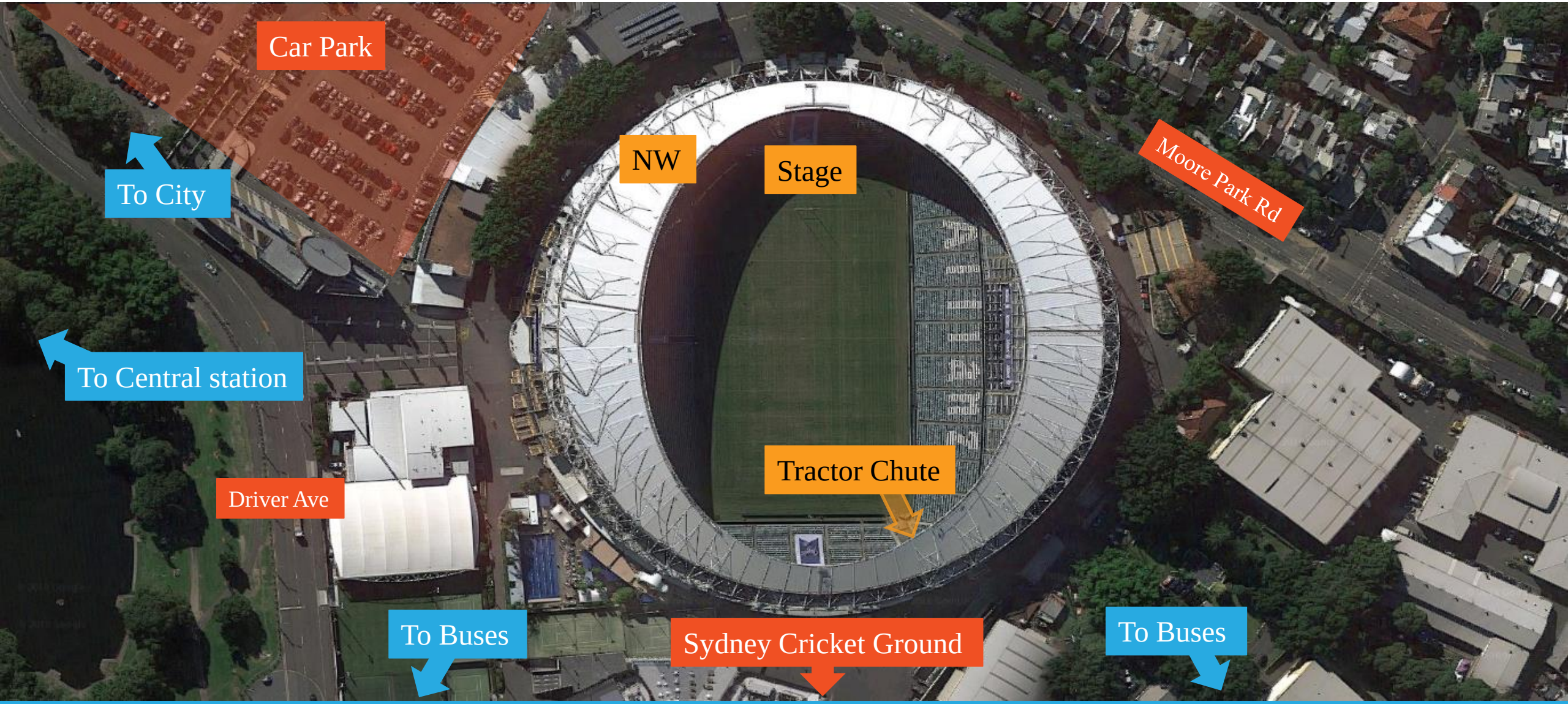


Tractor Chute – Toilets / Bar/ Food

NW Temporary Stair – Entry point

NE Temporary Stair – Exit only

Precinct Movement



Key Learnings and Recommendations

Why did people move away from less congested exits routes?

- Exit familiarity (fire engineering)
- Stadium layout (pedestrian planning)

Differences in occupant behaviour between model and real-life

Client was highly responsive to recommendations → valuable exercise

Design the stadium layout and exit capacity for evacuation and egress at initial stages of design so that there will be less congestion and queuing due to human behaviour to manage.