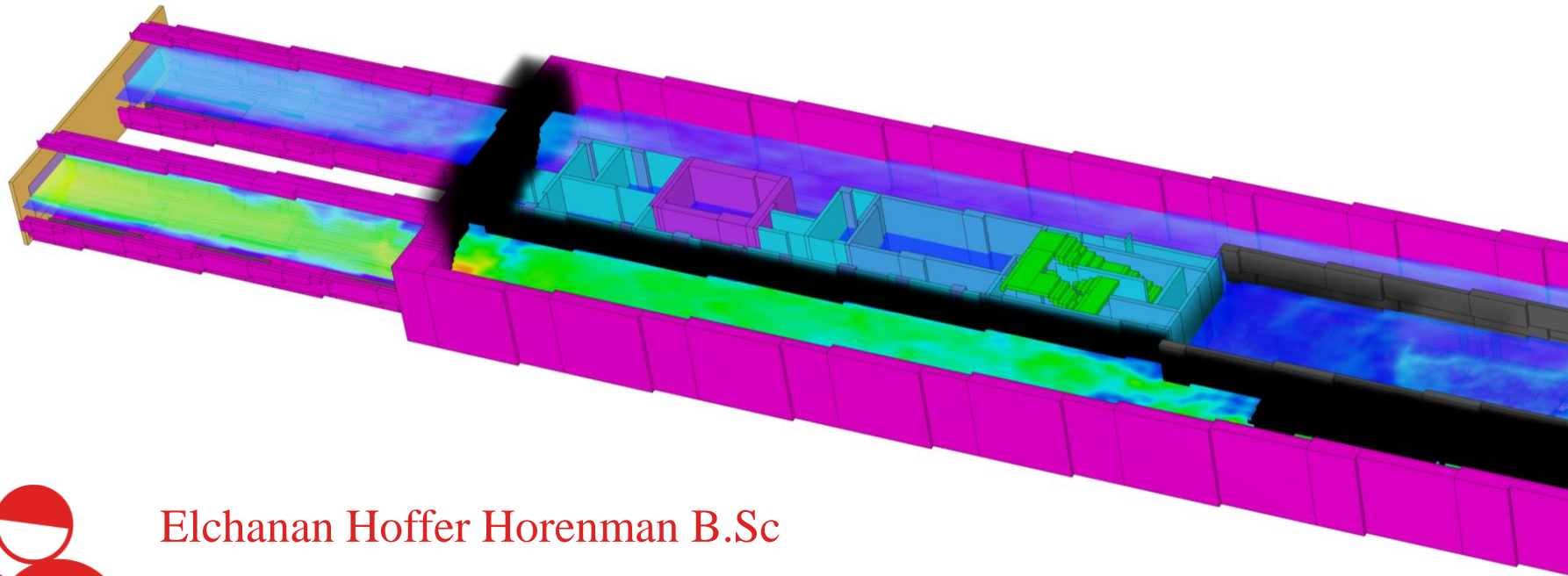


Using the HVAC Namelist in FDS For Tunnel Boundary Conditions – a Case Study



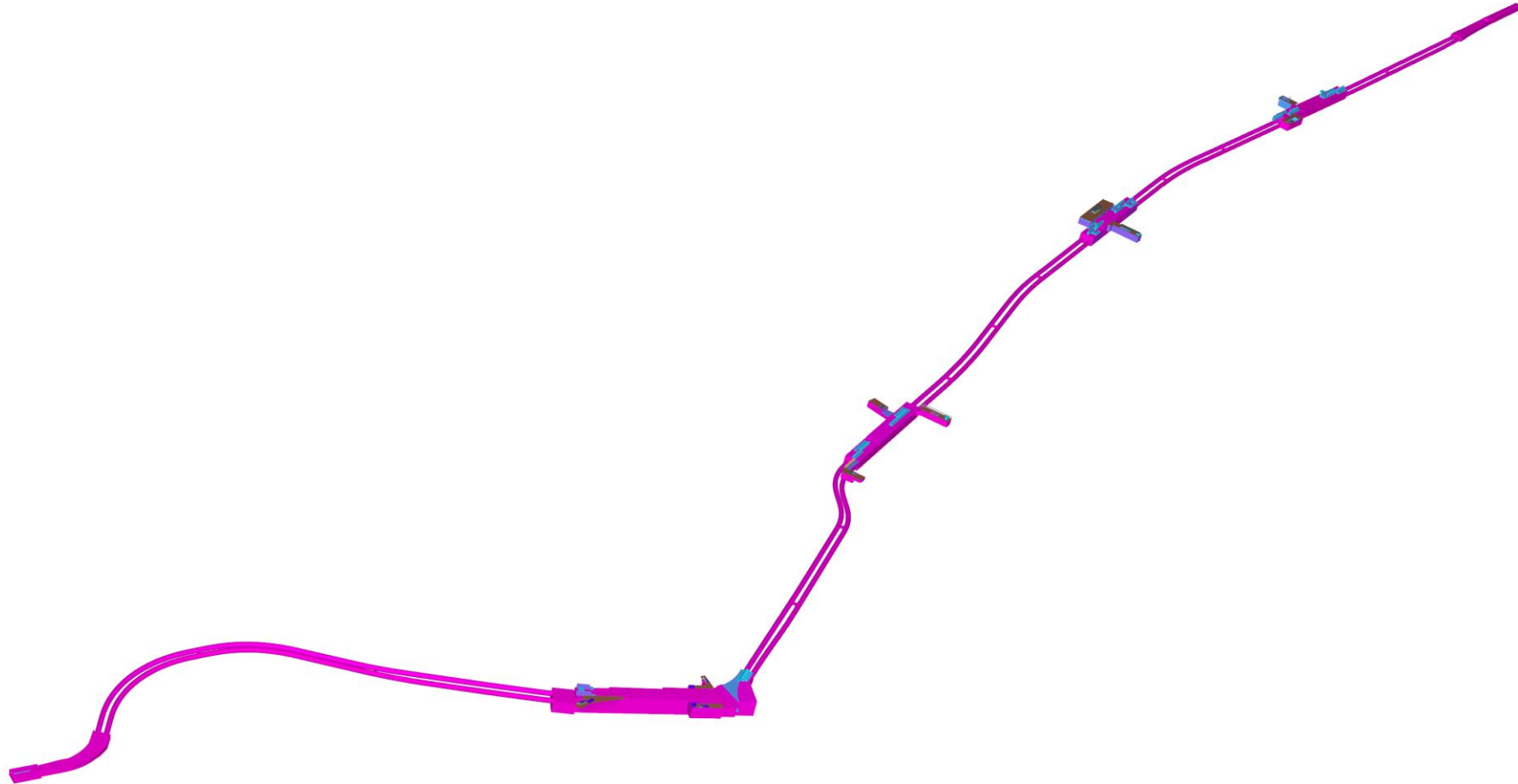
Elchanan Hoffer Horenman B.Sc

CFD Department

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Project Background – The Green Line LRT



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Approaches to Tunnel Simulations

- Simulate everything 3D.
- Simulate 1D for boundary conditions and apply as a fixed flow in 3D.
- Use 1D calculation coupled with 3D – multiscale approach.



HVAC namelist in FDS

- Designed to simulate HVAC systems.
- Employs a 1D calculation method.
- The HVAC solution is coupled with the 3D solution.



Multiscale Approach with HVAC in FDS – Partial Reference List

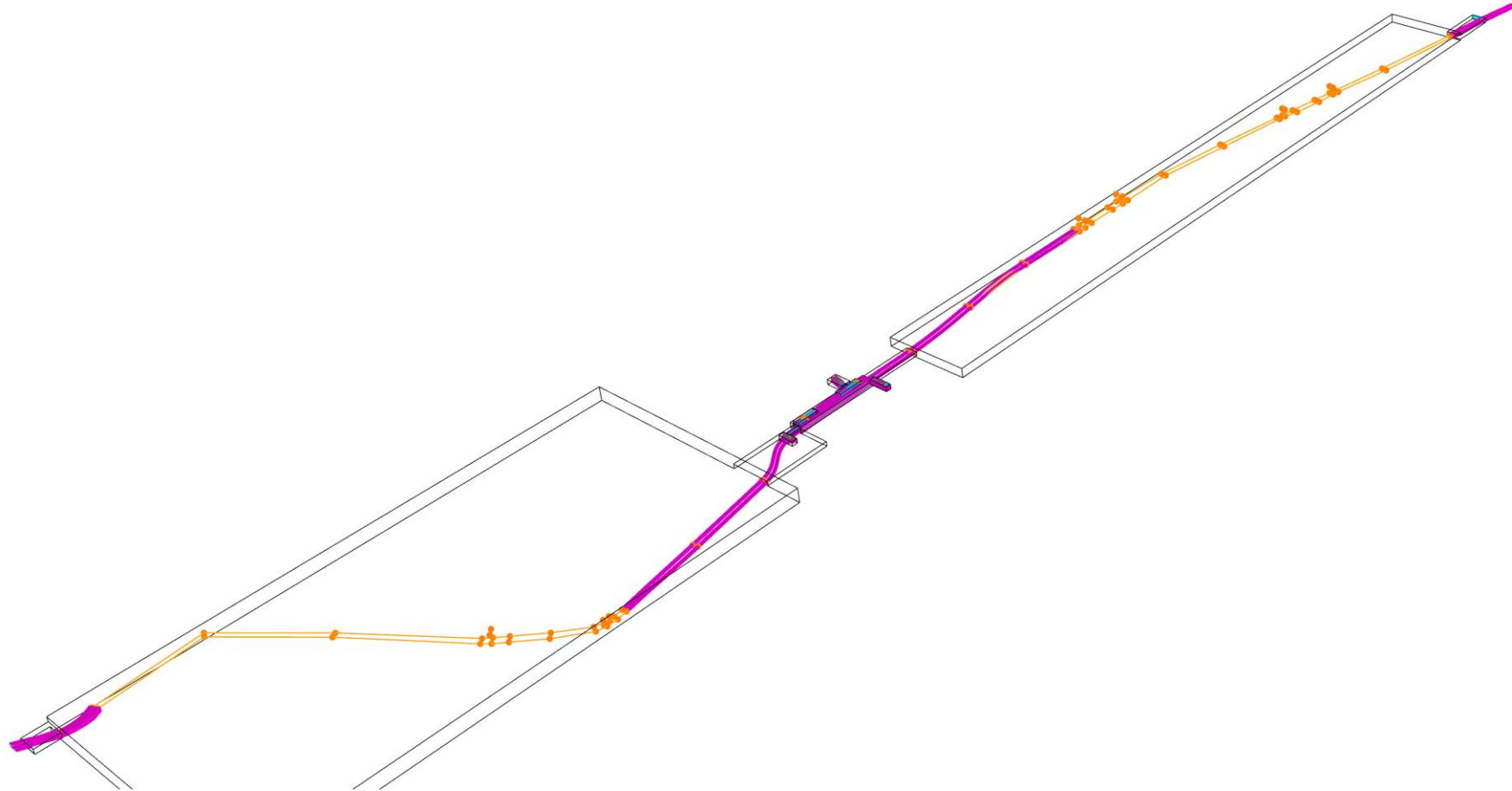
- Ang, 2014.
- Ang, Rein, Peiro, Anderson, 2016.
- Vermesi, Rein, Collela, Valkvist, Jomaas, 2017.
- Pachera, Deckers, Beji, 2018.



General Model Layout



Early Tries



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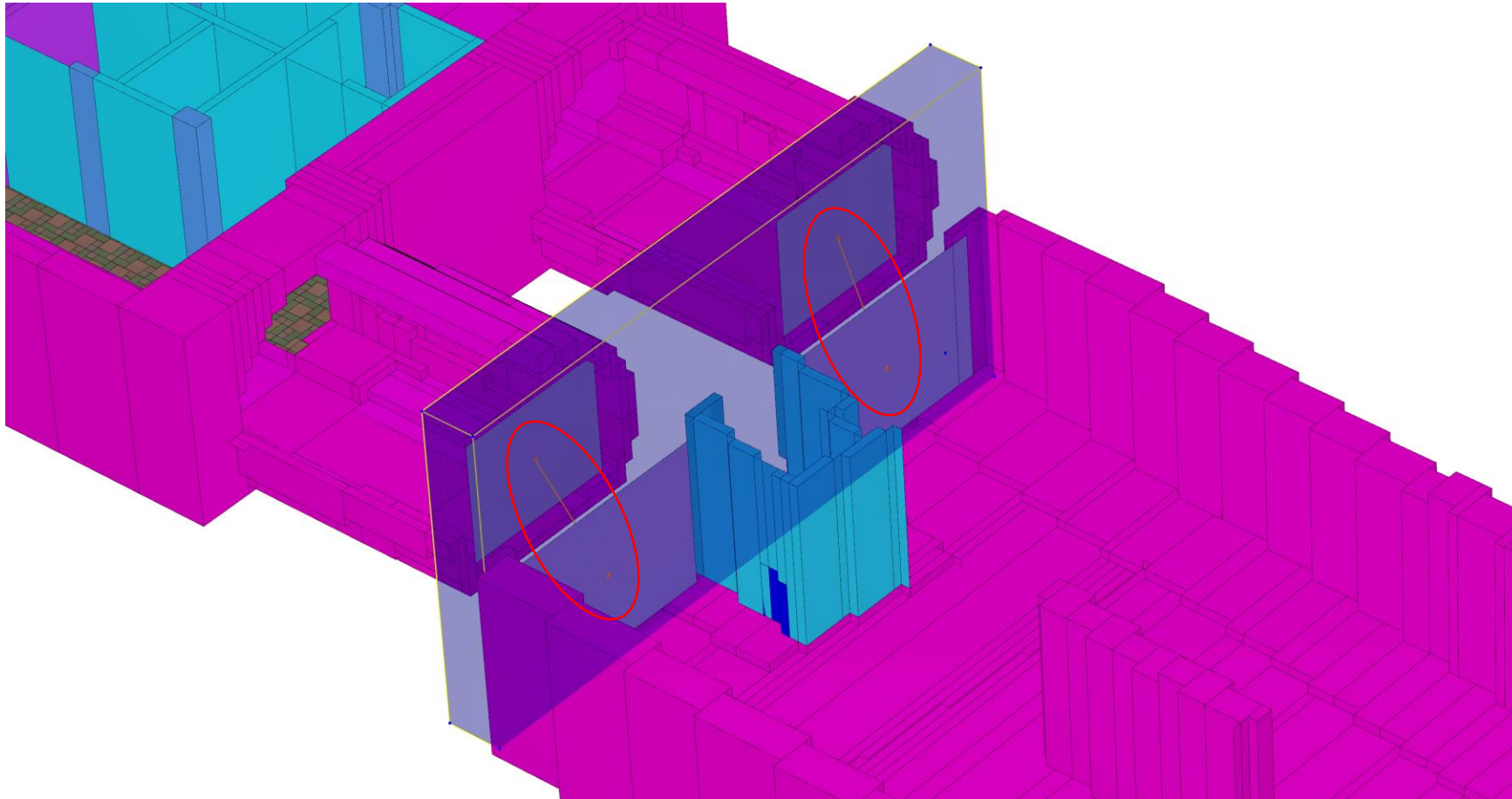
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Overview of Flow Losses in 1D Calculations

- Head losses – transition in the flow
- Friction losses – wall roughness



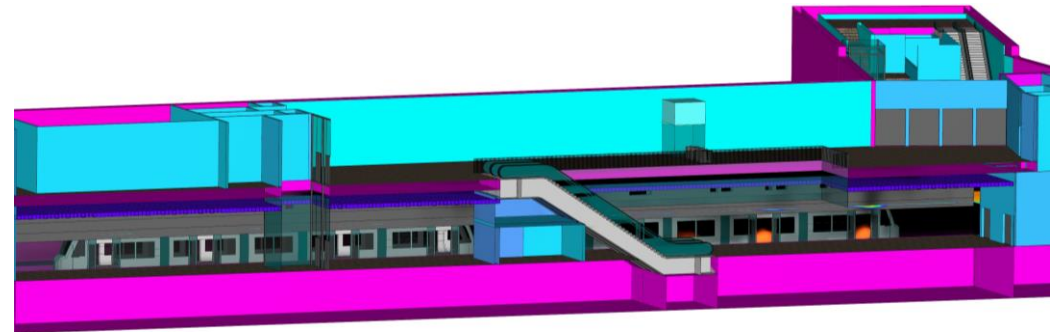
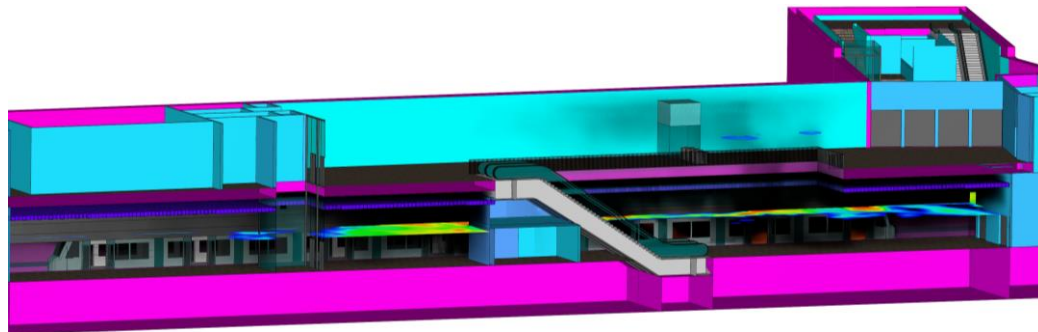
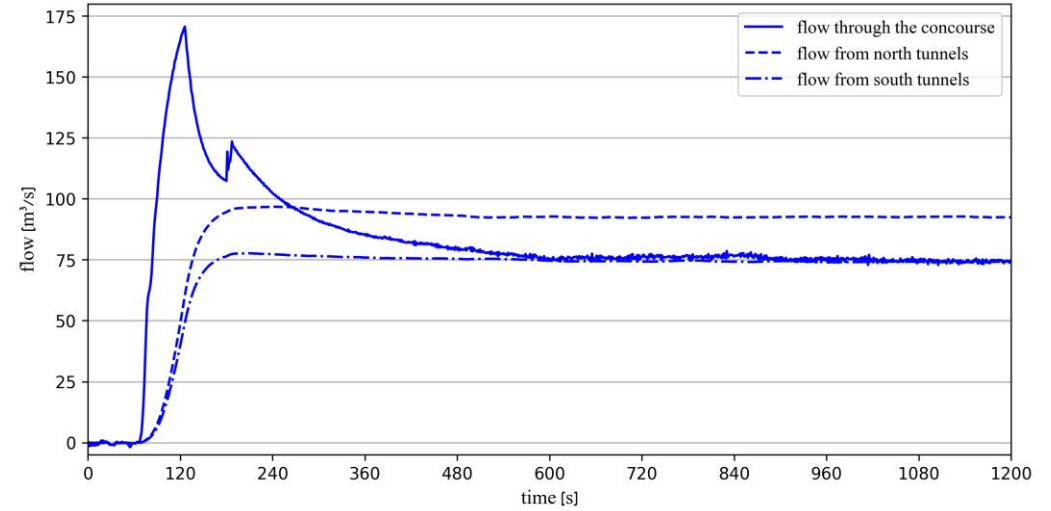
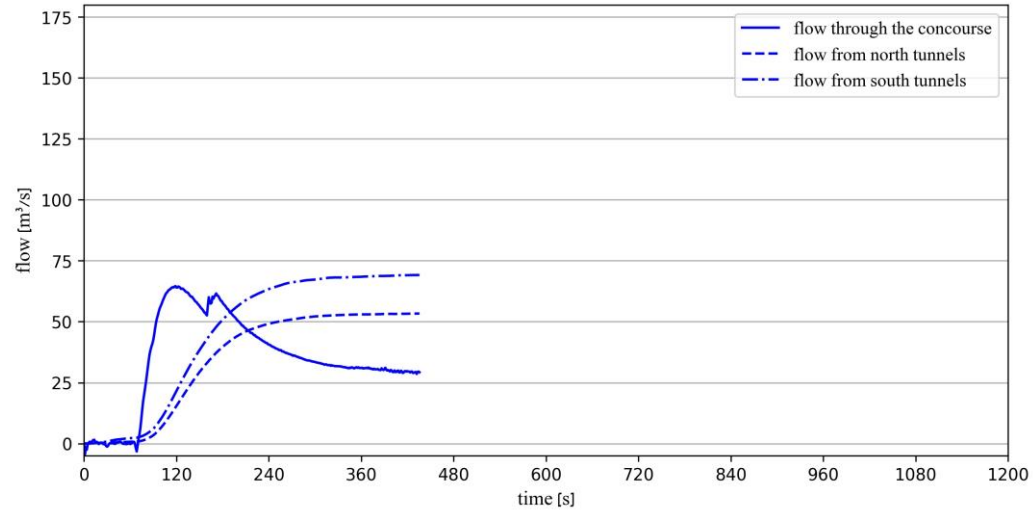
Final Setup



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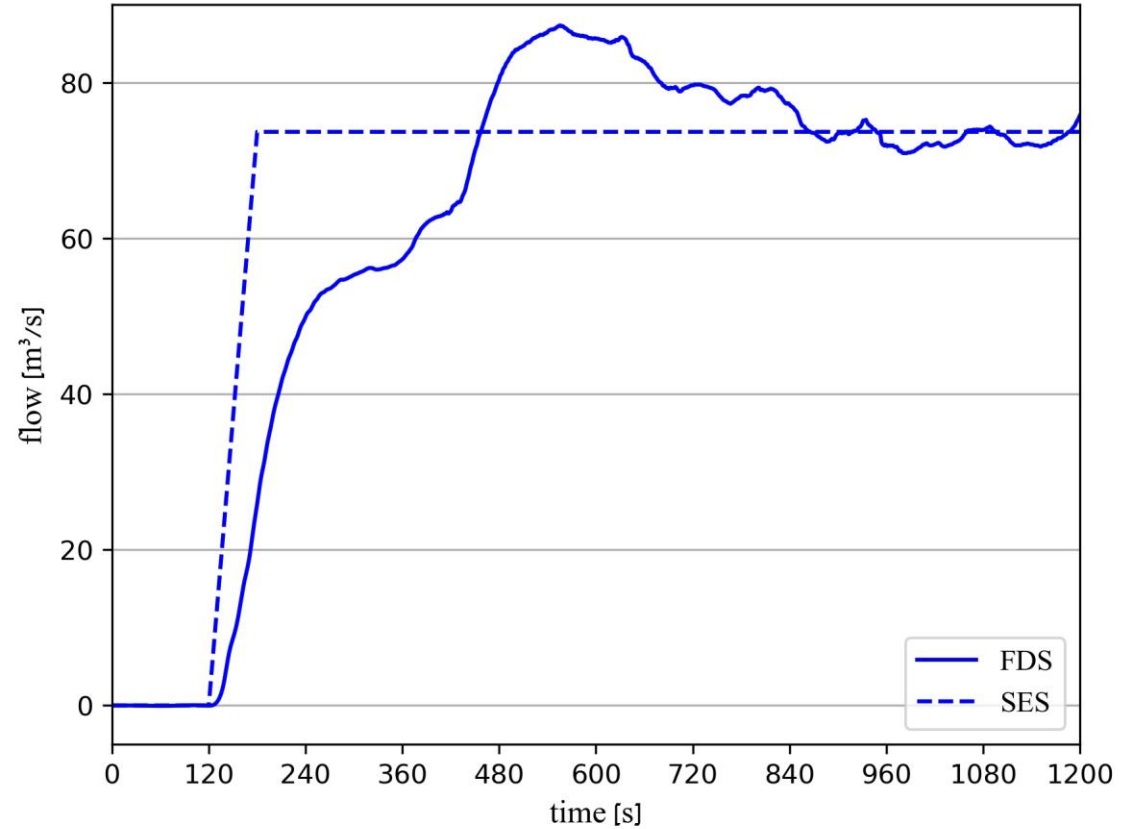
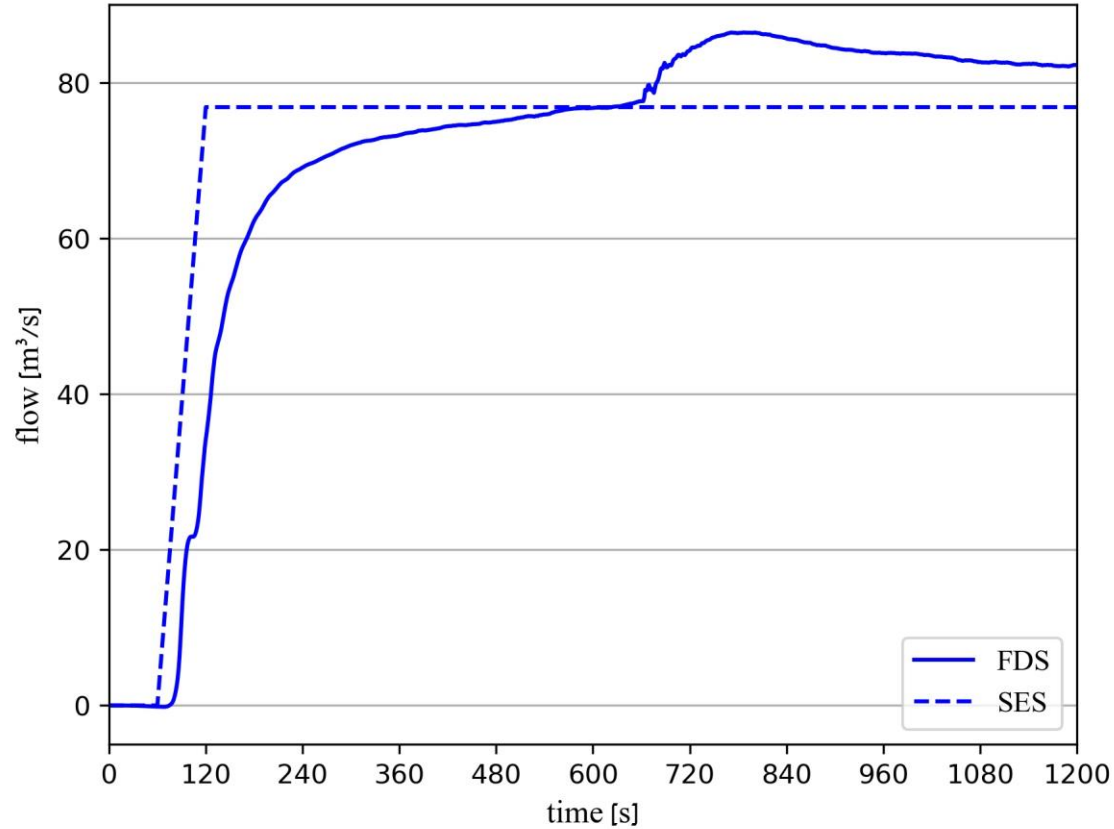
Results – station flow



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Results – FDS vs SES In Two Tunnels



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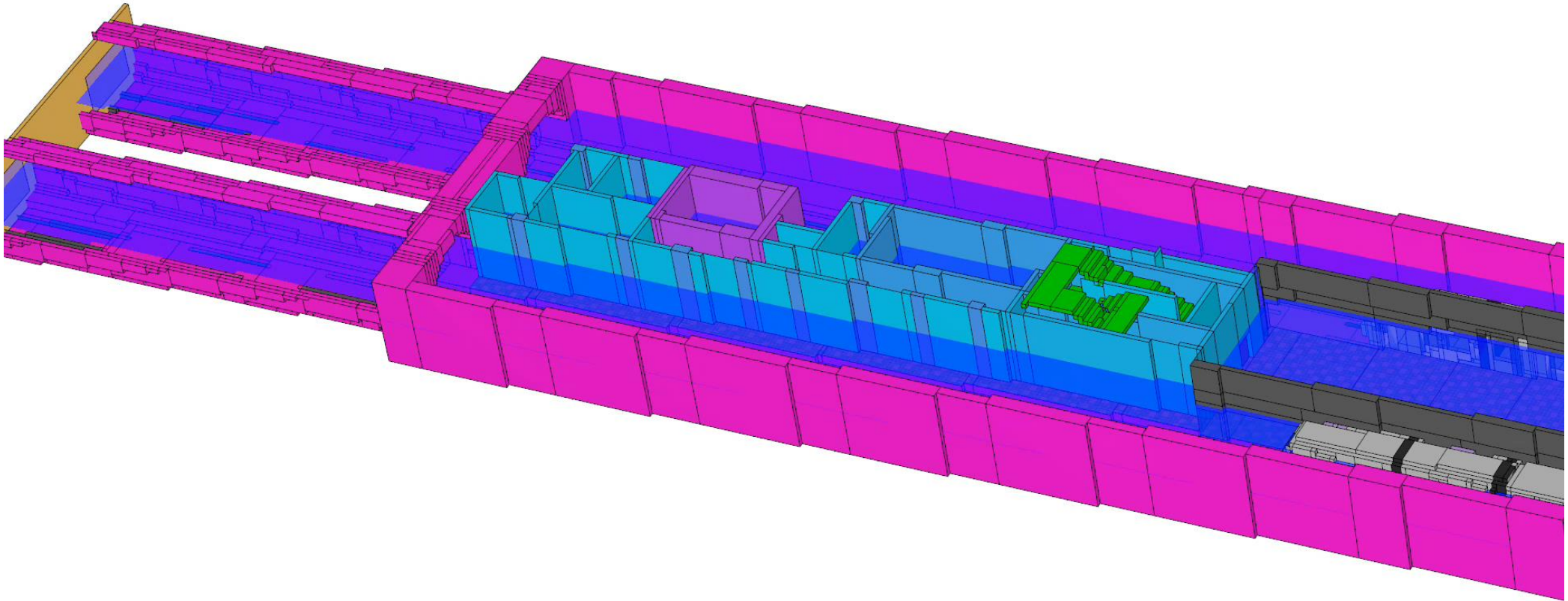
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Conclusions

- Steady-state flow shows good agreement with SES results
- The flow field is responsive to changes in the simulation
- Seems like a good representation of a real flow field



Questions?



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Thank You!



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