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Australian Water School

Tips & Tricks for Reviewing Flood Models

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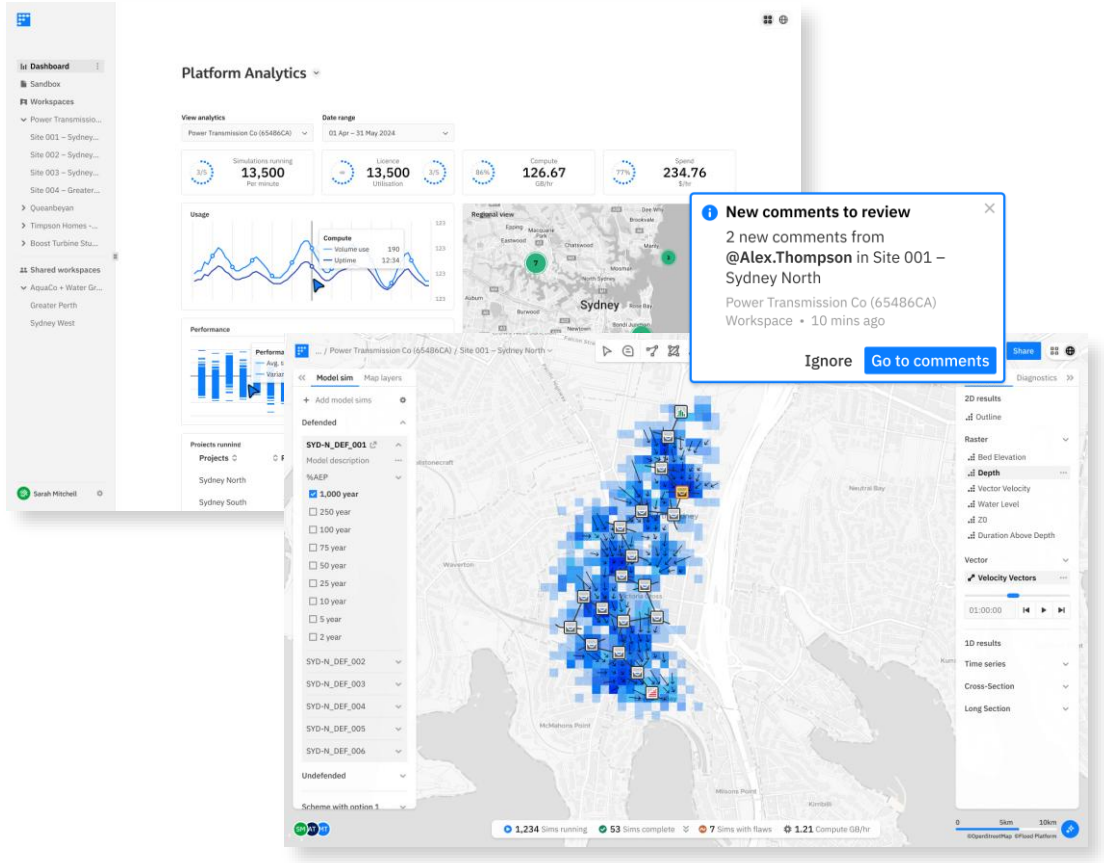
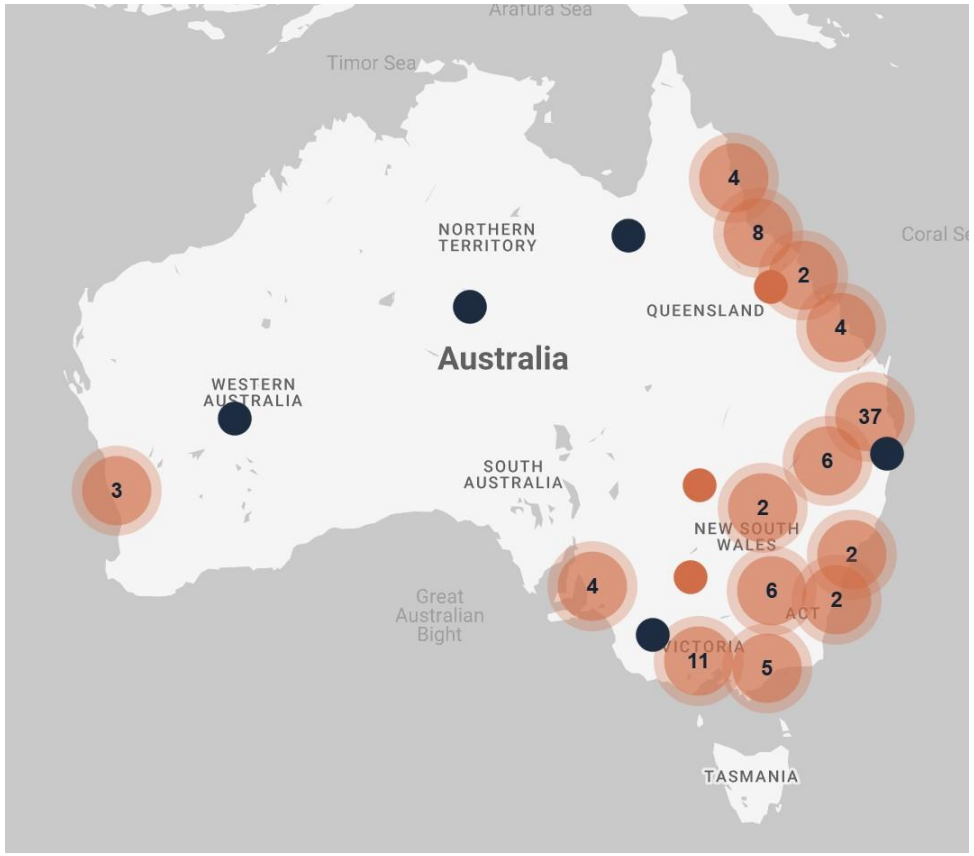
Agenda

- What happens when we get it wrong
- Modelling mistakes we've seen (or made)
- Tips on spotting & avoiding errors
- Q&A

Background





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What happens when we get it wrong?

What happens when we get it wrong?

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- Flooding
- Impacts flood insurance
- Expensive construction
- Damage to infrastructure
- Project delays
- Costly redesign
- Damaged reputation

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Modelling mistakes we've seen (or made)

Modelling mistakes we've seen (or made)

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Example 1

Outcome: Subdivision fill pad designed too low

Cause: Missed the peak flow/flood

Example 2

Outcome: Industrial pad level too low

Cause: Roughness & infiltration modelled incorrectly

Example 3

Outcome: Ring levee on a mine designed too high

Cause: Model generating inflows

Modelling mistakes we've seen (or made)

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Example 4

Outcome: Oversized culverts

Cause: Poor culvert & ground representation

Example 5

Outcome: Incorrect flowpaths / not meeting community expectations

Cause: Catchment extents not large enough

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Tips on spotting & avoiding errors

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- Has it been built?
- Has anyone been hurt?

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- Have you got the right model/results?
- Do flows go where you expect them to?
- Are the flows reasonable?
- Are the volumes sensible?
- Does the model represent the ground conditions?
- Is the simulation healthy?

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Please share your tips in the comments!

WARNING

Some viewers may find the following modelling errors disturbing. Viewer discretion advised.

Model Management

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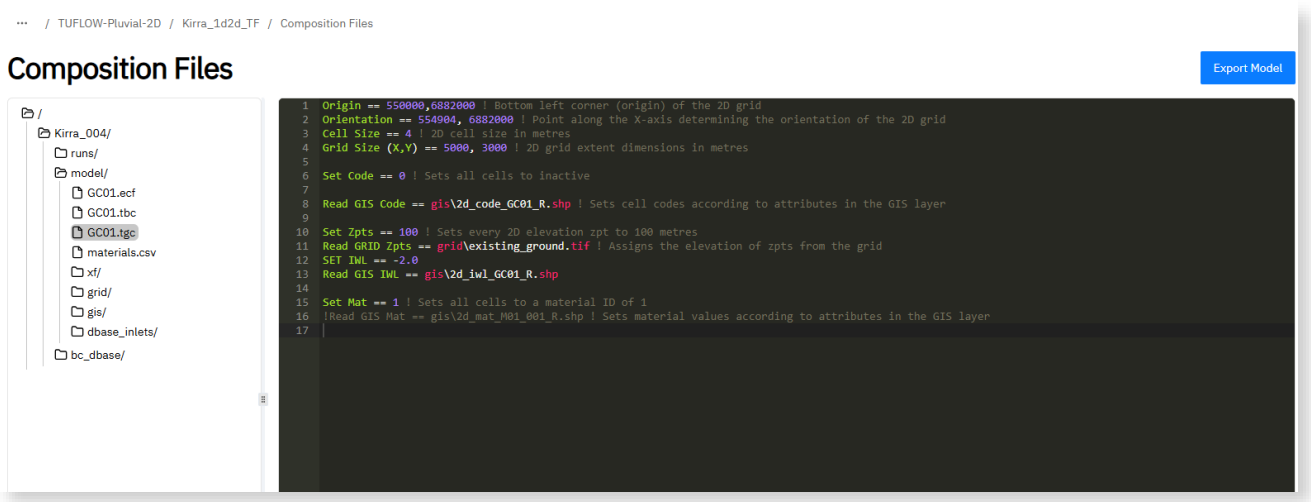
- Model version vs results version
- Model log



Visualising the Simulation

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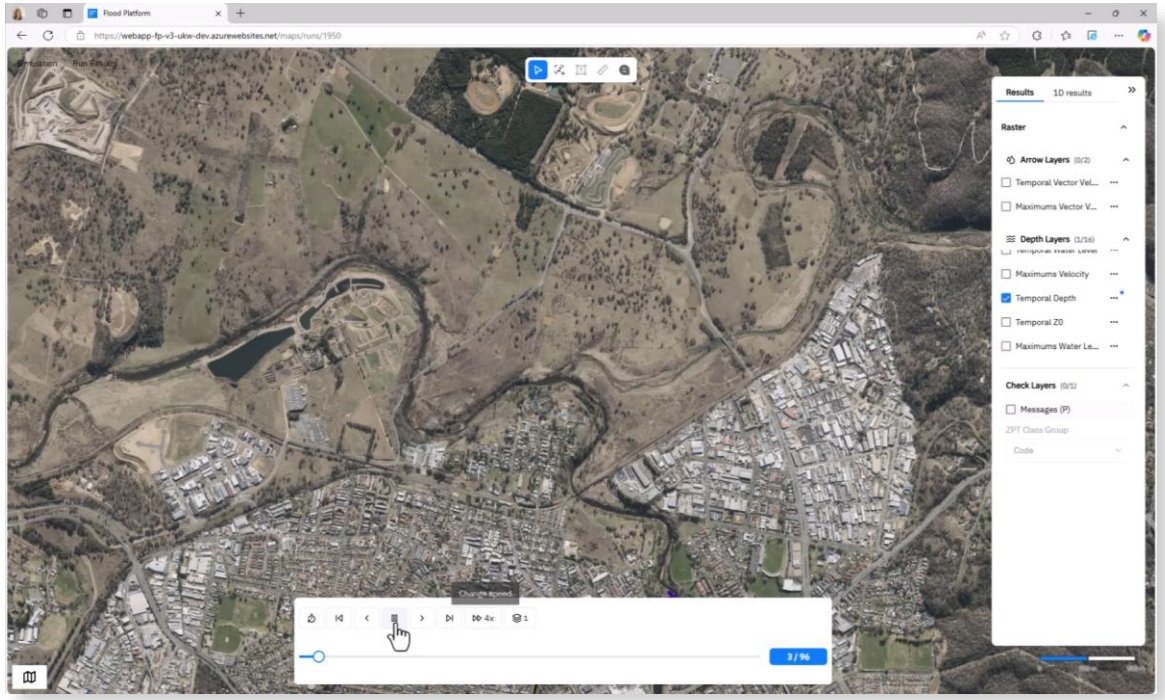
- Overland flowpaths
- Inflow connection points
- Catchment extent
- Initial water levels
- Outflows
- Oscillations



Reviewing the 2D representation

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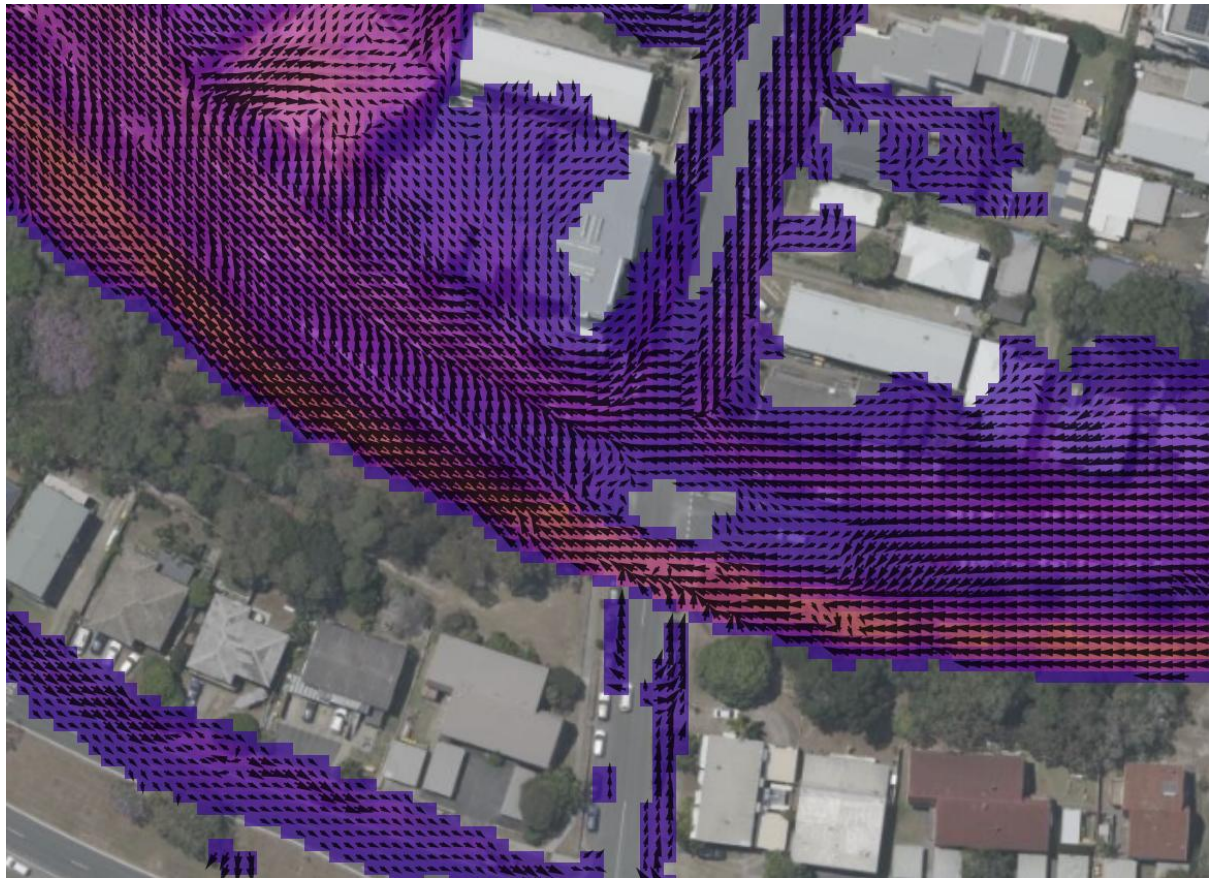
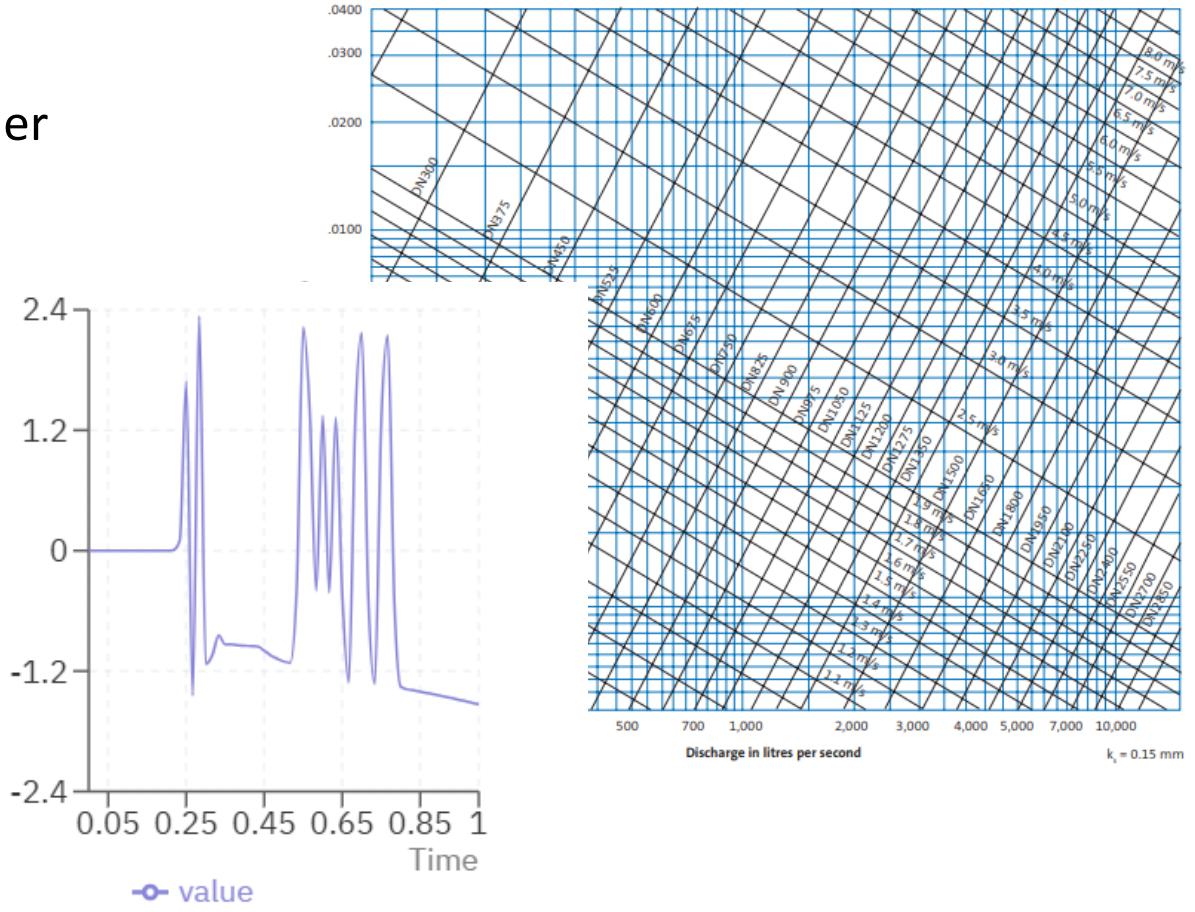
- GRID/Mesh size & rotation
- DTM modifications – have they been applied?
- Surface roughness & losses



Reviewing the 1D representation

- Pipe flows & velocities
- Pipe capacity check
- Energy losses – if it is a major structure do another model or hand calculations



Sanity checks & simulation health

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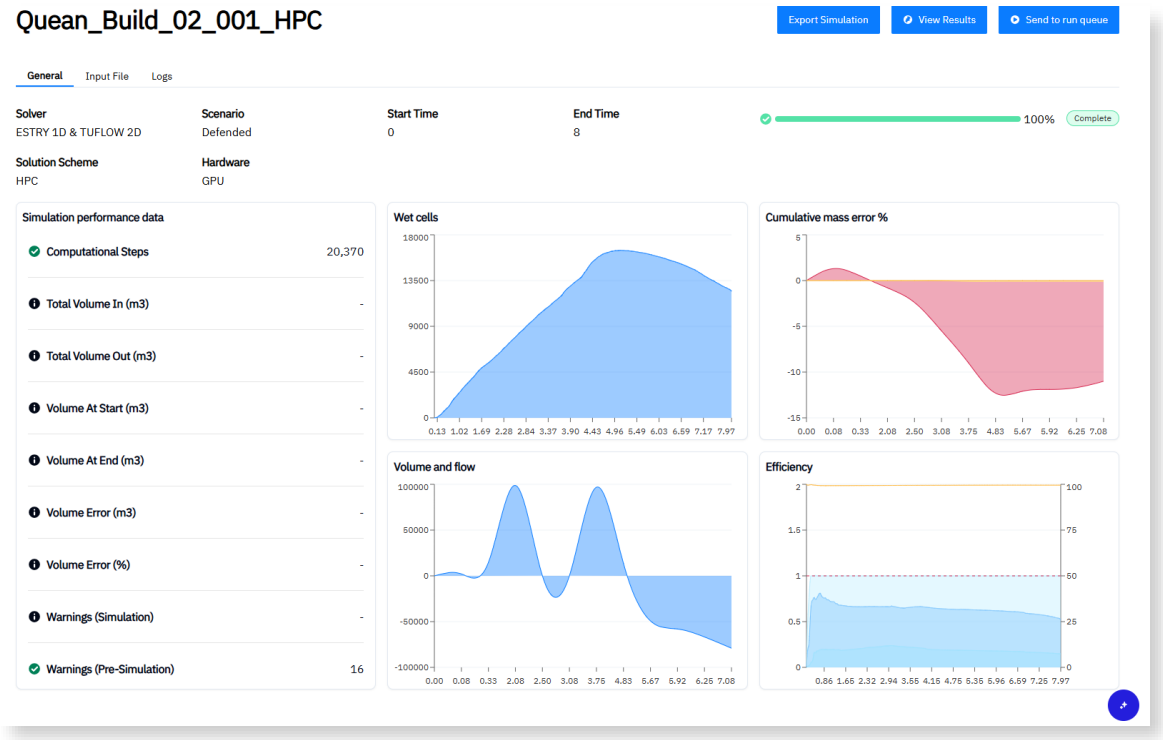
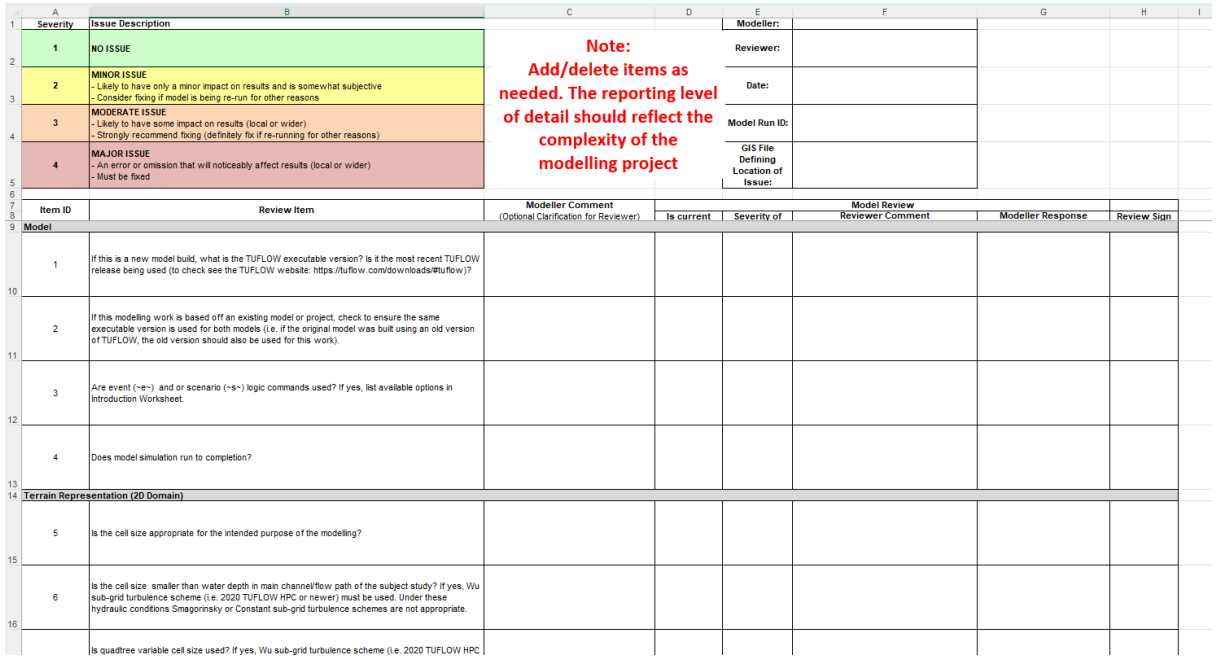
- Total volumes
- Peak flows
- Simulation time
- Flow stability
- Warnings & errors



Key Takeaways

- Site visits & listen to locals
- Visualise the results
- Perform some sanity checks
- Ask a colleague or friend (before it gets built)
- If you're a reviewer, ask to be walked through the simulation
- Use your resources!



Severity	Issue Description
1	NO ISSUE
2	MINOR ISSUE - Likely to have only a minor impact on results and is somewhat subjective - Consider fixing if model is being re-run for other reasons
3	MODERATE ISSUE - Likely to have some impact on results (local or wider) - Strongly recommend fixing (definitely fix if re-running for other reasons)
4	MAJOR ISSUE - An error or omission that will noticeably affect results (local or wider) - Must be fixed

Note:
Add/delete items as needed. The reporting level of detail should reflect the complexity of the modelling project

Modeller:	
Reviewer:	
Date:	
Model Run ID:	
GIS File Defining Location of Issue:	

Item ID	Review Item	Modeller Comment (Optional Clarification for Reviewer)	Model Review				
			Is current	Severity of	Reviewer Comment	Modeller Response	Review Sign
Model							
1	If this is a new model build, what is the TUFLOW executable version? Is it the most recent TUFLOW release being used (to check see the TUFLOW website: https://tuflow.com/downloads/#tuflow)?						
2	If this modelling work is based off an existing model or project, check to ensure the same executable version is used for both models (i.e. if the original model was built using an old version of TUFLOW, the old version should also be used for this work).						
3	Are event (~e~) and or scenario (~s~) logic commands used? If yes, list available options in Introduction Worksheet.						
4	Does model simulation run to completion?						
Terrain Representation (2D Domain)							
5	Is the cell size appropriate for the intended purpose of the modelling?						
6	Is the cell size smaller than water depth in main channel/flow path of the subject study? If yes, Wu sub-grid turbulence scheme (i.e. 2020 TUFLOW HPC or newer) must be used. Under these hydraulic conditions Smagorinsky or Constant sub-grid turbulence schemes are not appropriate.						
	Is quadtree variable cell size used? If yes, Wu sub-grid turbulence scheme (i.e. 2020 TUFLOW HPC						

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Discussion Time: top tips from the audience!

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Thank you.

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