

9 ways to reduce the cost of flood modelling

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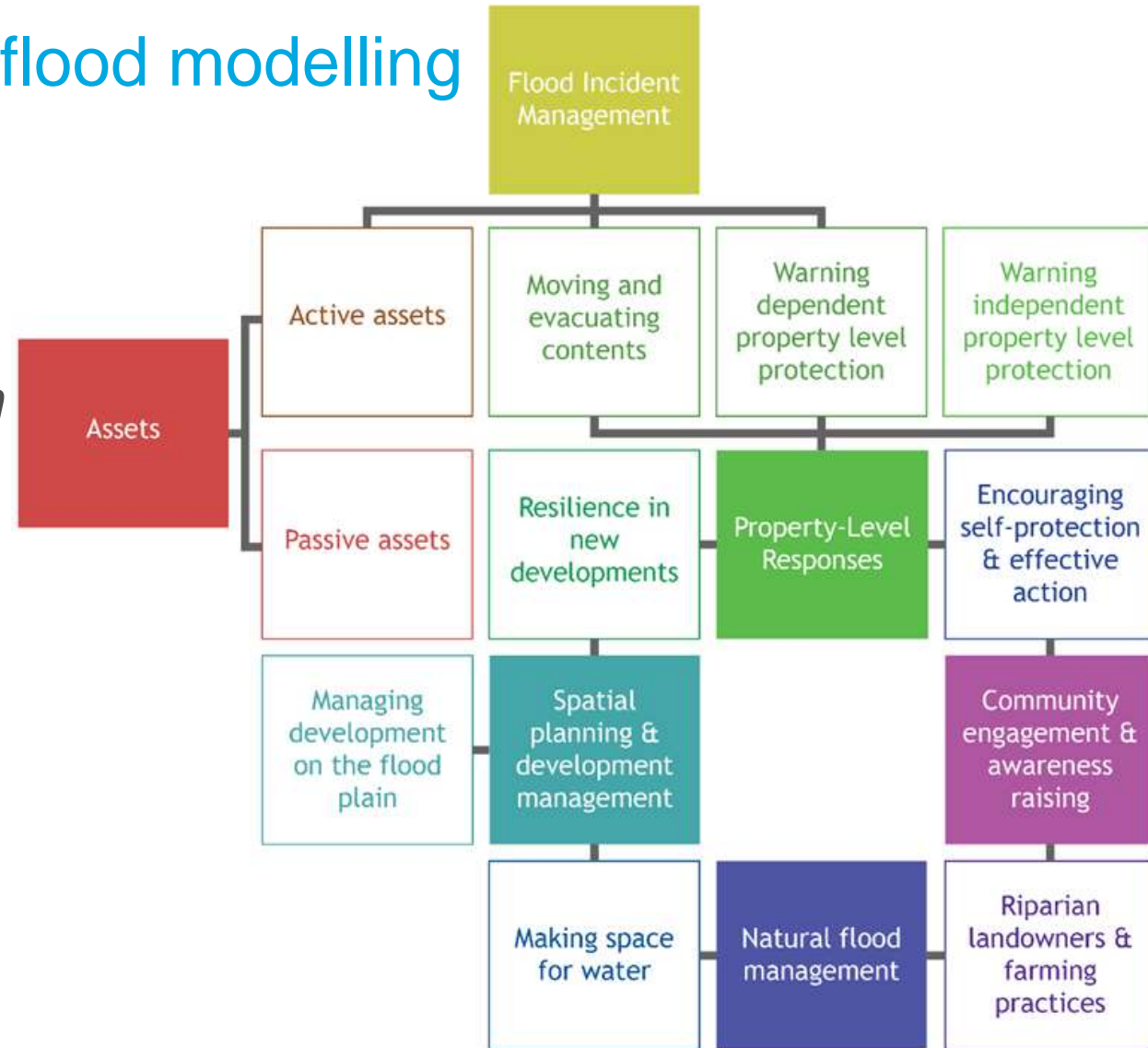
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1. Focused, defined objectives

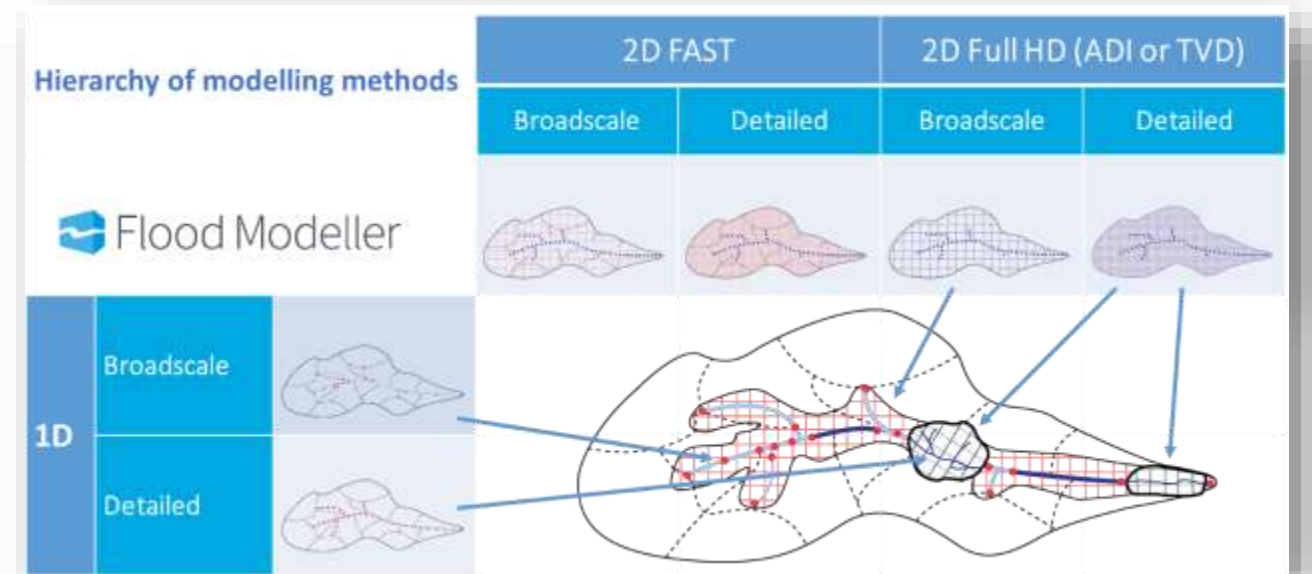
- Context – what decisions will models be used for
- What outputs are needed: ‘Must have’, ‘nice to have’
- Outcome focused, rather than define method
 - Allows modellers to identify cost saving
- Requirements specification (what, where..), key dates, budget available, linkages with projects



Biggest impact on cost

2. Carefully planned modelling approach

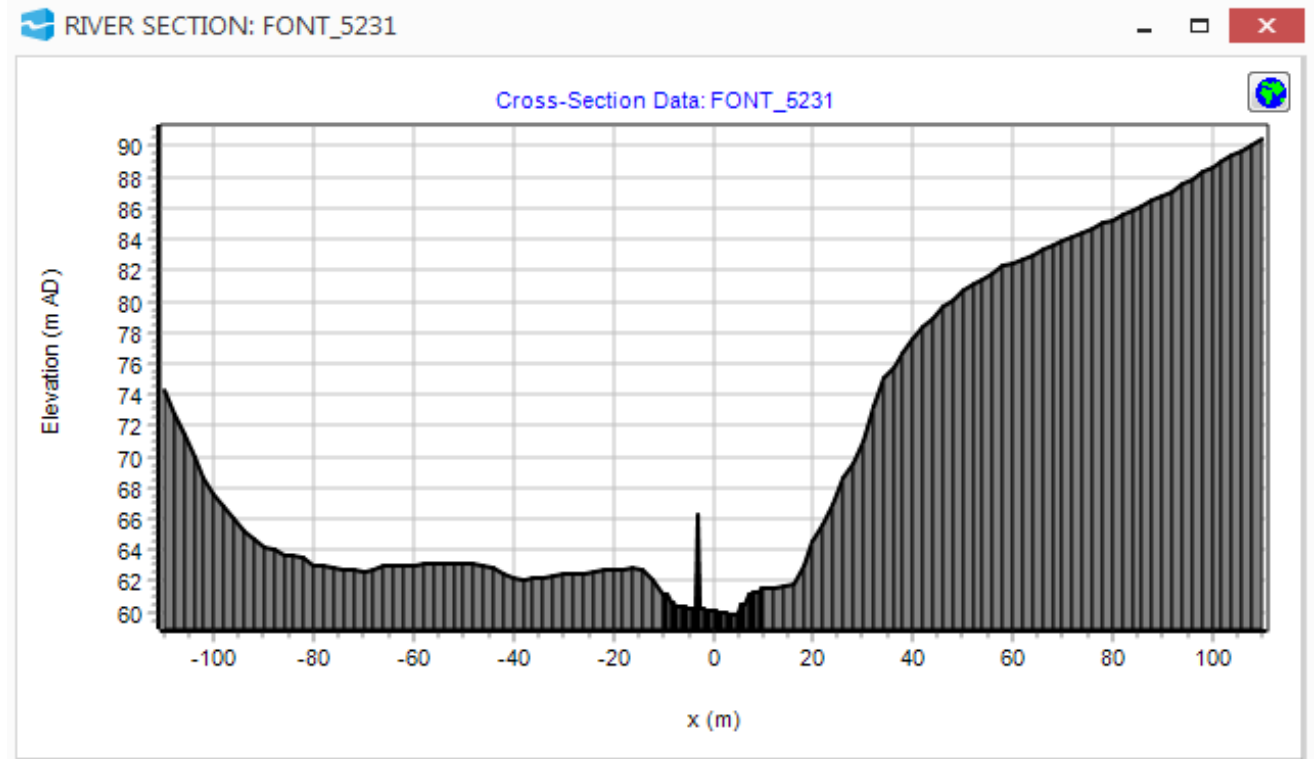
- Invest time at start to plan the modelling approach
 - Understand objectives
 - Local flooding processes – develop conceptual model
 - Data availability & quality
- Exploratory analysis
 - e.g. Flood Modeller FAST
- Mixed approach may be best
- Schematisation & grid size



Big impact on cost

3. Check the data

- Check the data first
 - Outliers - graphing
 - Step changes (datum change)
 - ‘free’ data – cost savings, but still need to check

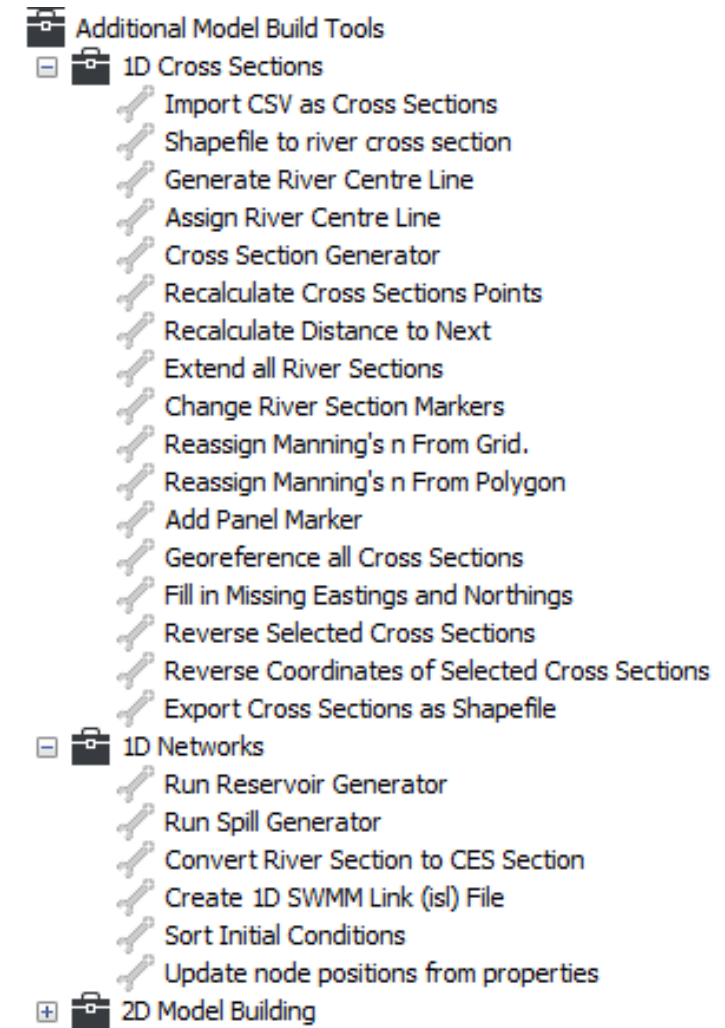


x (m)	y (m AD)	Mannings n	Panel	RPL	Marker	Easting	Northing	Deactivation	Sp. Marke
-4.512	60.280	0.035	<input type="checkbox"/>	1.000	▼	414150.31	587841.12	▼ 0	...
▶ -4.035	60.241	0.035	<input type="checkbox"/>	1.000	▼	414149.91	587840.88	▼ 0	...
-3.498	60.241	0.035	<input type="checkbox"/>	1.000	▼	414149.47	587840.56	▼ 0	...
-3.021	66.241	0.035	<input type="checkbox"/>	1.000	▼	414149.06	587840.31	▼ 0	...
-2.508	60.191	0.035	<input type="checkbox"/>	1.000	▼	414148.66	587840.00	▼ 0	...
-2.004	60.191	0.035	<input type="checkbox"/>	1.000	▼	414148.22	587839.75	▼ 0	...
-1.492	60.109	0.035	<input type="checkbox"/>	1.000	▼	414147.81	587839.44	▼ 0	...

4. Efficient model build

- Automation is key to cost savings
- Use 'built in' tools, plus 3rd party and bespoke scripting
- Most automation relies on standardisation of raw (open) input data formats
- Geo-referenced data

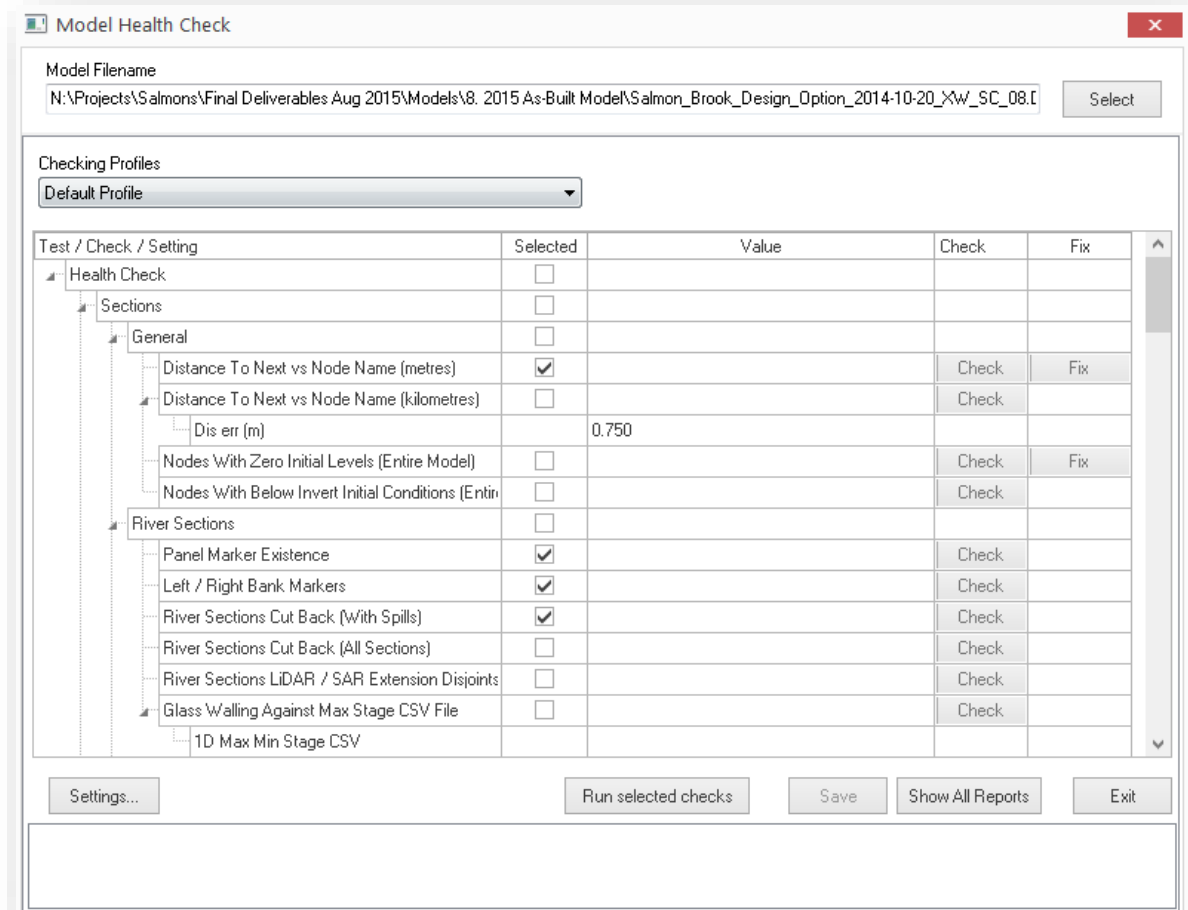
Some of the model building tools in Flood Modeller



Save money through automation

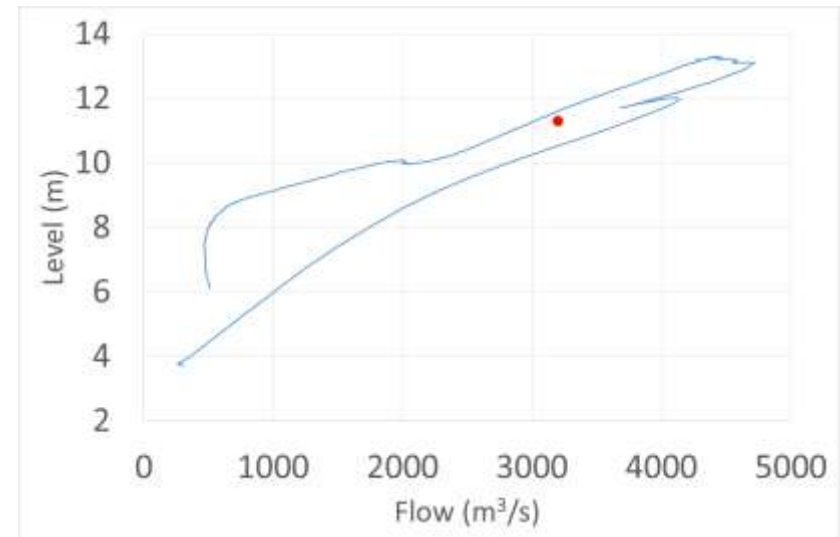
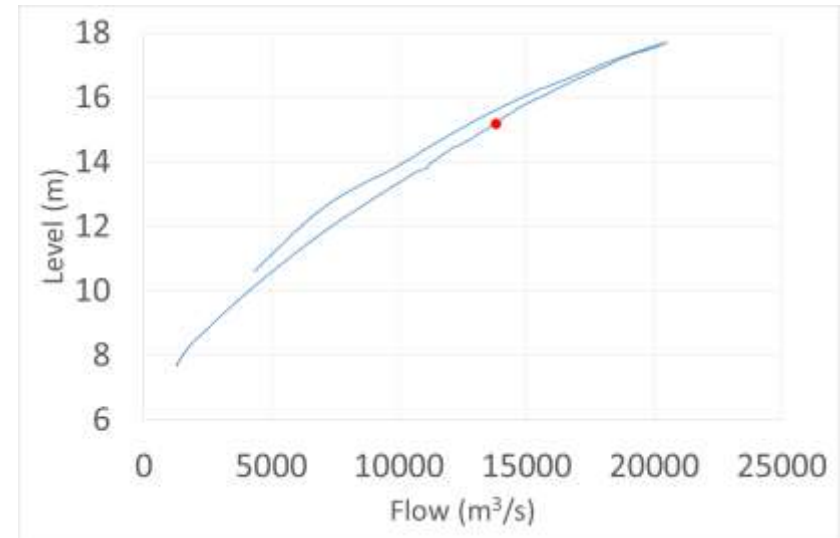
5. Check the model

- Check model before calibration
- ‘Stress test’ with range of flows
- Use automated tests: e.g. Flood Modeller Health Check with 50+ checks
- Use online mapping



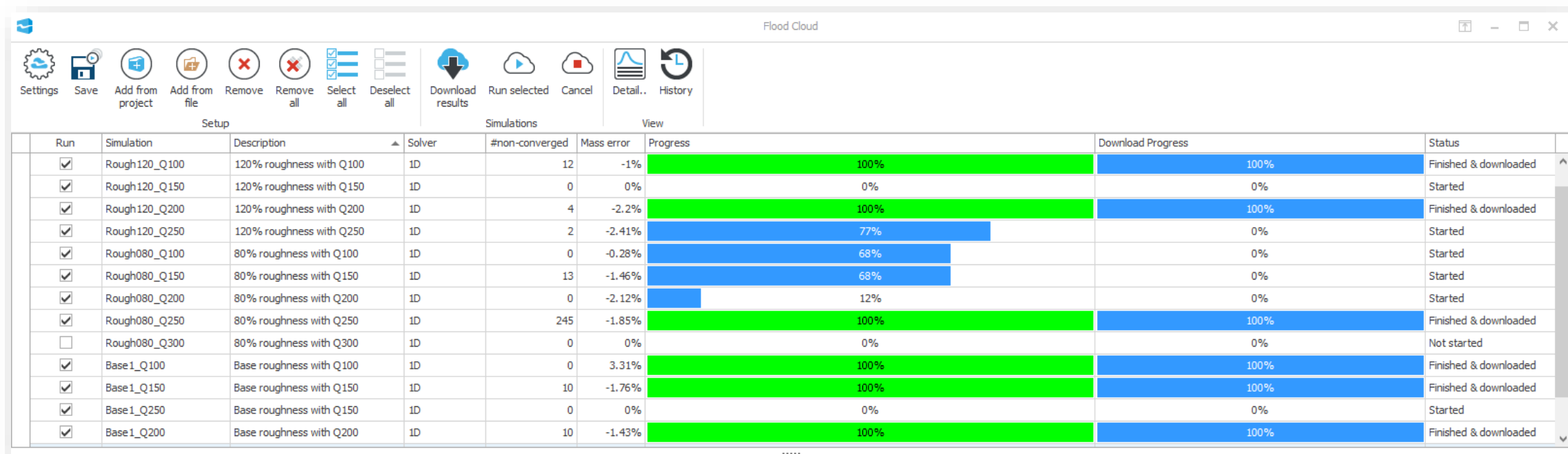
6. Calibrate/validate

- Important to understand performance of model
→ how much confidence outputs?
- Ideal world: sufficient data to calibrate, with different data to validate
- Real world: always insufficient data
- Use what's available & do sensitivity analysis
- Don't waste money on 'false' calibration
- Understand & document model behaviour
- Focus on what will impact the 'Decision'



7. Automate production runs

- Previously, small number of production runs (e.g. 10 with/without for 5 RPs)
- Now, many more (e.g. epochs, climate change, more options...)
- Automation of runs
- Clusters and cloud important to save time & money, e.g. CH2M Flood Cloud...

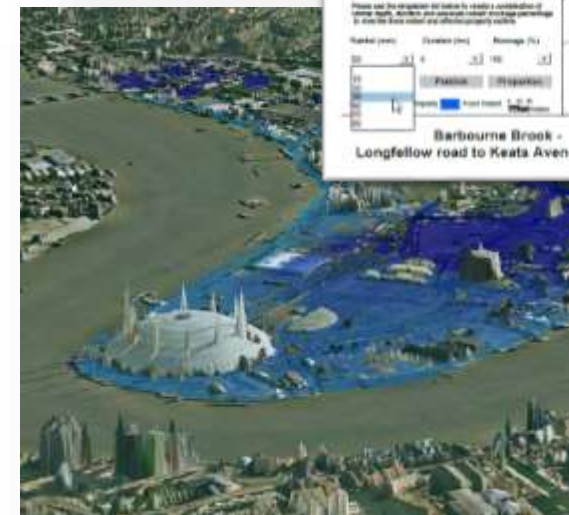
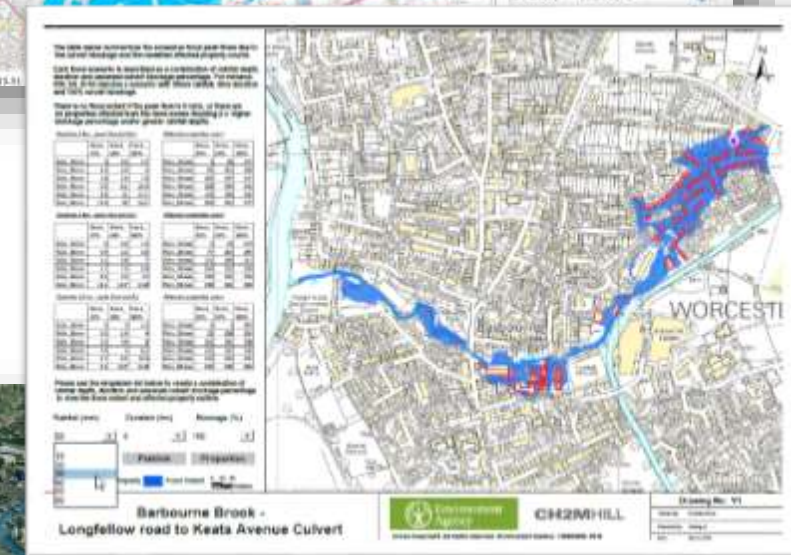
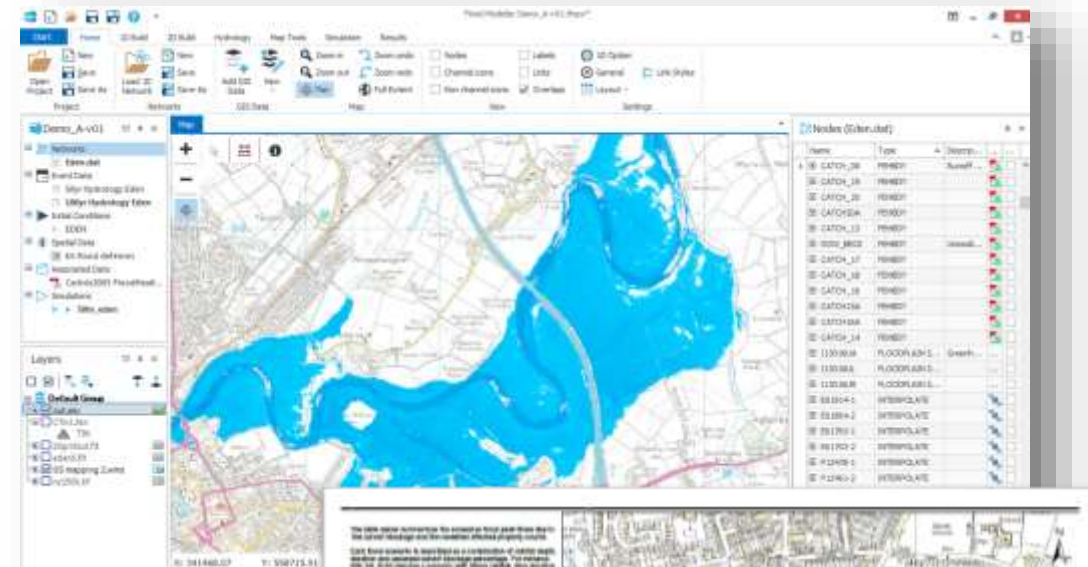


The screenshot shows the 'Flood Cloud' application window. The interface includes a toolbar with icons for Settings, Save, Add from project, Add from file, Remove, Remove all, Select all, Deselect all, Download results, Run selected, Cancel, Detail.., and History. Below the toolbar, there are three tabs: Setup, Simulations, and View. The Simulations tab is active, displaying a table with columns for Run, Simulation, Description, Solver, #non-converged, Mass error, Progress, Download Progress, and Status. The Progress column contains green and blue horizontal bars representing the completion percentage of each simulation.

Run	Simulation	Description	Solver	#non-converged	Mass error	Progress	Download Progress	Status
<input checked="" type="checkbox"/>	Rough120_Q100	120% roughness with Q100	ID	12	-1%	100%	100%	Finished & downloaded
<input checked="" type="checkbox"/>	Rough120_Q150	120% roughness with Q150	ID	0	0%	0%	0%	Started
<input checked="" type="checkbox"/>	Rough120_Q200	120% roughness with Q200	ID	4	-2.2%	100%	100%	Finished & downloaded
<input checked="" type="checkbox"/>	Rough120_Q250	120% roughness with Q250	ID	2	-2.41%	77%	0%	Started
<input checked="" type="checkbox"/>	Rough080_Q100	80% roughness with Q100	ID	0	-0.28%	68%	0%	Started
<input checked="" type="checkbox"/>	Rough080_Q150	80% roughness with Q150	ID	13	-1.46%	68%	0%	Started
<input checked="" type="checkbox"/>	Rough080_Q200	80% roughness with Q200	ID	0	-2.12%	12%	0%	Started
<input checked="" type="checkbox"/>	Rough080_Q250	80% roughness with Q250	ID	245	-1.85%	100%	100%	Finished & downloaded
<input type="checkbox"/>	Rough080_Q300	80% roughness with Q300	ID	0	0%	0%	0%	Not started
<input checked="" type="checkbox"/>	Base1_Q100	Base roughness with Q100	ID	0	3.31%	100%	100%	Finished & downloaded
<input checked="" type="checkbox"/>	Base1_Q150	Base roughness with Q150	ID	10	-1.76%	100%	100%	Finished & downloaded
<input checked="" type="checkbox"/>	Base1_Q250	Base roughness with Q150	ID	0	0%	0%	0%	Started
<input checked="" type="checkbox"/>	Base1_Q200	Base roughness with Q200	ID	10	-1.43%	100%	100%	Finished & downloaded

8. Effective communications

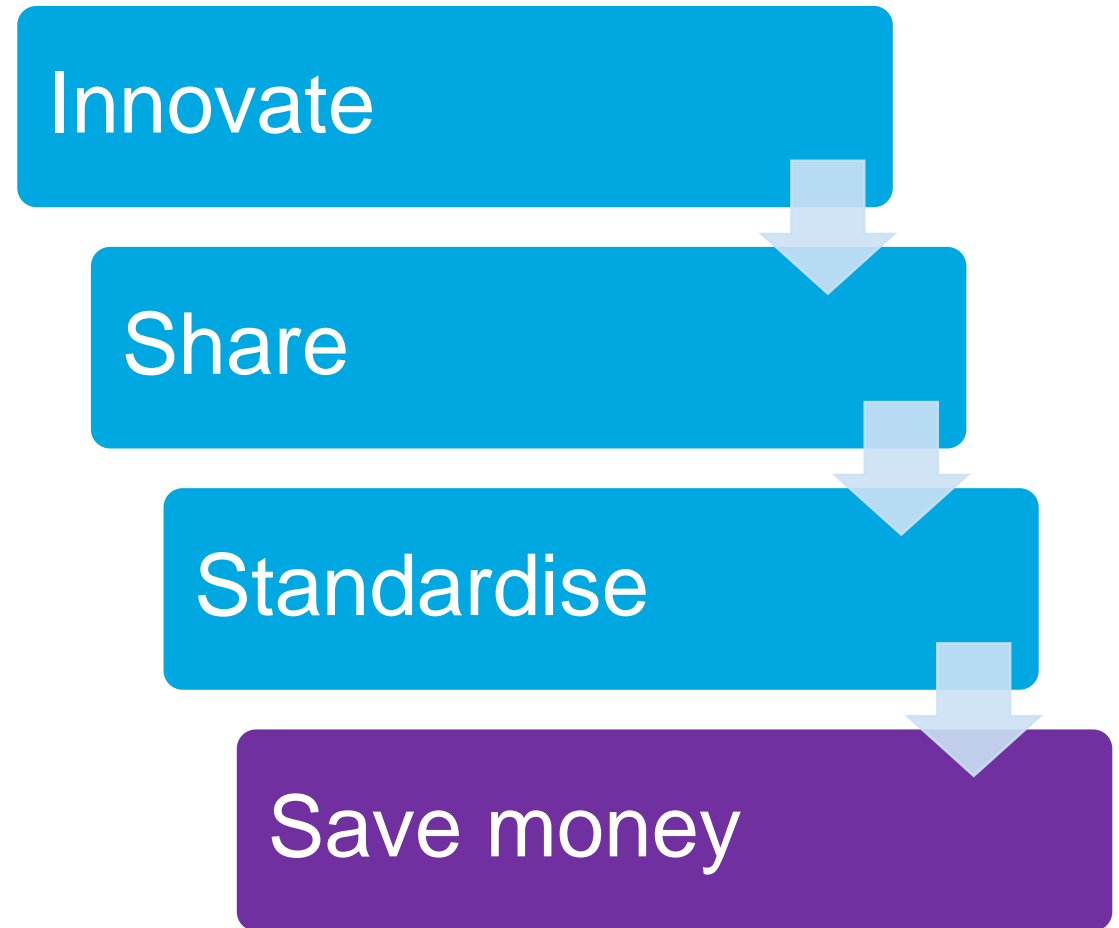
- Effective & timely is key factor in many successful projects
- Throughout – not just at end
- Visualisations: 2D & 3D → involvement & buy-in
- Helps build consensus on what's 'good enough'



Informed team, with common understanding, saves money

9. Standardise

- Standard approaches & templates
- Conventions (labels, folders, etc.)
- Checklists
 - Concept reviews
 - Quality reviews
- Standard report structures



Nine ways to reduce cost of flood modelling

Get the full paper for free from:

www.floodmodeller.com/9ways

