Avon River Modelling Bears Fruit

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overview

- the challenge for LDRP
- the new Avon model
- results and findings
- lessons learned



acknowledgements

- councillors, management, staff
- previous modellers
- consultants: GHD, AECOM, DHI



the challenge

- existing catchment models
- earthquake effects
- large infrastructure programme
- Iong term plan
- quick programme
- use as a design tool



the model



the model

FEATURE	APPROXIMATE SYSTEM LENGTH	MODEL ELEMENTS		
Mike 11 Rivers, Tributaries and Drains	160 km	197 M11 branches 7 km pipes 544 culvert structures		
Mike Urban Pipe Network	345 km Pipes 14 km Open Channel	10,450 links (Pipes) 990 links (Open channels)		
Mike 21 Mesh	145 km²	1.8 million mesh elements		
Mike Flood Coupling Models		 13,550 M21 - MU Urban links (Inlet & Outlet) 1,120 M21 - MU Urban links (MU open channel) 1,455 M21 - M11 Lateral links segments 33 M11/M21 Standard links 580 MU outlet to M11 River links 16 M11 to MU River links 		



the model

model runtime is approximately
 70% of (i.e. faster than) real time
 modelled storm event duration



multipurpose stability

- broadly diverse design events from 10% to 0.5%
 AEP and 0.5hr to 36hr duration plus variable
 tidal boundary conditions
- new ground / experimental but confident team
- event by event stability to run completion approach
- final batch run fell happily into place

stability standards

- defined scope of works in response to various
 level oscillation conditions (use of Mike View 1D analysis tool)
- development for project of M21 time varying
 level 2D result analysis tool analogous to Mike
 View
- detailed location level GIS reporting plus summary statistics

stability standards

...summary statistics

Model run V094 – Post- EQ Stability batch				
Max amplitude (mm)	MIKE 11 Number of H- points above threshold	MIKEURBAN Number of nodes above threshold	MIKE 21 Number of elements above threshold	
100 – 150	Not reported	Not reported	4859	
150-300	19	283	586	
300-500	6	23	12	
500-1000	13	9	4	
1000-2000	8	1	1	
>2000	3	0	0	

calibration - march 2014



calibration - march 2014



what did it show us

- new flood risk areas and better understanding...
- Kyle St
- western areas
- critical duration resolution

what did it show us















what did it show us



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lessons

- rain on mesh (ROM) on flats has been rewarding
- ROM hillside hydrology routing was no better than
 Model B and RORB was clearly better
- bridges and underpasses difficult (Bellvue)
- depth tolerance and lateral links



next steps

- model updates from 2014 to current
- exploring the model results and testing those
 against staff knowledge to identify areas where
 system data should be improved
- application within LDRP and Council business
 processes





