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"Where will our knowledge take you?"

Computer Says No! Interpreting Model Results in Flood Impact Assessment

Darren Lyons

Introduction

How accurate are our overland flow models?

How is overland flooding considered in our flood planning frameworks?

How are the limitations of mapping considered in development applications?

How onerous are controls for development in overland flow areas (having largely been derived from mainstream flooding)?

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Overland Flow Studies

- LiDAR availability, 1D-2D linked software, computing power enable detailed urban flood modelling
- Understanding of flood risk in urban environment
- Mapping of overland flow paths and inclusion in flood planning areas
- Some progression towards specific flood planning and development controls

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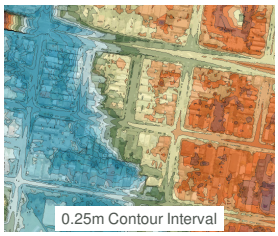
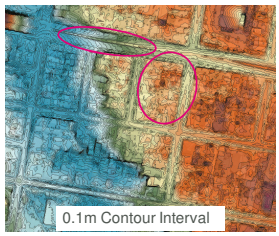
LiDAR DEM Accuracy





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LiDAR Point Cloud Data

- large proportion of roof area
- obstruction from mature vegetation
- landscaping features missed
- closely spaced houses
- parked cars
- narrow features

How well can we resolve the overland flow distribution?

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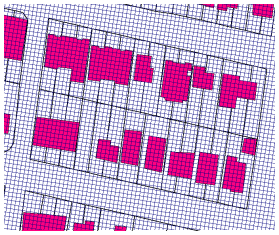
Model Grid Resolution and Alignment

- 2m x 2m grid resolution common (can be coarser if large catchment)
- narrow flow paths between buildings in dense urban development
- alignment of grid has impact on modelled flow path width and conveyance
- opportunity to modifying existing flood studies for development assessment?



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Representing Features in a Model

Lot Scale Features

- buildings
- treatment of under croft storage?
- garages / outbuildings
- fences
- driveways
- paved areas

In addition to representation of stormwater drainage network and road conveyance

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Representing Features in a Model

Micro Scale Features

- garden sheds
- cubby houses
- rainwater tanks
- air conditioning units
- gas bottles
- parked cars

Not as laughable in the context of some urban flow environments – similar scale to building encroachments?

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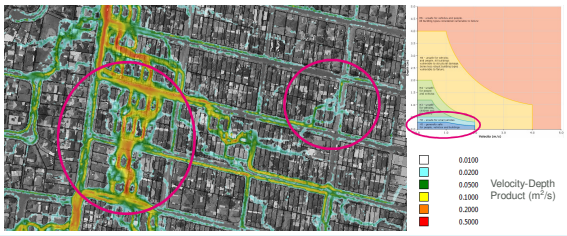
Flood Mapping and Planning Controls



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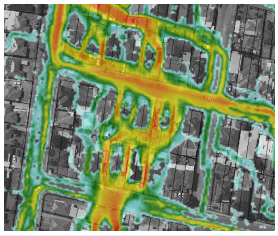
Flood Mapping and Planning Controls

Flood Planning Area

- 1% AEP design inundation extent
- depth mapping limit (0.05m, 0.1m ?)
- filtering for v x d product
- freeboard (0.3m, 0.5m ?)
- trim to contributing catchment limit?

Controls

- land use and hydraulic classification
- Flood Planning Level
- flood impact assessment



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Development Applications

Typical Scale of Development

- Knock down rebuild – enlarged footprint
- single dwelling to duplex

Constraints

- FPLs no problem (shallow depth)
- PMF often less than FPL (do we need full freeboard allowance?)
- No adverse impact

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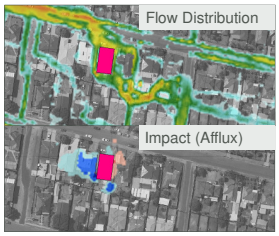
Flood Impacts

Impact Assessment

- is 5cm / 10cm impact significant?
- an impact is not a number
- material / adverse / prejudicial
- magnitude, extent, property impact
- impact below neighbouring floor levels
- allowable afflux considering uncertainty?



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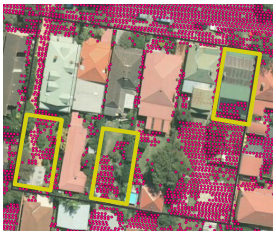
Considerations for Approval

- is the impact assessment appropriate?
- value of urban renewal
- cost of mitigating "impacts"
- development not requiring consent with similar impact on flood conditions:
  - sheds, cubby house
  - raised garden beds
  - landscaping, limited height retaining walls



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Final Points

Modelling uncertainty
- it's a "model" – not called a "reality"
- TUFLOW hydraulic ~~model~~ reality ~~simulation~~ replication?

Flood Planning Area for overland flow
- filtering of results (depth, velocity-depth product, contributing catchment)
- constraints for low risk development

Assessing impacts
- material and prejudicial
- similar impact of non-approvable works

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Thank you

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