



Empowering Communities:

New Technologies to Engage on Flooding Rains

Dr Raymond Laine



‘technology is the campfire around which we tell our stories’

Laurie Anderson

TO:	Inform	Consult	Involve	Collaborate	Empower
GOAL:	Share balanced and objective information to achieve mutual understanding of the problem, alternatives, trade-offs, opportunities and/ or solutions	Ask questions, listen and gain ideas, feedback, information and knowledge that will be considered and responded to during decision- making	Build networks, relationships and strong two-way communication with outcomes integral to decision-making	Build capacity to partner in decision-making with shared responsibility	Build capacity to pass full decision-making and responsibility to others
TOOLS: (mechanisms)	Fact sheets Brochures Web Sites Presentations Reports	Public comment Public meetings Public exhibitions Focus Groups Surveys	Workshops Deliberative- polling Social networks Online chat	Committees Consensus- building Participatory decision-making	Citizen juries Referenda Citizen panels DSS

Adapted from IAP2 and AEMI



Welcome

Steps.

1.

2.

3.

4.

Hi

Floodengage is a trial University of Wollongong decision support system developed to facilitate your investigation of floodplain management measures for the Wollongong City Catchment. The answers you provide over the next 4 steps (approx. 5 mins) will be considered by Wollongong City Council. This will allow you to contribute to the decision making process of reducing the social and economic damages of flooding in your local area. (Please note this trial has now ended. As a result, the website is no longer collecting submissions and is for demonstration purposes only)

**OR**

Learn about

1. the flood issues
2. the management measures
3. the Floodengage program

About

The Flood Issues



Assigning Weights**Steps.****1.****2.****3.****4.**

On the blue gauge to the right, please select how important it is that the flood management option

- Requires minimal ongoing council expenditure after implementation:

1 2 3 4 5 6 7 **8** 9 10

**Back****Next Step**

**Recommendations****Steps.****1.****2.****3.****4.**

Based on your inputs these are your most preferred options in order. Click on each option to see why

- Local Flood Policies and Development Controls - [Land Use Planning Management Measure](#)
- Flood Awareness - [Emergency Management Measure](#)
- Voluntary Purchase / Removal - [Building Management Measure](#)
- Local Flood and Disaster Plans - [Emergency Management Measure](#)
- Flood Proofing - [Building Management Measure](#)
- Riparian Vegetation Management - [Flood Management Measure-Conveyance of Floodwater](#)
- Voluntary House Raising - [Building Management Measure](#)
- Local Flood Warning and Flood Forecasting Systems - [Emergency Management Measure](#)
- Notifying Prospective Buyers and Developers Of Flood Prone Land (Section 149 Certificate) - [Land Use Planning Management Measure](#)
- Upper Story Flood Free Refuge - [Building Management Measure](#)
- Culvert / Bridge Upgrade - [Flood Management Measure-Conveyance of Floodwater](#)
- Debris Control Structure - [Flood Management Measure-Conveyance of Floodwater](#)

**Ranking****Steps.****1.****2.****3.****4.**

Please drag and drop these options slowly to re-rank from most preferred to least preferred. You can click **Back** to find out more information about each option. Once you are happy with your ranking, press **Next Step**.

1. Concrete Lined Channel - Flood Management Measure-Conveyance of Floodwater
2. Flood Detention Basin - Flood Management Measure-Containment of Floodwater
3. Flood Awareness - Emergency Management Measure
4. Local Flood and Disaster Plans - Emergency Management Measure
5. Flood Proofing - Building Management Measure
6. Riparian Vegetation Management - Flood Management Measure-Conveyance of Floodwater
7. Voluntary House Raising - Building Management Measure
8. Local Flood Warning and Flood Forecasting Systems - Emergency Management Measure
9. Upper Story Flood Free Refuge - Building Management Measure
10. Culvert / Bridge Upgrade - Flood Management Measure-Conveyance of Floodwater
11. Local Flood Policies and Development Controls - Land Use Planning Management Measure
12. Debris Control Structure - Flood Management Measure-Conveyance of Floodwater

Comments**Steps.****1.****2.****3.****4.**

Question 1: Please leave comments about the options or discuss alternative solutions.

Question 2: Have you ever experienced flooding in the Wollongong City catchment?

- ☐ Yes, floodwaters entered my house/business
- ☐ Yes, floodwaters entered my yard
- ☐ Yes, the road was flooded and I could not drive my car through
- ☐ Yes, the creek broke its banks
- ☐ Yes, parts of my neighbourhood were flooded
- ☐ Yes, the shops/business I work at or go to was flooded.
- ☐ No, I have not experienced a flood yet in the Wollongong City catchment (Go to question 6)

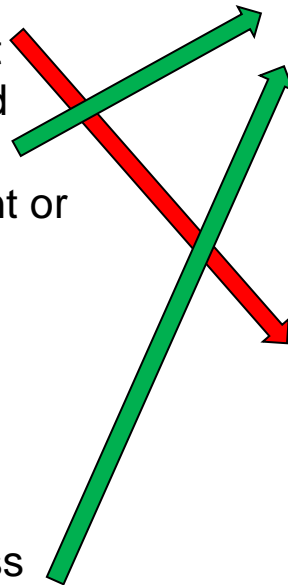
Question 3: If you have experienced flooding in the Wollongong City catchment, how did the flooding affect you, your family, your work or business?

Traditional Paper Surveys

1. Vegetation management
2. Watercourse enhancement
3. Flood related planning and development controls
4. Culvert/ bridge enlargement or improvement
5. Emergency response
6. Detention/ retention basin
7. Improvements to warning systems
8. Flood embankment levees
9. Flood education/ awareness
10. Flood proofing

Floodengage online consultation

1. Local flood policies and development controls
2. Flood awareness
3. Flood proofing of buildings
4. Voluntary house purchase / removal
5. Local flood and disaster plans
6. Local flood warning systems and flood forecasting
7. Voluntary house raising
8. Riparian vegetation management
9. Upper story flood free refuge
10. Notifying prospective buyers and developers of flood prone land (Section 149 Certificate)
11. Debris control structures
12. Culvert/ bridge upgrades
13. Flood detention basin
14. Channel realignment
15. Concrete lined channel
16. Concrete Levee
17. Increased infiltration capacity
18. Rainwater tanks

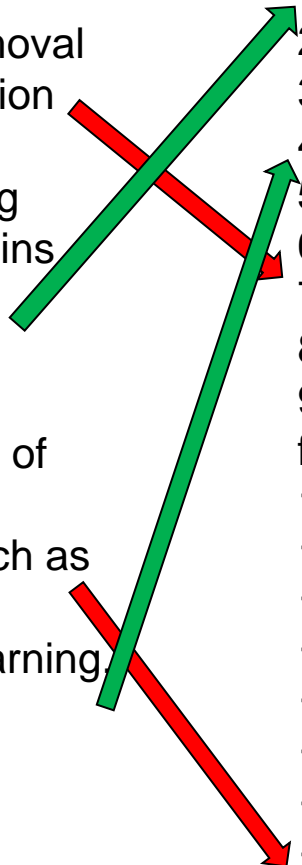


Traditional Paper Surveys

- 1.Environmental channel improvements, including removal of weeds and bank stabilisation
- 2.Improved flow paths
- 3.Culvert/bridge/pipe enlarging
- 4.Retarding or detention basins
- 5.Planning and flood-related development controls
- 6.Education of community, providing greater awareness of potential hazards
- 7.Stormwater Harvesting such as rainwater tanks
- 8.Flood forecasting, flood warning, evacuation planning and emergency response
- 9.Levee banks
- 10.Diversions of creeks and channels

Floodengage online consultation

- 1.Local flood policies and development control
- 2.Voluntary house purchase / removal
- 3.Flood awareness
- 4.Local flood warning systems and flood forecasting
- 5.Flood proofing of buildings
- 6.Local flood and disaster plans
- 7.Riparian vegetation management
- 8.Voluntary house raising
- 9.Notifying prospective buyers and developers of flood prone land (Section 149 Certificate)
- 10.Culvert/ bridge upgrades
- 11.Debris control structures
- 12.Upper story flood free refuge
- 13.Flood detention basin
- 14.Concrete levee
- 15.Channel realignment
- 16.Concrete lined channel
- 17.Increased infiltration capacity
- 18.Rainwater tanks
- 19.Earthen Levee

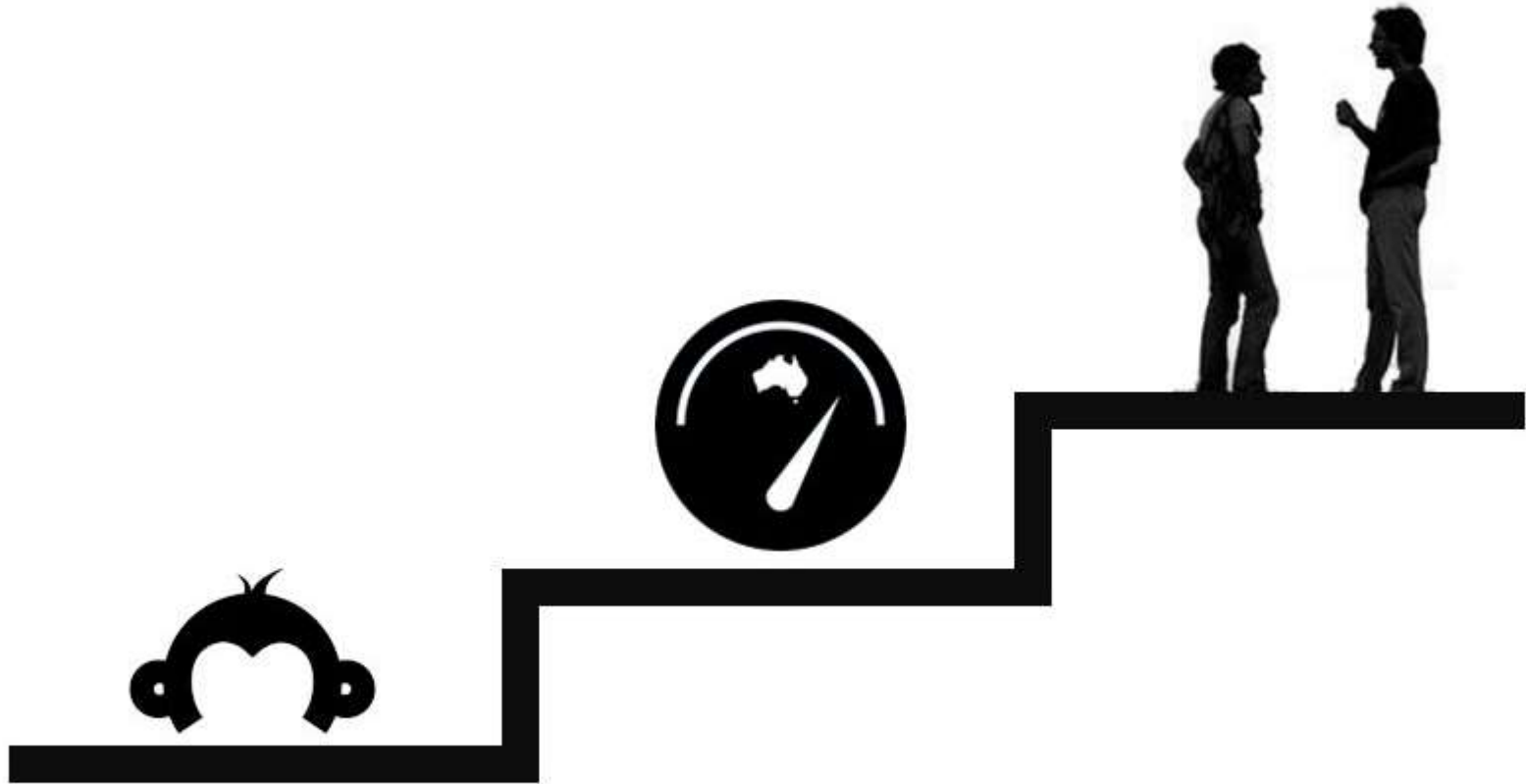


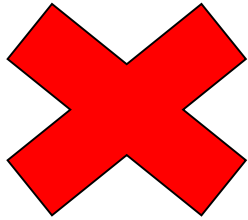
Traditional Paper Surveys

1. Removal of silt, weeds and/or bank stabilisation
2. Blockage prevention devices
3. Increased channel or flow path capacity
4. Culvert/ pipe bridge enlargement
5. Flood forecasting, flood warning, evacuation planning and emergency response
6. Planning and development control measures
7. Detention basins
8. Property modification measures

Floodengage online consultation

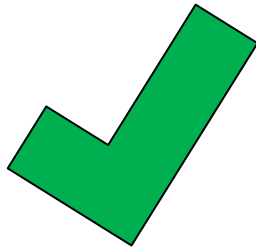
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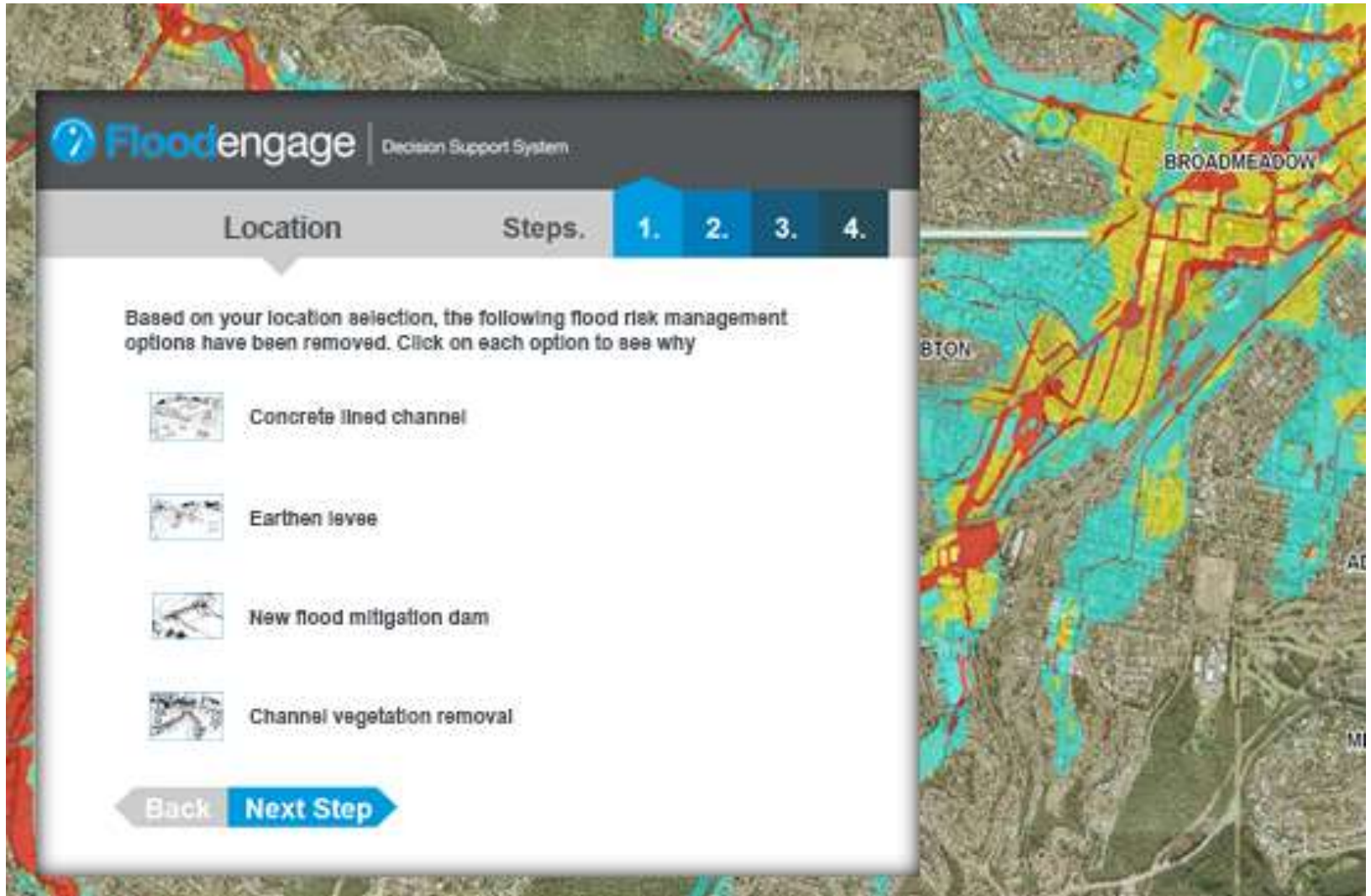
The system can't:

- Make the decision
- Replace flood managers
- Be solely used for consultation



The system can:





- Increase understanding
- Empower users to meaningfully contribute
- Consult widely and reduce conflict
- Enable more informed decisions
- Provide a centralised knowledge hub
- Be adapted to suit organizational and/ or stakeholder requirements



Floodengage | Decision Support System

Location Steps. 1. 2. 3. 4.

Based on your location selection, the following flood risk management options have been removed. Click on each option to see why

-  Concrete lined channel
-  Earthen levee
-  New flood mitigation dam
-  Channel vegetation removal

[Back](#) [Next Step](#)

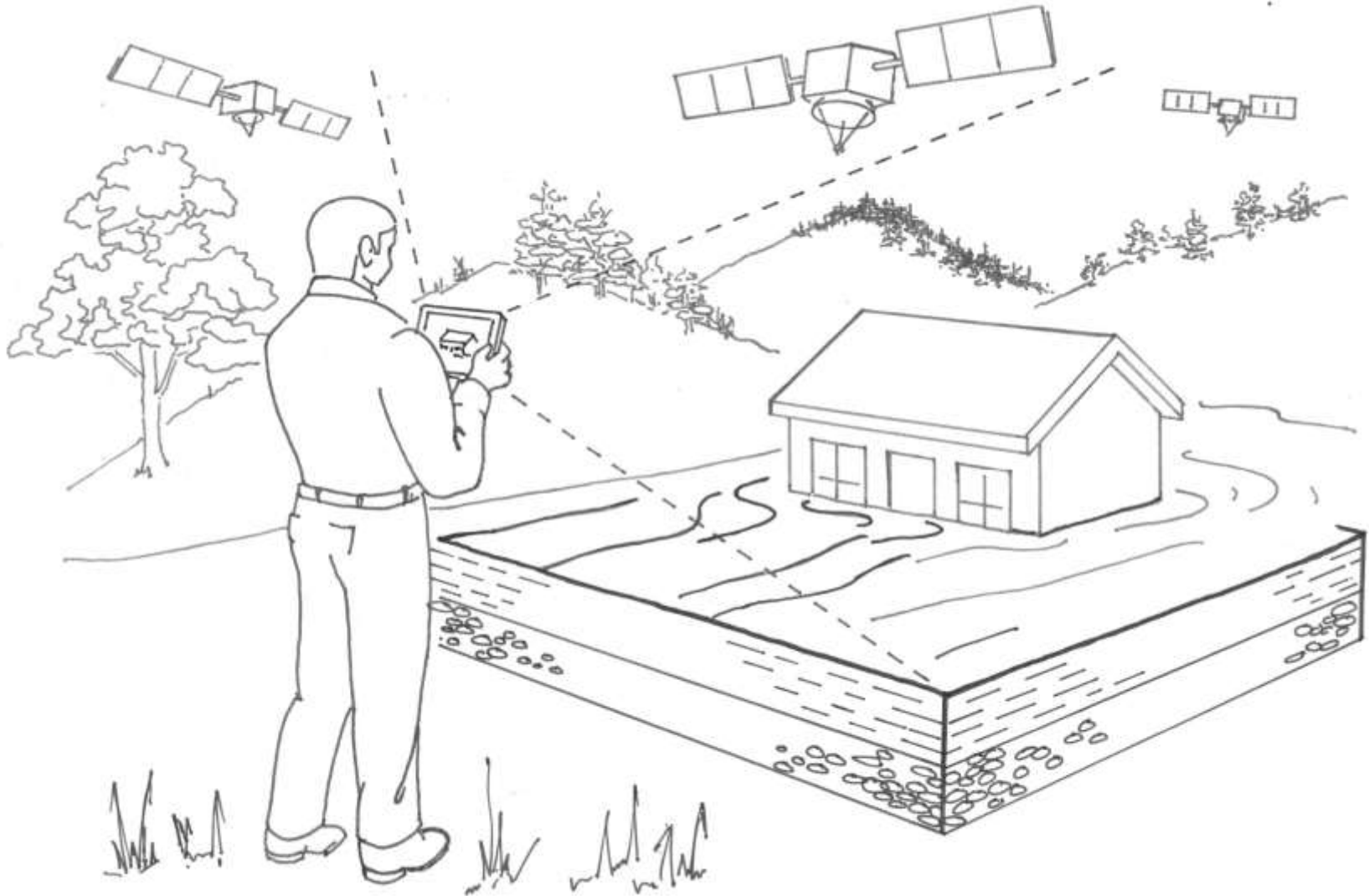
 **Flyingfox**engage

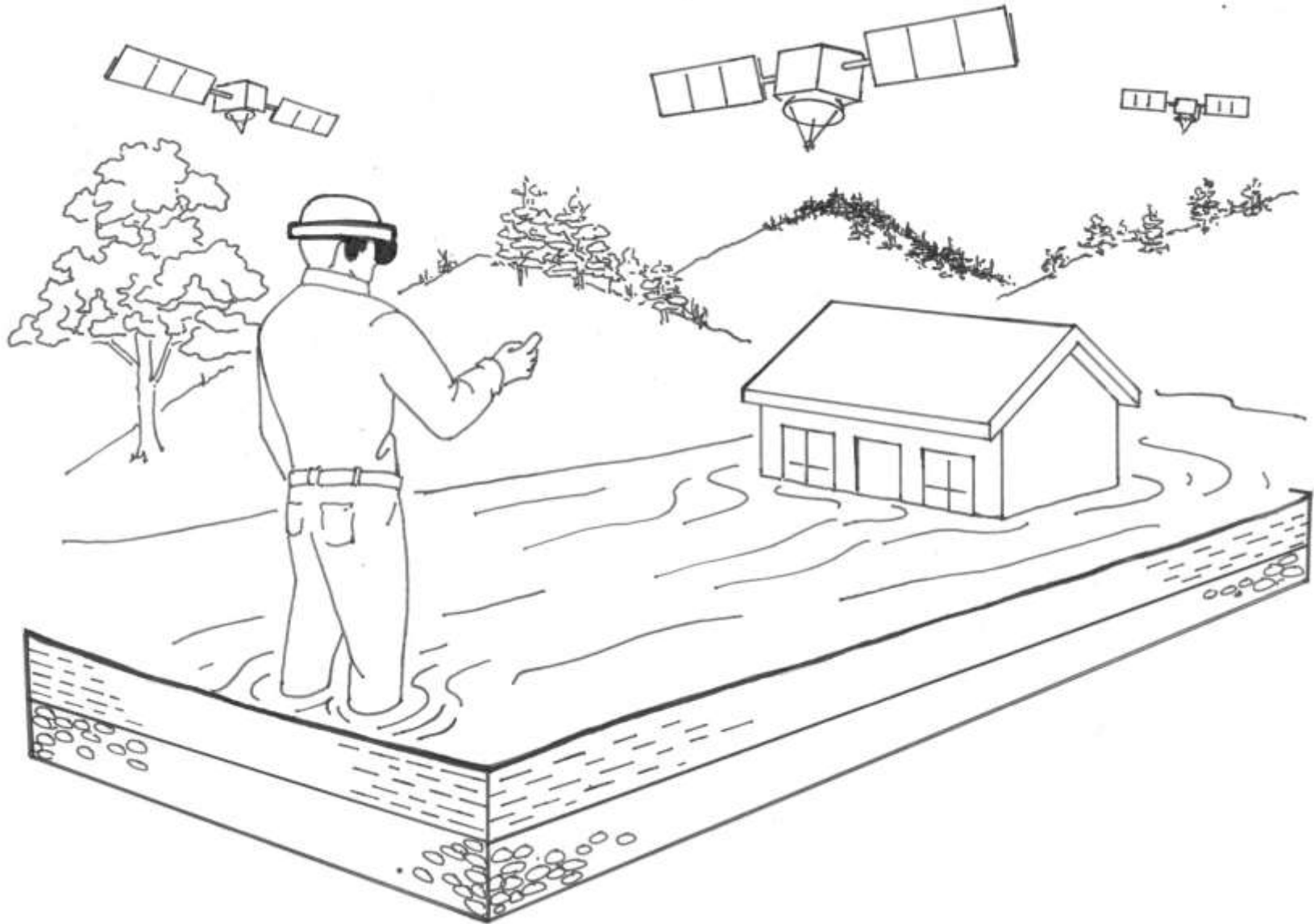
 **Environment**engage

 **Bushfire**engage

 **Coastal**engage

 **Flood**engage







Obtain and process users XYZ location information



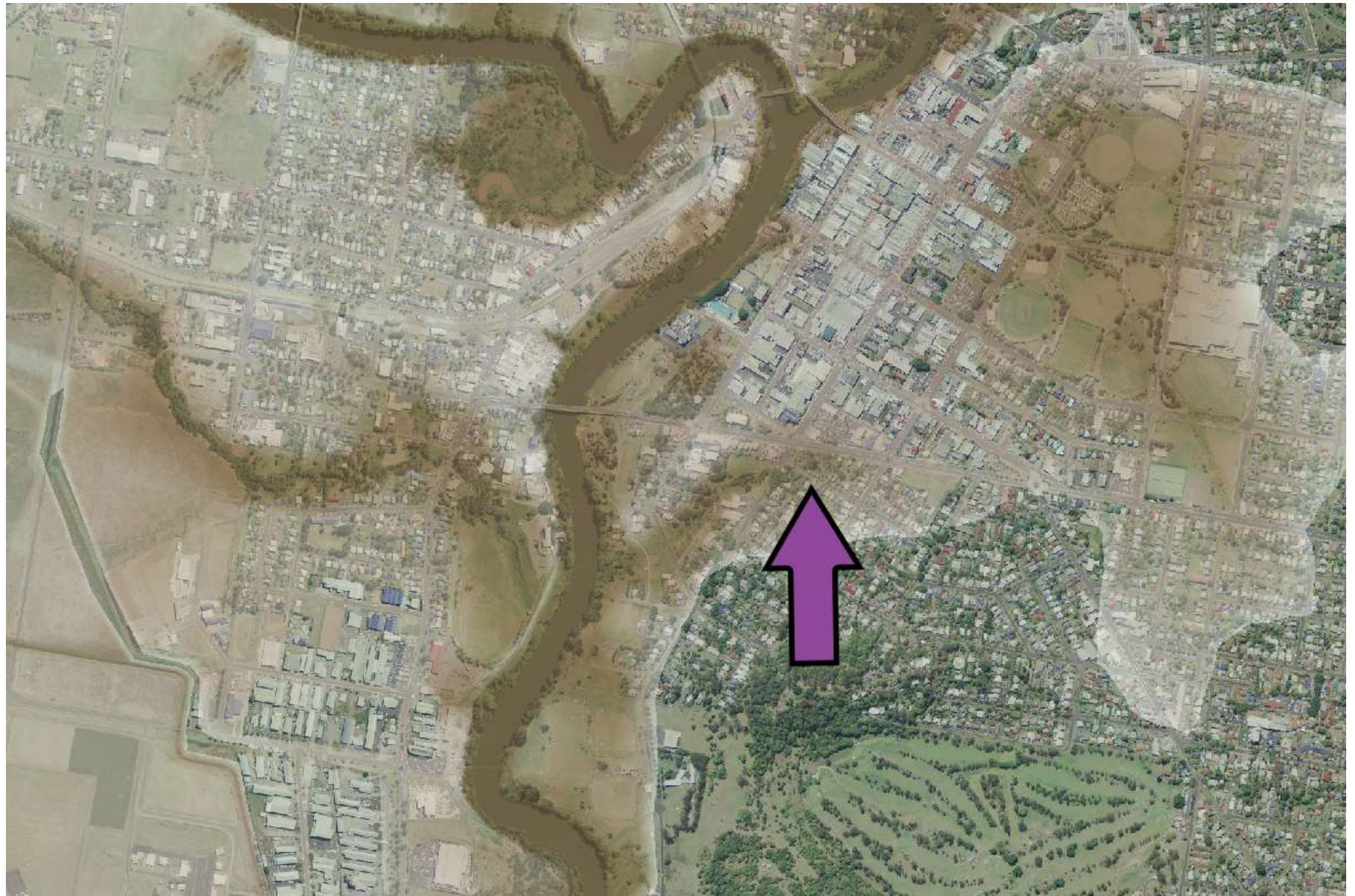
Obtain and process 3D digital water surface information for that location (h.dat, v.dat, .asc etc)



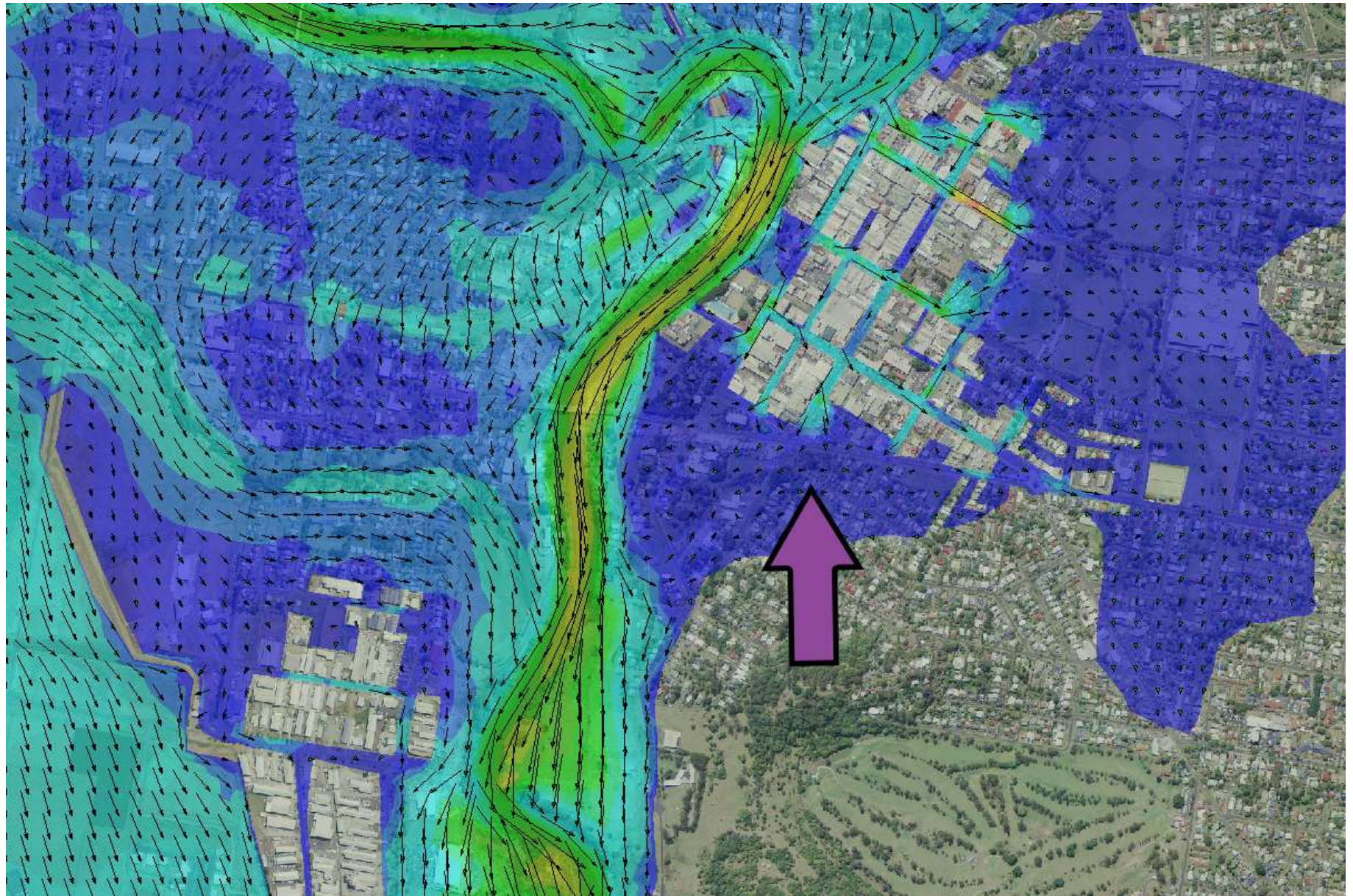
Generate, render and display the processed digital water surface information through mixed reality technology in real time



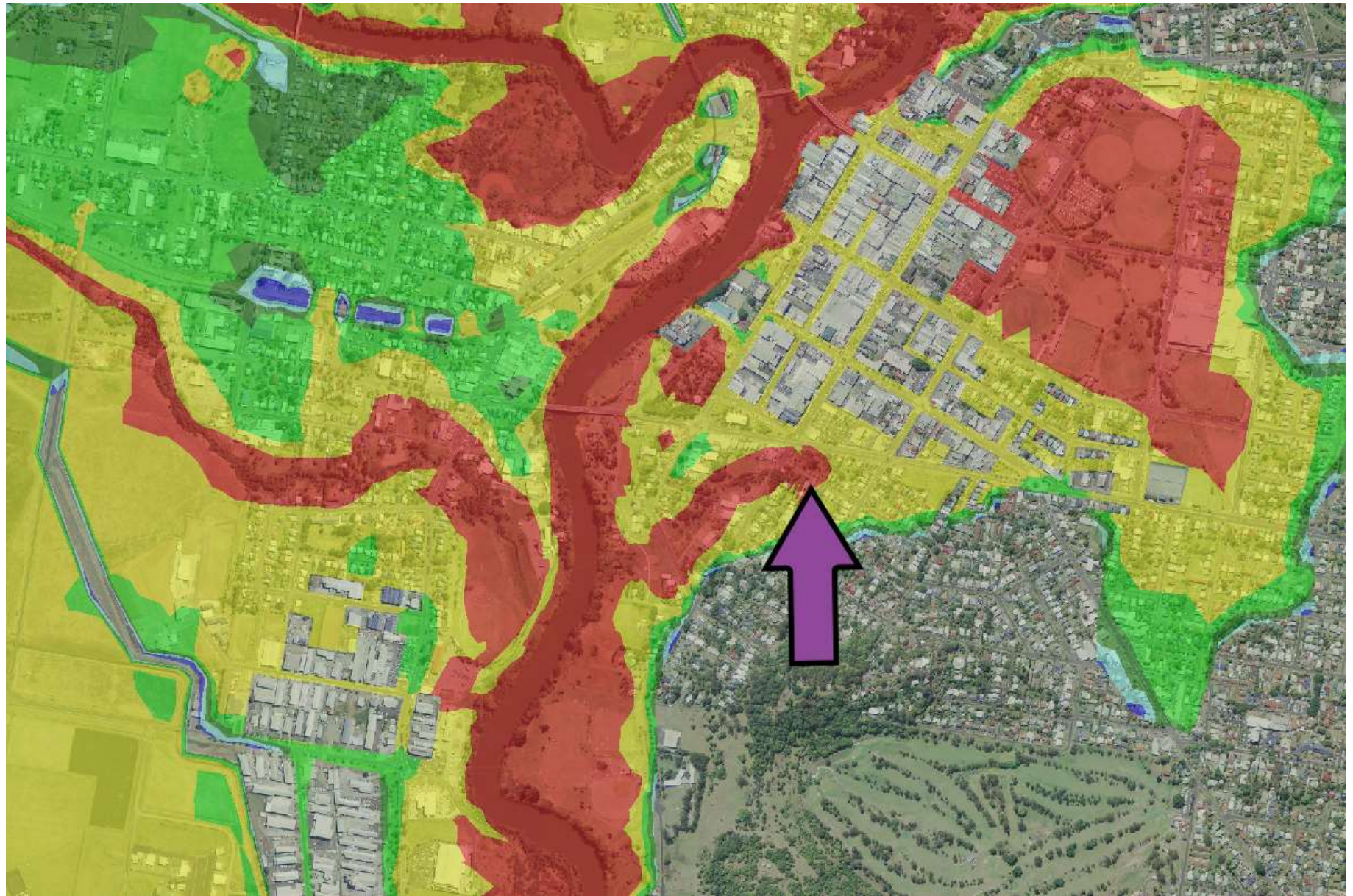


























Thankyou and Questions?

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- 1) criterion questions (cq_i) were $i=1, \dots, m$
- 2) options to be appraised (O_j) were $j=1, \dots, n$
- 3) The scoring of the options (O_j) against the selected criterion questions (cq_i) to generate learned scores (ls_{ij}).
- 4) The user assigning importance weightings (w_i)

$$O = (O_1, O_2, \dots, O_n)$$
$$\text{where } O_j = \sum_{i=1}^m w_i ls_{ij}$$
$$O_j > O_{j+1}$$

- 5) User re-ranks options (hopefully informed)
- 6) User submits preferences for aggregation, dissemination
- 7) Recommendations made