Modelling Group
WATER NEW ZEALAND

Modelling Symposium

Put your money where the benefit is

Presented by
Tamara Stratton and Kelsey van der Schyff

water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Overview

- Endeavour Project Overview and Research Aim 2 (RA2)
- Cost Benefit Analysis (CBA) and Multi Criteria Analysis (MCA)
- Whakātane Case Study and RA2 Workflow Development

Floo

Northland July 2020
Shane Whitmore

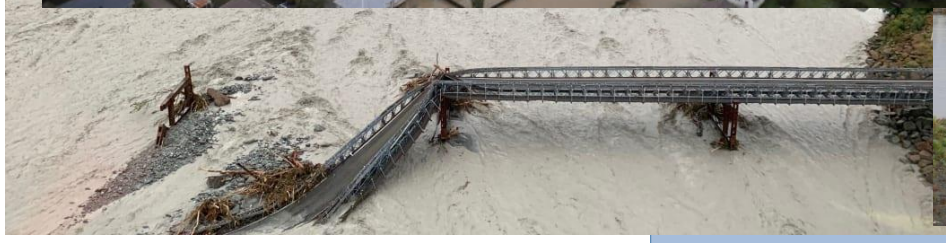
Auckland January 2
RNZ

be April 2017
/ Andrew Warner

Hawkes Bay February 2023
NZHerald

March 2022
RNZ / Angus Dreaver

Westport February 2022
NZHerald / George Heard



Canterbury May 2021
RNZ / Katie Todd

Endeavour Project

Reducing flood inundation and risk across Aotearoa-New Zealand

Research Aim 1: National Flood Mapping

Research Aim 2: Flood Risk to the Built Environment

Research Aim 3: Societal Vulnerability to Cascading Events

Research Aim 4: Reducing Flood Risk and Adapting to Change

NIWA Taihoro Nukurangi

The University of Auckland Te Whare Wānanga o Tāmaki Makaurau New Zealand

The University of Waikato Te Whare Wānanga o Waikato

Weather Radar New Zealand

Toitū Te Whenua Land Information New Zealand

Deliberate Discuss.Understand.Act.

Maiora Wekepiri Consultancy

wsp

neo NEO LEAF GLOBAL

Manaaki Whenua Landcare Research

UC University of Canterbury Te Whare Wānanga o Waitaha Christchurch New Zealand

University of Saskatchewan

University of Bristol

UC Universidad de Cantabria

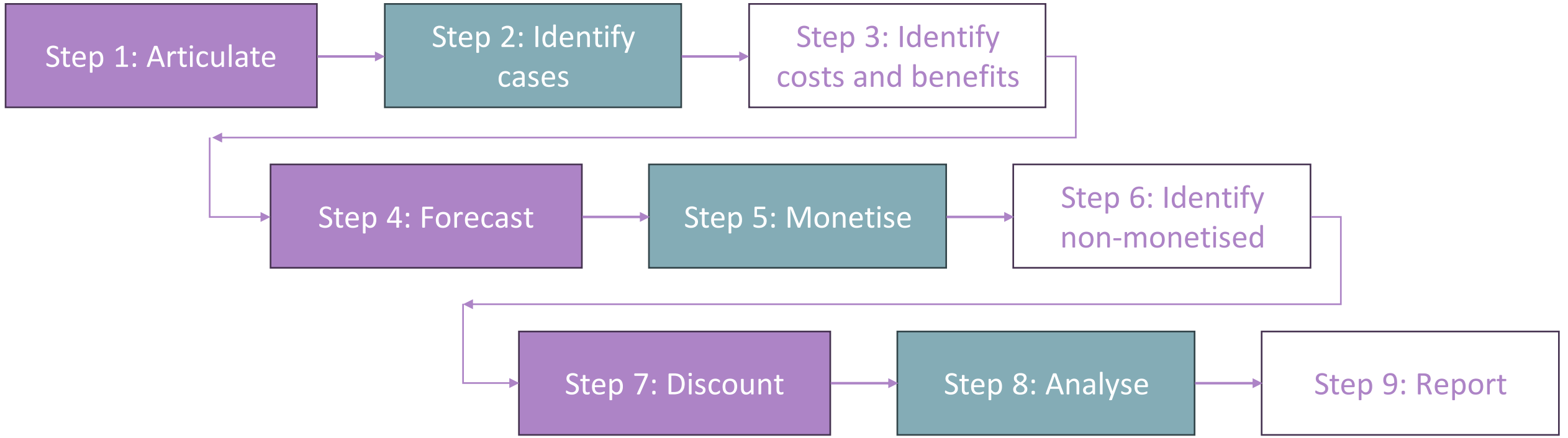
Endeavour Project RA2

Research Aim 2: Flood Risk to the Built Environment

Explore, develop and test a dynamic risk model to evaluate both evolving flood exposure and risk in Aotearoa-New Zealand, and opportunities to avoid or mitigate them.

Maiora Wekepiri Consultancy

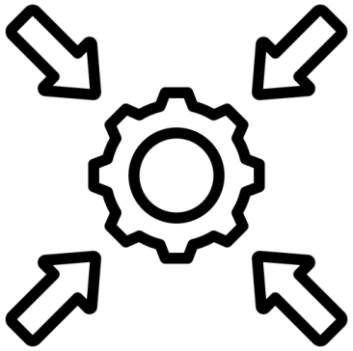
Cost-Benefit Analysis (CBA)



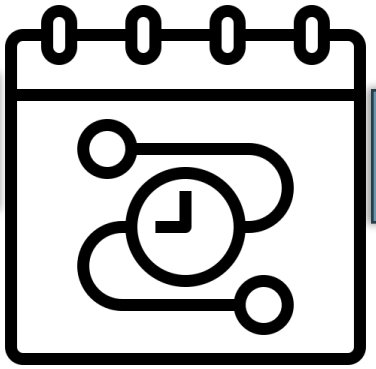
Important Steps in CBA

- Comprehensive problem understanding
- Defined scope
- Appropriate input complexity
- Qualitative and quantitative aspects
- Discount rate
- Sensitivity testing

CBA Key Considerations



Listing of Impacts



Long-life Span

Loss of Life

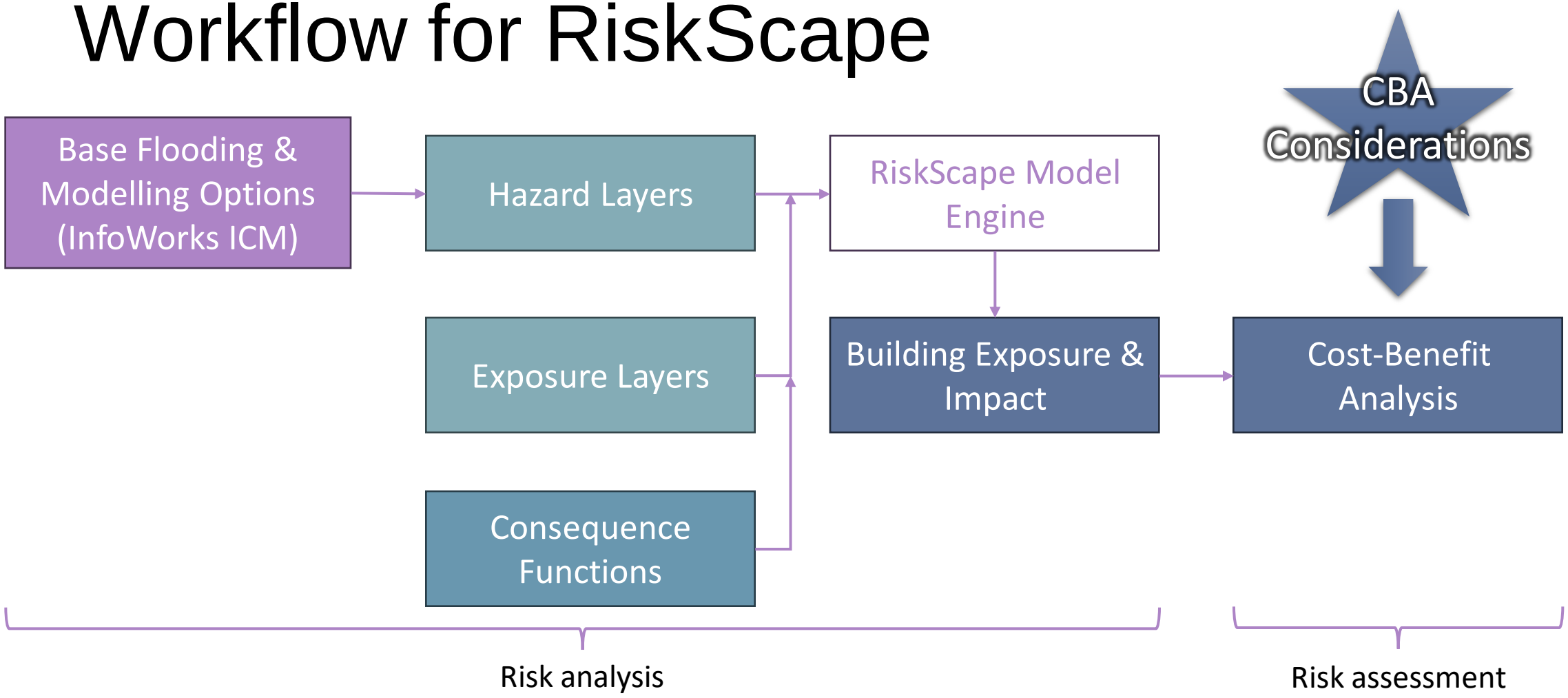
Benefit Cost Ratio

Double Counting

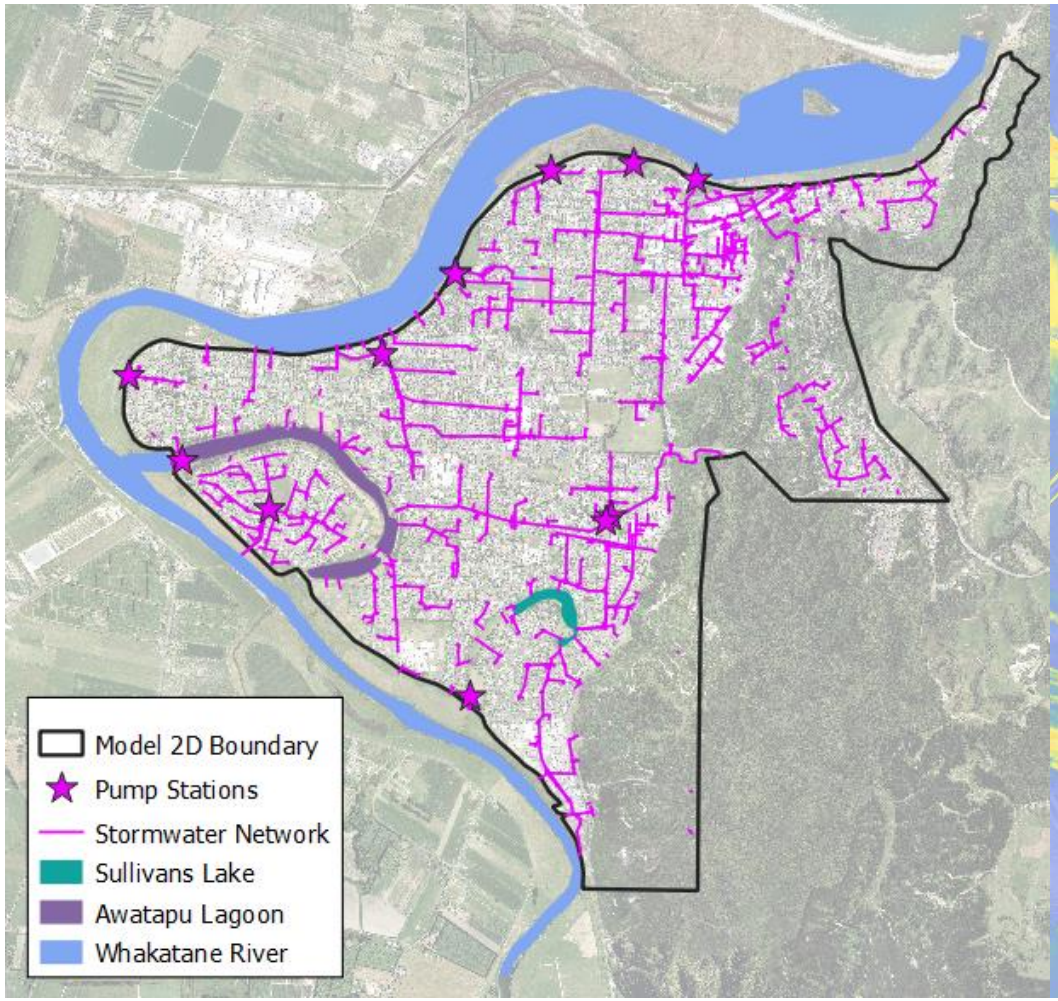
Social Aspects

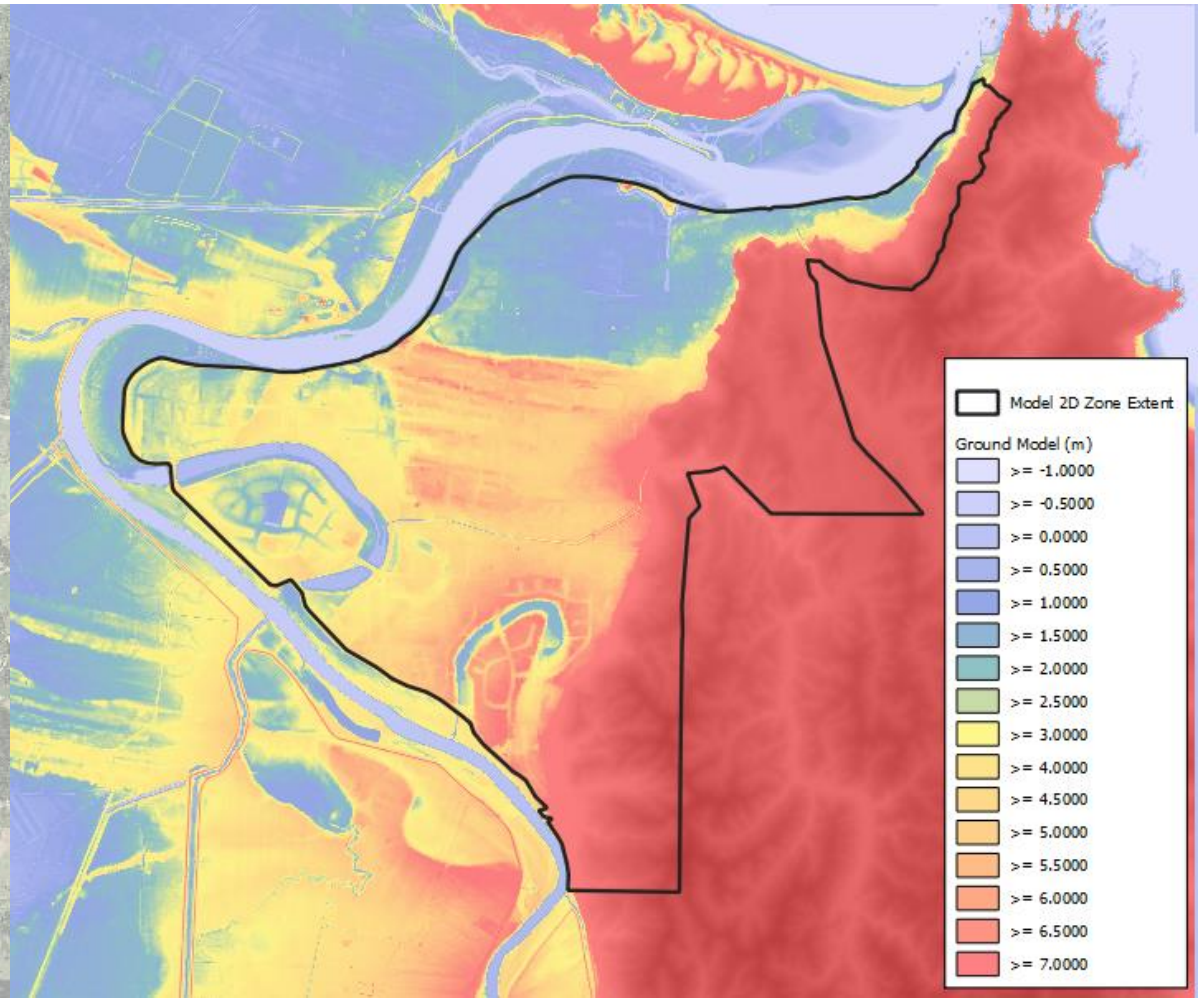
Multi-Criteria Analysis (MCA)

Whakatāne Case Study – Developing a Workflow for RiskScape

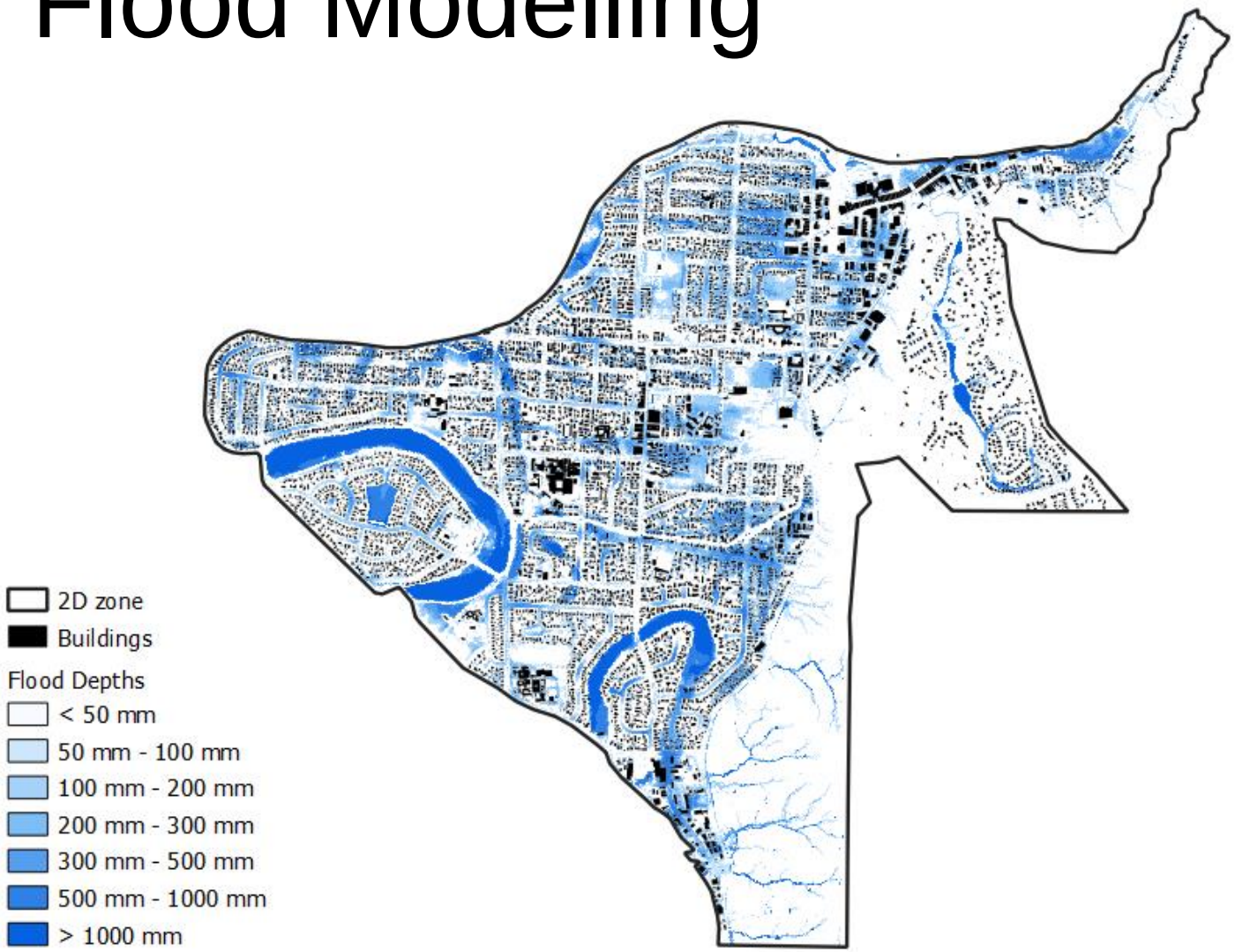


Whakatāne Stormwater Model

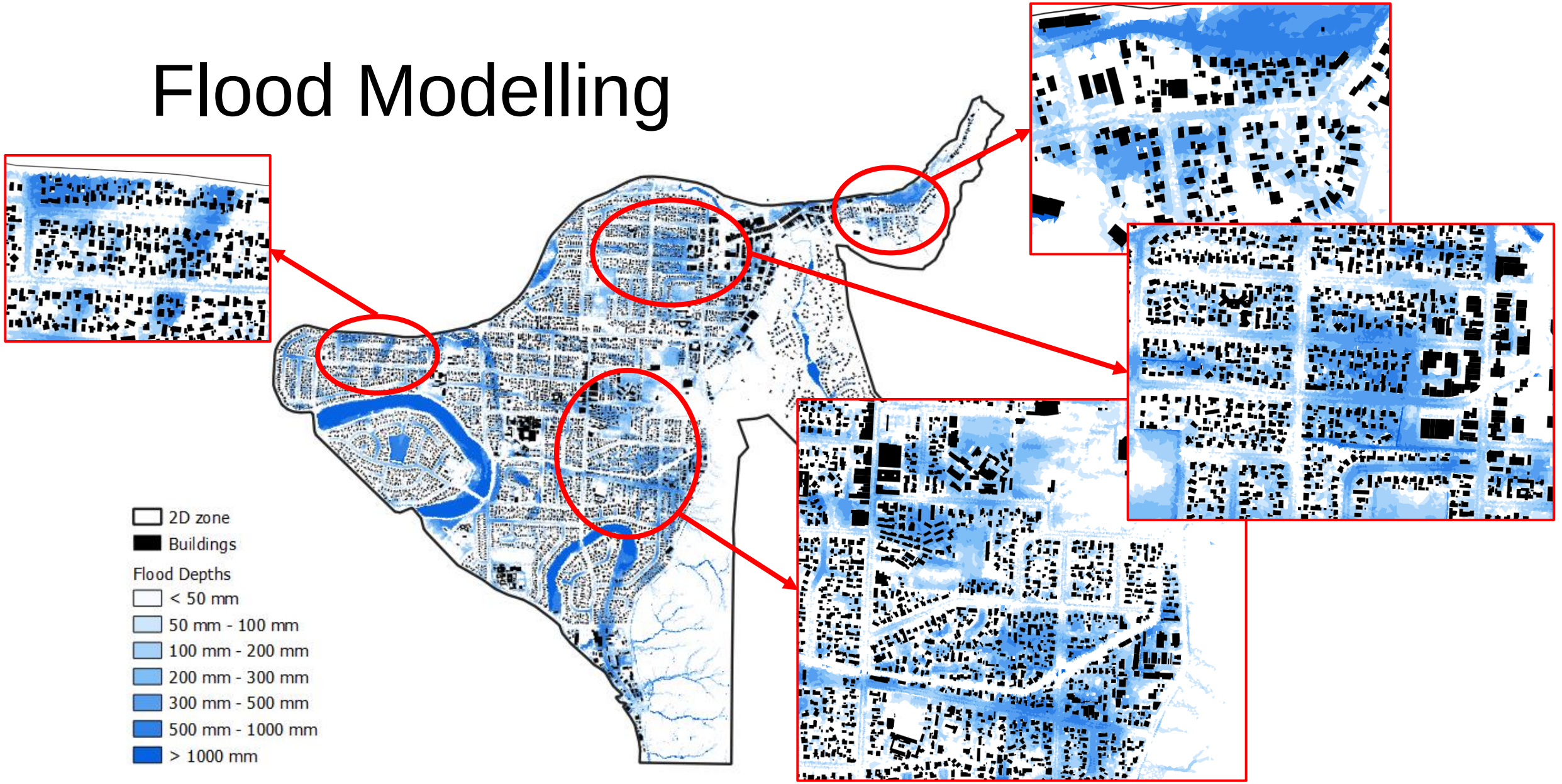




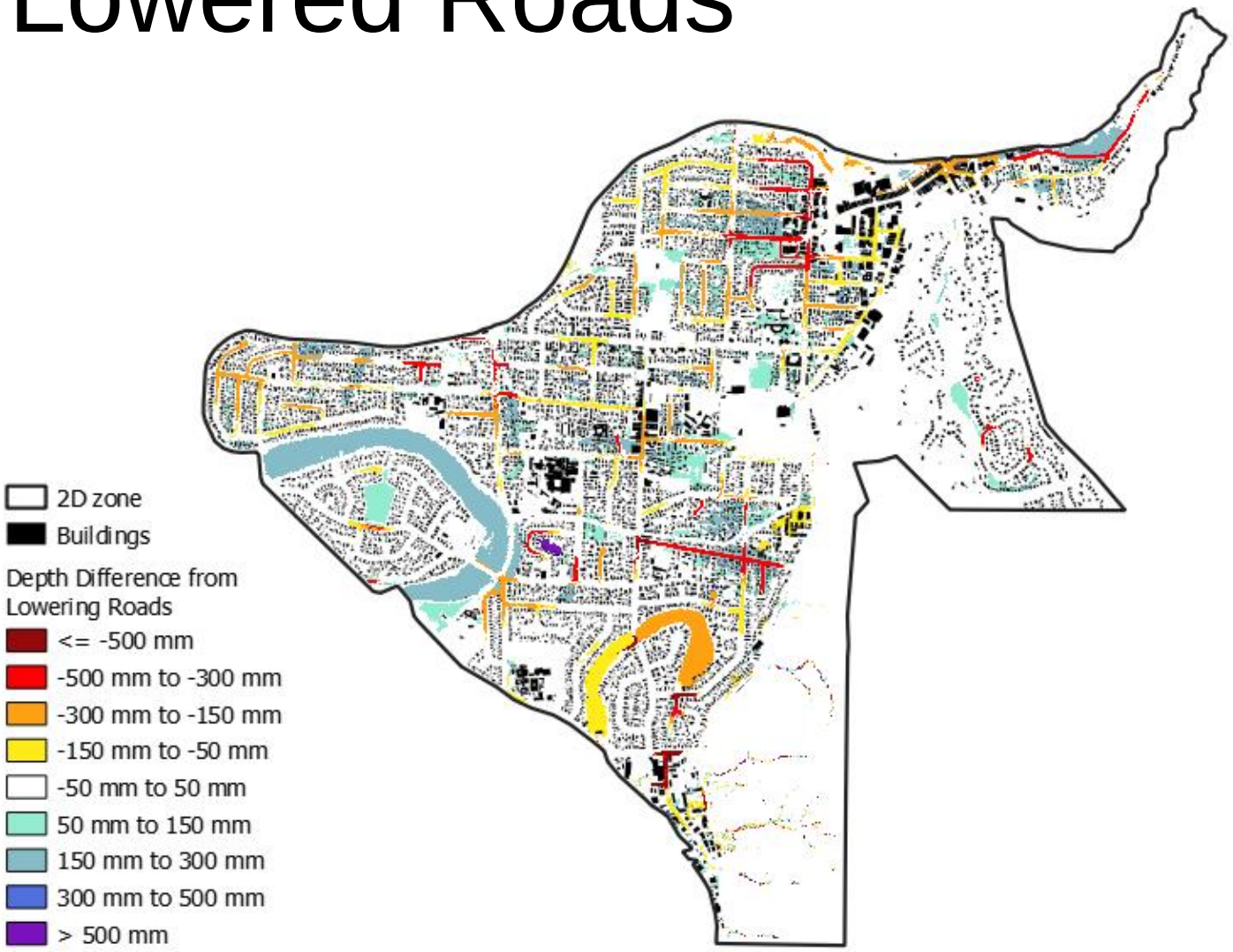
Flood Modelling



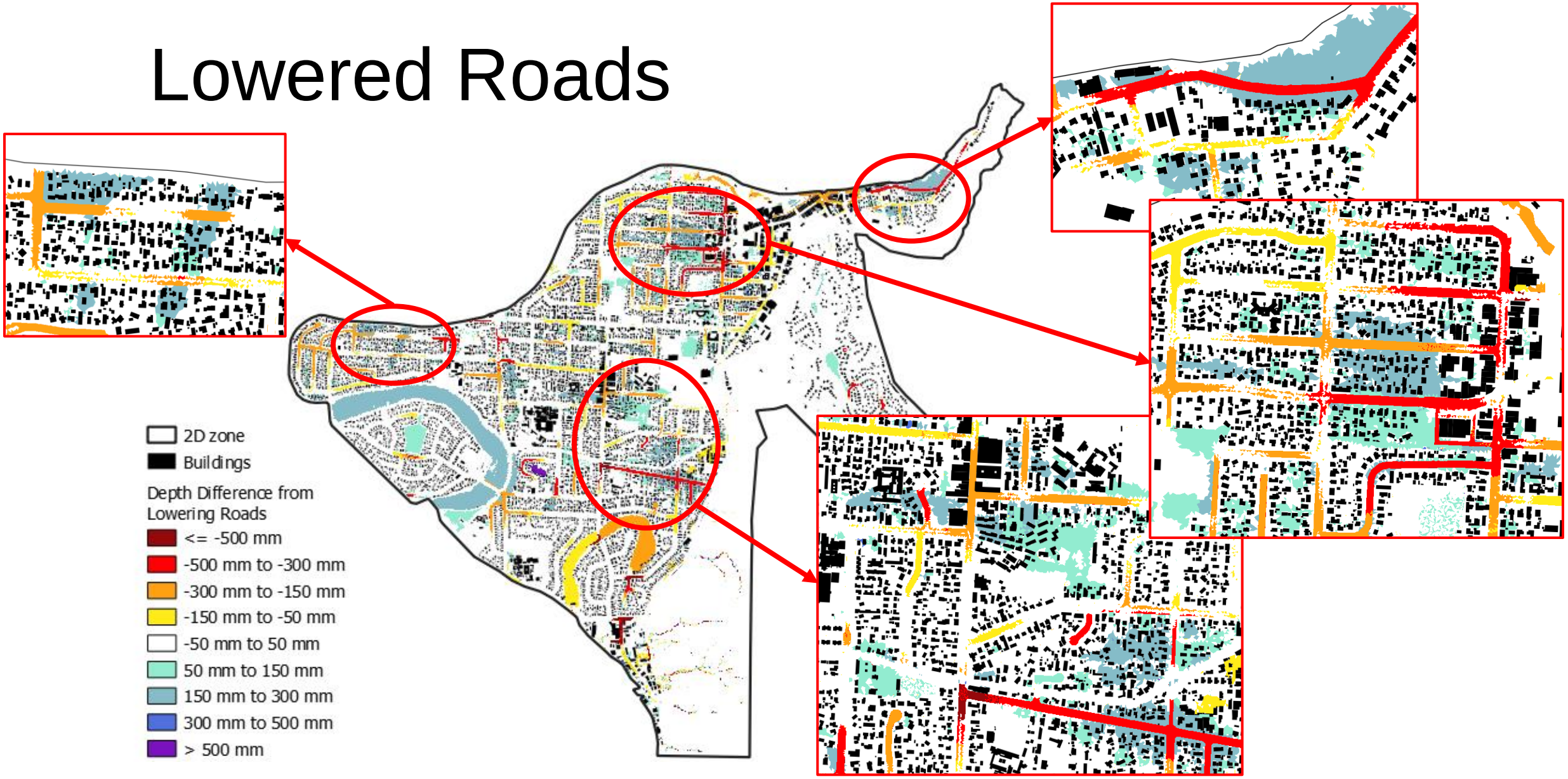
Flood Modelling



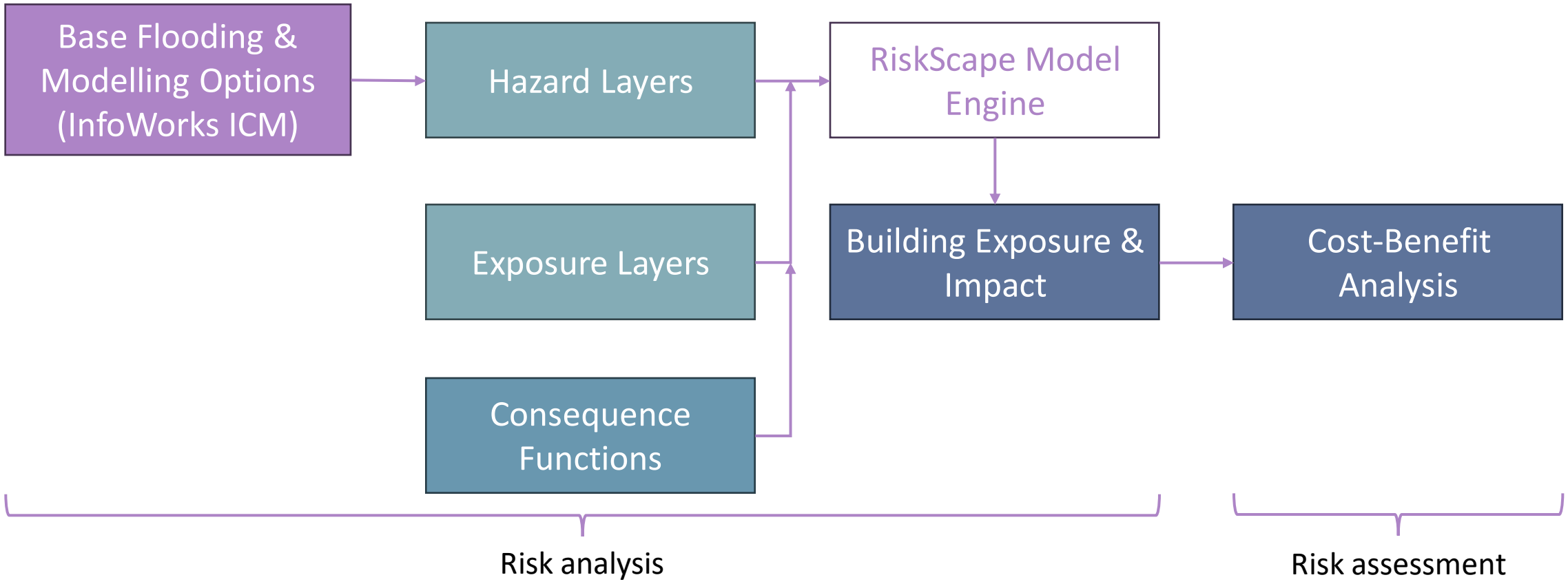
Lowered Roads



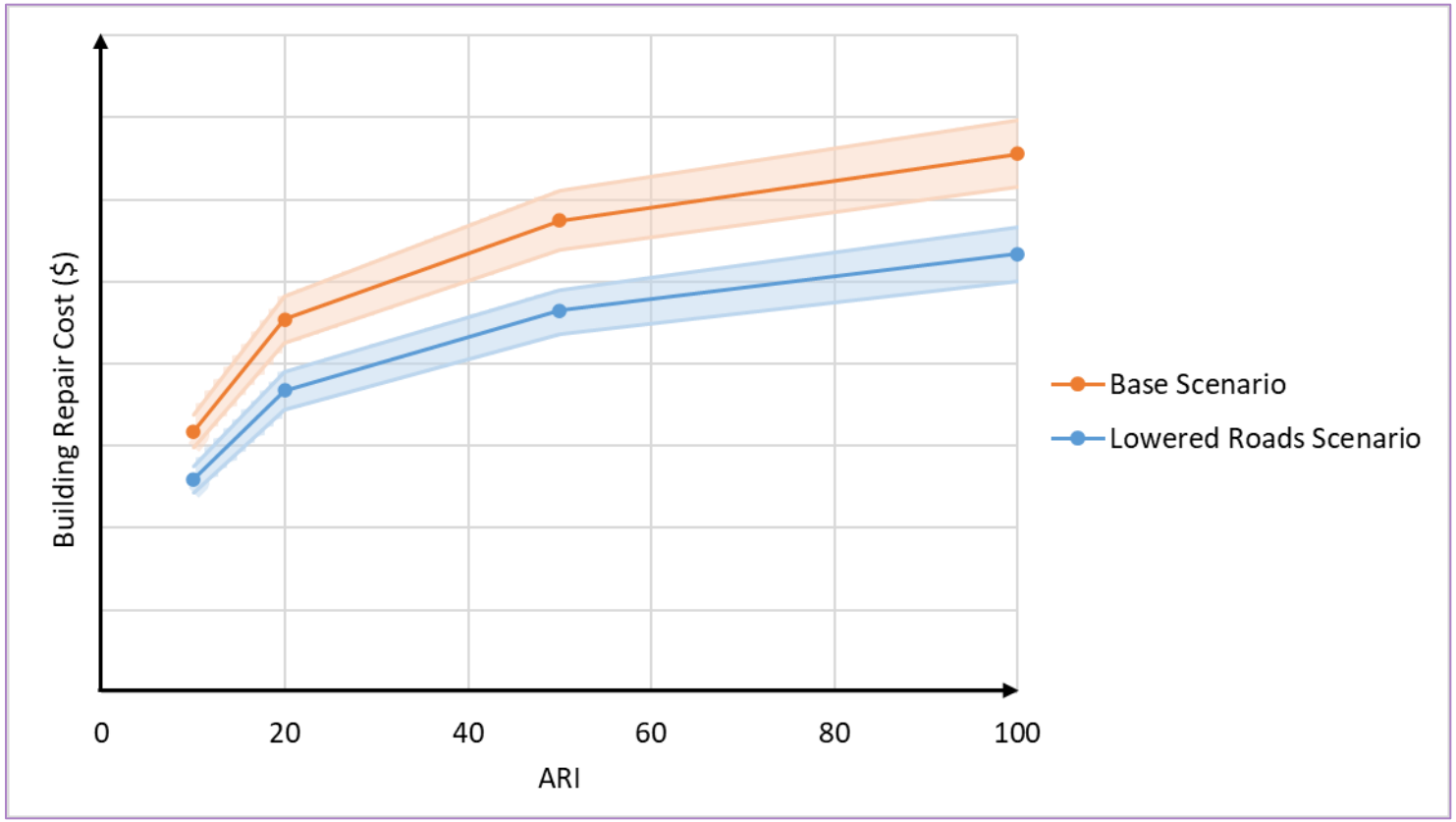
Lowered Roads



RiskScape Workflow



What does this tell us?



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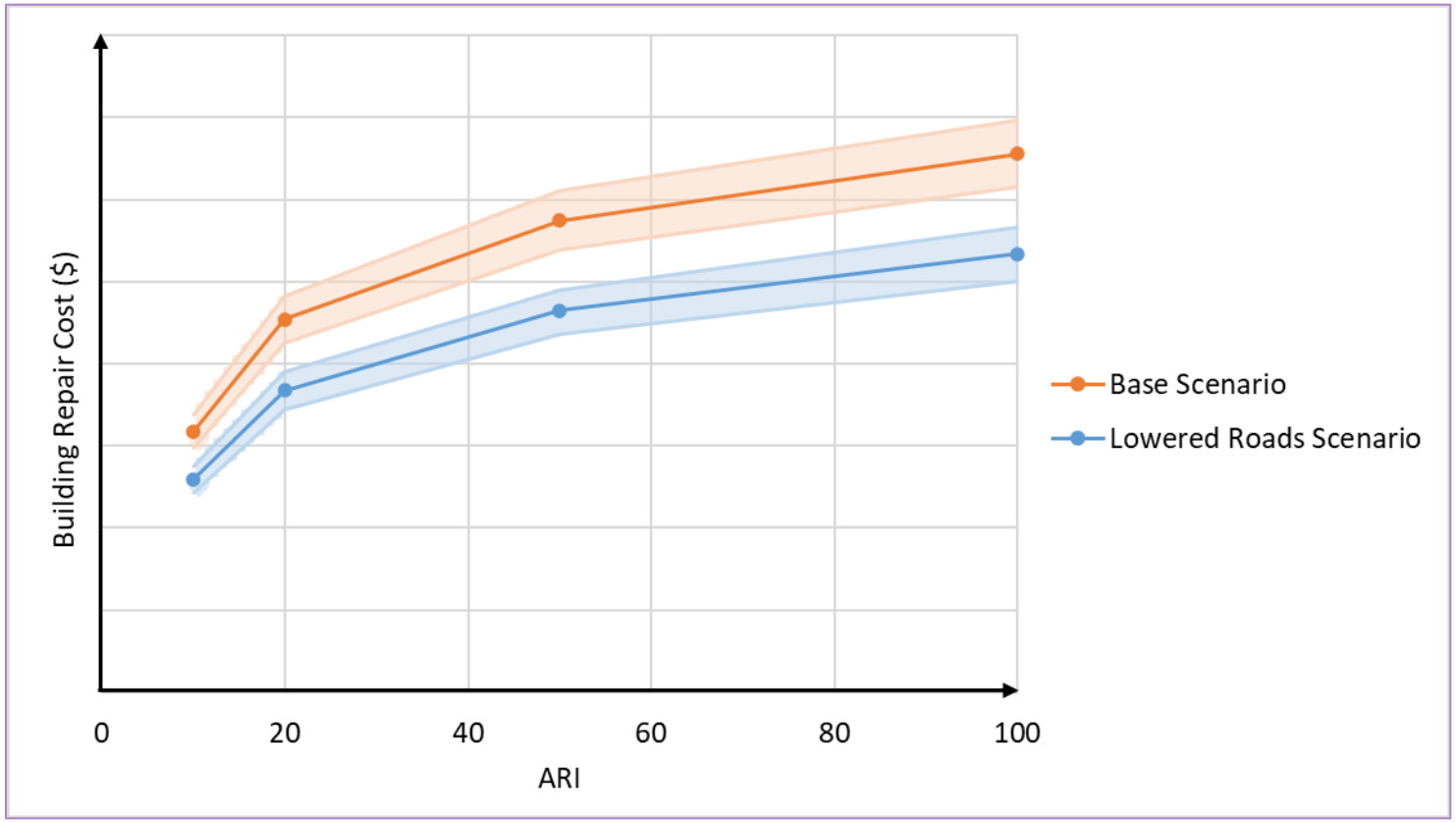
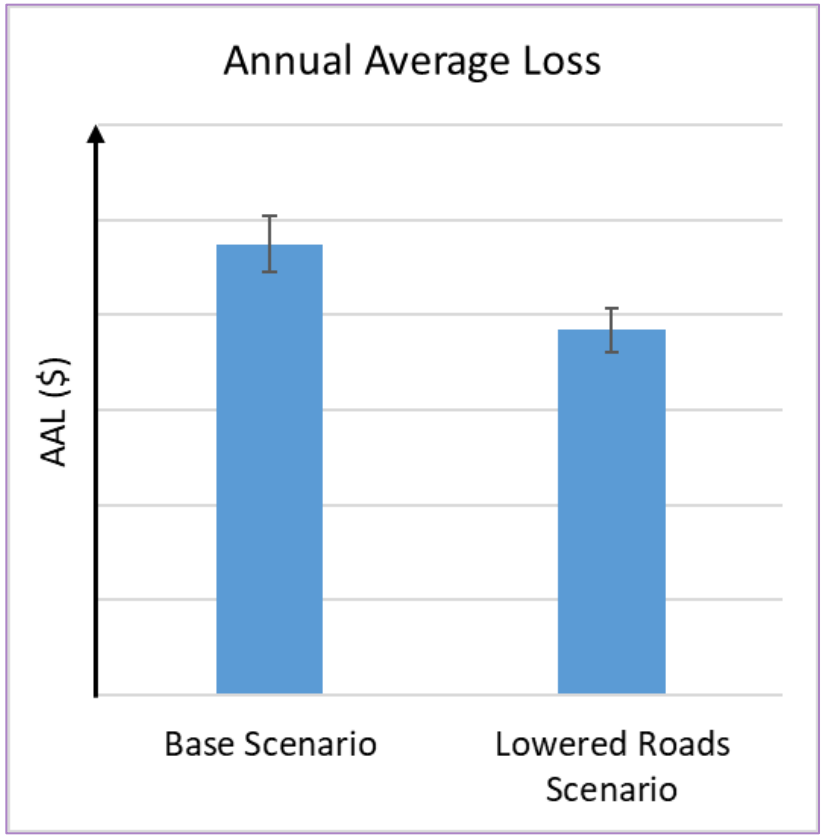
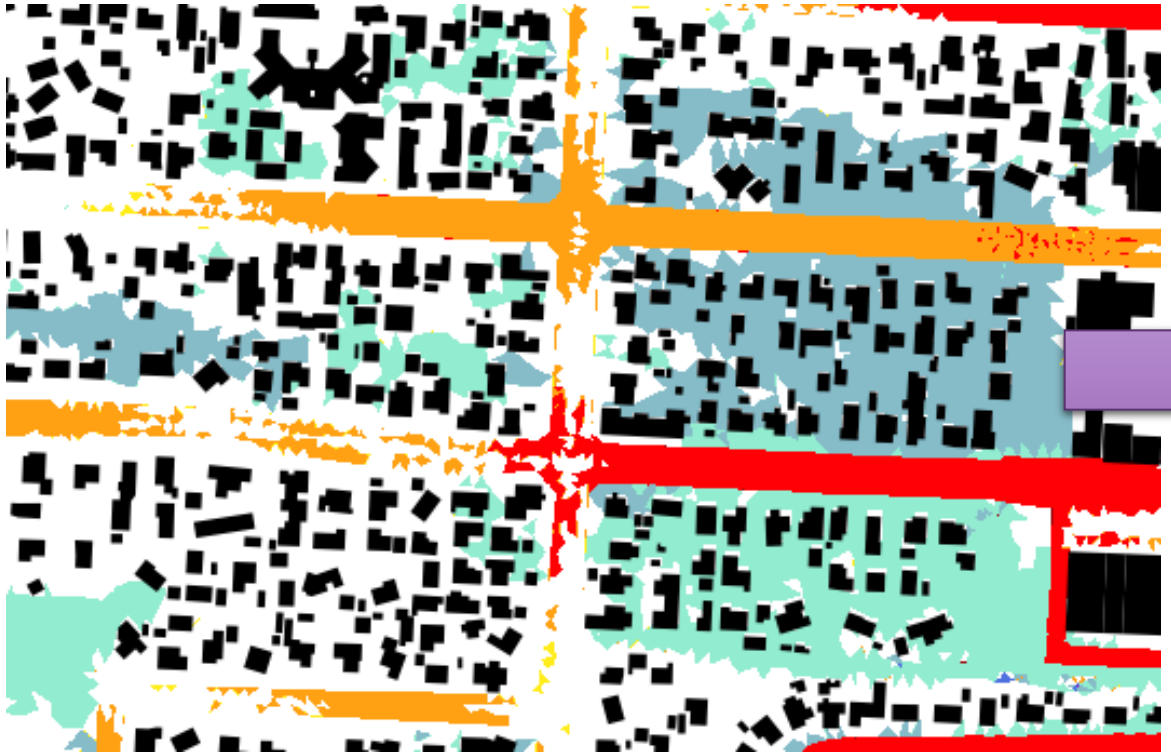




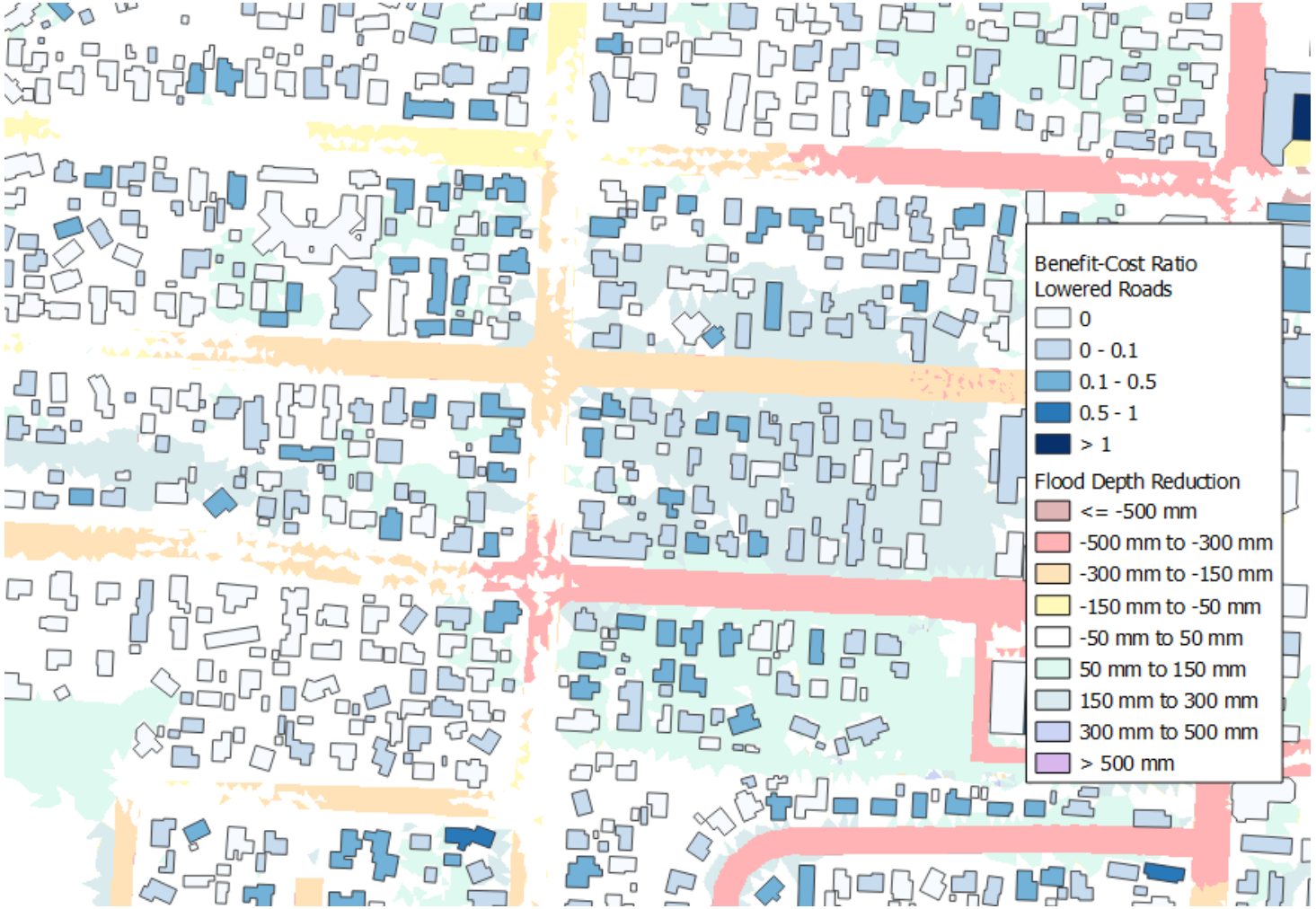
Benefit per Building



Depth Difference from Lowering Roads
- <= -500 mm
- -500 mm to -300 mm
- -300 mm to -150 mm
- -150 mm to -50 mm
- -50 mm to 50 mm
- 50 mm to 150 mm
- 150 mm to 300 mm
- 300 mm to 500 mm
- > 500 mm

Reduction in AAL
- $0
- $0 - $100 per year
- $100 - $500 per year
- $500 - $1,000 per year
- $1,000 - $10,000 per year
- > $10,000 per year

Benefit-Cost Ratio per Building



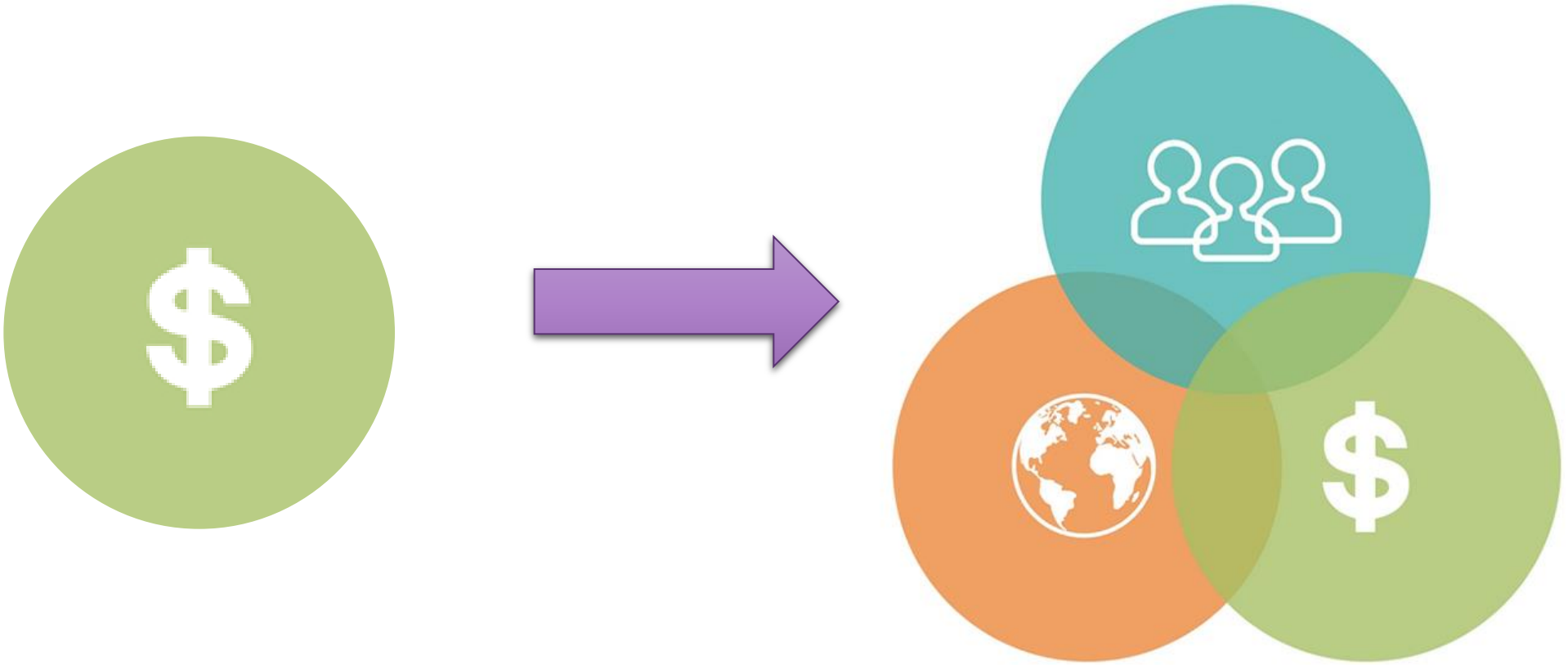
Further Work

- Refine costing and damage ratios
- Include future building development and climate change
- Model more broad, generalised options and use RiskScape to quickly compare them
- Model more targeted options to address flooding in specific problem areas
- Create a “patchwork” solution using a combination of options to produce the best cost-benefit ratios for the whole town

RiskScape Benefits – Streamline your CBA and MCA!

- Streamlined process
- Repeatable and scalable
- Inter-operability between different components
- Semi-automated approach for CBA

Whakatāne Case Study: CBA and MCA



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Thank you!
Questions? Patai?

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