Flood Storages and Peak Flows in Moonee Ponds Creek: is more storage always better?

Paul Clemson and Vanessa Wong

Engeny Water Management

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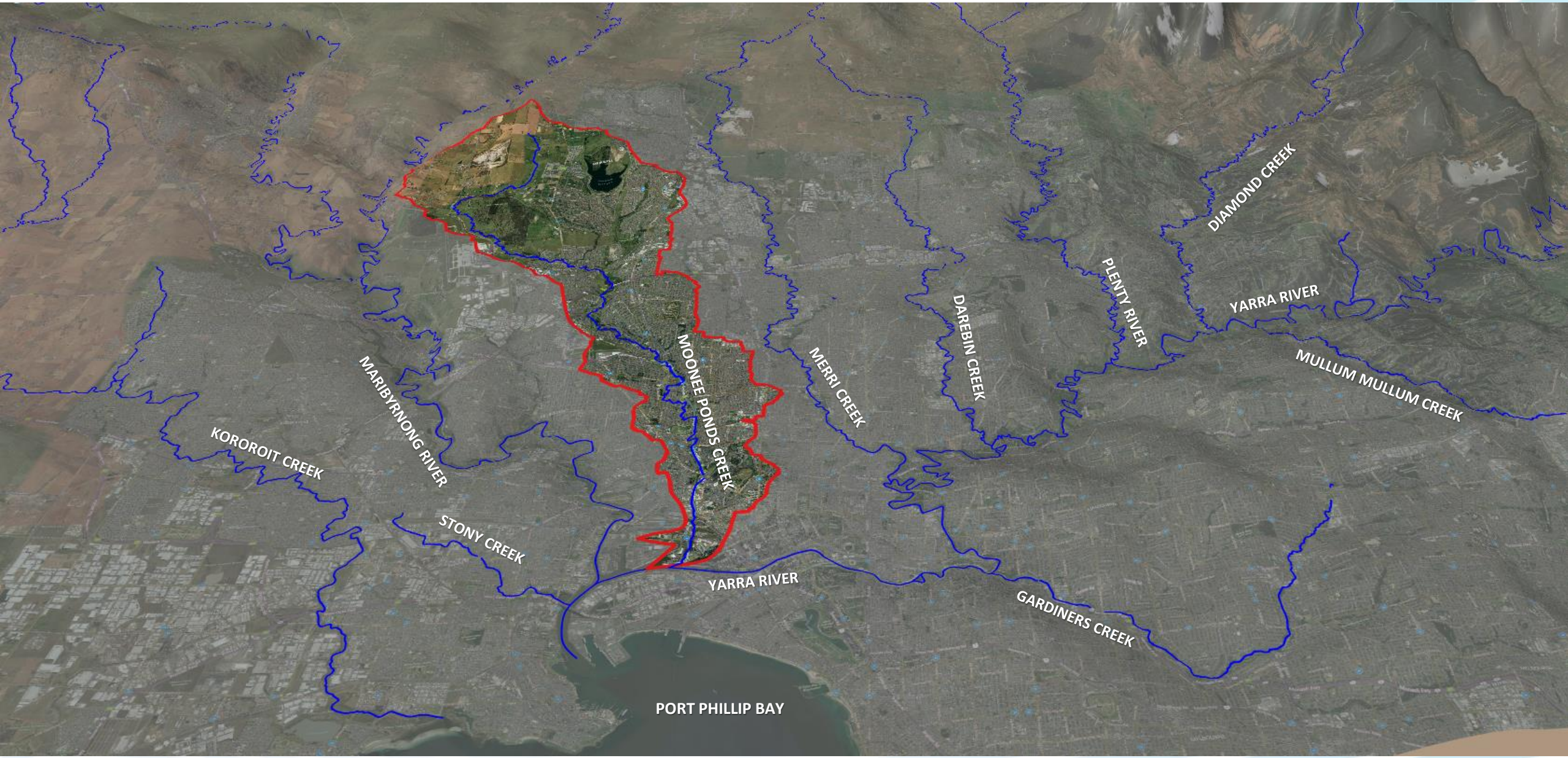
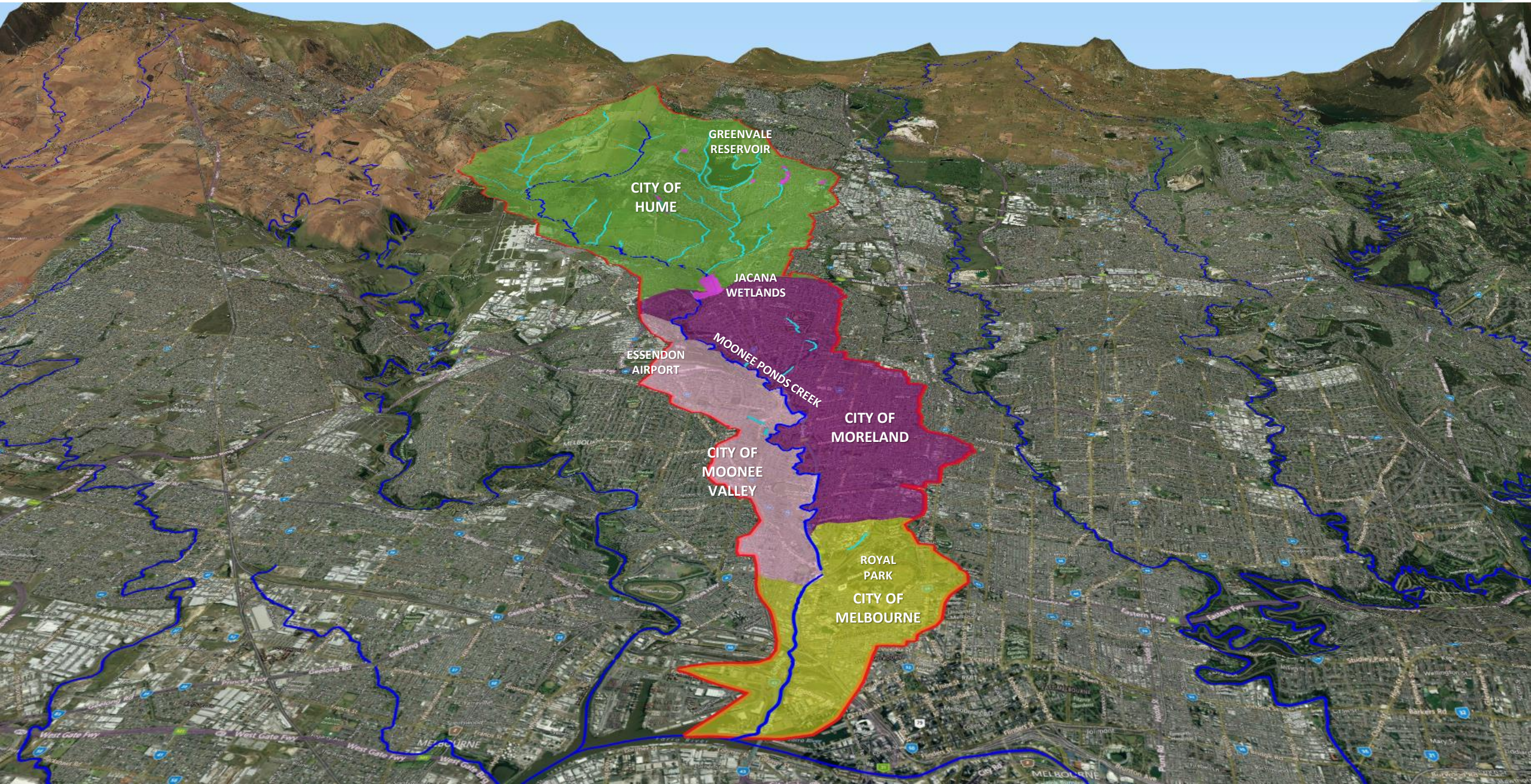
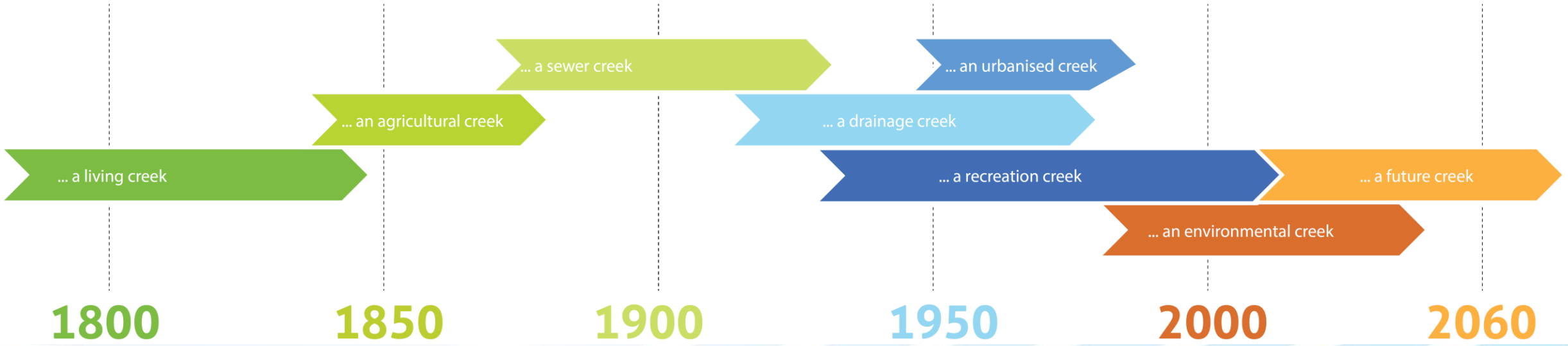
The Moonee Ponds Creek Catchment



Catchment Overview



A Timeline of Moonee Ponds Creek



Source: Chain of Ponds – Moonee Ponds Creek Plan
(Moonee Valley City Council and Moreland City Council, 2018)

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What does Moonee Ponds Creek Look Like Now?

Current Flood Management Issues

- Highly impervious catchment
- Hydraulically efficient drainage system
- Lack of flood storage
- Sensitivity of downstream areas to flooding

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Project Overview and Objectives

- Identify the potential for large scale flood storages in the catchment
- Investigate whether providing flood storage in the catchment can reduce flows downstream
- Determine what should be considered in the planning of flood storages

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Methodology

- Stage 1: Identification of Potential Flood Storage Sites
- Stage 2: Hydrologic Modelling (RORB)

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Methodology: Stage 1a

- Preliminary identification of sites
  - Review of drainage strategies
  - Council GIS: parks, open space and council-owned land
  - Aerial imagery

- Total of up to 76 sites covering 407 hectares

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Methodology: Stage 1b and 1c

- Stakeholder engagement
  - Known constraints
  - Known opportunities
  - Advice
- Shortlisted sites
  - Council feedback
  - Distribution of sites
- 14 sites shortlisted

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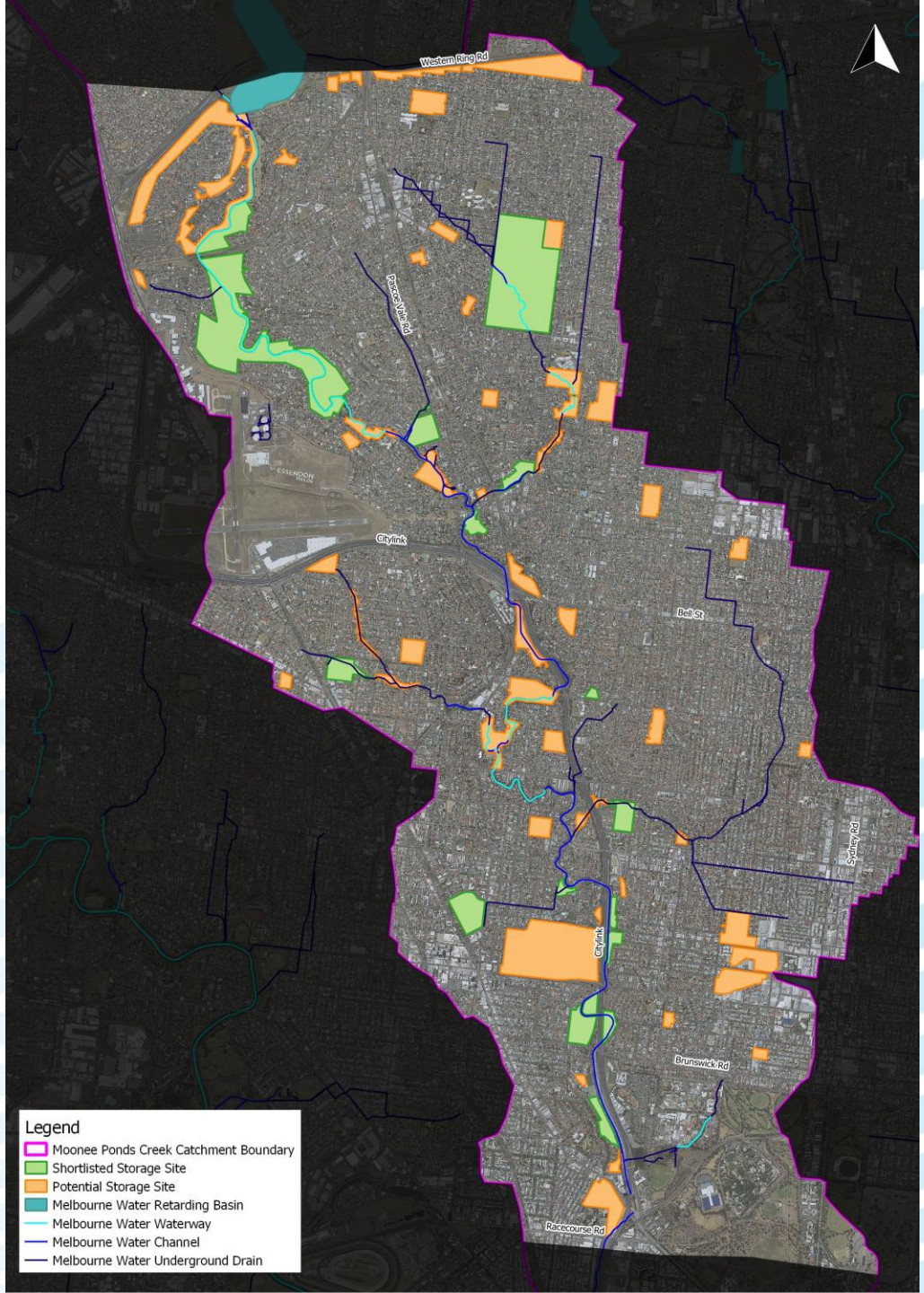
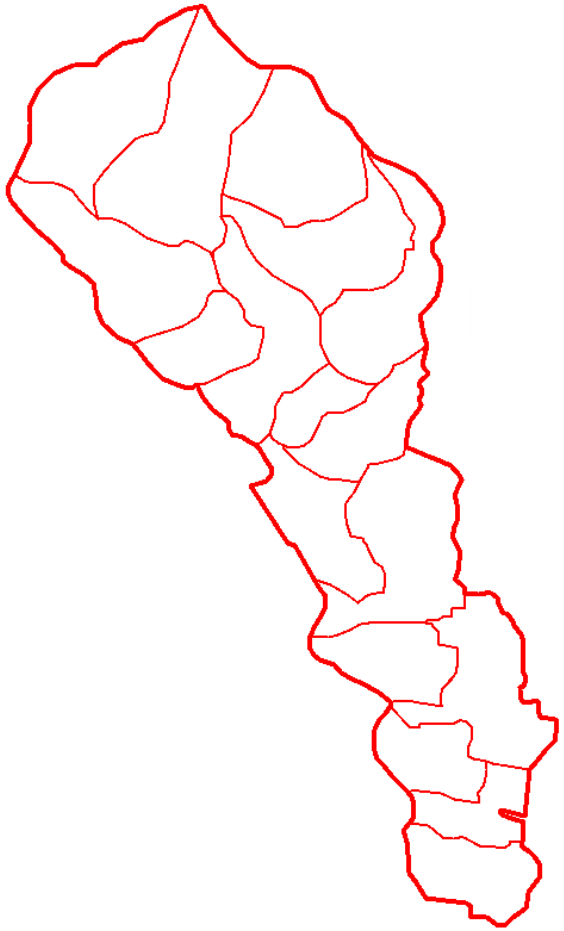
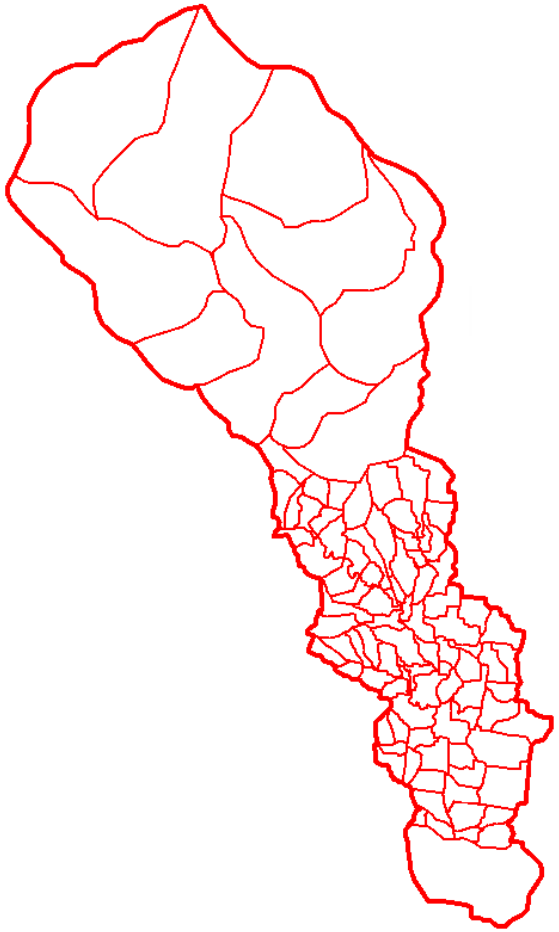


Methodology: Stage 2a





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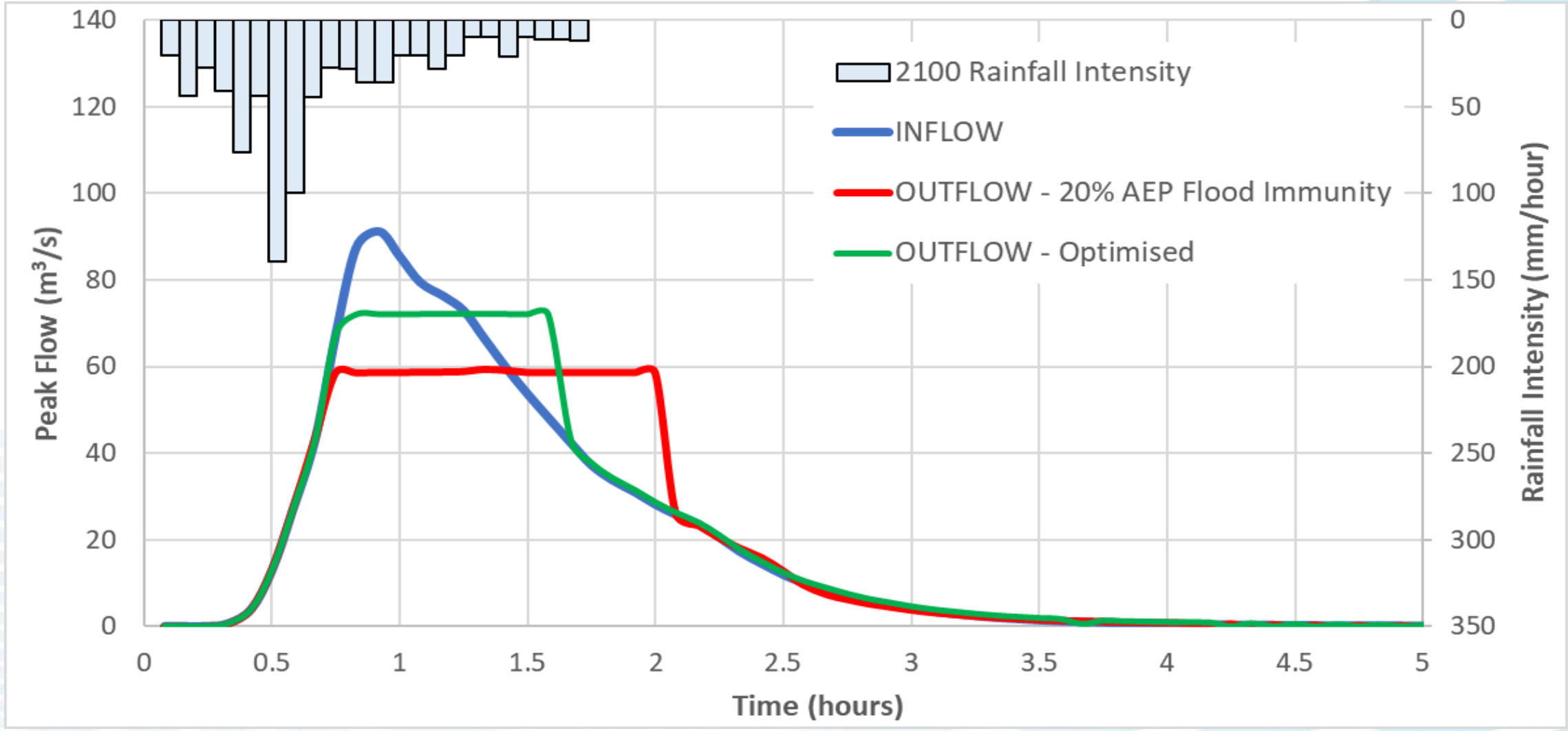
Methodology: Stage 2b



Methodology: 2c

Scenario	Description
Existing Conditions	Baseline model with revised subareas – peak flows verified at Mt Alexander Road
Scenario 1	14 storages
Scenario 2	12 storages plus 2 large downstream storages
Scenario 3	9 storages (excludes storages immediately downstream of Jacana Retarding Basin and storages with little proven benefit)
Scenario 4	2 large downstream storages only
Scenario 5	10 storages plus 2 large downstream storages (excludes storages immediately downstream of Jacana Retarding Basin)

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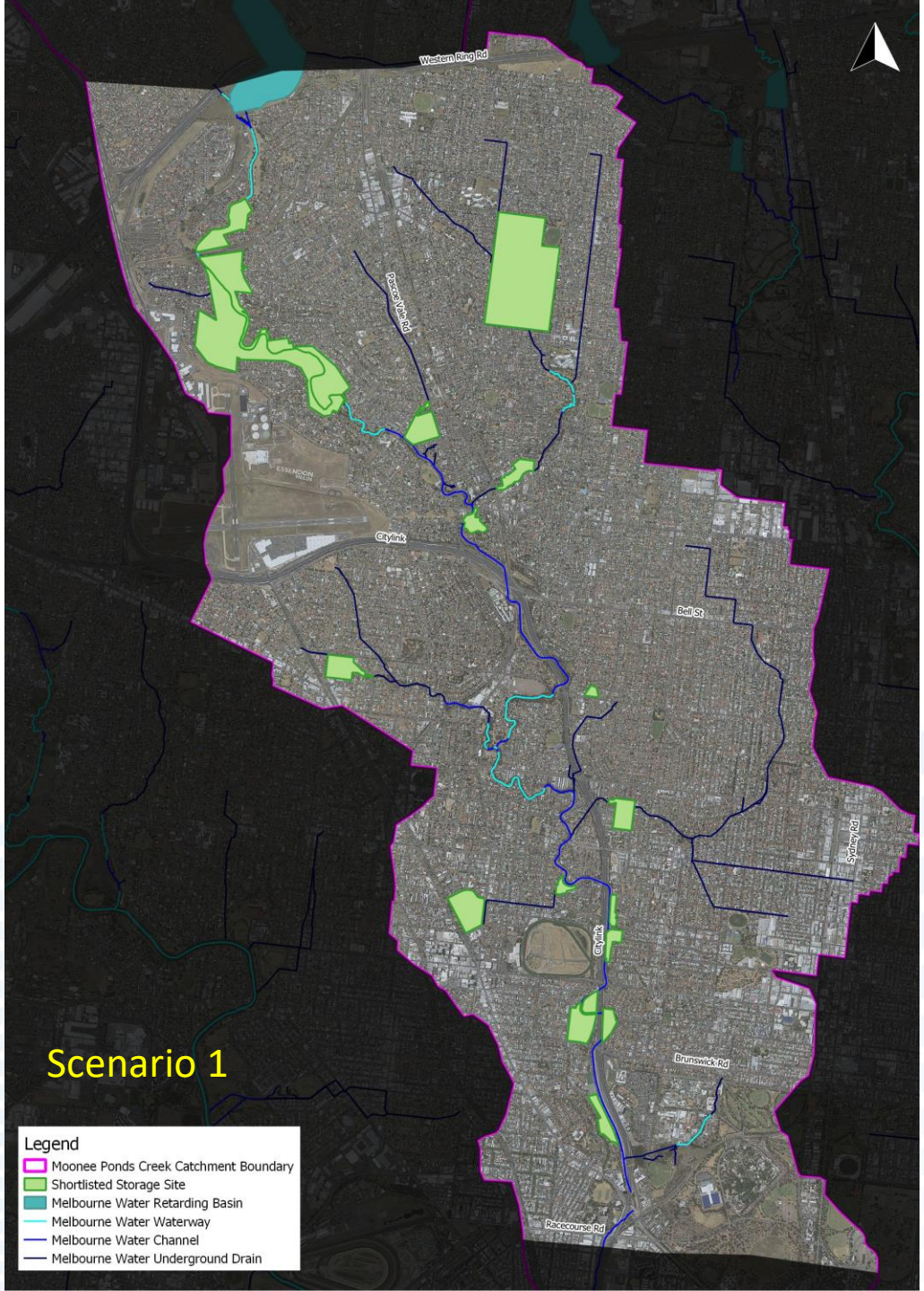
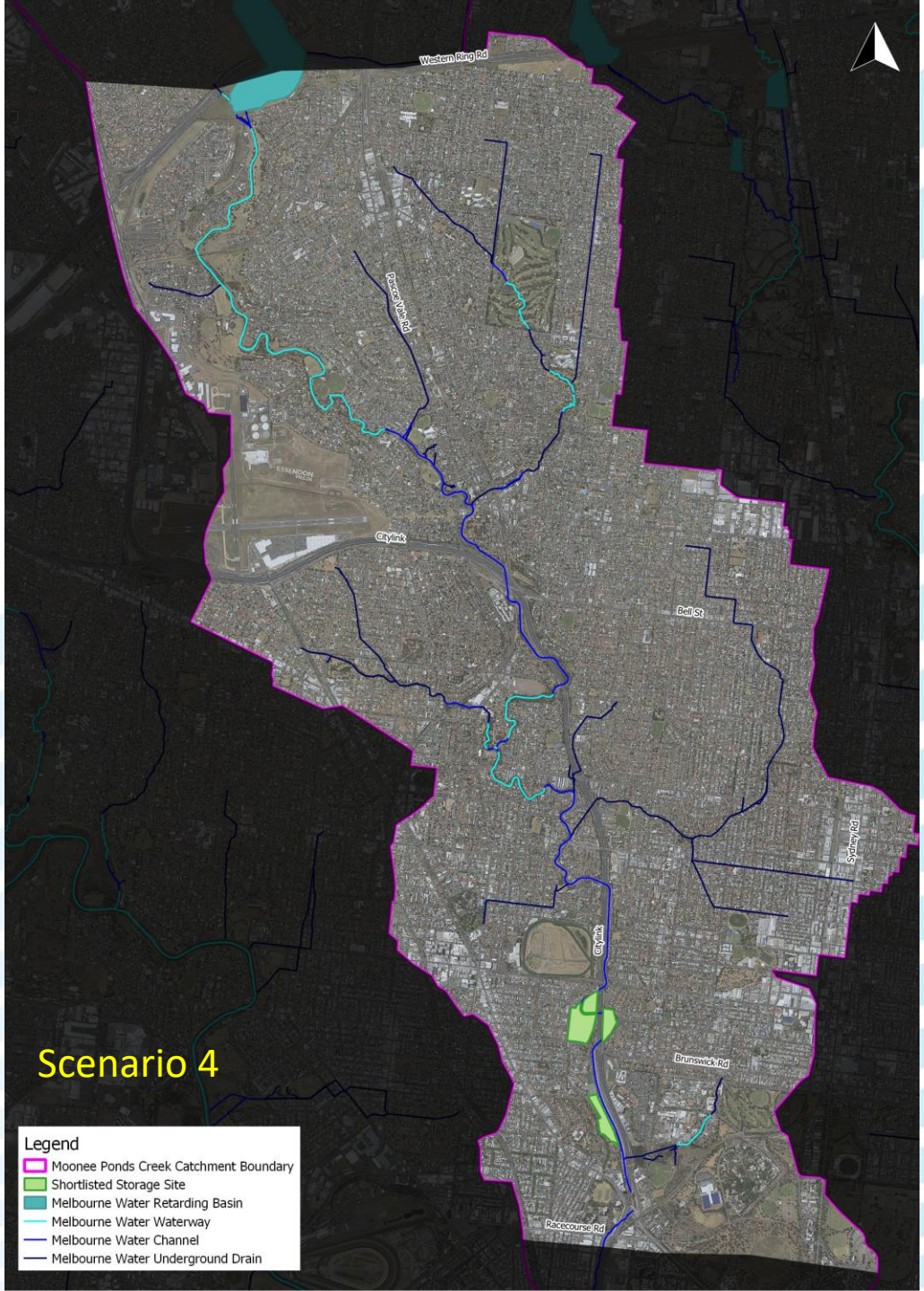

Western Ring Rd
Pascoe Vale Rd
Citylink
Bell St
Sydney Rd
Brunswick Rd
Racecourse Rd
Scenario 1
Legend
Moonee Ponds Creek Catchment Boundary
Shortlisted Storage Site
Melbourne Water Retarding Basin
Melbourne Water Waterway
Melbourne Water Channel
Melbourne Water Underground Drain


Western Ring Rd
Pascoe Vale Rd
Citylink
Bell St
Sydney Rd
Brunswick Rd
Racecourse Rd
Scenario 4
Legend
Moonee Ponds Creek Catchment Boundary
Shortlisted Storage Site
Melbourne Water Retarding Basin
Melbourne Water Waterway
Melbourne Water Channel
Melbourne Water Underground Drain

Key Project Outcomes

Scenario	Number of Storages	Approximate Storage Volume	Downstream Benefit *(peak flow reduction at Mt Alexander Road)*
Existing Conditions	0		
Scenario 1	14	309,000 m^3	16 % peak flow reduction
Scenario 2	14	389,000 m^3	20 % peak flow reduction
Scenario 3	9	206,000 m^3	13 % peak flow reduction
Scenario 4	2	160,640 m^3	19 % peak flow reduction
Scenario 5	12	302,000 m^3	18 % peak flow reduction

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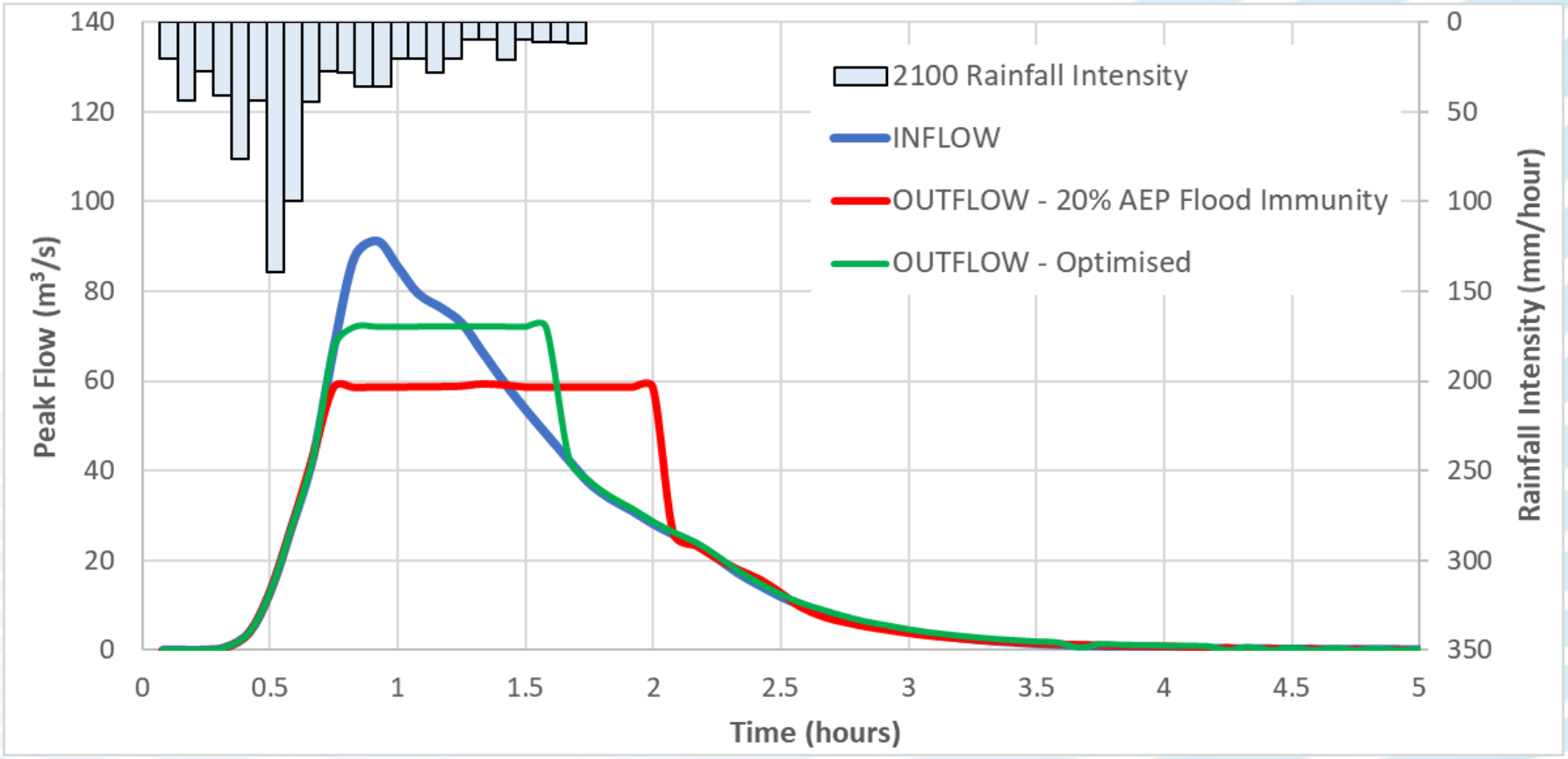
Key Project Outcomes

- Depending on your objective, adding flood storage is not necessarily good



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Key Project Conclusions

- Reducing flows to provide effective downstream flood mitigation is difficult
- Offline vs online storages
- Reducing the peak flow is not necessarily good if flows remain high for longer
- Local catchment studies vs overall catchment studies
- Flood storage strategy integration with other catchment stormwater strategies

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Thank You

- City of Melbourne
- Melbourne Water
- Moonee Valley City Council
- Moreland City Council

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