



# From a Forest in a City to a City in a Forest – Enhancing Melbourne's Liveability

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AIPH International Green City  
Conference  
22 March 2018

# Melbourne beginnings



CITY OF MELBOURNE

## View of falls and turning basin



c. 1830



c. 1837

## View of falls and turning basin



1884

## View of falls and turning basin



Industrial port c.1890

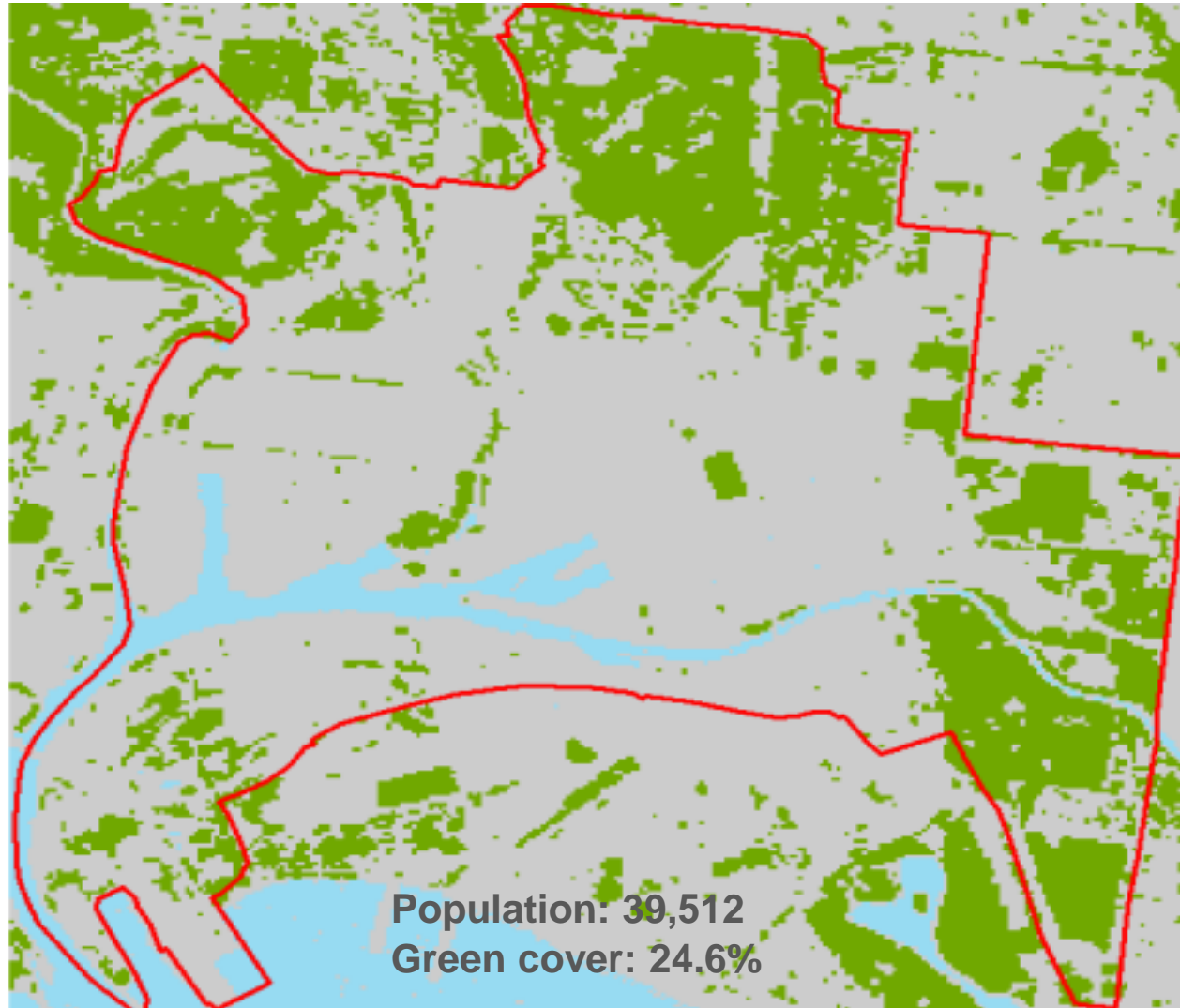
## Melbourne's Northbank – now

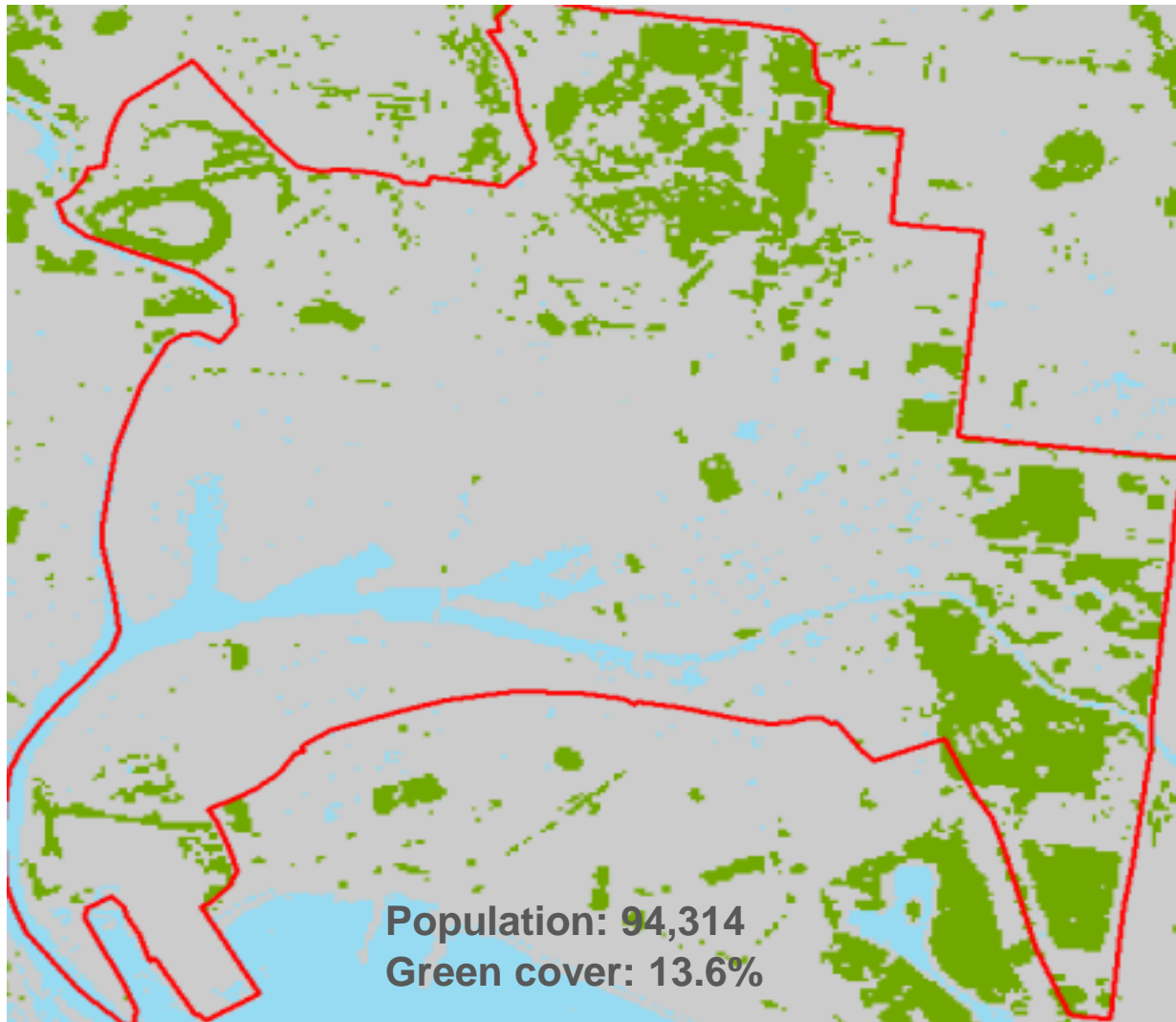


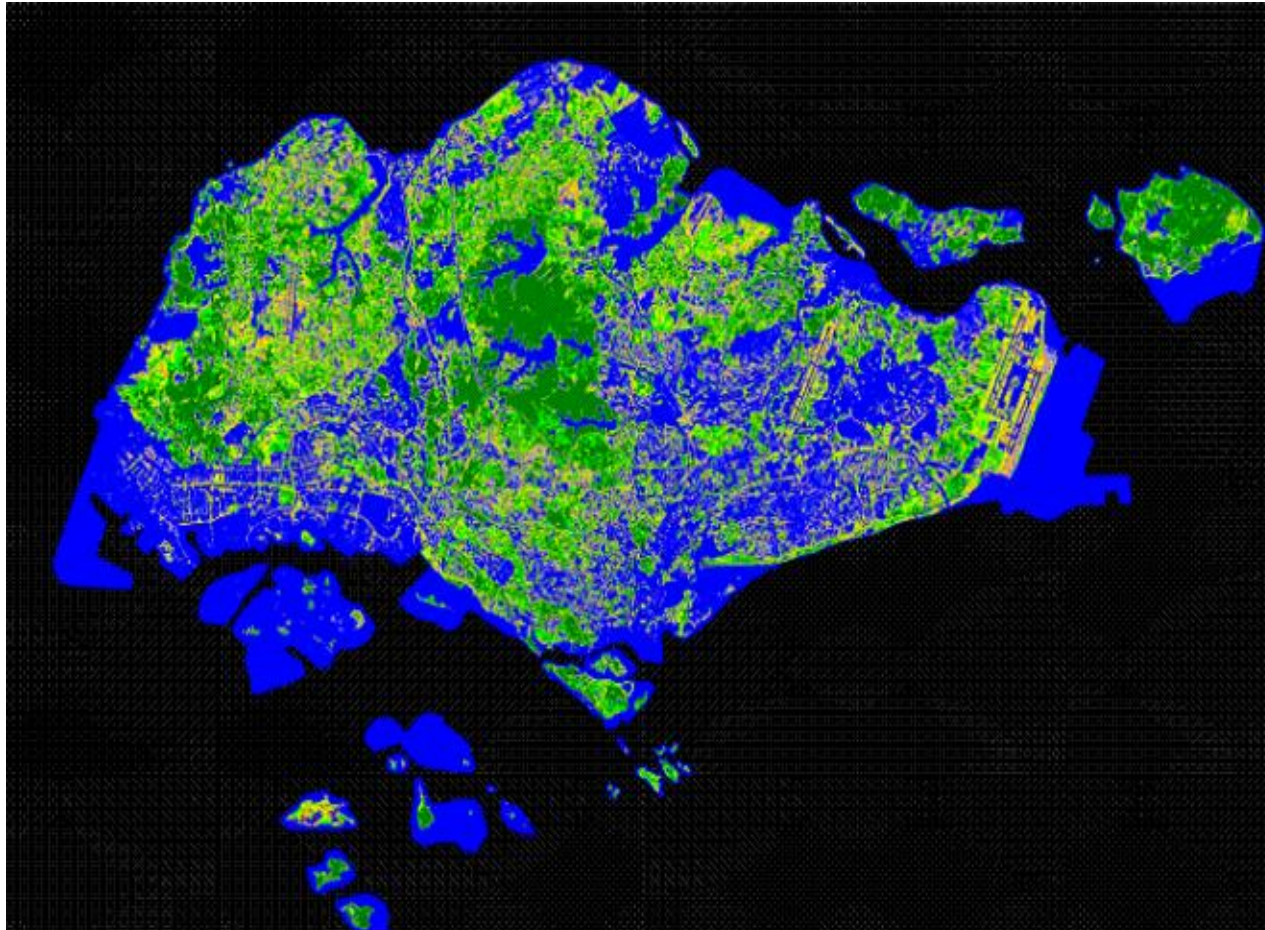
c. 1830



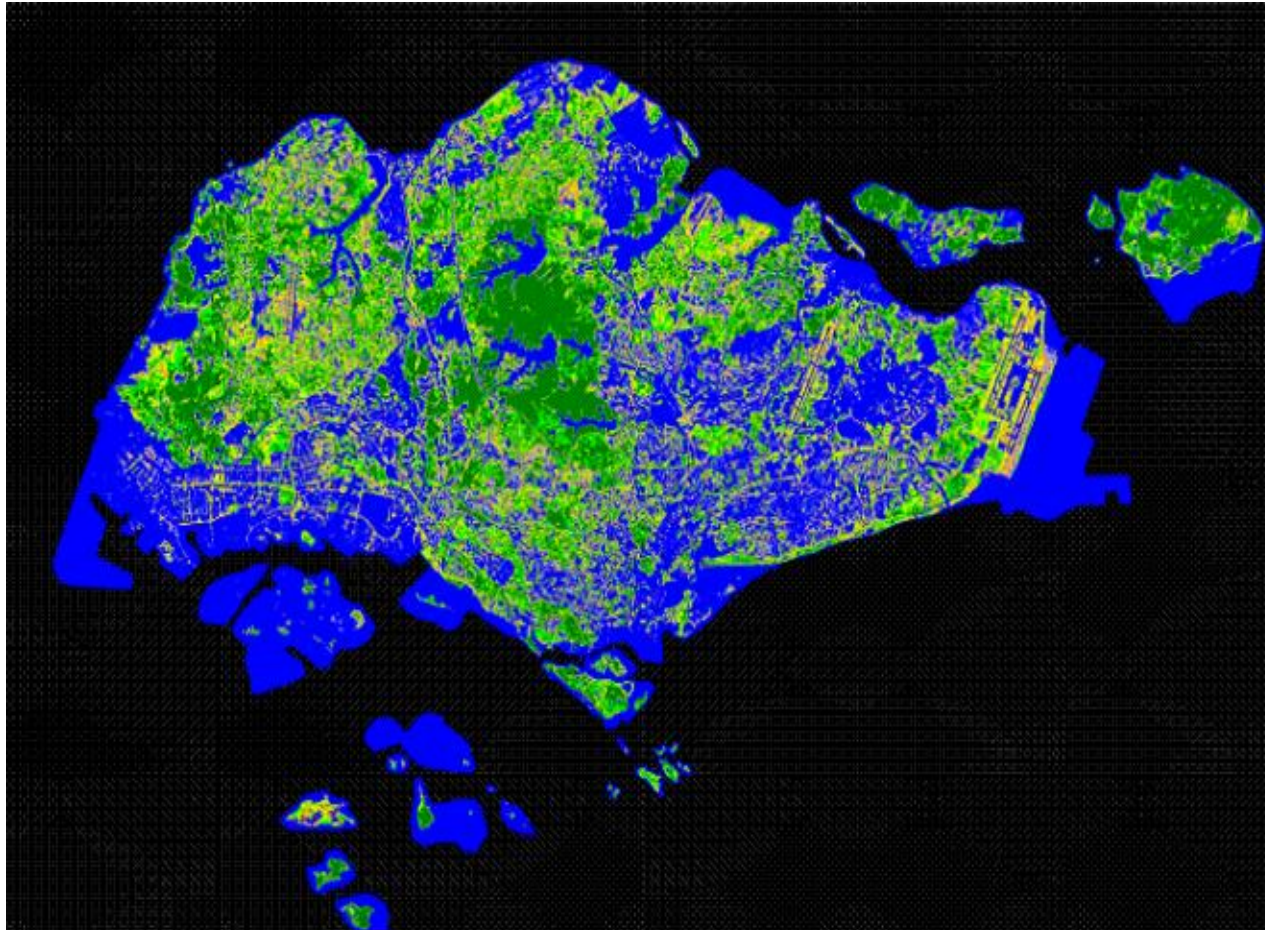
Current







Population: 2.7 million  
Green cover: 35.7%



Population: 4.8 million  
Green cover: 46.5%

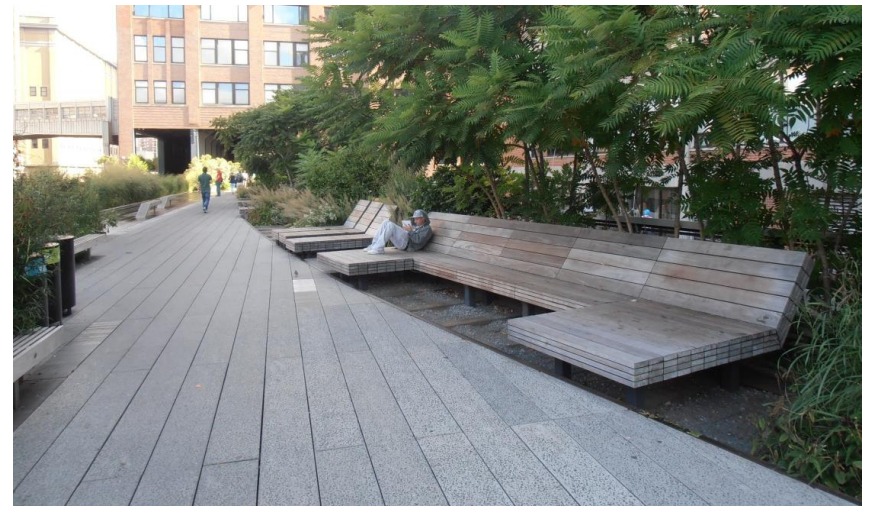
## Cheonggyecheon, Seoul – elevated freeway and paved waterway pre-2002



## Cheonggyecheon River Linear Park – urban oasis today




# New York City – The Highline



## New York City – Hudson River urban renewal



ONE NEED NEVER LEAVE THE CONFINES OF NEW YORK TO GET ALL THE GREENERY ONE WISHES

The image is a composite. The top half shows a city skyline with several skyscrapers under a blue sky with light clouds. The central skyscraper has a distinctive antenna-like structure on top. To its right is a glass skyscraper with 'EY & YOUNG' visible at the top. To the left is a tan-colored building. The bottom half shows a park scene with a green lawn, several palm trees, and a paved path where two people are walking. A semi-transparent dark grey banner is overlaid across the middle of the image, containing the title text.

# Current and projected environmental conditions



CITY OF MELBOURNE

## **Three primary challenges facing Melbourne (and cities worldwide):**

1. Population growth and intensification
2. Urban heating
3. Climate change

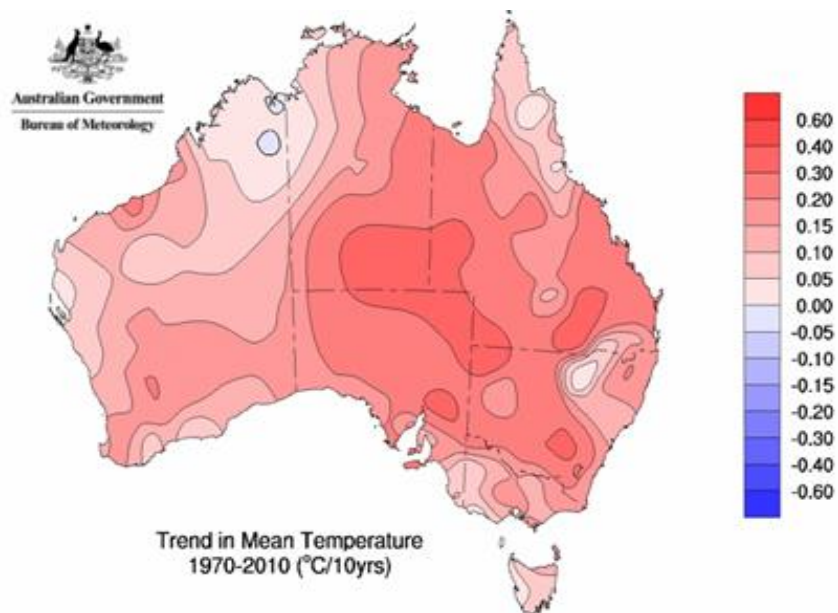
# Population growth and intensification



## City of Melbourne *Municipal Strategic Statement*

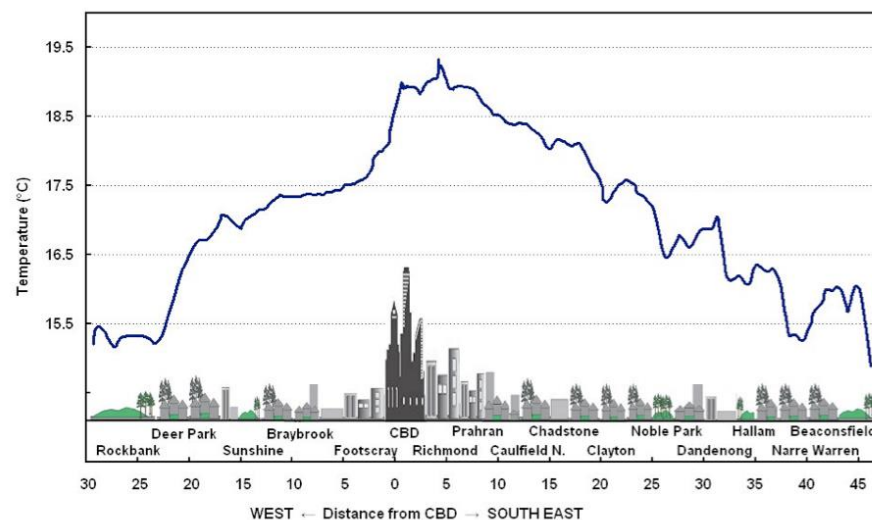
Almost doubling the  
residential and working  
population over 30 years

# Climate change and urban heat island



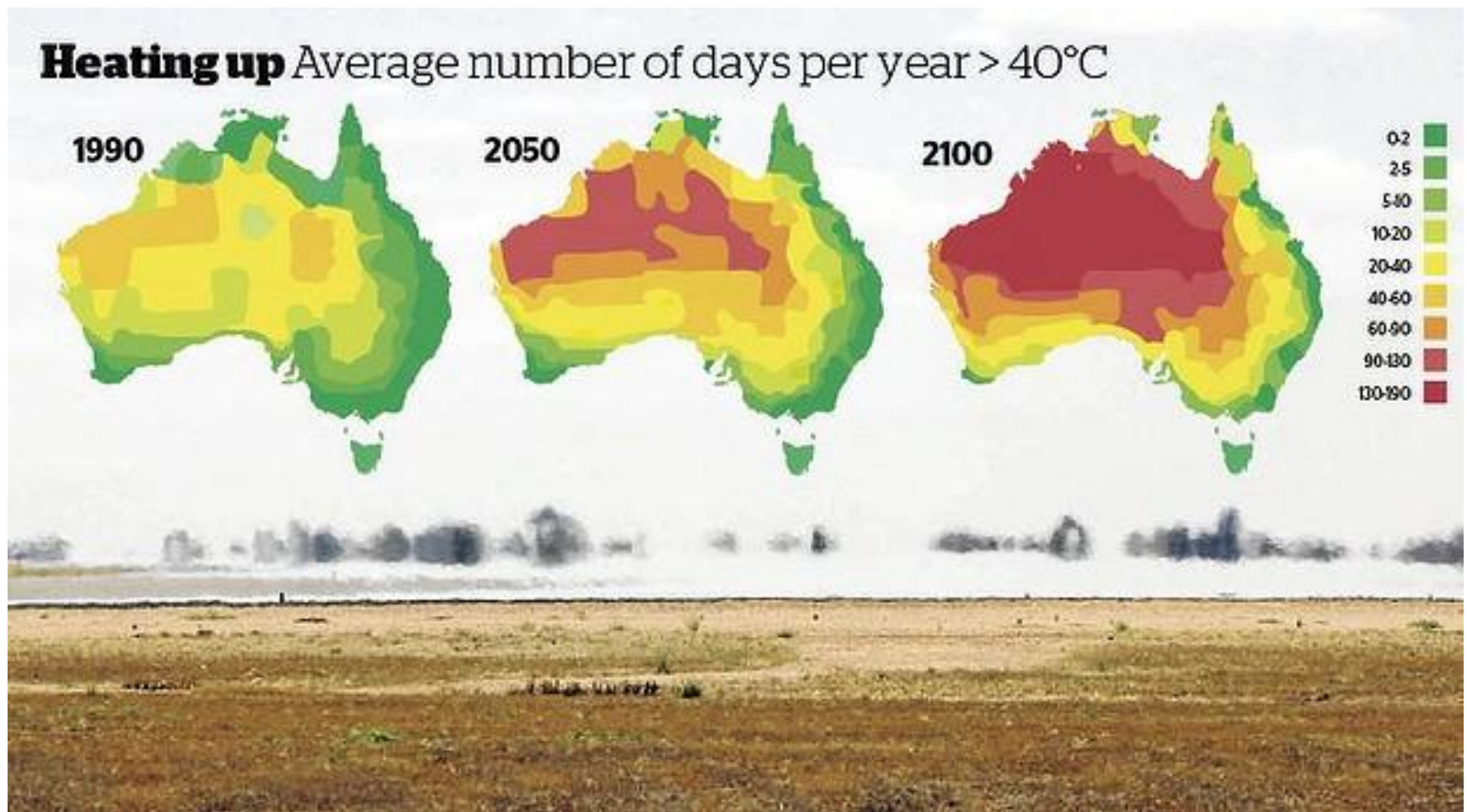
© Commonwealth of Australia 2011, Australian Bureau of Meteorology

Issue: 16/02/2011



▼ **4:22PM** Saturday February 07, 2009











# City of Melbourne tree population: Useful Life Expectancy – current scenario



## Overall

23% loss in 10 years

39% loss in 20 years

## Heritage landscapes

35% loss in 10 years

58% loss in 20 years

- 1< year to 10 years
- 11-20 years
- 21-30 years
- 31-60 years
- 61+ years
- To Be Determined

## Trees in decline – St Kilda Road, Melbourne



## Impact of the drought and water restrictions – Alexandra Avenue



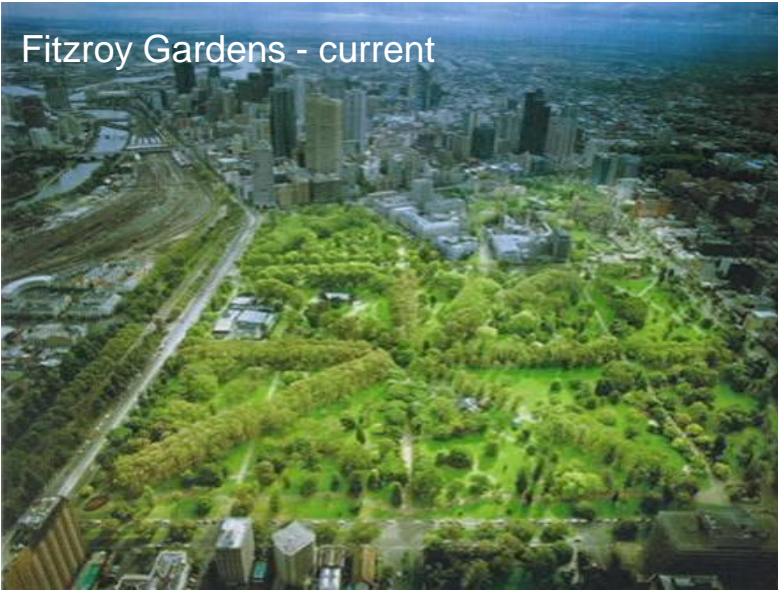
February 2004



February 2010

## Parks and boulevards – existing conditions

Fitzroy Gardens - current

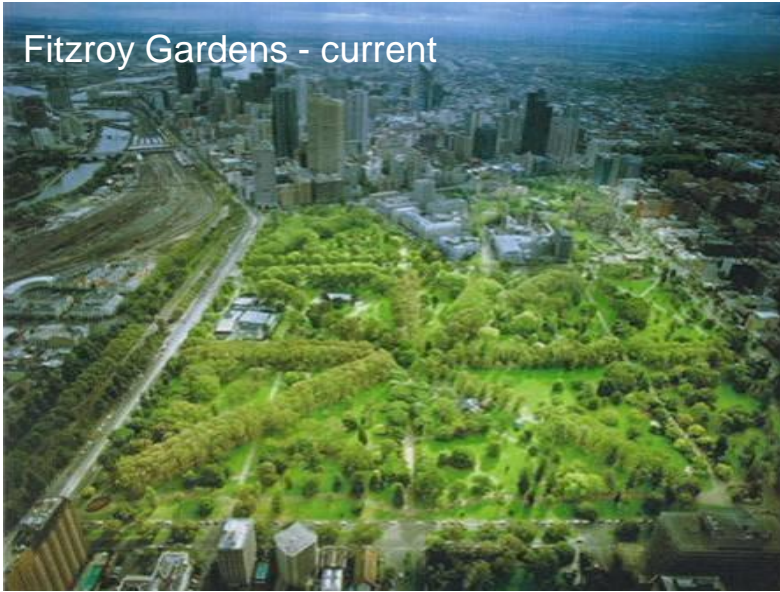


Royal Parade - current



## Parks and boulevards – potential scenario

Fitzroy Gardens - current



Fitzroy Gardens - potential



Royal Parade - current



Royal Parade - potential



# Planning the Urban Forest



CITY OF MELBOURNE



Strategically transforming  
our landscapes  
to respond  
to current challenges  
and to a dramatically  
different climate and  
population

To have 'a city in a forest,  
rather than a forest in a  
city'

## STRATEGIES



**TOTAL WATERMARK  
CITY AS A  
CATCHMENT 2014**



**OPEN SPACE  
STRATEGY 2012**



**URBAN FOREST  
STRATEGY 2012**



**NATURE IN THE CITY  
STRATEGY 2017**



**CLIMATE CHANGE  
ADAPTATION  
STRATEGY 2017**



**GROWING GREEN  
GUIDE 2014**



**ZERO NET EMISSIONS  
BY 2020  
UPDATE 2014**

## OUTPUTS



**INCREASE STORM-  
WATER HARVESTING**

**INCREASE GREEN  
SPACE**

**DOUBLE CANOPY  
COVER**

**ENHANCE  
BIODIVERSITY**

**ADAPT TO CLIMATE  
CHANGE**

**INCREASE BUILDING  
GREENING**

**BECOME A CARBON  
NEUTRAL CITY**

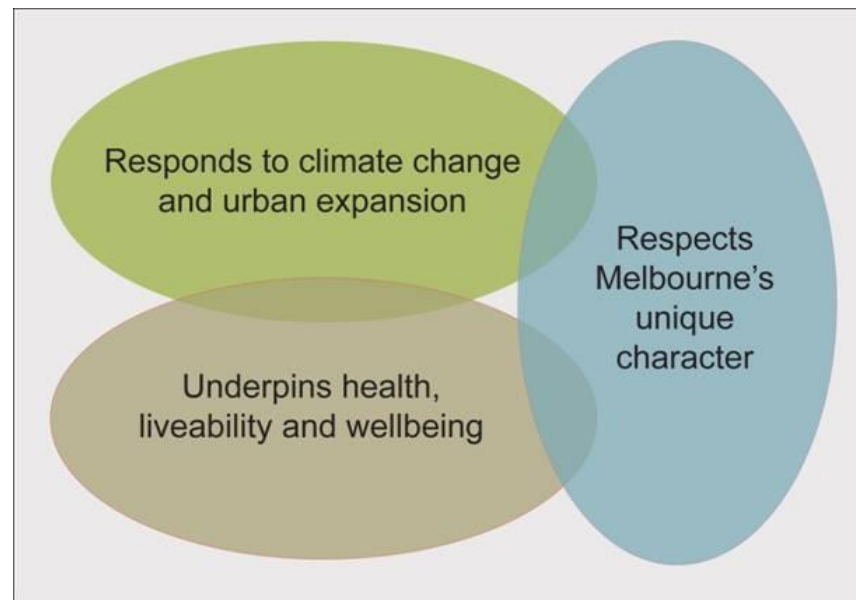
## BENEFITS

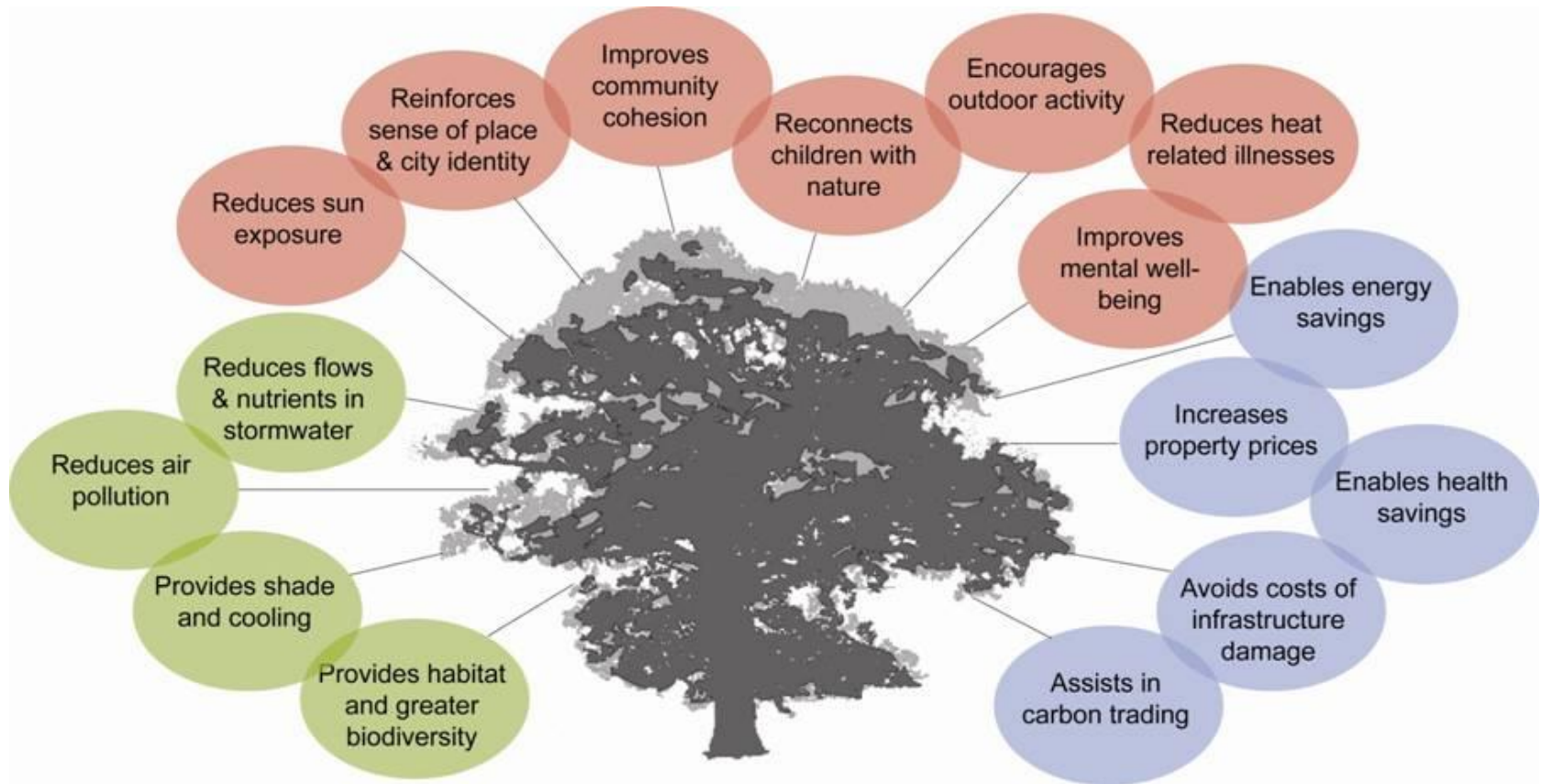
**GOAL = TO COOL MELBOURNE BY 4°C**

**IMPROVE LIVEABILITY, RESILIENCE,  
COMMUNITY HEALTH AND BIODIVERSITY**

### Major approaches

- **Multi-disciplinary** – using a broad range of learnings, research and data from industry experts, academics and decision makers (public and private)
- **Setting visionary targets** – based on understanding current conditions and future goals
- **Technical analysis** – employing technical data and suite of tools to quantify, assess and forecast the state of public realm assets and green infrastructure





Summary of the benefits offered by urban trees (adapted from the Woodland Trust UK)



1. Mitigate and adapt to climate change
2. Reduce the urban heat island effect
3. Design for health and wellbeing
4. Create healthier ecosystems
5. Become a water sensitive city
6. Position Melbourne as a leader in urban forestry
7. Design for liveability and cultural identity

## Strategy 1: **Increase canopy cover**

Target: Increase public realm canopy cover from 22 per cent to 40 per cent by 2040.

## Strategy 2: **Increase urban forest diversity**

Target: The urban forest will be composed of no more than 5 per cent of any tree species, no more than 10 per cent of any genus and no more than 20 per cent of any one family.

## Strategy 3: **Improve vegetation health**

Target: 90 per cent of the City of Melbourne's tree population will be healthy by 2040  
Design for health and wellbeing.

## Strategy 4: **Improve soil moisture and water quality**

Target: Soil moisture levels will be maintained at levels to provide healthy growth of vegetation.  
Become a water sensitive city.

## Strategy 5: **Improve urban ecology**

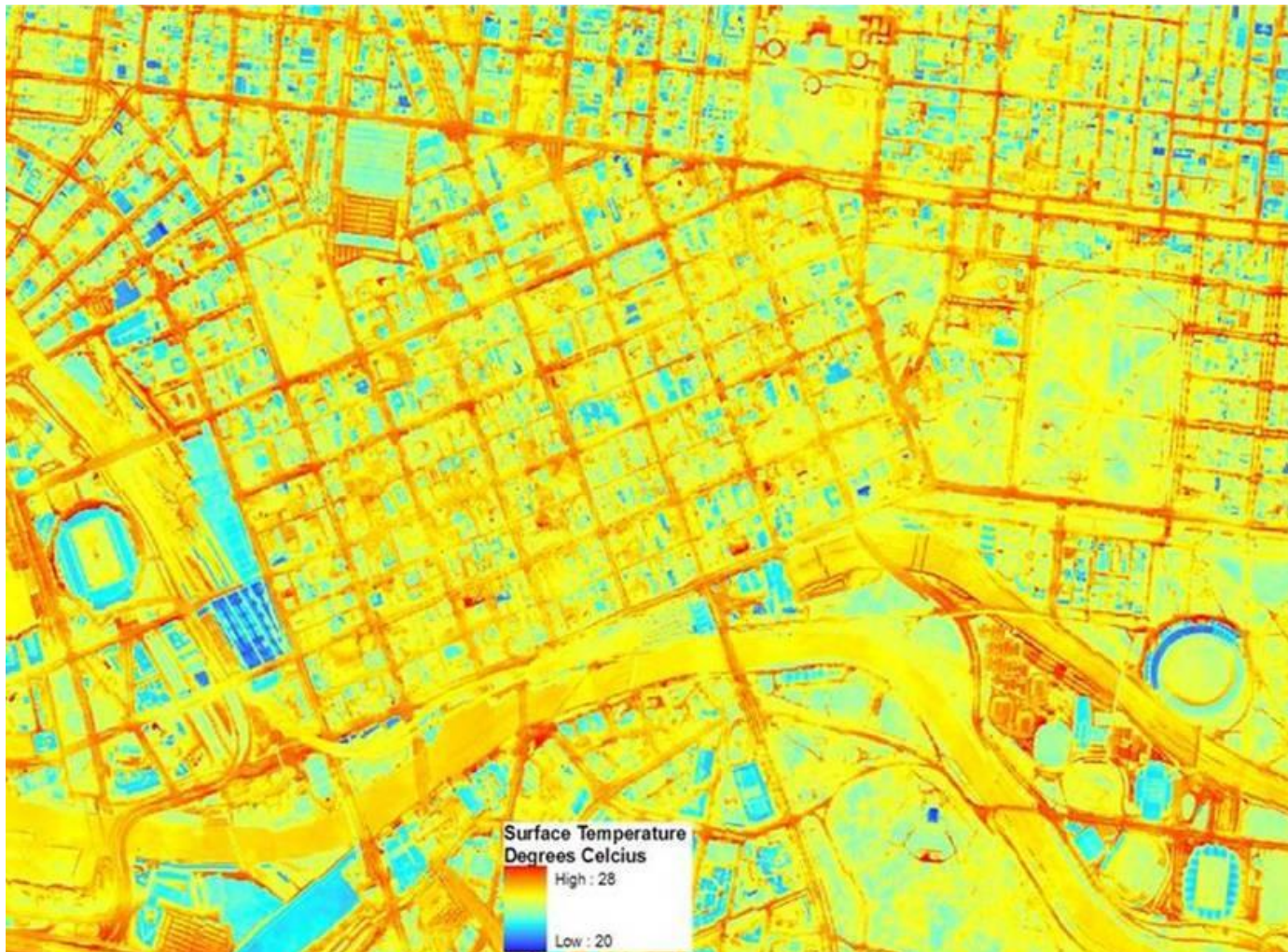
Target: Melbourne's green spaces will protect and enhance a level of biodiversity which contributes to the delivery of ecosystem services.

## Strategy 6: **Engage the community**

Target: The community will have a broader understanding of the importance of our urban forest, increase their connection to it and engage with its process of evolution.



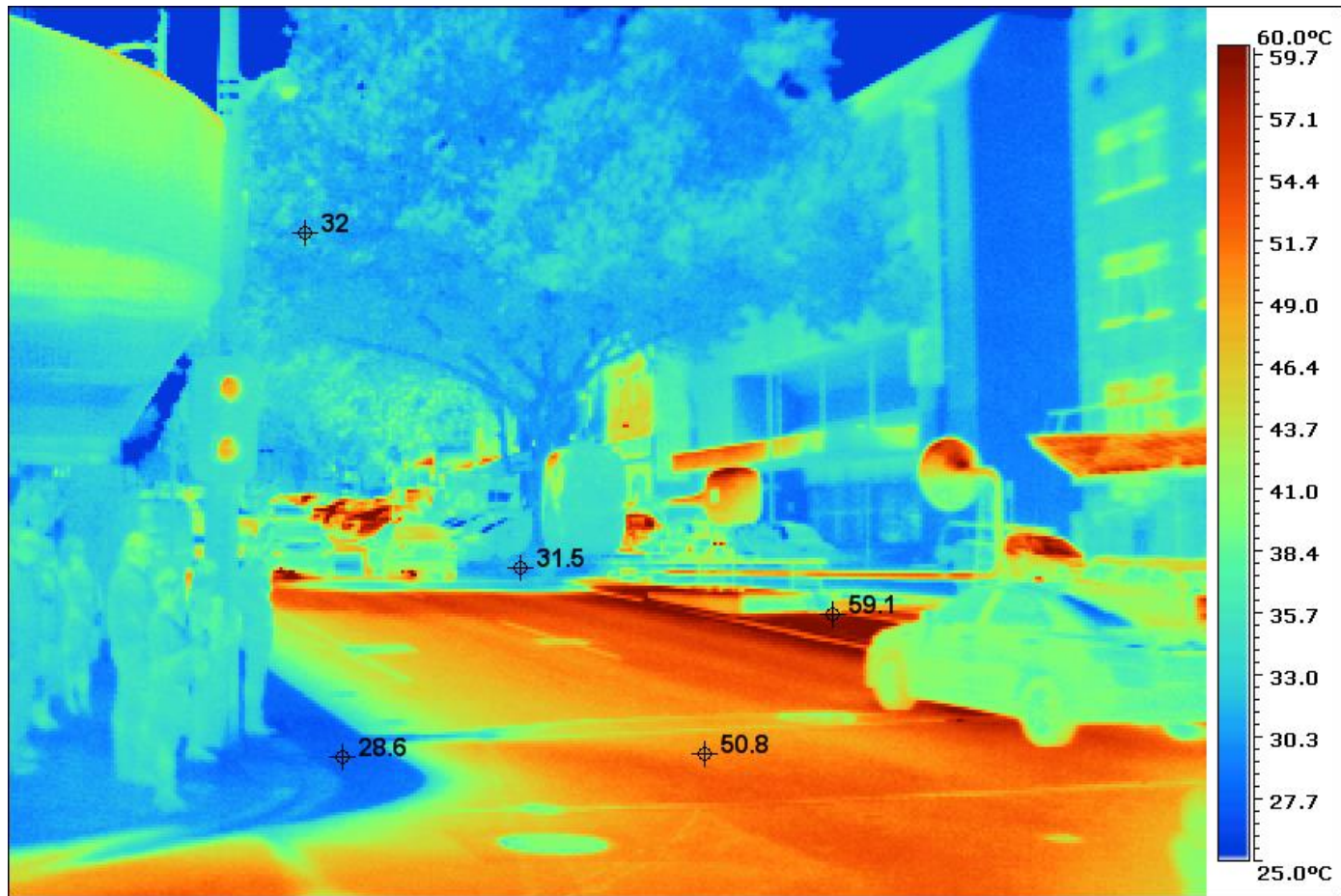
**Tools, techniques, methods and resources**



## Ideal (goal) streetscape response

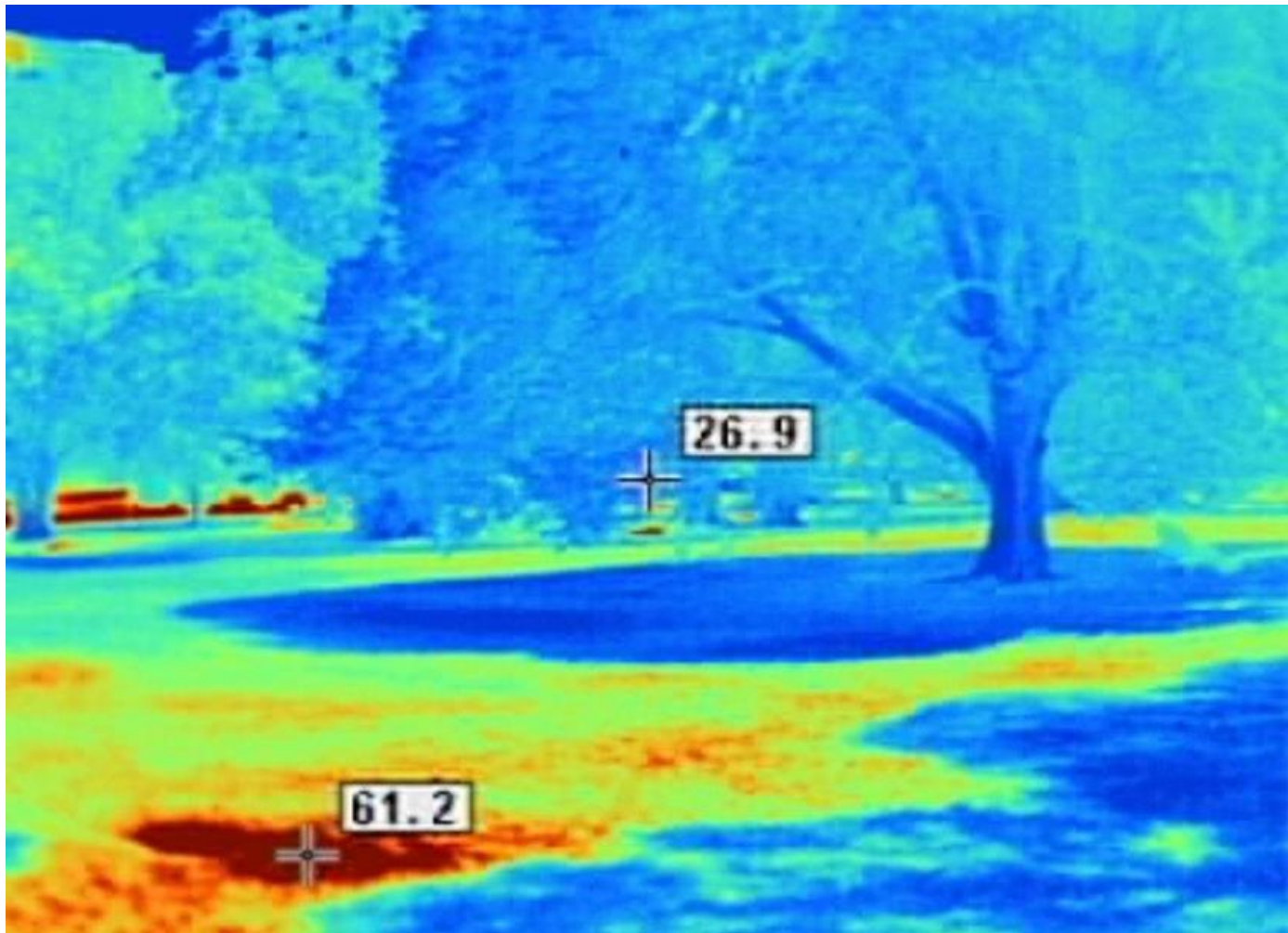


## Ideal streetscape – thermal image

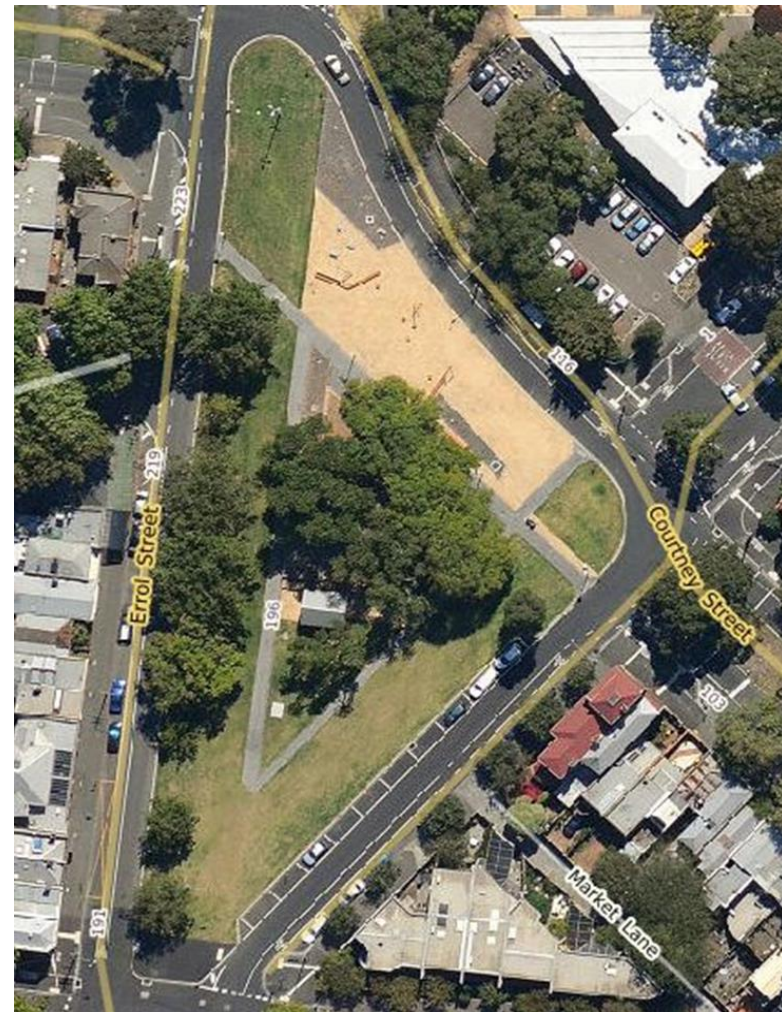


## Increasing canopy cover efficiently





## Turning streets into parks – North Melbourne

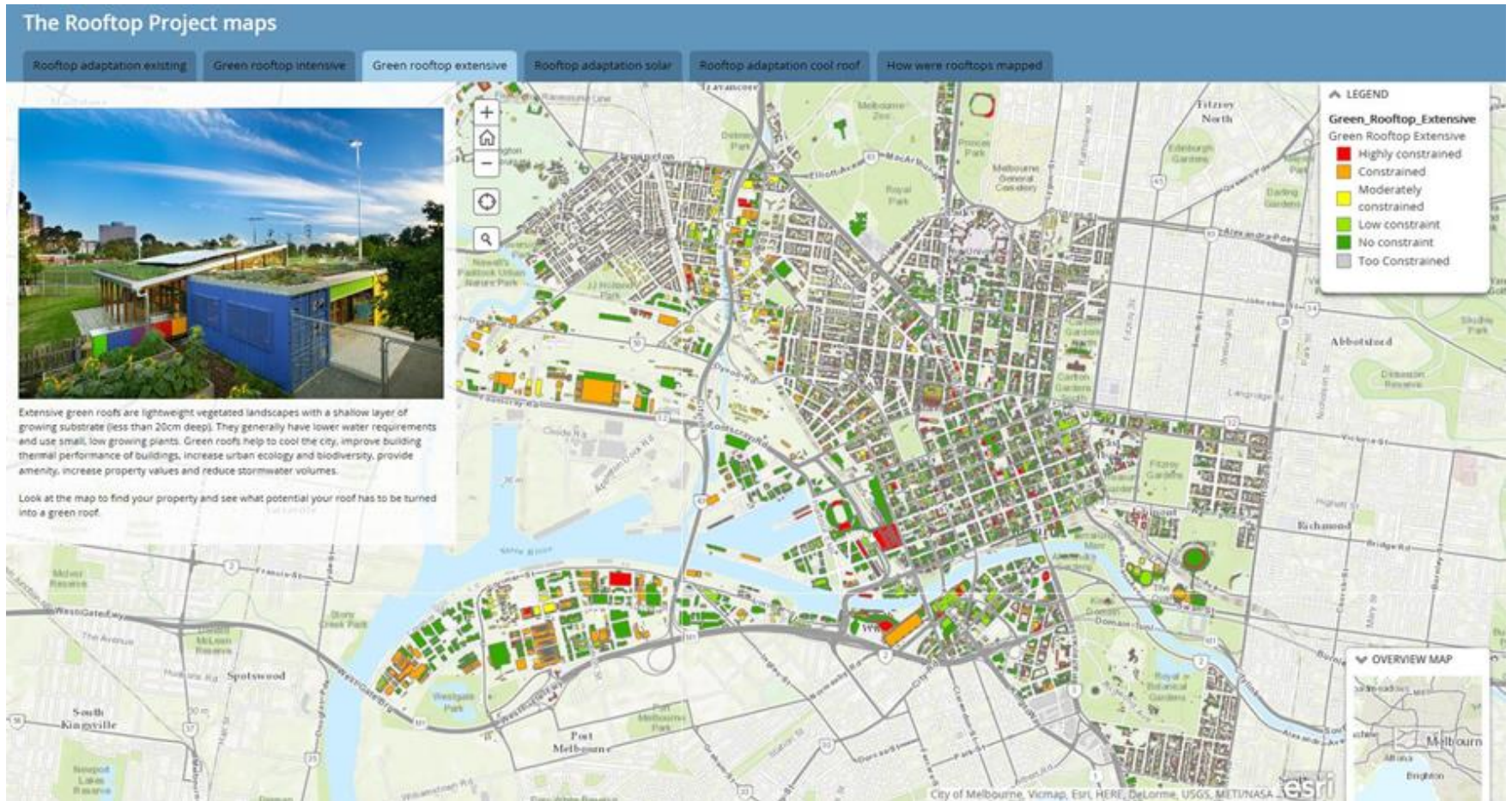




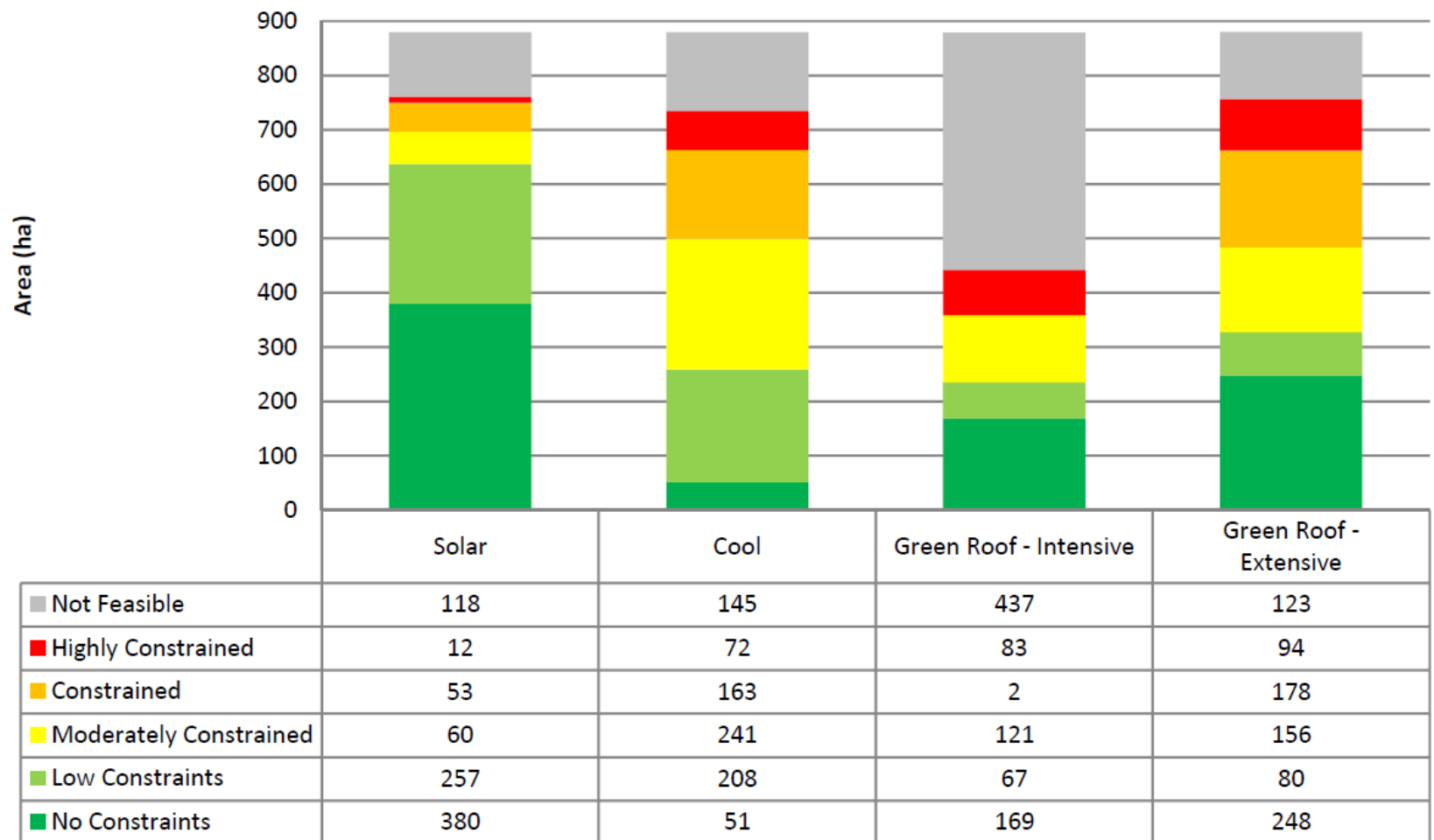


- Develop and test a method for assessing the suitability of any rooftop to be retrofitted with green roof, solar or cool roof technology.
- Create a spatial representation of the results
- Analyse the results for future strategic work

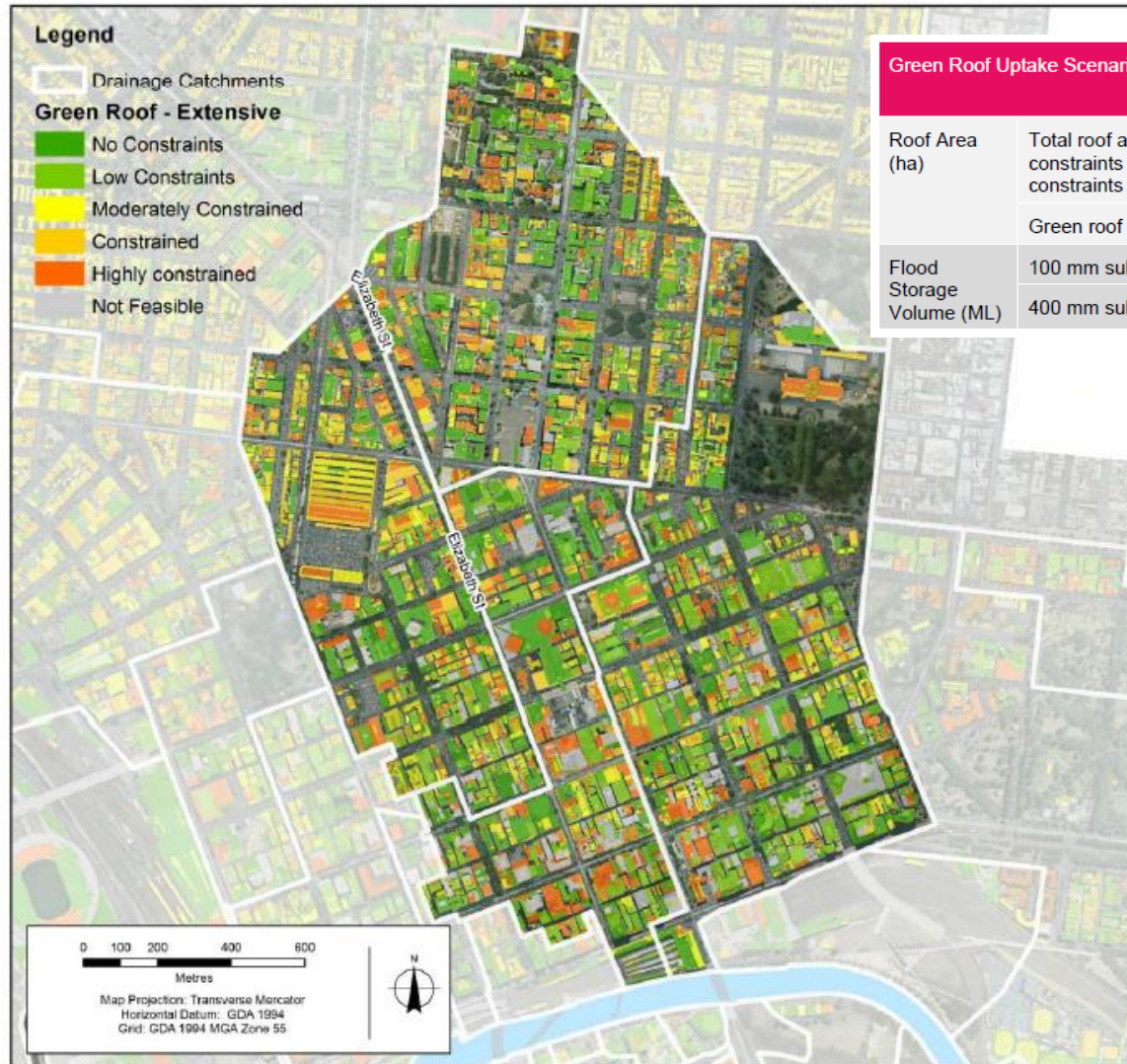
# The Rooftop Project Maps



# Adaptation Potential by Area (ha)



# Creating water storage in Elizabeth Street Catchment



Green Roof Uptake Scenario		Low Uptake 5% (by area)	Medium Uptake 15% (by area)	High Uptake 25% (by area)
Roof Area (ha)	Total roof area with low constraints or no constraints	65.5 ha	65.5 ha	65.5 ha
	Green roof uptake	3.27 ha	9.82 ha	16.37 ha
Flood Storage Volume (ML)	100 mm substrate	1.1 ML	3.4 ML	5.7 ML
	400 mm substrate	5.9 ML	17.7 ML	29.5 ML

The total additional storage volume required for the Elizabeth St Catchment was modelled at 6.8 ML

Document Path: G:\3132453\GIS\Map\Working\31\_32453\_003\_ReportMap\_Elizabeth\_Catchment.mxd

Data source: DELWP, Vicmap, 2015. GoM, Catchments, 2015

# Integrated water management – general principles

To inform 2018 target:

External research (CRC WSC)

Reduced peak under tree canopy

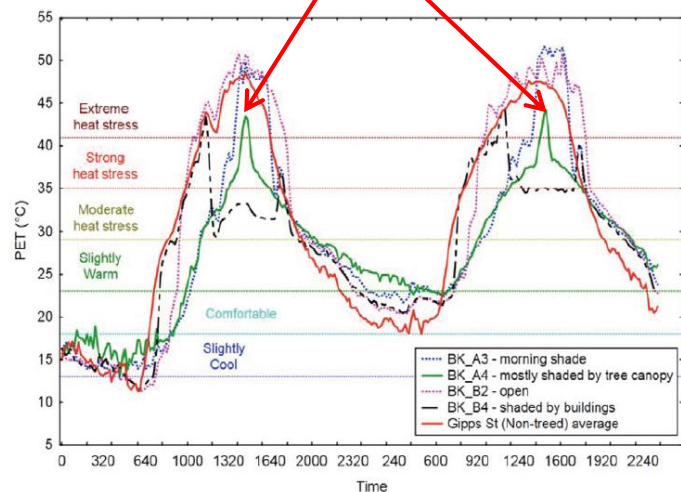
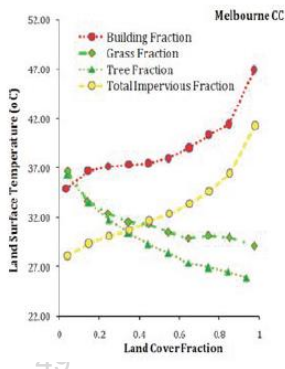
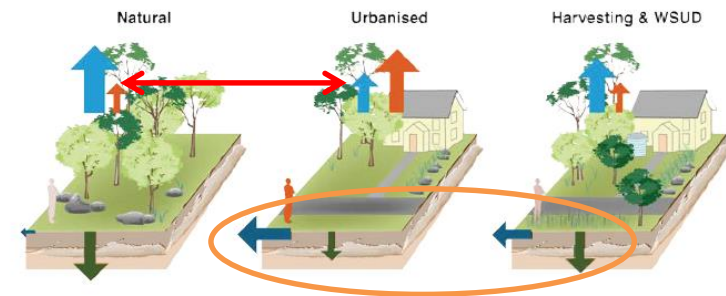


Figure 17. Influence of shade from trees and buildings on Physiological Equivalent Temperature (PET) in Bourke (BK) and Gipps Street, Melbourne, 24-25 February 2012. (Coutts *et al.*, 2013)<sup>66</sup>



10% increase in tree cover = reduction of land surface temperature of up to 4C

Figure 19. Relationships among summer daytime mean land surface temperature (LST) and various land cover fractions. Data are on a 30 m grid and temperatures are derived from a number of summer daytime satellite overpasses at approximately 11 am Eastern Summer Time.

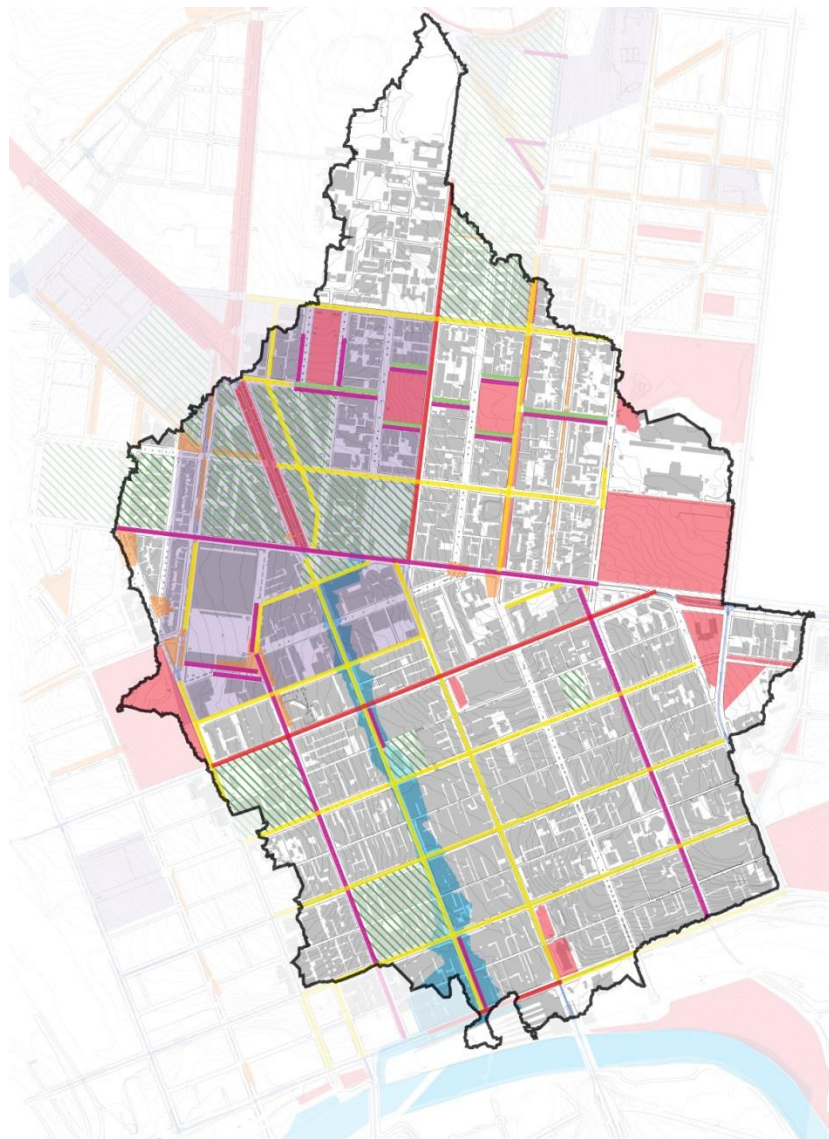


Stream channel form and biodiversity			
Groundwater recharge	High	Low	Moderate
Evapotranspiration	High	Low	Moderate
Atmospheric heating and heat storage in buildings	Natural	Hotter	Closer to natural
Human thermal comfort	Neutral	Hot	Slightly warm
Surface runoff	Low and infrequent	High and frequent	Infrequent and moderate
Stream hydrology	Natural	'Peaky'	Moderated (both high flows and low flows)
Riparian vegetation	Intact	Degraded	Restored
Channel form	Natural	Severely degraded	Potential for recovery

Figure 12. A synthesis of our understandings of urban impacts on the landscape, atmosphere and hydrology and the benefits of stormwater harvesting and WSUD.



# Integrated water management – Elizabeth Street catchment planning



## Existing / known / expected opportunities

- Canopy cover
- Irrigation priorities
- Open Space opportunities
- Future development
- Major landowners

### EXISTING OPPORTUNITIES

- |                              |                               |                                 |
|------------------------------|-------------------------------|---------------------------------|
| Medium canopy cover          | Biodiversity link opportunity | High priority irrigation need   |
| Low canopy cover             | Open space opportunity        | Medium priority irrigation need |
| Street re-design opportunity | Buildings                     | Future Development Zone         |

In line with targets set in *Total Watermark – City as a Catchment*, the *Urban Forest Strategy* and the *Open Space Strategy*:

- 1:20 ARI (or equivalent) flow capacity of all council drains within the catchment.
- Alternative water use 8% of all demands by 2018, increasing to 20% by 2030.
- 40% of the Elizabeth Street catchment's soil surface is unsealed by 2030
- Stormwater quality improved by reducing Total Nitrogen in runoff by 20% by 2018, and by 30% by 2030
- 40% reduction in stormwater runoff by 2050
- 45% reduction in potable water use by 2050
- Canopy cover – 40% or more across the catchment
- Increase the provision of open space



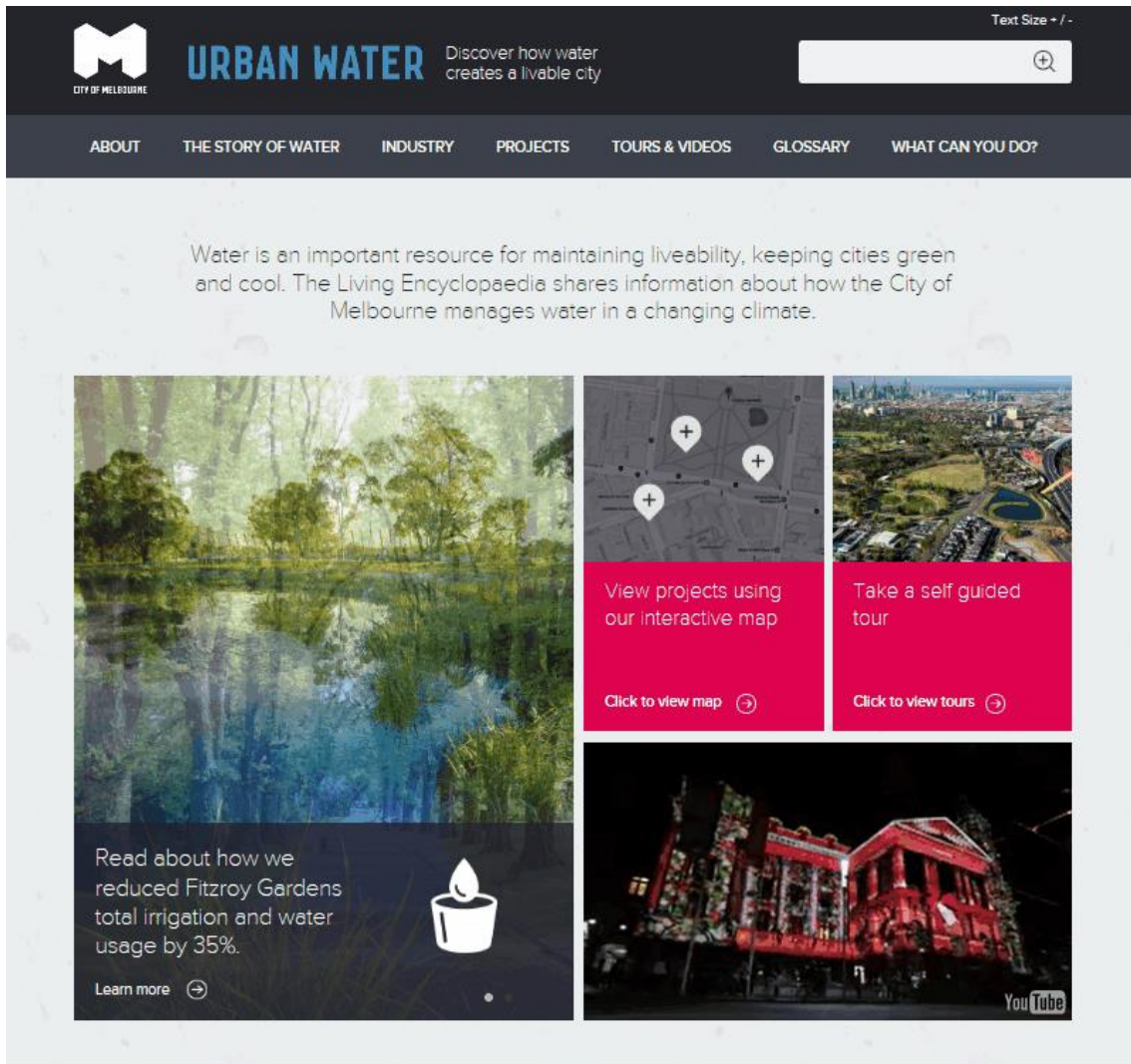


Darling Street, East Melbourne

## WSUD – ‘green streets’ structural soils and permeable asphalt





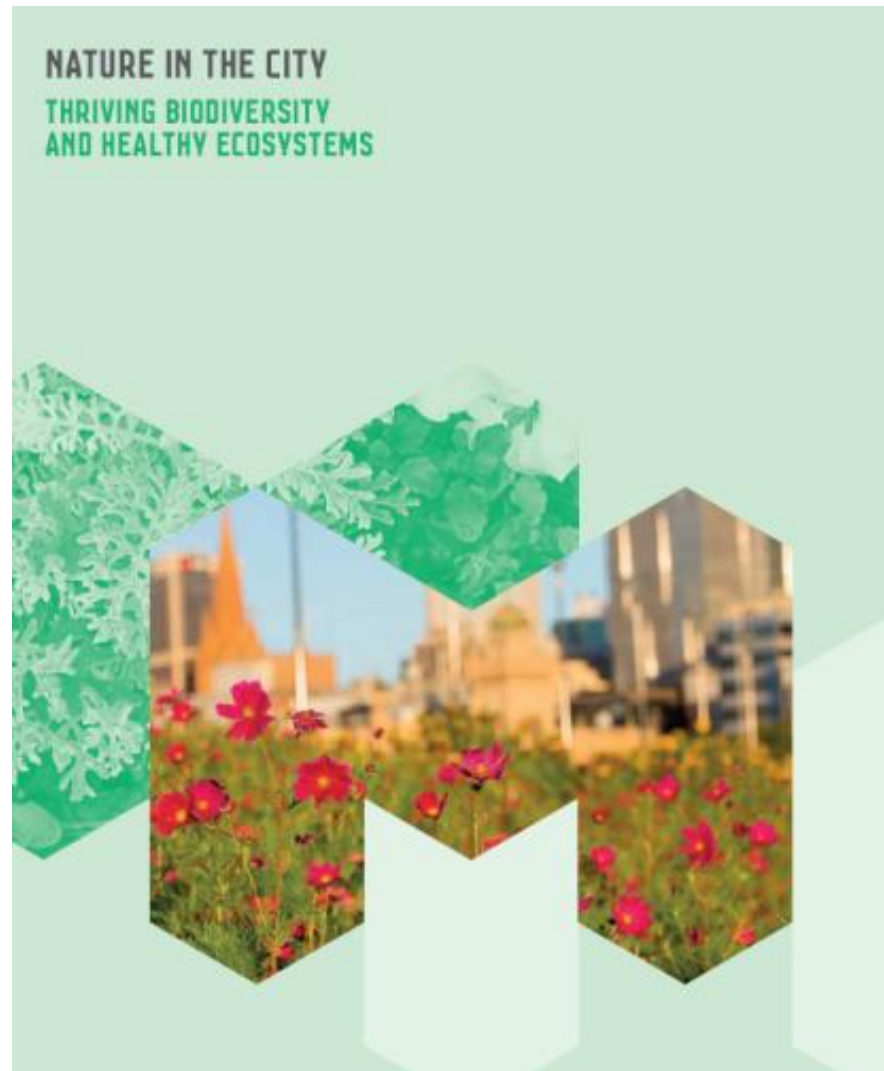


## The **story of water**

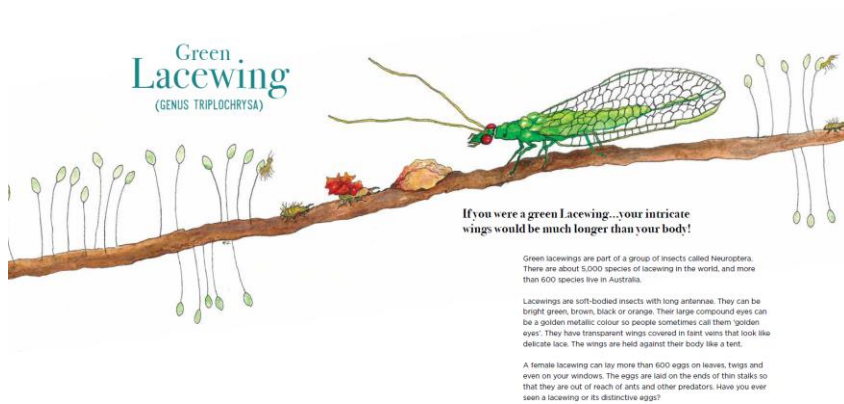
For a general community audience

Explains what we are doing and why

[melbourne.vic.gov.au/urbanwater](https://melbourne.vic.gov.au/urbanwater)









Community engagement


**Diverse programs and processes** for active engagement and democratic participation

**Full partnership** in determining the future urban forest for Melbourne


**Engagement principles:**

- Build understanding of the challenges
- Gauge community support for the strategy
- Understand the community's thoughts, perceptions and concerns
- Engage the community in a meaningful way

- **Accessible and engaging graphic communication**  
(‘pictures speak louder than words’)
- **Community outreach** and engaging more widely to get to diverse audiences  
e.g. Art and Design Competition
- **Advertising:** local press, council ‘on hold’ phone time
- **Mass media:** Press releases, briefings and interviews
- **Online:** Dedicated websites, Twitter, Instagram, Facebook, Youtube
- **Face to face:** Town Hall Forum, ‘World Café’, community meetings, ‘champions’

**CITY OF  
MELBOURNE**


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## URBAN FOREST PRECINCT PLANS

The Urban Forest Strategy provides a robust framework for the **evolution** and **longevity** of our **urban forest** but what will that look like at an individual street level?

Join the **conversation** to influence the plan for **Parkville's** trees until 31 March 2015.

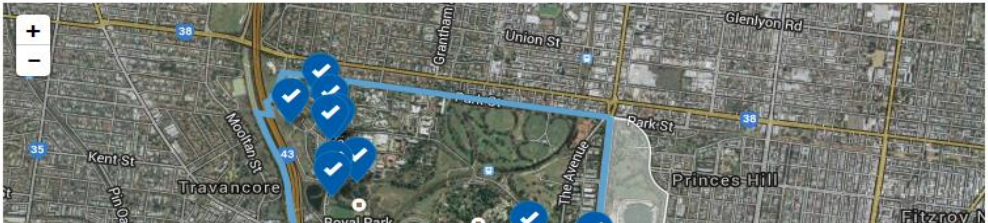


[MAP AND VISION](#) [PHOTO QUESTIONNAIRE](#) [UPDATES](#)

### Pin your ideas for Parkville's urban forest


Use the interactive map below to tell us what you like or don't like about a location in Parkville. This could be an existing landscape or an area that could be improved by greening.

Get started by hitting the 'Pin your Comment' button below.



Venue to be confirmed


[Register](#)

 **Fishermans Bend breakfast**  
Saturday 2 May 2015  
9.30am to 12.30am

Venue: Library at the Dock, 107 Victoria Harbour Promenade, Docklands

[Register](#)

### Timeline

 **2012**  
Urban Forest Strategy endorsed by Council



# Precinct planning workshops – tree species preferences

## Carlton



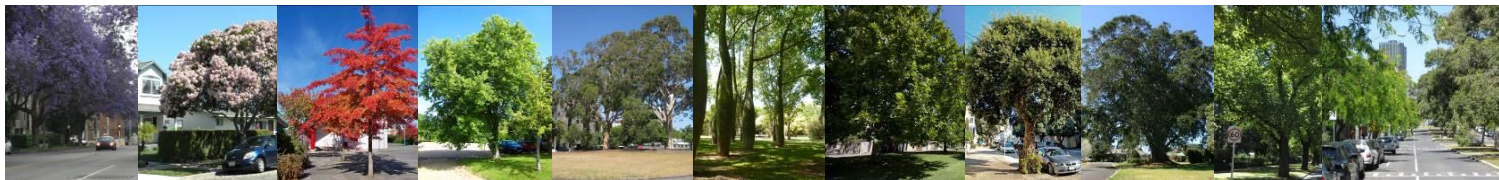
## Central City



## East Melbourne



## South Yarra



# Precinct plans - vision statements

## THE VISION FOR PARKVILLE'S URBAN FOREST

WITH SHADY AND LAYERED VEGETATION, THE ICONIC PARKVILLE URBAN FOREST WILL BE SMART, PRODUCTIVE AND DIVERSE TO SUPPORT PEOPLE AND WILDLIFE WHILE RESPECTING THE EXISTING CHARACTER.



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# Citizen forester program



# What is the citizen forester program?

Community volunteers are **trained** and **empowered** to grow the urban forest and improve urban ecology by carrying out essential **advocacy, monitoring** and **research** tasks.

## Program aims:

- Be fun, educational and rewarding for participants
- Provide useful data and research outcomes for Council that help to improve the health, longevity and size of the urban forest



## Benefits:

- Responded to the demand for more meaningful involvement
- Empowered, resilient community
- Ownership and stewardship of public assets
- Connection and belonging
- Increased capacity – us and them
- Healthier urban forest

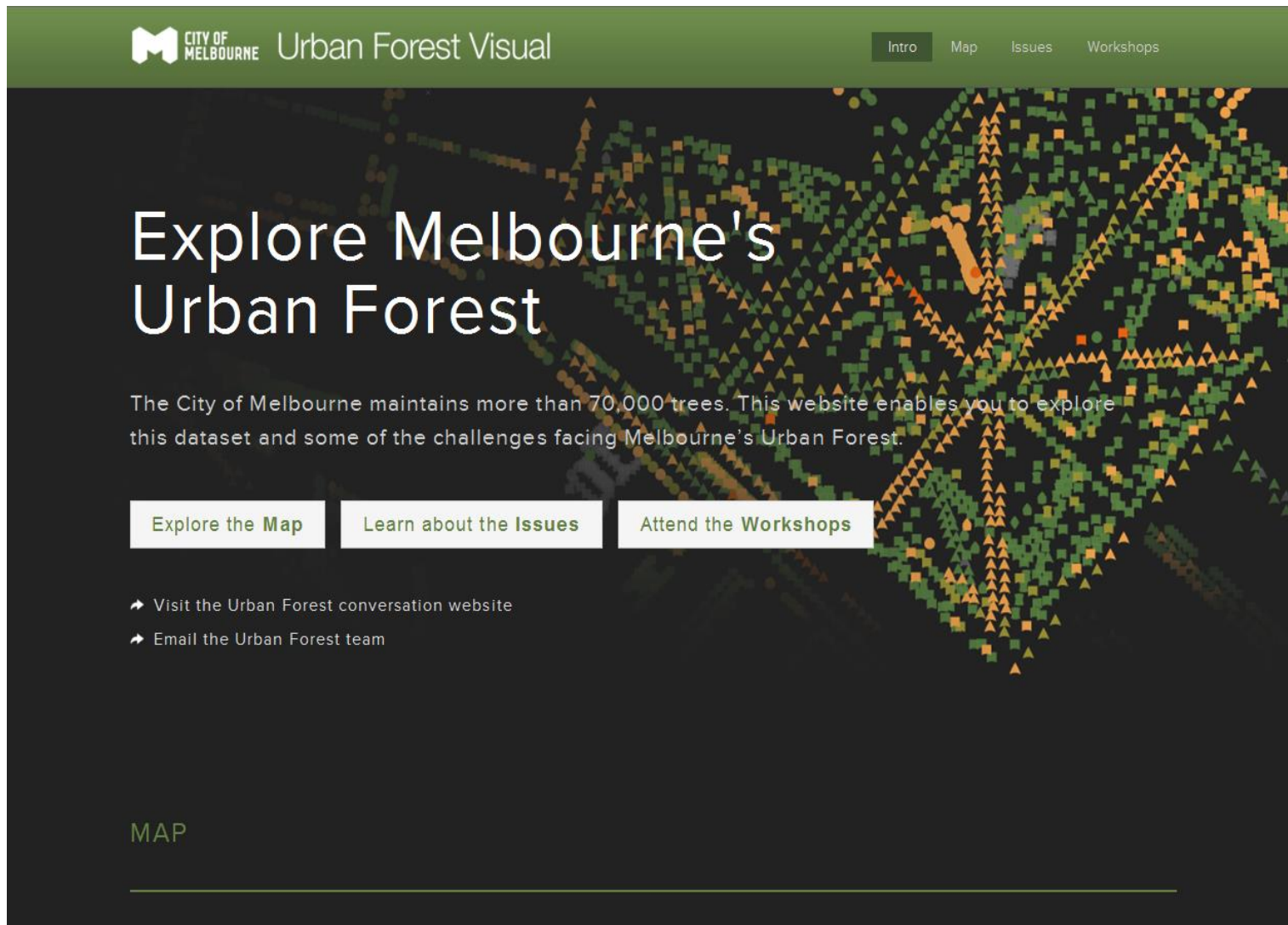



*I'd love to register my interest in the Citizen Urban Forester voluntary projects. It would be an amazing opportunity to help out with any projects and learn more about the nature in our urban landscape!*

- Laney, Citizen Forester

*Thanks to the team for a such an enjoyable and interesting training session yesterday. We'd love to be involved in similar activities in the future.*

- Lee, Citizen Forester



 **Urban Forest Visual**

[Intro](#) [Map](#) [Issues](#) [Workshops](#)

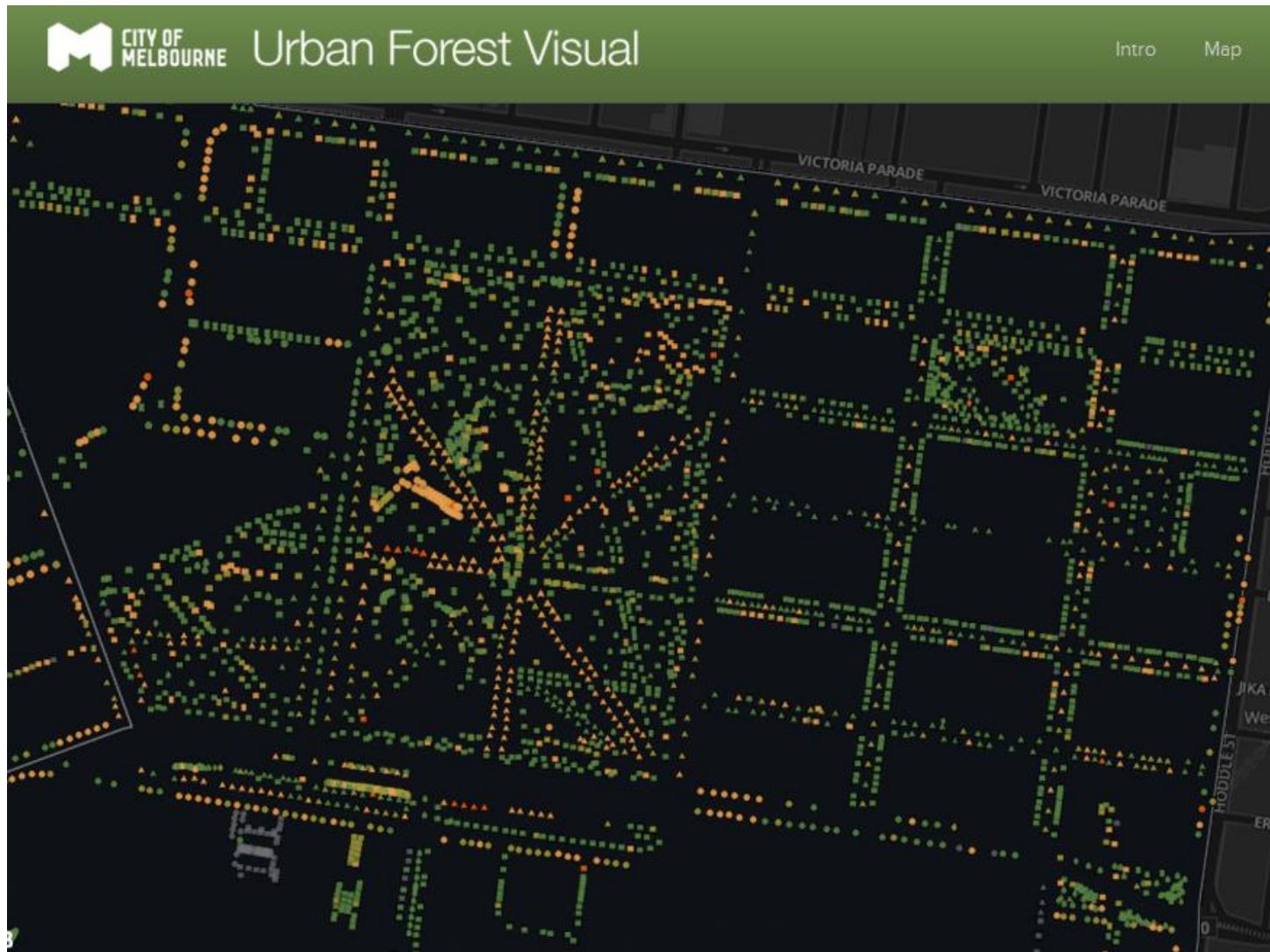
# Explore Melbourne's Urban Forest

The City of Melbourne maintains more than 70,000 trees. This website enables you to explore this dataset and some of the challenges facing Melbourne's Urban Forest.

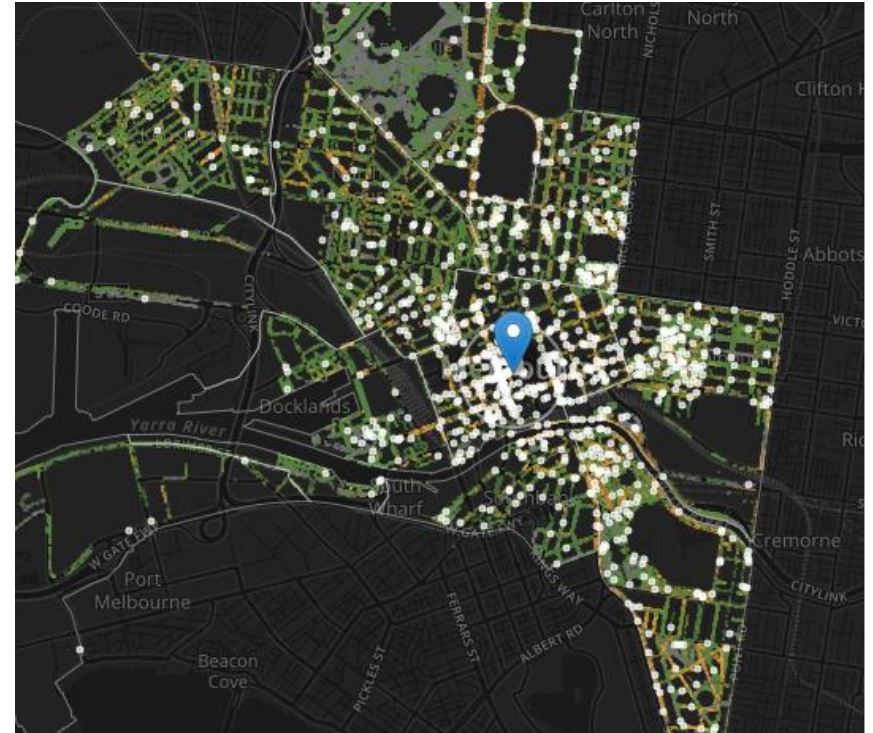
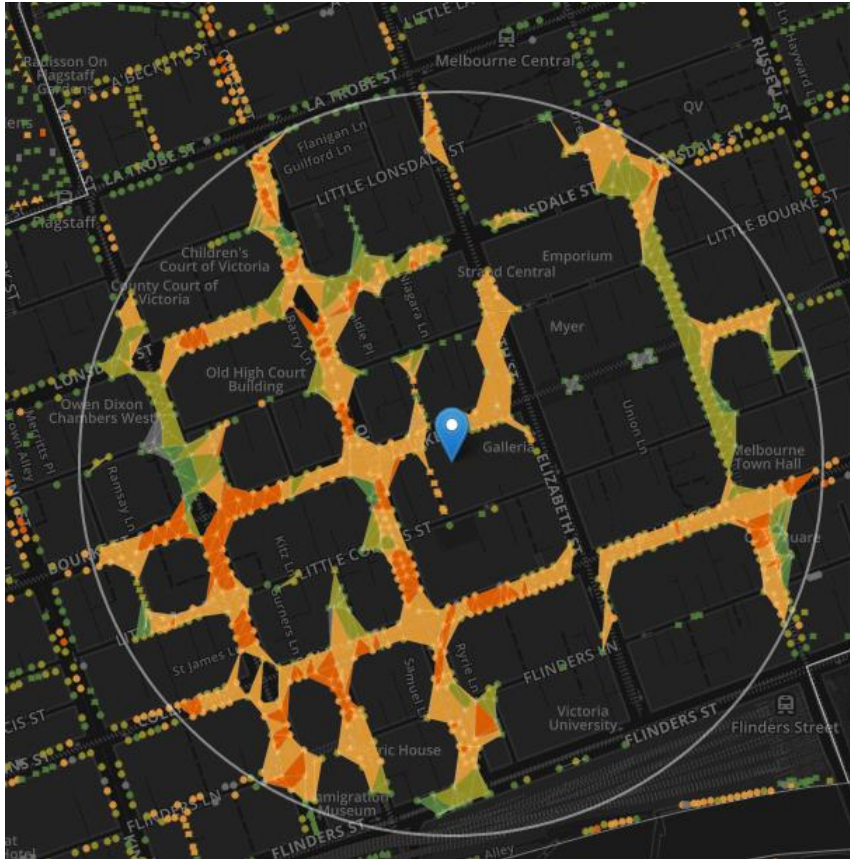
[Explore the Map](#) [Learn about the Issues](#) [Attend the Workshops](#)

- ➔ Visit the Urban Forest conversation website
- ➔ Email the Urban Forest team

MAP



# Urban Forest Visual



Aug 12, 2013

*Dear Tree,*

*If you are that big round  
beautiful low hanging tree I  
think you are my favourite  
tree. Such beauty on such  
an ugly road. Keep up the  
good work.*

Nick



September 22, 2013

*I see you every morning,  
watch you change with the  
seasons. It makes me  
happy knowing you are  
there.*

Alicia



## 'Dialogue' with a Chinese Elm, Tree ID 1030595

*You are a nice tree and I can see you out my window. Hope you are well. Have a nice day. Jamie*

*Dear Jamie, Thank you for your email. I am well and very much enjoying the beautiful weather today. I hope you are too. Chinese Elm 1030595.*

*Chinese Elm 1030595...(or can I call you Dale?), I am loving the weather...but I am stuck inside and am so jealous of you soaking up the sun. You seem to be having a ball out there today. What did you get up to on the weekend? Jamie*

*Dale... I like it. Sorry that you are stuck inside. A lunchtime stroll is a must today. I am really enjoying stretching my stomata and giving my chloroplasts a good workout. I spent the weekend well hydrated and preparing for the summer ahead. You?*

*Dale, I got a little dehydrated on Friday night and then spent the rest of the weekend re-hydrating ;-). You have a prime location for tonight's Brownlow ... you might see some interesting things later in the evening. If you get a chance can you please drop a branch on a Collingwood player or two's head. Anyway, I might pop down and say g'day later.*





## Actions, directions and outcomes

# Royal Park Nature Playground – master plan

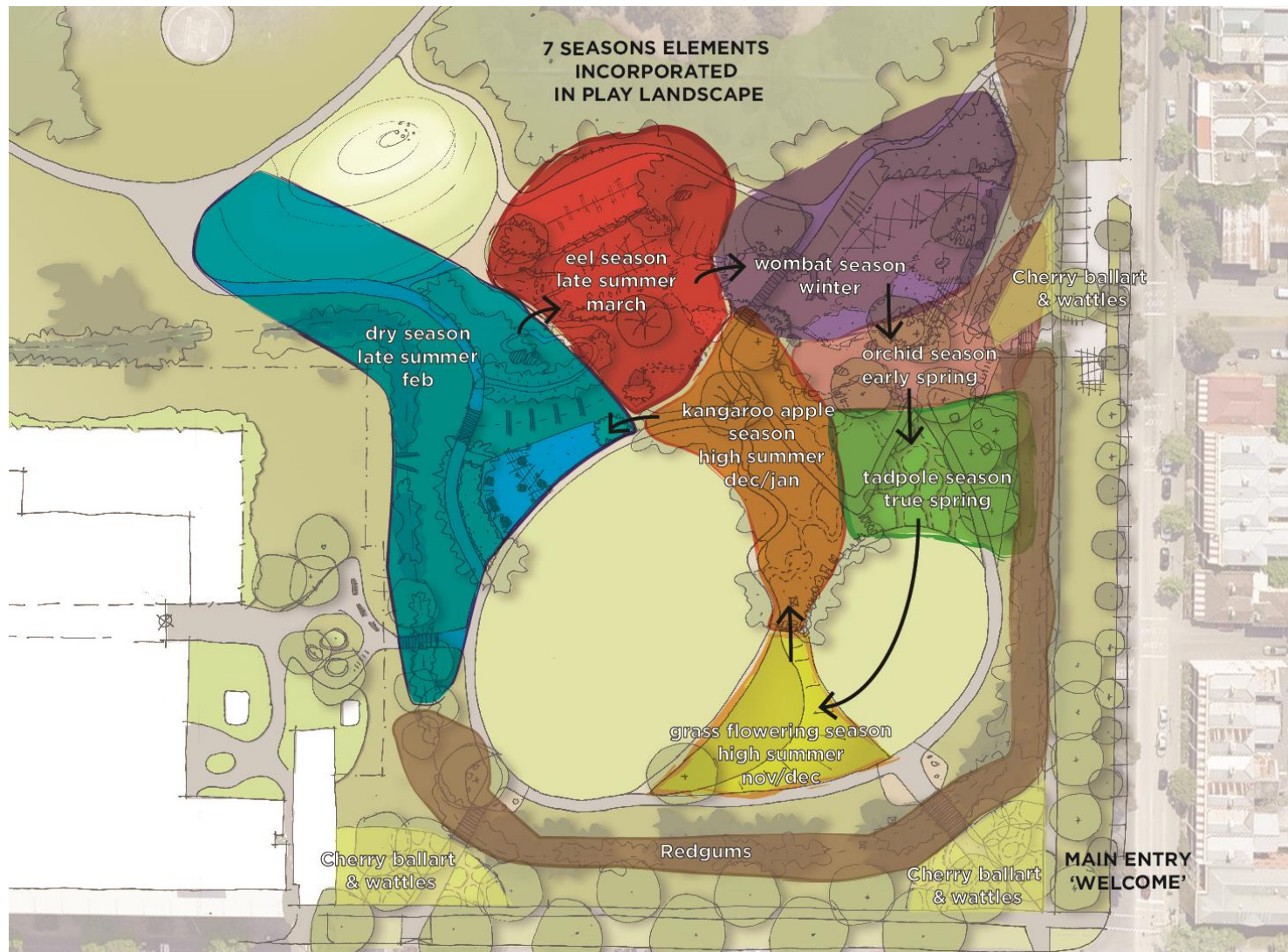


## DESIGN DEVELOPMENT PLAN

# Royal Park Nature Playground – seven Wurundjeri seasons



# Royal Park Playground – Wurundjeri seasons incorporated into play landscape



## Royal Park Playground – Water features throughout



## Royal Park Playground – play spaces for all abilities



## Royal Park Playground – healing spaces



Used global datasets of species distribution and climate to predict:

- Limiting factors to distribution of tree species
- The City of Melbourne's likely future climate
- The vulnerability of Melbourne's current trees
- Potential new tree species from Australia and cities elsewhere around the world



Will support greening projects that are outside the scope of existing work

Public and private realm

The Fund will financially match successful projects dollar for dollar

Will also accept donations from organisations



# Summer Campaign



Highly visible creative executed through CoM owned media:

- flag banners
- outdoor posters
- digital billboards (Y&J and Bourke Street)
- social media
- CoM website
- Melbourne Mag and other CoM publications

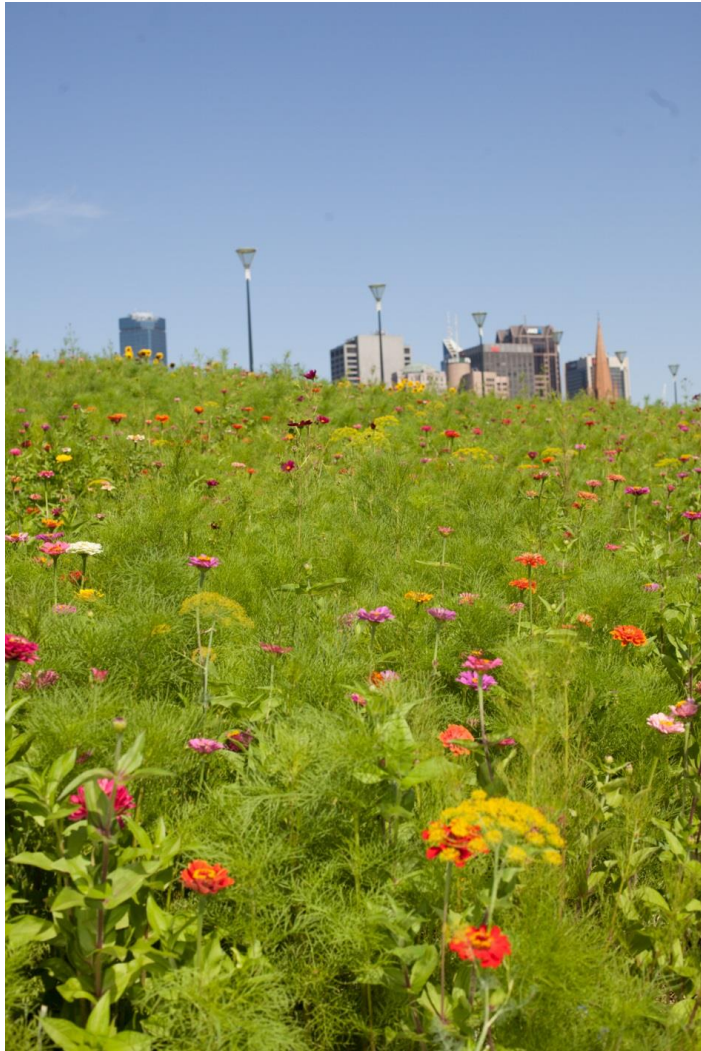
## Summer campaign



## Exhibition Street extension – wildflower meadow



## Exhibition Street extension – wildflower meadow



*Design 'buildings like trees, cities like forests'.*

**William McDonough, 2002**

*Natural and biophilic elements need to be central in everything and anything we design and build, from the individual site to neighbourhoods, to street systems and larger urban- and regional-scale design and planning.*

*From a spatial and ecological perspective the region sets the larger stage in which many of the other biophilic design ideas and planning strategies can be applied. It is the larger canvas – and an important strategy in its own right. A 'rooftop to region' approach is needed. The best biophilic cities are places where these different scales overlap and reinforce biophilic behaviours and lifestyles.*

**Timothy Beatley, 2011**



## A 'green roof'





*... in the urban epoch more than ever we need creative urban design and planning that makes nature the centrepiece, not an afterthought ...*

**Timothy Beatley, 2011**



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