From a Forest in a City to a City in a Forest – Enhancing Melbourne’s Liveability

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Melbourne beginnings
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: 39,512
Green cover: 24.6%
Population: 94,314
Green cover: 13.6%
Singapore – 1986

Population: 2.7 million
Green cover: 35.7%
Population: 4.8 million
Green cover: 46.5%
Cheonggyecheon River Linear Park – urban oasis today
New York City – The Highline
Current and projected environmental conditions
Primary environmental challenges

Three primary challenges facing Melbourne (and cities worldwide):

1. Population growth and intensification
2. Urban heating
3. Climate change
Almost doubling the residential and working population over 30 years
Climate change and urban heat island
Heat-related mortality
National heat pattern – existing and forecast

Heating up: Average number of days per year > 40°C

1990  2050  2100

[Map showing heat patterns for 1990, 2050, and 2100 with color coding for different temperature ranges.]
Melbourne – Mean daily temperature 15° C
Mildura – Mean daily temperature 18º C
Alice Springs – Mean daily temperature 21° C
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
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
Our Goal

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’
City of Melbourne – Integrated suite of strategies

**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 stormwater harvesting
- Increase green space
- Double canopy cover
- Enhance biodiversity
- Adapt to climate change
- Increase building greening
- Become a carbon neutral city

**GOAL** = To cool Melbourne by 4°C

**BENEFITS**
- Improve liveability, resilience, community health and biodiversity
How to address these impacts and lack of resilience?

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)
City of Melbourne Urban Forest Strategy and Precinct Plans
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
Thermal imaging – city centre
Ideal (goal) streetscape response
Ideal streetscape – thermal image
Increasing canopy cover efficiently
Turning streets into parks – North Melbourne

The image shows a plan view and an aerial view of a park created by converting streets into a greenspace. The park is located at the intersection of Harcourt Street and Errol Street, which is adjacent to Courtney Street. The plan view highlights the key streets and the park area, while the aerial view provides a bird's-eye perspective of the park and its surroundings. This transformation aims to enhance the urban environment and provide residents with more green spaces for recreation and relaxation.
The Rooftop Project

- 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

Extensive green roofs are lightweight vegetated landscapes with a shallow layer of growing substrate (less than 20cm deep). They generally have lower water requirements and use small, low-growing plants. Green roofs help to cool the city, improve building thermal performance of buildings, increase urban ecology and biodiversity, provide amenity, increase property values and reduce stormwater volumes.

Look at the map to find your property and see what potential your roof has to be turned into a green roof.
Adaptation Potential by Area (ha)

<table>
<thead>
<tr>
<th>Area (ha)</th>
<th>Solar</th>
<th>Cool</th>
<th>Green Roof - Intensive</th>
<th>Green Roof - Extensive</th>
</tr>
</thead>
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<tr>
<td>Not Feasible</td>
<td>118</td>
<td>145</td>
<td>437</td>
<td>123</td>
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<tr>
<td>Highly Constrained</td>
<td>12</td>
<td>72</td>
<td>83</td>
<td>94</td>
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<tr>
<td>Constrained</td>
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<td>Moderately Constrained</td>
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<td>121</td>
<td>156</td>
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<tr>
<td>Low Constraints</td>
<td>257</td>
<td>208</td>
<td>67</td>
<td>80</td>
</tr>
<tr>
<td>No Constraints</td>
<td>380</td>
<td>51</td>
<td>169</td>
<td>248</td>
</tr>
</tbody>
</table>
The total additional storage volume required for the Elizabeth St Catchment was modelled at 6.8 ML.
To inform 2018 target:
External research (CRC WSC)

Reduced peak under tree canopy

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

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

Figure 18. 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.
Integrated water management – Elizabeth Street
Existing / known / expected opportunities

- Canopy cover
- Irrigation priorities
- Open Space opportunities
- Future development
- Major landowners
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
Water Sensitive Urban Design – street tree pits
Water Sensitive Urban Design – stormwater harvesting

Darling Street, East Melbourne
WSUD – ‘green streets’ structural soils and permeable asphalt
WSUD – permeable bluestone paving
Urban Water website

The **story of water**

For a general community audience
Explain what we are doing and why

... evolved into a unique communication tool

If you were a green lacewing, your intricate wings would be much longer than your body!

Green lacewings are part of a group of insects called lacewings. There are about 5,000 species of lacewing in the world, with more than 600 species live in Australia.

Lacewings are soft-bodied insects with long, slender bodies. They can be green, brown, or even red. Their green compound eyes can see in three dimensions like an eagle. They have transparent wings covered in tiny veins that look like delicate lace. The wings can help against their body by a third.

A female lacewing can lay more than 100 eggs on leaves, fungi and even on your windows. The eggs can take up to two weeks to hatch. After they are out of the eggs and other predators, they are very rare to see a lacewing or its distinctive eggs.

YOU HAVE TO LOOK CLOSERLY TO SEE INSECTS, THEY CAN BE VERY SMALL. BUT, IF YOU PAY ATTENTION, YOU'LL START TO SEE AMAZING INSECTS EVERYWHERE!
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
Community engagement – multiple tools

- **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’
Community partnership – Urban Forest precinct planning

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

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.

PHOTO QUESTIONNAIRE

UPDATE
Precinct planning workshops – word clouds
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
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
Outcomes

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
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
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
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.
Royal Park Nature Playground – master plan

DESIGN DEVELOPMENT PLAN
Royal Park Nature Playground – seven Wurundjeri seasons

- **Biderap** (dry season)
- **Buath Gurrud** (grass flowering season)
- **Kangaroo Apple season**
- **Pornewet** (tadpole season)
- **Guling** (orchid season)
- **Waring** (wombat season)
- **Luk** (eel season)

seven wurundjeri seasons
Royal Park Playground – Wurundjeri seasons incorporated into play landscape
Royal Park Playground – Water features throughout
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
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
Create spaces for people
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