

# HAPPY & HEALTHY COMMUNITY

Worsening Mental Health due to Urban Densification



## BACKGROUND

A healthy and happy community is one in which all residents have access to quality education, safe and healthy homes, transportation, places for physical activity, social interaction and nutrition. This helps to ensure long term economic, environmental and social sustainability.



## URBAN CHALLENGE



**Worsening Mental Health**  
The United Nations Population Division estimated that 60% of the world's population will reside in cities by 2030. Urbanisation has led to the deterioration of the health and well-being of the native population.

**Promoting Mental Health & Wellbeing**  
Globally, 1 in 6 people have one or more mental disorders (World Health Organisation, 2017). Those who use green spaces for physical activity at least once a week will have about half the risk of poor mental health than those who do not (Mitchell, 2013). Furthermore, every extra weekly use will reduce the risk of poor mental health by a further 6%.

## SUSTAINABILITY RATINGS IN MELBOURNE



## ABOUT THE SITE: UNIVERSITY OF MELBOURNE

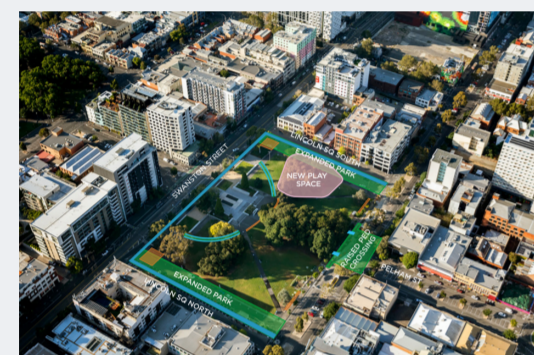


### University Square

- Ageing landscape
- Student activities conducted once a year
- Frequent crossing area for Business and Law students

Recognized for:

- Comprehensive Sustainability Charter and Plans
- Fostering health and well being of students
- First university to commit to achieving Green Star Communities rating
- Commitment to zero net carbon emissions from electricity by 2021 and carbon neutrality before 2030



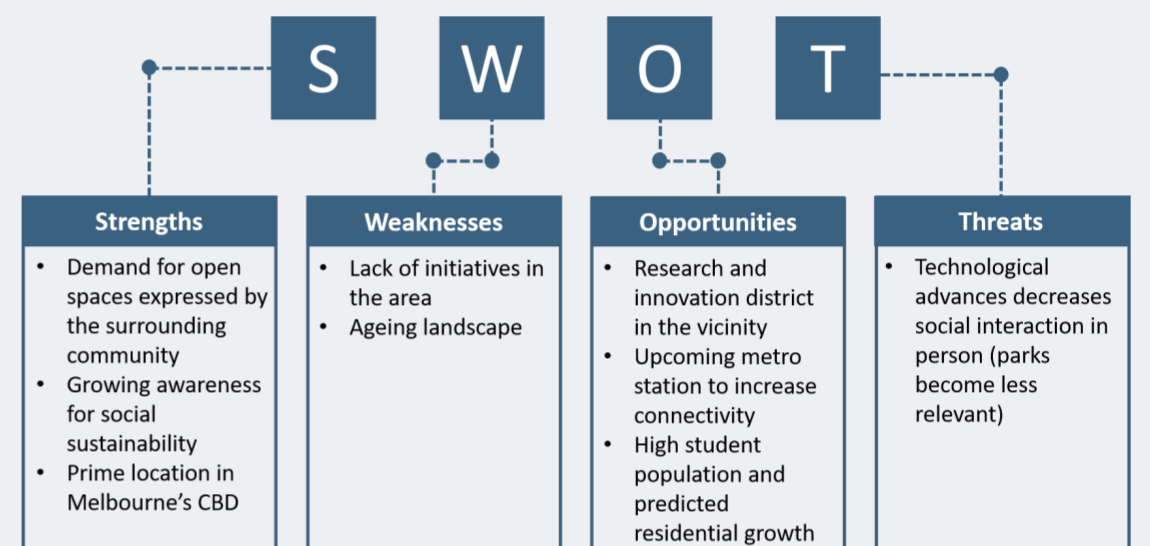
### Lincoln Square

- Park for general public
- Based at the heart of Melbourne's innovation district
- Currently under redevelopment for future park expansion, additional tree planting and facilities improvements



### Market Analysis

- UoM is an education precinct located in Carlton
- Median age of the population is 25 and 75% of the population is in the 15-29 year old age group



## CASE STUDY



### Kendall Square

- Adopting placemaking strategies in existing public spaces to achieve community vibrancy in the area
- Embracing ideas to form memorable and meaningful experience for the people
- Integration of open plazas for concerts, farmers' markets and canoeing



### Byrant Park

- Publicly owned, privately managed and financially self-supporting
- Food kiosks and restaurants, other facilities like an open-air library called The Reading Room, board game stations where people can borrow Chinese chess and quoits and other events available at the lawn
- Daily attendance counts often exceed 800 people per acre
- Profitable because the people identify with this place

## OUR PROPOSAL



### Vision and objectives

1. Shaping a 21st Century Park in Lincoln Square and University Square
2. Ensuring that it is socially sustainable, vibrant and inclusive for everyone, creating a happy and healthy community

### Site Plan

#### University Square



#### Lincoln Square



### Legend

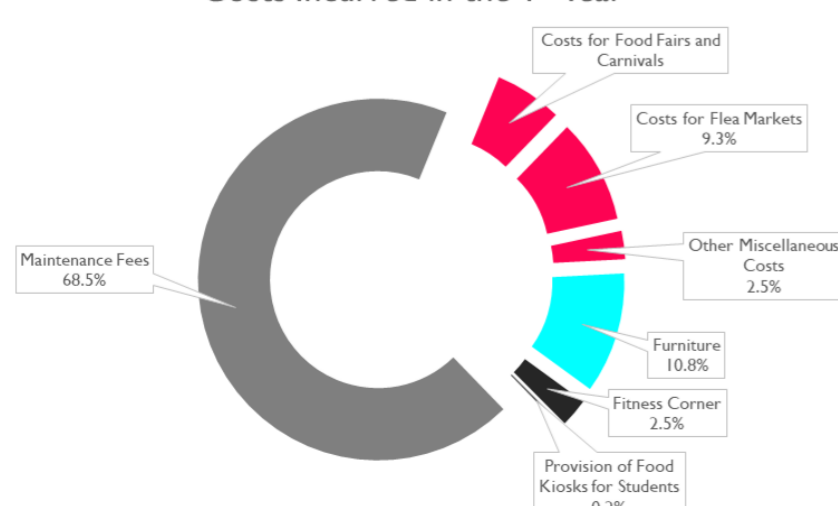
#### Existing Plans

- 1 Planning For Trees
- 2 Barry Street New Park Spaces
- 3 Leicester Street Road within a Park
- 4 Plaza and Grattan Street
- 5 Water Terrace
- 6 The Green
- 7 Pelham Street Park Front And Biodiversity Corridor

#### Proposed Plans

- 8 Stage
- 9 Food Truck (for external vendors)
- 10 Food Kiosks (for students)
- 11 Community Garden
- 12 Fitness Corner

### Costs Incurred in the 1<sup>st</sup> Year



### Feasibility

1. Initial outlay for this project will be \$26,800 and other costs are predicted to be \$170,930 in the first year
2. With the revenue from the food kiosk, food fair and carnivals, we expect to breakeven by Year 2.

## Plans

### Facilities Plan

- 1 Food trucks and kiosks
- Addition of fitness corner
- Interactive spaces



### Communal Plan

- 2 Community garden
- Public participation



### Facilities Plan

- 3 Casual events
- Flea markets
- Food fair and carnivals

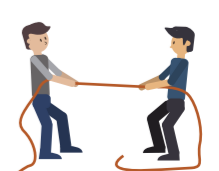


## Projected Timeline

- Jan 2020: Community and stakeholder engagement - Ideation
- Jun 2020: Community and stakeholder engagement - Final Draft
- Jan 2021: Demarcation works for the community garden, new facilities and leasing of food trucks
- May 2021: Leasing of booths for flea market and reminder notice for the grand opening
- Jun 2021: Press release announcing the grand opening of University Square and Community Garden

## Limitations & Challenges

- Ensuring Social Sustainability of Green Spaces for All
- No One Size Fit All Solutions
- Success of the proposal is dependent on the end users









# MELBOURNE GREEN CLUSTER

*Green Ecosystem where Innovative Minds & Sustainable Community meet*

## 1 WHAT IS GREEN URBAN ECONOMY?

An economy in an urban area which champions sustainable growth while benefiting the human development and preservation of the environment in the long run.

## 2 CURRENT CHALLENGES FACED

-  Lack of Job Opportunities due to Growing Population
-  Climate Change
-  Decline of low -manufacturing industry
-  Over-reliance on Mining Industry

## 3 PROPOSED STRATEGIES

GREEN VILLAGE

ECO INDUSTRIAL HUB

URBAN FOREST



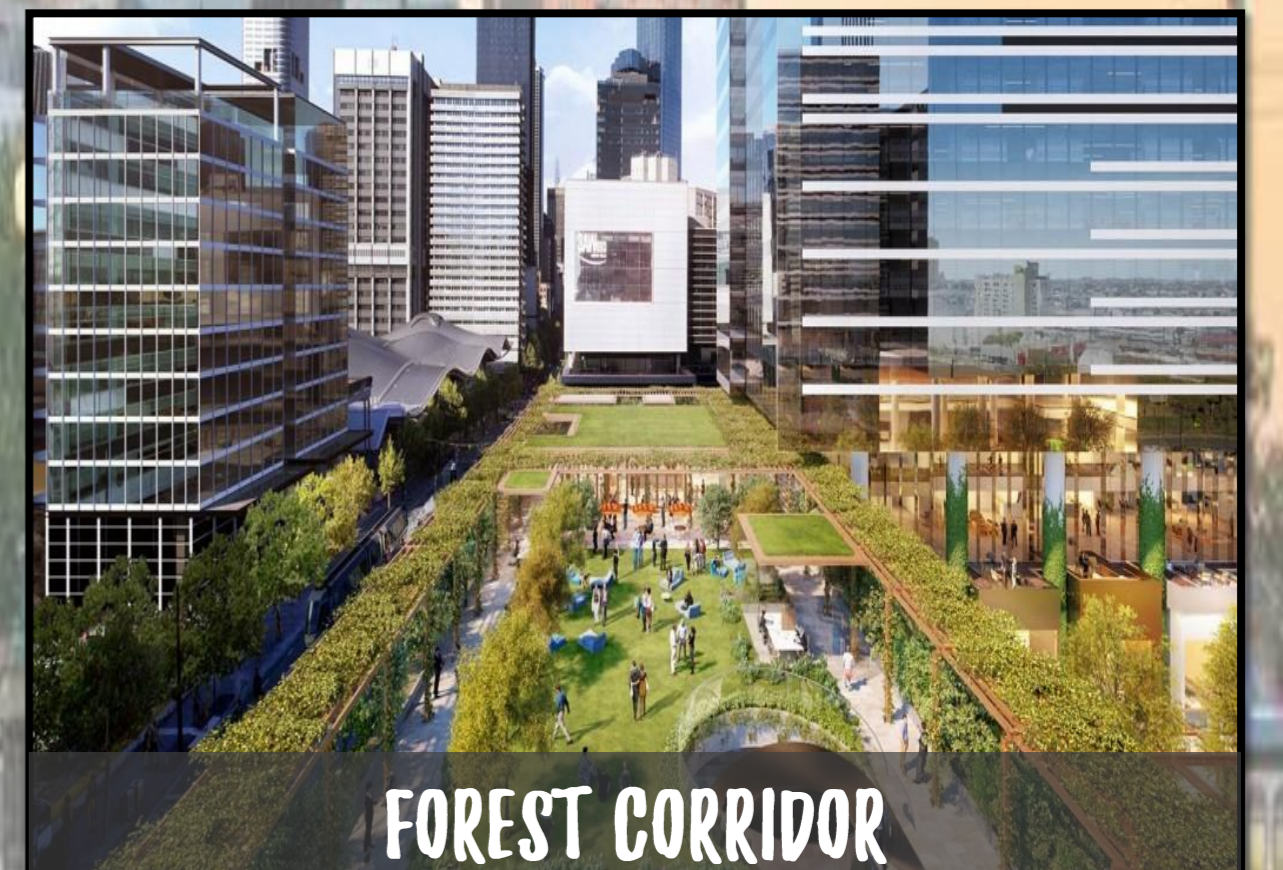
BIKE LANES

1. Improve commute of cycling
2. End of Trip Facilities



RESEARCH DEVELOPMENT

1. Test-bedding of Green Technologies
2. Sustainable Green Companies



FOREST CORRIDOR

1. Network of Cycling & Walking Paths
2. Lush Canopy of Greenery



URBAN FARM

1. Farm to Table concept
2. Community Events



GREEN EDUCATIONAL CENTRE

1. Green Skills Training: sustainability & energy efficient sector



SOLAR FARM

1. Electricity supplied to Eco-Industrial Hub and neighboring buildings



GREEN LUNG

1. Skypark with Community Green Space
2. Gathering Point for Community Events

## 4 OUTCOMES

### PRODUCTION

11.8% Increase in Annual Production to 18.9 Tonnes BY 2030



FARM TO TABLE

### GREEN SPACE

Promoting a Healthier and Active Community



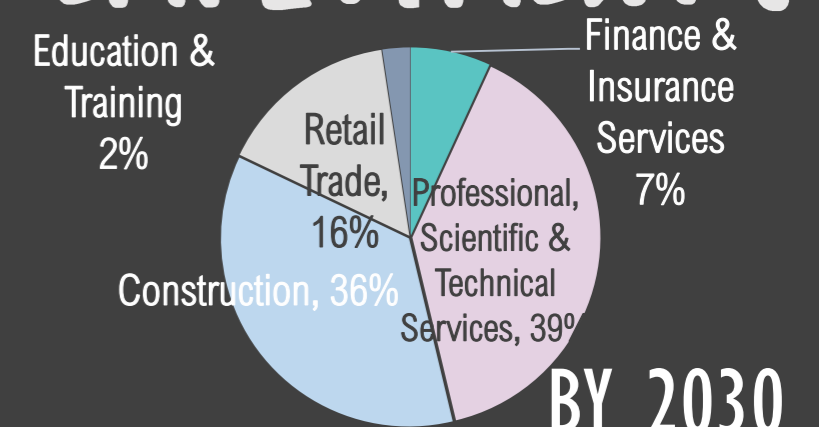
ZERO CARBON

### GREEN RATINGS

- 6 GREEN STAR — Design & As-Built
- 6 GREEN STAR — Communities
- 5 STAR —Nabers Water
- 5 START —Nabers Energy



### EMPLOYMENT



OPPORTUNITIES



# SMART URBAN INFRASTRUCTURE

Smart urban infrastructure as its name suggested using smart technology such as the information and communication technology (ICT), 5G technologies, and IoT (Internet of things), etc. to transform infrastructure to make the city more sustainable and to enhance citizen's living experiences

## SWOT ANALYSIS

### Rising Population

- Fastest population growing city in Australia
- Projected to reach 8 million by 2030
- Adding pressure to urban infrastructures

### Climate Changes

- Heat waves, floods, droughts and rising sea levels
- The urge to reduce carbon emission

### STRENGTHS

- Strong government support & involvement
- High participation from the public
- Advance in technology development

### WEAKNESSES

- High maintenance cOst
- Lack of public and private collaborations
- Low citizen's awareness & social interaction
- Low on information security and risk control

### OPPORTUNITIES

- Enable Melbourne To move to a higher stage of digital and intelligent city
- Smart Urban Infrastructure: enhance the efficiency and citizen's quality of life
- Strong business market opportunities

### THREATS

- Economic uncertainty
- Involvement of different stakeholders hinders the project development
- Smart Urban Infrastructure has high reliability on IT network
- Risk on data privacy and security

### Transport Strategy in Melbourne

Melbourne being the leader in innovating and piloting technology

1/9 Major initiatives of Melbourne build a connected city

#### Deputy Lord Mayor

"Crucial parking data will help increase parking efficiency, cut greenhouse gas emissions, improve traffic flow, relieve stress and increase visitation to the city especially for those who can't use other modes of transport and need to travel by car."

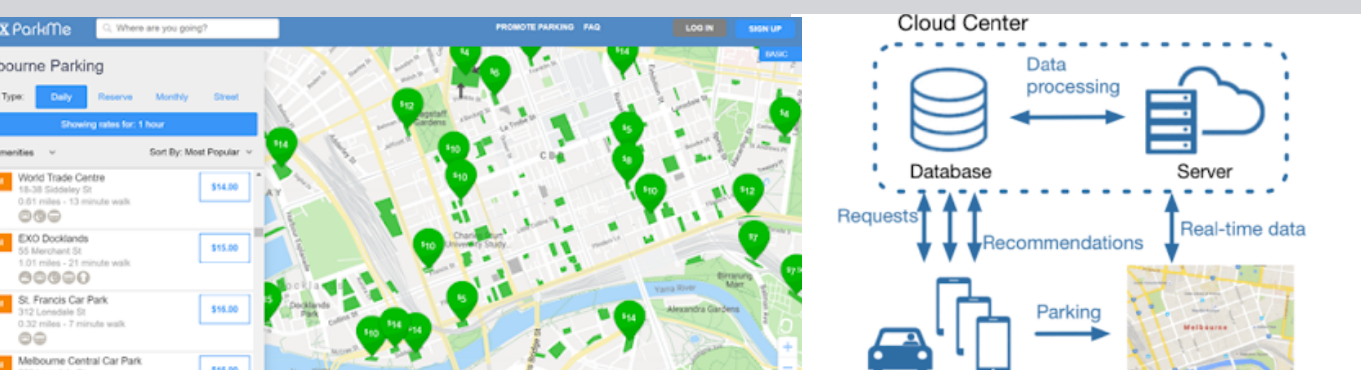


## SMART PARKING

Smart sensors for better decisions

### IoT-Based Smart Parking Technology

5228 sensors are installed across CBD. Sensors record the arrival and departure time of a car from the parking bay. When a vehicle has exceeded the time permitted in a parking bay or other parking violations are detected, the information will be forwarded to the parking inspectors, but not linked to the council's ticketing machines. Hence, the parking inspector in the vicinity will receive a notification from the sensor immediately and issue a parking fine electronically after checking. Provide real-time open data to the public. Encouraged Entrepreneurs and developers to develop apps, products and services which utilise smart technologies.



### Effectiveness

- Ensure parking compliance, maintains law and order
- Revenues from parking fines (From \$39,066,000 to \$44,347,000)
- Increase the productivity of the enforcement officials
- government decision-makers work with the app developers to implement smart technology
- Council can address parking resource allocation, traffic congestion, pollutant levels, community productivity and improve community quality of life.

### Costs

- Funding is set aside for transport infrastructure
- The city has invested heavily into its technology and research
- Incurring costs for sensors maintenance, cloud services, open data management and on-street Parking Guidance System/app.

## CLEANCUBES

#### 1 Clean Cube

Solar-powered waste compacting bin also senses bin fill-level and sends real-time data to Clean City Networks.

#### 2 Clean Cap

Wireless bin fill-level sensor. Senses bin fill-level and sends real-time data to Clean City Networks.

#### 3 Clean City Networks

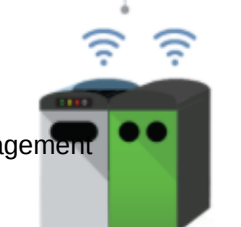
Real-time monitoring and data management platform. Provides optimization of collection routes.

#### 4 Smart Collection Planning

Collection requires less trucks, fuel, and time, reducing operational costs by up to 80%.

#### 5 Greener Environment

Eliminates overflowing bins and reduces harmful gas emissions, resulting in cleaner cities.



### Figures and facts

AVM and AVM Integrated Service system (AVMIS) highlights: real-time data processing and delivering historical vehicle data storing and analysing scheduled timetables monitoring

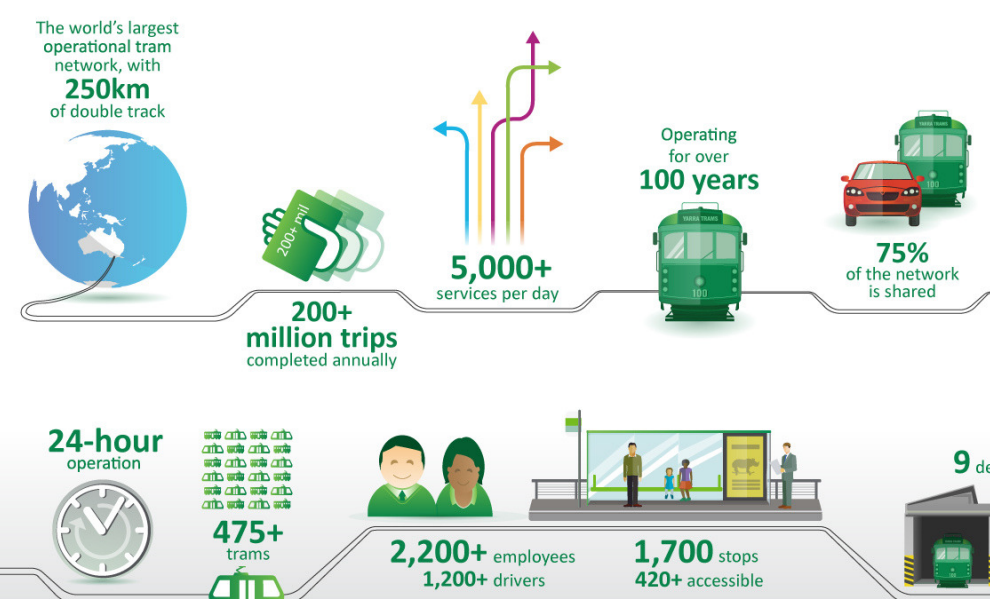
#### Sustainability

- issued solved: traffic priority trams share 75% of the network with other road traffic
- premium line strategy: E-class trams "Route 96"
- Improved punctuality and increased frequency 100% accessibility for passengers with reduced mobility
- Reduced travelling times
- Enhanced passenger information

#### Costs

FY12 to FY18: remains steadily at 0.2 to 0.3 billion - 4.3% to 5.9% of total expenses

## YARRA TRAM



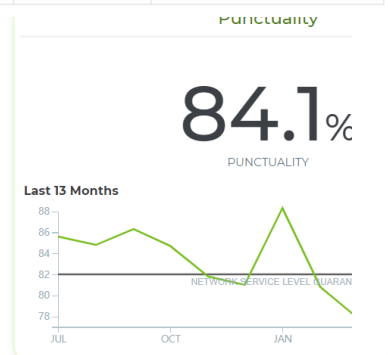
## Performance

### Monthly reliability

Mode of transport	Target	July 2019	June 2019 (previous month)	July 2018	12 month average
Metropolitan train	98.5%	98.4%	98.4%	98.6%	98.4%
Metropolitan tram	98.5%	99.1%	99.1%	98.7%	98.5%
Regional train (V/Line)	96.0%	97.5%	97.0%	96.7%	96.5%

### Monthly punctuality

Mode of transport	Target	July 2019	June 2019 (previous month)	July 2018	12 month average
Metropolitan train	92.0%	91.3%	88.3%	92.5%	91.0%
Metropolitan tram	82.0%	85.1%	84.1%	85.6%	83.1%
Regional train (V/Line)	92.0%	89.8%	88.2%	85.9%	87.2%



### Effectiveness

- Reduce number of trucks on the road
- Reduce carbon emission
- Educational purposes on environmental awareness
- extra revenue

### Costs

- A budget of \$200,000 is side aside for waste management
- High initiate costs

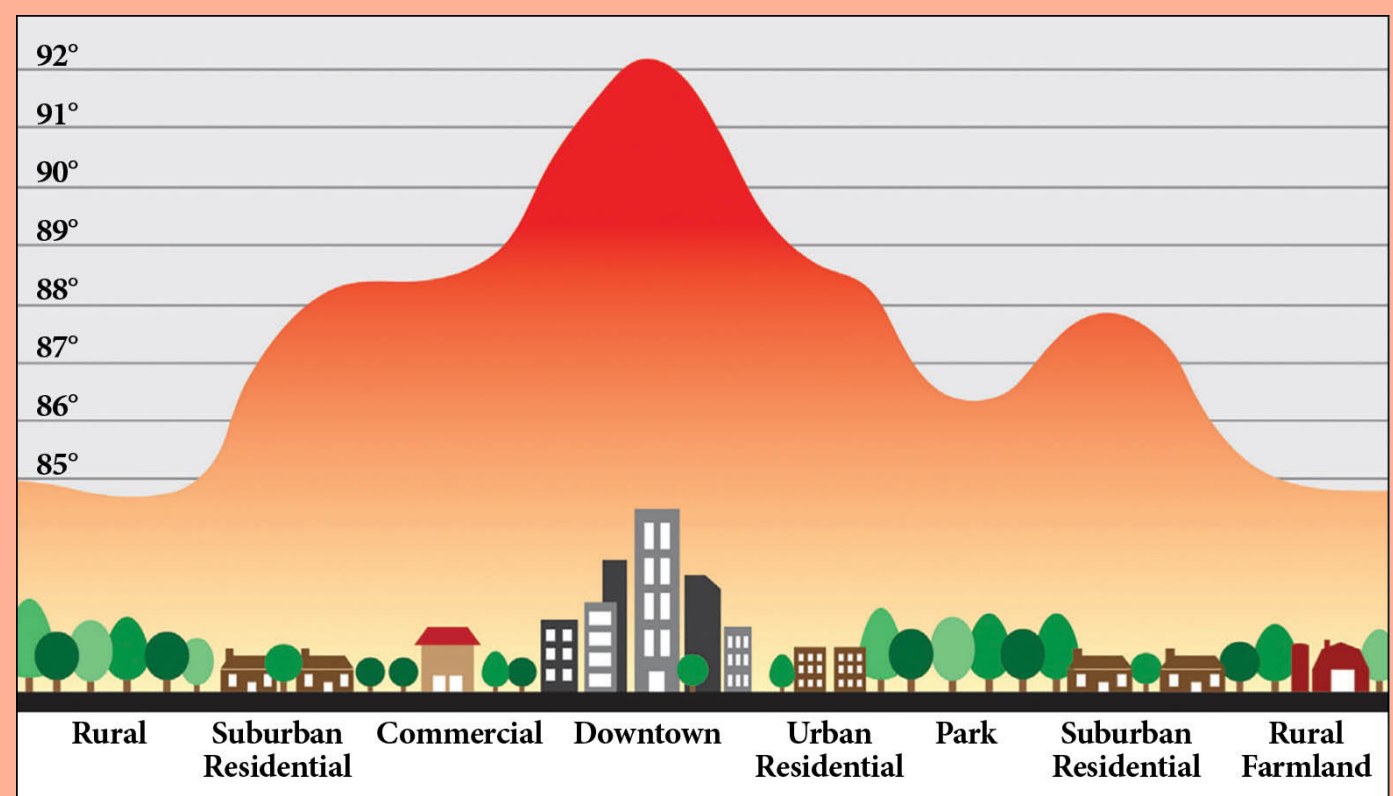


# Victoria Harbour, the model for a Low Carbon City, Melbourne



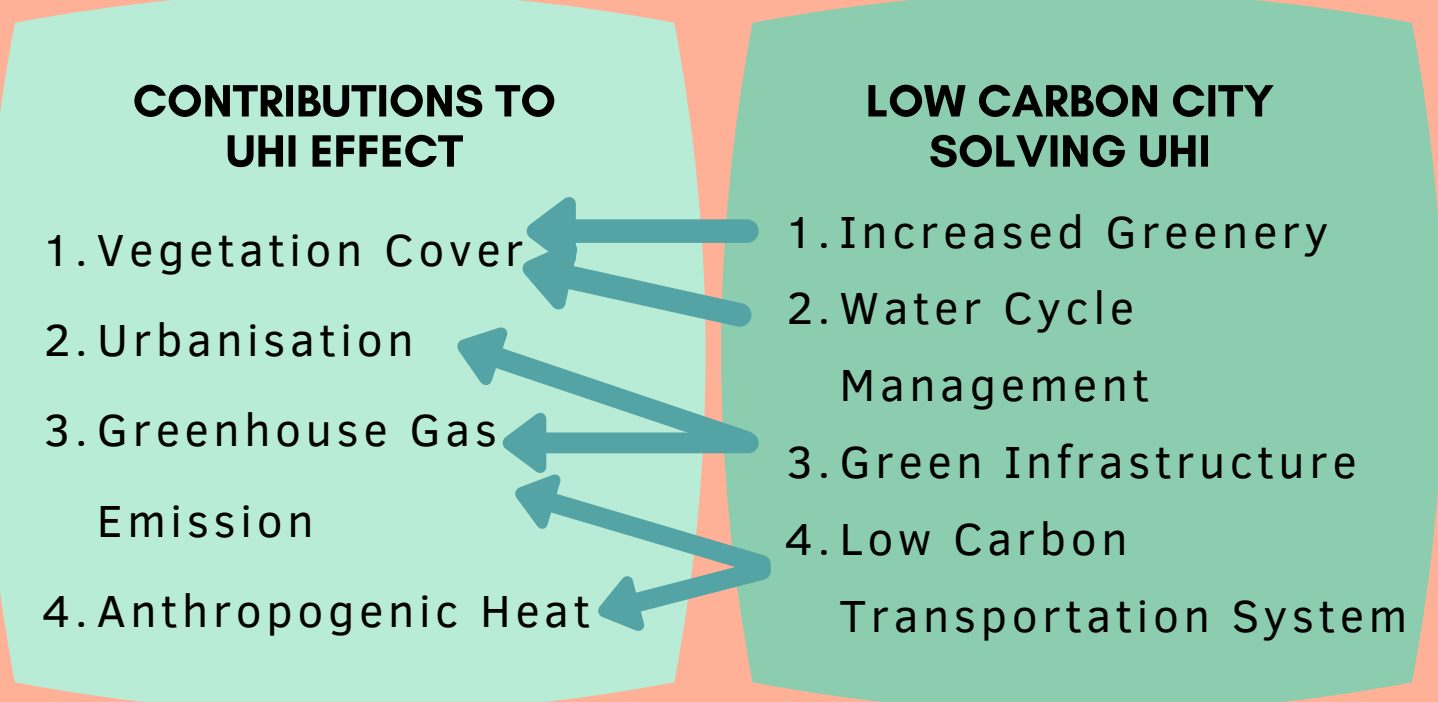
Lee Koon Xin, Lois (A0157541E), Ong Shen Yi (A0157338X), Tay Wei Hao Marcus (A0155185B)  
 Tham Jing Hui, Claire (A0161893W), Tng Yee Fong (A0159946J)

## URBAN CHALLENGE : URBAN HEAT ISLAND EFFECT



**Definition: Urban Areas Having a Higher Temperature Compared to Rural Areas**

Urban areas are **7% WARMER** than rural areas



**ALARMING FACT: THE 2009 HEATWAVE IN VICTORIA KILLED MORE PEOPLE THAN BUSHFIRES IN THE SAME PERIOD**

- Significance:**
- Projected increase in urban population growth increases rate of urbanisation
  - Affects liveability of the population, especially the elderly, sick & socially disadvantaged

## SUGGESTIONS FOR MELBOURNE

- INCREASE VEGETATION COVER**  
Green Roofs and Walls
- ALTERNATIVE ENERGY SOURCES**  
Adoption of Nuclear Energy
- INCREASE VEGETATION COVER**
  - Mandatory Planning Policy
  - Financial Incentives

## 1. TRANSPORT ORIENTED DEVELOPMENT (TOD)

- INTEGRATED NETWORK OF ACTIVE MOBILITY TRANSPORT**
- Bike parking & showering (NAB, Myer, ANZ buildings)
  - Increase public transportation network (tram 11, 42, 48)
  - Formalised bike & car sharing roads
- INTEGRATED PLANNING: HORIZONTAL MIXED USE TYPOLOGY**
- Compactness as a principle - reduce sprawl
  - Residential, office & amenities (location: cross junction of Bourke Street & Collins Street) in walking distance
  - Usage on automobile decreases

## 2. CITY GREENING

**INCREASING GREEN AREAS IN VICTORIA HARBOUR**

Docklands has significantly more trees than other precincts near the CBD (South Bank and Fishermans Bend)

Essentials of an Urban Forest:

- Canopy cover
- Species and age diversity of trees

**DID YOU KNOW?**

- Older trees store more carbon in their biomass
- Younger trees sequester more carbon
- Together, they absorb significant amounts of CO2 from the atmosphere!

## 3. GREEN BUILDINGS

- CONSTRUCTION**
- Victoria Docklands is a showcase of sustainable low carbon timber buildings
  - Timber is easily recyclable and easier to handle on site
  - Examples: Forte Living & Library at the Dock
- OPERATION & MAINTENANCE**
- All buildings in Victoria Docklands meet the usual sustainability features
    - E.g. natural lighting, waste management, energy conservation
  - Library at the Dock: full height glazing maximises natural lighting
    - Designed to be passively ventilated
    - A 85-kilowatt solar PV system on the roof
  - The Gauge: water efficient technologies
    - Onsite black water sewage treatment system recycles 92% of water annually

**VICTORIA HARBOUR HAS THE HIGHEST CONCENTRATION OF GREEN BUILDINGS IN MELBOURNE**

## 4. URBAN GREEN LIFESTYLE

DECOMPOSING WASTE EMITS LARGE AMOUNTS OF CARBON, SO...

**REDUCE, REUSE AND RECYCLE**

**27% OF THE WASTE IN VICTORIA HARBOUR IS ORGANIC**

**Urban Reforestation Project**

- Encourage the community to grow and prepare it's own food
- Reduce energy, waste and water

**Organic waste fell from:**

- 27% to 9% by volume
- 61% to 26% by weight



# THE LEAGUE OF RESILIENCE

# SUPERHEROES

**FEATURING:**

Melbourne's very own superheroes... CERES & Merri Creek!

## INTRODUCTION

Superheroes symbolize resilience as they have the ability to withstand and absorb the impact of Villains.

Today, cities are facing imminent threats such as **Acute Shocks & Chronic Stresses**, which will lead to severe problems socially, physically and economically...

Therefore, every city needs a league of **resilient** superheroes to ensure that it has the capacity to:

**SURVIVE, ADAPT, GROW & RECOVER**



## VILLAIN OF THE DAY: CLIMATE CHANGE

Climate Change has led global temperatures to be on the rise for decades, largely due to greenhouse gases produced by human activities.

It has caused changes in arctic temperatures and ice, unpredictable changes in precipitation patterns and extreme weather events.

As Climate Change worsens, **dangerous weather events** are becoming more severe and frequent.

Cities are facing a potentially staggering expansion of threats over the coming of decades that...

**threatens the liveability of a city**



## AUSTRALIA'S HEADLINES

### BREAKING NEWS!

#### Thunderstorm Asthma! (2016)



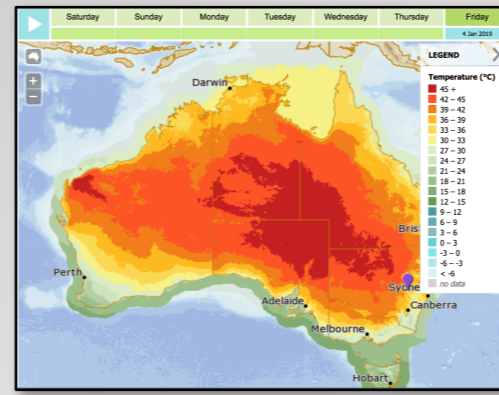
9 Dead! Hundreds Hospitalized

#### Flash Flood ALERT! (2018)



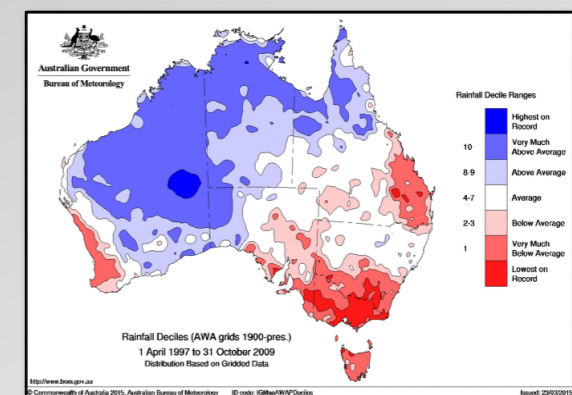
30mm of rain falling within 15 minutes!  
Immediate Closure Of Trams!  
Disastrous floods in CBD!

#### Worst Heatwave of History! (2019)



Temperatures predicted to hit...  
**46 Degree Celsius!**  
More than 60,000 households face power outages in regional areas!

#### Millennium Drought (2001 - 2018)

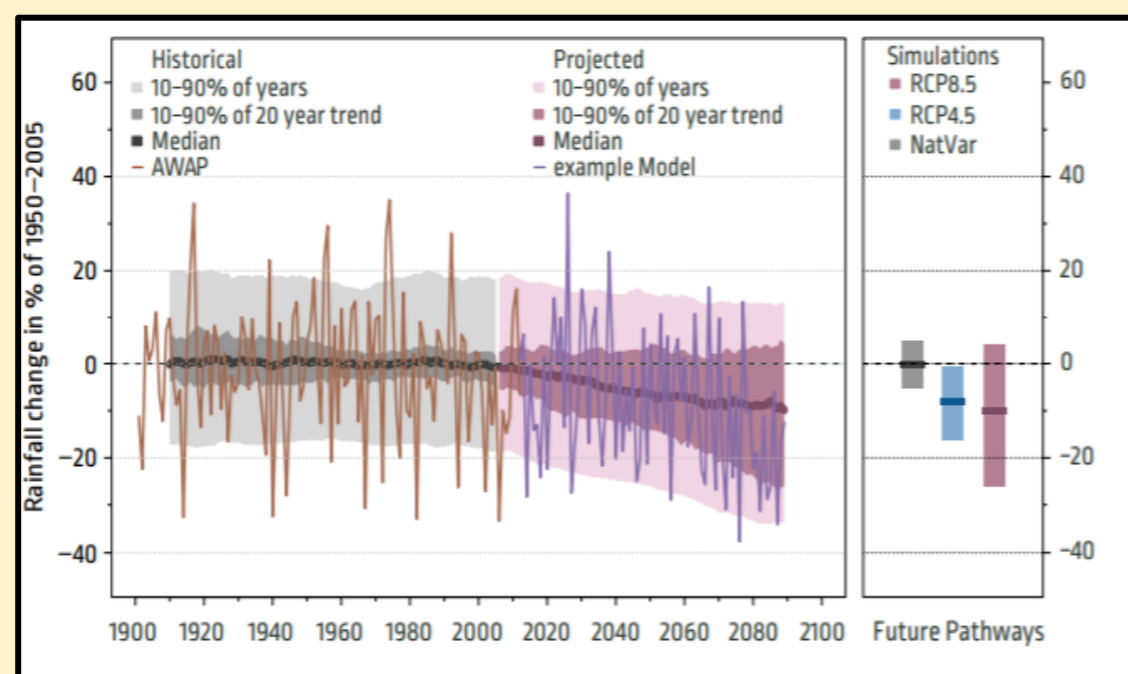


Huge Threat to Agriculture & live stocks!  
Negative Impact for almost 2 decades!

## STATISTICS & DATA

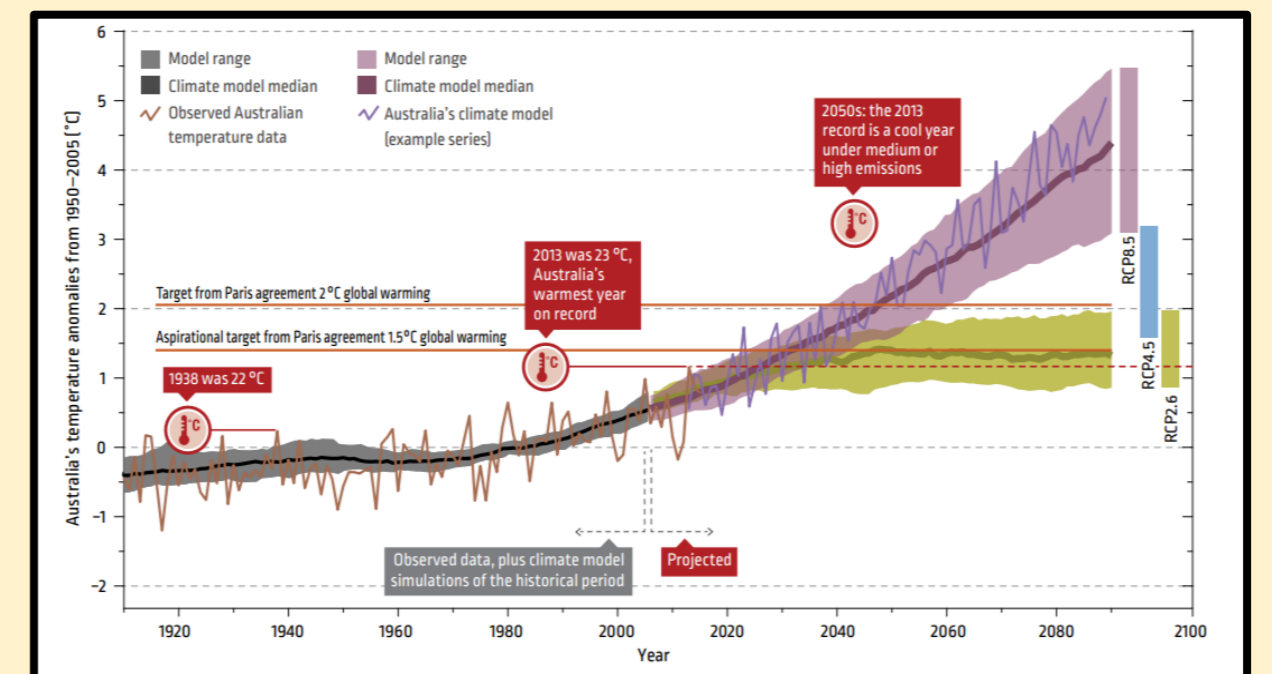
The volatility of rainfall especially in southern Melbourne, growing on a negative pathway as seen from the trend line.

Rainfall changes expected to drop years go but volatility in the charts represent large variability which could mean potential high rainfall.



Rising temperatures and anomalies have been studied and is greatly linked to the increase in extreme weather events such as droughts or floods (IPCC, 2007)

Statistics have shown that if temperature continues increasing, Australia will be left in **serious danger**.



## MAIN HERO

## MERRI CREEK



Merri Creek flows from 70km north down to join the Yarra River at Dights Falls in the suburbs of Melbourne. It encourages ecological growth, together with the vision of incorporating flood control measures to strengthen its biodiversity by various stakeholders.

### Resilient Powers:

#### 1. Structural Flood Mitigation Measures

Retarding basins were employed to manage the drainage system that act as a flood protection tool.

Melbourne Water Retarding Basin	On Drain/ Waterway	Full Supply Level	Spillway Level	Embankment Height	Storage Capacity	Houses In Flow Path	Melway Ref
Merri Creek	Merri Creek, Northcote	Unavailable	N/A	2.0m (32.9m AHD)	~ 50 ML	0	30C8

#### 2. Development Service Drainage Systems

The Development Services Schemes, Redevelopment Services Scheme and Drainage schemes are Melbourne Water's efforts in provision of infrastructure that can combat flooding such as storm water drains, overland flow paths and retarding basins.

#### 3. Management Models

Outdated Flood mitigation models revised to counteract higher intensity rainfall as a result of climate change.

## Support Hero

## CERES



CERES is recognized as a self-sufficient community enterprise, occupying 4.5 hectares on the Merri Creek in Melbourne. Just like Robin as Batman, CERES not only possesses its own resilient powers to combat drought and heatwaves, but is also able to help Merri Creek intercept flood events with its 3-tier flood management.

### Resilient Powers:

#### 1. Irrigation System

During a flood, the irrigation system navigates rainwater towards the dam, as shown on the right.

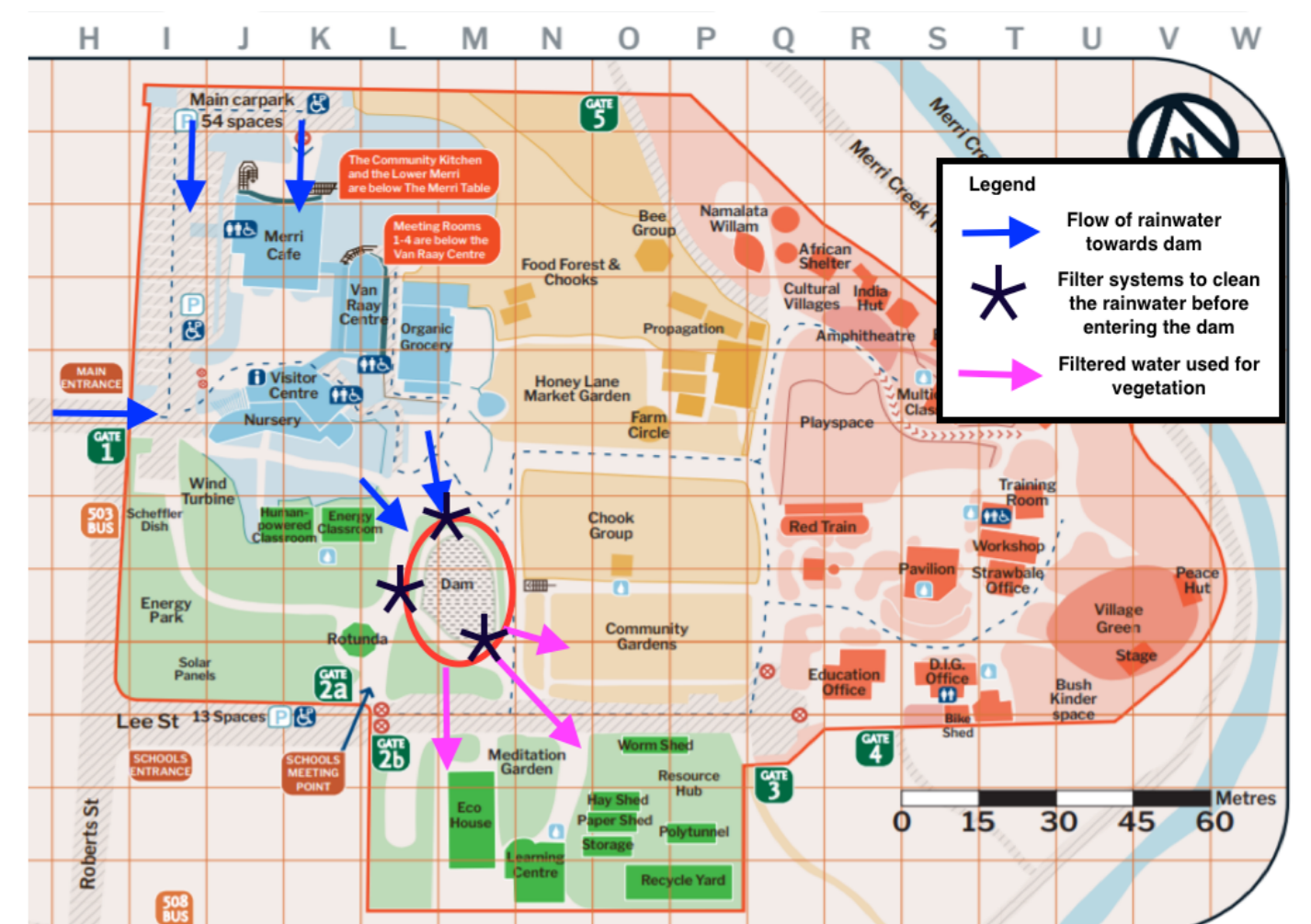
#### 2. Partially Permeable Soil

In the event of excess water that overflows the dam, the partially permeable soil allows rainwater to be infiltrated and stored underground.

#### 3. Unique Plantations

The plants chosen are able to absorb and retain a large amount of water.

Besides floods, the water stored in the dam is used to serve the plantation during droughts. When the water is used up, excess water stored under the partially permeable soil can be utilized!



## LIMITATIONS & RECOMMENDATIONS

- The biggest limitation faced was a lack of statistical information online. Therefore, a more qualitative approach was taken.
- The site's features focus on short term weather changes. Hence, a long term strategic planning is needed to strengthen its resilience.
- Currently, most of the systems implemented are weighed against the pre-existing conditions which would not be able to withstand future changes in climate and weather. With the forecasted increase in global temperatures and sea levels, necessary measures have to be taken to update the current model that had been designed to mitigate the current conditions.

## CONCLUSION

A Resilient City is one that is able to withstand both acute shocks and chronic stresses and achieve fast recovery from major events.

CERES and Merri Creek would have to improve their adaptability in order to fend against unprecedented conditions.

By achieving that, we believe that these sites have the potential to enhance the resilience of the city of Melbourne through cultivating preparedness in people and attain the status of a **Resilient City**.

## References

100 RESILIENT CITIES

RESILIENT MELBOURNE

Australian Climate Change Science Programme  
Australia Broadcasting Company  
CERES Community Environment Park  
Merri Creek Natural Reserve