



Citizen Science project - CSG55969

Scientists work with communities to improve urban microclimate

<https://citizenscienceproject.org.au/>

Riccardo Paolini – r.paolini@unsw.edu.au



Citizen Science

Urban Microclimate Project



Sustainable Building
Innovation Laboratory



Built Environment
High Performance Architecture





Australian Government
Department of Industry,
Innovation and Science

Business

Objectives of the Citizen Science grants scheme

- To involve the community in scientific research
- To increase scientific literacy and understanding of the scientific method



Project specific objectives

The project aims to enable citizens to discover:

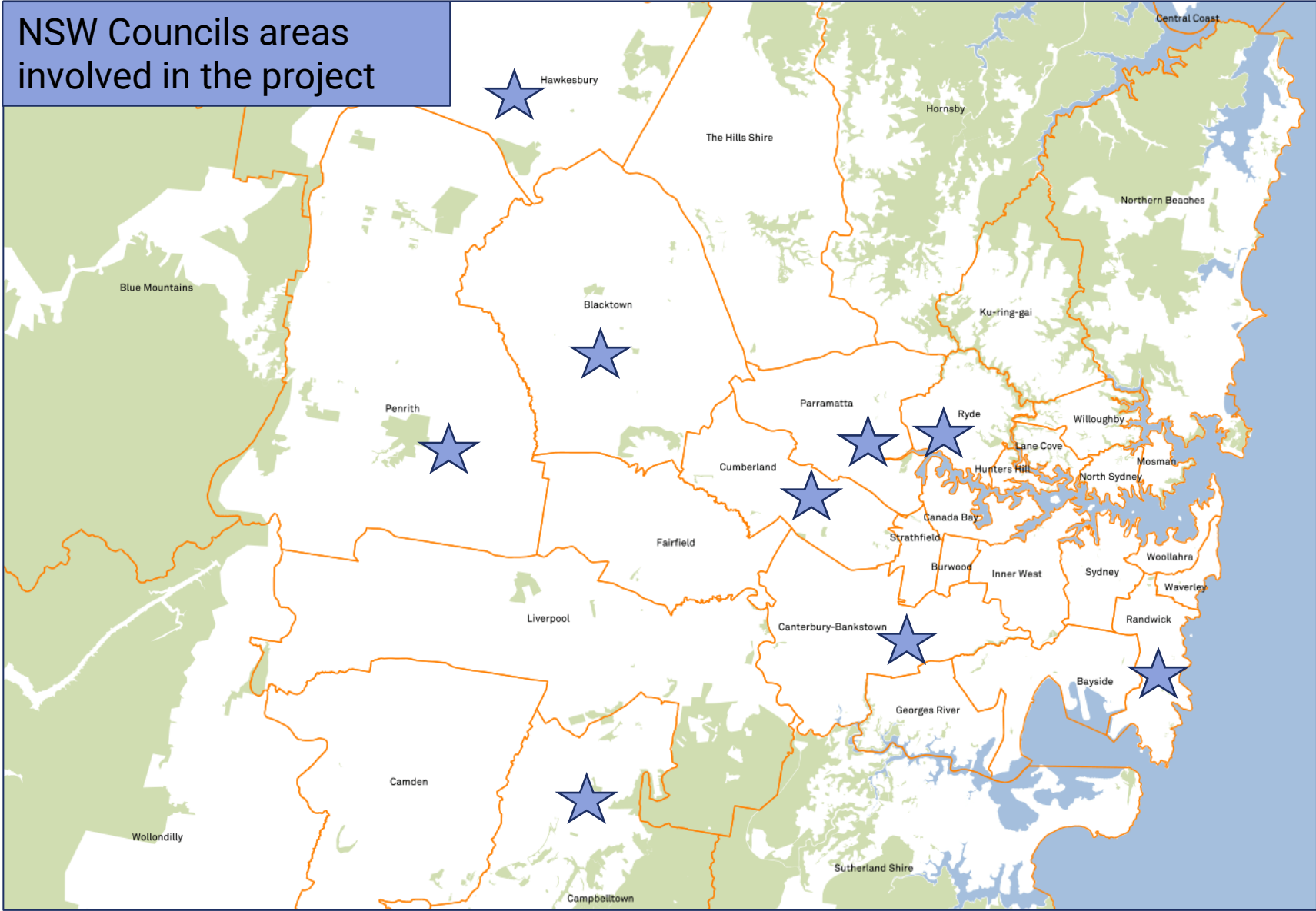
- The impact of the design of the built environment on the local climate
- The impact of materials on the local climate
- How to mitigate local climate
- The limits of existing technologies

Our project is more on the empowerment, engagement and dissemination rather than on the pure data collection side of the citizen science projects spectrum.

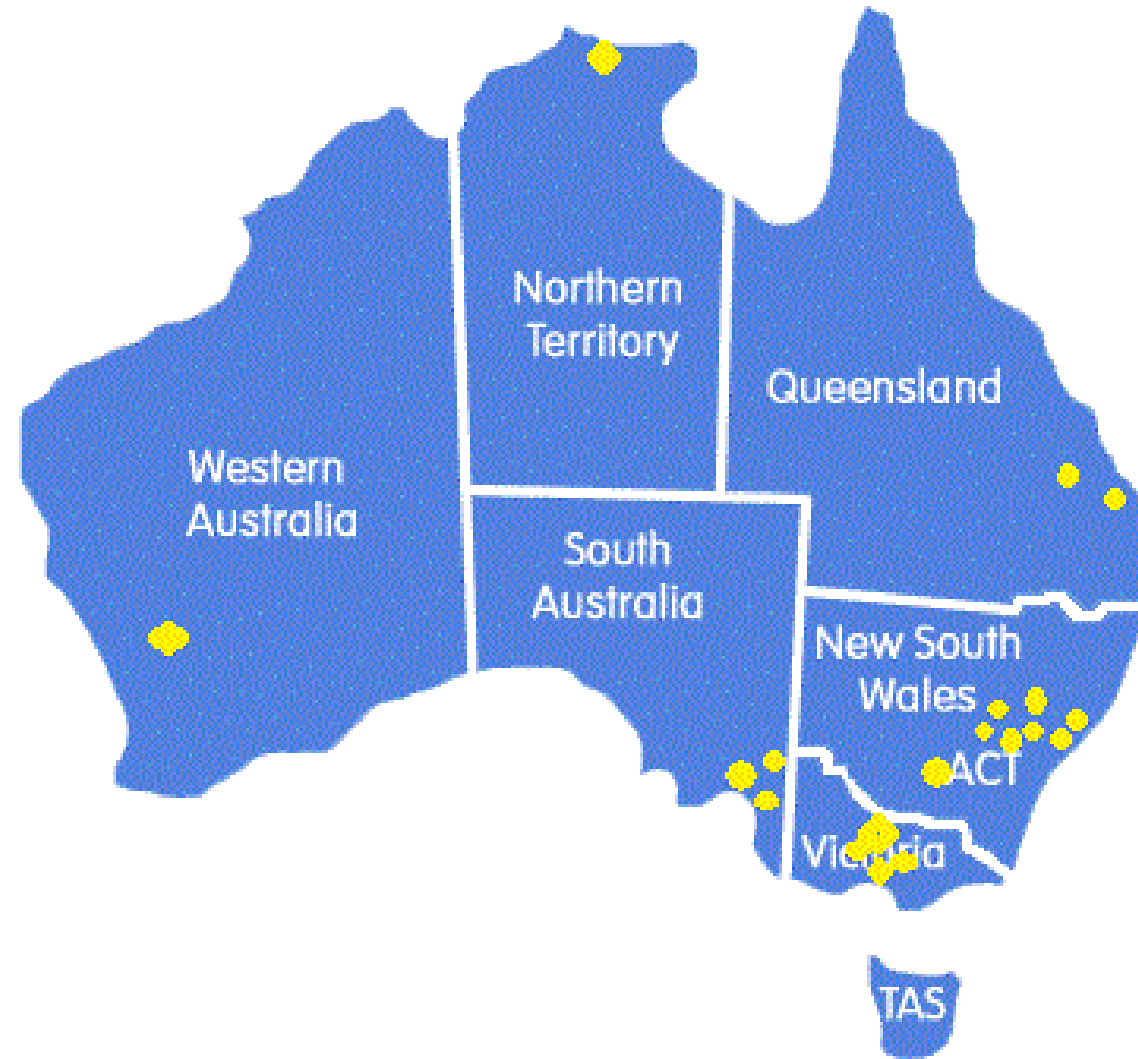
Project activities

Main project activities and deliverables

- Workshops with citizens and researchers to map the local climate (local climate maps)
- BLE temperature & humidity sensors & app
- Outdoor thermal comfort calculator
- Heat mitigation tool
- Weather stations

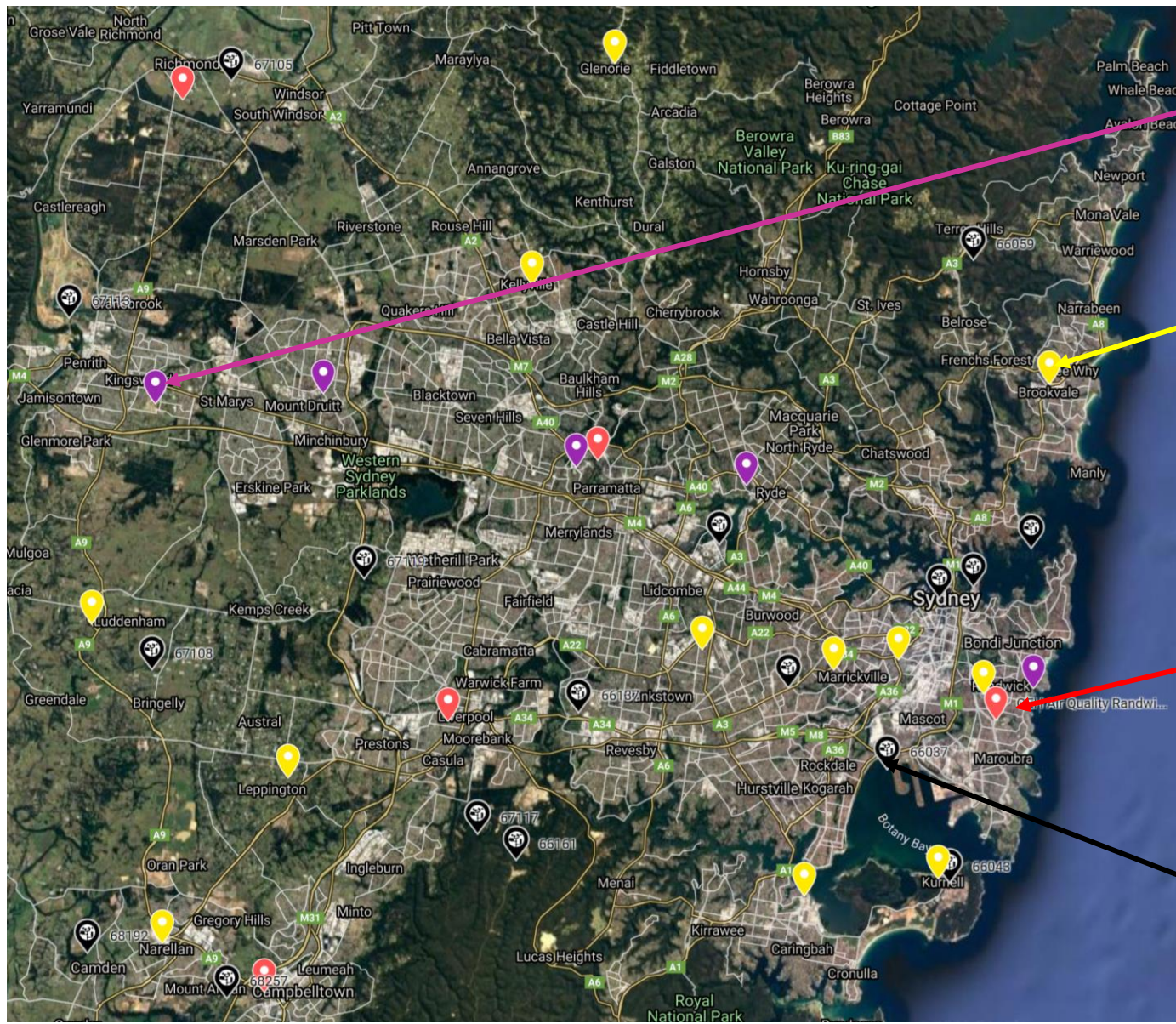


Distribution of participating Councils across Australia



Climate data in Sydney

Open data for UNSW stations



Urban Microclimate Citizen Science stations (UNSW BE)

SWAQ Citizen Science stations (UNSW CCRC)
<https://www.swaq.org.au>

DPIE (OEH) AQ stations

BoM stations

Weather stations - Ryde to be deployed



Kingswood (Penrith) at WSU
<https://thingspeak.com/channels/379380>



Clovelly (Coogee) at UNSW Cliffbrook
<https://thingspeak.com/channels/373725>

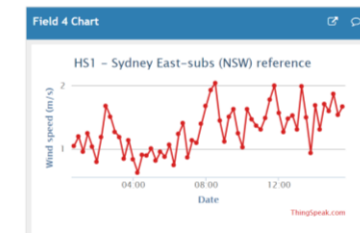
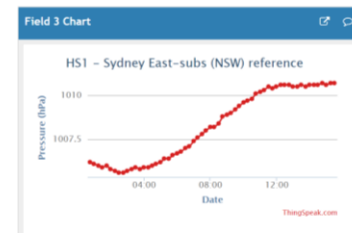
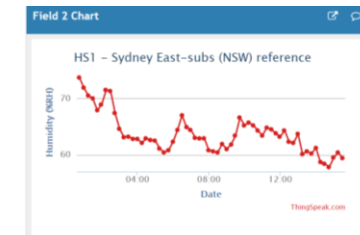
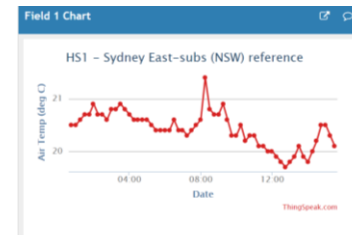


Parramatta Westmead Hospital
<https://public.eagle.io/public/dash/6ar87c8zrthqrs9>



Mt Druitt Blacktown
<https://public.eagle.io/public/dash/6ar87c8zrthqrs9>

Note: we are working on bringing all station on one dashboard (it will take some time)



Equipment for the climate mapping workshops

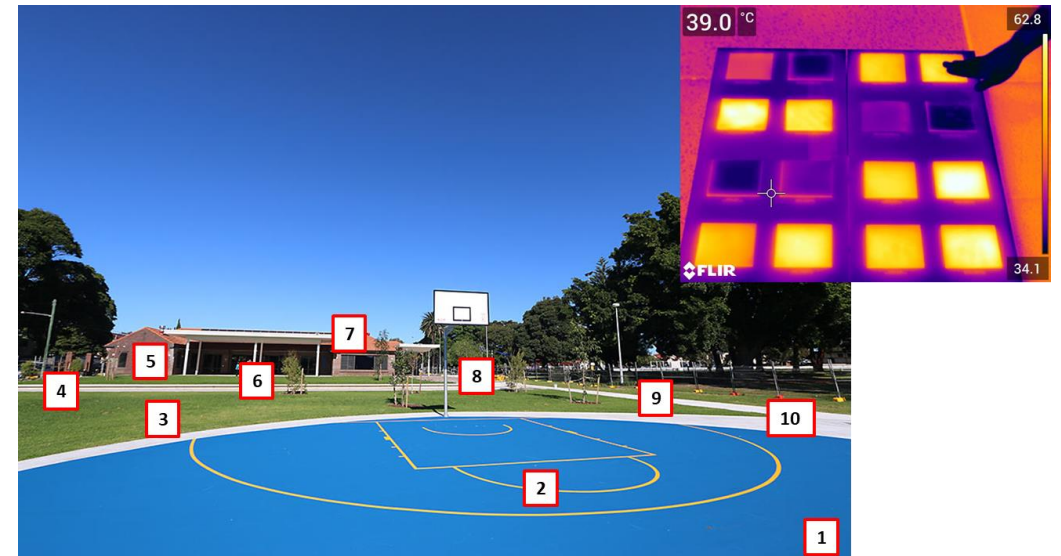
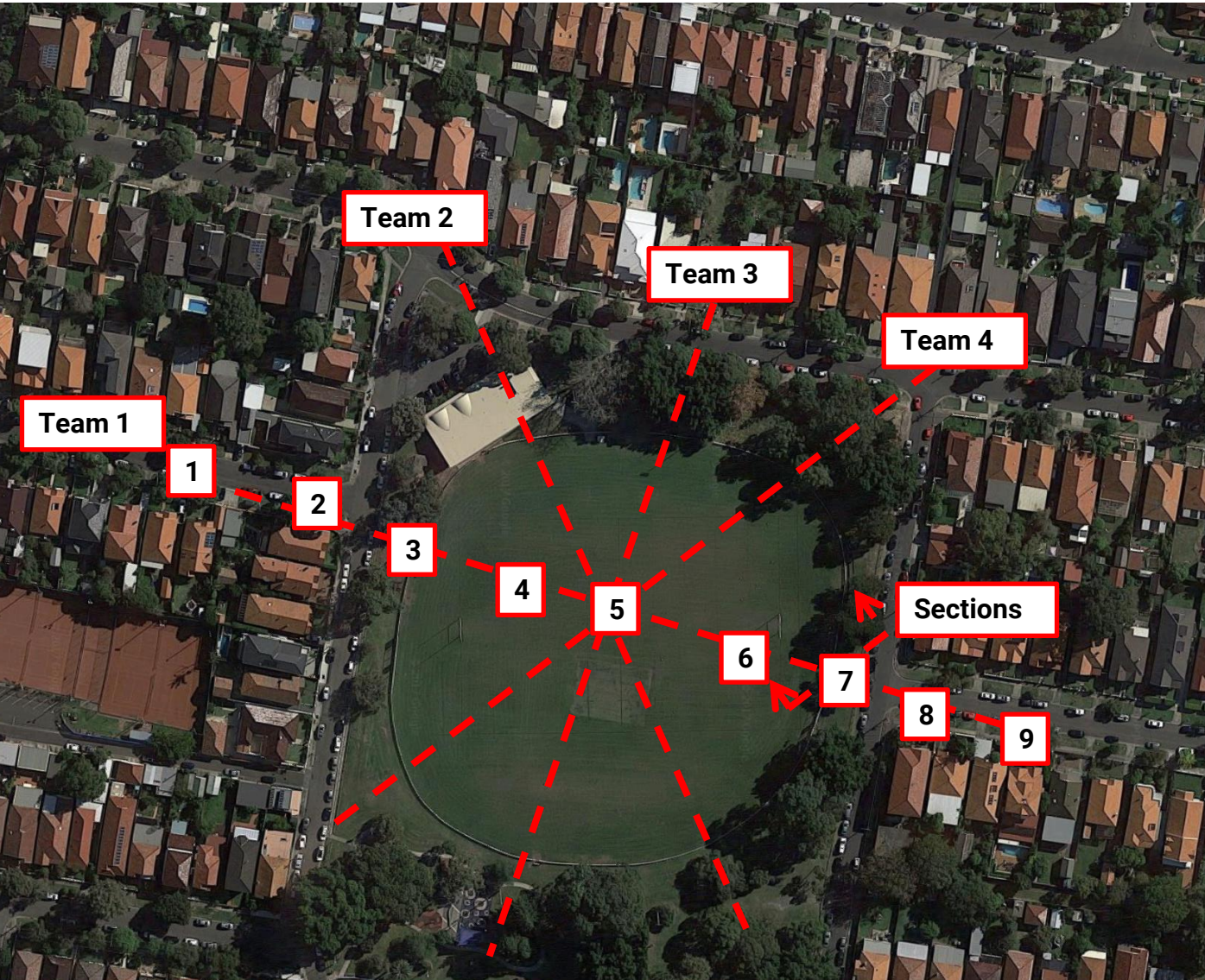




Location	Experiment	Date	Team
	Layout		

#	Time hh:mm	sidewalk					grass			street			Notes	
		Tg (°C)	Tair (°C)	RH (%)	Wind (m/s)	Tpav (°C)	Metadata	Tgrass (°C)	Metadata	Tpav (°C)	Metadata			
							Sun/ shade	Light /dark mat.		Sun/ shade	Dry/ wet			Sun/ shade
1														
2														
3														
4														
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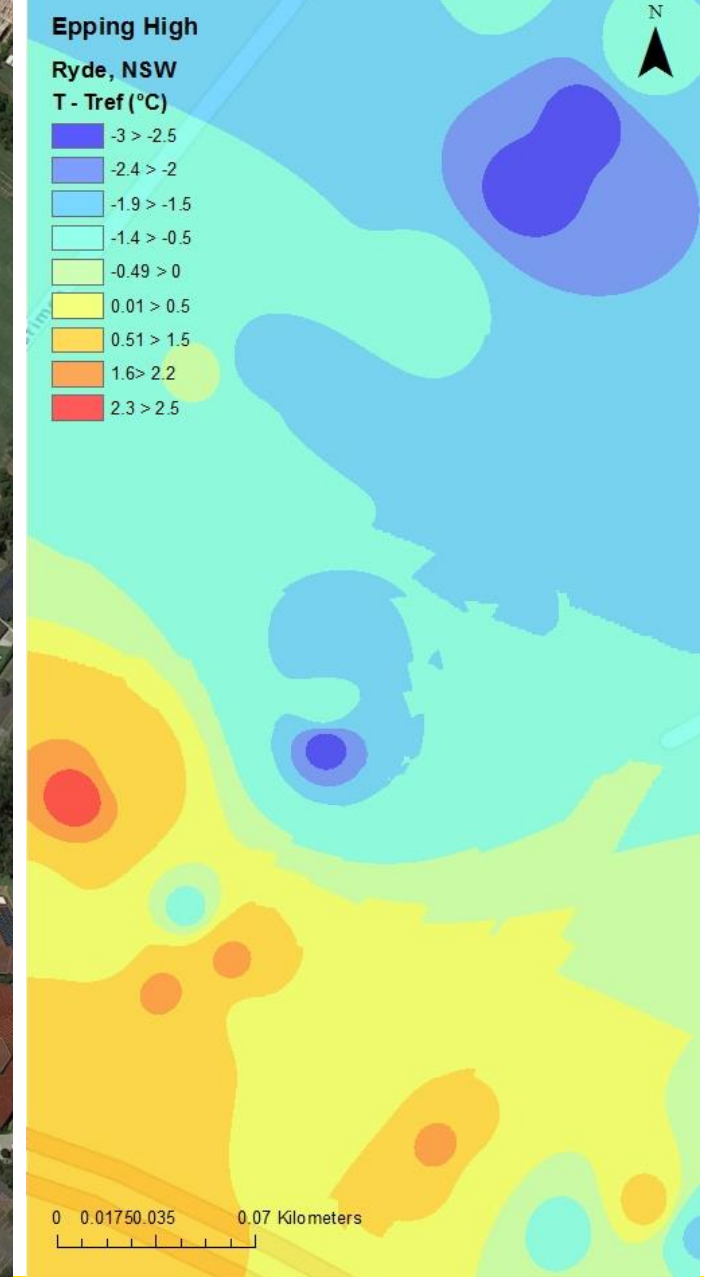




Experiments in Ryde

Example at Epping Boys High

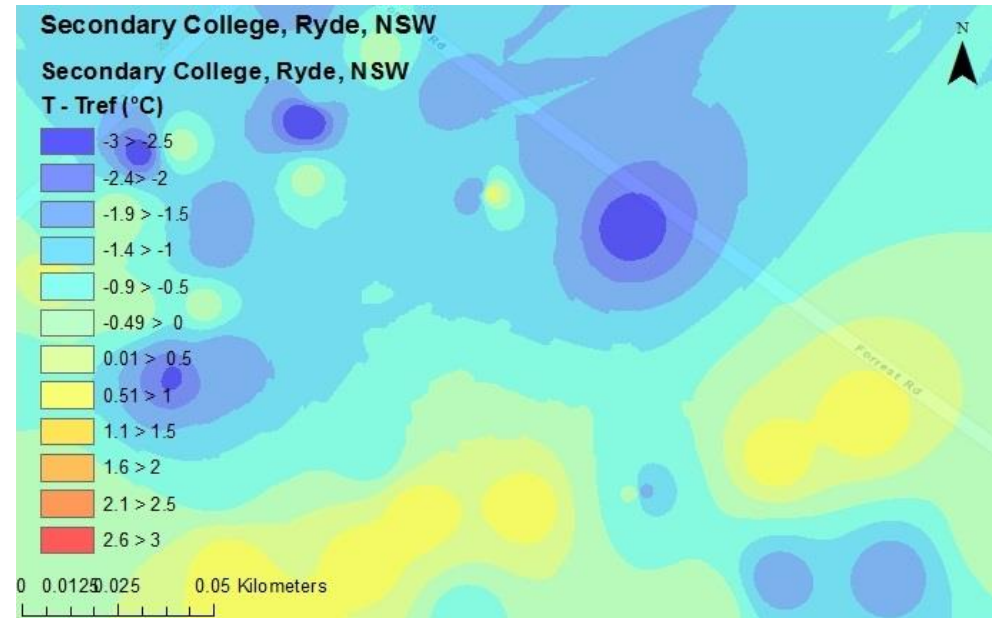
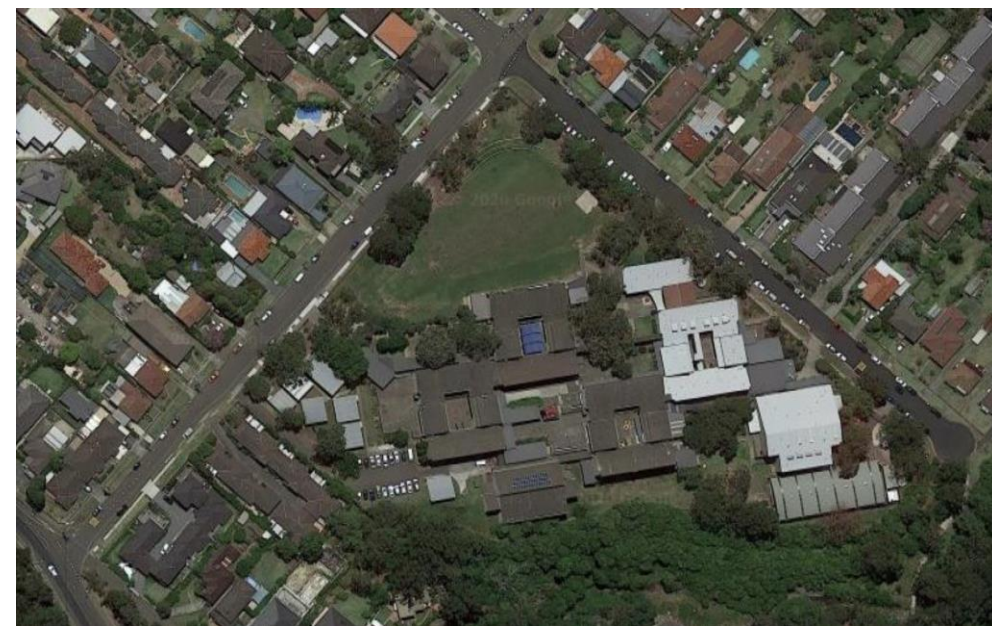
Science Teacher: Sylvia Lane



Experiments in Ryde

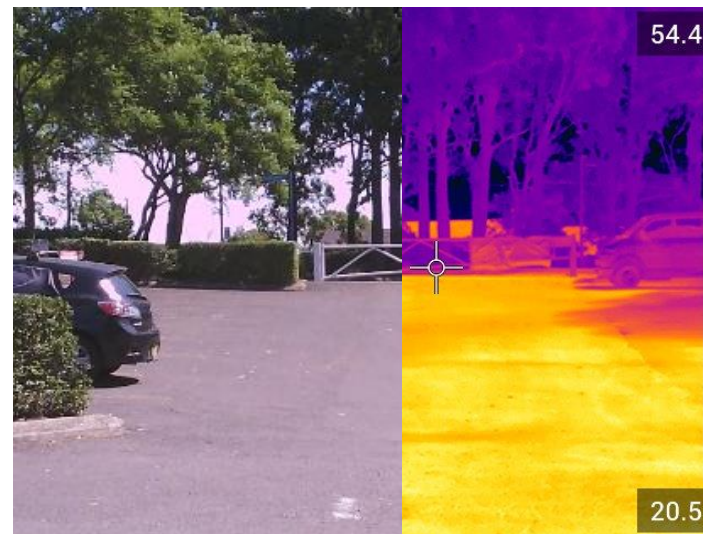
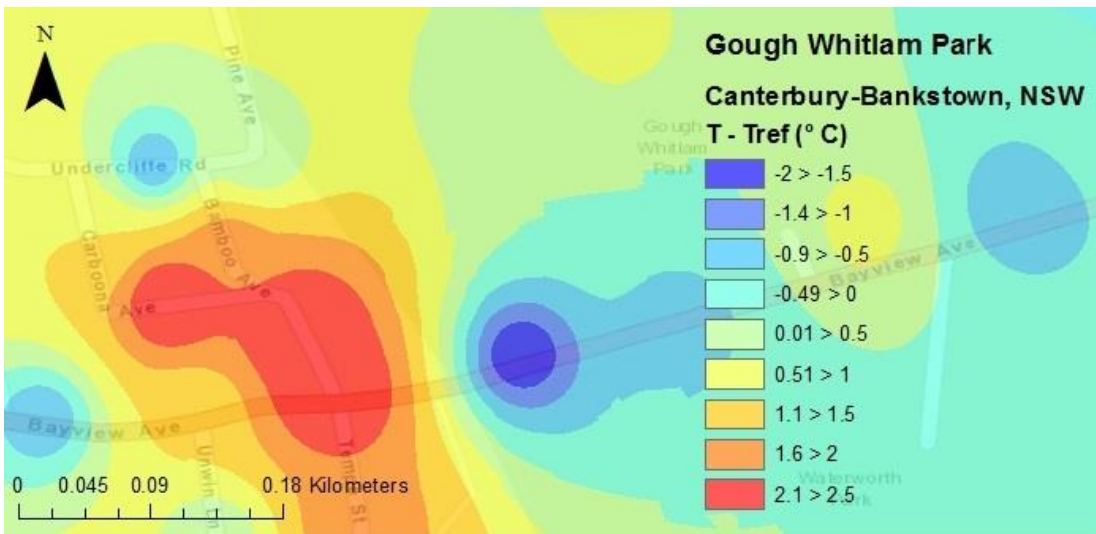
Example at Ryde Secondary College

Science Teacher: Christopher Yates



Mapping surface temperatures of different materials

Visible and infrared view of the playground and car park at Gough Whitlam Park (Canterbury-Bankstown)



Portable BLE sensors

24 h experiments recording temperature and humidity



Urban Microclimate Sensor Assembly Instructions

CAUTION!

Requires adult supervision. This kit contains small parts and a button cell battery. Dispose of the battery properly and keep out of reach of children. If swallowed, contact a physician immediately.

1 Parts Check

- Sensor x 1
- Long bolt x 1
- Black plate x 3
- White plate x 5
- Spare CR2032 Battery x 1
- Plastic bag x 3
- Dome Washer x 6
- Flat Washer x 1
- Spacer tube x 1
- Hex nut x 1
- Tripod x 1

<p>2 Scan QR code below to install the Urban Microclimate App. OR type the URL below into your browser.</p> <p>Android users bit.ly/CSSAndroid</p> <p>iOS (Apple) users bit.ly/CSSApp</p>	<p>3</p> <p>Press</p> <p>Press button for 1 second. If flashing GREEN then proceed to Step 7. If not, change battery as shown in Steps 4, 5 & 6.</p>	<p>4</p> <p>Remove sensor from red cover.</p>
<p>5</p> <p>Remove clear plastic cover from sensor.</p>	<p>6</p> <p>Remove sensor board from plastic case and replace battery with spare provided. Reassemble and retest (Step 3).</p>	<p>7</p> <p>Add Dome Washer to the Long Bolt.</p>
<p>8</p> <p>Add 1x White Plate.</p>	<p>9</p> <p>Add 1x Black Plate.</p>	<p>10</p> <p>Add 2x Dome Washers, as shown.</p>

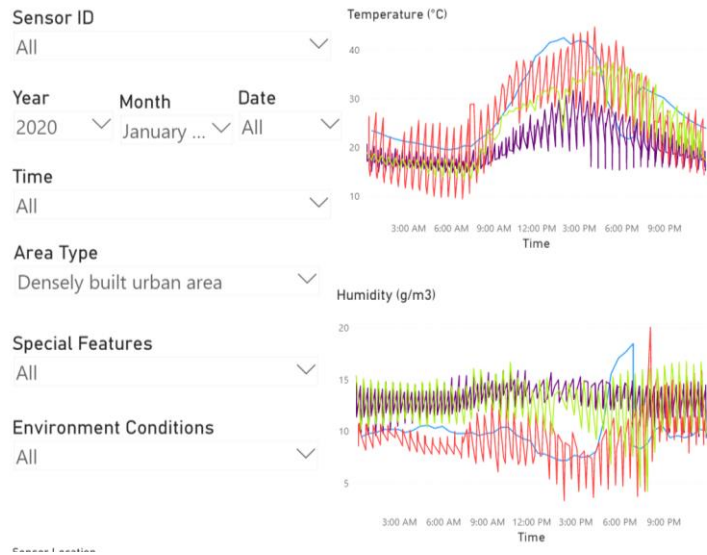


Photo by Sylvia Lane (Epping Boys High)

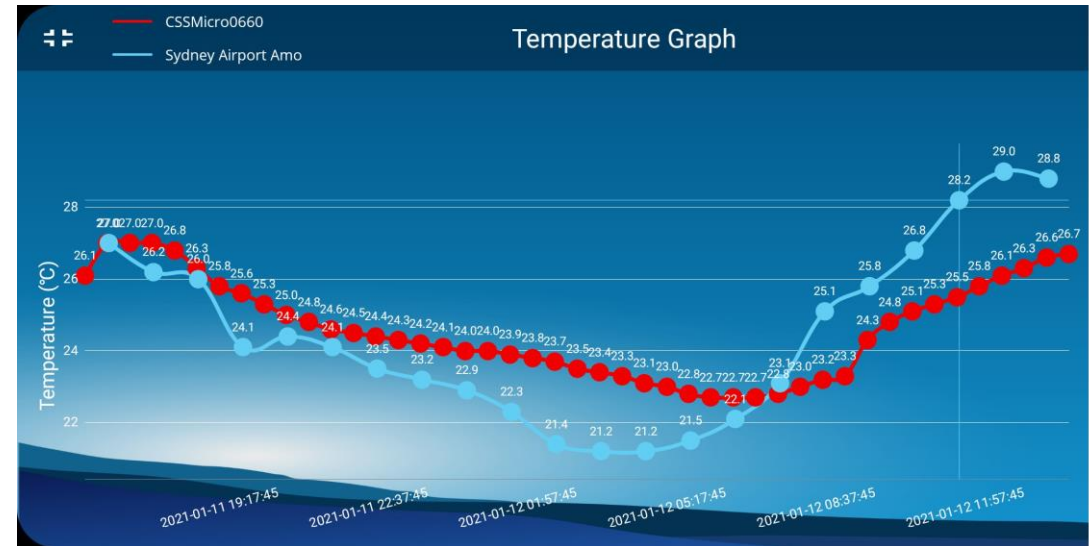
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Sensor Data



<https://citizenscienceproject.org.au/mobile-app/local-climate/>



Heat mitigation tool

Online visualization tool

<https://citizenscienceproject.org.au/mitigation-tool/>

Development Alternatives

- Basecase
- Wind Break
- Shading
- Water
- Cool Materials
- All Interventions

UHI Mitigation Indicators

Air Temperature Summary

Average Precinct Temperature	37.69°C
Min. Localised Temperature	19.85°C
Max. Localised Temperature	41.41°C

Max. Air Temperature Reduction

Max. Average Precinct Temperature Reduction	0.62°C
Max. Localised Temperature Reduction	14.60°C

Potential air temperature reduction of chosen development alternative.

Location Inspector

Air Temperature

Click a tile from the temperature overlay to see the specific temperature value.

Development Alternatives

- Basecase
- Wind Break
- Shading
- Water
- Cool Materials
- All Interventions

UHI Mitigation Indicators | **UHI Mitigation Index**

20 | 45

Detail

Simultaneous application of all mitigation options described above.

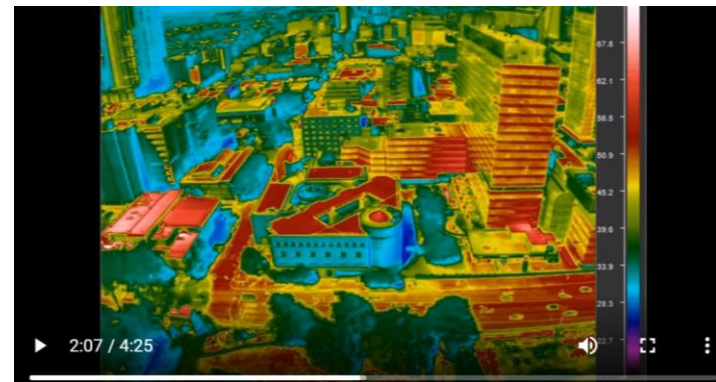
Acknowledgements

Citizen Science | RMIT | UNSW | Sustainable Building Innovation Laboratory | Built Environment CRC

The visualisation of the thermal field in mitigated conditions has been supported by the

Videos, training material, and other resources available on the project website

<https://citizenscienceproject.org.au/resources-for-citizens/videos/>



Urban Heat Islands: ¹⁸
An Introduction

Field Measurement:
Instructions

Mobile App: Device
set up Instructions

Project conclusion

All deliverables available on the website

From project to process...

... possible use in science curricula



Thank you for your attention!

Questions?

