

RESILIENT EAST

Climate Ready Eastern Adelaide

COOLING OFF

Temperatures above 35°C are uncomfortable for our thermal regulation. The more days we experience this heat, the greater risk it has on our health.

Typically, artificial surfaces (such as roads, footpaths and buildings) store heat and prevent water infiltration. On the other hand, surfaces with grass, gardens beds or trees assist in cooling by releasing water (transpiration) and shading surrounding surfaces.

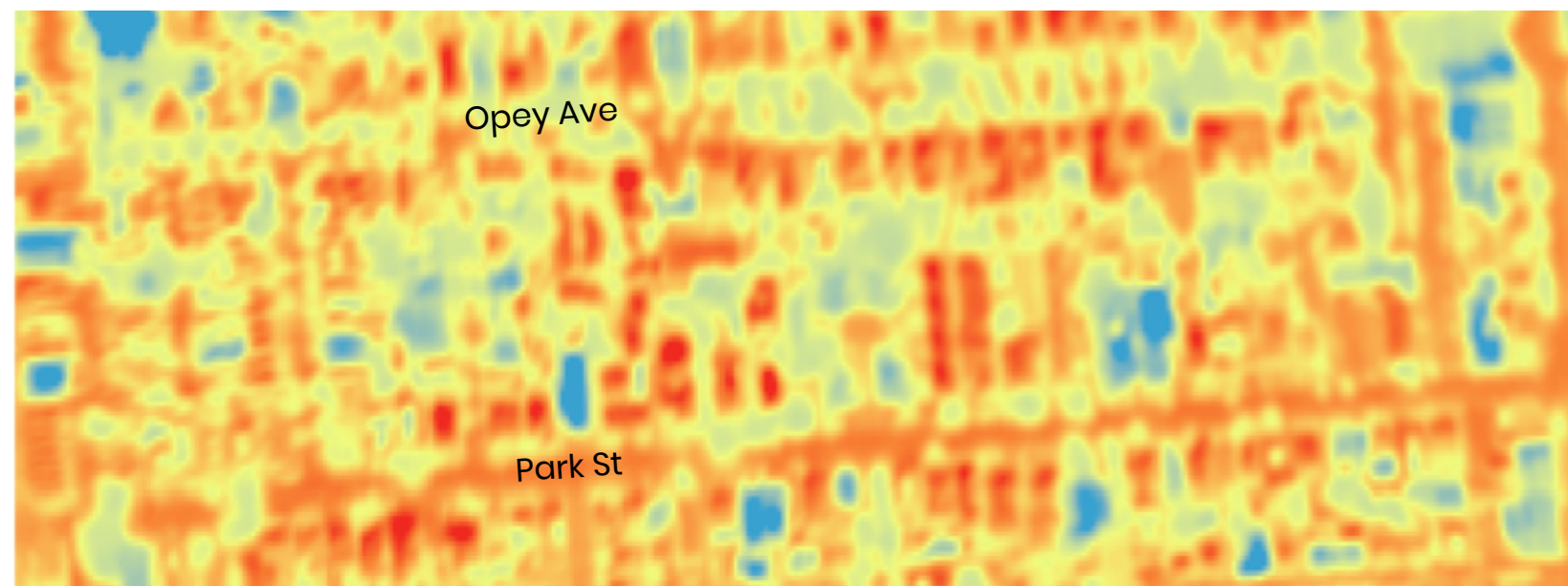
As heatwaves become hotter and more frequent, urban density increases, backyards become smaller and less space is available for trees, it becomes vital that we act now to keep our cities cool.

By identifying hotspots we can prioritise on ground action to cool areas so our homes and communities continue to be healthy and resilient. We can also check to see if hotspots are located near our most vulnerable members of the community, or around heavily used public spaces.

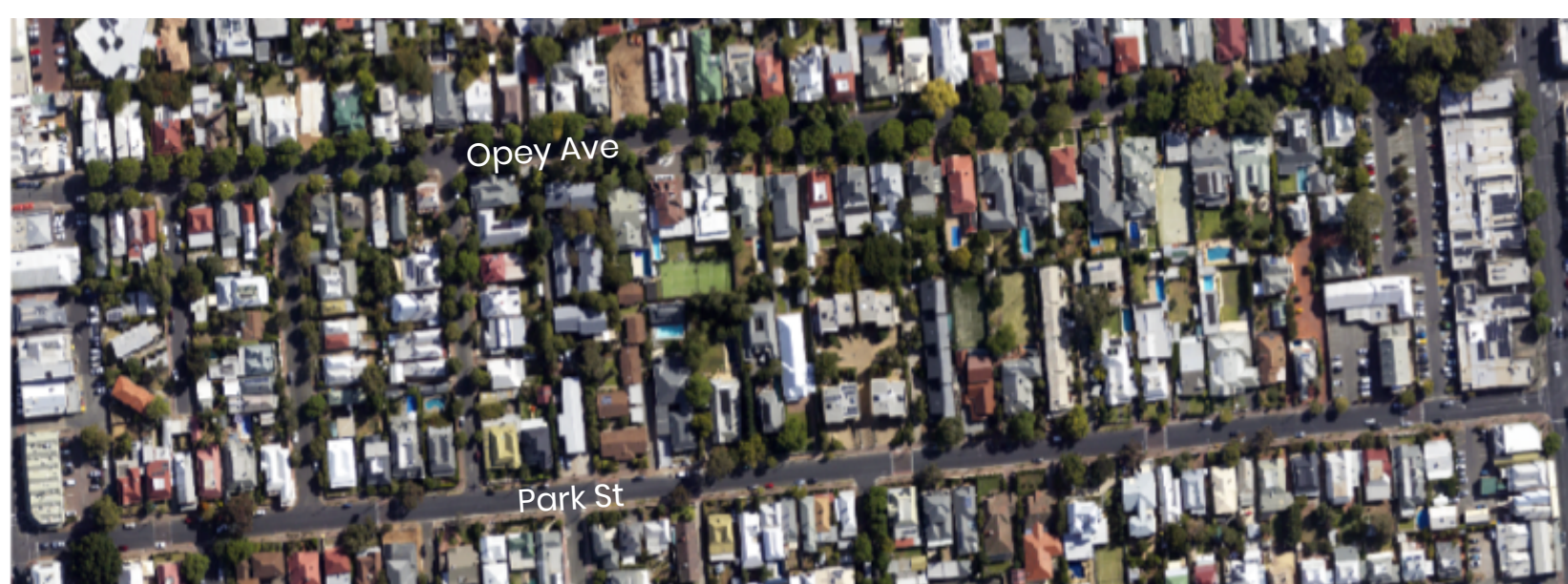
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URBAN HEAT MAPPING

As our climate becomes hotter and drier, it is important to understand high risk areas and identify opportunities to better plan for the future. [Urban Heat and Tree Mapping Viewer](#) is an online tool that can help us do this by highlighting where surface heat builds up and why. The tool shows a snapshot of surface temperatures in hot weather so we can compare different land uses, designs, materials and colours. For example, imagine how a dense community of houses with little or no gardens would compare with a more spacious one, with large gardens. How about a bitumen road compared with irrigated grass? Or, a house with a white roof compared to one with a grey roof? Which surfaces do you think would be cooler or hotter?



An aerial map (bottom) and a heat map (top) of Opey Avenue and Park Street, Hyde Park. Compare the two. Which surfaces are cool (blue) and which are hotter (red). Can you guess why?



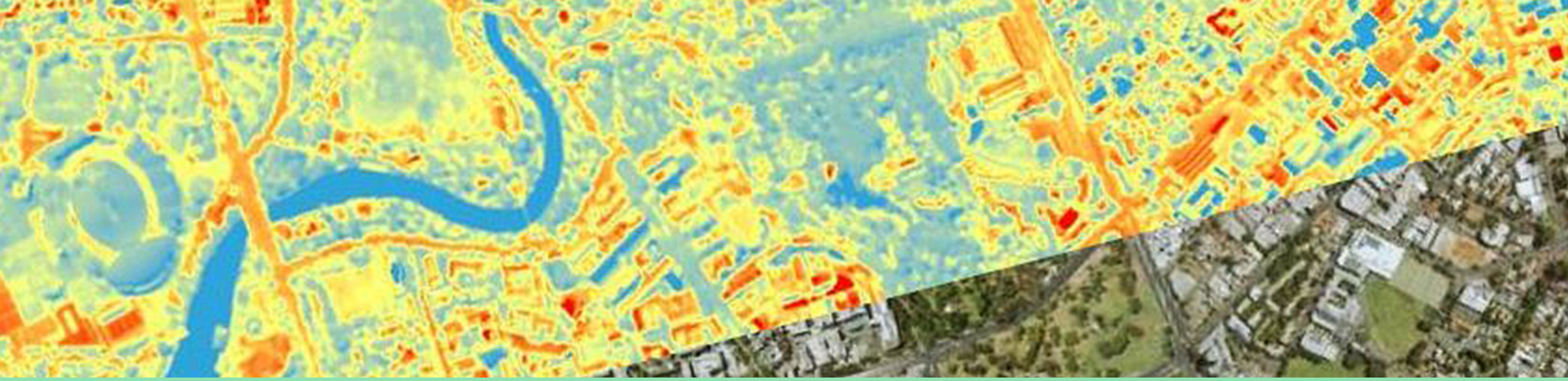
ABOUT THE DATA

Heat maps of the Resilient East region were captured on 10 March 2018. On this day, the ambient temperature was above average for summer, with a maximum of 33.8°C and a minimum of 21.3°C. An aeroplane was used to capture thermal infrared imagery during a series of flyovers. The maps show daytime and nighttime data with a colour scale from blue (coolest) to red (hottest).

WORKING TOGETHER

This tool was developed in partnership with the Department for Environment and Water, Resilient South, Adapt West and Adapting Northern Adelaide.

Zoom in to see how cool your home is at resilienteast.com/map-viewer/

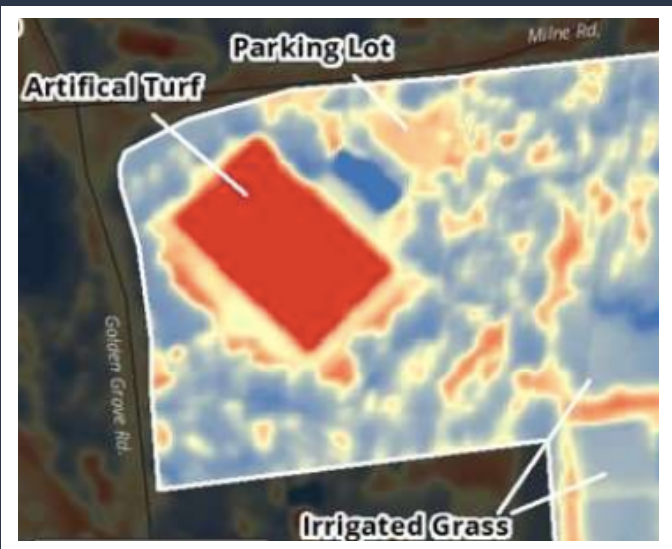


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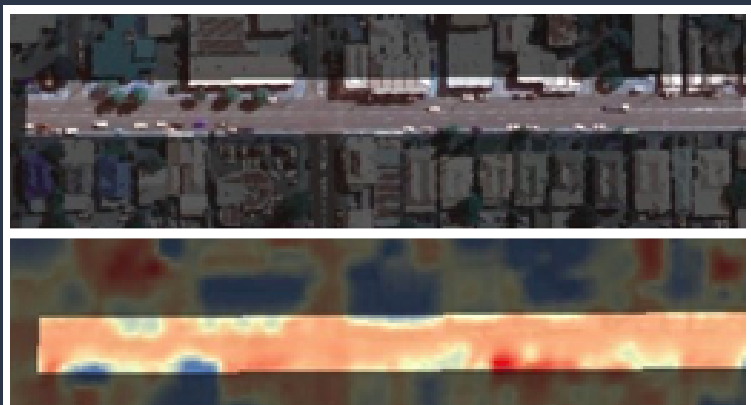
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PLANNING OUR CITIES

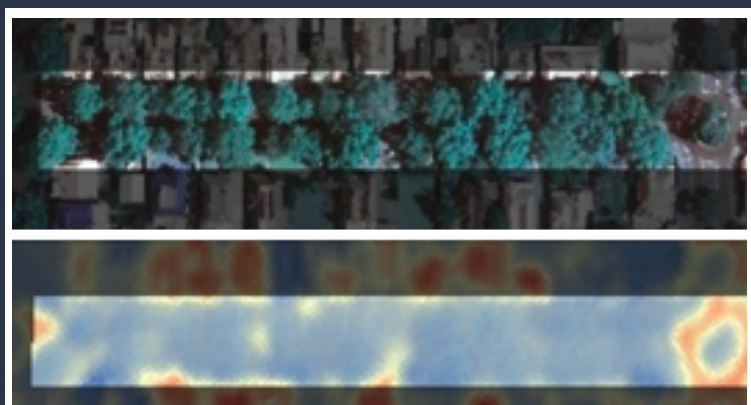
The number of extremely hot days are increasing across Adelaide, impacting on health, energy demand and the economy.



By understanding the data and using the online maps, we hope you can see how this information can help all of us to plan more resilient homes, businesses, schools, neighbourhoods and cities.



A street with little to no trees (above) has a surface temperature of about 40.6°C, versus a street with full canopy cover (below) which is 31.1°C. That's a difference of 9.5°C!

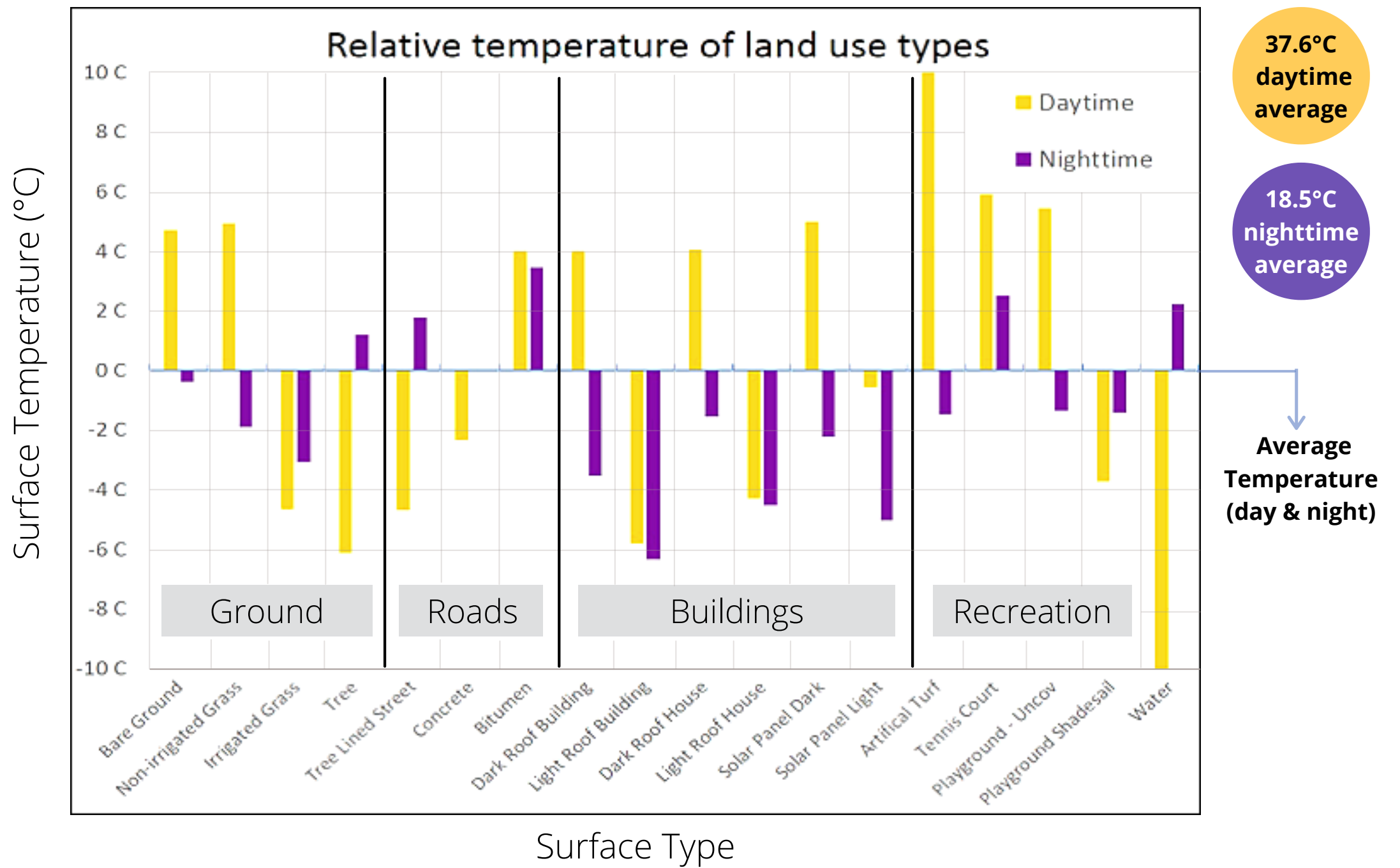


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UNDERSTANDING THE DATA

Let's understand the data behind the Urban Heat and Tree Mapping Viewer using the graph below. Access the maps at resilienteast.com/map-viewer.

Across the Resilient East region in this study, the average surface temperature for day and nighttime is 37.6°C & 18.5°C, respectively. This represent a baseline (0°C) for us to work from. Across 18 surface types, 1,100 points on the map were randomly selected. Relative to the baseline, the average temperature for each surface type is shown in the graph. Below the line is cooler (negative), and above the line is hotter than the average. Note, concrete at nighttime is the same temperature as the baseline (18.5°C).



USE THE GRAPH!

- Which surface has the hottest average daytime temperature of 47.6°C?
- Name three surfaces that are hotter than bitumen during the day.
- What is the temperature difference between irrigated grass and artificial turf during the day?
- Which surface is the coolest at night?
- An uncovered playground is _____°C hotter than a shaded playground in the day.
- Compare a tree-lined street to a bitumen street (which doesn't have trees). The _____ street is _____°C cooler. At nighttime, the _____ street releases the heat it absorbed during the daytime.
- _____ roofs or solar panels remain below the average temperature for both day and nighttime.

Answers: 1. Artificial Turf, 2. Bare ground, non-irrigated grass, solar panel dark, artificial turf, tennis court &/or playground uncovered, 3. 14.5°C (or 15°C also accepted), 4. Light Roof Building, 5. 9°C, 6. Tree-lined / 8.5°C / Bitumen, 7. Light

RESILIENT EAST

URBAN HEAT & TREE MAPPING VIEWER QUICK GUIDE

Access mapping online at:
resilienteast.com/map-viewer

Climate Ready Eastern Adelaide

This is a quick guide to help you easily find your way around the Urban Heat and Tree Mapping Viewer online platform. Use this page to help navigate the map, access the layers and discover information available for the Adelaide region.

Home Panel

Home
Urban Heat and Tree Mapping of Adelaide
 With the Urban Heat and Tree Mapping Viewer you can explore high-resolution surface temperature data, tree canopy information and vegetation greenness over Adelaide. This is the result of three separate mapping projects, commissioned by the four metropolitan local government climate change adaptation groups of Adapt West, Resilient East, Adapting Northern Adelaide and Resilient South in collaboration with the SA Government.
 View Urban Heat and Tree Mapping Data
 Find a State Electorate
 Find a Ward
 Find an LGA
 Find a Suburb

Zoom in/out

Attributes Box
 Selected Feature Attributes
Resilient East & City of Salisbury - Day Heat Map 10th March 2018
 Surface Temperature: 40.2°C
[Further Information](#)

Search Bar
 Find address or location...

Additional Information
 User Guide Home Page FAQ

Layers

Search Layers... Search

- Administrative Boundaries
- Cadastral Information
- Adapt West Urban Heat Data
- Resilient East & City of Salisbury Urban Heat Data
 - Heat Maps
 - Heat Map Day 10th March 2018
 - Heat Map Night 10th March 2018
 - Social Vulnerability - Day
 - Social Vulnerability - Day
 - Heat Islands - Day

Panel Actions Menu

Transparency Slider

Location Marker

Display Map

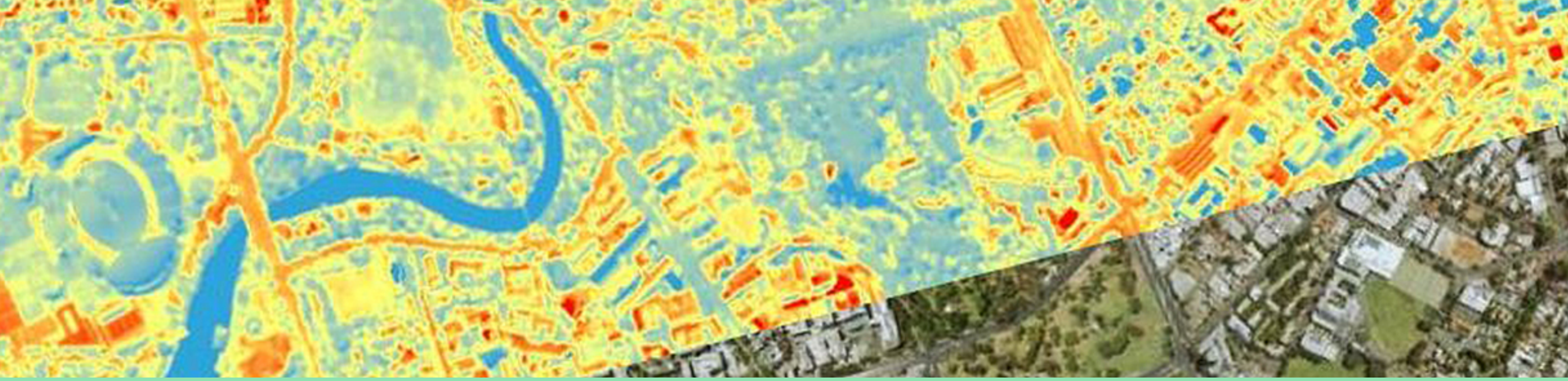
Information & Actions (right click)

- Address: 66 WALKERVILLE TERRACE, GILBERTON, SOUTH AUSTRALIA, 5081
- X: 15430508.77
- Y: -4150007.84
- Find data on the map
- Draw a Point
- Plot a Coordinate
- Add Some Text
- Center the Map Here
- Zoom to Initial Extent
- Clear Highlighted
- Imagery Details
- Open Streetview Here

Checkbox

Scroll down for Tree Layers

- Tree Canopy Heights (>3m) 2018/2019
- Tree Canopy Boundaries (>3m) 2018/2019
- Vegetation Greenness (NDVI) Sept 2018
- Canopy Coverage by Unit Area 2018/2019



LET'S USE THE HEAT MAPS!

Using the online Urban Heat and Tree Mapping Viewer, let's explore and compare surface temperatures of houses, gardens, streets, parks, water bodies and more for the Adelaide Metropolitan area! If you're local, you can also search to find out how **cool** or **hot** your house or street is. This guide will help you navigate the tool using a desktop computer.

Let's get started at resilienteast.com/map-viewer.

1. MOVING AROUND THE MAP

Move the map by clicking and holding the left mouse button, then drag the map in the direction you want. You can also move the map using the arrows ← → ↓ ↑ on your keyboard.

Zoom in or out, using the **Zoom +** or **or -** buttons on the top left of the **Display Map**, or the **+** or **-** buttons on your keyboard. If you have a mouse with a scroll, you can also use this. To zoom to a specific spot on the map, hold **Shift** on your keyboard and the **left mouse button** and draw a rectangle around the area you want to zoom to.

- Practice moving around the map and zooming in and out.
- Right click on a location to find out more or perform an action.

2. VIEW THE LAYERS

In the Layers Menu, you can view different layers, such as:

- Administrative Boundaries (search by suburbs, postcodes, electorates & more.)
- Cadastral Information (property boundaries)
- Urban Heat Data for the climate regions (i.e. Resilient East & City of Salisbury)
- Land Use Data (2016, 2017 & 2018 for different regions)
- Overlays (topography & road labels).

- Try turning layers on/off by ticking/deselecting the adjacent **checkbox**.
- Expand the layer folder by clicking on **+** next to its name (collapse using **-**).
- What landmarks can you find? Can you see Adelaide Oval?
- Slide the Transparency Slider to fade a layer in or out (over another layer).

★ Tip: turn off unused layers to make the map run faster.

Under the dropdown for Resilient East & City of Salisbury, you will find more layers;

- Heat map (day & night)
- Social Vulnerability (day)
- NDVI (Normalised Difference Vegetation Index, i.e. vegetation density).

★ Tip: view the legend for a layer by clicking on the Panel Actions Menu, and Show Menu.

★ Tip: a greyed out layer means it will become visible when you zoom to an appropriate scale.

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3. SEARCH FOR A LOCATION

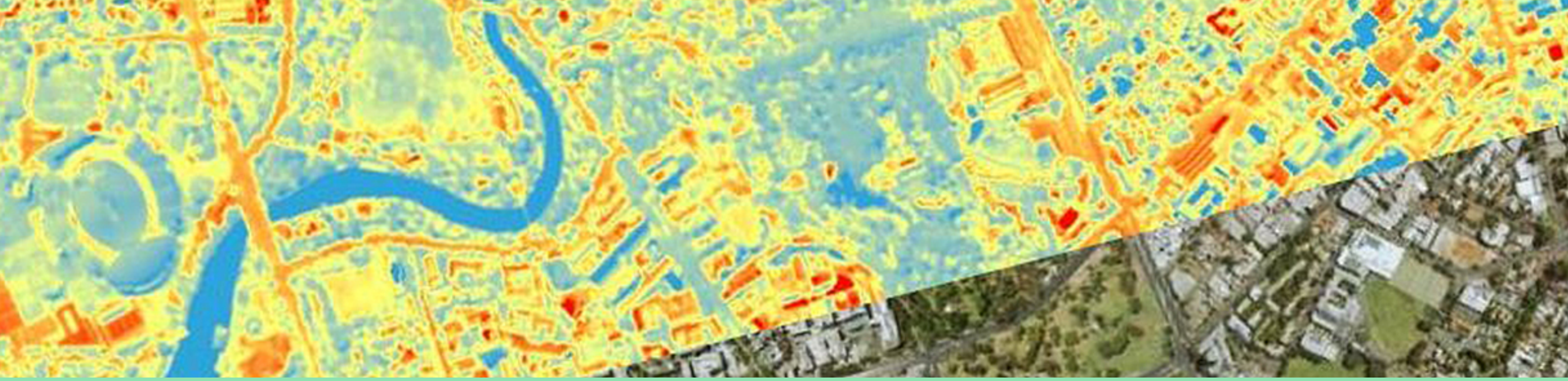
Type the name of a location or an address into the **Search Bar**. Then click the magnifying glass, or hit Enter on your keyboard.

Click on **ALVS** in the left side panel. The closest matched results will appear. Select a location from the list and zoom in to the **Location Marker**. Click on the **Layers menu** to compare how **cool** or **hot** the surface temperature is there. Why are some surfaces hotter than others? We answer this in another factsheet.

★ Tip: Left click on a location to show the **Attributes Box**. Right click to show the **Information & Actions** box. These boxes provide more options or information.

Search for your street or house. Turn the heat layer on/off and compare what's hotter/cooler and why. Compare day vs night too.

What are some things you can do to cool your home? Search our website for ideas.



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Eastern Adelaide*

EXPLORE THE HEAT LAYERS

The Urban Heat and Tree Mapping Viewer allows us to see high-resolution surface temperature data for the Adelaide metropolitan area.

Explore the data by turning on/off the layers available. These layers help us evaluate features that make up our neighbourhoods and discover opportunities to plan for more resilient communities and assets.

Explore the layers at resilienteast.com/map-viewer.

ABOUT THE LAYERS

Resilient East & City of Salisbury Heat Map data was collected on 10 March 2018 between 11:30 am - 4:00 pm for day, and, 11:00 pm - 3:30 am for night. The minimum temperature that day was 21.3°C, the maximum was 33.8°C. The data resolution is 2 metres, where each 2x2 metre pixel represents the average temperature within that space.

Social Vulnerability was developed using census data to create a simple Social Vulnerability index (SVI).

Capturing thermal data on a regular basis will allow us to assess the effectiveness of climate change adaptation measures, like greening, climate sensitive infrastructure and the use of water.

Note, water plays an important role in cooling cities. Just like evaporative air conditioners, water bodies cool surrounding air via evaporation. Like the River Torrens, which shows up cool / blue on the map!

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IMAGERY BASEMAP

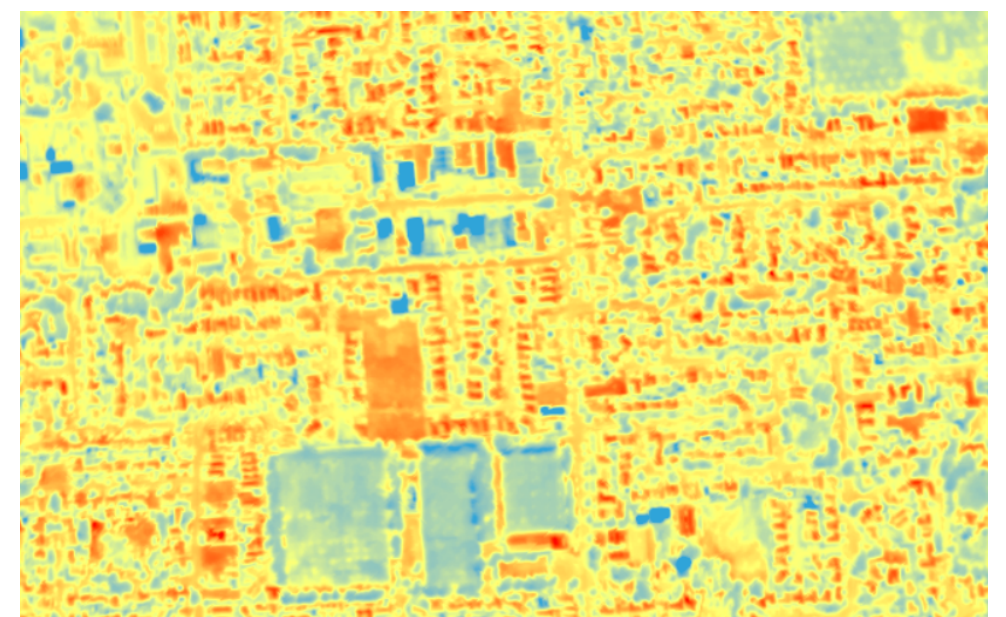
A 'bird's eye view' of what our neighbourhoods look like from above.

Access this layer simply by deselecting all other layers. It will remain as a basemap and cannot be turned off. Note: this aerial imagery is updated more often than other layers, therefore some things may not match up as changes on the land occur.

HEAT MAPS - DAY & NIGHT

On opening the Resilient East & City of Salisbury Heat Data menu, you will see two layers for heat. One captured in the day, the other at night.

The colour scale shows surface temperatures on the date of capture, from **coolest** (blue) to **hottest** (red).



HEAT ISLANDS - DAY & NIGHT

This layer shows 125m x 125m areas that experience above average surface temperatures. We call these 'heat islands'.

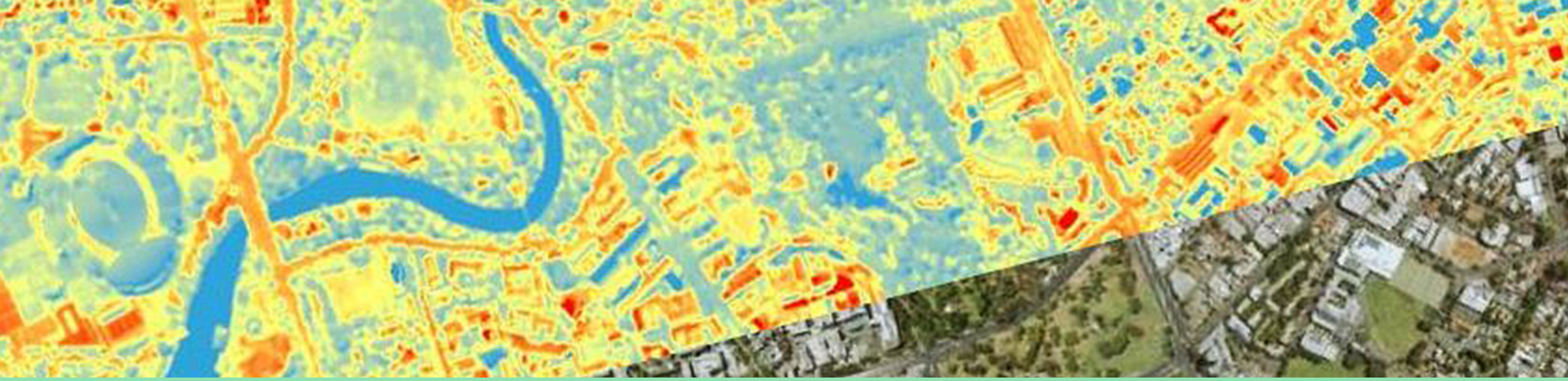
Yellow represents >2°C above average surface temperature. **Red** represents >4°C above average surface temperature.

SOCIAL VULNERABILITY - DAY

With heat islands, a social vulnerability index (SVI) is available so we can identify where vulnerable community members are exposed to heat.

The colour scale shows the least vulnerable in **light blue** to the most in **dark blue**.





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LET'S GO HOME

Navigate to your home, school or business. Is the roof **cool** or **hot**? Turn off the heat layer and see what colour it is. Compare it with nearby roofs, and day/night.

Colours influence temperatures. Dark colours absorb heat from the sun, where lighter colours reflect heat. This impacts the temperature inside buildings too, where typically darker roofs require more energy and are more expensive to cool.

Look at your home, school or business on the map, can you identify opportunities for cooling? Perhaps by introducing more vegetation, or changing surface colours? What can you do? Write in the space below...

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FEELING THE HEAT

Now that you understand how to use the Urban Heat and Tree Mapping Viewer and what layers are available, let's have a go at using the maps to understand how different materials influence surface temperatures that contribute to urban heat. We will explore how this differs from day to nighttime.

Start by opening the Urban Heat and Tree Mapping Viewer at resilienteast.com/map-viewer.

IMAGINE THAT

Imagine it's a hot summer's day in Adelaide, which areas would you go to cool down and which would you avoid?

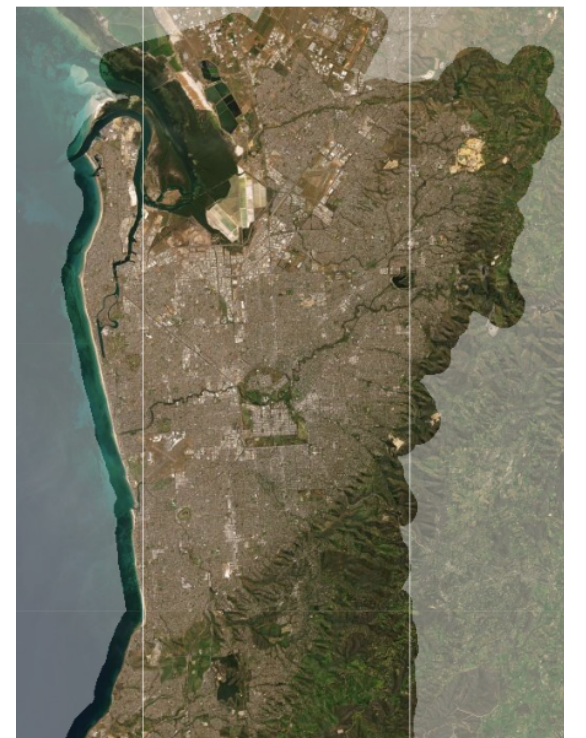
- I would go to _____ to cool down.
- I would avoid _____.

What about at night?

- I would go to _____ to cool down.
- I would avoid _____.

If you were in the backyard of a home in the day time,

- where would you go? _____.
- where would you avoid? _____.



★ Tip: Urban areas tend to be significantly warmer than rural areas due to human activity and land that's been converted from natural, living spaces to artificial areas. This creates Urban Heat Islands (UHI).



STEPPING OUT

Now imagine walking bare foot on these six surfaces during the day. How would they feel, and why?

In the boxes, write a 'C' for **Cool** or 'H' for **Hot**.

Using the online map, search for these types of surfaces, overlay the heat map and click on it to see temperature differences. If you get stuck, here are some locations to search (the numbers correlate with the images).

1. Lot 20 Darley Rd, Paradise (skate park)
2. 571 Montague Road, Modbury
3. 75 Golden Grove Road, Ridgehaven
4. 1 Menzies Crescent, Prospect
5. Reservoir Park / Kangatilla
6. Fullarton Road, Kent Town

★ Tip: Hard impervious surfaces (i.e. roads) are unable to retain water and are typically hotter. Permeable/irrigated surfaces (i.e. grass/water bodies) are cooler as they retain and release moisture, acting just like evaporative air conditioners.



1. Hot, 2. Cool, 3. Hot, 4. Hot, 5. Hot, 6. Hot