Overheating and adaptation for schools

Islington Council

Antonietta Canta | Associate | Buildings Decarbonisation & Resilience

16 November 2026



Urban heat in London

2006 2008 2010 2012 2014 2016 2018 2020 2022 2024 2026

2006 2011 2018 2022 2026

Last Updated: Wednesday, 19 July 2006, 22:39 GMT 23:39 UK

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Heatwave breaks record for July

The hottest recorded July day has emerged to have been in Wisley, Surrey, where temperatures hit 36.5C (97.7F).



People all over the country are trying to find ways to cool off

Earlier in the day, 36.3C (97.3F) near Gatwick Airport was thought to have been the high.

As the sun blazed across the country schools closed and workers dressed down while the elderly and young children were urged to drink plenty of water.

Peaks were 29.7C in St Angelo, Northern Ireland, 31.3C in Prestwick, Scotland, and 34.2C in Penhow, south Wales.

April set to be warmest on record as Britain basks in the sun

More than 100,000 people reported to have made the trip to south coast beaches amid high weekend temperatures



Heatwave: 2018 was the joint hottest summer for UK

3 September 2018



2018 was the joint hottest summer on record for the UK as a whole, and the hottest ever for England, the Met Office has announced.

UK heatwave: Temperature tops 38C and likely to rise on Tuesday

18 July 2022 · Comments

UK heatwaves



Watch latest forecast: An even hotter day on Tuesday

Summer 2026 was UK's hottest on record, Met Office says

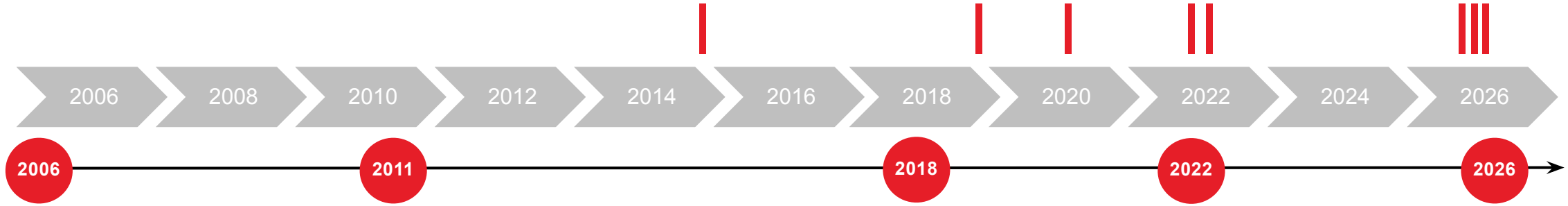


Ben Rich, Lead Weather Presenter, Justin Rowlatt, Climate Editor and Simon King, Lead Weather Presenter

1 September 2026 · 1959 Comments

Summer 2026 was the UK's hottest on record, according to provisional data from the Met Office.

Urban heat in London



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8 out of the top 10 hottest UK days in the last 10 years

Properties Vulnerable to Heat Impacts in London

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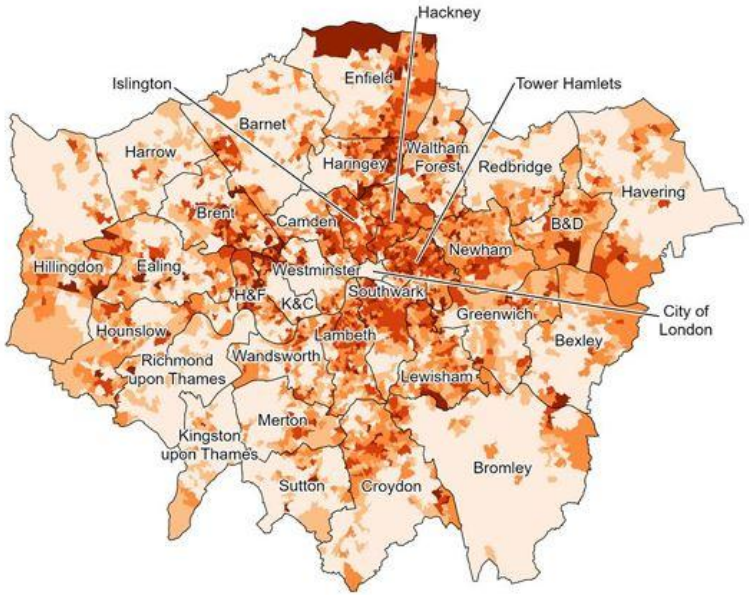
Properties Vulnerable to Heat Impacts in London

Prioritisation for adaptation interventions



ARUP

Properties Vulnerable to Heat Impacts in London

Approach

Heat risk is a combination of vulnerability to heat and exposure to heat hazards of a given magnitude or duration.

Heat hazard

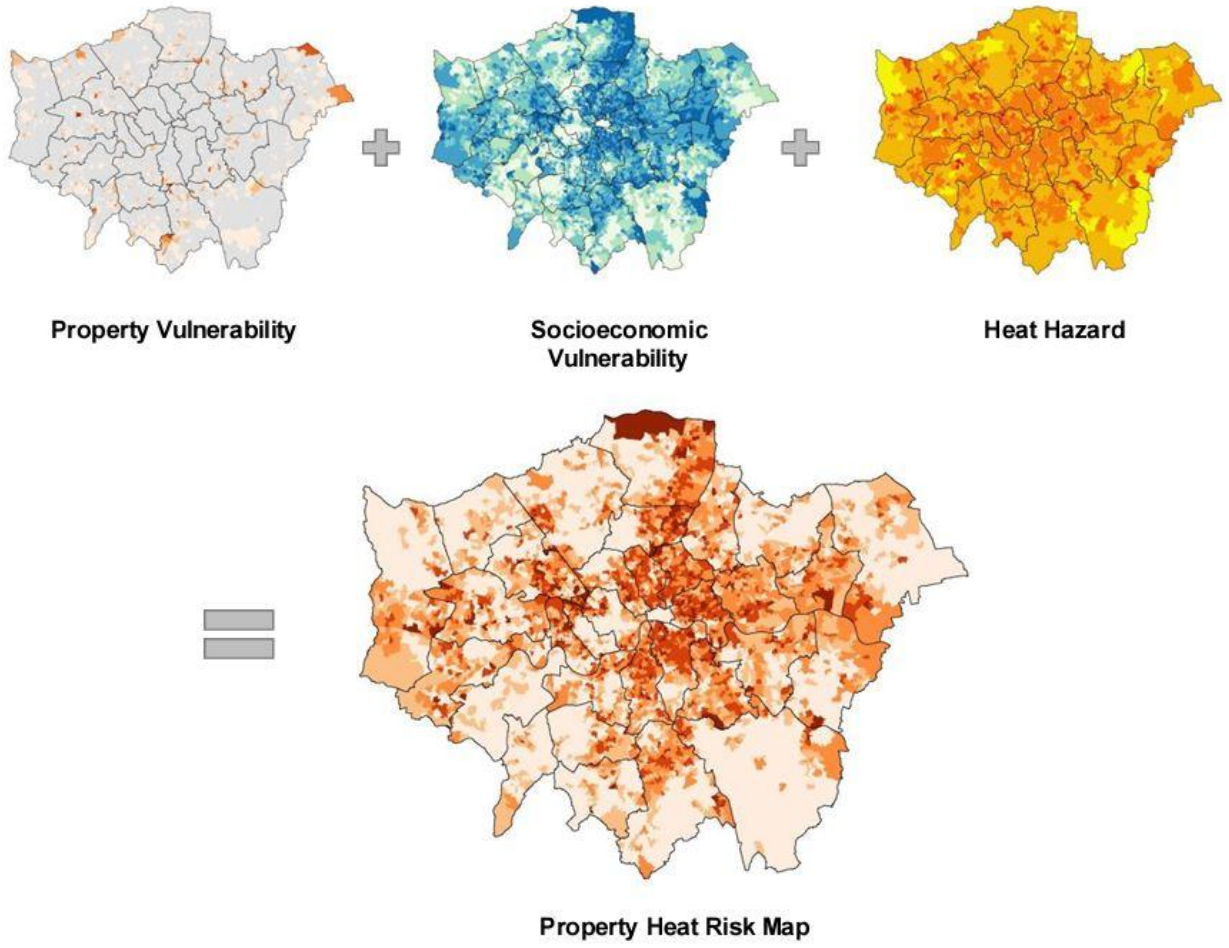
- A “hazard” is a potential source of harm; in this case, extreme or prolonged heat.

Heat exposure

- “Exposure” relates to the presence of (in this case) people or properties in places and settings that could be affected by heat hazards.

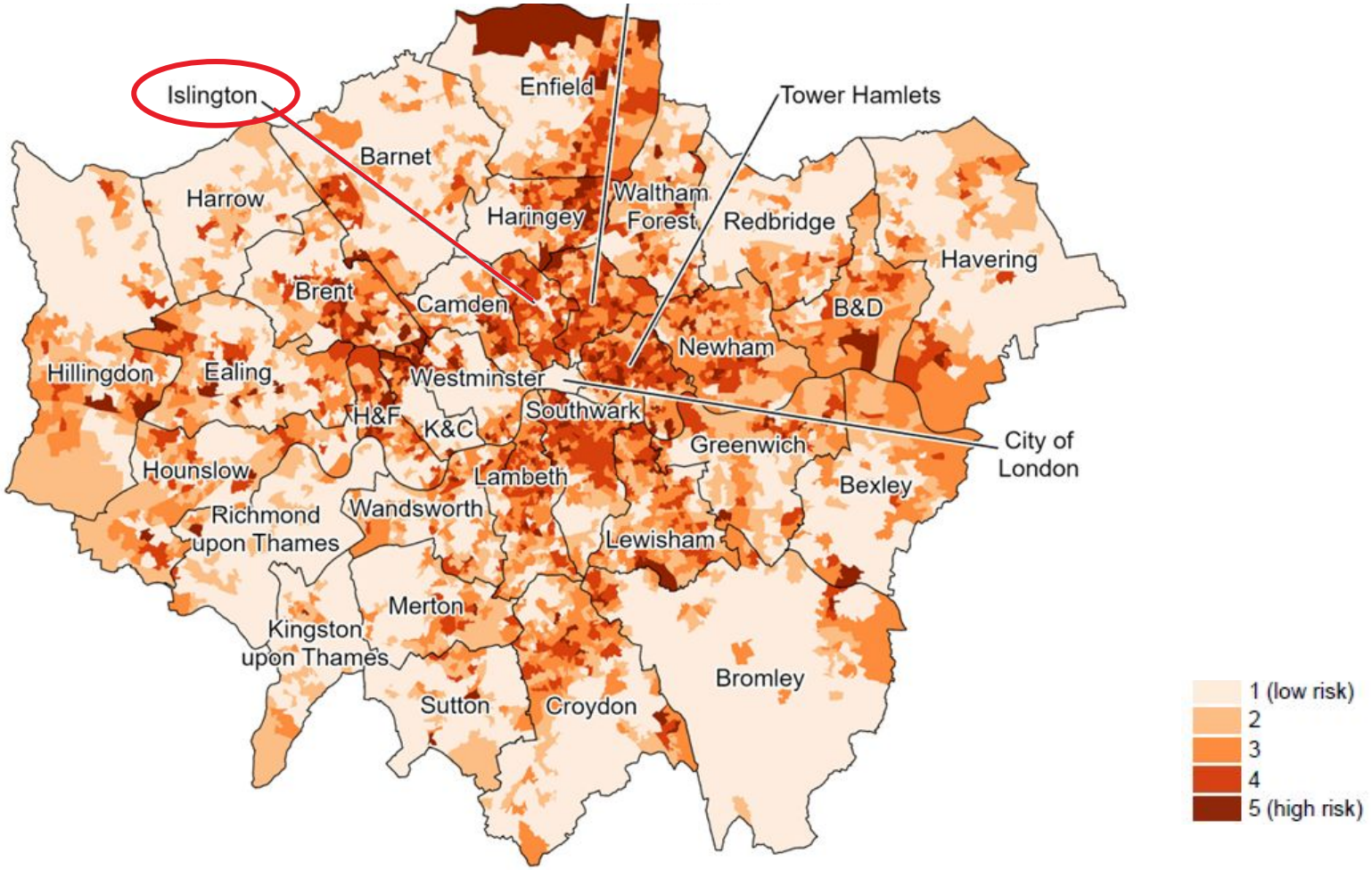
Vulnerability

- “Vulnerability” refers to the propensity or predisposition to be adversely affected by the impacts of climate change.

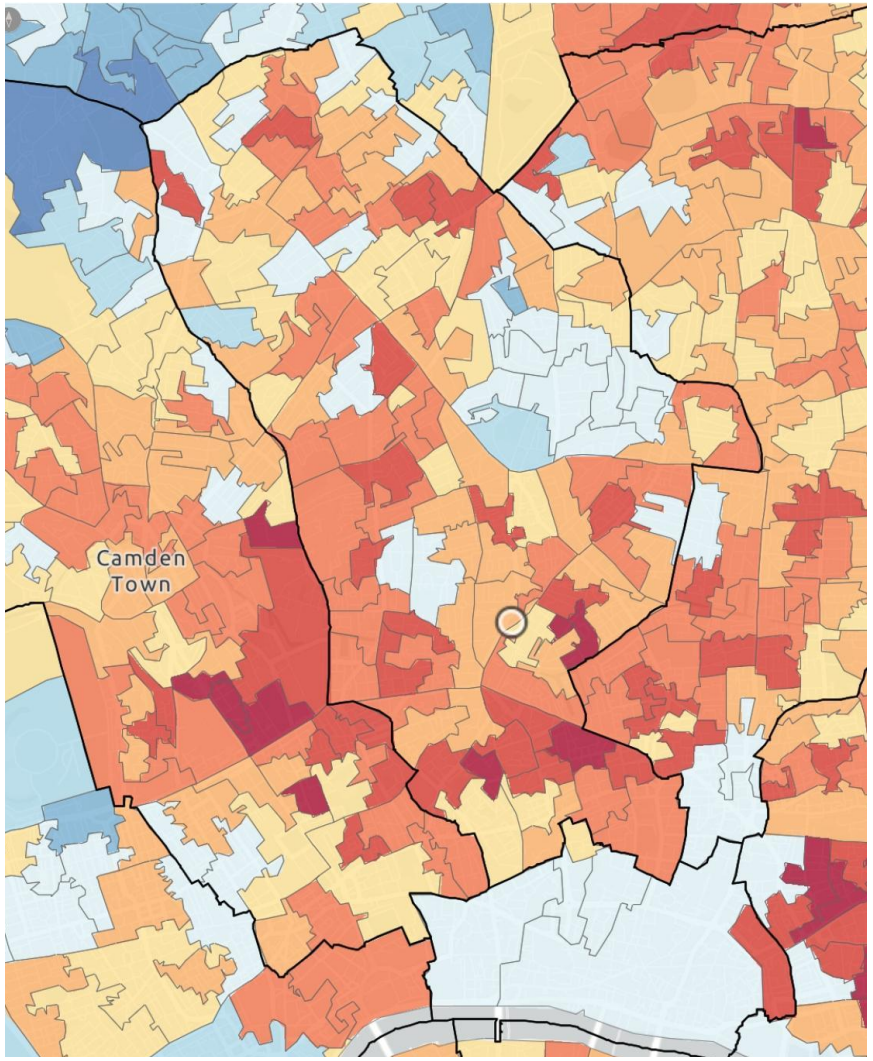


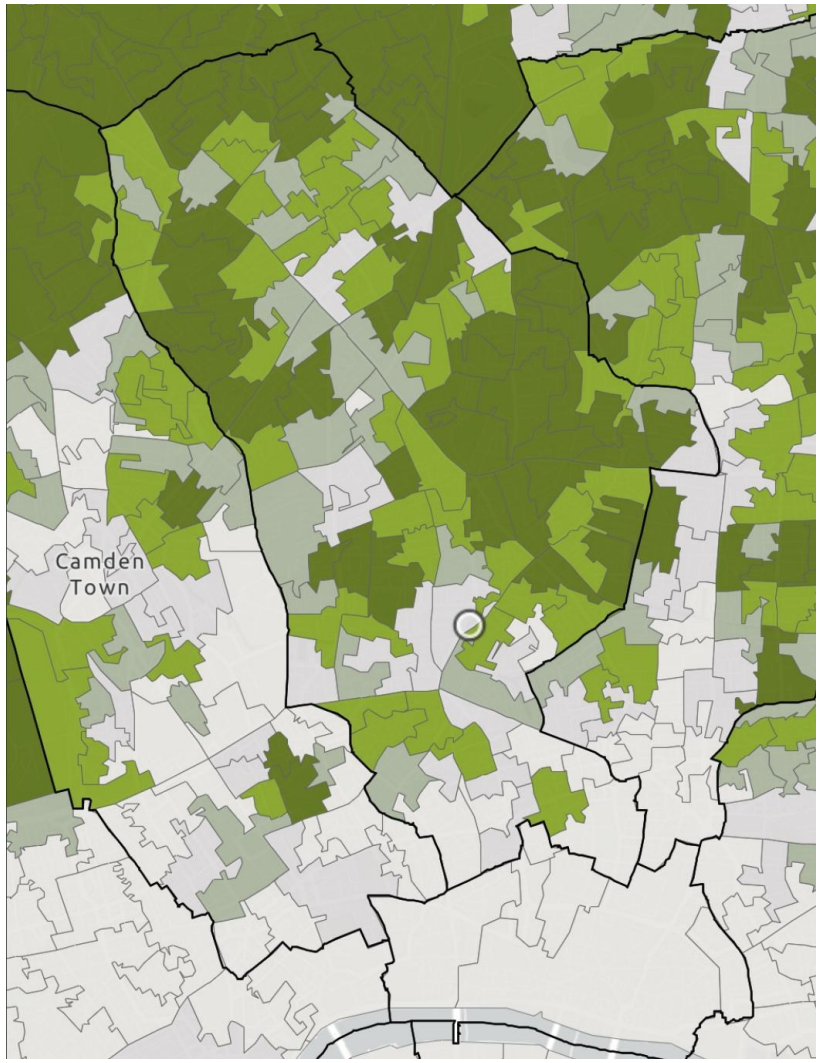
Calculation method for property heat risk map at neighbourhood (LSOA) level

School Heat Risk Maps



Islington Heat Risk Maps





Left Side Map
Heat Risk

gridcode

High | Low

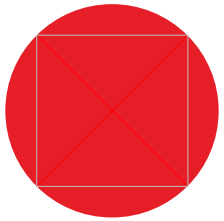
Right Side Map
% of Area Under Tree Canopy Cover

% of Area Under Tree Canopy Cover

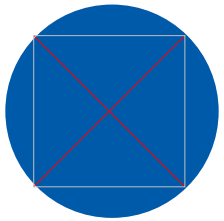
25 - 73% | 19 - 24% | 15 - 18% | 11 - 14% | 0 - 10%

Interactive London Climate Risk Maps

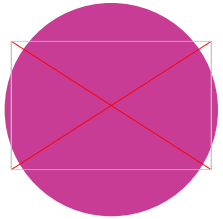
What makes buildings vulnerable to heat?



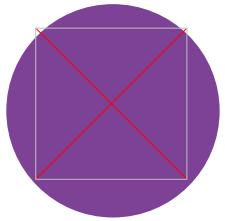
Location & urban environment
- Dense urban areas
- Hard surfaces
- Busy roads



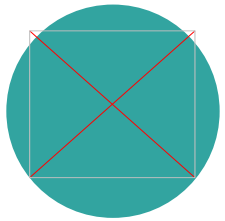
Uninsulated roof
- Excessive heat through the roof



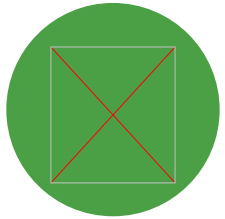
Glazing area & openable area
- Too much glazing lets in too much sun
- Fix, non-openable panels trap the heat



Shape & size
- Small rooms,
- High occupancy density



External wall insulation
- Good if good ventilation,
- Bad if not enough ventilation (for example, if windows cannot be fully opened)



Room orientation
- East and West facing rooms can get too hot in the morning and in the evening

Adaptation measures

Building scale

Windows		Internal blinds or curtains	Reduces solar gain
		External shading on south, east and west orientated windows	Reduces solar gain
		External and internal shutters	Reduces solar gain
		Low g-value window film (Plastic film which can be applied to windows to reduce the solar transmittance) or replacement of windows with low g-value glazing to reduce solar transmittance	Reduces solar gain
		Replacement of windows with an increased openable area	Increases natural ventilation of home

Building skin		Solar reflective coating to walls/ roofs, or solar reflective tilin	Reduces heat gains through conduction via the building envelope
		Roof insulation	Reduces heat gains through conduction via the building envelope
		Green roofs/walls	Reduces temperature of the roof surface and surrounding air by providing shade and evapotranspiration
Active cooling		Ceiling fans	Increases air movement to provide cooling
		Active conditioning (air-conditioning)	Provides cool air supply

From the Arup report for the UK Climate Change Committee "Heat risk and adaptation in the urban built environment"

Adaptation measures

Urban scale

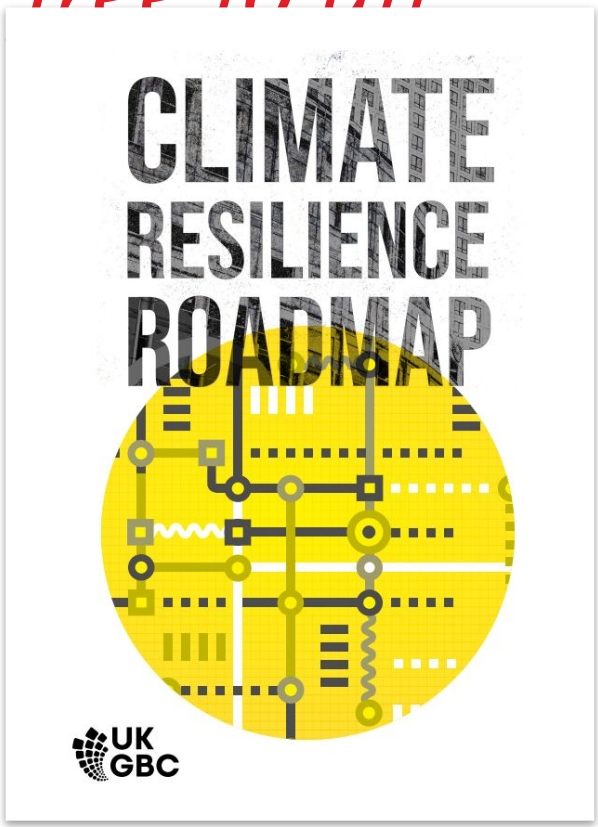
Green infrastructure		Green infrastructure – establishing parks and green spaces, increasing tree cover or undertaking strategic planting around buildings	Increases evapotranspiration, shade and albedo of the urban surface
Water management		Blue infrastructure – establishing ponds and rivers and water features	Increases heat absorption and evaporation.
		Irrigation	Cooling through evaporation
Pavements and surfaces		Pervious or porous surfaces	Increases heat absorption and evaporation (when there is moisture)
		Cool roofs/pavements	Increases albedo of the urban surface
Urban design		Pedestrianisation of streets	Reduces heat generating vehicle traffic
		Street shading	Reduces absorption of solar radiation

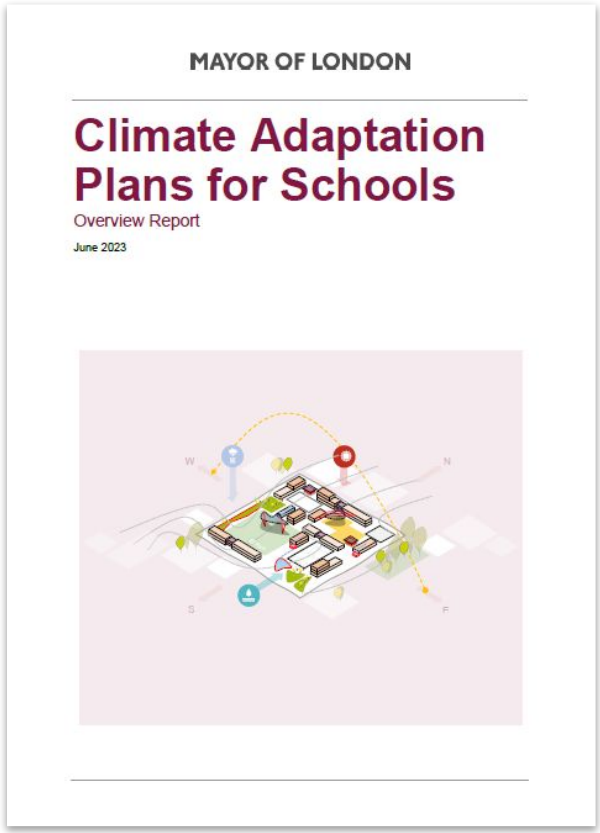


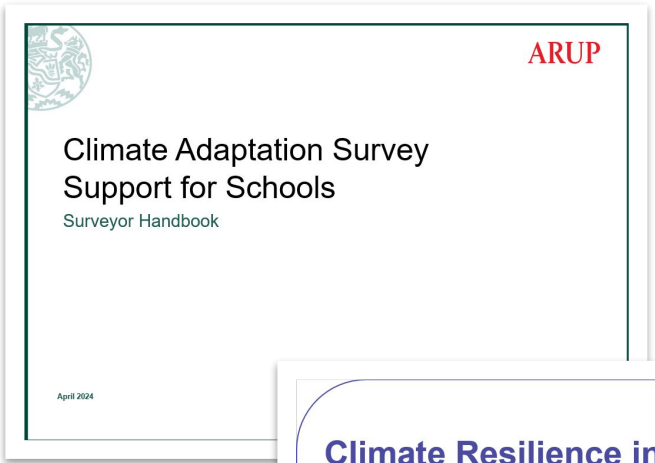
From the Arup report for the UK Climate Change Committee "Heat risk and adaptation in the urban built environment"

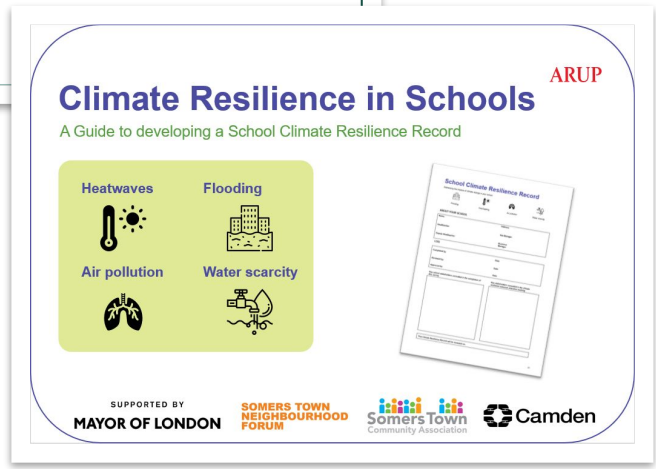
Multiple organisations have developed strategy planning and practical toolkits

free to all







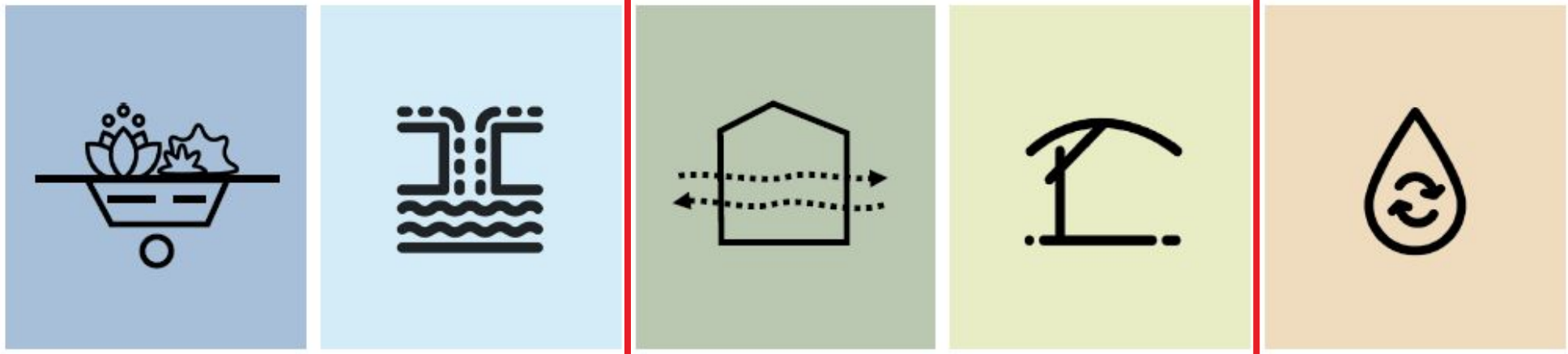


Compendium of adaptation and resilience measures for schools



https://www.arup.com/projects/climate-change-guidance-and-action-plans-for-london-schools-and-early-years-settings/

Key risks and areas



Section A
Sustainable Drainage Systems (SuDS) measures

Section B
Hard flood resilience measures

Section C
Ventilation and cooling measures

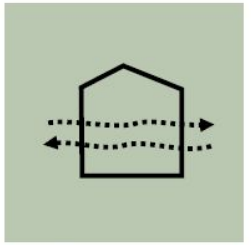
Section D
Solar shading measures

Section E
Water efficiency measures

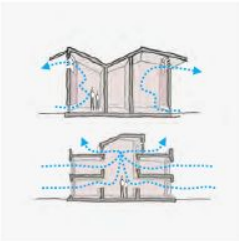
Adaptation measures for schools

C. Ventilation and cooling measures

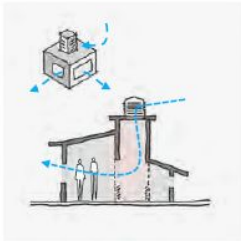
Index of ventilation and cooling measures



Ventilation and cooling measures



C.1
Natural ventilation: stack



C.2
Natural ventilation: wind catchers



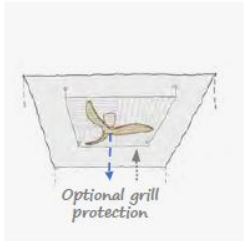
C.3
Natural ventilation: grill vents



C.4
Natural ventilation: skylights



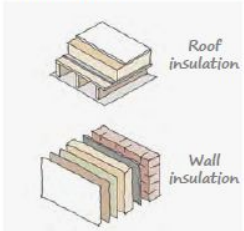
C.5
Natural ventilation: openable windows



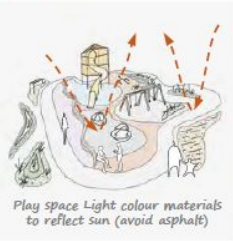
C.6
Natural ventilation: ceiling fans



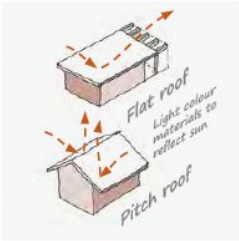
C.7
Ventilate weatherproof awnings



C.8
Insulation: walls and roofs



C.9
Cool surfaces



C.10
Cool roof



C.11
Planted beds



C.12
Green roof

Adaptation measures for schools

D. Solar shading measures

Index of solar shading measures



Solar shading measures



D.1
Grounds shade: sail



D.2
Grounds shade: pergola



D.3
Grounds shade: lunch benches



D.4
Trees



D.5
Green screen



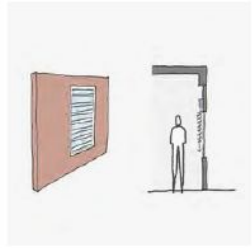
D.6
Green wall



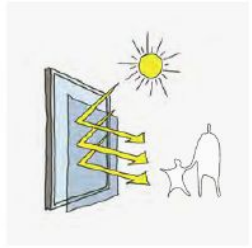
D.7
Louvres or brise soleil



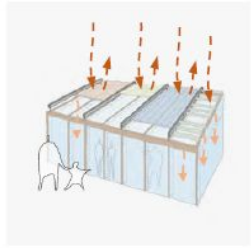
D.8
Awning or canopy



D.9
Internal blinds



D.10
Window solar protection



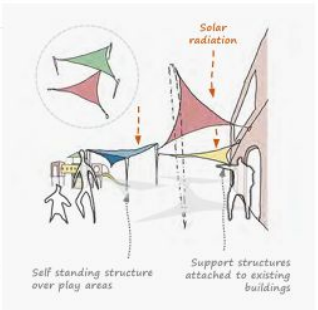
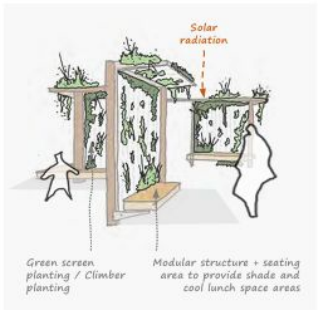
D.11
External roof blind

Adaptation measures

Solar shading

D. Solar shading measures

Descriptions of solar shading measures

	D.1 Grounds shade: sail	D.2 Grounds shade: pergola	D.3 Grounds shade: lunch benches
Illustrative sketch of measure			
Description of measure	A shade sail is a device to create outdoor shade using a flexible membrane tensioned between several fixed points. They are usually provided above seating areas and playgrounds in areas exposed to direct sun. They can also be waterproof.	A pergola is an arched structure in a outdoor space consisting of a framework covered with climbing or trailing plants. Depending on materials, size and choice of plants pergolas can provide shade and cooling in school playgrounds.	Creating seated areas covered with a shade structure or a planted trellis creates spaces in the playground for students to eat their lunch or rest throughout summer months.

Note: Sketches and reference images for illustrative purposes only

Note: Generic description of measure

D. Solar shading measures

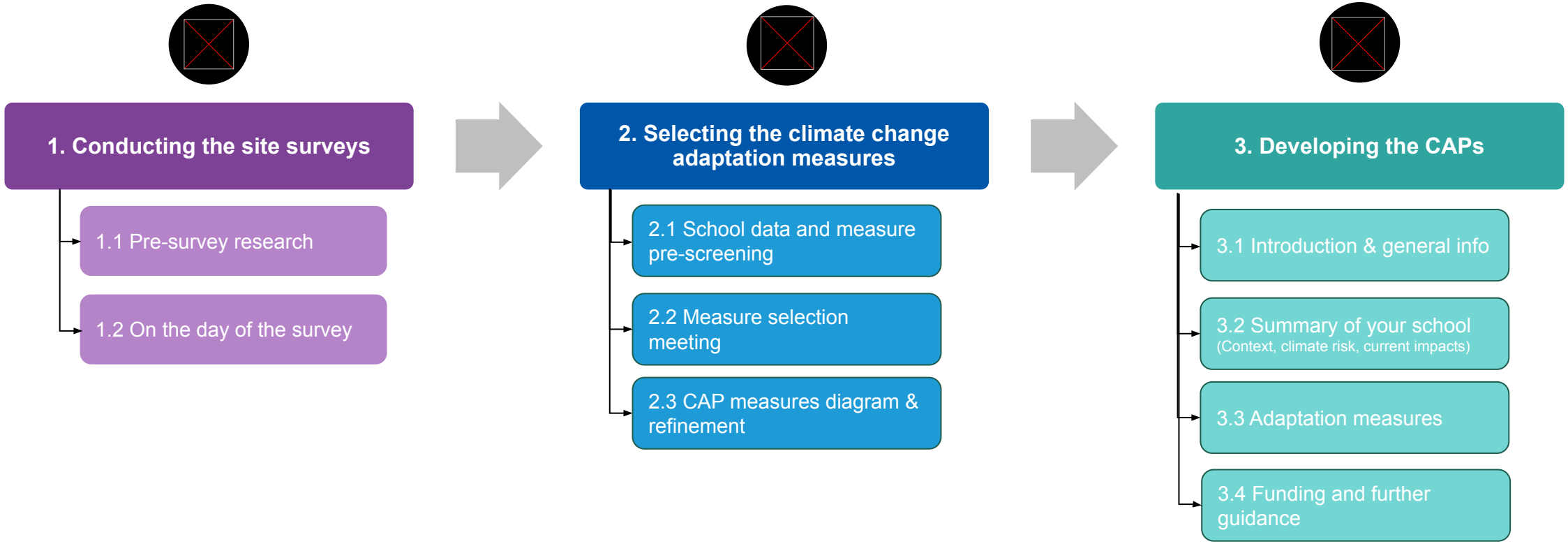
Costs of solar shading measures

	D.1 Grounds shade: sail	D.2 Grounds shade: pergola	D.3 Grounds shade: lunch benches
Indicative cost of measure	**Climate risks addressed** Heat **Maintenance requirements** Ad-hoc cleaning of shade-giving fabric **Co-benefits** n/a **Indicative capital cost range** £2,700 - £5,300 **Cost assumptions** Costs include for metal frame structure, circa 3m x 3m, with fabric stretching between poles, no walls, fixed to solid base. Includes supply, delivery and installation; solid base not included and assumes will be available (concrete, block paving, pavers, etc.). Costs include for contractor preliminaries, overheads and profit, and risk.	**Climate risks addressed** Heat **Maintenance requirements** Ad-hoc cleaning of shade-giving structure **Co-benefits** n/a **Indicative capital cost range** £1,800 - £3,400 **Cost assumptions** Costs include for softwood timber structure, circa 3m x 3m, with solid wooden / tiled roof finish, no walls, fixed to solid base. Includes supply, delivery and installation; solid base not included and assumes will be available (concrete, block paving, pavers, etc.). Costs include for contractor preliminaries, overheads and profit, and risk.	**Climate risks addressed** Heat **Maintenance requirements** Ad-hoc cleaning of shade-giving structure **Co-benefits** n/a **Indicative capital cost range** £900 - £1,700 **Cost assumptions** Costs range includes for bench type seating (2 seater) to picnic table, all with integrated shading structures. Costs include for supply, delivery and construction. Costs include for securely fixing to ground. Costs include for contractor preliminaries, overheads and profit, and risk.

Note: Cost reference for indicative purposes only

Delivering the Climate Adaptation Plan

The methodology



Delivering the Climate Adaptation Plan

Summary of your school

Site survey date and time: 23 November 2022, 10.00-12.00

School stakeholder/s met at survey:
Liza Storm, Deputy Head and Mark Pepperday, Caretaker.

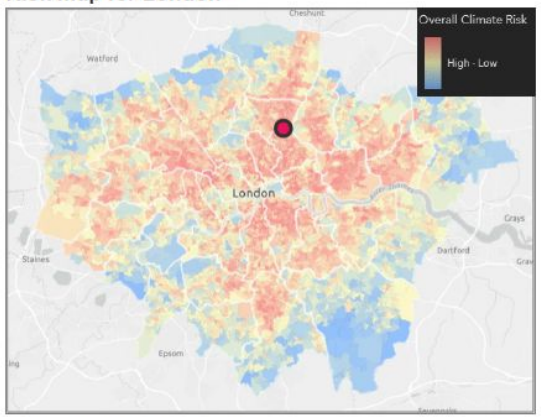
The site has one main building, three separate playgrounds, a science garden and a car park. The building is a brick building of ~2,500m2, mainly comprising one storey with a flat bitumen roof, with a smaller two-storey block also with a bitumen roof. It is heated with gas boilers, and cooled by manual window ventilation, with the exception of two air conditioning units - one in the IT room, which is not often used, and one in the server room.

The three playgrounds are predominantly surfaced with impermeable asphalt and rubber play surfaces. A science garden on the south-east corner of the site is mostly vegetated with trees, bushes, and raised beds. It is an important site for shaded outdoor learning during the summer. Planted beds and hedges dot the perimeters of the playground, and the school has use of a separate allotment immediately adjacent to the school.

- **School type:** Primary school and nursery with 320 students
- **Constructed:** 1970s with early 2000s extension
- **Index of Multiple Deprivation decile[1]:** 30%
- **Percentage of students eligible for Free School Meals[2]:** 48%
- **Conservation area:** No

[1] e.g. 10% would indicate that the school is in the top 10% of most deprived areas in England. The Index of Multiple Deprivation measures relative deprivation across multiple factors including income, employment, education, health and others. Source: National Statistics, English indices of deprivation 2019. Available here.
[2] England average = 22.5%. Department for Education. Available here
[3] Historic England (2022). Available here

Figure 3: School location on map of Overall Climate Risk map for London[4]



School risk rating: High

Figure 4: School location on Land Surface Temperature map[4]



School risk rating: Medium

Figure 5: School location on surface water flood risk map[5]



School risk rating: High

[4] Source: GLA and Bloomberg Associates. Available here
[5] Source: Environment Agency Flood Risk Maps. Available here

Delivering a Climate Adaptation Plan

Survey methodology: Field Maps data collection

Information about your school was gathered using a bespoke application developed for this project using Esri Field Maps.

Arup surveyors carried out an accompanied site visit of your school's buildings and grounds, highlighting areas of interest including existing climate change adaptation and resilience measures, and internal and external areas where climate impacts have been experienced, as below:

- **Hot spots**: areas prone to high temperatures or overheating
- **Wet spots**: areas prone to flooding or water pooling
- **Dry spots**: areas of visible water scarcity impacts

Surveyors also collected basic information on the school buildings such as age of construction, building typology, construction materials, ventilation and cooling systems, and marked out the different land uses that make up the school grounds.

A summary of the Field Maps data collected for your school is shown in the adjacent image.



Figure 10: Screenshot of data collected using the Field Maps survey app

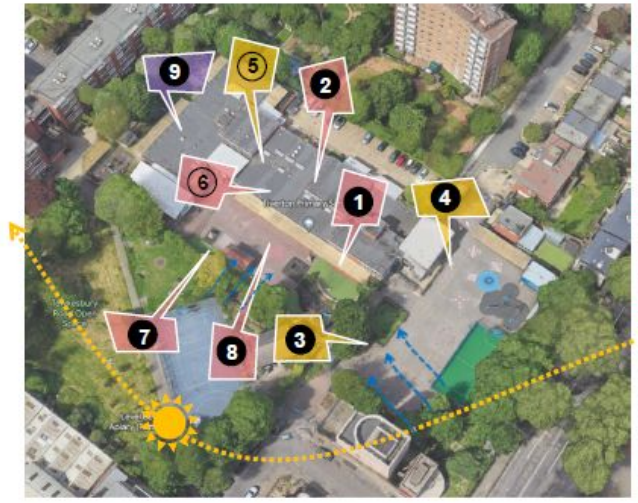
Delivering a Climate Adaptation Plan

Summary of recommended measures

The diagram below summarises physical climate change adaptation and resilience measures which would help to address the climate change impacts and risks faced by your school. Measure descriptions and additional information can be found in the pages that follow.

01 Intervention areas

Quick win measure (#)
Long term measure (#)



Key

- Heat related measures
- Water scarcity measures
- Surface water flow direction
- Flood risk
- Heat risk
- Flood + Heat measures
- Solar pathway
- Water scarcity risk

02 Climate risk(s) addressed	03 Recommended adaptation measure	04 Notes on measure position and impact*
	1 Ventilate weatherproof awnings	Retrofit existing shade structures to include gaps that allow air to escape from the sides and top
	2 Cool roof	Covering majority of roof
	3 Rain garden: non-linear	Intercepting water that flows from the south-east perimeter of the site
	4 Rain garden: linear	In front of the building to intercept water
	5 Green roof	Small planted areas of green roof where accessible
	6 Skylights	To provide ventilation for classrooms on the south-west façade
	7 Grounds shade: pergola	Consider extending the existing shade structure to provide additional cool space
	8 Grounds shade: sail	Consider linear shade tarpaulin sails connecting the existing pergola with the building
	9 Internal water efficiency measures	Across the school site, for example low flow taps and dual flush toilets

*See following pages for descriptions of measures with benefits and costs.

Questions?



Roundtable discussion:
Adapting to overheating

- Do you already have a CAP?
- What are your top 3 challenges?
- What are your top 3 successes?

