



POLINATIONS

SUSTAINABILITY
REPORT



CONTENTS

Through this report we intend to share our project learning to encourage open discourse on the challenges and benefits of prioritising sustainability in outdoor arts.

INTRODUCTION

- PoliNations Overview
- PoliNations Team

OVERVIEW

- Sustainability Landscape
- Sustainability Aims
- Action Plan

KEY LEARNINGS

- Energy
- Travel & Transport
- Resources
- Procurement
- Materials
- Waste & Recycling
- Nature
- Digital & Print
- Carbon Footprint

CONCLUSION

- Conclusion

POLINATIONS OVERVIEW

2 – 18 SEP 2022
VICTORIA SQUARE,
BIRMINGHAM

PoliNations was a Birmingham city-centre garden of magical proportions where audiences were welcomed by an epic array of colour and nature, to discover the history and natural diversity of people and plants.

Our rainwater-drinking, towering architectural trees and free events programme attracted audiences of over 150,000 people over 17 days.

Sustainability was a key part of PoliNations, and the team set out to try and make the event as low carbon as possible and to tell the story of the success, challenges and learnings along the way.

Trigger engaged a Sustainability Consultant to advise us during the planning, design and delivery.

We developed a Sustainability Policy and Action plan and have monitored our progress - shared with you here in this report.

**Commissioned as part of UNBOXED: Creativity in the UK
and presented as part of Birmingham 2022 Festival.**

POLINATIONS TEAM

ANGIE BUAL

Creative Director of PoliNations
and Artistic Director of Trigger
(The Hatchling, WithYou, Curio)

BRONIA HOUSMAN

Set and costume designer
(Bristol Old Vic, Take That,
Sadler's Wells)

CARL ROBERTSHAW

Multidisciplinary designer and
artist (Björk, Ellie Goulding,
London 2012 Olympics Opening
and Closing Ceremonies)

DOCK STREET EVENTS

Events specialists (MIF, Waltham
Forest London Borough of Culture,
GDIF, Hull UK City of Culture)

CHRIS AND TOBY MARCHANT OF ARBOR-NOVA LTD

Horticultural designers
(Contributors to RHS Chelsea
Flower Show medal-winners)

SUSTAINABILITY CONSULTANT

Helen Freudenberg

THISS

Architecture, research and spatial
design studio (UCL, London Met)

TRIGGER

Award-winning creators and
producers (The Hatchling, GROW)





SUSTAINABILITY LANDSCAPE

The current climate situation is grave. The climate stripes developed by Reading University (Figure 1) show, in visual terms, the huge increase in global temperatures in recent years.

The festival industry itself is responsible for over 24,000 tonnes of greenhouse gas emissions in the UK every year* not counting indirect emissions or emissions generated in the build and break of an event or the transport emissions of people travelling to an event.

Brexit, the global pandemic and the war in Ukraine have created a challenging environment in which to plan an event leading, as they have, to soaring fuel and material costs and creating supply chain issues.

*<https://www.vision2025.org.uk/the-show-must-go-on/>

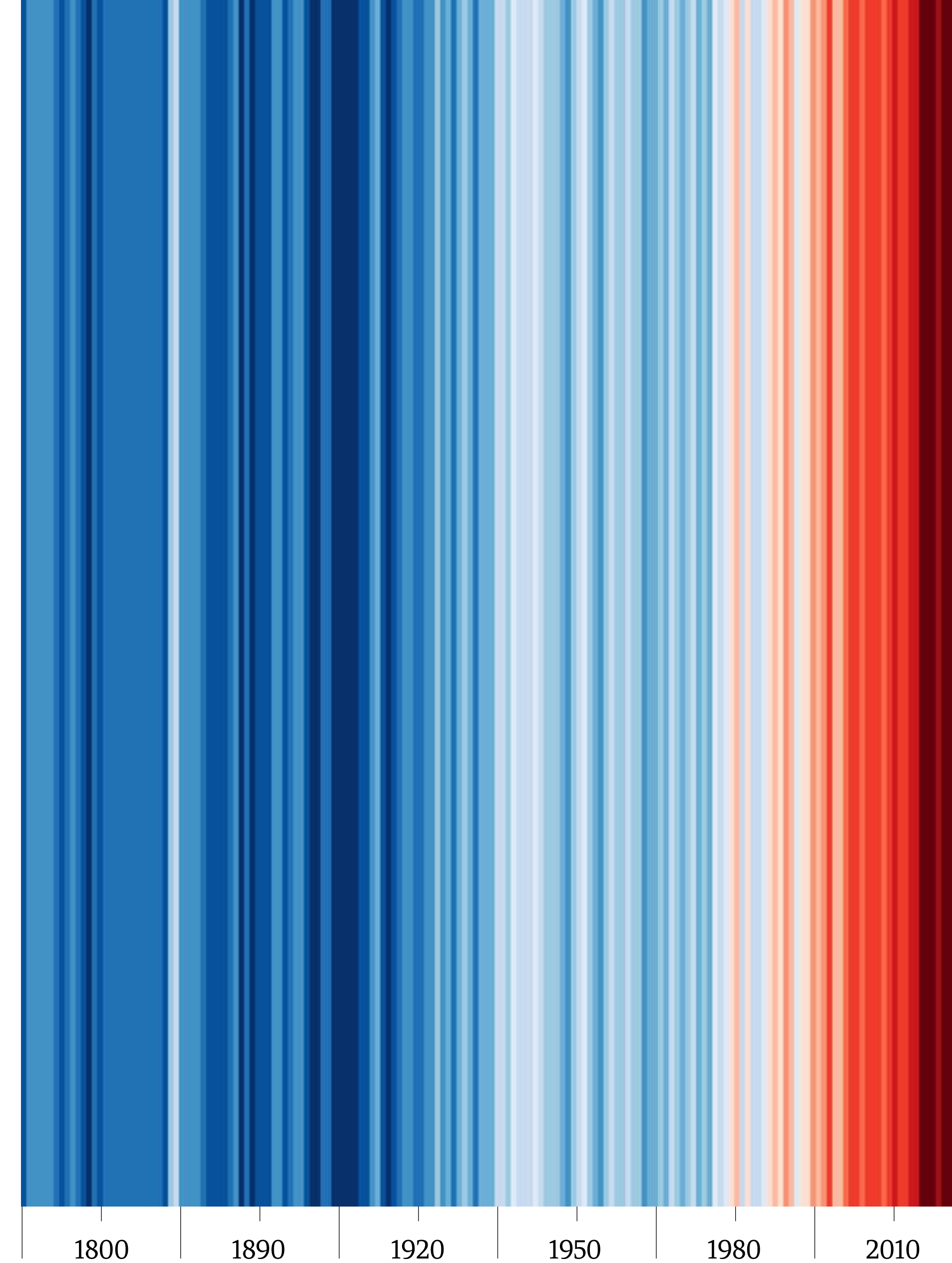


FIGURE 1: **GLOBAL TEMPRATURE CHANGE (1850 - 2020)**

**6000+
LIVE PLANTS**

**5 GIANT
ARCHITECTURAL
TREES**

**2 LOCATIONS:
VICTORIA
SQUARE &
CHAMBERLAIN
SQUARE
BIRMINGHAM**

**495 PERFORMERS
57 CREW
21 CREATIVE &
PRODUCING TEAM
10 TRAINEES
8 WORKSHOP
FACILITATORS
6 FOH TEAM**

**20 DAY BUILD
17 DAY LIVE EVENT
12 DAY DERIG**

**18 MONTHS
FROM
COMMISSION
TO LIVE**

**23 BESPOKE
COSTUMES**

**1 INTERNATIONAL
COLLABORATION
WITH PAKISTANI
DESIGNERS**

SUSTAINABILITY AIMS

- Minimise the overall environmental impact of the project within the realms of large scale installations, challenging current restrictions
- Leave Birmingham a legacy of planting
- Raise audience awareness and engagement in sustainability
- Work with partners to improve sustainability
- Share our project learning to encourage open discourse on the challenges and benefits of prioritising sustainability



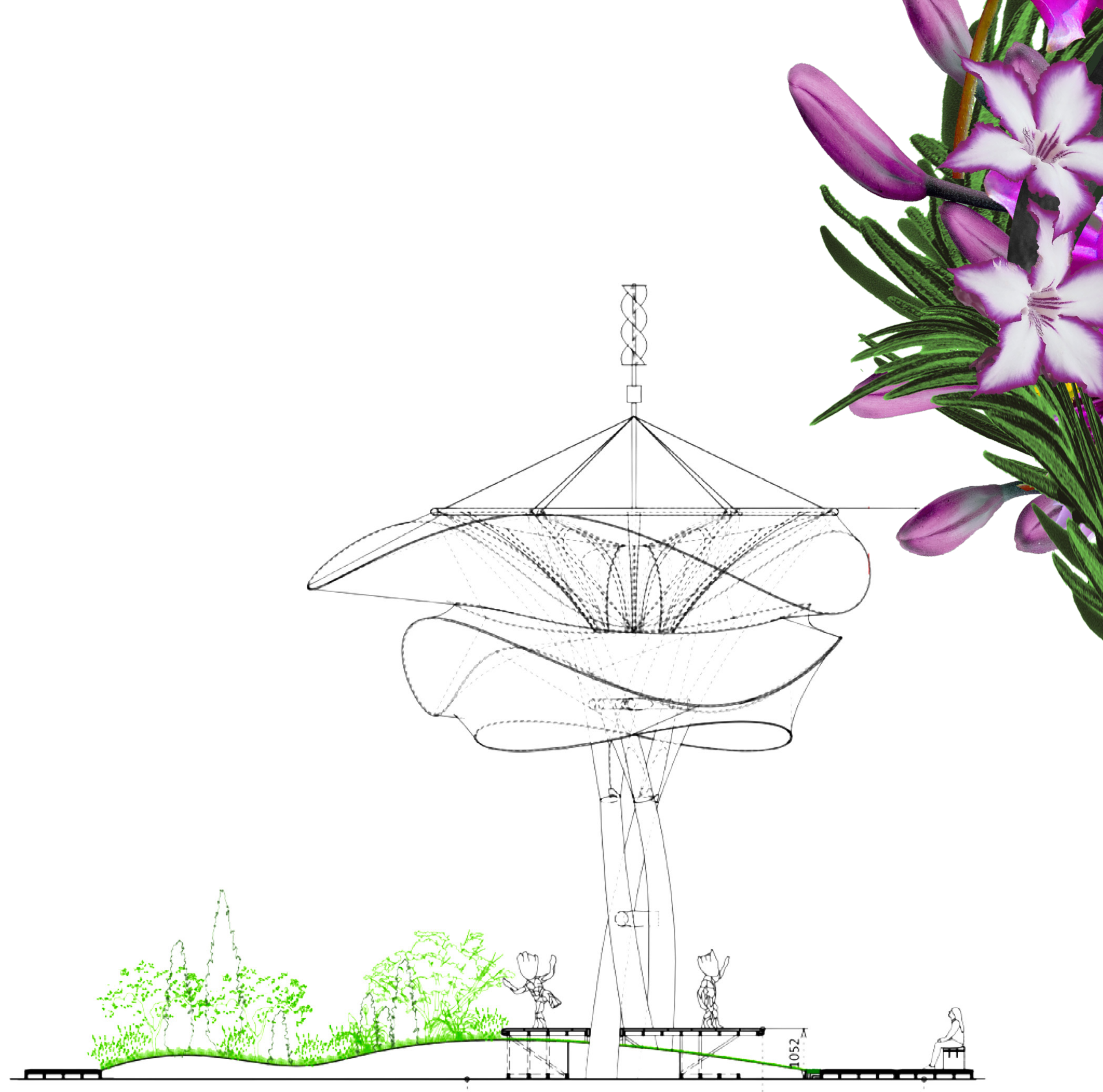
ACTION PLAN

A Sustainability Action Plan was developed splitting the project out into key areas:

1. Energy
2. Travel & Transport
3. Resources
4. Procurement
5. Materials
6. Waste & Recycling
7. Nature & Biodiversity
8. Digital & Print

Each heading had specific actions, milestones, outputs and named staff responsible for achieving and monitoring actions.

This action plan was regularly reviewed and updated by the Sustainability Lead and Sustainability Consultant.





ENERGY

Achievements

- **100% Renewably powered** – the main site was plugged into Birmingham City Council's supply in Victoria Square which is 100% renewable. There were no generators onsite.
- **100% LED Lighting** – across the site and including all show lighting.
- **100% Hydrogenated Vegetable Oil** used as fuel for on site machinery – 1000 litres were used. No diesel or petrol was used by plant on site. (Using diesel would have produced 67 times the amount of carbon emissions!)

Learnings

- **Wind Turbines** – initially factored into the design, but during development consultations it was understood that the energy generated would not outweigh the carbon costs of installing the turbines.
- **Solar panels** – carbon emissions associated with fabricating and transporting them would not be compensated for by the energy produced.
- **Electric plant hire vehicles** are still prohibitively expensive and aren't reliably able to lift heavy weights e.g steel trees.



ANGIE BUAL
CREATIVE DIRECTOR

It's been extremely eye opening.
We thought we could put in wind
turbines and generate our own power,
but it would do more harm than good...
In this case the energy used to
transport and make the turbines would
outweigh the amount of energy that
could be created in a city centre for
a couple of weeks!

TRAVEL/TRANSPORT

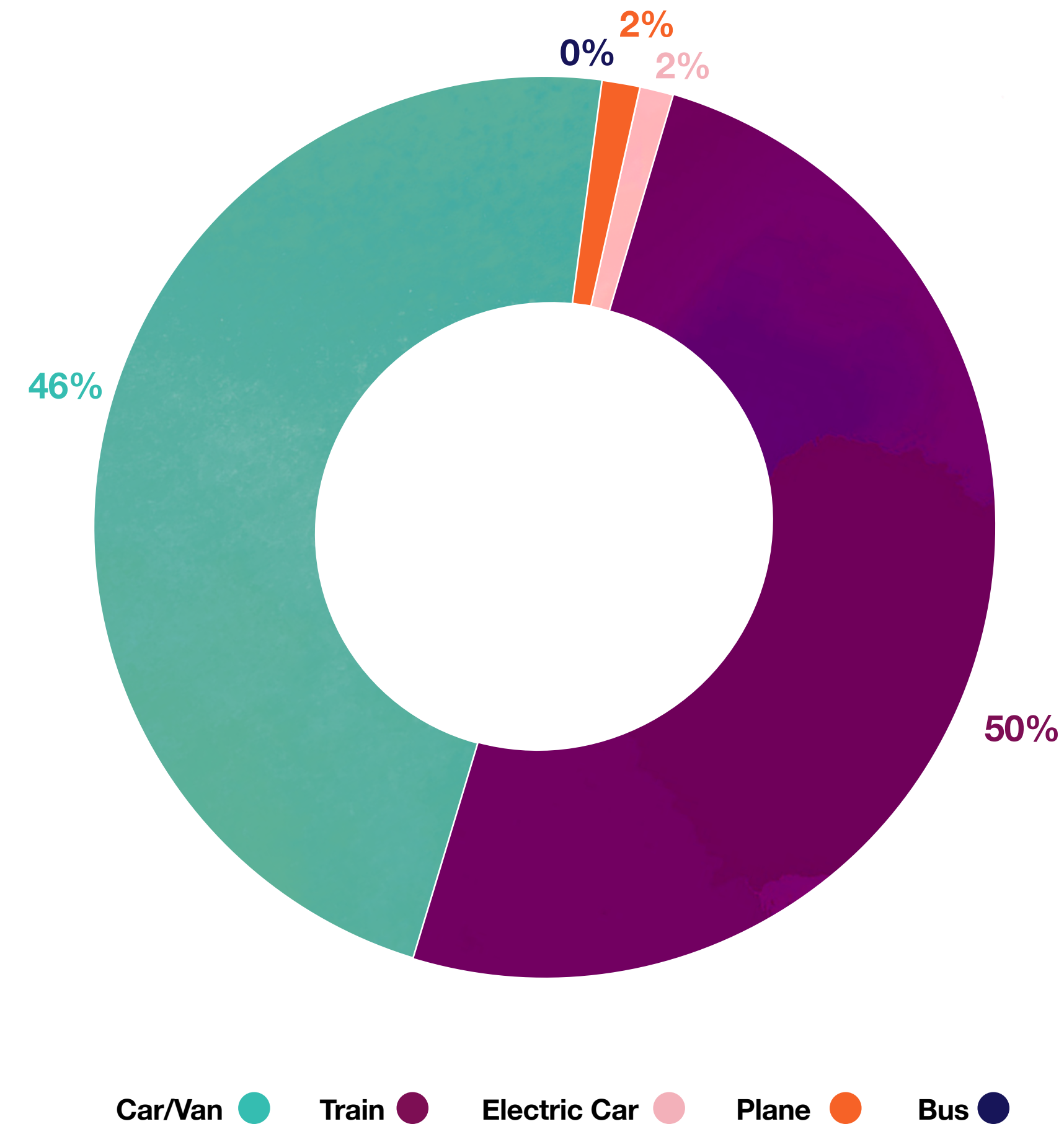
Achievements

- **Trains**
Half of all journeys were made by train.
- **Flights**
Over the whole project only 13 journeys took place by plane. Primarily these were made by Airformance our canopy and cladding fabricator, based in Germany.

Learnings

- **Local staff doesn't always mean less travel**
Birmingham based staff working unusual hours or in need of a car for their role e.g. Props, made up 24% of car journeys.

TOTAL JOURNEYS





RESOURCES

Achievements

Rainwater Collection

The super trees collected rainwater, diverted via the canopies, down chains and into a container. Collected water was used to supplement irrigation.

UK grown plants

Most plants were grown from seed in the UK. Where this was not possible within the timeframe, some shrubs were imported as young plants from Europe and grown on in the UK.

Peat

All plants were grown in peat-free or peat-reduced compost and soils.

Learnings

Irrigation

Rainwater capture alone is not enough to water a garden of this size. The estimated use was 23,760 gallons (16kg CO₂e emissions) but it wasn't possible to verify this as Council water was not on a meter.

Peat free

100% peat free compost is not yet standard in the commercial horticultural industry. This is something nurseries are trying to change, however, planting in organic soil requires more time.



**The biggest challenge?
We had to adapt our design to
be more sustainable. But I think
of this quite philosophically
- any adaptations are generally
going to make the project better
and are a natural part of the
process for a designer.**



CARL ROBERTSHAW
DESIGN DIRECTOR

PROCUREMENT

Achievements

Applicant specifications

We built sustainability targets into our job specs in order to advertise to potential applicants that achieving a low carbon footprint was a priority for the project.

Sustainability credentials

We prioritised applicants with good sustainability credentials for high value contracts.

Challenge established ways of working

During partnership development we challenged suppliers to interrogate their fabrication, packaging and transport processes to ensure that sustainability targets were felt down the chain.

Learnings

Costs

Sustainable options are often more expensive so there is a constant conversation on balancing financial cost and environmental cost.

Be transparent

Open conversations with suppliers helps present the objectives from the start.

Packaging

After a lot of effort was put into interrogating materials and fabrication process, some items then arrive wrapped in plastic! It's important to check how items will be packaged ahead of time!





**CHRIS CLAY
& JENNY HUTT
DOCK STREET EVENTS**

We spent a lot of time talking about materials and their sustainability but not a lot of time talking about packaging. Some elements of the canopy frames arrived wrapped in polythene to protect the paint work, so this was kept and used to re wrap the frames on the load out.

MATERIALS

Achievements

Zinco - Required under planting to keep plants in place. We sourced zinco made from recycled marine waste which can be reused in future projects.

Cork - Seating on site was made from recycled cork previously used in a V&A exhibition.

Ballast - Despite requiring redesigns, pre-cast concrete blocks and sandbags were used in place of new concrete as, though pre-cast concrete has a higher embodied energy, it can be reused over and over.

Reusable materials - All materials used in the super trees can be stored and reused for future presentations including bungee ties!

Shared materials - Kit and haberdashery leftover from the Commonwealth Games ceremonies was reused at PoliNations.

Costumes - Designers tried to use as much material as possible that was recycled or deadstock (at least 50%). Costume scraps were recycled to Scrapstore in Birmingham.

Learnings

Steel - Despite its high environmental impact, structural steel combined the strength needed to support the huge canopies under high winds while achieving the slimness of profile needed to accentuate the tall slender tree like structures. Alternative materials were considered but rejected in favour of steel as this had good dynamic performance and ease of erection. We used 15% recycled steel sourced from Cleveland Steel, which lowered the embodied carbon by 2% as compared to virgin steel.

Cable ties - It's hard to get away from cable ties! While bungee cords were used where possible cable ties still had to be used e.g. to tie the scrim to the fencing.

Cladding material - It wasn't possible to find a fire retardent natural material with the correct tensile strength. We sourced Austronet, a geotextile made of high density polyethylene to cover the trees as it was the only workable option.

Costumes - While costume designers aimed to avoid polystyrene, PVC, polycarbonate/acrylic, aerosols, parabens & triclosanit, and found creative solutions to avoid the use of glitter, it was impossible to find an environmentally friendly alternative to glue!



To ballast the trees, concrete fitted the bill in terms of density and weight but a carbon analysis of poured concrete revealed that we'd be emitting the equivalent greenhouse gas emissions of 10 return flights from London to New York if we used it! That went against everything the project was trying to achieve, so was a big no-no.

We settled on using sandbags and renting pre-cast concrete blocks which will have had a life before the project and will be used again afterwards.

**SASH SCOTT
& TAMSIN HANKE,
THISS STUDIO
ARCHITECTURAL &
SPATIAL DESIGNERS**



WASTE AND RECYCLING

Achievements

Toilets

- Public site toilets used low flush cisterns (using 450ml per flush compared to a standard toilet which uses 4-6 litres per flush) and connected to the mains.
- A staff member responsible for emptying them stayed locally rather than travelling back and forth as required.

Recycling

- 80% of waste was recycled or reused.
- The vast majority of infrastructure onsite was hired including tables, chairs, fencing, cabins, marquees and the WonderSphere geodesic dome.

Learnings

Toilets

- Compostable toilets were not financially viable nor located close to Birmingham (additional travel emissions). We found compost toilets to be 100% more expensive than standard ones.

Recycling

- Public use of Council provided waste pods is not always consistent, making recycling harder.





NATURE

Achievements

PoliNations legacy

- 100% of plants and shrubs were given away to the public at the Plant Giveaway or donated to Birmingham City Council for local community engagement work.
- 5% of trees were donated to the See Monster UNBOXED project.
- Sleepers that formed the edges of the flower beds were also given to the council.

Engagement with green space - Re-affirming connection with nature & raising awareness of the importance of green space in urban areas.

Biodiversity - Birds, bees, dragonflies and butterflies regularly seen on site. Mosquito larvae found in water barrels.

Learnings

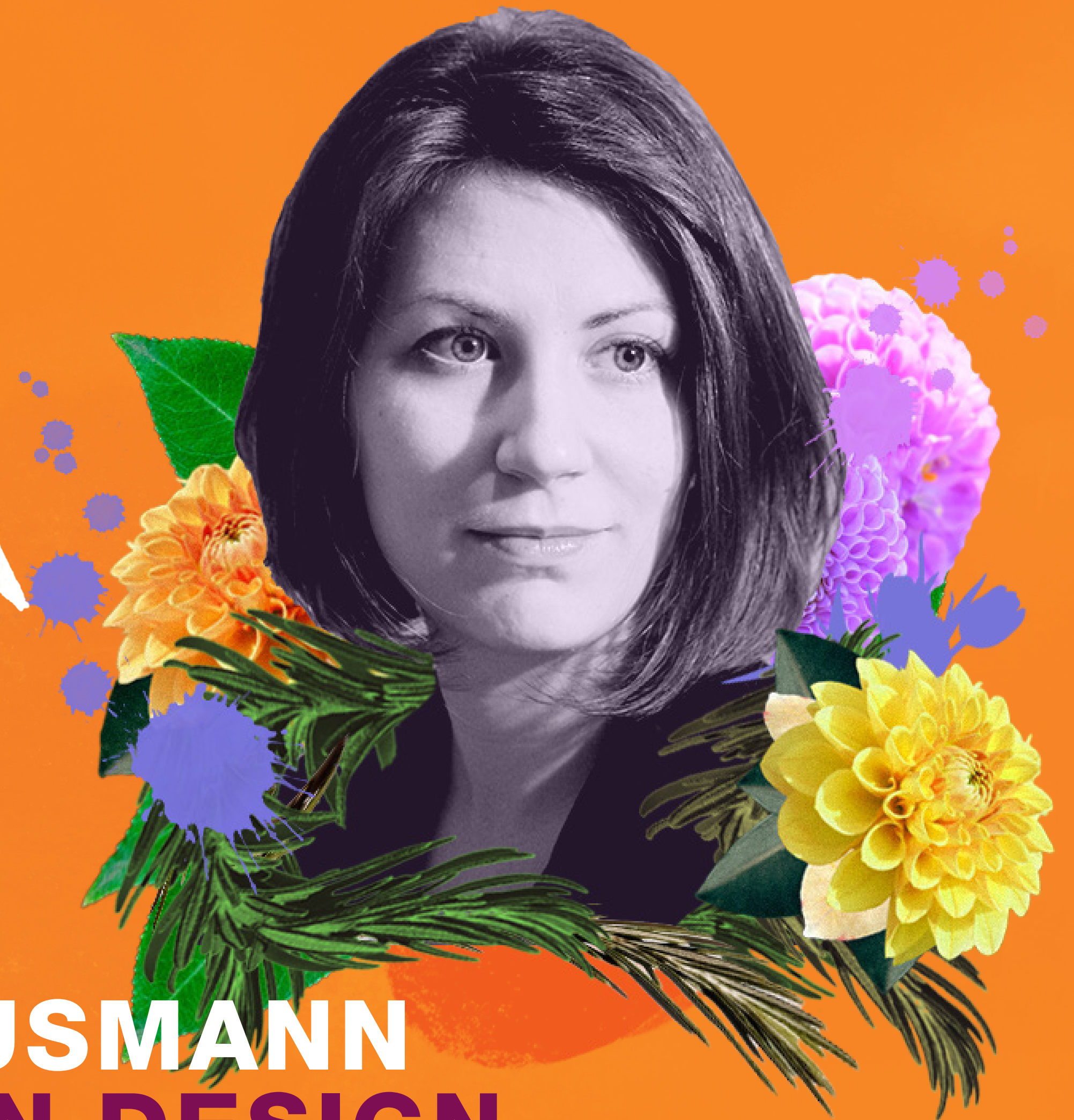
Biodiversity survey

- We contacted 15+ organisations including local Wildlife Trusts, but couldn't secure anyone to undertake a biodiversity assessment.





**Engage a
Sustainability
Consultant from
the beginning!**



BRONIA HOUSMANN
PRODUCTION DESIGN

DIGITAL & PRINT

Achievements

Website

The website was 100% renewably powered and designed where possible to be low carbon, delivered in phases to be efficient and avoid energy intensive rebuilds.

Online Education packs

Created using environmentally friendly materials such as peat free compost and Aeroplas pots made in the West Midlands from post consumer waste streams.

Zine

The iconic plant zines were printed using the Japanese risograph method with rice-based ink on recycled paper – FSC certified, carbon neutral and made with wind power!

Learnings

Time

Documenting every aspect of sustainability on site is time consuming and without a dedicated staff member can be hard to maintain in the pre-event build up.

Website

Whilst the website was 100% renewably powered, it still consumed high amounts of energy according to [websitecalculator.com](https://www.websitecalculator.com/). This was due to the inclusion of pictures and moving content which require energy to power and take up space.

App

During its development, we learnt that each part of the digital journey needs to create a rich user experience, including what we ask and how we ask the questions in order to streamline the data held in the app.

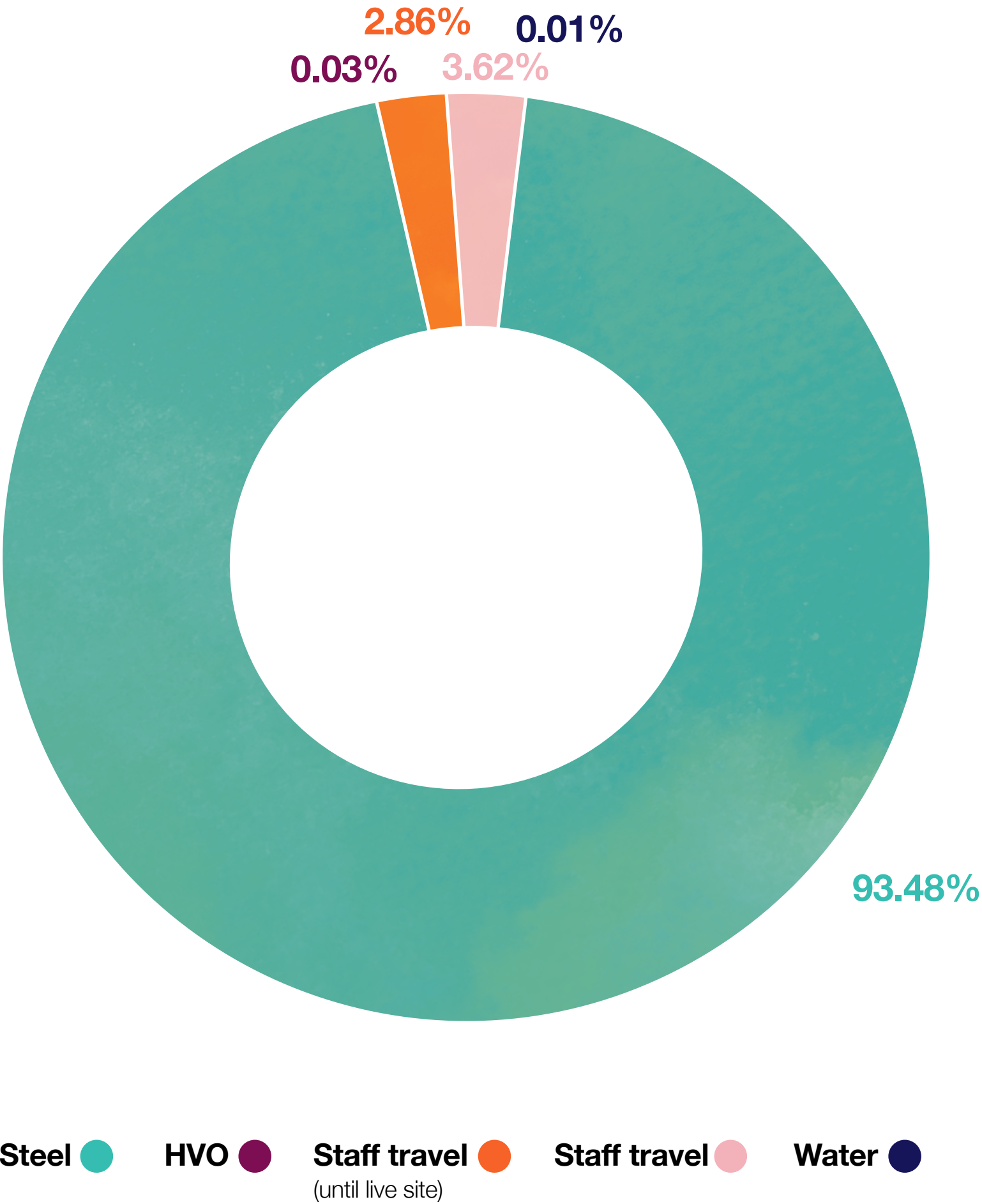




CARBON FOOTPRINT

	Emissions kg CO ₂ e	% of total emissions
HVO for site machinery	40	0.03%
Water supply for watering plants	16	0.01%
Staff travel (until live site)	3331	2.86%
Steel for super trees	108871	93.48%
Staff travel (while live)	4210.73	3.62%
Total emissions	116468.73	

Our calculations do not include: Electricity, water supply for toilets, audience travel, waste and trucking. From these calculations you can see that over 90% of our total carbon footprint was in the steel for the trees.



FUTURE TOURING



Designed for future life

The trees, iconic plants, tuktuk and other elements have been carefully designed with future life and touring in mind.

The trees break down into 3 main elements - the trunk, canopy frames, and material cladding - and were designed to fit into containers to be tourable, as well as safe and robust. Nothing is going to waste and all elements are reused again and again.



**100%
RENEWABLY
POWERED**

**100% LED
LIGHTING**

**35% OF
PLANTS WERE
GIVEN AWAY TO
THE PUBLIC**

**AT LEAST
80% OF
BUILD WASTE
RECYCLED
OR REUSED**

**56% OF PROJECT
MILES TRAVELLED
BY TRAIN**

**1 CAGE VAN
LOAD COLLECTED
BY ECO-WASTE
COMPANY
FOR SORTING**

**65% OF PLANTS
WERE GIVEN
TO THE LOCAL
COUNCIL FOR
THEIR PROJECTS**

CONCLUSION

While there have been challenges and learnings along the way, by building sustainability into the project from the start and making it a key agenda point at every production/ project meeting, we found that the importance was felt right through the team with high engagement across all departments.

[Critical friend](#)

It has been crucial to work alongside an engaged sustainability consultant who has kept us on track by critiquing and supporting our efforts to make the project as low carbon as possible.

[Raise audience awareness and engagement in sustainability](#)

We have had strong engagement on social media and a public call for increased green spaces in urban areas.

[Work with partners to improve sustainability](#)

Reflected in partner key learnings throughout and summed up by our Sustainability Consultant, Helen Freudenberg: “The biggest surprise? How responsive people are...if you show people the impact, they are very happy to adapt to make things sustainable.”

[Share our project learning to encourage open discourse on the challenges and benefits of prioritising sustainability](#)

Blogs reflecting our journey on the PoliNations website along with this presentation.



We hope you have found this report useful! If you would like to access some of the sustainability data gathered over the event please be in touch with us at hello@triggerstuff.co.uk

