periscope

Stockpile Garden

002 Stockpiles

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Stockpile Garden: 002 Stockpiles

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Year: 2023

Periscope is a spatial design agency focused on regenerative design and public architecture.

We design and deliver resilient projects that work for people and planet, grounding our interventions within their greater ecological, topographic and social fabric. In valuing meticulous research, technical rigour and plural voices we seek to meet the challenges of our and future generations.

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Stockpile Garden is a whole new breed of garden - a landscape laboratory on one of the biggest construction sites in Europe!

Between 2022 and 2023, Periscope, Kirsty Badenoch, UCL Bartlett School of Architecture and the Department of Biochemical Engineering developed a live research project investigating human and ecological health on meanwhile sites. The project explores the significance of 'temporary' landscapes as a largely unaddressed contributor to urban green infrastructural fabric.

Following Periscope's initial research into soil health across London and the UK a site-based investigation at Barking Riverside was identified. Collaborative partners were sought to bridge research-in-practice with academia, connecting the project to established work on soil health undertaken at UCL Biochemical engineering. The project was awarded UCL Grand Challenges funding in 2022 which became a catalyst for the involvement of more partners and a nucleus of activity for other experimental work which continues beyond the grant.

Stockpile Garden transforms a working construction site on the Thames Estuary into a testing ground for brownfield biodiversity improvement methods. Designed responsively to on-site processes, Stockpile Garden explores locally-sourced, low-cost, and low-maintenance ecological restoration, inviting people, plants, protozoa and other kingdoms to thrive behind the hoarding.

As a living laboratory, the garden will continue to test bioremediation techniques and monitor biodiversity improvements over the coming years, helping to fill current knowledge gaps in the ecological functioning of brownfield sites. As a social space, it will form the stage for an unfolding programme of events.

Book 002: Stockpiles

This book is part of a mini-series documenting the various aspects of Stockpile Garden, intended to be read alongside one another. The book series will be added to as the garden grows. Book 002 tells the story of the stockpiles, and of developing a responsive design approach to biodiversity in brownfield soils.

001: The Project
003: The Story Table
004: Earth to Table

www.stockpilegarden.com

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01 Sites and Soils

Stockpile Garden embraces an open design approach. Led by the various interactions, negotiations and unexpected developments on site, it was not predictated by a specific plan or expected fixed result.

The garden process evolved through simultaneous site conversations between our design team of landscape architects, designers and bioengineers; the site contractor and infrastructure teams; and specialists in green infrastructure and brownfield ecology. As the site, scale, and material availability for the project remained uncertain until the very last minute, we progressed a flexible approach that sought to identify a general strain of enquiry, an understanding of the context in which we were working, and a set of values; which we could then implement on whatever site was chosen with whatever resources would ultimately become available. It was an experiment.

The stockpiles of Stockpile Garden provide the 'laboratories' for our experiments into industrial ecology. An initial set of piles was constructed in June 2023, these will be added to over time. Like sand dunes, they will continue to shift around the garden and are amalgamated, excavated to construct planters, spread apart and rebuilt.

This continually open-ended design approach allows the principles of Stockpile Garden to be versatile enough to adapt to its surroundings, and to be implemented elsewhere on other post-industrial sites.

Shifting Sites, Shifting Soils

Construction sites are constantly evolving according to pre-planned phasing strategies as well as unplanned improvisations between construction needs and working areas, deliveries and temporary storage, meanwhile projects and public programmes.

There were a number of sites initially proposed for the garden. Our priorities were to locate it in a working construction area, close to the public domain and to existing areas of biodiversity, and that it should remain on site for a number of years. Over six months of site visits and conversations, plans, needs and availabilities kept changing, as did our site.

Ultimately, the construction of a public footpath along the foreshore landed the garden's location. The path had to be opened by summer, providing a new public access route along the foreshore and a bounty of freshly excavated soil available for us to use. With contractors immediately on site and available, we grasped the opportunity.

Stockpile Garden would be located on the south-eastern portion of a working construction site between Barking Riverside Station, Barking Riverside Limited Project Office, the Thames Clipper jetty and the Thames foreshore.

Stockpile Garden Site

Barking Riverside Site Plan

Site

Development sites, like Barking Riverside, are places in transition, places caught between what they are and what they will become. In this gap lies a huge amount of ecological potential. When we arrived, the future garden site had been used for various works and was in an empty but disturbed state, with areas of surplus construction materials, exposed soil churned up by vehicle activity, concrete plateaus and areas of waterlogging. The site is typical of London brownfield lots, evidencing negotiations between human and plant communities, with the areas having been left alone for longer already self-seeding with diverse riverine vegetation. Ground disturbance and material leftovers on brownfield sites are positive. What may at first glance seem industrial is in-fact incredibly ecologically rich. We were immediately conscious of leaving any planted areas intact, and only intervening where micro-ecologies had yet to take hold.

The area designated for Stockpile Garden is located adjacent to an existing hedgerow and the new public foreshore footpath. These are both narrow but richly established habitats. The remaining construction site area to the north and west of Stockpile Garden will continue to be used intermittently for site compounds and temporary storage for the foreshore works. The terrain to the far west is undulating, due to its inaccessibility it has established strong plant growth. We will monitor the biodiversity changes in these adjacent areas, to provide comparative information and understand the adjacent impacts of the Stockpile Garden experiments.

Soil

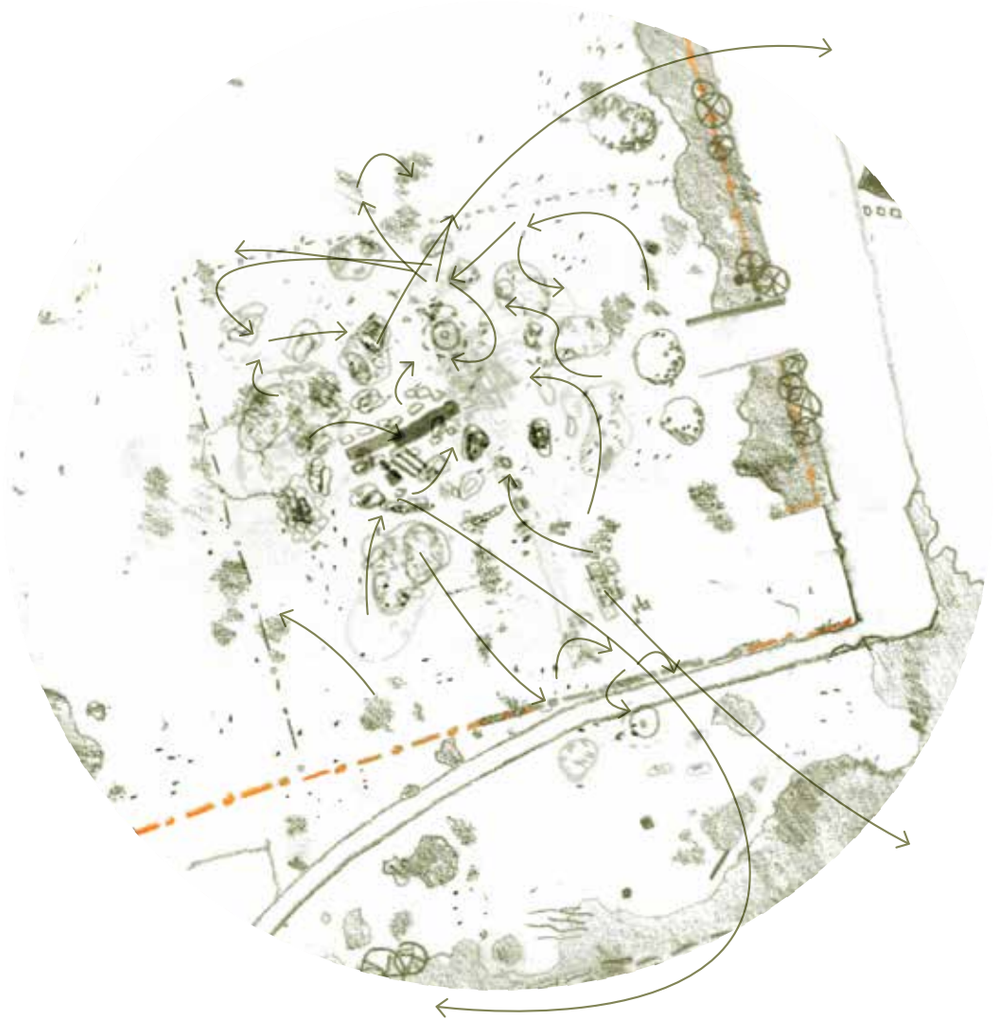
Although there is a huge amount of soil constantly being transported back and forth across Barking Riverside, we faced a number of restrictions around safety and release of soil. Contemporary construction sites tend to work towards a zero cut-fill balance, so the majority of excess soil is stored and earmarked for later use. This is generally used to fill deep underground, then capped with sterilised or imported soil.

We sought to work with post-industrial soil that was safe for public contact. There are tough stipulations for what is deemed human safe, yet not ecologically safe. Over months of conversations and considerations, we were finally granted permission to safely work with soils from two locations:

1. Stockpile SPO1
A large stock of soil located 500m east of Stockpile Garden, collected from around the construction vicinity during previous works. The soil has been resting in its current site for about a year, and young plants have begun to grow.

2. The immediate site and foreshore area
As part of the foreshore path construction, scraping and levelling removed the existing ground over an area of circa 2000m². This was replaced with topsoil and the removed earth given to our project.

02 Digging a Garden



Arriving on site the day after the foreshore path excavation works, we found our empty garden area had already been turned into a soil storage site. Unfortunately lack of time had meant we hadn't had the chance to communicate with the sub-contractors and tell them what our precise needs were. The sub-contractors had driven heavy vehicles across some of the delicate ecologies we had hoped to retain, piling up waste material across the site, to form the first stockpiles. They'd done their job too well, pre-empting our needs and beating us by a day.

Embracing the unexpected, the randomly sized and positioned mini-stockpiles that were now on site would form the base framework for the garden arrangement. We spent the day surveying the site by eye, pacing out areas, gauging sun and shaded spots, and framing our moves around key views. We marked the garden out on the ground with spray paint. Like planning out a theatre set, the land became a 1:1 drawing of its future self.

The next day, the construction work was undertaken together with two friendly contractors, an excavator, a tipper and a double drum roller and some spray paint.

By mid-afternoon we had opened a rich conversation around ecology. It happened that the foreman lived on a canal boat and woke every morning with his head at the level of grasshoppers and fieldmouse burrows. Embracing this rather unusual way of working, he operated his thundering machinery with sensitive dexterity, skimming around tiny young grasses and flowers with the upmost care.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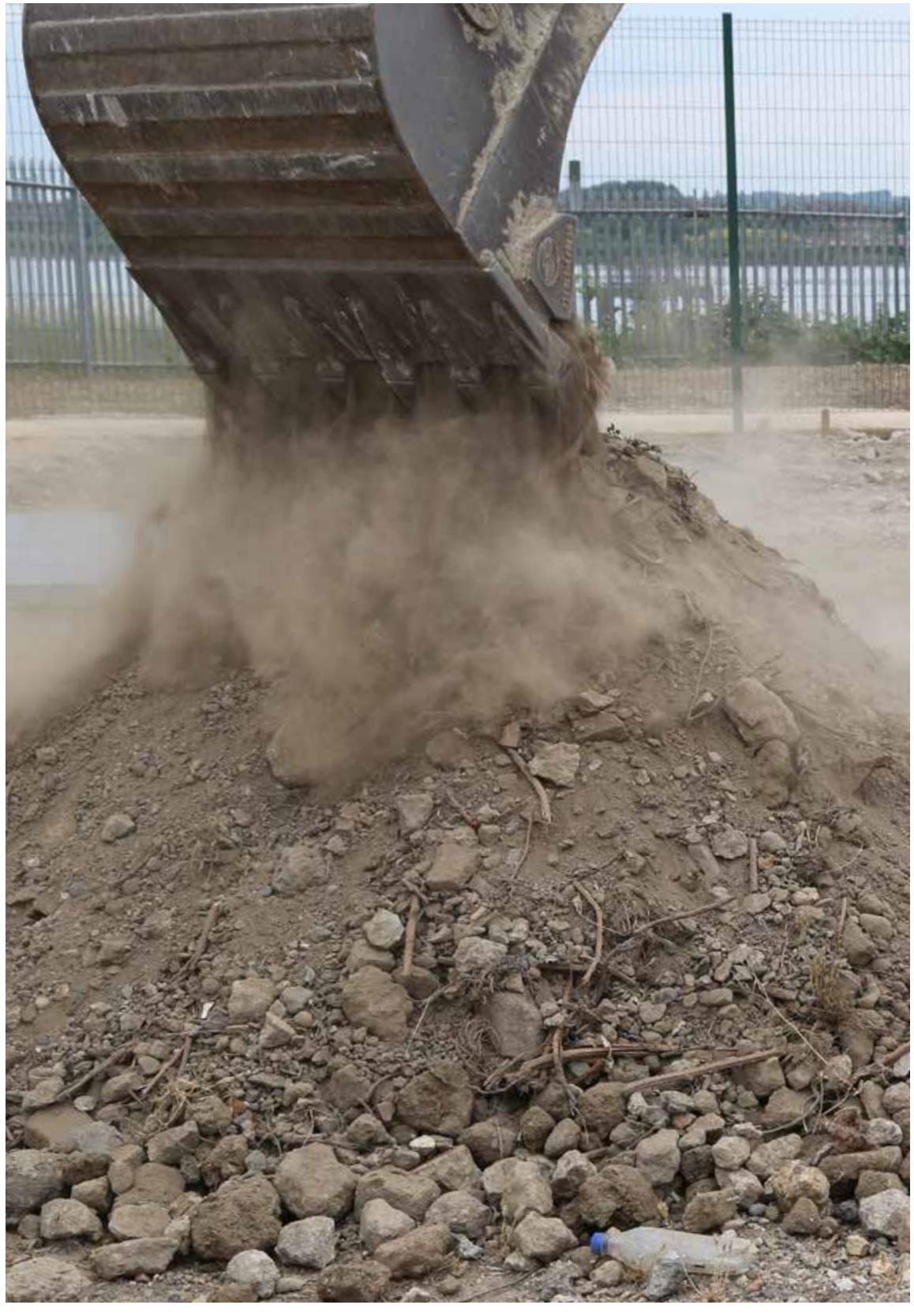


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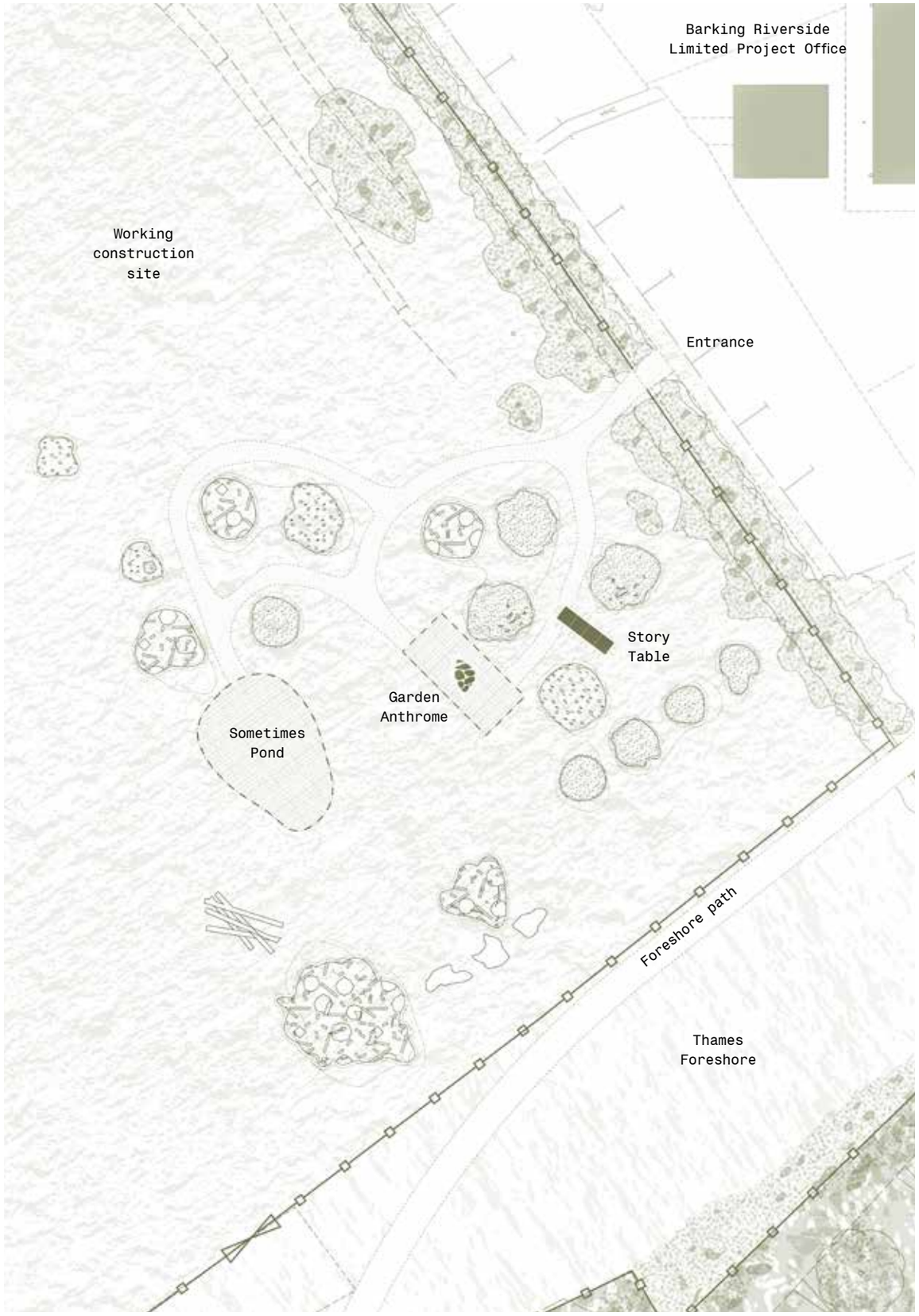
03 Piles of Dirt



The arrangement of stockpiles seeks to provide a diverse set of environmental conditions for testing and comparing, through siting, size and composition, responding to specific ground conditions, existing vegetation and vehicle access needs.

Moments of enclosure and revelation curate a scenographic experience from the entrance, through a series of enclosed ‘rooms’, where you are closely contained within the earth mounds, through the procession of garden features and finally opening out to wide views towards the foreshore. The scale of stockpiles varies, An accessible ramp and rollered path leads a primary route around the garden. The Garden Anthrome, Story Table and Sometimes Pond create defined gathering spaces where activities can take place.

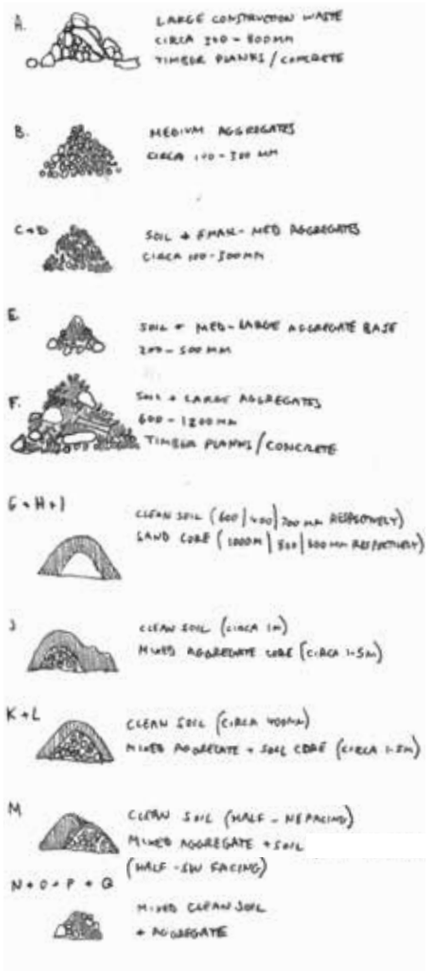
The configuration is loose and open, allowing new stockpiles to be constructed as more soil becomes available in the future, to increase the density of experience and experiments.

Types of Stockpile

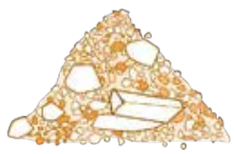
The stockpiles vary in size, material scale, composition, soil and aggregate type. An on-site inventory recorded the various compositions during the construction process, including where material was sourced from, to allow future tracking. Soil was obtained from the adjacent foreshore and from previous site works around Barking Riverside. The aggregates were categorised by size.

The stockpile construction was informed by conversations with brownfield landscape specialist, John Little, and the work he's been conducting at Hilldrop; and with Harry Watkins, ecologist, researcher and landscape designer at St Andrews Botanical Garden.

The stockpiles can be simply split into four typologies, described opposite and over the following pages.

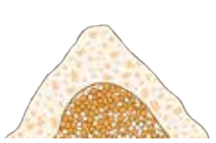


Type A:
Large construction waste



Type B:
Soil and aggregates

Type C:
Soil with sand core



Type D:
Soil with aggregate core

Stockpile Type A

Large construction waste.

Mixed aggregates, concrete blocks and bricks, sleepers and tree roots. Although mostly salvaged from on-site, some waste had been broken up, transported and collected from the wider Barking Riverside construction site.

Stockpile Type B

Soil and aggregates, with some stockpiles made from the foreshore and others from remote areas of the Barking Riverside construction site. The churned soil contains seeds from its former environment, some of which quickly germinated once the stockpiles were in place and left alone.

Stockpile Type C

Soil (as type B) with an internal sand core of height between 0.6 and 1.2m. Sand creates a sponge which collects rainwater, increasing the dampness of soils in dry months. These stockpiles will be specifically compared to Type B to monitor species differences and growth variations.

Stockpile Type D

Soil (as type B) with an internal crushed aggregate core of height between 0.6 and 1.2m. The air gaps between aggregates allow for water storage and accumulation of other microbiologies. These stockpiles will be specifically compared to Type B and C to monitor species differences and growth variations.

04 Garden Anthromes

The Garden Anthrome[1] is an anthropogenic biome for soil regeneration. It is designed to enhance biodiversity in environments that have been disturbed by human activity. The impact printed soil structure controls erosion, while encouraging a cover of vegetation to increase organic content within the local environment. It provides a conducive ecological system for a root network that is host to an array of microbial life.

In 2023 the UCL team installed a series of Garden Anthromes at Stockpile Garden - artificial biomes fabricated from compacted earth components. Using advanced manufacturing techniques, we impact-printed soil walls to combat erosion and promote vegetation cover, enhancing organic content in the locale. Within this bio-integrated design, the containers act as reservoirs, storing water and creating refugia for plants to thrive within and between the anthromes. The integration of form and material serves as a catalyst for metal-hyperaccumulating ecological assemblies, facilitating interactions with the environment.

1 Term coined by Erle Ellis and Navin Ramankutty in “Putting People in the Map: Anthropogenic Biomes of the World”, 2008


JCB


Q-FIT

The anthromes allow designers to introduce a range of soil conditions retained behind the anthrome wall. Integration of digital design enables achievement of geometries that are impossible to conceive of with traditional techniques, but draw upon recent research from UCL into advanced manufacturing with organic and vernacular materials[1]. Finally, as the anthromes grow, transform and eventually degrade back into the land it makes it possible to work with the uncertain timescales that characterise meanwhile sites.

The Garden Anthromes are part of a suite of materials and design techniques that are being pioneered through research into bio-integrated design led by UCL. Through this approach they aim to explore space and typology, novel materiality, and interaction with systems like the microbiome and water management. The Garden Anthrome was impact printed with an UR robot at the B-Made facilities at UCL Here East defining a gradient of kerb- to wall-like structures. Soil viscosity, structural integrity, curing time and bullet size were calibrated to form separate planters.

1 Variable Aggregate Impact Printing of Cob, link here

This is the first prototype of the garden anthrome. As the structural integrity and performance of the planters is monitored, the soil recipes will be improved and re-built to incorporate biologically-based polymers, algaes and seed mixes that look to improve the soil health. The prototype was constructed in the UCL Here East lab, the next iteration will be constructed on site by the robots, as a public performance that brings together construction, technology and ecology.

05 Public Opening

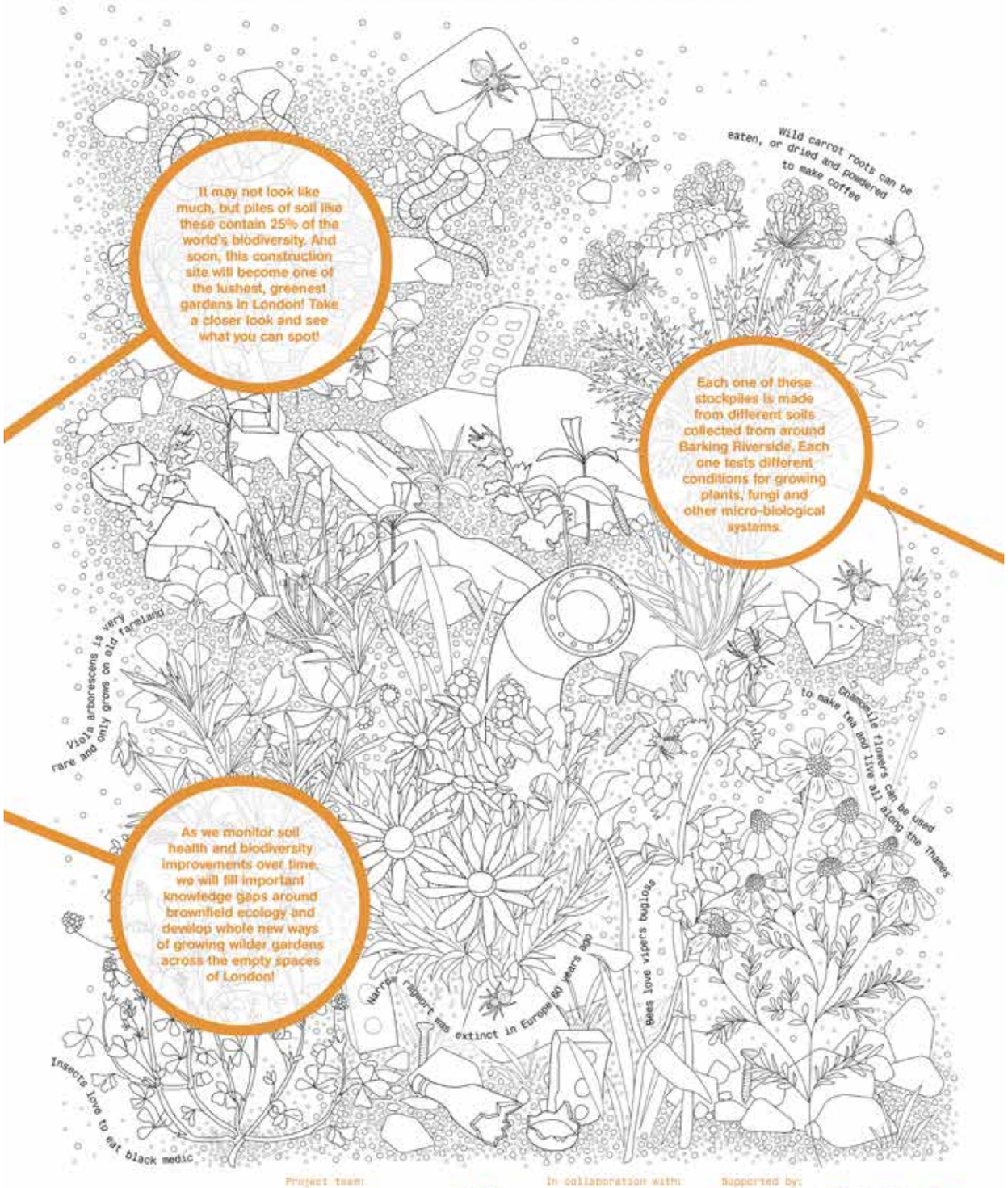
Stockpile Garden was soft-launched to the public as part of the Emerge East festival on Saturday 16 September. A local celebration of food and nature, we hosted a series of mini activities to engage families with ideas of industrial ecology.

The launch was the first of a programme of future public events that the garden will host over the coming years.

To date, other activities that have been hosted on Stockpile Garden include a soil sampling workshop with UCL Bio-ID students, walks with 'Greening Cities' students at The Bartlett School of Architecture, and walks with members of the Barking Riverside management team.

Welcome to Stockpile Garden

A landscape laboratory on one of the biggest construction sites in Europe



Project team: periscope UCL BioCene

In collaboration with: Barking Riverside

Supported by: Grand Challenges

Welcome to Stockpile Garden

A landscape laboratory on one of the biggest construction sites in Europe

Lunar Landscape

Industrial landscapes contain some of the richest and most important biodiversity in Britain, yet we know suprisingly little about how they work, and why.

These little piles of soil are being used to test different natural soil-health improvement techniques, and help better understand how industrial ecosystems develop and evolve.

At the same time, the garden is a prototype for an ecologically progressive temporary use, exploring new ways that empty and unused sites can be transformed into green havens across London.

The Story Table

It takes 500 years to make just 2cm soil. Soil has a long memory, registering millions of stories that date back centuries.

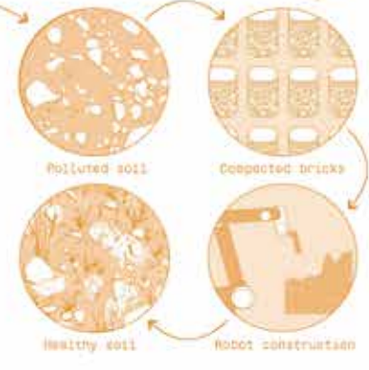
Sometimes you might see an old rusty table moving around the garden. This table was buried underground on the construction site, during which it became imprinted with the deep memories of Barking Riverside's past. Memories that we can no longer see ourselves, but that the ground registers. And clues to a better ecological future. The table will host a series of talks, picnics and dinners around the garden, a place for exchanging stories and sharing knowledge.

Garden Anthrome

Soil is the building block for natural ecosystems, can it also be our building block for public spaces?

These planters are constructed from soil, using an innovative technology currently being developed at UCL, called impact printing. The 'bricks' are all formed and layed by robots from the Here East laboratory.

Inside the planters we are growing plants that help remove toxins from the soil. Over time, the planters will become overgrown and fall apart, returning the now-healthy soil back to the ground. Could natural construction methods like this help improve local ecologies in the long term?



Garden Parties

We will host a series of public and private events as the garden (and our research) grows. These will include dinners, picnics, ecology walks, seed harvesting and creative workshops. To find out more, scan the QR code below, email: hello@periscope.uk or visit:
www.periscope.uk/atlas/stockpilegarden

This is a sensitive project supporting fragile ecologies and dealing with the unknown. Please treat it with care and avoid touching, climbing or disturbing our experiments.

Project team: periscope UCL BioCene

In collaboration with: Barking Riverside

Supported by: Grand Challenges

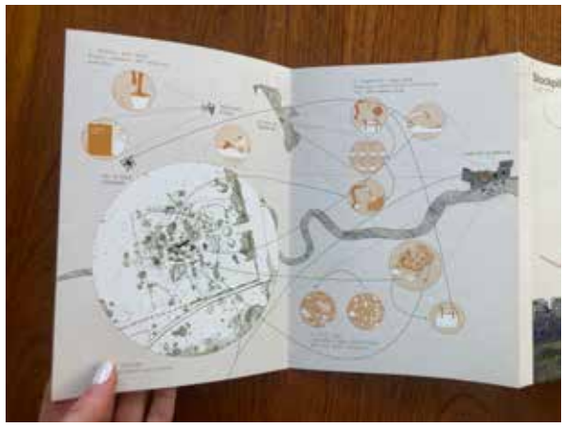
Garden Talks
A series of public talks shared the story behind Stockpile Garden with local visitors.

Ecology Hunt

A pamphlet sets out an ecology hunt in and around Stockpile Garden, inviting children to explore the area, identify and colour in local plants.

Growing our Garden

Members of the public were invited to draw their dream garden, and ‘plant’ them on a field of orange stakes along the foreshore. Conversations discussed how local people see and interact with gardening.



Sharing the Garden
Our information pamphlet provides a foldable guide to the project, spreading our story and inviting people to participate as the garden continues to grow. Keep an eye on www.stockpilegarden.com for more!