



Stockpile Garden

004
Earth to Table

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 004: Earth to Table

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 004 looks to apply and extend the clay reclamation techniques through making a set of site-specific slip cast tableware.

“Earth to Table” is an extension of Periscope’s ‘Earth Works Vol 1’ investigation (2022) and of James Hepper’s material research at The Bartlett UCL. Through a long, slow, and laborious manual process, earth is collected, cast, dismantled and re-cast back into itself, resulting in a perpetually degrading set of tableware. Through bringing together soil processes and craft, ‘Earth to Table’ explores a transitional approach to making with the landscape.

001: Project Overview
002: Stockpiles
003: The Story Table

www.stockpilegarden.com

Stockpile Garden: Earth to Table

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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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01 Introduction



In Periscope's 'Earthworks Vol 1' (2022) we started on a process of reclaiming usable clay from site excavated soil. 'Earth to Table' looks to apply and extend these clay reclamation techniques. To further explore the potentials of soil processing, composing and decomposing, we set about making a set of site-specific slip cast tableware adding as little as possible to the raw materials we found on site.

Slip casting is a process which celebrates the changing of material states. Adapting the traditional process to incorporate earth throughout, each step leaves its earthy trace on the next. The process evolves through many transformations of soil states, as we process, cast and re-cast the earth back into itself. From compressed solidity, viscous liquid, porous cast form, to vitrified shell; the earth follows a shifting dialogue with itself. Positive to negative to positive, it embarks on a reciprocal journey that alludes to the cyclical nature of soil itself.

Each stage sought to engage with the soil as a living system, as we opened ourselves to be led by the properties, behaviours, and desires of the soil to lead its own forms.

In doing so, the project created a material dialogue with the site, ingraining a sense of place within both the design and experience. Celebrating site materials and engaging with processes of construction and site transformation usually kept out of the public eye.



Barking Riverside Station

Stockpile Garden

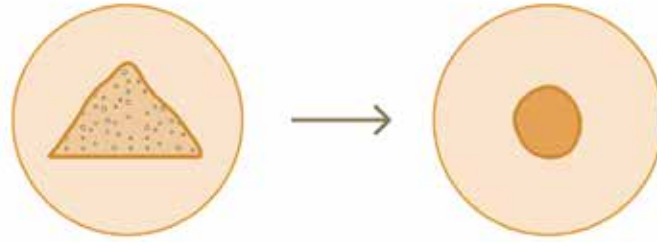
Stockpile

Process / Chapter Map

There are four main steps in the slip casting process, forming the four core chapters of this book:

02 Reclamation

Creating liquid clay casting slip from reclaimed site soil.



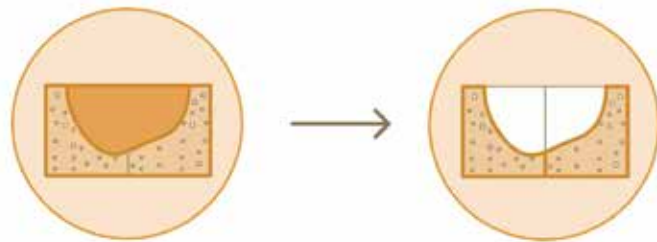
03 Positive Forms

An iterative evolution of bowl forms cast into rammed earth



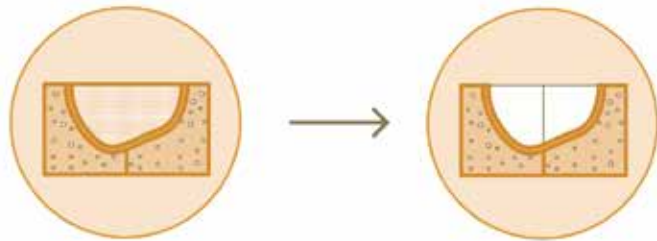
04 Mould Making

Using cast earth to form the multi-part slip cast formworks.



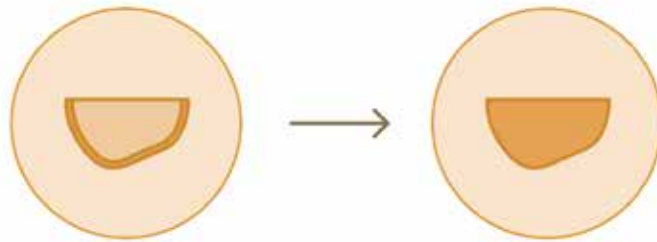
05 Slip Casting

Slip casting the bowls and the firing process.



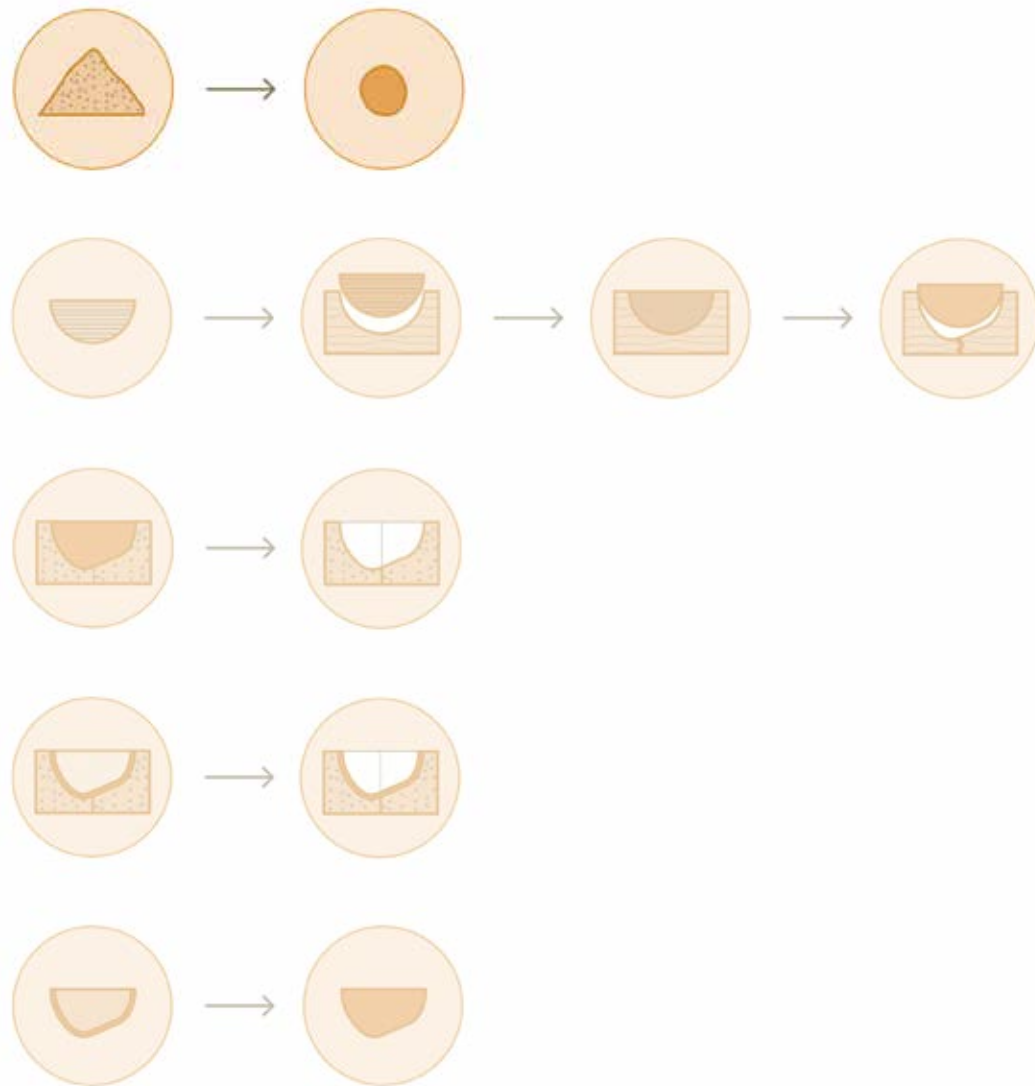
06 Bowls

Final outcomes in context.



02 Reclamation





This chapter looks at the first stage of the process: reclaiming soil. In ‘Earthworks Vol 1’, we reclaimed clay from soil across London and refined a small-scale, low-fi method of processing clay from it. This section adapts this process to create a clay casting slip to produce a series of bowls, that evolve from the earth to the table.

London soils are highly clay-rich, with an equally rich history of site specific clay use. At the end of the Victorian era of London brick-making, excavation and construction operated together on the same site. The practice of using local techniques and local earth, tied to the heritage and geological conditions of their locale, underlines a sense of place.

The process of earth building is not a rapid construction method - it takes time. Earth is suited to its local climate but also has the capacity to generate an equally localised building culture. This process asks how we might learn from traditional earth-building techniques, and explore their potential for adaptation within contemporary creative practices.

Reclamation Process

The clay reclamation recipe undertaken was based on the process refined in 'Earthworks Vol 1', as listed below. Refinements and additional steps in the process adapted it to make a liquid clay slip suitable for slip casting.

Equipment:

3 buckets, metal sieve, cotton drill fabric, string,

Matter:

Water, Soil, Soda Crystals

Steps:

- 1 Collect and dry the sample from the site.
- 2 Powder the soil through a fine metal sieve removing large debris as you go.
- 3 Combine a ratio of 1 part soil to 4 parts water in a bucket big enough to allow for mixing.
- 4 Agitate and mix the liquid, making sure to break up the clumps of soil.
- 5 Allow the water mixture to begin settling - larger particles of sand and rocks will fall out of suspension immediately; Silt and fine sand should fall out of suspension between 5-10 minutes; Clay should remain in suspension for an hour+.
- 6 After 10 minutes slowly pour off the clay-water mixture, through a metal sieve, into a bucket. Stop pouring just before the sand and silt begin to flow out.
- 7 Re-agitate the clay water and repeat steps 5 and 6.
- 8 Mix Soda Crystals and water and add to the clay water mixture.
- 9 After 20 minutes pour off the clay water suspension into a clean bucket and allow it to completely fall out of suspension. (3-24+ hours)
- 10 Carefully pour off the clear water sitting on top of the settled clay.
- 11 Pour the liquid clay into a cotton fabric set inside a bucket to filter out the remaining water.
- 12 Remove and dry the clay to an appropriate consistency and knead the clay together.





Reclamation Process 01

Following our recipe from 'Earthworks Vol 1', the dried soil was crushed, sieved and slaked (soaked in water to dissolve clay particles). The settled liquid clay was filtered, partially dried and re-consolidated into a ball of clay, used to conduct initial firing and glazing tests. This clay was then fully dried out and powdered, to be weighed and combined with a specific amount of water in order to achieve the optimum 1.8kg/Litre density of clay slip for slip casting. However this process proved to be highly labour intensive for the amount of clay slip required (around 15 litres).



Reclamation Process 02

As the desired result was already a liquid clay, the later stages of drying, powdering and sieving the clay were skipped. Instead, the soil was directly slaked in water in large batch buckets, before being filtered through cloth to remove the excess water.

At this stage the filtered clay in the cloth has almost the properties of casting slip. It was spread out on plaster wedging boards to thicken and consolidate it, before combining all of the batches into a single bucket ready for the de-flocculant and mixing (see next page).

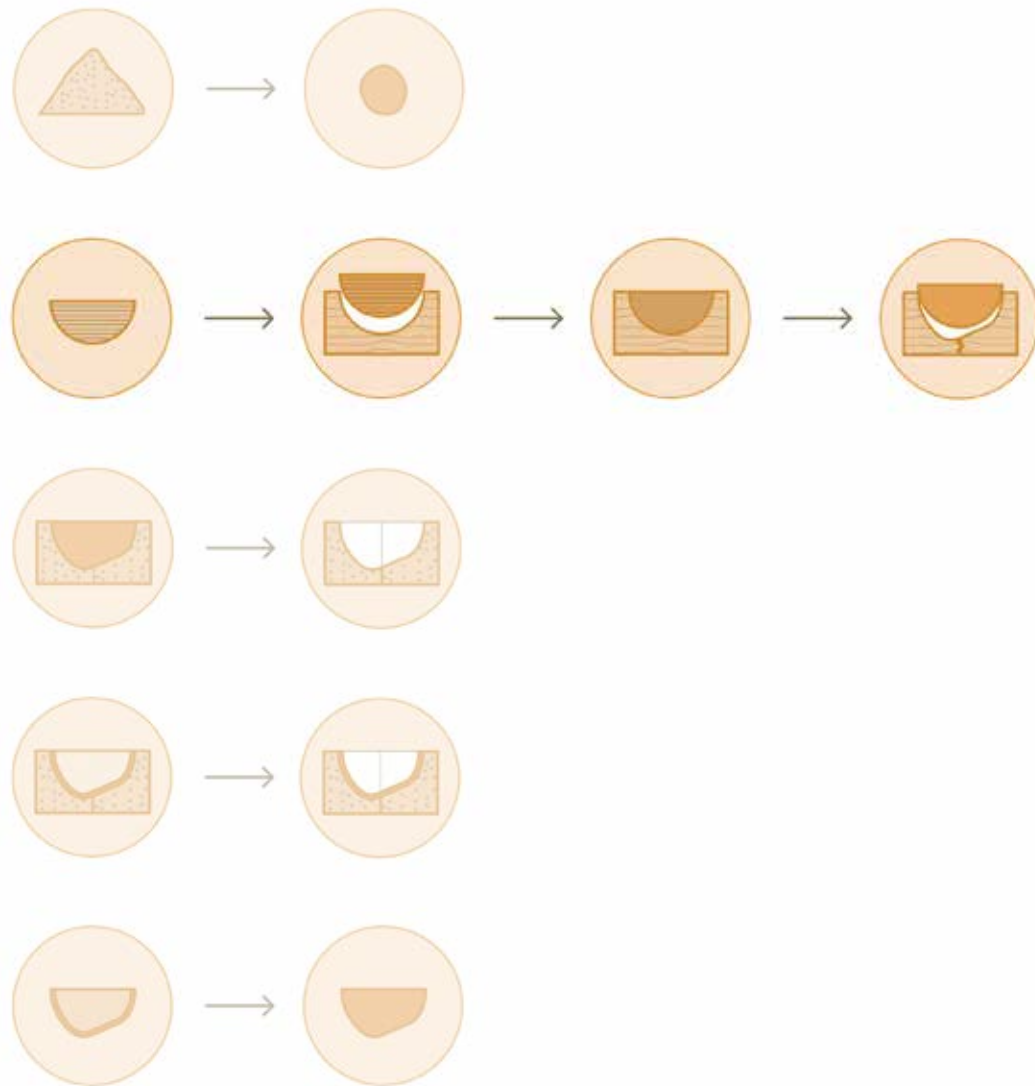


Slip Mixing

A 2% solution of de-flocculant calcium chloride is mixed with water, before being added gradually to the clay mix. An electric paddle mixer is then used to mix the clay slip, agitating up the particles to ensure that the de-flocculant is thoroughly mixed, in order to stop the clay separating and settling. The slip should be mixed for at least half an hour, and before each time it is used to cast.

03 Positive Forms





Through a reciprocal and iterative casting process, this section documents the evolution of the positive bowl forms, into a series of three.

By repeatedly casting plaster into a degrading rammed earth mould, the initial form of the bowl sequentially morphed. The behaviour of the earth itself becomes active in the design process, with the plaster picking up the fine details of the earth imprint as it takes on the qualities of the shifting earth mould. Seamlines, ‘imperfections’, and mutations are celebrated as honest results of a design process guided by the physical properties of earth as the primary material.



Master Form

The initial 'master' bowl form was created out of speckled maple wood, shaped and sized based on traditional ramen bowl dimensions. As it was turned on the lathe, chip outs, textured tool markings, and rotational patterns were kept and celebrated as honest marks of the process.



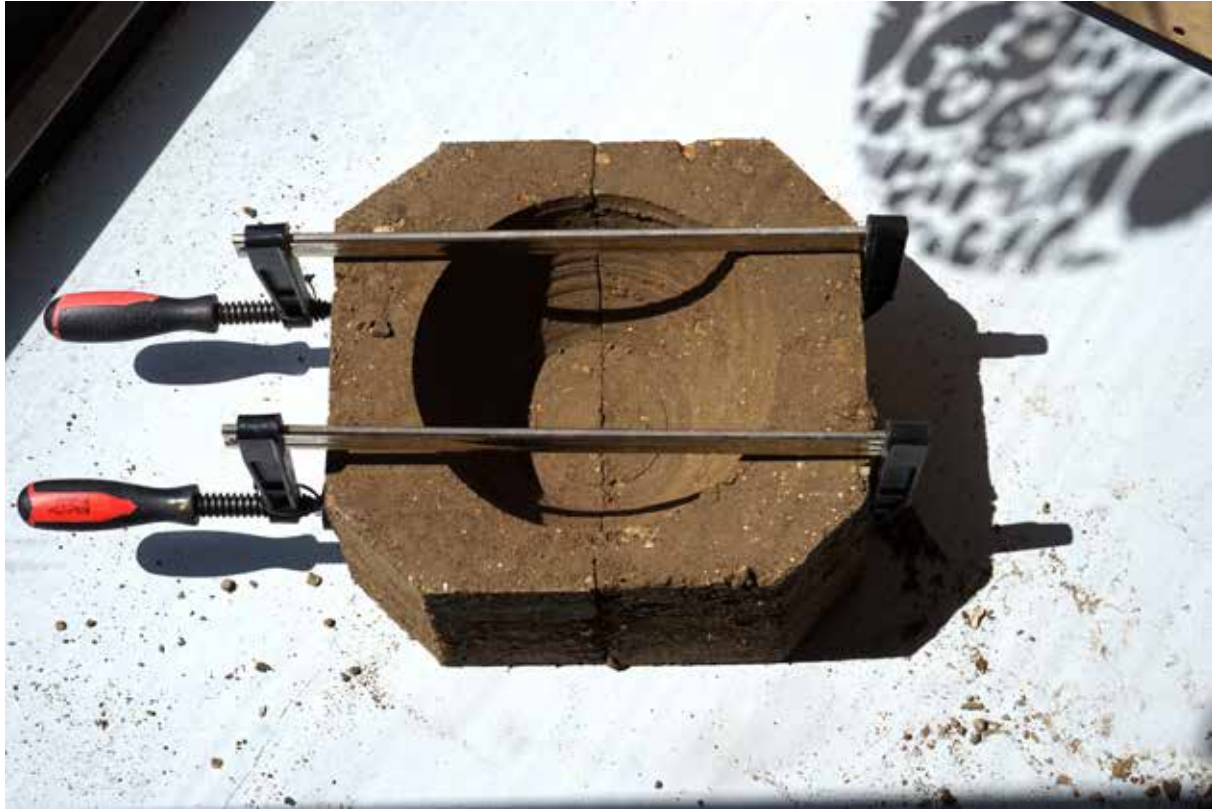


Rammed Earth Mould

The master bowl positive is registered within a re-usable formwork. Moist earth from Stockpile Garden is rammed into a two part mould, picking up details from the lathe turning process, whilst imperfections in the layering of the compression add layers of detail to the mould surface.







Rammed Earth Mould

The rammed earth pieces are clamped together to ensure that shrinkage during the drying process occurs at the same rate on each piece, maintaining a clean connection between the two parts along the seam line. This mould is used to create a series of plaster positive bowls, which follow a gradual process of degradation.

Once completely dry, the rammed earth moulds can be used directly for slip casting, substituting the gypsum based plaster for a site specific, fully recyclable alternative. Each bowl would be embossed with a layer of the earth, creating a unique surface texture.







Evolving Earth Forms

Plaster of paris is cast into the rammed earth mould to create the first positive bowl form. The process is destructive, with the earth absorbing the water and fixing itself to the plaster, breaking and creating new seamlines as the mould is taken apart. The rammed earth mould is then re-assembled, and the process is repeated to create a series of three evolving positive forms which take on the textural qualities of the earth.



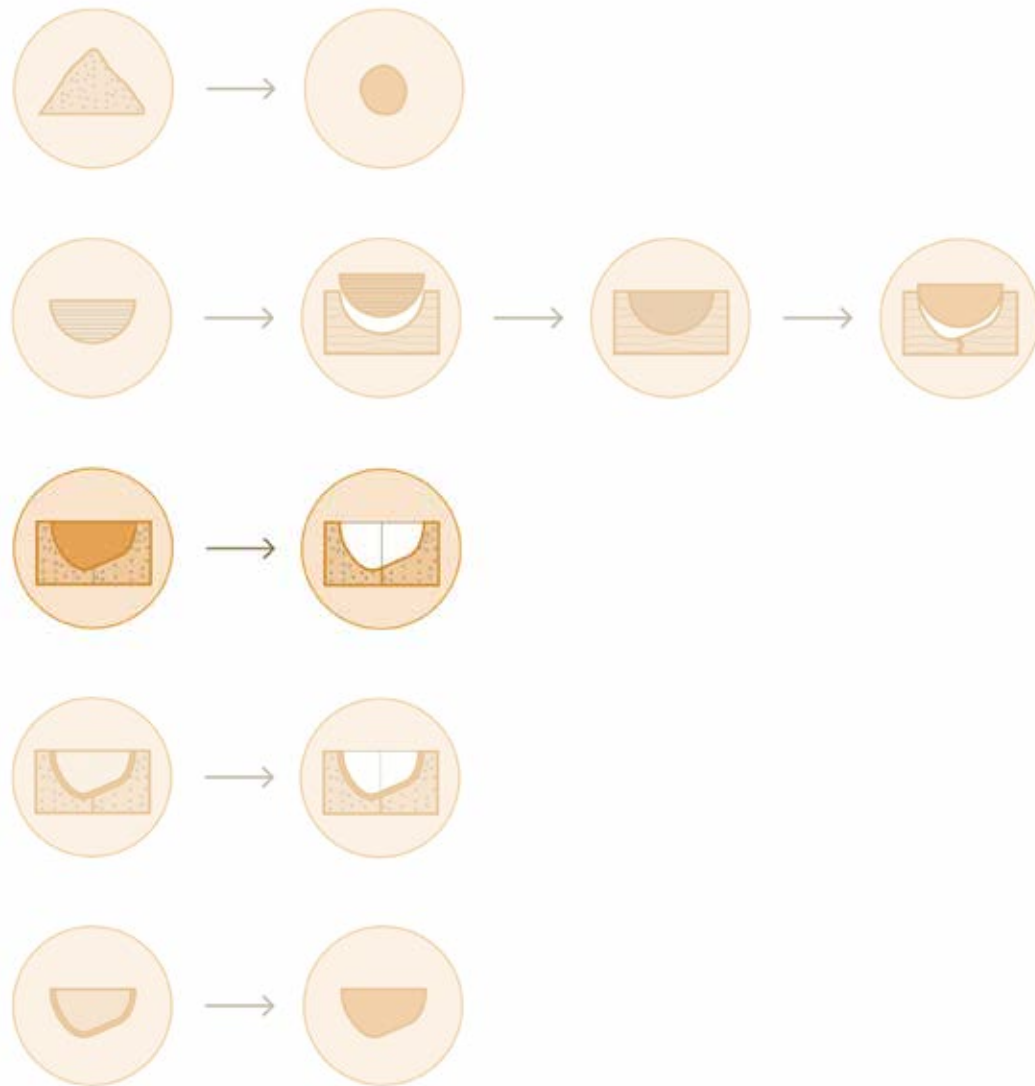






04 Mould Making





This chapter follows the process of using the plaster positive bowl forms to create the final negative slip casting moulds. These thick moulds are filled with the liquid clay slip, and their absorptive qualities draws the water out of the clay, depositing a thin shell layer on the surface geometry.

Conventionally made from solid plaster of paris – a highly processed and carbon intensive product – this section experiments instead with a cast-earth recipe, reducing the plaster content to 20%. Earth from Stockpile Garden once again provides the primary material foundation: combined with a hemp shiv to reduce its weight. It is hoped that this recipe might have wider applications in casting processes, in a step towards re-integrating earth into contemporary practices.

Cast Earth Moulds

Equipment:

1 Large mixing bowl, 1 Measuring Jug, 1 Bucket or Large container for Soil

Matter:

Water, Soil, Plaster of Paris (Preferably Ceram), Hemp Shiv, Soft Soap (release agent)

Ratio:

Water 1.5: Soil 2.5 : Plaster 1.5 : Hemp Shiv 1

Steps:

- 1 Make sure the mould box is prepared and sealed with a release agent wax.
- 2 Dissolve the soft soap in boiling water, and apply in layers to the plaster positive object, wiping off excess liquid at each stage. The plaster should take on a shiny, oily surface texture.
- 3 Gather the soil in a large bucket, shaking it to allow the larger rocks and debris to rise to the top.
- 4 Remove the larger stones and pebbles, leaving the gravel.
- 5 Combine a ratio of 2 part soil to 1 parts hemp shiv, to 1 parts water in a bucket big enough to allow for mixing.
- 6 Agitate and mix the liquid, making sure to break up the clumps of soil.
- 7 Mix thoroughly and add more water if it is too thick - it should be of a pourable consistency.
- 8 Gradually sprinkle 1.5 parts plaster into the mix a bit at a time, allowing it to settle.
- 9 Fully mix the plaster into the liquid and allow it to thicken slightly - due to the addition of the earth and hemp it will be much thicker than regular plaster but still of pouring consistency.
- 10 Pour the mix into the formwork, making sure it hits the lowest point first to reduce trapped air, and that it evenly coats the plaster.
- 11 Once poured, tap the side of the formwork to release any air bubbles.
- 12 Once set (around 1-2 hours), use a rounded knife or coin to carve out registration keys for the next cast piece.
- 13 Repeat soft-soaping, and repeat steps 5-11.
- 14 The final casts can be left to air dry, or placed in an oven on a low temperature.











Clay walls are sculpted by hand to follow the seam lines and segment the main geometric areas of the positive. This is to ensure that there are no undercuts which prevent the mould from releasing the positive.

Once each section has been cast, layers of soft soap are applied with a sponge to create a water tight film to stop the pieces fusing together.

At each stage, a circular tool is used to create male/female keys, registering the separate pieces.

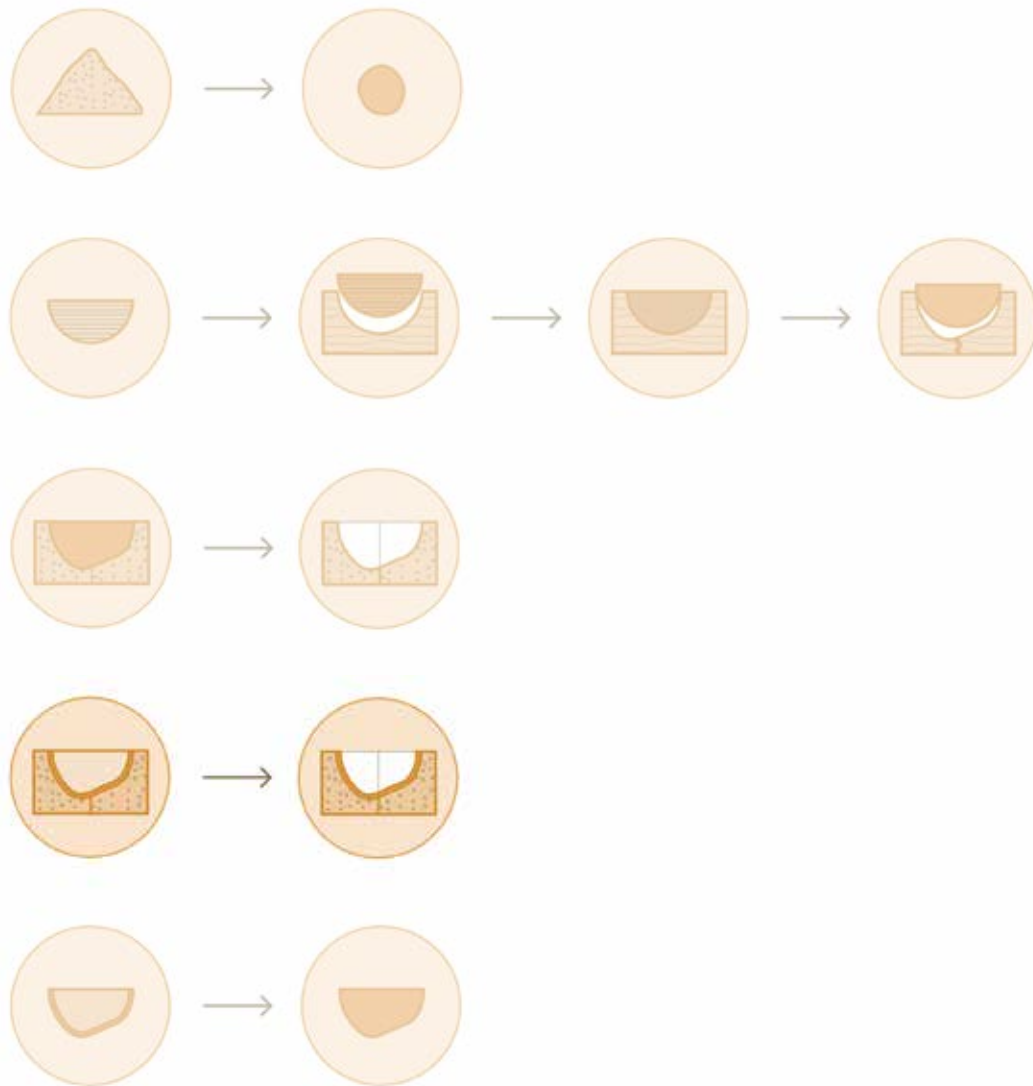
Once left to cure over night, the cast earth moulds are placed into an oven at 150 degrees. This allows the casts to dry and strengthen. The loss of water content releases the clay's binding properties, and melts the wax release agent allowing the mould to be pulled apart.





05 Slip Casting





Slip casting is a creative method that has an in-built sense of time: the settling thickness of the slip shell records its own pace of making, reflecting the gradual geological accretion of soil and sediments. By undertaking this slow, methodical process, we are forced to operate on a different timescale: to pause, to observe, to reflect, and above all, to take our time.

This chapter details the process of using the processed clay slip from the site to cast the final bowl forms: an engagement undertaken daily for several weeks. Once fully dried, the bowls are glazed and fired ready for use.

Due to the nature of working with a clay reclaimed from a post-industrial site, it was important to seal the surface of the bowls with a food safe glaze. A clear glaze was chosen on the interior surface, to allow the colour to shine through, and to create an enhanced contrast to the earthy exterior finish.

Moving forwards, our intention is to experiment with creating site-specific ash glazes using vegetation from the site. Plants have the capacity to absorb heavy metals from soil through a process called phyto-extraction. When burnt into ash and used as a glaze – as has been known in ceramic practices for centuries – they become a visual record of both the contamination and remediation of the site.



The clay slip is poured into the cast earth moulds, which absorb the excess water, pulling and depositing the clay onto its surface as a shell. The longer the clay is left in the mould, the thicker the layer of clay is deposited.

Once the excess clay has been poured out, the clay bowl shrinks as it dries, and peels away from the mould.



Unfired Bowls

Before firing the dry terracotta clay looks like porcelain. Through the violent firing process the living earth clay dies, locked into a ceramic form, yet its vibrancy of colour comes to life.





Firing and Glazing Tests

Initial firing tests produced cracking of the clay where organic matter expanded. To remediate this, the clay slip was sieved through a fine mesh to remove unwanted elements. The clear glazing in places also showed cracking and cloudiness where it was applied too thickly, and the final glaze was therefore thinned and applied by pouring into the bowls to achieve even layering.



Bisque Firing

When first cast, the green clay body maintains a rich chocolate colour (left). Once fully dried out, the bowls underwent an initial bisque firing at 1000 degrees, bursting out in a vibrant terracotta orange (below). This alchemical process is irreversible and dramatic, compounded in the second firing process at 1200 degrees, in which the bowls are glazed into usable tableware.





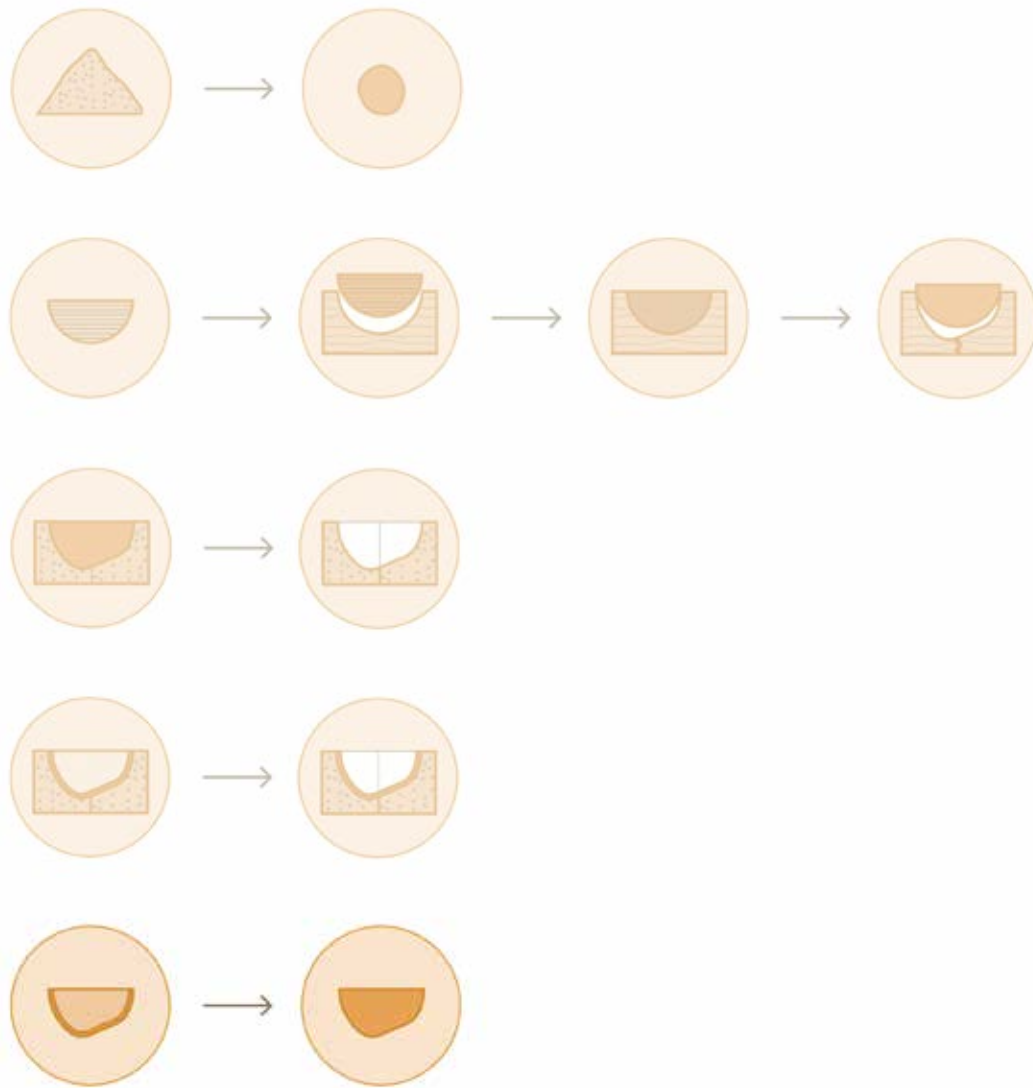




A clear food-safe glaze was chosen on the interior surface, to allow the rich terracotta colour to shine through, and to create an enhanced contrast to the tactile and earthy exterior finish.

06 Bowls





The products of a tactile and evolving process, each of the fourteen objects are unique in their varied forms, thickness, and subtle surface nuances.

Whilst the fired bowls sit as a static conclusion of a dynamic process - their vitrified forms symbolising the end of a living material cycle - they are now ready for the table, for continued use and evolution through human hands.

Their negative spaces are waiting to be filled once more in the intimate space of eating. The dinners and picnics they will be used for on the site will cultivate conversation, the clay in the diner's hands connecting them once more to the ground beneath their feet. These objects serve as a reminder that the earth provides us with the food in our hands, mouths and bellies, and the knowledge with which we maintain a healthy dialogue with our environment.

Through these bowls, we both consume and simultaneously pay our respects, making an offering back to the Earth.



















