

RE-RAIL STUDIO: REIMAGINING THE JOURNEY OF FASHION

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MATERIAL & ENVIRONMENTAL RESOLUTION

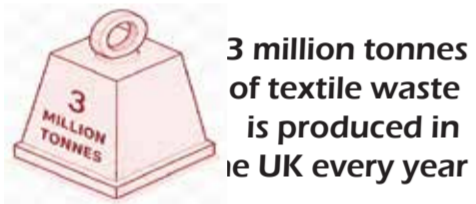
Re-Rail transforms former Leicester Central Station into a circular fashion infrastructure that addresses the environmental impacts of fast fashion through adaptive reuse, material recovery and regenerative design.

Retaining the existing building reduces demolition waste and embodied carbon, while reclaimed materials, reversible construction methods and visible repair processes extend the lifespan of garments and resources.

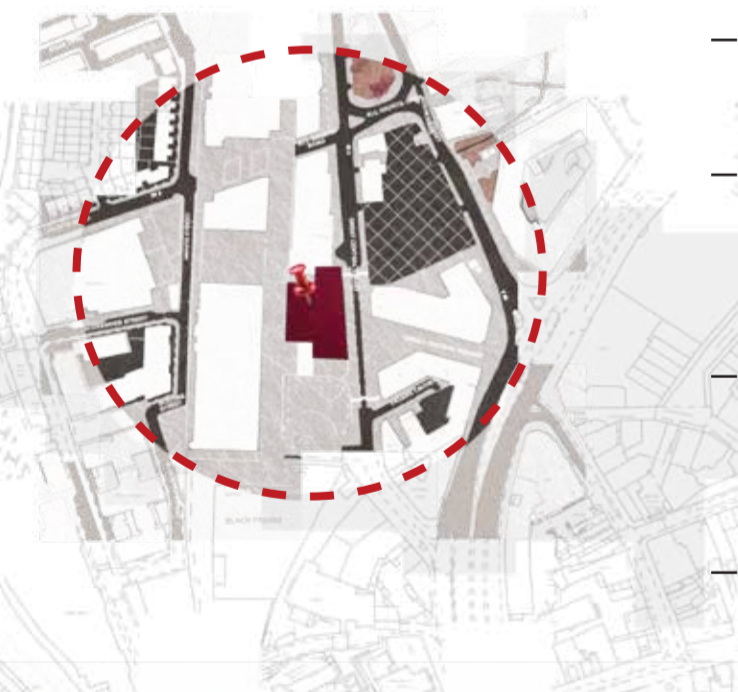
Regenerative textile systems convert waste into energy and reusable outputs, creating a closed-loop environmental strategy embedded within the architecture. By integrating material, construction and environmental systems into the visitor experience, the project demonstrates how design can encourage more sustainable consumer behaviours and long-term resource stewardship.

DRIVERS OF THE PROJECT

*Data sourced from online research



A STATION FOR CONTINUOUS MOVEMENT



- Formerly **Leicester's Grand Central Station**.
- Historic railway station was **defined by movement and connection**.
- Garments replace passengers, **travelling through repair, reuse and regeneration**.
- Clothing is **kept in circulation**, creating a new destination rather than an end point.



FROM RAILWAY TO RE-RAIL

REIMAGINING THE JOURNEY OF FASHION THROUGH CIRCULAR SYSTEMS OF REPAIR, REUSE, AND REGENERATION

PEOPLE

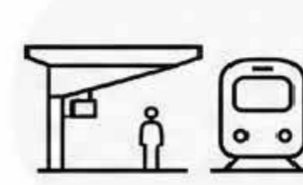
RAILWAY JOURNEY - A **LINEAR** JOURNEY

1 ARRIVAL



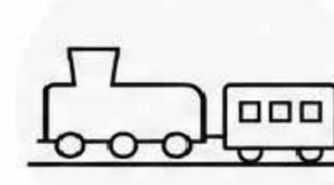
People arrive at the station.

2 PLATFORM



People wait and board.

3 JOURNEY



People travel to their destination.

4 DESTINATION



People arrive at their destination.

GARMENTS

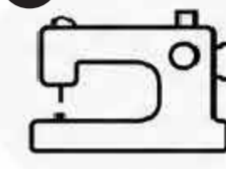
GARMENT JOURNEY - A **CIRCULAR** JOURNEY

1 COLLECTION



Garments are donated and collected.

2 REPAIR



Garments are repaired and restored.

3 REWEAR



Garments are resold and rework.

4 REGENERATE



Garments which can't be repaired are broken down into fibres and regenerated.

5 RETURN TO CIRCULATION



New resources feed back into the system.

Where Leicester Central once transported people through a network of destinations, **Re-Rail Studio transports garments through continuous cycles of repair, reuse, and regeneration.**

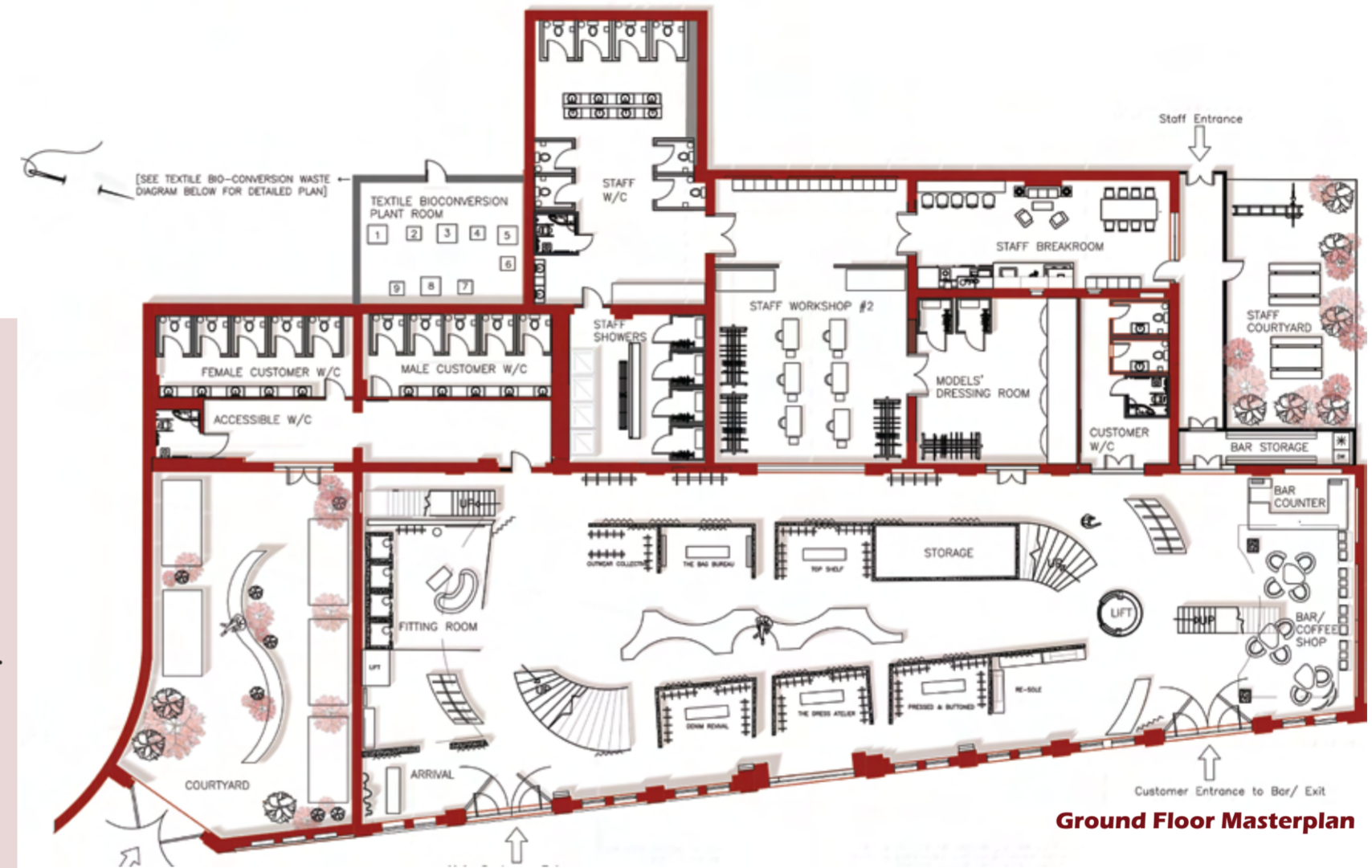
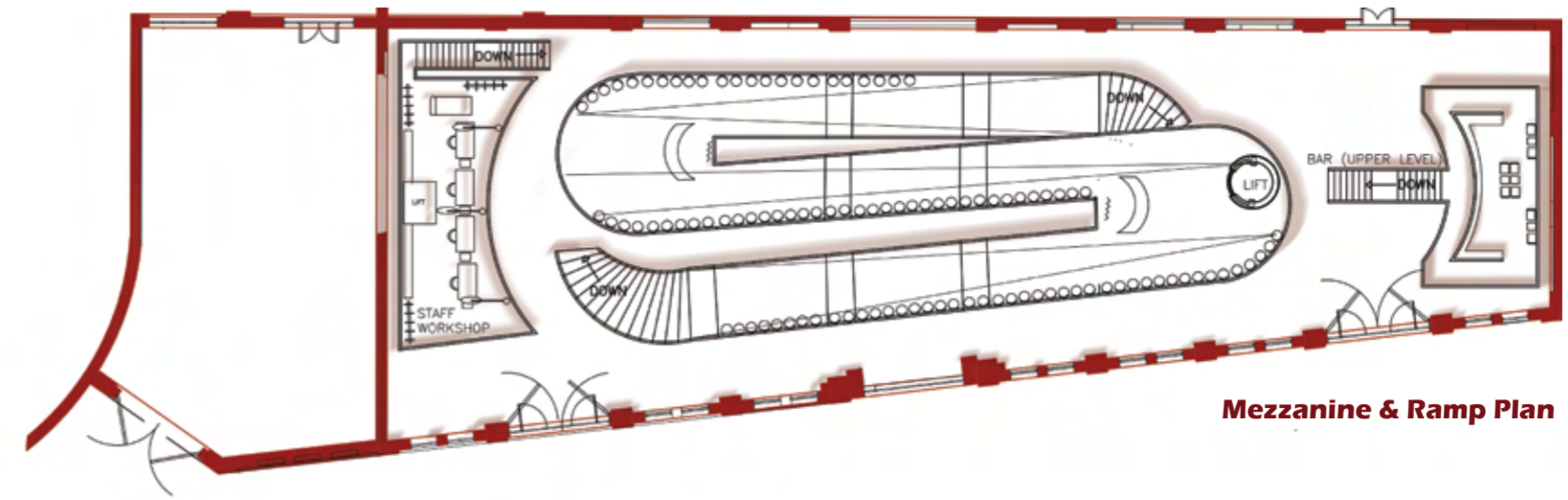
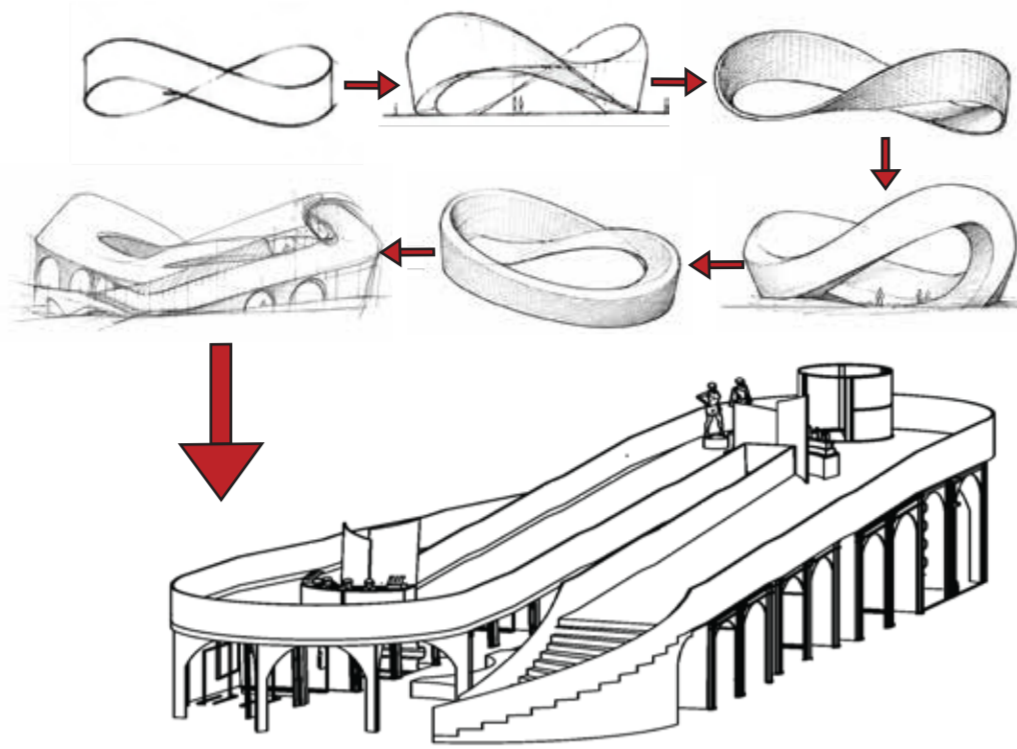


THE CATWALK SHOW

CONSUMPTION TO CIRCULATION

THE CONCEPT

Inspired by the **Möbius strip**, a mathematical model of continuity and perpetual movement, the proposal transforms this into an **architectural journey** that threads through the space. The **elevated ramp slows the pace** of movement through the building, encouraging visitors to engage with the visible processes of making, repairing and reusing clothing. In doing so, the intervention challenges the fast-paced nature of conventional retail, **promoting slower consumption**, greater material awareness and longer garment lifecycles.



ZONES ON PLAN

- 1 Garment intake at arrival
- 2 Fitting room
- 3 Retail booths under the ramp
- 4 Checkout
- 5 Coffee shop & bar
- 6 Textile Regeneration system (see page 4)
- 7 Upcycling workshop
- 8 Elevated ramp/ catwalk
- 9 Observation point & seating

CIRCULAR BEHAVIOUR

- Encourages repair, reuse and regeneration.
- Challenges disposable consumption habits.
- Keeps garments in continuous circulation.

MATERIAL AWARENESS

- Reveals the value of materials and resources.
- Demonstrates how textiles can be reused and regenerated.
- Promotes responsible and conscious consumption.

HUMAN EXPERIENCE

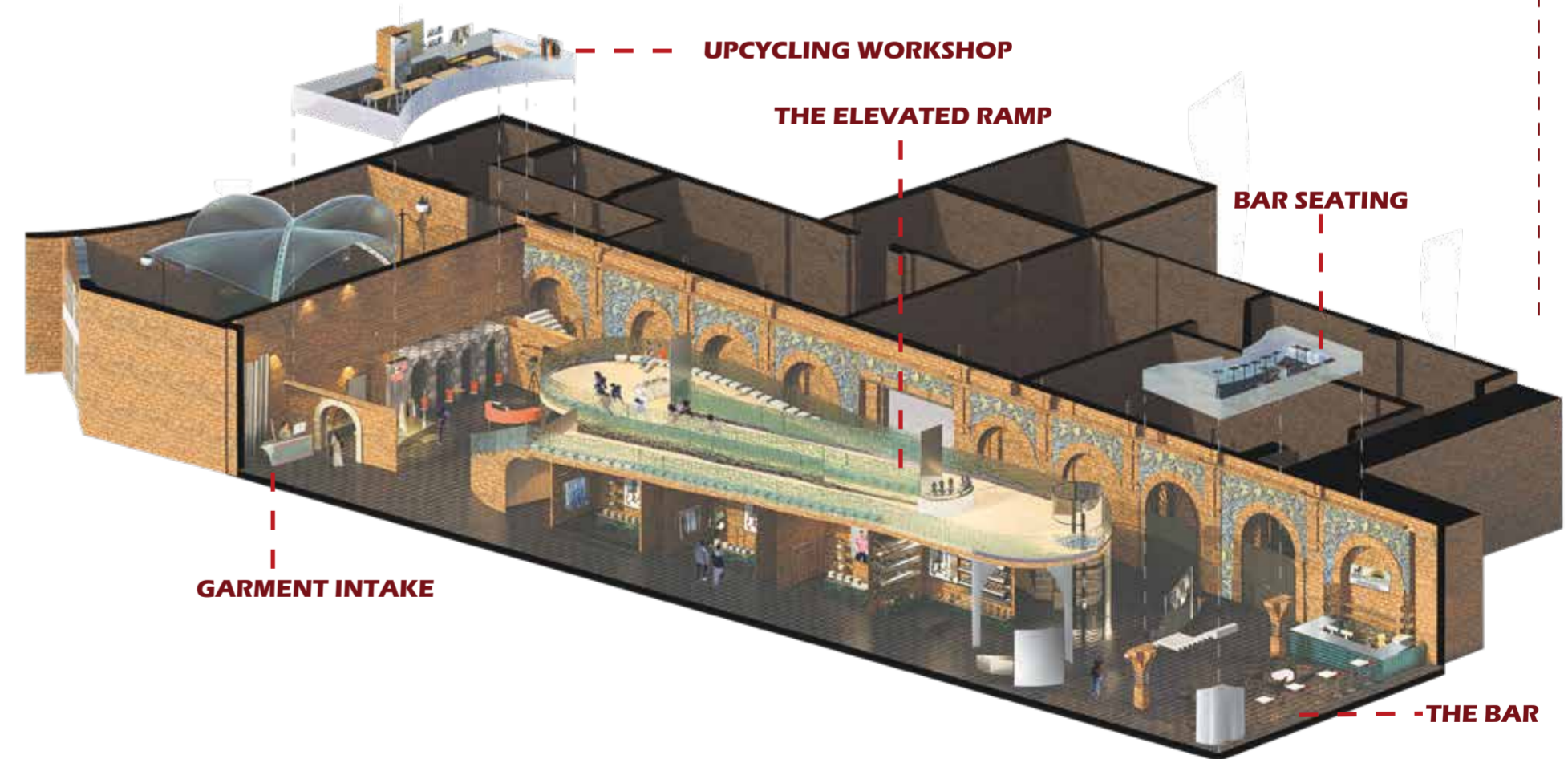
- Immersive and participatory retail environment.
- Connects people to the journey of their clothing.
- Encourages meaningful engagement beyond purchasing.



THE UPCYCLING WORKSHOP



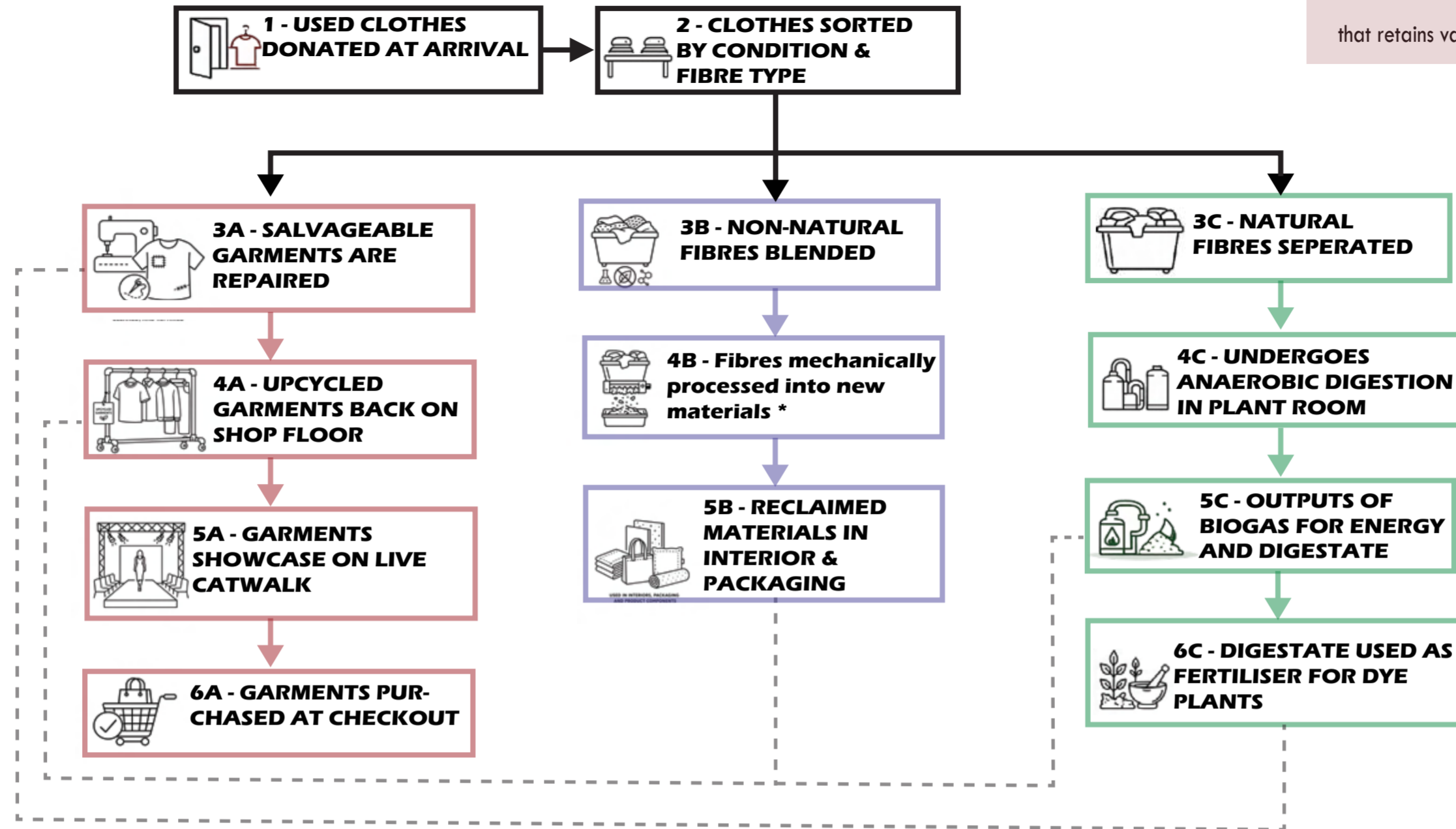
GARMENT INTAKE AT ARRIVAL



By making repair, reuse and regeneration visible, the proposal transforms fashion from a process of consumption into a culture of participation and stewardship.

CLOSED - LOOP CIRCULAR ECONOMY MODEL

Rather than ending as waste, garments are continuously redirected through repair, reuse, material recovery and biological regeneration, creating a closed-loop system that retains value and reduces environmental impact.



- CIRCULAR SYSTEM REINTEGRATION**
- REGENERATIVE BIOCONVERSION LOOP**
- SYNTHETIC RECLAMATION LOOP**
- GARMENT REUSE LOOP**

*Non-natural and blended textile fibres are separated during sorting and redirected into an external material reclamation network, where they are transformed into recycled composite materials for future architectural and product applications.



WASTE - TO - ENERGY SYSTEM

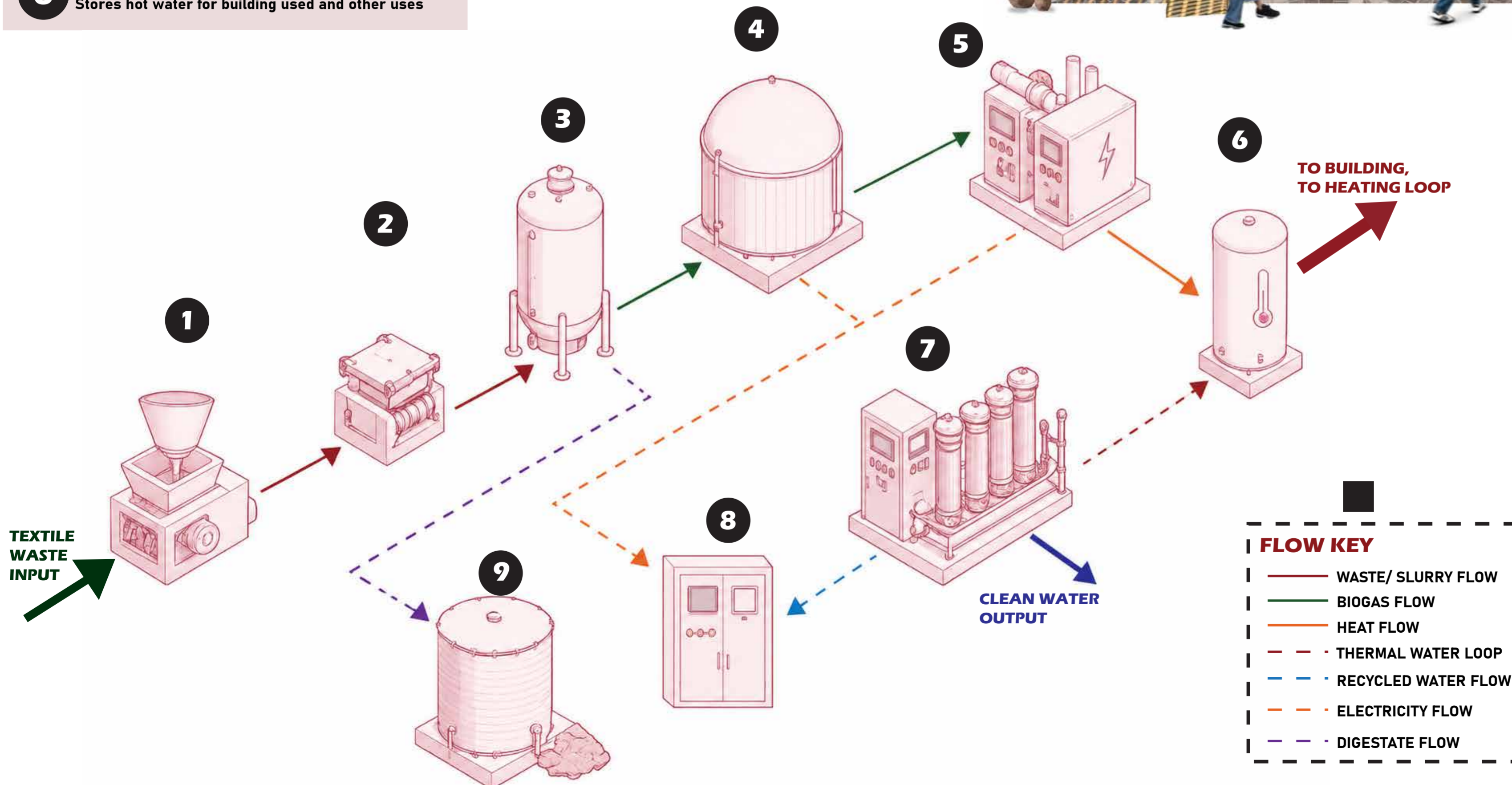
Textile Regeneration System

EQUIPMENT KEY (IN PROCESS ORDER)

- 1** WASTE SHREDDER & FEED SYSTEM
Reduces textile fibres and mixes with water for slurry
- 2** FIBRE SHREDDER
Further reduces the fibre size to improve hydrolysis efficiency
- 3** HYDROLYSIS TANK
Enzymes break down cellulose into simple sugars in slurry
- 4** ANAEROBIC DIGESTER
Microorganisms convert the slurry into biogas
- 5** CHP UNIT (COMBINED HEAT & POWER)
Biogas is burned to generate electricity & heat
- 6** HEAT & BUFFER TANK
Stores hot water for building used and other uses
- 7** FILTRATION & WATER TREATMENT
Cleans process water for reuse within the system
- 8** ELECTRICAL CONTROL PANEL
Monitors & controls all system operations
- 9** DIGESTATE STORAGE TANK
Holds the digestate before it is removed for reuse



REGENERATIVE COURTYARD



YIELDS FROM TEXTILE WASTE (APPROX)

NATURAL FIBRE WASTE (DIGESTION)
1kg natural fibre textile waste
→ 0.2 - 0.35m² biogas
→ 0.6 - 0.8kg digestate

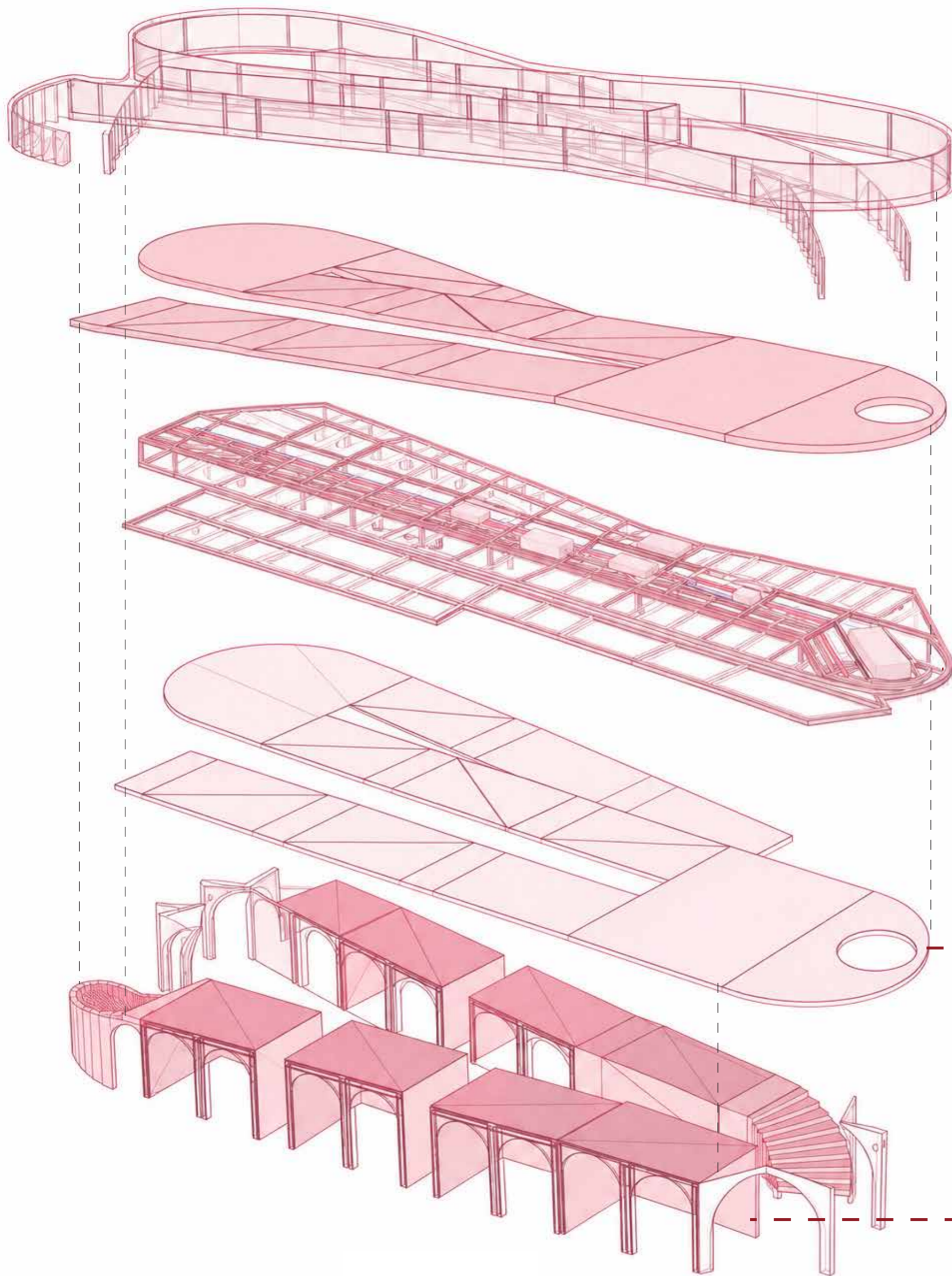
SYNTHETIC WASTE (RECLAMATION)
1kg synthetic textile waste
→ 0.8 - 1.0 kg reclaimed material (mechanically processed)

SYSTEM OUTPUTS	FROM UNIT
HEAT	6
ELECTRICITY	5
CLEAN WATER	7
BIOGAS	4
DIGESTATE	9

EACH OUTPUT IS PRODUCED BY THE UNIT SHOWN

ADAPTABLE CONSTRUCTION & MATERIAL STRATEGY

CONSTRUCTING THE RAMP AS A PHYSICAL EXPRESSION OF CIRCULARITY



MODULAR GLASS BLOCK BALUSTRADE SYSTEM

1 Prefabricated glass block panels are housed within a bolted steel framing system, allowing the balustrade to be removed, replaced, and reconfigured if needed.

KINETIC POWER FLOOR SYSTEM

2 Kinetic plates are installed within the ramp floor, generating electricity when walked on, capturing the energy of movement.

INTEGRATED SERVICES

3 Lighting, power, and display systems are integrated within the structure using accessibly plug-and-play service routes.

CEILING SYSTEM

4 A lightweight steel frame supports a perforated steel ceiling and regenerated textile insulation, concealing services while enhancing acoustic comfort.

BRICK CONSTRUCTION

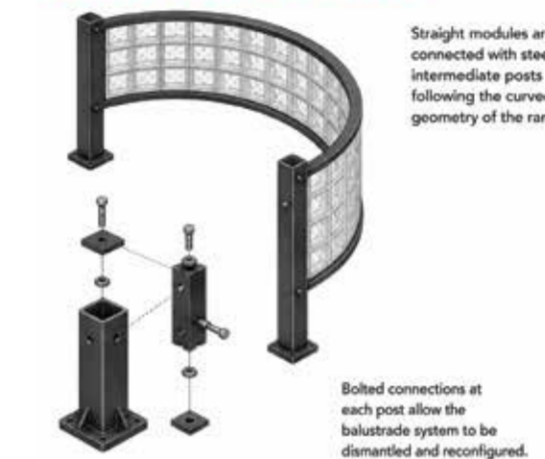
5 Reclaimed brick load-bearing walls provide structural support while reducing embodied carbon and delivering high thermal mass and durability.

1 GLASS BLOCK BALUSTRADE

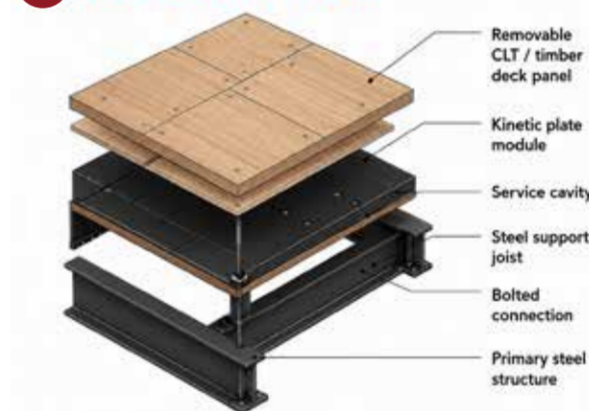


Prefabricated glass block cassettes are supported on neoprene setting blocks and steel T-sections, allowing for movement tolerance and individual replacement.

1 CURVED BALUSTRADE MODULE

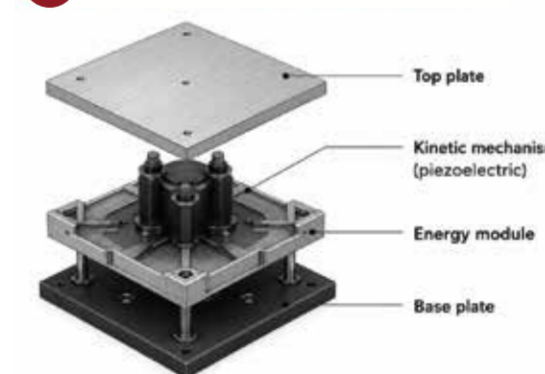


2 TIMBER DECK PANEL BUILD UP



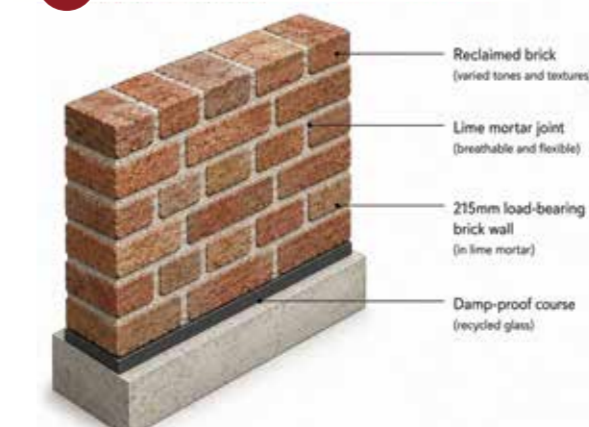
Kinetic modules sit within the deck panels and can be replaced or upgraded without affecting the primary structure.

2 KINETIC PLATE MODULE



Pressure from footfall activates the kinetic mechanism, generating electricity.

5 BRICK WALLS



Reclaimed bricks are laid in lime mortar to form a durable, breathable load-bearing wall with minimal embodied carbon.

MATERIALS



MATERIAL: Reclaimed brick.

APPLICATION: Load-bearing walls.

SUSTAINABILITY BENEFIT: Reduces embodied carbon and diverts materials from landfill.



MATERIAL: Reclaimed steel.

APPLICATION: Ramp structure, balustrade posts, support frames and integrated services.

SUSTAINABILITY BENEFIT: Reusable, durable and designed for disassembly.



MATERIAL: Glass block.

APPLICATION: Ramp structure, balustrade posts, support frames and integrated services.

SUSTAINABILITY BENEFIT: Reusable, durable and designed for disassembly.



MATERIAL: Timber plank.

APPLICATION: Joinery, furniture and display elements.

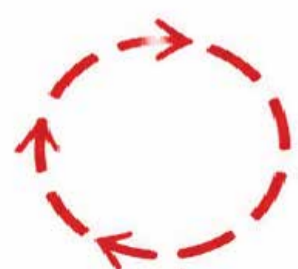
SUSTAINABILITY BENEFIT: Extends material lifespan and reduces demand for virgin timber.



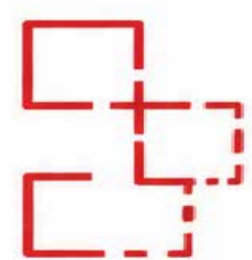
MATERIAL: Regenerated Textile Acoustic Insulation.

APPLICATION: Ceiling and acoustic treatments.

SUSTAINABILITY BENEFIT: Manufactured from post-consumer textile waste.



CIRCULAR MATERIALS



ADAPTIVE REUSE



LOW EMBODIED CARBON



LIGHTWEIGHT DESIGN



FLEXIBLE AND ADAPTABLE