EVAPORA

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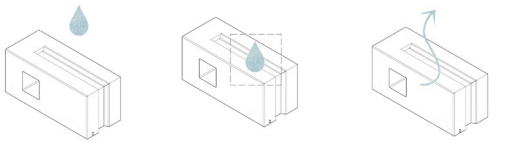
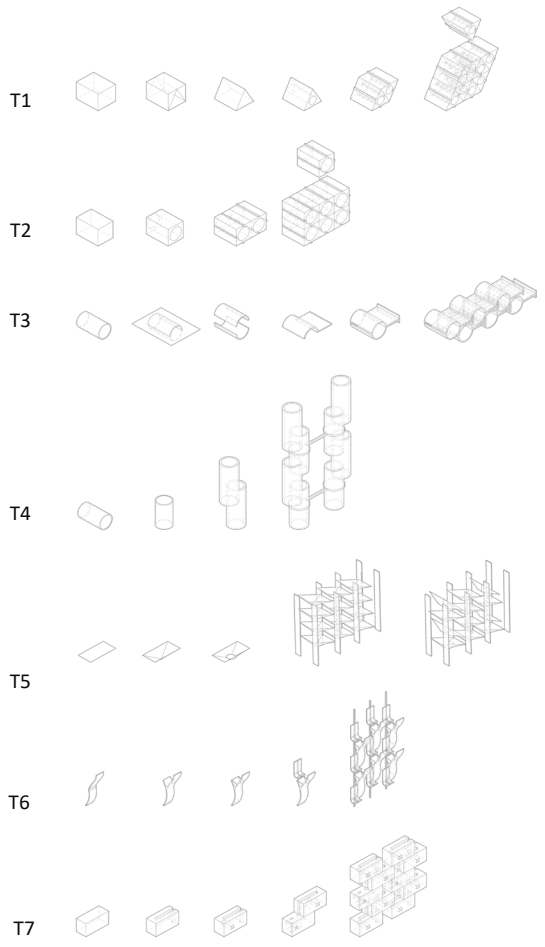
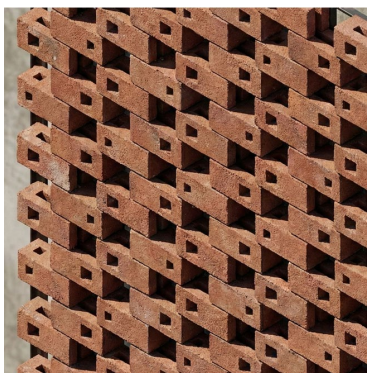
Evaporative Cooling Façade using porous materials



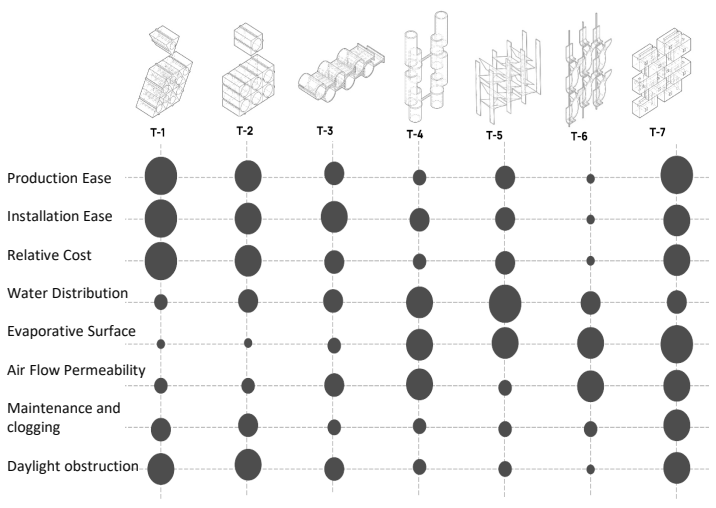


Evapora is an innovative, performance-driven architectural solution focused on developing a passive evaporative cooling façade system specifically designed for hot-dry climates. By utilizing porous modules made by recycled brick dust, the system leverages the latent heat of water evaporation, absorbing, holding, and releasing moisture, to significantly lower indoor temperatures and mitigate the urban heat island effect with minimal energy consumption. The project integrates an iterative design process that balances thermal efficiency with daylight performance, ensuring adequate natural light and solar shading through modular flexibility. Beyond its cooling capacity, Evapora emphasizes sustainability by utilizing locally sourced recycled brick dust and low-energy manufacturing processes, achieving an reduction in embodied carbon compared to traditional fired ceramic façades. Ultimately, the project offers a scalable, eco-friendly alternative to conventional air conditioning, providing a climate-responsive envelope that enhances occupant well-being while addressing the environmental challenges of modern urban densification.



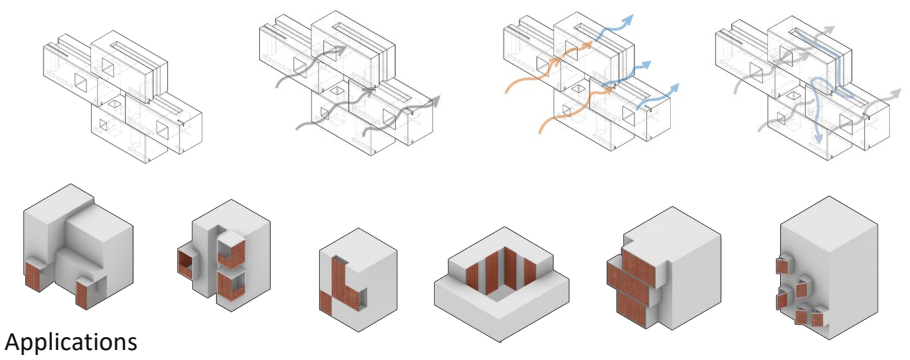
Iterations

An iterative approach was adopted for the development of the module, which were further compared using a matrix, on relevant parameters to arrive at the final module

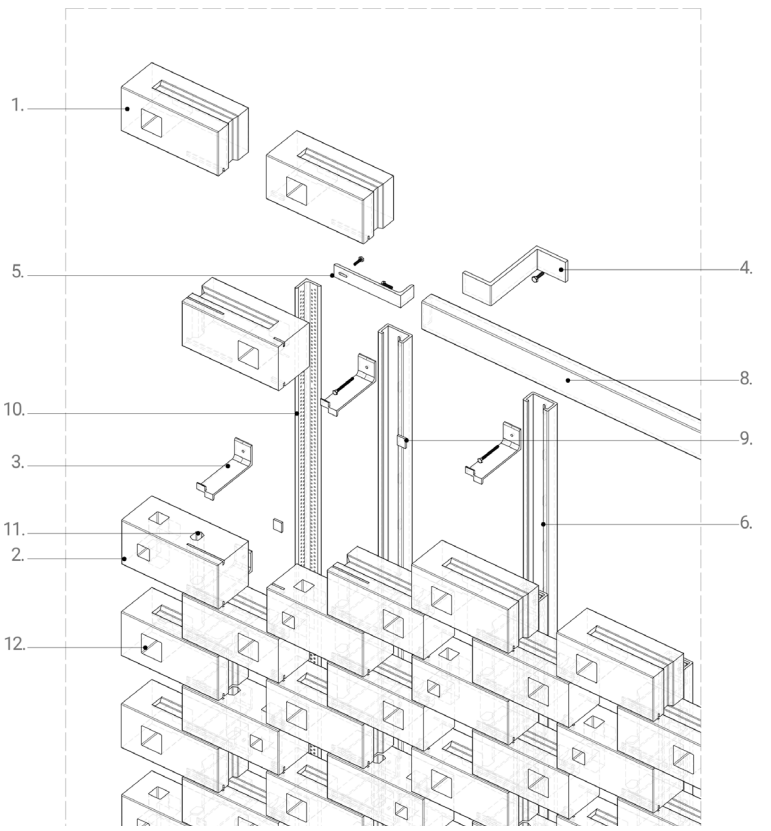


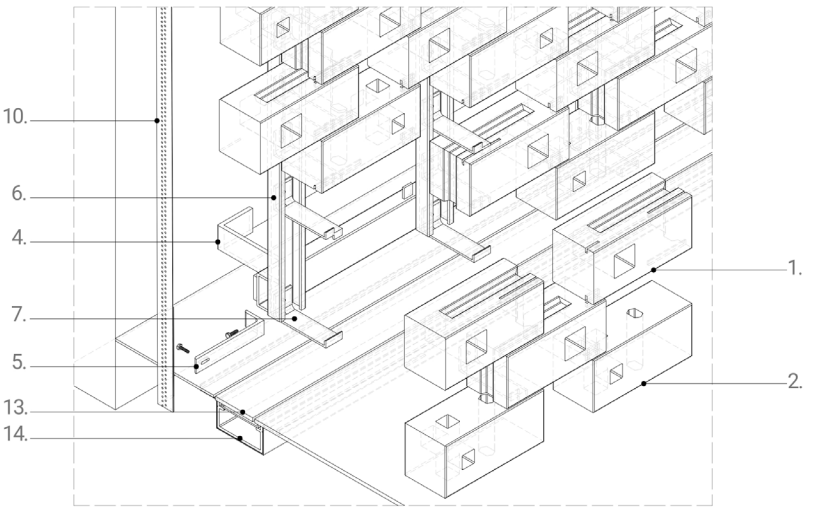
Legend

1 - Brick (Typology 1): Custom porous brick unit
2 - Brick (Typology 2): Custom porous brick unit
3 - Retention Clip: 5mm Stainless Steel (Grade A4/316) L-clip for brick support and stability
4 - Primary Bracket: 8mm S355 Steel plate for facade-to-Structure load transfer
5 - Edge Support: 6mm S355 Steel L-angle for perimeter frame lateral stability
6 - Vertical Mullion: Cold-formed Steel C-channel secondary structural member
7 - Retention Clip (Type 2) 5mm Stainless Steel (Grade A4/316) L-clip for brick support and stability
8 - Horizontal Transom: Steel RHS (Rectangular Hollow Section) primary spanning member
9 - Anchoring Clip: Mechanical SS316 clip ensuring brick-to-brick connection
10 - Framing Angle: 6mm S235 Steel Perforated L-section for perimeter frame.
11 - Vertical Conduit: Internal brick aperture for gravity-fed water circulation
12 - Air Plenum: Horizontal brick void for intake and evaporative cooling exchange
13 - Drain Cover Plate, finished in terracotta/ceramic tile
14 -Drainage Channel Stainless Steel laid to slope



Applications





Exploded Axonometric Assembly Detail

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