

ILLUMANATE FILTER

Situated in a transitioning industrial zone, surrounded by contaminated sites, our proposal envisions the existing building and site as a filter, a provision of respite from the toxic remnant industry and a hopeful vision of the future.

The concept of filtering manifests through the design in 3 ways.

Building and site as environmental filter:

Provision of water cleaner than the neighbouring Stoney Creek, nutrient rich soil produced on-site for the production of food, the power of the sun harvested on-site as clean energy that powers the wider community, and native vegetation that populates the local area and encourages the return of rich biodiversity.

Filtered spatial experience through blurred interior boundaries and intermingled programme:

A heritage building transformed, refitted to serve the community through a range of services & uses, providing healthy interiors and outputting clean resources.

Building as filter for the regenerative re-use of the building:

Offering a great opportunity to curb emissions by prolonging the useful life of materials already in place, especially those with long-life durability and high embodied energy, such as steel, aluminum and concrete.

A key element of the proposal is the incorporation of not only the 7 living building challenge petals, but also the addition of 4 site-specific petals that seek to tackle environmental issues pertaining to the immediate context and

local community. These are:

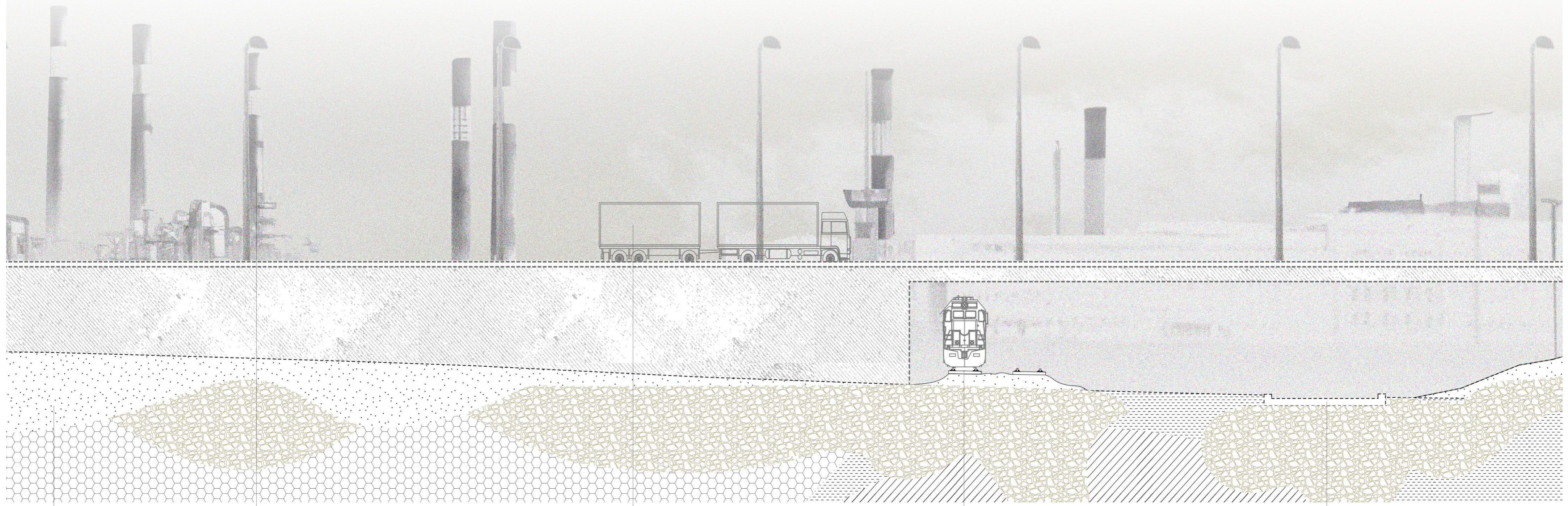
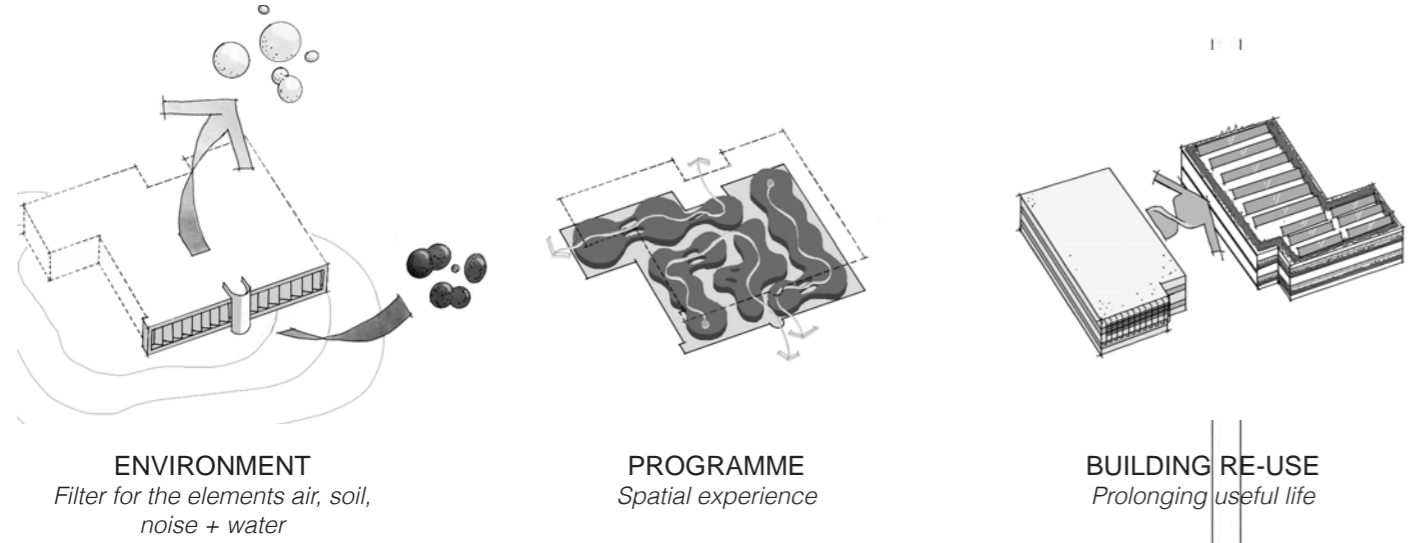
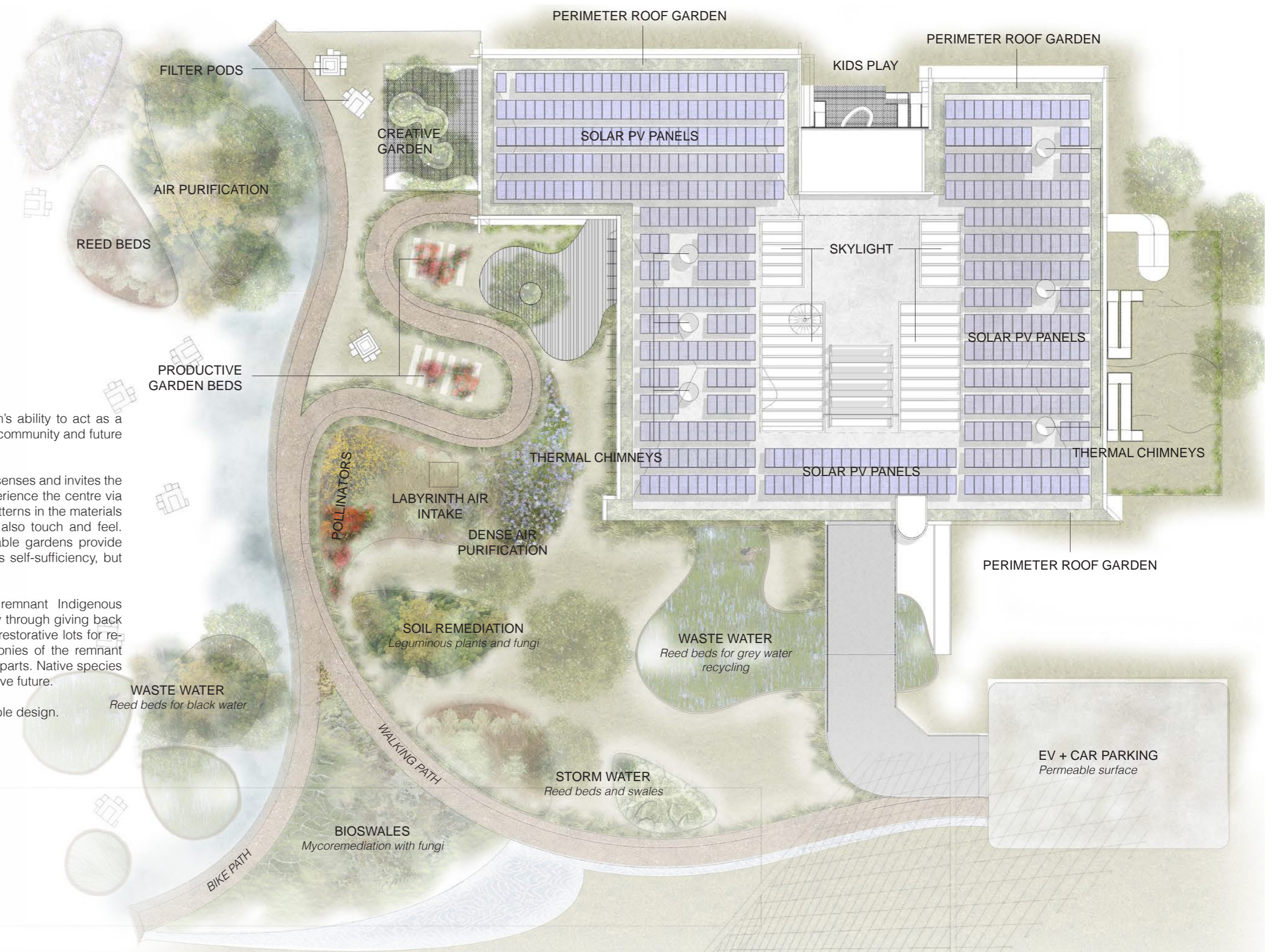
- Air purification
- Soil remediation
- Noise pollution
- Re-wilding and biodiversity

The addition of these extra petals assist in the design's ability to act as a filter not only for the environment, but also for the local community and future longevity of developments within the LUMA site.

The proposed design creates journeys to stimulate the senses and invites the local community, staff, and visitors to explore and experience the centre via the surrounding landscape. The varied textures and patterns in the materials and planting encourage visitors to not just look, but also touch and feel. Provision of allotments for productive fruit and vegetable gardens provide ways for the local community to not only work towards self-sufficiency, but also share meals and skills.

The surrounding landscape seeks to restore the remnant Indigenous landscapes and species, prioritising caring for Country through giving back to the land. Gardens unless otherwise stated become restorative lots for re-wilding, with a focus on respecting the natural harmonies of the remnant Indigenous grasslands, flowers and their fauna counterparts. Native species are prioritised, with a broader aim of creating a restorative future.

Luma Filter – a precedent for sustainable and responsible design.



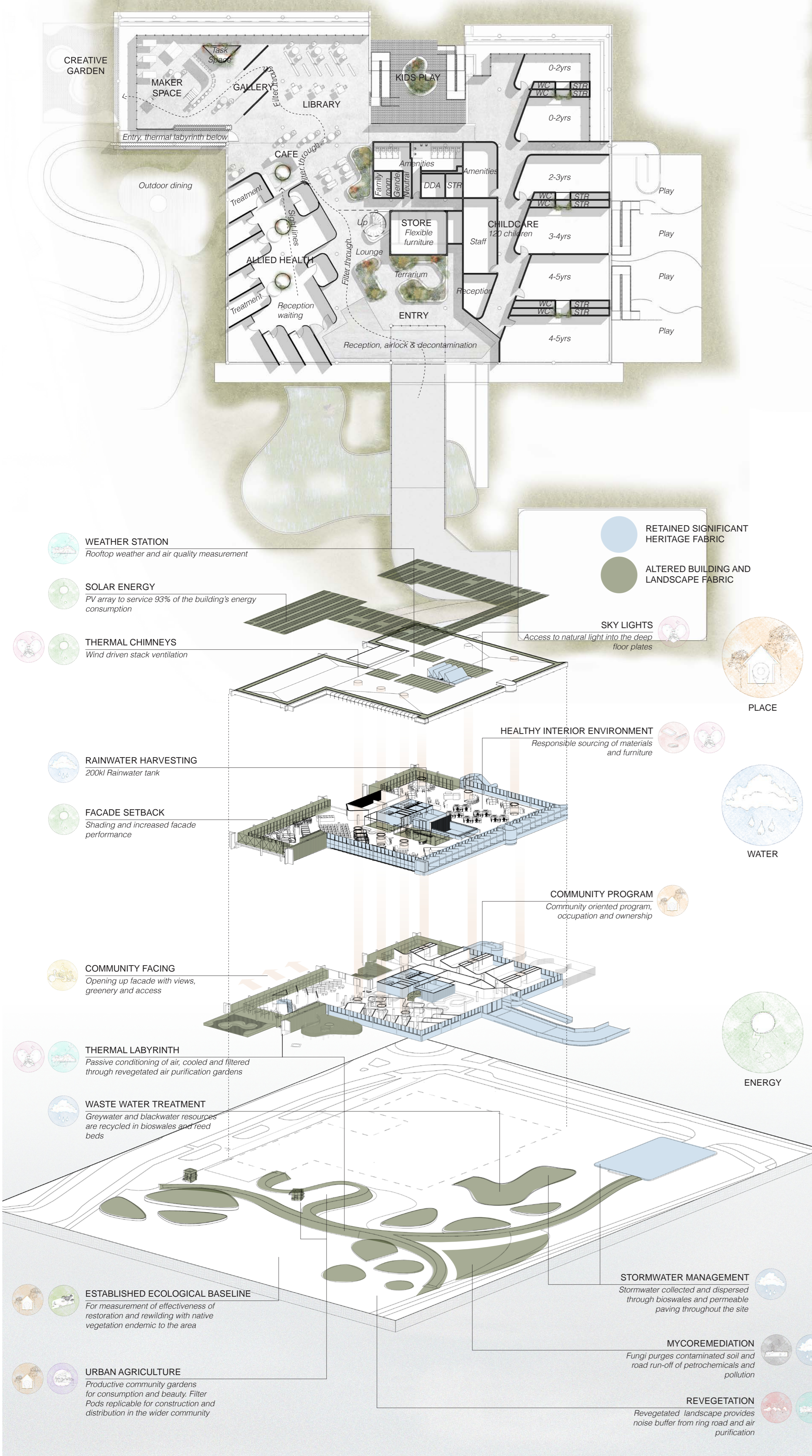
THE LANDFILL
Contaminated soil,
Toxic gas,
Endangered species,
Endangered people

INDUSTRY
Plastics, reinforcement/concrete, + textiles factories,
Ground pollution,
Air pollution,
Waterway pollution,

THE HIGHWAY
Western Ring Rd,
Toxic fumes,
Noise (24/7),
Air pollutants + particles
Over reliance on + prioritising car transportation

THE RAILWAY
Metropolitan train line (Sunbury)
V-Line train line (Bendigo)
Noise (periodical)
Fumes (periodical)
Connection + accessibility - prioritising communal + sustainable transport

THE ROAD
Noise,
Fumes + particles
Obstruction to foot connectivity + pedestrian routes
Obstruction to cycling connectivity
Soil contamination from road runoff



Healthy Air Quality Unhealthy Air Quality
DIAGNOSTICS DISPLAY- FACADE GLOW
Indicates air quality measured from rooftop weather station to the community and commuters

Situated in a transitioning industrial zone, surrounded by contaminated sites, our concept for the "luminate" competition envisions the existing building and site as a Filter. This metaphor applies in 3 ways:
 Firstly, as an environmental Filter by providing water cleaner than Stony Creek, soil for productive gardens, clean energy that powers the grid beyond the site, clean the air that washes over it and native vegetation that populates the local area and encourages the return of rich biodiversity.
 Secondly, as a people Filter through and experience the building, internally the heritage building will be refitted to serve the community through a range of services & uses, providing healthy interiors and outputting clean resources.
 And finally, as a Filter for the regenerative re-use of building offering a great opportunity to curb emissions by prolonging the useful life of materials already in place, especially those with long-life durability and high embodied energy, such as steel, aluminum and concrete.

Rainwater Harvesting
 Our proposed design will harvest rainwater off the existing standing seam metal roof. While it is estimated that up to 1.18ML of rainfall would be typically expected to fall on the roof only 765.330L would be considered collectible when considering issues of first flush, roof drainage design, etc. In consideration of this and the projected usage within the building and for irrigation the optimal size of rainwater storage is estimated to be 100,000L, which would meet close to 30% of demand.
 Noting that before re-use the rainwater will be filtered and disinfected by cones and UV to supply all suitable water uses within the building. Considering rainwater is considered to have a low health risk it will be maximised to replace potable water uses.
Stormwater Management
 Stormwater is proposed to be managed entirely on site, without reliance upon municipal infrastructure. The existing tarmac parking area will be replaced with permeable pavers and gravel, with adjacent bioswales to treat and infiltrate runoff. Rainwater that is not captured for re-use within the building will be diverted into the bioswales for both filtration and permeation into the ground to aid soil remediation.
Blackwater Treatment
 Although the existing building is currently connected to the municipal sewer system, the project will seek to shift to on-site waste water treatment by combining mechanical treatment and on-site bioswales to treat and appropriately treat waste water. According to the solution will need to work with the local water authority and the Department of Health to attain suitable approvals.

Passive Architectural Design
 The proposed design has used the central core of the building to deliver an effective natural ventilation strategy that combines single side and cross ventilation with solar / wind driven stack ventilation through optimally positioned thermal chimneys that can use both heat from the sun and prevailing winds to induce effective natural ventilation through the different functional areas bounding the central spine.
 Similarly, the proposed setting back of the internally inhabitable spaces on the northern boundary of the existing building will ensure the external facades of these spaces are effectively shaded from the existing structure, while also allowing for a higher thermally efficient and air-tight building envelope to be constructed. This will allow the new building envelope to offer significant improvement over regulatory compliance.
Passive Conditioning
 To further complement the effective naturally ventilation strategy integrated into the building the proposed design has integrated a thermal labyrinth that in addition to drawing cooling air from the re-vegetated areas alongside the building, will also use the high diurnal temperatures that are experienced by the prevailing climate of Melbourne to provide passively conditioned air from the building.
 This is a tried and successfully delivered system that has been used in numerous buildings in Melbourne. It relies on passive cooling of ambient air in summer of between 10 - 13°C enabling ambient air at design conditions of 25°C to be passively cooled to 20°C - 25°C. Which will offer significantly operational energy efficiency, particularly for the numerous high occupancy spaces within the building. However, the benefits of the thermal labyrinth is not just limited to Summer as it can be used to store the heat of the day in winter to pre-heat incoming outside air by between 40°C - 60°C, offering further operational energy efficiencies.

On-site Renewable
 To both test and inform design decision making, an assessment of the potential capacity and output of a roof mounted solar PV array has been evaluated and fine-tuned as the concept design has developed. From the Helioscope simulations undertaken it is estimated that a solar PV array of 220kWp could be accounted on the roof of the existing building when accounting for access for cleaning and maintenance.
 Based on this capacity, as well as the tilt and orientation of the roof mounted panels on the different pitches of the roof it is estimated that this size array would generate 261,070 kWh of electricity. This output would represent approximately 98% of the projected annual energy consumption that would typically be used by the nature of facilities proposed within the building without the benefits of the passive conditioning or energy efficiency measures that are to be integrated into the overall design response.

Embodied Carbon
 Based on a combination of benchmarking and preliminary high level embodied carbon assessment for the proposed redevelopment it is expected that the re-use of the existing structure and majority of the existing facade the proposed concept design would reduce upfront carbon emissions by between 50% - 60%, possible greater.
Net Positive Energy
 In consideration of this the further energy efficiency measures being adopted will need to deliver at least an approximate 12% improvement on the typical annual energy consumption of the proposed facilities within the building.
 Based on the following initiatives and strategies it is expected that energy efficiency reductions well in excess of the required 12% will be delivered.

- Optimised natural ventilation which will limit the need for active air conditioning systems (i.e. heating & cooling) by between 20 - 25% of a typical year.
- The proposed thermal labyrinth will offer during summer and winter offering up to 10 - 15% reductions in the required peak cooling and heating loads.
- The combined impacts of improved solar shading and building envelope performance from the proposed setback of the Community Lounge Room, Tech and Community Kitchen + Dining spaces.
- Improved lighting efficiency through a combination of lower lighting power densities and controls, offering potential energy consumption reductions of up to 30%.
- Right sizing of engineering systems with efficiencies of 15% expected.
- Application and use of Green Leases with tenants requiring minimum energy efficiency targets to be met.

As such the proposed concept design can confidently state that the proposed on-site renewable energy system will supply the required minimum 100% of the development's energy needs on a net annual basis without the use of combustion.

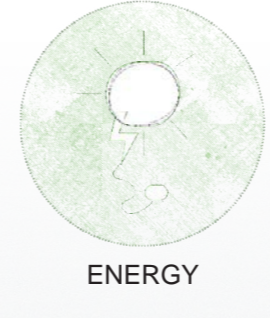
- WEATHER STATION**
Rooftop weather and air quality measurement
- SOLAR ENERGY**
PV array to service 93% of the building's energy consumption
- THERMAL CHIMNEYS**
Wind driven stack ventilation
- RETAINED SIGNIFICANT HERITAGE FABRIC**
- ALTERED BUILDING AND LANDSCAPE FABRIC**
- SKY LIGHTS**
Access to natural light into the deep floor plates
- HEALTHY INTERIOR ENVIRONMENT**
Responsible sourcing of materials and furniture
- RAINWATER HARVESTING**
200kl Rainwater tank
- FACADE SETBACK**
Shading and increased facade performance
- COMMUNITY PROGRAM**
Community oriented program, occupation and ownership
- COMMUNITY FACING**
Opening up facade with views, greenery and access
- THERMAL LABYRINTH**
Passive conditioning of air, cooled and filtered through revegetated air purification gardens
- WASTE WATER TREATMENT**
Greywater and blackwater resources are recycled in bioswales and food beds
- ESTABLISHED ECOLOGICAL BASELINE**
For measurement of effectiveness of restoration and rewilding with native vegetation endemic to the area
- URBAN AGRICULTURE**
Productive community gardens for consumption and beauty. Filter Pods replicable for construction and distribution in the wider community
- STORMWATER MANAGEMENT**
Stormwater collected and dispersed through bioswales and permeable paving throughout the site
- MYCOREMEDIATION**
Fungi purges contaminated soil and road run-off of petrochemicals and pollution
- REVEGETATION**
Revegetated landscape provides noise buffer from ring road and air purification



PLACE



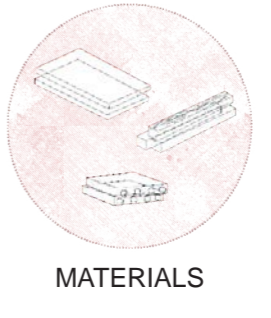
WATER



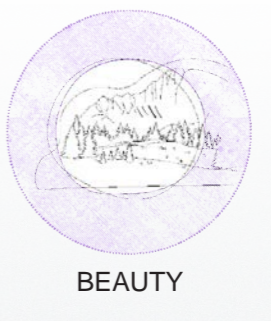
ENERGY



HEALTH + HAPPINESS



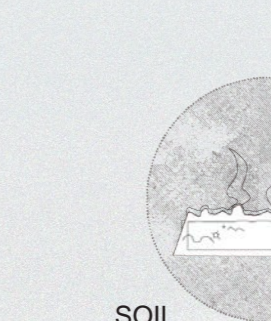
MATERIALS



BEAUTY



EQUITY



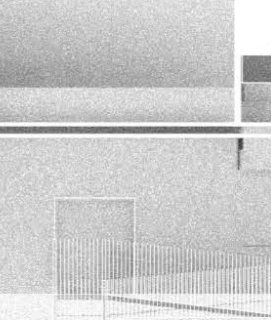
NOISE



SOIL CONTAMINATION



BIODIVERSITY



AIR



CLEANER SOIL
 Contaminants from the soil begin to be absorbed and filtered through the bordering patches of fungi beds. As time moves forward the soil becomes cleaner, bugs begin to return, plants begin to grow. A thriving future germinates.

CLEANER AIR
 Hot, congested, toxin heavy air sweeps through the site. Trees weaving and clipping capture the breeze on their leaves as the air cools and filters downwards. The beds of ferns and reeds further capture and filter out the carbon dioxide and toxins. This air is passively directed towards the interior, through a thermal labyrinth network. Air quality begins to improve immediately.

MENTAL + PHYSICAL HEALTH
 Cracks begin to appear in the building as the dense facade is penetrated by greenery. Sunlight flows through the skylights, bathing the cold walls in warmth. Cool, clean air flows through the building. The community + the building begin to form a rhythm. The building begins to physically reflect its role as mediator of community connection + health.



GARDEN

Re-wilding seed dispersal, productive, ornamental

ROOF ACCESS PORTAL

Optional support and access

SHELVES

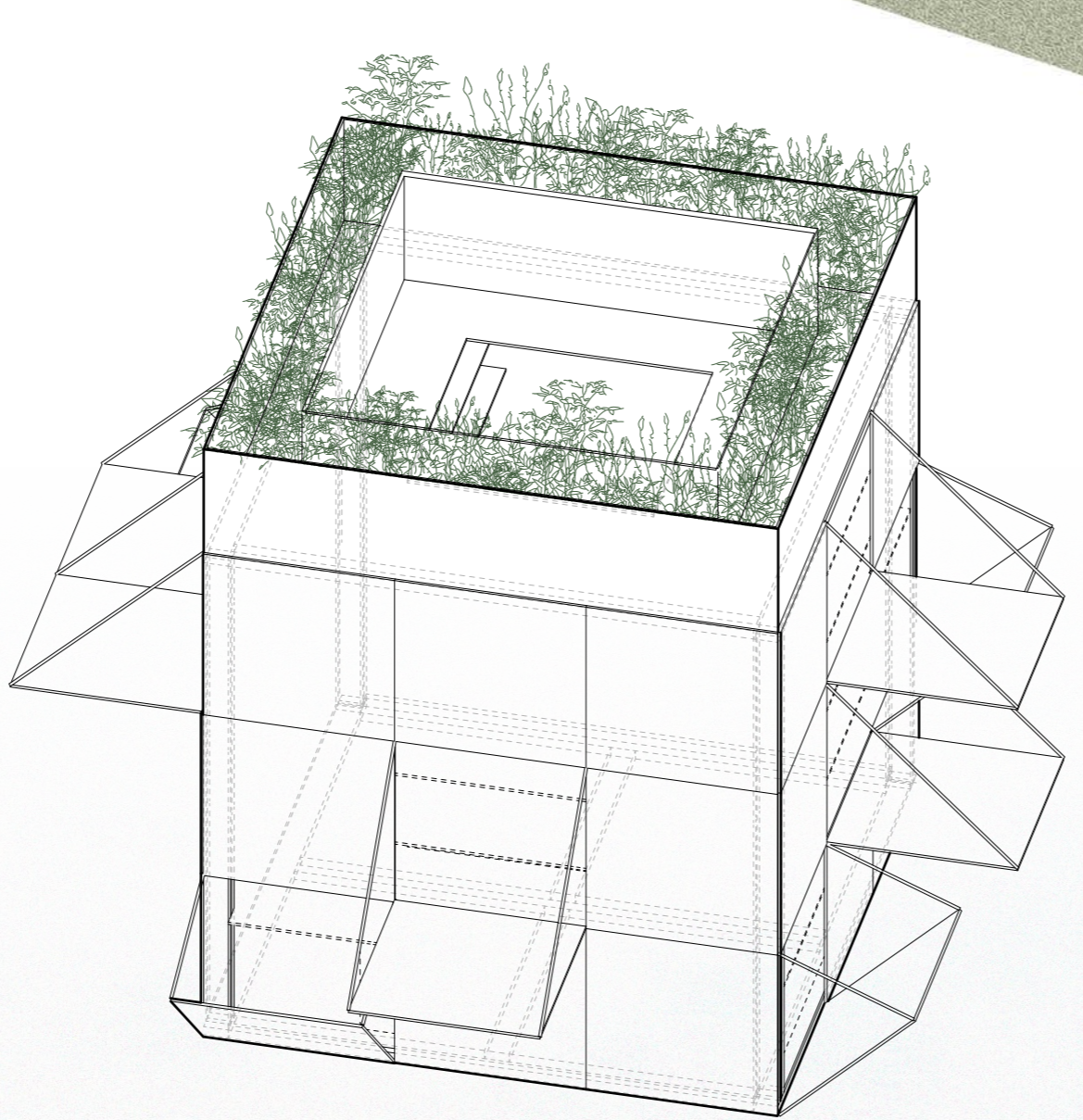
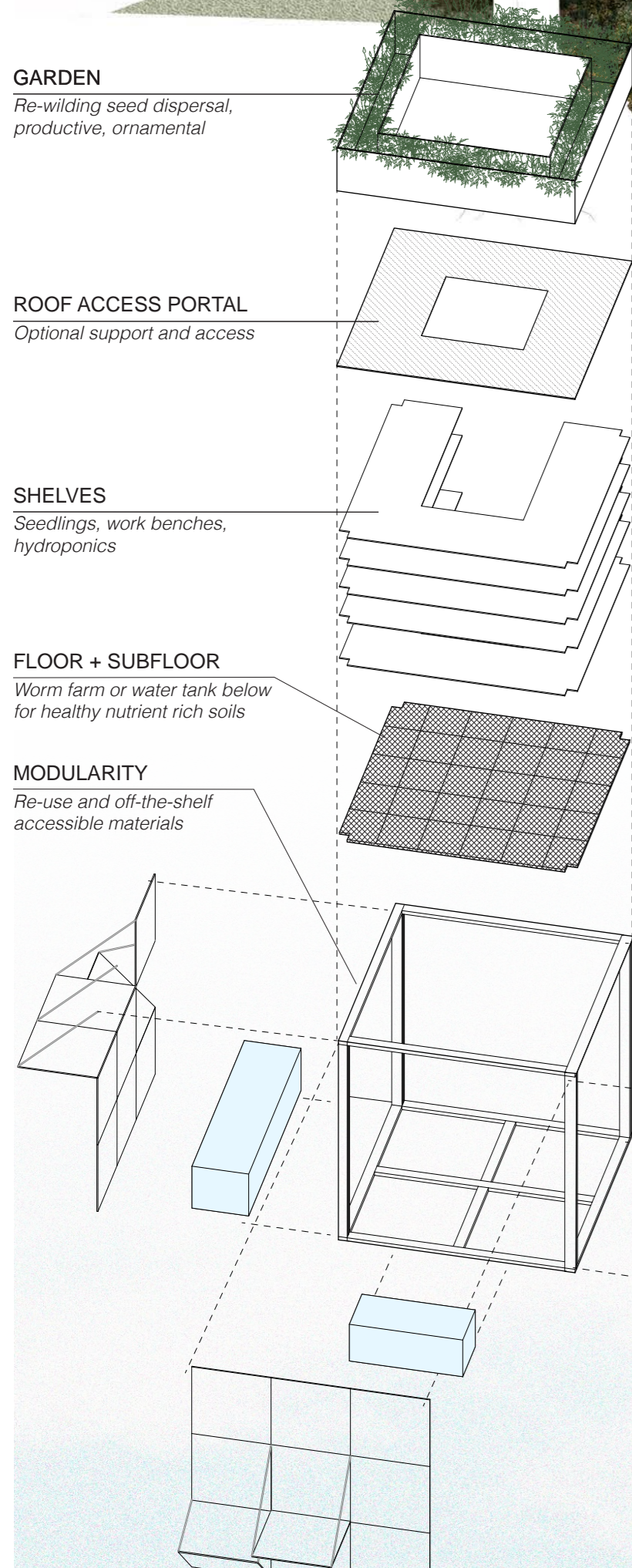
Seedlings, work benches, hydroponics

FLOOR + SUBFLOOR

Worm farm or water tank below for healthy nutrient rich soils

MODULARITY

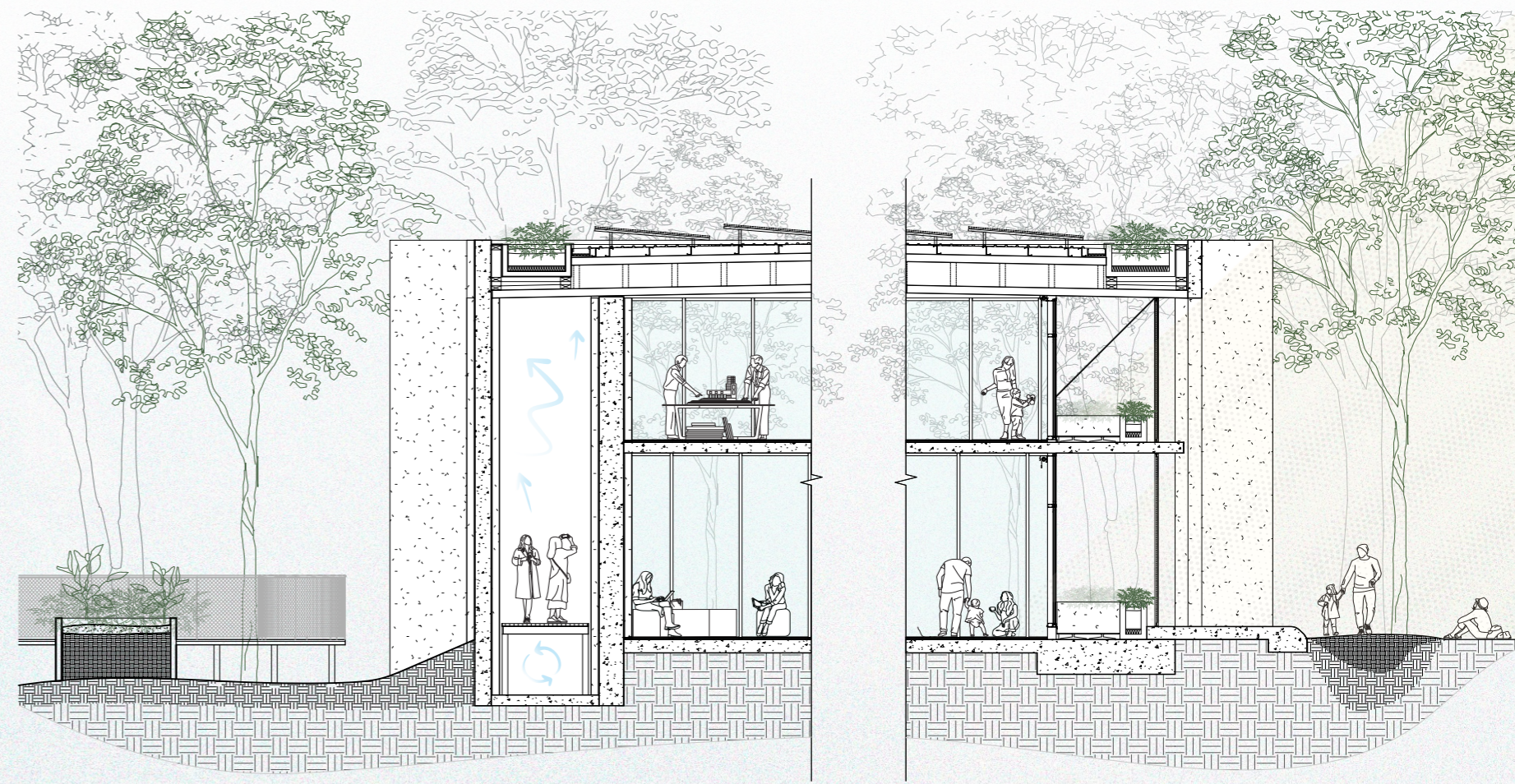
Re-use and off-the-shelf accessible materials



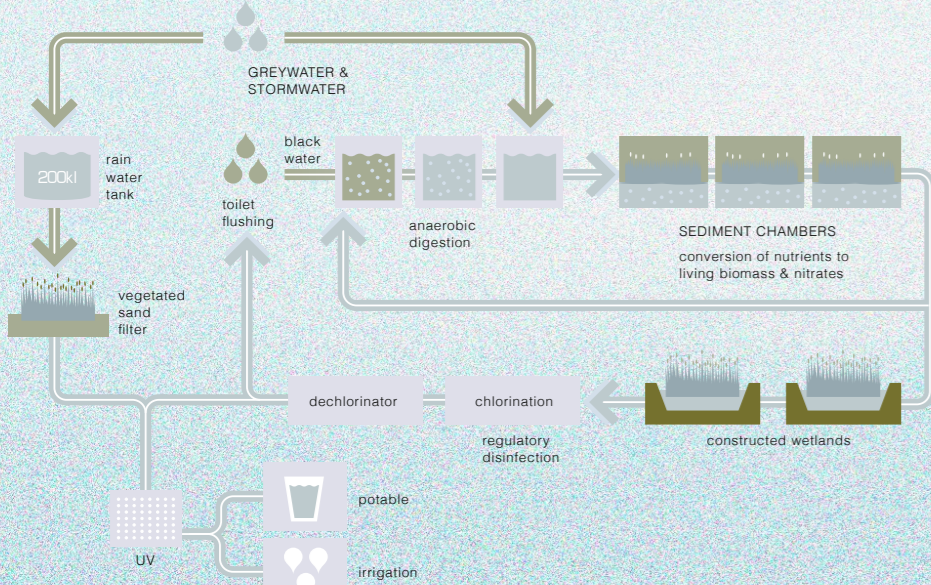
As a solution to density in urban living environments, the filter pods address both issues of suburban biodiversity, whilst promoting a circular economy and self-sufficiency. The pods consist of a modular timber frame system, with bracket adjustable shelving. The external facade can be made of ready made timber plywood, available recycled materials at hand such

as plastic sheeting or recycled timber, or be left open to the elements as a form of vertical garden. The flexibility of the system allows for users to configure the shelving as desired, widening or condensing shelves to suit their needs as garden beds, worm farms, water tanks or simple workshops and storage.

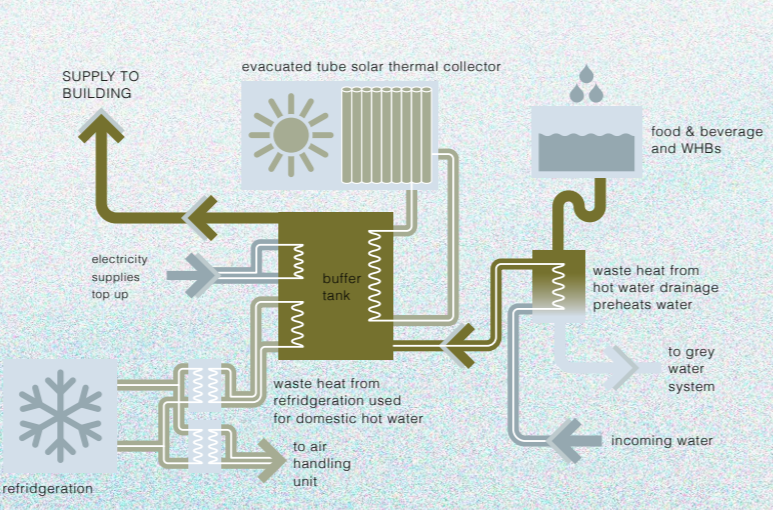
In order to address a fully sustainable and highly performing building facade, the proposed design seeks to remove the outer layer of north facing facade and introduce an external balcony environment with a new thermally broken glazed facade offset from the existing slab line. The proposed arrangement creates deep eaves allowing for a strong passive solar design implementation. The proposed facade on the existing slab line consists of new planters and recycled mesh wire fencing which allows new planting to grow up the facade. This strategy ties back in to the idea of air purification as the air crosses the vegetation before entering the building at the new offset facade line. On the south side of the proposed facade is where the thermal labyrinth enters the building. The thermal labyrinth draws filtered air in to the building prior to integrating with the HVAC system in order to reduce stress on the system. We are proposing to extend the treatment of the labyrinth walls up the facade at this point in order to educate and facilitate conversation around sustainable practices, allowing the building to physically communicate its sustainable principles.



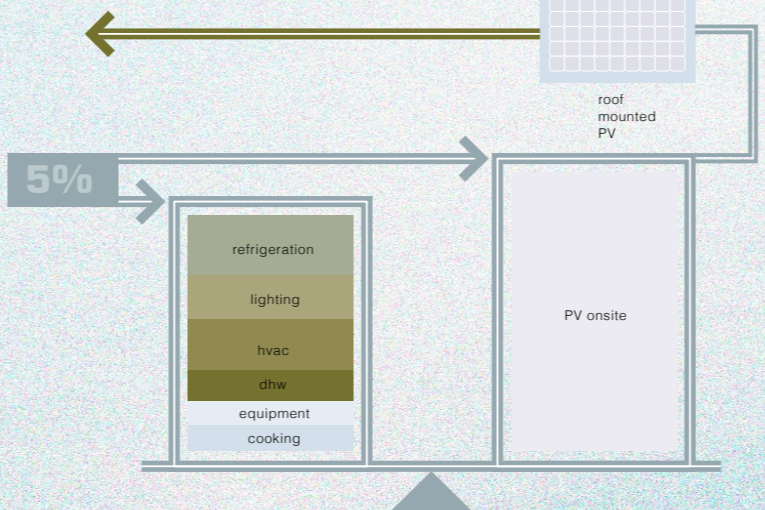
WATER



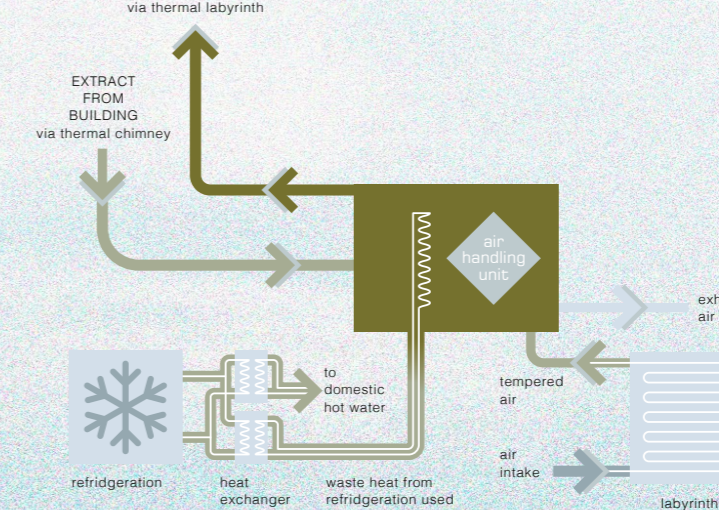
HOT WATER



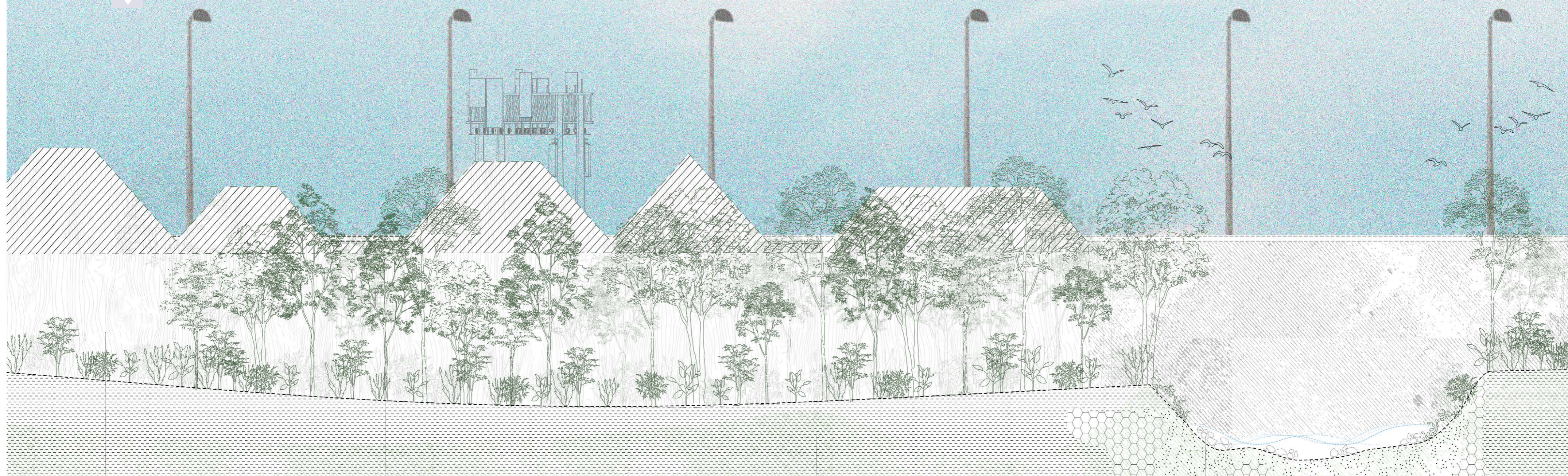
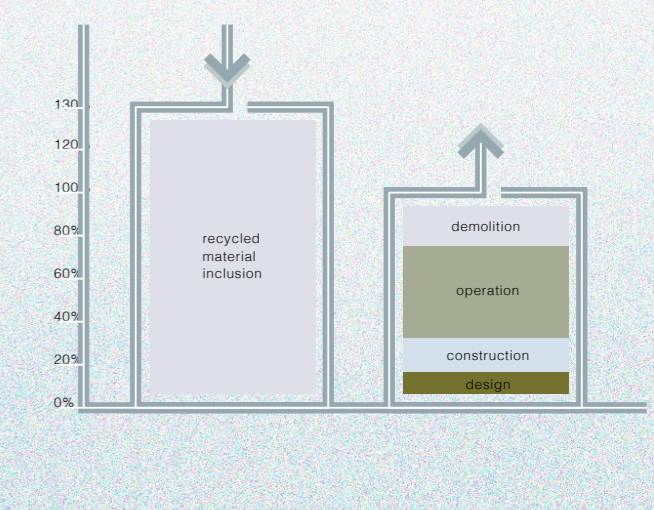
ELECTRICITY + ENERGY



HEATING & COOLING



WASTE



A VISION OF THE FUTURE

Connected, healthy living
Strong community
Greenspace + nature abounds
Biodiverse + rejuvenated landscapes

BIODIVERSITY + ABUNDANCE

Native trees + vegetation are established
Nature acts as the final and permanent filter
A clean + healthy environment supports a thriving community
Native species return
Productive gardens flourish, self-sufficiency becomes a reality

HEALTHY SOILS

Healthy soils
Healthy plants
Healthy animals
Healthy humans

BUBBLING CREEK

The filtering of runoff and stormwater enables the restoration of the creek
A restored creek sees the reestablishment of green corridors + increased biodiversity
Clean + clear waters