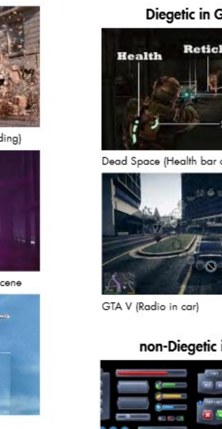
DIEGETIC/S
Understanding Diegesis in Space, Sound, and Story

Diegesis is not just a storytelling tool — it's a framework that determines what exists within the world of the story (experienced by characters) and what exists outside of it (only for the audience).

Diegesis - The world of the story. Everything the characters can see, hear, touch, and interact with.
Non-Diegesis - Elements outside that world, meant only for the audience's understanding — music, narration, overlays.
If the character can perceive it, it's diegetic.
If it's only for the viewer, it's non-diegetic.

Inception - café explosion scene (dream folding)
Blade Runner 2049 - Las Vegas hologram scene
The Truman Show - dome reveal

Diegetic in Games



Dead Space (Health bar on character's spine)
GTA V (Radio in car)
non-Diegetic in Games
Game HUDs, off-screen map icons, menus

Element Type	Diegetic (Inside the World)	Non-Diegetic (Outside the World)
Dialogue	Yes	No
Visible Objects	Yes	CGI overlays only
Sound Effects	Footsteps, gunshots	Score / music
Narration	No	Yes
Spatial Design	If interacted with	If only symbolic or fourth-wall

CAMERA PATH

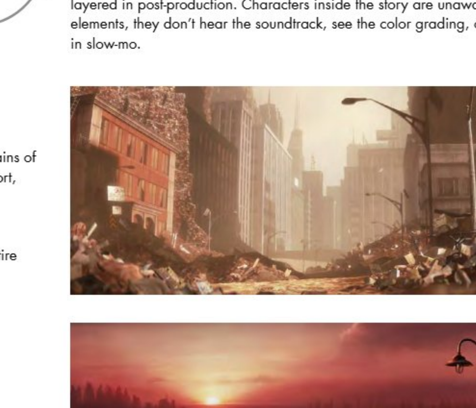
Non-diegesis refers to all elements in a film, game, or narrative experience that do not exist within the story world itself, they are added for the benefit of the audience. These include things like background music, voiceover narration, subtitles, slow-motion, dramatic lighting, camera movements, and visual effects layered in post-production. Characters inside the story are unaware of these elements, they don't hear the soundtrack, see the color grading, or know they're in slow-mo.

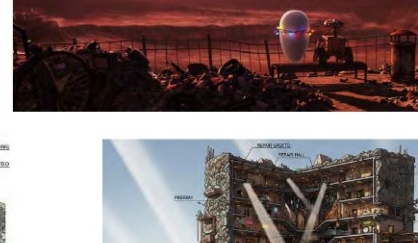
WALL E

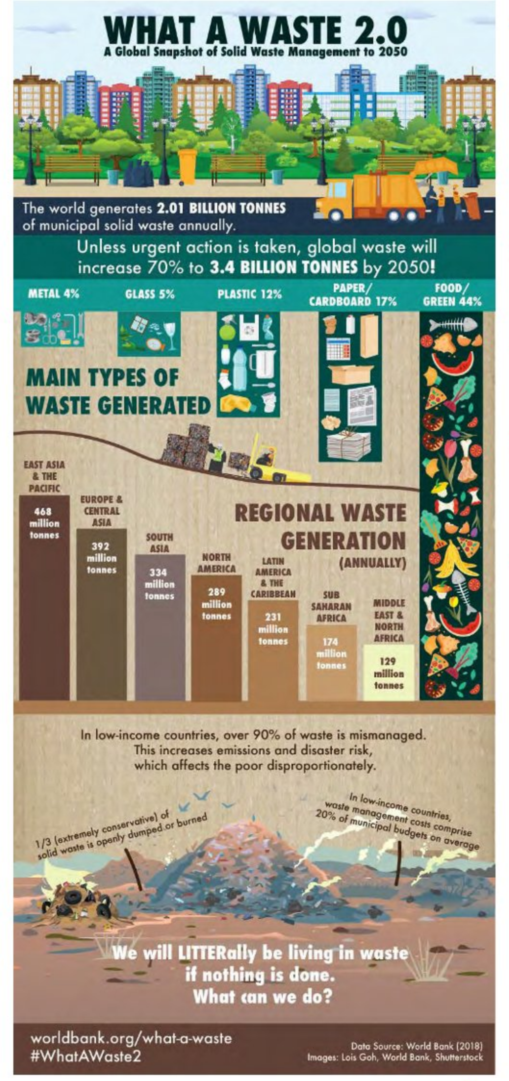
Film Setting:
The Earth is abandoned by humans, covered in endless mountains of compacted trash cubes. A single robot, WALL·E, continues to sort, repair, and collect fragments of memory.

Diegetics:
For WALL·E, the waste is not "background scenery." It is the entire diegetic world.
The ground is stacked waste (not soil).
The architecture is trash towers (not buildings).
The archive is broken objects (not libraries).
The commons are his garage, filled with repaired things.

Why this matters:
WALL·E shows us a world where waste is geology, waste is architecture, waste is memory. It is lived-in, felt, repaired and not erased or hidden.







World Bank "What a Waste 2.0" Infographic (to 2050)

Municipal Solid Waste (MSW)
- **2016**: approx. **2.01 billion** tonnes/year globally.
- **2050** projection: approx. **3.40–3.80 billion** tonnes/year.
  - Source: World Bank ("What a Waste 2.0") and UNEP Global Waste Management Outlook 2024

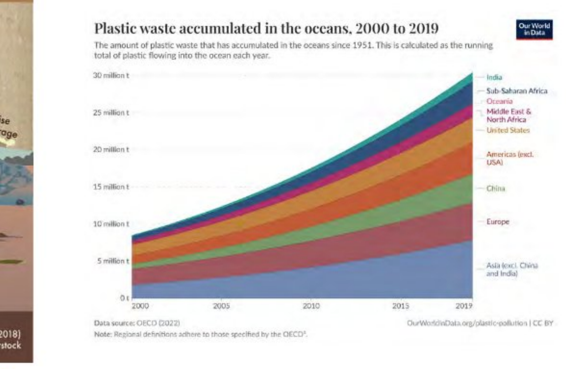
Plastic Waste & Production
- **1950** production: approx. **2 million** tonnes.
- **2019** production: approx. **460 million** tonnes annually.
- Cumulative by **2015**: approx. **8.3 billion** tonnes produced; **79% uncontained.**
- **2050** projected waste in landfill/environment: approx. **12 billion** tonnes.
  - Source: Geyer, Jambeck, Law 2017; Our World in Data; UNEP projections

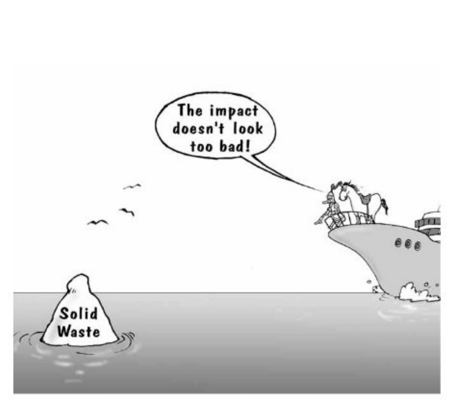
E-Waste
- **2019**: **53.6 million** tonnes.
- **2030** projection: approx. **74 million** tonnes.
  - Source: Global E-Waste Monitor 2020, updated data

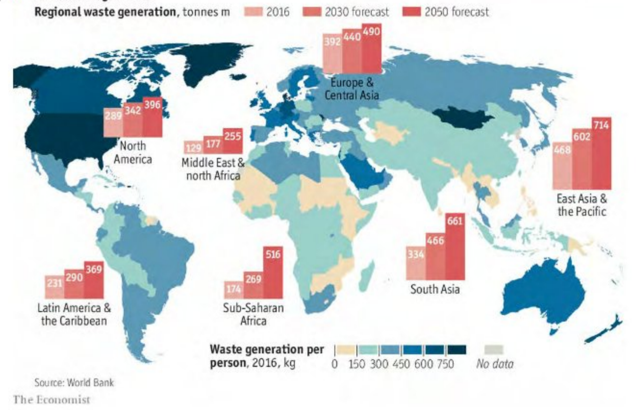
Plastic in Oceans
- **Current** leakage: approx. **11 million** tonnes/year.
- **2040** projection: up to **29 million** tonnes/year under business-as-usual.
  - Source: Pew & SYSTEMIQ via Our World in Data, Wired article

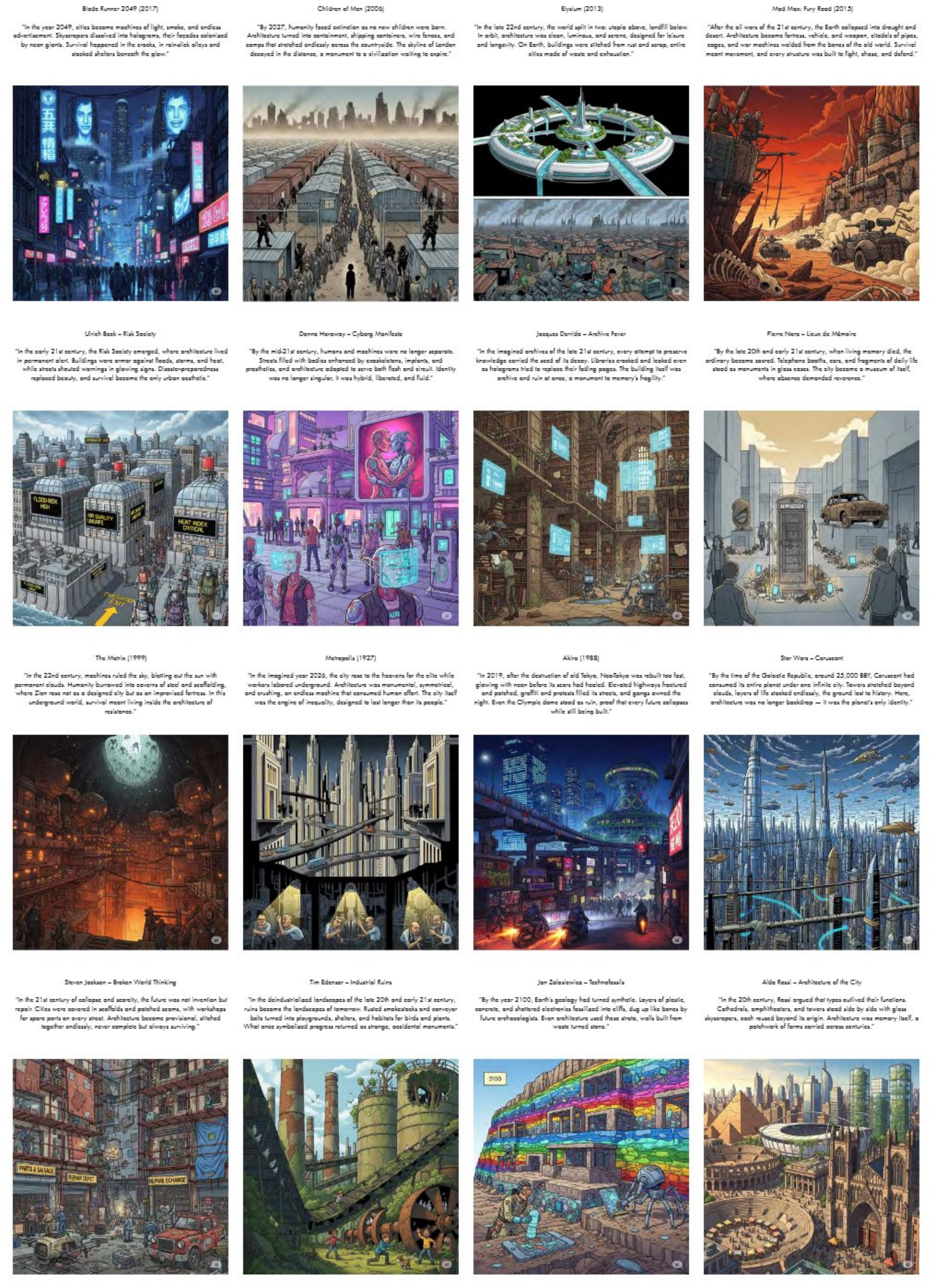
Economic Impact
- **2020** global MSW management cost: approx. **$252 billion**/year (22 lakh crore rupees); including externalities: **$361 billion** (31 lakh crore rupees).
- **2050** projection without action: **$640.3 billion**/year (56 lakh crore rupees).
  - Source: UNEP Global Waste Management Outlook 2024

Human Scale
- Per capita (**2016**): approx. **0.74 kg**/person/day rising from 0.74 to
- approx. **1.01 kg**/person/day.
- Gap by income level: High-income countries approx. 34% of waste production, though only 16% of population.
- Fastest growth in waste generation in low-income regions (expected to triple by 2050).
  - Source: World Bank, urban studies









WHAT?
"Not a building. A methodology for architecture when waste is the ground."

This thesis is not a single design.
It is a speculative methodology for making architecture when waste is no longer a problem "out there," but the ground condition of Earth. In such a world, the discipline pivots from adding new objects to learning from, building within, and building out of the waste strata we have already produced.

Technofossils : Jan Zalasiewicz
Waste is no longer a threat, it is geology. Plastics, alloys, e-waste, concrete rubble are layered into new strata. Architecture must design with and within these "technofossil horizons."

Broken-World Thinking : Steven J. Jackson
The future of design is not novelty but maintenance, patching, repair, salvage. Architecture must evolve to survive as long-duration repair cycles, not as pristine beginnings.

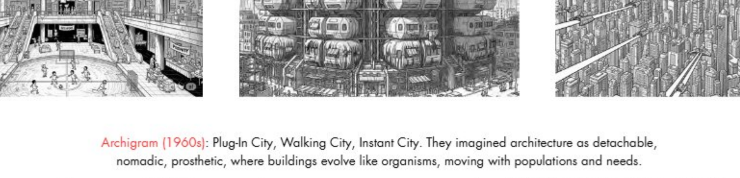
Futurist films:
Mortal Engines (moving cities),

Typology Outlasts Function : Aldo Rossi
Urban forms persist even as their functions mutate. In waste futures, the forms most resilient to drift survive: courtyards, markets, warehouses, adapted endlessly.

Metabolists (Japan, 1960s):
megastructures with plug-in capsules, anticipating future urban growth.

Futurist films:
Star Wars Coruscant (planet-city stratification)

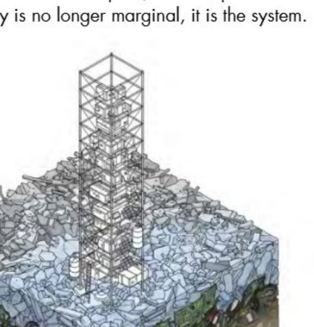
Archigram (1960s): Plug-In City, Walking City, Instant City. They imagined architecture as detachable, nomadic, prosthetic, where buildings evolve like organisms, moving with populations and needs.

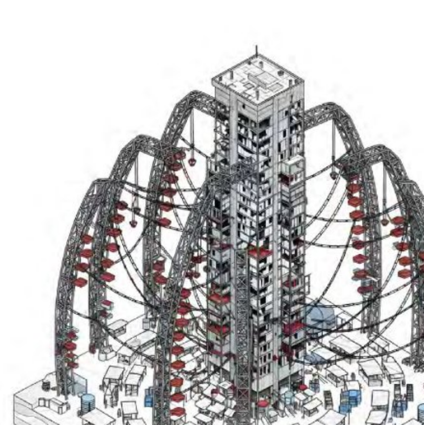


Together, these anchors justify the thesis as a speculative methodology, learning to design with geology, through repair, across changing typologies, and into modular futures.

2100 — GEOLOGY OF WASTE
Proto-Cores

By 2100, waste is not surface trash, it has become geology, forming new urban strata.
Carcasses are still occupied, but new proto-cores rise, salvaged spines where pods cluster vertically.
Informality is no longer marginal, it is the system.





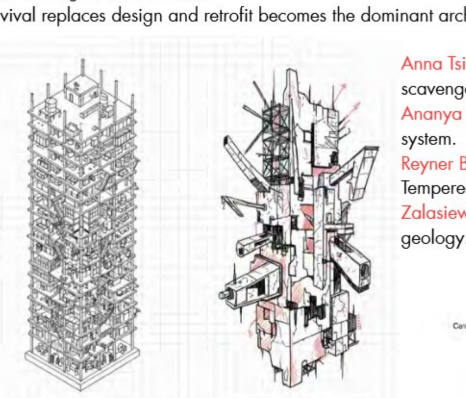
Zalasiewicz (Anthropocene / Technofossils) plastics and rubble enter Earth's stratigraphy.
Ananya Roy informality as a durable mode of urbanization.
AbdouMaliq Simone people as infrastructure: social networks sustain broken systems.
Anna Tsing salvage economies formalize into systemic value.
Ostrom (Commons Governance) pod guilds evolve into water councils and salvage unions.

Condition:
Carcasses still retrofitted, but new proto-cores emerge.
Steel lattice towers built from salvage act as spines for pod growth.
Typologies:
Pods clustered vertically on proto-cores.
Base-rings of barter markets and council halls.
Rope bridges, catwalks, pulley systems interconnect clusters.
Towers resemble scaffolds more than buildings, skeletal but alive.

Economy: Salvage is the normalized industry; barter and repair become city-scale systems.
Society: Guilds mature into councils (water, salvage, pod-rights); parallel governance entrenched.
Technology: High-tech islands vanish; bricolage and fragments dominate.
Waste/Ecology: Landfills are stratified geology; rubble and plastic horizons mined as quarries.
Health: Exposure shifts from interiors to waste landscapes (toxic mining, fumes).

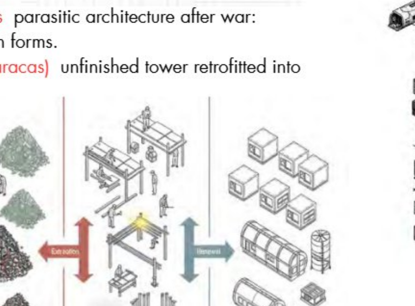
2075 — CRISIS RETROFITS
Carcasses, Pods, and Salvage Economies

Global supply chains collapse; waste accumulates into mountains.
The skeletons of 20th–21st century buildings remain standing, uninhabitable inside, but retrofitted outside with pods, fuselages, and scaffolds.
Survival replaces design and retrofit becomes the dominant architectural logic.

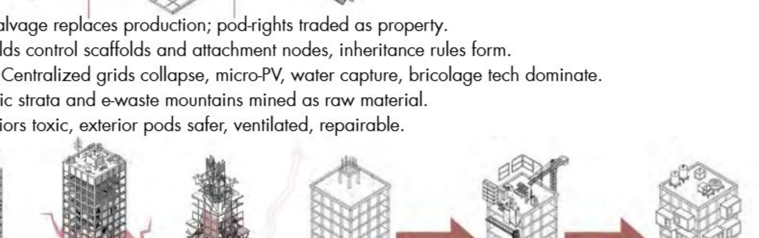


Anna Tsing Salvage Capitalism: value comes from scavenged fragments.
Ananya Roy Informality is not failure but an urban system.
Reyner Banham Survival tech > aesthetics (Well-Tempered Environment).
Zalasiewicz "technofossils": waste enters the Earth's geology.

Lebbeus Woods parasitic architecture after war: attach to broken forms.
Torre David (Caracas) unfinished tower retrofitted into vertical city.

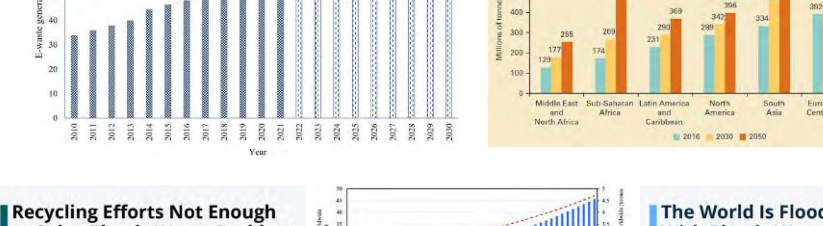


Economy: Salvage replaces production; pod-rights traded as property.
Society: Guilds control scaffolds and attachment nodes, inheritance rules form.
Technology: Centralized grids collapse, micro-PV, water capture, bricolage tech dominate.
Waste: Plastic strata and e-waste mountains mined as raw material.
Health: Interiors toxic, exterior pods safer, ventilated, repairable.



WHY?
Architecture cannot "solve" waste; it can design how we live with it, through repair, care, or memory inside the sites and systems we already broke.
Ulrich Beck (Risk Society): The 21st century is about living with risk, not eliminating it.
Donna Haraway: We must "stay with the trouble" — endure, adapt, and make kin with damaged worlds.
Instead of designing escape routes, we design ways of inhabiting the mess.

We're not in a problems to solutions era. We're in a risks to ongoing-negotiations era.
Risk Society, in one sentence. Modernization manufactures risks (pollution, waste, climate) that can't be fully eliminated; they must be continuously managed, socially, spatially, politically. That's Beck's thesis; it collapses the fantasy of definitive, technical "fixes."
Haraway's directive, stay with the trouble; make kin, not cleanse, is an ethic of situated care within damaged worlds. That's a perfect description of a repair-commons paradigm for architecture.
So the thesis reframes architecture's job: stop promising "endings" to crises; prototype modes of inhabitation inside them.



.....because every credible dataset says waste volumes, climate forcing from landfills, and digital-toxic churn will define urban life to 2050 and beyond. Beck tells you the era of "final solutions" is over; Haraway tells you to stay put and care. Therefore, design the spaces, tools, and rituals to live well inside waste: the repair commons.

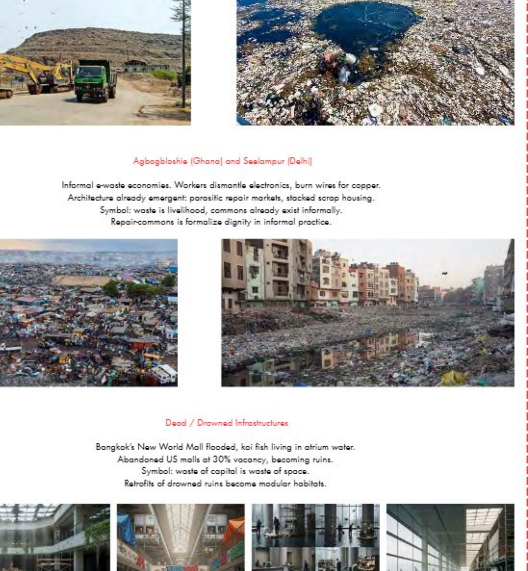
WHERE?
Nowhere and Everywhere. Because in the coming century, everywhere becomes landfill, scrapyard, or drowned ruin. Context collapses into sameness. That's why this architecture is modular and site-fluid: it inhabits any waste landscape, because every place is becoming one. So, this Design is not about "where," but about "how to slot in."

Ghaziabad Landfill (India)
65m high, taller than Qutub Minar.
Emits methane fires so intense they're visible at night.
Landfill as urban mountain.
Future architecture would be carved inside waste, not on top of tabula rasa. (blank slate)

Great Pacific Garbage Patch (Ocean)
Size: approx. 1.6 million km² (3x France).
Plastic micro-ecologies: floating fishing nets colonized by crabs, microbes.
Symbol: garbage becomes continent, waste is floating ground.
Architecture could be amphibious, modular, buoyant.

Agbogbloshie (Ghana) and Seelampur (Delhi)
Informal e-waste economies. Workers dismantle electronics, burn wires for copper.
Architecture already emergent: parasitic repair markets, stacked scrap housing.
Symbol: waste is livelihood, commons already exist informally.
Repair-commons is formalize dignity in informal practice.

Dead / Drowned Infrastructures
Bangkok's New World Mall flooded, koi fish living in atrium water.
Abandoned US malls at 30% vacancy, becoming ruins.
Symbol: waste of capital is waste of space.
Retrofits of drowned ruins become modular habitats.



MOVIE ANCHORS

WALL-E (2008, Pixar)
Anchor: memory and care persist inside waste when humans forget.
Architecture Lens: stacked trash cubes as new geological strata, small repair-commons as life-sustaining units.
Why it matters: the most accessible cultural symbol of living inside waste.

Snowpiercer (2013, Bong Joon-ho)
Anchor: survival inside a closed, ruined ecosystem where class, power, and waste are distributed along a single machine.
Architecture Lens: modular compartments, adaptive interiors, parasitic infrastructures in motion.
Why it matters: allegory for risk society → no escape, only managed ruin.

Blade Runner 2049 (2017, Denis Villeneuve)
Anchor: vast ruins, endless scrapyards, collapsed cities.
Architecture Lens: monumental wastelands of junk (Las Vegas ruins, San Diego dump), fragile commons carved from debris.
Why it matters: cinematic vocabulary of post-capitalist ruins and their affective scale.

Mad Max: Fury Road (2015, George Miller)
Anchor: bricolage survival architecture: vehicles, scaffolds, citadels made entirely from waste and scrap.
Architecture Lens: adaptive, parasitic, nomadic commons built from ruins.
Why it matters: shows repair and improvisation as survival logics.

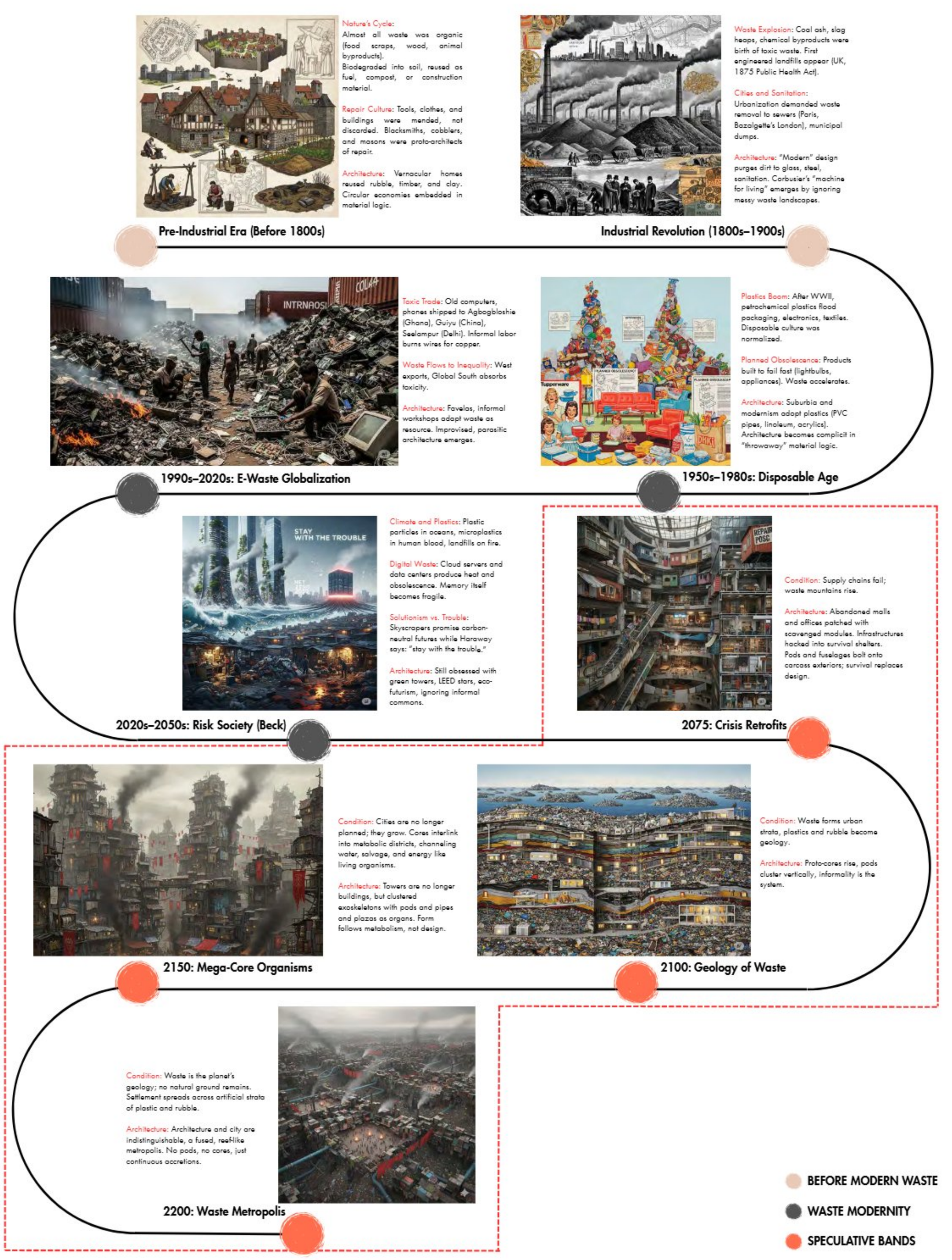
THEORETICAL ANCHORS
Alan Berger (Drosscape): waste landscapes as emergent design fields.
Jennifer Gabrys (Digital Rubbish): infrastructures of obsolescence is new material reality.
Tim Edensor (Industrial Ruins): ruins as productive, affective ecologies.
Donna Haraway (Staying with the Trouble): no purity, live with trouble.
Cedric Price (Plug-in City): architecture as modular futures.
Gaia Engine Thesis: speculative modular architecture for planetary crisis.

Everywhere is Waste:
By 2050, world generates 3.4 billion tonnes MSW/year (World Bank).
Plastics nearly triple by 2060, <20% recycled (OECD).
E-waste: 62 Mt in 2022 to 82 Mt by 2030, recycling falling to ~20% (UN/ITU).
Implication: all landscapes absorb waste, no "pure" ground left.

Site is Distributed:
The "where" isn't fixed geography. It's networked hotspots, landfills, patches, scrapyards.
Together, they form one global waste-ecology.

Architecture Response:
Not site-specific, instead site-fluid.
Modular, parasitic, detachable units that adapt to landfill slope, floating patch, ruined atrium, scrapyard edge.
Plug-in, repair, scaffold, detach.

WHEN?



City of anarchy

FLOATING CITY

Adeyemi's vision for a floating city of low-cost sustainable floating homes to address the flooding that affects hundreds of thousands of people along Nigeria's coast. The buildings have a pyramid timber frame to provide a low centre of gravity, protecting them from high winds, and are suspended on more than 250 recycled barrels. Photograph: PR

SPIDER MAN

Spider man: in 2010, Spanish architect Santiago Cirugeda squatted this disused wasteland and established the Big Top, a self-built community centre. Working with volunteers and waste materials, it took five people two days to erect this building, known as the Spider. Photograph: PR

ELEVATED FLOOD SHELTER

Above it all: Yasmeen Lari, pictured in front of her elevated flood shelter, designed as a response to the 2010 floods in Pakistan, which hit more than 14 million people. Open-sided ground floors allow water to flow up to a height of 7ft, while space on top provides shelter for 20 people and their belongings in case of disaster. Photograph: PR

KOWLOON CITY

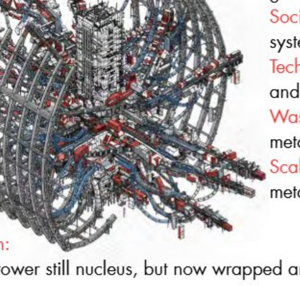
At its peak, Kowloon Walled City was home to around 50,000 people crammed into just 2.6 hectares, making it the densest urban settlement in history. Built incrementally without state control, the city became a vertical maze of over 300 interconnected high-rises stitched together by bridges, ladders, and shared circulation paths. Tiny apartments, workshops, clinics, and factories coexisted in layers of parasitic construction, often blocking out natural light. Despite its chaotic appearance, the city functioned with its own systems of repair, adaptation, and community self-organization. Its architecture, grown out of necessity, embodied density, bricolage, and survival, a city-as-commons made entirely from improvisation.

FAVELAS IN BRAZIL

Favelas emerged on the steep hillsides of Brazilian cities in the late 19th and 20th centuries, built by marginalized communities excluded from formal housing. Over decades, they developed into dense, self-built urban fabrics where homes are incrementally expanded using brick, concrete, and recycled materials. Pathways wind through stacked houses, with parasitic extensions cantilevered over alleys and rooftops converted into additional living spaces. Favelas operate as vibrant ecosystems of survival, where informal economies, from repair shops to street markets, anchor community life. Though stigmatized as "slums," their architecture demonstrates resilience, adaptability, and the collective intelligence of improvised commons.

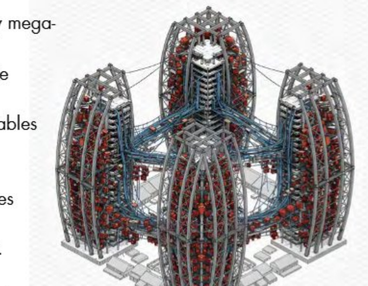
2150 — MEGA-CORE ORGANISM
Clusters and Metabolism

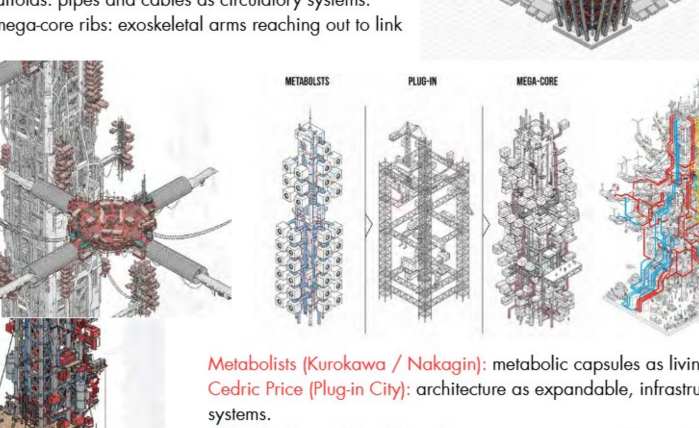
By 2150, proto-cores have expanded into mega-core clusters, branching spines wrapped in pods, cables, and scaffolds that interconnect across landscapes.
These are no longer isolated scaffolds, they behave like organisms, circulating water, salvage, and energy through vascular systems.
Architecture has become metabolic infrastructure, not just survival shelter.



Economy: Salvage unions becomes resource syndicates and guilds federate across cores.
Society: Pod inheritance and attachment rights become proto-legal systems.
Technology: Pipes, cables, pulleys act as vascular systems, solar and salvage energy flows.
Waste/Ecology: Waste geology mined systematically, mega-cores metabolize waste into usable fragments.
Scale: Multiple cores cluster, stitched by scaffold bridges and metabolic flows, proto-city emerging.

Condition:
Carcass tower still nucleus, but now wrapped and eclipsed by mega-core ribs.
Branching spines interconnect to a cluster network, not a single vertical.
Flows (water, salvage, energy) define structure to pipes and cables run visibly.
Typologies:
Truss-junction plazas: suspended communal nodes where spines intersect.
Pod alveoli clusters: dense swarms, hive-like, breathing in/out.
Vascular scaffolds: pipes and cables as circulatory systems.
Branching mega-core ribs: exoskeletal arms reaching out to link clusters.

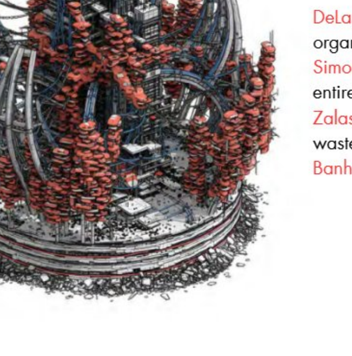




Metabolists (Kurokawa / Nakagin): metabolic capsules as living units.
Cedric Price (Plug-in City): architecture as expandable, infrastructural systems.
DeLanda (Assemblage Theory): mega-cores as assemblages of humans, waste, flows.
Simone (People as Infrastructure): inter-core networks of labor and exchange.
Banham: architecture is survival services made visible (pipes, ducts, scaffolds).

2200 — WASTE METROPOLIS
Continuous Organisms of Survival

By 2200, clusters of mega-cores have fused into sprawling waste metropolises.
The ground is no longer soil but plastic strata and rubble bedrock,
architecture grows directly from this geology.
Informality is no longer outside the system, it is the system, governing how life is metabolized across the city.



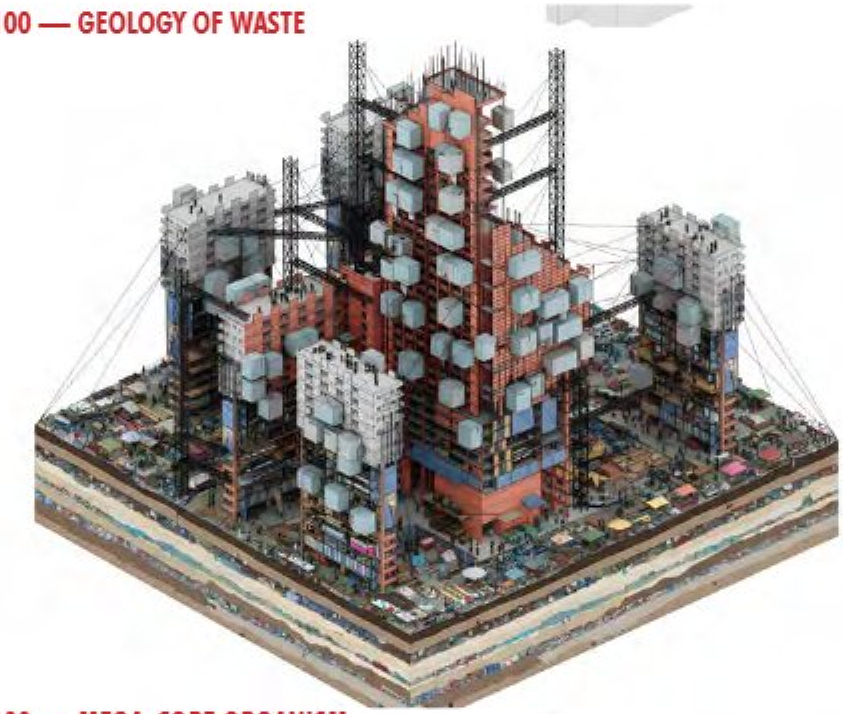
Mike Davis (Planet of Slums): informal growth as the dominant urban condition.
DeLanda (Assemblage Theory): cities as hybrid organisms of humans and nonhumans with flows.
Simone: 'people as infrastructure' is now scaled to entire urban metabolisms.
Zalasiewicz (Anthropocene geology): plastics and waste as permanent strata.
Banham: architecture defined by systems, not style.

Economy: Guilds to institutions, resource syndicates govern whole regions.
Society: Pod inheritance becomes law and rituals codify pod-attachments and rights.
Technology: Metabolic infrastructure are pipes, ducts, salvage circulatory systems. No centralized grids, only distributed flows.
Waste/Ecology: Landfills are bedrock, geology is artificial, rubble and plastic mined as stone.
Scale: Not clusters anymore but continuous, reef-like urban fabric, sprawling horizontally and vertically.

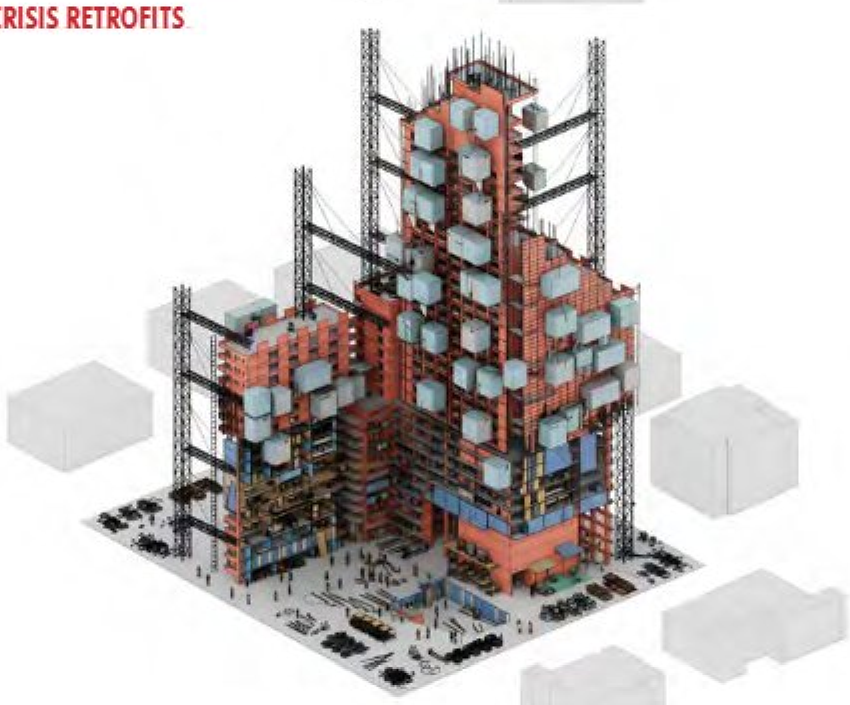
Condition:
Mega-core clusters merge, boundaries blur.
Pods no longer 'attachments' but they fuse into continuous blocks, indistinguishable from structure.
Carcass towers are fully subsumed, still present as hidden skeletons.
Typologies:
City: dense accretions of pods, ducts, scaffold-plazas, pipes.
Metabolic boulevards: infrastructural arteries carrying resources across the metropolis.
Strata foundations: plastic-rubble bedrock quarried and layered as new ground.
Hive districts: indistinct divisions of pods, blending into organism-like density.

2025

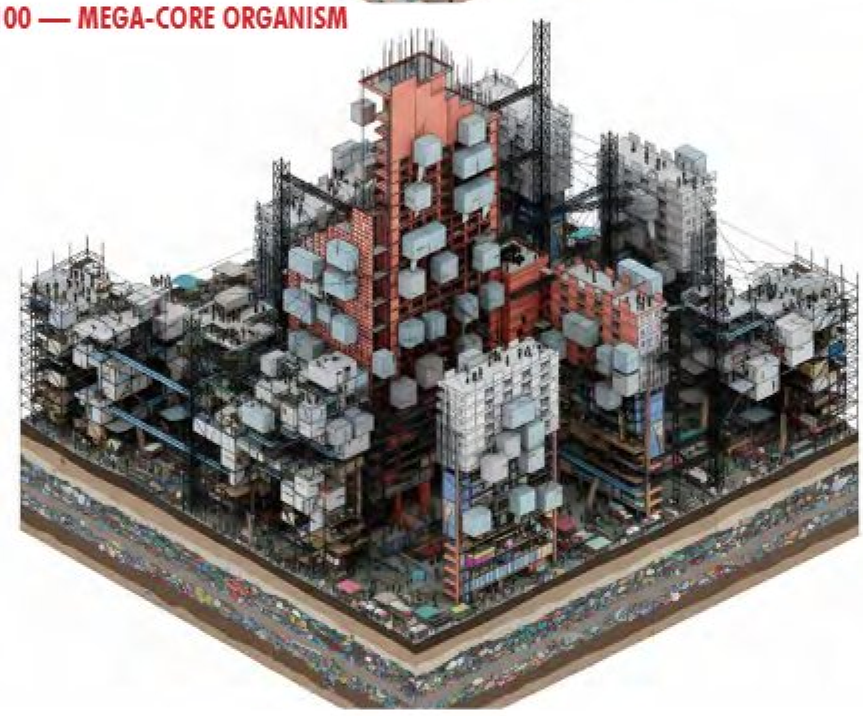
2100 — GEOLOGY OF WASTE



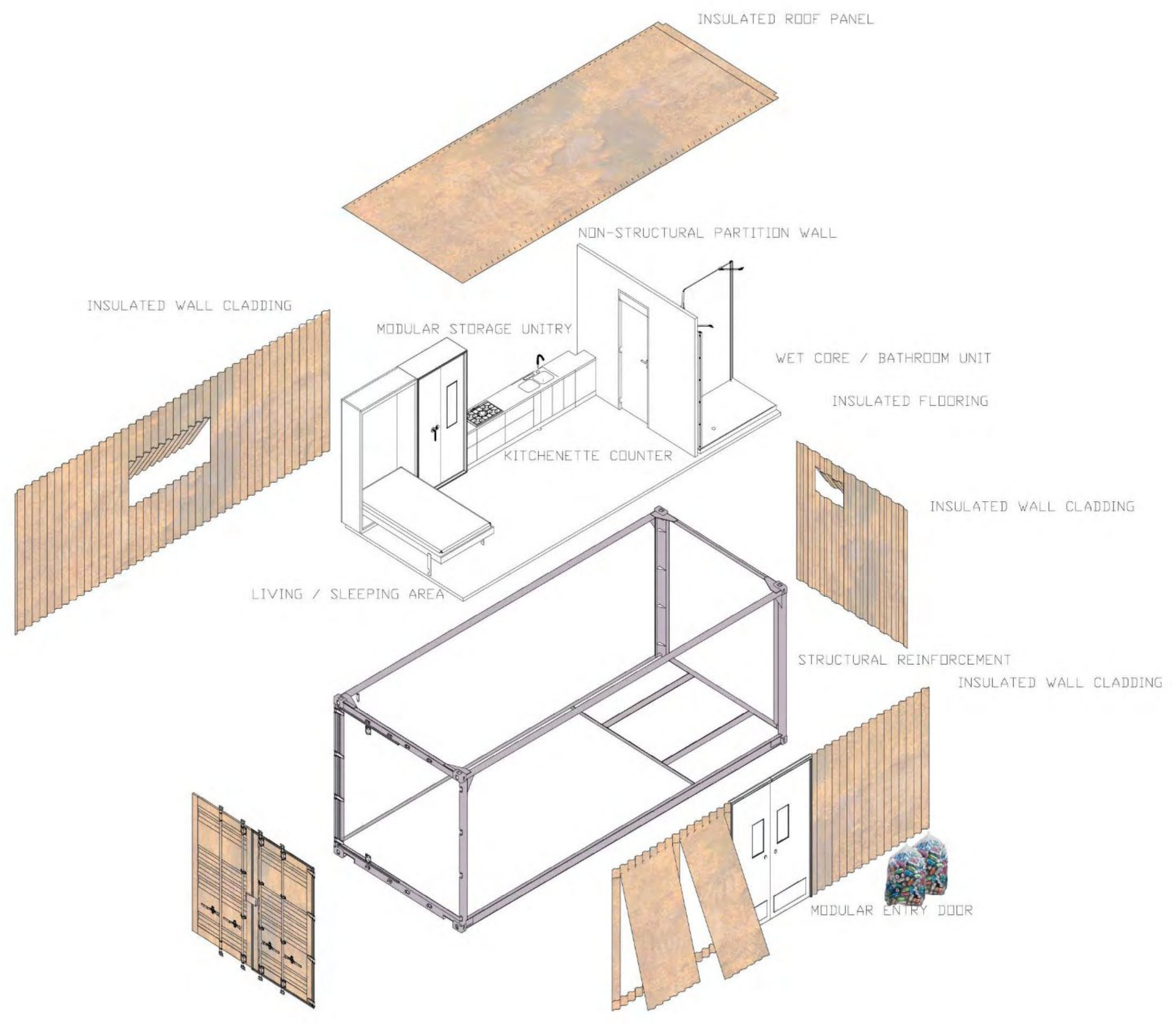
2075 — CRISIS RETROFITS



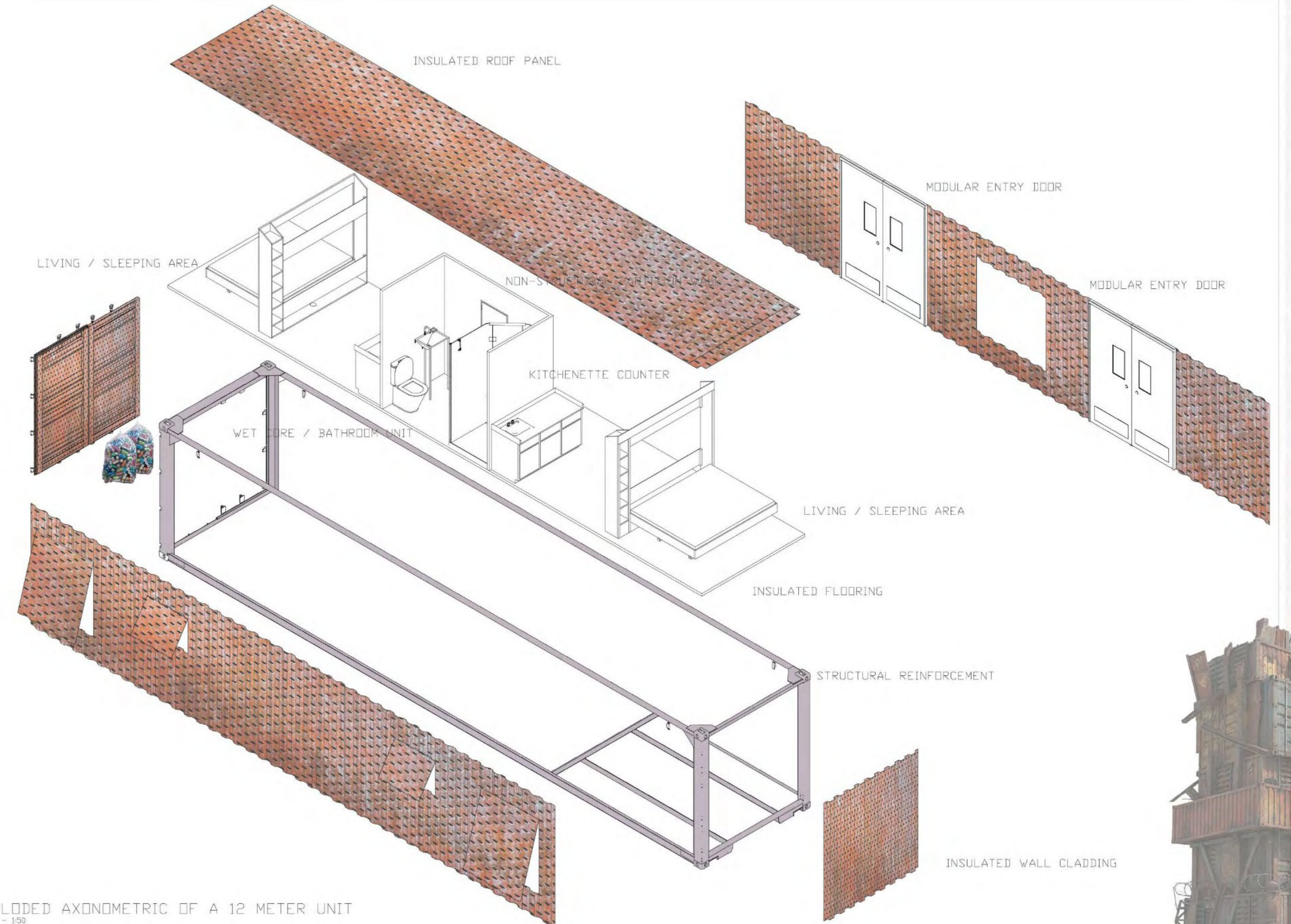
2100 — MEGA-CORE ORGANISM



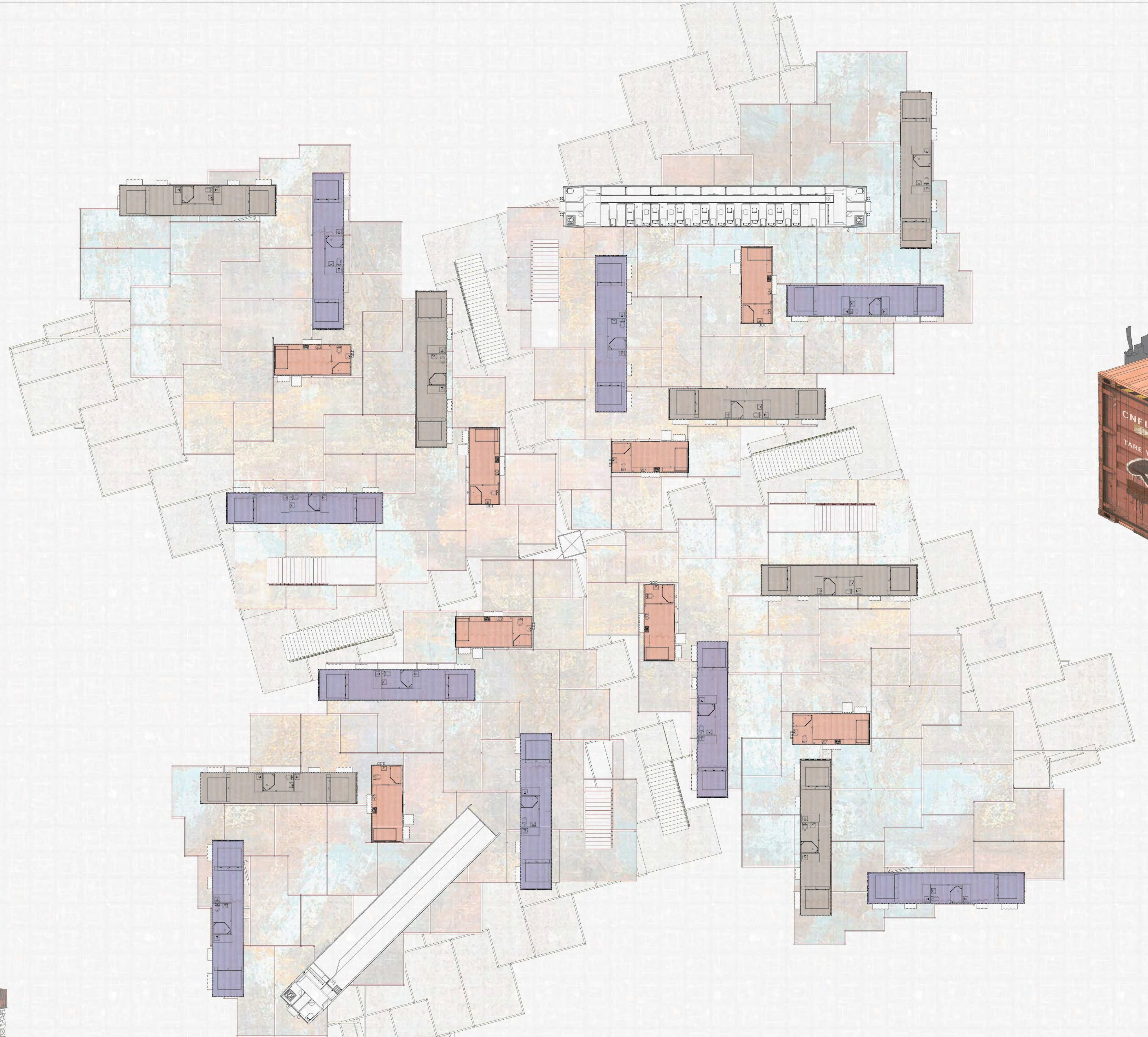
2200 — WASTE METROPOLIS



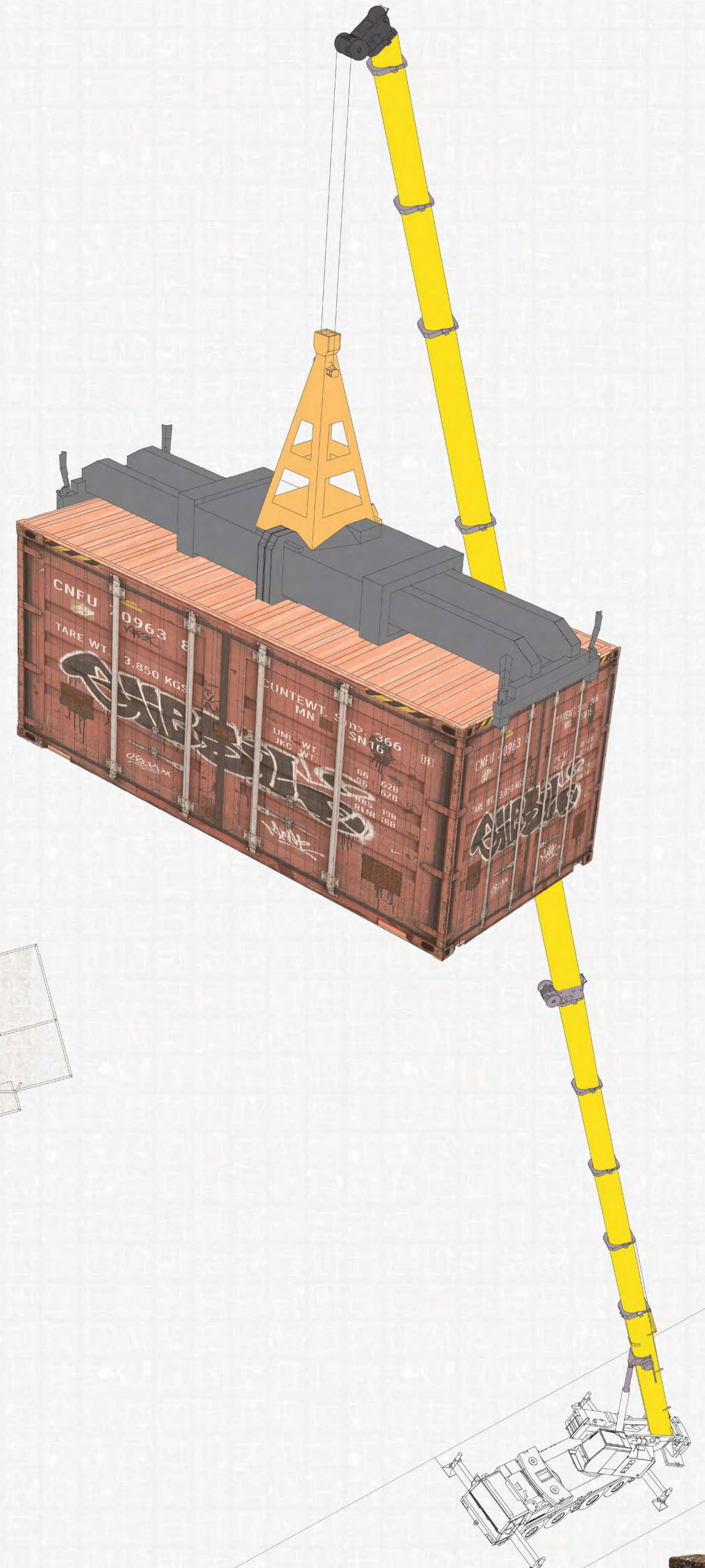
EXPLODED AXONOMETRIC OF A 6 METER UNIT
SCALE - 1:50

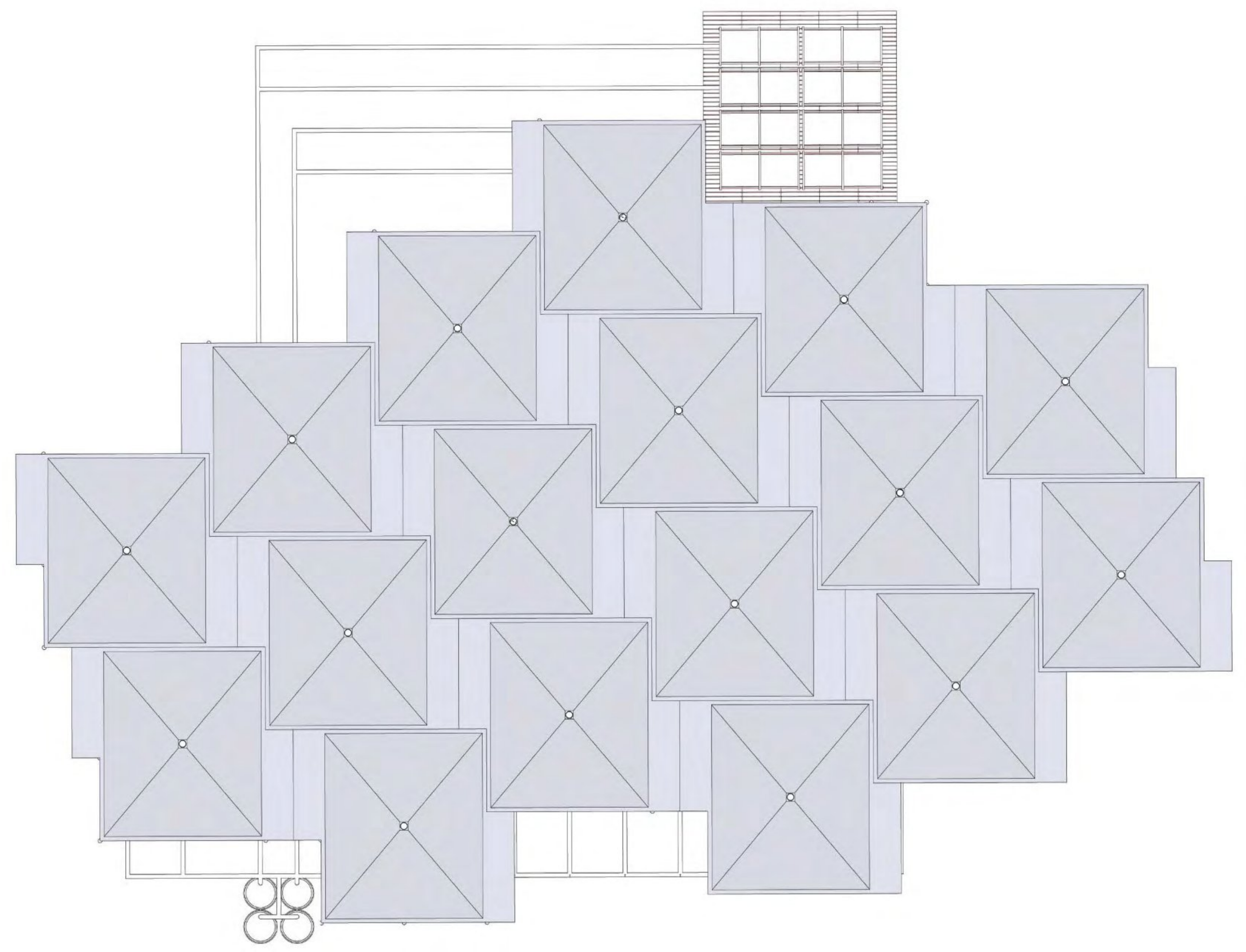


EXPLODED AXONOMETRIC OF A 12 METER UNIT
SCALE - 1:50

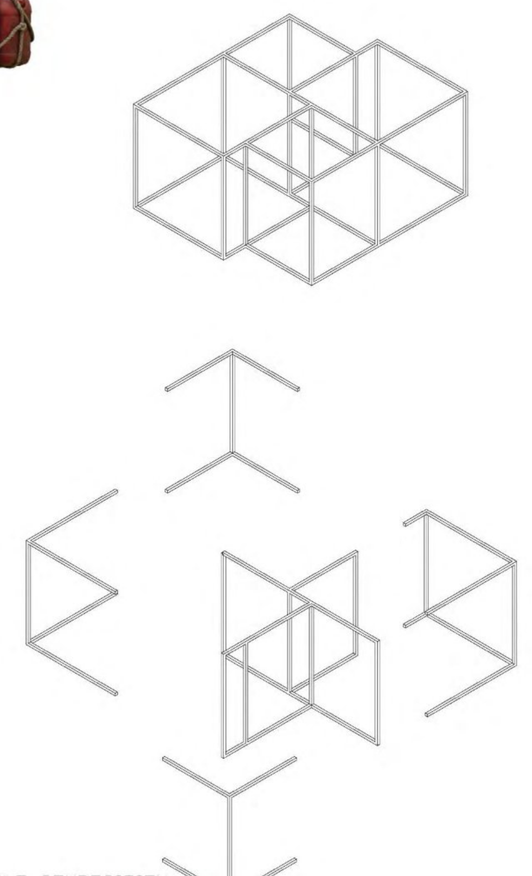


PLAN AT 4500 MM
SCALE - 1:100

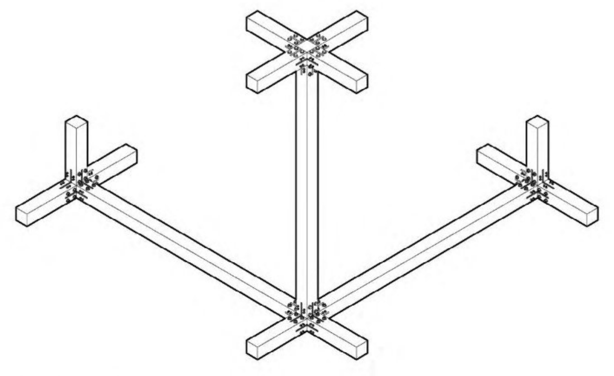




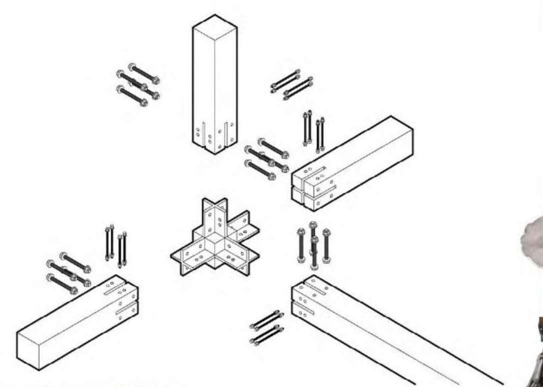
ROOF PLAN OF 1 MODULE SHOWING TANKS AND SAND-CHARCOAL FILTER
SCALE - 1:75



MODULE COMPOSITION
SCALE - 1:100



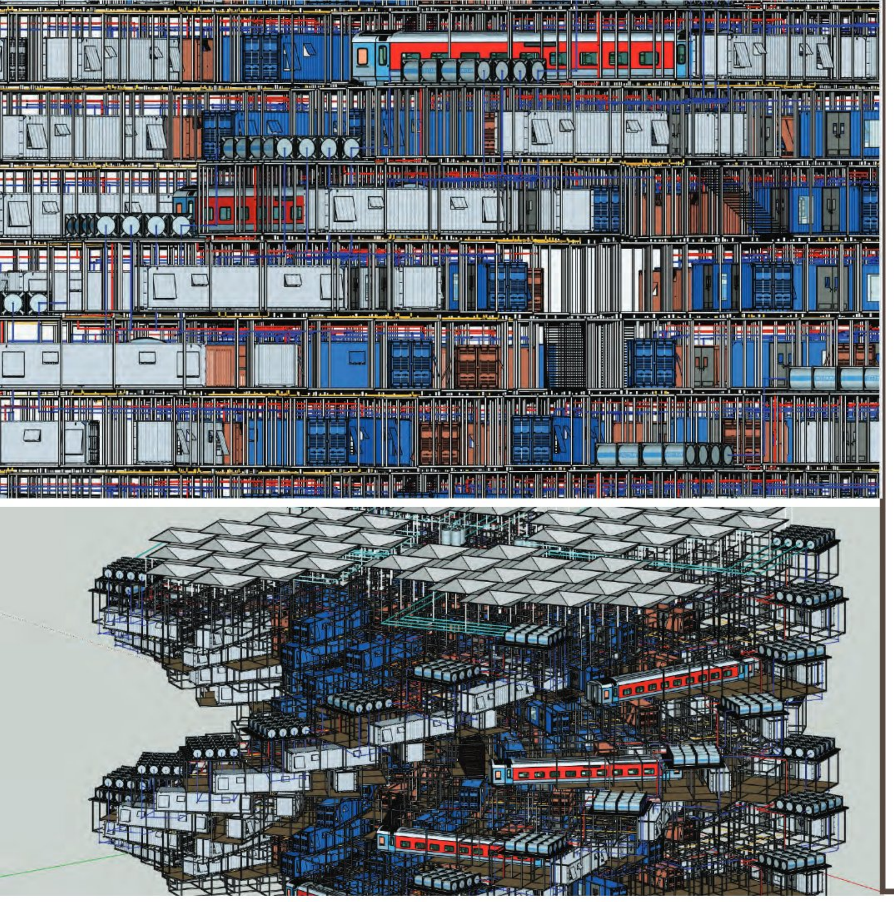
JOINERY DETAIL
SCALE - 1:20

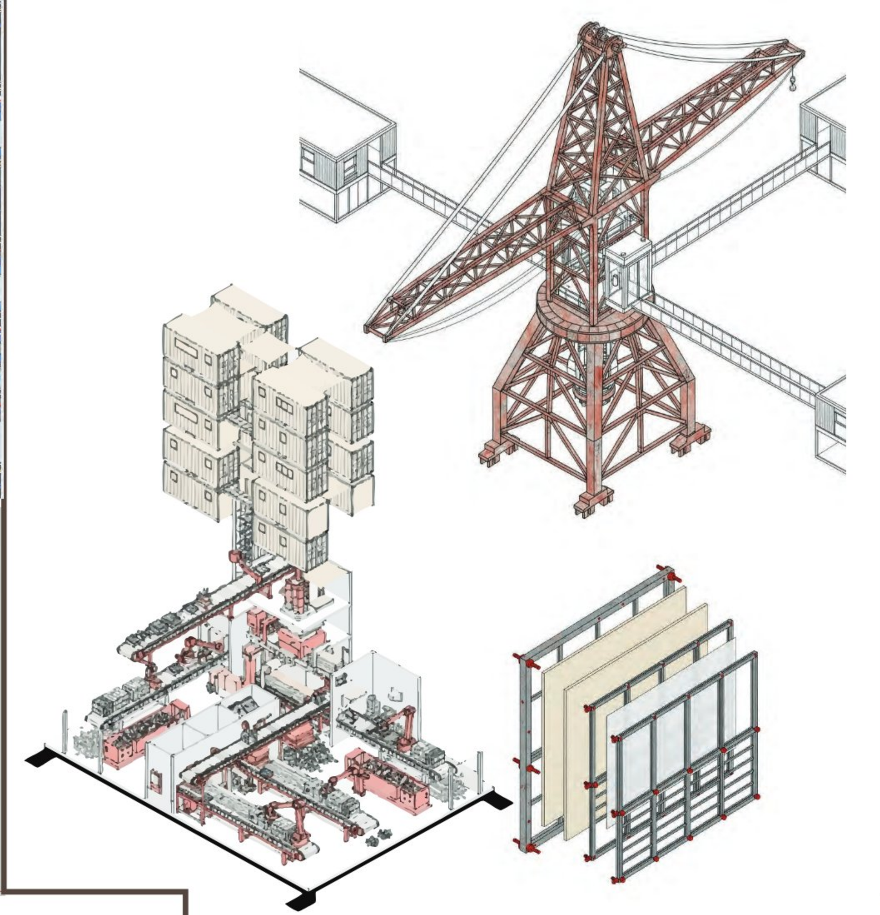


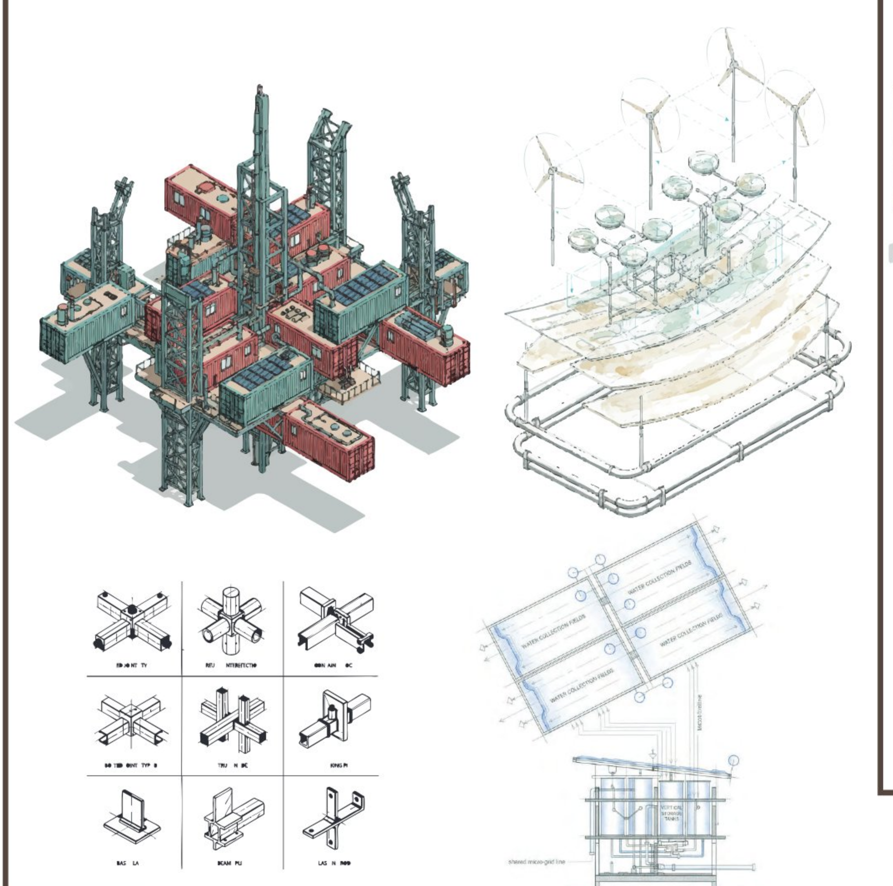
EXPLODED JOINERY DETAIL
SCALE - 1:10

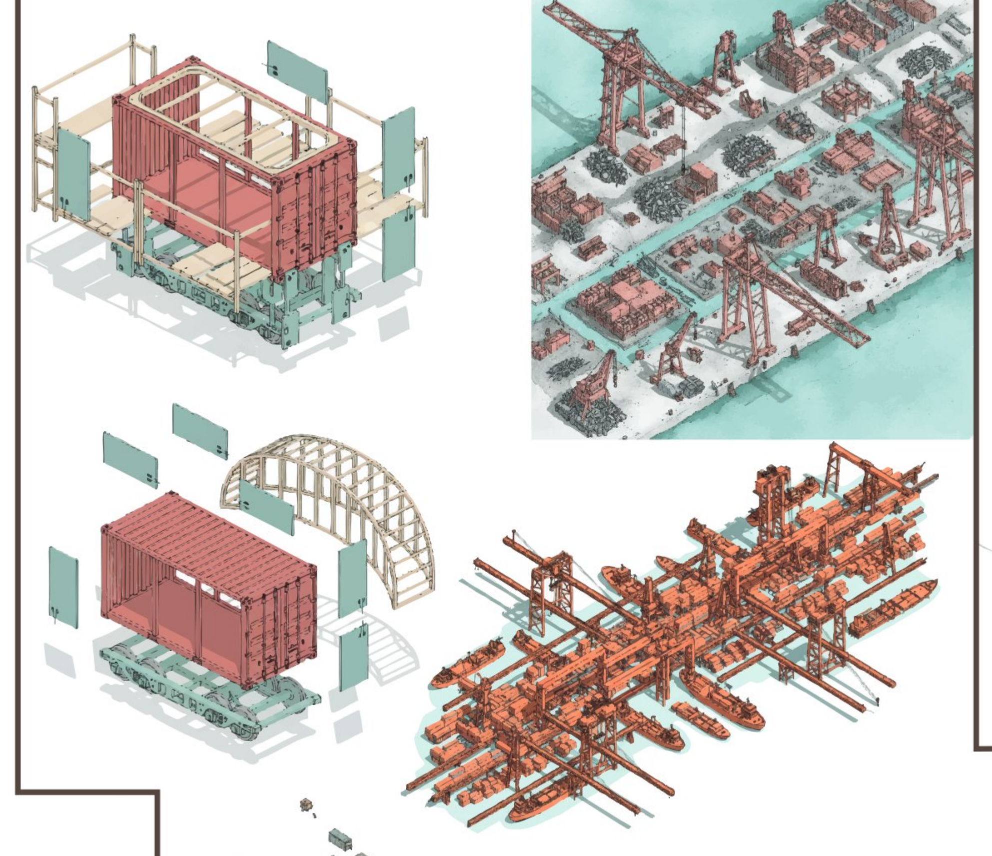
Axonometric Sectional Projections

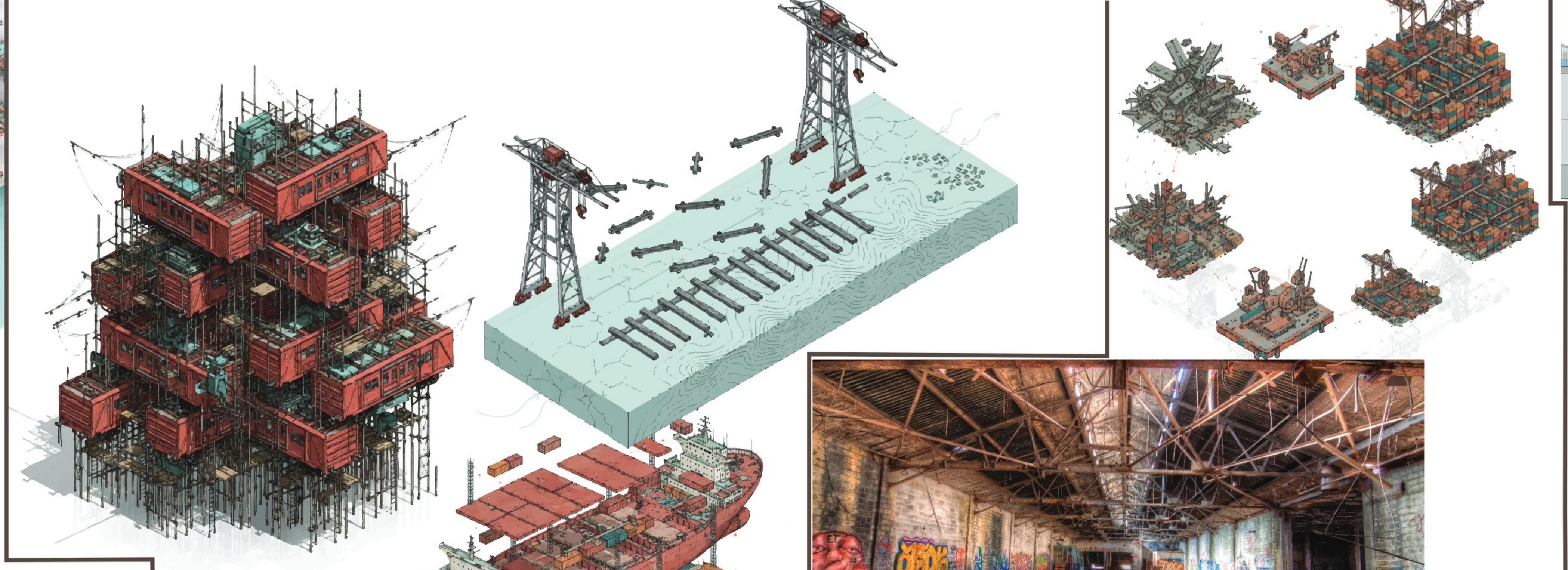
Scale 1:100

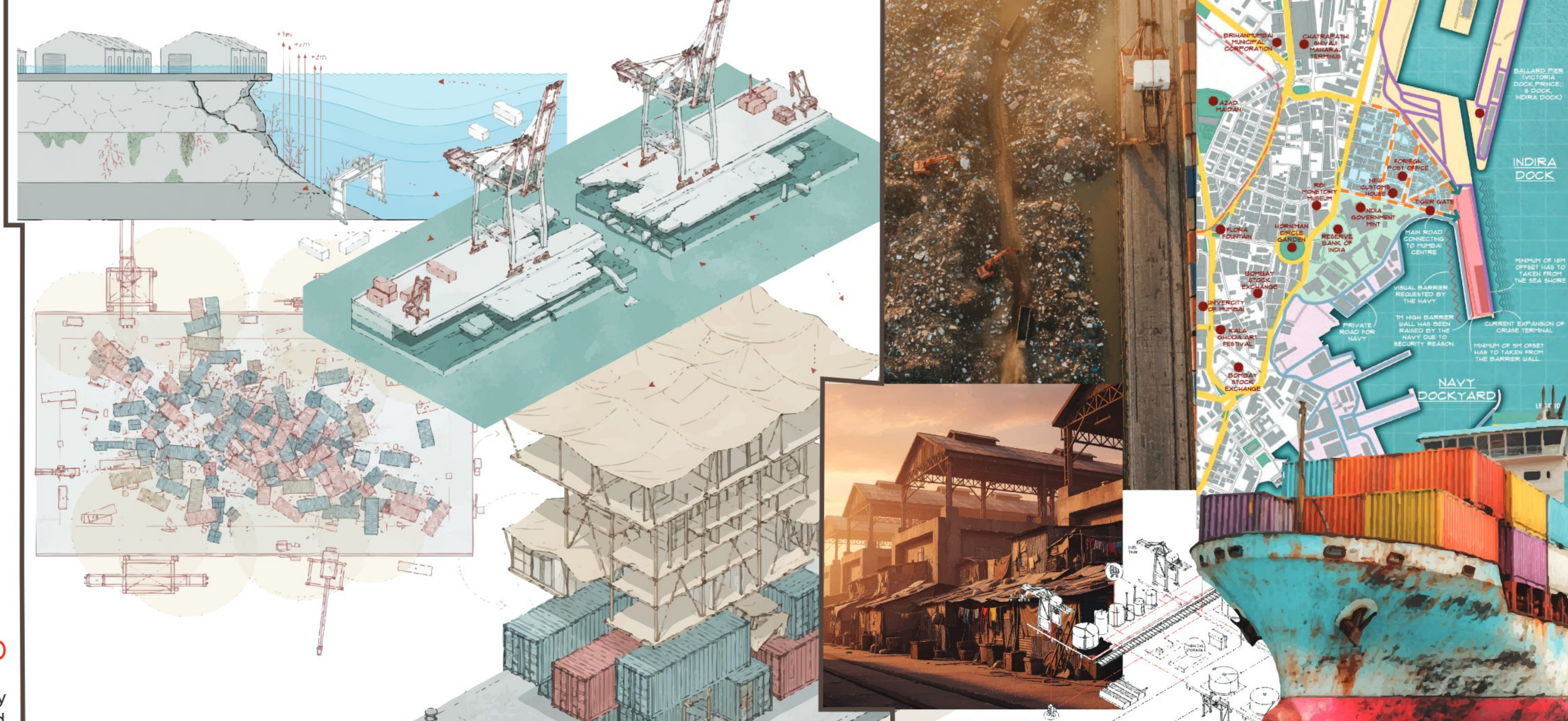












2025_2030

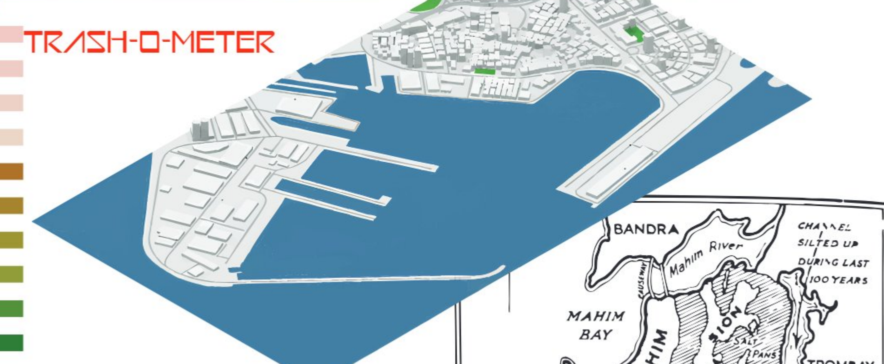
Mumbai Port operational with regular container trade; Indira Dock and Victoria Dock still active.

Standard concrete steel architecture dominates construction.

Waste management functional but inefficient, landfill overflow beginning near Deonar and Mankhurd.

Informal waste workers occupy peripheral dock spaces; early scavenging networks form.

Port machinery aging, but replacement postponed due to budget redirection toward inland infrastructure.



2030_2040

Global shipping insurance premiums rise due to increased cyclone activity in the Arabian Sea.

Mumbai Port Trust delays dredging and quay wall maintenance, gradual functional decline.

Coastal flooding damages low-lying warehouses annually.

Private logistics begin shifting to Gujarat's Dholera Port; Mumbai's throughput drops.

Accumulation of disused containers begins at Indira Dock yards.

Informal settlements emerge around storage zones, live-work units built from damaged containers and scaffolded sheets.

2040_2050

Two major flood events submerge portions of the old dock area, repairs only partially completed.

Government privatization plans stall, operations run on reduced capacity.

By 2048 major carriers redirect routes to Oman and East Africa.

Indira Dock becomes a static storage yard, thousands of containers remain immobile.

Small-scale reuse begins, containers converted into housing, canteens, and workshops.

Parallel trend: decline in new construction due to cost inflation in concrete and steel.

Recycling markets stabilize, scrap steel, shipping panels, and timber from pallets become building stock.

2050_2060

Suburban dock-branch railway suspended (2057) after multiple track failures.

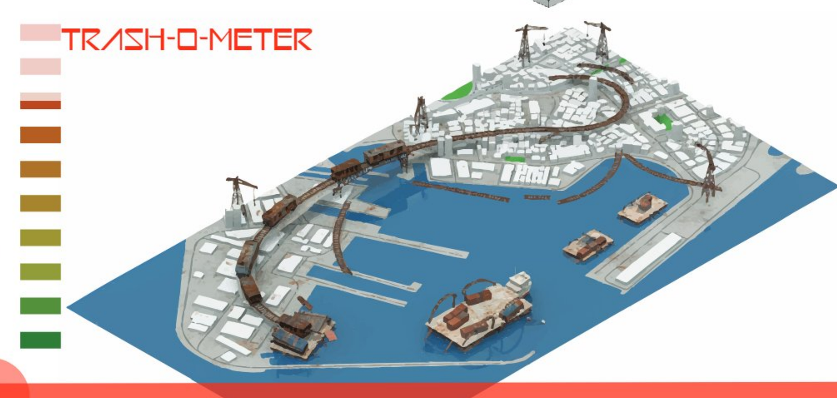
Abandoned train bogeys repurposed by nearby worker communities.

Freight and passenger services cease beyond Cotton Green tracks reclaimed for temporary shelters and workshops.

National policy shift: new "Material Levy Act" (2060) taxes virgin concrete to promote recycled alternatives.

Adaptive reuse becomes a necessity, not ideology.

Disused ships stripped for structural steel and floating platforms.



2060_2070

Formal acknowledgment of the reuse economy by BMC (Municipal Corporation).

"Reforge Yards" established near Mazgaon for controlled dismantling and refabrication.

2066: Modular Registration Act standardizes dimensions of reused units (containers, bogeys, ship ribs).

2067: Interface Plate Standard introduced, enabling cross-assembly between different salvaged components.

The first experimental hybrid units appear, stacked container, bogey assemblies forming semi-permanent structures.

Architectural education begins documenting this as a new typology: modular adaptive habitat.

2070_2080

Rising sea levels partially reclaim old dock edges; flood mitigation abandoned.

Residents build elevated platforms using bolted steel lattice frames.

Roof harvesters and micro wind turbines integrated into units for water and energy independence.

Docklands evolve into semi-autonomous zones disconnected from city grid systems.

2075: Official reclassification of dock precincts as self-sustaining reclamation districts.

Material circularity becomes the basis of design, every component reused, reassembled, or traded.

2080_2090

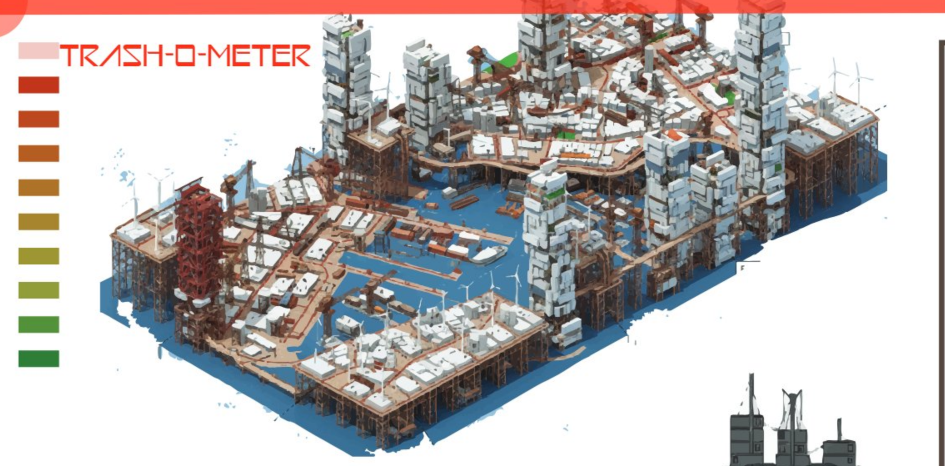
Layers of reused material accumulate, lower strata of older units, upper strata of lighter assemblies.

Waste-sorting facilities integrated into the architecture itself.

Local manufacturing uses recovered plastics, e-waste metals, and composite panels.

Old cranes retrofitted into vertical transit cores and observation points.

Docklands begin to function as independent vertical neighborhoods, housing, workspaces, energy loops, all embedded in repurposed infrastructure.



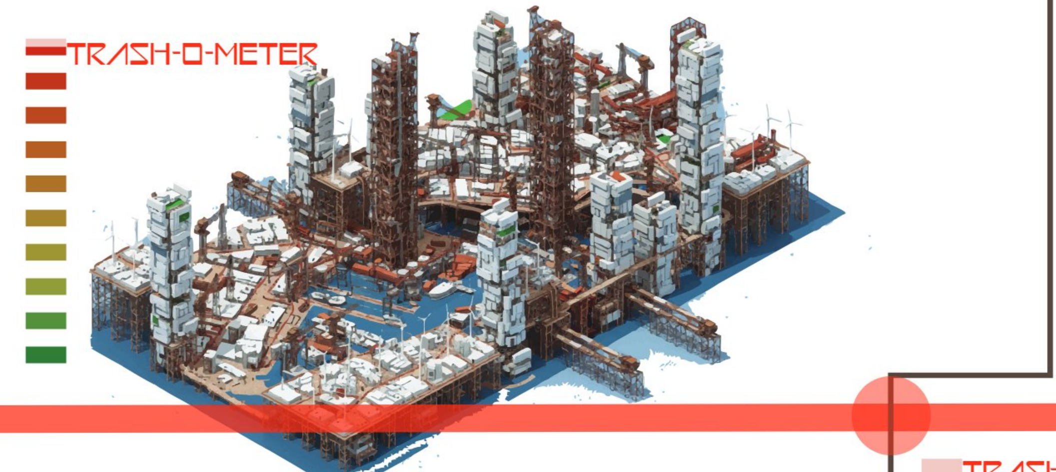
2090_2100

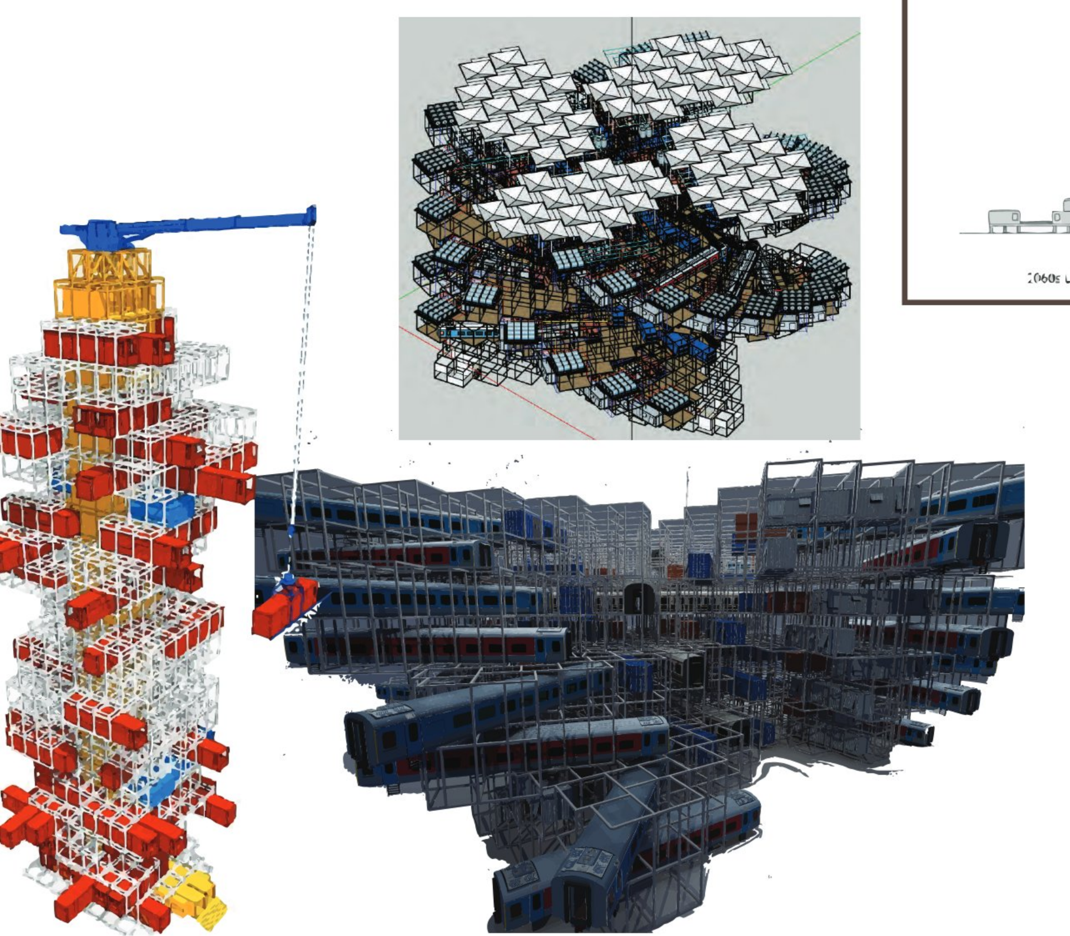
The reuse system achieves near-total autonomy.

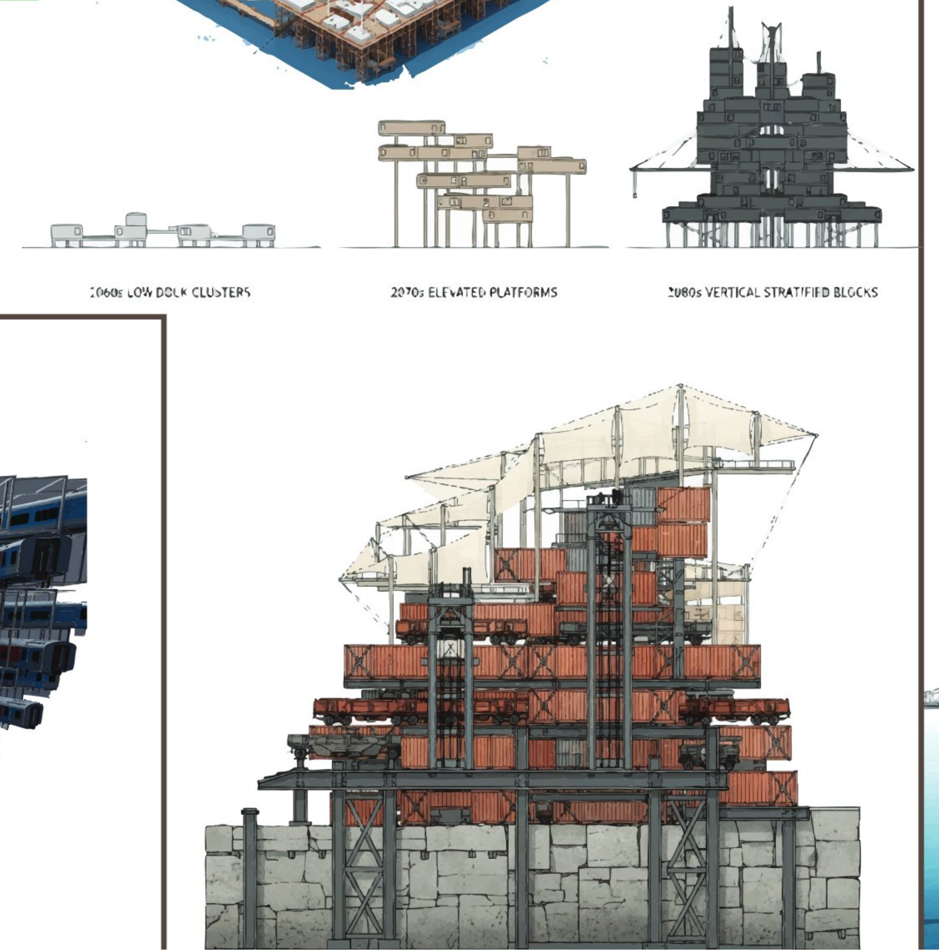
City core gentrifies; docklands remain self-sufficient.

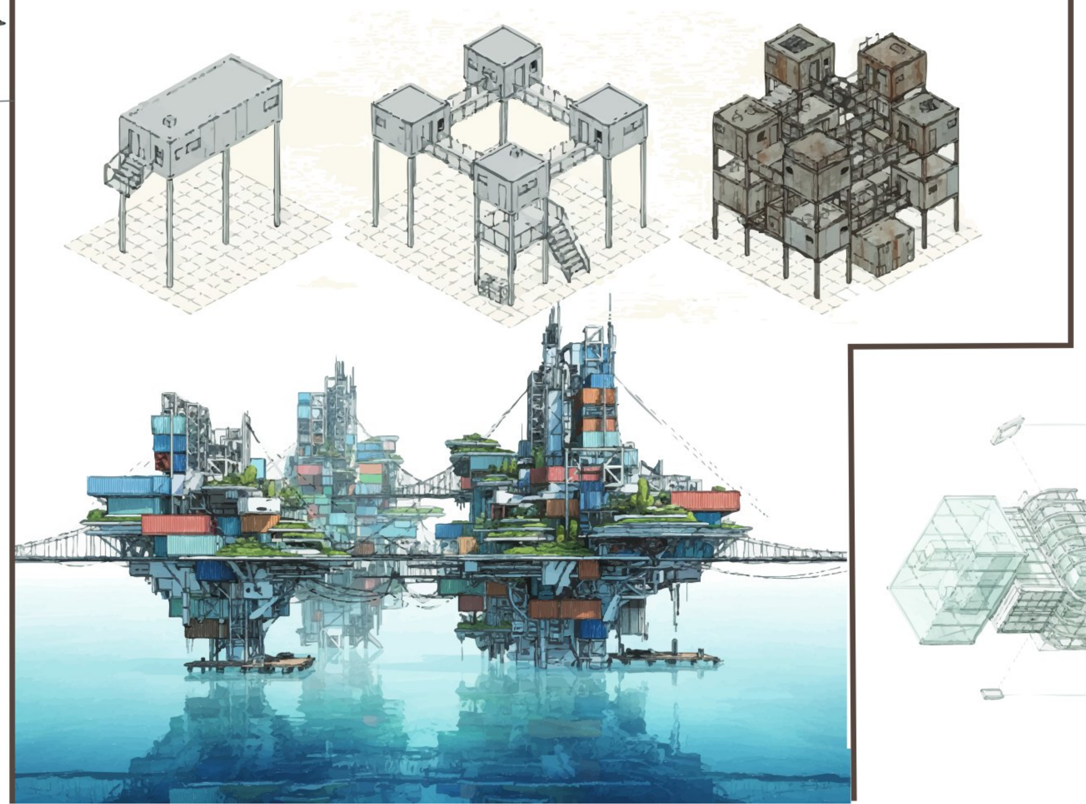
Remaining open water infilled with compacted debris and converted to structural base.

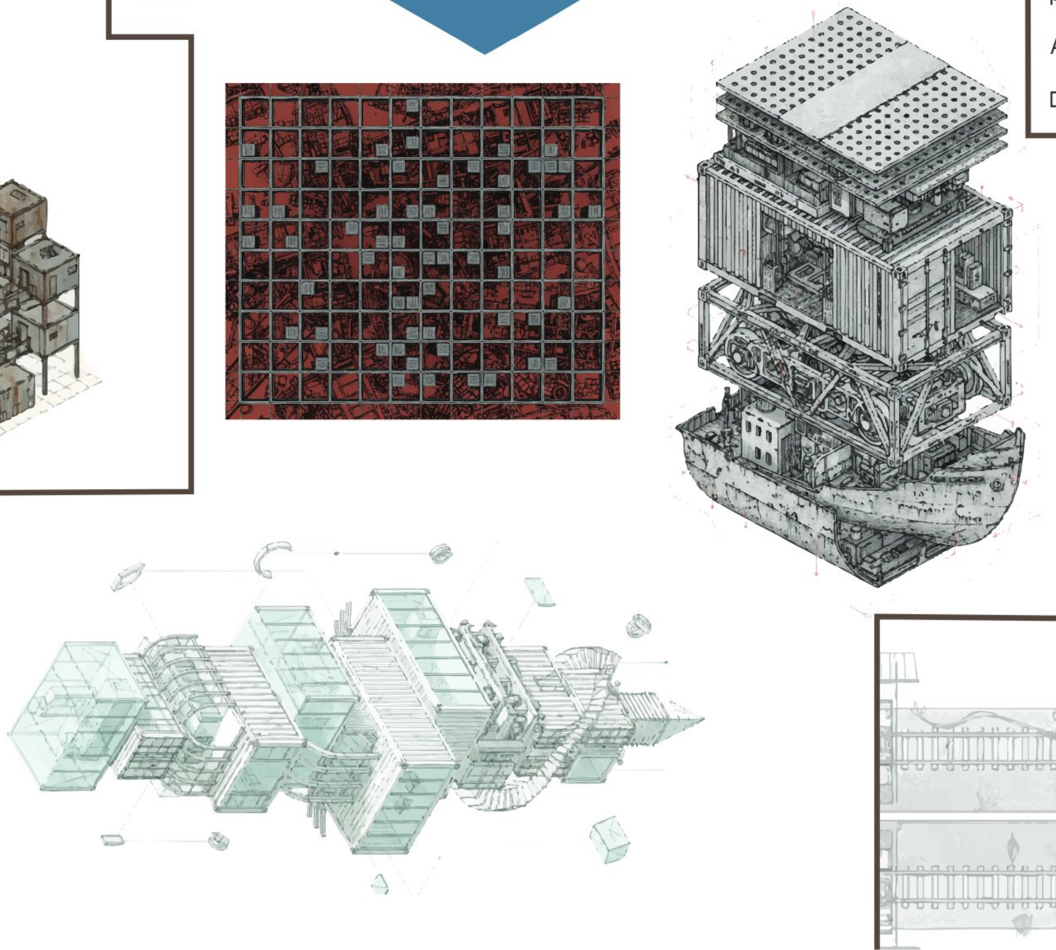
Municipal recognition of the dock precincts (2098), formal tenure rights and inclusion in development maps.

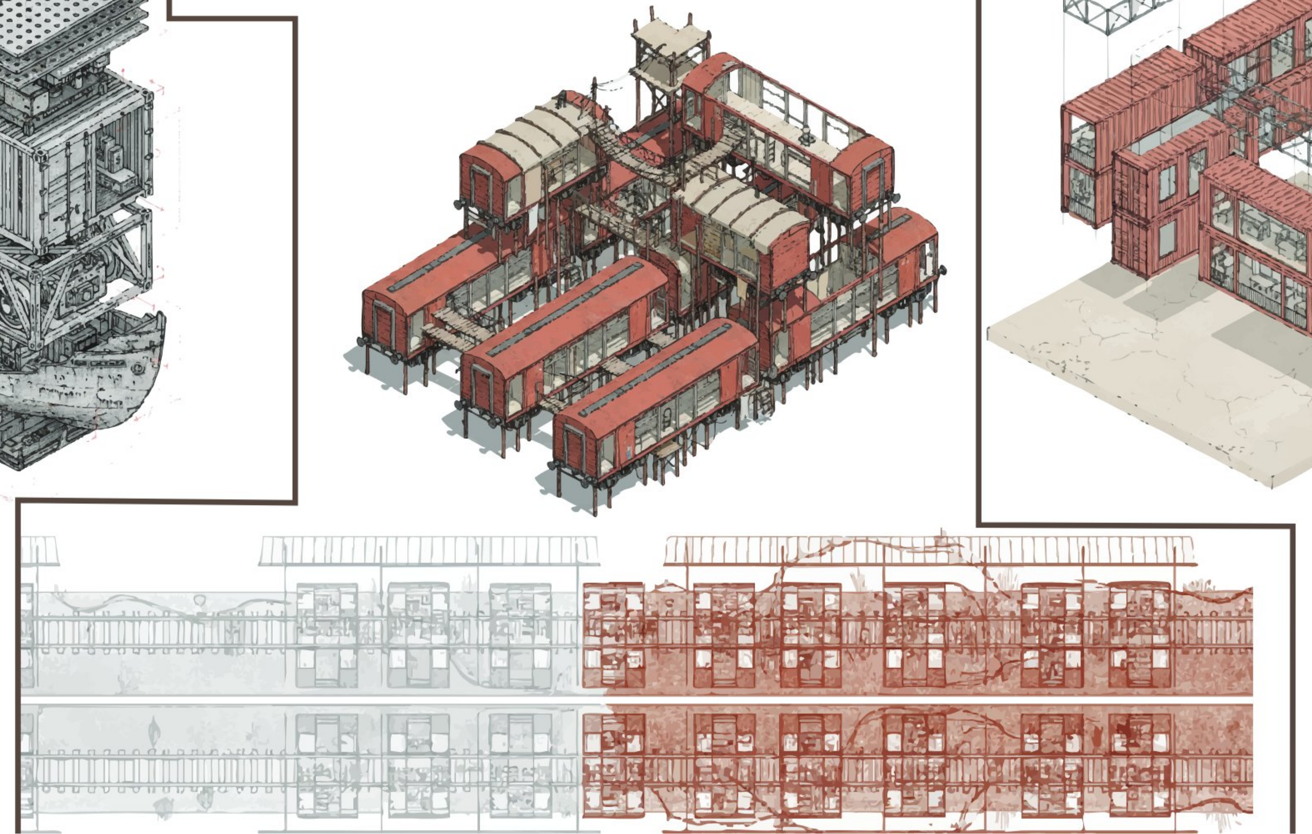


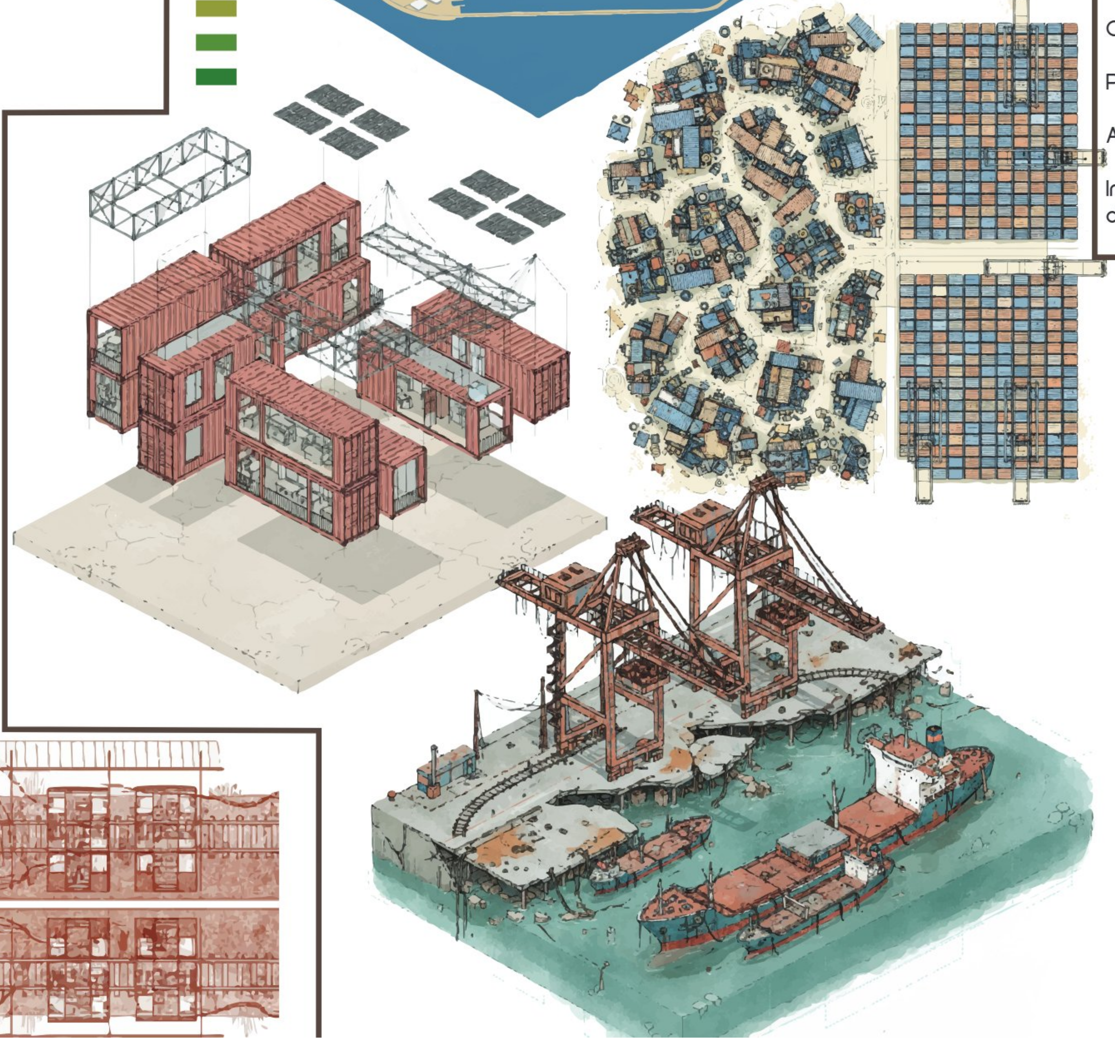


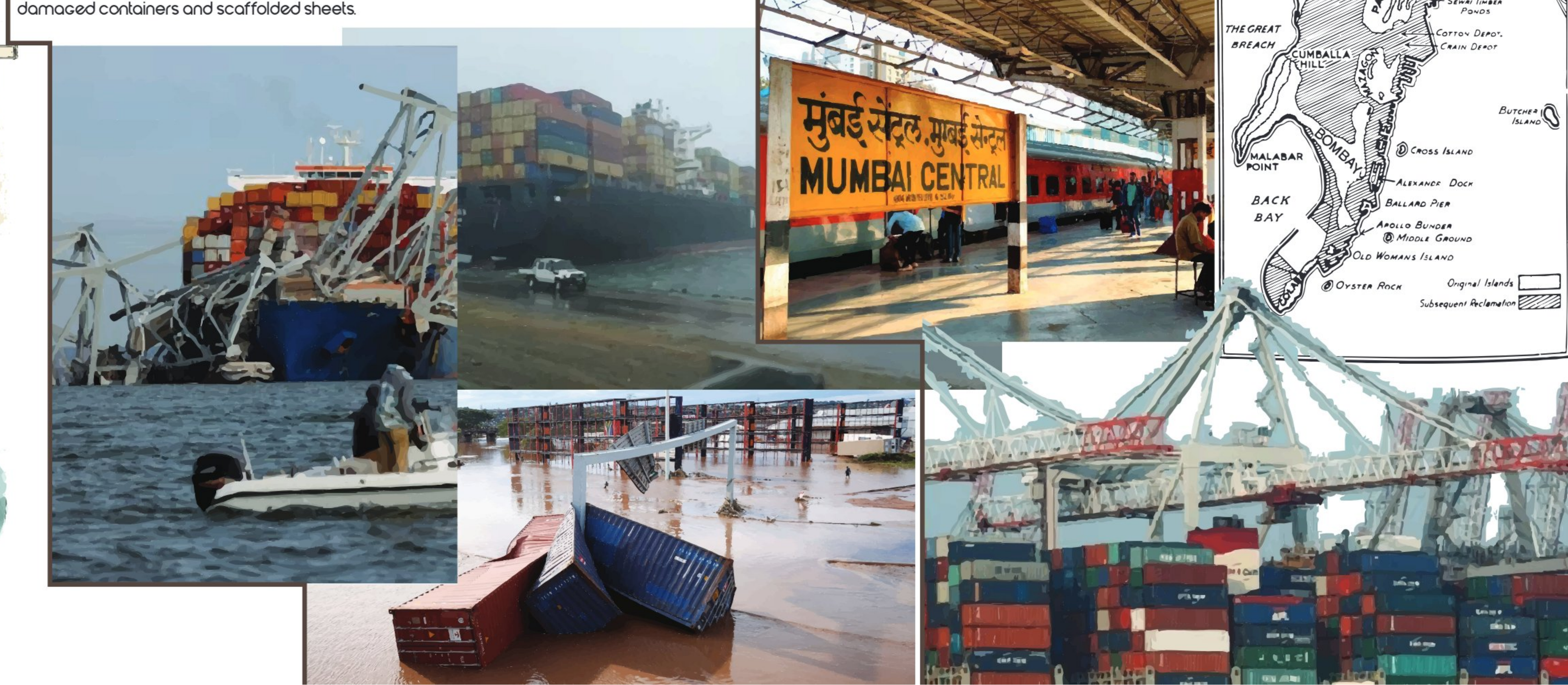


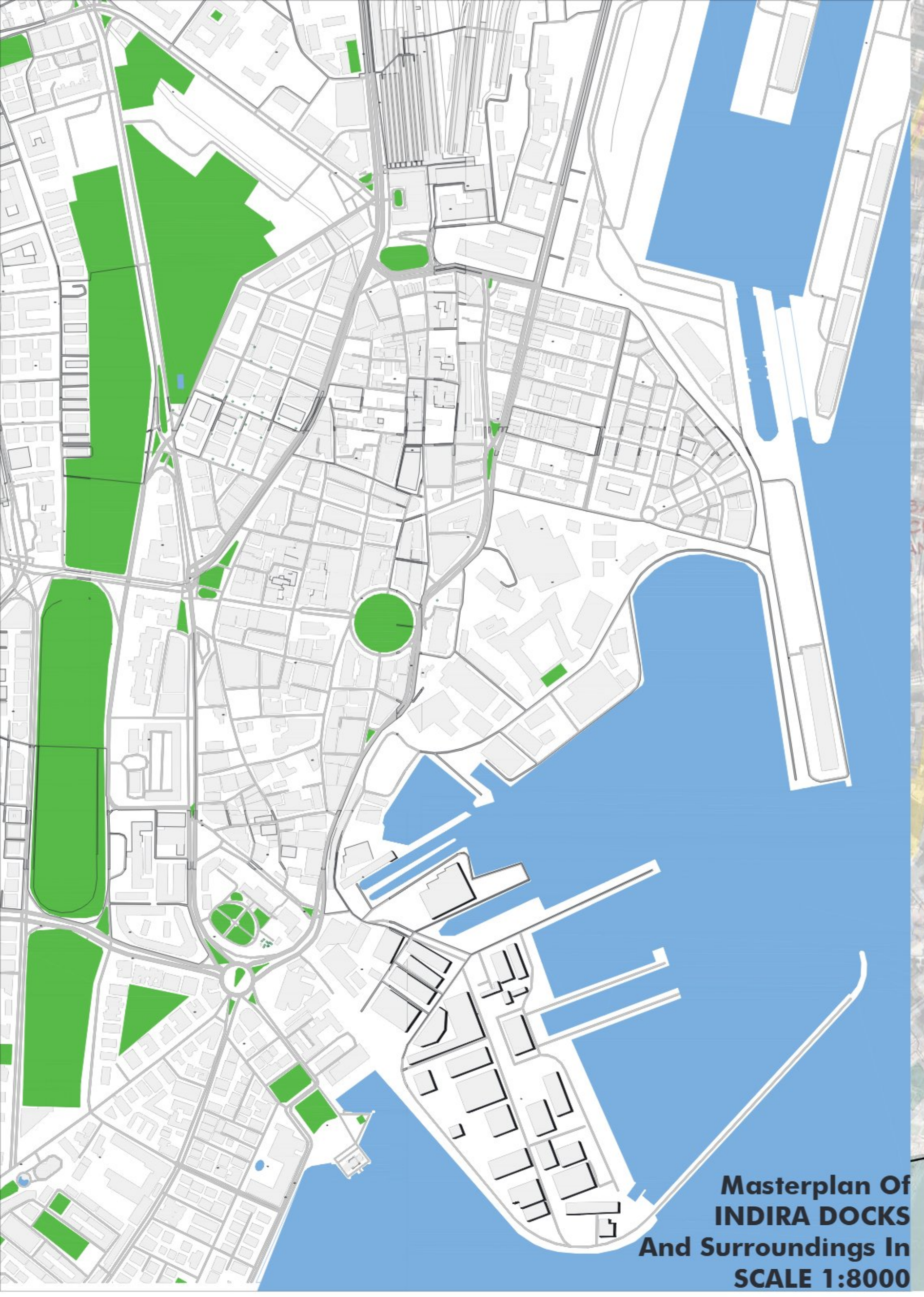




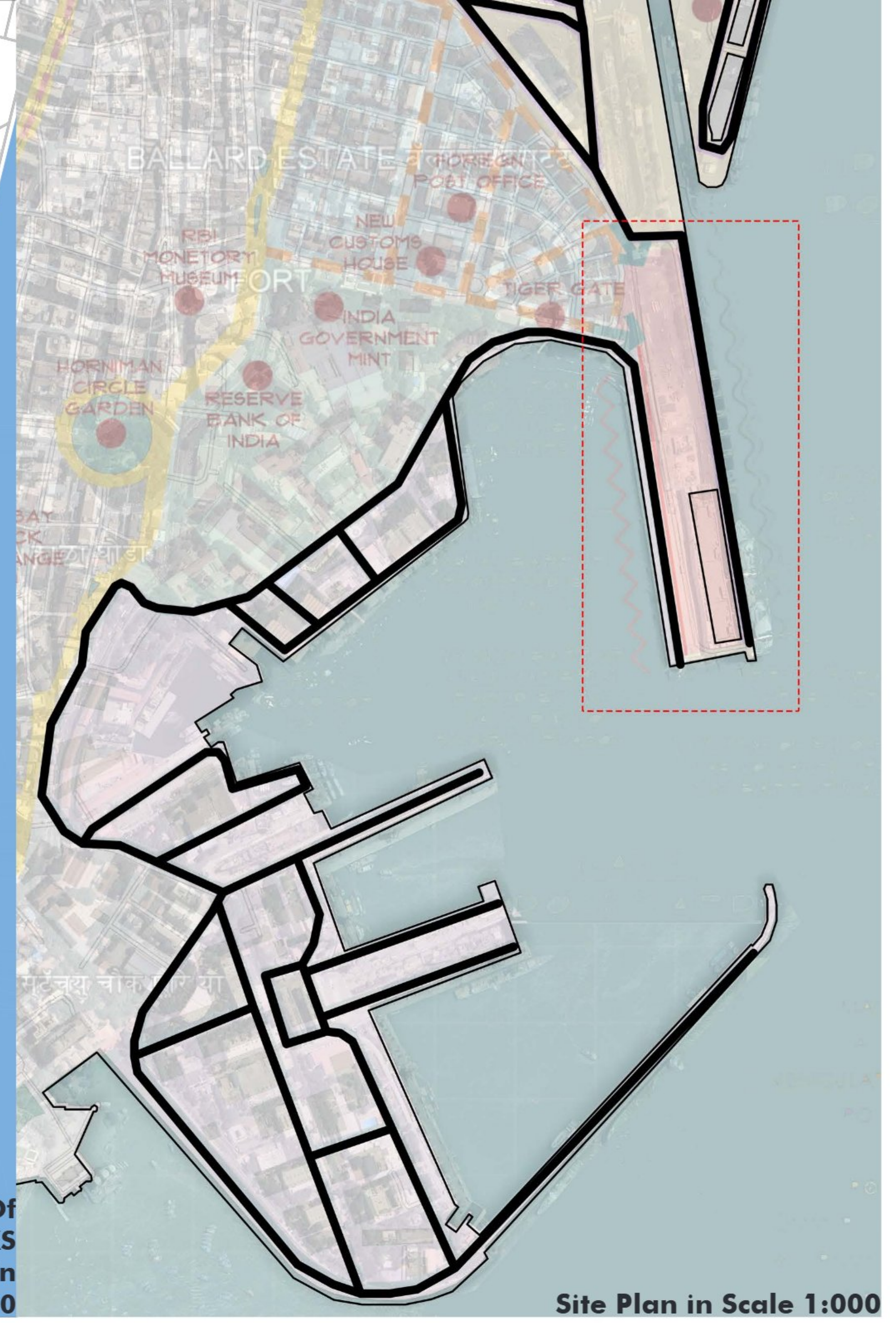




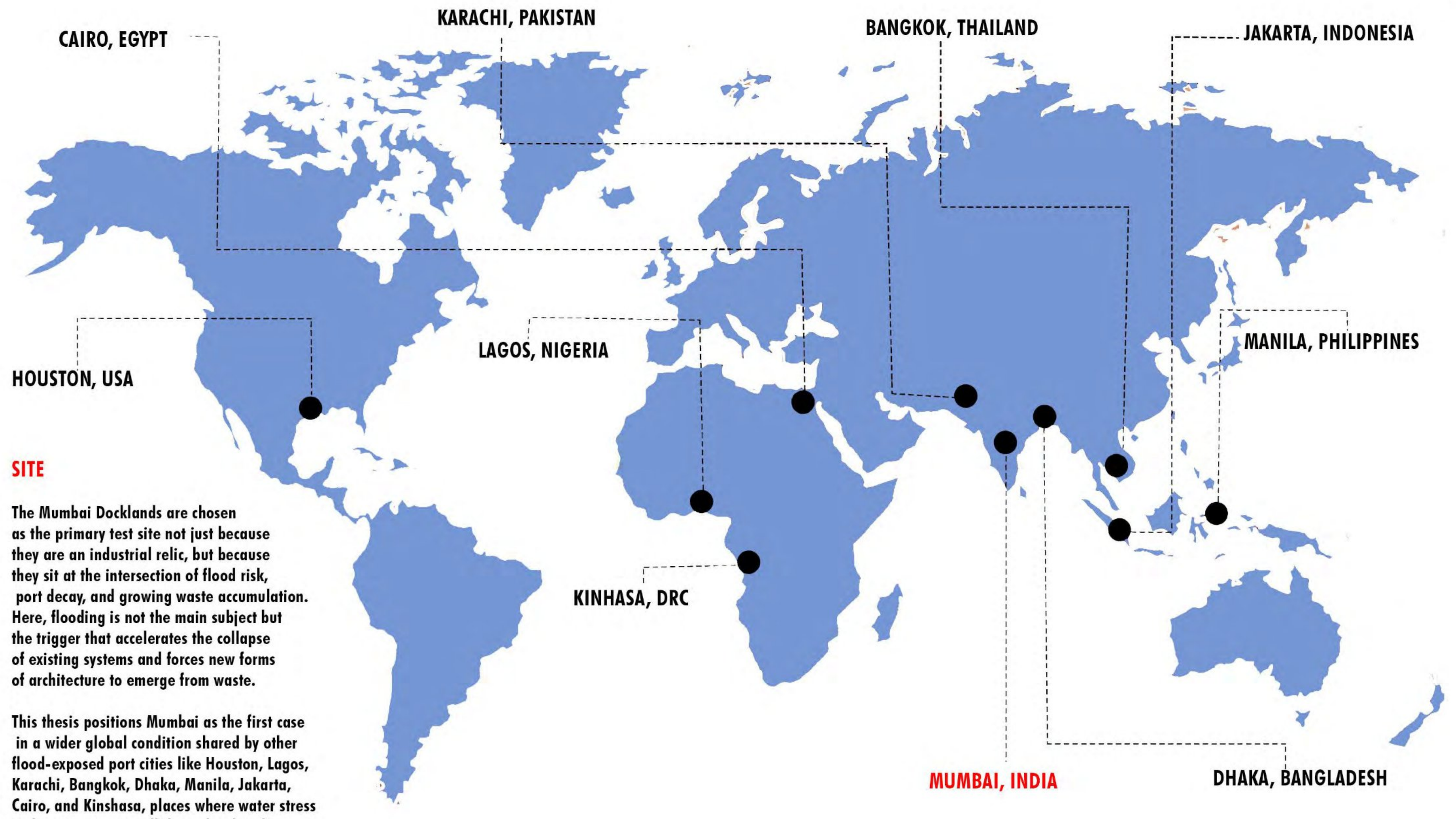




Masterplan Of
INDIRA DOCKS
And Surroundings In
SCALE 1:8000



Site Plan in Scale 1:000



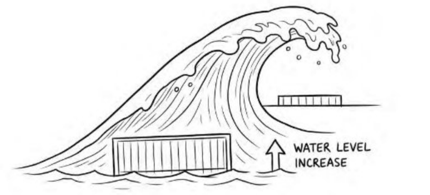
SITE

The Mumbai Docklands are chosen as the primary test site not just because they are an industrial relic, but because they sit at the intersection of flood risk, port decay, and growing waste accumulation. Here, flooding is not the main subject but the trigger that accelerates the collapse of existing systems and forces new forms of architecture to emerge from waste.

This thesis positions Mumbai as the first case in a wider global condition shared by other flood-exposed port cities like Houston, Lagos, Karachi, Bangkok, Dhaka, Manila, Jakarta, Cairo, and Kinshasa, places where water stress and waste systems collide at the shoreline.

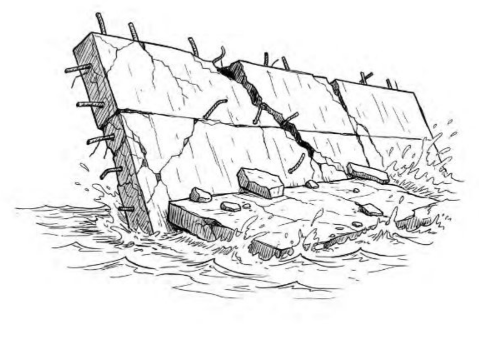
Mumbai is the prototype.
The framework is transferable.

WHY PORTS FAIL



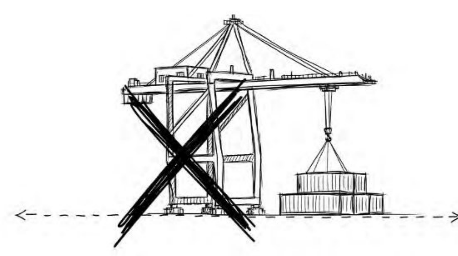
Chronic Flooding

Rising tides and extreme monsoon events repeatedly submerge port surfaces, making logistics, storage, and access unreliable. Flooding shifts from seasonal disruption to permanent operating condition.



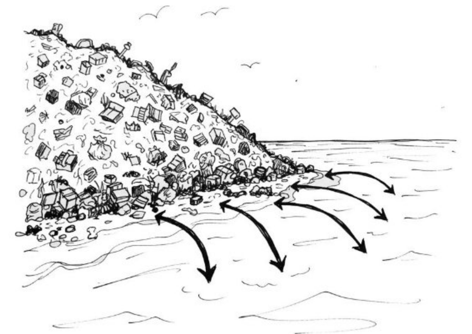
Infrastructural Erosion

Saltwater intrusion, corrosion, and structural fatigue slowly destroy dock foundations, retaining walls, pipelines, and cranes. The port becomes more expensive to repair than to abandon.



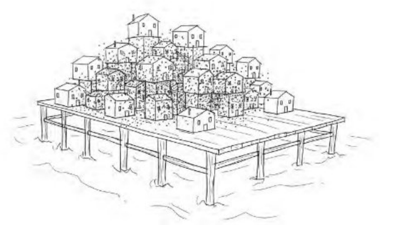
Trade Obsolescence

Global shipping routes reorganize, container traffic declines, and inland logistics outcompete sea-based movement. The port doesn't shut down overnight but it becomes economically irrelevant first.



Waste Backflow

Accumulated industrial and municipal waste returns into the port basin through storm drains, broken seawalls, and tidal reversal. What the port once exported becomes what it now drowns in.



Informal Reoccupation

Once industry retreats, people fill the void but informal housing, scavenging economies, repair workshops, and survival networks take over decaying docks. The failed port becomes a living ruin.

BUILDING POPULATION: 2240 PEOPLE
TOTAL FLOORS: 8
TOTAL CATCHMENT AREA: 2291.40 m^2
ANNUAL RAINFALL (MUMBAI): 2400 mm
RAIN PER mm: 2.2914 m^3
ANNUAL HARVEST POTENTIAL: 5499.36 m^3
TOTAL USABLE STORAGE: 1555.9064 m^3 (unchanged)
STORAGE AUTONOMY (NO RAIN): $1555.9064 \div 56.00 = 27.78$ DAYS

PRIMARY STORAGE TANKS
256 cylindrical tanks (Ø1050 × H5800 mm)
Volume per tank = 5.0219 m^3
Total storage = 1285.612 m^3

FILTERED WATER RESERVE
4 rectangular tanks (6.9 × 2.9 × 3.0 m)
Volume per tank = 59.97 m^3
Total = 239.88 m^3

SAND + CHARCOAL FILTER BARRIERS
16 units (Ø1100 × H2000 mm)
Volume total = 30.4144 m^3

TOTAL USABLE STORAGE = 1555.9064 m^3

POTABLE WATER (25 L / person / day)
Per person = 0.025 m^3/day
Whole building (2240 ppl) = 56.00 m^3/day
Annual potable use (building) = $56.00 \times 365 = 20440.00$ m^3/year

RAIN HARVEST vs POTABLE DEMAND
Annual harvest = 5499.36 m^3/year
Annual potable demand = 20440.00 m^3/year
Harvest covers = $5499.36 \div 20440.00 = 0.269$ = 26.9% of annual potable demand

STORAGE vs POTABLE DEMAND
Total usable storage = 1555.9064 m^3
Storage covers = $1555.9064 \div 56.00 = 27.78$ days of potable supply (if full, no rain)

GREYWATER + BLACKWATER (minimal-use assumptions)
Greywater per person = 0.020 m^3/day
Blackwater per person (WC) = 0.009 m^3/day

Whole building daily:
Greywater = $2240 \times 0.020 = 44.80$ m^3/day
Blackwater = $2240 \times 0.009 = 20.16$ m^3/day

Whole building annual:
Greywater = $44.80 \times 365 = 16352.00$ m^3/year
Blackwater = $20.16 \times 365 = 7358.40$ m^3/year

REED BED (TREATMENT)
Reed bed per module = 3.9 × 3.9 × 1.65 m
Volume per module = 25.0965 m^3
Total system (4 modules) = 100.386 m^3
Hydraulic loading = 44.80 m^3/day ÷ 15.21 m^2 = 2.945 m/day = 2945.0 mm/day
Retention time = $100.386 \div 44.80 = 2.24$ days

SEPTIC TANK (TREATMENT)
Septic per module = 2.9 × 2.9 × 1.9 m
Volume per module = 15.983 m^3
Total septic (4 modules) = 63.932 m^3
Hydraulic loading = 20.16 m^3/day ÷ 8.41 m^2 = 2.398 m/day = 2398.0 mm/day
Retention time = $63.932 \div 20.16 = 3.17$ days

RAIN to CATCHMENT to FIRST FLUSH to FILTER to STORAGE to USE to SEPTIC to REED BED to