The Cyborg Interface
Operational Ecologies in London

Isaac Vaarzon Morel

Index

History is something I admire and am fascinated by. History in itself is a very linear process characterised by cause and effect through history's medium, time. The stories of the past form the foundation for many parts of a city. Nowadays it seems like history is catching up with the future in the sense that our society and the use of our built environment is changing so rapidly and that more and more systems and processes are added. Time of change is reduced to an unmeasurable unit.
The connections between fast changing and contrasting industries, ideologies etc. of the past and near future are inherently related to the city's citizens. Change and permanence evoke, I think, behaviour and thinking on every level. However, if the time of change is reduced to nothing, permanence is also reduced to nothing because nothing becomes permanent. How will communities respond to this? I think a more subject/user oriented approach in relation with understanding the dynamic between past/present/future is valuable.

*Photograph of Church of St. Edward and Ferrybridge B Power station, Yorkshire by Eric de Maré. 1960s*

London has been a trade town and city for nearly a millenium. Starting with the romans in Londinium (The City of London) it has progressed from trade into banking after WWII. The wholesale markets are characteristic to London. Very different from what we experience in the Netherlands, some of these markets are ancient and trades one type of product, such as meat, fish or vegetables. These places are characterised by conflicting natures within the city. The thresholds of these two different worlds tend to collide on the street, yet is part of the identity of that place.
Furthermore, back in the day these markets were situated in between all the towns of Greater London, generating gathering places.

Smithfiield Meat Market
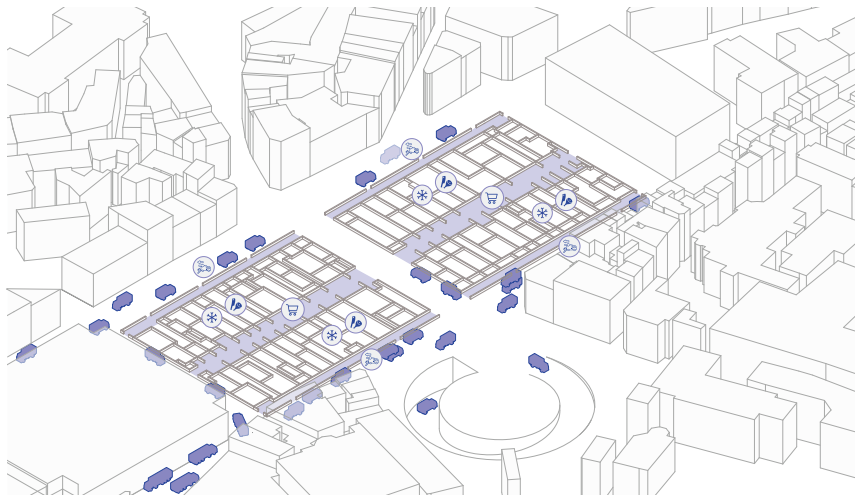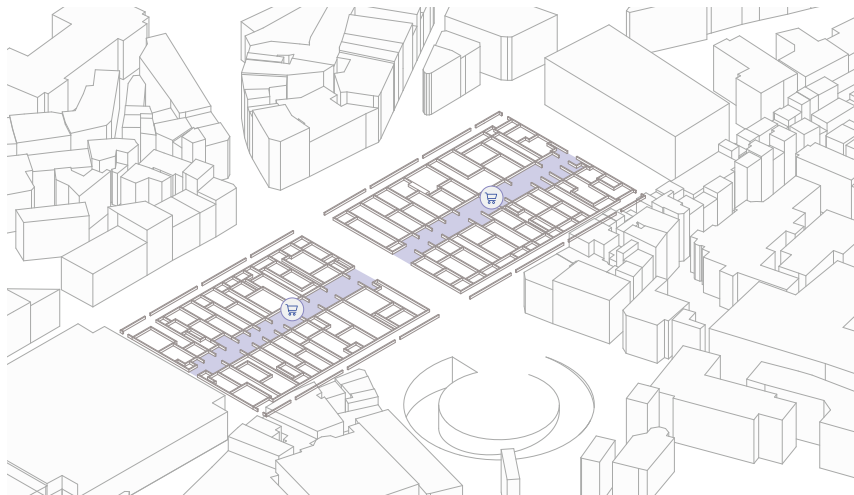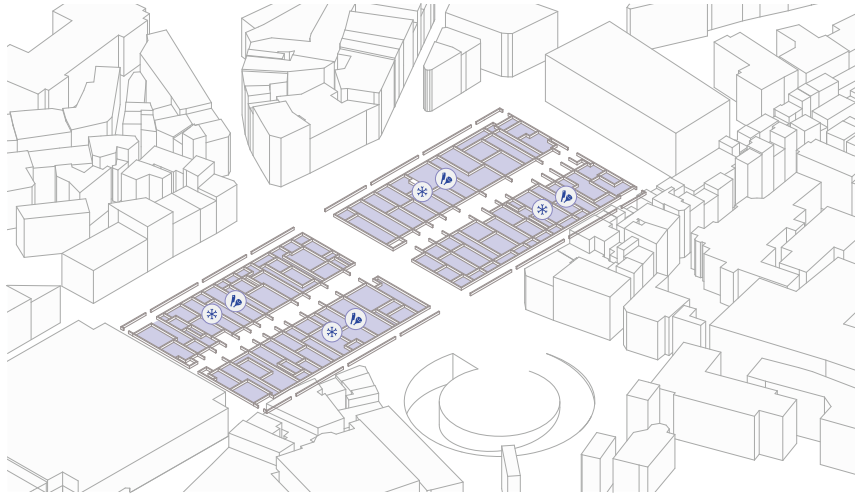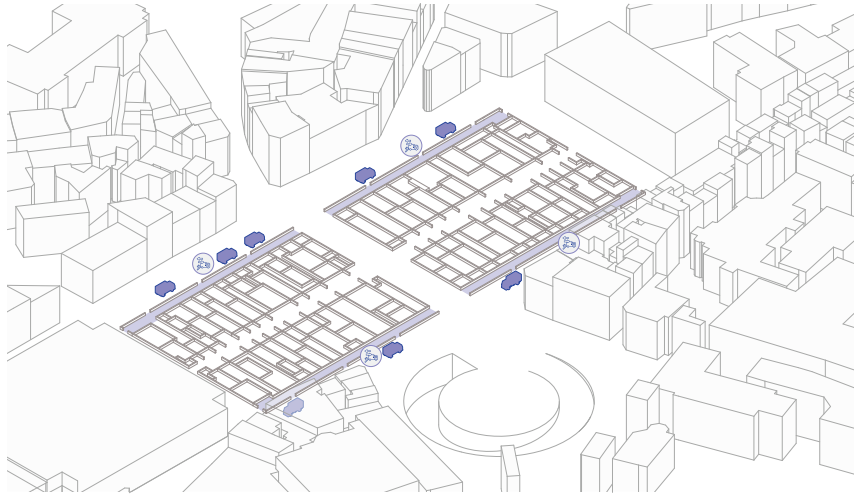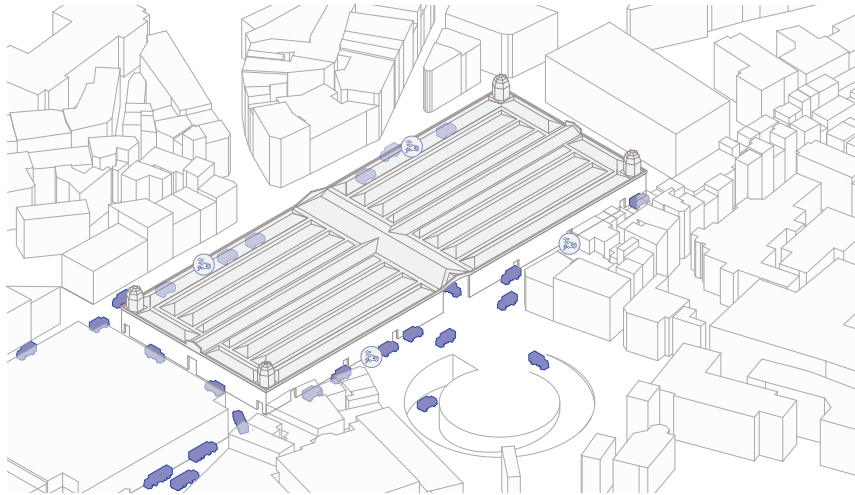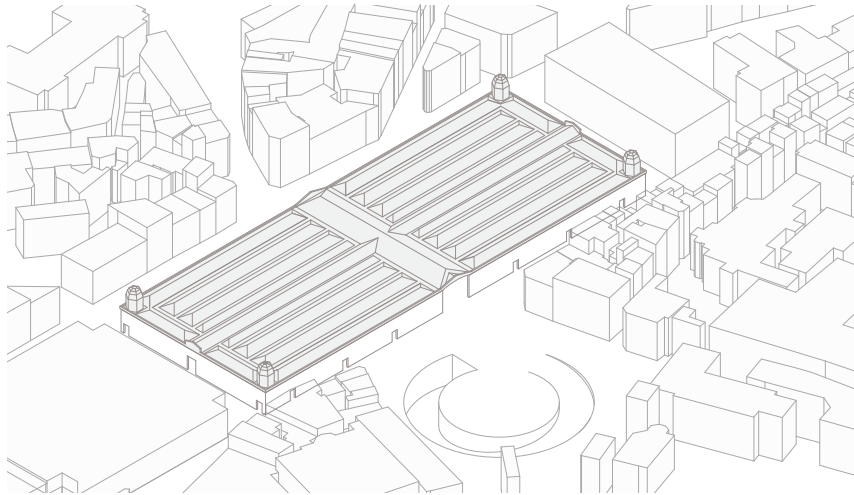
Bill the Butcher, Smithfield

Inauguration ritual of a butcher, Smithfield
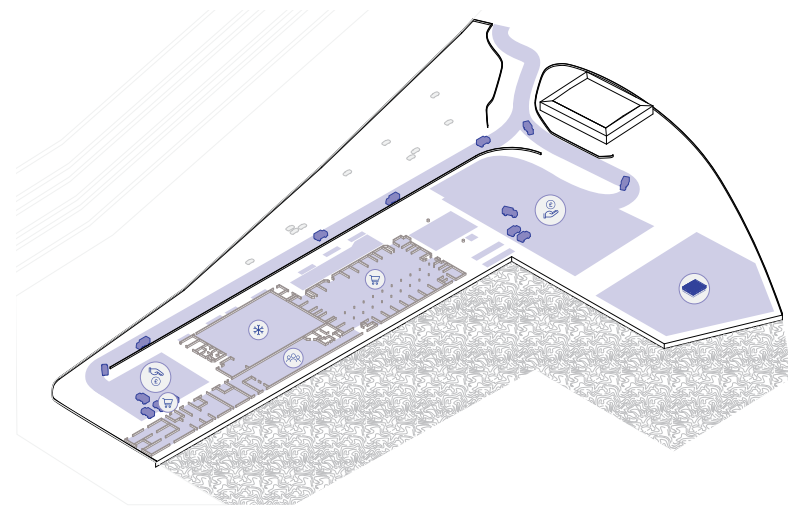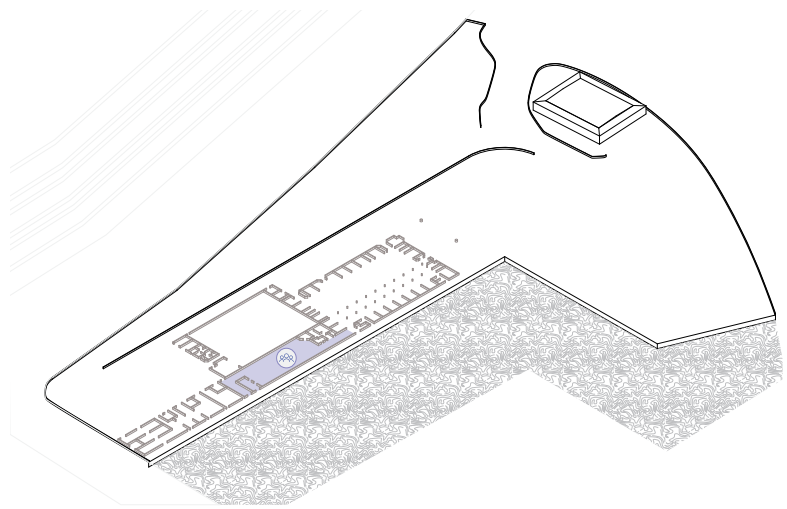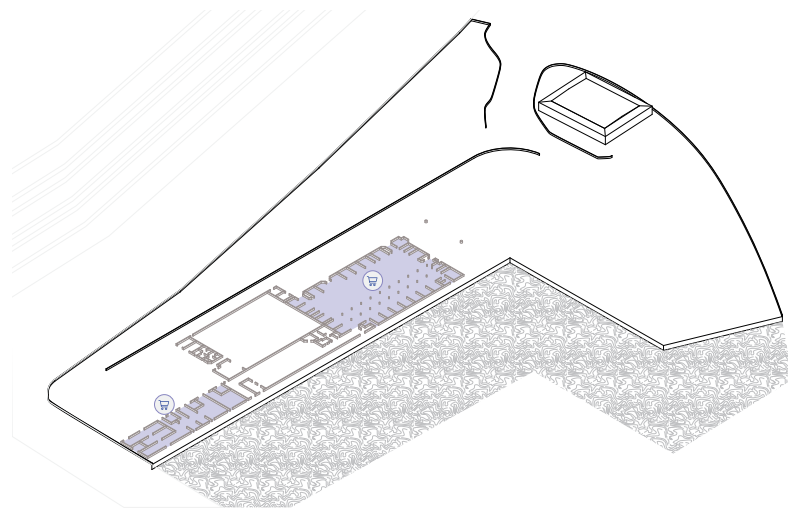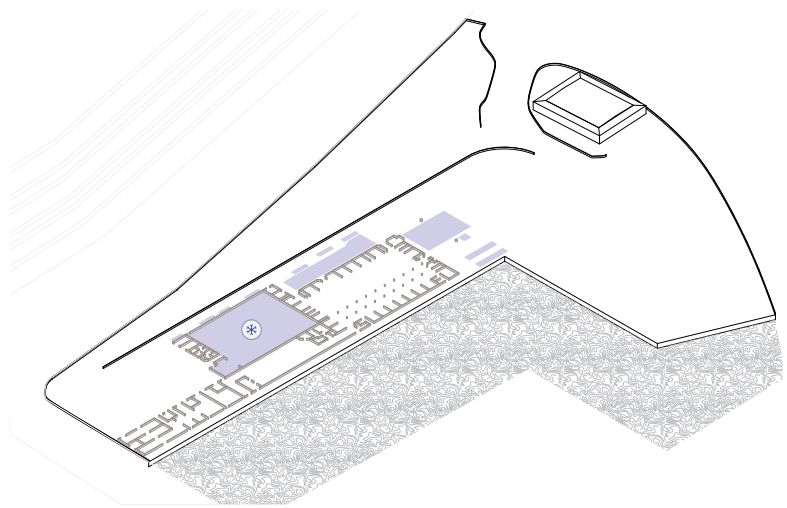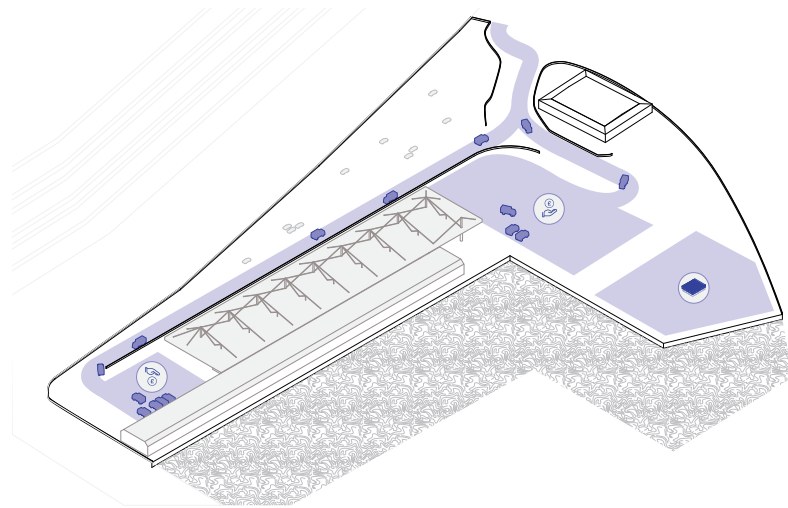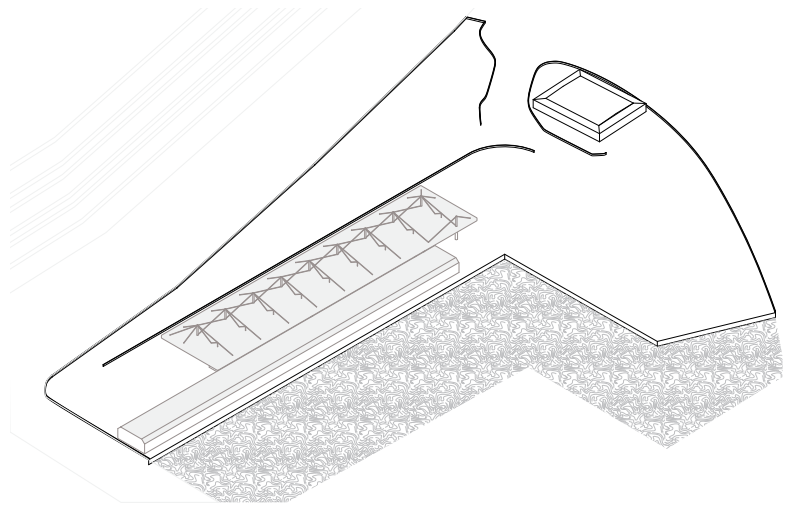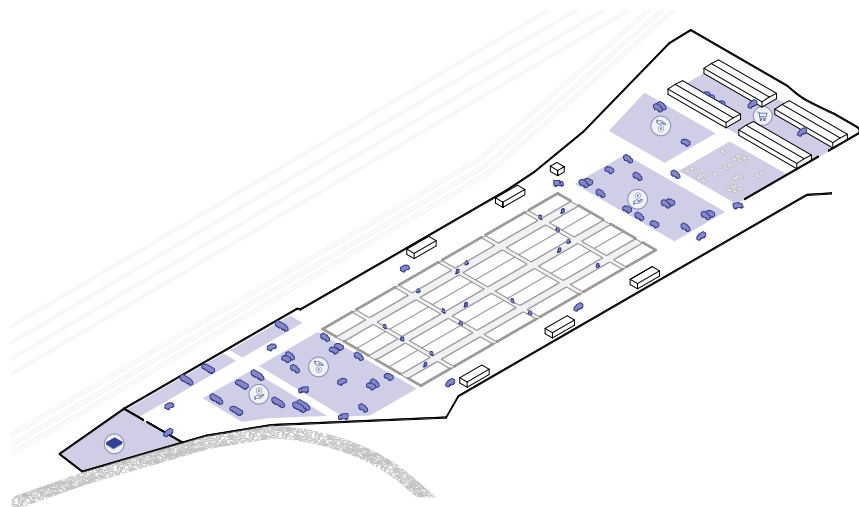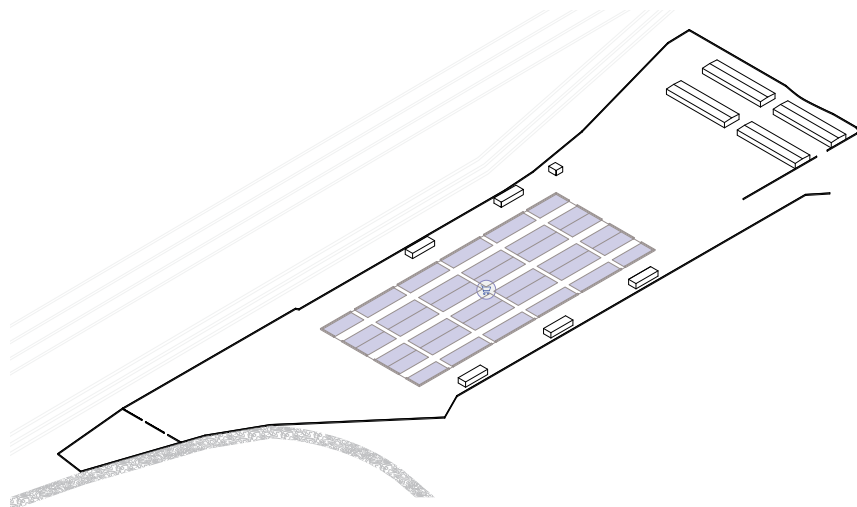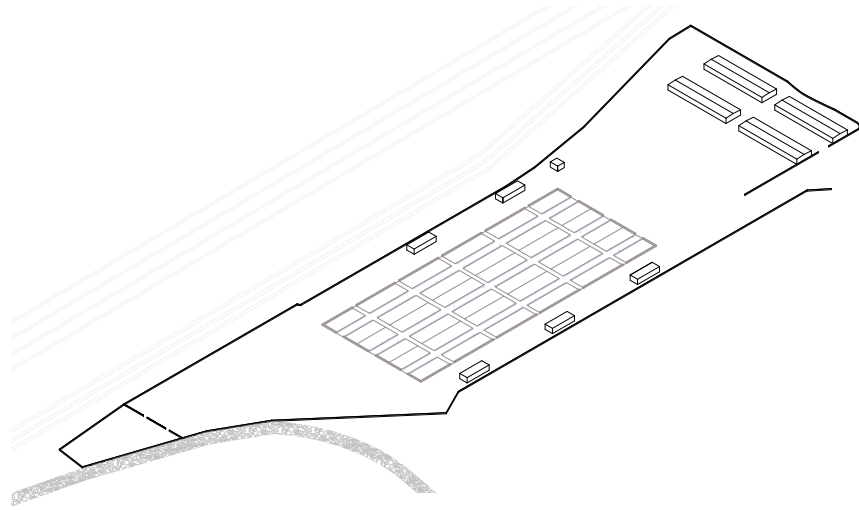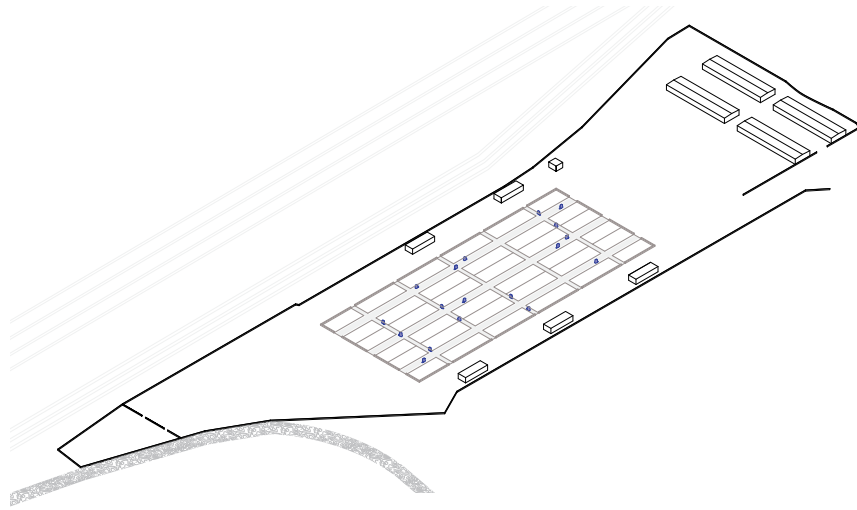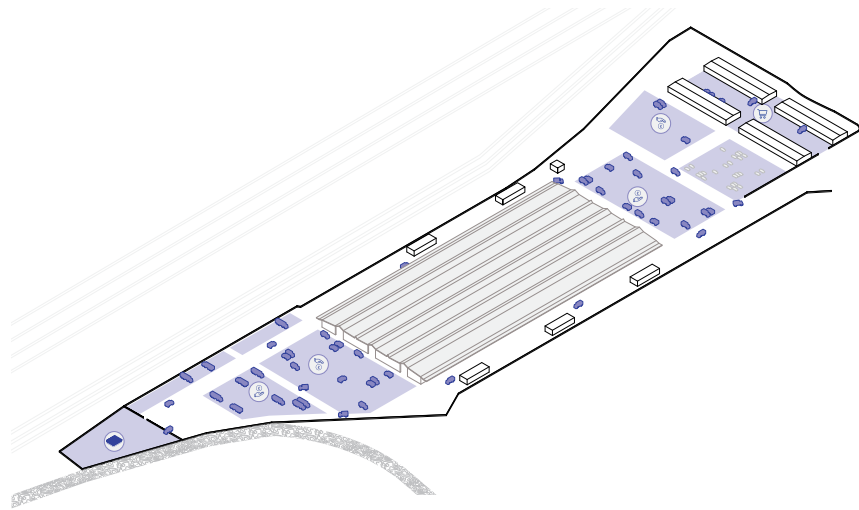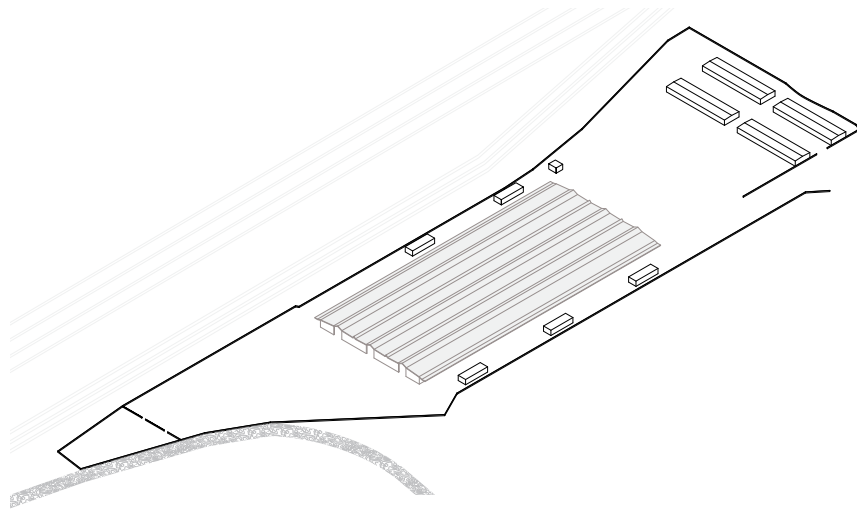
Sattelite imagery

To find patterns in the countryside around London, satellite imagery was used as a technique to research the landuse. Satellite imagery is processed through color bands that each have different information of what they have captured on earth. By mixing these bands in particular order, different color schemes can show particular information of the landuse. A couple of tests were done around London to see if patterns could be recognized.

Actual colors, Suffolk province

Agriculture imagery, Suffolk province
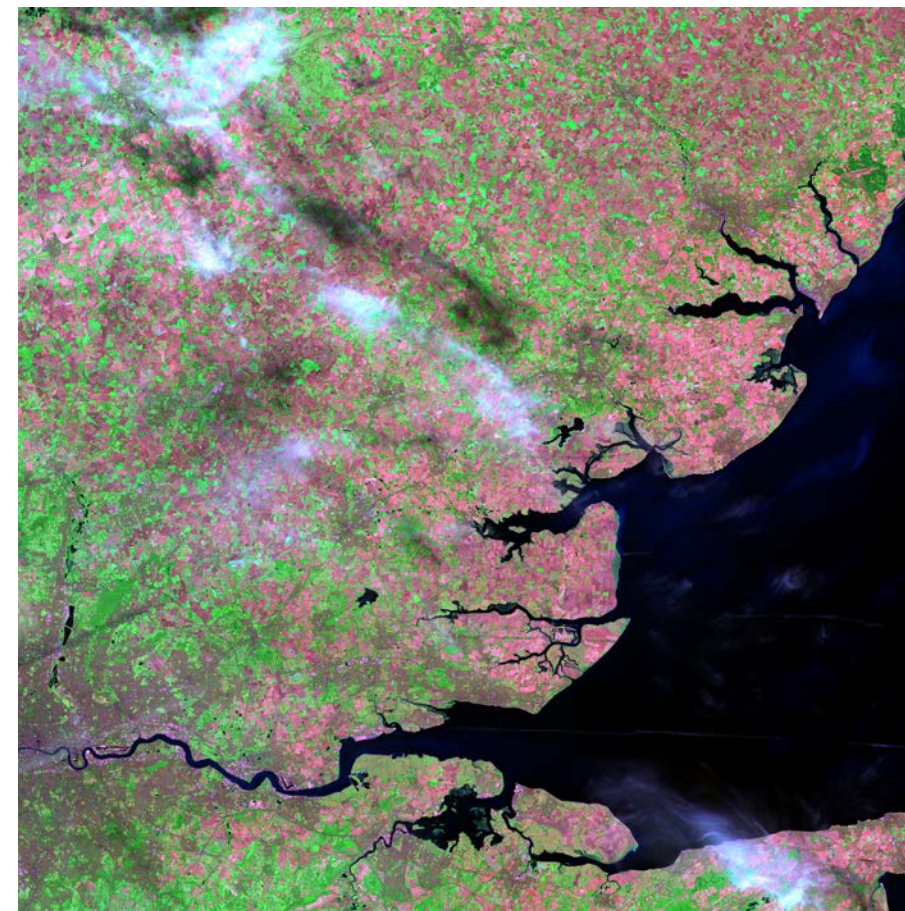
Vegetation imagery, Suffolk province
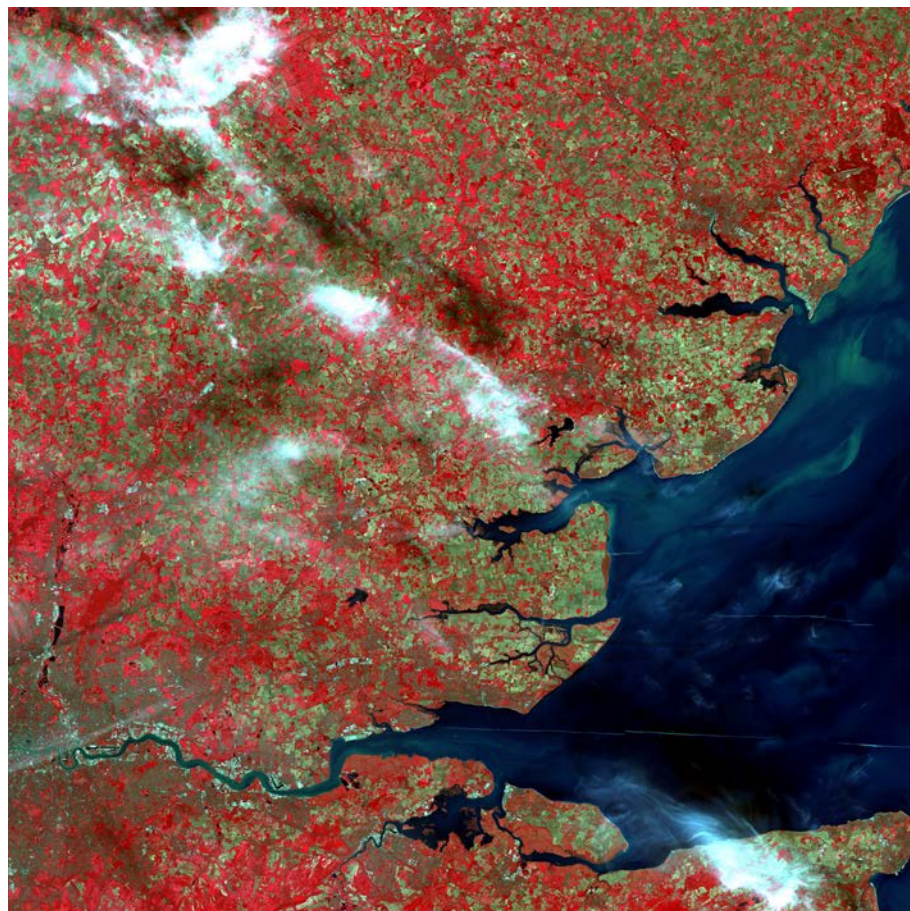
Infrared imagery, Suffolk province
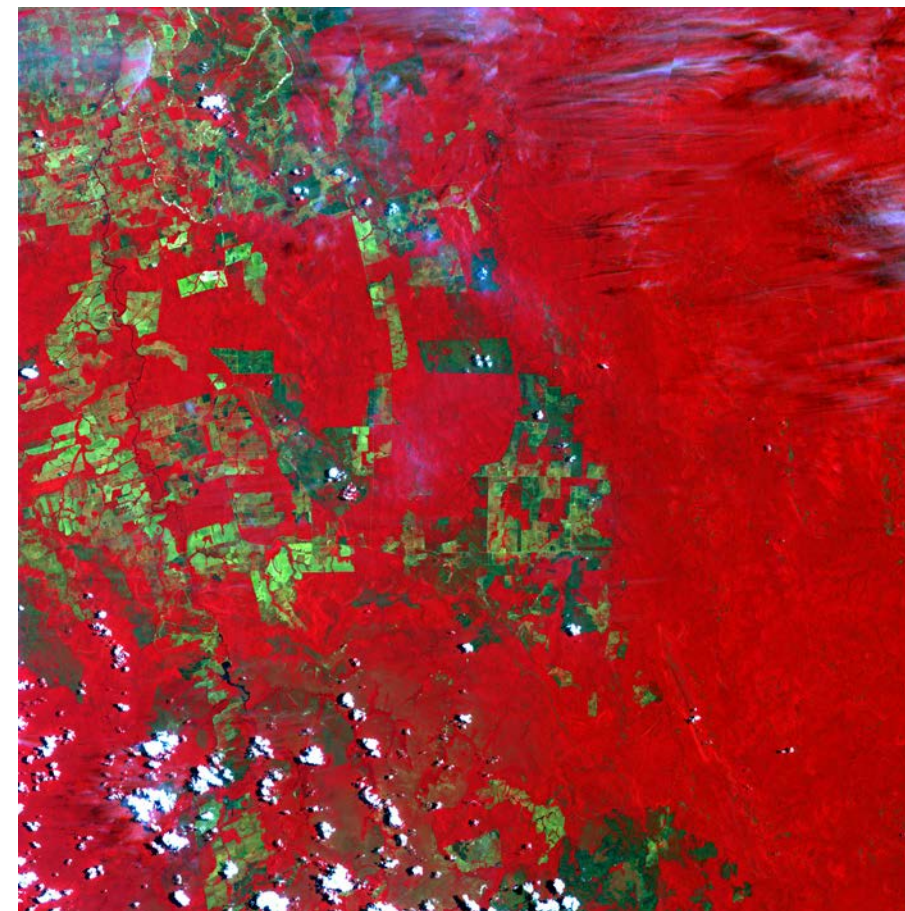
Infrared imagery, Amazone forest

London vs Amazone

Research plan

City and hinterland are inherently ntertwined yet seenas two different entities. The term city implies a singular object. A division between production and consumer has been established, furthermore we are also further removed from the hinterlands' primary commodity: nature. The general problem is that cities are no longer only reliant on their adjacent hinterlands resulting in cities industrializing and transforming them, all over the world, into strategically essential terrains of capitalist urbanisation (Brenner, N. 2016). Furthermore, industrial productive terrains, characterised by heterogeneity, within the city are pushed to the boundaries of the city, leaving behind a homogenous residue. The

foundation of this problem is based on certain dualisms (society/nature, city/hinterland, interior/exterior, mind/body) that we have shaped through history that deny interlaced relationships. Williams (1973) describes the loss of 'Nature' as a loss of a specifically human and historical landscape, indicating society's need to reflect in nature. While current research opts for redesign of the hinterlands, it neglects the qualities of heterogeneous exchange nodes that now form the frontier of the hinterlands, parallel to nature, in the city.

The main research question is: how do we perceive the dynamic between hinterlands and city? However, a prioritized sub-question to the above in terms of the prospect of a project is; how to recognize the dynamic in design; and thus how to integrate that into an architectural construct? Through my research I have switched between these contexts.

Historical context:

How did we view the country and city dynamic in earlier days?

When was the turning point that the city becamemore important than the country and why?

If nature connects both city and hinterland through production, then what does the production of nature entail? What are the issues and

qualities?

If a city has become its own region, then what are its 'primary' resources and forms of production parallel to the hinterlands?

How do we perceive these primary resources in terms of spatial and sensory dimensions?

Contemporary context:

What are the current conditions of the hinterlands in relation to the metropolitan city?

Where do products of the hinterlands enter the city [exchange nodes] and to what extent is the consumer involved?

What are its social and spatial implications to its direct environment of the city?

What are the human and non-human actors?

If the consumer becomes the producer in terms of waste, then how do we perceive our own production?

In what form do these primary resources, waste, manifest themselves and how are they connected to the city network?

What does the production process entail?

What are its by- products/ non-human actors?

Design context:

How do you transgress the notion of conceptual boundaries, for example self/other, in terms of spatiality and materiality?

Theoretical Framework

Cities have always drawn and consumed materials from their nearby areas of supply. Through a historical process of systems of trade, and economic and political controls, metropolitan areas have exceeded their adjacent countryside and infiltrated the hinterlands on international scale. These hinterlands have been transformed into industrially optimized and strategically essential terrains in capitalisms' quest for global urbanisation (Brenner, N. & Katsikis, N. 2020). Spaces where commodities enter the city, exchange nodes, is where hinterlands and city essentially meet. However, the metropolitan city has become its own region with resources and production. Is there a way to investigate and unravel qualities that we as society have blindsided?

What is key in understanding the dynamic of hinterlands and city as

well as the hinterlands inside the city, is our perception of nature, of which all production is maintained. Williams, and Lefebvre, explain in great detail how our perception changed along with how the city interacted with its adjacent hinterland through history. At a certain moment a shift occurred that changed that perception. The city would no longer be perceived as an urban island in an agrarian ocean. The country changes into the city's environment (Lefebvre, H. 1970). Static dualisms such as city/countryside, urban/rural, society/nature, interior/exterior maintained and have now begun to show themselves to society, accompanied with critical circumstances. They have to be superseded in order to grasp the urbanisation process and thus the dynamic between city and hinterlands (Brenner, N. 2016).

This change of perception went together with an anthropocentric vision of nature. Which translates to an internal dialectic of the concept of

nature, explained in a simplified diagram. As the current dynamic is mainly focused on industrialized production, the concept of the
production of nature has to be investigated, and how this manifests in a metropolitan city. The distinction is made between 'first nature' and 'second nature'. First nature constitutes nature as creation; second nature is formed by the process of labour. It is not merely the material creations of 'first nature' but also the institutions, economic and political rules, which run society (Smith, N. 1984). The city is, therefore, a manifestation of second nature, however produces another realm of primary resources, part of the hinterscape. These are the byproducts of nature as production. Waste can then be seen as a newly created form of first nature (primary resources)
and mode of production. The problem is that we distance ourselves from these spaces of primary production and exchange nodes within the city. owever, we desperately need these spaces to technologically advance along with society's perception to diminish the city's

domination over the hinterland. In order to acknowledge the entwinement of hinterlands and city, these two concepts have to be breached, reworked and mixed.

The cyborg theory of Donna Haraway is used to blur these static dualisms our society has produced. The cyborg is a hybrid of machine and organism, city and nature. It no longer has to reproduce itself in the dualisms of society, so nature and culture are reworked (Haraway, D. 1991). Through the concept of cyborg urbanization the dualism of city/non-city is made indistinct. It produces an organization of integration between body, technology and social practices. In that manner, the city becomes a corporeal as well as relational construct and can therefore not be disconnected from within itself and its non-city space (Gandy, M. 2005). Cyborgization proves to be a tool, rather than a solution, in theory to the 'hinterlands problematique' on urban as well as architectural scale. The research started
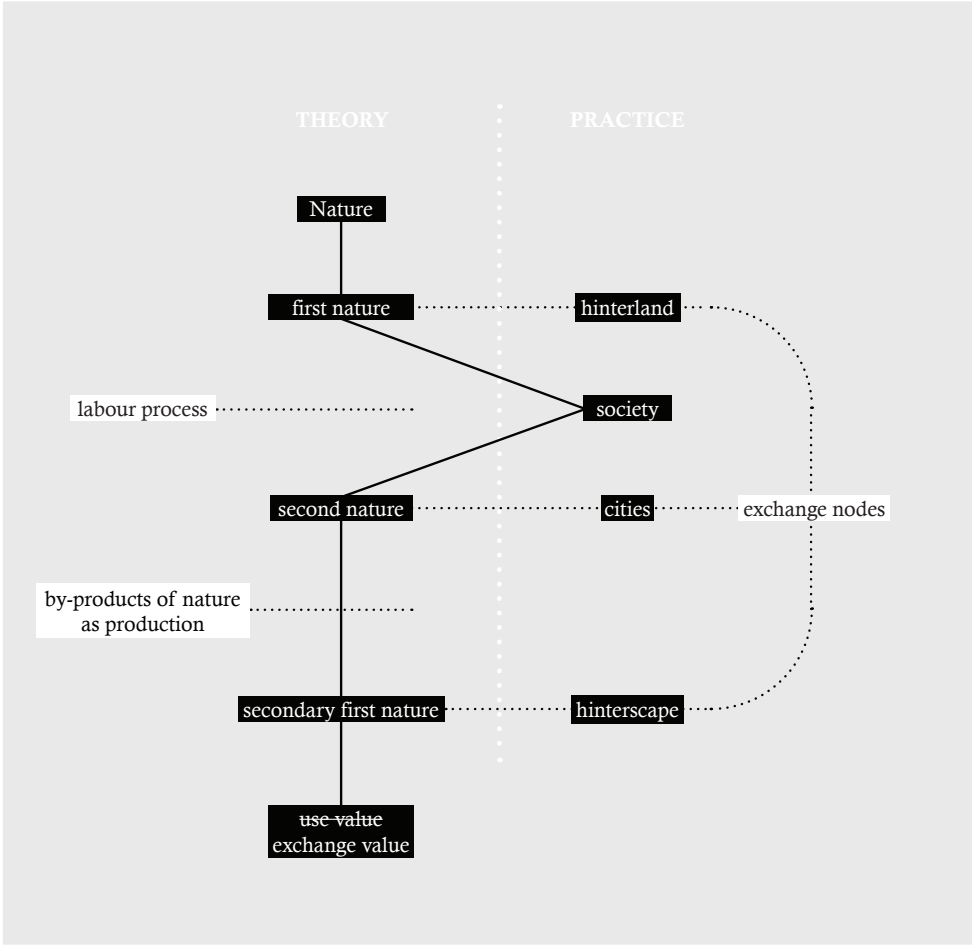

Fig.1: *Oversimplified diagram explaining production of Nature process*

Methodology / methods

with looking into London's wholesale markets as a historic architectural object as well as a social environment. This led to the topic of the hinterlands as these particular markets were part of the national system of food transportation. The logistics of the city was then followed as a whole to reveal more of these exchange nodes. However, this method was clearly too broad and did not have a motivated direction, so the research had to be restructured. Literature review is the backbone of the research, mainly philosophical, to explain the direction and lenses of the research. The "Hinterlands problematique" of the theory will mainly be explained as a conceptual phenomenon. Including the results of the design research, the solution embedded in the cyborg theory will emerge. In order to convert this to practice, precedents will be used and translated into diagrams.

Exchange nodes will be mapped through scales, from territorial to urban to architectural scale, to explain its dimensions as well as its context and how it interacts with its surroundings. As a lens to understand the hinterscape, the process of waste (in particular food waste to minimize amount of research) will be analysed as well as the corresponding infrastructure. By mapping these facilities non-human actors included in those processes are pointed out. Literature review will further be applied on how we perceive the non-human actors of this hinterscape and how they might be used in design, for example Subnature of David Gissen.

Through typology research of the wholesale markets its processes will be established, trying to find overlaps with other systems. This coincides with actor analyses that unravel its logistics as well as social structures. Documentaries and photography are used to document these interesting places/nodes of exchange.

Topological research will touch mostly urban and territorial scale. The instrument used for this is a foldable section because this can not be represented in a lineair fashion. The folds represent the relationships between nodes. The foldable section contains multiple layers where production processes, the many facilities that expand into the "hinterscape", and their surroundings are exposed. The appendix, final fold, will hold the constraints and qualities of the intervention.

Argument on relevance

The exploitation of the land around us is a current political, economic, as well as design topic. It is felt in trade embargo's, climate change, and local social communities affected by the urbanization of the planet. Present, and past, research is looking into the redesign of the hinterlands, removing the discourse off the city, while simultaneously is established that the two cannot be separated from each other. Current cities change incredibly fast along with their demand for commodities and production processes. It is now the time to act. Not that I vouch for a redesign of the city as we, as Lefebvre suggests, have no concrete understanding of the urban yet. However, by looking through certain lenses we might be able to grasp the

dynamic and incorporate it into an architectural construct. A construct that changes with, yet confronts, the city and follows the hinterlands/city paradigm.

Annotated bibliography

Angélil, M. & Klingmann, A. (1999). Hybrid Morphologies: Infrastructure, Architecture, Landscape.

Several theories and methods are explored that assume the city as a fluid fragmented, yet unified whole. Through a dialectic approach, the city is revealed without hierarchies.

Brenner, N. (2016). The Hinterlands Urbanised? Architectural Design: p. 118-127.

The Hinterlands Urbanized? and Operational Landscapes can be seen as one article. Brenner reflects on the lack of research on the hinterlands as a industrialized territory. He suggests the hinterlands have become key to the process of capitalist urbanization. In Operational Landscapes the concept is explored further and the hinterlands are more defined as optimized and industrialized terrains with social, political and environmental consequences.

Brenner, N. & Katsikis, N. (2020). Operational Landscapes: Hinterlands of the Capitalocene. Architectural Design: p. 22-31.

Haraway, D.J. (1991). A Cyborg Manifesto – Simians, Cyborgs, and Women. London: Free Association Books.

The manifesto lays the foundation for the cyborg theory part in this research. It provides a framework for a world that rejects the static dualisms that have shaped our current, and rapidly changing, world. Because the book itself is comprised of articles explaining the dualisms of human/animal, organism/machine, self/other, man/woman, on a social level, other authors have been used to interpret and provide a framework for the discipline of architecture and urbanism.

Lefebvre H. (1970). The Urban Revolution. Minneapolis: University of Minnesota Press.

A critical reading of the concept of urbanization as a totality. Lefebvre describes in the first two chapters how the urbanization process began through exploring the concept as a virtual historical process. He explores why it happened and how in the first and second chapters of the book.

Negroponte, N. (1975). Soft Architecture Machines. London: The MIT Press.

This source is used to move from abstract theory to tangible practice and elaborate on the machinic side of the cyborg. The chapters "Computer-Aided Participatory Design" and "Intelligent environments" emphasise the notion of responsive architecture and machinics in architecture in terms of materials and how these would interact with the user.

Smith, N. (1984). Uneven Development: Nature, Capital and the Production of Space. Bath: The Pitman Press.

The book presents a theoretical and philosophical exploration and critique of the concepts of nature and capitalism. It explores the concept of the production of nature and its consequences in relation to capitalism. Built on Marxist theory, the concept of nature is elaborated.

Williams, R. (1973). The Country and The City. London: Vintage Classics.

Williams' detailed analysis describes how literature documented our language on the city and countryside and views this as a historical process. He explores the changes of that perspective and describes the countryside in a sharp objective manner. He does not idolize the country, he documents it, as well as the city.

Supporting sources

sources on developing cyborg position

Benjamin, G. (2016). The Cyborg Subject: Reality, Consciousness, Parallax.

Bertram, A. (1935). The House: A Machine for Living in. London: A.&C. Black Ltd.

de Canales, F.G. (2013). Approaching a New Biotope. Architectural Theories of the Environment: Posthuman Territory.

Gandy, M. (2005). Cyborg Urbanization – Complexity and Monstrosity in the Contemporary City.
Gandy, M. (2013). Zones of Indistinction: Bio-political Contestations in the Urban Arena. Architectural Theories of the Environment: Posthuman Territory.

Kaika, M. (2005). City of Flows – Modernity, Nature and the City. Abingdon: Taylor & Francis Group.

Negroponte, N. (1995). Being Digital. New York: Alfred A. Knopf, Inc.

Teyssot, G. (2005). Hybrid Architecture – An Environment for the Prosthetic Body.

Wilhart, M. (2015). The Architecture of Soft Machines.

Sources on developing position on concept of Nature

Gissen, D. (2010). Territory: Architecture Beyond Environment.

Gissen, D. (2019). Nature. AA files: The Architectural Association.

Gissen, D. (2009). Subnature: Architecture's Environments. New York: Princeton Architectural Press.

Gissen, D. (2013). The Architectural Reconstruction of Nature. Landscape Futures: Instruments, Devices and Architectural Inventions.

Hysler-Rubin, N. (2011). Patrick Geddes Town Planning: A Critical Review. Abingdon: Taylor & Francis Group.

Steel, C. (2013). Hungry City: how food shapes our lives. London: Vintage Books.

Welter, V.M. (2014). Grounding Metabolism: The Valley Region, from figure of thought to figure of ground. Cambridge, Massachusetts: Harvard University Press.

Additional sources

Busbea, L. (2007). Topologies – The Urban Utopia in France, 1960-1970. London: MIT Press.

Berger, A. (2009). Systemic Design Can Change The World. Amsterdam: SUN Publishers.

Ghosn, R. & Jazairy, E.H. (2014). Geographies of Trash.

Gregory P. (2003). New Scapes – Territory of Complexity. Basel: Birkhäuser Verlag AG.

Hardingham, S. (2016). Cedric Price Works 1952-2003: A Forward-Minded Retrospective. Vol. 2.

Kronenburg, R. (1996). Portable Architecture: Design and Technology. Berlin: Birkhäuser Verlag AG.

Price, C. & Littlewood, J. (1968). The Fun Palace. The Drama Review: TDR. Vol. 12, No. 3, Architecture/Environment

Viganò, P. (2012). The SAGE Handbook of Architectural Theory: The Contemporary European Urban Project: Archipelago City, Diffuse City and Reverse City. London: SAGE Publications Ltd.

Personal glossary

Hinterlands

In this research, the hinterlands are defined as terrains that are partly 'first nature', as defined by Neil Smith, and provide primary commodity production. However, in current times most hinterlands are transformed into 'operational landscapes'.

Operational landscapes

Hinterlands that have been transformed into industrially optimized and strategically essential terrains. They form planetary patterns of agglomeration as they supply city spaces, and their own, non-city spaces. This transformation goes along with monogeneous development as well as destruction of ecological habitats.

Exchange nodes

Places where hinterlands and cities meet and exchange production, commodities and social relations. In this research they form nodes as they are characterized by interconnected systems stretching across the city.

Nature

The concept of Nature functions in this research as the foundation for production and creation. It is divided into multiple principles in order to identify different types of nature and how we use or can use this to our advantage.

Hinterscape

This is a personal definition to provide an overarching body for the variety of places of production and exchange that act as a frontier between hinterlands and city. It is in these places where the future of our cities lie in terms of durable technological and social advancement.
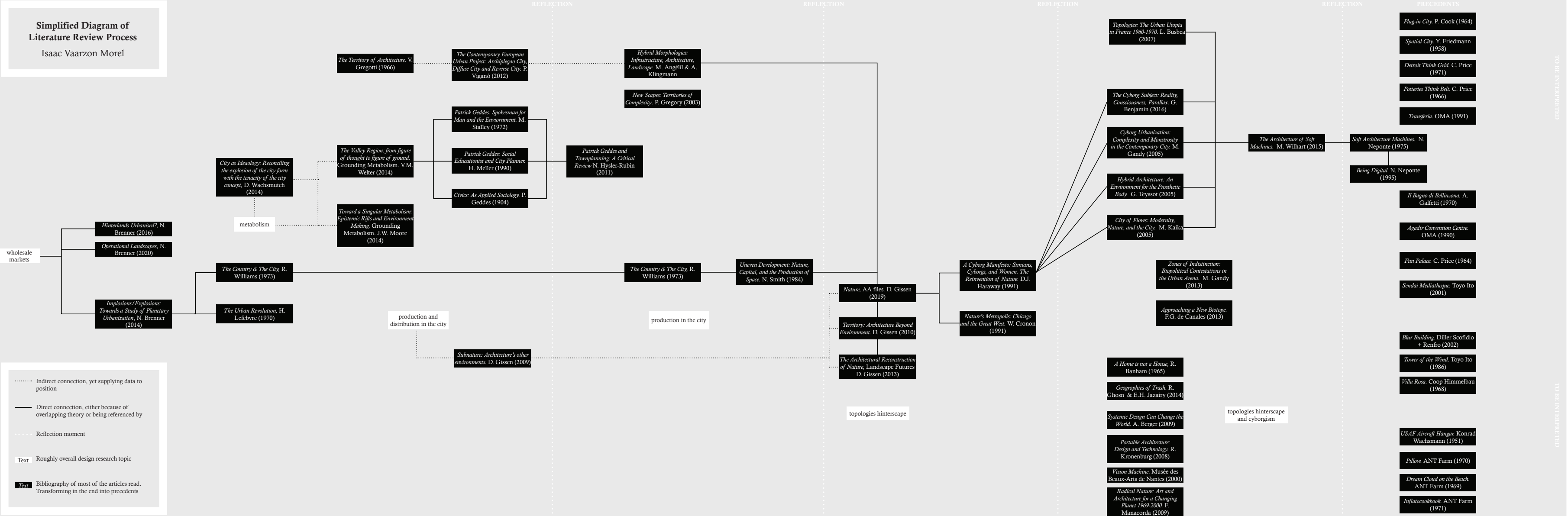
Cyborg

The Cyborg implies a mixture of organism and machine. The one has no control over the other. In architectural terms this would mean a technological environment where the boundaries of self and other are blurred as a cyborg is, in a way, indifferent towards static dualisms. As Teyssot explains: "The incorporation of technology is not effected by 'imagining' a new environment, but by reconfiguring the body itself, pushing outward to where its artificial extremities encounter the 'world'."

Cyborgization

Cyborgization is in this research used as a machinic process on architectural and urban scale, and perhaps in the future on territorial scale. The process entails breaking down boundaries through technological and machinic abilities of the construct. It tries to blend our perception of dualisms into a mixture rather than generate and control anothers domination over the other.

Simplified Diagram of Literature Review Process

Isaac Vaarzon Morel

REFLECTION   REFLECTION   REFLECTION   REFLECTION   PRECEDENTS

Plug-in City. P. Cook (1964)

Spatial City. Y. Friedmann (1958)

Detroit Think Grid. C. Price (1971)

Potteries Think Belt. C. Price (1966)

Transferia. OMA (1991)

The Territory of Architecture. V. Gregotti (1966)

The Contemporary European Urban Project: Archiplegao City, Diffuse City and Reverse City. P. Viganò (2012)

Hybrid Morphologies: Infrastructure, Architecture, Landscape. M. Angélil & A. Klingmann

Topologies: The Urban Utopia in France 1960-1970. L. Busbea (2007)

New Scapes: Territories of Complexity. P. Gregory (2003)

Patrick Geddes: Spokesman for Man and the Enviornment. M. Stalley (1972)

The Cyborg Subject: Reality, Consciousness, Parallax. G. Benjamin (2016)

The Valley Region: from figure of thought to figure of ground. Grounding Metabolism. V.M. Welter (2014)

City as Ideaology: Reconciling the explosion of the city form with the tenacity of the city concept, D. Wachsmutch (2014)

Patrick Geddes: Social Educationist and City Planner. H. Meller (1990)

Patrick Geddes and Townplanning: A Critical Review N. Hysler-Rubin (2011)

Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City. M. Gandy (2005)

The Architecture of Soft Machines. M. Wilhart (2015)

Soft Architecture Machines. N. Neponte (1975)

Civics: As Applied Sociology. P. Geddes (1904)

Hybrid Architecture: An Environment for the Prosthetic Body. G. Teyssot (2005)

Being Digital N. Neponte (1995)

metabolism

Toward a Singular Metabolism: Epistemic Rifts and Environment Making. Grounding Metabolism. J.W. Moore (2014)

City of Flows: Modernity, Nature, and the City. M. Kaika (2005)

Il Bagno di Bellinzona. A. Galfetti (1970)

Hinterlands Urbanised?, N. Brenner (2016)

Operational Landscapes, N. Brenner (2020)

wholesale markets

The Country & The City, R. Williams (1973)

The Country & The City, R. Williams (1973)

Uneven Development: Nature, Capital, and the Production of Space. N. Smith (1984)

A Cyborg Manifesto: Simians, Cyborgs, and Women. The Reinvention of Nature. D.J. Haraway (1991)

Agadir Convention Centre. OMA (1990)

Nature, AA files. D. Gissen (2019)

Zones of Indistinction: Biopolitical Contestations in the Urban Arena. M. Gandy (2013)

Fun Palace. C. Price (1964)

Implosions/Explosions: Towards a Study of Planetary Urbanization, N. Brenner (2014)

The Urban Revolution, H. Lefebvre (1970)

Nature's Metropolis: Chicago and the Great West. W. Cronon (1991)

Approaching a New Biotope. F.G. de Canales (2013)

Sendai Mediatheque. Toyo Ito (2001)

production and distribution in the city

production in the city

Territory: Architecture Beyond Environment. D. Gissen (2010)

Blur Building. Diller Scofidio + Renfro (2002)

Tower of the Wind. Toyo Ito (1986)

Subnature: Architecture's other environments. D. Gissen (2009)

The Architectural Reconstruction of Nature, Landscape Futures D. Gissen (2013)

Villa Rosa. Coop Himmelbau (1968)

topologies hinterscape

A Home is not a House, R. Banham (1965)

topologies hinterscape and cyborgism

Geographies of Trash. R. Ghosn & E.H. Jazairy (2014)

Systemic Design Can Change the World. A. Berger (2009)

USAF Aircraft Hangar. Konrad Wachsmann (1951)

Portable Architecture: Design and Technology. R. Kronenburg (2008)

Pillow. ANT Farm (1970)

Vision Machine. Musée des Beaux-Arts de Nantes (2000)

Dream Cloud on the Beach. ANT Farm (1969)

Radical Nature: Art and Architecture for a Changing Planet 1969-2000. F. Manacorda (2009)

Inflatocookbook. ANT Farm (1971)

Legend:

⋯⋯⋯ *Indirect connection, yet supplying data to position*

—— *Direct connection, either because of overlapping theory or being referenced by*

∙∙∙∙∙ *Reflection moment*

Text *Roughly overall design research topic*

Text *Bibliography of most of the articles read. Transforming in the end into precedents*

Deep rooted history of the wholesale markets and port of London as relay systems to the hinterlands during colonial and imperial times

Sites of most promising vital business parks sorted by industrial activity

Discrepancies in London between industrial activity and inhabited areas

Infrastructure and segmentation

Society has often no clue where products come from or how they are made. However the public knows even less about the influence and consequences of the systems and infrastructure that are behind what we consume.

Extension of Port of London to Tilbury with accompanying infrastructure systems, landuse and allotment
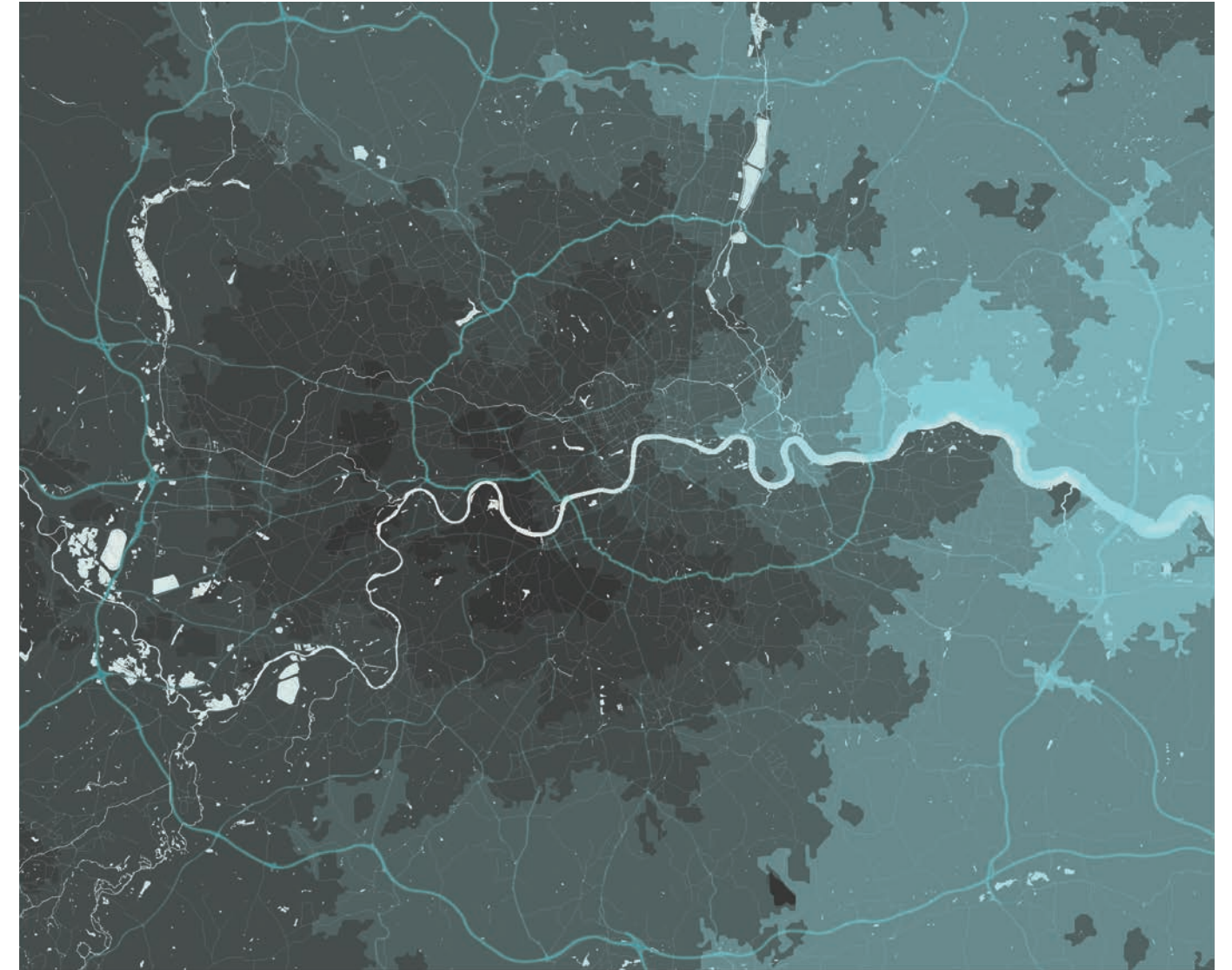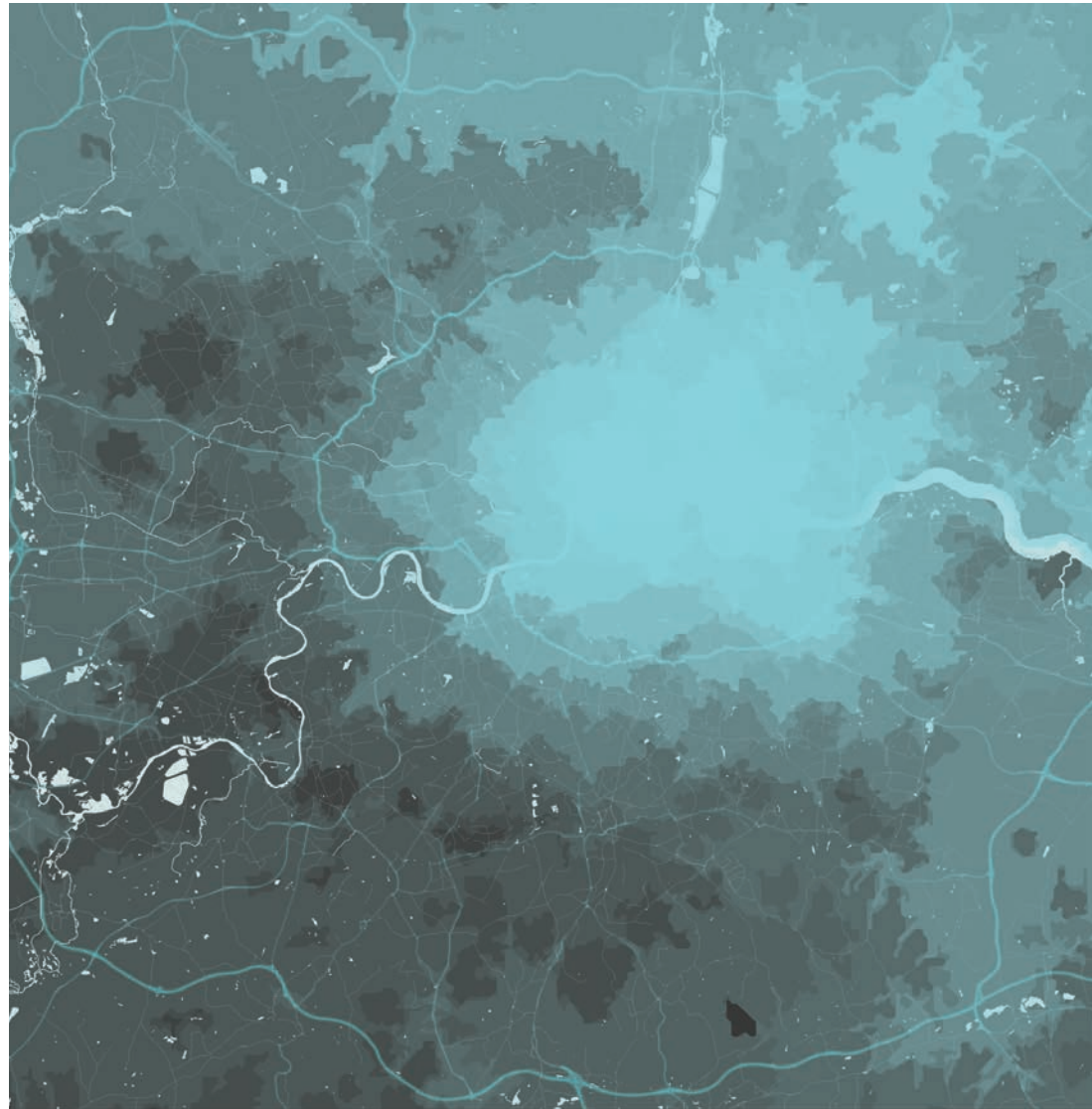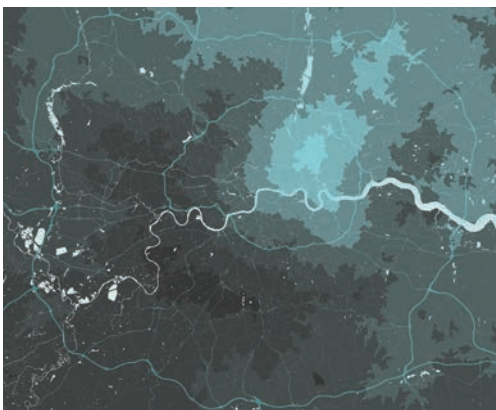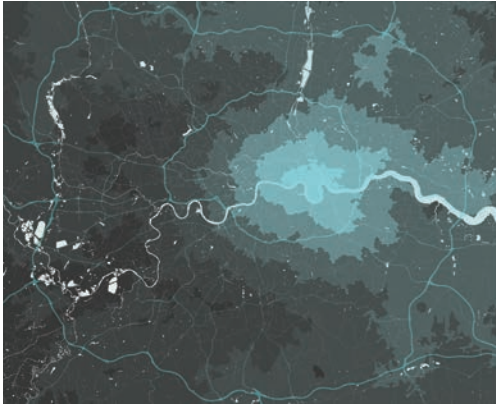
Time travelled from wholesale markets. Every gradient counts as 15 minutes. Because of their long history they are still situated in the middle of London. However there are plans of them being moved to outside of the city because the wholesale markets are overloading the infrastructure with their imported and exporting products.

The new location is located near the Port of London. In comparison to the new location at Dagenham Docks, although in between the M25 and inner ring, it is short on time to distribute London evenly in the same amount of time the current situation does. However, in Dagenham all wholesale markets will be present, allowing buyers to only make one stop.

Topomorfological drawing of London´s waste cycles
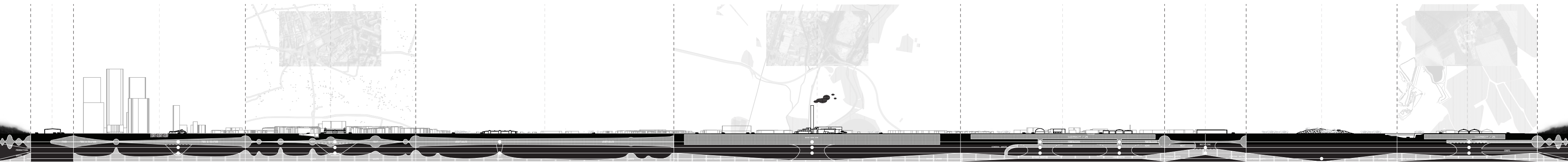
I analysed the processes and cycles of waste as well as the corresponding infrastructures. By mapping these facilities, non-human actors included in those processes are pointed out. Through typomorphological analysis of selected wholesale markets in London, I examined the spatial and logistical organization of the exchange nodes, and their embedded heterogeneity.
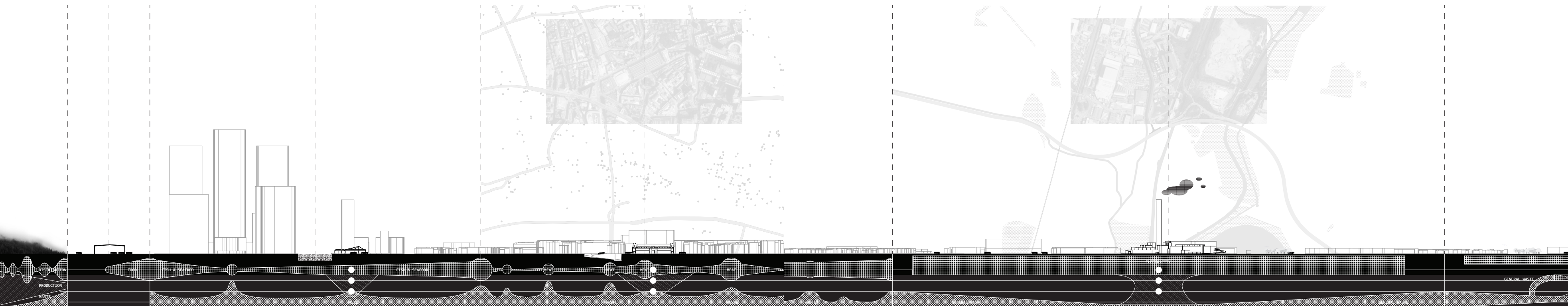
Consumption = Production

Production = Consumption

London has produced and become its own region of primary resources in the form of waste.

Although the amount of waste being exported to adjacent landfills or exported internationally is decreasing, the
infrastructure of the city does not facilitate the city vs hinterlands paradigm
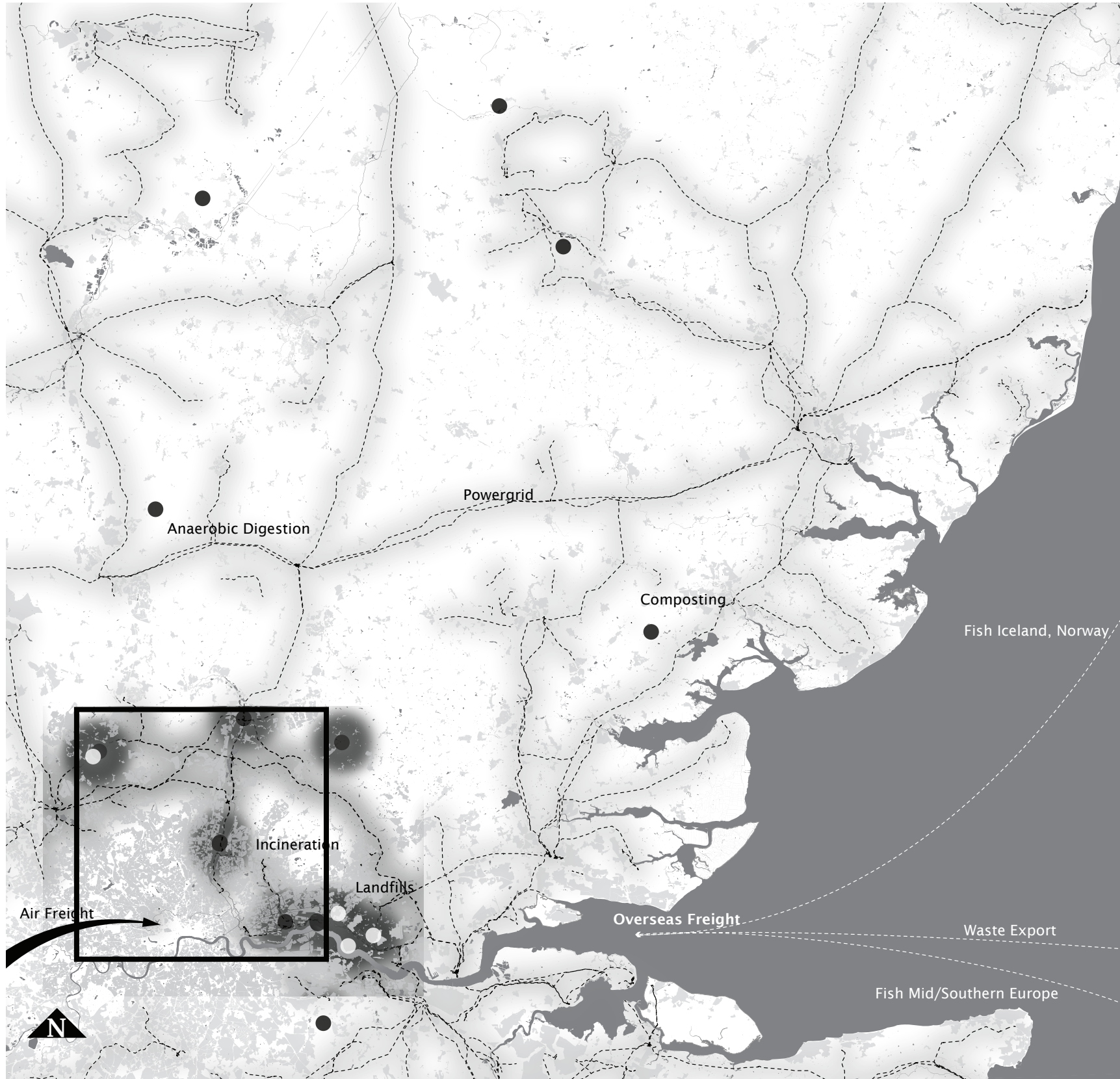
Territorial reach of London's waste management
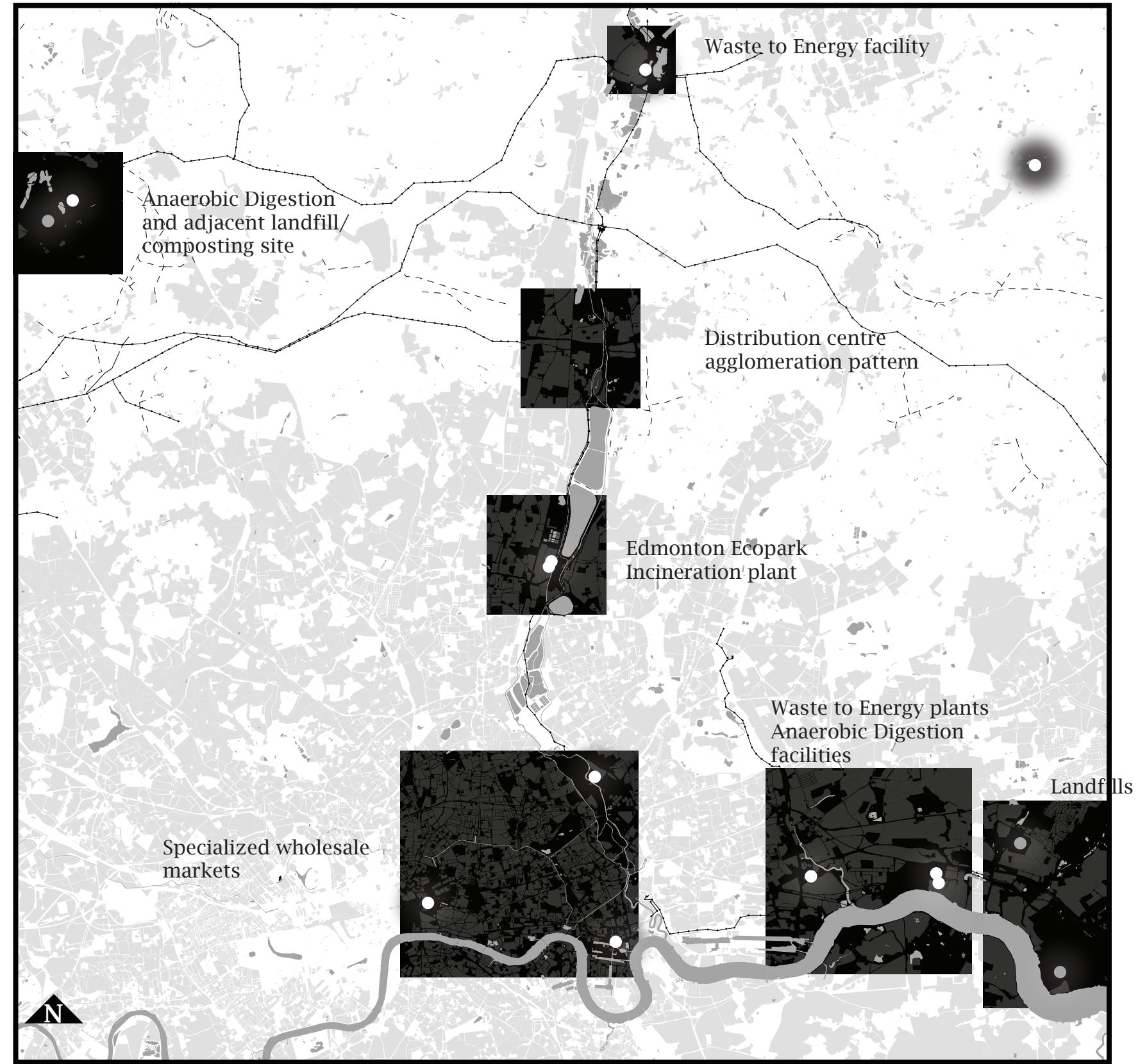
Mapping of places defined as hinterscape

Map 1 labels:
- Powergrid
- Anaerobic Digestion
- Composting
- Fish Iceland, Norway
- Incineration
- Landfills
- Air Freight
- Overseas Freight
- Waste Export
- Fish Mid/Southern Europe

Map 2 labels:
- Waste to Energy facility
- Anaerobic Digestion and adjacent landfill/composting site
- Distribution centre agglomeration pattern
- Edmonton Ecopark Incineration plant
- Waste to Energy plants Anaerobic Digestion facilities
- Landfills
- Specialized wholesale markets

After the topo-morfological urban section, the places of interest were scrutinized. This is the urban landscape of the Anaerobic Digestion facility in Dagenham's Ecopark, characterised by powerline infrastructure.

*Edmonton's Ecopark where one of the three
incineration plants of London is situated is shut off
from the rest of its environment. The facility becomes a
boundary between neighbourhoods.*

New Spitalfields Market is situated in the southern
tip of the Lee Valley Regional Park. The park itself
is a production system of water treatment, however it
is used for leisure activities and appreciated as natural
landscape.

Research essay

In contemporary society we are experiencing a division between city and hinterland. Or at least, that is what we think. Metropolitan centres of power have been, most of the time, required to look for resources beyond their geographical boundaries. Ancient Rome was heavily dependent on its grain import from their overseas colonies like Egypt. Many periods of famine have been known to ravage ancient Rome as the cities' import flows were severed by riots or extreme drought ruining the colonies' crops. In the case of London the imperial history of the British Empire plays a role in our understanding of material flows between the city and 'planetary' hinterland. The port of London was the relay in between the western consumer and the production system of the Empire's colonies, reaching far into the 1900's. Spices and other exotic products were imported and displayed in warehouses where they were sold in bulk and transported to specialized wholesale markets in London. The port and linked wholesale markets were and still are nodes of exchange where the material entwinement of city and hinterland is visible.

The dynamic between city and hinterland is evident although in our society, the hinterland is thought to be the city's environment. This suggests a conceptual static dualism. Critical urban theorists Neil Brenner and Nikos Katsikis focus their research on historical geographies in relation to contemporary supply-chain capitalism. They argue that the hinterlands problematique is based on multiple static dualisms. Because of the reality of planetary urbanisation it is unthinkable that city and nature are a dichotomy. As Brenner and Katsikis rightfully ask *"Given the de facto heterogeneity of agglomeration patterns, can a universal notion of 'the' city be maintained?"*, they suggest the entwinement of the two. Rigid analytical constraints within mainstream urban theory limit our view on these static dualisms (Brenner & Kastsikis, 2016). Why can these concepts not be reworked into something that acknowledges this problem? The core of the problem suggests a deep-rooted conceptual imbalance between notions that we cannot grasp when put together. It is the task of the field of architecture and urbanism to recognize this dynamic in design. This essay focuses on finding an approach to integrate a reconceptualized notion of city and hinterland into an architectural construct.

'The City of Ships' (1940) showing the busy docks being worked by varying types of machinery.

The City and the concept of Nature

City and nature have broken apart in our minds much earlier. As most problems find its root in political economical structures of power, so did the dynamic between city and nature. Raymond Williams was a socialist critic around the mid 20th century who focused his writings on the changing meanings of vocabulary in relation to literature and society. Williams describes in *The Country and The City* by poetry and literature through the ages, the view of the English population on the division of classes that heavily coincide with their view on nature as towns grew into cities. The changes that the meanings of 'city' and 'nature' endure are striking and at the same time appalling. Williams traces back to the feudal age that is characterized by power structures that are considered a natural order. From an all providing nature and easy consumption, a paradise, it shifts towards something

that needs hard labour. Serfs and peasants work for their lord and provide, or better bless, him with basic needs. As the land he owns turns into wealth, from feudal power structures to that of capitalist agriculture, social relationships are reduced to a moneyed order (Williams, 1973).

This is where Williams warns for evident crises of contemporary values. Critique on contemporary capitalism, a new moneyed order of our own time, often coincides with carrying feelings to an irrecoverable pre-capitalist world. However, many forget the circumstances of such a world. For example, in *"Hungry City"* (2008), Caroline Steel romanticizes the relationships between city and its hinterland during the feudal ages. This is something we really have to be careful about, power structures can not easily be ignored. Williams advises caution, as this kind of critique or fetishization of a past world comes with social values, that if they become active, at once jump to the defence

of certain social hierarchies and moral stabilities. In a contemporary application this can be very dangerous (Williams, 1973).

Williams explains a more dramatic shift in poetry called *"The Green Language"*. During this movement there are two notable changes in how we perceive nature. There is the separation of possession, the control over land and its prospect. And on the other hand, there is the separation of spirit, the identification of forces which we need to learn from and not control. These two notions go simultaneously with two principles of Nature. There is the ordering principle of which human activity seeks to rearrange and control. However, there is also the principle of creation, wherein the creative mind takes part and shows truths to our own human nature.

> *"It is not now the will that is to transform nature; it is the lonely creative imagination; the man driven back from the cold world and his own natural perception, and language seeking to find and recreate man. This is the 'green language' of the new poetry"* (Williams, 1973, p.193)

As *"The Green Language"* suggests a more anthropocentric vision of nature, it sheds more light on how we perceive nature in the city/nature dichotomy. Both principles of *"The Green Language"* determine that the concept of nature is fundamentally contradictory. Neil Smith elaborates on Marx' concept of nature. Partly borrowed from Hegel, Marx recognized Nature as two derived principles; *'first* nature' and *'second* nature'. First nature is here seen as a conceptless occurrence, this can be put parallel to Williams' description of *"The Green Language"*, a principle of creation. A tree, without human intervention, does what it does, it lives and dies. Second nature is then on the other hand the world of men. Second nature starts where the tree is turned into planks to craft a chair. It is a manifested reason. Marx' notion of Nature is tied to the labour process.

> *"The world of men as it takes shape in the state, law, society, and the economy, is for him 'second nature', manifested reason, objective Spirit. For Marx, Smith*

> *explains, 'society itself (second nature) is precisely because 'men are still not in control of their own productive forces vis-à-vis nature."* (Smith, 1984, p.19)

According to the notion of *first* nature, Nature presents itself in use-values. However, in capitalist society, use-value is handed in for exchange-value. Through this change, social and societal values become more and more attached to the process of production. Smith therefore argues that the production of nature stands at the centre of our perception of Nature. Smith suggests the material landscape poses itself as a process of the production of nature. The differentiated results of this type of production is what Smith calls the 'material symptoms of uneven development' (Smith, 1984). In order to fully grasp the concept of Nature, the production of Nature as well as its consequences need to be elaborated upon.

Neil Smith implies that the metabolism of human beings with nature is the process whereby human beings appropriate the means to fulfil their needs and return other use-values to nature (Smith, 1984):

"It is an eternal nature-imposed necessity, without which there can be no material exchanges between man and nature, and therefore no life'. But labour effects more than just a simple change in the form of matter; it produces a simultaneous effect on the labourer. 'Labour is, in the first place, a process in which both man and nature participate, and in which man of his own accord starts, regulates, and controls the material re-actions between himself and nature. He opposes himself to nature as one of her own forces, setting in motion arms and legs, the natural forces of his body, in order to appropriate nature's productions in a form adapted to his own wants. By thus acting on the external world and changing it, he at the same time changes his own nature."(Smith,

1984, p.35)

Production of material life, or to say second nature, involves mainly the production of workers, or to quote Smith, the reproduction of labour power. Social relations come into play in this realm of production. As Williams suggested earlier social structures become the precipice of power structures. The most basic is the split of labour between the sexes. Smith elaborates that this is the first fundamental social division of labour, however he also implies that its creation lies in pre-human social organization. Unfortunately, Smith does not elaborate on the fact what this pre-human social organization comprises of. He does however conclude that human society is concurrently natural and social, showing the unity of nature.

This unity of nature then heavily coincides with the production and concept of space. Both nature and society are mostly conceptualized as

two different spaces, mainly focused on the material aspects of the concept of space. As established, human society is simultaneously social as well as natural. The concept of space is in its definition a social product.
Smith elaborates on three kinds of spaces, which were the result of Newtonian thinking. Newton made the distinction between absolute space which marked physical, biological and geographical processes as the natural principle of physical space, and relative space, the undefined space of human social relations which was then adopted as 'social space'. Social space thus acts within absolute space yet remains untouched, or in Newton's words, is relative (Smith, 1984).

According to Smith the material basis for the bifurcation of physical and social space lies in the process of second nature out of first nature. This process comes together within geographical space, although inherently different. Although geographical space might seem social it is innately physical. As defined by

Smith this particular subset of absolute space comprises of "the physical space of cities, fields, roads, hurricanes and factories." Geographical space is therefore in its definition ambiguous as it tries to identify social relations and processes within absolute natural space. As a result of the development of identification of geographical space, the relationship between natural and social space becomes more problematic, as well as the ambiguity of the meaning of physical space becomes clear. As Smith concludes:

'The conception of the 'production of space' is meant to provide a means of taking the next step and enabling us to demonstrate rather than simply assert the unity of space and society. (…) Space is no longer an 'accident of matter' but a direct result of material production." (Smith, 1984, p.77)

In conclusion, the production of nature coincides with the concept of space. In terms of the hinterlands problematique society and nature are seen as separate spaces. Smith

elaborates and provides insights on this ambiguous boundary we have defined through the last couple centuries. In practice we, as a society, will have to demonstrate the ambiguous relation between natural and social space as its current conceptual framework only allows for a framework tied to the absolute conception of space. The development of second nature out of first nature will have to be addressed as part of our conception of space. As the production of Nature is established as the core of the hinterlands problematique, it is understandable that a theory is needed that transgresses the conventional way of thinking about Nature. This leads to an intriguing concept that has emerged in the last century.

Bike in a Tree. The entwinement of first and second nature.

The pioneering cyborg theory of Donna J. Haraway suggests a way out of these dualisms and ambiguous conceptual boundaries. Haraway's intent is essentially to abolish power structures of man-oriented society imposed on women by suggesting a phenomenon that is not bound by the traditional concept of Nature. This theory reworks the notion of nature and provides insights on how architectural apparatus could play a role in this progressive way of thinking.

The theory behind the cybernetic organism goes much deeper than only the rework of Nature. As Nature is reworked, Culture is reworked as well. The cyborg as Haraway puts it, is a hybrid creature. It is constructed of organism- and machine parts. One does not hold power over the other. Creating completeness from parts, including those of polarity and hierarchical power structures. Because the cyborg is neither man nor woman the notion of reproduction of Nature, or in that sense the production of Nature, rewrites itself (Haraway, 1991). Production becomes the assemblage of parts, so to say, building a self-identified nature out of second nature (society and all its social relations and processes, including the political and scientific).

"No objects, spaces, or bodies are sacred in themselves; any component can be interfaced with any other if the proper standard, the proper code, can be constructed for processing signals in a common language." (D. Haraway, 1991, p.163)

Matthew Gandy, by means of researching water infrastructure in relation to cultural and histrocial human society, explains that the idea of the cyborg has been used as a means to explore the interface between technology and the body (Gandy, 2005). Haraway explains that apart from the fusion of body and technology, the other essential ingredient is 'machines in their guise', as communication systems, texts, and self-acting, ergonomically designed apparatus. She suggests a network ideological image, with which she implies a profusion of spaces and identities but also the permeability of boundaries. Weaving is the method of oppositional cyborgs. Through these methods she opposes dualisms that have been persistent in Western society characterised by power structures:

"domination of all constituted as others, whose task is to mirror the self. Chief among these troubling dualisms are self/other, mind/body, culture/nature, total/partial." (Haraway, 1991, p.177)

This weaving is supplemented by immunological thinking wherein the immune system has the ability to regulate itself using only itself, as suggested by Niels Kaj Jerne´s immune theory. Through the interlocking of internal recognitions and responses, the immune system will always be in a state of dynamic internal responding. Therefore, it is immanent that it will always be active, that it would not have to wait for stimuli from an outside entity. Haraway argues that there then could be no exteriority that the immune system had not already mirrored internally. Consequently, ´self´ and ´other´ lose their oppositional quality and transform into delicate plays of partially mirrored readings and responses. To quote Haraway;

"The notion of the internal image is the key to the theory, and it entails the premise that every member of the immune system is capable of interacting with every other member." (Haraway, 1991, p.218)

Although abstract, the notion of the cyborg suggests a way out of things that are either politically complicated, morally defined by society, or just plainly conceptualized as two different entities while ambiguously forming one system.

Stellark´s ´Third Hand´ prosthetic arm.

The cyborg can be translated into architectural or urban terms to understand what this would mean in contemporary society, what its complication are, but also how it could elaborate on how we perceive city and architecture as relational constructs.

Gandy elaborates on the notion of the cyborg on urban scale. He explains that a comparison can be made between the cyborg playing a role as the material interface between body and city and the physical infrastructures that link the human body to technological networks. In this way, the city can be conceptualized and visualized as a system of interconnected life-support systems. Therefore, many envelopes become the exoskeleton of what we perceive as our body in relation to the city as it provides us with contemporary basic needs. The technological networks span from sewage pipes, and electrical

wires within the ground to the elevated powerlines in the sky. In this sense the city can be conceptualized as a single entity that holds machinic properties and is thus a prosthetic extension of the city. However, this has been challenged by 'a hybridized conception of space as a system of technological devices that enhances human productive and imaginative capabilities.' (Gandy, 2005).

"The organicist city of the modern era was founded on a clear separation between mind and body that enabled the city to be conceptualized as a coherent entity to be acted upon, disciplined, regulated and shaped according to human will. The emergence of the neo-organicist city, in contrast is founded on the blurring of boundaries rather than their repeated delineation." (Gandy, 2005, p.29)

Gandy elaborates on one principal dimension to contemporary neo-organicist urban thought. It is about the convergence of ideas surrounding the 'thinking space' of the city and the indeterminacy of spatial forms.

When the relation between body and city is further conceptualized as a thinking machine, then the analytical focus shifts towards the identification of those critical networks that sustain the relationship between the body and the city (Gandy, 2005). Maria Kaika elaborates on this by stating that the city and home only appear to function autonomously because of the fetishization of the flow of natural elements and social relations, and being visually severed in the case of the hidden city, technology networks. Her work is focused on establishing a conceptual framework that aims to define city and nature as socio-evironmental hybrids. She uses the example of the water systems, inherently linked to cities, that flow in between the natural, the urban, and the domestic sphere. It uncovers that nature and city are not separated space envelopes, but rather, as she coins, hybrids. These systems are neither completely human-made nor natural. She concludes that they are the outcomes of the same socio-spatial

process of the urbanization of nature (Kaika, 2005). These hybrid spaces also become politicized as they form complex systems within the ambiguity of relative and absolute space.

"In sum, the world is a historical geographical process of perpetual metabolism in which 'social' and 'natural' processes combine in a historical geographical 'production process of socio-nature' whose outcome (historical nature) embodies chemical, physical, social, economic, political and cultural processes in highly contradictory but inseparable manners." (Kaika, 2005, p.23)

The post-industrial city has been transformed through the last decades by a process of deterritorialization by rapid development of informatics. Communication technologies have been increasingly defying place-bound identities. Gandy suggests that the territorial and administrative structures associated with the industrial city have been displaced by an increased plurality and simultaneity of different spatial forms. Through instant deportation

made possible by intense technological development urban space has lost its 'geopolitical reality' according to Paul Virilio.

"The cyborg city is, in other words, close to an interpretative analytical framework that can connect analysis with the cultural and ideological realm of everyday life and include those 'unconventional' urban landscapes that have emerged outside the core metropolitan regions of the world economy and where incongruities and displacements are an even more pervasive feature of the urban experience." (Gandy, 2005, p.36)

The city when the ideological cyborgization of urbanism is applied becomes a relational construct, it becomes a polymorphous web that weaves body, technology and social practices. This new, but already existing landscape requires recognition and should reveal itself as the interface of these conceptually separated entities. How does such a relational construct manifest itself in architectural terms?

Architectural Cyborg Space

As previously mentioned, the cyborg operates through different spatial forms. It operates on the level of the body in relation to its environment, through relative and absolute space. It can be argued that architecture plays the role of an interface between these two defined entities. Georges Teyssot argues that the cyborg has unfolded the way our bodies truly dwell in society. His research focuses on topo-analyzing spaces. He urgently suggests that society ought to no longer base itself on the metaphysical and traditional dichotomies, because digital technologies have gradually been blurring these traditional distinctions. Architecture should therefore no longer be defining an environment exclusively for 'natural' bodies. He vouches for architecture defining and imagining an environment for bodies projected outside themselves, by means of their technologically extended

senses (Teyssot, 2005).

The state of the body becomes an arrangement seeking communication between interior and exterior. The body then crosses through surfaces which delimit our surroundings. In that sense the surfaces that comprise the interface (etymologically the interface can be understood as a thing between surfaces) can be visualized as communication devices. Haraway states that the world is subdivided by boundaries pervious to information, as information allows for universal translation. Immunology theory is therefore a *natural* example of a communication device. She suggests that communication sciences and biology, are constructions of natural-technical objects of knowledge in which the difference between machine and organism is thoroughly blurred; mind, body, and tool are on very intimate terms (Haraway, 1991). If architecture plays the role of interface, it can be reconceptualized as a communication device, a construct that

responses and mimics separate entities through its surfaces as it is permeable to information. Architecture then simultaneously acts as an intelligible environment and becomes responsive.

During the late seventies many new forms of architecture were explored and the rise of new materials gave way to new types of space. Nicholas Negroponte sought a new way how architecture would have to behave in an environment that was increasingly becoming machine, and consequently intelligible. His work focused on interactions between humans and intelligent machines. In his book *Soft Architecture Machines* Negroponte makes a distinction between three types of approaches towards a responding architecture; flexible, manipulative, and responsive environments.
The main difference is the way architecture is processed by the user. A manipulative environment is a very static environment in which the user provides physical transformation to the environments' objects for example.

The manipulative environment is a passive one, one that is moved as opposed to one that moves. What an intelligent environment strives for is its responsiveness to the user, it is taking an active role, initiating changes as a result of computation. Responsiveness suggests that it must have purpose and intentions and able to compute or create models of the user and operate within them in the particular context. It is therefore not a regulatory control system, rather an intelligent system (Negroponte, 1975). Negroponte addresses multiple types of responses which are not relevant to this case as it features very particular futuristic visions, however the overall theory about responsive architecture provides insights for architecture as cyborg.

Negroponte also elaborates on responsive materials and makes a distinction between softs and cyclics. Soft materials, for example inflatables, present themselves as the most natural material for responsive architecture as they feature motor reflexes by simple

controls. Negroponte argues that the response is in that case architectural, however the system hardly comprises intelligent behaviour. Furthermore, he points to an approach that is at that time not yet explored, the property of memory. He proposes the example of cellular pneumatic structures that integrate pressure-sensing devices in every cell, by which they become memory themselves. In this way the structure can respond locally to body movements and interactions. As Negroponte says, *'we could directly push and pull upon memory.'*
There is also the distinction between *soft* and *hard* architecture. Hard architecture is defined by Negroponte as architecture consisting of more permanent materials, like stone, wood, and concrete that are by definition in their material properties not capable of morphing to different shapes as they are the medium themselves, while soft architecture consists of, for example, inflatables that uses a dynamic medium, like air or water. The concept of memory as suggested by Negroponte

can however be implemented into hard architecture. This is however much more difficult as, for example, concrete surfaces require large mechanical systems to motor them.

Cyclics are considered to be part of architectural responses in a coarser time grain. Negroponte makes the assumption that we can develop a continuous construction and destruction process. In this case architectural transformations could be taking place on a day-to-day basis, providing an impermanence and thus responsiveness to architectural structures (Negroponte, 1975).

The notion of the cyborg instigates, when implemented into architecture, some type of interface that acts as a relational construct. It provides an environment that responds and mimics its internal dynamics between body and environment, which is simultaneously projected onto entities trying to communicate. It can then be concluded that architecture becomes a

construct that blurs its own boundaries to arrange interactions with its surroundings on different spatial terms. An architectural construct can then behave as a communication device, searching for an ambiguous common ground where different entities meet. By definition this requires some kind of responsive environment that can adapt or respond to continuously transforming systems.

The Cyborg, the City and the Hinterland

The city/hinterlands dichotomy is fundamentally flawed through its defined concepts as two opposing separate entities. The cyborg approach is not meant as the ideal solution, but to break up conventional thinking. It is meant to add to the discourse of how architecture and urbanism could complement each other as one relational construct in order to undertake action within the hinterlands problematique.

The pivotal question in the hinterlands problematique is how we define the urban phenomenon. Brenner and Katsikis vouch for the relaxation of static dualisms that occupy mainstream urban theory; city/countryside, urban/rural, interior/exterior, society/nature. It is then vital to find a way to relax these dichotomies. In terms of the hinterlands problematique it lies in the way we view and perceive nature, how we define its conceptual ground. As we have to cope with planetary urbanization processes, we have to redefine the concept of Nature. Smith points out that the concept of Nature is tied to the process of *second* nature out of *first* nature. It can be concluded that the contemporary world lives exclusively in *second* nature, the city has become second nature. We, as society, have to look at a way how to make nature out of *second* nature.

The cyborg is a hybrid creature that rewrites the production of Nature. As it is not defined by something created out of *first* nature, production becomes the assemblage of parts, building a *self-identified* nature out of *second* nature. It is permeable and responsive to information, the universal language of the cyborg, and thus seeks to communicate. By blurring conceptual and physical, boundaries it weaves through differential space. The cyborgization of architecture and urbanism can then be visualized as an interface, a relational construct that weaves itself through physical, but also relative space. It provides an architectural environment able to respond and mimic its internal dynamic, while simultaneously being permeable to information from 'outside', surrounding environment. In this way the notion of exteriority and interiority fall apart as they become one. *Self* and *other* lose their oppositional qualities.

The city and hinterlands require an approach that distinguishes the two, although ambiguously recognizing them as one concept or phenomenon. Architecture and urbanism ought to become a relational construct that weaves through systems that engage within differential space. Forming a hybrid space is then essential as it neither denies nor agrees that the city belongs to the hinterlands or vice versa.

We have long entered the era of the cyborg, it is time to acknowledge our nature and handle its consequences.

Bibliography

Brenner, N. (2016). *The Hinterlands Urbanised?* Architectural Design: p. 118-127.

Brenner, N. & Katsikis, N. (2020). *Operational Landscapes: Hinterlands of the Capitalocene*. Architectural Design: p. 22-31.

Gandy, M. (2005). Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City. *International Journal of Urban and Regional Research, 29(1)*, 26–49. https://doi.org/10.1111/j.1468-2427.2005.00568.x

Haraway, D.J. (1991). *A Cyborg Manifesto – Simians, Cyborgs, and Women*. London: Free Association Books.

Kaika, M. (2005). *City of Flows – Modernity, Nature and the City*. Abingdon: Taylor & Francis Group.

Negroponte, N. (1975). *Soft Architecture Machines*. London: The MIT Press.

Smith, N. (1984). *Uneven Development: Nature, Capital and the Production of Space*. Bath: The Pitman Press.

Teyssot, G. (2005). Hybrid Architecture: An Environment for the Prosthetic Body. *Convergence: The International Journal of Research into New Media Technologies, 11(4),* 72–84. https://doi.org/10.1177//1354856505061055

Williams, R. (1973). *The Country and The City*. London: Vintage Classics.

Site analysis

Forms a boundary

Perceived as first nature
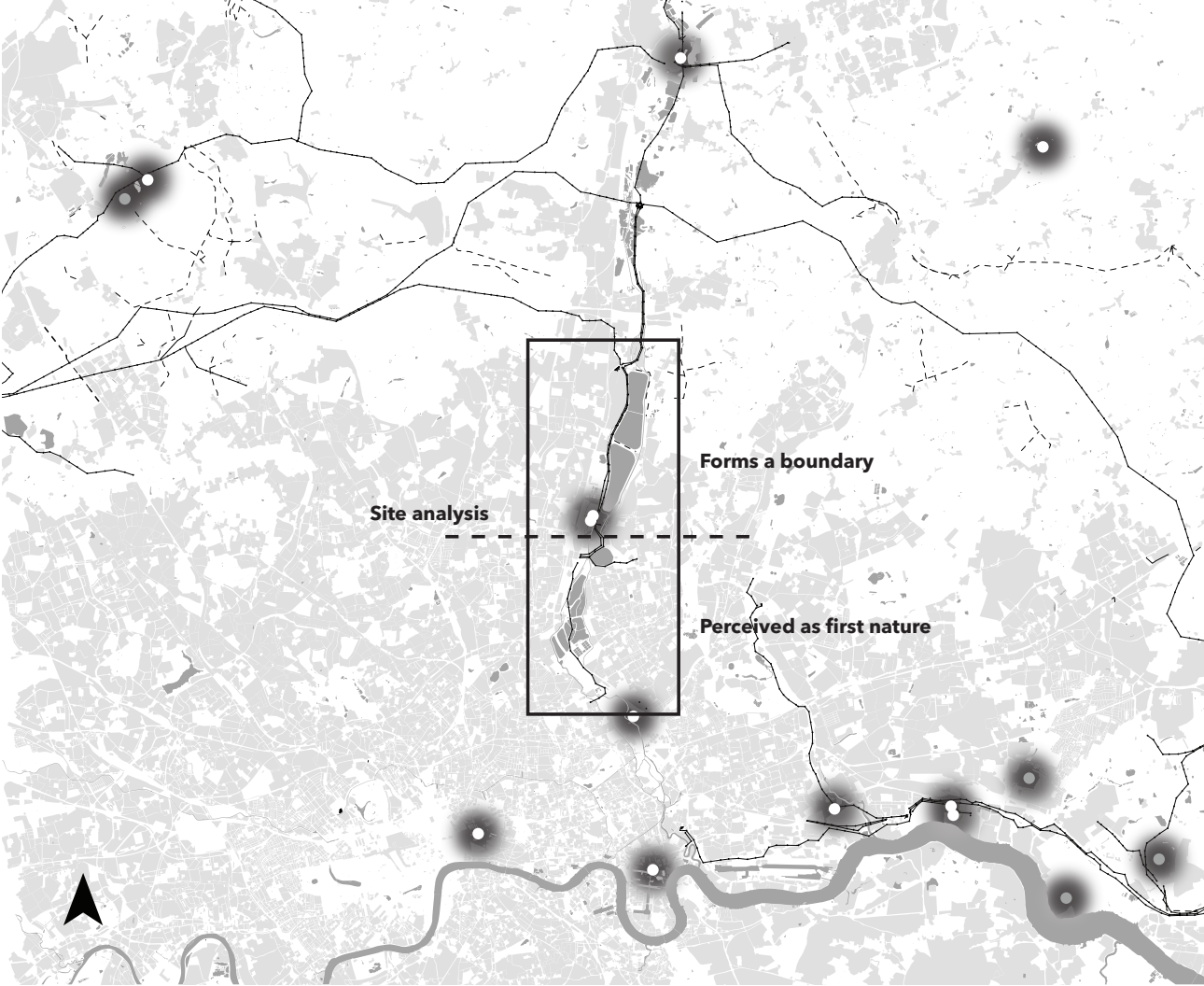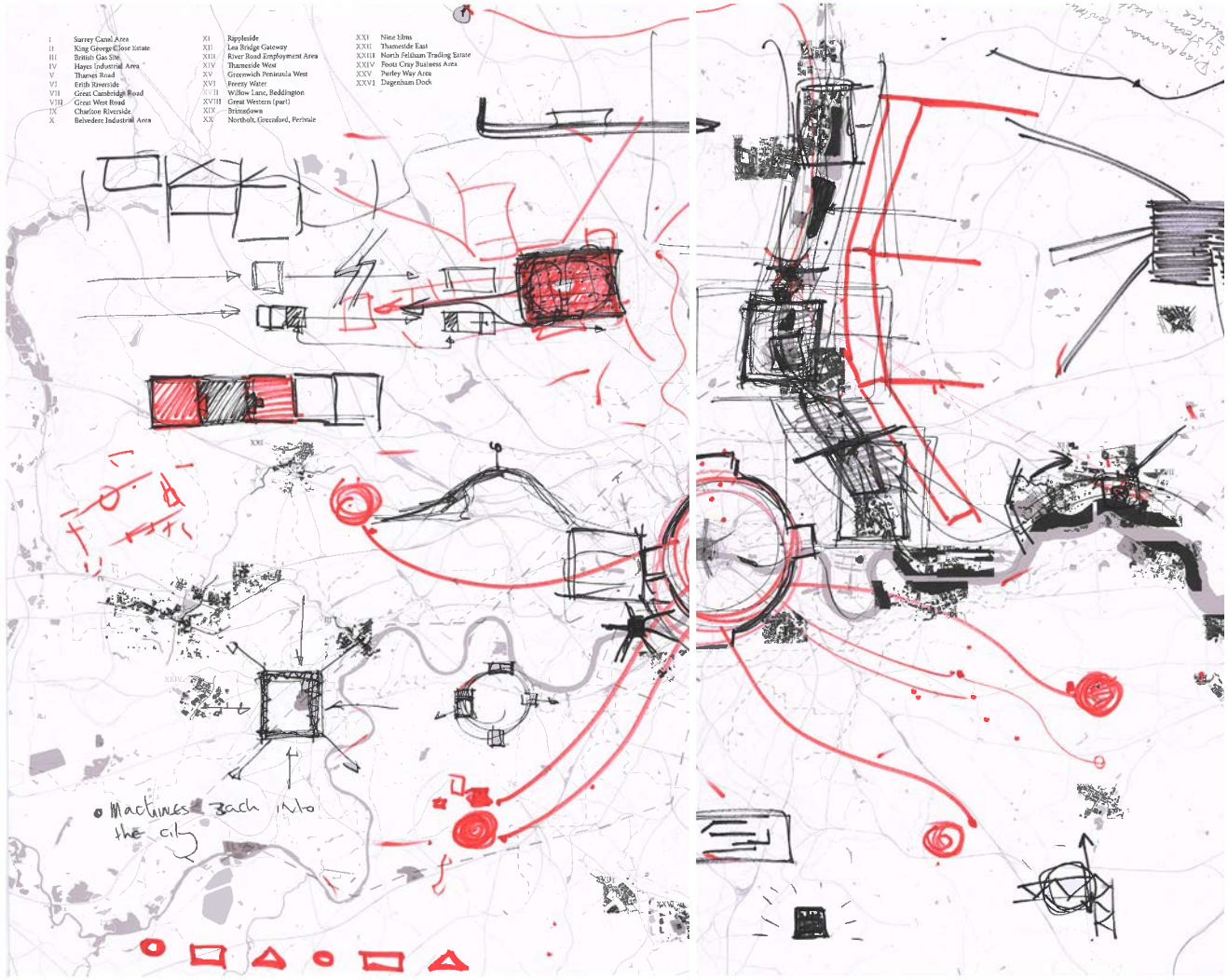
Site analysis at intersection closed and open reservoirs   1:10000

Railway

Edmonton center

A406

Western Residential Suburb shut off by traintracks.   1:10000

Flour Mill (factory)

Deepsham Sewage Treatment Works

Edmonton Ecopark

Industrial strip.   1:10000

William Girling Reservoir

River Lee Navigation

River Lee

Aggregate recycle plant

Although the southern reservoirs are partially open to the public, the northern reservoirs are completely shut off and form a massive boundary in northern London. The backside of Chingford Mount is unable to access the river Lea for safety reasons.   1:10000

The eastern residential strip is surrounded by the reservoirs and the A406. Small towncenters with a couple of shops provide basic needs. Public parks are situated as pockets in between rowhouses. Although totally empty fields, the English really appreciate it.

1:10000

PARK
DWELLING
PLAYGROUND
SPORTS
RECYCLING
DISTRIBUTION
ECOPARK
WASTE MANAGEMNT
COCA COLA
WATERWORKS
RETAIL
INCINERATION PLANT
COMPOSTING
CANAL
SHIP FREIGHT?
LEE VALLEY WALK
POWERLINES
PLEASURE CRAFT
WILD FOWL
WATER RESERVOIR
BARRIER
FILTRATION SYSTEM
DYKE
RIVER LEA
GREEN POCKETS
WATER LOCKS
FENCES
STREET
BACKSIDE NEIGHBOURHOOD
SUBURB
PARK POCKET
LEISURE
PLAYGROUND
SKATEPARK

LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON PUDDLE CLAY
LONDON PUDDLE CLAY
LONDON CLAY ALLUVIUM
LONDON CLAY ALLUVIUM
LONDON CLAY ALLUVIUM
LONDON CLAY ALLUVIUM
LONDON CLAY ALLUVIUM
LONDON CLAY ALLUVIUM
LONDON CLAY ALLUVIUM
LONDON PUDDLE CLAY
LONDON PUDDLE CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY
LONDON CLAY

1:5000

INSTALLATIONS
URBAN PLAYGROUND
PLANTATION
LABORATORY
URBAN PLAYGROUND
LABORATORY
INSTALLATIONS
PLANTATION
LIBRARY
WILD FOWL
LABORATORY
COMPOSTING
URBAN PLAYGROUND
COMPOSTING
PLANTATION
WILD FOWL
LABORATORY
INSTALLATIONS
WILD FOWL
LIBRARY PLANTATION
URBAN PLAYGROUND

PLANTATION   LIBRARY   LABORATORY

LONDON CLAY (repeated)

1:5000

88   89

Production Sector

Urban Sector   WATER SECTOR

Production Sector

Cellular Layout

Fractal Layout

neighbourhood

information becomes activity

RESERVOIR

interaction with ground

Roof structure

interaction with infrastructure

Precedents analysis

Atmospheric
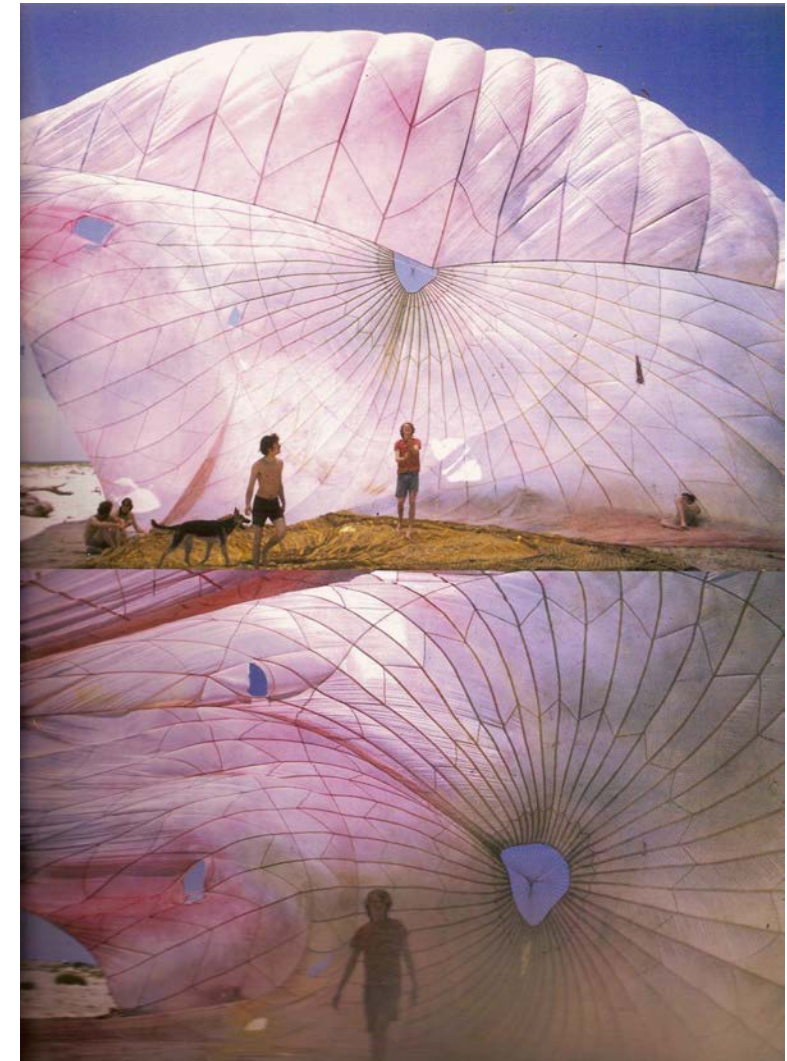
Pillow / ANT Farm / 1970

Blur Building / Diller Scofidio + Renfro / 2002

Tower of the Wind / Toyo Ito / 1986
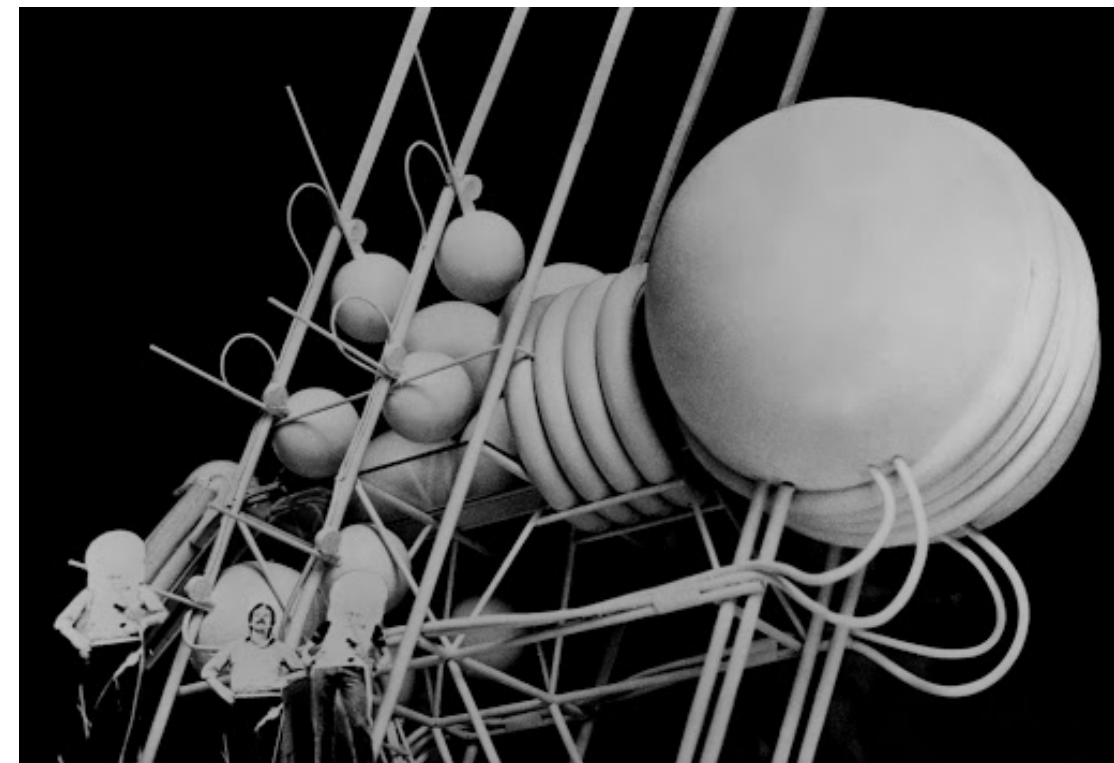
Villa Rosa / C. Himmelbau / 1968

Fondation Cartier pour l'art contemporaire / Jean Nouvel / 1994
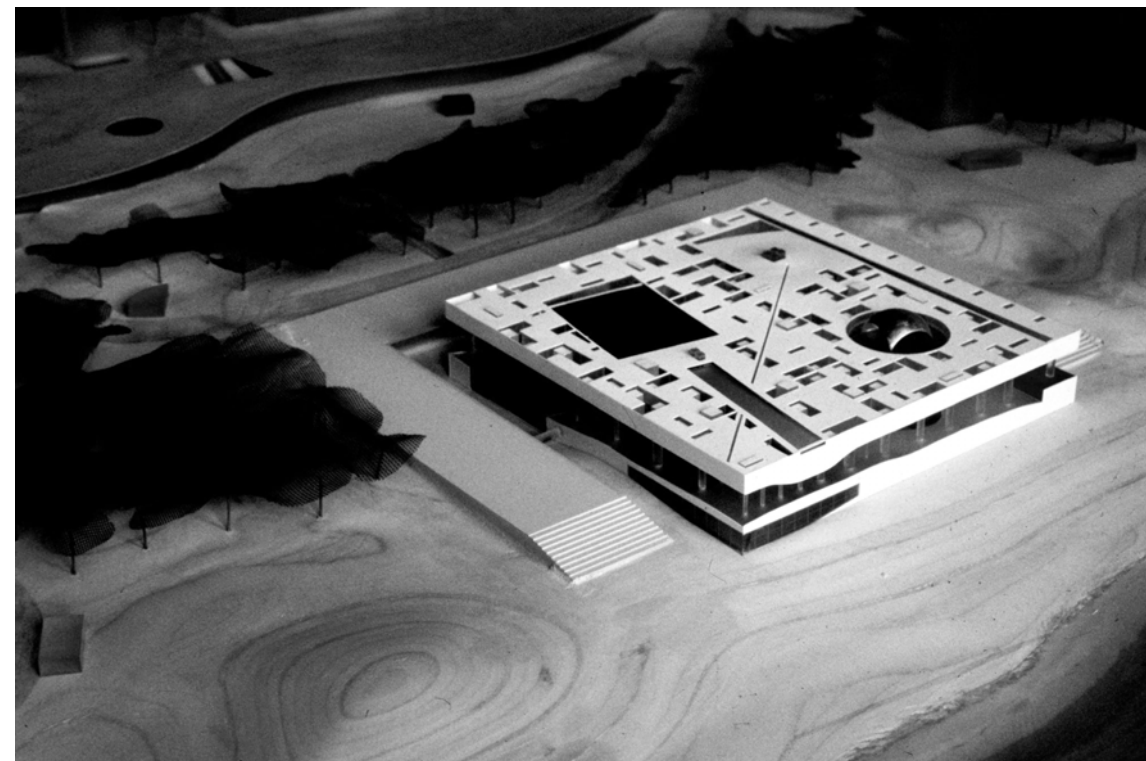
Agadir Convention Centre / OMA / 1990

Agadir Convention Centre / OMA / 1990
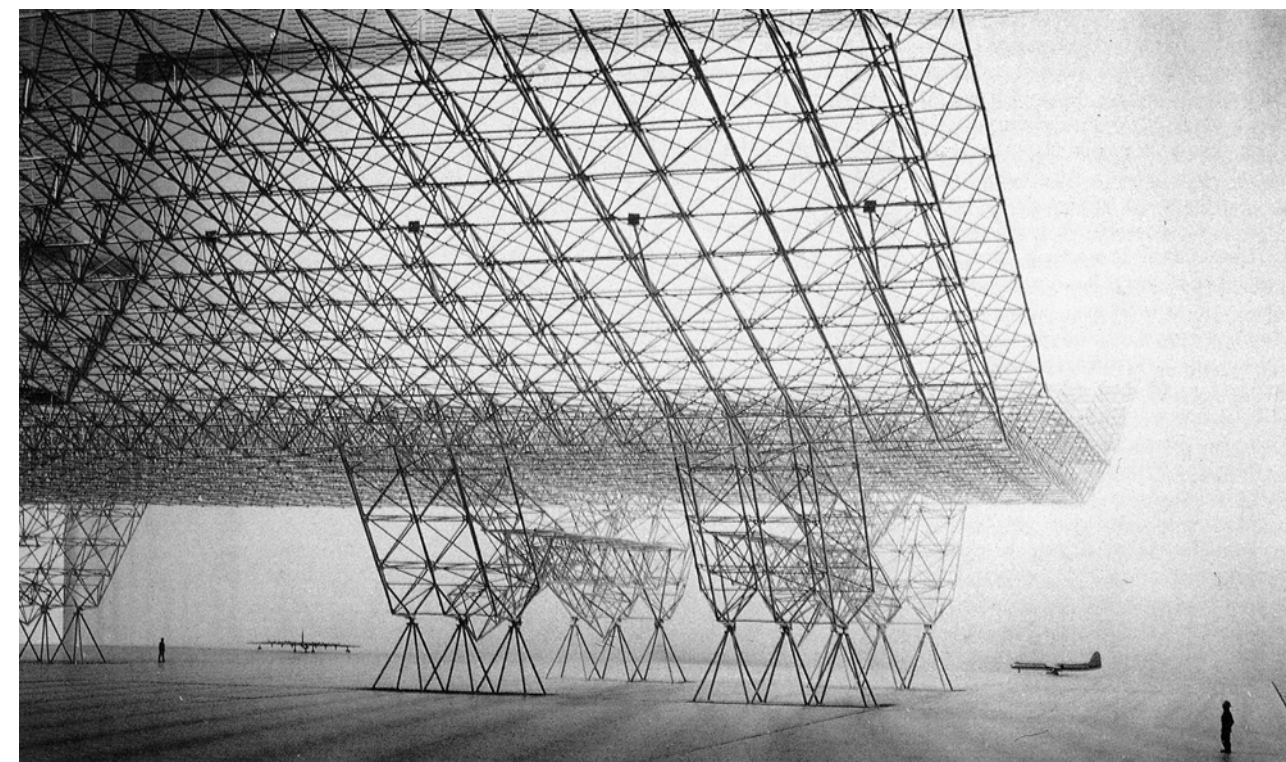
USAF Aircraft Hangar / K. Wachsmann / 1951
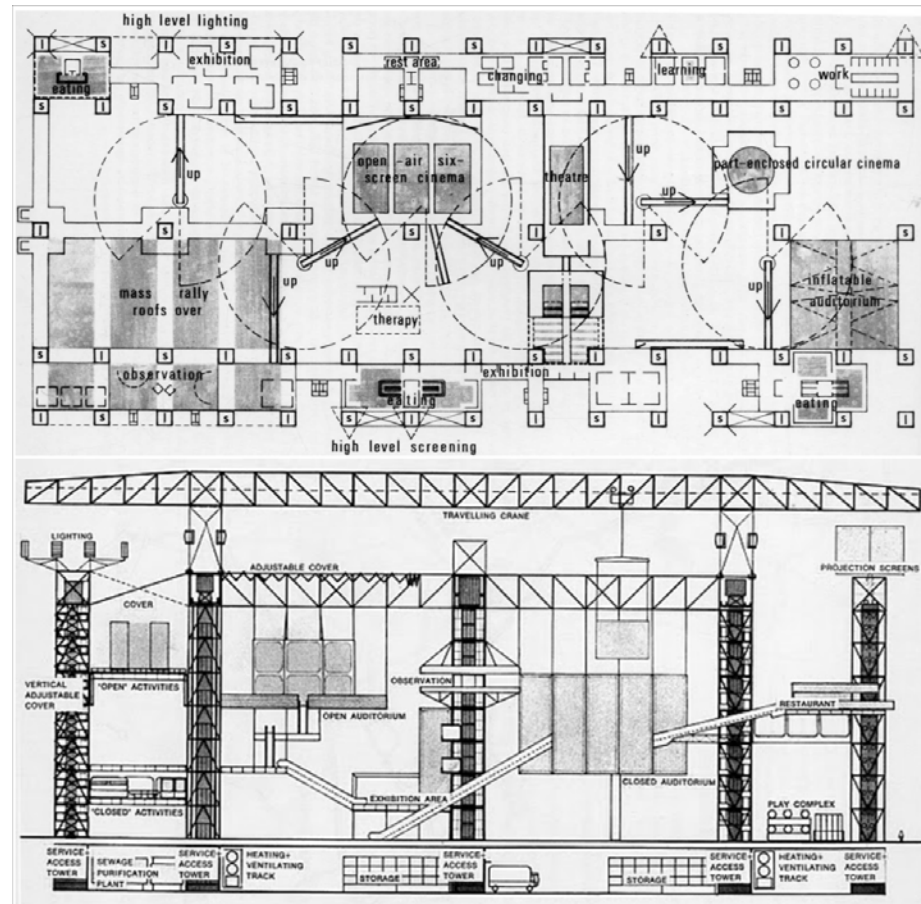
Fun Palace / C. Price / 1964

Territorial

Detroit Think Grid / C. Price / 1971
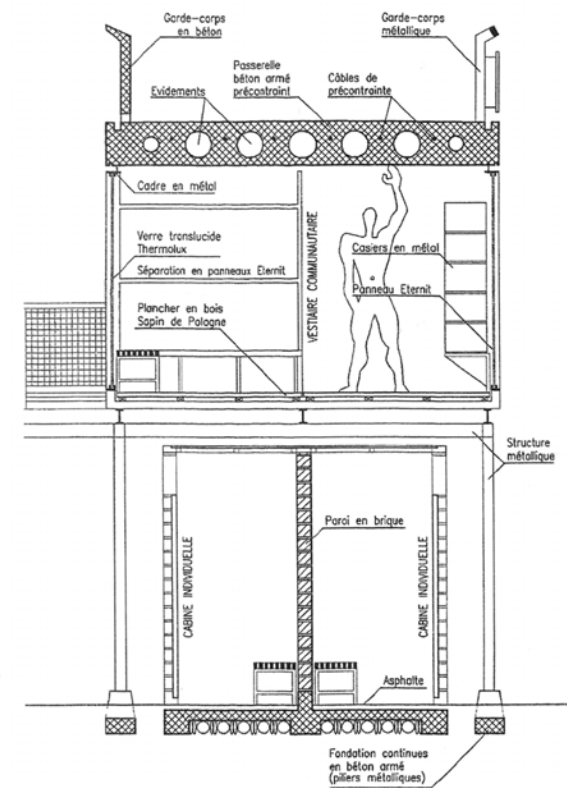
Il Bagno di Bellinzona / A. Galfetti / 1970

Calabria University / V. Gregotti / 1995

Potteries Thinkbelt / C. Price / 1971
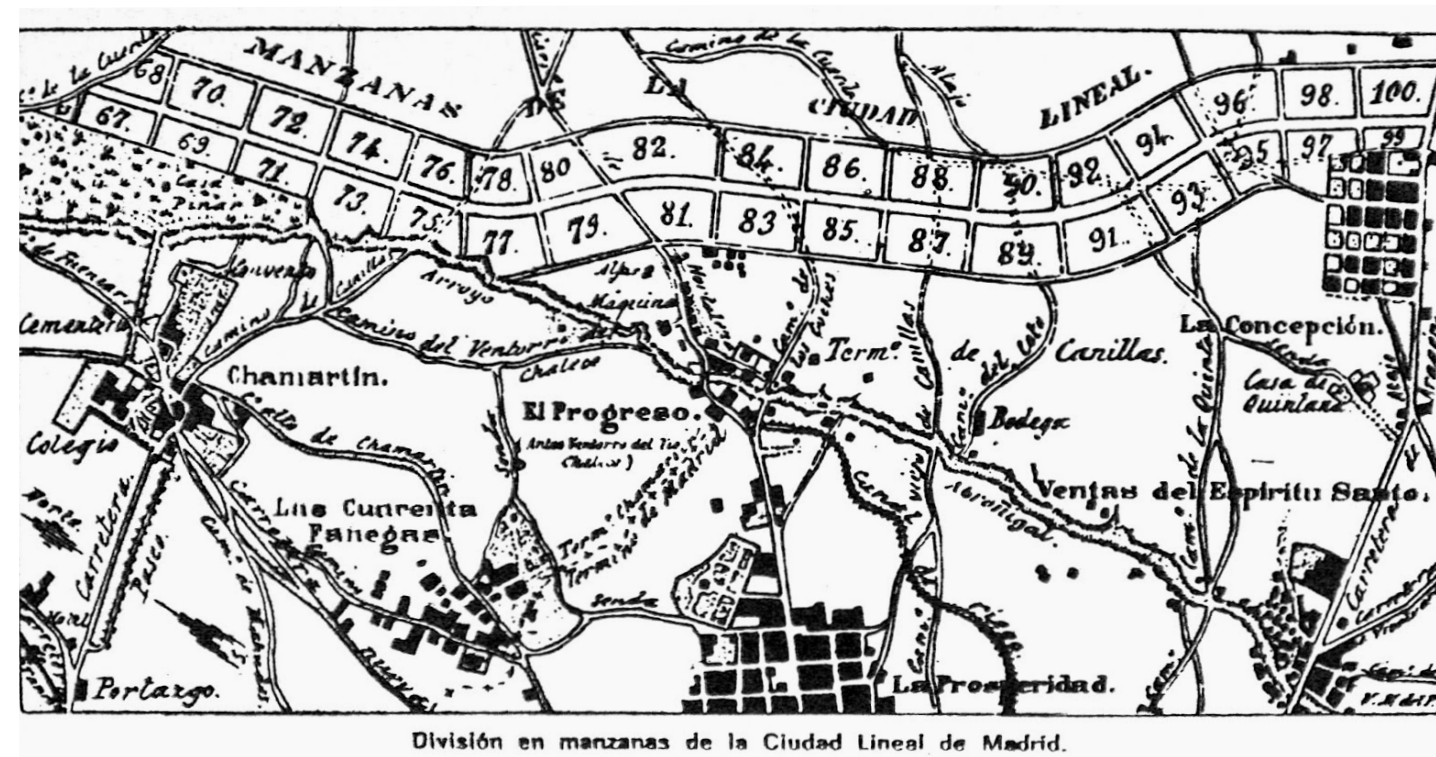
Ciudad Lineal / A. Soria y Mata / 1900

STRUMENTO A   STRUMENTO C   STRUMENTO D
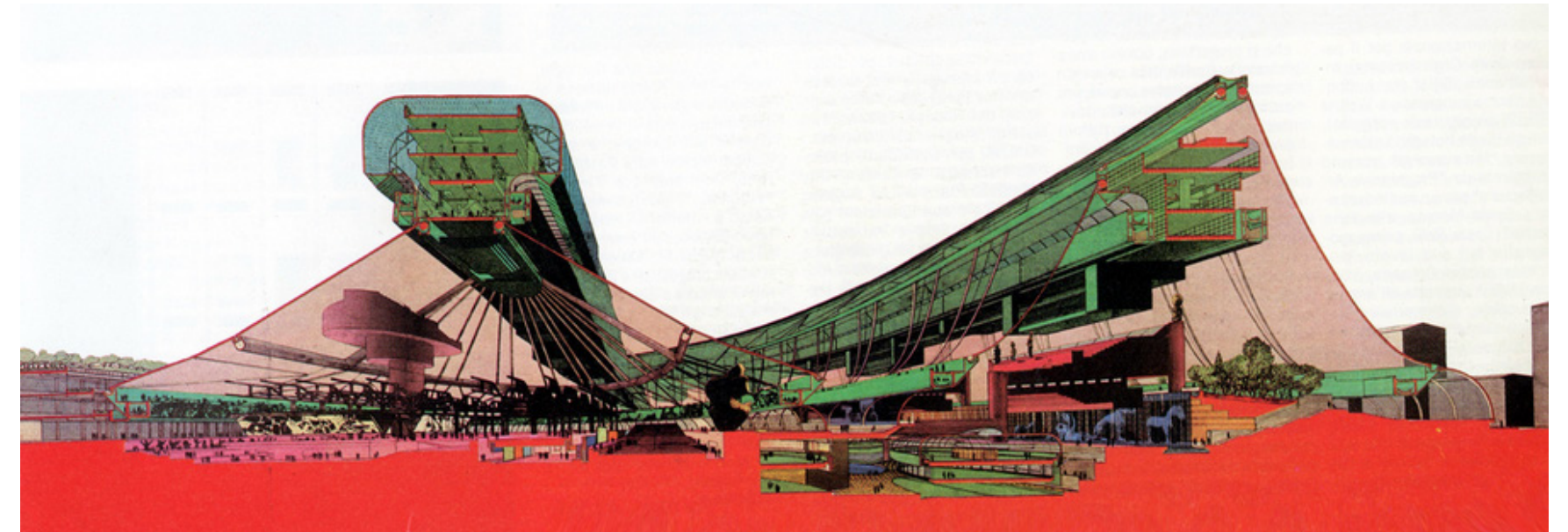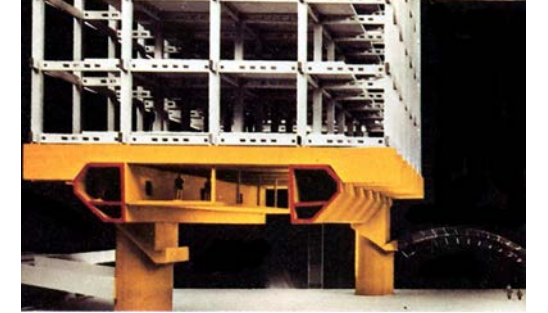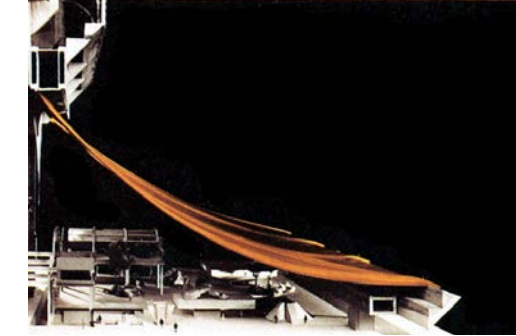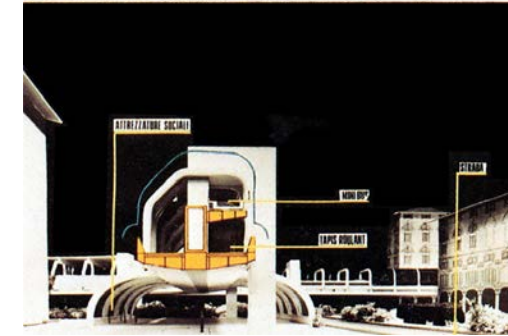
Lingotto Factory competition entry / L. Pellegrin / 1985

Neom: The line / Saudi Arabia / 2020s

Megastructure
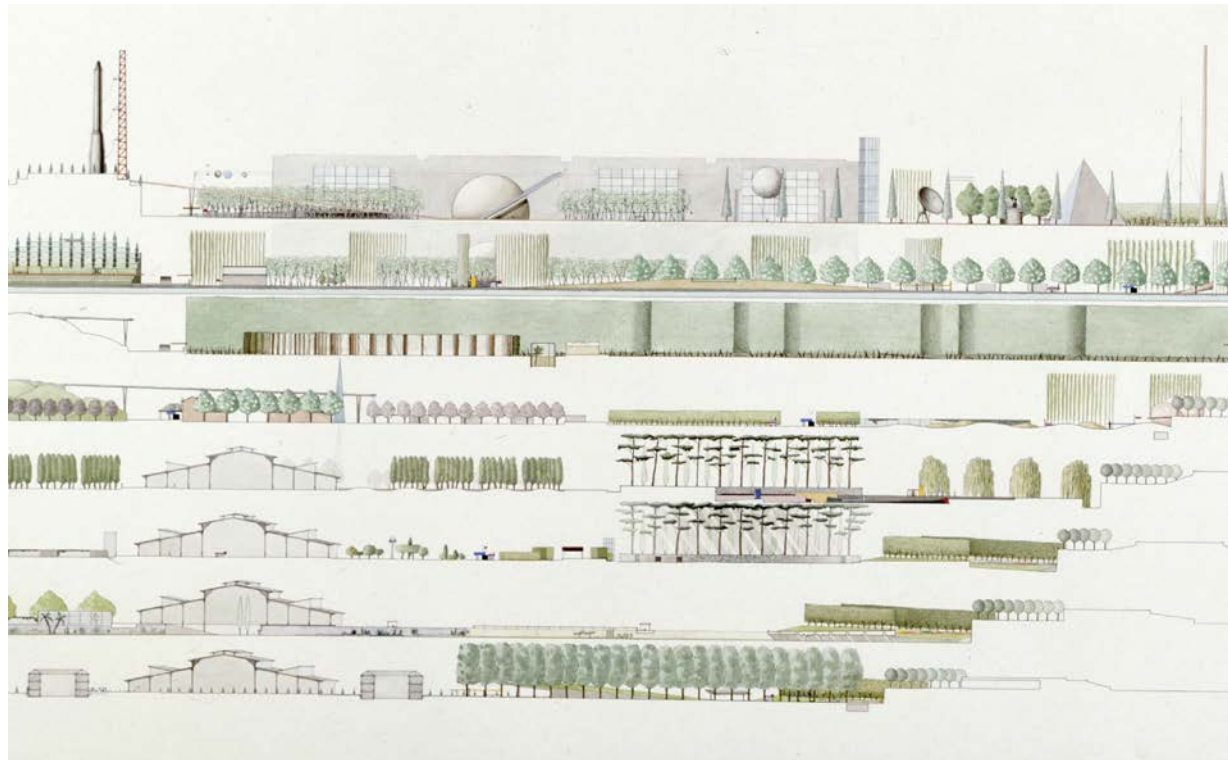
Parc de la Villette / OMA / 1982
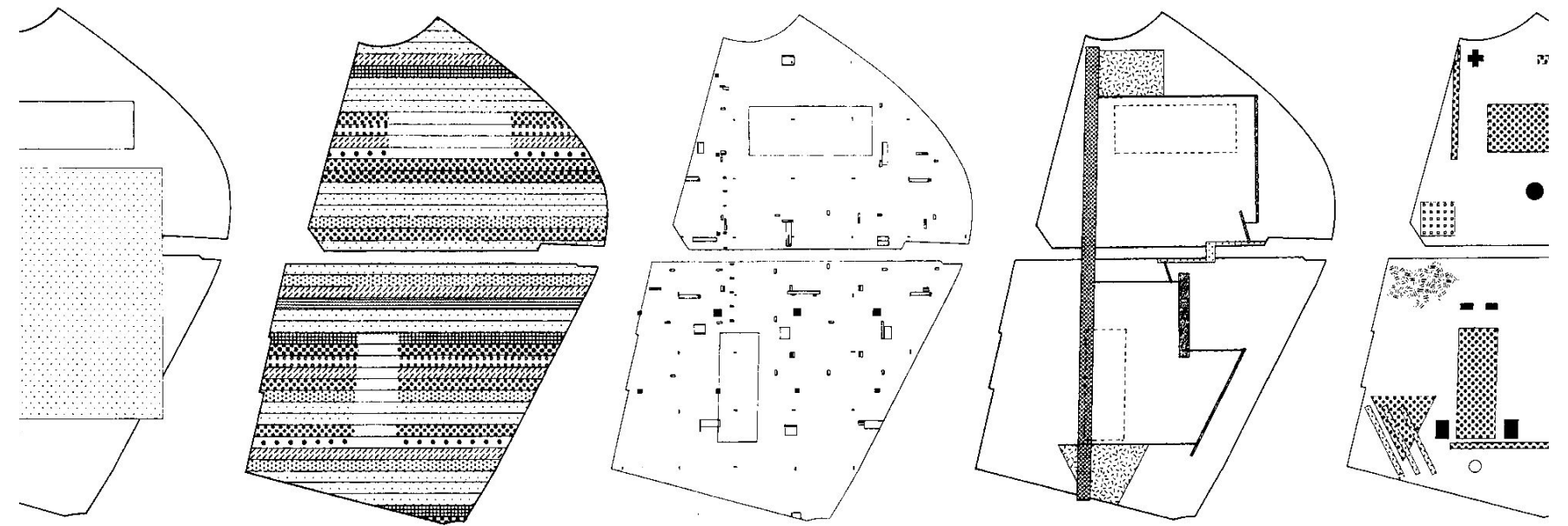
esis (scale: 1/20,000)   *The strips*   *Point grids, or confetti*   *Access and circulation*   *The final layer*
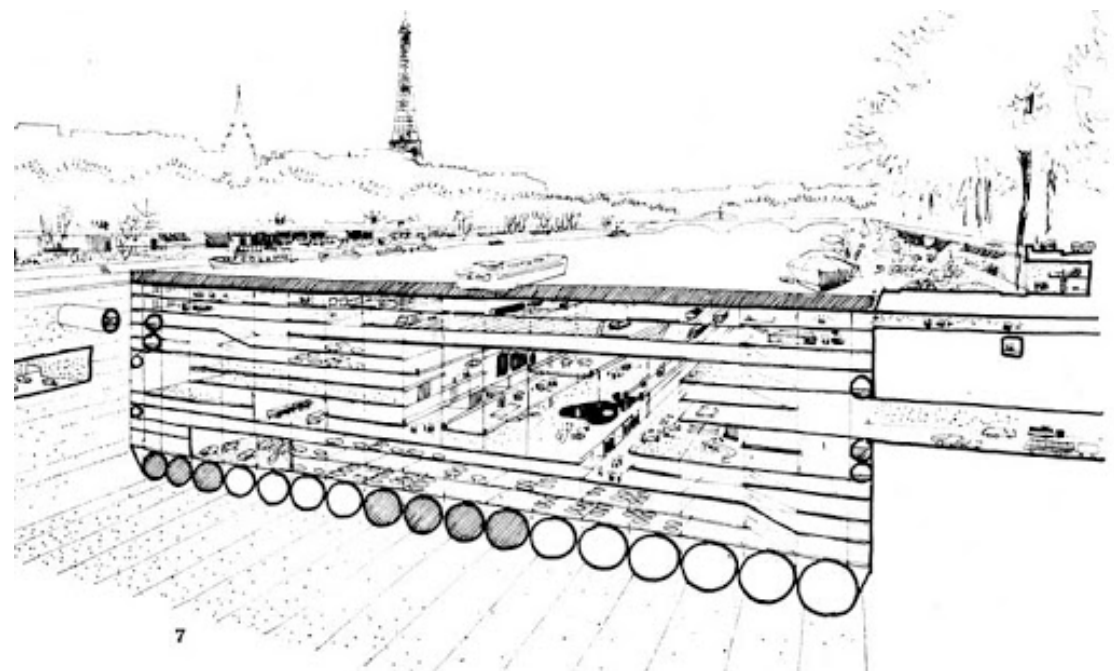
City under the Seine project / P. Maymont / 1962
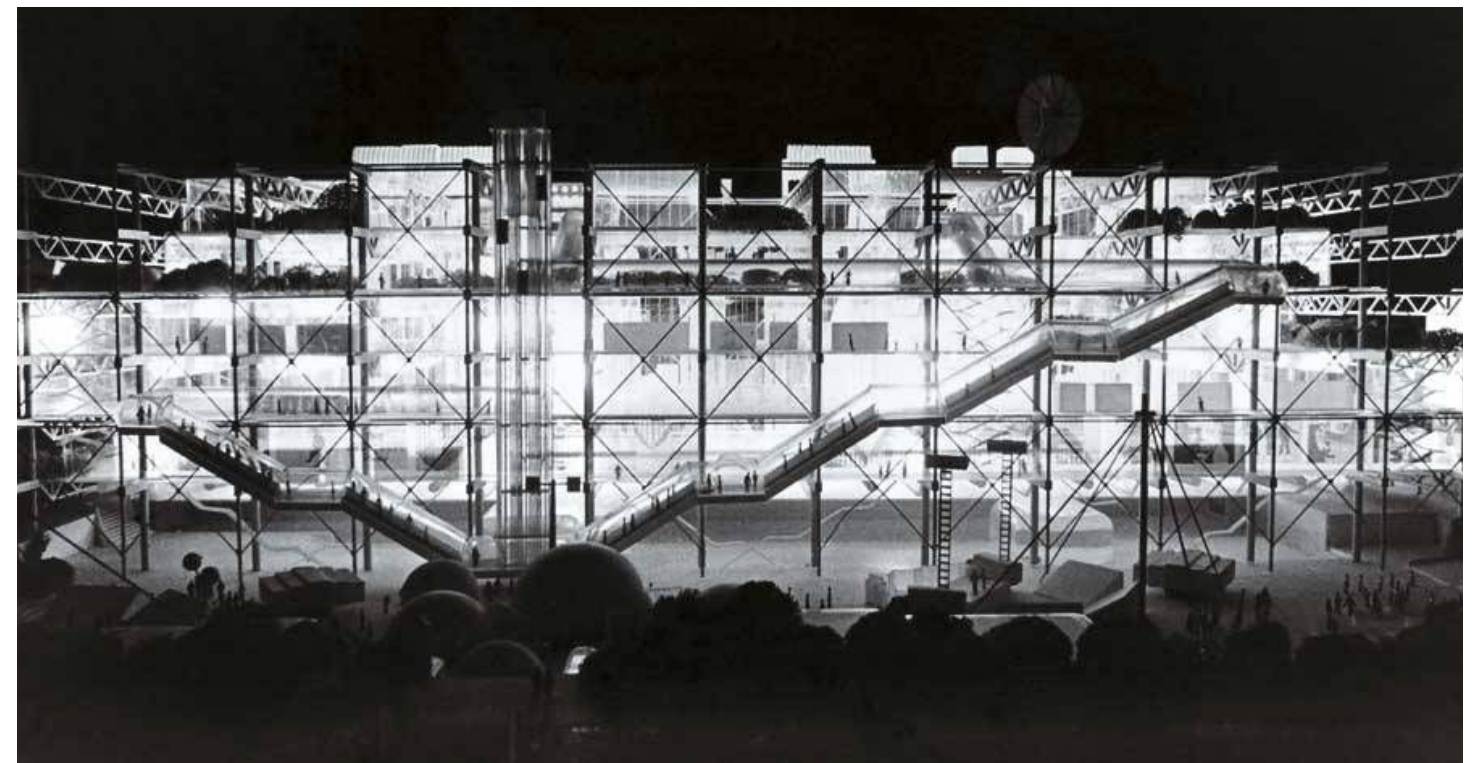
Centre Pompidou / Renzo Piano, Richard Rogers / 1977
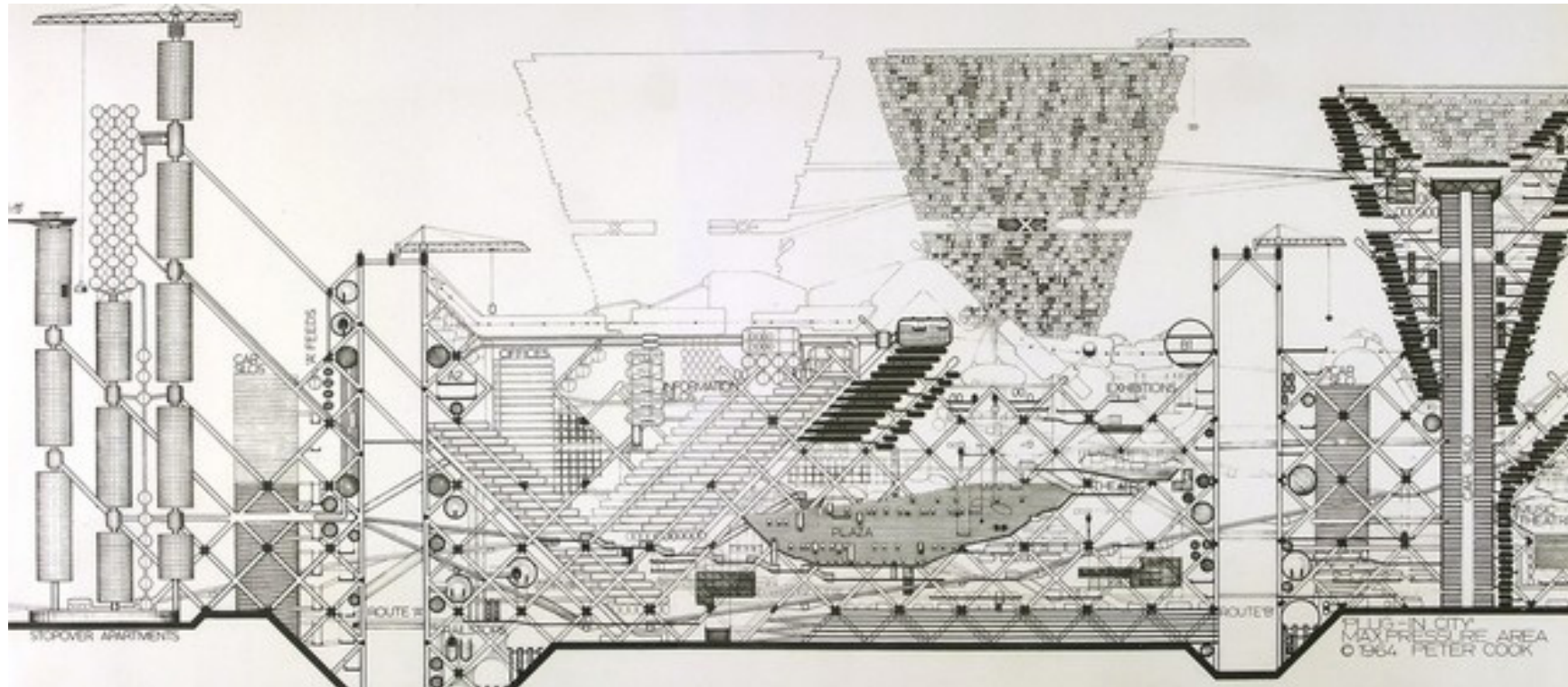
Plug-in City / P. Cook / 1964
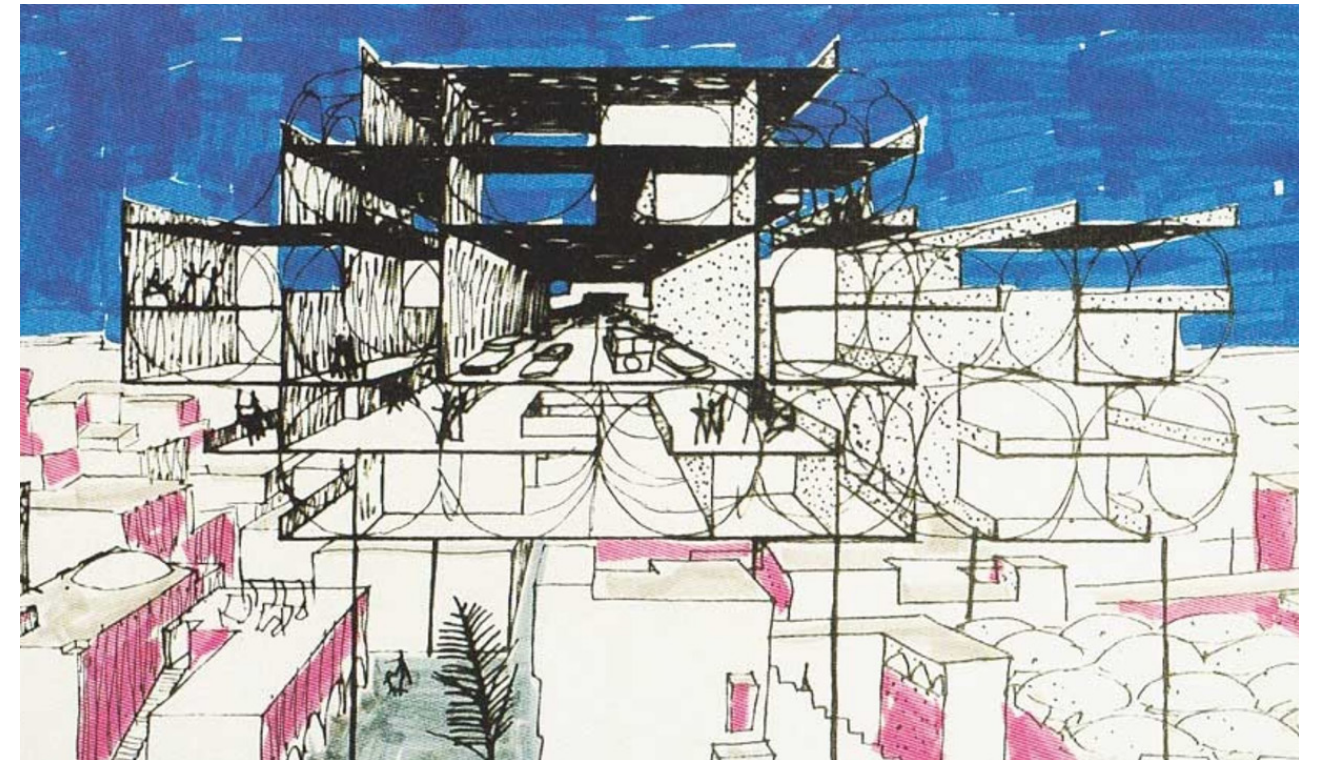
Spatial City / Y. Friedmann / 1958
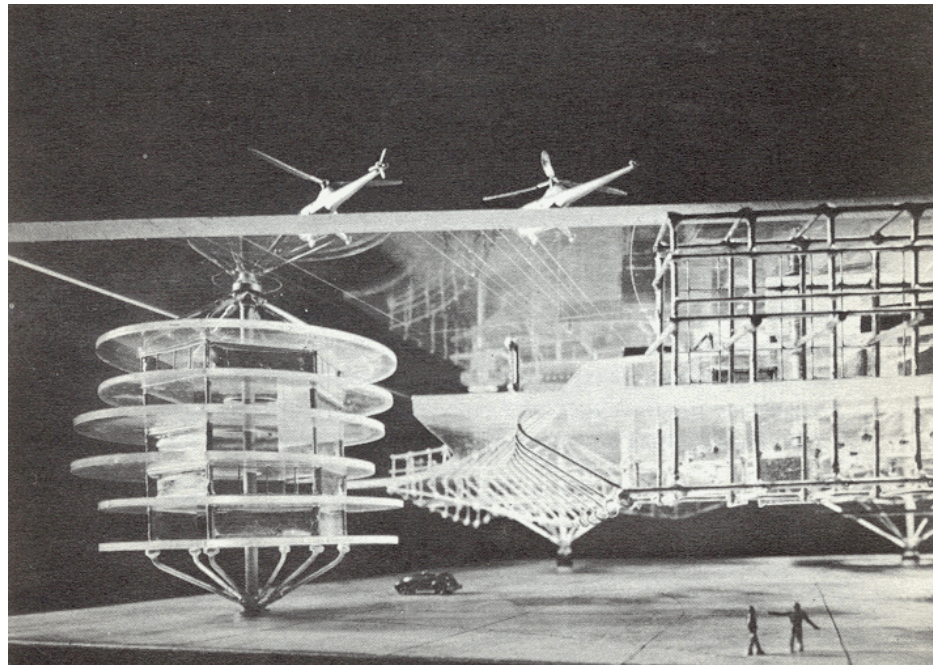
New Babylon project / C. Nieuwenhuys / 1959
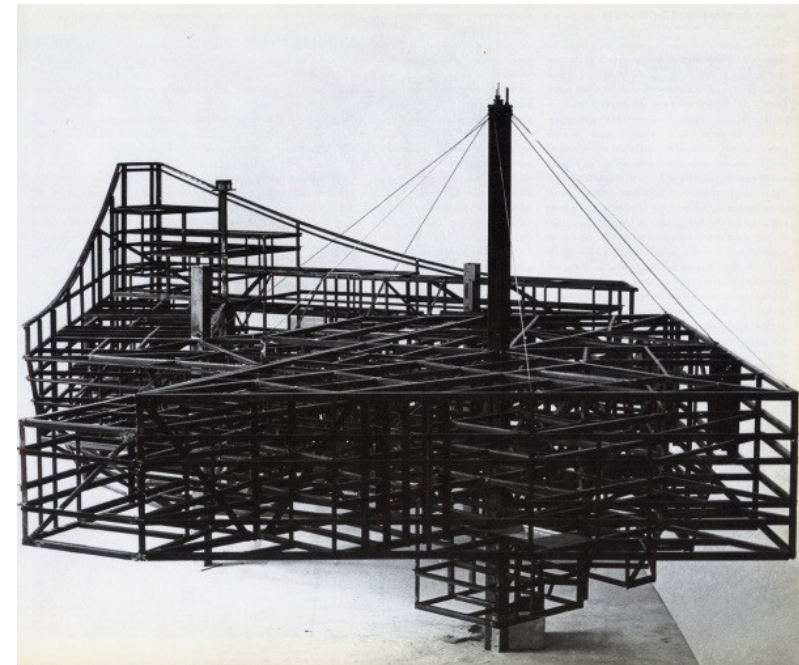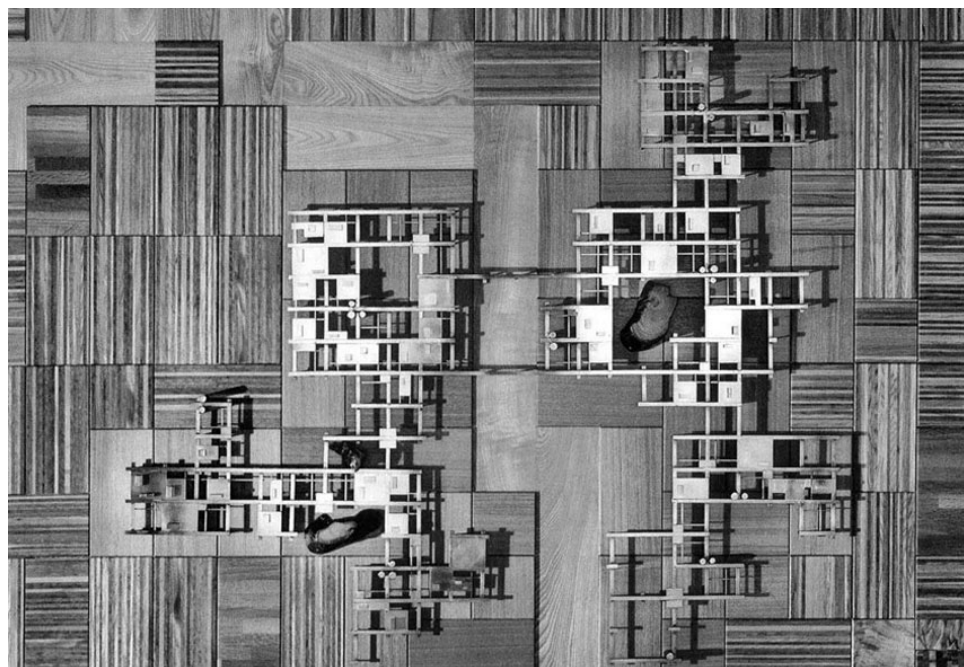
Agricultural City / K. Kurokawa / 1960

CITY INTERCHANGE

58.
Project for a communication interchange for static and moving communication systems by Warren Chalk and Ron Herron 1963.
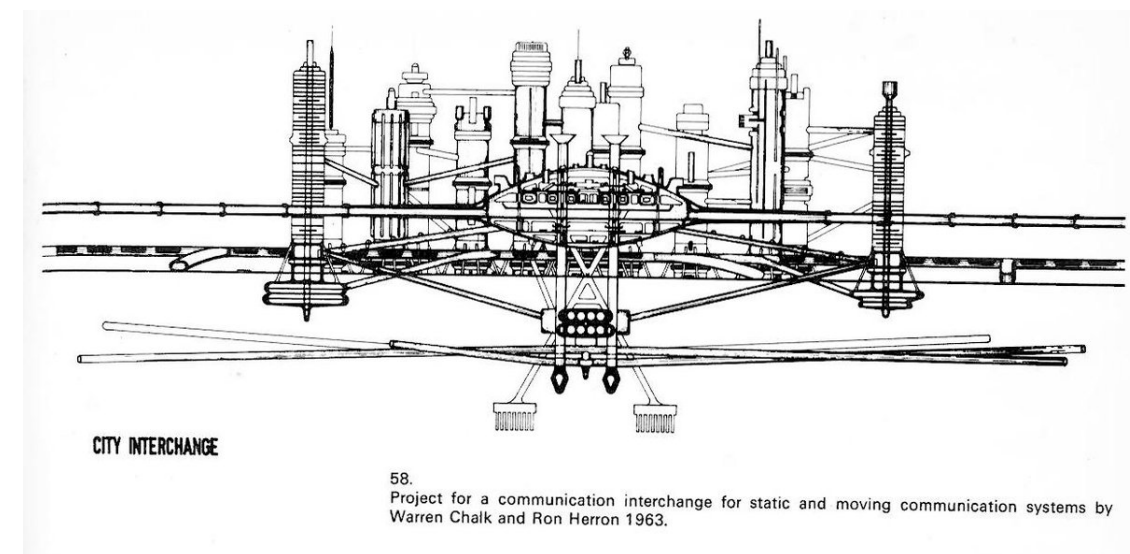
City Interchange project / R. Herron, W. Chalk / 1963

Tokyo Bay plan / K. Tange / 1960
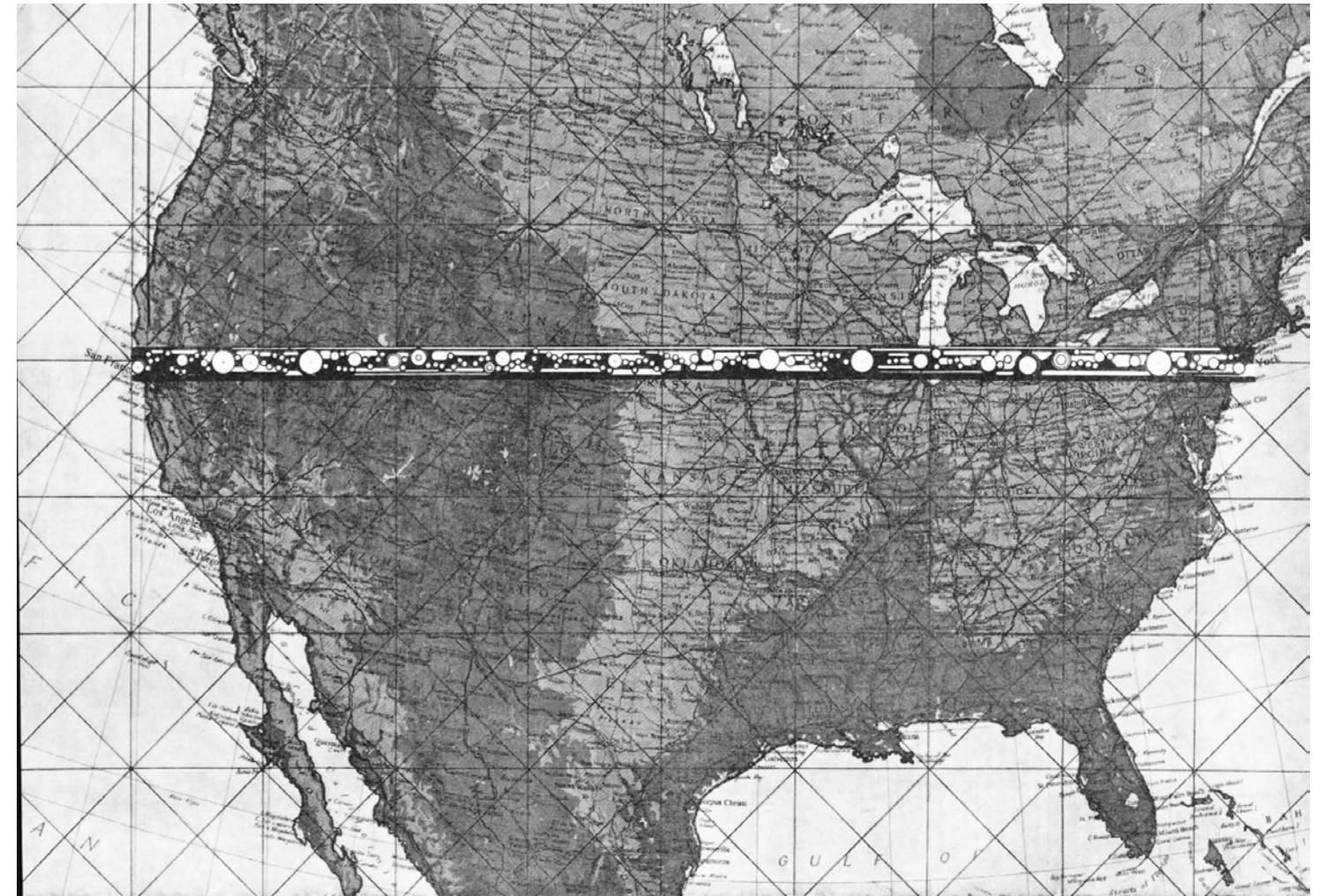
Comprehensive City project / M. Mitchell, D. Boutwell / 1969
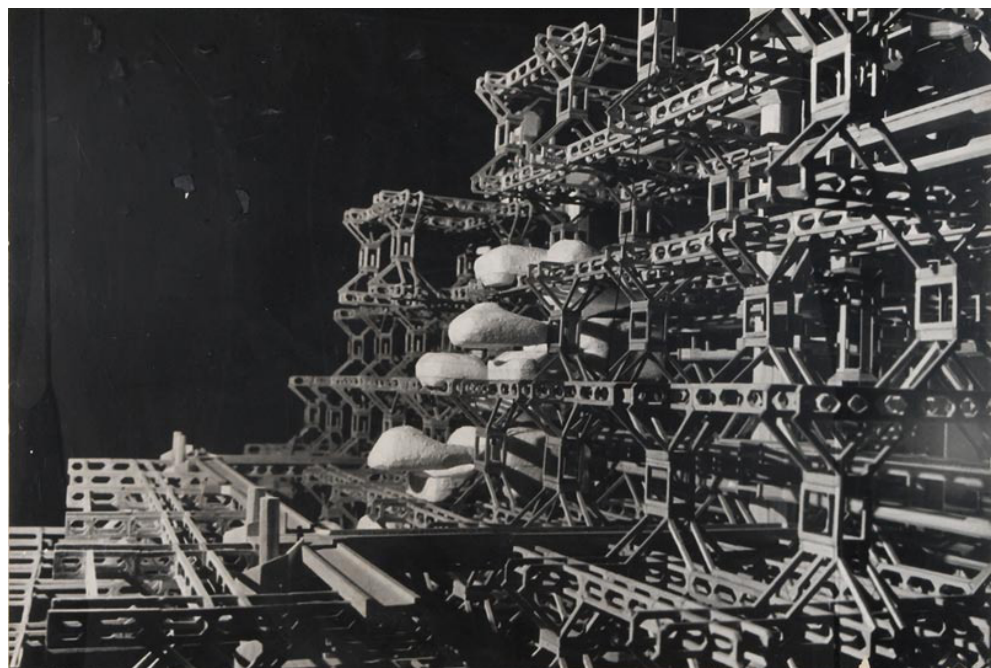
Graz-ragnitz project/*G. Domenig, E. Huth / 1969*
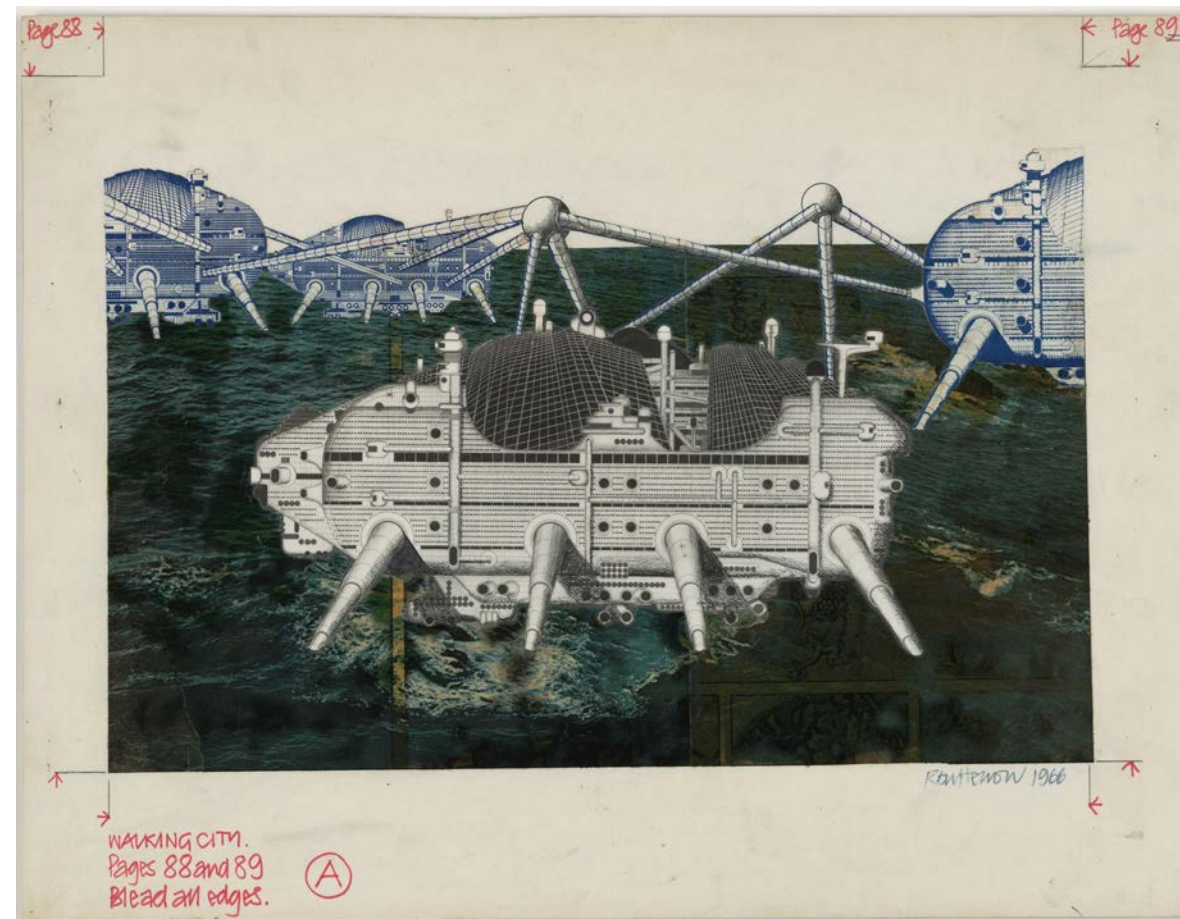
Walking City / Archizoom / 1966
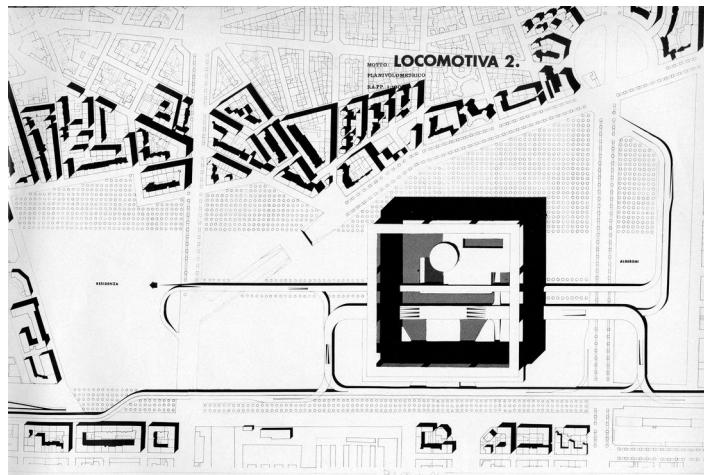
Locomotiva 2.0 / A. Rossi / 1962
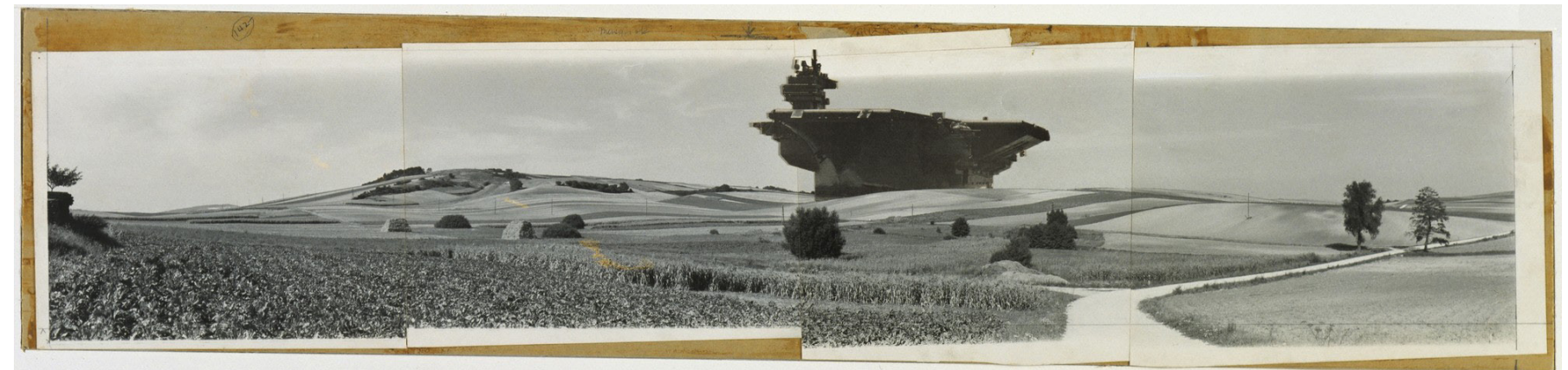
Aircraft Carrier in Landscape / H. Hollein / 1964

Supersuperficie / Superstudio / 1966
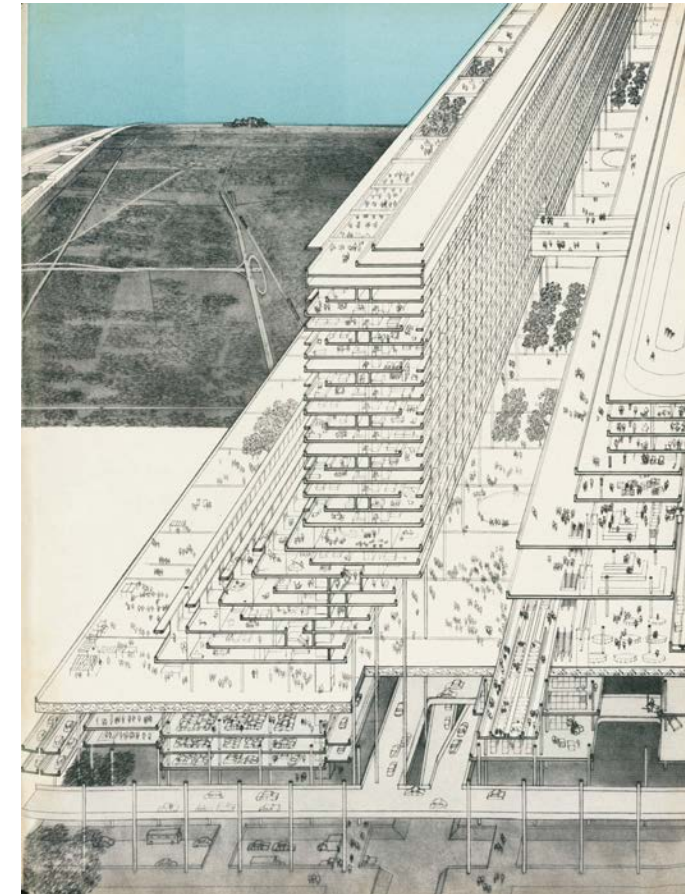
Linear City / P. Eisenmann & M. Graves / 1965

Megastructure vs Megaform

The history of the megastructure, most commonly known as "a massive construction or structure, especially a complex of many buildings", goes back to the late 50´s and 60´s where the megastructure generation had focused its eyes on all of the US's problems that were vast enough to require ´visionary´ solutions and the biggest technologicall resources for dealing with them. The sheer dimensional bigness was an essential part of the solution to these continent-sized problems. The meaning of megastructure was developed during these years as a replicating solution for cities, for example Ralph Wilcoxon's etymology of megastructure; "not only a structure of great size… but also a structure which is frequently:

1. Constructed of modular units;

2. Capable of great or even 'unlimited' extensions;

3. A structural framework into which smaller structural units can be built- or even 'plugged-in' or 'clipped-on' after having been prefabricated elsewhere;

4. A structural framework expected to have a useful life much longer than that of the smaller units which it might support.

As an example, the ruleset of Wilcoxon already shows the imposed order on the landscape. It neglects basically every condition met, by imposing an order of architectural form by means of a structural framework that can extend endlessly. It becomes a city in itself, with every tailored need towards its citizens. However, Banham criticizes the meaning of megastructure as a way of modernist architects to impose an order on the incomprehensible chaos of cities.

What if we do not impose architectural form with a particular expressive language on our earth's landscape, but a form of hybrid morphology. This hybrid morphology's goal, dirived from Koolhaas, is to integrate architecture, landscape and infrastructure. Hence, the megastructure imposed on the landscape is a form of order in terms of interface; it connects with its surroundings and adapts to its locality. As a result, the meaning of megastructure is no longer an imposed hollow shell continuing endlessly, but a carefully tailored synergetic being, something that adapts to the heterogeneity of urbanisation, its ground conditions and systems accordingly. The megastructure transforms into a relational construct of;

1.   Megaform that is not limited to its geographical conditions but seeks communication with and 'plugs in' systemically produced properties of the operational ecologies;

2.   and strengthens therefore the last two points of Wilcoxon, its adaptable structural properties, a structural framework without content.

Calabria University / V. Gregotti / 1995

Typologies analysis

exterior replicating structural fragment

facade module provides several functions

elements particular to function transformed/integrated as load-bearing structure
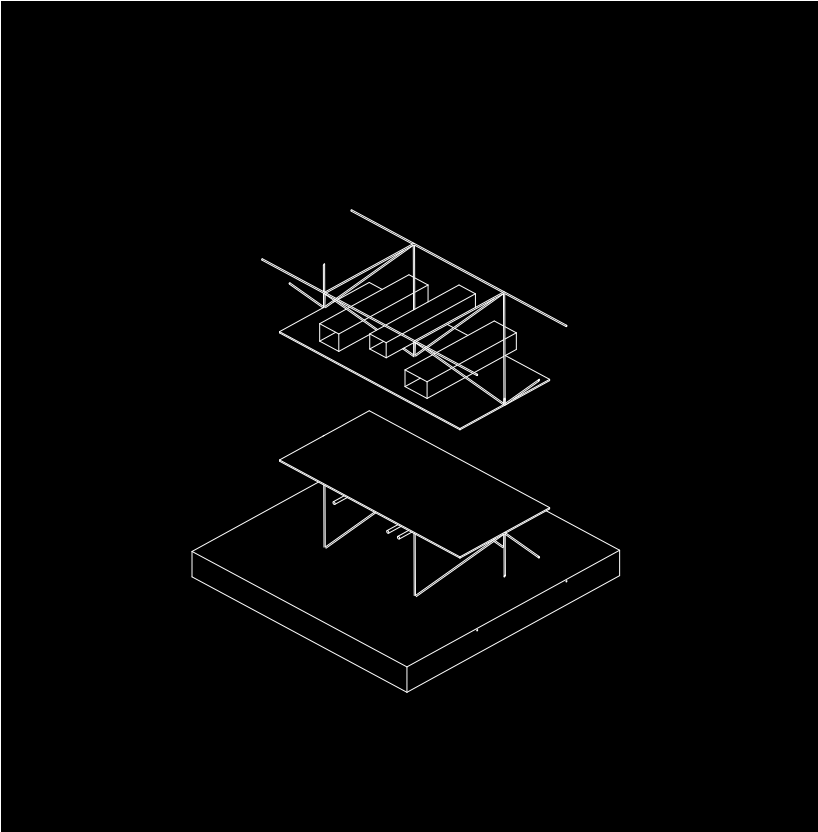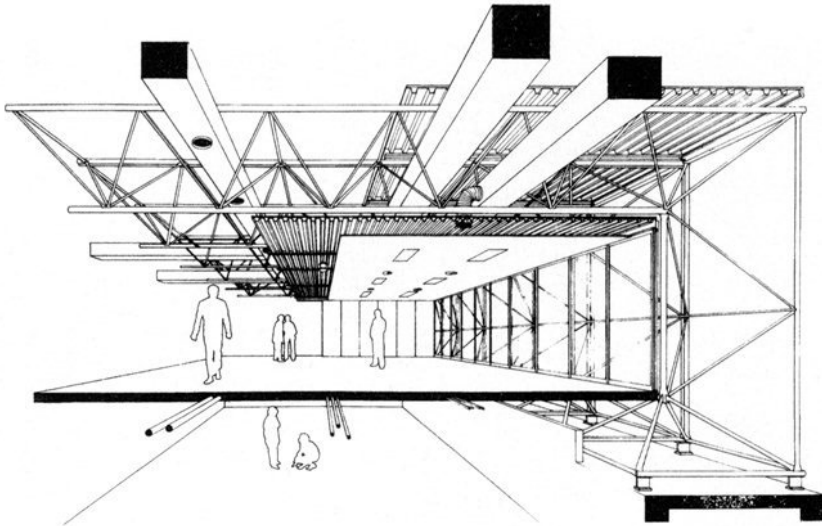
roof layer with integrated 'life-support' systems to afford flexible large open spaces
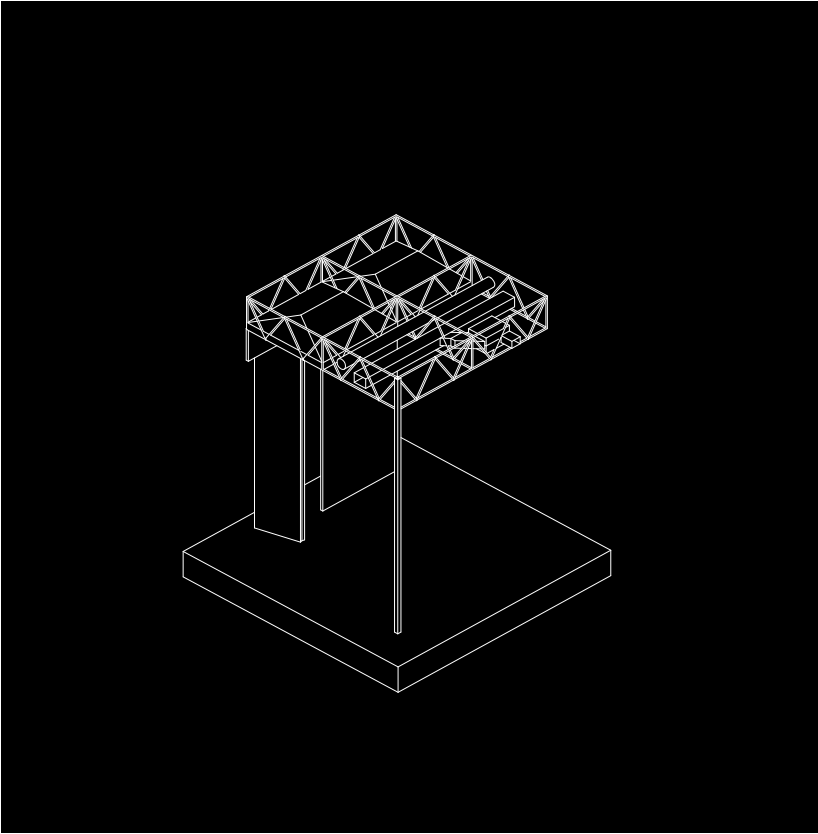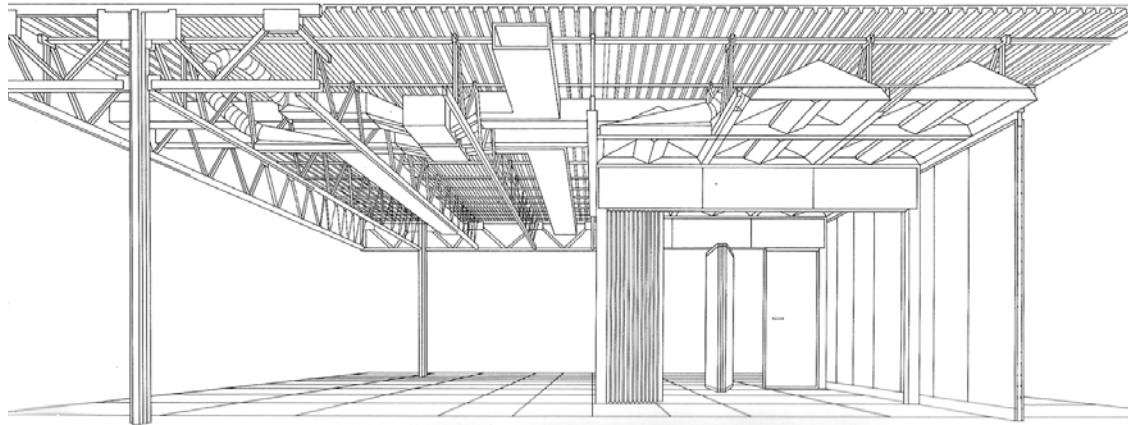
modular system of walls and roof to adjust to specific needs
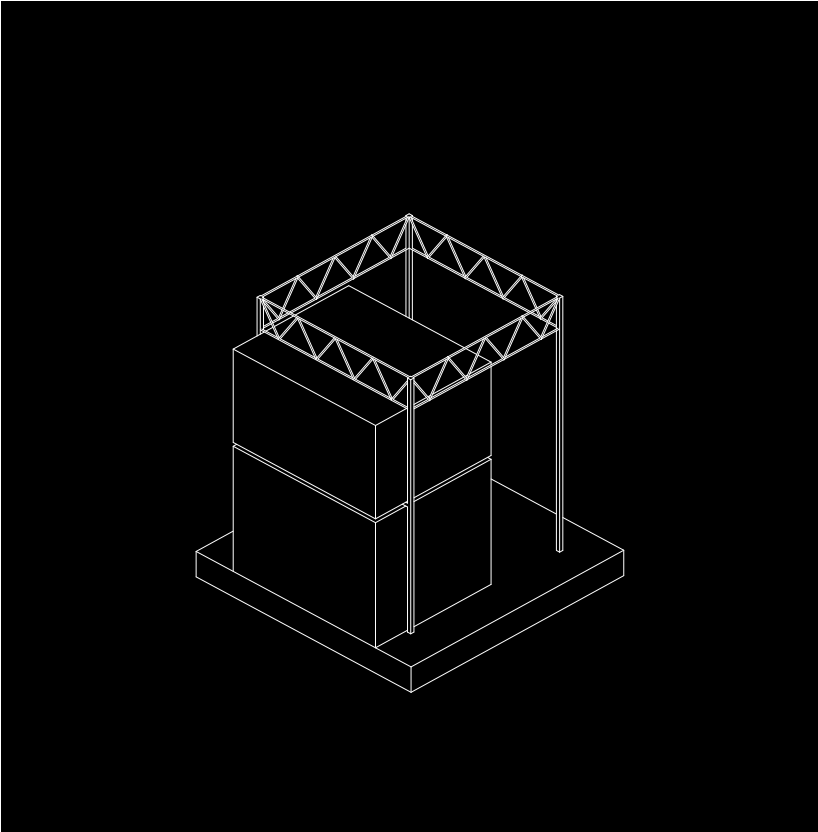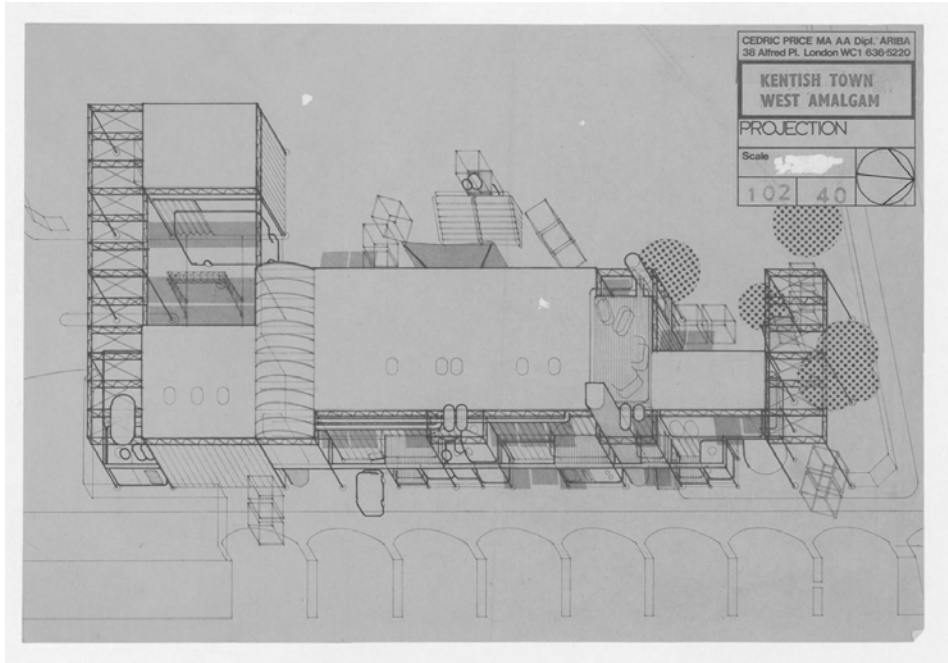
flexible truss system to allow re-/ disassembling of programs
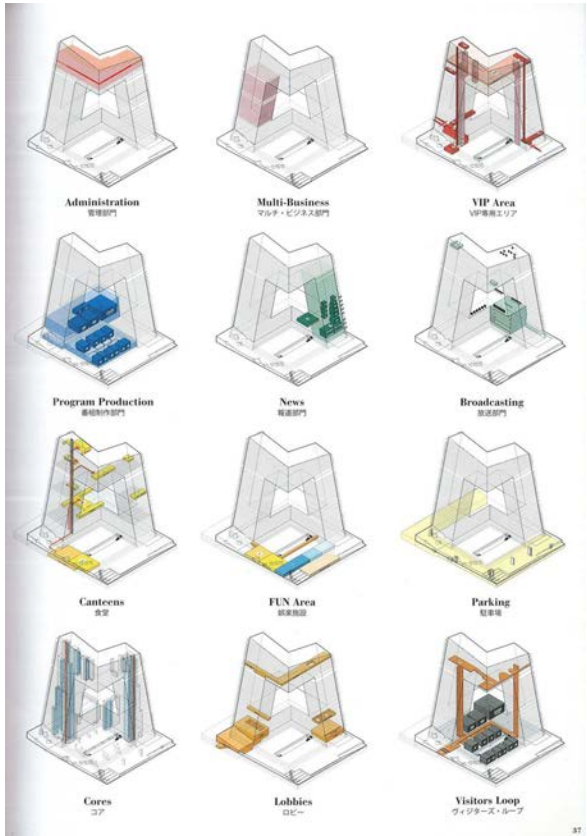
regulated segmented circulation to connect particular systems and programs
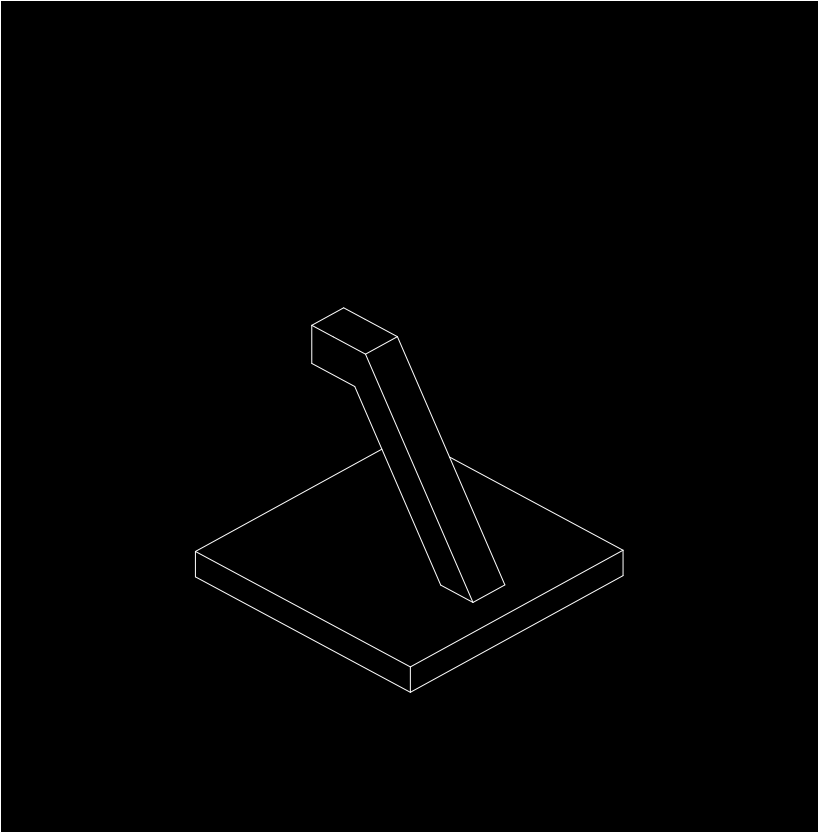
form as representation of context
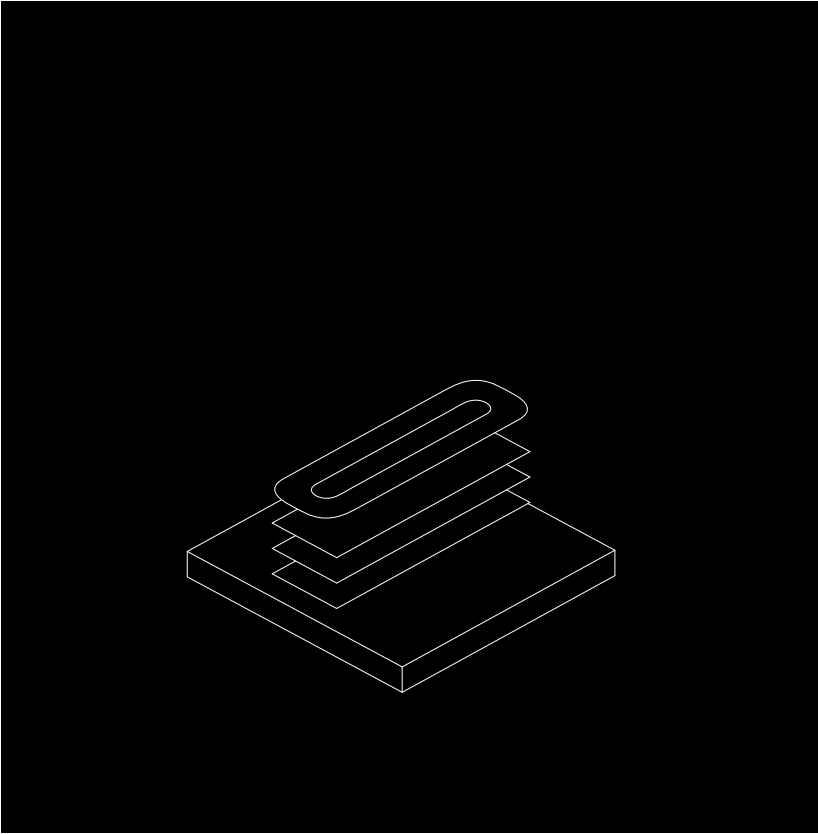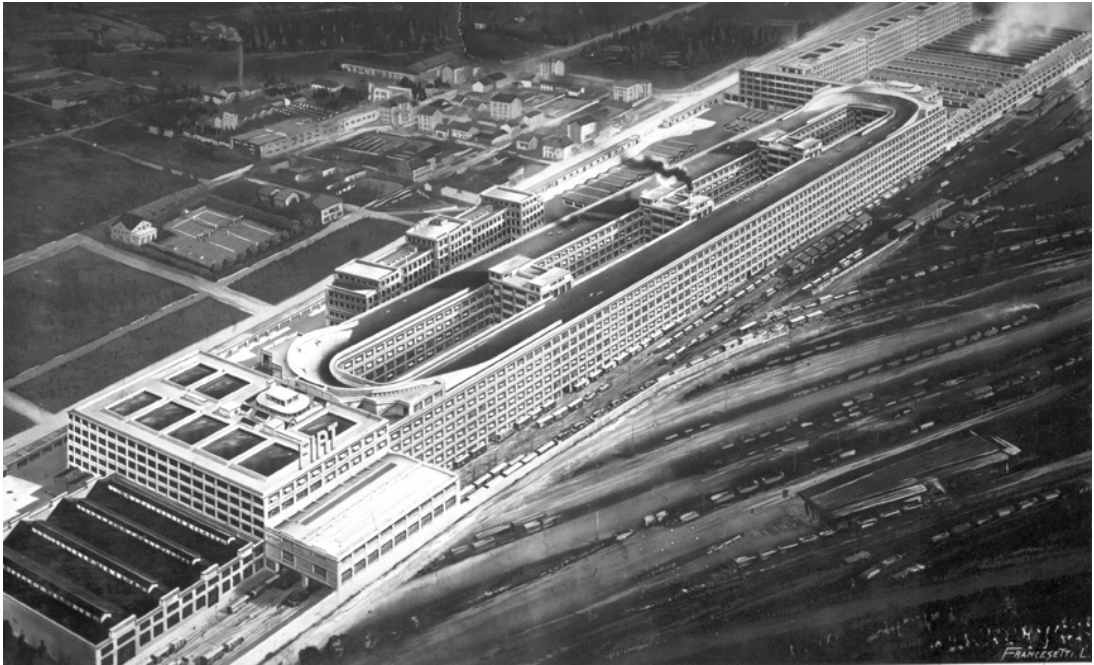
excessive function as architectural element
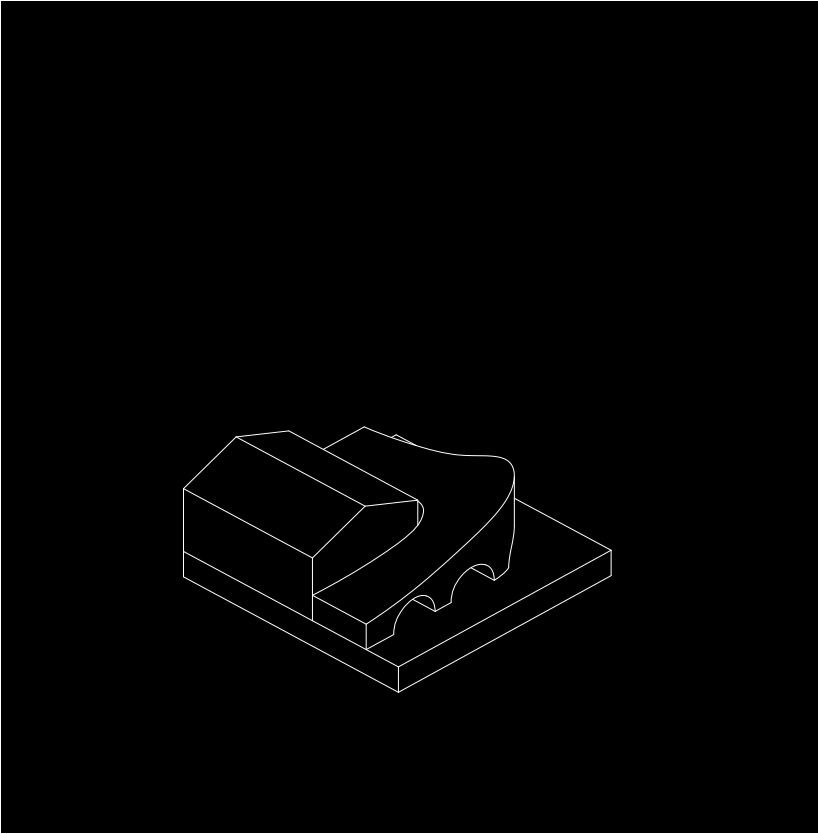
leftover space as programmatic element
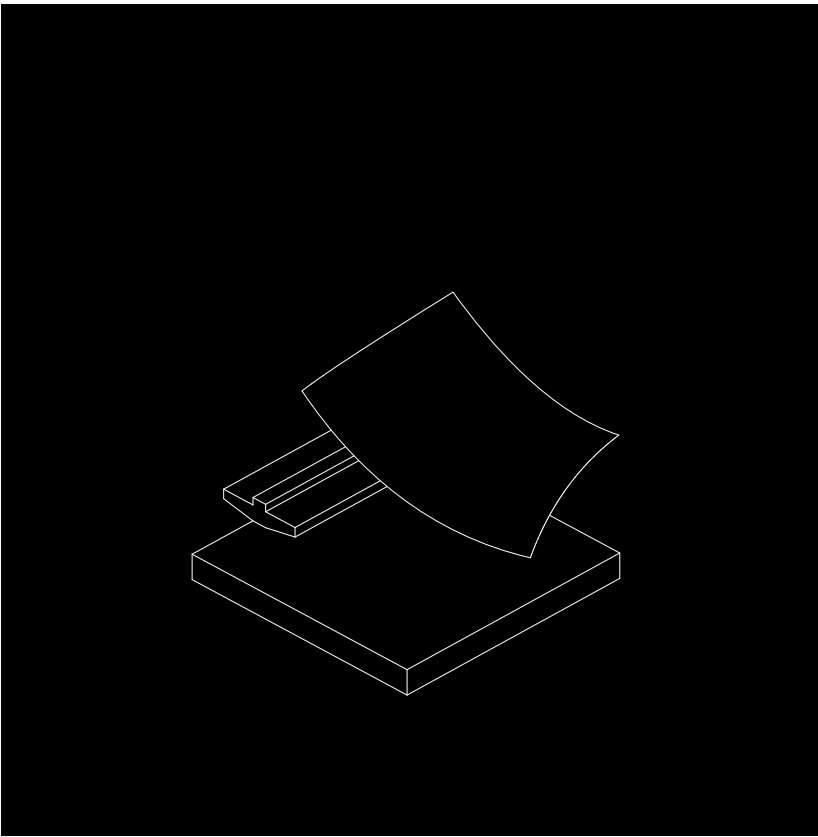
megastructure divided into elements of architecture
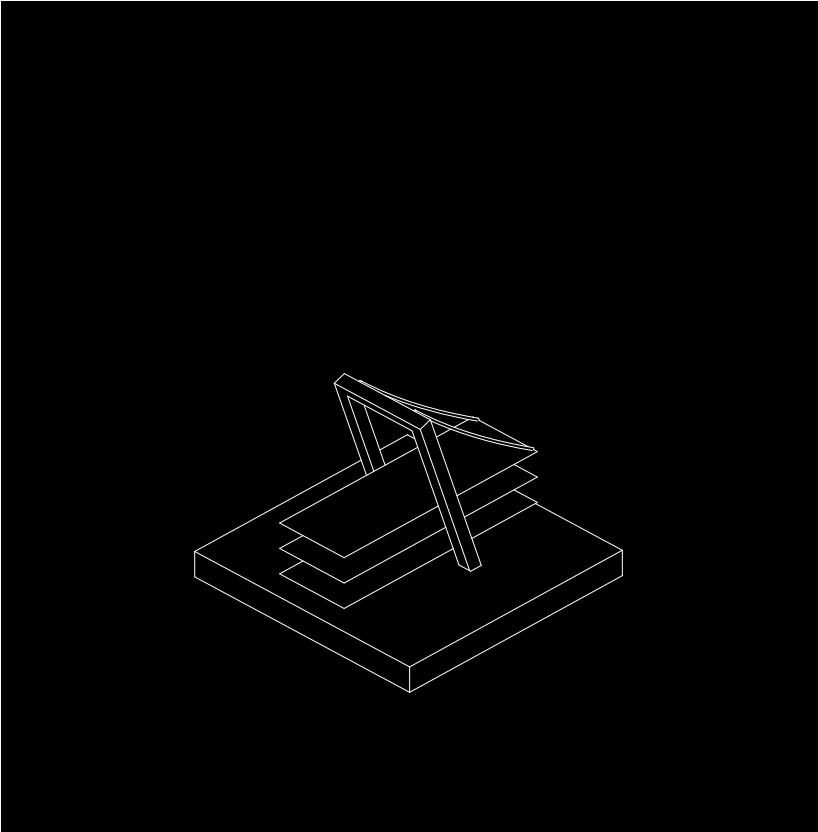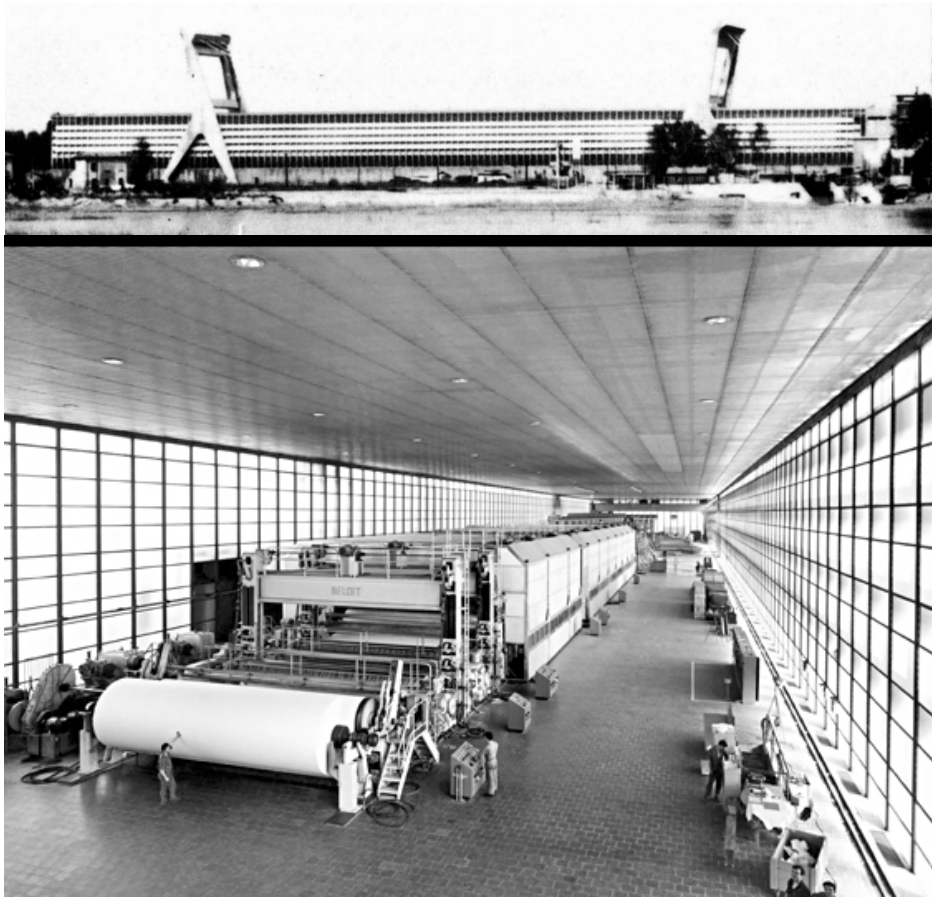
expressive exterior structural elements
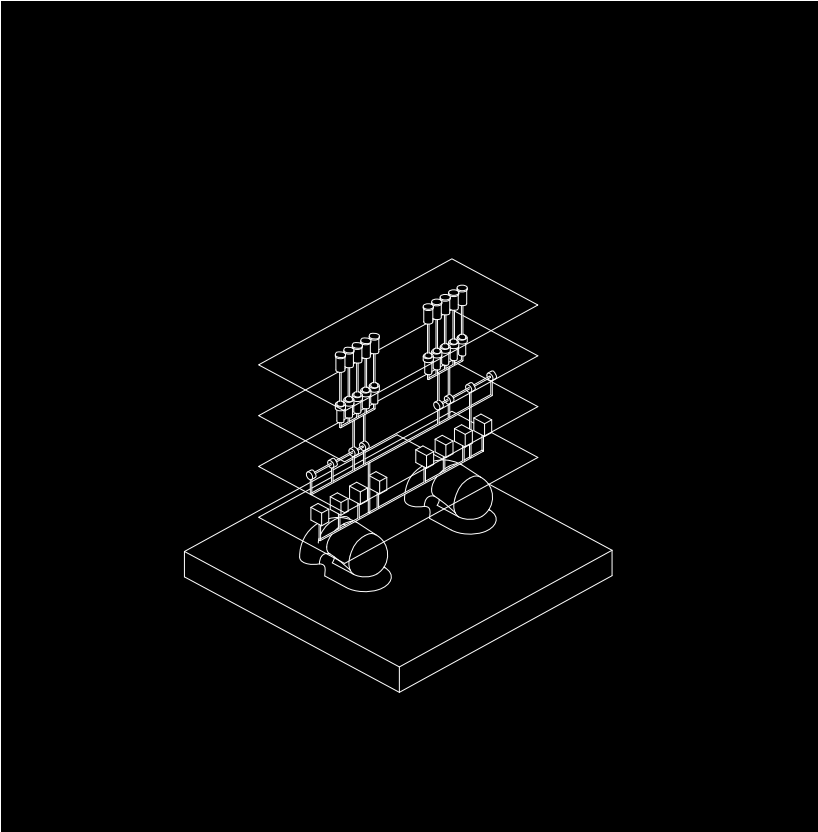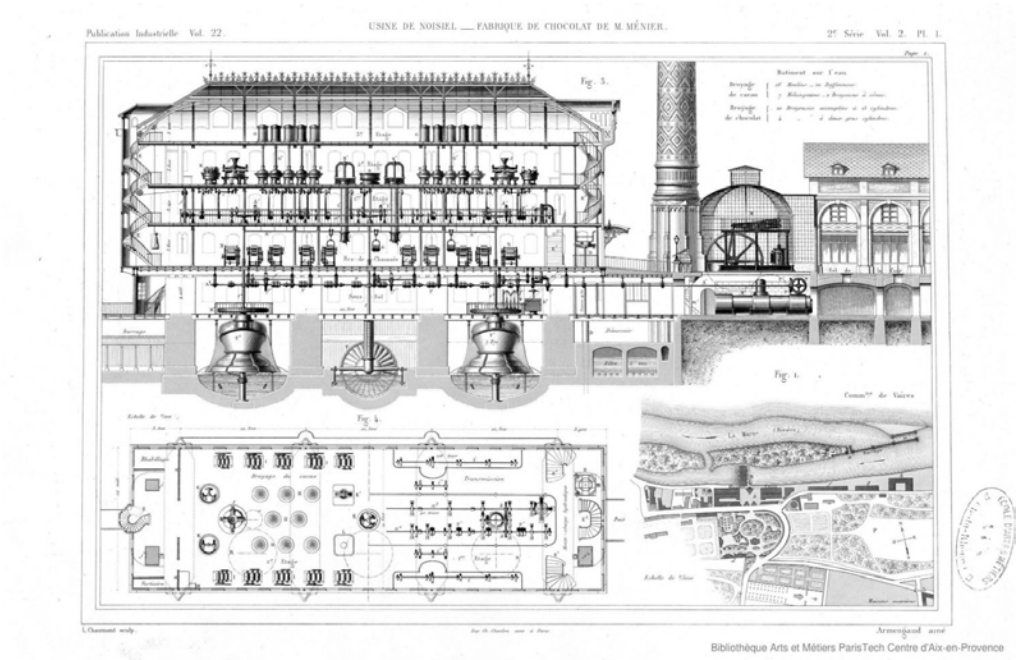
integration of systems across floors
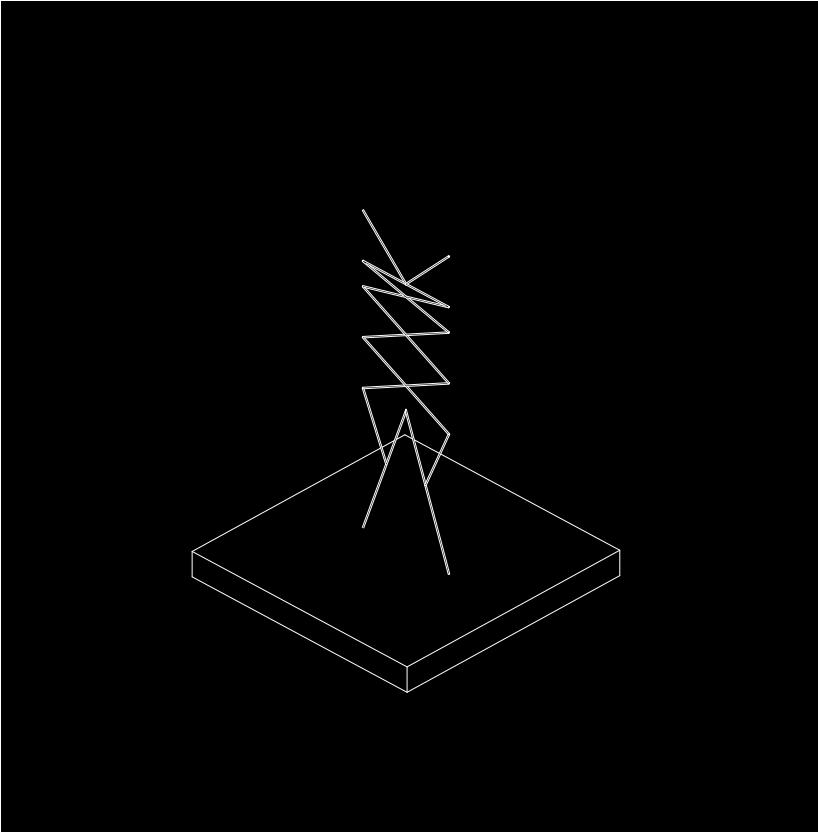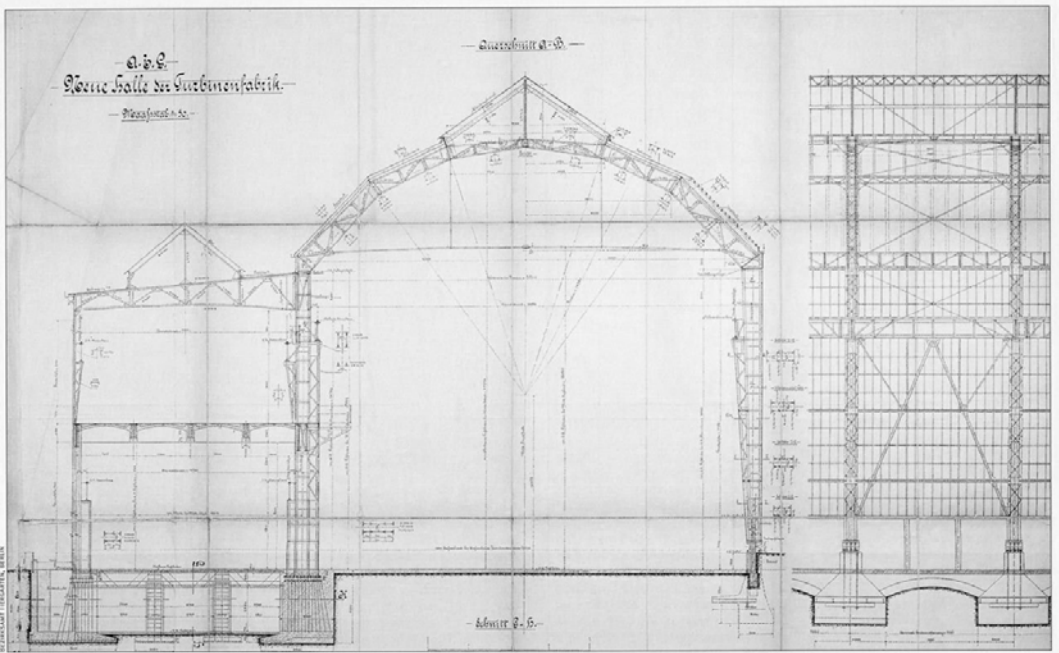
bracing systems correspond to particular use
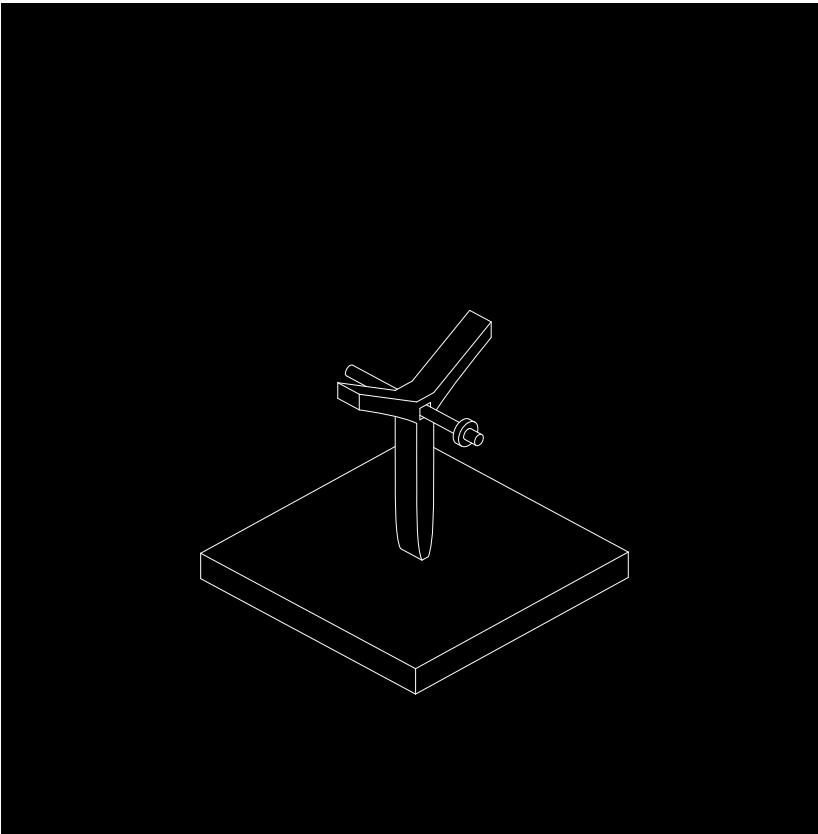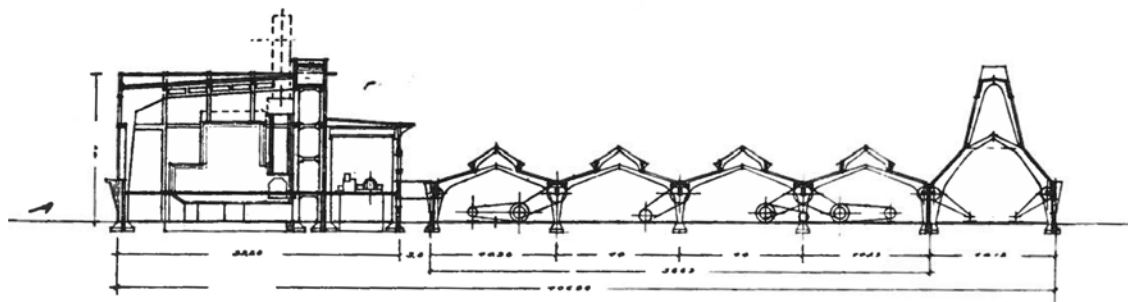
structural element integrated with machinic production system
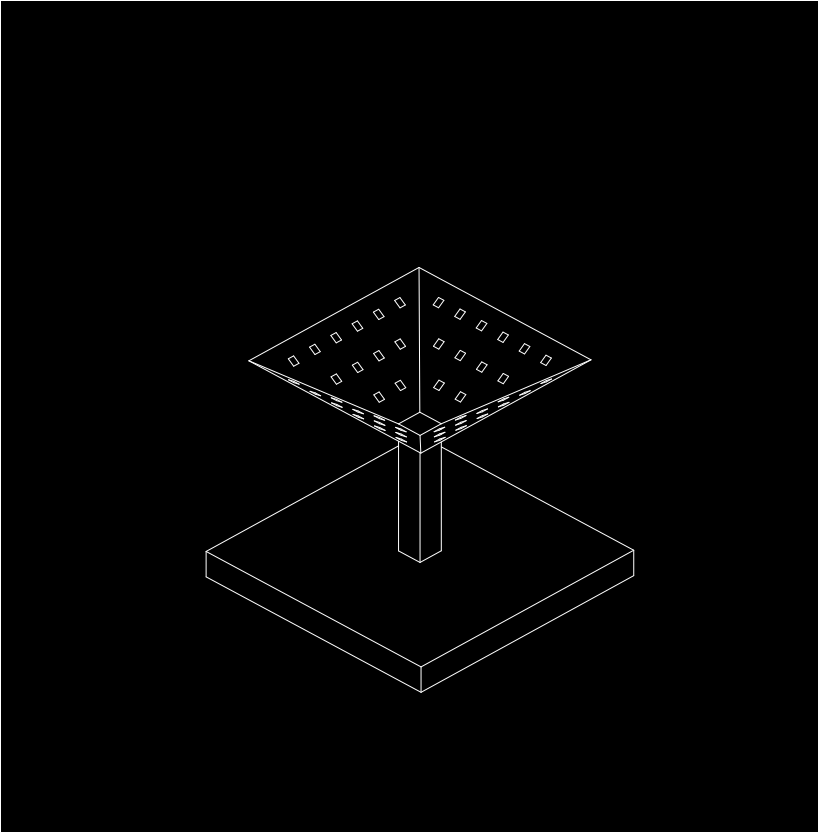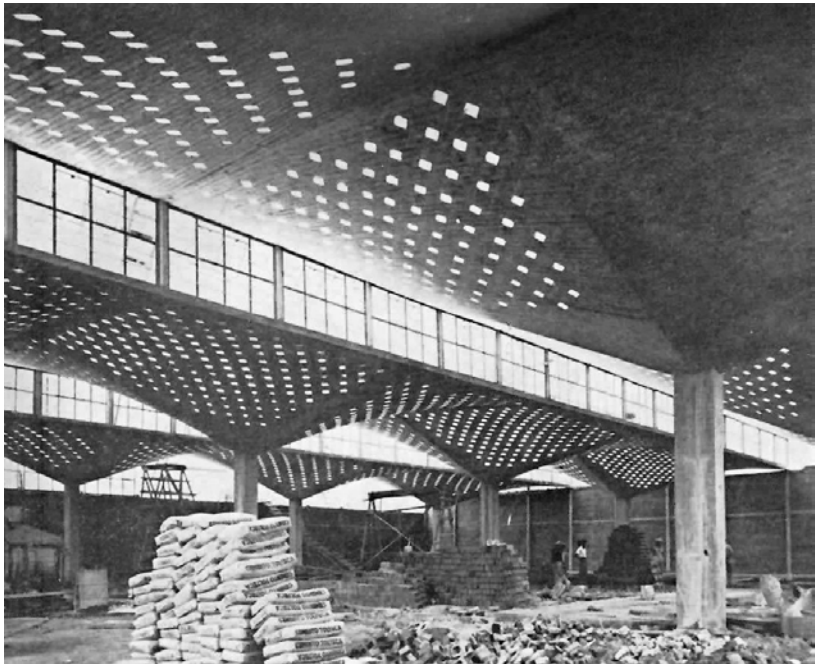
structure informs climate
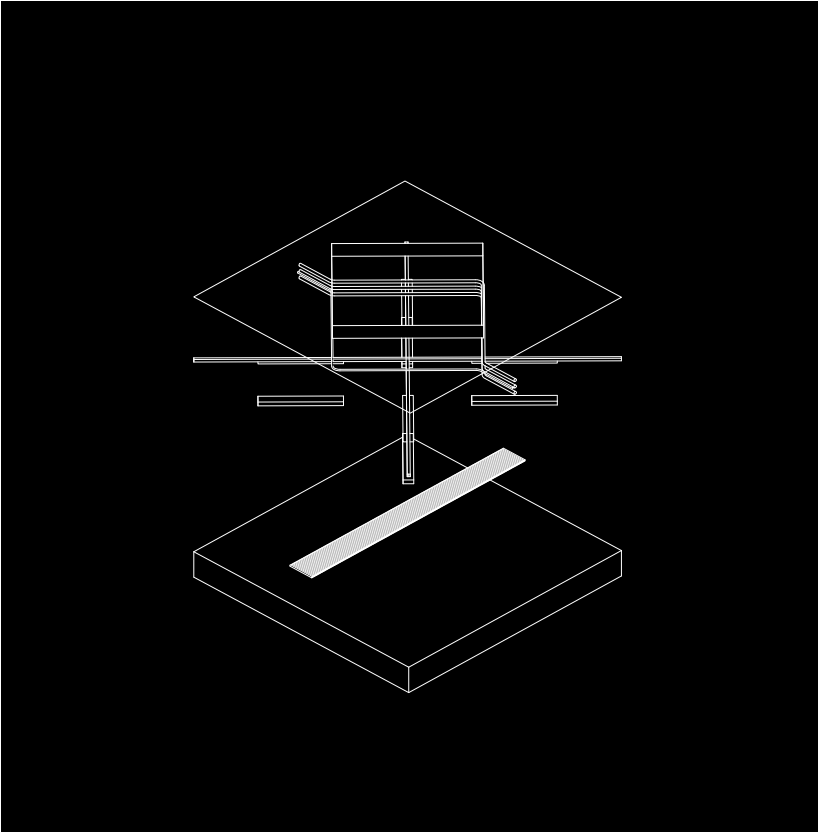
layering of systems in different directions
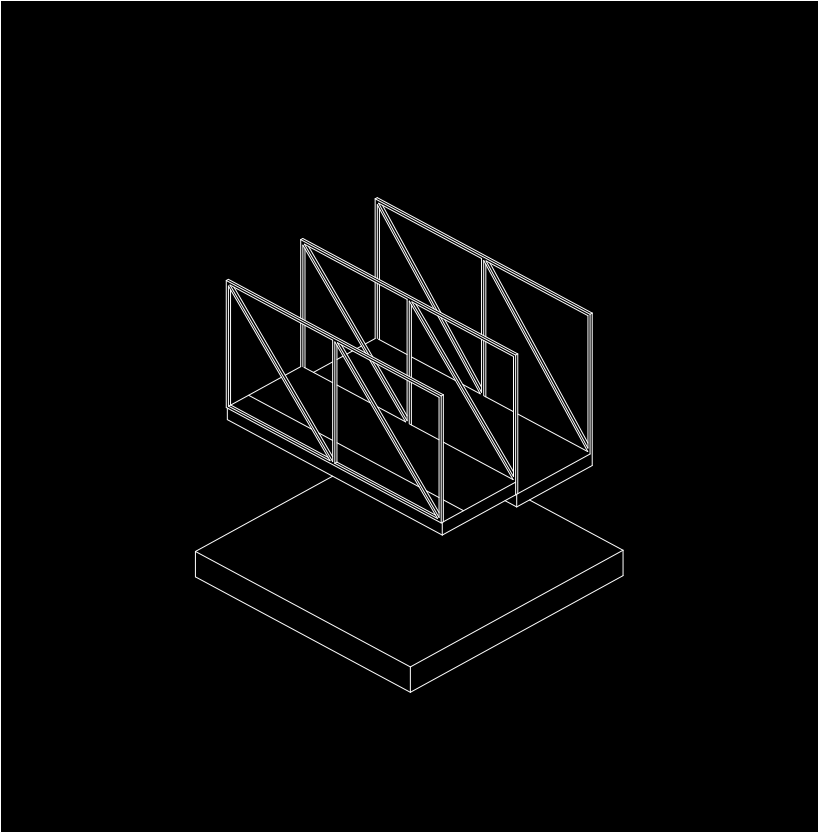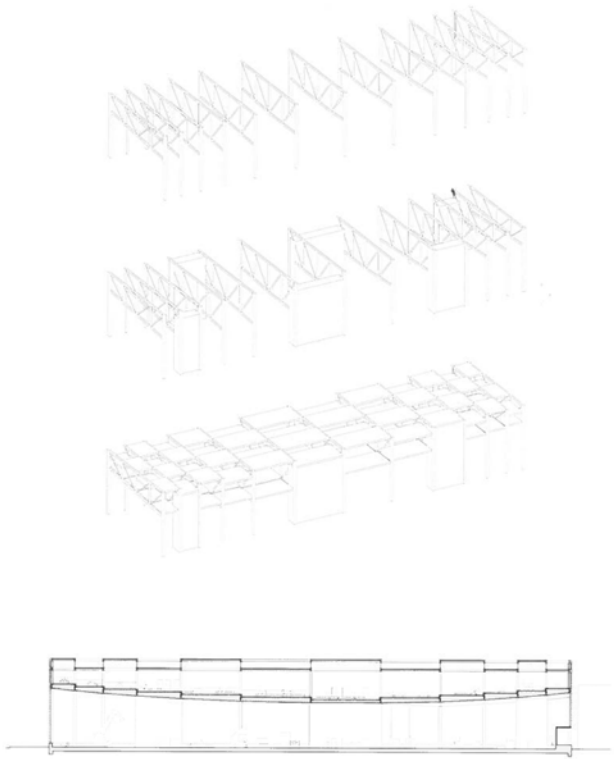
height as element of configuration of space
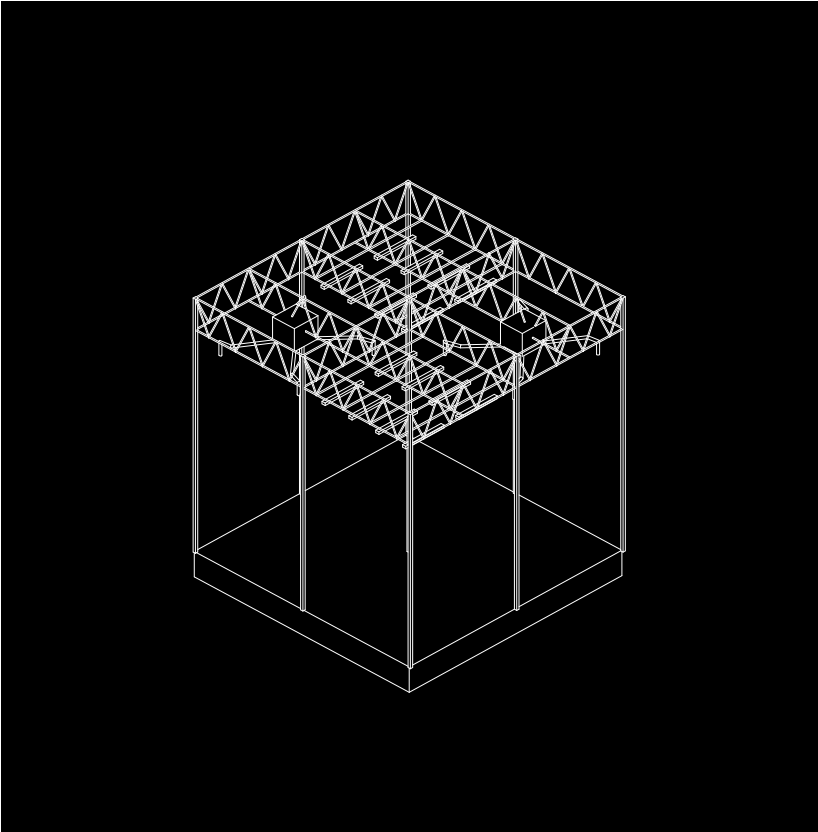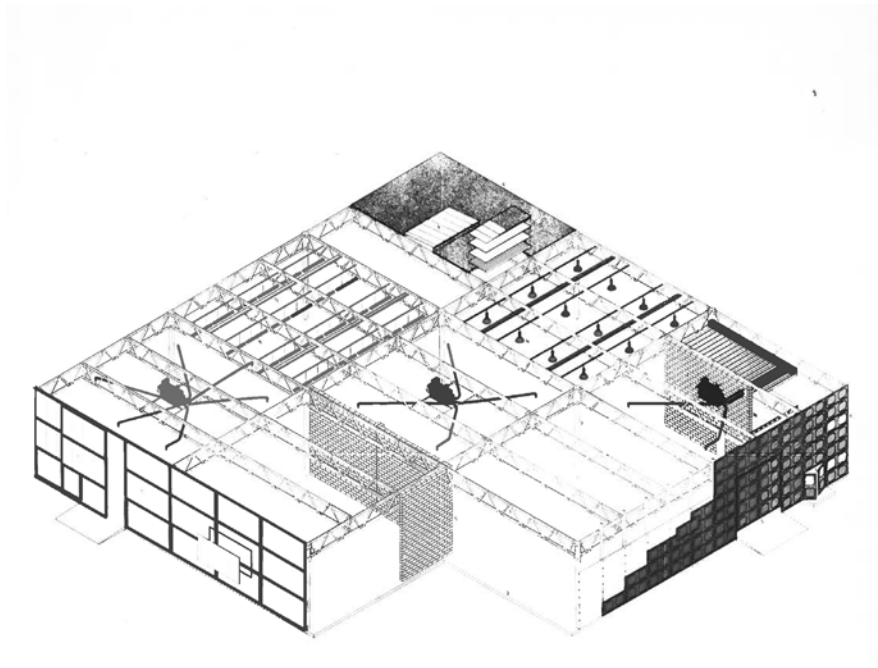
structure as replicating element informs variation of use
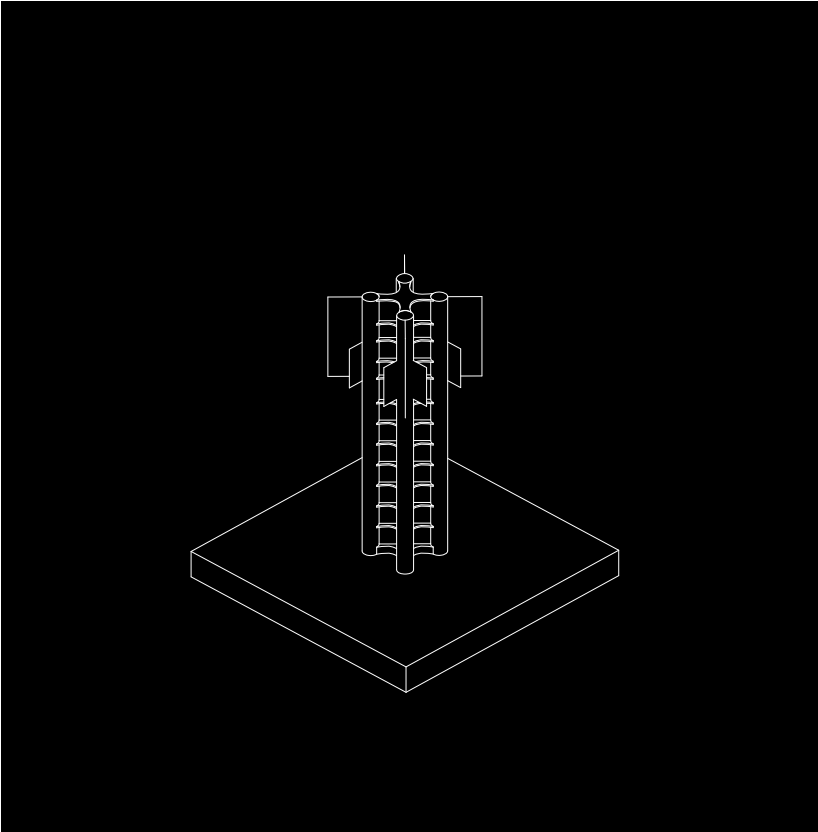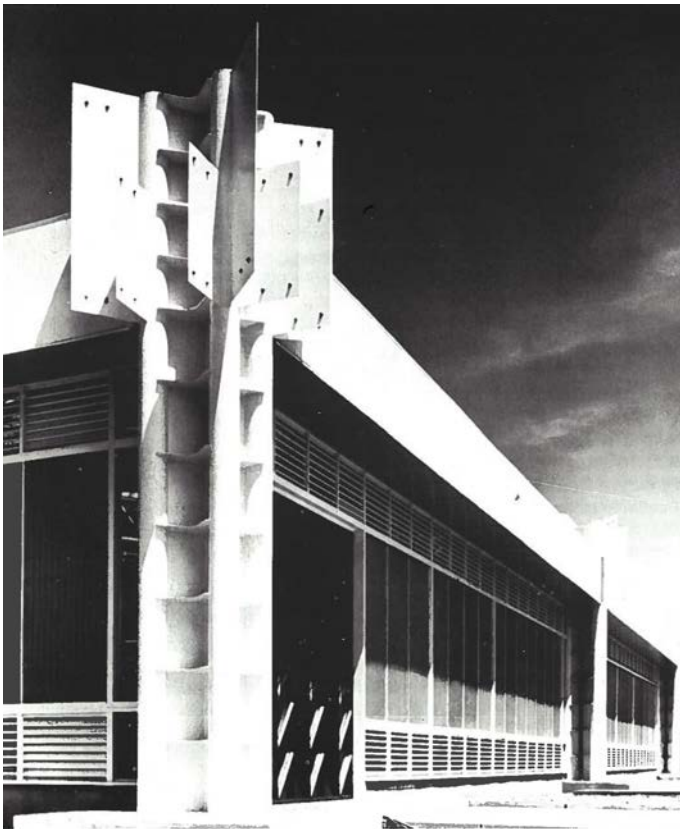
structural replicating fragment allows re/-disassembling
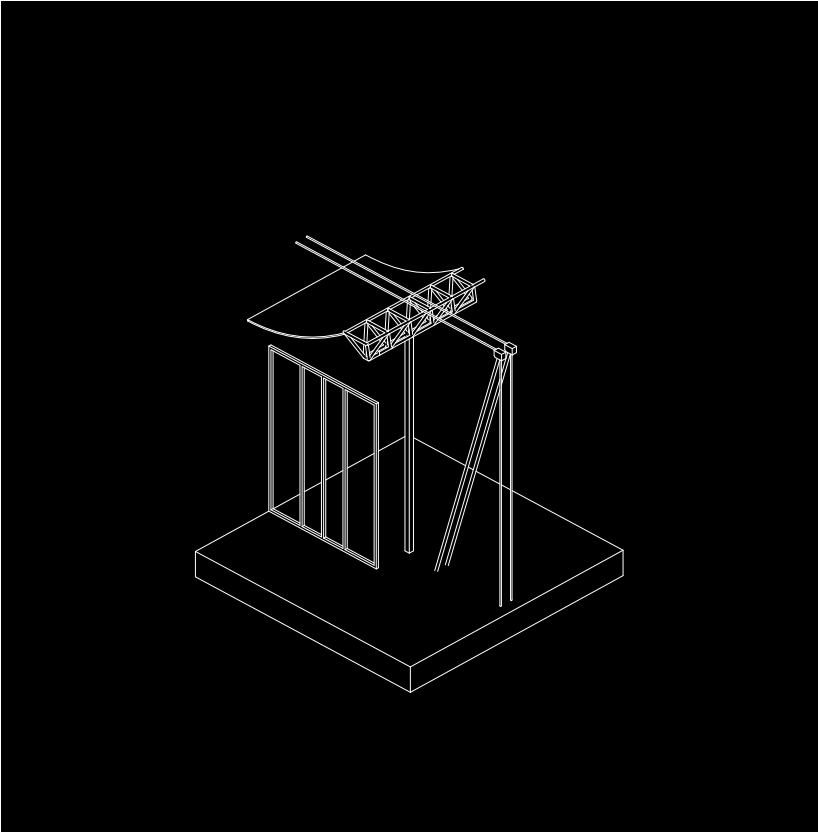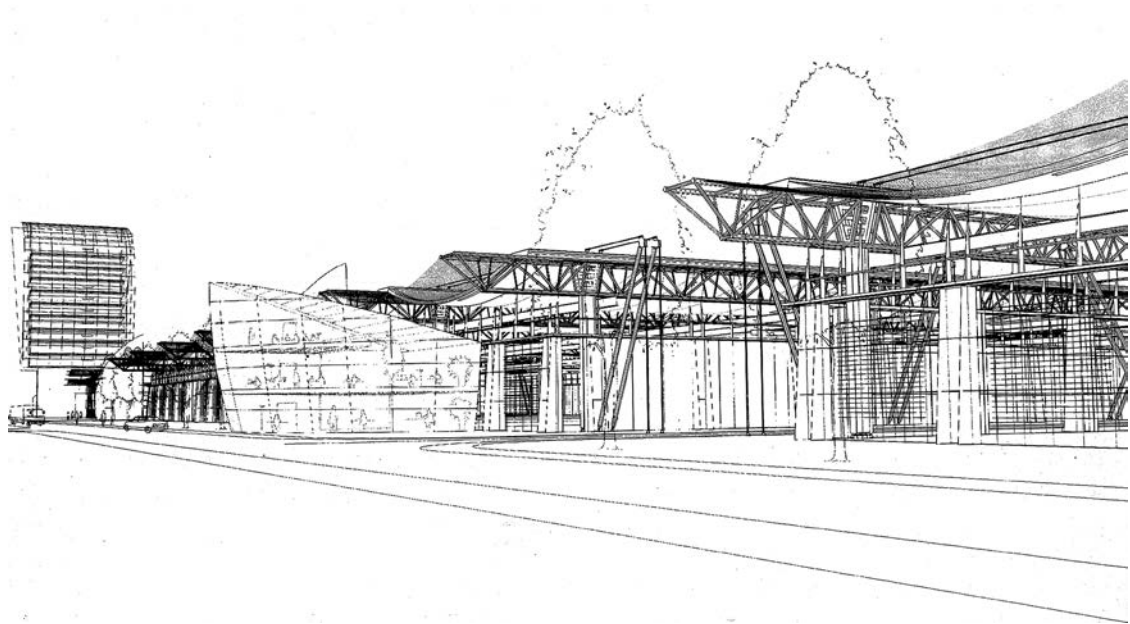
roof and wall as structural components
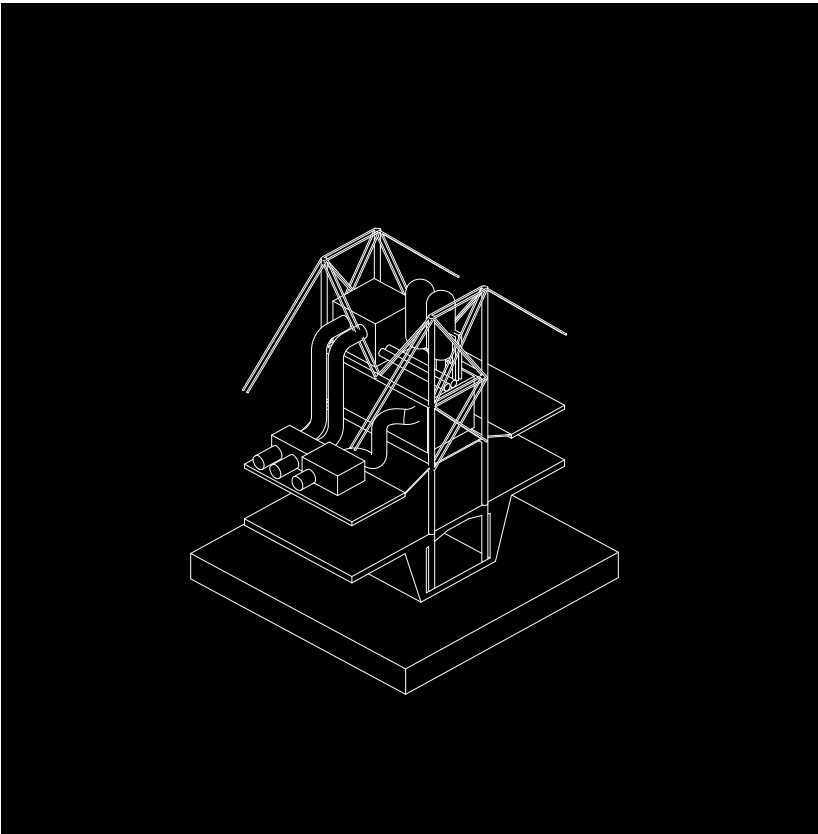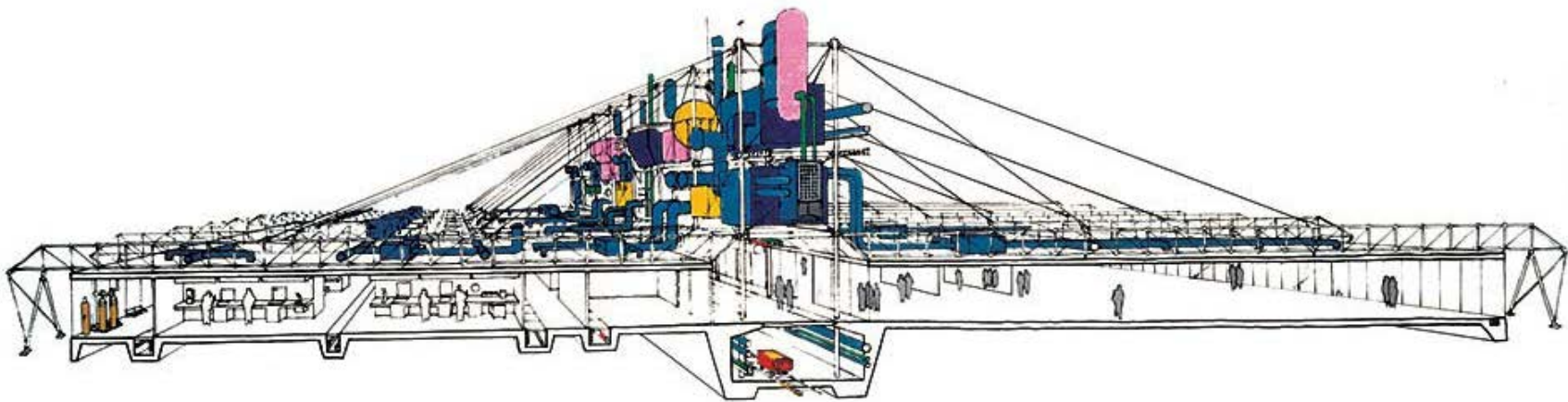
suspended horizontal riser core as architectural element

4.89

4.90
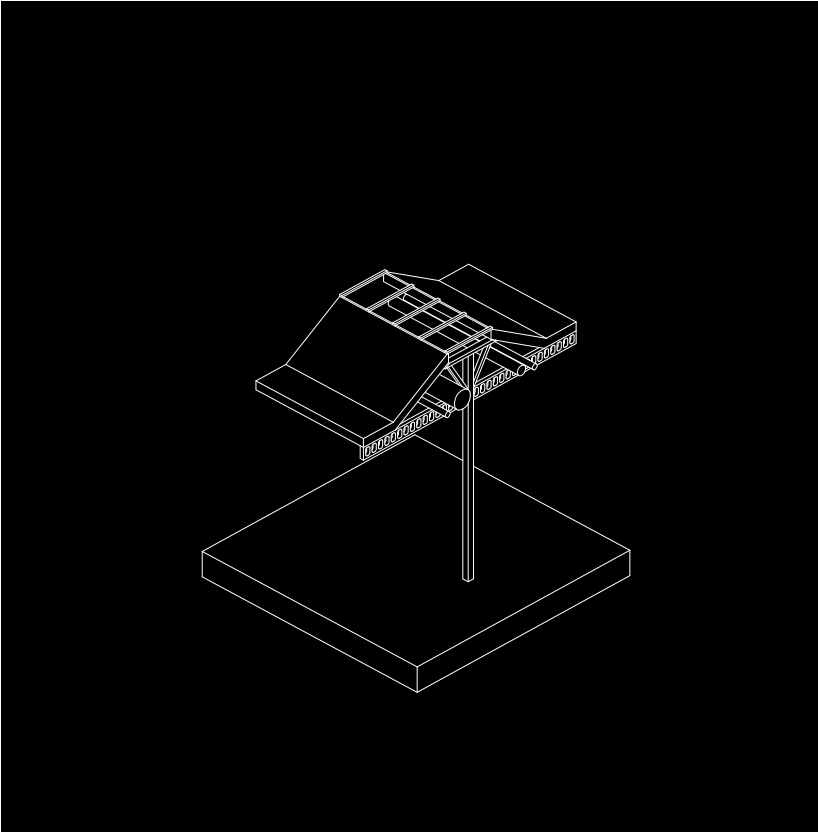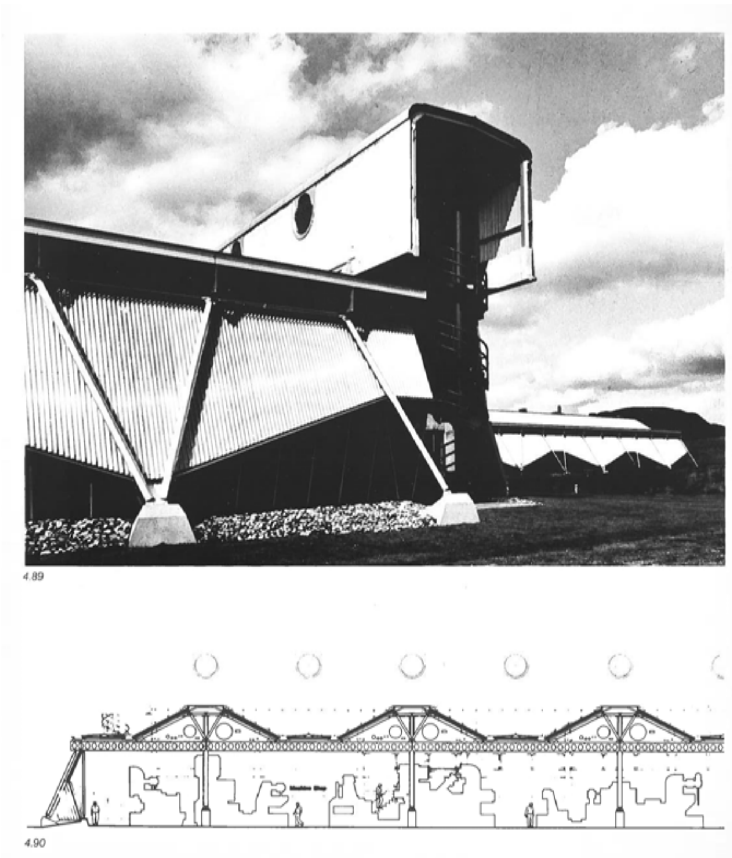
integrated systems of void space
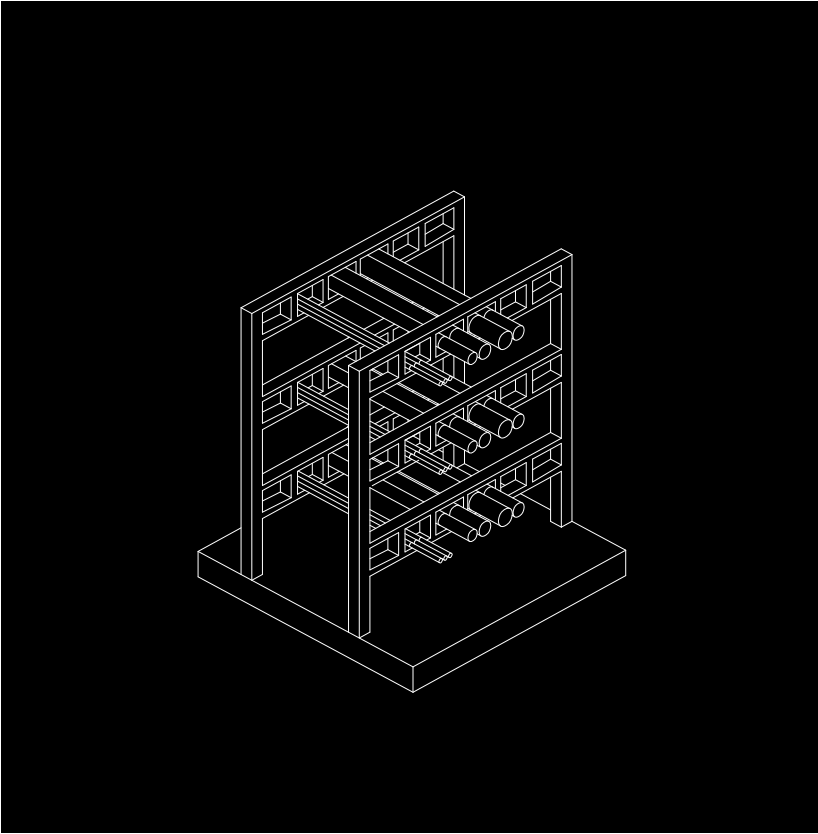
integrated technical properties with permanent structure

North-south section scale 1/1,000.
南北断面　縮尺1/1,000.

...rance hall in the 2nd phase. The roof is the air-inflated membrane using the transparent
...bon fluoride film.

East-west section. 東西断面.
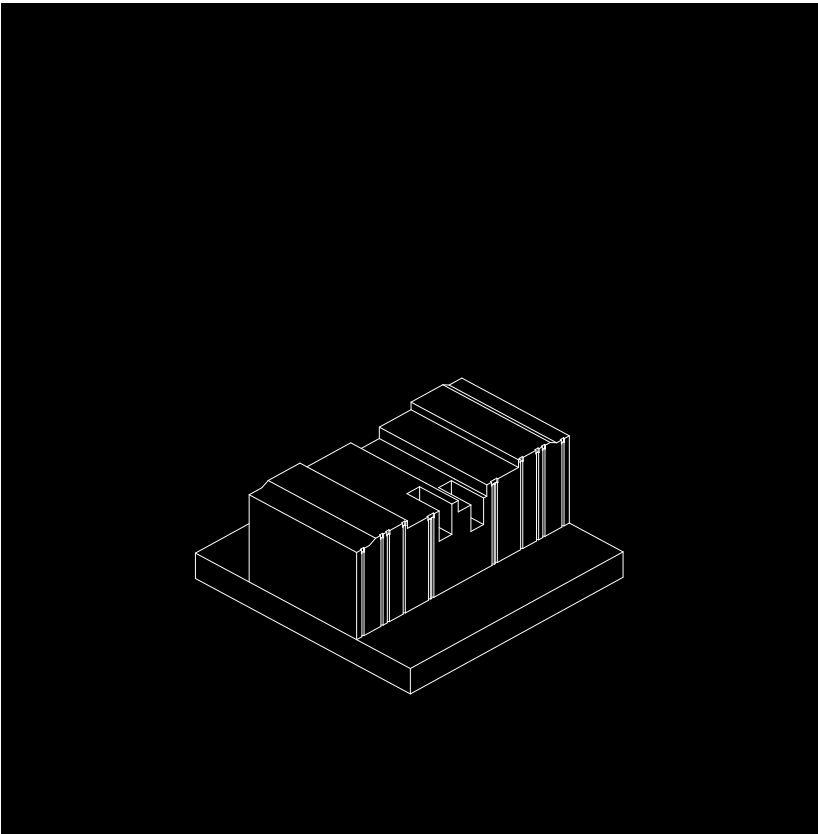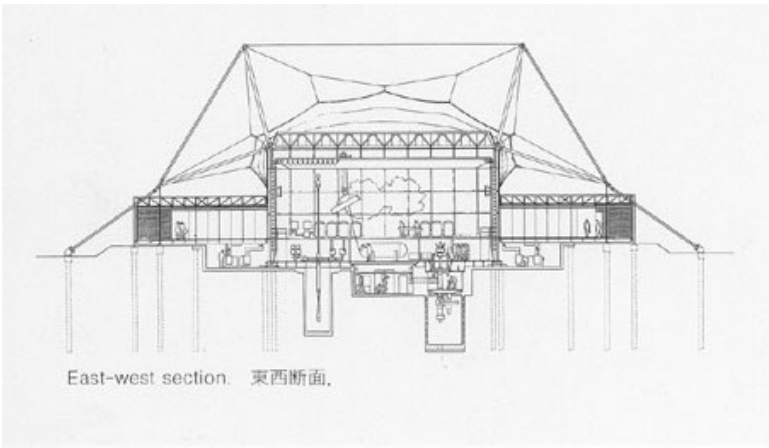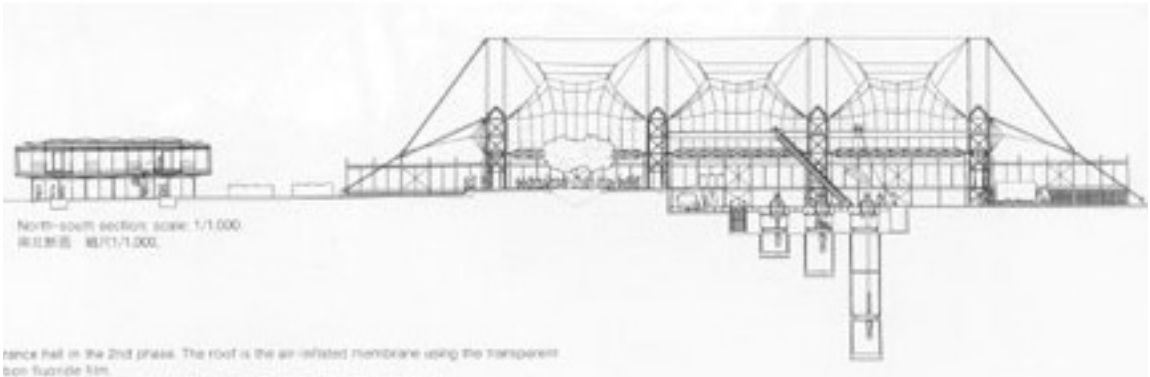
symmetric pile foundations afford assymetric configuration of space
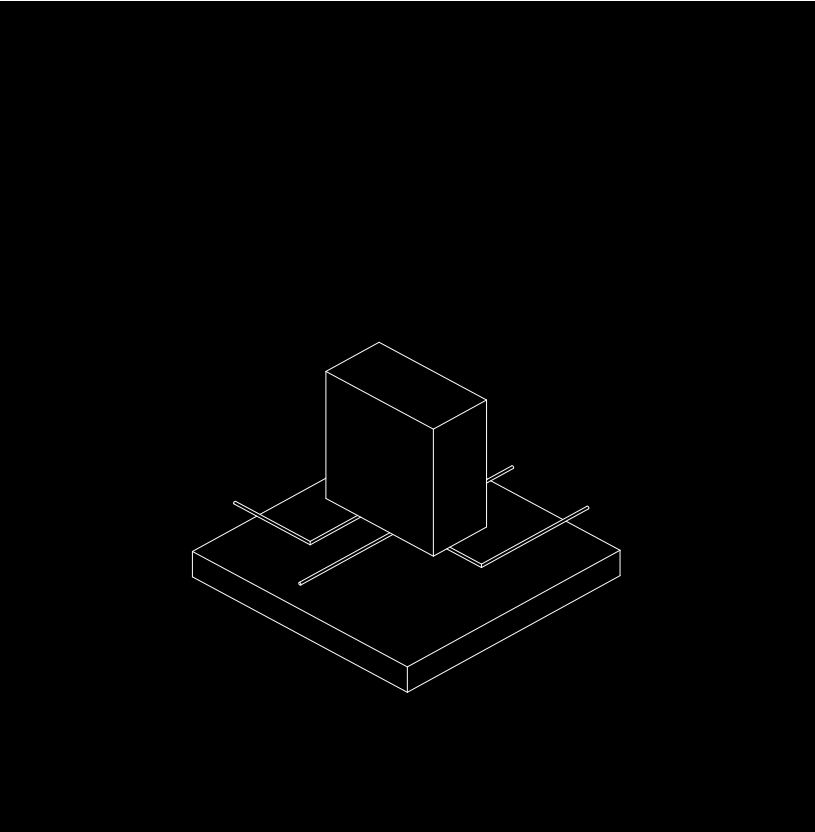
synergetic monolithic closed form
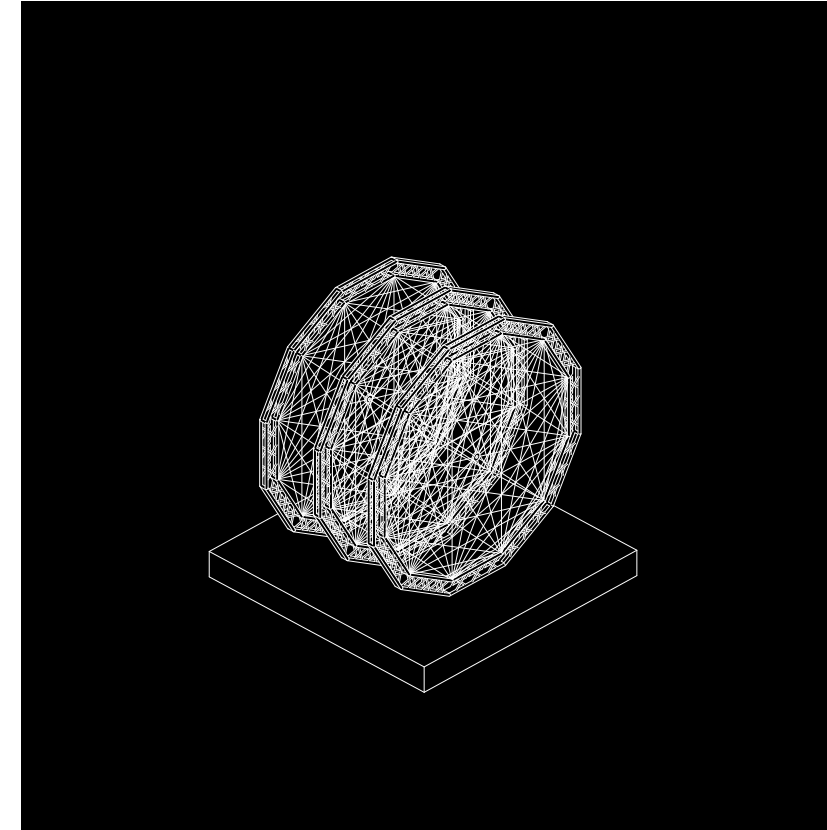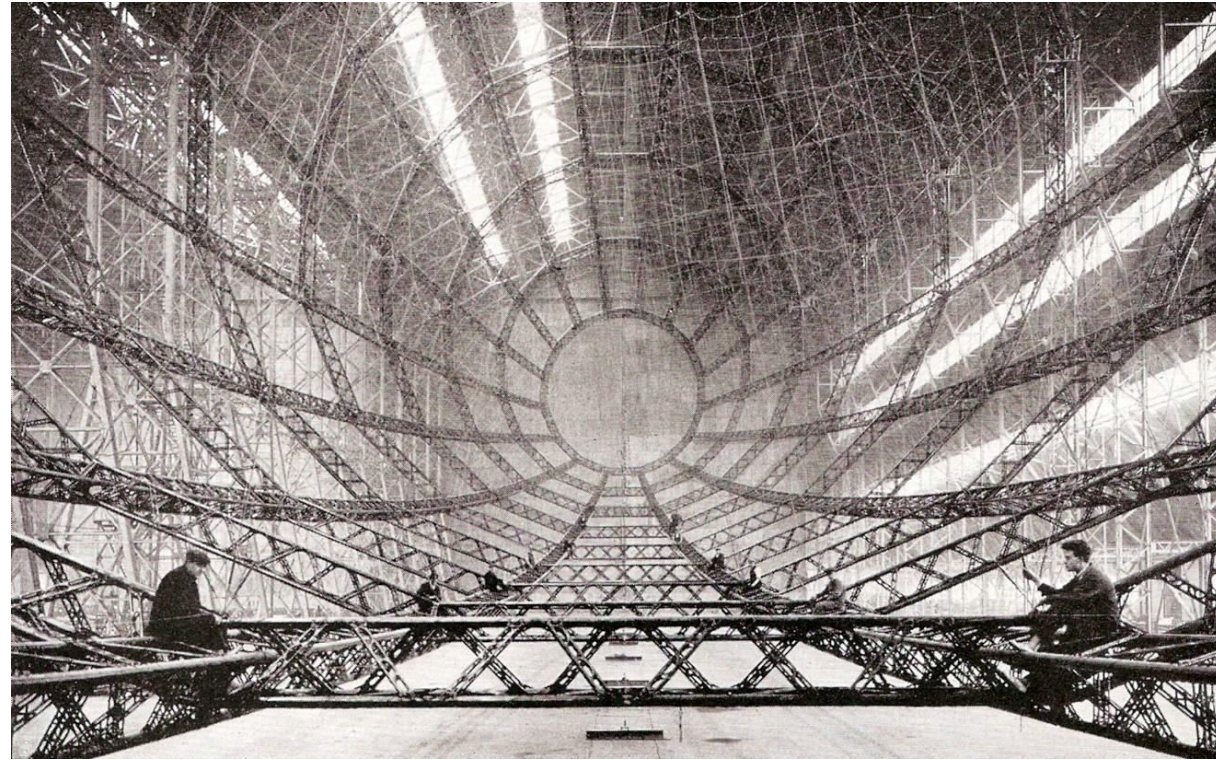
*bracing system as replicating fragment*
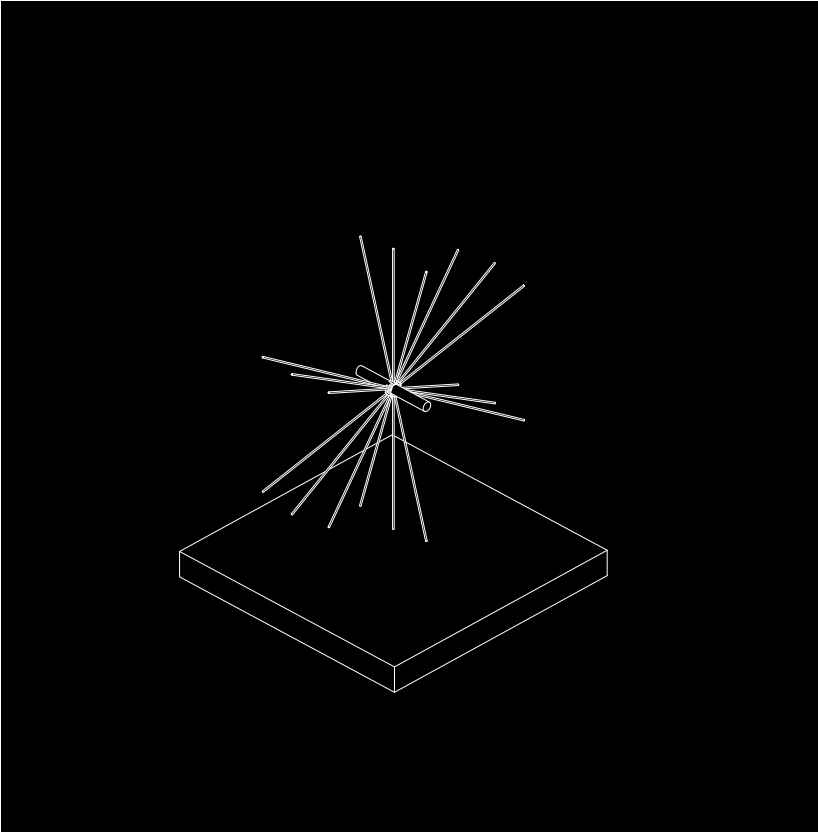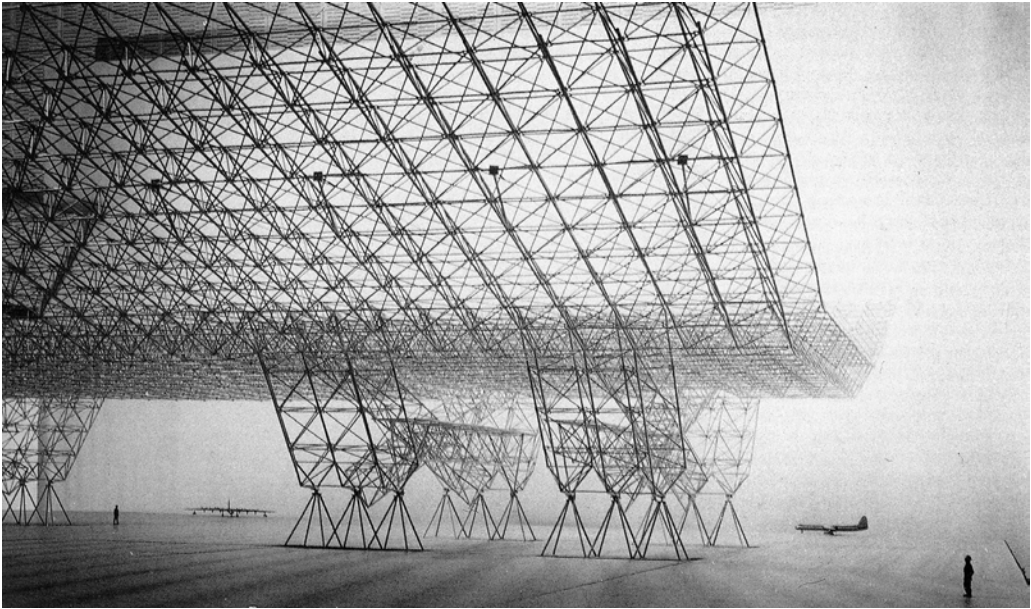
omnidirectional replicating node

The roof is developed out of the simple vault module
The height and width varies according to needs
The structure orders and lights the spaces.

The grain and angle of the structure
provides instant orientation
Both inside the building and also from the outside.
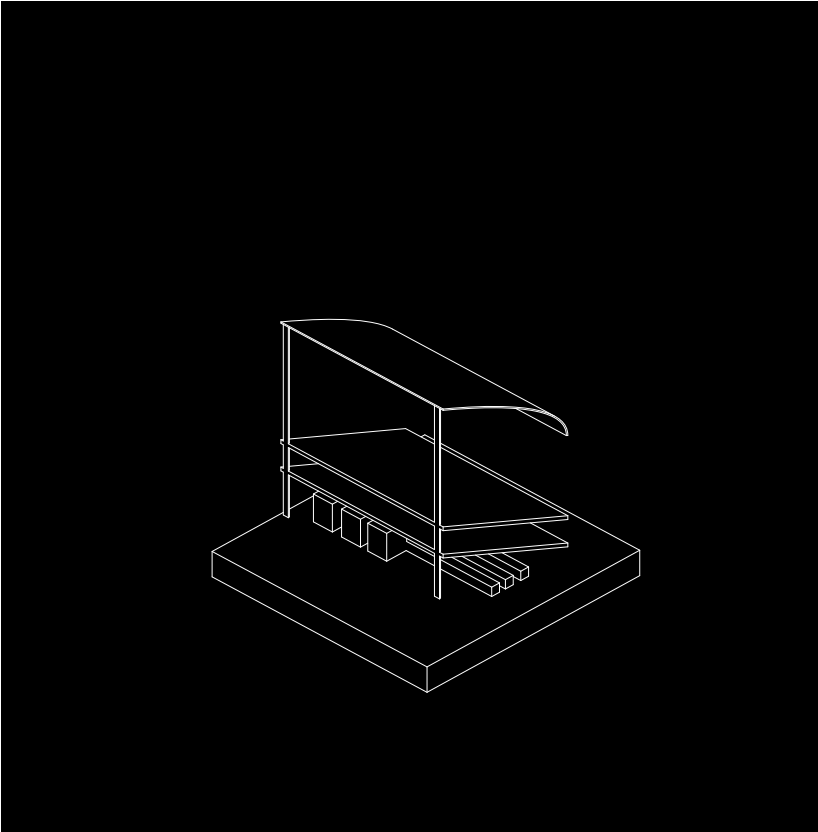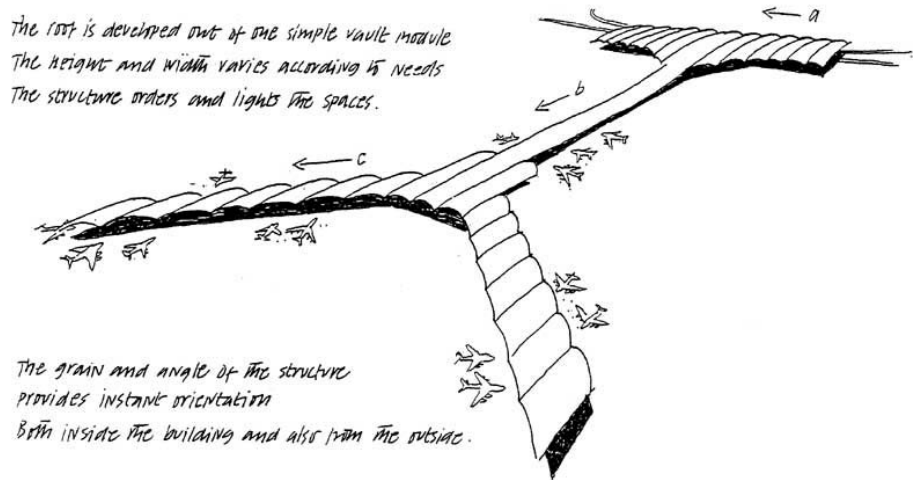
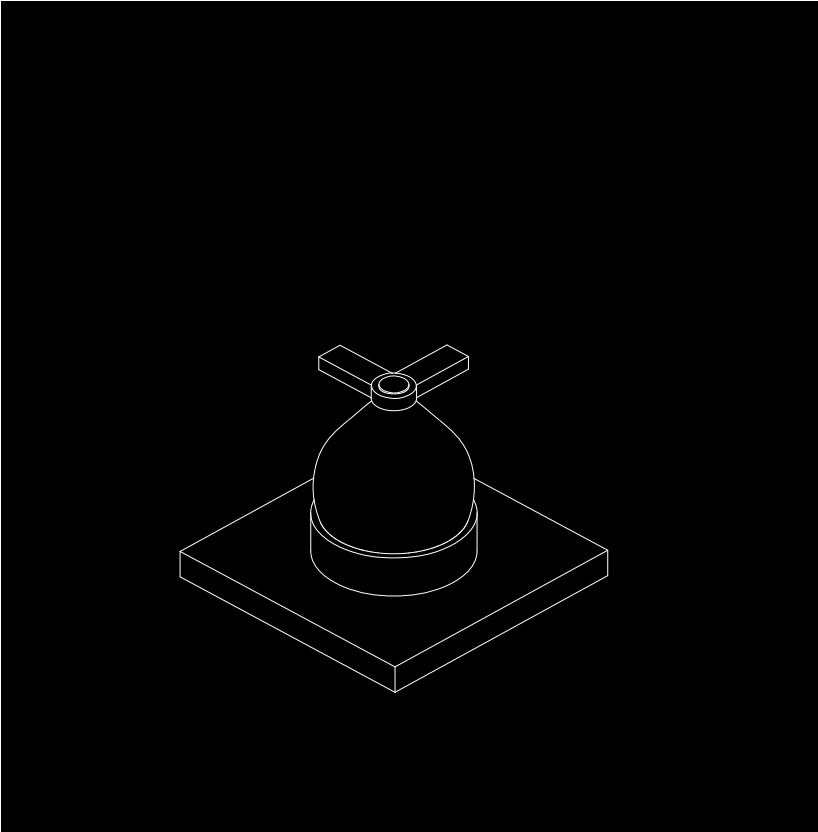*layering of 'life-support' systems affords large open spaces*
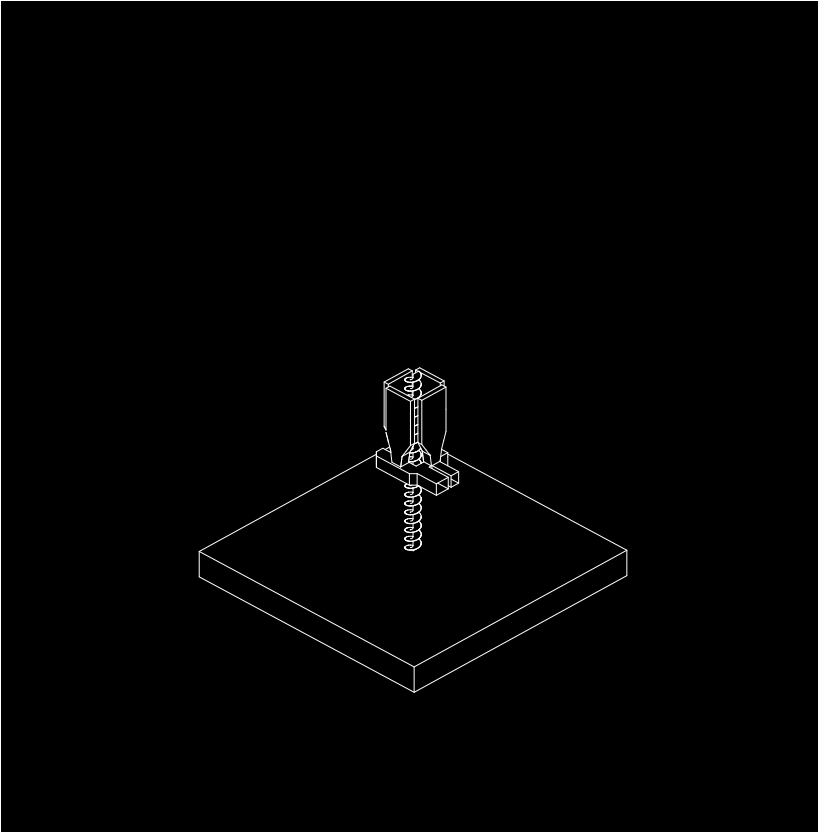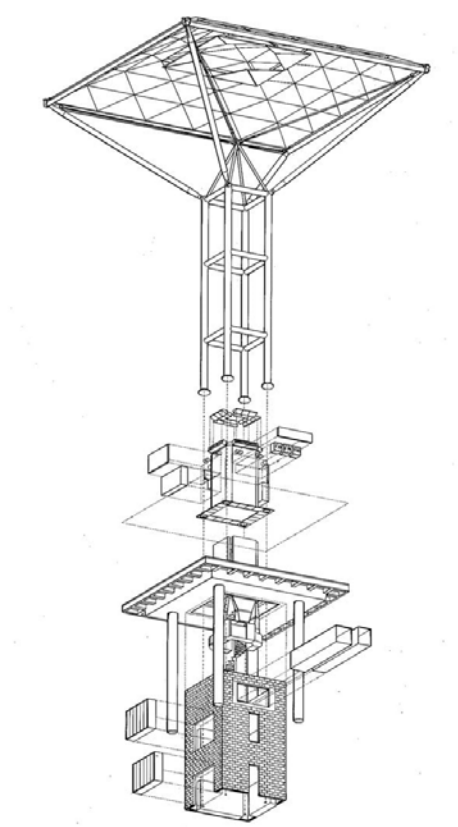
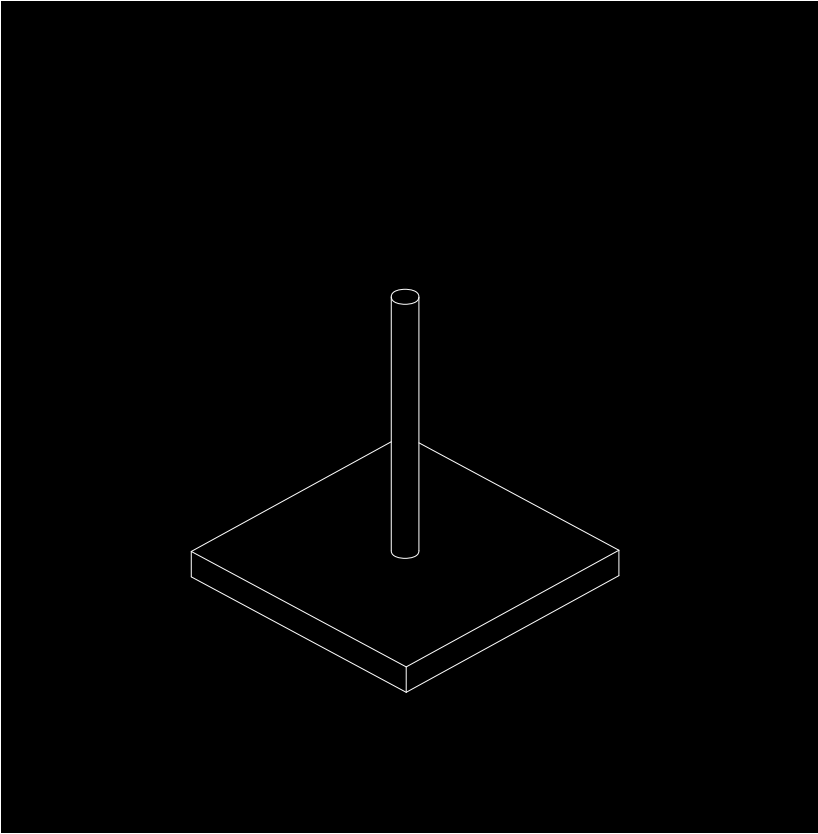*technical equipment integrated with structural core component*
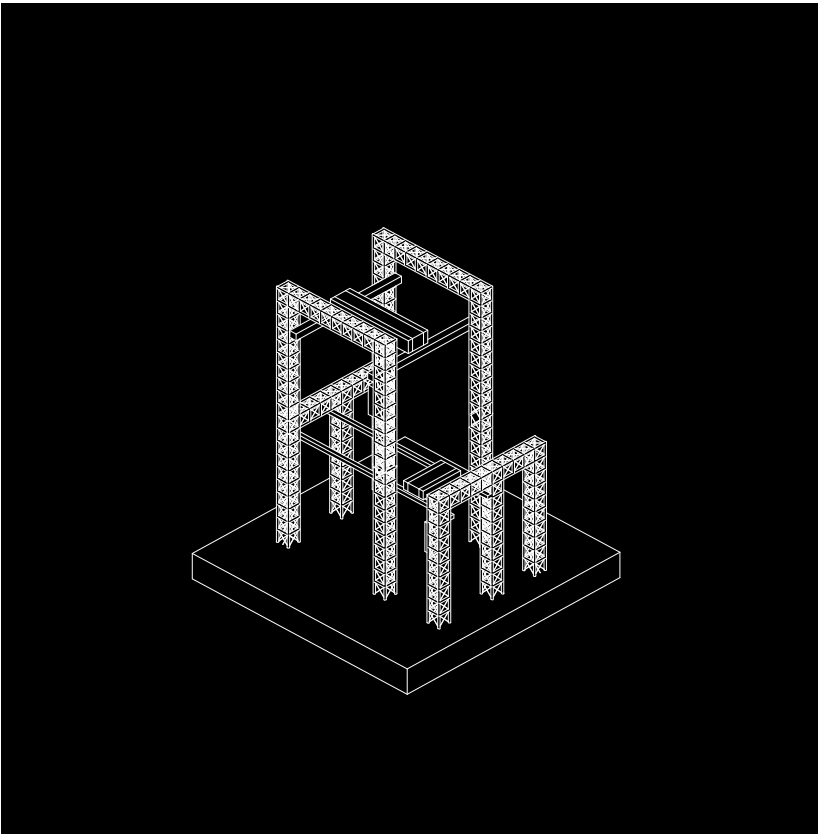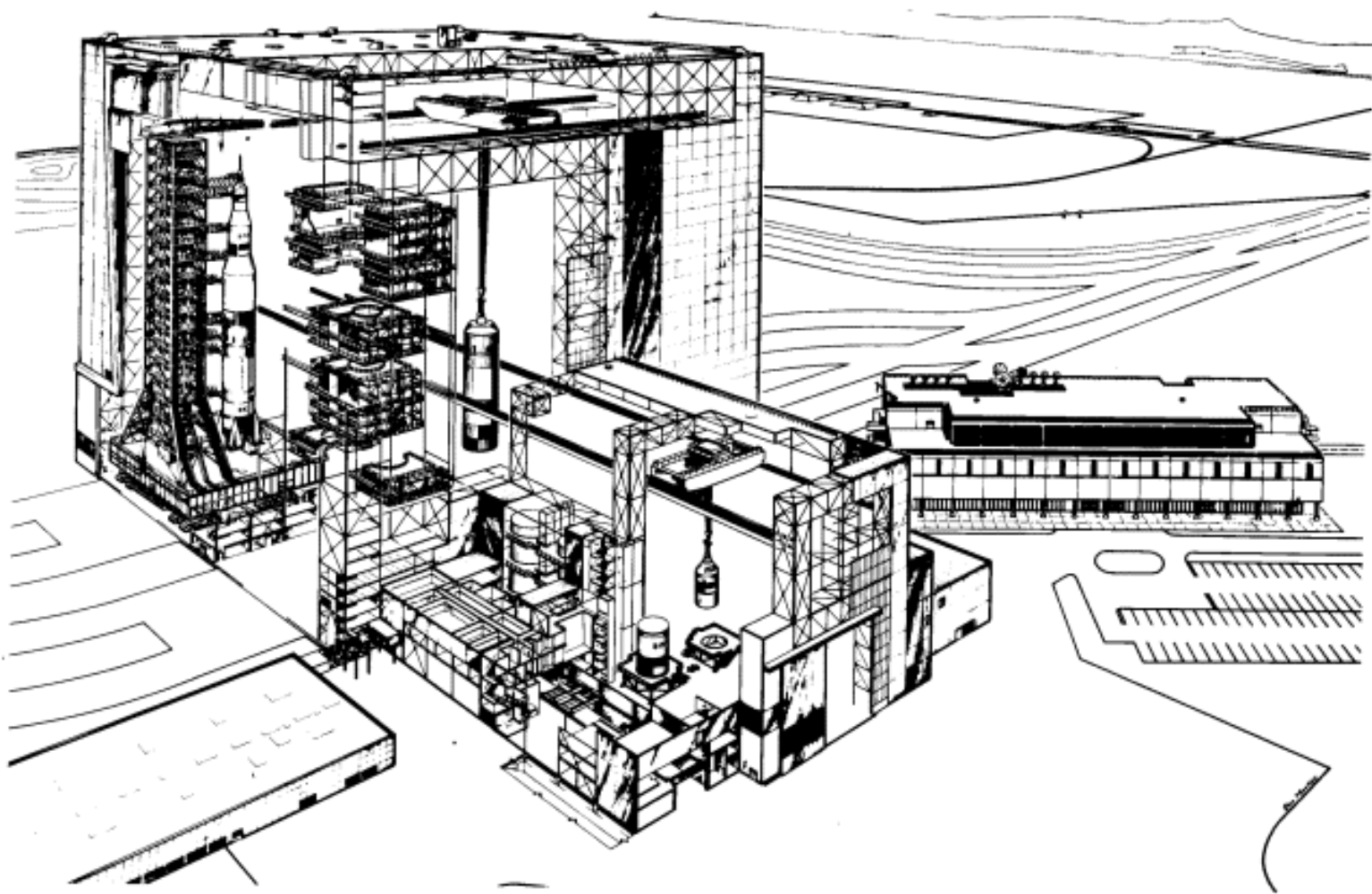
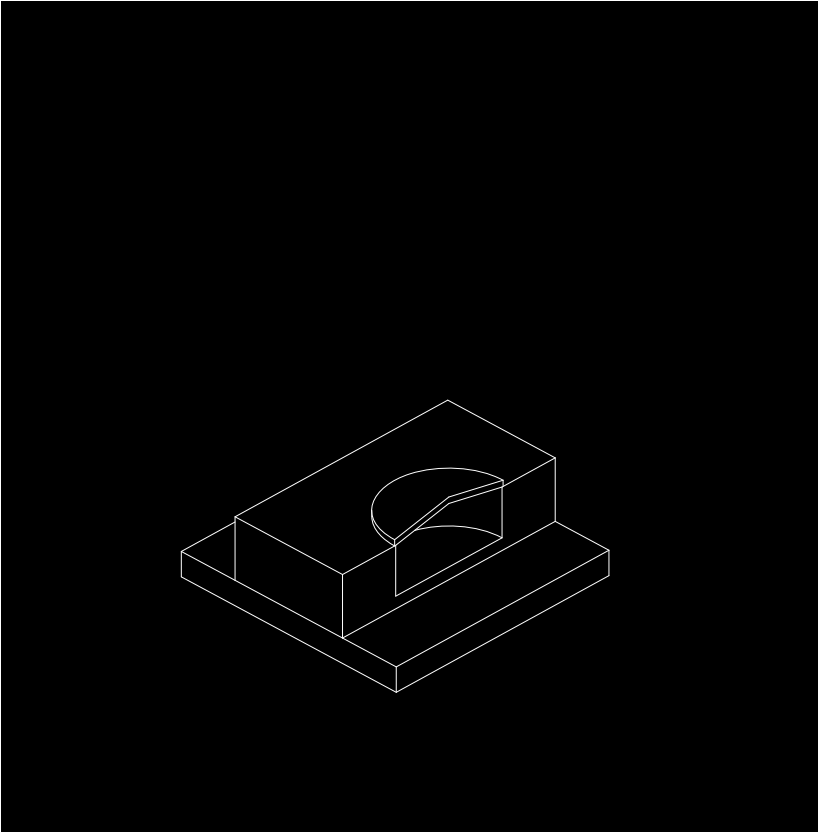*transportation of modular components as production line*

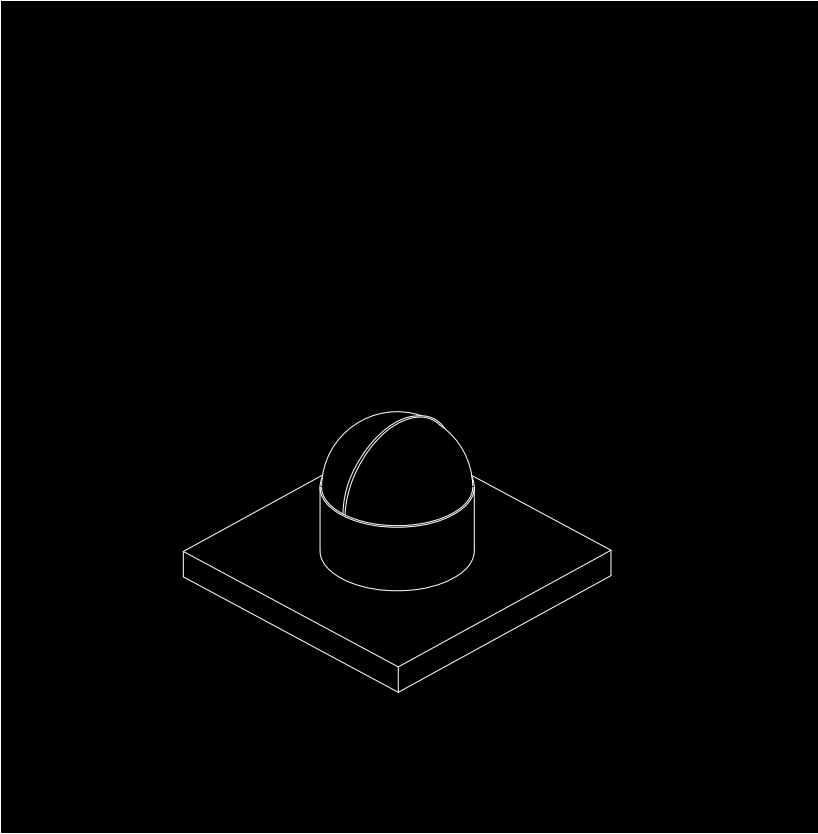*functional form as aesthetic element*
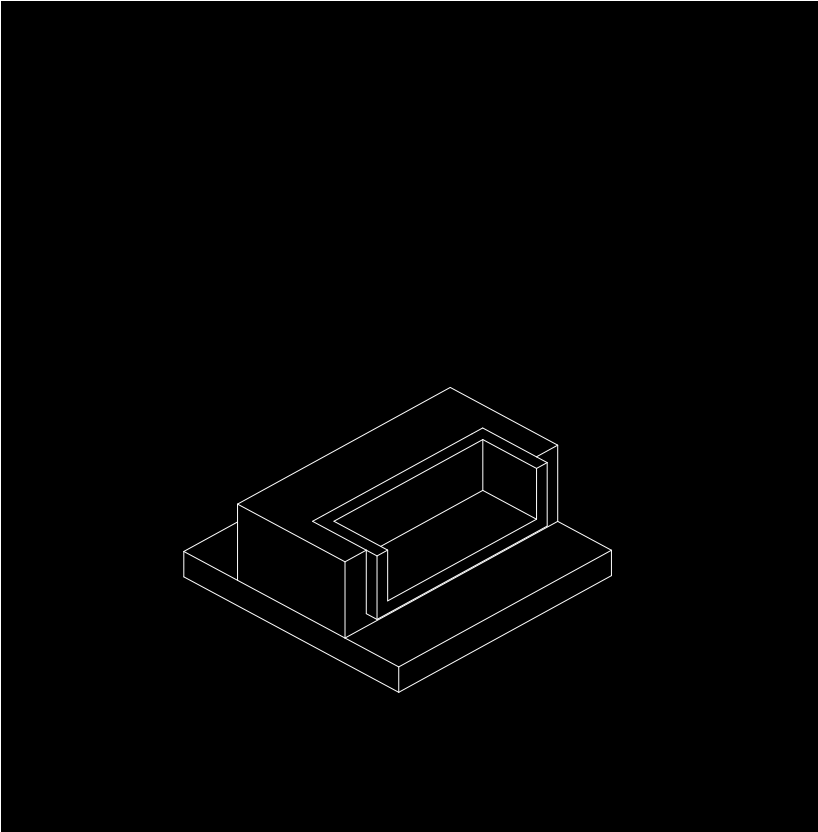
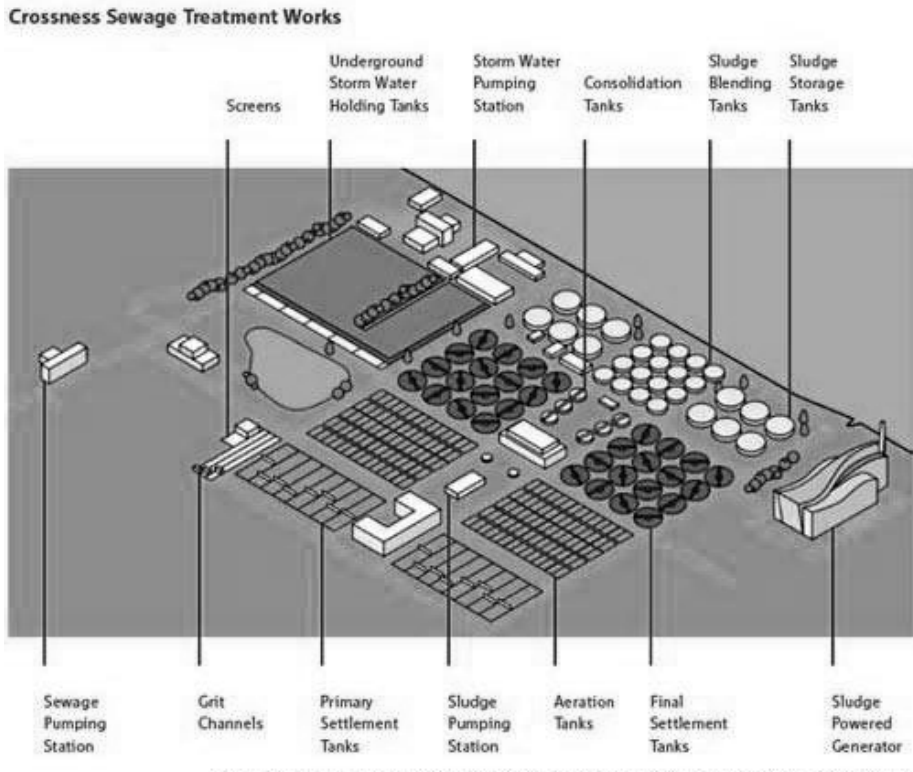*excessive program as architectural element*

functional form as landscaping element

functional form as architectural element

Crossness Sewage Treatment Works

Screens

Underground Storm Water Holding Tanks

Storm Water Pumping Station

Consolidation Tanks

Sludge Blending Tanks

Sludge Storage Tanks

Sewage Pumping Station

Grit Channels

Primary Settlement Tanks

Sludge Pumping Station

Aeration Tanks

Final Settlement Tanks

Sludge Powered Generator
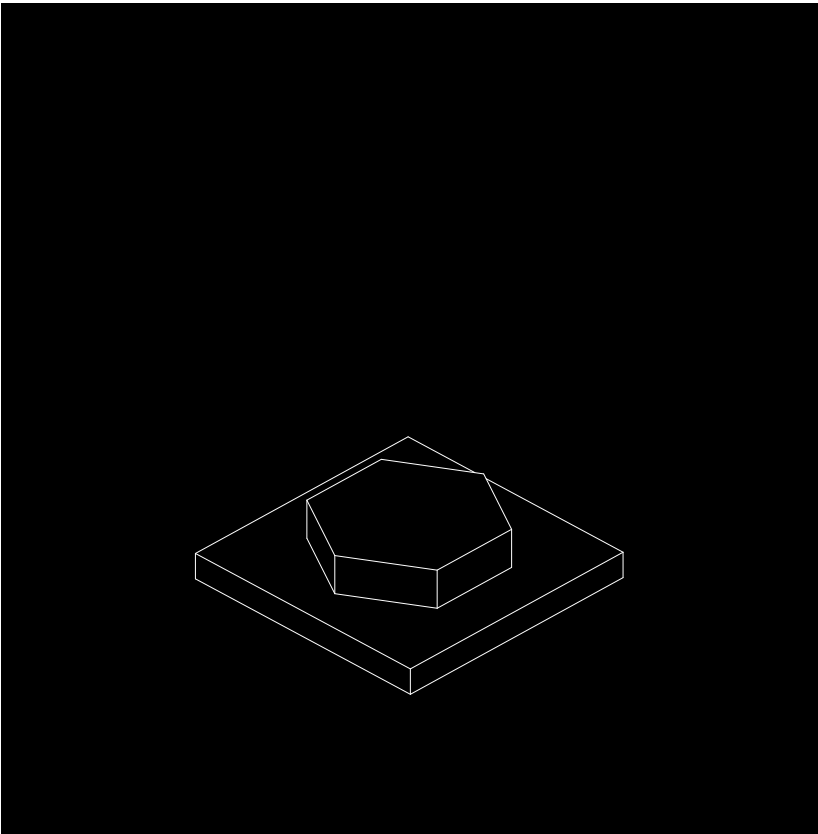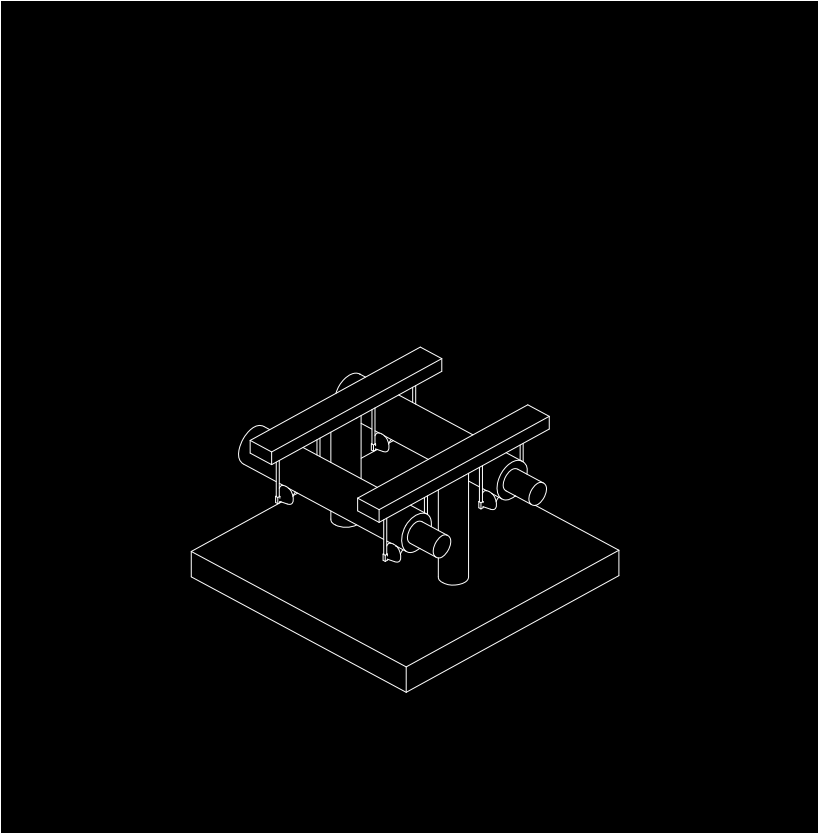

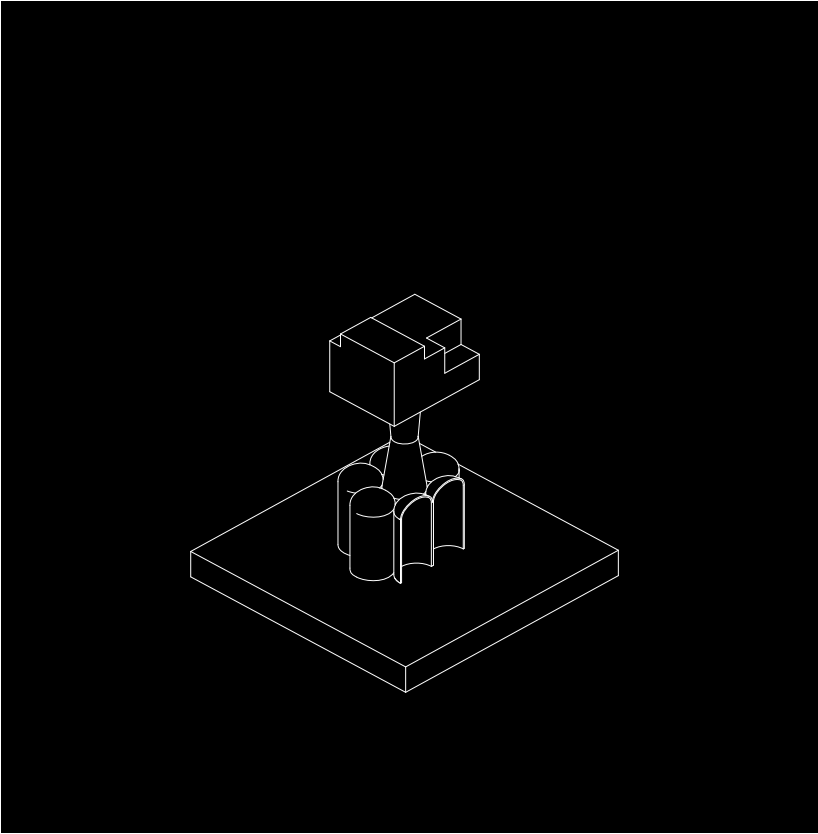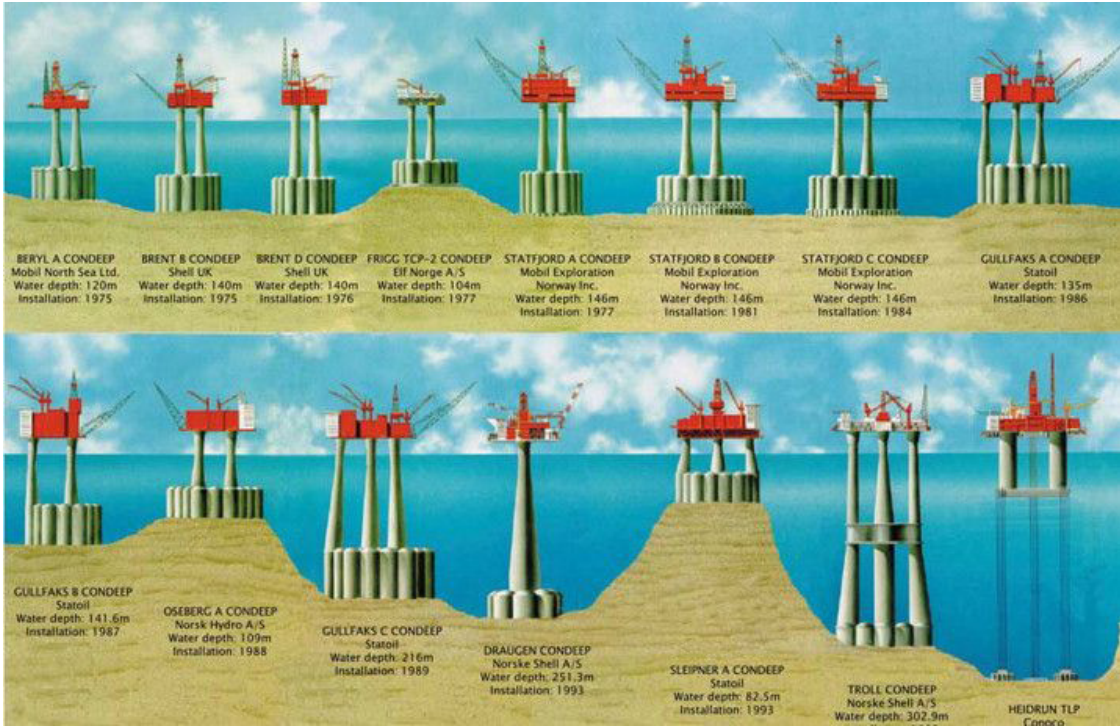*form optimised for industrial purposes*
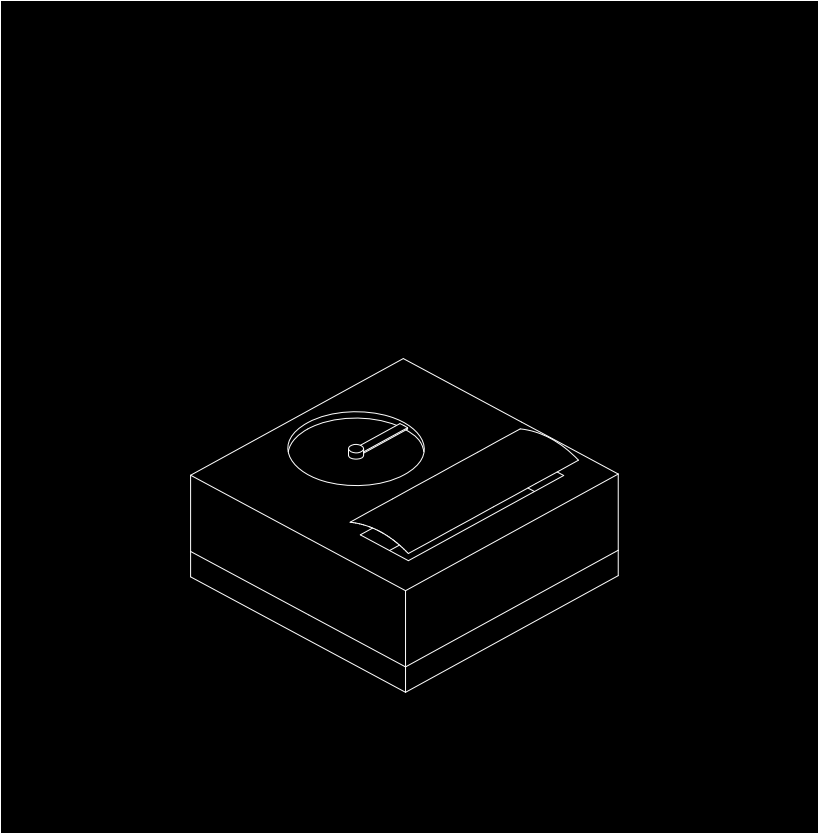
unique industrial forms

forms reapplied as landscape elements

infrastructure adapted to ground conditions

foundation as functional element

conclusions

hyperbolic forms

replicating fragment

machinic forms

integrated structures

modular structures

infrastructure

machinic

stacking

underground
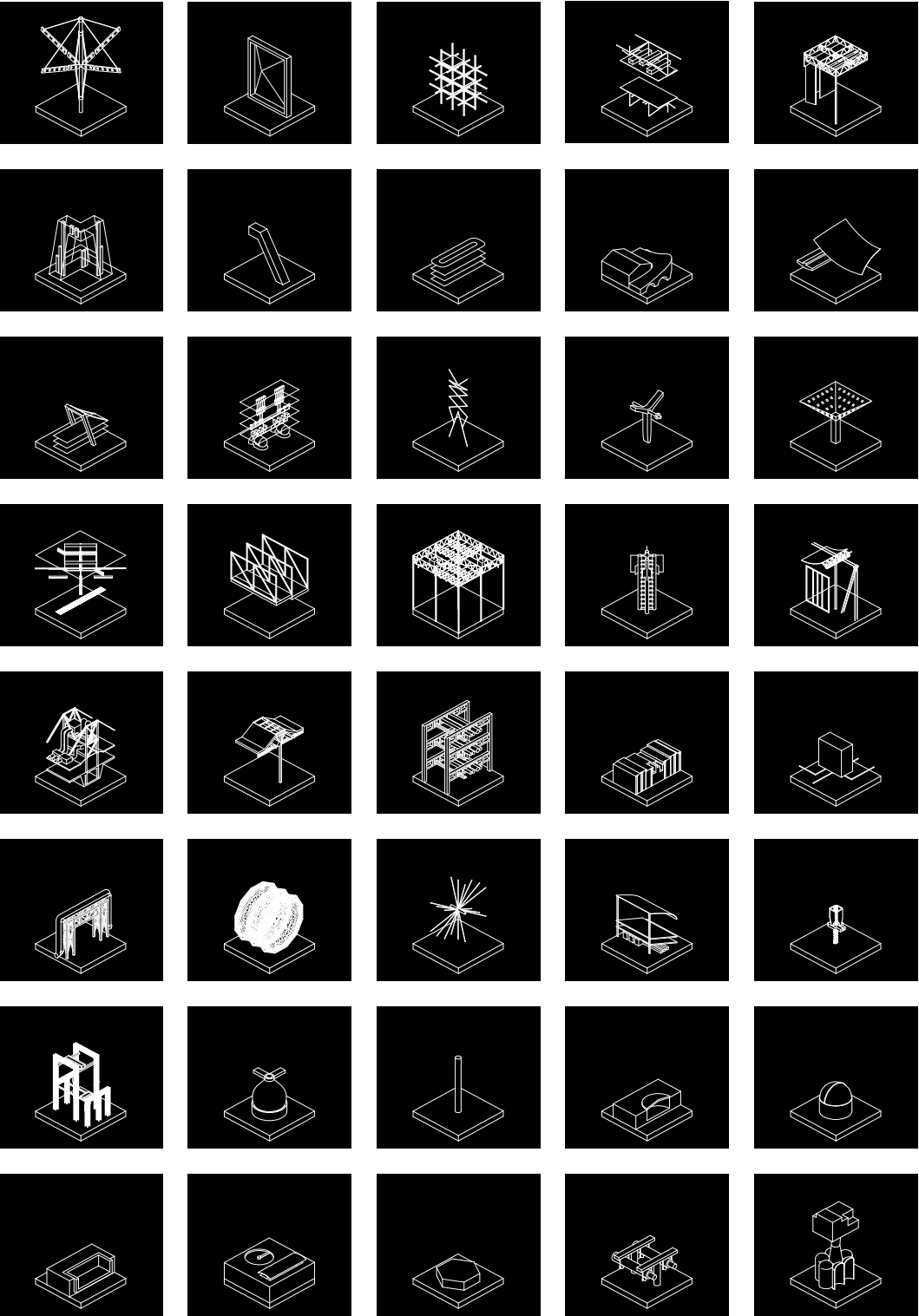
Hyperbolic forms

Excessive form implies an
architectural language. It tries to
visually communicate ideas and is
simultaneously not just a hollow
excessive form. Program stimulates
form and its relation between its
content and expression.

The project requires a degree
of excessiveness in terms of
a clear language between the
´hollow´programs and their
interfaces, the ´gates´. A language
that distinguishes but recognizes
the world of the machinic and the
anthopocentric.

Projects

zollverein kohlenwäsche
lingotto factory
imperia automobile factory
burgo paper mill
newstead waste water treament plant
copenhill

Replicating fragment

Projects
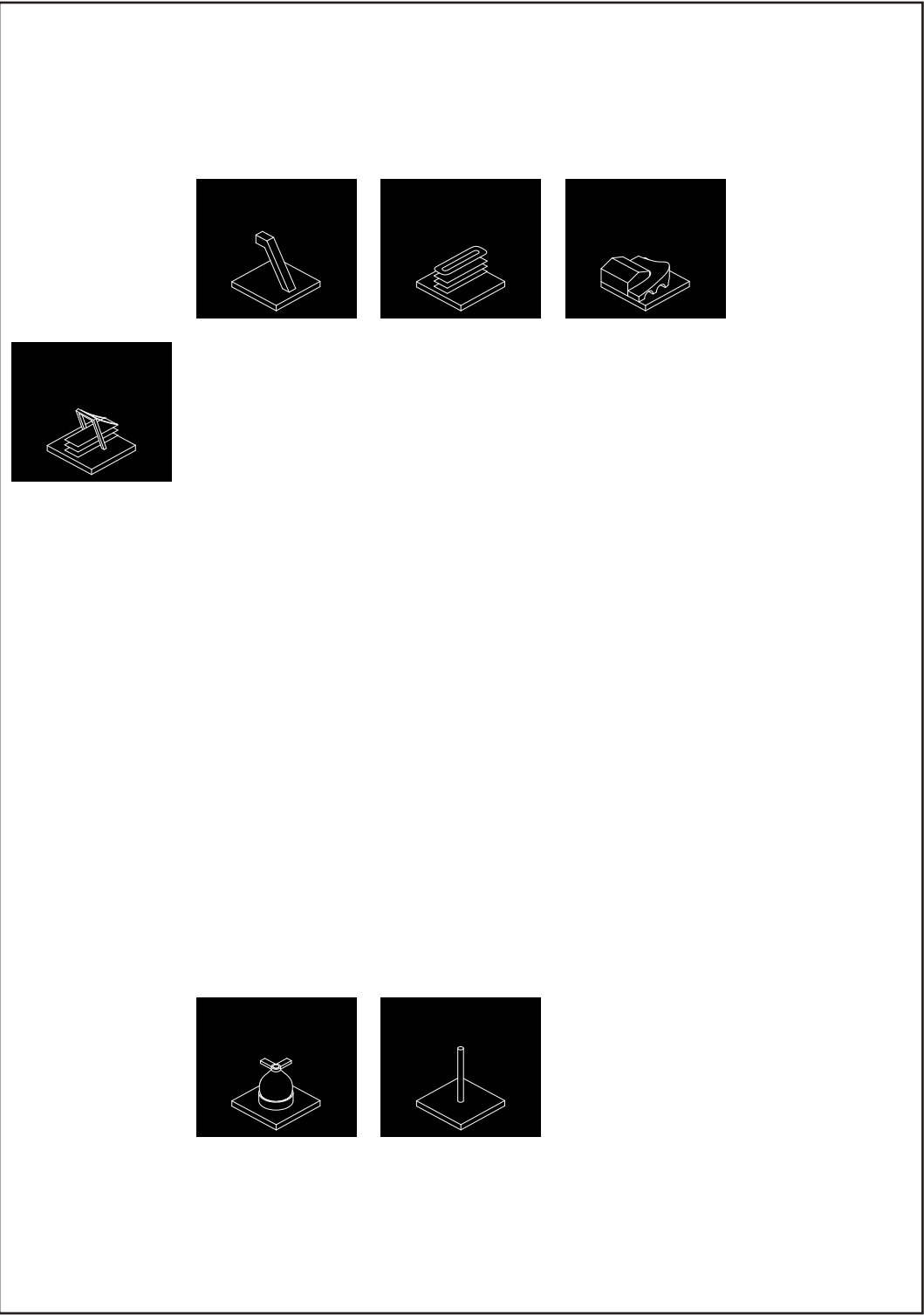
The megastructure requires a
replicating fragment that allows
assembly and disassembly and is
integrated with corresponding
systems. The structural node is also
part of an expressive language of
the megastructure. It should express
dependence of programs docking
to the structure. Allowing different
structural systems to the image of that
its content does not matter. Structure
and program then become, structurally,
a cohesive system.

renault distribution centre
imperia automobile factory
aeg turbine factory
steinberg hat factory
high life textile factory
nitto food cannery
airship interior structure
usaf air force hangar

Machinic form

Projects
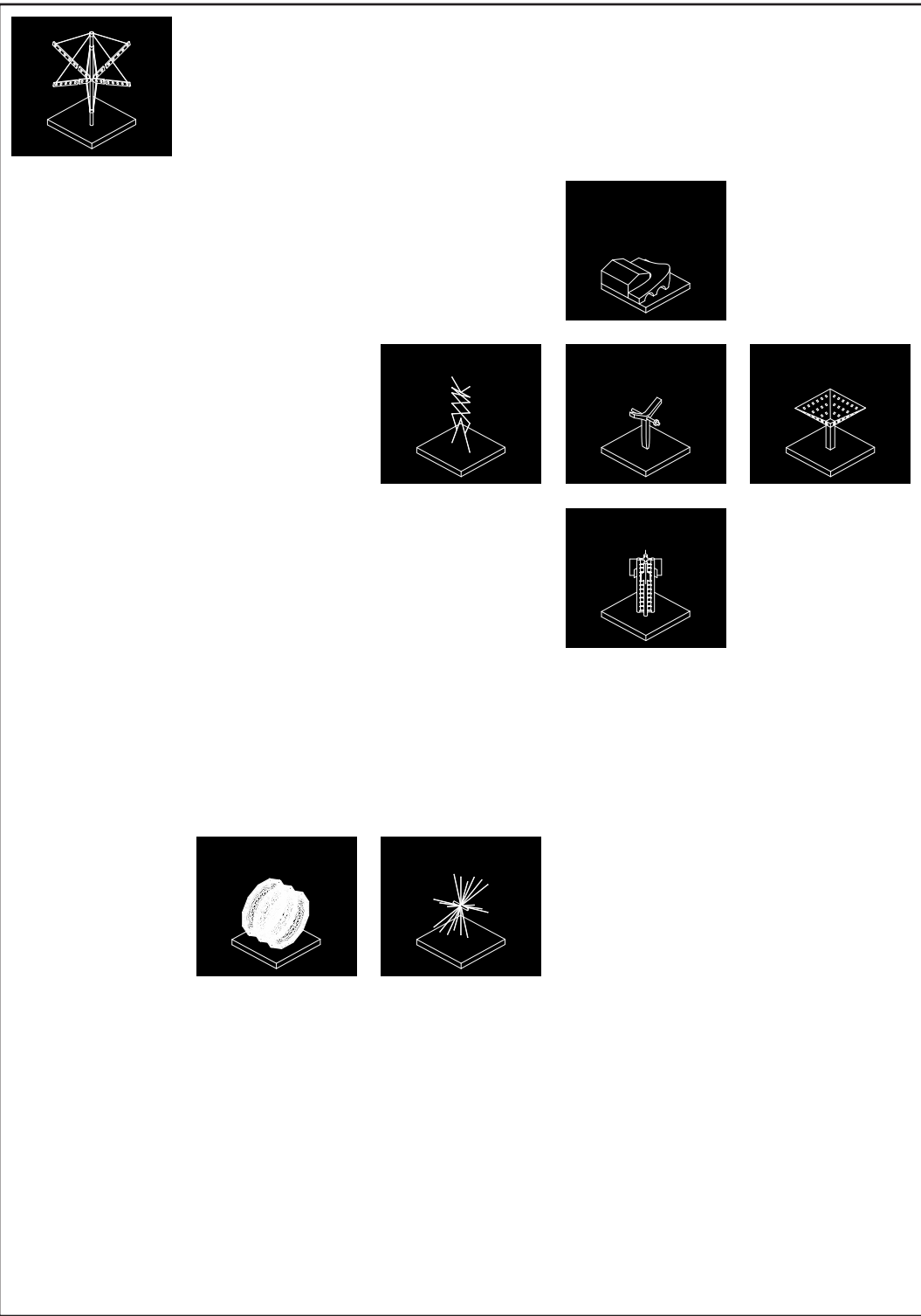
The architecture should incorporate the machinic as well as the anthropocentric. However to incorporate the machinic thematics, the right question is how would this be expressed. Although efficiency is part of this language a certain expression adds to the whole. It requires undomesticating design. In this way the ground is for example superfluous, machines do not need floors to stand on or specific heights to feel comfortable. It is based more on performative qualities. The expressiveness of the machine is bulky, rough and sheer bigness. This side of architecture should expressive itself and recognize the machine as form within the project.

zollverein kohlenwäsche
lingotto factory
imperia automobile factory
shell piping bridge
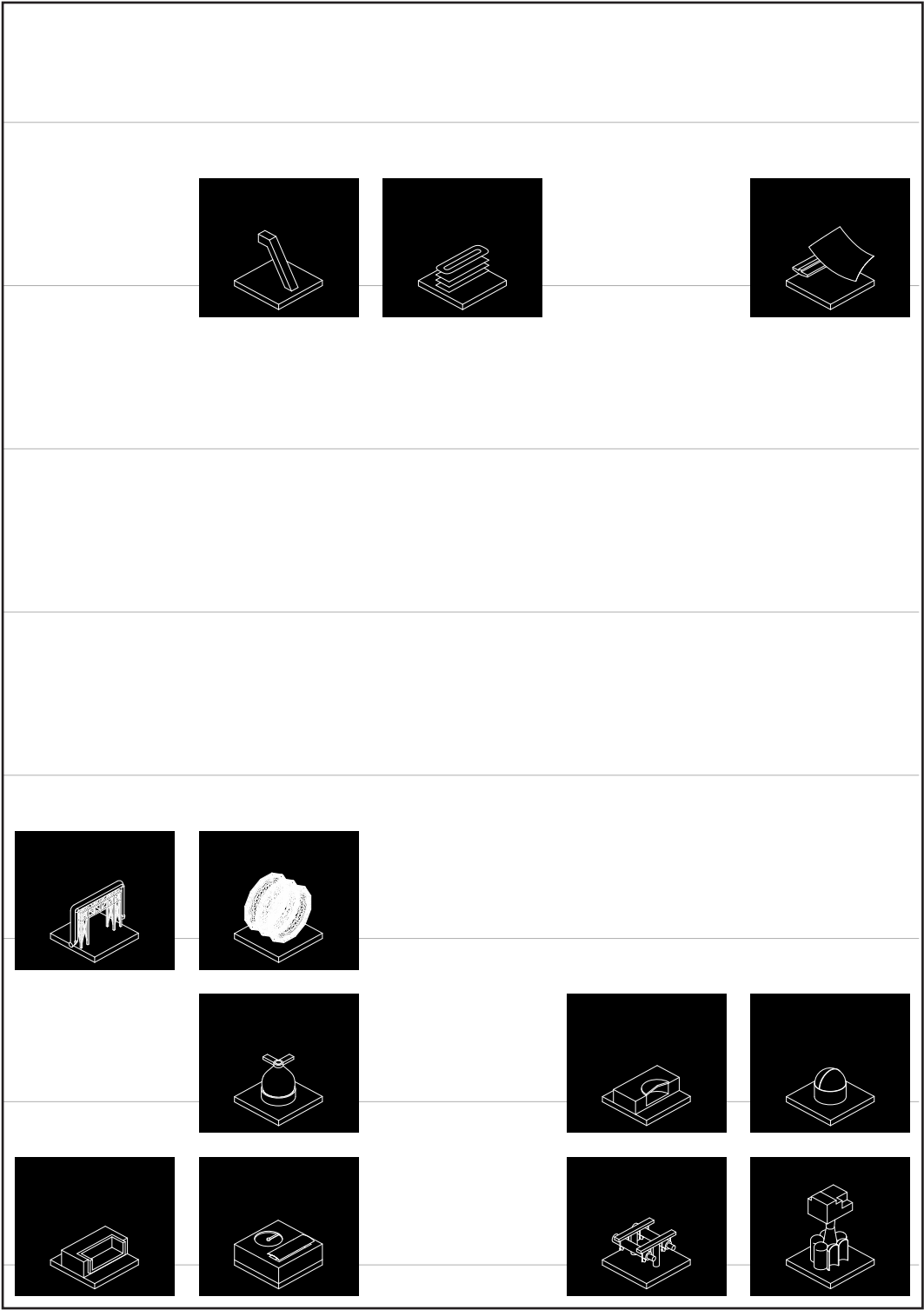airship interior structure
newstead waste water treament plant
solrødgård water treatment plant
british sugar st edmunds
crossness sewage treatment works
deephams sewage treatment works
arctic utilidor
concrete gravity structures

Integrated structures

Projects

In order to recognize the machinic parts within the project systems we depend on have to be integrated. Structure provides the movement of the machine, the layering of machinic and structure. Performative qualities should come hand in hand with spatial, architectural expression and structure forming not only an integrated structure but integrated architectural language as well.

erco p3
b+b italia office building
menier chocolate mill
steinberg hat factory
high life textile factory
olivetti underwood factory
cummins engine plant
salk institute laboratories
stansted airport
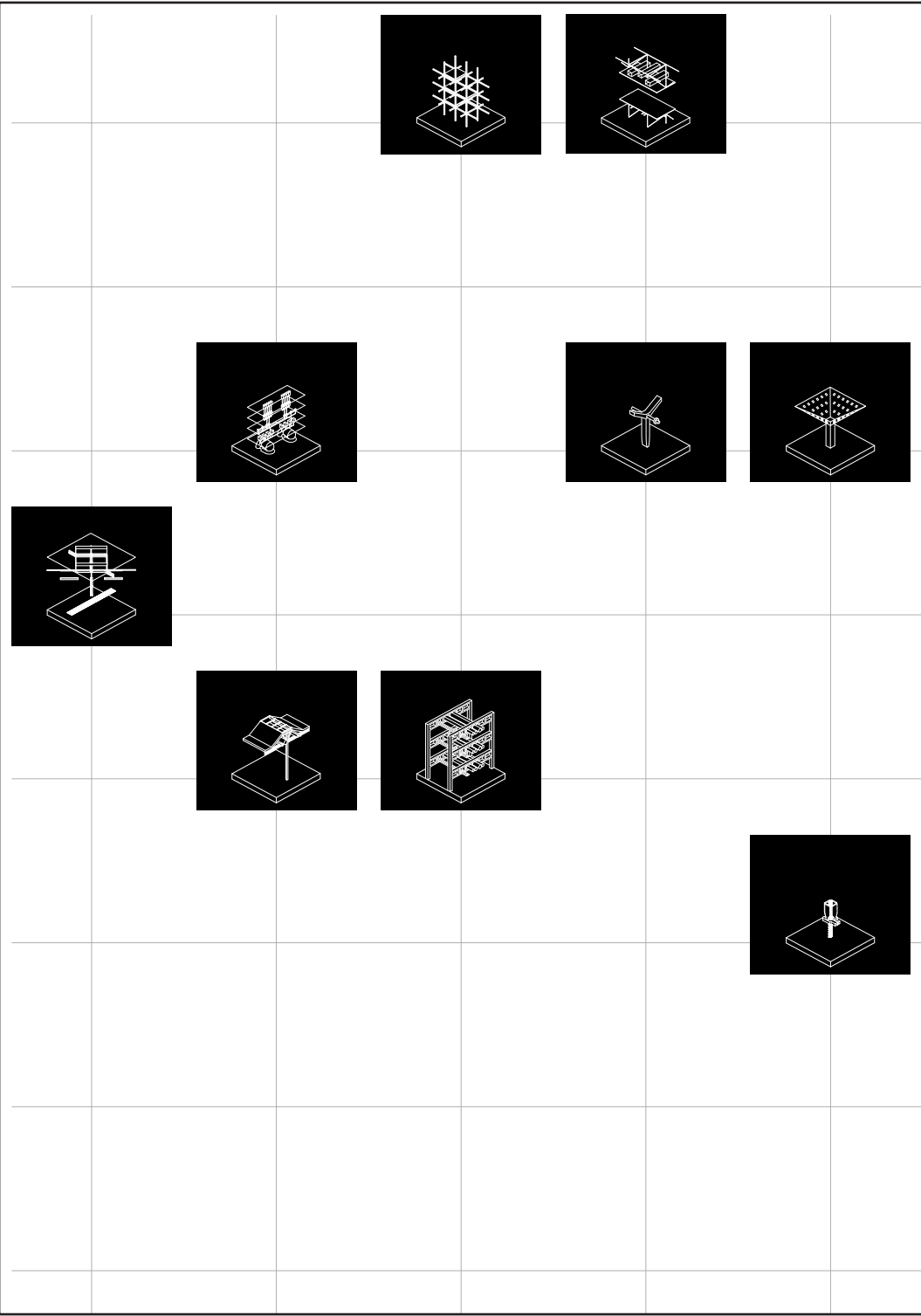
Modular structures

Projects

Modularity should play an important role in terms of the megastructure´s disassembly closing its cycle within the city. Also in terms of the notion of the cyborg being an assemblage of parts. Structure and envelope should complement eachother as well as the programs in between the ´gates´, such as living quarters and restrooms. The program in that sense becomes modular as well as the structure that affords this modularity. The megastructure therefore adds to the assemblage of its surrounding conditions, place.

renault distribution centre
mumbai warehouse
scsd system for california school
inter-action centre
advanced factory unit
seele factory competition
usaf air force hangar
apollo assembly building

Infrastructure

Projects
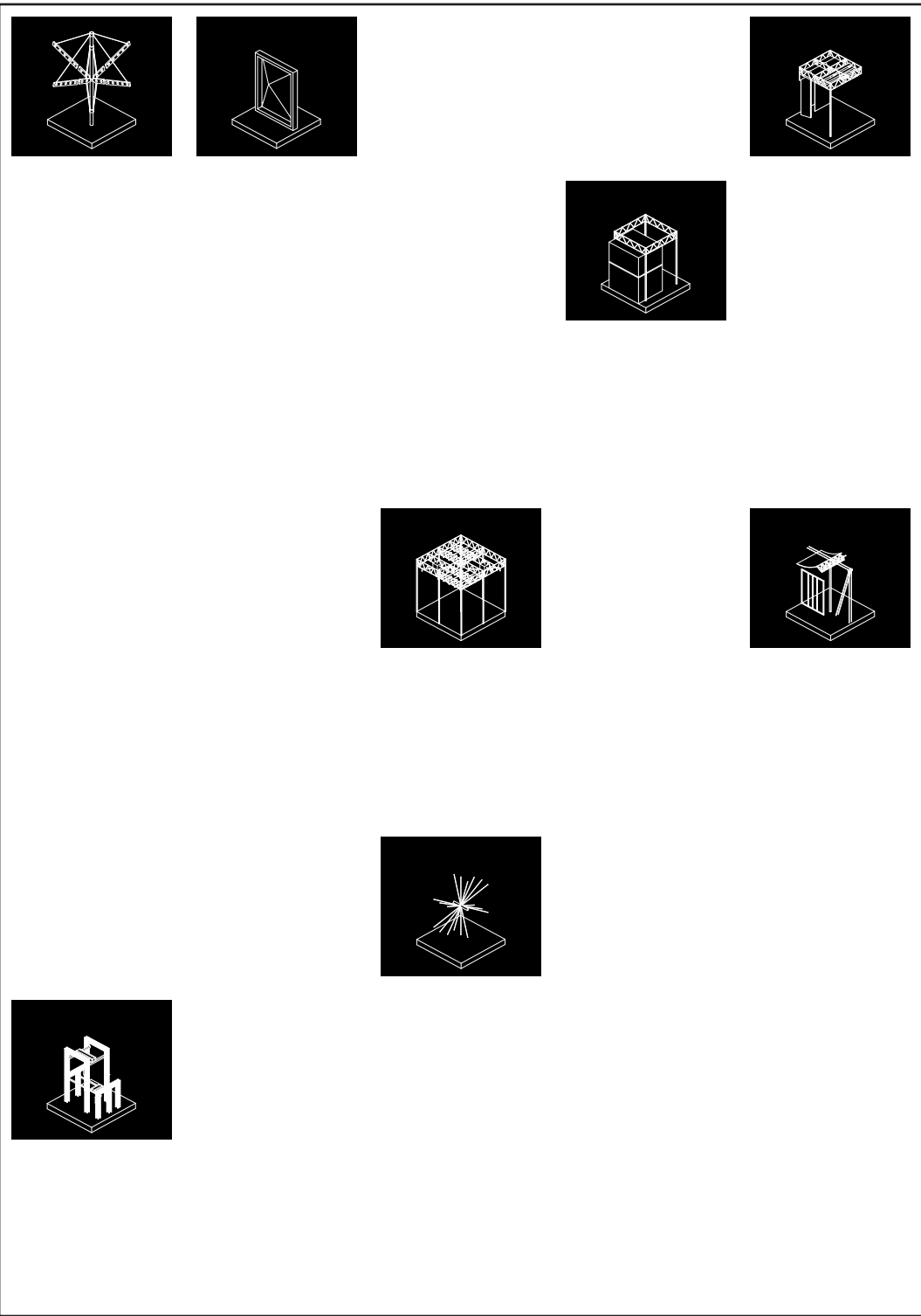
The programs and their technical
equipment need a particular way
of circulation, both in exporting/
importing products, pedestrians and
performative qualities. Although one
might think bringing these flows
altogether I think this should be
layered. Not every program produces
particular products. Every program's
output and input is different.

The 'gates' should become the
interface arnessing these systems as
they only interact with the quality of
relations rather than pure physical
output. Machinic and infrastructure
requires different approaches however
do have to interact.

erco p3
cctv headquarters
zollverein kohlenwäsche
lingotto factory
inmos microprocessor factory
hong kong international airport
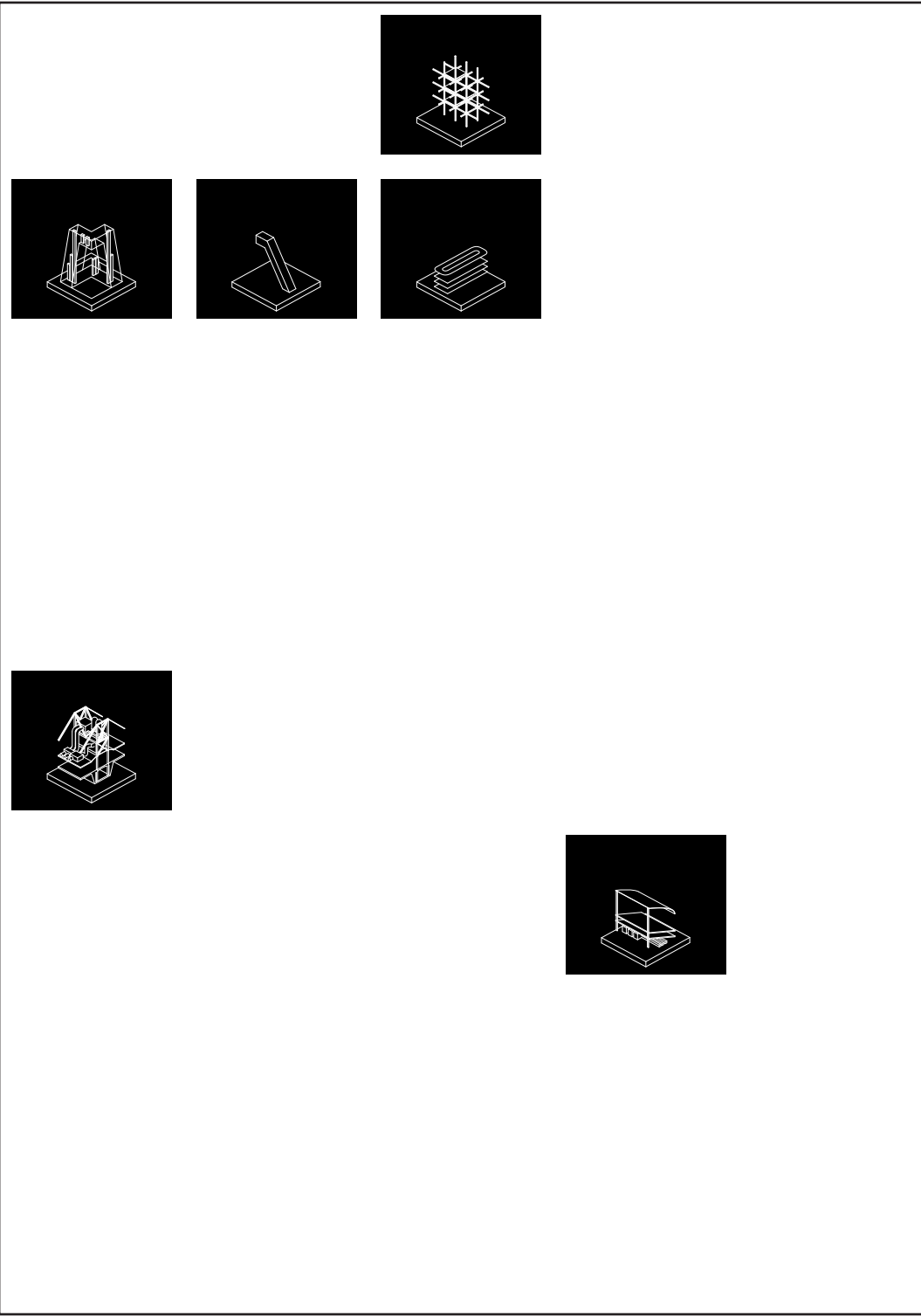
Machinic

What's machinic? What systems are
needed in general and what programs
are specific. Hierarchy is always
present, the conclusion of the previous
mentioned research is that the machine
is below men in that pyramid. Part
of the cyborg theory is to not have
any hierarchy. In order to approach
this hierarchy horizontally instead of
the conventional vertically I opt for
exposing the machine by integration.

The machinic forms spaces as well as
that they are shaped/configured by
space. The machinic language most
of the time is distant and does not
communicate with the comfortable.
What if we change this to a language
that actually shows our dependence
of the machinic, not only on the
small scale but the local/regional and
territorial scale as well.

Projects

menier chocolate mill
steinberg hat factory
olivetti underwood factory
inmos microprocessor factory
shell piping bridge
airship interior structure
apollo assembly building
newstead waste water treament plant
arctic utilidor

Stacking

Projects
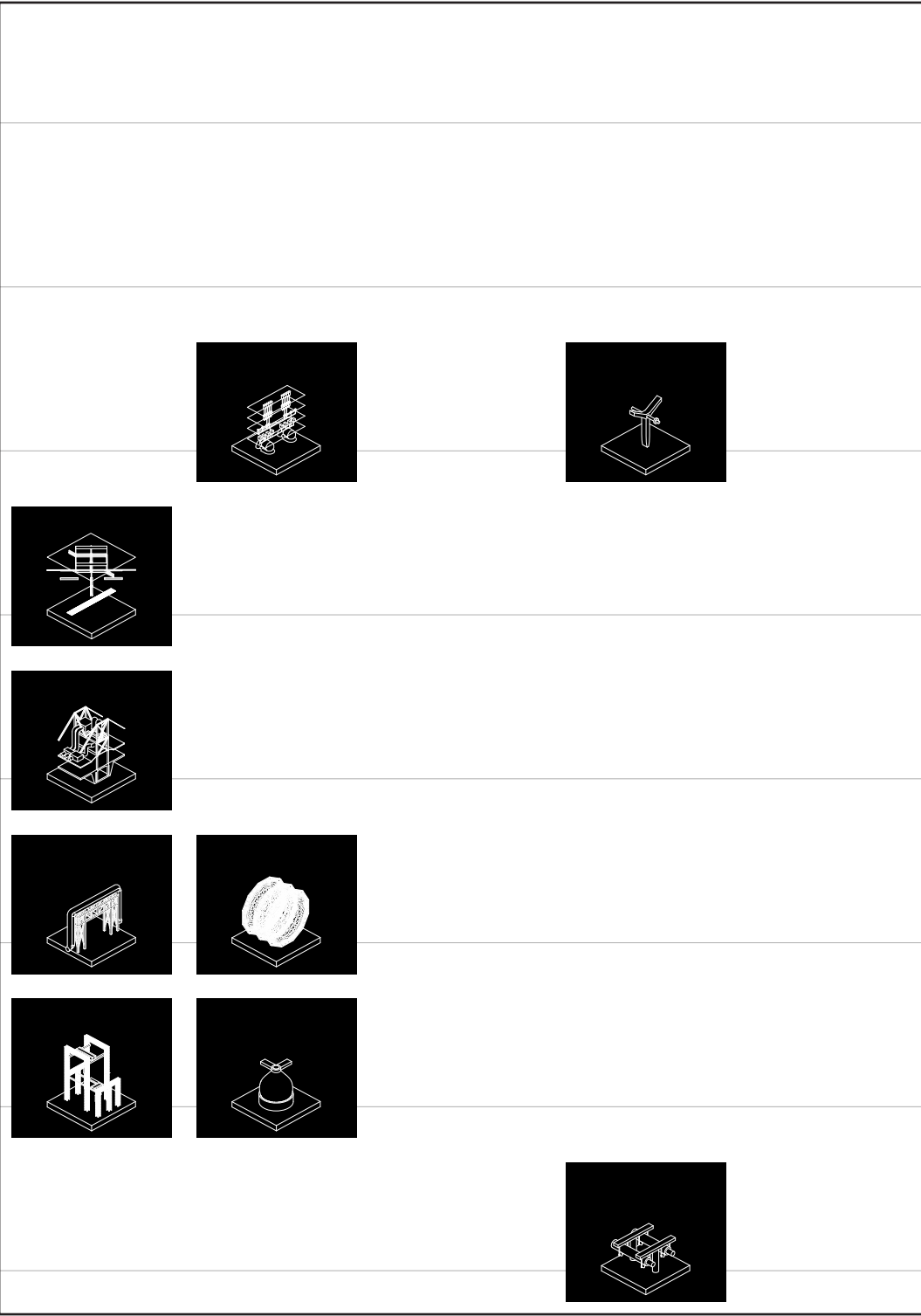
The layering of systems as well
as concepts such as city/nature,
organism/machine within the structure
come together within the detailing/
architecture. The depth and width
of systems, as they are integrating or
distancing themselves, or penetrating
provides possibilities of adaptability.
The structure and membrane is key
in understanding this 'stacking' of
systems. It provides the translation
of breaking with conventional
dichotomies as well as the practical
side of performative qualities and
the qualities of relations between the
programs. Degree of transparancy
plays a vital role I think in terms
of exposing the machine as well as
creating different characters of space.

erco p3
b+b italia office building
scsd system for california school
aeg turbine factory
olivetti underwood factory
advanced factory unit
inmos microprocessor factory
cummins engine plant
salk institute laboratories
hong kong international airport
arctic utilidor

Underground

Projects
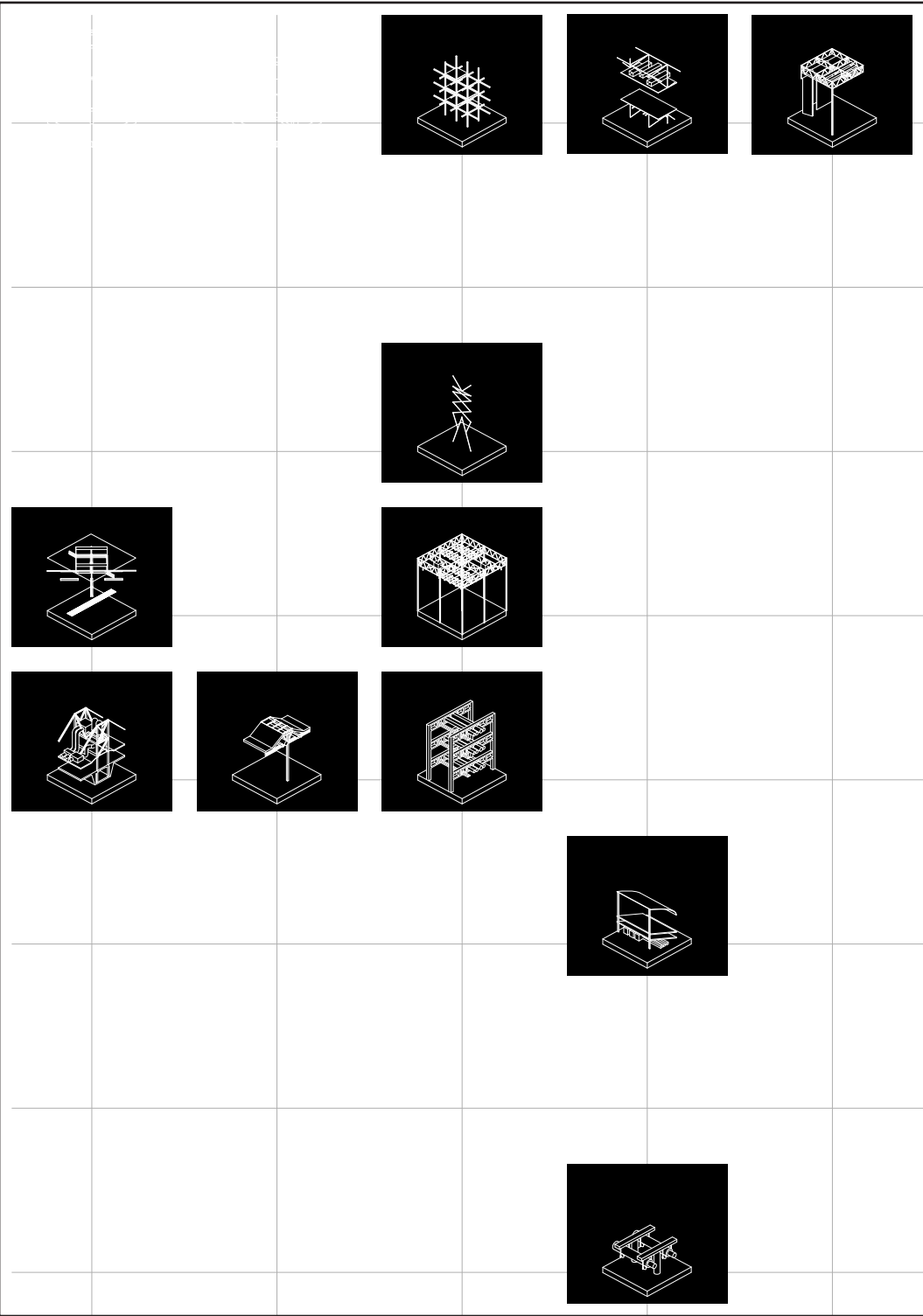
'Gates' have to attach themselves
to underground systems. Particular
foundation systems are needed for
this as well as expressive languages
that confine with the specific ground
conditions. Underground systems are
very useful and part of the machinic
that we have to recognize and pay
attention to. In that sense the structure
should expose the undergound systems
in a way that is both expressive but also
functional. The ground is not ground
anymore, it becomes a new landscape
that we can visually tap into.

menier chocolate mill
inmos microprocessor factory
schlumberger cambridge research centre
the spark
arctic utilidor
concrete gravity structures
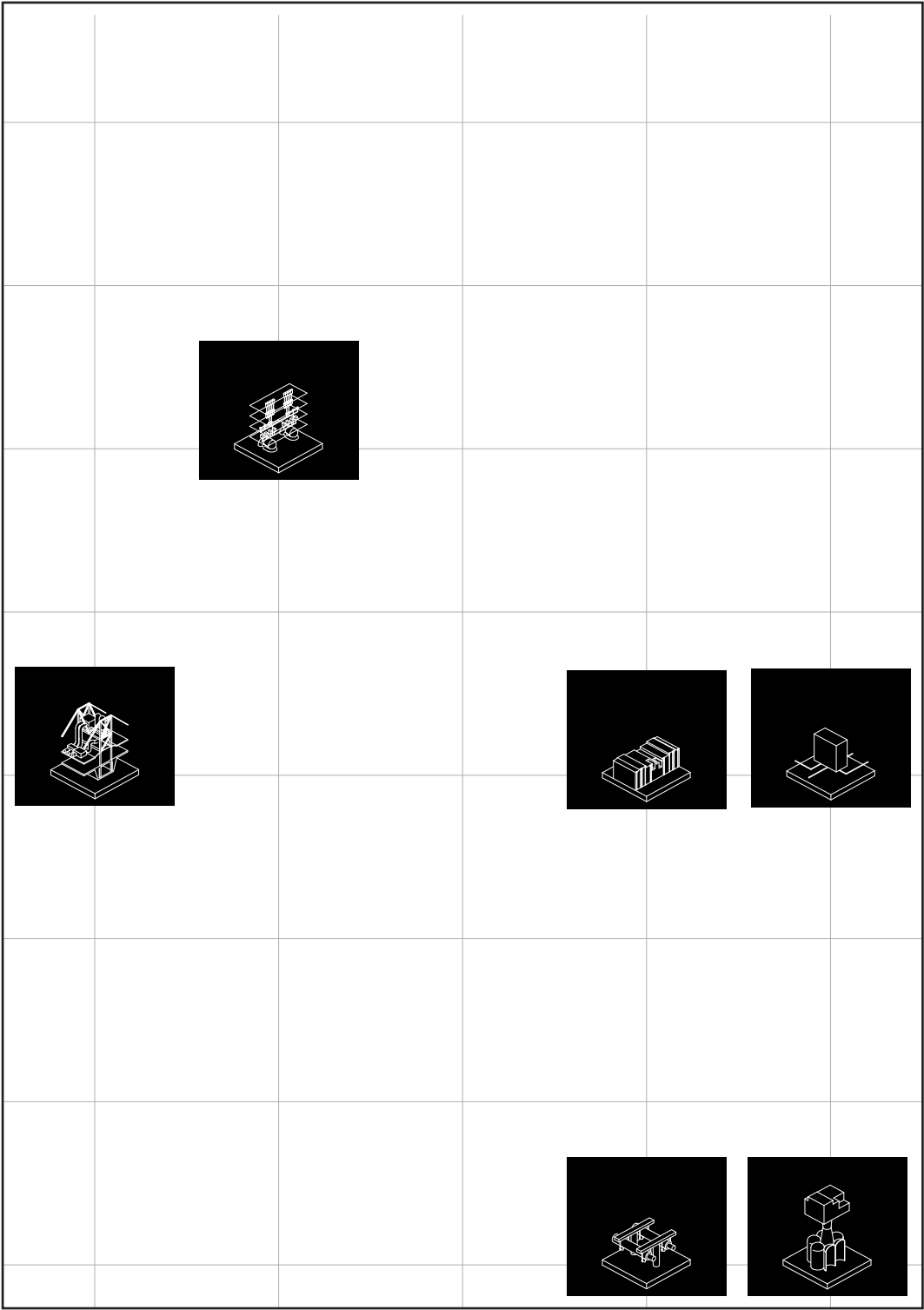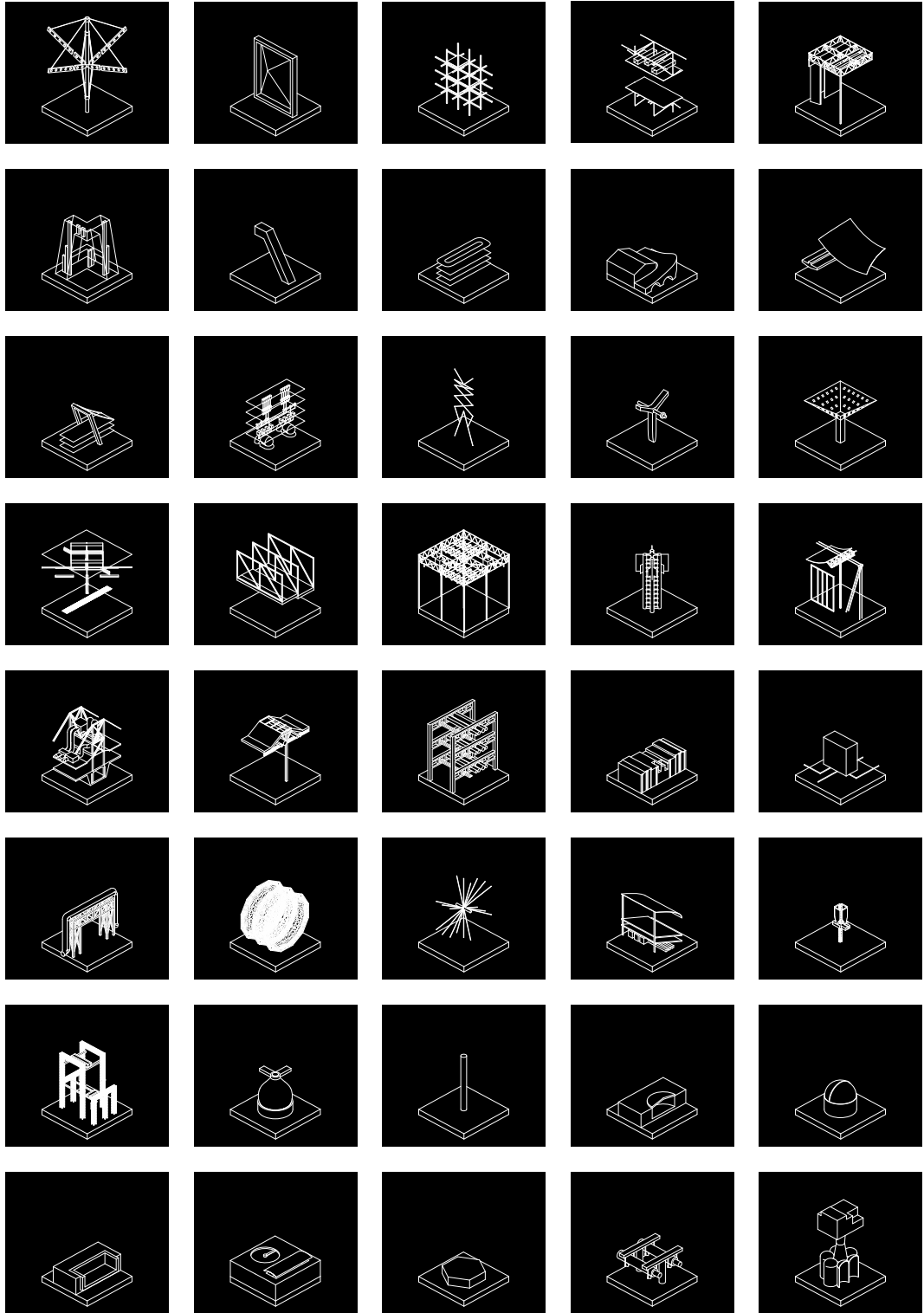
All across the world, great metropolitan cities are to be found. These places are defined as '' a region consisting of a densely populated urban core and its less-populated surrounding territories under the same administrative jurisdiction, sharing industries, commercial areas, transport network, infrastructures and housing''. However, a number of these metropolitan cities, like London, cannot just be defined by sheer growth, but also have to be defined by systemically produced urbanization processes; the city demands a tremendous amount of resources that are extracted elsewhere. This could still be regionally, but also nationally or globally sourced. This provides a picture of the influence of these urbanisation systems on the environment, ecologically as well as socially. Thus, it is evident that the metropolitan territory holds no clear boundary.

This 'external' territory of a city is inextricably intertwined with the 'internal'. The territory of the metropolitan city is not geographically bound anymore but planetary. This has been increasingly defined as flows connecting varying Operational Landscapes, described by Katsikis and Brenner as 'external' fields of pure exploitation, and the cities. This illusory ' exteriority' is being transformed into high-intensity and large scale industrial infrastructure exploiting the land, simultaneously being negligent to ecological and cultural context.

In the case of London, England's capital and largest city, the planetary agglomeration patterns are linked to the productive and consumptive sites of the city. The waste generated by this is being exported, in large quantities, to the countryside as well as through international trade. Over recent years, the definition of waste is slightly altered due to the processes of recycling, reuse, etc. The duality between consumption and production

has been dissolved to the point where waste (consumption) has become a resource (production) for energy as well as products; the metropolitan city has created their own Operational Landscapes.

However, it is impossible to define them as landscapes in the context of the city. The operational fields within the city are characterized by their very own infrastructure defining its surrounding environment and contributing to heterogeneity of the cities. As a result of this, these specific places can be understood through Banham's Ecologies, where he argues that operational fields within the city are part of natural mechanisms as well as human. Operational Ecologies are places that are defined by their systemically produced properties and can be understood to the larger condition of the city and hinterlands paradigm.
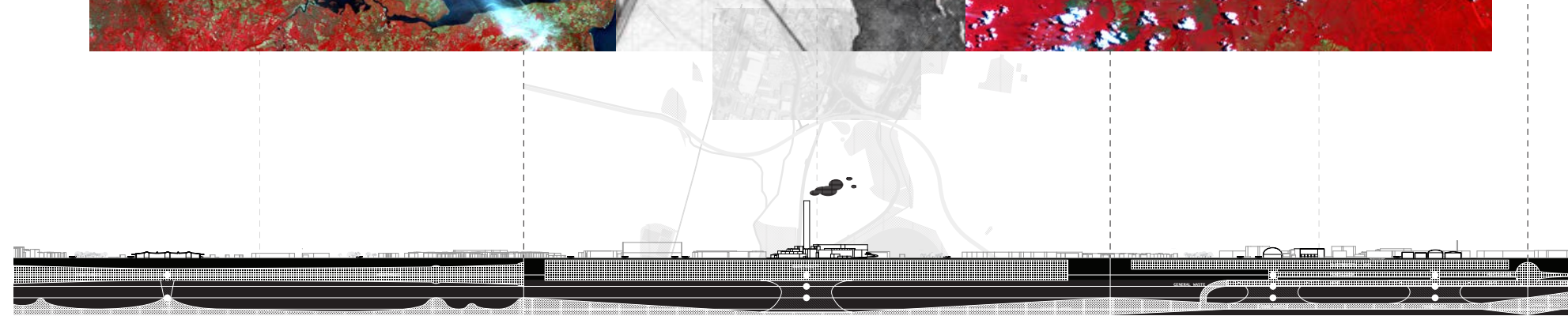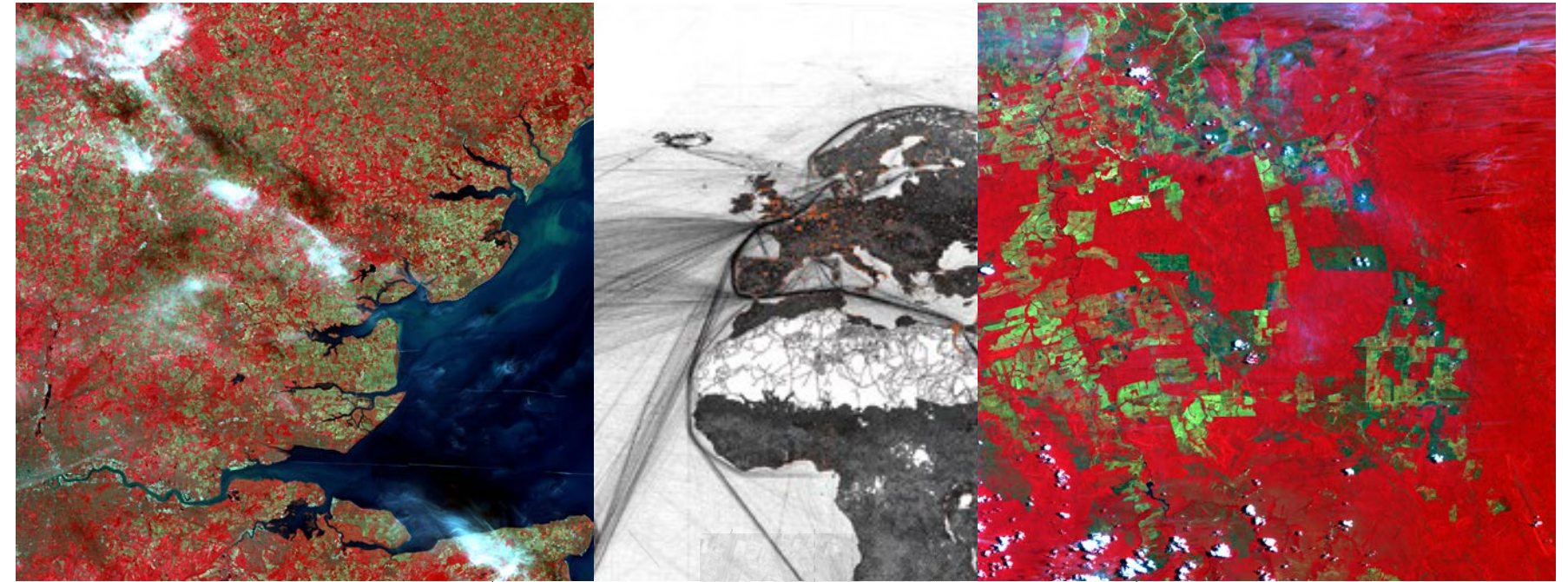
Operational Landscapes, as part of the urbanisation process of capitalist exploitation of the land, exterminate the Natural. If the Natural is threatened with extinction, how do we define our perception of Nature? And more importantly: how does this influence our perception of the city and hinterlands paradigm?

Operational fields of dualisms are inherently machinic, in that, the machine combined with its flows of products and energy transforms the landscape and its social as well as natural ecology. The machinic dictates the reproduction of systems and landscapes as well as our perception of the Natural. It is becoming increasingly important to recognize things that we, as society, have been neglecting for a long time. Humankind is morphing into a being of cyborg, a hybrid being of constructed machine and organism parts. Think about our water systems within the city. Humankind has domesticated water from a natural resource to a contained substance that we control, from the mountain up to our kitchen sink. In a very visual and practical sense humanity is heavily dependent on machines for doing our bidding: the journey towards a more sustainable future, where the use of exhaustible sources has to be omitted and changed into natural ways of generating energy by for example solar panels and wind turbines, goes hand in hand with the mining of rare metals which, unfortunately, involves a lot of emissions. Hence the objective will have to be to find a balance between these extremes, these opposites which at first glance seem to be incompatible.

The notion of the cyborg reimagines dualisms because of its hybridism. The machine holds no power over the organism and vice versa; it is integral to each other. Haraway states in her Cyborg Manifesto that due to the fact that the cyborg is neither man nor woman, the reproduction of Nature as we know it, is altered, and in that sense the production of Nature rewrites itself. The hybrid's production, and by definition Nature, becomes an assembly of parts; it is no longer a power structure of the internal over the external. As operational landscapes equal machinic landscapes they reproduce themselves by the assembly of parts. Hence Operational Ecologies become this exact same hybrid structure of parts. The machine can no longer be seen as something exterior to our way of life, a thing that is being used. Therefore one has to recognize the machinic, include it in our perception of the city, in the transition towards a more sustainable and durable future.

In the case of London, its underground networks have always played a big role in its functioning as a city; sometimes even recognized as vital, in visual as well as societal sense. After the Great Stink of 1858, where a hot summer increased the smell of human waste to abnormal proportions and industrial waste was deposited in the River Thames to an unbearable level, an intrinsic and enormous sewage network was rapidly built. The numerous sewage works were architecturally expressed as it had recognition of the people as being their savior. This particular sewerage system is still being used today, however in recent times problems came to light as the current sewerage system cannot hold both the increasing amount of waste due to London's increasing population and excessive rainfalls. As a result, the construction of another outstanding sewage project has been announced: the Thames Tideway Tunnel - a combined sewer at -30m depth stretching for 25 km underneath the Thames River.

When looking at these examples, it is only logical to suggest that these systems can be seen as the life-support systems of the city. However, this is where we as society keep straying of the path; 'life-support system' suggests an external device. The idea of technological networks and their corresponding built environment as life-support systems recognize the idea of dependencies. However the term does not imply it is part of our existence. It is at this intersection, where dualisms are defined, that we have to act. The Hidden City of electrical wiring, sewage systems and water infrastructure is an unrecognized assemblage of infrastructural landscapes and part of the assemblage of ourselves. These Hidden Cityscapes also prove to be resourceful, as part of our waste can be transformed into energy, but more importantly because it connects the whole of the built environment; it exposes a field of interactions between buildings that are often unseen. Currently 'net-zero buildings' are being fetishized, which of course should be promoted as far as fetishization goes. It is important that every building provides itself with enough energy to even out its costs, though in order to create a more sustainable future we have to look one step further ahead. The focus should shift towards interdependencies; providing infrastructure that will connect and let buildings 'communicate' in the sense of interacting resourceful systems: 'synergy'.
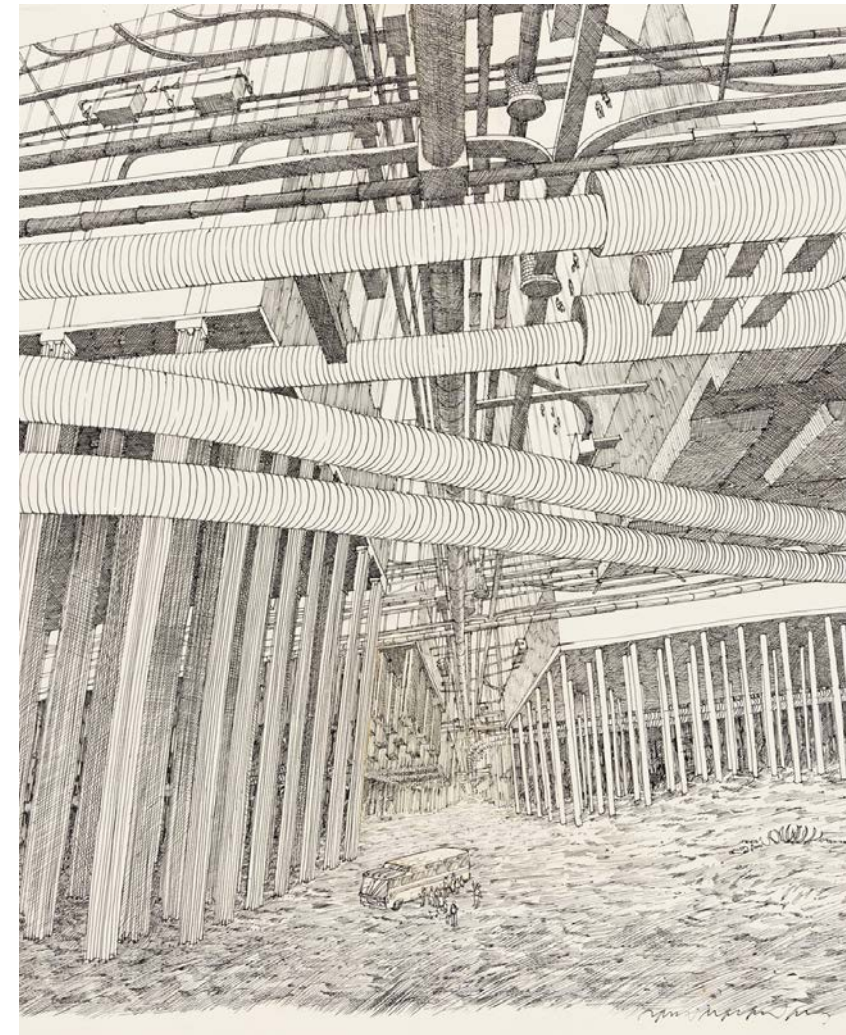
Underground / D. Macaulay / 1983

Synergetics

Etymologically, 'synergy' is derived from the Greek word synergos meaning working together; it suggests the cooperation between two or more entities. It is separated from the idea of an interface, where the difference will discussed in the following chapter.
In this case, the word 'synergy' is used to explain two things: the approach of Buckminster Fuller, American architect and systems theorist, and the more concrete meaning "interaction between things".

In *Operating Manual for Spaceship Earth* Buckminster Fuller describes the world as overspecialized and calls for a holistic approach that is based on systems theory. He refines synergy as:

"behavior of whole systems unpredicted by the separately observed behaviors of any of the system's separate parts or any subassembly of the system's parts."

'the synergetic effectiveness of a world-around integrated industrial process is inherently vastly greater than the confined synergistic effect of sovereignty operating separate systems."

Bluntly stated, the world has fallen into a decay of autonomous disciplines, which is indeed going on at this moment. Fuller's definition of synergetics implies a more interscalar and interdisciplinary approach. This could be applied to the city, the hinterland and architecture as it is now understood as a relational construct. Overspecialization has been the death of recognition of our hybrid existence. Therefore we have to opt for an approach that considers synergetics as a cooperative state of two entities that result in a different or greater response than that of the individual entities.

When it concerns the role of the architect, this phenomenon becomes more complicated. The architect is already a holistic thinker on building scale, being that electrics, structural engineering etc. are being designed by other disciplines, he holds the key to urgently needed interscalar design. However, where does his reign stop, and essentially, where does it start? The architects role is not to design and succumb to the perils of politics or fall into the deathtrap of megastructure imposing architectural form; His role, as it mainly already is, becomes one of designing mediation, but not of mediation between disciplines but of yet to be 'plugged-in' systems. A world where everything is connected and communicated yet not recognized, asks for mediation design which brings us to the interface, something that is between things.
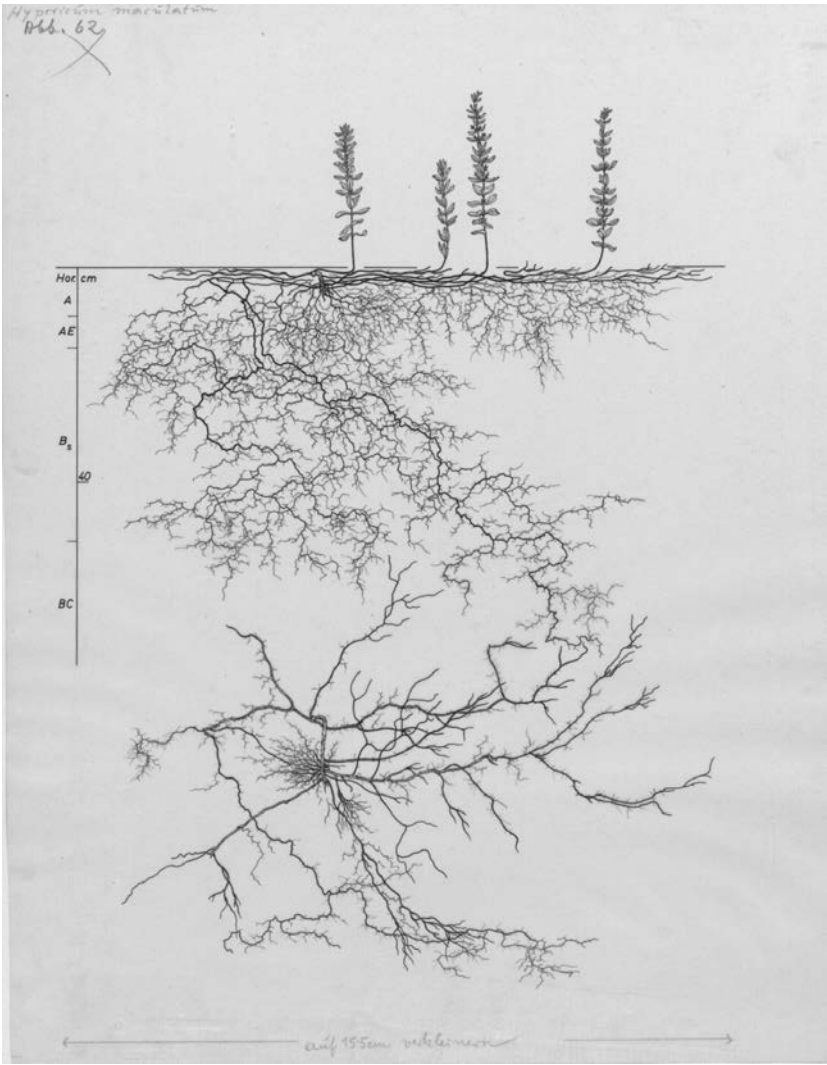
The meaning of interface suggests something 'in-between' entities. Branden Hookway, a cultural theorist with interest towards architecture, considers the interface as a form of relations. Instead of defining the qualities of the entities binding the interface it is rather about the qualities of relation between entities. The interface is therefore a strange liminal or threshold space. In terms of synergetics, the interface becomes the tool for opening up unavailable relations for use, participation and exploitation. The 'gates' of the megastructure I have designed seek communication and provide the infrastructure needed for the qualities of these relations between programs and their ground conditions. This implies that the interface is at every stage concerned with the liminal, or threshold condition. The interface is by definition 'empty', it is defined by what it is not. It communicates between two faces/two entities, and responds to its relation rather than the entities themselves. However, this implies that the interface includes interiority and exteriority. Its faces are the site of assembling the qualities of an interior and are communicated towards its exterior. However its effect does not extend into the entities that it is confined to, rather limits itself to the relation that occur between them. When this theory is applied to the city it implies a hollow architecture. An architecture without content. It is focused on threshold conditions, the communication and translation between systems and sequence of spaces, and is therefore increasingly being dismantled from its physical content.footnote k. geers. Architecture becomes focused on its perimeter, its transition.
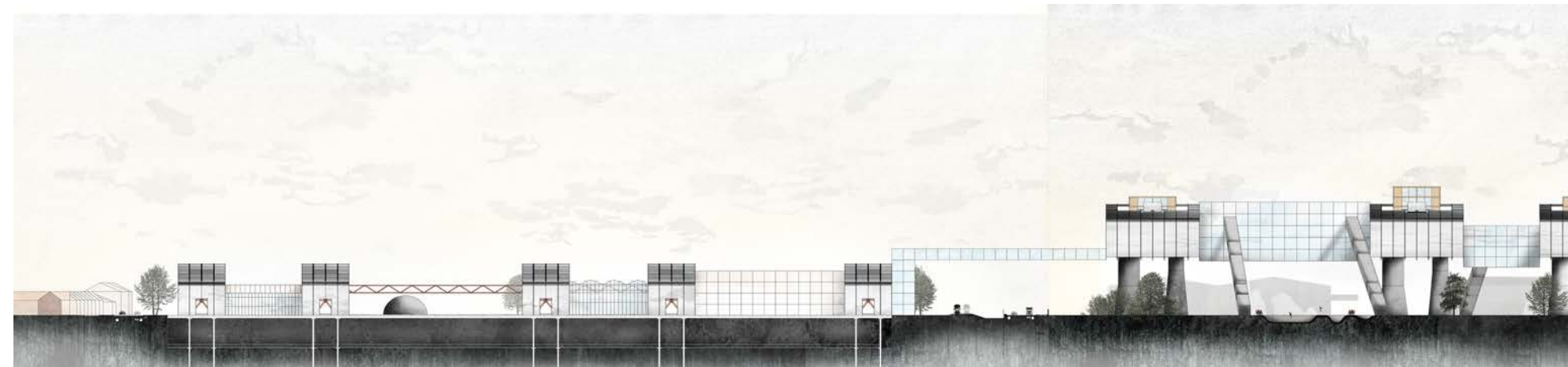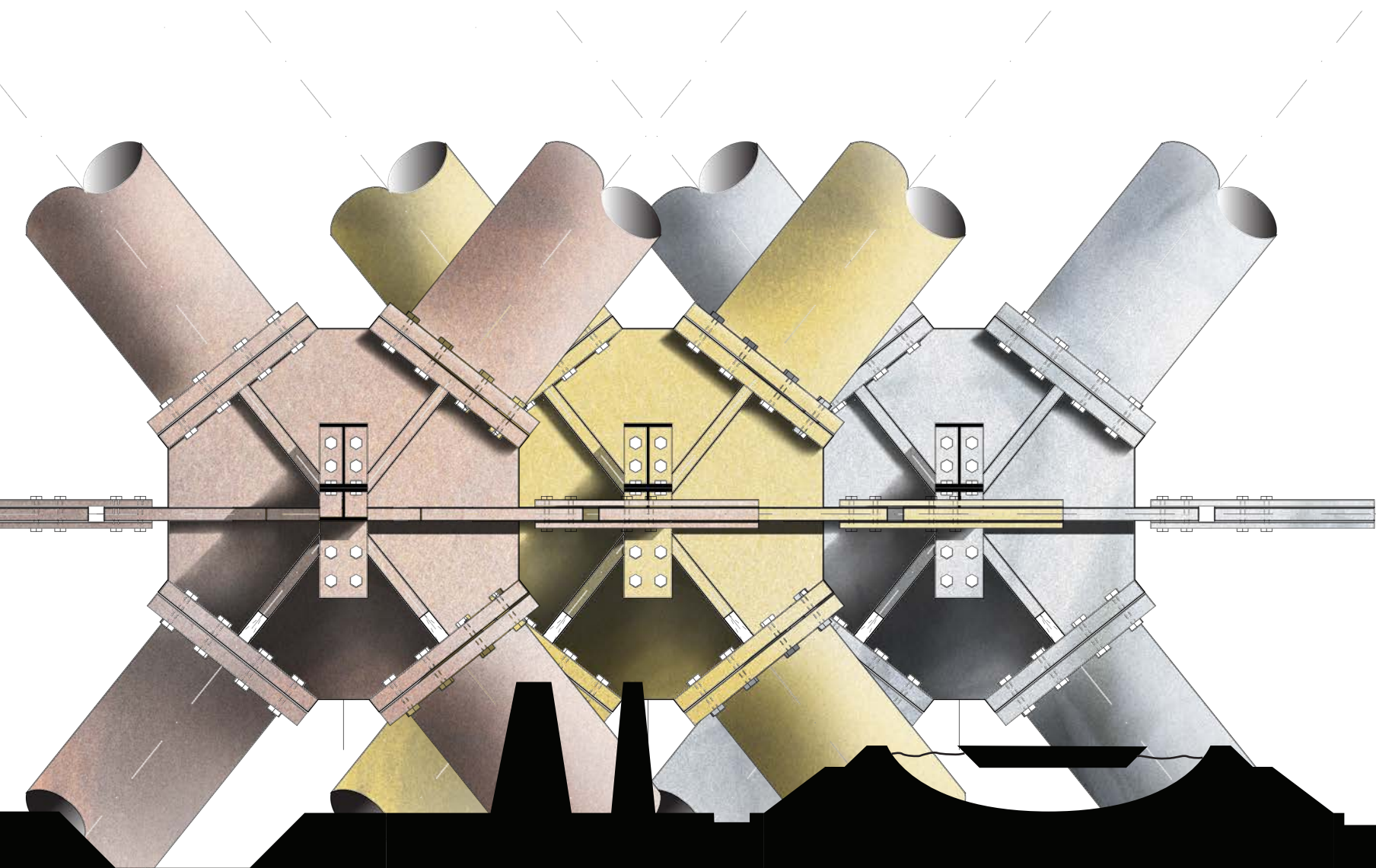
In terms of our cities what we will have to design in the future are interfaces that tap into the hybridized systems that make our way of life in cities possible, scrutinizing and exploiting these systems for our benefit and recognizing them in return, providing a solid ground for innovation and technological advancement.
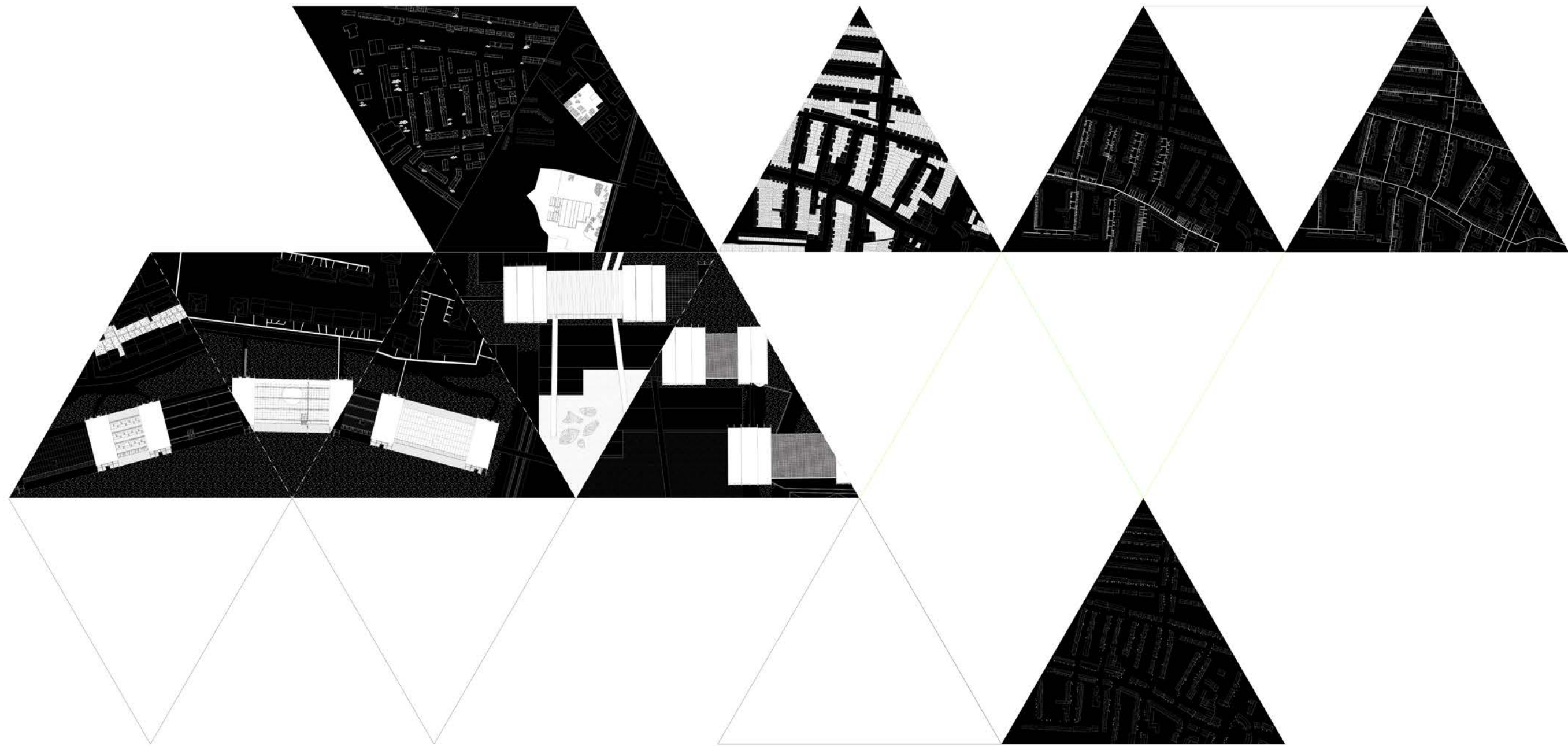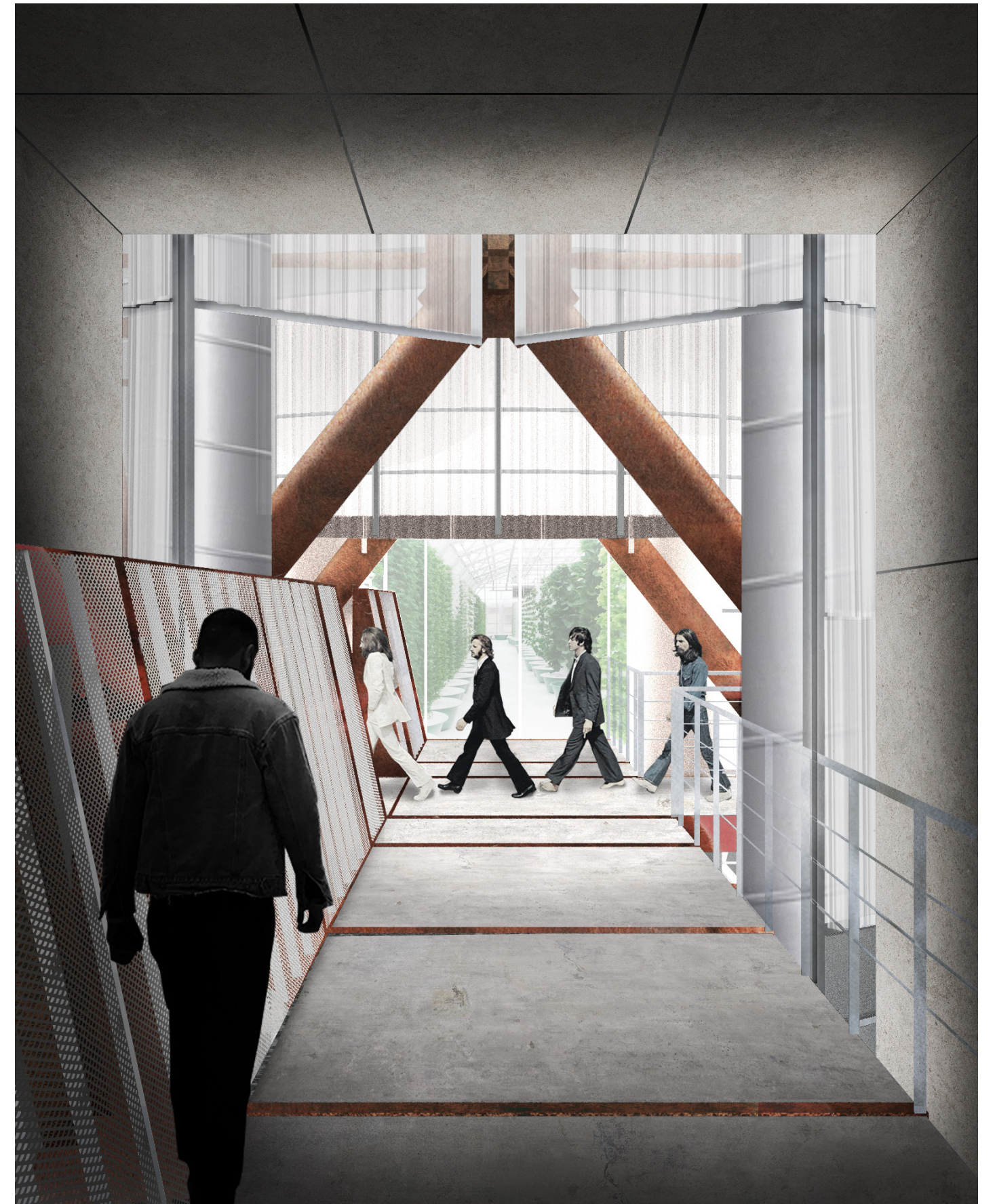
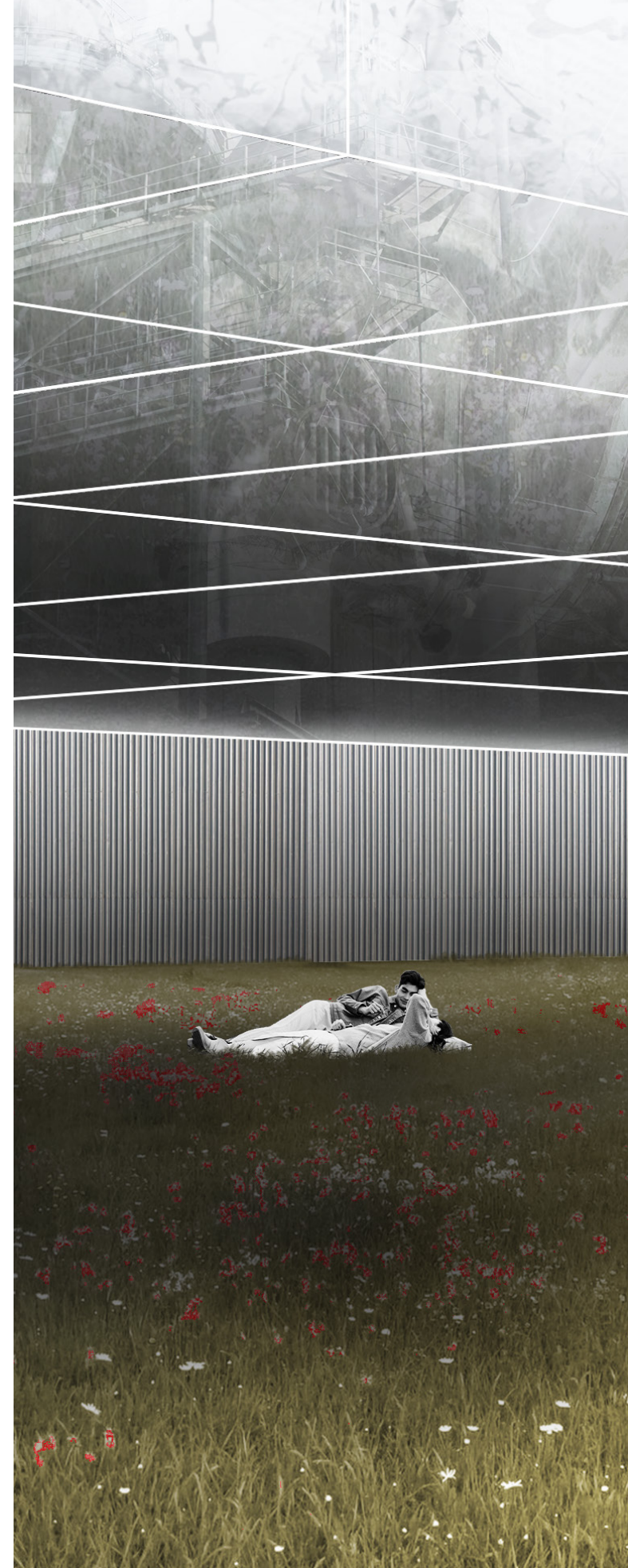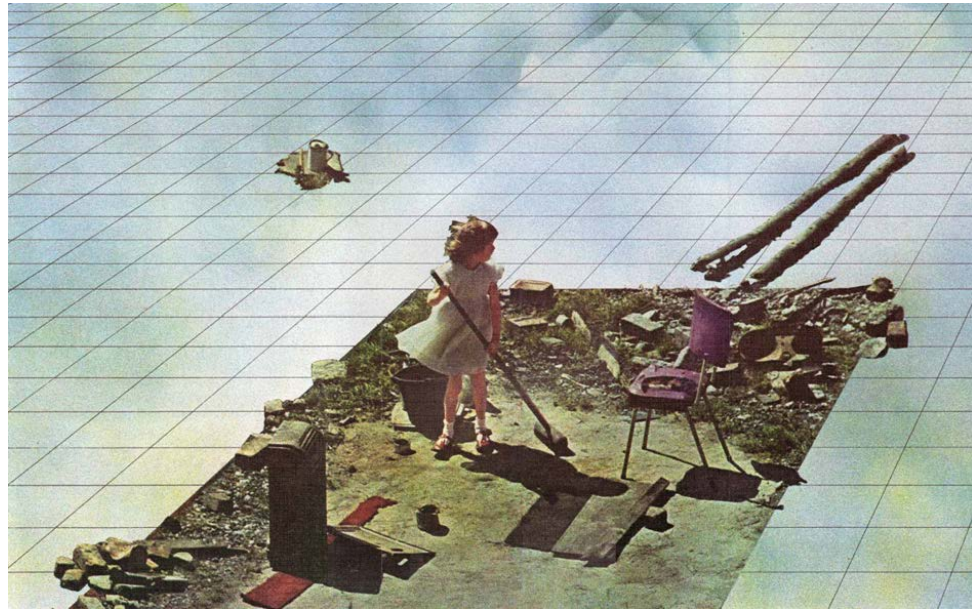*As you enter the cyborg interface*

you will recognize the dependencies between people as well as machines

it is time for us to interact and learn to coexist and especially accept that we cannot afford to
distance ourselves from our counterpart