2023/2024
Urban Architecture

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Preface

I began this research with the intention to try and understand where, and how, we can improve the way our environment is constructed in order to improve biodiversity not only in the city, but in the surrounding peri-urban spaces.

This research began with a focus on industrial infrastructure, as these developments usually sit at the fringes of cities, my hypothesis being they formed the boundary between urban and nature. In this exploration I first needed to determine 'what is nature'? Where is the location where city ends and 'outside' begins? What is the urban fringe?

While searching for the answer to this question, I realised what I was looking for no longer exists, that, in fact, there is no longer an urban rural dichotomy.

This ambiguity sent me down a completely different research path, where instead I attempted instead to try understand the contemporary social, economic, spatial, and ecological structures of our planet, and use this understanding to elaborate upon the question;

How, in the age of the Anthropocene, can we improve biodiversity by redefining the limits and border conditions between human and urban?

This essay begins with a historical breakdown of urban and social development, with a focus on urbanity after the industrial revolution, as a means to understand where, and how, the breakdown in the urban/rural dichotomy happened. Following this, a brief theoretical discussion into the urban and spatial implications of this breakdown, particularly what the Anthropocene means to urban development. Lastly, to conclude my practical and literary research, a manifesto of industrial ecology in which I discuss the spatial, social, and ecological opportunities housed within the industrial peripheries.

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Research

The Industrial Condition

Cities and the historic idea of nature

Man and nature – the paradigm shift of religion

For most of prehistory, living in hunter-gatherer and nomadic conditions, mankind lived in complete dependence of mother nature and her seemingly uncontrollable circumstances. This experience made way for the multitude of pagan religious which feared and worshipped the natural world, exhibiting ideologies of submission and servitude to these greater forces. However, following the expansion of agrarian societies, and later Abrahamic religions which spread notions a singular humanist God figure, the rift between human and nature began, a division that continued growing, furthered by our technological developments and mastery over nature.

Aided by the spread of religion, man was given a soul, and nature – something 'soulless' – was stripped of its agency, reducing it to a series of objects with man becoming the only subject. This, in a sense, completely disenchanted nature and established man as its dominant force (Magan, 2020). Nature was no longer something we exist within, but instead is now something which exists for us – something to be appropriated, used, and colonised. With this ideological shift the notions of *urban* and *nature* began.

The concept of a wasteland is one of the most telling examples of mankind's attitude towards nature. Historically, while the word has changed etymologically, the concept of these places are universal; a body of land outside human settlement, or without immediate functionality, which in turn is seen as hostile and in need of intervention. From early Christianity colonising the natural landscape was perceived as a holy act, returning the Earth to the Garden of Eden, a completely anthropocentric paradise. Later, following the industrial revolution, it was seen as a humanitarian act; maximising profits, and feeding the masses (DiPalma, 2014).

Regardless of intention the outcomes remained the same, reducing landscapes not productive for human life to a minimum and shrinking Earth's complex natural ecosystems to a mono-functional agricultural or urban landscape with our needs at its centre.

The most Anthropocentric manifestation of the contemporary attitude towards nature is the city. Even historically, the city was a space designed entirely by our creation, with little regard to the natural condition of the place, and nature artificially introduced only as ornament or function. Beginning as a place of commerce to sell goods at market, to becoming the centres of arts, culture, and politics, for many centuries the form of the city remained unchanged. Often surrounded by a wall, road, moat, or other fortification the city had defined limitations and boundaries – an inside and an outside.

The city was the object, set in a backdrop of nature. What could be understood as rural, and city were clear and distinguishable, therefore to an extent, in a natural harmony with nature. Space for man and space for nature were separated, leaving large, connected swaths of landscape with small, consolidated areas of hostile human settlement. The agricultural landscape extended the city walls but was a more diverse and fragmented organisation than we know today, and these societies used traditional farming practices which did not disrupt ecosystems as harshly as modern practice (Magan, 2020).

However, with the industrial revolution this dichotomy disappeared, the industrialised city irreparably blurred these lines (Gugger & Maçães Costa, 2014). The explosive expansion of cities to accommodate new industry and population booms crumbled the city boundary, giving cities a new function as places of production. As discussed by Henri Lefebvre in *The Urban Revolution* the city has evolved from the political city, to the mercantile city, to the industrial city, and now into its final form or 'critical zone' – the urban city. Industrial infrastructure radiated deep into the rural landscape, disregarding the city and its walls with its endless growth. Railways and canals allowed for expansive developments throughout the countryside, rapid suburban expansion housed workers, and agriculture was consolidated into the industrialised economy catalysing the shift from subsistence to industrial farming.

What a city is, spatially, functionally, and atmospherically was fundamentally changed during this time, the power of the city was no longer bound to its walls, but its organisational power structure now dominates the landscape, with urban now the default condition, and "natural" the other.

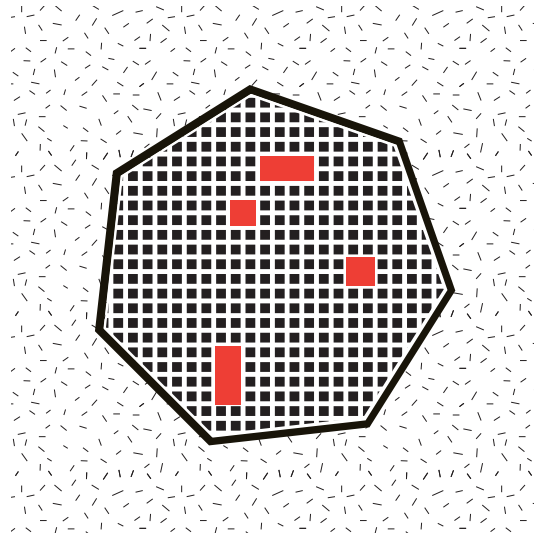# The Industrial Revolution and new Border Conditions

The new economy which followed the industrial revolution lessened dependence on agriculture, creating new social structures, lifestyles, and spatial conditions inside – as well as outside - the city.

It is important to note that the 'industrial revolution' was not one monolithic event, but instead a recurring event with each major technological advancement. Each revolution saw new architectural and spatial approaches to dealing with the issue of industry in the city.

1st 1750-1870

The First Industrial Revolution was sparked by the invention of the steam engine and mechanisation. Industrialisation was a new and unprecedented phenomenon, leading to rapid and unplanned industrial development. These developments were usually close to the historic centres of cities, or built within existing fabric through demolition.

The Second Industrial Revolution was responsible for the majority of what we now know as industrial urban fabric. Industrial activity was advanced by electrification and the ideas of mass production, leading to larger more dominant developments. The detrimental effects of the First industrial revolution to the city fabric meant industry was now being pushed further to the peripheries.

Urban zoning, garden cities, and company towns are all typical developments of this time. Industrial areas became cities themselves, with companies now building entire neighbourhoods to house workers. Cities gradually dissipated outwards with these developments, and the unsanitary conditions of city life led to suburban satellite developments, completely dissolving the relationship between urban and rural.
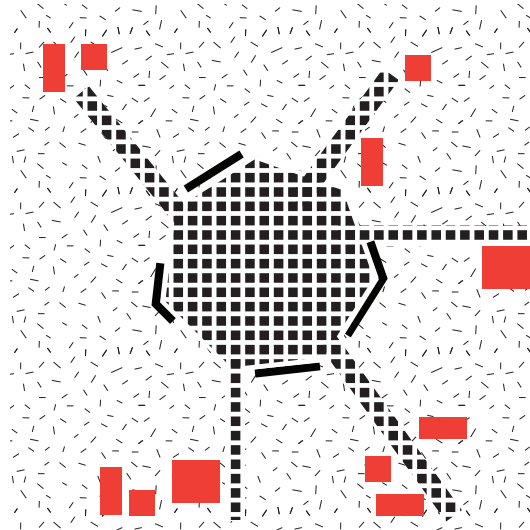
The Third Industrial Revolution, initiated by computerisation and automation, saw industry removed from the city fabric entirely. Predominantly, industrial activities were pushed to ex-urban industrial estates, with little to know surroundings, and accessible only by car or public transport.

This methodology to industrial development frames the relationship between industry and the city in the truest sense – industry is rarely a truly 'urban' activity. Industry, particularly on a large scale, does not serve the immediate needs of urban life, and so should exist in an ex-urban state.

Previously existing large scale or permanent industrial sites were abandoned, leading to redevelopment and integration of these sites into the city fabric, usually as trendy new residential neighbourhoods.
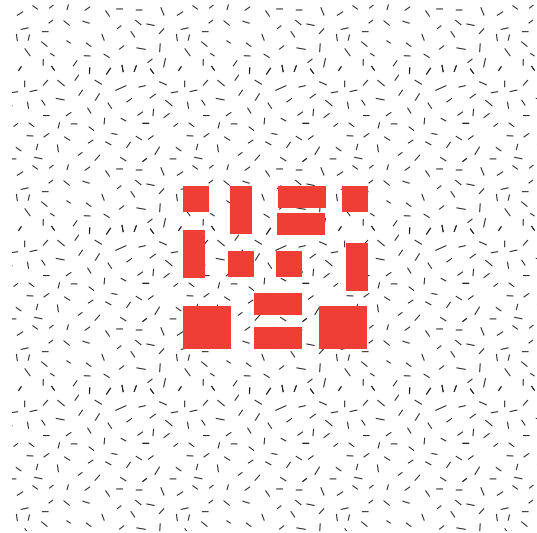
The most contemporary rendition of industry is a revolution currently in progress. The Fourth Industrial Revolution is response to the decades of deindustrialisation in the west, with the integration of small-scale industrial activities into the urban fabric, a pendulum swing from previous zoning ideals which separated work from residential.

This development is made possible due to the nature of industry in the post-industrial economy, mostly small-scale artisan manufacturing, or specialty production.
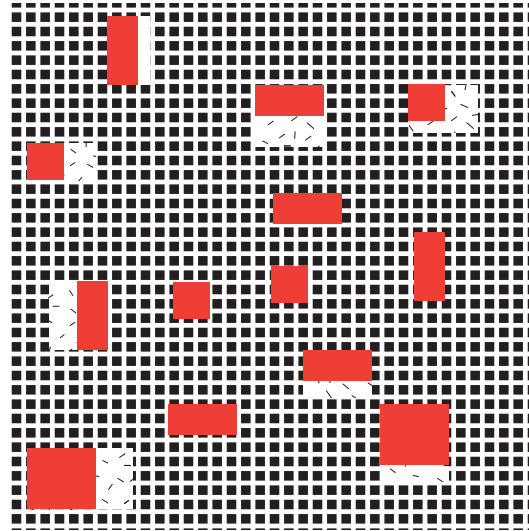
Contemporary urbanism and the death of the natural

Death of the rural - the transgenic landscape

The contemporary urban condition, emerging following the second and third industrial revolutions, is a fragmented, discontinuous, and endless urban landscape. The perpetuation of the urban landscape typology has therefore dissolved other historically eco-centric typologies. What is a natural landscape, or a rural landscape, is no longer clearly defined or universal. As written by Costa & Gugger;

"city-as-object and rural-as-background no longer exist; what is left now is an ambiguous and hybrid condition that has no genetic code and is impossible to describe in typological terms."

p 32, Urban-Nature: The Ecology of Planetary Artifice, SAN ROCCO: Ecology, 2014

Geographer Álvaro Domingues attempts to define a new typology to describe such conditions, the 'transgenic landscape'. This term does not aim to encompass all factors of diverse and differing landscapes into one clearly defined box, but instead aims to define the social, environmental, and economic components that have defined such a condition.

The term *'transgenic'* was borrowed from the field of GMO research, meaning "those whose genetic material has been altered in a way that does not occur naturally". Here, Domingues poetically illustrates our innate contradictory discomfort with the idea of living in the Anthropocene. The notion of a transgenic landscape, a landscape in which we have manufactured every aspect of the landscape – 'natural' or urban – disrupts the ingrained sentiment of a singular 'nature',

"breaking an interdict regarding the legitimacy of disturbing a supposed superior order, a divine and transcendental creation, a 'mother nature'."

p 16, TRANSGENIC LANDSCAPESi, Finisterre, 2021

What we can consider nature, or wilderness, or rural is now a purely arbitrary discussion centred solely around idealised notions or conceptualisations of what nature means to *us*. These notions give little consideration to what nature truly *is*, instead focusing on perceptions of what we want nature to *be* - beautiful, useful, sacred, pure. However, what nature is has never been a clear concept, and similar to landscape, is becoming an ever more complex and fragmented idea.

Nature is commonly loosely organised into three categories from purest to most artificial, first, second, and third. Pure, or first nature, can now only truly be defined by atoms and molecules. Second nature or 'domestic nature', has become the predominant force on this earth, encompassing everything which we have influenced. Lastly, third nature or 'synthetic nature', which encompasses GMOs, biomaterials, composites and nanotechnology. (Allenby & Sarewitz, 2011)

The contemporary idea of nature is a purely artificial concept both ideologically and spatially, with even the most 'natural' of spaces, such as nature reserves or national parks, paradoxically synthetic. It is

a condition of the Anthropocene that space for nature is unnatural, as even the act of conserving these places is an inherently man-made activity.

The deconstruction of the city wall, whether material or spatial, following industrialisation paved the way for sprawling and ill-defined landscapes. Garden cities, suburban developments, industrial estates, shopping malls, among others surround city hearts, while slowly over time being consumed deeper into the city limits by uncontrolled expansion. With each expansion land is colonised for human use, regardless of how 'green' a development presents itself the comfort expected within human habitation defines us as the user, and nature as the other.

Nature, therefore, occupies only the 'in between'. The residual, forgotten, or unplanned intersections of these junkspaces where the human habitat has not taken over. According to Lefebvre we can understand this organisation as society becoming completely urbanised, causing "the prodigious extension of the urban to the entire planet" (Lefebvre, 1970), outlining the inherent link between the socio-spatial organisation of a city, and the resultant problems of defining what is nature in the Anthropocene.

The *Urban Society* has happened, and in recent years with the expansion in globalist economies and explosion of international infrastructural organisations, implies the urban has become the dominant global condition. With these irreversible and fundamental changes to the structure of our world, the only way out it forwards, and a fundamental shift in how we view our place in the world, and in nature. In conversations such as these it is impossible to ignore the prevailing system and ideology responsible for the methods we enact to design and organise our world – capitalism. As discussed by Hartley, there is an inherent contradiction in the concept of the Anthropocene.

Inherently the Anthropocene is supposed to be defining the merger of man and nature, yet, contradictorily, "at the conceptual level has divided them further apart than ever" (Hartley, 2016, p163). The argument by Hartley being that the current social, environmental, and geological conditions of the Anthropocene are not inherently resultant of us (the Anthropos), but instead

of the economic structure for which we organise under, and that in fact the negative impacts of 'Anthropocentric' development is instead resultant of the overproduction and predatory tendencies of a capitalist economy. Without redefining our relationship to endless economic growth, profits, production, and expansion, we cannot redefine our relationship to nature.

Ecology, in the urban environment, is intrinsically linked to the ecological structures of the entire word. Urban Ecology means responsibility, intimacy, coexistence, and hospitality. In the urban society there is no longer an 'elsewhere', an 'outside', or a 'wasteland' where we can simply leave 'nature' to itself, there are only opportunities amongst the endless expanse of 'urban'.

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Analysis

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Industrial networks and the relationship to our environment

Historical development along canals and waterways

Technological limitations at the beginning of industrialism meant most industrial developments had to be constructed along bodies of water. This lead to the industrialisation of rivers, as well as the construction of thousands of kilometres of canals throughout the world.

At the time, such developments were detrimental to ecosystems, polluting the waterways and poisoning plants and animals. Today however, with relatively cleaner industrial practices, these developments have resulted in an extensive and continuous network of waterways.

The electric grid

Electrical grids, similar to canals, are large scale infrastructural projects which cross continuously entire continents, expanding over wide varieties of terrain and landscapes.

Large pylons, electricity plants, and transformer stations all leave a surrounding area, next to or below them, which cannot be built upon or cultivated under, leaving long stretches of land free from human intervention and open to inhabitation. Their interconnectivity can allow for nature to traverse, relatively undisrupted, across these networks encouraging increasing biodiversity along their route.

Railways are incredibly important ecological pathways, carrying seeds, allowing safe passage of small mammals, a black zone for birds and bats, and wild embankment highways for bees and other pollinators.

Railways are inherently interconnected, making them as valuable for transporting biodiversity as people or cargo. They are also undesirable for people to live near, loud, dangerous, and hard to traverse. Their fencing off leaves the surrounding land untrodden, making it inhabitable for delicate insects and wild grasses.

Railway construction exploded following the industrial revolution, and primarily were used for industrial processes. Now they instead transport mainly people, and the marshaling yards of the past leave large areas of land abandoned and polluted, many of which have been taken over by nature.

Transience, Impermanence, and the Economy

Inefficiency of land use

Industrial zoning, unlike residential, has neither the financial incentive nor logistical capability to heavily densify. Inherently industrial areas are transient - influenced immensely and immediately by changes in the economy, technology, demand, supply chains, labour forces. Plots are left empty, or in dereliction, or are bought in case of future expansion, all scenarios which pose opportunity for inhabitation.

The constant demolition and reconstruction that happens is itself an opportunity;

"when a building is demolished, a location rich in relief often remains. the relief of the soil and the unplanned quality of such places are the reason that these attract species that stand little chance elsewhere." p XX, Making Urban Nature, 2017

In some industrial sites in the Netherlands, policies have enacted wherein a potential building site can be used in the most nature-friendly way possibility, with a guarantee it can still be built on without legal restriction, this policy works as;

"It doesn't really matter that nature is only a temporary guest here, as long as new empty spaces become available elsewhere" p XX, Making Urban Nature, 2017

The Atlas Brewery, constructed during the industrial peak of Brussels in the 1920's, has been in a continuous state of degradation since the 1980's after it's sale and subsequent moving of production outside the city.

Across the road, a former Shell industrial site had been left abandoned and contaminated.

Historically a swamp, the site has been reclaimed by marshy plants, which also purify the soil.

Damage, Decay, Domicile

Unlike residential areas, industrial regions are rarely well maintained, unless in a prominent urban location.

These areas have what can be called *porosity*, nooks, crannies, cracks, or unevenness, can all host opportunistic species such as birds, insects, small mammals, and climbing plants.

A currently worsening problem in modern cities is the 'perfection' of contemporary buildings, these accidental nooks and crannies once relied on by birds like swifts, are no longer a common occurrence, and have caused a massive loss of habitat.

Decay, abandonment, and apathy towards the maintenance of industrialised areas creates a uniquely disheveled spatial expression. While, to our eyes – unsightly, to opportunistic species – the perfect location for home. The decline in numbers of many once prolific species in our cities can be partially attributed to the 'smoothness' of contemporary construction.

The transient and precarious nature of industry within the city economy leads to a continuous pattern of construction, abandonment, and demolition.

Within habited neighbourhoods of a city such dangerous neglect would have been demolished and redeveloped before nature could colonise. However, within neglected areas these hospitable shells remain, creating a habitat.

The shift worker

The majority of industrial functions follow a standard shift workday, workers clocking in the morning, and going home at night. This means, for much of the day the sites are relatively empty - beneficial for attracting more timid species.

"Due to their disuse at night, there is less need for lighting in buildings and streets, allowing these areas to become 'dark corridors' important low-light spaces beneficial for nocturnal animals, as well as those effected by light pollution."

p XX, Making Urban Nature, 2017

Spatial Opportunities of Industrial Estates

Aesthetics (or lack thereof)

Industry is known to be messy, it is nearly expected for junk to lie around, environments to be left unkempt, and general dirtiness to be the default. There is no expectation for these spaces to remain a certain way, look a certain way, or smell a certain way. They are utilitarian spaces where anything goes.

This provides a unique opportunity for ecology and biodiversity in the city. Nature, too, can be messy. Nests, faeces, half eaten food, death, corpses, feather, fur, all things necessary by-products of, but not things we like to see in our living spaces. In the industrial mess they are hidden amongst the turmoil

The final stretch of the Senne river, before moving underground for the extent of urban Brussels. The river was covered for the cleanliness of the city, and only resurfaces again at the industrial peripheries.

Buda, Brussels.

Industry is messy. Supply chains are messy, schedules are messy, oversights are messy, equipment is messy, work is messy. There is a constant yet impermanent need for storage, overflow, extra space within the industrial processes. These spaces, only occasionally inhabited, hold opportunity for appropriation.

Buda, Brussels.

Discomfort and Disconnection

In the spaces where we live, modern man demands the utmost in comfort. The contemporary residential neighbourhood provides it all, for every person; the pavement is solid and uniform, the gardens are perfectly trim and proper, lights illuminate the streets, our houses are air-tight and upkept. However, for non-human life these conditions are as inhospitable as possible.

Industrial areas are working areas, people clock-in, clock-out, and go home. There is no connection of pride over these spaces, allowing for types of nature which are in direct opposition to our comfort.

Most species, in any large quantity, is seen by us as a pest, and residential areas are designed to be as pest unfriendly as possible.

However, where people don't live, they tend not to care.

Animals can be loud,
smelly, dirty, messy,
or   dangerous.

We don't want them
in our homes. They
probably   don't
want us in theirs.

A broken down
washing machine,
demolition debris,
overgrown weeds.
A swan does not
know what rubbish is.

Whether desirable or not, infrastructure is a necessity. Every luxury of the modern city is granted by some enourmous, ugly, largely unseen machine.

Electricity plants, water purification plants, sewage treatment plants, waste disposal centres, train yards, motorways, ports, distribution centres – all the necessary evils that make the city function. Given their necessity it seems only logical to design them as spatially beneficial and productive as possible – using them as space not only for human infrastructure, but also ecological infrastructure.

Many of these processes require access to specific resources or locations, such as this water purification plant located along the remnants of the river Senne, one of the last stretches of the river uncovered surrounding Brussels.

This river is the natural habitat for ducks and other birds, who were pushed out of the city following the removal of the river for the comfort of people in the city.

Gas, coal, or nuclear

Fumes, smells, noise, dangers, eye-sores

Geese don't seem to mind

The Urban Fringe

Boundaries between industry, and urban, are often strictly spatially or physically demarcated. This poses a unique opportunity in a city. In nature reserves or preserved spaces borders, walls, or boundaries have to be built and enforced, but in the case of industry these borders already exist and are enforced, and at the fear of safety are usually respected.

Private property, difficult terrain, messy conditions, and lack of value make these spaces inaccessible and undesirable, allowing for nature to flourish unhindered.

Borders and boundaries are clearly marked, defined, and respected. The orderliness of business, but the disorder of industry, creates a unique breeding ground.

The line between the
city and nature can be
thin as chainlink fence.

These infrastructural developments are often situated at the peripheries of cities, out of sight, meaning they could form an important link between, or bypass of, the city for nature.

Solid level ground,
clean closed facades,
pristinely kept nature
, situated across the
motorway from one of
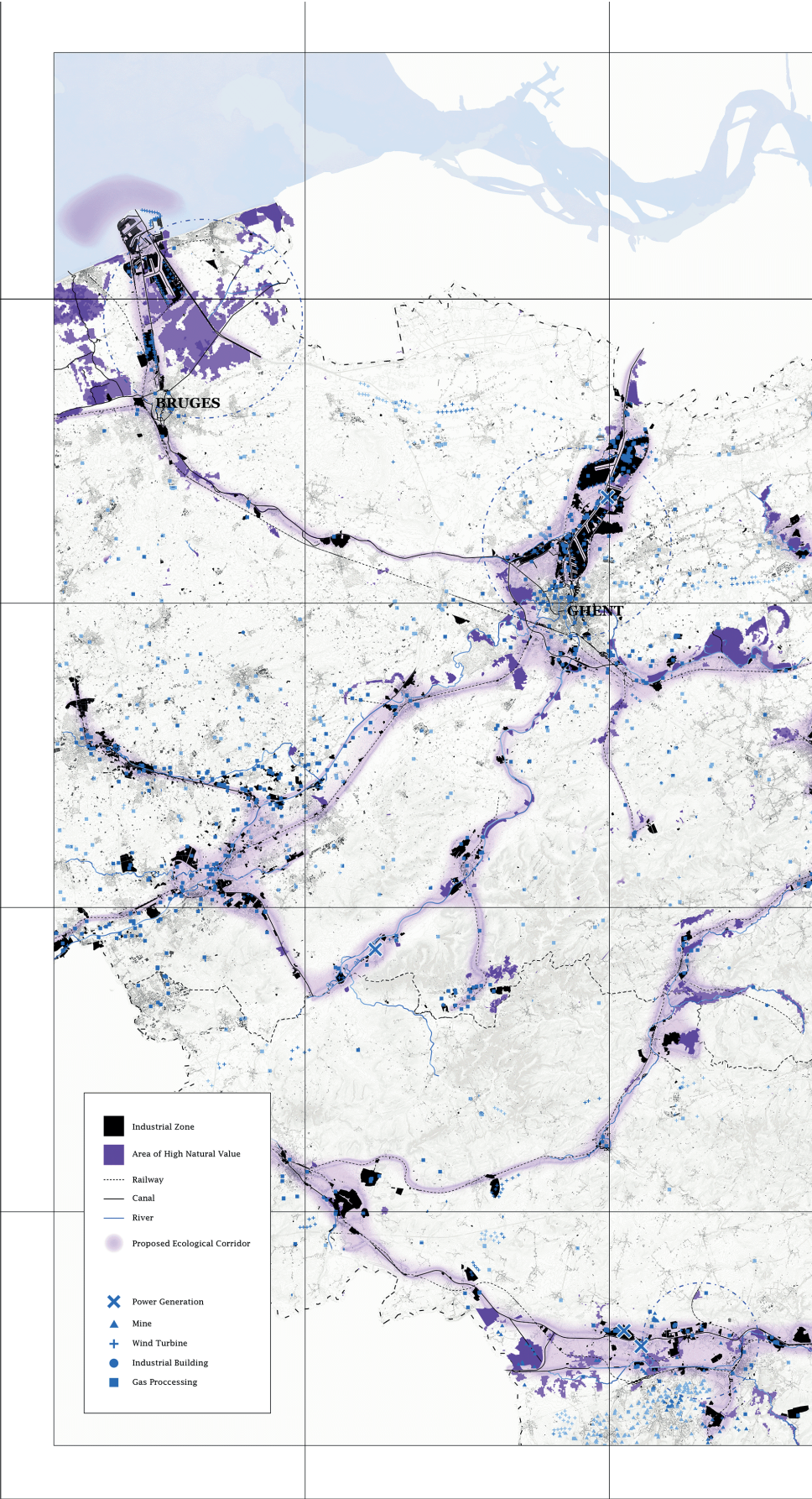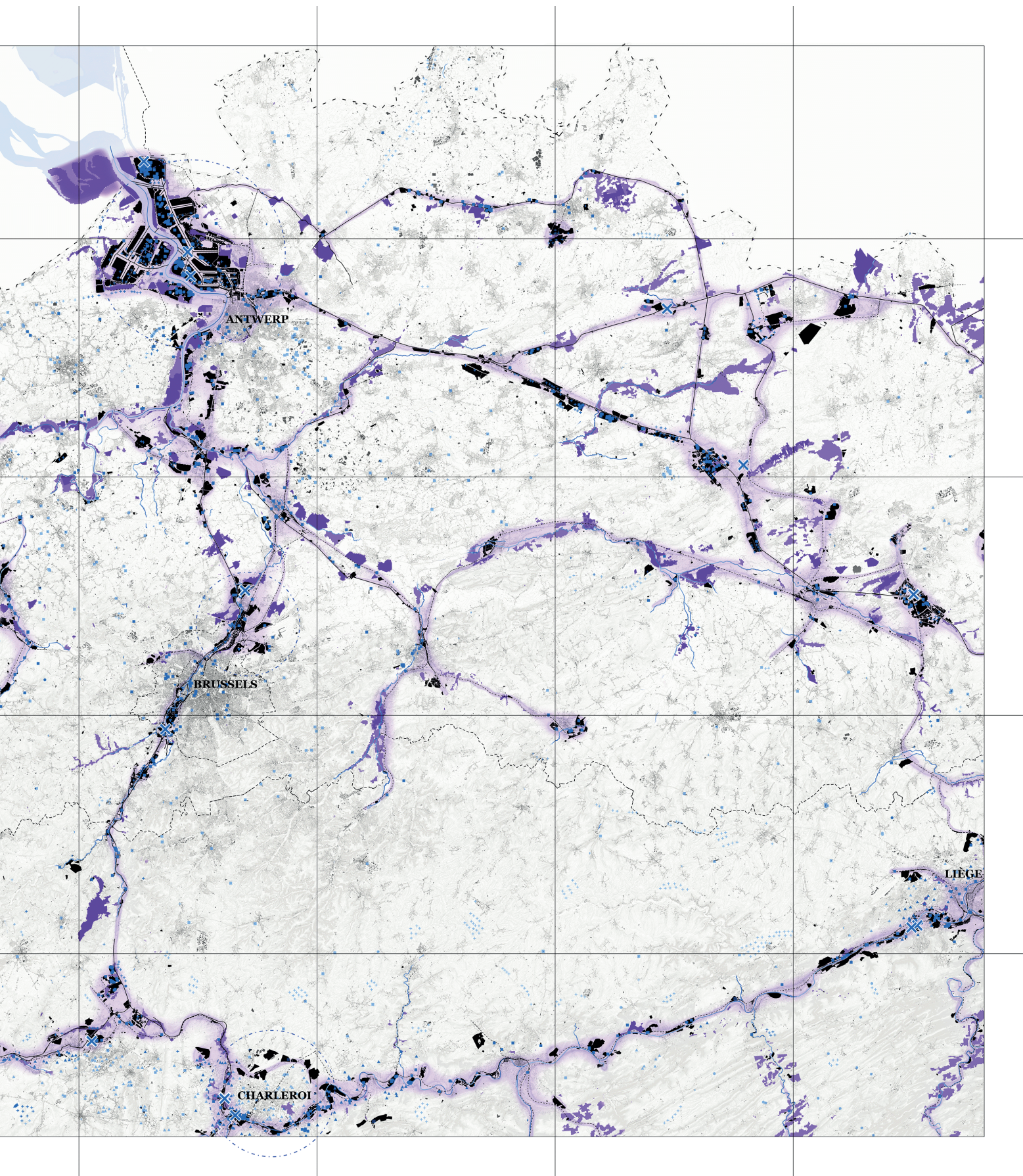the largest industrial
areas of Brussels

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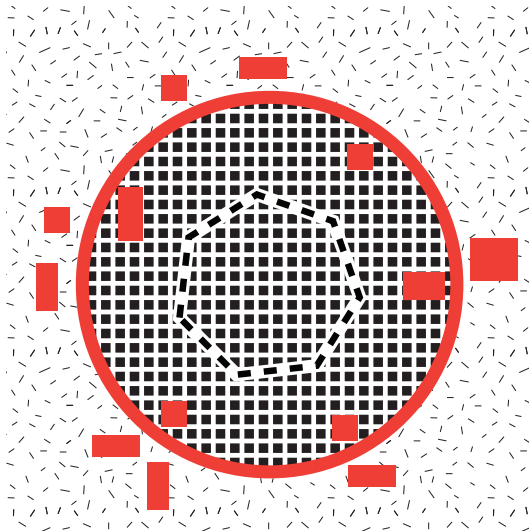# Manifesto

The nationwide network

When industrial infrastructure is mapped in conjunction with areas deemed having 'high natural value', an inherent correlation between these two typologies can be seen. This can be attributed to many factors, such as development along waterways, existing on the externalities of cities, post-industrial wastelands being re-inhabited, and limited human activity near industrial areas.

When these interrelated pathways are mapped together the opportunity of interconnected green corridors becomes clear,

BRUGES

GHENT

Industrial Zone

Area of High Natural Value

Railway

Canal

River

Proposed Ecological Corridor

✕ Power Generation

▲ Mine

✛ Wind Turbine

● Industrial Building

■ Gas Proccessing

ANTWERP

BRUSSELS

LIÈGE

CHARLEROI

Re-establishing the city walls

As a result of historic patterns of industrial urban development, and the subsequent continuation of urban sprawl to meet them, in many cities globally there is a noticeable and contiguous area of industrial estates, infrastructural developments, and utility facilities which impose a border to development of the urban core. As discussed, for numerous spatial, social, practical, and aesthetic reasons these areas cannot be infringed upon by human habitation making them, in a sense, the new walls of the city.

Unlike the walls of the traditional city, the outside is not 'other' or 'nature' but instead more 'urban.' However, the area (in) between this industrial boundary becomes the natural condition of interest. In the urban society the default has become the urban, with only the space in between leaving space for nature.

Reframing our relationships

For   us,   for   them,   for   neither

The most prevalent contemporary ideas on industrial sites and how to deal with them discuss their decay, danger, and spatial conditions as in opposition or offense to the city. Most of the attention is focused on discussing how to make them clean, safe, and integrated, assimilating them into the city fabric. This point of view assesses only the human value in these areas, negating their intrinsic qualities as solely negative as they do not serve *us*. There is a lack of care or awareness for the ecological potential they hold.

In the modern city space is of a premium, and not only for human life, but its non-human inhabitants too. The anthropocentrism of our developments puts *us* as the top priority, and non-human life as the guest. Given the imminent threat of climate change, collapsing ecosystems, and diminishing biodiversity the need for a reconsideration of our attitude and mindset towards nature is essential.

The desire to make spaces which are inherently and intrinsically hostile to human life better for us, at the cost of its ecological value, is the prerequisite which this research hopes to dismantle.

In a way, a look into the past could be one precedent for how we move forwards in this discussion. Given the rapidity of climate change, we are left unable to adapt our way of life at the same pace, and natural disasters and climactic conditions grow more extreme by the year – in a way we are returning to the prehistoric state in which we exist in submission to nature. The natural worship of prehistoric religions reinstated by re-situating natures agency into our governmental bodies and instilling a symbiotic rather than anthropocentric methodology of governance.

In a spatial way, it is too late to return to the urban nature dichotomy, thus instead a new precedent must be established in the urban condition- actively creating spaces for nature, and not solely for man. It is too optimistic, and perhaps unnatural, to assume that as a collective mankind would give up the comfort of our present urban conditions, which are inherently hostile to forms of nature which we deem unsuitable.

Therefore, it can be considered a necessity to establish, outside of our areas of habitation, these spaces for nature. From the arguments and observations posed in this paper, the adaptation of industrial infrastructure could be the ideal typology for introducing formal ecological developments.

Conceptions of nature should be distanced from our romantic nostalgia of pure and untampered, and instead brought into the contemporary reality of the urban condition and the Anthropocene – that we need nature, and nature needs us.