

SUSTAINABLE
URBAN
REGENERATION
OF BRUSSELS
EX-NATO / DE-
FENCE SITE

SUSTAINABLE URBAN DESIGN STUDIO, MA-1
BRUFACE - ULB + VUB - 2018/2019

SDS-I PROJECT 2018-19
SUSTAINABLE URBAN REGENERATION OF BRUSSELS
EX-NATO / DEFENCE SITE

TEACHING TEAM:

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HERA VAN SANDE & GEERT PAUWELS (VUB)

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INTRO

Sustainable Urban Project for the NATO-Defense Site:
HIGH DENSITY MIXED-USE

The project for this year's Sustainable Design Studio (SDS) is focused on the theme of "high density mixed-use" with the objective of sustainable development of the NATO-Defense site in Brussels.

During the 1st Semester, students work in groups to develop a sustainable urban design framework in the form of a master plan and program. Students work individually in the 2nd semester on a building or cluster within their master plan to develop a sustainable architectural project.

The NATO / Defense site (the old NATO headquarter buildings) covers 90 hectares along the Boulevard Leopold III, both in the Brussels-Capital Region (Evere and Brussels-City municipalities) and in the Flemish Region (Zaventem municipality). One third of the site was released in May 2017 with the relocation of NATO activities headquarters.

Perspective.brussels, in consultation with the Ministry of Defense, owner of the land, began in 2015 a definition study (NL) of the redevelopment potential of this site, taking into account the option to build on this same site a new headquarters. Given its location, the potential redevelopment of the NATO / Defense site is also a pilot project for interregional consultation, as part of the Noordrand territorial development program.

The urban question or the sustainability problematic for the SDS is "How to tackle the redevelopment of the 20th century urban sprawl and its potential within the Belgian Horizontal Metropolis structure? What are the strategic pathways for envisioning a sustainable redevelopment? Starting from landscape and public infrastructures, how to envision and re-structure a renewed identity, sustainable and qualitative urban space?"

In both semesters, the students design work is / will be guided by this problematic and a set of questions to be addressed at the scale of both the urban / master plan and building scale: What is the right density and scale? What degree of environmental sustainability? How green? What is the right mix of uses? What should be the ambition of mobility reconfiguration? What about co-production? Addressing these problematic and questions, distinct visions of urban design based scenarios will be developed in the form of Master Plans (1st Sem), and Sustainable Architectural Projects (2nd Sem).

The aim is to provide concretely illustrated and coherent set of innovative ideas as the stepping-stones for creatively defining the urban project for the NATO-defense site, and deliberating a more inclusive vision for sustainable urban development of the area.

PARK BRUX

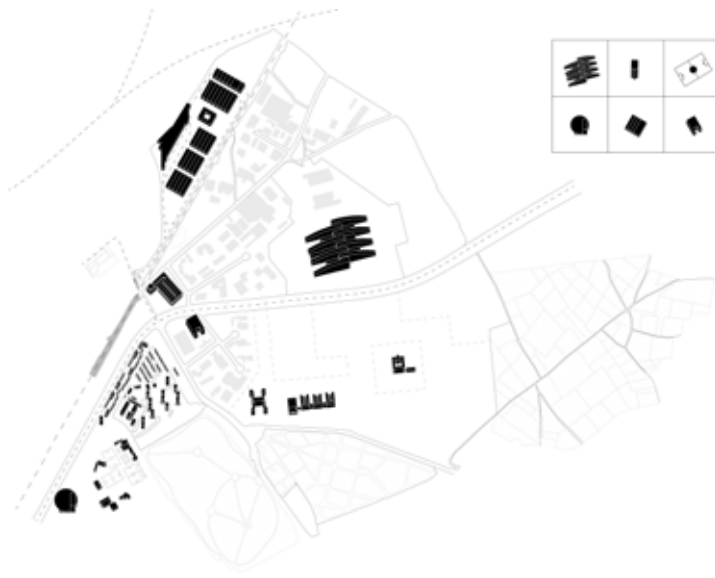
TEAM:

LAMEES AWAD, PELLE DARRAS, WOUT DE ZUTTER, HELEN DE WESER & DIANA TOMA



01

1. Points of interest



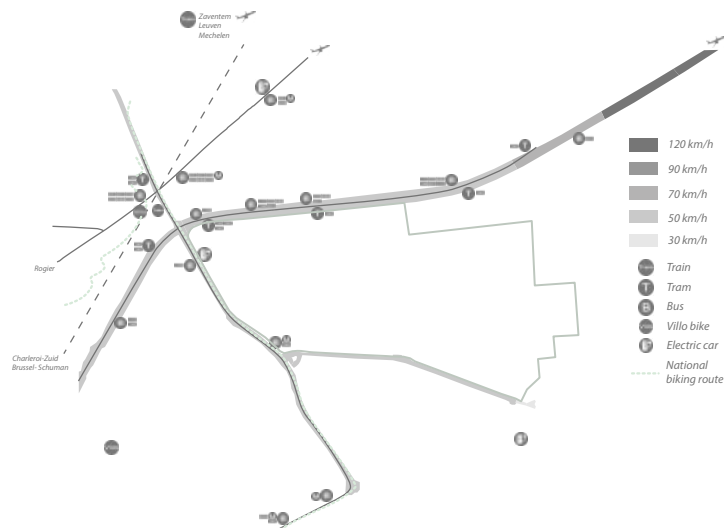
2. Flood zones



3. Typology & function



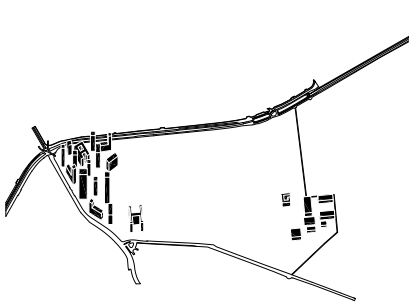
4. Transport



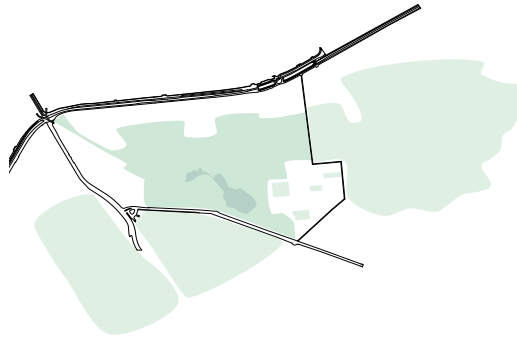
5. Green in Brussels



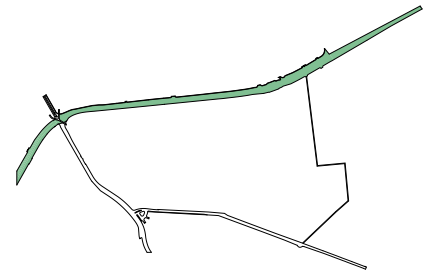
PARK BRUX



Density - Mixity



Connecting green



Boulevard

Park Brux is an urban development which aims to bring identity and program to an area marked by the juxtaposition of two actors. On the one hand Brussels demographic growth, economical pressure and ambition for a European boulevard connecting Brussels Airport to the European quarter. On the other hand Flanders urban sprawled context which lacks program and identity, but is eager to preserve its green.

The answer to this specific context lies in using green infrastructure as an urban hinge that connects both juxtaposed actors and is able to introduce a new type of living for more than 9.000 inhabitants.

The center point of this vast green infrastructure is a large recreational park including the only public swimming lake of Brussels. Right next to it, a more biodiverse lake enables the transition to a biodiverse forest. Furthermore, a substantial area is provided for a self-sufficient agricultural hub which provides food and energy to the new development.

The more urban development is located on the former DaVinci-site, which is redeveloped along both the Leopold III boulevard and the Jules Bordet lane. It functions as a new productive and active quarter, meticulously balancing













residential, educational and cultural functions with commercial, (soft-)industrial and economical functions. In order to give both structure to this dense and mixed area and connect the growing Bordet transportation hub with the green infrastructure, a main axis was created primarily destined for bicycle and pedestrian flows.

This fine grained mixity is translated through and brought to human scale by new building typologies that embrace societal and environmental sustainability throughout a three-dimensional layered program. A first layer serves as space for soft industries, commercial activities and sports. This layer can be fully closed or left open in the middle. The second layer also provides space for commercial and in some cases residential purposes. All layers above are mostly residential. These new typologies help making the development dense and mixed, brings character and activity, while ensuring breathability and intimacy for the individual.

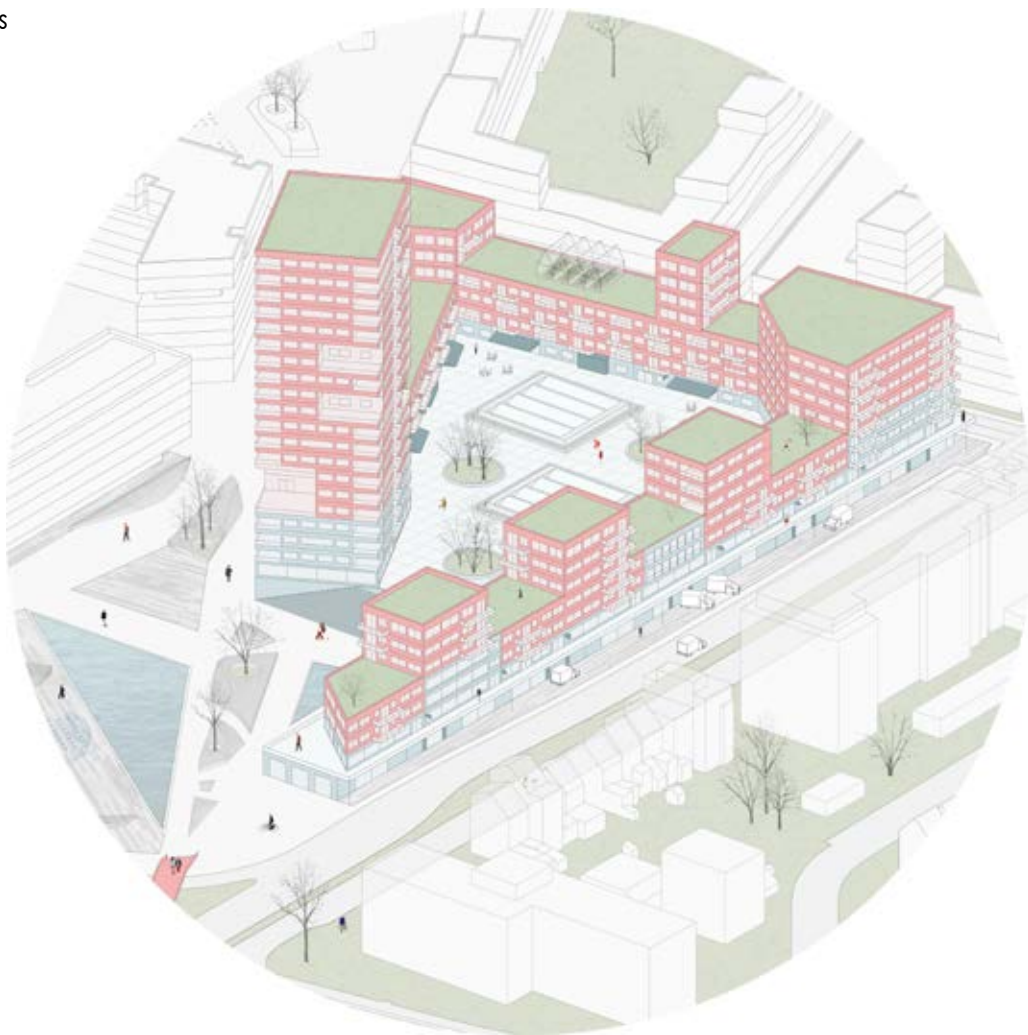
The project is thus marked by a dense and mixed redevelopment of the DaVinci-site, while taking the specific context of the boulevard into account, but most importantly creating 275 000 m² of extra green infrastructure.





<p>A</p>  <p> — 22 757 m² — 9 026 m² — 6 118 m² — 6 289 m² </p>	<p>B</p>  <p> — 12 222 m² — 10 478 m² </p>	<p>C</p>  <p> — 7 300 m² — 5 840 m² </p>	
<p>D</p>  <p> — 18 504 m² — 7 443 m² — 9 252 m² </p>	<p>E</p>  <p> — 12 540 m² </p>	<p>F</p>  <p> — 12 975 m² — 9 000 m² — 3 190 m² </p>	
<p>G</p>  <p> — 45 981 m² — 13 391 m² </p>	<p>H</p>  <p> — 18 968 m² — 802 m² — 9 484 m² </p>	<p>I</p>  <p> — 24 005 m² — 4 801 m² </p>	
<p>J</p>  <p> — 18 564 m² — 6 600 m² — 9 282 m² </p>	<p>K</p>  <p> — 19 610 m² — 3 922 m² </p>	<p>L</p>  <p> — 27 555 m² — 11 022 m² </p>	
<p> ■ Residential 301 149 m² ■ Soft-Industries 23 069 m² ■ Educational 12 540 m² </p>			<p> ■ Offices 32 490 m² ■ Public & commercial 68 681 m² </p>

Mixed-use typologies



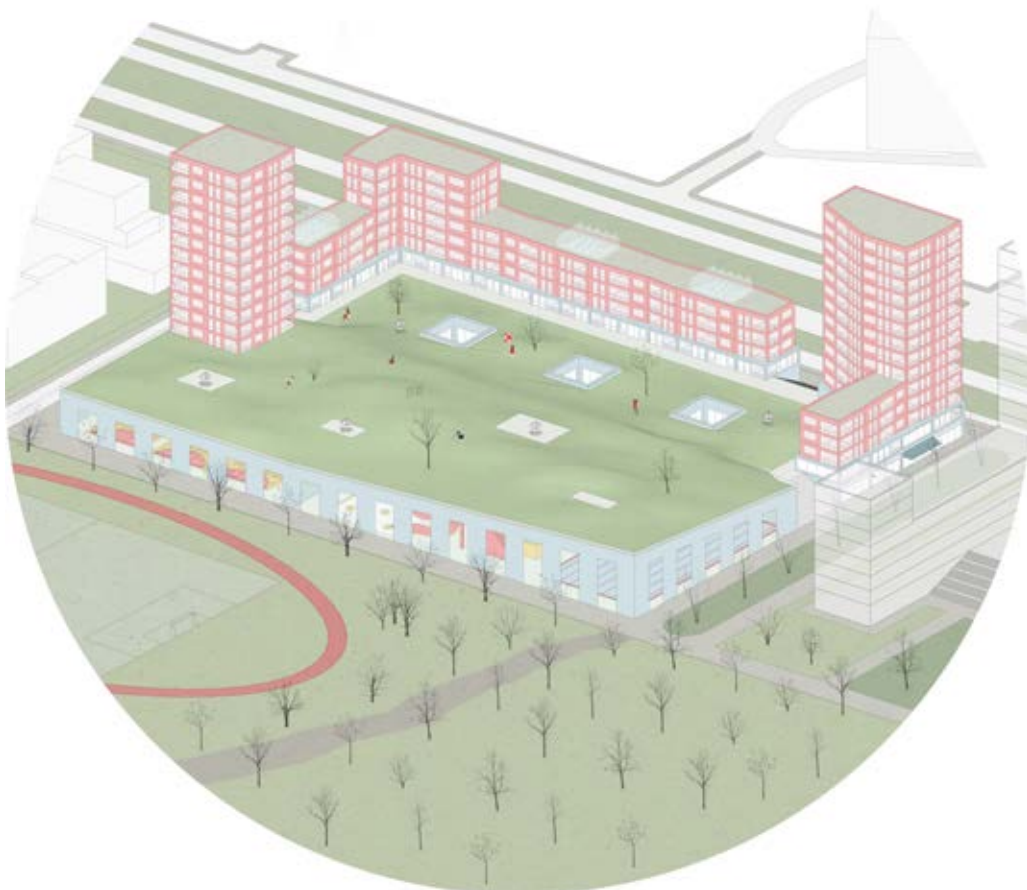
- Program
- Soft-industries
 - Elevated square
 - Commercial functions
 - Housing



- Program
- Soft-industries
 - Commercial functions
 - Inner private garden
 - Housing

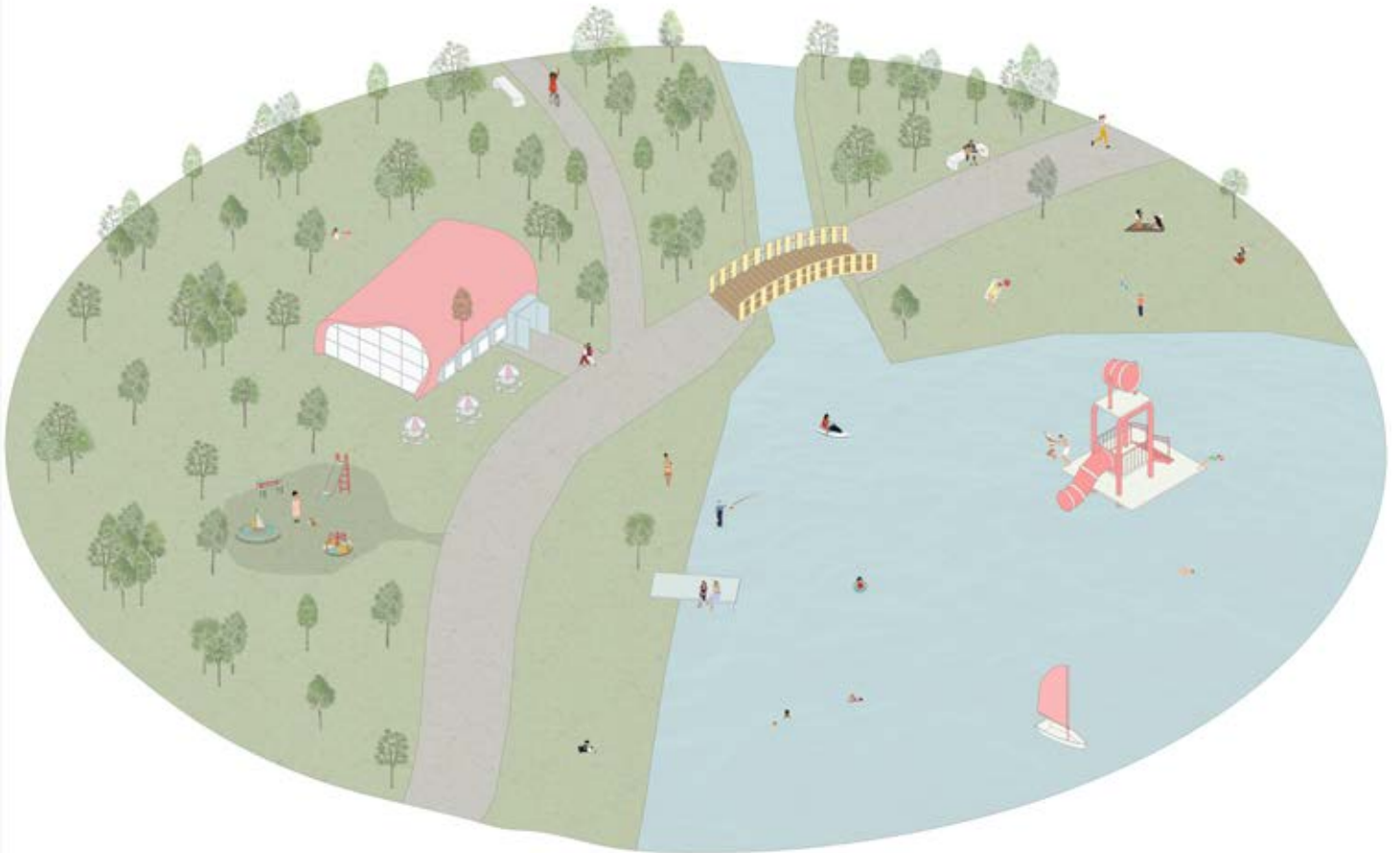


- Program
- Soft-industries
 - Elevated private garden
 - Rentable floor space
 - Housing

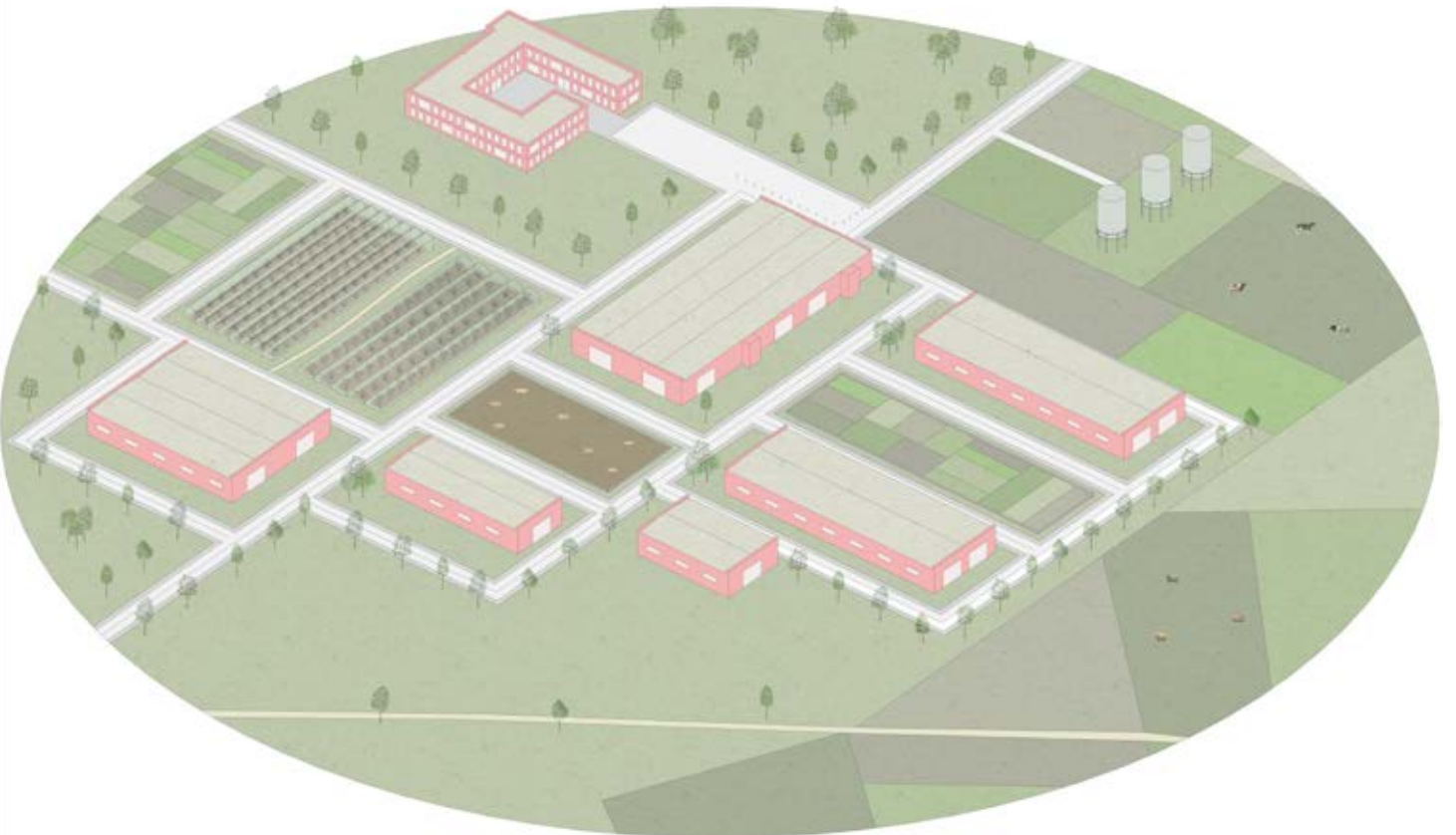


- Program
- Sports
 - Elevated private garden
 - Rentable space
 - Housing

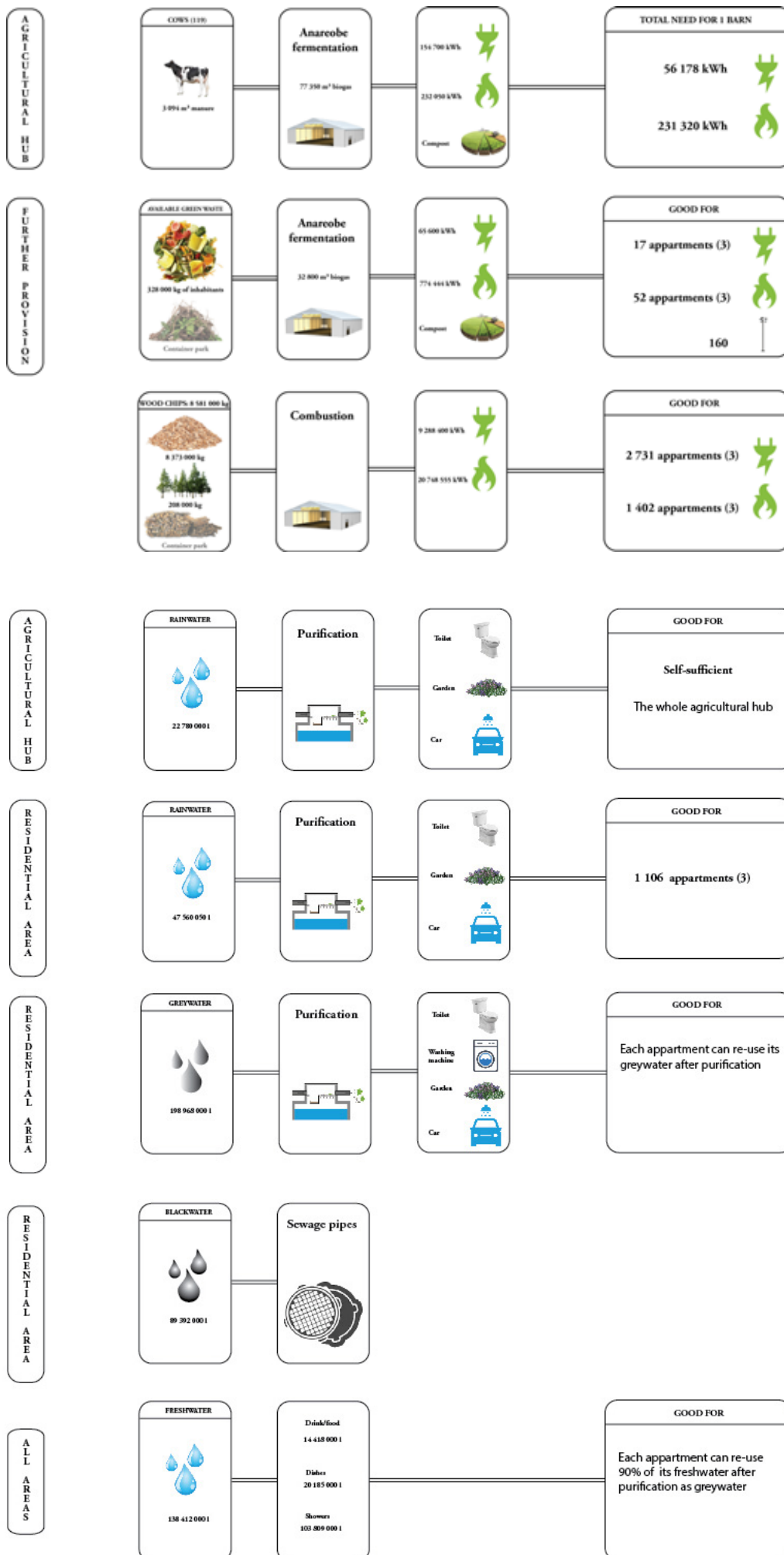
1. Recreational lake



2. Agricultural hub



3. Sustainable design strategies



ENTWINED SPINES

TEAM:

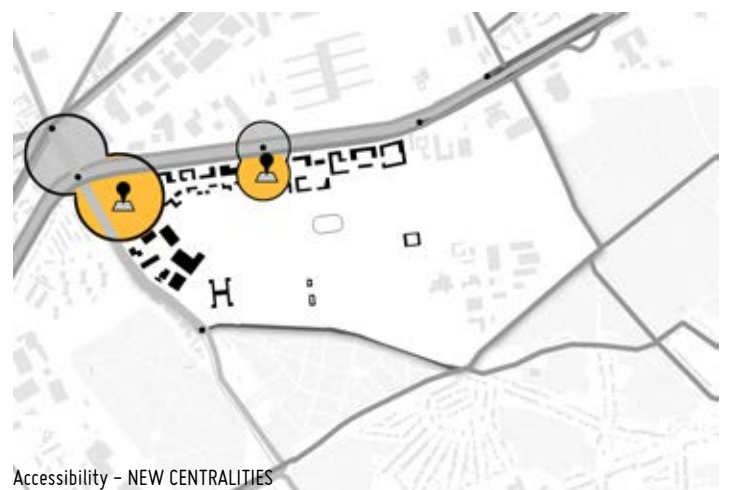
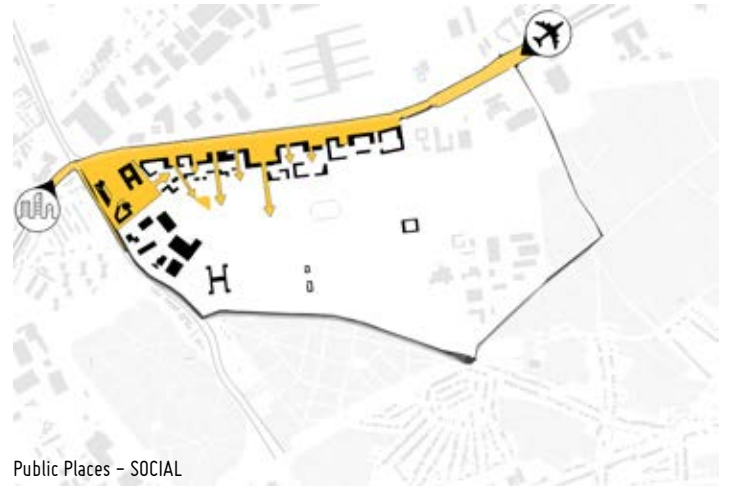
SARAH FONTAINE, LARA HAELTERMAN , ACHYUT PAUDEL , CAMILLE SEGAERT,
OPHELIE VAN SCHINGEN

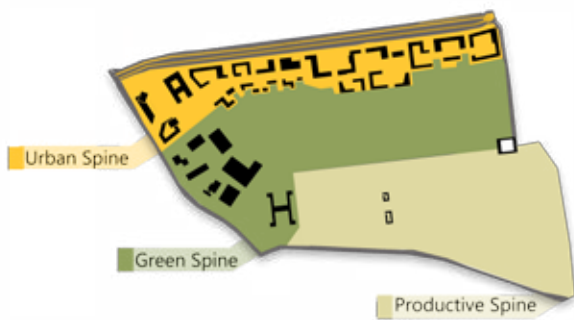


ANALYSIS



SUSTAINABLE STRATEGIES





Entwined Spines represents the idea of densifying the boulevard to give it an urbanity and as such, make it a visible part of the international corridor. That way, people would be invited to stop along the way and penetrate the project. Using this strategy, green spaces are freed, serving the site and ensuring a continuity with the surroundings.

The masterplan includes 3 key elements. The urban spine that features the character and density of an urban space, the green spine as a park that provides recreational services for the community as well as a pleasant place to rest. Finally, the productive spine links the neighboring green spaces, namely the fields in the east and trees in the west. With this complementarity between urban and productive areas, the potential of a more circular economy-based site is visible. Also, soft mobility will be proposed throughout the whole site.

Structured in two built lines, the urban spine responds to different scales, from an international to a more local one. Along the boulevard, a linked network of public places has been defined around which different buildings are placed in a dense way.

Those will provide place for more economic, urban and productive activities. From those squares, some axes define views and accesses towards the rest of the site and green areas. The second built line, with a smaller density, is dedicated to residential purposes. These buildings have a good orientation and enjoy a nice view on the park. In between those two, a pedestrian, local street as a “rambla” is present, from which the residential buildings can be accessed. Along it, local services and community spaces are present.

In this organized urban spine, two important landmarks are identified and given the largest places. The first one is located at Bordet as this place represents an important node for transportation and for the neighborhood. A very mixed program is planned in it, making the place lively at all times. It includes, among others, cultural activities that will serve the surroundings. The second landmark, described as the local food corner, has a strategic location being placed just in front of the tram stop. Different catering businesses are situated around this public square, and the square itself offers place for markets to sell locally produced goods.



MASTERPLAN



A

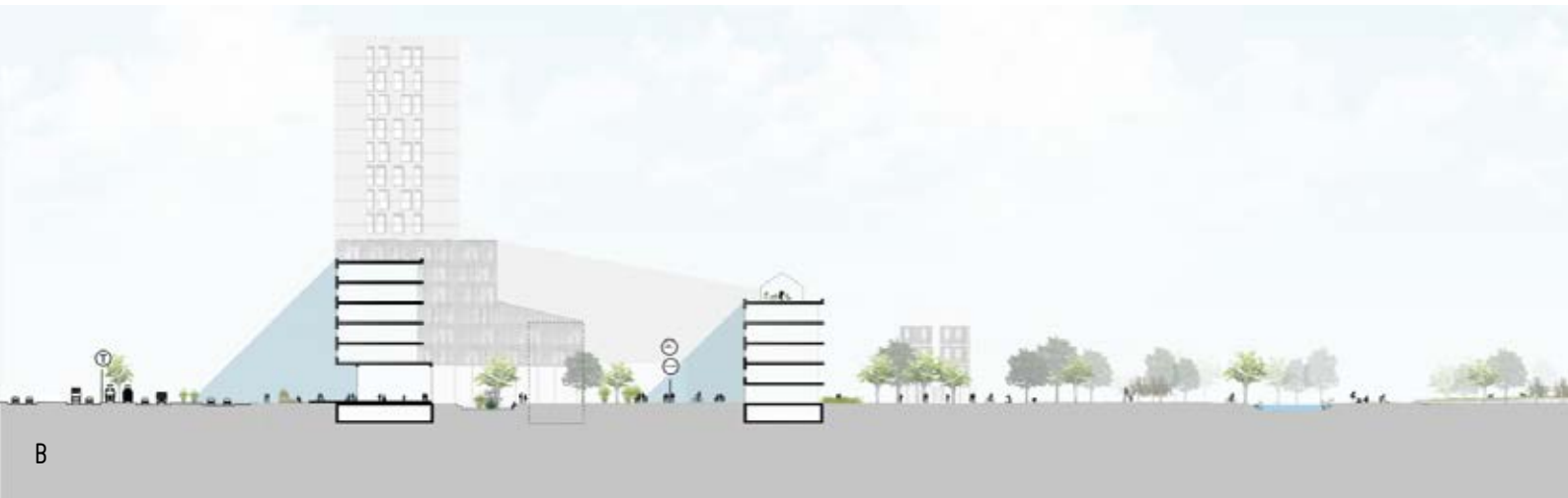
B

B'

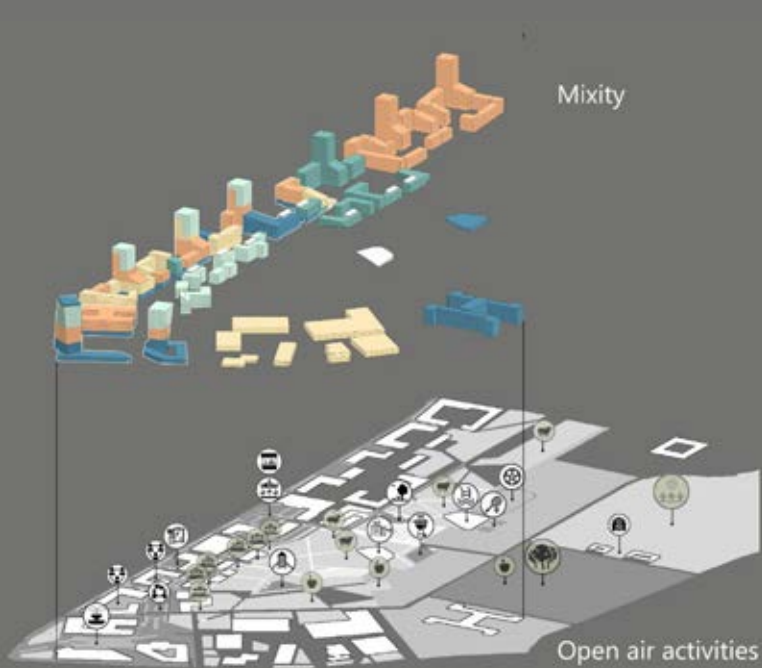


A'

SECTIONS



PROGRAM



HOUSINGS	32.1%	BUSINESSES	21.8%
Appartments	10.4%	B2B	5.1%
Penthouses	5.0%	Coworking and offices	7.6%
Social housing	6.0%	Start-up incubators	4.4%
Expat housing	7.2%	Lab and research	4.6%
Hotels	4.4%		
PRODUCTION	17.6%	SERVICES	25.2%
Atelier (food transformation)	2.4%	Cultural	8.4%
TIC	4.6%	Catering	7.8%
Workshop spaces (prototyping,...)	3.8%	Local services	2.0%
Printing & Fablab	1.7%	Community spaces	2.2%
Light industry	2.0%	Retain and other services	4.9%
		EDUCATION	4.6%

TOTAL BUILT AREA: 194806 m²
 TOTAL BUILT AREA INC. DAVINCI, EU SCHOOL, DEFENSE SITE: 304716 m²



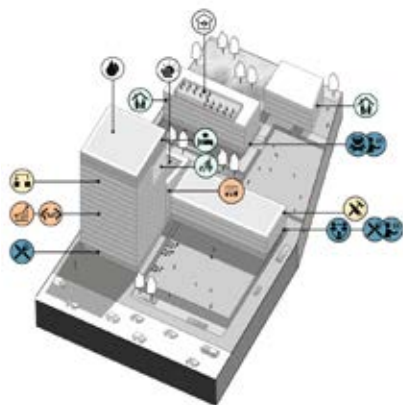
TYPOLOGIES

Bordet public Square

- Museum
- Performing Arts Center
- Exhibitions
- Conferences
- Hotel
- Housing
- Orange offices / Startups
- B2B
- Relocated Da Vinci
- Restauration
- Commerces/Services

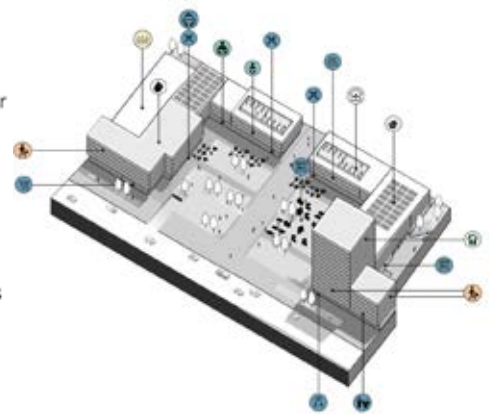


- Rooftop greenhouses
- Rainwater collectors
- Solar panels
- Housing
- Hotel
- Expat housing
- Local services
- Repair Café
- Restauration/services
- Community spaces for workers and habitants
- Start up
- Co-working spaces
- Research and laboratory
- Business to Business (B2B)
- Workshop spaces and Ateliers for carpenters

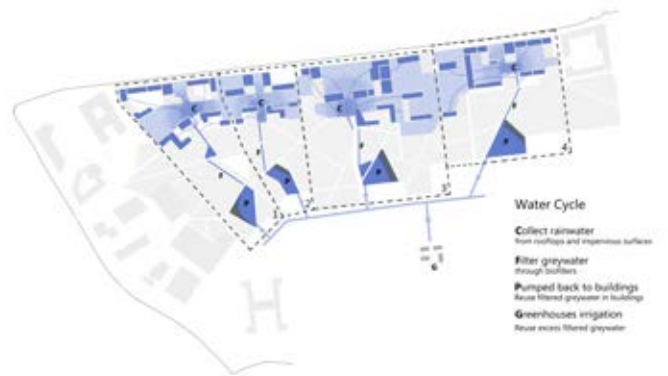
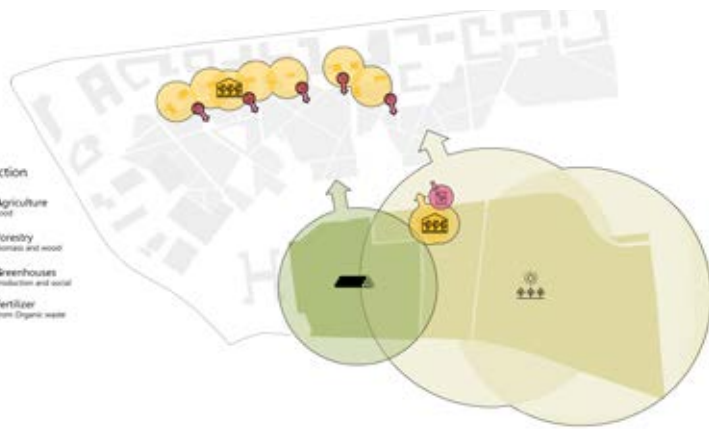
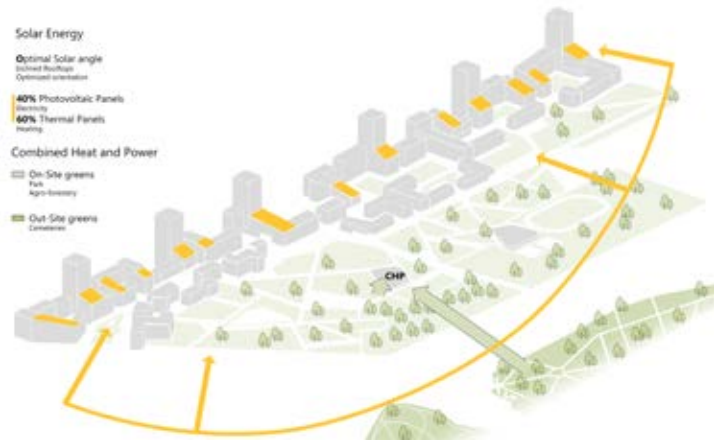
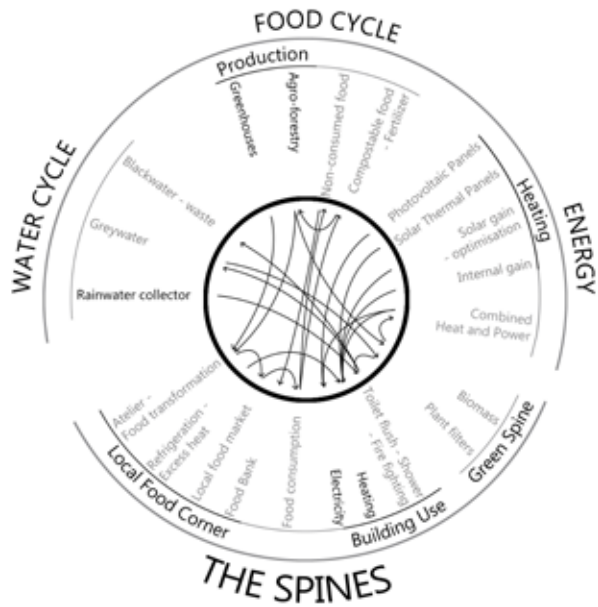


Local Food Corner

- Food Bank
- Rooftop greenhouses
- Food transformation atelier
- Local food market
- Local Supermarket
- Library
- Local cook & book
- Restauration
- Sensibilisation conferences
- Exhibitions
- Secondary school cafeteria
- Nursery
- Housing



CYCLES



RENDERS





BORDETBRANCH

TEAM:

YANNICK GHYSEL LAURENCE PAQUET ANNA LOCATELLI KIRSTEN SCHOTMAN FLORIANA HYSI



Connection of Green spaces



Compactness



Axes



Sustainability



Vision



Situated at the border of Brussels Capital Region and Flanders, the site was used as an airport during WWI and became both a military and civilian airport afterwards. When it finally moved to Zaventem in the 50's, the Leopold III-lane was constructed to connect Brussels Airport Zaventem with the city center of Brussels. In 1967 the NATO seized the opportunity to use the big area of open land to build their headquarters. The Ministry of defense also expanded on this land. This led to the sprawled and inaccessible situation we know today. The state of the NATO building became too ill-conditioned so a new HQ was built and finished in 2017 at the other side of the Leopold III-lane. Brussels region declared the site as a "ZEMU" zone (Area with Enterprises in an Urban Environment) which states that the zone requires a high mix of production, commercial and housing.

Giving qualitative green spaces back to the community was one of our main priorities. Transforming the south part of the site in a park links the two cemeteries and the Woluwefields. This park provides a more pleasant environment to live nearby but also attracts people from the surrounding suburban clusters. The sport facilities are incorporated in the park and are accessible by the Ministry of defense and the European school as well.

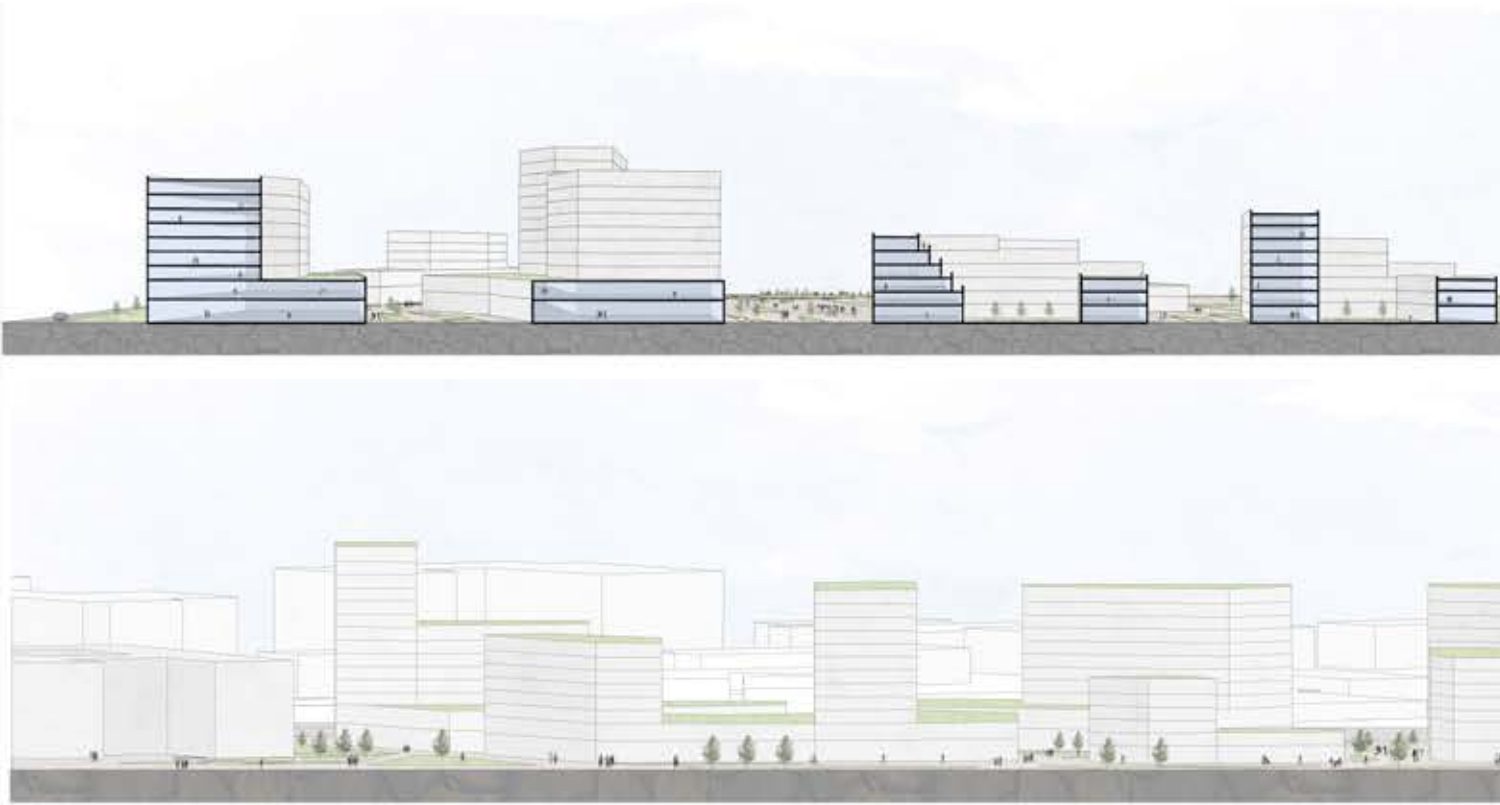
To top this off, an agricultural hub is created from the existing infrastructure of the Ministry of defense. This hub can communicate with the ZEMU zone on a economic and social level.

Compactness also played a key role in our project. We wanted to make the site as car free as possible and focused on pedestrian fluxes. This mentality made us work on an area that is within five minutes walking distance to one of the nearby bus or tram stops. The creation of a pedestrian bridge over the Leopold III-lane, from the new mobility hub - Bordet station- towards the site, allows a straight connection for the soft mobility. The connection introduces the main axis providing different social, commercial and productive opportunities leading to a big square with cultural activities. This axis branches off in different directions towards the park, hence the name of our project.

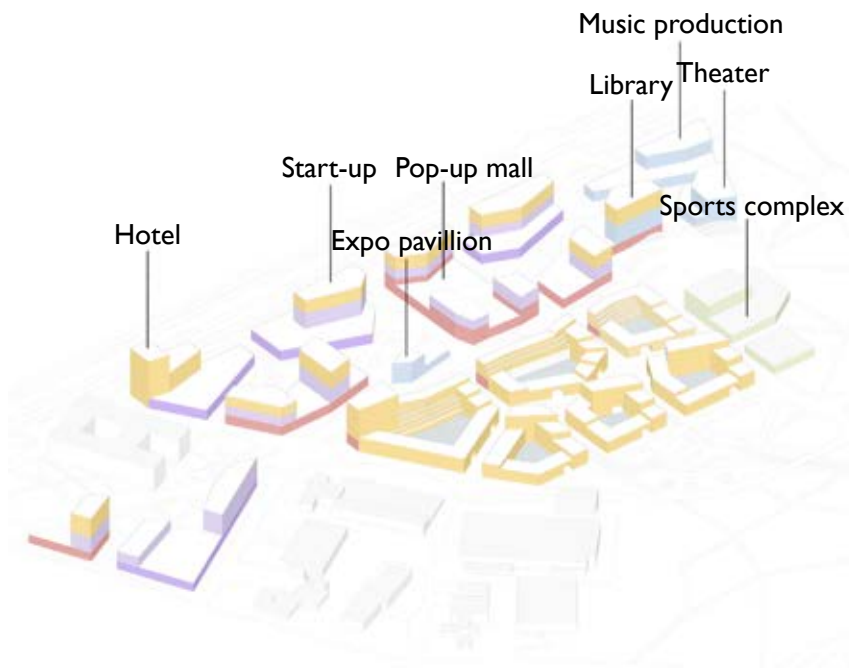




Sections



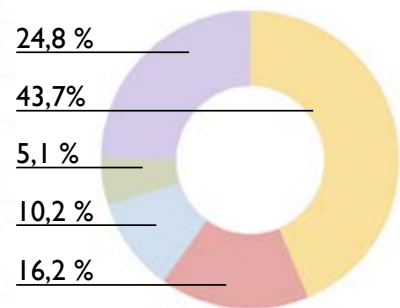
Program: Urban hub



Housing	134 815 m ²
Commercial	51 365 m ²
Production	78 520 m ²
Sports	16 070 m ²
Cultural	32 435 m ²

Total: 316 805 m²
 Plot area: 158 594 m²

FAR = 1,99

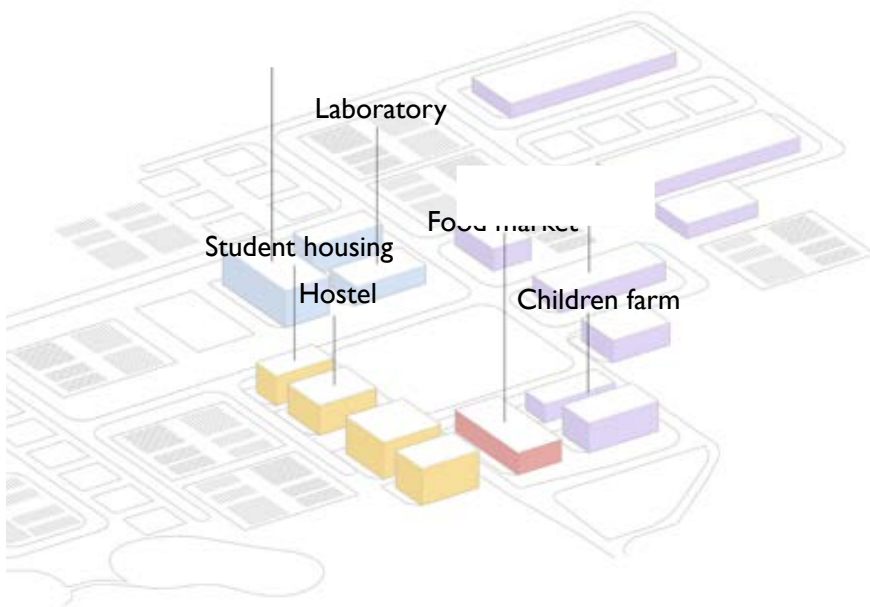




Program: agricultural hub

Housing	14 600 m ²
Commercial	2 674 m ²
Production	19 122 m ²
Educational	11 105 m ²

Total: 47501 m²

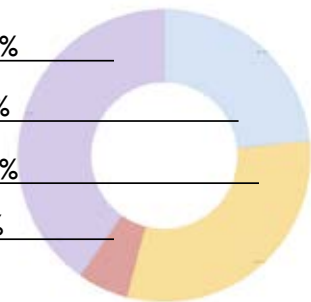


40,3 %

23,4%

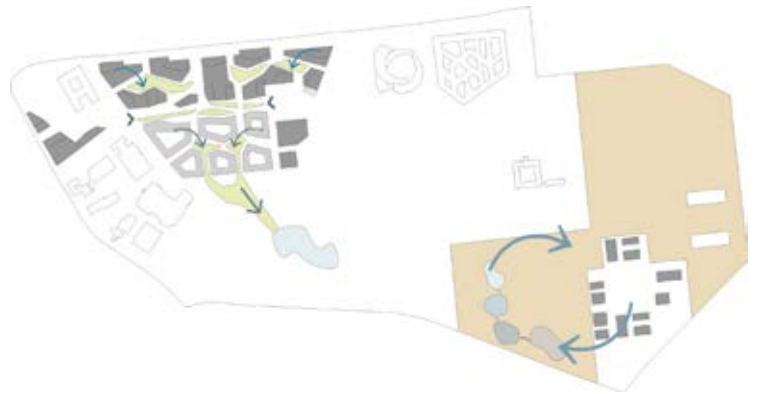
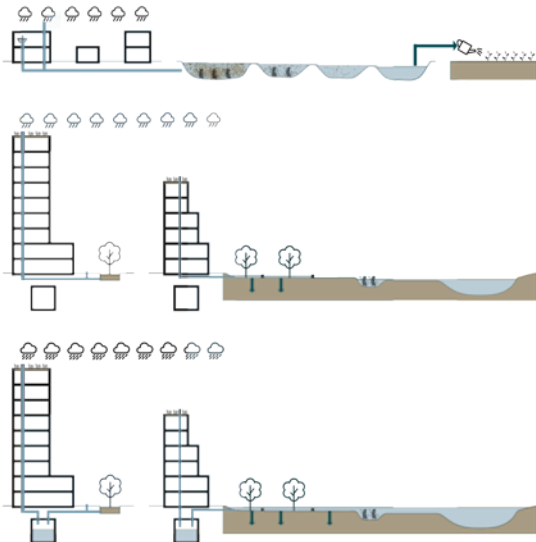
30,7 %

5,6 %

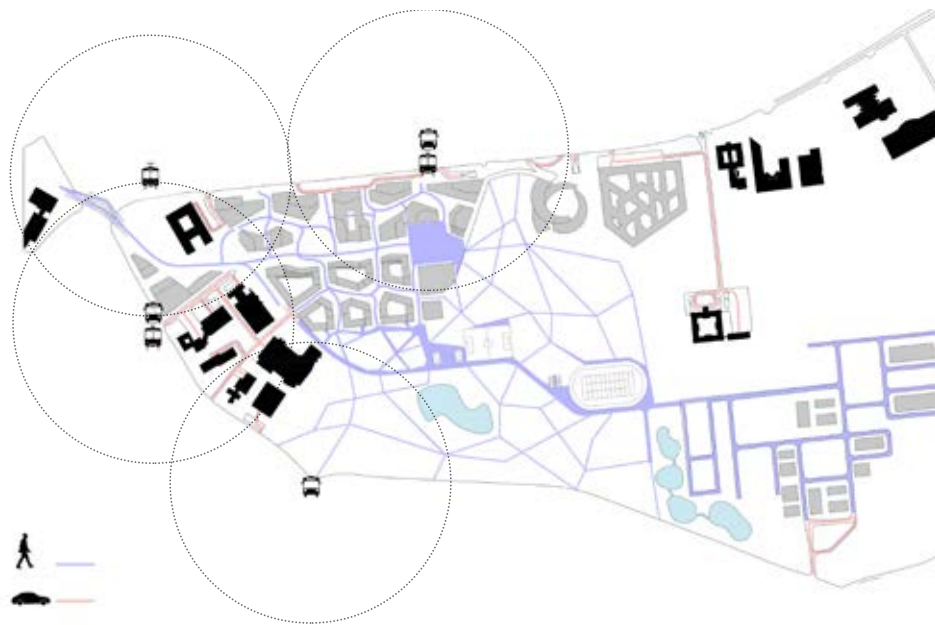




Sustainable strategies



Mobility and access



View of main axis



3D view



HUB 3

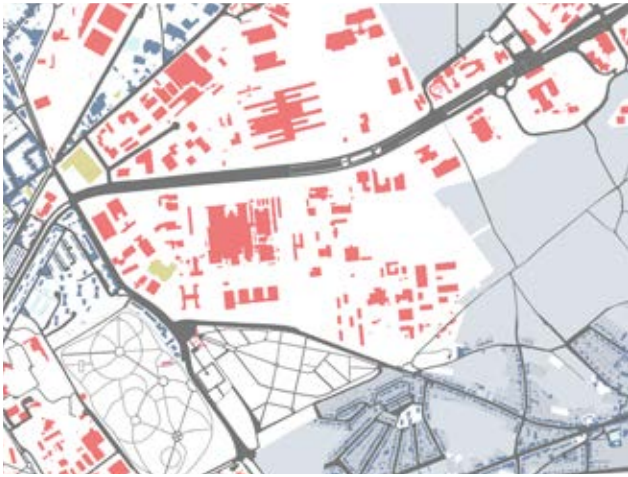
TEAM:

CLAEYS KATO, DEBROEYER JENS, DE LA ROSA LORENA, GEBOES ESTHER, HENNEMAN MARIE



04

Land use



Green spaces in Brussels



Mobility



Green spaces



Spatial concept



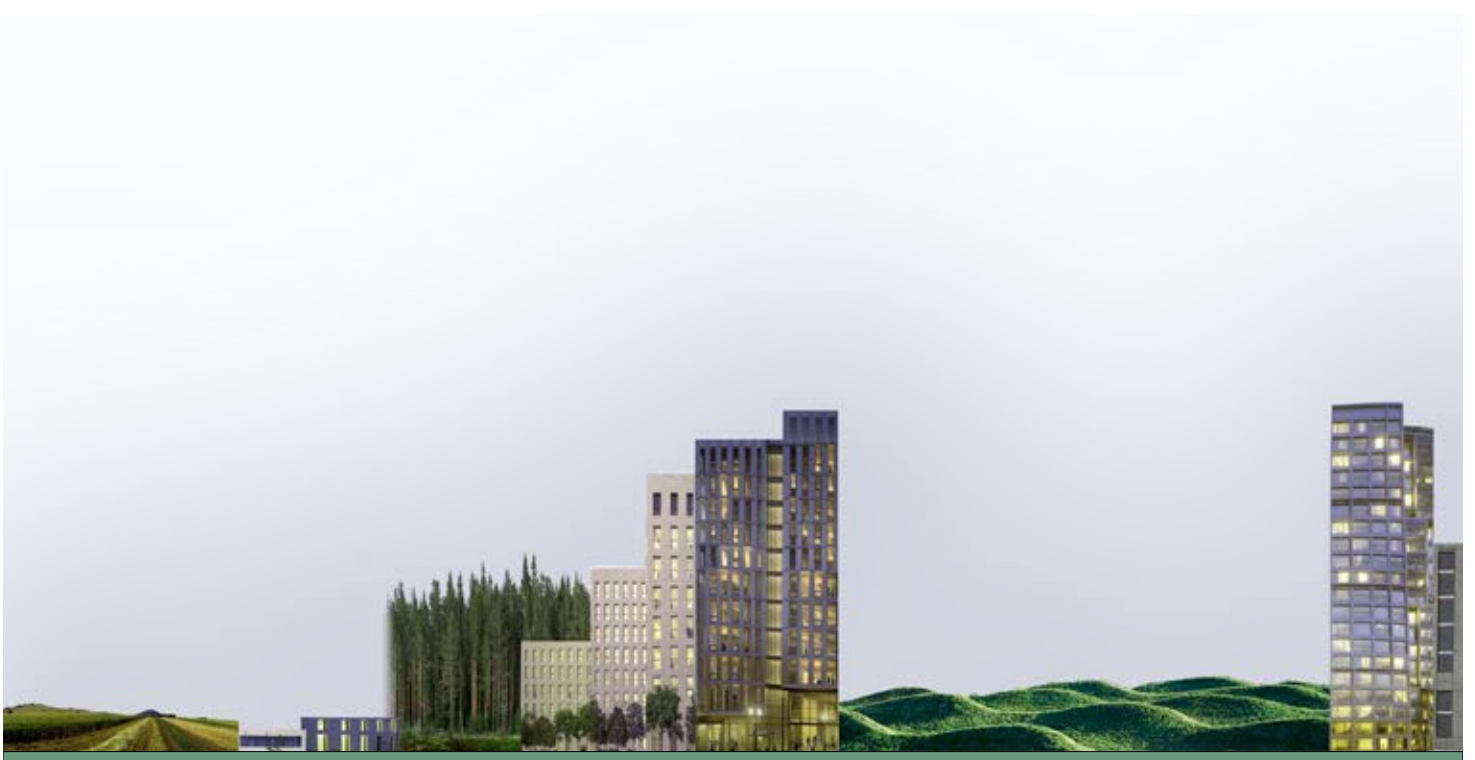
The project for this year's Sustainable Design Studio focused on the theme of "high density mixed-use" with the objective of sustainable development on the NATO site in Brussels. The NATO Defense site covers about 90 hectares along the Boulevard Léopold III, both in the Brussels-Capital Region and in the Flemish Region. Therefore a sustainable urban design framework was elaborated, keeping in mind the different demands to satisfy both regions, namely the lack of housing units in Brussels and the vision of Flanders to keep its region green.

First of all the analysis of the site and its surroundings showed the qualities as well as the shortcomings. The main problems are the lack of qualitative green spaces and in general the low amount of different types of functions such as educational or residential buildings, while the qualities lay in its good mobility and accessibility. Based on these findings a vision was elaborated that focuses on the increase of environmental quality by implementing three big green spaces and realizing a connection between the densified Brussels in the west and the more open and green Flanders in the east. These three green spaces are to be perceived as a vivid, organic park with height differences, a forest with sports as

well as educational activities and at last fields near Flanders that are at the base of the **economic sustainability** of our project.

Furthermore a high density and mixity of functions is introduced in such a way that **social sustainability** is increased by developing a new cultural centre that is in visual connection with the Bordet hub. The densification of the site is established by connecting buildings that are re-used and by designing residential towers in order to also clearly define the park and its borders. All of the buildings are oriented in a way to maximize solar gains and to reduce consumption of energy.

A good mobility on site is ensured by the elongation of some existing bus lines, the possibility to rent a bicycle or to use a shared electrical car and the implementation of visual axes for pedestrians to encourage them to do as much as possible by foot. This mobility strategy increases **environmental sustainability** together with the realization of a strategy to re-use and treat water and the extensive use of green spaces, the key element in our project.



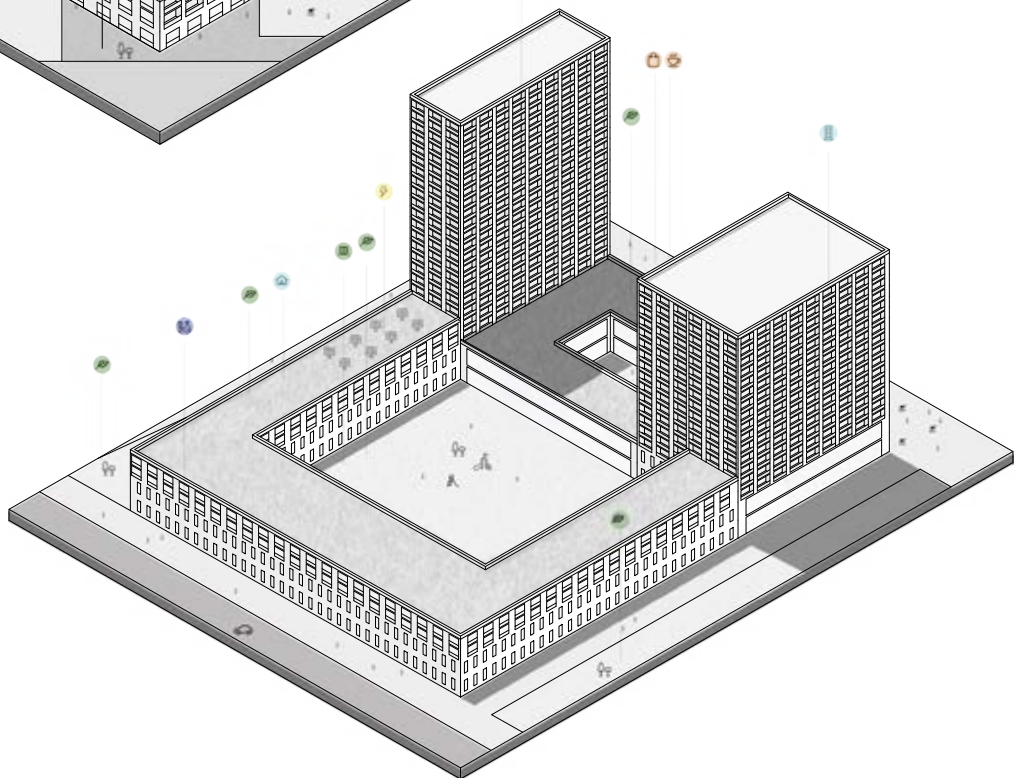
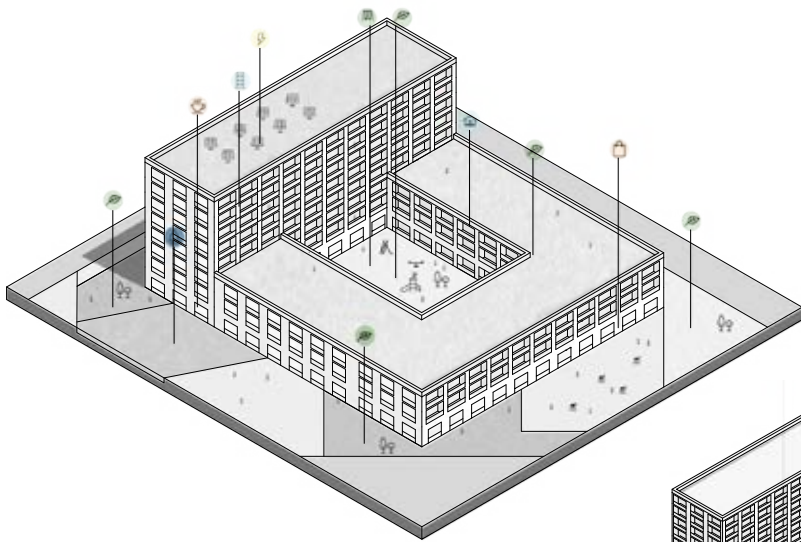
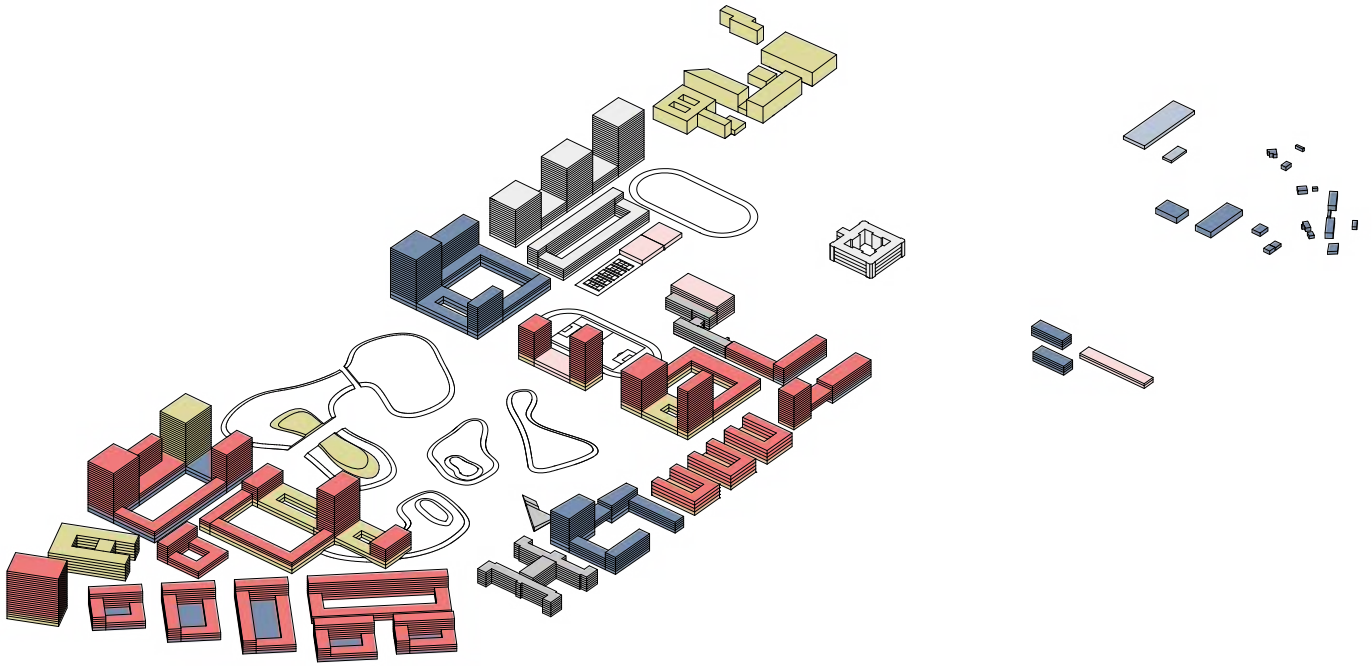
Masterplan





Sections

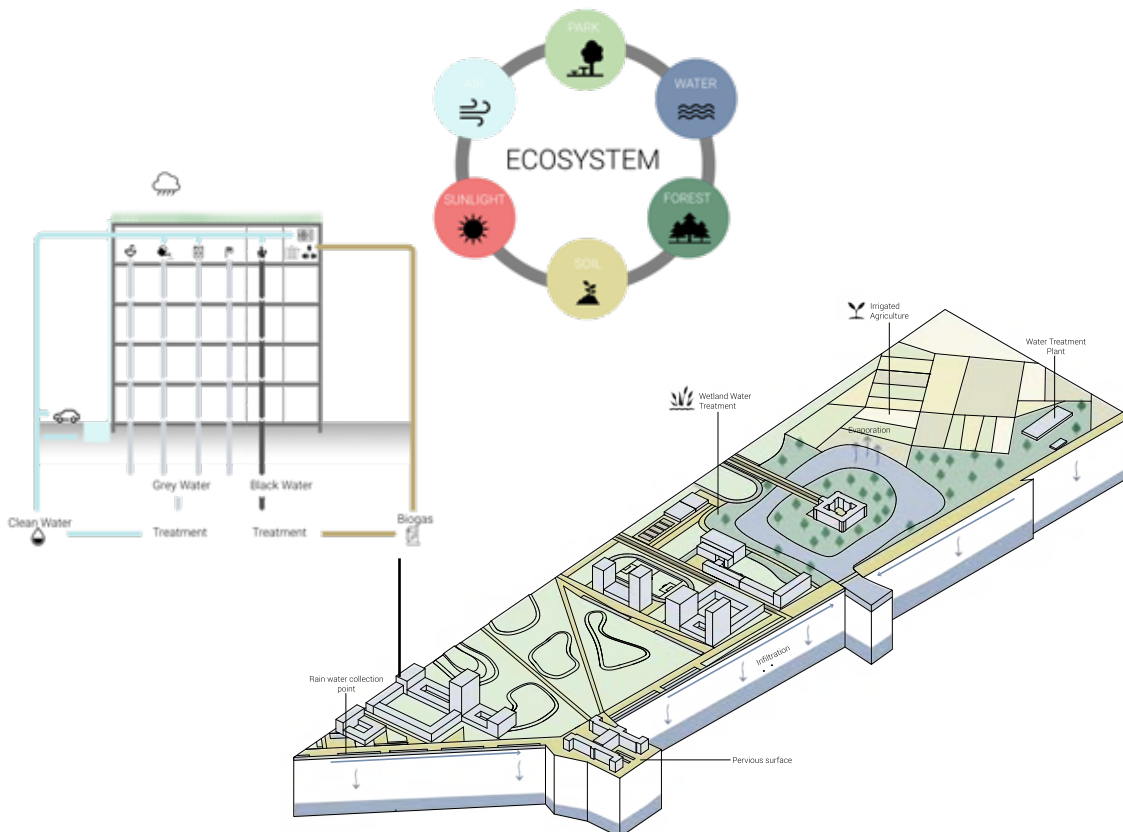




View of the park



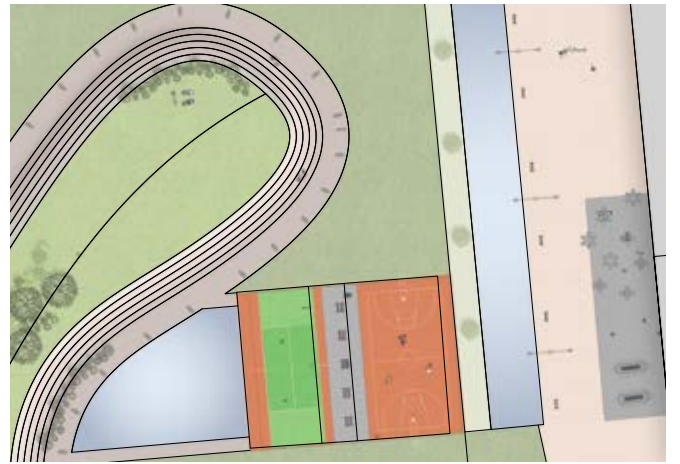
Water treatment



View from Bordet



Zoom-in



CITYGREEN

TEAM:

SOHEIL ESGANDARZADEH, LUKAS GEIJSEN, MARGOT MISSOORTEN, NABILA NASRI & ROMAIN VAN WASSENHOF

05

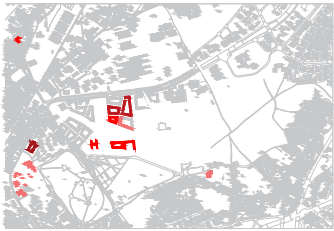


1 ANALYSIS OF THE SITE

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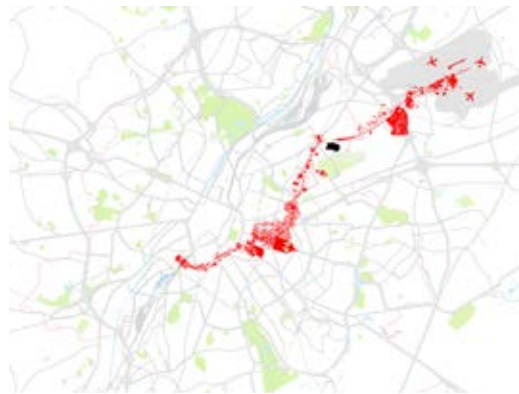


FUNCTIONS

MOBILITY STRATEGY

GREEN STRATEGY

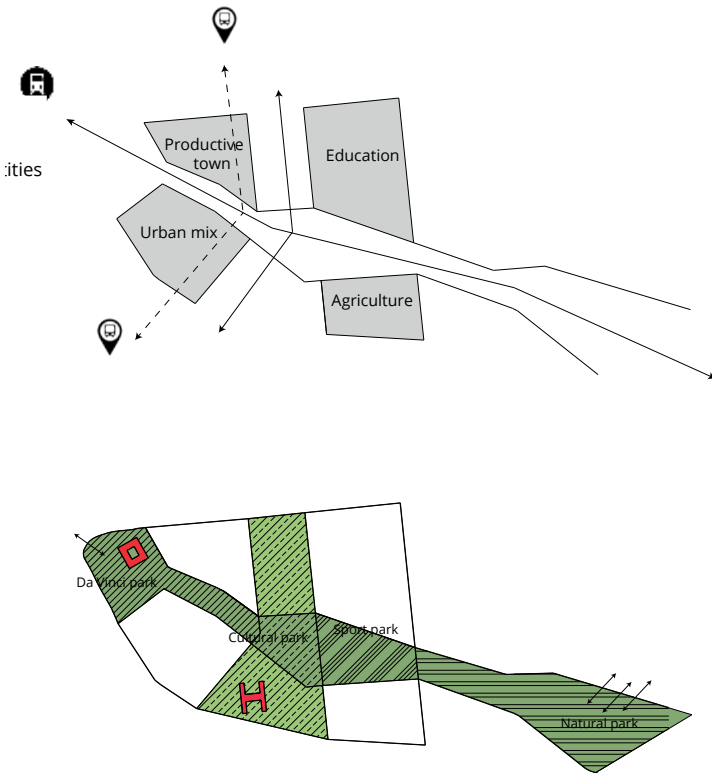
2 BROADER CONTEXT



3 VISION



4 SPATIAL CONCEPT



CONTEXT

On the grounds of the former NATO and Defense site, located at the border of Brussels and Flanders, the opportunity lies to create a new district of high density combined with qualitative and sustainable open spaces amongst the sprawled existing building fabric. The site is situated close to the mobility hub at Bordet and the big Leopold III boulevard, which takes part in the connection between the International Airport of Zaventem and the European Quarter. This connection is of great importance, since people travelling to Brussels will most likely pass by the site. It is however also surrounded by two cemeteries in the south-west and by an open agricultural landscape in the south-east, providing a lot of open space and tranquility in contrary to the busy north side. Since the site lies in between two main green landscapes, CityGreen wants to continue it on the project site.

CITYGREEN

A central green corridor connects the mobility hub at Bordet and the agriculture fields in the south-east. This green lane invites you to cross the area with its explicit openings, amongst which is a big park at the boulevard, as well as to share the generous sports and open spaces for the neighborhood.

5 GREEN INFRASTRUCTURE



Inside the CityGreen project, the green corridor connects four mixed development areas, which benefit from the green centre and infrastructure, while also being located towards the adjacent urban space. This green centre is also structured by four different characters, a Da Vinci park situated at the current DaVinci site, a cultural park, a sports park and a natural park with a lake and forest.

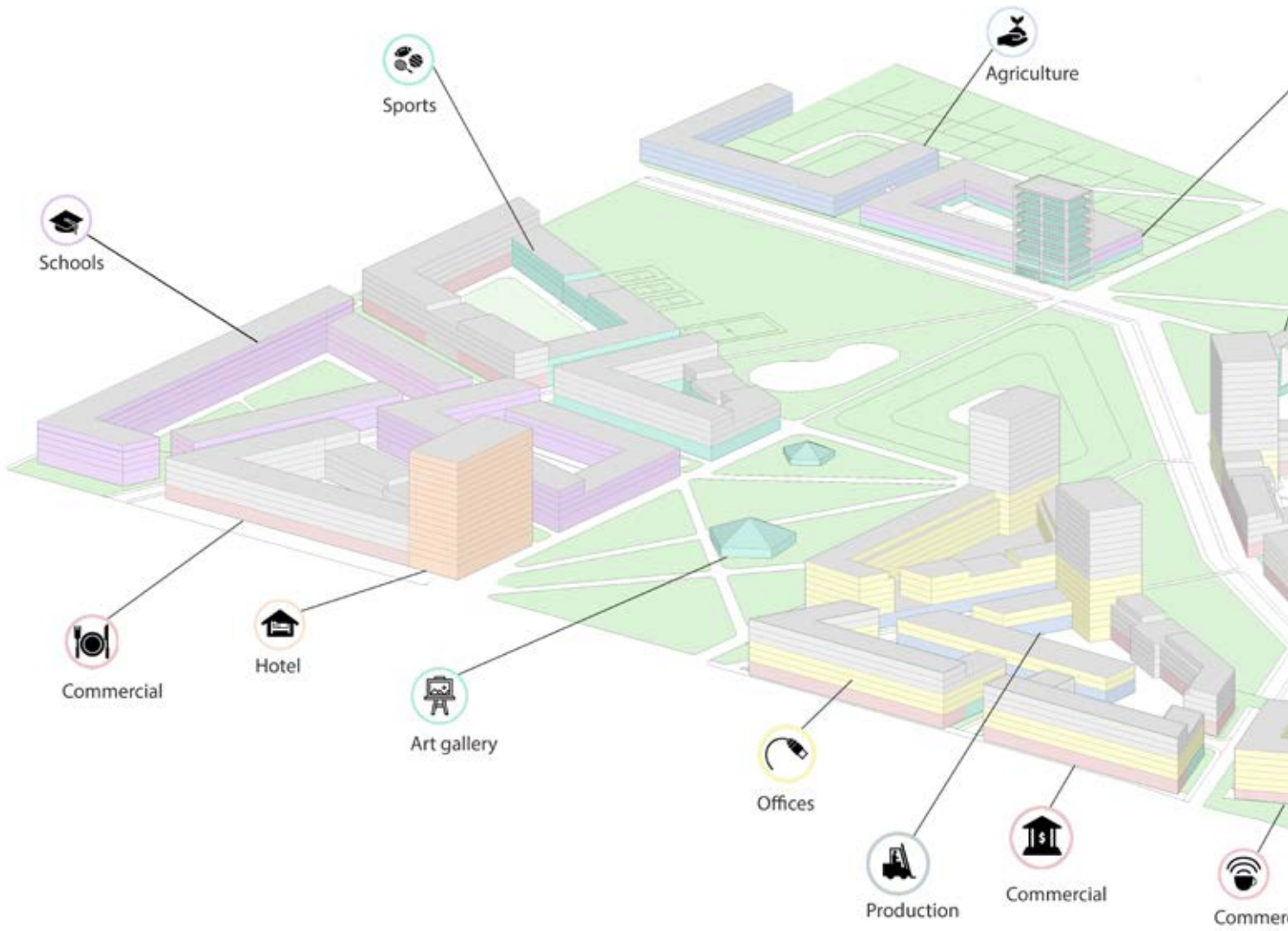
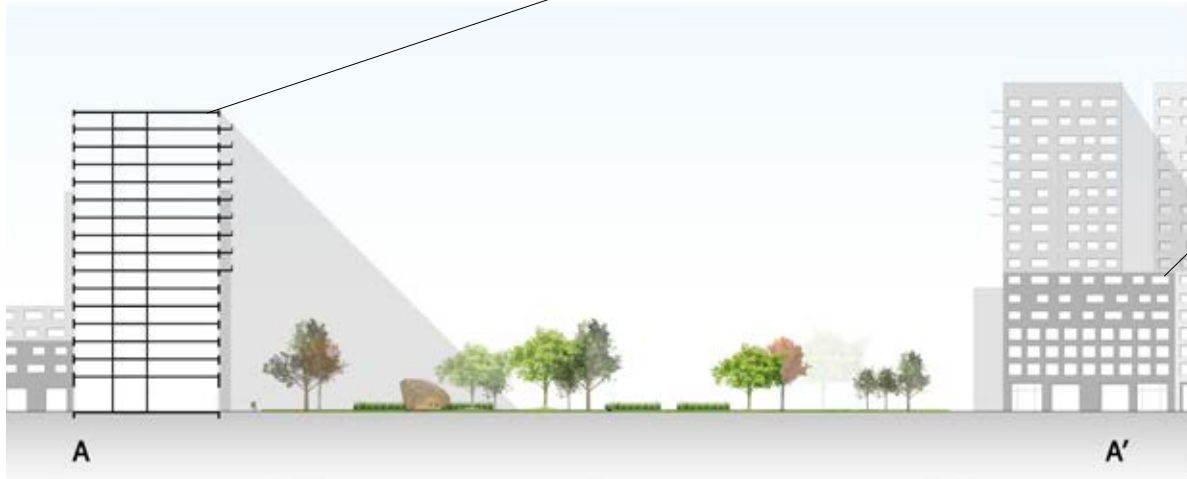
GREEN INFRASTRUCTURE

Four neighborhoods structure the area by their mixed program and they adjoin the green corridor by emphasizing the communicative scale. The corridor serves in CityGreen as a green infrastructure, fully integrated in the spatial planning of the site as a network of natural and semi-natural areas to deliver a wide range of services to the neighborhood. Several ecosystem services are integrated, amongst the purification and management of water along the lane, a forest ecosystem and cultural & provisioning services as for example agriculture.

Cultural reuse of some of the existing buildings, a secondary school situated in the north and larger commercial units on the edges complete the concentrated mix. In the area of transition between urban density and green space, a district of sustainable heterogeneity is created.









- Offices - 109 739 m²
- Private services - 74 988 m²
- Education - 93 711 m²
- Production - 34 628 m²
- Public services - 58 389 m²
- Residential - 241 185 m²

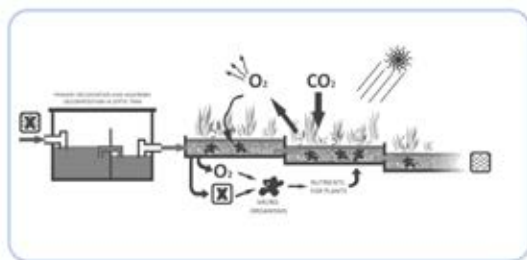
Constructed ratio Da Vinci area: 2.07

6 VISUAL AGRICULTURE & NATURAL PARK

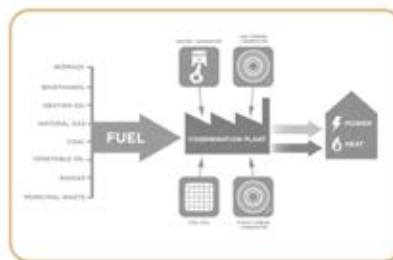


7 CYCLES

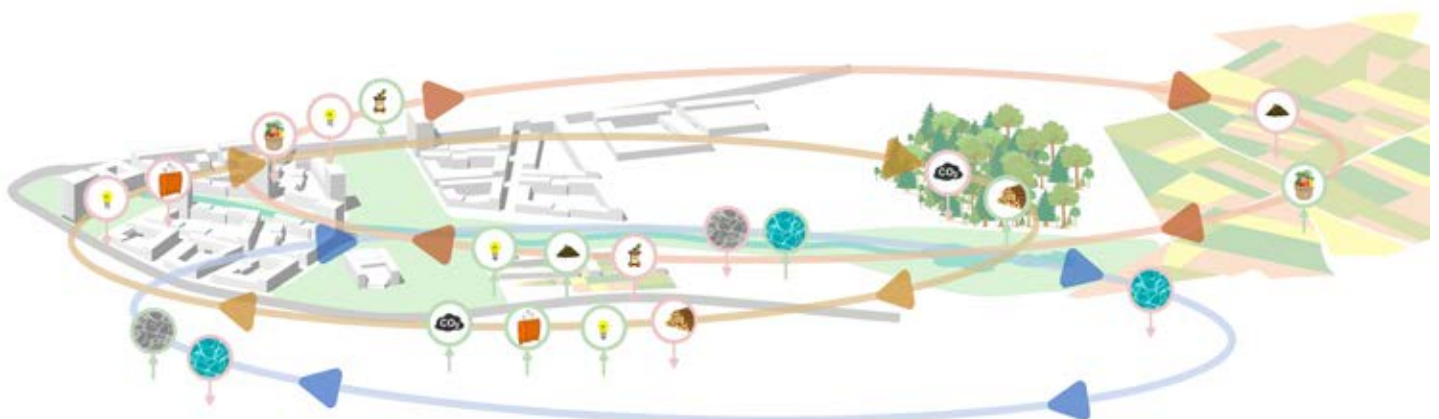
Bioremediation process



Cogeneration plant (CHP)



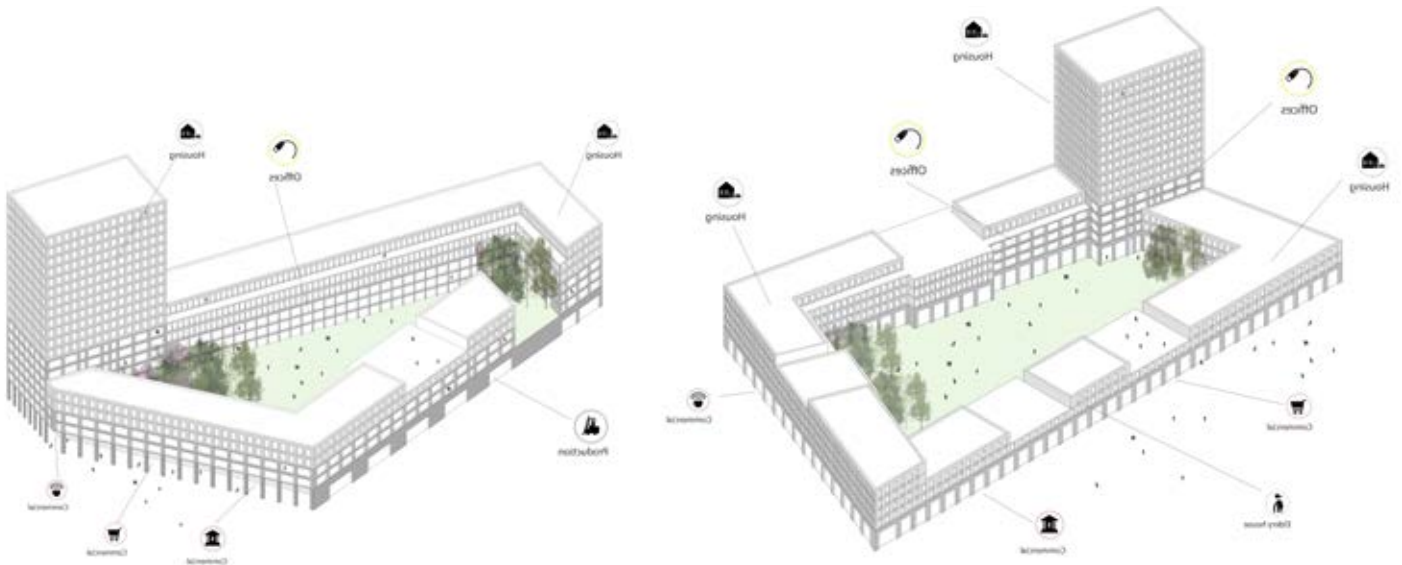
Biomethanation plant



8 VISUAL ENTRANCE DA VINCI



9 TYPOLOGIES DA VINCI NORTH & SOUTH



THE ZINNEKE PLATEAU

TEAM:

SOUMAYA BENADDIA ROBIN MESSENS JONAS RENTS JULIE SEGAL WANNES SOETE



ob

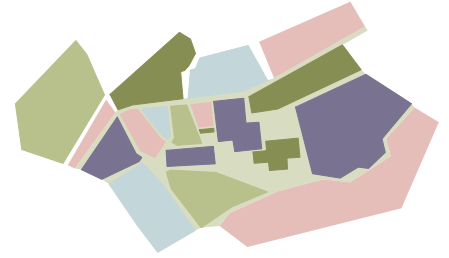
HETEROGENEOUS



Lack of permeability
in the area



BUT LINKED



LACK OF INFRASTRUCTURE



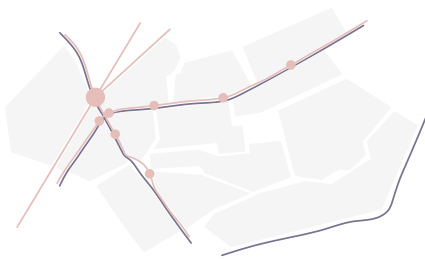

5 000 new people
in 2030



NEW INFRASTRUCTURE



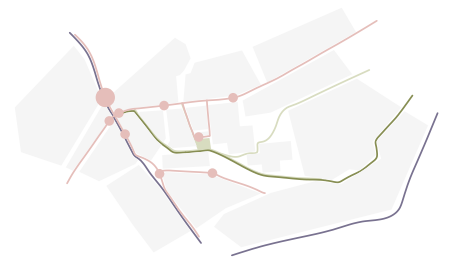
CAR ORIENTED



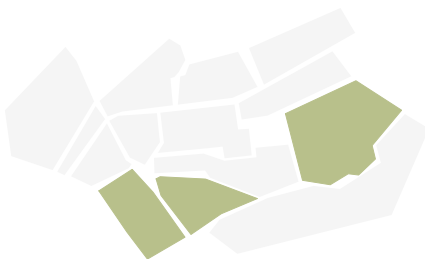
2 500 cars/h
on Leopold III




PEOPLE ORIENTED



ACCESSIBLE GREEN




45% of 2 472 000 m²
green is public



GREEN CONTINUITY





During the analysis of the site and its environment there were several things that stood out for us. We clustered them around four different themes: heterogeneity, lack of social infrastructure, mobility and green continuity.

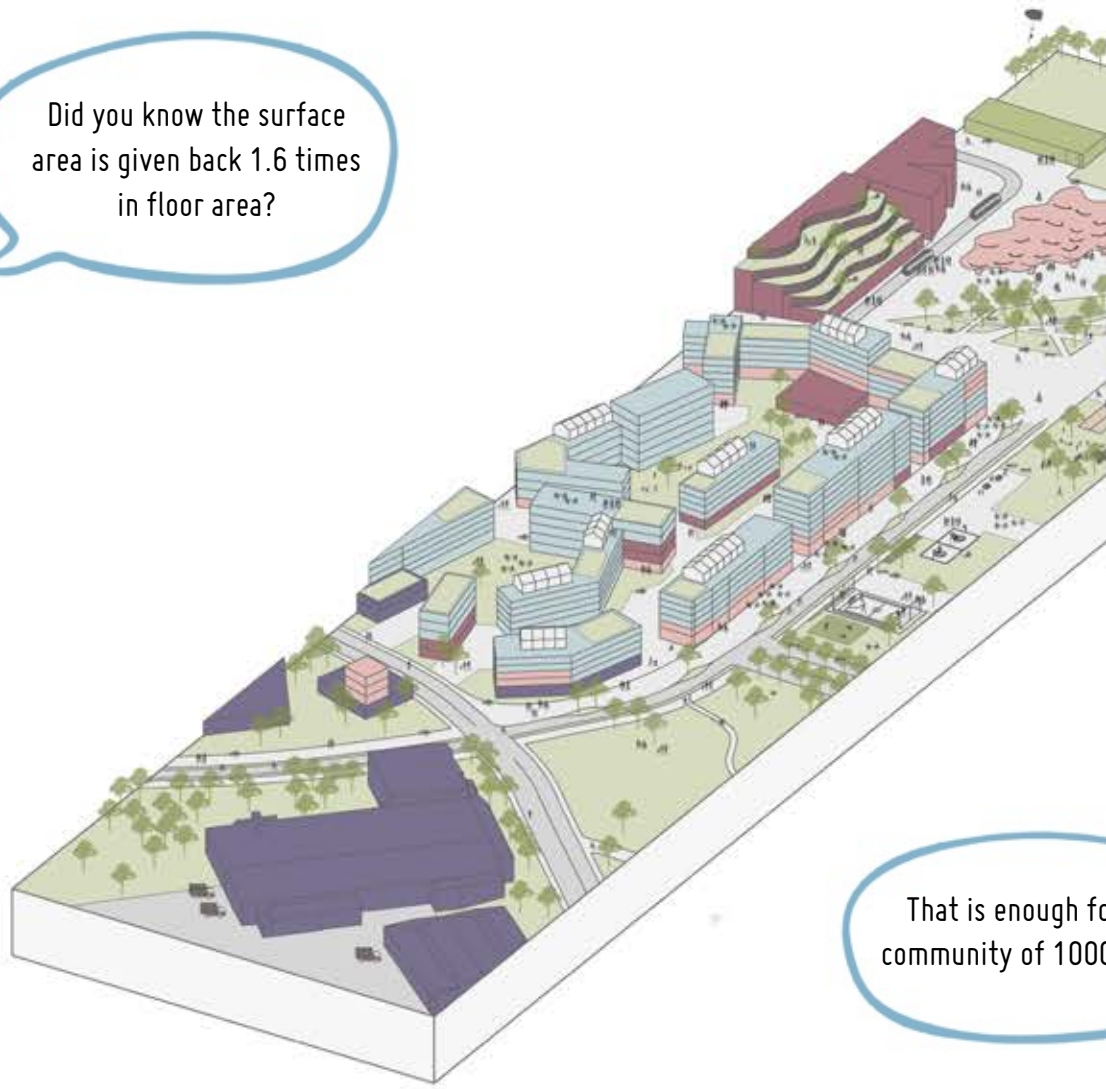
In the neighborhood there are a lot of different islands that are very mono-functional. There is the site of the NATO, the DaVinci quarter, the social housing neighborhood of Evere... a lot of functions that aren't linked to each other at all. This results in a very heterogeneous patchwork that looks like a zoning plan from the early modernists. It influences the social cohesion a lot. If there are any social functions, they are based in Evere but even in Evere there is a lack of certain functions. The part of Evere closest to the site consist of a social housing neighborhood. The people who live here are located in the lowest social classes of society, but we saw that there are no facilities that help them to increase their social status. In order for these facilities to be effective they need to be accessible which led to our third theme. In the current situation the whole area is car oriented. The Brussels capital region is aware of this and is constructing a new transport hub at Bordet, which will be ready in 2030. This isn't enough in our opinion since Bordet is still 750 meters away from the site. We propose to make the public transport penetrate the

site and connect to a network of bike paths and pedestrian roads. In this way we assure that the site and its social function are accessible. Our fourth main point of attention is the green continuity. The area has a lot of green to offer, but only 45% of all this green is currently open for access to the public. We want to increase this amount of accessible green, in that way we not only make it more pleasant for the local community but it can also become a green lung in Brussels. Throughout the development of our masterplan these themes remained the cornerstones on which we emphasized. We synthesized all of this in our proposal of a new kind of urbanity called: The Zinneke Plateau.

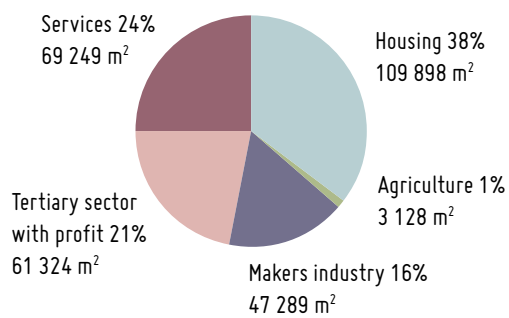
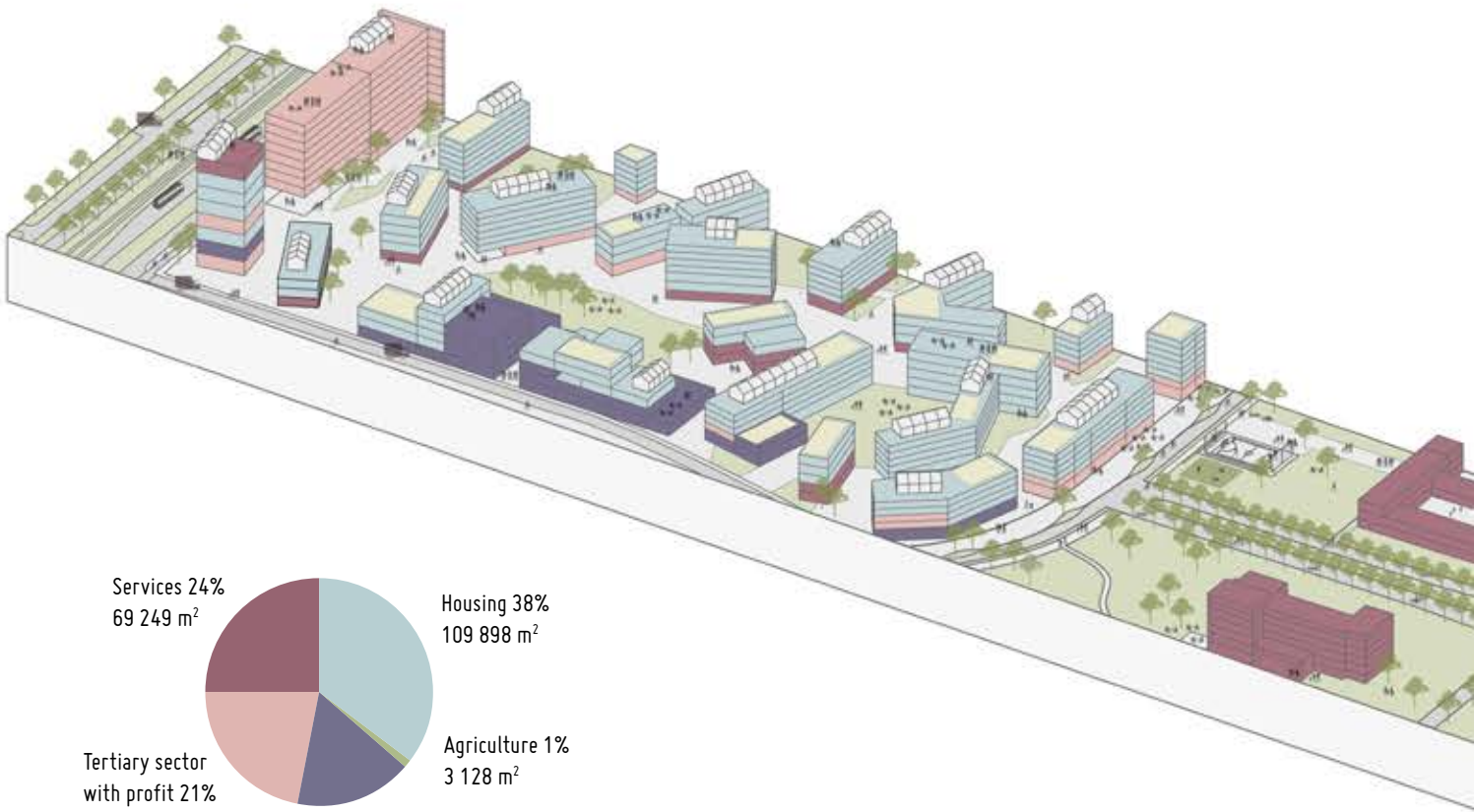


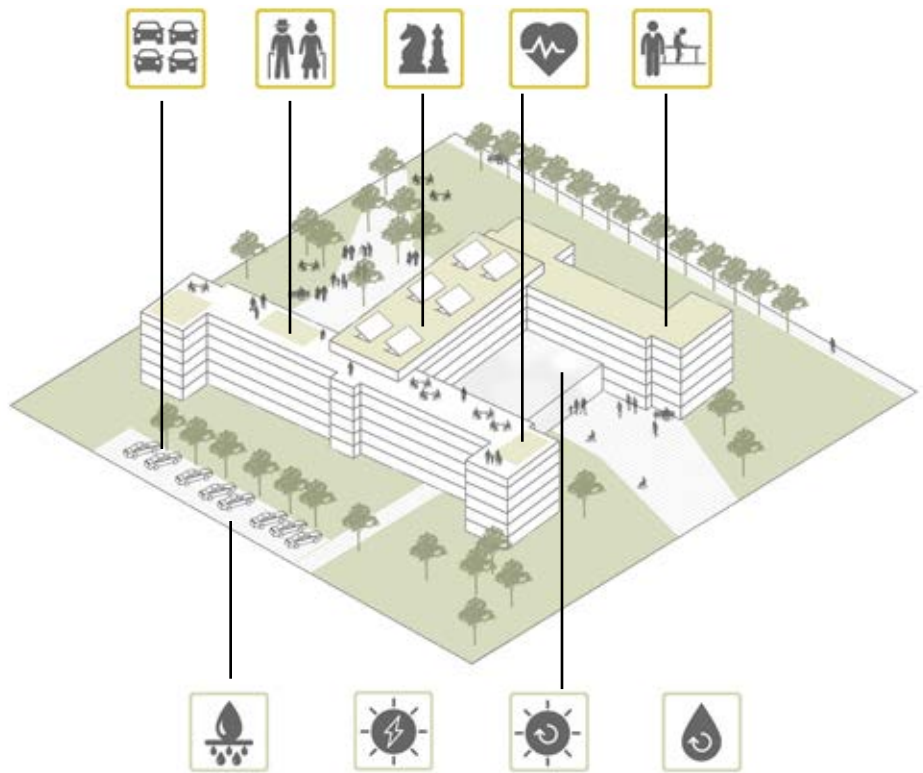
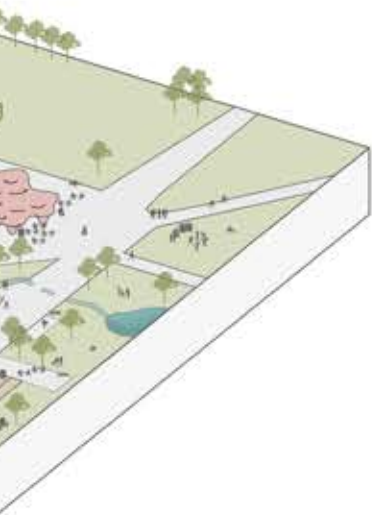


Did you know the surface area is given back 1.6 times in floor area?

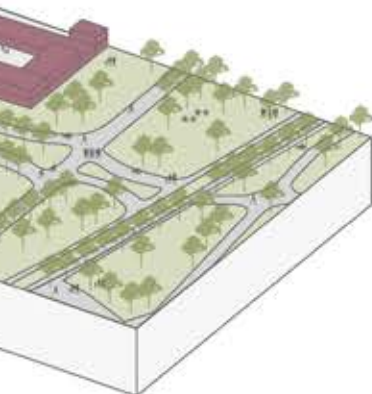


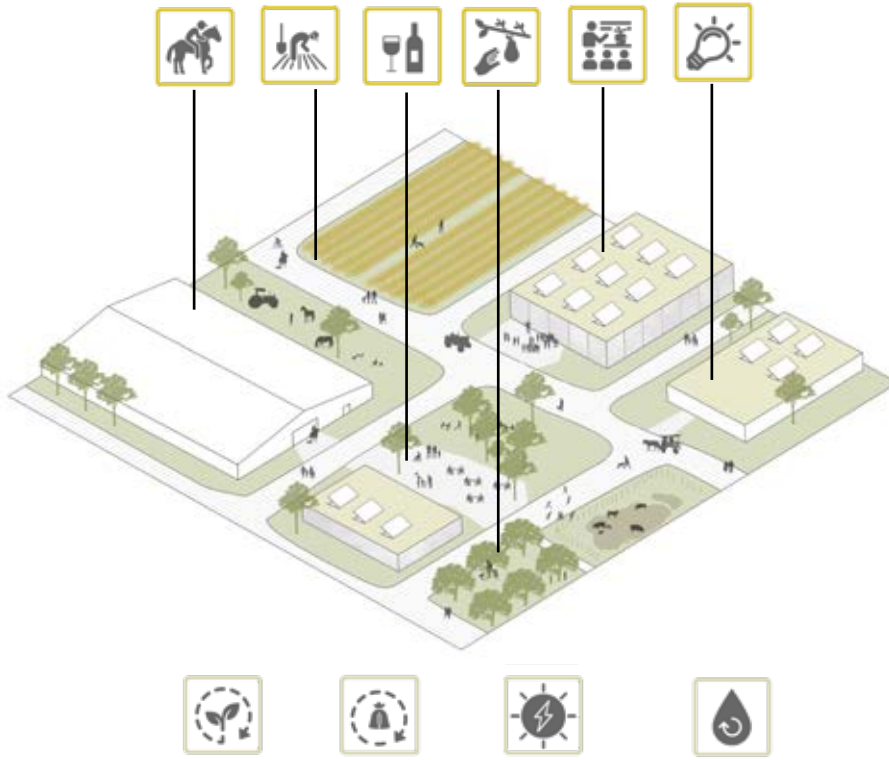
That is enough for a community of 1000





for a new
families!

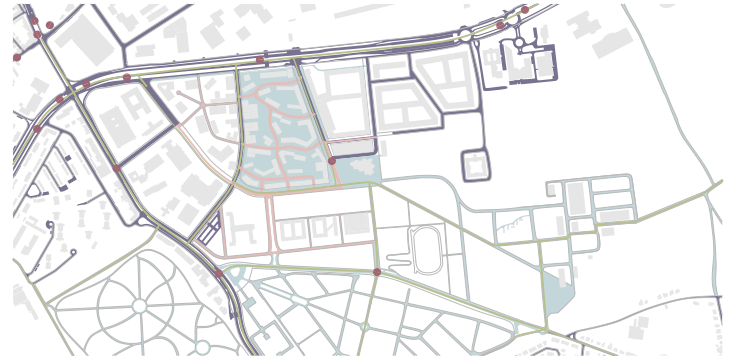




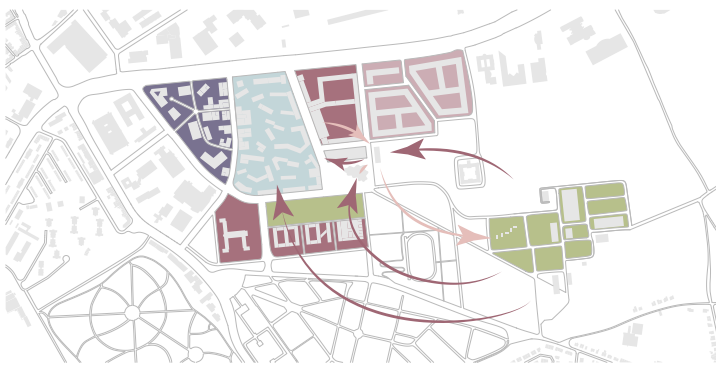
RELEVANT TRACES



CONNECTIVITY



LOCAL SYNERGIES



SUSTAINABLE URBAN DESIGN STUDIO, MA-1
BRUFACE - ULB + VUB - 2018/2019