

International Student Competition

Exploring Tartu Emajõgi and its watercourses

Winning teams and finalists

Working Period: October 2023 - January 2024
https://forum.ln-institute.org/international-student-competition-2023-2024

Weaving with Water

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FIRST PRIZE

Drawing inspiration from Estonian folk textile traditions, we view blue-green infrastructure as the warp and weft of Tartu's urban fabric. Just as stories unfold in the regional weaving traditions in Estonia, water weaves the context for a new regenerative narrative with the landscape. A network of urban streams and bicycle and pedestrian pathways serve as a loom for abundant life, clean water, and diverse cultural and economic functions.

In our focus area, we offer a solution for how development in housing and business can integrate ecological value into the urban fabric and provide a legible transition from the city to the rural landscape, releasing pressure on valuable habitats. We support and expand Tartu's current planning and sustainability initiatives as part of an integrated blue-green system designed to maximize the benefit of Tartu's investments in the city and increase equitable distribution.

Where land meets water has a timeless attraction for social life and biodiversity. By designing a new orientation to water, Tartu provides new amenities to its people, supports social and intergenerational cohesion, and enhances urban life both now and in a climate-adaptive future. Our model exemplifies a scheme for other periurban areas in an interconnected green belt. Weaving with Water will be considered a success when an abundant context for ecological and public health and well-being is established. Within this network, each local participatory initiative will ensure that the people of Tartu can steward their landscape and waterscapes as they develop, and weave their own stories into the city.

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WEAVING WITH WATER

ANALYSIS

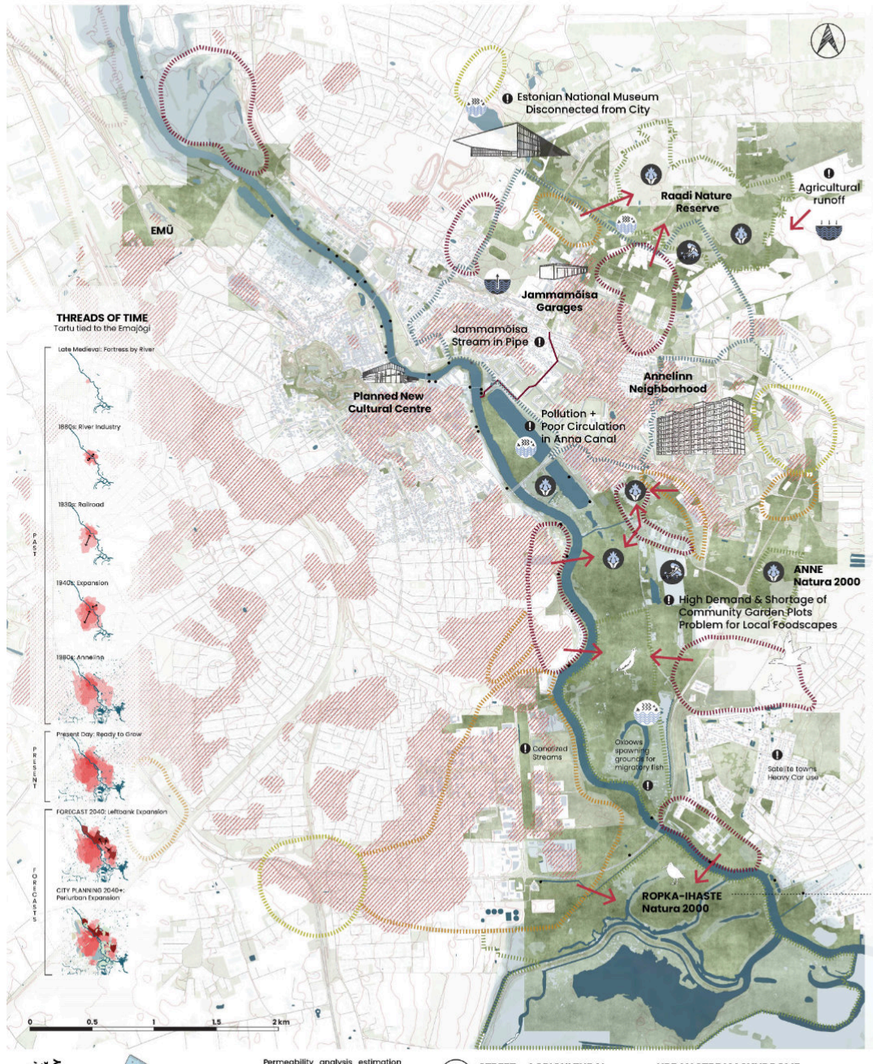
Drawing inspiration from the traditions of Estonian folk textiles, we view the blue-green infrastructure as the weft and warp of the urban fabric of Tartu. Just as stories unfold in the many regional fabric traditions, water weaves the context for a new sustainable narrative with the landscape. Community, culture, business, nature, foodscapes, and history are interwoven to create the context for equitable ecological and social health.

In the coming 50 years, Tartu is planning development and housing in the periubran areas of the city to meet future needs of its population, driven by rising opportunities in Tartu's academic institutions and IT innovation. However, these areas put pressure on the valuable ecological areas that neighbor and overlap with planned development sites. We offer a solution that meets the demands for development while practices water-sensitive design.

DEVELOPMENT PLANNED IN ECOLOGICALLY SENSITIVE AREAS

NEED FOR WATER SENSITIVE URBAN FABRIC







FORECASTED RISKS

FLOODING

HQ 10, 50 and 100.

URBAN HEAT ISLANDS

Risk areas for Urban Heat Islands are based off 2014 and 2019 recordings of extreme temperature days. By 2075, the effect of urban heat will be exacerbated, posing a risk to public health.

Urban Heat Island risk areas match with past urban morphology, highlighting a need for a new scheme of development.

FRAGMENTED NATURAL LANDSCAPE FABRIC

Histories of urbanisation, military use, and agriculture have isolated ecological areas with valuable species and fragmented waterways. Connection is stifled between rural and urban waterways, leaving little room for migration of species and lack of social benefit from local waterscapes.

DISTRIBUTION OF PUBLIC GREEN SPACE

Public urban green space per habitant per neighborhood in Tartu.



URBAN NATURE + BIODIVERSITY

- 22 Protected Birds
- 4 Protected Fish
- 2 Protected Invertebrates
- 1 Protected Mammal
- 1 Protected Plant

SEALED SURFACES, PIPED WATERWAYS & LOW PERMEABILITY



Permeability analysis estimation based on land cover for Paju-Jaama-Kalda Tee stormwater catchment area

least permeable — most permeable: 3.7

Score to estimate average permeability based on GIS analysis of relative permeability of land cover typologies in relation to percentage of land cover type in the stormwater catchment area.

STREET + AGRICULTURAL RUNOFF IN THE EMAJÕGI

Low permeability in the urban fabric leads to runoff of pollution and sediments in the Emajõgi, decreasing the water quality, threatening aquatic life, and limiting the benefit of the river amenity.



URBAN STREAM SYNDROME
As seen in Jammamõisa Stream

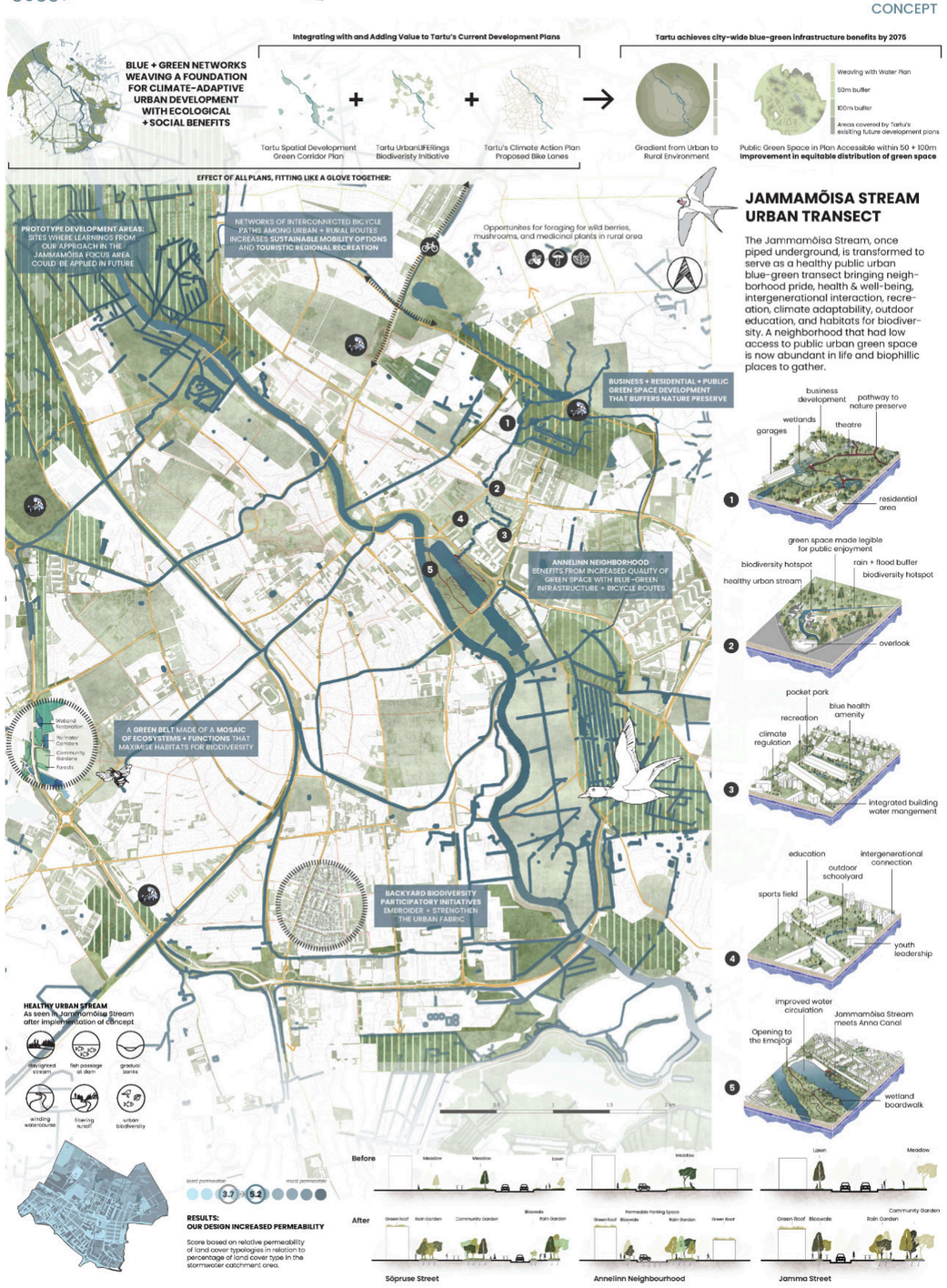


JAMMAMÕISA STREAM:
AT THE CENTER OF DEVELOPMENT
HIGH POPULATION DENSITY
NATURAL AREAS AT RISK

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WEAVING WITH WATER

CONCEPT



JAMMAMÕISA STREAM URBAN TRANSECT

The Jammamõisa Stream, once piped underground, is transformed to serve as a healthy public urban blue-green transect bringing neighborhood pride, health & well-being, intergenerational interaction, recreation, climate adaptability, outdoor education, and habitats for biodiversity. A neighborhood that had low access to public urban green space is now abundant in life and biophillic places to gather.

HEALTHY URBAN STREAM
As seen in Jammamõisa Stream after implementation of concept

least permeable — most permeable: 3.7 → 5.2

RESULTS:
OUR DESIGN INCREASED PERMEABILITY

Score based on relative permeability of land cover typologies in relation to percentage of land cover type in the stormwater catchment area.

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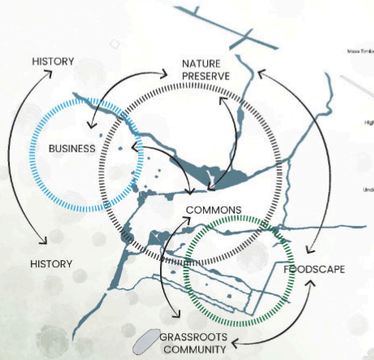
WEAVING WITH WATER

FOCUS AREA

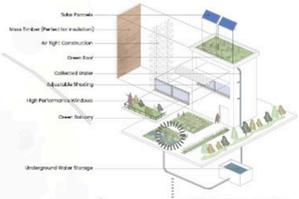
CONCEPT DIAGRAMS









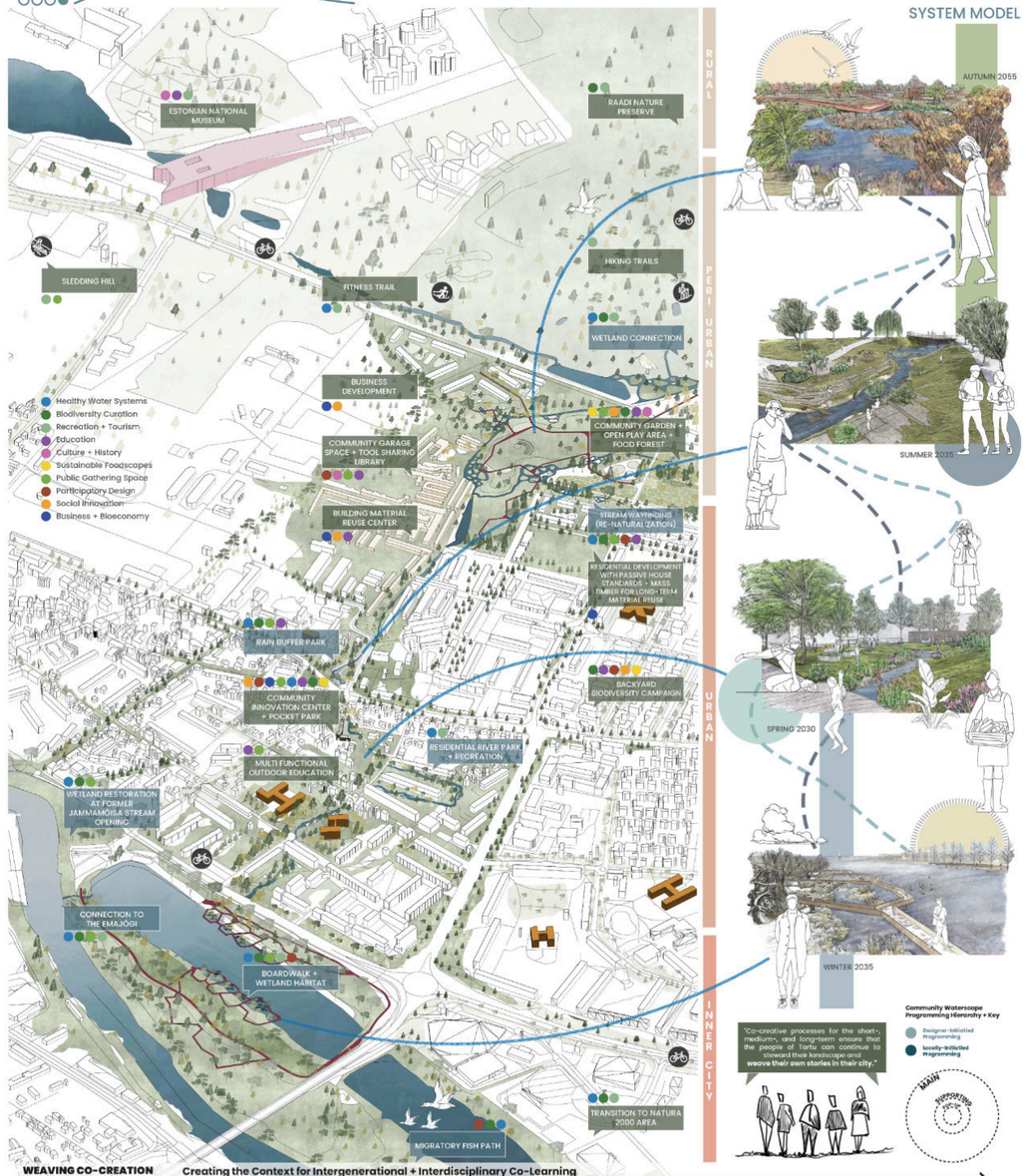


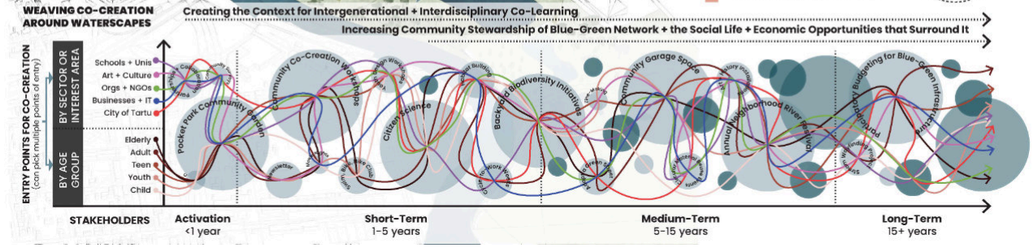


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WEAVING WITH WATER

SYSTEM MODEL





PermaTartu

Yanis Becquart, Steffen Both,
Ryutaro Hanzawa

Sapienza University in Rome

SECOND PRIZE

The Emajogi river is the main feature of the urban landscape and life in tartu, both today and in the past. In order to secure the future of Tartu as a climate-resilient city, it was first important to understand the main threats and potentials of Tartu's urban history and development

With increasing precipitation events during ongoing urbanization, it is vital to ensure a permeable urban landscape and society.

Our project therefore investigates the watercourse of the Emajogi river and the city as a whole with a particular focus on the aspects of permeability and accessibility Focusing on the area around the Anne Canal, we as a group have identified three areas that offer particular challenges and opportunities.

The unused green space by the Emajogi river is to be renatured to serve as a wetland and attract a greater diversity of species. Nevertheless, the population of Tartu should be encouraged to visit the area for recreational purposes by means of a sensitively designed route. Clear rules are intended to make coexistence work and demonstrate the great value of nature in the city.

Since there are hardly any places to stop and linger in the chosen area, the usability of the green space between the river and the canal is to be increased by means of low-key offerings, pathways, footbridges and benches, without increasing the amount of sealed surfaces.

The unused industrial site on the Emajogi river is to undergo the greatest transformation. Due to the location of the site directly on the riverbank, this area offers enormous potential. The building is to be repurposed as a community lab for permaculture with a participatory educational approach. In addition, the aspect of meeting and sharing is a priority, in a urban area where the possibility of cultivating regional plants together is given.

In addition, space for various cultural events will be offered in the heart of the capitol of culture.

This concept is intended to function in cooperation with the university of Tartu, schools, the city and its population and to be coordinated in a participatory process.

PermaTARTU 214

An analysis of the city development, the economical factors and the Emajõgi river as driving force of Tartu led us to the question of the permeability in Tartu.
The project focuses on the effects of future flooding on the emajõgi river and surface permeability in the urban area of Tartu.This site analysis aims to identify the strengths and weaknesses, as well as the opportunities and threats of the emajõgi river and the city land use.
The aim is thereby to develop concrete proposals for land conversion and the integration of urban wetlands in particularly endangered areas.

Flood risks and water level occurence (last 150 years)
Precipitation occurence (since 1980)

Exceedance probability curve (next 250 years)

IMPACT

Annual average of affected GDP

Social and urban impact of flooding

Porijõgi river

Jaamamõisa stream

Bank typology and level of permeability
Natural bank
Man-made
Vertical concrete bank

Ihast Ditch

Tahtvere stream

Tartu's surface typologies
EVAPOTRANSPIRATION 40%
Green and nature areas
Housing areas
Industrial areas
10%
25%
DEEP INFILTRATION 18%
35%
25%
RUN OFF 55%
30%
5%

1:10 000

PermaTARTU 214

Embracing state-of-the-art ecological design, we propose an urban landscape that seamlessly coexists with nature, prioritizing green infrastructure, biodiversity, and climate resilience. With a focus on achieving high permeability and accessibility, our aim is to create an environment characterized by permeability, superior urban quality, and a resilient economy. Ecologically, we recognize the importance of wetlands and green spaces, emphasizing the natural integration of blue infrastructure as a vital element for a diverse and resilient ecosystem. By enhancing the accessibility and user-friendliness of blue-green infrastructure, Tartu has the potential to provide an urban setting conducive to interaction and well-being. From an economic standpoint, our vision nurtures local entrepreneurship and resource efficiency, fostering a thriving urban economy while remaining adaptable to future challenges posed by the impacts of climate change.

GOALS
MITIGATE CLIMATE CHANGE IMPACTS
URBAN LIVABILITY AND ECONOMIC RESILIENCE

STRATEGIES
Increasing the permeable surfaces in Tartu
Manage soil, air and water quality
Retaining & increasing biodiversity
Improve the accessibility and walkability of public spaces
Increase usability of natural areas
Promote soft mobility
Decrease estimated financial impact of flooding
Increase renewable energy use and bio-based materials

SOLUTIONS
2023 2030 2050
Usage of permeable and sustainable materials for river banks and urban
Increase area of constructed wetlands
Reuse of abandoned land to natural resorts/wetland
Flooding adaptation with water runoff and storing systems
Sustainable reduction of the river in urban mobility system
Riverfront and riverbanks as social meeting zones
Re-wetlands as recreation areas
Increase enjoyable open spaces
Implementing urban solar and hydrologic energy systems

Tahtvere stream
Jaamamõisa stream
Ihaste ditch
Porijõgi river

BEFORE / AFTER
Wetlands and protected areas
Natural banks
Center Tartu's - Man-made banks
Industrial areas
Vertical concrete banks

WETLANDS
BALANCING ANTHROPIC ACTIVITY WITH NATURAL PROTECTION, USE OF BIO MATERIALS
ACCESSABILITY & USABILITY AS RECREATION AREA FOR WELL BEEING

URBAN AREAS
INCLUSION OF PERMEABLE PAVEMENTS
RUNOFF MANAGEMENT INFRASTRUCTURES
INCREASING SLOW MOBILITY AND SOCIAL ACTIVITY
SOLAR SYSTEM & NATURAL COOLING

INDUSTRIAL AREAS
SOLAR SYSTEM, NATURAL COOLING
INTEGRATION OF URBAN RUNOFF SYSTEM
GREENERY USED TO SEQUESTRATE POLLUTION AND REDUCING URBAN HEAT ISLAND EFFECTS

HIGH PERMEABILITY
MEDIUM PERMEABILITY
LOW PERMEABILITY

EASY PUBLIC ACCESSABILITY
MEDIUM PUBLIC ACCESSIBILITY
HARD PUBLIC ACCESSIBILITY

PermaTARTU 214

As focus area 3 presents the most challenges and potential in terms of our topics and priorities, we are concentrating further on this area.
After specific analysis, we identified hotspots for possible transformations. The aim is to increase permeability on the basis of analyzed circumstances, while also making the space gained for nature and biodiversity usable for people as a recreational area.

Due to the lack of public places for social interaction, these are also to be created in order to create a gathering area from transit.

GOALS
- MITIGATE CLIMATE CHANGE IMPACTS
- ADAPT CLIMATE CHANGE IMPACTS
- URBAN LIVABILITY COMMUNITY AND ECONOMIC RESILIENCE

STRATEGIES
- Increasing the permeable surfaces in Tartu
- Manage soil, air and water quality
- Restoring & managing biodiversity
- Balancing natural protection with recreational activities in natural areas
- Improve the accessibility and walkability of public spaces
- Increase visibility of open public spaces to health and well-being
- Increase soft mobility and Public transportation
- Decrease potential financial impact of flooding by managing runoff
- Increase renewable energy use and Nature-based materials

SOLUTIONS
- Usage of permeable and suitable materials for riverbanks and urban space
- Increase constructed wetlands and restore natural wetlands
- Reuse of abandoned and and brown fields to natural resorts/wetland
- Managing runoff (grey water and rain water)
- Sustainable inclusion of the
- Riverfront and riverbanks as climate proof social meeting zones
- Regulate the use and access to natural areas
- Increase quality and quantity of urban spaces redesigns with bio-based materials
- Implementing urban solar- and hydrosolar energy systems

2024 2030 2

Tartu has been selected as one of the 100 euro cities with the mission to be climate neutral and smart cities by 2030.

Perma Culture

Current Situation - 2024

New Situation - ~2050

Social and local economal activation on the riverfront

Increasing soft mobility

Building and restoring wetlands

ZONE 1
Creating a space of social interaction, comprising secure water access, picnic areas, cyclable and walkable pathways and eco friendly promenade itineraries.

ZONE 2
Turn the desafected factory infrastructures into permaculture school, directly connected to the green spaces by a walkable bridge. A lot of abandoned soils, shared gardens, greenhouses can be put in place to empower communities.

ZONE 3
Construct wetlands while increasing accessibility and usability by preserving biodiversity. The wetlands can be open to public only 3 days a week to avoid a negativ anthropogenic activity.

Emajõgi river
ANNE KANAL

- Bus ways
- Main cycle paths
- Main walkways
- Bike share stations
- Meeting zones
- Residentil area (individual)
- Residentil area (collective)
- Industrial areas
- Areas of potential
- Green areas
- Wetlands
- Possible wetlands
- Water bodies
- Industrial areas
- Underground Jamamoisa stream
- Above ground Jamamoisa stream

1:2 000

PermaTARTU 214

An inclusive space for society will be created on the disused industrial site, where community gardens and workshops will demonstrate the benefits of permaculture. The other side of the river will be made more usable and inviting without harming the environment.

The existing green space to the south of the bridge will be renaturalized to improve the quality of all habitats and also be carefully made accessible to people.
The entire area will be a recreational area for people and nature in the heart of the city.

In order to achieve the goal of collaborative spatial reuse, it is necessary to involve the entire community and the city of Tartu. The aspect of participation and inclusion is decisive here for successful and sustainable space and project development.

New cyclable and walkable pathways
Create opportunities for people to flow and get involved through improved soft mobility.

Reforestation workshops and sensibilization
Create opportunities for people to flow and get involved through improved soft mobility.

Community gardens
Local production for local consumption stimulates the local economy, cares for the environment, and creates community cohesion.

PERMACULTURE COMMUNITY LAB

BY TARTU & TARTU CITIZENS
FOR TARTU & TARTU CITIZENS

INPUTS & RESOURCES
- Material for teaching, learning & practice
- Local Sponsoship and partners
- goverment funds
- Construction to ReUse former industrial area

PARTNERS
- City funding
- University (part of study program)
- Schools
- Community
- Partizipation & inclusion

OUTCOME
- Learning from each other and the nature
- Social gathering and interaction
- Biological products to trade, sale and consume
- Physical and mental well beeing

Space for social gathering and settling down

Inclusive community gardening & fair sharing

permaculture workshops for everyone

Accessible wetland for mental and physical health and well beeing (sinsitive regulated to protect ecosystem)

2 ECO TRAIL AND PROMENADE
PUBLIC BEACH
WALKABLE AND CYCLE PROMENADE
1 PERMACULTURE
2 ANNE KANAL
ECO TRAIL
LOCAL PRODUCTION CANTEEN
PERMA-CULTURE SCHOOL
SHARED GARDENS
GREENHOUSES
3 WETLANDS ACCESSIBLE TO PUBLIC 2 DAYS A WEEK
RENATURED WETLANDS
REFORESTATION WORKSHOPS
BIODIVERSITY SENSIBILIATION

- Wooden pontoons
- Sand areas
- Forest areas
- Green areas
- Wetlands
- Water bodies
- Picnic
- Fitness areas
- Observation spots
- Kayak
- Swimming
- Volleyball
- Tree planting
- Water playground structures
- Cyclable ways

TREE SPECIES OF CHOICE

ALNUS INCANA — POPULUS TREMULA — ACER PLATANOIDES — FRAXINUS EXCELSIOR

potentially natural vegetation suitable for flood areas

1:1500

Live in Harmony

THIRD PRIZE

Eren Caba, Alina Chomaeva, Rojan Kamyab, Ghazaleh Monshizadeh

Sapienza University in Rome

The vibrant student city of Tartu is facing challenges as the Emajõgi river, spanning 10 km through Estonia, has transformed into a hazardous area in Tartu. In response, our project initiative seeks to convert this adversity into an opportunity by implementing environmentally friendly and sustainable strategies. The project envisions diverse businesses synergizing to create livable, entertaining, and safe spaces along the river, with circular economy principles.

The most important risk that Tartu is facing is flood near wetlands, therefore We came into the idea that using Tartu's timber resources to construct new residential areas with timber and high-rise buildings, significantly reducing the carbon footprint. Flood risks are addressed with adaptable stairs and structures, also adding a fun element along the river bank. A botanical garden and education center on the left side contribute to wetland preservation and biodiversity education which all connected through new bicycle lane to give residence unique experience.

Zone 1 includes new local industry, while downstream offers a recreational area for tourists with sports and cultural activities. The project aims to create a nature-oriented environment by strategically implementing green spaces, residential developments, and eco-friendly industries, fostering synergy between residential, recreational, and industrial functions.

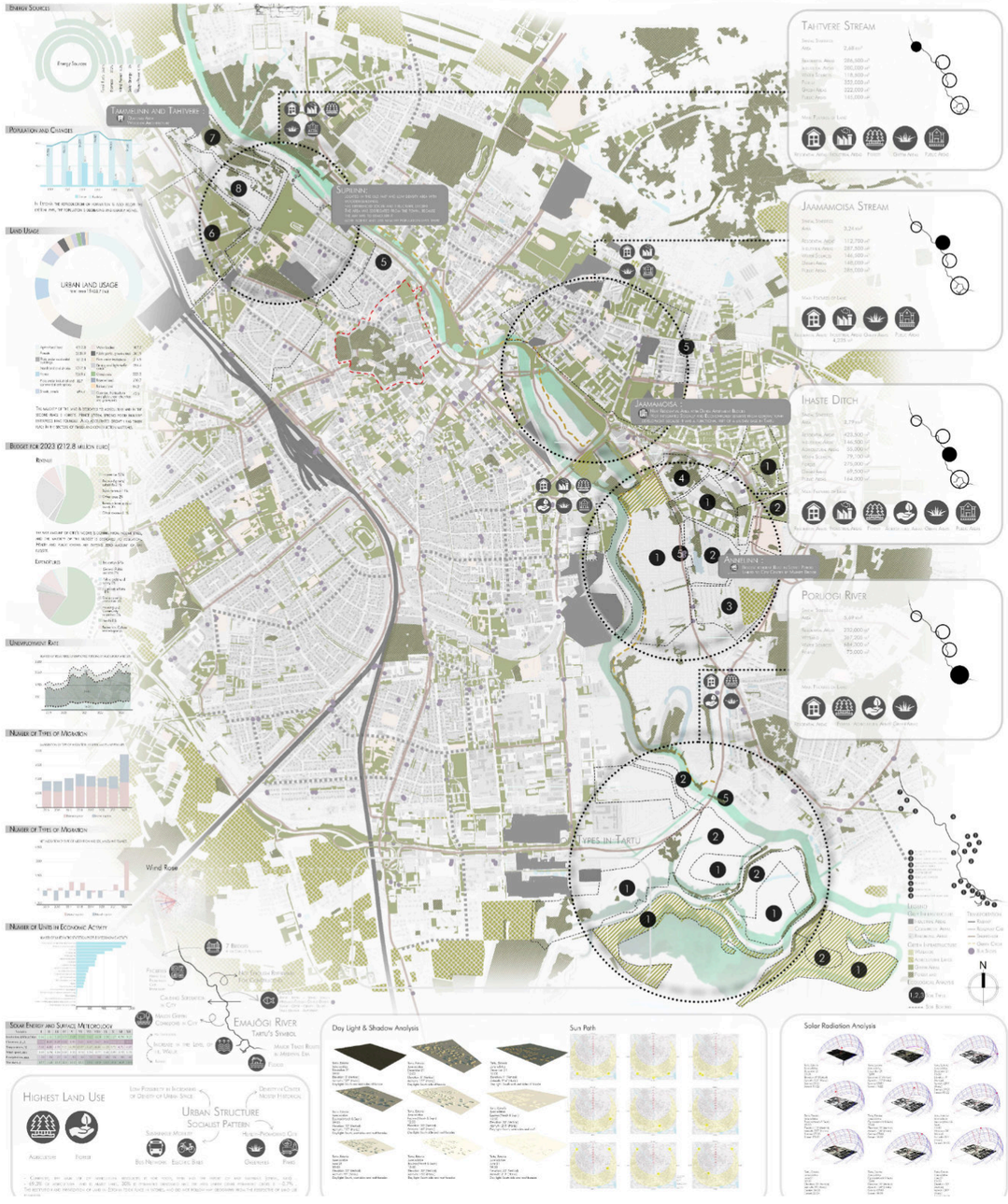
The transformation of the Emajogi river into a secure and enjoyable destination is envisioned to attract diverse individuals, providing memorable experiences and educational opportunities about the local environment.

Ultimately, the project holds the potential to draw people from various backgrounds throughout different days and seasons, enriching their understanding of their living environment and nature.

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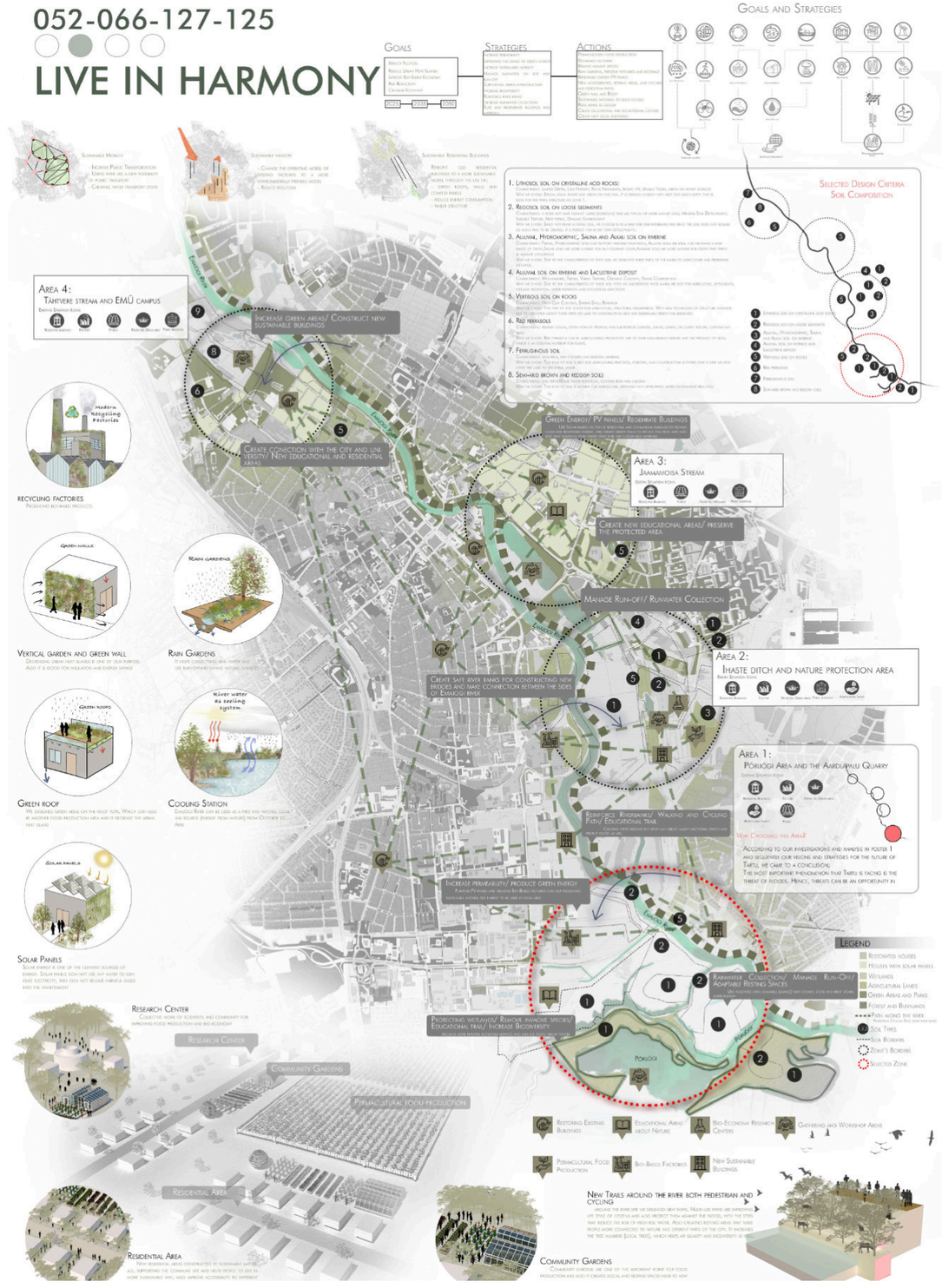
LIVE IN HARMONY





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LIVE IN HARMONY



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LIVE IN HARMONY



Industrial

Use abandoned areas as a place to put new PV panels to produce sustainable energy for Producing clean energy for the zone. Also use the recycling factory to produce wood and fuel from the trees in Tartu or from the left-over of the destroyed buildings. Botanical Garden to plant new endangered or completely local plants and trees, to preserved them and give opportunity to people to enjoy the relationship with nature.

Mobility

Create new path and bus stations to connect the southern part of Tartu to the central part and be more welcoming to the residents with being more accessible to all. New pedestrian and bicycle friendly wooden bridges to connect different sides of the river to each other and create more useable areas for people to utilize. Educational trail is a path, mostly pedestrian and bicycle friendly, which gives the opportunity to users and visitors to take a walk in to nature without destroy it . also to utilize the side parts of the river.

Landscape

Create a safe place at the end of the rivers branches to invite people to nature-base areas to enjoy it all over the year with different experiences. these areas depend on their soil will contain channels to collect water and create a sustainable rainwater system. Wetlands will stand preserved and with the paths created people can pass by them. New recreational areas are dedicated to new activities, mostly fun to invite residents to use theis ceneries and enjoy the river.

Residential

Sustainability: Timber is a renewable resource, and using it in construction helps reduce the carbon footprint of buildings. Timber production requires less energy compared to traditional construction materials like steel or concrete, making it an environmentally friendly option.

Energy Efficiency: Timber has excellent thermal insulation properties, which can contribute to energy efficiency in buildings. Timber apartments can provide better insulation, helping to maintain comfortable temperatures and reduce the need for extensive heating or cooling systems.

Carbon Sequestration: Trees absorb carbon dioxide during their growth, and using timber in construction helps sequester carbon. This makes timber buildings a potential carbon-neutral or even carbon-negative option when managed sustainably.

Recyclability: Timber can be recycled or repurposed at the end of a building's life cycle. This promotes a circular economy and minimizes waste.

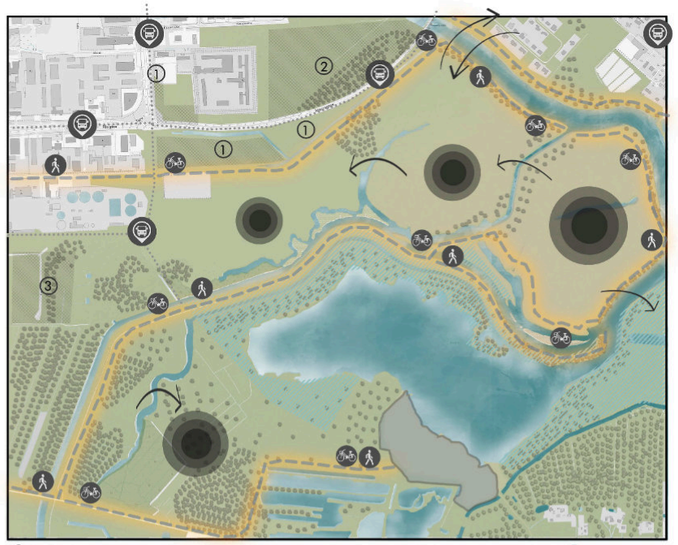


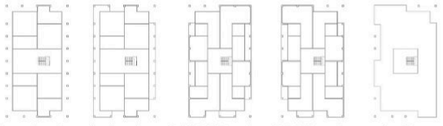
Timber Social Housing

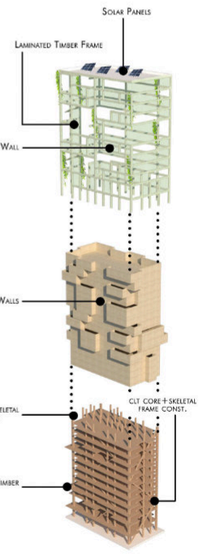
Ground floor and first floor are the social areas for commercial places. 44 apartments and 16 common areas is located in each social house and there are 9 apartment in the site which is surrounding with environmental design.

Each apartment has unique design and each apartment has sustainable materials. all the flates has 16 x2 balcony and the apartment surrounding with terrace for creating grear circulation and creating great social areas.

All terraces has full of plants for food production and plants are using river water.





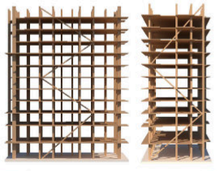


Designing and constructing high-rise buildings with a focus on low carbon emissions involves integrating sustainable practices and technologies throughout the building's lifecycle

CLT Core:
Cross-Laminated Timber (CLT): Engineered wood made by stacking and bonding layers of wood for strength and versatility.
Core: Central part of the building constructed using CLT panels, providing stability and support.

Skeletal Frame:
Skeletal Structure: Construction framework of columns and beams supporting the building's load.
CLT Skeletal Frame: Construction method where both the core and exterior structure, including columns and beams, are made from CLT.

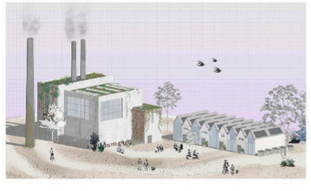
Sustainability: CLT is a renewable and sustainable material, contributing to environmentally friendly construction.
Strength and Stability: CLT provides excellent strength and stability, making it suitable for high-rise buildings.
Speed of Construction: CLT construction can be faster than traditional methods, as the prefabricated panels are assembled on-site.



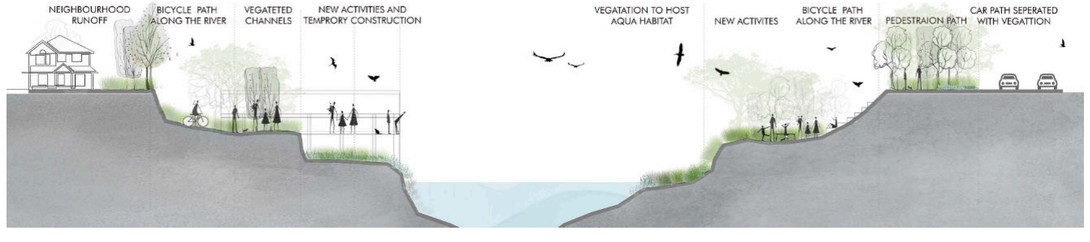
Bioenergy: This sector focuses on producing energy from biological resources, such as biomass. Bioenergy sources include biofuels (like biodiesel and bioethanol), biogas, and solid biomass for heating and power generation.

Biorefineries: Biorefineries are facilities that integrate various biomass conversion processes to produce a range of bio-based products. These products may include biofuels, biochemicals, and biomaterials. Biorefineries play a critical role in extracting maximum value from renewable resources.

Bio Industry







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LIVE IN HARMONY

TO UNDERSTAND SUSTAINABLE URBAN DEVELOPMENT IN TARTU BY IMPLEMENTING APPROACHES, BIOECONOMY, INNOVATIVE DESIGN AND COMMUNITY ENGAGEMENT AND ENHANCING RESIDENCE KNOWLEDGE

A COLLABORATIVE TALE OF CONSERVATION



FUNDING NAVIGATOR

MARINA MILLER

GRANT AND FUNDRAISING MANAGER

SHE IDENTIFIES FUNDING OPPORTUNITIES, WRITES GRANT PROPOSALS, AND BUILDS PARTNERSHIPS WITH ORGANIZATIONS AND DONORS WHO SHARE A COMMITMENT TO ENVIRONMENTAL SUSTAINABILITY.



COMMUNITY CATALYST

ERIK ROOS

COMMUNITY ENGAGEMENT COORDINATOR

HE IS A LOCAL RESIDENT AND COMMUNITY ENGAGEMENT EXPERT, PASSIONATE ABOUT INVOLVING THE COMMUNITY IN ENVIRONMENTAL INITIATIVES. HIS ROLE IS TO BRIDGE THE GAP BETWEEN THE PROJECT AND THE RESIDENTS OF TARTU. ANU ORGANIZES WORKSHOPS, TOWN HALL MEETINGS, AND PROGRAMS TO ENSURE THAT THE COMMUNITY IS INFORMED, INVOLVED, AND SUPPORTIVE OF THE WETLAND CONSERVATION EFFORTS.

EDUCATION

REUSING MATERIALS

COMMUNITY ENGAGEMENT

URBAN DESIGN STANDARDS

SUSTAINABILITY PRINCIPLES

KEY PARTNERS

KEY PROCESSES

KEY RESOURCES

KEY PRODUCTS

CREATING AN ENVIRONMENTALLY SUSTAINABLE NEIGHBORHOOD THAT NOT ONLY REDUCE THE FLOOD RISCK , PROMOTE BIODIVERSITY AND REDUCE CARBON FOORPRINT AND ENHANCE ECONOMIC GROWTH

ENTREPRENEURS

INDUSTRY PARTNERS

LOCAL GOVERNMNET

SUPPLIERS

LAND OWNERS

TIMBER

EDUCATIONAL LABRATORY

CITIZENS

UNEMPLOYED

STUDENTS

TOURIST

LOCAL INDUSTRIES

RESIDENCE

UNIVERSITIES

DIGITAL PLATFROMS

LOCAL MEDIA

SEASONAL EVENTS

TARTU ECO HUB PROJECT ENVISIONS A HOLISTIC APPROACH TO URBAN DEVELOPMENT, FOCUSING ON FLOOD PREVENTION, COMMUNITY WELL-BEING, RECYCLING, INCREASED PROPERTY VALUES, EDUCATIONAL EMPOWERMENT, AND BIODIVERSITY ENHANCEMENT TO CREATE A SUSTAINABLE AND RESILIENT LIVING ENVIRONMENT FOR THE RESIDENTS OF TARTU

TIMBER SALING

ECO-FRIENDLY RESIDENTIAL HOUSING

TOURIST ATTRACTION



ECOLOGIST EXPLORER

MARKO TOOMAS

LEAD ECOLOGIST

HE BRINGS A WEALTH OF KNOWLEDGE AND EXPERIENCE TO THE PROJECT. HER ROLE INVOLVES CONDUCTING ECOLOGICAL ASSESSMENTS, ANALYZING BIODIVERSITY, AND RECOMMENDING SUSTAINABLE PRACTICES TO PRESERVE TARTU'S WETLANDS.



URBAN PLANNER

SOFIA LAANE

MUNICIPAL PLANNING COORDINATOR

SHE WORKS CLOSELY WITH THE MUNICIPALITY TO ENSURE THAT ANY CONSTRUCTION ACTIVITIES ARE CARRIED OUT IN AN ENVIRONMENTALLY RESPONSIBLE AND SUSTAINABLE MANNER.
SHE FACILITATES COMMUNICATION BETWEEN THE PROJECT TEAM AND THE LOCAL GOVERNMENT.



Symbiotic Tartu

Ruba Khaled Al-Hamzi, Asfia Islam, Shamim Rokhsari, Diana Salazar

Nürtingen-Geislingen University and
Weihenstephan-Triesdorf University of Applied Sciences, Germany

HONORABLE MENTION

Tartu is a continously growing city in Estonia, with the Emajõgi river flowing right through the center of it. As it transformed it lost certain important natural landscape features; neglecting or burying the water streams, expanding on wetlands, loss of biodiversity and more which we explored further in the project by digging deeper and creating our base and overlaying the swot maps which leads the way to the concept, vision and mission.

Concept: Footsteps Towards The Future

Our strategic approach employs the Green-Blue Footsteps concept, strategically addressing a city's strengths, weaknesses, opportunities, and threats. Applying a methodical acupuncture-like transect along rivers and streams, we categorize footstep interventions into research, educational, public interest, and climate adaptation. Each focuses on specific city sections, fostering a greener fabric and water course management. Through three phased implementations over 30 to 50 years, we aim for sustainable urban development, mitigating challenges and enhancing resilience for a vibrant and eco-friendly tomorrow.

Focus Area

Knowing the pros and cons and the areas of opportunities that Ihaste Dich offers, such as its residential and commercial areas, its interaction with the forest, areas of protection and connection with the main river Emajogi and with our vision for the future we were able to choose Ihaste Dich for awareness, reconnection and activation of its population.

Our proposal is divided into four zones, each zone has different interventions following the green-blue footsteps typology

Zone 1.- Riverfront Activation: Floating Gardens

Zone 2.-Educational: Floating Library, Botanical garden, Adm.research center, Retention point & Tree house (bird observatory)

Zone 3.- Semi-Urban park: Biomarkers & pocket parks & Community eco-park.

Zone 4.- Natural Retreat: Leisure corner for the elderly people, extension of tartu Oak tree park and protection of the flower Shining.

All these areas are connected by bicycle & pedestrian roads and these interventions are designed for different station changes in Tartu.

Transformation and Implementation

To transform Tartu into Symbiotic Tartu, we provide each zone with a footstep, monitored by administration. Locals earn points for eco-friendly services, redeemable for benefits like farmers market space or farming school priority. 3 Phases include community-engaged growth, riverbank naturalization, and by third phase, creating wildlife sanctuaries and integrating gardening into children's education will be achieved.

SWOT ANALYSIS

STERNGHT
new city center
museum
protected area
garages
city center
Anna Kannal
park
protected area

WEAKNESS
Underground stream
Groundwater reduction
Anna Kannal
Railway

OPPORTUNITY
Forest
city center
community garden
residential
protected area
wet land

THREATS
residential
industry
flood zone
city boundary
abandoned Anna Kannal
flood zone
industry
residential

Tartu is a continously growing city in Estonia, with the Emajõgi river flowing right through the center of it. Tartu has transformed drastically in recent centuries losing certain important features; neglecting or burying the water streams, amongst other loses, which we will explore further in the project

LOCATION
ESTONIA
TARTU

CITY GROWTH
After exploring SWOT map we came to a conclusion that Tartu has great potential to be the city of the future by combining the strengths, opportunities and landscape value
Together we can eliminate the threats and work on the weaknesses over time

FUTURE DEVELOPMENT
Highway
New commercial
Developing the green network
New residential

LANDSCAPE VALUE MAP
High blue
Low blue
High green
Low green

1/10000

TYPOLOGIES
A — Impermeable parking space — Inaccessible Forest
B — Concrete river bank — Impermeable parking space — Inaccessible Forest
C — Impermeable parking — Inaccessible River front — Inactive public space
D — Unused public space — Polluted still water
E — Mistreated River front — Inactive protected area

2024

After realizing the importance of the river and the streams that once were, we decided to take the methodological approach of acupunctures along a transect. The acupuncture being out Green/Blue Footsteps and the transect being the Emajõgi River .and the streams

1 RESEARCH-EDUCATIONAL FOOTSTEPS
2 PUBLIC INTERES FOOTSTE
3 CLIMATE ADAPTATION ACTIVITIES FOOTSTEPS

As the name may hint c green footstep is working towards the green fabric o the area and the blue footstep is related to the ,waterscapes in context
Our vision of footsteps comes into three types research educational basec green/blue footsteps, Public interest based green/blue footsteps and climate adaptation activities basec green/blue footsteps

WOT ANALYSIS
REEN FOOTSTEPS
LUE FOOTSTEPS
rd PHASE 2nd and lue Green Footsteps

With the help of our analysis we were able to decide for each context what kind of footsetp intervention is needed, and then phases that the city can 3 have work on over the next thirty fifty years

PHASE 1
PHASE 2
PHASE 3

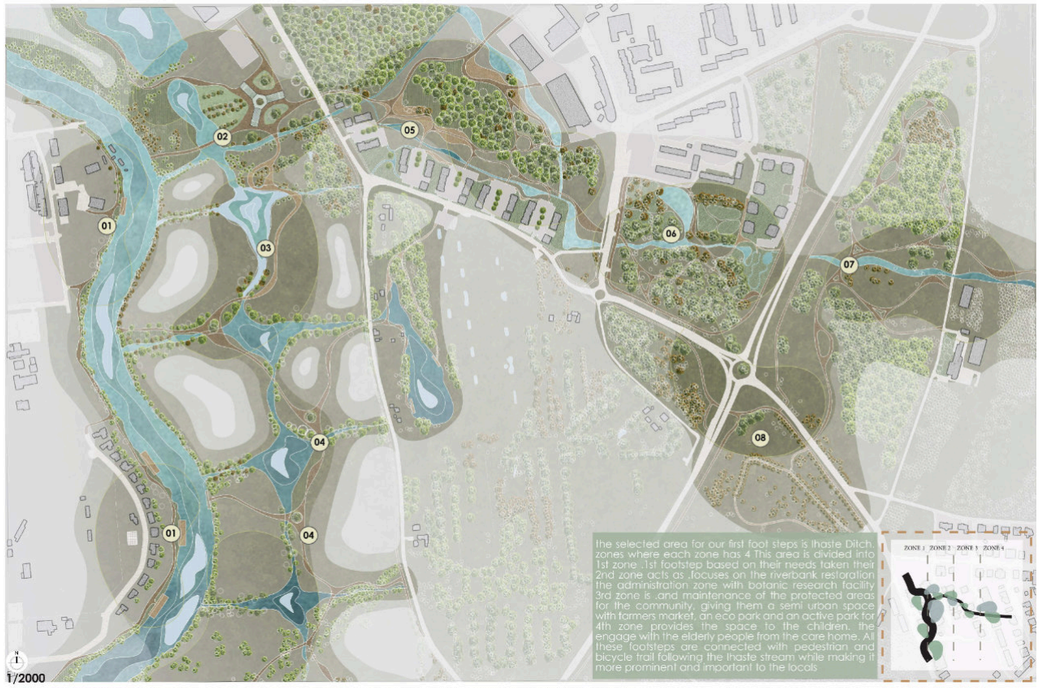
Old City
Residential
Military
Commercial
Govermental
Parking
Beach
Agriculture
Grassland
Forest/Shrubland
Green areas
Recreational

1/1000

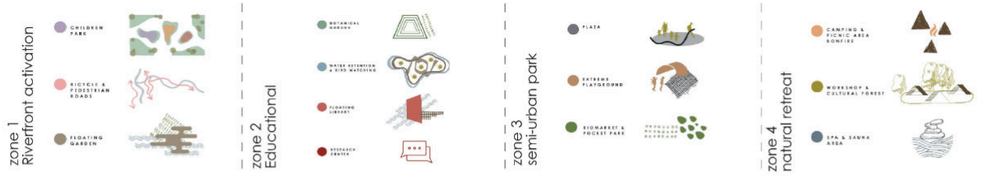
YPOLOGIES
A — Permeable parking — Accessible Forest
B — Accessible river bank — Retention point in flood zone — Green Roof
C — Permeable parking — Green treatment for river bank — Pocket garden
D — Green Roof — Accessible river bank — Activated protected area — Purification of still water
E — Naturalisation of river front — Retention point in flood zone — street bioswale

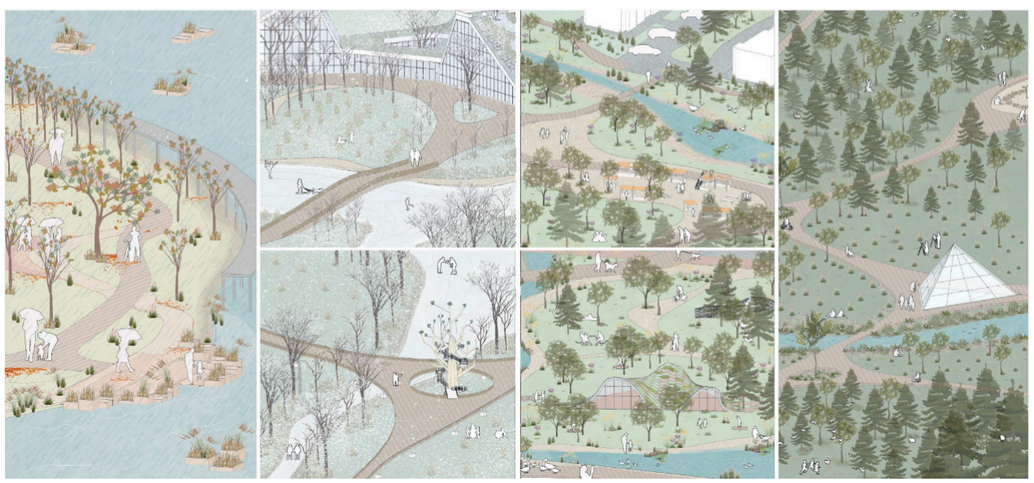
116 SYMBIOTIC TARTU

GREEN / BLUE FOOTSTEPS
Ihaste Ditch : Let's Take The First Steps Toghether



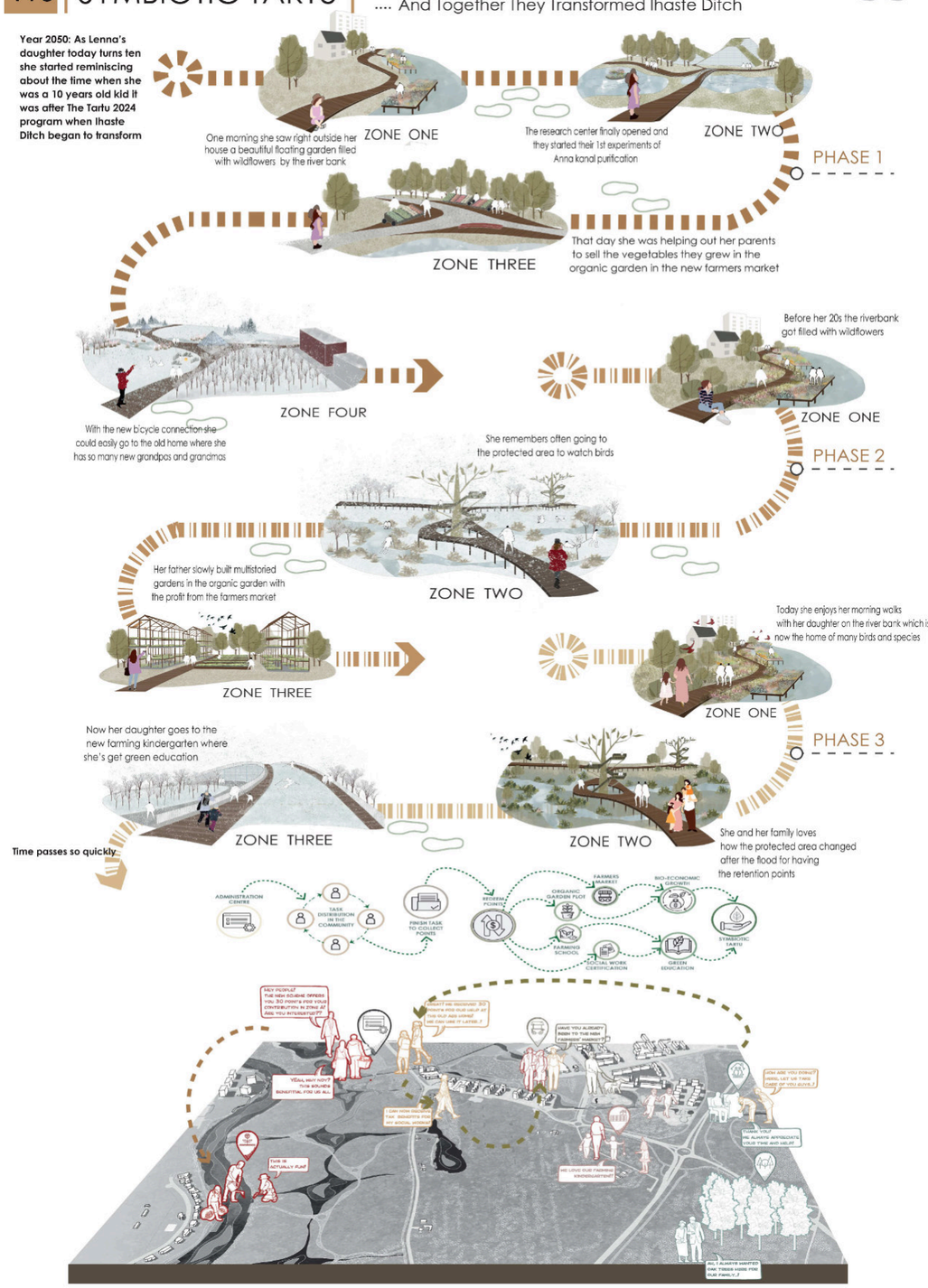
01 Floating Garden 02 Administration and Botanical research center 03 Retention point 04 tree house (observatory) 05 Farmers market with bike lane connection 06 Community Eco park 07 Leisure corner for the elderly 08 Extension of Tartu Oak Tree park





116 SYMBIOTIC TARTU

GREEN / BLUE FOOTSTEPS
.... And Together They Transformed Ihaste Ditch



Co-Diary

Xianjie Pan, Chenyue Meng, Bei Chen, Xinyu Wang, Changhong Sun, Menglin Huang, Hanqing Zhao, Zihang Zhour

Huazhong Agricultural University

HONORABLE MENTION

Co-Diary. Landscape as a solution to active urban vitality.

Emajõgi flows through different parts of Tartu, where rivers, people, and cities together create diverse landscapes. Nowadays, Tartu is facing the challenges of urban expansion and climate change, as well as the increasing demand for public space. Tartu is currently characterized by flowing rivers, convenient transportation, and a large area of natural open areas.

The concept of Co-Diary is to make Tartu a vibrant, blue-green city with shared prosperity, with universities, communities, and enterprises working together to shape the future of urban development. Existing green Spaces are connected to new ones, forming a resilient network with rivers that brings surrounding natural resources into the city. Healthy green infrastructure ensures the food security and mental health of citizens. Sensory blue infrastructure brings water features into the city and urban stormwater management ensures the safety of diverse activities. Streets are pedestrian-friendly and bike-friendly. Inclusive activities take place in the vitality urban area and are further linked to the surrounding unique natural areas. Renewable energy is being used to support the city.

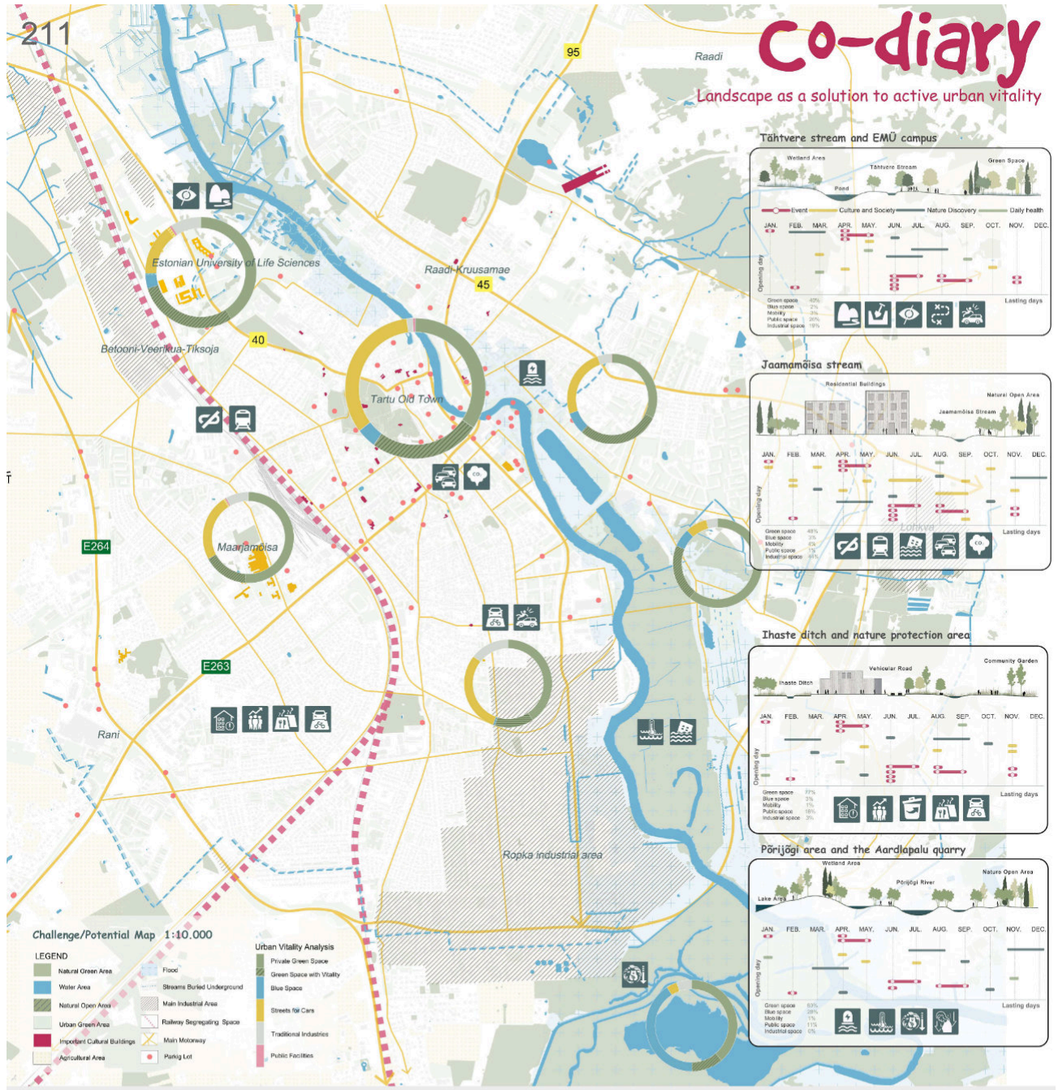
In a detailed focus area, the Estonian University of Life Sciences becomes the Research and Development Centre which is assembled as a demonstration area for the future bioeconomy. It brings together a mixed-use industrial clusterwith a sustainable food industry at its core. Citizens, students, and tourists can

enjoy activities during the four seasons.

New activities are built through green, blue, and streets, interweaving new possibilities for living, working, and touring in the city. Tartu becomes a co-diary for all citizens.

Co-diary

Landscape as a solution to active urban vitality

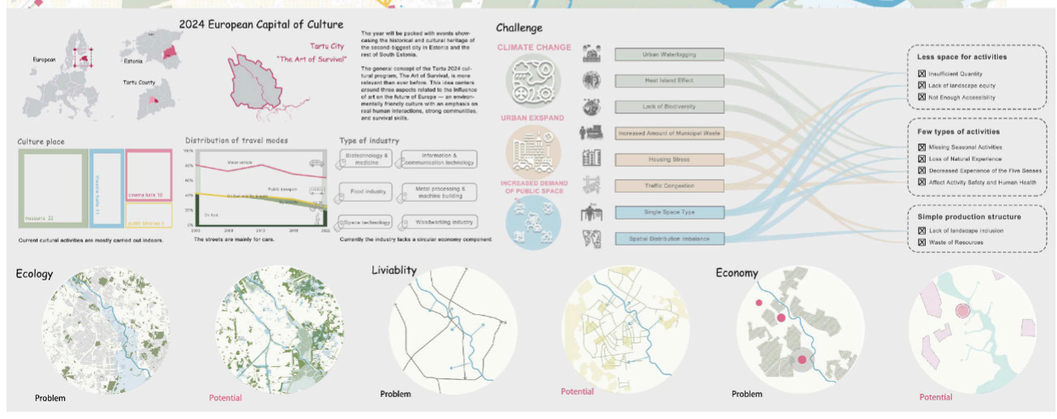


Tähtvere stream and EMÜ campus

Jaamamõisa stream

Ihaste ditch and nature protection area

Põrijõgi area and the Aardlapalu quarry



Co-diary

Landscape as a solution to active urban vitality



Tähtvere stream and EMÜ campus

Jaamamõisa stream

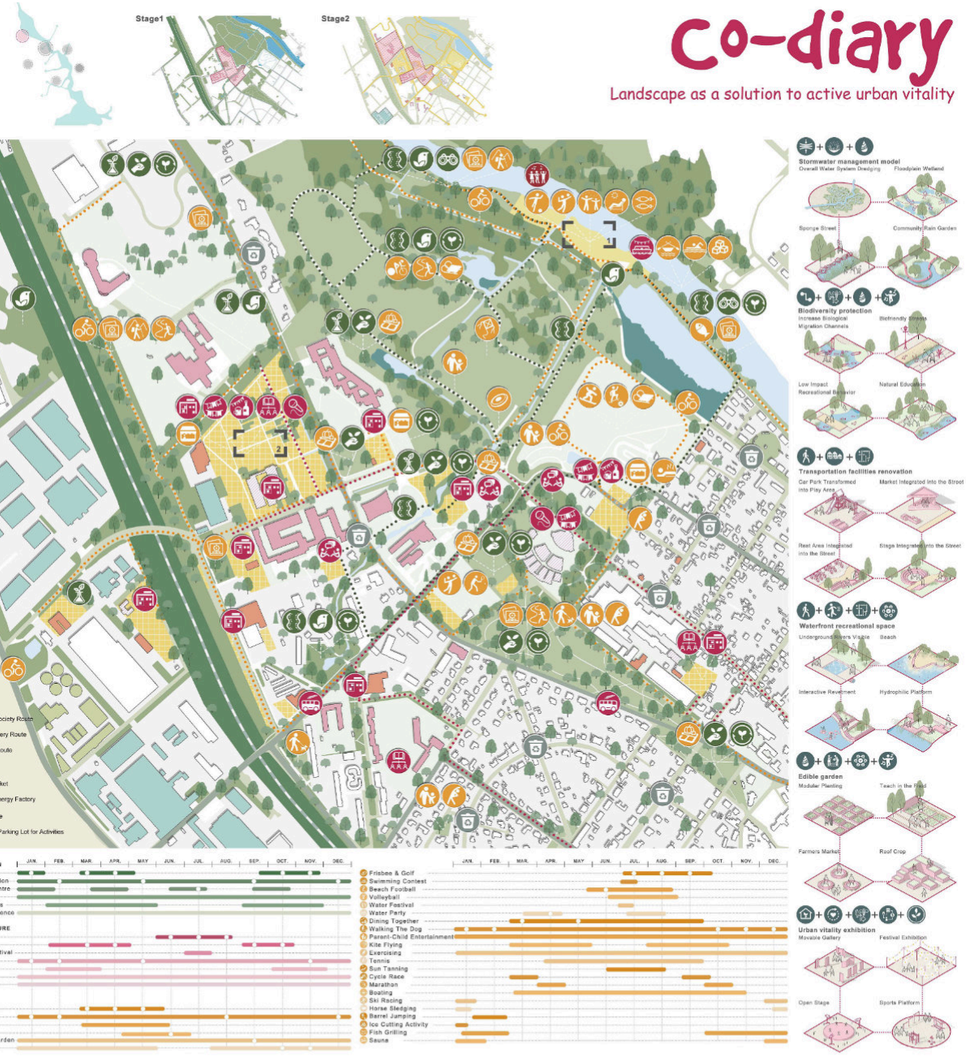
Ihaste ditch and nature protection area

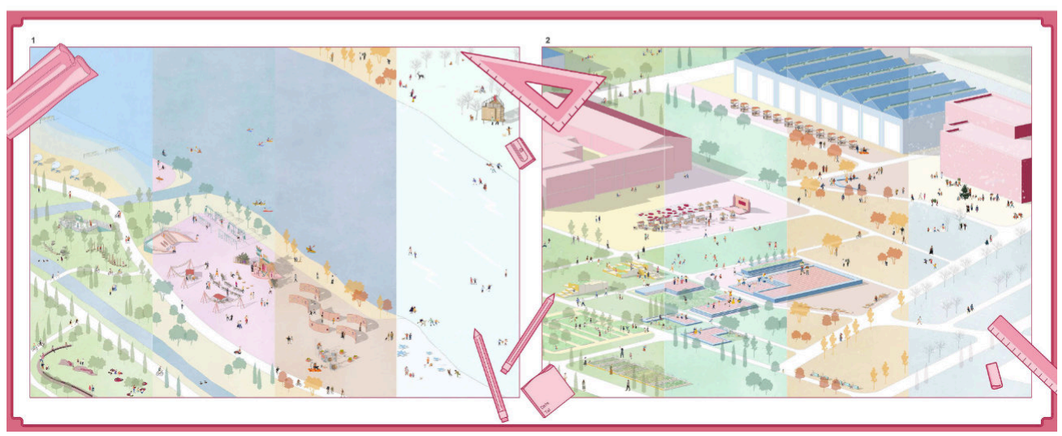
Põrijõgi area and the Aardlapalu quarry



Co-diary

Landscape as a solution to active urban vitality

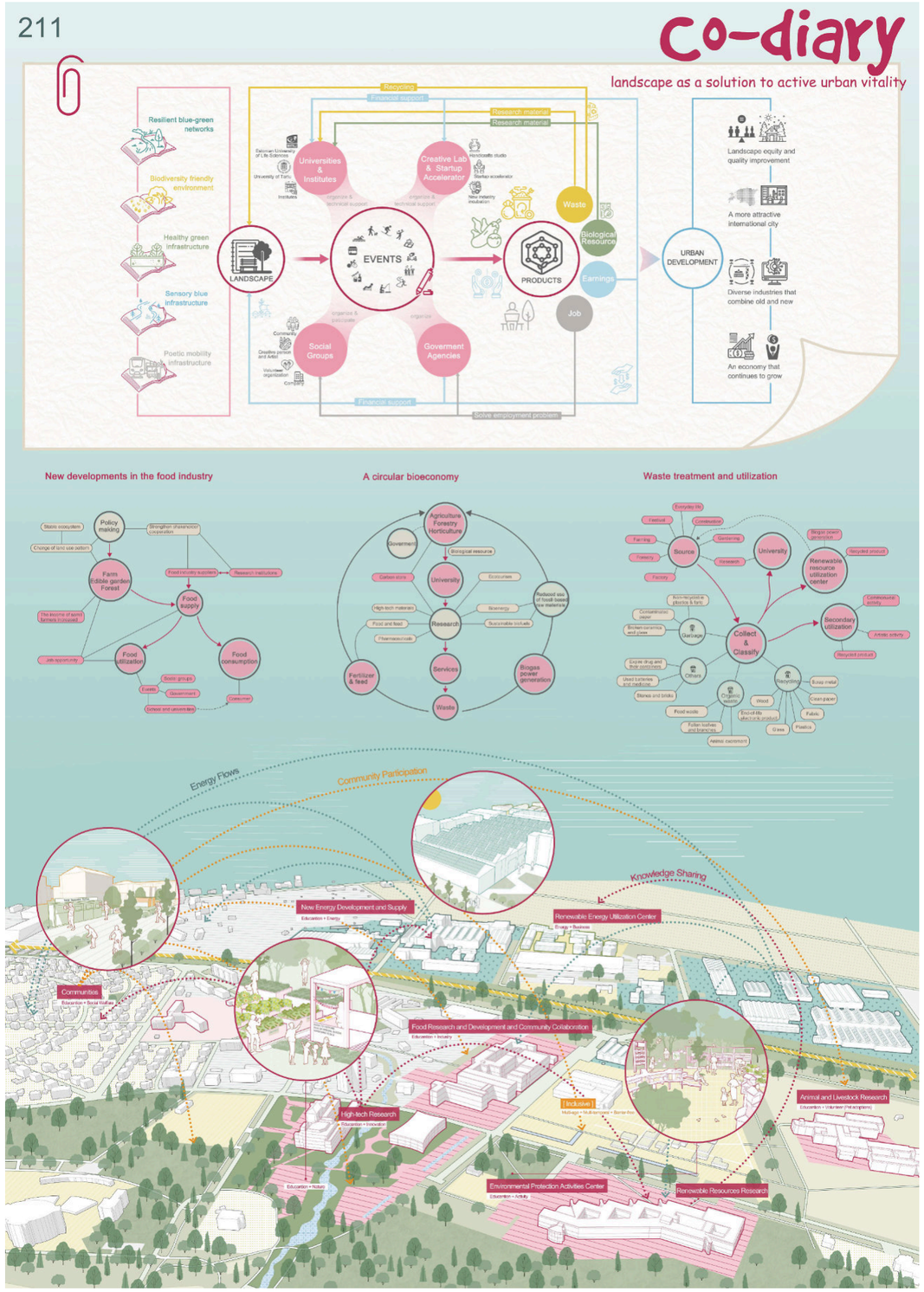




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Co-diary

landscape as a solution to active urban vitality



The Tartu Hive

FINALIST

Sean Moyano, Chiara Moretti, Harrison Wade

Sapienza University Rome

The city of Tartu has a multitude of great resources to utilize in terms of creating a more unified and connected cityscape through multiple means including economic, social, ecological, and environmental. To accomplish these goals, we created in depth analyses looking at the existing blue green network, environmental risks, urban sprawl trends, the industrial coverage and existing cultural heritage sites, and referred to a SWOT analysis to aid in the process of creating a future forecast of the city based on current trends and what was deemed necessary to change for future growth. A series of circular economy models were created that identify the current issues and how they are all related to each other and with a series of thoughtful interventions the quality of life of residents and the overall city landscape could see drastic positive changes while progressing towards the future.

Suburbanization has been deemed the main culprit for many of the issues that Tartu is currently facing. Residents have moved farther from the city, leading to major land consumption that impacts biodiversity and agricultural land, greater needs for residents to purchase vehicles, and rising costs of agricultural products, amongst other issues. By identifying the areas where urban sprawl has taken place, we can focus on discouraging this practice going forward by creating co-living housing for residents and university students. In this way, it could be possible to lower the dependence of personal vehicles and promote the use of public transportation along with encouraging foot traffic and non-motorized means of mobility.

Sensitive land areas should be protected by lowering carbon emissions, enhancing elements of biodiversity by creating ecological corridors that attract pollinators and identifying major environmental risks. It was deemed a priority to focus on filtering out impurities in water runoff through purification systems to keep all waterways and biodiversity areas healthy.

Moreover, industrial areas located in Tartu are a major contributor to carbon emissions and there are proposed methods to promote these industries in an eco-friendlier way, for example the lumber industry will have more strict regulations of forest management that also encourages the use of local wood formed into cross laminated timber, extending its lifespan and structural capabilities for new construction.

Last, there is a need to empower locals with access to a variety of resources that encourage interaction with each other and the environment including green spaces, parks, small businesses, community gardens, etc. that promotes the art of survival and working as one. We want to use every resource at our disposal including collecting rainwater for non-potable uses, and harvesting wind energy along roadways that can power outdoor lights by using wind from passing vehicles. We believe that by implementing these elements in Tartu, the city will work as a hive, able to repair itself and create a more self-sufficient community by reconnecting the fragments and utilizing all its resources in a thoughtful way. The hive will function properly only when all its components (social, economic, ecological and environmental) work together for the common goal of improving the quality of life of its inhabitants, creating a stronger sense of community and improving environmental qualities.

We decided that the Tähtvere Stream site was a great sandbox to implement these interventions because of the existing infrastructure and resources available that could use greater interconnection such as the university, the river, recreational elements, industrial areas, residential areas, and green areas. Moreover, this area is currently facing some of the major threats that were deeply analyzed, such as the suburbanization given by the future expansion of the nearby residential area, the fragmentation of services, the possible loss of biodiversity and the industries nearby. The Tartu Hive aims to create a strong, interconnected, and more selfsufficient community, that can be exemplified by future communities.

053 TARTU HIVE

TARTU – EMAJÕGI RIVER AND ITS WATERCOURSES

The city of Tartu as the Cultural Capitol of 2024 has a multitude of great resources to utilize in terms of creating a more unified and connected cityscape through multiple means including economic, social, ecological, and environmental. To accomplish these goals, first generic analysis was made through researching population demographics, social structures, urban heat island, and major trends pertaining to each specific site.

We referred to a SWOT analysis to aid the process of creating a future forecast of the city based on current trends and what was deemed necessary to change for future growth. Through the SWOT analysis, we create the framework for addressing specific goals, strategies, and solutions for the Emajõgi River and its water courses.

MACRO TO MICRO

EUROPE
Estonia's location relative to the European Union (NUTS) and it's identity as one of the three Baltic Sea countries.

ESTONIA
Composed of 15 counties, Tartu as the focus area for the European Capitol of Culture is situated between Lake Võrtsjärv and Lake Peipus.

COUNTIES / MUNICIPALITY
Tartu County is ruled by the Tartu Municipality which currently is one of 79 municipalities within Estonia in which 15 are administrative.

TARTU
Tartu is one of five cities in a so-called urban-rural network and is the second most populated cities following Tallinn, the country's capitol.

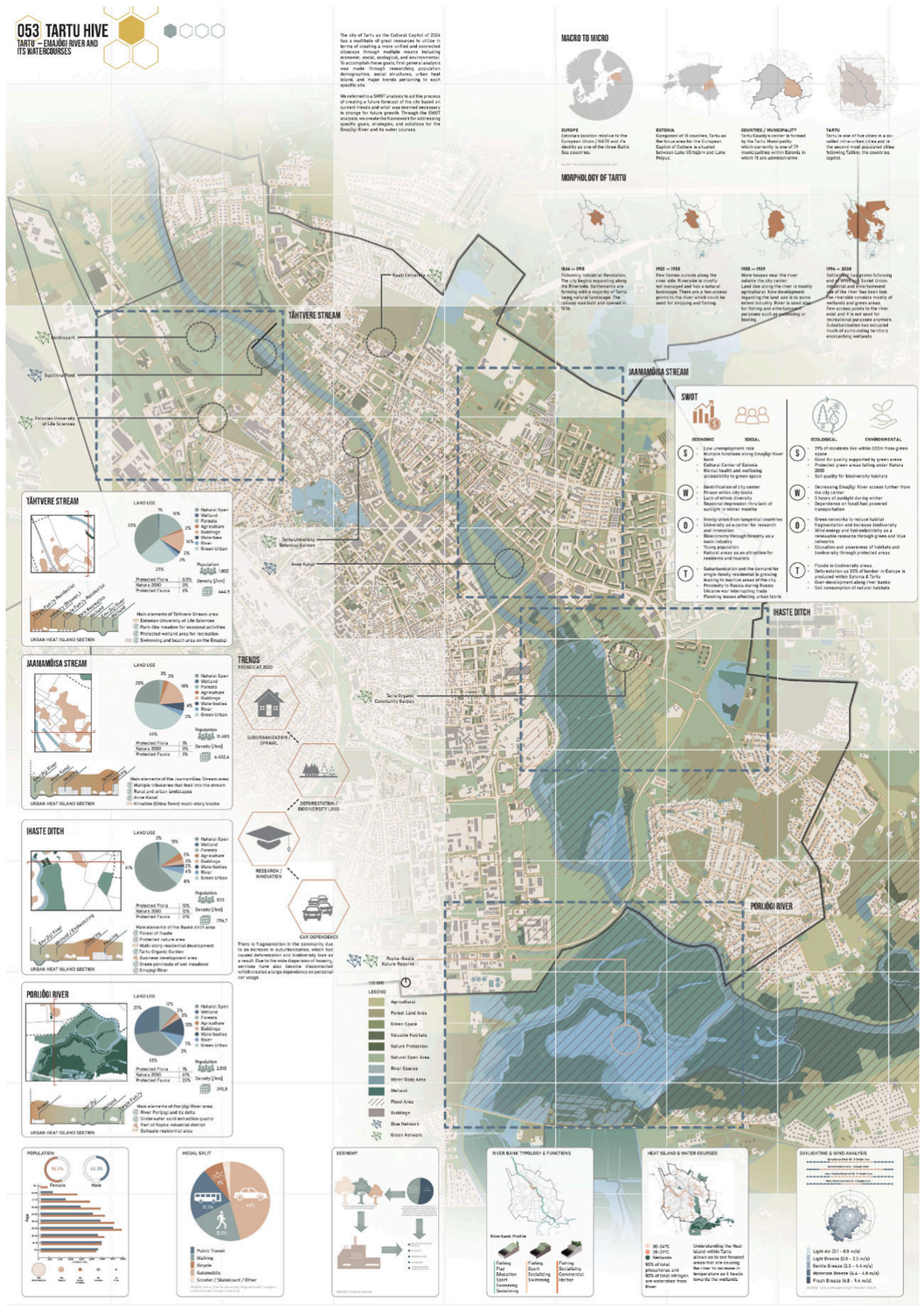
MORPHOLOGY OF TARTU

1866 — 1913
Following industrial Revolution, The city begins expanding along the Riverside. Settlements are forming with a majority of Tartu being rural landscape. The railway was built and opened in 1876.

1922 — 1955
Few homes outside along the river side. Riverside is mostly not managed and has a natural landscape. There are a few access points to the river which could be used for shopping and fishing.

1955 — 1979
More houses near the river outside the city center. Land Use along the river is mostly agricultural. New development regarding the land use is to some extent industry. River is used also for fishing and entertainment purposes such as swimming or boating.

1994 — 2020
Settling the overgrown following end of Warsaw Soviet Union. Industrial and entertainment use of the river has been lost. The riverside contains mostly of wetlands and green areas. Few access points to the river exist and it is not used for recreational purposes anymore. Suburbanization has occupied much of surrounding territory encroaching wetlands.



SWOT

	ECONOMIC	SOCIAL	ECOLOGICAL	ENVIRONMENTAL
S	Low unemployment rate Attractive riverbanks along Emajõgi River Tech Cultural Center of Estonia Mental health and wellbeing accessibility to green space		39% of residents live within 300m from green space Good Air quality supported by green areas Protected green areas falling under Natura 2000 Soil quality for biodiversity habitats	
W	Gentrification of city center Prices within city limits Lack of ethnic diversity Seasonal depression thru lack of sunlight in winter months		Decreasing Emajõgi River access further from the city center 5 hours of sunlight during winter Dependence on fossil fuel powered transportation	
O	Immigration from tangential countries University as a center for research and innovation Bioeconomy through forestry as a main industry Young population National areas as an attraction for residents and tourists		Green networks to reduce habitat fragmentation and increase biodiversity Wind energy and hydroelectricity as a renewable resource through green and blue networks Education and awareness of habitats and biodiversity through protected areas	
T	Suburbanization and the demand for single-family residential is growing leading to inactive areas of the city Proximity to Russia during Russia Ukraine war interrupting trade Flooding issues affecting urban fabric		Floods in biodiversity areas. Deforestation as 33% of lumber in Europe is produced within Estonia & Tartu. Over-development along river banks Soil consumption of natural habitats	

TÄHTVERE STREAM

JAAMAMÕISA STREAM

IHASTE DITCH

PORIJÕGI RIVER

TRENDS

TRENDS AT 2030

There is fragmentation in the community due to an decrease in suburbanization, which has caused deforestation and biodiversity loss as a result. Due to the wide dispersion of housing, services have also become disconnected which created a large dependency on personal car usage.

053 TARTU HIVE

TARTU – EMAJÕGI RIVER AND ITS WATERCOURSES



BLUE-GREEN NETWORK



The lack of agricultural areas within Tartu County are currently disconnected due to suburbanization and city expansion. Within the county limits, little-to-no agricultural land can be found thus having a missed opportunity for being integrated with the city's green-blue network between the surrounding areas and the Emajõgi River.

ENVIRONMENTAL RISK



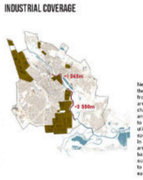
Flood risk as a concurring threat to Tartu as carbon emissions and climate change continue if actions are not done to combat and mitigate the issue. Congenial neighborhoods and urban fabric along the Emajõgi River will be developed. How pushing further expansion through suburbanization towards the outskirts of the city territory which will lead to erosive on agricultural land and biodiversity.

URBAN SPRAWL



Urban Sprawl can be seen through mapping and understanding the dependance on Tartu for single-family homes. Large areas of suburban neighborhoods can be found within a 5-minute walk from Tartus historic city center. It's close proximity to the city signifies a lack of density and multi-functional neighborhoods.

INDUSTRIAL COVERAGE



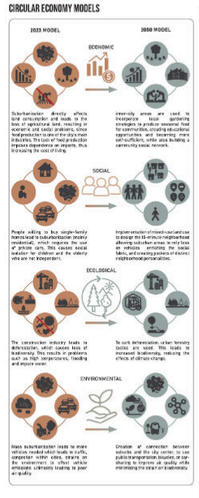
Nearly 4,445 meters of the Emajõgi River are fronted by industrial areas. This becomes a challenge for creating safe and accessible means to reaching the river and utilizing it for leisure, sport, or social activities. In addition, the industrial areas along the river are also cut off from the rest of the suburban neighborhoods to cross the river into the east side of Tartu.

CULTURAL HERITAGE



The cultural heritage of Tartu as shown in the historic city center is the expansion with the majority while smaller areas can be found on both sides of the Emajõgi River. The ability to consider the River itself as a part of it's Cultural Heritage. The history of Tartu tells stories of how the River was used as a resource for trade and business while also being a means for leisure and entertainment. Rethinking the river's identity as a cultural heritage element can redistribute it as a thread to stitch/the historic areas together.

CIRCULAR ECONOMY MODELS



Suburbanization directly affects land consumption and leads to the loss of agricultural land, resulting in a decline in the region's food and biofuel production to one of the city's main industries. The loss of food production implies dependence on imports, thus increasing its cost of living.

Increasingly areas are used to incorporate local gardening strategies to produce seasonal food and biofuel, creating employment opportunities and lessening more carbon-efficient, while also building a community social network.

People willing to buy single-family homes lead to suburbanization/ society residential, which requires the use of private cars. This causes social isolation for children and the elderly who are not independent.

Implementation of mixed-use land use to design the 15-minute neighborhood allowing suburban areas to rely less on vehicles, enriching the social fabric, and increasing presence of electric neighborhood personalities.

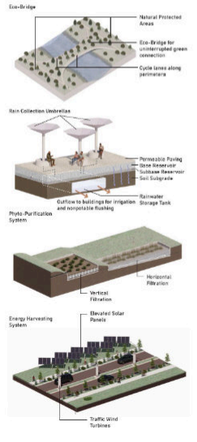
The construction industry leads to deforestation, which causes loss of biodiversity. This results in problems such as high temperatures, flooding and impure water.

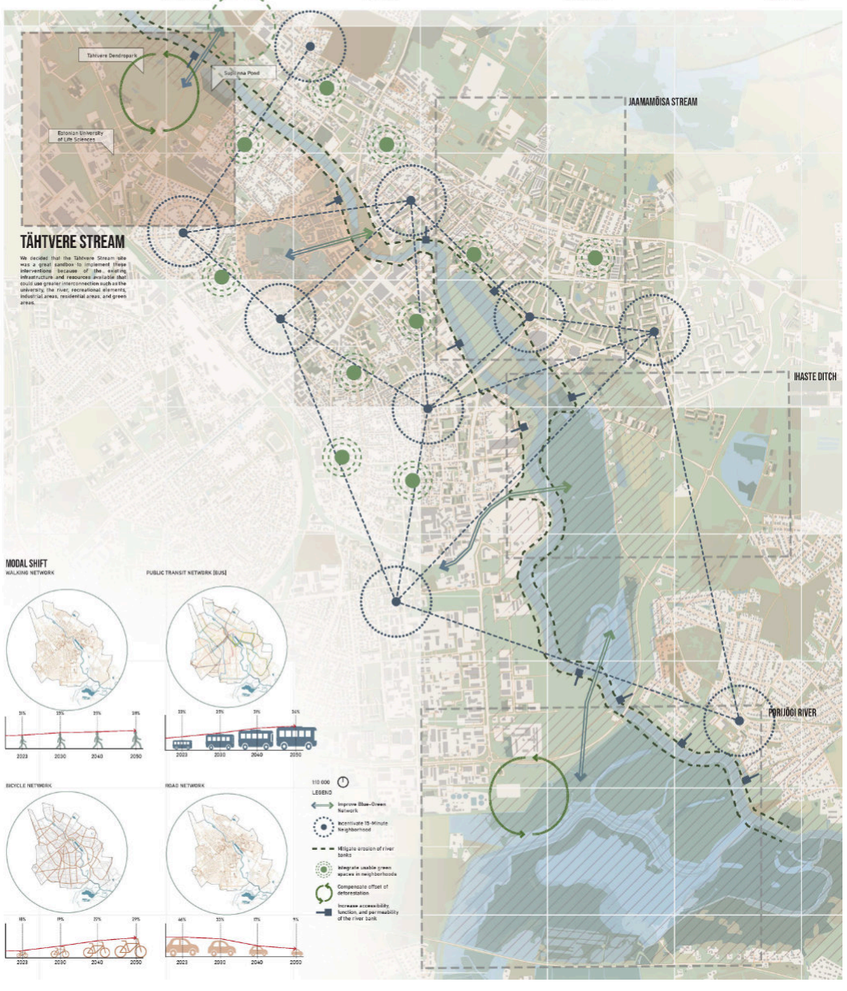
To curb deforestation, urban forestry tactics are used. This leads to increased biodiversity, reducing the effects of climate change.

Mass suburbanization leads to more vehicles needed which leads to traffic, more carbon emissions, harm to the environment, to offset vehicle emissions, citizens looking to pay air quality.

Creation of connection between suburbs and the city center, to use public transportation locations, or ride sharing to improve air quality while minimizing the impact on biodiversity.

SELECTED PUNCTUAL SOLUTIONS





TÄHTVERE STREAM

We decided that the Tähtvere Stream site was a great candidate to implement these interventions because of the existing infrastructure and resources available that could use greater interconnection such as the university, the river, recreational elements, industrial areas, residential areas, and green areas.

MODAL SHIFT

053 TARTU HIVE

TARTU – EMAJÕGI RIVER AND ITS WATERCOURSES

CIRCULAR ECONOMY — SYSTEM THINKING

The "hive mentality" wants to refer to how bees function together for the one specific goal that benefits the greater good. After our analysis showing the important threat of suburbanisation given by the excavation of single family houses, we can consider the new housing as a hive with multiple cells in which each building host different apartments. Thanks to the new housing, it is possible to increase density and create more social connections starting to think of people functioning like a bee colony working together as the health and success of the colony are more important than the single being.

These connections can be then brought to the natural elements of the area and increase the green/blue network, creating new ecosystems and reducing the habitats fragmentation. From this point it is possible to focus on local resources, such as the river and green areas, and increase their quality. The resources can then be used in sustainable ways, creating renewable energy, purifying and collecting water and harvesting materials with responsible consumption. To close the circle, the new resources can help minimise the ecological footprint of the community bringing their effects to the housing.

"Sharing Knowledge to create a collective intelligence"

THE TÄHTVERE STREAM HIVE CELL STRUCTURE

Focusing on Social Connection as the center of the hive for the site with its supporting interventions surrounding it help us understand the cell structure of the hive for Tähtvere Streams and the requirements for inhabitants. The subsequent cells surrounding its center are the networks needed to create social connections while the subsequent cells such as flood mitigation, lumber harvesting, renewable energy, and water purification are the means to reach a social network and connection.





TÄHTVERE STREAM SWOT ANALYSIS



NEIGHBORHOOD CONNECTIVITY



Tähtvere Stream is currently fragmented into distinct areas comprised of suburban neighborhoods, Estonia University of Life Sciences, and Tähtvere Manor. These areas all function more individually than as a collective whole. The disconnections among them are seen through lack of density, accessibility, and social integration of varying demographics. If we consider the area to act as a hive— similar to a bee hive— we can be critical on reinforcing the connection between the various distinct areas while also keeping in mind the social, ecological, environmental, and economical functions that are needed for the Tähtvere Stream area.

Stream site: Recreational areas utilizing housing as a hive to minimize suburbanisation. Increase density and begin building with the mentality of a community allowing for common cooking such as coworking and local business shopping. Hive people groups function like hives who are working together through different functions (social, economic, environmental, ecological). By creating hives composed of cells with area and need-specific functions, we are allowed to formulate smaller hives which connect to become the larger hive located on the Tähtvere Stream area.

TÄHTVERE STREAM MASTER PLAN

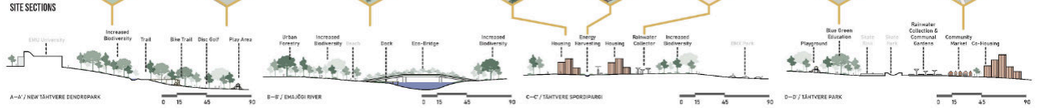




STRATEGIC INTERVENTIONS



SITE SECTIONS



053 TARTU HIVE

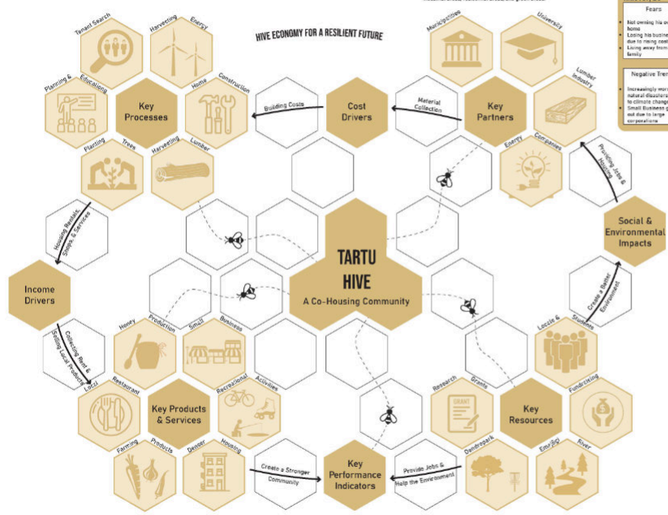
TARTU – EMAJÕGI RIVER AND ITS WATERCOURSES

There is also an important element of celebrating the history of Tartu by intertwining new interventions with the existing cultural heritage sites to educate locals and visitors on what makes this place unique. There is a great need to lower the dependence of personal vehicles and promote the use of public transportation along with encouraging foot traffic and non-motorized means of mobility by creating more efficient routes for public transit and by strengthening the bike network and reducing more car-dependent infrastructure. Introducing more green spaces throughout at our disposal including collecting rainwater for non-potable uses, and harvesting wind energy along roadways that can power outdoor lights for users relief from passing vehicles. We believe that by implementing these elements in Tartu, the city will regain itself and create a more self-sufficient community by reconnecting the fragmented and utilizing all it's resources in a thoughtful way. We decided that the Tähtvere Stream site was a great sandbox to implement these interventions because of the existing infrastructure and resources available that could see greater interconnection such as the university, the river, recreational elements, industrial areas, residential areas, and green areas.

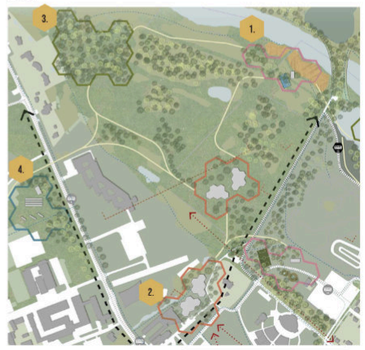
USER PERSONAS



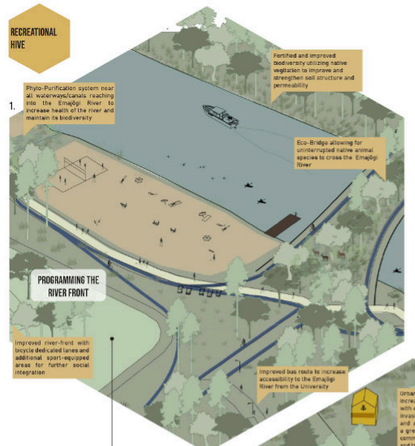
HIVE ECONOMY FOR A RESILIENT FUTURE



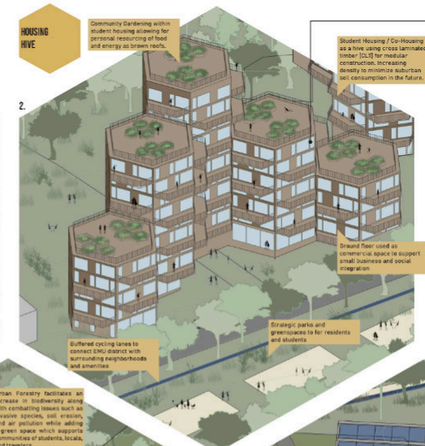
KEY PLAN



RECREATIONAL HIVE



HOUSING HIVE



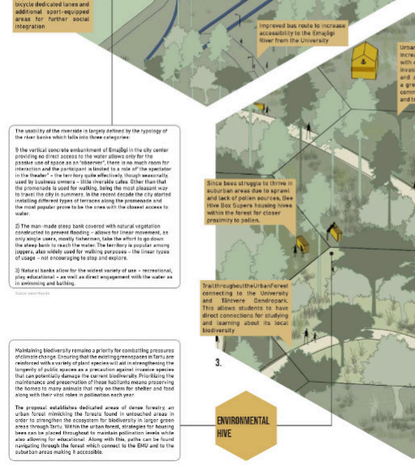
Co-Housing and Student Housing remain a need for Tartu to further support the cities growth and student populations. Along with every growing pressures of eco-translation and soil consumption, to mitigate further environmental and social issues of biodiversity loss or lack of housing, proposing a new type of housing that aims to bridge the gap between students and locals means integrating each into the urban fabric through new interventions. This entails a mixed-use function popularized in many cities throughout Europe to increase density in the area while introducing small businesses to the ground level. Rooftops can be utilized by residents for shared purposes along with communal gardens for minimizing footprint of vegetable and fruit consumption found in super markets.

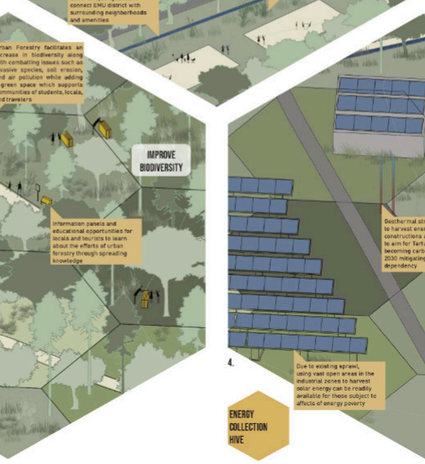
Using Cross Laminated Timber (CLT) as a modular technique for construction of these housing developments uses one of Estonia's largest goods it produces along with minimizing its carbon footprint on embodied energy found in many other popular construction methods.

The 2023 revised directive raises the EU energy efficiency target, making it binding for EU countries to collectively ensure an additional 11.9% reduction in energy consumption by 2030.

A new aspect of energy poverty could be the inability to sufficiently purchase any fuels used by a household, including both car fuels and energy, that prevents people (households) from living a quality life (e.g., drive from rural areas to the city for work, take part in events, take children to after-school activities, etc.). In addition, energy poverty could be linked to the ability to utilise renewable energy sources both in apartment buildings and private houses (mainly solar panels, geothermal heat pumps, etc.).

Strategies to increase renewable clean energy are imperative to combat energy poverty amongst low-income households. Because Tartu has a vast network for automobiles, implementing traffic turbines to use vehicle movement can create energy to be used for municipal services such as traffic lights.





Tartu Technology of Nature

FINALIST

Alicja Reglinska, Antoni Hope, Natalia Wolska, Kamila Wysocka, Justyna Wasilewska

Gdańsk University of Technology

Welcome to the Tartu Eco-Educational Hub, where nature, innovation, and education meet along the spectacular Emajogi River. Project based on:

Education and Research: Come on a journey of discovery as we explore the areas of permaculture and aquaculture. Our hub specializes in expertise and promoting the development of new academic areas in biotechnology and innovative agriculture.

Recreation: Dive into the wonders of the waterfront by transforming the Emajogi River into a paradise for water and sports enthusiasts. From cycling and fishing to rowing and kayaking, our project inspires riverfront tourism.

Technology: Ambitions are high, setting our sights on creating a zero-emission district or, even better, a positive energy district. Enter the future with us, integrating cutting-edge technologies to confront urban heat islands.

Nature: Embedded in the sponge city concept, our project exemplifies the fusion between urban life and nature. We are addressing the challenge of climate change by using blue-green infrastructure in new green spaces.

Agriculture: Come to see the secrets of permaculture and the experimental swamp cultivation.These fields are unique - they are breathing laboratories where sustainable processes bloom.

Model: Tartu Eco-Educational Hub is a joint effort of universities, Tartu City Council, Tartu Region, Estonian Government, European Union, environmental NGOs, secondary schools, local companies and Karula National Park Authority. Together we want to create a solid network for a sustainable future.

In our pursuit of sustainability, key processes guide our steps: management of EU funds, research, education, and reliable support for retention and recruitment. Our center rests on the pillars of knowledge, technology, partnerships, location, and funds, laying the foundation for sustainable initiatives and educational endeavors.

The offerings include courses, community gardens, locally produced food, coworking spaces, conferences, workshops, with attractive financial benefits - for tourists, students, and researchers/entrepreneurs. Join us on this one-of-a-kind journey, where the rhythm of the river tunes in with the beat of education, agriculture, recreation, technology and nature. The Tartu Eco-Education Hub is not just a project; it is a symphony of cooperations, processes, resources, values, products and services.

TARTU TECHNOLOGY OF NATURE

LOCATION CONTEXT

CITY DEVELOPEMENT

1884 1920-30 1930-40

WATER-BASED SYSTEM
WATER PRESENCE IN THE AREA

5 4 3 2 1

Surface waters: rivers, lakes, ponds, artificial Lakes, other types of surface water
Wetlands: bodies, lowland, marsh
Green areas: grassland, arboretum, park, forest
Utilized areas: horticultural land, sport facility, field, sandy area/beach, private yard
Impervious surfaces: substation, pedestrian area, roads, waste land, production land, parking lot

Cross-section A-B

WATER-BASED SYSTEM

Area 4: Tähtvere stream

Area 3: Jaamamõisa Stream

Cross-section C-D

WATER-BASED SYSTEM

DPSIR MODEL

Driving force
INNOVATIVE HUB FOR ECOLOGICAL EDUCATION
- located by the Emajõgi river or Anne canal
- in cooperation with the University and other NGOs
- learning through practise about environment in the field

Pressures
- pedestrian, bicycle and car movement
- necessary infrastructure
- Inlenced water activities at the river and canal, as well as activities in the green areas

State
- anthropogenic landscape (former natural)
- shortage of green areas that flatten the wave in case of river overflow

Impacts
Negative
- disfunction of the ecosystems
- higher risk of flooding

Positive
- rise in people's ecological awareness and interest in ecology
- new public space
- promotion of ecology and sustainability

Responses
- introducing green areas elsewhere to compensate for their loss in the development site
- creation of a water retention system, planting hydrophylic vegetation ("sponge city")
- use of sustainable materials, building on stilts

SECTORAL ANALYSES

Cultural heritage
Cultural heritage points
Cultural heritage areas

Cross-section E-F

WATER-BASED SYSTEM

Area 2: Ihaste Ditch

Relief
Height above sea level (m)

Cross-section G-H

WATER-BASED SYSTEM

Protected areas
Nature protection area
Natura 2000 bird area
Protected fauna till
Protected flora till
Semi-natural habitats

Flood probability
probability once in 10 years
probability once in 50 years
probability once in 100 years
probability once in 1000 years

Area 1: Porijõgi River

Landcover
- Abandoned land
- Agricultural land
- Forest/bushland
- Garden /yard
- Grassland
- Green area
- Industrial area
- Other
- Water
- Wetland

N W E S

0 500 1 000 m

COLLAGE OF VIEWS OF THE EMAJÕGI RIVER
IMPORTANCE OF WATER IN THE LANDSCAPE



Supilinn / Tähtvere area | Kroonuaia street area | Promenade near Kaarsild bridge | Area under Ihasteslid bridge

094

TARTU TECHNOLOGY OF NATURE

WATER-BASED SYSTEM
WATER PRESENCE IN ACTIVITIES

NATURE
AGRICULTURE
RECREATION
EDUCATION
TECHNOLOGY

HUB OPERATING MODEL

retention: blue-green infrastructure in encouraging, new public spaces
water: developing waterfront tourism such as kayaking and rowing , fishing on the river
ecology: conducting research on permaculture and aquaculture, integrating and socializing community
economy: cooperation with local business creating a space for supporting start-up
locality: producing local food and socializing at community gardens
protection: Monitoring protected ecosystems in the city using IoT System

TARTU - TECHNOLOGY OF NATURE

greenery: afforestation, conserving natural habitats, promoting ecological balance
innovation: experimensing with and studying, aspects Tartu's of swamp ecosystems
mobility: promoting and developing active mobility alon riverside
education: providing classes and workshops, space for global conference with workshops, exhibitions and lectures
agriculture: new academic areas in biotechnology and innovative agriculture.
energy: empowering alternative energy sources possible in Tartu such as water mills or solar panels, creating pilot positive energy district

GOALS REACHED

RELATIONS WITHIN THE HUB

TARTU'S HUB

Area 4: Tähtvere stream
Area 3: Jaamamõisa Stream
Area 2: Ihaste Ditch
Area 1: Porijõgi River

NATURE
1 EXPERIMENTAL SWAMP
2 SPONGE CITY
3 AFFORESTATION

AGRICULTURE
4 PERMACULTURE
5 AQUACULTURE
6 PLANT CULTIVATION ON SWAMPS

RECREATION
7 WATER TOURISM
8 PROMENADE
9 RECREATION AREAS

EDUCATION
10 ECOLOGICAL-EDUCATIONAL HUB CENTER
11 GREEN EDUCATION ZONES
12 DEVELOPMENT OF STARTUPS

TECHNOLOGY
13 POSITIVE ENERGY DISTRICTS
14 PROTECTING ECOSYSTEMS IN TARTU BU USING IOT SYSTEMS
15 ALTERNATIVE ENERGY

DEVELOPMENT IN TIME

DEVELOPMENT
2030 2040 2050 2060

Landcover
- Abandoned land
- Agricultural land
- Forest/bushland
- Garden /yard
- Grassland
- Green area
- Industrial area
- Other
- Water
- Wetland

N W E S

0 500 1 000 m

TARTU TECHNOLOGY OF NATURE



neighborhood spaces with retention infrastructure



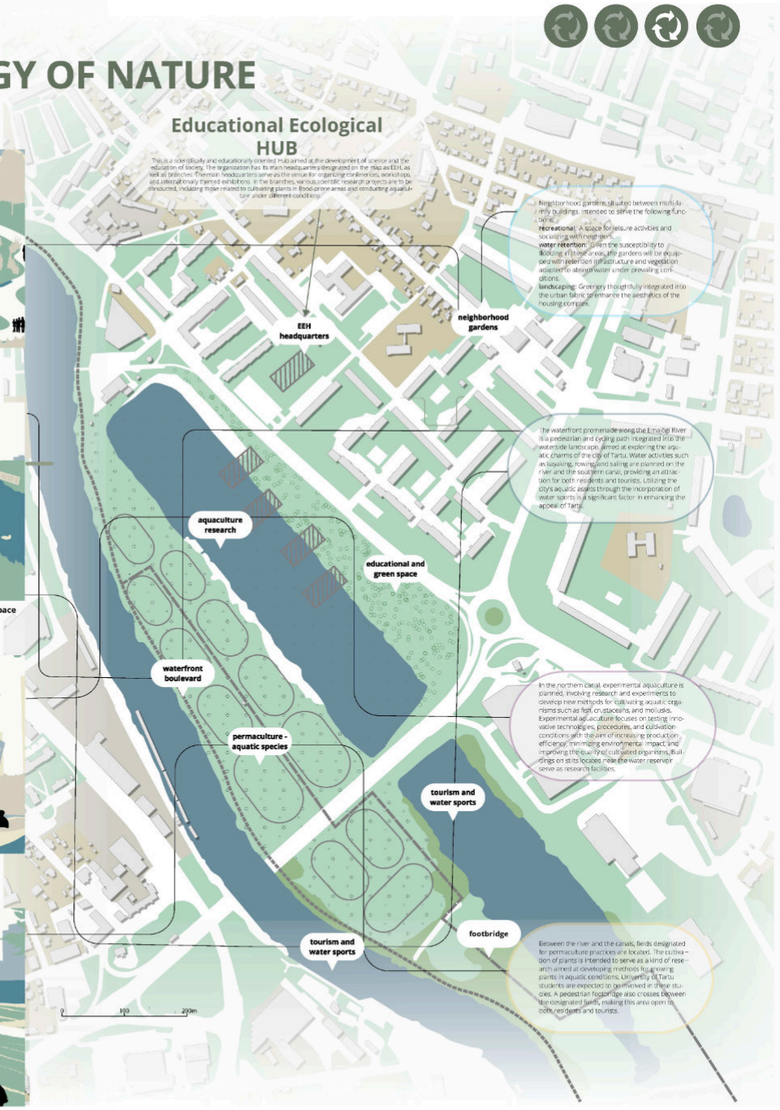
waterside boulevard and water sports - attractive public space

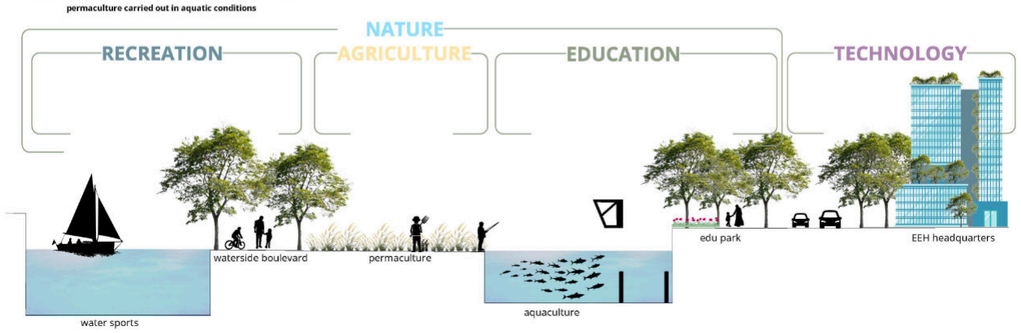


experimental centers - buildings on stilts



permaculture carried out in aquatic conditions





TARTU TECHNOLOGY OF NATURE

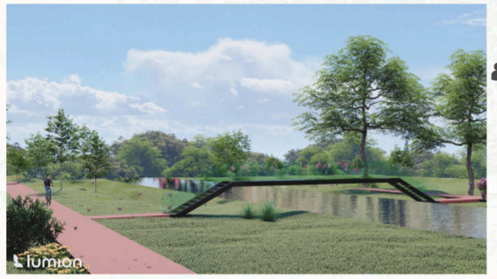
PERMACULTURE - COMMUNITY GARDEN



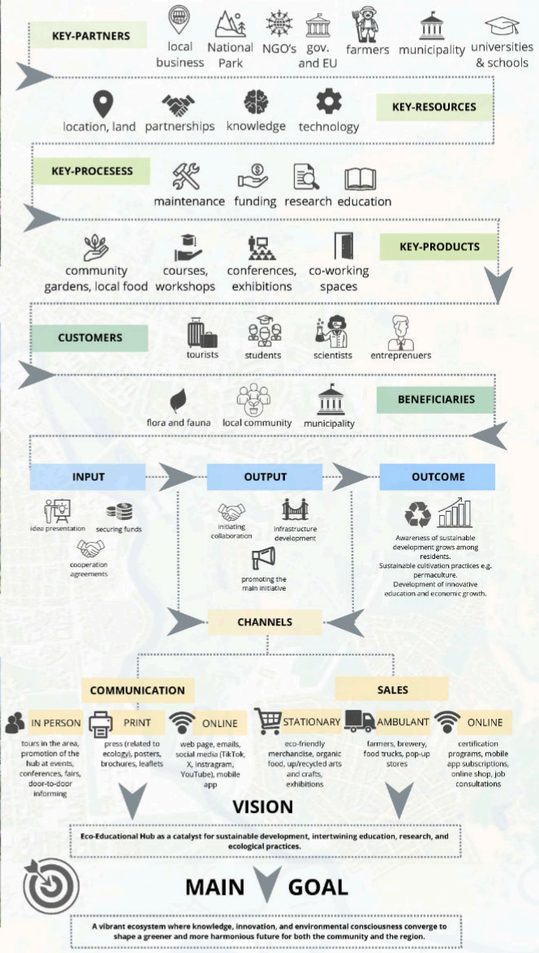
EXPERIMENTAL SWAMP



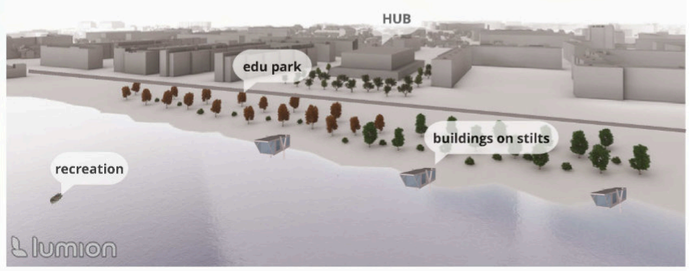
FOOTBRIDGE



SOCIAL-BUSINESS MODEL CANVA



3D SCHEME OF OF AREA NEARBY THE NORTHERN ANNE CANAL



BUILDING ON STILTS



A More Inclusive Future

FINALIST

Guan Ruofei, Lyu Xinyi, Zhu Jiaojiao, Cao Fangxin, Zhang Hao, Lai Meihui, Gong Yuqu, Ma Yuewen

Huazhong Agricultural University

Facing with multiple pressures from the environment, economy, as well as unresting political conflicts, we are attempting to fully revitalize Tartu through a coupled revitalization of ecological and public space with the river as the backbone to create a more inclusive future.

The program is based on Tartu's history and culture, taking into account climate change, population inflation, biodiversity conservation, as well as the planning and implementation of a zero-carbon economic and social transition. It will adopt online-offline integration of shared-economy, shared-transportation and other modes to activate creative industry and ecological economy, leading to the construction and renewal of zero-carbon communities.

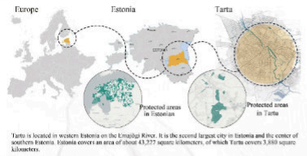
Targeted to construct "the Cultural Capital of Europe", bringing along the revitalization of public life, including poetry, music, dance, water activities, nature education, urban agriculture, etc., the program is designed to create a multi-verse human-nature community, and ultimately to create a new model of more harmonious an sustainable urban development.

A MORE INCLUSIVE FUTURE

177 River revitalization orientated development for Tartu



■ Location $ Protected area analysis



■ Cultural context



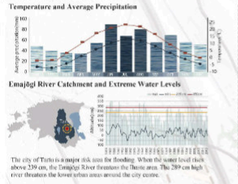
■ Crowd Behavior



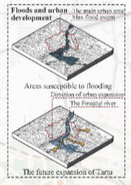
■ Timeline



■ Born to the river

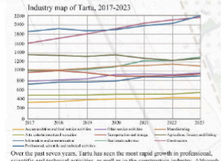




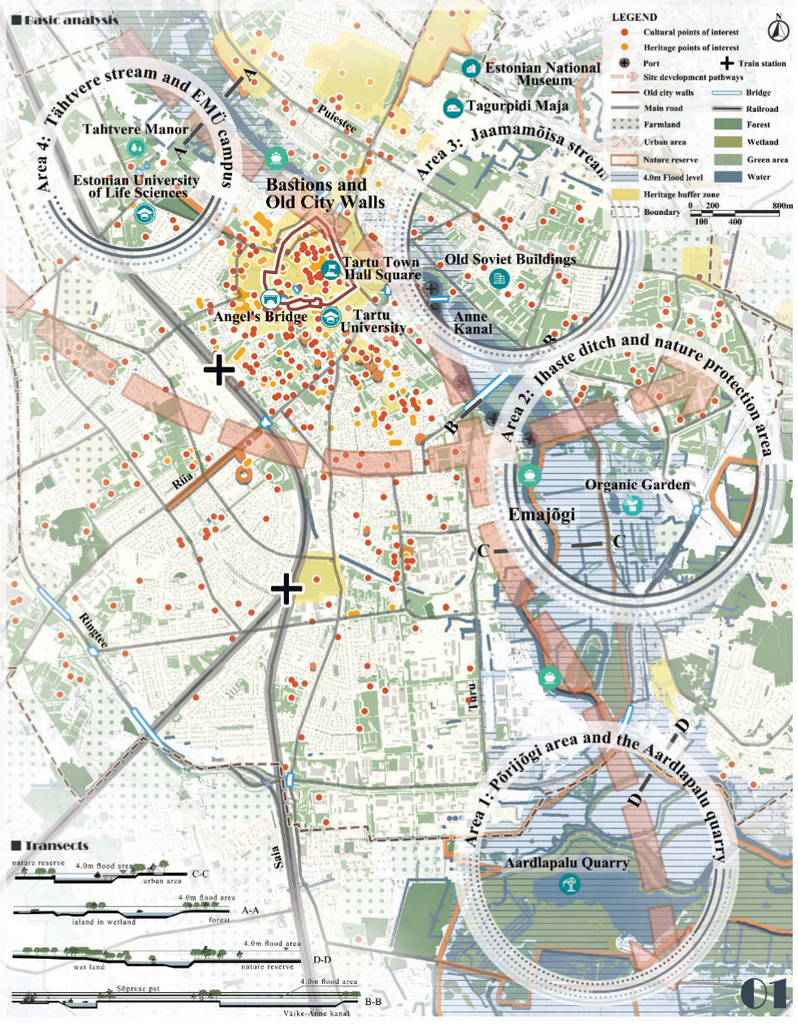




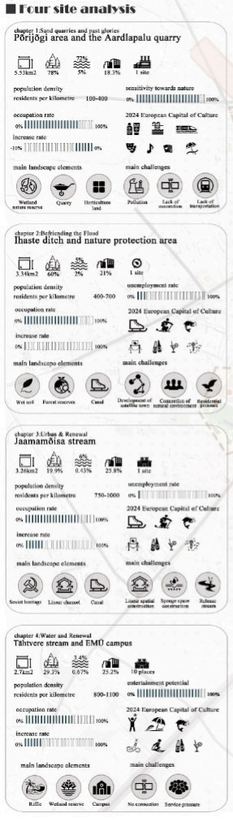
■ Current economy



■ Basic analysis



■ Four site analysis



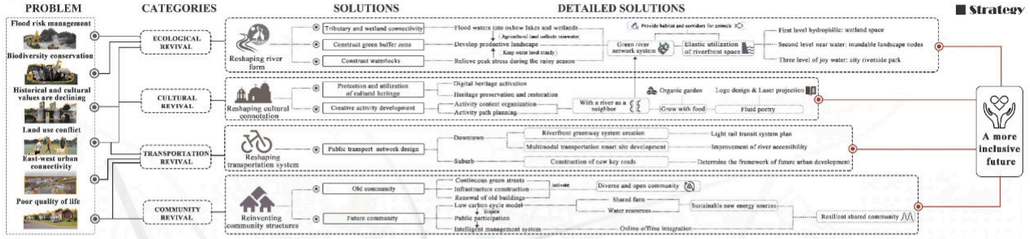
■ Transects

A MORE INCLUSIVE FUTURE

177 River revitalization orientated development for Tartu

In Vision 4.0, Tartu will be transformed into a vivid and inclusive city through the revival of Emajõgi river. The future Tartu connects waterways and wetlands to form a comprehensive green river network, which enhances anti-flood capacity and provide excellent habitats for all creatures. Historical Tartu will be revitalized into a digitalized "poem city" with creative pop-up events and smart-and-shared transportation network. The planning and fusion of past and future communities in town greatly enhances the everyday life.

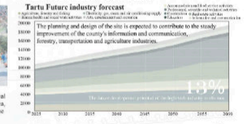
■ Strategy



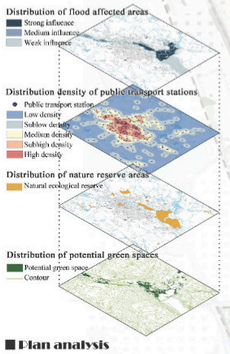
■ Short, medium and long-term vision



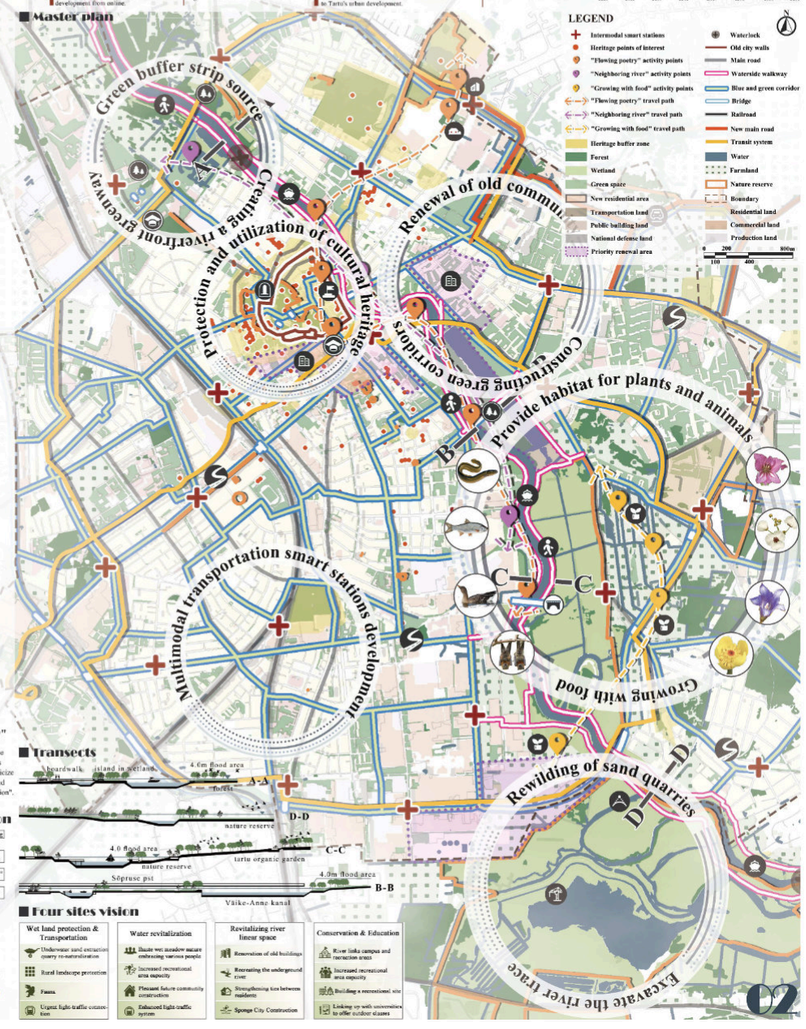
■ Economic forecast



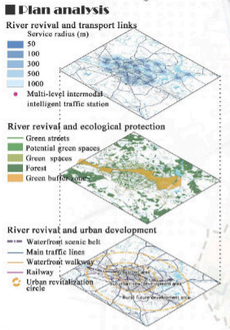
■ Plan generation



■ Master plan



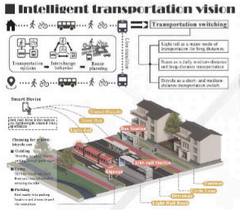
■ Plan analysis



■ Cultural vision



■ Intelligent transportation vision



■ Transects

■ Four sites vision

A MORE INCLUSIVE FUTURE

177 River revitalization orientated development for Tartu

Design analysis

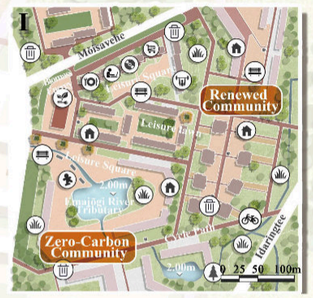


Detailing area 2 design

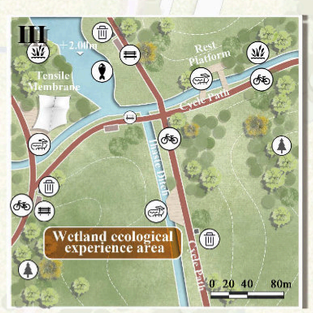
In Tartu 4.0, we envisioned to transform Tartu from 4 aspects, including ecological, cultural, transportation, and community revitalization, Area 2 is designed to connect all existing water system, build a light traffic network, create a future zero-carbon community, a wetland conservation area, a well-planned Emajõgi waterfront, a shared farm. In addition, our structure design aims to harmoniously fuse energy landscape with cultural landscape.

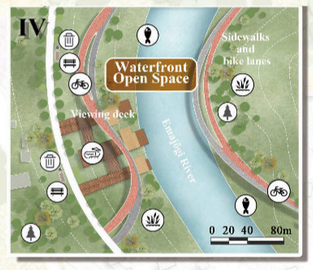


Local layout

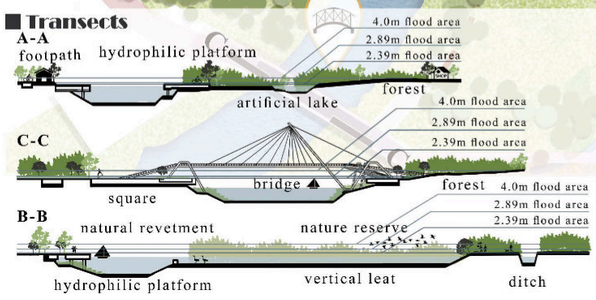








Transects



Vision rendering

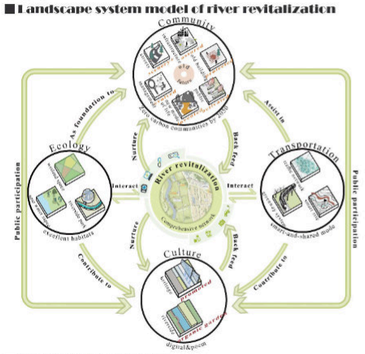


A MORE INCLUSIVE FUTURE

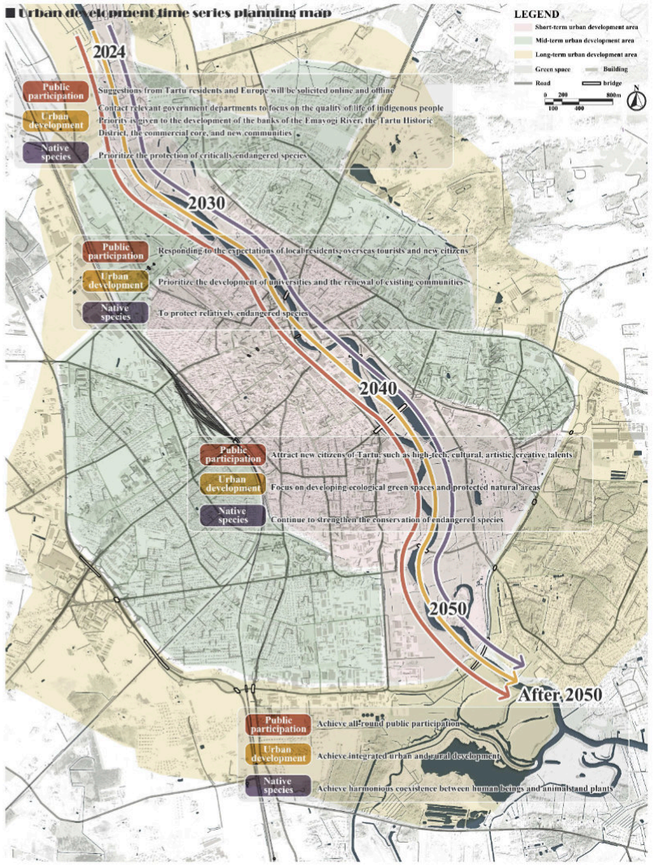
177 River revitalization orientated development for Tartu

There will be three developmental phases for the future Tartu. The Tartu 4.0 expresses our efforts to connect nature with broader social, cultural and ecological values, which will address the pressing challenges of the human-river-city relationship. We are also dedicated to use landscape to provide a complementary and pervasive solutions to Estonian urbanization, which could ultimately be brought to other cities with similar conditions.

■ Landscape system model of river revitalization



■ Urban development time series planning map



■ Future vision analysis

Integration for human-nature relationship



Native species preservation
On the basis of scientific and rational allocation of ecological space, protect the various types of habitats in the city, and build a high-quality living space necessary for their survival, and form a networked ecological system.

Habitat stabilization and maintenance
Integration and optimization of existing nature reserves, enhance habitat connectivity and promotes the formation of ecological corridors, thereby promoting species habitat connectivity and wildlife population hotels.

Increased riverfront accessibility
Increase the density of patched river access, improve riverfront accessibility, promote good communication between citizens and rivers, and create a harmonious future.

Riverine green corridors
Green corridors serve as infrastructure needed for wildlife habitat and protective agricultural land. It also serves to control storm, provide stormwater, and reduce flooding impacts.

Urban water systems
Water systems in blue infrastructure can be utilized through different strategies to treat urban surface runoff and provide resources for wetland ecology and provide resources for wetland ecology.

Integration of green circular economy



Community energy program
Conduct an overall analysis based on energy consumption and develop a program of measures to save energy and reduce consumption. A national renewable energy plan is defined for business.

Establishment of a common farming platform
The fringe area bordering the city was utilized to bring in a wide variety of agricultural products and a peaceful, idyllic life to the city, while enhancing the connection between the community and the land.

Organic food offerings
It makes full use of the fragmented space in the city to provide city dwellers with safe food that they can see with their own eyes. It also enables children to learn about agriculture, which has educational value.

Biomethane plants
Repurpose agricultural waste to produce renewable energy, provide energy support for the community, and promote by-products such as compost or sustainable fertilizers that can be used on local farmland.

Green building construction
The new community building was constructed using agricultural waste as a raw material, while enhancing the building's acoustic lighting and utilizing the roof space to create a rooftop garden.

Integration for community formation



Multi-purpose activity area
Two multi-functional activity areas for community events, etc. to stimulate neighborhood participation.

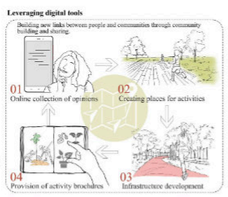
Social node design
Create a friendly and aesthetically pleasing environment that people want to congregate at these nodes to form the heart of the neighborhood.

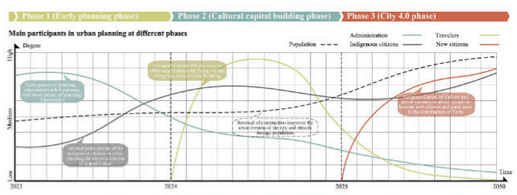
Shared farm
Neighbors can participate in plant cultivation and flower care together to develop a common interest.

Community facilities layout
Design child-friendly amenities that encourage neighborhood families to bring their children along to enhance neighborhood connections.

Community participation and decision-making
Encourage residents to participate in community activities and decision-making to increase their sense of belonging.

Leveraging digital tools





■ Future vision renderings





International Student Competition Exhibition

Exploring Tartu Emajõgi and its watercourses

This preview shows the 8 finalists and winning project of the Tartu Student Competition.
We received 38 submissions from 10 different countries in total.
All projects have been intensively evaluated by an international jury of eight experts.
We will soon present all submissions online.

See you at the Landscape Forum Tartu and South Estonia: June 24 - 28, 2024
https://forum.ln-institute.org/

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Muru Villavabrik