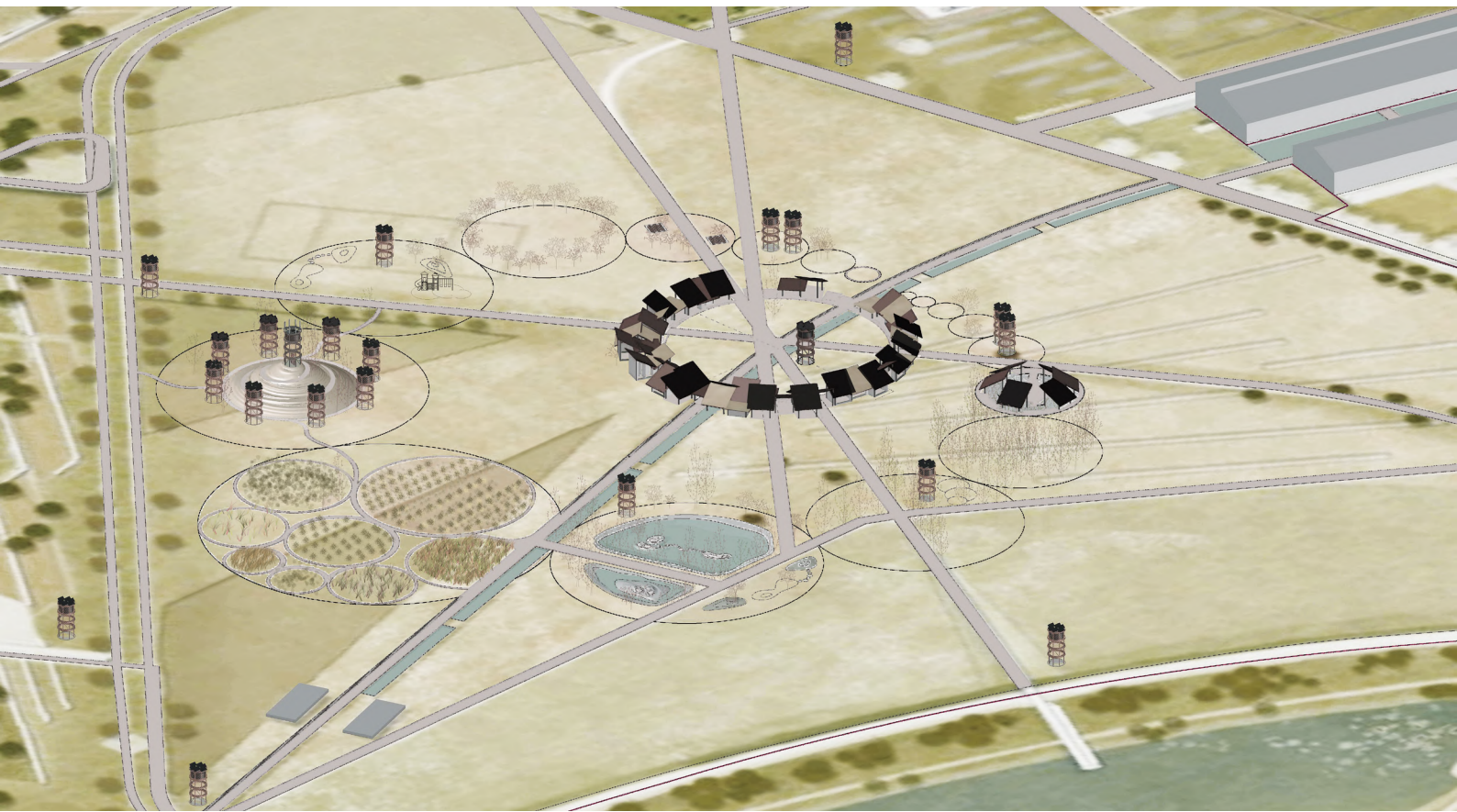


CIRCULARITY

There is no planet B

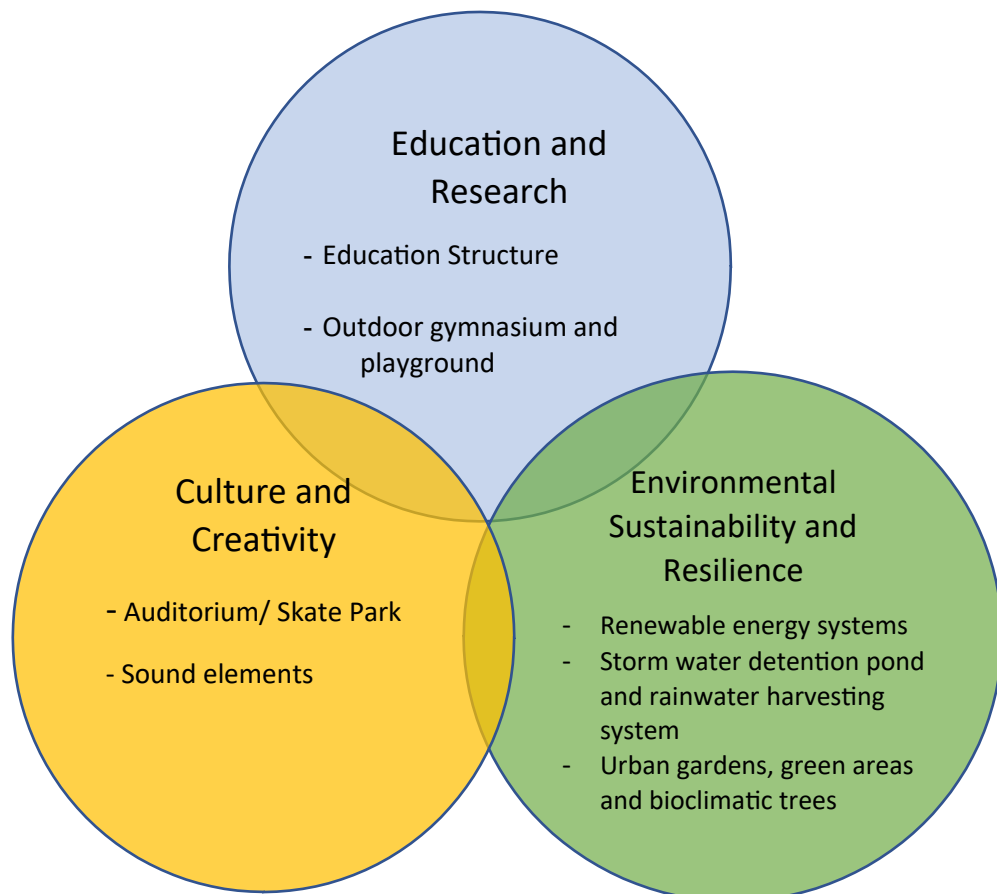


Lagi 2022 Mannheim

Cities are one of the main drivers of our economies, opening up effective paths of growth, providing opportunities that drive innovation, economic, environmental and social wealth creation. Something to be highlighted is that urban areas are home to 55% of the world's population, and this percentage is expected to rise to almost 70% by 2050¹.

As society, we are increasingly aware of the need for resilient urban environments that can protect and promote the health of both people and the planet. For this reason, we have decided to create Circularity, a project which puts people's and environment's needs at the centre, prioritising responses to environmental and climate challenges. The emphasis of our project is on creating a prosperous, sustainable, welcoming and supportive area for Mannheim citizens and visitors. Through the technologies which will be implemented in Circularity, we will boost the economic, social and environmental resilience of the city of Mannheim.

1. PROJECT PROPOSAL

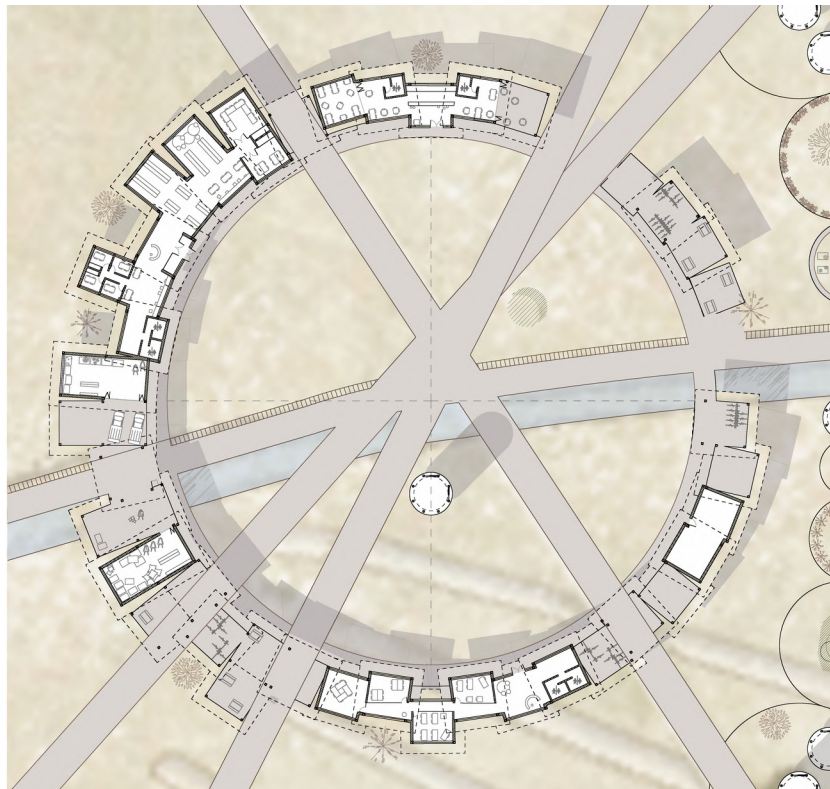


¹ United Nations, 2019. UN. Department of Economic and Social Affairs.

Circularity is made up of scalable structures in the shape of circles. We have taken as inspiration the concept of, as its name suggests, circularity, whose fundamental objective is to rethink the way we use resources and manufacture products, in order to transform unsustainable production and consumption models. This concept will be represented throughout all stages of our project, both in the design, construction and maintenance. Circularity aims to represent, through its structures, a framework of systemic solutions that addresses global challenges such as climate change, biodiversity loss, waste and pollution and at the same time, provide Mannheim with a pleasant and interactive space for its citizens and visitors.

Our project is based on three pillars which will contribute to revitalise the area from a social, economic and environmental perspective:

Education and Research



One of the main structures will be dedicated to providing a space where people can gather to work, co-create, hold workshops, talks and events. In this way, we intend to provide a space for the transmission of knowledge, promoting multidisciplinary collaboration and creation of synergies between people. This structure will act as a catalyst for human interaction. Given the existence and creation of urban gardens within the project, people will be able to experiment and innovate, designing innovative solutions for the agricultural sector and trying different forms of cultivation such as permaculture or organic agriculture for instance. These green areas and urban gardens will create as well, an ideal atmosphere for the organization of environmental education and sustainability courses and programmes. Moreover, the outdoor gymnasium, playground and the energy carousels are structures to promote education and creativity through play.

It should be mentioned that gender balance will be sought in all activities carried out at Circularity and female participation will be promoted in the different workshops, classes and events.

Culture and Creativity

Circularity ensures recognition of the social role that culture and creativity have to play in our societies. We intend to respect Mannheim's rich cultural variety by ensuring that its cultural heritage is enhanced, to this end, we have taken into account the socio-cultural context of the city. Inspired by the city's long musical tradition, especially by the Mannheim school of composers and the Mannheim orchestra of the 18th century, as well as by the more modern musical and theatrical events and festivals that take place in the city nowadays, a specific space will be dedicated to an open-air auditorium.

In this space, concerts and theatrical events, which abound in the city of Mannheim throughout the year, can be held. In addition, by adding mobile structures, this space, when not being used for musical or theatrical events, creates a skate park which will allow and promote physical activity among citizens.



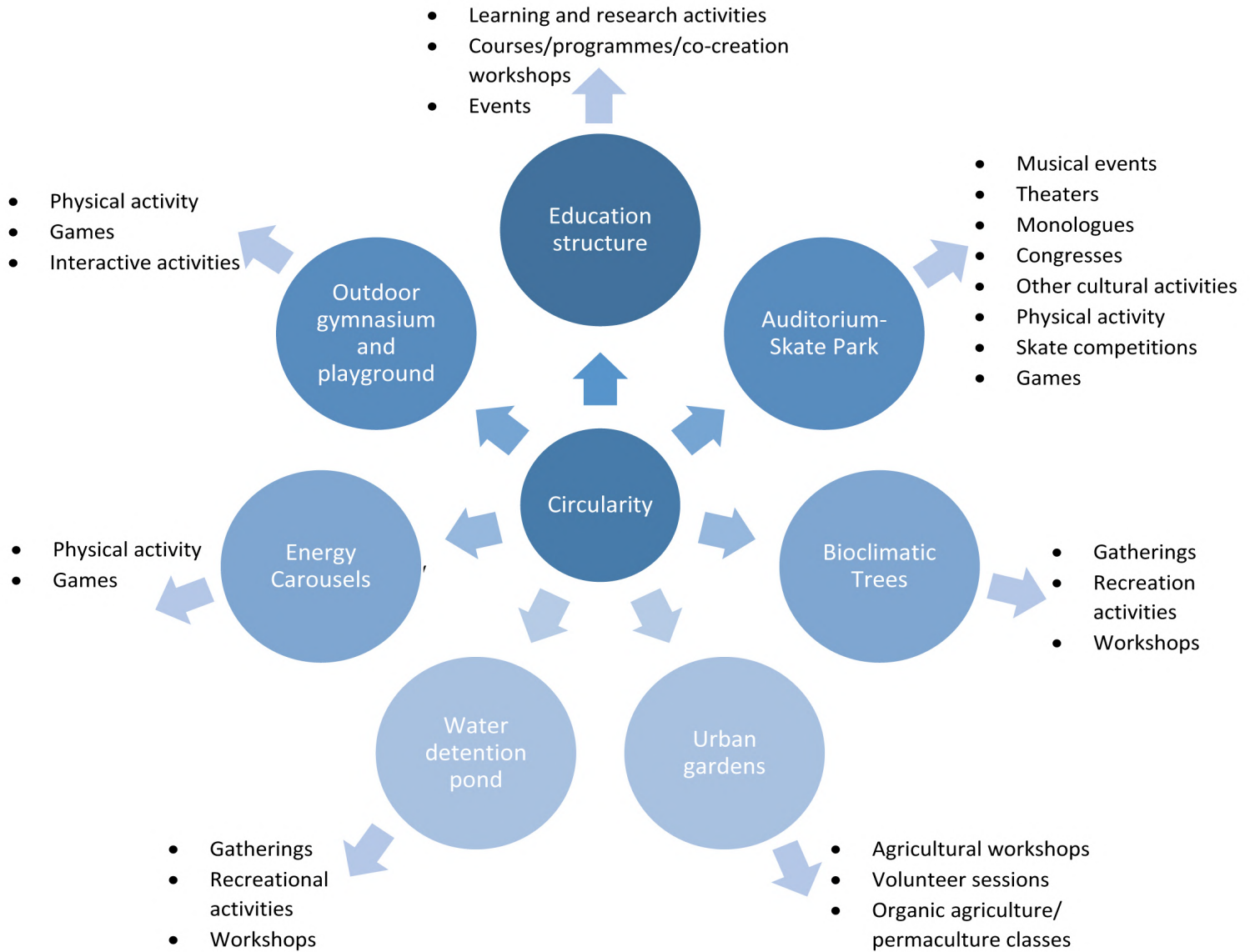
On the other hand, one of the bioclimatic trees will have musical elements in the structure through which sounds will be generated.



Environmental Sustainability and resilience

Ensuring environmental sustainability and building resilience is at the heart of this design. Through our structures and processes, we want to create an area that is largely self-sustaining, creating circular processes of energy and matter. We will use the energy obtained through solar panels, wind turbines, kinetic energy of water collectors and the energy carousels, for lighting and maintenance of the buildings. In this way we will create structures that will be self-sustaining and feedback with the energy obtained. In addition, by collecting rainwater, we will be able to irrigate urban gardens and provide food for the residents of Mannheim, promoting food security, reducing water consumption and decreasing water scarcity at the same time.

Circularity offers a wide range of uses and activities for visitors, as shown below:



Considering the 17 Sustainable Development Goals (SDGs), Circularity has a direct positive effect on the following SDGs:

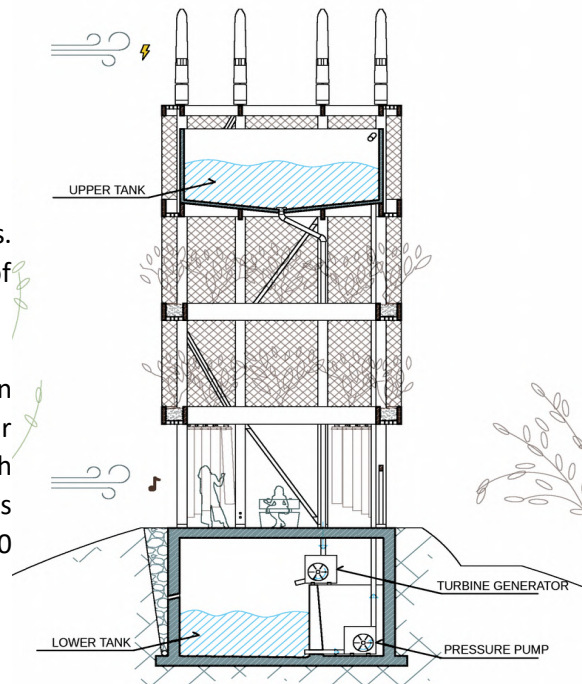
SDG/Project Structure	Education Structure	Auditorium-Skate Park	Energy generation systems (wind turbines, solar panels...)	Storm water detention pond and rainwater harvesting system	Urban Gardens	Bioclimatic trees	Outdoor gymnasium and playground
GOAL 1: No Poverty							
GOAL 2: Zero Hunger					X	X	
GOAL 3: Good Health and Well-being	X	X	X		X	X	X
GOAL 4: Quality Education	X	X					X
GOAL 5: Gender Equality	X				X		
GOAL 6: Clean Water and Sanitation				X		X	
GOAL 7: Affordable and Clean Energy			X			X	
GOAL 8: Decent Work and Economic Growth							
GOAL 9: Industry, Innovation and Infrastructure	X	X	X			X	
GOAL 10: Reduced Inequality	X				X		
GOAL 11: Sustainable Cities and Communities	X	X	X	X	X	X	X
GOAL 12: Responsible Consumption and Production			X	X	X	X	
GOAL 13: Climate Action			X	X	X	X	
GOAL 14: Life Below Water							
GOAL 15: Life on Land					x	X	
GOAL 16: Peace and Justice Strong Institutions							
GOAL 17: Partnerships to achieve the Goal							

1.2 Technology used

Energy/Power generation

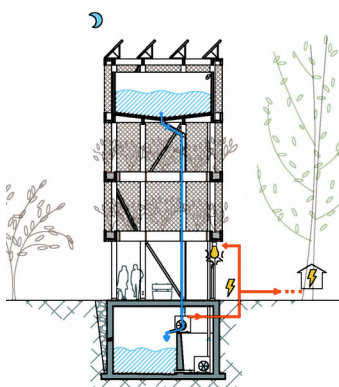
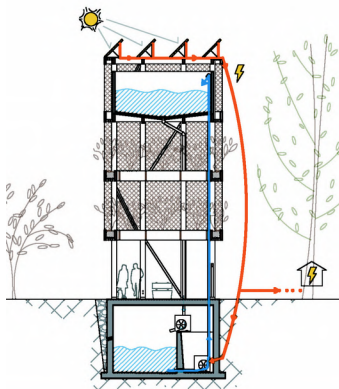
➤ **Wind:** Wind turbine without blades. The 8 wind turbines will generate a total of 14000 MWh per year.

➤ **Solar:** Solar panels. Each structure can be customised to produce up to 36 MWh per year. We have provided 35 structures with solar panels on top so that our project, thanks to solar energy will generate annually 1260 MWh.



➤ **Kinetic energy**

- **Energy carousel:** The kinetic energy released as children and people spin and hang from the ropes is stored in a battery under the central platform. This energy will be then used to illuminate the structure and the remaining energy will be stored and used for other purposes. Each energy carousel will be able to generate approximately 10 MWh per year, although this figure will vary greatly depending on the number of children and the amount of time they play. Given that there will be 3 carousels this will give a total of approximately 30 MWh produced per year.



- **Bioclimatic trees:** Another of our energy sources that is integrated into the project is a system for collecting rain water and using it to generate kinetic energy. In the bioclimatic trees, two reservoirs will be established, one at the bottom of the structure, in the subsoil, and one at the top. The water from below, which will be collected rainwater, will be pumped up to the upper reservoir. The water from above is stored as potential energy that we will make fall when energy is needed, since by means of kinetic energy and a system of turbines energy will be generated. In this process, it will not be necessary to use batteries for energy storage, but only two water tanks. With this system we will generate in a yearly basis, considering all the structures approximately 4MWh.

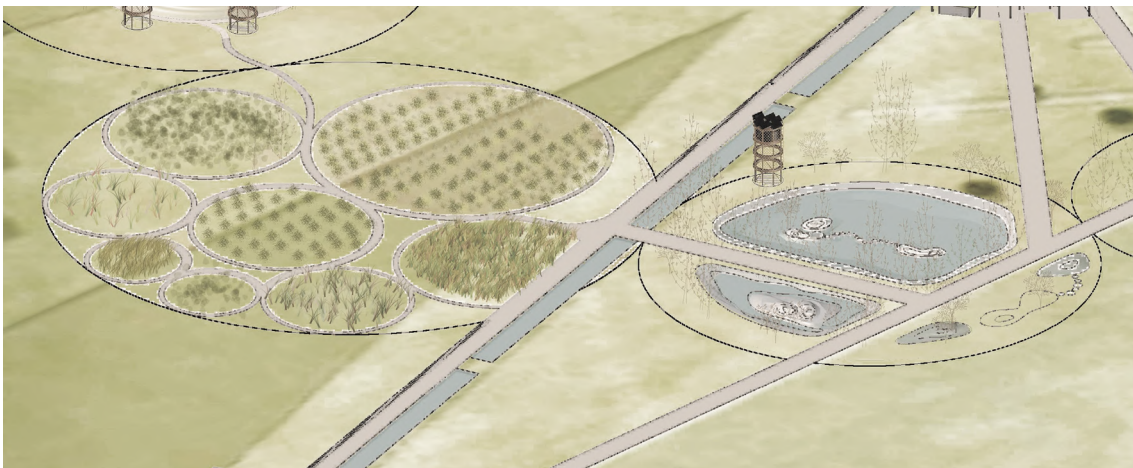
Rainwater harvesting

- Stormwater detention pond
- Water harvesting from buildings and structures

Agricultural and green systems

Urban gardens: We want to promote the shift from linear to circular sustainable food systems, in which resources are reused, nutrients are recycled and what is left over is reused. The urban gardens will consist of native plants and vegetables, which will have a nitrogen-fixing and carbon sequestration function.

Bioclimatic trees: these structures create a social and bio climatically conditioned public space. We will install 32 air-dynamizing social trees oriented to generate activity, and will also have an environmental character. Filled with native vegetation these trees will achieve the bioclimatic adaptation of the outdoor space, which is achieved through a passive climate control system based on cooling by evapotranspiration. These structures are exportable, so they can be reinstalled in other places.



1.3 Environmental impact

Thanks to the following solutions and strategies on which we have based our project, we will achieve a positive environmental impact, producing more than we consume. Circularity is based in the following principles:

Principle of responsible construction and materials: Most of the materials used will be natural materials with a low environmental impact:

- Wood as a CO2 absorbing material, traditional material and with the possibility of coming from nearby sources, to minimize transportation
- Mud as a local, traditional material with unique thermal characteristics
- Other materials such as locally sourced gravels or stones for flooring.

Transportation minimization: reduce unnecessary transportation by using local or nearby resources, materials and suppliers, the use of machinery and vehicles during execution and lifetime will be minimised.

Reuse: all materials/elements and furniture have been and will be chosen based on their recyclability.



Self-sufficiency: through the active energy generation and water cycle control systems, the proposal will produce its own energy making the space a fully self-sufficient. In addition to this, the passive architecture systems we use will minimise the energy needed to maintain the structures.

Food security: the trees, urban gardens and bioclimatic trees will absorb CO₂, produce oxygen, provide food for the community and thus, contribute to food sovereignty. In addition, these green areas will provide shelter for insects and animals.

Ultimately, it should be highlighted that with this project we have been interested in creating spaces that add value beyond their functionality, that become experiences for Mannheim's citizens and visitors, while addressing global challenges such as climate change, biodiversity loss and pollution. Circularity creates sustainable and inclusive spaces that are beautiful to our minds and our short-term and long-term future.