Water & Culture, Adaptation & Integration

A Pattern Language for integrated urban transformation for river flood resilience and sustainable leisure industry

----- Pattern Book -----

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2nd Mentor: Diego Andres Sepulveda Carmona

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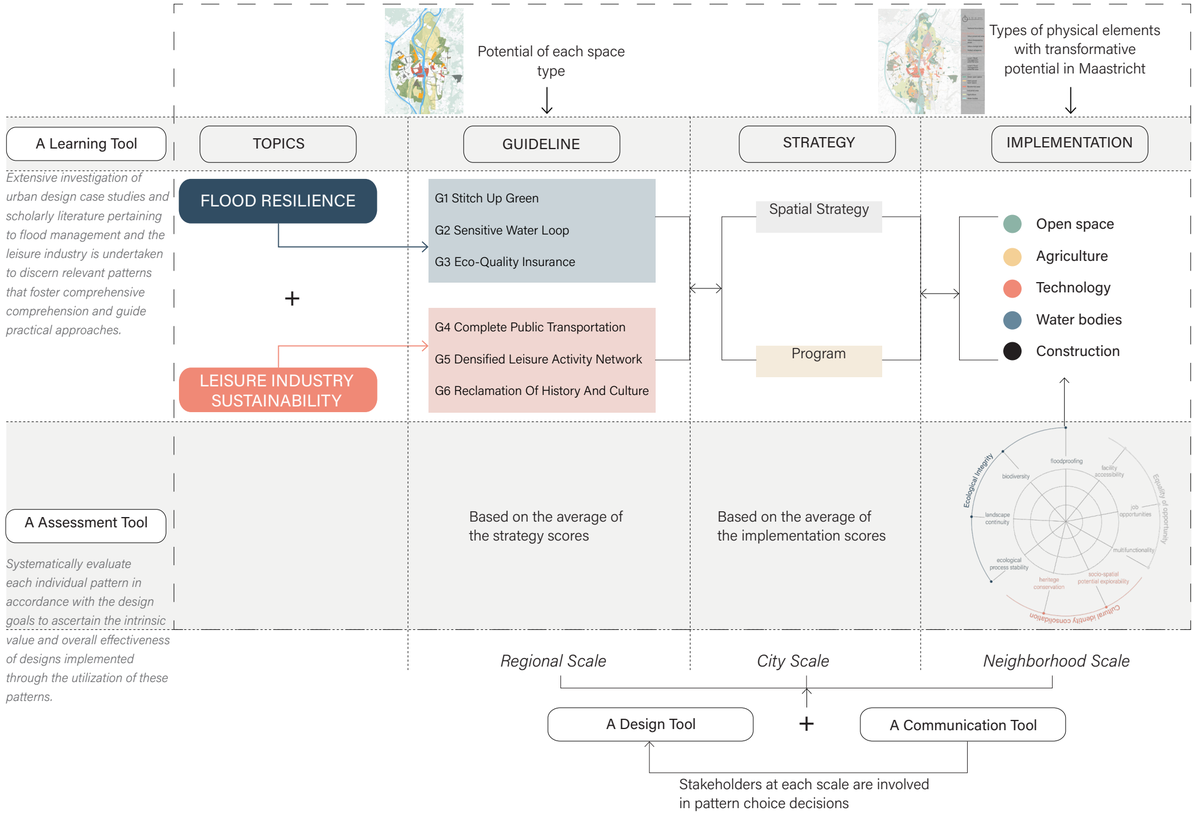
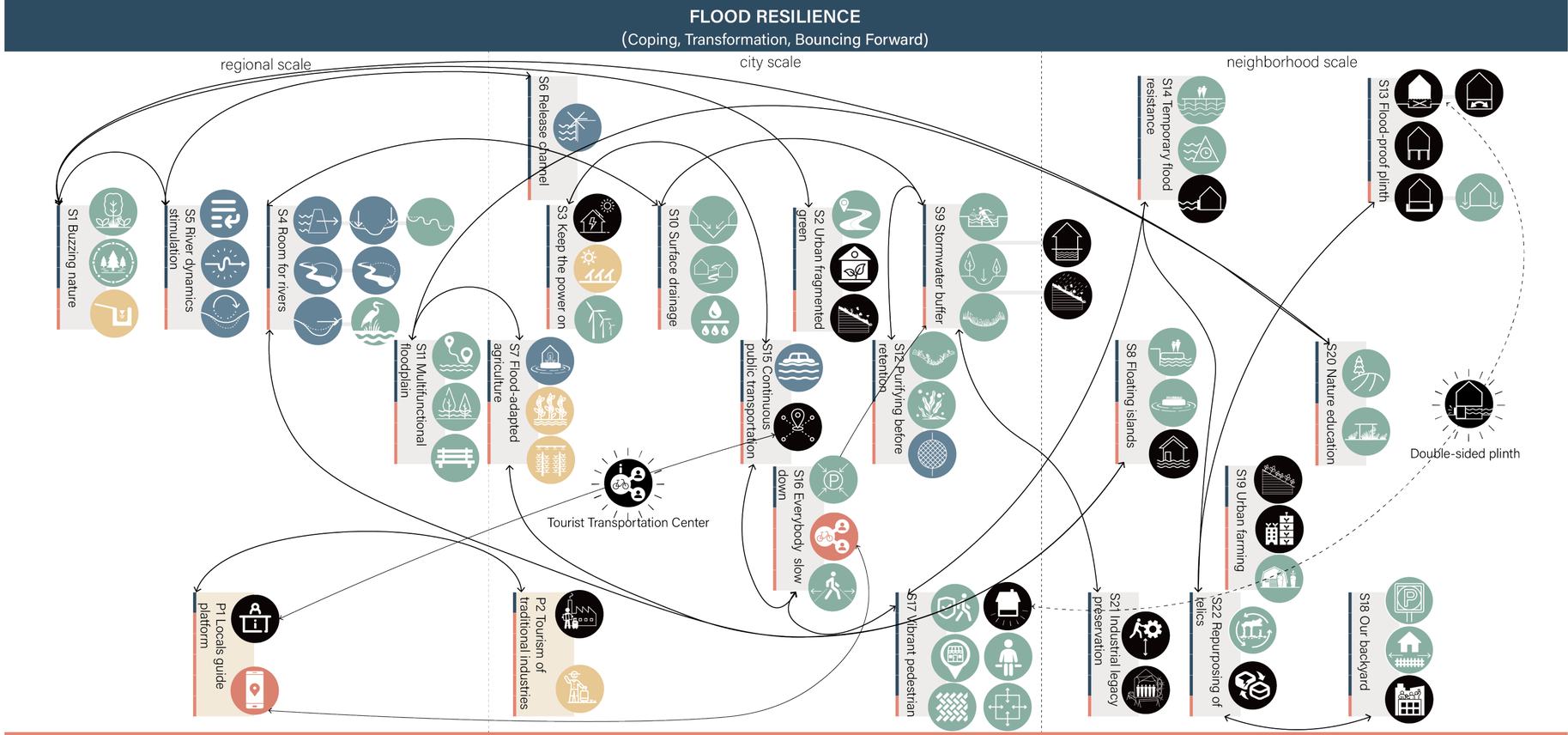


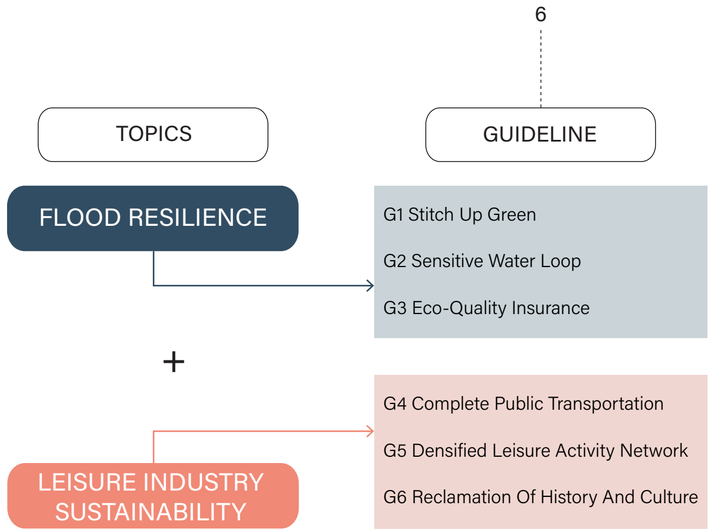
Pattern Network



Spatial Strategy
Program
Synergy
Conflict
Integrated pattern

Open space
Agriculture
Technology
Water bodies
Construction

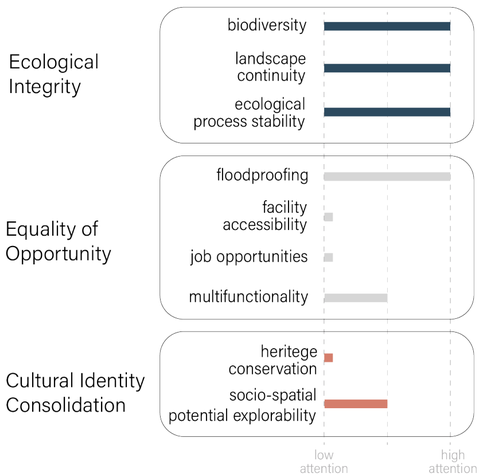
Guideline



At the guideline level, the study establishes overarching principles and objectives for the integrated urban transformation of flood resilience and leisure industry sustainability. These guidelines serve as a foundation for the subsequent development of strategies and programs.

Eco-Water City

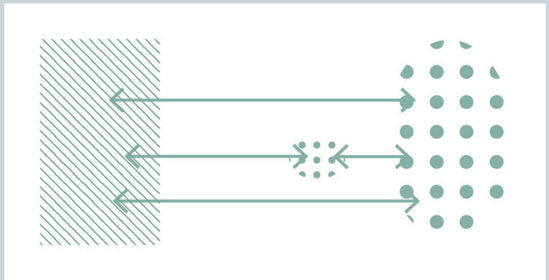
A city retains the maximum amount of water and respects the ecological integrity of the territory.



G1 STITCH UP GREEN

Hypothesis

Stitching up urban green spaces reconnects the natural system and reduces the urban heat island effect.



Included patterns

S1 BUZZING NATURE
S2 URBAN FRAGMENTED GREEN
S3 KEEP THE POWER ON
S4 ROOM FOR RIVERS
S9 STORMWATER BUFFER

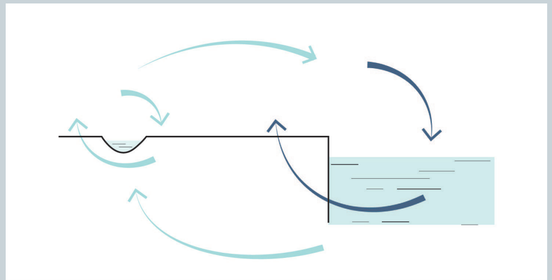
Reference

https://www.newprocontainers.com/blog/benefits-urban-green-spaces/

G2 SENSITIVE WATER LOOP

Hypothesis

Reserving enough space for water and massively closing the local water loop in rivers and inland, respectively, accommodates excessive rain and river water during extreme weather.



Included patterns

S4 ROOM FOR RIVERS
S5 RIVER DYNAMICS STIMULATION
S6 RELEASE CHANNEL
S7 FLOOD-ADAPTED AGRICULTURE
S8 FLOATING ISLANDS
S9 STORMWATER BUFFER
S10 SURFACE DRAINAGE
S11 MULTIFUNCTIONAL FLOODPLAIN

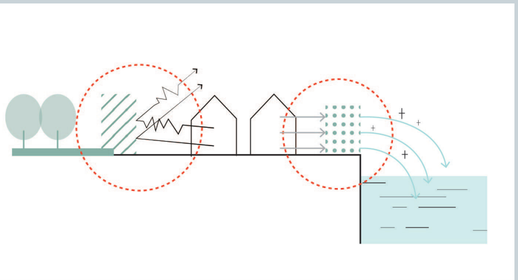
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

G3 ECO-QUALITY INSURANCE

Hypothesis

Placing purification and protection structures at the interface between the city and nature minimizes the pollution and disturbance of nature by urban emissions and ensures the quality of the ecological environment.



Included patterns

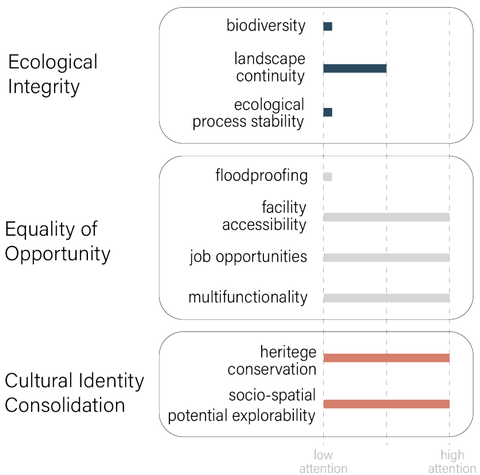
S1 BUZZING NATURE
S2 URBAN FRAGMENTED GREEN
S8 FLOATING ISLANDS
S11 MULTIFUNCTIONAL FLOODPLAIN
S12 PURIFYING BEFORE RETENTION
S13 FLOOD-PROOF PLINTH
S14 TEMPORARY FLOOD RESISTANCE

Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

Leisure Culture City

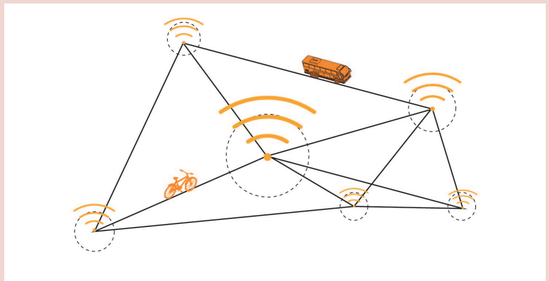
A city that can fully exploit its socio-spatial potential to promote the development of its leisure industry and reveal its cultural heritage.



G4 COMPLETE PUBLIC TRANSPORTATION

Hypothesis

A comprehensive public transportation system maximizes accessibility to the area and helps to phase-out the automobile.



Included patterns

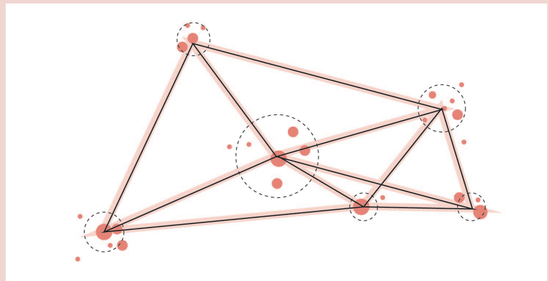
S15 CONTINUOUS PUBLIC TRANSPORTATION
S16 EVERYBODY SLOW DOWN

Reference

Southworth, M. (2005). Designing the walkable city. Journal of urban planning and development, 131(4), 246-257.

G5 DENSIFIED LEISURE ACTIVITY NETWORK

Hypothesis



Included patterns

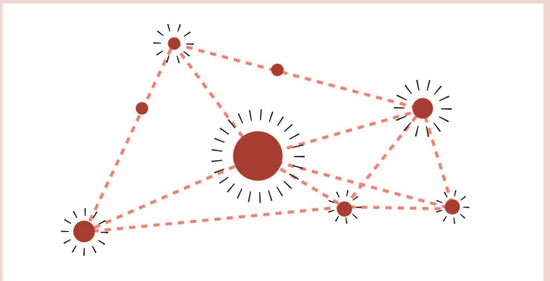
S16 EVERYBODY SLOW DOWN
S17 VIBRANT PEDESTRIAN
S18 OUR BACKYARD
S19 URBAN FARMING
S20 NATURE EDUCATION

Reference

Jacobs, J. (2016). The death and life of great American cities. Vintage.
Gehl, J. (2011). Life between buildings.

G6 HISTORY AND CULTURE VALUE REVIVAL

Hypothesis



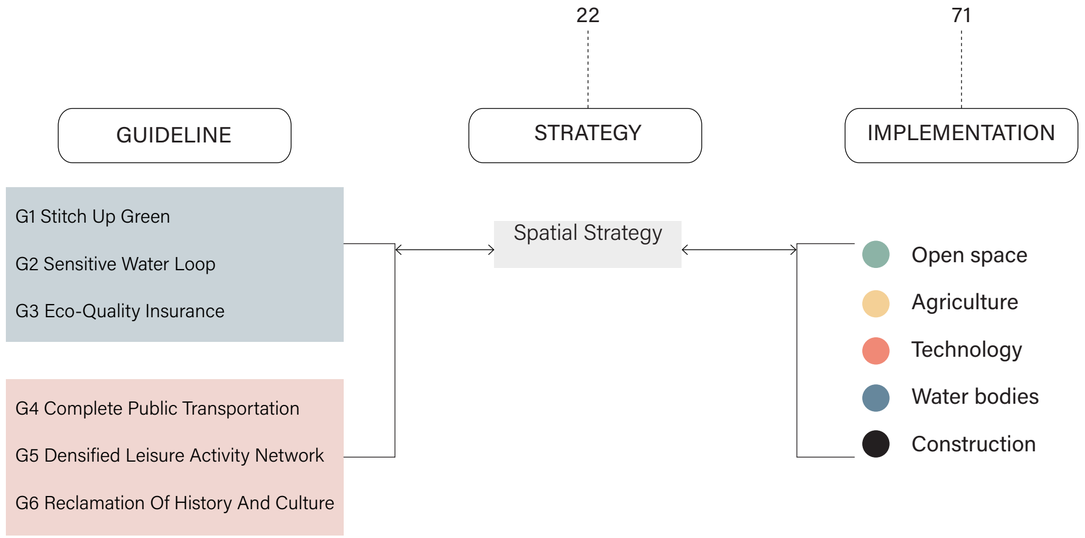
Included patterns

S21 INDUSTRIAL LEGACY PRESERVATION
S22 REPURPOSING OF RELICS

Reference

Moreira, F., Queiroz, A. I., & Aronson, J. (2006). Restoration principles applied to cultural landscapes. Journal for Nature Conservation, 14(3-4), 217-224.

Spatial Strategy



The study explores spatial strategies that align with the established guidelines, tailoring them to the urban context, and delves into their practical implementation considering site-specific conditions, constraints, and opportunities. Each implementation will be assessed based on its alignment with the defined design goals, ensuring that the strategies and interventions effectively address the desired outcomes and objectives.

S1 BUZZING NATURE

Hypothesis

Creating diverse habitats benefits biodiversity conservations.

Theoretical back-up & Practical implication

Creating diverse habitats is essential for biodiversity conservation because it allows for the coexistence of a wide range of species, each occupying specific ecological niches. This promotes species richness, ensuring that a greater number of species thrive in the ecosystem. Diverse habitats also enhance ecosystem resilience, as they provide a buffer against disturbances and enable adaptation to changing environmental conditions. Additionally, diverse habitats support crucial ecological interactions such as pollination and predation, which are vital for ecosystem functioning and the maintenance of a balanced ecological system.

It can be realized by by providing a variety of ecological niches, promoting species richness, enhancing ecosystem resilience, and supporting crucial ecological interactions, thereby ensuring the overall health and sustainability of ecosystems.

Reference

https://www.newprocontainers.com/blog/benefits-urban-green-spaces/

S1.1 MULTI-LAYERED VEGETATION

Hypothesis

Diverse vegetation in a neighborhood enhances the ecosystem for more creatures.

Contribution to Goals

Stakeholders

Maastricht municipality
water sectors
educational institutions
environmental institutions

S1.2 LEAVE NATURE WILD

Hypothesis

Keeping nature wild and respecting its rhythms protects the habitat of local animals and creates more biodiversity.

Contribution to Goals

Stakeholders

Maastricht municipality
water sectors
tourism sectors
transportation sectors
educational institutions
environmental institutions

S1.3 ECOLOGICAL IRRIGATION CANAL

Hypothesis

In polder agriculture areas, purifying vegetation in irrigation canals ensures water quality and improves ecological resilience and biodiversity.

Contribution to Goals

Stakeholders

Maastricht municipality
water sectors
tourism sectors
transportation sectors
educational institutions
environmental institutions

S2 URBAN FRAGMENTED GREEN

Hypothesis

Urban fragmented greenery reconnects and restores natural systems that have been disrupted by human activities within the confines of a limited urban area.

Theoretical back-up & Practical implication

Human activities often result in the destruction and fragmentation of natural habitats. By creating patches of green spaces within urban areas, such as pocket parks, green roofs, vertical gardens, urban wildlife corridors, community gardens, linear parks and greenways, urban forests, and green infrastructure, we can help restore and reconnect ecosystems, providing refuge for biodiversity, improving ecosystem services, and increasing the overall resilience of urban environments to the challenges of climate change and urbanization.

Reference

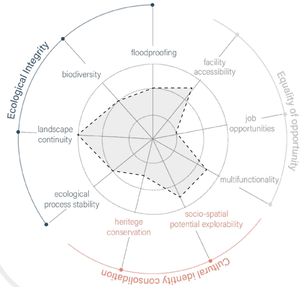
https://www.newprocontainers.com/blog/benefits-urban-green-spaces/

S2.1 BOULEVARD

Hypothesis

Boulevards provide a scenic and functional corridor that enhances mobility, aesthetics, and community interaction.

Contribution to Goals



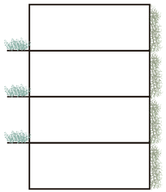
Stakeholders

Maastricht municipality
leisure business
transportation companies
contractors
locals
migrants

S2.2 ECO-FACADE

Hypothesis

Green facades provide the advantage of enhancing buildings with vegetation, improving air quality, reducing energy consumption.



Contribution to Goals

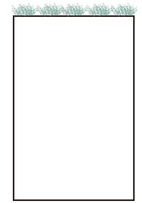
Stakeholders

Maastricht municipality
leisure business
contractors
factories
locals
migrants

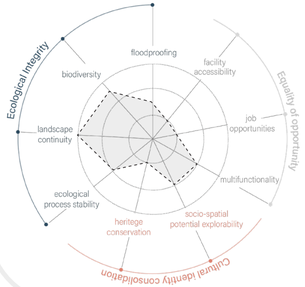
S2.3 ROOF GREEN

Hypothesis

A certain amount of rain-collecting roofs expands water retention areas and promotes urban biodiversity.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
contractors
factories
locals
migrants

S3 KEEP THE POWER ON

Hypothesis

Flood-proof renewable energy infrastructure maintains long-term stable power supply.

Theoretical back-up & Practical implication

Flood-proof renewable energy infrastructure reduces reliance on fossil fuels, which are vulnerable to supply disruptions during floods, and harnesses clean and sustainable energy sources that are less affected by flood-related damage, thus promoting energy resilience and mitigating climate change impacts.

For example, solar panels installed on rooftops or in open areas can generate electricity from sunlight, providing a flood-proof and reliable source of renewable energy. Implementing decentralized renewable energy systems, such as rooftop solar panels and small wind turbines, can ensure power supply resilience during floods by diversifying energy sources and reducing dependence on centralized infrastructure.

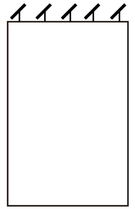
Reference

IOVENKO, C. (2018). Dutch Masters: The Netherlands Exports Flood-Control Expertise. Earth: The Science Behind the Headlines (31 August 2018), online: Earth Magazine< https://www.earthmagazine. org/article/dutch-masters-netherlands-exports-flood-control-expertise.

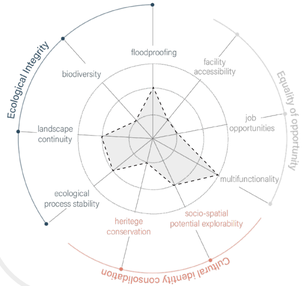
S3.1 SOLAR ROOF

Hypothesis

Solar roofs harness solar energy at the building level, enabling clean and renewable power generation while maximizing space utilization and reducing reliance on traditional energy sources.



Contribution to Goals



Stakeholders

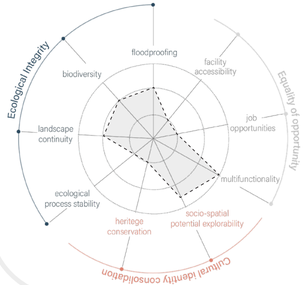
Maastricht municipality
leisure business
energy companies
contractors
factories
locals
international students
migrants

S3.2 SOLAR PARK

Hypothesis

Solar parks offer large-scale clean energy generation from sunlight, promoting sustainability and reducing carbon emissions.

Contribution to Goals



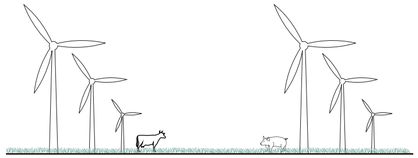
Stakeholders

Maastricht municipality
energy companies
contractors
locals
tourists
farmers

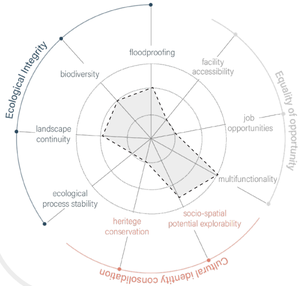
S3.3 WIND TURBINE PARK

Hypothesis

Wind turbine parks offer the benefit of harnessing renewable wind energy on a larger scale, contributing to clean electricity generation, reducing carbon emissions, and promoting sustainable energy practices.



Contribution to Goals



Stakeholders

Maastricht municipality
energy companies
contractors
locals
farmers

S4 ROOM FOR RIVERS

Hypothesis

Reserving more space for rivers enhance our ability to cope with the uncertainties of future climate change.

Theoretical back-up & Practical implication

The concept of making room for rivers, as stated by Deltares (2013), involves allowing rivers to occupy larger areas during periods of excessive flow, which can help reduce flood risk and simultaneously enhance water-related biodiversity, leading to improved water quality. This nature-based approach offers adaptable solutions to address climate challenges by utilizing natural processes and ecosystems to manage water resources effectively.

To handle tidal flooding, the first step is often removing existing dikes and lowering floodplains, potentially leading to floodable wetlands and increased tourism; creating a new river arm can also be considered.

Reference

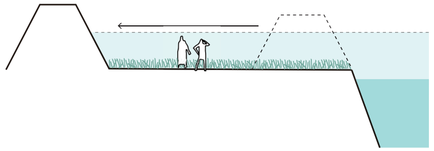
Deltares annual Review. (2013). Retrieved from https://www.deltares.nl/app/uploads/2015/02/Deltares-annual-Review-2013.pdf

WLA. (2016). *Room for the river.* Retrieved from https://worldlandscapearchitect.com/room-for-the-river-nijmegen-the-netherlands-hns-landscape-architects/#.Y0wPu3ZBy3B

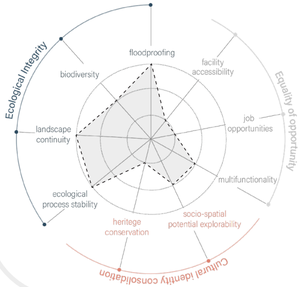
S4.1 SETBACK DIKE

Hypothesis

Setback dikes widen the water surface and slow down the rise of the river level.



Contribution to Goals



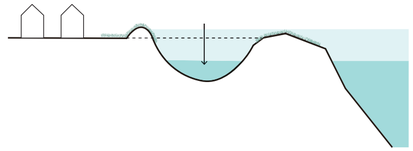
Stakeholders

Maastricht municipality
water sectors
tourism sectors
transportation sectors
agriculture sectors
industrial sectors
energy sectors
culture and sports sectors
housing developers
educational institutions
environmental institutions
housing associations

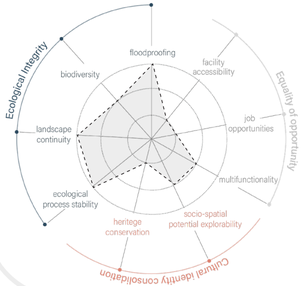
S4.2 ARTIFICIAL TRIBUTARIES

Hypothesis

Opening new river channels in urban areas slows the rise of rivers and improves the inner city ecology.



Contribution to Goals



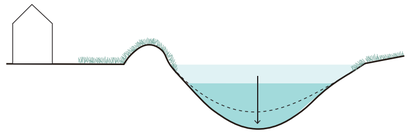
Stakeholders

Maastricht municipality
water sectors
tourism sectors
transportation sectors
agriculture sectors
culture and sports sectors
educational institutions
environmental institutions

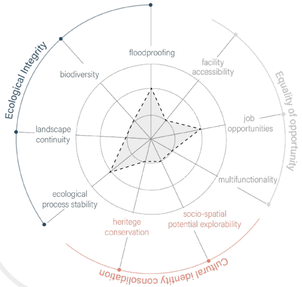
S4.3 DEEPENING OF THE RIVERBED

Hypothesis

Opening new river channels in urban areas slows the rise of rivers and improves the inner city ecology.



Contribution to Goals



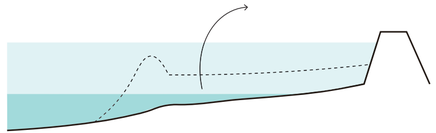
Stakeholders

Maastricht municipality
water sectors
transportation sectors
educational institutions
environmental institutions

S4.4 LOWERING FLOODPLAIN

Hypothesis

Lowering the floodplain creates a wider buffer zone buffer to adapt to variable water levels, which also enriches the biodiversity of the riverside.



Contribution to Goals

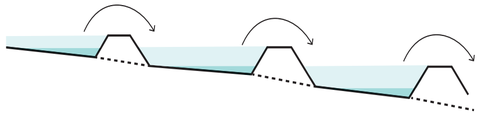
Stakeholders

Maastricht municipality
water sectors
agriculture sectors
industrial sectors
educational institutions
environmental institutions

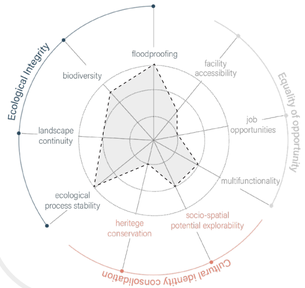
S4.5 MULTILAYERED RETENTION BASIN

Hypothesis

Multilayered retention basins effectively manage stormwater runoff by reducing flooding, improving water quality, and replenishing groundwater resources.



Contribution to Goals



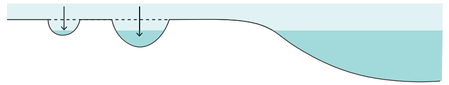
Stakeholders

Maastricht municipality
water sectors
agriculture sectors
educational institutions
environmental institutions

S4.6 BACK-UP WATERS

Hypothesis

Backwaters create diverse and unique aquatic habitats, supporting biodiversity, providing recreational opportunities, and serving as natural water reservoirs.



Contribution to Goals

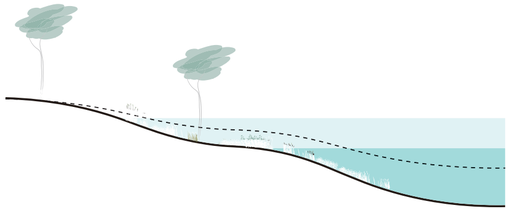
Stakeholders

Maastricht municipality
water sectors
educational institutions
environmental institutions

S4.7 FLOODABLE WETLAND

Hypothesis

The return of large riverine green spaces to a wetland state allows them to flourish according to the rhythm of the natural water circulation.



Contribution to Goals

Stakeholders

Maastricht municipality
water sectors
tourism sectors
culture and sports sectors
educational institutions
environmental institutions

S5 RIVER DYNAMICS STIMULATION

Hypothesis

Incorporating media in specific areas of the stream using morphodynamics will enrich the stream structure.

Theoretical back-up & Practical implication

Incorporating media, such as rocks or woody debris, in specific areas of a stream using morphodynamics techniques can enhance the stream structure by creating diverse microhabitats, promoting natural flow patterns, and providing refuge and food sources for aquatic organisms, thus enriching the overall ecological functioning of the stream.

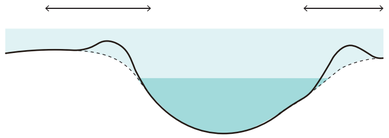
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

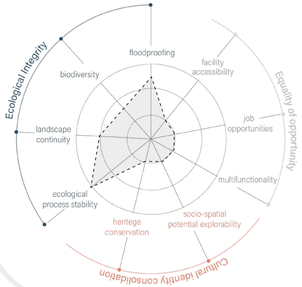
S5.1 RESHAPING CHANNEL CROSS-SECTIONS

Hypothesis

Reshaping channel cross-sections increase water conveyance capacity and reduce flood risk.



Contribution to Goals



Stakeholders

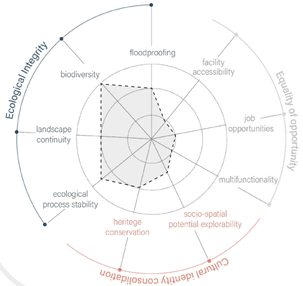
Maastricht municipality
water sectors
agriculture sectors
industrial sectors
educational institutions
environmental institutions

S5.2 INTRODUCING FLOW DISTURBANCES

Hypothesis

Setting interfering elements catalyze erosion or deposition at specific locations in the riverbed.

Contribution to Goals



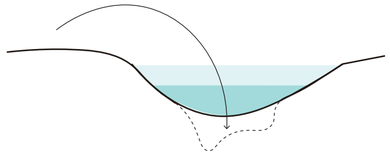
Stakeholders

Maastricht municipality
water sectors
educational institutions
environmental institutions

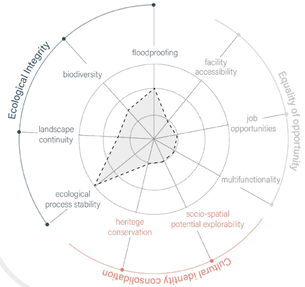
S5.3 LOADING THE RIVERBED

Hypothesis

Reloading eroded riverbeds restores natural water flow by mitigating erosion.



Contribution to Goals



Stakeholders

Maastricht municipality
water sectors
transportation sectors
educational institutions
environmental institutions

S6 RELEASE CHANNEL

Hypothesis

Removing or reducing artificial interventions in the river restores ecological functions and services in the catchment.

Theoretical back-up & Practical implication

Removing or reducing artificial interventions in the river allows natural processes to resume, leading to improved water quality, enhanced habitat connectivity, increased biodiversity, and the reestablishment of ecological interactions. By restoring the river's natural state, the ecosystem can regain its ability to provide essential services such as water filtration, flood regulation, and support for aquatic and terrestrial organisms, resulting in overall ecological health and resilience (Prominski, 2012).

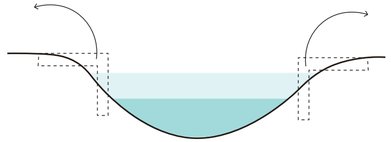
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

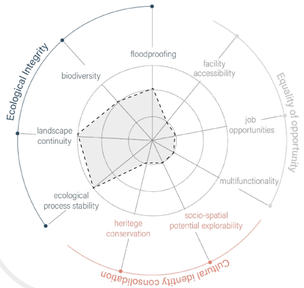
S6.1 RIVER REINFORCEMENT REMOVAL

Hypothesis

Removing bank and bed reinforcement will restore the normalized channel to its natural meandering form.



Contribution to Goals



Stakeholders

Maastricht municipality
water sectors
agriculture sectors
industrial sectors
educational institutions
environmental institutions

S7 FLOOD-ADAPTED AGRICULTURE

Hypothesis

Multifunctional agriculture areas adapt to periodic flooding and provide a variety of leisure activities and functions under normal conditions.

Theoretical back-up & Practical implication

Multifunctional agriculture areas are designed to adapt to periodic flooding by implementing flood-resistant infrastructure and employing flood-tolerant crops and farming practices. These areas not only ensure agricultural productivity during flood events but also offer a variety of leisure activities and functions under normal conditions. By integrating recreational amenities, water management systems, and educational opportunities, multifunctional agriculture areas provide opportunities for agro-tourism, outdoor recreation, and ecological conservation. This multifaceted approach enhances the resilience and value of these areas, allowing them to serve as productive agricultural spaces while providing recreational and educational benefits to the community.

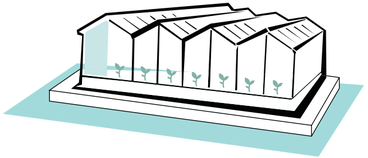
Reference

https://www.farmingforabetterclimate.org/adapting-to-climate-change/adapting-to-flooding-heavy-rainfall/

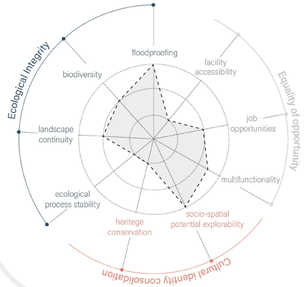
S7.1 FLOATING GREENHOUSE

Hypothesis

Floating greenhouses maximize agricultural space while reducing water consumption and protecting crops from adverse weather conditions.



Contribution to Goals



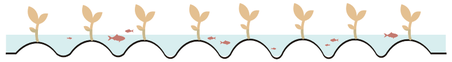
Stakeholders

Maastricht municipality
energy companies
contractors
farmers

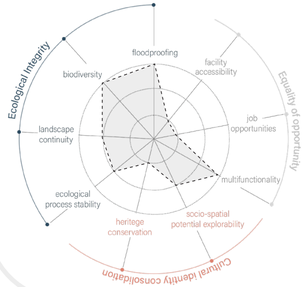
S7.2 WATER-BORNE AGRICULTURE

Hypothesis

Water-borne agriculture utilizes aquatic environments for cultivation and increases food production.



Contribution to Goals



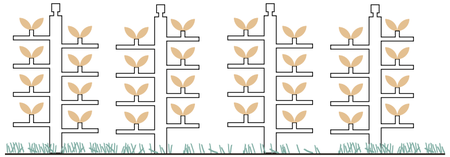
Stakeholders

Maastricht municipality
contractors
farmers

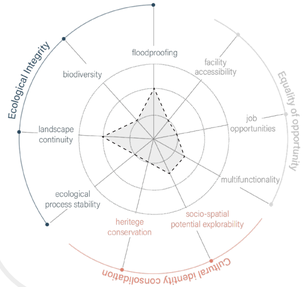
S7.3 HYDROPONIC VERTICAL FARMING

Hypothesis

Hydroponic vertical farming maximizes crop yields in limited space and enables year-round cultivation for sustainable and efficient food production.



Contribution to Goals



Stakeholders

Maastricht municipality
energy companies
contractors
farmers

S8 FLOATING ISLANDS

Hypothesis

The floating patches extend the public space above the water and serve as a shelter in case of flooding.

Theoretical back-up & Practical implication

Floating islands can flexibly adapt to water levels and therefore have little impact on the flow resistance and discharge cross-section of waterways. In addition, floating elements can serve as strong visual features in the urban landscape.

Floating elements are more likely to be used in waterways where the flow is slow. In places with strong water currents, it is best to use guards to prevent dangerous floating objects at high water levels. In addition, the floating elements need to be fixed, and those near the shore can be connected to the shore in the form of stairs, while those in the middle of the water need to be fixed in the submerged land.

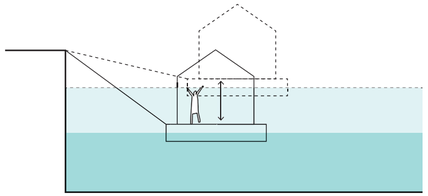
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

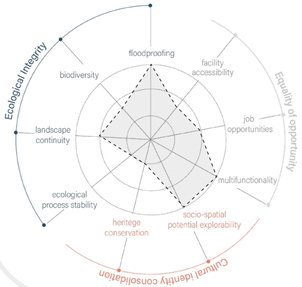
S8.1 FLOATING BUILDING

Hypothesis

Floating buildings allow people to live safely on water.



Contribution to Goals



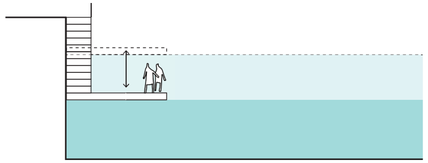
Stakeholders

Maastricht municipality
leisure business
energy companies
contractors
locals
international students
migrants
tourists

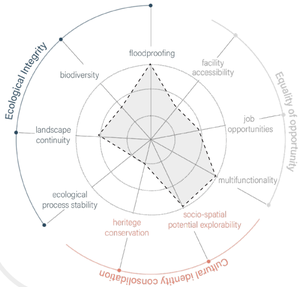
S8.2 WATERFRONT EXTENSION

Hypothesis

Floating elements expand the waterfront activity space and enrich the diversity of activities.



Contribution to Goals



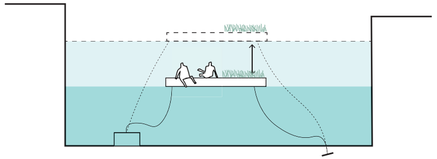
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

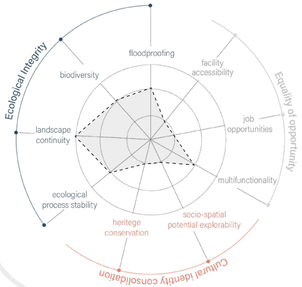
S8.3 WATER CENTRAL ISLAND

Hypothesis

Floating elements provide a place for people to dock in the water, or grow water purifying plants to filter the water.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
contractors
locals

S9 STORMWATER BUFFER

Hypothesis

Enough urban retention spaces allow the rainwater to stay during extreme flood events.

Theoretical back-up & Practical implication

Various forms of retention space, such as retention ponds, natural ditches, urban canals, floodable wetlands, amphibious parks, rainwater squares/ sports fields, retention roofs, and storage below buildings, serve as valuable tools for managing rainwater and enhancing flood resilience in cities. These spaces provide permanent or temporary water storage capacity, allowing them to store excess rainwater during floods and also be utilized for future consumption, maximizing space utilization and improving urban flood resilience (NWRM, 2015).

Reference

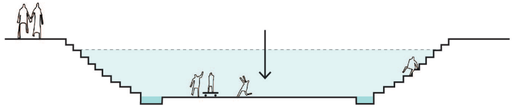
Magdaleno Mas, F., & Dalacamara Andres, G. (2015). *Natural Water Retention Measures (NWRM): from Design to Implementation through European Projects.* Ingenieria Civil (Madrid), 179, 131-138.

Mairs, J. (12 July, 2016). *Chains of pools proposed to ease flooding in Copenhagen.* Retrieved from https://www.dezeen.com/2016/07/12/hans-tavsens-park-korsgade-sla-copenhagen-denmark-flooding-urban-planning/

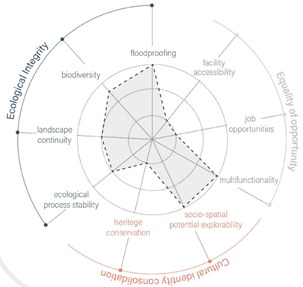
S9.1 WATER SQUARE

Hypothesis

The sunken square acts as a sports field in dry weather, but forms a storm water retention area during heavy rainfall.



Contribution to Goals



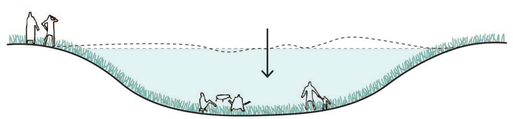
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

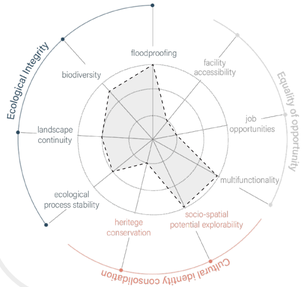
S9.2 SINKING GREEN SPACE

Hypothesis

The sunken green space stores and purifies rainwater while improving the urban microclimate.



Contribution to Goals



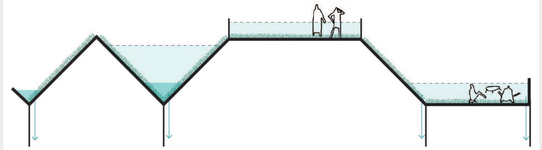
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

S9.3 CATCHMENT ROOF

Hypothesis

A certain amount of rain-collecting roofs expands water retention areas and promotes urban biodiversity.



Contribution to Goals

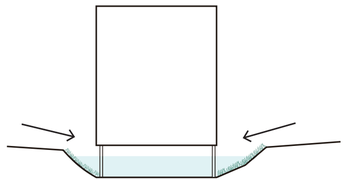
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants

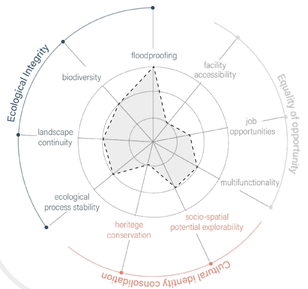
S9.4 BUILDING SUBSURFACE RETENTION

Hypothesis

Underground areas in buildings improve the city's stormwater retention capacity when there is not enough open space in the city.



Contribution to Goals



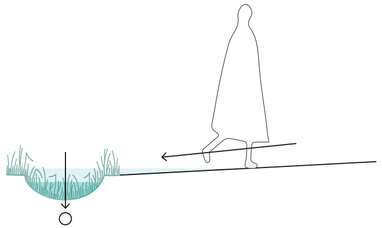
Stakeholders

Maastricht municipality
leisure business
contractors
factories
locals
migrants

S9.5 ECOLOGICAL DITCH

Hypothesis

Ecological ditches in cities collect and purify rainwater, contributing to urban biodiversity and microclimate regulation.



Contribution to Goals

Stakeholders

Maastricht municipality
water sectors
tourism sectors
transportation sectors
educational institutions
environmental institutions

S10 SURFACE DRAINAGE

Hypothesis

Making full use of urban surface drainage minimize the pressure on underground drainage infrastructure.

Theoretical back-up & Practical implication

Flooding in urban areas can be attributed to surface drainage inefficiencies, even with well-designed stormwater pipes, and implementing blue-green systems with sun exposure offers interactive and low-technical solutions. For instance, adopting V-shaped urban road cross-sections can minimize roadway space while increasing water retention capacity during daily and extreme storms, and the inclusion of small drains allows for additional drainage space without compromising public use of the area (Pallao et al., 2018).

Reference

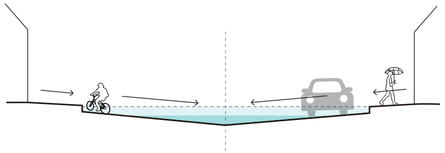
Palla, A., Colli, M., Candela, A., Aronica, G. T., & Lanza, L. G. (2018). *Pluvial flooding in urban areas: The role of surface drainage efficiency.* Journal of Flood Risk Management, 11, S663-S676.

Mairs, J. (12 July, 2016). *Chains of pools proposed to ease flooding in Copenhagen.* Retrieved from https://www.dezeen.com/2016/07/12/hans-tavsens-park-korsgade-sla-copenhagen-denmark-flooding-urban-planning/

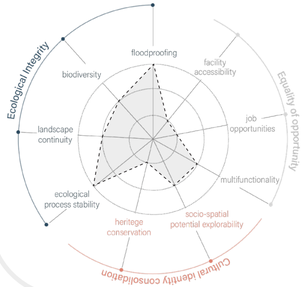
S10.1 V-SHAPED ROAD

Hypothesis

The road slopes to the median so that it forms a waterway to quickly drain away the storm water.



Contribution to Goals



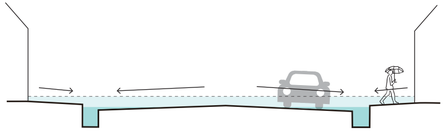
Stakeholders

Maastricht municipality
transportation companies
contractors
locals
international students
migrants
tourists

S10.2 MICRO CANAL

Hypothesis

Small drains throughout the city divert rainwater to storage areas to effectively prevent water from accumulating in public spaces.



Contribution to Goals

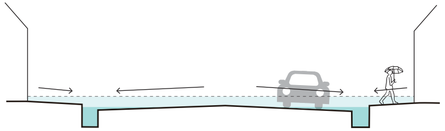
Stakeholders

Maastricht municipality
transportation companies
contractors
locals
international students
migrants

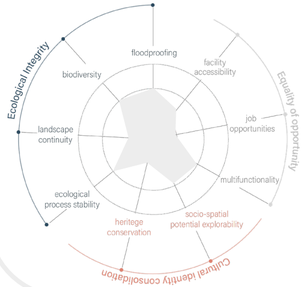
S10.3 PERMEABLE PAVEMENT

Hypothesis

Permeable pavements improve the permeability of built-up areas making them more resilient to flooding.



Contribution to Goals



Stakeholders

Maastricht municipality
transportation companies
contractors
locals
international students
migrants

S11 MULTIFUNCTIONAL FLOODPLAIN

Hypothesis

Multifunctional floodplains adapt to periodic flooding and provide a variety of leisure activities and functions during non-flood periods.

Theoretical back-up & Practical implication

Through the implementation of flood-resistant infrastructure, such as elevated walkways and flood-proof buildings, these floodplains can accommodate floodwaters safely. During normal conditions, they offer recreational amenities, ecological restoration efforts, and cultural events, enhancing community well-being, promoting biodiversity, and contributing to the overall resilience of the area (Prominski et al., 2012).

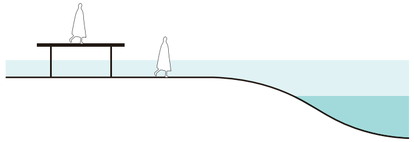
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

S11.1 BACK-UP ROUTE

Hypothesis

Putting an elevated track on the floodplain maintains transportation connectivity during floods and reduces infrastructure damage.



Contribution to Goals

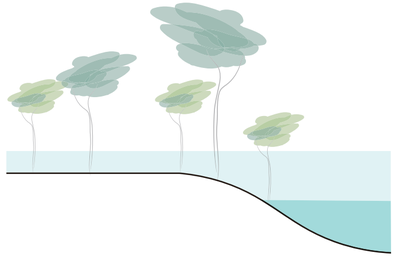
Stakeholders

Maastricht municipality
leisure business
transportation companies
contractors
locals
international students
migrants
tourists

S11.2 WET-LOVING TREES

Hypothesis

Wet-loving trees survive in chronically flooded areas and help purify water bodies.



Contribution to Goals

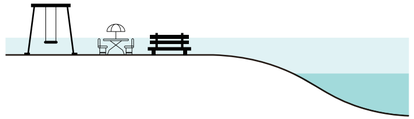
Stakeholders

Maastricht municipality
water sectors
tourism sectors
educational institutions
environmental institutions

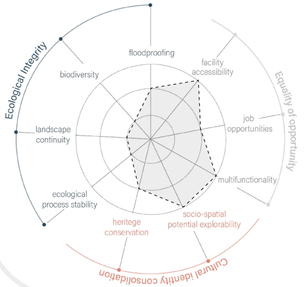
S11.3 TEMPORARY STREET FURNITURE

Hypothesis

Moving street furniture to a safe place before a flood extends their lifespan and adds vibrancy to public spaces under normal conditions.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
energy companies
contractors
locals
international students
migrants
tourists

S12 PURIFYING BEFORE RETENTION

Hypothesis

Placement of purification elements around the retention area improves the cleanliness and usability of the flood water.

Theoretical back-up & Practical implication

Purification vegetation, also known as constructed wetlands or vegetative buffers, can improve water quality through several mechanisms. Firstly, the plants in purification vegetation systems, such as wetland plants and grasses, have extensive root systems that trap and filter pollutants, such as sediments, nutrients, and heavy metals, from the water. Secondly, the microbial activity within the wetland or vegetative buffer plays a crucial role in the breakdown and transformation of organic matter and pollutants, enhancing water quality. Lastly, the natural processes occurring in these vegetation systems, such as sedimentation, adsorption, and nutrient uptake, further contribute to the removal of contaminants and the improvement of water quality.

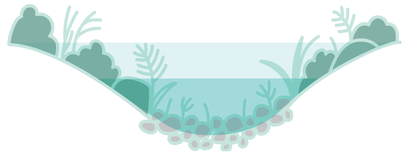
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). *River. Space. Design.* In River. Space. Design. Birkhäuser.

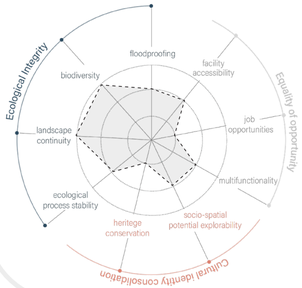
S12.1 BIOSWALES

Hypothesis

Bio Valley maximizes the residence time of flood water in the swamp while removing pollutants from the water.



Contribution to Goals



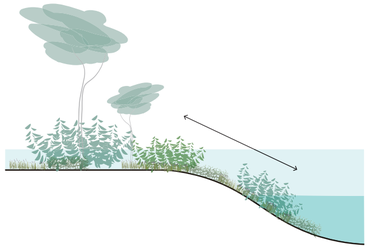
Stakeholders

Maastricht municipality
water sectors
tourism sectors
agriculture sectors
educational institutions
environmental institutions

S12.2 WATER PURIFICATION PLANTS

Hypothesis

Water purifying plant roots have a strong ability to purify water and energize riparian ecosystems.



Contribution to Goals

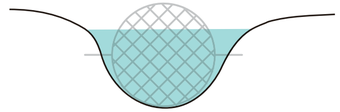
Stakeholders

Maastricht municipality
water sectors
tourism sectors
agriculture sectors
environmental institutions

S12.3 STRAINERS

Hypothesis

Placing strainers in rivers effectively removes debris, prevents clogging, and maintains the flow of water for improved water quality and ecosystem health.



Contribution to Goals

Stakeholders

Maastricht municipality
water sectors
tourism sectors
catering sectors
industrial sectors
educational institutions
environmental institutions

S13 FLOOD-PROOF PLINTH

Hypothesis

Flood-proof plinths enhance the resilience of buildings to flooding.

Theoretical back-up & Practical implication

The damage caused by flooding to buildings primarily occurs in their lower floors. By protecting the lower floors from flood damage, the safety of the building can be maximized, and property damage can be minimized (Pelsmakers, 2014). The commonly employed method for new construction is to raise the plinth above the maximum flood level. For existing buildings, retrofitting options often involve sacrificing the basement or ground floor and sealing a reinforced plinth to prevent flood damage. These approaches aim to safeguard the building's structural integrity and mitigate potential losses caused by flooding events.

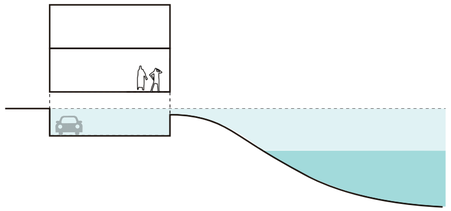
Reference

Pelsmakers, S. (2014). Living with water: four buildings that will withstand flooding. The Conversation.

S13.1 SACRIFICIAL LOWER TIER

Hypothesis

Relocation of living quarters to building levels above the flood water line minimizes the risk of flooding and economic damage.



Contribution to Goals

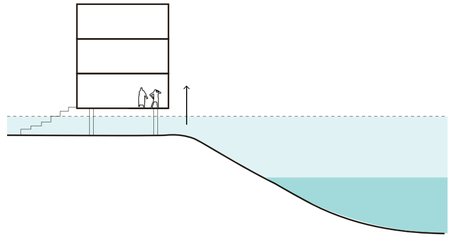
Stakeholders

Maastricht municipality
leisure business
contractors
factories
locals
international students
migrants
tourists

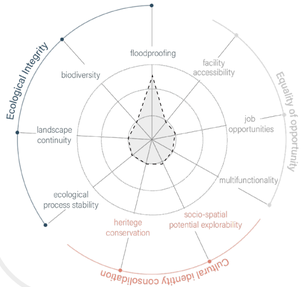
S13.2 HIGH-HEELED PLINTH

Hypothesis

Elevate building plinths to prevent flooding from entering the building.



Contribution to Goals



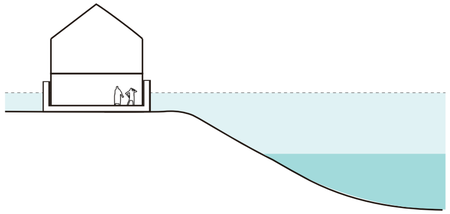
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

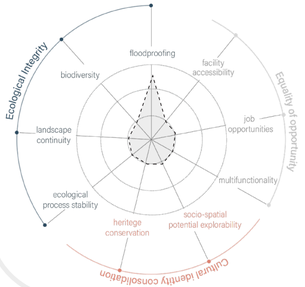
S13.3 SEALED PLINTH

Hypothesis

Seal the building plinth with moisture-proof material to prevent flooding from entering the building.



Contribution to Goals



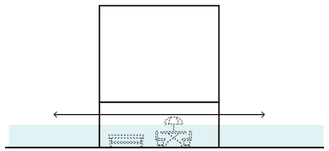
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

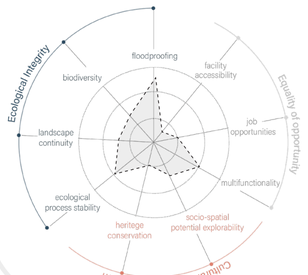
S13.4 FLEXIBLE PLINTH

Hypothesis

Open and flexible public space on the ground floor brings more vitality and minimizes potential risks to any private property.



Contribution to Goals



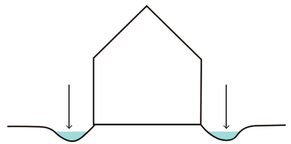
Stakeholders

Maastricht municipality
leisure business
contractors
factories
locals
international students
migrants
tourists

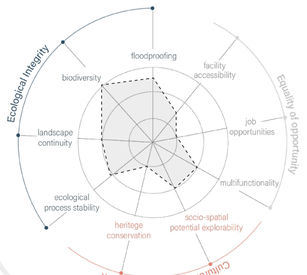
S13.5 LOWER SURROUNDING

Hypothesis

Lower surrounding areas of buildings prevent water accumulation, improve drainage, and reduce the risk of flood damage.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
contractors
factories
locals
international students
migrants
tourists

S14 TEMPORARY FLOOD RESISTANCE

Hypothesis

Temporary elements immediately protect the city construction in case of emergency.

Theoretical back-up & Practical implication

Temporary flood protection elements, also known as mobile flood protection elements, play a crucial role in reducing the flood protection gap or increasing the level of protection during rising water levels. These elements can be moved as needed, allowing for openings in the flood protection line or designing them to be smaller. Efficient logistics are necessary to ensure timely installation when a flood threat arises. Examples of such elements include flood gates that close roads, sidewalks, and bike lanes when water levels reach the flood level. Walls can be built at medium height or with small gaps, and they can be raised or closed when flooding is imminent. Additionally, temporary pedestrian bridges can be constructed to facilitate passage for people during flooding events, ensuring connectivity within the city.

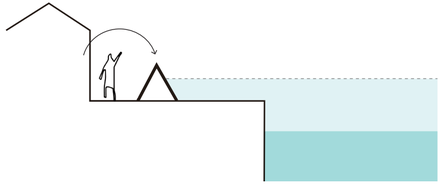
Reference

Prominski, M., Stokman, A., Stimberg, D., Voermanek, H., & Zeller, S. (2012). River. Space. Design. In River. Space. Design. Birkhäuser.

S14.1 REMOVABLE DIKE

Hypothesis

Assembled dikes quickly provide protection against flooding in areas where protection is weak.



Contribution to Goals

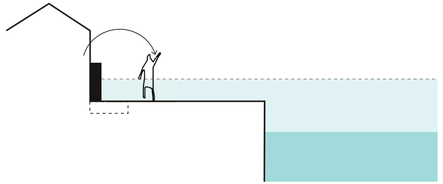
Stakeholders

Maastricht municipality
leisure business
transportation companies
energy companies
factories
locals
international students
migrants
tourists

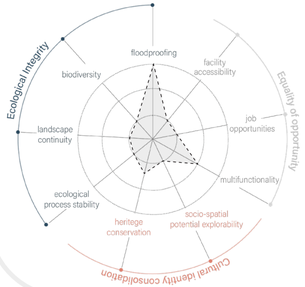
S14.2 WATERPROOF CONSTRUCTION MASK

Hypothesis

Waterproofing elements cover doors and windows prevent water from entering the building interior when flooding occurs.



Contribution to Goals



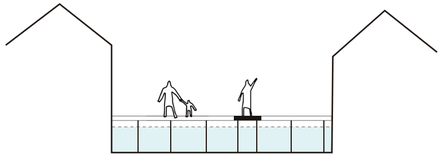
Stakeholders

Maastricht municipality
leisure business
transportation companies
energy companies
contractors
factories
locals
international students
migrants
tourists

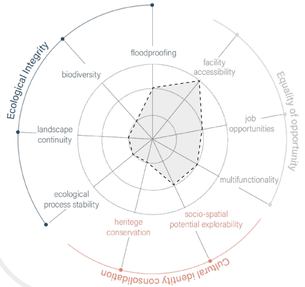
S14.3 PASSAGE IN FLOODS

Hypothesis

Putting an elevated track after floods ensures efficient movement of people and goods.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
transportation companies
factories
locals
international students
migrants
tourists

S15 CONTINUOUS PUBLIC TRANSPORTATION

Hypothesis

A well-developed public transportation system promotes urban accessibility and significantly reduces the use of private vehicles.

Theoretical back-up & Practical implication

A well-developed public transportation system refers to a comprehensive network of public transit options, including buses, trains, trams, subways, and other modes of transportation, that are efficiently planned, integrated, and accessible to meet the diverse travel needs of a population within an urban area.It promotes urban accessibility by providing convenient, reliable, and efficient transportation options that cater to diverse travel needs, reducing the dependence on private vehicles and resulting in improved mobility, reduced traffic congestion, enhanced environmental sustainability, and increased social equity (Southworth, 2005).

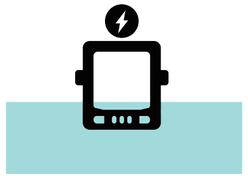
Reference

Southworth, M. (2005). Designing the walkable city. Journal of urban planning and development, 131(4), 246-257.

S15.1 GREEN WATERBUS

Hypothesis

A waterbus powered by green energy prevents pollution of the water while connecting people's daily life with water more.



Contribution to Goals

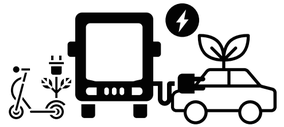
Stakeholders

international governments
Province of Limburg
Rijkswaterstaat & Water boards
international transportation companies
non-government organizations

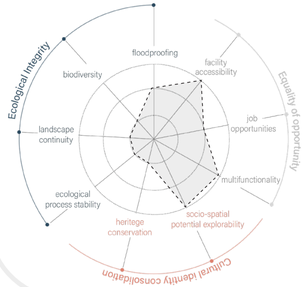
S15.2 MOBILITY HUB

Hypothesis

Mobility hubs consist of multiple intersecting public transportation modes and/or lines that connect and dense the public transportation network.



Contribution to Goals



Stakeholders

Maastricht municipality
tourism sectors
transportation sectors
energy sectors
educational institutions
environmental institutions
labour associations

S16 EVERYBODY SLOW DOWN

Hypothesis

Making public spaces that prioritize pedestrians and cyclists reduces private car use.

Theoretical back-up & Practical implication

Limiting the use of cars in certain areas of the city, such as riverside areas and urban centers, is a crucial initiative to protect sensitive ecosystems, reduce environmental damage caused by automobile emissions, reclaim urban space, and prioritize pedestrian-friendly environments. By creating car-free zones and promoting walking and alternative modes of transportation, cities can mitigate air and noise pollution, revitalize public spaces, foster community engagement, and preserve biodiversity (Southworth, 2005). This approach not only improves the well-being of residents but also contributes to a more sustainable and resilient urban future.

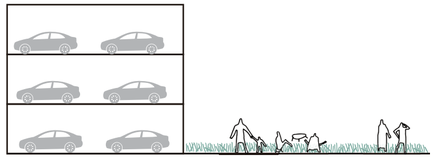
Reference

Southworth, M. (2005). Designing the walkable city. Journal of urban planning and development, 131(4), 246-257.

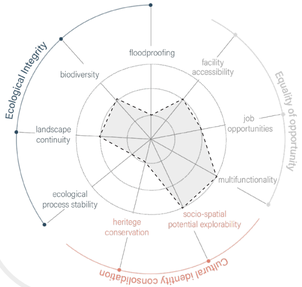
S16.1 CENTRALIZED PARKING

Hypothesis

Vertical concentration of parking areas to return open space to pedestrians.



Contribution to Goals



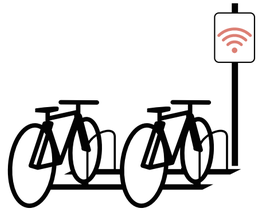
Stakeholders

Maastricht municipality
leisure business
transportation companies
energy companies
contractors
locals
international students
migrants
tourists

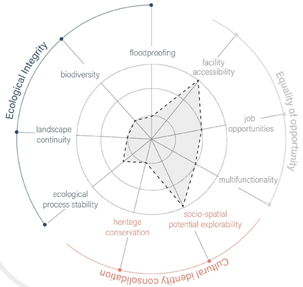
S16.2 SHARED MICRO MOBILITY

Hypothesis

Shared micro-mobility enables convenient and eco-friendly transportation for short urban trips, reducing congestion and promoting sustainability.



Contribution to Goals



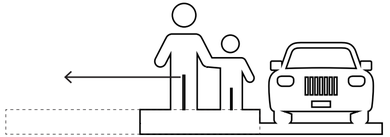
Stakeholders

Maastricht municipality
leisure business
transportation companies
energy companies
contractors
locals
international students
migrants
tourists

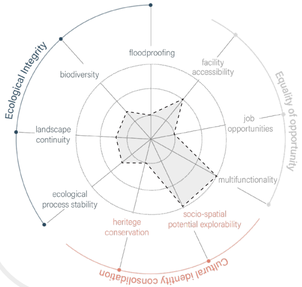
S16.3 LARGER PEDESTRAIN

Hypothesis

Larger pedestrian spaces enhance safety, walkability, and the liveliness of urban environments.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
transportation companies
contractors
locals
international students
migrants
tourists

S17 VIBRANT PEDESTRIAN

Hypothesis

A vibrant pedestrian environment improves walkability, promotes social interaction, boosts local economies, and enhances the overall livability of urban areas.

Theoretical back-up & Practical implication

By providing safe and visually appealing pedestrian infrastructure, such as wide sidewalks and pedestrian-only streets, people are encouraged to walk, which promotes physical activity and reduces congestion. These areas also create spaces for social connections, with well-designed public spaces and gathering areas fostering a sense of community and belonging (Gehl, 2011). Additionally, vibrant pedestrian environments support local businesses as people can easily discover and frequent shops, cafes, and restaurants while exploring the urban landscape.

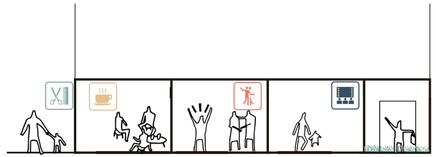
Reference

Jacobs, J. (2016). The death and life of great American cities. Vintage.
Gehl, J. (2011). Life between buildings.

S17.1 VIBRANT PLINTH

Hypothesis

The compact concentration of different functions in the plinth activate the street.



Contribution to Goals

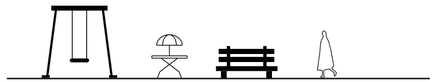
Stakeholders

Maastricht municipality
leisure business
transportation companies
energy companies
contractors
locals
international students
migrants
tourists

S17.2 HAVE A SEAT

Hypothesis

The provision of adequate sitting facilities in public spaces increases the use of space and thus enhances the vitality of the area.



Contribution to Goals

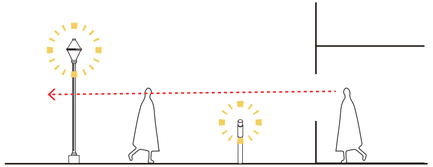
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

S17.3 A SAFE WALK

Hypothesis

Street lights and eyes on the street enhance the feeling of safety for walking.



Contribution to Goals

Stakeholders

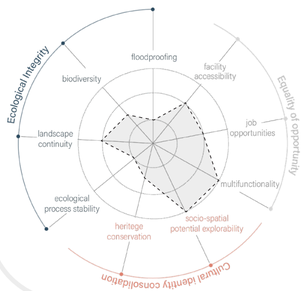
Maastricht municipality
leisure business
transportation companies
energy companies
contractors
locals
international students
migrants
tourists

S17.4 POROUS EDGES

Hypothesis

Porous edges create inviting and inclusive public spaces, promote social interaction, and enhance the livability of urban areas.

Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

S17.5 SOFT PAVEMENT

Hypothesis

Soft pavement reduces noise pollution, improves walking and cycling comfort, and enhances safety for pedestrians and cyclists.

Contribution to Goals

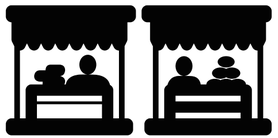
Stakeholders

Maastricht municipality
leisure business
transportation companies
contractors
locals
international students
migrants
tourists

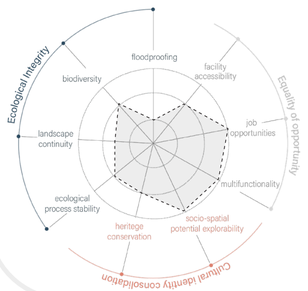
S17.6 TEMPORARY MARKET

Hypothesis

Temporary markets promote local entrepreneurship, foster community engagement, and offer diverse and unique shopping experiences.



Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
factories
locals
international students
migrants
tourists

S18 OUR BACKYARD

Hypothesis

The large amount of fragmented and unused open space in the city has the potential to be transformed into commonly used public spaces and contribute to urban vitality and natural circulation.

Theoretical back-up & Practical implication

The integration of diverse functions and users in urban spaces enhances vitality and natural surveillance, which is often lacking in housing complexes built in the 1960s. While these complexes may have large green spaces, residents struggle to connect with generic and anonymous areas. There is a growing demand for apartments that offer private spaces connected to green areas, creating a new dynamic within housing blocks. By redefining the green spaces, privatizing certain land parcels, and introducing commercial and service functions on the ground floor, the objective is to transform these areas from neglected spaces into personalized and vibrant environments that residents can truly embrace as their own (Jacobs, 1961).

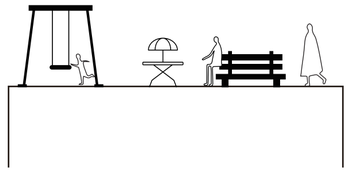
Reference

Jacobs, J,. 1961. The Death and Life of Great American Cities, New York: Random House
https://land8.com/parkstad-rotterdam-how-to-design-a-new-model-of-communal-living-in-the-city/

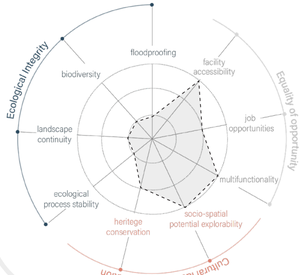
S18.1 ROOFTOP PLAYGROUND

Hypothesis

Rooftop playgrounds utilize underutilized space, promote physical activity and outdoor play.



Contribution to Goals



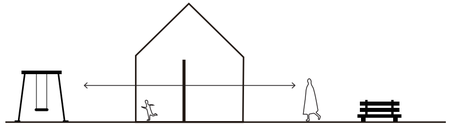
Stakeholders

Maastricht municipality
leisure business
contractors
locals
international students
migrants

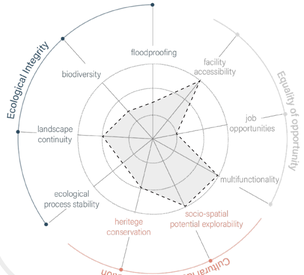
S18.2 EXPANDING THE BACKYARD

Hypothesis

Expanding the backyard creates additional outdoor space for recreation, gardening, and relaxation.



Contribution to Goals



Stakeholders

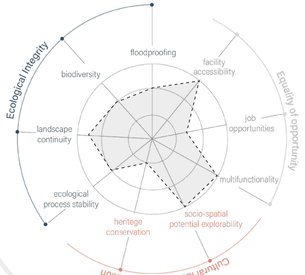
Maastricht municipality
leisure business
contractors
locals
international students
migrants
tourists

S18.3 RECLAIM PARKING LOT

Hypothesis

Reclaiming parking lots offers the advantage of repurpose underutilized spaces for green areas, community gathering, and promoting sustainable urban development.

Contribution to Goals



Stakeholders

Maastricht municipality
leisure business
transportation companies
contractors
locals
international students
migrants
tourists

S19 URBAN FARMING

Hypothesis

The use of spare urban space for agricultural production improves space utilization and generates additional income for residents.

Theoretical back-up & Practical implication

By utilizing spare urban space for agricultural production, underutilized or vacant land can be transformed into productive and functional areas. This involves activities such as rooftop gardens, vertical farming, community gardens, or small-scale farms. These spaces are optimized for growing crops, raising livestock, or cultivating plants, thereby maximizing the use of available land.

In this way, residents can grow and sell fresh produce, contributing to the local economy and increasing access to nutritious food. Urban agriculture also benefits the environment by mitigating the urban heat island effect, improving air quality, and supporting biodiversity.

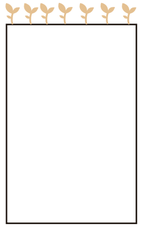
Reference

https://borgenproject.org/urban-farming-can-help-reduce-poverty/

S19.1 ROOFTOP FARM

Hypothesis

Rooftop farms utilize unused urban spaces for agricultural production and promote local food supply.



Contribution to Goals

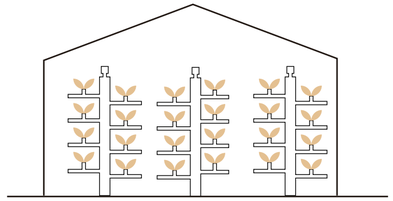
Stakeholders

Maastricht municipality
contractors
locals
international students
migrants
tourists
farmers

S19.2 VERTICAL AGRICULTURE

Hypothesis

Vertical agriculture maximizes food production in limited space and reduces transportation costs.



Contribution to Goals

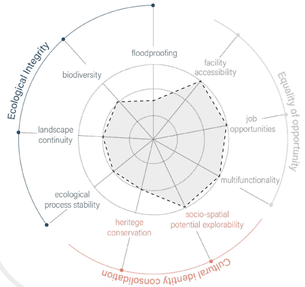
Stakeholders

Maastricht municipality
contractors
locals
international students
migrants
tourists
farmers

S19.3 COMMUNAL FARMING

Hypothesis

Contribution to Goals



Stakeholders

Maastricht municipality
contractors
locals
international students
migrants
tourists
farmers

S20 NATURE EDUCATION

Hypothesis

Nature education fosters a deeper connection between individuals and the natural world, leading to increased environmental awareness, conservation efforts, and overall well-being.

Theoretical back-up & Practical implication

Beatley (2011) explores the concept of biophilic cities, which emphasize incorporating nature into urban environments to enhance well-being, sustainability, and ecological connectivity. This relates to nature education by promoting the integration of natural elements, such as parks, green spaces, and wildlife habitats, into urban design, providing opportunities for urban residents to engage with and learn from nature. It supports the idea that fostering a connection with nature in urban settings is vital for environmental education, promoting a sense of stewardship, and creating more sustainable and livable cities.

Reference

Beatley, T. (2011). Biophilic cities: integrating nature into urban design and planning. Island Press.

S20.1 WILD TRAIL

Hypothesis

A wild trail allows people to enjoy and appreciate the wildness of nature in a eco-friendly manner.

Contribution to Goals

Stakeholders

Maastricht municipality
tourism sectors
transportation sectors
culture and sports sectors
educational institutions
environmental institutions
labour associations
locals
international students
migrants
tourists

S20.2 ELEVATED TRACK

Hypothesis

By using the elevated tracks in the nature reserve, people can sightsee and have fun in nature without damaging the natural landscape.

Contribution to Goals

Stakeholders

Maastricht municipality
tourism sectors
transportation sectors
culture and sports sectors
educational institutions
environmental institutions
labour associations
locals
international students
migrants
tourists

S21 INDUSTRIAL LEGACY PRESERVATION

Hypothesis

Industrial legacies preserves tangible reminders of the industrial past, and contributes to the cultural and educational enrichment of the community.

Theoretical back-up & Practical implication

The practice of preserving industrial legacies involves identifying, protecting, and repurposing historic industrial sites and structures. This can include former factories, warehouses, mills, power plants, or industrial complexes. Preservation efforts may involve restoring and maintaining the original architectural features and character of the buildings, while adapting them for new uses such as office spaces, museums, art galleries, or recreational facilities. This practice often requires collaboration between government entities, community organizations, and private stakeholders to ensure the successful preservation and sustainable revitalization of these sites. By preserving industrial legacies, communities can honor their industrial heritage, stimulate economic growth, and create vibrant spaces that celebrate the past while meeting the needs of the present.

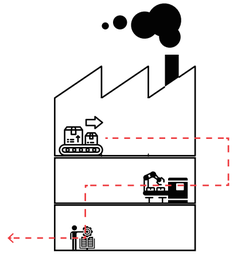
Reference

https://www.interregeurope.eu/good-practices/a-new-future-for-industrial-heritage

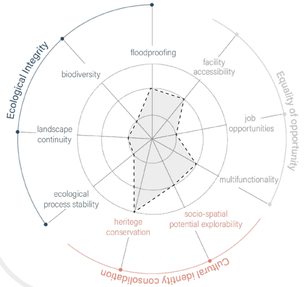
S21.1 VERTICAL PRODUCTION

Hypothesis

Reduce industrial footprint and protect industrial heritage by concentrating dispersed manufacturing functions into the vertical space of the buildings.



Contribution to Goals



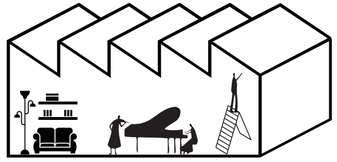
Stakeholders

Maastricht municipality
leisure business
transportation companies
energy companies
contractors
factories

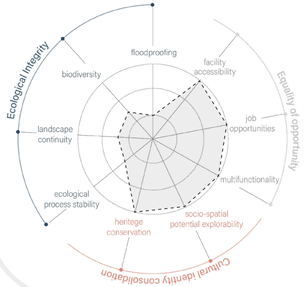
S21.2 SQUATTING

Hypothesis

Direct placement of new urban functions in vacant factory constructions preserves the industrial fabric and saves construction costs.



Contribution to Goals



Stakeholders

Maastricht municipality
tourism sectors
catering sectors
transportation sectors
industrial sectors
energy sectors
culture and sports sectors
housing developers
educational institutions
environmental institutions
housing associations
labour associations

S22 REPURPOSING OF RELICS

Hypothesis

Reuse of relics preserves cultural heritage and strengthens community identity.

Theoretical back-up & Practical implication

The practice of reusing relics involves finding new and meaningful purposes for historic artifacts and structures, ensuring their preservation and continued relevance. Examples of this practice include transforming old churches into art galleries, converting abandoned industrial buildings into creative workspaces or community centers, repurposing historic train stations as transportation hubs or cultural venues, and adapting heritage homes into boutique hotels or restaurants (Moreira, 2006). These repurposing efforts breathe new life into relics while maintaining their historical integrity and creating spaces that serve the needs and aspirations of the community.

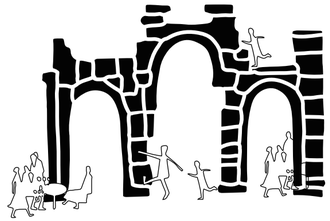
Reference

Moreira, F., Queiroz, A. I., & Aronson, J. (2006). Restoration principles applied to cultural landscapes. Journal for Nature Conservation, 14(3-4), 217-224.

S22.1 ENABLING FUNCTIONALITY

Hypothesis

Enabling functionality of ruins revitalizes historical sites, preserves cultural heritage, and creates versatile spaces for various purposes.



Contribution to Goals

Stakeholders

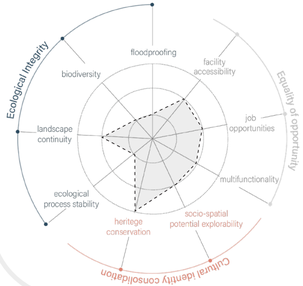
Maastricht municipality
water sectors
tourism sectors
catering sectors
industrial sectors
energy sectors
culture and sports sectors
housing developers
educational institutions
environmental institutions
housing associations
labour associations

S22.2 BLENDING OLD AND NEW

Hypothesis

Blending old and new buildings preserves architectural heritage, fosters harmonious urban aesthetics, and creates a sense of continuity while accommodating modern functionality.

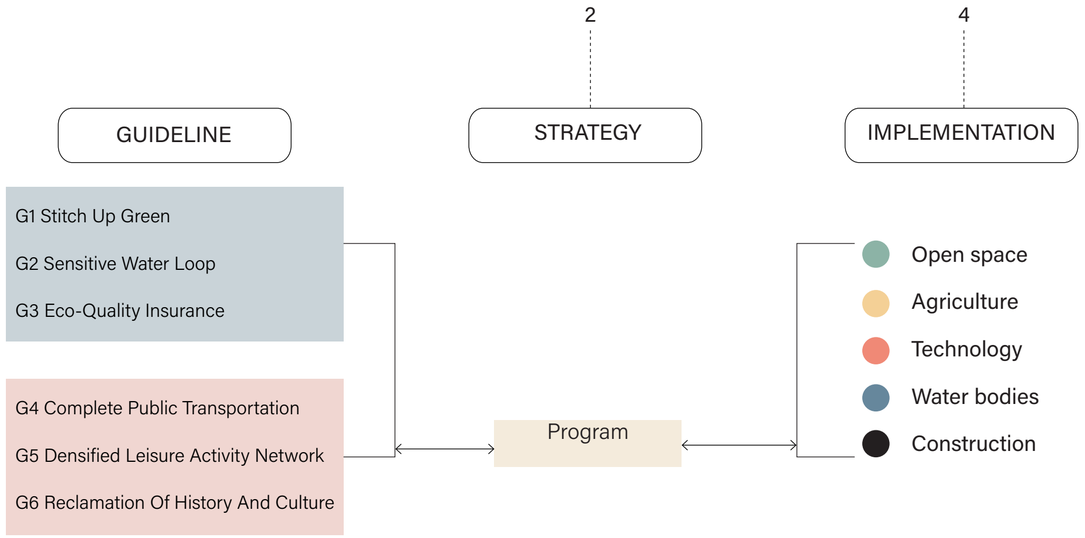
Contribution to Goals



Stakeholders

Maastricht municipality
water sectors
tourism sectors
catering sectors
industrial sectors
energy sectors
culture and sports sectors
housing developers
educational institutions
environmental institutions
housing associations
labour associations

Program

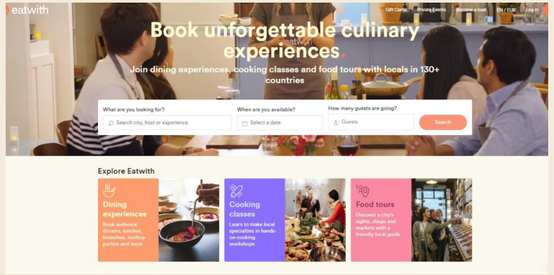


The study explores social strategies that align with the established guidelines, tailoring them to the urban context, and delves into their practical implementation considering site-specific conditions, constraints, and opportunities. Each implementation will be assessed based on its alignment with the defined design goals, ensuring that the strategies and interventions effectively address the desired outcomes and objectives.

P1 LOCALS GUIDE PLATFORM

Hypothesis

Establishing a tour guide platform for residents to participate in the operation of the tourism industry.



Theoretical back-up & Practical implication

Establishing a tour guide platform allows residents to participate in the operation of the tourism industry by providing them with opportunities to showcase their local knowledge, cultural heritage, and unique experiences to visitors. This platform empowers residents to become tour guides, sharing their insights and personal stories, and contributing to the authentic and immersive travel experiences of tourists. It promotes community engagement, economic empowerment, and a sense of pride and ownership among residents, while also offering tourists a more intimate and local perspective on the destination.

Reference

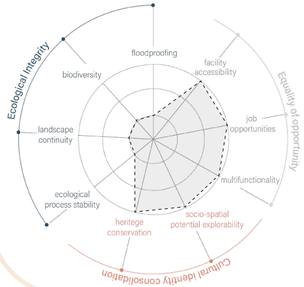
https://m.kun.uz/en/news/2019/02/13/tourist-service-center-to-be-opened-at-tashkent-international-airport
https://dribbble.com/shots/9152235-Voyage-Local-Guide-Travel-App

P1.1 TOURISM SERVICE CENTER

Hypothesis

Establishing resident-led tourism service centers gives residents more control over tourism operations.

Contribution to Goals



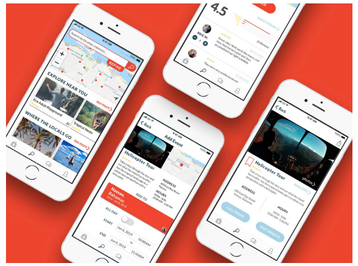
Stakeholders

Maastricht municipality
tourism sectors
catering sectors
transportation sectors
culture and sports sectors
educational institutions
labour associations
locals
international students
migrants
tourists

P1.2 LOCALS GUIDE APP

Hypothesis

A locals guide app provides personalized recommendations for visitors, and creates more direct job opportunities for locals.



Contribution to Goals

Stakeholders

Maastricht municipality
tourism sectors
catering sectors
transportation sectors
culture and sports sectors
educational institutions
labour associations
locals
international students
migrants
tourists

P2 TOURISM OF TRADITIONAL INDUSTRIES

Hypothesis

Tourism provides traditional industries with new markets, increased demand, and economic opportunities, supporting the preservation and growth of cultural heritage and local craftsmanship.

Theoretical back-up & Practical implication

Tourism brings exposure to traditional local products, supporting the industries, creates a market for their livelihoods of artisans, farmers, and products or services, generates other workers involved in traditional income for local artisans and workers, industries. Additionally, tourism can and contributes to the preservation help preserve and promote traditional of cultural heritage and traditional practices and craftsmanship, ensuring practices. Traditional industries, such their continuity and cultural significance. as handicrafts, local cuisine, textile By incorporating traditional industries production, and cultural performances, into tourism experiences, destinations often rely on tourism as a vital source of can celebrate their heritage, diversify income and market exposure. Tourism their economies, and create sustainable brings in visitors who are interested in livelihoods for local communities. experiencing and purchasing authentic

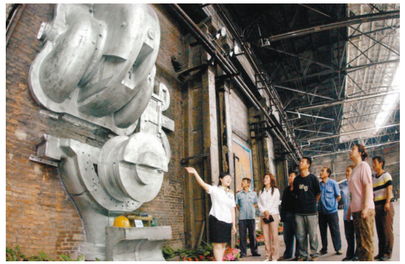
Reference

https://www.chinadaily.com.cn/m/liaoning/investinshenyang/2016-05/05/content_25083833_4.htm

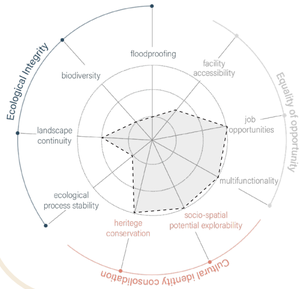
P2.1 VISUAL INDUSTRIAL PRODUCTION

Hypothesis

Turning industrial production into an exhibition tourism project preserves industrial heritage without affecting productivity.



Contribution to Goals



Stakeholders

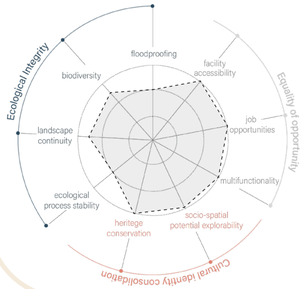
Maastricht municipality
water sectors
tourism sectors
catering sectors
transportation sectors
industrial sectors
energy sectors
culture and sports sectors
educational institutions
labour associations
locals
international students
migrants
tourists

P2.2 AGRICULTURAL EDUCATION

Hypothesis

Turning industrial production into an exhibition tourism project preserves industrial heritage without affecting productivity.

Contribution to Goals



Stakeholders

Maastricht municipality
water sectors
tourism sectors
catering sectors
transportation sectors
agriculture sectors
energy sectors
educational institutions
environmental institutions
labour associations
locals
tourists