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## HIGH QUALITY OPEN SPACES IN URBAN DEVELOPMENT –

SELECTED EXAMPLES FROM GRAZ, AUSTRIA

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### Abstract

Growing urbanization poses an enormous challenge to city planners. Noticeable effects of the increased population density in cities include housing shortages, rising real estate prices, increased traffic, air pollution, shortages of green spaces and attractive public spaces, the rising cost of urban infrastructure and the risk of social tensions. Especially in dense urban areas, public open spaces (squares and streets, urban parks and spacious recreational areas) have become increasingly important. Their design, functionality and the adaptation to the needs of the residents significantly influences the quality and atmosphere of urban coexistence. The consideration of quality criteria is essential for the creation of sustainable, livable and smart open spaces. Modern approaches to sustainable planning in urban areas and the versatile aspects of state-of-the-art open space design are the core themes of this article. General aspects of landscape planning in Austria and selected best practice projects in the context of urban development are presented.

This article gives an overview of open space planning in Austria. To be successful, projects must consider the specific needs of city districts, which requires tailor-made approaches and an interdisciplinary planning team. To be accepted and adequately used by the public, projects must be based on a detailed analysis of the spatial, natural and social conditions.

**Takeaway for practice:** The complex and diverse challenges of open space planning in Austrian cities can be seen as representative for other cities, as certain urban trends occur (in slightly altered dimensions) all over Europe or on an even bigger scale. Selected best practice urban planning projects, which have been realized by freiland Environmental Consulting CE Ltd, based on state-of-the-art principles, demonstrate modern planning approaches to tackling these challenges.

**Key words:** open space planning; urban development; quality criteria; landscape architecture; resource-efficient planning; stakeholder integration; urban planning instruments

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## Introduction

The challenges of open space planning in European cities are complex and diverse. Forecasts state that the population in cities will continue to rise steadily, driven by ongoing migration into urban areas. The degree of urbanization, measured by the share of city dwellers of the total population, was just under 66% in Austria (in 2016) and the EU average was 75% [Statistik Austria, 2017]. Noticeable effects of the increased population density in cities include housing shortages, rising real estate prices, increased traffic and air pollution, shortages of green spaces and attractive public spaces, the rising costs of urban infrastructure and the risk of social tensions [Hammerl, Berkhout, Oswald, 2016].

In increasingly dense urban areas, the importance of open spaces (squares and streets, urban parks and spacious recreational areas) is growing. How they are shaped, how they function and how they meet the diverse needs of residents, significantly influences the quality and atmosphere of urban coexistence. Open spaces are important places of encounter and interaction, but also of leisure and recreation. Improving the quality of life in cities means creating new recreational areas, but also providing high-quality green and open spaces in the immediate living environment of residents.

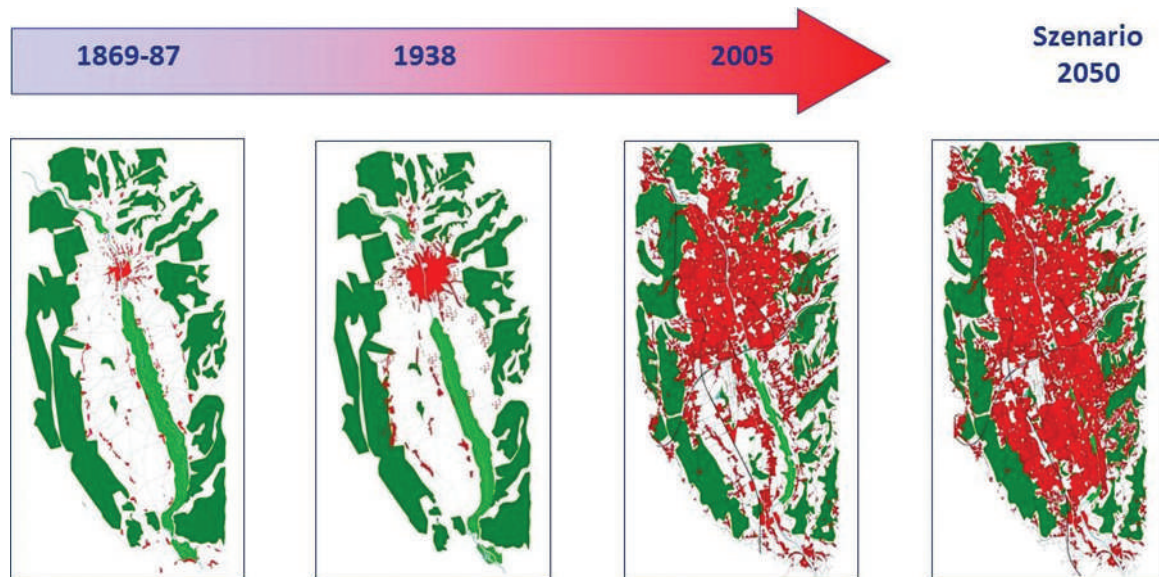


Fig. 1. Density of residential areas (red) and green spaces in Graz

Source: [freiland CE Ltd., spaceunit Network, 2005].

The consideration of quality criteria is essential for the creation of sustainable, livable and intelligent open spaces. The participation and cooperation of all stakeholders (authorities, planners, property developers, residents) creates and ensures the quality of open spaces, also contributing to more efficient development. Modern, smart planning concepts must meet today's requirements and therefore be constantly adapted and monitored.

The following principles are of particular importance in modern open space planning:

- The creation of high-quality open spaces
- Sustainable planning for all ages and social classes
- Safeguarding and linking green spaces
- Sustainable mobility
- Stakeholder participation and governance
- The lowest possible resource consumption, low emissions

Landscape planning and open space planning are key disciplines in the planning of urban open spaces. freiland Environmental Consulting CE Ltd. is strongly involved in urban planning in Graz, Austria. The focus of freiland's expertise lies in the field of ecological planning, thus the work is based on a detailed analyses of spatial, natural and social conditions. It is indispensable to con-

stantly adapt to changing conditions in the fields of landscape, urban and regional planning and to establish modern planning approaches. freiland's approach to creating the highest possible quality of open spaces while meeting the targets of resource-efficiency, has been applied successfully in many urban development projects in recent years.

#### *Core Themes and the Structure of the Article*

The versatile aspects of state-of-the-art open space planning are the core themes of this article, with in depth discussion of the following four topics:

- The definition of the qualities of open spaces
- Safeguarding green spaces
- Urban mobility
- Stakeholder participation

The article is structured in three parts. The first part includes an introduction to the general aspects of landscape planning in Austria, outlining federal regulations, responsibilities and jurisdiction and providing an overview of applied planning instruments.

The theoretical framework of modern open space planning in the context of urban development is discussed in the second part.

Selected best practice urban planning projects, which have been realized based on these principles and integrated into local contexts, are presented in the final part. The planning approach for all projects is based on detailed analyses of spatial, natural and social conditions in order to establish resource-saving infrastructure while meeting the target of creating the highest possible quality of open spaces.

All projects are located in Graz, Austria's second largest city and have been realized in cooperation with freiland.

#### *Open Space and Landscape Planning in Austria*

In Austria, landscape architecture is regarded as a technical-scientific and aesthetic-creative discipline that seeks to reconcile socio-cultural, ecological and economic goals. The job description is diverse, ranging from planning and design, through process-accompanying and oversight activities. It also includes conceptual and theoretical engagement with the landscape and land-use interests [ÖGLA, 2018].

#### *Responsibilities and Jurisdiction*

In Austria, landscape planning matters are dealt with by federal states, including the regulation of the legal framework, although the specifications of the authority's responsibilities are not included. The Environmental Protection Act, the Spatial Planning Act, the Nature Conservation Act and the National Park Act are the most important legal bases of landscape planning. Higher level state laws are the Environmental Impact Assessment Act and EU guidelines.

Diverging federal state laws mean that landscape planning is dealt with differently in each federal state in terms of planning procedures, responsibilities and implementation – thus tasks, scale and planning depths vary to a certain degree. In general, landscape planning is part of other planning tools and categories (e.g. spatial planning, development or land use plans of different planning bodies).

The *Landscape Program* is a strategic planning instrument for landscape planning at the supra-regional level, whereas the federal state acts as the planning authority. It regulates and establishes the requirements and measures of nature conservation and landscape management. Further, it depicts them in consistent and nationwide maps.

Map scale: 1:200.000 – 1:100.000

The *Federal State Development Program* is a spatial planning instrument used at the supra-regional planning level. The federal state acts as the planning authority. It sets specific spatial planning principles and objectives and outlines long-term development goals. It further lists regions for the elaboration of regional development programs, including guiding principles for spatial development concepts and plans.

Map scale: 1:200.000 – 1:100.000.

*Regional Development Programs* are legislative decrees of the federal state government. They enable favorable spatial and functional developments in each planning region in accordance with spatial legislation. The main aspects of the Regional Development Programs are the specification of supra-regional development goals, the documentation of public interest, the allocation of financial resources and guidelines for municipal spatial planning [Land Steiermark, 2018].

Map scale: 100.000 – 1:50.000

The *Landscape Framework Plan* implements landscape planning objectives at the regional level. It provides guidance to measure and assess existing protected goods, for either the entire federal state or specific regions. Planning authorities are the federal state and regional associations. The basis of the Landscape Framework Plan is the federal nature conservation law [Land Steiermark, 1976].

Map scale: 1:50.000 – 1:25.000

The *Landscape Plan* is the main instrument of landscape planning at the level of cities and municipalities. The main aim of the Landscape Plan is to provide guidance for future settlement developments, the safeguarding of undeveloped corridors, and forest and nature conservation areas. The goals and principles of nature conservation and landscape management form the basis for the development of the Landscape Plan, which is continuously updated according to current developments.

Map scale: 1: 15.000 – 10.000

### *Urban Landscape Planning*

Amidst overall planning initiatives at European, national and regional level, attempts are being made to design cities according to modern planning principles. Improving the quality of life in cities means developing new recreational areas for leisure activities, but also providing high-quality green and open spaces within settlement areas and returning open spaces to residents.

Green and open space planning are indispensable elements of sustainable urban development and need to be considered at the urban planning level. Safeguarding green infrastructure is a major task in the development of new districts. In urban planning competitions, in master plans and in the elaboration of zoning and development plans, these green and open spaces are key elements. In Austria, various planning instruments regulate the design of cities locally.

The *Urban Development Plan* is binding for urban policy and administration. It serves as the basis for all future decisions concerning the spatial development of the city. Numerous measures to be implemented by the municipal administration, the districts and other private and public actors, are specified in the plan. It further outlines the requirements of other bodies and entities that are crucial for the achievement of the goals set.

Furthermore, the plans define the guiding principles and concepts of specific initiatives, for example, multimodal mobility, integrated spatial energy planning or the “greening” of a densely built-up urban area. The contents serve as the basis for further specific guidelines, urban planning concepts, master plans, and zoning and development plans.

*Open Space Concepts* provide general statements about the natural conditions in the community and contribute to the reduction of land use conflicts. These concepts are the basis for decisions in terms of community development, both for better reasoning in land use planning (e.g. priority zones, no-go zones) and for specific planning projects.

A *Master Plan* provides strategic development goals for the medium-term and is usually drawn up in close collaboration with the residents. Due to their legal informality master plans vary in terms of content. A master plan for the development of a district or a residential building area is usually the result of an urban design competition, it defines construction zones and open spaces, determines the functions and qualities of the green and recreational areas and sets implementation timeframes.

Master plans form the basis for legally binding zoning and building development plans or even urban development contracts. For large-scale projects they define the strategic environmental assessment requirements and clarify the spatial compatibility.

The *Zoning Plan* is legally binding and determines how areas are to be used during a specific planning period to achieve the development goals of the community, which are defined within Development Concepts.

Map scale: 1: 5.000.



The *Building Development Plan* specifies how the designated building areas are to be developed. It regulates the spatial distribution and design of built-up areas and open or green spaces, and the type and extent of these elements.

Map scale: 1:1.000

### Quality Criteria and Key Aspects in Open Space Planning

#### Defining the Quality of Open Spaces

Open spaces in an urban context are undeveloped areas, regardless of whether they are sealed, unsealed or landscaped. Although the term ‘open space’ includes green space structures, it is often referred to as green and open spaces to emphasize the importance of greenery in urban areas [Magistrat der Stadt Wien, 2015].

The quality and atmosphere of urban coexistence is significantly influenced by how open spaces are shaped, how they fulfill functions and how they meet the diverse needs of urban residents. Future population development will pose new challenges to open spaces due to changing and diversifying demands. Coping with those challenges requires tailor-made approaches. In central urban areas the adaptation of public spaces to meet diverging requirements will be the main challenge. On the other hand, new neighborhoods will need to provide sufficient open space to enable the vitality and urban diversity characteristic of well-organized city districts.

According to the principle of sustainable planning, the valuable is to be conserved, the tired is to be renewed and the outdated is to be transformed. Furthermore, measures need to be taken to strengthen equity and social balance. Especially for children and the elderly, recreational areas, such as small parks and attractively designed public spaces, are of utmost importance. They form the basis for social coexistence within the district and are important in enabling elderly people to live an active and self-determined life in their own district for as long as possible.

Urban areas are characterized by being highly built-up and having a wide variety of services (e.g. infrastructure, workspaces, housing, cultural and leisure facilities). In terms of open spaces, the demands of their utilization are highly variable depending on the user group. As a result, urban open spaces also have an increased need for maintenance.

## Planning instruments



Fig. 2. Planning instruments in Austria

Source: [freiland CE Ltd.].

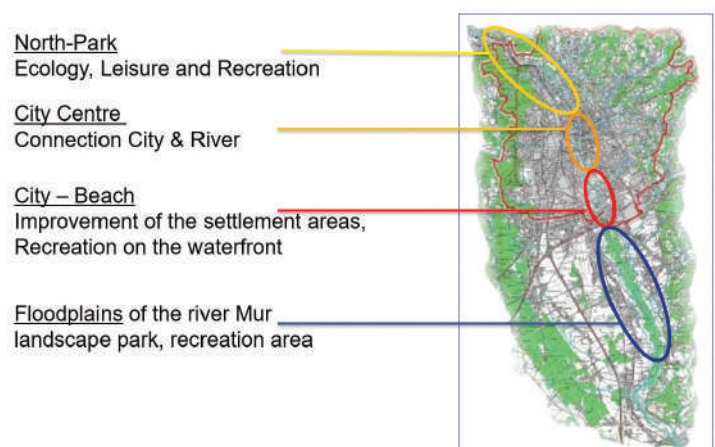


Fig. 3. Masterplan “Lebmur”, defining functions and qualities of river stretches and their surroundings

Source: [freiland CE Ltd., spaceunit Network, 2005].



**Fig. 4. Green and blue infrastructure in the city development area Aspern, Vienna; Master plan Aspern – “The Lake-city of Vienna”**

Source: [Team Tovatt Architects & Planners AB, 2005].

The various open spaces within a city, including streets, squares, parks and green spaces, are defined as the public space which enables social interaction for all residents. As cities become more anonymous, this informal, social platform is of particular importance. Open space planning differentiates between residential areas, neighborhoods and higher-level open spaces. Their required size and accessibility increase (towards higher-level spaces). User pressure and maintenance requirements decrease with the size of the open space. Extensive “natural” recreational areas or parks therefore always require a certain minimum size (e.g. Donauinsel in Vienna, English Garden in Munich, Central Park in New York). Small extensive succession areas in densely built-up areas quickly become crowded, dirty, unhygienic and not very desirable for residents.

Especially for densely populated districts with small open spaces, thoughtful design and flexibility are required to meet the demands of diverse user groups. A mixture of public, semi-public and private open spaces in residential areas enables the creation of identity and contributes to the avoidance of conflict.





**Fig. 5. Multifunctional open space structures in residential areas**

Source: [freiland CE Ltd.].

The responsibility for care and maintenance also plays a role here, which brings more social control and thus eases the burden on the public. While for streets, maintenance is clearly the responsibility of the city administration, the situation is quite different in districts' living environment. One's privacy might be extended to a (semi)public space and undefined extensive areas are appropriated and subjected to intensive use. This creates individual responsibility, independence and connectedness with the neighborhood. A mix of open space characteristics in heterogeneous neighborhoods with residential, work and leisure facilities contributes to the satisfaction of everyone's daily needs and increases the satisfaction of the inhabitants. The aim should be to make the urban environment livable and thereby reducing the need to regularly escape from the city and its negative concomitants (e.g. traffic, sprawling peripheries, commuter communities, shopping centers). The availability of a diverse, green, and vibrant urban environment counteracts the need to escape and provides residents with a livable environment.

In order to meet the requirements of a dynamically growing city, the parameters for green space availability contribute to quality assurance [Magistrat der Stadt Wien, 2015]. They include both minimum sizes and catchment areas. Quality in residential open spaces is defined by the following criteria [Stadt Graz, 2018]:

- Good accessibility and connectivity
- Barrier-free accessibility
- The consideration of all user groups
- Open spaces relating to the residential area/housing characteristics
- Sophisticated conception and choice of materials
- Multifunctionality, flexible usage
- Functional open design and clearly defined functions
- High quality open design
- Appropriate facilities
- High quality technical detailed design
- High recreational value
- High ecological value, climate protection
- High quality maintenance



**Fig. 6. High Quality Design in public spaces, Eduard-Wallnöfer Platz, Innsbruck**

*Source:* [freiland CE Ltd.].

These qualities are achieved through conscious design and the staging of the open space. This includes important structural-aesthetic aspects, the organization of the open space and its functionality.

During planning stages, the formulation of the minimum requirements ensures the quality of the project. Binding regulations, such as the requirements of building regulations, e.g. design concepts for green and open spaces and a clear commitment from the developers is beneficial for the conception of urban open spaces.

#### *Ensuring Green Spaces – Promoting Green Axes*

Green spaces in the city, such as large recreational areas, parks and green alleys in dense areas, are essential in defining urban quality of life and provide the basis for sustainable urban (population) growth.

Safeguarding urban green areas is an essential aspect of open space planning. Not only is sufficient green space essential for recreational value, but especially in the context of the regulation of the urban climate, including air quality. It is also necessary to assign high priority to this. Against the background of climate change and the conservation of resources, it is necessary to secure and to create, new urban green areas.



Design measures of the left bank

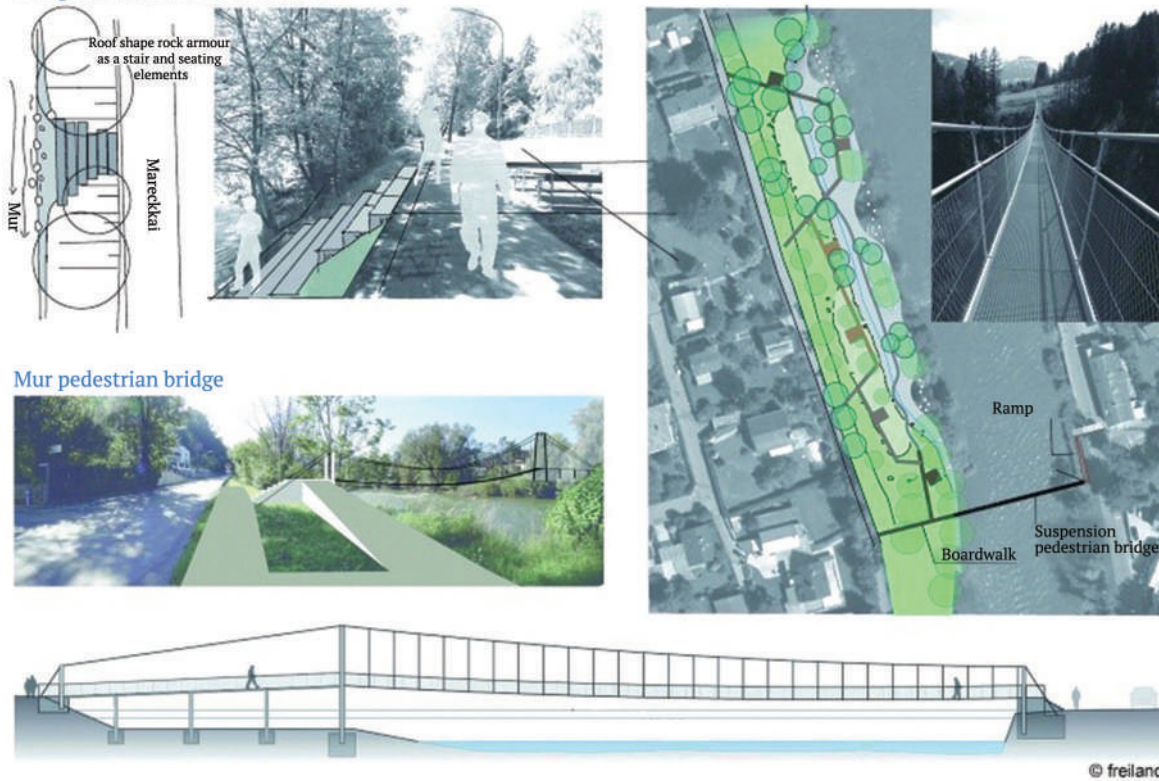


Fig. 7. Design goals and nature preservation along the river Mur, Masterplan Mur Leoben

Source: [freiland CE Ltd., 2016].

Green areas and river landscapes play key roles as green corridors in cities. The potential of rivers as linear axes through dense urban landscapes has special importance as they represent the green lungs of cities. They fulfill essential functions for the urban climate such as cooling, dust filtering and increasing the humidity, and they play a fundamental role in the water balance. Additionally, they represent important habitats for numerous animal and plant species.

Along city borders large forests or meadows have the potential to serve as recreation areas for the urban population, but they are also of great ecological importance. Cities form large landscape units within their surrounding areas, which is why regional cooperation is key. Persevering and linking those areas is particularly important in the context of compensating for habitat loss of flora and fauna. Further dissection of green areas (e.g. by intensive farming or new infrastructure) should be avoided, while the permeability of those structures has to be secured. By small interventions connections can be established in green axes and corridors.

With the motto “a green city instead of air conditioning” many cities today see climate protection and climate adaptation as an integral part in their development strategies. This starts by promoting the self-organization of Urban Gardening Communities and continues with the activation of small free spaces and Public-Private Partnership models.

To provide the necessary climate change adaptation measures in dense urban areas, unconventional forms of greening should be used and the conservation of resources and innovative approaches should be promoted. For example, the greening of roofs and facades can be used in the city.

Specific targets, such as the reduction of CO<sub>2</sub> consumption per capita, require solutions that are also found in green and open space planning. For example, water is used as an urban development tool in new urban developments such as in the urban development project Seestadt Aspern in Vienna. The linking of the blue and green infrastructure with “water landscapes” has great potential.

Future urban growth must be accompanied by a quantitative and qualitative increase in green spaces. The focus should be on the interests of the general public, rather than on individual or group

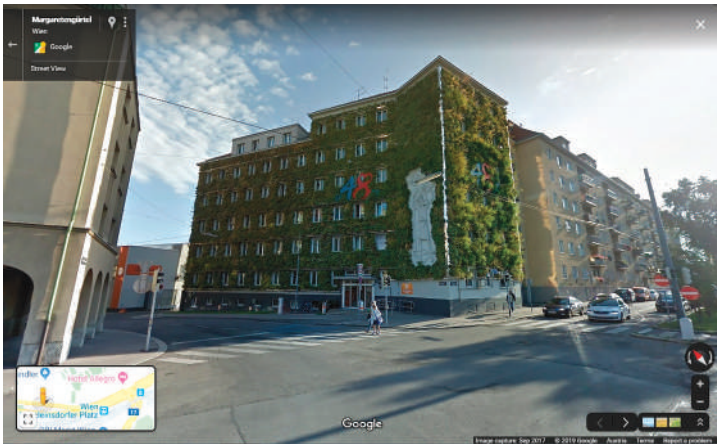


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**Fig. 8. Green facade in dense urban area; Vienna Austria**

promote the recreational value and the greening of urban areas also in “problem” areas [*architekturbüro Halle1, 2008*].

The network of green and open spaces also contributes to significantly increasing the share of non-motorized urban traffic. Therefore, efforts to establish an attractive network of trails to connect green spaces and recreational areas should be increased [*Rathschüler, Raderbauer, 2012*].

Urban development plans and concepts represent an essential instrument for the management of green spaces, as they include strategies and instruments for connecting and securing green spaces.

#### *Urban Mobility in Transition*

Urban mobility patterns and needs are constantly changing and diversifying. The prevailing growth of the urban population and the subsequent traffic requires constant adjustment. Generally, more flexible working conditions are on the rise, while traditional working patterns decrease. Therefore, public transport is in high demand even during off-peak hours. While the mobility of the 60+ generation increases, the growing labour market participation of women changes their mobility behavior. As living in suburban or rural areas and working in the city increases, commuter flows are growing. Therefore regional relationships between cities and their surroundings must intensify, especially with regard to public transport. The general attitude towards the car as a status symbol is changing and the role of public traffic is of increased importance. The enhancement of public transport is additionally boosted by new technologies that provide real-time information and reduce waiting times.

In urban areas with a well-developed public transport network, the share of motorized private transport is declining. In Vienna, for example, 39% of all journeys are made using public transport, making Vienna one of the international leaders [*Magistrat der Stadt Wien, 2014, p. 102*]. Especially in urban areas, cycling and the combined use of different modes of transport are on the rise. This development requires optimized interaction between different types of traffic.

Modern mobility concepts should be ecologically compatible, economically viable and socially fair. New ways of mobility have the potential to massively contribute to the achievement of climate targets (e.g. the reduction of CO<sub>2</sub> emissions). Being socially fair refers to the idea that mobility should be possible for all, regardless of income and living conditions.

The key objective of mobility policies is to steadily increase the share of non-motorized traffic and to keep reducing the proportion of journeys by car. Not only adjustments in the transport system are necessary, but also the redesign of streets and open spaces. In urban areas, it is important to establish a dense and attractive pedestrian and cycle network for short distance travel within the city. Based on the network of green and open spaces and the bicycle and footpath system, a new infrastructure of urban mobility is being created. This applies equally to the urban development and the dense urban areas.

interests. In the development of the Urban Development Concept Graz (Stadtentwicklungskonzept Graz), a minimum area of public open space per inhabitant was determined depending on the respective district's present building structure [*Stadtplanung Graz, 2013a; 2013b, p. 41*]. The range of acceptable public spaces is defined between 3 m<sup>2</sup> (per capita, for a family house area) and 10 m<sup>2</sup> (in dense urban areas). With these values, the city of Graz has set high standards.

Interventions in urban spaces — for example tree planting, small parks, shaded seating areas and multifunctional open spaces — have the potential for upgrading districts and should not be reserved for exclusive residential areas, rather they should be applied in affordable-housing districts. In some Austrian cities such as Salzburg-Lehen attempts have been made to pro-

The design of street spaces plays an important role here as an increase in the quality of time spent and more space for a variety of uses make the space attractive and ensure increased adoption of public transport to these places. Multi-functional street spaces can take over network functions for green and open spaces, thereby contributing to the enhancement of biodiversity. Those multifunctional connections must be broad enough to allow non-motorized travel and recreational activities at the same time.

For urban development areas, tailor-made mobility management concepts need to be developed, enabling short and environmentally friendly routes. In planning, the principle of the economical use of limited spatial resources in the urban area is always followed.

So far in most cities the design of the street spaces insufficiently reflects changes in mobility behavior and the multifunctional potential of public spaces. On average, about 65% of roads are occupied by motorized traffic (parking included) [*Ibid.*, p. 103]. The changed priorities in urban mobility are not yet adequately reflected in street design. Urban planning has to consider sustainable planning and the urban mobility policy must also be conceived as an integral part of the urban climate protection strategy.

#### *Stakeholder Participation – Governance*

During planning, different interests need to be taken into account – especially when related to public space and financing. This can lead to conflicting goals, which complicates planning and the acceptance of newly designed open spaces. The design of densely built-up urban areas demands the coordination of the diverse user requirements regarding open spaces and their functions. Therefore sustainable urban development needs the participation of politicians and the city administration, planners, property developers/businesses and most importantly civil society. Civic engagement processes and stakeholder discourse are essential elements to keep up with social and economic transformation. The participation and cooperation of all stakeholders is deemed a decisive factor influencing the efficiency and quality of a development, meeting the demands and expectations of those involved. If used in the early planning stages and in a targeted manner, participation can lead to better, more sustainable long-term results. Qualified monitoring during the planning, implementation and maintenance stages is crucial.

Participation increases the acceptance and legitimacy of political decisions, strengthens social relationships, enhances horizons and contributes ideas and wishes for successful coexistence in growing cities [*Humboldt-Viadrina Governance Platform, 2018*].

Successful participation requires respect, communication, a willingness to learn and openness among all the involved parties. For planning, this often means a new understanding and new methods: it is no longer just about transparent communication about projects and decisions, but also about inclusion, especially when it comes to defining development goals. In growing cities in need of innovation, the challenge is to develop a dialogue that balances the interests of resident populations or companies with those in need of housing, offices or schools. The needs of less privileged or less represented groups need to be considered professionally [*Magistrat der Stadt Wien, 2014, p. 30*].

Cooperative procedures have the broadest possible stakeholder involvement. The required features are defined as early in the process as possible, securing quality which can be seen only late in the planning. A greater variety of planners and competences are involved than with conventional methods. The cooperative method deals with architectural landscape issues comparatively early in the planning process and results are binding. Cooperative procedures have resulted in positive effects on the quality of the open space of the project [*Detzlhöfer, Dessovic, 2014, p. 11*].

Summarizing, the following opportunities for planning can be derived from stakeholder participation (according to [*Schwan, Podann, Müller, 2017, p. 8*]):

- Accessing hidden knowledge
- Transparency
- Planning according to needs
- Defusing potential conflicts
- Smoother implementation of construction projects
- Building trust
- Finding cross-system solutions
- Education and learning

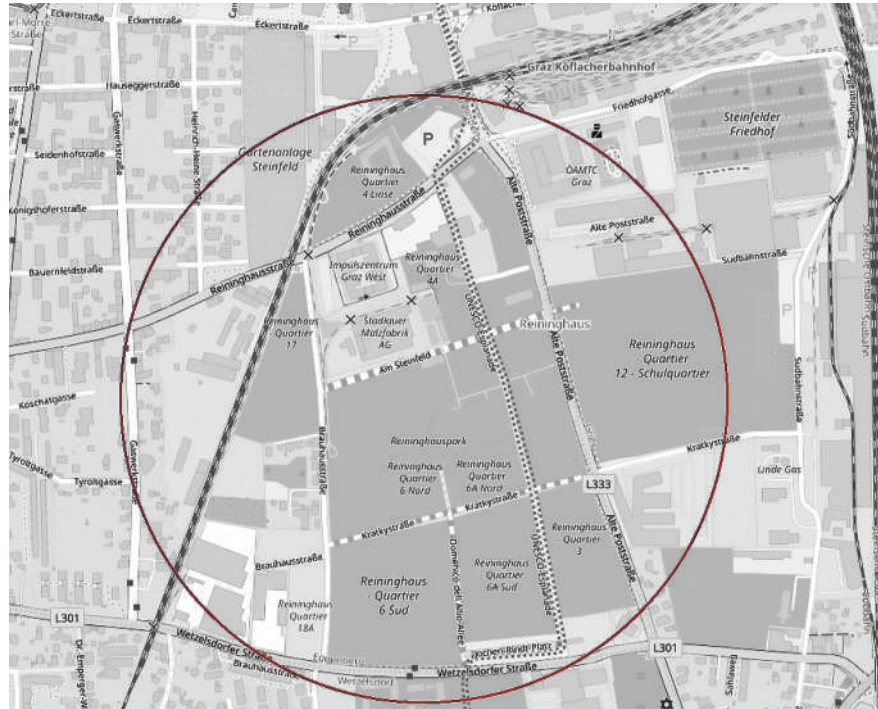


## Selected Projects

The planning process must be adapted to the actual conditions and functions of city quarters and to changing higher-level planning principles (as defined in planning instruments such as development concepts, master plans).

In Graz, freiland CE Ltd. was involved several projects to increase the quality of living spaces. All projects were committed to sustainable urban development and establishing multifunctional, high-quality open spaces in an urban context.

### Urban Development Area Reininghaus



Данные картографической основы: © Участники проекта OpenStreetMap

### General data

Location:	Graz South-West, former brewery
Project area:	ca. 100 ha
Owner/client:	City of Graz, Department of Urban Planning
Completion date:	2022
Planning instruments:	Urban Framework plan Graz-Reininghaus, Verkehrskonzept ZIS-P

### Planning priorities

- The sustainable reuse of a former industrial site, “brownfield reuse”
- Multifunctional, high-quality open spaces
- The development and networking of the subspaces in a hierarchy of ways
- Gentle mobility with priority for public, pedestrian and bicycle transport
- The consideration of all user groups
- Sustainable urban development, resource management

### Short description

The industrial area of the former Reininghaus brewery, located 2 km from the city center, is one of the largest urban development areas in Graz. The mixed residential area will accommodate up to 20,000 inhabitants, forming a new city centre in the west of the city.

The master plan for the area [freiland CE Ltd., 2012b] follows the concept of a smart-city: establishing a high quality of urban life and efficient resource management through technological and

infrastructural smart grids. Attractive public spaces, open space facilities and social infrastructures are defined as prerequisites for the sustainable urban development of the district.

The traffic concept defines hubs as starting points for the development of individual subareas and envisages a step-by-step establishment of individual quarters.



**Fig. 9. Old view on the Reininghaus brewery, City center of Graz in the background**

*Source:* [freiland CE Ltd., Graz Town archive].



**Fig. 10. Design goal for multifunctional open spaces**

*Source:* [freiland CE Ltd., Hohensinn Architektur, 2017].

The backbone of the entire area is the 800 m long esplanade, providing access and connecting all the quarters. The axis connects the different quarters with their various types of buildings and open spaces, and links living, strolling and commercial areas. This central axis offers public spaces in several sections, one special feature is modular micro-open spaces. The esplanade also offers diverse uses for art, culture and leisure, and provides access to all quarters. A public traffic axis accompanies the entire esplanade as a central linear fast connection.

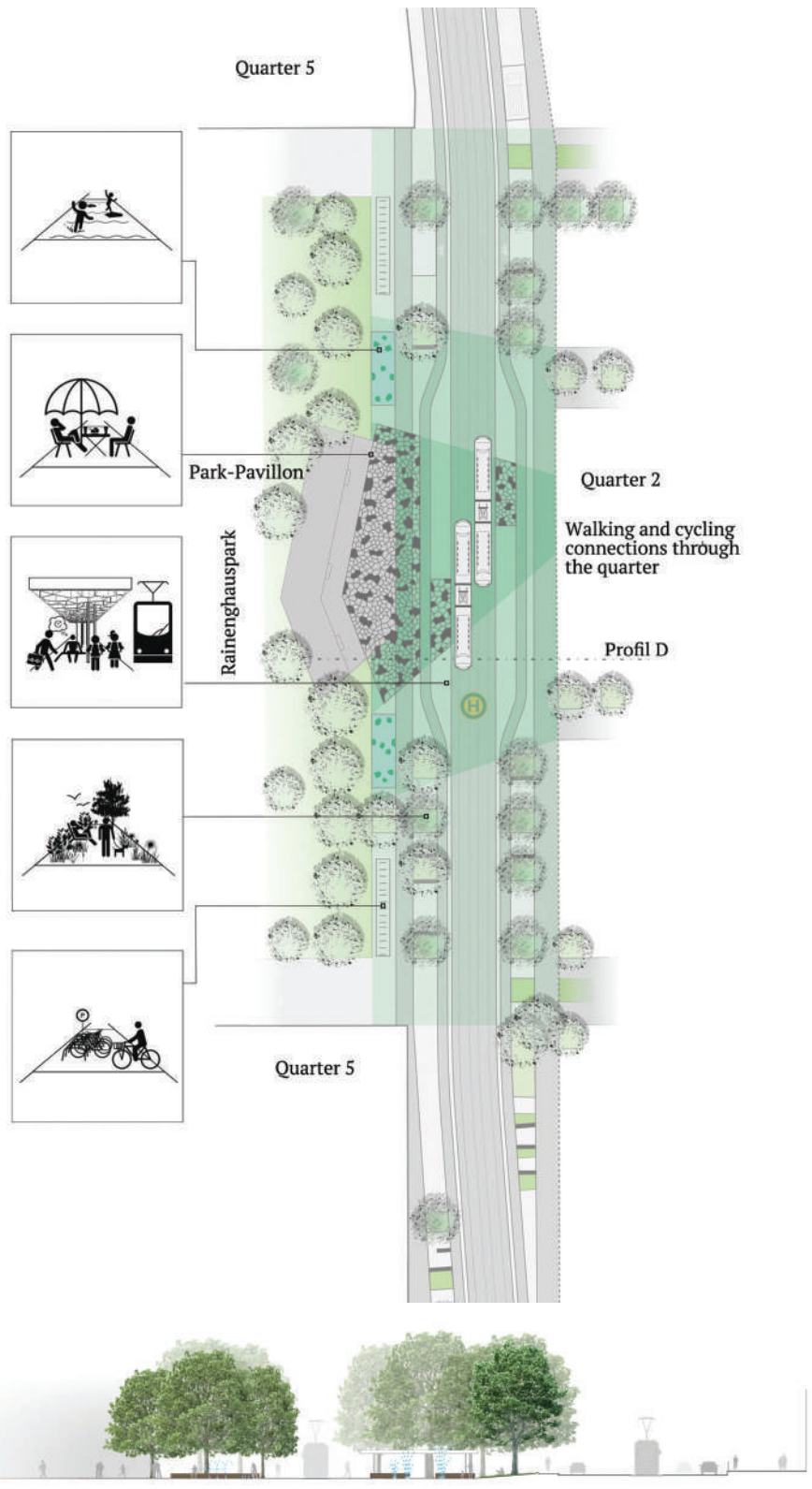


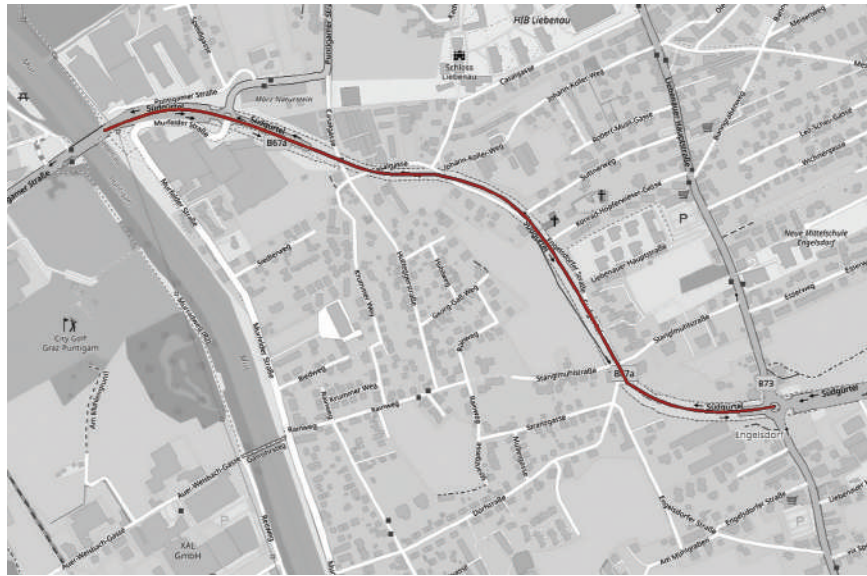
Fig. 11 . Central area of the esplanade with micro spaces of multifunctual design

Source: [freiland CE Ltd., 2017].



This open space design in Reininghaus allows the implementation of superordinate planning ideas (different usage claims, a mix of uses, social space design, individual urban spaces) by mixing small-scale open spaces, individual adaptations to the respective spatial situation and providing the basis for connecting the development of all the quarters.

### *Südgürtel – The Creation of Open Spaces for Traffic infrastructure*



Данные картографической основы: © Участники проекта OpenStreetMap

#### **General data**

Location:	Graz South, Liebenau
Project area:	ca. 6,3 ha, 1,7 ha park area
Owner/client:	Province of Styria — Department of Traffic and Landscaping
Teilauftrag:	City of Graz, Directorate of Urban Development, Department of Green Spaces and Water
Completion date:	2017
Planning instruments:	Design competition 2015 (with Arch. Reissner), Urban Development Plan Murfeld.

#### **Planning priorities**

- Enclosing traffic areas
- Creating green spaces
- New spaces for recreational and recreational use
- Improving the quality of living by creating open spaces
- Strengthening local identity
- Improving the urban ecology and climatic improvement

The project *Südgürtel* (Southern Belt) is a road construction project, closing the gap between two major roads in the south of Graz (region *Murfeld*). The project is 2 km long, consisting of a 1,4 km double-tube underground section. The *Südgürtel* significantly contributes to relieving the traffic around Graz, and the new infrastructure on top of the road section creates new public green and open spaces.

On the top of the underground section, a “green arc” was created through the *Murfeld*. The design planning pursued the goal of connecting existing and planned settlements by a new open space and establishing a network with existing open spaces, most of them constructed only in the past few years.

The open spaces were planned as extensive areas, scattered with intensively designed areas at significant points. The extensive green areas follow the typical natural elements of the region around Graz — thereby the green arc serves as a recreational area with high potential for a nature experience.



**Fig. 12. Perspective view on the Südgürtel]**

Source: [freiland CE Ltd., SRU Reissner].

The superordinate open space concept is characterized by several kinds sub-spaces:

- The south belt acts as an extensive area of greenery and fruit trees, characterized by different types of meadows and woodland areas with varying species.
- The south belt acts as an area of movement and interaction. Footpaths connect the eastern and western urban settlements. The main routes are attractive for pedestrians, wooden decks and benches invite people to linger.
- The park has a paved place in the main entrance area serving as a central meeting and resting place. Stairs for seating invite people to relax in this area.
- A central area for sports and other recreational activities forms the heart of the park. Here a one-of-a-kind climbing frame (*the CUBE*) is the central element and acts as an attractive, high-quality functional element in the design of the park.



**Fig. 13. Central park area with the CUBE**

Source: [Picture freiland CE Ltd.].



### Smart City Waagner Biro



© Bild: Klima – und Energiefonds  
Historic view of industrial sites along Waagner-Biro-Strasse

#### General data

Location:	Graz West, proximity to railway station, former industrial quarter
Project area:	ca. 6,5 ha
Owner/client:	City of Graz, Directorate of Urban Development
Completion date:	ongoing construction
Planning instruments:	Competition 2016 (with Hohensinn Architektur), Framework Plan Waagner-Biro

#### Planning priorities

- Linking with neighboring sites
- Implementing an “inverse mobility hierarchy” – a mobility network prioritizing pedestrians and cyclists
- A mix of social and functional aspects
- Establishing sunlight and shading in summer and winter
- Enabling temporary uses
- Creating spatial identities and character

#### Description

The design concept of the Smart City is characterized by a corporate design described by the uniform coloring of numerous objects and structures. Elements of urban furniture such as seating and lighting, bus stops and play areas are connected in this way. Bright, open, accessible spaces convey security and clarity. Around important road crossings and at bus stops colored tapes are used to show directions for pedestrians and to slow motorized traffic. Linking public transport with car sharing, bicycle parking and taxi services ensures that future mobility needs are fully covered.

Different types of open spaces can be found in the central park area: to the east and west calm places prevail while the western square is embedded in a birch grove.

In the central part there is a ramp designed as a special, multifunctional spiral. It represents a striking architectural element as that connects the new district with the urban area as a footbridge and cycle path connection. The support structure is made of a steel structure, which is partially covered by climbing plants, preserving the transparent character of the construction. The overlay of the spiral is made of colored concrete.

The area has a multifunctional character and can also be used as stage. The center of the spiral is designed as an elevated water surface (“water table”) with a fountain. Between the two squares, are the movement and play areas of the park. These areas are deliberately kept open for use.

Following the spiral to the east, a broad axis of movement, separated into cycle and footpaths, runs through the entire park area, providing access to the western settlement areas.



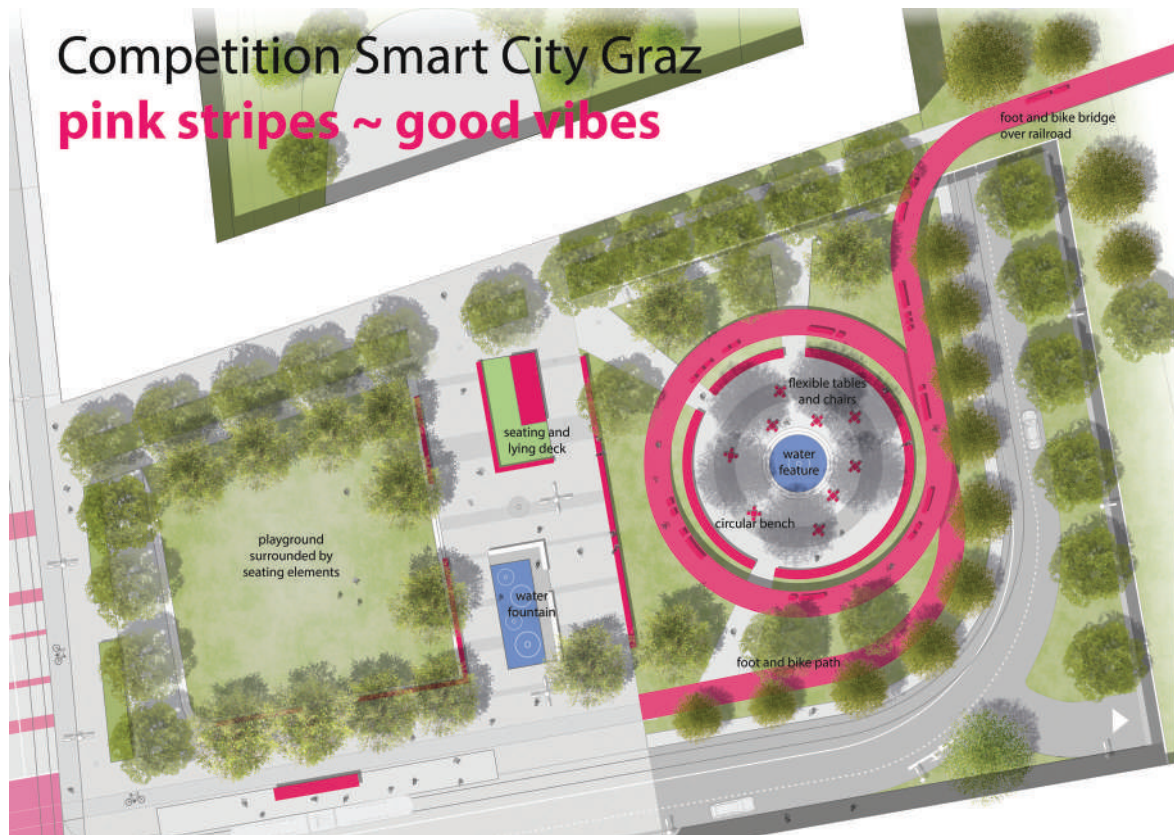


Fig. 14. Part of the layout plan for the Smart City Wagner-Biro

Source: [freiland CE Ltd., Hohensinn Architektur].



Fig. 15. Visualization for the Smart City Wagner-Biro

Source: [freiland CE Ltd., Hohensinn Architektur].



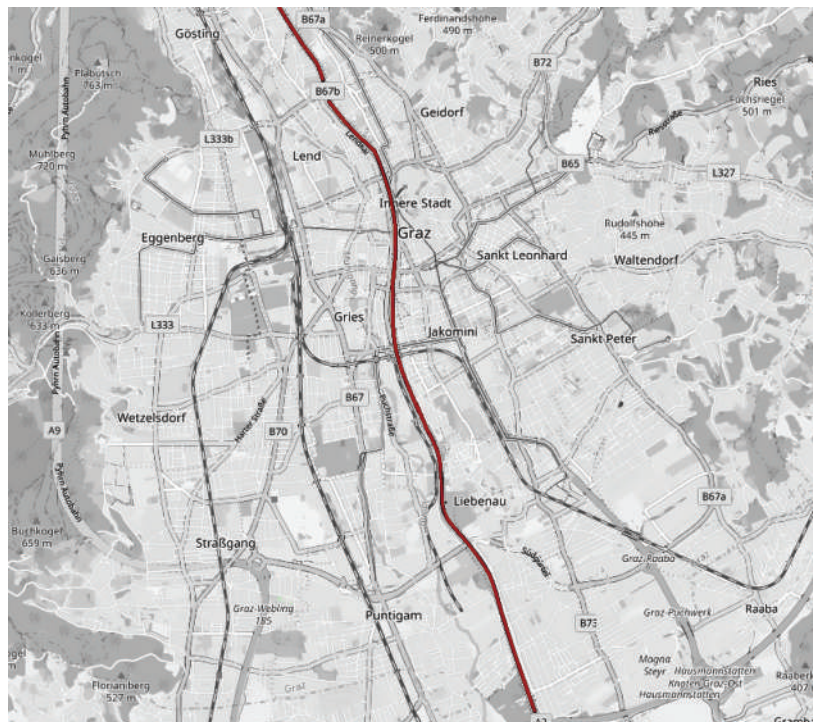
The public square and the parking areas of the existing event hall form a coherent space and are provided with a uniform surface. The parking lot remains unused for many days of the year as urban open space. The visual dominance of the parking area marking is abandoned. The linear structures of the parking spots are used as design elements and adopted for the entire space area. Along the parking area there are scattered resting and communication rooms.



Fig. 16. Scheme for the greening of the spiral

Source: [freiland CE Ltd., Hohensinn Architektur].

### River Mur



Данные картографической основы: © Участники проекта OpenStreetMap

#### General data

Location:	City of Graz and surroundings (north, south)
Project area:	appr. 10 km in length in the wider urban area
Owner/client:	City of Graz
Completion date:	2019
Planning instruments:	Konzept "Lebensraum Mur", Masterplan Mur Graz Süd, Masterplan Mur Graz Mitte, Kraftwerke Gössendorf und Puntigam

### Planning priorities

- Connecting the city with the surrounding area
- An architectural, creative approach to the river
- Establishing the river landscape as a visual experience for the city and its inhabitants
- More space for leisure and recreation
- Strengthening the green axis
- Increasing the number of open spaces
- The movement axis serving as connection and activity route
- Ecological enhancement, securing animal and plant habitats

### Description

The river Mur with its natural green riverbanks forms a central structure in Graz, dividing the city into different sections. The river's recreational potential is very high, but currently is only partially used due to the lack of strategic planning in the past. For the last 15 years increased efforts have been made to enhance the river's ecology and to upgrade the river's accessibility. As the Mur area will play a more important role for the inhabitants of Graz, measures and goals are defined in the city development concept [*Stadtplanung Graz, 2013a*] for securing and improving the Mur and its adjacent areas.

The Mur flows through numerous urban districts of heterogenic morphology. From the core area of the old town to the Wilhelminian quarters with predominantly residential and commercial buildings, through industrial areas and newer housing developments to agricultural land in the southern section. Many commercial settlements are situated adjacent to the river, so that leisure and recreation areas are usually confined to a narrow strip (often only a foot or bike path). Residential buildings usually face away from the river, whereas potentially valuable recreational areas along the river are used for unattractive commercial areas resulting in noticeably devalued riverbanks and thus significantly reducing the recreational value.

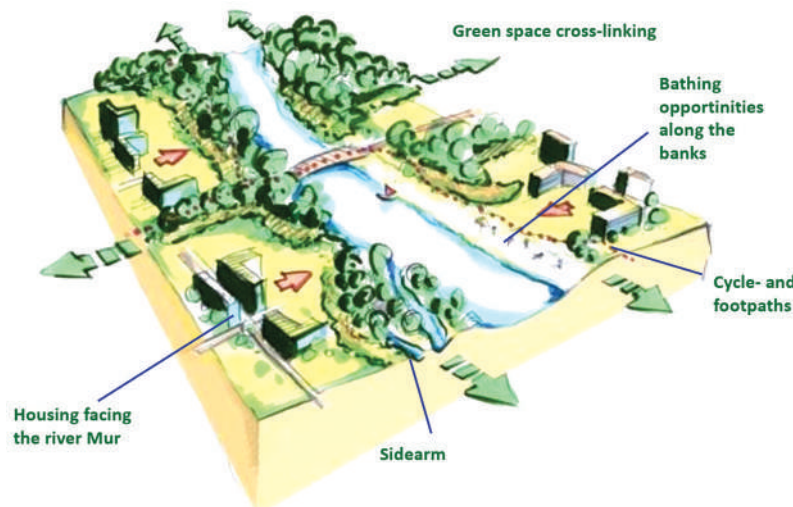


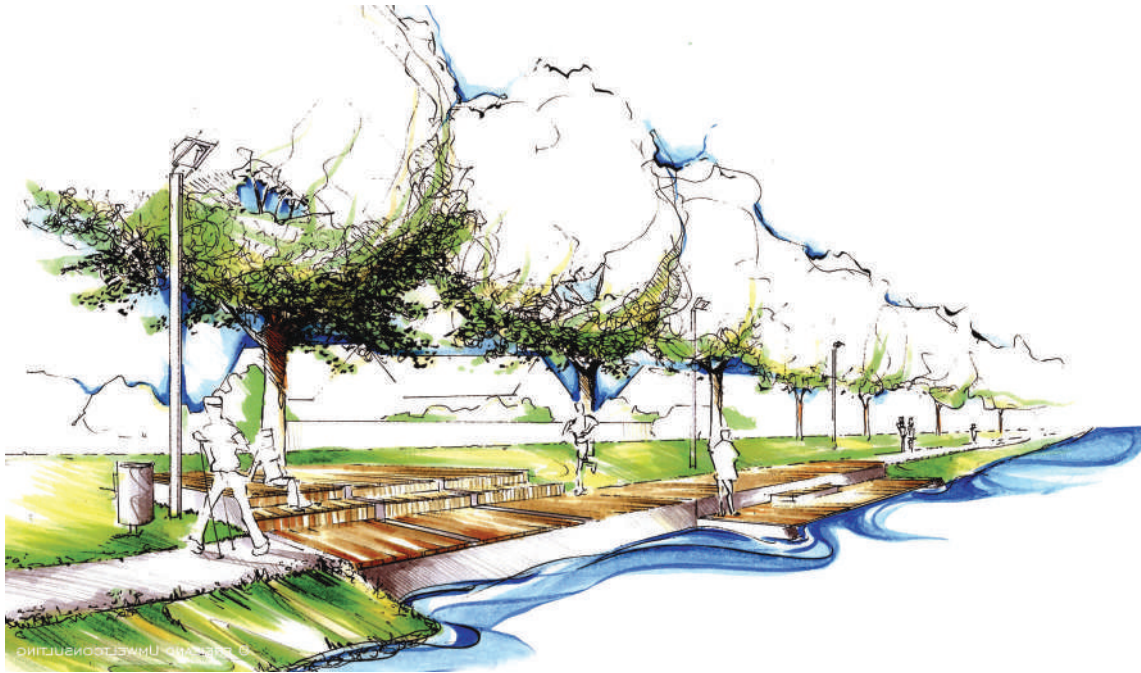
Fig. 17. Concept "Lebensraum Mur" promoting river-related development opportunities

Source: [freiland CE Ltd., spaceunit; 2005].

Against the background of a dynamically developing city, the river landscape in the urban area of Graz gains particular importance as a recreational axis and an area for leisure activities. This status will continue to increase in the coming decades. Under the theme *Lebensraum Mur – sustainable use, careful development, intensive experience and attractive design*, freiland has been dealing with various projects for the river basin in Graz for almost 15 years [freiland CE Ltd., spaceunit Network, 2005].

Since the Mur is in a very tight channel, the multiple use claims can only be increased on a qualitative level. As in many other European cities, Graz is initiating programs to upgrade the urban river landscape.





**Fig. 18. Design scheme and implementation example for a functional river shore design with high recreational value**

Source: [freiland CE Ltd.].

Freiland’s “Lebensraum Mur” concept was used to initiate a continually optimized plan. Within the framework of this concept development possibilities and measures were developed. These contribute to the protection, the optical enhancement and the long-term ecological protection of the river area. Another focus is the protection and enhancement of the region for recreation and leisure activities. Two master plans were developed for specific river stretches (Masterplan Mur Graz Süd [freiland CE Ltd., 2012b] and Mur Graz Mitte [freiland CE Ltd., 2012a]) in which the concept was taken up again.

As the river Mur has the potential for hydropower, the masterplans have to align the potential for river enhancement with the construction of the Puntigam power plant.

This has large effects on the river morphology, resulting in a more stable runoff and an associated loss of significant valuable riverbank structures.

From the city's perspective, the Puntigam development creates opportunities for the appreciation of the Mur as a recreational and adventure space. To compensate for the hydropower plant's adverse impacts on aquatic habitats, extensive accompanying measures were required: to enhance shallow water zones in the river and develop its banks. The dam construction means the foot and bike paths along the river Mur are lost and must be restored, thereby opening up new possibilities for design and implementation.

With the Puntigam construction, the river water level will rise and although its natural characteristics are changed, it has the potential to become more visually appealing. Due to the homogenized water level and slower flow rate, measures along the river are easier to implement. For example dams are to be integrated creatively. It is also imperative to ensure the best possible restoration of the riparian vegetation and to maintain the networking function and the visual impact of the river. With regard to a more intensive use of the river by the population, the plans have to concentrate on recreational design. In this way, currently existing deficits in the green and open spaces can be improved.

The following measures improve the spatial orientation towards the river and its links to the surrounding areas:

- A revaluation of the riverbanks as an urban experience space.
- Living environment: improving the accessibility and use of the riverbanks; establishing an architectural, high quality free space design approach, preventing spaces of no added value for the public.
- Working environment: the creation of high quality relaxation areas along the river banks in proximity to workplaces for those on breaks.
- Settlement environment: connecting or opening the adjacent settlement-related recreation areas towards the river.
- Linking the river to central urban green spaces.
- Connecting the cycle path along the Mur with workplaces; the creation of linear network structures in adjacent business parks and development areas.
- The reduction of the separation effect of the river by the construction of additional east-west-facing foot and bicycle connections.

### *Eggenberg alley*



Данные картографической основы: © Участники проекта OpenStreetMap

#### **General data**

Location:	Graz West
Project area:	1,2 km length
Owner/client:	Holding Graz
Completion date:	2018



### Planning priorities

- Listing Eggenberger Alley as a UNESCO World Heritage Site
- High priority for protecting alley trees
- Establishing modern solutions to make more space available for tree roots
- Applying the *Stockholm system*
- Tackling urban climate challenges by rainwater management
- Reducing the amount of sealed surfaces
- Attractive design of technical elements
- Infrastructural upgrading for pedestrians and cyclists

### Description

Eggenberg Alley constitutes the axis of the world heritage sites of the Old Ganz city center and the Eggenberg chateau (in the west of the city). The alley serves as an important traffic route, hence the functional design was mainly focused on motorized vehicle use. There is little space for trees due to the prevailing use of the public space; the existing trees were in bad condition and solutions had to be found to enhance the conditions of their habitat. This was used for a general facelift of the area, also in terms of creating more public space and safe traffic routes for non-motorized traffic.

In the course of the tramline renewal in the alley, the city administration decided to redesign the street space between Alte-Post-Straße and Karl-Morre-Straße. One important aspect is improving the tree habitat conditions to increase their life expectancy. In the future the tramline will include a green multifunction strip that will be installed. The pedestrian and cycle path will be improved, and a new space will be created in front of the technical college.

Some of the old trees were in good condition, others were severely impacted by the limitations regarding space, oxygen, water, and nutrients as well as having salt damage. Tree root growth depends on the prevailing spatial conditions – as they grow near sealed surfaces they often form one-sided root systems. These deficits should be remedied in the course of the renovation works by providing the necessary conditions according to the *Stockholm system*. The implementation is a pilot project to investigate whether the resource-efficient Stockholm System has the potential to be used on a broader scale.

The use of the Stockholm system creates generous root spaces, to enable healthy plant growth and to utilize rainwater. The application of this method can mitigate conflicts between the tree and the technical infrastructure. The optimization of tree sites with decentralized rainwater management in densely built-up areas represents a way of meaningfully combining apparently divergent requirements.

The function of the Stockholm system is based on layered structural soil in the substructure. Gravel (100–150mm) is compacted layer by layer and then covered with soil, which water under high pressure moves between the stones. This results in root-friendly pore volume (air, water) thereby improving the conditions for the roots. The installation of inlet shafts directly on the compacted soil serves to drain rainwater and an emergency overflow leads to the public canal. This allows rainwater to be used as an important resource (stormwater management).

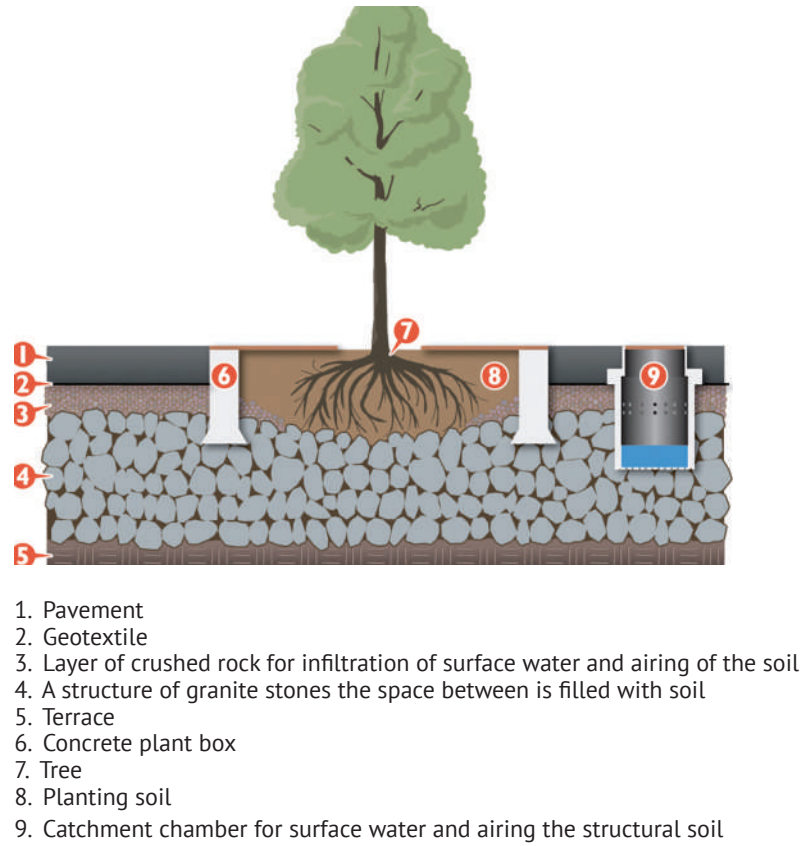
In terms of sustainable urban development, it is necessary to develop ecologically and economically efficient adaptation measures regarding climate change, which in Austria primarily means



Fig. 19. Reduced space for trees due to high traffic pressure

Source: [freiland CE Ltd.].





**Fig. 20. Scheme Stockholm System**

Source: [freiland CE Ltd., 2017].



**Fig. 21. Visualization of the future alley**

Source: [freiland, pixLab]

adapting to more extreme conditions. Hot, dry summers with more extreme rainfall events require the rapid removal of surface water without overloading the waste water system.

The city of Graz aims to increase the implementation of this construction method in the future, so surface water discharges can be more efficiently used and controlled. With regard to resource-efficiency this method has positive impacts, both ecologically and economically. For example, demolition materials can be used as structural material. The use of the roof-waters from adjacent buildings and the water from walking and cycling paths is a further positive effect. The increased vitality of the trees reduces the overall conservation effort. Due to the much larger root area, less damage is likely to be caused to nearby infrastructure.

## Conclusion

Today's most pressing challenges in urban areas are rising urbanization and population density, increased traffic and air pollution, the loss of green structures, changing mobility patterns, adaptation to climate change and the risk of social tensions.

Green and urban spaces have the potential to mitigate adverse developments. The importance of open spaces (squares and streets, urban parks and spacious recreational areas) is growing, especially in dense urban areas.

Attractive public infrastructure is a prerequisite for the sustainable urban development of districts. However, not all open space planning projects in the past have contributed to upgrading urban areas. In central urban areas the adaptation of public space to meet the diverging requirements of a mix of uses will be the main challenge. New neighborhoods will need to provide enough open spaces to enable the vitality and urban diversity that are characteristic of well-organized city districts.

The design and functionality and the adaption to the needs of the residents, significantly influence the quality and atmosphere of urban coexistence. The knowledge, consideration and use of quality criteria is essential to the creation of sustainable, livable and intelligent open spaces.

Derived from the quality criteria section in this article and from the selected projects, the following key aspects are recognized as prerequisites for successfully implementing green and open spaces:

- According to the principle of sustainable planning, the valuable is to be conserved, the tired is to be renewed and the outdated is to be transformed.
- The participation and cooperation of all stakeholders (authorities, planners, property developers, residents) creates and ensures the quality of free space, also contributing to more efficient development.
- Qualities are achieved through the conscious, high-quality design and staging of the open space. This includes important structural-aesthetic aspects, the organization of the open space and its (multi) functionality.
- In dense urban areas, the mix of small-scale open spaces can support the implementation of superordinate planning principles (different usage claims, a mix of uses, social space design, individual urban spaces). A mixture of public, semi-public and private open spaces enables the creation of identity and contributes to the avoidance of conflict.
- In urban areas it is important to establish a dense and attractive pedestrian and cycle network for short distance travel. The design of street spaces plays an important role, multifunctional connections allow a range of non-motorized movement and recreational activities at the same time. Thereby, new concepts for urban mobility are promoted.
- Against the background of climate change and the conservation of resources, it is not necessary only to secure and upgrade green zones — rivers landscapes also play key roles as green corridors in cities and programs will contribute to upgrade urban river landscapes.
- Resource efficiency should also be considered at the planning level. The Stockholm system helps to create generous root spaces for trees, enabling healthy plant growth and the efficient use of surface water discharge.

The integration of modern planning principles in binding regulations have proven beneficial for the conception of urban open spaces. Certain planning tools (Regional Development Programs, Urban Development Plans, Open Space Concepts, Master Plans) define spatial determinants (construction zones, open spaces, green belts), the functions and qualities of green and recreational areas, and timetables for the implementation of measures. In Austria, due to the range of federal

state laws, landscape planning is dealt with differently in each federal state in terms of planning procedures, responsibilities and implementation – thus the tasks, scale and planning depths vary to a certain degree.

The selected projects shown in this article, demonstrate freiland's successful approach towards open and green space planning. Establishing resource-saving technologies while creating the highest possible quality of open spaces considering all ages and social classes of potential users.

For future plans to be successful, it is indispensable to constantly adapt to the changing, complex and diverse conditions in urban surroundings, therefore concept and planning approaches have to be updated on a regular basis.

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## ВЫСОКОКАЧЕСТВЕННЫЕ ОТКРЫТЫЕ ПРОСТРАНСТВА В РАЗВИТИИ ГОРОДА:

ЛУЧШИЕ КЕЙСЫ ИЗ ГРАЦА (АВСТРИЯ)

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Продолжающаяся урбанизация бросает вызов городским планировщикам. Последствия увеличивающейся плотности населения в городах — нехватка жилья, рост цен на недвижимость, увеличение трафика, загрязнение воздуха, недостаток зеленых территорий и привлекательных публичных пространств, рост стоимости на городскую инфраструктуру и риск социальной напряженности — становятся все более заметными. Значение открытых публичных пространств — площадей и улиц, городских парков и просторных зон отдыха — в этом контексте существенно возрастает, особенно в густонаселенных городских районах. Их дизайн, функциональное наполнение и адекватность запросу горожан влияют на качество и психологическую атмосферу в городе. Учет критериев качества имеет большое значение для создания устойчивых, умных и «живых» открытых пространств. Передовые подходы к устойчивому планированию городских районов и универсальные принципы создания современного дизайна открытых пространств являются основными темами данной статьи. В статье представлены общие аспекты ландшафтного планирования в Австрии и отдельные лучшие проекты в контексте городского развития.

Статья дает представление о подходах к проектированию открытых пространств в австрийском Граце. Чтобы стать успешными, проекты должны учитывать конкретные потребности городских округов, что требует индивидуальных подходов и междисциплинарной группы планирования. Чтобы проекты были приняты общественностью, они должны основываться на детальном анализе пространственных, природных и социальных условий.

**Практическая польза:** Сложные и разнообразные проблемы планирования открытых пространств в австрийских городах можно рассматривать как релевантные для других городов, поскольку аналогичные тенденции (в нескольких иных масштабах) характерны для всей Европы. Лучшие проекты планирования территорий, реализованные freiland Environmental Consulting CE Ltd., основаны на современных принципах планирования, демонстрируют актуальные подходы для решения обозначенных проблем.

**Ключевые слова:** открытые общественные пространства; городское развитие; критерии качества; ландшафтная архитектура; ресурсоэффективное планирование; интеграция стейкхолдеров; инструменты городского планирования.

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