BiodiverCity

Städte • Gärten • Vielfalt
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STRATEGY PAPER

Strengthening Citizen Participation for Biodiversity
in Urban Green Spaces

Vienna • Bratislava, March 2026

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Biodivercity

GLOBAL 2000
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Strategic Partners:
Burghauptmannschaft Österreich
City of Vienna (MA 22 – Environmental Protection)
District Authority of Vienna's 20th Municipal District

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Glossary

Bezirksvorstehung des 20. Wiener Gemeindebezirks	District Authority of Vienna's 20th Municipal District
Bundesdenkmalamt Österreich	Federal Monuments Authority Austria
Burghauptmannschaft Österreich (BHÖ)	Subordinate entity of the Federal Ministry of Economy, Energy and Tourism; in charge of the architectural heritage of the Republic of Austria
DAPHNE Inštitút aplikovanej ekológie	DAPHNE Institute of Applied Ecology
Gebietsbetreuung Stadterneuerung	Urban Renewal Area Management
Jägerstraße	Street in Vienna's 20th Municipal District
Kochova záhrada	Koch's Garden
MA 22 – Umweltschutz	Municipal Department 22 – Environmental Protection (City of Vienna)
MA 28 – Straßenverwaltung und Straßenbaue	Municipal Department 28 – Road Administration and Road Construction (City of Vienna)
MA 42 – Wiener Stadtgärten	Municipal Department 42 – Vienna City Gardens (City of Vienna)
Metropolitný inštitút Bratislavy (MIB)	Metropolitan Institute of Bratislava (MIB)
Národný Trust n.o.	National Trust of Slovakia
Österreichische Bundesgärten	Federal Gardens Austria

1 Introduction

1.1 Background

The region extending between Vienna and Bratislava creates a unique European landscape. Nowhere else do two capital cities lie in such proximity, connected not only by a shared history and economic ties but also by a vital, common ecosystem: the Danube and its surrounding green corridors.

Vienna and Bratislava share a strong commitment to urban green spaces, recognizing their value for biodiversity, climate resilience, and quality of life. Yet both cities face the same structural paradox: the very pressures that make green spaces most needed – urban densification, soil sealing, climate change, and fragmented governance – are also the forces that make them hardest to manage and sustain. Green spaces in both cities risk degradation not through neglect, but through management regimes that optimise for visual order at the expense of ecological function. Vienna's Fachkonzept Grün- und Freiraum STEP 2025 (Sectoral Concept Green and Open Space) responds to this tension by committing to a minimum green space share of 50% while pursuing internal densification instead of outward expansion. Bratislava faces comparable pressure as its metropolitan area grows, with green space maintenance largely outsourced and strategic coordination between development and green space management still evolving.

The BiodiverCity project addresses this paradox directly. It brings together six partner organisations from both cities – municipal administrations, federal administrations, heritage institutions, and civil society NGOs – in a joint strategy to strengthen citizen participation as the key lever for sustainable biodiversity in urban green spaces.

This strategy paper sets out the shared analytical foundation, strategic objectives, and priority action areas of the project. It is the reference document for all partners and a communication instrument for the wider policy community.

1.2 Target Groups

This strategy paper addresses three distinct groups, each with different roles in achieving the strategy's goals:

- **Authorities and public green space managers:** Representatives from departments of environment, urban planning, and green space management as well as federal administrations who require a unified framework for cross-border cooperation and decision-making. These are institutions responsible for translating strategy into everyday management decisions, maintenance contracts, and governance structures.

- **Civil society organisations and community groups:** NGOs, grassroots organizations, neighbourhood initiatives, schools, and volunteer networks who are the primary agents of citizen stewardship and environmental education in both cities, including local influencers who lead communities and mobilize citizens.

- **Heritage and conservation professionals:** Garden managers, conservators and oversight authorities who manage the particular governance challenges of historic gardens under conservation law.

Representatives from all three categories are part of the BiodiverCity project and are directly addressed as stakeholders within these target groups. A special challenge of the project is that different levels of administration are involved in this project. Cooperation between municipal, regional and federal administrations follow other principles and rules than internal collaboration within municipalities. This also means that some measures and budget rules are different.

1.3 Vision

"Create resilient, biodiverse urban ecosystems through participatory governance – connecting cities and citizens for nature – and culture-inclusive urban development."

By realising this vision, we aim to demonstrate to the European community that high population density and high biodiversity are not contradictory goals. Cities can be both dense and diverse – with citizens as active co-managers of their green infrastructure, rather than merely passive users.

1.4 Definitions and Key Concepts

1.4.1 Conventional vs. Biodiversity-Oriented Management

Conventional management prioritises visual attractiveness and representative appearance, which means in some gardens: closely trimmed hedges, low-diversity ornamental lawns, seasonal plantings with exotic ornamental species, regular mowing, shaping of trees and shrubs, and – where perceived necessary – the use of fertilisers and pesticides. The prevailing standard imposes a well-maintained, excessively orderly cityscape.

Biodiversity-oriented management inverts these priorities. It focuses on ecological function, natural design, and multifunctionality – creating spaces that simultaneously serve as recreation areas, habitats for fauna and flora, and climate adaptation infrastructure. Practical measures include planting native and climate-adapted species, creating structural elements such as deadwood piles and stone heaps, reducing management intensity to allow natural processes, and integrating citizen participation into ongoing maintenance. The shift is not merely aesthetic but systemic: from maximum control to guided succession, from monoculture to complexity, from input-intensive to adaptive management.

1.4.2 Urban and Public Green Spaces

Urban green spaces encompass the wider green infrastructure of a city. All vegetated areas, whether publicly accessible or not, that contribute to ecological function, climate resilience, and quality of life. Within this broader category, public green spaces are permanently or partially publicly accessible areas that primarily serve recreational purposes. They include parks, historic gardens, playgrounds, street-side greenery, tree pits, flower beds,

Table 1: The Management Paradigm Shift – from Traditional to Biodiversity-oriented Green Space Management

Paradigm Shift in Green Space Management		
Conventional Management ←	DIMENSION	→ Biodiversity-Oriented Management
Visually tidy, homogeneous appearance	**Management Goal**	Species-rich, functional habitats with nature-inspired aesthetics
Uniform, frequent, entire area simultaneously	**Mowing Regime**	Mosaic mowing: differentiated in time & space; refuge zones left uncut
Low-maintenance ornamentals, turf grass, partially exotic shrubs	**Species Selection**	Native, climate-adapted perennials, shrubs, and wildflowers
Removed (deadwood, stone heaps = 'disorder')	**Structural Elements**	Retained as habitat for insects, fungi, and small mammals
Low-maintenance costs; clean look and aesthetic; full implementation of defined heritage conservation requirements in historic gardens	**Success Criterion**	Species richness increases; heat stress indicators decline
Passive users with the right to complain	**Citizen Role**	Active co-stewards and co-decision makers
'Preserve how it looked' (fixity dogma)	**Heritage Logic**	'Preserve how it worked' (adaptive management)
Caretakers' experiential knowledge & aesthetic conventions	**Knowledge Base**	Ecological monitoring, scientific data, citizen science

and front gardens, and are conceived in this project as multifunctional urban green spaces that simultaneously provide habitat for biodiversity, contribute to urban cooling and heat mitigation, and serve as anchors of community identity.

In the context of the BiodiverCity project and this paper, the focus is placed specifically on green areas that are both urban and publicly accessible. Within this framework public green spaces encompass public green spaces owned by the city or others, as well as historic and non-historic gardens. The historic gardens considered in this project fall under the responsibility of Národný Trust n.o. (National Trust of Slovakia) and Burghauptmannschaft Österreich (representative of the owner for heritage buildings and gardens & parks).

Throughout this paper, the terms “urban green spaces” and “public green spaces” are used in accordance with this definition.

Almost 50 % of Vienna’s city area is designated as green space, equating to approximately 18,600 hectares or 100 m² per capita. Bratislava manages approximately 36 %, equating 10,996 hectares or around 333 m² per capita. Despite Bratislava’s significantly higher per-capita green space provision, both cities face the same structural challenges: soil sealing pressure and fragmented management structures create a structural gap between the political commitment to green spaces and the ecological quality delivered on the ground.

1.4.3 Citizen Participation

Citizen participation in this project is understood as a structured continuum of engagement, not a single act and can be understood as comprising three levels of intensity: **information**, **consultation**, and **cooperation**.

At the level of information, stakeholders are informed but have no influence on decisions, for example through public information events or the publication of plans. Consultation allows stakeholders to comment on proposals, with their input taken into consideration, as is common in zoning procedures. Cooperation represents the highest level of involvement, where stakeholders actively participate in the development, execution, and implementation of projects alongside public authorities, with influence ranging from joint proposal development to substantial decision-making powers.

To clarify its scope, participation can be distinguished from related concepts: **citizen participation** involves only individual citizens; **public participation** includes citizens, organisations, and experts; while full **participation** encompasses citizens, organisations, experts, public administration, political representatives, and companies (Praxishandbuch Partizipation, City of Vienna).

Both cities already operate established participation instruments that the project builds upon. In Vienna, the platform ‘mitgestalten’ enables digital co-design of urban projects, the Mitmachbudget allows citizens to allocate funds for neighbourhood initiatives, and the *Masterplan Partizipative Stadtentwicklung* (Masterplan for Participatory Urban Development) provides the binding framework for citizen involvement in planning. In Bratislava, the participation methodology of the *Metropolitný inštitút Bratislavy (*Metropolitan Institute of Bratislava, MIB) – including neighbourhood design workshops, *Zásadné víkendy* (weekend planting events), and the Green Space Adoption programme – has been refined over six years across 50+ projects. BiodiverCity extends these existing instruments with a biodiversity-specific focus.

Table 2: The Three Levels of Citizen Participation – from Information to Cooperation

Participation Model: Three Levels of Civic Engagement			
Level	**Goal**	**Possible Activities**	**Intensity**
LEVEL 1 INFORMATION Citizens are informed	Raise public awareness for biodiversity projects and their benefits; build knowledge as a foundation for future engagement.	• Information boards at pilot sites • QR codes with species information • Guided tours and excursions • Press and social media communications	**Low**
LEVEL 2 CONSULTATION Citizens can contribute	Actively gather ideas, suggestions, and feedback from citizens; incorporate local knowledge into planning and management decisions.	• Surveys and questionnaires • Public planning meetings • Online platform co-design • Participatory budgeting	**Medium**
LEVEL 3 COOPERATION Citizens co-design	Citizens as equal co-designers of green spaces; sustained shared responsibility for the care and development of public areas.	• Planting & maintenance events • Stewardship agreements with citizens • Community stewardship	**High**

1.4.4 Two Key Players for Participation in Bratislava and Vienna

- **MIB Participation Framework (Bratislava)**
  The Metropolitan Institute of Bratislava (MIB) is the City of Bratislava's strategic planning and design body and the central institutional partner for all citizen engagement activities, including the city's urban biodiversity communication strategy. Its Participation and Urban Studies Section has, over six years, delivered more than 50 participatory projects involving over 100,000 people, demonstrating that large-scale civic engagement in urban planning is achievable. This experience provides a strong platform to integrate BiodiverCity's biodiversity focus, connecting MIB's participatory expertise with the Green Department's biodiversity mandates and the ecological knowledge of BROZ – Conservation Association and the DAPHNE Inštitút aplikovanej ekológie (DAPHNE Institute of Applied Ecology).

  MIB's participatory infrastructure is exemplified by its flagship programme, Mesto pre deti (City for Children). Engaging over 30 schools, the programme combines traffic safety improvements with the revitalisation of public spaces, involving children, parents, and neighbourhood residents in age-appropriate participatory activities. Physical interventions at schools have increased surrounding greenery, while complementary initiatives – including the Pešibus (walking bus), Ulice na hranie (play streets), and 15 community-requested play boxes – show that participatory formats can drive behavioural change at the neighbourhood scale.

- **Gebietsbetreuung Stadterneuerung and Green Space Adoption (Vienna)**
  Vienna's *Gebietsbetreuung Stadterneuerung* (Urban Renewal Area Management) – a network of decentralized neighbourhood service centres covering all major districts – provides the city's core infrastructure for community mobilisation and stewardship. The *Gebietsbetreuung*, active for over 25 years, combines neighbourhood renewal with community engagement, supporting residents in co-managing public spaces, fostering social cohesion, and implementing small-scale urban improvements. Programmes such as the Green Space Adoption Programme, which enables community groups and schools to take long-term responsibility for specific public green spaces, form the model on which BiodiverCity builds its formalized stewardship framework. The project extends this approach with biodiversity-specific criteria, monitoring protocols, and legally robust agreements, linking neighbourhood stewardship directly to ecological outcomes.

2 Situation Analysis

2.1 Central Challenges

2.1.1 Fragmented Habitats and Fragmented Management in Cities

Urban macro – and microhabitats are spatially separated by buildings, roads, and sealed surfaces. Without a sufficient network of small green spaces as stepping-stone biotopes, species cannot exchange and disperse – creating sink habitats rather than functioning ecological corridors. Green spaces often face a structural mismatch: while individual parks and gardens may be well managed, the connective tissue between them is fragmented and ecologically thin.

This ecological fragmentation is often manifested by administrative fragmentation. In Vienna, the departments *MA 42* (Vienna City Gardens, responsible for parks and street greenery), *MA 28* (Road Administration and Road Constuction, responsible for street infrastructure) and *MA 22* (Environmental Protection, responsible for nature conservation) operate under separate mandates and budgets.

Joint projects – such as biodiversity-oriented street planting – require cross-departmental coordination that has no formal institutional home. In Bratislava, overlapping competencies between the MIB, the municipal Green Department, the heritage authority, and individual city districts create parallel decision-making tracks that rarely converge. At Austrian state level, the *Burghauptmannschaft Österreich* (representative of the owner for heritage buildings, and gardens and parks), *Österreichische Bundesgärten* (Federal Gardens Austria, maintenance of historic gardens and parks) and *Bundesdenkmalamt* (Federal Monuments Authority Austria) operate under separate budgets.

The consequence in all cases is the same: governance fragmentation systematically disadvantages biodiversity-oriented management, which is by nature multifunctional and cross-departmental.

2.1.2 Historic Gardens – Heritage and Nature in Opposition

Following ICOMOS' Florence Charter (1981), "... historic gardens are defined as architectural and horticultural compositions of public interest from a historical or artistic point of view." Therefore, they are considered monuments. BiodiverCity works with a broader definition: historic gardens are understood as living cultural landscapes which contribute to the urban ecology and need to respond to both conservation obligations and the functional demands of climate adaptation and biodiversity. No official listed status is required for inclusion in this project – what matters is the presence of a designed, demarcated landscape with identifiable heritage values.

The conflict between cultural heritage protection and biodiversity management is often seen as one of the sharpest systemic barriers regarding historic gardens. The fact is that monument protection law and nature conservation law operate on different legal frameworks with different authorities, different timelines, and – often – different visions of what a historic garden should look like. This leads to a situation in which both sides are technically correct, but it becomes very difficult to take coherent action.

The core problem is not the existence of heritage protection – it is the absence of shared frameworks for what "conservation" means under the changing conditions of the current climate and biodiversity crisis.

In Vienna the *Burghauptmannschaft Österreich* is responsible and manages several federal heritage sites like the Imperial Palace complex under strong heritage protection rules while facing growing challenges related to biodiversity and climate resilience. In Bratislava, the approval requirements imposed by the monument protection authority are slowing down adaptation measures in gardens that would benefit from immediate climate-related interventions.

The silo problem operates on two distinct axes. Horizontally, departments at the same administrative level define success differently: heritage bodies measure authenticity and conservation standards; environmental agencies prioritise ecosystem health and climate resilience; tourism departments track visitor numbers and revenue; and urban planning authorities focus on housing and mobility. Because these mandates are rarely harmonized, protecting a historic landscape may conflict with climate adaptation targets, and biodiversity goals may restrict access or use patterns that tourism or recreation demand. Each department fulfills its own legal mandate – but the mandates are structurally misaligned.

Table 3: Horizontal Silos arise between Agencies Operating at the Same Administrative Level. In the Field of Historic Gardens, the Following Mandates are Typically in Play

Agency Type	Typical Focus	Success Criterion
Monument Protection Authority	Authenticity, conservation standards, reversibility of interventions, minimal interventions, status quo preservation	No loss of heritage substance; aesthetics, authenticity, expert assessments
Nature Conservation Authority	Ecosystem functions, biodiversity indices, habitat quality	Species counts, Red List species, monitoring results
Green Space Administration	Operations, traffic safety, aesthetic quality, user satisfaction	Complaint rate, maintenance cost per m^2
Tourism / Economic Agency	Visitor numbers, branding, revenues, international profile	Tickets, overnight stays, media reach, tourist expenditure
Urban Planning / Infrastructure	Land use, densification, mobility, growth	Zoning conformity, servicing targets
Science / Research	Evidence base, long-term monitoring, knowledge transfer	Publications, data depth, methodological validity

Vertically, heritage and nature governance spans local, regional, national, and sometimes international levels – each with different priorities and timelines. National protection frameworks and international conventions set standards that may be unfunded at the local level. Local communities may resist top-down conservation rules that ignore neighbourhood-level needs. Regional development plans can override site-specific heritage or ecological values. The result is policy incoherence even when all levels formally support the same goals.

These structural misalignments are reinforced by budget silos: funding streams are earmarked for either culture or environment, or tourism, making cross-cutting projects difficult to finance. And they are deepened by knowledge silos: historians, ecologists, planners, and economists operate with different epistemologies and evidence standards, so that cultural values may be dismissed as subjective in environmental assessments, while ecological thresholds are ignored in heritage reuse projects. Breaking down these silos requires not only coordination mechanisms but also shared analytical frameworks.

2.1.3 Resource Constraints

Highly fragmented, small-scale and multifunctional green spaces, which are often zoned to support diverse ecological and social uses, require specialized maintenance efforts. This results in higher operational complexity, increased time requirements, and higher costs, particularly during the transition phase. Consequently, there is a structural preference for management regimes involving regular mowing and traditional ornamental planting. In Bratislava, green space maintenance is largely outsourced to external contractors under contracts that leave little room for biodiversity-oriented deviation from standard practices.

But this resource constraint can be a strategic opportunity: formalized citizen stewardship – where community groups take on defined maintenance responsibilities for specific green areas – can extend the effective capacity of city management without additional budget.

2.1.4 Managing Expectations in Maintaining Historic Gardens

Managing historic gardens involves deeply embedded beliefs about what should be preserved and how. Often there are five misbeliefs regarding management, each of them including specific tensions with biodiversity goals:

- Fixity dogma: the belief that a garden must be kept frozen in a specific historical moment.
- Formal-aesthetic dogma: the prioritization of geometric form and visual tidiness over ecological function.
- Botanical-purity dogma: authenticity is defined by the "right" species, in the sense of a monumentalist approach.
- Conservation-by-control dogma: the assumption that good garden management requires maximum intervention – intensive mowing cycles, heavy pruning, and chemical treatments. The paradoxical implication is that conservation is equated with minimal intervention, despite requiring intensive control practices.

Beyond these misbeliefs, it is often overlooked that the protection of historic gardens and parks does not prevent changes. Changes must follow the rules defined in monument protection law, and their feasibility varies by garden type: the Imperial Palace Vienna gardens, for instance, face stricter constraints due to their representative functions. The key principle, however, is not the absence of change but its direction. Historic gardens were designed as multifunctional systems – their canopy structures provided shade and air circulation, their

species diversity ensured resilience, their water features regulated microclimates. Conserving 'how a garden functioned as a system' ensures these ecological and climatic functions continue within the framework of monument protection law.

2.1.5 Social Acceptance and the "Neglect" Problem

One of the most direct threats to biodiversity-oriented management is not institutional – it is social. When citizens perceive mosaic mowing, retained deadwood, or wildflower meadows as evidence of municipal neglect, they generate political pressure to reverse course. An example of this was the collapse of the mosaic mowing trial at *Sad Janka Kráľa* Park in Bratislava: an ecologically correct intervention, abandoned because communication failed to frame public expectations prior to implementation.

The systemic lesson: ecological transformation cannot outrun public understanding. Social acceptance must be built before and during implementation, not after.

2.1.6 Education Deficit and Contradicting Requirements

In Bratislava, a comprehensive survey conducted as part of the BiodiverCity project by BROZ in autumn 2024 among green space managers confirmed that the primary barriers to biodiversity management are not a lack of political will but the low prestige of gardening professions, a chronic shortage of financial resources, and the absence of long-term management plans. Respondents repeatedly cited budget constraints as the primary reason for their inability to implement high-quality, nature-oriented measures. Most managers operate without formalized long-term maintenance plans, exacerbating the gap between the strategic visions of MIB and the reality of day-to-day green space maintenance. This knowledge and capacity deficit extends across all professional levels – landscape architects, municipal planners, and maintenance workers alike. The low prestige of ecology as a profession in Slovakia, combined with limited continuing education provision, creates a systemic capability gap.

Interviews conducted in Vienna, also as part of the BiodiverCity project, showed that effective green space management is a collaborative effort involving diverse stakeholders. A balance between standardized planning and flexible adaptation is key. Addressing challenges like budget constraints, vandalism, and conflicting interests requires innovative solutions and strong community engagement. Targeted training and knowledge-sharing initiatives can empower stakeholders to create and maintain sustainable, biodiverse, and well-loved urban green spaces.

In both cities, management bodies simultaneously face contradictory requirements: tourist boards want attractive visual experiences; environmental authorities want ecological richness; heritage authorities want authentic restoration; residents want tidiness and safety. Without institutional frameworks that reconcile these demands, individual managers default to the path of least resistance – and that path is rarely biodiversity-friendly.

2.1.7 Land-Use Pressure and Densification

In Cities, urban green spaces face mounting competition from housing, transport infrastructure, and commercial development. Vienna's population has surpassed two million and is projected to reach 2.2 million before 2040, intensifying pressure on available land. Vienna's STEP 2025 *(*Vienna's Urban Development Plan) responds by shifting from outward expansion to internal densification – no new large-scale development areas on the urban fringe will be designated. Instead, underused sites such as former railway stations are being converted into mixed-use neighbourhoods.

Such densification strategies create both safeguards and risks for biodiversity. On the safeguard side, Vienna legally commits to maintaining at least 50% of its area as green space and applies a mandatory Green Space and Rainwater Management Factor for new developments. On the risk side, intensified land use within existing urban fabric increases pressure on the small, fragmented green spaces that serve as ecological stepping stones – precisely the spaces most critical for urban biodiversity networks.

In Bratislava, rapid development in the broader metropolitan area creates comparable tensions between construction activity and green space preservation. Without proactive integration of biodiversity criteria into land-use planning, densification will erode the ecological connectivity that both cities' biodiversity strategies depend on.

2.1.8 Climate Change Impacts on Public Green Spaces and Historic Gardens

Green Spaces are already significantly affected by climate change, and the rate of impact is accelerating. Key effects observed at project partner sites include:

- Heat stress weakens plants and increases mortality
- Loss of shade and cooling functions creates overheating feedback loops in dense urban contexts
- Prolonged drought leads to soil dehydration, damage to roots and accelerated loss of old trees.
- Heavy rainfall events cause soil erosion
- Invasive species exploit climate stress to displace native species

2.2 Opportunities and Drivers

2.2.1 Growing Civic Environmental Awareness

Both cities show significant and growing citizen interest in urban nature. In Bratislava, programmes like 10,000 Trees, the Green Space Adoption Programme, and BROZ's entomological walking tours demonstrate that public demand for active environmental engagement exists and is growing.

In Vienna, the *Gebietsbetreuung Stadterneuerung* provides a decentralized mobilisation network covering all major districts. Community gardens, *Pflanzpatenschaften* (plant stewardship schemes), and the *Mitmachbudget* (participatory budget) have created an experienced civic sector ready to take on more formal stewardship roles.

2.2.2 Strategic Momentum

The EU Biodiversity Strategy 2030 and the Nature Restoration Law create a regulatory momentum that makes biodiversity-oriented urban management not just politically desirable but legally expected.

2.2.3 The City Cooperation Advantage

Cooperation and knowledge exchange between partner cities offer great potential. When methods are stress-tested against a second city with different institutions, legal frameworks, and civic cultures, the resulting evidence base becomes far more robust and transferable than any single-city pilot could achieve. Cooperation also creates an internal accountability mechanism: coordinating externally requires each city to harmonise its own governance first, accelerating the cross-departmental reform that biodiversity management demands. The twin cities Vienna and Bratislava may offer an indication of what an ambitious partnership could one day look like: from synchronized transport networks and joint green belt protection along the Danube-Auen to shared digital urban models simulating cross-border climate impacts, and a permanent Cross-Border Planning Council aligning infrastructure and building standards. In the realm of biodiversity, this vision could translate into coordinated ecological corridor management, joint monitoring of shared green belts such as the Marchfeld region, and the transfer of participatory stewardship models between cities.

2.2.4 Urban Heritage as a Living Quality and Climate Asset

Urban areas across Europe frequently overlap with both biodiversity hotspots and areas of rich cultural heritage. Historic urban landscapes – gardens, parks, tree-lined avenues, and the urban fabric itself – function as repositories of ecological knowledge and practical climate adaptation. Historically, cities were shaped to respond to their regional climatic conditions: narrow streets and aligned axes improved air circulation; tree canopies provided shade; water features moderated microclimates. These design principles were not conceived as climate measures, but they functioned as such – and their effectiveness is being rediscovered as cities confront rising temperatures.

However, centuries of urban densification have progressively undermined these mechanisms. Original urban layouts have been altered, reducing natural ventilation. Traditional shading elements have been removed. Increased solar gain can no longer be adequately dissipated, leading to intensified urban heat stress – particularly within heritage sites where sealed surfaces and dense building fabric dominate.

Historic gardens and parks are among the most effective urban cooling infrastructures available – their preservation and ecological enhancement delivers measurable climate adaptation benefits (see Annex B).

2.3 Strategic Framework

The project BiodiverCity is embedded in, and designed to operationalise, an interlocking set of strategic frameworks at EU, national, and municipal levels. The following table highlights a selection of strategies most directly relevant to public green space management, community engagement, and urban biodiversity. For a full overview of all identified strategies, see Annex A.

Table 4: The Project BiodiverCity within a Multi-level Strategic Framework. An Overview of the Relevant Strategies. See Annex A for a more extensive list

Level	Document	Relevance to BiodiverCity
EU	EU Biodiversity Strategy 2030	30% of land under protection; urban biodiversity target
EU	Nature Restoration Law (2024)	Legally binding restoration targets for urban ecosystems
EU	OMC Report	Strengthening cultural heritage Resilience for climate change
National	Austrian Biodiversity Strategy 2030+	Native species protection; near-natural public land management – 80% of public green spaces 50% of public green spaces along the traffic routes
Vienna	Sectoral Concept Green and Open Space (STEP 2025)	Min. 50% green space share; depaving requirement
Vienna	Guiding Principles for Vienna's Green Spaces	Native species, natural design, structural elements as standard for municipal urban green spaces.
Vienna	Smart Climate City Strategy by the City of Vienna	Biodiversity as part of its broader goals to adapt to climate change
Vienna	Practical Guide to Participation by the City of Vienna	Methods, measures and practical experience for employees of the Vienna City Council and planners to actively involve citizens.
National	Slovak Nature Conservation Act	Urban green space protection; biodiversity monitoring
Bratislava	Strategic Plan Bratislava 2030	Citizen participation and nature-based solutions as cross-cutting priorities
Bratislava	Principles and Standards of Urban Greenery	Ecological green space management and nature-oriented design
Bratislava	Climate Plan – A Greener and Healthier Bratislava	Climate resilience through green infrastructure
Bratislava	Participatory Planning and 'City for People' Grant Scheme	Cooperation between the city and residents, moving from consultation to active co-creation of the urban environment.

Bratislava and Vienna already have several guidelines and strategies aimed at the **sustainable and ecological management of green spaces.** These also provide a framework for the design of green spaces in the project. Several of these frameworks set concrete, quantifiable targets that directly frame this strategic paper (see Tab.3 and Annex A).

For example the measure of the Austrian Biodiversity Strategy 2030+ reduce land use and fragmentation is to design at least 80% of the public green spaces in residential areas and at least 50% of the public green spaces along the traffic routes in a natural way with native plants that are appropriate to the site. Vienna's Sectorial Concept Green and Open Space STEP 2025 commits the city to maintaining at least 50% green space share and requires the application of a Green Space and Rainwater Management Factor for all new developments. The Guiding Principles for Vienna's Green Spaces sets minimum dimensions for tree pits and planting beds and mandates the use of native species as standard. Vienna's Urban Heat Island-Strategy targets an expansion of public green space by 400,000 m² and requires high-quality green spaces within 250 metres of every resident. Bratislava's 10,000 Trees Initiative sets a three-year planting target, and the PHSR Bratislava 2030 requires that at least 80% of public green spaces in residential zones be managed ecologically, with 50% along transport routes. This strategy is designed to contribute directly to these targets.

2.4 Open Governance Questions

Three unresolved questions in the current governance landscape constrain the implementation of existing strategies in both cities:

- Liability and legal framework for stewardship: The current absence of standardized agreements means citizen groups who wish to maintain public green spaces have no clear legal basis, limiting the scale and durability of community engagement.

- Simplification of legal rules: Existing procedures for approvals, plant replacements, and implementing biodiversity measures are calibrated for professional contractors. These lead to specific challenges regarding risk handling and liabilities. This also creates disproportionate barriers for voluntary citizen groups and NGOs to support operational tasks.

- Funding continuity: Biodiversity investments made within project cycles need to be connected to recurring municipal and federal budget lines to ensure post-project sustainability. The mechanisms for this transition currently do not exist.

3 Overall Objective

"Strengthening Citizen Participation for Biodiversity in Urban Green Spaces"

The overarching goal is to strengthen citizen participation for biodiversity: to actively involve citizens in the improvement of biodiversity in urban green spaces – from public parks to historic gardens – and encourage them to contribute sustainably to the conservation of these biodiversity areas. This is pursued through hands-on conservation activities, volunteering, and emotionally engaging communication fostering long-term commitment.

The strategy integrates awareness-raising, environmental education, and practical action competence across all levels of engagement – from students and residents to municipal & federal staff and community stewards – offering clear ways to make urban green spaces more biodiversity-friendly. It also promotes cooperative urban planning, bringing together administrations, (heritage) experts, and citizens to design and manage biodiverse, climate-resilient urban landscapes.

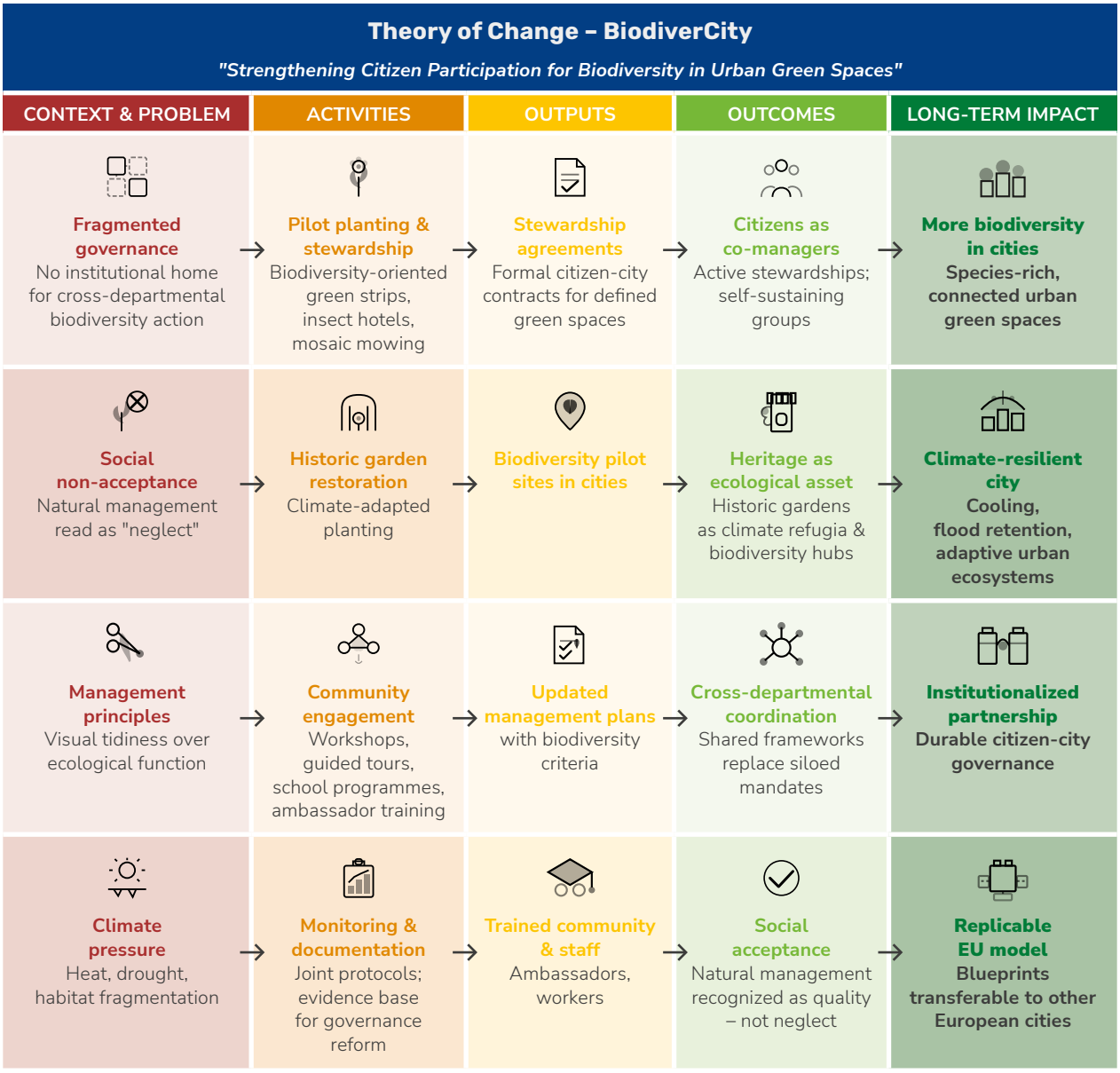

Figure 1: Theory of Change – from Challenges to Long-term Impact

4 Specific Objectives

The overall objective is pursued through three interlocking specific objectives, each addressing a distinct governance and implementation dimension of the challenge.

4.1 Promoting Citizen Participation for Biodiversity in Urban Green Spaces

The first objective is to activate citizens as direct agents of biodiversity improvement across urban green spaces, especially municipal public green spaces. Engagement is structured across three mutually reinforcing levels:

- hands-on conservation and stewardship, through which residents care for, co-design, and monitor green spaces
- diverse communication formats and contact points beyond traditional outreach, linking biodiversity to everyday human themes such as history, arts and neighbourhood identity, making participation personally meaningful and accessible to diverse audiences
- environmental education for schools and communities, building ecological literacy and practical competence for the next generation of urban nature stewards.

Success requires not just reaching citizens but sustaining their involvement beyond individual events. The specific objective therefore includes the institutional dimension: building formal stewardship agreements between citizen groups and municipal or heritage authorities and organizations, and training green space managers and workers to facilitate rather than replace citizen engagement. This creates a functional partnership in which informed citizens and professional administrators jointly manage defined green areas under clear shared agreements.

4.2 Promoting Biodiversity in Urban Green Spaces

The second objective is to strengthen the transformation of urban green spaces – particularly municipal public green spaces as well as historic gardens – into actively managed, climate-resilient and closely monitored parts of the urban ecology. Specifically, this means:

- introducing climate-adapted, biodiversity-oriented planting in urban green spaces and also alongside heritage-significant specimens in historic gardens
- managing structural elements – such as deadwood, rough grass margins, water (retention) features – as legitimate expressions of adaptive practice
- building joint protocols, for example with municipal departments or garden managers that enable biodiversity measures to be implemented as a complement to regulatory requirements rather than in competition with them.

The communication dimension of this objective is equally important. Especially historic gardens offer a uniquely compelling narrative for biodiversity communication. Their long history, cultural resonance, and visual richness make them ideal venues for engaging audiences who might not respond to abstract ecological arguments. The project BiodiverCity uses guided tours, workshops, before-and-after visualisations, and community participation in restoration as tools for building social acceptance of biodiversity-oriented management at scale.

4.3 Promoting Cooperative Urban Planning in Vienna and Bratislava

The third objective is the least visible but structurally most important: creating lasting institutional conditions for biodiversity-oriented citizen participation. The project BiodiverCity aims to implement cooperative urban planning in Vienna and Bratislava by actively involving citizens, community groups, schools, and ecological experts alongside municipal departments in the co-design, management, and stewardship of urban green spaces. Additionally, it requires the inclusion of heritage actors such as *Burghauptmannschaft Österreich*, *Bundesdenkmalamt*, *Bundesgärten* and others with specific agreements.

Achieving this requires building cross-departmental working relationships within each city, establishing joint monitoring protocols that translate management recommendations into operational decision-making, and – at the bilateral level – creating formalized exchange mechanisms between Vienna and Bratislava that will continue in the long term. By combining participatory engagement with coordinated governance, monitoring, and legally anchored frameworks, this objective ensures that biodiversity initiatives are sustainable, evidence-based, and fully integrated into long-term urban and cross-border planning.

The results and lessons learned from the project BiodiverCity are intended to facilitate the implementation of similar initiatives in other cities, municipalities, and historic gardens.

4.3.1 The Cross-Border Dimension

Cross-border governance can create strong institutional incentives by requiring cities to coordinate internally before cooperating externally, accelerating governance reform and enhancing strategic planning. Such collaboration opens broader opportunities, including coordinated management of shared green belts and ecological corridors, the development of shared digital planning tools for infrastructure and environmental monitoring, and the establishment of permanent cross-border planning councils to align regulations, development timelines, and green space standards. These structures provide a durable institutional framework for integrating long-term biodiversity and urban planning objectives.

5 Action Areas

The three action areas operationalise the specific objectives by setting out concrete measures, defining responsibilities, and establishing measurable indicators. They are designed to reinforce each other: Action Area 5.1 engages communities in protecting biodiversity in urban green spaces. Action Area 5.2 creates visible, physically transformed biodiversity-friendly green spaces, and Action Area 5.3 demonstrates how even highly protected and culturally sensitive green spaces can be made compatible with biodiversity objectives.

Specific Objectives & Action Areas

OVERALL OBJECTIVE: Strengthening Citizen Participation for Biodiversity in Urban Green Spaces

SPECIFIC OBJECTIVES

Promoting Citizen Participation for Biodiversity in Urban Green Spaces	Promoting Biodiversity in Urban Green Spaces	Cooperative Urban Planning
• Activate citizens as direct biodiversity agents • Build formal stewardship agreements • Environmental education from schools to stewards • Train municipal staff to facilitate – not replace – engagement	• strengthen the transformation of historic gardens • Build joint protocols with heritage authorities • Use gardens as communication venues for biodiversity	• Create lasting institutional conditions for participation • Build cross-departmental working relationships • Joint monitoring → operational decision-making • Formalized Vienna–Bratislava exchange beyond project end

↓ operationalized through ↓

ACTION AREAS

Education and Community Building	Historic Gardens: Climate Adaptation and Biodiversity	Public Green Spaces: Management & Monitoring
• Community workshops & stewardship events • School programmes – green spaces as classrooms • Local biodiversity ambassador network • Strategic communication to shift 'neglect' perception	• Biodiversity-oriented planting strips, wildflower beds, hedges and trees • Climate-resilient replanting and water (retention) features • Depaving • Mosaic mowing • Habitats for (small) wildlife, e.g. deadwood, open soil, nesting sites • Adaptive management protocols • Citizen stewardship in green space restoration	• cross-departmental working relationships • Joint monitoring protocol (plants, pollinators, soil) • Stewardship agreements: citizen-city contracts • Data loop: monitoring findings → maintenance plans

Figure 2: Connection between the Specific Objectives and the Action Areas

5.1 Action Area 1

Education and Community Building

Strategic Objective

Build an informed, self-sustaining community of citizens who actively supports and protects biodiversity in urban green spaces – while creating a robust educational foundation that prioritizes those directly involved in their care (gardeners, local residents, schools, volunteers), complemented by outreach to the wider public across all generations.

Risks and Prerequisites

- Conflicting interests between urban green spaces caretakers, NGOs, monument boards, nature conservation authorities and the public regarding how green spaces are used and managed.
- Potential resistance to a "wilder" appearance of urban green spaces.
- Low initial engagement levels, particularly where residents have no prior experience with participatory environmental programmes.
- Urban green spaces stewardship challenges like waste, vandalism, and maintenance burdens can lead to volunteer disengagement.
- Disappointment among urban green spaces caretakers if expectations can not be met.
- Long-term continuity: without institutional anchoring and documented training materials, the community remains dependent on an external coordinator.
- Citizen participation in historic gardens and parks owned by state bodies or private owners must follow specific rules and consider implications of volunteer work regarding liabilities and insurance. Therefore, monument protection authorities can often be sceptical about citizen participation. Before citizens can be involved, they require specific training on historic gardens and what they represent. The transfer of stewardship to citizens, as practiced for streets and their adjacent green strips, is not applicable to historic gardens.
- If schools are involved, continuity depends heavily on the commitment of individual teachers and the school management. Formal agreements with the educational institutions are therefore an important prerequisite.

Key Measures

- Cooperation with local actors – district administration, area management (e.g., *Gebietsbetreuung* in Vienna), and experienced institutes (such as MIB in Bratislava) – combined with transparent, proactive communication about realistic possibilities and clearly defined responsibilities.
- Identification of target audiences and the design of inclusive participation formats tailored to diverse needs, including language, age, and abilities.
- Opportunities for feedback and open dialogue on community challenges, addressing them collaboratively and turning them into shared action.
- Inclusive, low-threshold community engagement activities – such as guided tours, urban rallies, and art-based projects – that celebrate diversity, strengthen community bonds, and make biodiversity tangible through creative, accessible formats beyond conventional ecological communication.
- Practical workshops and knowledge transfer on biodiversity: hands-on activities (such as community planting and maintenance activities or nesting sites construction), educational events (e.g., excursions and guided species-identification walks) and informational materials on urban biodiversity, plant care and maintenance, which build practical knowledge, shared responsibility and long-term self-sufficiency.
- Educational programmes for schools of all ages, including gardening schools, combining expert-led lectures with hands-on visits to urban green spaces as living classrooms to teach practical biodiversity protection and enhancement.
- Local biodiversity ambassador network: training key residents as neighbourhood interpreters, creating peer-to-peer communication channels that persist beyond the project period.

Actors

- Expert institutions and environmental specialists: Responsible for providing professional content, educational methodology, and guidance for practical field activities.
- Communication departments and institutions (e.g., Metropolitan Institute of Bratislava (MIB)): Key partners for strategic communication, public participation, and setting standards for community engagement.
- Educational institutions, such as schools and vocational education and training providers: Direct partners for implementing educational activities and bridging the gap between theory and practice.
- Local communities, civic initiatives, volunteer networks and NGOs: Primary actors in the hands-on stewardship and community care of urban green spaces.

Table 5: Indicators of Action Area 1 (all the indicators are preliminary proposals and require operationalization in the specific application context to ensure they are concrete and measurable and can be effectively implemented and assessed)

	Municipal Public Green Spaces	Historic Gardens & Parks
Number of school pupils, school classes and schools reached through formal education programmes	X	X
Share of school pupils, school classes and schools reached through formal education programmes	X	X
Participants in community workshops and stewardship events	X	X
Reach of communication campaigns (views, shares, media coverage)	X	X
Social acceptance measurement: comparative survey before and after implementation	X	X

5.2 Action Area 2

Municipal Public Green Spaces: Management and Monitoring

Strategic Objective

Achieving deeper citizen involvement in both the planning and direct care of urban green spaces, moving from passive use to active co-management. Biodiversity-oriented management becomes embedded in routine practice rather than remaining a pilot experiment.

Risks and Prerequisites

- Local authorities with limited budgets and a lack of expertise in managing biodiversity areas may struggle to maintain green spaces designed to promote biodiversity in the long term. Without incorporation into the regular budget and training programmes, there is a risk that pilot sites will revert to conventional maintenance practices once the pilot phase ends.
- Personnel constraints within the municipalities and among expert partner organisations may limit the frequency and quality of field activities, educational programmes, and long-term urban green space maintenance.
- Administrative approval procedures for depaving and replanting in street spaces usually involve several different authorities, such as departments and district offices. Difficulties and delays in coordinating these authorities may slow down the implementation process.
- Citizen stewardship groups require continuous institutional support (e.g., information materials, equipment, waste collection, technical guidance). Volunteer fatigue and personnel turnover can erode stewardship capacity if support structures are not formalized and do not meet the needs of the target groups.

- Social resistance to biodiversity-oriented management (see the "neglect problem" described in Chapter 2.1.6) may generate political pressure to reverse interventions.

- Successful implementation depends on the city's access to relevant expert entities with the capacity to deliver education and practical field activities.

Key Measures

- Ecological design of public green spaces: e.g.
  - biodiversity-oriented planting strips and flower beds,
  - creation of habitats and nesting sites for (small) wild animals,
  - nature zones in parks,
  - depaving.

- Regular trainings for green space workers about ecological design and biodiversity-friendly maintenance of green spaces

- Citizen involvement in urban green space planning: involving local residents in planning decisions around the creation, redesign, and management of urban green spaces – for example through structured consultation rounds or joint working groups with planning departments, so that citizen knowledge feeds into processes that would otherwise remain purely administrative.

- Hands-on co-management: defined green space plots where citizen groups take on practical maintenance tasks (seasonal planting, upkeep, habitat care) — with support and guidance.

- Formalized stewardship agreements: standardized, legally robust agreements between citizen groups and municipalities, defining stewardship areas, responsibilities, city obligations (materials, waste collection), liability, and renewal procedures.

- Regular trainings for citizens about ecological design and biodiversity-friendly maintenance of green spaces

- Standardized biodiversity monitoring protocol: a joint methodology covering plants, pollinators, and soil quality, applied at pilot sites in both cities. The protocol is designed to transfer to environmental departments as an operational tool, generating annual public reporting.

- Data transfer mechanism: systematic transfer of monitoring findings into annual green space maintenance plans, creating a feedback loop between citizen-generated ecological data and management decisions.

Actors

- Municipalities and cities (politicians, administration, departments, district offices, etc.): primary leaders of the agenda; responsible for the administrative, legislative, and communication framework (facilitating and inspiring participation).

- Expert entities and specialists: providers of know-how, educational methodologies, and professional oversight for field activities.

- Educational institutions (e.g., schools): active participants in programs and a key group for building environmental awareness among future generations.

- Citizens and local communities: active co-creators and users who take over part of the stewardship of green spaces in their neighbourhoods.

Table 6: Indicators of Action Area 2 (all the indicators are preliminary proposals and require operationalization in the specific application context to ensure they are concrete and measurable and can be effectively implemented and assessed)

	Municipal Public Green Spaces	Historic Gardens & Parks
m² / Number of biodiversity areas / new planting beds established	X	X
Share of biodiversity areas of all UGAs	X	X
Number of species, annual comparison through continuous monitoring	X	X
Number of habitats (definitions), annual comparison through continuous monitoring	X	X
Trendline of number of species	X	X
Trendline of number of habitats	X	X
Number of trained employees for biodiversity-friendly green spaces	X	X
Number of stewardship agreements in cities	X	X
Management plans for green spaces with integrated biodiversity measures	X	X
Number of citizen (groups), actively carrying out maintenance tasks in defined urban green space plots.	X	X
Number of planning processes for urban green spaces in which citizen groups were formally involved	X	–

5.3 Action Area 3

Historic Gardens: Climate Adaptation and Biodiversity

Strategic Objective

Develop historic gardens as climate-resilient, ecologically valuable habitats – without sacrificing cultural authenticity. Apply the principle of adaptive management to historic gardens and parks by respecting the specific legal regulations for implementing changes.

Risks and Prerequisites

- Heritage protection authorities may delay or reject biodiversity measures that modify the visual character of protected sites. Early and continuous consultation is a prerequisite, not an option.
- Conflicting objectives between property owners, managing organisations (e.g., NGOs), heritage authorities, and neighbourhood residents require a structured mediation process. Without it, pilot interventions stall in approval cycles.
- Climate-resilient replanting requires species that are both ecologically appropriate and heritage-compatible – a narrow intersection that demands specialized botanical expertise.
- The *Parkpflegewerke* (garden maintenance plans) for the protected gardens and parks of the Imperial Palace complex (site managed by *Burghauptmannschaft Österreich*) were last updated in the early 2000s and do not fully reflect current climate conditions. Updating them is a prerequisite for legally embedding biodiversity measures.

- Shared conceptual framework: All relevant stakeholders – heritage authorities, property owners, and managing organisations – must agree on the principle of adaptive management. Without a shared understanding that functional authenticity is as valid as visual authenticity, every individual biodiversity measure risks being blocked on aesthetic grounds alone. For protected objects changes are always a matter of balancing between different values and objectives.

- Long-term joint maintenance standards: cross-agency binding standards integrating all maintenance approaches based on an administrative agreement.

- Integrated management plan: a single document uniting monument, nature, and operational requirements; in Vienna, for example, an updated version of the *Parkpflegewerke* incorporating biodiversity requirements. Management plans must be updated regularly.

- Monitoring as a bridge: Joint data collection creates a shared knowledge base and forces coordination. Prior agreement on indicators is required.

Key Measures

- Climate-resilient replanting: introduction of native, drought-tolerant species as replacements for climatically vulnerable plants, in consultation with heritage authorities.

- Integration into climate adaptation plans: ensuring that historic gardens are formally included in climate adaptation strategies with integrated biodiversity measures. This requires administrative agreements due to multi-level governance structures.

- Biodiversity structural measures: eg., retention of deadwood as insect habitat, creation of rough-grass margins, mosaic mowing regimes, installation of nest aids, and water retention features (rainwater collection, mulch, permeable paths).

- Adaptive management plan: joint development, with heritage and nature protection authorities, of biodiversity-compatible management standards that satisfy conservation law requirements. In Vienna, this requires updating the existing *Parkpflegewerke*, last revised in the early 2000s and not fully reflecting current climate conditions or biodiversity targets.

- Evidence-based scaling of biodiversity practices: e.g., the historic Koch's Garden in Bratislava provides a proven implementation base where biodiversity-oriented management is already in place. These good practice examples offer both ecological evidence and practical learning opportunities for replication across cities.

- Citizen stewardship in restorations: replicating the Koch's Garden model of voluntary community involvement in the planting, maintenance and monitoring phases of heritage garden restorations.

- Digital tools for biodiversity communication: using digital tools, such as audio guides, to communicate biodiversity-related content.

- Practical workshops for schools and the public, like building insect nesting aids and botanical illustration, to make biodiversity tangible through direct experience.

Actors

- Administrative managers and/ or representatives of the owners of historic parks and gardens (e.g., *Národný Trust*, *Burghauptmannschaft Österreich*)

- City and state departments (e.g., Bratislava heritage authority, *Österreichische Bundesgärten*)

- Expert entities and specialists: providers of know-how, educational methodologies, and professional oversight for field activities.

- Community volunteers

Table 7: Indicators of Action Area 3 (all the indicators are preliminary proposals and require operationalization in the specific application context to ensure they are concrete and measurable and can be effectively implemented and assessed)

	Municipal Public Green Spaces	Historic Gardens & Parks
Number of historic gardens per city with an adaptive management plan	–	X
Biodiversity baseline surveys in historical gardens	–	X
Number of climate-resilient species planted	–	X
Share of climate-resilient species planted	–	X
Number of biodiversity structural measures installed per site	–	X
Share of biodiversity structural measures installed per site	–	X
Number of digital tools (for example audio guides) with biodiversity related content	–	X
Number of citizen stewardships in restoration projects (replicating the Koch's Garden model)	–	X

6 Good Practices

The following two case studies are the empirical foundation of the BiodiverCity strategy. They demonstrate that the strategic objectives are not aspirational – they have already been tested, evaluated, and refined in real urban conditions.

6.1 Greening Jägerstraße, Vienna – A Blueprint for Urban Biodiversity and Community Building

Context and Challenge

Located in Vienna's 20th district (Brigittenau), *Jägerstraße* is a typical densely built-up urban artery characterized by high traffic volume, extensive soil sealing, and a structural absence of green corridors. The primary challenge was to introduce effective green infrastructure into a space-constrained public realm without disrupting essential urban functions.

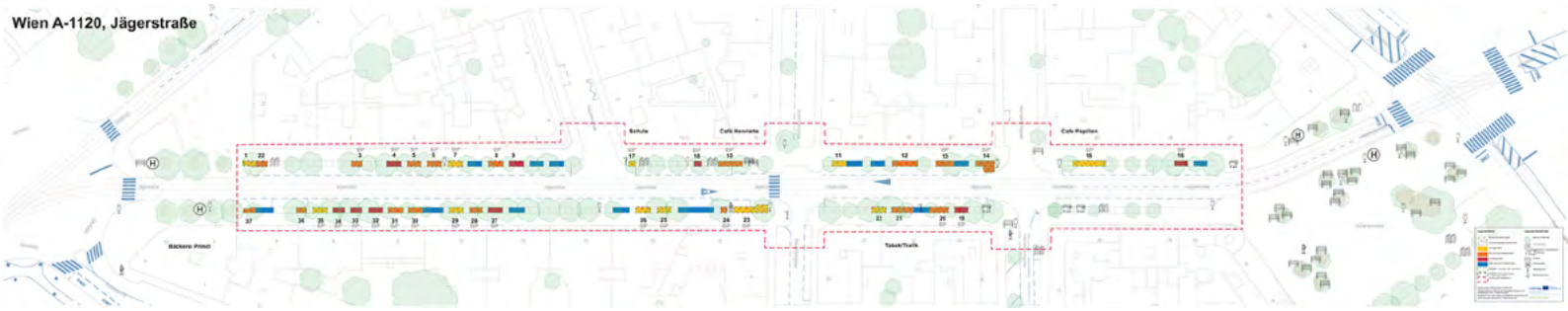

Figure 3: Map of Jägerstraße showing the location of the new flower beds designed to promote biodiversity

Intervention

In close collaboration with the *Bezirksvorstehung des 20. Wiener Gemeindebezirks* (District Authority of Vienna's 20th District), MA 42 (Vienna City Gardens), MA 28 (Road Administration and Road Construction), as well as *Gebietsbetreuung Stadterneuerung* (Urban Renewal Area Management), GLOBAL 2000 designed and implemented biodiversity-oriented flower beds along the street. The core intervention focused on the unsealing of impervious surfaces along the sidewalks and planting native species with high habitat value for pollinators and ground-nesting insects. The process was fully participatory, involving local residents from the very beginning, starting with local information events and visual information (posters).

Key measures

- **Biodiverse Planting**: in total, 37 flower beds were planted with a mix of native, drought-resistant perennials and wild shrub species specifically selected to support local pollinators (primarily bees and butterflies).
- **Soil Rehabilitation**: the underlying soil structure was improved to enhance water retention, directly contributing to local micro-climate cooling through evapotranspiration, and adapted to the needs of the plants.

Figure 4: Community activities: Participatory meeting with local residents of Jägerstraße, Vienna

- **Biodiversity Monitoring**: regular biodiversity monitoring throughout the whole project, covering both plants and insects. The first results show that some endangered plant species have already been reintroduced, and pollinator activity has increased.

- **Community Building**: offering of several community activities since the beginning such as *Mitmachtreffen* (participatory meetings), planting days, as well as accessible, low-barrier community workshops related to the topic of biodiversity (e.g., crafting small water stations for insects, crocheting gardening bags, building insect hotels).

The *Jägerstraße* project serves as a pilot project for urban roadside greening and powerfully demonstrates that biodiversity need not be confined to large parks. By transforming grey infrastructure into blooming micro-habitats, the project has brought nature directly to residents' doorsteps. The visibility of the intervention has generated strong positive resonance within the local community, raising awareness of the value of surface depaving and the urgent need to strengthen biodiversity in urban spaces. From this initiative, an active neighbourhood stewardship group has emerged – maintaining the beds year-round.

Figure 5: Community activities: Planting day with local residents and volunteers at Jägerstraße, Vienna

Figure 6: Community activities: Planting day with local residents and volunteers at Jägerstraße, Vienna

Figure 7: Community activities: Participatory meeting with local residents of Jägerstraße, Vienna

Figure 8: Community activities: Planting day with local residents and volunteers at Jägerstraße, Vienna

Transferability

The *Jägerstraße* model represents represents the project's primary transferable instrument for public green space action. Its three structural components – a standardized methodology for depaving and biodiversity-oriented planting, a participatory co-design process with the local community, and a formalized shared stewardship arrangement – are not bound to Vienna alone and can be replicated in other cities with similar preconditions.

Figure 9: Stages of progress in the creation of flowerbeds on Jägerstraße

6.2 Koch's Garden, Bratislava – Restoring a Historic Garden as a Community Project

History and Context

Kochova záhrada (Koch's Garden) is a historic garden in central Bratislava, built in the 1930s in a functionalist style. Its uniqueness lies in its direct connection to Koch's sanatorium: while the sanatorium served the healing of physical diseases, the garden was conceived as a place for healing patients' souls – a therapeutic landscape integral to the treatment concept. This dual function of medical and horticultural care gave the garden a distinctive character that set it apart from purely ornamental urban parks. The garden's diverse tree composition and the rare microclimate created by its topography and dense canopy further distinguish it as an ecologically and historically significant site.

The garden had its own dedicated gardener until 2007. After that, it had no responsible owner and deteriorated steadily over fifteen years – losing both its cultural function and its botanical richness. From 2007 to 2022, *Národný Trust* (National Trust of Slovakia) persistently advocated with successive city governments to take the necessary protective actions before the loss became irreversible. In 2022, the City of Bratislava finally acquired ownership and, after securing financial resources, initiated the reconstruction process.

Restoration Process

In 2022, the City of Bratislava acquired ownership of the garden and secured funding for reconstruction. The City of Bratislava and *Národný Trust* signed a Memorandum of Cooperation for the garden's future management. The restoration process was distinctive in its participatory approach: before reconstruction began, the garden was included in the Open Gardens programme, allowing residents to engage with its history and ecological potential. The garden was regularly part of the Open Parks and Gardens Weekend – a cultural-educational event promoting green heritage, organized in Slovakia since 2007 by Národný Trust. Through guided tours, dozens of volunteers helped interpret the garden's historical and ecological significance to the public, learning in the process about its botanical uniqueness and, at the time, its lack of systematic management.

Beyond educational engagement, individual and corporate volunteers participated in voluntary brigades focused on clearing invasive plant species. These brigades served a dual function: they delivered practical maintenance results while building a constituency of informed citizens who understood the garden's condition and advocated for its restoration.

The participatory dimension is designed to continue beyond reconstruction. The Koch's Garden will remain part of the Open Parks and Gardens Weekend programme, and voluntary maintenance brigades are planned as a recurring element of the garden's stewardship model. Additionally, workshops for school groups, public lectures, and guided nature walks are planned to sustain civic engagement and build long-term environmental literacy around the site.

Biodiversity Integration

The restoration introduced a biodiversity-oriented planting programme in collaboration with the *DAPHNE Inštitút aplikovanej ekológie* (DAPHNE Institute of Applied Ecology). Entomological surveys established a baseline for monitoring change. Structural biodiversity measures – deadwood retention, rough margins, insect habitats – were integrated into the formal restoration design and

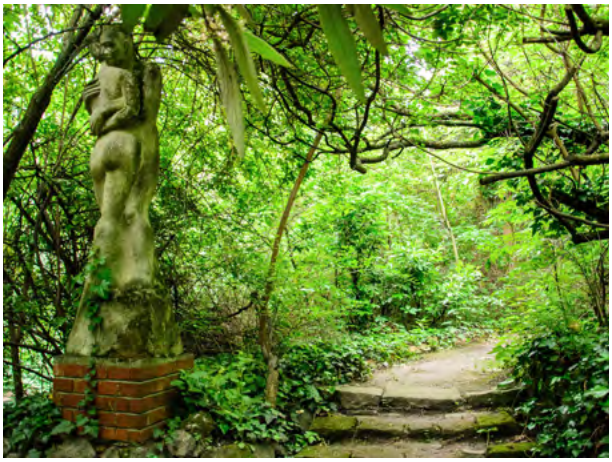

Figure 10: Koch's Garden, Bratislava

Figure 11: Open Parks and Gardens Weekend

Figure 12: Community engagement at Koch's Garden

Figure 13: Guided tour through the Koch's Garden with the National Trust volunteers

reviewed with the heritage protection authority, establishing a precedent for heritage-compatible biodiversity management in Bratislava.

The restoration methodology itself was designed as a biodiversity-sensitive process. A detailed tree inventory and arborist assessment identified specimens that posed safety risks and could not be retained, while others were maintained according to expert recommendations. An entomologist assessed the presence of rare insect species before any interventions were carried out. Standing trunks and lying deadwood were retained to preserve their ecological function as insect habitat; branches were chipped and left on-site as mulch for newly planted trees, and collected conifer needles were stored for use as mulch for acid-loving species. Due to the hilly terrain and dense root networks, all excavation work was carried out manually to minimise disturbance to the existing root systems. This level of methodological care – integrating arboricultural, entomological, and conservation expertise into a single restoration process – is what makes the Koch's Garden a credible and transferable model for other historic garden projects.

The Koch's Garden is currently entering its final restoration phase: the planting of new greenery. Both planting design and subsequent maintenance follow the biodiversity-oriented approach established throughout the restoration process. The new planting scheme respects the garden's original species composition while enhancing ecological diversity and climate resilience. The aim is for the garden to function not only as an aesthetically restored historic space but as an ecologically valuable habitat – and as a place where residents can reconnect with both nature and the site's layered history.

Community Engagement During Restoration

Given the garden's central location and its significance for the surrounding neighbourhood, the restoration process actively involved owners of neighbouring properties, conservation organisations, and all residents directly affected by the planned interventions. During dedicated meetings, the restoration team explained each planned measure – including its purpose, its expected impact on the garden's ecology, and its consequences for the surrounding public space. Participants were shown the current condition of mature trees alongside visualisations of the garden's future appearance, allowing them to understand the rationale behind difficult decisions such as the retention of deadwood.

All questions were addressed in open and transparent discussion. This neighbourhood-level engagement process achieved two outcomes: it built informed consent for measures that might otherwise have been perceived as neglect or damage (particularly deadwood retention and reduced intervention zones), and it created a local stakeholder group with a direct sense of ownership over the garden's future – precisely the social infrastructure that the project's stewardship model depends on.

Strategic Significance

The Koch's Garden case demonstrates three core claims of this strategy paper: that cultural heritage and biodiversity are compatible objectives; that citizen engagement can be integrated and embedded throughout formal heritage restoration processes; and that a long-term stewardship model combining public ownership with NGO management can deliver both conservation and community outcomes.

Figure 14: Volunteers taking action in the garden

7 Summary and Conclusions

7.1 Summary

Based on an analysis of the current situation in the cities of Vienna and Bratislava, the strategy paper "Strengthening citizen participation for biodiversity in urban green spaces" analyzes existing barriers and challenges as well as the need for biodiversity-friendly management of green spaces in cities. Through three action areas, it shows that the integration of biodiversity goals into urban green space management can be achieved not despite, but precisely because of citizen participation, and describes opportunities and resulting positive effects. The action areas covered are municipal public green spaces, historic gardens and cooperative planning.

Good practice examples like the *Jägerstraße* in Vienna aim to show that street corridors with low current ecological function can be transformed into biodiverse, community-managed habitats through a combination of native, ecological planting, and formal stewardship agreements. The Koch's Garden restoration in Bratislava shows that adaptive management – treating ecological function as the object of conservation – is legally feasible, heritage-compatible, and publicly embraced.

7.2 Key Conclusions

7.2.1 Social Acceptance is the Critical Bottleneck

Even technically correct biodiversity interventions can fail due to public complaints if the community has not been prepared for what the results will look like and the value of the measures through effective communication. Ecological transformation cannot outpace social understanding. Citizen participation is not an optional extra in biodiversity management; it is a prerequisite for its operation. Without public understanding and community support, even well-designed interventions are politically unsustainable.

7.2.2 Governance Fragmentation is the Structural Bottleneck

One main obstacle in both cities is not the absence of ecological knowledge or political will – it is the fragmentation of institutional responsibility. In Vienna and Bratislava, several municipalities and federal departments and institutions are responsible for the management of different but overlapping parts of the street ecosystem without a clear coordination mechanism for joint biodiversity projects. They operate in parallel without shared frameworks. To overcome this situation, structural cross-departmental working relationships must be implemented. Pilot projects like BiodiverCity can deliver good practice examples for such relationships, as well as shared monitoring protocols and documented pilot outcomes that provide the evidence base for governance reform.

7.2.3 Cultural Heritage and Biodiversity are Allies, Not Rivals

One of the strategy's central objectives is to reframe the relationship between heritage and biodiversity. The conventional assumption – that heritage conservation constrains biodiversity management – proves empirically untenable when heritage is properly understood. Structurally diverse canopies, for instance, are not only more climate-resilient but also more historically authentic than monocultural, clonal replicas. Likewise, the presence of deadwood as habitat for insects should be recognized as an expression of long-term ecological knowledge rather than as a sign of neglect. In this light, historic gardens have always functioned as multifunctional ecological systems.The paradigm shift from 'preserve how it looked' to 'preserve how it worked' – sustaining the ecological and climatic functions a garden was designed to perform rather than freezing its visual appearance at a single historical moment – is not a concession by heritage managers. It is a more rigorous application of the conservation principle (see Chapter 2.1.5). The formal management instruments that govern historic gardens – in Austria, the *Parkpflegewerke* (garden maintenance plans) commissioned by *Bundesdenkmalamt Österreich* (Federal Monuments Authority Austria) – provide an existing institutional framework for integrating biodiversity and climate adaptation. Due to the fact that these manuals (at least for the Imperial Palace gardens) were produced in the late 1990s and early 2000s there is no focus on biodiversity and climate adaptation. However,

there are some measures included which supports these goals. Other parts need to be revised to reflect current ecological and climatic conditions; this is a necessary precondition for implementing biodiversity measures in heritage-protected sites. Without such an updated formal basis, justifying changes remains legally and institutionally difficult.

7.3 Sustaining Results Beyond the Project BiodiverCity

7.3.1 Institutional Anchoring and Stewardship Formalization

Ecological pilot sites are only viable if integrated into formal maintenance plans with named responsible persons and dedicated budget lines. Community stewardship groups without formal agreements are vulnerable to staff changes, liability gaps, and political shifts. Standardized stewardship agreement templates establishing clear rights and responsibilities for citizen groups, city obligations, and renewal procedures are required.

7.3.2 Knowledge Retention and Knowledge Sharing

Practical knowledge from pilot projects, for example about which plant combinations work under city street conditions, which cost-effective maintenance measures have proven effective, or which communication approaches help to overcome resistance among citizens, should be systematically collected and shared in order to create a broad knowledge base. Training modules for professional garden managers, professional gardeners, (municipal) workers, and committed citizens must be developed and implemented.

7.3.3 Twin-City Continuity

The relations between Vienna and Bratislava, as well as cooperation with other twin towns, should continue beyond the end of the project, as the benefits in terms of knowledge transfer and the exchange of experiences are highly valuable.

7.3.4 Institutional Conditions

To ensure effective implementation of biodiversity-oriented maintenance, simplified stewardship procedures will allow rapid approval for citizen groups adopting clearly defined green areas, with liability issues clarified in advance. Updated management standards establish biodiversity criteria as binding elements within existing maintenance contracts and park management plans. Stable coordination has to be secured through dedicated contact roles for participation processes.

Annex A

This annex contains a reference list of existing strategies from Vienna, Bratislava an the EU that are connected to BiodiverCity and builds a framework for the BiodiverCity strategy paper.

A.1 Vienna: Strategic Framework Documents

Urban Development and Green Space

Guiding Principles for Vienna's Green Spaces
(Leitbild Grünräume Wien), 2020
https://www.wien.gv.at/spezial/wien-plan/stadtentwicklung-steuern-und-gestalten/grun-und-freiraum/#leitbild-grunraume-106

Vienna's green space guiding Booklet is a comprehensive document that sets out guidelines for the design of green spaces in public street areas.

Sectoral Concept Green and Open Space STEP 2025
(Fachkonzept Grün – und Freiraum STEP 2025), 2015
https://www.digital.wienbibliothek.at/wbrup/content/titleinfo/4007775

The Sectoral Concept Green and Open Space serves the preservation and development of Vienna's high-quality green and open spaces. The concept is guided by several planning principles: compact city design, green space connectivity, and enhanced quality of life through greenery in residential and work environments.

Urban Heat Island Strategy
(Urban Heat Islands (UHI) – Strategieplan Wien), 2015
https://www.wien.gv.at/umweltschutz/raum/uhi-strategieplan.html

The "Vienna Heat Island Strategy Plan" outlines various ways to cool urban heat islands. It includes strategic and concrete measures for climate-sensitive urban planning. It is a strategic document that sets out the long-term goals and measures for the spatial and social development of the city.

Vienna Climate Guide
(Wiener Klimafahrplan), 2022
https://www.wien.gv.at/spezial/klimafahrplan/

The Vienna Climate Guide describes our common path towards Vienna's climate goals until 2040 with a view to a climate-friendly city

Vienna Parking Space Strategy
(Parkraum Strategie der Stadt Wien)
https://www.wien.gv.at/verkehr/parkraumbewirtschaftung-ziele

Vienna's car park strategy has a direct influence on the number and extent of green spaces in the city that accompany traffic.

Vienna's Smart Climate City Strategy
(Smart Klima City Strategie Wien), 2022
https://www.wien.gv.at/spezial/smartklimacitystrategie/

The Smart Klima City Strategy of Vienna places a strong emphasis on green spaces and biodiversity as part of its broader goals to adapt to climate change, ensure sustainability, and maintain a high quality of life in the city.

Biodiversity and Ecology

Austrian Biodiversity Strategy 2030+
(Biodiversitäts-Strategie Österreich 2030+), 2022
https://www.bmluk.gv.at/dam/jcr:49476b8f-31b2-4b7a-857b-3cc1b877207f/Biodiversitaetsstrategie_2030.pdf

Austria's Biodiversity Strategy 2030+ incorporates the objectives and measures for biodiversity conservation formulated by the European Union and at the international level.

The Vienna Strategy for Pesticide Minimisation
(Wiener Strategie zur Pestizidminimierung), 2022
https://www.wien.gv.at/umweltschutz/naturschutz/pestizidminimierung.html

This strategy aims to permanently and sustainably reduce the use of pesticides throughout the city and to slow down the general decline in insect populations and its negative consequences for amphibians, birds and other insectivores.

Citizen Participation

Forms and Practices of Participation in Municipal Vienna
(Formen und Praktiken der Partizipation im kommunalen Wien), 2020
https://emedien.arbeiterkammer.at/viewer/toc/AC15767311/1/

Research report by the Vienna Chamber of Labour, which provides a comprehensive overview of participatory processes in Vienna. Based on a broad definition of participation, extensive research was conducted on participatory activities in Vienna's districts.

Green Space Justice for a Resilient City
(Grünraumgerechtigkeit für eine resiliente Stadt), 2023
https://emedien.arbeiterkammer.at/viewer/image/AC16878339/

Examines the equitable distribution, accessibility and quality of green spaces in neighbourhoods, particularly in the densely built-up existing city, in order to mitigate social injustices and climate impacts.

Master Plan for Participatory Urban Development
(Masterplan Partizipative Stadtentwicklung), 2017
https://www.digital.wienbibliothek.at/urn/urn:nbn:at:AT-WBR-580968

Regulates the early involvement of citizens in urban development projects since 2017. It defines principles, phases and criteria for when participation in planning processes is mandatory in order to ensure transparency, improved communication and a higher quality of life through co-design.

Practical Guide to Participation
(Praxisbuch Partizipation), 2012
https://www.wien.gv.at/stadtplanung/praxisbuch-partizipation

Guide to planning and implementing participatory processes in urban development. It offers methods, measures and practical experience for employees of the Vienna City Council and planners to actively involve citizens.

Historic Gardens Vienna – Institutional Sources

For all gardens and parks within the Imperial Palace Vienna area and other federal properties:

- Parkpflegewerke (produced on behalf of the Federal Monuments Office): formalized management handbooks with inventory analysis, historic classification, and maintenance target definition. Produced primarily in the late 1990s / early 2000s; require updating.
- Burghauptmannschaft Österreich (BHO): responsible for the historic gardens and properties of the Republic of Austria. Heat protection study Hofburg 2023: investigation of the thermodynamic background and medical effects of heat hotspots in the Hofburg complex (see Annex B).

A.2 Bratislava: Strategic Framework Documents

Urban Development and Climate

Action Plan for Climate Change Adaptation
(Akčný plán adaptácie na zmenu klímy), 2022
https://bratislava2030.sk/

The action plan focuses on reducing the negative impacts of climate change and increasing the city's resilience to extreme events, including heatwaves and floods. It includes measures like expanding green spaces, improving water management, and adapting infrastructure to better cope with climate risks. The goal is to create a sustainable and resilient urban environment capable of responding to changing climate conditions.

Climate Plan – A Greener and Healthier Bratislava
(Klimatický plán – Zelená a zdravšia Bratislava), 2025
https://bratislava.sk/en/enviroment-and-construction/climate/climate-plan

It serves as the city's overarching strategic framework for reducing greenhouse gas emissions and strengthening the protection of residents from the negative consequences of climate change.

MIB Manuals and Guidelines – Public Space Manual and further documents
(Princípy a štandardy – Manuál verejných priestorov), 2020
https://mib.sk/manual-verejnych-priestorov/principy-a-standardy/

A comprehensive set of documents providing clear standards for interventions in urban spaces. These manuals address the legal framework and liability questions, offering citizens and civic groups a clear 'how-to' for small-scale projects, effectively reducing administrative barriers.

Principles and Standards of Urban Greenery
(Princípy a štandardy mestskej zelene), 2021
https://mib.sk/manual-verejnych-priestorov/principy-a-standardy/

Ecological green space management, nature-oriented design, maintenance standards as binding framework for all public green spaces in Bratislava.

Strategic Plan Bratislava 2030
(Program hospodárskeho a sociálneho rozvoja – PHSR), 2022
https://bratislava2030.sk/

The city's central strategic document, which defines public participation and nature-based solutions as cross-cutting priorities for resilient urban development. Provides the political and strategic mandate for involving residents in urban green space management.

The Mayor's Climate Challenge
(Klimatická výzva primátora Bratislavy), 2024
https://bratislava.sk/en/enviroment-and-construction/climate/bratislava-mayors-climate-challenge

The Bratislava Mayor's Climate Challenge is an open initiative that provides a platform for the city and businesses to work together on concrete actions to reduce emissions and adapt to climate change

Participation and Community Programmes

Green Space Adoption Programme
(Adopcia zelene), 2022
https://bratislava.sk/en/environment-and-construction/greenery/greenery-creation-and-maintenance/greenery-adoption

Programme enabling long-term assumption of responsibility for public green spaces by individuals, community groups, schools, and organisations.

Community Gardens Programme
(Komunitné záhrady), 2022
https://bratislava.sk/en/environment-and-construction/greenery/greenery-creation-and-maintenance/community-gardens

Programme promoting community gardens as an instrument of citizen participation and food production in urban space.

Participatory Planning and 'City for People' Grant Scheme
(Nadácia mesta Bratislava)
https://nadaciaba.sk/

Practical instruments for financing and implementing citizen-led biodiversity projects. Enable direct cooperation between the municipality and residents, moving beyond simple consultation to active co-creation of the urban environment.

10,000 Trees Initiative
(10 000 stromov), 2019
https://bratislava.sk/zivotne-prostredie-a-vystavba/zelen/10000-stromov

Planting of 10,000 trees over three years as a city-wide biodiversity and climate protection programme.

Regional Framework Documents

Programme of Economic Development and Social Development of the Bratislava Self-Governing Region 2021–2027 with view to 2030
(Program hospodárskeho rozvoja a sociálneho rozvoja BSK na roky 2021 – 2027 s výhľadom do roku 2030),2020
https://bratislavskykraj.sk/regionalny-rozvoj/strategie/phrsr-2021-2027/

The programme for the Bratislava Region is a key strategic framework that defines the region's development priorities with a long-term outlook towards 2030. It focuses on economic, social, and environmental development and serves as a tool for planning projects and allocating public funding, including EU funds.

Programme of Economic Development and Social Development of the Bratislava-Staré Mesto Urban District 2024–2030
(Program hospodárskeho rozvoja a sociálneho rozvoja mestskej časti Bratislava – Staré Mesto na roky 2024 – 2030), 2023
https://old.staremesto.sk/data/MediaLibrary/75/75844/PHSR%202024%20-%202030.pdf

The document for Bratislava-Staré Mesto is a strategic plan that defines the main direction of development of the district until 2030. It focuses on areas such as transport, environment, public space, and quality of life. The document outlines key priorities and specific measures to support sustainable and balanced development.

A.3 European Framework

Biodiversity and Nature Conservation

EU Biodiversity Strategy 2030, 2020
https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_de

Goal: 30 % of land and sea under protection by 2030; restoration of degraded ecosystems; urban biodiversity targets for all EU cities with populations above 20,000.

Nature Restoration Law – Regulation (EU) 2024/1991, 2024
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R1991

Legally binding restoration targets for all EU member states, including urban green infrastructure. Article 8 contains specific requirements for urban ecosystems.

Climate Adaptation and Cultural Heritage

ICOMOS Florence Charter on Historic Gardens, 1981
https://www.icomos.org/images/DOCUMENTS/Charters/gardens_e.pdf

Foundational international document on the conservation of historic gardens. Article 1: 'A historic garden is an architectural and horticultural composition of interest to the public from the historical or artistic point of view. As such, it is to be considered as a monument.' Central to the legal classification of historic gardens as cultural monuments.

Report: 'Strengthening Cultural Heritage Resilience for Climate Change', 2022
https://www.kreativnievropa.cz/co5fokmmap3aa309/uploads/2022/10/strengthening-cultural-heritage-resilience-for-climate-NC0822056ENN.pdf

Highlights both the role of cultural heritage in climate action and the significant impacts of climate change on heritage assets. Foundational document for the relationship between heritage governance and climate adaptation in the EU.

Annex B

Study on Heat Hotspots in the Imperial Palace Vienna Complex

by the Burghauptmannschaft Österreich (BHÖ)
Study conducted: in 2023

Background and Context

The ever-increasing challenge posed by heat hotspots in the Imperial Palace Vienna complex led the Burghauptmannschaft Österreich to commission a study in 2023 to investigate the thermodynamic background and medical effects of these hotspots. Based on feedback temperature measurements and in-depth interviews, the study analysed the location of heat hotspots and the perceived impact on people.

The Imperial Palace Vienna (Wiener Hofburg) is one of the largest palace complexes in the world, covering approximately 240,000 m² in the centre of Vienna's first district. It houses federal museums, the Austrian National Library, the Spanish Riding School, federal offices, and approximately 5,000 residents and regular users, and receives over three million visitors per year. As the owner's representative, the Burghauptmannschaft Österreich manages the complex under the dual obligation of heritage conservation law (Denkmalschutzgesetz) and public health and occupational safety regulations.

The urgency of the study is framed by Vienna's changing climate conditions. While high summer temperatures are not unusual, the rising frequency of summer days (more than 60 in the last 10 years, up to 120) and hot days (more than 20 in the last 10 years, up to 45), as well as warm nights represents a growing health challenge. Daytime temperatures of around 30 °C are increasingly followed by so-called tropical nights, during which temperatures fail to drop sufficiently – affecting residents, visitors, and site users alike.

Definition of Temperature and Heat Hotspots

Temperature or heat hotspots refer to localized areas within or around buildings where heat accumulates disproportionately as a result of environmental conditions, material properties, or human activity. In urban contexts, such hotspots occur because temperatures are typically higher than in surrounding rural or green areas, primarily due to:

- dense urban development,
- extensive soil sealing,
- a lack of vegetation, and
- insufficiently developed fresh-air corridors.

In historic and heritage buildings, heat hotspots may additionally result from:

- inadequate ventilation,
- excessive solar heat gain through unshaded façades, roofs, or paved surfaces.

Thermodynamic Aspects

Thermodynamics provides a framework for analysing how heat is transferred, stored, and released within buildings and open spaces. The principal heat transfer mechanisms include:

- **Conduction**, such as heat storage in thick stone walls;
- **Convection**, driven by natural or forced air movement within interiors; and
- **Radiation**, primarily from solar exposure and heated surrounding surfaces.

Traditional building materials exhibit distinct thermal behaviours. Thick stone walls and ceilings typically have high thermal inertia, meaning they warm slowly but retain heat for extended periods. As a result, preventing overheating in stone-built heritage structures is crucial. Other traditional materials behave differently: wooden structures may act as thermal insulators but can deteriorate under repeated temperature fluctuations, while lime-based mortars and clay tiles are particularly sensitive to cycles of thermal expansion and contraction.

These material properties significantly influence the microclimate within historic buildings and sites. Local factors such as solar exposure, humidity, and wind patterns further shape temperature distribution and comfort conditions. Beyond their physical impacts on buildings, these microclimatic effects also have direct implications for human health.

Heat Hotspots in the Imperial Palace Vienna District

Perceived thermal comfort depends not only on air temperature but also on solar radiation, humidity, and wind conditions. To capture these combined effects, the study calculated the Physiological Equivalent Temperature (PET), a widely used indicator of human thermal comfort. PET is based on the Munich Energy Balance Model for Individuals (MEMI), which evaluates the human body's heat balance under complex outdoor conditions. It is defined as the air temperature at which the human heat balance is maintained under typical indoor conditions, without wind or solar radiation.

Using this methodology, the Burghauptmannschaft Österreich initiated a climatological study of the Imperial Palace Vienna area. The study employed simulation methods to assess heat stress levels during a typical summer day with maximum air temperatures below 30 °C. The results show that areas exposed to direct sunlight – particularly near buildings and sealed surfaces – are perceived as significantly hotter than shaded areas beneath broad-crowned trees, even when air temperatures are comparable.

The results demonstrate that heat load varies considerably depending on location within the district. For example, walking along the eastern side of Heldenplatz instead of the western side near the Neue Burg can noticeably reduce individual heat exposure.

Health Implications

Heat hotspots in heritage sites pose risks not only to buildings but also to human health, particularly in areas open to the public or used for residential and occupational purposes. Health impacts are multifaceted. High temperatures can cause heat exhaustion, dehydration, and heatstroke, while poor indoor air quality may exacerbate respiratory distress and aggravate chronic conditions.

Long-term exposure to elevated temperatures and humidity can also impair cognitive performance, sleep quality, and mental well-being. These risks affect a wide range of users, including residents, tourists, staff, and construction or conservation workers, underscoring the urgent need to address heat stress in the management of historic urban environments.

Source: Wagenhofer, G., Sahl, R., Novotny, K. (2026). Cooling Our Heritage: Enhancing Biodiversity in Historic Gardens and Parks to Reduce Urban Heat in European Heritage Sites. In: Yilmaz, M., Clarke, P., Riel, A., Messnarz, R., Zelmenis, M., Buce, I.A. (eds) Systems, Software and Services Process Improvement. EuroSPI 2025. Communications in Computer and Information Science, vol 2658. Springer, Cham. https://doi.org/10.1007/978-3-032-04291-0_4

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