

The nature of a park – managing complexity and unpredictability for the long term

Anna Sunding^{a,*}, Nicola Dempsey^b

^a Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences, Sweden

^b Department of Landscape Architecture, University of Sheffield, UK

ARTICLE INFO

Keywords:

Park management and maintenance
Nature management
Design by management
Organizational practice
New Public Management

ABSTRACT

Global challenges of climate change and biodiversity loss increase demands on urban green infrastructure (GI) to provide increasingly wide ranges of functions and services. Academia, policy and practice call for long-term perspectives to ensure the sustainability of GI and address solutions by adopting approaches inspired by nature. Meanwhile, current trends in contracted out park management entail attention to economic and technical aspects, overlooking long-term GI development. The interface between long-term ambitions and short-term operational GI practice is addressed through the case of a planned park in Täby municipality, Sweden. The case represents an ambition to integrate design, construction and management of high biodiversity GI through a 'design-by-management' approach, resting on ideas of continuous and adaptive vegetation development after the initial construction. Workshops were conducted with responsible stakeholders in project management, park management and nature management, providing insight into current contexts and future demands of GI establishment and management. Results reveal differences in contract management approaches depending on landscape typology – namely, 'parks' and 'nature'. Project and park managers work with an approach based on adherence to rigid formal documents where dynamics and uncertainty are understood as liabilities. Conversely, nature managers work with strategic development goals as a foundation for a joint view with responsible contractors. The case suggests that existing organizational practices in park construction and maintenance make it difficult to fully embrace the complexity and uncertainty of the intended processes. However, introducing GI management in early design phases offers valuable opportunities to address these challenges strategically, supporting long term sustainability.

1. Introduction

Green infrastructure (GI) can be described as a “*network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife*” (Benedict and McMahon, 2012, p. 1). A range of different green and blue environments, from parks and forested areas in the urban context to larger forest or nature areas in peri-urban and more rural settings, GI is managed by different actors, complicated further in the public realm when one space can be the responsibility of different departments or units in the same municipal authority (Jansson et al., 2020).

In the urban context, global challenges such as climate change, biodiversity loss and health inequities put demands on urban GI to provide an increasingly wide range of functions and services (Haaland

and Konijnendijk, 2015). However, despite these demands, the design of new parks is often homogenous in expression and function (Aalbers and Sehested, 2018), largely dominated by mown lawns (Aronson et al., 2017). To ensure the sustainability of new GI, there is growing consensus across academia, policy and practice calling for a long-term perspective, and to utilize approaches based on and inspired by nature (EC, 2013; Randrup et al., 2020a). Policy concepts such as nature-based solutions (NBS) acknowledge that GI does not provide short-term solutions or adhere to simple linearity (Moosavi et al., 2021), instead taking a long time to develop full functionality (Sarabi et al., 2020).

At site scale, concepts such as designed ecology (Dunnett and Hitchmough, 2008) and dynamic vegetation design (Wiström et al., 2023) use natural processes as active agents to develop vegetation in an “evolutionary” approach. This non-linearity also prompts calls for experimentation and adaptive learning in the process of planning,

* Corresponding author.

E-mail address: anna.sunding@slu.se (A. Sunding).

<https://doi.org/10.1016/j.ufug.2025.129170>

Received 16 September 2024; Received in revised form 29 October 2025; Accepted 9 November 2025

Available online 10 November 2025

1618-8667/© 2025 The Authors. Published by Elsevier GmbH. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

designing and maintaining these nature-based and dynamic approaches (Kabisch et al., 2016; Nielsen et al., 2023). As GI is dynamic, it needs to be managed to ensure its functions and qualities over time (Young and McPherson, 2013; Fongar et al., 2019). Ideally, this would mean that maintenance is already considered in the design planning process (Burton et al., 2014; Graef et al., 2023). However, a linear logic reflecting a hierarchical and sequential progression often characterizes planning, design and management of urban GI (Jansson et al. 2020). This linear process turns urban GI management into an endpoint, a conclusion, with no place in the design process beyond maintaining initial design ideas. As such, there is a need to also organize in a way that supports the dynamic character of these processes by working across organizational silos and administrative borders (Randrup et al., 2020a).

A growing body of research demonstrates the discrepancies between set goals for urban GI and conditions for the daily management work that implement them (Dempsey, 2020; Whitten, 2020; Winslow, 2021). However, research remains scarce on if and how maintenance issues are considered in design phases (Winslow, 2021) and urban green areas are rarely designed for long-term multifunctional management (Wiström et al., 2024). Recent studies also highlight the lack of funding for maintenance (e.g. Dobson et al., 2021; Roman et al., 2021; Smith et al., 2023; Sunding et al., 2025), with a resulting focus on effectiveness of short term operations instead of on long-term development (Dempsey and Smith, 2014; Randrup et al. 2017; Fongar et al., 2019).

Beyond the known lack of resources, the impact of governance and organizational settings on sustainability of GI is still largely unknown (Hölscher et al., 2023). Governance approaches such as New Public Management (NPM), initiated in the 1980s, have had a strong influence on how work is carried out in western societies' public organizations (Torfing et al., 2020). The implications of underlying business-like steering mechanisms from the private sector into public governance, e.g. procurement procedures, are under-examined in the literature. In Scandinavia, market-centered models have generally been embraced for maintenance of public space and GI (Lindholm, 2023). Previous studies on contracting out park maintenance have focused on quality (Lindholm et al., 2015), satisfaction (Lindholm, 2023) and partnership approaches (Dempsey et al., 2016). Contracting out park maintenance has been also found to promote generic cheaper solutions at the expense of horticultural skills and professional experience (Lindholm, 2009), which aligns with maintenance needs in "conventionally" designed parks, see further in 1.2. These insights have prompted calls for more collaborative partnership alternatives to the standard contracting approaches (Lindholm, 2023; Lindholm, 2009; Randrup et al., 2020b). However, there has been little academic focus on the impact of these organizational structures and administrative routines in the design of new parks which embrace nature-based and dynamic approaches to GI creation.

1.1. Aim and research questions

This paper therefore aims to explore to what extent design, construction and management practices align with long-term ambitions of nature-based approaches. It does this by examining the case study of a new park created in Täby, Sweden to answer the following questions:

What are the challenges in current practices when creating and managing urban GI in Täby municipality?

What are the opportunities for strategically addressing nature-based park design and long-term management?

1.2. Täby's new city park

An example highlighting the challenges in the interface between running management operations, and innovative approaches in park design can be found in Täby, Sweden. Täby municipality encompasses 6000 ha land in the northern part of the greater Stockholm area. A general policy for the municipality's green infrastructure is 'Half of Täby green' (Täby municipality, 2022). This 'green' consists of both urban

green spaces and parks, as well as forested areas inside and outside the city border. Swedes have a strong tradition of using forested areas for recreation (Hörnsten and Fredman, 2000). Swedish cities have an average 20 % forest cover which becomes higher in the urban fringe (Nielsen et al., 2017). Täby municipality has 30 % forest cover and 2,3 % park cover within the city limits (Aamodt et al., 2023), with forested areas outside the city limits.

Täby municipality houses about 75 000 inhabitants with population increase since the mid-2000s. Current city development projects include Täby Galopp, a disused horseracing track with surrounding facilities being developed into a new central city district. This is one of the largest developments in the municipality and intended to create 6000 new homes for an expected population of 20 000. A new city park, Grönbetet ("The green pasture"), spanning 10 ha is planned as a central part of the new city district encompassing the site of an old racetrack and preserved forested areas, see Fig. 1.

To reduce costs and waste, contaminated soils from the demolished facilities were partially used, meaning the vegetation design had to be adapted to difficult growing conditions. Experts were hired to develop a vegetation design concept underpinned by goals stipulated by Täby municipality (2024):

- Experience of nature, animals and plants
- High ornamental value
- Nature pedagogy
- Maintenance that follows the natural development of the trees and plants
- Increased biological diversity and improved ecological connections
- Multi-layered vegetation and good shading from trees
- Resilience to climate change

Grönbetet's design concept is based on a range of habitat types that vary in composition and expression, displaying high structural complexity. These habitat ranges from wet multi layered forest for storm water management to dry meadows with patches of bare sand (Fig. 2). The establishment of new wooded areas builds on principles of silviculture (e.g. Piana et al., 2023), by planting multiple species of smaller saplings in great numbers and then thinning out, as opposed to traditional park construction where individual trees intended in the final design are planted during construction. This approach has been described as creative management (Tregay, 1986; Koning, 2004; Wiström et al. 2023). Here, it is acknowledged that an initial design only sets the starting point for vegetation development (ibid.; Gustavsson et al. 2005), and management interventions become "design over time" (Nielsen et al., 2023), in effect (re)steering the development towards intended goals, or updating goals as new opportunities emerge. The approach, while not novel within park design (e.g. Woudstra, 2004; Gustavsson, 2004; von Doeren and Nielsen, 2019), with famous examples including the Dutch heemparks (Koning, 2004), is still an uncommon occurrence in Swedish parks.

Grönbetet's design concept requires a combined establishment and management plan during the extended 'construction' period to include initial plantings, maintenance, thinning efforts and successive planting over 6–7 years. In this context, the nature-based approach demands a longer establishment period than conventional park construction projects. After establishment, the park's design will develop as maintenance, the operational activities tending to the vegetation (Gustavsson et al., 2005), is done in response to the opportunities emerging as the vegetation grows. In this sense, the approach requires a different, and ongoing, relationship between design and management than "conventional" parks. This long-term perspective envisages the park as a collection of small-scale environments that require coordinated, nature-based and creative management for the different biotope-types, which differ greatly from the "formal" maintenance routines that are put in place for traditional park designs (Parker, 1986; Gustavsson, 2004; Wiström et al., 2023). The "naturalistic" maintenance activities are instead characterized by specialized skills and methods of nature



Fig. 1. The area for Grönbetet city park in the central part of the new city district. Parts of existing nature will be incorporated in the park, and parts will be constructed from previously hardscaped areas. Image: [Täby municipality \(2023\)](#), with permission.



Fig. 2. Conceptual plan showcasing the design (left) and the different nature types (right) of the new park. Images: [Täby municipality \(2024\)](#), with permission.

management combined with understandings of landscape architecture regarding experiential and aesthetic aspects (Table 1).

2. Theoretical background

In response to the linear logic characterizing planning, design and management (Jansson et al. 2020), models have been introduced to emphasize how processes operating after a space has been created are constantly ongoing without a definitive end.

One such approach can be found in the concept of place-keeping, which offers a direct response to the concept of place-making. Place-making is a concept with a long history and wide range of interpretations (Keidar et al., 2023) but generally focusing on the processes leading up to the creation of a place that offers accessible, safe and inclusive spaces for its users. In effect, this entails the planning and designing of a site (Dempsey and Smith, 2014). Place-keeping in turn underlines the importance of the ongoing process that maintains and enhances the created ‘product’ of place-keeping: the place in its local context. As such, place-keeping is understood as “*responsive long-term management which ensures the social, environmental and economic quality and benefits a place brings can be enjoyed by present and future generations*” (Dempsey et al., 2014, p. 9).

The potential relationship between place-making and place-keeping can be conceptualized in different ways (see Fig. 3). The first (a) describes a linear process, when an investment funds a new design which then leads to its maintenance. Here, the design has an impact on management and maintenance, but not the other way around. The second (b) describes designers and managers working together, where aspects of management and maintenance are taken into consideration at the design stage, e.g. shaping spaces (lawns, perennials) or placing elements (light poles, benches) to facilitate easier maintenance. The third (c) describes long-term management as the driver of the design process. Here, place-making is understood as a part of place-keeping, and happens at varying intervals within the longer process, emphasizing monitoring and evaluation as key for improving results and related processes (Smith et al., 2014). It further emphasizes the multifaceted process of long-term management as encompassing policy, governance, partnerships, resources, maintenance and evaluation of the place (Dempsey and Smith, 2014).

Another concept, related to place-keeping but stemming from forestry is adaptive management. This concept is defined as “*a systematic process for continuously improving management policies and practices by learning from the outcomes of previously employed policies and practices where management is treated as a deliberate experiment for purposes of learning*” (MEA, 2005). The concept also understands management as a driver and builds on an iterative process of decision-making that evolves with the gained experiences from previous decisions. This concept lends further insights into how management can act as a driver, with systemic and continuous learning from gained experiences as a key factor.

In this paper, we understand place-keeping as a conceptual umbrella for strategic, adaptive and creative approaches to management as a driver for GI development. This concept not only addresses the spatial domain, but also incorporates an organizational perspective, in effect encompassing how the work is organized to carry out the relevant activities, and steer developments towards set goals and beyond.

Table 1

Comparison of maintenance activity characteristics between formal and nature-based management, adapted from Parker (1986).

Formal (Conventional)	Naturalistic
Frequent and regular	Infrequent and irregular
Highly mechanized	More manual work
Repetitive	Low repetition
Few people involved	Larger teams across skillsets
Low biological knowledge required	Higher biological and ecological skills required

3. Methodological underpinnings

This study was conducted within the NORDGREEN research project, with Täby municipality being one of six city partners. The cities participating in the project were chosen as potential sources of best practice in GI planning and management. Through the research project, the plans for the new park as described in Section 1.1 were introduced. The unique context of the new park design, and the well documented and unique governance context of current GI management in Täby, presented below and in 4.1, contributed to make the interface between these two phenomena the object of this study.

3.1. A case study approach

The single-case study approach allows for an investigation of “*an event or phenomenon in depth and in its natural context*” (Crowe et al., 2011, p. 1). This approach permits deeply situated insight in the current GI management practices in Täby, and the extent to which design, construction and management practices align with emerging ambitions of nature-based approaches in urban GI.

Täby has all operational GI management outsourced, with a well described history of contracting out (Kristoffersson et al., 2020). The municipality is run by a strong right-wing liberal coalition which has contracted out almost all park services since the mid-1980s. This can be understood as a forerunner to national legislation on public procurement for all Swedish public organizations which was introduced in 1992. In Nordic and other European countries, Täby municipality therefore presents an “*extreme case*” (Flyvbjerg, 2006), described as “*unusual cases, which can be especially problematic or especially good in a more closely defined sense.*” (ibid. p. 230).

The case study is based on a document analysis of the history of park maintenance organization in Täby, workshops with relevant practitioners, and one complementary in-depth interview with a park manager. The combination of methods allows for the investigation of both the current challenges and opportunities on this topic as they are perceived by the involved actors and compare the differences in discourses between them. The document analysis gives an overview of the development of the current governance arrangements in park and nature management practices, while the workshops and the complementary interview detail how the current arrangements affect daily work and the ability to strategically address long term perspectives.

3.2. Data collection

The case study is based on three sources of data, a document study, workshops and one interview.

3.2.1. Document study

The unique case of Täby’s outsourced operational GI management has been described in detail up to the late 2010s (Persson and Kristoffersson, 2019; Kristoffersson et al., 2020). A synthesis of these studies, alongside existing grey literature provided by Täby municipality, provides the background of the current practices and discourses in park and nature management and is presented in 4.1.

3.2.2. Workshops

Workshops were used as a research methodology, following Ørngreen and Levinsen (2017), meaning they were aimed at achieving predefined goals as well as producing data about a specific topic. The workshops firstly provided participants with opportunities to identify and develop “*approaches*” related to both perceived current challenges and the demands that came with the proposed new park. Secondly, they promoted active and genuine participation (Ørngreen and Levinsen, 2017) from a small group of stakeholders with domain specific knowledge to facilitate collaboration that could affect future organizational change. This method supported the study’s aim of exploring Täby’s

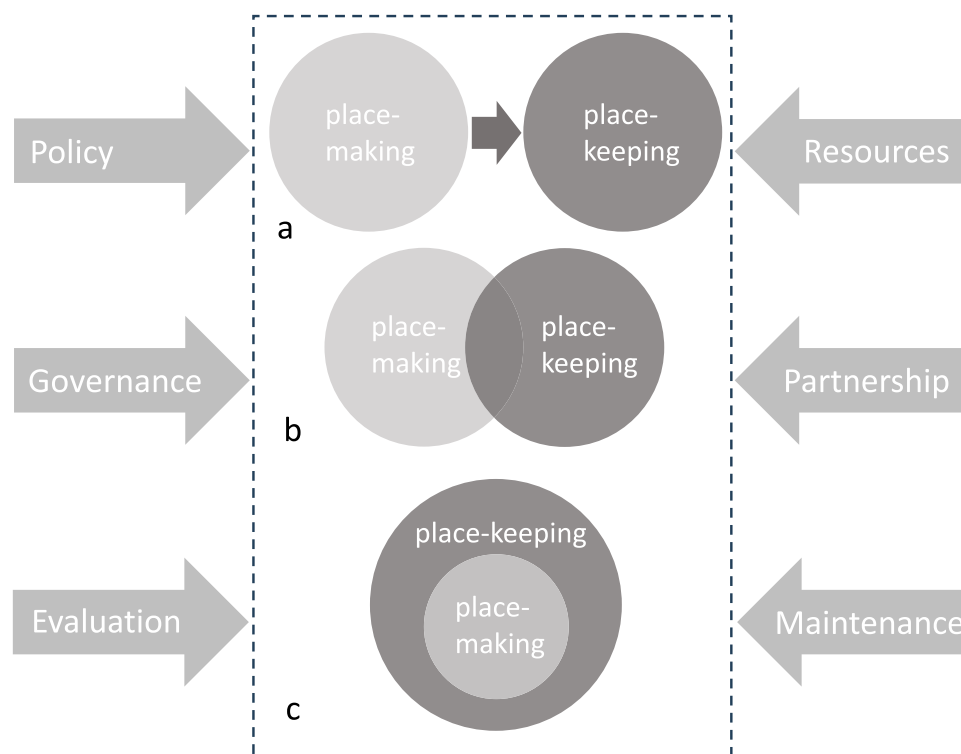


Fig. 3. Three ways to understand the conceptual relation between place-making and place-keeping, with factors affecting this relation. Adapted from Dempsey and Smith (2014).

current practices in GI design and management in their real-life setting (Crowe et al., 2011) by facilitating collaboration with the potential to influence future organizational change.

Participants were selected together with the municipal contact in the [redacted] research project, who was also responsible for the Grönbetet park design project. The participants represented relevant professional roles related to the municipality's GI, from either park management, management of green investment projects, or nature management. Park management includes staff responsible for maintenance and upkeep of the city's parks. Project management is responsible for design and construction of investment projects in new urban GI, such as the new city park Grönbetet. Recently, a warranty group was established to manage the transfer from project to park management, overseeing the warranty maintenance and inspections stipulated in the contracts. Nature management manages the city's urban and peri-urban forests and other nature areas. At the time of the workshops, all roles responsible for designing and managing GI had been merged into one joint unit following a recent reorganization. Table 2 shows an overview of participants and their thematic focus. Further descriptions of the roles can be found in Section 4.

A workshop structure was designed inspired by the three horizons model Sharpe et al. (2016). The goal of the workshops was to address

current constraints in governance, management and maintenance (factors of place-keeping), as well as future visions of these practices based on the needs that the new park introduce, potentially challenging current relations between place-making and place-keeping, see Fig. 3 and Table 3. See appendix A for a more in-depth presentation of the workshop structure.

Three workshops were convened with municipal staff in late spring 2023. The audio recorded workshops lasted 2–3 h with 6–8 participants and two researchers in each. Before starting, participants were informed of the dual purpose of the workshops, and how their input was going to be used both for the design project and in the research project.

3.2.3. Interview

One individual semi-structured interview (Kvale and Brinkmann, 2009) was conducted with a park manager (MM), to get a deeper insight into the current challenges of the park management. This was done specifically to get a richer context to the perceptions of the current park management contract, and insights into how discussions went on developing the new contract which was ongoing at the time of the study

Table 2
Overview of workshop participant's roles and thematic focus.

Organizational unit	Area of responsibility	Workshop participant
Parks and Urban Environments	Unit leader - all groups	City gardener A (MA)
Unit in the Technical and Urban Environments Department	Park management	Park manager M (MM)
	Investment project management	Landscape architect M (PM)
		Landscape architect T (PT)
		Landscape architect A (PA)
	Nature management	Warranty manager C (WC)
		Ecologist Y (NY)
		Forester C (NC)

Table 3
The three workshops conducted in the study.

Workshop number and topic	Aim	No. of participants
WS1: current situation	Uncover the different working teams' perception of their current work, and the current challenges that exist in GI management and maintenance, investment projects, and in the interface between them.	7
WS2: New demands	Present the new park design and its demands on GI maintenance and management and assess the needs for new organizational structures and routines.	6
WS3: Scaling up	Explore and evaluate pathways to upscaling on a city-wide scale considering management from a long-term perspective.	8

Table 4Comparison of the two maintenance contracts, from primary data, [Kristoffersson et al. \(2020\)](#) and [Persson and Kristoffersson \(2019\)](#).

	First contract 2004–2016	Second contract 2016–2024
Contractor selected by most favourable price?	Yes, adjusting for 5 factors ^a	Yes, but adjusted for formal demands and cost calculation transparency
Number of contractors (Nature management discussed below)	1 for all public space maintenance	4: 1 street-park; 3 specialist hardscape maintenance
Levels of monitoring	2	1
Clients responsible	3 Täby concept managers 1 City gardener 1 main project manager	2 managers for hardscape 1 manager for everyday park management
Contract length	10 + 2 years	5 + 3 years
Formal contract reporting requirements		
Monthly and quarterly meetings with client	Yes	Yes
Yearly planning conference	Yes	No
Self-control/monitoring reports by contractors	Yes	No
Budgetary details		
Fixed unit prices, varying budget for maintenance and complements.	Yes	Yes
Costs under budget were shared 50:50.	Yes	No
Costs over budget covered by the client.	Yes	Yes
Service level specifications		
Output based specification of functional goals on individual elements (shrubs, lawns etc.).	Yes	Yes
Strategic long-term goals on park level.	Yes	No
Collaboration arrangements		
Every-day collaboration seen as more important than the written contract	Yes	Initially yes, but did not materialise, see 4.2.1
Goals and prioritization continuously discussed	Yes	Initially yes, but did not materialise, see 4.2.1
Performance evaluation		
Based on principle of shared responsibility	Yes	Initially yes, but did not materialise, see 4.2.1
Through daily evaluation, formal meetings, annual park meetings	Yes	Initially yes, but did not materialise, see 4.2.1
Formal penalty fees	No	No
Nature management contracts		
Nature management	Yes, but incrementally broken out, see 4.2.3	No, see Table 5

^a partnership model, operation plan, organization, competence and quality & environmental management

(see Appendix B for topics and questions).

3.3. Data analysis

The workshops and the interview were transcribed, and a summary of the main points was sent out to the participants for approval/ clarification. The data was analyzed using inductive (bottom up) coding and thematic analysis ([Braun and Clarke, 2021](#)), highlighting discourses within and between the different groups of practitioners, as well as other prominent themes that were expressed recurrently, either strongly by individuals, or jointly within the group.

The analysis then examined the codes created from the perspective of place-keeping, focusing on sentiments that relate to the three different views on the relation between place-making and place-keeping ([Fig. 3](#)). For example, mentions of expressed need for contractual rigidity and financial predictability reflect a linear view between design and management, where the need to control all parameters in early stages is central. In contrast, mentions of e.g. site-based discussions imply sentiments reflecting management and maintenance as a driver of development, rather than upholding a static expression determined beforehand.

4. Results

In the following sections, insights into what characterizes current practices and their challenges in creating and managing urban GI (RQ1), and the perceived organizational opportunities for strategically addressing nature-based park design and long-term management (RQ2) are presented. In 4.1, a comparison of Täby's first and second maintenance contracts provides a background for (4.2) current practices and discourses which are categorized in three main themes addressed by the three areas of responsibility. This is followed by a view into what is jointly perceived to be new opportunities to better address these challenges (4.3).

4.1. Täby's public-private partnerships in public urban GI

[Kristoffersson et al. \(2020\)](#) describe the history and development of the 'ground-breaking' 'Täby Concept' as an approach to public-private partnerships, a collaborative approach between the public client and the private contractor. [Table 4](#) describes the main aspects of the first contract, as well as key features of the contract that followed. The Täby Concept was introduced as a response to perceived unacceptably low standards in the maintenance of green space in the mid-1990s.

4.1.1. The Täby Concept 2004–16

The first contract brought street and park services into joint management by the park and road units in the Technical Department, covering all public GI in the municipality including urban woods. The Täby Concept proposed longer contract periods compared to practice standards of 5 years ([Lindholm et al., 2020](#)). Instead of traditional input-based maintenance descriptions, e.g. number of times a lawn is mowed per year or how frequently watering is done, the descriptions were based on output-based demands. This effectively described the purpose of, or functions expected from the individual elements of the park. Methods remained unspecified and were up to the contractor.

With a contractor appointed and the contract initiated, collaboration was a key focus. Workshops were held to establish common goals and competences required for the different roles in both client and contractor organizations. Due to the general opinion that the contract worked to satisfaction, dips in quality or failures to reach the objectives were not penalized, instead agreements were made on more costly operations to get back on par. Formal documents were used less as the collaboration went on, used only as a reference when opinions differed. An engaged field staff was considered a main reason for the high level of quality.

This long-term contract-based partnership ran for twelve years. In 2009, a forester was hired, which meant that urban woods and other nature areas were incrementally removed from the contract, and they were not part of the second contract. [Kristoffersson et al. \(2020\)](#)

conclude that the first contract relied on professional expertise and personal engagement as drivers rather than penalties for non-compliance of task delivery.

4.1.2. The Täby Concept 2016-24

In 2015, before the new procurement process, politicians requested changes for the new contract including increased competition and involving more contractors to potentially lower costs. Main aspects of the old contract were kept, but split into four, separating paving, bridges and graffiti removal from the street and green space. The length of all contracts was shortened. A new contractor won the bid and for unrelated reasons most of the municipality personnel was replaced, meaning that the experience and knowledge from the previous contract was lost on both sides. The procurement process for the four new contracts was described as successful, with lower prices compared to the first contract. This marks a difference from the first contract where economic performance was not a key factor and collaboration was considered more important. As the first contract succeeded in improving greenspace quality, this was considered less central in the second contract. While an innovative model of incentivizing quality improvement was introduced in the second contract, the allocated budget was small compared to the total contract sum, and significantly smaller than in the first contract.

The Kristoffersson et al. (2020) study was done in 2016, at which point the second contract had just started. Data collection was therefore based on the *expectations* of the clients and contractors, rather than *experiences*. During data collection for this study, the procurement process for the post-24 contract was recently initiated.

4.2. Current practices and discourses in creating and managing GI

At the time of the workshops (2023), the three areas of responsibility within GI creation and management work in different contract setups with external contractors, based on different formats of steering documents. The three areas also have different practices and discourses, which are categorized into three key themes based on the six factors that affect place-keeping (see Fig. 3). See Table 5 for an overview of the themes, followed by a deeper insight into each area of responsibility.

4.2.1. Park management practises and discourses

4.2.1.1. Financial context and political focus. The park manager shares their view of the responsibilities of park management: “Our responsibility? It is to deliver operationally reliable, functional, clean and undamaged environments” (MM), reflecting a technical attitude to the work, focusing on operational functionality. This contrasts with a reflection that current methods and rationales are not sustainable. The last decade has seen a strong political push for large investments, without realisation of the financial consequences:

“Politicians wanted maximum quality on everything, and there wasn’t really any talk about [long-term] management. As we took over the newly built spaces, there was a realisation that they generate lots of fixed costs. [...] and that we can’t have all these extravagances, because we can’t maintain them. And I think that there is a better understanding about management [now]” (MM).

This mismatch has led to frugality in current investment projects, lowering both complexity and quality to manage future costs. However, increasing prices and more extreme weather means that even keeping existing parks at their present status will become increasingly costly. As such, environmental and economic factors present a combined challenge, with a joint agreement that a descaling of current maintenance regimes is required, even to just make ends meet.

4.2.1.2. Relationships with contractors and importance of written steering documents. There is a deep dissatisfaction with the current maintenance

Table 5

Perceived differences and similarities on key themes according to responsible actors (with relevant place-keeping dimension in brackets).

	Park management	Project management	Nature management
<i>General information on contracting details</i>			
<i>Contract setup</i>	Park maintenance is performed as part of a street maintenance contract.	A new construction contractor is procured for each project. Sub-contractors are used for specialist (GI) tasks	5 different contractors for forestry, landscape conservation, ancient monuments, beach and water conservation and annual scrub clearance
<i>Steering document format</i>	Object based maintenance descriptions (e.g. lawn, shrubs, hedges)	Object based construction and warranty maintenance descriptions	Strategic plans with visions guide development and conservation of all areas
<i>Financial context</i>	and political focus (Resources and Policy)		
<i>Financial context</i>	Funds are critically lacking for park maintenance (MM)	Costs considered but not critically lacking. A key argument for the new park is lower costs for establishment (PT)	Funds are lacking but not yet critical (NC)
<i>Political focus</i>	Low, focusing on demands of cost savings (MM)	Previous intensive investments and current high ambitions for new urban developments, including Grönbetet (MM, PT)	Ambitious in the Swedish context, with political decisions to manage all municipally owned forests for recreational purposes (NC)
<i>Relations to contractors and importance of written contracts (Partnership and Governance)</i>			
<i>Relations to contractors</i>	Low trust based on previous experiences (4.1) (MM)	Low trust based on general perceptions and previous experiences (WC, PM)	High trust based on extensive, site-based dialogue with contractors (NC, NY)
<i>Importance of written contracts</i>	High, needed to control and monitor contractors and finances (MM)	High, to ensure intended outcomes and avoid unforeseen costs from extra work (PC)	Low, used as starting point for discussion with contractors (NC)
<i>Predictability of maintenance activities and Complexity of GI (Maintenance and Evaluation)</i>			
<i>Predictability of maintenance activities</i>	Necessary to maximize use of fixed prices and avoid unforeseen costs (MM)	Necessary to ensure the construction results in intended outcomes in the new park (PM, WC)	None, vegetation growth guides development based on visions for different nature types (NC)
<i>Complexity of GI</i>	The new maintenance contract is geared towards increasing control with input-based descriptions, limiting possibilities to evaluate GI development and adapt the maintenance as needed.	Grönbetet’s design requires a stepwise and dynamic approach to vegetation planting and development (see 1.1), which is challenged by current contracting practices in both GI construction and maintenance. (PT)	Different nature types have different structural and species complexity. Maintenance is geared towards promoting or reducing species or structures based on running evaluation.

contract, which is viewed as having been a failure from the start, mainly due to “price dumping”, i.e. when a contractor bids too low a price to realistically fulfil the contract, to win the procurement. Attempts at benchmarking show that the contract price is among the lowest of the neighbouring municipalities, which is politically cherished, but leave

contracted services undelivered.

The output-based maintenance descriptions (see 4.1.1) depend on close collaboration and a joint understanding and is now seen as a liability as it is difficult to come to a consensus on what the descriptions mean in practice. *“Based on the target visions we had, there was too much room for interpretation in relation to the current contractor” (MM).*

The lack of agreement with the contractor renders monitoring and evaluation difficult, with frequent discussions about what is sufficiently performed maintenance and neglected areas where maintenance has not been carried out at all. Consequently, the post-2024 procurement is geared towards more standardized descriptions focusing on input-based descriptions, detailing frequencies of maintenance activities, as it is easier to follow up.

4.2.1.3. Predictability of maintenance activities and complexity of GI. Beyond the mounting costs, current levels of maintenance in the city's 50 parks are also seen as unsustainable from an ecological perspective:

“Even if we still need to have these traditional ‘high maintenance’ parks, it is a question of identifying where we can transition to a maintenance that supports ecosystem services and biodiversity, which is also aesthetically pleasing, and try to find a rational format for that management” (MM).

While there is a perceived need to develop new management regimes to support a broader set of functions, the focus on economic control puts a strong emphasis on keeping extra work at a minimum, keeping a fixed maintenance contract with as few changes or additional work activities as possible. The focus on descriptions and financial controls leaves few, if any, resources for the park managers to evaluate the work. *“Regardless of how we describe the maintenance, we lack resources for following up, and then there is no way of knowing if it is done” (MM).*

4.2.2. Project management practises and discourses

4.2.2.1. Financial context and political focus. Project managers primarily work as clients in construction projects, using consultants for the design, as in Grönbetet. The construction and a two-year warranty maintenance, (standard approach in Täby), are part of the capital investment project. Despite high ambitions for the new park, the realisation of rising maintenance costs due to recent investments has led to a political push for long-term management costs to be established in early project stages. This is perceived as a risk, as contract pricing will influence design choices.

“... we have to calculate management costs before the design is even finished. And since we only have the prices from the construction contractor, it looks super expensive, [...] and we get the horror scenario that we should design based on what is cheapest to maintain [in the warranty maintenance contract]” (PM).

4.2.2.2. Relationships with contractors and importance of written steering documents. Project managers share park managers' low trust in contractors and view contract clarity as a main premise for a working relationship. Their goal is to have clear descriptions of the required work, clear handovers and 'clean cuts' in the distribution of responsibility to avoid costly add-ons. *“A contractor's main task, I mean, they do this to make money [...] and they calculate based on the contract, and what is not described in the agreement will either not be done or becomes an extra cost” (WC).*

While contractual clarity is seen as a premise for the work, *‘that's also what makes it bad’ (PT)*, as multiple actors means that no one has overall responsibility for the final product. Instead, resources are spent figuring out 'who's at fault' when small issues arise. Additionally, technical green expertise has been lacking in construction management leading to technical specifications driving costs up, in both construction and warranty maintenance phases. This has also led to problems moving from

the warranty period into the long-term maintenance:

“The contractor botches the warranty maintenance prices and then coldly calculates the cost of redoing the entire planting, without any maintenance, and just replaces all the plants for the final inspection, [...] and we are left with plants that are sensitive as day one, and should we then demand a new warranty? And then we are in this never-ending loop.” (PT).

4.2.2.3. Predictability of maintenance activities and complexity of GI. The contract-based practice and low trust in contractors leave project managers unwilling to believe that even the lowest level of provision can be done without detailed instructions and rigid control. However, they also note how this practice is challenged by aspects that are increasingly harder to predict, such as the weather. Consequently, costing up basic activities becomes an impossibility; *‘We can't just say [water] “when needed” in the contract’ (PM)*. Descriptions that take extremes into account become very expensive, and omitting the extremes creates extra work that is not based on the fixed prices in the contracts.

The pre-determined object-based descriptions also challenge any complexity in more nature-like designs, such as intended in Grönbetet, e.g. when an intended character falls between two maintenance categories or is a mixture of several types.

“We tried to experiment with a kind of natural space, a meadow with some shrubs. But there are no [maintenance] categories for that type of space. Either it is a meadow, or natural shrubbery...if we say it's a meadow, [the contractor] comes and mow all the shrubs together with the meadow.” (PM).

4.2.3. Nature management practices and discourses

4.2.3.1. Financial context and political focus. The nature managers manage all publicly owned forests and other nature areas within and outside the city. Following a political decision in 2021, all forests owned by the municipality are managed with recreation as the main goal. In the Swedish context this is unique, as timber production is often the primary focus. Beyond forests, other open landscape types such as meadows and beaches are also under their responsibility.

The perceived main challenge is the low budgets, as newly planted forests are not supported by increased funding, similar to park maintenance. The work partly depends on funding from external sources and biology- and flora-related NGOs support ongoing monitoring. Still, the ecologist mentions doing habitat surveys in their spare time as there is not enough time to do it during working hours.

4.2.3.2. Relationships with contractors and importance of written steering documents. The nature managers are generally satisfied, both with current working methods and current contractors who are perceived to be skilled and contributing with input and experiences to improve the development. Each of the five contracts (Table 5) is based on a strategic plan, using visions, principal sketches and photos for different nature types. By having one contract per type of activity i.e. meadow mowing or forest thinning, contractors are often smaller and locally based, employing specialists in the required methods and requisite equipment. No concerns are raised about price dumping or insufficient skills for the required maintenance. The contractors, in turn, are perceived as happy with the strategic plans, which are rarely provided by other clients.

It is perceived as important *“that the contractor has a feeling for what they are doing, because then they also care about the work” (NC)*. The same contractor has won the same contract several times, which the forester claims mean they know the forests and understand the client, agreeing on how to think about the developments. There is continuous communication with the contractors to monitor the maintenance.

4.2.3.3. Predictability of maintenance activities and complexity of GI. The forester consistently uses the term structural maintenance to describe the operational work, emphasizing that the work is aimed at creating a good structure in the multiple layers in a forest, as opposed to statically maintained spaces. Contrary to park and project managers, the forester argues that it is impossible to perfectly predict maintenance costs beforehand.

"You can never know exactly what the cost is going to be, when it's more complex areas where you have to go in and mark trees [to be removed] and keep an eye on the contractor to avoid mistakes." (NC).

Pressing the need to start small and learn as they go, the forester describes their last establishment of a small, forested area, based on classic afforestation principles.

"We did not have a clear project when we started, but it grew gradually, and then we kept developing it, and it is still a development project because it's still growing. So, you have to be a little open to what happens" (NC).

The work is underpinned, however, by considerable time spent on site, discussing with and instructing the contractors, e.g. marking out trees for thinning in forested areas. Monitoring and evaluation follow rolling schedule at different intervals for the different nature types, but limited funds force them to prioritize heavily. Crucially, it is not establishment or even maintenance that takes time but monitoring results and evaluating next steps. *"A meadow is not something you just create, it takes resources in the form of time, and follow-ups, and infill sowing over many years" (NY).*

4.3. Perceived opportunities to meet new demands with a new organization

4.3.1. A merged group to share responsibilities and practices

Despite the challenges that all the managers face in their work, they are hopeful towards new ways of working based on recent changes. Based on the failure of the park maintenance contract, political levels (once again) demand a higher level of quality in public spaces. While budgets will remain unchanged, the solution is the recent reorganization merging park management, nature management and project management. This formally brings all 'green responsibilities' from comprehensive planning to maintenance in the same unit (see Table 2) which is seen as an opportunity work more closely together and get away from the micro siloes that come with the different working methods.

"Do we really have to make a difference between park and forest – everything is cultural landscapes that are created by man, we have to have a more long-term and robust view, maybe it looks more like nature in the way we manage it." (PM).

To tackle current challenges in park maintenance, all roles in the newly merged group will have monitoring responsibility for a number of existing parks. This is seen as an opportunity to gain a better overview and a joint understanding of the current status of the parks and what ambitions to strive for. As such, sharing monitoring responsibilities is seen not only a way to share the responsibilities but for all roles to get more insight into the current state of the parks, as well as 'field experience'. The forester firmly presses that the most important resource is getting time to work together, wishing specifically for more collaboration with the landscape architects in the urban woods. *"We need time to think new, it's when we work together in the field, with our different skills that we can really learn from each other and develop our environments" (NC).*

4.3.2. Time to experiment and integrate new routines

As such, the demands of the new park mark an opportunity to change the current routines and approaches that are considered unsustainable, in effect shifting from the traditional park approach to more nature-based and long-term. There is a general agreement in the unit that do not yet have all the relevant knowledge required to work with the new

park but see this as an opportunity to learn by doing collectively. Among park and project managers there is also a strong notion that the main challenge revolves around setting the organizational aspects of the project, rather than just gaining the methodological or technical knowledge needed to create the park.

"We can buy in expertise or look at how other places did some great experiments that turned out great, but then it comes down to the weaknesses in the implementation in our own organization. Just because we use the knowledge from another organization doesn't mean that we get the organizational structure from that place" (PT).

In this context, Grönbetet is seen as a good opportunity to work together towards a concrete goal. From the park management perspective, the ambitions of joint work and taking management serious in the early stages is understood as key for the project to succeed.

"The good thing about Grönbetet is that this is considered now, ten years ahead. Otherwise, some consultant would have made the design, and they are often not really connecting what they do with [long-term] management..." (MM).

The plan is to work with prototyping over the coming years and test out all the planned nature-typologies intended in Grönbetet, not only on how they develop, but how the needed maintenance routines pan out. This is also seen as key for the incremental transition in the rest of the parks in the municipality, which is a prerequisite for the new park to be viable in a management context.

"It's so important to think about the larger context, and how to scale up, because if we only look at the new park in isolation, so many things won't be rational in the long term, but in the larger context, it might very well be possible" (MM).

5. Discussion

In this study, we aimed to explore to what extent design, construction and management practices align with emerging ambitions of nature-based approaches. In the results, three related notions seen from the perspective of place-keeping were found that address these questions, which are discussed in the following. First, political attention and allocated finances, second, contractor relations and the role of the contract, and third, the relevance of practices in maintenance and evaluation. Finally, we discuss opportunities to ways forward to manage complexity and unpredictability in GI.

5.1. Current practices and challenges in creating and managing urban GI

5.1.1. Current practices are challenged by political focus on GI creation, overlooking long-term management finances (resources, policy)

The first 'Täby Concept' park management contract tells a story of an innovative and experimental approach to contracting out (Kristofferson et al., 2020), with a strong focus on collaboration and joint interpretation of output-based maintenance. As such, the contract represents an example of the collaboration-based partnership approaches suggested as a remedy for some of the challenges introduced by market centred models (Carmona et al., 2008; Lindholm, 2009; Randrup et al., 2020b). But the history of Täby's maintenance procurements (4.1) also show how political focus went from innovation and increasing green space quality, to 'increased competition' during the second procurement process (Kristofferson et al., 2020), with a thinner client model and fewer resources to manage the contract that is of lower value than the first. The results show how park managers consider the new contract a failure. Partnering models in public private partnerships, such as the Täby Concept, have been suggested as a potential way (Dempsey et al., 2020; Dempsey and Burton, 2012) to address multiple demands and urban complexity in contracting out maintenance. But as our results show, their success is highly dependent on whether maintenance

practices are driven by concerns of collaboration and quality, or cost savings.

In parallel, the introduction describes how political ambitions for a biodiverse, multifunctional and sustainable city development is currently being drawn up by the municipality's planners and designers. This marks a mismatch where higher ambitions in early phases are not taking conditions for long-term management into account, also noted by other studies (Sunding et al. 2025; Randrup et al., 2021; Kotze, 2024). This alludes to a trend of steadily increasing ambitions for city development and GI design based on progressively more complex demands, while management and maintenance focus remains unchanged, oscillating between low prices and technical quality (Bel, Hebbon and Warner, 2018; Clifton et al. 2019). As such, our results highlight how political ambitions underpinning design ambitions diverge from ambitions in long term GI management, instead focused on cost control. This view mirrors the linear relationship between place-making and place-keeping, characterized by few or no regards for long-term consequences (Fig. 3a; Dempsey and Smith, 2014).

5.1.2. Contract- and control-based contractor relations affect long term development of GI (partnership, governance)

Contract management literature argues that green space maintenance is a comparably simple service to contract out satisfactorily (Brown and Potoski, 2005; Hefetz and Warner, 2012). However, studies also suggest that complexity is detrimental for contract performance (Lindholm, 2023). The results show how the focus on low costs brings a dependence on predictability about which activities are performed and when, to get contracts that cover as much as possible and prevent unforeseen costs. The collaborative approach of the Tåby concept went from being a considered a strength to a liability. In response to a perception of an unsuccessful second maintenance contract (2016–2024), the new, third, contract drawn up during the data collection is geared towards a more standardised approach and increasing means of control.

Other studies on the effects of NPM also show less strategic focus and increased focus on controlling contractor work in park management (Randrup and Persson, 2009). Jones (2000, p. 25) noted that NPM induced regimens led to managers “Managing contracts not managing parks. Taking our eyes off the horizon”. It is worth noting that the exact same issues are at the forefront almost 25 years later in park management.

However, the results also show how nature managers instead describe working in a trust-based relationship with their contractors. Their strategic plans act as an outset and basis for joint understanding. Critically, nature management adheres to the same NPM procedures and utilize the same tools, qualifying Jones' (2000) conclusion. The striking difference between perceived satisfaction with the collaboration between the park and nature managers, implies aspects related to both different approaches to contract design and other governance factors outside the immediate outcomes of NPM.

5.1.3. Park maintenance practices fall short in utilizing vegetation dynamics (maintenance, evaluation)

The results show that within park construction and maintenance, activities are described through an object-based approach, i.e. detailed descriptions of fragmented elements of GI such as street trees, lawns or hedges (Lindholm et al., 2015). Any combination or in-between is perceived as nearly impossible to convey through current descriptions. Instead of being considered an asset to develop, the dynamic nature of vegetation becomes a liability, as it does not immediately adhere to the maintenance descriptions used for a lamppost or a stretch of asphalt. This confirms studies noting that this type of description results in a static approach to urban green spaces (Nuppenau, 2009; Lindholm et al., 2015), lacking any relation to overall function and use (Beer et al., 2003),

The nature-based approach applied in Grönbetet addresses many of

the challenges mentioned by the managers, offering a potentially more robust and biodiversity supporting design than the ‘conventional’ park (Aronson et al., 2017). However, the design demands an approach that is currently beyond current conventional park construction and maintenance regimes (Winslow, 2021). Paradoxically, the required activities are often not complicated to perform but complicated to describe and fully anticipate beforehand. Instead, the maintenance is dependent on ongoing monitoring and evaluation. The results show that adequate monitoring is currently generally lacking within park maintenance, confirming the literature (Smith et al., 2014). Conversely, monitoring is an integrated part of the nature management work method, with a cycle of evaluating vegetation and adapting maintenance activities to steer development, through on-site collaboration with contractors.

The results confirm previous research underlining how parks are increasingly subject to more complex demands with expectations to provide increasing ecosystems services, combat climate change and counter biodiversity loss (Whitten, 2022), but also require site-specific maintenance routines (Qiao et al., 2018; Knapik et al., 2024). At the same time, forests are increasingly understood as recreational resources (Mann et al., 2010). While there are differences in terms of unique values and functions between parks and (peri-)urban woodlands that should not be overlooked, the relative dichotomy between the park and the urban forest dissolves into a gradient. From an experiential (user) perspective, these are by no means new ideas. However, this study offers a complement to other studies regarding the sectorial differences in between landscape architecture and silviculture (Piana et al., 2023), with insights on how the organizational practices in management and maintenance are foundationally different in addressing complexity and unpredictability, in situ and over time.

5.2. Opportunities to manage unpredictability and maintain complexity in urban GI

From the results, two main notions are seen as key opportunities for the development of the future park and the related management practices. First, addressing the barriers that come with the organizational structure, and second, allowing the time to for new operational routines to develop before they are being implemented in the new park.

5.2.1. Mitigating barriers in organizational structures

First, the newly merged joint group offers opportunities to share responsibilities and practices. The design intention of the new park shows that as demands and required knowledge becomes increasingly multi-disciplinary, management and maintenance of urban GI become not only a technical, but also a governance challenge, as argued by Knapik et al. (2024). Organizationally, dividing responsibilities between different units has been shown to lead to less successful GI planning (Baycan-Levent and Nijkamp, 2009). The organizational division of planning/design and management responsibilities hampers opportunities to address the more complex challenges that shape current practices (Said and Temples, 2023) as the findings of this study confirms.

In Grönbetet, management is understood as part of the park design from a methodological and organizational perspective. To implement the new park in Tåby, planners and designers now understand management routines as a key aspect and an opportunity to shift from only controlling maintenance activities to become a part of the development process. Nature management practices with managers personally involved in both formulating strategies and implementing them through on-site decision-making, offers a glimpse into the effects of understanding maintenance as a strategic, rather than purely technical, activity. As such, merging these groups together offers a way to share knowledge between disciplines by learning from each other, and utilizing sector specific contracts and contractors in a more seamless way.

5.2.2. Understanding the importance of time for developing new operational routines

Low-cost maintenance was added to the list of demands on Grönbetet's design, motivated by political levels starting to recognize the extensive management costs generated by high ambition investments. This is a view of place-keeping (Fig. 3b; Dempsey and Smith, 2014) in effect retaining the linear logic, adding more demands at early stages. However, the park design was underpinned by a joint view between project and park managers that current practices are not sustainable, and radically new approaches are required to face the described challenges.

This means changing the relationship between design and management, place-making and place-keeping (Fig. 3c; Dempsey and Smith, 2014), marking an attempt to systemic transformation and taking a long-term perspective at the outset, as called for by others (Kabisch et al., 2016). As such, the challenges of the current management become one of the drivers for the new design, not a barrier to it, upending current divisions between design and management and looking towards new possibilities, as suggested by the literature (Nielsen et al., 2023).

The fact that these discussions took place ten years before the park is built gives park managers time to test and to evaluate not only new methods, but also operational routines and time required to handle collaboration with contractors and working more extensively on site. Including ongoing management in experimentation by testing the required methods and routines in existing urban parks also has the potential to lower the threshold for scaling up. Expanding the practices from the one park to more of the urban GI avoids the new approaches ending up as isolated 'demonstration projects' (Hölscher et al., 2023), which park managers see as crucial for rational management routine that is sustainable in the long term.

5.3. Study limitations

While the detailed methods offer a way to get deep and situated insights into the addressed fields of practice, they also come with drawbacks. Single case-study findings are highly dependent on the context they spring from and the results as such not immediately generalizable to other contexts. They can, however, shed light on a specific phenomenon, not through generalization but 'particularization', as described by Stake (2006). This means that while the findings are not directly generalizable to other contexts, they highlight phenomena or notions that can enrich the understanding in other settings.

The chosen participants mainly represent professional roles responsible for creating and managing GI in Täby municipality. The participants' views on the current challenges can be incomplete or misrepresent other relevant actors (e.g. residents/ users). Here, broader inputs from other actors, such as the contractors used in construction, establishment, and management of both parks and nature areas would give a deeper insight into the addressed issues. Similarly, the views of politicians are presented as they are perceived by responsible practitioners, which gives a potentially biased view.

The researcher's role becomes both a methodological strength and limitation when using workshops as a research methodology. Ørngreen and Levinsen (2017) describe how the researcher effectively becomes both a facilitator and a researcher, simultaneously. This creates and ethical dilemma, with the boundaries between the different roles of researcher and potentially becoming blurred as relevant outcomes from the workshops differs between the participants' and the researchers' perspective. To avoid conflicts of interest and interfering with the perceptions of the participants, this notion was a point of recurring reflection, to stay aware of the researcher's potential influence both during and between the workshops. To align the expectations and contributions from the researchers and the municipality (e.g. Darke et al., 1998), it was agreed that the researcher (the main author) structured and moderated the workshops and compiled a report detailing the results to the municipality. The participants agreed to partake in as many

workshops as possible, and comment on report drafts and answer additional questions arising from the workshops.

6. Concluding thoughts for practitioners

This paper highlights a trend found in current literature where ambitious plans for urban development are contrasted by shrinking GI management budgets. While nature-based design efforts are an important step on the way towards sustainable cities, they are in themselves not enough to warrant long-term sustainability. The study shows how current administrative systems for park construction and management are set up to adhere to static maintenance and economic rationales. If GI development processes isolate maintenance to a technical afterthought, any initial design values of complexity and incremental change risk being replaced with ideals of financial predictability and contractual rigidity within the long-term management practices. Therefore, practitioners need to implement planning, design and management strategies that acknowledge the non-linearity of the processes they seek to utilize to develop new urban landscapes for the long term (Gustavsson et al., 2005; Nielsen et al., 2023).

By considering the process as place-keeping, utilizing management as a driver, practitioners are encouraged to develop experimental and adaptive approaches not only to the landscape, but also to their organizational conditions to help achieve GI sustainability. The findings on this study show that practitioners should go beyond the practical maintenance methods needed, towards understanding and addressing organizational conditions for construction and long-term management during the design phase. This includes creatively and strategically utilizing existing organizational and administrative routines or adapting them to function in accordance with new needs. Here, silviculture practices offer insights into how complexity and unpredictability can be understood by practitioners as drivers rather than liabilities, in effect allowing natural processes to take their place in the management of urban parks.

CRedit authorship contribution statement

Nicola Dempsey: Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Anna Sunding:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This research was supported by Nordforsk under the Nordic Council of Ministers in the programme Sustainable Urban Development and Smart cities, project number 95322, "Smart Planning for Healthy and Green Nordic Cities (NORDGREEN)".

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ufug.2025.129170.

References

- Aalbers, C.B.E.M., Sehested, K., 2018. Critical upscaling. How citizens' initiatives can contribute to a transition in governance and quality of urban greenspace. *Urban For. Urban Green.* 29, 261–275. <https://doi.org/10.1016/j.ufug.2017.12.005>.
- Aamodt, G., Nordh, H., Nordbo, E.C.A., 2023. Relationships between socio-demographic / socio-economic characteristics and neighborhood green space in four Nordic

- municipalities – results from NORDGREEN. *Urban For. Urban Green.* 82, 127894. <https://doi.org/10.1016/j.ufug.2023.127894>.
- Aronson, M.F., Lepczyk, C.A., Evans, K.L., Goddard, M.A., Lerman, S.B., MacIvor, J.S., Nilon, C.H., Vargo, T., 2017. Biodiversity in the city: key challenges for urban green space management. *Front. Ecol. Environ.* 15 (4), 189–196. <https://doi.org/10.1002/fee.1480>.
- Baycan-Levent, T., Nijkamp, P., 2009. Planning and management of urban green spaces in Europe: comparative analysis. *J. Urban Plan. Dev.* 135 (1), 1–12. [https://doi.org/10.1061/\(ASCE\)0733-9488\(2009\)135:1\(1\)](https://doi.org/10.1061/(ASCE)0733-9488(2009)135:1(1)).
- Beer, A.R., Delshammar, T., Schildwacht, P., 2003. A CHanging Understanding of the Role of Greenspace in High-density Housing: A European perspective. *Built Environ.* 29 (2), 132–143.
- Bel, G., Hebdon, R., Warner, M., 2018. Beyond privatisation and cost savings: alternatives for local government reform. *Local Gov. Stud.* 44 (2), 173–182. <https://doi.org/10.1080/03003930.2018.1428190>.
- Benedict, M.A., McMahon, E.T., 2012. *Green. Infrastruct. Link. Landsc. communities Isl.* Press.
- Braun, V., Clarke, V., 2021. *Thematic Analysis: A Practical Guide.* SAGE Publications, Limited.
- Brown, T.L., Potoski, M., 2005. Transaction costs and contracting: the practitioner perspective. *Public Perform. Manag. Rev.* 28 (3), 326–351. <https://doi.org/10.1080/15309576.2005.11051842>.
- Burton, M., Dempsey, N., Mathers, A., 2014. Connecting making and keeping - Design and management in place-keeping, 2014. In: Dempsey, N., Smith, H., Burton, M. (Eds.), *Place-Keeping: Open Space Management in Practice*, 1st ed. Routledge, pp. 125–150. <https://doi.org/10.4324/9780203725313>.
- Clifton, J., Warner, M.E., Gradus, R., Bel, G., 2019. Re-municipalization of public services: trend or hype? *J. Econ. Policy Reform* 24 (3), 293–304. <https://doi.org/10.1080/17487870.2019.1691344>.
- Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., Sheikh, A., 2011 Jun 27. The case study approach. *BMC Med Res Method.* 11, 100. <https://doi.org/10.1186/1471-2288-11-100>. PMID: 21707982; PMCID: PMC3141799.
- Darke, P., Shanks, G., Broadbent, M., 1998. Successfully completing case study research: combining rigour, relevance and pragmatism. *Inf. Syst. J.* 8 (4), 273–289.
- Dempsey, N., 2020. Measuring the Gap Between Rhetoric and Practice: Examining Urban Green Space Interventions Post-implementation. In: Dempsey, N., Dobson, J. (Eds.), *Naturally Challenged: Contested Perceptions and Practices in Urban Green Spaces.* Cham: Springer International Publishing, pp. 167–187.
- Dempsey, N., Burton, M., Duncan, R., 2016. Evaluating the effectiveness of a cross-sector partnership for green space management: the case of Southey Owlerton, Sheffield, UK. *Urban For. Urban Green.* 15, 155–164. <https://doi.org/10.1016/j.ufug.2015.12.002>.
- Dempsey, N., Burton, M., Smith, H., 2014. From space to place - The importance of place-keeping, 2014. In: Dempsey, N., Smith, H., Burton, M. (Eds.), *Place-Keeping: Open Space Management in Practice*, 1st ed. Routledge, pp. 1–12. <https://doi.org/10.4324/9780203725313>.
- Dempsey, N., Burton, M., 2012. Defining place-keeping: The long-term management of public spaces. *Urban For. Urban Green.* 11 (1), 11–20. <https://doi.org/10.1016/j.ufug.2011.09.005>.
- Dempsey, N., Martínez Velarde, C.L., Burton, M., 2020. Long-Term Partnership Contracting in Practice: Queen Elizabeth Olympic Park, London. In: Lindholst, A.C., Hansen, M.B. (Eds.), *Marketization in Local Government: Diffusion and Evolution in Scandinavia and England.* Springer International Publishing, Cham, pp. 225–240.
- Dempsey, N., Smith, H., 2014. Understanding place-keeping of open space. In: Dempsey, N., Smith, H., Burton, M. (Eds.), *Place-Keeping: Open Space Management in Practice*, First ed. Routledge, pp. 13–29. <https://doi.org/10.4324/9780203725313>.
- Dobson, J., Birch, J., Brindley, P., Henneberry, J., McEwan, K., Mears, M., Richardson, M., Jorgensen, A., 2021. The magic of the mundane: The vulnerable web of connections between urban nature and wellbeing. *Cities* 108, 102989. <https://doi.org/10.1016/j.cities.2020.102989>.
- van Dooren, N., Nielsen, A.B., 2019. The representation of time: addressing a theoretical flaw in landscape architecture. *Landsc. Res.* 44 (8), 997–1013. <https://doi.org/10.1080/01426397.2018.1549655>.
- Dunnett, N., Hitchmough, J. (Eds.), 2008. *The dynamic landscape: design, ecology and management of naturalistic urban planting.* Taylor & Francis, London.
- EC (2013). *Green Infrastructure (GI) — Enhancing Europe's Natural Capital.* Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions. Brussels, 6.5.2013. COM(2013).
- Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qual. Inq.* 12 (2), 219–245. <https://doi.org/10.1177/1077800405284363>.
- Fongar, C., Randrup, T., Wiström, B., Solfeld, I., 2019. Public urban green space management in Norwegian municipalities: a managers' perspective on place-keeping. *Urban For. Urban Green.* 44, 126438. <https://doi.org/10.1016/j.ufug.2019.126438>.
- Graef, M., Stangl, R., Zluwa, I., Allerstorfer, D., 2023. Sustaining green: quality improvement of green infrastructure in residential facilities through effective maintenance and resident participation. *J. Facil. Manag.* 25, 46–59. <https://doi.org/10.34749/jfm.2023.4667>.
- Gustavsson, R., 2004. Exploring woodland design: designing with complexity and dynamics - woodland types, their dynamic architecture and establishment. In: Dunnett, N., Hitchmough, J. (Eds.), *The Dynamic Landscape.* Spon, New York, pp. 184–214. <https://doi.org/10.4324/9780203402870>.
- Gustavsson, R., Hermy, M., Konijnendijk, C., Steidle-Schwahn, A., 2005. Management of Urban Woodland and Parks — Searching for Creative and Sustainable Concepts. In: Konijnendijk, C., Nilsson, K., Randrup, T., Schipperijn, J. (Eds.), *Urban Forests and Trees: A Reference Book.* Heidelberg: Springer Berlin Heidelberg, Berlin, pp. 369–397.
- Haaland, C., Konijnendijk, C., 2015. Challenges and strategies for urban green-space planning in cities undergoing densification: a review. *Urban For. Urban Green.* 14. <https://doi.org/10.1016/j.ufug.2015.07.009>.
- Hefetz, A., Warner, M., 2012. Contracting or Public Delivery? The Importance of Service, Market, and Management Characteristics. *J. Public Adm. Res. Theory.* J. PART 22, 289–317. <https://doi.org/10.2307/23250883>.
- Hölscher, K., Frantzeskaki, N., Collier, M., Connop, S., Kooijman, E., Lodder, M., McQuaid, S., Vandergert, P., Xidou, D., Beslagić, L., Dick, G., Dumitru, A., Dziubala, A., Fletcher, I., Adank, C., Vázquez, M., Madajczyk, N., Malekkidou, E., Mavroudi, M., Vos, P., 2023. Strategies for mainstreaming nature-based solutions in urban governance capacities in ten European cities. *npj Urban Sustain.* 3. <https://doi.org/10.1038/s42949-023-00134-9>.
- Hörnsten, L., Fredman, P., 2000. On the distance to recreational forests in Sweden. *Landsc. Urban Plan.* 51 (1), 1–10. [https://doi.org/10.1016/S0169-2046\(00\)00097-9](https://doi.org/10.1016/S0169-2046(00)00097-9).
- Jansson, M., Vogel, N., Fors, H., Dempsey, N., Buijs, Randrup, T.B., 2020. Defining urban open space governance and management. In: Jansson, M., Randrup, T.B. (Eds.), *Urban Open Space Governance and Management.* Routledge, pp. 11–29.
- Jones, R., 2000. "Managing the green spaces: problems of maintaining quality in a local government service department". *Manag. Serv. Qual. Int. J.* 10 (1), 19–31. <https://doi.org/10.1108/09604520010307021>.
- Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., Haase, D., Knapp, S., Korn, H., Stadler, J., Zaunberger, K., Bonn, A., 2016. Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecol. Soc.* 21 (2). <https://doi.org/10.5751/ES-08373-210239>.
- Keidar, N., Fox, M., Friedman, O., Grinberger, Y., Kirresh, T., Li, Y., Brail, S., 2023. Progress in placemaking. *Plan. Theory Pract.* 25 (1), 143–151. <https://doi.org/10.1080/14649357.2023.2286131>.
- Knapik, E., Brandimarte, L., Usher, M., 2024. Maintenance in sustainable stormwater management: issues, barriers and challenges. *J. Environ. Plan. Manag.* 1–27. <https://doi.org/10.1080/09640568.2024.2325041>.
- Konings, H., 2004. Creative Management. In: Dunnett, N., Hitchmough, J. (Eds.), *The Dynamic Landscape.* New York, Spon Press, pp. 256–292. <https://doi.org/10.4324/9780203402870>.
- Kotze, S., 2024. *Overdesign and under-funding: A theory of park (re)development in Gothenburg.* Doctoral thesis, Series B, no. 136. Department of Economy and Society, University of Gothenburg, Gothenburg. ISBN 978-91-8069-701-9 (PRINT) ISBN 978-91-8069-702-6 (PDF).
- Kristofferson, A., Lindholst, A.C., Persson, B., Randrup, T.B., 2020. Experiences with Public-Private Partnerships in Sweden: Balancing Collaboration and Competition. In: A. Lindholst, A.C., Hansen, M.B. (Eds.), *Marketization in Local Government: Diffusion and Evolution in Scandinavia and England.* Springer International Publishing, Cham, pp. 241–258.
- Kvale, S., Brinkmann, S., 2009. *InterViews: Learning the craft of qualitative research interviewing.* Second ed. Sage Publications, Inc.
- Lindholst, A.C., 2009. Contracting-out in urban green-space management: Instruments, approaches and arrangements. *Urban For. Urban Green.* 8 (4), 257–268. <https://doi.org/10.1016/j.ufug.2009.07.002>.
- Lindholst, A.C., 2023. Long live marketization for local public spaces: a study of Scandinavian managers' satisfaction with private provider performance. *Urban Aff. Rev.* 59 (1), 200–237. <https://doi.org/10.1177/10780874211042544>.
- Lindholst, A.C., Hansen, M.B., Bretzer, Y.N., Dempsey, N., Leiren, M.D., 2020. Patterns and Variations of Marketization Compared. In: Lindholst, A.C., Hansen, M.B. (Eds.), *Marketization in Local Government: Diffusion and Evolution in Scandinavia and England.* Springer International Publishing, Cham, pp. 197–221.
- Lindholst, A.C., Sullivan, S.G., van den Bosch, C.C.K., Fors, H., 2015. The Inherent Politics of Managing the Quality of Urban Green Spaces. *Plan. Pract. Res.* 30 (4), 376–392. <https://doi.org/10.1080/02697459.2015.1057943>.
- Mann, C., Pouta, E., Gentin, S., Jensen, F.S., 2010. Outdoor recreation in forest policy and legislation: a European comparison. *Urban For. Urban Green.* 9 (4), 303–312. <https://doi.org/10.1016/j.ufug.2010.06.004>.
- Carmona, M., Magalhães, C.D., Hammond, L. (Eds.), 2008. *Public Space: The Management Dimension*, First ed. Routledge. <https://doi.org/10.4324/9780203927229>.
- MEA, 2005. *Millennium ecosystem assessment report - ecosystems and human well-being: synthesis.* Island Press, Washington, DC.
- Moosavi, S., Browne, G.R., Bush, J., 2021. Perceptions of nature-based solutions for Urban Water challenges: Insights from Australian researchers and practitioners. *Urban For. Urban Green.* 57, 126937. <https://doi.org/10.1016/j.ufug.2020.126937>.
- Nielsen, A.B., Gustavsson, R., Wiström, B., 2023. Beginnings: Defining a laboratory approach for urban woods. In: Nielsen, A.B., Diedrich, L., Szanto, C. (Eds.), *Woods go Urban.* Blauwdruk, Wageningen, pp. 42–59.
- Nielsen, A.B., Hedblom, M., Olafsson, A.S., Wiström, B., 2017. Spatial configurations of urban forest in different landscape and socio-political contexts: identifying patterns for green infrastructure planning. *Urban Ecosyst.* 20 (2), 379–392. <https://doi.org/10.1007/s11252-016-0600-y>.
- Nuppenau, C., 2009. *Marketizing municipal park management organisations in Denmark. A Study Policy Organ. Change Period 1985-2005 PhD Thesis.* University of Copenhagen.
- Ørngreen, R., Levinsen, K., 2017. Workshops as a research methodology. *Electron. J. eLearn.* 15, 70–81.

- Parker, J.C., 1986. Low cost systems of management In: Bradshaw, A.D., Goode, D.A., Thorp, E.H.P. (Eds.), *Ecology and Design in Landscape*. Blackwell, Oxford, pp. 211–218.
- Persson B. & Kristoffersson, A. (2019) SköBES – Kontroll, uppföljning, utvärdering och incitament för rätt skötselkvalitet, [MainDes – Control, follow up, evaluation and incentives for correct maintenance quality] Alnarp: Swedish University of Agricultural Sciences. (Report series of the LTV faculty, 2017:1).
- Piana, M.R., Pevzner, N., Hallett, R.A., 2023. Beyond the axe: Interdisciplinary approaches towards an urban silviculture. *J. Landsc. Archit.* 18 (1), 70–81. <https://doi.org/10.1080/18626033.2023.2259653>.
- Qiao, X.-J., Kristoffersson, A., Randrup, T.B., 2018. Challenges to implementing urban sustainable stormwater management from a governance perspective: A literature review. *J. Clean. Prod.* 196, 943–952. <https://doi.org/10.1016/j.jclepro.2018.06.049>.
- Randrup, T.B., Buijs, A., Konijnendijk, C.C., Wild, T., 2020a. Moving beyond the nature-based solutions discourse: introducing nature-based thinking. *Urban Ecosyst.* 23 (4), 919–926. <https://doi.org/10.1007/s11252-020-00964-w>.
- Randrup, T.B., Lindholm, A.C., Dempsey, N., 2020b. Managing the Maintenance of Urban Open Spaces. In: Jansson, M., Randrup, T.B. (Eds.), *Urban Open Space Governance and Management*. Routledge, London, pp. 150–167.
- Randrup, T.B., Östberg, J., Wiström, B., 2017. Swedish green space management – The managers perspective. *Urban For. Urban Green.* 28, 103–109.
- Randrup, T.B., Persson, B., 2009. Public green spaces in the Nordic countries: development of a new strategic management regime. *Urban For. Urban Green.* 8 (1), 31–40. <https://doi.org/10.1016/j.ufug.2008.08.004>.
- Randrup, T.B., Svännel, J., Sunding, A., Jansson, M., Sang, Å.O., 2021. Urban open space management in the Nordic countries. Identification of current challenges based on managers' perceptions. *Cities* 115, 103225. <https://doi.org/10.1016/j.cities.2021.103225>.
- Roman, L.A., Conway, T.M., Eisenman, T.S., Koeser, A.K., Ordóñez Barona, C., Locke, D. H., Jenerette, G.D., Östberg, J., Vogt, J., 2021. Beyond 'trees are good': Disservices, management costs, and tradeoffs in urban forestry. *Ambio* 50 (3), 615–630. <https://doi.org/10.1007/s13280-020-01396-8>.
- Said, M., Tempels, B., 2023. Challenges in managing public space: insights from public space management practice. *J. Environ. Plan. Manag.* 1–20. <https://doi.org/10.1080/09640568.2023.2263635>.
- Sarabi, S., Han, Q., Romme, A.G.L., de Vries, B., Valkenburg, R., den Ouden, E., 2020. Uptake and implementation of Nature-Based Solutions: an analysis of barriers using Interpretive Structural Modeling. *J. Environ. Manag.* 270, 110749. <https://doi.org/10.1016/j.jenvman.2020.110749>.
- Sharpe, B., Hodgson, A., Leicester, G., Lyon, A., Fazey, I., 2016. Three horizons: a pathways practice for transformation. *Ecol. Soc.* 21 (2), 47. <https://doi.org/10.5751/ES-08388-210247>.
- Smith, H., Pereira, M., Roe, J., Sosenko, F., Lindholm, A.C., Mathers, A., 2014. The evaluation of place-keeping - Unrealised potential (2014). In: Dempsey, N., Smith, H., Burton, M. (Eds.), *Place-Keeping: Open Space Management in Practice*, First ed. Routledge, pp. 151–172. <https://doi.org/10.4324/9780203725313>. (2014).
- Smith, A., Whitten, M., Ernwein, M., 2023. De-municipalisation? Legacies of austerity for England's urban parks (n/a(n/a)). *Geogr. J.* <https://doi.org/10.1111/geoj.12518>.
- Stake, R.E., 2006. *Multiple Case Study Analysis*. The Guilford Press, New York.
- Sunding, A., Sang, Å.O., Nilsson, K., et al., 2025. Planning and managing urban green infrastructure for human health: perspectives on collaboration and implementation from four Nordic cities. *Socio Ecol. Pr. Res* 7, 233–252. <https://doi.org/10.1007/s42532-025-00214-3>.
- Täby Municipality (2022) Halva Täby grönt – grönplan för Täby kommun [Half of Täby green – green plan for Täby Municipality] Retrieved [2024-08-26] from: (<https://www.taby.se/bygga-bo-miljo/miljo-och-hallbarhet/halsa-och-biologisk-mangfald/halva-taby-gront/>).
- Täby Municipality (2023) Samrådsförslag: Planbeskrivning till för detaljplan västra Boulevarden i Täby park (detaljplan 4), del av Hästen 4 [Consultation proposal: Plan description to detail plan for part of Täby park]. Retrieved [2025-08-22] from: (<https://doc.taby.se/handlingar/Stadsbyggnadsn%C3%A4mnden/2023/2023-11-14/Handlingar/08.03%20Planbeskrivning.pdf>).
- Täby Municipality (2024) Täbys nya stadspark [Täby's new City park] Retrieved [2024-08-22] from: (<https://www.taby.se/taby-utvecklas/taby-park/tabys-nya-stadspark/>).
- Torring, J., Bøgh, Andersen, L., Greve, C., Klausen, K.K., 2020. *Public Governance Paradigms: Competing and Co-Existing*. Edward Elgar Publishing.
- Tregay, R., 1986. Design and Ecology in the management of Nature-Like plantations. In: Bradshaw, A.D., Goode, D.A., Thorp, E.H.P. (Eds.), *Ecology and Design in Landscape*. Blackwell, Oxford, pp. 275–284.
- Whitten, M., 2020. Contesting Longstanding Conceptualisations of Urban Green Space. In: Dempsey, N., Dobson, J. (Eds.), *Naturally Challenged: Contested Perceptions and Practices in Urban Green Spaces*. Cham: Springer International Publishing., pp. 87–116.
- Whitten, M., 2022. Planning past parks: overcoming restrictive green-space narratives in contemporary compact cities. *Town Plan. Rev.* 93 (5), 469–493. <https://doi.org/10.3828/tpr.2021.55>.
- Winslow, J.F., 2021. Multifunctional green infrastructure: planning and design for long-term care. *SocioEcol. Pract. Res.* 3 (3), 293–308. <https://doi.org/10.1007/s42532-021-00088-1>.
- Wiström, B., Gustavsson, R., Nielsen, A.B., Hladíková, D., Šesták, J., 2023. Creative management - hands-on care for continuous change. In: Nielsen, A.B., Diedrich, L., Szanto, C. (Eds.), *Woods go Urban*. Blauwdruk, Wageningen, pp. 214–277.
- Wiström, B., Mårtensson, F., Ode Sang, Å., Litsmark, A., Hedblom, M., 2024. Creative management: a framework for designing multifunctional play biotopes - lessons from a Scandinavian landscape laboratory. *Urban Ecosyst.* <https://doi.org/10.1007/s11252-024-01537-x>.
- Woudstra, J., 2004. The changing nature of ecology: a history of ecological planting (1800–1980). In: Dunnett, N., Hitchmough, J. (Eds.), *The Dynamic Landscape*. New York, Spon Press, pp. 33–80. <https://doi.org/10.4324/9780203402870>.
- Young, R.F., McPherson, E.G., 2013. Governing metropolitan green infrastructure in the United States. *Landsc. Urban Plan.* 109 (1), 67–75. <https://doi.org/10.1016/j.landurbplan.2012.09.004>.