Issue 05

ARUP

AI for Future Cities

Nature

Arup
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Contents

This fifth issue in the series focuses on **nature** in our cities. How is artificial intelligence (AI) changing the way we observe, restore, design and steward nature in the built environment? How might new, AI enabled ecological systems reshape the physical fabric of our cities and the outcomes of the people who live in them? What new competencies may future practitioners require for designing natural systems that are increasingly augmented by intelligent tools? And how do we ensure that AI remains a technology we use thoughtfully and responsibly, supporting nature as an equal partner in the urban realm?

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AI for Future Cities series

The rapid evolution of (AI) promises to enhance efficiency, speed and innovation. But what does this mean for cities: for how they are planned, designed, built and managed? What are the opportunities and what are the risks? Amongst the hype and speculation, how do we ensure that these technologies support us in achieving our shared goal of creating cities that are better for people and the planet?

Compiled by Arup's Foresight team, **AI for Future Cities is a series of critical reflections and expert insights on the uses and impacts of artificial intelligence across all aspects of our cities** – from planning them through to running them, from infrastructure through to resource flows. It will give you a rich understanding of how AI already operates in urban contexts today, what trends are shaping its use tomorrow, and informed speculation on the long-term possibilities.

At Arup, we use the OECD definition[1] of AI: "*AI refers to systems that make predictions, recommendations, or decisions based on data to achieve human-defined objectives.*" [1] Click here to view Arup's AI Policy.

This is issue 05 of ***a series*** on AI for Future Cities. The upcoming publication will focus on Workplace. Explore other issues here.

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Introduction
Why consider AI and nature in the city? Why now?

AI is increasingly shaping the integration and monitoring of nature in our cities. In recent years, the rise in generative AI has on one hand created more stress on the natural environment, but, on the other hand, AI has created new tools which have improved how we plan, manage and co-exist with nature in our cities.

Today, AI can independently suggest the optimal placement of nature-based solutions (NbS), analyse the effects of tree placement for cooling, and autonomously hold or deploy flood water through sponge city release systems. The potential of these initiatives to be rapidly and independently deployed using AI is exciting but also raises questions regarding ethical considerations, accuracy and unintended consequences that we must acknowledge.

How do we establish shared visions of natural cohesion within our cities? On whose behalf is AI acting: for that of the natural world or of humans within nature? Who sets the rules for these decisions and how do we ensure transparency, fairness and accountability when machines act on our behalf?

This work seeks to use the best evidence available today to explore these questions and the future possibilities that could emerge as we more readily use AI as a tool to enhance nature in our cities.

Futures Triangle

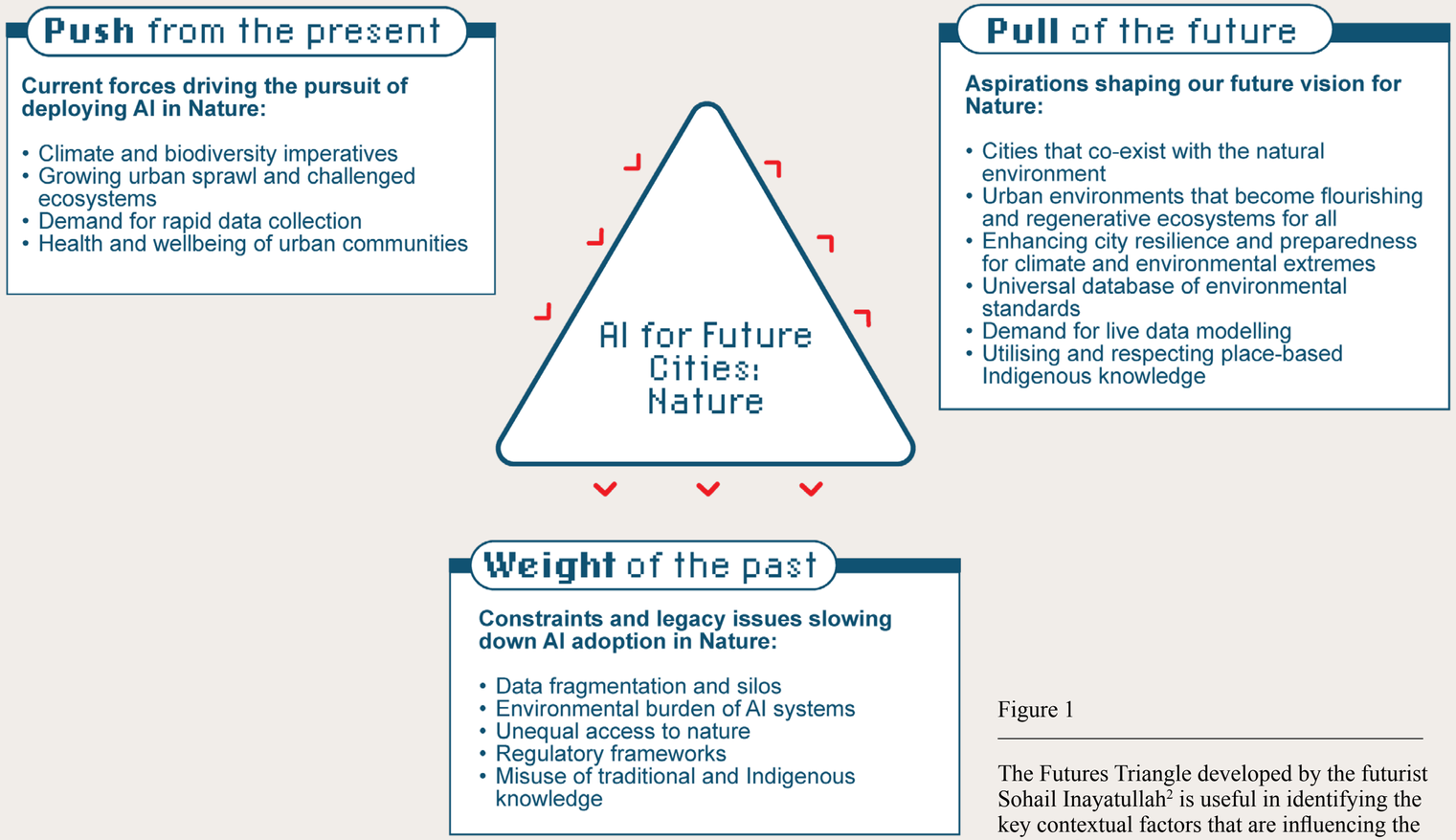

Figure 1

The Futures Triangle developed by the futurist Sohail Inayatullah[2] is useful in identifying the key contextual factors that are influencing the future of how AI may shape nature in our cities.

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Foreword
Enhancing nature in our cities with AI

Cities are the crucibles of our collective future; places where humanity's ingenuity, ambition, and diversity converge. Yet, as we stand at the intersection of rapid urbanisation, climate emergency and technological revolution, we must also ensure that cities are safe, resilient and regenerative places where communities and businesses thrive — now and into the future.

Nature is not a luxury in our cities. It is the foundation of our health, wellbeing, and resilience. Parks, wetlands and green spaces cool our streets and clean our air. They provide vital habitats for wildlife. They are our first line of defence against the shocks and stresses of a changing climate. Yet, nature is often undervalued, fragmented and under threat, competing for space with other urban priorities.

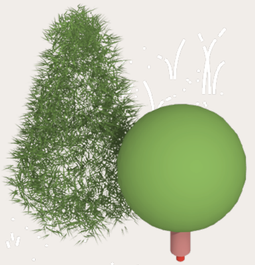
AI offers us new tools to address these challenges. It is already transforming the way we plan, design, and manage urban environments. Its promise is immense, and we are already seeing the benefits in our work. AI is helping us to optimise nature-based solutions, monitor biodiversity, predict and mitigate the impacts of extreme weather.

But the true value of AI lies in its capacity to help us reimagine the relationship between people, nature and technology.

AI can help us map and monitor the health of our green spaces with great fidelity, identify biodiversity hotspots and design interventions that maximise benefits for people and planet. It can draw on Indigenous knowledge and live-time data so we, as humans, take more place-based, context-sensitive solutions that build on the wisdom of previous generations. It can also help overcome the challenges of siloed data and fragmented governance, enabling the cross-sector collaboration that is essential for systemic change.

But we must approach this future with humility and care. AI is not a panacea. Its outputs are only as good as the data and values we embed within it. We must remain vigilant to the risks of bias, unintended consequences and the environmental footprint of digital infrastructure. We must ensure that AI serves the interests of both humanity and the natural world, and that its benefits are shared equitably.

This report by Arup University's Foresight team invites us to imagine a future where AI can enable us to create cities that are not just less harmful, but actively restorative; places where nature and people thrive together. It challenges us to think critically about how we deploy AI and to ensure that it serves the broader goal of creating cities that are better for people, places and the planet.



Jo da Silva
Global Sustainable Development Director
Arup Fellow

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Foresight Perspective:
How can AI help us make space for nature in the face of climate change?

The balancing act

For much of history, cities functioned as a refuge from the ‘wild’, and their expansion into the rural landscape aimed primarily to tame rather than integrate the natural world. The modern shift in perspective from control to coexistence with urban nature has risen for decades, but it is perceived to stand in tension with needs to meet the requirements of continued urban population growth. The application of AI for nature may help to accelerate the shift to coexistence, both through greater deployment of natural interventions, and more targeted ones that place nature where it can have most impact and wider benefits.

Wherever you look in a city, you will find nature somewhere growing and flourishing, from the microbial networks in the small cracks in our pavements, to the ecosystems formed within the brambles of building sites and neglected plots of land, to our designated greenspaces, parks and gardens teeming with life. Nature, like us, is restless, it is constantly on the move, adapting and evolving. As the era of climate change progresses, nature will become an increasingly important pillar supporting and sustaining urban life.

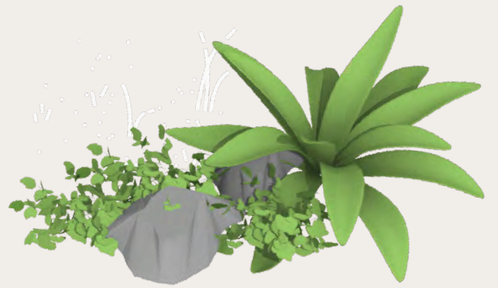
Beyond aesthetics, nature will be the cornerstone of our adaptation and resilience strategies. It will support our adaptation to the increasing frequency and scale of climate events, as well as relieving socio-economic urban challenges such as urbanisation and population growth. The impacts of such change will not be felt equally, and resilience measures will need to be targeted to the most vulnerable areas and populations.

What if AI supported us in deploying nature-based solutions, in the right places with maximal impact on our cities, focusing on quality of intervention rather than quantity?

The role of nature

Nature plays a key role in so many of the services that urban life takes for granted. Parks and green roofs keep us cool, support our mental and physical health and mitigate the air pollution resulting from industrialised living. Wetlands, green space, urban forests: they all support the sponginess and absorptive water capacity of cities, mitigating the impact of storms and flooding, the intensity of which are only set to increase with climate change.

While it may not seem like it, our cities provide crucial habitats for animals and wildlife such as foxes, coyotes, birds and racoons, who play key roles in urban food webs, living off an abundance of human food waste and counteracting the population growth of rodents and insects. As a species, our physical and mental health benefits from our proximity to nature; green spaces provide space to relieve stress and be active in.



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So where does AI come into this?

The problem, however, is that we don't have enough nature in our cities to support us in adapting and becoming resilient to climate events. Nature is one of a vast array of assets such as transport, housing, leisure, education and commercial competing for scarce urban land resources. Where the value of such built infrastructure and the benefits they bring are measurable and tangible, nature is often the opposite. As such it remains neglected and under-provisioned. AI is not necessarily a tool that will bring new ideas of how to manage our urban and natural environments. After all, there is a long history of nature-based solutions and natural land management for improving resilience. First Nations populations have long practised terrace agriculture where steep slopes are reshaped to manage waterflows, irrigate crops and limit erosion.[3] Where AI can support is in building on, and collaborating with, existing knowledge systems and augmenting them with new data sources to deploy nature in a targeted and tangible way that realises and maximises the benefits of nature in our urban environments.

What if AI planned and tracked the health of our green spaces, providing a network of green corridors for commuters, increasing their mental and physical health?

Looking further ahead, we can envisage a future city where AI is supporting the development of new remarkable techniques that allow us to understand nature better and even communicate directly with nature itself.[4] We are already seeing cutting-edge practice where nature is included as a stakeholder in urban development. Could AI further enhance this as a mainstream practice and complement outcomes in our cities? We are also beginning to observe emerging signs of AI supporting our ability to even modify certain characteristics of the natural environment to enhance our resilience to future climate stresses and shocks. Could this be a vital pillar in building greater resilience in the cities that are on the front line of climate change?

Yet, as we develop our deployment of AI in nature, we need to also be wary of the potential unintended consequences that could have adverse impacts on both human populations and on the flora and fauna of our cities. If we are building our AI models based on previous data, how can we be sure that they are not based on historical biases and blind spots in the dataset? How can we avoid favouring certain species over others and unintentionally reduce biodiversity? How do we prevent monocultures forming, which actually weaken ecosystems resilience? As we stand at the intersection of urban growth and ecological urgency, AI offers us a chance to reimagine how cities and nature can thrive together. The decisions we take now will determine whether this partnership becomes a foundation for a more resilient urban future.

What if we could continuously map and monitor biodiversity hotspots in every part of the city?

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Horizon scan evidence:
Trends shaping the future of AI in nature

This is just a small selection of key data we are tracking on how AI operates in the context of cities at present (now→), of emerging trends we are observing (near →), and of informed speculations we are making about long-term possibilities that stem from signals of change (next →).

Get in touch to explore our expanding database of trends, spanning across all issues of the AI for Future Cities series.

Enhanced biophilic design
04

Nature is increasingly being deployed in buildings bringing with it the benefits of biophilic design. It can, however, face barriers in its effective deployment. AI models are supporting optimal placements of nature in different micro-environments, while also reducing the cost and complexity of maintenance, through the use of sensors and analytics.

Eco Gardener, 2025 **NOW**

Nature-based solutions (NbS) deployment
05

AI models are advancing the placement of NbS for societal gain in cities, by identifying the optimal locations, effective interventions and enabling accurate benefit quantifications of interventions for quicker deployment of green and blue infrastructure.

NCE, 2025, UKRI, 2025 **NOW**

AI and net zero
15

AI can support net zero ambitions through three key levers: transforming complex systems into meaningful datasets for humans, innovating technology discovery and resource efficiency beyond current practices and slowly creating behavioural change through accessibility and tools which we have access to.

Nature, 2025 **NEAR**

Equity-focused interventions
17

The physical and mental health benefits of access to nature in our cities are limited and unequal. AI techniques applied to satellite imagery are beginning to support better targeting of nature based interventions (such as tree planting and parks) in places of need to deliver more equitable outcomes in underserved and climate-vulnerable communities.

OECD 2025 **NEAR**

Growing risks from biological designs
32

Within urban nature, AI-driven biodesign can operate as a black box, lacking traceability, accountability and biosafety. Introducing engineered organisms into city ecosystems carries serious risks; intentional misuse could lower barriers to biological attacks, damaging natural systems and harming people who rely on them.

LSE, 2025 **NEXT**

AI-enhanced surveying and compliance
10

AI models can process data from satellite imagery, sensors such as bioacoustics sensors to monitor environmental compliance as well as quantify the environmental gains promised by NbS and interventions. However, data quality issues and an over-reliance on automation pose risks without professional, human, oversight.

ICES, Microsoft, 2024, RICS, 2025 **NOW**

Climate change modelling and resilience planning
12

AI algorithms can analyse climate data, ecological variables and species distributions to model the impacts of climate change on ecosystems. This information can aid in developing climate change adaptation strategies, identifying climate refugees and enhancing ecosystem resilience to changing environmental conditions.

WEF, 2024 **NOW**

City and species planning
24

City decision-making is made with animal habitat and welfare in mind. Using AI models alongside methods such as bioacoustics and metabarcoding allows for better identification of how species interact with, and move through, urban environments, helping to design physical infrastructure accordingly

Reynolds et al. 2025, Urban AI, 2020 ZSL, 2023 **NEAR**

Talking to nature
34

AI-enabled trees equipped with sensors are starting to ‘talk’, sharing real-time data on soil health, moisture and air quality. This emerging symbiosis signals a future where urban ecosystems communicate directly with humans, fostering stewardship and resilience.

Avanade, 2025 **NEXT**

Funding polarisation and reduced stewardship
47

AI’s perceived gold standard could divert attention and funding to wealthy institutions. Novelty bias could shift grants, focus and leadership away from conventional experimentation and participatory fieldwork, diminishing support for grounded research, narrowing diverse voices and approaches, weakening place based conservation stewardship.

Cell Press, 2025 **NEXT**

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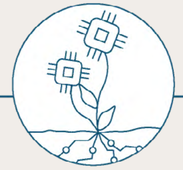
The city of 2035:
How might AI in Nature shape the city, and what new realities might emerge?

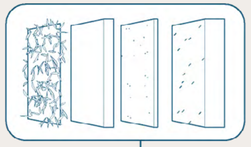
New data storage systems

New methods emerge to store data in naturally made entities such as data gardens and DNA data storage that shrink the environmental footprint of AI and data centres.



Supporting biomimetic structures & design

AI supports designers to more readily learn from nature so as to generate biophilic urban design that mimics natural systems. These structures are lighter, stronger built forms that optimise material and cut embodied carbon and environmental impact.

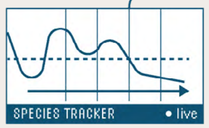


Neo-materials for carbon sequestration

AI aids design decisions of buildings clad in new materials developed to sequester carbon.

City and species monitoring

AI-connected sensors and monitors track animal populations and movements. This can serve as a proxy measure for urban health, and ensure interventions are targeted and population sustained.



AI gene editing

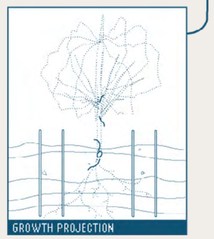
Advances in gene editing allow the modification of plants to maximise traits such as growth speed, root size and photosynthesis rates, being careful of unintended consequences.

Improved future condition / climate modelling

AI algorithms model current and future climate change on urban ecosystems, helping develop future resilience strategies.

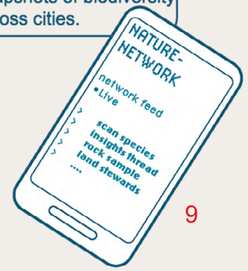
AI-supported nature interventions

AI models scan and analyse urban environments, optimising the location and type of nature-based solutions that are deployed for maximum impact.



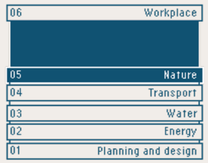
Citizen science

New platforms are emerging that expand citizen science, enabling residents to identify species and submit photos or recordings. AI helps check data quality and combine datasets generated at scale, producing large-scale snapshots of biodiversity across cities.



Using and sharing Indigenous knowledge

Communities utilise AI systems to enhance data collection and curation of Indigenous knowledge to respect local cultures and improve NbS within cities.



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Expert insight:
Setting the foundations for AI can maximise the benefits of nature in our cities

The use of AI, specifically with a focus on nature, will change the way we design and conserve our cities. But the machinations of how we build the models and reach a point where these models are fit for purpose, accurate and trusted, need to be understood to provide confidence.

"For most of history, man has had to fight nature to survive; in this century he is beginning to realize that, in order to survive, he must protect it."[5]

- Jacques-Yves Cousteau

Tom Butterworth
UKIMEA, Biodiversity and Environment Leader
Arup

Damien McCloud
UKIMEA Geospatial Leader
Arup

"Rubbish in, rubbish out": Data quality & access are fundamental

AI models are only as good as the information they are trained on. Otherwise the old adage of "rubbish in, rubbish out" will hold true. AI models need as many sound and verified datasets as possible and must be maintained in their training to give accurate and relevant answers to queries. With the climate crisis and the acknowledged value nature holds as a means of mitigating some of its effects, we must have as much data as possible to understand nature and how nature is functioning in the urban ecosystem. The question then becomes: where will this data come from?

This is where local and national governments need to come to the fore. Millions of pounds worth of ecology studies captured over many years are sitting dormant, behind historic contracts that mean they cannot be used. Imagine being able to access the rich survey data collected across all the major infrastructure projects of the last 20 years to drive machine learning models. Unlocking this trove of information about our natural world would have a profound effect on the quality, accuracy and utility of our nature-based AI tools which ultimately help us develop solutions that will allow nature and our urban spaces to flourish.

Enhancing our understanding of the natural environment

If we can utilise well trained models that understand nature in our cities and urban spaces, our understanding of nature's role in ensuring resilience will dramatically increase. One major opportunity for AI to transform our capability in nature is through its application in biodiversity and green space monitoring. AI-powered sensors and computer vision systems can identify plant and animal species in real time, enabling authorities to monitor biodiversity health and allow areas to be maintained more expediently. Having this data can inform policies that protect native species and prevent invasive ones from disrupting urban habitats.

Having a temporal element to models that accurately monitors the effects of climate change on our urban green spaces and biodiversity will enable better informed design and policy decisions. This will also create an environment that drives predictive and risk-based maintenance of green spaces. Machine learning models can analyse key facets such as soil moisture, weather patterns and plant health to optimise irrigation schedules and reduce water waste. Similarly, AI can forecast tree growth and disease outbreaks, helping urban forestry teams take proactive rather than reactive measures.

Maximising the environmental and human health benefits of nature

AI could ultimately support how we maximise natural spaces and biodiversity in the design and planning of our cities. AI will offer the opportunity to simulate how green infrastructure, such as new parks, green roofs and tree corridors, will impact air quality, temperature, stormwater management and other key elements. These insights will allow planners to maximise environmental benefits while balancing space constraints in dense cities.

AI can strengthen how our communities engage fully with nature through the gamification of citizen science, encouraging residents to report wildlife sightings or participate in other interactive schemes throughout a city's green spaces. This approach helps maximise the positive impact that nature has on our mental and physical health.

Better attributing the benefits of nature

Not only could AI allow us to maximise the benefits of nature, but it could also offer a step-change in our understanding of how natural assets contribute to the resilience and performance of our cities. As richer ecological datasets become available and AI models advance, there is the potential to move beyond general assumptions and begin to attribute benefits at the level of individual natural assets, such as parks, wetlands or urban greening. By isolating these effects, AI could help us better understand the precise role that each natural feature plays in delivering environmental and social outcomes. This could transform our ability to attribute value of the natural world and unlock new opportunities to strengthen the investment case for nature-based projects, better assess insurability and evidence tangible returns generated by specific natural assets.

AI has the potential to transform the way we manage and value the natural world whilst helping us look after nature with far greater clarity and confidence. By investing in strong data foundations and applying AI responsibly, we can ensure that nature is recognised, prioritised and strengthened as a vital part of our urban future.

Click here to explore more on Nature-based solutions and digital technology in 'New Civil Engineer' in partnership with Arup.

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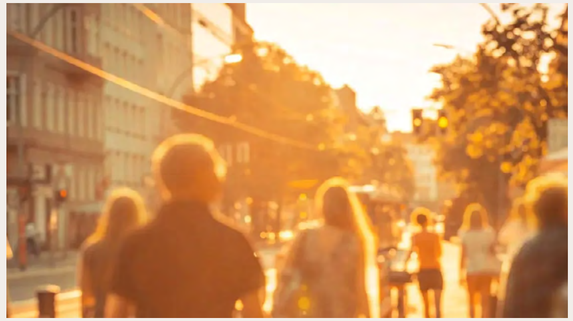
Case Studies:
What is Arup currently doing to improve nature in cities through AI?

Arup has worked with partners and clients around the world on AI-driven solutions for real-world applications that deliver better outcomes for cities.

These cutting-edge projects give us powerful insight into how AI may shape the future expectations of practitioners and how these may be transferable to other domains across the city.



***What if** AI could help all aspects of the built environment to consider implications for urban heat?*

UHeat - Urban Heat Snapshot

Read more

In cities, the impact of extreme heat can be intensified by material and design choices, creating so-called 'urban heat islands' (UHI). Arup developed UHeat to help urban planners and city authorities identify interventions to cool cities. The tool uses a combination of satellite imagery, climate data and the AI-powered Terrain tool to analyse huge areas of cities, identifying specific buildings, structures and materials that cause temperatures to rise as well as interventions such as tree cover and green spaces or corridors that keep cities cool.

The Urban Heat Snapshot Arup produced analysed the temperatures in urban centres of nine cities: Brisbane, Cairo, London, Los Angeles, Madrid, Melbourne, Mumbai, New York and Singapore. Not only did it reveal where the UHI hotspots were developing, but also that urban populations are facing unequal heat risk, with large variations in temperatures occurring from one neighbourhood to the next. This analysis was then used by our teams to develop new planning solutions that can reshape a city's use of land and materials and support temperature reductions without the need for additional building and structures.

***What if** every city had an intelligent ecological network which mapped how land, species and people interact?*

Tirana Orbital Forest, Albania

Terrain

Read more

The Municipality of Tirana, Albania, collaborated with the European Bank for Reconstruction and Development (EBRD) and Arup to reduce urban sprawl and reconnect its citizens with nature. The municipality set out to minimise its impact on the environment from traffic congestion, poor air quality, flood risk, urban heat, low green space and urban sprawl which challenge the quality of life and biodiversity in the city.

In collaboration with the EBRD, Arup developed an economic and environmental assessment for the Tirana Orbital Forest. The Orbital Forest presented a nature-first approach, connecting the city's forests, shrublands, agricultural lands and recreational areas through a ring around the urban perimeter of Tirana. Terrain, Arup's AI and land use analysis tool, was used to map and classify the existing land and land uses within the city and their uses. The process assessed the benefits of different forest options, how the city might integrate nature and the economic incentives of such investments. Tirana's Orbital Forest aimed to protect existing landscapes of natural assets, connect people and ecologies and restore habitats.

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Expert insight:
AI and the future of nature in cities: from ambition to long-term stewardship

Commitments to biodiversity, greener neighbourhoods and nature-positive development are becoming more ambitious and widespread. Yet, as expectations rise, so does a critical question. How do cities move beyond good intentions and ensure that nature not only appears in plans, but genuinely thrives over time?

From static assessment to continuous intelligence

The challenge is not a lack of policy or aspiration, but one of management. Urban nature is often still managed as something static. Plans are created at a single point in time, assessments are carried out at key milestones, and success is assumed once delivery is complete. In reality, the nature element in cities is dynamic and constantly evolving. Habitats change with seasons, vegetation responds to heat, drought and human disturbance, with the pressures of development and maintenance reshaping ecosystems year after year. Managing the complexity of nature with static snapshots leaves cities without the visibility they need and ability to intervene to change outcomes before it is too late.

Historically, this has been difficult to solve. Ecological data has been labour-intensive to collect, expensive to update, and fragmented across sites and stakeholders. Planners, ecologists, developers and local authorities often work with different datasets, timescales and incentives. As a result, decisions about urban nature are frequently reactive rather than preventative, with risks or degradation only becoming apparent once commitments are under threat or remediation becomes costly.

This is where AI, when applied responsibly, has the potential to fundamentally improve how cities understand and support nature.

Rather than replacing ecological expertise, AI can provide a continuous intelligence layer that supports better human decision-making.

Advances in remote sensing and machine learning now allow cities to observe land cover, habitats and vegetation health consistently across complex urban areas. Instead of relying on occasional surveys, nature can be understood as a living system that is continuously monitored and compared over time. This shift from episodic data to ongoing visibility is crucial because it enables early detection of stress, decline or unintended change before issues become entrenched.

Remote sensing is central to this shift because it changes both the scale and consistency at which nature can be understood. Here, satellite imagery enables landscapes to be observed repeatedly, revealing patterns in land cover and vegetation condition that are not easily detected from the ground. Combined with AI, these observations can be transformed into actionable ecological insight, showing where habitats are improving or degrading, where pressures are emerging, and where interventions may have the greatest impact. This approach delivers consistent intelligence across large areas, reducing reliance on isolated site visits and supporting a move from anecdotal understanding to evidence-based stewardship.

Anastasia Filatova
Director of Brand and Creative,
AiDASH

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Understanding nature beyond the site boundary

Equally important is the role AI can play in scaling biodiversity decisions beyond individual sites. Urban nature does not exist neatly within development boundaries. It is shaped by cumulative change across neighbourhoods, estates, transport corridors as well as regeneration areas. AI allows insights to be aggregated across multiple projects, helping cities understand patterns of biodiversity gain or loss at district and city scale. This supports more strategic planning, better prioritisation of interventions and stronger alignment between nature ambitions and real-world delivery.

In practice, this kind of intelligence is already beginning to reshape how biodiversity is planned and monitored. Platforms such as BNGAI™ by AiDASH demonstrate how AI-enabled analysis can support consistent baselining, monitoring, and long-term tracking of biodiversity outcomes across urban developments. Used in this way, AI does not dictate decisions; it provides a shared evidence base that helps cities, planners and ecologists work from the same understanding of what is happening on the ground.

That shared understanding is crucial. One of the most persistent barriers to delivering successful urban nature outcomes is fragmentation between disciplines. Ecologists, planners, designers and decision-makers often engage with nature at different points in the lifecycle of a project. AI can help us to build a bridge between these perspectives, creating transparency and continuity from planning through to long-term stewardship.

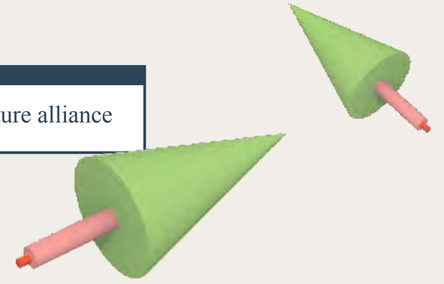
Cross industry and government collaboration is key

Alongside these developments, there is growing recognition that no single organisation or technology can address the nature crisis in isolation. The Ai4Nature Alliance has emerged in response to this challenge, bringing together founding partners from across ecology, engineering, conservation, policy and technology — including AiDASH, Arup, Natural England, CIEEM, Mott MacDonald, AtkinsRéalis, Ramboll, Conservation Evidence, and more. This alliance is grounded in a shared mission to ensure that AI is applied responsibly and transparently in support of nature recovery at scale. Alongside this mission, the ambition is even broader: to establish common principles, evidence-led approaches and cross-sector collaborations that enable nature to be protected, sustained and restored across landscapes, infrastructures and ecosystems worldwide.

Looking ahead, the cities best positioned to succeed will be those that treat nature as essential urban infrastructure rather than an aesthetic or compliance requirement. AI offers cities the ability to manage nature with the same rigour and foresight applied to other critical systems, while still respecting ecological complexity.

The opportunity is not to automate nature, but to steward it more intelligently. By combining human expertise with continuous insight, AI can help cities move from ambition to accountability — ensuring that nature in our urban environments is not only planned for, but demonstrably flourishing for generations to come.

Click here to explore Ai4Nature alliance



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Recommendations: Practical steps for today's practitioners

AI will impact nature in cities in profound ways. Although we can't predict these impacts exactly, we can take anticipatory steps today to be better prepared for the future city.

These recommendations seek to provide the **foundational elements** and **enablers** that are required for AI to augment how practitioners design and manage our natural world.

1 Maintain subject matter expertise and knowledge

AI is set to speed up and automate much of the work involved in nature and the built environment. A growing reliance on AI solutions and models comes with the risk of blindly believing outputs. Being able to critically analyse and interrogate outputs is crucial. This requires professionals to maintain their expertise, from an understanding of the science to conducting surveys, performing calculations, critical thinking and problem-solving.

2 Develop the skills that AI requires

AI itself is not just a technology but includes a whole host of new and necessary skills. Practitioners should understand the core principles behind AI as well as the models and systems built upon it, including data, metadata and visualisation standards. This understanding is essential for effectively using AI in nature-related projects.

3 Recognise AI is one of many tools

AI should not be seen as a universal solution to any problem. It is just one of several tools and solutions available to practitioners. Its use should be considered in the wider context of the task at hand: beginning with whether it is fully necessary, followed by how best it should be used. This should extend into being clear and transparent as to when AI is used, and why it was used.

4 Move beyond siloed data: reform data access, IP and procurement practices

AI models can only approximate real-world complexity, but their accuracy improves significantly with access to large, high-quality datasets. Today, much of this data remains locked within organisations and governments due to restrictive IP rules and outdated procurement terms, with only a small number of institutions sharing data openly. Updating commercial and legal frameworks to enable responsible data sharing would enhance the quality and representativeness of AI models. Governments, in particular, hold substantial ecological datasets that could accelerate model performance if made accessible.

5 The past is not the future, data needs to be continuously updated

Nature is a continuously evolving field, particularly in the context of cities, infrastructure and the growing impact of climate change. We are entering an unprecedented era where historical data is limited in modelling the future. Project data is crucial in capturing this change and feeding back into models. Whether it is data from infrastructure projects, monitoring data from nature schemes or even learning and knowledge data captured at the end of a project, they all contribute to making AI more accurate and effective in supporting nature in cities.

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6 Cross-sector collaboration is needed

Nature-based solutions require coordinated efforts from various organisations and sectors to maximise their effectiveness. Often, however, legacy legislation, fragmented governance structures and misaligned objectives hinder the collaboration required, making it challenging to implement cross-sector solutions. AI could potentially be deployed to facilitate this integration by identifying opportunities and aligning objectives, while also benefitting from wider deployment itself.

7 Ensure intervention outcomes are measured

Understanding the value and benefits of nature-based interventions is crucial in growing and improving their deployment in our cities. AI and machine learning algorithms alongside digital models and earth observation data are playing a growing role in measuring the outcomes of nature-based solutions. Understanding the outcomes and how they can be measured should be considered from the outset of projects, when teams are assessing and integrating natural assets in their designs.

8 Enable adaptive management through continuous monitoring

Outcome monitoring should not end with measurement alone. Nature-based solutions require ongoing adjustment to remain effective in changing environmental and urban conditions. AI, machine learning and earth observation data can aid this by providing continuous feedback on performance, allowing teams to identify when interventions need refinement. Embedding these adaptive management practices will ensure nature-based solutions remain resilient and responsive over the longer term.

9 Acknowledge that not all geographies are the same

Nature functions differently across climates, biomes and cultural contexts. AI models and their training data must reflect this variability rather than assume a universal ecological baseline. Training data, model architectures and performance expectations should be tailored to the specific environmental and social conditions of each location.

10 Strengthening storytelling around nature's value

There is a persistent gap in how the benefits of nature are communicated across the economy and built environment industry. Creating a consistent body of evidence, shared language and clear storytelling tools will help practitioners articulate the value of nature-based interventions more effectively and build public and political support for them.

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