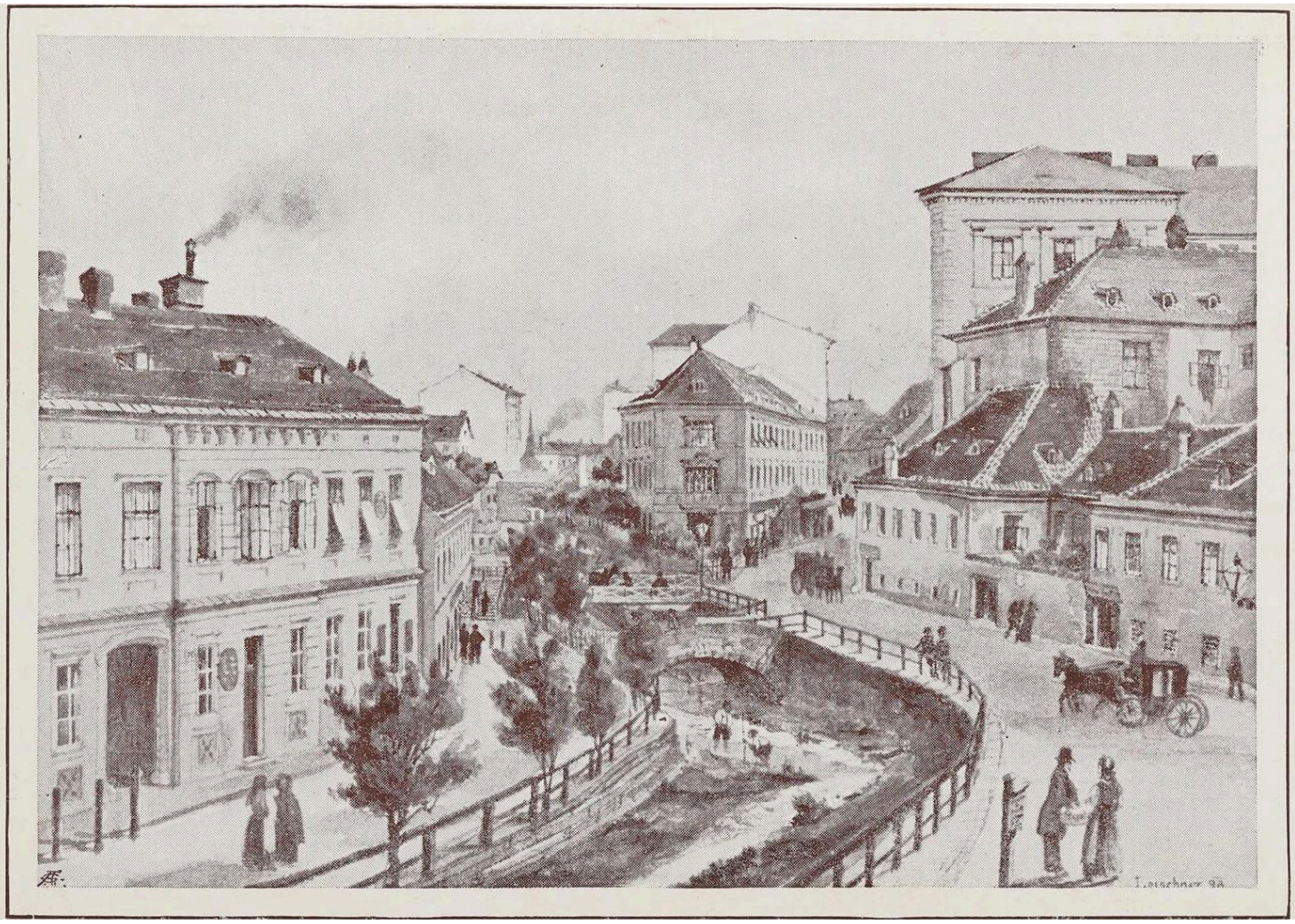
Hidden Streams as Blue-Green Infrastructure

Revisiting the climate-adaptation potential of Vienna's Wienerwaldbäche, 2021-2026

Julia Korol · BOKU University Vienna · Initial research 2021 · Revisited 2026



Elterleinplatz before the Alsbach was culverted (view c. 1870; postcard produced after 1904). C. Angerer & Göschl, after Hans Leischner. Wien Museum, Inv. 58891/1306, CC0.

Research question, design and evidence base

RESEARCH QUESTION

To what extent can the daylighting and revitalisation of Vienna's buried Wienerwaldbäche contribute to a more climate-resilient urban environment?

Research design

2021 / INITIAL RESEARCH

Interdisciplinary literature + policy review

Literature from climatology, ecology, urban planning, economics, environmental history and water management; review of the then-current Smart City and UHI strategies; historical and spatial context of the Wienerwaldbäche; Liesingbach as a practical comparison case.

2026 / EVIDENCE REVIEW

Policy-to-implementation update

Review of current official City of Vienna strategy, regulation, planning tools and project status. The update tests whether the systems logic identified in 2021 has moved into operational planning or built infrastructure.

Analytical lens

QUESTION SHIFT

From cooling effect to multifunctionality

The original hypothesis focused too narrowly on direct thermal effects. The 2026 review evaluates the combined performance of water, vegetation, soil, flood safety, drainage, biodiversity and public space.

IMPLEMENTATION TEST

From plausibility to feasibility

A concept is treated as stronger when it is reflected in planning instruments, regulation or built projects - not simply because it appears in strategy language.

Scope and limitations

- **No new field measurements or microclimate modelling were conducted for the 2026 review.**
- Current-policy claims rely primarily on official City of Vienna sources reviewed on 26 August 2026; political proposals are labelled as such.
- The review evaluates planning logic and implementation evidence; it does not attempt a full cost-benefit analysis of individual stream daylighting projects.

> **WORKING CONCLUSION**
> **The strongest change since 2021 is not mass stream daylighting. It is the institutionalisation of the systems approach behind it: water, vegetation, soil, flood safety and technical infrastructure are increasingly planned as interacting parts of climate-resilient urban development.**

The question changed less than the planning context

The initial research did not confirm the strongest version of its starting hypothesis. Bringing water back to the surface could improve microclimatic conditions locally, but the available evidence did not support a large city-wide cooling effect from exposed streams alone. The stronger case emerged from the combination of functions: vegetation and evapotranspiration, water retention, ecological connectivity, biodiversity, flood resilience, public space, recreation, health and quality of life.

Five years later, Vienna has not launched a broad programme to uncover all historic streams. Around 50 Wienerwaldbäche flow through the city and roughly two thirds remain invisible at the surface because historical enclosures incorporated them into the drainage and sewer system. Restoration therefore remains highly site-specific.

At the same time, the strategic environment has changed substantially. The Smart Klima City Strategy adopted in 2022 gives climate adaptation a dedicated role; the 2023 Building Code strengthens local rainwater management; the Wien-Plan 2035 explicitly commits the city to further renaturation of the Liesing and other Wienerwaldbäche; and GRF Wien is available as a planning tool for assessing climate effect, water sensitivity and land-use efficiency.

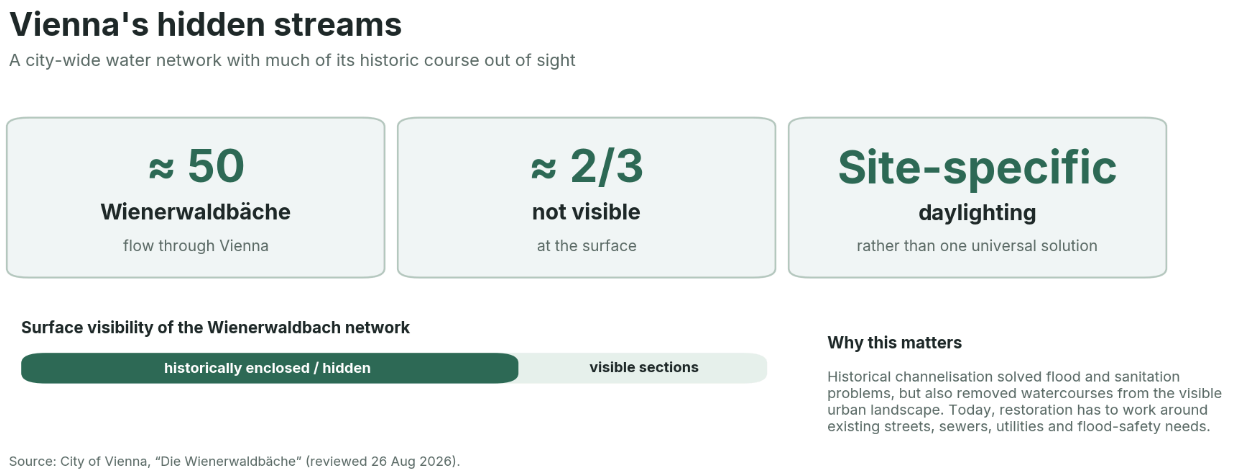


Figure 1. Current status of the Wienerwaldbach network.
Source: City of Vienna, “Die Wienerwaldbäche”; reviewed 26 Aug 2026.

The same geology that makes these streams ecologically interesting also complicates restoration. Much of the Wienerwald lies in the Flysch zone, with low infiltration capacity and rapid runoff responses. Any daylighting or renaturation concept must remain compatible with flood safety and existing urban infrastructure.

Why blue-green infrastructure matters

The original research distinguished between green, blue, grey and hybrid infrastructure. For dense existing cities, the distinction is less useful than the interaction between them. A visible stream without appropriate drainage, flood protection, water quality and vegetation would not automatically be a climate-resilient solution.

Potential functions of a restored urban water corridor

- Local microclimatic improvement through shade, evapotranspiration and reduced heat storage.
- Rainwater retention and slower runoff, reducing pressure on drainage systems during heavy rainfall.
- Ecological connectivity and habitat creation along a continuous linear corridor.
- Improved water quality where polluted runoff can be separated from the stream.
- New walking, cycling and recreation space, with potential benefits for health and quality of life.
- Public visibility of urban water systems and stronger awareness of the natural water cycle.

> **INTERPRETATION RULE**
> **Do not ask only “Does a stream cool the city?” Ask which ecological, hydrological, social and infrastructure functions a restored corridor can deliver together - and whether those combined benefits justify the space and investment required.**

Implementation constraints

CONSTRAINT	PLANNING IMPLICATION
Space	Streets, buildings, public transport, parking, utilities and private property already occupy the corridor.
Hydrology	Fast runoff and flood peaks make flood-safety requirements non-negotiable.
Water quality	Historic drainage connections can make clean surface water a technical prerequisite rather than a given.
Existing infrastructure	A former stream course may now overlap with sewers, pipes, bridges and transport structures.
Competing interests	Mobility, housing, trees, public space, commerce and flood protection compete for limited urban land.
Cost and phasing	Inner-city restoration can require complex engineering and long construction phases.

From Smart City principles to operational planning

In 2021, Vienna already had a conceptual basis for the research question. The Urban Heat Island Strategy explicitly discussed opening enclosed watercourses and associated the measure with microclimate, ecological connectivity, biodiversity, drainage relief, flood protection and urban-design benefits. The main uncertainty was implementation in a dense existing city.

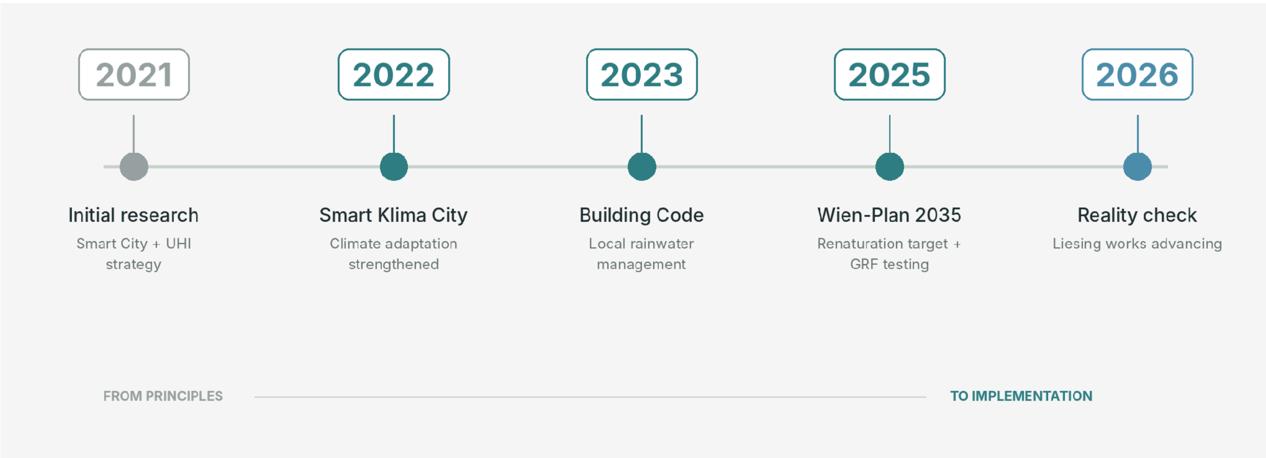


Figure 2. Selected institutional changes relevant to the 2021 research question.
Sources: City of Vienna Smart Klima City Strategy, Building Code monitoring, Wien-Plan 2035, GRF Wien and Liesingbach project pages; reviewed 26 Aug 2026.

What has become more operational

LEVEL	2026 INSTRUMENT	RELEVANCE TO THE 2021 QUESTION
Strategy	Smart Klima City Strategy (2022)	Climate adaptation has a dedicated strategic field; local rainwater cycles, cooling and climate-sensitive urban development are explicit objectives.
Regulation	Building Code amendment (2023)	On-site infiltration, use or return of precipitation to the natural water cycle is strengthened before sewer discharge.
Assessment	GRF Wien	A quantitative planning tool evaluates green structures, rainwater management, climate effectiveness and land-use efficiency early in project design.
Spatial plan	Wien-Plan 2035 (2025)	Continued renaturation of the Liesing and other Wienerwaldbäche is explicit; around 20 km of additional renatured watercourse banks are targeted by 2035.

LEVEL	2026 INSTRUMENT	RELEVANCE TO THE 2021 QUESTION
ASSESSMENT **Compared with 2021, climate adaptation is more strongly embedded across strategy, regulation, assessment tools and spatial planning. The change is not only rhetorical: it creates more specific requirements for how water and green infrastructure enter project decisions.**		

Opening a stream is not a binary planning choice

The appeal of daylighting is intuitive: recover a lost watercourse, create a blue-green corridor and combine ecological restoration with public space. In a built city, however, "opening the stream" is usually shorthand for a much more complicated reconfiguration of land, drainage and infrastructure.

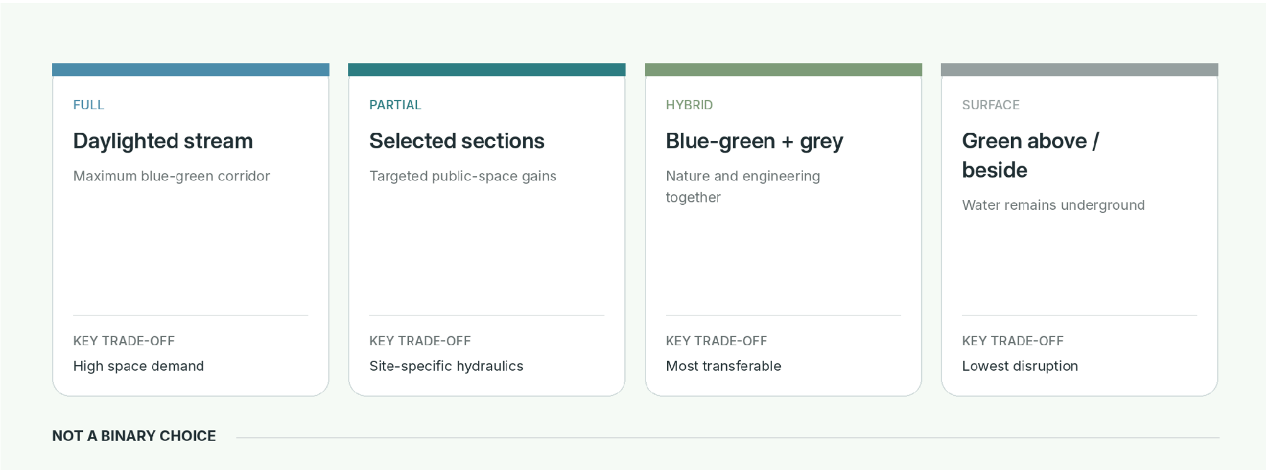


Figure 3. A spectrum of interventions rather than a universal daylighting template.

A spectrum of interventions

- Full daylighting where sufficient space and hydraulic conditions exist.
- Partial daylighting of selected sections.
- Near-natural open channels combined with engineered flood structures.
- Hybrid blue-green surface corridors while critical water functions remain underground.
- Biodiversity and rainwater-management interventions that reference the historic stream corridor even where the stream itself cannot be reopened.

The Als: proposal rather than implementation

The Als is a useful counter-case because it runs underground through Hernals, one of the dense western districts considered in the initial research. Daylighting ideas were already discussed politically in 2020 and resurfaced in 2025, but no adopted large-scale daylighting project is evident in the current City programme. At the same time, a biodiversity corridor along the Alszeile is being developed, showing that the ecological-network logic can influence surface planning even while the stream remains underground.

> **WHY THIS MATTERS**
> **Urban transformation is rarely binary. If full daylighting is not feasible, the ecological and climate functions associated with the historic corridor can still inform surface design, biodiversity connections and rainwater management.**

Liesingbach: hybrid infrastructure in practice

The Liesingbach was selected in the 2021 research as a comparison case because large-scale revitalisation had already demonstrated that a modified Viennese watercourse could be transformed. The 2026 review makes the case more valuable:

the current programme shows how ecological restoration, drainage, flood safety and public space are integrated in a single infrastructure corridor.

Figure 4. The Liesingbach as hybrid blue-green-grey infrastructure.
Source synthesis based on City of Vienna project pages and Press Service update, 15 Jul 2026.

Why this is a stronger test than a showcase project

The project does not represent a simple return to a hypothetical natural condition. It requires ecological redesign and engineered systems to function together. The new rainwater sewer separates polluted first-flush runoff; hydraulic capacity and flood safety remain essential; the bed and banks are reshaped; vegetation and habitat are restored; and paths and recreation areas turn the corridor into public space.

9.2 km **remaining corridor** under staged renaturation	≈9 km **rainwater sewer** parallel technical infrastructure	2027 **planned completion** final project phase	≈€85 m **integrated programme** incl. Gelbe Haide storage basin

What the Liesingbach case actually demonstrates

Four interacting systems

SYSTEM	FUNCTION IN THE INTEGRATED PROJECT
Ecology	Reshaped bed and banks, native planting, habitat improvement and better ecological continuity.
Water quality	A new rainwater sewer intercepts polluted first-flush runoff from traffic areas before it reaches the stream.
Flood safety	Renaturation is combined with hydraulic capacity, retention and contemporary flood-protection requirements.
Public space	Paths, access, recreation and a more attractive river landscape add social value to the infrastructure corridor.

What the case tests against the 2021 reasoning

- Hybrid infrastructure is more realistic than treating ecological and engineered systems as substitutes.
- Climate-adaptation value can arise from combined functions even where direct cooling by water alone is limited.
- Water quality is an enabling condition: ecological restoration depends on technical drainage infrastructure.
- Project costs must be interpreted against multiple outputs - flood protection, drainage, ecology and public-space value - rather than against renaturation alone.

> **METHODOLOGICAL NOTE**
> **The 2021 paper referred to a much smaller LIFE EnCAM programme budget. It should not be compared directly with the current ≈ €85 million cost of the integrated Liesing project: the scopes are different. The 2026 figure covers a much larger package of channel, flood-protection and storage infrastructure.**

Case-study status

The remaining 9.2 kilometres of previously hard-engineered Liesingbach are being transformed in stages. In summer 2026, works were continuing between Atzgersdorfer Platz and Gutheil-Schoder-Gasse, with completion of the final stages still planned for 2027. This provides implementation evidence rather than only policy intent.

2021 question → 2026 evidence

2021 / QUESTION	2026 / EVIDENCE
01 **Can blue-green infrastructure move into mainstream planning?**	01 Yes. Climate adaptation, local water cycles and green infrastructure are now more explicit.
02 **Can climate performance become a planning criterion?**	02 Increasingly. GRF Wien and climate-proofing tools translate strategy into assessment.
03 **Can stream restoration combine several urban functions?**	03 Yes. Liesing links ecology, drainage, flood safety and public space.
04 **Will Vienna simply reopen its buried streams?**	04 No. Around two thirds remain underground; feasibility is site-specific.

Figure 5. Reality check against the central questions of the 2021 project.
Author synthesis based on the 2021 research and current City of Vienna sources reviewed 26 Aug 2026.

Evidence matrix

2021 PROPOSITION	2021 POSITION	2026 EVIDENCE
Direct cooling	The original expectation was too strong.	Evidence still supports mainly local/microclimatic effects; the stronger case is the vegetated corridor and combined functions.
Hybrid infrastructure	The 2021 analysis identified technical integration as likely necessary.	Strongly supported by the current Liesingbach programme: ecological restoration, sewer infrastructure and flood protection are interdependent.
Planning recognition	Blue-green infrastructure was present in strategy but implementation was uncertain.	Stronger institutionalisation through Smart Klima City, Building Code provisions, GRF Wien and Wien-Plan 2035.
Large-scale daylighting	Possible option, especially in selected western corridors.	Not realised as a city-wide programme; roughly two thirds of Wienerwaldbäche remain underground and inner-city projects remain site-specific.
Transferability	Liesing offered a useful comparison but differs from dense western districts.	Still unresolved. The hardest planning question is whether comparable multifunctional corridors can be created where space is most constrained.

From hidden infrastructure to multifunctional corridors

The most important development since 2021 is a change in planning logic. Traditional urban infrastructure often separated functions: water was drained through pipes, roads carried traffic, parks provided greenery and flood structures provided safety. Climate adaptation creates pressure to connect those functions again.

A street tree needs soil and water. Rainwater needs temporary storage. Flood protection needs space. Biodiversity benefits from connected habitat. People need shade, accessible public space and routes for walking and cycling. A well-designed blue-green corridor can potentially deliver several of these functions at once.

This multifunctionality does not make nature-based solutions automatically cheaper or technically simpler. It changes the cost-benefit frame because the same spatial intervention can deliver several kinds of value. The Liesingbach demonstrates this particularly clearly: expenditure is not buying only an ecologically improved stream, but also flood protection, drainage infrastructure, water quality, vegetation and recreation.

> **2026 ANSWER**
> **Yes - selected Wienerwaldbäche can contribute to climate resilience, but not primarily because exposed water would cool Vienna at city scale. Their more significant potential lies in multifunctional blue-green corridors that combine local microclimate, water management, ecological connectivity, biodiversity, flood resilience and public-space functions.**

Transferable planning lesson

The most promising pathway is unlikely to be a complete reversal of nineteenth-century channelisation. It is the selective transformation of existing infrastructure into systems in which water, vegetation, soil and engineering work together rather than separately.

What remains unresolved

The unresolved question is where this approach can be transferred from the more spacious Liesing corridor into Vienna’s dense western districts - precisely where the need for climate adaptation is high and the physical space available for it is lowest.

Limitations of the 2026 review

- The 2026 update is a desk-based evidence review, not a new hydrological or microclimatic study.
- **Project economics are interpreted at programme level only; a full lifecycle cost-benefit analysis is outside the scope of this review.**
- Current implementation status is time-sensitive and reflects publicly available information as of 26 August 2026.

Selected references and current sources

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2026 review - official sources

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- Smart Klima City Strategy - strategy history
- City of Vienna - Die Wienerwaldbäche
- Urban Heat Island Strategy Vienna
- GRF Wien - Grünflächen- und Regenwassermanagementfaktor
- Wiener Klimafahrplan Monitoring - rainwater management
- Wien-Plan 2035
- Wien-Plan 2035 - investments and stream renaturation
- Integrativer Hochwasserschutz Liesingbach
- City of Vienna Press Service - Liesingbach update, 15 Jul 2026
- City of Vienna Press Service - Als proposal, 1 Apr 2025
- Hernals - Biodiversity corridor

Historical cover image: Wien Museum Online Collection, "17., Elterleinplatz - vor der Alsbach Einwölbung, um 1870, Ansichtskarte", Inv. 58891/1306, CC0.

Note on sources and revision

This 2026 edition revisits an earlier academic research project completed at BOKU University Vienna in 2021. It retains the original research question and core findings, replaces borrowed visual material, and adds a clearly separated review of current strategy, planning tools and implementation evidence.
Current web sources reviewed on 26 August 2026.