Monitoring Guidance in a Nutshell

For active planners

Jacek Oskarbski
Konrad Biszko
Daniel Kaszubowski

Gdańsk University of Technology

Interreg Baltic Sea Region
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Purpose of this document

This document is an entry point to the BATS Monitoring Guidance. It helps city teams set up a practical monitoring process before and during an active mobility intervention. It focuses on the minimum logic needed to define the intervention, select indicators, check data feasibility, plan measurements, account for weather and lighting, and use results for decisions.

It should be read as a practical starting point, not as a substitute for the comprehensive recommendations. The aim is to reduce entry barriers, support independent use by city teams, and translate the broader Monitoring Guidance into a realistic monitoring roadmap for a specific intervention.

Quick navigation

1. Why Monitoring Matters

Monitoring and evaluation should be understood as an integral component of active mobility interventions rather than as a separate administrative obligation. When integrated from the beginning, monitoring helps cities control implementation progress, assess whether the intervention is working as intended, demonstrate results to municipal authorities and funding bodies, and support evidence-based adjustments during implementation and operation. Monitoring is valuable not only because it enables technical evaluation, but also because it helps cities demonstrate results, justify further investment, and understand the real effects of their interventions in operational terms (Fig. 1).

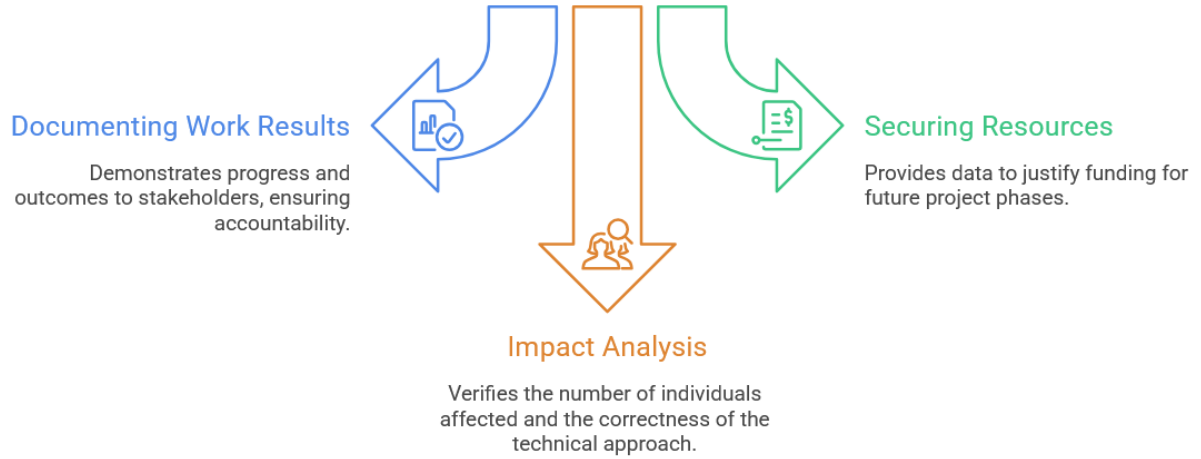


Fig. 1 Why monitoring matters in practice

For year-round active mobility interventions, monitoring is particularly important because outcomes are often influenced by changing weather, lighting conditions, school calendars, travel routines, and other local circumstances. A structured monitoring process helps cities distinguish between real intervention effects and changes caused by external conditions. In this sense, monitoring is not only a reporting function, but also a practical tool for interpretation, learning, and continuous improvement.

The Monitoring Guidance supports this approach by linking intervention objectives with measurable indicators, data sources, and monitoring procedures. Its main purpose is to help local authorities select feasible Key Performance Indicators (KPIs), identify appropriate data sources, and interpret results in a way that supports planning, implementation, and longer-term policy development.

2. Impact Evaluation and Process Evaluation

The Monitoring Guidance distinguishes between two complementary dimensions of evaluation: impact evaluation and process evaluation (Fig. 2).

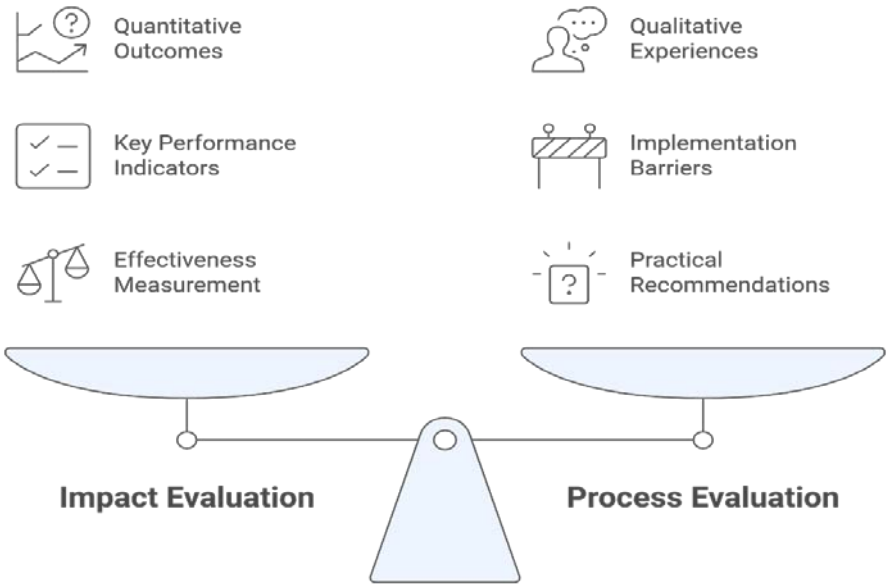


Fig. 2 Complementary roles of impact evaluation and process evaluation in intervention monitoring

Impact evaluation focuses on measurable changes in selected KPIs. It answers questions such as whether pedestrian or cycling volumes increased, whether perceived safety improved, whether conflicts were reduced, or whether modal shift occurred. Impact evaluation therefore concentrates on the quantitative effects of the intervention and on comparing conditions before and after implementation.

Process evaluation focuses on how the intervention was implemented and how the monitoring process functioned in practice. It captures barriers, enabling factors, risks, dependencies, institutional issues, data limitations, and lessons learned during preparation, implementation, operation, and evaluation. This part is especially important in local experiments, where the quality of implementation, data access, stakeholder cooperation, and timing often affect outcomes as much as the intervention itself.

Evaluation dimension	Main question	Typical evidence	Why it matters
Impact evaluation	Did the intervention produce observable change?	Pedestrian or cyclist volumes, modal split, perceived safety, conflicts, delay, emissions, satisfaction, continuity of operation.	It provides measurable evidence on whether the intervention achieved its intended effect.
Process evaluation	How was the intervention implemented and what affected the result?	Barriers, drivers, risks, delays, stakeholder cooperation, data access, operational issues, communication problems.	It explains the result and supports adaptive management, replication and learning.

Both perspectives are necessary. Impact evaluation helps determine whether the intervention produced observable change, while process evaluation helps explain why results were achieved, limited, delayed, or difficult to measure. Together, they provide a more complete basis for adaptive management, communication with stakeholders, and possible replication of successful measures in other contexts.

3. How to Set Up the Monitoring Process in Practice

This subsection provides a practical entry point to setting up the monitoring process. Rather than starting with the full methodological detail or the complete indicator catalogue, city teams should begin with a manageable set of decisions that connect the intervention, the expected change, the indicators, the available data, responsibilities, and the evaluation timeline.

Before starting the six-step process, city teams may use the overview of supporting materials in Section 4.1 to understand which tools are relevant at each stage. This overview explains how the appendices, the Indicator Selection Tool and the Monitoring Guidance Canvas support the preparation of the monitoring roadmap, and how the same information can later feed into a more detailed Evaluation Plan if such a document is required in a specific project or institutional context.

The purpose is to help city teams prepare a practical monitoring roadmap for a planned year-round active mobility intervention. The monitoring roadmap summarises the key decisions needed to set up monitoring in a clear and feasible way, including the intervention logic, proposed core and supporting indicators, data availability, main data gaps, indicative measurement periods, key responsibilities, assumptions and risks. More detailed explanations of KPI selection, data acquisition, monitoring methods and evaluation procedures are provided in the BATS Monitoring Guidance - Comprehensive Recommendations and related appendices. The monitoring roadmap will serve as the basis for developing the Evaluation Plan, which should be treated as a working document updated during the implementation and evaluation of the intervention, and an example Evaluation Plan template is included in the BATS Monitoring Guidance - Comprehensive Recommendations. The six practical steps described below help city teams prepare a concise monitoring roadmap.

Step	Action	Key question	Main output
1	Define the intervention and expected change	What is the measure, where is it implemented, who is the target group, what problem should it solve, and what change is expected?	Intervention profile and evaluation question.
2	Select 1-2 core indicators and 2-4 supporting indicators	Which measurable result would show success? Which supporting indicators help interpret the result?	Preliminary KPI list linked to objectives.
3	Run a practical data audit	What data already exists, who owns it, how reliable is it, and what is missing?	Data availability and gap assessment.
4	Plan data collection and responsibilities	How could data be collected, by whom, when, and with what basic quality checks?	Initial data collection outline and responsibility mapping.
5	Document assumptions, drivers and barriers	What may support success, what may prevent it, and how can risks be reduced?	Process evaluation notes and mitigation actions.
6	Prepare the monitoring roadmap	What are the indicative stages, timing, responsible actors, risks and dependencies,?	Main output: monitoring roadmap.

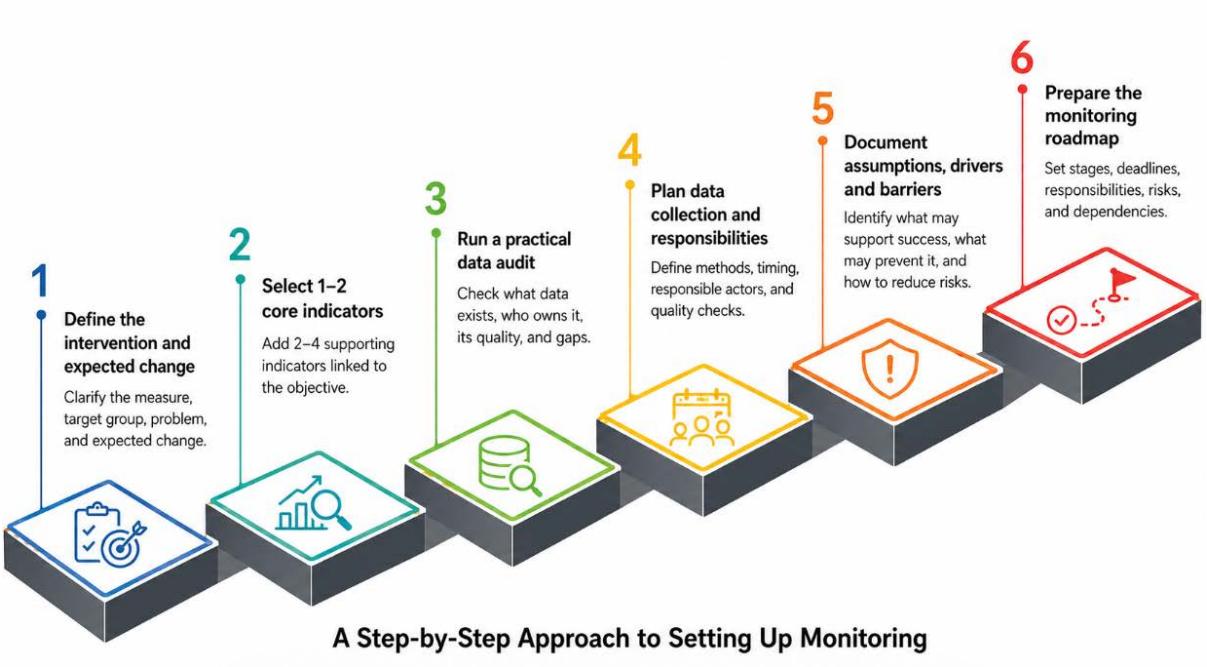


Fig. 3 A Step-by-step approach to getting started with monitoring

Getting Started: A Step-by-Step Approach

Step 1: Integrate Monitoring from Day One

Begin thinking about monitoring during the initial planning stages of your pilot activity, not after implementation has already begun. As you define your intervention – whether it is infrastructure changes like protected bike lanes, policy updates such as revised parking

regulations, or community programs like school travel campaigns – simultaneously identify how you will measure success.

This proactive integration ensures that data collection mechanisms are built into your intervention design from the outset, making monitoring feel natural rather than burdensome. It also helps avoid situations in which important baseline data is missing or where indicators are selected too late to be measured properly.

Step 2: Select 1–2 Main Indicators That Truly Matter

Rather than being overwhelmed by the comprehensive indicator catalogue, focus on identifying 1–2 main indicators that directly measure the intended impact of your specific intervention. These should be supplemented by two to four supporting indicators that provide context, explain variation, or help interpret the observed results.

A KPI should always be understood as a measurable value directly linked to a specific intervention objective (Fig. 4) In practice, this means that indicators should not be selected merely because data is available, but because they provide meaningful evidence on whether the intervention is achieving its intended effect.

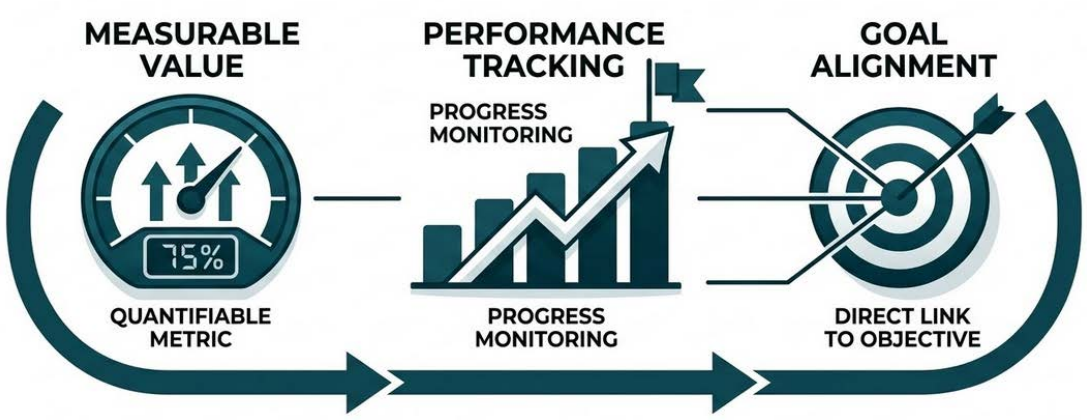


Fig. 4 KPI as a measurable value linked to a specific objective

Use these guiding questions to clarify your monitoring needs (Fig. 5):

- What specific behaviour or outcome are you trying to change?
- How do weather and lighting conditions affect your intervention's effectiveness?
- What barriers might prevent success, and how would you detect them?

- What existing data do you already have access to?

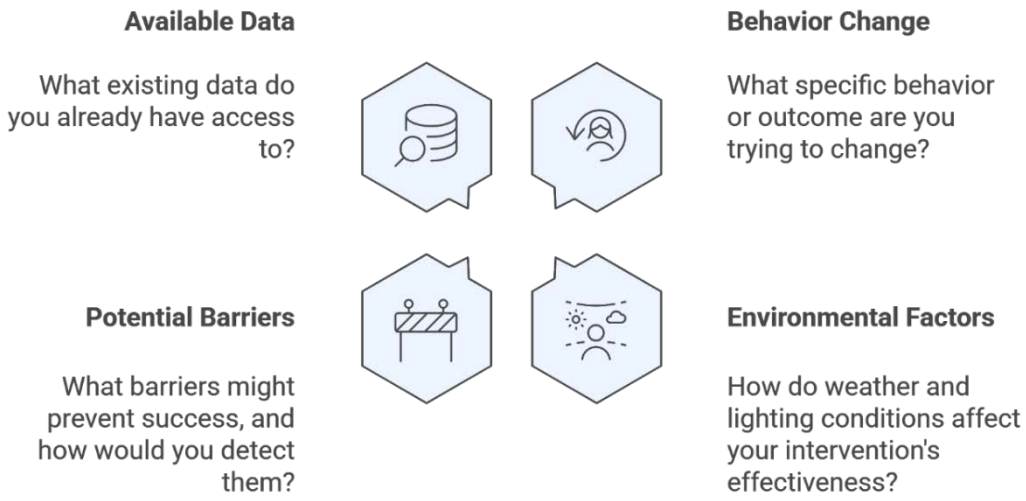


Fig. 5 Guiding questions for selecting main monitoring Indicators

This approach makes the monitoring design more focused and feasible. It also helps ensure that the selected indicators are directly linked to the core purpose of the intervention rather than reflecting only what is easiest to measure.

A useful practical rule is to start with the simplest monitoring setup capable of answering the main evaluation question. More detailed measurement layers may be added later only where they improve interpretation or respond to a specific decision need (Fig. 6).

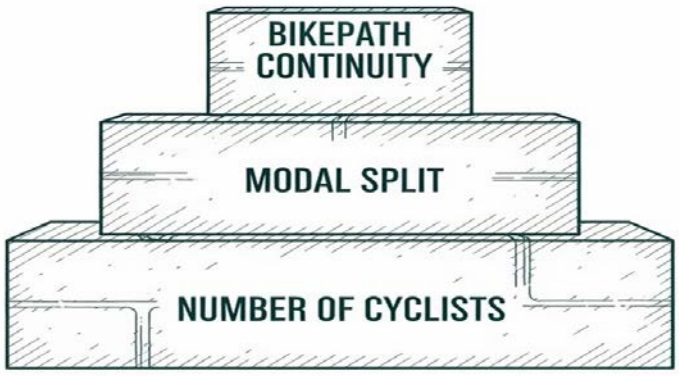


Fig. 6 Keep monitoring simple and layered

Step 3: Assess Your Data Availability and Collection Capacity

Before finalizing your indicator selection, conduct a practical assessment of available data resources. The Data Audit Scheme helps you systematically work through this process (Fig. 7):

- **Define data requirements:** Specify what data type, format, and collection frequency each selected indicator needs.
- **Check data accessibility:** Determine whether required data already exists in city databases, GIS systems, transport models, or other municipal departments.

- **Evaluate collection options:** If data is not readily available, assess whether you can collect it internally with existing staff and resources, or whether external assistance is needed.
- **Assess data quality:** Verify that available data is accurate, complete, and collected with sufficient consistency for your purposes.

Be realistic about practical constraints. Acknowledging limitations early allows you to either adjust your indicator selection or plan adequate resources to overcome barriers.

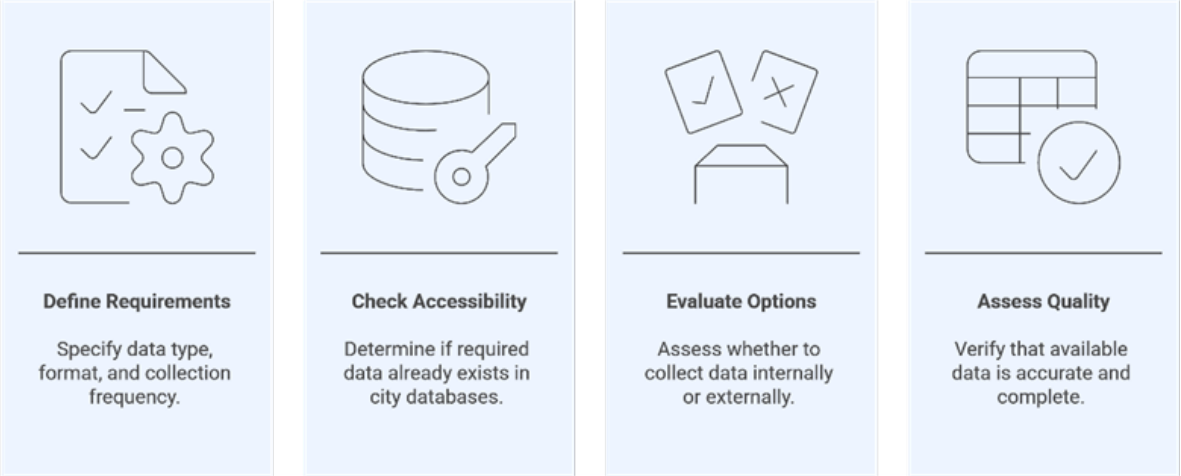


Fig. 7 Data audit scheme for assessing data availability and collection capacity

Step 4: Plan Your Data Collection Timeline
Active mobility monitoring requires data collection at multiple time points to enable meaningful before-and-after comparisons (Fig. 8).

Baseline data collection (before intervention): Establish a benchmark of current conditions across various weather and lighting scenarios relevant to your location. This might include data during normal conditions, rain, snow, strong winds, daytime, and nighttime.

Post-intervention monitoring (immediately after implementation): Capture data across the same range of conditions to assess immediate impacts. This typically occurs within weeks or months after your intervention becomes operational.

Long-term follow-up (1–2 years later): Assess lasting effects and behavioural changes once residents have had time to adjust their habits. Ideally, conduct this during the same seasons as your baseline collection to enable direct comparison.

Ongoing monitoring (regular intervals): Continue data collection at least seasonally (minimum three times per year) to support continuous improvement and integration into broader city planning initiatives such as Sustainable Urban Mobility Plans.

This phased approach balances scientific rigor with practical feasibility. While more frequent data collection provides richer insights, the recommended timeline acknowledges resource limitations faced by most cities.

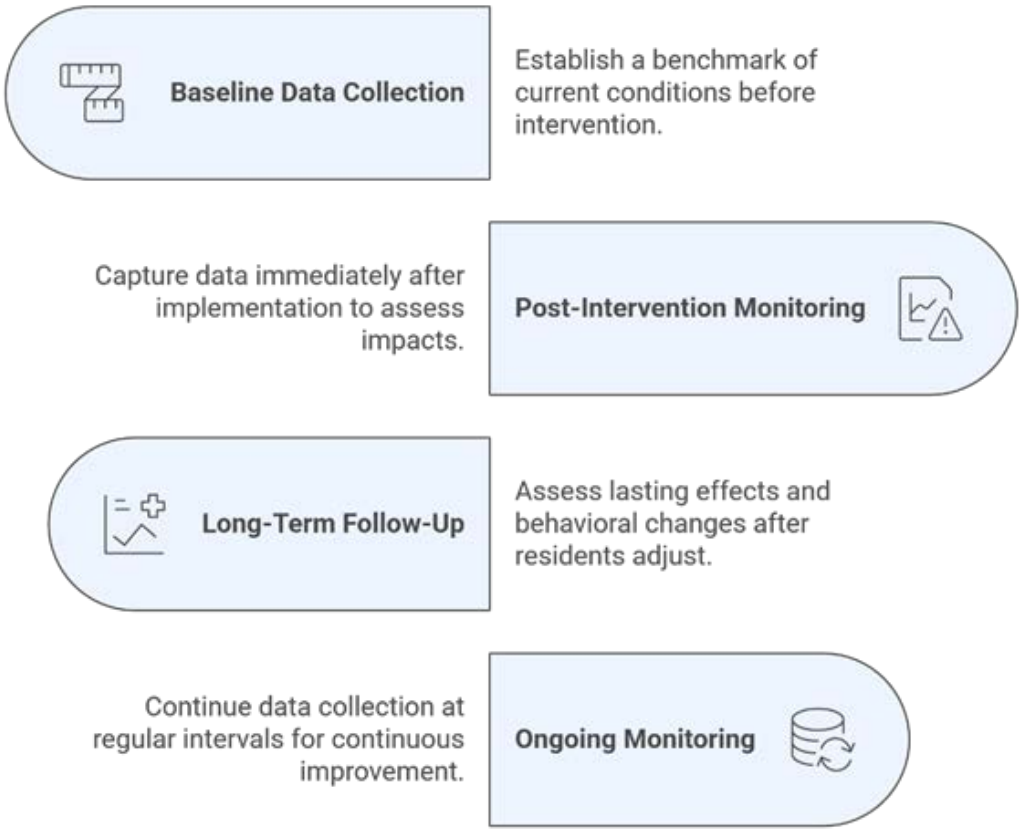


Fig. 8 Recommended timeline for active mobility data collection

Step 5: Document Assumptions, Drivers and Barriers

Record the conditions that may affect the result. This is part of process evaluation and should not be postponed until the final report. Typical assumptions, drivers and barriers include data access, stakeholder cooperation, maintenance quality, communication activities, implementation delays, political support, user awareness, and weather or lighting differences between measurement periods.

Step 6: Prepare the Monitoring Roadmap

Translate the selected indicators, data sources, responsibilities, timing, assumptions, risks and dependencies into a short monitoring roadmap. It should also reflect the key notes and decisions developed through the canvas process (as described in Monitoring Guidance Canvas), especially those concerning intervention logic, success criteria, data feasibility, drivers, barriers and mitigation actions. The roadmap should be simple enough to prepare during rapid scoping, but specific enough to show what needs to be agreed before, during and after the implementation of the intervention.

The monitoring roadmap should not be treated as a complex reporting template. Its purpose is to organise the key monitoring decisions in one place and to make clear what has already been agreed, what still needs to be clarified, who is responsible, which process-related notes should be carried forward from the canvases, and which risks or dependencies may affect the monitoring process.

The table below presents a monitoring roadmap template.

Stage / activity	Deadline	Responsible partner	Status	Risks / dependencies	Canvas / process notes
Definition of intervention					
Definition of indicators					
Data sources and collection methods					
Baseline data collection (before)					
Implementation of the measure					
Follow-up data collection (after)					
Evaluation and interpretation					
Reporting and lessons learned					

The columns should be completed as follows:

- Stage / activity defines the main monitoring-related task or phase.
- Deadline indicates when the task should be completed or reviewed.
- Responsible partner identifies the organisation, department or person responsible for completing the task.

- Status is used to confirm that a given item has been agreed, or to specify what still remains to be clarified and to what extent. At the roadmap stage, this column should mainly show whether the necessary decisions have been made before implementation starts.
- Risks / dependencies records external conditions, data limitations, institutional dependencies, implementation risks or other factors that may affect the monitoring process.
- Canvas / process notes record the most important findings from the canvas work, including assumptions, drivers, barriers, mitigation actions, data feasibility issues, stakeholder dependencies and other process observations that should be taken into account when developing the monitoring roadmap.

The rows cover the main stages of the monitoring process:

- Definition of intervention describes the measure, location, target group, problem addressed and expected change. This row should draw mainly on the intervention context, problem statement and expected change defined in Canvas I.
- Definition of indicators specifies the core and supporting indicators selected to assess whether the intervention produces the expected effects. It should also note the success criteria, contextual variables, baseline assumptions and target values discussed in the canvas process.
- Data sources and collection methods identifies existing or new data sources, data owners, collection methods, data quality issues and potential gaps. This row should reflect the data audit and feasibility check developed in Canvas II, including data availability, access conditions, coverage, quality and integration issues.
- Baseline data collection (before) defines the pre-intervention measurement period and the conditions under which baseline data should be collected. It should also record whether weather, lighting, seasonality or local context may affect comparability.
- Implementation of the measure records the planned timing and responsibility for implementation before the measure starts. It should also capture process notes on implementation barriers, enabling factors, stakeholder cooperation and mitigation actions.
- Follow-up data collection (after) defines the post-intervention measurement period and ensures that, where possible, it is comparable with the baseline period. Any differences in weather, lighting, data availability or implementation conditions should be noted.
- Evaluation and interpretation covers the analysis of the selected KPIs, process evaluation notes, weather and lighting context, limitations and explanatory factors. It should also use the canvas notes to explain why the observed results could later be limited, delayed or difficult to measure.
- Reporting and lessons learned summarises how findings should be reported and used after the evaluation is completed, including practical conclusions, recommendations and lessons for future replication or scaling up. This row should also indicate which types of findings may require further monitoring or clarification.

At this stage, the roadmap does not need to contain all operational details or actual monitoring results. The monitoring roadmap is an ex-ante planning output: it should be prepared before the intervention starts and should organise the key decisions needed to launch monitoring in a coherent way. These elements are developed further in the Evaluation Plan, which is a working document completed and updated during implementation and evaluation, as real data, dates, results, limitations, barriers and lessons become available.

The Evaluation Plan should specify the impact evaluation table, data provision methods, data sources and owners, baseline and post-intervention measurement periods, quality checks, responsibilities, assumptions, limitations and process evaluation notes. Where results are available, it may also include before-and-after values for the selected main and auxiliary indicators. An example Evaluation Plan template is included in the BATS Monitoring Guidance - Comprehensive Recommendations.

This six-step approach is intended to make the monitoring process easier to set up from the outset. The following sections expand selected elements in more detail, including indicator selection, data audit procedures, monitoring schedules, the use of canvases and appendices, weather and lighting considerations, and interpretation of results.

4. Working with the Indicator Selection Tool

The Indicator Selection Tool in Appendix 1 should be treated as the primary linked file for detailed KPI selection and technical indicator information. It is supported by Appendix 1A, which provides a quick KPI overview per Community Goal, and Appendix 1B, which summarises possible data sources and data collection methods. Appendix 2 provides the detailed process map for indicator selection, data audit and feasibility decisions. Together with the Monitoring Guidance Canvas, these tools help city teams move from an intervention idea to a feasible monitoring roadmap. Appendices 1A, 1B and 2 are included at the end of BATS Monitoring Guidance-Comprehensive Recommendations document.

The comprehensive indicator table in Appendix 1 is organized by Community Goals, including Travel Performance, Safety, Environment, Traffic Behaviour / Quality of Life, and Economic goals. Each indicator entry specifies the required data types, calculation logic, appropriate data sources, and whether the KPI is weather-dependent or lighting-dependent.

Use the Indicator Selection Tool as a reference tool, not as a checklist. It is not necessary, and usually not feasible, to implement every indicator. Instead, city teams should use it after the intervention objective and expected change have been clarified. In most cases, the practical starting point should be one or two core indicators, supplemented by a limited number of supporting or contextual indicators that help interpret the results.

4.1. How to use the supporting tools

This document should be used together with the appendices and canvases. They have different functions and should not be treated as one long checklist. The aim is to move from an intervention idea to a feasible monitoring roadmap, which may later feed into a more detailed Evaluation Plan if such a document is required in a specific project or institutional context.

Tool	Use it for	How to use it
Appendix 1 - Indicator Selection Tool	Detailed KPI selection and technical indicator information.	Use it after defining the intervention objective. Select only indicators that are relevant and feasible.
Appendix 1A - KPI overview per Community Goal	Quick scan of possible KPIs across Travel Performance, Safety, Environment, Traffic Behaviour / Quality of Life and Economic goals.	Use it to discuss candidate indicators with a multidisciplinary team before going into technical detail.
Appendix 1B - Data sources overview	Understanding possible data collection methods and data source categories.	Use it during the data audit to identify whether data can come from counts, surveys, GIS, police data, models, city inventories, cost data or health indicators.
Appendix 2 - Detailed process map	Full process logic for indicator selection, data audit and feasibility decisions.	Use it when the short six-step logic is not enough and the team needs a more detailed decision path.
Monitoring Guidance Canvas	Workshop-based planning of the monitoring approach.	Use it as a working space for city teams to define objectives, indicators, data, responsibilities and barriers, and to prepare the monitoring roadmap.

Using the Indicator Selection Tool in practice

The Indicator Selection Tool is meant to support informed trade-offs when selecting indicators. Some indicators are highly relevant but require substantial data collection, while others may be easier to calculate but less directly connected to the intervention objective. For this reason, indicator selection should always be followed by a practical data audit and a feasibility check. If the required data cannot be accessed, collected or interpreted with sufficient confidence, the indicator should be adjusted, replaced or documented as a limitation.

Two simplified selection methods may be used to navigate the Indicator Selection Tool (Fig. 9):

Method 1: Multi-faceted approach

This approach considers geographic scope (area-wide vs. local), management category (e.g. safety, infrastructure, transport management), maintenance needs, and weather and lighting dependencies. It is particularly suitable for more complex interventions with multiple objectives.

Method 2: Weather- and lighting-focused approach

This approach simplifies selection by primarily categorizing indicators according to whether they are affected by weather conditions, lighting conditions, both, or neither. It is especially useful where environmental factors are central to the intervention.

The choice of method should depend on the complexity of the intervention, the evaluation needs of the city, and the team's familiarity with monitoring concepts. The full structured indicator set is included in Appendix 1.

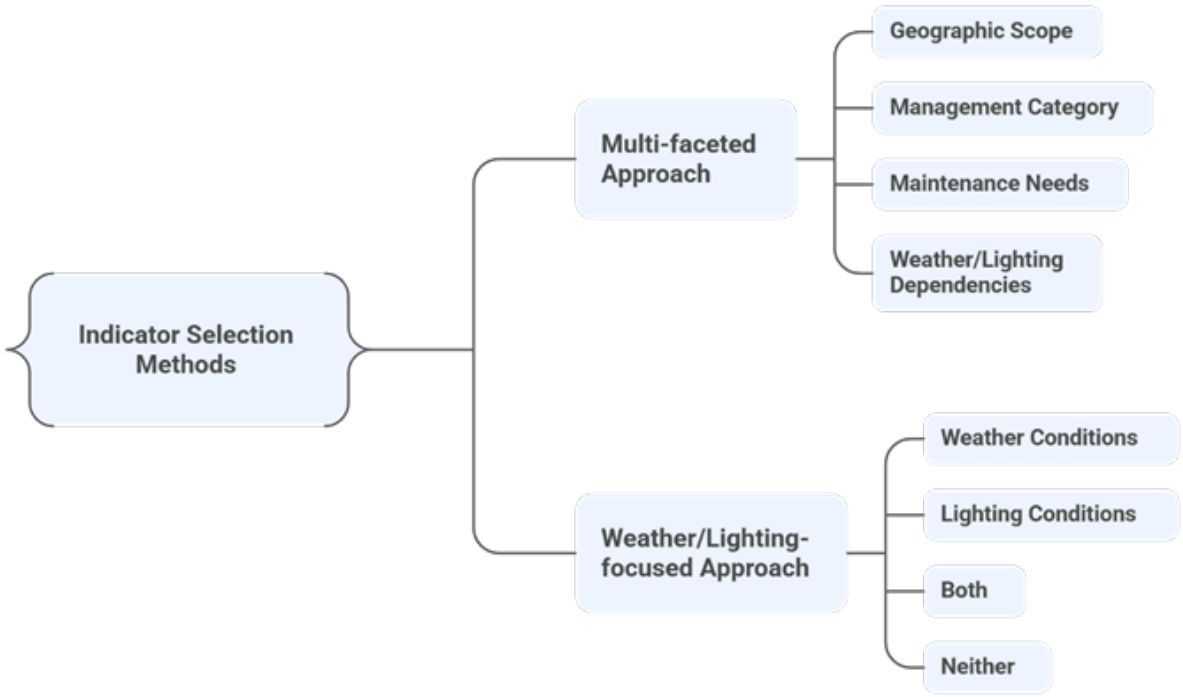


Fig. 9 Simplified methods for selecting Indicators from the Indicator Selection Tool

In addition to these two simplified methods, city teams may use the following practical entry points when discussing the final KPI set.

Selection logic	Use when	Practical output
Community-goal approach	The intervention is linked to a broader policy goal such as safety, travel behaviour, environment or traffic performance.	Candidate KPIs grouped by objective.
Weather / lighting approach	The key question is whether the intervention works in darkness, rain, snow, wind, ice or other adverse conditions.	KPI shortlist with weather and lighting sensitivity.
Data-feasibility approach	The city has limited resources or uncertain data access.	A realistic KPI set that can be measured with available or achievable data.
Layered approach	The team wants to avoid excessive monitoring burden.	One or two core indicators plus a few supporting or contextual indicators.

When working with the Indicator Selection Tool, city teams should use it to move from the evaluation question to a short and feasible KPI list. The recommended sequence is to check relevance to the intervention objective, verify weather and lighting sensitivity, identify the required data and calculation logic, and then confirm whether the indicator can realistically be measured with available or achievable data.

Use the tool to...	Do not use it to...
Check which indicators are relevant to the intervention objective.	Create an obligation to use all indicators.
Check whether the indicator is weather-dependent or lighting-dependent.	Select indicators only because data is easy to access.
Check required data, calculation logic and possible data sources.	Replace the data audit and feasibility check.
Prepare a short KPI list for the monitoring roadmap.	Overload a small pilot with unnecessary monitoring tasks.

This approach keeps the Indicator Selection Tool useful for rapid scoping while preserving the methodological link with the full Monitoring Guidance. The tool helps city teams select a small number of meaningful indicators, while Appendix 1A, Appendix 1B, Appendix 2 and the Monitoring Guidance Canvas support team discussion, data feasibility checks and preparation of the monitoring roadmap.

The Indicator Selection Tool helps confirm the technical properties of selected indicators. The canvases, described in the next section, help the city team discuss and organise these choices in a workshop format.

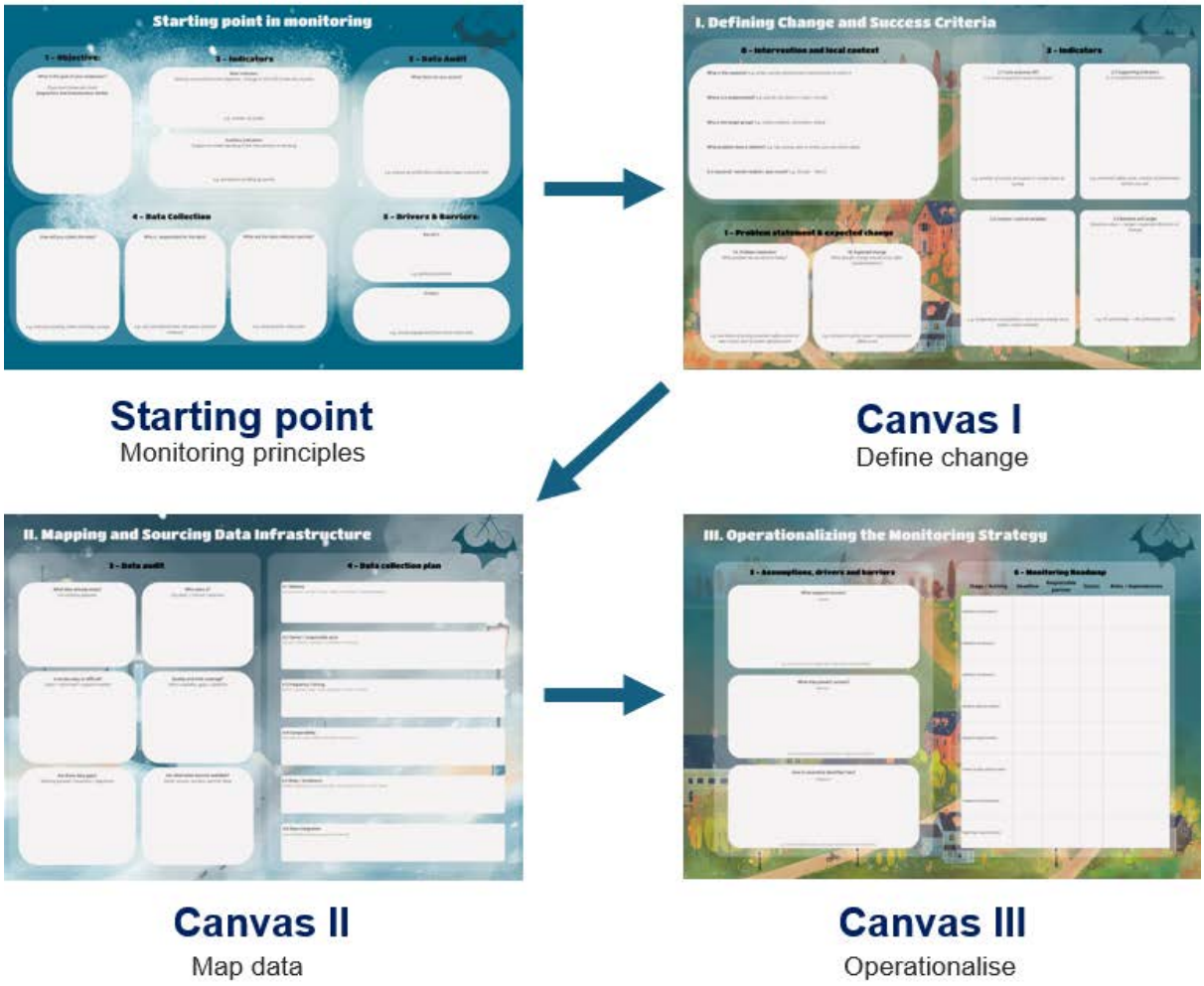
4.2. How to use the canvases as a starting point

The canvases are practical working spaces for workshops, internal planning meetings and rapid scoping. They should not be treated as another checklist or as a replacement for the indicator table. Their role is to help a city team agree the monitoring logic before detailed KPI and data work begins: what the intervention is expected to change, which indicators matter, what data is available, who is responsible, and how the monitoring roadmap should be organised.

Use the canvases with sticky notes in Miro, as a PDF, or as printed workshop sheets. Start with the "Monitoring Guidance in a Nutshell" canvas when the team needs quick orientation. Move to Canvases I, II and III when the pilot requires more space to define change, map data infrastructure and operationalise the monitoring strategy. A small pilot may use only the starting canvas, a more complex intervention can follow the full sequence.

The recommended workflow is therefore: start with the general canvas, refine the intervention logic in Canvas I, test data feasibility in Canvas II, and translate the result into actions, responsibilities and risks in Canvas III.

Canvas sequence



Use the first canvas for rapid orientation.
Use Canvases I-III when you need:

- **more space to define logic,**
- **map data,**
- **prepare the monitoring roadmap.**

Fig. 10 Canvas sequence - from quick orientation to an Evaluation Plan outline

Canvas	Use it when...	Main content and practical output
Starting point / Monitoring Guidance in a Nutshell	The team needs a quick orientation, a short "how to start?" discussion, or a simple workshop entry point.	Covers the objective, main and auxiliary indicators, data audit, data collection, drivers and barriers. Output: initial monitoring logic and first roadmap inputs.
Canvas I - Defining Change and Success Criteria	The team needs to clarify the intervention logic before selecting or confirming KPIs.	Covers intervention context, problem statement, expected change, core and supporting indicators, context variables, baseline and target. Output: success criteria and preliminary KPI shortlist.
Canvas II - Mapping and Sourcing Data Infrastructure	The team needs to check whether the selected indicators are feasible with available or achievable data.	Covers existing datasets, data owners, access conditions, quality and time coverage, data gaps, collection methods, comparability and integration. Output: data feasibility check and data collection plan.
Canvas III - Operationalising the Monitoring Strategy	The team needs to turn the monitoring idea into the monitoring roadmap.	Covers assumptions, drivers, barriers, mitigation actions, stages, deadlines, responsible partners, status, risks and dependencies. Output: monitoring roadmap.

After the canvas session, use Appendix 1 to confirm the detailed indicator properties, Appendix 1A to scan possible KPIs by Community Goal, and Appendix 1B to check likely data source categories. The canvases help structure the discussion, the indicator table confirms the technical details.

5. Weather and Lighting Considerations

Weather and lighting are not background details in year-round active mobility monitoring. They may directly affect behaviour, safety, comfort, route choice, infrastructure performance, public transport access, maintenance quality and data reliability. They should therefore be considered when selecting indicators, planning measurements, storing contextual data and interpreting results. The monitoring setup should, where relevant, collect or link KPI observations with temperature, precipitation, wind, humidity, snow or ice, surface condition, visibility, lighting level, presence of street lighting, traffic incidents, traffic volume, maintenance status and community feedback.

Condition	Why it matters	Monitoring implication
Rain / surface water	May reduce walking and cycling volumes, affect comfort, visibility and route choice.	Record precipitation and surface condition. Avoid comparing rainy post-data with dry baseline unless this is intentional.
Snow / ice	May affect route availability, safety, maintenance quality and user confidence.	Document snow or ice presence, maintenance status and whether paths were actually usable.
Low temperature / heat	May affect willingness to travel actively, comfort and survey response patterns.	Store temperature with observations and interpret volumes and perceptions by temperature category where relevant.
Wind	May strongly affect cycling comfort and route choice, especially on exposed sections.	Record wind conditions where they may influence the result.
Darkness / low light	May affect perceived safety, visibility, conflict risk and the use of lighting interventions.	Separate daytime, twilight and night-time observations when relevant. Record artificial lighting conditions.
Low visibility	Fog, heavy rain, snow or darkness may affect both user behaviour and sensor/video quality.	Flag low-visibility periods and check whether the data remains reliable.
Road safety and traffic volume	Accidents, conflicts and exposure may vary by weather, lighting and traffic conditions.	Combine incident/conflict data with traffic volumes and environmental context.
Seasonality and calendar effects	School holidays, winter routines, tourist periods and maintenance cycles may affect demand.	Compare equivalent periods where possible and document calendar effects.

Practical rule for comparability

Whenever possible, compare like with like: similar season, weekday type, time period, weather category and lighting condition. If this is not possible, document the difference and treat it as part of the interpretation rather than as a hidden limitation.

Minimum weather and lighting checklist

Question	Minimum answer before data collection
Is the main KPI weather-dependent or lighting-dependent?	Yes / no / partly. Note the expected sensitivity.
Which weather variables are relevant?	Temperature, precipitation, snow, ice, wind, visibility, surface condition and maintenance status.
Which lighting variables are relevant?	Daylight, darkness, twilight, artificial lighting, local lighting quality and visibility.
Can baseline and post-intervention data be collected under comparable conditions?	If not, define how differences will be documented and interpreted.
Are weather and lighting contextual variables stored with the KPI data?	Define source, format and aggregation method.
Could adverse weather reduce data quality?	Check sensor performance, survey feasibility, manual count safety and missing observations.

6. Leveraging Existing Data Sources

Most cities already possess substantial data relevant to active mobility monitoring if they know where to look. For this reason, monitoring should begin with an internal data audit across different municipal departments and data holders.

Potential internal sources include:

- **Transport departments:** traffic counts, public transport usage data, bike-sharing system statistics;
- **Planning departments:** GIS data on road networks, pedestrian infrastructure, cycle paths, and land-use patterns;
- **IT / Smart City systems:** data from traffic cameras, automated counters, and air quality monitors;
- **Police departments:** accident records and incident reports;
- **Health departments:** data related to physical activity and health impacts.

Cities should establish collaborative relationships with these departments through joint meetings, formalized data-sharing arrangements, and data mapping exercises documenting where datasets are stored, who owns them, and how they can be accessed. Appointing a dedicated data manager or coordination person can substantially streamline this process.

External sources should also be considered, including national travel surveys, open data portals, transport operators, shared mobility providers, and, where appropriate, commercial data providers. Although such sources may have limitations in local specificity or update frequency, they can supplement internal datasets in a cost-effective way. Additional useful sources may include maintenance logs, public transport operator datasets, school mobility plans, weather services, and project-specific pilot datasets generated during implementation.

The purpose of this step is not to collect as much data as possible, but to identify which data can realistically support the selected indicators. Existing data should therefore be assessed in terms of relevance, ownership, accessibility, quality, time coverage, spatial coverage, update frequency and comparability with future measurements. This is especially important when the city wants to use existing datasets as a baseline or combine them with new post-intervention data.

7. Adapting Your Monitoring Approach

Monitoring should be structured as an adaptive process that accommodates changes in pilot scope, evolving data availability, and emerging needs throughout the preparation, implementation, and operation of the intervention.

Rather than rigidly adhering to initially selected indicators, cities should allow for periodic refinement based on implementation experience and resource constraints identified during execution. If collecting data for a particular indicator proves impossible or excessively burdensome, it may be necessary to revisit earlier planning stages and either choose alternative indicators or adjust the monitoring design to align with available data and local capacities.

This flexibility is essential because cities differ substantially in terms of data access, institutional arrangements, staff availability, and analytical resources. Monitoring should therefore be robust and methodologically consistent, but also realistic and proportionate.

Cities are encouraged to document their monitoring experiences – including both challenges and successes – as part of process evaluation. This documentation supports adaptive management during implementation and also generates useful recommendations for other cities considering similar interventions.

Adaptive monitoring does not mean changing the evaluation logic without control. Any adjustment to indicators, data sources, measurement periods or interpretation rules should be documented. This helps maintain transparency and makes it possible to explain why the final monitoring setup differs from the initial plan. If such adjustments affect the evaluation design, they should also be reflected in the pilot-specific Evaluation Plan or its update. This ensures that differences between the initial monitoring roadmap and the implemented evaluation approach remain transparent.

8. Communicating Results for Impact

The ultimate value of monitoring lies in how the results are used. Systematically collected data can support a range of post-project applications (Fig. 11):

- **Municipal decision-making:** presenting evidence to elected officials and senior administrators when requesting continued funding or expansion of successful measures,
- **Funding justification:** demonstrating results and return on investment to secure additional resources from national or European programmes,

- **Citizen engagement:** sharing accessible summaries of findings with residents and local stakeholders to build support for active mobility initiatives,
- **Intervention replication:** providing documented evidence that can help other departments or neighbouring cities implement similar measures.

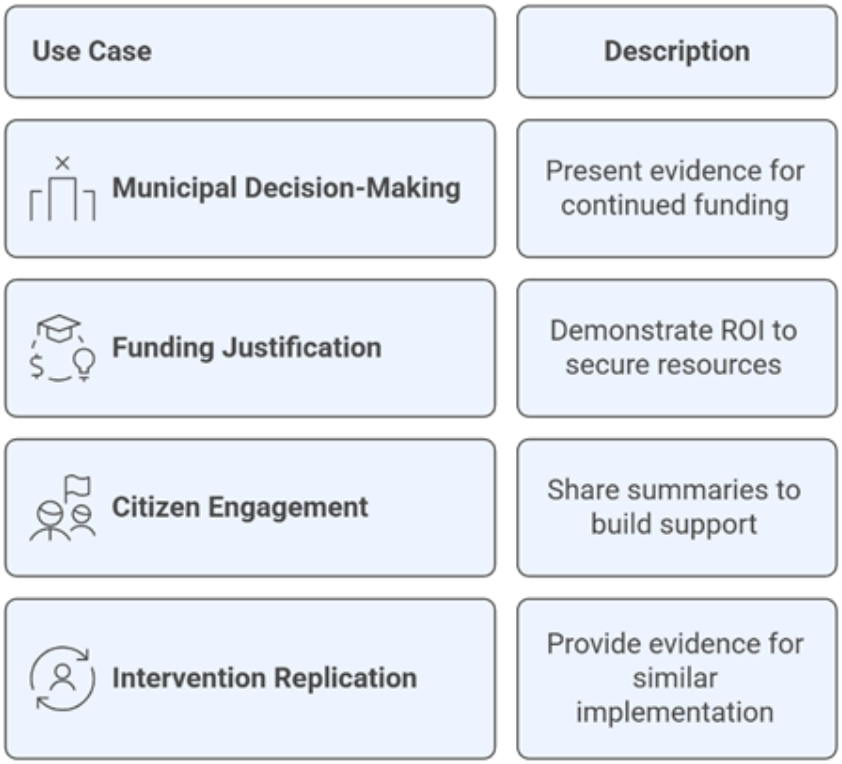


Fig. 11 Main Use Cases for Communicating Monitoring Results

When presenting results, findings should always be linked back to the original intervention objectives and broader community goals. It is also important to explain how weather and lighting conditions influenced the observed outcomes, as this context helps avoid misleading conclusions based only on favourable or non-comparable conditions.

Communication should also reflect the strength of the evidence. Where data is robust, results can be presented as clear findings. Where monitoring was limited by missing baseline data, low response rates, non-comparable weather conditions or implementation delays, these limitations should be stated openly. This makes the results more credible and helps decision-makers understand what can be concluded with confidence and what should be treated as indicative learning.

9. Minimum Viable Monitoring Setup

Cities often face limited funds, staff, time and data access. A useful monitoring setup should therefore be proportionate. The minimum viable setup below is intended for cases where the city needs credible evidence but cannot implement a complex evaluation system.

Element	Minimum viable choice
Evaluation question	One clear question linked to the intervention objective.
Core indicators	One or two indicators that directly show the intended effect.
Supporting / context indicators	Two to four indicators or variables that help interpret the result.
Baseline	One clearly documented pre-intervention measurement period, preferably under relevant weather and lighting conditions.
Post-intervention measurement	One comparable measurement period after the measure is operational.
Process documentation	Short notes on barriers, drivers, implementation changes, data limitations and responsibilities.
Reporting	A concise interpretation linked to the original objective and to next steps.

The minimum viable setup should not be understood as a weak or incomplete evaluation. It is a proportionate monitoring design that focuses on what is most important and feasible. In small pilots, a narrow but well-documented evaluation is usually more useful than an ambitious indicator set that cannot be implemented reliably.

Before, During and After Implementation

Moment	What to do
Before implementation	Define the intervention, select KPIs, run the data audit, assign responsibilities, collect baseline data and record assumptions.
During implementation	Track whether the measure is implemented as planned. Document changes, delays, communication activities, barriers and drivers.
Immediately after implementation	Collect post-intervention data under comparable conditions where possible and check data quality.
Follow-up	Repeat selected measurements where behaviour change may take longer. Integrate useful indicators into city planning or SUMP monitoring where relevant.
Reporting and learning	Explain results using both KPI values and process observations. Recommend whether to continue, modify, scale up or replicate the measure.

This before-during-after logic connects impact evaluation with process evaluation. It helps city teams avoid treating monitoring as a single reporting task at the end of the pilot. Instead, monitoring becomes a structured learning process that supports decisions throughout preparation, implementation, operation and follow-up.

10. Common Challenges and How to Address Them

Cities implementing the Monitoring Guidance may encounter several common barriers.

Financial constraints are often the most critical barrier. These can be addressed by prioritizing existing data sources over extensive new collection, focusing on fewer but more meaningful indicators, and sharing costs and responsibilities across departments.

Limited staff capacity can reduce a city's ability to collect, process, and interpret data. In such cases, efficient protocols, automated counting tools, and the integration of monitoring tasks into existing roles may be more feasible than creating entirely new structures.

Lack of political support may reduce motivation to invest in evaluation. This can be addressed by clearly explaining the practical benefits of monitoring for accountability, adaptive management, and future funding. Small-scale but visible monitoring exercises may help demonstrate value before broader systems are introduced.

Data access limitations are also common. Where needed data is not readily available, cities should explore data-sharing agreements, open data sources, national surveys, or simplified indicators based on existing information.

By embedding monitoring into planning from the beginning, focusing on a manageable set of meaningful indicators, leveraging existing datasets, and maintaining flexibility, cities can transform evaluation from a perceived burden into a practical management tool. For this reason, the Monitoring Guidance should be applied proportionately: the aim is not to maximise the number of indicators, but to establish a credible and feasible monitoring setup.

Practical responses to common challenges

The following table summarises practical responses that can be used when setting up a proportionate monitoring process.

Challenge	Practical response
Too many possible indicators	Start with one or two core indicators. Add supporting indicators only when they improve interpretation.
No baseline data	Check existing data first. If no suitable data exists, collect a simple baseline before implementation or document the limitation clearly.
Limited staff capacity	Use existing data sources, automate where possible, simplify monitoring frequency and assign one coordination person.
Difficult data access	Identify data owners early, use formal data-sharing arrangements and consider aggregated or anonymised data.
Weather not comparable	Store weather and lighting context with each observation and interpret results by condition category.
Low survey response	Keep surveys short, time them well, combine them with existing engagement activities and supplement with observations or counts.
Data quality problems	Document metadata, check completeness, flag missing periods and avoid over-interpreting weak evidence.

11. Final Readiness Checklist

Use this checklist before implementation of intervention starts. If several items cannot be answered, the monitoring setup is not yet operational.

- The intervention is clearly described in terms of measure, location, target group and expected change.
- The main evaluation question is clear and linked to the intervention objective.
- One or two core indicators have been selected and justified.
- Supporting indicators or context variables have been selected only where they help interpretation.
- Weather and lighting sensitivity has been checked for each relevant indicator.
- Required data sources have been identified, and data owners are known.
- Data access, quality and gaps have been checked before final KPI confirmation.
- Baseline data collection is planned before the intervention changes the site or behaviour.
- Post-intervention and follow-up data collection periods are defined.
- Indicative responsibilities, timing, risks and dependencies are written into the monitoring roadmap.
- Process evaluation notes will be collected during preparation, implementation and operation.
- The team knows how results will be communicated and used for decisions.
- The monitoring roadmap contains enough information to support the later evaluation process.

12. Output and Working Materials

After using this document, a city team should have a practical monitoring roadmap: a concise summary of the intervention logic, proposed core and supporting indicators, initial data availability, main data gaps, indicative measurement periods, key responsibilities, assumptions and risks. The monitoring roadmap is the main practical output of this short guidance. It should help any city set up a proportionate monitoring process for a year-round active mobility intervention.

The monitoring roadmap should be prepared before the intervention starts. The purpose of the roadmap is to organise the main monitoring decisions in a simple and operational form: what will be monitored, which data will be used, who is responsible, when measurements will take place, and which assumptions, risks and limitations should be documented. It is therefore an ex-ante planning tool, not a full evaluation report and not a document for presenting final results.

If a more detailed Evaluation Plan is required in a specific project or institutional context, the monitoring roadmap can serve as its starting point. In that case, the Evaluation Plan develops the roadmap into a more detailed working document that is completed and updated during the implementation and evaluation of the intervention. It may specify the impact evaluation table, data provision methods, data sources and owners, baseline and post-intervention measurement periods, quality checks, responsibilities, assumptions, limitations and process evaluation notes. Where monitoring data become available, the

Evaluation Plan may also be updated with baseline results, post-intervention results, interpretation of findings, barriers, drivers and lessons learned. An example Evaluation Plan template is included in the BATS Monitoring Guidance - Comprehensive Recommendations.

As a final check, the monitoring roadmap prepared before implementation should answer four practical questions: what will be monitored, which data will be used, who is responsible, and how the results will support later decisions, reporting and learning.

Editorial note: this document intentionally keeps the main text focused on setting up the monitoring process. Detailed recommendations on data acquisition, alternative data sources, data integration and local experiment examples remain in the comprehensive version.

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Contact information

For more information about monitoring, contact

Jacek Oskarbski
jacek.oskarbski@pg.edu.pl

Daniel Kaszubowski
daniel.kaszubowski@pg.edu.pl

Konrad Biszko
konrad.biszko@pg.edu.pl

BATS project:

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