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## D7.1 – N4C Field Test Management Plan

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## Table of Contents

<b>List of Figures</b> .....	<b>4</b>
<b>List of Tables</b> .....	<b>5</b>
<b>Abbreviations</b> .....	<b>6</b>
<b>Executive Summary</b> .....	<b>7</b>
<b>1 Introduction</b> .....	<b>9</b>
1.1 Objective and scope .....	9
1.2 Structure of the document.....	9
1.3 Contribution of partners .....	11
1.4 Targeted audience.....	12
1.5 Relation to other tasks of Nature4Cities .....	13
<b>2 Methodological approach</b> .....	<b>14</b>
2.1 M&E Practices and Benefits.....	14
2.1.1 Performance Management .....	17
2.2 Steps of the Monitoring and Evaluation (M&E) framework for the Field Test Plan (FTP). 19	
<b>3 Phase 1: Planning for the Field Tests</b> .....	<b>21</b>
3.1 Identifying the Field-Testing Teams .....	21
3.2 Identifying the Tools and Services for the Field Tests .....	23
3.3 Identifying the use cases for the field tests.....	25
3.4 Identifying the monitoring data that needs to be collected .....	32
3.5 Identifying the expectations and challenges for the field tests .....	37
<b>4 Phase 2: Monitoring of the Field Tests</b> .....	<b>41</b>
4.1 Monitoring the data collection process .....	41
4.2 Monitoring the Field Test Progress .....	43
4.3 Monitoring the baseline for performance assessments .....	45
<b>5 Phase 3: Conducting the Field Test Evaluations</b> .....	<b>46</b>
5.1 Quality Assurance of Field-Testing .....	46
5.2 Capturing the Field Test Experience .....	48
<b>6 Phase 4: Communication of Evaluation Feedback</b> .....	<b>51</b>
6.1 Reporting and Analysing the Field Test Experience .....	51
6.2 Use of Feedback.....	52
<b>7 Concluding Summary</b> .....	<b>53</b>
<b>8 References</b> .....	<b>54</b>

## List of Figures

Figure 1: Structure of D7.1 .....	10
Figure 2: Overview of Nature4Cities Task Relations for 7.1 .....	13
Figure 3. Layers in the practice of performance management.....	17
Figure 4: Scope and ambition of the Field Test Management Plan, aligned with the tasks of work package 7. ....	20
Figure 5 Field Tests and Technical Correspondents Role Sharing.....	22
Figure 6 Assessment of NBS Use cases (Task 7.3).....	25
Figure 7 Linking values, issues, indicators and performance criteria in a participatory process (1).....	37
Figure 8: Feedback mechanism demonstrating the flow of M&E results back into delivery & practice .....	52

## List of Tables

Table 1: List of Abbreviations .....	6
Table 2: Contribution of partners .....	11
Table 3. Aspects of M&E Frameworks .....	15
Table 4. List of toolkits utilised in the field test for each partner city .....	24
Table 5. List of knowledge & support tools and participatory methodologies utilised in the field test for each partner city .....	24
Table 6: Use Cases for each partner city for the field test management.....	26
Table 7. Data description templates for input data from each city to carry out the SUAT and external tools.....	33
Table 8. Template for the assessment of KPIs of interest by the partner cities.....	35
Table 9. Streamlined process for the monitoring of data-streams required to carry out the SUAT and EMM and external tools .....	36
Table 10. Alignment and challenge identification template for the field-testing process.....	38
Table 11. Template for cross-checking of KPI relevance per case study.....	40
Table 12. Template for data collection monitoring of the Field Tests.....	42
Table 13. Field Test Progress Monitoring Template .....	44
Table 14. Information Quality Template for field test managers. Adapted from (3) .....	47
Table 15. Categories for Structuring the field test experience .....	48
Table 16. Qualitative Feedback Structure .....	50

# Abbreviations

*Table 1: List of Abbreviations*

<b>Abbreviation</b>	<b>Description</b>
FTM	Field Test Management
ICT	Information and Communication Technologies
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
Mun	Municipality
NBS	Nature-Based Solution
TRL	Technology Readiness Level
UC	Urban Challenges
UPI	Urban Performance Indicator
USC	Urban-Sub Challenges
ICT	Information and Communication Technologies

# Executive Summary

**Purpose of Study** - The primary phase of Monitoring & Evaluation (M&E) activities is critical for the tasks under WP7 to be smoothly carried out. To this end, a management framework is necessary that will describe the path for demonstration activities in partner cities to ensure a structured way in which validation and feedback of the N4C tools and the overall platform is provided for, as part of the field-testing activities. In this context, a general plan or roadmap has to be prepared for every output forthcoming within the WP7 deliverables. The purpose of this deliverable 7.1 is therefore to support the planning and implementation of the Nature4Cities field testing, with a definitive Monitoring and Evaluation framework presented for use by all stakeholders involved in the field test.

## **Methodology**

Partner cities can employ this framework to effectively implement the field test through its four key phases:

- Phase 1: Field test planning.
- Phase 2: Monitoring the field test in practice.
- Phase 3: Conducting evaluation of the field test.
- Phase 4: Communication and feedback for further development.

**Phase 1** facilitates the preparation of the field testing throughout partner cities: identifying key positions within teams, outlining the tools and services to be used and developed, outlining use cases of the N4C platform relevant to the partner cities, identification of the data partner cities require for platform tools and modules, and pinpointing both expectations and challenges of the field test. These steps are advised upon and data templates provided to allow partner cities and other stakeholders to document and review such planning measures.

**Phase 2** outlines the process for monitoring: the data collection, test progress and of baselines in test cities, with the ultimate aim of ensuring the field tests themselves are conducted accurately and that partner cities can ensure the efficacy and integrity of their results and their feedback.

**Phase 3** moves towards the evaluation and reporting of the field test experience, ensuring quality of the field testing whilst capturing partner city experiences and advising upon analysis of their practice. The evaluation framework sets the foundation for the information and data that will be communicated back to the N4C development and exploitation teams, ensuring data across all cities is coherent and directly comparable.

**Phase 4** outlines the expected pathway for communication between partner cities and the N4C development and exploitation teams, demonstrating how the first 3 phases and their results will be mobilised to back within the platform itself.

**Key Findings & Lessons Learned** - This task is a pre-emptive planning exercise, the field-testing has not yet taken place and thus tangible success or results of the management framework are yet to be seen and evaluated. The research into monitoring and evaluation itself has revealed a coherent and versatile management structure that could be applied to many different types of project, concept and environment. Implemented effectively, the framework outlined below should guide the field testing whilst also generating results that allow for analysis of the platform and its efficacy. This encapsulates aspects of institutional planning capacity, data requirements and the platform strengths and weaknesses, as well as a system for feedback and improvement.

**Links with Nature4Cities platform** - This deliverable is clearly linked to the Nature4Cities platform test and validation as it aims to plan the demonstration activities and deliver a careful management framework. Consequently, a general roadmap was provided and will be used for feedback analysis and compilation.



# 1 Introduction

## 1.1 Objective and scope

The main result expected by the Nature4Cities project is to launch a knowledge and decision support platform regarding the Nature Based Solutions (NBS). Tools and methodologies developed for this platform will be dedicated to the evaluation of several scenarios containing a set of NBS and also to the management of stakeholder's participation processes. In order to validate and improve these tools and methodologies developments but also to demonstrate the capability of N4C platform and tools to support urban planners field test activities are planned in operational environment through real case studies in four pilot cities: Çankaya Ankara, City of Milano Metropolitan, Szeged and Alcala de Henares.

The purpose of this deliverable is therefore to support the planning and conducting of field test activities by developing a standardised field test management (FTM) framework. A step-by-step general roadmap of the Nature4Cities demonstration activities will be provided, linking to templates for every deliverable in the corresponding work package (WP7). Central to the approach is a system of feedback to improve the quality of the field-testing, and the compilation of the results and findings in a centralised manner.

The specific objectives of this Task 7.1 deliverable are:

- Outlining the need for field test management and evaluation activities.
- Defining the monitoring and evaluation methodology for the field tests.
- Identifying the phased approach and methods used in the field-testing.
- Providing guidance on how the field test performance is monitored.
- Setting up the evaluations for the field-testing and the feedback mechanisms.

## 1.2 Structure of the document

The next sections of the report are split into a step by step structure. It starts in Chapter 2 with the methodological approach to define Monitoring and Evaluation (M&E) and the reason for it in the context of field test management, and what constitutes a M&E framework. Subsequently, each chapter from 2 to 6 describes a phase and its activities under the M&E plan for the field test management, to deliver a systematic approach. Each of the phases is defined in section 2.2 and these include: planning for the Field Test Management; Conducting the Field Test and Monitoring; Conducting the Field Test Evaluations; and Reporting, Communication and Feedback.

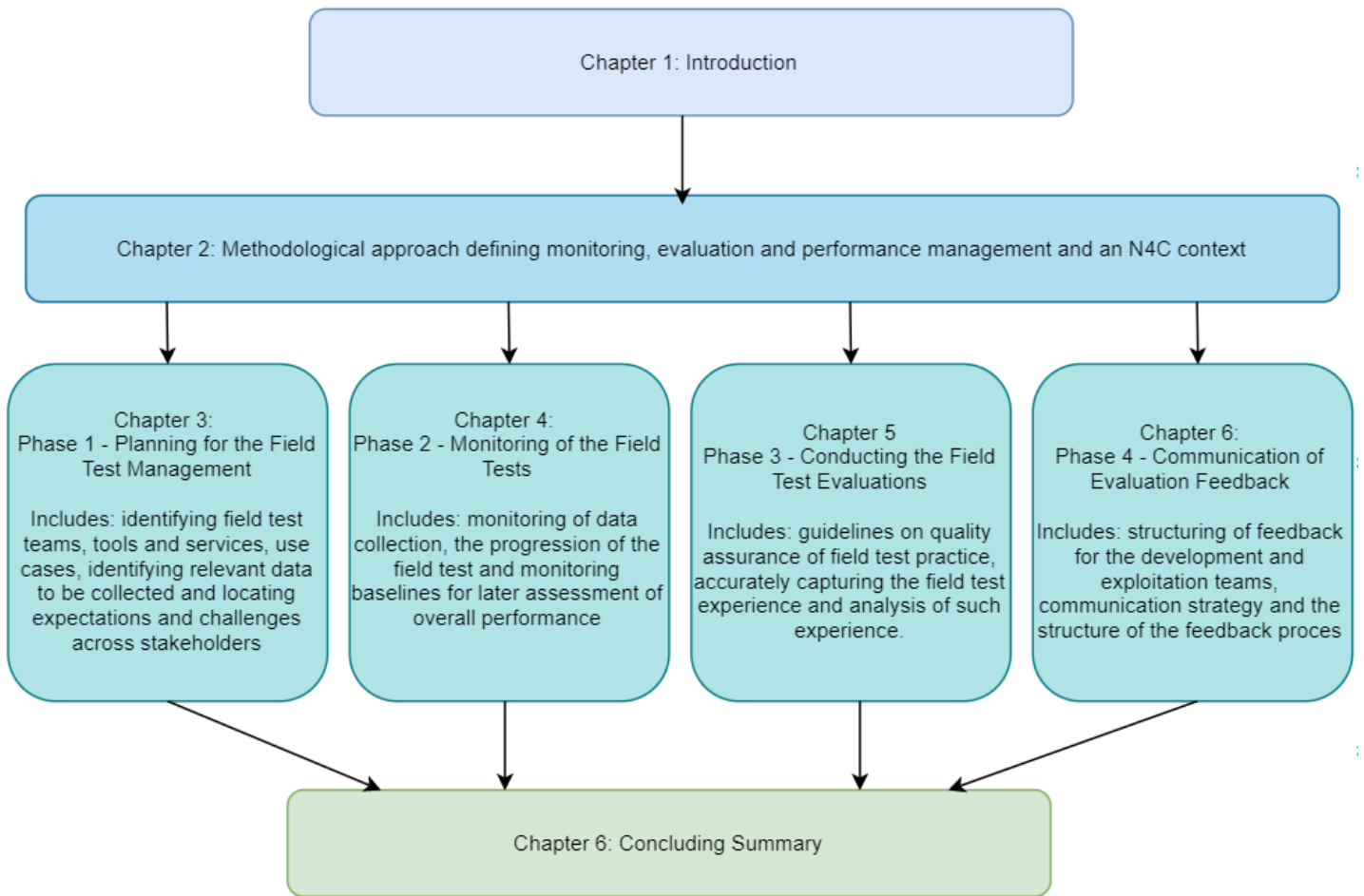


Figure 1: Structure of D7.1

## 1.3 Contribution of partners

*Table 2: Contribution of partners*

<b>Partner</b>	<b>Contribution</b>
<b>NBK</b>	In-depth review and improvement of the deliverable 7.1 Provide the template for the assessment of the KPIs of interest by the partner city
<b>TEC</b>	In-depth review and improvement of the deliverable 7.1
<b>ACC</b>	
<b>RINA-C</b>	In-depth review and improvement of the deliverable 7.1 Provide the data collection template for input data from each city to carry out the SUAT and EMM
<b>R2M</b>	In-depth review and improvement of the deliverable 7.1
<b>EKO</b>	Writing of core parts of the deliverable 7.1
<b>MUTK</b>	Review of Field-Testing Procedures for suitability in Szeged
<b>CMM</b>	Review of Field-Testing Procedures for suitability in Citta Metropolitana di Milan
<b>CAN</b>	Review of Field-Testing Procedures for suitability in Cankaya
<b>SZEG</b>	Review of Field-Testing Procedures for suitability in Szeged
<b>AH</b>	Review of Field-Testing Procedures for suitability in Alcala de Henares

## 1.4 Targeted audience

The deliverable is primarily generated for the support to the management of the WP7 activities of the project. The targeted audience within the project includes:

- WP Management experts.
- Field test managers for each of the project pilot cities.
- Technology providing partners of the consortium.
- Demo city and data providing partners of the consortium.
- Experts providing assessment and decision support services within the consortium.

Due to the reusable and replicable nature of the methodology provided in the deliverable, it is seen as a public open document, aiming to support a wider audience who may be working on similar investment and monitoring activities. The methodology and the activities proposed for the monitoring and assessment of urban level investments and projects have the potential to be reused in the future applications as a reference.

Additionally, thanks to the dynamic data assessment approach and integrated ICT portal of the project, the proposed activities are intended to be integrated into the process and role definitions of the N4C platform roles. As a future task and research field, automated process management, including data connectivity, processing and assessment services, are seen as key capabilities of such platforms. The deliverable aims to provide a showcase to that nature, with the potential of serving a wider audience on urban data management and analyses.

## 1.5 Relation to other tasks of Nature4Cities

The task provides an M&E framework for the field test-management using particular platform tools. Thereby it builds upon the works that develop those tools in work packages 2, 3 and 4, and the desired outcomes that are to be provided with the tools and the overall Nature4Cities Platform (see Figure 1). Specifically, it builds upon the Nature4Cities KPI framework as delivered in Task 2.1, and those therein utilised in particular tools. This includes those defined in task 2.2 in the expert modelling toolbox from where the Simplified Urban Assessment Tools were mainly selected, and those defined in WP3 for the environmental assessment including task 3.1's inventory of urban flows, components and systemic environmental boundaries, task 3.3 defining the scope and goals of environmental KPIs and impact indicators assessment, and task 3.5 reporting the dynamic analyses and interpretative methodology. The latter task includes specific details on what periodicity of data would be collected and for whom, and what trends can be analysed that can be utilised in evaluation of the performance of NBS, which forms an input for the evaluation part of this M&E framework. Finally, the task also builds upon the on-going works in WP6 to deliver the Nature4Cities platform and the processes therein for data structures and data management for which the monitoring process in this report forms an extension.

The task interlinks with other tasks in Work package 7 by providing a number of protocols or schemas that are utilised in other tasks (see Figure 2). The planning and monitoring guidelines (in Chapter 4 and Chapter 5) form inputs for the choice and definition of case studies (task 7.3) and the data collection works (task 7.4). The feedback and evaluation matrix and accompanying procedures (Chapter 6) form inputs for the evaluation and feedback of the local planning teams and training, and the holistic assessment field test, to evaluate whether the intended outcomes are in line with the field tests carried out, and furthermore, to provide technical and user feedback to the development and exploitation teams.

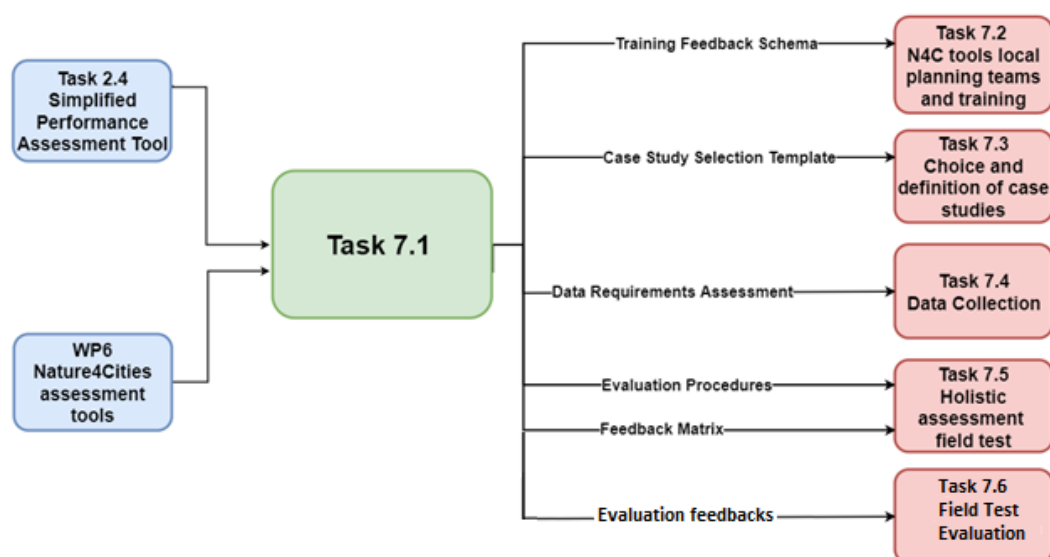


Figure 2: Overview of Nature4Cities Task Relations for 7.1

## 2 Methodological approach

### 2.1 M&E Practices and Benefits

The purpose of the field test management plan is to institute a Monitoring & Evaluation (M&E) framework for the Nature4Cities field test management. Key reference works here that were consulted include The UNDP Handbook (2009), the M&E framework published by The City of Johannesburg (2012), and the Quyen et al. (2018) M&E study published in *Urban and Regional Planning Review*. The approaches are complimentary and at a high-level it can be said that monitoring provides information on where the project or activity is at a particular point in time, and evaluation gives information on why the desired outcomes are on track or not being achieved.

**Monitoring** is the routine checking of information on progress, so as to confirm that progress is occurring against the defined direction. For example, if the objectives and progress in relation to allocated funds is commensurate. It commonly involves monthly to quarterly reporting, on outputs, activities and use of resources (e.g. people, time, money, and materials). It should be used to ensure that what has been planned is progressing as intended and within the resources allocated. Monitoring tools and services have to be identified in line with the gathering and collection of the data which will be used in demonstration activities in each of four partner cities in Nature4Cities.

#### M&E Case Study: *The City of Johannesburg's Monitoring and Evaluation Framework*

In 2012, The City of Johannesburg generated an M&E framework to provide a unified process for group, cluster and departmental performance management throughout the municipal entity's government. The City had carried out M&E activities as part of its performance management for many years but saw fit to publish an updated version in 2012, responding to new priorities, challenges and changes within Johannesburg, embedding M&E across further spheres of government. The M&E framework in this context formed a cycle between **performance management** and **reflection** that enabled **performance improvement** of the city's efforts to deliver their development plans and policy directives. In much the same way, the M&E framework outlined in this deliverable will hope to define a cycle between the management of the N4C field test and reflection upon the efficacy of the platform, to generate performance improvement of the platform.

**Evaluation** is used to assess if a project or activity is meeting its intentions, whether the design, implementation and results were adequate, and if the right mix of strategies and resources were used to get there. It can typically be formative (helping to develop learning and understanding within stakeholders) or summative (i.e. indicating the degree of achievement). Evaluation usually focuses on outcomes and their relationship with desired outputs for a project or activity. Both are complementary and at a high-level it can be said that Monitoring provides information on where the project or activity is at a particular point in time, and evaluation gives information on why the desired outcomes are on track or not being achieved.

Commonly a M&E framework is put in place and used for a project, activity, or overarching programme, especially within public management structures. For example, the Sustainable Development Goals (SDG) form a high-level global framework for monitoring of progress towards more equitable and environmental societies. The critical benefits of M&E are that the framework can be used to work with stakeholders and parties in collaborations as a shared learning trajectory, and as a means to intervene and keep things on track (see Table 3 below).

Specific benefits of **Monitoring** include:

- A shared and transparent approach that makes it clear what information needs to be collected and when;
- The ability to timely access information on the status and performance of a project, activity or programme;
- Potential to provide feedback and intervene to adjust a project or activity to keep things on track, and even to prevent failure.

Specific benefits of **Evaluation** include:

- The ability to gain insights in how the overall project or activity or programme performed relative to initial desired outcomes;
- The delivery of knowledge on what the strategies, processes and protocols were that led to a successful outcome (or lack thereof);
- The provisioning of a series of learnings on what went well and what did not go well to better equip future projects or activities;
- An understanding of the relevance and effectiveness of the project or activity in relation to what the intended outcomes are.

*Table 3. Aspects of M&E Frameworks*

	<b>Monitoring</b>	<b>Evaluation</b>
Objective (why?)	To standardise baseline information about a project or activity. To clarify the objectives of the activity or project. To enable tracking of changes from start to finish to assess desired outcomes. To identify whether a project or activity is on track and if any corrective action is needed.	To assess if the results that were achieved are in line with the project or activities requirements, and to assess if the project or activity is over or underperforming, and if so what the reason is for this deviation. To learn from the successes or failures of the project or activity for future projects/activities. To assess any results that were not intended.
Focus (What?)	Looks at the intermediary and final outputs of a project or activity and	To compare planned outcomes or initial requirements with achievements made and the final results. Assesses how strategies,

	how they compare against desired outcomes.	frameworks and protocols (or the lack thereof) helped to achieve the final outcomes. Including questions about relevance and effectiveness.
Responsibility (Who?)	Project managers and/or internal programme or activity managers.	Internal and/or external evaluation team.
Timing (when)	At a high periodic frequency, usually every month or every quarter, depending on the project or activity.	Either one-off at the end of a project or activity, or for longer duration projects/activities at periodic intervals.
Framework documents	Progress reports, monitoring data sheets.	Evaluation reports, evaluation data sheets, scorecards.

In general, whilst M&E activities have been carried out by cities and their governance bodies for years, such as the City of Johannesburg (2012) new changes, priorities and challenges that face cities now have highlighted a greater necessity for more meaningful and effective M&E processes. Policies, systems and protocols associated with inter-related areas of performance management, including both monitoring and evaluation, must be adapted over time to ensure cities and their governance bodies can adapt to the new challenges they contend with.

Recent reasons for cities to adapt M&E frameworks include:

- An imperative to deliver commitments in a transparent manner to a much wider spectrum of stakeholders, across a range of citizen-public-private actors.
- A growing importance of transparent 2-way communications between citizens-public-private actors to deliver actual solutions or development.
- Managerial requirements to more timely adjust plans in an on-going manner, requiring accurate and timely data-rich information.
- Increasing capacity to ensure the managerial process of activities, projects or programmes can not only deliver but be improved as they are on-going, plus that future works can be started at a higher level of quality.
- The necessity to cross-pollinate by using learnings on projects, activities and programmes to feed into city, regional or national regulatory process amendments, ensuring governance processes are also evolving alongside city requirements.
- To support the successful implementation of broader performance-based tracking that does not solely prioritize immediate short-term reward/goals for investment, by ensuring alignment on socio-economic and environmental output and outcomes for city-wide long-term planning and delivery



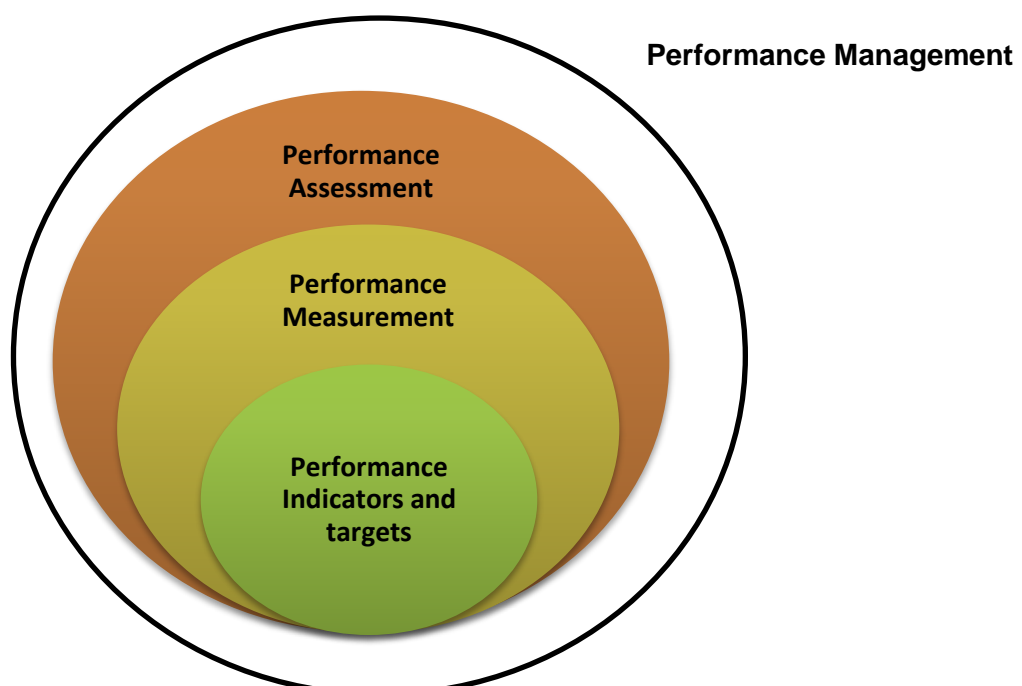
## 2.1.1 Performance Management

The activities associated with M&E relate strongly to the domain of performance management; the management practice to measure and assess the performance of a project. Performance management is critical for a pro-active and dynamic M&E framework that improves the performance during a project, as opposed to a framework where insights are only gained after a project is finished in a final single evaluation, without the means to improve performance.

Performance management consists of three layers that are formed by a series of protocols or mini frameworks (see Figure 3 below). The core layer is a **performance indicator and target framework** that outlines what the performance is all about, corresponding with the work within task 7.5 of this work package. The indicators here relate as much as the desired outcomes of the project, as the performance of the project itself. For example, it consists of indicators and targets for the time duration of carrying out tasks, the completeness and completion of the tasks, and the quality of the provided outputs. For example, an indicator with a target for the number of users or interviewees in a toolkit user or stakeholder involving project, or an indicator on the usability of the outputs on a score-card if usability forms one of the quality requirements.

The second layer is **the performance measurement** process in the framework, which constitutes of a standardised measurement protocol and associated method, also relating to task 7.5 of this work package. The measurement framework includes a periodicity of measurement, what indicators are measured, and how they are measured. The methods, or how to measure, can include interviews with stakeholders, periodic direct data entry in a standardised form by a project manager or project data controller, or automated digital measurements (such as number of visitors on a website, satellite measurements with algorithms like for building sites, or sensor-based measurements).

*Figure 3. Layers in the practice of performance management*



The final layer of **Performance Assessment**, corresponding to task 7.6 of the work package, consists of an evaluation that serves to indicate on whether the measured performance is on or off track, and whether any particular interventions are required. It consists of an assessment approach such as a performance scorecard that is delivered from the performance measurement layer. The scorecard indicates the under-or-overperformance of the project. The second aspect is a series of defined assessment measures that indicate actions that need to be taken to adjust the project in a beneficial manner. Generic assessment measures can include do nothing, expand the project, increase maintenance works, improve communications, increase frequency of activity, or in a severe case abandon the project. Specific assessment measures can be defined depending on the type of project and the processes therein.

The M&E framework for the field test management utilises the performance management approach as a meta-layer to assess the M&E performance, and is thereby featured across all the phases of the framework, as defined in the next section 2.2, and as featured in each of the Chapters 3, 4, 5, and 6 that form the total M&E FTM framework for Nature4Cities.

## 2.2. Steps of the Monitoring and Evaluation (M&E) framework for the Field Test Plan (FTP).

The M&E framework developed in section 2.2 of the report has been split into four specific phases (see Figure 3 below). The **first phase**, corresponding to T7.1 of this work package, is the planning phase to setup the field-test team personnel and their roles therein. By providing for a structured implementation team with assigned responsibilities, the works carried out gain clarity and transparency, and communications are improved from the outset. It also includes the setup of desired outcomes in the form of targets and metrics. In case of the Nature4Cities platform these are tied to both particular NBS use cases for each city, as well as to the KPI's developed for monitoring those NBS's. In addition, there are specific M&E indicators for the Nature4Cities platform and its use that are integrated here, to indicate the overall success of the field test management.

The **second phase** is the monitoring phase which in the context of the field test management (FTM) serves to assess the state of data acquisition and the state of the field tests itself. The data acquisition for each city is required to evaluate the Nature Based Solution cases using the Nature4Cities platform tools. A specific set of data input requirements have been established in WP6 and refined under T7.4 of this work package, with an associated collection procedure. Once the associated data is collected the platform tools can be operated and use experience is gained for each city, resulting in a series of tool use experience data that needs to be monitored.

After the monitoring of data collection and platform use is carried out, the **third phase** is the evaluation of all the monitored data-streams, planned in T7.1 and carried out in T7.5 of this work package. This phase serves as a quality assurance process to define whether the platform usage tests have been carried out in line with the intended testing, to assess quality aspects such as completeness and to gain more information on the qualitative aspects of the field-testing.

The **final fourth phase** is the reporting and feedback phase, which is also planned in T7.1 in this work package and carried out across T7.5 and T7.6. The purpose is to derive a series of learnings as an overall evaluation. In this context, learnings on the usefulness of the Nature4Cities platform for the cities in assessing their NBS use cases. The M&E framework serves to make this part of the field-testing standardized, by establishing common feedback mechanisms and reporting procedures for each tool in the Nature4Cities platform, and the overall platform itself.

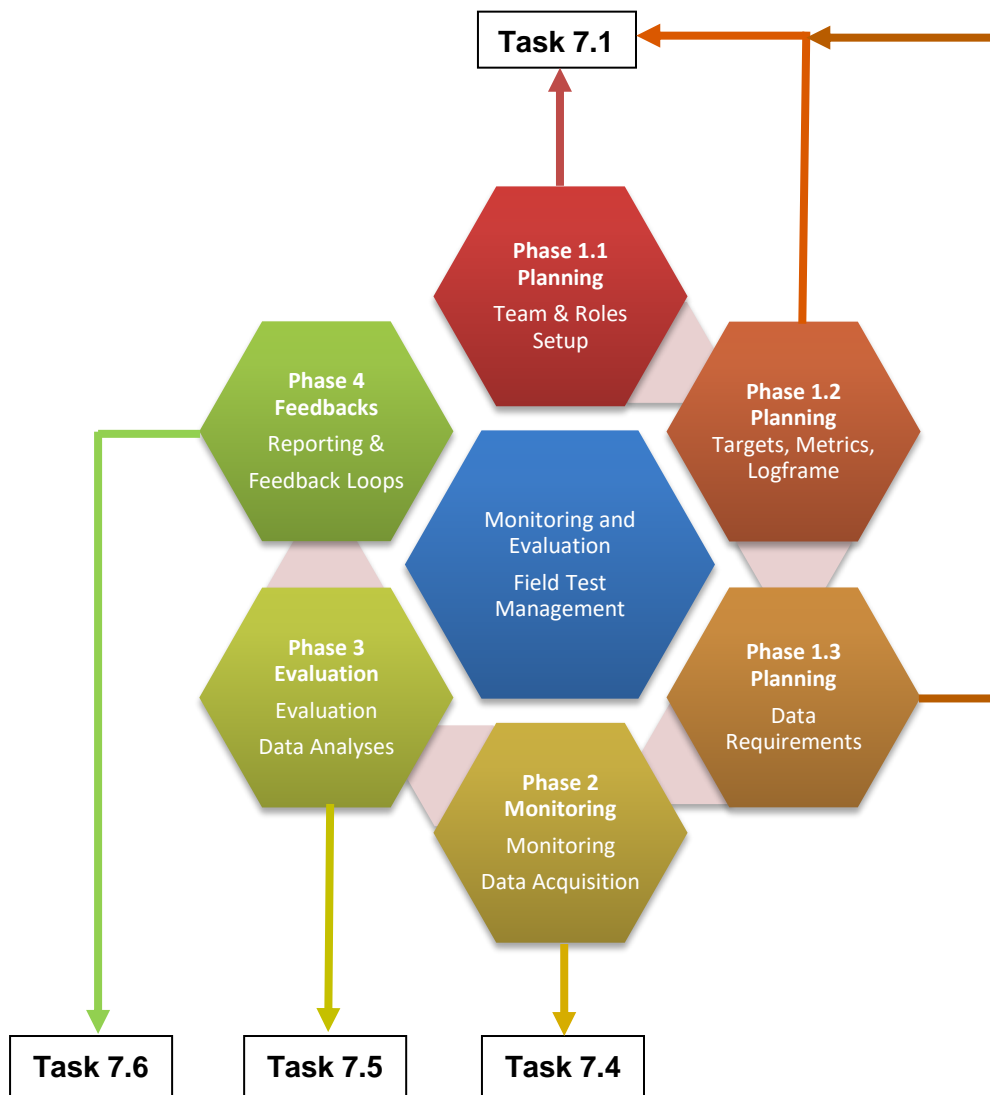


Figure 4: Scope and ambition of the Field Test Management Plan, aligned with the tasks of work package 7.

## 3 Phase 1: Planning for the Field Tests

The planned field tests for the Nature4Cities Platform consist of three separate approaches that need to be field-tested using city-specific case studies. The first approach is the Simplified Urban Performance Assessment Tool (SUAT) (Task 2.4), and the second is a series of external methods/tools that are independent from the Nature4Cities platform at this stage of development (described in detail in section 3.2).

The M&E of the field tests starts with the planning process, where the requirements for the field-testing are laid out in terms of what needs to be monitored and evaluated. Planning consists of a series of identification steps that provide specifics on what roles each partner has, what monitoring data needs to be collected, what the baseline comparative information is, and what the expected targets for the field tests to be successful.

### 3.1 Identifying the Field-Testing Teams

The first planning step is to identify the roles in the field-testing approach. Four specific roles are foreseen in the context of the Nature4Cities platform:

- **The field-testing managers for each city**, who have the role of supervision and implementing the M&E framework.
- **The experts behind the toolkits** within the Nature4Cities platform, who provide input on what datasets need to be collected, and receive feedback on the use of the tools (defined in section 3.2)
- **The city partners** who carry out the field tests and gain experience in using the SUAT.
- And finally, specific **knowledge support partner** roles to support the field test managers and city partners to carry out data collection, monitoring and evaluation across tasks 7.2 to 7.6 of the project.

For each M&E phase and associated task the organisations and person(s) filling the four roles need to be clearly defined so as to have a smooth field-testing process (see Figure 5 below).



*Figure 5 Field Tests and Technical Correspondents Role Sharing*

## 3.2 Identifying the Tools and Services for the Field Tests

The starting point of N4C holistic assessment chain is the NBS urban performance and impact assessment toolbox (WP2, WP3 and WP4). Therefore, the field test activities of the Nature4Cities platform encompass 3 assessment modules (Urban Assessment, Environmental Assessment and Socio-economic Assessment Tools) developed and assembled into the platform. Regarding these modules two set of tools are distinguished; 1. “Expert modelling” tools based on detailed models, and 2. “Simplified performance and/or impact assessment” tools, which will be derived from the application of the expert modelling tools on archetypal NBS case studies.

- The first set of tools correspond to WP2, WP3 and WP4 original set of models. Their application in archetypal NBS case studies allowed the development of the second type of models.
- The “experts modelling” tools are the support of a consultancy service for municipalities and will not be integrated in the platform, whereas the “simplified performance and impact assessment” tools will be completely integrated in the platform and are meant to be used by urban/landscape planners and city officers.

The purpose of the field-testing itself is to evaluate and validate all these sets of tools and their use through several use cases, so as to ascertain key aspects such as their applicability, usability, potential for improvement, and scalability, for the assessment of NBS, with the overarching goal being to increase deployment of NBS in cities across the European Union. In the next section the use cases for the field-testing are discussed. In parallel, participatory methodologies and tools developed in WP4 and WP5 also integrated into the N4C platform will be tested.

The results from the application of the expert modelling tool will be used to validate the simplified performance tools (**Erreur ! Source du renvoi introuvable.**) as well as to define the margins of uncertainty of their results.

One objective of N4C is to build the capacities of local planners to use N4C simplified tools as a part of their daily planning routine. The N4C corresponding partner for each city will back-up local teams and also make detailed observation and documentation on the way the project tools are used by local teams. Including the technical elements, a specific works on citizen participation, and empowering and social acceptance of the envisaged measures/projects will be carried out by applying participatory methodologies and tools developed in previous tasks (WP4 and WP5 (**Erreur ! Source du renvoi introuvable.**)).

The **Simplified Urban Assessment Toolkit (SUAT)**, which consists of four external standalone tools that have been linked within the Nature4Cities platform: Greenpass, Colouree, Expert Models Based Box and Noise Box, that can be used to calculate 20 specific KPIs on a standardised basis with the possibility to compare between NBS across cities. These methods and tools were selected and derived from a list of Expert Models and Methods (EMM). This list was selected from the EMM toolbox developed in D2.2 where EMM were evaluated and scored by their performance, usability and other important points of view. The SUAT should be directly usable in terms of being run by the city partners themselves, potentially with internal or external expert guidance, so as to obtain insights to the costs and benefits of the NBS that is under study. The field test thus also encompasses the Nature4Cities – D7.1 – N4C Field Test Management Plan

usability of the SUAT within the Nature4Cities platform to obtain insights by the city partners directly. In addition to the SUAT tool, the field tests encompass the use of a number of external and internal tools including the Noise Box, the environmental assessment using the EPESUS tool with the works provided under WP3, and the socio-economic assessments based on the MIMES-List evaluation

Table 4. List of toolkits utilised in the field test for each partner city

Toolset	Tools/Module	Responsible partners
Urban assessment – SUAT- ET6 – M6	GREENPASS (Internal Tool)	G4C, MUTK, CLR, NBK, IFSTTAR, AO, SZTE, P&C, R2M, CAR, ARG
Urban assessment – SUAT – ET3– M6	COLOUREE (Internal Tool)	
Urban assessment – SUAT – ET6 bis– M6	Expert models based BOX (Internal tool)	
Urban assessment – ET6 bis– M6	Noise BOX (External Tool)	
Environmental Assessment – ET7 – M7	EPESUS (External tool)	EKO
Environmental Assessment – ET8 – M7	Simplified LCA tool (Internal Tool)	NBK
Socio-economic assessment – ET9 – M8	MIMES-LISTS (Internal tool)	LIST, UN

Table 5. List of knowledge & support tools and participatory methodologies utilised in the field test for each partner city

Method / Tool	Tools/Method	Responsible partners
Step-by-Step Guide	Method associated to a guide for participatory & socially inclusive NBS projects integrated in T7.4 with Citizens’ Say	DW, IIL
Quality of life assessment	Method associated to modules developed with specific questionnaire – To be included within Citizens’ Say Participative tool	UN, IIL
Social acceptance assessment	Method associated to a questionnaire – utilised in Task5.2 and potentially applied in the CAN city pilot. Synthesis of the method will be provided with feedback to improve guidelines	METU, IIL
Agent Based Modelling	Utilised in Task 5.4 implementation models as an example, not included in the field tests	EKO
Citizens’ Say Participative tool – ET2	Online collaboration platform that joints functionalities for data collection and participation : questionnaire modules, voting module, etc. (External Tool)	IIL
Geocluster4NBS – M3 - M4 - M5	NBS pre-selection tool, Implementation Model pre-selector tool, Replication tool, will be used in scenario definition but not directly in the field test	RINA-C, TEC, CER, CAR, NBK

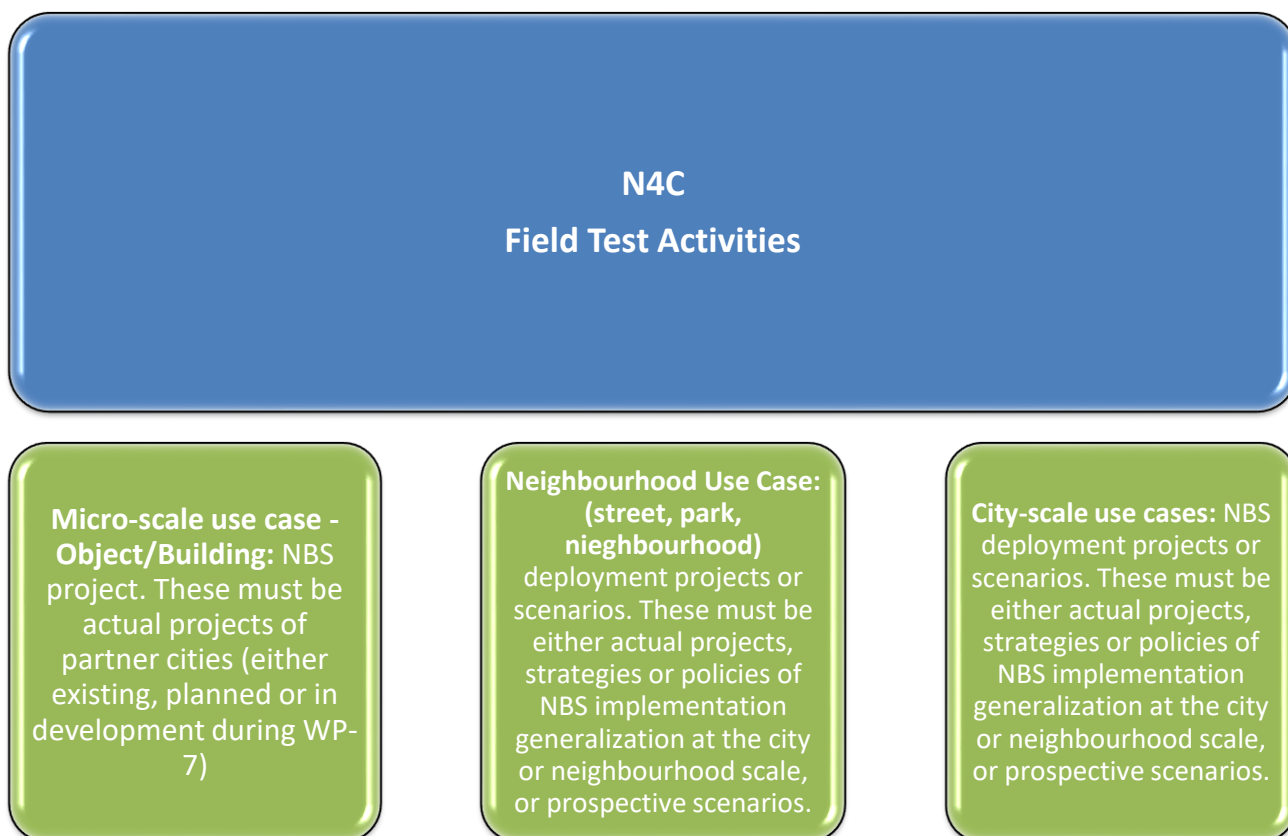


### 3.3 Identifying the use cases for the field tests

Key stakeholders in the FTM framework in this project are the municipalities and related organisations to improve their decision-making on the implementation and maintenance of NBS and related urban planning mechanisms. Each partner city to this end has to specify several NBS case studies that could be analysed with the Nature4Cities platform. The diversity of the selection of cases will lead to a heterogenous sampling to have a robust field test, both in terms of the number of NBS covered, and the number of city contexts, for testing of the Nature4Cities platform and associated tools.

For the justification of the NBS case studies, a brief on the experiences and urban challenges of each partner city has been prompted. Past experiences are crucial for understanding and estimating NBS implementation possibilities within cities. The third planning step is thereby to identify the use cases and/or clarify any uncertainties on their scope and their boundaries (See Figure 6)

Figure 6 Assessment of NBS Use cases (Task 7.3)



In the Nature4Cities project a structured multiscale typology of NBS types was developed in Task 1.1 that serves to identify different NBS boundaries from a standardised perspective. Subsequently, in task 7.3, summarised in the deliverable D7.3, use cases were identified by the city partners drawing from this typology and existing expertise of the urban planners, NBS experts, and green infrastructure maintenance teams working for the city partners and the associated knowledge partners. The process took into account a selection criteria that generated case studies based on the type of NBS, the scale, the main objectives of the NBS, and the availability of data, to ensure that the variety of NBS and their documentation will viably test the capabilities of the platform. The process resulted in a total of 12 identified use cases, two to four for each city, with a very varied NBS typology as listed in Table 6 below.

Table 6: Use Cases for each partner city for the field test management

City Partner	Use Case	NBS Type(s)	Use Case Description
Alcalá de Henares	Plantation and management of an edible forest	<ul style="list-style-type: none"> <li>• Urban Forest</li> <li>• Urban orchard</li> <li>• Urban vineyard</li> <li>• Rustic plants (frost and disease resistant)</li> <li>• Indigenous species</li> <li>• Diversity of plant species</li> <li>• Plants with bio-filter features</li> <li>• No management (as way of management)</li> <li>• Limit or prevent access to an area</li> <li>• Ensure continuity with ecological network</li> <li>• Limit use of agricultural land</li> </ul>	This project aims to increase the biodiversity of peri-urban spaces by re-naturalizing through the creation of an edible forest. It is part of a recovery strategy of an island which has been very degraded by the intensive agriculture. A part of the island remains unused and it is intended to create an edible forest on it in order to enhance the biodiversity.
	Restoration of the gallery forest on the right bank of the river Henares as it passes through the city	<ul style="list-style-type: none"> <li>• Recovery of the ecological quality of the river.</li> <li>• Urban forest</li> <li>• Green waterfront</li> </ul>	The forest on the right bank of the Henares River almost disappeared due to the intensive agriculture. The main objectives of this project are to improve the hydraulic conditions (water quality, water flow...) and recover the ecological quality (ecosystem health) of the river.

		<ul style="list-style-type: none"> <li>• Management of polluted areas by plants (phytoremediation)</li> <li>• Rustic plants (frost and disease resistant)</li> <li>• Indigenous species</li> <li>• Excavation of new water bodies (ponds, lakes)</li> <li>• Limit or prevent access to an area</li> <li>• Ensure continuity with ecological network</li> <li>• Limit use of agricultural land</li> </ul>	
Çankaya Municipality	Healthy Cities Healthy Streets	<ul style="list-style-type: none"> <li>• Single tree</li> <li>• Grass tram tracks</li> <li>• Street tree</li> <li>• Green strips</li> <li>• Climber green walls</li> <li>• Green wall system</li> <li>• Planter green wall</li> <li>• Ensure continuity with ecological network</li> </ul>	Healthy Streets Project proposes to organize public participation in urban planning processes through new project areas. The general function of the project areas can be modified according to the use citizens want to showcase, prioritizing the development of safe and instinctive pedestrian streets and cycle path.
	Water Management using NBS in İsmet İnönü Park	<ul style="list-style-type: none"> <li>• Constructed wetlands and built structures for water management</li> <li>• Excavation of new water body (pond)</li> <li>• Large urban public park</li> <li>• Public urban green spaces with specific uses (School playgrounds, camp grounds, sport field, etc.)</li> </ul>	İsmet İnönü Park is a large green area in which a biological slough is located on a valley bottom and under risk of flood. The project is about managing storm-water filling into the pond by using NBS.

		<ul style="list-style-type: none"> <li>Excavation of new waterbodies (ponds, lakes)</li> <li>Floodplain</li> </ul>	
	Urban Green Space Management - İlhan Cavcav Park	<ul style="list-style-type: none"> <li>Public urban green spaces with specific uses (school playgrounds, camp grounds, sport field etc.)</li> <li>Indigenous species</li> <li>Diversity of plant species</li> <li>Excavation of new waterbodies (ponds, lakes)</li> </ul>	İlhan Cavcav Park project aimed to transform an unoccupied land in a natural area. This project represents a potential case study for calibrating and testing the NBS model through various processes such as reduction of grass use, recycling, bringing into use of wooden materials, implementation of biological pond.
Metropolitan City of Milan	Quarry Restoration: ATEg30 PERO	<ul style="list-style-type: none"> <li>Hedge and planted fences</li> <li>Wood</li> <li>Lawn</li> <li>Structural soil</li> <li>Revegetation of aquatic planting</li> <li>Eco-management plans</li> </ul>	The project aims to transform an old quarry into a public park. The project foresees the re-naturalization of the lake shores, the realization of a peninsula, the filling of settling tanks created for extraction activities and the design of soft slope in the north sector to connect the lake with the countryside.
	Quarry Restoration: ATEg32 - GAGGIANO, TREZZANO SUL NAVIGLIO, ZIBIDO SAN GIACOMO	<ul style="list-style-type: none"> <li>Large urban public park</li> <li>Hedge and planted fences</li> <li>Public urban green space with specific uses</li> <li>Wood</li> <li>Lawn</li> <li>Revegetation of aquatic planting</li> <li>Constructed wetland for phytoremediation</li> <li>Eco-management plans</li> </ul>	The quarry ATEg32 started its activity in 1962 and initiates in 1994 an important environmental project for the development of new outdoor activities. Thanks to the two combined projects "ATEg32_C1" and "Nature Boscaccio", quarry company Cave Merlini has created in 2006, an area called "Lake Nature Boscaccio" for "green outdoor events" like corporate meetings, educational activities, weddings.

	Quarry Restoration: ATEg15 - PADERNO DUGAGNO	<ul style="list-style-type: none"> <li>• Large urban public park</li> <li>• Hedge and planted fences</li> <li>• Public urban green space with specific uses</li> <li>• Wood</li> <li>• Lawn</li> <li>• Revegetation of aquatic planting</li> <li>• Vegetation engineering systems for slope erosion control – flat</li> <li>• Vegetation engineering systems for slope erosion control – deep</li> <li>• Structural soil</li> <li>• Constructed wetland for phytoremediation</li> </ul> <p>Eco-management plans</p>	<p>This recovery project won several awards in 1999 and 2005. The area is characterized by the presence of two separate lakes connected by a tree-lined pathway. The first lake is used for the fishing while the second one is characterized by a more spontaneous development of wild flora and is the home of different bird species.</p>
	Quarry Restoration: ATEg20 - POZZUOLO MARTESANA, TRUCCAZZANO	<ul style="list-style-type: none"> <li>• Wood</li> <li>• Lawn</li> <li>• Vegetable garden</li> <li>• Structural soil</li> <li>• Revegetation of aquatic planting</li> <li>• Eco-management plans</li> </ul>	<p>This project consists in two main areas:</p> <ul style="list-style-type: none"> <li>• The northern section: first phases of extraction ended in 2007;</li> <li>• The southern section: cultivation and regeneration plan.</li> </ul> <p>The proposed project involves the areas cultivated in the northern part. It forecast an overall natural regeneration of the environment in the entire park area</p>
<b>Szeged Municipality</b>	Reconstruction of Széchenyi square	<ul style="list-style-type: none"> <li>• Wood</li> <li>• Management of polluted areas by plants (phytoremediation)</li> <li>• Plants with bio-filter</li> </ul>	<p>This park is the central square of the city. It's used as a resting park, a representative green area and some outdoor events are organized here. The park is one of the most important junctions of public transport and the most visited. The project aims to reconstruct the park, to create new</p>

		<p>features</p> <ul style="list-style-type: none"> <li>• De-sealed area (and associated systems, ex-permeable paving)</li> <li>• Create and preserve habitats and shelters for biodiversity</li> <li>• Insect hotels (for wild bees)</li> <li>• Take into account the distribution of public green spaces through the city</li> </ul>	<p>connections for pedestrians and to arrange the space in front of the building.</p>
	<p>Plan for rehabilitation of the waterfront of the Tisza River</p>	<ul style="list-style-type: none"> <li>• Floodplains</li> <li>• Green waterfront</li> <li>• Large urban public park</li> <li>• Urban forest</li> <li>• Wood</li> <li>• Plants with bio-filter features</li> <li>• Take into account the distribution of public green spaces throughout the city.</li> </ul>	<p>The goal of this project is to rehabilitate the Tisza river' banks located in the downtown to offer green recreational areas and mitigate the urban heat island effect. The area is very touristic and needs an environmental planning. Swimming buildings, shielding trees, green areas will be implemented in order to achieve the climate-conscious development of the area.</p>
	<p>Bird friendly school garden</p>	<ul style="list-style-type: none"> <li>• Urban green space with specific uses (school playground, camp grounds, sports field etc.)</li> <li>• Vegetation diversification</li> <li>• Create and preserve habitats and shelters for biodiversity</li> <li>• Composting</li> <li>• Hedge and planted fences</li> <li>• Diversity of plant species</li> </ul>	<p>The goal of this project is to reconstruct the school yard of Arany János Elementary School to become a diver habitat especially for birds. This project aims to enhance mitigation of traffic noise and air pollution from the closely passing highway. The project was initiated in 2016 by enthusiastic volunteer parents and developed to a school-wide project, now with some financial fund.</p>

- Eco-management plans

### 3.4 Identifying the monitoring data that needs to be collected

The fourth planning step is to identify what data needs to be collected as part of the monitoring process for each toolkit and each use case. It was identified that three layers of data collection are demanded by the WP7 partners. First, for performing the field tests the required data inputs need to be identified. Without required datasets being available for the toolkits, in relation to each NBS use case for each city, the field-testing of the approach cannot be carried out. To this end a data collection, verification and validation process is needed that starts with the identification of the toolkit data, the collection of which is monitored in the monitoring stage.

In terms of the data inputs for the tools, a generic data template in line with WP7.4 that provides for the data requirements for each tool that is part of the SUAT (see Table 7 below). The data template is orchestrated to be in line with the use cases, as defined in task 6.1 of WP6 and WP7.3 (see previous section), so that required data inputs are arranged for each city case study according to their expectations and relations.

The second layer is to identify the outputs of interests for each city and their use-case as part of the desired NBS performance assessments (see section 2.1). The process relates to what evidence the city partner could utilise in specific local planning and evaluation practices, so as to improve the uptake of NBS. To this end the Nature4Cities project started with a broad-scoping of potential KPI's in work-package 2.1 that resulted in a set of Urban Performance Indicator's (UPIs) for assessing NBS performance based on Climate, Environment, Resource, Social and Economy domains. KPIs were identified as a result, of which a selection of 42 can be calculated with SUAT tools as identified in WP2.4.



Table 7. Data description templates for input data from each city to carry out the SUAT and external tools

Module Name							
<p><b>@Organisation:</b> please list all the data requirements for:                      - Module Name                      in order to make clear what data are needed to be collected from each city to test the N4C platform and tool  <b>@ Organisation</b> please feel free to revise the structure of the tables, to add relevant items and to group the data based on the calculated KPIs</p>							
M7 - Module Name							
Name of the data	Type (e.g. number, database, cad/GIS plan, ..)	Description of the data	Useful information on how to get the data / Further clarification on how create the data	CCM	CAN	SZEG	AH
<p><i>Please insert the data that have to be collected (explain the table beside from D6.1). E.g. in the case of a database, provide the structure/table to collect the information</i></p>							
				<i>Fields to be provided by each city</i>			

The 20 selected KPIs that can be evaluated relate to nine particular urban challenges including:

1. Climate issues
2. Water Management
3. Air Quality
4. Green space and biodiversity
5. Urban regeneration and soil
6. Resource efficiency
7. Public Health and wellbeing
8. Urban planning and governance
9. Green Economy

The partner cities' perspective on what KPI's need to be monitored as part of the field-testing process is critical. As such their points of interest for indicators provided by the Nature4Cities platform modules needs to be evaluated. To this end KPIs of relevance will be identified for each city partners to ensure the field-testing is carried out in line with local needs to deal with local challenges. The selected approach is to use a score-card low-medium-high rating for each KPI for each of the identified city use cases. A template process was developed in line with WP7.4 as shown in Table 8 on the next page. The screening provides insights in the identified relevancies between performance indicators, case studies and modules/tools with urban challenges.



The third layer is the meta-layer of the field-testing process itself, in terms of how the SUA tools are used and what data needs to be collected to understand the testing process itself. A series of monitoring templates for the status of data collection have to this end been generated in line with WP7.4, that provide for a means to evaluate what data has been provided and where there are missing gaps (see Table 9 on the next page).

Based on the above, integral to the process is for the N4C consortium to agree internally on the relevancy score of selected KPI's to monitor as part of the field-testing. It is imperative that during the preparation stage of field-testing, the perspective of partner cities is taken into consideration for the assessment of their interests in the KPIs supported by the platform tools and modules.

Table 8. Template for the assessment of KPIs of interest by the partner cities

ET9 - Indicator List				City Partner 1				City Partner 2					
TOPIC	CHALLENGES	SUB-CHALLENGES	Title of the case study	NBS Use Case 1	Indicators calculated with your module/tool/methodology ?	NBS Use Case 2	Indicators calculated with your module/tool/methodology ?	NBS Use Case 3	Indicators calculated with your module/tool/methodology ?	NBS Use Case 4	Indicators calculated with your module/tool/methodology ?	NBS Use Case 5	Indicators calculated with your module/tool/methodology ?
			Location	City Partner 1	City Partner 1	City Partner 2	City Partner 2	City Partner 2	City Partner 2				
			INDICATORS	Municipalities have specified for each case studies									
CLIMATE ISSUES	1.1 Climate mitigation	1.1.1   CO2 - Annual carbon sequestration	2		1		1		2		2		
		1.1.2   GHG - Avoided GHG emissions	1		1		2		2		2		
	1.2 Climate adaption	1.2.1   AT - Air temperature	2		2		1		2		2		
		1.2.2   TLO - Thermal load of outstreaming air body	1		1		1		2		2		

Table 9. Streamlined process for the monitoring of data-streams required to carry out the SUAT and EMM and external tools

PILOTS Data collection		Nature4Cities Tools													
		 ET3 COLOUREE		ET4 Satellite Imagery Analysis		ET5 Inspection via drones		 ET6 GREENPASS		ET7 EPESUS		ET8 Simplified LCA tool		ET9 MIMES-LIST	
		Data collection RINA	Data check CLR	Data collection RINA	Data check TRS	Data collection RINA	Data check EUT + R2M	Data collection RINA	Data check G4C	Data collection RINA	Data check EKO	Data collection RINA	Data check NBK	Data collection RINA	Data check LIST
ÇANKAYA [CAN + EKO]	Site 1														
	Site 2	ongoing		ongoing		ongoing ?		ongoing		ongoing		ongoing		ongoing	
	Site 3	ongoing		ongoing		ongoing ?		ongoing		ongoing		ongoing		ongoing	
MILANO [CMM + R2M]	Site 1	completed	ongoing	completed (1)	ongoing	ongoing									
	Site 2	completed	ongoing	completed (1)	ongoing	ongoing									
	Site 3	completed	ongoing	completed (1)	ongoing	ongoing									
	Site 4	completed	ongoing	completed (1)	ongoing	ongoing									
SZEGED [SZEG + SZTE + MUTK]	Site 1	completed	checked	completed (2)	ongoing	ongoing ?		ongoing		ongoing	ongoing	ongoing		ongoing	
	Site 2	completed	checked	completed (2)	ongoing	ongoing ?		ongoing		ongoing	ongoing	ongoing		ongoing	
	Site 3	completed	checked	completed (2)	ongoing	ongoing ?		ongoing		ongoing	ongoing	ongoing		ongoing	
ALCALA DE HENARES [AH + TEC]	Site 1	completed	checked	completed	checked	not allowed	not allowed	completed **	ongoing	ongoing		ongoing		ongoing	
	Site 2	completed	checked	completed	checked	not allowed	not allowed	completed **	ongoing	ongoing		ongoing		ongoing	

### 3.5 Identifying the expectations and challenges for the field tests

The final step in the planning framework is to make sure the stakeholders are well aligned, and any potential concerns are addressed before starting the field test activities. The level of involvement of the municipality in each partner city, and their concerns, has to be represented for each set of processes, especially when involving a complex enterprise like the use of new toolkits and methods for a pioneering area like Nature Based Solutions.

The alignment process involves sharing expectations of stakeholders (here the city partners and associated knowledge experts) for the evaluation of the case studies to be well understood. Setting the expectations will support the monitoring process and make it more participatory, by starting the process of linking stakeholder values and issues with anticipated outcomes and performance targets (See Figure 7).

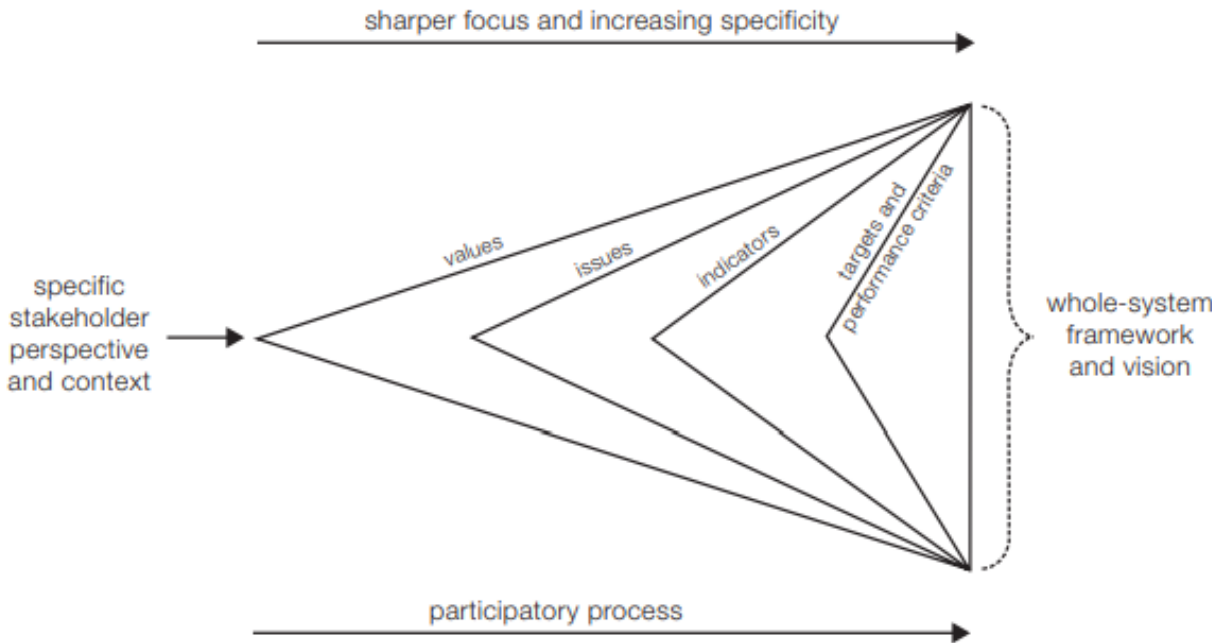


Figure 7 Linking values, issues, indicators and performance criteria in a participatory process (1)

The foreseen challenges and their respective comments and suggestions to improve the field test process also need to be captured and taken on board. Moreover, there could be already different mechanisms (tool, solutions etc.) developed and in place for use in the city partner, to encounter urban challenges so this has to be identified to characterize the status of the city in that sense.

The process of alignment of expectations and challenge-solving is streamlined by developing a template to facilitate this for the city partners, field test managers and knowledge supporting partners. The template as depicted in Table 10 below allows for each partner city to communicate the relevance of constraints, positive impacts, and data to their field-testing.

Table 10. Alignment and challenge identification template for the field-testing process

ET[4-5] - [Name of the External Tool] Reference Partner:					
Constraints that could affect the analysis	Description of the constraint / Further clarification	CCM Relevant? Y/N	CAN Relevant? Y/N	SZEG Relevant? Y/N	AH Relevant? Y/N
			<i>Fields to be provided by each city</i>		
Positive conditions that could affect the analysis	Description of the positive condition / Further clarification	CCM Relevant? Y/N	CAN Relevant? Y/N	SZEG Relevant? Y/N	AH Relevant? Y/N
			<i>Fields to be provided by each city</i>		
Data useful for the analysis	Description of the data	CCM	CAN	SZEG	AH
<i>Please insert the data that have to be collected (explain the following table from D6.1).</i>					
			<i>Fields to be provided by each city</i>		

In addition to overall expectations and challenges, specific city partner expectations on the KPI's that are relevant should also be cross-checked. A dashboard or other comparison method will be a good demonstration for the categorization with respect to the expected target KPI values (qualitative and/or quantitative). To this end a template was developed wherein the city partners set the relevance of the KPI's for particular use cases as a cross-checking procedure (see Table 10 on the next page).

Table 11. Template for cross-checking of KPI relevance per case study

ET9 - Indicator List				City Partner 1				City Partner 2					
TOPIC	CHALLENGES	SUB-CHALLENGES	Title of the case study	NBS Use Case 1	Indicators calculated with your module/tool/methodology ?	NBS Use Case 2	Indicators calculated with your module/tool/methodology ?	NBS Use Case 3	Indicators calculated with your module/tool/methodology ?	NBS Use Case 4	Indicators calculated with your module/tool/methodology ?	NBS Use Case 5	Indicators calculated with your module/tool/methodology ?
			Location	City Partner 1	City Partner 1	City Partner 2	City Partner 2	City Partner 2	City Partner 2				
			INDICATORS	Municipalities have specified for each case studies									
CLIMATE ISSUES	1.1 Climate mitigation	1.1.1   CO2 - Annual carbon sequestration	2		1		1		2		2		
		1.1.2   GHG - Avoided GHG emissions	1		1		2		2		2		
	1.2 Climate adaption	1.2.1   AT - Air temperature	2		2		1		2		2		
		1.2.2   TLO - Thermal load of outstreaming air body	1		1		1		2		2		



## 4 Phase 2: Monitoring of the Field Tests

The purpose of the monitoring phase is three-fold. First, the aim is to provide for the data that is needed to carry out the field tests and monitor the progress on data collection (section 4.1). Second, to understand the progress of the field tests themselves, also allowing for timely signalling of any challenges and required support action interventions (section 4.2). And thirdly, to monitor, where relevant, the setting by partner cities of baseline comparative datasets and the targets for the field tests (section 4.3). The latter is only required where the field tests are implemented as part of a performance management process (see section 2.1.1).

### 4.1 Monitoring the data collection process

Data availability for field-testing activities, regardless of whether the NBS project was already implemented, ongoing or will be implemented, is a crucial subject. The process of providing the required inputs by the city partners for the field tests are to be overseen by city field test managers and associated support partners in the project. City partners, urban planners and other civil servants that operate in these institutions usually face a multi-fold of requirements in their day-to-day work that they need to meet. To this end, knowledge support partners are required to support a complex data collection process. To fulfil these roles as identified in section 3.1, in the project each city partner has an identified support partner which oversees the field test management. Also, each support partner delivers a field test manager that oversees the data collection process.

The monitoring of the data collection is to be carried out in a centralised manner so as to provide a transparent and clear process. It is based on the identification of required data as developed under Phase 1 and consists of a tracking process to identify the progress and stage of data collection. Updating the status as new datasets are provided by city partners and knowledge partners to the field managers and to the centralised party responsible for overall data collection monitoring, results in a streamlined process. The template for the data collection process is shown in table 12 below.

Table 12. Template for data collection monitoring of the Field Tests

Toolbox or Tool Name Reference Partner: Organisation Name										
Name of the data	Type - Format data	Description of the data	Useful information on how to get the data / Further clarification on how create the data	City Partner X Reference Partner [Organisation Name]						
				Site 1 - NBS Use Case Name			Site 2 - NBS Use Case Name			
				Provided Y/N	Source	Comments	Provided Y/N	Source	Comments	

**RINA C:**  
Please indicate the source and the type:

- A1 bis: Previous task - number
- A2: public data source
- A3: municipalities owned data

## 4.2 Monitoring the Field Test Progress

For the purpose of reporting the experience of the field test, data templates have been designed to streamline reporting on platform delivery as well as progress of the field tests. The data structures take form in a single quantitative *Field Test Progress Template* that can be used by the field test manager and the partner cities.

The *Field Test Progress Template* provides a way for the partner cities to capture which use cases have been carried out, what modules and data outputs were enlisted for that use case, what type of users participated in the field test, and the context of that use case in the field test (see Table 13 on the next page). It thereby provides not only a checklist, but also useful insights that can be used to assess whether adjustments are needed in the field tests, and identifies challenges that require further support and facilitation. It also gives early insights that can be used for deeper evaluation analysis and feedbacks (see Phase 3 in chapter 5).

Table 13 shows the basic structure of the *Field Test Progress Template* and how to fill in partner cities' usage of the platform, based on their use of specific data outputs, separated by tool and module. The matrix in its entirety contains a progress overview for the field-testing of all the Nature4Cities' tools and modules when completed. Tools and their data outputs are listed in the left most-column. The subsequent sections 1, 2 and 3, denote different parameters of platform use, namely; what user are you? (who), which tool have you used (what), and for what use case was the tool used (application). An **X** in the matrix shows the corresponding monitoring relating to each listed data output.

In the case of the example in the template, an Expert has accessed 4 specific data outputs from the Colouree tool. The use column would be filled with whichever use case or project said data was applied to. The template is useful for monitoring if partner cities fill in the entire matrix in this manner for every module and its data output accessed. If an output is required: (a) at multiple time periods, or (b) for multiple purposes, then multiple fields in Section 2 and Section 3 can be filled in with **X**. Once filled in, it provides a track record of all the field-testing activities split out by city partner, tool, user type and purpose.

The *Field Test Progress template* once filled in after monitoring thus also provides direct quantitative data regarding the use and experience of the N4C platform. Such numerical data can be aggregated and compared between partner cities, therefore producing both an individual city scale and larger project-wide extrapolated trends. For example, to compare differences in modules and tools used and their KPIs between cities. It aims to demonstrate what data outputs and tools are used the most, what user profiles access the platform, how often data is required, and the most common purposes of platform use.

Table 13. Field Test Progress Monitoring Template

N4C Platform Tools & Modules Field Test Progress

City Partner:

Tools and Outputs		Section 1			Section 2	Section 3
		Which type of user are you?:			Which tool have you used?	For which Use Case have you used the tool?
		Citizen	Expert	Municipality		
<b>Colouree Tool</b>						
Output	UGSP - Urban Green Space Proportion		X			
	SHI - Shannon Index					
	CGS - Connectivity Green Spaces		X		X	
	AS - Area Sprawl		X			
	BN - Betweenness					
	ACC - Accessibility		X		X	
<b>TRS (TerraMap Satellite Imagery)</b>						
Output	Landsat Image (60m spatial resolution)					
	Sentinel2 Images (20m spatial resolution)					
	Pleiades Image (<1m spatial resolution)					
	Height & Slope of vegetation & buildings					
	Naturalness					
	Compactness (Surface)					
	Connectivity					
	Heterogeneity					
	Ecological Potential					

## 4.3 Monitoring the baseline for performance assessments

The monitoring activity, if also carried out as a performance assessment process (see section 2.1) requires the setting of a proper baseline by city partners (also referred to as a reference point) to support comparisons of any monitoring of results with this baseline. A baseline can either be a set of results from a different project or activity within the same or another city, or a starting point within the project measurement, or both. In WP3, task 3.5, the setting of a baseline and its use for comparative studies as part of a dynamic assessment was discussed in detail for environmental assessment purposes. The methodology under task 3.5 can also be extended to other fields of measurement (social, economic, and so forth) and is thus also applicable for the field-testing.

In the context of Nature4Cities, field-testing a baseline is helpful for a comparative assessment of results, given that the NBS use cases will not be monitored over long periods of time and the implementation of a dynamic assessment (as per WP3, task 3.5) is not intended. The database of tools that will be integrated within the Nature4Cities platform requires the intervention of experts to utilise them to obtain baseline indicator values for each NBS. Once obtained these can be utilised by cities to compare with relative to their particular NBS performance, as measured during the field tests. For example, the i-Tree Eco tool can be used to obtain baseline data on carbon sequestration of particular NBS's in a city landscape, to create a before and after NBS implementation baseline assessment.

Once established, the baseline values from the SUAT can be utilised to compare results with other external tools. As described, the main intention is to conduct the field-test activities using the SUAT application and external tools under 7.5 as a holistic assessment. The comparison is fundamental to determine the extent or the limits of the uncertainties between two tools. As such, SUAT individual tools can be based on previous data calculation, and thus be validated for comparative assessment in order to validate the external toolkit for use by local actors.

## 5 Phase 3: Conducting the Field Test Evaluations

The third phase of the monitoring and evaluation (M&E) framework is to carry out the evaluation of the field-testing of the Nature4Cities platform. An M&E Framework can only be of value ‘if findings are reported on and put in to action’ (City of Johannesburg, 60). To this end, city partners together with their supporting technical partners will utilise the SUAT, and the overall Nature4Cities Platform and provide feedback on this use. Experience is drawn up in this use, both positive and negative, and these experiences need to be captured as part of the field-testing to enable effective feedback to tool developers and tool support partners. The evaluation process is split into two parts: the overall quality assurance of the field-testing (outlined in section 5.1) and the framework to analyse field-testing experiences (section 5.2) that forms the basis for the communication and feedback process outlined in Chapter 6.

### 5.1 Quality Assurance of Field-Testing

The quality of incoming feedback is of paramount importance. Both nature-based solutions and data quality are multi-interpretative concepts, and as such, quality assurance is not a simple process and needs to be defined in a robust manner. Quality is not an absolute concept and as a word, “quality” needs to be defined on a case-by-case basis.

In the case of field-testing quality, field test managers need to look at specific relevant attributes in line with the Nature4Cities context they are evaluating. Context is also of paramount importance. For example, in the context of a software system, the quality of data is related to the benefits that it might give to an organization if it is error-free, and the costs to the organisation if it contains substantial errors. A total of seven quality criteria have been developed that can be utilised in Task 7.5 for all field tests, to evaluate from a qualitative perspective how the field test process has undergone.

The seven characteristics that define the field test information quality include:

- **Completeness:** is the field test completed up to the expectations? For example, are the SUAT and external tools tested in the field test for each use case appropriate?
- **Relevance:** is the field test completed in a way that it is relevant for understanding the capabilities and shortfalls of the tools in the Nature4Cities platform?
- **Reliability:** is the field test carried out by actual city partners and thus is the information considered valid/trustworthy? Or is the field test carried out predominantly by experts that are further away from city partners?
- **Amount:** how many field tests are expected to be carried out or sub-field tests for each use case, and how many were actually carried out.
- **Correctness:** is the field test carried out on the version of the toolkit that is to be tested, and thus is the feedback representative of a recent tool?

- **Unambiguous:** are the experiences reported by the city partners in field tests understandable and can they be interpreted with ease? Or is further clarity required because the meaning is not clear?
- **Objectivity:** is the field test carried out in a way that is objective in how the results are reported? Or is their bias at play?

The criteria are provided in a template (Table 14 below) that can be used by field test managers as part of the evaluation procedure. The template forms a structured way to assess how the field test was carried out and provides for a quality assurance check.

*Table 14. Information Quality Template for field test managers. Adapted from (3)*

<b>Quality attribute</b>	<b>Definition</b>	<b>Field Test Performance Comments from Field Test Managers</b>
<b>Completeness</b>	Field-testing requirements are met which are comprehensive enough to determine whether the field test can be evaluated	
<b>Relevance</b>	Level of relevancy of the field-testing area and the information	
<b>Reliability</b>	Trustable considered as true information.	
<b>Amount</b>	The number of field tests carried out (use case number)	
<b>Correctness</b>	Does the test represent the toolkits process that is to be tested as part of a real-life situation	
<b>Unambiguous</b>	Each piece of information provided in the field test can be interpreted with ease, or further clarification is required.	
<b>Objectivity</b>	No dependence on the judgment, interpretation, or evaluation of people.	

## 5.2 Capturing the Field Test Experience

The object of analysis is to ‘transform data into credible evidence about [a specific] intervention and its performance’ (Ministry of Foreign Affairs of Denmark, 2006, 72). As such, this phase of the field-test is based around partner cities’ ability to assess the success and efficacy of the N4C platform in conjunction with their planning and decision-making processes. The analysis should serve to identify areas of success, risks, and weak spots of the platform and processes.

When evaluating and forming an analysis of the N4C Platform for the feedback process, the outcomes approach to monitoring and evaluation will be applied. This paradigm should allow partner cities to connect the direct **outputs** of the platform with specific **outcomes**; these outcomes should depict how outputs supported planning and decision when integrating nature-based solutions. When synergised and monitored by partner cities, this should facilitate analysis of field tests that build effective feedback for further improvement.

Table 15. Categories for Structuring the field test experience

<b>Output:</b>	Data generated by the N4C platform
<b>Outcome:</b>	The utilized data are effectively support: development projects, municipal policy documentation, spatial planning.
<b>Outcome Indicators:</b>	A quantitative way to connect outputs to outcomes. Indicators may be; number of platform users, specific use of data outputs in drafting policies or project plans, number of times data accessed.
<b>Tacit Outcomes:</b>	Thoughts, experiences, behaviours and attitudes of users following from use of the platform and how it positively/negatively shapes the workstreams of partner cities.
<b>User Knowledge Testing:</b>	Regular training and user knowledge-testing of the platform should be applied in partner cities throughout the field-test. This ensures that users will be (a) well-informed, and (b) well-equipped when it comes to providing feedback.
<b>Information Collection:</b>	The above information related to partner cities’ experience is collated and fed back for further platform development (phase 4, see below).

Based on the categories in Table 15 the core analysis that needs to be fed back to the N4C development by the test management teams are **Outcomes**, **Outcome indicators**, and **Tacit Outcomes**. The internal process for how analysis of these categories is conducted and recorded is for the partner city to decide; this will depend on who is taking part in the field-testing and the governance and reporting structures already in place. However, the categories and activities to map this information, if adhered to, form a structured approach to ensure the quality of the field-testing process. The reporting approach of these aspects is defined in the following sections to provide the core of the evaluation approach for the field-testing of each partner city, so as to ensure the evaluation is structured and relevant.



For the purpose of reporting the experience of the field test, data templates have been designed with outputs and outcomes in mind to ensure reporting on platform delivery as well as progress. The template takes the form of the *Feedback Templates*, each to report on an individual tool or module of the N4C platform. The *Feedback Templates* provide partner cities a way to demonstrate how they use each module and their specific results:

- The efficacy or usefulness of both inputs and outputs.
- Number of users.
- Purpose of using a tool and its data output.
- The overall success of tools, indicated by why, when, and how they were used.
- Desired outcomes or recommendations for development.

To accompany the quantitative data of the *User Feedback Matrix*, *Feedback Structures* have been created for qualitative reporting of partner cities' experience during the field test. The feedback structures are focused on the inputs and outputs of a specific tool; feedback here should focus on the relevance of these data to the partner city's projects and planning process.

The feedback structure, as outlined in Table 16 below, focuses more on the general experience of partner cities, again in the context of a specific tool. Feedback is encouraged to be as concise as possible, to avoid large data-dumping where unnecessary. Furthermore, where findings and analysis are negative, ensure that these negative findings are still communicated; this is essential for the integrity and usefulness of both the platform and the M&E process to drive improvements. When presenting negative results, recommendations from the perspective of users is encouraged – input on recommendations for improvement and their implications can assist in driving these improvements.

Table 16. Qualitative Feedback Structure

	Tool	SUAT (GREENPASS)
	Use Case	User
	<b>User Feedback</b>	
<b>Who</b>	<b>Who is using the GREENPASS data? (role, level, how many users)</b>	
<b>Why</b>	<b>Why was GREENPASS needed?</b>	
<b>When</b>	<b>At what point(s) of the planning process was GREENPASS used?</b>	
<b>Did it work</b>	<b>Successful/Proven Outcomes?</b>	

## 6 Phase 4: Communication of Evaluation Feedback

The fourth phase of the Monitoring & Evaluation Framework consists of the final evaluation and feedback provisioning to each of the developers of the Nature4Cities platform tools, from the user experiences in the partner cities. The value of reporting, feedback, and effectively the entire M&E process, is only fully-actualized when analysis and findings are applied back in to development and practice in the context of platform use. Findings emerging from M&E will support performance and service improvements, and ultimately, the creation of a learning culture. This culture requires participation across stakeholders, encouraged by the availability of the platform to citizens, experts and municipal staff. To instil the feedback procedure into WP7, phase 4 aligns with task 7.6 of the project to provide feedback to the Nature4Cities development teams. The approach is to utilise a specific feedback protocol that is outlined in this chapter.

### 6.1 Reporting and Analysing the Field Test Experience

After the field test experience has been captured utilising the templates as provided in section 5.2, the captured experiences need to be interpreted by the tool developers so that they can improve the services provided by these tools. To this end, a reporting process needs to be constructed with the intention, based on communications and feedback mechanisms, to ensure the greatest relevance of partner cities' feedback to the N4C platform and the tools' development and exploitation teams. The process is to improve the interpretation and understanding of the evaluation findings across city partners, allowing for a consistent comparison of results.

The communication strategy, aligned with the feedback reports, facilitates follow-through on the feedback and seeks to provide a real understanding and appreciation of the efforts, achievements and challenges faced by the city. To be able to capture the complete essence of such feedback personal communication is required, with the feedback templates when filled in serving as a guidance for questioning, further elaborations, and interrogations between city partners, support partners, and tool developers. As such a series of workshops are suggested to be held under Task 7.6 that utilise these templates once filled in and establish direct two-way communications between users and developers, to outline clearly further improvements.

At an early stage already, interactions could take place by sharing the feedback forms internally about particular aspects. To this end the feedback templates can be shared internally in the consortium. Later they can be used to prepare and organise the workshops which could be guided by the field test managers, who have a nexus role in between the city partners, knowledge support partners, and the tool developers. The workshops serve as a means of further analysis of the results and the value of the tools for providing insights into NBS

## 6.2 Use of Feedback

The final step in the M&E framework is for the evaluation feedback as communication both with templates and in person (as described in the previous section) to be utilised in improving both the tools themselves, and the overall process of tool usage for examining various aspects of NBS in real-life settings (see figure 8). The feedback can be used in a wide variety of ways, covering insights in the marketability of the tools, as well as true user experience relating to interface and usefulness not gained during development stages.

It is integral to the success of the field testing that user feedback is as rich as possible without constituting a datadump back to the development and exploitation teams. Feedback must contain both positives and negatives of the platform in practice, as well as recommendations for how the platform may have been different to avoid difficulty in the specific example. Difficulties may include factors such as the relevance of the KPIs required and generated by tools, difficulty in collecting the data required by the platform, difficulty in extracting results, difficulty integrating platform into existing city procedures, or city-level data management. Conversely, solutions for these may be recommended measures such as sensors to be developed and integrated, specific training for city stakeholders as well as capacity building exercises. Such difficulties and their necessary solutions are integral to the success of the N4C platform, especially prior to the platform being scale

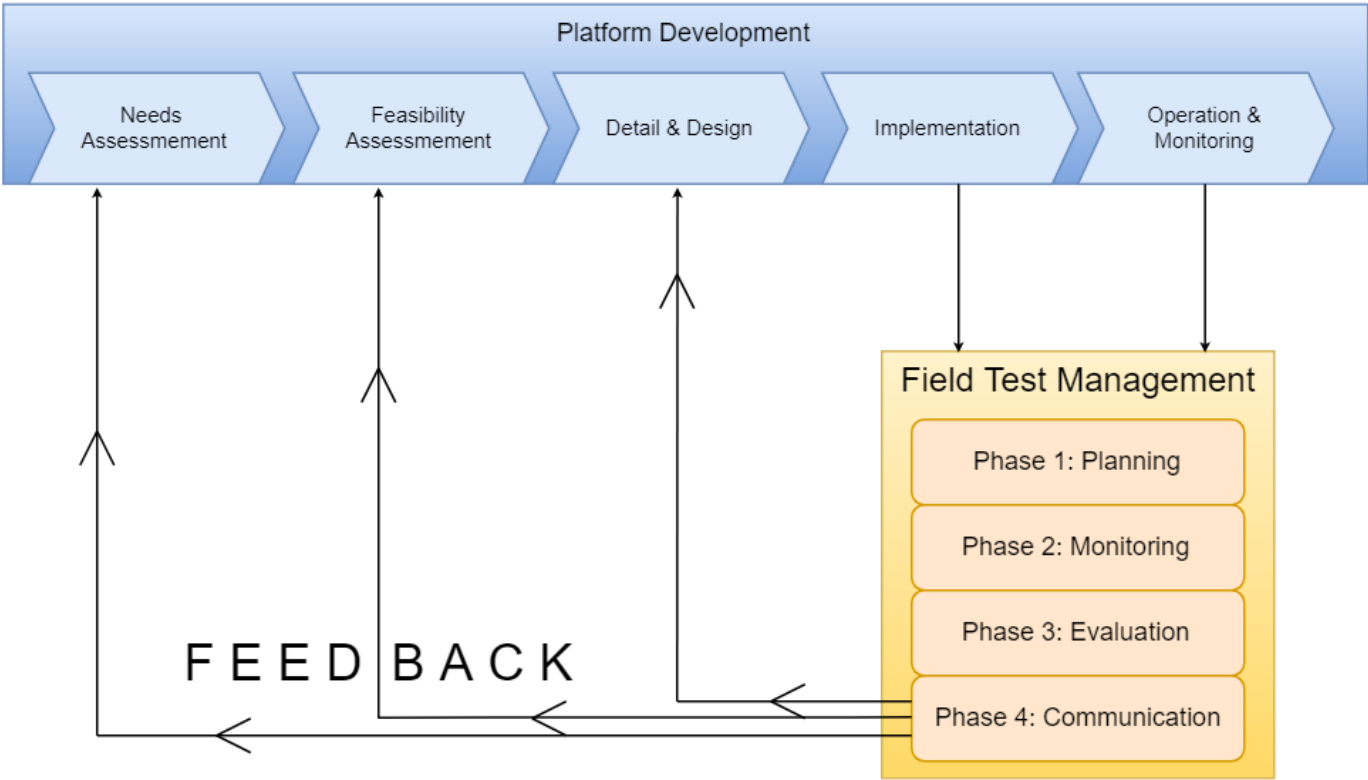


Figure 8: Feedback mechanism demonstrating the flow of M&E results back into delivery & practice

## 7 Concluding Summary

The monitoring and evaluation framework outlined in this report has been designed with the precise context of the Nature4Cities platform in mind. Implemented effectively, the framework should facilitate a field testing that allows for analysis of the efficacy of the platform when integrating nature-based solutions to within urban planning and decision-making procedures. Such analysis will indicate the capacity and planning of differing urban governments when it comes to NBS and decision-making; the viability of the platform's application in terms of data requirements; and the strengths and weaknesses of the platform when applied to predetermined relevant use cases and projects throughout partner cities. Analysis will then be directed back towards the N4C platform development and exploitation teams to further improve and reiterate the platform's functionality, with the overarching aim of producing a replicable, scalable and ultimately useful urban decision-making tool.

Research into monitoring and evaluation frameworks and procedures has been desk-based in nature, seeking out relevant examples of monitoring and evaluating in urban contexts with the aim of performance management and improvement. Organizations such as the United Nations Development Programme, the municipal government of The City of Johannesburg, and the National League of Cities have provided data, information, advice and recommendation on why M&E frameworks are useful in an urban planning context and how they can be mobilised for the improvement of urban government project delivery.

As this deliverable 7.1 is a pre-emptive exercise in planning and management of field testing, conceivable results based on this framework and its application are as-of-yet nonexistent. All succeeding tasks throughout this work package have some relation to the M&E framework outlined; task 7.2 presents the platform and its M&E process to field test teams in partner cities; task 7.3 will decide specific use cases for field testing identified from a wider pool as noted above in section 3.3; task 7.4 will collect required urban data for the N4C platform, to be reviewed upon in the M&E and reported back; task 7.5 will apply the N4C platform to the selected use cases and generate the actual field test experience to be reported upon; and task 7.6 will facilitate the delivery of collective feedback on field test experience.

## 8 References

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