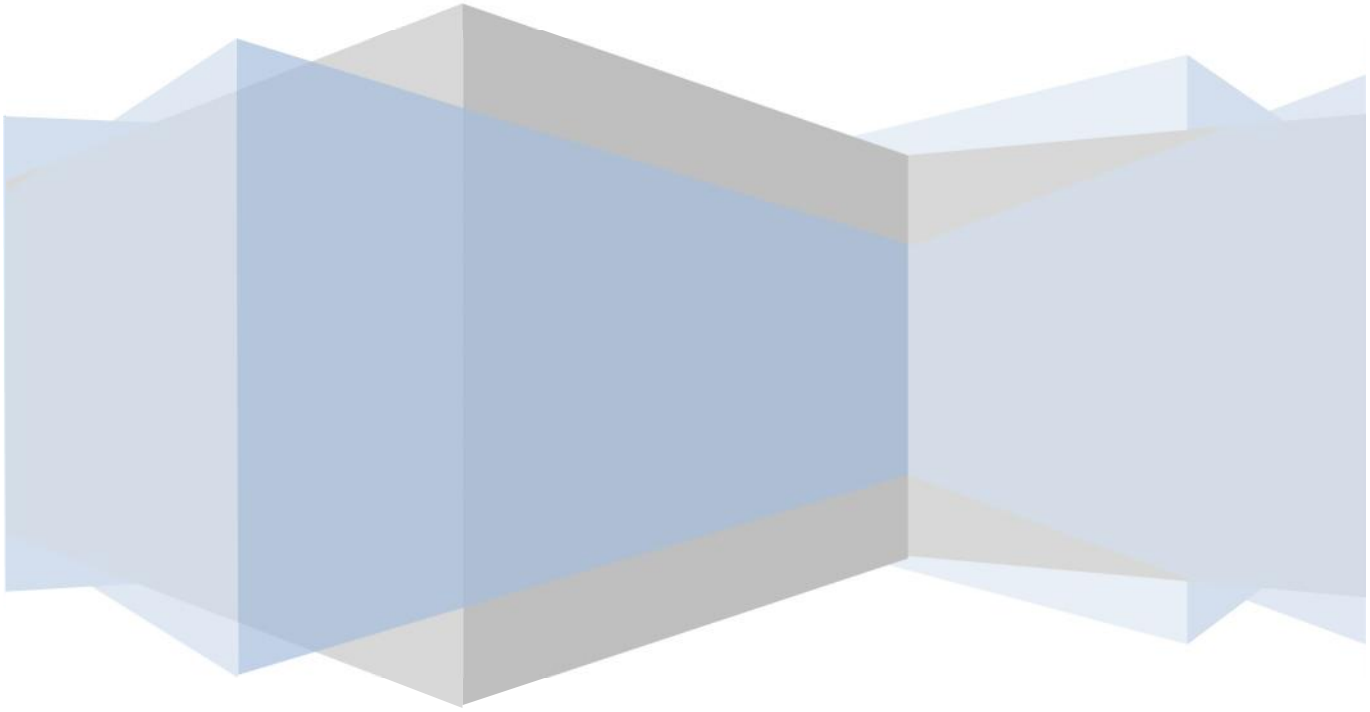
Template of Mid-Term Progress Report

Water Joint Programming Initiative 2018 Joint Call

Closing the water cycle gap - Sustainable management of water resources

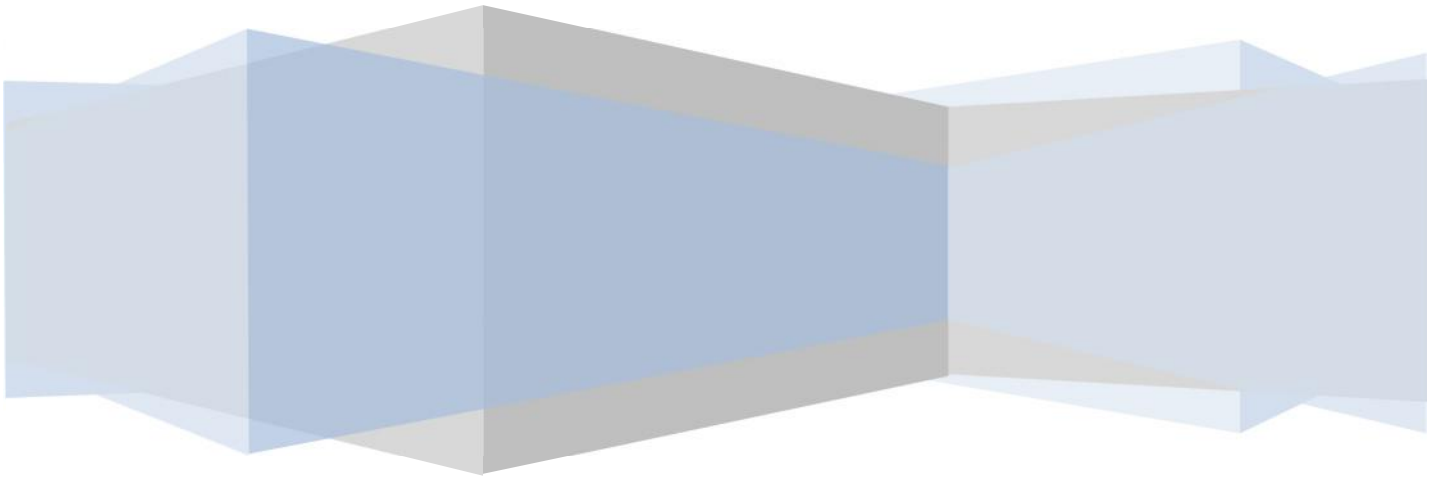


2018 Joint Call
Mid-Term Progress Report
Closing the water cycle gap - Sustainable management of water resources

To Ally Technology, Nature and Society for integrated urban water management
ATENAS

This document must be filled in by the project coordinator with the help of its project partners and must be sent to the WaterWorks2017 Follow-up Secretariat by **31th October 2020** (for Consortium ATENAS).

The WaterWorks2017 Follow-Up Secretariat will ensure distribution to the concerned national funding agencies. The project coordinator is responsible for sending a copy of the report to its partners.



PROJECT TITLE AND ACRONYM

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Project Website: ATENASjpi.eu
Project code: WaterWorks2017-ATENAS

Duration of project: 36 months
Start date: 1st April 2019 End date: **30th April 2022**

Period covered by this report: 1st April 2019 – 30th September 2020

1. Publishable Summary

Maximum 1 page

*The content of this section is intended for communication by the Water JPI on the project, mainly through its website. The style should be adapted to communicate to a wide audience (**non-technical** English) and the quality of the data must enable direct publication.*
The authors authorise the publication of information about this project by the Water JPI.

The publishable summary should provide the following information:

- *The main results achieved so far;*
- *The expected final results and their potential impact and use (including the socio-economic impact and the wider societal implications of the project so far); and*
- *The address of the project's public website, if applicable.*

The access to good quality water resources worldwide, increasing stress on water resources due to climate change and resource overuse, have become important drivers for setting Sustainable Development Goals tackling water issues (SDGs 3, 11, 13 & 14). Cities are increasingly in the focus of water related challenges because a number of their inhabitants rapidly increases in many regions, and the pressure on land is high, due to people aspirations, environment misuse and poor planning, both spatial and socio-economic. Additionally, aging of urban population, poverty of proportion of society, and high accumulation of assets, make cities vulnerable to many aspects of water cycle disruption, including flooding and droughts, urban heat island and their consequences. Decades of conventional urban water management, targeted ultimately at water provision and draining, led to decline of groundwater resources, deterioration of surface waters, drying out of headwaters and related ecosystems. Cities reached the state in which solving one problem immediately triggers the next one, e.g. removing rain water from the city increases heat effect, but preserving grounds for water storage and infiltration creates tensions over land use and prices. Untangling such nexus requires innovative thinking within the field of technology and engineering, built upon flexible approaches and behavioural change among decision-makers and civilians.
ATENAS aims to improve water management in cities through restoring natural, regulatory interaction between biota and hydrology, namely diversion of urban runoff to supply city ecosystems using Nature-Based Solutions (NBS). The ambition is to increase project's impact through triggering learning process among the water users. For that purpose, ATENAS develops real scale demo-sites in a gradient of urban pressures and urban dynamics, to embrace a range of conditions for future applications. Thus, the project develops in five complementary steps: 1. identification of NBS available on the market, selection of options best adapted to the social, economic and ecological contexts of three cities: Łódź (Poland), Helsinki (Finland) and Lyon (France), collaborative and participatory evaluation of pros and cons of different solutions, and creating fast implementation track in each city; 2. analysing the specificity of rainwater run off in each city – areas being its sources and accumulation places for optimal allocation of NBS; 3. development of handbook for implementation of selected NBS, including monitoring of their effectiveness and estimation of cost-efficiency; 4. overview of up-scaling options with focus on who, how and where can contribute to closing water gap, and what are *conditio sine qua non;* 5. how to secure the long-term impact of the project through building a critical mass of human capital: skills, interest and enthusiasm.

The modelling framework has been already established and tested across all demo sites. Also, activities related to review of NBS, and stakeholder mapping and networking have been advanced. ATENAS enters the phase of participatory design of solutions and planning for implementation of

exemplary NBS. The final outcomes of the project will be a cook book / standards on how to implement NBS in cities starting from raising interest of citizens, launching a learning alliance with decision makers, land owners, engineers and planners, to recognize and overcome barriers, to identify critical locations for NBS, to implement them minimizing the economic costs and maximizing the ecological efficiency and societal acceptance, and finally to upscale approach based on human, economic and ecosystem capitals. The estimation of individual implementation costs and mechanisms to engage investors in more common application of NBS should generate broader economic and environmental impact. ATENAS has also an ambition to establish long lasting community of knowledge and practice in each demo site.

Project website: ATENASjpi.eu

2. Work Performed and the Results achieved during the reporting period

Maximum 10 pages.

Please attach any deliverables produced and information on milestones achieved during the reporting period of this report.

a. Scientific and technological progress

Please describe the work performed and the results obtained during the period concerned, and the conformity of the work progress within the initial schedule.
Take into account the following aspects:

- *Has progress been made towards progressing the project objectives according to the original description and milestones? If not, please, explain the deviation.*
- *Detailed update on methodology & results*
- *How has the progress of the project promoted multi-disciplinary work?*

ATENAS workplan included six workpackages.

WP1 – Enabling and critical environment.

WP1 deals with critical factors in successful implementation of nature-based solutions (NBS) in urban water management. The work started with the examination of local NBS in demo cities. The examined solutions included structures for infiltration and retention of stormwaters, biofiltration structures to improve the quality of runoff water, urban wetlands, and green areas around urban brooks that provide several ecosystem services. First step in the analysis was collection of existing knowledge on critical factors of NBS in research literature, inventories and case presentations. ATENAS referred to Urban Nature Atlas by Naturvation project and H2020 Connecting Nature, the Horizon 2020 project Think Nature, in particularly its Handbook on Nature Based Solutions (Somarakis et al. 2019), Life + projects EHREK LIFE08 ENV/PL/000517 and EKOROB LIFE08 ENV/PL/000519, project "Climate Mitigation through Nature-Based Solutions in Urban Poland (Climate NBS Polska)" funded under EUKI scheme and carried by the Sendzimir Foundation, and H2020 project Nature4Cities. The overview of different types of NBS helped to identify solutions to be considered by ATENAS for demo sites' specific implementations. The previous studies identified common critical issues, but they also indicated that many factors are very context-specific. Therefore, ATENAS pulled together also information on critical factors found at

particular case level. Existing presentations of different NBS included description of their structure and functions, but usually lacked examinations of challenges, barriers and success factors. These were produced in ATENAS for the collection of case descriptions and inventories by July 2020 (**Milestone 1.1: Collection of case descriptions and inventories**). Simultaneously the template for structuring further interactions with stakeholders has been developed in November 2019. The range of NBS to be considered in each ATENAS city has been defined and critical factors were discussed in interviews / workshops with demo sites representatives, starting in November 2019 and continuing through April 2020 and in following meetings by June 2020 (**Milestone 1.2: Interviews / workshop discussions of case area representatives on critical factors**). The workshops had a common thematic structure that was drawn from the research literature. The main themes were: effectiveness and management of NBS; organizational aspects, governance and partnerships; public awareness and reception of NBS; and financial resources and valuation. Each of the workshops emphasized the themes that were relevant in the demo case context. Findings on critical factors were included in the report **Critical factors and indicators in NBS planning, implementation and maintenance** (**Deliverable 1.1**).
The results of the analysis on critical factors will be presented to local stakeholders in November-December 2020 (**Milestone 1.3: Presentation of results gathered in the report and factsheets to stakeholders in the demos**). Case-specific findings on critical factors have been collected in illustrative descriptions that are published as Factsheets on barriers and ways to overcome them (**D.1.2**) by the end of 2020.

As in case of Polish demo site the critical factor influencing the uptake of NBS appears to be spatial planning policy, it has been decided to extend the research and organize a sequence of 2-3 workshops to allow for participatory development of decision making tree for potential implementors. It is to clarify and present to broader society the formal and administrative paths for implementation: water tanks / ponds, green walls, rainwater gardens, façade gardens, and infiltration basins. Additionally, as the planning permissions seems to be a tool enabling but also blocking implementation of NBS in new investments, ERCE initiated, in collaboration with local investors and land developers, critical analysis of the process of evaluation and issuing of the permissions.

The progress towards milestones and deliverables has been half a year delayed by late decision about the funding of the project, mostly by Polish funder. The effort has been done to catch up on the workplan. The milestones have been achieved and the reports / deliverables prepared, however some more time is needed to complement details. The ambition of ATENAS is also to provide deliverables in the form attractive and useful to stakeholders. Therefore, a simplified version of D 1.1. merged with factsheets of D 1.2 is to be prepared in a form of information cards, table comparing NBS, using descriptors selected for both deliverables, and demo-site specific aspects of NBS enabling environment.

WP2 - Modelling for the best NBS management options

The IRIP (Indicators of Intense Pluvial Runoff) model is based on the calculation of factors derived

from readily available layers of geomatic information. The topography determines the flow paths, while land use and hydraulic characteristics of the surface layer of the soil determine the runoff production and erosion processes which, combined, transfer material from upstream to downstream through successive scouring, transport and deposition phases at different scales. Construction of the model began in 2012 on basis of the state of the art, mainly in terms of soil conservation knowledge and spatial hydrological modelling. For more than 8 years, the intense runoff forecast maps have been confronted with a series of natural disasters observed in France. The recent conclusion is that it has now reached an operational level.
The IRIP model essentially calculates 5 factors from a combination of topography, land use and soil hydraulic properties. The factors express the potential of different aspects of the runoff process. The factors differ between the 3 final maps called production, transfer and accumulation. Each final map is scored from 0 to 5 after adding the explanatory factors in each pixel of the topographic raster. Experience has shown that scores of 3 to 5 often explain the damage observed at specific locations after a heavy runoff event.

The IRIP modelling platform is QGIS, while the basic set of input data consists of catchment delineation, terrain model, land use / cover layer, soils, and rainfall intensity and frequency data. The requested information has been delivered to IRSTEA / INRA in December 2019 and January 2020 to allow testing of the model and check on data quality. Subsequent online meetings have been organized to fill data gaps and tune the model.
The key issues that emerged in cases of Lodz and Helsinki demos were: availability of case specific datasets, their classification, accuracy of data, and the functionality of the model. The milestone **M.2.1 Review of data imported in an open and shared GIS tool for the "large scale" modelling of the basic layers at each demo site catchment** has been accomplished in March 2020.
The progress towards deliverable **D.2.1 Report describing implementation and results of the "Model for NBS suitability"** in the form of decision maps, has been made for two demo cities – Lyon and Lodz, and is delayed for Helsinki.

In the case of Finnish demo site, the first target area selected was the Vantaanjoki River basin, but in the first model trials it was found to be too large and lacking accurate land use data of the whole area. The next step was the selection of a smaller sub-catchment to analyse it using detailed 2 m land use data provided by the Helsinki Region Environmental Services Authority HSY. The new analyses will be carried in November-December 2020. SYKE is also analysing the use and integration of different models and calculators, the approaches of which are partly inter-connected. SYKE has started collecting data on models and tools used in urban water management and land use planning and consulted them with local planers. The models include runoff models, flood risk models, modelling of water quality, green area factor calculators, resource use and emission assessment tools, and urban development models. There is a plan to capitalize on this work by extending the WP2 approach to precise in-site modelling, at least with comparison of available models
In the Lodz case the first outcomes of modelling appeared to be very promising. The model well indicates the sources of runoff and flood vulnerable areas. Thus, it already allows for initial identification of the best location of NBS. There is however a need and possibility to tune the

model using more detailed layers distinguishing small permeable patches within build up areas, adding some more information about soils, although for majority of the area the assumption about anthropogenic – therefore low infiltration capacity – needs to be made. Adding additional layer of actual pluvial flooding occurrence has been discussed and considered as a next step.

In September 2020 INRA organized a training session for all consortium partners and students who will further develop model locally to meet objectives of WP4.
The report D 2.1. Report describing implementation and results of the "Model for NBS suitability" will be completed with the Finnish case by the beginning of 2021.

There is a deviation in delivery of M 2.1. related to late start of ATENAS superimposed by COVID-19. Actions initiated in the end of 2019 have been hampered by lock down, which limited the interactions with stakeholders.

ATENAS has an ambition to co-design cities' NBS according to local contexts: history, culture, ecological values of the areas and economic viability, while still to apply technical and technological standards tested in other projects. The milestone **M.2.2 Expert pre-selection of NBS and re-design options (where applicable), that correspond to hot-spot management needs – national workshops,** was focused on filtering the broad information on NBS, to provide local stakeholders with solutions best fitting their own contexts.

In the Finnish case, the hotspot areas have been discussed in the meeting with the land use and water management experts of the city of Vantaa. Hotspots have been preliminarily identified on the basis of previously modelled flood risks, functioning of blue-green infrastructure and urban development needs. The city of Vantaa is currently processing a new masterplan for the whole area of the city, and many questions for further analysis haven risen from the challenges met in the planning.

In the French case, the hotspot has been selected in agreement with the river syndicate after a meeting, where results of the previous experimental site were considered conclusive. The ATENAS demonstration site is located in a river bed, that is heavily impacted by urban runoff. Its quality degrades that of the main watercourse into which it discharges. Consequently, the improvement works carried out on the main watercourse are not valorised. The demonstration site is located just upstream of the confluence with the main river. The objective is to intercept organic pollution in low waters in order to bio-degrade it naturally. The proposed NBS is called "porous ramp". It consists of pebbles that block the flow over part of the width of the river bed. It allows the storage of sand that circulates naturally in the watercourse. This storage, carried out according to innovative eco-engineering, allows the flow of polluted water to be directed through this natural filter. It is a device for amplifying the self-purification capacity. The device includes two porous ramps. It will be equipped in December 2020 with water quality measurements to evaluate its efficiency. The IRIP mapping shows that this sector combines the properties of high water transfer and accumulation potential. It is therefore a favourable location for the development of an NBS.

In Lodz the starting point were pluvial flooding maps, observations and bilateral discussions with

city decision makers on critical areas requiring action in order to recharge rainwater to the river, and simultaneously to protect the assets. The types of NBS have been defined based on previous studies related to perception of blue-green infrastructure, citizens' demand on greening the city, and experiences of FPP Enviro in implementation of different types of NBS. The initial selection pool included: green roofs, green walls, biofilters, wetlands and ponds, rainwater gardens, infiltration ditches and basins, green bus stops, plant buffering zones, denitrification zones and tree trenches. During subsequent meetings and discussions organized between December 2019 and May 2020, and considering results of the Civilian Panel on City Greenery (May – July 2020), which operation coincided with ATENAS, the selection has been reduced to: 1. free standing and building-associated green walls, with green bus stop as an option, 2. rainwater gardens with option of society gardens, 3. façade gardens – small impermeable surfaces created along walls of the buildings, 4. water tanks – indicated by citizens as source of water for different purposes, however with option of biodiversity friendly ponds, 5. infiltration basins. The selection is based on leading themes in the City policy now and popularity – therefore willingness to multiple – of solutions among Lodz inhabitants. Possibility to broader the choice later under WP3 is also considered. For all the solutions barrier / critical factor analysis was carried within WP1, they are also feasible to apply in areas indicated by IRIP model. Designing options are currently analysed with stakeholders – i) with decision makers in order to establish a clear legal implementation path (decision tree) and to indicate critical aspects related to location, structure of NBS and required associated infrastructure, and simultaneously ii) FPP Enviro being responsible for technical design and implementation and iii) with local activists in order to understand needs, expectations, preferences and fears of communities within the study area.

WP3 - NBS scanning, selection, redesign

Although no deliverables have been planned in WP3 until mid-term report, this is a workpackage potentially the most impacted by the COVID-19 situation. According to the plan WP3 is to capitalize on the information about environmental context (WP2) and critical stakeholders (WP1/5) and engage the business partner FPP Enviro. Based on understanding the enabling / disabling environment, pre-selected solutions according to local needs M 2.1, ATENAS has ambition to analyse the best practices and best examples of NBS implementations to select, in a participatory way, the elements which have a special meaning at demo sites and bring added value to the sites and communities in terms of multi-functionality, aesthetics, sense of place and education. The work was to involve broad range of actors, number of workshops and events and lead to 2-3 implementations of the exemplary NBS in all demo sites. The final outcome of the WP is a main product of ATENAS - "NBS cook book", understood as "personalized" know-how on implementation, operation and monitoring of selected and designed NBS.

The target is to be achieved in three steps. The first one is **M.3.1 Demo site workshop on NBS co-benefits, selection and co-design for local implementations**, was to be finalized in April 2020, however it is in different phases of accomplishment in demos. The critical factor here is a living-lab approach and participatory co-design. Pandemics significantly reduced possibility to engage society into the project. Partners had to develop new communication channels to reach

citizens and still one of the main goals – to build upon the recycling of skills and knowledge of seniors and to build society of knowledge including marginalized communities – has not been achieved. The current steps are focused on stakeholders already linked up with the project.

SYKE has started examinations of NBS selection for different urban gradients. Planning areas where NBS selection is a current issue have been identified by researchers, but also brought up by expert workshop participants. The aim has been to find ongoing development project in the metropolitan region where planners are interested in collaborating with the ATENAS project. Several areas have been preliminarily chosen for examination, and YKE researchers have started investigations in two areas. The question of NBS selection for different urban gradients is particularly topical n new sub-center Kivistö in the city of Vantaa, where reconciling density objectives and space required for NBS is a big challenge. Kivistö is being developed around a railway station in three density zones. NBS options for the zones have been discussed with four meetings with local planners and will be assessed with the help of Multi-Criteria Decision Analysis (MCDA) framework in November-December 2020.

In France a first draft of the cook book has been produced to assist in the selection and sizing of an NBS to answer a local question. The prefiguration of the "cook book" is an entry through the natural processes that are implemented by different types of NBS. The next step is to define the implementation constraints and management rules that correspond to particular processes. The objective is to communicate the operating principles, monitoring indicators and maintenance operations to decision-makers. For this purpose, two meetings were held with the sanitation union (SIAHVY) and two engineering firms to define the best NBS to be implemented. One case concerns the treatment of wastewater from about ten houses by means of a filter planted with reeds. The other case concerns the use of a wetland to treat urban rainwater. As the topography is not favourable, the solution of an amplification of the self-purification capacity of a small river is under discussion.

In Poland ERCE initiated workshops on identification of NBS critical for the city in terms of meeting goals of climate change adaptation and mitigation of UHI, recognizing the funding sources and activists / leaders willing to support NBS implementation in variety of ways. A learning alliance has been established bringing together NGO monitoring city trees and organizing trainings, the Allotment Gardens Association which can provide plants for NBS, hobbyists specialized in plants of historical and cultural meaning, football clubs offering manpower and organizing open air schools for children, primary schools of the upper Lodka catchment area, the Lodz Landscape Park Office providing seedlings of old trees and shrubs cultivars, mostly extinct in the area, city guides, the Strike for Earth activists, the Ecological Training Centre Źródła, and many others. In next months, activists will begin a process of designing standards for NBS implementation in the city. ERCE will also apply the MCDA methodology provided by SYKE to consider optimal solutions for different city spaces. The workshops will be carried using Mural interactive platform (www.app.mural.co) and Mentimeter (www.menti.com).
The second part of planning and co-design is related to particular locations, and NBS construction. The locations have already been selected in the City with support of City's departments, however

a serious delay is foreseen. The process of co-design involves marginalized communities and requires time to build trust and interest, especially under COVID-19 conditions, the contract of lending the land to ATENAS has been processed for several months already and no design is possible without having final confirmation on ground availability, also preparation of technical plan requires time, finally implementation must fit the beginning of growing season to make the effects visible to implementers. Prolongation of the project by 6 months would make the plan more feasible and concordant with ATENAS core assumption – transparency of process, and inclusiveness.

Additionally, ERCE launched collaboration with the Lodz School of Revitalization to understand business options related to NBS and drafting a business model.

In consequence of delayed accomplishment of M 3.1 the deadline for **M 3.2: First draft of the "cookbook" to be used for M.3.1** had to be postponed.

WP 4 - Closing Water Gap – strategy setting for NBS implementation

WP4 has recently started with reviewing both the information gathered so far by other workpackages to identify the gaps in knowledge or information that needs to be filled before the setting up a concept of upscaling the solutions (**M.4.1 Pooling and review of the results of WP1-3 for analysing**). Simultaneously it searches through successfully applied approaches linking qualitative and quantitative information and facilitating cultural, mental, technological switch from conventional water management to NBS in cities.
There is a slight delay in the review process due to shifts in time of other milestones and deliverables, however WP4 takes also a role to complement other WPs with the elements, which are missing or must be precised. As the IRIP model already allows to identify the hot-spots for NBS implementations at larger scale, the methodology of WP4 will focus mostly on overcoming other constraints, The adequate choice seems to be methodology applied in the sister project of ATENAS – H2020 NAIAD (http://naiad2020.eu), where fuzzy cognitive mapping (FCM) has been innovatively combined with social network analysis (SNA) for identification critical knowledge – agent – task interactions that create conditions to NBS upscaling (Giordano et al. in press).

WP 5 – Mutual learning

WP5 implementation has been and will be conducted through following activities:

- **M.5.1 Stakeholder mapping and organization of networking between representatives of different cases, disciplines and sectors of administration**
- **D.5.1 Identification of stakeholders and ways to engage them in co-design actions**
- **M.5.2 Plan for training and dissemination (December 2020 - January 2021)**
- **D.5.2 Online events, courses and guidance materials, such as videos**

WP5 deals with co-design methods and mutual learning of city authorities and other stakeholders.

The project promotes methods to engage stakeholders and develop NBS with them. In the case areas, the first step was to carry out stakeholder mapping. The WP provided guidelines for the mapping which was realized in all case areas. In addition to stakeholder mapping, the aim was also to organize networking between representatives of different cases, disciplines and sectors of administration (**M 5.1**). The networking among project partners has taken place mostly on national level, mainly because of the COVID-19 pandemic.

The stakeholder engagement process can be divided into two major operational phases: inclusion and closure. Inclusion means that the organizing team needs to decide who are invited to become stakeholder and those who are left out. SYKE guided other partners with mapping and choosing key stakeholders for demo sites (**M5.1**). The idea of structured mapping is to make sure that all potential actors have been identified and their role in the project discussed. Optimally, stakeholder mapping has been done in collaborative way and discussed with key stakeholders. Closure includes the selection of tools of how these stakeholders are involved and engaged. Project researchers need to evaluate how powerful the stakeholder is to facilitate or embed the project (e.g. level of influence), and how relevant the project is for the stakeholder (e.g. level of interest). Based on weighted results of influence and relevance, the level of participation (inform, consult, involve, collaborate, empower) can be chosen. Different participation tools may be used and selecting the most effective set of tools for engagement is crucial to the success of the whole process. ERCE made carefully mapping and identified totally six different local authorities, three municipal companies, local administration, local communities, NGO and university as stakeholders that need to be engaged at certain level. The first round of partner selection was linked to their power with reference to provide basic input to the project: land, data, legacy, extensive dissemination channels, the second round involved those stakeholders who can bring to the project innovative thinking, networks, skills, the third round included end-users of ATENAS products: implemented NBS, awareness and knowledge. Two latter groups have been actively linked with the project by specialized social animators working in the field, distributing information about the project, contacting groups of interests which use similar key-words, and carry synergistic actions, checking the relationships between people and the area, developing narrative about the past / history of places and current linkages. ERCE has organized meetings and workshops engaging all the stakeholders, it also carried interviews among local residents, released questionnaire revealing stereotypes related to water in the city, and finally launched field observation of people behavior and customs in the future NBS implementation site. SYKE, on the other hand, identified local and regional authorities (city planners, environmental experts), planners and environmental experts from consultant companies, and researchers as to be invited to the workshop (**D5.1**).

The French partners of the ATENAS project have been selected already prior the project submission. Those are the river syndicate (SAGYRC) and the sanitation syndicate (SIAHVY) of the peri-urban catchment area of the Yzeron, whose downstream part is in the city of Lyon. The two syndicates are complementary in order to better manage the water resource and its extremes. They coordinate their actions around the basin's water resource management plan, which aims to conserve the resource in the catchment area as much as possible. The SAGYRC is responsible for achieving good ecological status (2000/60/EEC). The SIAHVY improves its sewerage network infrastructure so as to no longer pollute watercourses by urban discharges during rainy weather

and to convey urban waste water (91/271/EEC) to the central treatment plant in Lyon. The stakes are ecological, sanitary and economic, because the SIAHVY pays a depollution tax per cubic meter transferred to the central wastewater treatment plant in Lyon. The management and planning of sanitation is closely linked to that of urbanisation. SAGYRC has drafted a letter of intent for the ATENAS project. It provided the location and technical services for the first demonstration site. SIAHVY signed a partnership agreement with INRAE in June 2020, with funding for the expertise of new nature-based solutions to treat wastewater and urban runoff water. Two sites are under study and should be completed in 2021 and 2022. INRAE is supporting two research consultancies in this context.

The choice of these two operational actors of the catchment area allows to have a spatialized approach of NBSs by proposing alternative solutions to the "all in the pipe" usual approach for urban used waters.

To enhance mutual learning, each partner organized an interactive workshop for key stakeholders. The stakeholder workshops were organized in spring 2020 and gathered experts from different organizations, disciplines and sectors of administration. The plan for training and dissemination (**M 5.2**) has also evolved because of the uncertainty related to organizing meetings. In October 2020, the training and dissemination activities are agreed to be organized online as a default. Sessions involving representatives from different case areas are planned for November-December 2020. WP5 has also developed Multi-Criteria Decision Analysis (MCDA) approach for NBS planning in co-operation with planners from cities of Vantaa and Helsinki. A framework for the valuation of NBS objectives is developed jointly in Kivistö case study. NBS cases and alternatives have been selected for two workshop discussions that will be organized in the end of 2020 or beginning of 2021 depending on the city of Vantaa. The same methodology will be tested in the Lodz case study.

WP X - Coordination & management

The coordination workpackage began its operation formally on 1st April 2019 and operationally on 1st March 2019 with **M.X.1 Setting up the office**. The first task included preparation of the Consortium Agreement.
Due to delayed funding decisions the first six months of the project were based on virtual contacts among consortium members. Although information about eligibility of costs incurred since the 1st April 2019 has been confirmed by all funding bodies, at least in case of the project coordinator there was no formal confirmation that the project will get funded and up to what budget until October 2019. The kick off meeting has been organized on 18th April 2019 (**M.X.2 Kick off meeting**) with virtual presence of all the partners.
The informative brochure in local languages - **M.X.3 Informative brochure in local languages** – has been substituted with dedicated local website (Lodz), and website information about the project (Helsinki and Vantaa). The gained experience will be also used to set up a website for Lyon demo site. The presentation template, basic presentation and roll-up, together with general project website and logo have been released in March-May 2020. They will be complemented according to project development and populated with its results. The delay is a consequence of

late funding decision which made impossible to open the call for website design required by public procurement law.

Accomplishment of **M.X.4 Launching meetings for local stakeholders meeting in demo sites** foreseen for June-July 2019 has been extended in Vantaa and Lodz beyond this period, what enabled to create a snow-ball effect. Lodz organized the first meeting in November 2019 as an information event for the City decision makers. It involved seven critical city departments: Municipal Services being the owner of implementation site, Bureau of Public Participation running all participatory and information actions in the city, Board of City Investment responsible for all the grey infrastructure investments, Department of Ecology and Climate being in charge of all the aspects of water and nature management, City Waterworks in charge of city rivers and stormwater system, and Urban Planning Bureau. Subsequent stakeholder meetings engaging other groups (see WP5) have been still organized to increase impact of the project and establish community of practice.
In France launching meeting was held in Vaugneray in January 2020, in the presence of representatives of the sanitation union (SIAHVY), of the Yzeron river union (SAGYRC), of the metropolis of Lyon, of the community of communes, of the regional Water Agency, of the water police, of various elected representatives of commissions delegated to town planning, environment, technical services, of the company in charge of the maintenance of the network (SUEZ), the engineering offices involved and researchers from INRAE.

SYKE organized stakeholders workshop in spring 2020, anteceded by number of meetings taking place already from spring 2019.

All the partners successfully reported to funding agencies by March 2020 - **M.X.5 Annual reporting to funding agencies** – getting a green light to proceed with work according to the plan.

The milestone **M.X.6 Annual and final meetings** that foresaw consortium meetings for January 2020 and October 2020 has been approached in flexible way due to entirely virtual way of communication. The meetings were organized every one or two months (despite holidays breaks) with monthly bilateral communication.

b. Collaboration, coordination and mobility

- *Is the collaboration between partners effective? Is the contribution of each partner clearly identifiable? Does the project still meet the transnational nature?*
- *Please, indicate clearly those who performed the work (incl. also in-kind partners).*
- *Are the coordination and organisation of the project efficient?*
- *Please, describe the mobility of the researchers within the Consortium.*
- *Please indicate coordination with other projects funded in the 2018 Joint Call or national and international projects funded by other instruments*

Collaboration between partners has been efficient, first thanks to the clear organization of the project structure, involving 5 subsequent and supplementary steps (WPs), second with the help of regular online meetings of the whole consortium, and between individual partners whenever

necessary. Slightly different situation has been encountered with regard to interaction with stakeholders. ATENAS is a project build around the concept of inclusiveness, broad collaboration and outreach, engagement of society, and deep consideration of local contexts for NBS. There is a number of stakeholders i.e., decision makers, with whom collaboration (even transnational) also works well involving meetings in person, hybrid events and remote collaboration. However, COVID-19 heavily impacted involvement of civil society, in particular seniors, school children and marginalized societies, what was one of major aims of ATENAS.

The contribution of each partner has been clearly identifiable and presented in the reports, when applicable. ERCE took responsibility of organizing and managing the workflow, communication, presentation of the project (WPX), with the support of all the partners. In recently started WP4 it is to lead the harmonization of the results, filling the gaps in knowledge recognized in other WPs, and create the common approach for upscaling NBS. SYKE took responsibility for in-deep analysis of legal, societal and cultural framework and review of knowledge on challenges and successes of existing NBS (WP1 and WP5), supported by ERCE which employed dedicated social animators and collaborates with variety of stakeholders within Lodz Learning Alliance. FPP Enviro served its knowledge and experiences with implementation of different NBS as a practitioner and SME developing such solutions internationally. IRSTEA / INRA contributed with its excellence in hydrological modelling, ecosystem engineering and environmental monitoring, leading WP2 and WP3.

However, by the ATENAS' specificity each consortium partner had to play two roles – a lead of transnational task and a lead of the own demo site activities. This required, especially in COVID-19 conditions, a strong focus on local actions and actors. In this case the consortium took care also for an exchange of experiences between cases, with subsequent virtual trips, more of which is still foreseen. For example, the first year of activities revealed that each demo site has a distinctive set of key issues, which differ between the cases. The local environmental context creates differences e.g., in problems for which solutions are sought and the phase of NBS implementation. The broad approach to NBS applications applied in project's Work Packages has enabled the examinations of NBS in different phases and contexts. In the second phase of the project more harmonization between methodologies is to be achieved through sharing the most efficient approaches. In the mapping of critical factors, the consortium has already produced a common template that was applied in the workshops in each case area. Although the composition of workshop participants varied between the workshops, and so did the leading themes, the common template enabled the collection of ideas on the shared topics.

One of a very efficient tools enabling transnational co-operation are modelling ones, which can serve not only ATENAS demo sites, but also a variety of areas in Europe, after being tested in different circumstances. In Southern Finland, relatively flat topography, clay soils, medium rainfall, snow and rain intervals in the winter and occasional dry hot periods in the summer characterise the environment. In Southern France, topography, climate and soil differ significantly from Finland. On the basis of pilot analysis carried out in the project, the same modelling can be applied in both areas, when it has been tested and results reviewed and interpreted.

Another outcome of ATENAS, with clear potential for transnational application, especially under COVID-19, will be the guideline for stakeholders' involvement in NBS related activities, incorporating different lines of actions from policy analysis, legal path development, defining and

attracting activists, mobilizing civilians, broader education and collaborative implementation of NBS.

It needs to be underlined, however, that although the project met its transnational nature in terms of content, it was not able to develop its full collaborative and dissemination potential due to constrained international trips, cancelled conferences, subsequent bans on national and local gatherings, and isolation of local communities due to pandemics. The fact that ATENAS consortium operates only based on virtual platforms since its beginning, and its members had no chance to visit sites in other countries which they support with their work, neither to meet in person, also influences the outcomes of the project. The situation is an outcome of several superimposed factors: late release of decisions about funding in case of IRSTEA - July 2019, FPP Enviro and ERCE (the coordinator) - October 2019; this made impossible to charge institutions' budgets with substantial cost, and influenced the decision to shift visits to the sites to spring 2020 - the beginning of growing season, to allow overview of local environmental context important to properly consider NBS; with outbreak of COVID-19 in March 2020 the plans had to be modified again in order to minimize the health risk to consortium members.

Surely coordination of the project has been handicapped by lack of meetings in person, discussions and joint workshops enabling real time working together, collective meetings of project partners - especially local / national stakeholders being interested in study visits, and synchronization of the actions.

There is very limited contact with other JPI Water projects. However, ATENAS has been linked up with H2020 project NAIAD (http://naiad2020.eu) and Biodiversa project ENABLE (https://www.biodiversa.org/1014) being a follow up of both in terms of building the knowledge about insurance role of ecosystems in Lodz and understanding the limits to accessibility of green areas and their services to broader society. SYKE's collaborator HSY is involved in EU CBC project Rainman (http://projects.gtk.fi/rainman) and synergies have been sought between the projects. The outcomes of an earlier EU European Regional Development Fund project Climate-Proof City (ILKKA) – Tools for Planning (https://ilmastotyokalut.fi/en/about-the-project/) have been used as a starting point when collecting local NBS implementations to analyse their critical factors. The EU Horizon 2020 project Urban Nature Labs (https://unalab.eu/en/) offers opportunities for interesting comparisons to ATENAS having the Finnish city Tampere as a frontrunner example of NBS implementation. A national meeting of Water JPI projects in Finland was organised by the Academy of Finland in November 2019. ATENAS project was presented in the meeting, and information was exchanged between the projects.

Currently ATENAS will spin up with H2020 project EuPOLIS (https://cordis.europa.eu/project/rcn/229212/en) operating in the City of Lodz, but involving eight other cities around Europe and beyond, and it is building a knowledge on the links between NBS, blue-green infrastructure and health.

c. *Impact and knowledge output*

- *Are the main impacts achieved?*
- *Are there any unexpected impacts?*
- *Where do the results of the project impact? (e.g. industry, end users, policy, etc.)*
- *Have the partners identified exploitable results?*

- *Has intellectual property protection been considered?*

The main impacts of the project have not been achieved so far, although the progress has been made. ATENAS recognized two sets of impacts: at general project level and at demo site level.

At the project level ATENAS promised to contribute to: *Improved use of scarce human and financial resources in the area of water research and innovation and reduced fragmentation of water research and innovation.* ATENAS capitalizes on the knowledge and data gathered by H2020 NAIAD, Nature4Cities, RadomKlima, EHREK and ThinkNature, international project Rainman and European project ILKKA. Locally each partner links up with NBS implementors (private investors, NGOs) to better recognize pros and cons of NBS types locally, and create pathways for cost-efficient implementation of NBS.

With respect to *Synergy, coordination and coherence between national and EU funding in the relevant research fields through transnational collaboration*. ATENAS ATeNaS builds upon established long-term collaboration among stakeholders and embeds its actions in local needs and investments aimed at meeting EU regulations (WFD, Nitrogen, Habitat), international commitments – COP21, SDG, and EU strategies – cohesion policy. The products of the project e.g. mapped by the IRIP modelled sources and accumulation places of run off, initiated overview of models allowing for individual NBS modelling and design, or the "cook book" for NBS implementation including building up human capacity contribute to national strategies of sustainable development and climate adaptation. The links established with international networks – UNESCO IHP Ecohydrology programme and Long-Term Ecosystem Research – allows for better exchange of knowledge and application for complementary funding, bringing competences of other partners.

For *Improved implementation of research and innovation programmes* ATENAS is progressing with experimental NBS implementations based on co-design and living-lab approach, building the contact platforms between SMEs and decision makers. Together with identified business partners ATENAS is building the knowledge base on business options related to NBS. The consortium is currently establishing alternative ways of communication to meet the aim of providing extensive trainings to local leaders, and to trigger citizen projects. Due to COVID-19 those goals are more difficult to meet. ATENAS has also an ambition to identify and network local suppliers of modules needed for NBS construction as well as NBS experts.

ATENAS also facilitates *Implementation of the Sustainable Development Goals (SDGs) as well as the conclusions of the COP21 Paris Agreement27*. Although actions in all the demos have been very much impacted by the pandemics, the progress towards selection of model NBS for upscaling in the cities is progressing, its part will be recommendations of measures which enable improved quantity and quality of water in urban areas, improvement of habitat conditions for biodiversity, and securing quality of life and recognition of the health issues. Simultaneously ERCE and SYKE are developing the methodology to ensure social inclusion along the whole process from visioning through planning to implementation of NBS, with particular focus on marginalized communities. It appears to be especially challenging under COVID-19 regulations because such communities cannot be approached virtually.

ATENAS is also pushing for *Strengthening the competitiveness and growth of companies by developing innovations meeting the needs of European and global markets; Delivering innovations to the public and private markets, including public administrators (public executive bodies) and civil society organisations*.

ATENAS has already established a mutual learning process in all the demos with number of actors including local companies, citizens, societies, organizations and decision makers. The materials supporting decision makers in awareness building, and serving know-how for implementation on NBS for climate adaptation and water regulation are in progress.

Łódź demo site launched website for local communication and fanpage with aim to develop them into permanent communication platform where activists will find know-how they need for implementations, decision makers will store the information important for NBS implementations in cities and SMEs can advertise their products or projects.

In the Finnish case, the main impacts are related to the identification of critical factors in NBS planning, implementation and maintenance, NBS selection for different city fabrics, and assessment frameworks for the collaborative planning of NBS. The project also contributes to more efficient use of different planning tools and produces research-based knowledge on how to integrate water management, analysis on land use and green surfaces, and studies on urban form. In the middle of the project, many processes are still under way, and impacts will be fully achieved by the end of the project.

Thus the main users of the project outputs are the cities, but also other stakeholders, such as consultancies, building companies, local residents, and other research institutes. The exploitable results of the project have been discussed in stakeholder meetings. The researchers have actively tried to find out how research activities could be integrated to current processes in the cities and provide support to them. The NBS case studies have been directed to local planning questions, where the city officials have seen most added value from co-operation. In the city of Vantaa, Kivistö is such an area, and in the city of Helsinki, Malmi sub-centre. In case of Łódź the lower Łódka River catchment being also an ongoing city revitalization project.

The intellectual property protection has been considered in the respective paragraphs of the Consortium Agreement.

3. Table of Deliverables

Please indicate whether the planned deliverables are completed, delayed or readjusted. Explain any changes/difficulties encountered and solutions adopted. Please add/delete rows, as necessary in the table below.

Deliverable name	Lead partner (country)	Date of delivery (dd/mm/yyyy)	Changes, difficulties encountered and new solutions adopted
WP1			
D.1.1. Report on critical factors and indicators in NBS planning, implementation, maintenance (May 2020)	SYKE	(1) 31/10/2020 (2) 30/11/2020	Due to late start of project and delay in organizing stakeholder workshops, the D1.1. is running a few months behind the scheduled deadline. Delivery in two steps: (1) A draft version with reported analysis results in text, (2) Illustrated report published on web pages.
D.1.2 Factsheets on barriers and ways to overcome them (July 2020)	SYKE	31/12/2020	Due to late start of project and delay in organizing stakeholder workshops the D1.2. is running a few months behind the scheduled deadline
WP2			
D.2.1 Report describing implementation and results of the "Model for NBS suitability" in the form of decision maps (March 2020)	INRA	10/12/2020	Deliverable is only partly completed. At the moment Model has been implemented fully in Poland and French demo watersheds. Some data with enough refine spatial resolution are lacking at the moment for Finland and Poland. Data providers were not working as usual due to the pandemic situation. Solutions have been discussed with stakeholders to overcome this problem and succeed by end of year.
WP3	**N/A**		
WP4	**N/A**		

WP5			
D.5.1 Identification of stakeholders and ways to engage them in co-design actions (November 2019)	*SYKE*	(1) 31/12/2019 (2) 30/11/2020	(1) Guidance for partners how to map and identify key stakeholders, feedback to ERCE about the stakeholder mapping work. (2) Written report from each workshop and analyzing results for identifying enablers and barriers for NBS by each partner
D.5.2 Online events, courses and guidance materials, such as videos (March 2020, September 2020)	*SYKE*	31/12/2019	Power point presentation "Stakeholder mapping and involvement – 3 steps" for partners. We will have more online meetings at the end of 2020 and beginning of 2021.
WPX			
D.X.1 Setting the ATENAS project website	ERCE	01/04/2020	The project coordinator received the positive decision about the funding only on 3rd October 2019; this blocked all the actions based on budget for central services. The call for offers was released by ERCE as soon as the funds got confirmed.
D.X.2 Periodic summaries on project progress (months: June 2019, November 2019. March 2020, July 2020, November 2020)	ERCE	18/04/2019; 18/06/2019; 07/11/2019; 12/12/2019; 05/03/2020; 03/06/2020; 24/09/2020	The periodic summaries of progress are carried according to the requests of consortium members but at least every 3 months. They help to compensate for lack of physical meetings for the whole year 2020.
D.X.3 Mid-term consolidating study meetings in demonstration sites (months: January 2020, June 2020, October 2020)	ERCE	30/06/2020	Due to late start of actions the meetings have been shifted to spring and then blocked by the COVID-19 pandemics; the way to substitute the meetings partners prepared videos showing sites and challenges they face; the second round of virtual study meetings is planned for the beginning of November 2020

4. Budget review

Name of the Partner	Funding Agency	Funding	Salaries - Personnel Costs (€)				Equipement (€)		Travel & Subsistence (€)		Consumables (€)		Subconstracting (€)		Other Costs (€)		Total planned costs	Total costs incurred	Overheads (%)	Overheads (€)	Overheads incurred (€)	Total with Overheads (€)	Total with Overheads incurred (€)
			Permanent Position (planned)	Permanent Position (incurred)	Non permanent position (planned)	Non permanent position (incurred)	Planned	Incurred	Planned	Incurred	Planned	Incurred	Planned	Incurred	Planned	Incurred							
ERCE PAS	NCBiR	REQUESTED	44 664	6 992	41 486	8 173	3 234	0	11 000	523	6 000	-	5 000	-	10 000	1 948	121 383	17 637	25	29 096	4 409	150 479	**22 046**
		OWN	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL	44 664	6 992	41 486	8 173	3 234	-	11 000	523	6 000	-	5 000	-	10 000	1 948	121 383	17 637	25	29 096	4 409	150 479	**22 046**
IRSTEA	ANR	REQUESTED	-	-	54 000	19 180	1 820	0	10 400	934	-	-	5 600	1 860	2 500	1 826	74 344	23 800	8	5 948	1 904	80 292	**25 704**
		OWN	70 238	-	-	-	-	0	-		-	-	-	-	-	-	70 238	-	0	-	-	-	-
		TOTAL	70 238	-	54 000	19 180	1 826	0	10 400	934	-	-	5 600	1 860	2 500	1 826	144 564	23 800		5 948	1 904	80 292	**25 704**
SYKE	AKA	REQUESTED	105 000	30 370	-	-	2 100	0	10 500	520	1 400	-	10 500	-	7 000	-	136 500	30 890	63	66 150	19 133	202 650	**50 023**
		OWN	45 000	13 016	-	-	900	0	4 500	223	600	-	4 500	-	3 000	-	58 500	13 239	63	28 350	8 200	86 850	**21 439**
		TOTAL	150 000	43 386			3 000		15 000	742	2 000		15 000		10 000		195 000	44 128		94 500	27 333	289 500	**71 462**
FPP Enviro	NCBiR	REQUESTED	23 200	9 604	8 000	-	1 000	0	7 000	-	20 000	-	5 000	-	5 000	-	69 200	9 604	25	16 050	2 401	85 250	**12 005**
		OWN	4 640	-	1 600	-	200	0	1 400	-	4 000	-	1 000	-	1 000	-	13 840	-	25	3210	0	17 050	-
		TOTAL	27 840		9 600		1 200		8 400		24 000		6 000		6 000		83 040	9 604		19 260	2 401	102 300	**12 005**

5. Consortium Meetings

Please list below the Consortium meetings which took place during the reporting period, by filling in the table below. Add/delete rows as necessary in the table below.

N°	Date	Location	Attending partners	Purpose/ main issues/main decisions?
1	18/04/2019	virtual	ERCE (K. Krauze), SYKE (A. Rehunen), Fpp Enviro (I. Wagner), INRA (P. Breil)	Development of CA, discussing critical legal issues - delays in funding decisions, and contracts signature // CA evaluation closed by lawyers of Syke; still processed by IRSTEA; reporting on WATER JPI kick off meeting; possibility to organize a session at Ecohydrology conference in Faro as ATENAS or even JPI Water projects presentation event; reporting on the first actions at Demos, mostly internal planning meetings // Main decisions: finishing of CA must be a priority in order to get contracts signed and to release funding.
2	18/06/2019	virtual	ERCE (K. Krauze), SYKE (A. Rehunen), Fpp Enviro (I. Wagner), INRA (P. Breil)	Formalities related to starting the project and progress report // urgency of finalizing legal check of CA by IRSTEA; first discussions with stakeholders initiated at all the demos, mostly with decision makers; template for stakeholder identification and mapping // Main decisions: IRSTEA will provide final amendments to CA by the end of the month; sites will continue networking activities among stakeholders, preparation of the website of the project will begin as soon as ERCE will receive funding.
3	07/11/2019	virtual	ERCE (K. Krauze, R. Włodarczyk-Marciniak), SYKE (A. Rehunen, K. Vierikko), INRA (P. Breil)	Stakeholder mapping and stakeholder engagement – discussion of the approach and way forward // Presentation of the template for stakeholder mapping of WP5, approach to identify key players, reporting on bilateral talks and interest of different stakeholders groups // Main decisions: All the partners will fill the tables prepared by Syke to visualise the stakeholder platforms of each Demo; during next meeting the consortium will tackle the planning of discussion points for different stakeholders groups
4	12/12/2019	virtual	ERCE (K. Krauze, R. Włodarczyk), FppEnviro (I. Wagner), INRA (P.	Discussion on the content for the 1st stakeholder workshop on NBS implementations // Main decisions: 1. Optimally the 1st

			Breil, P. Namour); SYKE (A. Rehunen; K. Vierikko)	stakeholder workshop should be organized by mid-February; 2. In a meanwhile the information about NBS cases needs to pulled together to present them to stakeholders: types, locations, efficiencies, thresholds, weaknesses, and costs; 3. The template will be provided by Syke by the end of the year. 4. The source of information are real-life implementations, websites, papers.
5	05/03/2020	virtual	ERCE (K. Krauze, R. Włodarczyk), FppEnviro (I. Wagner), INRA (P. Breil, P. Namour); SYKE (A. Rehunen; K. Vierikko)	Progress of catchments modelling and work done in demos // the use of the first models for Polish and Finnish demos as a training tool; the first stakeholder meetings of Lodz and Helsinki are to be organized in March, the basics will be the template for stakeholder engagement provided by WP5 – SYKE; conference SURE2020 and ATENAS session; foreseen study meetings at each demo site; project website – the requests to the partners regarding contribution to the content // the first outcomes of the modelling to be provided by INRA by the beginning of next week; the most precise (in terms of resolution) data will be needed to achieve expected accuracy; stakeholder meetings should be documented in order to well describe the process of communication and collaboration; study meetings at each demo site must be postponed due to coronavirus epidemics, the initial new dates are: May in Helsinki, June in France and September in Poland; nice photos are needed for the website.
6	03/06/2020	virtual	ERCE (K. Krauze, R. Włodarczyk, A. Bednarek), FppEnviro (K. Korpowska, I. Wagner), INRA (P. Breil, P. Namour); SYKE (A. Rehunen; K. Vierikko)	Tracing project progress – delays and the counteractions // delays related to model development – restructuring of IRSTEA and its merging with INRA; problems with employment of people due to COVID 19 constraints; alternative actions under WP 1 and WP5 to substitute foreseen participatory selection and assessment of NBS for each demo; actions to substitute lack of demo site visits and joint meetings of the consortium; activities performed in each demo: person-limited stakeholders meetings and communication, consultations over the NBS carried in all three demos; website requiring input of the partners // Main

				decisions: the model to be finished for Lyon and Lodz by the end of June, Helsinki need to provide higher resolution data; the review of the NBS from available materials is done however it still needs to be consulted with at least decision makers; due to the closed borders each demo will prepare set of videos to enable other teams to see the site and understand the context of ATENAS actions; all the workshops requiring direct participation of stakeholders are shifted to September and October.
7	24/09/2020	virtual	ERCE (K. Krauze, R. Włodarczyk, A. Bednarek), FppEnviro (K. Korpowska, I. Wagner), INRA (P. Breil, P. Namour); SYKE (A. Rehunen; K. Vierikko)	Mid-term report – progress on the deliverables, training on the modelling for demo sites // the delays in work of WP 1 and 5 and inconsistences in approaches; the website – new, cleaned version available for promotion; release of dedicated Polish project website: the newly opened sharepoint on OneDrive with the templates for reporting is created to facilitate file exchange; the need to strengthen work on engaging communities – request for adaptation of methods; the model training session /

6. Stakeholder/Industry Engagement

Maximum 1 page

- Please indicate how stakeholders/industry were involved in the project during the reporting period:
- *Has the project succeeded to engage with stakeholders/industry? If Yes, how? If No – why?*

The link to the business has been established by the French demo site, which already in the preparatory phase of the proposal involved both with the river basin syndicate (SAGYRC) and the sanitation syndicate (SIAHVY). Engagement of both partners has been recognized as condition sine qua none of implementations planned in Lyon.

In the Polish case a link to industry has been established recently with letter of intent signed by Mikronatura Środowisko Sp o.o., which has a longer history of collaboration with ERCE on developing the barriers against nitrogen non-point source pollution. Additionally ERCE has established contacts with business partners. Except FPP Enviro being already a beneficiary of ATENAS and interested in further testing of its know-how in Lodz case study, ERCE engaged one more SME implementing rain gardens in different Polish cities including Lodz, and two city investors: one with an expertise in implementing NBS as element of revitalized historical buildings (http://www.synergia.lodz.pl/en/budynek/zielony.html) and one representing Lodz Revitalization School (https://www.facebook.com/Lodzka.Szkola.Rewitalizacji/) being a consortium of companies, which supports ERCE in analysing legal and investment barriers to

NBS. All stakeholders have been identified and contacted by ATENAS social animators, via personal contacts, identification of active players in the City of Lodz and approaching societies and communes.

In the Finnish case, stakeholders from cities (different departments in administration), regional authorities, planning consultancies, universities and research institutes have been involved in workshops. Stakeholders from industry have not been directly addressed, but their viewpoints have been indirectly brought to discussion by planners and consultancies who work with them. Associations of locals are planned to be engaged in the next steps of the project.

- *If applicable, please, describe the provision of data by stakeholders/involvement of industry and dialogue between the project and stakeholders/industry.*

1) An agreement (including a soft financial support) with SIAHVY, within the framework of the sanitation development projects of its sanitation master plan. Responding to the issues related to the Water Resource Management Plan for the Yzeron basin drawn up by SAGYRC and validated in December 2017. The actions include :

- the fight against parasitic clear water intrusions, maintaining water on the territory, supporting low water flows and maintaining a quality water resource in the basin;

- reducing the impact of sanitation systems on the quality of watercourses.

The SIAHVY master plan includes a work programme listing and prioritising all the scenarios to be carried out, as the investments will be substantial. Innovative solutions based on NBS will be tested under the expertise of INRAE, which is developing applied research on these new eco-technologies.

2) A partnership with SAGYRC, in the framework of its letter of intent for the ATENAS project, consisted in providing in September 2020 a site to develop two NBS in a river impacted by urban rainy weather discharges. The materials and earthworks were financed by SAGYRC. If the system's performance is confirmed in 2021, other locations will be possible to improve water quality in the Yzeron river catchment area.

SYKE has directly contacted and met several times with city authorities in Vantaa. SYKE researchers have regularly met with city planners of Kivistö planning area, Vantaa. Together with city planners and other authorities SYKE have developed a content for a table of multi-decision criteria. Researchers and planners have exhaustively discussed about the role of NBS in urban & stormwater management planning. Regular meetings have enhanced mutual learning about barriers and capacities of NBS between planners and researchers. The stakeholder workshop was organized together with HSY, and due to bad covid19-situation in spring 2020 in Helsinki metropolitan region, the workshop was organized virtually. These meetings have been crucial to implement and achieve expected impacts of the project in Helsinki region.

ERCE did not request data neither from stakeholders nor industry, however stakeholders were requested to support the project with their thematic knowledge and to enable recycling of ideas and skills of activist and society members. With this regard ERCE capitalized on the knowledge of: 1. small family enterprise of Elżbieta Urbaniak (designer of first rainwater gardens in Lodz) to learn on pros and cons of small NBS; 2. Mikronatura Środowisko company engaged in protection and improvement of surface water to consult the creation of guidelines and possible implementations, engaged 3. the Community Tree Keepers to supplement ATENAS with knowledge on native trees and shrubs which can serve NBS implementations in the city, 4. the Greenpeace Project on Urban Pollinators – to recognize role of key flowering herbs and weeds in the City and popularize them in NBS; 5. investors from the Lodz Revitalization School to analyze legal path for land

development, and indicate critical points for broader implementation of blue-green infrastructure in densely built-up areas, and to create synergy between ERCE biotechnological innovations and innovators from the School towards new solutions for cleaner water and air; 6. the core investor of the Synergia to start a networking platform for the suppliers and recipients of ideas and technical elements for NBS construction (water tanks, pipes, substrates, rainwater collectors, etc.); 7. the Strike for Earth community as a networking gear. Additionally, ERCE continue collaboration with the City of Lodz offices with respect to deploying the land for ATENAS implementation, obtain the documentation on critical infrastructure, create the decision-making tree for NBS selected with the City, namely NBS related with: rain water gardens, façade gardens, green walls, infiltration basins and ponds. ERCE collaborates also with the Social Participation Office, which organized Citizens' Panel on City Greenery.

- *Has the cooperation between the Consortium and industry/stakeholder partners influenced the project outcome(s) to date? If Yes, How? If No, why?*

There is no direct outcomes of the collaboration with industry and business yet, because of the early stage of partnerships. Many planned actions have been suspended due to COVID-19. To counteract this adverse impact of pandemics i.e. ERCE builds mostly on the past contacts trying to create a snowball effect and in consequence a critical mass of expertise on topics essential for the project: new applicable technologies, patented solutions which can trigger new ideas, and led to new solutions. In Helsinki / Vantaa and Łódź demo sites such influence is therefore expected at implementation stage of the project, where we will search for practical solutions to encountered local challenges.

In the case of the French partner, the NBSs are considered experimental. If the selected NBS demonstration site is effective, replication is already planned in the catchment area on other small rivers.

- *Outline the progress made towards achieving the project expected impacts.*

Although impact on the industry was not the main goal of ATENAS, the expectation is to advance available NBS with patented elements or being in the testing phase, whenever required or enabled by the local conditions. Those involve denitrification module – modułOPO patented by ERCE in 2020, or the biopolimer nutrient trap which won a prize at Concours Lepine Innovation Fair in 2018.
For the French demonstration site, the first results show the effectiveness of the device in covering trapping organic matter linked to urban waste during rainy weather. The 2020 monitoring will allow to evaluate the rate of biodegradation produced by NBS.

The other progress steps have been described in earlier parts of the report.

- *Were there unexpected impacts to date?*

There are three unexpected impacts of ATENAS experienced by the consortium partners:

a) The project to implement NBS in the French DS led to a win-win negotiation with an association of fishermen which had different objectives in terms of river development.

b) Networking activities of ATENAS in Lodz led to increased interest of business partners in the project as a way to normalize legal issues related to land development, clarification of administrative pathways, and also development of a business model of re-greening the city, while lowering the costs of maintenance of infrastructure. The subsequent two-weekly workshops are planned for October – January.

c) Stakeholder engagement in the Kivistö case area in the city of Vantaa, Finland, has articulated the connections of NBS planning to the wide planning context of the city. The assessment framework for NBS was produced jointly with city planners and environmental experts, and the co-development work brought new focus to NBS planning by emphasising links to strategic climate change mitigation and adaptation measures, resource wisdom targets, and ecological connectivity goals. NBS are not planned only as water management and land use issues, but touch many other aspects of city functions. The link to education was stressed already before ATENAS project.

7. List of Publications produced by the Project - Open Access

- List all presentations, posters, and publications in scientific, peer-reviewed journals derived from this project, separating those in preparation, those in review and those accepted or in press.
- Provide websites and/or electronic copies of the key ones.
- Indicate all the co-authors for each publication.
- Order publications per date (chronologically) and for each year by alphabetical order.

Metadata on all project publications are required to be submitted as part of the final reporting. This will be done via the **Open Data & Open Access platform**, available at: http://opendata.waterjpi.eu/ (also accessible from the bar menu of the Water JPI website).

Due to late start of the project and pandemics, no project outcomes have been published yet. Also, the events planned for year 2020 have been either cancelled or shifted to 2021. However, several publications are in preparatory phase.

Planned publications:

International	Peer-reviewed journals	1. Włodarczyk-Marciniak, R. Does educational profile influence students' perception of the ecosystem service provision of blue-green infrastructure? Digesting a hard lesson to university educators. Water. 2. Perlińska, K., Włodarczyk-Marciniak, R. People's needs towards and perceptions of urban green infrastructure – methods to track, code and understand the choices. Methods 3. Dahlberg N. & Marttunen M. Assessment of the multiple benefits of nature-based solutions – an approach. 4. Rehunen A. Applicability of nature-based solutions in different urban fabrics: a case study on urban water management. 5. Dahlberg N, Vierikko K, Rehunen A. & Lähde E. Combining runoff quantity and quality modelling with green area factor in NBS planning

	Books or chapters in books	Breil P. et al. 2020. "Nature-based solutions of bioremediation in water environment". In: *Sustainable Solutions for Environmental Pollution*. Scrivener Publishing and John Wiley and Sons To be published by the end of the year.
	Communications (presentations, posters)	1. Krauze, K., Belka, K., Sikorska, D., Włodarczyk-Marciniak R., 2021. The design of ecohydrological solutions to post-industrial city - combining citizens' attitudes and local knowledge with blue-green infrastructure impact assessment. 6th IAHR Europe Congress, February 15-18, 2021, Warsaw 2. Conference session "How to enable Nature-Based Solutions for urban water management: a socio-ecological approach": The 3rd World Conference of the Society for Urban Ecology, 7-9 July 2021, Poznań. 3. Breil, P. 2021. Influence of urban development on flood risk and the functioning of aquatic ecosystems. Plenary lecture, Ecohydrology & HydroEco joint conference. 18-21 October 2021. 4. Guerin S. & Breil P. 2020. Field visit presenting the Yzeron river restoration by SAGYRC and porous ramp principle by ATEANS project. https://www.astee.org/evenements/99e-congres-lyon-14-au-16-septembre-2020/.
National (separate lists for each nationality)	Peer-reviewed journals	1.
	Books or chapters in books	1.
	Communications (presentations, posters)	1. Presentation about ATENAS project in stakeholder workshop in Helsinki region (31.3.2020) 2. ATENAS info in SYKE's external website: https://www.syke.fi/fi-FI/Tutkimus__kehittaminen/Tutkimus_ja_kehittamishankkeet/Hankkeet/ATENASTo_Ally_Technology_NAture_and_Society_for_integrated_urban_water_management/To_Ally_Technology_NAture_and_Society_fo(52727) 3. ATENAS Lodz website: https://ATENASpolska.wixsite.com/lodz 4. ATENAS Lodz fan page: https://www.facebook.com/wodazielenlodz/
Dissemination initiatives	Popular articles	1.
	Popular conferences	1.
	Others	1.

8. Knowledge output transfer

For each of the Knowledge Output arising from the project so far, please complete the following table.

Short Title *Please provide a short and concise title to describe the Knowledge Output*	**NBS Info Cards: 10 case descriptions of different NBS in Helsinki metropolitan region and ATENAS demo sites**
Knowledge Output Description *Please only include generated Knowledge Outputs, not those that are expected. Note: Knowledge Outputs can be non-deliverables, milestones or 'grey knowledge'. Also, multiple Knowledge Outputs could exist within one deliverable, and should be separated.* *Try to give a comprehensive description, making the Knowledge Output fully understandable to a non-expert.* *If relevant please provide detail of where the Knowledge Output differs from its equivalent, e.g. What are the key characteristics of the Knowledge Output? What research is it adding to and what is innovative about the Knowledge Output? (Max 500 characters).*	Illustrative information about implemented nature-based stormwater management solutions that are developed in industrial, recreational or residential areas. There are maps and photos from each case site. Info cards covers following information: Type, location, problem to be solved, solution, effectiveness, capacity, life cycle, maintenance, co-benefits, disadvantages, risks, barriers, alternative solutions and Enablers for better implementation.
Knowledge Type	* other
Link to Knowledge Output *If you can provide a link to the Knowledge Output then please do so, e.g. digital object identifier (DOI), web address, download, research paper.* *If the Knowledge Output is not publicly available currently but will be in the future, please provide details. Also, if it is available but only upon request, please state this.* *If the Knowledge Output is not planned to be publicly available, please state "Not available for public".*	The knowledge output will be formatted and processed graphically and then published on the ATENASjpi.eu website as a publicly available product.
Sectors & Subsectors *Choose as many options as required from the list. Pick those sectors that you think would benefit from the application of this Knowledge Output.*	õ Flood Risk Management õ Adaptation to Global Change õ Others o Stakeholder Involvement
End User *Choose as many options as required* *Per identified End User, please identify possible applications of the Knowledge Output.*	o Education & Training o Environmental Managers & Monitoring o Policy Makers / Decision Makers o Civil Society
IPR *Please indicate whether IPR has been applied to this Knowledge Output (applied for a patent, copyright*	N/A

etc), or not. *Please insert "n/a" if no IPR has been applied.*	
Policy-Relevance If the Knowledge Output is relevant to the WFD or any other related Directives, please list and explain why	Document provides information on how to implement local NBS to manage urban stormwater problem and also how to improve quality of runoff water and decrease the risks of surface water pollutants.
Status *Please identify whether the Knowledge Output is finalised, is still being generated or whose status/future is unknown. Consider:* *• Is your knowledge conclusive enough that it provides sufficient evidence to make an impact on, or be applied by, an End User?* *• Is there a corroborating body of evidence, or are contradictory results, available?* *• Does your knowledge progress beyond the current state-of-the-art / evidence base?* *• Is more research or demonstration needed to validate the results?*	The output basic output is finalised however it is to be extended with additional information, formatted and improved graphically to attract potential end-users. It also needs to be translated into local languages in order to secure its broad dissemination. The output presents personalized information dedicated to end users of the ATENAS demo cities as well as nationally in France, Poland and Finland. It is to present only evidence based information "ready-to-implement".

Short Title *Please provide a short and concise title to describe the Knowledge Output*	**NBS Users' Behaviour tracing method (BTM)**
Knowledge Output Description *Please only include generated Knowledge Outputs, not those that are expected. Note: Knowledge Outputs can be non-deliverables, milestones or 'grey knowledge'. Also, multiple Knowledge Outputs could exist within one deliverable, and should be separated.* *Try to give a comprehensive description, making the Knowledge Output fully understandable to a non-expert.* *If relevant please provide detail of where the Knowledge Output differs from its equivalent, e.g. What are the key characteristics of the Knowledge Output? What research is it adding to and what is innovative about the Knowledge Output? (Max 500 characters).*	It is a methodology of tracing uses of blue-green infrastructure through non-invasive observation of people customs. Applied in Lodz the method allowed to reveal subconscious barriers to use of urban spaces, invisible borders, and hidden inhabitants' preferences, as well as societal interactions driven by the structure of the space. BTM is a field observation matrix supported by 1. description of users: age, gender, being part of a group or single; 2. the purpose of the visit: chat, passing by, walk, sport, dog walking; and 3. the ways of interaction with the space: drinking, cleaning, relaxing, exercising, It is also accompanied by detailed map of tracking movement of individual users.
Knowledge Type	* exploitable scientific result * scientific publication * services/tools
Link to Knowledge Output *If you can provide a link to the Knowledge Output then please do so, e.g. digital object identifier (DOI), web address, download, research paper.* *If the Knowledge Output is not publicly available*	The knowledge output is not yet publicly available however it is under preparation for a paper to journal *Methods*

currently but will be in the future, please provide details. Also, if it is available but only upon request, please state this. *If the Knowledge Output is not planned to be publicly available, please state "Not available for public".*	
Sectors & Subsectors *Choose as many options as required from the list. Pick those sectors that you think would benefit from the application of this Knowledge Output.*	) Others o Stakeholder Involvement
End User *Choose as many options as required* *Per identified End User, please identify possible applications of the Knowledge Output.*	o Education & Training o Environmental Managers & Monitoring o Policy Makers / Decision Makers o Scientific Community
IPR *Please indicate whether IPR has been applied to this Knowledge Output (applied for a patent, copyright etc), or not.* *Please insert "n/a" if no IPR has been applied.*	N/A
Policy-Relevance If the Knowledge Output is relevant to the WFD or any other related Directives, please list and explain why	N/A
Status *Please identify whether the Knowledge Output is finalised, is still being generated or whose status/future is unknown. Consider:* *• Is your knowledge conclusive enough that it provides sufficient evidence to make an impact on, or be applied by, an End User?* *• Is there a corroborating body of evidence, or are contradictory results, available?* *• Does your knowledge progress beyond the current state-of-the-art / evidence base?* *• Is more research or demonstration needed to validate the results?*	Paper under preparation based on two sets of collected data. The method can be replicated in any NBS implementation site prior a technical design. There are similar methods applicable to socio-ecological studies, applying different approaches and coding methods.

9. Open Data

In relation to Open Data, the funded projects will be requested to submit metadata on all the resources directly generated by the project, as well as additional information on how these data will be exploited, if and how data will be made accessible for verification and re-use, and how it will be curated and preserved. Metadata on all project resources are required to be submitted as part of the final reporting. This will be done via the **Open Data & Open Access platform**,

available at: http://opendata.waterjpi.eu/ (also accessible from the bar menu of the Water JPI website).

10. Problems Encountered during Project Implementation

- Please indicate if any problems were encountered during the Project Implementation.
- Did any of the partners find difficulties related to the grant agreement, the availability of funds at national level or other similar issues not specifically related to the technical part of the project?

a) A several months delay in payment decisions and funding, especially in the case of the project coordinator, burdened provision of central services and impacted partners mobility in 2019, with unexpected consequences related to later COVID-19 pandemics;

b) Prolonged formulation of CA according to formal requirements of all the partners;

c) Constraint contacts with consortium partners, no possibility to organize demo sites visits what results in situation when consortium is developing some of products "blindly", without ability to interact with places and stakeholders;

d) Very limited possibilities for project presentation due to cancellation of events;

e) Difficulties in contracting planned staff, e.g. due to COVID –19 all the medical points serving employees with legally required health check refused or delayed visits, also constraint mobility of people reduced interest in new positions;

f) Continued and subsequent lock down of cities departments and their workers delayed both formal and informal processes, e.g. enabling the land for NBS implementation in Łódź;

g) No option to work directly with local communities what was a core aim of the project – to design NBS fully customised to places in terms of ecological performance, but also cultural, historical elements, to activate communities in order to sustain implementations beyond ATENAS, to create a vivid network of NBS module suppliers, legal advisors, designers, funding institutions;

h) Difficult contact with SMEs which were to be the main actors at least in NBS focused networking.

11. Suggestions for improvement regarding project implementation?

I. **The ATENAS consortium requests at least six months prolongation of the project**. We are currently elaborating alternative ways of collaboration with our stakeholders, which are tested and improved according to the needs. Also to secure time buffer for the improvements, the ATENAS implementations require at least one more growing season. Due to COVID-19 all the legal procedures as well as participatory actions take much more time than assumed, while some of them are inevitable for the project, e.g. agreement over design of NBS among neighbouring communities.

II. Joint online event for all WaterWorks2017 projects would support networking of teams and ideas. We had initial insight of projects goals during the kick off meeting, however the progress of the projects and its trajectories due to current situation are unknown.