D.T3.3.4 FUA-LEVEL CWC STRATEGIES ON INTEGRATED CIRCULAR URBAN WATER MANAGEMENT INCLUDING TARGETED ACTION PLANS

Subtitle

Version 1
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PREPARED BY

MUNICIPALITY OF TURIN

CONTENT

INTRODUCTION

Summary of chapters 1-5. The description of stage of local strategies on circular urban water management preparation covering vision creation, goal and objectives setting.

The TURIN FUA Strategy Planplan is improved step by step in every Stakeholder Group Meeting. As already mentioned, the real problem is the absence of an administrative authority over the FUA that can give policies and regulations on the municipality.

Unluckily there are only 3 municipalities beyond Turin that are active in the Stakeholder group and we think that without a real contribute from the Città Metropolitana that can manage all the FUA Municipalities it will be hard to achieve the objectives of our new-born Strategy Plan.

We can, however, affirm that the participation of the Stakeholders already on board in the SGMs is always constant and active.

With the strong support of Iridra, we have developed a strategic plan with short and long term horizons (2030 and 2050) and the first Action Plan envisaging the actions to be implemented in the first 4 years.

1. Determination of the territorycovered by the strategy

Description of FUA as territorial unit.

The territory of the FUA of Turin is about 1.701 km^2 and has 89 different municipalities. Municipalities are very different in terms of urbanization and green areas, as some of them are mountain municipalities and others are urbanized cities. The criteria for determining the FUA territory elected by OECDencountersignificant problems when it comes to adopting laws, regulations, and policies on water management and creating a real governance system, because there is no administrative body corresponding to the FUA. It would be more feasible to work in a different geographic area, such as the "Città Metropolitana" or the "Regione".

2. Stakeholder involvement

The description of the stakeholders, and the way of their involvement in strategy building process.

Supplementing the description of the way of stakeholders involvement in strategy building process resulting from the third meeting (SGM3)

The engagement process went well, with a high level of participation, both from the qualitative and quantitative point of view.

Among the stakeholders, Regions have an important role as they write the urban regional regulations (normativa urbanistica regionale), which have effects on both provincial and municipal levels. Also the Autorità di bacino are important stakeholders, as they are the operators in charge of the supply and management of the network.

In the SGM4, Stakeholders gave inputs for the FUA level action plan, contributing to the design of the FUA-level action plan and strategy and outlining the desired interventions to utilize RW, GW and WW.Stakeholders have an impact on the final version of the strategic documents, that were discussed it in the SGM5. SGs took part in finalising the FUA-level strategies (OT3.1) identifying local policy measures fostering urban circle water use and finalized targeted action plans (based on DT3.2.5) to implement specific interventions.

The stakeholders involved in the SGMs are listed in the following tables.

Water management

INSTITUTION	DESCRIPTION	NAME	ROLE	CONTACT
SMAT	Single manager of the Integrated Water Service	Elisa Brussolo	Researcher	elisa.brussolo@smatorino.it
STET SPA	East Trentino Territorial Services	Manuela Seraglio Forti	Chairman of the board of directors	mforti@stetspa.it
IREN		Enrico Pochettino		enrico.pochettino@gruppoiren.it

Urban planning

INSTITUTION	DESCRIPTION	NAME	ROLE	CONTACT
Metropolitan City of Turin	local authority	Gianna Betta	Environmental Expert Officer	gianna.betta@cittametropolitana.torino.it
Piemonte Region- Strategic Plannin and Green	Local authority	Elena Porro	Officer	Elena.porro@regione.piemonte.it

Economy Sector				
Municipality of Collegno	local authority	Elena Casassa	Environment Councilor	elena.casassa@comune.collegno.to.it
Municipality of Rivoli	local authority	Chiara Mussino	Environment Councilor	chiara.mussino@comune.rivoli.to.it
Municipality of Venaria	Local authority	Diego Cipollina	Environment Councilor	Diego.cipollina@comune.venaria.to.it

Citizens

INSTITUTION	DESCRIPTION	NAME	CONTACT
Freelancer (trainer)		Antonio Castagna	castagnaformazione@gmail.com
Environmental Consortium Castello di Lucento	It brings together all the companies that carry out their business within the Area 4.19 Castello di Lucento.	Michele Zaffino	michele.zaffino@gmail.com
Environmental council		Emilio Soave	consultaambienteverde@comune.torino.it emilio.soave@alice.it
Freelancer		Marine Cornelis	Marine.cornelis@nextenergyconsumer.eu

Sectoral agency

INSTITUTION	DESCRIPTION	NAME	ROLE	CONTACT
ENVIRONMENT PARK	Science and technology park for the environment	Ilaria Schiavi		ilaria.schiavi@envipark.com
ARPA Piemonte	Regional Agency for Environmental Protection	Davide Bonansea	Employee Expert professional technical collaborator	e.bonansea@arpa.piemonte.it
		Renata Pelosini	Employee Expert professional technical collaborator	r.pelosini@arpa.piemonte.it
ENEA	National Agency for New Technologies, Energy and Sustainable Economic Development	Mariarita Minciardi	Researcher	mariarita.minciardi@enea.it

Other – Public authority

INSTITUTION	NAME	ROLE	CONTACT

ANCI	Elena Ciarlo	European Projects Manager	europa@anci.piemonte.it
ATC	Paola Leto	Architect & Project Manager	p.leto@atc.torino.it

Associations and NGOs

INSTITUTION	DESCRIPTION	NAME	ROLE	CONTACT
HYDROAID	Non-profit association	Sergio Galletta		sergio.galletta@hydroaid.it
Associazione Mercato Circolare (Circular Market Association)	Srl Benefit Company	Nadia Lambiase	Founder & CEO	nadia.lambiase@gmail.com;
D.O.C. s.c.s.	cooperative and social enterprise	Ignazio Cafarelli	Head of OPEN 011 structure	ignazio.cafarelli@cooperativadoc.it;
IL TUO PARCO (YOUR PARK)		Piergiorgio Tenani		info@iltuoparco.it
PRONATURA		Emilio Soave		torino@pro-natura.it

Higher education and research

INSTITUTION	DESCRIPTION	NAME	ROLE	CONTACT
Polytechnic of Turin - DIATI	Department of environmental engineering of the territory and infrastructures	Rajandrea Sethi	Director of the Department of Environmental, Land and Infrastructure Engineering	rajandrea.sethi@polito.it;
University of Turin	Green office	Stefano Ferraris	Green Office contact person	stefanof32@gmail.com

SMEs

INSTITUTION	DESCRIPTION	NAME	ROLE	CONTACT
HYDRODATA SPA	Engineering services, studies and research in the hydrological-hydraulic-environmental field, technical-economic and organizational consultancy.	Cecilia Mosca	Scientific coordinator of applied research	hydrodata@hydrodata.it mosca@hydrodata.it

Orti Alti (High Gardens)		Emanuela Saporito	Urban Designer	elena.carmagnani@ortialti.com emanuela.saporito@ortialti.com

Large enterprises

INSTITUTION	NAME	CONTACT
FCA	Simone Cencetti	sustainability@fcagroup.com - paolo.segreto@fcagroup.com - simone.cencetti@fcagroup.com

3. Baseline assessment

The synthesis of quantitative and qualitative assessment.The data and analysis essential for creation a common vision together with stakeholders.

The FUA total area is about 1.701 km^2 and includes 89 Municipalities, the measured data in 2018 counted 1.784.753 inhabitants. The percentage of soil consumed in 2018 was 34,50%, and the green area in the entire FUA is about 1.320 km^2. The average annual precipitation is 927 mm. The water quality assessment for rivers, canals and lakes rangesfrom very good to adequate.

The percentage of population with access to the water supply network is 100%. SMAT manages all the systems of purification and treatment: 93 drinking water plants are currently in operation (some plants simultaneously remove several pollutants).

The processes adopted by SMAT to guarantee the quality of the water supplied to users are the following: aeration, chemical oxidation with chlorine, chlorine dioxide or ozone, clarification and precipitation, filtration on sand or ion exchange resins, reverse osmosis, ultrafiltration, adsorption on activated carbon and other materials, disinfection with hypochlorite, chlorine dioxide and ultraviolet rays.

The index of real losses in distribution is 24,97% in the City of Turin, and there is no dual water distribution system. In 2018, the extension of the sewerage network per inhabitant served (meters per inhabitant) remained stable compared to the previous year.

In order to optimize the treatment of wastewaters, these should be divided into two separate dedicated networks; in this way the dilution of black water (which makes the purification processes more expensive) and the fouling of rainwater (which by its nature is not very polluted and requires simpler treatments) is avoided. For this reason, SMAT, in recent years, foresees the separation of the two types of network for new sewage constructions and for the remaking of the older ones.

SMAT manages a sewer development of 9,526 kilometres of municipal networks, white, black and mixed, corresponding to 4.2 meters per inhabitant served.

Most of the water withdrawn from the environment is of underground origin, i.e. from wells and springs (overall about 82%). Only 17,7% is of superficial origin (rivers, streams, canals).

- Water produced from wells: 71%
- Water produced from surface withdrawals: 17,7%
- Water produced from springs: 11,3%

In 2018, the water supplied by SMAT was 177,2 million cubic meters in total, of which almost 79,12% was used for domestic use. Considering that the residents of the municipalities served by SMAT are 2.247.449, an average of 171 l of drinking water per person for civil use was consumed per day in the Metropolitan city of Turin.

Starting from national considerations, it has been estimated that for 2018 in the FUA the annual water consumption was equal to: 290.000.000 of 1,5-liter bottles (approximately 0,66 litres/day per capita).

- Use of Potable Water Domestic use 79,12%
- Commercial and industrial use 13,61%
- Public use 5,83%
- Agricultural use and breeding 1,35%
- Other uses 0,09%

4. Vision

The concise description of FUA's desired future state with suggested time horizon for the strategy 2030.The description of outputs of vision creating process (What visions were proposed by stakeholders? How was the joint vision chosen?)

The vision of the stakeholders emerged during the first two stakeholders meetings organized in spring and summer 2020.

GENERAL OBJECTIVES:

- Quantitative and qualitative protection of the water resource
- Attention to the reality of climate change
- Develop an (eco) systemic approach to the strategy
- Generate a legal framework that facilitates water management
- Sharing of resources and knowledge
- Attention to data quality and solutions
- Involvement of entities, the population and dialogue between the parties
- Generate consciousness, awareness and education on the water resource
- Generate an action plan that can be extended and which can become practice, generate culture and influence at the political level
- Acting on the various levels and recognizing the different actors

OVERALL STRATEGIES

- Education, training, information, awareness
- Collaboration, participation, co-creation and co-design
  - Between institutions / bodies
  - With the territory

- Water: conscious use
- Urban green and ecosystem services
- Pilot projects
- Financing
- Data and indicators

During the third stakeholders meeting held in the fall of 2020, the vision ideas have been organized in the logical framework of the Strategic Plan.

5. Strategic goals and objectives

The list of strategic goals and relevant objectives(incl. indicators, state-value and tasks).

Supplement with a description of strategic goals and objectives; The practical fulfilment of the vision will be achieved through strategic goals, along with specific objectives.

Several fundamental objectives were identified during the stakeholder meetings:

1. Ensure the good quality of water bodies
2. Improve the hydrological response of the territory
3. improve the ecological conditions of watercourses
4. enhance the services offered by ecosystems and NBSs
5. improve the quality of the air and the microclimate
6. Generate consciousness, engagement and awareness, and improve governance
7. Minimize land use

5.1. Fundamental objective1

Ensure the good quality of water bodies in the FUA territory, through the following sub-objectives:

- Adaptation to climate change and increased resilience to drought events: reducing withdrawals from the water body
    - Reduce the consumption of drinking water for civil uses
        - Increase the use of rainwater
        - Increase the reuse of gray water
    - Reduce water withdrawals for other uses
        - increase the use of treated wastewater for agricultural and industrial uses
    - Reduce water network losses
- Reduce polluting loads
    - Reduce the polluting contribution due to untreated discharges
    - Reduce the polluting contribution due to the wastewater treatment plants
    - Reduce the polluting contribution due to flood spillways and urban runoff

- Reduce the load of diffuse pollution

5.1.1. Operational objectives and indicators

The practical fulfilment of the fundamental objectives will be achieved through the accomplishment of operational objectives, and it will be measured thanks to specific indicators:

Operational objective	Indicator
Reduction of network losses within values of ...	Percentage (%) or specific losses (l/d/km)
Provide rainwater collection and reuse systems ... buildings within the FUA	No. of buildings
Provide gray water reuse systems … buildings within the FUA	No. of buildings
Implement NBSs for the treatment of overflow water/runoff for an area of …	Total area of the implemented treatment NBSs

5.2. Fundamental objective 2

Improve the hydrological response of the FUA territory, through the following sub-objectives:

- Increase infiltration capacity
- Adaptation to climate change and improve resilience to extreme weather events ("Water bombs"): increase retention

5.2.1. Operational objectives and indicators

The practical fulfilment of the fundamental objectives will be achieved through the accomplishment of operational objectives, and it will be measured thanks to specific indicators:

Operational objective	Indicator
Create infiltration SUDS to serve a waterproofed surface equal to …	Total area drained by SUDS
Creategreen roofs (lamination and evapotranspiration) for a total area of …	Total area of green roofs
Create diffuse lamination systems equal to …	Diffused lamination volume created

5.3. Fundamental objective 3

Improve the ecological conditions of watercourses

5.3.1. Operational objectives and indicators

The practical fulfilment of the fundamental objectives will be achieved through the accomplishment of operational objectives, and it will be measured thanks to specific indicators:

Operational objective	Indicator
Improve ecological conditions on … km of watercourses	Improvement of at least 1 IFF (= Fluvial Function Index) class in the affected waterways

5.4. Fundamental objective 4

Enhance the services offered by ecosystems and NBSs

5.4.1. Operational objectives and indicators

The practical fulfilment of the fundamental objectives will be achieved through the accomplishment of operational objectives, and it will be measured thanks to specific indicators:

Operational objective	Indicator
Implement NBSs for the treatment of overflow water/runoff for an area of …	Total area of the implemented treatment NBSs
Create infiltration SUDS to serve a waterproofed surface equal to …	Total area drained by SUDS
Create green roofs (lamination and evapotranspiration) for a total area of …	Total area of green roofs
Implement diffuse lamination systems equal to …	Diffused lamination volume created

5.5. Fundamental objective 5

Improve the quality of the air and the microclimate

5.5.1. Operational objectives and indicators

The practical fulfilment of the fundamental objectives will be achieved through the accomplishment of operational objectives, and it will be measured thanks to specific indicators:

Operational objective	Indicator
Create green roofs (lamination and evapotranspiration) for a total area of …	Total area of green roofs

5.6. Fundamental objective 6

Generate consciousness, engagement and awareness among citizens, and improve governance

5.6.1. Operational objectives and indicators

The practical fulfilment of the fundamental objectives will be achieved through the accomplishment of operational objectives, and it will be measured thanks to specific indicators:

Operational objective	Indicator
Involve citizens in information, education and awareness activities	Number of participants in activities / year
Involve key players in training activities	Number of participants in activities / year

5.7. Fundamental objective 7

Minimize land use

6. Action Plan

The short term action plan (2022-2026) is divided in four type of actions:

- GOV: Governance
- CON: increase of knowledge on the FUA about the topic of interest of CWC
- EDU: education
- INFR: infrastructure

An example of action factsheet is following reported, while the full action plan can be consulted in ANNEX 1.

Typology	Governance	**Code**	Gov1
Title Revision of the NTA (Technical Implementation Standards) of the PRG		**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved** Action to be subsequently extended to the other Municipalities of the FUA	
Description of the Action Adaptation of the NTA of the PRG of the Municipality by providing for specific measures that promote the use of non-conventional water resources and the use of SUDS for the management of urban rainwater.			

Time scale By 2025
Financial resources (expected costs, available resources, resources to be found, lenders) Action achievable with internal human resources of the responsible party.
Expected results / products Revised NTA and PRGC
Reference Municipality of Turin - Urban Planning and Quality of the Built Environment Area

7. Implementation

Implementation is the carrying out of planned actions.Implementation will need the cooperation of a range of local government departments, institutions and organisations, although the actual implementation activities may be undertaken by private contractors.This chapter should determine roles, responsibilities, relationships and communicationbetween theseimplementing bodies / stakeholders. Who will be coordination unit-the organization having potential of carrying out strategy successfully(to ensure that deadlines are being met, the quality of results is satisfactory, budgets are being correctly managed and up-todate information is distributed to stakeholders, etc.)? What resources will the implementation of the strategy be financed from?Are any of financial, logistical, political and social factors specific to the local context particularly important for successful implementation of strategy?In this chapter you can also mention risk mitigation.To introduce and to boost circular urban water management the organisational, co-operational, financial, legislative or attitude changes may be needed. The sources of information about what prevents / hinders us from achieving the vision are the baseline assessment (e.g. identified gaps) and the analysis of the national legislative and policy frameworks (D.T3.4.2, 3).

As mentioned above, the Strategic Plan envisages a short-term (2030) and a long-term (2050) horizon. The Action Plan is designed with a duration of 4 years: the progressive drafting of new Action Plans is envisaged, one every 4 years. By launching the first Action Plan in 2022, it is expected that the first two Action Plans will make it possible to achieve the objectives set for 2030 and the subsequent 5 Action Plans will make it possible to achieve the objectives set for 2050 (see chapter 8 Monitoring and Evaluation).

Each of the actions of the first Action Program described in the previous paragraph provides:

- a person responsible for correct implementation,
- an indication of the other subjects possibly involved,
- a time frame within which the action is expected to be carried out,
- the expected results,
- an estimate of the necessary financial resources (if the action cannot be carried out with internal resources of the implementing bodies) and the possible source of funding.

Those responsible for the actions included in the first action program are some of the stakeholders who have participated more assiduously in the activities of the CWC project: Municipality of Turin, Metropolitan City of Turin, Polytechnic of Turin, SMAT.

The coordination of the implementation of the Strategic Plan, and of the Action Plans that will be progressively implemented, will be handled by the Municipality of Turin with the support of the Metropolitan City of Turin.

8. Monitoring and Evaluation

The implementation of the Strategy should be subject to cyclical monitoring + reporting and assessment of the obtained results + evaluation. The purpose of monitoring and evaluation is to check whether the course of activities leads to the desired results(measured byindicators). Where this is doubtful, the underlying causes have to be identified which might lead to a revision at the action plan or even strategy (goals, objectives, targets).This section should contain information:Who will be responsible for monitoring the progress of the strategy / action plan? Who will collect the data?Where will this data come from? How often will there be monitoring and reporting on the progress of the strategy implementation? Will the progress in achieving the goals of the strategy be communicated to the general public and how? By whom and how often will the assessment and evaluation be carried out? How will evaluation research (on-going, ex-post) be conducted? How often will the strategy be updated / review?Will stakeholders be involved in the monitoring and evaluation process and how?

This paragraph has the purpose of illustrating the monitoring system of the Strategic Plan of the CWC project, a tool that sets itself various strategic objectives whose achievement is not always easily verifiable and depends not only on the implementation of the actions envisaged by the present Plan, but also from other measures that go beyond the possibilities of the CWC project. For this reason, some "operational objectives" have been defined, conceived precisely to be verifiable and quantifiable and exclusively concerning the "lines of action" proposed by the CWC project: it is precisely on these objectives that the attention of the Plan's monitoring system, as the monitoring has the purpose of verifying over time whether the actions implemented allow the achievement of the objectives.

The following table shows all the operational objectives, the indicators used for quantification and the targets identified on the two time horizons of the Strategic Plan: 2030 and 2050. The person responsible for collecting and providing the data and the frequency of detection is also identified.

Operational objective		**Indicator**	**Target 2030**	**Target 2050**	**Entity responsible for providing the data**	**Monitoring frequency**
Reduce network losses		Specific losses(m^3/Km/day)	18	13	SMAT	annual
Reduce civilian consumption		Per capita consumption (liters/person/day)	155	140	SMAT	annual
	Increase the use of rainwater	Annual volumes used to replace drinking water (m^3/year)	59.000	590.000	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)
	Increase the use of treated greywater	Annual volumes used to replace drinking water (m^3/year)	10.000	100.000	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)
Cut the urban expansion forecasts of the municipalities of the FUA		Extension of new urbanized land (m^2/year)	*	*	Municipality of Turin on ISPRA data	Quadrennial (at the end of each Action Plan)
Promote NBS and SUDS in urban contexts		Waterproofed area served by SUDS (hectares)	100	1000	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)

	Green roofs (m^2)		50.000	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)
Promote both urban and rural forestry	New trees planted	680.000	1.700.000	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)
Involve key players in training activities	Number of people involved in the activities	*	*	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)
Involve citizens in information, education and awareness activities	Number of people involved in the activities	53.400	178.000	Municipalities of the FUA	Quadrennial (at the end of each Action Plan)

**target values not yet defined*

If the main purpose of the monitoring of the Strategic Plan is to verify the achievement of operational objectives, the monitoring of the Action Plan aims to verify the effective implementation of the planned actions and the achievement of the results of each individual action. This monitoring activity will be carried out by each action manager who - at the end of the expected duration period for the action - will prepare a short report that will inform if the action has been carried out and if it has achieved the expected results. In case of deviation from the forecasts - if the action has not been successful or if it has not achieved the expected results - it will include a self-assessment of the reasons for the deviation and a proposal on the opportunity to re-propose the action for the Action Plan which will be activated in the following four years, and any changes necessary for the correct implementation of the action.

9. Consistence with other documents

The implementation of the Strategy is interdependent with currentstrategies, policies and programs at the national, regional and local level. The goals of Strategy must dovetail with goals of existing and ongoing higher-level documents. The impact of the strategic goals of the Strategy on the achievement of the strategic goals of other higher-level documents can be presented in the table below. However, the very assessment of these relations took place at lower levels, e.g. objectives, operational goals. It is important that none of the objectives of the Strategy negatively affect the achievement of the objectives set out in government and local government documents of a higher order.

Name of higher-level document	*Strategic goals of Strategy*						
	Ensure the good quality of water bodies	*Improve the hydrological response of the territory*	*Improve the ecological conditions of watercourses*	*Enhance the services offered by ecosystems and NBSs*	*Improve the quality of the air and the microclimate*	*Generate consciousness, engagement and awareness, and improve governance*	*Minimize land use*
National adaptation strategy to climate change[1]	*0*	***	*	**	*	***	***
The regional strategy on climate change[2]	*0*	***	*	**	*	***	***
Resilience Plan of the City of Turin[3]	*0*	***	*	**	*	***	***
National Strategy for Sustainable Development[4]	*	*	*	**	**	***	*
Management Plan of the hydrographic district of the River Po[5]	***	***	***	***	*0*	*	*
Water Protection Plan (Piedmont region)[6]	***	***	***	***	*0*	*	*
Urban water plan (ATO3 - Turin metropolitan city)[7]	***	***	***	***	*0*	*	*

(***) - very strong positive impact;

(**) - strong positive influence;

[1] https://www.mite.gov.it/sites/default/files/archivio/allegati/clima/snacc_2014_elementi.pdf

[2] https://www.regione.piemonte.it/web/temi/ambiente-territorio/cambiamento-climatico/strategia-regionale-sul-cambiamento-climatico

[3] http://www.comune.torino.it/torinosostenibile/documenti/200727_Piano_Resilienza_Climatica_allegati.pdf

[4] https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/obiettivi_eng.pdf e https://www.mite.gov.it/pagina/la-snsvs

[5] https://www.adbpo.it/PianoAcque2021/ELABORATI_PIANO/Elaborato_00_RelGEn/PPdGPo2021_Elab_0_RelGen_22dic20.pdf

[6] https://www.regione.piemonte.it/web/sites/default/files/media/documenti/2019-01/relazione_generale_0.pdf

[7] http://www.ato3torinese.it/site2015/pianificazione/piano%20d'ambito/001_All_A_delib_598_16.pdf

(*) - positive influence;

(0) - no relation;

(-) - negative impact;

(- -) - strong negative;

(- - -) - very strong negative influence.

It is suggested to include a short summary, the most important conclusions from the review of the Strategy's consistence with other national documents, at the end of the chapter. You can also refer to EU policies and strategies (if needed).

ANNEX 1: Action plan

Typology	Governance	**Code**	Gov1
Title Revision of the NTA (Technical Implementation Standards) of the PRG		**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved** Action to be subsequently extended to the other Municipalities of the FUA	
Description of the Action Adaptation of the NTA of the PRG of the Municipality by providing for specific measures that promote the use of non-conventional water resources and the use of SUDS for the management of urban rainwater.			
Time scale By 2025			
Financial resources (expected costs, available resources, resources to be found, lenders) Action achievable with internal human resources of the responsible party.			
Expected results / products Revised NTA and PRGC			
Reference Municipality of Turin - Urban Planning and Quality of the Built Environment Area			

Typology	Governance	**Code**	Gov2
Title Revision of the Building Regulations and the Environmental Energy Annex		**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved** Action to be subsequently extended to the other Municipalities of the FUA	
Description of the Action Adaptation of the Building Regulations (RE) and its Environmental Energy Annex (AEB) providing for specific measures that promote the use of unconventional water resources and the use of SUDS for the management of urban rainwater.			
Time scale By 2025			
Financial resources (expected costs, available resources, resources to be found, lenders) Action achievable with internal human resources of the responsible party.			
Expected results / products Revised Building Regulations and Environmental Energy Annex			
Reference Municipality of Turin - Private Building Area			

Typology	Governance	**Code**	Gov3

Title Regulations for the design and construction of urbanization works	**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts
Responsible party Municipality of Turin	**Subjects involved** Action to be subsequently extended to the other Municipalities of the FUA
Description of the Action Implementation of a new regulation for the design and construction of urbanization works (RU), in implementation of the guidelines referred to in Annex 2 of the City's Climate Resilience Plan, for the design of streets, parks and squares, providing specific measures that promote the use of unconventional water resources and the use of SUDS for the management of urban rainwater.	
Time scale By 2025	
Financial resources (expected costs, available resources, resources to be found, lenders) Action achievable with internal human resources of the responsible party.	
Expected results / products New regulation	
Reference Municipality of Turin - Infrastructure and Mobility Division - Infrastructure Area - Urbanization	

Typology	Governance	**Code**	Gov4
Title Analysis of specifications for public works		**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved** Action to be subsequently extended to the other Municipalities of the FUA and to the signatories of the APE Protocol	
Description of the Action Drafting of updating indications to be introduced in the specifications regarding transformations and / or tampering with the soil and for public works (roads, urban green spaces, public buildings) or subjected to public use with the identification - every time it is verified - of the solutions for the collection of rainwater, the reuse of water and sustainable drainage, leaving existing sewage networks where necessary, possibly reduced, as emergency "overflow" solutions.			
Time scale By 2025 and by 2023 some experiments directed by the Municipality of Turin			
Financial resources (expected costs, available resources, resources to be found, lenders) Action achievable with internal human resources of the responsible partyand use of ministerial funds and other public funds for the implementation of interventions			
Expected results / products Indications for standard specifications to be applied in the context of the construction of Public Works and subject to public use			
Reference Municipality of Turin –Environment Department and Procurement and Economics Area			

Typology	Knowledge	**Code**	Con1
Title Performance survey of certified buildings – LEED - Itaca		**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts	
Responsible party Polytechnic of Turin		**Subjects involved** Owners of the buildings affected by the investigation Municipality of Turin	

Description of the Action

Through academic exercises (thesis), in a first experimental phase, a survey will be carried out on the performance in terms of water (consumption of drinking water and reduction of runoff) of the LEED certified buildings built on the territory of the FUA.

The preliminary identified buildings are

- Green Pea - via Nizza 230
- Nuvola Lavazza - via Bologna 22

In a second experimental phase, the same survey will be conducted on ITACA certified buildings or urban areas where the ITACA indicators at Urban Scale have been applied.

Time scale

First phase by 2026

Second phase by 2027

Financial resources (expected costs, available resources, resources to be found, lenders)

Master's thesis

Expected results / products

LEED - ITACA buildings performance analysis compared to conventional buildings and compared to project data

Reference

Polytechnic of Turin- Department of Environmental, Land and Infrastructure Engineering

Municipality of Turin - Department of Community and National Planning Projects – Innovation and European Funds Area

Typology	Knowledge	**Code**	Con2
Title Co-design of URL 7 of the NICE project		**Operational objective** Increase the use of rainwater / the reuse of grey water / Promote NBS and SUDS in urban contexts	
Responsible party IRIDRA		**Subjects involved** Municipality of Turin	

Description of the Action

Collaborative co-design of the local context of the URL (Urban Real Lab) of Turin and definition of the scenarios for the future improvement of the NBS project NICE:

- definition of the requirements at the local level for the implementation of the Green Roof of Turin (URL 7) of the NICE project, involving relevant stakeholders, including water services, policy makers, local administrators and representatives of civil society;

- definition of scenarios and recommendations for the improvement of NBS, which will then be included in the NICE Guidelines, involving stakeholders through workshops:

● an initial workshop where results from the pilot NBS system and results from other URLs will be presented

● a second workshop in which stakeholders will be able to present counter-proposals

● a workshop for technical developers to propose various scenarios taking into consideration the proposals of the stakeholders

● a final workshop to present and discuss the results of the participatory process.

Time scale

By 2025

Financial resources (expected costs, available resources, resources to be found, lenders)

IRIDRA funds (H2020 project)

Expected results / products

Maintain stakeholder engagement, increase social acceptance of NBS solutions and make administrative procedures for the implementation of these solutions more flexible.

Reference

IRIDRA Srl

Typology	Training / education	**Code**	Edu1
Title Resilient design - Training initiative for technicians of the FUA municipalities		**Operational objective** Involve key players in training activities	
Responsible party Municipality of Turin		**Subjects involved** Action to be subsequently extended to other Public Administrations and professional orders	

Description of the Action

Creation of a training course aimed at providing municipal technicians with the necessary knowledge to review the way of designing urban space through the creation of innovative solutions, mainly based on nature, to counter the impacts caused by the increasingly frequent occurrence of extreme climatic events (heat waves and floods). The course will be divided into three parts:

1. Knowledge of climate vulnerabilities in Turin;
2. Solutions to be implemented to adapt the Turin area to the new climate scenarios;
3. Laboratories for the design of resilient solutions.

Time scale By 2023
Financial resources (expected costs, available resources, resources to be found, lenders) Ministry of Ecological Transition funds for adaptation measures
Expected results / products Trained technicians
Reference Municipality of Turin – Environment Department

Typology	Training / education	**Code**	Edu2
Title Information campaign aimed at students on water saving and the use of unconventional resources		**Operational objective** Involve citizens in information-education-awareness activities / reduce the consumption of drinking water for civil uses	
Responsible party Municipality of Turin		**Subjects involved** Primary schools	
Description of the Action Implementation of training meetings (face-to-face or online) for primary school students, as part of the "Growing in the City" project, on the issues of climate change and the challenges that cities will have to face in relation to management and the lack of resources water. At least 5 annual meetings lasting about 3 hours are planned, involving about 125 young people.			
Time scale By 2025			
Financial resources (expected costs, available resources, resources to be found, lenders) Action achievable with internal human resources of the responsible party			
Expected results / products Number of citizens reached by the campaign (about 625)			
Reference Municipality of Turin – Environment Department in collaboration with ITER			

Typology	Training / education	**Code**	Edu3
Title Dissemination activities - workshops and visits on the theme of water, science and sustainability		**Operational objective** Involvement of MAcA visitors in dissemination and awareness raising activities on CWC issues. Dissemination of good practices among the general public and school	
Responsible party Museum A come Ambiente - MAcA		**Subjects involved** Municipality of Turin	

Description of the Action

Water is the great protagonist of the second floor of Museum A come Ambiente. A fascinating thematic area guides the visitor to discover the molecule that gives color to our planet and that, belowform of seas and oceans, it covers over 70% of the earth's surface. Thanks to a special lift, visitors can “immerse themselves” in the wonderful marine scenarios and learn about the mysteries of the different onesdepth: from the Coral Reef up to -11,000 meters of the Mariana Trench. Along this path you can closely observe the aquatic world and its inhabitants, from the largest to the smallest, visible

through the microscope. To learn without sacrificing fun, a large game table challenges visitors to test themselves on the subject of water and its characteristics, comparing themselveswith potability, purification and use in human activity.

In addition to the guided tour, seven water-themed workshops are available for school groups (Drinking tap water, The Water Theater, Universe in the saucer, Virtual water, PlayDecide! The wars of water, The thousand blue bubbles).

The objective of this action, therefore, is to integrate an eighth laboratory focused on the key themes of the CWC project, therefore dedicated to raising awareness on non-conventional water issues, such as the collection and reuse of rainwater and the treatment and reuse of gray water, also through the use of Nature-based Solutions.

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Action achievable with internal human resources of the responsible party or to be financed with regional, national or European funding channels

Expected results / products

Number of citizens and schools reached by the campaign

Reference

Museum A come Ambiente - MAcA

Typology	Training / education	**Code**	Edu4
Title Dissemination activities - training workshops and dissemination formats on CWC themes		**Operational objective** Involvement of visitors in dissemination and awareness raising activities on CWC issues	
Responsible party Mercato Circolare srl		**Subjects involved** Municipality of Turin	

Description of the Action

Mercato Circolare proposes itself as a provider of training workshops and dissemination formats aimed at educating and raising awareness about water saving, the use of unconventional water resources and, more generally, the circular management of water in the city and among businesses (eg: adoption of aquaponics systems).

Circular Market proposes formats that use and combine tools and languages of theater, design thinking and digital technologies to actively involve its audience and make the process of acquiring knowledge interactive, participatory and fun.

In particular, the proposed working method involves three steps:

1. Get curious, working on questions and changing your point of view.

First of all it is necessary to capture the attention of the public through games with a displacement effect, inviting them not to take anything for granted, to consider the problems from several points of view, to answer them with as many questions, and finally, inviting everyone and all to take a stand.

2. Learn about keywords, concepts and practices.

The stimulus to tackle issues by asking other questions, before reaching an answer too quickly, arouses in people a desire, a necessary condition, for deepening. This is done thanks to interactive and gamification dynamics, where play and fun are fundamental ingredients.

3. Push for action to generate impact.

Finally, after curiosity and knowledge, we invite action, identifying spaces, areas and action for change, individual and collective.

Applying this approach, a workshop is proposed in several appointments (4 modules of 1.5h) dedicated to the themes of the CWC project, therefore dedicated to raising awareness on non-conventional water issues, such as for example the collection and reuse of rainwater and the treatment and reuse of gray water, also through the use of Nature-based Solutions..

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Cost not yet estimated, to be financed with funding channels such as regional, national or European

Expected results / products

Numero di cittadini e scuole raggiunti dalla campagna

Reference

Mercato Circolare Srl
Municipality of Turin - Department of Community and National Planning Projects – Innovation and European Funds Area

Typology	Infrastructural	**Code**	Infr1
Title Rainwater management in the Mennea park and in the Martini Mauri sud, Braccini ovest and Braccini est car parks		**Operational objective** Promote NBS and SUDS in urban contexts / Increase the use of rainwater	
Responsible party Municipality of Turin		**Subjects involved** Ministry of Ecological Transition	

Description of the Action

Implementation of interventions for the management of rainwater in the urban area straddling the Circumscriptions 1, 2 and 3 on areas intended for parking for a total area of about 20,000 square meters. At present, the areas are completely paved and waterproof and there are plans to remove the existing flooring, restore the permeability of the surfaces, create urban green spaces, collect and drain rainwater. In some cases, the aforementioned interventions will also be accompanied by the construction of tree-lined barriers or shading structures. Specifically, the car parks involved are: - Martini Mauri sud - Braccini ovest - Braccini est.

Furthermore, the construction of draining trenches at the Mennea Park and an intervention to collect rainwater from the roof of the building in via Braccini, seat of municipal offices, and subsequent reuse for irritation of the green belts to be created in the Braccini est car park are planned.

Time scale

By 2023

Financial resources (expected costs, available resources, resources to be found, lenders)

Experimental program of interventions for adaptation to climate change in urban areas of the Ministry of Ecological Transition.

Available resources: EURO 2,266,927.00

Expected results / products

Conversion of "inhospitable" car parks for those who cross them and use them in resilient areas.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr2
Title Rainwater management in the Valdocco Vivibile Project		**Operational objective** Promote NBS and SUDS in urban contexts/ Promote urban and rural forestry	
Responsible party Municipality of Turin		**Subjects involved** Ministry of Ecological Transition	

Description of the Action
Valdocco Vivibile is a demonstration project of a climate-proof neighborhood; it implements various nature-based solutions (engineered green infrastructures to collect rainwater, depavingof asphalted areas and conversion to green infrastructures) to improve the management of rainwater, especially for intense precipitation events. This intervention will also be accompanied by tree plantings in order to create shaded surfaces. The area involved in the interventions is the Valdocco district in the territory of District 7 between: Via San Pietro in Vincoli, Strada del Fortino, C.so Principe Oddone and C.so Regina Margherita..

Time scale
By 2022

Financial resources (expected costs, available resources, resources to be found, lenders)
Environmental compensation funds from TRM S.p.A.

Resources: approximately 1,200,000 euros

Expected results / products
The set of measures is aimed at combating climate vulnerabilities in the area, also creating a more livable urban context and becoming an example for the rest of the city.

Reference
City of Turin - Infrastructure and Mobility Division - Mobility Area

Typology	Infrastructural	**Code**	Infr3
Title Rainwater management in the Valdocco Vivibile Project 2		**Operational objective** Promote NBS and SUDS in urban contexts/ Promote urban and rural forestry	
Responsible party Municipality of Turin		**Subjects involved** Ministry of Ecological Transition	

Description of the Action
In continuity with the Valdocco Vivibile Project, "Valdocco Vivibile 2" will carry out depaving interventions with a reorganization of road spaces and the construction of new docks, the creation of permeable green areas that can contribute to the disposal of rainwater and the planting of new trees, in order to create a more livable and resilient urban environment. The area involved in the interventions is Valdocco district in the territory of District 7, extending northwards (up to Corso Vigevano) the area involved in the first lot of the project.

Time scale
By 2023

Financial resources (expected costs, available resources, resources to be found, lenders)
PON Metro - integration with REACT-EUR funds

Available resources: Euro 3,500,000

Expected results / products
The set of measures is aimed at combating climate vulnerabilities in the area, also creating a more livable urban context.

Reference
Municipality of Turin - Environment, Green and Civil Protection Division - Green Area

Typology	Infrastructural	**Code**	Infr4
Title Rainwater management in the "Resilient Neighborhoods" Project		**Operational objective** Promote NBS and SUDS in urban contexts/ Promote urban and rural forestry	
Responsible party Municipality of Turin		**Subjects involved** Ministry of Ecological Transition	
Description of the Action The "Resilient Neighborhoods" project aims to rethink and transform the public space of the Basso San Donato and Borgo San Secondo neighborhoods in order to adapt it to new climatic scenarios. It will implement innovative solutions aimed at counteracting the "heat island" effect and better manage rainwater during intense precipitation events, also creating a more livable urban context. In particular, asphalted and waterproof surfaces will be reduced, converting them into green infrastructures capable of providing shade and collecting rainwater by reducing the amount of rainwater that enters the sewer and reducing any flooding.			
Time scale By 2023			
Financial resources (expected costs, available resources, resources to be found, lenders) PON Metro - integration with REACT-EUR funds Available resources: Euro 3,000,000			
Expected results / products The set of measures is aimed at combating climate vulnerabilities in the area, also creating a more livable urban context.			
Reference Municipality of Turin - Environment, Green and Civil Protection Division - Green Area			

Typology	Infrastructural	**Code**	Infr5
Title Adaptation interventions for a more liveable city		**Operational objective** Promote NBS and SUDS in urban contexts/ Increase the use of rainwater	
Responsible party Municipality of Turin		**Subjects involved** GTT - "Il Tuo Parco" Association - Altiero Spinelli School	

Description of the Action

The project involves the implementation of innovative solutions to counter the impacts on the territory and citizens caused by climate change and to increase the supply of ecosystem services. It will be divided into the following functional phases:

PHASE 1: Green stops of the Local Public Transport - Redevelopment of about 16 stops of the Local Public Transport through the construction of shelters with green roof and the replacement of the existing flooring with draining material and high albedo index.

PHASE 2: Green tracks - Transformation into green tracks of some sections of the network of tram tracks in a protected site, currently characterized by a waterproof asphalt cover, in order to increase urban resilience, intervening on transport infrastructures (roads and tracks).

PHASE 3: Resilient redevelopment of public space through depavinginterventions and relative replacement of the existing flooring with fresher and more draining materials, creation of green areas and planting of trees and / or shrubs in areas mainly used for public parking on the slab. The area of intervention is Spina Reale - "Allievo" School.

PHASE 4: Construction of a green roof at the building in Viale Michelotti 166, owned by the municipality and subject to the collaboration agreement between the Municipality of Turin, the "Il Tuo Parco" Association and the "Altiero Spinelli" European State International School for the development of educational and cultural activities in the environmental field.

Time scale

By 2023

Financial resources (expected costs, available resources, resources to be found, lenders)

PON Metro - integration with REACT-EUR funds

Available resources: Euro 1,000,000

Expected results / products

The set of measures is aimed at combating climate vulnerabilities in the area, also creating a more livable urban context.

Improvement of the use and production of eco-systemic services.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr6
Title Urban forestry interventions		**Operational objective** Promote urban and rural forestry	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

The hilly woods and trees of the parks and avenues that will be affected by the interventions are an integral part of the "Turin urban forest". The intervention aims to enhance the ability of trees to mitigate climate vulnerabilities, in particular heat islands and rainwater management, and to encourage the use of tree-lined areas, including recreational purposes, by improving accessibility. The Project is divided into the following three lots:

Lot 1 - Parks and hilly woods - it will enhance the hilly woods and parks by addressing the critical issues related to hydro-geological instability, maximization of ecosystem services and use by citizens.

Lot 2 - Plain river parks - it will enhance the ecological corridors in correspondence with the Turin river parks: Pellerina Park, Meisino Park, Colletta and Confluence Park, Stura Nord Park, Millefonti Park.

Lot 3 - Reconstitution of urban avenues - it will redevelop the tree-lined streets of Corso Belgio and C.so Umbria.

Time scale

By 2023

Financial resources (expected costs, available resources, resources to be found, lenders)

PON Metro - integration with REACT-EUR funds

Available resources: Euro 1,000,000

Expected results / products

Improvement of the use and production of eco-systemic services.

Reference

Municipality of Turin - Environment, Green and Civil Protection Division - Green Area

Typology	Infrastructural	**Code**	Infr7
Title Management of rainwater in the buildings of the Altiero Spinelli primary school		**Operational objective** Promote NBS and SUDS in urban contexts / Increase the use of rainwater	
Responsible party Municipality of Turin		**Subjects involved** "Il Tuo Parco" Association, District 7, Teaching Body of the Spinelli School	

Description of the Action

Adaptation of the buildings of the Altiero Spinelli primary school, located in viale Michelotti 166, near corso Chieri.

Interventions are expected to contribute to the disposal of rainwater captured by the school building, for a total area of 1,550 square meters.

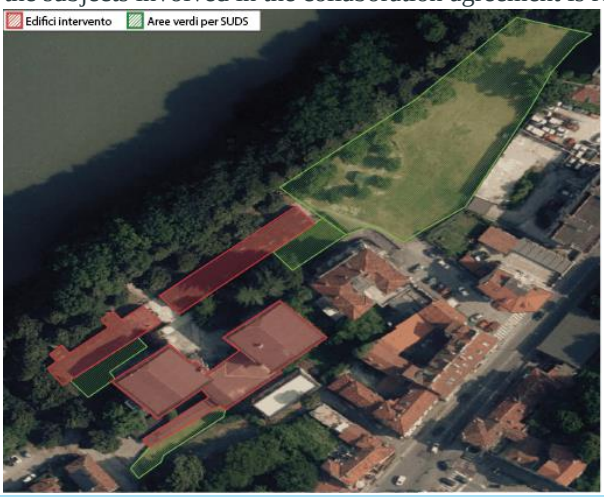
The interventions are divided into:

1) 130 m^2 of rain garden for the infiltration of rainwater, built in the areas pertaining to the school complex;

2) storage tank of 50 m^3 for the reuse of captured water;

3) 100 m^3 dry holding basin, sized for meteoric events with a return time <10 years, inserted in the adjacent park area.

The interventions will also be discussed in the context of the Collaboration Agreement signed on 14 December 2021 with a duration of 5 years: Collaboration Agreement between the Municipality of Turin, Environment Department, SIES Spinelli and the Il Tuo Parco Association. The pact has the objective of revaluation, care and shared management of the municipal building in Viale Michelotti 166 for the implementation of educational and cultural activities in the environmental field and to develop new forms of citizenship through the management of the building. Therefore, in the design phase of this action, an interaction between the future designers of the area with the subjects involved in the collaboration agreement is required.



Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 100,000.00

Economic framework: € 135,000.00 (including sums available to the contracting authority and VAT)

Expected results / products

Improvement of the rainwater management capacity of existing buildings and enhancement of the water resource in a circular economy perspective. In particular, about 1,800 cubic meters / year of water not sent to the sewer and / or recovered for other uses.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr8
Title Rainwater management of the municipal buildings in via Bologna		**Operational objective** Promote NBS and SUDS in urban contexts / Promote urban and rural forestry	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

Adaptation of the building housing the municipal offices and the municipal police, located in via Bologna at the corner of via Padova, with relative parking. It is planned to carry out interventions that can contribute to the disposal of rainwater captured by the building for a total area of 2,100 square meters, and green shading of the 1,250 square meters of parking.

The interventions are divided into:

1) retrofit of 2,100 square meters of flat roof in extensive green roof, for insulation, reduction of the heat island effect and filtering of rainwater;

2) 100 square meters of rain garden for the infiltration of rainwater, created in the resulting green areas of the lot, currently unused;

3) storage tank of 80 cubic meters for the reuse of captured water;

4) green shading systems for the parking of 1250 square meters, made with pergola and climbing plants, fed by recycled water, without reducing the existing parking spaces.

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 100,000.00

Economic framework: € 135,000.00 (including sums available to the contracting authority and VAT)

Expected results / products

Improvement of the rainwater management capacity of existing buildings and enhancement of the water resource in a circular economy perspective. In particular, about 2,350 cubic meters / year of water not sent to the sewer and / or recovered for other uses.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr9
Title Rainwater management of the municipal buildings Peschiera course near Racconigi course		**Operational objective** Promote NBS and SUDS in urban contexts / Promote urban and rural forestry	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

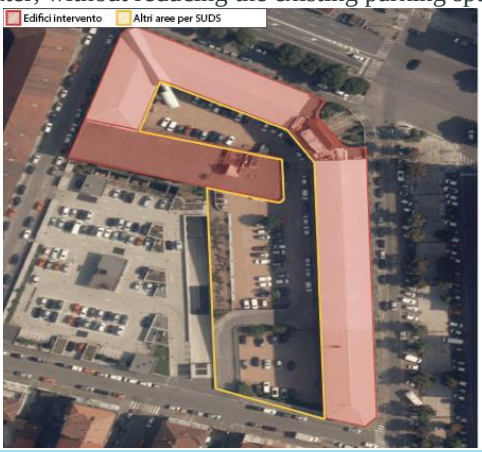
Adaptation of the buildings, located in the lot framed between corso Racconigi, corso Peschiera and via Cumiana, which house the offices of the district 3, the municipal police, the state police and the headquarters of a local authority. It is planned to carry out interventions that can contribute to the disposal of rainwater captured by the complex, for a total area of 4,400 square meters of the buildings and 3,700 square meters of the adjoining lowered courtyard. The interventions are divided into:

1) retrofit of 1,100 square meters of flat roof in green roof for insulation (also assuming the closure of the facades), reduction of the heat island effect and filtering of rainwater and water recovered from buildings.

2) 400 square meters of rain garden for the infiltration of water;

3) storage tank of 100 cubic meters for the reuse of water collected or recovered from buildings;

4) green shading systems for the parking of 2000 square meters, made with pergola and climbing plants, fed by recycled water, without reducing the existing parking spaces.



Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 550,000.00

Economic framework: € 740,000.00 (including sums available to the contracting authority and VAT)

Expected results / products

Improvement of the rainwater management capacity of existing buildings and enhancement of the water resource in a circular economy perspective. In particular, about 5,700 cubic meters / year of water not sent to the sewer and / or recovered for other uses

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr10
Title Rainwater management of corso don Luigi Sturzo, in the section between via Friedrich Nietzsche and the Del Pascolo bridge-dam		**Operational objective** Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

Modernization interventions with SUDS solutions of road sections that undermine the sewage systems for water management following meteoric events.

It is planned to intervene on the section of Corso don Luigi Sturzo between the dam bridge and via Friedrich Nietzsche with two types of interventions:

1) creation of 1,200 square meters of bio-retention bands for the portions flanked by areas of size <5 m;

2) creation of 5,700 square meters of bio-retention bands that can act as dry holding basins sized to collect and retain the waters of high-flow meteoric events up to a return time <5 years, for the portions flanked by areas of size> 5m.

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 265,000.00

Economic framework: € 400,000.00 (including sums available to the contracting authority and VAT)

Expected results / products

Tackling climate vulnerabilities in the most fragile points of the sewage system with a consequent increase in their ability to manage large-scale meteoric events and enhance the offer of ecosystem services in existing park areas. In particular, approximately 4,300 cubic meters / year of water not sent to the sewer and the ability to retain and dispose of up to 250 cubic meters of water for a single meteoric event.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr11
Title Rainwater management of corso Regina Margherita, in the section between via Pietro Cossa and corso Svizzera		**Operational objective** Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

Modernization interventions with SUDS interventions of road sections that undermine the sewer systems for water management following meteoric events.

It is planned to intervene on the stretch of viale Regina Margherita between via Pietro Cossa and corso Svizzera with three types of interventions:

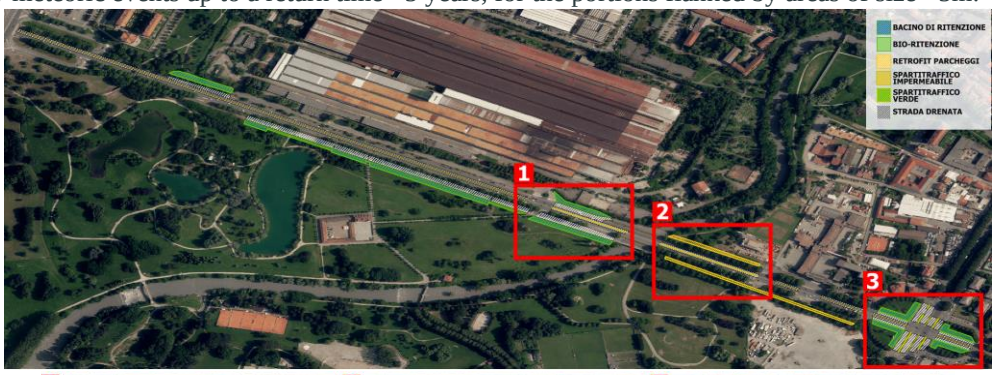
1) transformation of 700 square meters of existing green traffic dividers into bio-retention systems;

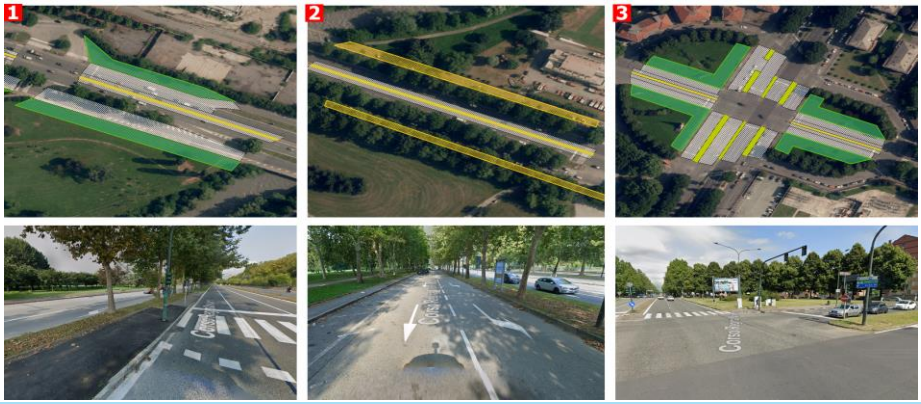
2) modification of the cross-sectional slope of the two central lanes, for a length of 1,500 m in order to convey water to 3,000 square meters of new bio-retention surfaces recovered from the traffic dividers;

3) retrofit of 2,600sqm of parking spaces to allow water infiltration of the cross roads without adjacent free areas;

4) creation of 900 square meters of bio-retention bands for the portions flanked by areas of size <5 m;

5) creation of 9,700sqm of bio-retention strips that can act as dry holding basins sized to collect and retain the waters of high-flow meteoric events up to a return time <5 years, for the portions flanked by areas of size> 5m.





Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 1,200,000.00

Economic framework: € 1,800,000.00 (including sums available to the contracting authority and VAT)

Expected results / products

Tackling climate vulnerabilities in the most fragile points of the sewage system with a consequent increase in their ability to manage large-scale meteoric events and enhance the offer of ecosystem services in existing park areas.

In particular, approximately 4,300 cubic meters / year of water not sent to the sewer and the ability to retain and dispose of up to 250 cubic meters of water for a single meteoric event.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr12
Title Rainwater management of via Ippolito Nievo		**Operational objective** Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

Modernization interventions with SUDS interventions of road sections that undermine the sewer systems for water management following meteoric events.

It is planned to intervene on the entire area traveled by via Ippolito Nievo with two types of interventions are envisaged:

1) remodeling of the section of the road on the first 80 m on the side of via Alfonso Varano, from 15 m to 10 m, to accommodate two bio-retention strips for a total of 500 square meters;

2) retrofit of the level car parks with the creation of 50 square meters of infiltrating islands.

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 270.000,00

Economic framework: € 405.000,00 (including sums available to the contracting authority and VAT)

Expected results / products

Tackling climate vulnerabilities in the most fragile points of the sewage system with a consequent increase in their ability to manage large-scale meteoric events and enhance the offer of ecosystem services in existing park areas. In particular, the intervention will make it possible not to send approximately 4,500 cubic meters / year to the sewer.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr13
Title Rainwater management of Corso Trattati di Roma		**Operational objective** Promote NBS and SUDS in urban contexts	
Responsible party Municipality of Turin		**Subjects involved**	

Description of the Action

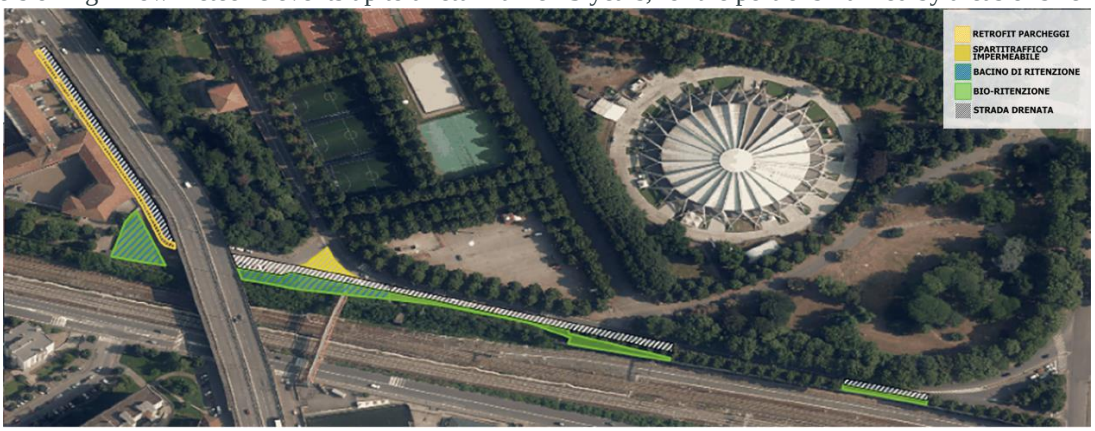
Modernization interventions with SUDS interventions of road sections that undermine the sewer systems for water management following meteoric events.

It is planned to intervene on the entire area covered by Corso Trattati di Roma with three types of interventions:

1) transformation of 200 square meters of traffic dividers into bio-retention systems;

2) creation of 650 square meters of bio-retention bands for the portions flanked by areas of size <5 m;

3) creation of 1200 square meters of bio-retention bands that can act as dry holding basins sized to collect and retain the waters of high-flow meteoric events up to a return time <5 years, for the portions flanked by areas of size> 5m.



Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

Investment costs: € 170.000,00

Economic framework: € 256.000,00 (including sums available to the contracting authority and VAT)

Expected results / products

Tackling climate vulnerabilities in the most fragile points of the sewage system with a consequent increase in their ability to manage large-scale meteoric events and enhance the offer of ecosystem services in existing park areas. In particular, about 1,900 cubic meters / year of water not sent to the sewer and the ability to retain and dispose of up to 100 cubic meters of water for a single meteoric event.

Reference

Municipality of Turin – Environment Department

Typology	Infrastructural	**Code**	Infr14
Title Scrigno verde del Meisino		**Operational objective** Promote NBS and SUDS in urban contexts/ Involvement of visitors in dissemination and awareness raising activities on CWC issues	
Responsible party Municipality of Turin - Il Tuo Parco Association - Altiero Spinelli School - District 7 Turin		**Subjects involved** Management Body of the Protected Areas of the Po Torinese, Institute for Wood Plants and the Environment (IPLA), SIES Spinelli, local associations, University of Turin, Polytechnic of Turin, citizens, public and private bodies	

Description of the Action

For the area of the former gallop (military state property now municipal state property) a model based on the use and protection of the property and in respect of the vocation and peculiarities of the various areas that compose it has been proposed: it is necessary to pursue the objective of a restoration harmonious of pre-existing and existing landscape values through naturalistic interventions, intended as habitat reconstruction and improvement and silvicultural reorganization, which must be addressed to the minimum possible impact and to contribute to the contrast of climate change, taking into account the present naturalistic excellences, extremely rare in an urban context, which must be preserved and protected.

The wetlands, present in the area, can be fed by the collection of seasonal rainwater, by the collection of the water from the roofs of neighboring buildings, by a network of small collection channels that converge in the wetlands and possibly transferred to a network of already partially existing wells and cisterns. It is also necessary to identify management procedures in order to trigger a "self-maintenance of the wetland".

It is necessary to conceive a project for the renaturalization / conservation of the entire area to be regulated through a new Collaboration Agreement for the common goods (pursuant to Regulation no. 391 of the City of Turin) or the extension of the existing one in Viale Michelotti 166.

It is essential to build a path of democratic participation to define the requalification, control and management criteria, to make citizens active and aware actors, each according to their own peculiarities, of the area project: knowledge, attention, respect, responsibility, teaching, dissemination.

The project therefore aims to pursue the following objectives:

• verify and confirm the present naturalistic constraints;

• following the transformations that have taken place in the various periods, restore and conserve the wetland in the urban area on the right bank of the Po in the RNS (Special Nature Reserve) aimed at helping to combat climate change;

• favor the presence of valuable amphibians and avifauna, thanks to management interventions of meteorological runoffs in a sustainable and natural way to restore and maintain a correct habitat;

• establish and strengthen any further constraints in the area of greatest naturalistic value for the exclusive use of research, study and teaching;

• any building interventions must respect and maintain the existing typological characteristics (without adding new volumes) and respect the constraints of the PRG and the Building Regulations. The intended uses will be aimed at satisfying the aims of the project (teaching, laboratories, toilets, refreshments) in the particular environmental context;

• to create, through a continuous information / training path, a new environmental awareness in citizens.

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders) To be defined, verifying the possibility of identifying sources of funding in competition with other local, national and European institutions.
Expected results / products Number of citizens involved in the co-design Area project
Reference Municipality of Turin – Environment Department - District 7, Il Tuo Parco Association as part of the Collaboration Agreement of Viale Michelotti 166

Typology	Infrastructural	**Code**	Infr15
Title Design, construction and validation of URL 7 of the NICE project (Green roof)		**Operational objective** Increase the reuse of grey water/ Promote NBS and SUDS in urban contexts	
Responsible party IRIDRA		**Subjects involved** Municipality of Turin	
Description of the Action Co-design and construction of the innovative NBS under the guidance of IRIDRA, taking into account the knowledge gathered in NICE's research activities and the opportunities and constraints of the local context. In the case of Turin, a green roof will be implemented for the treatment of 2 m^3 of grey water.			
Time scale By 2024			
Financial resources (expected costs, available resources, resources to be found, lenders) € 23,000, IRIDRA funds (LIFE project)			
Expected results / products Validate the innovative grey water treatment system and define the conditions to improve and replicate the NBS system.			
Reference IRIDRA Srl			

ACTIONS PERTAINED TO STAKEHOLDERS OUTSIDE THE CITY OF TURIN

Typology	Knowledge	**Code**	Con1.B
Title Modeling of the Turin sewer network		**Operational objective** Identify criticalities deriving from meteoric influxes	
Responsible party Polytechnic of Turin		**Subjects involved** SMAT	
Description of the Action Development of a mathematical model of the rainwater drainage network of the Municipality of Turin, with the aim of predicting in detail the response of the network to heavy rainfall and identifying the existing criticalities.			
Time scale By 2023			
Financial resources (expected costs, available resources, resources to be found, lenders) Research activity funded by SMAT			
Expected results / products Report on the developed model			
Reference Polytechnic of Turin - Department of Environmental, Land and Infrastructure Engineering			

Typology	Knowledge	**Code**	Con2.B
Title Thesis on CWC topics on FUA of Turin		**Operational objective** Explore the effectiveness of possible SUDS interventions and the reduction of water losses.	
Responsible party Polytechnic of Turin		**Subjects involved**	
Description of the Action Carrying out a master's degree thesis (Civil Engineer, Environment and Territory Engineer) aimed at deepening the CWC issues for the FUA of Turin: - effectiveness of systems for the reuse of rainwater; - effect of SUDS on the quality of first rain water; - analysis of water losses from aqueduct networks.			
Time scale By 2026			
Financial resources (expected costs, available resources, resources to be found, lenders) Master's thesis			
Expected results / products 3 degree theses			
Reference Polytechnic of Turin - Department of Environmental, Land and Infrastructure Engineering			

Typology	Knowledge	**Code**	Con3.B
Title Thesis on CWC topics on FUA of Turin		**Operational objective** Explore the effectiveness of possible SUDS interventions and the reduction of water losses.	
Responsible party Polytechnic of Turin		**Subjects involved**	
Description of the Action Realization of a full-scale rain garden in the courtyard of the "Giorgio Bidone" Hydraulics Laboratory of the Turin Polytechnic. The rain garden will be used both for carrying out research activities and for demonstration purposes.			
Time scale By 2023			
Financial resources (expected costs, available resources, resources to be found, lenders) Turin Polytechnic Funds (DIATI)			
Expected results / products Implementation of the rain garden			
Reference Polytechnic of Turin - Department of Environmental, Land and Infrastructure Engineering			

Typology	Training / education	**Code**	Edu1.B
Title Click 3 Project		**Operational objective** Involve citizens in information-education-awareness activities	
Responsible party Metropolitan City of Turin (Water Resources Department and Communication Department) as project partner together with Hydroaid (lead partner), Legambiente, Museo A Come Ambiente and Cinemambiente		**Subjects involved** Lower secondary schools	
Description of the Action Implementation of training sessions (face-to-face or online) for students of lower secondary schools in some Municipalities of the River Sangone Agreement, including Turin, on the issues of water protection. At least 10 meetings are planned in 2022, in person or remotely with at least 5 classes. There will be role-playing games with students for the representation of conflicts about the use of water.			
Time scale By 2022			
Financial resources (expected costs, available resources, resources to be found, lenders) Action funded by the ATO3 Area Authority			
Expected results / products Sensitization of the 5 classes and of the parents and relatives of the children.			
Reference Metropolitan City of Turin - Water Resources Department			

Typology	Training / education	**Code**	Edu2.B
Title PCTO project (former school-work alternation) Communicating Water		**Operational objective** Involve citizens in information-education-awareness activities	
Responsible party Metropolitan City of Turin (Water Resources Department and Communication Department) as project partner together with Hydroaid (lead partner), Legambiente, Museo A Come Ambiente and Cinemambiente		**Subjects involved** Secondary school Gobetti Marchesini Casale Arduino - "water chemistry" section	
Description of the Action Organization of training sessions (face-to-face or online) for third and fourth grade students of the Gobetti Marchesini Casale Arduino professional institute in Turin. The training meetings on water resources and on quality and quantity problems are preparatory to the realization by the students of the two classes of materials to raise awareness of citizenship on particular problems of the use of water resources (eg domestic water pollution, water saving, etc…). The topic will be chosen by the students of the two classes following the training and the materials will be created in synergy with the CMT offices There are 30 project hours for each class, to be carried out in the school year 2021/2022, in person or remotely. The project is the continuation of the one already carried out in previous years by other classes of the Institute and it is intended to continue the collaboration with the specialist section on water also in the coming years, on the basis of specific PCTO agreements drawn up annually.			
Time scale By 2022			
Financial resources (expected costs, available resources, resources to be found, lenders) Self-financed action with human resources of the responsible party			
Expected results / products Awareness and specific training of the children of the two classes involved and, as a consequence, of the other classes of the institute thanks to the peer to peer approach of the project. The impact will also be on citizens who will be identified as a target for raising awareness on the topic that will be chosen by young people (in 2021 the previous project was concluded with video materials on the problem of disposing of used oils in domestic sewers, available on the youtube channel of the CMT).			
Reference Metropolitan City of Turin - Water Resources Department			
Typology	Infrastructural	**Code**	Infr1.B
Title A green bridge		**Operational objective** Promote NBS and SUDS in urban contexts/ Involvement of visitors in dissemination and awareness raising activities on CWC issues	
Responsible party Il Tuo Parco Association as project partner together with the Municipality of Chieri Environment Department - UPM Association (Un Punto Macrobiotico) aps - Lo_Scoprinetwork Communication		**Subjects involved** Municipality of Turin	

Description of the Action

A process that, using a very practical tool, the arrangement of green areas, builds a "GREEN BRIDGE", with the areas redesigned and connected to each other by safe paths and that, thanks to the involvement of local realities and schools in particular, sets the goal of strengthening a stable network of relationships between the educational agencies of the territory in order to accompany the creation of these green areas and their planning and management for which it is intended to promote types of interventions that are able to reduce consumption and water waste (green roofs and rain gardens) and favour management that is shared, economically sustainable and lasting over time.

Time scale

By 2026

Financial resources (expected costs, available resources, resources to be found, lenders)

€ 23,000, IRIDRA funds (LIFE project)

Expected results / products

Number of citizens involved in the co-design
Area project

Reference

Il Tuo Parco Association