

Helsinki

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City of Helsinki Storm Water Management Program



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Photo: Elisa Lärde

The preparation group of the program included representatives of the Urban Environment Division, Executive Office and Helsinki Region Environmental Services Authority HSY:

Paula Nurmi, chairman / Urban Space and Landscape planning

Kajsa Rosqvist, secretary / Environmental Services

Kimmo Kuisma / Executive Office

Jouni Kilpinen / Strategic Urban Planning

Suvi Tynnilä / Detailed Planning

Pia-Liisa Orrenmaa / Building Control Services

Arto Korkeila / Land Property Development and Plots

Ville Hahkala / Environmental Services

Aninka Urho / HSY

Anna Böhling (from March 2017) / Urban Space and Landscape planning

Viliina Evokari (from September 2017) / Environmental Services

1. Background

The City of Helsinki's Storm Water Strategy was completed in cooperation among various subdivisions within the municipality on 28 December 2007, and it was approved by the City Board on 20 October 2008. The implementation of this strategy has been monitored by a cross-sectoral storm water group, which reported on the realisation of the strategy's objectives and measures to the City Board in 2015.

Updating the storm water strategy into an integrated Storm Water Management Program became relevant as the storm water legislation changed and the strategic work on the adaptation to climate change started, as well as following the changes in the city's management system and organisational structures.

Integrated Storm Water Management Program means that the measures specified in the program are implemented and developed as an integral part of city planning, construction and various related processes. Funding of the measures is, for the most part, included in the current operational budget of the municipal services without significant need

for additional funding. In the long term, these measures promote cost-efficient storm water management and mitigate the increase in storm water management costs.

Updating the storm water strategy was connected to the preparation and objectives of the climate change adaptation guidelines. The actual updating work was carried out in the Integrated Storm Water Management (iWater) project, whose one work package was to develop storm water management programs of the partner cities of the project.

The updated City of Helsinki's Storm Water Management Program concerns measures to be implemented by the city organisation in order to develop comprehensive storm water management systematically, sustainably and in a long-term manner. The Storm Water Management Program specifies the objectives and measures of the former storm water strategy and takes into account the development and changes that have taken place in the urban environment. The Storm Water Management Program replaces the storm water strategy approved by the City Board in 2008.

2. Definition of Storm Water

According to the definition in the Finnish Water Services Act, storm water is rainwater or meltwater that is conveyed from soil surface, roofs of buildings and other similar surfaces on built areas.

In addition to rainwater and meltwater, also water from other sources, such as firefight-

ing or tunnel or street rinsing, may end up in the storm water system. The impact of human activities is emphasised in the context of storm water, which differentiates it from other runoff. Storm water legislation is also applied to drainage water from the foundations of buildings. Runoff from unbuilt areas is not storm water but natural runoff.

3. New challenges

City structure becomes more dense

The key objectives of the city plan approved by the City Council on 26 October 2016 include expanding the inner city and developing smaller centres in various parts of the city through urban infill, which makes the city structure more dense. As the city structure becomes more dense and the area of surfaces impermeable to water increases, the amount of surface runoff and storm water increases, which poses additional challenges to storm water management in already built environment. In the preparation of the Storm Water Management Program, the impact of densifying city structure on storm water management is brought up as a new key issue to be taken into account. According to forecasts, the mean sea level will rise in the long run, which plays a role in making it more difficult to convey storm water away, especially at low-lying seashore areas with a combined sewer system, in which case more attention must be paid on controlling sewer system flooding and overflows.

Densifying the city structure is also an objective in Helsinki City Strategy 2017–2021, “The Most Functional City in the World” (City Council 27 September 2017, 16/2017). According to the city strategy, the amount of green areas must be increased in the city structure in order to promote cost-efficient storm water management. This has been taken into account in the Storm Water Management Program. By proper management and utilisation of storm water also other city strategy objectives are promoted, such as attractiveness of the environment, biodiversity, good state of small watercourses and adaption to climate change.

Climate changes

Helsinki has prepared guidelines for climate change adaptation for the period of 2017–2025 (“Helsingin ilmastomuutokseen sopeutumisen linjaukset 2017-2025”. (Climate working group, 23 February 2017). The storm water-related adaption measures included in the guidelines are implemented by the prevailing Storm Water Management Program.

According to climate change forecasts, Helsinki will see increase in rainfall especially in winter and more intense and common heavy rains in summer, but on the other hand also dry spells will become more common. Due to extreme weather conditions, storm water flow rates increase. In watercourses dependent on these flow rates, such as brooks, also fluctuations in the flow rates increase. High flow rates cause floods, whereas low flow rates dry out watercourses and sewers. Maintenance of water drainage routes becomes harder and aquatic ecosystems suffer. Moreover, the capacity of storm water sewer network may be insufficient during heavy rain.

In the Storm Water Management Program, more attention is paid to controlling storm water runoff in planning and construction. The objective is to prevent urban flooding also in the future, and also to secure sufficient flow in important watercourses during low flow rate periods

Legislation requires

The Land Use and Building Act was amended with a new chapter on storm water management (Chapter 13a, 682/2014). The new provisions entered into force on 1 September

2015. The municipalities are responsible for storm water management in areas where a local detailed plan is in force. The general objectives of storm water management specified in the law are as follows: **1)** developing systematic storm water management especially in areas where a local detailed plan is in force; **2)** infiltration and detention of storm water at the source; **3)** preventing the impacts and damages to the environment and property caused by storm water, while taking account of climate change; **4)** promote giving up the practice to convey storm water into wastewater sewers. The Storm Water Management Program takes the objectives of the reformed legislation into account and promotes them.

The provisions of Chapter 13a of the Land Use and Building Act are supervised by a panel of the municipality, that in Helsinki is the Urban Environment committee or its subcommittee (Administrative regulations, City Council, 16 November 2016).

HSY and its member municipalities are currently preparing a storm water agreement that will specify the responsibilities and the division of duties between HSY and cities in terms of storm water management. The agreement is expected to be signed in 2018. According to the draft agreement, HSY would be responsible for storm water sewerage, and other storm water matters in Helsinki would fall under the responsibility of the city. Under section 17a of the reformed Water Services Act, the final decision on the party that is responsible for storm water sewerage is made by the city council.

The Water Services Act no longer requires compiling water service development plans but Helsinki has deemed it necessary to have such plans. The third City of Helsinki's water service development plan was completed in February 2017. In relation to the Storm Water Management Program, the development of storm water management in the City of Helsinki's areas with a combined sewer system is connected to the water service development plan and to an agreement on storm

water management in areas with a combined sewer system ("Sopimus hulevesien hallinnasta sekaviemäröintialueella"), that is currently prepared in cooperation with HSY. Although the reformed Water Services Act (681/2014) defines combined sewer system and combined wastewater as wastewater, conveying storm water into a combined sewer/wastewater sewer is taken into account in the Storm Water Management Program.

City organisation develops

The processes concerning storm water fall mainly under the responsibility of the Urban Environment Division, and in all of its three segments. In the city organisation, the responsibilities for the measures of the Storm Water Management Program are always assigned clearly to the service or unit under whose scope of duties each matter belongs to. The developing city organisation creates both the conditions for cooperation and the necessary resources for comprehensive storm water management. On the other hand, the Storm Water Management Program contributes to developing new procedures for the city organisation, increasing collaboration and adopting good practices for promoting storm water management.

Storm water quality becomes better

Storm water is often contaminated by undesirable substances originating from air pollution, various surfaces, effluents, accidents, pipe ruptures and other events. The main sources of emissions include traffic, construction materials, energy production and the chemicalisation of the environment. Nutrient loadings originate from fertilising fields and green areas, as well as from wastewater discharges. The amount of information and studies concerning the factors affecting storm water quality and quality-related high-risk sites in Helsinki is still quite limit-

ed. Therefore, research efforts should be increased and resources for research should be allocated. This has been taken into account in the Storm Water Management Program. Assessing the quality of storm water is impaired by the lack of national storm water quality criteria that the government (The Finnish Environment Institute) should prepare to support storm water quality assessments.

Urban environment benefits

Storm water is utilised more and more as part of attractive, high-quality and sustainable urban space. Overground storm water features, such as swales, flood plains, rain gardens and similar features enrich citizens' living environment, parks, streets and courtyards. Green environment encourages people to go outdoors to re-energise themselves and this way maintain their health.

Whenever possible, storm water and vegetation will be interlinked in the urban environment. Vegetation areas in the built urban environment need water, while at the same time they transpire and infiltrate the water, thus reducing the amount of storm water runoff and therefore making storm water management easier. Natural water features also provide other natural benefits of urban environment ecosystems, such as cooling on hot summer days and balancing flow rates between dry and rainy periods. This is an important part of climate change adaptation.

Natural management of storm water promotes the biodiversity of urban nature. Overall development of biodiversity and preservation of rare habitats and species can be supported by conserving and developing natural watercourses and small water bodies, while taking into account the characteristics of urban nature in terms of, for example, selecting the plant species and meeting the requirements of landscape connectivity.





Photo: Viliina Evokari

4. Objectives



Storm water has been utilised for increasing the attractiveness of the environment, maintaining biodiversity and promoting a good condition of surface and groundwater.



Regional and local drainage has been ensured while taking the impacts of climate change into account.



The disadvantages caused by storm water have been prevented and eliminated in changing conditions and densifying city structure.



Storm water flow rates are under control and storm water quality is improved.



Conveying storm water into wastewater sewer has been reduced.



Cooperation and procedure models supporting systematic overall management of storm water are in use, and sufficient competence and resources have been secured.

The symbols in front of each objective are shown in the measure table to indicate the objectives the measure in question promotes.

5. Priority order

Storm water management will be planned and storm water will be treated and conveyed in accordance with the following priority order:

1 Primarily, storm water will be treated and utilised at the source.

If the soil quality and other conditions allow, storm water will be infiltrated on the lots and public areas where storm water is generated. If storm water cannot be infiltrated, it will – whenever possible – be retained or detained on the lot/public area before it is conveyed away.

2 Storm water will be conveyed away from the source with a system that retains and detains the water.

If storm water cannot be infiltrated or detained at the source and therefore the water must be conveyed away from the lots/public areas, it is carried out by retaining and detaining the water in surface systems via ditches, meandering brooks and swales, in which water can infiltrate into the ground, be retained by vegetation and evaporate into the atmosphere.

3 Storm water will be conveyed away from the source in a storm water sewer to retention and detention areas located on public areas before conveying the water to a water body (brook).

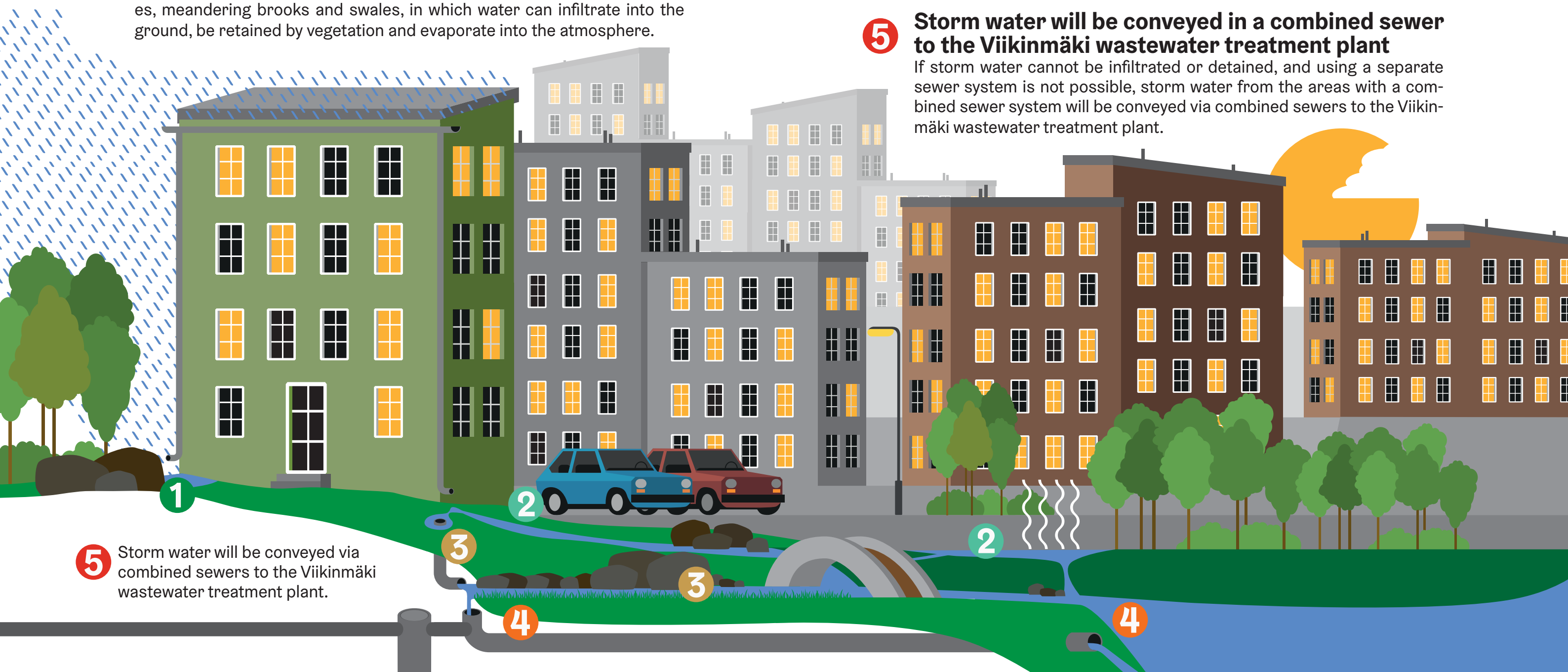
If storm water cannot be infiltrated or conveyed away from the lots/public areas with a retaining and detaining surface system, the water is conveyed away in a pipe. However, storm water will be treated with a retaining and detaining system before the water is finally conveyed to an urban brook. If storm water is conveyed from the lots/public areas directly to the sea or to Vantaanjoki/Keravanjoki river, retaining and detaining is required only if the quality of storm water is poor.

4 Storm water will be conveyed in a storm water sewer directly to the recipient water body.

If storm water cannot be infiltrated or detained on lots or public areas before the recipient water body, the water is conveyed directly to the water body in a pipe.

5 Storm water will be conveyed in a combined sewer to the Viikinmäki wastewater treatment plant

If storm water cannot be infiltrated or detained, and using a separate sewer system is not possible, storm water from the areas with a combined sewer system will be conveyed via combined sewers to the Viikinmäki wastewater treatment plant.



6. Measures






The implementation of the measures falls under the responsibility of the services of the Urban Environment Division and of the storm water group that is assigned separately for implementation and monitoring duties.

The measures are implemented in cooperation with various services, other divisions, HSY, various stakeholders and residents.



Photo: Paula Nurmi

Measures under the responsibility of the storm water group

	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
1.	Prepares and develops a clear and smooth procedure model for the overall management of storm water for the city organisation.	Storm water group, in cooperation with the required parties	2018 Continuous development	Budget	
2.	Gathers the indicators with which the services monitor the implementation of the measures of the program, and prepares an annual summary.	Storm water group, Storm water group in cooperation with services	Continuous	Budget	
3.	Promotes the establishment of an user-oriented information platform, project register and guideline database for gathering and storing storm water information, and makes relevant proposals for development.	Storm water group, in cooperation with HSY and other re- quired parties	Continuous	Budget	
4.	Specifies the storm water plan referred to in Section 103l of the Land Use and Building Act and establishes its necessity and connections to other plans.	Storm water group, in cooperation with the required parties	2019-2020	Budget	
5.	Establishes the necessity of general storm water regulations concerning the entire city (section 103j of the Land Use and Building Act) and, if necessary, makes proposals for these regulations.	Storm water group, in cooperation with the required parties	2019-2020	Budget (consultant)	



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	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
6.	Coordinates the objectives and activities originating from various programs, agreements and plans of the city and makes proposals for solving potential conflicts.	Storm water group, in cooperation with the required parties	Continuous	Budget (consultant)	
7.	Organises tailored training for various actors, decision-makers and residents promoting the overall management of storm water.	Storm water group, in cooperation with the required parties	Continuous, at least once a year	Budget + stakeholders, HMA cooper- ation	
8.	Updates the Storm Water Management Program.	Storm water group, in cooperation with the required parties	As required	Budget	
9.	Reports annually to the Urban Environment Division's steering group and other required parties on the implementation of the measures of the Storm Water Management Program.	Storm water group	Continuous	Budget	

Land Use and City Structure / Measures under the responsibility of the Strategic Urban Planning Services


	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
10.	Produces, for the purpose of land use plans, the general plans for infrastructure maintenance's regional grading and draining, as well as flood management general plans. Prepares, if necessary, a general catchment area-based storm water management plan for the purpose of land use planning.	Technical and Economic Planning Unit, in cooperation with the Detailed Planning Services and Urban Space and Landscape Planning Services	Continuous	Budget (consultant)	
11.	Develops the 'storm water management in detailed planning' tool.	Technical and Economic Planning Unit, in connection with the Detailed Planning Services and Urban Space and Landscape Planning Services	Continuous	Budget	

Land Use and City Structure / Measures under the responsibility of the Detailed Planning Services

	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
12.	Preserves the natural watercourses for the purpose of storm water management and flood routes in detailed planning whenever possible.	Regional units, in cooperation with the Area Planning Unit of the Urban Space and Landscape Planning Services	Continuous	Budget	
13.	Reserves sufficient space for natural storm water management systems and snow in detailed plans.	Regional units, in cooperation with the required parties	Continuous	Budget	
14.	Uses and applies new planning tools.	Detailed Planning Coordination Unit, in cooperation with the regional units and the Urban Space and Networks Unit of the Urban Space and Landscape Planning Services.	Continuous	Budget	
15.	Uses Helsinki's green factor as a tool in detailed planning in order to determine the green efficiency of blocks.	Regional units, in cooperation with the Urban Space and Landscape Planning Services	Continuous	Budget	
16.	Develops plan regulations concerning storm water.	Detailed Planning Coordination Unit, in cooperation with the Urban Space and Landscape Planning Services and Traffic and Street Planning Services	Continuous	Budget	
17.	Prepares, for the purpose of detailed planning, planning principles for taking storm water into account in urban infill, rooftop courtyards and street areas by increasing the amount of green areas.	Detailed Planning Coordination Unit, in cooperation with the regional units, Urban Space and Landscape Planning Services and Traffic and Street Plan- ning Services	2018-2019	Budget (consultant)	





Land Use and City Structure /

Measures under the responsibility of the Land Property Development and Plots Services

	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
18.	Includes regulations concerning storm water to lot assignment terms and land use agreements if necessary.	Plots Unit	Continuous	Budget	

Land Use and City Structure /

Measures under the responsibility of the Traffic and Street Planning Services

19.	Reserves sufficient space for storm water management structures and storm water detention and infiltration solutions in traffic and street plans.	Planning Unit, in cooperation with the required parties	Continuous	Budget (consultant)	
20.	Increases the use of pervious materials in street construction where applicable.	Planning Unit, in cooperation with the required parties	Continuous	Budget (consultant)	
21.	Conducts a survey on the conditions to construct a street without a storm water sewer and makes it a pilot project.	Planning Unit, in cooperation with the Urban Space and Landscape Planning Services	Assessment in 2020	Budget (consultant)	
22.	Separates the storm water costs from the street and park construction costs to a separate cost centre in investment programming and monitoring.	Resource Planning Unit, in cooperation with the required parties	Continuous	Budget	



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Land Use and City Structure /

Measures under the responsibility of the Urban Space and Landscape planning Services

	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
23.	Prepares and develops catchment area-specific storm water management plans for brooks and other areas for the purposes of detailed planning and further planning.	Area Planning Unit in cooperation with other units of the Urban Space and Landscape Planning Services and other required parties	Continuous	Budget (consultant)	
24.	Uses an ecosystem service-based blue green network planning tool in planning public areas and develops the tool.	Area Planning Unit in cooperation with other units of the Urban Space and Landscape Planning Services and other required parties.	Continuous	Budget (consultant)	
25.	Promotes the construction of storm water surface systems, restoration of small watercourses and utilisation of green areas for storm water management in planning the renovation of public areas, especially in areas with a combined sewer system.	Urban Space and Landscape Planning Services in cooperation with the Traffic and Street Planning Services, Buildings and Public Areas Segment and HSY	Continuous	Budget (HSY)	
26.	Participates, in connection with various projects, in the planning, piloting and implementation of new storm water management methods that are suitable for built environment.	Park and Green Area Planning Unit in cooperation with the Area Planning Unit, Environmental Services and other required parties	Continuous	Budget, project funding, partners, EU funding	
27.	Updates the small watercourse program.	Urban Space and Networks Unit, in cooperation with the required parties	2020	Budget (consultant)	




Buildings and Public Areas /

Measures under the responsibility of the Maintenance Services

	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
28.	Develops the competence, tools and methods for the maintenance of storm water management.	Municipal Engineering Unit and Public Areas Unit , in cooperation with the required parties	Continuous	Budget, project funding, partners, EU funding	
29.	Prepares the maintenance instructions for the storm water solutions and storm water flooding routes in streets and green areas.	Public Areas Unit , in cooperation with HSY	2019-2020	Budget (consultant)	
30.	Separates the storm water costs and income from the maintenance costs and income in budgeting and control.	Public Areas Unit	Continuous	Budget	






Services and Permits /

Measures under the responsibility of the Building Control Services

31.	Requires the separation of storm water and wastewater sewers when the property drains are renovated in areas with a combined sewer system.	Building Control , in cooperation with HSY	Continuous	Budget	
32.	Keeps the instructions on storm water management on lots up-to-date.	Building Control , in cooperation with the Environmental Services	Continuous	Budget	
33.	Specifies, in cooperation with HSY, the criteria based on which HSY can give discounts on the property-specific storm water fees it charges. The objective of the criteria is to promote the utilisation of storm water on the lots.	Building Control , in cooperation with HSY	2019-2020 Continuous development	Budget	

Services and Permits /

Measures under the responsibility of the Environmental Services

	Measure	Responsible unit/ In cooperation with	Schedule	Financing	Promotes the objective (page 11)
34.	Unifies and develops the permit and notification practices concerning storm water	Environmental Protection Unit , in cooperation with the Building Control Services and the Land Use Unit of the Urban Environment Resident and Business Services	Continuous	Budget	
35.	Updates the instructions on drainage waters from construction sites and monitors its implementation.	Environmental Protection Unit , in cooperation with the required parties	Continuous	Budget	
36.	Regulates storm water management issues in environmental permits when necessary.	Environmental Protection Unit	Continuous	Budget	
37.	Establishes the high-risk sites concerning the quality of storm water and prepares a program of measures to improve storm water quality.	Environmental Protection Unit , in cooperation with the required parties	2019-2020	Budget	
38.	Prepares a storm water quality monitoring program for long-term monitoring and implements the program.	Environmental Protection Unit	Program 2019, continuous implementation	Budget	



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7. Monitoring and reporting

The implementation of the Storm Water Management Program and its measures is monitored by the storm water group that consists of the storm water coordinators to be named to the services of the Urban Environment Division. The operations of the storm water group are monitored and directed by the Urban Environment Division's steering group, to which the storm water group annually reports on the implementation of the program.

The tasks of the storm water group are already specified in the measures table. The group can also undertake and work on storm water-related matters other than those mentioned in this program, if the group finds it necessary. The storm water group can use external experts. The storm water group has an important role and responsibility in promoting and monitoring comprehensive storm water management.

The implementation of the measures of the program is monitored with various indicators that will be prepared for this. Based on the information gathered from these indicators and from other progress, the storm water group will, in a manner to be agreed, compile necessary reports to the parties that require the information. This information can be used, for example, for environmental reports, monitoring the climate change adaptation measures, implementation of the city strategy, and monitoring the storm water management investments and costs.

Based on the monitoring information the storm water group gathers, the group can make proposals to the Urban Environment Division's steering group, various committees and the City Board in order to direct the city's resources to the storm water projects the group considers to be important.



8. Training and communications

The storm water group ensures that the personnel of the city organisation become familiar with the objectives and measures of the Storm Water Management Program and that the personnel comply with these objectives and measures. The program will be implemented in cooperation with various services, stakeholders and residents.

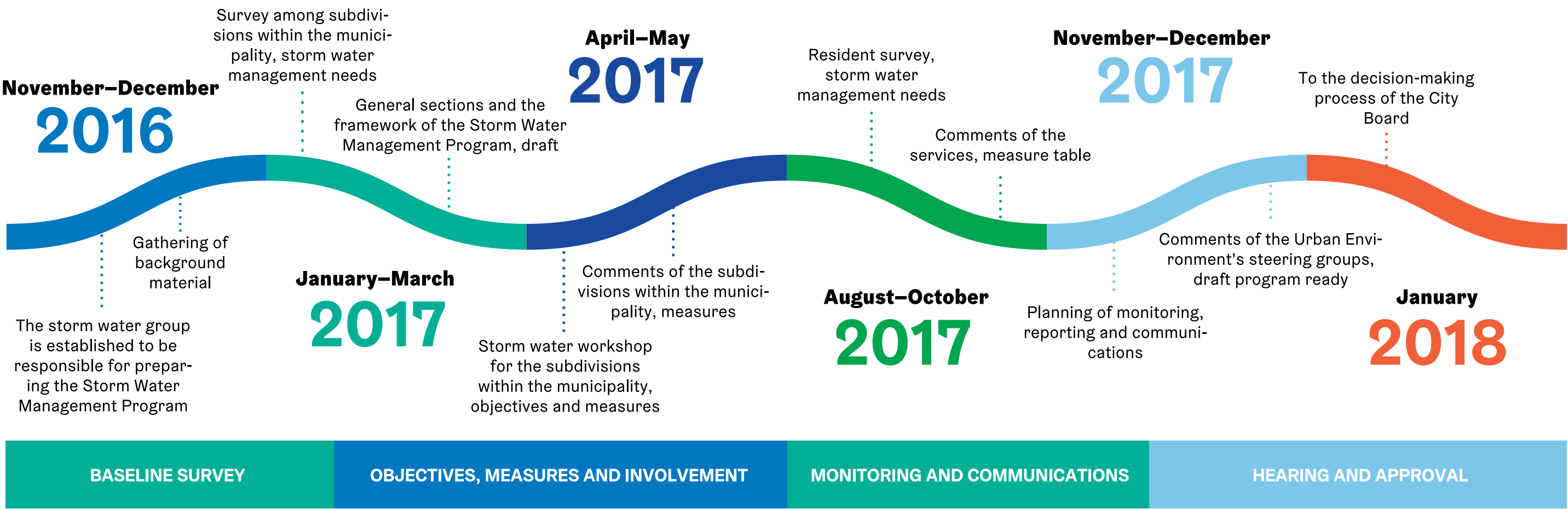
After the program is approved, the storm water group will organise tailored training sessions for the personnel and also for planning

and consulting companies and developers, among others. If necessary, training can also be arranged for other actors, such as committees, management/steering groups and other decision-makers. Training can be organised in cooperation with the storm water groups of Espoo and Vantaa. Residents and property owners will be informed, instructed and included in the projects, especially in terms of local projects and by using electronic means of communication.



Photo: Paula Nurmi

Process description on the preparation of the Storm Water Management Program





Helsinki

The Urban Environment Division is responsible for planning, construction and maintenance, building supervision and environmental services in the Helsinki city environment.