



# RIVER UNIVERSITY



THE ROLES OF THE STATE AND  
LOCAL GOVERNMENT in FLOOD  
RISK MITIGATION

11-15  
July  
2022

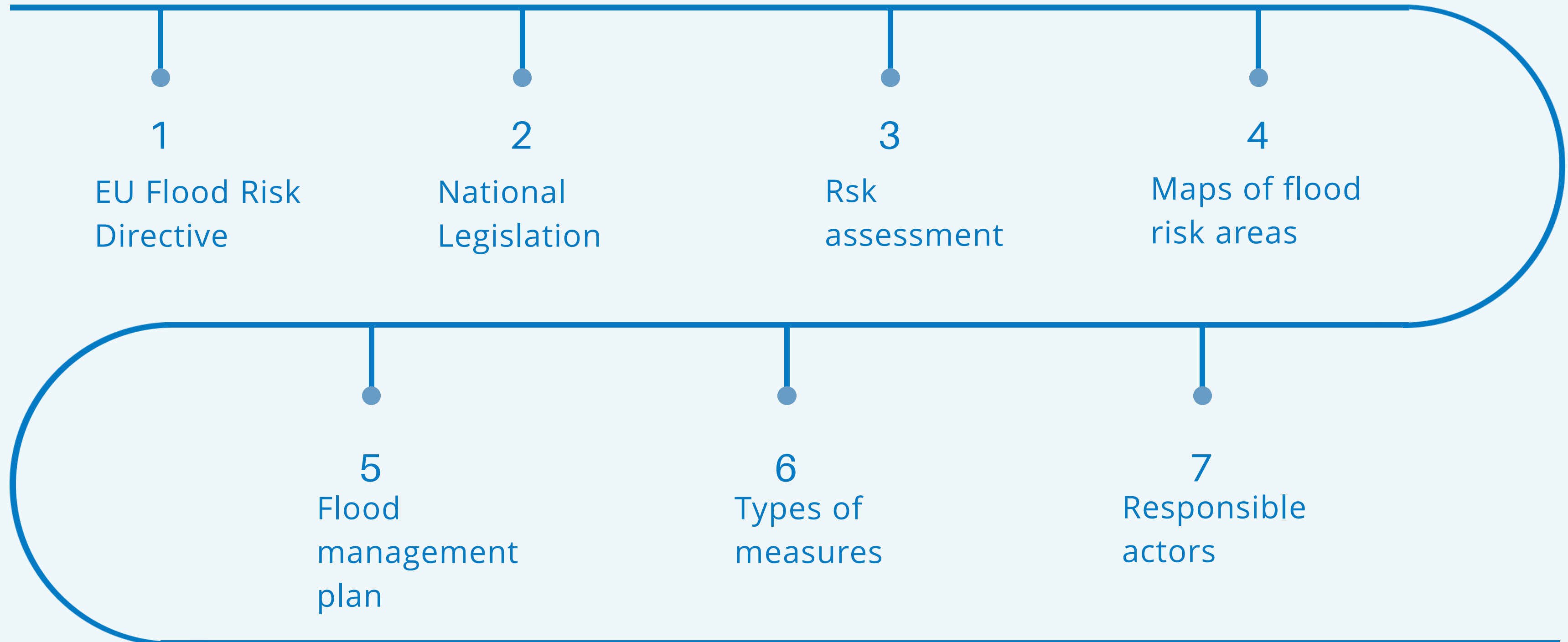
MARET MERISAAR  
and SVEN OTSMAA  
from EstWA



Haaliste river, credit,  
Ilmar Roosmaa,  
[www.Soomaa.com](http://www.Soomaa.com)

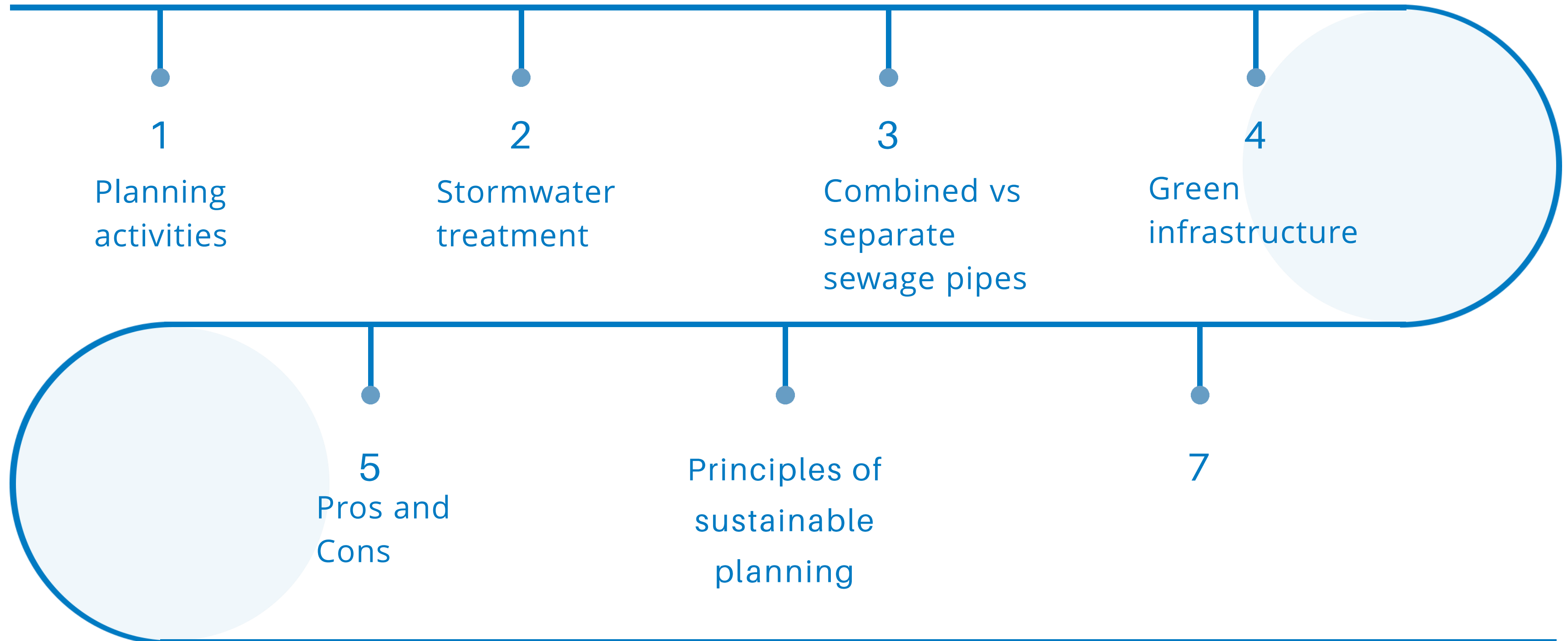
# State level activities

Sed quid est quod in hac causa maxime homines admirentur et reprehendant meum consilium, cum ego idem antea multa decreverim, que magis ad hominis



# Local level activities

Today the local planning usually does not consider flood risks yet.



# Harmonizing the legislation

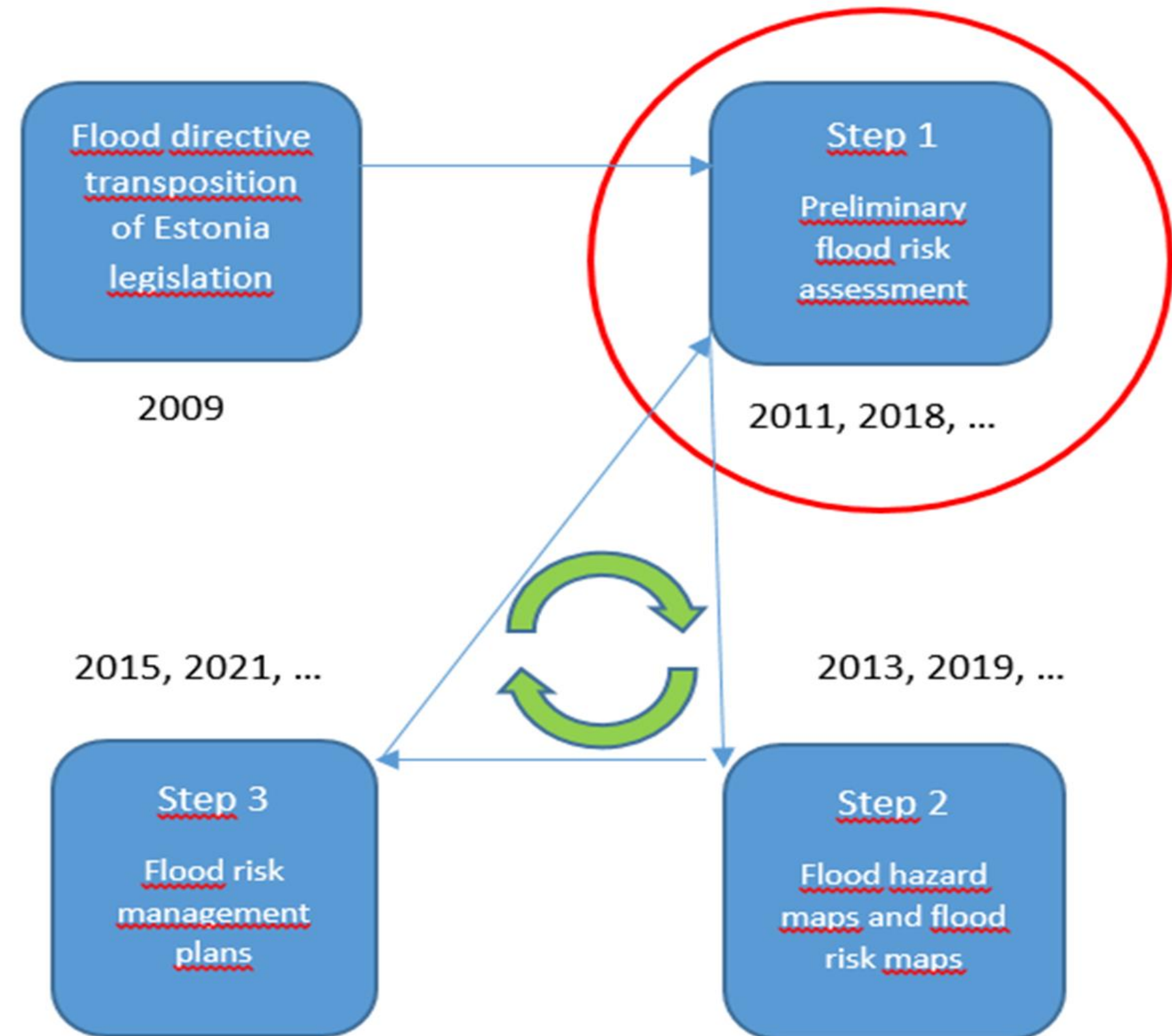
- By 2009 the Estonian laws were harmonised with the EU Flood Directive
  - Water Act
  - Public Water Supply and Sewerage Act
  - Environmental Charges Act

# The cycle of flood risk management plans

The cycle of flood risk management planning consists of

- risk assessment (and 6 months public consultation),
- \*decision on risk areas and compilation of maps (after 6 months public consultation)
- Draft management plans (followed by public consultation)
- Adoption of flood risk management plan

In Estonia the latest plan was adopted on 22 December 2021



# Most frequent types of floods



**Floods of rivers and streams due to excess rainfall or snowmelt**



**Floods of the seawater on the coastal area  
(e.g. Haapsalu)**



**Stormwater floods in densely built areas  
(e.g. Sindi)**

# Floods in the past

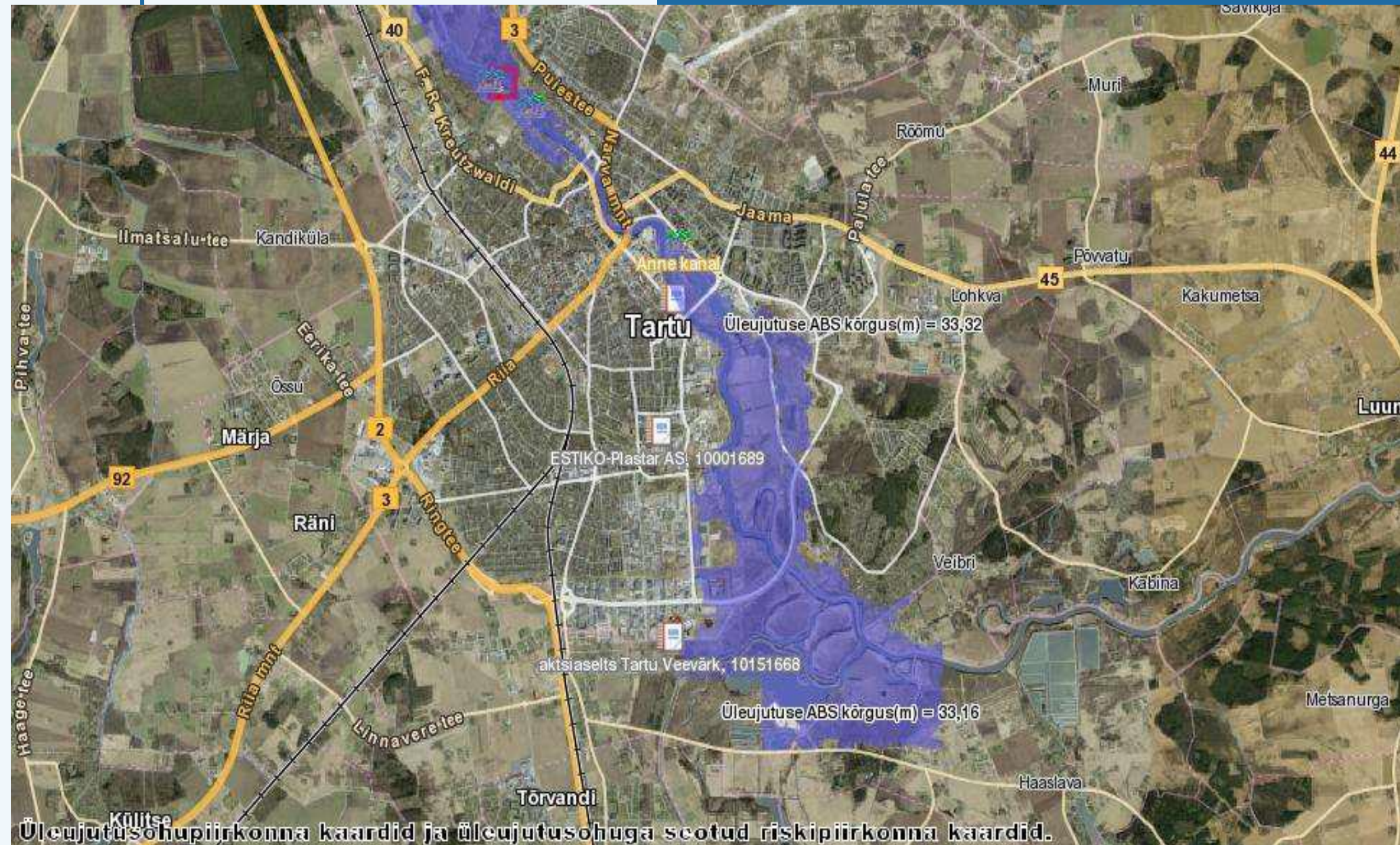
- Data in local governments
- Articles in old newspapers
- Info in the Ministry of Environment and electronic database EELIS
- In the first cycle, photos from satellites taken in spring 2010 were used
- Info from the big storm in January 2005..



# GOALS OF THE RISK MITIGATION

- Avoiding the floods
- Protection from the floods
- Warding the flood off
- Safeguarding preparedness
- Prevention of new flood risk areas.





# Maps of flood risk areas

Maps of flood risk areas in Estonia are compiled according to four scenarios, showing the possible rise of water level in 10,50,100 and 1000 years.

For each scenario the following forecasts are made: extent of the flood, water level and, in case of flowing watercourses, flow rate.

The layer of flood risk area is made using the model DEM.



# Maps of flood risk areas

Maps of flood risk areas describe possible hazards to population, wastewater treatment plants, swimming beaches, owners of environmental permits, branches of economic activities under threat.

The maps are published in the geoportal of Land Board.

There are direct links to these maps on the homepage of the Ministry of Environment.

# Urban and rural areas under flood risk

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Tallinn	Settlements:	Villages
Tartu	Virtsu	Papsaare (Audru parish)
Pärnu	Häädemeeste	Aardlapalu (Haaslava parish)
Haapsalu	Järvakandi	
Kuressaare	Nasva	
Kärdla	Uuemõisa	
Paide	Paralepa	
Võru	Maidla	
Kohtla-Järve	Võiste	
Maardu	Ilmatsalu	



# Measures in the plan

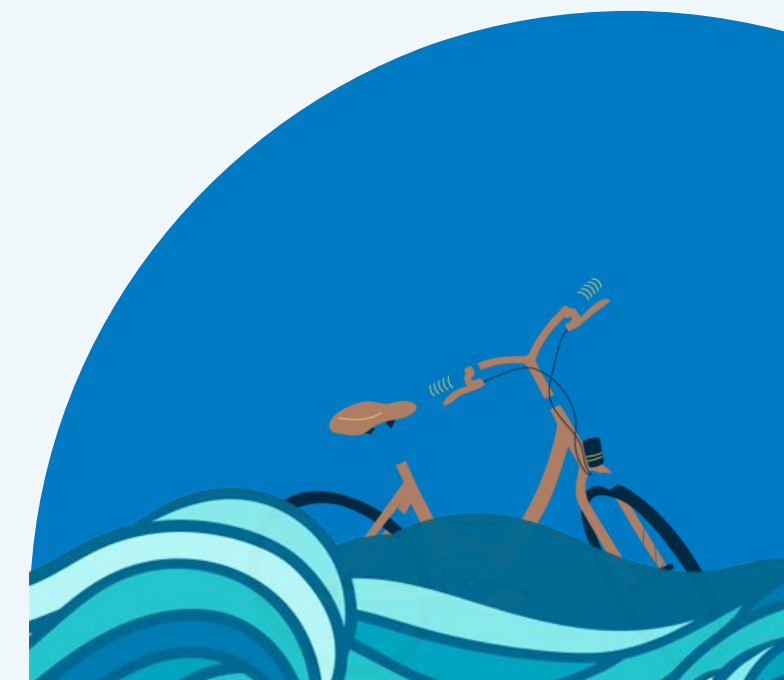
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According to the goals, the measures are divided into anticipative, protective and being ready measures.

They are interconnected with river basin management plans, but if needed, can ignore the borders of the water basins.

The flood management plans and measures are published on the website of the Ministry of the Environment :

<http://www.envir.ee/et/uLeujutused>



# 12 chapters of the flood management plan

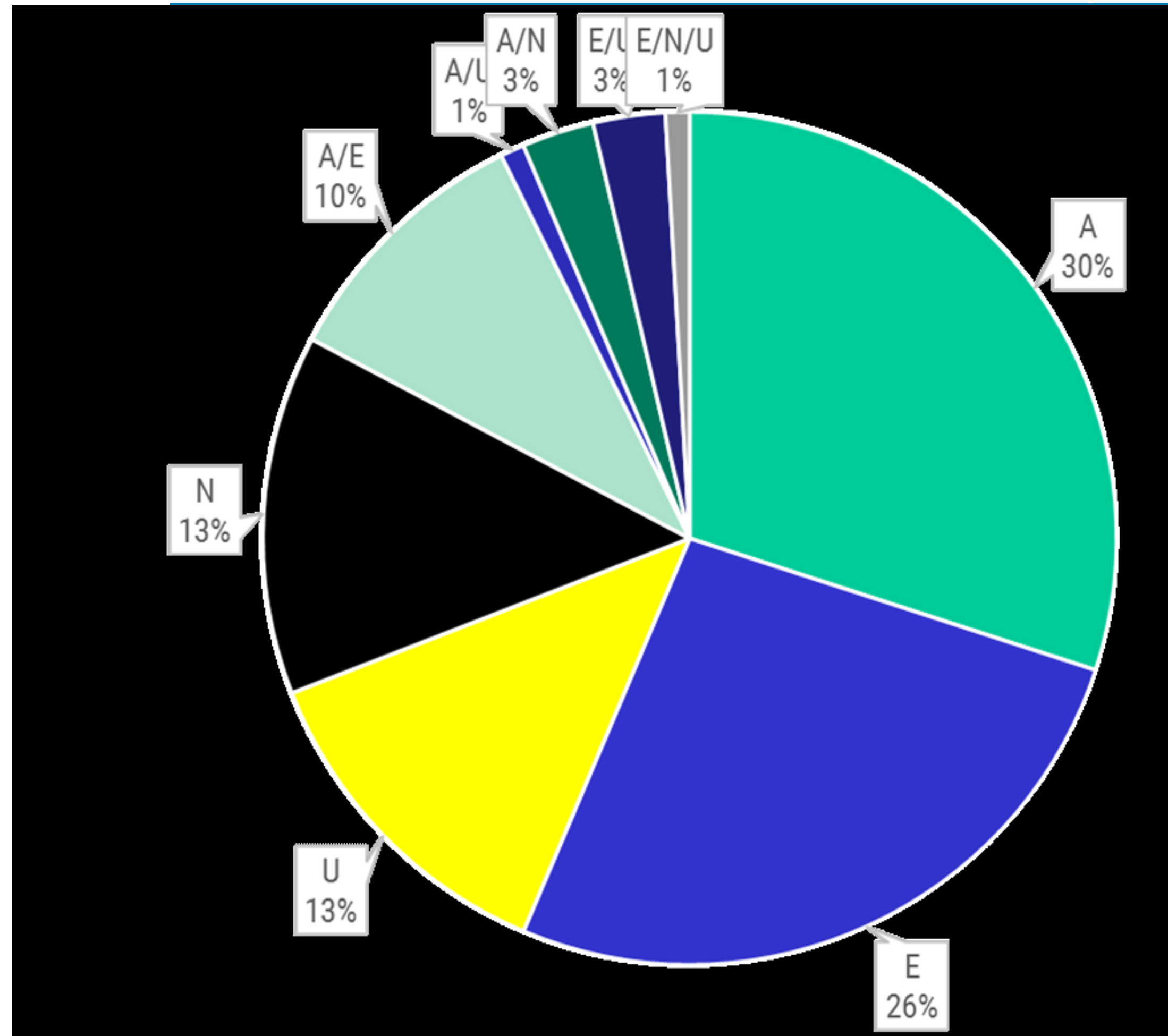
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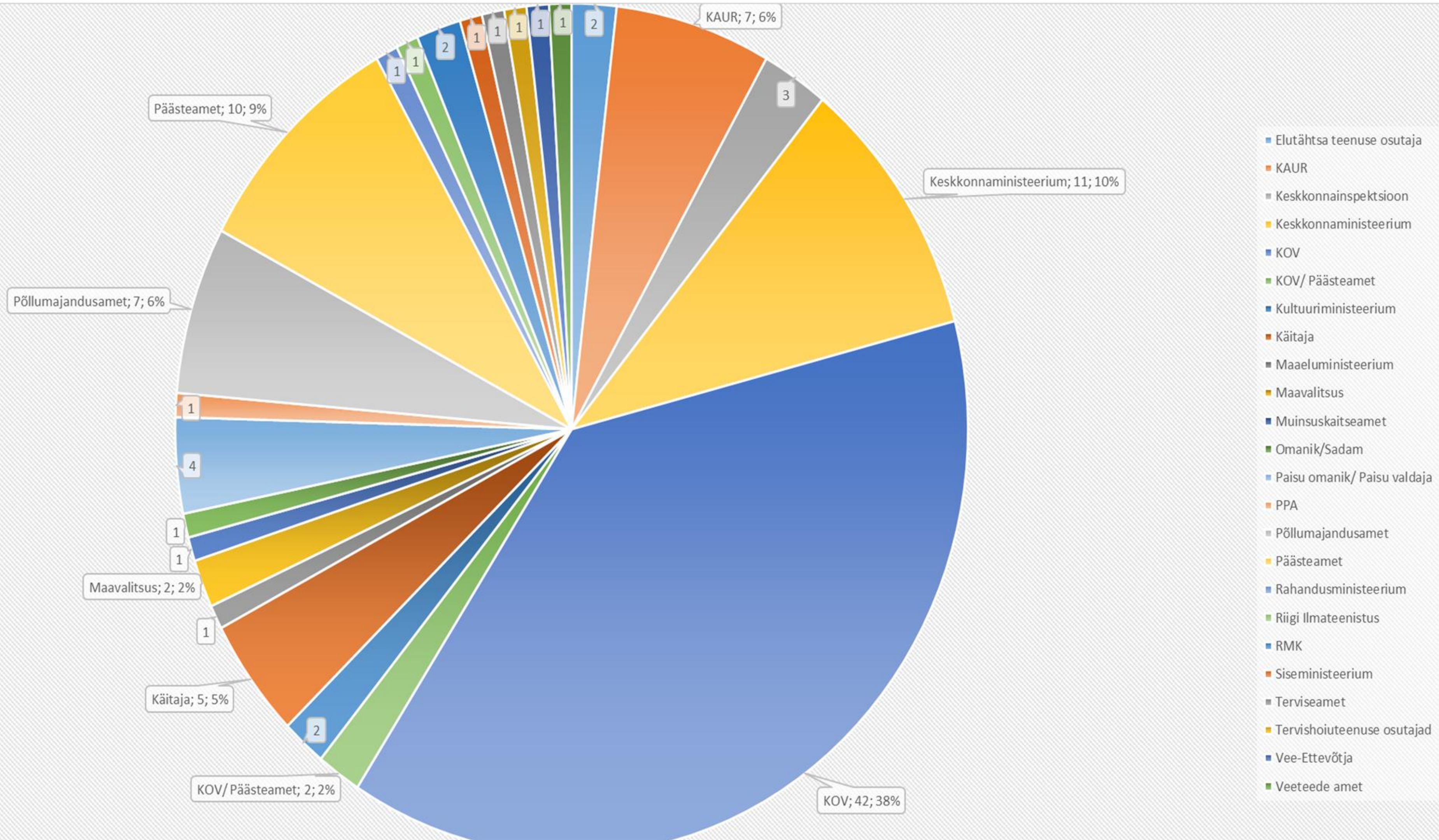
1. Limiting the new constructions in flood risk areas
2. Dispersion of stormwater and application of methods for infiltrating it into the soil
3. Safeguarding an efficient stormwater system
4. Maintenance of impoundments
5. Prevention of pollution after floods
6. Enabling runoff, lowering water levels, avoiding high tides by construction activities
7. Existence and setup of means for stopping temporary floods
8. Forecasting the floods
9. Compilation and testing of evacuation plans
10. Securing important services like healthcare, water and energy supply, transport and rescue services
11. Protection of object with cultural value from possible floods
12. Updating the flood management plan.



# Types of measures

- Administrative (A) 33
- Civil Engineering (E) 29,
- Councelling (N) 15
- Research (U) 14
- A/E 11
- A/N 3
- E/U 3
- E/N/U 1
- A/U 1
- In the following slide the responsible institutions are characterised.
- Local governments have the leading role





# Adaptation considerations

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- Construction standards for flood risk areas (e.g. height of ground)
- Construction standards for areas outside flood risk (e.g. height of the ground floor)
- Planning green areas
- What is the impact of climate change for the environment in the planning area, for human health and properties and natural environment
- How will climate change influence the planned activities and measures?
- Should the area where construction activities are banned, be enlarged and where should the borders be (This is not only for protecting nature but also for the benefit of human health).

*The following overview on green infrastructure is translated and adapted from the MoE homepage as well (author of the text is Lauri Lokko from Estonian Association of Water Engineers)*





# SUDS



**Sustainable  
Urban  
Drainage  
System**



**Traditional  
stormwater  
system**

# Soakaways

—  
Imbkaevud



# Raingardens

—  
Vihmaiad



# Permeable surfaces

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Vett läbi laskvad pinnakatted



# Filter strips

—  
Taimpeenrad kõvakattega aladel



# Swales

—  
Viibekraavid



# Infiltration trenches

Imbkraavid



# Infiltration basins

Imbväljakud





# Detention basins

Puhveralad



# Retention ponds

Viibetiigid



# Pros and cons of sustainable stormwater systems

\*

<b>Act as water reservoirs and infiltration systems, slowing the run-off</b>	<b>It may be complicated to include it into area wit dense housing</b>
Recreational value is added to the area	Infiltration is not functioning in winter
In wintertime can be used as snow storage place	I case of water saturation of the soil during heavy rainfall, the infiltrartion does not function any more
	Need maintenance
	Take a lot of space



# Principles of sustainable planning

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- Buildings should be planned on suitable areas
  - In low and wet areas the stormwater will collect and should be pumped out (extra costs later)
  - On clay and peat areas the costs of construction will be high
- While planning make it sure that the stormwater will be running away from the building not towards it
- For new constructions the stormwater solutions should be elaborated during the preliminary project as the latest
- When planning infiltration systems, the geological studies must be done during planning phase already.
- Water is infiltrating into the soil almost always, but it may take time:
  - Filtration modules:
    - Coarse sand 100...10 m/d;
    - Fine sand and clay sand 1 -0,1 m/d





# THANK YOU

**For more information on flood management plans you can contact Ms Agne Aruväli**

**from the Estonian Ministry of Environment, Water Department**

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This presentation is a translation of materials on the website of the Estonian MoE

