

ЕКОЛОГІЧНА БЕЗПЕКА І ТЕХНОЛОГІЇ ЗАХИСТУ УРБАНІЗОВАНОГО ДОВКІЛЛЯ

IMPLEMENTATION OF SUSTAINABLE URBAN DRAINAGE SYSTEMS IN ESTONIA

Valdo KUUSEMETS, Gen MANDRE

Estonian University of Life Sciences

valdo.kuusemets@emu.ee

The continuous development of urban areas increases the rise of impermeable surfaces to water (roads, parking lots, roofs etc.) that increases in combination with the climate change serious flooding risks. The climate change increased not only temperature but also heavy rain events that cause fast cumulation of storm water and damaging floodings. The cities work out climate change strategies and adaption plans that include management of storm water. The existing conventional systems – more pipelines, pumping stations, treatment facilities, does not provide sustainable solutions, therefore we need sound alternatives for storm water management.

Sustainable Urban Drainage Systems (SUDS) use more nature based systems that focus on the increased infiltration and buffering of storm water to decrease rapid outflow and cumulation of water during short period. The SUDS has several concrete techniques to manage storm water like permeable pavement, porous asphalt, infiltration beds and ditches, swales, rain gardens, green roofs etc. Crucial is to use catchment approach where we “move” from upper part of the catchment down to the mouth of the catchment using different SUDS techniques forming chain of solutions (Figure 1a).

The catchment approach needs proper analyses where exact watershed, water amount, collection areas etc., are distinguished. According to the results of analyses, we can choose different solutions and placement of specific techniques (Figure 1b).

The SUDS solutions are mainly based on ecosystems that increase green areas in the city. Therefore, SUDS have several benefits, providing in addition to the water management several ecosystem services and advantages like cleaning air, regulating air temperature, especially decreasing heat islands in the city and offer climate change adaption measures, increasing biodiversity, providing opportunities for recreation, overall security and rising property prices etc.

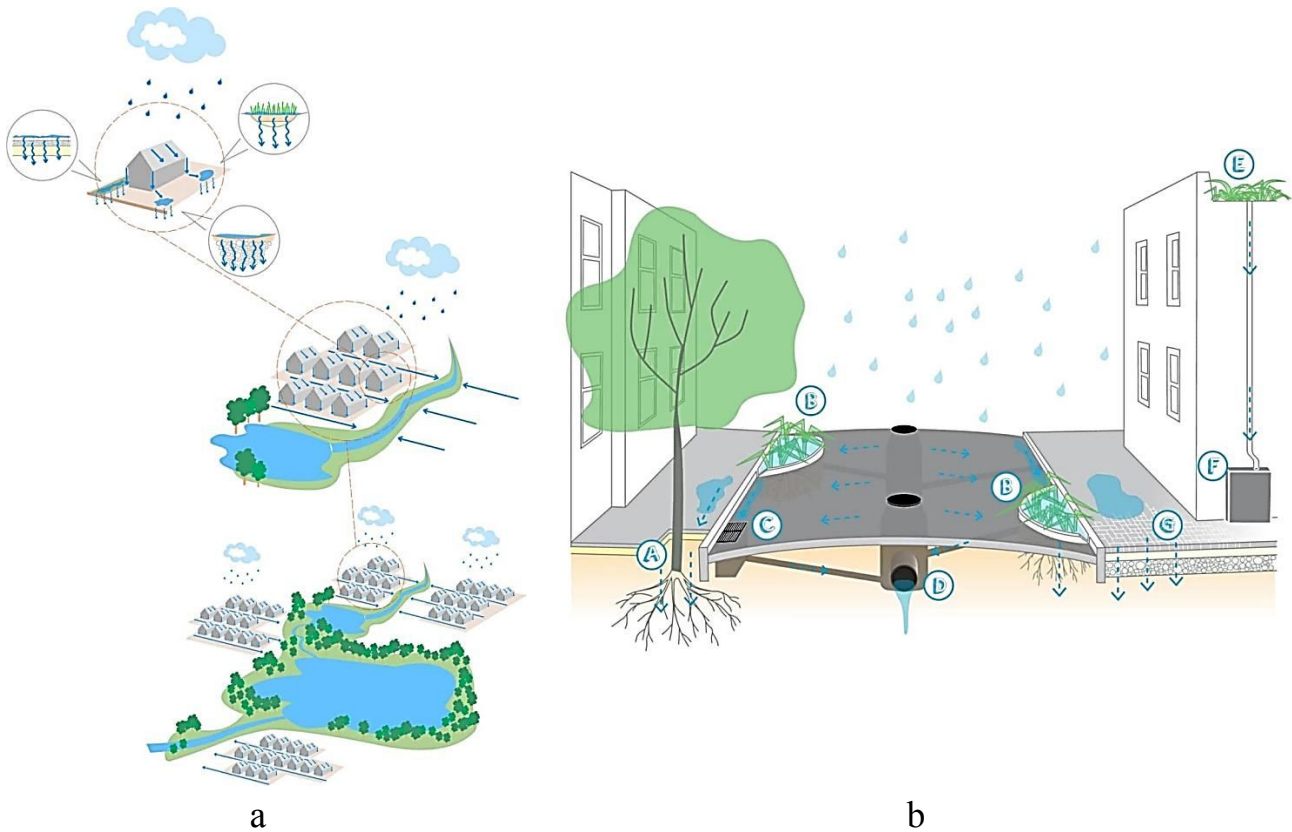


Fig. 1. (a) – The principal scheme of application SUDS techniques in different part of the catchment. (b) – Application of different SUDS techniques. A – the planting box of the tree; B – raingarden; C – collection screening well; D – the drainage pipelines; E – green roof; F – water collection tank; G – permeable pavement

In Estonia, the SUDS solutions are not very widely used. To promote the opportunity for more sustainable water management and to study efficiency of different SUDS techniques in Estonian conditions, we carry out the EU LIFE UrbanStorm project. We have built up parking lot and storm water drainage system with different SUDS techniques. All systems are monitored, on the bases of catchment analyses and measurement stations (for rain, flow rate) we create digital storm water management system for local authority. The project includes various information and capacity building activities to promote application of SUDS solutions in our urban environment.