

Storm water management and Natural Water Retention Measures Activity No.: N-W-IL-2



Workshop on Natural Water Retention Measures

26 November 2020 –

10:00 to 14:30 (Israeli Time)

(Video-conference)

Presented by: Dr. D. ZARRIS, WES Non – Key Expert





Assessment of the NWRMs efficiency

- ✓ The assessment of the NWRMs efficiency will be the outcome of the volume of stormwater stored in natural storage or used for general exploitation compared to the corresponding volume that would be otherwise lost by directly discharging to the sea;
- ✓ The efficiency can also be estimated by the reduction of the extent of the flood inundation areas before and after the NWRMs application.
- ✓ These volumes of water will be also compared to the capital costs and maintenance costs of implementing NWRMs.
- ✓ Calculation of the volume of water gained in storage can only be carried out through extensive and comprehensive hydrologic modelling.



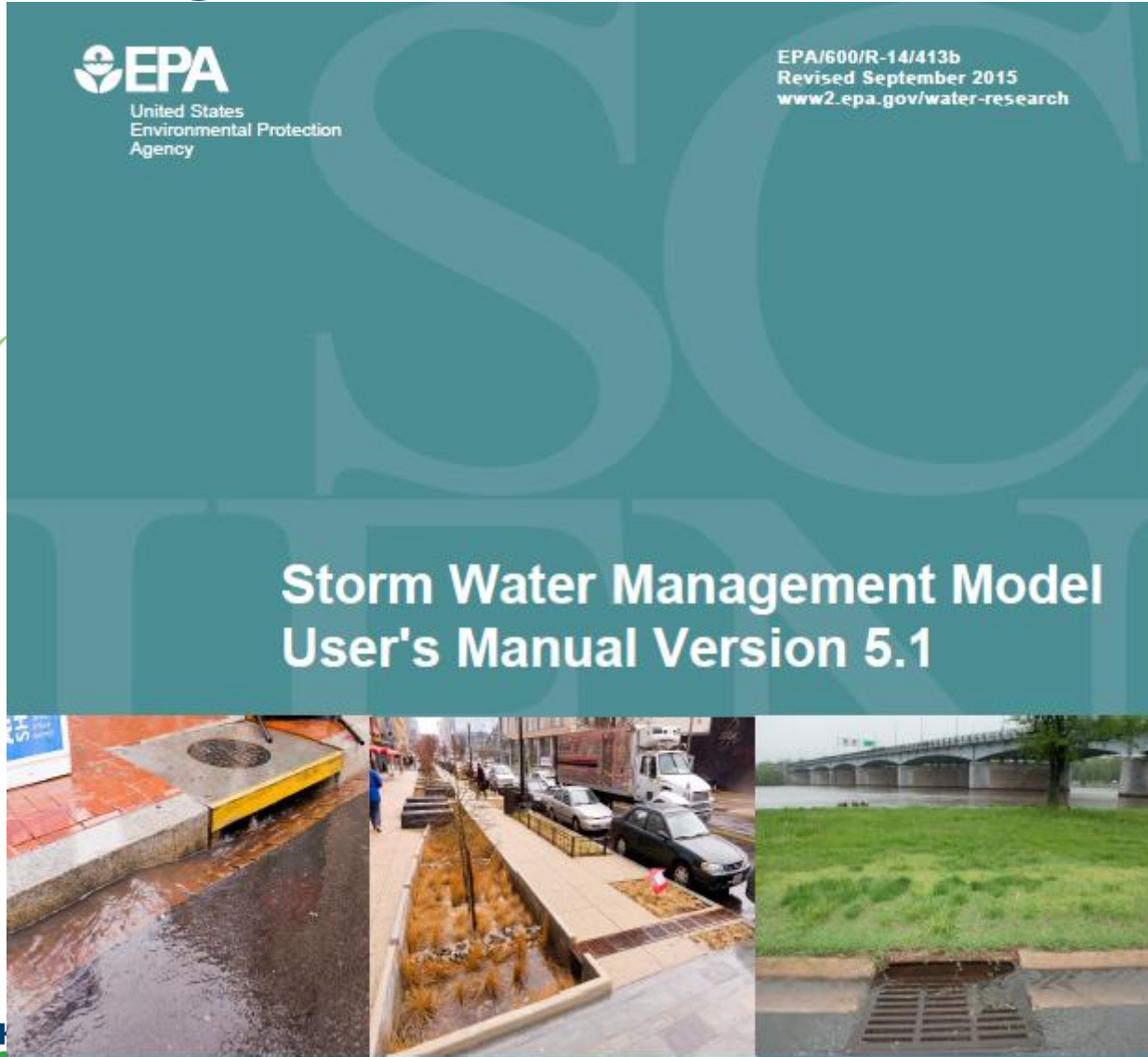
Modelling Tools for Urban Areas



**Water and
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Model (SWMM)

Model (SWMM) is a dynamic for single event or long-term and quality from primarily urban IM operates on a collection of and generate runoff and of SWMM transports this runoff orage/treatment devices, pumps, ty and quality of runoff generated y rate, flow depth, and quality of a simulation period comprised of



Definitions



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EPA's StormWater Management Model (SWMM)

- ✓ Model special elements such as storage/treatment units, flow dividers, pumps, weirs, and orifices;
- ✓ Model various flow regimes, such as backwater, surcharging, reverse flow, and surface ponding;
- ✓ Model NWRMs (also called Low Impact Development, LID) and sizing of detention/retention facilities.
- ✓ Modelling approach allows NWRM controls to be placed along in series and also allows runoff from several different upstream subcatchments to be routed onto the NWRM subcatchment.





EPA's StormWater Management Model (SWMM)

SWMM can explicitly model eight different generic types of NWRMs.

- ✓ Bio-retention Cells;
- ✓ Rain Gardens.
- ✓ Green Roofs
- ✓ Infiltration Trenches.
- ✓ Continuous Permeable Pavement.
- ✓ Rain harvesting with barrels.
- ✓ Rooftop Disconnection.
- ✓ Vegetative Swales.

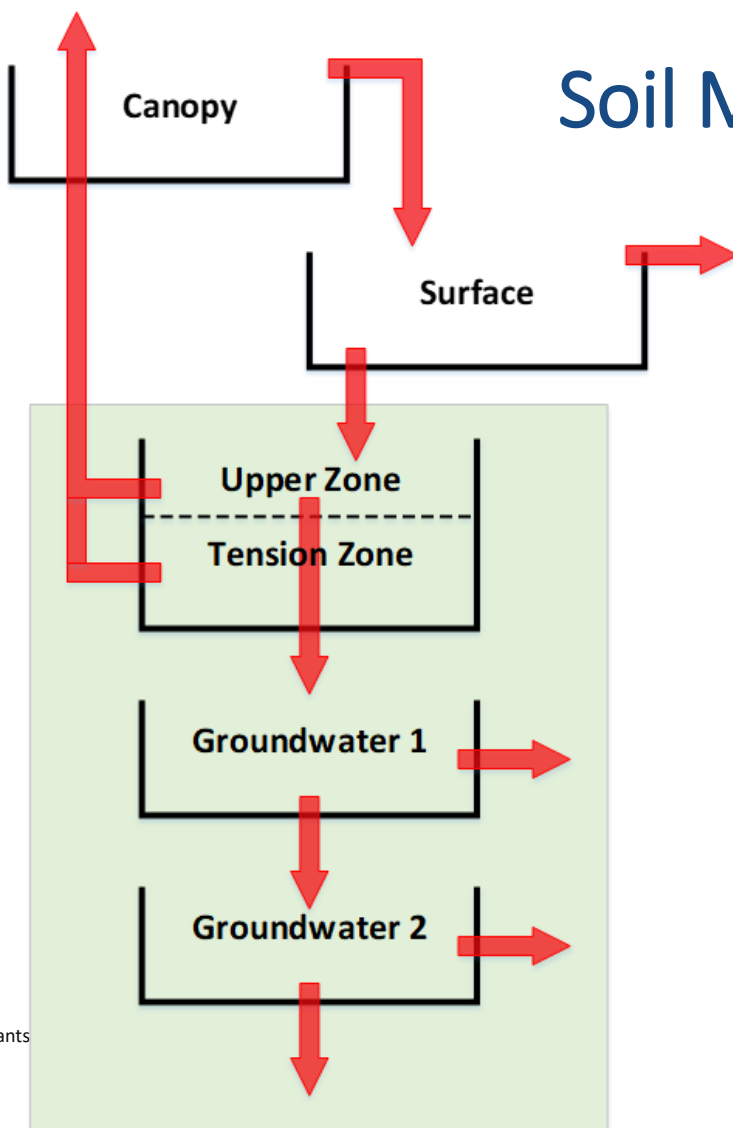




USA HEC – Hydrologic Modelling System (HEC-HMS)

The Hydrologic Modeling System is designed to simulate the precipitation-runoff processes of dendritic watershed systems. It is designed to be applicable in a wide range of geographic areas for solving the widest possible range of problems. This includes large river basin water supply and flood hydrology, and small urban or natural watershed runoff. Hydrographs produced by the program are used directly or in conjunction with other software for studies of water availability, urban drainage, flow forecasting, future urbanization impact, reservoir spillway design, flood damage reduction, floodplain regulation, and systems operation.





Soil Moisture Accounting (SMA) Method

Precipitation fills the canopy storage. Precipitation that exceeds the canopy storage will overflow onto the land surface. The new precipitation is added to any water already in surface storage. The current infiltration rate is a function of the maximum infiltration rate, the current surface storage, and the current soil storage. The highest infiltration occurs when the surface storage is at maximum and the soil storage is at zero.





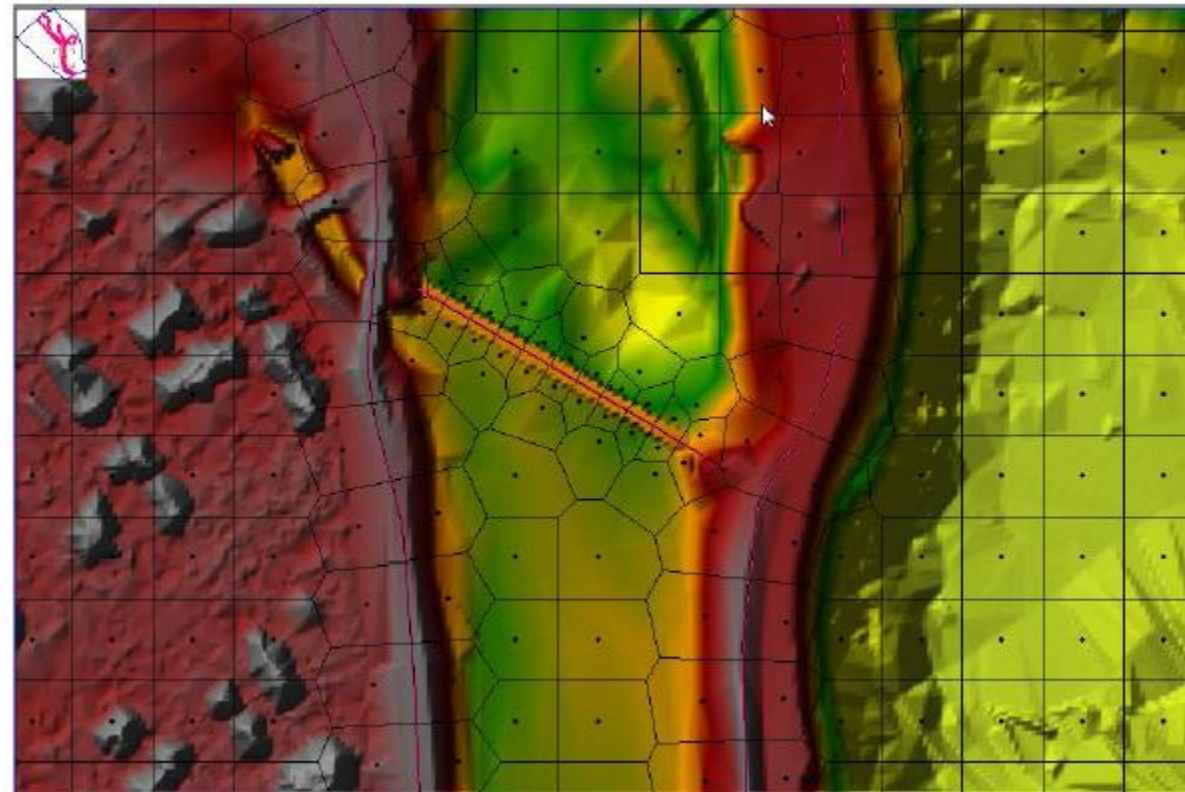
HEC-RAS River Analysis System



2D Modeling User's Manual

Version 5.0
February 2016
LDK Consultants Engineers &
Planners SA

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Thank you for your attention!

