Fluidit

QUICK TOUR OF FLUIDIT SEWER

Aalto University – 2019-02-25

OVERVIEW

Model settings

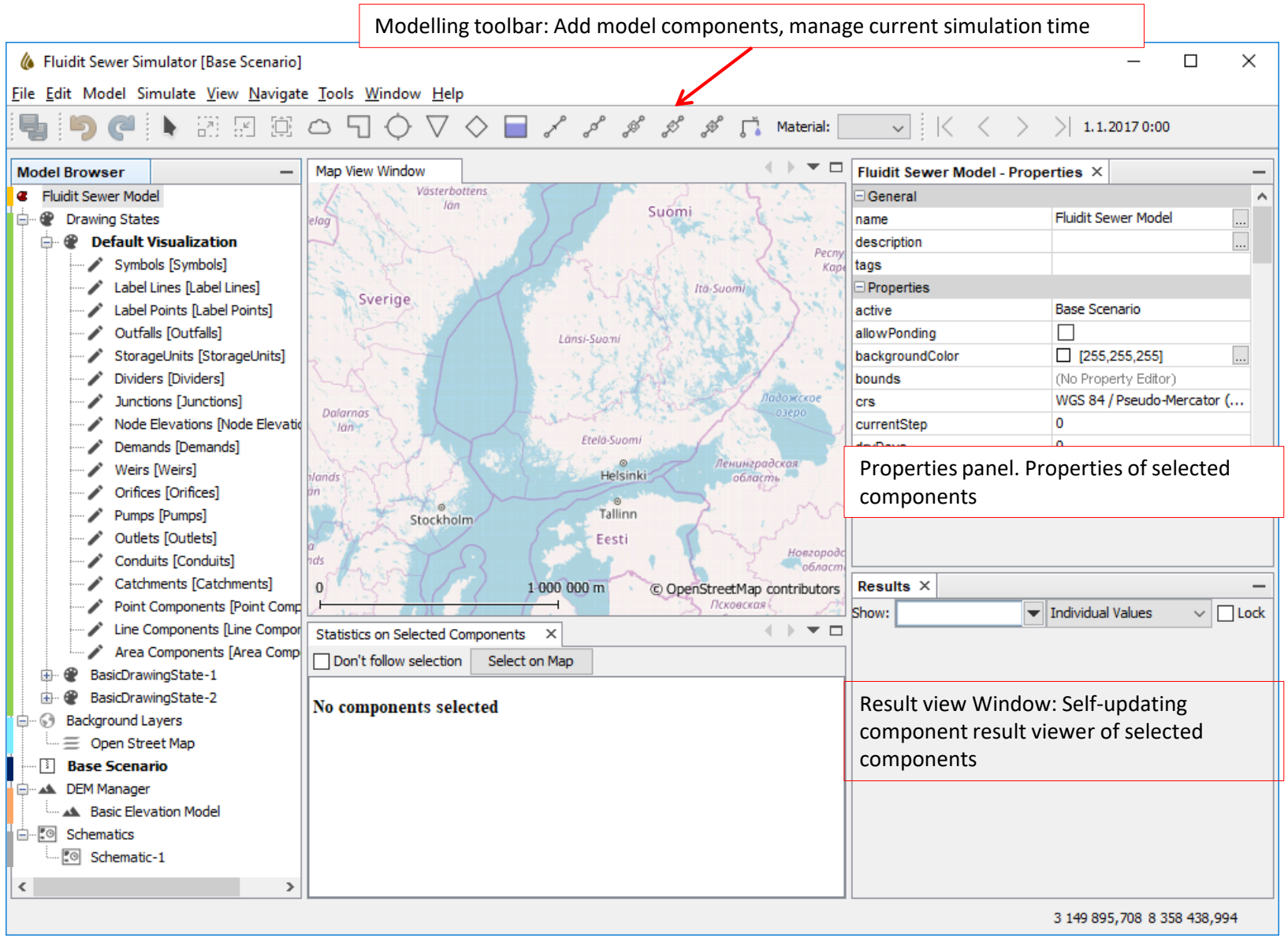
Model component styling
- Drawing order
- Manage colors and sizes
- Manage colors and sizes based on results
- Manage component filtering
- Edit legend

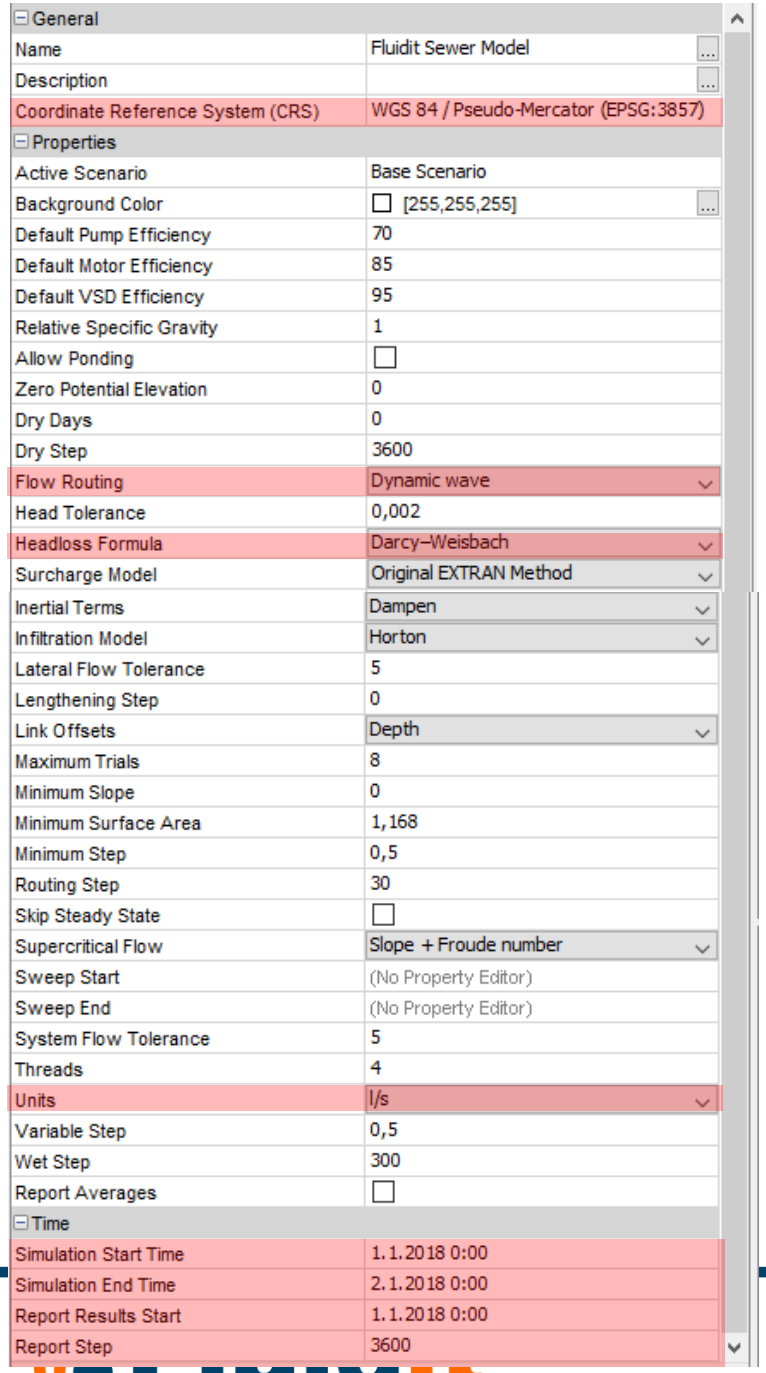
Background layers:
- Insert background maps
- Add external files for reference
- Add calculated raster layers from nodes
- Manage background layer order

Scenario tree: Create a child scenario that inherits all features from mother scenario. Edits made in child scenario does not affect to mother scenario.

DEM Manager: Elevation layers can be used for example to define node elevations, critical pressure levels or rim elevations of manholes

Schematics: add fixed figures and maps that are stored in schematics for later use.



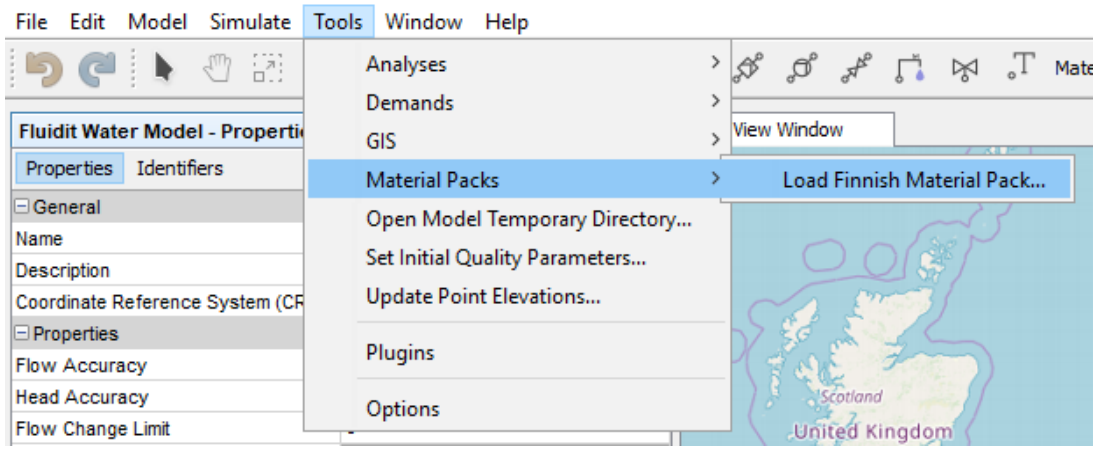


General	
Name	Fluidit Sewer Model
Description	
Coordinate Reference System (CRS)	WGS 84 / Pseudo-Mercator (EPSG:3857)
Properties	
Active Scenario	Base Scenario
Background Color	[255,255,255]
Default Pump Efficiency	70
Default Motor Efficiency	85
Default VSD Efficiency	95
Relative Specific Gravity	1
Allow Ponding	☐
Zero Potential Elevation	0
Dry Days	0
Dry Step	3600
Flow Routing	Dynamic wave
Head Tolerance	0,002
Headloss Formula	Darcy–Weisbach
Surcharge Model	Original EXTRAN Method
Inertial Terms	Dampen
Infiltration Model	Horton
Lateral Flow Tolerance	5
Lengthening Step	0
Link Offsets	Depth
Maximum Trials	8
Minimum Slope	0
Minimum Surface Area	1,168
Minimum Step	0,5
Routing Step	30
Skip Steady State	☐
Supercritical Flow	Slope + Froude number
Sweep Start	(No Property Editor)
Sweep End	(No Property Editor)
System Flow Tolerance	5
Threads	4
Units	l/s
Variable Step	0,5
Wet Step	300
Report Averages	☐
Time	
Simulation Start Time	1.1.2018 0:00
Simulation End Time	2.1.2018 0:00
Report Results Start	1.1.2018 0:00
Report Step	3600

MODEL PROPERTIES

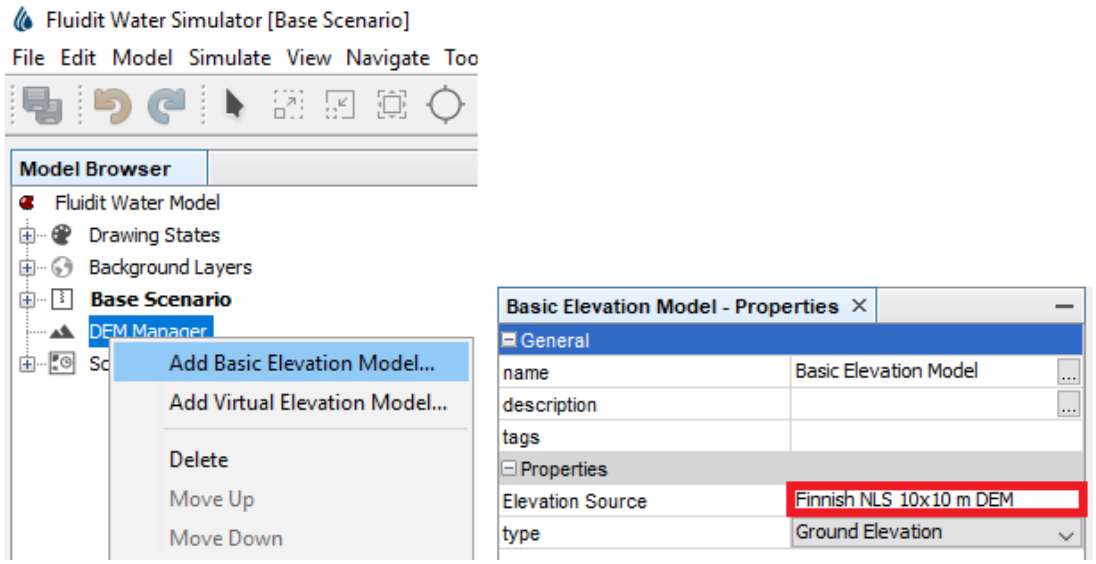
- Things to set up
  - **Units**: the most common approach is to use **l/s** everywhere – flows and demands in l/s, depths in meters of water column [m], diameters in m, roughness unitless / in mm for pressurized *force main* pipes
  - **Flow routing**: Dynamic Wave
  - **Headloss formula**: Darcy-Weisbach (general friction loss equation; used for surcharged, *force main* type conduits)
  - **Coordinate reference system**: the default, global Pseudo-Mercator system is not really metric – use ETRS89-GKxxFIN coordinate systems in Finland
  - **Simulation time settings**: Start time, end time, report start, report step (in seconds) and hydraulic time step (in seconds) – it's important to note, that it takes time for the network to fill up – simulate at least two days and report the last

LOAD FINNISH MATERIAL PACK



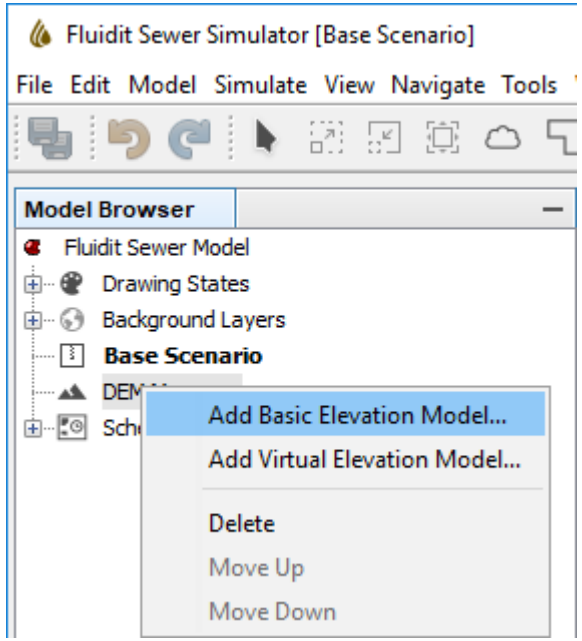
- The Finnish Material Pack includes the common pipe sizes and materials in use in Finland
- Most of materials include rough construction costs
- Materials can be inspected and modified via Model -> Materials… menu

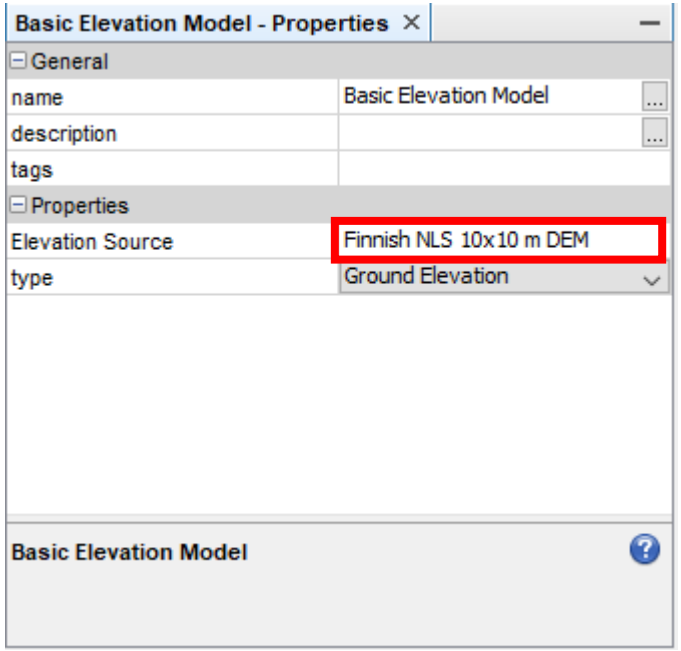
ADD AN ELEVATION MODEL



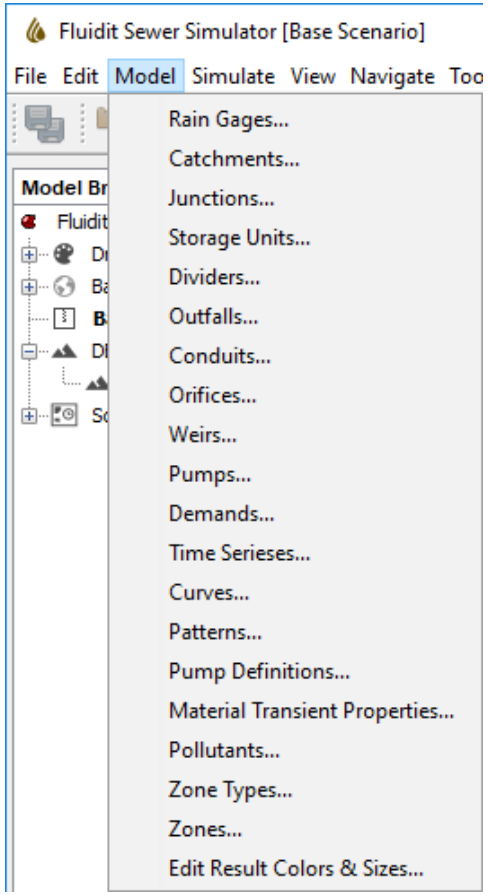
- Newly created nodes will automatically get elevation (z) from the DEM
- Elevations can be updated later from Tools->Update Point Elevations… (updates selected / all nodes and other points)
- Finnish NLS 10x10 m and 2x2 m grids are available – neither covers the whole country

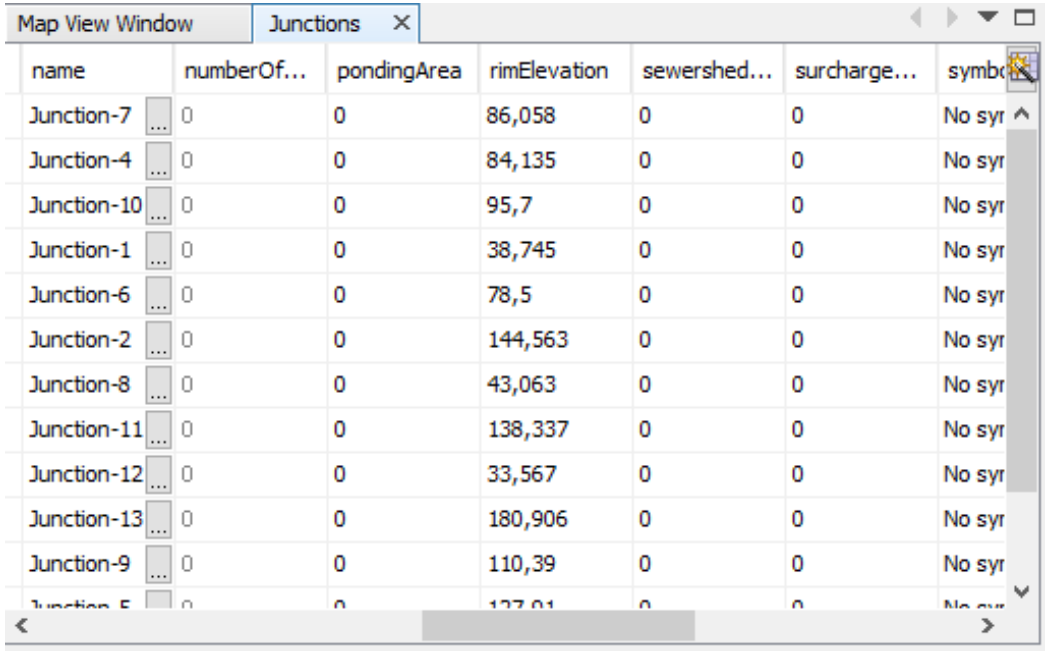
HOW TO ADD A DEM



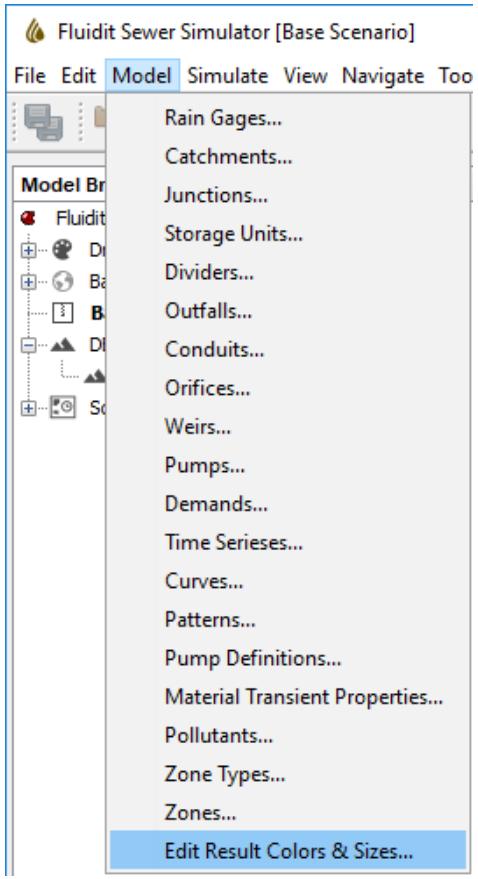


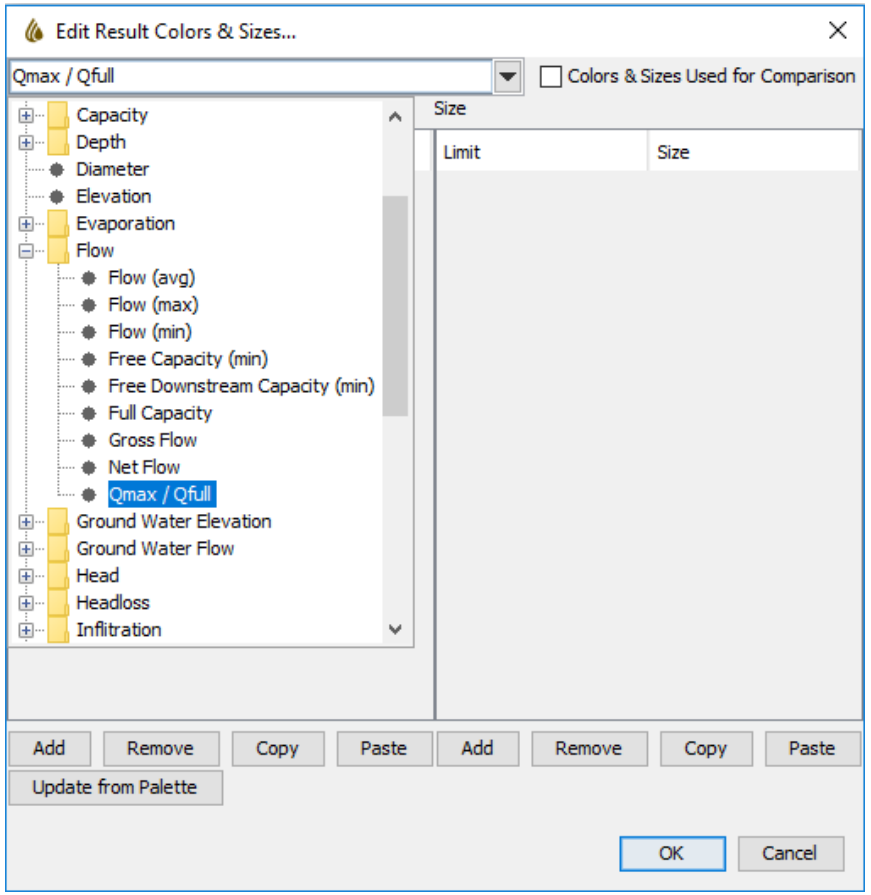
OPEN LIST OF COMPONENTS IN TABLE



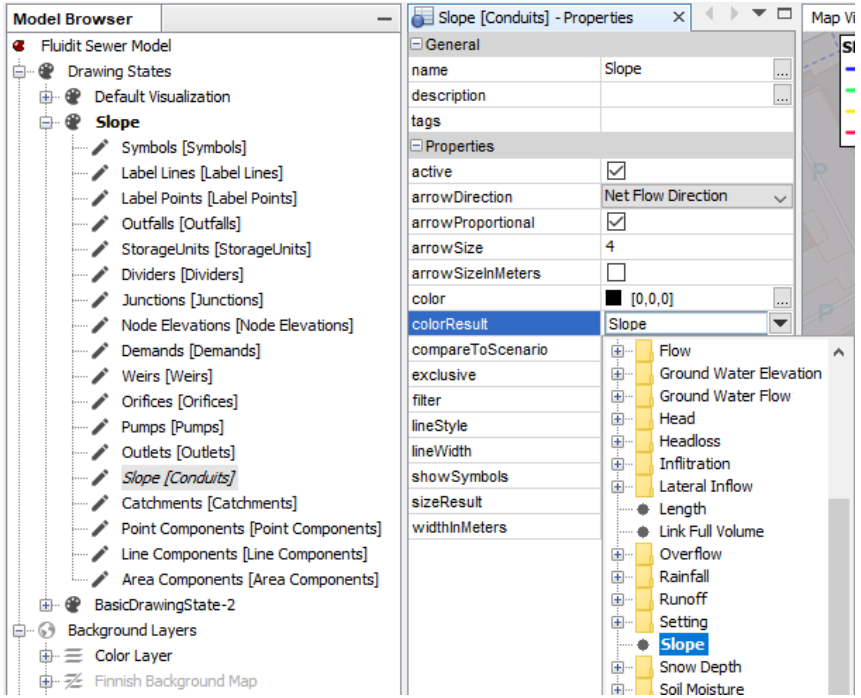


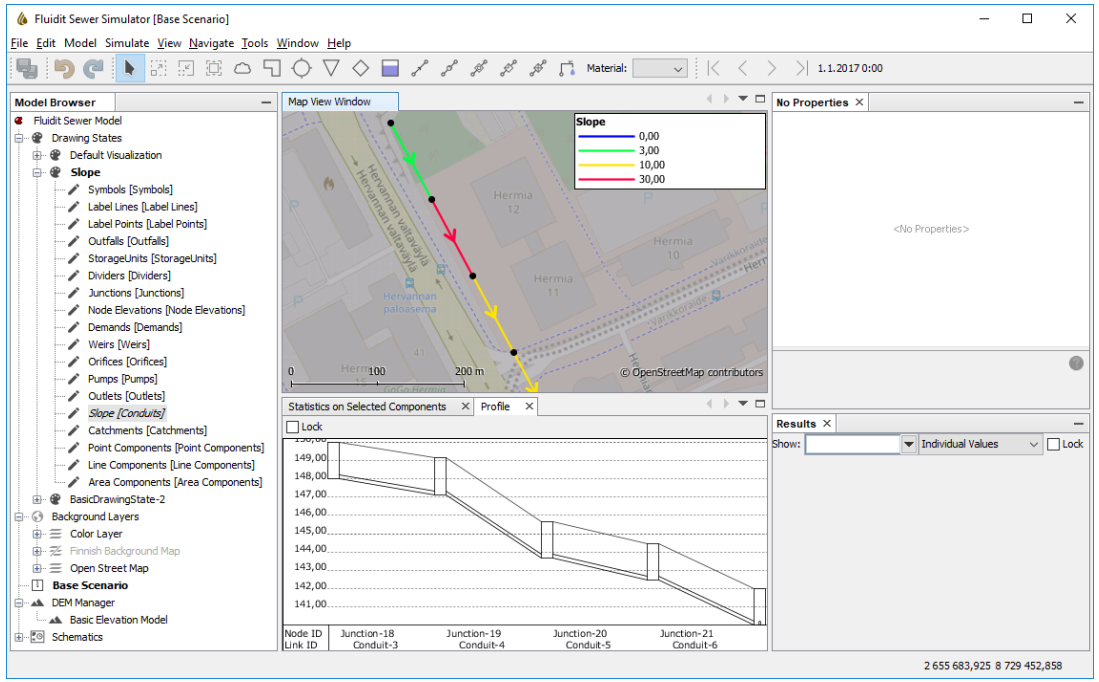
EDIT RESULT COLORS





DISPLAY RESULT COLORS





MAIN TOOLBARS

SELECT PAN, ZOOM

COMPONENTS: RAIN GAGES, CATCHMENTS, JUNCTIONS, OUTFALLS, DIVIDERS, STORAGE UNITS, CONDUITS, PUMPS, ORIFICES, WEIRS, OUTLETS, DEMANDS

PIPE SIZE & MATERIAL

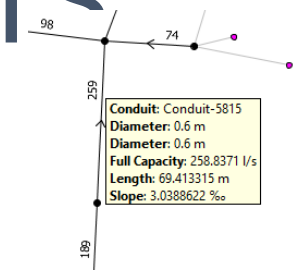
CHANGE TIME STEP BACK OR FORWARD

CONTROLLING THE MAP VIEW & DRAWING COMPONENTS

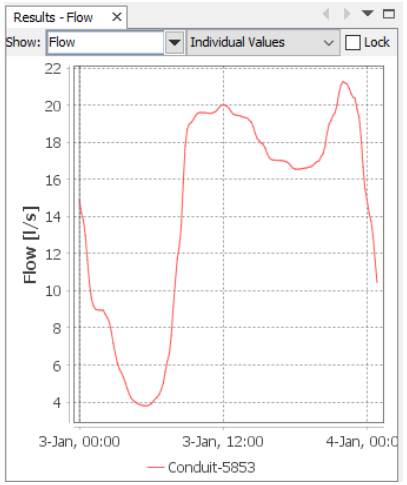
- Pan with middle mouse button or arrow keys
- Zoom using mouse scroll or + and -
- Double-ESC always activates the selection tool
  - Select by clicking or dragging
  - Holding CTRL adds to current selection
  - SHIFT+CTRL removes from current selection
  - Selection is reflected in component tables
- Component properties from selection are displayed dynamically in properties window. Double clicking on component opens properties in a new window
- Right clicking opens context menu

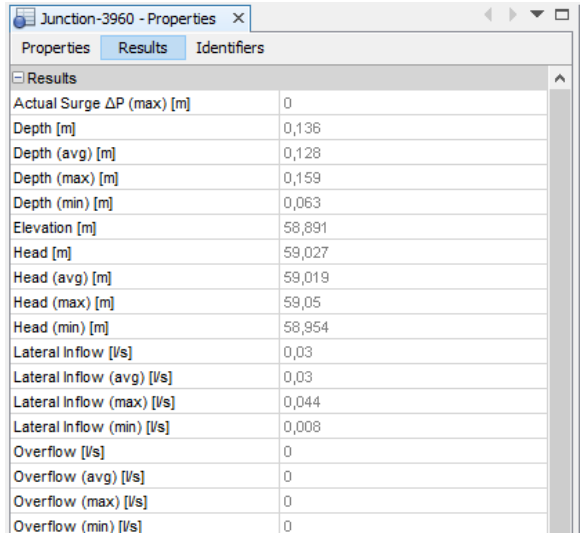
- First draw nodes: choose desired tool and click on map
- Choose pipe size and material (also activates the pipe drawing tool)
  - Start from a node by clicking or CTRL click to create a junction automatically
  - Clicking adds vertices
  - Backspace removes last vertex
  - Esc cancels
  - End by clicking on another node or CTRL click to create a new junction or split existing link
  - It's possible to zoom and pan while drawing

VIEWING SIMULATION RESULTS



- On map using controls in Display menu
- Most important results in tool tips
- Graphically using Result View Window or component context menu: show result
- Tabularly using:
  - Statistics from Selected Components
  - Results from component property window Results-tab
- More complex analysis possible using Schematics





CREATING A HYDRAULIC PROFILE (GRADE LINE)

- Open Profile View Window
- Select starting node by clicking it
- Select ending node by CTRL clicking it
- Now that you have two nodes selected, right clicking the map view shows *Find Best* and *Find Shortest Route*– select either
- Selects all links between the nodes
- Left click on the profile and choose properties to change what is shown