



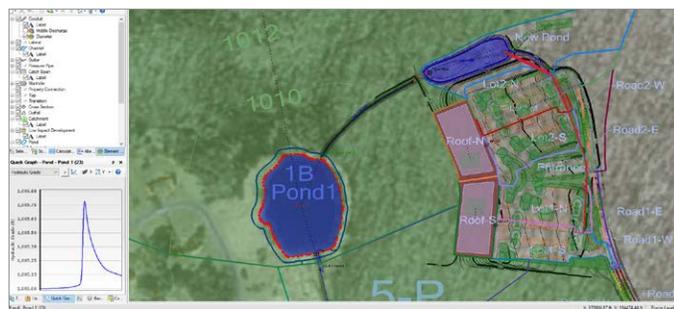
OpenFlows™ CivilStorm®

Comprehensive Stormwater Modeling and Analysis

OpenFlows CivilStorm is a fully dynamic, multiplatform hydraulic modeling solution developed to analyze complex stormwater systems. You can use built-in hydraulics and hydrology capabilities to generate flows, analyze conveyance and storage capacity, and automatically design storm sewer networks. The application also helps you to understand surface flooding depth and velocity, flood hazard, and inundation times with the user-friendly 1D/2D hydraulic analysis capability.

ONE SOLUTION FOR YOUR ENTIRE WORKFLOW

From stormwater master plan development to water quality studies, OpenFlows CivilStorm provides an easy-to-use environment for analyzing, designing, and operating stormwater systems. The application can perform comprehensive analysis of all aspects of stormwater systems, including rainfall, runoff, inlet capture and bypass, gravity and pressure piping, ponds, outlet structures, open channels, culverts, and more. Within a single product, you can analyze pressure and free-surface flow conditions for networks of channels and closed conduits, model



Map and model systems in a scaled environment whether the work is done using the stand-alone CivilStorm interface, integrated within a Bentley application such as OpenRoads™, OpenRail™, OpenSite®, or MicroStation®, or integrated within AutoCAD.

complex pond outlets for a variety of tailwater conditions, and use weirs, orifices, culverts, risers, and inlet boxes in their design.

Model as Stand Alone or within Your Favorite CAD Platform:

Regardless of the platform used, you can maintain a single set of model files for true interoperability across platforms. The application provides support for multiple background layers, data conversion utilities for use with CAD, GIS, and databases, and unlimited undo and redo.

Streamlined Model Building: Speed the model-building process by leveraging geospatial data, CAD drawings, databases, and spreadsheets. You can connect with virtually any digital data format by creating and synchronizing database connections and geospatial links. Drawing and connectivity review tools help guarantee a hydraulically coherent model.

Easy Model Management with Scenarios: With OpenFlows CivilStorm you can configure, run, evaluate, visualize, and compare an unlimited number of scenarios within a single file. Easily make decisions by comparing alternative designs or proposed rehabilitation methods for a variety of system conditions.

Built-in Stormwater Hydrology: You can load models with runoff from precipitation with the built-in rainfall distributions or create your own rainfall events.

Low-impact Development: Gain the ability to model the effect of low-impact development controls for retaining runoff before it enters the stormwater system.

Multiple Solvers: The application allows you to easily switch between multiple solvers. Use the integrated 1D/2D hydraulic analysis capability to understand 2D surface flooding and its interaction with 1D hydraulic structures. For dynamic 1D analysis, you can use Saint-Venant equations. The GVF solver can analyze peak flow conditions and automatically design storm sewers.

SYSTEM REQUIREMENTS

MINIMUM: 720 x 480 resolution, Windows 8.1 or higher, 8 GB RAM

RECOMMENDED: 1920 x 1080 resolution, Windows 10, 16 GB RAM

PLATFORM COMPATIBILITY: Stand-alone application, or runs within MicroStation, AutoCAD, OpenRoads, OpenSite, or OpenRail Designer.

OpenFlows CivilStorm At-A-Glance

INTERFACE AND GRAPHICAL EDITING

- ◆ InRoads® Storm and Sanitary file import/export
- ◆ Ability to add online Bing Maps layer as background
- ◆ Unlimited undo and redo
- ◆ Element morphing, splitting, and reconnection
- ◆ Nodes in close proximity merging tool
- ◆ Automatic element labeling
- ◆ Scaled, schematic, and hybrid environments
- ◆ Inference tool to interpolate missing data
- ◆ Element prototypes with one-click setup
- ◆ Dynamic zooming
- ◆ Named view
- ◆ Aerial view
- ◆ Multiple image, CAD, and GIS background layer support
- ◆ Automatic input and result field filtering based on solver used

INTEROPERABILITY AND MODEL BUILDING

- ◆ Automated catchment delineation
- ◆ One set of model files for four compatible interfaces
- ◆ GIS-ID property (maintain associations between records in the source file and elements in the model that may not be one-to-one)
- ◆ Polyline-to-pipe conversion from CAD files
- ◆ Spreadsheet, database, Shapefile, and OleDB connections
- ◆ Oracle spatial import/export
- ◆ LandXML data import/export
- ◆ SWMM model import/export
- ◆ Import/export MicroDrainage files
- ◆ MX Drainage file import
- ◆ Observed data import
- ◆ Time-series data import
- ◆ Taps and lateral modeling
- ◆ Storm events scenario wizard
- ◆ Automated assignment of elevation data to maintenance hole elements
- ◆ Unified file format with OpenFlows SewerGEMS®, OpenFlows SewerCAD®, and OpenFlows StormCAD®

MODEL MANAGEMENT

- ◆ Unlimited scenarios and alternatives
- ◆ Comprehensive scenario management
- ◆ Scenario comparison
- ◆ Active topology to activate or deactivate network elements
- ◆ Tabular reports with global editing
- ◆ Sorting and persistent filtering on tabular reports
- ◆ Statistical analysis from tabular reports
- ◆ Customizable engineering libraries
- ◆ Dynamic (query-based) and static selection sets
- ◆ Change tracking
- ◆ Element selection by polygon
- ◆ Element selection inversion
- ◆ Table opening on selection
- ◆ Global engineering units management
- ◆ Drawing review tools to ensure connectivity
- ◆ Automatic topology review

- ◆ Drawing navigator
- ◆ Orphaned node and dead-end pipe queries
- ◆ Custom data fields with user-assigned or formula-based values
- ◆ Hyperlinks for network elements
- ◆ Surface water flow path displayed across terrain
- ◆ Support for ProjectWise® and ProjectWise Geospatial Management

HYDRAULICS AND OPERATIONS

- ◆ Integrated 1D/2D hydraulic solver for surface flow analysis
- ◆ Ability to switch between two 1D engines for solving the full set of St. Venant equations
- ◆ Implicit and explicit (EPA SWMM) dynamic engines included
- ◆ Gradually varied flow/rational engine from OpenFlows StormCAD included
- ◆ Steady-state simulations (peak flow)
- ◆ Automatic constraint-based design for storm sewers
- ◆ Long-term simulations with statistical reports
- ◆ HEC-22 inlet capacity calculations
- ◆ HEC-22 node headloss calculations
- ◆ Support for V-shaped and parabolic gutters
- ◆ Evaporation definition
- ◆ Aquifer simulation
- ◆ HDS-5 and SWMM culvert support
- ◆ Tractive stress calculation
- ◆ Critical storm analysis
- ◆ Pollution analysis with optional definition of land use categories and land surface characteristics
- ◆ Treatment analysis
- ◆ Pond infiltration
- ◆ Culvert roadway overtopping
- ◆ Rule-based controls
- ◆ Variable-speed pumping
- ◆ Low-impact development control analysis

RAINFALL DATA

- ◆ Synthetic design storms or gauged events, including SCS Types (I, IA, II, or III), Bulletin 71 rainfall, cumulative depth, dimensionless depth (depth with time), incremental depth, and intensity hyetograph
- ◆ Chicago Storm
- ◆ Flood Estimation Handbook (UK)
- ◆ Australian Rainfall and Runoff

STORMWATER LOAD ALLOCATION AND ESTIMATION

- ◆ Runoff methods: SCS Unit Hydrograph, Modified Rational Method, EPA SWMM, RTK Unit Hydrograph, generic unit hydrograph, Time-Area Method, ILSAX, and user-defined hydrograph
- ◆ Time of concentration methods: user-defined, Carter, Eagleson, Espey/ Winslow, Federal Aviation Agency, Kerby/Hathaway, Kirpich (PA and TN), Length and Velocity, SCS Lag, TR-55 Sheet Flow, TR-55 Shallow Concentrated Flow, TR-55 Channel Flow, Friend, Kinematic Wave, Bransby-Williams, and UK standard
- ◆ Loss Methods: Constant loss rate, Green and Ampt, Horton, Initial Loss and Constant Fraction, Initial Loss and Constant Loss Rate, SCS Curve Number
- ◆ Inflow control center

Bentley® FIND OUT MORE AT [BENTLEY.COM](https://www.bentley.com)
Advancing Infrastructure

1.800.BENTLEY (1.800.236.8539) | Outside the US +1.610.458.5000 | [GLOBAL OFFICE LISTINGS bentley.com/contact](https://www.bentley.com/contact)