

## OpenFlows™ Sewer Wastewater Collection System Modeling and Management

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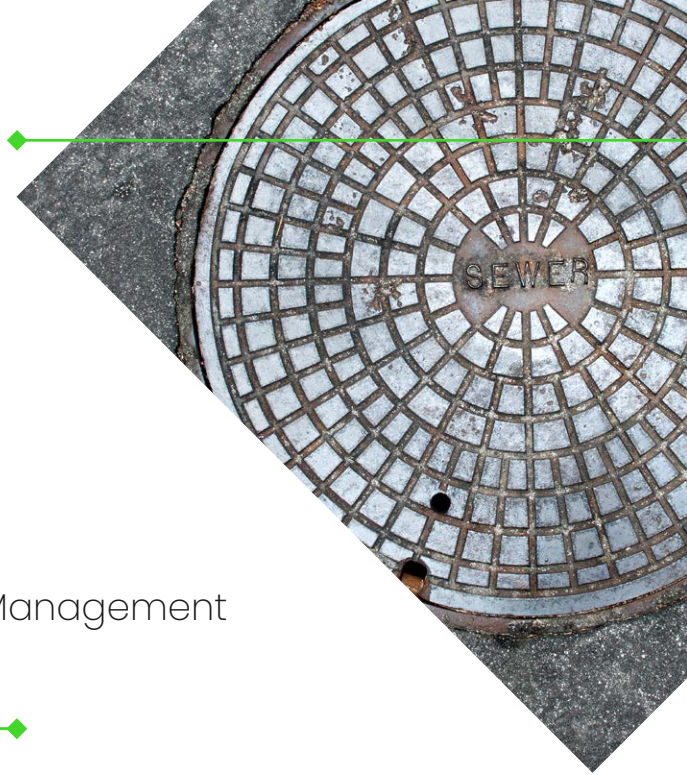


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# OpenFlows™ Sewer

## Wastewater Collection System Modeling and Management

### COMPREHENSIVE SEWER SYSTEM PLANNING AND DESIGN

OpenFlows Sewer is advanced hydraulic analysis software that enables engineers to design and analyze sanitary, stormwater, and combined sewer systems using built-in hydraulic and hydrologic capabilities. Engineers can efficiently design and analyze new sewers and expand existing sewer and stormwater systems to meet future population growth, renew aging or problematic wastewater infrastructure, or perform comprehensive analysis of all aspects of stormwater systems to ensure regulatory compliance.

### DESIGN AND ANALYZE SANITARY AND COMBINED SEWER SYSTEMS

Analyze gravity flow, overflows, flow splits/diversions, pump stations, and force mains with various dry- and wet-weather calculation methods. Automated gravity system design and scenario management capabilities help you to quickly formulate and compare solutions for extending an existing system or developing a new one. The ability to readily evaluate a range of possible alternatives and impacts can help mitigate risks related to uncertainties. OpenFlows Sewer also provides an easy-to-use environment for designing and analyzing stormwater systems, including inlet capture and bypass flows, gutters, detention facilities, open channels, and culverts.

### SCENARIO MANAGEMENT

Configure, evaluate, visualize, and compare an unlimited number of scenarios within a single file. Evaluate strategies for design, operations, sanitary loading, and network topology to improve your decision-making.

### INTEROPERABLE HYDRAULIC MODELING

OpenFlows Sewer enables you to model within several platforms while accessing a single, shared project data source. You can produce optimal urban sewer planning and overflow remediation analysis designs in an easy-to-use environment. Leverage geospatial (GIS) data, CAD drawings, real-time or historic SCADA data, databases, and spreadsheets to connect with virtually any digital data format by creating and synchronizing database connections and geospatial links to build an effective model. Use drawing and connectivity review features to help guarantee a hydraulically coherent model.

### 1D/2D HYDRAULIC ANALYSIS

If surface flooding is a concern, you can better understand surface flooding depth and velocity, flood hazard, and inundation times with user-friendly

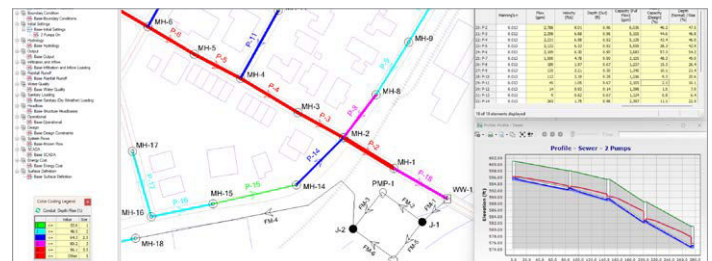
capabilities that connect 1D network elements with 2D surface flows. Communicate vital information to stakeholders with versatile mapping and reporting capabilities.

### MULTIPLE 1D HYDRAULIC SOLVER OPTIONS

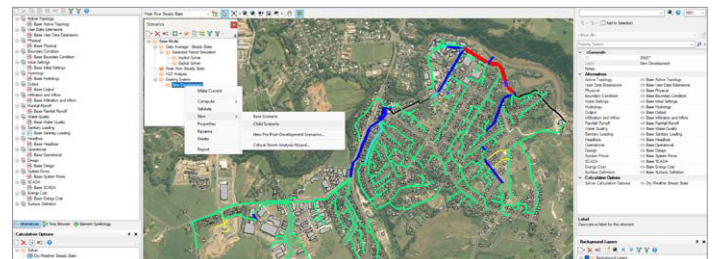
Perform dynamic 1D analysis using Saint-Venant equations, which can account for storage effects within structures and quantify overflows. Use the GVF-Convex solver to analyze peak flows, automatically design storm sewers, or perform extended-period simulations with convex routing of hydrographs.

### LOADING ALLOCATION AND ESTIMATION

Access and customize the comprehensive dry-weather unit load engineering library with its numerous typical unit loads based on population, area, count, and discharge. Input and save an unlimited number of flow patterns to accurately model flow changes over a day. Load models with wet weather runoff flows from precipitation using built-in rainfall distributions or user-defined rainfall events. Spot bottlenecks and potential surcharging with animated 3D graphs and profiles, then use color coding, element symbology, and annotation to visualize input and results.



Configure, evaluate, visualize, and compare an unlimited number of scenarios.



Produce optimal urban sewer planning and overflow remediation analysis and designs.

## SYSTEM REQUIREMENTS

**MINIMUM:** Windows 10 (32-bit and 64-bit), 11, Server 2019, or Server 2022, can run stand-alone on MicroStation® 2023, OpenRoads™, OpenSite®, OpenRail™ Designer, AutoCAD 2023 and 2024, or ArcGIS Pro 3.1 (SewerGEMS® only)

# OpenFlows Sewer At-A-Glance

**OpenFlows Sewer includes the capabilities of SewerGEMS and SewerCAD®. See the [Comparison Checklist](#) to decide the tier that best suits your project and analysis needs.**

## INTEROPERABILITY

- Includes stand-alone Windows interface
- Runs within ArcGIS, ArcGIS Pro (with Esri license)
- Runs within OpenRoads Designer, OpenSite Designer, or OpenRail Designer (with Civil license)
- Runs within MicroStation (with MicroStation license)
- Runs within AutoCAD (with AutoCAD license)

## MODEL BUILDING

- Automated catchment delineation from terrain
- Automated NRCS Curve Number and Rational “c” weighting from land use polygons
- Automatic sanitary load allocation from geospatial data (for example, land use), flow monitors, and/or property connections
- Seed files for new model templates
- Model building and synchronization with shapefiles, spreadsheets, databases, Oracle Spatial, and open database connectivity connections
- Creation of model elements from CAD drawings
- Model building and synchronization with geodatabases, geometric networks, and SDE
- Connects to live and historical data, such as SCADA, to define model inputs and compare results to measured data
- Import/export of SWMM and MicroDrainage model files
- Import/export of LandXML, MX Drainage, and InRoads® storm and sanitary data

## SCENARIO AND MODEL MANAGEMENT

- Active topology to activate or deactivate network elements
- Comprehensive, unlimited scenarios and alternatives
- Customizable engineering libraries
- Dynamic and static selection sets
- Orphan node and dead-end pipe queries
- Sub-model management
- ProjectWise® integration
- Surface flow path tracing from terrain

## HYDRAULICS AND OPERATIONS

- 1D/2D hydraulic analysis for surface flood modeling
- Two available solvers for the full set of 1D St. Venant equations: implicit dynamic and explicit dynamic (EPA-SWMM)
- Gradually varied flow solvers for sewer (with convex routing and EPANET-based pressure network solution) and stormwater (with rational method flow calculation)

- Extreme flow factors for use with steady-state simulation
- Long-term continuous simulation
- Critical storm analysis
- Energy cost analysis
- Automatic constraint-based design of gravity systems
- V-shaped and parabolic gutters
- Culvert headwalls with SWMM and HDS-5 culvert support
- Inline control structures and diversions (weirs, orifices, and depth-flow curves)
- Air valves for high points in force mains
- SCADA signal element
- Low-impact development controls
- Ability to model individual property connections, taps, and laterals
- Evaporation definition
- Aquifer simulation
- Pollution analysis with optional definition of land use categories and surface characteristics
- Hydrogen sulfide formation
- Rule-based controls
- Tractive stress calculation
- HEC-22 inlet capacity and node headloss calculations
- Variable-speed pumps
- Totalizing flow meters

## INTERFACE AND GRAPHICAL EDITING

- Dynamic elevation assignment and updates from terrain model
- Ribbon interface
- Unlimited undo and redo
- Element morph, split, and reconnect
- Merge nodes in close proximity feature
- Automatic element labeling
- Element prototypes
- Multiple background file layer support
- Bing Maps, image file, CAD, and GIS backgrounds

## RESULTS PRESENTATION

- Grid browser for visualizing 2D surface input and output data
- ArcGIS Pro visualization (with Esri license)
- Thematic mapping with color coding
- Scenario and element comparison
- Dynamic profiling
- Advanced tabular reporting with FlexTables
- Property-based color coding, symbology, and annotation
- Engineering profile annotation tables
- Custom reports
- Animation AVI creation
- Gutter cross section viewer