Release Notes 2021

MIKE+

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Introduction

Welcome to MIKE+ 2021 Update 1

In this Release Note, you will find information about new features of MIKE+, and what you need to know in order to install and get started with MIKE+ 2021.

MIKE+ is our new, flexible system for modelling and designing water distribution networks and collection systems for wastewater and storm water, as well as for modelling river networks and 2D surface flooding.

MIKE+ is offered in two versions:

- **MIKE+**
- **MIKE+ ArcGIS**

With MIKE+ you get:

- GIS-based model building and data management
- Powerful hydraulic simulation engine that supports parallel processing
- Integrated water quality, fire flow, real time control, flushing, multi-source tracing and hydraulic simulation (water distribution)
- Integrated water quality, control rules, LID and Soakway, rain dependent inflow and infiltration (collection system and river network)
- Long-term statistics (collection system)
- Integrated 2D hydraulic and water quality, dynamic interactions with collection system and river networks, surface flows visualisation (2D overland)
- Full undo and redo capability in all editors
- Thematic mapping and integrated result visualisation
- Open data models - easy integration with other applications
- Instant data checking and validation

With MIKE+ ArcGIS you get:

- Sophisticated GIS capabilities and smooth integration with ArcGIS Pro. MIKE+ embeds ArcGIS/ArcGIS Pro software for GIS-based model building, data management and result presentation.

System requirements

The recommended minimum system requirements are:

Fully supported Windows operating systems *	Windows 10 Pro, version 20H2/2009 (64 bit) Windows Server 2016 Standard (64 bit) Windows Server 2019 Standard (64 bit)
Processor	x64, 2.2 GHz (or higher)
Memory (RAM)	2 GB (or higher)
Hard disk	40 GB (or higher)
Monitor	SVGA, resolution 1024x768 in 16-bit color
Graphics adapter	64 MB RAM (256 MB RAM or higher recommended), 32-bit true color **
File system	NTFS
Software requirements	Microsoft .NET Framework 4.7.2 or later

* Fully supported operating systems are systems that have been tested in accordance with MIKE's Quality Assurance procedures and where warranty and software maintenance agreement conditions apply.

** MIKE+ utilizing GPU for 2D overland simulations requires a Nvidia graphics card with compute capability 5.2 or higher. Please note that some of these graphics' cards have varying performance in single compared to double precision calculations. The GPU functionality is based on version 11.1.1 of the Nvidia® CUDA® Toolkit.

Installation

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DHI License Management - If you are installing on a computer or server where you will also install the license file, please also install the DHI License Manager. It must be downloaded separately.

To install MIKE+:
To install MIKE+, please go to the MIKE+ product folder and execute the setup.exe file either on the MIKE 2021 USB or from the downloaded, un-zipped installation files. Press the 'Install' button to begin installation.

The setup program will automatically install all necessary files and folders on your computer. Additionally, an entry is created in the Start Menu for MIKE+.

To install MIKE+ ArcGIS:
To install MIKE+, please go to the MIKE+ product folder and execute the setup.exe file either on the MIKE 2021 USB or from the downloaded, un-zipped installation files. Press the 'Install' button to begin installation.

The setup program will automatically install all necessary files and folders on your computer. Additionally, an entry is created in the Start Menu for MIKE+.

Please choose ArcGIS Pro's "ArcGISPro.msi" to install ArcGIS Pro separately. This version of MIKE+ comes with ArcGIS Pro 2.7. You find the installation of ArcGIS Pro in the folder "Prerequisites\ArcGIS Pro 2.7". Other versions of ArcGIS Pro might also work with MIKE+ but are not covered by warranty and software maintenance agreement conditions.

Optional installation of PostgreSQL/PostGIS:
Both MIKE+ and MIKE+ ArcGIS are installed with SQLite/SpatiaLite. If you wish to use the alternative database option, PostgreSQL/PostGIS then please install the two products found in the "Prerequisites\PostgreSQL 11.2" and "Prerequisites\PostGIS 2.5.1" folders. Before you install the two products, we recommend that you read the note describing how to install PostgreSQL/PostGIS - this is available here.

License file and dongle

To use MIKE software in licensed mode, please refer to the DHI License Manager Release Notes. (License Manager Release Notes)

Product invocation

Launch MIKE+ from the Windows Start menu.

Support

For general support, please refer to our FAQ.

If you experience any difficulties, or if you have questions, please contact our Customer Success team by e-mail or phone:

Customer Success
DHI A/S
Agern Allé 5
DK-2970 Hørsholm
Denmark

mike@dhigroup.com
Tel: +45 4516 9333

You can also contact your local Customer Success team for support in your local language. You can find the list here.

New features and fixed issues

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Release 2021

Every new release of MIKE+ consists of new modules, new features and/or corrections to problems or significant inconsistencies discovered in previous releases. Please find short descriptions of the most significant news in Release 2021 below.

New features

Module/type	New feature
General	MIKE URBAN+ is renamed MIKE+. MIKE+ is a product supporting Urban, River and Flood applications.
Collection System	SWMM5 is now supported. It can be chosen as a new model type when creating a new model setup. Note that Water Quality modelling is not supported in this first release of SWMM in MIKE+.
Water Distribution	Water Hammer analyses can now be performed. The Water Hammer simulation engine has been improved compared to its previous version in MIKE URBAN classic, with: • Improvements to Air valves • Improvements to Check valves (user defined cracking pressure and velocity, opening and closing times) • Support of Hazen Williams and Manning friction • Ability to cancel the simulation while it is running • Improved error reporting when reading the input file • Orifice outflow (pressure dependent turnout).
Rivers	The Water Quality module (Advection-Dispersion and MIKE ECO Lab) can now be used with River network models.
2D overland	MIKE+ (Collection system and river networks) can be coupled to an existing MIKE 21 FM setup file.
Collection System	The Network simplification tool has been significantly improved, including new options to: • Trim networks • Merge pipes • Merge catchments • Reconnect the disconnected features (boundary conditions, catchments, etc.) • Convert the pipe network to a set of basins and orifices for surrogate applications.
General	Background maps can be obtained from WMS servers. Note that this option supports only WMS servers with projected map projections (not geographical projections) and that the map projection from the WMS server must be the same as the projection used in MIKE+.
General	The map projection used in MIKE+ can be modified. While selecting a new map projection, it is possible to convert coordinates of features in the model setup to the new coordinate system. Note that 2D files (including e.g. existing 2D overland domain file) cannot be re-projected.
General	GeoTIFF files and Arc/Info binary grids are now supported: layers can be displayed on the map and used in the ‘Interpolation and assignment’ tool.
Collection System	Custom units can now be applied with the RTC module.
2D overland	The coupling to River ends, with rivers created in MIKE+, is now supported.
2D overland	The hydrodynamic solver has been extended with the possibility to simulate one-phase flows with different flow characteristics than clear water, e.g. oil or water with high concentrations of debris or mud.
Rivers	River cross sections can be digitised and edited on the map.

Rivers	A new ‘Create and update cross sections’ tool is available for use with river networks, allowing to: • Create multiple new cross sections, from survey points and/or DEM • Update existing cross sections with a new DEM • Assign the distributed roughness values in the cross sections, from a GIS layer.
Rivers	A new ‘Structure link’ type of river has been added. A structure link is a simple type of river with no cross section but with structures placed at the center. It is e.g. used to describe overbank spilling. Any type of river structure can be added to a structure link.
Rivers	The scenario manager now allows defining scenarios with changes on the river network.
2D overland	Buildings and roads can now be defined from a polygon layer, to apply special treatments in the 2D overland simulation: • Buildings are elevated and rain falling on their roofs can now weir onto surrounding ground • A building runoff factor can delay rainfall runoff from buildings – for example, dealing very simplistically with complex roof construction or green roofs • Rain falling on buildings can be retained in the buildings. It is possible to position a coupling to the collection system network in the building area to convey rainfall to the network • Topography in roads or embankment areas can be raised / lowered.
2D overland	Surface roughness and infiltration can now be defined from a polygon layer, for example mapping to the land cover.
2D overland	Surface roughness and infiltration rates can now be defined as a function of the simulated water depth or flux.
2D overland	Insertion of new 2D dikes from a file has been improved. If the input file is a 3D shape file (containing crest levels in the lines geometry), then all the lines from the file are imported simultaneously as separated dikes, and the crest levels are also imported from the file.
2D overland	The result file type 'Section discharge' now supports polylines shapes, instead of straight lines.
2D overland	The result file type '2D flood statistics' has been extended to save new statistic items from flood simulations.
2D overland	New result file types ‘2D culverts results and ‘2D weirs results’ have been added, to save the discharge through these 2D structure types as well as water level upstream and downstream.
Water Distribution	Batch runs are now also available for Water Distribution.
Water Distribution	Demands can now be aggregated for selected items only.
Water Distribution	A new ‘Flow modulated’ setting type has been added for PRV valves.
Water Distribution	Zones can now be generated using the zone ID information specified in the Pipes properties.
General / Results visualization	A new ‘Cross section plot’ tool is available in the Results ribbon, and displays animated water levels in cross sections from river results, 2D overland results, or a combination of both.
General	When importing data from a geodatabase, it is now also possible to import data from plain tables, i.e. tables without geometry on the map.
MIKE 1D engine	Added support for setting an outlet type node as the tail node for Pressure Mains (TT56148)

Fixed issues

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Module/type	Error/Inconvenience
General	The list of supported map projections has been significantly increased, offering new and updated map projections. It is possible to change the model projection to a new map projection to correct eventual shifts of the background maps.
General	Geometries (coordinates) were sometimes not imported correctly during the import from a .sqlite database.
General	An unexpected error about an invalid source type was sometimes obtained while attempting to select a geodatabase to import data from.
General	Arc/Info binary grids could not be loaded to the map or were wrongly displayed.
General	Error checking has been improved in multiple editors to detect more errors in input data.
Collection System	The water level filling was incorrectly plotted on the Profile plot, when there is an offset between the pipe's and the node's invert levels.
Water Distribution	Various issues have been corrected in relation with Flushing Analysis.
Water Distribution	Extended rules were not always imported from EPANET .inp file.
Water Distribution	Pipe regulations were not always imported correctly from EPANET .inp file.
Water Distribution	The curve plotted in the Pumps editor had a wrong shape for pumps with relative speed, and was plotted with wrong units.
Water Distribution	The demand coefficient specified in the 'Multiple demands' editor was not taken into account during the simulation.
Collection System	An unexpected error was sometimes returned while executing batch runs.
2D overland	Automatic import from MIKE 21 FM sometimes failed.
Collection System	Q-H weirs were listed with links in the result documents, instead of weirs.
Collection System	The unit shown for geometric catchment area was wrong.
Collection System	The import of catchment connections sometimes failed when the 'Topology' option was active, even though this option was not supposed to apply to catchments import.
Collection System	Rainfall-Runoff results could be wrong with Time-Area method when using user-defined Time-Area curves.
Collection System	There was an error in the accounting of events for a particular month/year in monthly/annual statistics, when these errors were triggered by a job failure in the following month/year.
2D overland	An unexpected error was returned by the simulation engine, when including both 'Natural channel' couplings to 2D overland, and also coupling to a MIKE HYDRO River setup with 'River bank' couplings.
2D overland	An error was obtained from the simulation engine when coupling weirs to the 2D overland model, considering that the coupling was made with an outlet.

2D overland	A wrong unit conversion sometimes applied to the 2D domain's elevations, when the values were specified in feet in a flexible mesh file.
2D overland	dfs2 files were wrongly placed on the map when they were defined in a map projection expressed in feet units.
1D-2D coupling	Fixed unhandled exception occurring during 1D-2D coupled simulation (TT56672)
MIKE 1D engine	Fixed error in calculation of time-centered flow area in ECO Lab velocity calculations (TT56716)
MIKE 1D engine	Fixed error occurring when using gridded rain boundary in network HD simulation (TT56534)
MIKE 1D engine	Fixed error with MIKE 1D LTS statistics caused by job failure (TT56665)
MIKE 1D engine	Added support for setting outlet node type as tail node for pressurized sections (TT56148)
MIKE 1D engine	Fixed error in reporting of runoff diverted to surface in urban flood models (TT54811)
MIKE 1D engine	Fixed error in computation for 1D engine where information about opening valve from hotstart not used (TT53043)
MIKE 1D engine	Fixed error with disabling of flow regulation at a link in a MIKE+ model (TT56583)
MIKE 1D engine	Fixed error causing long initialization times in complex MIKE+ setups (TT56849)
MIKE 1D engine	Fixed error with transmission of minimum reach length information in the MIKE+ to MIKE 1D bridge (TT56914)
MIKE 1D engine	Added error message when weir crest level below node invert level (TT56032)
MIKE 1D engine	Fixed bug occurring when additional results for Froude number calculation in HD simulation selected in MIKE+ (TT56054, TT56935)
MIKE 1D engine	Fixed error in validation warning about weir Q-H curves (TT56080)
MIKE 1D engine	Fixed error occurring when a combination of load points on a node and link use the same load category (TT54478)
MIKE 1D engine	Fixed errors with ECO Lab results (TT56130, TT56773)
MIKE 1D engine	Fixed unhandled exception when running flood with MIKE 1D AD module (TT56523)

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Release 2021 Update 1

Every new release of MIKE+ consists of new modules, new features and/or corrections to problems or significant inconsistencies discovered in previous releases. Please find short descriptions of the most significant news in Release 2021 Update 1 below.

New features

Module/type	New feature
General	ArcGIS integration tool has been extended to also export Rivers, 2D overland and SWMM data to ArcGIS Pro. 2D results can be exported with multiple time steps in order to be animated in ArcGIS Pro. An option has been added to the tool to export relevant data to 3D format, allowing using the layers in 3D scenes in ArcGIS Pro.
General	The 'Project information' dialog has been extended to also show summary information for Rivers, 2D overland and SWMM data, and also show extra information for Collection System and Water Distribution.
General	The ‘Import and export’ tool now supports comments, which can also be saved to a configuration file.
General	The ‘Import and export’ tool can now import data from a Microsoft SQL Server database.
General	The ‘Import and export’ tool can now import polyline data into a polygon layer. This especially allows importing catchments when the source file describes catchments with polylines.
General	The ‘Import and export’ tool now has an option to control how to import a shape file containing dissolved polylines (multi-polylines defining a single item): either by merging the various polylines or by importing them as separate items.
General	The ‘Import and export’ tool can now import CAD files in both *.dwg and *.dxf formats. It has options to import individual layers from the CAD files or all layers with a specified layer type.
General	CAD files (*.dwg, *.dxf) can be added as layer on the map.
General	Layers from a geodatabase (*.gdb) can be added to the map.
General	While adding layers to the map, it is now possible to select and import multiple files at once.
General	The active date and time of the animated results is now shown above Profile plots and Cross section plots.
General	In Time series plots, a new option in the contextual menu allows deriving accumulated values from relevant result items. This typically helps computing an accumulated volume from a time series of discharge.
SWMM	SWMM projects can now include Water Quality modelling.
SWMM	Profile plots have been enabled for SWMM projects, including display of SWMM results.
SWMM	Various tools in the ribbon are now enabled for SWMM projects: 'Interpolation and assignment', ‘Create and update transects’, ‘Model and result report’, ‘Catchment processing’, and calibration plots.
SWMM	Extra SWMM parameters have been added to the ‘LID deployment’ editor, to control the percentage of pervious area treated, and to select a node or catchment to send drain flow to.
SWMM	Tags are supported for all relevant SWMM features.
SWMM	Internal time series can now be defined with a relative time axis (no date specified).

Collection System	A special analysis called 'Pump emergency storage estimation' has been added. It is activated from the 'Model type' editor, and enables extra simulation options under the 'Special analysis' group in the Setup tree view. It estimates the time and volume available prior to an overflow at the wastewater pump station assets in the event of system failure.
Collection System	The 'Real-time control' module has been revisited. It is now renamed 'Control rules' and applies to both Collection systems and River networks. New types of sensors are available. The 'Actions' and 'Control rules' editors have been split for more clarity. New action types have been added. A new 'Control strategy ID' item can be saved in result files to return time series of active control rule numbers for each controlled structure.
Rivers	A 'Flow factor' option has been added to Weir and Culvert structures.
Rivers	Two extra types of structures are now supported on river networks: 'Gates' and 'Direct discharges'. These structures are designed to be regulated using control rules.
Rivers	The definition of left and right sides of the river has been clarified and applied consistently across the different tools. The sides are now always defined looking in the flow direction and are therefore a function of the 'Flow direction' specified for the rivers. Mapping of cross sections without coordinates has been corrected accordingly for negative-direction rivers, and a new warning has been introduced in case cross sections are digitised in the wrong direction. The tool 'Edit multiple cross sections' now recomputes coordinates accordingly for negative-direction rivers.
Collection System	The time required for initialization of simulations has been significantly reduced for major model setups.
Collection System	The 'Catchment delineation' tool has been extended with new options to process only the selected items and with a filter on the network type.
Collection System	The boundary condition type 'Exfiltration from link' is now supported.
Collection System	A 'Soil infiltration capacity' parameter has been added to the 'LID properties' editor, for the 'Vegetative swale' LID type.
2D overland	Coupling to external overland files now supports coupling to MIKE 3 FM files, besides MIKE 21 FM files.
Water Distribution	The version 2.2 of the EPANET engine can now be used for Water Distribution simulations. The choice between version 2.0 and 2.2 can be made in the 'Model type' page. When using the version 2.2, extra parameters are now available in the 'Tanks' and 'Hydrodynamic simulation' editors, as well as for VSD pumps which can now use either a constant or a variable set point.
Water Distribution	A new tool 'Refresh connection lines' has been introduced in the 'WD network' tab in the ribbon, to repair connection issues.

Fixed issues

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Module/type	Error/Inconvenience
General	A display issue (misplaced buttons, texts overlapping buttons and data fields, etc.) occurring on various types of monitors required to change the "High DPI settings" of the application after the installation, in order to fix the problem. The proper settings are now set during the installation, with no extra action required afterwards.

General	The error “Unable to open” was returned when trying to open a *.sqlite project database located on a network location. It is now possible to open a project database either on the local machine or from another repository / computer on the local network.
General	Some map layers were misplaced when their map projection was defined with US units.
General	When changing the display of curves on the Time series plot, the zoom level was always reset to default.
General	An unexpected error was sometimes returned when importing data from an Excel file.
General	The configuration file saved from the ‘Import and export’ tool could sometimes not be loaded again in a new project: an unexpected error was obtained.
General	In the ‘Plots and statistics’ editor, the correlation plots used to show all plots for all result types. They are now shown only for the selected result type.
Collection System	For a rainfall boundary condition using the option ‘Grid distributed weights’, unexpected errors were sometimes obtained while computing the weights.
Collection System	When importing a model setup from MIKE URBAN, the value of optional additional flows on catchments was correctly imported, but the use of the additional flow was not active per default for the simulations. This led to different results compared to MIKE URBAN until the additional flows were manually included in the simulation.
Collection System	The ‘Catchment delineation’ tool was not displayed properly with Chinese Operating Systems.
Collection System	The tools ‘Show disconnected loads' and ‘Show connected loads’ sometimes highlighted unexpected load points.
Collection System	The boundary condition types ‘Load point discharge’ and ‘Load point discharge per unit’ used to use the load value specified in the boundary condition itself. This has been redesigned and the load value is now the ‘Flow’ value specified in the ‘Load points’ editor.
Collection System	Two extra grid points were created on links compared to the user-specified number of grid points.
Collection System	The filled water area was sometimes filled below the bottom level, when drawing a Profile plot on Natural channels.
Collection System	‘Link filling’ result item was wrongly shown in meters on the Profile plot.
Collection System	In the boundary conditions editor, selection of a node from the map using the arrow button didn’t work.
Collection System	While trying to merge catchments using the ‘Network simplification’ tool, an error "Found non-noded intersection" was sometimes returned.
Rivers	The ‘Create and update cross sections’ tool has been improved to avoid creating erroneous cross sections when the maximum number of points is reached. In the previous release, there was in that case a mismatch between the length on the map and the length of the raw data, leading to a validation error.
Rivers	An unexpected error was sometimes obtained when attempting to create cross sections from survey points using the tool ‘Create and update cross sections’.
Rivers	When drawing connections between rivers on the map, there was no snapping to cross sections locations. When drawing a river on the map, there was also no snapping to nodes from the Collection system network.

2D overland	The boundary condition type ‘Single distributed source’ was incorrectly applied in the simulation, with the source not properly distributed spatially.
2D overland	The 2D overland simulation could stop during initialization due to the input 2D precipitation file not found, for major model sizes.
2D overland	2D overland’s surface roughness was incorrectly set up in the simulation when using 2D infrastructure layers but without combining it with a land cover layer.
2D overland	MIKE+ randomly crashed when configuring 2D overland simulations to run on GPUs.
2D overland	2D simulation time steps were wrongly disabled in the editor if no 1D simulation was also included.
2D overland	The import of MIKE 21 FM file sometimes failed.
2D overland	An unexpected error could occur while attempting to draw a cross section plot covering multiple rivers and the 2D overland domain.
1D-2D coupling	An unexpected error was sometimes obtained during initialization of the simulation, due to ‘River end’ couplings.
Water Distribution	The simulation start time was disabled for steady-state simulations. It is now enabled even for this simulation type, to control the start time of controls.
Water Distribution	In Water hammer simulations, boundary conditions, pumps start up, and air-valves were not always correctly configured.
Water Distribution	The inner diameter of pipes was not visible in the editor.
Water Distribution	The ‘Zone mapping’ tool did not isolate zones in presence of pumps or open valves.
Water Distribution	X-axis values on the Q-H curve plot were wrong, in the ‘Pumps’ editor.
Water Distribution	Various issues related to the export of data to the *.inp simulation file have been corrected.
Water Distribution	The ‘Shutdown planning’ tool didn’t allow working without a GIS valves layer being specified.
Water Distribution	Water hammer simulations failed in case inactive pipes were included in the network.
Water Distribution	In the ‘Patterns’ editor, it was not possible to specify dates for the special days.
SWMM	Various errors related to the import of SWMM models from MIKE URBAN, and to the export to *.inp simulation files, have been corrected.
SWMM	It was not possible to edit the roughness value in the Conduits editor, for force main conduits.
SWMM	Handling of nodes and conduits geometric data has been improved when switching between use of ‘Relative depths’ and ‘Absolute elevations’.
SWMM	SWMM simulations failed when saving a detailed report for a LID.
SWMM	The [SYMBOLS] section was not exported to the *.inp files, which was therefore missing the coordinates or rain gauges.
SWMM	When conduits’ roughness was defined using a material type, the roughness value was expressed as Manning’s M instead of expected Manning’s n.

SWMM	The ‘Open layer editor’ button couldn’t open the catchments editor.
SWMM	SWMM simulations failed when the date and time format of the computer was set to use some specific regional settings. SWMM simulations are no longer dependent on this format.
SWMM	Network data were sometimes misplaced on the map after importing SWMM data from an *.inp file for some unit systems.
SWMM	SWMM simulations failed when including LIDs with type ‘Rooftop disconnection’.
SWMM	MIKE+ closed down abruptly when picking up a node for the ‘From node’ and ‘To node’ fields with SWMM projects.
MIKE 1D engine	Disabled a mass correction term to make pump stop/start events in pressurized sections more consistent with MOUSE behavior (TT58554).
MIKE 1D engine	Fixed bug causing simulations to fail when using setups with many short sections (TT57877).
MIKE 1D engine	Enabled reporting results using time steps smaller than one second (TT56679).
MIKE 1D engine	Disabled obsolete warning about basin porosity (TT55483).
MIKE 1D engine	Relaxed requirements about minimum distance between digipoints to avoid errors arising from very short links (TT54072).
MIKE 1D engine	Removed inappropriate use of gridded rainfall boundaries by HD model when RR model enabled (TT54953).
MIKE 1D engine	Corrected misleading warning message that had labeled zero flow points as zero scale factor points (TT57467).
MIKE 1D engine	Improved reporting of LID results in html summary file (TT58035).
MIKE 1D engine	Improved initialization of constant and cyclic catchment discharge (TT54336).
MIKE 1D engine	Added flexibility for working with two or more catchment layers (TT57984).
MIKE 1D engine	Fixed volume error in model setups with non-cylindric basins (TT58135).
MIKE 1D engine	Fixed error in saving RDI-related result items (TT57841).
MIKE 1D engine	Fixed error in reporting of results from control structures (TT58130).
MIKE 1D engine	Increased frequency of flushing results to res1D so that it’s easier to view progress during a simulation run (TT58280).
MIKE 1D engine	Enabled simulation of junction nodes as internal pressure nodes (TT58101).
Engine couplings	Fixed object reference error arising from use of ‘river end’ coupling (TT58377).

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