

Levenmouth - Integrated Catchment Study

Clients: Scottish Water, SEPA,
Fife Council



Caley Water, on behalf of Stantec, were commissioned to complete the Integrated Catchment Study for the Levenmouth area.

The ICS model was requested by Scottish Water (SW) with drivers related to the Flood Risk Management (Scotland) Act 2009 (the FRM Act) and to the Urban Wastewater Treatment (Scotland) Regulations 1994.

The catchment consists of areas of both combined and separate drainage, alongside several watercourses including the River Leven, River Ore, Lochty Burn, Lochfitty Burn and Scoonie Burn. Overall, the study aims were to update the hydraulic model for the Levenmouth catchment in line with current SW specifications and integrate parts of the watercourses to assess the interactions between systems. The InfoWorks ICM model covers 42,000ha and contains 30,000 nodes. It also includes 30km of open channel watercourse and culverts; plus overland interactions are represented using 2D modelling techniques.

The integrated model is being used as a tool for assessments of flooding, intermittent discharges from CSOs and dual manholes. In order to do this surveys were undertaken at key assets, including manholes, dual manholes, pumping stations and CSOs, alongside CCTV and river cross-sections. Caley Water completed the initial scoping for these surveys, splitting the catchment into 13 manageable zones prior to identifying knowledge gaps for targeting data collection.

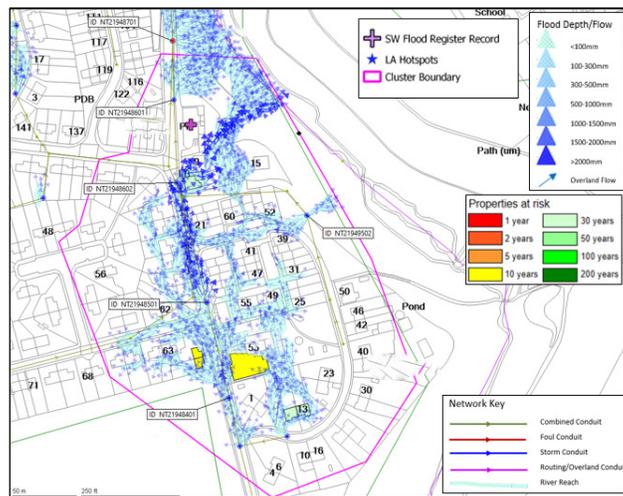
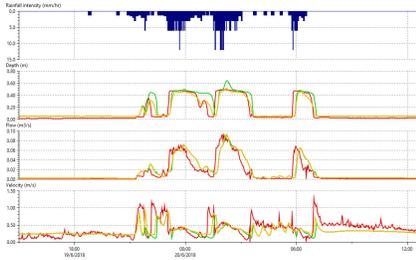
Verification was undertaken using short term flow surveys to calibrate the model outputs against real time data. A total of 156 flow monitors were installed across the catchment, alongside 26 rain gauges. Both dry weather verification and storm verification involve modifications to the network in order to achieve a good match between the predicted and observed data.

The fully integrated model is being used to assess a range of design storms, climate change scenarios, assessments of future growth and urban creep. It is also being used to assess water quality in receiving watercourses and to support a programme of screening to address aesthetic issues at CSO outfalls. The outputs will meet the requirements of the FRM Act and provide stakeholders with detailed understanding of flooding

mechanisms, overland flow paths and estimation of properties at risk with associated cost of damages.

Services provided

- Plan and manage large scale asset surveys / data collection.
- Flow survey data review to determine the suitability for verification purposes.
- Undertake Dry Weather Verification and understand levels of infiltration in the network
- Undertake Storm Verification, including the impacts of slow response runoff on the network
- Undertake Historical Verification reviewing model performance against known Flood Register locations and customer complaint records
- Amalgamate zones into a final catchment model and assess any changes to verification
- Complete Catchment Flooding Assessment, Catchment Performance Assessment and Section 16 flood mapping
- Prepare reporting in accordance with SW specification.



Solutions and added value

Caley Water has knowledge and experience in determining the modelling requirements for Integrated Catchment Studies. This includes determining the requirements for watercourse modelling elements, appropriate hydrology and boundary conditions.

We are able to provide high quality fully-integrated InfoWorks ICM models which allow our clients to use these as increasingly accurate tools to understand the interactions between catchment drainage systems.