caleywater

Case Study

Troqueer, Dumfries – Catchment Performance Assessment

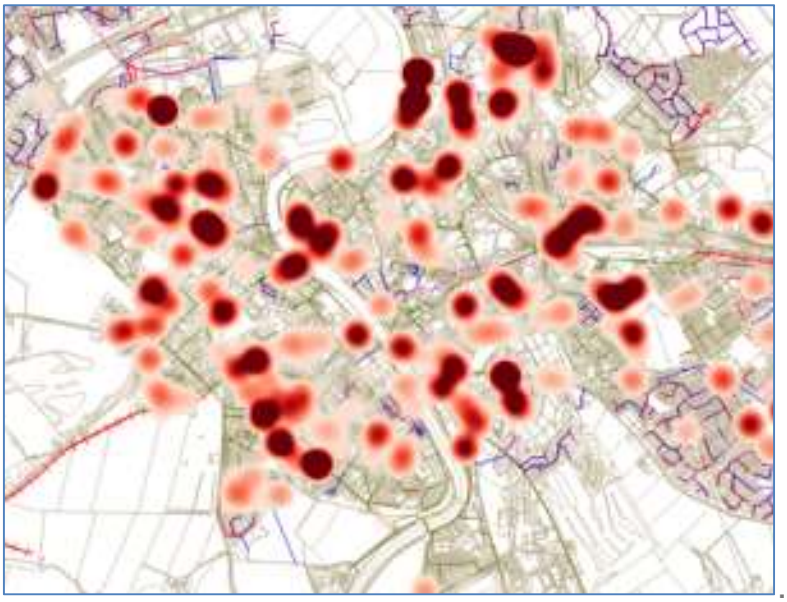
Client: Scottish Water

Caley Water, in conjunction with Stantec, were commissioned to undertake the Troqueer Catchment Performance Assessment for Scottish Water.

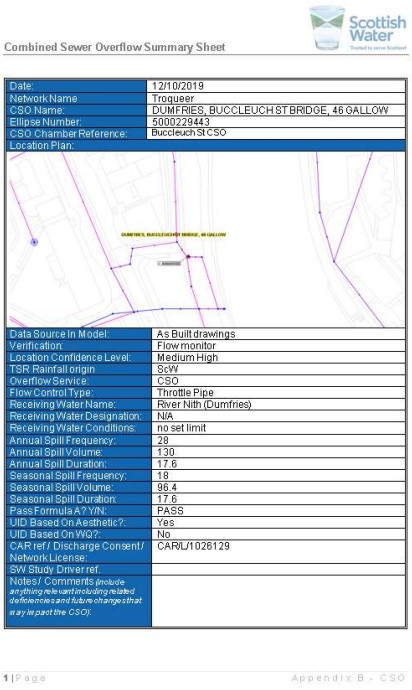
This work was completed following our model build and verification of the hydraulic model. The analysis was undertaken in accordance with the clients' specification and reporting procedures.

The outputs from the CPA provide a range of information which is useful to different departments of Scottish Water's business; including customer liaison, operations, flooding, regulation, development management, strategic planning, asset management and many more.

The modelling was completed in InfoWorks ICM and results were produced for a range of hydraulic scenarios to analyse dry weather performance, flooding, environmental performance against regulatory standards, WwTW performance, impact of operational issues on network performance, impact of future development, impact of urban creep, impact of climate change, impact of boundary conditions with River Nith and tidal states in Solway Firth.



Flooding Hotspots



Combined Sewer Overflow Summary Sheet

Scottish Water

Date:	12/10/2019
Network Name	Troqueer
CSO Name:	DUMFRIES, BUCCLEUCH ST BRIDGE, 46 GALLOW
Ellipse Number:	5000229443
CSO Chamber Reference:	Buccleuch St CSO
Location Plan:	
Data Source In Model:	As Built drawings
Verification:	Flow monitor
Location Confidence Level:	Medium High
TSR Rainfall origin	ScW
Overflow Service:	CSO
Flow Control Type:	Throttle Pipe
Receiving Water Name:	River Nith (Dumfries)
Receiving Water Designation:	N/A
Receiving Water Conditions:	no set limit
Annual Spill Frequency:	28
Annual Spill Volume:	130
Annual Spill Duration:	17.6
Seasonal Spill Frequency:	18
Seasonal Spill Volume:	96.4
Seasonal Spill Duration:	17.6
Pass Formula A? Y/N:	PASS
UID Based On Aesthetic?:	Yes
UID Based On WQ?:	No
CAR ref / Discharge Consent / Network License:	CAR/L/1026129
SW Study Driver ref.	
Notes / Comments *(include anything relevant including related deficiencies and future changes that may impact the CSO):*	

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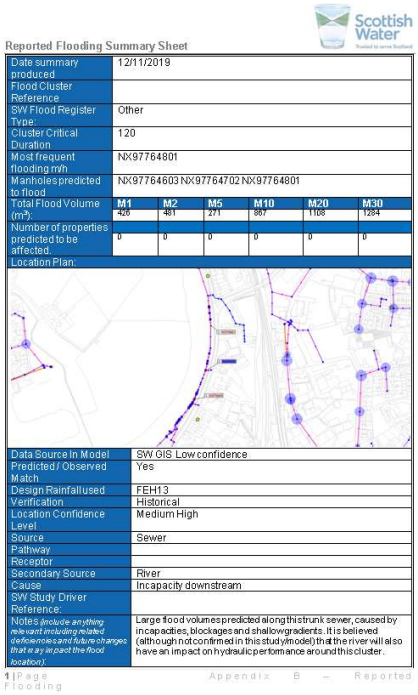

Reported Flooding Summary Sheet

Scottish Water

Date summary produced	12/11/2019					
Flood Cluster Reference						
SW Flood Register Type:	Other					
Cluster Critical Duration	120					
Most frequent flooding m/h	NX97764801					
Manholes predicted to flood	NX97764603 NX97764702 NX97764801					
Total Flood Volume (m^3):	M1 426	M2 481	M5 271	M10 867	M20 1108	M30 1284
Number of properties predicted to be affected.	0	0	0	0	0	0
Location Plan:						
Data Source In Model	SW GIS Low confidence					
Predicted / Observed Match	Yes					
Design Rainfall used	FEH13					
Verification	Historical					
Location Confidence Level	Medium High					
Source	Sewer					
Pathway						
Receptor						
Secondary Source	River					
Cause	Incapacity downstream					
SW Study Driver Reference:						
Notes *(include anything relevant including related deficiencies and future changes that may impact the flood location).*	Large flood volumes predicted along this trunk sewer, caused by incapacities, blockages and shallow gradients. It is believed (although not confirmed in this study model) that the river will also have an impact on hydraulic performance around this cluster.					

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Services provided

- Analysis of baseline model and understanding of quality based on MBV process.
- Update of model to current day to reflect development changes, any new capital schemes or changes in operational regimes.
- Assessment of flooding against historical records.
- Assessment of CSO spills against historical records.
- Operational assessment to determine impact of resolving catchment issues in terms of changes to flooding or CSO spills.
- Analysis of urban creep and impact on network performance
- Analysis of climate change and impact on network performance.
- Analysis of river levels and tidal states and their impact on network performance.
- Reporting in accordance with CPA specification including production of ancillary performance cards and flooding performance cards.
- Development assessment for range of build out scenarios from 1 year to 25 year horizon.
- Reporting in accordance with NIA specification to review development impacts. Understand requirements for future optioneering and mitigation of impacts.

Solutions and added value

Caley Water has been involved in the model maintenance for the Troqueer catchment. This experience has been valuable in gaining understanding of operational performance of the network and identifying any issues. Through various engagements with SW representatives throughout the study, we have developed a thorough understanding of how the system performs and this has been used to calibrate and refine the modelling tools. This has enabled an informative CPA to be developed which captures detailed analysis of the network for all client stakeholders.

Caley Water has worked in a close collaboration with our client to deliver high quality tailored modelling services (i.e. sewerage network performance analysis and critical area identification), providing robust solutions at affordable costs.