

# Towards Dynamic Wastewater Discharge Management: River Water Quality Modelling

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Imperial Hotel, Torquay, Devon



The  
University  
Of  
Sheffield.

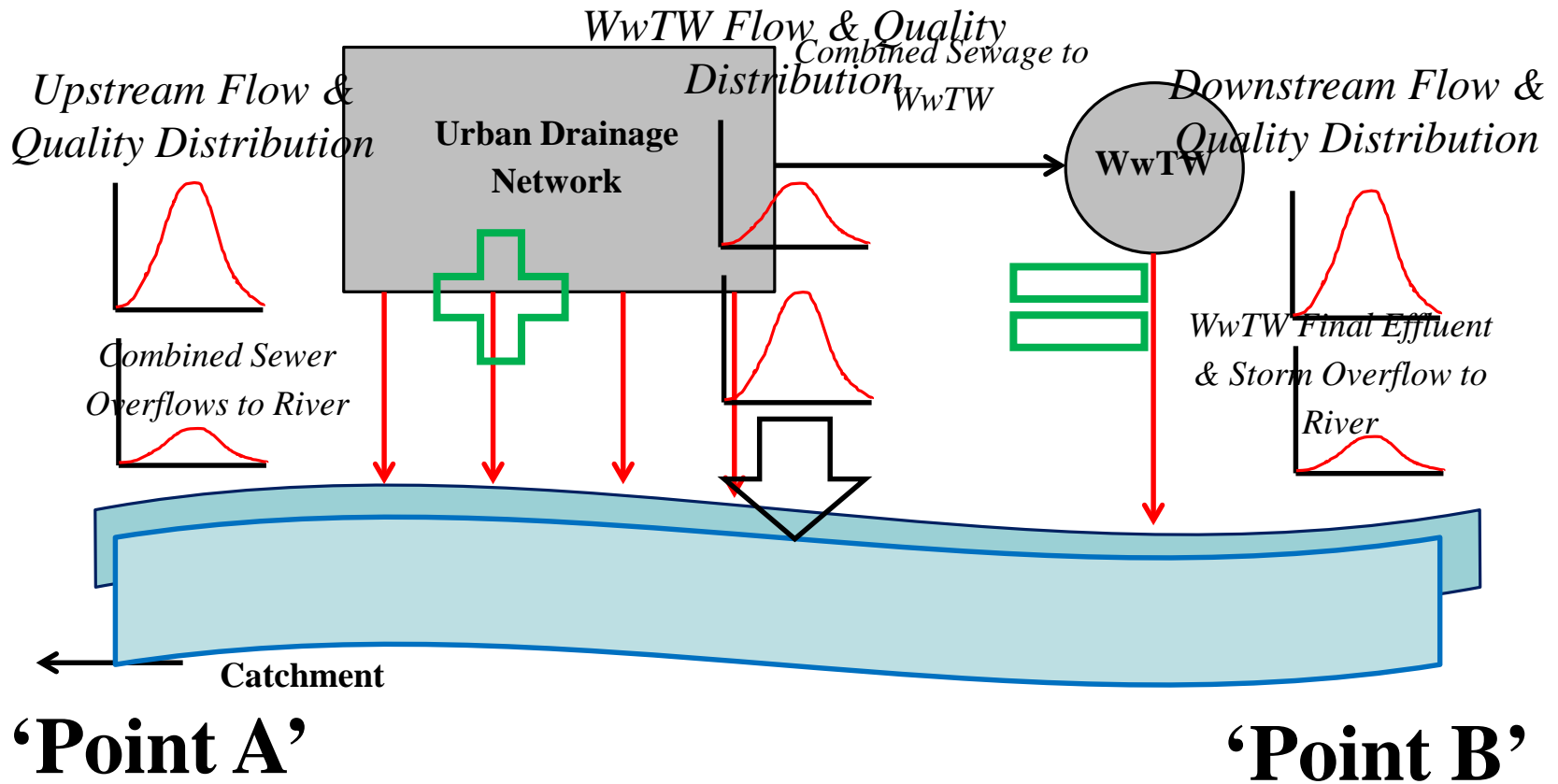


# Project Inception & Drivers

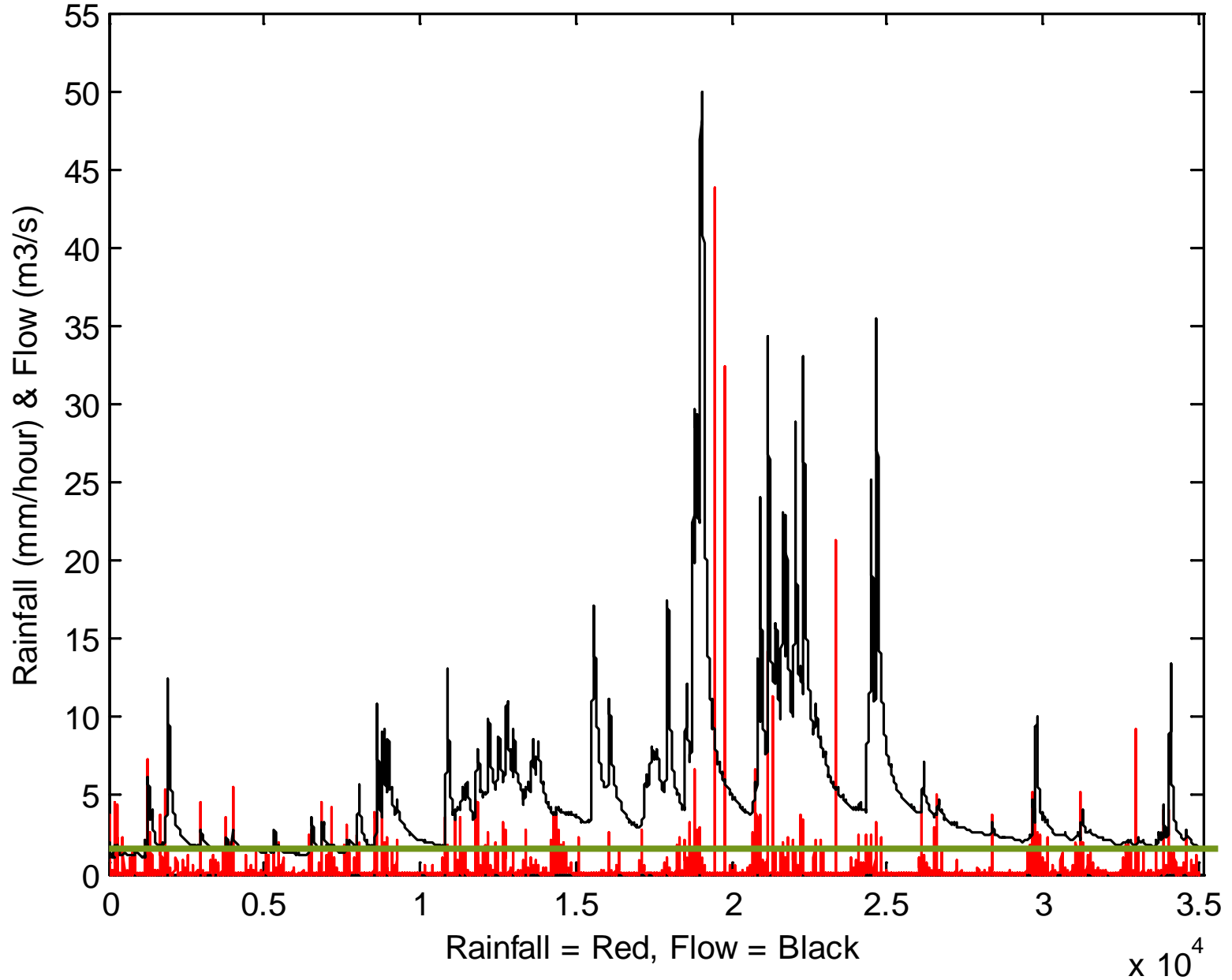
- Strategic Review of Prices 2010 (SR10)
  - 01/04/2010 to 31/03/2015
- Ministerial Directive for Climate Change & Adaptation
- Carbon & Energy Footprinting
  - Increasing Energy Use – Past 10 Years
  - Quality Drivers (UWWTD, WFD)
  - More Aeration & Tighter Licenses
- Policy Approaches & Strategic Direction – Scottish Water & SEPA
  - Seasonal Licensing
  - Variable Licensing – Environmental Capacity
- Building on wider interest and support within U.K. wastewater sector.



# Current Practice



River Eden (Fife) - Flow & Rainfall - 01/07/2010 to 01/07/2011 (15 Min. Time-step)



# The Projects

## Industrial Project (SR10)



**MWH**

*BUILDING A BETTER WORLD*

### 2 Trial Sites

- Cupar WwTW & River Eden, Fife
- Selkirk WwTW & Ettrick Water, Scottish Borders

Attempting dynamic control within current treatment headroom based on monitored data.

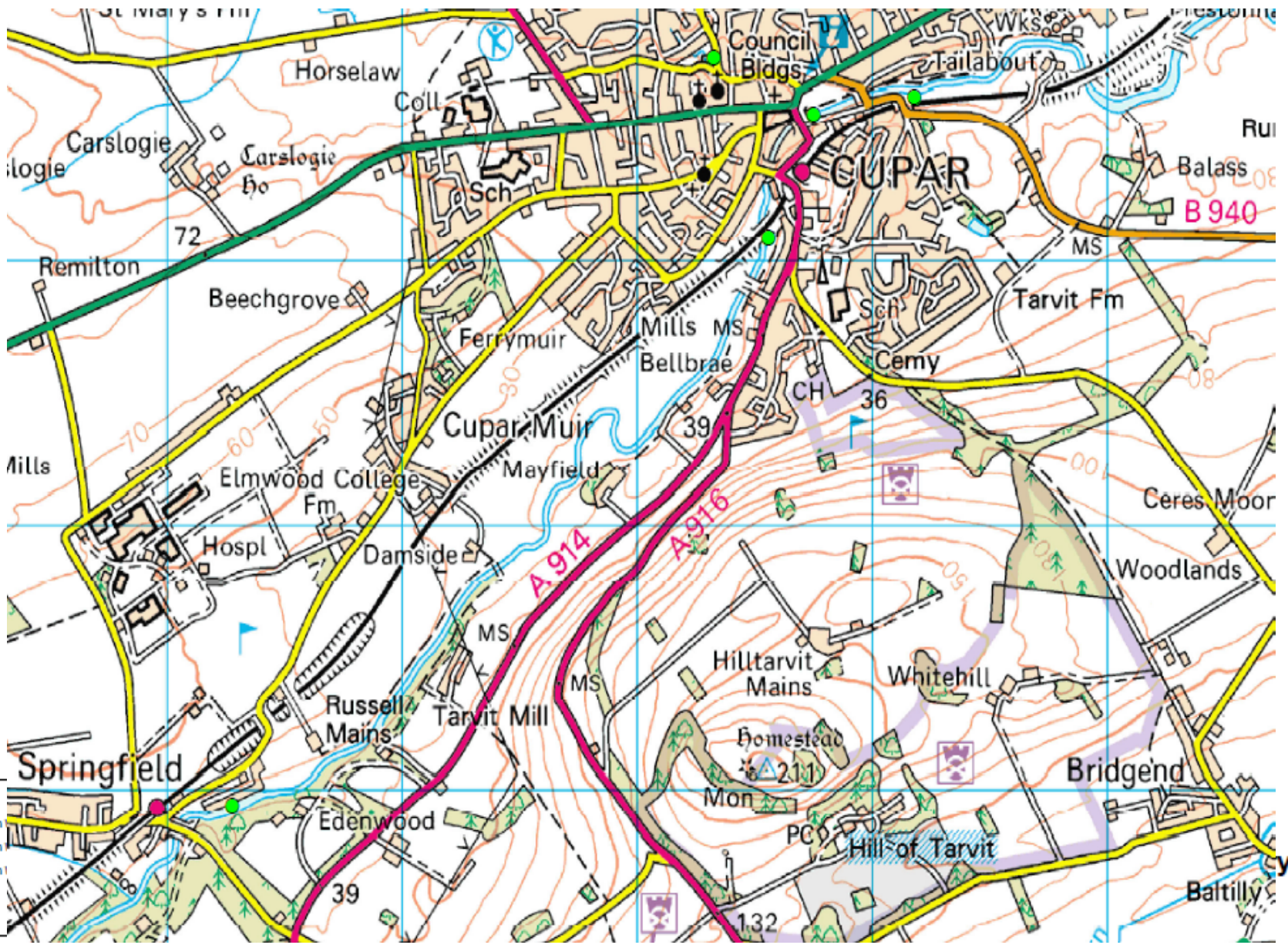
## STREAM Projects



- 2 STREAM Projects
- Going beyond industrial project to use more advanced predictive modelling.

**Data, Information & Experience.**

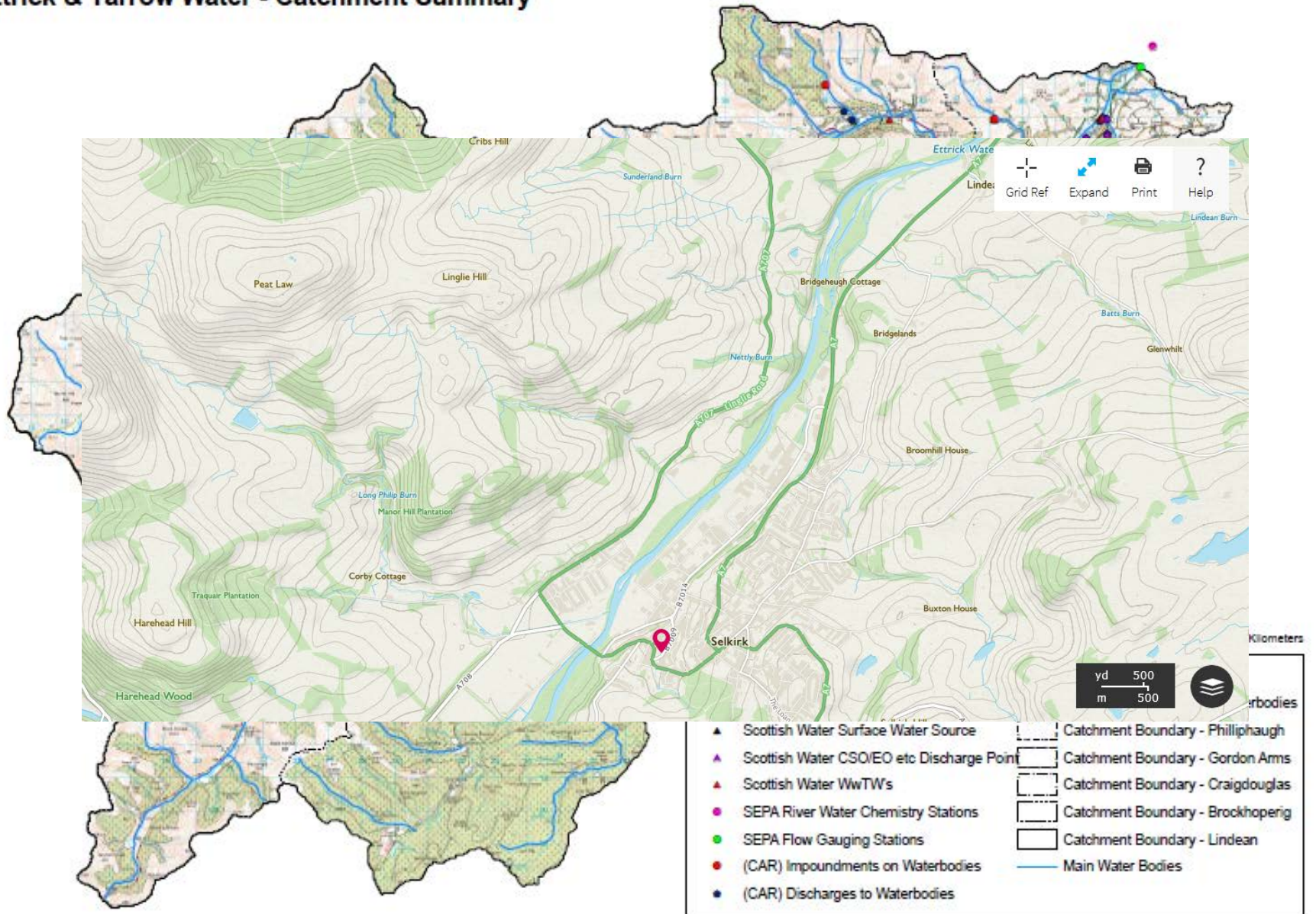




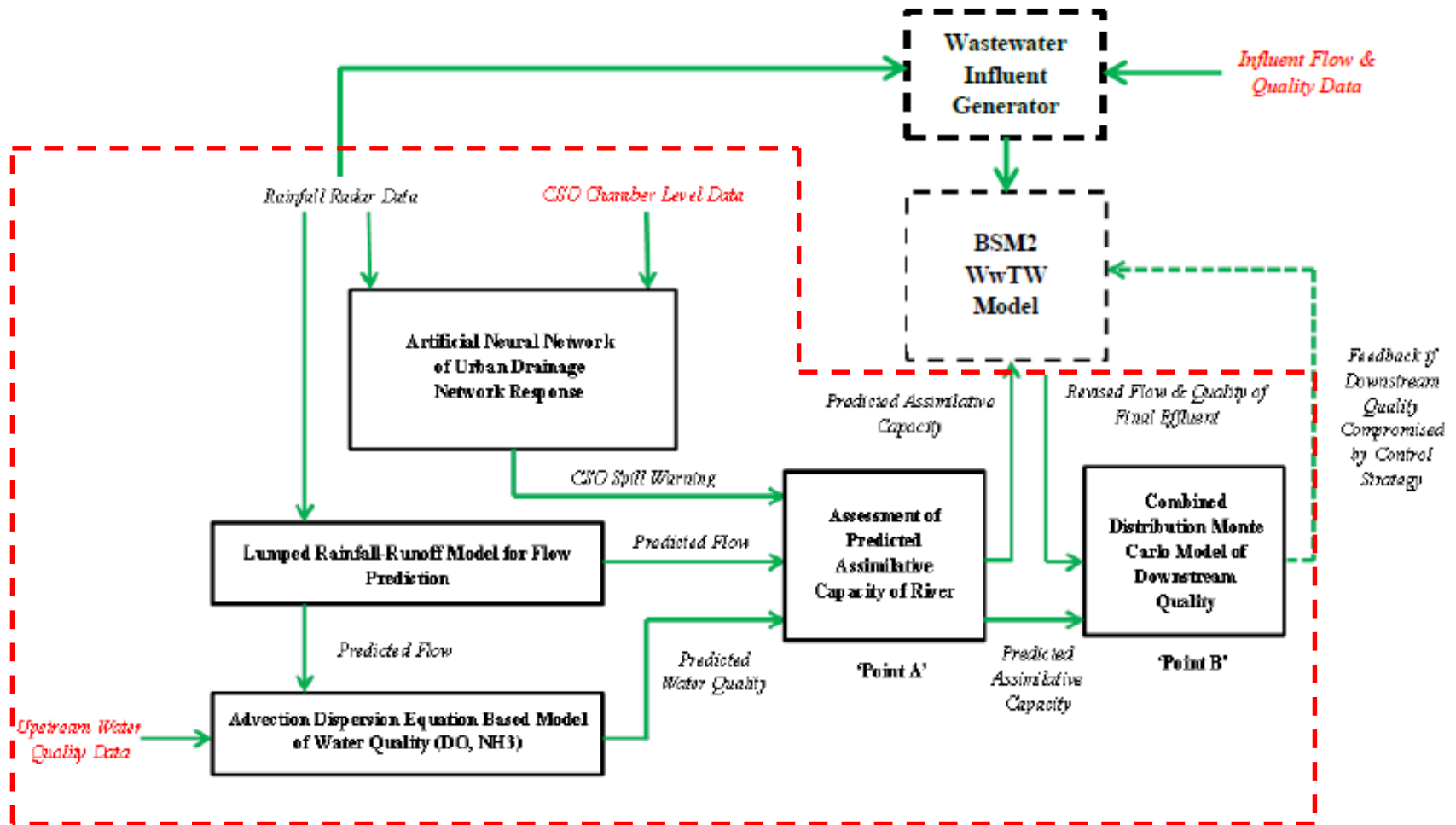
- ▲ Scottish
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# Ettrick & Yarrow Water - Catchment Summary

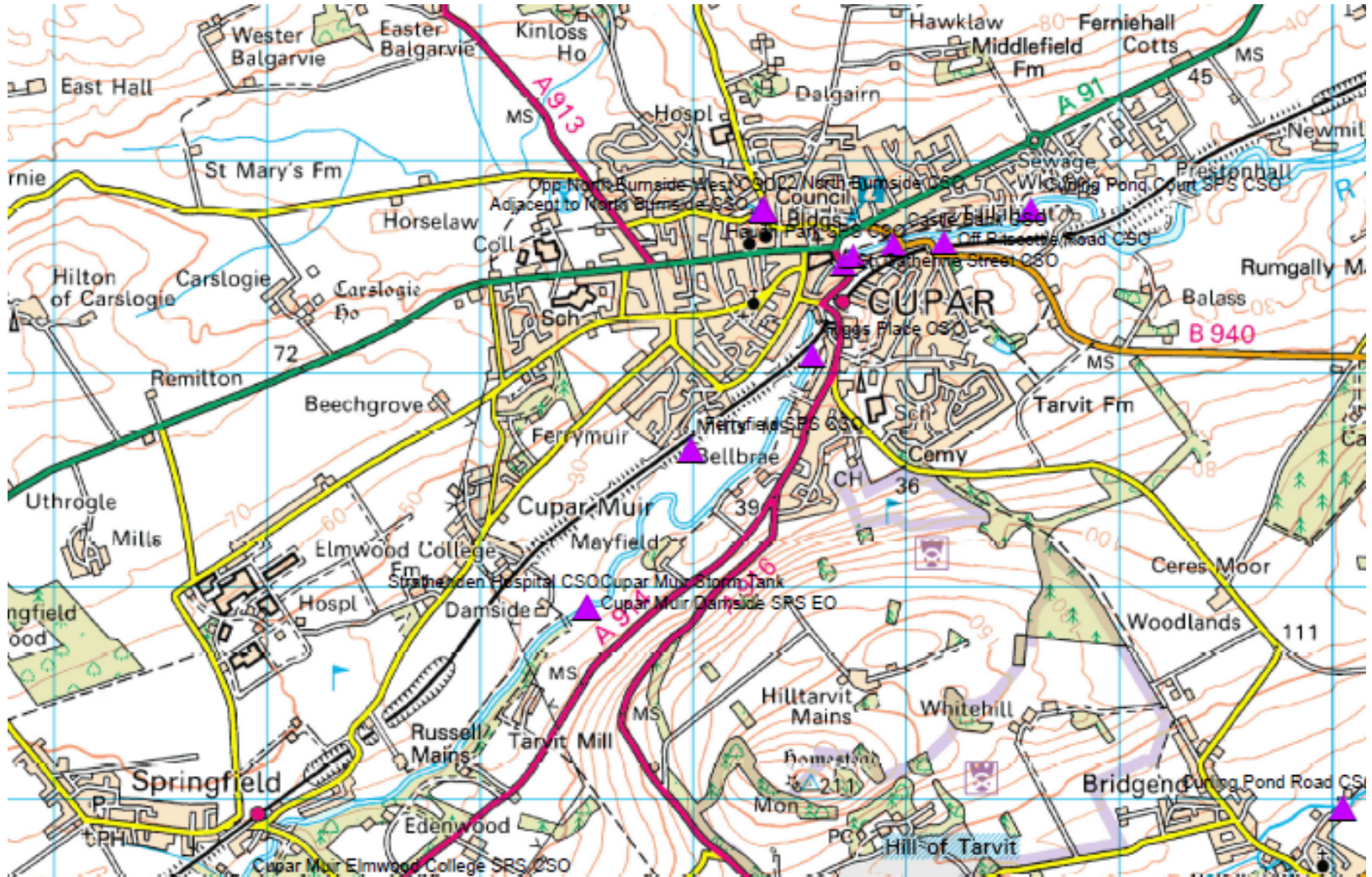


# Conceptual Model & Framework

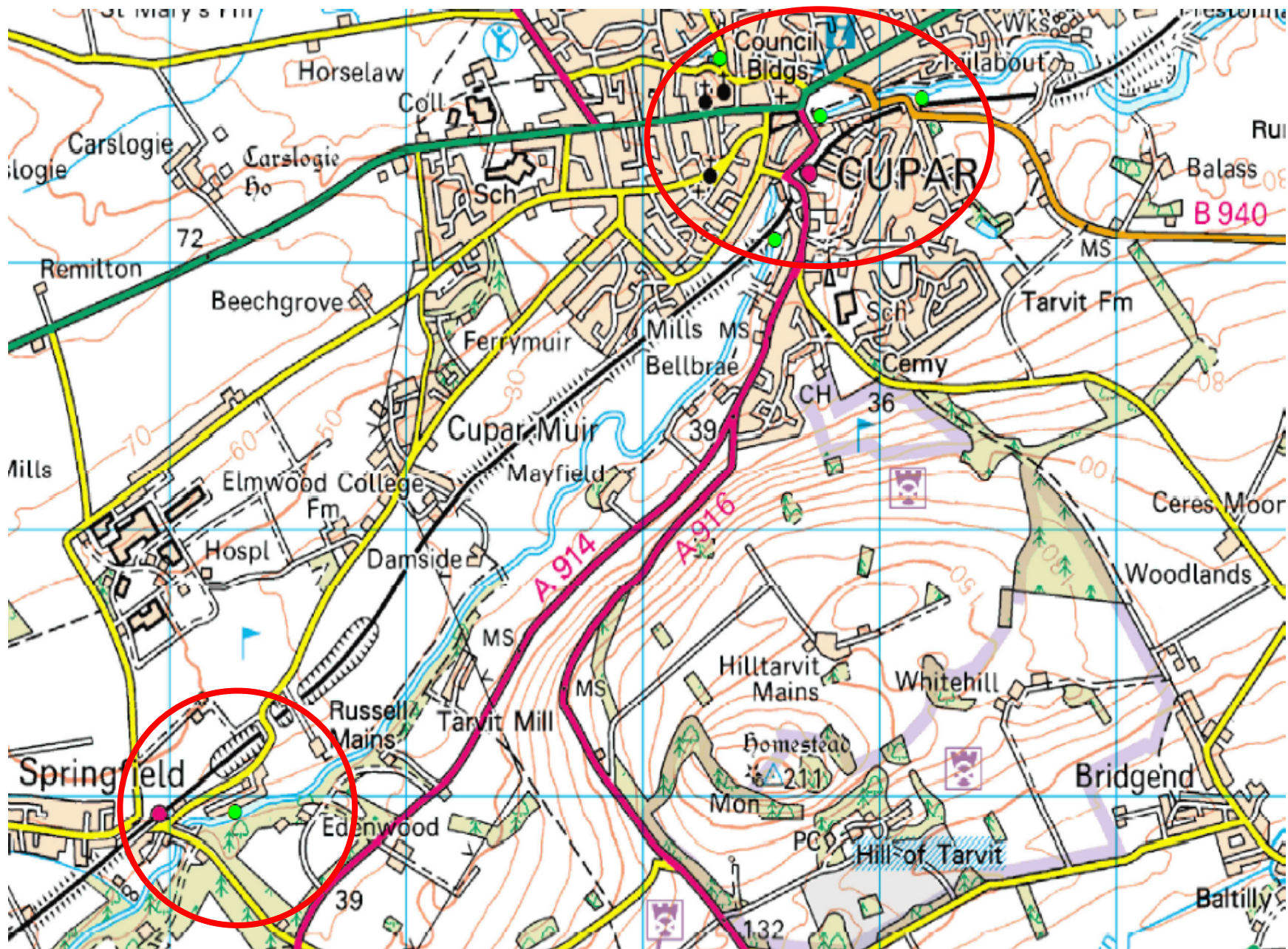




# River & CSO Monitoring Campaign



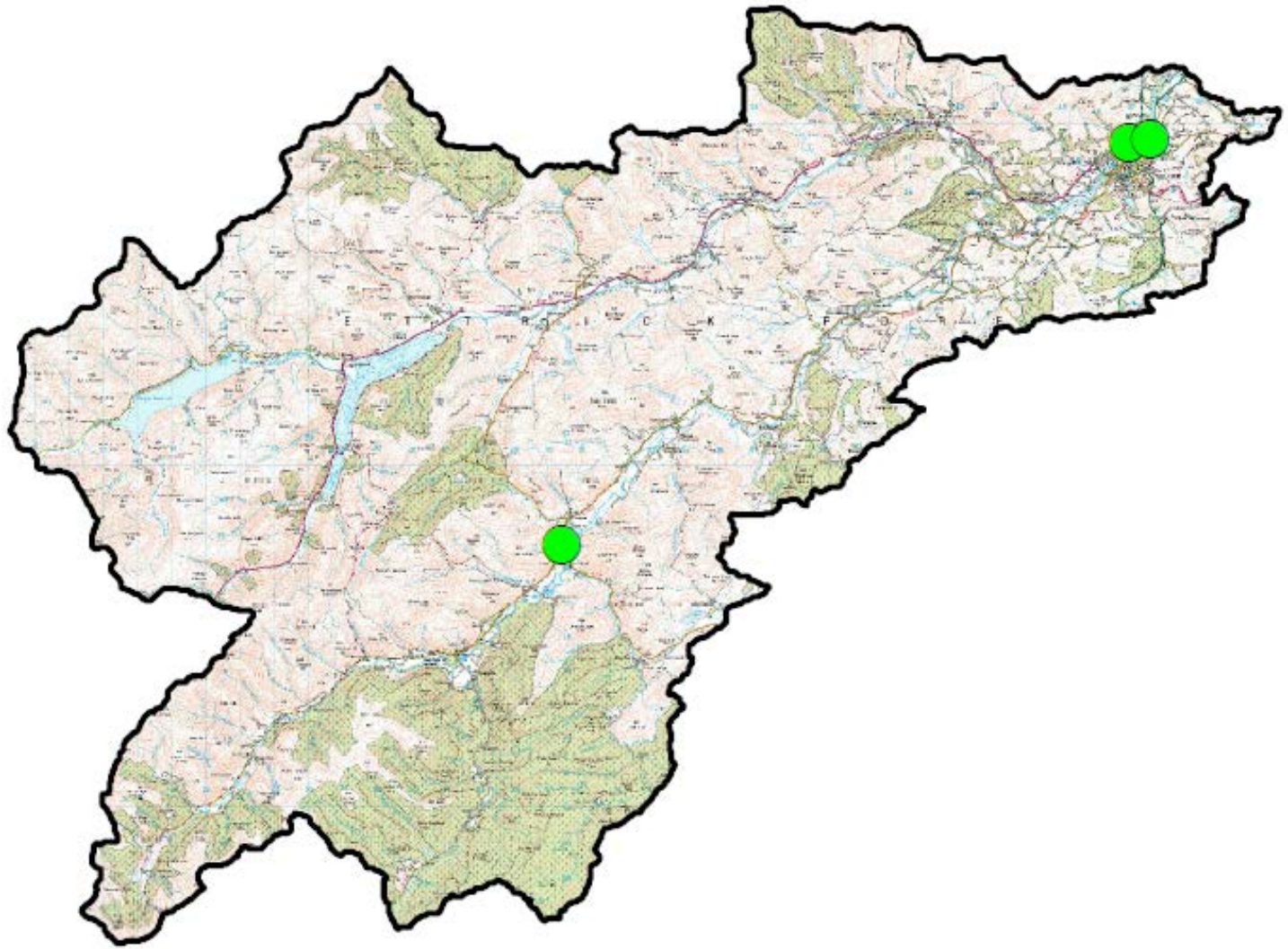








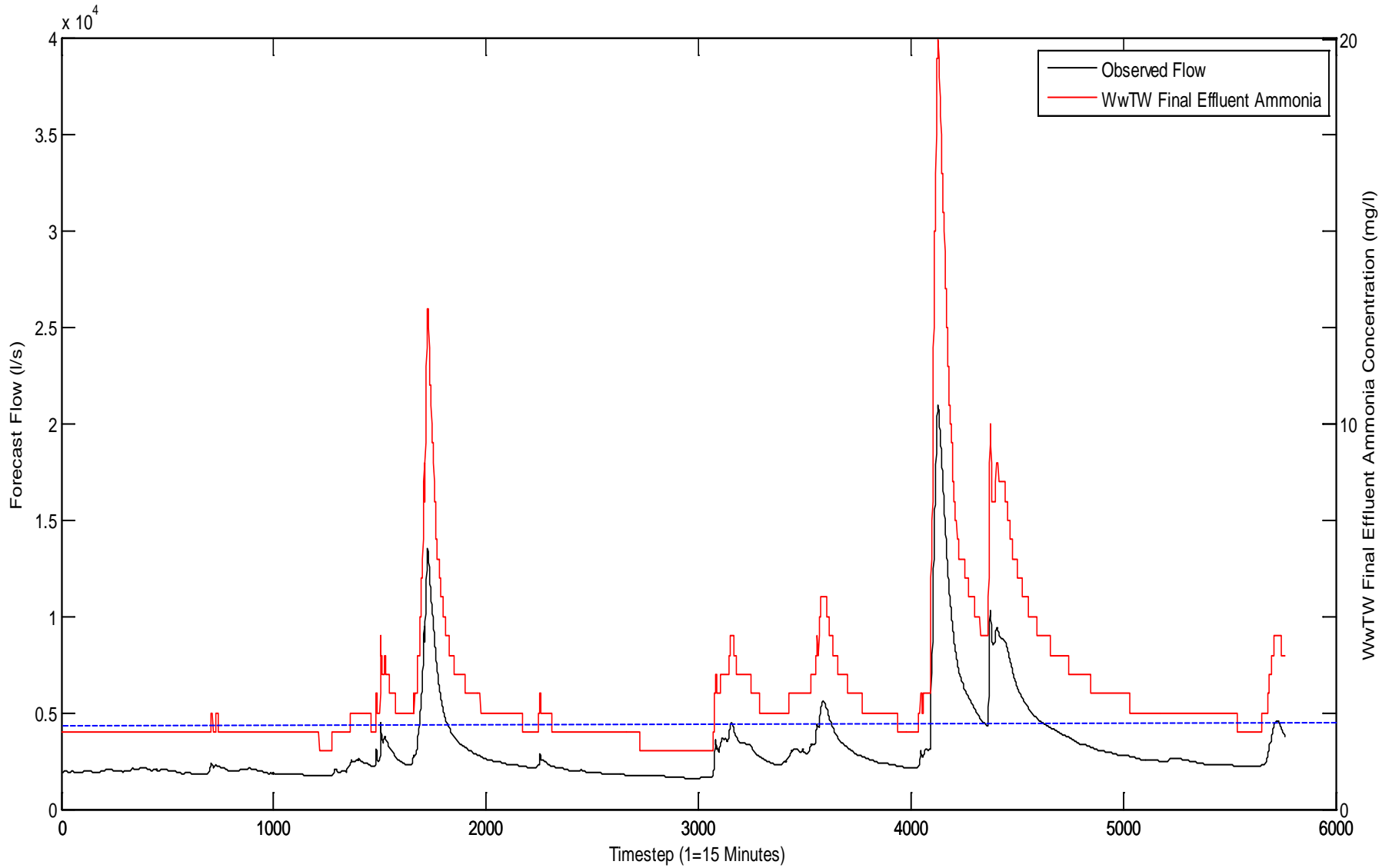




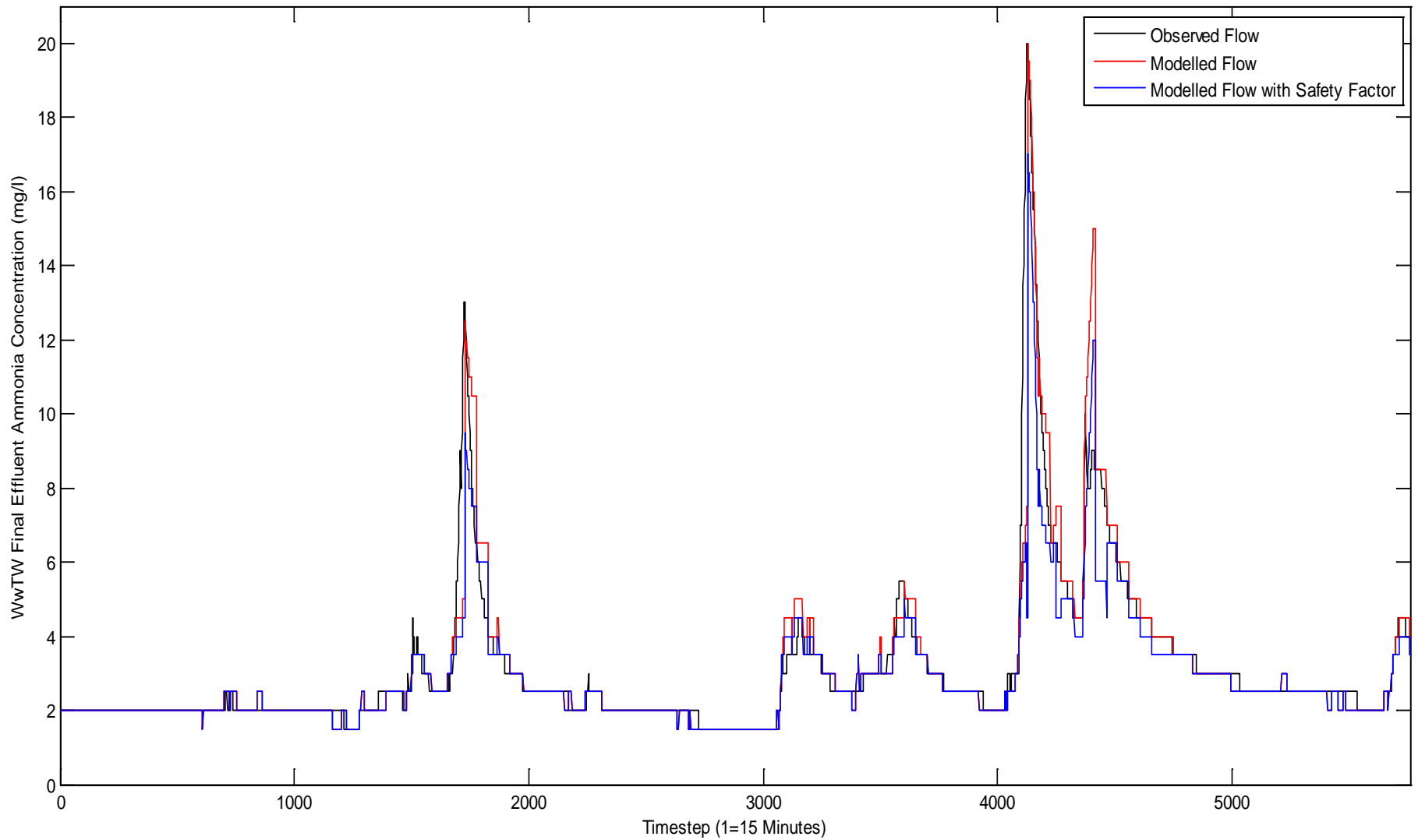


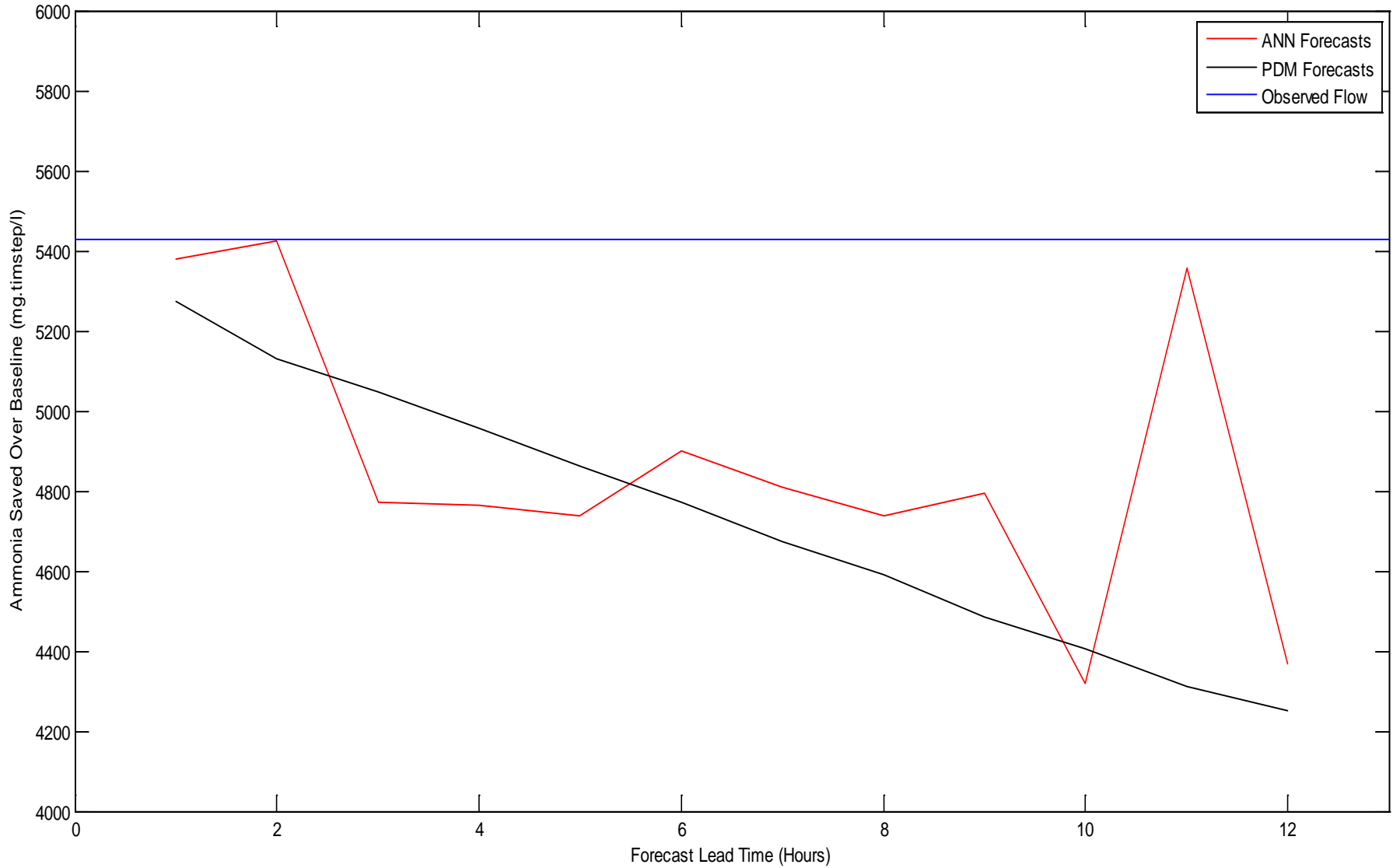


# Initial Work & Potential









## Delays & Issues

- SR10 Industrial Project Delayed
  - Technical Issues on Site
  - Unexpected Equipment Failures
- Additional Data Required
  - Time to Scope & Plan Monitoring Regime

## Further Work

- Finalise Development of Transport & Decay Model
- Develop Final Water Quality Model Code
- Develop ANN Models of CSO Performance
- Integrate with Biniam's WwTW Model

## Interim Conclusions

- Identified the potential and scope for the approach.
- Identified a framework with which to achieve control of small to medium sized WwTW.
- Identified a parsimonious and minimal set of data requirements to achieve the objectives of the study.
- Identified model types and approaches suitable in data scarce predictive environment.
- Developed a framework for quasi-integrated urban wastewater system modelling in the Scottish context.



# Thank You for Listening!

Any Questions?

