A radical approach to wastewater model builds – saving time and money whilst increasing consistency

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ABSTRACT

Automation and Innovation, InfoWorks ICM, Wastewater, Ruby, Python, Continued Improvement

Building hydraulic models is time consuming and to date has required extensive manual data handling. Work is often repetitive as issues are identified in the model build process. In addition, a lack of consistency becomes apparent when multiple model builds are undertaken by different consultants, as each modeller has a different approach. Historically, modellers have looked for ways to automate repetitive processes that are time hungry and prone to error and whilst some progress has been made there has been a mismatch between aspiration and investment.

One year into the Watercare Network Performance Modelling and Monitoring (NP2M) programme, together with progress on individual projects, a long-term programmatic approach has been taken to innovation and creating tools to increase efficiency and consistency. This approach means we can develop and automate processes and see the benefit of the investments over the life of the programme. One example is the automation of the initial model builds for wastewater networks.

Driven by Watercare and Mott MacDonald, with input from programme partners, a set of scripts have been developed to automate a large proportion of the repetitive manual data manipulation at the start of wastewater model build process. The scripts were developed in Python and Ruby, with Python offering good general geospatial processing abilities and Ruby leveraging the network set up and built-in functions in the modelling software. The scripts cover initial data extraction, data import and user text mapping, network connectivity adjustments, sub-catchment and population allocation, missing data inference and data error flagging. Once this process is completed, the model is provided to programme partners to set up complex structures and to review, update, and finalise the model build.

The scripts were developed with significant input from the sponsor and programme partners. We worked with the sponsor to develop the process and gathered feedback from the partners as the first batch catchments were run through the scripts. This allowed the process to be continuously improved and capture of previously missed details.

So far, the tool has been used for five wastewater catchments and is on the third revision. The tool is expected to be used on another 15 catchments this year. Each model takes two days to complete the automated process, including relevant data review prior to and during the automated process, running the scripts and providing relevant documentation and outputs. The aspiration for the next revision of the model is to incorporate information from older, existing models into the model builds, such that the tool can handle model updates too.

This radical change in approach to initial wastewater model building has been made possible by programme level financing, good knowledge of scripting and a strong partnership, all delivering best value for Auckland.

Declaration

Topic	Wildcard
☒	Can attend in person
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