**Drinking Water
Engineering and Science
Discussions**

Interactive comment on "Modelling water quality in drinking water distribution networks from real-time direction data" *by* S. Nazarovs et al.

S. Nazarovs et al.

serviss@adrona.lv

We thank the referee for the comments.

1) The paper begins by stating that modelling contamination spread, and locating the source of the contamination is important – but not why it is important, or what could be done if these things were known.

Location of contamination source enables more precise determination of affected area. Moreover, there are reports of deliberate contamination of water distribution network (e. g. Gleik P. H., Water and terrorism, Water Policy 8 (2006) 481-503). In case of deliberate contamination location of contamination source helps to determine who is responsible for it and improve security of the network.

2) It would be helpful to understand the frequency of flow direction measurement, and the time lapse before this data is made available to the user, and how varying these affect application, and the usefulness of the results in terms of operational reaction action.

Flow direction sensors have a simple relay output. As soon as flow direction is changed or the flow is stopped, a signal is sent to the data acquisition station. In this way the time lapse before data about flow direction changes are available to the user is negligible.

3) The DMAs created appear to be "virtual", the boundaries of each being defined only by the location of flow sensors (as opposed to sluice valves).

Yes, a DMA is "virtual" that is a part of the networks separated by pipes with flow direction sensors installed.

4) What is the definition of real time data as used in this case study? Is it real time data presented for use at some time interval after the measurements were actually taken, or is it data that is immediately available for processing with virtually no time lapse between data measurement and use?

A signal from flow direction sensors is sent as soon as flow direction is changed. Therefore there is virtually no time lapse between data measurement and use of data.

5) What is the specification of the flow direction sensors? How sensitive / robust are they? Hydraulic models are often calibrated to 15 min frequency flow and pressure data; indeed this is the industry standard in some countries. Hydraulic model build techniques have become significantly automated and the cost of producing a model has fallen in recent years. Do these hydraulic modelling developments start to erode the need for the matrix method?

Flow direction sensors are typically activated by flow of about 0.01 m/s. Pipes with smaller flows will be considered as "zero" flow pipes.