

## RTS: Helping deliver some of the best drinking water in the world.



### Seymour-Capilano Water Filtration Plant

"It's a fabulous example of Metro Vancouver's commitment to sustainable use of water. People around the world would love to have a facility like this." - Vancouver councilor Tim Stevenson, a member of the Greater Vancouver Regional District board, said in his opening remarks.

#### Clean Drinking Water Increased Demand in Vancouver, Canada

Predicting a population increase of 800,000 people over the next 20 years in the Greater Vancouver area, along with Canadian federal and provincial regulations demands of lower turbidity and micro-organisms levels in the drinking water, the British Columbia Government identified the need to increase the supply of clean drinking water to the city's residents.



*The filtration pipe gallery. The project was largely driven by the need to reduce turbidity*

While over 70% of the region's drinking water was supplied by Seymour and Capilano watersheds, the Greater Vancouver Regional District (GVRD) decided to build filtration plant drawing water from both reservoirs, conveying it by regional water mains to member municipalities.

#### Building Canada's Largest Water Filtration Plant

Forecasted to treat 1.8 billion liters of water per day, the project budget was \$600 million dollars, aiming to construct Canada's largest (and one of the biggest of its kind in North America) water filtration plant.

The plant included the largest ultraviolet disinfection facility, one of the largest Foundation Fieldbus networks in Canada, as well as a series of innovative technologies for energy efficiency.

The eight hectare site would also include a pumping station, an energy recovery facility and break head tank, an electrical substation, two 3.7m diameter tunnels and new water storage clear-wells.



*Aerial view of the filtration plant; it occupies a site of around 8 hectares, located in the Lower Seymour Conservation Reserve.*

## Key Players

The greater Vancouver Regional District (GVRD) was the project sponsor. The General Contractor was North America Construction (NAC). Real Time Systems Inc. (RTS), who demonstrated having the in-house knowledge and capabilities to undertake the project, was awarded the engineering, procurement and commissioning/validation of instrumentation and controls.

The almost \$9 million dollar contract for RTS would include more than 270 control panels, as well as over 1,000 field instruments, with digital, analog and serial communication to the host control hardware, all connected via Foundation Fieldbus (FF) technology.

## Foundation Fieldbus (FF) Technology for Increased Performance.



**FOUNDATION**

The Greater Vancouver Seymour-Capilano filtration plant was planned using best practices which included Foundation Fieldbus (FF), a protocol designed to support “mission-critical” type applications where proper transfer and handling of data is of paramount importance.

FF allows an easy distribution of LOGIC processes into the field instruments, and it’s based on the International Standards Organization’s Open System Interconnect (OSI/ISO) seven-layer communications model.

The FOUNDATION specification is compatible with the officially sanctioned SP50 standards project of The International Society for Measurement and Control (ISA) and the International Electrotechnical Committee (IEC).

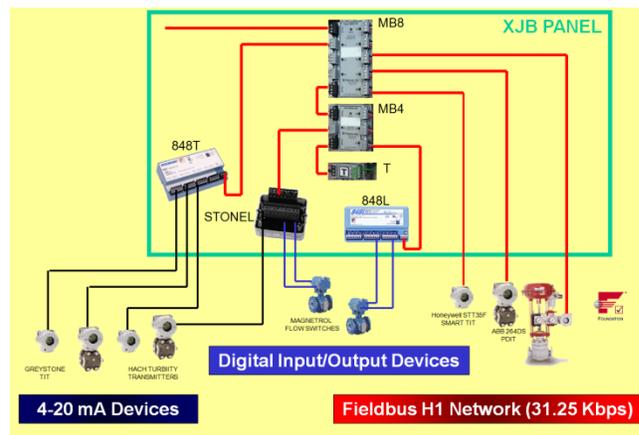
## RTS, helping deliver clean drinking water to more than 2 million residents in Vancouver.

The scope of work for RTS included:

### Foundation Fieldbus and Devicenet LAN (Local Area Network) design and field validation.

It involved gathering the data required for all of the different devices and control panels; confirm communication, document and attending Site Acceptance Testing (SAT).

This included the verification of individual instrument devices and panels in stages, working closely with NAC’s team at site as the equipment was installed.



*Project requirements: Field instruments, controllers, motor control centres 100% Functional / Shall include complete test of panels, controllers, and instrumentation / Shall be tested loop-by-loop, segment-by-segment and component-by-component.*

The Fieldbus Validation included:

- Inspection of Fieldbus wiring.
- Impedance measurements to be conducted on each Fieldbus segment length.
- Measurement of power supply voltages in each segment to ensure adequate level, appropriate power usage and compare voltage drops to calculated values.
- Addition of each device to the network, assign an address and ensure communication functionality.
- Compliance with all Fieldbus Validation reports as outlined in Section 16900 (Appendix A; Test Forms), specifically, Test Forms 16900-B,C, D & F.

The DeviceNet Validation included:

- Collection of data for all applicable device types
- Inspection of cabling and all connections
- Measurements of network segment lengths and resistance of terminations while checking for short-circuits
- Powering up of each device and parameter communication configuration
- Verification with software of all devices on the network
- Signal level checks with appropriate equipment (oscilloscope, multimeter, etc)
- Documentation on check sheet and electronic file for each network

## Selection, procurement, delivery and start-up of over 1,000 field instruments.

RTS was responsible for the co-ordination of all instrument calibration reports, instrument vendor training and composition of final Instrument Operator & Maintenance (O&M) manuals for all instrumentation devices. RTS managed the overall coordination for complete commissioning and start-up of instruments and other vendor procured equipment as per contract requirements.



Mr. Mehran Abbasi, P.Eng.  
RTS' Instrumentation Specialist at the Filtration Area

## Electrical design, fabrication, factory testing and site delivery of 270 control panels.

The types of panels included the following:

- FF junction boxes for Foundation Fieldbus termination
- Local Control Panels (DeviceNet)
- DeviceNet Power Supply Panels

Additionally, RTS provided onsite supervision of all panel installations to be performed by the contractor (NAC) as per contract requirements.



Mr. Amaury  
Pereira, P.Eng.  
RTS' Electrical Control Panel Specialist at the Control Room

## Major Automation Contractor (MAC) means: low risk, low cost and reduced time.

RTS was trusted with providing Metro Vancouver's drinking water due to its expertise in automation and systems integration, combined with its exceptional project management skills, which allowed RTS to offer these unique abilities as a single source of responsibility for the entire plant automation project.

Having a single source of responsibility reduced the coordination efforts by the client, increasing effectiveness/return on investment (ROI) and lowering the total cost of ownership (TCO).



CONSULTING - AUTOMATION

[www.rtsperfectplant.com](http://www.rtsperfectplant.com)  
USA and Canada: (416) 798-2511

### References:

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- [http://www.linkpath.com/data/issuePDF/DE/9000000388\\_up\\_front.pdf](http://www.linkpath.com/data/issuePDF/DE/9000000388_up_front.pdf)
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- <http://www.metrovancouver.org/services/constructionprojects/water/Pages/seymourcapilano.aspx>