



Regional District of North Okanagan – Greater Vernon Water Duteau Creek Water Treatment Plant

A New Water Treatment Plant for Greater Vernon

The new Duteau Creek Water Treatment Plant will serve approximately 15,000 homes and businesses in Coldstream, Vernon, and Electoral Areas “B” and “C”.

Stage 2 (Filtration) is scheduled to be completed by 2015, as currently required by the Interior Health Authority.



GOAL:

“To ensure the economical supply and distribution of a sufficient quantity and quality of water in the interests of both the agricultural and non-agricultural users in the Greater Vernon community”

Who is RDNO-Greater Vernon Water?

Regional District of North Okanagan - Greater Vernon Water (RDNO-GVW) supplies and delivers water to customers in the City of Vernon, the District of Coldstream, Electoral Areas “B”, “C”, “D” and the Township of Spallumcheen.

Why Build A Water Treatment Plant?

The new Duteau Creek Water Treatment Plant (“Plant”) was envisioned by the Master Water Plan of 2002 and was constructed to improve quality, including the turbidity and colour of the Duteau Creek water source.

Why Is Treatment Required?

Treatment is required to meet Canadian Drinking Water Standards and avoid long-term health risks, as required by the Interior Health Authority.

Turbidity and Colour

The new Plant significantly improves the “yellow” colour of Duteau water, which previously measured about 50 TCU (True Colour Units). The aesthetic objective set by the Canadian Drinking Water Guidelines is 15 TCU, and the new plant reduces colour to below 5 TCU, 95% of the time. Recent tests show that colour was reduced to 3 TCU or lower. For comparison, Kalamalka Lake water measures approximately 6 TCU.

The addition of filtration (Stage 2) will further reduce the turbidity of Duteau Creek water.

MASTER WATER PLAN Proposed Timeline

Completed (2010)	Irrigation Separation Lavington, King Edward
Completed (2010)	Stage 1: Construction of Duteau Creek Water Treatment Plant
2012 to 2020	Irrigation Separation to West Swan Lake, Coldstream Ranch, Lavington, Binns Road, Warren Road
2015	Stage 2: Construction of Filtration Plant



Can you see the difference?

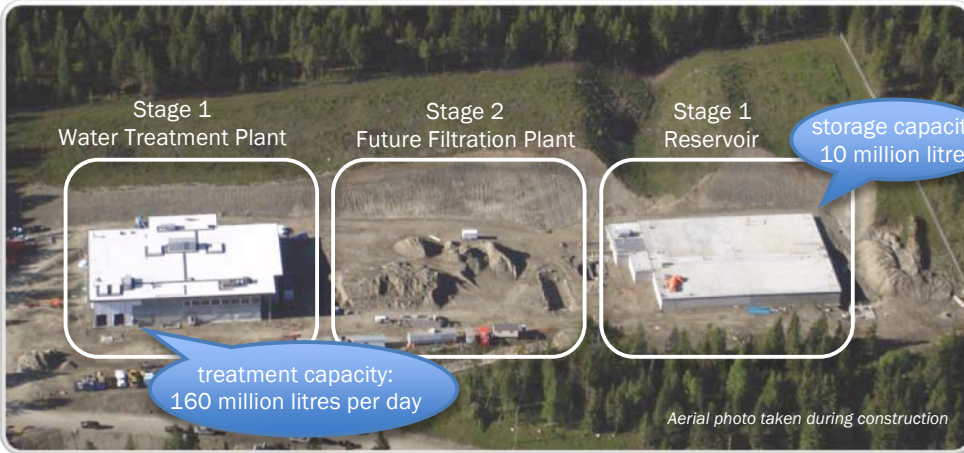
A Duteau Creek Watershed Assessment was completed in 2008. In 2009, a Stakeholder Advisory Committee comprised of provincial and federal agencies, licence & tenure holders and First Nations, set priorities to reduce risks to drinking water.



Duteau Creek Water Treatment Plant Project Funding & Timelines

Stage 1 (Clarification) of the new Duteau Creek Water Treatment Plant was completed in 18 months from the start of construction, at a cost of \$29.2 million dollars. The project received \$10.5 million in funding from the Federal Gas Tax Grant, and \$3.3 million from the Municipal Rural Infrastructure Fund.

The new Plant will treat up to 160 million litres of Duteau Creek water per day.



As currently required by the Interior Health Authority (IHA), the addition of **Stage 2 (Filtration)** is scheduled to be completed in 2015. Construction cost is estimated to be \$20 million. The Regional District of North Okanagan will undertake formal cost evaluations in the coming year.

Master Water Plan capital program

The Duteau Creek Water Treatment Plant is the largest and most important step in the Master Water Plan capital program. Treatment of the Duteau Creek source addresses water quality issues affecting Greater Vernon residents, provides operational flexibility in conjunction with the Kalamalka Lake source, and allows maximum use of existing water licenses.

Sustainable Practices:

The Duteau Creek Water Treatment Plant project utilized sustainable building and environmental technologies and practices, including:

Protecting sensitive habitat – prior to construction, a habitat study was performed to ensure there were no species at risk in the area.

Identifying culturally significant areas – a First Nations Archeological Field Reconnaissance assessed the archaeological importance of the site.

Retaining habitat - a significant tree buffer was retained, and the site will be re-vegetated with native plant species post-construction.

Reusing resources - logged trees were salvaged for best end use. Construction materials were recycled.

Enhancing habitat - a managed wetland was created. Stormwater will be managed using best practices for reducing run-off.

Reclaiming sludge – solid waste by-products from the clarification process will be used as landfill cover material.



Current Plans for Future System Separation

Portions of the existing water distribution system serve both domestic and agriculture irrigation customers (termed the “Combined System”). In compliance with the current Master Water Plan, separation of agricultural and domestic water has already commenced and shall continue over the next several years.

The bulk of the water is used for irrigation of agriculture. With the increasingly stringent requirements for drinking water, the Regional District will continue with the separation of agriculture use water and domestic use water such that the necessity to treat all agriculture use water is minimized.

In the short term, it is acceptable to treat all the water due to the phased nature of the construction of the water treatment and water distribution facilities but in the long term it does not make economic sense to filter all the water destined for irrigation to drinking water quality standards.

STAGE 2 (FILTRATION) TIMELINE:

Conceptual design:	2010
Detailed design:	2011-2012
Interior Health Authority approval:	2012

Following IHA approval, construction of Stage 2 (Filtration) will commence with project completion anticipated in late 2015.



Sustainable Water Use

Sustainable use of water is key for our region to continue to grow and prosper while maintaining our quality of life and our environment. Key components of regional drinking water treatment include: protecting the water source (watersheds); treating water at the source and disinfecting at further points in the distribution system; cleaning and maintaining the distribution system; and monitoring water quality at all stages.

Water Quality Concerns, Causes and Solutions

RDNO-GVV serves a large population with high quality drinking water by successfully addressing the following concerns:

Concern	Causes	Solution
Turbidity: Reduced clarity of water due to suspended particles e.g. clay, sand or silt	Natural disturbances - stream bank erosion, landslides and spring run-off Human activities in the watershed – roads, forest harvest, range use and recreation	Dissolved Air Flotation (DAF) treatment to reduce turbidity and meet Canadian Drinking Water Guidelines
Colour: Visually noticeable and displeasing	Caused by natural dissolved organic from decaying vegetation (leaves and forest litter) and inorganic compounds (e.g. iron)	DAF process removes most of the colour by coagulation and flocculation
Bacteria regrowth: in distribution system between treatment plant and customer's tap	Chlorine levels deplete along the distribution system Sediments settle out of water in distribution system, creating an environment for bacteria to grow Biofilm	Additional chlorine added along the distribution system Flushing and reservoir cleaning programs to reduce sediment and biofilm buildup
Organics: Produce disinfection by-products	Natural dissolved organic matter (e.g. decaying vegetation and algae) reacting with chlorine, the disinfectant	DAF process removes about 95% of the organic matter, significantly reducing disinfection by-products



More about Turbidity:

The new Duteau Creek Water Treatment Plant significantly reduces the turbidity of Duteau Creek water.

Turbidity results from the presence of tiny particles of clay, silt, or plankton in the water that scatter a beam of light, and is measured in Nephelometric Turbidity Units (NTU).

Typically, a turbidity of less than 5 NTU is not visible to the naked eye. The new plant reduces turbidity to below 1.5 NTU, 95% of the time.

The addition of Stage 2 (Filtration) will ensure turbidity below 1.5 NTU, 100% of the time.

Dissolved Air Flotation (DAF)

The new Plant clarifies Duteau water by separating suspended solids from the water. A coagulant is used to suspend fine particulate matter in the water. Air is then dissolved in the water under pressure, forming air bubbles that attach to the suspended matter and float it to the surface, where skimmers remove it.

Clear water is then drawn from the bottom of the DAF basin for follow-up chlorination, discharge to the reservoir, distribution into water mains, and finally, delivered to your home or business.

Why Filtration?

Filtration improves drinking water by removing turbidity and micro-organisms, and by reducing the amount of chlorine required to maintain water quality.

Filtration will also reduce the aluminum content of DAF-treated Duteau water to the recommended level of 0.1 mg/l.

Water Quality Testing

Water produced by the new Plant is automatically and continuously tested for a variety of water quality parameters, including free chlorine residual, pH (acidic or basic), conductivity (directly relatable to Total Dissolved Solids), turbidity (cloudiness caused by suspended particles), water temperature, particle count (2 to 900 micron in diameter), and Dissolved Organic Carbon (DOC).

Canadian Drinking Water Guidelines

15

Reducing the Colour of Duteau Water

pre-DAF Duteau water

50

post-DAF Duteau water

5

(after DAF clarification treatment)

Kal Lake water

6

TCU (True Colour Units)

Automatic Water Quality Monitoring

The new Plant automatically analyzes water quality, and is monitored by trained and qualified personnel 24 hours a day, seven days a week. The SCADA (Supervisory Control And Data Acquisition) system alerts operators immediately when desired water quality parameters are not met. On-site laboratory testing is used to confirm automated water quality monitoring data.

Who is RDNO-GVW?

The Regional District of North Okanagan - Greater Vernon Water (RDNO-GVW) supplies and delivers water to customers in the City of Vernon, the District of Coldstream, and Electoral Areas "B" and "C". The utility also supplies bulk water to Spallumcheen, and irrigation water to customers in Electoral Area "D".

Background

RDNO - GVW took responsibility for the supply and distribution of domestic and agricultural water within the Greater Vernon Water service area of the Regional District after the 2003 amalgamation of the water utilities of the City of Vernon, the District of Coldstream and the North Okanagan Water Authority, formerly known as VID, or Vernon Irrigation District.

Master Water Plan

The Master Water Plan was amended in 2004 to ensure that our community's present and future water quality and water supply needs, as well as critical health protection goals, are met in an efficient and financially sustainable manner. A key feature of the plan is the separation of irrigation and domestic water systems. The start of operations at the new Duteau Creek Water Treatment Plant marks a significant step towards realizing the domestic water quality improvements envisioned by the Master Water Plan.



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Greater Vernon Water

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Not sure about your water source?
Check the Water Source Map:
www.rdno.ca/water/map

Greater Vernon Water Service Area - By volume, RDNO-GVW is the fourth largest water utility in BC

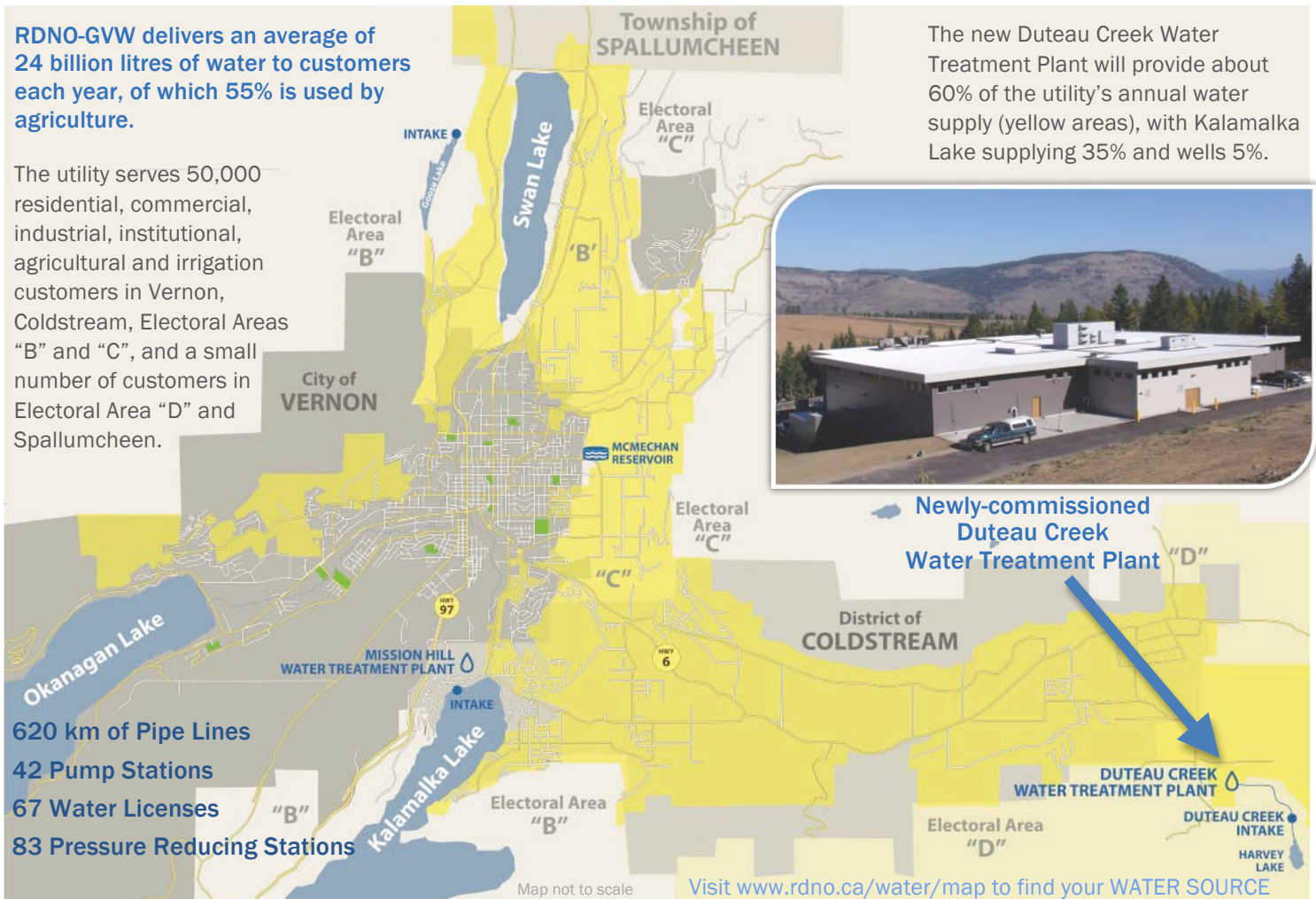
RDNO-GVW delivers an average of **24 billion litres of water to customers each year, of which 55% is used by agriculture.**

The utility serves 50,000 residential, commercial, industrial, institutional, agricultural and irrigation customers in Vernon, Coldstream, Electoral Areas "B" and "C", and a small number of customers in Electoral Area "D" and Spallumcheen.

- 620 km of Pipe Lines
- 42 Pump Stations
- 67 Water Licenses
- 83 Pressure Reducing Stations

Map not to scale

Township of SPALLUMCHEEN



The new Duteau Creek Water Treatment Plant will provide about 60% of the utility's annual water supply (yellow areas), with Kalamalka Lake supplying 35% and wells 5%.



Newly-commissioned Duteau Creek Water Treatment Plant "D"

Visit www.rdno.ca/water/map to find your WATER SOURCE