CITY OF SALMON ARM

WATER QUALITY REPORT 2005

TABLE OF CONTENTS

1.0	BACKGROUND	1
2.0	WATER SYSTEM OVERVIEW	2
3.0	MONITORING PROGRAM	4
4.0	TESTING PARAMETERS	4
5.0	TESTING PROGRAM	7
6.0	WATER DISTRIBUTION SYSTEM DETAILS	8
7.0	SYSTEM MAINTENANCE	14
8.0	WATERMAIN BREAKS	18
9.0	NOTIFICATION PROTOCOL	19
10.0	WATER CONSUMPTION	19
11.0	TEST RESULTS	21
12.0	2005 CHALLENGES TO DRINKING WATER QUALITY	21
13.0	CONCLUSION	21
14.0	APPENDICES	

Appendix 1 : SOURCE WATER CHEMICAL ANALYSIS TEST RESULTS
Appendix 2 : WATER SERVICE AREA
Appendix 3 : IHA/CSA WATER SAMPLE SCHEDULE
Appendix 4 : IHA BIOLOGICAL MONITORING RESULTS
Appendix 5 : DAILY WATER CONSUMPTION 2001 TO 2005
Appendix 6 : CSA POLICY NO. 5.16 (WATER CONSERVATION POLICY)

Water has become a highly precious resource. There are some places where a barrel of water costs more than a barrel of oil.

Lloyd Axworthy, Foreign Minister of Canada (1999 - News Conference)

1.0 BACKGROUND

The City currently operates and maintains a public water distribution system under the regulations the Drinking Water Protection Act and Regulations passed May 16, 2003 (http://www.qp.gov.bc.ca/statreg/stat/D/01009_01.htm) by the Province of BC and the Guidelines for Canadian Drinking Water Quality, sixth edition (http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/revised-revisees_e.html).

The Interior Health Authority (IHA) have advised the City that *"Under the legislation, the province has increased the basic expectations around assessing water systems, certifying operators and suppliers, and monitoring and reporting on water quality. The legislation gives provincial drinking water officers (i.e. Interior Health Authority) increased powers to protect water sources from contamination by a drinking-water health hazard. In addition, the drinking-water officers will oversee a source-to-tap assessment of every drinking-water system in the province to address all potential risks to human health."*

These provincial health officials will ensure water quality is maintained through operating permits developed specifically for each water system. The permits specify monitoring requirements for all substances of concern in a particular water system. In addition, the regulations require all water system operators to be certified under the "Environmental Operators Certification Program."

In August of 2004 the City received from Interior Health an outline of the proposed changes to the City's Operating Permit that would be required to meet the Drinking Water Protection Act & Regulation standards. These include:

- A study to determine options to meet the minimum treatment/disinfections standards of:
  - 4 log (99.99%) inactivation of viruses
  - 3 log (99.9%) inactivation of Giardia
  - 2 log (99%) inactivation of Cryptosporidium
  - Less than 1 NTU turbidity, and
  - The use of two or more disinfection technologies acceptable to the Health Authority and develop a work/installation plan to implement the chosen option.
- Continuous monitoring of the water disinfection process.
- An audit of our Bacteriological monitoring program.
- An updating of the Emergency Response Plan.

1.0 BACKGROUND (continued)

- A documented yearly maintenance program for the next five years.
- Development and implementation of a Cross Connection Control program.
- Implementation of a monthly and yearly reporting system.

During 2005 the City commissioned Stantec Consulting Ltd. (Kamloops/Surrey Offices), to review our current treatment practices and recommend the best options to meet the IHA requirements. The study was completed and recommends using a rapid sand filtration process followed by UV disinfection and chlorination for the Shuswap Lake supply. For East Canoe Creek the recommendation is for UV disinfection followed by chlorination and automatic valving to prevent turbidity exceeding 1.0 NTU. (2005 Water Treatment Plant Study). A Pilot Study to confirm the suitability of the proposed process will proceed in the spring of 2006.

The City has also started work on updating the Emergency Response Plan, revised its Bacteriological Monitoring Program, and initiated staff training in Cross Connection Control. The City will continue to do further work in these areas in 2006.

2.0 WATER SYSTEM OVERVIEW

Water is the best of all things.

PINDAR (C. 522-C. 438 B.C.), Olympian Odes

The municipal water system consists of two main raw water sources, treatment systems for the source waters and an extensive water pumping, distribution, and storage system. Our water supply is via three (3) sources, East Canoe Creek at Metford Dam, Shuswap Lake at Canoe Beach and a minor water supply from Rumball Creek for irrigation at the Mt. Ida Cemetery (Figure 1). Water treatment of the source waters (except Rumball Creek) is by primary disinfection with chlorine. The distribution system includes approximately 204 km of watermain varying in diameter from 100 mm to 1000 mm. It also includes seven (7) different pressure zones, thirteen (13) reservoirs, one dam and five pump stations.

Shuswap Lake is at a nominal elevation of about 346 m (1135 ft.) Geodetic Survey of Canada (GSC) datum while the Metford Dam intake on East Canoe Creek is at elevation 567 m (1860 ft.) GSC. The Utilities Department attempts to maximize the supply of water from East Canoe Creek so that pumping into the system from Shuswap Lake and the associated costs are minimized. The flow of water from East Canoe Creek into the water system is by gravity.

Water has no taste, no color, no odor; it cannot be defined, art relished while ever mysterious. Not necessary to life, but rather life itself. It fills us with a gratification that exceeds the delight of the senses.

ANTOINE DE SAINT-EXUPERY (1900-1944), Wind, Sand, and Stars, 1939

2.0 WATER SYSTEM OVERVIEW (continued)

Periodic problems are experienced with East Canoe Creek, such as:

- turbidity levels that exceed the Interior Health Maximum Allowable Concentration. High turbidity levels are typically associated with higher creek flows during the spring snowmelt and extended high rainfall events in the watershed;
- peak summer water demands that exceed the low natural summer flows in the creek; and
- intermittent high coliform counts, which cause the shutdown of the Metford Dam intake and required the use of Shuswap Lake as the sole water source.

The distribution system is segregated into seven (7) pressure zones. The storage reservoir in the highest pressure zone (Zone 5) is at elevation 615 m (2020 ft.) GSC above sea level. Water has to be pumped over 269 m (885 ft.) in elevation from Shuswap Lake to the storage reservoir at the highest elevation.

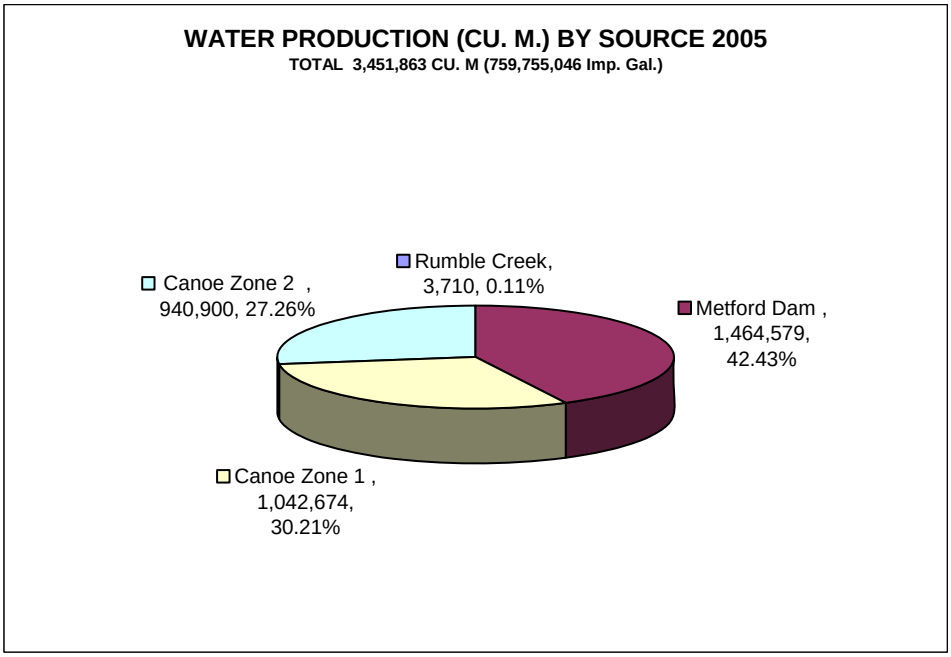


Figure 1 - Water Source Distribution

When the well is dry, we know the worth of water.

BENJAMIN FRANKLIN, (1706-1790), Poor Richard's Almanac, 1746

3.0 MONITORING PROGRAM

Drinking water quality is a function of source water quality, water treatment, and water quality changes after treatment. As a result, monitoring of drinking water quality consists of three components: source (raw) water monitoring, monitoring after treatment, and monitoring in the distribution system.

4.0 TESTING PARAMETERS

The City of Salmon Arm, as a purveyor of drinking water to a service population of approximately 14,100, is required to test at least 14 samples per month as outlined in the *Guidelines for Canadian Drinking Water Quality, Sixth Edition*. Our water distribution network is approximately 202 kilometres long.

To adequately represent all areas within our network, Interior Health has approved a program to test 18 samples per month (we sample nine sites on a bi-weekly basis, see Appendix 3). The water is regularly tested for its microbiological characteristics, specifically total coliforms, faecal coliforms, turbidity and pH.

At the time of sampling, the Water Utility Operator also checks the water temperature and chlorine residual to ensure the water continuously has disinfection capability. As it is not economically feasible to test for all pathogens in drinking water, the microbiological guidelines are based on these indicator tests.

A Maximum Acceptable Concentration (MAC) level has been established by Health Canada for microbiological criteria. Each MAC has been designed to safeguard human health, assuming a lifelong consumption of drinking water containing the substances at the maximum concentration level.

Aesthetic Objectives (AOs) apply to characteristics of drinking water that can affect its acceptance by consumers. These would include items such as taste, odour, and appearance. However, there are constituents that could pose a health risk in some individuals (i.e. compromised immunity, etc.) if the allowable AOs are exceeded.

High quality water is more than the dream of the conservationists, more than a political slogan; high quality water, in the right quantity at the right place at the right time, is essential to health, recreation, and economic growth.

EDMUND S. MUSKIE, U.S. Senator, speech, 1 March 1966

4.0 TESTING PARAMETERS (continued)

4.1 Test Parameters

Total Coliforms

The presence of total coliforms in the water system is an indicator that the system is experiencing regrowth of bacteria, infiltration of contaminates has occurred, or that it has not been properly treated at the source. The MAC for total coliforms is 10 per 100 ml (see Section 11.0, Pg. 21). If the sample tests are shown to exceed the MAC, it is re-sampled to confirm the original result. If the second test result is above the MAC, the affected main is isolated, monitored, flushed, and tested again. The response to another unacceptable test result is to take the main out of service, chlorinate, flush, retest it, and keep it out of service until acceptable results are obtained.

Faecal coliforms

Faecal coliforms in drinking water may indicate the presence of faecal contamination. Escherichia coli, one species in the faecal coliform group and the one best known because of its link to the death of seven people and illness of over 2000 others in Walkerton, Ontario, in 2000, is a definite indicator of the presence of faeces in the distribution system. The MAC for faecal coliform is 0 per 100 ml.

An unacceptable MAC test for faecal coliform triggers an immediate Boil Water Order by the Medical Health Officer which remains in effect until the problem is isolated, identified, resolved, and acceptable test results are obtained.

Heterotrophic Plate Count

The general bacterial population is estimated by means of a background colony count referred to as a heterotrophic plate count (HPC). Although not a significant health concern on its own, the presence of a background bacterial growth indicates that pathogenic bacteria could thrive in the system should they be able to enter it. Also, excessively high HPCs can hinder the detection of coliforms. The MAC for HPCs is 500 colonies per millilitre. If a test result indicates more than 500, the water is re-sampled and tested. Further test results indicating HPCs above 500 require the watermains to be flushed and monitored until a decreasing trend is observed.

Filthy water cannot be washed.

WEST AFRICAN PROVERB

4.0 TESTING PARAMETERS (continued)

Turbidity

Turbidity measurements relate to the optical properties of water. Poor turbidity is caused by suspended matter such as clay, silt, finely divided organic and inorganic matter, soluble coloured organic compounds, plankton, and other microscopic organisms. Excessive turbidity not only detracts from the appearance and taste of water, it can also serve as a source of nutrients for waterborne bacteria. As our supply source is surficial, and therefore subject to changes in quality due to weather changes, the water is sometimes discoloured and may taste different when it rains heavily after a long dry spell. Excessively high turbidity can also have a negative effect on disinfection techniques. The unit of measurement is the nephelometric turbidity unit (NTU). The MAC for water at the source is one NTU and the AO within the system has been set at less than five (5) NTU at the point of consumption. The Metford Dam intake is automatically shut off when the turbidity level reaches one (1) NTU. The system is monitored and flushed, if necessary, when unacceptably high turbidity test results are recorded. Turbidity is continuously measured at both water supply sources (see Figure 2).

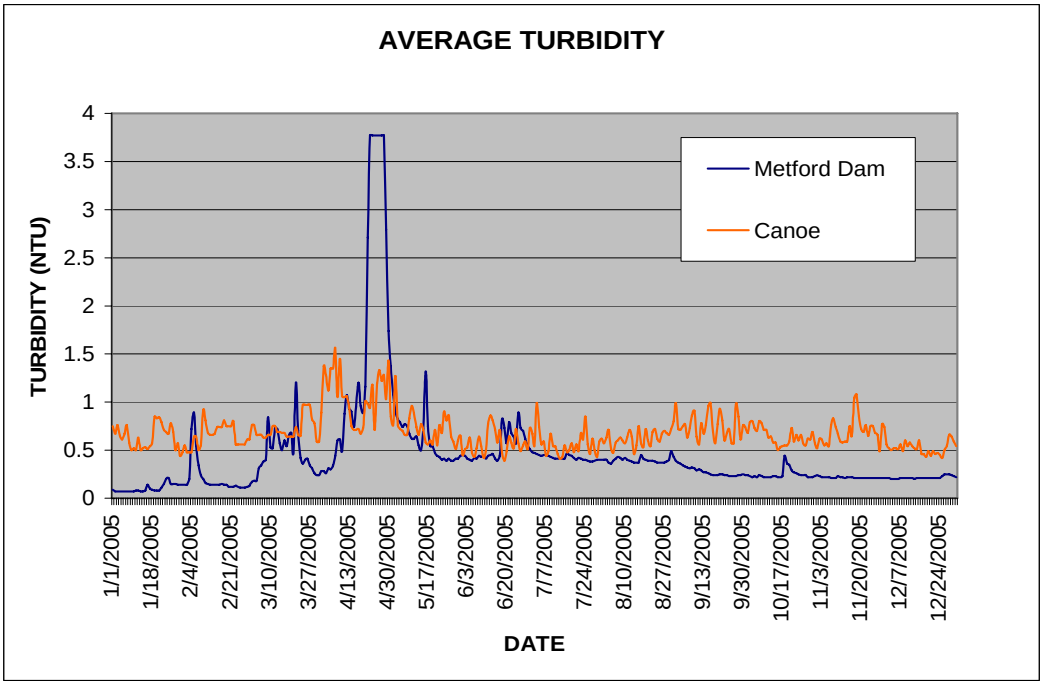


Figure 2 – Turbidity : 2005

In every glass of water we drink, some of the water has already passed through fishes, trees, bacteria, worms in the soil, and many other organisms, including people...Living systems cleanse water and make it fit, among other things, for human consumption.

ELLIOT A. NORSE, in R.J. Hoage, ed., Animal Extinctions, 1985

4.0 TESTING PARAMETERS (continued)

Chemical Analysis

The Utilities Department takes samples on a yearly basis from both sources for a chemical analysis of common minerals and other chemical parameters (such as hardness). Results are checked against the *Guidelines for Canadian Drinking Water Quality* (see Appendix 1). To date no tests have shown any parameters outside the maximum values recommended in the guidelines.

5.0 TESTING PROGRAM

Water at the nine sampling sites is tested and sampled every second week by our Water Utility Operator, see Appendix 4. Samples are tested on-site for temperature and chlorine residual, and the results are recorded. Samples are taken in accordance with the *20th Edition of Standard Methods for the Examination of Water and Wastewater*, placed in a sterile bottle, sealed, identified by location with time of day noted, placed in a cooler, and delivered to for testing at a certified laboratory in Kamloops/Kelowna. The water is tested for total coliform, and faecal coliform counts. All results are returned to Interior Health. If there is a positive test result, the local Health Office contacts the Director of Operations. Depending on the location and type of positive test result, the City will institute one or more of the following:

a) further testing to confirm the previous test results;
b) main flushing to remove stagnant water;
c) disinfection, if it appears to have contamination from an outside source; and
d) Boil Water Advisory, if there is a health risk to users.

Supplementary to the Interior Health requirement for the bi-weekly testing of water within the distribution system, the City has instituted a weekly testing program of 17 additional sites that are tested for temperature and chlorine residual. These sites are located in key locations on the extremities of the system known to have low flow or stagnant water conditions. This ensures that no biological re-growth is occurring within the system. Where either of these parameters reaches the set limits, flushing to refresh the water supply is instituted.

The health of our water system and public trust in it are things the City takes seriously. Our Utilities Department staff work closely with Interior Health so that a program is in place that ensures our citizens are provided with safe and healthy drinking water.

Figure 3 - Salmon Arm Water Utility Operator sampling water.

Did you know...?

- *80 percent of the earth's surface is water*
- *97 percent of the earth's water is seawater.*
- *2 percent of the earth's water supply is locked in icecaps and glaciers.*
- *1 percent of the earth's water is available for drinking.*

6.0 WATER DISTRIBUTION SYSTEM DETAILS

The public water system services an area of approximately 7,290 hectares (see Appendix 2) of which 969 hectares is the newly serviced Band Lands. The City distributes water in pipes made of a variety of materials. The first watermains were made of wood. These wooden mains have since been replaced with cast iron, ductile iron, PVC, polyethylene, steel, asbestos cement and some copper piping. The oldest mains still operating in the Salmon Arm water system inventory are cast iron pipes.

6.1 Watermains

Cast Iron Watermains

Approximately 0.3%, or 0.7 kilometres, of our watermain inventory is made of cast iron pipe. The majority of this pipe material was installed prior to 1978. The service life expectancy of cast iron pipe is between 50 and 100 years, depending on the soil type.

Ductile Iron Watermains

Approximately 10.1%, or 20.5 kilometres, of our water system is made of ductile iron pipe. Ductile iron is still used in some applications in Salmon Arm. The service life expectancy of ductile iron pipe can be up to 100 years.

6.0 WATER DISTRIBUTION SYSTEM DETAILS (continued)

PVC Watermains

Approximately 35.9%, or 73.2 kilometres, of our water system is made of PVC pipe. Most of this pipe material has been installed since 1979. Although the service life of PVC pipe is not yet known, it is anticipated that it is 70 years or greater.

Asbestos Cement Watermains

Approximately 52.0%, or 106.1 kilometres, of our watermain inventory is made of Asbestos Cement water pipe. Most of this pipe material was installed prior to 1978. The life expectancy of Asbestos Cement pipe is between 50 and 60 years, depending on water quality, soil type and installation conditions. The remaining service life of existing Asbestos Cement pipe is estimated at 1 to 50 years.

The asbestos fibres in the pipe do not pose a health risk in this form. The fibres are entirely encased in a cement jacket where they pose no problem to human health. The Utilities Department crew employ special techniques to cut the pipe to ensure that the fibres cannot become airborne during the cutting process.

Did you know…?

- *About 60 percent of the weight of the human body is water.*
- *An elephant is 70 percent water.*
- *A tomato is 95 percent water.*
- *An egg is about 74 percent water.*

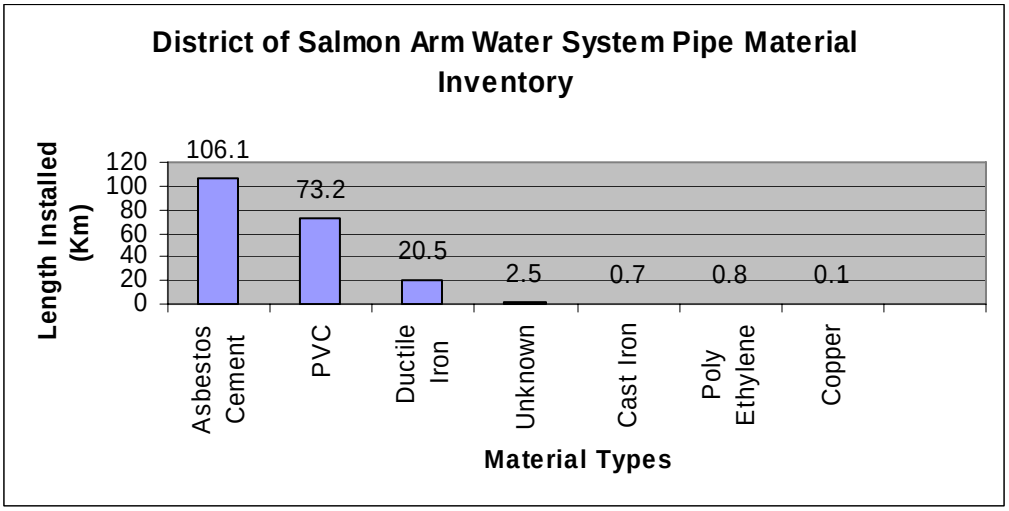


Figure 4 - Pipe inventory

High Density Polyethylene Watermains (HDPE)

Approximately 0.4% or 0.8 kilometres of our water system is made of Polyethylene pipe. Up until now it has only been used in small diameters for water services or distribution to small numbers of houses. The recently upgraded intake pipe from Shuswap Lake to the Canoe Pump Station is a 1000mm diameter High Density Polyethylene pipe.

6.0 *WATER DISTRIBUTION SYSTEM DETAILS (continued).*

6.2 Other Components

Water Pumping Stations

The municipal water system includes 14 water storage facilities and six pumping stations. Normally, if there is a major pumping station or storage facility failure, water service to a large area of the community could be discontinued or adversely affected until repaired. With our gravity feed from Metford Dam, water can be cascaded down through all the zones, with the exception of Zone 5.

The pump stations house a combined total of 15 pumps with a service life of approximately 40 to 50 years for each pump.

Figure 5 - Zone 1 Pumping Station at Canoe Beach

6.0 WATER DISTRIBUTION SYSTEM DETAILS (continued).

Water Services

Salmon Arm has 4,869 connections supplying water from the main to the property line. As with the watermains, these pipes age and require replacement. If a service connection were to fail, water service to the affected home or business would be discontinued until repaired. Whenever possible, service connections older than 25 years are replaced by the developers in accordance with the Subdivision and Development Servicing Bylaw. Service pipe may also be replaced when the watermain is being upgraded as part of the Capital Expenditure Program.

Of the 4,869 service pipes, approximately 90% are copper pipe. Based on a study by the Seattle Water Department, the average service life for copper service pipes installed in Seattle is 40 to 50 years. The corrosive nature of some soils will likely decrease the average service life of some connections.

The remaining 10% of service pipes are made of galvanized iron, cast iron, asbestos cement, ductile iron, PVC or polyethylene pipe. The older industrial service pipes are made of asbestos cement and cast iron pipe, while the newer industrial service pipes are made of ductile iron, PVC or polyethylene.

Did you know …?

- *A watermelon is about 92 percent water.*
- *A piece of lean meat is about 70 percent water.*
- *Fresh, uncompacted snow is usually 90-95 percent trapped air.*
- *The water we use today is the same water the dinosaurs used.*

System Control – "SCADA" (**S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition software**)**

Maintaining reservoir water levels, operating pumps, monitoring quality control equipment and maintaining a historical data file of the water systems operations is made easier these days by a comprehensive software program employed by the Utilities Department. Connected by telephone lines and/or radio links, the SCADA software is able to monitor sensors at all the reservoirs and pump stations. Interpreting the data received, it then automatically turns pumps on and off to keep the system flowing smoothly. When trouble is detected within the system the software issues alarms and notifies Water Utilities Department staff.

Water Storage Facilities

The City has thirteen (13) enclosed reservoirs and one (1) dam storing water for seven (7) pressure zones within the system. Each reservoir is sized to balance daily water consumption, as well as provide an emergency water supply for fire protection. The 13 reservoirs have a total storage capacity of 15,500 m^3 (3,410,300 gallons). In addition, the Metford Dam on East Canoe Creek has storage for 8200 m^3 (1,800,000 gallons).

6.0 WATER DISTRIBUTION SYSTEM DETAILS (continued)

Fire Hydrants

Salmon Arm has approximately 642 City and 120 private fire hydrants. Approximately 92% of the hydrant inventory is the older style, slide-gate hydrant and the remainder are the newer compression style hydrants.

Air Valves

Turbulence created in the water as it flows through the system causes some of the dissolved air in the water to collect as bubbles in the pipes. These air bubbles collect at the high points in the system and restrict water flow. We have approximately 170 air valves installed in below-ground chambers that automatically bleed air from the pressurized piping system. If an air valve failed, negative pressures could allow groundwater to infiltrate and contaminate the water system. Air valves receive regular maintenance as required and are replaced at the end of their service life, which is approximately 20 years.

Did you know …?

- *A fully grown oak tree may transpire about 100 gallons (380 litres) of water a day. In summer an acre of corn transpires from 3,000 to 4,000 gallons (11,360 to 15,140 litres) of water each day.*

Flow Control (Gate) Valves

We have approximately 1600 flow control valves attached to the underground water pipe network. The valves are primarily used to control the direction of water flow and to isolate areas of the network for inspection or repair. The expected service life of a flow control valve is 40 to 50 years.

- *Once evaporated, a water molecule spends ten days in the air.*

Pressure-Reducing Valve Stations

The maximum design water pressure for piping within the municipal water system is 1034 kPa (kilopascals)/150 psi. We have five pressure reducing valve stations containing one Pressure-reducing valve (PRV) each. Pressure reducing valves are used to control the pressure in the water system by creating head losses that prevent pressures from exceeding the design maximum. The failure of a PRV could disrupt flows and mainline pressures to a large area of the community.

- *Every 24 hours about 250 cubic miles of water evaporates from the sea and the land.*

The Utilities Department currently overhauls the PRV stations every year in an effort to extend their service life. Most individual premises also have secondary PRV's as fluctuating pressures can place excessive stress on internal plumbing systems and fixtures.

6.0 WATER DISTRIBUTION SYSTEM DETAILS (continued)

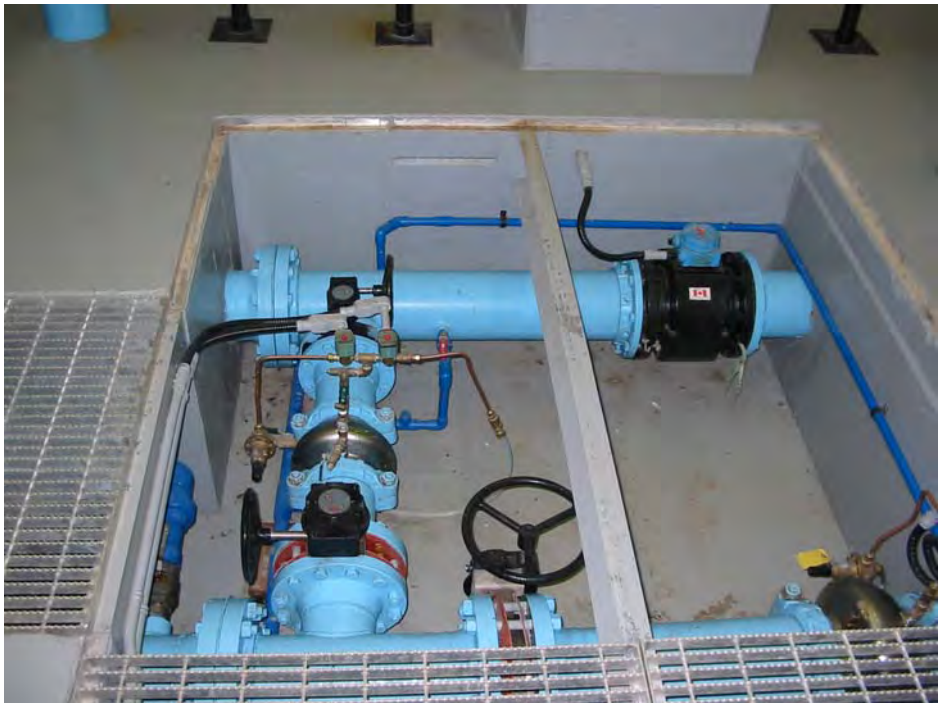


Figure 6 – Zone 4 Pump/Pressure Reducing Station on 30th Street NE

Water Meters

The City currently meters approximately 1120 water services or only about 25.5% of all water connections to homes or businesses. As a water meter ages, its mechanisms tend to underestimate the water passing through it and consequently users may be undercharged for the actual water use. The normal service life of a water meter is approximately 15 years.

6.3 Water System Value

The total value of our primary water distribution system, as detailed in Figure 7 below, is approximately $55,800,000. We budgeted $1.472 million in 2005 or approximately 2.6%, on water infrastructure replacement. The replacement program is designed to address some of these previously discussed replacement components and other general deficiencies within the system on a priority basis. However; a thorough and comprehensive maintenance program also helps to extend the life expectancy of a majority of these water infrastructure elements.

6.0 WATER DISTRIBUTION SYSTEM DETAILS (continued)

System Components	Quantity in Use in Salmon Arm	Approximate Replacement Cost
Watermains	204 km	$42,600,000
Reservoirs/Tanks	13 Reservoirs/1Dam	$7,600,000
Pumping Stations	6	$5,200,000
System Control	1	$400,000
TOTAL		**$55,800,000**

Figure 7 - Infrastructure replacement value

Did you know …?

- *The average toilet uses 5 to 7 gallons of water per flush.*
- *A shower can use 25 to 50 gallons (5 gallons per minute).*
- *Just washing your hands can use up to 3 gallons of water (with tap running at 3 gallons per minute).*
- *Leaving the water running while you brush your teeth can waste 3 gallons of water (at 3 gallons per minute).*

7.0 SYSTEM MAINTENANCE

Maintenance of the Salmon Arm water system involves four key programs:

1) Valves;
2) Watermains;
3) Hydrants; and,
4) Reservoirs.

As replacement of the entire distribution grid is not affordable, system maintenance becomes a critical component in the management of the water infrastructure. The total Operation and Maintenance Expenditures in 2005 for the water system was $1.022 million.

7.1 Annual Maintenance Program

Valve Maintenance

Valves are interspersed along watermains and can be shut or opened to alter the flow of water or to isolate a portion of the water system for repair or maintenance. These valves can be inadvertently buried or left closed causing maintenance challenges by restricting water flow through the main. In response to these problems, Utilities Department staff began a valve exercising program. A City crew tries to inspect each valve annually, exposing buried valves, making repairs, and exercising every valve by turning it first to a closed position then back to open.

7.0 SYSTEM MAINTENANCE (continued)

Watermains

Watermain maintenance involves both the upgrading of aging watermains and ensuring that existing watermains are operating effectively.

Watermain Upgrading

In addition to repairing watermains that break, aging watermains must be replaced. An ongoing replacement/preventative measures program is in place, targeting areas with older piping materials in susceptible condition and areas identified with inadequate fire flow. Future development is also factored into the overall plan.

Did you know …?

- *Outdoor spigots can pump out 5 to 10 gallons per minute.*
- *Automatic dishwashers use about 15 gallons per load.*
- *Washing one load of clothes in an automatic washer uses about 45 gallons.*
- *The average bath takes about 36 gallons of water.*

Capital Watermain Projects for 2005 were:

1) Lakeshore Road NE, Phase 7 of the Engineers Point Transmission Main Upgrade completed the final 960 metres of 600mm diameter pipe; this finalizes the upgrading of the Zone 1 trunk main between Canoe Beach and the Skelton Reservoir (next to RCMP station).
2) Ross Street NE/lane in conjunction with the Town Centre Revitalization between Hudson Avenue NE and Lakeshore Drive NE 120 metres of watermain was upgraded to 200mm diameter PVC. The upgrade improves available fire flows in the Town Centre.
3) 30th Street SW watermain south of 13th Avenue SW was upgraded from 50mm to 150mm diameter PVC. The replaced portion had experienced a number of breaks in recent years and local demand was exceeding its flow capacity.
4) 50th Street SE from Auto Road SE to 46th Avenue SE was constructed as part of a subdivision to provide additional looping in the Industrial Park.
5) 10th Street SE was upgraded from 150 to 300mm diameter as Stage 1 of a multi year program to provide a new trunk main between the Trans Canada Highway and the Homely (Zone 1) Reservoir;
6) 12th Avenue SE watermain between 13th Street SE and 15th Street SE was upgraded from 100mm diameter to 250mm diameter PVC to improve available flows in the Zone 4 network;
7) As part of the 5th Street SW rebuild project the watermain was upgraded from 100mm diameter to 200mm diameter PVC. This project included a connection across the Trans Canada Highway to the transmission main on Lakeshore Drive SW to improve available fire flows in this commercial area;

7.0 ***SYSTEM MAINTENANCE*** *(continued)*

8) In addition to improvements under the annual Capital Improvement program the water system was extended to service new residential development. 515m of 200mm diameter watermain was installed to service the Laurel Estates Development north of Auto Road SE at 12th Street SE. A further 380m of 150mm diameter watermain was installed in Phases 2 & 3 of the Lakeview Meadows Development in the 1900 block of 22nd Street NE and 23rd Street NE.

Watermain Flushing

As water travels from the watersheds, it collects organic particles and transports them to the water system. As these particles travel to areas of the water system with lower flow velocities they settle out. Accumulated debris and stagnant water inhibit flow through mains, cause dirty water and potentially create a favourable environment for bacterial growth. In response to these concerns, the Utilities Department initiated a watermain flushing program for identified problem areas. Each main is flushed annually during daytime hours. When flushing, a hydrant is opened and the water stream is used to expel the contents of the main. There are approximately 17 locations throughout the municipality referred to as “high maintenance areas” where water demand is low or where watermains terminate in a dead end. These areas are flushed as required, sometimes as often as every month during the summer.

Figure 8 – Utilities Department operator flushing watermain as part of regular maintenance

7.0 SYSTEM MAINTENANCE (continued)

We also flush mains within 24 hours of receiving test results from the Interior Health that indicate bacteria levels outside the accepted provincial standard which are based on the "Guidelines for Canadian Drinking Water Quality".

Hydrant Maintenance

Historically, fire hydrants were only serviced when requested by the Fire Department. To ensure proper fire protection, Salmon Arm implemented a fire hydrant maintenance program. The program requires staff to check the pressure on each hydrant before it is serviced and dismantles each hydrant, renewing worn parts as necessary. The hydrant is then lubricated and reassembled. All hydrants get an overhaul once each year.

Did you know …?

- *The average individual uses about 125 gallons of water per day.*

Reservoir Maintenance

Debris can accumulate in reservoirs and bacteria and algae can grow on the walls. Each year, the Utilities Department staff cleans and services two different reservoirs. The program involves decommissioning the reservoir, draining it, removing any sediment, repairing leaks, and disinfection.

- *An average residence uses 107,000 gallons of water per year.*

The reservoir is then refilled, chlorinated and tested for water quality. This program requires approximately two days to complete before the reservoir can be brought back into service.

- *About 340 billion gallons of water are used every day in the United States. This total includes water used in irrigation, in industry, and in fire fighting and street cleaning.*

Figure 9 - Metford Dam (August, 2003)

8.0 WATERMAIN BREAKS

Most water utilities frequently experience minor disruptions. Pipes break, valves stick, hydrants leak and power outages occur. Although these are not anticipated, the problems experienced can usually be corrected with minimal disruption, and regular service can be quickly restored.

In 2005, our staff responded to and repaired only three watermain breaks. (Note: service connection or hydrant lead breaks are not included in this total).

Procedures for Watermain Repairs or Tie-ins

Watermains are disinfected whenever they are exposed to the atmosphere. To prevent a possible introduction of contamination, City crews try to maintain positive pressure in the system. This practice makes it more difficult to complete repairs and it may appear as though water is being wasted when conducting them, but it is a necessary safeguard to protect the integrity of the system.

Did you know …?

- *It takes about 1 gallon of water to process a quarter pound of hamburger.*
- *It takes 1,500 gallons of water to process 1 barrel of beer.*
- *It takes 39,000 gallons of water to manufacturer a new car, including tires.*

Repairs or tie-ins with no groundwater entry

These repairs are typically the result of electrolysis holes, cracks, or splits, and are repaired using repair clamps. Provided the watermain maintains positive pressure until City crews have excavated below the invert of the pipe, it is assumed that no contaminant can enter the system. The repair clamps and other materials required to complete the repairs are cleaned with a 6% chlorine solution. Upon completion of the repairs, the main is flushed and put back into service.

Repairs or tie-ins with groundwater entry

On occasion, watermain breaks have occurred where it is impossible to maintain positive pressure or to pump all groundwater below the invert of the watermain before throttling it down or shutting it off. In this case, disinfection, flushing, and residual testing procedures are followed prior to recommissioning the watermain.

The City adheres to the procedures set out in the American Water Works Association (AWWA) Standard C651-92 regarding watermain chlorination. This, in summary, requires that the main is completely isolated, that it is disinfected with a chlorine concentration of 200 milligrams per litre for a retention time of two hours, and that after two hours the chlorine residual level is a minimum of 100 milligrams per litre.

8.0 WATERMAIN BREAKS (continued)

If this condition is not met, the main must be re-chlorinated using the same standard. After a successful result, the watermain is flushed continuously until the chlorine residual is less than one milligram per litre. When the desired residual level is achieved, the watermain is returned to service.

New Watermains

Disinfection of a new watermain is completed in accordance with AWWA C651, Continuous Feed Method which requires initial disinfection with a chlorine concentration of 25 milligrams per litre for a retention time of twenty-four hours. At the end of the disinfection period, the chlorine residual level is a minimum of 10 milligrams per litre. If this condition is not met, the main must be re-chlorinated using the same standard. After a successful result, the watermain is flushed continuously until the chlorine residual is less than one milligram per litre. When the desired residual level is achieved it is allowed to sit for 24 hours before test samples are sent to a certified laboratory for coliform tests. If the bacterial tests are clean, then the main is ready for connection to the system. If the samples are not clean, the whole process is repeated.

9.0 NOTIFICATION PROTOCOL

Normally, breaks or disruption to water service are caused by conditions that can be repaired and reinstated quickly, directly by City forces without risk to the public health. Sometimes however, situations arise that require extra care to guarantee that the integrity of our water infrastructure has not been compromised. The Utilities Department endeavours to keep the Medical Health Officer apprised of any extraordinary situations that may adversely impact the City's water system.

10.0 WATER CONSUMPTION

Our community still has an above average per capita water use amongst Canadian municipalities. Some possible causes of this excessively high per capita consumption may include undetected system leaks, illegal connections, high residential summer irrigation demand, and inaccurate metering. The City commissioned a Water Use Efficiency Study and appointed a committee to review the findings and make recommendations to Council on the need for and the form of any water conservation measures. In 2003 the Water Use Efficiency Committee brought forward a Water Conservation policy which Council adopted (see Appendix 6). Sustainable Shuswap continues to assist with the management of this Program.

10.0 WATER CONSUMPTION (continued)

The policy sets water consumption targets and calls for a two phase program. Phase 1 is a three year education and voluntary compliance program aimed at informing the residents of the need and benefits to the community if we change our water consumption habits to reduce wasting water. Phase 2, proposed a review of Phase 1 and implementation of possible regulatory measures including full water metering to achieve targeted water consumption goals. 2005 was Year 3 of Phase 1. The water conservation program has been extended to 31 December, 2006. The program concentrated on random residential water use audits during the summer sprinkling season. 88% of the 1139 homeowners' contacted participated, a much higher rate than anticipated. The Water Use Efficiency Program is deemed partially successful to date with peak day production and average day production being reduced by 14% and 12% respectively (goal was 20% and 14%). The "Water Ambassador" was again well received by customers. For a full report on the results of the audit see the 2005 Fall Water Wise news letter on the Salmon Arm web site.

Did you know …?

- *It takes about 800,000 gallons of water to grow an acre of cotton.*
- *Ten gallons of water are needed to refine one gallon of gasoline.*
- *Cutting one minute off your shower time can save about 700 gallons of water per month.*

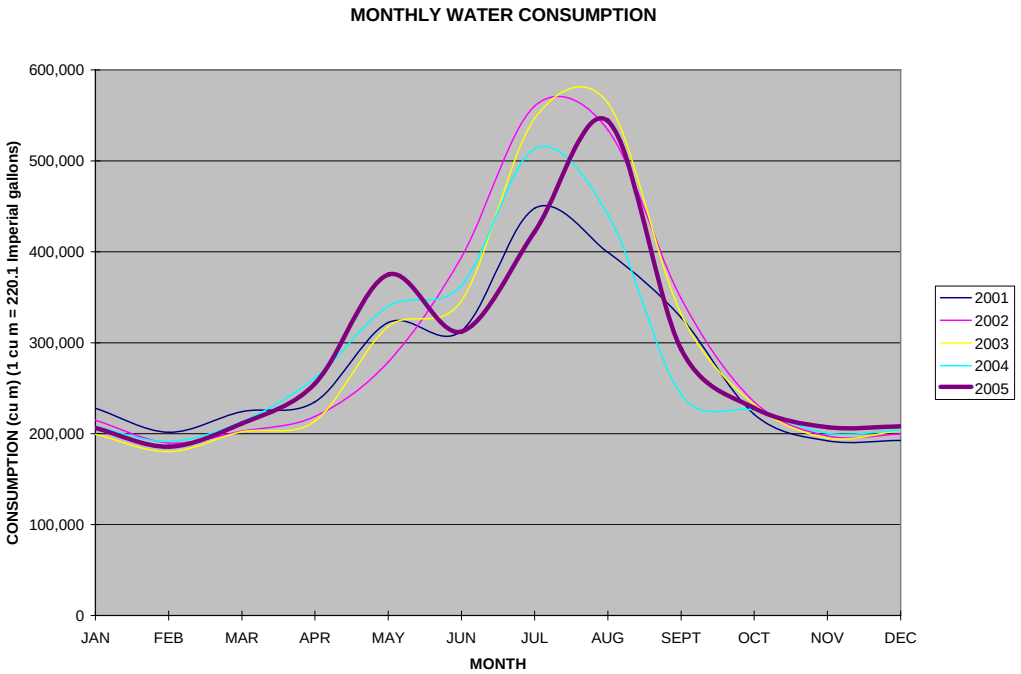


Figure 10 See Appendix 5

11.0 TEST RESULTS

The Guidelines for Canadian Drinking Water Quality, Sixth Edition and the *British Columbia Safe Drinking Water Regulation* have established the following microbiological criteria:

- No sample should contain more than ten total coliform organisms per 100 ml, none of which should be faecal coliforms;
- No two consecutive samples from the same site should show the presence of coliform organisms; and
- At least 90% of the samples must have zero total coliforms per 100 ml.

Did you know …?

Of the 87 treated water samples analysed for microbiological criteria in 2005, zero faecal coliforms were detected and all sites indicated less than one for the presence of total coliforms.

- *A faucet that drips 60 times in one minute would waste over 3 gallons a day, 1,225 gallons per year.*

12.0 2005 CHALLENGES TO DRINKING WATER QUALITY

2005 was a good year for the Utilities Department. There were no contamination incidents within the distribution system but we did have two short periods where the source water on East Canoe Creek had high coliform test results. In each incident the Medford Dam intake was shut down until testing showed that the raw water quality had returned to acceptable standards.

- *Humans require about 2½ quarts of water a day.*

13.0 CONCLUSION

- *A human can live more than a month without food but only as much as one week without water.*

Implementation of BC's Drinking Water Protection Act and Regulations has established increased standards for Operator training, water sampling and system monitoring, emergency response plans, long range planning and public reporting. Some have only required minor changes to our established practice. Others such as the new Water Treatment Plant will be a major step forward in the sophistication of our water system. Working with the staff at Interior Health we continue to implement the new legislation, as it all works towards insuring the safety and reliability of the water we deliver to our customers.

The City of Salmon Arm staff welcomes the opportunity to present to our citizens the 2005 Annual Water Quality Report, detailing the health of our water system. We hope this report will provide some information about your drinking water and give you an insight into the way we operate the system. If you have any questions about the report or want more specific information about the water, please contact the Operations Department at 803-4000.

APPENDIX

Appendix 1 : SOURCE WATER CHEMICAL ANALYSIS TEST RESULTS
Appendix 2 : WATER SERVICE AREA
Appendix 3 : IHA/CSA WATER SAMPLE SCHEDULE
Appendix 4 : IHA BIOLOGICAL MONITORING RESULTS
Appendix 5 : DAILY WATER CONSUMPTION 2001 TO 2005
Appendix 6 : DSA POLICY NO. 5.16 (WATER CONSERVATION POLICY)

APPENDIX 1

CITY OF SALMON ARM
SOURCE WATER CHEMICAL ANALYSIS
TEST RESULTS

WATER QUALITY REPORT
METFORD DAM INTAKE

	pH (units)	Conductivity at 25 deg C (umhos/cm)	Dissolved Solids (Total) mg/L	Suspended Solids mg/L	Hardness (Total) mg/L as CaCO3	Nitrate mg/L as N	Nitrite mg/L as N	Fluoride mg/L	Total Coliform (Colonies/100mL)	Fecal Coliform (Colonies/100mL)	Aluminum Total) mg/l	Antimony (Total) mg/l	Arsenic (Total) mg/L	Barium (Total) mg/L	Boron (Total) mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Copper (Total) mg/L	Iron (Total) mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese (Total) mg/L	Mercury (Total) mg/L	Molybdenum (Total) mg/l	Potassium (Total) mg/l	Selenium (Total) mg/L	Sodium (Total) mg/L	Sulphate mg/L	Uranium (Total) mg/l	Zinc (Total) mg/L	Heterotrophic Plate Count (colonies/100mL)
01-Dec-94	7.8	400	190	1.2	204	<0.05	<0.05		2				<0.005	0.044	0.16	<0.002	65.1	<0.05	<0.005	0.003	0.03	<0.005	10.1	<0.01	<0.0001			<0.005		28.3		<0.01	
05-Dec-95	7.66	360	130	<1	161	<0.03	<0.03	0.06	<1	<1			<0.0050	0.022	0.17	<0.001	55.1	<2	<0.005	<0.002	0.07	<0.005	5.6	<0.005	<0.0001			<0.005	<1	17		<0.01	
29-Mar-96	Note: Resampled Shuswap Lake Source Only																																
15-Jan-97	8.08	370	200	<1	220	<0.05	<0.05	<0.05	<1	<1			<0.005	0.11	<0.05	<0.001	72.9	<2	<0.005	0.004	0.03	<0.01	8.6	<0.01	<0.0001			<0.005	2	17.1		<0.01	
04-Feb-98	7.31	410	250	<1	240	<0.05	<0.05	0.13	12	<1			<0.02	0.13	<0.05	0.001	79.7	<2	0.008	0.034	0.19	<0.01	10.9	<0.01	<0.0001			<0.005	4	28		<0.01	32
15-Dec-98	7.32	580	380	2	267.5	0.28	0.28	0.3	40	<1			<0.02	0.0509	<0.01	<0.0005	87	26	<0.001	0.011	0.098	<0.005	12.2	0.0173	<0.0001			<0.01	10.8	33		0.013	
08-Mar-99	8.08	445	273		192	<0.003	<0.003	0.2	0	0			<0.001	0.08	<0.01	<0.0005	61	<0.50	<0.004	<0.005	<0.01	<0.001	10.2	<0.005	<0.05			<0.01	2.78	37		<0.002	
13-Jan-00	8.4	380	241	<1	226	0.01	<0.01	0.2	7	0			<0.01	0.03	<0.1	<0.0002	75.6	0.6	<0.01	<0.01	<0.03	<0.001	9.1	<0.005	<0.00005			<0.0005	2.16	20		<0.005	19
18-Jan-01	7.9	390	267	<1	241	0.05	<0.01	0.2	1	0			<0.01	0.03	<0.1	<0.0002	77.3	0.6	<0.01	<0.01	<0.03	<0.001	11.7	<0.005	<0.00005			<0.001	2.92	33		<0.005	44
09-Jan-02	8.2	358	214	<1	184	<0.01	<0.01	<0.10	4	0			<0.0001	0.02	<0.1	<0.0002	60	0.5	<0.01	<0.01	<0.03	<0.001	8.3	<0.005	<0.00005			<0.0005	2.26	16.3		<0.005	68
14-Jan-03	8.1	409	232	<1	219	0.02	<0.01	<0.10	10	2			<0.0001	0.03	<0.1	<0.0002	68.6	0.6	<0.01	<0.01	<0.03	<0.001	11.7	<0.005	<0.00005			<0.001	3	31		<0.005	49
13-Jan-04	7.9	396	254	<1	216	0.05	<0.01	0.25	1	1	<0.01	<0.0005	<0.001	0.03	<0.1	<0.0002	69.4	0.45	<0.002	<0.01	<0.03	<0.001	10.3	0.003	<0.0002	<0.03	1.59	<0.001	2.8	31	0.00102	<0.05	200
19-Jan-05	**7.8**	**371**	**228**	**<1**	**203**	**0.03**	**<0.01**	**0.2**	**7**	**0**	**<0.01**	**<0.0005**	**<0.001**	**0.03**	**<0.1**	**<0.0002**	**68**	**0.5**	**<0.002**	**<0.01**	**<0.03**	**<0.001**	**8.5**	**<0.002**	**<0.0002**	**<0.03**	**1.3**	**<0.001**	**2.2**	**18.2**	**0.00080**	**<0.05**	**200**
20-Sep-05	**8.0**	**352**	**233**	**<1**	**182**	**0.00**	**<0.01**	**0.20**	**3**	**2**	**<0.01**	**<0.0005**	**<0.001**	**0.03**	**<0.1**	**<0.0002**	**60**	**0.50**	**<0.002**	**<0.01**	**0.00**	**<0.001**	**7.9**	**<0.002**	**<0.0002**	**<0.03**	**1.5**	**<0.001**	**2**	**22**	**0.00070**	**<0.05**	**34**
CDWG : Canadian Drinking Water Quality Guidelines																																	
CDWG*1		**-**				**10.0**	**1.0**	**1.5**	**	**			**0.025**	**1.0**	**5.0**	**0.005**	**-**		**0.05**		**0.3**	**0.01**	**-**		**0.001**			**0.01**			**<0.02**		**500**
CDWG*2	**6.5-8.5**		**<500**		**<500**													**<250**		**<1.0**				**0.05**					**<200**	**<500**		**<.05**	
CDWG*1	Maximum acceptable concentration																																
CDWG*2	Aesthetic concentration																																

** Microbiological Characteristics:
For total coliform the maximum acceptable concentration is 0 colonies/100mL. However, due to uneven distribution in water:
1) No sample should contain more than 10 total coliform organisms per 100 mL none of which should be fecal coliforms.
2) No consecutive samples from the same site should show any coliforms
3) If any coliforms are detected, or if there are more than 200 background colonies on a toal coliform membrane filter per 100 100 mL, the site should be resampled, and if results confirmed, cause should be determined and remediation undertaken.

Notes: Hardness: 80-100 as CaCO3 preferred
>200 as CaCO3 poor but tolerated
>500 as CaCO3 normally unaccepted

Aluminum - No health guideline "operational guidance values" for water treatment are 0.10 or 0.20 mg/l depending on treatment type.

WATER QUALITY REPORT
SHUSWAP LAKE INTAKE AT CANOE PUMP STATION

	pH (units)	Conductivity at 25 deg C (umhos/cm	Dissolved Solids (Total) mg/L	Suspended Solids mg/L	Hardness (Total) mg/L as CaCO3	Nitrate mg/L as N	Nitrite mg/L as N	Fluoride mg/L	Total Coliform (Colonies/100mL)	Fecal Coliform (Colonies/100mL)	Aluminum Total) mg/l	Antimony (Total) mg/l	Arsenic (Total) mg/L	Barium (Total) mg/L	Boron (Total) mg/L	Cadmium (Total) mg/L	Calcium (Total) mg/L	Chloride mg/L	Chromium (Total) mg/L	Copper (Total) mg/L	Iron (Total) mg/L	Lead (Total) mg/L	Magnesium (Total) mg/L	Manganese (Total) mg/L	Mercury (Total) mg/L	Molybdenum (Total) mg/l	Potassium (Total) mg/l	Selenium (Total) mg/L	Sodium (Total) mg/L	Sulphate mg/L	Uranium (Total) mg/l	Zinc (Total) mg/L	Heterotrophic Plate Count (colonies/100mL)
01-Dec-94	6.51	120	58	2.5	46	0.1	0.1		3				<0.005	0.033	0.14	<0.002	14.3	0.8	<0.005	0.021	0.17	<0.005	2.5	<0.01	<0.0001			<0.005		8.9		0.04	
05-Dec-95	6.7	110	76	<1	37.5	0.06	0.06	<0.05	4	<1			<0.005	0.007	0.16	<0.001	11.9	<2	<0.005	0.004	1.6	<0.005	1.9	<0.005	<0.0001			<0.005	<1	8.2		0.01	
29-Mar-96	7.11	120	80	1	45.7	0.07	0.07	0.06	<1	<1			0.02	<0.002	<0.05	<0.002	14	<2.0	0.006	0.003	<0.01	<0.01	2.6	0.02	<0.0001			<0.01	2.2	7.2		0.01	
15-Jan-97	7.63	140	<5	100	60	<0.05	<0.05	<0.05	<1	<1			<0.005	0.092	<0.05	<0.001	17.9	<2	<0.005	0.005	0.06	<0.01	3.3	0.01	<0.0001			<0.005	3	8.4		0.01	
04-Feb-98	7.11	130	70	9	61	<0.05	<0.05	0.05	14	<1			<0.02	0.11	<0.05	0.001	18.8	<2	<0.005	0.028	0.16	<0.01	3.4	<0.01	<0.0001			<0.005	4	<5		<0.01	56
15-Dec-98	7.4	130	74	2	55.4	0.08	0.08	0.1	6	<1			<0.02	0.011	<0.01	<0.0005	17.7	1	<0.001	0.007	<0.003	<0.005	2.72	<0.0005	<0.0001			<0.01	2.23	8		0.002	12
08-Mar-99	7.59	130	94		48.7	0.102	<0.003	0.1	0	0			<0.001	<0.08	<0.01	<0.0005	15.4	1	<0.004	<0.005	<0.01	<0.01	2.9	<0.005	<0.05			<0.01	2.02	9		<0.002	
13-Jan-00	7.9	119	75	<1	57	0.11	<0.01	0.1	8	0			<0.01	0.01	<0.1	<0.0002	18	1.1	<0.01	<0.01	<0.03	<0.001	3	0.006	<0.00005			<0.0005	2.24	8.7		0.006	15
18-Jan-01	7.2	192	81	<1	60	0.11	<0.01	<0.1	0	0			<0.01	0.01	<0.1	<0.0002	19.3		<0.01	<0.01	<0.03	<0.001	2.8	<0.005	<0.00005			<0.001	2.12	8.3		0.008	12
09-Jan-02	7.6	111	67	<1	53	0.09	<0.01	<0.10	0	0			0.0002	0.01	<0.1	<0.0002	16.6	0.95	<0.01	<0.01	<0.03	<0.001	2.7	<0.005	<0.00005			<0.0005	2.03	7.6		0.007	26
14-Jan-03	7.3	119	58	<1	46	0.09	<0.01	<0.10	0	0			0.0002	<0.01	<0.1	<0.0002	14.5	1.1	<0.01	<0.01	0.03	<0.001	2.5	0.007	<0.00005			<0.001	2	7.5		<0.005	14
13-Jun-03	7.6	115	75	2	52	0.07	<0.01	0.1	0	0			<0.001	<0.02	<0.01	<0.0002	16.5	1.25	<0.002	<0.01	0.08	<0.001	2.6	0.003	<0.0002			<0.001	2	8		<0.05	
13-Jan-04	7.5	110	68	<1	48	0.09	<0.01	0.15	0	0	0.01	<0.0005	<0.001	<0.02	<0.01	<0.0002	15.3	0.9	<0.002	<0.01	<0.03	0.002	2.28	0.003	<0.0002	<0.03	1.01	<0.001	<2	6.8	0.00037	<0.05	60
19-Jan-05	**7.3**	**108**	**63**	**2**	**49**	**0.09**	**<0.01**	**0.1**	**0**	**0**	**0.05**	**<0.0005**	**<0.001**	**<0.02**	**<0.10**	**<0.002**	**15**	**0.9**	**<0.002**	**<0.01**	**0.124**	**<0.001**	**2.5**	**0.021**	**<0.0002**	**<0.03**	**1.0**	**<0.001**	**<2**	**7.1**	**0.0004**	**<0.05**	**8**
20 Sept 05 `	**7.0**	**107**	**73**	**2**	**47**	**0.11**	**<0.01**	**0.15**	**2**	**0**	**0.04**	**<0.0005**	**<0.001**	**<0.02**	**<0.1**	**<0.0002**	**15**	**1.00**	**<0.002**	**<0.01**	**0.10**	**<0.001**	**2.3**	**0.019**	**<0.0002**	**<0.03**	**1.0**	**<0.001**	**<2**	**6.5**	**0.0004**	**<0.05**	**43**
CDWG : Canadian Drinking Water Quality Guidelines																																	
CDWG*1		**-**				**10.0**	**1.0**	**1.5**	******	******			**0.025**	**1.0**	**5.0**	**0.005**	**-**		**0.05**		**0.3**	**0.01**	**-**		**0.001**			**0.01**			**<0.02**		**500**
CDWG*2	**6.5-8.5**		**<500**		**<500**													**<250**		**<1.0**				**0.05**					**<200**	**<500**		**<0.05**	
CDWG*1	Maximum acceptable concentration																																
CDWG*2	Aesthetic concentration																																
Notes:	Hardness: 80-100 as CaCO3						preferred																										
	>200 as CaCO3						poor but tolerated																										
	>500 as CaCO3						normally unaccepted																										
	Aluminum - No health guideline "operational guidance values" for water treatment																																

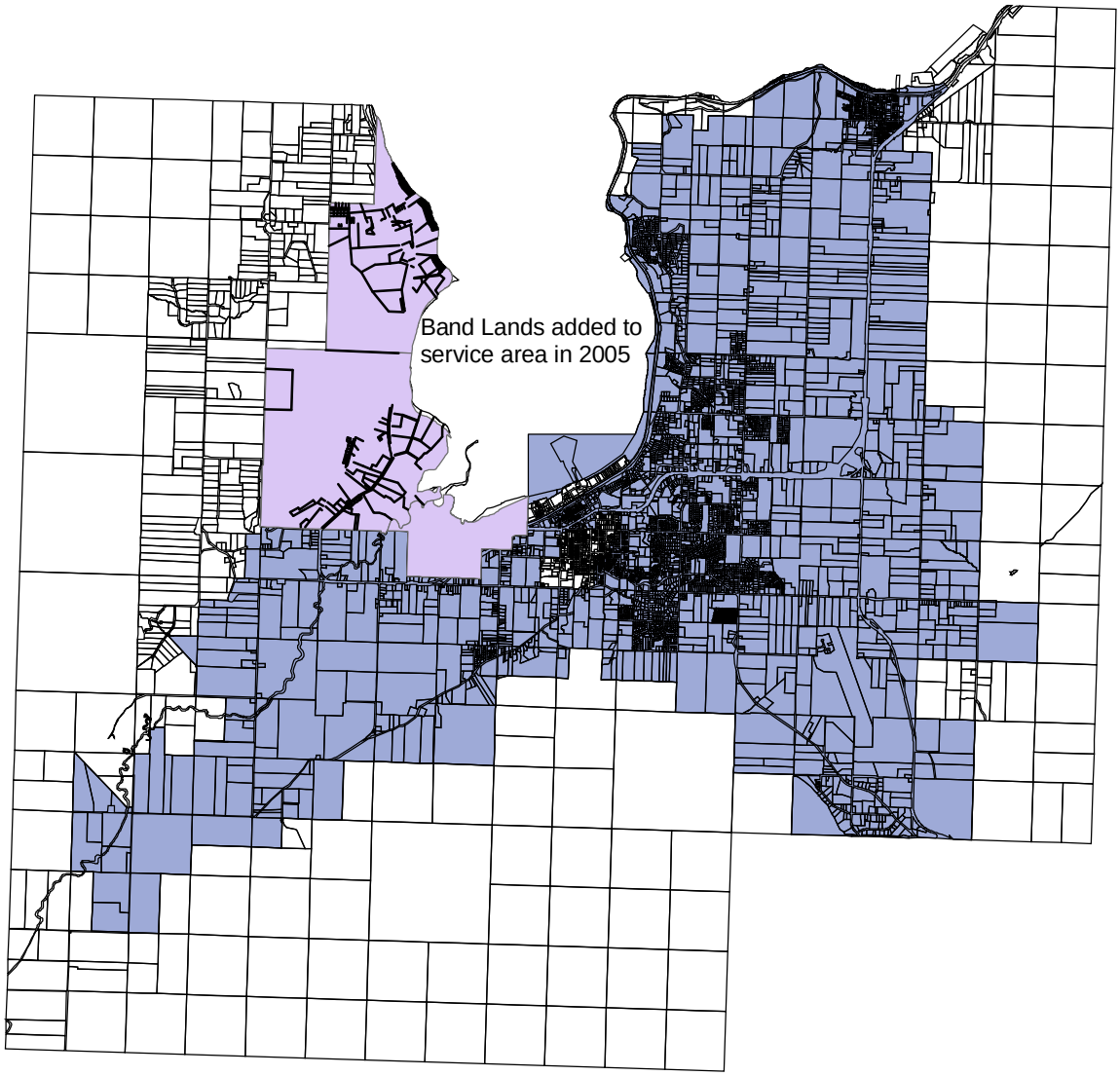
** Microbiological Characteristics:
For total coliform the maximum acceptable concentration is 0 colonies/100mL. However, due to uneven distribution in water:
1) No sample should contain more than 10 total coliform organisms per 100 mL none of which should be fecal coliforms.
2) No consecutive samples from the same site should show any coliforms
3) If any coliforms are detected, or if there are more than 200 background colonies on a toal coliform membrane filter per 100
100 mL, the site should be resampled, and if results confirmed, cause should be determined and remediation undertaken.

APPENDIX 2

CITY OF SALMON ARM
WATER SERVICE AREA

3

CITY OF SALMON ARM
WATER SERVICE AREA



APPENDIX 3

INTERIOR HEALTH AUTHORITY
CITY OF SALMON ARM
WATER SAMPLE SCHEDULE

DISTRICT OF SALMON ARM
OPERATIONS DEPARTMENT
WATER UTILITY
WATER SAMPLE SITES & LOCATIONS

	Water Sample Site Name	Street Location
1.	Canoe Fire Hall	6600 – 50 Street NE
2.	Mt Ida School	7381 – 50 Avenue SW
3.	Homely Reservoir	851 – 10 Avenue SE
4.	Zone 3 Reservoir	4921 – 30 Street NE
5.	Country Kitchen	5270 Auto Road SE
6.	TCH East	4940 - 50 Street NE [TCH]
7.	IR #3 Reservoir	251 Gleneden Road NW
8.	IR #6 Reservoir	2540 – 50 Street NW
9.	DSA Gravel Pit* [alternate]	6641 – 10 Avenue SE

WATER SAMPLE SCHEDULE

Week **1 & 3**	Canoe Fire Hall Country Kitchen Mt Ida School IR #6 Reservoir
Week **2 & 4**	Homely Reservoir IR #3 Reservoir Zone 3 Reservoir TCH East DSA Gravel Pit* [alternate]

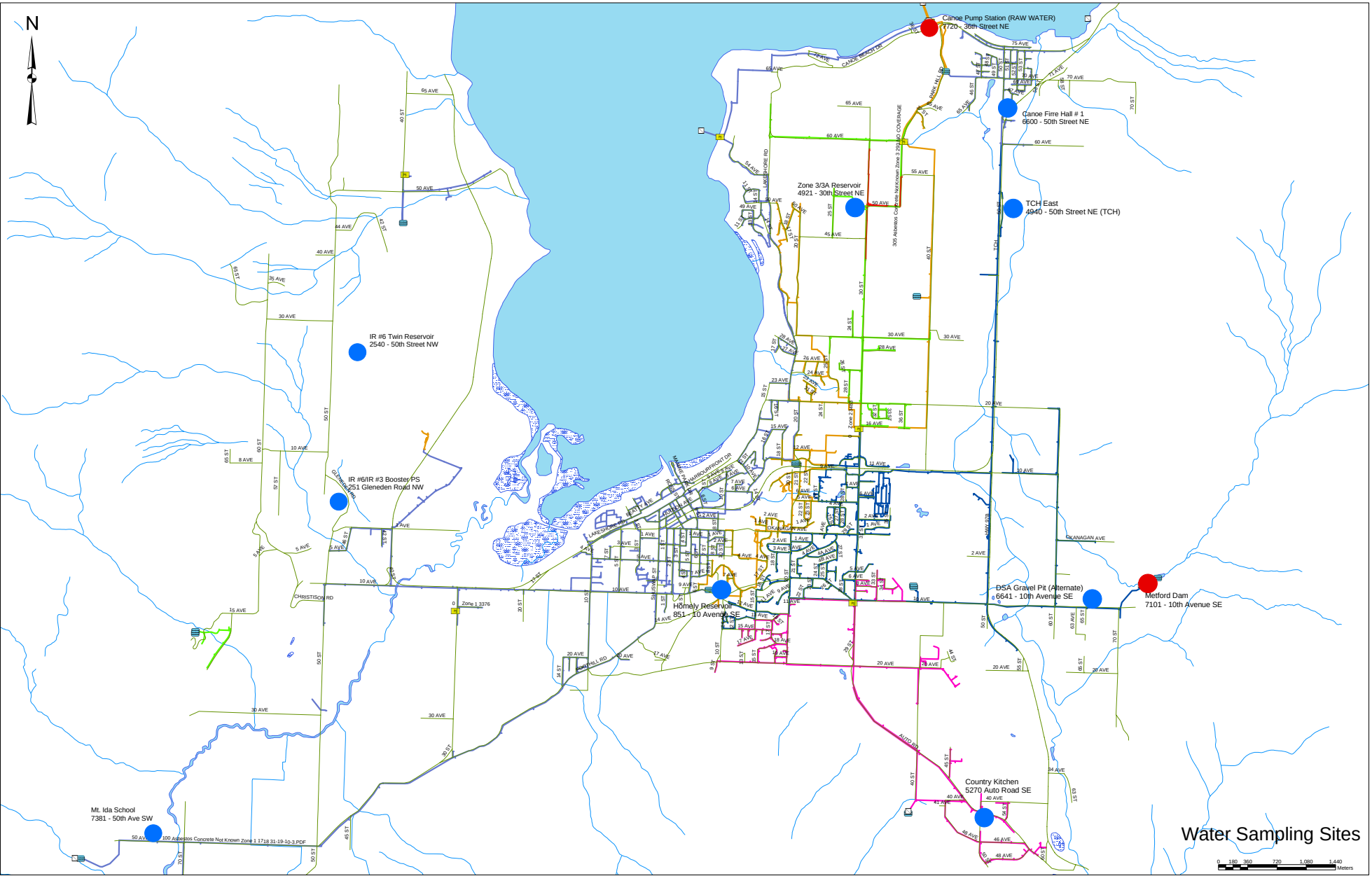
*DSA Gravel Pit is an alternate site for water samples when Metford Dam is not in use.

OTHER BACTERIOLOGICAL SAMPLING/TESTING:

	Raw Water Sample Sites	Street Location	Sample Schedule
1.	Canoe Pump Stn [Raw]	7720 – 36 Street NE	Week 1 & 3
2.	Metford Dam [Raw]	7101 – 10 Avenue SE	Week 2 & 4

Canoe Beach [Swimming]

- May and September [Twice a month from the three alternating sites as listed below]
- June, July & August [Once a week 2 samples from the three alternating sights between Canoe Beach Wharf, Canoe Beach in front of the Pump Stn and Canoe Beach East].


N
Canoe Pump Station (RAW WATER)
4720 - 36th Street NE
Canoe Firre Hall # 1
6600 - 50th Street NE
Zone 3/3A Reservoir
4921 - 30th Street NE
TCH East
4940 - 50th Street NE (TCH)
IR #6 Twin Reservoir
2540 - 50th Street NW
IR #6/IR #3 Booster PS
251 Gleneden Road NW
Homely Reservoir
851 - 10 Avenue SE
DSA Gravel Pit (Alternate)
6641 - 10th Avenue SE
Metford Dam
7101 - 10th Avenue SE
Country Kitchen
5270 Auto Road SE
Mt. Ida School
7381 - 50th Ave SW
Water Sampling Sites
0 180 360 720 1,080 1,440
Meters

APPENDIX 4

INTERIOR HEALTH AUTHORITY
CITY OF SALMON ARM WATER SYSTEM
BIOLOGICAL MONITORING REPORTS

City of Salmon Arm - Reporting Database

From: Jan 01 2005 To: Dec 31 2005

Eco Tech Laboratory Ltd
Coliform Testing - Part 2

Friday, April 21, 2006

DATE		Country Kitchen			T.C.H. East			I.R. #3 Reservoir			Zone 2A Reservoir			D.S.A. Gravel Pit			Panorama Ranch S/D			Miscellaneous Site			
		Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Name	Total	Faecal	Over
Jan 10	M	<1	<1	NO																SC Schoo	<1	<1	
Jan 17	M																			NC Schoo	<1	<1	
Jan 24	M	<1	<1	NO																SC Schoo	<1	<1	
Jan 27	T																			Interior Health	<1	<1	
Feb 2	W																			Interior Health	<1	<1	
Feb 7	M													<1	<1					Ben's Towing	<1	<1	
Feb 14	M				<1	<1		<1	<1														
Feb 21	M	<1	<1	NO																IR #6 Reservoir	<1	<1	
Feb 28	M							<1	<1														
Mar 2	W																			Interior Health	<1	<1	
Mar 7	M	<1	<1	NO							<1	<1											
Mar 14	M				<1	<1		<1	<1														
Mar 21	M										<1	<1								Mt Ida School	<1	<1	
Mar 29	T							<1	<1														
Apr 4	M	<1	<1	NO				<1	<1														
Apr 11	M							<1	<1														
Apr 12	T																			Interior Health	<1	<1	
Apr 18	M	<1	<1	NO							<1	<1											
Apr 25	M	L1	L1	NO				<1	<1					<1	<1								
May 2	M	<1	<1	NO				<1	<1														
Jun 6	M	L1	L1	NO																			
Jul 4	M	L1	L1	NO																			
Jul 18	M	L1	L1	NO																			
Jul 29	F													0	0								
Aug 2	T	L1	L1	NO																			
Nov 7	M	0	0	0							0	0	0										
Nov 15	T				0	0	0	0	0	0													
Nov 21	M	0	0	0							0	0	0										
Nov 28	M				0	0	0	0	0	0													
Dec 5	M	0	0	0							0	0	0										
Dec 12	M				0	0	0	0	0	0													
Dec 20	T	0	0	0				0	0	0													

City of Salmon Arm - Reporting Database

From: Jan 01 2005 To: Dec 31 2005

Eco Tech Laboratory Ltd
Coliform Testing - Part 1

Friday, April 21, 2006

DATE		Canoe Pump Stn RAW			Metford Dam RAW			Canoe Wharf RAW			Canoe Beach RAW			Canoe Beach East RAW			Canoe Firehall			Mt. Ida School			Homely Reservoir			Zone 3 Reservoir		
		Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over	Total	Faecal	Over
Jan 10	M	2	<2	NO																								
Jan 17	M				10	<2																						
Jan 24	M	<2	<2	NO																								
Feb 7	M				6	<2																						
Feb 14	M				12	<2																	<1	<1		<1	<1	
Feb 21	M	<2	<2	NO													<1	<1		<1	<1							
Feb 28	M				6	<2																	<1	<1		<1	<1	
Mar 7	M	4	<2	NO													<1	<1		<1	<1							
Mar 14	M				16	2																	<1	<1		<1	<1	
Mar 21	M	<2	<2	NO													<1	<1										
Mar 29	T				Est 24	<2																	<1	<1		<1	<1	
Apr 4	M	2	2	NO													<1	<1		<1	<1							
Apr 11	M				178	144														<1	<1					<1	<1	
Apr 18	M	<2	<2	NO	44	2	NO										<1	<1	NO	<1	<1							
Apr 25	M				vergrov	8																	<1	<1		<1	<1	
May 2	M	<1	<1	NO													<1	<1		<1	<1							
Jun 28	T					1400	1200																					
Jul 4	M	L2	L2	NO																								
Jul 11	M				12	<2																						
Jul 18	M	4	L2	NO																								
Jul 25	M				1590	1200																						
Aug 2	T	4	<2																									
Aug 8	M				90	6																						
Aug 15	M	<2	<2		120	4						2			<2													
Aug 22	M				Est 70	<2			6			2																
Sep 6	T	4	<2		106	8																						
Sep 19	M	4	<2	8	<2																							
Sep 26	M				8	2																						
Oct 3	M	2	<2		10	<2																						
Oct 17	M	4	<2																									
Nov 7	M	1	0	37													0	0	0	0	0	0						
Nov 15	T				1	1	>200																0	0	0	0	0	0
Nov 21	M	3	0	50													0	0	0	0	0	0						
Nov 28	M				3	3	>200																0	0	0	0	0	0
Dec 5	M	2	0	16													0	0	0	0	0	0						
Dec 12	M				2	0	14																0	0	2	0	0	0
Dec 20	T	2	0	7													0	0	0	0	0	0						

APPENDIX 5

DAILY WATER CONSUMPTION 2001 TO 2005

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

January

	2001	2002	2003	2004	2,005
01-Jan	8,684	8,989	5,632	5,655	6,010
02-Jan	7,353	6,571	6,484	7,633	6,463
03-Jan	7,145	6,701	6,467	5,673	6,856
04-Jan	8,089	6,908	6,965	6,754	5,972
05-Jan	8,112	6,537	5,461	7,360	6,812
06-Jan	8,569	7,069	7,509	8,194	6,428
07-Jan	8,026	6,950	5,568	7,624	6,255
08-Jan	7,280	6,294	7,013	7,378	6,735
09-Jan	6,850	6,651	7,004	6,928	6,214
10-Jan	7,093	6,686	5,922	8,030	6,392
11-Jan	7,066	6,704	6,618	6,915	6,800
12-Jan	7,024	5,854	5,996	7,267	6,200
13-Jan	7,480	7,400	6,837	5,996	7,013
14-Jan	7,196	6,187	6,865	6,866	7,114
15-Jan	7,186	8,590	6,308	6,625	7,169
16-Jan	7,218	7,970	6,025	7,474	6,677
17-Jan	6,868	5,998	6,561	6,525	6,798
18-Jan	7,074	6,723	6,116	6,519	6,269
19-Jan	7,900	7,082	6,409	6,857	7,129
20-Jan	6,437	7,082	6,431	6,907	6,655
21-Jan	7,390	7,082	7,090	6,527	6,216
22-Jan	7,183	7,082	6,348	6,728	6,539
23-Jan	7,231	7,082	6,209	6,752	6,860
24-Jan	7,349	8,315	6,157	6,609	6,801
25-Jan	7,444	6,014	6,927	6,195	6,764
26-Jan	7,127	6,631	6,620	7,083	6,061
27-Jan	7,360	6,184	6,310	2,933	7,966
28-Jan	7,145	7,613	6,010	6,475	6,200
29-Jan	7,140	6,795	6,670	6,933	7,083
30-Jan	6,841	6,691	7,064	6,198	6,099
31-Jan	7,073	6,392	5,697	6,243	7,668
TOTAL	227,934	214,827	199,292	207,855	206,220

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

February

	2001	2002	2003	2004	2,005
01-Feb	7,033	7,329	7,101	7,325	6,372
02-Feb	7,499	6,870	5,850	6,497	6,863
03-Feb	7,082	6,620	6,762	6,384	6,536
04-Feb	7,044	7,272	6,529	7,248	5,693
05-Feb	7,229	6,723	6,027	6,410	7,489
06-Feb	9,443	6,550	6,686	6,813	5,652
07-Feb	7,427	6,824	6,010	6,379	7,111
08-Feb	8,025	6,919	6,657	7,131	4,443
09-Feb	6,447	6,824	6,431	7,182	9,479
10-Feb	7,572	6,846	6,280	6,686	5,882
11-Feb	5,071	7,387	6,820	6,493	6,443
12-Feb	7,314	6,318	6,281	6,958	6,756
13-Feb	7,244	6,811	6,795	7,021	6,141
14-Feb	6,943	6,728	5,552	6,351	7,130
15-Feb	6,819	6,379	6,746	6,748	6,973
16-Feb	7,665	6,970	6,318	7,092	5,884
17-Feb	6,864	7,469	6,930	6,841	6,549
18-Feb	7,355	6,374	5,983	7,045	6,792
19-Feb	7,393	6,739	6,412	6,490	7,240
20-Feb	7,815	7,493	6,790	5,718	6,943
21-Feb	7,292	5,827	6,338	6,606	6,282
22-Feb	7,064	7,253	6,392	7,001	6,430
23-Feb	7,063	6,301	6,361	7,101	6,824
24-Feb	7,232	6,631	6,298	7,234	6,734
25-Feb	7,268	6,675	6,809	8,342	6,469
26-Feb	6,759	6,544	5,952	6,572	6,691
27-Feb	6,595	6,581	6,508	6,992	6,759
28-Feb	7,055	6,534	6,607	6,776	7,152
29-Feb				7,226	

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

March

	2001	2002	2003	2004	2,005
01-Mar	6,849	7,077	6,330	6,594	5,873
02-Mar	7,202	5,862	6,425	7,185	7,508
03-Mar	7,452	7,147	6,268	6,021	7,695
04-Mar	7,086	6,528	6,728	7,490	7,320
05-Mar	7,599	5,868	5,662	6,743	6,021
06-Mar	7,919	6,801	6,693	7,043	6,845
07-Mar	6,693	6,045	6,850	6,412	7,182
08-Mar	7,478	7,245	6,076	6,615	6,681
09-Mar	6,944	5,985	6,432	6,897	7,119
10-Mar	7,067	6,544	7,492	6,724	6,148
11-Mar	7,036	6,696	5,711	6,845	6,391
12-Mar	7,550	6,396	7,076	6,127	6,153
13-Mar	7,364	7,168	5,608	7,077	7,763
14-Mar	7,186	5,773	6,929	6,470	6,075
15-Mar	6,733	6,663	6,344	6,193	7,378
16-Mar	7,104	6,546	6,368	7,484	6,216
17-Mar	6,923	6,268	6,734	6,272	7,489
18-Mar	7,927	6,472	6,152	7,292	6,168
19-Mar	6,902	6,665	6,922	6,337	6,296
20-Mar	7,436	6,458	6,831	6,959	6,229
21-Mar	7,424	6,880	6,031	7,681	7,292
22-Mar	7,228	6,887	6,321	6,831	7,323
23-Mar	7,023	6,164	6,344	7,465	7,299
24-Mar	6,849	7,339	7,116	6,464	7,197
25-Mar	7,357	6,246	6,353	7,188	6,184
26-Mar	8,308	6,889	6,445	7,031	6,869
27-Mar	7,307	6,061	7,113	6,483	6,295
28-Mar	7,417	7,008	5,999	7,507	7,868
29-Mar	6,351	6,518	6,917	7,300	7,249
30-Mar	8,018	6,451	7,171	7,463	7,126
31-Mar	6,496	6,087	6,757	7,037	6,136
TOTAL	224,225	202,736	202,197	213,226	211,386

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

April

	2001	2002	2003	2004	2,005
01-Apr	7,256	7,262	7,595	7,572	7,434
02-Apr	7,365	6,679	5,996	6,967	6,919
03-Apr	6,240	6,958	6,692	7,625	7,198
04-Apr	7,392	7,001	6,791	8,424	7,077
05-Apr	6,816	6,417	6,767	8,016	7,404
06-Apr	7,298	7,242	6,932	8,838	6,865
07-Apr	7,297	7,088	7,179	9,772	7,911
08-Apr	7,919	7,716	7,487	8,439	7,224
09-Apr	7,775	6,286	6,905	8,611	7,978
10-Apr	7,722	6,968	7,395	9,085	8,657
11-Apr	7,642	6,519	7,612	8,964	7,062
12-Apr	7,351	7,752	6,704	10,396	7,669
13-Apr	6,585	6,001	8,001	9,287	6,939
14-Apr	7,433	6,781	6,786	6,894	7,945
15-Apr	7,554	6,661	6,378	7,832	7,032
16-Apr	8,555	6,906	6,526	7,736	7,044
17-Apr	6,994	7,253	7,182	6,865	7,838
18-Apr	8,104	6,848	6,811	8,241	7,735
19-Apr	7,366	6,501	6,908	8,036	7,303
20-Apr	8,619	7,806	7,043	7,605	9,070
21-Apr	7,965	7,657	7,940	7,673	9,059
22-Apr	8,618	7,029	7,892	9,010	9,584
23-Apr	8,620	6,688	7,633	8,351	9,571
24-Apr	8,159	6,602	7,657	9,047	10,661
25-Apr	8,925	7,509	6,777	10,739	10,955
26-Apr	9,972	7,355	6,948	9,586	10,809
27-Apr	9,689	8,067	6,860	8,717	10,396
28-Apr	8,182	10,072	7,820	10,177	11,710
29-Apr	8,062	9,996	7,573	11,733	11,078
30-Apr	7,617	9,353	7,217	11,177	10,990
TOTAL	235,091	218,969	214,003	261,414	255,116

DISTRICT OF SALMON ARM					
DAILY WATER CONSUMPTION FOR 2001 TO 2005					
(Volume in Cubic Meters, 1 cu m = 220.1 gallons)					
May					
	2001	2002	2003	2004	2,005
01-May	8,437	12,012	9,378	12,368	12,208
02-May	8,113	10,505	7,584	12,265	12,010
03-May	7,070	9,914	7,600	11,344	11,013
04-May	8,326	8,620	7,411	11,382	11,083
05-May	7,669	8,531	7,137	10,003	11,392
06-May	9,115	7,235	6,925	10,281	10,996
07-May	8,338	8,092	8,354	11,812	12,825
08-May	8,610	7,774	7,561	11,241	11,509
09-May	9,091	8,728	7,639	9,463	11,962
10-May	10,129	9,568	8,625	10,499	13,410
11-May	10,062	10,537	8,262	9,857	16,563
12-May	10,878	11,308	6,583	9,310	15,357
13-May	12,930	11,592	8,960	10,571	13,092
14-May	9,305	7,884	10,584	10,610	12,675
15-May	8,619	10,496	12,180	11,737	12,143
16-May	8,655	9,862	11,230	13,836	9,545
17-May	7,703	9,139	8,497	12,844	9,140
18-May	9,083	9,092	8,583	15,191	9,857
19-May	8,977	10,026	10,193	15,535	8,723
20-May	9,525	9,345	9,609	14,872	8,743
21-May	12,673	8,028	10,465	13,168	8,984
22-May	14,318	7,641	8,733	9,599	9,040
23-May	15,376	7,430	9,330	9,052	9,950
24-May	14,000	7,356	11,256	10,175	10,468
25-May	16,724	7,191	8,763	10,297	12,293
26-May	16,466	7,911	8,305	9,367	12,651
27-May	9,712	5,959	15,041	8,940	15,241
28-May	10,619	8,114	19,675	9,590	16,677
29-May	9,117	9,930	22,776	8,618	18,154
30-May	10,300	10,124	21,389	8,800	13,926
31-May	12,254	8,870	9,166	7,494	13,254
TOTAL	322,191	278,814	317,793	340,119	374,882

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

June

	2001	2002	2003	2004	2,005
01-Jun	10,986	8,702	8,925	8,658	11,142
02-Jun	9,369	10,868	10,279	9,002	10,420
03-Jun	8,568	11,824	11,207	10,486	12,284
04-Jun	5,012	12,431	13,379	12,367	13,759
05-Jun	13,923	11,831	14,519	10,942	13,873
06-Jun	9,519	9,729	15,318	8,704	10,935
07-Jun	9,012	8,254	16,645	9,159	9,409
08-Jun	9,911	8,078	15,987	10,759	9,354
09-Jun	9,122	8,726	9,684	12,116	9,993
10-Jun	8,339	11,056	10,123	9,872	11,546
11-Jun	7,812	13,409	9,939	8,781	12,196
12-Jun	7,920	14,789	11,113	8,381	9,802
13-Jun	8,016	16,263	9,674	9,110	9,818
14-Jun	7,971	17,524	9,637	8,598	10,124
15-Jun	7,996	16,651	10,161	8,420	9,379
16-Jun	8,240	15,247	11,663	10,659	11,110
17-Jun	8,414	14,671	15,740	11,421	10,731
18-Jun	9,585	9,896	14,026	12,657	8,471
19-Jun	13,061	10,207	12,378	14,645	8,898
20-Jun	12,537	11,420	9,579	14,477	10,032
21-Jun	13,810	14,878	8,973	13,317	10,795
22-Jun	14,262	16,376	7,178	17,521	10,049
23-Jun	14,820	16,857	9,275	18,088	9,296
24-Jun	13,781	17,784	9,501	18,082	9,442
25-Jun	13,600	17,927	9,852	17,539	9,067
26-Jun	12,550	19,923	11,367	15,423	8,637
27-Jun	10,686	16,471	11,906	11,345	13,379
28-Jun	9,115	11,038	13,960	11,398	8,629
29-Jun	11,848	11,362	13,370	15,335	10,675
30-Jun	13,098	9,877	10,657	15,649	9,121
TOTAL	312,883	394,066	346,014	362,909	312,365

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

July

	2001	2002	2003	2004	2,005
01-Jul	13,262	11,716	13,763	14,611	10,472
02-Jul	15,653	13,693	11,156	13,770	10,105
03-Jul	17,706	15,596	12,174	15,271	9,777
04-Jul	18,625	13,644	11,812	15,357	8,961
05-Jul	18,937	11,774	11,878	15,152	12,737
06-Jul	18,937	14,373	14,307	13,311	10,340
07-Jul	17,799	17,561	12,177	13,456	10,285
08-Jul	17,131	11,915	14,628	11,909	10,276
09-Jul	20,931	13,355	15,975	13,612	10,923
10-Jul	20,684	17,383	16,960	13,199	11,544
11-Jul	22,283	19,017	17,564	10,790	10,425
12-Jul	19,739	20,084	17,863	10,593	13,724
13-Jul	17,900	16,721	17,014	15,231	12,752
14-Jul	17,830	15,256	14,396	15,577	13,469
15-Jul	13,719	19,290	18,287	16,750	12,998
16-Jul	10,778	19,889	19,711	17,691	10,402
17-Jul	9,826	20,785	19,704	19,475	11,316
18-Jul	9,168	19,953	18,615	19,398	12,955
19-Jul	8,914	21,180	19,560	15,198	17,010
20-Jul	9,322	19,664	18,201	16,943	16,001
21-Jul	9,766	20,118	16,515	17,142	17,397
22-Jul	11,019	23,080	21,364	17,142	14,717
23-Jul	8,108	21,892	22,452	19,213	12,698
24-Jul	10,971	23,915	22,350	20,398	15,557
25-Jul	12,055	22,937	21,141	19,758	13,355
26-Jul	15,689	23,172	21,974	16,960	17,916
27-Jul	15,161	21,220	21,080	20,787	17,809
28-Jul	12,719	19,824	17,643	21,045	18,644
29-Jul	10,838	19,869	22,009	21,177	19,497
30-Jul	11,338	17,643	22,731	21,007	19,170
31-Jul	11,142	13,677	21,600	21,593	18,818
TOTAL	447,952	560,195	546,602	513,513	422,050

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

August

	2001	2002	2003	2004	2,005
01-Aug	12,554	15,562	21,800	19,752	15,477
02-Aug	13,000	14,551	21,855	17,705	20,868
03-Aug	13,000	14,887	19,723	19,957	20,748
04-Aug	13,500	12,411	16,458	17,571	19,620
05-Aug	13,000	13,275	20,706	11,368	20,440
06-Aug	12,000	13,532	20,431	12,379	21,282
07-Aug	12,500	16,574	19,013	10,863	21,674
08-Aug	12,000	17,682	19,663	13,027	17,377
09-Aug	12,000	17,895	19,785	10,956	22,001
10-Aug	12,000	16,259	18,792	17,382	21,593
11-Aug	12,000	18,067	12,886	17,581	19,348
12-Aug	11,000	19,079	18,272	17,506	22,256
13-Aug	12,437	20,049	19,118	19,373	20,684
14-Aug	12,353	20,309	18,461	19,717	20,487
15-Aug	12,609	18,260	19,141	18,013	18,300
16-Aug	17,043	17,573	19,336	14,700	18,963
17-Aug	17,727	16,031	18,588	17,694	13,385
18-Aug	15,706	16,692	15,075	18,542	14,968
19-Aug	15,690	18,295	18,931	17,664	16,361
20-Aug	15,520	17,435	19,699	17,758	17,014
21-Aug	13,204	18,533	18,309	15,171	17,964
22-Aug	10,673	18,585	18,369	10,871	14,503
23-Aug	9,780	19,776	17,830	10,211	14,963
24-Aug	10,090	18,426	16,602	11,083	14,881
25-Aug	9,850	18,162	12,999	9,132	15,932
26-Aug	11,504	17,103	16,540	9,348	17,332
27-Aug	12,302	18,529	17,694	9,436	16,287
28-Aug	13,111	18,155	16,983	10,019	16,675
29-Aug	13,979	18,137	16,976	8,695	11,086
30-Aug	13,550	17,732	17,539	8,244	9,672
31-Aug	13,838	16,534	16,215	9,584	11,959
TOTAL	399,517	534,089	563,789	441299	544,098

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

September

	2001	2002	2003	2004	2,005
01-Sep	10,437	11,586	14,158	9,967	9,706
02-Sep	11,586	11,852	16,628	8,716	11,571
03-Sep	14,593	11,611	18,291	8,204	12,178
04-Sep	11,730	11,906	15,992	7,851	9,636
05-Sep	12,871	12,356	15,898	8,333	10,045
06-Sep	10,618	11,827	16,679	8,457	12,040
07-Sep	10,492	12,301	14,791	8,628	12,185
08-Sep	10,493	12,198	9,741	8,297	11,512
09-Sep	10,802	11,252	13,159	8,506	10,285
10-Sep	12,693	12,673	12,518	7,850	9,516
11-Sep	11,517	13,332	11,197	8,547	10,270
12-Sep	11,442	14,028	9,788	7,824	8,898
13-Sep	12,252	13,937	11,073	8,583	10,582
14-Sep	13,189	12,781	10,194	7,817	9,165
15-Sep	11,436	12,900	7,745	8,490	8,899
16-Sep	13,827	11,403	9,507	8,067	8,703
17-Sep	13,378	11,097	9,107	6,618	9,425
18-Sep	12,450	11,984	8,742	8,237	9,844
19-Sep	11,506	10,711	7,637	6,838	8,636
20-Sep	10,191	10,552	9,411	7,795	9,397
21-Sep	8,753	10,323	7,971	8,280	9,619
22-Sep	9,167	11,608	8,343	7,486	7,677
23-Sep	10,832	11,569	8,254	7,726	9,008
24-Sep	10,059	12,263	8,979	7,901	9,339
25-Sep	9,518	11,271	9,200	7,753	9,455
26-Sep	8,477	9,983	8,943	8,182	9,767
27-Sep	8,230	10,686	9,771	7,853	9,690
28-Sep	8,126	10,006	9,477	7,725	8,833
29-Sep	8,106	9,054	8,845	8,080	8,846
30-Sep	8,953	9,487	9,510	8,073	8,172
TOTAL	327,724	348,537	331,549	242,683	292,900

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

October

	2001	2002	2003	2004	2,005
01-Oct	8,007	8,134	9,825	7,870	7,796
02-Oct	8,829	8,869	9,793	8,395	7,873
03-Oct	8,530	8,306	8,774	7,334	8,085
04-Oct	7,857	8,787	10,094	7,621	7,536
05-Oct	8,446	7,848	9,444	8,390	7,882
06-Oct	7,766	8,971	8,112	7,530	7,687
07-Oct	7,733	8,359	8,687	8,129	7,870
08-Oct	7,851	8,409	7,331	7,901	7,472
09-Oct	7,554	7,309	8,432	8,071	7,437
10-Oct	7,995	7,655	7,579	6,467	7,561
11-Oct	6,813	7,130	7,381	7,914	8,280
12-Oct	6,430	8,500	6,984	7,142	7,477
13-Oct	7,861	6,591	6,689	7,391	6,717
14-Oct	6,911	8,161	7,981	7,651	8,408
15-Oct	7,437	7,979	6,651	7,358	7,281
16-Oct	7,075	7,588	6,901	6,553	7,651
17-Oct	6,562	7,605	6,886	7,367	7,082
18-Oct	6,844	7,408	6,318	6,833	6,209
19-Oct	6,632	7,471	6,543	7,308	7,368
20-Oct	6,631	7,014	7,508	6,241	7,757
21-Oct	7,016	6,768	6,099	7,232	7,311
22-Oct	6,642	7,940	6,833	7,061	6,714
23-Oct	6,065	7,509	6,690	6,989	7,295
24-Oct	7,141	6,881	6,399	6,129	7,218
25-Oct	6,123	7,297	7,918	7,450	7,531
26-Oct	6,472	6,620	6,793	6,756	6,706
27-Oct	6,237	6,942	6,172	6,651	7,292
28-Oct	5,537	6,844	5,330	6,688	7,492
29-Oct	6,093	7,059	8,297	6,823	7,071
30-Oct	7,459	6,529	7,076	7,021	5,491
31-Oct	6,581	6,617	7,012	7,519	6,688
TOTAL	221,129	235,098	232,530	225,785	228,237

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

November

	2001	2002	2003	2004	2,005
01-Nov	6,159	6,616	6,044	6,587	6,357
02-Nov	6,103	6,783	6,341	6,901	7,399
03-Nov	6,729	6,545	6,878	7,140	6,131
04-Nov	6,803	7,092	6,390	6,483	7,016
05-Nov	6,657	6,203	6,831	6,468	6,846
06-Nov	6,369	6,608	6,480	7,123	7,111
07-Nov	7,357	6,945	6,293	6,495	8,193
08-Nov	6,734	6,402	6,116	6,826	7,510
09-Nov	6,659	6,489	5,978	7,016	6,750
10-Nov	7,179	6,605	6,543	6,276	5,914
11-Nov	5,833	6,461	6,709	6,249	8,139
12-Nov	6,426	6,811	6,572	7,203	6,479
13-Nov	7,134	6,558	6,972	5,992	6,515
14-Nov	5,929	7,059	6,395	6,685	7,419
15-Nov	6,245	6,265	6,170	6,632	6,495
16-Nov	6,702	6,394	6,045	7,083	7,080
17-Nov	6,307	6,806	6,489	6,624	7,303
18-Nov	5,977	6,939	7,247	6,638	5,814
19-Nov	7,647	6,608	6,886	6,865	6,728
20-Nov	7,568	6,491	6,261	7,143	6,611
21-Nov	5,753	6,929	6,534	6,874	7,755
22-Nov	6,108	6,302	5,342	6,061	6,010
23-Nov	5,994	6,074	6,537	6,914	7,858
24-Nov	0	6,360	7,219	7,020	6,136
25-Nov	9,122	6,231	6,254	6,657	7,039
26-Nov	6,244	6,968	7,117	6,439	6,597
27-Nov	6,240	6,681	6,595	6,453	6,867
28-Nov	7,400	6,341	6,607	6,556	6,476
29-Nov	6,139	6,862	6,768	7,242	7,907
30-Nov	6,782	6,066	6,679	5,999	6,750
TOTAL	192,298	197,494	195,291	200,641	207,205

DISTRICT OF SALMON ARM

DAILY WATER CONSUMPTION FOR 2001 TO 2005

(Volume in Cubic Meters, 1 cu m = 220.1 gallons)

December

	2001	2002	2003	2004	2,005
01-Dec	5,573	6,625	6,883	6,548	6,894
02-Dec	7,224	6,864	6,443	6,627	5,985
03-Dec	6,461	5,767	6,462	6,229	7,198
04-Dec	3,143	6,160	6,471	6,505	6,662
05-Dec	6,528	7,239	6,528	6,470	6,810
06-Dec	5,058	6,151	5,670	6,598	6,907
07-Dec	8,345	5,874	6,214	5,698	7,052
08-Dec	6,691	6,502	7,604	7,593	7,269
09-Dec	6,291	6,246	6,113	6,080	6,244
10-Dec	6,515	6,536	6,729	6,127	6,715
11-Dec	6,344	6,277	6,486	6,260	6,035
12-Dec	6,451	6,890	6,348	6,836	7,713
13-Dec	6,053	6,622	5,509	7,283	5,889
14-Dec	6,427	5,473	6,645	6,585	7,430
15-Dec	6,187	6,265	7,079	7,377	6,319
16-Dec	6,800	6,771	6,679	6,276	5,649
17-Dec	6,711	6,743	6,517	7,185	7,248
18-Dec	6,998	6,745	6,749	6,156	7,126
19-Dec	0	6,054	6,407	6,534	6,187
20-Dec	8,046	6,459	6,393	6,697	6,891
21-Dec	6,435	7,162	6,791	6,280	6,542
22-Dec	6,543	5,722	6,752	6,454	6,769
23-Dec	5,194	7,518	7,360	7,662	7,012
24-Dec	6,829	6,133	6,614	6,584	6,810
25-Dec	5,842	6,303	6,091	5,967	6,183
26-Dec	5,594	6,005	6,005	5,996	6,411
27-Dec	7,454	6,324	6,829	6,571	7,379
28-Dec	6,015	6,723	6,473	6,390	6,149
29-Dec	6,451	6,525	7,403	6,412	6,379
30-Dec	7,309	5,402	6,839	6,777	7,012
31-Dec	7,170	7,548	6,515	6,734	7,119
TOTAL	192,681	199,627	203,600	203,488	207,986

APPENDIX 6

WATER CONSERVATION POLICY

DISTRICT OF SALMON ARM **POLICY NO. 5.16**

TOPIC: To establish District water reduction goals and a water use efficiency program

PURPOSE:

1. to effectively defer the need for water & sewage system capacity improvements and the resultant other associated infrastructure costs;
2. to reduce operating / maintenance (o & m) costs;
3. to establish a more fair and equitable water rates structure;
4. to contribute directly or indirectly to the reduction of impact on the environment;
5. to have in place a District water conservation strategy so as to qualify for senior government funding programs.

POLICY
(**GOALS**) Goals: Years 2003, 2004 and 2005 (3 years)

1. Develop and deliver a public awareness & education program for VOLUNTARY water use efficiencies to achieve
   a. a reduction of PEAK daily use by 20% (Factor of 1:5)
   b. a reduction of AVERAGE daily use by 14% (Factor of 1:7)

   There shall be a report back to Council in 2005 / 2006.

POLICY
(IMPLEMENTATION) Implementation Strategy – Goals

1. Formalize the rationale in support of deferral of infrastructure and related costs in relation to peak daily demand.
2. Formalize the rationale in support of reduction in average daily demand.
3. Approach the goals on three fronts:
   a. Public use (leakage & public land sprinkling).
   b. Business use: water audits and / or inventory of use.
   c. Residential use: conservation by education.
4. Review the water user fee rates (i.e. metered vs non-metered).
5. Review commercial, industrial, institutional and multi-family metered accounts to ensure consistency.

6. Adopt a Bylaw requiring "ultra-low" flush toilets.
7. Develop a Water Efficiency Program using internal resources (staff) and external resources (consultant or others), funded through the Water Management budget; such program to include, at minimum, the following elements:
    a. Water efficiency theme, logo, or slogan for purposes of branding and imaging of objectives.
    b. Education materials for multi-media communication purposes, such materials to clearly present the goals, rationale and strategies being pursued in the interests of conservation.
    c. Establish media partnerships, as appropriate, with newspaper, radio, television and internet services for short and long-term use of multi-media communication with water users.
    d. Establish business partnerships, as appropriate, with suppliers, service businesses and others to facilitate and encourage more efficient water management in and around the home and business.
    e. As appropriate from year to year, engage the resources of third party agencies to supplement the primary efforts of the District in public education.

8. Amend Bylaw No. 1274 to effectively convert permissible outdoor sprinkling from the current "alternate odd/even days" which results in potential 50% peak daily demand to a "three-day cycle" which results in a potential 33% peak daily demand.
9. Develop and implement an evaluation process to monitor the success of the Water Efficiency Program, the results of which shall be made public at intervals as part of the public education process.

Prepared by: Director of Operations	Date: March 15, 2003
Approved by Council	Date: March 24, 2003
Amended:	

Acknowledgements

This report was assembled and edited by the Operations Department, City of Salmon Arm.

Sample Data and Source Information provided by Frank Schock, Utilities Foreman, City of Salmon Arm.

Special thanks to the Corporation of Delta for the report template.