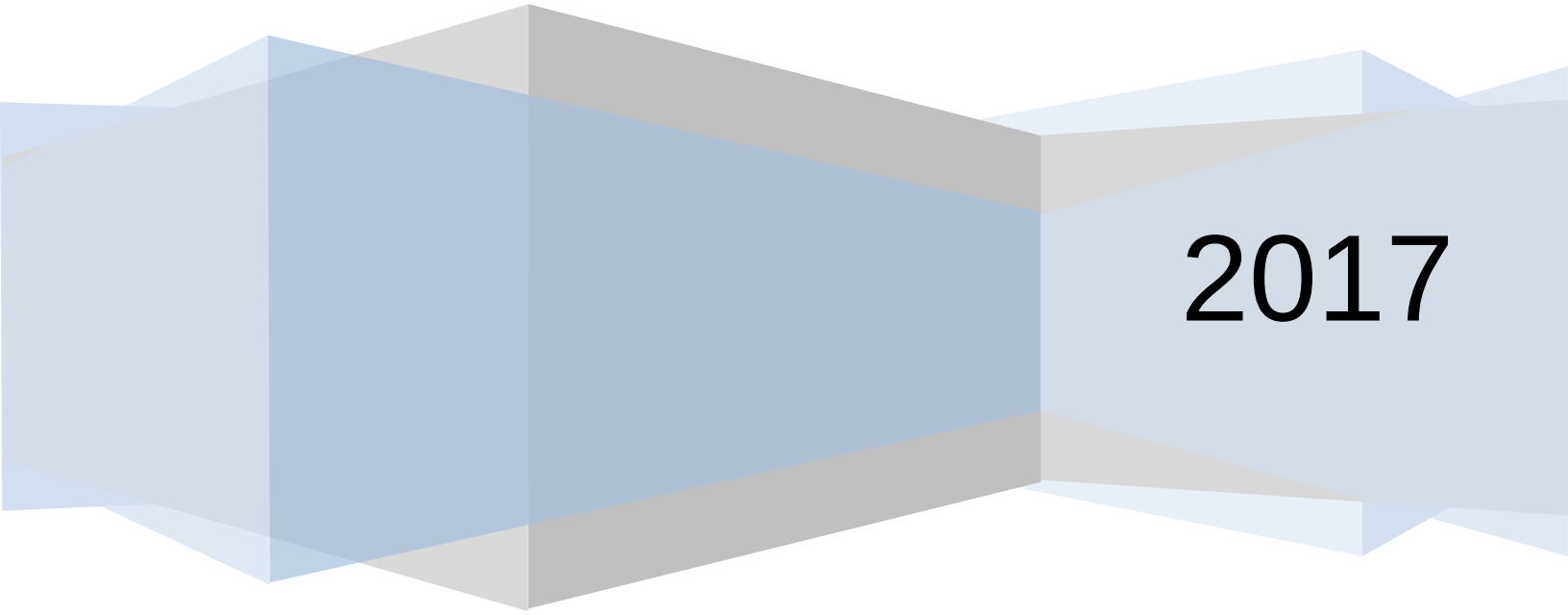
Rutland Waterworks District

WATER SYSTEM ANNUAL REPORT



2017

Rutland
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Water System Annual Report

Memorandum to: Interior Health – Gordon Moseley, Drinking Water Officer
From: Kevin Reynolds
Issue: Water System Annual Report – 2017

Recommendation
It is recommended that this report be received for informational purposes only.

1.0 System Description and Classification

Rutland Waterworks District obtains its water from 15 deep operating wells in the Greater Kelowna Aquifer. There are two zones to the system, the Upper zone, which in combination, pumps directly to that zone and to a 1.8 million US gallon reservoir on Teasdale Road. This reservoir then gravity feeds to the upper zone. The lower zone is run by pressure and directly from pumps, some of which are controlled by variable speed drives. As most of the wells are located in the lower zone there are two booster stations that boost water from the lower zone to the upper zone.

The District operates two pressure reducing stations that regulate pressures between the upper and lower zones. These stations respond to high demands by opening valves to allow water to flow between zones and the storage reservoir.

The District office is located at #106 - 200 Dougall Road North and the warehouse and shop at 1175 Hollywood Road South.

The pump stations properties have several types of legal titles. Some station sites are owned by the District, some sites are held by Statutory Rights of Way on properties owned by FortisBC, the Central Okanagan Regional District and School District No. 23.

Total annual water consumption for 2017 was in excess of 834 million US gallons.

The District is classified by the Environmental Operators Certification Program (E.O.C.P) as a Level III Water Distribution System. The District has seven operators with Water Distribution Classifications and are continually upgrading their training and certifications in compliance with Interior Health who issue the District's Annual Operating Permits.

2.0 Annual Operations Summary

2.1 Seasonal Operation

The District has seasonal operational procedures to adapt to water quality and water consumption changes.

During the winter months the daily average demand is 1.4 million US gallons. This demand is supplied primarily from three wells. These wells are of excellent quality and operate with variable speed drives which provide power efficiencies while stabilizing the demand surges in the system.

The spring and fall months have significant demand ranges depending on the weather. The water consumption can change significantly in any given day during this period. These changes are managed by using variable speed drives, the reservoir and by automatic controls that sequence pumps off and on as demands change.

The summer months are the highest consumption months. The demand is met using a sequentially controlled pump program that call for additional pumps as required. These rapid changes in water demands can change water quality significantly as well water with higher mineral content enters the system.

Daily Operations:

- Daily rounds (Recording gallons pumped, Chlorine used, and visual inspection of equipment & grounds)
- Reservoir grounds inspection
- Cl2 monitoring

Total Gallons Pumped (US Gallons) – 2017 (Chart below read in thousands)

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Well #3					543		365	601	143				1652
Well #12				149	7223	12096	19207	14022	6507	525			59729
Well #8					558	1642	4959	3244	1251	481			12135
Well #6					58	19462	32734	29722	24279	4453	619	108	111435
Well #7E & 7W					316	5158	9902	10655	4704	176		27	30938
Well #10					10	233	16000	11389	4079				31711
Well #13 S	19163	16974	19140	19904	20932	21178	21004	22623	20366	22884	20726	21232	246126
Well #13 N	14082	12708	13174	12017	15534	21759	20527	17095	11901	10818	12082	12892	174589
Well #15	11587	10710	11240	12762	16978	18512	18127	17498	15850	11952	10372	10318	165906
Total	44832	40392	43554	44832	62152	100040	142825	126849	89080	51289	43799	44577	834221

2.2 Flushing

A flushing program for both the pipelines and the wells minimizes the effects of varying water quality in the system.

The District has a flushing program that is primarily designed to remove mineralization build up. These minerals come out of suspension in the water during the disinfection process. The mineral residue tends to adhere to the pipe walls and only move during higher flows from flushing or fire suppression.

Spring & Fall Flushing Program:

- Spring Flushing Upper Zone. April 11th to May 10th, 2017
- Fall Flushing Lower Zone. October 2nd, 2017 to October 24th, 2017

2.3 Valve, Meter and Hydrant Maintenance

Mainline valves are regularly inspected to confirm the open/close position and their ease of operation. Water meters are replaced or repaired as required to insure accuracy and performance. Hydrants are serviced annually according to the KJWC Service & Maintenance Specifications Agreement with the Kelowna Fire Department.

2.4 Service and Main Repairs

The District repaired approximately 5 water service connections and responded to 15 customer related service breaks. There were 0 water main breaks in 2017. As very few city projects like expansion of city sewer system, road widening and sidewalks were performed within the Rutland Waterworks District's distribution system area it kept service and water main repairs to a minimum for 2017.

The District has vigorous inspections and specifications for work around our infrastructure and in particular the repair and disinfection of water mains should break occur.

2.5 New Connections

The District boundaries are relatively fixed; therefore any change in connection numbers is primarily through densification.

There were 5 new connections added to the system and 3 old connections removed.

Lot amalgamations can reduce the number of services but the number of dwelling and commercial units can increase.

3.0 Water Quality Controls

Rutland Waterworks District has a rigorous program for monitoring and controlling our water quality.

Rutland Waterworks Water Quality Technicians collect from 10 sample sites throughout the District. These sample sites have been strategically chosen to ensure a good representative of our water in the system.

Rutland Waterworks uses Caro Environmental Services for bacteriological testing (Total Coliform and E.coli).

The District schedules chemical analysis testing on each well every 3 to 5 years. No chemical analysis testing in 2016 as we performed them on 13 wells in 2014. Those wells were #3, #3A, #6, #7E, #7W, #8, #9, #10, #11, #12, #13S, #13N, & #15.

As one of our wells (#12) has been pretty close to the MAC (0.02) for Uranium it is closely monitored in the summer or when in use. If the levels increased above the MAC it would immediately be removed from the sequence for further testing. Once I receive those results and they comply with the GCDWQ it would then be put back online. Uranium testing is also done by Caro Environmental Services.

We are very pleased with the results indicating very little change in the mineral levels and are still within the GCDWQ table.

RWD Water Quality Testing/Monitoring Program:

Sites that are currently monitored 24 hours/day for Cl2 free and pH and linked to the SCADA:

- #106 – 200 Dougall Rd. N. - Cl2 free.
- 2982 Springfield Rd. (Pump Station #9) - Cl2 free and pH.

RWD Regular Sample Site List

Six sites that are currently tested/monitored twice weekly are:

- #106 – 200 Dougall Rd. North (Office/Lab)
- 420 Pine Road
- 920 Saskatoon Road
- 2592 Highway 97 North
- 2080 Hollywood Road South
- 1040 Villa Vista Road

RWD Total Coliform / E.coli Sample Site List

Ten sites we are currently testing/monitoring are:

- #106 – 200 Dougall Rd. North
- 420 Pine Road
- 1040 Villa Vista Road
- South Rutland Elementary
- Belgo Elementary
- Quigley Elementary
- 2080 Hollywood Road South
- 920 Saskatoon Road
- Springvalley Elementary
- 2592 Highway 97 North

* Note **Total Coliform / E.coli** testing is on a rotation schedule of 2 per week, more added if situation warrants it.

Every Tuesday:

Six samples are tested for Cl_2 free, Cl_2 total, pH, Turbidity & Temperature (**short test**) (plus 2 from the **Total Coliform / E.coli** list) Depending on the rotation list; we could be collecting up to 8 samples on that day.

Friday:

***** Two types of testing are performed on Fridays, (**short test**) and (**full parameter test**).

Friday short test -- RWD Standard Sample Site List

Samples taken are tested for Cl_2 free, Cl_2 total, pH, Turbidity & Temperature.

Friday full parameter test (every second Friday) **RWD Regular Sample Site List**

Like every Friday samples are tested for Cl_2 free, Cl_2 total, pH, Turbidity & Temperature. With the addition of testing for Hardness as CACO3, Iron, Nitrate, Nitrite, Manganese. An estimated 350 tests are performed in any given month.

This does not include testing that is requested by our customers, specific wells or during our annual mainline-flushing program.

Backflow Prevention Program:
Background:
In conjunction with the Kelowna Joint Water Committee's Centralized CCC Program we first perform a hazard analysis of our district. Secondly we then rate our ICI customers as High, Moderate and Low and then we work at inspecting these properties from High to Low. All new developments go through the City of Kelowna Planning & Building departments and the city inspectors determine installation requirements and follow to completion.

RWD annually re-evaluates our ICI customers during the first quarter readings to visually determine if anything has changed.

3.1 Deviation Response Plan

The District has an established Deviation Response Plan set of data monitoring parameters to respond to any changes outside the normal ranges of the operating parameters.

Deviations in any tested parameter trigger a number of responses that vary from retesting, levels of public notification and Interior Health consultations.

4.0 Emergency Response Plan

The District has an Emergency Response Plan that is updated regularly. Our plan follows the standards established within the WRF Pocket Guide which provides the necessary procedures, notification lists in order of priority, action items including equipment, manpower, emergency services, etc. to respond to potential emergency situations.

The District works in conjunction with health agencies, first responders and other networked groups to foster a cooperative/coordinated response.

5.0 Training and Education

All our operators regularly attend seminars and workshops to upgrade and maintain a high skill level.

Safety meetings are a documented regular bi-weekly activity in our operations. The EOCP monitors and certifies the status of all our operators.

The District maintains an active roll in the water industry with direct involvement with the Kelowna Joint Water Committee and membership in the Water Supply

Association of BC, B.C. Ground Water Association, B.C Water and Waste Association and the American Waterworks Association – to name just a few.

6.0 Water Supply and System Sustainability

The District operates 15 deep water wells and has an additional four wells for monitoring and future expansion. The wells are checked regularly by our operators as they conduct standard "daily rounds" throughout the District.

Our water system wells and infrastructure are maintained by a series of seasonal procedures that include:

- Flushing dormant wells to treat and freshen them before they are brought on line.
- Treating specific wells to control regrowth and screen plugging
- Measuring static well levels, temperature and checking well performance through specific capacity calculations and current demand/water pumped calculations.
- Motor and pump efficiency tests and reports.

A number of consultants who specialize in the industry are regularly consulted for current performance and sustainability of all facets of the water system.

The District has a working computer model of the system that varies fire flows, directional flushing efficiencies. Annual tests are performed to monitor efficiencies of pumps, motors, wells, power consumption.

6.1 Well Head Protection/Aquifer Protection

As our engineers have designed well head protection into the pump stations and well head design. Our operators are trained to recognize deterioration of any protective equipment or materials.

In 2011 the City of Kelowna Mayor & Council adopted the 2030 the Official Community Plan, which now has a plan for groundwater protection. This plan is called the Natural Environment Development Permit Guidelines. The City of Kelowna has designated environmentally sensitive areas and groundwater resources which have a high intrinsic value and are therefore important to the city and its residents and by using established capture zones to limit or regulate new development within wellhead capture zone areas should better protect the groundwater from inappropriate development. The Development Permit Area designation is intended to complement the federal and/or provincial acts and regulations.

The Kelowna Joint Water Committee, Golder Engineering and the City of Kelowna IT department have developed a program called BITS (Borehole Information Tracking System). This program will collect and register all new groundwater well information that's in the Greater Kelowna Aquifer. This information is then registered through the City of Kelowna Planning and Permit

departments for review. This step is to help minimize negative impacts to groundwater by:

- Protecting and/or enhancing water quality
- Protecting drinking water sources against possible contamination from land use and development activities
- Protecting subsurface aquifers forming part of the City of Kelowna water supply
- Promoting the efficient use of water to ensure a sustainable hydrologic system in the watershed.

The work to date has been performed by a prominent hydrogeologist. Several agencies have been involved to assist with data collection, interpretation and current and future planning.

6.2 Capital Works Plan

A Capital Works Plan is prepared and updated regularly. The plans are driven by change in zoning, area specific City of Kelowna plans, rapid development and social needs, rising construction and material costs, etc.

The plans identify specific expansion upgrades to keep pace with development demand and land use changes. The plan is approved by the Ministry of Community, Sport and Cultural Development who control and verify the funds collected and released specifically for Capital Works Projects.

6.3 Water Use Efficiency

The majority of the District is metered and has developed a sustainable toll structure to maintain and upgrade the program. Water rates have been developed to encourage responsible water use by keeping water tolls low for basic water requirements and then developing an increasing block rate structure for consumers with higher non-essential water demands.

The District has been active with the KJWC with appropriately timed messaging that encourages education and awareness of the costs and benefits of using water responsibly. In 2017 we continued our partnership with the Okanagan Waterwise program.

The District enforces water regulations by patrols of residences and by acting on neighbour complaints, etc. Generally we have found that we have a very responsible customer base with few exceptions. Water consumption is tracked daily in the system and this data aids in the timely actions the District takes to maintain a level of responsible water use.

7.0 Long Term Plans

The District designs the systems long term plans by identifying future demands and aligning those demands with area development.

The district has been working closely with Mikael Epps and his staff (FLNR) on the groundwater licensing registry. RWD well logs and usage projections have been submitted on November 27th, 2017 and awaiting for application approval process.

Future well locations and increased yield from existing wells are identified and secured when appropriate. Reserves are put aside and used when required.

Future well yield capacity for Wells No. 7 East, 7 West, and 12. Reserve Wells No. 14 East, No. 14 West and Well No. 16 is planned to meet the District's demands for a 20 year projection. Reserves are also available in Well No. 2 once water treatment provides a viable solution.

A second balancing reservoir for the east Kelowna bench is in the planning stages with land acquisition and bridge design in process.

In 2017 we have completed the installation of a Variable Speed Drive (VFD) pump drive at well #6. This addition will gain better control in lessoning pump cycling of the Wells #7E & 7W and controlling the flows at Well #6.

For 2018 it is our plan to install a Genset at Well #6 for emergency backup power.

Looping of dead-end lines has been a mandated plan for the district and good progress has been made over the past few years.