DISTRICT OF LAKE COUNTRY
WASTEWATER TREATMENT PLANT
ANNUAL REPORT

2018

LAKE COUNTRY
Life. The Okanagan Way.

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1.0 SPECIFIC AUTHORIZED DISCHARGES AND RELATED REQUIREMENTS

This annual report for Year 2018 is submitted according to the requirements of the Lake Country Wastewater Treatment Plant (LCWWTP) Operational Certificate – PE #14651 with amendment ME #14651. This report follows the format detailed in the "Operational Certificate Permit", a copy of which is attached in **Appendix A.**

The LCWWTP, located at 4062 Beaver Lake Road in Lake Country, British Columbia, is a Class IV tertiary treatment plant owned, operated and maintained by the District of Lake Country.

1.1 Discharge of Effluent

The site reference number for the effluent discharge is Environmental Monitoring System (EMS) E233626. The LCWWTP discharges reclaimed wastewater to a ground infiltration system located south of the treatment works. In 2012, infiltration capacity was renewed with the addition of three open basins. In 2015, the existing sub-surface field was renewed to its original condition with new pipe and media. The discharge is authorized under provisions of Operational Certificate – PE #14651, issued November 5th, 1998 (amended August 22, 2013).

1.2 Authorized Rate of Discharge (m3/d)

The authorized maximum daily discharge limit issued for the year 2018 is 1610 m^3/d, based on a monthly average (as per MOE file 76750-40 amended from 2200 m^3/d, August 22, 2013). Effluent totals are being calculated using the incoming sanitary flow meter plus the septage receiving totalizer.

- 2018 Annual Average 1725 m^3/d (2017=1675m^3/d)
- 2018 Peak Month 61,717 m^3 May 2018; and
- 2018 Peak Daily 2,238 m^3/d – May 14, 2018

Effluent Basin #1

The Septage Receiving Facility accounts for a considerable portion of the flows through the treatment plant. The daily septage flows for Year 2017 are as follows:

- Annual Average 36.6 m3/d (2017=36 m3/d)
- Peak Month 1647.3 m3 – October 2018; and
- Peak Daily 133 m3/d – July 5, 2018

Details of the monthly flows are provided in **Table 1**.

2018	Influent Flow	Effluent				Septage Flow
		Flow *	Minimum*	Maximum*	Daily Ave.*	
	m3/month	m3/month	m3/day	m3/day	m3/day	m3/month
January	49,403	49,856	1,467	1,768	1,608	453
February	45,207	45,713	1,498	1,830	1,633	506
March	50,632	51,431	1,511	1,880	1,659	799
April	51,061	52,280	1,643	1,856	1,743	1,219
May	60,277	61,718	1,721	2,238	1,991	1,441
June	50,938	52,271	1,623	1,894	1,742	1,333
July	54,834	56,185	1,744	1,894	1,812	1,351
August	53,915	55,475	1,715	1,893	1,790	1,560
September	49,666	50,957	1,578	1,947	1,699	1,291
October	50,718	52,365	1,583	1,805	1,689	1,647
November	49,892	51,139	1,563	2,027	1,705	1,247
December	49,602	50,132	1,535	1,732	1,617	530
Total	616,146	629,523			1,725	13,377

*Effluent calculated from influent + Septage

Table 1 - Daily, Monthly and Average Flows

1.3 Effluent Quality - Ground Discharge by Infiltration

The LCWWTP treatment process is modified 3-Stage Bardenpho process that uses biological nutrient removal (BNR) arranged in sequential anaerobic, anoxic and aerobic zones for nutrient removal from the municipal wastewater. Long-term effluent discharge requirements are listed in **Table 2**.

Parameter	Daily	Weekly
Soluble BOD5 (mg/l)	10	
Total Suspended Solids (mg/l)	20	
Ortho-Phosphorus (mg/l as P)	1.5	
99 percentile	0.9	
90 percentile	0.6	
Annual Average	0.15	
Soluble Nitrogen (mg/l as N)		6.0

Table 2 - Effluent Quality Limits – Long Term Standards

Daily in-house samples of Ortho-phosphorus, ammonia-nitrogen and nitrite / nitrate-nitrogen are analyzed on-site with a HACH DR3900 Spectrophotometer. Ammonia-nitrogen and nitrates / nitrite-nitrogen are added together and reported as total soluble nitrogen, according to the discharge permit criteria. Monthly samples are analyzed for Suspended Solids and Soluble BOD(5) by an outside accredited lab. Listed in **Table 3** and **Table 4** are monthly average values for these effluent parameters and their respective standards.

In house laboratory

The 2017 operating results and effluent discharge criteria for Soluble BOD, TSS, soluble phosphorus and soluble nitrogen are presented in the following sections.

1.3.1 Soluble BOD (SBOD)

Monthly BOD samples analyzed by the accredited lab showed no results higher than 4mg/L. The discharge permit states that effluent BOD shall be equal to or less than 10 mg/l.

1.3.2 Total Suspended Solids (TSS)

Suspended Solids are analyzed monthly by accredited lab; the yearly average was 5 mg/l. The discharge permit states that effluent TSS shall be less than 20 mg/l. TSS is also done in-house five days a week to help with process control.

1.3.3 Ortho Phosphorus

Effluent Ortho Phosphorus is analyzed daily on-site as well as monthly by an external accredited laboratory **(Table 3).** The biological nutrient removal process is supported with periodic Alum addition. Annual Ortho Phosphorus discharge averaged 0.04 mg/l by the monthly accredited lab analysis and 0.09 mg/L by daily in-house analysis.

The permit annual average “not to exceed” 0.15 mg/l was achieved at 0.09 mg/l. The 99 percentile limit of 0.90 mg/l was also met with a result of 0.38 mg/l. The 90 percentile limit of 0.60 mg/l was achieved with a result of 0.20 mg/l. **At no time in 2018 did the plant exceed the daily ortho phosphorus limit of 1.5 mg/l.**

1.3.4 Total Soluble Nitrogen (TSN)

Total Soluble effluent Nitrogen analysis is measured as the sum of ammonia, nitrite, and nitrate nitrogen. Results for TSN are analyzed daily in house as well as monthly by the accredited lab **(Table 3).** Issues regarding TSN removal have mostly been attributed to the strength and volume of our centrate and septage. Effluent TSN variations can typically be seen with the volume of septage received. Cold weather has also had a detrimental effect on TSN removal and during the colder months ammonia removal has been difficult

In 2018, the facility experienced 0 days where the TSN limit of 6.0 mg/l was exceeded (see Appendix D – In-house lab results).

The yearly average was 2.01 mg/L TSN by accredited lab analysis and 2.26 mg/L TSN by in-house daily lab analysis. The permit limit for TSN is currently at 6.0 mg/l.

	Ortho P (mg/l as P) Monthly Average		Total Soluble N (mg/l as N) Monthly Average	
	In-house	Accredited Lab	In-house	Accredited Lab
Permit Levels (maximum)	1.5		6.0	
January	0.05	0.01	2.34	1.78
February	0.04	0.01	2.23	1.63
March	0.04	0.01	2.25	2.03
April	0.08	0.01	2.89	2.21
May	0.10	0.18	1.42	2.14
June	0.07	0.01	2.33	2.18
July	0.08	0.03	2.06	1.79
August	0.17	0.01	2.29	1.30
September	0.22	0.09	3.18	2.63
October	0.12	0.11	2.45	2.79
November	0.07	0.05	1.92	1.81
December	0.05	0.01	1.78	1.77
Annual Average	0.09	0.04	2.26	2.01

Table 3 – Effluent Sampling - Ortho Phosphate and TSN

	SBOD mg/l	TSS mg/l	pH
Permit Level	10	20	
January	<4	5	7.71
February	<3	9	6.95
March	<3	5	7.75
April	<3	<4	7.22
May	<3	5	7.79
June	<3	5	7.62
July	<3	3	7.42
August	<3	2	7.29
September	<3	4	7.68
October	4	4	7.72
November	<3	6	7.84
December	<4	9	7.57
Annual Avg.	3	5	7.50

Table 4 – Effluent Sampling - Monthly Accredited Lab Analysis – BOD, TSS and pH

1.4 Additional Effluent Sampling Program

All data sampled and collected is located in **Appendix D.**

2.0 INFLUENT MONITORING REQUIREMENTS

2.1 Influent Sampling Program

Grab samples are taken daily and analyzed in house for the following; Ortho phosphorus expressed as mg/l as P, ammonia nitrogen, and nitrate expressed as mg/l as N (TSN), and pH. Total suspended solids are also analyzed twice per week.

Grab samples are also taken once per month and sent to an off-site accredited lab for BOD(soluble), Total Phosphorus, Total Nitrogen and Total Suspended Solids (TSS). **Table 5** lists the monthly averages for parameters monitored.

2018	BOD(s)	TSS	Total-P	TSN	pH
	mg/l	mg/l	mg/l as P	mg/l N	
January	84	120	7.85	76.30	7.83
February	126	214	7.73	72.20	7.23
March	117	115	8.08	67.00	7.75
April	105	128	9.00	69.30	7.45
May	105	121	8.75	74.10	7.31
June	78	305	10.00	99.90	7.49
July	98	238	9.14	83.40	6.93
August	133	106	7.20	79.90	7.48
September	110	112	9.73	90.70	7.22
October	96	90	8.21	76.80	7.96
November	92	160	7.27	68.40	7.89
December	117	174	6.60	58.00	7.35
Annual Avg.	105	157	8.30	76.33	7.49

Table 5 – Influent Sampling – Monthly Accredited Lab Analysis

3.0 LAKE AND CREEK MONITORING

In March of 2004, the District of Lake Country installed the Groundwater Extraction Well that would pump groundwater from the Southwest corner of the Wastewater Treatment Plant Property to the middle of Vernon Creek at the south end of Swalwell Park. Extraction from this well could possibly commence once sufficient data has been collected and discharge to Vernon Creek has been approved.

4.0 GROUNDWATER MONITORING PROGRAM - INFILTRATION

4.1 Groundwater Elevations

The groundwater-monitoring program was developed by the geo-technical engineers at Golder Associates to monitor the following issues:

- groundwater flow pattern;
- groundwater quality;
- nutrient removal capability of the soil;
- groundwater levels
- give reasonable notice of impending high ground water problems; and
- Phosphorus and nitrate levels which may adversely affect the public, shorelines of Ellison and Wood Lake, domestic wells, or any other down gradient properties.

Ground water depths are measured monthly at 12 monitoring well locations. These monitoring wells, as well as six house wells are sampled and analyzed twice a year. Location map, lab results and grounds water depths are all located in **Appendix E.**

5.0 SLUDGE MONITORING REQUIREMENTS

5.1 Sludge Volume Measurement

Table 6 details the total amount of dewatered sludge hauled to the Ogogrow Production Facility.

2018	Total Monthly	
	# of loads	dry - tonnes
January	14	80.3
February	12	102.0
March	18	123.7
April	18	157.2
May	22	171.7
June	21	199.5
July	19	144.6
August	19	156.7
September	18	150.7
October	19	168.1
November	16	146.8
December	11	102.0
Total	207	1703.3

Table 6 - Dewatered Sludge Sampling - Hauled to Compost Facility

5.2 Sludge Sampling Program

Dewatered sludge samples are sent to an accredited lab on a monthly basis. The results of this monitoring are provided in **Appendix D.**

Pieralisi Centrifuge

5.3 Sludge Management Plan

Biosolids produced in the wastewater treatment plant process are trucked to the Ogogrow Production Facility at 551 Commonage Road in Vernon, B.C. where they are beneficially reused to produce a soil amendment known as Ogogrow™.

The process used for the stabilization of biosolids is the Extended Aerated Static Pile Composting Method. The biosolids are mixed with wood waste and the compost is aerated for a period of about 20 days. Naturally occurring aerobic bacteria generate elevated pile temperatures that destroy pathogens. All compost processed meets the minimum temperature requirement of 55 degrees Celsius for at least three days and 45 degrees Celsius for 14 days to achieve the requirements of the Organic Matter Recycling Regulation. Composted biosolids are then placed on a secondary aeration system for 14 days, followed by a curing process for a minimum of ninety days. Compost is screened to one half inch to produce the final product. Each 500 cubic yard batch is tested for *Salmonella* and Fecal Coliform bacteria prior to sale, with upper acceptable limits of 0.75 mpn/g *Salmonella*, and 1000 mpn/g Fecal Coliform. Furthermore, Ogogrow™ is tested at regular intervals for metals, nutrients, and other parameters, which are either required by regulation, or deemed to be important information for the end user.

The Facility produces Class A compost. This means that the product can be sold with no restrictions for use, so it can be applied to flowers, shrubs and vegetable gardens. Ogogrow is widely used throughout the Okanagan by gardeners and landscapers.

Lab analysis for biosolids can be found in **Appendix F**

6.0 SEPTAGE HANDLING FACILITY

The Lake Country Wastewater Treatment Plant is the site for the Regional District of the Central Okanagan septage receiving facility. This facility is owned by the R.D.C.O. but is operated by contract staff. The facility was designed to collect septage tank and holding tank wastes within the Regional District boundary (between Summerland and Vernon). The septage data collected and analyzed is located in **Appendix F.**

7.0 WASTEWATER COLLECTION SYSTEM

The District of Lake Country Wastewater Collection system consists of 10 lift stations and 54 kilometers of sanitary sewer main. Other appurtenances are air valves, siphon chambers as well as an odor chemical dosing station. The system is registered as a Level II collection system by the EOCP.

7.1 Infiltration, Inflow and Cross Connections

As the District of Lake Country grows, so has the collection system infrastructure. While there has been no noticable infiltration issues, there has been some recognized sources of inflow from properties dealing with drainage from flood events and high groundwater table. The District of Lake Country has been in contact with several properties and continues to deal with these on a case by case basis.

It also has been recognized that some pools have their backwash system tied into sewer. These connections have been indentified and a notice sent to property owners advising them of District bylaws regarding waste sent to the sanitary system.

8.0 INFLUENT WASTES BYLAW

The District of Lake Country currently has in effect a Sewer Use Bylaw.

9.0 WATER CONSERVATION

The District of Lake Country promotes a water conservation program to encourage a reduction in the volume of domestic, industrial and commercial wastewaters discharged to the sewer collection system. For more information see: http://www.makewaterwork.ca/

10.0 GENERAL REQUIREMENTS

10.1 Emergency Procedures

Material Safety Data Sheets for chemicals used at the treatment plant are located at the treatment plant. These chemicals include Ferric Chloride for H_2S control (not currently used), Aluminum Sulphate, used to assist phosphorus removal in the secondary clarifier, Hydrated Lime for septage phosphorus control, and Polymer used in the sludge de-watering process.

The “District of Lake Country Wastewater Treatment Facility Safety, Health and Environment Manual” is located at the site and is updated on a continuous basis.

In case of a power failure, an automated diesel generator provides emergency on-site power generation. The treatment plant is monitored by a Protalk Alarm Dialer for callout alarms and site security.

The Emergency Response Plan was updated in December 2018

10.2 Operation and Maintenance

The Operators complete several “Plant Operation Checklists” every day; a copy of these is attached in **Appendix B.**

In late 2009, a Preventative Maintenance Software program was purchased in collaboration with the District of Lake Country’s other utilities. Maintenance schedules and asset management information is being tabulated and entered.

All equipment is listed in the maintenance database and all manufacturer data and literature is indexed in binders.

10.3 Bypasses

There were no plant bypasses required in 2018.

10.4 Process Modifications

In September 2014, a 6.8 million dollar upgrade to the Wastewater was completed. In 2015, one of the existing sub-surface tile fields was retrofitted. The retrofit included removal of the existing media, piping and top cover, and bringing the field back to as-new condition. This was done with the necessary approvals from the Ministry of Environment. There have been no modifications or retrofits in 2017.

10.5 Odor Control

In 2018 no odor complaints were received regarding this facility. However, some odor issues have occurred concerning the collection system. The District of Lake Country has purchased two odor loggers (H_2S meters) to monitor the H_2S gas in the collection system. Odor neutralizing chemicals have been utilized in select areas and are used as required.

Lake Country Biofilters

10.6 Facility Classification and Operator Certification

The British Columbia Environmental Operators Certification Program (EOCP) classifies the Lake Country Wastewater Treatment Plant as a Level IV facility and the Collection system a Class II system. The four staff members at the LCWWTP are all EOCP-certified wastewater treatment plant operators and or Collection system operators. Levels of certification range between levels I to level IV for municipal wastewater treatment.

11.0 AMRY AND CARR'S LANDING SATELLITE PLANTS

11.1 AMRY (RE#17842)

Amry WWTP is an extended aeration facility that services a subdivision on the Oyama isthmus. Weekly in-house samples, as well as monthly accredited lab samples, are analyzed (EMS site reference #E262982). **Appendix D** shows monthly lab results for AMRY WWTP and flow readings are tabulated below (**TABLE 7**). Even though only bi-annual sampling is required, samples are taken and analyzed on a monthly basis by accredited lab and weekly by the in-house lab. AMRY became an EOCP certified facility (#2125) on January 23, 2013.

In September 2017, an additional storage vault was added to the treatment facility. This storage was intended to increase emergency capacity in event of extreme flow situations or extended power interruption.

AMRY WWTP

2018	Amry Average Daily Flow (m3)
Jan	5.90
Feb	5.09
Mar	5.94
Apr	5.43
May	5.80
Jun	5.14
Jul	6.67
Aug	6.80
Sep	8.05
Oct	8.20
Nov	7.58
Dec	8.91

11.2 Carrs Landing – Whitson-Nuyens (PE 10821)

The Carrs Landing septic disposal system consists of two separate low pressure collection systems, 5 pump stations, force mains and tile disposal fields. As per Permit requirements (Sec. 3.2) flow monitoring is compiled and tabulated (**TABLE 8**). Flow is determined with a drawdown and volume determination coupled with pump run times. For ease of reporting, daily values have been averaged and the daily averages shown for each month.

2018	Average Daily Discharge for Whitson Nuyens (m^3/day)	Average Daily Discharge for Lance Marshall (m^3/day)
Jan	7.1	4.6
Feb	7.7	3.8
Mar	7.1	3.5
Apr	19.0	5.2
May	4.9	5.8
Jun	5.6	9.8
Jul	7.1	8.8
Aug	8.5	7.2
Sep	4.9	8.0
Oct	3.9	4.0
Nov	3.0	5.9
Dec	3.1	3.9

Table 8 – Carrs Landing average daily flows

APPENDIX A
Operational Certificate

LAKE COUNTRY
Life. The Okanagan Way.

BRITISH COLUMBIA

August 22, 2013 File: 76750-40/ME-14651

District of Lake Country
10150 Bottom Wood Lake Road
Lake Country, BC V4V 2M1
Email: engineer@lakecountry.bc.ca

Attention: Michael Mercer, P. Eng.

Re: Director's Consent to Increase Effluent Discharge Rate

Further to Urban Systems request dated July 5, 2013, on behalf of the District of Lake Country, and pursuant to Section 2.4 of the Operational Certificate ME-14651 (issued November 5, 1998), I hereby amend the maximum discharge rate of treated effluent to the ground from:

- the 1500 m3/day as a monthly average (as contained in a letter of amendement dated February 14, 2013)
  to
  a monthly average of 1610 m^3/d .

Further changes to the monitoring program particularly the groundwater program are also being considered and if deemed necessary will follow in further correspondence.

All other terms and conditions of the Operational Certificate ME-14651 remain in effect. This letter does not constitute approval by any other agency with jurisdiction over this matter.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at 250-387-3464.

.../2

Ministry of Environment

Environmental Protection Division
Kootenay and Okanagan Regions
102 Industrial Place
Penticton BC V2A 7C8

Telephone: (250) 490-8200
Facsimile: (250) 490-2231

If you have any questions regarding this letter, please contact Mike Reiner at 250-490-8206 or Geri Huggins at 250-490-2239.

Yours truly,

Mike Reiner
Director's Delegate
Environment Management Act

MR/GH/js

cc: Dr. Joanne Harkness, Urban Systems. By email to: jharkness@urbansystems.ca
Chris Town, P.Eng., Urban Systems. By email to: ctown@urbansystems.ca
Greg Buchholz, District of Lake Country by email to: gbuchholz@lakecountry.bc.ca

BRITISH COLUMBIA

Date: November 5, 1998

File: 76750-40/PE-14651(01)

REGISTERED MAIL

District of Lake Country
Unit #17 - 11852 Hwy 97
Lake Country BC V4V 1E3

Attention: Bob McCoubrey, Mayor

Enclosed is a copy of Operational Certificate No. PE-14651 issued under the provisions of the Waste Management Act in accordance with Section 18(5) of the Waste Management Act. Your attention is respectfully directed to the terms and conditions outlined in the Operational Certificate. An Annual Permit fee will be determined according to the Waste Management Permit Fee Regulation.

This Operational Certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the Operational Certificate holder.

This Operational Certificate is issued pursuant to the provisions of the Waste Management Act to ensure compliance with Section 54(3) of that statute, which makes it an offence to discharge waste without proper authorization. It remains the responsibility of the Operational Certificate holder to ensure that all activities conducted under this authorization comply with any other applicable legislation which may be in force from time to time.

The administration of this Operational Certificate will be carried out by staff from our Regional Office located in Penticton, telephone (250)490-8200. Plans, data and reports pertinent to the Operational Certificate are to be submitted to the Pollution Prevention office, Suite 201, 3547 Skaha Lake Road, Penticton, British Columbia, V2A 7K2.

This decision may be appealed by any person(s) who considers themselves aggrieved by this decision, in accordance with Part 7 of the Waste Management Act. Written notice of intent to appeal must be received by the Regional Waste Manager within thirty (30) days of the date of this decision.

Yours truly,

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

Michael Mercer, DistEng

Enclosure

1:30
D.C.

Ministry of Environment, Lands and Parks
Environment and Lands
Telephone: (250) 490-8200
Facsimile: (250) 492-1314
Mailing Address & Location:
Suite 201-3547 Skaha Lake Rd,
Penticton, B.C.
V2A 7K2

POLLUTION
PREVENTION

BRITISH COLUMBIA

Suite 201
3547 Skaha Lake Road
Penticton
British Columbia V2A 7K2
Telephone: (250) 490-8200
Fax: (250) 492-1314

MINISTRY OF ENVIRONMENT,
LANDS AND PARKS

OPERATIONAL CERTIFICATE

PE 14651

Under the Provisions of the Waste Management Act

DISTRICT OF LAKE COUNTRY

Municipal Office

Lakewood Park Mall

Unit #1 - 11852 Hwy 97

Lake Country, British Columbia

V4V 1E3

Hereinafter referred to as the "District".

is authorized to discharge effluent from a municipal sewage collection and treatment system located at Lake Country, British Columbia, to the ground by infiltration, and reclaimed water to the ground by irrigation, and is further authorized to discharge sludge from this same system to an authorized compost facility, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Waste Management Act and may result in prosecution.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

Date Issued: November 5, 1998
Amendment Date:
(most recent)

It is recognized that the District has contracted the operation of the plant to a third party, hereinafter referred to as the "Contractor". The Contractor and/or the District may be liable under the Waste Management Act in the event of a violation of the terms and conditions of this Operational Certificate. References to the "District" in this Operational Certificate shall apply equally to the "Contractor" who may be retained by the District to operate the sewage collection and treatment system.

1. SPECIFIC AUTHORIZED DISCHARGES AND RELATED REQUIREMENTS

1.1. Discharge of effluent to which this section is applicable is from a municipal sewage treatment plant to an effluent **infiltration** system located approximately as shown on the attached Appendix A. The site Environmental Monitoring System (EMS) reference number for this discharge is **E233626.**

1.1.1. Rate Of Discharge

The maximum authorized rate of effluent discharged from the sewage treatment plant to the ground averaged on a monthly basis:

1998	50 m3/day
1999	250 m3/day
2000	500 m3/day
2001	800 m3/day
2002	1,000 m3/day
2003	1,200 m3/day
2004	1,400 m3/day
2005	1,600 m3/day
2006	1,800 m3/day
2007	2,000 m3/day
2008	2,200 m3/day

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

1.1.2. Effluent Quality - Ground Discharge by Infiltration

The characteristics of the effluent discharged from the sewage treatment plant shall be equivalent to or better than:

(a)	Soluble BOD_5	10 mg/L
(b)	Total Suspended Solids	20 mg/L
(c)	Ortho Phosphorus as P	
	Not to exceed	1.5 mg/L
	99 percentile	0.90 mg/L
	90 percentile	0.60 mg/L
	Annual Average	0.15 mg/L
	Level to strive for	0.01 mg/L

The Level to strive for is the Okanagan Lake background level. The percentile values given relate to the daily values. e.g.: 99 percentile means that 99 percent of all daily values throughout the year are not to exceed 0.90 mg/L Ortho Phosphorus as P.

Soluble Nitrogen as N 6.0 mg/L
(For compliance purposes Soluble Nitrogen is considered to be the sum of (NH3 as N) + (NO3 as N) + (NO2 as N))

1.1.3. Effluent Quality - Start-up

Since the District of Lake Country has not previously had a sewage collection and treatment system, it is recognized that it may take some time to reach the effluent quality requirements outlined above.

It is also recognized that the treatment plant requires a critical mass of influent sewage in order to allow plant start-up to efficiently take place.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

A start-up / commissioning plan shall be submitted by the District to the Regional Waste Manager a minimum of 30 days prior to discharge. During start-up the characteristics of the effluent shall not exceed the following criteria:

The Quality Of The Effluent Discharged To The Infiltration Area(S) Shall Be Equivalent To Or Better Than				
Months from start-up	**Soluble BOD_5**	**SS**	**Ortho Phosphorus**	**Soluble Nitrogen**
0 - 6	30	30	4	12
6 - 12	20	20	3	9
12 - 18	10	20	2	6
>18	Section 1.1.2 applies			

1.1.4. Permit Fee Calculations

For the purposes of permit fee calculations the following discharge factors have been assumed for the characteristics of the reclaimed wastewater discharged from the sewage treatment plant:

5 Day Biochemical Oxygen Demand, 10 mg/L; and
Total Suspended Solids - 20 mg/L.

1.1.5. The works authorized are a sewage collection system, a biological nutrient removal tertiary treatment plant, chemical phosphorus removal facilities, an infiltration facility, groundwater extraction and creek augmentation facilities and other related appurtenances.

1.1.6. The sewage collection system services Lake Country and surrounding areas.

1.1.7. The location of the sewage treatment system from which the wastewater is discharged is legally described as; The proposed lot C of - PID #013-537-270, the east 1/2 of the west 1/2 of Sec 11, Township 20 ODYD except plan 19644 and KAP 44270, ***and*** PID 013-537-334, the east 1/2 of Sec 11, Township 20 ODYD except plan 19644 and B17161 see Site Plan A.

The proposed future infiltration gallery is located on: the east 1/2 of Section 2, Township 20 except plan 19099, 19644 and 15293.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

1.1.8. It is recognized that it may be feasible to extract water from the aquifer into which the effluent is infiltrated. The same constraints apply as for use of reclaimed water except that disinfection may not be necessary. Prior to implementing this option, the District shall submit a conceptual proposal to the Regional Waste Manager and his written consent obtained.

1.1.9. Irrigation with reclaimed water within the fenced area of the sewage treatment plant is permitted, as long as the effluent has been filtered and disinfected and contains less than 200 CFU per 100 ml faecal coliforms per litre during testing, which is to be conducted weekly during the active irrigation season if reclaimed water irrigation should be utilized.

1.2. Discharge of effluent to which this section is applicable is from a municipal sewage treatment plant to a **reclaimed water irrigation** system located in the District of Lake Country and surrounding area. The site Environmental Monitoring System (EMS) reference number for this discharge is **E233629.**

1.2.1. There is no maximum authorized rate of reclaimed water which may be beneficially used for irrigation.

1.2.2. **Effluent Quality - Reclaimed Water**

The characteristics of the effluent discharged from the sewage treatment plant to the reclaimed water irrigation system shall be equivalent to or better than:

(a)	5 Day Biochemical Oxygen Demand -	10 mg/L
(b)	Total Suspended Solids -	10 mg/L

Un-restricted public access:

(c)	Faecal coliform -	2.2 CFU /100ml
(d)	Turbidity	2 NTU

Restricted public access: (agricultural, silvicultural and low public use lands)

(e)	Faecal coliform -	200 CFU /100ml

1.2.3. The additional works authorized are filtration, disinfection, reclaimed water irrigation facilities, and other related appurtenances.

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2. GENERAL REQUIREMENTS

2.1. MAINTENANCE OF WORKS AND EMERGENCY PROCEDURES

The District shall inspect the pollution control works regularly and maintain them in good working order.

In the event of an emergency or condition which prevents the District from complying with a requirement of the Operating Certificate that would otherwise be applicable, that requirement will be suspended for such time as the emergency exists or until otherwise directed by the Regional Waste Manager provided that:

2.1.1. The District can demonstrate the exercise of due diligence in relation to the process, operation or event which has caused the emergency and that the emergency has occurred notwithstanding this exercise of due diligence.

2.1.2. The Regional Waste Manager has been immediately notified of the emergency; and

2.1.3. The District is proceeding with due diligence to correct the emergency condition.

(Spill is over 200 litres) G. H. 11/24/98

2.2. BYPASSES

The discharge of effluent which has bypassed the designated treatment works is prohibited, unless the consent of the Regional Waste Manager is obtained and confirmed in writing.

2.3. PROCESS MODIFICATIONS

The District shall notify the Regional Waste Manager, and his written consent obtained, prior to implementing changes to any process that may affect the quality and/or quantity of the discharge.

2.4. PLANS - NEW WORKS

Plans of modifications and/or extensions to the existing works shall be signed and sealed by a Professional Engineer licensed to practise in the Province of British Columbia.

Plans and specifications of any proposed modifications or additions to works authorized in this Operational Certificate, with the exception of the sewage collection system, shall be submitted to the Regional Waste Manager, and his written consent obtained before construction commences. The works shall be constructed in accordance with such plans.

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A copy of all "as built", plans of modifications and/or extensions to the sewage collection system shall be retained by the District for perusal by the Regional Waste Manager, or his designate, upon request.

Plans for construction, modifications of and/or extensions to the effluent irrigation system shall be signed and sealed by a professional engineer or professional Agrologist suitably qualified and licensed to practise in the Province of British Columbia.

Design and construct the reclaimed water irrigation works in accordance with best current agricultural practice and the "Pollution Control Guidelines for Municipal Effluent Application to Land", dated January 1983, and any amendments thereto, issued by the Ministry of Environment of British Columbia, the "B.C. Trickle Irrigation Manual" 1987 issue, prepared by the B.C. Ministry of Agriculture and Fisheries. and the "Irrigation Design Manual for Farm Systems in British Columbia", 1989 edition, issued by the BC Ministry of Agriculture and Food of British Columbia.

2.5. SLUDGE MANAGEMENT PLAN

The rationale of sludge management, including frequency of withdrawal of sludge from the sewage treatment plant and the location(s) used for disposal and/or utilization shall be developed into a Sludge Management Plan. The Sludge Management Plan shall be amended as required and submitted annually to the Regional Waste Manager.

2.6. CONTINGENCY PLAN

Prepare a Contingency Plan that will address the appropriate course of action to be taken in any particular preconceived emergency situation, and submit a copy of the contingency plan to the Regional Waste Manager on or before December 31, 1999. The Contingency Plan shall include Spill Procedures including other leaks and any potential point of concern in the collection, treatment and disposal systems. Attention is to be given to public safety and the protection of the environment. The Contingency Plan is to be continually updated as necessary to reflect the current operation. Any revisions to the Contingency Plan are to be submitted annually to the Regional Waste Manager.

2.7. GROUNDWATER MONITORING PROGRAM - INFILTRATION

A Groundwater Monitoring Program, shall be submitted to the Regional Waste Manager, and his written approval obtained prior to the commencement of effluent infiltration. The program shall be designed by a Professional Engineer or a Hydrogeologist licensed to practice in the Province of British Columbia, to establish with acceptable scientific accuracy, the groundwater flow pattern and nutrient removal capability of the soil, to ensure reasonable notice of impending high groundwater, phosphorus or nitrate levels that may adversely affect the public.

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shoreline waters of Ellison Lake, Wood Lake, Vernon Creek , domestic water wells or otherwise adversely impact on down-gradient properties. The program shall consider the future need for groundwater extraction discussed below.

The sampling, measurement frequency and analyses shall be conducted in accordance with the Groundwater Monitoring Program upon it's written approval by the Regional Waste Manager.

2.8. GROUNDWATER EXTRACTION AND CREEK AUGMENTATION

It is recognized that groundwater extraction may be necessary downslope of the infiltration area to ensure that tailwater does not surface before reaching Vernon Creek, and does not cause problems to down-gradient residents.

The extracted groundwater shall be conveyed to Vernon Creek at a location and during a time period acceptable to the Fish, Wildlife and Habitat Program and as approved by the Regional Waste Manager.

2.9. ADDITIONAL TREATMENT

In the event that adverse levels of phosphorus should be found in the extracted reclaimed water, a higher level of phosphorus removal may be specified by the Regional Waste Manager.

2.10. DOMESTIC WELLS

In the event that domestic wells should be adversely affected by the effluent discharge, the District shall supply those residents so affected with an alternate source of domestic water.

2.11. ODOURS

The District shall provide measures to control odour from the sewage treatment collection and plant operation by using the best available technology. Should any aspect of the operation give rise to objectionable odours, appropriate remedial measures may be required, when directed in writing by the Regional Waste Manager.

2.12. OPERATION AND MAINTENANCE

Develop and maintain both an Operational and Maintenance Manual for the sewage collection, sewage treatment, effluent utilization and effluent disposal works. A copy of the Operational and Maintenance Manuals shall be retained at the treatment plant for inspection by the Regional Waste Manager or designate.

2.13. FACILITY CLASSIFICATION AND OPERATOR CERTIFICATION

The District shall have the works authorized by this Operational Certificate classified (and the classification shall be maintained) by the Environmental Operators Certification Program Society (EOCP). The works shall be operated and maintained by persons certified within and according to the program provided by the EOCP.

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Certification must be completed to the satisfaction of the Regional Waste Manager. In addition, the Regional Waste Manager shall be notified of the classification level of the facility and certification level of the operators, and changes of operators and/or operator certification levels within 30 days of any change.

Alternatively, the works authorized by this Operational Certificate shall be operated and maintained by persons who the Operational Certificate holder can demonstrate to the satisfaction of the Director, are qualified in the safe and proper operation of the facility for the protection of the environment.

2.14. WATER CONSERVATION

Establish a water conservation program to minimize the volume of domestic, industrial and commercial wastewaters discharged to the sewage collection system.

2.15. SEWAGE COLLECTION SYSTEM - INFILTRATION, INFLOW AND CROSS CONNECTIONS

Inspect and maintain the sewage collection system works so as to minimize the possibility of cross connections between the storm sewer and the sanitary sewer systems, to minimize infiltration of groundwater, to minimize inflow of water from basement sump pumps and roof drains, and minimize exfiltration of the collected sewage from the sewage collection system to the ground.

2.16. INFLUENT WASTES BYLAW

Subject to being declared a Sewage Control Area under Section 22 of the Waste Management Act, and in order to minimize the potential effect of heavy metals or other toxic materials in the effluent and/or sludge, the District shall prepare and implement an Influent Wastes Bylaw to regulate the input of such wastes to the sewage collection system. Devices to process household putrescible waste for disposal to the sewage collection system shall be prohibited.

2.17. RECLAIMED WATER PIPING

It is strongly recommended that piping used to convey reclaimed water for irrigation or in-plant use be a different colour, preferably purple, than other piping to minimize the possibility of unauthorized cross connection.

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3. RECLAIMED WATER IRRIGATION OPERATIONAL REQUIREMENTS

3.1. BUFFER ZONES

The requirement for formal buffer zones surrounding reclaimed water irrigated lands is no longer in effect, however, a buffer zone may be specified by the Regional Waste Manager. The reclaimed water irrigation system shall be managed in such a fashion as to preclude spray drift from leaving the irrigated lands in accordance with the "Health and Safety Criteria for Use of Reclaimed Wastewater" published by the Ministry of Health.

Reclaimed water applied by irrigation shall not be applied to the ground any closer than 15 metres from the edge of flowing streams or bodies of water, unless an approved plan of irrigation permitting lesser setbacks has been specifically authorized in writing by the regional waste manager.

3.2. DISINFECTION

Reclaimed water utilized for irrigation shall conform to the effluent irrigation guidelines developed by the British Columbia Ministry of Health. Faecal coliforms shall not exceed a count of 200 CFU or MPN per 100 ml for agricultural, silvicultural and low public use lands, or exceed a count of 2.2 CFU or MPN per 100 ml for high public use lands.

Reclaimed water utilized for irrigation outside the plant-site may, in addition to the above, be required to carry a disinfectant residual within the irrigation system and otherwise comply with the "Waste Management Act Municipal Sewage Regulation" which is under development.

3.3. TIMING OF IRRIGATION

Effluent irrigation outside of the plant grounds shall only occur when members of the public are not present. This may be accomplished be irrigation during the night, by controlled access or by some other equivalent means.

3.4. BC MUNICIPAL SEWAGE REGULATION

The requirements surrounding effluent irrigation and re-use are under review in conjunction with the new Municipal Sewage Reg. Once the new regulation has been finalized, it is expected that many of the clauses regarding effluent irrigation and re-use may be amended to reflect agreements reached between the Ministries of Health and Environment.

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3.5. SURFACE RUNOFF

There shall be no surface runoff of irrigated reclaimed water from the irrigated lands.

3.6. SURFACING EFFLUENT

Irrigation shall be managed in such a fashion as to preclude surfacing of irrigation tail water down slope of the point of irrigation.

3.7. HIGH WINDS

Devices utilized in the spray irrigation of reclaimed water shall be operated in such fashion as to preclude aerosol drift from leaving the irrigated lands, to minimize the necessity to shut down the irrigation system or portions thereof during windy conditions.

3.8. IRRIGATION RATES

Irrigation rates shall not exceed the rates given in "The Irrigation Design Manual for Farm Systems in British Columbia", dated 1989, published by the British Columbia Ministry of Agriculture and Food, except land that slopes in excess of 20% shall not be irrigated, without the written consent of the Regional Waste Manager.

Soils of the irrigated lands shall be monitored periodically to prevent saturation, erosion, and instability.

3.9. CATTLE LAG TIME

A three day lag time is required before un-inspected beef cattle are permitted on areas sprayed with reclaimed water. No lag time is required if beef cattle are subjected to the federal meat inspection program.

A six day lag time is required before dairy cattle are permitted in areas irrigated with reclaimed water.

A three day lag time, after irrigation has ceased, is required before a crop intended for animal feed is harvested.

3.10. SIGNAGE

Prominent "NO TRESPASSING", signs shall be erected around agricultural and silvicultural sites irrigated with effluent, warning persons of the possible health hazard during the irrigation season and advising that the water used for irrigation is NOT POTABLE. The wording shall be in language readily comprehensible by the general public. e.g. "NO TRESPASSING - RECLAIMED WATER - DO NOT DRINK"

Signage at the gate of the plant site and any irrigated areas shall have the appropriate emergency contact person(s) and phone numbers for use by the general public and others.

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3.11. FENCING

Fencing is generally not required for unrestricted use irrigation but may be required at the discretion of the Regional Waste Manager. Fencing is generally required for restricted use irrigation.

4. MONITORING REQUIREMENTS

4.1. INFLUENT - SAMPLING PROGRAM

The District shall install and maintain a suitable sampling facility (EMS site number **E233627**) and obtain a grab sample of the plant influent once each month for analysis by a suitably accredited independent laboratory. A proportional continuous sampler may be used, provided that prior written approval has been obtained from the Regional Waste Manager. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

4.1.1. Influent - Analyses

Obtain analyses of the influent sample for the following:

(a) 5-day biochemical oxygen demand, mg/L;
(b) total phosphorus expressed as mg/L P;
(c) total nitrogen, expressed as mg/L N; and
(e) pH.

4.2. EFFLUENT - SAMPLING PROGRAM

The District shall install and maintain a suitable sampling facility (EMS Site Number **E233626**) and obtain a grab sample of the effluent once daily during the period of maximum daily flow for subsequent in-house analysis, and once each month for check by a suitably accredited independent laboratory. A proportional continuous sampler may be used, provided that prior written approval has been obtained from the Regional Waste Manager. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

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4.2.1. Effluent - Analyses

Obtain analyses of the effluent sample for the following:

Daily Analyses, (in house)

(a) ortho phosphorus expressed as mg/L P
(b) ammonia nitrogen, and nitrate/nitrate nitrogen, all expressed as mg/L N; and
(c) pH,

Monthly Analyses (accredited lab)

(a) total suspended solids (non-filterable residue), mg/L:
(b) 5-day biochemical oxygen demand, mg/L;
(c) total and faecal coliforms CFU (or MPN) /100 mL;
(d) total and ortho phosphorus , expressed as mg/L P;
(e) total soluble nitrogen (ammonia and nitrate/nitrite), total nitrogen, ammonia nitrogen, nitrate/nitrite nitrogen, organic nitrogen, and total Kjeldahl nitrogen, , all expressed as mg/L N; and
(f) pH.

Occasional full chemical analysis of the main cations and anions and other characteristics may be required at the discretion of the Regional Waste Manager.

4.2.2. Effluent - Flow Measurement

Provide and maintain a suitable flow measuring device and record once per day the effluent volume discharged over a 24-hour period. Record the flows for each calendar month and for each calendar year. For the purposes of this section, effluent flows may be considered equivalent to influent measured flows.

4.3. GROUNDWATER MONITORING PROGRAM - INFILTRATION

4.3.1. Groundwater Elevations

Provide at least one monitoring well up-gradient, and a minimum of three monitoring wells down-gradient at hydrogeologically appropriate locations, to adequately monitor groundwater elevations surrounding the infiltration area and record once per month the groundwater elevation in each well. EMS site numbers for these wells shall be assigned once the number and locations of wells are established.

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4.3.2. **Groundwater Sampling**

Provide dedicated well sampling equipment and twice per year collect samples from all up-gradient and down-gradient monitoring wells. Domestic wells in the path of the effluent plume shall be included in the sampling program.

4.3.3. **Groundwater Analysis**

Obtain analyses by a suitably accredited independent laboratory of the groundwater samples for the following:

(a) total and ortho phosphorus expressed as mg/L P
(b) ammonia nitrogen and (nitrate/nitrite) nitrogen, expressed as mg/L N;
(c) pH,
(d) conductance expressed as µmhos/cm and
(e) sodium and chloride, expressed as mg/L Na and Cl

4.3.4. The above monitoring program may be modified through Regional Manager approval of a groundwater monitoring program designed by a Professional Engineer or a Hydrogeologist licensed to practice in the Province of British Columbia as outlined in Section 2.7 above.

4.4. SLUDGE - MONITORING REQUIREMENTS

4.4.1. **Sludge - Volume Measurement**

Install and maintain a system for measuring and recording the volumes of sludge produced, the location where the sludge was discharged, and the amount of sludge discharged at each location.

4.4.2. **Sludge - Sampling Program**

Obtain a representative sample of the sludge being produced at the treatment plant at least once every 6 months (EMS Site Number **E233628**).

Sludge - Analyses

Obtain analyses of the sludge sample for the following:

(a) Total solids (T.S.), g/L;
(b) Moisture content, %;
(c) Volatile suspended solids (V.S.S.), g/L;
(d) Total Kjeldahl Nitrogen (T.K.N.), g/L and g/kg dry solids;
(e) Aluminum, mg/kg;
(f) Arsenic, mg/kg;
(g) Cadmium, mg/kg;
(h) Calcium, mg/kg;
(i) Chromium, mg/kg;

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(j) Cobalt, mg/kg;
(k) Copper, mg/kg;
(l) Iron, mg/kg;
(m) Manganese, mg/kg;
(n) Mercury, mg/kg;
(o) Molybdenum, mg/kg;
(p) Nickel, mg/kg;
(q) Lead, mg/kg;
(r) Silver, mg/kg;
(s) Sodium, mg/kg; and
(t) Zinc, mg/kg.

Occasional full chemical analysis of the main cations and anions and other characteristics may be required at the discretion of the Regional Waste Manager.

4.5. GROUNDWATER MONITORING PROGRAM - IRRIGATION

A Groundwater Monitoring Program, shall be submitted to the Regional Waste Manager, and his written approval obtained prior to the commencement of irrigation of any lands other than the plant grounds. The program shall be designed by a Professional Engineer or a Hydrogeologist licensed to practice in the Province of British Columbia, to establish with acceptable scientific accuracy, the groundwater flow pattern and nutrient removal capability of the soil, to ensure reasonable notice of impending high phosphorus or nitrate levels that may adversely affect the shoreline waters of Ellison Lake, Wood Lake, Vernon Creek or domestic water wells.

The sampling, measurement frequency and analyses shall be conducted in accordance with the Groundwater Monitoring Program upon it's written approval by the Regional Waste Manager.

4.6. LAKE AND CREEK SAMPLING AND MONITORING PROGRAM

Depending upon the results of the Groundwater Monitoring Program a Lake or Creek Monitoring Program may be required at the discretion of the Regional Waste Manager.

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5. SOIL ASSESSMENT AND IRRIGATION PLAN

For agricultural lands that are irrigated with reclaimed water. retain a Professional Agrologist to once per year conduct a soil assessment of the irrigated lands. Maintain records of crop production and nutrient content. Maintain records of soil. water and nutrient balances and assessments of any changes in the soil, surface or groundwater regimes. Maintain records of groundwater monitoring data. Annually submit the data and Soil Assessment as part of the Annual Report.

An initial soils assessment is recommended for park lands prior to irrigation. Additional soils assessments are not scheduled but may be required at the discretion of the Regional Waste Manager.

6. SAMPLING AND ANALYTICAL PROCEDURES

The sampling, flow and monitoring requirements above shall be carried out in accordance with the appropriate procedures listed in the table below. Alternative test methods may be used provided that the alternative test methods are authorized by the Regional Waste Manager prior to performing the actual source testing. Test methods for parameters not listed below require the consent of the Regional Waste Manager.

LIQUID EFFLUENTS, SURFACE WATER, GROUND WATER, SOILS, SEDIMENTS, VEGETATIVE MATTER:		
Parameter	**Source Testing Procedure**	**Analytical Procedure**
Metals Nutrients Organics Toxicity	British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 1996 Permittee Edition	British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials, March, 1994, Permittee Edition

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The above manuals are available from Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Govt, Victoria, BC, V8W 9V7 (1-800-663-6105 or (250)387-4609). The above manuals are also available for inspection at all Pollution Prevention offices.

7. REPORTING

7.1. GENERAL REPORTING

The influent, effluent, reclaimed water, sludge quality, and related flow data, groundwater monitoring analyses, and lake and creek monitoring data (if required) is to be submitted to the Regional Waste Manager such that they are received by the Regional Waste Manager within 30 days of the results being received, or produced, by the District.

Monitoring is to be entered into EMS electronically and submitted in electronic and/or printed format satisfactory to the Regional Waste Manager.

7.2. ANNUAL REPORTING

Annually submitted data, as detailed below, is to be combined into a single report, suitably tabulated, and indexed and forwarded to the Regional Waste Manager, such that it is received by the Regional Waste Manager, on, or before March 31, each year for the previous year's monitoring. Raw data are to be attached as appendices to the report. The report shall include graphical trend analysis of amenable data, an evaluation of those trends and discussion of any points of action which may arise from the data. A copy of the Annual Report shall also be placed in the local library for public access.

7.2.1. Effluent

Maintain records of effluent analyses and flow measurements for inspection by the Regional Waste Manager or his designate, and annually submit the data, suitably tabulated, to the Regional Waste Manager.

For the first 12 months of operation, effluent data are to be submitted monthly to the Regional Waste Manager by E-mail or floppy disk. The data shall be arranged in a computer spreadsheet format acceptable to the Regional Waste Manager.

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7.2.2. Influent

Maintain records of influent analyses for inspection by the Regional Waste Manager or his designate, and annually submit the data, suitably tabulated, to the Regional Waste Manager.

7.2.3. Lake and Creek Monitoring

Maintain records of lake and creek monitoring for inspection by the Regional Waste Manager or his designate, and annually submit the data, suitably tabulated, to the Regional Waste Manager.

7.2.4. Infiltration area Well Monitoring

Maintain records of infiltration area well monitoring for inspection by the Regional Waste Manager or his designate, and annually submit the data, suitably tabulated, to the Regional Waste Manager.

7.2.5. Irrigation

Maintain effluent water balance records. Maintain records of the duration, intensity, acreage, location and type of effluent irrigation. For lands other than the treatment plant site: Maintain records of crop production and nutrient content. Maintain records of soil, water and nutrient balances and assessments of any changes in the soil, surface or groundwater regimes. Maintain records of groundwater monitoring data. Annually submit the data as part of an Irrigation Plan and Soil Assessment.

7.2.6. Sludge

Maintain records of sludge analysis, sludge volumes and application sites for inspection by the Regional Waste Manager or his designate, and annually submit the data, suitably tabulated, to the Regional Waste Manager, prior to the end of the month of March, for the previous year's monitoring.

7.2.7. I&I

Maintain records of efforts to reduce infiltration, inflow and cross connections and annually submit the data, suitably tabulated, to the Regional Waste Manager.

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– industrial effluent parameters.

7.2.8. Influent Wastes By-law(s)

Maintain records of efforts to administer the influent wastes by-law(s) and annually submit the data, suitably tabulated, to the Regional Waste Manager. Include as an attachment, any amendments to the influent wastes by-law(s) that have been made during the past year.

7.2.9. Water Conservation

Maintain records of efforts to implement water conservation initiatives and annually submit the data, suitably tabulated, to the Regional Waste Manager.

With prior written authorization from the Regional Waste Manager, data may be submitted, suitably formatted, on computer storage media such as a floppy disk or another similar device.

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APPENDIX A

Requirements of Reclaimed Wastewater Users

The holder of this Operational Certificate (The reclaimed water supplier) shall be responsible for ensuring that contractual agreement(s) with each Reclaimed Water User are in accordance with the Operational Certificate.

A copy of this Appendix is to be provided to EACH USER prior to the commencement of irrigation EACH YEAR. Documentation, indicating that Reclaimed Water Users were provided a copy of this Appendix, is to be included in the Annual Report each year.

8. GENERAL REQUIREMENTS

8.1. Plans - New Works

8.1.1. Plans for modifications and/or extensions to the existing reclaimed water irrigation system shall be approved by a person qualified in the design of irrigation systems and the Irrigation Plan and the Soils Assessment is to be submitted to the Regional Waste Manager for authorization prior to the commencement of irrigation on the subject property.

8.1.2. Design and construct the irrigation works in accordance with best current agricultural practice and the "Pollution Control Guidelines for Municipal Effluent Application to Land", dated January 1983, and any amendments thereto, issued by the Ministry of Environment of British Columbia, and also in accordance with the "B.C. Sprinkler Irrigation Manual", dated 1989, prepared by the B.C. Ministry of Agriculture and Fisheries or the "B.C. Trickle Irrigation Manual", dated 1987, prepared by the B.C. Ministry of Agriculture and Fisheries.

8.2. Construction Criteria

8.2.1. All reclaimed water user valves, shall be of a type, or secured in a manner, that permits operation only by personnel authorized by each reclaimed water user. All piping, valves and outlets should be clearly marked to differentiate reclaimed water from domestic water. All reclaimed water controllers, valves, etc., shall be affixed with reclaimed water warning signs. It is recommended that, where possible purple coloured pipe and fixtures be utilized to facilitate identification of reclaimed water piping and fixtures.

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8.2.2. Use or installation of hose-bibs on any irrigation system presently operating, or designated to operate with reclaimed water, regardless of the hose-bib construction or identification, is not permitted.

8.2.3. There shall be at least a 3 metre horizontal and a 0.3 metre vertical separation (with domestic water pipeline above the reclaimed water pipeline) between all pipelines transporting reclaimed water and those transporting domestic water.

8.2.4. There shall be no connection between a potable water supply, irrigation water or industrial well, and piping containing reclaimed water, except through an air gap separation or reduced pressure principle device.

8.3. Fencing

Fencing is generally not required for unrestricted use irrigation but may be required at the discretion of the regional waste manager. Fencing is generally required for restricted use irrigation

8.4. Signage

8.4.1. Prominent "NO TRESPASSING", signs shall be erected around agricultural and silvicultural sites irrigated with reclaimed water, warning persons of the possible health hazard during the irrigation season and advising that the water used for irrigation is NOT POTABLE. The wording shall be in language or symbols readily comprehensible by the general public. e.g. "NO TRESPASSING - RECLAIMED WATER - DO NOT DRINK"

8.4.2. Warning signs shall be posted in sufficient numbers and size and at strategic locations to advise the public that reclaimed water is being used. Additional signage may be required as directed by the Regional Waste Manager.

9. GENERAL REQUIREMENTS - RECLAIMED WATER IRRIGATION

9.1. Buffer Zones

9.1.1. The requirement for formal buffer zones surrounding lands irrigated with reclaimed water is no longer in effect, however, a buffer zone may be specified by the Regional Waste Manager.

9.1.2. Reclaimed water applied by irrigation shall not be applied to the ground any closer than 15 metres from the edge of flowing streams or bodies of water, unless an approved plan of irrigation permitting lesser setbacks has been specifically authorized in writing by the regional waste manager.

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9.1.3. There shall be no reclaimed water irrigated within 30 metres of any well or in-ground reservoir for domestic supply.

9.2. **Timing Of Irrigation**

Effluent irrigation outside of the plant grounds shall only occur when members of the public are not present. This may be accomplished be irrigation during the night, by controlled access or by some other equivalent means.

9.3. **BC Municipal Sewage Regulation**

The rules surrounding effluent irrigation and re-use are under review in conjunction with the new Municipal Sewage Reg. Once the new regulation has been finalized, it is expected that many of the clauses regarding effluent irrigation and re-use may be amended to reflect agreements reached between the Ministries of Health and Environment.

9.4. **Surface Runoff**

9.4.1. There shall be no surface runoff of irrigated reclaimed water from the irrigated lands.

9.4.2. The maximum ground slope shall not exceed 20% without the written consent of the Regional Waste Manager.

9.5. **Surfacing Reclaimed Water**

9.5.1. Irrigation shall be managed in such a fashion as to preclude surfacing of irrigation tail water down slope of the point of irrigation.

9.5.2. Irrigation shall be managed as to prevent ponding.

9.6. **Spray Irrigation Drift**

9.6.1. Reclaimed water shall be confined to the area designated and approved for irrigation with reclaimed water. The reclaimed water irrigation system shall be managed in such a fashion as to prevent aerosol drift from leaving the irrigated lands.

9.6.2. Precautions shall be taken to ensure that reclaimed water will not have contact with any facility or area not designated for reclamation, such as passing vehicles, buildings, domestic water facilities, fruit and vegetable gardens, or food handling facilities.

9.6.3. Drinking water facilities shall be protected from direct or wind blown reclaimed water spray.

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9.7. Irrigation Rates

9.7.1. Irrigation rates for spray irrigation shall not exceed the rates given in "B.C. Sprinkler Irrigation Manual", dated 1989, prepared by the B.C. Ministry of Agriculture and Fisheries and irrigation rates for trickle irrigation shall not exceed the rates given in those given in "B.C. Trickle Irrigation Manual", dated 1987, prepared by the B.C. Ministry of Agriculture and Fisheries.

9.7.2. Soils of the irrigated lands will be monitored periodically or as otherwise directed by the Regional Waste Manager or the Town, to prevent saturation, erosion, and instability.

9.8. Agricultural Products Lag Time

9.8.1. A three day lag time is required before uninspected livestock intended for human consumption are permitted on areas irrigated with reclaimed water. No lag time is required if livestock are subjected to the federal meat inspection program.

9.8.2. A six day lag time is required before dairy cattle are permitted in areas irrigated with reclaimed water.

9.8.3. A three day lag time, after irrigation has ceased, is required before a crop intended for animal feed is harvested.

9.9. Insect and Vector Control

Adequate measures shall be taken to prevent the breeding of insects and other vectors of health significance, and the creation of odours, slimes or unsightly deposits.

9.10. Irrigation of Public Areas

9.10.1. Irrigation on golf courses, parks or cemeteries shall only be practised when the public are not present.

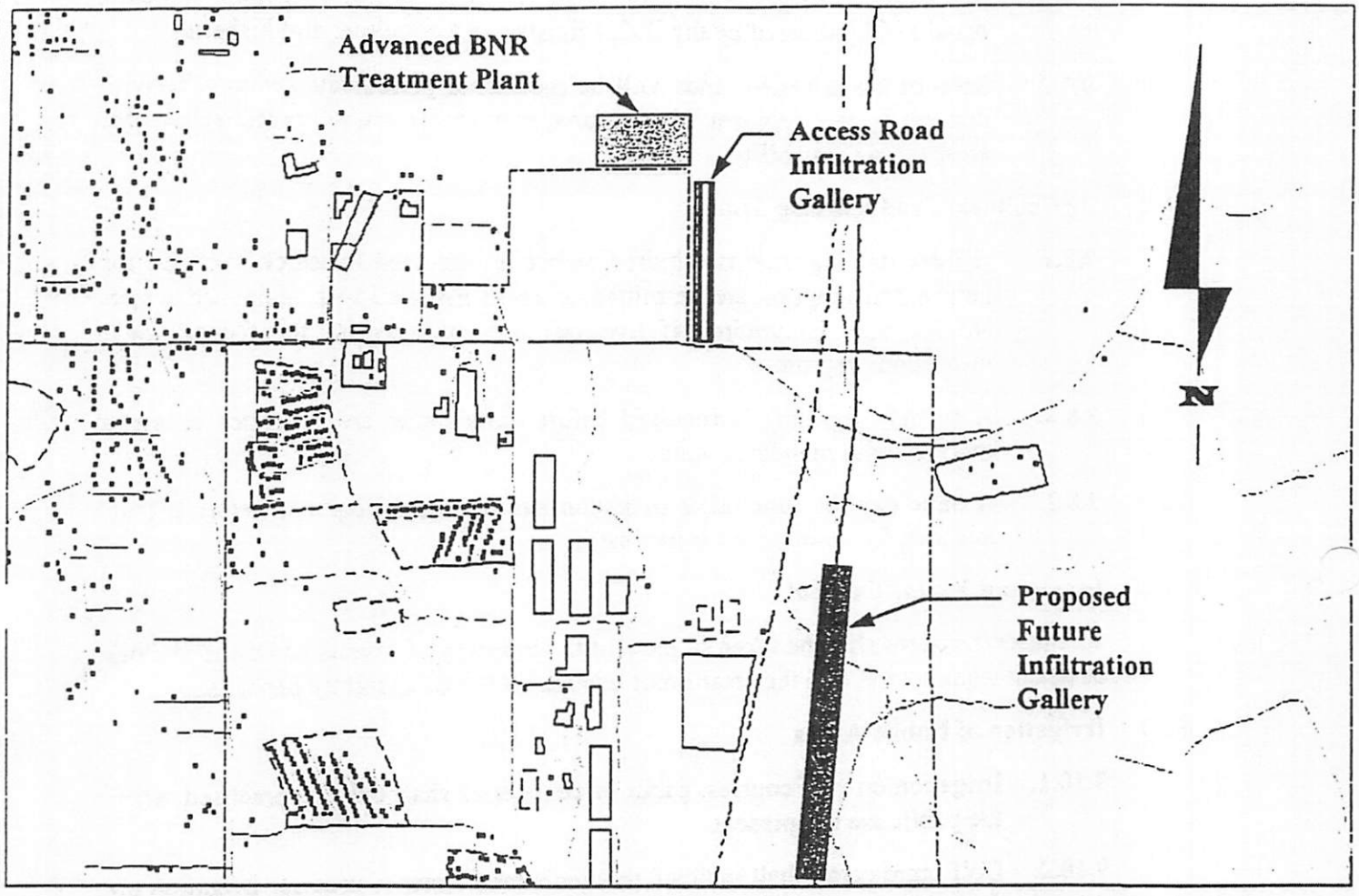
9.10.2. Golf score cards shall indicate that reclaimed water is used for irrigation on the golf course lands.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

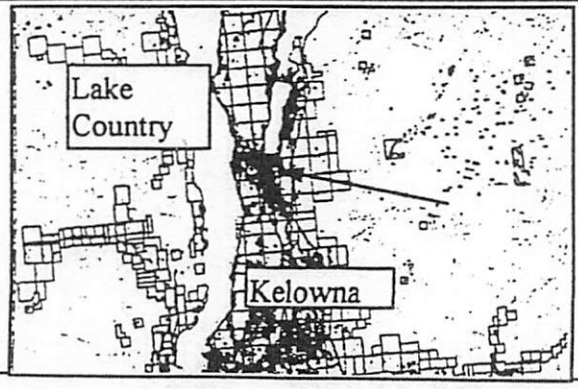
PROVINCE OF
BRITISH COLUMBIA

Environmental Protection

SITE PLAN A



Location Map



Scale: nts

Permit No: PE 14651

Date: November 5, 1998

T. R. Forty P.Eng.
Assistant Regional Waste Manager

POLLUTION
PREVENTION

BRITISH COLUMBIA

Suite 201
3547 Skaha Lake Road
Penticton
British Columbia V2A 7K2
Telephone: (250) 490-8200
Fax: (250) 492-1314

MINISTRY OF ENVIRONMENT,
LANDS AND PARKS

PERMIT
PE 10821

Under the Provisions of the Waste Management Act

District of Lake Country

Unit 17 11852 Highway 97

Lake Country BC V4V 1E3

is authorized to discharge effluent to the ground from the Whitson-Nuyens residential subdivision located at Carr's Landing Road, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Waste Management Act and may result in prosecution.

An annual Permit fee will be charged as per the Waste Management Permit Fee Regulation.

This permit supersedes and amends all previous versions of Permit PE 10821 issued under the Waste Management Act.

1. AUTHORIZED DISCHARGES

1.1. The discharge of effluent to which this Sub-Section is applicable is from the Whitson-Nuyens residential subdivision as shown on the attached Site Plan A. The Environmental Monitoring System (EMS) reference number for this discharge is E 219253.

1.1.1. The maximum rate at which effluent may be discharged is 28.6 m^3/day.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

1.1.2. The characteristics of the effluent shall be equivalent to or better than:

(a) 5-day Biochemical Oxygen Demand, 130 mg/L;

(b) Total Suspended Solids, 130 mg/L.

1.1.3. The works authorized are low pressure sewage collection system, pump station and forcemain, dousing chamber and forcemains, remote site alarm monitoring system, septic tanks, two sub-surface tile disposal fields each containing a minimum of 360 m of tile and related appurtenances approximately located as shown on the attached Site Plan (Appendix A).

1.1.4. The location of the facilities from which the discharge originates is the Whitson-Nuyens residential subdivision.

1.1.5. The location of the point of discharge is Lot 2, Plan 28861, Section 5, Township 14, O.D.Y.D.

2. GENERAL REQUIREMENTS

2.1. Maintenance of Works and Emergency Procedures

The Permittee shall inspect the pollution control works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the Permittee which prevents continuing operation of the approved method of pollution control, the Permittee shall immediately notify the Regional Waste Manager and take appropriate remedial action.

2.2. ByPasses

The discharge of effluent which has bypassed the designated treatment works is prohibited unless the consent of the Regional Waste Manager is obtained and confirmed in writing.

2.3. Process Modifications

The Permittee shall notify the Regional Waste Manager prior to implementing changes to any process that may affect the quality and/or quantity of the discharge.

2.4. Plans - New Works

Plans and specifications of the works authorized in Section 1.1.3 shall be submitted to the Regional Waste Manager and his consent obtained before construction commences. The works shall be constructed in accordance with such plans.

2.5. Septic Tank Sludge and Scum Removal

Sludge and scum shall be removed from the septic tank(s) annually, or at other frequencies as the Regional Waste Manager may allow, for disposal at a suitable site. The disposal arrangements require the consent of the Regional Waste Manager. Records of sludge and scum removal shall be maintained for inspection.

2.6. Service Contract

The Permittee shall retain a person professionally qualified in the area of wastewater treatment systems with a service contract which is acceptable to the Regional Waste Manager to oversee and ensure proper operation and servicing of the sewer collection system, septic tanks and tile disposal fields.

2.7. Tile Field Operation

The Permittee shall alternate the use of the tile fields. The alternating period requires the consent of the Regional Waste Manager.

2.8. Standby Facilities

The Permittee shall set aside a standby area equivalent to 50% of the total installed disposal field area. The standby area is to be held in reserve for future use as a disposal field and is to be maintained free of any permanent structures.

2.9. Vehicular Access

Vehicular access to the disposal tile fields and standby area shall be restricted to the satisfaction of the Regional Waste Manager.

2.10. Surface Water Diversion

Surface water shall be intercepted and diverted away from the disposal area.

3. MONITORING AND REPORTING REQUIREMENTS

3.1. Flow Measurement

Provide and maintain a suitable flow measuring device and record once per day the effluent volume discharged over a 24-hour period.

3.2. Reporting

Maintain data of flow measurements for inspection and submit the data, suitably tabulated, to the Regional Waste Manager for the previous year's monitoring. All reports shall be received in the Regional Office within sixty days of the end of a calendar year for that year's monitoring

3.3. Groundwater Observations Wells

The Permittee may be required to install groundwater observation wells. The numbers, locations and structural details of these facilities require the consent of the Regional Waste Manager.

APPENDIX B
Daily Checklist/SOPs

LAKE COUNTRY
Life. The Okanagan Way.

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Operator Initials							
Time							
HEADWORKS							
Influent Flow (L/sec)							
Channel Level LI-1001 (m)							
Barscreen SCR-1001A							
Level SP (m)	0.910						
Cycle Time SP (mins)	60						
Low Level SP (m)	0.480						
Compactor COM-1002							
Barscreen Cycles to Start (cycles)	30						
Compactor Run Time SP (mins)	4						
Septage Handling FI-1500 (L/sec)							
Septage Screen LI-1551							
Start Level (m)	0.55						
Stop Level (m)	0.30						
Wash Water On (mins)	3.5						
Wash Water Off (mins)	0.3						
High Level Alarm (m)	1.00						
Grit Pump P1704							
Start Level (m)	0.55						
Stop Level (m)	0.40						
Oil / Grit Alarm SP SEP-1525A							
Low Level (m)	0.10						
High Level (m)	1.10						
Gas Detection							
Combustables (% LEL)							
H2S (ppm)							
Flow Totals - Yesterday							
Septage (m^3)							
Influent (m^3)							
Run Times - Yesterday							
SCR-1001A (cycles)							
COM-1002 (mins)							
SCR-1551 (mins)							
P-1704 (mins)							

Comments:

Printed on: 2019-01-18

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
GRIT REMOVAL / RAW SEWAGE							
Run Times - Yesterday							
GCM-1060 (mins)							
P-1066 (mins)							
SC-1725 (mins)							
RS Grit Cyclone CYC-1070							
Cycle Time SP (mins)	120						
Pre-Scour Time SP (mins)	0.2						
Enable / Disable							
PRIMARY CLARIFIER							
FI-2025 (L/sec)							
Alarm SP Low Flow (L/sec)	0.05						
Flow Controller							
Auto / Manual	Auto						
Output (Hz)	2.6						
SP (L/sec)	0						
Variable (SP)	0						
Run Times - Yesterday							
PCM-2011 (mins)							
MAC-2015 (mins)							
P-2020 (mins)							
Flow Totals (m^3)							

Comments:

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
BIOREACTOR #1							
Primary Effluent Flow (L/Sec)							
Primary Effluent Diversion							
Cycle Time SP (mins)	9						
Duration SP (mins)	6						
Control (cycle / cont)	Cycle						
Control (remote/local)	Remote						
Dissolved Oxygen							
Air Flow to Bioreactor 1 (m3/min)							
Aerobic Cell #1 (mg/L)							
Aerobic Cell #2 (mg/L)							
Aerobic Cell #3 (mg/L)							
Bioreactor 1 Average D.O. (mg/L)							
D.O. Control (auto/man)	Auto						
Blower Output (%)							
D.O Setpoint (mg/L)							
PV Selector	BIO 1 & 2 ALL CELLS MOVING AVGERAGE						
Moving Average Time (mins)	3						
WAS Pump 3015-A							
On/Off							
Mixer Controls (remote/local)							
MXR-3001A	Remote						
MXR-3004A	Remote						
MXR-3007A	Remote						
Mixed Liquor Recycle							
Control (remote/local)	Remote						
Recycle Speed SP (Hz)							
Recycle Speed PV (Hz)							
Alarms							
RAS Low Flow	2.0						
Controlling D.O. Low	0.9						
Controlling D.O. High	4.0						
Cell #1 Low	0.1						
Cell #2 Low	0.1						
Cell #3 Low	0.0						
Flow Totals - Yesterday							
Primary Effluent (m^3)							
RAS (m^3)							
Run Times - Yesterday							
P-2999A (mins)							
MXR-3001A (mins)							
MXR-3004A (mins)							
MXR-3007A (mins)							
MXR-3011A (mins)							
P-3015A (mins)							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
BIOREACTOR #2							
Primary Effluent Flow (L/Sec)							
Primary Effluent Diversion							
Cycle Time SP (mins)	9						
Duration SP (mins)	6						
Control (cycle / cont)	Cycle						
Control (remote/local)	Remote						
Dissolved Oxygen							
Air Flow to Bioreactor 2 (m3/min)							
Aerobic Cell #1 (mg/L)							
Aerobic Cell #2 (mg/L)							
Aerobic Cell #3 (mg/L)							
Bioreactor 2 Average D.O. (mg/L)							
D.O. Control (auto/man)	Auto						
Blower Output (%)							
D.O Setpoint (mg/L)							
PV Selector	BIO 1 & 2 ALL CELLS MOVING AVGERAGE						
Moving Average Time (mins)	3						
WAS Pump 3115-A							
On/Off							
Mixer Controls (remote/local)							
MXR-3101A	Remote						
MXR-3104A	Remote						
MXR-3107A	Remote						
Mixed Liquor Recycle							
Control (remote/local)	Remote						
Recycle Speed SP (Hz)							
Recycle Speed PV (Hz)							
Alarms							
RAS Low Flow	2.0						
Controlling D.O. Low	0.9						
Controlling D.O. High	4.0						
Cell #1 Low	0.1						
Cell #2 Low	0.1						
Cell #3 Low	0.0						
Flow Totals - Yesterday							
Primary Effluent (m^3)							
RAS (m^3)							
Run Times - Yesterday							
P-2998A							
MXR-3101A (mins)							
MXR-3104A (mins)							
MXR-3107A (mins)							
MXR-3111A (mins)							
P-3115A (mins)							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
BLOWERS							
Blower Building Temp (deg C)							
Electrical Room Temp (deg C)							
Outside Temp (deg C)							
Sequence (Lead Lag Stand-by)							
Blower 3910 Control (remote/local)	Remote						
Blower 3920 Control (remote/local)	Local						
Blower 3930 Control (remote/local)	Local						
Blower 3910							
Status							
Outlet Pressure (kPa)							
Set Vaule (%)							
Blower Speed (RPM)							
Power (Kw)							
Air Flow (Q) (m3/min)							
Inlet Temp (T1) (degC)							
Outlet Temp (T2) (degC)							
Filter Diff Pressure							
Run Times (hours)							
Blower 3920							
Status							
Outlet Pressure (kPa)							
Set Vaule (%)							
Blower Speed (RPM)							
Power (Kw)							
Air Flow (Q) (m3/min)							
Inlet Temp (T1) (degC)							
Outlet Temp (T2) (degC)							
Filter Diff Pressure							
Run Times (hours)							
Blower 3930							
Status							
Outlet Pressure (kPa)							
Set Vaule (%)							
Blower Speed (RPM)							
Power (Kw)							
Air Flow (Q) (m3/min)							
Inlet Temp (T1) (degC)							
Outlet Temp (T2) (degC)							
Filter Diff Pressure							
Run Times (hours)							
DO Controller Tuning							
Gain	0.75						
Reset (secs)	45.00						
PV Deadband	0.03						
Output High Limit (%)	100						
Output Low Limit (%)	50						

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
DAF SYSTEM DAF-7000A							
Cycle SP (mins)	14.5						
M3 Stop SP (m^3)	1000						
Enable/Disable	Enabled						
Control (cycle / cont)	Cycle						
Run Times - Yesterday							
SKM-7000A (cycles)							
P-7010A (mins)							
P-7720A (mins)							
P-7720B (mins)							
WAS Flow Control							
Control (auto/man)	Auto						
Output (Hz)							
WAS Local SP (L/sec)							
WAS Flow FIT-7000A (L/sec)							
Low Flow SP (L/sec)							
WAS Totalizer (m3)							
DAF Polymer							
Control Mode	Flow Pace						
Duty Pump Selector (switch weekly)							
Pump SP (L/Hr)							
P-7720A Flow (L/Hr)							
P-7720A Speed (Hz)							
P-7720B Flow (L/Hr)							
P-7720B Speed (Hz)							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
SECONDARY CLARIFIER / EFFLUENT							
RAS FIC-4106							
Auto / Manual	Auto						
Output (Hz)							
Setpoint (L/sec)							
Bioreacor #1 Flow (L/Sec)							
Bioreacor #2 Flow (L/Sec)							
Effluent FI-6050							
Flow (L/sec)							
Flow Alarm SP (L/sec)	3.00						
Auto / Manual	Auto						
Low Level SP (m)	1.00						
High Level SP (m)	3.50						
First Pump Start SP (m)	2.60						
Second Pump Start SP (m)	2.70						
Third Pump Start SP (m)	2.80						
First Pump Stop SP (m)	1.70						
Second Pump Stop SP (m)	1.70						
Third Pump Stop SP (m)	1.70						
Pump Sequence (switch weekly)							
Effluent Tank Level LI-6100 (m)							
Run Times - Yesterday							
SCM-4100 (mins)							
P-4106 (mins)							
P-4121 (mins)							
P-6101 (mins)							
P-6102 (mins)							
P-6103 (mins)							
Flow Totals - Yesterday							
RAS to Bio 1 (m^3)							
RAS to Bio 2 (m^3)							
Effluent (m^3)							
C3 water (m^3)							
Final Effluent (minus C3) (m^3)							
Comments:							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
DEWATERING							
Tank Levels							
TWAS LIC-7020A (m)							
Septage LIC-7020B (m)							
Centrate LIC-7925A (m)							
Centrate Control FIC-7935							
Auto / Manual							
Flow SP (L/sec)							
Gas Detection							
Combustables (% LEL)							
H2S (ppm)							
Run Times - Yesterday							
MAC-2015 (mins)							
P-2020 (mins)							
P-7711 (mins)							
MAC-7720 (mins)							
P-7721 (mins)							
P-7725 (mins)							
P-7722A (mins)							
P-7722B (mins)							
P-7724A (mins)							
P-7935A (mins)							
AER-7705 (mins)							
MXR-900 (mins)							
MXR-900B (mins)							
CENT #1 (mins)							
CENT #2 (mins)							
Flow Totals - Yesterday							
FPS (m^3)							
TWAS (m^3)							
Septage P-7721 (m^3)							
Septage P-7725 (m^3)							
Total Sludge (m^3)							
Centrate (m^3)							
SLUDGE BIN							
Emptied Today (Y / N)							
Bin taken at what time?							

Comments:

LAKE COUNTRY
Life. The Okanagan Way.

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
MISC. SERVICES							
C3 Water System P-6100A							
Pressure (psig)							
Flow (L/sec)							
Pressure SP (psig)	50.0						
Output (Hz)							
Start Pressure SP (psig)	40.0						
Stop Pressure SP (psig)	65.0						
Low Pressure SP (psig)	20.0						
High Pressure SP (psig)	80.0						
C3 Water System P-6100A (m3)							
Security							
Intursion (Normal?)							
Smoke (Normal?)							
Trouble (Normal?)							
FOUL AIR & HVAC SYSTEMS							
Foul Air Blowers EF-5 & EF-6							
Foul Air Fan EF-5 (Hz)							
Foul Air Fan EF-6 (Hz)							
Supply Fan SF-2 (Hz)							
All fans in remote?							
Exhaust Fans in Auto (Y / N)							
Foul and Supply Air Settings							
Foul Air Duty Selector (switch weekly)							
Foul Air EF-5 Speed SP (Hz)	48.0						
Foul Air EF-6 Speed SP (Hz)	48.0						
Supply Air Fan 2 Speed SP (Hz)	50.0						
Supply Air Fan 2 Alarm SP (Hz)	35.0						
Foul Air Blowers B-8050 B-8052							
Foul Air Duty Selector(switch weekly)							
Foul Air B-8050 (amps)							
Foul Air B-8052 (amps)							
Run Times							
B-8050A							
B-8052A							
B-8053A							
B-8054A							

Comments:

LAKE COUNTRY
Life. The Okanagan Way.

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
TREND SCREENS (look at "Highest" column on trends)							
Headworks							
Trends OK?							
Blowers Air Flow							
Trends OK?							
Average Flow to Bio 1 (m^3/min)							
Average Flow to Bio 2 (m^3/min)							
Average DO Process Variable							
Average DO control OP							
Highest DO control OP							
Lowest DO control OP							
Bioreactor #1							
Trends OK?							
Average DO 3005 (mg/L)							
Average DO 3006 (mg/L)							
Average DO 3007 (mg/L)							
Bioreactor #2							
Trends OK?							
Average DO 3105 (mg/L)							
Average DO 3106 (mg/L)							
Average DO 3107 (mg/L)							
WAS/ Scum							
Trends OK?							
DAF							
Trends OK?							
WAS Totalizer (m^3)							
Centrate							
Trends OK?							
Centrate Pump Timer (min)							
RAS							
Trends OK?							
Effluent							
Trends OK?							
Septage Unloading							
Trends OK?							
Grit							
Trends OK?							
TWAS to Centrate							
Trends OK?							
FPS to Centrate							
Trends OK?							
Septage to Cent							
Trends OK?							
C3 Water							
Trends OK?							
Centrifuge							
Trends OK?							

Comments:

Printed on: 2019-01-18

LAKE COUNTRY
Life. The Okanagan Way.

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
LIFTSTATIONS							
Lodge Road							
Pump Mode (ALT/Lead1/Lead 3)	ALT						
Level Control Source(Mill/Sub)	MILL						
Flow SP (L/sec)	26.00						
Pump Lead Stop SP (m)	0.95						
Pump Lead Start SP (m)	1.20						
Pump Lag Stop SP (m)	1.30						
Pump Lag Start SP (m)	1.50						
High Level SP (m)	1.80						
Low Level SP (m)	0.20						
Milltronics Level Incre. SP (m)	N/A						
Milltronics Lvl Changing Timer (s)	N/A						
Sub Not Changing Timer (s)	500						
Clement							
Pump Mode (ALT/Lead1/Lead 2)	ALT						
Pump Stop SP (m)	0.75						
Pump Lead SP (m)	1.00						
Pump Lag SP (m)	1.90						
High Level SP (m)	2.20						
Low Level SP (m)	0.40						
Woodsdale							
Pump Stop SP (m)	0.80						
Pump Lead SP (m)	1.50						
Pump Lag SP (m)	1.80						
High Level SP (m)	2.00						
Low Level SP (m)	0.40						
Seymour							
Pump Stop SP (m)	0.60						
Pump Lead SP (m)	2.00						
Pump Lag SP (m)	0.80						
Pump Lag Stop SP (m)	2.10						
High Level SP (m)	2.20						
Low Level SP (m)	0.30						
Low Flow SP (lps)	5.00						
Davidson							
Pump Stop SP (m)	0.70						
Pump Lead SP (m)	0.90						
Pump Lag SP (m)	1.20						
High Level SP (m)	1.50						
Low Level SP (m)	0.40						
Lakes							
Pump Stop SP (m)	0.90						
Pump Lead SP (m)	1.10						
Pump Lag SP (m)	1.30						
High Level SP (m)	2.00						
Low Level SP (m)	0.50						
Low Flow SP (lps)	0.80						

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
LIFTSTATIONS							
Lakestone 1							
Pump Stop SP (m)	0.80						
Pump Lead SP (m)	1.00						
Pump Lag SP (m)	1.40						
High Level SP (m)	1.50						
Low Level SP (m)	0.20						
Lakestone 2A							
Pump Stop SP (m)	1.00						
Pump Lead SP (m)	1.07						
Pump Lag SP (m)	1.30						
High Level SP (m)	1.50						
Low Level SP (m)	0.20						
Lakestone 2B							
Pump Stop SP (m)	1.00						
Pump Lead SP (m)	1.15						
Pump Lag SP (m)	1.30						
High Level SP (m)	2.00						
Low Level SP (m)	0.20						
Lakestone 4							
Pump Stop SP (m)	0.90						
Pump Lead SP (m)	1.15						
Pump Lag SP (m)	1.90						
High Level SP (m)	2.50						
Low Level SP (m)	0.20						

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Lakestone 3 Sanitary							
Pump Lead Stop SP (m)	0.55						
Pump Lead Start SP (m)	0.70						
Pump Lag Stop SP (m)	0.60						
Pump Lag Start SP (m)	1.20						
High Level SP (m)	1.50						
Low Level SP (m)	0.20						
Low Flow SP (L/sec)	13.00						
Lakestone 3 Storm							
Pump Lead Stop SP (m)	0.75						
Pump Lead Start SP (m)	0.84						
Pump Lag 1 Stop SP (m)	0.75						
Pump Lag 1 Start SP (m)	1.36						
Pump Lag 2 Start SP (m)	1.47						
Pump Lag 2 Stop SP (m)	0.77						
High Level SP (m)	1.89						
Low Level SP (m)	0.21						
Low Flow SP (L/sec)	10.00						
Lakestone 3 Temp Controls							
Exhaust fan on SP (deg C)	30.0						
PID Temp SP (deg C)	10.0						
PID Manual SP (%)	11.0						
Lakestone 3 PID Controls							
PID level SP (m)	1.02						
PID Manual Speed SP (%)	100.0						
PID Flow SP (L/sec)	11.0						
Benchlands 1							
Pump Lead Stop SP (m)	0.50						
Pump Lead Start SP (m)	0.80						
Pump Lag Stop SP (m)	0.40						
Pump Lag Start SP (m)	0.90						
High Level SP (m)	0.95						
Low Level SP (m)	0.20						
Low Flow SP (L/sec)	0.50						

LAKE COUNTRY
Life. The Okanagan Way.

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
END SCREENS (look at "Highest" column on trends)							
Lodge Road - Yesterday							
Flow Totalizer (m^3)							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Clement - Yesterday							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Woodsdale - Yesterday							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Seymour - Yesterday							
Flow Totalizer (m^3)							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Davidson - Yesterday							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Carrs #1 - Whitson-Nuyens - Yesterday							
Lower Station Pump 1 (mins)							
Lower Station Pump 2 (mins)							
Upper Station Pump 1 (mins)							
Upper Station Pump 2 (mins)							
Carrs #2 - Lance Marshall - Yesterday							
Lake Station Pump 1 (mins)							
Lake Station Pump 2 (mins)							
Lower Station Pump 1 (mins)							
Lower Station Pump 2 (mins)							
Upper Station Pump 1 (mins)							
Upper Station Pump 2 (mins)							
Amry - Yesterday							
Effluent Flow Total (m^3)							
DO High (mg/L)							
DO Low (mg/L)							
DO Avgerage (mg/L)							
Blower 1 (min)							
Blower 2 (min)							
Equal Pump 1 (min)							
Equal Pump 2 (min)							
Effluent Pump 1 (min)							
Effluent Pump 2 (min)							
Lakes - Yesterday							
Flow Totalizer (m^3)							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							

Printed on: 2019-01-18

LAKE COUNTRY
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LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Lakestone 1							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Lakestone 2A							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Lakestone 2B							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Lakestone 4							
Pump 1 (mins)							
Pump 2 (mins)							
Generator Run Time (mins)							
Lakestone 3 Sanitary							
Flow Totalizer (m^3)							
Pump 104 (mins)							
Pump 105 (mins)							
Generator Run Time (mins)							
Lakestone 3 Storm							
Pump 101 (mins)							
Pump 102 (mins)							
Pump 103 (mins)							
Generator Run Time (mins)							
Benchlands 1							
Flow Totalizer (m^3)							
Pump 1 (mins)							
Pump 105 (mins)							
Generator Run Time (hrs)							

Printed on: 2019-01-18

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	January 14	January 15	January 16	January 17	January 18	January 19	January 20
Operator Initials							
Time							
QA/QC							
Standards							
Ortho P = 0.33 mg/L							
NH_3 = 1 mg/L							
NO_3 = 1 mg/L							
pH meter							
pH 4							
pH 7							
pH 10							
Change storage solution							
Soak in Cleaning solution (overnight)							
Reagent Blank							
Otho P mg/L							
Pipette							
1-10mL Pipette (use 5mL)							
1)			g				
2)			g				
3)			g				
0.1-1.0mL Pipette (use 1mL)							
1)			g				
2)			g				
3)			g				
Balance							
Calibrate Balance							
Balance weight (1g weight)			g				
Check balance is Level							
Monthly Samples							
Effluent - with monthly samples							
COD (mg/L)							
Influent - with monthly samples							
COD (mg/L)							
Split Sample							
Sample Taken (Y/N)							
Indicate which Split sample taken							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
NH_3-N (mg/L)							
NH_3-N Dilution Factor							
NO_3-N (mg/L)							
NO_2 - N (mg/L)							
NO_2-N Dilution Factor							
TSN (mg/L)							
pH							
Duplicate Samples							
Sample Taken (Y/N)							
Indicate which samples are duplicate							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Operator Initials							
Time							
PROCESS LAB							
Influent							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
NH_3 -N (mg/L)							
NH_3-N Dilution Factor							
NO_3 -N (mg/L)							
pH							
Bioreactor #1 Cell #7 (Alternate bioreactor sample daily)							
Ortho P (mg/L)							
NH_3 -N (mg/L)							
NO_3 -N (mg/L)							
TSN (mg/L)							
Bioreactor #2 Cell #7 (Alternate bioreactor sample daily)							
Ortho P (mg/L)							
NH_3 -N(mg/L)							
NO_3 -N (mg/L)							
TSN (mg/L)							
Effluent - TSN exceedance value = 6mg/L							
Ortho P (mg/L)							
NH_3 -N (mg/L)							
NO_3-N (mg/L)							
NO_2 - N (mg/L)							
NO_2-N Dilution Factor							
TSN (mg/L)							
pH							
Centrate Vault							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
NH_3 -N(mg/L)							
NH_3-N Dilution Factor							
pH							
RAS							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
NH_3 -N(mg/L)							
NH_3-N Dilution Factor							
NO_3-N (mg/L)							
pH							
Anaerobic Zone (Alternate bioreactor sample weekly)							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
QA/QC							
Daily pH check (buffer 7)							
Pass/Fail							
Oven Temp Check (103-105 C)							

Not too exceed: 1.5 mg/L 6.0 mg/L (NH_3 + NO_3)
Annual Average: 0.15 mg/L

Comments:

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Operator Initials							
Time							
PROCESS LAB							
Amry Aeration Tank							
Ortho-P (mg/L)							
Ortho-P Dilution Factor							
NH_3 (mg/L)							
NH_3-N Dilution Factor							
NO_3 (mg/L)							
NO_3-N Dilution Factor							
TSN (mg/L)							
pH							
Amry Effluent							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
NH_3 (mg/L)							
NH_3-N Dilution Factor							
NO_3 (mg/L)							
NO_3-N Dilution Factor							
TSN (mg/L)							
pH							
Primary Effluent - Once per week							
Ortho P (mg/L)							
Ortho-P Dilution Factor							
VFA (mg/L)							
COD (mg/L)							
Centrate - Once per week							
VFA (mg/L)							
Inffluent - with monthly samples							
COD (mg/L)							
Effluent - with monthly samples							
COD (mg/L)							
Sludge Volume Index - Once per week							
Settled Volume after 30 mins (mL)				mL			
SVI (mL/g):				mL/g			

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Thursday

January 17

LIFT STATIONS

Lodge Road

Pump 1 - Run in hand	
Hours	
Amps	
Flow (L/sec)	
Pump 3 - Run in hand	
Hours	
Amps	
Flow (L/sec)	

Generator	
Hours	
Fuel Level (% full)	
Run Generator under Load	
Weed eat / Snow removal	
FOA Blower Hours	
FOA Blower Amps	

Comments:

Woodsdale

Pump 1 - run in hand if nesseccary	
Hours	
Amps	
Pump 2	
Hours	
Amps	

Generator	
Hours	
Fuel Level (% full)	
Run Generator under Load	
Weed eat / Snow removal	

Comments:

Clement

Pump 1 - run in hand if nesseccary	
Hours	
Amps	
Pump 2	
Hours	
Amps	

Generator	
Hours	
Fuel Level (% full)	
Run Generator under Load	
Weed eat / Snow removal	

Comments:

Seymour

Pump 1 - run in hand if nesseccary	
Hours	
Amps	
Flow (L/sec)	
Pump 2	
Hours	
Amps	
Flow (L/sec)	

Generator	
Hours	
Fuel Level (% full)	
Run Generator under Load	
Weed eat / Snow removal	

Comments:

LAKE COUNTRY
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Thursday

January 17

LIFT STATIONS

The Lakes

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours	
Amps		Fuel Level (% full)	
Flow (L/sec)		Run Generator under Load	
Pump 2		Weed eat / Snow removal	
Hours			
Amps			
Flow (L/sec)			

Davidson

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours	
Amps		Fuel Level (% full)	
Pump 2		Run Generator under Load	
Hours		Weed eat / Snow removal	
Amps			

Comments:

Carrs #1 - Whitson-Nuyens

Lower Station Pump 1 (hours)		Upper Station Pump 1 (hours)	
Lower Station Pump 2 (hours)		Upper Station Pump 2 (hours)	

Carrs #2 - Lance Marshall

Lake Station Pump 1 (hours)		Lower Station Pump 1 (hours)	
Lake Station Pump 2 (hours)		Lower Station Pump 2 (hours)	
Weed eat / Snow removal		Upper Station Pump 1 (hours)	
Comments:		Upper Station Pump 2 (hours)	

Amry

Effluent Sample Taken		Equalization Pump 1 (hours)	
Aeration Tank Sample Taken		Equalization Pump 2 (hours)	
Blower 1 (hours)		Effluent Pump 1 (hours)	
Blower 2 (hours)		Effluent Pump 2 (hours)	
Exhaust Fan (hours)		Generator Hours	
		Fuel Level	
Comments:		DO Reading with Handheld (mg/L)	
		DO Reading (mg/L)	

LAKE COUNTRY
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Thursday

January 17

LIFT STATIONS

Lakestone 1

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Pump 2		Run Generator under Load	
Hours		Weed eat / Snow removal	
Amps			

Comments:

Lakestone 2A

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Pump 2		Run Generator under Load	
Hours		Weed eat / Snow removal	
Amps			

Comments:

Lakestone 2B

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Pump 2		Run Generator under Load	
Hours		Weed eat / Snow removal	
Amps			

Comments:

Lakestone 4

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Pump 2		Run Generator under Load	
Hours		Weed eat / Snow removal	
Amps			

Comments:

LAKE COUNTRY
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Thursday

January 17

LIFT STATIONS

Lakestone 3 Sanitary

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Flow (L/sec)		Run Generator under Load	
Pump 2		Weed eat / Snow removal	
Hours		Odor chemical tote (% full)	
Amps			
Flow (L/sec)			

Lakestone 3 Storm

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Pump 2		Run Generator under Load	
Hours		Weed eat / Snow removal	
Amps			
Pump 3			
Hours			
Amps			

Benchlands

Pump 1 - run in hand if nesseccary		Generator	
Hours		Hours (Loaded)	
Amps		Fuel Level (% full)	
Flow (L/sec)		Run Generator under Load	
Pump 2		Weed eat / Snow removal	
Hours			
Amps			
Flow (L/sec)			

Comments:

LAKE COUNTRY WASTEWATER TREATMENT PLANT

LAKE COUNTRY
Life. The Okanagan Way.

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Operator Initials							
Time							
OUTSIDE							
Outside Temperature (C)							
Primary Scum Pit Level							
Effluent Basin Rotation							
Bio Bed Sprinkler (Y/N)							
DAF							
Feed Pressure (kPa)							
Tank Pressure (kPa)							
Effluent Quality							
Pump Seal Water							
TWAS Sludge Pump							
Clarifiers							
Primary Rake Arm Torque							
Primary (ft)							
Secondary (inches)							
Chemical Supply							
Polymer (bags remaining)							
Alum (bags remaining)							
Lime (bags remaining)							
Centrifuge							
Start Idle Centrifuge							
Centrifuge Running (#1or#2)							
Septage Feed (L/sec)							
TWAS Feed (L/sec)							
FPS Feed (L/sec)							
Polymer Feed Ratio							
Polymer Feed (L/hr)							
Differential speed (RPM)							
Torque (%)							
Bowl (RPM)							
Bowl (Amps)							
Scroll (RPM)							
Scroll (Amps)							
Vibration (mm/s)							
Macerator (Amps)							
Lab QA/QC							
Standards/pH/scale							
Absorbance Satndards							
Admin Liftstation							
Run pump in hand							
Test alarm							
Liftstation Rounds							
Liftstations							
Amry STP							
Lab / Computer Data							
Entered into HACH WIMS							
Septage Recieving							
Check Printer Paper							
Rock Trap Emptied (Y / N)							
Comments:							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
OUTSIDE							
Compressor							
Drain Compressor Tank							
DAF Feed Pressure (psi)							
Drain Air Filter Trap							
Blower 3910							
Status							
Set Value (%)							
Blower Speed (RPM)							
Power (Kw)							
Air Flow (m^3/min)							
Inlet Temp (deg C)							
Outlet Temp (deg C)							
Filter Diff. Pressure (kPa)							
DC link Voltage							
Blower 3920							
Status							
Set Value (%)							
Blower Speed (RPM)							
Power (Kw)							
Air Flow (m^3/min)							
Inlet Temp (deg C)							
Outlet Temp (deg C)							
Filter Diff. Pressure (kPa)							
DC link Voltage							
Blower 3930							
Status							
Set Value (%)							
Blower Speed (RPM)							
Power (Kw)							
Air Flow (m^3/min)							
Inlet Temp (deg C)							
Outlet Temp (deg C)							
Filter Diff. Pressure (kPa)							
DC link Voltage							
Polymer Room							
Water Feed Pressure (psi)							
Dry Poly feed SP							
Check water poly mix point							
Rotameter at 3.0m3/hr							
DAF feed pressure (psi)							
Cent #1 feed pressure (psi)							
Cent #2 feed pressure (psi)							
Run Dry Poly Vaccum							
C3 Room							
Flow (L/Sec)							
Discharge Pressure (%)							
Flush							
MCC Rooms							
Check for Tripped Breakers							
Foul Air							
Suction Pressure (psi)							
Discharge Pressure(psi)							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

LAKE COUNTRY
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	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
OUTSIDE							
Bioreactor #1							
Profile							
Cell 3005 Temperature (C)							
Cell 3005 DO (mg/L)							
Cell 3006 Temperature (C)							
Cell 3006 DO (mg/L)							
Cell 3007 Temperature (C)							
Cell 3007 DO (mg/L)							
Valve Positions (1-10)							
3005A							
3005B							
3005C							
3006A							
3006B							
3007A							
3007B							
3961							
Other							
Drain Condensate Traps							
Run Sprinklers (Y/N)							
Clean Sprinkler Filters							
Clean D.O. Probes							
WAS Pump On alternate weekly							
Bioreactor #2							
Profile							
Cell 3105 Temperature (C)							
Cell 3105 DO (mg/L)							
Cell 3106 Temperature (C)							
Cell 3106 DO (mg/L)							
Cell 3107 Temperature (C)							
Cell 3107 DO (mg/L)							
Valve Positions (1-10)							
3105A							
3105B							
3105C							
3106A							
3106B							
3107A							
3107B							
3962							
Other							
Drain Condensate Traps							
Run Sprinklers (Y/N)							
Clean Sprinkler Filters							
Check Hose on Efflunet Tank							
Clean D.O. Probes							
WAS Pump On alternate weekly							
Comments:							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

LAKE COUNTRY
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	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
	January 16	January 17	January 18	January 19	January 20	January 21	January 22
Operator Initials							
Time							

PROCESS ADJUSTMENTS

Sludge Age - Adjusted on Wednesday

Effluent Ammonia (mg/L)							

Weekly Ammonia AVG. (mg/L)

NH_3 (mg/L)	Action Taken
< 0.2	Increase by 0.1 L/sec (10%)
0.4 - 0.6	No Change
> 0.6	Decrease by 0.1 L/sec (10%)

Current WAS Set
Change +/- L/sec
New WAS

MLSS Concentration (mg/L)							
Primary Eff. TSS (mg/L)							
Influent Flow (m3)							

Current Bioreactor Temp (degree C)	
Target SRT (days)	

MLSS weekly avg. (mg/L)	
Influent Flow Weekly avg. (m3)	
Influent Flow to Each Bioreactor avg. (m3)	
Primary Effluent TSS weekly avg. (mg/L)	

Weekly Avg. SRT (days)	

$$SRT = \frac{(MLSS\ [mg/L]*390000)}{(PE\ TSS\ [mg/L]*((flow[m3]*1000)))}$$

RAS Control- Adjusted on Wednesday

Effluent Ortho P (mg/L)							

Weekly Ortho-P AVG (mg/L)

Ortho-P(mg/L)	Action Taken
< 0.1	Decrease 2 L/sec
0.1 - 0.2	No Change
0.21 - 0.5	Increase 2 L/sec
>0.5	Increase 4 L/sec

Current RAS Set
Change +/- L/sec
New RAS

RAS Ortho P (mg/L)							

Ortho-P(mg/L)	Action Taken
>3.0	Increase RAS 0.5 L/sec
<1.0	Decrease RAS 0.5 L/sec

Current RAS Set
Change +/- L/sec
New RAS

Centrate Loading

Centrate Ortho - P (mg/L)							

TSN (mg/L)	Action Taken
< 3.0	Increase flow by 0.1 L/Sec
3.1 - 4.0	Increase flow by 0.05 L/Sec
4.1 - 5.5	No Change
> 5.5	Decrease flow by 0.05 L/sec
> 6.0	Decrease flow by 0.1 L/sec

Centrate Ortho – P (mg/L)	kg/day*	Action Taken
0-200	0-10	No change
200-250	10-12.5	No change
250-300	12.5-15	Decrease flow by 25%
300-350	15-17.5	Decrease flow by 50%
350-400	17.5-20	Decrease flow by 75%
>400	>20	Add 1 bag of lime

*Calculated using avg volume of 50m3 per day

Alum Addition - added to bioreactor 1/2 in morning 1/2 at end of day

Ortho P (mg/L)*	Alum (kg)	Bags	am Addition	pm Addition
0.01 - 0.49	0	0	0	0
0.50 - 0.99	25	1	1/2	1/2
>1.00	50	2	1	1

*Based Daily Grab Sample

Denitrification - Primary Effluent Diversion

Effluent Nitrates (mg/L)							

NO_3 (mg/L)	Action Taken
< 1.5	Decrease 2 minutes
1.5 - 2.0	Decrease 1 minute
2.1 - 3.0	No Change
3.1 - 4.0	Increase 1 minute
> 4.0	Increase 2 minutes

Weekly Nitrate AVG. (mg/L)

Comments:

LAKE COUNTRY WASTEWATER TREATMENT PLANT

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Operator Initials							
Time In:							
Time Out:							
PROCESS LAB - SOLIDS							
Septage - daily when centrifuge running							
Dish	g	g	g	g	g	g	g
Dish + Sample (wet)	g	g	g	g	g	g	g
Sample (wet)	g	g	g	g	g	g	g
Dish + Sample (dry)	g	g	g	g	g	g	g
Sample (dry)	g	g	g	g	g	g	g
% Solids (dry/wet x 100)	%	%	%	%	%	%	%
Centrifuge - daily when centrifuge running							
Dish	g	g	g	g	g	g	g
Dish + Sample (wet)	g	g	g	g	g	g	g
Sample (wet)	g	g	g	g	g	g	g
Dish + Sample (dry)	g	g	g	g	g	g	g
Sample (dry)	g	g	g	g	g	g	g
% Solids (dry/wet x 100)	%	%	%	%	%	%	%
Polymer - Once Per week							
Dish	g	g	g	g	g	g	g
Dish + Sample (wet)	g	g	g	g	g	g	g
Sample (wet)	g	g	g	g	g	g	g
Dish + Sample (dry)	g	g	g	g	g	g	g
Sample (dry)	g	g	g	g	g	g	g
% Solids (dry/wet x 100)	%	%	%	%	%	%	%
TWAS - daily when centrifuge running							
Dish	g	g	g	g	g		
Dish + Sample (wet)	g	g	g	g	g		
Sample (wet)	g	g	g	g	g		
Dish + Sample (dry)	g	g	g	g	g		
Sample (dry)	g	g	g	g	g		
% Solids (dry/wet x 100)	%	%	%	%	%		
FPS - daily when centrifuge running							
Dish	g	g	g	g	g		
Dish + Sample (wet)	g	g	g	g	g		
Sample (wet)	g	g	g	g	g		
Dish + Sample (dry)	g	g	g	g	g		
Sample (dry)	g	g	g	g	g		
% Solids (dry/wet x 100)	%	%	%	%	%		
Comments:							

LAKE COUNTRY WASTEWATER TREATMENT PLANT

LAKE COUNTRY
Life. The Okanagan Way.

	Monday January 14	Tuesday January 15	Wednesday January 16	Thursday January 17	Friday January 18	Saturday January 19	Sunday January 20
Operator Initials							
Time In:							
Time Out:							
PROCESS LAB - TSS							
Primary Effluent							
Filter Before:		g	g	g			
Filter After:		g	g	g			
Dry Solids:		g	g	g			
Volume of sample:		mL	mL	mL			
TSS:	mg/L	mg/L	mg/L	mg/L	mg/L		
Secondary Solids							
Filter Before:	g		g		g		
Filter After:	g		g		g		
Dry Solids:	g		g		g		
Volume of sample:	mL		mL		mL		
TSS:	mg/L		mg/L		mg/L		
Bioreactor #1 MLSS - Cell # 3007 Daily							
Filter Before:	g	g	g	g	g	g	g
Filter After:	g	g	g	g	g	g	g
Dry Solids:	g	g	g	g	g	g	g
Volume of sample:	mL	mL	mL	mL	mL	mL	mL
MLSS:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Bioreactor #2 MLSS - Cell # 3107 Daily							
Filter Before:	g	g	g	g	g	g	g
Filter After:	g	g	g	g	g	g	g
Dry Solids:	g	g	g	g	g	g	g
Volume of sample:	mL	mL	mL	mL	mL	mL	mL
MLSS:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Effluent							
Filter Before:	g		g		g		
Filter After:	g		g		g		
Dry Solids:	g		g		g		
Volume of sample:	mL		mL		mL		
TSS:	mg/L		mg/L		mg/L		
RAS							
Filter Before:	g			g			
Filter After:	g			g			
Dry Solids:	g			g			
Volume of sample:	mL			mL			
TSS:				mg/L			
Amry Aeration Tank							
Filter Before:	g						
Filter After:	g						
TSS:	g						
Amount of sample:	mL						
MLSS:	mg/L						
Comments:							

APPENDIX C
Monthly Reports 2018

LAKE COUNTRY

Life. The Okanagan Way.

January 22, 2019 **PE NO. 14651 / ME-14651**

District of Lake Country
Municipal Office
10150 Bottom Wood Lake Road
Lake Country, BC
V4V 2M1

Attention: Mr. Greg Buchholz

Dear Sir:

RE: MONTHLY REPORT JANUARY 2018

As per terms of our Operating Agreement regarding the Lake Country Wastewater Treatment Plant, we offer our monthly report. The following provides current status on the development of our Contracts, Operations and Maintenance Plans.

MONTHLY INVOICES

Invoices for January are submitted by Suez – Indianapolis IN. Office.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	5 mg/L	n/a	0
Soluble BOD*	10 mg/L	<4 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.05 mg/L	0.22 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.3 mg/L	3.1 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
	NA	

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	11 mg/L
Soluble BOD	4 mg/L

OPERATION

Wastewater Treatment Plant

- January 2018 effluent flow averaged 1,608.2 m^3/day***** with a peak of 1,767.8 m^3/day*. The total effluent flow measured 49,855.6 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in January averaged 14.6 m^3/day with a peak of 79.2 m^3/day. The total septage processed was 452.9 m^3.
- The septage received averaged 14.6 m^3/day with a peak of 43.8 m^3/day. The total septage received was 452.6 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- Septage Vault cleaned. Grit to landfill.
- Centrate tank cleaned by D & L.

Lift Stations / Collection System

- Lodge Pump #1 deragged.(x2)
- Pulled and inspected Woodsdale Pump #1.
- Replaced Modpac Plus Communication Box at Carr's 2 (LM). Programmed by Omega.
- Sewer cleaned from Turtle Bay parking lot to HWY 97 by D & L.
- Battery Replaced at Lakestone 2B.

Sewer Plugs Pulled *(New Connections)*

Number of Plugs Pulled	2

Amry Treatment Plant

- Regular maintenance and sampling performed.

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
01/01	Carr's #2 Telemetry Fault	PC log in
01/01	Primary Eff. Low Flow	PC log in
01/02	Carr's #2 Telemetry Fault	PC log in
01/03	Carr's #2 Telemetry Fault	PC log in
01/07	Davidson Level Trans. Fault	PC log in
01/10	Influent Channel Low Level	Went to plant
01/15	WAS Low Flow	Went to plant
01/19	Power Bumps at Plant	PC log in
01/20	Power Bumps at Plant	PC log in
01/23	Power Bumps at Plant	Went to plant
01/23	Power Bumps at Plant	PC log in
01/29	Lake Pump Fault	PC log in

We trust the foregoing provides you with an update of current activities and look forward to continued co-operation with the District Staff throughout our agreement period.

Sincerely,

Davin Larsen
Operations Manager

SEUZ NORTH AMERICA
4062 BEAVER LAKE RD.
LAKE COUNTRY, BC
V4V1T5
250-766-1478

Encl.
Sludge Breakdown Spreadsheet
January Maintenance Cap Spreadsheet

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

FEBURARY 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	6 mg/L	n/a	0
Soluble BOD*	10 mg/L	< 3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.04 mg/L	0.16 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.2 mg/L	3.0 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
Feburary	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	6 mg/L
Soluble BOD	< 3 mg/L

OPERATIONS

Wastewater Treatment Plant

- Feburary 2018 effluent flow averaged 1632.6 m^3/day***** with a peak of 1830 m^3/day*. The total effluent flow measured 45,713.4m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in Feburary averaged 16.8 m^3/day with a peak of 65.3m^3/day. The total septage processed was 469.5 m^3.
- The septage received averaged 18.1m^3/day with a peak of 55.2 m^3/day. The total septage received was 506.4 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.

Lift Stations (L/S) / Collection System

- Lakestone 2B Pump#2 rebuilt and re-installed
- 200L added to Lakestone 4 gen

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	3

Amry Treatment Plant

- Regular maintenance and sampling performed.

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

MARCH 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	5 mg/L	n/a	0
Soluble BOD*	10 mg/L	< 3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.04 mg/L	0.31 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.2 mg/L	2.8 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
March	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	4 mg/L
Soluble BOD	< 3 mg/L

OPERATIONS

Wastewater Treatment Plant

- March 2018 effluent flow averaged 1659.1 m^3/day***** with a peak of 1880.2 m^3/day*. The total effluent flow measured 51,431.3m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in March averaged 26.0m^3/day with a peak of 61.7m^3/day. The total septage processed was 807.0 m^3.
- The septage received averaged 25.8 m^3/day with a peak of 67.2 m^3/day. The total septage received was 799.3 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- New fan in RAS MCC Bucket
- Barscreen chain broken. Temporarily in service with one rake.

Lift Stations (L/S) / Collection System

- Liftstation cleaning:
  - Lodge
  - Clement
  - Woodsdale
  - Seymour
  - Lakes
  - Davidson
- Seymour pump #1 and #2 de-ragged

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	13

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Load of sludge removed aprrox 10m3

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

January 18, 2019 **PE NO. 14651 / ME-14651**

District of Lake Country
Municipal Office
10150 Bottom Wood Lake Road
Lake Country, BC
V4V 2M1

Attention: Mr. Matthew Salmon

RE: MONTHLY REPORT APRIL 2018

The following is a synopsis of the WWTP operation for the previous month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	<4 mg/L	n/a	0
Soluble BOD*	10 mg/L	<3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.08 mg/L	0.3 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.9 mg/L	3.9 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
April	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	5 mg/L
Soluble BOD	<3 mg/L

OPERATION

Wastewater Treatment Plant

- April 2018 effluent flow averaged 1,742.7 m^3/day***** with a peak of 1,856.0 m^3/day*. The total effluent flow measured 52,279.8 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in April averaged 38.2 m^3/day with a peak of 77.1 m^3/day. The total septage processed was 1,147.3 m^3.
- The septage received averaged 40.6 m^3/day with a peak of 103.6 m^3/day. The total septage received was 1,218.8 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- Seals Replaced on septage pump (7725) By JML.
- Septage HMI screen Replaced by IITS.
- Installed new motor for Primary Clarifier drive.
- Installed new chain on barscreen.
- Replace bottom launder brushes on Secondary Clarifier.
- Replaced Faulty control power module for Blower #3.
- New bearing in Grit Vortex Drive motor. Replaced by EMPS.

Lift Stations / Collection System

- Lodge Pump #1 deragged.
- EMPS tested Flygt pump operation in Lodge Lift station.
- Lowered IC and replaced Lid at 13089 Gibson's Dr. Home owner Requested.
- Lowered IC at 13518 Lake Hill Way.
- Cleared sewer back up @11283 Bottom Wood Lake rd. Replaced lid and collar.
- Assisted contractors with Seymour gravity and force main bypasses.

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	14

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Load of wasted sludge removed.(approx. 10 m^3.)

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
	No call outs.	

Sincerely,

Davin Larsen
Lead Operator

January 18, 2019 **PE NO. 14651 / ME-14651**

District of Lake Country
Municipal Office
10150 Bottom Wood Lake Road
Lake Country, BC
V4V 2M1

Attention: Mr. Greg Buchholz

Dear Sir:

RE: MONTHLY REPORT MAY 2018

As per terms of our Operating Agreement regarding the Lake Country Wastewater Treatment Plant, we offer our monthly report. The following provides current status on the development of our Contracts, Operations and Maintenance Plans.

MONTHLY INVOICES

Invoices for May are submitted by Suez – Indianapolis IN. Office.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	5 mg/L	n/a	0
Soluble BOD*	10 mg/L	<3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.10 mg/L	0.95 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	1.4 mg/L	2.2 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
May	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	<2 mg/L
Soluble BOD	6 mg/L

OPERATION

Wastewater Treatment Plant

- May 2018 effluent flow averaged 1,990.9 m^3/day***** with a peak of 2,237.6 m^3/day*. The total effluent flow measured 61,717.7 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in May averaged 45.9 m^3/day with a peak of 87.7 m^3/day. The total septage processed was 1,422.8 m^3.
- The septage received averaged 46.5 m^3/day with a peak of 115.9 m^3/day. The total septage received was 1,440.7 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- Installed new fan motor for Secondary Kiosk. Supplied by EMPS.
- Replaced belts on Foul air blower #2.

Lift Stations / Collection System

- Lodge Pump #1 deragged.
- Sewer back up cleared @1724 Slateview Cres.
- 7X brooks box install on Limestone Dr.
- Lakestone 2b wetwell fan motor to EMPS for testing and repair.
- Sewer back up cleared @ 1743 Granite.
- Sewer back up cleared @13226 Apex Cr.
- Lowered I/C @ 13269 Apex Cr. New lid and collar.

- Installed brooks box @ 13226 Apex Cr.
- Installed 4 rain pans in manholes on Seymour Rd.
- 7 IC's lowered on Cliffshore Dr.
- Lodge Rd Generator serviced by Mountain Top Power Services.
- Lakstone 1, 2a, 2b & 4 Generators serviced by Mountain Top Power Services.
- Clement Pump #2 replaced with rebuilt pump. Assisted by EMPS. Old pump to EMPS for service.
- Clement L/S flood prevention in place.
- Plug in Manhole on Deldor to prevent infiltration.
- Removed rock and debris from IC @ 13371 Derek Tretheway Dr.
- Install carbon filter on Lakestone 2b wetwell foul air discharge.
- 3 IC and boxes lowered on Limestone.
- Manholes in Woodsdale campground repaired by contractor to prevent infiltration.
- Woodsdale pump #2 pulled and deragged.
- Lowered IC @ 11218 Pheasant. Replaced lid.
- Installed brooks box @1685 Travertine. Lowered IC for 1750 Limestone located in Driveway. Cleaned out Action Septic.
- Replaced Clement L/S transfer switch controller, HMI and Door.

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	13

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Load of wasted sludge removed.(3pprox.. 10 m^3.)
- Tile Field mowed X3

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
May 14	Seymour Telemetry Fault	Call out to station. Reset Communication box
May 24	Multiple power bumps	Call out to plant.
May 24	Multiple power bumps	PC Log in (22 calls)
May 25	Multiple power bumps	PC Log in (12 calls)

We trust the foregoing provides you with an update of current activities and look forward to continued co-operation with the District Staff throughout our agreement period.

Sincerely,

Davin Larsen
Operations Manager

SEUZ NORTH AMERICA
4062 BEAVER LAKE RD.
LAKE COUNTRY, BC
V4V1T5
250-766-1478

Encl.
Sludge Breakdown Spreadsheet
May Maintenance Cap Spreadsheet

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

JUNE 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	5 mg/L	n/a	0
Soluble BOD*	10 mg/L	<3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.07 mg/L	0.30 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.3 mg/L	3.4 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
June	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	3 mg/L
Soluble BOD	<3 mg/L

OPERATIONS

Wastewater Treatment Plant

- June 2018 effluent flow averaged 1,742.4 m^3/day***** with a peak of 1,893.8 m^3/day*. The total effluent flow measured 52,271.4 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in June averaged 42.2 m^3/day with a peak of 79.1 m^3/day. The total septage processed was 1,265.2 m^3.
- The septage received averaged 44.4 m^3/day with a peak of 101.4 m^3/day. The total septage received was 1,333.4 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- Installed new battery in Jet-Set trailer.
- New stator installed in Poly Pump#1 (7720).
- Replaced faulty CAT 5-E cable in PLC cabinet.

Lift Stations / Collection System

- Lodge Rd L/S cleaned.
- Siphon chamber cleaned.
- New start bulb installed at Carr's #2 Lakes chamber.
- 5 IC's lowered and brooks boxes installed on Kimberlite Rd.
- Storm sewer flooding at Clement L/S caused infiltration and high level alarm.
- Sewer backup cleared at 1716 Slateview.
- 2 IC's lowered next to Davidson L/S including 1 new lid and collar.
- IC lowered 3583 Woodsdale Rd and new lid installed.
- Power outage at Lakestone resulted in generators running for 20 hours.
- Carr's #1 and #2 septic field distribution boxes replaced and lines cleaned.

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	10

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Sewer backup of influent line into plant. Influent line cleaned.
- Tile Field mowed X1

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
June 14	Marshall Upper Lift Station High Level Alarm	Call out to station.

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

JULY 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	3 mg/L	n/a	0
Soluble BOD*	10 mg/L	<3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.08 mg/L	0.16 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.1 mg/L	3.0 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
July	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	3 mg/L
Soluble BOD	<3 mg/L

OPERATIONS

Wastewater Treatment Plant

- July 2018 effluent flow averaged 1,812.4 m^3/day***** with a peak of 1,893.7 m^3/day*. The total effluent flow measured 56,185.0 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in July averaged 37.1 m^3/day with a peak of 85.9 m^3/day. The total septage processed was 1,148.7 m^3.
- The septage received averaged 43.6 m^3/day with a peak of 133.0 m^3/day. The total septage received was 1,350.7 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- Replaced phase voltage monitoring transformer for WWTP generator.
- Added fuel to WWTP generator.
- New Battery for HVAC control panel UPS.
- Replaced MCC fan filters in old MCC room and Secondary Kiosk.

Lift Stations / Collection System

- Lodge Rd L/S cleaned.
- 6 IC's lowered on Marble Ledge(Lakestone).
- Sewer Back up @ 13205 Gibbons Rd. (Call out)
- Carr's 1 (Whitson-Nuyens) air valves exposed by D&L.
- Siphon chamber cleaned and repaired.
- Lakes pump #1 pulled and inspected.
- 4 plugs pulled @ Rock Ridge Building #9.
- Carr's #2 (Lance-Marshall) Lower Station Pump #2 discharge line back flushed.
    - New hold down bracket installed.

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	9

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Tile Field mowed X2
- Load of waste sludge removed by Action Septic.

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
July 10	Sewer Back up @13205 Gibbons.	Call out resident.
July 17	Power bump	Call out to plant. Reset equipment.
July 21	Power outage	Call out to plant.

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

AUGUST 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	2 mg/L	n/a	0
Soluble BOD*	10 mg/L	<3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.17 mg/L	0.38 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.3 mg/L	3.1 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
August	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	<2 mg/L
Soluble BOD	<3 mg/L

OPERATIONS

Wastewater Treatment Plant

- August 2018 effluent flow averaged 1,847.3 m^3/day***** with a peak of 1,893.0 m^3/day*. The total effluent flow measured 55,474.9 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in August averaged 42.8 m^3/day with a peak of 92.7m^3/day. The total septage processed was 1,326.8 m^3.
- The septage received averaged 50.3 m^3/day with a peak of 92.7 m^3/day. The total septage received was 1,326.8 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- DAF Chain replaced. Flights to JML for repair
- Replaced faulty transformer for door locks (process building)
- Replaced pulling cable on MXR-3101A

Lift Stations / Collection System

- Lodge Rd L/S cleaned by D&L hydrovac
- Benchlands Discharge repaired
- Jetted Seymour road easement manhole to trouble manhole at Wood lake compground .
- Woodsdale L/S cleaned by D&L hydrovac
- Clement L/S cleaned by D&L hydrovac
- Seymour L/S cleaned by D&L hydrovac
- Davidson L/S cleaned by D&L hydrovac
- Lowered 3I/C's on marble ledge.
-

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	12

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Pump #2 de-ragged
- Disposal field mowed

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
August 11	Power outage	Call out resident.
August 23	Sewer Back up @12892 Eastridge court	Call out to address

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

SEPTEMBER 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	4 mg/L	n/a	0
Soluble BOD*	10 mg/L	<3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.22 mg/L	0.46 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	3.2 mg/L	4.6 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
September	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	5 mg/L
Soluble BOD	<3 mg/L

OPERATIONS

Wastewater Treatment Plant

- September 2018 effluent flow averaged 1,698.6 m^3/day***** with a peak of 1,947.3 m^3/day*. The total effluent flow measured 50.956.9 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in September averaged 37.9 m^3/day with a peak of 91.3 m^3/day. The total septage processed was 1,136.2 m^3.
- The septage received averaged 43.0 m^3/day with a peak of 95.4 m^3/day. The total septage received was 1,290.5 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- DAF polymer check valve replaced.
- Replaced rubber on primary clarifier scum arm.
- DR 3900 and lab equipment serviced by Hach.
- Grit pump Deragged. Check valve flapper removed.

Lift Stations / Collection System

- Action Septic pumped out Carr's 2 (LM) upper and lower wet wells. Upper station power failure.
- Woodsdale pump #2 check valve flapper replaced.
- Sewer cleaning completed by D & L Environmental

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Load of waste sludge removed by Action Septic.

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**
Sept. 01	Power loss Carr's 2(LM) Upper station	Went to station. Pumped out tanks.
Sept. 03	No blowers running.	Went to plant. Reset.
Sept. 23	Lodge High level.	Complex dumping pool.
Sept. 28	Intrusion alarm	Went to plant. Cleaners.

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

OCTOBER 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	4 mg/L	n/a	0
Soluble BOD*	10 mg/L	4 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.12 mg/L	0.18 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	2.4 mg/L	2.9 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
October	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	8 mg/L
Soluble BOD	4 mg/L

OPERATIONS

Wastewater Treatment Plant

- October 2018 effluent flow averaged 1689.2 m^3/day***** with a peak of 1,804.6 m^3/day*. The total effluent flow measured 52,365.1 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in October averaged 47.4 m^3/day with a peak of 104.3m^3/day. The total septage processed was 1,468.3 m^3.
- The septage received averaged 53.1 m^3/day with a peak of 103.8 m^3/day. The total septage received was 1,647.3 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- HVAC Annual service – Britech HVAC
- MW-12 top of well pipe and casing knocked over. Repaired now.

Lift Stations / Collection System

- New Manhole lid @3180 Beaver Lake rd
- Carrs #2 Upper New Contactor and Overloads for Pump #2
- Carrs #2 Pump 2 re-installed. Rebuilt by EMPS
- Carrs #1 Upper Back Flushed and cleaned by action septic.
- Seymour pumps pulled and inspected.
- Woodsdale pump #2 Pulled Multple times. Keeps catching rocks. Wet well Cleaned by D&L.

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Tile field Mowed and sprayed by pest control
-

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

NOVEMBER 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	6 mg/L	n/a	0
Soluble BOD*	10 mg/L	< 3 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.07 mg/L	0.26 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	1.9 mg/L	2.6 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
November	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	5 mg/L
Soluble BOD	< 3 mg/L

OPERATIONS

Wastewater Treatment Plant

- November 2018 effluent flow averaged 1676.3 m^3/day***** with a peak of 2,026.5 m^3/day*. The total effluent flow measured 50,289.2 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in October averaged 36.0 m^3/day with a peak of 99.8 m^3/day. The total septage processed was 1,079.3 m^3.
- The septage received averaged 41.6 m^3/day with a peak of 120.7 m^3/day. The total septage received was 1,246.9 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- Bar screen chain pins drilled out to size new larger stainless steel cotter pins.
- Bio-bed mulch replaced.
- Oil-grit separator cleaned by D&L.
- New fluorescent caps on DO probes 3006 and 3106

Lift Stations (L/S) / Collection System

- Lodge Rd L/S bypassed, upgraded with new Flygt pumps and returned to service.
- Fence repaired at Turtle Bay Campgroud after Chute Creek raised manhole.
- Odor complaints on McCarthy Rd and Pollard Rd.
- Generator fuel topped up of winter at Lodge, Clement, Amry, and Lakestone #4.
- New coolant heater installed on Woodsdale generator.

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Wasting valve left open resulted in sludge on secondary, load taken out of Sludge tank and secondary skimmed by Action Septic.

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

LAKE COUNTRY
Life. The Okanagan Way.

Monthly Wastewater Operations Report

DECEMBER 2018

The following is report is a brief description of the operations and maintenance conducted in the sewer department for the past month.

EFFLUENT QUALITY

Wastewater Treatment Plant

Ministry of Environment PE No. 14651	Permit Requirements	Monthly Average	Monthly Maximum	Days Exceeding Permit
Total Suspended Solids*	20 mg/L	9 mg/L	n/a	0
Soluble BOD*	10 mg/L	< 4 mg/L	n/a	0
Ortho Phosphorus**	1.5 mg/L	0.05 mg/L	0.08 mg/L	0
Total Soluble Nitrogen**	6.0 mg/L	1.8 mg/L	2.1 mg/L	0

* Monthly Accredited Lab Data ** Daily In-house Lab Data

Permit Exceedances		
Dates	**Permit Violations**	**Cause / Corrective action**
December	Average Daily Flow	>1610 m^3/day

Amry Wastewater Treatment Plant

Parameter	Monthly Accredited Lab Data
Total Suspended Solids	4 mg/L
Soluble BOD	< 4 mg/L

OPERATIONS

Wastewater Treatment Plant

- December 2018 effluent flow averaged 1617.2 m^3/day***** with a peak of 1,732.4 m^3/day*. The total effluent flow measured 50,132.3 m^3*.

  (*Effluent flow totals calculated from influent plus septage.)

Septage Handling Facility

- Septage processed in December averaged 12.9 m^3/day with a peak of 59.5 m^3/day. The total septage processed was 399.4 m^3.
- The septage received averaged 17.1 m^3/day with a peak of 41.9 m^3/day. The total septage received was 530.2 m^3.

MAINTENANCE

Wastewater Treatment Plant

- Regular maintenance and sampling preformed.
- All HVAC filters replaced on process building.
- Differential sensor reinstalled on centrifuge #2.

Lift Stations (L/S) / Collection System

- Seymour pump #2 pulled and unclogged.
- Odor tracking conducted around Main and Pollard.
- Clement pump #1 pulled and unclogged, discovered leaks in discharge plumbing.
- Clement and Woodsdale wetwells cleaned by D&L hydrovac.
- Sewer back up 13142 Porter Dr; section of sewer on Porter Dr rodded by D&L hydrovac.
- Lodge Rd submersible level sensor found damaged, likely from upgrade.
-

Sewer Plugs Pulled *(New Connections)*	
Number of Plugs Pulled	2

Amry Treatment Plant

- Regular maintenance and sampling performed.
- Amry equalization pump #2 swapped with new pump.

Operator Emergency Call outs

Operator Call Outs		
Dates	**Alarm description**	**Action Taken**

Please contact me with any questions or issues found in this report.

Sincerely,

Davin Larsen
Lead Operator

APPENDIX D
Lab Analysis

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
January	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	2.8	27.5		7.54	0.03	1.68	1.39	0.05	3.1
02	8.0	53.5		7.86	0.03	1.15	1.27	0.04	2.5
03	7.5	52.0	0.53	8.20	0.01	1.34	1.10	0.04	2.5
04	5.5	52.5		8.29	0.03	0.73	1.11	0.03	1.9
05	5.5	39.5		8.21	0.03	1.51	1.02	0.03	2.6
06	5.3	45.5		8.24	0.02	1.48	1.08	0.03	2.6
07	3.5	35.0		7.89	0.02	1.86	0.96	0.04	2.9
08	5.5	54.0		8.16	0.03	1.91	0.70	0.04	2.7
09	5.5	54.5		8.28	0.03	1.63	1.08	0.03	2.7
10	5.8	50.0	0.51	8.38	0.02	1.40	1.25	0.03	2.7
11	6.5	61.0		8.43	0.03	0.73	1.13	0.02	1.9
12	6.3	57.0		8.27	0.02	0.79	1.19	0.03	2.0
13	6.5	53.5		8.29	0.03	1.09	1.31	0.02	2.4
14	4.8	40.0		8.06	0.05	1.31	1.14	0.02	2.5
15	6.0	51.5		8.34	0.02	1.19	0.89	0.03	2.1
16	5.8	46.5		7.44	0.03	0.95	0.99	0.03	2.0
17	5.5	46.5	0.58	8.37	0.11	1.06	0.99	0.04	2.1
18	5.8	46.0		8.19	0.20	0.73	1.22	0.02	2.0
19	6.5	51.0		8.39	0.06	0.25	1.15	0.03	1.4
20	6.3	49.5		8.22	0.04	0.51	1.11	0.03	1.7
21	4.5	35.5		7.91	0.05	0.91	1.11	0.05	2.1
22	5.8	50.5		8.44	0.04	0.90	0.99	0.05	1.9
23	5.8	52.5		8.48	0.05	1.11	1.38	0.05	2.5
24	5.8	49.5		8.31	0.03	0.75	1.22	0.04	2.0
25	5.8	50.0		8.27	0.06	1.00	1.30	0.03	2.3
26	5.8	53.0		8.32	0.05	0.87	1.41	0.04	2.3
27	3.5	31.5		8.08	0.11	1.29	1.44	0.04	2.8
28	3.3	27.0		7.81	0.11	1.33	1.41	0.05	2.8
29	5.8	52.5		8.36	0.03	1.20	1.29	0.05	2.5
30	6.0	48.5		8.29	0.22	1.66	1.35	0.05	3.1
31	5.8	46.0		8.24	0.04	0.68	1.44	0.04	2.2
Min	2.8	27.0	0.51	7.44	0.01	1.13	0.70	0.02	1.4
Max	8.0	61.0	0.58	8.48	0.22	1.91	1.44	0.05	3.1
Average	5.6	47.2	0.54	8.18	0.05	1.13	1.17	0.04	2.3

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
February	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.3	50.5		8.47	0.03	0.39	1.50	0.03	1.9
02	5.3	53.5		8.38	0.04	0.42	1.61	0.02	2.1
03	5.3	44.0		8.29	0.03	0.57	1.71	0.03	2.3
04	5.0	48.5		8.32	0.03	0.37	1.50	0.04	1.9
05	4.5	38.5		8.28	0.03	0.75	1.42	0.05	2.2
06	6.0	47.5		8.38	0.08	0.53	1.50	0.04	2.1
07	5.3	40.5		8.30	0.09	0.40	1.45	0.03	1.9
08	5.3	49.0		8.44	0.06	0.44	1.55	0.03	2.0
09	8.0	44.0		8.42	0.05	0.35	1.47	0.03	1.9
10	6.3	48.5		8.43	0.04	0.35	1.59	0.03	2.0
11	6.5	46.5		8.32	0.04	0.35	1.49	0.02	1.9
12	6.3	53.0		8.38	0.03	0.57	1.47	0.03	2.1
13	6.0	49.0		8.48	0.03	0.83	1.53	0.05	2.4
14	5.5	48.0	0.59	8.20	0.08	1.05	1.57	0.05	2.7
15	5.8	49.5		8.33	0.16	0.84	1.37	0.05	2.3
16	6.0	50.0		8.37	0.03	0.58	1.35	0.05	2.0
17	7.3	66.5		8.44	0.04	0.24	1.39	0.04	1.7
18	7.0	52.5		8.37	0.05	0.68	1.45	0.04	2.2
19	6.5	54.5		8.45	0.02	0.87	1.38	0.05	2.3
20	6.8	53.5		8.46	0.02	1.00	1.48	0.05	2.5
21	6.5	54.5	0.64	8.53	0.02	0.91	1.55	0.04	2.5
22	6.3	53.5		8.44	0.02	1.14	1.50	0.04	2.7
23	8.3	54.5		8.47	0.02	1.38	1.50	0.05	2.9
24	6.5	57.5		8.52	0.02	1.30	1.67	0.03	3.0
25	6.5	54.0		8.45	0.01	1.16	1.56	0.03	2.8
26	6.0	51.5		8.38	0.02	0.92	1.42	0.03	2.4
27	5.8	50.0		8.39	0.02	0.67	1.42	0.03	2.1
28	6.0	48.0	0.68	8.27	0.02	0.51	1.46	0.02	2.0
Min	4.5	38.5	0.59	8.20	0.01	0.70	1.35	0.02	1.7
Max	8.3	66.5	0.68	8.53	0.16	1.38	1.71	0.05	3.0
Average	6.2	50.4	0.64	8.39	0.04	0.70	1.50	0.04	2.2

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
March	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.5	53.5		8.45	0.02	0.37	1.45	0.02	1.8
02	6.8	40.5		8.18	0.05	0.43	1.68	0.02	2.1
03	6.5	55.0		8.34	0.02	0.65	1.47	0.23	2.4
04	5.0	43.0		8.23	0.03	1.13	1.30	0.03	2.5
05	5.5	50.0		8.43	0.02	0.74	1.54	0.03	2.3
06	6.5	54.5		8.52	0.02	0.55	1.71	0.03	2.3
07	6.3	51.5	0.61	8.46	0.01	0.30	1.67	0.03	2.0
08	6.5	56.5		8.36	0.03	0.44	1.90	0.03	2.4
09	5.8	49.5		8.37	0.02	0.31	1.90	0.03	2.2
10	0.5	65.0		8.43	0.02	0.30	1.95	0.03	2.3
11	3.5	55.5		7.96	0.02	0.66	2.02	0.04	2.7
12	6.0	50.5		8.40	0.03	0.68	1.70	0.06	2.4
13	4.8	39.5		8.11	0.03	0.59	1.69	0.07	2.4
14	5.8	51.0	0.61	8.43	0.02	0.27	1.56	0.06	1.9
15	6.0	53.0		8.35	0.03	0.77	1.80	0.06	2.6
16	5.3	37.5		8.25	0.04	0.58	1.69	0.07	2.3
17	6.5	58.0		8.47	0.03	0.43	1.76	0.06	2.3
18	6.0	53.5		8.40	0.02	0.74	1.53	0.05	2.3
19	6.0	49.0		8.41	0.02	0.65	1.34	0.07	2.1
20	5.8	47.5		8.29	0.04	0.22	1.39	0.05	1.7
21	5.8	45.5	0.57	8.35	0.03	0.14	1.41	0.04	1.6
22	6.0	53.0		8.37	0.31	0.14	1.42	0.04	1.6
23	4.5	45.5		8.35	0.08	0.55	1.61	0.05	2.2
24	5.8	47.0		8.48	0.02	0.48	1.82	0.04	2.3
25	5.3	43.5		8.36	0.02	0.81	1.77	0.03	2.6
26	6.0	55.0		8.35	0.03	0.96	1.77	0.04	2.8
27	4.8	39.5		8.17	0.03	0.47	1.83	0.03	2.3
28	5.3	49.5	0.47	8.25	0.10	0.44	1.85	0.03	2.3
29	5.3	48.0		8.22	0.17	0.55	1.84	0.03	2.4
30	6.3	46.0		8.29	0.03	0.31	1.77	0.03	2.1
31	6.0	45.0		8.22	0.04	0.63	1.82	0.03	2.5
Min	0.5	37.5	0.47	7.96	0.01	0.53	1.30	0.02	1.6
Max	6.8	65.0	0.61	8.52	0.31	1.13	2.02	0.23	2.8
Average	5.6	49.4	0.57	8.33	0.04	0.53	1.68	0.05	2.2

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
April	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.0	52.5		8.20	0.02	0.07	1.78	0.03	1.9
02	6.3	48.0		8.19	0.04	0.26	1.69	0.05	2.0
03	6.5	54.0		8.29	0.04	0.68	1.38	0.07	2.1
04	6.8	57.0		8.35	0.04	0.41	1.66	0.05	2.1
05	6.8	53.5		8.33	0.04	0.23	1.82	0.04	2.1
06	7.5	63.0		8.37	0.04	0.23	1.80	0.04	2.1
07	6.5	53.5		8.26	0.03	0.34	1.89	0.05	2.3
08	5.5	47.0		8.16	0.03	0.35	1.94	0.05	2.3
09	5.0	42.0		8.05	0.05	0.45	1.44	0.07	2.0
10	5.5	49.5		8.35	0.04	0.31	1.32	0.06	1.7
11	6.3	60.0		8.40	0.04	0.62	1.74	0.07	2.4
12	5.5	56.0		8.12	0.04	0.33	1.68	0.07	2.1
13	3.3	28.0		7.84	0.04	0.28	1.73	0.08	2.1
14	6.3	50.0		8.31	0.03	0.16	1.30	0.06	1.5
15	4.8	41.5		8.16	0.02	0.25	1.26	0.09	1.6
16	7.0	57.0		8.45	0.05	0.36	1.18	0.08	1.6
17	7.3	54.0		8.30	0.04	0.40	1.22	0.10	1.7
18	6.0	53.5		8.28	0.03	0.81	1.02	0.10	1.9
19	6.3	59.0		8.53	0.04	0.28	1.18	0.08	1.5
20	5.0	42.0		8.19	0.07	0.34	0.98	0.09	1.4
21	5.8	51.5		8.44	0.07	0.53	1.35	0.09	2.0
22	6.0	59.5		8.46	0.06	0.26	1.29	0.08	1.6
23	6.3	57.5		8.37	0.08	0.23	1.12	0.08	1.4
24	6.3	57.5		8.43	0.06	0.44	1.05	0.11	1.6
25	6.0	60.5		8.48	0.05	0.35	1.21	0.10	1.7
26	5.5	54.0		8.34	0.05	0.47	1.47	0.10	2.0
27	5.3	48.0		8.26	0.05	0.18	1.38	0.09	1.7
28	5.5	51.5		8.07	0.06	0.29	1.36	0.09	1.7
29	6.5	58.5		8.30	0.04	0.23	1.28	0.08	1.6
30	6.0	58.0		8.25	0.06	0.13	1.48	0.07	1.7
Min	3.3	28.0		7.84	0.02	0.34	0.98	0.03	1.4
Max	7.5	63.0		8.53	0.08	0.81	1.94	0.11	2.4
Average	6.0	52.6		8.28	0.05	0.34	1.43	0.07	1.8

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
May	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	5.8	53.0		8.32	0.20	0.54	1.51	0.13	2.2
02	6.3	54.5	0.56	8.43	0.09	0.11	1.61	0.09	1.8
03	5.3	48.0		8.25	0.95	0.11	1.64	0.07	1.8
04	5.0	41.5		8.21	0.06	0.06	1.71	0.06	1.8
05	3.3	30.0		7.96	0.05	0.04	1.76	0.10	1.9
06	4.0	34.0			0.05	0.06	1.42	0.06	1.5
07	5.3	52.5		8.32	0.04	0.14	1.04	0.08	1.3
08	5.0	46.5		8.07	0.05	0.07	1.49	0.06	1.6
09	9.0	43.0		7.44	0.06	0.03	1.71	0.07	1.8
10	5.5	49.0		8.18	0.17	0.65	1.30	0.09	2.0
11	5.3	45.0		8.15	0.09	0.23	1.34	0.07	1.6
12	5.0	38.5		8.22	0.05	0.06	1.20	0.05	1.3
13	5.0	41.5		8.14	0.07	0.03	0.79	0.08	0.9
14	5.3	39.5		8.09	0.06	0.10	0.58	0.09	0.8
15	5.5	44.0		7.87	0.09	0.13	0.50	0.10	0.7
16	6.3	43.0	0.41	8.23	0.07	0.18	0.61	0.10	0.9
17	4.8	43.0		8.15	0.07	0.11	0.84	0.09	1.0
18	5.0	49.0		8.21	0.06	0.18	0.95	0.09	1.2
19	5.5	52.5		8.24	0.04	0.14	1.02	0.07	1.2
20	4.5	42.5		8.09	0.04	0.15	0.99	0.07	1.2
21	6.0	50.0		8.12	0.05	0.21	1.07	0.07	1.4
22	5.8	51.5		8.18	0.05	0.79	0.85	0.12	1.8
23	5.5	38.0	0.62	7.71	0.06	0.20	0.73	0.10	1.0
24	4.3	41.0		7.75	0.05	0.18	0.80	0.10	1.1
25	5.8	51.5		8.11	0.06	0.47	0.87	0.09	1.4
26	5.5	49.0		8.04	0.05	0.27	1.14	0.09	1.5
27	4.5	45.5		7.93	0.04	0.15	0.95	0.08	1.2
28	5.0	49.0		8.09	0.07	0.28	0.79	0.09	1.2
29	5.8	51.0		8.22	0.06	0.40	1.07	0.08	1.6
30	5.3	39.0		7.92	0.05	0.45	1.14	0.07	1.7
31	5.3	51.0		8.16	0.05	0.28	1.10	0.05	1.4
Min	3.3	30.0	0.41	7.44	0.04	0.22	0.50	0.05	0.7
Max	9.0	54.5	0.62	8.43	0.95	0.79	1.76	0.13	2.2
Average	5.3	45.4	0.53	8.09	0.10	0.22	1.11	0.08	1.4

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
June	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	5.8	56.0		8.28	0.04	0.68	1.34	0.06	2.1
02	5.3	52.0		8.18	0.05	0.65	1.27	0.07	2.0
03	5.3	51.5		8.05	0.04	0.40	0.94	0.07	1.4
04	4.0	41.5		7.86	0.03	0.78	1.02	0.10	1.9
05	7.5	53.0		8.04	0.04	1.06	1.27	0.11	2.4
06	8.5	54.0	0.90	8.00	0.05	1.47	1.50	0.14	3.1
07	6.3	61.0		8.20	0.04	0.64	1.46	0.10	2.2
08	6.5	62.5		8.36	0.06	0.59	1.57	0.09	2.3
09	4.8	45.5		7.85	0.05	0.45	1.50	0.08	2.0
10	5.5	52.5		8.07	0.04	0.31	1.57	0.83	2.7
11	5.5	52.5		8.17	0.03	0.58	1.64	0.10	2.3
12	14.0	52.0		7.46	0.06	0.63	1.67	0.10	2.4
13	6.3	59.0	0.50	8.24	0.04	0.37	1.64	0.11	2.1
14	6.0	59.0		7.99	0.05	0.52	1.82	0.10	2.4
15	7.3	58.0		8.03	0.05	0.98	2.27	0.12	3.4
16	6.3	50.5		8.03	0.04	0.84	1.89	0.09	2.8
17	3.8	28.0		7.33	0.05	0.42	1.94	0.11	2.5
18	6.3	53.5		7.76	0.05	0.43	1.77	0.09	2.3
19	7.5	48.5		7.92	0.09	0.64	1.84	0.11	2.6
20	7.5	65.0	1.02	8.11	0.06	0.45	1.94	0.10	2.5
21	7.3	57.5		7.93	0.12	0.40	2.02	0.09	2.5
22	6.0	55.5		8.09	0.08	0.41	1.74	0.09	2.2
23	4.5	40.0		7.88	0.09	0.35	1.96	0.09	2.4
24	6.3	57.5		7.93	0.07	0.38	1.80	0.08	2.3
25	8.3	56.5		7.80	0.04	0.48	1.81	0.09	2.4
26	8.5	58.0		7.65	0.13	0.37	1.81	0.04	2.2
27	4.3	36.5		7.53	0.30	0.33	1.78	0.04	2.2
28	5.5	53.5		8.01	0.10	0.27	1.43	0.04	1.7
29	5.5	55.5		8.07	0.06	0.44	1.64	0.05	2.1
30	5.0	46.0		7.88	0.08	0.77	1.55	0.06	2.4
Min	3.8	28.0	0.50	7.33	0.03	0.57	0.94	0.04	1.4
Max	14.0	65.0	1.02	8.36	0.30	1.47	2.27	0.83	3.4
Average	6.4	52.4	0.81	7.96	0.07	0.57	1.65	0.11	2.3

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
July	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.5	55.0		8.14	0.05	0.93	1.78	0.06	2.8
02	5.5	48.0		7.82	0.08	0.93	1.76	0.05	2.7
03	5.3	51.5		8.03	0.04	1.36	1.59	0.07	3.0
04	5.5	56.0	0.53	7.97	0.07	0.65	1.58	0.04	2.3
05	6.8	59.0		8.11	0.09	0.37	1.66	0.03	2.1
06	8.5	53.5		7.80	0.07	0.42	1.62	0.04	2.1
07	7.0	61.0		8.12	0.05	0.37	1.56	0.03	2.0
08	3.8	36.5		7.84	0.04	0.29	1.65	0.03	2.0
09	7.0	59.0		7.99	0.04	0.14	1.55	0.02	1.7
10	5.8	52.5		8.04	0.07	0.11	1.53	0.02	1.7
11	7.3	62.5		7.95	0.07	0.15	1.66	0.02	1.8
12	7.0	57.0		7.86	0.08	0.09	2.07	0.01	2.2
13	6.5	60.0		8.07	0.12	0.16	1.59	0.02	1.8
14	6.0	56.0		7.94	0.07	0.10	1.69	0.01	1.8
15	5.5	50.0		7.71	0.06	0.18	1.96	0.02	2.2
16	6.5	53.5		8.00	0.05	0.26	1.53	0.04	1.8
17	5.3	53.5		7.82	0.08	0.10	1.61	0.03	1.7
18	7.3	51.0	0.64	7.88	0.10	0.14	1.89	0.04	2.1
19	5.5	51.0		7.97	0.10	0.09	1.62	0.03	1.7
20	8.0	59.0		8.02	0.09	0.15	1.68	0.06	1.9
21	6.0	56.0		8.17	0.09	0.20	1.57	0.07	1.8
22	4.8	47.0		8.17	0.13	0.85	1.61	0.10	2.6
23	6.8	63.5		8.13	0.08	0.46	1.42	0.10	2.0
24	6.0	57.0		7.92	0.07	0.59	1.52	0.13	2.2
25	6.0	57.5	0.65	8.06	0.11	0.24	1.41	0.11	1.8
26	9.3	53.0		7.69	0.08	0.45	1.51	0.12	2.1
27	6.0	62.5		8.16	0.16	0.48	1.57	0.14	2.2
28	3.8	34.0		7.93	0.12	0.34	1.75	0.11	2.2
29	6.5	42.0		8.10	0.09	0.45	1.45	0.11	2.0
30	6.8	61.5		8.02	0.10	0.36	1.50	0.08	1.9
31	6.0	57.5		8.02	0.08	0.40	1.46	0.08	1.9
Min	3.8	34.0	0.53	7.69	0.04	0.38	1.41	0.01	1.7
Max	9.3	63.5	0.65	8.17	0.16	1.36	2.07	0.14	3.0
Average	6.3	54.1	0.61	7.98	0.08	0.38	1.62	0.06	2.1

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
August	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.0	57.5		7.87	0.10	0.26	1.44	0.07	1.8
02	7.0	56.0		7.97	0.13	0.77	1.31	0.11	2.2
03	5.8	52.0		8.07	0.10	1.36	1.37	0.18	2.9
04	6.8	64.5		7.97	0.07	0.66	1.68	0.13	2.5
05	7.3	65.0		8.15	0.13	0.49	1.83	0.17	2.5
06	7.3	69.5		8.14	0.08	0.45	1.75	0.19	2.4
07	6.5	62.0		7.98	0.13	0.51	1.32	0.24	2.1
08	6.3	58.5	0.64	7.90	0.09	0.61	1.38	0.23	2.2
09	6.3	60.0		7.74	0.14	0.38	1.62	0.19	2.2
10	6.8	60.0		7.97	0.11	0.25	1.93	0.22	2.4
11	3.8	43.0		7.91	0.27	0.18	1.94	0.18	2.3
12	4.8	52.0		7.97	0.11	0.66	1.46	0.29	2.4
13	5.8	57.0		7.98	0.11	0.90	1.47	0.18	2.6
14	5.0	52.0		8.03	0.14	0.96	1.89	0.20	3.1
15	6.5	57.5	0.59	8.23	0.16	0.95	1.67	0.20	2.8
16	9.3	55.5		7.64	0.14	0.85	1.75	0.28	2.9
17	8.3	57.0		7.72	0.15	0.66	1.81	0.13	2.6
18	5.8	51.0		7.91	0.22	0.70	1.61	0.17	2.5
19	5.8	51.5		8.09	0.22	0.83	1.77	0.19	2.8
20	5.8	53.5		7.92	0.14	0.85	1.28	0.29	2.4
21	7.3	56.5		7.66	0.19	0.16	1.02	0.18	1.4
22	7.5	56.0	0.09	7.87	0.22	0.11	1.06	0.13	1.3
23	9.0	55.0		8.05	0.20	0.12	1.43	0.18	1.7
24	13.3	70.5		7.06	0.19	0.53	1.19	0.25	2.0
25	4.5	38.5		8.01	0.26	1.02	1.44	0.19	2.7
26	3.5	38.0		8.10	0.22	1.18	1.39	0.18	2.8
27	5.3	45.0		7.92	0.23	0.91	1.30	0.24	2.5
28	5.8	53.5		8.10	0.20	0.28	1.09	0.29	1.7
29	6.3	57.0	0.96	8.08	0.38	0.34	1.01	0.28	1.6
30	9.0	65.5		7.92	0.22	0.30	1.20	0.21	1.7
31	6.5	57.0		7.93	0.25	0.76	1.38	0.29	2.4
Min	3.5	38.0	0.09	7.06	0.07	0.61	1.01	0.07	1.3
Max	13.3	70.5	0.96	8.23	0.38	1.36	1.94	0.29	3.1
Average	6.6	55.7	0.57	7.93	0.17	0.61	1.48	0.20	2.3

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
September	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.0	60.5		8.20	0.31	1.39	1.57	0.25	3.2
02	6.3	54.0		8.14	0.25	0.97	2.03	0.15	3.2
03	5.0	52.0		8.08	0.31	0.74	2.17	0.25	3.2
04	6.5	58.5		7.65	0.24	1.62	1.67	0.36	3.7
05	6.0	62.5		8.30	0.19	1.00	1.73	0.35	3.1
06	5.3	53.5		8.08	0.35	1.02	2.35	0.30	3.7
07	5.5	55.0		8.15	0.15	0.63	2.74	0.26	3.6
08	5.8	62.0		8.15	0.23	0.99	3.27	0.35	4.6
09	6.0	60.5		8.20	0.21	1.12	2.97	0.39	4.5
10	6.8	66.0		8.24	0.24	1.20	2.24	0.42	3.9
11	5.5	57.5		8.15	0.27	0.84	2.04	0.40	3.3
12	5.8	55.0	0.76	8.05	0.23	1.02	1.74	0.33	3.1
13	15.3	74.5		7.05	0.35	1.39	1.57	0.38	3.3
14	5.5	61.3		8.23	0.39	3.07	1.24	0.33	4.6
15	5.0	54.5		8.04	0.38	2.47	1.46	0.47	4.4
16	5.0	53.0		8.10	0.46	1.83	1.34	0.41	3.6
17	6.3	61.0		8.18	0.26	2.73	1.05	0.55	4.3
18	6.0	60.5		7.82	0.25	1.75	1.27	0.42	3.4
19	6.8	63.0	1.26	8.08	0.18	1.43	1.59	0.35	3.4
20	6.8	64.0		8.22	0.21	0.99	1.70	0.35	3.0
21	5.0	50.5		8.06	0.15	0.71	2.44	0.32	3.5
22	3.3	28.5		7.69	0.13	0.54	2.49	0.18	3.2
23	3.5	30.5		7.65	0.13	0.52	2.08	0.33	2.9
24	5.8	49.0		7.84	0.10	0.71	1.15	0.25	2.1
25	6.8	58.5		8.08	0.15	0.47	1.06	0.22	1.8
26	5.8	52.5	0.52	8.14	0.11	0.32	0.95	0.28	1.6
27	6.0	59.0		8.17	0.10	0.23	1.32	0.25	1.8
28	6.8	59.0		7.95	0.10	0.25	1.38	0.24	1.9
29	4.8	45.5		7.92	0.13	0.41	0.98	0.23	1.6
30	5.0	43.0		7.96	0.12	0.46	1.29	0.26	2.0
Min	3.3	28.5	0.52	7.05	0.10	1.09	0.95	0.15	1.6
Max	15.3	74.5	1.26	8.30	0.46	3.07	3.27	0.55	4.6
Average	6.0	55.5	0.85	8.02	0.22	1.09	1.76	0.32	3.2

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
October	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.3	62.5		8.24	0.07	1.26	1.34	0.30	2.9
02	5.0	54.0		8.17	0.09	0.81	1.50	0.29	2.6
03	5.5	45.0	0.83	7.92	0.09	0.56	1.91	0.29	2.8
04	6.8	57.0		8.24	0.08	0.41	1.86	0.21	2.5
05	5.5	56.5		8.12	0.08	0.22	2.14	0.25	2.6
06	4.8	45.0		8.06	0.13	0.65	1.64	0.28	2.6
07	0.3	44.5		7.92	0.14	0.83	1.20	0.25	2.3
08	6.5	50.5		8.01	0.11	0.77	1.07	0.22	2.1
09	5.3	56.5		8.24	0.09	1.73	0.77	0.34	2.8
10	5.8	51.0	0.60	7.89	0.12	1.17	0.93	0.33	2.4
11	5.8	57.0		8.19	0.16	0.88	1.10	0.29	2.3
12	7.5	52.0		8.05	0.11	0.86	1.68	0.22	2.8
13	6.3	48.5		8.05	0.12	0.58	2.12	0.20	2.9
14	4.5	43.5		7.83	0.11	0.60	1.87	0.23	2.7
15	8.3	55.5		8.19	0.10	0.92	1.78	0.23	2.9
16	5.8	49.5		8.02	0.10	0.82	1.51	0.23	2.6
17	8.5	58.5	1.12	7.57	0.11	0.33	1.74	0.12	2.2
18	6.0	58.0		8.16	0.12	0.28	1.69	0.18	2.2
19	8.0	56.5		8.19	0.10	0.15	1.43	0.14	1.7
20	6.0	50.0		7.89	0.12	0.34	1.32	0.09	1.8
21	2.8	26.0		7.59	0.13	0.64	1.38	0.11	2.1
22	5.5	53.0		7.92	0.12	1.07	0.94	0.18	2.2
23	5.5	52.0		8.21	0.12	0.85	1.29	0.15	2.3
24	5.5	50.0	0.47	8.12	0.11	0.83	1.41	0.16	2.4
25	6.0	52.0		8.20	0.15	1.05	1.30	0.20	2.6
26	8.5	60.0		7.77	0.15	0.73	1.74	0.18	2.7
27	4.0	30.0		7.81	0.14	0.66	1.88	0.14	2.7
28	3.8	34.0		7.77	0.12	0.67	1.57	0.16	2.4
29	6.3	57.0		8.06	0.10	0.68	1.38	0.20	2.3
30	6.3	60.0		8.09	0.18	0.71	1.55	0.19	2.5
31	5.8	53.0		8.31	0.15	0.55	1.72	0.18	2.5
Min	0.3	26.0	0.47	7.57	0.07	0.73	0.77	0.09	1.7
Max	8.5	62.5	1.12	8.31	0.18	1.73	2.14	0.34	2.9
Average	5.8	50.9	0.76	8.03	0.12	0.73	1.51	0.21	2.4

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
November	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	8.0	51.5		8.17	0.08	0.23	1.62	0.12	2.0
02	8.3	52.0		7.56	0.26	0.77	1.60	0.17	2.5
03	5.8	50.5		8.23	0.18	0.37	1.64	0.16	2.2
04	4.5	43.5		8.07	0.09	0.70	0.95	0.19	1.8
05	5.3	50.5		8.05	0.08	0.89	0.80	0.18	1.9
06	7.0	53.5		7.66	0.07	0.72	1.01	0.16	1.9
07	5.3	50.5	0.47	8.20	0.07	0.44	1.19	0.14	1.8
08	5.8	54.5		8.01	0.07	0.47	1.37	0.11	2.0
09	5.3	50.5		7.91	0.05	0.38	1.43	0.10	1.9
10	6.0	53.0		8.16	0.04	1.02	1.41	0.12	2.6
11	4.3	39.5		8.07	0.09	0.67	1.24	0.12	2.0
12	4.8	33.5		7.97	0.06	0.49	1.20	0.10	1.8
13	6.3	53.0		8.02	0.06	0.52	1.22	0.12	1.9
14	5.5	48.5	0.50	8.23	0.05	0.55	1.07	0.07	1.7
15	5.8	51.5		8.23	0.05	0.55	1.69	0.06	2.3
16	5.0	42.5		7.85	0.06	0.19	1.33	0.06	1.6
17	7.0	46.0		8.18	0.05	0.19	1.56	0.05	1.8
18	6.8	39.5		8.16	0.09	0.30	1.53	0.05	1.9
19	6.0	46.5		8.14	0.04	0.31	1.24	0.05	1.6
20	6.5	55.0		8.10	0.04	0.37	1.48	0.05	1.9
21	5.8	49.0	0.51	8.24	0.05	0.55	1.61	0.06	2.2
22	6.0	50.0		8.07	0.06	0.17	1.60	0.03	1.8
23	6.8	57.5		8.05	0.06	0.03	1.63	0.04	1.7
24	6.5	54.5		8.24	0.06	0.04	1.69	0.02	1.8
25	6.3	54.0		8.21	0.05	0.08	1.72	0.03	1.8
26	6.8	51.5		8.12	0.03	0.13	1.53	0.03	1.7
27	7.0	47.5		7.87	0.05	0.14	2.01	0.03	2.2
28	12.0	42.0	0.86	7.83	0.05	0.07	1.89	0.03	2.0
29	6.0	56.0		8.14	0.05	0.06	1.74	0.03	1.8
30	6.8	58.5		8.19	0.07	0.05	1.54	0.03	1.6
Min	4.3	33.5	0.47	7.56	0.03	0.38	0.80	0.02	1.6
Max	12.0	58.5	0.86	8.24	0.26	1.02	2.01	0.19	2.6
Average	6.3	49.5	0.59	8.06	0.07	0.38	1.45	0.08	1.9

LCWWTP IN HOUSE LAB RESULTS

	Influent				Effluent				
December	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Inf pH	Orthophosphate (as P), mg/l	Ammonia (as N), mg/l	Nitrate (as N), mg/l	Nitrite (as N), mg/l	Eff Total Soluble Nitrogen mg/l
01	6.0	56.5		8.28	0.06	0.09	1.54	0.03	1.7
02	6.0	54.0		8.23	0.04	0.26	1.46	0.04	1.8
03	5.8	50.0		8.13	0.08	0.37	1.52	0.04	1.9
04	6.3	54.5		8.27	0.05	0.14	1.46	0.04	1.6
05	4.3	34.0	0.59	7.57	0.06	0.18	1.65	0.03	1.9
06	5.8	54.0		8.24	0.04	0.15	1.78	0.01	1.9
07	5.8	48.0		8.19	0.05	0.12	1.71	0.04	1.9
08	6.0	50.0		8.27	0.04	0.19	1.86	0.04	2.1
09	6.3	55.5		8.23	0.04	0.30	1.73	0.04	2.1
10	6.3	57.5		8.22	0.05	0.41	1.51	0.05	2.0
11	5.8	50.5		8.24	0.05	0.30	1.51	0.05	1.9
12	6.0	51.0	0.59	8.21	0.04	0.17	1.65	0.03	1.9
13	6.0	52.5		8.30	0.08	0.18	1.88	0.02	2.1
14	5.3	49.5		8.06	0.06	0.09	1.65	0.04	1.8
15	2.8	24.0		7.97	0.02	0.14	1.78	0.01	1.9
16	2.8	25.0		7.98	0.02	0.19	1.21	0.02	1.4
17	7.3	49.5		7.94	0.06	0.37	1.32	0.05	1.7
18	4.5	41.5		7.90	0.08	0.18	1.39	0.03	1.6
19	7.5	47.0	0.51	7.99	0.06	0.03	1.38	0.02	1.4
20	6.3	54.0		8.21	0.06	0.04	1.48	0.03	1.6
21	7.5	52.5		7.95	0.05	0.02	1.55	0.01	1.6
22	6.0	53.5		8.26	0.04	0.02	1.42	0.03	1.5
23	5.8	55.0		8.26	0.05	0.08	1.40	0.04	1.5
24	3.8	32.5		7.66	0.05	0.14	1.36	0.04	1.5
25	6.0	56.5		8.24	0.04	0.10	1.46	0.02	1.6
26	4.0	36.5		7.69	0.04	0.15	1.78	0.03	2.0
27	4.8	43.0		7.94	0.03	0.25	1.59	0.03	1.9
28	4.3	42.5		7.82	0.03	0.23	1.69	0.03	2.0
29	5.5	51.5		8.04	0.03	0.20	1.72	0.04	2.0
30	6.0	52.5		8.18	0.03	0.35	1.63	0.04	2.0
31	5.5	50.5		8.18	0.04	0.24	1.50	0.03	1.8
Min	2.8	24.0	0.51	7.57	0.02	0.18	1.21	0.01	1.4
Max	7.5	57.5	0.59	8.30	0.08	0.41	1.88	0.05	2.1
Average	5.6	47.9	0.56	8.09	0.05	0.18	1.57	0.03	1.8

2018	LCWWTP CARO Accredited Lab Results											
	Influent											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ammonia N (mg/L)	50.4	46.4	40.2	57.6	50.2	48.5	46.5	47.6	37.5	56.9	39.2	30.2
Nitrate as N (mg/L)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrite as N (mg/L)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total Kjeldahl Nitrogen (mg/L)	76.3	72.2	67.0	69.3	74.1	99.9	83.4	79.9	90.7	76.8	68.4	58.0
Total Nitrogen (mg/L)	76.3	72.2	67.0	69.3	74.1	99.9	83.4	79.9	90.7	76.8	68.4	58.0
Ortho P (mg/L)	4.97	5.26	5.00	5.56	4.54	5.86	3.57	3.79	4.26	3.53	4.84	3.45
Total Phosphorus (mg/L)	7.85	7.73	8.08	9.00	8.75	10.00	9.14	7.20	9.73	8.21	7.27	6.60
pH	7.83	7.23	7.75	7.45	7.31	7.49	6.93	7.48	7.22	7.96	7.89	7.35
BOD5 (mg/L)	84	126	117	105	105	78	98	133	110	96	92	117
Total Suspended Solids (mg/L)	120	214	115	128	121	305	238	106	112	90	160	174

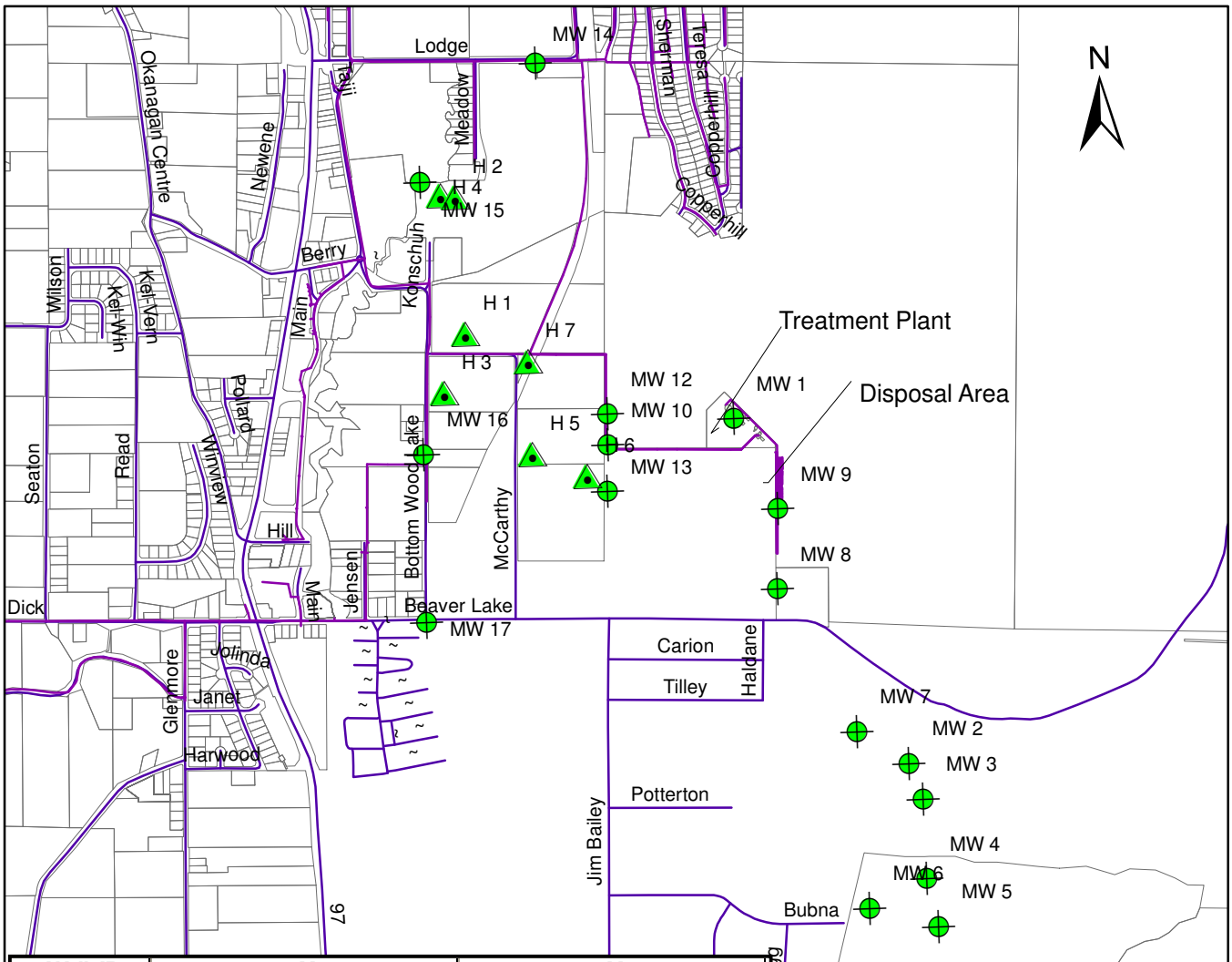
2018	LCWWTP CARO Accredited Lab Results											
	Effluent											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ammonia N (mg/L)	0.87	0.32	0.83	0.89	0.63	1.04	0.65	0.31	0.85	1.66	0.98	0.22
Nitrate as N (mg/L)	0.86	1.26	1.17	1.26	1.36	1.06	1.13	0.93	1.41	0.81	0.61	1.50
Nitrite as N (mg/L)	0.05	0.05	0.03	0.06	0.15	0.08	0.01	0.06	0.37	0.32	0.22	0.05
Total Kjeldahl Nitrogen (mg/L)	2.53	2.34	2.41	2.30	2.34	2.52	2.18	1.76	2.81	3.09	2.70	2.53
Total Nitrogen (mg/L)	3.43	3.65	3.61	3.61	3.84	3.65	3.32	2.75	4.59	4.21	3.53	4.08
Ortho P (mg/L)	0.01	0.01	0.01	0.01	0.18	0.01	0.03	0.01	0.09	0.11	0.05	0.01
Total Phosphorus (mg/L)	0.30	0.36	0.20	0.25	0.35	0.23	0.16	0.21	0.42	0.28	0.40	0.49
pH	7.71	7.44	7.75	7.22	7.79	7.62	7.42	7.29	7.68	7.72	7.84	7.57
BOD5 (mg/L)	4	3	3	3	3	3	3	3	3	4	3	4
Total Suspended Solids (mg/L)	5	9	5	4	5	5	3	2	4	4	6	9
Total Coliforms	110,000	24,000	110,000	110,000	110,000	24,000	46,000	110,000	110,000	24,000	11,000	46,000
Fecal Coliforms	110,000	24,000	15,000	110,000	24,000	24,000	24,000	15,000	24,000	24,000	11,000	11,000

2018	LCWWTP CARO Accredited Lab Results											
	Amry Effluent											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ammonia N (mg/L)												
Nitrate as N (mg/L)												
Nitrite as N (mg/L)												
Total Kjeldahl Nitrogen (mg/L)												
Total Nitrogen (mg/L)												
Ortho P (mg/L)												
Total Phosphorus (mg/L)												
pH												
BOD5 (mg/L)	4	3	3	3	6	3	3	3	3	4	3	4
Total Suspended Solids (mg/L)	11	6	4	5	3	3	4	2	5	8	5	4
Total Coliforms (MPN/100mL)												
Fecal Coliforms (MPN/100mL)												

APPENDIX E
Groundwater Monitoring

LAKE COUNTRY

Life. The Okanagan Way.



Well_ID	X	Y
H1	328281.247	5544452.272
H2	328264.447	5544849.476
H4	328222.447	5544855.476
H5	328463.649	5544097.069
H6	328620.851	5544027.468
H7	328460.049	5544364.671
H3	328214.046	5544281.871
MW1	329056.108	5544178.428
MW10	328688.154	5544114.182
MW12	328690.657	5544204.293
MW13	328682.313	5543981.518
MW14	328516.005	5545230.233
MW15	328168.877	5544895.518
MW16	328152.148	5544106.781
MW17	328143.700	5543619.178
MW2	329531.312	5543161.660
MW3	329568.228	5543057.833
MW4	329570.535	5542827.107
MW5	329600.529	5542686.365
MW6	329402.105	5542746.353
MW7	329383.052	5543259.101
MW9	329175.787	5543912.657

District of Lake Country Wastewater Treatment Plant
Appoximate Locations of Monitoring Wells

Scale: 1:20,000
Coordinates: NAD 1983 UTM Zone 11N
Revised: 2010.07.07

		LCWWTP CARO Accredited Lab Results "Spring"						
		House Wells						
		HHW-01 (General): 10050 McCarthy Road	HHW-02 (General): 10101 A Konschuh Road	HHW-03 (General): 9989 Bottom Wood Lake Rd.	HHW-04 (General): 10101 B Konschuh Road	HHW-05 (General): 9815 McCarthy Road	HHW-06(General): 9719 McCarthy Road	HHW-07 (General): 9991 McCarthy Road
Chloride	**mg/L**	0.4	73.1	48.1	93.4	69.0	44.0	64.8
Conductivity (EC)	**uS/cm**	274	716	539	824	732	870	709
Sodium	**mg/L**							
Ammonia (N)	**mg/L**	0.35	0.03	0.02	0.08	<0.02	0.04	0.07
Nitrate (N)	**mg/L**	<0.01	2.94	7.45	3.14	4.34	<0.01	3.51
Nitrite (N)	**mg/L**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
TKN	**mg/L**	0.36	0.09	0.08	0.20	0.05	0.05	0.13
Total N	**mg/L**	0.36	3.03	7.53	3.34	4.34	0.05	3.63
Ortho P	**mg/L**	0.25	0.01	0.01	0.01	0.01	0.01	0.01
Total P	**mg/L**	0.26	0.01	0.02	0.00	0.01	0.01	0.02
pH	**pH units**	8.12	7.56	7.44	7.66	8.05	8.01	7.80

2018		LCWWTP CARO Accredited Lab Results "Fall"						
		House Wells						
		HHW-01 (General): 10050 McCarthy Road	HHW-02 (General): 10101 A Konschuh Road	HHW-03 (General): 9989 Bottom Wood Lake Rd.	HHW-04 (General): 10101 B Konschuh Road	HHW-05 (General): 9815 McCarthy Road	HHW-06(General): 9719 McCarthy Road	HHW-07 (General): 9991 McCarthy Road
Chloride	mg/L	0.4	81.4	54.2	112.0	73.3	61.0	12.5
Conductivity (EC)	uS/cm	278	713	556	3	706	920	309
Sodium	mg/L							
Ammonia (N)	mg/L	0.30	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Nitrate (N)	mg/L	<0.01	3.15	6.92	2.74	3.22	<0.01	0.08
Nitrite (N)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
TKN	mg/L	0.26	0.09	0.07	0.14	0.09	0.05	0.15
Total N	mg/L	0.26	3.24	6.99	2.87	3.31	0.05	0.23
Ortho P	mg/L	0.23	0.01	0.01	0.01	0.01	0.01	0.01
Total P	mg/L	0.26	0.01	0.12	0.00	0.01	0.69	0.00
pH	pH units	8.18	7.30	7.21	7.42	7.32	7.89	7.96

		LCWWTP CARO Accredited Lab Results "Spring"										
		Monitoring Wells										
		MW-01-A: (General)	MW-02: (General)	MW-08: (General)	MW-09: (General)	MW-10: (General)	MW-12: (General)	MW-13: (General)	MW-14: (General)	MW-16: (General)	MW-17: (General)	MW-18: (General)
Chloride	**mg/L**	107.0	6.0			105.0	101.0	94.4	130.0			101.0
Conductivity (EC)	**uS/cm**	932	448			881	894	874	1,620			914
Sodium	**mg/L**	88	17			64	83	78	113			84
Hardness (Total)	**mg/L**											
Ammonia (N)	**mg/L**	0.038	0.077			0.086	0.103	0.045	0.112			0.053
Nitrate (N)	**mg/L**	3	1			2	3	4	0			1
Nitrite (N)	**mg/L**	0.01	0.01			0.01	0.01	0.01	0.01			0.01
TKN	**mg/L**	0.4	0.1			0.1	0.4	0.2	0.9			0.3
Total N	**mg/L**	3	1			2	3	4	8			2
Ortho P	**mg/L**	0.01	0.01			0.05	0.01	0.02	0.01			0.01
Total P	**mg/L**	4.7	0.1			0.5	1.0	0.7	1.8			0.6
pH	**pH units**	8	8			8	8	8	8			8

		AMRY CARO Accredited Lab Results "Spring"		
		Monitoring Well		
		Amry West Monitoring Well: (General)	Amry Central Monitoring Well: (General)	Amry East Monitoring Well: (General)
Chloride	**mg/L**	35.6	29.5	41.0
Conductivity (EC)	**uS/cm**	945	654	726
			38	34
Hardness (Total)	**mg/L**			
Ammonia (N)	**mg/L**	0.096	0.079	0.028
Nitrate (N)	**mg/L**	1	1	9
Nitrite (N)	**mg/L**	0.01	0.01	0.01
TKN	**mg/L**	0.299	0.2	0.1
Total N	**mg/L**	1	1	10
Ortho P	**mg/L**	0.01	0.02	0.01
Total P	**mg/L**	0.668	0.4	0.1
pH	**pH units**	8	8	8

		LCWWTP CARO Accredited Lab Results "Spring"										
		Monitoring Wells										
		MW-01-A: (General)	MW-02: (General)	MW-08: (General)	MW-09: (General)	MW-10: (General)	MW-12: (General)	MW-13: (General)	MW-14: (General)	MW-16: (General)	MW-17: (General)	MW-18: (General)
Chloride	**mg/L**	107.0	6.0			105.0	101.0	94.4	130.0			101.0
Conductivity (EC)	**uS/cm**	932	448			881	894	874	1,620			914
Sodium	**mg/L**	88	17			64	83	78	113			84
Hardness (Total)	**mg/L**											
Ammonia (N)	**mg/L**	0.038	0.077			0.086	0.103	0.045	0.112			0.053
Nitrate (N)	**mg/L**	3	1			2	3	4	0			1
Nitrite (N)	**mg/L**	0.01	0.01			0.01	0.01	0.01	0.01			0.01
TKN	**mg/L**	0.4	0.1			0.1	0.4	0.2	0.9			0.3
Total N	**mg/L**	3	1			2	3	4	8			2
Ortho P	**mg/L**	0.01	0.01			0.05	0.01	0.02	0.01			0.01
Total P	**mg/L**	4.7	0.1			0.5	1.0	0.7	1.8			0.6
pH	**pH units**	8	8			8	8	8	8			8

		AMRY CARO Accredited Lab Results "Spring"		
		Monitoring Well		
		Amry West Monitoring Well: (General)	Amry Central Monitoring Well: (General)	Amry East Monitoring Well: (General)
Chloride	**mg/L**	35.6	29.5	41.0
Conductivity (EC)	**uS/cm**	945	654	726
			38	34
Hardness (Total)	**mg/L**			
Ammonia (N)	**mg/L**	0.096	0.079	0.028
Nitrate (N)	**mg/L**	1	1	9
Nitrite (N)	**mg/L**	0.01	0.01	0.01
TKN	**mg/L**	0.299	0.2	0.1
Total N	**mg/L**	1	1	10
Ortho P	**mg/L**	0.01	0.02	0.01
Total P	**mg/L**	0.668	0.4	0.1
pH	**pH units**	8	8	8

Monitoring Well Depth to Water Report (5 Year)

MW-01: (General)					
Well Depth	4.45				
(meters)	2014	2015	2016	2017	2018
Jan	4.45			4.35	4.45
Feb	4.45				4.45
Mar	4.45			4.45	4.45
Apr	4.44	4.35		4.45	4.45
May	4.45			4.35	4.45
Jun	4.45			4.45	4.45
Jul	4.39			4.45	4.45
Aug	4.44			4.45	4.45
Sep	4.45		4.35	4.45	4.45
Oct				4.45	4.45
Nov				4.45	4.45
Dec				4.45	4.45

MW-01-A: (General)					
Well Depth	6.96				
(meters)	2014	2015	2016	2017	2018
Jan		5.71	5.64	5.56	5.64
Feb		5.66	5.57	5.50	5.69
Mar		5.51	5.55	5.46	5.68
Apr		5.47	4.49	5.54	5.52
May		5.55	5.44	5.40	5.39
Jun	7.68	5.56	5.43	5.39	5.38
Jul	7.62	5.56	5.38	5.43	5.42
Aug	7.76	5.61	5.45	5.43	5.42
Sep	5.72	5.65	5.44	5.51	5.53
Oct	5.64	5.68	5.41	5.56	5.56
Nov	5.77	5.63	5.57	5.59	5.58
Dec	5.76	5.71	5.49	5.68	5.60

MW-02: (General)					
Well Depth	13.36				
(meters)	2014	2015	2016	2017	2018
Jan		7.79		8.01	7.89
Feb			7.39	7.55	7.54
Mar	7.85		7.42	7.46	7.32
Apr	7.91	7.74	7.70	7.33	7.46
May	7.85	7.83	7.83	7.37	7.48
Jun	7.77	7.90	7.86	7.63	7.77
Jul	7.88	7.97	7.93	7.85	7.88
Aug	8.01	8.14	8.12	7.98	7.88
Sep	8.10	8.28	8.28	8.06	7.94
Oct	8.21	8.41	7.99	8.19	7.87
Nov	8.37	7.97	7.70	8.18	7.70
Dec		7.84		8.04	7.79

MW-08: (General)					
Well Depth	12.32				
(meters)	2014	2015	2016	2017	2018
Jan	12.30	12.32	12.20	10.23	11.40
Feb	12.25	11.91	12.81	12.05	11.43
Mar	12.32	11.71	11.57	12.32	8.52
Apr	12.32	10.27	12.79	11.65	11.57
May	12.32	11.90	12.01	11.47	10.87
Jun	12.32	12.32	12.13	11.55	12.43
Jul	12.32	12.32	12.38	11.87	11.72
Aug	12.32	12.32	12.93	12.12	11.72
Sep	12.32	12.32	12.30	12.19	11.67
Oct	12.32	12.32	12.16	11.90	11.67
Nov	12.25	12.32	12.19	11.25	11.66
Dec	12.13	12.32	12.32	11.82	11.87

MW-09: (General)					
Well Depth	14.74				
(meters)	2014	2015	2016	2017	2018
Jan	11.91	11.33	11.19	13.36	12.27
Feb	10.71	11.22	11.75	10.49	12.21
Mar	11.27	10.81	11.91	10.75	11.31
Apr	11.56	11.98	10.24	10.57	11.04
May	11.92	11.10	11.13	10.33	10.82
Jun	12.44	12.28	10.59	10.74	11.18
Jul	11.70	11.74	10.68	11.10	10.65
Aug	12.12	12.23	11.91	12.31	10.65
Sep	11.65	12.52	10.37	12.00	11.78
Oct	12.38	11.92	12.17	11.21	11.77
Nov	12.93	11.83	10.60	12.82	10.76
Dec	12.08	11.66	11.03	10.99	11.24

MW-10: (General)					
Well Depth	13.50				
(meters)	2014	2015	2016	2017	2018
Jan	7.92	7.96	7.89	7.67	7.82
Feb	7.94	7.81	7.71	7.65	7.76
Mar	7.95	7.64	7.62	7.54	7.75
Apr	7.83	7.60	7.52	7.48	7.63
May	7.77	7.50	7.32	7.17	7.37
Jun	7.70	7.47	7.14	7.00	7.14
Jul	7.61	7.50	7.13	7.10	6.96
Aug	7.61	7.50	7.17	7.18	6.96
Sep	7.64	7.57	7.18	7.16	7.06
Oct	7.64	7.69	7.32	7.52	7.35
Nov	7.86	7.85	7.56	7.62	7.54
Dec	7.92	7.88	7.65	7.73	7.61

MW-12: (General)					
Well Depth	9.70				
(meters)	2014	2015	2016	2017	2018
Jan	6.64	6.59	6.65	6.16	5.83
Feb	6.72	6.37	6.40	6.08	5.74
Mar	7.95	6.21	6.27	5.98	5.63
Apr	6.68	6.16	6.13	5.57	5.56
May	6.56	6.10	5.98	5.48	5.27
Jun	6.38	5.92	5.73	5.22	5.12
Jul	6.21	6.07	5.71	5.30	6.10
Aug	6.23	6.70	5.81	5.32	6.10

MW-13: (General)					
Well Depth	12.07				
(meters)	2014	2015	2016	2017	2018
Jan	9.11	9.11	8.99	8.98	9.06
Feb	9.11	9.05	8.97	8.92	9.07
Mar	9.03	9.98	8.95	8.91	9.01
Apr	9.02	8.99	8.94	8.91	8.96
May	9.06	9.00	8.91	8.88	8.93
Jun	9.07	9.02	8.86	8.88	8.92
Jul	9.06	9.04	8.90	8.92	8.92
Aug	9.10	9.05	12.20	9.03	8.92

Monitoring Well Depth to Water Report (5 Year)

Sep	6.32	6.54	5.88	5.37	5.04
Oct	6.43	6.23	5.81	5.51	5.27
Nov	6.50	6.48	5.88	5.54	5.36
Dec	6.59	6.62	6.04	5.70	5.45

Sep	9.04	9.08	8.89	8.97	8.94
Oct	9.05	9.08	8.90	9.03	8.99
Nov	9.13	9.08	8.96	9.02	8.99
Dec	9.14	9.07	8.95	9.06	9.01

MW-14: (General)					
Well Depth	5.81				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan	1.33	0.94	1.15	1.25	0.83
Feb	1.37	1.10	1.05	1.00	1.14
Mar	1.38	1.01	1.04	1.00	0.85
Apr	1.30	1.42	1.50	1.00	0.97
May	1.58	1.70	1.71	1.32	1.48
Jun	1.78	2.05	1.82	1.76	1.72
Jul	2.33	2.30	1.99	2.17	1.96
Aug	2.30	2.36	2.20	2.33	1.96
Sep	2.20	1.89	2.01	2.20	1.76
Oct	1.86	1.89	1.69	1.75	1.50
Nov	1.68	1.69	1.34	1.59	1.14
Dec	1.46	1.51	1.35	1.39	1.14

MW-16: (General)					
Well Depth	7.22				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan	5.92	5.73	5.90	5.46	5.16
Feb	5.94	5.43	5.62	5.42	5.11
Mar	5.92	5.30	5.43	5.31	4.98
Apr	5.73	6.12	5.05	5.07	4.72
May	5.00	5.08	4.81	4.19	4.04
Jun	5.21	5.28	4.97	4.49	4.24
Jul	5.58	5.61	5.22	4.74	4.40
Aug	5.86	6.05	5.65	4.82	4.40
Sep	5.93	6.12	5.65	4.83	4.68
Oct	6.01	6.12	5.39	4.90	4.59
Nov	6.01	6.14	5.34	4.92	4.57
Dec	5.81	6.13	5.38	5.03	4.63

MW-17: (General)					
Well Depth	9.71				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan	9.71	9.71	9.71	9.71	9.71
Feb	9.71	9.71	9.71	9.71	9.58
Mar	9.71	9.71	9.71	9.71	9.43
Apr	9.71	6.44	9.23	9.71	8.85
May	9.25	9.52	8.98	8.70	7.85
Jun	9.64	9.71	9.33	8.63	8.22
Jul	9.71	9.71	9.71	8.83	8.44
Aug	9.71	9.71	9.71	8.92	8.44
Sep	9.71	9.71	9.71	8.96	8.89
Oct	9.71	9.71	9.71	9.21	8.78
Nov	9.71	9.71	9.71	9.28	8.79
Dec	9.71	9.71	9.71	9.45	8.89

MW-18: (General)					
Well Depth	18.80				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan		8.09	7.97	8.93	8.86
Feb		7.96	7.92	7.86	7.76
Mar		7.64	7.90	7.80	7.75
Apr		7.55	7.87	7.90	7.74
May		7.54	7.83	7.76	7.72
Jun		7.67	7.87	7.73	7.74
Jul		7.51	7.88	7.74	7.72
Aug		7.56	7.77	7.73	7.72
Sep	7.71	7.94	7.81	7.73	7.71
Oct	8.10	7.94	7.70	7.74	7.74
Nov	8.24	7.92	7.97	7.78	7.73
Dec	8.14	8.10	7.74	7.77	7.73

Amry Monitoring Well Depth to Water Report (5 Year)

Amry West Monitoring Well: (General)					
Well Depth	5.50				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan	3.11	2.98	3.13	3.19	3.20
Feb	3.17	2.95	3.07	3.19	3.22
Mar	3.19	2.93	3.02	3.12	3.18
Apr	3.08	2.93	2.75	2.63	3.10
May	2.70	2.77	2.75	2.02	2.53
Jun	2.75	2.90	2.80	2.21	2.71
Jul	2.84	3.03	2.82	2.61	2.89
Aug	2.94	3.17	2.97	2.97	2.89
Sep	2.99	3.23	3.07	3.03	3.06
Oct	3.05	3.26	3.12	3.17	3.12
Nov	3.09	3.23	3.08	3.15	3.12
Dec	3.07	3.21	3.12	3.16	3.15

Amry East Monitoring Well: (General)					
Well Depth	14.95				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan	13.31	13.52	13.64	13.72	13.72
Feb	13.33	13.50	13.60	13.71	13.75
Mar	13.36	13.45	13.54	13.64	13.71
Apr	13.27	13.25	13.26	13.35	13.62
May	12.88	13.28	13.28	12.54	13.06
Jun	13.27	13.43	13.32	12.72	13.23
Jul	13.37	13.55	13.35	13.13	13.40
Aug	13.45	13.69	13.50	13.49	13.40
Sep	13.50	13.76	13.59	13.56	13.59
Oct	13.58	13.79	13.64	13.70	13.65
Nov	13.62	13.75	13.63	13.66	13.65
Dec	13.00	13.73	13.67	13.70	13.68

Amry Central Monitoring Well: (General)					
Well Depth	8.00				
(meters)	**2014**	**2015**	**2016**	**2017**	**2018**
Jan		7.15	7.32	7.40	7.41
Feb		7.15	7.26	7.38	7.42
Mar		7.50	7.21	7.32	0.37
Apr		6.92	6.94	7.02	7.29
May		6.96	6.95	6.22	6.74
Jun	6.94	7.10	7.00	6.31	6.92
Jul	7.12	7.20	7.02	6.80	7.10
Aug	7.14	7.35	7.17	7.17	7.10
Sep	7.17	7.43	7.29	7.23	7.28
Oct	7.25	7.46	7.33	7.38	7.31
Nov	7.29	7.42	7.30	7.35	7.31
Dec	7.27	0.42	7.33	7.37	7.33

APPENDIX F
Septage Reciving Facility

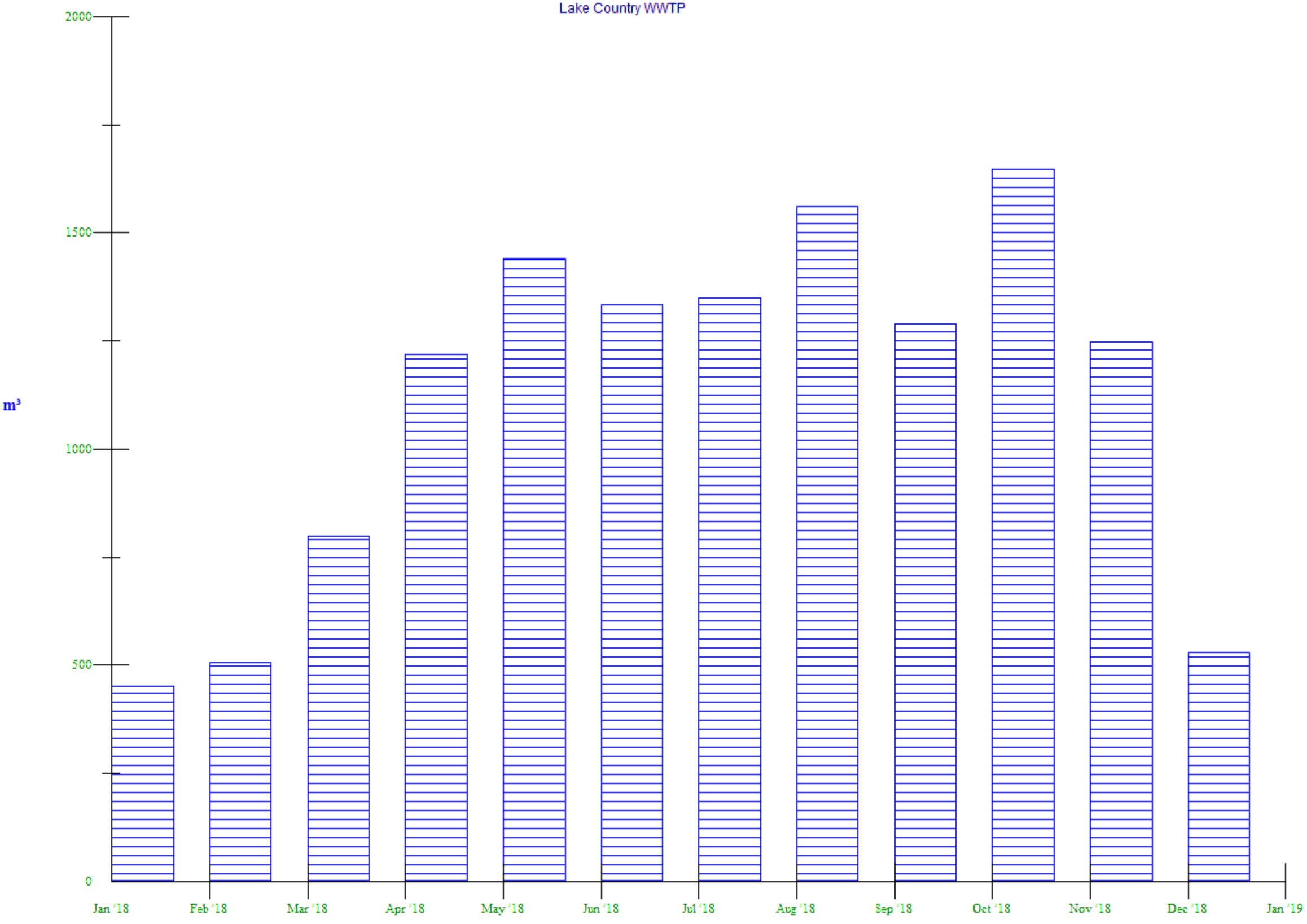
LAKE COUNTRY

Life. The Okanagan Way.

		LCWWTP CARO Accredited Lab Results											
		Bio Solids											
Parameter	Units	Jan '18	Feb '18	Mar '18	Apr '18	May '18	Jun '18	Jul '18	Aug '18	Sep '18	Oct '18	Nov '18	Dec '18
Aluminum	ug/g	4,470	2,100	4,040	2,990	4,120	3,440	6,620	3,400	3,550	6,860	4,740	2,740
Antimony	ug/g	1.1	1.2	1.2	1.3	1.8	1.6	1.3	1.4	2.7	1.3	2.7	1.9
Arsenic	ug/g	1.8	1.6	1.4	1.4	2.7	2.6	3.3	1.7	2.1	2.1	2.5	2.0
Barium	ug/g	109	91	120	108	122	204	175	138	145	133	205	120
Bismuth	ug/g	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Beryllium	ug/g	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Boron	ug/g	1.0	0.7	1.1	1.0	1.9	1.9	1.3	1.2	1.5	1.5	1.8	1.7
Cadmium	ug/g	1.0	0.7	1.1	1.0	1.9	1.9	1.3	1.2	1.5	1.5	1.8	1.7
Calcium	ug/g	12,000	8,990	9,050	9,500	16,000	15,300	13,800	10,300	11,800	11,000	14,800	12,100
Chromium	ug/g	11.5	10.3	9.2	9.3	13.4	32.3	12.3	13.6	13.5	12.3	15.4	14.4
Cobalt	ug/g	1.4	1.5	1.2	1.3	1.7	2.1	1.8	1.4	2.0	1.3	1.7	1.9
Copper	ug/g	340	335	305	369	546	472	373	384	465	375	557	492
Iron	ug/g	3,810	3,450	3,240	3,230	4,460	5,150	5,310	3,750	5,210	3,700	4,300	4,730
Lead	ug/g	10	9	10	11	12	15	12	12	14	14	15	15
Lithium	ug/g	1.7	1.4	1.5	1.3	1.6	1.9	1.6	1.4	2.5	1.3	1.8	1.5
Magnesium	ug/g	4,450	3,880	3,190	3,980	4,200	3,560	4,970	3,400	4,650	3,240	3,520	3,550
Manganese	ug/g	78	71	67	70	111	184	405	109	108	72	115	105
Mercury	ug/g	0.8	0.5	0.4	0.5	0.6	0.5	0.3	0.4	0.4	0.8	0.4	0.6
Molybdenum	ug/g	9.4	7.7	7.4	7.5	14.2	11.9	10.8	9.6	9.8	10.2	16.3	11.3
Nickel	ug/g	9.9	45.0	8.1	8.3	12.2	22.4	13.3	9.7	12.9	9.7	14.0	13.2
Phosphorus	ug/g	16,600	13,700	12,100	14,200	15,900	12,200	19,500	11,700	14,000	12,700	11,500	11,100
Potassium	ug/g	5,180	5,480	4,040	5,050	4,760	3,700	4,940	3,480	4,160	3,660	2,830	3,650
Selenium	ug/g	5.3	3.4	3.5	4.2	4.7	4.3	3.9	3.4	3.6	3.9	4.0	3.3
Silicon	ug/g	1	1										
Silver	ug/g	812.0	1.2	1.0	1.0	2.4	2.0	1.8	3.5	1.9	2.7	1.6	2.3
Sodium	ug/g	78	649	739	652	569	742	799	595	720	598	936	949
Strontium	ug/g	7,200	58	60	61	87	77	99	58	71	61	82	55
Sulphur	ug/g	0	5,600	4,270	3,260	6,780	4,530	3,170	5,290	5,270	4,610	5,430	4,290
Tellurium	ug/g	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Thallium	ug/g	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Thorium	ug/g	14.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Tin	ug/g	63.8	12.2	17.4	13.0	22.5	20.8	18.6	16.0	18.2	17.6	26.1	21.8
Titanium	ug/g	0.8	44.4	54.1	51.4	46.7	71.2	98.0	44.6	82.5	60.7	87.3	89.5
Uranium	ug/g	10.9	9.2	10.2	11.1	10.8	9.2	10.8	8.8	7.6	8.7	10.2	8.7
Vanadium	ug/g	7.0	6.1	5.7	6.0	7.4	7.6	7.0	6.6	9.1	6.3	8.1	8.2
Zinc	ug/g	546	437	465	480	895	806	797	592	755	734	974	771
Zirconium	ug/g	4.6	2.0	4.9	3.1	4.6	4.3	7.7	2.8	3.6	4.4	3.7	4.5
Moisture Content	%	79.9	79.5	81.3	79.5	79.7	79.8	80.8	80.2	79.1	79.6	77.8	79.4
Total Solids	%	20.8	20.5	18.7	20.5	20.3	20.5	19.2	19.8	20.9	20.4	22.2	20.6
TKN	mg/kg	7.3	6.2	5.1	6.0	6.2	4.6	6.1	5.2	3.5	5.3	3.7	5.6
VSS	%	82.4	84.3	82.3	84.4	81.2	81.2	80.0	82.5	77.5	83.8	79.7	83.5

Monthly Septage Totals (m3)

Lake Country WWTP



Date (1/1/2018 to 12/31/2018)

Septage Monthly Total (Mo Tot)

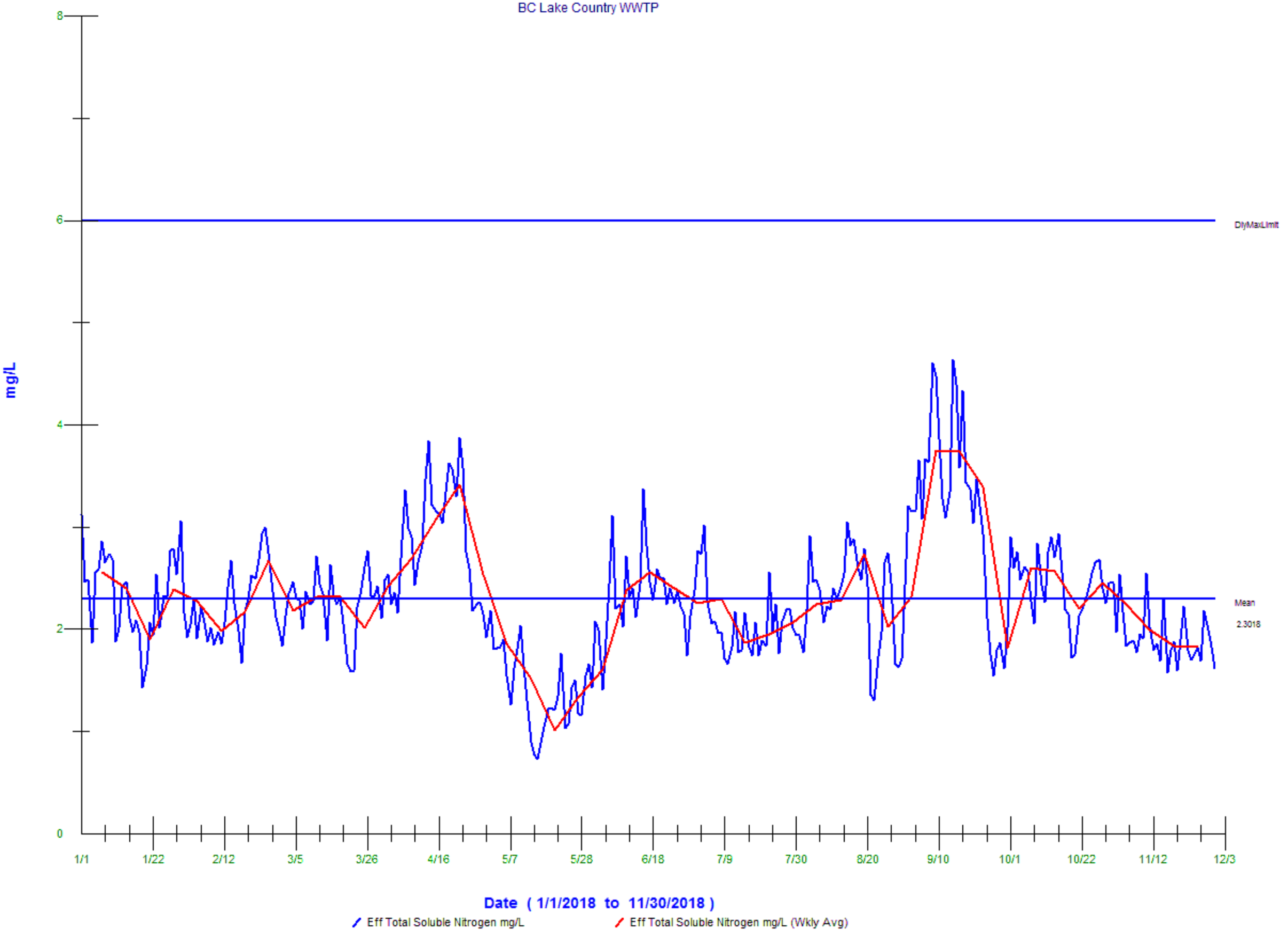
Monthly Septage Totals

APPENDIX G
Process Graphs

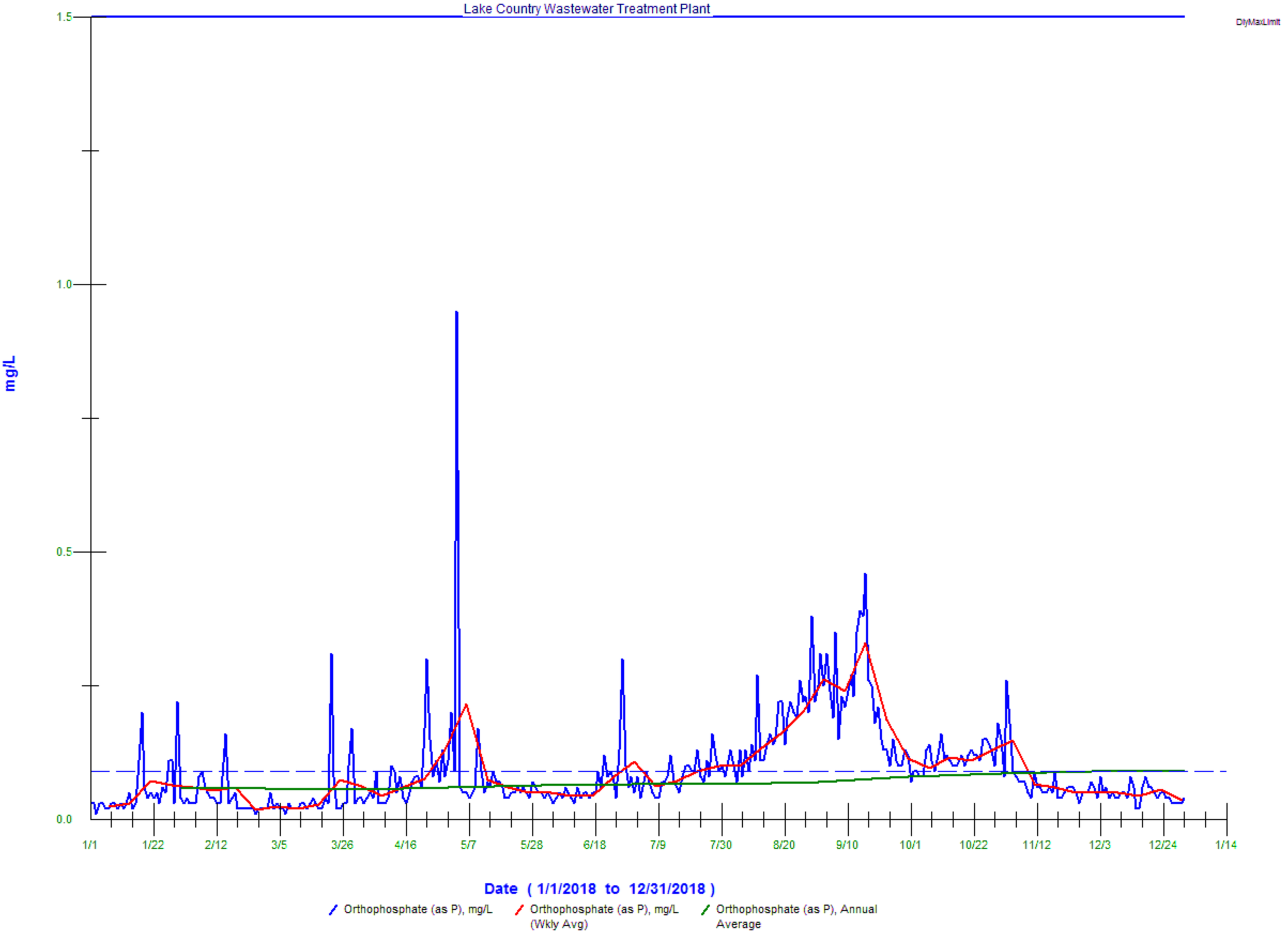
LAKE COUNTRY
Life. The Okanagan Way.

Total Soluble Nitrogen

BC Lake Country WWTP

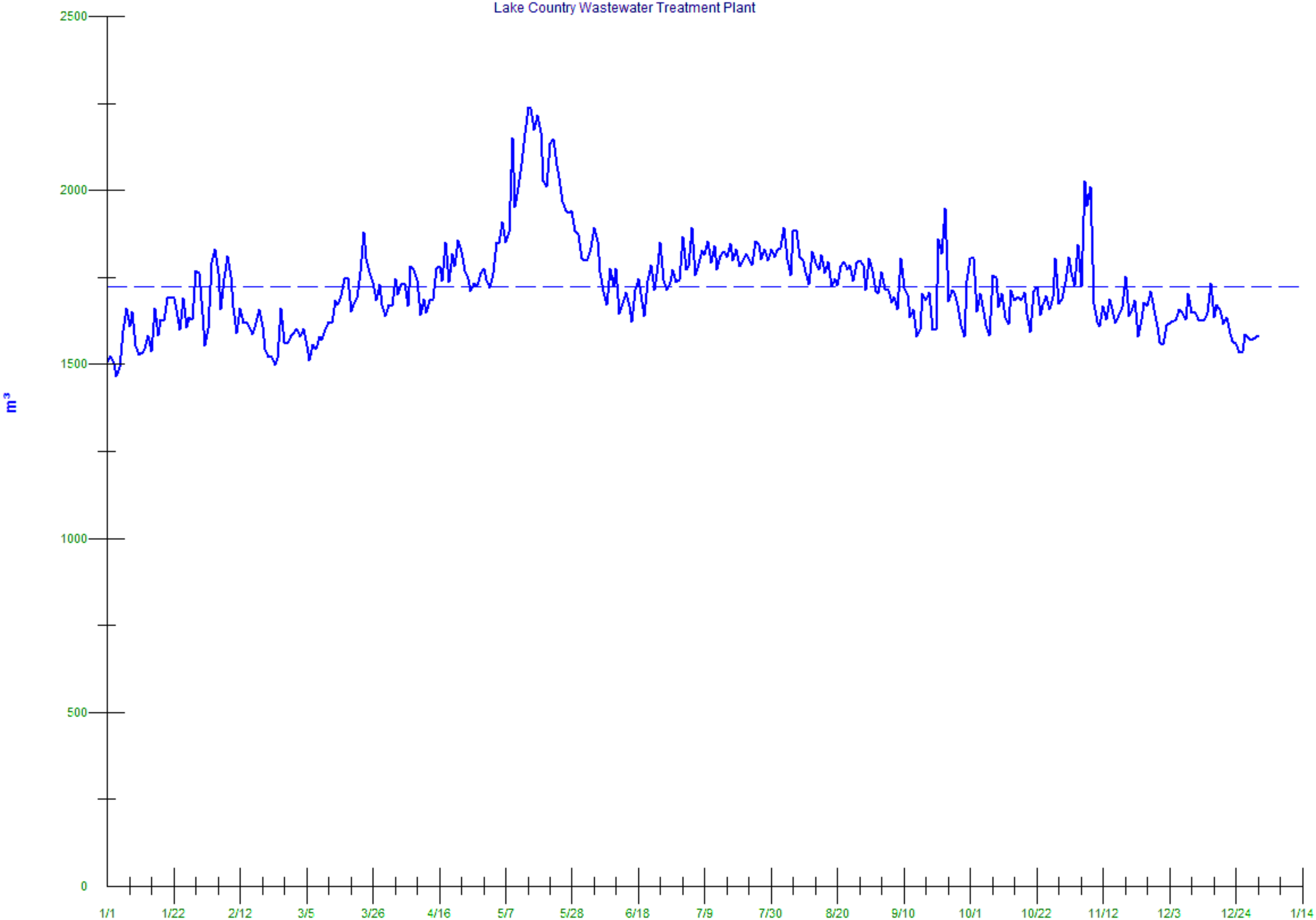


Effluent Ortho-P



Effluent Flow (M3)

Lake Country Wastewater Treatment Plant



Date (1/1/2018 to 12/31/2018)

Effluent Calculated Flow

Calculated Effluent Flow (M3)