



District of Peachland
Annual Drinking Water Report – 2015



View from the Peachland Lake Dam

INTRODUCTION

The District of Peachland is legally required by the *Drinking Water Protection Act* to provide an annual report on their water supply systems. The annual report will provide water system users with an overview of the system, a summary of all water tests performed and an update to any maintenance and/or improvements made to the system.

In late 2015, the Environmental Operators Certification Program (the EOCP – the association responsible for certification of system operators and classification of water distribution and treatment systems within British Columbia) made some integral changes in their program which affected Peachland directly. Previously, the District and all associated systems (Peachland Creek, Trepanier Creek and Okanagan Lake) were registered under a single banner as a water distribution system. As a result of the changes made by the EOCP, the District is now comprised of a water distribution system and three water treatment facilities (as listed below).

Facility Name/Number: District of Peachland Water Distribution System (#561)

Facility Name/Number: Peachland Creek Water Treatment Facility (#2288)

Facility Name/Number: Trepanier Creek Water Treatment Facility (#2289)

Facility Name/Number: Okanagan Lake Pumps Water Treatment Facility (#2290)

WATER SOURCES

Water for the District of Peachland is supplied from three surface water sources;

- Trepanier Creek,
- Peachland Creek and
- Okanagan Lake.

It should be noted that in the past, Peachland Creek sometimes been referred to as “Deep Creek”. As such, any information within this report that notes Deep Creek is ultimately referring to Peachland Creek.

The Deep Creek system supplies water to all properties accessed from Princeton Avenue as well as those that lie further south. It also supplies the properties accessed from Ponderosa Dr and the downtown area as far north as 11th Street (approximately). The Trepanier system supplies water to the remainder of the properties in the District (from 11th Street north). When the Okanagan Lake pumps are operated in place of the Trepanier Creek Intake, the supply area is identical to the Trepanier system.

The majority of water is supplied from the Deep Creek system (approximately 2/3) with the remainder supplied by the Trepanier Creek system (approximately 1/3) and the Okanagan Lake Pumps. The Okanagan Lake Pumps are typically operated during spring freshet/runoff to supply less turbid water to the Trepanier system.

In 2015, as a result of a slower than usual spring melt, the Okanagan Lake Pumps were not activated during the spring freshet. They were however used during the late summer / early fall due to extremely low water levels in Trepanier Creek at that time.

DISTRIBUTION SYSTEM

The District of Peachland currently uses chlorine gas as its primary disinfectant. The disinfectant is injected using flow paced technology and is dosed to provide inactivation of bacteria, viruses and giardia cysts which may be present within the surface water source. District staff maintains a first user residual ranging from 0.9 – 1.2 mg/L (depending on the time of year and clarity of the raw water). At the ends of the system, a chlorine residual goal is set for approximately 0.2 mg/L. A residual of chlorine remaining in the distribution system extends a measure of protection against any possible contamination entering the system after disinfection.

The distribution system and supply includes:

- 16 pressure reducing stations,
- 2 high consequence dams (Peachland Lake and Silver Lake)
- 1 significant consequence dam (Glen Lake)
- 4 active reservoirs
- 6 active pump stations
- Approximately 81 km of pipeline

The Water Department is staffed by operators certified through the EOCP, with their certifications as follows;

- Leadhand: Water Distribution Level IV
- Water Mechanic: Water Distribution Level II
- Water Mechanic: Water Distribution Level II

These operators have the capability to monitor the system at all times (24 hours a day, 365 days a year) through the use of the SCADA system (supervisory control and data acquisition). The system is set to alarm if it drifts beyond pre-determined set points, calling the standby operator to alert them.

ROUTINE MAINTENANCE

Fire Hydrants

All municipally owned fire hydrants are inspected and flushed annually. Hydrants undergo a complete tear down and rebuild on an as-needed basis.

Main Valve Exercising

Main valves are exercised at least biennially or on an as-needed basis.

System Flushing

System flushing occurs annually during the fall. Hydrants and blowoffs are used to pass higher velocity water through the system in order to scour any sediment that may have settled in the system over the year.

Pressure Reducing Valves (PRVs)

PRV's are inspected monthly and rebuilt or repaired on an as-needed basis.

WATER MASTER PLAN

In 2007, the then mayor and council adopted the Water Master Plan (WMP), a set of comprehensive upgrades that was anticipated to provide treated water to Peachland in its entirety by the years 2023/24. In 2015, the Water Master Plan was amended to include information not known during the writing of the original. The key features of said plan are as follows:

- 1) The construction of a conventional water filtration plant / filtered water storage in the vicinity of the current Peachland Creek Intake with the first phase capacity proposed at 25 ML/d. The estimated capital cost of this project is \$18.8 million.
- 2) Completion of the remaining water transmission trunk lines. The estimated capital cost of this project is \$18.5 million.
- 3) Transfer water licenses from Trepanier Creek to the Okanagan Lake source and upgrade the Okanagan Lake Pump Station to allow it to be used as a standby source for emergencies or a supplementary source in severe drought years. The estimated capital cost of this project is \$2.5 million.
- 4) Installation of the MacDonald Creek diversion (near the Brenda Mine site) to restore original flow to Peachland Creek.

If more in-depth information is desired, it is available at the District's website (<http://www.peachland.ca/water-master-plan-2015>)

The installation of this water treatment plant will allow the District to meet the minimum requirements of the Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia. If the minimum requirements are not met, water users can potentially be at increased risk of illness from protozoan pathogens.

WATER SAMPLING

Drinking water samples are tested weekly for *E.Coli* and total coliform counts by Caro Analytical Services in Kelowna.

On August 18/2015, samples were taken at Hydrants 89 and 133, located on Thwaite Cres and Coldham Rd, respectively. Both of the samples showed counts of total coliform bacteria. Upon being informed by Caro and in consultation with Interior Health, a water quality advisory was immediately instituted. The distribution system was flushed thoroughly and re-sampling was performed at the sites in question as well as other locations throughout the system. The water quality advisory was rescinded on August 31/2015.

District employees monitor and record daily turbidity values along with pH and chlorine levels. Turbidity is one of the main parameters leading to a water quality advisory or a boil water notice. As the turbidity increases over 1 NTU, a water quality advisory is instituted. Similarly, as it increases over 5 NTU, a boil water notice is instituted. For ease of understanding, if one of the sources increases over the noted thresholds, the entire system is placed on an advisory/order. Turbidity can affect the number and type of microorganisms that enter a surface water source. As surface waters experience increased flows (ie. Spring runoff, major rainfall events, etc), turbidity can fluctuate dramatically and the public is notified accordingly. Records of turbidity values can be found in Appendix V.

Chlorine concentrations are monitored continuously at 5-6 stations throughout the system (depending on the time of year) as well as daily grab samples at a number of locations to ensure instrument accuracy, allowing CT values to be monitored.

Samples are also collected annually in order to perform a comprehensive analysis, giving an indication of any changes occurring within the water supplies. It should be noted that all raw sources tested are within the maximum allowable concentration (MAC) limits set out in the Guidelines for Canadian Drinking Water Quality. Lastly, trihalomethanes (THM`s) are also tested annually to provide an indication of the level of disinfection byproducts present in the water supply system. The results from the comprehensive and THM analyses are included in Appendices I and II, respectively. The result sheets also indicate the limit or guideline for each parameter listed.

WATER QUALITY ADVISORIES / BOIL WATER NOTICES / DO NOT USE NOTICE

Water quality advisories and boil water notices are notifications designed to inform the public of possible public health threats. The decision to institute an advisory or notice is typically made in discussion with staff at IHA.

A water quality advisory (WQA) is the lowest-level notification and used in situations where the possible public health threat is modest. These advisories are instituted when the turbidity in the water source increases over a value of 1 NTU (nephelometric turbidity units).

April 1/2015 – a WQA was initiated due to turbidity values increasing above 1 NTU. It was rescinded on June 9/15.

Aug 21/2015 - a WQA was initiated due to irregular sampling results (as noted in previous section). It was rescinded on August 31/15.

A boil water notice is a moderate-level notification used in situations where the possible public health threat is one that can be effectively addressed by boiling the water. These notices are typically instituted when the water source turbidity increases over 5 NTU or there is a failure in the disinfection system. There were no boil water notices issued in 2015.

A do not use notice is the highest level of notification. It is used in situations where a significant public health threat exists (ie. Chemical spill, etc). There were no do not use notices issued in 2015.

WATER CONSUMPTION

In 2015, there was a total of 612,539,400 Imperial Gallons (or 2784.6 ML) passing through the District Intakes. A monthly summary of consumption per intake can be found in Appendix III.

WORKS COMPLETED AND IN PROGRESS

- A leak detection company (Watermark Solutions) was contracted to investigate three areas of concern within the District; Upper Princeton (Law St Reservoir pressure zone), Downtown business area and Bluewaters. A number of leaks were identified within the distribution system which were either repaired or slated to be repaired.
- A mounted generator was installed at the Trepanier Creek Intake. This machinery permits continuous service/chlorination in the case of a power outage.
- The Coldham PRV replacement was completed. The new equipment replaces infrastructure that was nearing the end of its life cycle and also allowed for the installation of telemetry. With new flowmeters and pressure sensors, this allows a better understanding of the system in the area and will be valuable in the future in detecting leaks and pressure surges.
- Due to an increased number of leaks appearing, all galvanized service lines on 3rd Avenue were replaced with PE tubing.

Appendix I – Comprehensive Analyses (Deep Creek Intake, Trepanier Creek Intake)



CERTIFICATE OF ANALYSIS

REPORTED TO	Peachland, Corporation of the District of 5806 Beach Avenue PEACHLAND, BC V0H 1X7	TEL	(250) 767-2647
		FAX	(250) 767-6370
ATTENTION	Shawn Grundy	WORK ORDER	5111556
PO NUMBER		RECEIVED / TEMP	Nov-24-15 12:55 / 11°C
PROJECT	Comprehensive	REPORTED	Dec-02-15
PROJECT INFO		COC NUMBER	B28413

General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Authorized By: **Ed Hoppe, B.Sc., P.Chem.**
Division Manager, Kelowna

If you have any questions or concerns, please contact your Account Manager:
Kristin McKeown (kmckeown@caro.ca)

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Richmond, BC V6V 2K9
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#102 3677 Highway 97N
Kelowna, BC V1X 5C3
Tel: 250-765-9646 Fax: 250-765-3893

17225 109 Avenue
Edmonton, AB T5S 1H7
Tel: 780-489-9100 Fax: 780-489-9700

www.caro.ca

REPORTED TO Peachland, Corporation of the District of
PROJECT Comprehensive

WORK ORDER 5111556
REPORTED Dec-02-15

Analysis Description	Method Reference	Technique	Location
Alkalinity in Water (Total)	APHA 2320 B*	Titration with H ₂ SO ₄	Kelowna
Anions in Water by IC	APHA 4110 B	Ion Chromatography with Chemical Suppression of Eluent Conductivity	Kelowna
Colour, True	APHA 2120 C	Spectrophotometry (456 nm)	Kelowna
Conductivity in Water	APHA 2510 B	Conductivity Meter	Kelowna
Cyanide, Total in Water	APHA 4500-CN- C / APHA 4500-CN- E	Distillation / Colorimetry	Kelowna
Hardness (as CaCO ₃)	APHA 2340 B	Calculation: 2.497 [Ca] + 4.118 [Mg]	N/A
Mercury, total by CVAFS	EPA 245.7*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	APHA 4500-H+ B	Electrometry	Kelowna
Solids, Total Dissolved	APHA 1030 E	Calculation: 100 x ((Cations)-[Anions]) / ((Cations)+[Anions])	N/A
Total Recoverable Metals	APHA 3030E* / APHA 3125 B	HNO ₃ +HCl Hot Block Digestion / Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	Richmond
Transmissivity at 254 nm	APHA 5010 B	Ultraviolet Absorption	Kelowna
Turbidity	APHA 2130 B	Nephelometry	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Method Reference Descriptions:

APHA Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation
EPA United States Environmental Protection Agency Test Methods

Glossary of Terms:

MRL Method Reporting Limit
< Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences
AO Aesthetic objective
MAC Maximum acceptable concentration (health based)
OG Operational guideline (treated water)
% T Percent Transmittance
CU Colour Units (referenced against a platinum cobalt standard)
mg/L Milligrams per litre
NTU Nephelometric Turbidity Units
pH units pH < 7 = acidic, pH > 7 = basic
µS/cm Microsiemens per centimetre

Standards / Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Oct 2014)

Website: http://www.hc-sc.gc.ca/lewh-sent/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

SAMPLE ANALYTICAL DATA

REPORTED TO Peachland, Corporation of the District of
PROJECT Comprehensive

WORK ORDER 5111556
REPORTED Dec-02-15

Analyte	Result / Recovery	Standard / Guideline	MRL / Units Limits	Prepared	Analyzed	Notes
Sample ID: Peachland Creek - Raw (5111556-01) [Water] Sampled: Nov-24-15 07:45						
<i>Anions</i>						
Chloride	3.21	AO ≤ 250	0.10 mg/L	N/A	Nov-25-15	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	N/A	Nov-25-15	
Nitrate as N	0.019	MAC = 10	0.010 mg/L	N/A	Nov-25-15	
Nitrite as N	< 0.010	MAC = 1	0.010 mg/L	N/A	Nov-25-15	
Sulfate	15.1	AO ≤ 500	1.0 mg/L	N/A	Nov-25-15	
<i>General Parameters</i>						
Alkalinity, Total as CaCO ₃	99	N/A	1 mg/L	N/A	Nov-25-15	
Colour, True	5	AO ≤ 15	5 CU	N/A	Nov-25-15	
Conductivity (EC)	232	N/A	2 µS/cm	N/A	Nov-25-15	
Cyanide, Total	< 0.010	MAC = 0.2	0.010 mg/L	Nov-25-15	Nov-27-15	
pH	7.97	6.5-8.5	0.01 pH units	N/A	Nov-25-15	HT2
Turbidity	0.5	OG < 0.1	0.1 NTU	N/A	Nov-25-15	
UV Transmittance @ 254nm	88.5	N/A	0.1 % T	N/A	Nov-26-15	
<i>Calculated Parameters</i>						
Hardness, Total (Total as CaCO ₃)	106	N/A	5.0 mg/L	N/A	N/A	
Solids, Total Dissolved	125	AO ≤ 500	2.0 mg/L	N/A	N/A	
<i>Total Recoverable Metals</i>						
Aluminum, total	< 0.05	OG < 0.1	0.05 mg/L	Nov-26-15	Nov-26-15	
Antimony, total	< 0.001	MAC = 0.006	0.001 mg/L	Nov-26-15	Nov-26-15	
Arsenic, total	< 0.005	MAC = 0.01	0.005 mg/L	Nov-26-15	Nov-26-15	
Barium, total	< 0.05	MAC = 1	0.05 mg/L	Nov-26-15	Nov-26-15	
Beryllium, total	< 0.001	N/A	0.001 mg/L	Nov-26-15	Nov-26-15	
Boron, total	0.06	MAC = 5	0.04 mg/L	Nov-26-15	Nov-26-15	
Cadmium, total	< 0.0001	MAC = 0.005	0.0001 mg/L	Nov-26-15	Nov-26-15	
Calcium, total	35.2	N/A	2.0 mg/L	Nov-26-15	Nov-26-15	
Chromium, total	< 0.005	MAC = 0.05	0.005 mg/L	Nov-26-15	Nov-26-15	
Cobalt, total	< 0.0005	N/A	0.0005 mg/L	Nov-26-15	Nov-26-15	
Copper, total	< 0.002	AO ≤ 1	0.002 mg/L	Nov-26-15	Nov-26-15	
Iron, total	< 0.10	AO ≤ 0.3	0.10 mg/L	Nov-26-15	Nov-26-15	
Lead, total	< 0.001	MAC = 0.01	0.001 mg/L	Nov-26-15	Nov-26-15	
Magnesium, total	4.3	N/A	0.1 mg/L	Nov-26-15	Nov-26-15	
Manganese, total	0.004	AO ≤ 0.05	0.002 mg/L	Nov-26-15	Nov-26-15	
Mercury, total	< 0.00002	MAC = 0.001	0.00002 mg/L	Nov-25-15	Nov-26-15	
Molybdenum, total	0.010	N/A	0.001 mg/L	Nov-26-15	Nov-26-15	
Nickel, total	< 0.002	N/A	0.002 mg/L	Nov-26-15	Nov-26-15	
Phosphorus, total	< 0.2	N/A	0.2 mg/L	Nov-26-15	Nov-26-15	
Potassium, total	1.6	N/A	0.2 mg/L	Nov-26-15	Nov-26-15	
Selenium, total	< 0.005	MAC = 0.05	0.005 mg/L	Nov-26-15	Nov-26-15	
Silicon, total	5	N/A	5 mg/L	Nov-26-15	Nov-26-15	
Silver, total	< 0.0005	N/A	0.0005 mg/L	Nov-26-15	Nov-26-15	
Sodium, total	5.2	AO ≤ 200	0.2 mg/L	Nov-26-15	Nov-26-15	
Uranium, total	0.0010	MAC = 0.02	0.0002 mg/L	Nov-26-15	Nov-26-15	
Vanadium, total	< 0.01	N/A	0.01 mg/L	Nov-26-15	Nov-26-15	
Zinc, total	< 0.04	AO ≤ 5	0.04 mg/L	Nov-26-15	Nov-26-15	

SAMPLE ANALYTICAL DATA

REPORTED TO Peachland, Corporation of the District of
PROJECT Comprehensive

WORK ORDER 5111556
REPORTED Dec-02-15

Analyte	Result / Recovery	Standard / Guideline	MRL / Units Limits	Prepared	Analyzed	Notes
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Sample ID: Trepanier Creek - Raw (5111556-02) [Water] Sampled: Nov-24-15 07:45

<i>Anions</i>						
Chloride	28.7	AO ≤ 250	0.10 mg/L	N/A	Nov-25-15	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	N/A	Nov-25-15	
Nitrate as N	0.083	MAC = 10	0.010 mg/L	N/A	Nov-25-15	
Nitrite as N	< 0.010	MAC = 1	0.010 mg/L	N/A	Nov-25-15	
Sulfate	15.4	AO ≤ 500	1.0 mg/L	N/A	Nov-25-15	
<i>General Parameters</i>						
Alkalinity, Total as CaCO ₃	94	N/A	1 mg/L	N/A	Nov-25-15	
Colour, True	< 5	AO ≤ 15	5 CU	N/A	Nov-25-15	
Conductivity (EC)	311	N/A	2 µS/cm	N/A	Nov-25-15	
Cyanide, Total	< 0.010	MAC = 0.2	0.010 mg/L	Nov-25-15	Nov-27-15	
pH	7.95	6.5-8.5	0.01 pH units	N/A	Nov-25-15	HT2
Turbidity	0.3	OG < 0.1	0.1 NTU	N/A	Nov-25-15	
UV Transmittance @ 254nm	92.4	N/A	0.1 % T	N/A	Nov-26-15	
<i>Calculated Parameters</i>						
Hardness, Total (Total as CaCO ₃)	128	N/A	5.0 mg/L	N/A	N/A	
Solids, Total Dissolved	161	AO ≤ 500	2.0 mg/L	N/A	N/A	
<i>Total Recoverable Metals</i>						
Aluminum, total	< 0.05	OG < 0.1	0.05 mg/L	Nov-26-15	Nov-26-15	
Antimony, total	< 0.001	MAC = 0.008	0.001 mg/L	Nov-26-15	Nov-26-15	
Arsenic, total	< 0.005	MAC = 0.01	0.005 mg/L	Nov-26-15	Nov-26-15	
Barium, total	< 0.05	MAC = 1	0.05 mg/L	Nov-26-15	Nov-26-15	
Beryllium, total	< 0.001	N/A	0.001 mg/L	Nov-26-15	Nov-26-15	
Boron, total	0.06	MAC = 5	0.04 mg/L	Nov-26-15	Nov-26-15	
Cadmium, total	< 0.0001	MAC = 0.005	0.0001 mg/L	Nov-26-15	Nov-26-15	
Calcium, total	40.5	N/A	2.0 mg/L	Nov-26-15	Nov-26-15	
Chromium, total	< 0.005	MAC = 0.05	0.005 mg/L	Nov-26-15	Nov-26-15	
Cobalt, total	< 0.0005	N/A	0.0005 mg/L	Nov-26-15	Nov-26-15	
Copper, total	< 0.002	AO ≤ 1	0.002 mg/L	Nov-26-15	Nov-26-15	
Iron, total	< 0.10	AO ≤ 0.3	0.10 mg/L	Nov-26-15	Nov-26-15	
Lead, total	< 0.001	MAC = 0.01	0.001 mg/L	Nov-26-15	Nov-26-15	
Magnesium, total	6.4	N/A	0.1 mg/L	Nov-26-15	Nov-26-15	
Manganese, total	< 0.002	AO ≤ 0.05	0.002 mg/L	Nov-26-15	Nov-26-15	
Mercury, total	< 0.00002	MAC = 0.001	0.00002 mg/L	Nov-25-15	Nov-26-15	
Molybdenum, total	0.005	N/A	0.001 mg/L	Nov-26-15	Nov-26-15	
Nickel, total	< 0.002	N/A	0.002 mg/L	Nov-26-15	Nov-26-15	
Phosphorus, total	< 0.2	N/A	0.2 mg/L	Nov-26-15	Nov-26-15	
Potassium, total	2.2	N/A	0.2 mg/L	Nov-26-15	Nov-26-15	
Selenium, total	< 0.005	MAC = 0.05	0.005 mg/L	Nov-26-15	Nov-26-15	
Silicon, total	6	N/A	5 mg/L	Nov-26-15	Nov-26-15	
Silver, total	< 0.0005	N/A	0.0005 mg/L	Nov-26-15	Nov-26-15	
Sodium, total	10.3	AO ≤ 200	0.2 mg/L	Nov-26-15	Nov-26-15	
Uranium, total	0.0030	MAC = 0.02	0.0002 mg/L	Nov-26-15	Nov-26-15	
Vanadium, total	< 0.01	N/A	0.01 mg/L	Nov-26-15	Nov-26-15	

SAMPLE ANALYTICAL DATA

REPORTED TO PROJECT Peachland, Corporation of the District of Comprehensive

WORK ORDER REPORTED 5111556 Dec-02-15

Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: Trepanier Creek - Raw (5111556-02) [Water] Sampled: Nov-24-15 07:45, Continued

<i>Total Recoverable Metals, Continued</i>							
Zinc, total	< 0.04	AO ≤ 5	0.04	mg/L	Nov-26-15	Nov-26-15	

Sample / Analysis Qualifiers:	
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

Appendix II – Trihalomethane Analyses



CERTIFICATE OF ANALYSIS

REPORTED TO	Peachland, Corporation of the District of 5808 Beach Avenue PEACHLAND, BC V0H 1X7	TEL	(250) 767-2647
		FAX	(250) 767-6370
ATTENTION	Shawn Grundy	WORK ORDER	5111557
PO NUMBER		RECEIVED / TEMP	Nov-24-15 12:55 / 11°C
PROJECT	Chemistry	REPORTED	Dec-01-15
PROJECT INFO		COC NUMBER	B28413

General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Authorized By: **Ed Hoppe, B.Sc., P.Chem.**
Division Manager, Kelowna

*If you have any questions or concerns, please contact your Account Manager:
Kristin McKeown (kmckeown@caro.ca)*

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#102 3677 Highway 97N
Kelowna, BC V1X 5C3
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17225 109 Avenue
Edmonton, AB T5S 1H7
Tel: 780-489-9100 Fax: 780-489-9700

www.caro.ca

REPORTED TO PROJECT Peachland, Corporation of the District of Chemistry

WORK ORDER REPORTED 5111557 Dec-01-15

Analysis Description	Method Reference	Technique	Location
Trihalomethanes	EPA 5030B / APHA 6200 B	Purge&Trap / Purge and Trap Capillary Column GC-MSD	Richmond

Method Reference Descriptions:

EPA United States Environmental Protection Agency Test Methods

Glossary of Terms:

MRL Method Reporting Limit
 < Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences
 AO Aesthetic objective
 MAC Maximum acceptable concentration (health based)
 OG Operational guideline (treated water)
 mg/L Milligrams per litre

Standards / Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Oct 2014)

Website: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

SAMPLE ANALYTICAL DATA

REPORTED TO Peachland, Corporation of the District of
PROJECT Chemistry

WORK ORDER 5111557
REPORTED Dec-01-15

Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: #1 - Todd Road Washrooms (5111557-01) [Water] Sampled: Nov-24-15 08:10

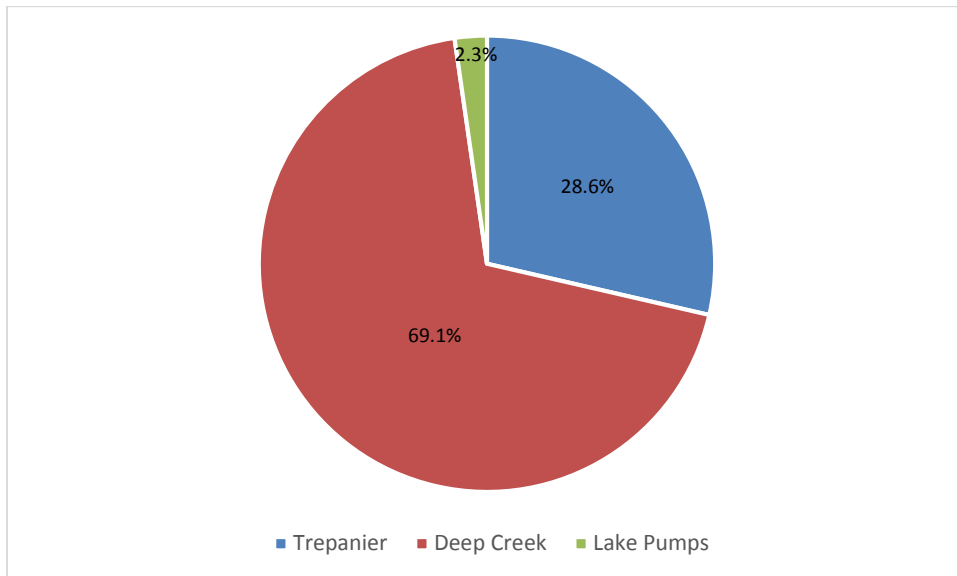
<i>Calculated Parameters</i>							
Total Trihalomethanes	0.039	MAC = 0.1	0.004	mg/L	N/A	N/A	
<i>Volatile Organic Compounds (VOC)</i>							
Bromodichloromethane	0.003	N/A	0.001	mg/L	N/A	Nov-26-15	
Bromoform	< 0.001	N/A	0.001	mg/L	N/A	Nov-26-15	
Chloroform	0.036	N/A	0.001	mg/L	N/A	Nov-26-15	
Dibromochloromethane	< 0.001	N/A	0.001	mg/L	N/A	Nov-26-15	
Surrogate: Toluene-d8	107		70-130	%	N/A	Nov-26-15	
Surrogate: 4-Bromofluorobenzene	97		70-130	%	N/A	Nov-26-15	

Sample ID: #3 - Swim Bay Washrooms (5111557-02) [Water] Sampled: Nov-24-15 08:20

<i>Calculated Parameters</i>							
Total Trihalomethanes	0.066	MAC = 0.1	0.004	mg/L	N/A	N/A	
<i>Volatile Organic Compounds (VOC)</i>							
Bromodichloromethane	0.005	N/A	0.001	mg/L	N/A	Nov-26-15	
Bromoform	< 0.001	N/A	0.001	mg/L	N/A	Nov-26-15	
Chloroform	0.061	N/A	0.001	mg/L	N/A	Nov-26-15	
Dibromochloromethane	< 0.001	N/A	0.001	mg/L	N/A	Nov-26-15	
Surrogate: Toluene-d8	105		70-130	%	N/A	Nov-26-15	
Surrogate: 4-Bromofluorobenzene	95		70-130	%	N/A	Nov-26-15	

Appendix III – 2015 Water Consumption

Month	Volume (IGal)				Volume	
	Trepanier	Deep Creek	Lake Pumps	Total	m ³	ML
January	4,387,500	20,274,000	0	24,661,500	112,210	112.11
February	3,705,100	18,863,000	0	22,568,100	102,685	102.60
March	16,511,300	21,521,000	0	38,032,300	173,047	172.90
April	12,773,900	30,131,000	0	42,904,900	195,217	195.05
May	23,721,300	51,719,000	0	75,440,300	343,253	342.96
June	24,957,200	55,067,000	0	80,024,200	364,110	363.80
July	31,599,300	65,440,000	0	97,039,300	441,529	441.15
August	21,433,400	60,707,000	6,748,500	88,888,900	404,444	404.10
September	10,365,400	44,204,000	7,203,000	61,772,400	281,064	280.82
October	11,470,100	24,011,000	0	35,481,100	161,439	161.30
November	7,261,700	15,588,000	0	22,849,700	103,966	103.88
December	7,034,700	15,842,000	0	22,876,700	104,089	104.00
TOTALS	175,220,900	423,367,000	13,951,500	612,539,400	2,787,054	2,784.66



Peachland water source use (percentage)

Appendix IV – Turbidity data

	Daily Average Turbidity (NTU)		
	Deep Creek	Trepanier Creek	OK Lake Pumps
02/01/2015 0:00	0.41	0.18	
03/01/2015 0:00	0.32	0.18	
04/01/2015 0:00	0.32	0.18	
05/01/2015 0:00	0.34	0.15	
06/01/2015 0:00	0.34	0.16	
07/01/2015 0:00	0.4	0.14	
08/01/2015 0:00	0.44	0.16	
09/01/2015 0:00	0.43	0.14	
10/01/2015 0:00	0.38	0.11	
11/01/2015 0:00	0.37	0.14	
12/01/2015 0:00	0.35	0.11	
13/01/2015 0:00	0.34	0.1	
14/01/2015 0:00	0.33	0.16	
15/01/2015 0:00	0.34	0.16	
16/01/2015 0:00	0.31	0.11	
17/01/2015 0:00	0.32	0.1	
18/01/2015 0:00	0.31	0.11	
19/01/2015 0:00	0.33	0.12	
20/01/2015 0:00	0.35	0.16	

21/01/2015 0:00	0.34	0.2	
22/01/2015 0:00	0.43	0.14	
23/01/2015 0:00	0.34	0.19	
24/01/2015 0:00	0.37	0.14	
25/01/2015 0:00	0.38	0.13	
26/01/2015 0:00	0.38	0.14	
27/01/2015 0:00	0.35	0.13	
28/01/2015 0:00	0.34	0.14	
29/01/2015 0:00	0.36	0.16	
30/01/2015 0:00	0.34	0.18	
31/01/2015 0:00	0.34	0.15	
01/02/2015 0:00	0.36	0.14	
02/02/2015 0:00	0.44	0.14	
03/02/2015 0:00	0.33	0.13	
04/02/2015 0:00	0.35	0.1	
05/02/2015 0:00	0.37	0.11	
06/02/2015 0:00	0.37	0.11	
07/02/2015 0:00	0.36	0.15	
08/02/2015 0:00	0.37	0.28	
09/02/2015 0:00	0.44	0.27	
10/02/2015 0:00	0.45	0.3	
11/02/2015 0:00	0.5	0.38	
12/02/2015 0:00	0.53	0.35	
13/02/2015 0:00	0.54	0.35	
14/02/2015 0:00	0.56	0.38	

15/02/2015 0:00	0.53	0.44	
16/02/2015 0:00	0.53	0.47	
17/02/2015 0:00	0.52	0.47	
18/02/2015 0:00	0.44	0.59	
19/02/2015 0:00	0.44	0.67	
20/02/2015 0:00	0.38	0.45	
21/02/2015 0:00	0.39	0.28	
22/02/2015 0:00	0.39	0.26	
23/02/2015 0:00	0.4	0.25	
24/02/2015 0:00	0.35	0.24	
25/02/2015 0:00	0.36	0.64	
26/02/2015 0:00	0.35	0.7	
27/02/2015 0:00	0.38	0.68	
28/02/2015 0:00	0.36	0.42	
01/03/2015 0:00	0.39	0.19	
02/03/2015 0:00	0.34	0.66	
03/03/2015 0:00	0.39	0.67	
04/03/2015 0:00	0.42	0.74	
05/03/2015 0:00	0.55	1.23	
06/03/2015 0:00	0.41	0.94	
07/03/2015 0:00	0.39	0.18	
08/03/2015 0:00	0.39	0.16	
09/03/2015 1:00	0.34	0.13	
10/03/2015 1:00	0.42	0.3	
11/03/2015 1:00	0.35	0.18	

12/03/2015 1:00	0.35	0.18	
13/03/2015 1:00	0.4	0.27	
14/03/2015 1:00	0.35	0.34	
15/03/2015 1:00	0.38	0.4	
16/03/2015 1:00	0.45	0.61	
17/03/2015 1:00	0.56	0.61	
18/03/2015 1:00	0.64	0.5	
19/03/2015 1:00	0.53	0.45	
20/03/2015 1:00	0.47	0.51	
21/03/2015 1:00	0.48	0.7	
22/03/2015 1:00	0.57	0.78	
23/03/2015 1:00	0.81	0.73	
24/03/2015 1:00	0.75	0.58	
25/03/2015 1:00	0.61	0.68	
26/03/2015 1:00	0.55	0.74	
27/03/2015 1:00	0.5	0.7	
28/03/2015 1:00	0.49	0.98	
29/03/2015 1:00	0.54	1.29	
30/03/2015 1:00	0.79	1.67	
31/03/2015 1:00	0.81	1.85	
01/04/2015 1:00	0.77	1.91	
02/04/2015 1:00	0.83	1.17	
03/04/2015 1:00	0.71	0.78	
04/04/2015 1:00	0.61	1.41	
05/04/2015 1:00	0.59	0.94	

06/04/2015 1:00	0.56	0.97	
07/04/2015 1:00	0.52	0.81	
08/04/2015 1:00	0.5	0.78	
09/04/2015 1:00	0.45	0.6	
10/04/2015 1:00	0.45	0.56	
11/04/2015 1:00	0.51	0.52	
12/04/2015 1:00	0.49	0.58	
13/04/2015 1:00	0.46	0.5	
14/04/2015 1:00	0.44	0.56	
15/04/2015 1:00	0.45	0.54	
16/04/2015 1:00	0.52	0.72	
17/04/2015 1:00	0.43	0.75	
18/04/2015 1:00	0.43	0.74	
19/04/2015 1:00	0.44	0.74	
20/04/2015 1:00	0.46	0.91	
21/04/2015 1:00	0.44	0.62	
22/04/2015 1:00	0.45	0.61	
23/04/2015 1:00	0.5	1.01	
24/04/2015 1:00	0.53	1.08	
25/04/2015 1:00	0.51	0.85	
26/04/2015 1:00	0.5	0.63	
27/04/2015 1:00	0.48	0.6	
28/04/2015 1:00	0.47	0.62	
29/04/2015 1:00	0.46	0.71	
30/04/2015 1:00	0.49	0.86	

01/05/2015 1:00	0.51	0.78	
02/05/2015 1:00	0.47	0.73	
03/05/2015 1:00	0.48	0.8	
04/05/2015 1:00	0.46	0.8	
05/05/2015 1:00	0.46	0.82	
06/05/2015 1:00	0.47	0.89	
07/05/2015 1:00	0.48	0.87	
08/05/2015 1:00	0.47	0.87	
09/05/2015 1:00	0.46	0.92	
10/05/2015 1:00	0.49	0.97	
11/05/2015 1:00	0.48	1	
12/05/2015 1:00	0.53	1.21	
13/05/2015 1:00	0.51	1.47	
14/05/2015 1:00	0.57	0.92	
15/05/2015 1:00	0.55	0.45	
16/05/2015 1:00	0.5	0.41	
17/05/2015 1:00	0.53	0.37	
18/05/2015 1:00	0.58	0.34	
19/05/2015 1:00	0.59	0.24	
20/05/2015 1:00	0.58	0.35	
21/05/2015 1:00	0.51	0.32	
22/05/2015 1:00	0.51	0.24	
23/05/2015 1:00	0.49	0.23	
24/05/2015 1:00	0.48	0.24	
25/05/2015 1:00	0.5	0.25	

26/05/2015 1:00	0.54	0.26	
27/05/2015 1:00	0.52	0.27	
28/05/2015 1:00	0.54	0.29	
29/05/2015 1:00	0.52	0.28	
30/05/2015 1:00	0.51	0.25	
31/05/2015 1:00	0.51	0.22	
01/06/2015 1:00	0.49	0.18	
02/06/2015 1:00	0.5	0.27	
03/06/2015 1:00	0.52	0.41	
04/06/2015 1:00	0.66	0.32	
05/06/2015 1:00	0.59	0.37	
06/06/2015 1:00	0.63	0.31	
07/06/2015 1:00	0.62	0.3	
08/06/2015 1:00	0.59	0.31	
09/06/2015 1:00	0.56	0.33	
10/06/2015 1:00	0.51	0.33	
11/06/2015 1:00	0.49	0.35	
12/06/2015 1:00	0.51	0.39	
13/06/2015 1:00	0.5	0.32	
14/06/2015 1:00	0.45	0.35	
15/06/2015 1:00	0.47	0.37	
16/06/2015 1:00	0.47	0.38	
17/06/2015 1:00	0.49	0.32	
18/06/2015 1:00	0.49	0.44	
19/06/2015 1:00	0.53	0.39	

20/06/2015 1:00	0.51	0.4	
21/06/2015 1:00	0.52	0.4	
22/06/2015 1:00	0.46	0.41	
23/06/2015 1:00	0.46	0.37	
24/06/2015 1:00	0.45	0.4	
25/06/2015 1:00	0.43	0.44	
26/06/2015 1:00	0.4	0.44	
27/06/2015 1:00	0.46	0.48	
28/06/2015 1:00	0.45	0.53	
29/06/2015 1:00	0.54	0.59	
30/06/2015 1:00	0.47	0.66	
01/07/2015 1:00	0.53	0.71	
02/07/2015 1:00	0.5	0.76	
03/07/2015 1:00	0.43	0.82	
04/07/2015 1:00	0.4	0.9	
05/07/2015 1:00	0.39	0.96	
06/07/2015 1:00	0.41	1.02	
07/07/2015 1:00	0.41	0.48	
08/07/2015 1:00	0.4	0.19	
09/07/2015 1:00	0.39	0.2	
10/07/2015 1:00	0.38	0.19	
11/07/2015 1:00	0.39	0.19	
12/07/2015 1:00	0.49	0.21	
13/07/2015 1:00	0.53	0.21	
14/07/2015 1:00	0.49	0.25	

15/07/2015 1:00	0.53	0.29	
16/07/2015 1:00	0.5	0.22	
17/07/2015 1:00	0.48	0.21	
18/07/2015 1:00	0.44	0.25	
19/07/2015 1:00	0.53	0.2	
20/07/2015 1:00	0.69	0.27	
21/07/2015 1:00	0.66	0.31	
22/07/2015 1:00	0.63	0.35	
23/07/2015 1:00	0.58	0.32	
24/07/2015 1:00	0.5	0.3	
25/07/2015 1:00	0.46	0.23	
26/07/2015 1:00	0.46	0.37	
27/07/2015 1:00	0.46	0.51	
28/07/2015 1:00	0.46	0.51	
29/07/2015 1:00	0.46	0.51	
30/07/2015 1:00	0.46	0.51	
31/07/2015 1:00	0.46	0.51	
01/08/2015 1:00	0.46	0.51	
02/08/2015 1:00	0.46	0.51	
03/08/2015 1:00	0.46	0.51	
04/08/2015 1:00	0.46	0.51	
05/08/2015 1:00	0.46	0.51	
06/08/2015 1:00	0.46	0.51	
07/08/2015 1:00	0.46	0.51	
08/08/2015 1:00	0.46	0.51	

09/08/2015 1:00	0.46	0.51	
10/08/2015 1:00	0.46	0.51	
11/08/2015 1:00	0.47	0.4	0.19
12/08/2015 1:00	0.48	0.24	0.35
13/08/2015 1:00	0.49	0.26	0.54
14/08/2015 1:00	0.5	0.26	0.54
15/08/2015 1:00	0.5	0.26	0.53
16/08/2015 1:00	0.58	0.26	0.5
17/08/2015 1:00	0.59	0.25	0.44
18/08/2015 1:00	0.56	0.26	0.43
19/08/2015 1:00	0.61	0.28	0.45
20/08/2015 1:00	0.41	0.28	0.53
21/08/2015 1:00	0.4	0.29	0.48
22/08/2015 1:00	0.41	0.31	0.42
23/08/2015 1:00	0.43	0.31	0.42
24/08/2015 1:00	0.39	0.32	0.41
25/08/2015 1:00	0.42	0.27	0.43
26/08/2015 1:00	0.45	0.3	0.48
27/08/2015 1:00	0.4	0.27	0.36
28/08/2015 1:00	0.47	0.19	0.43
29/08/2015 1:00	0.37	0.19	0.4
30/08/2015 1:00	0.39	0.23	0.39
31/08/2015 1:00	0.48	0.21	0.41
01/09/2015 1:00	0.44	0.18	0.42
02/09/2015 1:00	0.4	0.2	0.41

03/09/2015 1:00	0.5	0.23	0.42
04/09/2015 1:00	0.49	0.18	0.41
05/09/2015 1:00	0.4	0.22	0.39
06/09/2015 1:00	0.4	0.29	0.4
07/09/2015 1:00	0.42	0.22	0.4
08/09/2015 1:00	0.41	0.22	0.37
09/09/2015 1:00	0.41	0.27	0.39
10/09/2015 1:00	0.48	0.27	0.38
11/09/2015 1:00	0.45	0.24	0.37
12/09/2015 1:00	0.44	0.19	0.39
13/09/2015 1:00	0.44	0.21	0.42
14/09/2015 1:00	0.43	0.23	0.37
15/09/2015 1:00	0.43	0.23	0.38
16/09/2015 1:00	0.43	0.31	0.37
17/09/2015 1:00	0.41	0.33	0.38
18/09/2015 1:00	0.42	0.25	0.33
19/09/2015 1:00	0.42	0.19	0.36
20/09/2015 1:00	0.44	0.16	0.33
21/09/2015 1:00	0.5	0.17	0.66
22/09/2015 1:00	0.45	0.16	
23/09/2015 1:00	0.42	0.18	
24/09/2015 1:00	0.38	0.25	
25/09/2015 1:00	0.39	0.16	
26/09/2015 1:00	0.39	0.17	
27/09/2015 1:00	0.43	0.17	

28/09/2015 1:00	0.42	0.16	
29/09/2015 1:00	0.45	0.19	
30/09/2015 1:00	0.43	0.23	
01/10/2015 1:00	0.4	0.23	
02/10/2015 1:00	0.4	0.26	
03/10/2015 1:00	0.4	0.25	
04/10/2015 1:00	0.47	0.26	
05/10/2015 1:00	0.44	0.26	
06/10/2015 1:00	0.4	0.27	
07/10/2015 1:00	0.41	0.19	
08/10/2015 1:00	0.41	0.19	
09/10/2015 1:00	0.42	0.22	
10/10/2015 1:00	0.42	0.2	
11/10/2015 1:00	0.4	0.2	
12/10/2015 1:00	0.44	0.26	
13/10/2015 1:00	0.41	0.2	
14/10/2015 1:00	0.39	0.2	
15/10/2015 1:00	0.38	0.24	
16/10/2015 1:00	0.38	0.24	
17/10/2015 1:00	0.37	0.24	
18/10/2015 1:00	0.35	0.24	
19/10/2015 1:00	0.33	0.23	
20/10/2015 1:00	0.36	0.21	
21/10/2015 1:00	0.4	0.19	
22/10/2015 1:00	0.36	0.23	

23/10/2015 1:00	0.42	0.2	
24/10/2015 1:00	0.43	0.22	
25/10/2015 1:00	0.39	0.25	
26/10/2015 1:00	0.35	0.26	
27/10/2015 1:00	0.33	0.28	
28/10/2015 1:00	0.35	0.27	
29/10/2015 1:00	0.37	0.29	
30/10/2015 1:00	0.37	0.28	
31/10/2015 1:00	0.36	0.27	
01/11/2015 1:00	0.35	0.43	
02/11/2015 0:00	0.49	0.32	
03/11/2015 0:00	0.45	0.27	
04/11/2015 0:00	0.43	0.33	
05/11/2015 0:00	0.47	0.35	
06/11/2015 0:00	0.38	0.32	
07/11/2015 0:00	0.35	0.33	
08/11/2015 0:00	0.36	0.33	
09/11/2015 0:00	0.38	0.4	
10/11/2015 0:00	0.38	0.5	
11/11/2015 0:00	0.39	0.63	
12/11/2015 0:00	0.41	0.51	
13/11/2015 0:00	0.43	0.55	
14/11/2015 0:00	0.46	0.46	
15/11/2015 0:00	0.41	0.34	
16/11/2015 0:00	0.34	0.36	

17/11/2015 0:00	0.35	0.38	
18/11/2015 0:00	0.37	0.41	
19/11/2015 0:00	0.42	0.54	
20/11/2015 0:00	0.44	0.63	
21/11/2015 0:00	0.45	0.84	
22/11/2015 0:00	0.47	0.69	
23/11/2015 0:00	0.47	0.67	
24/11/2015 0:00	0.41	0.66	
25/11/2015 0:00	0.36	0.51	
26/11/2015 0:00	0.37	0.55	
27/11/2015 0:00	0.42	0.69	
28/11/2015 0:00	0.37	0.63	
29/11/2015 0:00	0.35	0.74	
30/11/2015 0:00	0.42	0.61	
01/12/2015 0:00	0.3	0.5	
02/12/2015 0:00	0.32	0.39	
03/12/2015 0:00	0.31	0.47	
04/12/2015 0:00	0.31	0.53	
05/12/2015 0:00	0.32	0.45	
06/12/2015 0:00	0.31	0.64	
07/12/2015 0:00	0.31	0.5	
08/12/2015 0:00	0.33	0.43	
09/12/2015 0:00	0.33	0.39	
10/12/2015 0:00	0.44	0.46	
11/12/2015 0:00	0.44	0.55	

12/12/2015 0:00	0.38	0.38	
13/12/2015 0:00	0.34	0.43	
14/12/2015 0:00	0.33	0.52	
15/12/2015 0:00	0.32	0.4	
16/12/2015 0:00	0.33	0.49	
17/12/2015 0:00	0.31	0.66	
18/12/2015 0:00	0.34	0.8	
19/12/2015 0:00	0.36	0.59	
20/12/2015 0:00	0.37	0.6	
21/12/2015 0:00	0.4	0.37	
22/12/2015 0:00	0.34	0.33	
23/12/2015 0:00	0.36	0.36	
24/12/2015 0:00	0.31	0.33	
25/12/2015 0:00	0.32	0.33	
26/12/2015 0:00	0.36	0.36	
27/12/2015 0:00	0.36	0.42	
28/12/2015 0:00	0.38	0.42	
29/12/2015 0:00	0.34	0.42	
30/12/2015 0:00	0.37	0.38	
31/12/2015 0:00	0.36	0.3	