THURBER ENGINEERING LTD.

FISHER ROAD GROUNDWATER INVESTIGATION
COBBLE HILL, B.C.

Report

to

Cowichan Valley Regional District

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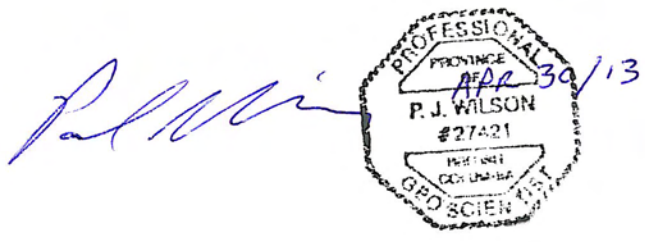

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EXECUTIVE SUMMARY

Use of this executive summary is subject to the Statement of Limitations and Conditions which is included at the end of the text of this report. The reader's attention is specifically drawn to these conditions as it is essential that they be followed for proper use and interpretation of this report. The CVRD is an approved user of this report.

This report builds on the findings of our December 5, 2011 environmental assessment report which looked at possible sources of soil and groundwater contamination in the vicinity of the industrial supply well at 1355 Fisher Road. Nitrates in the groundwater in the industrial supply well at 1355 Fisher Road have been known to be elevated since at least 2002 (Ministry of Environment sampling of the well on April 12, 2002 produced in a nitrate concentration of 47.7 mg/L). Our 2011 assessment was based on a review of current and historical site activities in the Fisher Road area. The primary potential sources of groundwater nitrate contamination identified by the report included current and historical site activities at: 1) the composting operations at 1345 Fisher Road, 2) the composting operations at 1355 Fisher Road and 3) greenhouse operations at 1360 Fisher Road and 1375 Fairfield Road. Other studies conducted in 2011 measured the local groundwater flow direction as being towards the north-northwest with an estimated velocity of 55 m per year.

The purpose of the current study is to investigate the potential contaminant sources, confirm suspected contaminant migration and to better understand potential seasonal variations in the groundwater flow direction. This included the drilling of three shallow-set groundwater monitoring wells, the collection and interpretation of long-term groundwater level monitoring data, the collection and analysis of two sets of groundwater samples obtained from the monitoring wells, and one set of samples obtained from the fertilized irrigation water at 1360 Fisher Road, the supply well at 1355 Fisher Road and the leachate water obtained from composting operations at both 1345 Fisher Road and 1355 Fisher Road.

A number of specific laboratory analyses were conducted to assist with identifying the likely origin of the observed nitrate and determine the general extent of the contamination. These analyses included nitrogen species, nitrate isotopic composition, caffeine and metals etc. The findings to date suggest that a minimum of two plumes of nitrate-contaminated groundwater are present within the upper part of the aquifer underlying the Fisher Road area. One plume was found to the south of 1355 Fisher Road which, based on the isotopic composition of the groundwater nitrates, appears to be sourced from chemical fertilizers or other sources of atmospheric-derived nitrogen. It is suspected that this plume may have originated from 1360 Fisher Road (and 1375 Fairfield Road) or from another unknown source located to the

south. A second plume (or plumes) was also found to the north of the properties at 1345 and 1355 Fisher Road. The isotopic composition of the second plume suggests that the nitrates in the plume were sourced from the decomposition of organic matter and / or manure or septic wastes. It is suspected that this second plume may have originated from 1345 and / or 1355 Fisher Road. Composting operations at these sites have been operating since the early 1990's and 2000 respectively. Additional investigations will be required to determine the full extent of the observed groundwater contamination and confirm the likely contaminant sources as there are presently limited temporal and spatial data (only 2 sampling dates from 3 monitoring wells) to estimate plume geometry and dynamics.

The most-recently available nitrate data from nearby groundwater supply wells at 1355, 1360 and 1375 Fisher Road and 1415 Galliers Road were also reviewed as part of this study. Water samples from the supply wells at 1355 and 1360 Fisher Road exceed applicable drinking water criteria / standards for nitrate and as such, the consumption of water from these wells may represent a health hazard. The groundwater supply wells at 1375 Fisher Road and 1415 Galliers Road draw water from about 20 to 25 m below the groundwater table and have much lower nitrate concentrations, which are below the Canadian Drinking Water Quality Guideline value. If these wells are located within the "footprint" of the nitrate plume(s), it is likely that the reason why the nitrates are low in these wells is that the highest nitrate concentrations may only be present within the shallowest part of the aquifer (i.e. above the level from which the wells are drawing water) as downward migration of nitrates in the aquifer may be minimal. While it is suspected that the aquifer may have little or no natural vertical flow (i.e. water is unlikely to be moving significantly upwards or downwards within the aquifer at this location), heavy well pumping has the potential to draw shallow (i.e. potentially contaminated) aquifer water downward towards the well intake.

As the primary (known) suspect source areas and activities have been present and occurring for a significant period of time (i.e. at least one of the greenhouses at 1360 Fisher and 1375 Fairfield Road has been in operation for ~35 years and composting operations at 1345 and 1355 Fisher Road have been occurring for ~20 years and ~13 years respectively), it is possible that the observed nitrate contaminant plume(s) is / are in static equilibrium with the surrounding groundwater (i.e. not significantly expanding or contracting, despite groundwater flow). It is possible that improvements and upgrades to the processes and facilities over time at each site (i.e. like those occurring at 1355 Fisher Road for example) could result in an eventual decrease in observed groundwater nitrate concentrations and result in a reduction in the extent of the contaminant plume(s). However, a significant long-term monitoring program would be required to demonstrate this potential theoretical affect.

Recommendations provided in this report include:

- That the CVRD notify the owners of the properties at 1345, 1355 and 1360 Fisher Road regarding the findings contained within this report.

- The CVRD may also wish to notify the B.C. Ministry of Environment Contaminated Sites Section, the Vancouver Island Health Authority and the owners of properties located down gradient of the suspected nitrate sources. The Ministry of Environment Contaminated Sites Section may contact the owners of the three potential source properties and request that they each conduct their own contaminated site investigations to further assess the groundwater nitrates and likely off site migration.

- Additional, shallow-set groundwater monitoring wells be constructed to better identify the origins and extent of the groundwater nitrate plume(s). The recommended locations for additional monitoring wells include: to the south and north of the subject properties to respectively assist in delineating the up gradient and down gradient extents of contamination.

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1. INTRODUCTION

This report presents the results from a groundwater investigation and monitoring program conducted by Thurber Engineering Ltd. (Thurber) at the request of the Cowichan Valley Regional District (CVRD). The investigation program included the installation of three new groundwater monitoring wells located in the vicinity of an area of known groundwater nitrate contamination in the Fisher Road area of Cobble Hill, and the collection, analysis and interpretation of groundwater sample results and measured groundwater water levels. The location of the three monitoring wells is shown in blue on Drawing 17-971-14-1 in Appendix A, along with the locations of known nearby groundwater supply wells. Drawing 17-971-14-2 in Appendix A shows a cross section through the area, roughly parallel with the groundwater flow direction, that includes two of the three monitoring wells and four nearby water supply wells.

The work for this investigation has been conducted in accordance with our proposals to the CVRD dated May 16, 2011 and July 18, 2012. This report should be read in conjunction with our December 5, 2011 report entitled "Preliminary Environmental Assessment 1355 Fisher Road Groundwater Well Site Cobble Hill, B.C."

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2. BACKGROUND AND PURPOSE

Nitrates in the groundwater in the industrial supply well at 1355 Fisher Road have been known to be elevated since at least 2002, as indicated by the results of well sampling conducted at the time by the Ministry of Environment (formerly Ministry of Water, Land, and Air Protection). Following a request by the CVRD, Thurber conducted a preliminary environmental assessment of a number of properties in the vicinity of 1355 Fisher Road and produced a report dated December 5, 2011 (Thurber, 2011a). The Thurber report included a review of historical information to identify potential nitrate sources in the vicinity of the well in addition to other potential contaminants of concern. Based on our review of current and historical site activities, the primary potential sources of the observed nitrate contamination in the Fisher Road area identified by the 2011 report included:

- 1345 Fisher Road - infiltration of composting leachate from composting operations at this address. Central Landscape Supplies has been in operation at this property since the early 1990's until present.

- 1355 Fisher Road - historical agricultural activities and more recent commercial composting activities. Westcoast Landfill owned this property from 2000 to 2006 and Fisher Road Recycling (FRR) from 2006 to present.

- 1360 Fisher Road / 1375 Fairfield Road - current and historical application of fertilized irrigation water in commercial greenhouses from the mid-1970's until present, as well as historical commercial poultry barns (1960's and 1970's) with unknown waste disposal and management practices prior to the establishment of the greenhouses. Gamboa Greenhouses has owned these properties since 1990 and 2000, respectively.

As a result of the above findings, the report contained a number of recommendations that included the installation of three new groundwater monitoring wells and an analytical program to better define the extent of the observed nitrate plume(s), to 1) determine if migration of contaminants across property boundaries was occurring in the groundwater, 2) determine if other contaminants are present and, 3) assist with identifying the likely origin of the observed nitrates (and other potential contaminants). Our recommendations for the placement of the new wells included:

- Either at the north end of the property at 1355 Fisher Road, or on the adjacent vacant property to the north. This well was intended to investigate the groundwater quality at or down gradient of 1355 Fisher Road.

- On the property to the north of the western end of the composting area at 1345 Fisher Road. This well was intended to investigate the groundwater quality down gradient of 1345 Fisher Road.

- On the Fisher Road right-of-way north of one of the two commercial greenhouses at 1360 Fisher Road. This well was intended to investigate the groundwater quality down gradient of 1360 Fisher Road and up gradient of the well located at 1355 Fisher Road.

The CVRD retained Drillwell Enterprises Ltd. of Duncan, B.C. to install the monitoring wells during the Summer of 2012 in accordance with our recommendations (see Section 3.1).

Thurber conducted a groundwater flow assessment of the Fisher Road area in March and April 2011 that was based on groundwater level data obtained from six nearby (unused) groundwater supply wells. The results of that assessment were presented in a report to the CVRD dated May 16, 2011 (Thurber, 2011b). The report at that time found a gentle groundwater gradient (with a slope of 0.004 to 0.005, i.e. 0.4 to 0.5%) flowing towards the north-northwest with an assumed horizontal flow velocity on the order of 1 cm per day (i.e. based on the measured

gradient and assumed values for hydraulic conductivity and porosity of the sandy aquifer). Our horizontal groundwater flow estimate for the Fisher Road area was later revised to approximately 15 cm per day (i.e. ~55 m per year) based on aquifer characteristic data obtained from others and based on test pumping of two wells owned by the Cobble Hill Improvement District, as reported in a Thurber memo dated November 1, 2011. The rate of vertical flow within the aquifer (i.e. groundwater moving upward or downward within the aquifer) has not been assessed, but is assumed to be negligible given the unconfined nature of the aquifer and likely presence of underlying low permeability layers (i.e. bedrock).

This report presents the data and interpretations from sampling and analysis of various water sources and from measurement of long-term water levels in each of the three new monitoring wells. The chemistry dataset included two rounds of groundwater samples collected from the monitoring wells and one round of groundwater / water samples obtained from the existing supply well at 1355 Fisher Road, from the fertilized irrigation water at 1360 Fisher Road and from the leachate water obtained from 1345 Fisher Road and from 1355 Fisher Road. This report contains recommendations for additional work.

3. METHODOLOGY

3.1 Monitoring Well Installation and Construction Details

Copies of the driller's logs are included in Appendix B, along with Thurber drawings showing the well construction details and the soil stratigraphy encountered. Additional well construction details are provided on Table 1 at the back of Appendix B.

As noted above, the three groundwater monitoring wells, MW12-1, MW12-2 and MW12-3 were drilled and installed by Drillwell Enterprises Ltd. at the general locations recommended by Thurber on June 8, July 24 and 31, 2012 using a dual rotary drill rig. The well locations are shown on Drawing 17-971-14-1 in Appendix A. MW12-1 was drilled on a road right-of-way at the east end of Galliers Road, just to the north of 1355 Fisher Road. MW12-2 was drilled on the edge of the Fisher Road right-of-way near the eastern end of the residential property at 1375 Fisher Road. This well site is located to the north of 1360 Fisher Road and south of 1355 Fisher Road. MW12-3 was drilled just to the north of the property at 1345 Fisher Road. The locations and elevations of the three monitoring wells were surveyed by Kenyon Wilson professional land surveyors on September 26, 2012.

The wells were constructed using 5 cm diameter PVC well pipe with 1.5 m long well screens set between 2.9 and 3.7 m below the static water level (as measured on September 17, 2012, i.e. MW12-1 = 3.7 m, MW12-2 = 2.9 m and MW12-3 = 3.7 m) to allow the groundwater quality data

to be directly compared between wells and to the provincial Contaminated Sites Regulation (CSR) numerical groundwater standards. As it is assumed that the nitrates are being delivered to the groundwater table via vertical infiltration of precipitation runoff through the soil column from the surface, it is expected that the highest nitrate (and other contaminant) concentrations will be present near the top of the water table. Nitrates break down in oxygen-depleted groundwater environments (i.e. such as at depth below the surface of the groundwater table) which would be expected to result in a vertical profile of decreasing nitrate concentrations and lower groundwater oxygen levels with increasing depth (Freeze and Cherry, 1979).

The 1.5 m long well screens were surrounded by a sand pack extending no more than 0.3 m above the top of the screen in accordance with guidance provided by the B.C. Ministry of Environment (Technical Guidance Document #8) for groundwater monitoring wells used in contaminated sites investigations. The boreholes around the well pipe were backfilled with cuttings and bentonite plugs in accordance with the provincial Groundwater Protection Regulation. The well heads were fitted with locked steel monument well head covers that were concreted in place.

3.2 Well Development and Sampling

The wells were developed on September 17, 2012 and purged and sampled by Thurber on September 17, 2012 (MW12-1, -2, and -3), January 29, 2013 (MW12-1 and -2), and February 18, 2013 (MW12-3) using a gas-powered Waterra Powerpump 2 inertial pump and dedicated 5/8" PVC tubing fitted with a one-way stainless steel foot valve. A sample could not be obtained from MW12-3 on January 29, 2013 due to abrasion-related damage to the Waterra tubing. The monitoring well was therefore sampled on February 18, 2013 after replacing the damaged tubing. During sampling, each well was purged of a minimum of three well volumes and until stable field temperature, pH and conductivity readings were obtained. Once stable field readings were achieved, water samples were collected.

Water samples were also collected from the supply well at 1355 Fisher Road, the compost leachate from 1345 and 1355 Fisher Road, and the fertilized irrigation water from the greenhouse operations at 1360 Fisher Road on January 29, 2013 to further delineate the nitrate plumes and provide additional information for identifying source(s) of nitrate contamination. Before sampling, the well at 1355 Fisher Road was purged for approximately 5 minutes using the dedicated supply pump. The sample was taken at a bib valve located at the well head. The leachate and irrigation water samples were scooped from the water surfaces using a bottle fastened to the end of an extendable pole. The sampling equipment was rinsed with deionized water between samples.

Water samples were put into clean, laboratory-supplied sample containers with analysis-specific preservation (where appropriate). The samples were stored in a chilled cooler until returned to the Thurber office where they were placed in a refrigerator overnight. The following day, the samples were delivered to the laboratory. The samples taken on September 17, 2012 were dropped off at Maxxam Analytics laboratory in Victoria, B.C. Maxxam conducted all of the laboratory analysis for these samples except for the ^{15}N and ^{18}O isotopes which Maxxam sub-contracted out to Isotope Tracer Technologies Inc. of Waterloo, Ontario. The samples taken on January 29 and February 18, 2013 were packed in ice and couriered to AGAT Laboratories Ltd. in Burnaby, B.C. The isotope analyses for samples taken on January 29 and February 18, 2013 were sent directly to and carried out by the University of Calgary's Isotope Science Laboratory.

The following laboratory analyses were conducted on the water samples:

- Routine parameters (i.e. conductivity, hardness, total dissolved solids, alkalinity, ions etc.) – These parameters are typically analyzed for all drinking water sources and provide an indication of the general groundwater quality and suitability of the groundwater to be used as a source of drinking water. In general, most of the routine parameters measure the concentrations of various elements and minerals that are dissolved in the groundwater.

- Caffeine (September 17, 2012 only) – This was analyzed in the hope that it could be used to assist with the identification of the source of observed nitrate contamination. Caffeine is often present in groundwater contaminated by septic discharges and could be present in groundwater impacted by composting operations that have processed biosolids and / or kitchen scraps.

- Nitrogen species (inc. ammonia, total Kjeldahl nitrogen, nitrate, nitrite, total nitrogen) – These analysis were conducted to provide an indication of the nitrogen groundwater chemistry. Nitrate, nitrite and ammonia are potentially hazardous contaminants that are commonly found in groundwater. While they can be found in groundwater in low concentrations as a result of natural processes, higher concentrations are generally the result of inputs associated with agricultural, industrial and septic sources.

- Nitrate isotopes (inc. ^{15}N and ^{18}O) – An evaluation of the isotopic ratios of nitrate in the water was conducted to identify the likely origin of the nitrate. For example, nitrates sourced from chemical fertilizers have an isotopic signature that is different and distinct from nitrates sourced from various types of organic matter such as those derived from

manure or septic sources or other types or organic waste (see Sections 3.3 and 4.5 below).

- Total and dissolved metals (monitoring wells only and the supply well at 1355 Fisher Road) – These are common contaminants in groundwater and are commonly tested in conjunction with routine analysis.

- Light and heavy extractable petroleum hydrocarbons (i.e. EPH_{10-19} and EPH_{19-32}) (September 17, 2012 only) – Potential sources of hydrocarbon contamination were identified at a number of properties in the Fisher Road area.

- Biological parameters including E. coli and total coliforms (September 17, 2012 only) – These were tested to determine if the water sampled was suitable as a source of potable water. E. coli is sourced from the digestive tracts of animals but does not travel very far in groundwater while total coliforms are more mobile and provide a possible indication of the presence of surface water inputs.

FRR's environmental consultant Sheena Goode-Jensen of Goode Environmental Services (GES) was present during sampling on January 29 and February 18, 2013. GES also independently collected water samples from the same sources on behalf of FRR.

3.3 Nitrate Isotopic Data Chart

The nitrate isotope data has been plotted on an X-Y chart labelled "NO_3 Fisher Road Isotope Data" at the back of Appendix C as a means of identifying potential nitrate sources and characterizing the groundwater nitrates at each monitoring well location and at the groundwater supply well at 1355 Fisher Road. On the chart, ^{15}N ratios are plotted along the "X" axis, while ^{18}O ratios are plotted along the "Y" axis. The chart includes five labelled areas of common ^{15}N / ^{18}O nitrate composition marked by dashed lines. These "zones" approximately delineate typical isotopic ranges for nitrate originating from different sources. The nitrate source zones shown on the chart include: nitrates originating from precipitation inputs, nitrate sourced from synthetic nitrate fertilizers, nitrates from manure and septic waste, nitrates originating from the decomposition of organic material in soil, and nitrates sourced from ammonium-based fertilizers. The isotopic ranges for the different sources shown on the chart were obtained from Kendall (1998) and are based on a summary of testing and research conducted by the authors at that time. The source zones noted on the chart are not definitive, but generally representative of typical isotopic values anticipated for the nitrate sources identified. Denitrification of residual nitrate (i.e. the chemical reduction of nitrate to nitrite (NO_2^-), nitric oxide (NO), nitrous oxide (N_2O) and finally di-nitrogen (N_2)), occurs in anoxic (i.e. low oxygen) environments and results in

increases in both the ^{15}N and ^{18}O isotopic values in a ratio of 2:1 as shown on the chart in Appendix C.

3.4 Aquifer Characterization

The static groundwater elevations were measured prior to well development in each well using a water level meter on September 17th, 2012, on January 29, 2013 and on February 18, 2013 (MW12-3 only). Once the well sampling was completed, a Solinist Levelogger Junior Edge data logger was installed near the bottom of each well using Kevlar downrigger line secured to the well head. The Leveloggers were set to automatically record hourly water levels. A Solinist Barologger Edge was also installed inside the MW12-1 well cover to record atmospheric pressure changes that were used to correct the Levelogger groundwater level data for the effect of atmospheric pressure changes. The three Leveloggers and the Barologger were retrieved on January 29, 2013 to improve our understanding of the short term and seasonal changes to the local groundwater table, flow direction and the aquifers response to individual precipitation events.

4. RESULTS

All analytical results from this program are presented on Table 2 in Appendix C with comparisons to applicable Canadian Drinking Water Quality Guidelines (CDWQG) and British Columbia CSR Schedule 6 Generic Numerical Standards for Drinking Water (DW). Data points that exceed the CDWQ guidelines are shaded yellow, while data points that exceed the CSR standards have tan shading. Parameters that exceed both CDWQG and CSR standards are rose-coloured. Copies of the original laboratory reports are included in Appendix D.

4.1 Groundwater Elevations

The groundwater elevations measured in the monitoring wells on September 17, 2012 and January 29, 2013 indicate that the groundwater table in the Fisher Road area has a gentle gradient of ~0.004 (i.e. ~1 m drop in elevation over ~250 m horizontal distance) that slopes downwards towards the north-northwest as shown on Drawing 17-971-14-1. The groundwater elevations measured in MW12-1 and MW12-2 are also shown on the cross section Drawing 17-971-14-2 (Appendix A) which includes the well intake depths and most recent available nitrate data for a number of nearby water supply wells including those at 1415 Galliers Road, 1355 Fisher Road, 1375 Fisher Road and 1360 Fisher Road.

A plot of groundwater elevations measured from September 2012 to January 2013 in the three monitoring wells is provided in Figure 1. This plot shows that the groundwater flow gradient

between the 3 wells is very consistent throughout the monitoring period as the three lines representing water levels on the figure do not cross and are roughly parallel. The high frequency fluctuations in the water levels, which are on the order of approximately 0.1 to 0.5 m, are thought to result from a delayed response to barometric pressure in the aquifer. This occurs as barometric pressure fluctuations become dampened and time-lagged by the thick unsaturated zone before reaching the aquifer. When the barometric pressure is subtracted from the total pressure measured in the monitoring wells at a given time, noise is introduced to the datasets as the pressure in the well actually responds to earlier barometric changes. This barometric effect on the groundwater elevation data appears to be essentially the same at all of the monitoring wells, and is therefore not considered to have a significant effect on the measured flow gradient. The noise, however, makes it difficult to determine if there are responses to precipitation events or are any long-term trends in the groundwater elevations.

The groundwater gradient and horizontal flow direction measured in the monitoring wells between September 17, 2012 and January 29, 2013 are very similar to the gradient and horizontal flow direction observed in six nearby unused drinking water wells between March 31 and April 8, 2011 (see Thurber report to the CVRD dated May 16, 2011). The similarity between the two independent groundwater flow direction measurements (i.e. collected in the early Spring of 2011 and late Summer of 2012 to Winter of 2013) suggests that it is unlikely that significant changes to the seasonal groundwater flow direction occur within the aquifer in the Fisher Road area.

4.2 Routine Parameters

The concentrations of “routine” parameters in the water samples collected from the monitoring wells are shown near the top of Table 2 in Appendix C. These data indicate that the groundwater at MW12-2 contains higher concentrations of common dissolved ions than the water at the other two monitoring wells. Elevated parameters of note include the related measurements of conductivity, hardness, total dissolved solids (TDS) and dissolved sulphate. All of these parameters were found to be about two to four times higher at MW12-2 than in MW12-1 or MW12-3 including conductivity of 1100 to 1140 µS/cm (versus 445 to 459 and 681 to 712 µS/cm), hardness of 480 to 482 mg/L (versus 172 to 183 and 257 to 280 mg/L), TDS of 444 to 814 mg/L (versus 173 to 318 and 329 to 457 mg/L) and sulphate of 89.4 to 93.7 mg/L (versus 12.3 to 17.9 and 22.6 to 47.9 mg/L). Dissolved sulphate in the fertilized irrigation water was 163 mg/L while the two compost leachate samples had low sulphate ranging from 4.7 to 12.8 mg/L.

The MW12-2 TDS concentration of 814 mg/L exceeds the CDWQ aesthetic guideline of 500 mg/L.

Dissolved chloride was higher in MW12-3 (69.5 to 114 mg/L), compared to MW12-1 and MW12-2 (29.2 to 31.5 and 35 to 36 mg/L, respectively). The chloride results in both compost leachate samples were relatively high, ranging from 186 to 316 mg/L which are comparable to the chloride concentrations measured at MW12-3. The location of MW12-3 is very close to the leachate pond at 1345 Fisher Rd. The fertilized irrigation water at 1360 Fisher Road had a chloride concentration of only 21.1 mg/L.

The high turbidity readings obtained from the water in each well (i.e. 1200 to 6000 NTU) is not representative of the local groundwater conditions, but likely the result of drilling disturbance and the lack of large volume well development.

The remainder of the "routine" parameters measured (i.e. alkalinity, pH, fluoride, colour etc.) were not found to be significantly elevated or different between the three monitoring wells.

4.3 Caffeine

No caffeine was detected in any of the three groundwater monitoring wells (i.e. <1 µg/L).

4.4 Nitrogen Species

Ammonia was detected in the groundwater from all three monitoring wells on the September 17, 2012 sampling date with the highest concentration (0.11 mg/L) found at MW12-1. Concentrations at MW12-2 and MW12-3 were 0.041 and 0.057 mg/L respectively. Ammonia was found to be less than the detection limit (0.01 mg/L) in samples from MW12-1 and MW12-2 taken on January 29, 2013 and 0.02 mg/L in the sample from MW12-3 taken on February 18, 2013.

Total Kjeldahl nitrogen was detected in MW12-1 at 5 and 4 mg/L on September 17, 2012 and January 29, 2013, respectively, and in MW12-3 at 2.5 mg/L on February 18, 2013. TKN was not detected at MW12-3 (<2 mg/L) on September 17, 2012, or at MW12-2 on either sampling dates (<2 and <1 mg/L).

Nitrate was found to exceed both CDWQ (health) and CSR DW standards of 10 mg/L in all three groundwater monitoring wells including 23.7 to 28 mg/L at MW12-1, 92.5 to 98.1 mg/L at MW12-2 and 15.3 to 16.3 mg/L at MW12-3. Nitrite was observed at MW12-1 at a concentration of 0.075 mg/L on September 17, 2012 and at MW12-2 at concentrations of 0.33 mg/L on September 17, 2012 and 0.04 mg/L on January 29, 2013. Nitrite was not observed at MW12-3

on either sampling date (with detection limits of 0.1 for analysis of the September sample and 0.005 mg/L for the February sample).

Nitrate in the supply well at 1355 Fisher Road was present at 58.3 mg/L while the fertilized irrigation water from 1360 Fisher Road had a nitrate concentration of 158 mg/L. Nitrate in the water in the two leachate ponds was very low ranging from ~5 mg/L to undetectable. However, the ammonia in the leachate samples was high, (ranging from 9.3 to 19.5 mg/L) and ammonia converts to nitrate at a ratio of 3 to 1 in the presence of oxygen.

4.5 ^{15}N and ^{18}O Isotopes

The ^{15}N and ^{18}O concentrations (in ‰, (per mille, i.e. thousandths)) detected in groundwater nitrate (NO_3^-) from the three monitoring wells, the supply well at 1355 Fisher Road, the fertilized irrigation water from 1360 Fisher Road, and the compost leachate from 1345 and 1355 Fisher Road (note: ^{15}N only obtained from ammonia (NH_3) in the sample collected from the leachate at 1345 Fisher Road as the nitrate concentration in this sample was too low) are shown on the middle rows on Table 2. Duplicate results (where conducted by the laboratory) are included and separated by a "/".

The isotope data suggest that the ^{15}N and ^{18}O in the water samples from MW12-1, MW12-3, and the compost leachate samples have similar isotopic compositions ranging from 5.7 to 13.0 ^{15}N and -1.0 to 4.2 ^{18}O which are distinctly different from the nitrate isotopic concentrations measured in the water samples obtained from MW12-2, the fertilized irrigation water, and the sample from the supply well at 1355 Fisher Road which ranged from 0.5 to 4.9 ^{15}N and 20.3 to 29.2 ^{18}O. The relative consistency of the isotopic data between the multiple sampling events at each of the monitoring wells suggests that the isotopic data is consistent and repeatable.

The isotopic data for the groundwater sample obtained from MW12-2 and the supply well at 1355 Fisher Road are practically identical and fall within the synthetic nitrate fertilizer zone (and partially within the larger nitrate in precipitation zone) on the chart in Appendix C, which are clearly separated from the isotopic ratios / values at MW12-1, MW12-3, and both samples of compost leachate (^{15}N only) which fall within the central portion of the "manure and septic waste" sourced nitrate zone and the right-hand portion of the soil nitrogen zone. The available data indicate that the separation between the two apparent groupings is distinct, particularly along the "Y" axis by their differing ^{18}O values. The separation of the isotopic ratios suggests that at least two distinct groundwater nitrate contamination plumes are present in the Fisher Road area and the nitrate in each of the plumes originated from two different sources. The isotopic ratios found in the groundwater samples collected from MW12-2 and in the supply well

at 1355 Fisher Road are consistent with nitrate sourced from synthetic nitrate fertilizer (as reported by Kendall, 1998), while the nitrates in the groundwater at MW12-1 and MW12-3 are consistent with the breakdown of organic material such as manure / septic waste and / or decaying plant matter.

The isotopic ratio of the nitrate in the sample of leachate obtained from 1355 Fisher Road falls within the cluster of ratios associated with the organic-sourced nitrate (but with the lowest ^{15}N and highest ^{18}O ratio).

The isotopic ratio of the nitrate obtained from the irrigation water used at 1360 Fisher Road falls within the typical range of values associated with atmospheric-sourced nitrates commonly found in precipitation between the reported isotopic ranges of synthetic nitrate fertilizer and those of desert nitrate deposits.

The reason why the isotopic range of the nitrate in the fertilized irrigation water falls marginally outside of the reported nitrate fertilizer zone (as reported by Kendall, 1998) is uncertain. However, it may be that the specific brand of nitrate fertilizer used at 1360 Fisher Road was not included within the older scientific studies upon which the Kendall (1998) summary findings were based. While it is our understanding that most synthetic-based nitrate fertilizers are produced from atmospheric sources of nitrogen and oxygen (hence the significant overlap between the nitrate fertilizer and precipitation nitrate boxes), it is possible that some combined fertilizer products or brands could be produced from some mixture of synthetic (atmospheric-sourced) nitrates and naturally-occurring desert nitrate deposits. Products produced from both of these source materials would be expected to have an isotopic ratio falling somewhere between the nominal fertilizer and desert nitrate isotopic ranges reported by Kendall (1998), such as those detected in the fertilized irrigation water. It should be noted that it is likely that the specific fertilizer products used at 1360 Fisher Road have changed significantly over time.

4.6 Total and Dissolved Metals

The total metals concentrations of the samples obtained from the monitoring wells in Table 2 are compared to the CDWQ guidelines while the dissolved metals concentrations are compared to the CSR DW standards. High total metals concentrations were seen in all three groundwater monitoring wells including chromium, iron, lead and manganese. However, it is suspected that the total metals results shown were impacted by the leaching of naturally occurring silt-derived metals (due to high turbidity in the new wells) and are not representative of the actual groundwater conditions or indicative of concentrations anticipated to be found within established drinking water wells. This is supported by the lower dissolved metals concentrations. The only

dissolved metals concentration found to exceed the applicable CSR DW standards is manganese in MW12-2 at 554 µg/L, sampled on September 17, 2012. While this concentration marginally exceeds the DW standard of 550 µg/L, it may be the result of naturally occurring manganese which is common on Vancouver Island. The subsequent dissolved manganese concentration for this well was 94 µg/L on January 29, 2013.

The remainder of the total and dissolved metals concentrations are well below the applicable CDWQ guidelines and CSR DW standards. However, it is interesting to note that most of the highest dissolved metals concentrations were observed in MW12-2 including cadmium (0.4 to 0.419 µg/L), cobalt (3.9 to 5.4 µg/L), copper (31.4 to 34.9 µg/L), iron (90 to 120 µg/L), manganese (94 to 554 µg/L), nickel (73.6 to 80.7 µg/L), calcium (112 to 114 mg/L), magnesium (47.2 to 49.2 mg/L), and sulphur (30.5 mg/L). MW12-1 had the highest dissolved metals concentrations for lead (0.26 to 0.79 µg/L) and zinc (17 to 47 µg/L), while MW12-3 had the highest concentration of uranium (0.84 to 1.76 µg/L). As the concentrations noted above are all relatively low, the significance of the observed dissolved metals data (if any) is uncertain.

4.7 Hydrocarbons

No EPH_{10-19} or EPH_{19-32} was detected in any of the wells. The laboratory analytical detection limit for these parameters was <0.2 mg/L.

4.8 Biological

E.coli bacteria were not detected in any of the wells suggesting that there is no direct source of faecal contamination in the groundwater sourced by the monitoring wells. However, total coliforms were detected in each well on September 17, 2012 (the only date total coliform sampling was conducted) including 50 MPN/100 ml at MW12-1, 480 MPN/100 ml at MW12-2 and 930 MPN/100 ml at MW12-3. The presence of total coliforms in non-disinfected wells indicates that the well (or adjacent area) is either prone to surface water infiltration or that bacterial growth is occurring within the well (Health Canada, 2006). It is also possible that total coliform bacteria were introduced during drilling and well construction preparations.

5. DISCUSSION AND CONCLUSIONS

5.1 Nitrate Sources

As discussed within our previous 2011 preliminary environmental assessment report (Thurber, 2011a) current and past activities at 1345, 1355 and 1360 Fisher Road each pose potential risks to local groundwater quality and are potential sources of nitrate. A sample of the fertilized irrigation water collected from 1360 Fisher Road on January 29, 2013 had a nitrate

concentration of 158 mg/L. Our 2011a report noted that the irrigation water is delivered to the plants via a drip irrigation system, but drips of fertilized watering water were observed to fall onto old poly sheeting which covers the bare soil greenhouse floor. Over time, it is possible that nitrates could be delivered to the local groundwater table in this way.

While the water samples collected from the compost leachate ponds at 1345 and 1355 Fisher Road on January 29, 2013 had little to no detectable nitrate (with concentrations ranging from ~5 mg/L to undetectable), the concentration of ammonia in the two samples was very high, ranging from 9.3 to 19.5 mg/L. As ammonia converts to nitrate in the presence of oxygen at a ratio of approximately 3 to 1 (based on molar mass), the leachate sourced from the two composting facilities is considered to be a significant potential source of groundwater nitrates. For example, nitrate and ammonia / ammonium are identified as potential leachable pollutants at commercial composting operations according to the Composting Factsheet "Composting Environmental Concerns" produced in 1996 by the BC Ministry of Agriculture and Food. Nitrates could have been delivered to the groundwater via the downward percolation of leachate from leaks or spills in the leachate ponds on each site, and / or as a result of the infiltration of precipitation inputs which came into contact with compost stockpiles.

The available groundwater data indicates that MW12-2 was found to have the highest conductivity (1100 to 1140 µS/cm), hardness (480 to 482 mg/L), TDS (444 to 814 mg/L), sulphate (89.4 to 93.7 mg/L), and nitrate (92.5 to 98.1 mg/L) concentrations of the three groundwater monitoring wells. The above parameters were found to be two to six times higher at MW12-2 than observed in the other two groundwater monitoring wells. Nitrate in the supply well at 1355 Fisher Road was present at 58.3 mg/L which is intermediate (both numerically and geographically) between the nitrate concentrations detected at MW12-2 and MW12-1 or MW12-3, suggesting a plume (or plumes) of nitrate (and other contaminants) with increasing concentrations towards the south. Based on the established regional groundwater flow direction, it is likely that the groundwater characteristics observed in the well at MW12-2 originate from a source located further to the south of the MW12-2 well location. The nitrate-contaminated groundwater at MW12-2 flows towards the north-northwest, almost certainly migrating to the property at 1375 and 1355 Fisher Road (as is evidenced by the isotopic data discussed in Section 4.5 and below). While our 2011a environmental report identified the properties at 1360 Fisher Road and 1375 Fairfield Road (to the south of MW12-2) as one of several potential sites of environmental concern, additional investigative work would be required to confirm the origin of the observed nitrate contamination at MW12-2.

The available ^{15}N and ^{18}O isotope data appears to indicate that the nitrate observed at MW12-2 and the supply well at 1355 Fisher Road originated from the same source and that this source is

different than the origin of the nitrate observed at MW12-1 and MW12-3, suggesting the presence of at least two distinct nitrate plumes in the Fisher Road area. The ^{15}N and ^{18}O nitrate-derived isotopes in MW12-2 and the supply well at 1355 Fisher Road have an isotopic signature indicative of synthetic nitrate fertilizer, while the isotopic concentrations found in samples collected from MW12-1, MW12-3 and the leachate collection pond at 1355 Fisher Road are similar to each other and indicative of nitrates sourced from organic material including manure and septic waste, or denitrified nitrate inputs from soil or other organic matter (see Chart in Appendix C).

Since our 2011a report was issued, it was brought to our attention that a community sewage disposal system has been operated at 1415 Hutchinson Road (i.e. approximately 600 m to the south-southwest of the study area) since 2009. However, based on the distance and location of the disposal system from the subject properties and the estimated groundwater travel time (~55 m/year) and direction (north-northwest), it is our opinion that the community sewage disposal facility is unlikely to be a contributor to the observed groundwater nitrate contamination near 1345, 1355 and 1360 Fisher Road. Also, it would be expected that sewage-sourced nitrate would have an isotopic signature similar to that observed at MW21-1 and MW12-3 (i.e. derived from organic sources) and not a signature consistent with synthetic fertilizer as was identified at MW12-2, which is the closest of the three monitoring wells to the community sewage disposal system.

Based on the available evidence, it is our opinion that the apparent fertilizer-sourced nitrate plume may have originated from the historic or current operations in the area of 1360 Fisher Road / 1375 Fairfield Road and flowed northward with the groundwater to 1375 Fisher Road and 1355 Fisher Road. However, another unknown up-gradient source (i.e. to the south of 1360 Fisher Road) may exist. The apparent moderate discrepancy between the isotopic ratio measured for the fertilized irrigation water present at 1360 Fisher Road on January 29, 2013 and the isotope ratio measured in the groundwater at MW12-2 and the supply well at 1355 Fisher Road (assuming that the fertilized irrigation water used in the greenhouses is the source of the nitrate contamination) may be able to be explained by a number of factors including possible changes in the brand or type of nitrate fertilizer used in the greenhouses over time and / or the mixing of low levels of naturally-occurring organic and synthetic-sourced nitrate in the aquifer.

The isotopic data and the locations of monitoring wells MW12-1 and MW12-3 suggest that a separate, organic material-sourced nitrate plume (or plumes) exists between the supply well at 1355 Fisher Road and the two more northerly monitoring wells. The extent of this plume (or plumes) to the north of MW12-1 and MW12-3 has not been determined. This organic-sourced

nitrate could have originated from historic and / or ongoing composting (or other) activities at 1345 and / or 1355 Fisher Road. The existing dataset is not sufficient to determine if the operations at 1345 Fisher Road alone contributed to the organic-sourced nitrate detected at MW12-3 as this monitoring well is down gradient of both properties. However, the leachate pond at 1345 Fisher Road is only located about ~25 m to the southwest of the well at the far northwestern corner of the property.

Additional groundwater monitoring wells would be required to determine the horizontal (and vertical) extent of the apparent plume(s) away from the properties at 1345, 1355, 1360, and 1375 Fisher Road. An additional groundwater monitoring well located to the south of 1360 Fisher Road / 1375 Fairfield Road would be especially useful in identifying the origin of the fertilizer-sourced nitrate plume. Additional shallow-set groundwater monitoring wells to the north of MW12-1 and MW12-3 would assist in determining how far the organic-sourced nitrate plume extends away from the suspected source areas.

As the primary (known) suspected source areas and activities have been present and occurring for a significant period of time (i.e. at least one of the greenhouses at 1360 Fisher and 1375 Fairfield Road has been in operation for ~35 years and composting operations at 1345 and 1355 Fisher Road have been for occurring for ~20 years and ~13 years respectively), it is possible that the observed nitrate contaminant plumes are in static equilibrium with the surrounding groundwater (i.e. not significantly expanding or contracting). It is possible that improvements and upgrades to the processes and facilities over time at each site (i.e. like those occurring at 1355 Fisher Road for example) could result in an eventual decrease in observed groundwater nitrate concentrations and result in a reduction in the extent of the contaminant plume(s). However, a significant long-term monitoring program would be required to demonstrate this potential theoretical affect.

No hydrocarbon or significant metals contamination was found in the three groundwater monitoring wells. The lack of detectable caffeine in the monitoring wells may or may not be significant. While the composting operation at 1355 Fisher Road was known to process possible caffeine-containing biosolids in the past (we understand they are not currently processing this material), and currently processes organic kitchen waste that likely contains caffeine-containing coffee grounds etc., the finding of a single null caffeine result in the down gradient wells is difficult to reliably interpret due to the large number of unknowns regarding the source material and potential dilution and transport effects.

5.2 Nearby Water Supply Wells

The most-recent available nitrate concentrations from select nearby groundwater supply wells collected by Thurber (1355 Fisher Road supply well) and provided to Thurber by the CVRD (1360, 1375 Fisher Road and 1415 Galliers Road) is shown on Drawing 17-971-14-2 in Appendix A. Nitrate concentrations exceeding 10 mg/L (i.e. both the CDWQ guideline and CSR DW standard) are shown on the drawing in red text. The well intake levels and noted presence of overlying sandy till are also shown on the drawing. This data was obtained from available driller logs (copies in Appendix E), and observations made by Thurber in our December 2011 report.

Water from the supply wells at 1355 and 1360 Fisher Road both exceed CDWQ and CSR criteria / standards for nitrate and as such, consumption of water from these wells may represent a health hazard.

The cross section shows that the groundwater supply wells at 1375 Fisher Road and 1415 Galliers Road are drawing water from about 20 to 25 m below the groundwater table and have much lower nitrate concentrations that range from about 0.4 to 3 mg/L and are below the CDWQ guideline criterion of 10 mg/L for nitrate. If these wells are located within the "footprint" of the nitrate plume(s), it is likely that the reason why the nitrates are low in these wells is that the highest nitrate concentrations are likely only present within the shallowest part of the aquifer (i.e. above the level from which the wells are drawing water). While it is suspected that the aquifer may have little or no natural vertical flow (i.e. water is unlikely to be moving significantly upwards or downwards within the aquifer), heavy pumping in a deeply set well has the potential to draw shallow (i.e. potentially contaminated) aquifer water downward towards the well intake.

The well intake at 1355 Fisher Road is located about 10 m below the groundwater surface, which is intermediate between the shallow well intakes in the groundwater monitoring wells and the deeper nearby water supply wells. As such, the shallower groundwater in the vicinity of the water supply well at 1355 Fisher Road may have higher nitrate concentrations than the most-recently observed concentration of 58.3 mg/L. Active pumping of this well however, is expected to locally draw down the water table, creating a mixing effect in the sampled water.

The water supply well at 1360 Fisher Road is screened at a relatively shallow depth below the groundwater level (i.e. ~4 m, which is comparable to MW12-2). The most-recently available nitrate concentration from the well is 17.1 mg/L which is lower than at MW12-2 but still exceeds the CSR / CDWQ standards.

Residential groundwater supply wells at 1345 Fairfield Road, 1395 Fisher Road, and 1425 Galliers Road were sampled by the CVRD on January 21, 2013 for nitrate and nitrite analyses. The nitrate concentrations were below the CDWQ guideline criterion for nitrate and the nitrite concentrations were all below detection (<0.010 mg/L). Although these results met the respective CSR standards and CDWQ guideline values, their significance to the conceptual understanding of area hydrogeology is not known at this time as the driller's logs for these wells could not be found in the MOE WELLS database.

5.3 Implications Under the CSR

The findings of this report indicate the presence of nitrate concentrations in groundwater that exceed applicable CSR Schedule 6 Generic Numerical [Drinking] Water Standards at various locations that are down gradient of suspected nitrate sources. Additional investigation and analysis will be required to delineate the horizontal extent of the plume(s) and to confirm that the suspected contaminant migration has actually occurred.

The suspected migration of contaminants beyond their point of origin in the vicinity of Fisher Road is a concern considering the nature of the local aquifer, its use as a supply of drinking water and the requirements of Section 60.1 (1) of the CSR which state:

> *A responsible person who carries out a site investigation that discloses that one or more substances has migrated or is likely to have migrated to a neighbouring site and is or is likely causing contamination of the neighbouring site must provide written notification described in subsection (2).*

Subsection 2 includes a description of the parties to be notified (i.e. owners of the neighbouring site(s) and the director of the B.C. Ministry of Environment, Contaminated Sites Section), the timeline required for notification (i.e. within 15 days of the responsible person becoming aware) and information to be included in the notification document. The definition of who is a "responsible person" is fairly extensive and presented in Section 45 of the Environmental Management Act (of which the CSR is a part) and will not be paraphrased here. However, our interpretation of Section 45 indicates that those who own or owned and / or operated the sites and caused the observed nitrate contamination are the "responsible persons".

6. RECOMMENDATIONS

- As a matter of due diligence, we recommend that the CVRD notify the owners of the three potential source properties (i.e. 1345, 1355 and 1360 Fisher Road) regarding the findings contained within this report. The notification should include reference to the

potential health hazards associated with the consumption of nitrate contaminated water and the requirements under the CSR regarding notification of contaminant migration.

- The CVRD may also wish to notify the B.C. Ministry of Environment Contaminated Sites Section, the Vancouver Island Health Authority and the owners of properties located down gradient of the suspected nitrate sources. The Ministry of Environment Contaminated Sites Section may contact the owners of the three potential source properties and request that they each conduct their own contaminated site investigations to further investigate the groundwater nitrates and likely off site migration.

- Additional, shallow-set groundwater monitoring wells would be required to better identify the origins and extent of the groundwater nitrate plume(s) suspected of originating from the greenhouses at 1360 Fisher Road / 1375 Fairfield Road and the composting facilities at 1345 and 1355 Fisher Road. The most potentially significant new well location would be to the south (i.e. up gradient) of the greenhouses at 1360 Fisher Road / 1375 Fairfield Road as the data from that well would likely either confirm that the potential sources identified are significant contributors (i.e. if little or no nitrate is found in the aquifer up gradient of the greenhouses), or would assist with the identification of a currently unknown source of nitrates further up gradient. Additional wells installed farther to the north of MW12-1 and MW12-3, and to the east and west of 1355 Fisher Road would assist in delineating the extent of the observed contamination. These new wells should be installed ~2 to ~3 m below the groundwater table and have intake screens no longer than 1.5 m in length.

7. REFERENCES

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Thurber Engineering Ltd., 2011a, Preliminary Environmental Assessment, 1355 Fisher Road Groundwater Well Site Cobble Hill, B.C., submitted to CVRD December 5, 2011.

Thurber Engineering Ltd., 2011b, Preliminary Environmental Assessment, 1355 Fisher Road, Cobble Hill, BC Groundwater Flow Assessment, submitted to CVRD May 15, 2011.

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and this report is delivered on the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over …)

INTERPRETATION OF THE REPORT *(continued. . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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APPENDIX A

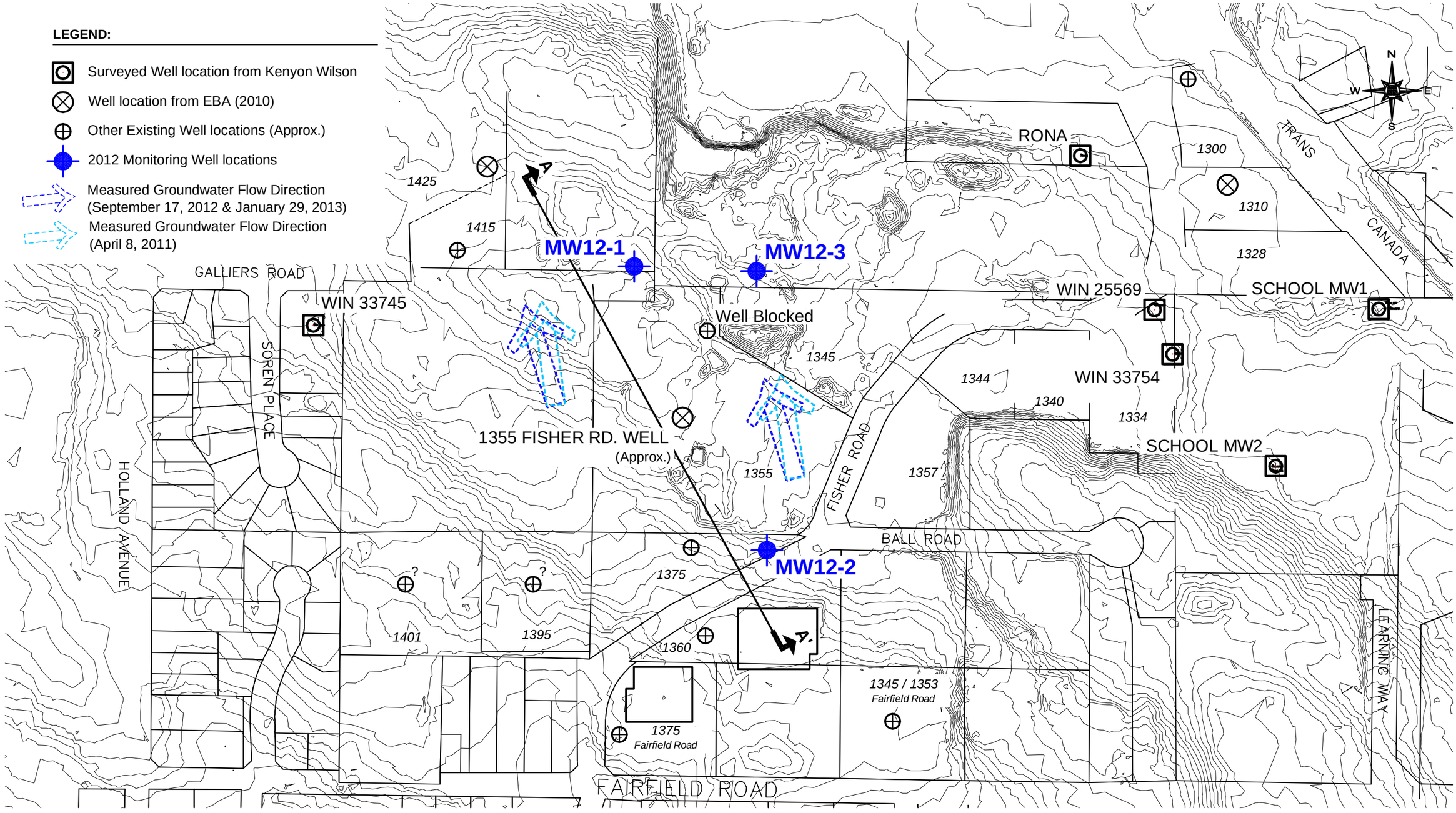
Figure 1

Drawings 17-971-14-1 and -2

APRIL 9, 2013

LEGEND:

- Surveyed Well location from Kenyon Wilson
- Well location from EBA (2010)
- Other Existing Well locations (Approx.)
- 2012 Monitoring Well locations
- Measured Groundwater Flow Direction (September 17, 2012 & January 29, 2013)
- Measured Groundwater Flow Direction (April 8, 2011)



NOTES:

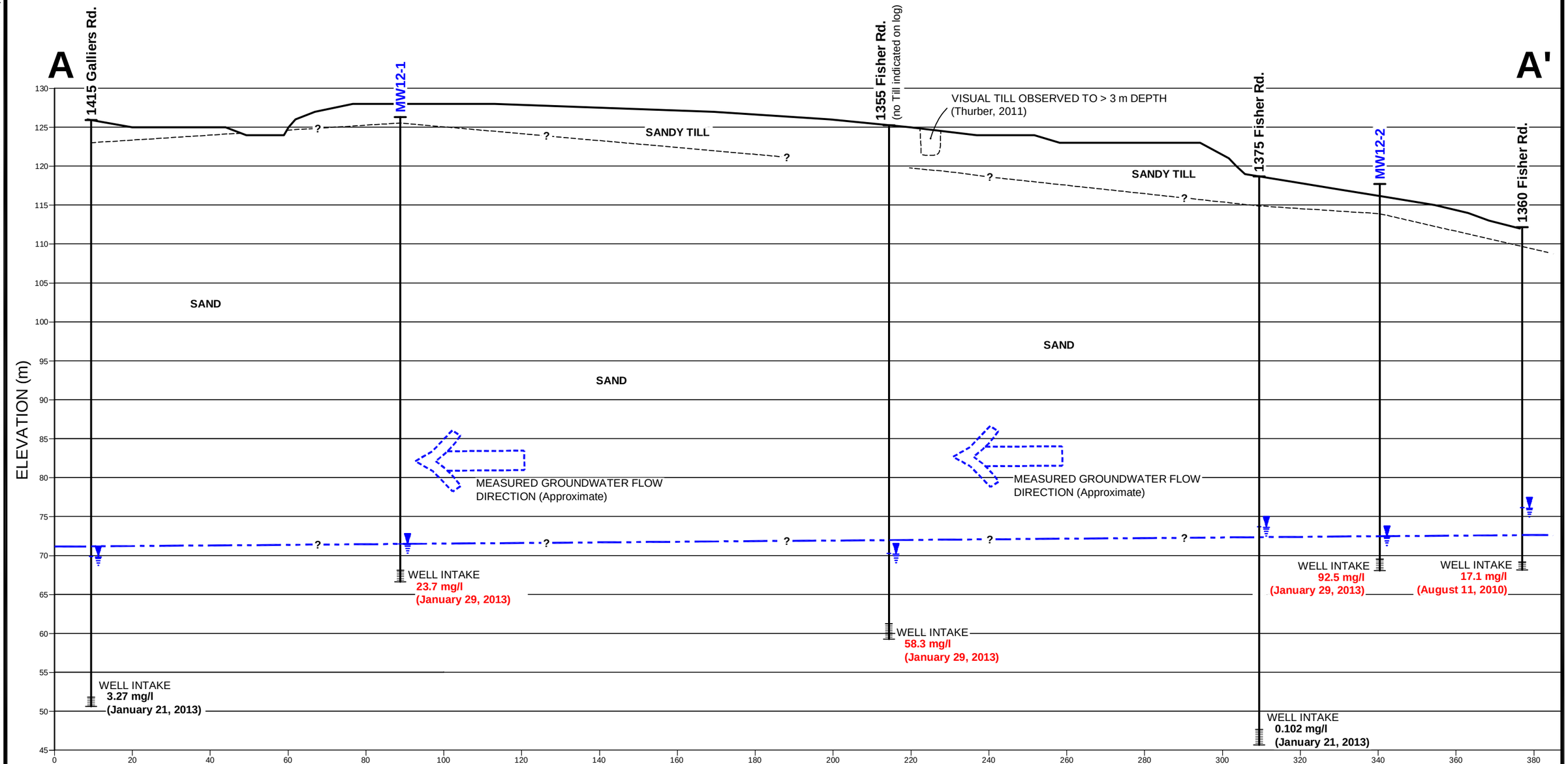
1. Digital base plan provided by Kenyon Wilson, Land Surveyors.
2. Contours from C.V.R.D.; 1 m contour intervals.

0 25 50 75 100 150 200 m
SCALE 1:3000

DESIGNED CWP / PJW	COWICHAN VALLEY REGIONAL DISTRICT
DRAWN RRS	**FISHER ROAD AREA WELL LOCATIONS**
DATE APRIL 9, 2013	
APPROVED PJW	
SCALE 1:3000	FISHER ROAD GROUNDWATER MONITORING — COBBLE HILL, B.C.
THURBER	DWG. NO. 17-971-14-1

TED04124.DWG

APRIL 9, 2013



NOTES:

1. The most recent available nitrate concentations are shown and the sampling date. Nitrate concentrations exceeding 10 mg/l are shown in red.
2. Topography obtained from 1 m contour data provided by the C.V.R.D.
3. Well and geological information obtained from driller's logs.
4. Surveyed well elevations for MW12-1 and MW12-2 provided by Kenyon Wilson, B.C.L.S.
5. Groundwater elevation shown based on measurements obtained at MW12-1 and MW12-2 on September 17, 2012. Groundwater elevations shown in the drinking wells were the drillers estimates at the time of drilling.

VERTICAL: 1:500
0 5 10 15 20 25 30m
SCALE 1:500

HORIZONTAL: 1:1000
0 10 20 30 40 50 60m
SCALE 1:1000

DESIGNED CWP / PJW	COWICHAN VALLEY REGIONAL DISTRICT	
DRAWN RRS	**SECTION A - A'**	THURBER
DATE APRIL 9, 2013		
APPROVED BW		
SCALE AS SHOWN	FISHER ROAD GROUNDWATER MONITORING — COBBLE HILL, B.C.	DWG. NO. **17-971-14-2**

TED04124.DWG

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COWICHAN VALLEY REGIONAL DISTRICT
FISHER ROAD REGIONAL GROUNDWATER INVESTIGATION - GROUNDWATER LEVELS

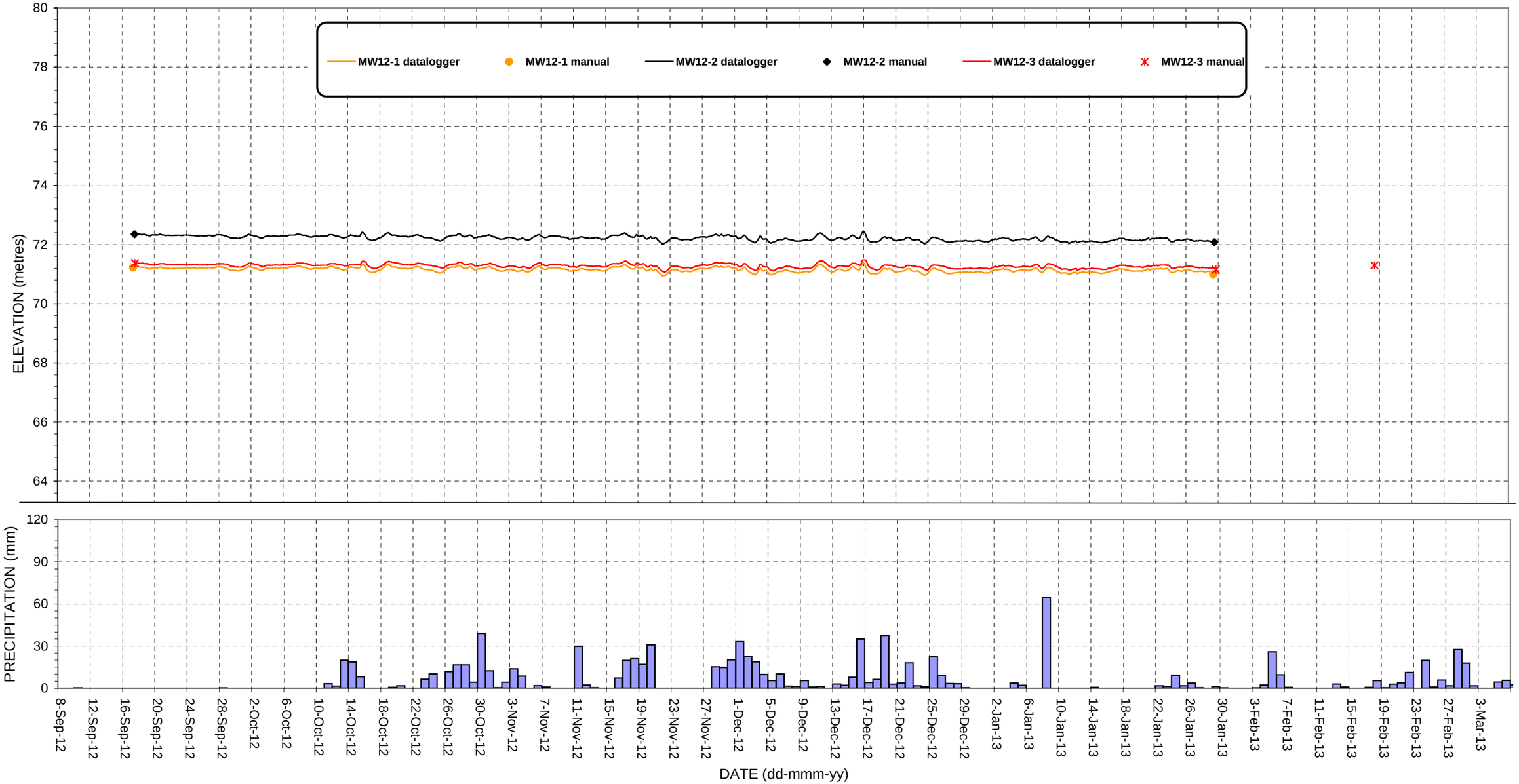

FIGURE 1

Client: Cowichan Valley Regional District
File No.: 17-971-14
E-File: cwp_17-971-14_tbl_2012-9(Sept)-17 to 2013-1(Jan)-29 Precip and WLs.xls

Date: April 8, 2013

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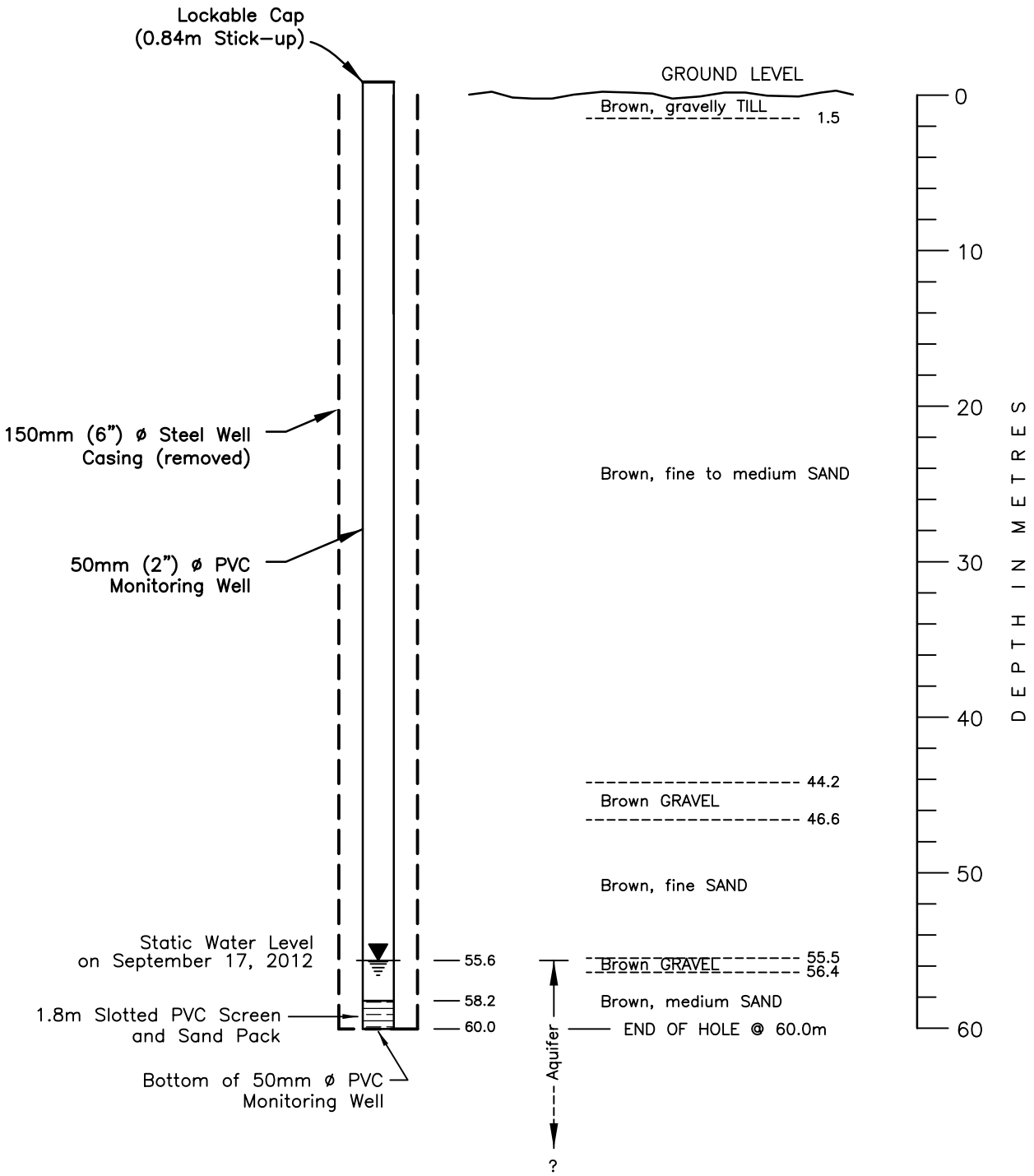
APPENDIX B

Monitoring Well Logs

Table 1 – Fisher Road Groundwater Monitoring Well Summary Table

THURBER

FILE No. 17-971-14 DECEMBER 3, 2012



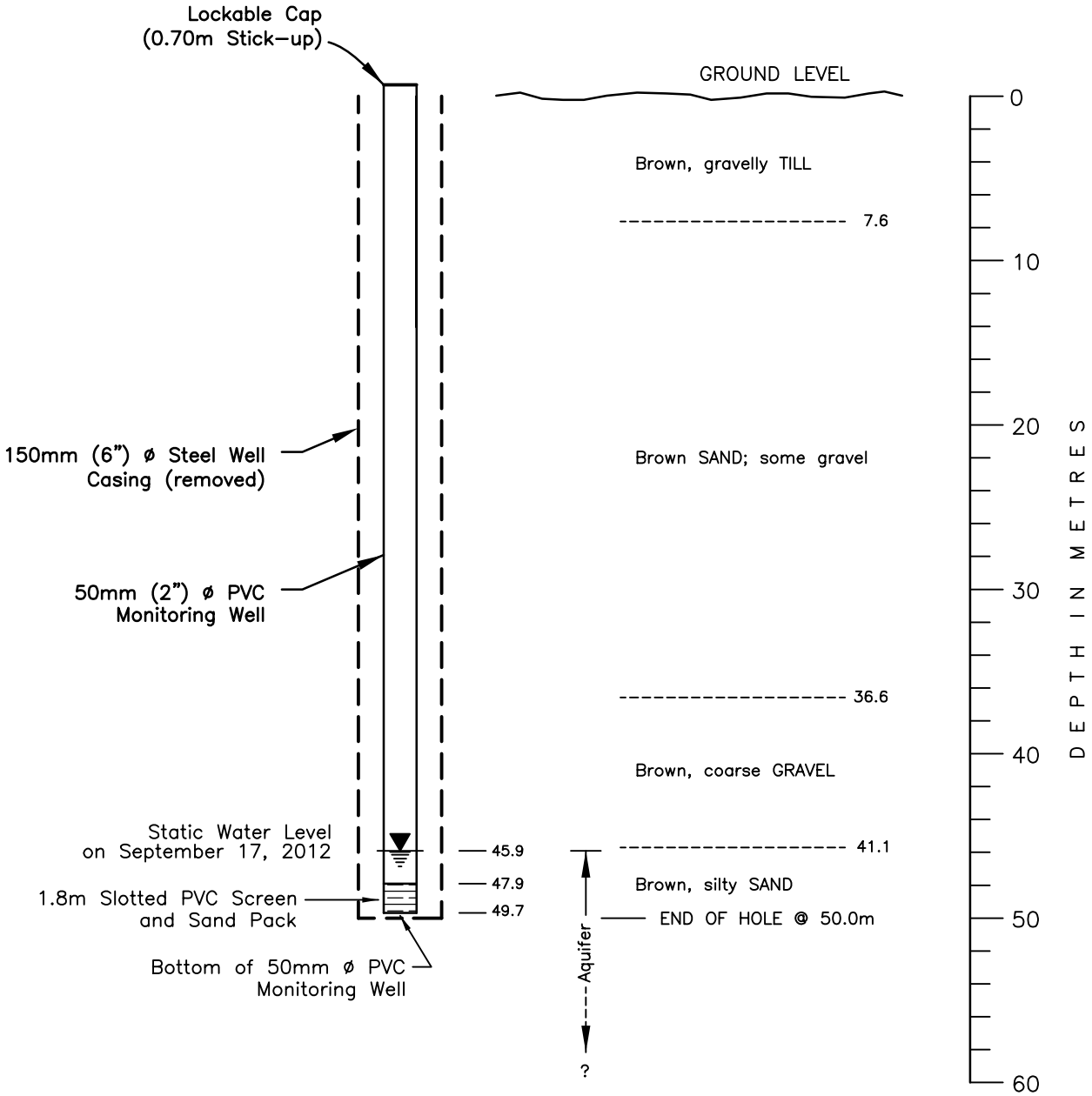
WELL ID: MW12-1

(INSTALLED JUNE 8, 2012)

CAD No.TED04086.DWG

THURBER

FILE No. 17-971-14 DECEMBER 3, 2012



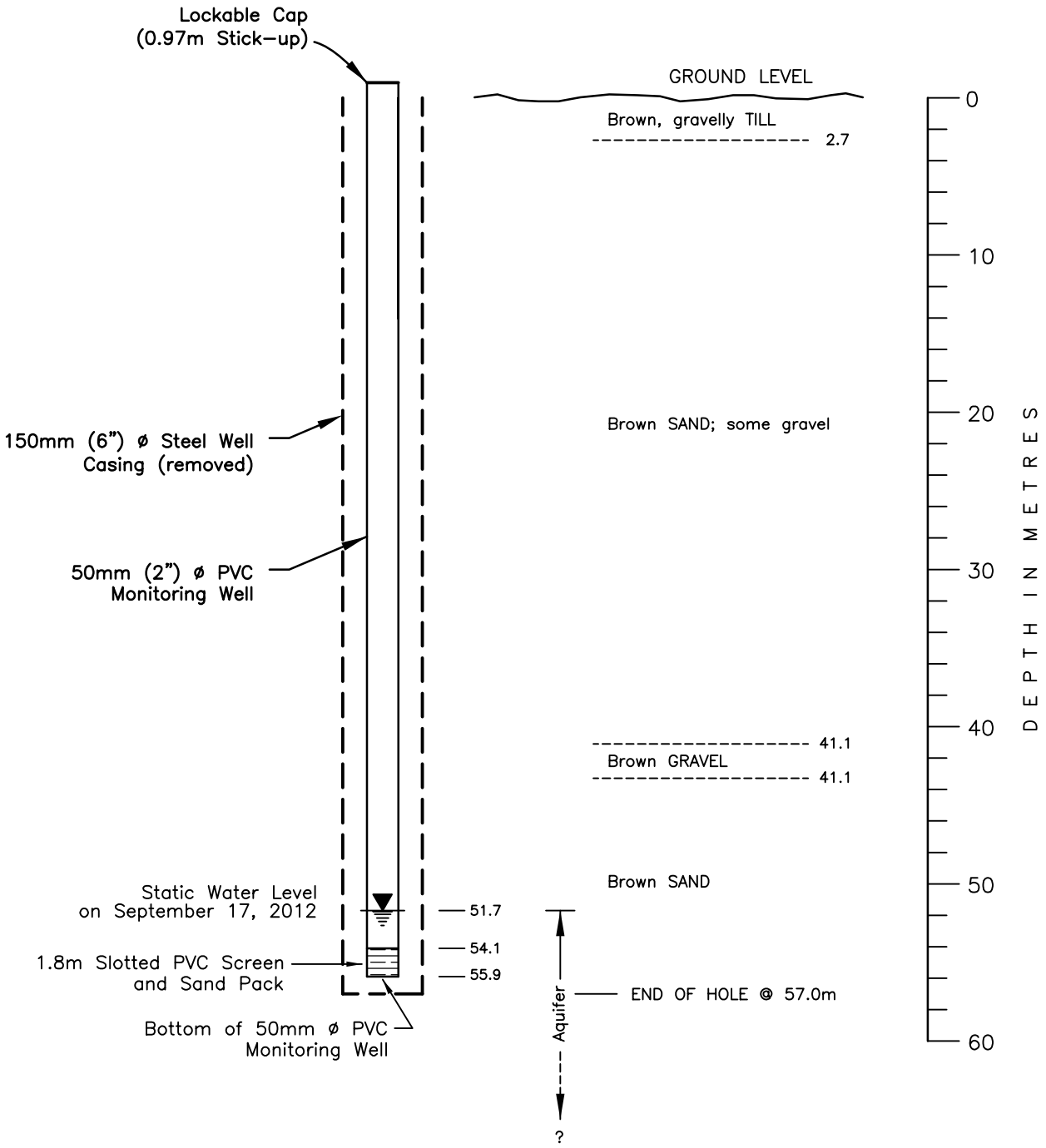
WELL ID: MW12-2

(INSTALLED JULY 31, 2012)

CAD No.TED04086.DWG

THURBER

FILE No. 17-971-14 DECEMBER 3, 2012



WELL ID: MW12-3

(INSTALLED JULY 24, 2012)

CAD No.TED04086.DWG

MW 12-1

CVRD RECEIVED

BRITISH COLUMBIA The Province · Place on Earth | Ministry of Environment

☒ Well Construction Report ☐ Well Closure Report ☐ Well Alteration Report

DRILLWELL ENTERPRISES LTD.
4994 Polkey Road
Duncan, B.C. V9L 6W3
Stamp name/address/phone/fax/e-mail here, if desired.
Phone: 250-746-5268

Ministry Well ID Plate Number:
Ministry Well Tag Number:
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Cowichan Valley Regional Dist (CVRD) Galliers Rd Well
Mailing address: 175 Ingram St Town Duncan Prov. BC Postal Code V9L 1N8
Well Location: Address: Street no. Street name Galliers Rd. Town Cobble Hill
(or) Legal description: Lot Plan D.L. Block Sec. Twp. Rg. Land District Shawnigan
(or) PID: (and) Description of well location (attach sketch, if nec.): 50 m. past end of Galliers rd.
NAD 83: Zone: (see note 2) (and) UTM Easting: 456 051 m UTM Northing: 539 3601 m (or) Latitude (see note 3): Longitude:
Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual rotary
Orientation of well: ☒ vertical ☐ horizontal Ground elevation: ft (asl) Method (see note 4):
Class of well (see note 5): Monitoring Sub-class of well: Permanent
Water supply wells: indicate intended water use: ☐ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	5	m	brn	Gravely Till	—	
5	145	S	brn	Sand - fine to medium	—	
145	153	S	brn	Gravel		
153	182	S	brn	Sand. Fine brown		
182	185	S	brn	Gravel		
185	197	S	brn	medium sand.	wet.	

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	197	6"	Threaded steel removed.		
0	197	2"	PVC Threaded. Sched. 40		

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
192	197	2"	slotted PVC Thread. Sched 40	10.
0	192	2"	Blank riser pipe sched 40 Threaded.	

Surface seal: Type: Bentonite chips Depth: 20 ft
Method of installation: ☒ Poured ☐ Pumped Thickness: 2 in
Backfill: Type: gravel & Bentonite Depth: ft
Liner: ☐ PVC ☐ Other (specify):
Diameter: in Thickness: in
P ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: ☒ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☒ Pipe size
Screen material: ☐ Stainless steel ☒ Plastic ☐ Other (specify):
Screen opening: ☐ Continuous slot ☒ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☒ Plug ☐ Plate ☐ Other (specify):
Filter pack: From: 191 ft To: 197 ft Thickness: in
Type and size of material: 10/20 Filter sand.

Developed by:

☐ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): Total duration: hrs
Notes: to be developed by others.

Well yield estimated by: N/A monitoring well

☐ Pumping ☐ Air lifting ☐ Bailing ☐ Other (specify):
Rate: USgpm Duration: hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Obvious water quality characteristics:

☐ Fresh ☐ Salty ☐ Clear ☐ Cloudy ☐ Sediment ☐ Gas
Color/odour: Water sample collected: ☐

Well driller (print clearly):

Name (first, last) (see note 19): Randy Creamer
Registration no. (see note 20): WD 0508152
Consultant (if applicable; name and company): C. Petersmeyer. Timber

Final well completion data:

Total depth drilled: 197 ft Finished well depth: 197 ft (bgl)
Final stick up: 24 in Depth to bedrock: — ft (bgl)
SWL: approx 180 ft (btoc) Estimated well yield: USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: Locking Monument Well disinfected: ☐ Yes ☒ No
Where well ID plate is attached:

Well closure information:

Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Date of work (YYYY/MM/DD):
Started: 2012/06/14 Completed: 2012/06/18
Comments: Monitoring well for Fisher Rd.

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.
Signature of Driller Responsible

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

white: Customer copy
canary: Driller copy
pink: Ministry copy

Sheet ____ of ____

MW12-2

BRITISH COLUMBIA The Place on Earth — Ministry of Environment — CVRD — RECEIVED AUG 10 2012

DRILLWELL ENTERPRISES LTD.
4994 Polkey Road
Duncan, B.C. V9L 6W3
Stamp company/name/address/ phone/fax/e-mail here, if desired.
Phone: 250-746-5268

☒ **Well Construction Report** ☐ **Well Closure Report** ☐ **Well Alteration Report**

Ministry Well ID Plate Number:
Ministry Well Tag Number:
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name: Engineering / Environmental Services Cowichan Valley Regional Dist CVRD Fisher Rd Well
Mailing address: 175 Ingram St. Town Duncan Prov. BC Postal Code V9L 1N8
Well Location: Address: Street no. Street name Fisher Rd. Town Cobble Hill
(or) Legal description: Lot Plan D.L. Block Sec. Twp. Rg. Land District Shawnigen
(or) PID: (and) Description of well location (attach sketch, if nec.): On Road allowance West of Fisher Rd. Recycling.
NAD 83: Zone: (see note 2) (and) UTM Easting: 456 160 m (or) Latitude (see note 3):
UTM Northing: 539 3371 m Longitude:
Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual Rotary
Orientation of well: ☐ vertical ☐ horizontal Ground elevation: ft (asl) Method (see note 4):
Class of well (see note 5): Monitoring Sub-class of well: Permanent.
Water supply wells: indicate intended water use: ☐ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	25	H	Brn	Till		
25	120	S	~~Sand~~ Brn.	Sand.		
120	150	M	Brn	Coarse Gravel		Water Bearing at 150.
150	164	S	Brn	Silty Sand.		

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	164	6"	Steel Pulled out.		
0	163	2"	PVC	Sched. 40	

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
158	163	2	PVC	0.010
0	158	2	PVC	Riser

Surface seal: Type: Bentonite Chips Depth: 15 ft
Method of installation: ☐ Poured ☐ Pumped Thickness: 2 in
Backfill: Type: Pea gravel Depth: ft
Liner: ☐ PVC ☐ Other (specify):
Diameter: in Thickness: in
Perforated: ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: ☒ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☒ Pipe size
Screen material: ☐ Stainless steel ☒ Plastic ☐ Other (specify):
Screen opening: ☐ Continuous slot ☒ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☒ Plug ☐ Plate ☐ Other (specify):
Filter pack: From 157 ft To 163 ft Thickness: in
Type and size of material: 10/20 Filter Sand.

Developed by:

☐ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): Total duration: hrs
Notes:

Well yield estimated by:

☐ Pumping ☐ Air lifting ☐ Bailing ☐ Other (specify):
Rate: USgpm Duration: hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Obvious water quality characteristics:

☐ Fresh ☐ Salty ☐ Clear ☐ Cloudy ☐ Sediment ☐ Gas
Color/odour: Water sample collected: ☐

Well driller (print clearly):

Name (first, last) (see note 19): Randy Cramer
Registration no. (see note 20): WD 0508150 2
Consultant (if applicable; name and company): C. Petersmeyer. Thurber

Final well completion data:

Total depth drilled: 164 ft Finished well depth: 163 ft (bgl)
Final stick up: 24 in Depth to bedrock: 0 ft (bgl)
SWL: 148' 8" ft (btoc) Estimated well yield: USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: Locking Monument Well disinfected: ☐ Yes ☒ No
Where well ID plate is attached:

Well closure information:

Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Date of work (YYYY/MM/DD):

Started: 2012/07/26 Completed: 2012/07/31
Comments:

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.
Signature of Driller Responsible

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

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Sheet of

MW12-3

BRITISH COLUMBIA The Best Place on Earth

Ministry of Environment

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☒ Well Construction Report ☐ Well Closure Report ☐ Well Alteration Report

DRILLWELL ENTERPRISES LTD.
4994 Polkey Road
Duncan, B.C. V9L 6W3
Stamp company name/address/ phone/fax/e-mail here, if desired.
Phone: 250-746-5263

Ministry Well ID Plate Number:
Ministry Well Tag Number:
☐ Confirmation/alternative specs. attached
☐ Original well construction report attached

Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.

Owner name/Environment & Engineering: Cowichan Valley Regional Dist CVRD Rona Well
Mailing address: 175 Ingram St. Town Duncan Prov. BC Postal Code V9L 1N8
Well Location: Address: Street no. Street name Fisher Rd Town Cobble Hill
(or) Legal description: Lot Plan D.L. Block Sec. Twp. Rg: Land District Shawnigan
(or) PID: (and) Description of well location (attach sketch, if nec.): Behind Rona & Pacific Truss. Near boundry with Central Landscape.
NAD 83: Zone: (see note 2) (and) UTM Easting: 456 151 m (or) Latitude (see note 3):
UTM Northing: 539 3590 m Longitude:
Method of drilling: ☒ air rotary ☐ cable tool ☐ mud rotary ☐ auger ☐ driving ☐ jetting ☐ excavating ☐ other (specify): Dual Rotary
Orientation of well: ☒ vertical ☐ horizontal Ground elevation: ft (asl) Method (see note 4):
Class of well (see note 5): Monitoring Sub-class of well: Permanent.
Water supply wells: indicate intended water use: ☐ private domestic ☐ water supply system ☐ irrigation ☐ commercial or industrial ☐ other (specify):

Lithologic description (see notes 7-14) or closure description (see notes 15 and 16)

From ft (bgl)	To ft (bgl)	Relative Hardness	Colour	Material Description (Use recommended terms on reverse. List in order of decreasing amount, if applicable)	Water-bearing Estimated Flow (USgpm)	Observations (e.g., fractured, weathered, well sorted, silty wash), closure details
0	9	M	Brn	gravely Till		
9	135	S	Brn	Sand with some gravel		
135	142	M	Brn	gravel		
142	187	S	Brn	Sand	Water bearing @ 180 ft.	

Casing details

From ft (bgl)	To ft (bgl)	Dia in	Casing Material / Open Hole	Wall Thickness in	Drive Shoe
0	187	6"	Steel - Pulled out		
0	183.5	2"	PVC	Sched 40	

Screen details

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size
178.5	183.5	2"	Screen	0.010"
0	178.5	2"	riser	Blank

Surface seal: Type: Bentonite Chips Depth: 16 ft
Method of installation: ☒ Poured ☐ Pumped Thickness: in
Backfill: Type: pea gravel Depth: ft
Liner: ☐ PVC ☐ Other (specify):
Diameter: in Thickness: in
F ft (bgl) To: ft (bgl) Perforated: From: ft (bgl) To: ft (bgl)

Intake: ☒ Screen ☐ Open bottom ☐ Uncased hole
Screen type: ☐ Telescope ☒ Pipe size
Screen material: ☐ Stainless steel ☒ Plastic ☐ Other (specify):
Screen opening: ☐ Continuous slot ☒ Slotted ☐ Perforated pipe
Screen bottom: ☐ Bail ☒ Plug ☐ Plate ☐ Other (specify):
Filter pack: From 177.5 To 183.5 Thickness: 2 in
Type and size of material: 10/20 filter Sand.

Developed by:

☐ Air lifting ☐ Surging ☐ Jetting ☐ Pumping ☐ Bailing
☐ Other (specify): Total duration: hrs
Notes:

Well yield estimated by:

☐ Pumping ☐ Air lifting ☐ Bailing ☐ Other (specify):
Rate: USgpm Duration: hrs
SWL before test: ft (btoc) Pumping water level: ft (btoc)

Obvious water quality characteristics:

☐ Fresh ☐ Salty ☐ Clear ☐ Cloudy ☐ Sediment ☐ Gas
r/odour: Water sample collected: ☐

Final well completion data:

Total depth drilled: 187 ft Finished well depth: 183.5 ft (bgl)
Final stick up: 24 in Depth to bedrock: 0 ft (bgl)
SWL: 169 ft (btoc) Estimated well yield: N/A USgpm
Artesian flow: USgpm, or Artesian pressure: ft
Type of well cap: locking monument Well disinfected: ☐ Yes ☒ No
Where well ID plate is attached: N/A

Well closure information:

Reason for closure:
Method of closure: ☐ Poured ☐ Pumped
Sealant material: Backfill material:
Details of closure (see note 17):

Well driller (print clearly):

Name (first, last) (see note 19): Randy Creamer
Registration no. (see note 20): 0508150 2
Consultant (if applicable; name and company): C. Petersmeyer Thurber

Date of work (YYYY/MM/DD):

Started: 2012/07/24 Completed: 2012/07/26
Comments:

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the *Water Act* and the Ground Water Protection Regulation.

Signature of Driller Responsible

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

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Sheet of

THURBER

TABLE 1: FISHER ROAD GROUNDWATER MONITORING WELL SUMMARY TABLE
COBBLE HILL, COWICHAN VALLEY REGIONAL DISTRICT

Well ID	MW12-1	MW12-2	MW12-3
General Location	North of 1355 Fisher Road East of Galliers Road	South of 1355 Fisher Road West of Ball Road Intersection	North of 1345 Fisher Road
UTM Easting	456052.8	456159.7	456151.3
UTM Northing	5393596.6	5393368.4	5393592.8
Installation Date	June 18, 2012	July 31, 2012	July 26, 2012
Installation Method	Dual Air Rotary	Dual Air Rotary	Dual Air Rotary
Ground Elevation (masl)	126.3	117.7	122.3
Top of Casing Elevation (masl)	127.14	118.4	123.27
Screen Length (m)	1.5	1.5	1.5
Screen Interval (masl)	66.3 to 67.8	68.0 to 69.55	66.37 to 67.9
Sand Pack	0.3 m above top of screen capped with a 1.2 m long bentonite plug	0.3 m above top of screen capped with a 1.2 m long bentonite plug	0.3 m above top of screen capped with a 1.2 m long bentonite plug
Well Backfill	gravel + bentonite with 6 m bentonite seal at surface	pea gravel with 4.6 m bentonite seal at surface	pea gravel with 4.9 m bentonite seal at surface
Monitoring Date	**Water Level Elevation (masl)**		
September 17, 2012	71.5	72.49	71.57
January 29, 2013	71.27	72.22	71.35
February 18, 2013			71.5

THURBER

APPENDIX C

Table 2 – Fisher Road Monitoring Well Data

Isotope Chart

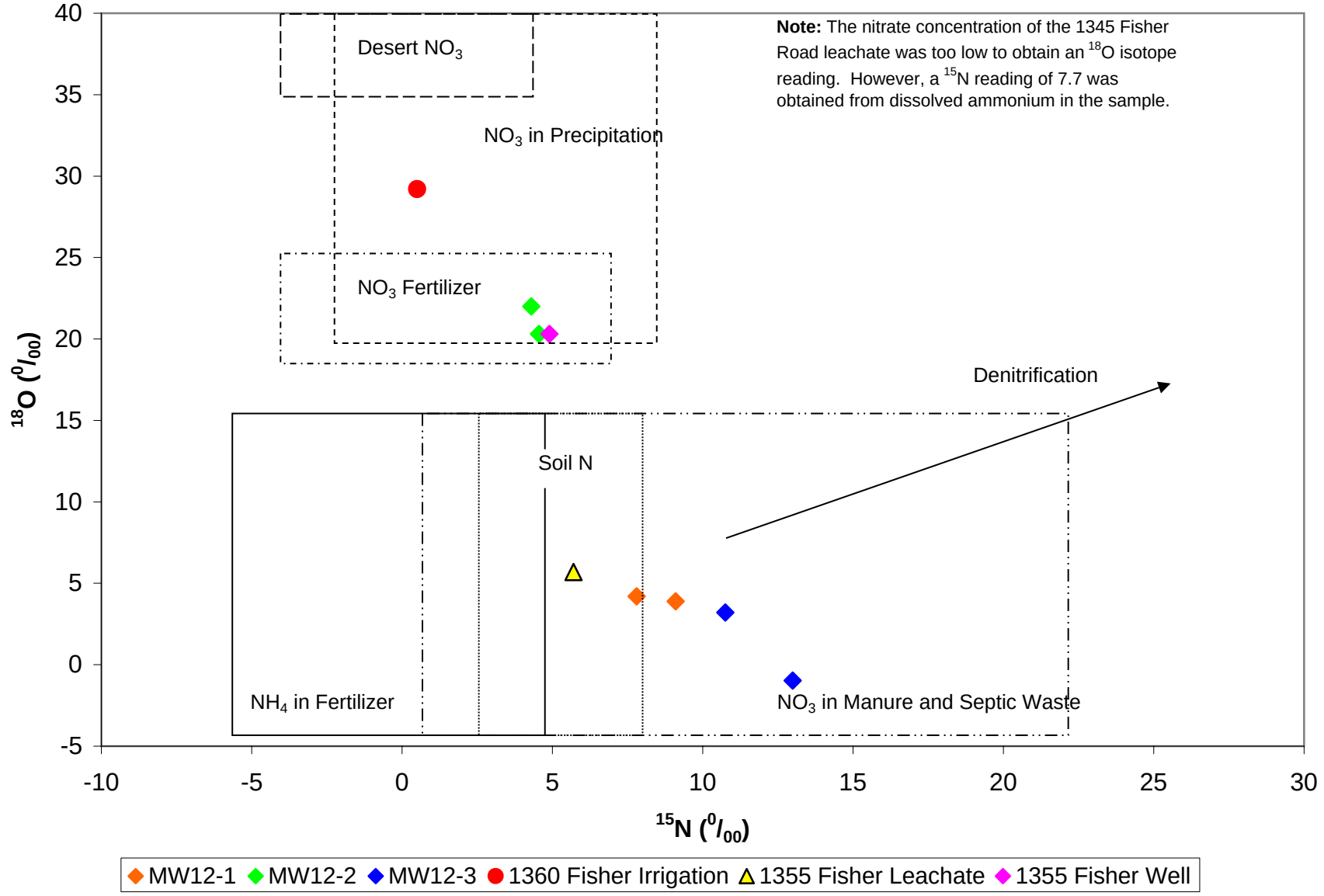
THURBER

TABLE 2: FISHER ROAD MONITORING WELL DATA
COBBLE HILL, COWICHAN VALLEY REGIONAL DISTRICT

SAMPLE ID (Well)	MW12-1				MW12-2				MW12-3				1355 Fisher Well		1360 Fisher Fertilized Irr.		1355 Fisher Leachate		1345 Fisher Leachate		Guidelines for Canadian Drinking Water Quality (GCDWQ)	British Columbia Contaminated Sites Regulation Numerical Standards (CSR)
SAMPLE DATE	September 17, 2012		January 29, 2013		September 17, 2012		January 29, 2013		September 17, 2012		February 18, 2013		January 29, 2013		January 29, 2013		January 29, 2013		January 29, 2013			
WELL PREPARATION	Purged		Purged		Purged		Purged		Purged		Purged		Purged		n/a		n/a		n/a			
LABORATORY	Maxxam		AGAT		Maxxam		AGAT		Maxxam		AGAT		AGAT		AGAT		AGAT		AGAT			
SAMPLED BY	PJW / CWP		CWP/RDM		PJW / CWP		CWP/RDM		PJW / CWP		CWP/RDM		CWP/RDM		CWP/RDM		CWP/RDM		CWP/RDM			Drinking Water
SAMPLE PREP.	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS	TOTAL	DISS		
pH, Field	6.95		7.28		6.67		6.78		6.9		6.97				6.59						6.5-8.5	
pH, Laboratory	7.5		7.6		7.2		7.35		7.6		7.15		7.35		6.74		7.98		7.03		6.5-8.5	
Conductivity, Field	258		428		1024		1073		639		713				1733							
Conductivity, Laboratory	459		445		1100		1140		681		712		865		1820		1140		3200			
True Colour	9				9				7												≤15†	
Turbidity	6000				1200				1300												≤1**	
Hardness $CaCO_3$ (mg/L) ↓		183		172		480		482		257		280		370		573		140		707		
Total Dissolved Solids		318		173		**814**		444		457		329		356		**747**		**602**		**1800**	500†	
Total Alkalinity $CaCO_3$	61.9		63		77		80		92.6		106		73		51		198		823			
Bicarbonate Alkalinity HCO_3	75.5		63		93.9		80		113		106		73		51		198		823			
Carbonate Alkalinity CO_3	<0.5		<1		<0.5		<1		<0.5		<1		<1		<1		<1		<1			
Hydroxide Alkalinity OH	<0.5		<1		<0.5		<1		<0.5		<1		<1		<1		<1		<1			
Fluoride F (dissolved)		0.1		0.07		0.067		0.03		0.084		0.13		0.05		0.06		0.1		0.5	1.5†	1.5
Chloride Cl (dissolved)		31.5		29.2		36		35		69.5		114		44.3		21.1		186		**316**	≤250†	250
Sulphate SO_4 (dissolved)		17.9		12.3		93.7		89.4		47.9		22.6		69.4		163		12.8		4.7	≤500†	500
Biological Oxygen Demand			<4				<4						<4									
Caffeine (ug/L)																						
Caffeine	<1				<1				<1				<500									
Nitrogen (mg/L)																						
Ammonia	0.11		<0.01		0.041		<0.01		0.057		0.02		<0.01		5.6		9.3		19.5			
Total Kjeldahl Nitrogen	5		4		<2		<1		<2		2.5		0.1		4.2		41		124			
Nitrate (as N)		**28**		**23.7**		**98.1**		**92.5**		**15.3**		**16.3**		**58.3**		**158**		4.99		<0.005	10	10
Nitrite (as N)		0.075		<0.005		0.33		0.04		<0.1		<0.005		<0.005		0.243		0.081		<0.005	1	3.2
Nitrate plus Nitrite (as N)		**28**		**23.7**		**98.5**		**92.5**		**15.3**		**16.3**		**58.3**	-	**158**		5.07		<0.01	10	10
Total Nitrogen	33.1		26		92.4		99.4		13.9		17.9		61.3		183		35.6		101			
Nitrate Isotopes (δI_{00})																						
^{15}N	9.0 / 9.2		7.8		4.7 / 4.4		4.3		10.6 / 10.9		13.0		4.9		0.5		5.7		7.7			
^{18}O	3.6 / 4.2		4.2		20.3		22		3.2		-1.0		20.3		29.2		-1.6		-			
Metals (ug/L)																						
Aluminum Al	**22200****	8.7	**21200****	78	**33600****	11	**24100****	<1	**4350****	25.1	**17400****	7	3	<1							200* **	9,500
Antimony Sb	<0.50	<0.50	<0.05	<0.05	<0.50	<0.50	<0.05	<0.05	<0.50	<0.50	0.24	0.05	<0.05	<0.05							6	6
Arsenic As	4.28	0.4	8.2	0.4	3.64	0.19	7.2	0.2	3.49	0.48	9.2	0.4	<0.1	0.2							10	10
Barium Ba	580	22.1	159	15.2	479	36.8	199	29.4	223	49.9	289	36.9	13.7	15.8							1,000	1,000
Beryllium Be	1.06	<0.10	0.96	0.01	1.04	<0.10	0.65	<0.01	1	<0.10	2.06	<0.01	<0.05	<0.01								
Bismuth Bi	<1.0	<1.0			<1.0	<1.0			<1.0	<1.0												
Boron B	<50	<50	2	2	<50	<50	29	29	<50	<50	21	6	18	24							5,000	5,000
Cadmium Cd	1.24	0.166	0.06	<0.01	1.2	0.419	0.48	0.4	1.05	0.148	1.14	0.15	0.07	0.06							5	5
Chromium Cr	**143****	<1.0	**63****	1.2	**95.9****	<1.0	**59.1****	0.7	30.8	<1.0	**56.8****	0.9	0.6	0.6							50 (Cr VI)	50
Cobalt Co	90.6	2.49	27.2	0.92	67.7	5.4	28.2	3.9	30	2.9	59.8	0.58	0.59	0.7								
Copper Cu	127	10.8	53.8	6.6	147	31.4	78.5	34.9	30.6	5.95	54.6	5.5	12.3	23.1							1,000††	1,000
Iron Fe	**57600****	22.8	**47900****	16	**57200****	120	**42400****	90	**11600****	61.5	**29500****	20	80	40		90		0.77		7.19	300†	6,500
Lead Pb	**11.4****	0.26	6.48	0.79	**12.1****	<0.20	4.7	0.02	8.52	<0.20	14.9	0.13	0.52	0.34							10	10
Manganese Mn	**1760****	344	**704****	43	**1990****	**554**	**696****	94	**754****	185	**1150****	22	2	2		**309**		0.076		2.48	50†	550
Mercury Hg	<0.050	<0.050	0.059	0.007	<0.050	<0.050	0.127	0.011	<0.050	<0.050	0.15	0.033	0.015	<0.003							1	1
Molybdenum Mo	10.6	16.3	4.5	1.47	5.2	6	<0.1	0.91	3.8	3.9	5.9	1.31	<0.1	<0.05							250	250
Nickel Ni	114	7.8	54.5	3.7	196	80.7	126	73.6	46.3	14.1	80.4	5	15.4	16								
Selenium Se	0.35	0.31	1.9	0.4	0.33	0.21	2.4	0.6	0.36	0.5	1.4	0.1	<0.3	0.5							10	10
Silicon SiO_2	31200	11400			45800	13200			16600	12400												
Silver Ag	0.113	<0.020	0.05	<0.01	0.099	<0.020	0.05	<0.01	<0.020	<0.020	<0.01	<0.01	<0.01	<0.01								
Strontium Sr	291	158			645	466			333	290												
Thallium Tl	0.204	<0.050	<0.01	<0.002	0.099	<0.050	<0.01	<0.002	0.128	<0.050	0.26	0.025	<0.01	<0.002								
Tin Sn	<5.0	<5.0			<5.0	<5.0			<5.0	<5.0												
Titanium Ti	45	<5.0	1010	51.6	159	<5.0	1700	153	29.2	<5.0	478	82.3	102	144								
Uranium U	2.33	0.45	1.3	0.31	1.89	0.46	0.78	0.17	3.67	1.76	3.45	0.84	<0.01	<0.01							20	20
Vanadium V	102	<5.0	73	1.2	135	<5.0	98.8	0.9	31.3	<5.0	59.8	0.8	1.5	1.6								
Zinc Zn	1650	17	179	47	189	8.1	72	8	41.8	7.1	374	16	9	11							5,000†	5,000
Zirconium Zr	<0.50	<0.50			1.88	<0.50			<0.50	<0.50												
Calcium Ca (mg/L) ↓	58	41.5	50.2	36.9	136	114	125	112	67.4	59.1	91.4	65.1	86	84.6		159		36.3		144		
Magnesium Mg	32.3	19.3	33.2	19.4	64.2	47.2	61.3	49.2	29.5	26.7	42	28.5	38.3	38.6		42.7		12		84.4		100
Potassium K	2.58	1.52		1.04	3.48	2.13		1.67	1.93	1.64		1.44		1.07		161		164		724		
Sodium Na	14.6	14.1	14.3	12.1	18.5	18.8	17.8	15.9	25.9	26.9	20.1	17.7	15.5	16		11.1		66.6		36.1	200*** †	200
Sulphur S	3.1	5.4			25	30.5			14.5	15.5												
Hydrocarbons (mg/L)																						
EPH - C10 to C19	<0.2				<0.2				<0.2				<0.1									5
EPH - C19 to C32	<0.2				<0.2				<0.2				<0.1									
BTEX and Volatile Hydrocarbons													<								various	various
Biological (MPN/100ml)																						
E. coli	<1				<1				<1												0	
Total Coliforms	50				480				930												0 **	

THURBER

FISHER RD NO_3 ISOTOPE DATA



Client: CVRD
E-File: pjw_17-971-14_tab_Fisher Road GW Monitoring Well Data.xls

Date: April 30, 2013

THURBER

APPENDIX D

Laboratory Reports

Analysis Report

REPORT ON: Analysis of Water Samples

REPORTED TO: Thurber Engineering Ltd.
Victoria
100-4396 West Saanich
Victoria, BC
V8Z 3E9

Att'n: Chad Petersmeyer

CHAIN OF CUSTODY: G068107
PROJECT NAME: 17-971-14

NUMBER OF SAMPLES: 3

REPORT DATE: November 19, 2012

DATE SUBMITTED: September 18, 2012

JOB NUMBER: B283411

SAMPLE TYPE: Water

Aesthetic Objective Summary:
Aesthetic Objectives as set by "Guidelines for Canadian Drinking Water Quality Summary Table" - August 2012. Aesthetic objectives apply to certain substances or characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water. For certain parameters, both aesthetic objectives and health-related guidelines have been derived. Where only aesthetic objectives are specified, these values are below those considered to constitute a health hazard.

CLIENT SAMPLE ID	AESTHETIC
MW12-1	Unacceptable
MW12-2	Unacceptable
MW12-3	Unacceptable

Encryption Key

Amandeep Nagra
BBY Customer Service

(Continued)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Maximum Acceptable Concentration Summary:
Maximum Acceptable Concentration (MAC) for both chemical and microbiological parameters are put forth in the "Guidelines for Canadian Drinking Water Quality Summary Table" - August, 2012. For the parameters tested, results are generally categorized by health concerns. Some parameters have no limit value denoted because: a) currently available data indicates no health risk, b) the compound is not permitted in Canada, or c) it refers to a family of compounds.

CLIENT SAMPLE ID	HEALTH
MW12-1	Unacceptable
MW12-2	Unacceptable
MW12-3	Unacceptable

TEST METHODS:

Elements by CRC ICPMS (dissolved) - Missing Narrative

Elements by CRC ICPMS (total) - This method describes the multi elemental determination of trace elements by Collision/Reaction Cell (CRC) ICP-MS. The method measures ions produced by a radio frequency inductively coupled plasma. Analyte species originating in a liquid are pneumatically nebulized and the resulting aerosol transported by argon gas into the plasma torch. The ions produced are entrained in the plasma gas and extracted, by means of a differentially pumped vacuum interface, into a mass spectrometer. The ions flow through a Collision/Reaction Cell (CRC) where depending on the mode of analysis either the ions passes through the cell unhindered (no gas - classical ICP-MS mode), or collisions/reactions chemistry takes place between the ions and a neutral gas such as hydrogen or helium. Any polyatomic ions which give interference on the analytes are removed. The ions are then sorted according to their mass to charge ratios by a quadrupole mass spectrometer. The ions transmitted through the quadrupole are quantified by a channel electron multiplier and the ion information processed by a data handling system.

Na, K, Ca, Mg, S by CRC ICPMS (diss.) - Missing Narrative

Na, K, Ca, Mg, S by CRC ICPMS (total) - Major Elements. Same as Elements by CRC ICPMS (Total).

Anions in Water by Ion Chromatography - Missing Narrative

Colour (True) - Analyses performed based on procedures described in the most current editions of "British Columbia Environmental Laboratory Manual" (2005) and/or "Standard Methods for the Examination of Water and Wastewater" (21st Edition).

pH Water - pH in Water was performed using a pH Meter at Maxxam's Victoria Laboratory (1104-4464 Markham Street, Victoria, BC V8Z 7X8).

Total Dissolved Solids (Filt. Residue) - Suspended Solids in Water: analysis was performed based on method 2540C in Standard Methods for the Examination of Water and Wastewater and the method in the British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials.

(Continued)

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REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Elements by CRC ICPMS (dissolved) - Missing Narrative

Elements by CRC ICPMS (total) - This method describes the multi elemental determination of trace elements by Collision/Reaction Cell (CRC) ICP-MS. The method measures ions produced by a radio frequency inductively coupled plasma. Analyte species originating in a liquid are pneumatically nebulized and the resulting aerosol transported by argon gas into the plasma torch. The ions produced are entrained in the plasma gas and extracted, by means of a differentially pumped vacuum interface, into a mass spectrometer. The ions flow through a Collision/Reaction Cell (CRC) where depending on the mode of analysis either the ions passes through the cell unhindered (no gas - classical ICP-MS mode), or collisions/reactions chemistry takes place between the ions and a neutral gas such as hydrogen or helium. Any polyatomic ions which give interference on the analytes are removed. The ions are then sorted according to their mass to charge ratios by a quadrupole mass spectrometer. The ions transmitted through the quadrupole are quantified by a channel electron multiplier and the ion information processed by a data handling system.

Coliforms & E.coli by Quantitray (MPN) - Microbiological Parameters: analyses were performed using procedures based on those described in "B. C. Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials", "Standard Methods for the Examination of Water and Wastewater", and Colilert Quanti-tray Standard Operating Procedure. Results are reported as Most Probable Number (MPN) per unit volume. Note: <1 MPN is equivalent to "Absent".

Anions in Water by Ion Chromatography - Missing Narrative

Extrac. Petroleum HC in Water by GC/FID - Missing Narrative

Elements by CRC ICPMS (dissolved) - Missing Narrative

Elements by CRC ICPMS (total) - This method describes the multi elemental determination of trace elements by Collision/Reaction Cell (CRC) ICP-MS. The method measures ions produced by a radio frequency inductively coupled plasma. Analyte species originating in a liquid are pneumatically nebulized and the resulting aerosol transported by argon gas into the plasma torch. The ions produced are entrained in the plasma gas and extracted, by means of a differentially pumped vacuum interface, into a mass spectrometer. The ions flow through a Collision/Reaction Cell (CRC) where depending on the mode of analysis either the ions passes through the cell unhindered (no gas - classical ICP-MS mode), or collisions/reactions chemistry takes place between the ions and a neutral gas such as hydrogen or helium. Any polyatomic ions which give interference on the analytes are removed. The ions are then sorted according to their mass to charge ratios by a quadrupole mass spectrometer. The ions transmitted through the quadrupole are quantified by a channel electron multiplier and the ion information processed by a data handling system.

Na, K, Ca, Mg, S by CRC ICPMS (diss.) - Missing Narrative

Na, K, Ca, Mg, S by CRC ICPMS (total) - Major Elements. Same as Elements by CRC ICPMS (Total).

(Continued)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Alkalinity - Water - Alkalinity of water is its acid-neutralizing capacity. It is the sum of all the titrable bases. The measured value may vary significantly with the end-point pH used. Alkalinity is a measure of an aggregate property of water and can be interpreted in terms of specific substances only when the chemical composition of the sample is known. The alkalinity of waters is due principally to salts of weak acids or strong bases. Such substances cause resistance to a drop in pH that normally occurs with acid addition. Alkalinity is then a measure of the buffer capacity of water. Alkalinity is determined by potentiometric titration with sulphuric acid, which has been standardized with sodium carbonate. The sample (if greater than pH 8.3) is first titrated to pH 8.3 which corresponds to the equivalence point for the conversion of carbonate to bicarbonate ion. The titration is continued to a pH of 4.5, which corresponds approximately to the equivalence point for the conversion of bicarbonate ion to carbonic acid.

Ammonia-N (Preserved) - Missing Narrative

Conductance - water - Conductivity in Water was performed using a Conductivity Meter at Maxxam's Victoria Laboratory (1104-4464 Markham Street, Victoria, BC V8Z 7X8).

Filter and HNO3 Preserve for Metals - Missing Narrative

Hardness (calculated as CaCO3) - Missing Narrative

Hardness Total (calculated as CaCO3) - Missing Narrative

Nitrate + Nitrite (N) (calculated) - NO2 + NO3 in Water: analysis was performed based on method 4500 NO2-E in "Standard Methods for the Examination of Water and Wastewater" and the Nitrite nitrogen (dissolved) method in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials".

Nitrogen (Total) - Missing Narrative

Sublet (Inorganics) - Missing Narrative

Sublet (ORGANICS) - Missing Narrative

TKN (Calc. TN, N/N) total - Missing Narrative

Turbidity - Analyses performed based on procedures described in the most current editions of "British Columbia Environmental Laboratory Manual" (2005) and/or "Standard Methods for the Examination of Water and Wastewater" (21st Edition).

COMMENTS:

Package 1	5.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

(Continued)

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REPORT DATE: November 19, 2012

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TEST RESULTS:

(See following pages)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Aesthetic Criteria) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2			
SAMPLE DATE:	Sep 17/12	Sep 17/12			
LAB ID:	EM4428	EM4429	Aesthetic	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12	Sep 21/12			
Elements by Atomic Spectroscopy					
Dissolved Sodium (Na)	14.1	18.8	200	0.050	mg/L
Dissolved Copper (Cu)	10.8	31.4	1000	0.20	ug/L
Dissolved Iron (Fe)	22.8	120	300	5.0	ug/L
Dissolved Manganese (Mn)	344 X	554 X	50	1.0	ug/L
Dissolved Zinc (Zn)	17.0	8.1	5000	5.0	ug/L
Total Sodium (Na)	14.6	18.5	200	0.050	mg/L
Total Copper (Cu)	127	147	1000	0.20	ug/L
Total Iron (Fe)	57600 X	57200 X	300	5.0	ug/L
Total Manganese (Mn)	1760 X	1990 X	50	1.0	ug/L
Total Zinc (Zn)	1650	189	5000	5.0	ug/L
Conventional Parameters					
Dissolved Chloride (Cl)	31.5	36.0	250	0.50	mg/L
Dissolved Sulphate (SO4)	17.9	93.7	500	0.50	mg/L
True Colour	9	9	15	5	Col. Unit
pH	7.5	7.2	6.5:8.5	0	pH Units

Col. Unit = colour units
mg/L = milligrams per liter
pH Units = pH Units
ug/L = micrograms per liter
X = Result is outside the Aesthetic Objective Limits
Sample# EM4428, EM4429 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

(Continued on next Page)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Aesthetic Criteria) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2			
SAMPLE DATE:	Sep 17/12	Sep 17/12			
LAB ID:	EM4428	EM4429	Aesthetic	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12	Sep 21/12			
Conventional Parameters					
Total Dissolved Solids	318	814 X	500	10	mg/L

mg/L = milligrams per liter
X = Result is outside the Aesthetic Objective Limits
Sample# EM4428, EM4429 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

(Continued on next Page)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Aesthetic Criteria) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-3			
SAMPLE DATE:	Sep 17/12			
LAB ID:	EM4430	Aesthetic	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12			
Elements by Atomic Spectroscopy				
Dissolved Sodium (Na)	26.9	200	0.050	mg/L
Dissolved Copper (Cu)	5.95	1000	0.20	ug/L
Dissolved Iron (Fe)	61.5	300	5.0	ug/L
Dissolved Manganese (Mn)	185 X	50	1.0	ug/L
Dissolved Zinc (Zn)	7.1	5000	5.0	ug/L
Total Sodium (Na)	25.9	200	0.050	mg/L
Total Copper (Cu)	30.6	1000	0.20	ug/L
Total Iron (Fe)	11600 X	300	5.0	ug/L
Total Manganese (Mn)	754 X	50	1.0	ug/L
Total Zinc (Zn)	41.8	5000	5.0	ug/L
Conventional Parameters				
Dissolved Chloride (Cl)	69.5	250	0.50	mg/L
Dissolved Sulphate (SO4)	47.9	500	0.50	mg/L
True Colour	7	15	5	Col. Unit
pH	7.6	6.5:8.5	0	pH Units
Total Dissolved Solids	457	500	10	mg/L

Col. Unit = colour units
mg/L = milligrams per liter
pH Units = pH Units
ug/L = micrograms per liter
X = Result is outside the Aesthetic Objective Limits
Sample# EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	HEALTH	REPORTING LIMIT	UNITS
SAMPLE DATE:	Sep 17/12	Sep 17/12			
LAB ID:	EM4428	EM4429			
ANALYSIS DATE:	Sep 21/12	Sep 21/12			
Elements by Atomic Spectroscopy					
Dissolved Antimony (Sb)	<	<	6	0.50	ug/L
Dissolved Arsenic (As)	0.40	0.19	10	0.10	ug/L
Dissolved Barium (Ba)	22.1	36.8	1000	1.0	ug/L
Dissolved Boron (B)	<	<	5000	50	ug/L
Dissolved Cadmium (Cd)	0.166	0.419	5	0.010	ug/L
Dissolved Chromium (Cr)	<	<	50	1.0	ug/L
Dissolved Lead (Pb)	0.26	<	10	0.20	ug/L
Dissolved Mercury (Hg)	<	<	1	0.050	ug/L
Dissolved Selenium (Se)	0.31	0.21	10	0.10	ug/L
Dissolved Uranium (U)	0.45	0.46	20	0.10	ug/L
Total Antimony (Sb)	<	<	6	0.50	ug/L
Total Arsenic (As)	4.28	3.64	10	0.10	ug/L
Total Barium (Ba)	580	479	1000	1.0	ug/L
Total Boron (B)	<	<	5000	50	ug/L
Total Cadmium (Cd)	1.24	1.20	5	0.010	ug/L
Total Chromium (Cr)	143 X	95.9 X	50	1.0	ug/L
Total Lead (Pb)	11.4 X	12.1 X	10	0.20	ug/L
Total Mercury (Hg)	<	<	1	0.050	ug/L
Total Selenium (Se)	0.35	0.33	10	0.10	ug/L
Total Uranium (U)	2.33	1.89	20	0.10	ug/L
Microbiology					

ug/L = micrograms per liter
< = Less than reporting limit
X = Result is outside the Maximum Acceptable Concentration Limits
Sample# EM4428, EM4429 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

(Continued on next Page)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	HEALTH	REPORTING LIMIT	UNITS
SAMPLE DATE:	Sep 17/12	Sep 17/12			
LAB ID:	EM4428	EM4429			
ANALYSIS DATE:	Sep 21/12	Sep 21/12			
Microbiology					
Total Coliforms	50 X	480 X	0	1	MPN/100mL
E. coli	<	<	0	1	MPN/100mL
Conventional Parameters					
Dissolved Fluoride (F)	0.100	0.067	1.5	0.010	mg/L
Dissolved Nitrate (N)	28.0 X	98.1 X	10	0.020	mg/L
Dissolved Nitrite (N)	0.075	0.330	1	0.010	mg/L

mg/L = milligrams per liter
MPN/100mL = Most Probable Number per 100 milliliters
< = Less than reporting limit
X = Result is outside the Maximum Acceptable Concentration Limits
Sample# EM4428, EM4429 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

(Continued on next Page)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-3			
SAMPLE DATE:	Sep 17/12			
LAB ID:	EM4430	HEALTH	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12			
Elements by Atomic Spectroscopy				
Dissolved Antimony (Sb)	<	6	0.50	ug/L
Dissolved Arsenic (As)	0.48	10	0.10	ug/L
Dissolved Barium (Ba)	49.9	1000	1.0	ug/L
Dissolved Boron (B)	<	5000	50	ug/L
Dissolved Cadmium (Cd)	0.148	5	0.010	ug/L
Dissolved Chromium (Cr)	<	50	1.0	ug/L
Dissolved Lead (Pb)	<	10	0.20	ug/L
Dissolved Mercury (Hg)	<	1	0.050	ug/L
Dissolved Selenium (Se)	0.50	10	0.10	ug/L
Dissolved Uranium (U)	1.76	20	0.10	ug/L
Total Antimony (Sb)	<	6	0.50	ug/L
Total Arsenic (As)	3.49	10	0.10	ug/L
Total Barium (Ba)	223	1000	1.0	ug/L
Total Boron (B)	<	5000	50	ug/L
Total Cadmium (Cd)	1.05	5	0.010	ug/L
Total Chromium (Cr)	30.8	50	1.0	ug/L
Total Lead (Pb)	8.52	10	0.20	ug/L
Total Mercury (Hg)	<	1	0.050	ug/L
Total Selenium (Se)	0.36	10	0.10	ug/L
Total Uranium (U)	3.67	20	0.10	ug/L
Microbiology				
Total Coliforms	930 X	0	1	MPN/100mL
E. coli	<	0	1	MPN/100mL
Conventional Parameters				

MPN/100mL = Most Probable Number per 100 milliliters
ug/L = micrograms per liter
< = Less than reporting limit
X = Result is outside the Maximum Acceptable Concentration Limits

(Continued on next Page)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Health Criteria at Point of Use) in Water

Sample# EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

(Continued on next Page)

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-3			
SAMPLE DATE:	Sep 17/12			
LAB ID:	EM4430	HEALTH	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12			
Conventional Parameters				
Dissolved Fluoride (F)	0.084 (1)	1.5	0.010	mg/L
Dissolved Nitrate (N)	15.3 X	10	0.020	mg/L
Dissolved Nitrite (N)	<0.10 (2)	1	0.010	mg/L

mg/L = milligrams per liter
< = Less than reporting limit
X = Result is outside the Maximum Acceptable Concentration Limits
Sample# EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.
(1) RDL raised due to sample matrix interference.
(2) RDL raised due to sample matrix interference.
Sample analysed past recommended hold time.

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REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Total Petroleum Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	MW12-3	
SAMPLE DATE:	Sep 17/12	Sep 17/12	Sep 17/12	
LAB ID:	EM4428	EM4429	EM4430	REPORTING
ANALYSIS DATE:	Sep 20/12	Sep 20/12	Sep 20/12	LIMIT
EPH (C10-C19)	<	<	<	0.20
EPH (C19-C32)	<	<	<	0.20

Results expressed as milligrams per liter (mg/L)
< = Less than reporting limit
Sample# EM4428, EM4429, EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Elements by Atomic Spectroscopy in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	MW12-3		
SAMPLE DATE:	Sep 17/12	Sep 17/12	Sep 17/12		
LAB ID:	EM4428	EM4429	EM4430	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12	Sep 21/12	Sep 21/12		
Dissolved Calcium (Ca)	41.5	114	59.1	0.050	mg/L
Dissolved Magnesium (Mg)	19.3	47.2	26.7	0.050	mg/L
Dissolved Potassium (K)	1.52	2.13	1.64	0.050	mg/L
Dissolved Sulphur (S)	5.4	30.5	15.5	3.0	mg/L
Dissolved Aluminum (Al)	8.7	11.0	25.1	3.0	ug/L
Dissolved Beryllium (Be)	<	<	<	0.10	ug/L
Dissolved Bismuth (Bi)	<	<	<	1.0	ug/L
Dissolved Cobalt (Co)	2.49	5.40	2.90	0.50	ug/L
Dissolved Lithium (Li)	<	<	<	5.0	ug/L
Dissolved Molybdenum (Mo)	16.3 (1)	6.0	3.9	1.0	ug/L
Dissolved Nickel (Ni)	7.8	80.7	14.1	1.0	ug/L
Dissolved Silicon (Si)	11400	13200	12400	100	ug/L
Dissolved Silver (Ag)	<	<	<	0.020	ug/L
Dissolved Strontium (Sr)	158	466	290	1.0	ug/L
Dissolved Thallium (Tl)	<	<	<	0.050	ug/L
Dissolved Tin (Sn)	<	<	<	5.0	ug/L

mg/L = milligrams per liter
ug/L = micrograms per liter
< = Less than reporting limit
Sample# EM4428, EM4429, EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.
(1) Dissolved greater than total. Reanalysis yields similar results.

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Elements by Atomic Spectroscopy in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	MW12-3		
SAMPLE DATE:	Sep 17/12	Sep 17/12	Sep 17/12		
LAB ID:	EM4428	EM4429	EM4430	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12	Sep 21/12	Sep 21/12		
Dissolved Titanium (Ti)	<	<	<	5.0	ug/L
Dissolved Vanadium (V)	<	<	<	5.0	ug/L
Dissolved Zirconium (Zr)	<	<	<	0.50	ug/L
Total Calcium (Ca)	58.0	136	67.4	0.050	mg/L
Total Magnesium (Mg)	32.3	64.2	29.5	0.050	mg/L
Total Potassium (K)	2.58	3.48	1.93	0.050	mg/L
Total Sulphur (S)	3.1	25.0	14.5	3.0	mg/L
Total Aluminum (Al)	22200	33600	4350	3.0	ug/L
Total Beryllium (Be)	1.06	1.04	1.00	0.10	ug/L
Total Bismuth (Bi)	<	<	<	1.0	ug/L
Total Cobalt (Co)	90.6	67.7	30.0	0.50	ug/L
Total Molybdenum (Mo)	10.6	5.2	3.8	1.0	ug/L
Total Nickel (Ni)	114	196	46.3	1.0	ug/L
Total Silicon (Si)	31200	45800	16600	100	ug/L
Total Silver (Ag)	0.113	0.099	<	0.020	ug/L
Total Strontium (Sr)	291	645	333	1.0	ug/L
Total Thallium (Tl)	0.204	0.099	0.128	0.050	ug/L
Total Tin (Sn)	<	<	<	5.0	ug/L
Total Titanium (Ti)	45.0	159	29.2	5.0	ug/L

mg/L = milligrams per liter
ug/L = micrograms per liter
< = Less than reporting limit
Sample# EM4428, EM4429, EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

(Continued on next Page)

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Elements by Atomic Spectroscopy in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	MW12-3		
SAMPLE DATE:	Sep 17/12	Sep 17/12	Sep 17/12		
LAB ID:	EM4428	EM4429	EM4430	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 21/12	Sep 21/12	Sep 21/12		
Total Vanadium (V)	102	135	31.3	5.0	ug/L
Total Zirconium (Zr)	<	1.88	<	0.50	ug/L

ug/L = micrograms per liter
< = Less than reporting limit
Sample# EM4428, EM4429, EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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REPORTED TO: Thurber Engineering Ltd.

REPORT DATE: November 19, 2012

JOB NUMBER: B283411

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	MW12-3		
SAMPLE DATE:	Sep 17/12	Sep 17/12	Sep 17/12		
LAB ID:	EM4428	EM4429	EM4430	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 20/12	Sep 20/12	Sep 20/12		
Alkalinity (Total as CaCO3)	61.9	77.0	92.6	0.5	mg/L
Alkalinity (PP as CaCO3)	<	<	<	0.5	mg/L
Bicarbonate (HCO3)	75.5	93.9	113	0.5	mg/L
Carbonate (CO3)	<	<	<	0.5	mg/L
Hydroxide (OH)	<	<	<	0.5	mg/L
Conductivity	459	1100	681	1	uS/cm
Total Hardness (CaCO3)	278	604	290	0.50	mg/L
Dissolved Hardness (CaCO3)	183	480	257	0.50	mg/L
Total Nitrogen (N)	33.1 (1)	92.4	13.9 (1)	2.0	mg/L
Ammonia (N)	0.11	0.041	0.057	0.0050	mg/L
Nitrate plus Nitrite (N)	28.0	98.5	15.3	0.02	mg/L
Filter and HNO3 Preservation	FIELD	FIELD	FIELD	0	N/A
Subcontract Parameter	ATTACHED	ATTACHED	ATTACHED	0	N/A
Total Total Kjeldahl Nitrogen (Calc)	5.0	<2.0	<2.0	2.0	mg/L

mg/L = milligrams per liter
N/A = Not Applicable
uS/cm = microSiemens per centimetre
< = Less than reporting limit
Sample# EM4428, EM4429, EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.
(1) RDL raised due to sample matrix interference.

(Continued on next Page)

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Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	MW12-1	MW12-2	MW12-3		
SAMPLE DATE:	Sep 17/12	Sep 17/12	Sep 17/12		
LAB ID:	EM4428	EM4429	EM4430	REPORTING LIMIT	UNITS
ANALYSIS DATE:	Sep 20/12	Sep 20/12	Sep 20/12		
Turbidity	6000	1200	1300	1	NTU

NTU = nephelometric turbidity unit
Sample# EM4428, EM4429, EM4430 - The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6123692	Total Dissolved Solids	2012/09/20			94	80 - 120	<10	mg/L	1.6	20
6180856	Dissolved Nitrate (N)	2012/09/14	109	80 - 120	97	80 - 120	<0.010	mg/L	0.3(1)	20
6180856	Dissolved Nitrite (N)	2012/09/14	116	80 - 120	113	80 - 120	<0.010	mg/L	NC	20
6180856	Dissolved Chloride (Cl)	2012/09/19	85	80 - 120	111	80 - 120	<0.50	mg/L		
6180856	Dissolved Fluoride (F)	2012/09/19	110	80 - 120	113	80 - 120	<0.010	mg/L		
6180856	Dissolved Sulphate (SO4)	2012/09/19	112	80 - 120	110	80 - 120	<0.50	mg/L		
6181206	Dissolved Aluminum (Al)	2012/09/21	103	80 - 120	107	80 - 120	<3.0	ug/L		
6181206	Dissolved Antimony (Sb)	2012/09/21	104	80 - 120	100	80 - 120	<0.50	ug/L		
6181206	Dissolved Arsenic (As)	2012/09/21	104	80 - 120	103	80 - 120	<0.10	ug/L	1.5	20
6181206	Dissolved Barium (Ba)	2012/09/21	NC	80 - 120	103	80 - 120	<1.0	ug/L	0.9	20
6181206	Dissolved Beryllium (Be)	2012/09/21	102	80 - 120	97	80 - 120	<0.10	ug/L		
6181206	Dissolved Bismuth (Bi)	2012/09/21	95	80 - 120	103	80 - 120	<1.0	ug/L		
6181206	Dissolved Cadmium (Cd)	2012/09/21	101	80 - 120	102	80 - 120	<0.010	ug/L		
6181206	Dissolved Chromium (Cr)	2012/09/21	100	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
6181206	Dissolved Cobalt (Co)	2012/09/21	97	80 - 120	101	80 - 120	<0.50	ug/L		
6181206	Dissolved Copper (Cu)	2012/09/21	93	80 - 120	101	80 - 120	<0.20	ug/L	NC	20
6181206	Dissolved Iron (Fe)	2012/09/21	NC	80 - 120	110	80 - 120	<5.0	ug/L	2.6	20
6181206	Dissolved Lead (Pb)	2012/09/21	93	80 - 120	100	80 - 120	<0.20	ug/L	NC	20
6181206	Dissolved Lithium (Li)	2012/09/21	NC	80 - 120	100	80 - 120	<5.0	ug/L		
6181206	Dissolved Manganese (Mn)	2012/09/21	NC	80 - 120	104	80 - 120	<1.0	ug/L	0.2	20
6181206	Dissolved Mercury (Hg)	2012/09/21	102	80 - 120	96	80 - 120	<0.050	ug/L		
6181206	Dissolved Molybdenum (Mo)	2012/09/21	NC	80 - 120	95	80 - 120	<1.0	ug/L		
6181206	Dissolved Nickel (Ni)	2012/09/21	97	80 - 120	104	80 - 120	<1.0	ug/L		
6181206	Dissolved Selenium (Se)	2012/09/21	108	80 - 120	105	80 - 120	<0.10	ug/L		
6181206	Dissolved Silver (Ag)	2012/09/21	97	80 - 120	102	80 - 120	<0.020	ug/L		
6181206	Dissolved Strontium (Sr)	2012/09/21	NC	80 - 120	100	80 - 120	<1.0	ug/L		
6181206	Dissolved Thallium (Tl)	2012/09/21	88	80 - 120	98	80 - 120	<0.050	ug/L		
6181206	Dissolved Tin (Sn)	2012/09/21	106	80 - 120	107	80 - 120	<5.0	ug/L		
6181206	Dissolved Titanium (Ti)	2012/09/21	105	80 - 120	102	80 - 120	<5.0	ug/L		
6181206	Dissolved Uranium (U)	2012/09/21	NC	80 - 120	96	80 - 120	<0.10	ug/L		
6181206	Dissolved Vanadium (V)	2012/09/21	103	80 - 120	103	80 - 120	<5.0	ug/L		
6181206	Dissolved Zinc (Zn)	2012/09/21	100	80 - 120	106	80 - 120	<5.0	ug/L	NC	20
6181206	Dissolved Boron (B)	2012/09/21					<50	ug/L		
6181206	Dissolved Silicon (Si)	2012/09/21					<100	ug/L		
6181206	Dissolved Zirconium (Zr)	2012/09/21					<0.50	ug/L		
6182459	E. coli	2012/09/18							NC	50
6182459	Total Coliforms	2012/09/18							NC	45
6183128	Total Nitrogen (N)	2012/09/21	NC	80 - 120	100	80 - 120	<0.020	mg/L	2.8	20
6183201	O-TERPHENYL (sur.)	2012/09/20			106	50 - 130	108	%		
6183201	EPH (C10-C19)	2012/09/20			112	50 - 130	<0.20	mg/L		
6183201	EPH (C19-C32)	2012/09/20			111	50 - 130	<0.20	mg/L		

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6184049	Conductivity	2012/09/20			101	96 - 104	<1	uS/cm	0.5	20
6184051	Alkalinity (Total as CaCO3)	2012/09/20	88	80 - 120	94	80 - 120	<0.5	mg/L	0.9	20
6184051	Alkalinity (PP as CaCO3)	2012/09/20					<0.5	mg/L	NC	20
6184051	Bicarbonate (HCO3)	2012/09/20					<0.5	mg/L	0.9	20
6184051	Carbonate (CO3)	2012/09/20					<0.5	mg/L	NC	20
6184051	Hydroxide (OH)	2012/09/20					<0.5	mg/L	NC	20
6187317	Total Aluminum (Al)	2012/09/21	104	80 - 120	102	80 - 120	<3.0	ug/L	NC	20
6187317	Total Antimony (Sb)	2012/09/21	NC	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
6187317	Total Arsenic (As)	2012/09/21	104	80 - 120	102	80 - 120	<0.10	ug/L	NC	20
6187317	Total Barium (Ba)	2012/09/21	98	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
6187317	Total Beryllium (Be)	2012/09/21	105	80 - 120	96	80 - 120	<0.10	ug/L	NC	20
6187317	Total Bismuth (Bi)	2012/09/21	98	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
6187317	Total Cadmium (Cd)	2012/09/21	106	80 - 120	101	80 - 120	<0.010	ug/L	12.6	20
6187317	Total Chromium (Cr)	2012/09/21	104	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
6187317	Total Cobalt (Co)	2012/09/21	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
6187317	Total Copper (Cu)	2012/09/21	105	80 - 120	100	80 - 120	<0.20	ug/L	NC	20
6187317	Total Iron (Fe)	2012/09/21	109	80 - 120	108	80 - 120	<5.0	ug/L	NC	20
6187317	Total Lead (Pb)	2012/09/21	98	80 - 120	99	80 - 120	<0.20	ug/L	NC	20
6187317	Total Manganese (Mn)	2012/09/21	103	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
6187317	Total Mercury (Hg)	2012/09/21	102	80 - 120	95	80 - 120	<0.050	ug/L	NC	20
6187317	Total Molybdenum (Mo)	2012/09/21	92	80 - 120	94	80 - 120	<1.0	ug/L	NC	20
6187317	Total Nickel (Ni)	2012/09/21	104	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
6187317	Total Selenium (Se)	2012/09/21	104	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
6187317	Total Silver (Ag)	2012/09/21	97	80 - 120	97	80 - 120	<0.020	ug/L	NC	20
6187317	Total Strontium (Sr)	2012/09/21	103	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
6187317	Total Thallium (Tl)	2012/09/21	104	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
6187317	Total Tin (Sn)	2012/09/21	97	80 - 120	104	80 - 120	<5.0	ug/L	NC	20
6187317	Total Titanium (Ti)	2012/09/21	102	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
6187317	Total Uranium (U)	2012/09/21	98	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
6187317	Total Vanadium (V)	2012/09/21	103	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
6187317	Total Zinc (Zn)	2012/09/21	NC	80 - 120	106	80 - 120	<5.0	ug/L	NC	20
6187317	Total Boron (B)	2012/09/21					<50	ug/L	NC	20
6187317	Total Silicon (Si)	2012/09/21					<100	ug/L	0.4	20
6187317	Total Zirconium (Zr)	2012/09/21					<0.50	ug/L	NC	20
6188823	Dissolved Nitrate (N)	2012/09/21	107	80 - 120	118	80 - 120	<0.010	mg/L	2.2	20
6188823	Dissolved Nitrite (N)	2012/09/21	118	80 - 120	106	80 - 120	<0.010	mg/L	NC	20
6188823	Dissolved Chloride (Cl)	2012/09/21	115	80 - 120	114	80 - 120	<0.50	mg/L	NC	20
6188823	Dissolved Fluoride (F)	2012/09/21	105	80 - 120	112	80 - 120	<0.010	mg/L	5.1	20
6188823	Dissolved Sulphate (SO4)	2012/09/21	NC	80 - 120	114	80 - 120	<0.50	mg/L	0.6	20
6191234	Ammonia (N)	2012/09/21	101	80 - 120	99	80 - 120	<0.0050	mg/L	14.7	20
6192185	Total Nitrogen (N)	2012/09/22	108	80 - 120	100	80 - 120	<0.020	mg/L	0.01	20

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6193638	Turbidity	2012/09/24			100	80 - 120	<0.1	NTU	1.7	20
6193643	True Colour	2012/09/24			96	94 - 106	<5	Col. Unit	NC	10

N/A = Not Applicable
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Sample analysed past recommended hold time.

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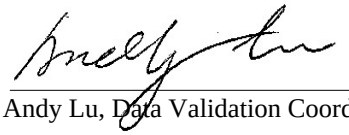
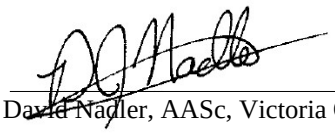
Validation Signature Page

Maxxam Job #: B283411

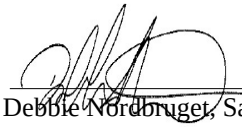
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



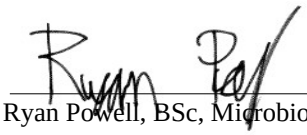
Andy Lu, Data Validation Coordinator



David Nadler, AASc, Victoria Operations Manager



Debbie Nordbruget, Sample Logistics Technician



Ryan Powell, BSc, Microbiology Group Coordinator

==========

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Fundamental Laboratory Acceptance Guideline

Invoice To:
Thurber Engineering Ltd.
ATTN: Chad Petersmeyer
100-4396 West Saanich
Victoria, BC
Canada V8Z 3E9
Client Contact:
Chad Petersmeyer

Maxxam Job #:	B283411
Date Received:	2012/09/18
Your C.O.C. #:	G068107
Your Project #:	17-971-14
Maxxam Project Manager:	Amandeep Nagra
Quote #:	B01584

[x] Labelling issue (missing/incorrect)

Report Comments
11. 1 x 1LAG bottle and 1 x Micro bottle received unlabeled.

Received Date: 2012/09/18 **Time:** 09:05 **By:** DN3

Inspected Date: 2012/09/18 **Time:** 09:53 **By:** DN3

FLAG Created Date: 2012/09/18 **Time:** 13:57 **By:** DN3

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Your Project #: B283411
Your C.O.C. #: NA

Attention: Amandeep Nagra
Maxxam Analytics
4606 Canada Way
Burnaby, BC
V5G 1K5

Report Date: 2012/10/02

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2E5353
Received: 2012/09/20, 11:10

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Caffeine in Liquds by GC/MS (1)	3	2012/09/21	2012/09/26	CAM SOP-00301	EPA 8270 (modified)

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Sample(s) analyzed using methodologies that have not been subjected to Maxxam's standard validation process for the submitted matrix and is not an Accredited method. Analysis performed with client consent, however results should be viewed with discretion

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Ken Pomeroy,
Email: kpomeroy@maxxam.ca
Phone# (905) 817-5700

==========

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Total cover pages: 1

Maxxam Job #: B2E5353
Report Date: 2012/10/02

Maxxam Analytics
Client Project #: B283411

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		OX3464	OX3464	OX3465	OX3466		
Sampling Date		2012/09/17 11:30	2012/09/17 11:30	2012/09/17 14:00	2012/09/17 16:30		
COC Number		NA	NA	NA	NA		
	Units	**EM4428 \ MW12-1**	**EM4428 \ MW12-1 Lab-Dup**	**EM4429 \ MW12-2**	**EM4430 \ MW12-3**	**RDL**	**QC Batch**
Caffeine	ug/L	<1	<1	<1	<1	1	2977799
Surrogate Recovery (%)							
D14-Terphenyl	%	78	77	87	94	N/A	2977799

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B2E5353
Report Date: 2012/10/02

Maxxam Analytics
Client Project #: B283411

Test Summary

Maxxam ID OX3464 **Collected** 2012/09/17
Sample ID EM4428 \ MW12-1 **Shipped**
Matrix Water **Received** 2012/09/20

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Caffeine in Liquds by GC/MS	GC/MS	2977799	2012/09/21	2012/09/26	Milijana Avramovic

Maxxam ID OX3464 Dup **Collected** 2012/09/17
Sample ID EM4428 \ MW12-1 **Shipped**
Matrix Water **Received** 2012/09/20

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Caffeine in Liquds by GC/MS	GC/MS	2977799	2012/09/21	2012/09/26	Milijana Avramovic

Maxxam ID OX3465 **Collected** 2012/09/17
Sample ID EM4429 \ MW12-2 **Shipped**
Matrix Water **Received** 2012/09/20

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Caffeine in Liquds by GC/MS	GC/MS	2977799	2012/09/21	2012/09/26	Milijana Avramovic

Maxxam ID OX3466 **Collected** 2012/09/17
Sample ID EM4430 \ MW12-3 **Shipped**
Matrix Water **Received** 2012/09/20

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Caffeine in Liquds by GC/MS	GC/MS	2977799	2012/09/21	2012/09/26	Milijana Avramovic

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Maxxam Job #: B2E5353
Report Date: 2012/10/02

Maxxam Analytics
Client Project #: B283411

Package 1	5.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Analytics
Attention: Amandeep Nagra
Client Project #: B283411
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB2E5353

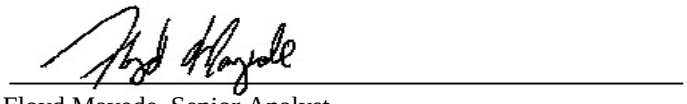
QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
2977799	MA	Matrix Spike	D14-Terphenyl	2012/09/26		84	%	30 - 130
		Matrix Spike (OX3465)	Caffeine	2012/09/26		42	%	30 - 130
		Spiked Blank	D14-Terphenyl	2012/09/26		93	%	30 - 130
			Caffeine	2012/09/26		93	%	30 - 130
		Method Blank	D14-Terphenyl	2012/09/26		94	%	30 - 130
			Caffeine	2012/09/26	<1		ug/L	
		RPD - Sample/Sample Dup	Caffeine	2012/09/26	NC		%	40

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B2E5353

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Floyd Mayede, Senior Analyst

==========

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ISOTOPE TRACER TECHNOLOGIES INC

IT2#: 120235
Contact: Jennifer Exter
Company: Maxxam

#	Sample Name	Sample #	$\delta^{15}N$	Result	Repeat	$\delta^{18}O$	Result	Repeat	Sample Size
			NO_3	AIR		NO_3	VSMOW		
1	EM4428-02R\MW12-1	14460	X	9	9.2	X	3.6	4.2	2 X 1Litre Bottle
2	EM4429-02R\MW12-2	14461	X	4.7	4.4	X	20.3		2 X 1Litre Bottle
3	EM4430-02R\MW12-3	14462	X	10.6	10.9	X	3.2		2 X 1Litre Bottle

695 Rupert St. - Unit B - Waterloo - Ontario - N2V 1Z5
Tel: 519-886-5555 - Fax: 519 886 5575 - Email: mirnas@it2isotopes.com - www.it2isotopes.com

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

CLIENT NAME: THURBER ENGINEERING LTD
SUITE 100, 4396 WEST SAANICH ROAD
VICTORIA , BC V8Z3E9
(250) 727-2201

ATTENTION TO: Paul Wilson

PROJECT NO: 17-971-14

AGAT WORK ORDER: 13V684633

FOOD CHEMISTRY REVIEWED BY: Corina Miron, Chimiste

TRACE ORGANICS REVIEWED BY: Craig Stehr, Organics Lab Manager

WATER ANALYSIS REVIEWED BY: Marie England, Inorganics Lab Manager

DATE REPORTED: Feb 05, 2013

PAGES (INCLUDING COVER): 21

VERSION*: 4

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 4: Version 4 of this report was issued to revise the sample names for Samples 4106587/588/589/590, as requested by Paul Wilson from Thurber Engineering on April 29, 2013. Version 4 is an amendment of Versions 1, 2, and 3.

Some dissolved metal results are greater than the total metal results; results have been verified.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
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http://www.agatlabs.com

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Caffeine

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

				SAMPLE DESCRIPTION:	1355 Fisher Well
				SAMPLE TYPE:	Water
				DATE SAMPLED:	1/29/2013
Parameter	Unit	G / S	RDL	4106590	
Caffeine	mg/100ml		0.05	<0.05	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

BTEX / VPH (C6-C10) Water

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

		SAMPLE DESCRIPTION:		**1355 Fisher**
		SAMPLE TYPE:		**Well**
		DATE SAMPLED:		**Water**
				1/29/2013
Parameter	**Unit**	**G / S**	**RDL**	**4106590**
Methyl tert-butyl ether (MTBE)	µg/L		1	<1
Benzene	µg/L		0.5	<0.5
Toluene	µg/L		0.5	<0.5
Ethylbenzene	µg/L		0.5	<0.5
m&p-Xylene	µg/L		0.5	<0.5
o-Xylene	µg/L		0.5	<0.5
Styrene	µg/L		0.5	<0.5
VPH	µg/L		100	<100
VH	µg/L		100	<100
Total Xylenes	ug/L		1	<1
Surrogate	**Unit**	**Acceptable Limits**		
Bromofluorobenzene	%	70-130		92
Dibromofluoromethane	%	70-130		72
Toluene - d8	%	70-130		86

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4106590 VPH results have been corrected for BTEX contributions.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

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CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

EPH Water

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

			SAMPLE DESCRIPTION:	1355 Fisher Well
			SAMPLE TYPE:	Water
			DATE SAMPLED:	1/29/2013
Parameter	**Unit**	**G / S**	**RDL**	**4106590**
EPH C10-C19	µg/L		100	<100
EPH C19-C32	µg/L		100	<100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4106590 EPH results are not corrected for potential PAH contributions.

Certified By:

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AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Ammonia in Water

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

		SAMPLE DESCRIPTION:		MW12-1	MW12-2		1360 Fisher Fertilized Irrigation	1355 Fisher Leachate	1345 Fisher Leachate		1355 Fisher Well
		SAMPLE TYPE:		Water	Water		Water	Water	Water		Water
		DATE SAMPLED:		1/29/2013	1/29/2013		1/29/2013	1/29/2013	1/29/2013		1/29/2013
Parameter	Unit	G / S	RDL	4106577	4106583	RDL	4106587	4106588	4106589	RDL	4106590
Ammonia-N	mg/L		0.01	<0.01	<0.01	0.1	5.6	9.3	19.5	0.01	<0.01

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Biochemical Oxygen Demand

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

		SAMPLE DESCRIPTION:		MW12-1	MW12-2	1355 Fisher Well
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		1/29/2013	1/29/2013	1/29/2013
Parameter	Unit	G / S	RDL	4106577	4106583	4106590
BOD (5 day)	mg/L		4	<4	<4	<4

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

British Columbia CSR- Schedule 6 Dissolved Metals

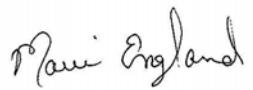
DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

		SAMPLE DESCRIPTION:		MW12-1	MW12-2	1355 Fisher Well
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		1/29/2013	1/29/2013	1/29/2013
Parameter	Unit	G / S	RDL	4106577	4106583	4106590
Aluminum Dissolved	µg/L		1	78	<1	<1
Antimony Dissolved	µg/L		0.05	<0.05	<0.05	<0.05
Arsenic Dissolved	µg/L		0.1	0.4	0.2	0.2
Barium Dissolved	µg/L		0.05	15.2	29.4	15.8
Beryllium Dissolved	µg/L		0.01	0.01	<0.01	<0.01
Boron Dissolved	µg/L		1	2	29	24
Cadmium Dissolved	µg/L		0.01	<0.01	0.40	0.06
Calcium Dissolved	µg/L		50	36900	112000	84600
Chromium Dissolved	µg/L		0.5	1.2	0.7	0.6
Cobalt Dissolved	µg/L		0.05	0.92	3.90	0.70
Copper Dissolved	µg/L		0.2	6.6	34.9	23.1
Iron Dissolved	µg/L		10	16	90	40
Lead Dissolved	µg/L		0.01	0.79	0.02	0.34
Lithium Dissolved	µg/L		0.1	1.1	1.4	1.1
Magnesium Dissolved	µg/L		50	19400	49200	38600
Manganese Dissolved	µg/L		1	43	94	2
Mercury Dissolved	µg/L		0.003	0.007	0.011	<0.003
Molybdenum Dissolved	µg/L		0.05	1.47	0.91	<0.05
Nickel Dissolved	µg/L		0.1	3.7	73.6	16.0
Selenium Dissolved	µg/L		0.1	0.4	0.6	0.5
Silver Dissolved	µg/L		0.01	<0.01	<0.01	<0.01
Sodium Dissolved	µg/L		50	12100	15900	16000
Thallium Dissolved	µg/L		0.002	<0.002	<0.002	<0.002
Titanium Dissolved	µg/L		0.1	51.6	153	114
Uranium Dissolved	µg/L		0.01	0.31	0.17	<0.01
Vanadium Dissolved	µg/L		0.1	1.2	0.9	1.6
Zinc Dissolved	µg/L		1	47	8	11
Hardness (calc)	ug CaCO3/L		100	172000	482000	370000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

British Columbia CSR- Schedule 6 Total Metals

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

		SAMPLE DESCRIPTION:		MW12-1	MW12-2	1355 Fisher Well
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		1/29/2013	1/29/2013	1/29/2013
Parameter	Unit	G / S	RDL	4106577	4106583	4106590
Aluminum Total	µg/L		1	21200	24100	3
Antimony Total	µg/L		0.05	<0.05	<0.05	<0.05
Arsenic Total	µg/L		0.1	8.2	7.2	<0.1
Barium Total	µg/L		0.1	159	199	13.7
Beryllium Total	µg/L		0.05	0.96	0.65	<0.05
Boron Total	µg/L		2	2	29	18
Cadmium Total	µg/L		0.01	0.06	0.48	0.07
Calcium Total	µg/L		50	50200	125000	86000
Chromium Total	µg/L		0.5	63.0	59.1	0.6
Cobalt Total	µg/L		0.05	27.2	28.2	0.59
Copper Total	µg/L		0.5	53.8	78.5	12.3
Iron Total	µg/L		10	47900	42400	80
Lead Total	µg/L		0.01	6.48	4.70	0.52
Lithium Total	µg/L		0.1	14.3	15.6	1.0
Magnesium Total	µg/L		50	33200	61300	38300
Manganese Total	µg/L		1	704	696	2
Mercury Total	µg/L		0.003	0.059	0.127	0.015
Molybdenum Total	µg/L		0.1	4.5	<0.1	<0.1
Nickel Total	µg/L		0.5	54.5	126	15.4
Selenium Total	µg/L		0.3	1.9	2.4	<0.3
Silver Total	µg/L		0.01	0.05	0.05	<0.01
Sodium Total	µg/L		100	14300	17800	15500
Thallium Total	µg/L		0.01	<0.01	<0.01	<0.01
Titanium Total	µg/L		1	1010	1700	102
Uranium Total	µg/L		0.01	1.30	0.78	<0.01
Vanadium Total	µg/L		0.5	73.0	98.8	1.5
Zinc Total	µg/L		5	179	72	9
Total Hardness (calc)	ug CaCO3/L		100	262000	565000	372000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Nitrogen - Total Kjeldahl

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

		SAMPLE DESCRIPTION:		MW12-1	MW12-2		1360 Fisher Fertilized Irrigation		1355 Fisher Leachate	1345 Fisher Leachate
		SAMPLE TYPE:		Water	Water		Water		Water	Water
		DATE SAMPLED:		1/29/2013	1/29/2013		1/29/2013		1/29/2013	1/29/2013
Parameter	Unit	G / S	RDL	4106577	4106583	RDL	4106587	RDL	4106588	4106589
Nitrogen - Total Kjeldahl (TKN)	mg/L		1	4	<1	0.1	4.2	1	41	124

		SAMPLE DESCRIPTION:		1355 Fisher Well
		SAMPLE TYPE:		Water
		DATE SAMPLED:		1/29/2013
Parameter	Unit	G / S	RDL	4106590
Nitrogen - Total Kjeldahl (TKN)	mg/L		0.1	0.1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

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Certificate of Analysis

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Routine Chemistry Water Analysis

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

SAMPLE DESCRIPTION:				MW12-1	MW12-2	1360 Fisher Fertilized Irrigation	1355 Fisher Leachate	1345 Fisher Leachate	1355 Fisher Well
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water
DATE SAMPLED:				1/29/2013	1/29/2013	1/29/2013	1/29/2013	1/29/2013	1/29/2013
Parameter	Unit	G / S	RDL	4106577	4106583	4106587	4106588	4106589	4106590
pH	pH units		0.01	7.60	7.35	6.74	7.98	7.03	7.35
p-Alkalinity	mg CaCO3/L		1	<1	<1	<1	<1	<1	<1
Alkalinity (pH 4.5)	mg CaCO3/L		1	63	80	51	198	823	73
Alkalinity, Bicarbonate	mg CaCO3/L		1	63	80	51	198	823	73
Alkalinity, Carbonate	mg CaCO3/L		1	<1	<1	<1	<1	<1	<1
Alkalinity, Hydroxide	mg CaCO3/L		1	<1	<1	<1	<1	<1	<1
Electrical Conductivity	uS/cm		1	445	1140	1820	1140	3200	865
Chloride	mg/L		0.05	29.2	35.0	21.1	186	316	44.3
Fluoride	mg/L		0.02	0.07	0.03	0.06	0.10	0.50	0.05
Nitrate-N	mg/L		0.005	23.7	92.5	158	4.99	<0.005	58.3
Nitrite-N	mg/L		0.005	<0.005	0.040	0.243	0.081	<0.005	<0.005
Sulphate	mg/L		0.5	12.3	89.4	163	12.8	4.7	69.4
Calcium Dissolved	mg/L		0.05	36.9	112	159	36.3	144	84.6
Magnesium Dissolved	mg/L		0.05	19.4	49.2	42.7	12.0	84.4	38.6
Sodium Dissolved	mg/L		0.05	12.1	15.9	11.1	66.6	36.1	16.0
Potassium Dissolved	mg/L		0.05	1.04	1.67	161	164	724	1.07
Iron Dissolved	mg/L		0.01	0.16	0.09	0.09	0.77	7.19	0.04
Manganese Dissolved	mg/L		0.001	0.043	0.094	0.309	0.076	2.48	0.002
Calculated TDS	mg/L		1	173	444	747	602	1800	356
Hardness (calc)	mg CaCO3/L		0.5	172	482	573	140	707	370
Nitrate + Nitrite-N	mg/L		0.01	23.7	92.5	158	5.07	<0.01	58.3

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AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Routine Chemistry Water Analysis

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4106577-4106587 Literature holding time exceeded for pH analysis.

4106588 Literature holding time exceeded for pH analysis.
Some total nitrogen results are less than the TKN nitrogen results, results were confirmed. Solids in the water sample would be included in the TKN analysis but would not be included in the Total Nitrogen analysis.

4106589 Literature holding time exceeded for pH analysis. Due to unanalyzed ions present in the sample the ion balance is not within expected limits.
Some total nitrogen results are less than the TKN nitrogen results, results were confirmed. Solids in the water sample would be included in the TKN analysis but would not be included in the Total Nitrogen analysis.

4106590 Literature holding time exceeded for pH analysis.

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AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Total Nitrogen in Water

DATE RECEIVED: 2013-01-31

DATE REPORTED: 2013-02-05

SAMPLE DESCRIPTION:				MW12-1		MW12-2	1360 Fisher Fertilized Irrigation	1355 Fisher Leachate	1345 Fisher Leachate	1355 Fisher Well
SAMPLE TYPE:				Water		Water	Water	Water	Water	Water
DATE SAMPLED:				1/29/2013		1/29/2013	1/29/2013	1/29/2013	1/29/2013	1/29/2013
Parameter	Unit	G / S	RDL	4106577	RDL	4106583	4106587	4106588	4106589	4106590
Nitrogen - Total	mg/L		0.05	26.0	0.5	99.4	183	35.6	101	61.3

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

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CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

ATTENTION TO: Paul Wilson

Food Chemistry Analysis

RPT Date: Feb 05, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Caffeine															
Caffeine	206	4106590	< 0.05	< 0.05	0.0%	< 0.05	NA	80%	120%	99%	80%	120%	99%	80%	120%

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CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

ATTENTION TO: Paul Wilson

Trace Organics Analysis

RPT Date: Feb 05, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
EPH Water															
EPH C10-C19	60855	W-MS	370	370	0.0%	< 100	100%	70%	130%				102%	65%	120%
EPH C19-C32	60855	W-MS	440	440	0.0%	< 100	100%	70%	130%				110%	80%	120%
BTEX / VPH (C6-C10) Water															
Methyl tert-butyl ether (MTBE)	60856	4102524	<1	<1	0.0%	< 1	101%	80%	120%				89%	70%	130%
Benzene	60856	4102524	<0.5	<0.5	0.0%	< 0.5	104%	80%	120%				99%	70%	130%
Toluene	60856	4102524	<0.5	<0.5	0.0%	< 0.5	105%	80%	120%				101%	70%	130%
Ethylbenzene	60856	4102524	<0.5	<0.5	0.0%	< 0.5	108%	80%	120%				102%	70%	130%
m&p-Xylene	60856	4102524	<0.5	<0.5	0.0%	< 0.5	108%	80%	120%				101%	70%	130%
o-Xylene	60856	4102524	<0.5	<0.5	0.0%	< 0.5	108%	80%	120%				98%	70%	130%
Styrene	60856	4102524	<0.5	<0.5	0.0%	< 0.5	109%	80%	120%				104%	70%	130%
VPH	60856	4102524	<100	<100	0.0%	< 100									
VH	60856	4102524	<100	<100	0.0%	< 100									
Bromofluorobenzene	60856	4102524	102	98	4.0%		119%	70%	130%				121%	70%	130%
Dibromofluoromethane	60856	4102524	80	79	1.0%		104%	70%	130%				76%	70%	130%
Toluene - d8	60856	4102524	96	94	2.0%		110%	70%	130%				96%	70%	130%

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CLIENT NAME: THURBER ENGINEERING LTD **AGAT WORK ORDER: 13V684633**

PROJECT NO: 17-971-14 **ATTENTION TO: Paul Wilson**

Water Analysis

RPT Date: Feb 05, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Routine Chemistry Water Analysis															
pH	15530	4106577	7.60	7.66	0.8%	< 0.01	99%	90%	110%	100%	95%	105%			
Alkalinity (pH 4.5)	15530	4106577	63	65	3.1%	< 1	111%	85%	115%	108%	90%	110%			
Electrical Conductivity	15530	4106577	445	444	0.2%	< 1	105%	90%	110%	105%	90%	110%			
Chloride	17546	4101933	0.06	0.06	0.0%	< 0.05	109%	85%	115%	105%	90%	110%			
Fluoride	17546	4101933	0.04	0.04	0.0%	< 0.02	100%	85%	115%	98%	90%	110%			
Nitrate-N	17546	4101933	0.020	0.021	4.9%	< 0.005	106%	85%	115%	106%	90%	110%			
Nitrite-N	17546	4101933	<0.005	<0.005	0.0%	< 0.005				102%	90%	110%			
Sulphate	17546	4101933	38.2	38.4	0.5%	< 0.5	108%	85%	115%	107%	90%	110%			
Calcium Dissolved	11722	4108409	82.1	81.9	0.2%	< 0.05	100%	90%	110%	100%	90%	110%			
Magnesium Dissolved	11722	4108409	35.7	35.7	0.0%	< 0.05	106%	90%	110%	105%	90%	110%			
Sodium Dissolved	11722	4108409	34.8	34.7	0.3%	< 0.05	102%	90%	110%	102%	90%	110%			
Potassium Dissolved	11722	4108409	2.4	2.4	0.0%	< 0.05	100%	90%	110%	102%	90%	110%			
Iron Dissolved	11722	4108409	<0.01	<0.01	0.0%	< 0.01	102%	90%	110%	102%	90%	110%			
Manganese Dissolved	11722	4108409	0.297	0.298	0.3%	< 0.001	101%	90%	110%	102%	90%	110%			
Ammonia in Water															
Ammonia-N	17547	4106577	< 0.01	< 0.01	0.0%	< 0.01	101%	85%	115%	104%	90%	110%			
Nitrogen - Total Kjeldahl															
Nitrogen - Total Kjeldahl (TKN)	17550	4106587	4.2	4.0	4.9%	< 0.1	110%	85%	115%	108%	90%	110%			
British Columbia CSR- Schedule 6 Dissolved Metals															
Aluminum Dissolved	11690	4106577	78	80	2.5%	< 1	105%	90%	110%	107%	85%	115%			
Antimony Dissolved	11690	4106577	<0.05	<0.05	0.0%	< 0.05	98%	90%	110%	102%	85%	110%			
Arsenic Dissolved	11690	4106577	0.4	0.4	0.0%	< 0.1	91%	90%	110%	100%	90%	110%			
Barium Dissolved	11690	4106577	15.2	15.0	1.3%	< 0.05	101%	90%	110%	97%	90%	110%			
Beryllium Dissolved	11690	4106577	0.01	<0.01	NA	< 0.01	99%	90%	110%	108%	90%	110%			
Boron Dissolved	11690	4106577	7	6	15.4%	< 1	98%	90%	110%	115%	80%	120%			
Cadmium Dissolved	11690	4106577	<0.01	<0.01	0.0%	< 0.01	94%	90%	110%	104%	90%	110%			
Calcium Dissolved	11690	4108409	82100	81900	0.2%	< 50	100%	90%	110%	100%	90%	110%			
Chromium Dissolved	11690	4106577	1.2	1.3	8.0%	< 0.5	90%	90%	110%	110%	90%	110%			
Cobalt Dissolved	11690	4106577	0.92	0.90	2.2%	< 0.05	100%	90%	110%	97%	90%	110%			
Copper Dissolved	11690	4106577	6.6	6.3	4.7%	< 0.2	95%	90%	110%	100%	90%	110%			
Iron Dissolved	11690	4108409	<10	<10	0.0%	< 10	102%	90%	110%	102%	90%	110%			
Lead Dissolved	11690	4106577	0.79	0.77	2.6%	< 0.01	91%	90%	110%	102%	90%	110%			
Lithium Dissolved	11690	4106577	1.1	1.1	0.0%	< 0.1				110%	90%	110%			
Magnesium Dissolved	11690	4108409	35700	35700	0.0%	< 50	106%	90%	110%	105%	90%	110%			
Manganese Dissolved	11690	4108409	297	298	0.3%	< 1	101%	90%	110%	102%	90%	110%			
Mercury Dissolved	11724	4106577	0.007	0.007	0.0%	< 0.003	95%	90%	110%	96%	90%	110%			
Molybdenum Dissolved	11690	4106577	1.47	1.52	3.3%	< 0.05	91%	90%	110%	104%	90%	110%			
Nickel Dissolved	11690	4106577	3.7	3.7	0.0%	< 0.1	94%	90%	110%	110%	90%	110%			

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CLIENT NAME: THURBER ENGINEERING LTD **AGAT WORK ORDER: 13V684633**

PROJECT NO: 17-971-14 **ATTENTION TO: Paul Wilson**

Water Analysis (Continued)

RPT Date: Feb 05, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Selenium Dissolved	11690	4106577	0.4	0.2	NA	< 0.1	96%	90%	110%	105%	85%	115%			
Silver Dissolved	11690	4106577	<0.01	<0.01	0.0%	< 0.01				106%	90%	110%			
Sodium Dissolved	11690	4108409	35200	35200	0.0%	< 50	102%	90%	110%	102%	90%	110%			
Thallium Dissolved	11690	4106577	<0.002	<0.002	0.0%	< 0.002	91%	90%	110%	97%	90%	110%			
Titanium Dissolved	11690	4106577	51.6	52.6	1.9%	< 0.1				92%	90%	110%			
Uranium Dissolved	11690	4106577	0.31	0.32	3.2%	< 0.01				98%	90%	110%			
Vanadium Dissolved	11690	4106577	1.2	1.2	0.0%	< 0.1	92%	90%	110%	93%	90%	110%			
Zinc Dissolved	11690	4106577	47	43	8.9%	< 1	90%	90%	110%	108%	85%	115%			
British Columbia CSR- Schedule 6 Total Metals															
Aluminum Total	11691	4106577	21200	20500	3.4%	< 1	109%	85%	115%	107%	85%	115%			
Antimony Total	11691	4106577	<0.05	<0.05	0.0%	< 0.05	97%	85%	115%	102%	90%	110%			
Arsenic Total	11691	4106577	8.2	8.0	2.5%	< 0.1	103%	85%	115%	100%	90%	110%			
Barium Total	11691	4106577	158	159	0.6%	< 0.1	94%	85%	115%	97%	90%	110%			
Beryllium Total	11691	4106577	0.96	0.94	2.1%	< 0.05	101%	85%	115%	108%	90%	110%			
Boron Total	11691	4106577	2	2	0.0%	< 2	102%	85%	115%	115%	80%	120%			
Cadmium Total	11691	4106577	0.06	0.05	18.2%	< 0.01	96%	85%	115%	104%	90%	110%			
Calcium Total	11691	4106577	50200	48900	2.6%	< 50	105%	85%	115%	101%	90%	110%			
Chromium Total	11691	4106577	1.2	1.3	8.0%	< 0.5	85%	85%	115%	90%	90%	110%			
Cobalt Total	11691	4106577	27.2	27.6	1.5%	< 0.05	90%	85%	115%	97%	90%	110%			
Copper Total	11691	4106577	53.8	53.6	0.4%	< 0.5	90%	85%	115%	100%	90%	110%			
Iron Total	11691	4106577	47900	46100	3.8%	< 10	109%	85%	115%	103%	90%	110%			
Lead Total	11691	4106577	6.48	6.41	1.1%	< 0.01	88%	85%	115%	102%	90%	110%			
Lithium Total	11691	4106577	14.3	14.3	0.0%	< 0.1				110%	90%	110%			
Magnesium Total	11691	4106577	33200	33300	0.3%	< 50	109%	85%	115%	107%	90%	110%			
Manganese Total	11691	4106577	704	681	3.3%	< 1	106%	85%	115%	103%	90%	110%			
Molybdenum Total	11691	4106577	4.5	4.4	2.2%	< 0.1	89%	85%	115%	104%	90%	110%			
Nickel Total	11691	4106577	54.5	53.7	1.5%	< 0.5	88%	85%	115%	110%	90%	110%			
Selenium Total	11691	4106577	1.9	2.1	10.0%	< 0.3	111%	85%	115%	105%	85%	115%			
Silver Total	11691	4106577	0.04	0.04	0.0%	< 0.01				106%	90%	110%			
Sodium Total	11691	4106577	14300	14400	0.7%	< 100	103%	85%	115%	107%	90%	110%			
Thallium Total	11691	4106577	<0.01	<0.01	0.0%	< 0.01	88%	85%	115%	97%	90%	110%			
Titanium Total	11691	4106577	1010	965	4.6%	< 1				93%	90%	110%			
Uranium Total	11691	4106577	1.42	1.42	0.0%	< 0.01	85%	85%	115%	98%	90%	110%			
Vanadium Total	11691	4106577	73.0	71.6	1.9%	< 0.5	85%	85%	115%	93%	90%	110%			
Zinc Total	11691	4106577	179	179	0.0%	< 5	101%	85%	115%	108%	80%	120%			
Biochemical Oxygen Demand															
BOD (5 day)	15526	4105589	76	75	1.3%	< 4	102%	70%	130%	105%	85%	115%			

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CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V684633

PROJECT NO: 17-971-14

ATTENTION TO: Paul Wilson

Water Analysis (Continued)

RPT Date: Feb 05, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Nitrogen in Water															
Nitrogen - Total	17607	4106577	26.0	26.1	0.4%	< 0.05	112%	85%	115%	101%	90%	110%			

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Method Summary

CLIENT NAME: THURBER ENGINEERING LTD **AGAT WORK ORDER: 13V684633**

PROJECT NO: 17-971-14 **ATTENTION TO: Paul Wilson**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Food Chemistry Analysis			
Caffeine	FC-102-	LCFC-102 avril 1980 Lab. protec. santé Scarborough	HPLC
Trace Organics Analysis			
Methyl tert-butyl ether (MTBE)	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
Benzene	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
Toluene	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
Ethylbenzene	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
m&p-Xylene	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
o-Xylene	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
Styrene	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
VPH	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
VH	ORG-180-5130	Modified from BC MOE Lab Manual Section D	GC/MS/FID
Bromofluorobenzene	ORG-180-5130	modified from BC MOE Lab Manual Section D	GC/MS
Dibromofluoromethane	ORG-180-5130	modified from BC MOE Lab Manual Section D	GC/MS
Toluene - d8	ORG-180-5130	modified from BC MOE Lab Manual Section D	GC/MS
EPH C10-C19	ORG-180-5134	Modified from BC MOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5134	Modified from BC MOE Lab Manual Section D (EPH)	GC/FID

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TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: THURBER ENGINEERING LTD **AGAT WORK ORDER: 13V684633**

PROJECT NO: 17-971-14 **ATTENTION TO: Paul Wilson**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Ammonia-N	INOR-181-6001	Modified from SM 4500-NH3 G	CONTINUOUS FLOW ANALYZER
BOD (5 day)	INOR-181-6032	Modified from SM 5210 B	PC TITRATE
Aluminum Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Antimony Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Arsenic Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Barium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Beryllium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Boron Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Cadmium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Calcium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Chromium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Cobalt Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Copper Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Iron Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Lead Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Lithium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Magnesium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Manganese Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Mercury Dissolved	MET-181-6103, LAB-181-4015	Modified from EPA 245.7	CV/AA
Molybdenum Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Nickel Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Selenium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Silver Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Sodium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Thallium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Titanium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Uranium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Vanadium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS

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Method Summary

CLIENT NAME: THURBER ENGINEERING LTD **AGAT WORK ORDER: 13V684633**

PROJECT NO: 17-971-14 **ATTENTION TO: Paul Wilson**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Zinc Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Aluminum Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Antimony Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Arsenic Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Barium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Beryllium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Boron Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Cadmium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Calcium Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Chromium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Cobalt Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Copper Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Iron Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Lead Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Lithium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Magnesium Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Manganese Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Mercury Total	MET-181-6103	Modified from EPA 245.7	CV/AA
Molybdenum Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Nickel Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Selenium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Silver Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Sodium Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Thallium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Titanium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Uranium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Vanadium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Zinc Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS

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Method Summary

CLIENT NAME: THURBER ENGINEERING LTD **AGAT WORK ORDER: 13V684633**

PROJECT NO: 17-971-14 **ATTENTION TO: Paul Wilson**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Nitrogen - Total Kjeldahl (TKN)	INOR-181-6013, LAB-181-4017	modified from EPA 351.2	SPECTROPHOTOMETER
pH	INOR-181-6000	Modified from SM 4500-H+	PH METER
p-Alkalinity	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity (pH 4.5)	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity, Bicarbonate	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity, Carbonate	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity, Hydroxide	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-181-6000	Modified from SM 2510B	PC TITRATE
Chloride	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate-N	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite-N	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Calcium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Magnesium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Sodium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Potassium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Iron Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Manganese Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Nitrogen - Total	INOR-181-6006	Modified from SM 4500-N	COMBUSTION

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 13V 684633

RECEIVING BASICS:
*Complete CoC as well where required
Date and Time: 31-JAN-13 @ 10:25AM
Courier: Loomis
Received by: S. Napier
Relinquished by: Loomis
Branch Received From: N/A
Company: Thurber
Consultant: N/A
Client left without count verified: N/A

CoC INFORMATION:
Received: (Yes) No Emailed to PM
Completed in full: Yes No If NO, why:
TURNAROUND TIME: REGULAR
COC Numbers: V101257

SAMPLE QUANTITIES:
Coolers: 1 Bottles/Jars: 26 Bags:

TIME SENSITIVE ISSUES:
Earliest Date Sampled: 29-Jan-13
Microbiology Test:
Hydrocarbons Test:
Samples are received >5 days after sampling: Yes No
ALREADY EXCEEDED? Yes No
Expiry:
Expiry:
Time Sensitive Test (circle): (BOD) Chlorine, Colour, Dissolved Oxygen, Ortho-Phosphate, (Nitrate/Nitrite) (pH) Turbidity

SPECIALTY ISSUES:
Legal Samples: Yes (No)
International Samples: Yes (No)
**Proper tape/labels applied: Yes No

Hazardous Samples:
Why hazardous:

Precaution taken:

SAMPLE REQUIREMENTS:
*Complete while logging in by login staff.

Correct bottles used for testing: (Yes) No
If No, explain:

Correct amount of sample for analysis: (Yes) No
If No, explain:

Are all samples labeled correctly (Yes) No
If No, explain:

NON-CONFORMANCES:
3 temperatures of samples* and average of each cooler: (record differing temperatures on the CoC next to sample ID's) *use jars when available
(1) 5 + 4 + 2 = 4 °C (2) ___ + ___ + ___ = ___ °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Additional integrity issues:
1)
2)
3)

Account Project Manager: Have they been notified of the above issues: Yes No
Whom spoken to: Date and Time:

ADDITIONAL NOTES:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
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CANADA V5J 0B6
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CLIENT NAME: THURBER ENGINEERING LTD
SUITE 100, 4396 WEST SAANICH ROAD
VICTORIA , BC V8Z3E9
(250) 727-2201

ATTENTION TO: Paul Wilson

PROJECT NO: 17-971-14 Fisher Road Env

AGAT WORK ORDER: 13V689932

WATER ANALYSIS REVIEWED BY: Marie England, Inorganics Supervisor

DATE REPORTED: Feb 22, 2013

PAGES (INCLUDING COVER): 10

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

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TEL (778)452-4000
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CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Ammonia, TKN, and Total Nitrogen

DATE RECEIVED: 2013-02-19

DATE REPORTED: 2013-02-22

		SAMPLE DESCRIPTION:		MW12-3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2/18/2013
Parameter	Unit	G / S	RDL	4143042
Ammonia-N	mg/L		0.01	0.02
Nitrogen - Total Kjeldahl (TKN)	mg/L		0.1	2.5
Nitrogen - Total	mg/L		0.05	17.9

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

AGAT Laboratories

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Burnaby, British Columbia
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Certificate of Analysis

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

British Columbia CSR- Schedule 6 Dissolved Metals

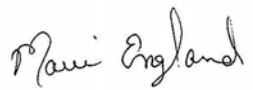
DATE RECEIVED: 2013-02-19

DATE REPORTED: 2013-02-22

		SAMPLE DESCRIPTION:		MW12-3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2/18/2013
Parameter	Unit	G / S	RDL	4143042
Aluminum Dissolved	µg/L		1	7
Antimony Dissolved	µg/L		0.05	0.05
Arsenic Dissolved	µg/L		0.1	0.4
Barium Dissolved	µg/L		0.05	36.9
Beryllium Dissolved	µg/L		0.01	<0.01
Boron Dissolved	µg/L		1	6
Cadmium Dissolved	µg/L		0.01	0.15
Calcium Dissolved	µg/L		50	65100
Chromium Dissolved	µg/L		0.5	0.9
Cobalt Dissolved	µg/L		0.05	0.58
Copper Dissolved	µg/L		0.2	5.5
Iron Dissolved	µg/L		10	20
Lead Dissolved	µg/L		0.01	0.13
Lithium Dissolved	µg/L		0.1	1.4
Magnesium Dissolved	µg/L		50	28500
Manganese Dissolved	µg/L		1	22
Mercury Dissolved	µg/L		0.003	0.033
Molybdenum Dissolved	µg/L		0.05	1.31
Nickel Dissolved	µg/L		0.1	5.0
Selenium Dissolved	µg/L		0.1	0.1
Silver Dissolved	µg/L		0.01	<0.01
Sodium Dissolved	µg/L		50	17600
Thallium Dissolved	µg/L		0.002	0.025
Titanium Dissolved	µg/L		0.1	82.3
Uranium Dissolved	µg/L		0.01	0.84
Vanadium Dissolved	µg/L		0.1	0.8
Zinc Dissolved	µg/L		1	16
Hardness (calc)	ug CaCO3/L		100	280000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

British Columbia CSR- Schedule 6 Total Metals

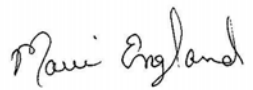
DATE RECEIVED: 2013-02-19

DATE REPORTED: 2013-02-22

		SAMPLE DESCRIPTION:		MW12-3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2/18/2013
Parameter	Unit	G / S	RDL	4143042
Aluminum Total	µg/L		1	17400
Antimony Total	µg/L		0.05	0.24
Arsenic Total	µg/L		0.1	9.2
Barium Total	µg/L		0.1	289
Beryllium Total	µg/L		0.05	2.06
Boron Total	µg/L		2	21
Cadmium Total	µg/L		0.01	1.14
Calcium Total	µg/L		50	91400
Chromium Total	µg/L		0.5	56.8
Cobalt Total	µg/L		0.05	59.8
Copper Total	µg/L		0.5	54.6
Iron Total	µg/L		10	29500
Lead Total	µg/L		0.01	14.9
Lithium Total	µg/L		0.1	11.7
Magnesium Total	µg/L		50	42000
Manganese Total	µg/L		1	1150
Mercury Total	µg/L		0.03	0.15
Molybdenum Total	µg/L		0.1	5.9
Nickel Total	µg/L		0.5	80.4
Selenium Total	µg/L		0.3	1.4
Silver Total	µg/L		0.01	<0.01
Sodium Total	µg/L		100	20100
Thallium Total	µg/L		0.01	0.26
Titanium Total	µg/L		1	478
Uranium Total	µg/L		0.01	3.45
Vanadium Total	µg/L		0.5	59.8
Zinc Total	µg/L		5	374
Total Hardness (calc)	ug CaCO3/L		100	401000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

CLIENT NAME: THURBER ENGINEERING LTD

ATTENTION TO: Paul Wilson

Routine Chemistry Water Analysis

DATE RECEIVED: 2013-02-19

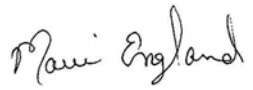
DATE REPORTED: 2013-02-22

		SAMPLE DESCRIPTION:		MW12-3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2/18/2013
Parameter	Unit	G / S	RDL	4143042
pH	pH units		0.01	7.15
p-Alkalinity	mg CaCO3/L		1	<1
Alkalinity (pH 4.5)	mg CaCO3/L		1	106
Alkalinity, Bicarbonate	mg CaCO3/L		1	106
Alkalinity, Carbonate	mg CaCO3/L		1	<1
Alkalinity, Hydroxide	mg CaCO3/L		1	<1
Electrical Conductivity	uS/cm		1	712
Chloride	mg/L		0.05	114
Fluoride	mg/L		0.02	0.13
Nitrate-N	mg/L		0.005	16.3
Nitrite-N	mg/L		0.005	<0.005
Sulphate	mg/L		0.5	22.6
Calcium Dissolved	mg/L		0.05	65.1
Magnesium Dissolved	mg/L		0.05	28.5
Sodium Dissolved	mg/L		0.05	17.7
Potassium Dissolved	mg/L		0.05	1.44
Iron Dissolved	mg/L		0.01	0.02
Manganese Dissolved	mg/L		0.001	0.021
Calculated TDS	mg/L		1	329
Hardness (calc)	mg CaCO3/L		0.5	280
Nitrate + Nitrite-N	mg/L		0.01	16.3

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4143042 Literature holding time exceeded for pH analysis.

Certified By:



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Quality Assurance

CLIENT NAME: THURBER ENGINEERING LTD
AGAT WORK ORDER: 13V689932
PROJECT NO: 17-971-14 Fisher Road Env
ATTENTION TO: Paul Wilson

Water Analysis

RPT Date: Feb 22, 2013

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Routine Chemistry Water Analysis															
pH	15574	4142105	7.02	7.06	0.6%	< 0.01	100%	90%	110%	100%	95%	105%			
Alkalinity (pH 4.5)	15574	4142105	97	99	2.0%	< 1	105%	85%	115%	107%	90%	110%			
Electrical Conductivity	15574	4142105	421	424	0.7%	< 1	103%	90%	110%	100%	90%	110%			
Chloride	17598	4141693	0.42	0.43	2.4%	< 0.05	108%	85%	115%	104%	90%	110%			
Fluoride	17598	4141693	0.10	0.10	0.0%	< 0.02	95%	85%	115%	98%	90%	110%			
Nitrate-N	17598	4141693	0.094	0.098	4.2%	< 0.005	105%	85%	115%	107%	90%	110%			
Nitrite-N	17598	4141693	<0.005	<0.005	0.0%	< 0.005				99%	90%	110%			
Sulphate	17598	4141693	6.1	6.1	0.0%	< 0.5	107%	85%	115%	104%	90%	110%			
Ammonia, TKN, and Total Nitrogen															
Ammonia-N	17606	984	<0.01	<0.01	0.0%	< 0.01	97%	85%	115%	96%	90%	110%			
Nitrogen - Total Kjeldahl (TKN)	17608	4143042	2.5	2.6	3.9%	< 0.1	107%	85%	115%	102%	90%	110%			
Nitrogen - Total	17607	4106577	26.1	26.0	0.4%	< 0.05	112%	85%	115%	101%	90%	110%			
British Columbia CSR- Schedule 6 Dissolved Metals															
Aluminum Dissolved	11782	4142105	820	902	9.5%	< 1	97%	90%	110%	105%	85%	115%			
Antimony Dissolved	11782	4142105	2.46	2.60	5.5%	< 0.05	102%	90%	110%	91%	85%	110%			
Arsenic Dissolved	11782	4142105	1.5	1.8	18.2%	< 0.1	95%	90%	110%	94%	90%	110%			
Barium Dissolved	11782	4142105	25.2	26.3	4.3%	< 0.05	97%	90%	110%	105%	90%	110%			
Beryllium Dissolved	11782	4142105	0.02	<0.01	NA	< 0.01	91%	90%	110%	94%	90%	110%			
Boron Dissolved	11782	4142105	30	32	6.5%	< 1	90%	90%	110%	88%	80%	120%			
Cadmium Dissolved	11782	4142105	0.06	0.06	0.0%	< 0.01	95%	90%	110%	92%	90%	110%			
Calcium Dissolved	11782	4142105	65100	64600	0.8%	< 50	99%	90%	110%	100%	90%	110%			
Chromium Dissolved	11782	4142105	3.2	3.5	9.0%	< 0.5	97%	90%	110%	98%	90%	110%			
Cobalt Dissolved	11782	4142105	1.25	1.35	7.7%	< 0.05	96%	90%	110%	98%	90%	110%			
Copper Dissolved	11782	4142105	31.5	34.6	9.4%	< 0.2	101%	90%	110%	104%	90%	110%			
Iron Dissolved	11782	4142105	20	20	0.0%	< 10	101%	90%	110%	103%	90%	110%			
Lead Dissolved	11782	4142105	1.87	2.04	8.7%	< 0.01	95%	90%	110%	100%	90%	110%			
Lithium Dissolved	11782	4142105	1.1	1.3	16.7%	< 0.1				108%	90%	110%			
Magnesium Dissolved	11782	4142105	28500	28200	1.1%	< 50	105%	90%	110%	107%	90%	110%			
Manganese Dissolved	11782	4142105	21	20	4.9%	< 1	101%	90%	110%	103%	90%	110%			
Mercury Dissolved	11782	4142105	< 0.003	< 0.003	0.0%	< 0.003	94%	90%	110%	103%	90%	110%			
Molybdenum Dissolved	11782	4142105	3.73	4.19	11.6%	< 0.05	92%	90%	110%	96%	90%	110%			
Nickel Dissolved	11782	4142105	3.7	3.9	5.3%	< 0.1	99%	90%	110%	97%	90%	110%			
Selenium Dissolved	11782	4142105	<0.1	0.2	NA	< 0.1	95%	90%	110%	104%	85%	115%			
Silver Dissolved	11782	4142105	0.01	0.01	0.0%	< 0.01				92%	90%	110%			
Sodium Dissolved	11782	4142105	17700	17700	0.0%	< 50	101%	90%	110%	105%	90%	110%			
Thallium Dissolved	11782	4142105	0.002	0.002	0.0%	< 0.002	99%	90%	110%	106%	90%	110%			
Titanium Dissolved	11782	4142105	107	113	5.5%	< 0.1				94%	90%	110%			
Uranium Dissolved	11782	4142105	0.09	0.09	0.0%	< 0.01	105%	90%	110%	108%	90%	110%			

AGAT Laboratories
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Quality Assurance

CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

ATTENTION TO: Paul Wilson

Water Analysis (Continued)

RPT Date: Feb 22, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Vanadium Dissolved	11782	4142105	2.7	3.0	10.5%	< 0.1	93%	90%	110%	96%	90%	110%			
Zinc Dissolved	11782	4142105	119	130	8.8%	< 1	103%	90%	110%	104%	85%	115%			
British Columbia CSR- Schedule 6 Total Metals															
Aluminum Total	11783	4142906	2630	2540	3.5%	< 1	105%	85%	115%	106%	85%	115%			
Antimony Total	11783	4142906	24.4	24.2	0.8%	< 0.05	107%	85%	115%	98%	90%	110%			
Arsenic Total	11783	4142906	2.8	2.4	15.4%	< 0.1	105%	85%	115%	103%	90%	110%			
Barium Total	11783	4142906	21.1	23.2	9.5%	< 0.1	108%	85%	115%	110%	90%	110%			
Beryllium Total	11783	4142906	1.1	1.4	NA	< 0.5	91%	85%	115%	104%	90%	110%			
Boron Total	11783	4142906	155	161	3.8%	< 2	95%	85%	115%	96%	80%	120%			
Cadmium Total	11783	4142906	6100	6240	2.3%	< 0.01	103%	85%	115%	99%	90%	110%			
Calcium Total	11783	4142906	639000	639000	0.0%	< 50	102%	85%	115%	104%	90%	110%			
Chromium Total	11783	4142906	<0.5	<0.5	0.0%	< 0.5	112%	85%	115%	106%	90%	110%			
Cobalt Total	11783	4142906	1050	1060	0.9%	< 0.05	105%	85%	115%	107%	90%	110%			
Copper Total	11783	4142906	23.4	25.5	8.6%	< 0.5	107%	85%	115%	106%	90%	110%			
Iron Total	11783	4142906	29700	29800	0.3%	< 10	105%	85%	115%	108%	90%	110%			
Lead Total	11783	4142906	2190	2230	1.8%	< 0.01	109%	85%	115%	110%	90%	110%			
Lithium Total	11783	4142906	468	497	6.0%	< 0.1				106%	90%	110%			
Magnesium Total	11783	4142906	268000	272000	1.5%	< 50	108%	85%	115%	109%	90%	110%			
Manganese Total	11783	4142906	73500	73500	0.0%	< 1	104%	85%	115%	106%	90%	110%			
Mercury Total	11783	4142906	<0.003	<0.003	0.0%	< 0.003	93%	85%	115%	103%	90%	110%			
Molybdenum Total	11783	4142906	0.8	0.8	0.0%	< 0.1	100%	85%	115%	101%	90%	110%			
Nickel Total	11783	4142906	2410	2410	0.0%	< 0.5	107%	85%	115%	106%	90%	110%			
Selenium Total	11783	4142906	19.4	19.3	0.5%	< 0.3	105%	85%	115%	109%	85%	115%			
Silver Total	11783	4142906	<0.01	<0.01	0.0%	< 0.01				101%	90%	110%			
Sodium Total	11783	4142906	97600	97800	0.2%	< 100	101%	85%	115%	106%	90%	110%			
Thallium Total	11783	4142906	41.5	42.1	1.4%	< 0.01	103%	85%	115%	107%	90%	110%			
Titanium Total	11783	4142906	811	834	2.8%	< 1				105%	90%	110%			
Uranium Total	11783	4142906	28.7	29.0	1.0%	< 0.01				105%	90%	110%			
Vanadium Total	11783	4142906	<0.5	<0.5	0.0%	< 0.5	106%	85%	115%	108%	90%	110%			
Zinc Total	11783	4142906	868000	871000	0.3%	< 5	93%	85%	115%	106%	80%	120%			

Certified By:

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Burnaby, British Columbia
CANADA V5J 0B6
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Method Summary

CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

ATTENTION TO: Paul Wilson

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Ammonia-N	INOR-181-6001	Modified from SM 4500-NH3 G	CONTINUOUS FLOW ANALYZER
Nitrogen - Total Kjeldahl (TKN)	INOR-181-6013, LAB-181-4017	modified from EPA 351.2	SPECTROPHOTOMETER
Nitrogen - Total	INOR-181-6006	Modified from SM 4500-N	COMBUSTION
Aluminum Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Antimony Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Arsenic Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Barium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Beryllium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Boron Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Cadmium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Calcium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Chromium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Cobalt Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Copper Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Iron Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Lead Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Lithium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Magnesium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Manganese Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Mercury Dissolved	MET-181-6103, LAB-181-4015	Modified from EPA 245.7	CV/AA
Molybdenum Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Nickel Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Selenium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Silver Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Sodium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Thallium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Titanium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Uranium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS

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Method Summary

CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

ATTENTION TO: Paul Wilson

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vanadium Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Zinc Dissolved	MET-181-6102, LAB-181-4015	Modified from SM 3125 B	ICP-MS
Aluminum Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Antimony Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Arsenic Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Barium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Beryllium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Boron Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Cadmium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Calcium Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Chromium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Cobalt Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Copper Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Iron Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Lead Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Lithium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Magnesium Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Manganese Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Mercury Total	MET-181-6103	Modified from EPA 245.7	CV/AA
Molybdenum Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Nickel Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Selenium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Silver Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Sodium Total	MET-181-6101, LAB-181-4009	Modified from SM 3120 B	ICP/OES
Thallium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Titanium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Uranium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
Vanadium Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS

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Method Summary

CLIENT NAME: THURBER ENGINEERING LTD

AGAT WORK ORDER: 13V689932

PROJECT NO: 17-971-14 Fisher Road Env

ATTENTION TO: Paul Wilson

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Zinc Total	MET-181-6102, LAB-181-4009	Modified from SM 3125 B	ICP-MS
pH	INOR-181-6000	Modified from SM 4500-H+	PH METER
p-Alkalinity	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity (pH 4.5)	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity, Bicarbonate	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity, Carbonate	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Alkalinity, Hydroxide	INOR-181-6000	Modified from SM 2320 B	PC TITRATE
Electrical Conductivity	INOR-181-6000	Modified from SM 2510B	PC TITRATE
Chloride	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate-N	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite-N	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-181-6002	Modified from SM 4110 B	ION CHROMATOGRAPH
Calcium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Magnesium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Sodium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Potassium Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Iron Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES
Manganese Dissolved	MET-181-6101, LAB-181-4015	Modified from SM 3120 B	ICP/OES

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 13V689932

RECEIVING BASICS:
***Complete CoC as well where required**
Date and Time: 19-FEB-13@ 10:27
Courier: LOOMIS
Received by: DAMIEN LACROIX
Relinquished by: LOOMIS
Branch Received From:
Company: Thurber Eng
Consultant:
Client left without count verified: N/A

COC INFORMATION:
Received: (Yes) No Emailed to PM
Completed in full: (Yes) No If NO, why:
TURNAROUND TIME: Reg
COC Numbers: V10131

SAMPLE QUANTITIES:
Coolers: 1 Bottles/Jars: 4 Bags:

TIME SENSITIVE ISSUES:
Earliest Date Sampled: 18-FEB-13
Microbiology Test:
Hydrocarbons Test:
Samples are received >5 days after sampling: Yes (No)
ALREADY EXCEEDED? Yes No
Expiry:
Expiry:
Time Sensitive Test (circle): BOD, Chlorine, Colour, Dissolved Oxygen, Ortho-Phosphate, Nitrate/Nitrite, pH, Turbidity

SPECIALTY ISSUES:
Legal Samples: Yes No N/A
International Samples: Yes No
**Proper tape/labels applied: Yes No

Hazardous Samples:
Why hazardous:

Precaution taken:

SAMPLE REQUIREMENTS:
*Complete while logging in by login staff.

Correct bottles used for testing: (Yes) No
If No, explain:

Correct amount of sample for analysis: (Yes) No
If No, explain:

Are all samples labeled correctly: (Yes) No
If No, explain:

NON-CONFORMANCES:
3 temperatures of samples* and average of each cooler: (record differing temperatures on the CoC next to sample ID's) ***use jars when available**
(1) 1 + 3 + 4 = 3 °C (2) ___+___+___=___°C (3) ___+___+___=___°C (4) ___+___+___=___°C

Was ice or ice pack present: (Yes) No

Additional integrity issues:
1)
2)
3)

Account Project Manager: Have they been notified of the above issues: Yes No
Whom spoken to: Date and Time:

ADDITIONAL NOTES:

ISOTOPE SCIENCE LABORATORY
Dept of Physics and Astronomy
University of Calgary
2500 University Dr. NW, Calgary, Alta.
T2N-1N4

Results
Contact : S. Taylor
Tel. : (403) 210-6003
Fax : (403) 220 7773
e-mail steve.taylor@ucalgary.ca

Name: Chad Petersmeyer
Affiliate: Thurber Engineering
Address: 100, 4396 West Saanich Road

Victoria, BC
Canada
V8Z 3E9

IN January 25, 2013
OUT March 4, 2013

phone: 250-727-2201
fax: 250-727-3710

email: cpetersmeyer@thurber.ca

W/O #

#	LIMs ID	1345 Fisher Leachate	[N] (mg/L)	[NO3] (mg/L)	$\delta^{15}N_{nitrate}$	$\delta^{18}O_{nitrate}$	Comments	subsequents ubmission date
1	N-3177	MW12-01	23.7	105.0	**7.8**	**3.3**	[NO3] analyzed at AGAT-results will	
2	N-3178	MW12-02	92.5	409.6	**4.3**	**22.0**	be provided when available	
3	N-3179	1360 Fisher Fertilized Ir	158	699.7	**0.5**	**29.2**		
4	N-3180	1355 Fisher Leachate	4.99	22.1	**5.7**	**-1.6**		
5		1345 Fisher Leachate	0.005	0.022			too low. Measure diss-NH4 instead	
6	N-3182	1355 Fisher Well	58.3	258.2	**4.9**	**20.3**		
7	N-3331	MW12-03	16.3	72.2	**13.0**	**-1.0**		19-Feb-13
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δ^{15}N-N2 and δ^{18}O-SMOW of dissolved nitrate (denitrifier technique - Delta+XL)

All results reported in the usual permil notation relative to IAEA stds

IAEA values used to normalize data

		^{15}N	^{18}O
IAEA N1	IAEA N1	0.4 ± 0.2	
IAEA N2	IAEA N2	20.3 ± 0.2	
IAEA NO3	IAEA NO3	4.7 ± 0.2	25.6 ± 0.4
USGS 32	USGS 32	180 ± 1.0	25.7 ± 0.4
USGS 34	USGS 34	-1.8 ± 0.2	-27.9 ± 0.6
USGS 35	USGS 35	2.7 ± 0.2	57.5 ± 0.6

Precision and accuracy as 1 sigma of (n=10) lab stds are: 0.5 for δ^{15}N
1.0 for δ^{18}O

ISOTOPE SCIENCE LABORATORY
Dept of Geosciences, ES-513
University of Calgary
2500 University Dr. NW, Calgary, Alta.
T2N-1N4

Results
Contact : *S. Taylor*
Tel. : *(403) 210-6003*
Fax : *(403) 220 7773*
e-mail steve.taylor@ucalgary.ca

Name: Chad Petersmeyer
Affiliate: Thurber Engineering
Address: 100, 4396 West Saanich Road
Victoria, BC
Canada
V8Z 3E9

IN January 25, 2013
OUT March 4, 2013

phone: 250-727-2201
fax: 250-727-3710
email: cpetersmeyer@thurber.ca

W/O #

NH4-N target (ug) = **150**

#	LIMs ID	SampleID ("**ID**_yymmdd")	**[NH4-N] (mg/L)**	[NH4] (mg/L)	Diff. tech sample (ml)	DI make-up (ml)	δ^{15}**N**	Comments
1	N-3181	1345 Fisher Leachate	**19.5**		7.69	142	**7.7**	

δ^{13}C-PDB and δ^{15}N-N_2 of organics (CF_EA_IRMS)

All results reported in the usual permil notation relative to IAEA stds
IAEA values used to normalize data

	^{13}C	^{15}N
USGS 24	-16.0 ± 0.1	
IAEA-CH-6	-10.4 ± 0.2	
IAEA-CH-7	-31.8 ± 0.2	
NBS 22	-30.03 ± 0.2	
USGS 40	-26.39 ± 0.2	-4.52 ± 0.2
USGS 41	37.63 ± 0.2	47.57 ± 0.2
USGS 25		-30.40 ± 0.2
USGS 26		53.70 ± 0.2

THURBER

APPENDIX E

Groundwater Supply Well Logs

THURBER

Fisher Road Regional Groundwater Study:
SUMMARY OF WELL CONSTRUCTION DETAILS
for Wells in Study Area

Address	WELL TAG NO.	TOTAL DEPTH (feet)	TOTAL DEPTH (metres)	WATER DEPTH (feet)	WATER DEPTH (metres)	DIAM (inches)	DIAM (mm)	SCREEN SECTION (feet)	SCREEN SECTION (metres)
1355 Fisher Rd.	102275	218	66	180	55	6	152	210 to 218	64 to 66
1360 Fisher Rd.	24510	144	44	119	36	6	152	140 to 144	43 to 44
1375 Fisher Rd.	64066	238	73	147	45	6	152	234 to 238	71 to 73
1415 Galliers Rd.	68617	247	75	185	56	6	152	243 to 247	74 to 75

1355 FISHER WELL
(ON TABLE)

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 102275

Owner: BISHOP

Address: 1355 FISHER ROAD

Area: COBBLE HILL

WELL LOCATION:
SHAWNIGAN Land District
District Lot: Plan: 29581 Lot: 1
Township: Section: 13 Range: 6
Indian Reserve: Meridian: Block:
Quarter:
Island: VANCOUVER ISLAND
BCGS Number (NAD 27): 092B063333 Well:

Class of Well: Water supply
Subclass of Well: Domestic
Orientation of Well:
Status of Well: New
Well Use:
Observation Well Number:
Observation Well Status:
Construction Method:
Diameter: inches
Casing drive shoe:
Well Depth: 210 feet
Elevation: feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag: Y
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: N

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1972-12-06 00:00:00.0

Driller: Drillwell Enterprises
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 20 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Development Method:
Pump Test Info Flag: N
Artesian Flow:
Artesian Pressure (ft):
Static Level: 180 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag:
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag: N
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size	
Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
WELL ORIGINALLY DRILLED FOR MR. ALLAN COWAN.

LITHOLOGY INFORMATION:

From	0	to 42	Ft.	SANDY GRAVEL
From	42	to 144	Ft.	GRAVELY SAND
From	144	to 167	Ft.	COARSE GRAVEL
From	167	to 187	Ft.	GRAVELY SAND
From	187	to 201	Ft.	SANDY GRAVEL WATER BEARING
From	201	to 218	Ft.	FINE SAND WATER BEARING

15617

WELL LOG CONSTRUCTION RECORD

1980

OWNER Mr. Allan Cowan GRACE BISHOP

Address Fisher Rd. Cobble Hill B.C.

Well Location DL5

Date Started Nov. 29/1972 Date Completed Dec 6 /1972

DRILLWELL ENTERPRISES LTD.
KEN SLADE - - Phone: 746-5268
R.R.1, COWICHAN STATION, B.C.

Drilling Method Percussion

Driller P. MISEK Helper —

File — Folio —

Signed By [illegible]

LOG OF FORMATIONS

Depth			Descriptions
0	to	42	Sandy gravel
	to		
42	to	144	Gravelly sand
	to		
144	to	167	Coarse gravel
	to		
167	to	187	Gravelly sand
	to		
187	to	201	Sandy gravel waterbearing
	to		
201	to	218	Fine sand waterbearing
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		
	to		

GENERAL REMARKS

Screen slot No. 10 2 sect. (12 feet)

CASING RECORD

Dia. 6 ins. Wt. ___ #/ft. From 0 to 218

Dia. ___ ins. Wt ___ #/ft. From ___ to ___

Dia. ___ ins. Wt. ___ #/ft. From ___ to ___

Shoe ✓ Welded ✓ Cemented ___

SCREEN RECORD

Make CH Material Stainless steel

Slot opening No. 10 Length 6' 2 sect.

Top 210 ft. Bottom 218 ft.

Fittings Top Lead joint Fittings Bottom Lead plug

Gravel Pack ___ Natural ✓

Development Method Bailing

ROCK WELL DATA

Open Bore Hole ___ Dia. ___ ins.

From ___ ft. to ___ ft.

PRODUCTION DATA

Static Level 180' ft.

Measured from surface

Pumping Level ___ ft. at ___ GPM

___ ft. at ___ GPM

Bail Test ___ ft. at ___ GPH

___ ft. at ___ GPH

Recommended Pump Setting ___ ft.

Recommended Max. Pump Output 20 GPM ~~GPH~~

Duration of Test ___ Hrs.

PUMP DATA

Make ___ Type ___

Model ___ Serial No. ___

Size ___ HP ___ Drop Pipe ___

GPM ___ Head ___ ft.

Motor ___ Volts ___ PH ___

Well Seal ___

Water Analysis — Hardness ___

PH ___ Iron ___

1360 FISHER (GAMBOA)

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 24510

Owner: L R TAYLOR

Address:

Area: COBBLE HILL

WELL LOCATION:
SHAWNIGAN Land District
District Lot: Plan: 1986 Lot: 7
Township: Section: 13 Range: 6
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 27): 092B063333 Well: 28

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well: New
Well Use: Unknown Well Use
Observation Well Number:
Observation Well Status:
Construction Method: Drilled
Diameter: 6.0 inches
Casing drive shoe:
Well Depth: 144 feet
Elevation: 0 feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag:
File Info Flag:
Sieve Info Flag:
Screen Info Flag:

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1971-02-01 00:00:00.0

Driller: Drillwell Enterprises
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 7 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Development Method:
Pump Test Info Flag:
Artesian Flow:
Artesian Pressure (ft):
Static Level: 119 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag:
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag:
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
EST. YIELD: 7-8 GPM.

LITHOLOGY INFORMATION:

From	0	to	15 Ft.	Light sand and gravel till
From	0	to	97 Ft.	Tight br. sand, dry
From	0	to	105 Ft.	Gravelly, easy wash hardpan
From	0	to	120 Ft.	Br. sand, coarse and loose, able to bail
From	0	to	0 Ft.	plug
From	0	to	140 Ft.	Fine, blue sand, changing to fine br.
From	0	to	0 Ft.	sand
From	0	to	144 Ft.	Fine br. sand
From	0	to	144.5 Ft.	Showing clay in bailer samples
From	0	to	0 Ft.	
From	0	to	0 Ft.	Bottom 144'
From	0	to	0 Ft.	140' of pipe left in hole

1375 FISHER
(ON TABLE)

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 64066

Owner: WALLENBURG TONY

Address: 1375 FISHER ROAD

Area:

WELL LOCATION:
SHAWNIGAN Land District
District Lot: Plan: 1986 Lot: 8
Township: Section: 13 Range: 6
Indian Reserve: Meridian: Block:
Quarter:
Island: VANCOUVER ISLAND
BCGS Number (NAD 27): 092B063333 Well: 50

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well: New
Well Use: Private Domestic
Observation Well Number:
Observation Well Status:
Construction Method: Drilled
Diameter: 6.0 inches
Casing drive shoe:
Well Depth: 238 feet
Elevation: 0 feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag: N
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: N

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1988-04-28 00:00:00.0

Driller:
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 12 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Development Method:
Pump Test Info Flag: Y
Artesian Flow:
Artesian Pressure (ft):
Static Level: 147 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag: N
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag: N
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
STEEL CASING,0.0 TO 234.0, CONTINUOUS,STAINLESS STEEL,PUMP TEST RATE 12 GPM,167 FT AFTER 1 HRS

LITHOLOGY INFORMATION:

From	0	to	25 Ft.	GRAVEL & SAND SILTY W/COBBLES & BOULDERS
From	25	to	140 Ft.	SAND W/GRAVEL LAYERS DRY
From	140	to	200 Ft.	QUITE SILTY FINE SAND WET
From	0	to	0 Ft.	BAIL AT 12 GPM 20FT OF DROWDOWK
From	0	to	0 Ft.	FINE GRAVEL SEAMS
From	0	to	0 Ft.	SET #12 SLOT SCREEN
From	200	to	240 Ft.	SAND CLEANER SLIGHTLY COURSER WITH SMALL

1415 GALLIER ON TABER.

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 68617

Owner: ROLLS W

Address: 1415 GALLIER RD

Area: COBBLE HILL

WELL LOCATION:
SHAWNIGAN Land District
District Lot: Plan: 26786 Lot: A
Township: Section: 14 Range: 6
Indian Reserve: Meridian: Block:
Quarter:
Island:
BCGS Number (NAD 27): 092B063333 Well: 36

Class of Well:
Subclass of Well:
Orientation of Well:
Status of Well: New
Well Use: Private Domestic
Observation Well Number:
Observation Well Status:
Construction Method: Drilled
Diameter: 6.0 inches
Casing drive shoe:
Well Depth: 247 feet
Elevation: 0 feet (ASL)
Final Casing Stick Up: inches
Well Cap Type:
Bedrock Depth: feet
Lithology Info Flag:
File Info Flag:
Sieve Info Flag: N
Screen Info Flag:

Site Info Details:
Other Info Flag:
Other Info Details:

Construction Date: 1991-01-18 00:00:00.0

Driller: Drillwell Enterprises
Well Identification Plate Number:
Plate Attached By:
Where Plate Attached:

PRODUCTION DATA AT TIME OF DRILLING:
Well Yield: 20 (Driller's Estimate) Gallons per Minute (U.S./Imperial)
Development Method:
Pump Test Info Flag: N
Artesian Flow:
Artesian Pressure (ft):
Static Level: 185 feet

WATER QUALITY:
Character:
Colour:
Odour:
Well Disinfected: N
EMS ID:
Water Chemistry Info Flag: N
Field Chemistry Info Flag:
Site Info (SEAM):

Water Utility:
Water Supply System Name:
Water Supply System Well Name:

SURFACE SEAL:
Flag:
Material:
Method:
Depth (ft):
Thickness (in):

WELL CLOSURE INFORMATION:
Reason For Closure:
Method of Closure:
Closure Sealant Material:
Closure Backfill Material:
Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe

GENERAL REMARKS:
STEEL CASING,.209 THICK, CONTINUOUS,STAINLESS STEEL,

LITHOLOGY INFORMATION:

From	0	to	19 Ft.	SILTY GRAVEL
From	19	to	49 Ft.	SAND
From	49	to	77 Ft.	SILTY SAND BROWN
From	77	to	98 Ft.	SAND FINE
From	98	to	135 Ft.	AND SILTY
From	247	to	0 Ft.	SILT SAND
From	148	to	218 Ft.	SILTY SAND
From	218	to	226 Ft.	SAND
From	226	to	237 Ft.	SILTY SAND
From	237	to	247 Ft.	SAND MED FINE GRAVEL
From	135	to	148 Ft.	SAND FINE GRAVEL