

Engineers 210 Prescott Street P.O. Box 189 Kemptville, Ontario K0G 1J0 Civil • Geotechnical •

Structural • Environmental •

Hydrogeology •

(613) 860-0923

FAX: (613) 258-0475

REPORT ON

HYDROGEOLOGICAL INVESTIGATION 6787 HIRAM DRIVE OSGOODE WARD, GREELY CITY OF OTTAWA ONTARIO

Submitted to:

Venom Motorsports Canada 6820 McKeown Drive Greely, Ontario K4P 1A2

DATE October 3, 2018

DISTRIBUTION

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180696



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Venom Motorsports Canada 6820 McKeown Drive Greely, Ontario K4P 1A2

RE: HYDROGEOLOGICAL INVESTIGATION

EXISTING SUPPLY WELL

PROPOSED LIGHT INDUSTRIAL WAREHOUSE

6787 HIRAM DRIVE, GREELY CITY OF OTTAWA, ONTARIO

Dear Sir:

This letter presents the results of an evaluation of the water quality and quantity for the well that will supply water for the above noted proposed light industrial development at 6787 Hiram Drive in the City of Ottawa, Ontario (see Key Plan, Figure 1). It is understood that the proposed light industrial development is to consist of a warehouse and office building.

The well in question was constructed by Air Rock Drilling Company of Richmond, Ontario on September 4, 2018. A Ministry of the Environment and Climate Change (MOECC) Well Record for the subject well (TW1) and the Certificate of Well Compliance, provided by the well driller, are provided as Attachment A.

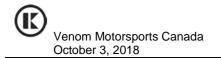
A pumping test was carried out at the well, TW1, by a member of our engineering staff on September 12, 2018. The testing consisted of a 6 hour duration constant discharge rate pumping test. During the pumping test, water level measurements were made both manually and using a pressure transducer to monitor the drawdown of the water level in the well in response to pumping. Groundwater samples were collected from TW1 at about hour 3 and at hour 6 of the pumping test to characterize groundwater quality. After the pumping period, the pump was shut off and the recovery of the water level in the well was monitored for a period of time.

Groundwater Supply Evaluation

Water Demand

The water demand calculations were provided to Kollaard Associates Inc. by others. It is understood that the well was to provide a minimum flow rate of 30 litres/minute. The daily sewage design flow (also done by others) is indicated to be 2,680 litres/day.





Water Quantity

The well was pumped for six hours at a pumping rate of about 61.8 litres per minute. Over the course of the pumping test, the water level in the well dropped some 0.2 metres. At the end of the pumping test, about 30 minutes were required for 100 percent recovery of the total drawdown in the static water level created during pumping. This is based on manual water level measurements. According to the data logger, the well water level recovered after about 15 minutes. The discrepancy is due to measurement error from the data logger which is not vented (does not account for small water level fluctuations that may be due to atmospheric pressure changes). These errors are more significant when the drawdown is very small (as in this case where drawdown is only 0.2 metres).

The pumping test drawdown and recovery data and plots for TW1 are provided as Attachment B. The drawdown and recovery data provided were measured with reference to the top of the well casing at the test well location.

The pumping test data for the test well was analyzed using the method of Cooper and Jacob (1946). Although the assumptions on which these equations are based are not strictly met, this method provides a reasonable estimate of the aquifer transmissivity.

Transmissivity was calculated using the following relationship:

$$T = \frac{2.3Q}{4\pi ds}$$

where Q is the pump rate, m^3/day ds is the change in drawdown over one time log cycle, m T is the transmissivity, m^2/day

Based on the pumping test drawdown data the transmissivity of the aquifer is estimated to be about 540 m²/day. Based on the recovery data the aquifer transmissivity is estimated to be about 226 m²/day. A higher flow rate could provide a more accurate estimate of transmissivity. However, it is sufficient to demonstrate that the aquifer is capable of supplying the expected water demand for the site.

Water Quality

To determine the water quality of the groundwater supply, groundwater samples were obtained from the well during the pumping test and prepared/preserved in the field using appropriate techniques and submitted to Eurofins Environmental Testing in Ottawa, Ontario for the chemical, physical and bacteriological analyses listed in the MOECC guideline entitled Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment, August 1996. The temperature, conductivity, pH, total dissolved solids, turbidity and residual chlorine levels of the groundwater were measured and qualitative observations of the odour and colour of the groundwater were made at periodic intervals during the pumping test. The results of the chemical, physical and bacteriological analyses of the water samples obtained from the test well and the field water quality are provided as Attachment C and in Table I, respectively.

The water quality as determined from the results of the analyses is acceptable. The water meets all the Ontario Drinking Water Standards (ODWS) health and aesthetic parameters tested for at the

test well except for aesthetic objectives for hardness, total dissolved solids and iron. Sodium is above the 20 mg/l medical advisory limit for those on sodium restricted diets.

Hardness

The water is considered to be hard by water treatment standards. Water with hardness above 80 to 100 milligrams per litre as $CaCO_3$ is often softened for domestic use. The hardness at the well is ~ 290 milligrams per litre. Water softening by conventional sodium ion exchange may introduce relatively high concentrations of sodium into the drinking water, which may contribute a significant percentage to the daily sodium intake for a consumer on a sodium restricted diet. Where ion exchange water softeners are used, a separate unsoftened water supply could be used for drinking and culinary purposes.

Total Dissolved Solids

The total dissolved solids (TDS) were measured at 509 and 504 milligrams per litre after three and six hours of pumping, respectively, above the ODWS of 500 milligrams per litre. The Ryznar Stability Indices (RSI) and Langelier Saturation Indices (LSI) were calculated for the samples obtained and gave an RSI value of ~6.9, and LSI of ~0.6, respectively, indicating that the water is not corrosive and there is potential for scale to form and carbonate precipitation may occur. The effect of elevated TDS levels on drinking water depends on the individual components, which are principally chlorides, sulphates, calcium, magnesium and bicarbonates. Depending on which parameters are elevated, TDS exceedances can include hardness, taste, mineral deposition or corrosion. In this case, the water samples had higher levels of hardness and iron. Sodium and chloride are well within their aesthetic objectives and are not elevated enough to affect the taste of the water significantly. In this case, the effect of elevated TDS is considered to affect mineral deposition, due to the potential for scale to form.

Iron

The iron level at TW1 after three and six hours of pumping is 0.41 and 0.37 milligrams per litre, respectively, which exceeds the ODWS aesthetic objective of 0.3 milligrams per litre. The iron level is well within the MOE treatability limit of 5.0 milligrams per litre using a water softener or manganese greensand filter. Manganese frequently occurs where iron is also present. The manganese level was measured at 0.02 milligrams per litre, which is within the aesthetic objective of 0.05 milligrams per litre.

The sodium level in the water is about 40-42 mg/l. The ODWSOG states that "the local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/l so that this information may be communicated to local physicians for their use with patients on sodium restricted diets."

Wellhead Protection/Floodplain Considerations

Recommendations for well maintenance include; inspect wellhead annually to ensure that the casing is structurally sound, verify well cap is sealed and that surface water is not pooling around wellhead.

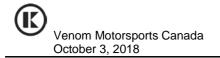
The supply well is located within the southwest portion of the site, while the location of the proposed septic system is within the northwest portion of the site, greater than 18 metres distance from the well location. The Site Plan that was provided to Kollaard Associates Inc. for review indicated that the proposed finished grade at the well location is about 99.76 metres geodetic elevation. The minimum top of casing elevation is at 100.16 metres to ensure that is at least 400 millimetres above the finished grade at the well location.

Additionally, the ground surface shall be graded such that it is the highest point on the ground surface within 3 metres radially from the exterior of the well casing and shall ensure that water does not collect or pond near the well head. The well has been properly grouted and cased to a depth of about 15.2 metres below the existing ground surface. The Site Plan indicates that armour stone is proposed around the wellhead to protect the well from physical damage. With these measures in place, it is considered that an adequate amount of wellhead protection is going to be in place to protect the water supply for the proposed light industrial use of the property. The well location is also appropriate for access in case of repairs and well maintenance.

Recommendations for wellhead protection include ensuring that potential contaminant sources are at least 15 metres and preferably at least 30 metres or more from the well. Possible contaminant sources include; chemical storage, garage and related chemicals, such as antifreeze, gasoline, oils, vehicle/boat/equipment storage, sewer lines, septic systems, animal enclosures, manure or compost piles. If liquid chemicals, such as antifreeze, oil and gasoline/diesel, and their waste products, are to be stored at the site, they should be done in containers approved for that purpose. The container(s) should be labelled with their contents. Secondary containment should be installed around all bulk liquid chemical or waste storage containers, to collect and contain leaks and spills from the tank and all connections. A lock on the well cap is useful to prevent vandalism.

The 1:100 year floodplain elevation at the site is indicated to be 99.78 metres geodetic. Information from the City of Ottawa indicates that the top of the well casing shall be at least 300 millimetres above the floodplain elevation (~100.08 metres). Based on the Site Plan grading information provided, the top of the well casing is indicated to be at 100.16 metres geodetic elevation, which will exceed the minimum elevation requirement due to the floodplain.

Therefore, the potential for contamination of the well due to flooding is minimized.



Conclusions

Based on the results of this evaluation it is considered that the well in question should supply water of adequate quantity and quality for the proposed development with suitable treatment and wellhead protection as indicated above.

We trust this letter provides sufficient information for your purposes. If you have any questions concerning this letter, please do not hesitate to contact our office.

Yours truly,

Kollaard Associates Inc.



Colleen Vermeersch, P. Eng.

Attachments: Figure 1 - Key Plan

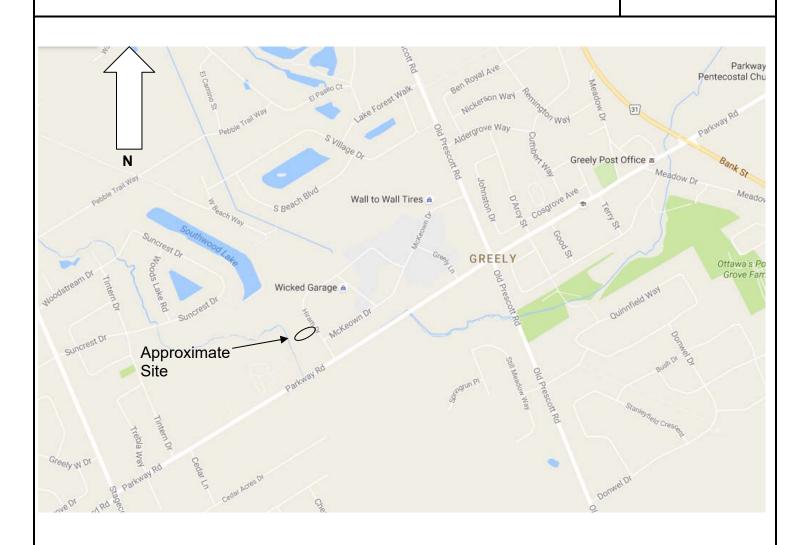
Table I - Field Water Quality

Attachment A - Well Record and Certificate of Well Compliance

Attachment B - Pumping Test Data

Attachment C - Well Water Laboratory Test Results

KEY PLAN FIGURE 1



NOT TO SCALE



Project No. 180696

Date October 2018

September 12, 2018 180696

TABLE I
FIELD WATER QUALITY MEASUREMENTS
FOR TEST WELL

Time Since Pumping Test Started	Temp.	рН	Turbidity	Total Dissolved Solids	d Conductivity	Free chlorine (ppm)
(min)	(°C)		(NTU)	(ppm)	(µS)	
TW 1 60	9.6	7.8	0.0	350	710	-
120	9.5	7.4	0.0	350	692	-
180	9.6	8.0	0.0	352	705	0.0
240	9.8	7.7	0.0	340	696	-
300	9.6	7.6	0.0	347	680	-
360	9.7	8.2	0.0	346	670	0.0

ATTACHMENT A

MOE WELL RECORD FOR TW1 CERTIFICATE OF WELL COMPLIANCE PROVIDED BY WELL DRILLER

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Cable Tc Rotary (to Ro	Conventiona Reverse) ussion pecify Open Ho (Galvaniz Concrete Steel Quantity (Plastic, Galvaniz d at Depth Gas d at Depth Gas d at Depth Gas d at Depth Gas	Diamon Diamon Jetting Driving Digging Distruction Released Rele	Record Ca Wall Thickness (crivin) .188 Record Scr Slot No.	prestic prestic prestock igation stustrial ther, specify Sing Dep From +2' 50' Depi From Depi From Unitested Unitested Unitested	Comme Municip Test Ho Cooling To So ' 123 ' th (m/ft) To Dep From	srcial Not used bal Dewatering les Monitoring & Air Conditioning Status of Well Water Supply Replacement Well Dewatering Well Dewatering Well Doservation and/or Monitoring Hole Alteration (Construction) Abandoned, Insufficient Supply Abandoned, other, specify Golfe Diameter th (m/ft) Diameter (cm/in) 123 123 134 134 134 134 134 134 134 134 134 13	Pumping rate (I/m 20 Duration of pump hrs + Final water level of 10.5 If flowing give rate Recommended pr (I/min / GPIM) Well production (I/m) Please provide a	min min min (m/ft) (l/min / GPM) ump depth (m/ft) ump rate min / GPM) Map of War map below followin	4 5 10 15 20 25 30 40 50 60	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 20.5 ation actions on the second	4 5 10 15 20 25 30 40 40 he back	i i i i i i i i i i i i i i i i i i i
Cable Tc Rotary (I Rotary	Conventional Reverse) Usesion pecify Open Ho (Galvaniz Concrete Steel Pearl (Plastic, Galvaniz dat Depth Gas dat Depth	Diamon Diamon Jetting Driving Digging Digging Disping Digging Disping Digging Disping Disping	Record Ca Wall Thickness (crivin) .188 Record Scr Slot No.	prestic prestic prestock igation stustrial ther, specify Sing Dep From +2' 50' Depi From Depi From Unitested Unitested Unitested	Comme Municip Test Ho Cooling Sth (mag) To 123' th (m/ft) To 50 Prom	srcial Not used bal Dewatering les Monitoring & Air Conditioning Status of Well Water Supply Replacement Well Dewatering Well Dewatering Well Doservation and/or Monitoring Hole Alteration (Construction) Abandoned, Insufficient Supply Abandoned, other, specify Golfe Diameter th (m/ft) Diameter (cm/in) 123 123 134 134 134 134 134 134 134 134 134 13	Pumping rate (I/m 20 Duration of pump hrs + Final water level e 10.5 If flowing give rate Recommended pi (I/min / GPM) Well production (I/ Please provide a	min min min (m/ft) (l/min / GPM) ump depth (m/ft) ump rate min / GPM) Map of War map below followin	4 5 10 15 20 25 30 40 50 60	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 20.5 ation actions on the second	4 5 10 15 20 25 30 40 40 he back	cck
Cable Tc Rotary (I Rotary	Conventiona Reverse) ussion pecify Copen Ho (Galvaniz Concrete Steel Steel Galvaniz d at Depth Gas d at Depth	Diamon Diamon Jetting Driving Digging Waterial Alvanized, Steel) Waterial Alvanized, Steel) Waterial Coher, spe Kind of Water Dother, spe Kind of Water Dother, spe Kind of Water Dother, spe Contractor	d Pt Lin	prestic prestic prestock igation stustrial ther, specify Sing Dep From +2' 50' Depi From Depi From Unitested Unitested Unitested	Comme Municip Test Ho Cooling stith (mage) To 123 ' th (m/fl) To Dep From Id We We We	Status of Well Status of Well Status of Well Water Supply Replacement Well Test Hole Recharge Well Dewatering Well Observation and/or Monitoring Hole Alteration (Construction) Abandoned, hosufficient Supply Abandoned, other, specify Other, specify To Diameter th (m/ft) Other, specify It (m/ft) To Diameter To Com/in)	Pumping rate (I/m 20 Duration of pump hrs + Final water level of 10.5 If flowing give rate Recommended pr (I/min / GPIM) Well production (I/min / GPIM) Please provide a	min min min (m/ft) (l/min / GPM) ump depth (m/ft) ump rate min / GPM) Map of War map below followin	4 5 10 15 20 25 30 40 50 60	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 20.5 ation actions on the second	4 5 10 15 20 25 30 40 40 he back	cck
Cable To Rotary (for Rotary (f	Conventiona Reverse) ussion pecify Open Ho (Galvaniz Concrete Steel Steel Other Gas d at Depth Grand Gas	Diamon Diamon Jetting	d Pull Lin	prestic prestic prestock igation stustrial ther, specify Sing Dep From +2' 50' Gen: Depi From Unitested Unitested Unitested	Comme Municip Test Ho Cooling th (mag) 10 123' th (m/ti) To Dep From di Municip Test Ho Local Test Ho Double Test Ho Municip Test Ho Double Test Ho Municip Test Ho	srcial Not used bal Dewatering ble Monitoring & Air Conditioning Status of Well Water Supply Replacement Well Dewatering Well Dewatering Well Observation and/or Monitoring Hole Alteration (Construction) Abandoned, Insufficient Supply Abandoned, other, specify Other, specify Hole Diameter (cm/in) 10 123 44 11 Contractor's Licence No.	Pumping rate (I/m 20 Duration of pump hrs + Final water level e 10.5 If flowing give rate Recommended pi (I/min / GPM) Well production (I/min / GPM) Please provide a Comments:	min min min min min min min min min/GPM) min/GPM) min/GPM) Map:of:We map below followin	4 5 10 15 20 25 30 40 50 60 e0 listra	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 20.5 10.5 10.5 10.5 10.5 10.5 10.5	4 5 10 15 20 25 30 40 40 he back	o ck
Cable To Rotary (for Rotary (f	Conventiona Reverse) ussion pecify Open Ho (Galvaniz Concrete Steel Steel Other Gas d at Depth Che Drilling Gas	Diamon Diamon Jetting Driving Digging Digging	d Pull Lin	prestic prestic prestock igation stustrial ther, specify Sing Dep From +2' 50' Gen Depi From Unitested Unitested Unitested Unitested E-mail Additional and a second sec	Comme Municip Test Ho Cooling To To To 123' th (m/ti) To To To To Municip Test Ho Cooling th (m/ti) To To Municip Test Ho Cooling th (m/ti) To Municip To Municip	sercial Not used bal Dewatering le Monitoring a Air Conditioning Status of Well Water Supply Replacement Well Peplacement Well Dewatering Well Dewatering Well Dewatering Well Dewatering Well Alteration (Construction) Abandoned, Insufficient Supply Abandoned, Other, specify Other, specify Other, specify Other, specify Ionic Diameter th (m/ft) Diameter (cm/in) 11 12 13 15 15 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	Pumping rate (I/m 20 Duration of pump hrs + Final water level e 10.5 If flowing give rate Recommended pr (I/min / GPM) Well production (I/ Please provide a Please provide a Well owner's Da Well owner's Da	min	4 5 10 15 20 25 30 40 50 60 30 40 50 60	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5	4 5 100 155 200 255 300 400 500 he bas	ck
Cable To Rotary (I Rotary	Conventiona Reverse) ussion pecify Open Ho (Galvaniz Concrete Steel Steel Other (Plastic, Galvaniz d at Depth Gas d at Depth Gas d at Depth Gas d at Depth Gas d at Depth Concrete Concrete Gas d at Depth Gas d at Depth Concrete Concrete Open Ho (Galvaniz Concrete Steel Open Ho (Galvaniz Concrete Steel Open Ho (Galvaniz Concrete Steel Open Ho (Plastic, Galvaniz Concrete Open Ho (P	Diamon Diamon Jetting	d Public Interest of the Inter	mestic restock igation in the process of the proces	Comme Municip Test Ho Cooling th (mm) To 123' th (m/ft) To 50' 123' we will be performed we will be performed by the minimum of the min	sercial Not used bal Dewatering les Monitoring as Air Conditioning Status of Well Nater Supply Replacement Well Dewatering Well Alteration (Construction) Abandoned, Insufficient Supply Abandoned, Other, specify Diameter th (m/ft) Diameter th (m/ft) Diameter th (m/ft) Diameter Com/in) 10 123 13 100 1100 1100 1100 1100 1100 1	Pumping rate (I/m 20 Duration of pump hrs + Final water level e 10.5 If flowing give rate Recommended p (I/min / GPM) Well production (I/min / GPM) Please provide a Well owner's information package Well owner's information package	min	4 5 10 15 20 25 30 40 50 60 and instru	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 20.5 10.5 10.5 10.5 10.5 10.5 10.5	4 5 100 155 200 255 300 400 500 he bas	ck
Cable To Rotary (f Rotary	Conventiona Reverse) ussion pecify Open Ho (Galvaniz Concrete Steel Steel Other Gas d at Depth Gas d at Depth Gas d at Depth Gas d at Depth Grand Gas	Diamon Diamon Jetting Driving Digging Digging	d Pull Lin	prestic prestic prestock igation sustrial ther, specify Sing Dep From +2' 50' Gen: Depi From Depi From Unitested Unitested Serial Add air-rock echnician (decimal serial and serial add s	Comme Municip Test Ho Cooling th (mm) To 123' th (m/tt) To 50' 123' th (m/tt) To We Municip Test Ho Cooling th (mm) To 50' 123' th (m/tt) To Solution To Last Name,	sercial Not used bal Dewatering les Monitoring as Air Conditioning Status of Well Nater Supply Replacement Well Dewatering Well Alteration (Construction) Abandoned, Insufficient Supply Abandoned, Other, specify Diameter th (m/ft) Diameter th (m/ft) Diameter th (m/ft) Diameter Com/in) 10 123 13 100 1100 1100 1100 1100 1100 1	Pumping rate (I/m 20 Duration of pump hrs + Final water level of 10.5 If flowing give rate Recommended pr (I/min / GPM) Well production (I/min / GPM) Please provide a Vell owner's information package delivered production of the package of th	min	4 5 10 15 20 25 30 40 50 60 and instru	10.2 10.3 10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5	4 5 100 155 200 255 300 400 500 he bas	ck

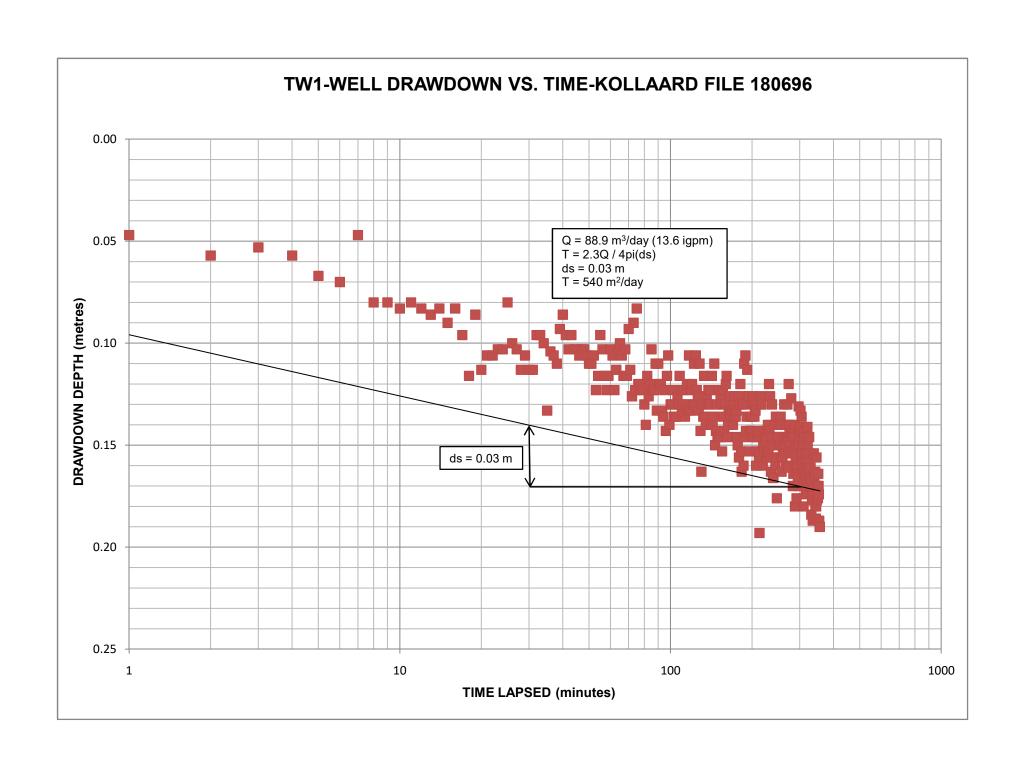


CERTIFICATE OF WELL COMPLIANCE

I,		niers DO HEREBY CERTIFY that I am licensed to drill
	wells in the Province of	f Ontario, and that I have supervised the drilling of a well on the
	property of VENC	IM MOTORSPORTS INC.
	located of #678	57 HIRAM DRIVE, Greely
		ty of Ottawa (Geographical Township of Osgoode).
	1675 CONC	4 PLAN# 4M-351 S/L# X
••••	CERTIFY FURTHER	that, I am aware of the well drilling requirements, the guidelines,
	recommendations and r	regulations of the Ministry of the Environment governing well
	installations in the Prov	vince of Ontario, and the standards specified in any subdivision
	agreement and hydroge	eological report applicable to this site and City Standards.
	*.	
	AND DO HEREBY CI	ERTIFY THAT the said well has been drilled, cased, grouted
	(cement or bentonite) a	s applicable and constructed in strict conformity with the
	standards required.	
a.	Signed this 4 7H Well Driller/Company	ay of SEPTEMBER 2018 -Airkock Drilling Co. Ltd.
	the well and it was cons	f of the landowner set out above Certifies that he/she has inspected structed in accordance with the specifications in O.Reg.903, this ological Report with regards to casing length and grouting
	SIGNED this 3RD Ulmos Engineer	day of <u>October</u> , <u>2018</u> .
Shaping our fi En	uture together semble, formons not	Kollaard Associates Engineers P.O. Box 189 210 Prescott Street, Unit 1 Kemptville, Ontario KOG 1J0 iile d'Ottdwg

8743 Victoria Street Cuttawa; ON KOA 280 entre de service R243, rue Victoria Ottawa, ON KOA 280

ATTACHMENT B PUMPING TEST DATA FOR TW1



Kollaard File 180696	Pump Rate	61.7	litres/minute
DRAWDOWN DATA 1	ΓW-1		

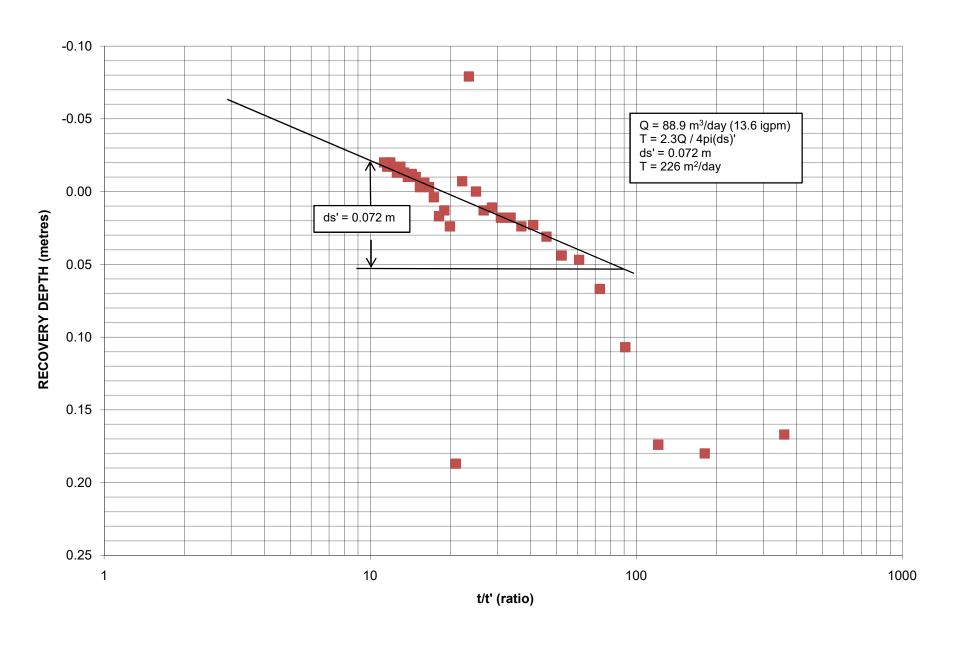
Time Lapsed	Abs Pres	Temp	Water Level	Drawdown
(minutes)	(kPa) 437.383	(°C)	(m)	(m)
1	437.383 436.926	7.782 7.782	-2.71 -2.757	0.05
2	436.828	7.782	-2.767	0.06
3	436.861	7.782	-2.763	0.05
4	436.828	7.782	-2.767	0.06
5	436.73	7.782	-2.777	0.07
6 7	436.698 436.926	7.782 7.782	-2.78 -2.757	0.07 0.05
8	436.926	7.782	-2.757	0.05
9	436.6	7.782	-2.79	0.08
10	436.567	7.782	-2.793	0.08
11	436.6	7.782	-2.79	0.08
12	436.567	7.782	-2.793	0.08
13	436.535	7.782	-2.796	0.09
14 15	436.567 436.502	7.782 7.782	-2.793 -2.8	0.08 0.09
16	436.567	7.782	-2.793	0.08
17	436.437	7.782	-2.806	0.10
18	436.241	7.782	-2.826	0.12
19	436.535	7.782	-2.796	0.09
20	436.274	7.782	-2.823	0.11
21	436.339	7.782	-2.816	0.11
22	436.339	7.782	-2.816	0.11
23	436.372 436.372	7.782	-2.813	0.10
24 25	436.372 436.6	7.782 7.782	-2.813 -2.79	0.10 0.08
26	436.404	7.782	-2.79	0.10
27	436.372	7.782	-2.813	0.10
28	436.274	7.782	-2.823	0.11
29	436.339	7.782	-2.816	0.11
30	436.274	7.782	-2.823	0.11
31	436.274	7.782	-2.823	0.11
32	436.437	7.782	-2.806	0.10
33 34	436.437 436.404	7.782 7.782	-2.806 -2.81	0.10 0.10
35	436.078	7.782	-2.843	0.13
36	436.363	7.682	-2.814	0.10
37	436.339	7.782	-2.816	0.11
38	436.307	7.782	-2.82	0.11
39	436.47	7.782	-2.803	0.09
40	436.535	7.782	-2.796	0.09
41 42	436.437 436.372	7.782 7.782	-2.806 -2.813	0.10 0.10
42	436.372	7.782	-2.813 -2.806	0.10
44	436.372	7.782	-2.813	0.10
45	436.372	7.782	-2.813	0.10
46	436.339	7.782	-2.816	0.11
47	436.372	7.782	-2.813	0.10
48	436.372	7.782	-2.813	0.10
49 50	436.339	7.782	-2.816	0.11
50 51	436.307 436.307	7.782 7.782	-2.82 -2.82	0.11 0.11
51 52	436.307	7.782	-2.82 -2.816	0.11
53	436.176	7.782	-2.833	0.11
54	436.241	7.782	-2.826	0.12
55	436.437	7.782	-2.806	0.10
56	436.372	7.782	-2.813	0.10
57	436.241	7.782	-2.826	0.12
58 59	436.176 436.241	7.782 7.782	-2.833 -2.826	0.12 0.12
60	436.241	7.782	-2.826	0.12
61	436.339	7.782	-2.816	0.10
62	436.176	7.782	-2.833	0.12
63	436.274	7.782	-2.823	0.11
64	436.372	7.782	-2.813	0.10
65	436.404	7.782	-2.81	0.10
66 67	436.339 436.241	7.782 7.782	-2.816 -2.826	0.11 0.12
67 68	436.241	7.782	-2.826 -2.813	0.12
69	436.241	7.782	-2.826	0.12
70	436.47	7.782	-2.803	0.09
71	436.274	7.782	-2.823	0.11
72	436.143	7.782	-2.836	0.13
73	436.502	7.782	-2.8	0.09
74 75	436.176 436.567	7.782 7.782	-2.833 -2.793	0.12
75 76	436.567	7.782	-2.793 -2.83	0.08 0.12
76 77	436.209	7.782	-2.83	0.12
78	436.176	7.782	-2.833	0.12
79	436.176	7.782	-2.833	0.12
80	436.111	7.782	-2.84	0.13
81	436.013	7.782	-2.85	0.14
82	436.241	7.782	-2.826	0.12
83	436.143	7.782	-2.836	0.13
84 85	436.209 436.372	7.782 7.782	-2.83 -2.813	0.12 0.10
85	430.3/2	7.782	-2.813	0.10

86					
87	86	436 176	7 782	-2 833	0.12
88 436.078 7.782 -2.82 0.11 90 436.077 7.782 -2.83 0.12 91 436.209 7.782 -2.83 0.12 92 436.209 7.782 -2.83 0.12 93 436.06 7.782 -2.843 0.13 94 436.016 7.782 -2.844 0.14 95 436.176 7.782 -2.833 0.12 96 435.98 7.782 -2.833 0.12 97 436.241 7.782 -2.855 0.14 98 436.033 7.782 -2.856 0.12 99 436.013 7.782 -2.85 0.14 100 436.11 7.782 -2.85 0.14 101 436.176 7.782 -2.83 0.12 103 436.267 7.782 -2.84 0.13 104 436.066 7.782 -2.846 0.14 105 436.17					
89					
90		436.307	7.782		
91	89	436.078	7.782	-2.843	0.13
91	90	436.307	7.782	-2.82	0.11
92					
93					
94					
95	93	436.078	7.782	-2.843	0.13
96	94	436.046	7.782	-2.846	0.14
96	95	436 176	7 782	-2 833	0.12
97					
98					
99					
100	98	436.339	7.782	-2.816	0.11
101 436.111 7.782 -2.84 0.13 102 436.046 7.782 -2.846 0.14 104 436.046 7.782 -2.846 0.14 105 436.046 7.782 -2.846 0.14 106 436.143 7.782 -2.846 0.14 106 436.143 7.782 -2.846 0.14 107 436.111 7.782 -2.846 0.13 108 436.241 7.782 -2.833 0.12 109 436.176 7.782 -2.833 0.12 110 436.078 7.782 -2.833 0.12 111 436.111 7.782 -2.84 0.13 112 436.176 7.782 -2.843 0.13 113 436.046 7.782 -2.843 0.13 114 436.111 7.782 -2.84 0.13 115 436.078 7.782 -2.843 0.12 116 436.078 7.782 -2.843 0.13 117 436.339 7.782 -2.843 0.13 118 436.078 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 120 436.209 7.782 -2.843 0.13 121 436.111 7.782 -2.84 0.13 122 436.307 7.782 -2.833 0.12 123 436.111 7.782 -2.84 0.13 124 436.339 7.782 -2.84 0.13 125 436.143 7.782 -2.84 0.13 126 436.143 7.782 -2.84 0.13 127 436.078 7.782 -2.836 0.11 128 436.307 7.782 -2.836 0.11 129 435.98 7.782 -2.835 0.14 131 436.111 7.782 -2.84 0.13 127 436.078 7.782 -2.836 0.13 127 436.078 7.782 -2.836 0.13 128 436.307 7.782 -2.835 0.14 131 436.111 7.782 -2.84 0.13 132 436.046 7.782 -2.836 0.14 133 436.111 7.782 -2.84 0.13 134 436.046 7.782 -2.846 0.14 135 436.013 7.782 -2.846 0.14 136 436.03 7.782 -2.846 0.14 137 436.111 7.782 -2.846 0.14 138 436.101 7.782 -2.846 0.14 139 436.111 7.782 -2.846 0.14 140 436.076 7.782 -2.835 0.14 141 436.076 7.782 -2.836 0.13 142 436.241 7.782 -2.836 0.13	99	436.013	7.782	-2.85	0.14
101 436.111 7.782 -2.84 0.13 102 436.046 7.782 -2.846 0.14 104 436.046 7.782 -2.846 0.14 105 436.046 7.782 -2.846 0.14 106 436.143 7.782 -2.846 0.14 106 436.143 7.782 -2.846 0.14 107 436.111 7.782 -2.846 0.13 108 436.241 7.782 -2.833 0.12 109 436.176 7.782 -2.833 0.12 110 436.078 7.782 -2.833 0.12 111 436.111 7.782 -2.84 0.13 112 436.176 7.782 -2.843 0.13 113 436.046 7.782 -2.843 0.13 114 436.111 7.782 -2.84 0.13 115 436.078 7.782 -2.843 0.12 116 436.078 7.782 -2.843 0.13 117 436.339 7.782 -2.843 0.13 118 436.078 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 119 436.176 7.782 -2.843 0.13 120 436.209 7.782 -2.843 0.13 121 436.111 7.782 -2.84 0.13 122 436.307 7.782 -2.833 0.12 123 436.111 7.782 -2.84 0.13 124 436.339 7.782 -2.84 0.13 125 436.143 7.782 -2.84 0.13 126 436.143 7.782 -2.84 0.13 127 436.078 7.782 -2.836 0.11 128 436.307 7.782 -2.836 0.11 129 435.98 7.782 -2.835 0.14 131 436.111 7.782 -2.84 0.13 127 436.078 7.782 -2.836 0.13 127 436.078 7.782 -2.836 0.13 128 436.307 7.782 -2.835 0.14 131 436.111 7.782 -2.84 0.13 132 436.046 7.782 -2.836 0.14 133 436.111 7.782 -2.84 0.13 134 436.046 7.782 -2.846 0.14 135 436.013 7.782 -2.846 0.14 136 436.03 7.782 -2.846 0.14 137 436.111 7.782 -2.846 0.14 138 436.101 7.782 -2.846 0.14 139 436.111 7.782 -2.846 0.14 140 436.076 7.782 -2.835 0.14 141 436.076 7.782 -2.836 0.13 142 436.241 7.782 -2.836 0.13	100	436 111	7 782	-2 84	0.13
102					
103					
104	102	436.176	7.782	-2.833	0.12
105	103	436.046	7.782	-2.846	0.14
105	104	436.046	7.782	-2.846	0.14
106	105	436 046			0.14
107					
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110	108	436.241	7.782	-2.826	0.12
110	109	436.176	7.782	-2.833	0.12
111					
112					
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114	112	436.176	7.782	-2.833	0.12
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133 436.241 7.782 -2.826 0.12 134 436.046 7.782 -2.846 0.14 135 436.013 7.782 -2.85 0.13 136 436.143 7.782 -2.836 0.13 137 436.111 7.782 -2.834 0.13 138 436.111 7.782 -2.833 0.12 139 436.111 7.782 -2.833 0.12 140 436.117 7.782 -2.833 0.12 141 436.013 7.782 -2.855 0.14 142 436.241 7.782 -2.826 0.12 143 436.013 7.782 -2.826 0.12 143 436.046 7.782 -2.826 0.12 144 436.046 7.782 -2.82 0.11 145 435.915 7.782 -2.85 0.14 144 436.041 7.782 -2.85 0.15 147	132	436.046	7.782	-2.846	0.14
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138 436.176 7.782 -2.833 0.12 139 436.111 7.782 -2.84 0.13 140 436.176 7.782 -2.833 0.12 141 436.013 7.782 -2.85 0.14 142 436.241 7.782 -2.826 0.12 143 436.013 7.782 -2.846 0.14 144 436.046 7.782 -2.846 0.14 145 436.307 7.782 -2.86 0.15 147 435.98 7.782 -2.86 0.15 147 435.98 7.782 -2.853 0.14 148 436.111 7.782 -2.856 0.15 147 435.948 7.782 -2.856 0.15 150 435.948 7.782 -2.856 0.15 151 436.176 7.782 -2.833 0.12 152 435.948 7.782 -2.836 0.15 153 <t< td=""><td>137</td><td>436.111</td><td>7.782</td><td>-2.84</td><td>0.13</td></t<>	137	436.111	7.782	-2.84	0.13
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169 436.078 7.782 -2.843 0.13 170 436.013 7.782 -2.85 0.14 171 436.111 7.782 -2.84 0.13 172 436.046 7.782 -2.846 0.14 173 436.143 7.782 -2.836 0.13 174 436.046 7.782 -2.846 0.14 175 436.078 7.782 -2.843 0.13					
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	176	435.948	7.782	-2.856	0.15
				•	

177	435.915	7.782	-2.86	0.15
178	436.143	7.782	-2.836	0.13
179	435.85	7.782	-2.866	0.16
180	436.111	7.782	-2.84	0.13
181	436.209	7.782	-2.83	0.12
182	435.883	7.782	-2.863	0.15
183	435.785	7.782	-2.873	0.16
184	436.111	7.782	-2.84	0.13
185	436.111	7.782	-2.84	0.13
186	435.817	7.782	-2.87	0.16
187	436.307	7.782	-2.82	0.11
188	435.948	7.782	-2.856	0.15
189	436.339	7.782	-2.816	0.11
190	435.98	7.782	-2.853	0.14
191	436.046	7.782	-2.846	0.14
192	436.274	7.782	-2.823	0.11
193	436.143	7.782	-2.836	0.13
194	436.143	7.782	-2.836	0.13
195	435.883	7.782	-2.863	0.15
196	435.98	7.782	-2.853	0.14
197	436.046	7.782	-2.846	0.14
198	435.98	7.782	-2.853	0.14
199	435.98	7.782	-2.853	0.14
200	436.046	7.782	-2.846	0.14
201	436.111	7.782	-2.84	0.13
202	436.143	7.782	-2.836	0.13
203	435.948	7.782	-2.856	0.15
204	436.046	7.782	-2.846	0.14
205	436.078	7.782	-2.843	0.13
		_		
206	436.078	7.782	-2.843	0.13
207	435.817	7.782	-2.87	0.16
208	435.883	7.782	-2.863	0.15
209	435.948	7.782	-2.856	0.15
210	435.972	7.682	-2.854	0.14
211	435.98	7.782	-2.853	0.14
212	435.85	7.782	-2.866	0.16
213	435.491	7.782	-2.903	0.19
214	435.883	7.782	-2.863	0.15
215	436.143	7.782	-2.836	0.13
216	436.111	7.782	-2.84	0.13
217	436.111	7.782	-2.84	0.13
218	435.98	7.782	-2.853	0.14
219	435.817	7.782	-2.87	0.16
220	435.915	7.782	-2.86	0.15
221	435.883	7.782	-2.863	0.15
222	435.98	7.782	-2.853	0.14
223	435.915	7.782	-2.86	0.15
224	435.948	7.782	-2.856	0.15
225	435.948	7.782	-2.856	0.15
226	435.85	7.782	-2.866	0.16
227	435.85	7.782	-2.866	0.16
228	435.883	7.782	-2.863	0.15
229	436.013	7.782	-2.85	0.14
230	435.883	7.782	-2.863	0.15
231	436.209	7.782	-2.83	0.12
232	435.98	7.782	-2.853	0.14
232	436.143			
		7.782	-2.836	0.13
234	435.85	7.782	-2.866	0.16
235	435.785	7.782	-2.873	0.16
236	435.915	7.782	-2.86	0.15
237	436.111	7.782	-2.84	0.13
238	435.948	7.782	-2.856	0.15
239	435.752	7.782	-2.876	0.17
240	435.752	7.782	-2.876	0.17
241	435.85	7.782	-2.866	0.16
242	435.915	7.782	-2.86	0.15
243	436.013	7.782	-2.85	0.14
244	435.817	7.782	-2.87	0.16
245	436.046	7.782	-2.846	0.14
246	435.85	7.782		0.14
			-2.866	
247	435.654	7.782	-2.886	0.18
248	435.948	7.782	-2.856	0.15
249	435.948	7.782	-2.856	0.15
250	435.915	7.782	-2.86	0.15
251	436.013	7.782	-2.85	0.14
252	436.013	7.782	-2.85	0.14
253	435.915	7.782	-2.86	0.15
254	435.915	7.782	-2.86	0.15
255	436.046	7.782	-2.846	0.14
256	435.85	7.782	-2.866	0.16
257	435.785	7.782	-2.873	0.16
258				
	436.013	7.782	-2.85	0.14
259	435.85	7.782	-2.866	0.16
260	435.883	7.782	-2.863	0.15
261	435.915	7.782	-2.86	0.15
262	435.907	7.682	-2.861	0.15
263	436.111	7.782	-2.84	0.13
264	435.948	7.782	-2.856	0.15
265	435.883	7.782	-2.863	0.15
266	435.915	7.782	-2.86	0.15
267	435.817	7.782	-2.87	0.16
	•	•	•	•

200	425.04	7.000	2.057	0.15
268	435.94	7.682	-2.857	0.15
269	436.013	7.782	-2.85	0.14
270	436.111	7.782	-2.84	0.13
271	435.948	7.782	-2.856	0.15
272	435.809	7.682	-2.871	0.16
273	436.209	7.782	-2.83	0.12
274	436.013	7.782	-2.85	0.14
275	435.972	7.682	-2.854	0.14
276	435.915	7.782	-2.86	0.15
277	435.883	7.782	-2.863	0.15
278	435.972	7.682	-2.854	0.14
279	436.135	7.682	-2.837	0.13
280	435.874	7.682	-2.864	0.15
281	435.972	7.682	-2.854	0.14
282	435.98	7.782	-2.853	0.14
283	435.72	7.782	-2.88	0.17
284	435.777	7.682	-2.874	0.16
285	435.948	7.782	-2.856	0.15
	435.883	-		
286		7.782	-2.863	0.15
287	436.013	7.782	-2.85	0.14
288	435.622	7.782	-2.89	0.18
289	435.817	7.782	-2.87	0.16
290	435.85	7.782	-2.866	0.16
291	435.915	7.782	-2.86	0.15
292	435.654	7.782	-2.886	0.18
293	435.809	7.682	-2.871	0.16
294	435.817	7.782	-2.87	0.16
295	435.752	7.782	-2.876	0.17
296	435.915	7.782	-2.86	0.15
297	436.103	7.682	-2.841	0.13
298	435.72	7.782	-2.88	0.17
299	435.948	7.782	-2.856	0.15
300	436.005	7.682	-2.851	0.14
301	435.98	7.782	-2.853	0.14
302	436.078	7.782	-2.843	0.13
303	435.98	7.782	-2.853	0.14
304	435.842	7.682	-2.867	0.16
305	436.046	7.782	-2.846	0.14
306	435.874	7.682	-2.864	0.15
307	435.915	7.782	-2.86	0.15
308	435.777	7.682	-2.874	0.16
309	435.915	7.782	-2.86	0.15
	435.622			
310		7.782	-2.89	0.18
311	435.972	7.682	-2.854	0.14
312	435.948	7.782	-2.856	0.15
313	435.752	7.782	-2.876	0.17
314	435.842	7.682	-2.867	0.16
315	435.874	7.682	-2.864	0.15
316	435.679	7.682	-2.884	0.17
317	435.711	7.682	-2.88	0.17
318	435.744	7.682	-2.877	0.17
319	435.809	7.682	-2.871	0.16
320	436.005	7.682	-2.851	0.14
321	435.915	7.782	-2.86	0.15
322	435.842	7.682	-2.867	0.16
323	435.809	7.682	-2.871	0.16
324	435.874	7.682	-2.864	0.15
325	435.948	7.782	-2.856	0.15
326	435.744	7.682	-2.877	0.17
327	435.752	7.782	-2.876	0.17
328	435.711	7.682	-2.88	0.17
329	435.809	7.682	-2.871	0.16
330	435.752	7.782	-2.876	0.17
331	435.581	7.682	-2.894	0.18
332	435.744	7.682	-2.877	0.17
333	435.654	7.782	-2.886	0.18
334	435.679	7.682	-2.884	0.17
335	435.548	7.682	-2.897	0.19
336	435.679	7.682	-2.884	0.17
337		7.682		0.18
	435.646		-2.887	
338	435.874	7.682	-2.864	0.15
339	435.777	7.682	-2.874	0.16
340	435.752	7.782	-2.876	0.17
341	435.711	7.682	-2.88	0.17
342	435.785	7.782	-2.873	0.16
343	435.622	7.782	-2.89	0.18
344				
	435.557	7.782	-2.896	0.19
345	435.613	7.682	-2.89	0.18
346	435.85	7.782	-2.866	0.16
347	435.646	7.682	-2.887	0.18
348	435.72	7.782	-2.88	0.17
349	435.711	7.682	-2.88	0.17
350	435.654	7.782	-2.886	0.18
351	435.777	7.682	-2.874	0.16
352	435.711	7.682	-2.88	0.17
353	435.679	7.682	-2.884	0.17
354	435.548	7.682	-2.897	0.19
355	435.516	7.682	-2.9	0.19
356	435.516	7.682	-2.9	0.19
550	.55.510	7.302	2.3	5.15

TW1- WELL RECOVERY VS. TIME - KOLLAARD FILE 180696



Kollaard File 180696

RECOVERY DATA TW-1

ť'	t / t'	Abs Pres	Temp	Water Level	Drawdown	Recovery
		(kPa)	(°C)	(m)	(m)	(%)
1	360	435.744	7.682	-2.877	0.167	11%
2	181.0	435.613	7.682	-2.89	0.18	4%
3	121.0	435.679	7.682	-2.884	0.174	7%
4	91.0	436.331	7.682	-2.817	0.107	43%
5	73.0	436.722	7.682	-2.777	0.067	64%
6	61.0	436.918	7.682	-2.757	0.047	75%
7	52.4	436.95	7.682	-2.754	0.044	76%
8	46.0	437.081	7.682	-2.741	0.031	83%
9	41.0	437.154	7.782	-2.733	0.023	88%
10	37.0	437.146	7.682	-2.734	0.024	87%
11	33.7	437.211	7.682	-2.728	0.018	90%
12	31.0	437.211	7.682	-2.728	0.018	90%
13	28.7	437.277	7.682	-2.721	0.011	94%
14	26.7	437.252	7.782	-2.723	0.013	93%
15	25.0	437.383	7.782	-2.71	0.00	100%
16	23.5	438.157	7.682	-2.631	-0.079	142%
17	22.2	437.448	7.782	-2.703	-0.007	104%
18	21.0	435.548	7.682	-2.897	0.187	0.0%
19	19.9	437.146	7.682	-2.734	0.024	87%
20	19.0	437.252	7.782	-2.723	0.013	93%
21	18.1	437.22	7.782	-2.727	0.017	91%
22	17.4	437.342	7.682	-2.714	0.004	98%
23	16.7	437.415	7.782	-2.707	-0.003	102%
24	16.0	437.44	7.682	-2.704	-0.006	103%
25	15.4	437.415	7.782	-2.707	-0.003	102%
26	14.8	437.481	7.782	-2.7	-0.01	105%
27	14.3	437.505	7.682	-2.698	-0.012	106%
28	13.9	437.481	7.782	-2.7	-0.01	105%
29	13.4	437.513	7.782	-2.697	-0.013	107%
30	13.0	437.546	7.782	-2.693	-0.017	109%
31	12.6	437.513	7.782	-2.697	-0.013	107%
32	12.3	437.546	7.782	-2.693	-0.017	109%
33	11.9	437.578	7.782	-2.69	-0.02	111%
34	11.6	437.546	7.782	-2.693	-0.017	109%
35	11.3	437.578	7.782	-2.69	-0.02	111%

ATTACHMENT C

RESULTS OF LABORATORY TESTING OF WELL WATER SAMPLES



Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON K0G 1J0

Attention: Ms. Colleen Vermeersch

PO#:

Invoice to: Kollaard Associates Inc. Page 1 of 5

 Report Number:
 1816566

 Date Submitted:
 2018-09-12

 Date Reported:
 2018-09-19

 Project:
 180696

COC #:

Dear Colleen Vermeersch:

Report Comments:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-569)	Р	lease fi	nd	attac	hed	the	anal	∕tica	l resul	ts fo	or your	r sami	oles. I	f you '	have	any o	questi	ons re	gardine	q this	repo	ort,	please c	io n	ot hes	sitate	to ca	III (6	13-7	727-!	5692	2)
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APPROVAL:	
	Addrine Thomas, Inorganics Supervisor

All analysis is completed in Ottawa, Ontario (unless otherwise indicated).

Eurofins Ottawa is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on our CALA scope of accreditation. It can be found at http://www.cala.ca/scopes/2602.pdf.

Eurofins(Ottawa) is certified and accredited for specific parameters by OMAFRA, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils). Licensed by Ontario MOE for specific tests in drinking water.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required.



Environment Testing

Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON K0G 1J0

Attention: Ms. Colleen Vermeersch

PO#:

Invoice to: Kollaard Associates Inc.

Report Number: 1816566 Date Submitted: 2018-09-12 Date Reported: 2018-09-19 Project: 180696

COC #:

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1387022 Water 2018-09-12 TW1-3Hr	1387023 Water 2018-09-12 TW1-6Hr
Anions	CI	1	mg/L	AO 250	88	86
	N-NO2	0.10	mg/L	MAC 1.0	<0.10	<0.10
	N-NO3	0.10	mg/L	MAC 10.0	<0.10	<0.10
	SO4	1	mg/L	AO 500	62	61
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 500	226	226
	Colour	2	TCU	AO 5	4	4
	Conductivity	5	uS/cm		783	775
	F	0.10	mg/L	MAC 1.5	0.20	0.20
	рН	1.00	-	6.5-8.5	8.00	8.00
	S2-	0.01	mg/L	AO 0.05	<0.01	<0.01
	TDS (COND - CALC)	1	mg/L	AO 500	509*	504*
	Turbidity	0.1	NTU	AO 5.0	3.3	2.2
Hardness	Hardness as CaCO3	1	mg/L	OG 100	293*	291*
Indices/Calc	Ion Balance	0.01			0.92	0.94
Metals	Ca	1	mg/L		68	67
	Fe	0.03	mg/L	AO 0.3	0.41*	0.37*
	K	1	mg/L		3	3
	Mg	1	mg/L		30	30
	Mn	0.01	mg/L	AO 0.05	0.02	0.02
	Na	2	mg/L	AO 200	40	42
Subcontract-Inorg	DOC	0.5	mg/L	AO 5	1.2	1.4
	N-NH3	0.01	mg/L		0.09	0.09
	Phenols	0.001	mg/L		<0.001	<0.001
	Tannin & Lignin	0.1	mg/L		<0.1	<0.1
	Total Kjeldahl Nitrogen	0.1	mg/L		0.2	0.2

Guideline = ODWSOG

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

^{* =} Guideline Exceedence



Environment Testing

Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON

K0G 1J0

Ms. Colleen Vermeersch

PO#:

Attention:

Invoice to: Kollaard Associates Inc.

 Report Number:
 1816566

 Date Submitted:
 2018-09-12

 Date Reported:
 2018-09-19

 Project:
 180696

COC #:

QC Summary

Analyte		Blank		QC % Rec	QC Limits
Run No 352625 An Method C SM2130B	nalysis/Extraction Date 20	18-09-13 A	nalyst	AC	
Turbidity	<0.1 NTU		102	70-130	
Run No 352651 An Method EPA 200.8	nalysis/Extraction Date 20	18-09-13 A	nalyst	SKH	
Iron		<0.03 mg/L		92	91-109
Manganese		<0.01 mg/L		100	92.9-107
Run No 352697 An Method C SM2120C	nalysis/Extraction Date 20	18-09-14 A	nalyst	AA	
Colour		<2 TCU		100	90-110
Run No 352721 An Method C SM4500-NO3-F	nalysis/Extraction Date 20	18-09-14 A	nalyst	Z_S	
N-NO2		<0.10 mg/L		97	80-120
N-NO3		<0.10 mg/L		107	80-120
Run No 352777 Analysis/Extraction Date 2018-09-17 Analys Method M SM3120B-3500C			nalyst	H_F	
Calcium		<1 mg/L		99	90-110
Potassium		<1 mg/L		104	87-113
Magnesium		<1 mg/L		97	76-124

Guideline = ODWSOG

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

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^{* =} Guideline Exceedence



Environment Testing

Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON K0G 1J0

Attention: Ms. Colleen Vermeersch

PO#:

Invoice to: Kollaard Associates Inc.

 Report Number:
 1816566

 Date Submitted:
 2018-09-12

 Date Reported:
 2018-09-19

 Project:
 180696

COC #:

QC Summary

Analyte	Blank	QC % Rec	QC Limits	
Sodium	<2 mg/L	85	82-118	
Run No 352801 Analysis/Extraction Date 20 Method C SM4500-NO3-F	018-09-17 A na	llyst Z_S		
N-NO2	<0.10 mg/L	100	80-120	
N-NO3	<0.10 mg/L	105	80-120	
Run No 352825 Analysis/Extraction Date 20 Method SM 4110	018-09-17 A na	ilyst H_F		
Chloride	<1 mg/L	104	90-110	
SO4	<1 mg/L	111	90-110	
Run No 352877 Analysis/Extraction Date 2018-09-14 Analyst AET Method SUBCONTRACT P-INORG				
DOC	<0.5 mg/L	101		
N-NH3	<0.01 mg/L	101		
Phenols	<0.001 mg/L	88	69-132	
Tannin & Lignin	<0.1 mg/L	80		
Total Kjeldahl Nitrogen	<0.1 mg/L	92	81-126	
Run No 352927 Analysis/Extraction Date 20 Method SM2320,2510,4500H/F	018-09-18 A na	llyst AET		
Alkalinity (CaCO3)	<5 mg/L	96	90-110	

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Environment Testing

Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON K0G 1J0

Attention: Ms. Colleen Vermeersch

PO#:

Invoice to: Kollaard Associates Inc.

 Report Number:
 1816566

 Date Submitted:
 2018-09-12

 Date Reported:
 2018-09-19

 Project:
 180696

COC #:

QC Summary

Analyte	Blank	QC % Rec	QC Limits	
Conductivity	<5 uS/cm	99	90-110	
F	<0.10 mg/L	101	90-110	
рН		99	90-110	
Run No 352937 Analysis/Extraction Date 2018-09-19 Analyst AET Method C SM2340B				
Hardness as CaCO3				
Ion Balance				
TDS (COND - CALC)				
Run No 352948 Analysis/Extraction Date 2018-09-14 Analyst AET Method C SM4500-S2-D				
S2-	<0.01 mg/L	107		

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON K0G 1J0

Attention: Ms. Colleen Vermeersch

PO#:

Invoice to: Kollaard Associates Inc. Page 1 of 2

Report Number: 1816565

Date Submitted: 2018-09-12

Date Reported: 2018-09-14

Project: 180696

COC #: 198008

Dear Colleen Vermeersch:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL:

Krista Quantrill, Microbiology Supervisor

All analysis is completed in Ottawa, Ontario (unless otherwise indicated).

Eurofins Ottawa is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on our CALA scope of accreditation. It can be found at http://www.cala.ca/scopes/2602.pdf.

Eurofins (Ottawa) is certified and accredited for specific parameters by OMAFRA, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils). Licensed by Ontario MOE for specific tests in drinking water.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required.



Environment Testing

Client: Kollaard Associates Inc.

210 Prescott St., Box 189

Kemptville, ON K0G 1J0

Attention: Ms. Colleen Vermeersch

PO#:

Invoice to: Kollaard Associates Inc.

Report Number: 1816565
Date Submitted: 2018-09-12
Date Reported: 2018-09-14
Project: 180696
COC #: 198008

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1387020 Water 2018-09-12 TW1-3Hr	1387021 Water 2018-09-12 TW1-6Hr
Microbiology	Heterotrophic Plate Count	0	ct/1mL		0	3
Others	Escherichia Coli	0	ct/100mL	MAC 0	0	0
	Faecal Coliforms	0	ct/100mL		0	0
	Total Coliforms	0	ct/100mL	MAC 0	0	0

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

additional QA/QC information available on request.

Ryznar Stability Index

$$RSI = 2(pH_s) - pH$$

RSI $<< 6 \rightarrow$ the scale tendency increases as the index decreases

RSI >> 7 → the calcium carbonate formation probably does not lead to a protective corrosion inhibitor film

RSI >> 8 → mild steel corrosion becomes an increasing problem

Langelier Saturation Index

$$LSI = pH - pH_s$$

If LSI is negative → no potential to scale, the water will dissolve CaCO₃

If LSI is positive → scale can form and CaCO₃ precipitation may occur

If LSI is close to zero → borderline scale potential, water quality or temperature change or evaporation could change the index

where pH measured from sample

pH_s = pH at saturation in calcite or calcium carbonate

$$pH_{s} = (9.3 + A + B) - (C + D)$$

$$A = \frac{\log_{10}[TDS] - 1}{10}$$

$$B = -13.12 \times \log_{10}(^{\circ}C + 273) + 34.55$$

$$C = \log_{10}[Ca^{2+}asCaCO_{3}] - 0.4$$

$$D = \log_{10}[alkalinityasCaCO_{3}]$$

pH hardness [mg/l as CaCo₃] Alkalinity [mg/l as CaCo₃] total dissolved solids [mg/l] temperature (°C)

 $\rightarrow \rightarrow$ RSI $\rightarrow \rightarrow$ LSI

TW1-3hr	TW1-6hr		
8.00	8.00		
293	291		
226	226		
509	504		
9.6	9.7		
6.88	6.88		
0.56	0.56		