Kollaard Associates
Engineers
215 Sanders Street, Unit 1
P.O. Box 189
Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Industrial Health & Safety

(613) 860-0923

FAX: (613) 258-0475

December 18, 2008

070352

Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

Attention: Mr. Murray Chown

RE: ADDITIONAL GROUNDWATER QUALITY INFORMATION
PROPOSED VETERINARY CLINIC AND CAR WASH SITE
DUNROBIN ROAD AT THOMAS A. DOLAN PARKWAY
DUNROBIN, ONTARIO

Dear Sirs:

This letter provides additional well and hydrogeological information concerning the above noted site further to that provided in previous Kollaard Associates Inc. letters of April 28, 2008, July 24, 2008 and November 27, 2008. This present letter is provided to address seven items in a City of Ottawa email from Mr. Don Herweyer dated December 3, 2008 concerning this project.

The following information is provided in order of the items outlined in the above mentioned December 3, 2008, City of Ottawa email.

- The well records for the three wells put down at the site are attached as Appendix A. Please note that the original well at 2744 Dunrobin Road (proposed Veterinary Clinic site) was replaced by the well with Tag No. 068278. All three wells are indicated to be within a sand aquifer below a surficial clay layer. The "new" well at 2744 Dunrobin Road is some 4.4 metres shallower than the previous well.

- A City of Ottawa Certificate of Well Compliance for the first two wells at the site were included in the Kollaard Associates Inc. letter of July 24, 2008. A

Certificate of Well Compliance has been provided by Capital Water Supply Ltd. for the third well (the "new" well at 2744 Dunrobin Road). All three well certificates are provided in Appendix B.

- The "new" well at 2744 Dunrobin Road was pumped for six hours on December 15, 2008. Well water samples were obtained at hour 3 and hour 6 of the pumping and submitted to Accutest Laboratories Ltd. for the MOE "Subdivision Package" list of parameters and for VOC's. All of the laboratory test results for the "new" well are provided in Appendix C. The results of this present testing indicate groundwater of similar quality to that previously tested for the "new well", and no significant change in water quality between the 3 and 6 hour test results. The results of previous testing of an existing well at the adjacent Blue Heron storage site, 2730 Dunrobin Road, indicated to have been drilled in 1999, are provided in Appendix D, along with the MOE well record. A review of those test results indicate similar water quality to that of the "new" well. Accordingly, all of the above laboratory testing provides no indication that the groundwater quality at the site can expect to change significantly in the future.

- TDS measured for the well water samples are 806 and 800 for the 3 hour and 6 hour samples, respectively. The Ontario Drinking Water Standards (ODWS) for TDS is 500 milligrams per litre. The presence of TDS, which is an MOE aesthetic related parameter, will result in the water being either encrusting or corrosive to plumbing/plumbing fixtures. The degree of encrustation or corrosion is commonly indicated by the Ryznar Stability Index (RSI). The RSI value is calculated using the measured hardness, pH, alkalinity and TDS for the water. A RSI value of 7 indicates water than is neither encrusting or corrosive but this value is essentially non existent for groundwater. Water with a RSI value below 7 is indicated to be encrusting and water with a RSI value above 7 is indicated to be corrosive. The degree of acceptable encrusting or corrosion that can be expected by an RSI value above or below 7 is subjective. To provide an indication of the degree of encrusting that can be expected for the present water samples, the calculated RSI value for water with the MOE maximum acceptable hardness, pH, alkalinity and TDS levels was compared to the calculated RSI for the present water samples. The RSI value calculated for the former case is 6.0 and that for the present water samples is 5.9. Accordingly, although the TDS for the water samples in question is above the ODWS the degree of encrustation that can be expected due to the level of TDS is indicated to be essentially the same to that which would be caused by water that meets the ODWS for the applicable parameters. Taste would also be the same or likely improved due to the relatively low chloride levels compared to the ODWS.

- Water samples with an elevated iron level typically test high for turbidity at the laboratory but within the ODWS at the well head. It is considered that this difference in test results is due to precipitation of iron in the sample during the

time the sample is obtained at the well and then tested at the laboratory. The well water for this site has elevated iron levels. Accordingly, it is considered that the above explains the difference between the laboratory and well head tests for turbidity. The well head test is considered to reflect the actual turbidity level for the supply aquifer.

- The Ministry of the Environment (MOE) indicates organic nitrogen is an operational parameter. It is our experience that organic nitrogen is present in varying amounts as a naturally occurring compound in most of the well water samples that we have tested for land development purposes. The MOE indicates that the presence of organic nitrogen can possibly indicate groundwater impact from septic systems. However the main indicators of septic system impact are bacteria and nitrate, neither of which are indicated to be above the ODWS for the wells at the site. It is pointed out that the laboratory test results for the 3 and 6 hour samples from the "new" well indicate that the level of organic nitrogen measured meets the ODWS.

- During the above mentioned six hours of pumping at the "new" well, observations of any water level changes were monitored at two near by observations wells. The observations wells consist of the existing well at 2242 Dunrobin Road (the proposed car wash site) and at the Blue Heron site, 2730 Dunrobin Road. The two observations wells are some 22 and 105 metres from the pumped well, respectively. As mentioned above the 3 hour and 6 hour samples from the pumped well were tested for VOC's.

  The results of water level draw down and recovery measurements for the pumping of the "new" well and the results of the monitoring at the observation wells are provided in the attached Appendix E. Based on the results of the well pumping, calculations were carried out to estimate the potential zone of influence at the "new" well at the field pumping rate and at the expected pumping rate of 3 cubic metres per day for the veterinary clinic. The car wash daily water requirement is indicated as some 1.5 cubic metres per day. The results of that calculation are provided in the attached Appendix F, and indicate a zone of influence/capture zone of some 39 metres for the field pumping rate of about 33 cubic metres per day, and some 4 metres for the expected maximum Veterinary Clinic daily requirement of 3 cubic metres per day.

  No presence of VOC's above the method reporting limit was indicated for either the 3 hour or 6 hour sample. In addition previous testing for VOC's and total petroleum hydrocarbon reported in our previous letter of July 24, 2008 also indicated no presence of those parameters above the method reporting limit.

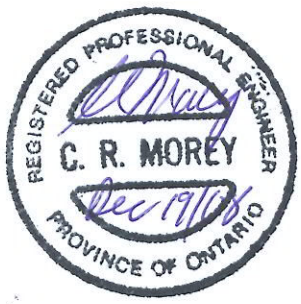
Based on the above it is considered that the reported hydrocarbon contamination plume in the vicinity of the intersection of Dunrobin Road and Thomas Dolan Parkway has not impacted that groundwater at the wells for the site and that pumping from the on site wells for the purposes of the proposed car wash and veterinary clinic should not influence the plume migration direction.

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

Yours truly,

Kollaard Associates Inc.

C. R. Morey, P. Eng.



Attachments: Appendices A to F

APPENDIX A

MINISTRY OF THE ENVIRONMENT WELL RECORDS FOR SITE WELLS SUPPLIED BY CAPITAL WATER SUPPLY LTD.

FROM :Davies Residence FAX NO. :16138328209 Apr. 02 2008 03:01PM P2

Ontario Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below) A 051520 A051520

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name: | Last Name: | E-mail Address: | ☐ Well Constructed by Well Owner

MacBeth Mechanical Inc.

Mailing Address (Street Number/Name, RR): 13 Neely | Municipality: Dunrobin | Province: Ontario | Postal Code: K0A 1T0 | Telephone No. (inc. area code): 6138320190

Part A Construction and/or Major Alteration of a Well

Address of Well Location (Street Number/Name, RR): 2742 Dunrobin Road | Township: Kanata | Lot: 27 | Concession: 3

County/District/Municipality: Ottawa Carleton | City/Town/Village: Dunrobin | Province: Ontario | Postal Code:

UTM Coordinates: NAD 83 | Zone 18 | Easting 442028 | Northing 5030284 | GPS Unit Make | Model: Garmin | Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
			Packed	0	7.6
Brown	Clay			7.61	11.5
Brown	Sand			11.58	17.9
Gray	Sand				

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
7.61	0	Grouted - Bentonite Slurry	.132m3

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☒ Driving
☐ Rotary (Air) ☐ Digging
☐ Air percussion ☐ Boring
☐ Other, specify

Water Use

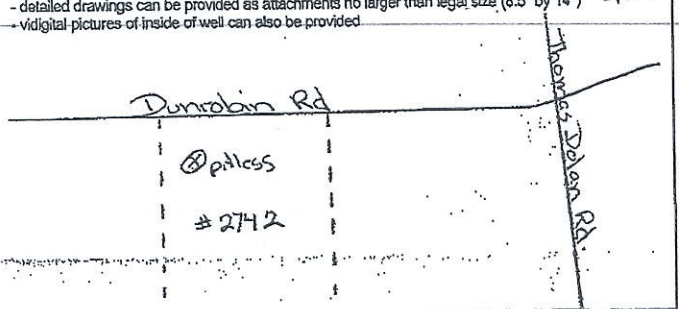
☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Status of Well

☒ Water Supply ☐ Dewatering Well ☐ Observation and/or Monitoring Hole
☐ Replacement Well ☐ Abandoned, Insufficient Supply ☐ Alteration (Construction)
☐ Test Hole ☐ Abandoned, Poor Water Quality ☐ Other, specify
☐ Recharge Well ☐ Abandoned, other, specify

Location of Well

Please provide a map below showing:
- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- digital pictures of inside of well can also be provided



Date Well Completed (yyyy/mm/dd): 2008/3/12 | Was the well owner's information package delivered? ☒ Yes ☐ No | Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd): 2008/3/19

Well Contractor and Well Technician Information

Business Name of Well Contractor: Capital Water Supply Ltd. | Well Contractor's Licence No.: 1558

Business Address (Street No./Name, number, RR): Box 490 | Municipality: Stittsville

Province: Ontario | Postal Code: K2S1A6 | Business E-mail Address: office@capitalwater.ca

Bus. Telephone No. (inc. area code): 6138361766 | Name of Well Technician (Last Name, First Name): Miller, Stephen

Well Technician's Licence No.: 10097 | Signature of Technician | Date Submitted (yyyy/mm/dd): 2008/3/19

Results of Well Yield Testing

Check box if after test of well yield, water was:
☐ Clear and sand free
☐ Cannot develop to sand-free state

If pumping discontinued, give reason:

Pumping test method: submersible

Pump intake set at (Metres): 13.71

Pumping rate (Litres/min): 54.6

Duration of pumping: 4 hrs + ____ min

Final water level end of pumping (Metres): 6.84

Recommended pump type: ☐ Shallow ☐ Deep

Recommended pump depth: 13.71 Metres

Recommended pump rate (Litres/min): 45.5

If flowing give rate (Litres/min):

Draw Down Time (Min)	Water Level (Metres)	Recovery Time (Min)	Water Level (Metres)
Static Level	4.91	Static Level	
1	6.51	1	5.62
2	6.71	2	5.36
3	6.78	3	5.05
4	6.81	4	4.98
5	6.81	5	4.95
10	6.82	10	4.93
15	6.83	15	4.93
20	6.83	20	4.92
25	6.83	25	4.91
30	6.83	30	
40	6.83	40	
50	6.83	50	
60	6.83	60	

Water Details

Water found at Depth	Kind of Water
17.06 Metres 17.98 Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Mineral
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Mineral
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Mineral

Casing Used

☐ Galvanized ☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete

Screen Used

☐ Galvanized ☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete

Casing and Well Details

Diameter of the Hole (Centimetres): 15.86 0 - 16.94 / 16.94 -
Depth of the Hole (Metres): 17.98
Wall Thickness (Metres): .48
Inside Diameter of the Casing (Metres): 15.86
Depth of the Casing (Metres): +.45 to 16.94

No Casing and Screen Used

☐ Open Hole

Disinfected? ☒ Yes ☐ No

Ministry Use Only

Audit No.: Z77320 | Well Contractor No.:
Date Received (yyyy/mm/dd): | Date of Inspection (yyyy/mm/dd):
Remarks:

05086 (11/2006)

Ontario Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below): A 051505 / A051505

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name	E-mail Address	Well Constructed by Well Owner
	MacBeth Mechanical Inc.		☐

Mailing Address (Street Number/Name, RR)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
13 Nedy	Dunrobin	Ontario	K0A1T0	6138322010

Part A Construction and/or Major Alteration of a Well

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
2744 Dunrobin Road	Kanata	27	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Carleton	Dunrobin	Ontario	

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation
NAD 83	18	4 52 68 8 5 03 02 98			GArmin	☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
Brown	Clay		Packed	0	7.61
Brown	Sand			7.61	11.58
Gray	Sand			11.58	18.43

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
17.22	0	Grouted – Bentonite Slurry	.132m3

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☒ Driving ☒ Rotary (Air) ☐ Digging ☐ Air percussion ☐ Boring ☐ Other, specify

Water Use

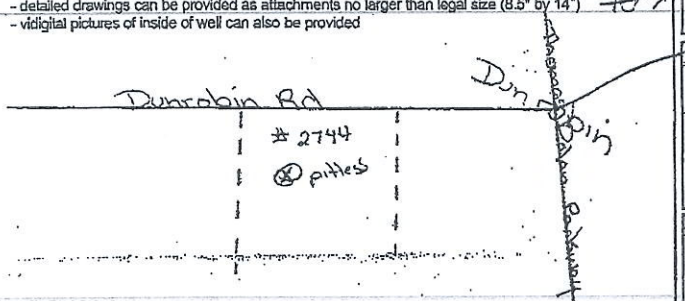
☐ Public ☐ Commercial ☐ Not used ☒ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify

Status of Well

☒ Water Supply ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Replacement Well ☐ Abandoned, Insufficient Supply ☐ Alteration (Construction) ☐ Test Hole ☐ Abandoned, Poor Water Quality ☐ Other, specify ☐ Recharge Well ☐ Abandoned, other, specify

Location of Well

Please provide a map below showing:
- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- v/digital pictures of inside of well can also be provided



Results of Well Yield Testing

Check box if after test of well yield, water was: ☒ Clear and sand free ☐ Cannot develop to sand-free state

If pumping discontinued, give reason:

Pumping test method: submersible

Pump intake set at (Metres): 13.71

Pumping rate (Litres/min): 54.6

Duration of pumping: 4 hrs + ____ min

Final water level end of pumping (Metres): 7.82

Recommended pump type: ☐ Shallow ☒ Deep

Recommended pump depth: 13.71 Metres

Recommended pump rate (Litres/min): 45.5

If flowing give rate (Litres/min):

Draw Down Time (Min)	Draw Down Water Level (Metres)	Recovery Time (Min)	Recovery Water Level (Metres)
Static Level	5.13	Static Level	
1	6.58	1	6.18
2	7.01	2	5.77
3	7.38	3	5.59
4	7.58	4	5.46
5	7.63	5	5.40
10	7.67	10	5.234
15	7.74	15	5.18
20	7.81	20	5.16
25	7.72	25	5.13
30	7.74	30	
40	7.81	40	
50	7.81	50	
60	7.87	60	

Water Details

Water found at Depth	Kind of Water
17.22 Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Casing Used / Screen Used / Casing and Well Details

Casing Used	Screen Used
☐ Galvanized	☐ Galvanized
☒ Steel	☒ Steel
☐ Fibreglass	☐ Fibreglass
☐ Plastic	☐ Plastic
☐ Concrete	☐ Concrete

Diameter of the Hole (Centimetres): 0 17.22 / 17.22 – 18

Depth of the Hole (Metres): 18.43

Well Thickness (Metres): .48

No Casing and Screen Used

☐ Open Hole

Disinfected? ☒ Yes ☐ No

Inside Diameter of the Casing (Metres): 15.86

Depth of the Casing (Metres): + 1.21 to 17.22

Date Well Completed (yyyy/mm/dd)	Was the well owner's information package delivered?	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd)
2008/3/17	☒ Yes ☐ No	2008/3/18

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Capital Water Supply Ltd.	1558

Business Address (Street No./Name, number, RR)	Municipality
Box 490	Stittsville

Province	Postal Code	Business E-mail Address
Ontario	K2A1A6	office@capitalwater.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
613 836 5176	Miller, Stephen

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
0097		2008/3/19

Ministry Use Only

Audit No.	Well Contractor No.
Z 77321	
Date Received (yyyy/mm/dd)	Date of Inspection (yyyy/mm/dd)
Remarks	

0506E (11/2006)

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A 065278

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	MacBath Mechanical Inc.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
13 Neely	Dunrobin	Ontario	K0A1T0	613 832 0100

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2744 Dunrobin Road	Kanata	27	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Carleton	Dunrobin	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	412027	5030301		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Clay		Packed	0	5.40
Brown	Sand	Silt	Fine	5.40	11.27
Brown	Sand		Fine	11.27	12.19
Gray	Sand			12.19	14.02

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used *(Material and Type)*	Volume Placed (m³/ft³)
12.80	0	Grouted Bentonite Slurry	.132m3

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☐ Air percussion ☐ Other, *specify*

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, *specify*

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15.86	Steel	.48	4.65	12.80

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
14.	Steel	8	12.80	14.02

Status of Well

☐ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, *specify* ☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	12.80	15.86
12.80	14.02	14

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Capital Water Supply Ltd.	1515

Business Address (Street Number/Name)	Municipality
Box 490	Smiths Falls

Province	Postal Code	Business E-mail Address
Ontario	K7A4A6	office@capitalwater.ca

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
613 283 1760	Miller, Stephen

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1515		2009/09/04

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, *specify*

If pumping discontinued, give reason:

Pump intake set at (m/ft): 12.19

Pumping rate (l/min / GPM): 54.5

Duration of pumping: 1 hrs + ____ min

Final water level end of pumping (m/ft): 7.61

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 12.19

Recommended pump rate (l/min / GPM): 45.5

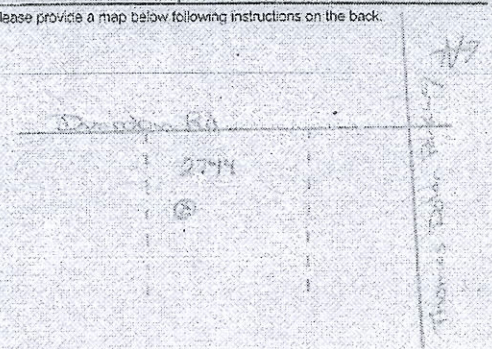
Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	5.18		
1	6.80	1	5.95
2	7.32	2	5.45
3	7.50	3	5.38
4	7.56	4	5.32
5	7.58	5	5.20
10	7.60	10	
15	7.61	15	
20	7.61	20	
25	7.62	25	
30	7.61	30	
40	7.61	40	
50	7.62	50	
60	7.61	60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered: ☐ Yes ☒ No

Date Package Delivered: 2009/09/04

Date Work Completed: 2009/08/31

Ministry Use Only

Audit No. Z 84396

APPENDIX B

WELL COMPLIANCE CERTIFICATES FOR ON SITE WELLS

Ottawa

CERTIFICATE OF WELL COMPLIANCE

Capital Water Supply Ltd DO HEREBY CERTIFY that I am licensed to drill wells in the Province of Ontario, and that I have supervised the drilling of a well on the property of MacBeth Mechanical (Name of Landowner), located at 2744 Duranbin Road (Legal Description. Lot/Plan No.) in the City of Ottawa (Geographical Township of).

LOT 26 CONC. 3 PLAN* S/L*

CERTIFY FURTHER that, I am aware of the well drilling requirements, the guidelines, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario, and the standards specified in any subdivision agreement and hydrogeological report applicable to this site and City Standards.

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted (cement or bentonite) as applicable and constructed in strict conformity with the standards required.

Signed this 17 day of March, 2008

Well Driller/Company

The Engineer on behalf of the landowner set out above Certifies that he/she has inspected the well and it was constructed in accordance with the specifications in O.Reg.903. this report ~~and the Hydrogeological Report~~ with regards to casing length and grouting requirements.

SIGNED this 28th day of July 2008

Engineer

for KOLLAMS ASSOCIATES INC.

Shaping our future together
Façonnons notre avenir

City of Ottawa
Client Service Centre
4949 Victoria Street
Ottawa ON K2A 0A6

Ville d'Ottawa
Centre de service
4949, rue Victoria
Ottawa ON K2A 0A6

2001

Ottawa

CERTIFICATE OF WELL COMPLIANCE

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LOT 26 CONC. 3 PLAN# S/L#

CERTIFY FURTHER that, I am aware of the well drilling requirements, the guidelines, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario, and the standards specified in any subdivision agreement and hydrogeological report applicable to this site and City Standards.

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted (cement or bentonite) as applicable and constructed in strict conformity with the standards required.

Signed this 12 day of March, 2008.

Well Driller/Company

The Engineer on behalf of the landowner set out above Certifies that he/she has inspected the well and it was constructed in accordance with the specifications in O.Reg.903, this report ~~and the Hydrogeological Report~~ with regards to casing length and grouting requirements.

SIGNED this 28th day of July 2008.

Engineer

for KOLLAARD ASSOCIATES INC.

Shaping our future together
Ensemble, formons notre avenir

City of Ottawa
Client Service Centre
Ville d'Ottawa
Centre de service

2001

Capital
WATER SUPPLY LTD.
WELL DRILLING

P.O. Box 490
Stittsville, Ontario
K2S 1A6
www.capitalwater.ca

Stittsville (613) 836-1766
Richmond (613) 838-7845
Almonte (613) 256-1766
Fax (613) 838-5899

CERTIFICATE OF WELL COMPLIANCE

We, Capital Water Supply Ltd., do hereby certify that we are licensed to drill water wells in the Province of Ontario, and that we have drilled the well on the property of MacBeth Mechanical located at 2744 Dunrobin Road in the township of Kanata

We certify further that we are aware of the drilling requirements of the Township of KAnata , recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario and the standards specified in any subdivision agreement and hydro-geological report applicable to the site noted by the owner.

And I do hereby certify that the said well has been drilled, cased and grouted to the standards required.

SIGNED THIS 3 Day of September 2008

Engineer

Well Driller/Company

The landowner of the lot set out above certifies that the best of the owner's knowledge and belief all statements set out above are true.

SIGNED THIS Day of 20

Landowner.

APPENDIX C

RESULTS OF FIELD AND LABORATORY TESTING OF "NEW" WELL WATER SAMPLES

RESULTS OF THE FIELD WATER QUALITY MEASUREMENTS
FOR TEST WELL #A068278

Time Since Pumping Test Started [hours]	Turbidity [NTU]	Temperature [°C]	pH	Total Dissolved Solids [mg/l]	Conductivity [μs]	Free Chlorine [mg/l]
1	0.0	8.2	7.35	611	1190	0
2	0.0	8.2	7.36	572	1146	0
3	0.0	8.3	7.36	584	1157	0
4	0.0	8.3	7.41	575	1157	0
5	0.0	8.1	7.40	573	1148	0
6	0.0	7.8	7.43	577	1149	0

ACCUTEST LABORATORIES - A New Bodycote Company

REPORT OF ANALYSIS

Client: Kollaard Associates Inc.
215 Sanders St., Box 189
Kemptville, ON
K0G 1J0
Attention: Mr. Randy Morey

Report Number: 2831432
Date: 2008-12-18
Date Submitted: 2008-12-15
Project: 070352
P.O. Number:
Matrix: Water

Chain of Custody Number: 95548

			LAB ID:	681684	681685				GUIDELINE		
			Sample Date:	2008-12-15	2008-12-15						
			Sample ID:	3:33 6Hr	12:33 3Hr				ODWSOG		
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Alkalinity as CaCO3	mg/L	5		261	261				OG	500	mg/L
Chloride	mg/L	1		182	179				AO	250	mg/L
Colour	TCU	2		5	2				AO	5	TCU
Conductivity	uS/cm	5		1230	1240						
Dissolved Organic Carbon	mg/L	0.5		2.3	2.6				AO	5	mg/L
Fluoride	mg/L	0.10		<0.10	<0.10				MAC	1.5	mg/L
Hydrogen Sulphide	mg/L	0.01		0.01	0.02				AO	0.05	mg/L
N-NH3 (Ammonia)	mg/L	0.02		0.05	0.05						
N-NO2 (Nitrite)	mg/L	0.10		<0.10	<0.10				MAC	1.0	mg/L
N-NO3 (Nitrate)	mg/L	0.10		<0.10	<0.10				MAC	10.0	mg/L
pH				7.86	7.84					6.5-8.5	
Phenols	mg/L	0.001		0.001	<0.001						
Sulphate	mg/L	1		101	102				AO	500	mg/L
Tannin & Lignin	mg/L	0.1		0.3	0.3						
TDS (COND - CALC)	mg/L	5		800	806				AO	500	mg/L
Total Kjeldahl Nitrogen	mg/L	0.10		0.17	0.16						
Turbidity	NTU	0.1		26.6	23.9				MAC	1.0	NTU
Hardness as CaCO3	mg/L	1		503	510				OG	100	mg/L
Ion Balance		0.01		1.03	1.05						
Calcium	mg/L	1		129	130						
Magnesium	mg/L	1		44	45						
Potassium	mg/L	1		7	8						
Sodium	mg/L	2		61	61				MAC	20	mg/L
Iron	mg/L	0.03		1.72	1.75				AO	0.3	mg/L
Manganese	mg/L	0.01		0.13	0.13				AO	0.05	mg/L

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL
Ewan McRobbie
Inorganic Lab Supervisor

ACCUTEST LABORATORIES - A New Bodycote Company

REPORT OF ANALYSIS

Client: Kollaard Associates Inc.
215 Sanders St., Box 189
Kemptville, ON
K0G 1J0
Attention: Mr. Randy Morey

Report Number: 2831425
Date: 2008-12-18
Date Submitted: 2008-12-15

Project: 070352

P.O. Number:

Chain of Custody Number: 95548

Matrix: Water

			LAB ID:	681675	681676				GUIDELINE		
			Sample Date:	2008-12-15	2008-12-15				ODWSOG		
			Sample ID:	3:33 6hr	12:33 3hr						
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Total Coliforms	ct/100mL			0	0				MAC	0	ct/100mL
Escherichia Coli	ct/100mL			0	0				MAC	0	ct/100mL
Heterotrophic Plate Count	ct/1mL			24	60						
Faecal Coliforms	ct/100mL			0	0						
Faecal Streptococcus	ct/100mL			0	0						

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Jennifer Mitchell
Microbiology Lab Supervisor

Client: Kollaard Associates Inc.
215 Sanders St., Box 189
Kemptville, ON
K0G 1J0
Attention: Mr. Randy Morey

Report Number: 2631432
Date: 2008-12-18
Date Submitted: 2008-12-15

Project: 070352

P.O. Number:
Matrix: Water

Chain of Custody Number: 95548

			LAB ID:	681684	681685				GUIDELINE		
			Sample Date:	2008-12-15	2008-12-15						
			Sample ID:	3:33 6Hr	12:33 3Hr				ODWSOG		
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
VOLATILE ORGANIC COMPOUNDS - VOCs											
1,1,1,2-tetrachloroethane	ug/L	0.5		<0.5	<0.5						
1,1,1-trichloroethane	ug/L	0.4		<0.4	<0.4						
1,1,2,2-tetrachloroethane	ug/L	0.5		<0.5	<0.5						
1,1,2-trichloroethane	ug/L	0.4		<0.4	<0.4						
1,1-dichloroethane	ug/L	0.4		<0.4	<0.4						
1,1-dichloroethylene	ug/L	0.5		<0.5	<0.5				MAC	14	ug/L
1,2-dibromoethane	ug/L	1.0		<1.0	<1.0						
1,2-dichlorobenzene	ug/L	0.4		<0.4	<0.4				MAC	200	ug/L
1,2-dichloroethane	ug/L	0.5		<0.5	<0.5				IMAC	5	ug/L
1,2-dichloropropane	ug/L	0.5		<0.5	<0.5						
1,3,5-trimethylbenzene	ug/L	0.3		<0.3	<0.3						
1,3-dichlorobenzene	ug/L	0.4		<0.4	<0.4						
1,4-dichlorobenzene	ug/L	0.4		<0.4	<0.4				MAC	5	ug/L
Benzene	ug/L	0.5		<0.5	<0.5				MAC	5	ug/L
Bromodichloromethane	ug/L	0.3		<0.3	<0.3						
Bromoform	ug/L	0.4		<0.4	<0.4						
Bromomethane	ug/L	0.5		<0.5	<0.5						
c-1,2-Dichloroethylene	ug/L	0.4		<0.4	<0.4						
c-1,3-Dichloropropylene	ug/L	0.2		<0.2	<0.2						
Carbon Tetrachloride	ug/L	0.5		<0.5	<0.5				MAC	5	ug/L
Chloroethane	ug/L	1.0		<1.0	<1.0						
Chloroform	ug/L	0.5		<0.5	<0.5						
Chloromethane	ug/L	1.0		<1.0	<1.0						
Dibromochloromethane	ug/L	0.3		<0.3	<0.3						
Dichloromethane	ug/L	4.0		<4.0	<4.0				MAC	50	ug/L
Ethylbenzene	ug/L	0.5		<0.5	<0.5				AO	2.4	ug/L
m/p-xylene	ug/L	1.0		<1.0	<1.0						
Monochlorobenzene	ug/L	0.2		<0.2	<0.2				MAC	80	ug/L
o-xylene	ug/L	0.5		<0.5	<0.5						

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

REPORT OF ANALYSIS

Client: Kollaard Associates Inc.
215 Sanders St., Box 189
Kemptville, ON
K0G 1J0
Attention: Mr. Randy Morey

Report Number: 2831432
Date: 2008-12-18
Date Submitted: 2008-12-15

Project: 070352

P.O. Number:
Matrix: Water

Chain of Custody Number: 95548

			LAB ID:	681684	681685				GUIDELINE		
			Sample Date:	2008-12-15	2008-12-15				ODWSOG		
			Sample ID:	3:33 6Hr	12:33 3Hr						
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Styrene	ug/L	0.5		<0.5	<0.5						
t-1,2-Dichloroethylene	ug/L	0.4		<0.4	<0.4						
t-1,3-Dichloropropylene	ug/L	0.2		<0.2	<0.2						
Tetrachloroethylene	ug/L	0.3		<0.3	<0.3				MAC	30	ug/L
Toluene	ug/L	0.5		<0.5	<0.5				AO	24	ug/L
Trichloroethylene	ug/L	0.3		<0.3	<0.3				MAC	5	ug/L
Trichlorofluoromethane	ug/L	0.5		<0.5	<0.5						
Vinyl Chloride	ug/L	0.2		<0.2	<0.2				MAC	2	ug/L
VOC SURROGATES											
1,2-dichloroethane-d4	%			104	105						
4-bromofluorobenzene	%			98	96						
Toluene-d8	%			99	98						

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

APPENDIX D

RESULTS OF PREVIOUS LABORATORY TESTING OF WELL WATER SAMPLE AND WELL RECORD FOR 2730 DUNROBIN ROAD

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: Kollaard Associates Inc.
215 Sanders St, Box189
Kemptville, ON
K0G 1J0
Attention: Dean Tataryn

Report Number: 2523587
Date: 2005-11-28
Date Submitted: 2005-11-18

Project: 050175

P.O. Number:
Matrix: Water

			LAB ID:	426586	426587				GUIDELINE		
			Sample Date:	2005-11-17	2005-11-17				MOE REG. 170/03		
			Sample ID:	TW1-1hr	TW1-6hr						
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Alkalinity as CaCO3	mg/L	5		231	232				OG	500	mg/L
Chloride	mg/L	1		95	101				AO	250	mg/L
Colour	TCU	2		4	3				AO	5	TCU
Conductivity	uS/cm	5		839	846						
Dissolved Organic Carbon	mg/L	0.5		2.1	1.6				AO	5	mg/L
Fluoride	mg/L	0.10		0.34	0.36				MAC	1.5	mg/L
Hydrogen Sulphide	mg/L	0.01		<0.01	<0.01				AO	0.05	mg/L
N-NH3 (Ammonia)	mg/L	0.02		0.04	0.06						
N-NO2 (Nitrite)	mg/L	0.10		<0.10	<0.10				MAC	1.0	mg/L
N-NO3 (Nitrate)	mg/L	0.10		<0.10	<0.10				MAC	10.0	mg/L
pH				7.80	7.86				AO	6.5-8.5	
Phenols	mg/L	0.001		<0.001	<0.001						
Sulphate	mg/L	1		62	65				AO	500	mg/L
Tannin & Lignin	mg/L	0.1		<0.1	<0.1						
TDS (COND - CALC)	mg/L	5		545	550				AO	500	mg/L
Total Kjeldahl Nitrogen	mg/L	0.05		0.16	0.14						
Turbidity	NTU	0.1		17.7	3.2				AO	1.0	NTU
Hardness as CaCO3	mg/L	1		391	388				OG	100	mg/L
Ion Balance		0.01		1.04	1.00						
Calcium	mg/L	1		112	111						
Magnesium	mg/L	1		27	27						
Potassium	mg/L	1		4	4						
Sodium	mg/L	2		23	23				AO	20	mg/L
Iron	mg/L	0.03		2.16	0.50				AO	0.3	mg/L
Manganese	mg/L	0.01		0.15	0.20				AO	0.05	mg/L

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Ewan McRobbie
Inorganic Lab Supervisor

Ontario Ministry of the Environment

The Ontario Water Resources Act

WATER WELL RECORD

TW 1

COPY

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

County or District	Township/Borough/City/Town/Village	Con block tract survey. etc.	Lot
OTTAWA CARLETON	KANATA RURAL (March)	CONCESSION 4	27
Owner's surname / **First Name**	**Address**	**Date completed**	
BLACK CONSTRUCTION	2123 Chalmers Rd, Ottawa, Ont.	19 day 08 month 99 year	

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
GREY	CLAY			0	10
BLUE	CLAY			10	19
GREY	SAND		FINE	19	47

WATER RECORD

Water found at - feet	Kind of water
47	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 4"	☒ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic	0.188"	+2	43
Screen	☐ Steel ☐ Galvanized ☐ Concrete ☒ Open hole ☐ Plastic		43	47
	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter	Length
SLOT #8	5 1/2 inches	4 feet
Material and type	**Depth at top of screen**	
Stainless / Kitterage	43 feet	

PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	20	Holeplug grout.

PUMPING TEST

Pumping test method	Pumping rate	Duration of pumping
☐ Pump ☒ Bailer	10 GPM	1 Hours 0 Mins

Static level	Water level end of pumping	Water levels during ☒ Pumping ☐ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
18 feet	24 feet	24 feet	24 feet	24 feet	24 feet

If flowing give rate	Pump intake set at	Water at end of test
GPM	40 feet	☒ Clear ☐ Cloudy

Recommended pump type	Recommended pump setting	Recommended pump rate
☐ Shallow ☒ Deep	40 feet	5 GPM

FINAL STATUS OF WELL

☒ Water supply ☐ Observation well ☐ Test hole ☐ Recharge well
☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Abandoned (Other) ☐ Dewatering
☐ Unfinished ☐ Replacement well

WATER USE

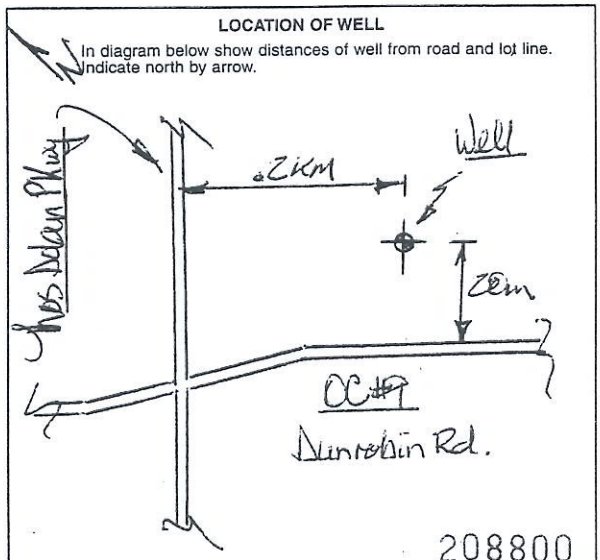
☒ Domestic ☐ Stock ☐ Irrigation ☐ Industrial
☐ Commercial ☐ Municipal ☐ Public supply ☐ Cooling & air conditioning
☐ Not use ☐ Other

METHOD OF CONSTRUCTION

☒ Cable tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☒ Rotary (air)
☐ Air percussion ☐ Boring ☐ Diamond ☐ Jetting
☐ Driving ☐ Digging ☐ Other

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Name of Well Contractor	Well Contractor's Licence No.
STANTON DRILLING INC	4875
Address	
BOX 219, Pakenham, Ont.	
Name of Well Technician	**Well Technician's Licence No.**
Peter Stanton	T-0086
Signature of Technician/Contractor	**Submission date**
	day 24 mo 08 yr 99

MINISTRY USE ONLY

APPENDIX E

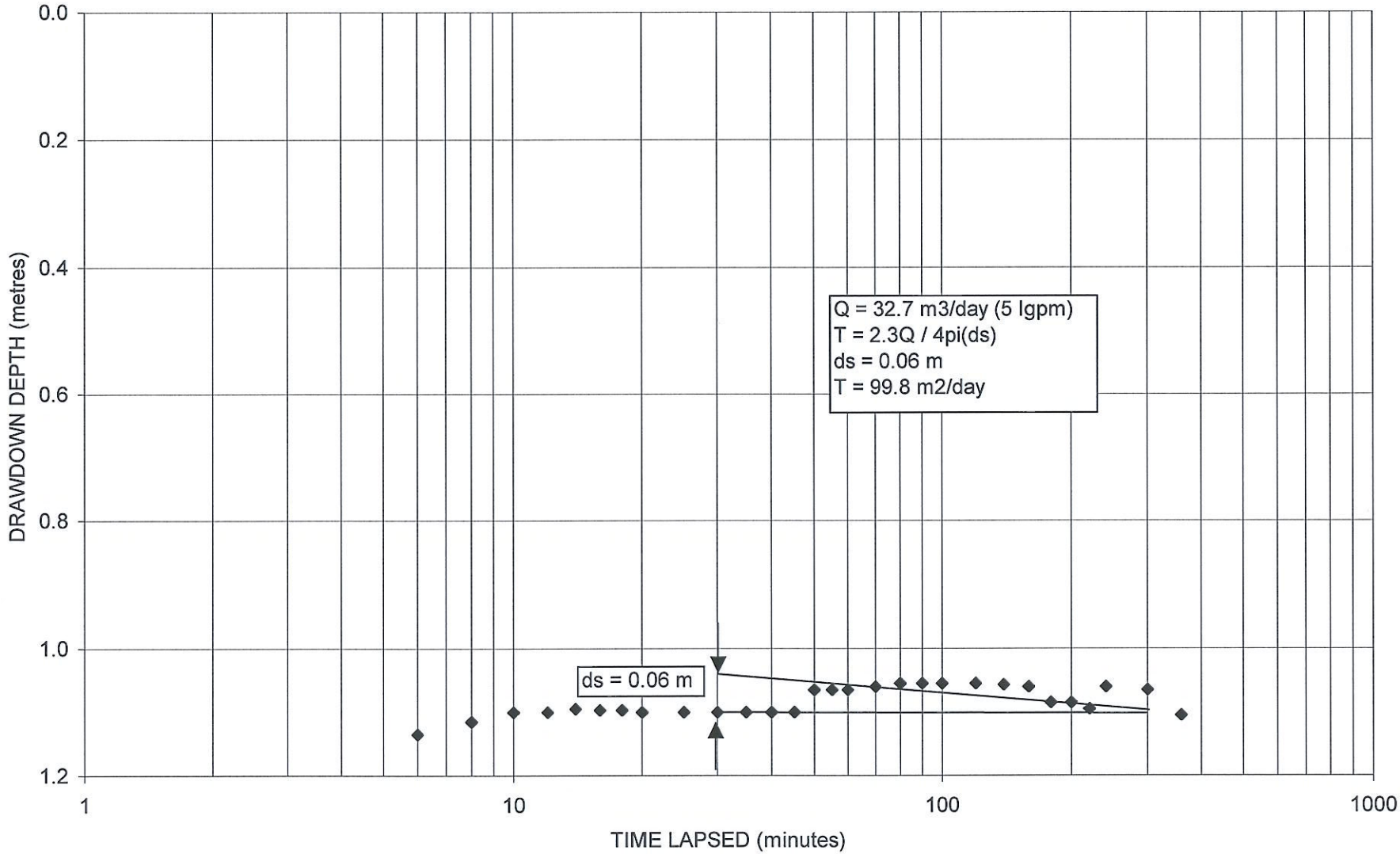
"NEW" WELL PUMPING OBSERVATIONS

Kollaard File 070352
DRAWDOWN DATA WELL TAG #A068278

Pump Rate **5 gal/min**

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
9:33	0	5.085	0.000
9:39	6	6.220	1.135
9:41	8	6.200	1.115
9:43	10	6.185	1.100
9:45	12	6.185	1.100
9:47	14	6.180	1.095
9:49	16	6.182	1.097
9:51	18	6.182	1.097
9:53	20	6.185	1.100
9:58	25	6.185	1.100
10:03	30	6.185	1.100
10:08	35	6.185	1.100
10:13	40	6.185	1.100
10:18	45	6.185	1.100
10:23	50	6.150	1.065
10:28	55	6.150	1.065
10:33	60	6.150	1.065
10:43	70	6.145	1.060
10:53	80	6.140	1.055
11:03	90	6.140	1.055
11:13	100	6.140	1.055
11:33	120	6.140	1.055
11:53	140	6.142	1.057
12:13	160	6.145	1.060
12:33	180	6.170	1.085
12:53	200	6.170	1.085
13:13	220	6.180	1.095
13:33	240	6.145	1.060
14:33	300	6.150	1.065
15:33	360	6.190	1.105

WELL DRAWDOWN VS. TIME-Kollaard File 070352

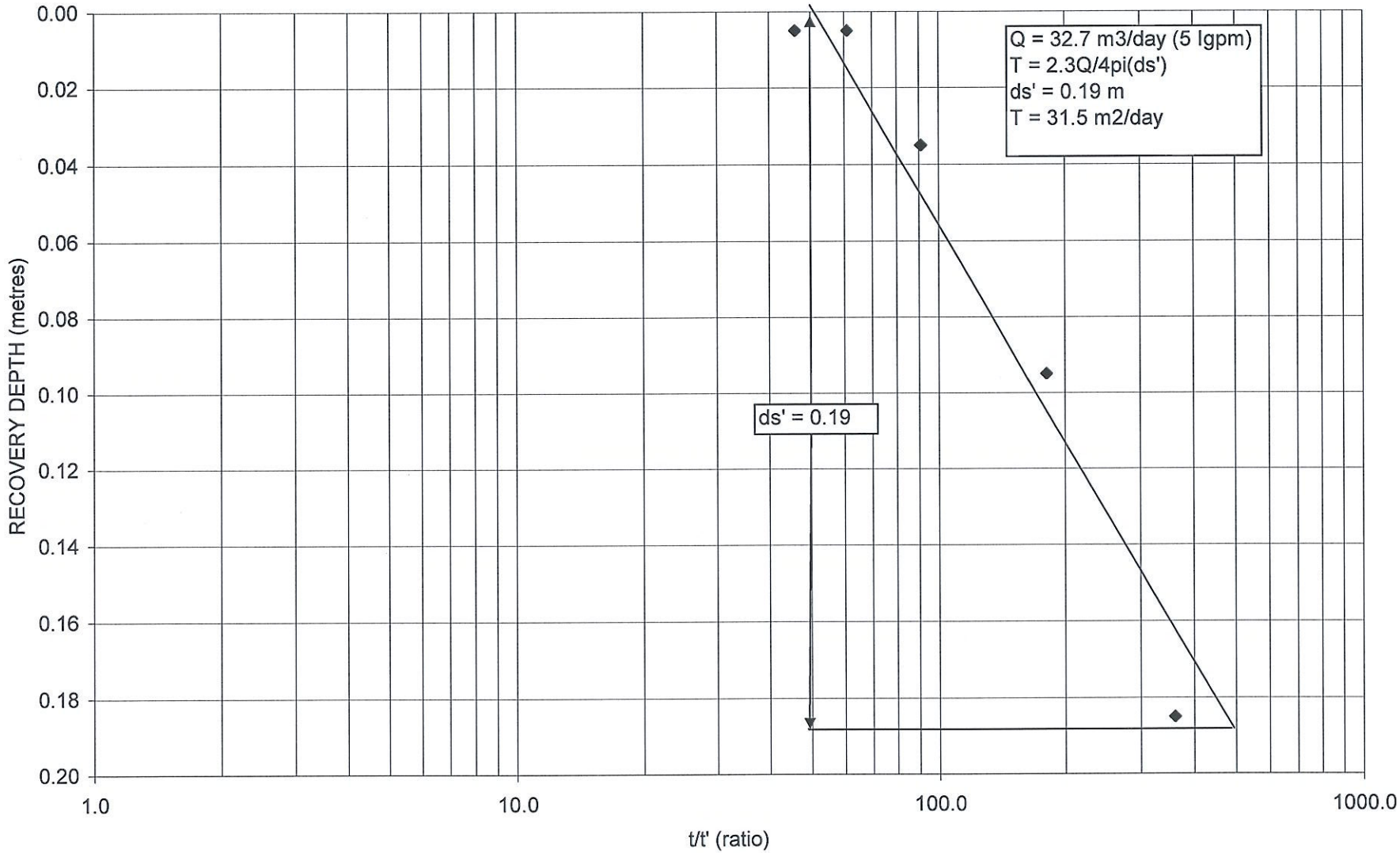


Kollaard File 070352
RECOVERY DATA WELL TAG #A068278

Recovery Time t' (minutes)	t / t' (ratio)	Depth (metres)	h-ho (metres)
0		6.19	1.11
1	361.0	5.27	0.19
2	181.0	4.99	0.09
4	91.0	5.05	0.04
6	61.0	5.08	0.00
8	46.0	5.09	0.00

100% **RECOVERY AFTER** **8.00** **MINUTES.**

RESIDUAL(RECOVERY) DATA-Kollaard File 070352



December 2008 070352

DRAWDOWN IN OBSERVATION WELLS
DURING PUMPING OF TEST WELL TAG #A068278

PUMPED WELL: WELL TAG #A068278
OBSERVATION WELL: 2730 Dunrobin Road
DISTANCE BETWEEN
PUMPED WELL AND OBSERVATION WELL: 105 metres

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
9:33 (Before Start)	0	4.945	0.000
10:33	60	4.950	0.005
11:33	120	4.955	0.010
12:33	180	4.955	0.010
13:33	240	4.950	0.005
14:33	300	4.955	0.010
4:03 (Recovery)	390	4.950	0.005

PUMPED WELL: WELL TAG #A068278
OBSERVATION WELL: WELL TAG #A051529
DISTANCE BETWEEN
PUMPED WELL AND OBSERVATION WELL: 21.5 metres

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
9:33 (Before Start)	0	4.995	0.000
10:33	60	5.010	0.015
11:33	120	5.010	0.015
12:33	180	5.010	0.015
13:33	240	5.030	0.035
14:33	300	5.015	0.020
4:03 (Recovery)	390	4.995	0.000

APPENDIX F

ZONE OF INFLUENCE CALCULATIONS

December 2008 070352

Steady State Capture Zone
Calculation

$$Y\max = \frac{Q}{2KbI}$$

where Q Pump Rate, m3/day
K Hydraulic conductivity, m/day
b aquifer thickness, m
I hydraulic gradient, dimensionless

from Fetter, C.W., 2011, Applied Hydrogeology, 4th edition, Upper Saddle River, New Jersey, Prentice Hall.

Given:

Q	32.7 m3/day	
I	5.085 - 4.995	hydraulic gradient between the two test wells on site,
	21.5	based on static water levels

For a confined aquifer, that is fully penetrated, T = Kb
Transmissivity 99.8 m2/day, from pumping test data

$$Y\max = \frac{Q}{2\Pi I}$$

Y max 39 m

At a pumping rate of 5 igpm (32.7 m3/day), the radius of the well capture zone is about 39 metres.

The expected demand for the proposed use is about 3000L/day.
Given:
Q 3 m3/day
Y max 3.59 m

Equation assumes:
fully penetrating, confined aquifer of infinite lateral extent of isotropic media