Water Supply Summary Report - Kawartha Downs & Speedway, Fraserville, Ontario

October 14, 2021

Prepared for: Romspen Investment Corporation

Cambium Reference: 12579-001

CAMBIUM INC.

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Romspen Investment Corporation (Client) to conduct a water supply assessment for the Kawartha Downs and Speedway, located at 1382 County Road 28, in the community of Fraserville, in the County of Peterborough, Ontario (Site).

The present land-use for the middle and southern section of the Site is as a commercial raceway; the northern section of the site is presently rural residential with some agricultural uses (Figure 1). Cambium understands that the Client is exploring a subdivision development for the subject property.

The water supply assessment was completed in support of a proposed re-development and includes a general review of available surrounding hydrogeological and water supply information and an evaluation of the results of pumping tests conducted on two (2) on-site wells. As part of the scope of work, Cambium was also retained to complete a Geotechnical Investigation (Cambium, 2021a), a Phase I and Phase II Environmental Site Assessment (ESA) (Cambium, 2021b; Cambium, 2021c; Cambium, 2021d), a Preliminary Natural Features Assessment & Ecological Constraints (Cambium, 2021e), a Wastewater Packaged Treatment Plant Concept (Cambium, 2021f), and an Environmental Impact Study (EIS) (Cambium, 2021g); each of these reports will be presented under a different cover.

1.1 Site Description

The Site is 267 acres (108 ha) and is L-shaped. The southern portion of the Site is developed with a commercial building, paved parking, paved driveways, and a 3/8-mile paved oval racetrack; it is zoned Commercial District 4 (C4) as per plate 'D-4' per the Township of Cavan-Monaghan Zoning By-Law 2015-58 Schedule. The northern portion of the Site is currently vacant field; it is zoned Agricultural (A) as per 'Map D-4' per the Township of Cavan-Monaghan Zoning By-Law 2015-58 Schedule. The Site is bordered by natural core, rural residential, and agricultural to the west, hamlet residential and agricultural to the south, County Road 28 to the



east, and Moore Drive to the North. Refer to Appendix A for Zoning By-Law and land information.



2.0 Surrounding Area Hydrogeology and Water Supply

2.1 Water Well Records

The Ministry of Environment Conservation and Parks (MECP) Water Well Information System (WWIS) was accessed to review water well records in the area of the Site. There were 48 water well records located within approximately 500 m of the borders of the Site (see Figure 2). The following water well records were identified:

- Forty-four (44) water well records for drilled wells
- One (1) water well record for a monitoring well
- One (1) record outlined no information
- Two (2) records outlined well abandonments

The soil profile generally consisted of >1 m of topsoil, underlain by overburden. Overburden generally consisted of interlayered beds of brown clay with clasts and sand and sand with silt and gravel sediments. 24 well records reported bedrock (limestone and shale) contact between 8.23 to 14.48 metres below ground surface (mbgs).

Water bearing sediments were identified within overburden at various depths. Water bearing strata were also identified at the overburden bedrock contact and within bedrock (within 0 to 26.51 m, average 4.88 m of bedrock contact).

The static water level of overburden wells ranged from 1.22 to 9.14 mbgs, average of 4.70 mbgs. The recommended flow rate reported from the overburden supply wells ranged from 3 gallon per minute (gpm, assumed to be US gallons per minute) to 30 gpm, averaging 11 gpm. These flow rates equate to ranges between 11 L/min and 114 L/min, averaging 41 L/min.

The static water level of bedrock wells ranged from 0.61 to 7.01 mbgs, average of 3.42 mbgs. The recommended flow rate reported from the bedrock supply wells ranged from 4 gpm to 25 gpm, averaging 11 gpm. These flow rates equate to ranges between 15 L/min and 95 L/min, averaging 41 L/min. Further information summarized from the water well records are listed below in Table 1.



		Total Depth (mbgs)	Depth Water Encountered (m)	Depth Installed into Bedrock (m)	Static Water Level (mbgs)	Recommended Pumping Rate (gpm)
Overburden	Min	9.14	7.01	-	1.22	3.00
Wells	Max	17.37	17.37	-	9.14	30.00
Count:22	Avg.	11.53	11.25	-	4.70	10.82
Bedrock	Min	10.67	8.23	0.30	0.61	4.00
Wells Count:	Max	41.15	39.62	28.04	7.01	25.00
22	Avg.	20.12	14.87	10.13	3.42	10.91

Table 1:Water Well Record Information

2.1.1 Tested Water Wells

The following MECP wells records correlate to the wells that were used for the pump testings for the scope of work for this assessment. The MECP well records can be found in Appendix B.

2.1.1.1 Well 1: 5119296

Well 1 (MECP Tag # 5119296) was installed on November 20, 2002, approximately 400 m southeast of the existing residential dwelling at 1627 Moore Drive, Fraserville, Ontario. Well 1 was installed to a depth of 22.86 mbgs, with an open bedrock hole extending from 14.48 mbgs to 22.86 mbgs. During installation, sediments were described as sandy clay transitioning into sandy clay with gravel and some boulders. A water-bearing gravel layer was encountered at the overburden – bedrock contact at 14.48 mbgs. Limestone bedrock continued until well termination at 22.86 mbgs. Static water level on the day on the well installation was 3.35 mbgs. The well driller's recommended pumping rate was 38 L/min.The location of Well 1 is provided on Figure 1.

2.1.1.2 Well 2: 5119297

Well 2 (MECP Tag # 5119297) was installed on November 18, 2002, approximately 350 m east of the existing residential dwelling at 1627 Moore Drive, Fraserville, Ontario. Well 2 was installed to a depth of 23.16 mbgs, with an open bedrock hole extending from 11.58 mbgs to 23.16 mbgs. During installation, sediments were described as silty sand overlying sandy clay



with gravel. A water-bearing gravel layer was encountered at the overburden – bedrock contact at 11.58 mbgs. Limestone bedrock continued until well termination at 23.16 mbgs. Static water level on the day on the well installation was 3.05 mbgs. The well driller's recommended pumping rate was 45 L/min. The location of Well 2 is provided on Figure 1.

2.1.2 Minimum Yield Rate

As per Guideline D-5-5 (Ministry of the Environment, 1996) the minimum yield rate per person is 450 litres per day (0.3125 L/min). As per the most up-to-date proposed site plan at the preparation of this report (Appendix A), there will be 588 single-family dwellings built. At an average of 2.5 residents per dwelling, the minimum yield from one supply well for the proposed development would average approximately 460 L/min continually. Guideline D-5-5 also dictates that peak demand occurs for a period of 120 minutes per day and the peak demand rate is a minimum of 3.75 L/min per person. This yield of a minimum rate for the proposed development to approximately 5,500 L/min.

As per the MECP WWIS, the average yields of the overburden supply wells and bedrock supply wells were both approximately 41 L/min. This yield rate is insufficient for a communal/municipal supply that would be required for the proposed development.

2.2 Wetlands

A provincially significant wetland (PSW) is located within the boundaries of the Site. The PSW was identified as Cavan Creek Wetland. Existing Ministry of Natural Resources and Forestry (MNRF) PSW mapping shows two pieces of the PSW on the property, one extending eastward into the property from the western property boundary, in the central portion of the Site and the other extending southward onto the property from the northwest corner. Mapped unevaluated wetlands are approximate; as such, they require field verification in order to determine their presence and confirm their boundaries. In addition, areas of unevaluated wetlands are mapped surrounding the PSW's perimeter on the Site and adjacent lands. Mapped unevaluated wetlands are approximate; as such, they require field verification to determine their presence and confirm their boundaries. In 2021e).



The central portion of the Cavan Creek Wetland drains westwards off the Site. The northern portion of the Cavan Creek Wetland drains northwards off the Site. Other wetland areas in the northeastern portion of the Site drain eastwards off-site. All drainage from the Site converges with Cavan Creek before outletting to the Otonabee River.

2.3 Vulnerable and Regulated Areas

As per the Ministry of the Environment, Conservation and Parks (Ministry) Source Water Protection Information Atlas (SPIA) the Site is within the following areas:

- Highly Vulnerable Aquifer
- Significant Groundwater Recharge Area
- Intake Protection Zone 3

The SPIA mapping is attached in Appendix A.

There are several setback areas associated with the wetlands present on-site that should be considered as part of development on the property. Further studies to delineate on-site wetland boundaries and associated setback will be required (Cambium, 2021e).

2.4 Hydrogeological Conditions

Available information indicates that there are fine- to medium-grained sediments located at surface on the Site. Overburden sediments generally were water bearing indicating a shallow aquifer in the area averaging 4.70 mbgs. 22 drilled well records encountered bedrock on average 10.9 mbgs; each of these records recorded water found at or below the overburden bedrock contact, indicating an additional deeper bedrock aquifer averaging 14.9 mbgs.

Groundwater flow within the shallow overburden sediments on-site was assumed to follow the overlying topography of the Site, and groundwater to the north and west of the topographic high was assumed to flow northward off-site into the PSW (Cavan Creek Wetland). Groundwater to the south and east of the topographic high flows to the east toward the Otonabee River (Appendix A, Figure 1). The on-site unevaluated wetland is assumed to be sourced both from surface runoff and shallow groundwater discharge.



3.0 Pumping Test Results

This section presents the results of the pumping tests for two (2) on-site wells.

3.1 Well 1

The static water level of Well 1 was 2.77 mtop (which corresponds to a depth of 2.15 mbgs) just prior to the pumping test. The pumping test commenced at 10:20 am on August 16, 2021 at a rate of 30 L/min. Within 10 minutes after the commencement of the pumping test, the water level of Well 1 lowered to 6.88 mtop. After the initial 10 minute interval the water level of Well 1 lowered consistently until 12:20 pm to a level of 8.27 mtop. At 12:20 pm, the pumping rate was increased to 45 L/min. Within 10 minutes of the new pumping rate, the water level lowered to 9.85 mtop; water levels then lowered consistently until 2:20 pm to a level of 10.88 mtop. Finally, the pumping rate was adjusted to 60 L/min at 2:20 pm. Again, after the initial 10 minute interval the water level was lowered to 13.92 mtop. Water levels consistently lowered after this until the end of the pumping test at 3:32 pm with a recorded water level of 14.88 mtop. The depth of drawdown achieved at Well 1 upon completion of the pumping test was 10.41 m. The pumping rate was maintained at an average rate of 30 L/min throughout the first two hours of the test, which equated to approximately 3,600 L of water and an initial interval Specific Capacity of 5.45 L/min/m and a theoretical yield of 113.3 L/min. The next two hours of the test maintained a pumping rate of 45 L/min which corresponds to 5,400 L of water and an interval Specific Capacity of 25.00 L/min/m. The final two hours of the test maintained a pumping rate of 60 L/min which corresponds to 7,200 L of water and an interval Specific Capacity of 18.99 L/min/m; the total amount of water withdrawn is approximately 16,200 L.

Upon completion of the pumping test the water level of Well 1 was allowed to recover. By 3:58 pm on August 16, 2021 the water level in Well 1 recovered to 4.47 mtop (or 86% recovery to pre-test static conditions). The water level responses of Well 1 during the pumping test are provided on a time/drawdown plot in Figure 3.

The drawdown data recorded from Well 1 were imported into AquiferTest Pro[™] and processed to determined transmissivity and hydraulic conductivity. The transmissivity was calculated to



be 4.89 m²/day; the hydraulic conductivity was 6.75 x 10⁻⁶ m/s. The results of the aquifer test analyses are outlined below in Table 2. The AquiferTest Pro[™] results are included in Appendix C.

The stepped – drawdown test indicates a sustainable yield of between 45 and 60 L/min.

3.2 Well 2

The static water level of Well 2 was 2.66 mtop (which corresponds to a depth of 1.67 mbgs) just prior to the pumping test. The pumping test commenced at 10:58 am on August 17, 2021 at a rate of 65 L/min. The water level within Well 2 dropped quickly upon initiation of the pumping test, and had reached 21.63 mtop within 6 minutes. Due to the rate that the water level was dropping at and the pump being installed at 23.3 mtop, the pumping test was ended at the 6 minute mark. Throughout the duration of the pumping test, the pumping rate was maintained at an average rate of 65 L/min.

Upon completion of the pumping test the water level of Well 2 was allowed to recover. By 12:45 pm on August 16, 2021 the water level in Well 2 recovered to 4.12 mtop (or 92% recovery to pre-test static conditions). The water level responses of Well 2 during the pumping test are provided on a time/drawdown plot in Figure 4.

The drawdown data recorded from Well 2 were imported into AquiferTest Pro^{TM} and processed to determined transmissivity and hydraulic conductivity. The transmissivity was calculated to be 0.18 m²/day; the hydraulic conductivity was 1.79 x 10⁻⁷ m/s. The results of the aquifer test analyses are outlined below in Table 2. The AquiferTest Pro^{TM} results are included in Appendix C.

The sustainable yield of Well #2 is less than 65L/min.



Table 2:	Aquifer Test Pro' ^m Results	
Well	Transmissivity (m²/day)	Hydraulic Conductivity (m/s)
Well 1	4.89	6.75 x 10 ⁻⁶
Well 2	0.18	1.79 x 10 ⁻⁷

3.3 Extrapolated Drawdown

The lowering water levels trend recorded near the end of the pumping test for Well 1 (when a stable lowering was recorded) was extrapolated to 1 year and 20 years on a logarithmic time scale. Because it has to be assumed that the pumping rate would remain stable; only the extrapolated drawdown for the pumping rate of 30 L/min was viable as it was the pumping rate that started at static water level (Figure 5). Well 2 could not be analysed in this way as it never reached a stable lowering trend. This kind of assessment is valuable in estimating long-term impacts related to water withdrawal at a well. The results of the drawdown extrapolation for Well 1 are in Table 3:

Well 1	Time Frame	Extrapolated Drawdown (m)	Available Drawdown (m)
	Beginning of Test	-	20.79
20 L /min	End of Test	5.50	15.29
30 L/min	1 Year	11.80	8.99
	20 Years	13.00	7.79

Table 3: Results of Drawdown Extrapolation

Note: Extrapolated drawdown indicates the expected drawdown from the static water level of each respective well

The results of the extrapolated drawdown analysis indicate that if water withdrawal at the Well 1 is continued for 1 and 20 Years at 30 L/min, the depths of drawdown were estimated to be 11.80 m and 13.00 m, respectively. The corresponding depths of available drawdown for the 1 and 20 Year periods were estimated to be 8.99 m and 7.79 m, respectively.



4.0 Conclusions and Recommendations

Cambium completed a pumping test on two (2) previously installed wells on-Site. Both of these wells are drilled into similar stratigraphy which characterizes the area: overburden extended until approximately 12.5 mbgs and consisting of sandy clay with some gravel, and bedrock extending until well termination and composed of limestone. Both wells draw from the aquifer that exists at or within several metres of the overburden – bedrock contact.

Water withdrawal occurred for a continuous 6 hour period for the pumping test at Well 1; the pumping test at Well 2 was cut short at 6 minutes due to insufficient water supply. The rate at Well 1 was initially 30 L/min for the first 2 hours, stepped up to 45 L/min for the middle 2 hours, and finally increased to 60 L/min for the final 2 hours. The pumping rate at Well 2 was initiated at 65 L/min. In total, 16,200 L and 390 L of water was withdrawn from the Well 1 and Well 2, respectively. The Specific Capacity of Well 1 during the 30 L/min pumping rate was 5.50 L/min/m with a theoretical yield of 113.3 L/min, during the 45 L/min pumping rate the Specific Capacity was 3.16 L/min. The Specific Capacity of Well 2 with a 65 L/min pumping rate was calculated to be 3.43 L/min/m with a theoretical yield of 73.72 L/min.

Upon completion of the pumping test for Well 1, approximately 16,200 L was pumped from the well and a maximum drawdown of 5.50 m was recorded (leaving approximately 15.29 m of available drawdown in the well). With a sustained pumping rate of 30 L/min, the depths of drawdown were extrapolated to be 11.80 m after 1 year of pumping and 13.00 m after 20 years of pumping. The corresponding depths of available drawdown for the 1 and 20 year periods were estimated to be 8.99 m and 7.79 m, respectively. This is a sufficient supply for a single residential dwelling use, however a pumping rate of 30 L/min is not sufficient for communal or municipal use. Because the pumping rates of 45 L/min and 60 L/min for Well 1 did not start at static water level, an accurate extrapolated drawdown could not be established. However, based off of the pumping test for Well 2 at 65 L/min which is installed in the same stratigraphy and is assumed to draw from the same aquifer, the higher pumping rate of 60 L/min (and most likely 45 L/min) would not be sustainable for any significant period of time and therefore would



not be sufficient. Furthermore, the proposed development would require a higher pumping rate than 65 L/min to sustain the amount of single-family dwellings proposed (see Section 2.1.2); therefore, neither well would be sufficient for the proposed development as neither can sustain a pumping rate of 65 L/min, and a pumping rate of 65 L/min would still be insufficient for the proposed development requirements of municipal/communal use.

In summary, the pumping test data collected from the two (2) on-Site wells are consistent with the MECP well records for water supply wells in the area: that there is insufficient water supply in the area for communal or municipal purposes. However, should private on-site servicing be considered in future, there is adequate supply for single family homes.

Given the objective of the study was to determine if an adequate communal supply was available on-site, water quality testing was not performed as there was no indication from the onsite wells that an adequate yield was available.

Cambium recommends that the proponent investigate off-site municipal supply well potential, The Township of Cavan Monaghan recently undertook a study to investigate the possibility of providing a Municipal Supply to the Fraserville Settlement Area and secured a property at 1256 Syer Line where a water well was installed in overburden sediments that was pumped continuously for 72 hours and provided a potential yield of ~9000L/min based on the pumping rate and extrapolation of Specific Capacity.



4.1 Respectfully submitted,

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Mits Pan

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- Ministry of the Environment. (1996). *Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment.*



6.0 Standard Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

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A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

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Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.



Appended Figures











Water Supply Assessment, Kawartha Downs Speedway, Fraserville, ON Romspen Investment Corporation Cambium Ref. No.: 12579-001









Appendix A Land Information and Proposed Development Plan











Legend

- Land Parcels
- Zoning
- Floodplain Overlay

Zone Description

- A Agricultural
- C4 Entertainment Commercial
- HR Hamlet Residential
- I Institutional
- M2 Rural Employment
- M4 Disposal Industrial
- NC Natural Core
- NL Natural Linkage
- RR Rural Residential

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	A-1	A-2	A-3	A-4	A-5	Â
	B-1	B-2	B-3	B-4	B-5	B-67
	C-1	C-2	C-3	C-4	C-5	C-6
	D-1	D-2	D-3	D-4	D-5	7
	E-1	E-2	<mark>٤-3</mark>	E-4		
	F-1	کر F-2	F-3	F-4		
	G-1	G-2	G-3	G-4	KEY MA	AP

Schedule A Zoning By-law

Township of Cavan Monaghan Zoning By-law No. 2018-58

Map D-4

SPIA Mapping





This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources and Forestry(OMNRF) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

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MIN. LOT FRONTAGE: 15 M. AND 18 M. FOR CORNER LOT



URBAN RESIDENTIAL TWO ZONE: SEMI-DETACHED AND SEMI DETACHED LINKED MIN. LOT AREA: 325 SQ.M. MIN. LOT FRONTAGE: 10 M. AND 15 M. FOR CORNER LOT

SIDEWALK ON BOTH SIDES

8.5m ROAD WIDTH (GUTTER TO GUTTER) 18.5m ROW MIN. CURB RADIUS 10.7m



URBAN RESIDENTIAL THREE ZONE: TOWNHOUSE MIN. LOT AREA: 800 SQ.M. AND 240 SQ. M. PER TOWNHOUSE UNIT MIN. LOT FRONTAGE: 20 M. AND 7.5 M. PER TOWNHOUSE UNIT

WETLAND

DEVELOPMENT AREA

197	351.68m ²	295	248.74m ²	393	279.23m ²	491	325.00m ²		
198	351.85m ²	296	248.94m ²	394	386.34m ²	492	325.00m ²		
200	351.94m 351.95m ²	297	249.13m 249.33m ²	395	240.50m ²	493	325.00m ²	BENCH MARK 2	
201	351.88m ²	299	249.53m ²	397	240.50m ²	495	325.00m ²		
202	351.73m ² 351.50m ²	300 301	249.73m ²	398 399	240.50m ²	496 497	325.00m ²		
204	351.18m ²	302	250.12m ²	400	240.50m ²	498	325.00m ²		
205	350.79m ²	303 304	250.32m ²	401	240.50m ²	499 500	325.00m ²		
207	349.78m ²	305	250.72m ²	403	240.50m ²	501	325.00m ²		
208	349.15m ²	306	250.91m ²	404	240.50m ²	502	342.86m²		
209	347.69m ²	308	251.31m ²	406	240.50m ²	503	344.70m ²		38
211	346.85m ²	309	251.51m ²	407	240.50m ²	505	344.70m ²		
212 213	359.44m ² 414.62m ²	310 311	251.71m ² 251.90m ²	408 409	240.50m ² 240.50m ²	506 507	344.70m ² 344.70m ²		
214	257.28m ²	312	250.39m ²	410	240.50m ²	508	344.70m ²		-
215 216	257.28m ²	313 314	250.30m ² 391.03m ²	411	240.50m ²	509 510	344.70m² 344.70m²		
217	257.28m ²	315	261.05m ²	413	240.50m ²	511	344.68m ²		
218	589.20m ²	316	246.24m ²	414	240.50m ²	512	325.00m ²	REVIS No. Descriptio	IONS n Date
220	289.43m ²	318	247.88m ²	416	240.50m ²	515	339.46m ²		
221	290.85m ²	319	248.70m ²	417	240.50m ²	515	845.94m ²		
222	292.27m 293.68m ²	320	249.52m ²	418	240.50m ²	517	339.46m ²		
224	515.11m ²	322	251.15m ²	420	240.50m ²	518	339.46m ²		
225 226	337.04m ² 325.00m ²	323 324	251.97m ² 252.79m ²	421 422	240.50m ² 249.80m ²	519 520	339.46m ² 339.46m ²		
227	325.00m ²	325	253.61m ²	423	251.24m ²	521	339.46m ²		
228 229	325.00m ² 325.00m ²	326 327	254.43m ² 255.24m ²	424 425	251.47m ² 247.10m ²	522 523	339.46m ² 339.46m ²		
230	325.00m ²	328	256.06m ²	426	240.54m ²	524	339.46m ²		-/Ub/21
231	325.00m ²	329	256.88m ²	427	240.54m ²	525 526	339.46m ²	METRIC Dimensions of MILLIMETRES	are in METRES and/or unless otherwise shown
232	325.00m ²	331	258.52m ²	429	240.54m ²	520	339.46m ²		
234	325.00m ²	332	259.33m ²	430	284.42m ²	528	684.19m ²		
235 236	325.00m ²	334	260.15m ²	431	2+1.77m ² 508.27m ²	529	354.25m ²		
237	325.00m ²	335	261.79m ²	433	241.77m ²	531	354.25m ²		
238 239	325.00m ²	336 337	263.42m ²	434 435	241.77m ² 241.77m ²	532	354.25m ²		
240	325.00m ²	338	264.24m ²	436	241.77m ²	534	354.25m ²		
241 242	325.00m ²	339 340	265.88m ²	437 438	241.77m ² 241.77m ²	535 536	354.25m ²		
243	325.00m ²	341	266.70m ²	439	241.77m ²	537	354.25m ²		
244 245	325.00m ² 325.00m ²	342 343	267.51m ² 268.33m ²	440 441	241.77m ² 241.77m ²	538 539	354.25m ² 354.25m ²		
246	325.00m ²	344	269.15m ²	442	241.77m ²	540	354.25m ²		
247 248	325.00m ² 325.00m ²	345 346	269.97m ² 270.79m ²	443	241.77m ² 255.56m ²	541 542	354.25m ² 354.25m ²		
249	471.53m ²	347	271.60m ²	445	255.96m ²	543	354.25m ²		
250	544.16m ²	348 349	338.08m²	446 447	256.34m ²	544 545	354.25m²		
252	325.00m ²	350	243.75m ²	448	257.07m ²	546	1107.96m ²		
253	325.00m ²	351	243.75m ²	449	257.41m ²	547	1595.16m ²		
254	325.00m ⁻²	352	243.75m ² 243.75m ²	450	257.74m ⁻ 258.04m ²	548 549	555.00m ²		
256	325.00m ²	354	716.57m ²	452	258.34m ²	550	555.00m ²		
257 258	325.00m ² 325.00m ²	355 356	338.21m ² 379.85m ²	453 454	258.61m ² 258.87m ²	551 552	555.00m ² 555.00m ²		
259	325.00m ²	357	391.09m ²	455	259.11m ²	553	555.00m ²		
260	325.00m ²	358	402.34m ²	456 457	259.34m ²	554	555.00m ²		
262	325.00m ²	360	424.83m ²	458	259.73m ²	556	559.18m ²		
263	325.00m ²	361 362	436.07m ²	459 460	259.91m ²	557	558.41m ²		
265	636.07m ²	363	458.57m ²	461	260.20m ²	559	1123.78m ²		
266	317.95m ²	364	469.81m ²	462	260.32m ²	560	1188.92m ²		
268	292.38m ²	366	492.30m ²	464	260.50m ²	562	740.11m ²		
269	265.71m ²	367	503.55m ²	465	260.57m ²	563	604.33m ²		
270	240.00m ²	369	526.04m ²	467	260.64m ²	565	561.75m ²		
272	240.00m ²	370 371	537.28m ²	468	260.65m ²	566	677.59m ²		
274	243.75m ²	372	559.14m ²	470	260.62m ²	568	555.00m ²		
275	537.74m ²	373	572.82m ²	471	260.57m ²	569	555.00m ²		
273	243.75m ²	375	568.96m ²	473	260.43m ²	570	608.43m ²		
278 279	243.75m ²	376	544.36m ²	474	270.27m ²	572	555.00m ² 81.3 90m ²		
280	245.72m ²	378	455.58m ²	476	325.00m ²	574	841.05m ²		TIMN
281	245.97m ²	379	403.75m ²	477	325.00m ²	575	555.00m ²		TRUCIU
283	246.36m ²	381	352.95m ²	479	325.00m ²	577	556.83m ²	\sim	N2 ···
284	246.56m ²	382	327.73m ²	480	325.00m ²	578	555.00m ²	FOR	
286	246.96m ²	384	262.43m ²	482	325.00m ²	579	555.00m ²	NO/ '	
287	247.16m ²	385	263.14m ²	483	325.00m ²	581	727.01m ²		
289	247.55m ²	387	264.55m ²	484	325.00m ²	583	853.93m ²		
290	247.75m ²	388	527.09m ²	486	325.00m ²	584	1064.34m ²		D.M. WIIIS Associates Limited
291 292	247.95m ² 248.14m ²	389 390	566.91m ² 279.23m ²	487 488	325.00m ² 325.00m ²	585 586	651.89m ²		Peterborough, Ontario Canada K9J 0B9
293	248.34m ²	391	279.23m ²	489	325.00m ²	587	673.45m ²		P. 705.742.2297
294	248.54m ²	392	279.23m ²	490	325.00m ²	588	555.00m ²	WILLS	F. 705.748.9944 E. wills@dmwills.com
								Project Name/Location KAWARTH, REDEVEL FRASERV Drawing Title Drawn By: LC SCALE: I	A DOWNS OPMENT ILLE, ON
								Designed By: LC Plot Dat	e: 10/09/2021
								Checked By: — Project	No.: 21-85152 Sht. No.:
								∎∟ngineer: — Dwa File	NO.:



Appendix B MECP Water Well Records for Test Wells

🔊 Ontari	O Ministry of the Environment			Th	WATER WE	ELL REC	es ac ORE
int only in spaces p ark correct box with	provided. a checkmark, where applicable.	11	511	9296			22 23 2
County or District	<u> </u>	Township/Borough/City/	Town/Village		Con block tract sur	vey, etc. Lot	25-27
recerborougi		Address			KOL 1VO Date	20 11	02*
		General Deli	very, Fr	Elevation B	C Basin Code ii	id day mo iii	onth yea iv
:1			24 25				
	LOG OF OV	ERBURDEN AND BEDR	OCK MATER	IALS (see instruc	ctions)	Depth	- feet
General colour	Most common material	Other materials		Gene	ral description	From	To
lack	Topsoil						
Brown	Sandy clay					1	2 10
Brown	Sandy clay & gravel						12
Gray	Sandy clay & gravel	boulders				12	19
Gray	Silty sand & gravel	some clay, bou	lders			19	47
Gray	Limestone					47方	75
-							
		·			· · · · · · · · · · · · · · · · · · ·		
				<u></u>			
31							
32						tor 3438 L opp	111 75
41 WATER I	RECORD 51 C	CASING & OPEN HOLE	RECORD Depth - fe	et Sizes	No.)	inches	in se
t - feet	Kind of water diam inches	Material thickness inches	From	To Hate	erial and type	Depth at top o	of screen
471 1/0 Fr	$\begin{array}{c c} \mathbf{resh} & 3 & 0 & 0 & 0 & 10 & 11 & 1 \\ 4 & 0 & \mathbf{Minerals} & 10 & 11 & 1 \\ \mathbf{alby} & 4 & 0 & \mathbf{Minerals} & 10 & 11 & 1 \\ 2 & 3 & 10 & 11 & 1 \\ 2 & 3 & 10 & 11 & 1 \\ 3 & 10 & 10 & 11 \\ 3 & 10 & 11 & 1 \\ 3 & 10 & 10 & 11 \\ 3 & 10 & 11 & 11 \\ 3 & 10 & 11 & 11 \\ 3 & 10 & 10 \\ 3 & 10 & 10 & 10 \\ 3 & 10 & 10 & 10 \\ 3 & 10 & 10 & 10 \\ 3 & 10 & 10 & 10 \\ 3 & 10 & 10 & 10 \\ 3 & 10 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 3 & 10 & 10 \\ 3 & 3 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 & 10 \\ 3 & 10 \\ 3 & 10 \\ 3 & $	X Steel ¹² Galvanized		1310 UN			feet
15-18 1 🗍 FI	resh 3 Sulphur 19 04 4	Concrete Open hole Plastic	+2*		PLUGGING & SEAL	ING BECORD	
20-23 S	alty 6 Gas 17-18 1	Steel 19 Galvanized		20-23	Annular space	Abandonm	ent
1 🗋 Fi 2 🗌 Sa	alty 6 Gas 6	Concrete	471	75 Depth s	To Material and type	e (Cement grout, be	entonite, et
25-28 1 [] Fr	atty 3 Sulphur 29 5 4 Minerals 24-25 1	Plastic Steel ²⁶		27-30 00-13	20 ⁷ Bentonit	e	
30-33 1 🗆 F	resh 3 Sulphur 34 60 3	Galvanized Concrete		26-29	30-33 80		
2 🗆 S	alty 6 Gas 5	Open noie Plastic				<u></u>	
Pumping test meth	od A110 Pumping rate 11-14	Duration of pumping	1				
/1 1 □ Pump 2 □ 1 Wate	Bailer IZ GPM	Hours JU Mins	41 <u>P</u>	n diagram below s	how distances of well fro	m road and lot	t line.
Static level end of	of pumping 22-24 15 minutes 30 minutes	45 minutes 60 minutes		ndicate north by a	now.	1 JUN 115	5
5 11	74 17 15 ²⁹⁻³¹	13.5 12.5	N			ALC:	
If flowing give rate	feet feet feet feet 38-41 Pump intake set at	Water at end of test 42	11 1				
Becommended pum	GPM feet n type Recommended 43-45	Clear Cloudy Recommended 46-49					
Shallow	Deep pump setting 70 feet	pump rate 10 GPM		MADDE D)R		
50-53			- -	1,100 K- 2	1	1	
FINAL STATUS (1 Water supply	54 54 54 54 54 54 55 C Abandoned, insufficient sup	ply ⁹ 🗍 Unfinished			oo' #1683		
 ² Observation v ³ Test hole 	well 6 Abandoned, poor quality 7 Abandoned (Other)					HWY 28	
* 📋 Hecharge we		<u></u>		11	1000 1		OLAG
MATER USE	55-56 5	9 D Not use		Ø.		LIN	e e
2 🗋 Stock 3 📋 Irrigation	 6 in Municipal 7 Public supply 8 Cooling & air conditioning 	hole		150'			
						1	
METHOD OF CO	5 Air percussion	⁹ 🔲 Driving					
2 🗌 Rotary (conv 3 🛄 Rotary (rever	entional) ⁶ Diamond ⁷ Diamond	10 Digging 11 Other				252	277
4 🕅 Rotary (air)	⁸ 🗌 Jetting					252	511
Name of Well Contract	lor	Well Contractor's Licence No	Data	58 Contrac	tor 59-62 Date	e received	63-6
G.Hart & S	ons Well Drilling Lt	d 2662		finspection	2662 FE	<u>B 1 9 20</u>	03
Box 850, F	enelon Falls, ON						
-							
Name of Well Technici	ian	Well Technician's Licence N	o. 🔀 Remar	ks			
Name of Well Technici Bryan Wats	ian ON In/Contractor	Well Technician's Licence N T-2441 Submission date	o. XH Remar	ks	C	SS.ES3	

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Ministry of the

Environment

Print only in spaces provided. Mark correct box with a checkmark, where applicable. 5119297

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1.2.

 $\begin{array}{c|c} & \text{Municipality} \\ \hline 10 \\ 1$

The Ontario Water Resources Act WATER WELL RECORD

County or District	ough	Township/Borough/City/To Cavan Twp.	own/Village	Con block tract surve	ey, etc. Lot 25-27 23
		Address General Delive	ery, Fraserv	KOL IVO Date 111e, ON completed	18 11 02 ⁸⁻⁵³ day month year
21	ų ————— ų	Northing	RC Eleva	tion RC Basin Code ii	
2			CK MATERIALS (se	ee instructions)	47
General colour	Most common material	Other materials		General description	Depth - feet From To
Black	Topsoil				0 1
Brown	Silty sand				1 3
Brown	Silty clay				3 8
Gray	Sandy clay & grave	1 .			8 21
Gray	Silty sand & grave	1 some clay	wet		21 38
Gray	Limestone				38 76
<u> </u>					
31					
32					<u>- 1 1 1 1 1 1 1 1 1 1 </u>
41 WAT	ER RECORD 51	CASING & OPEN HOLE R	ECORD Depth - feet	Sizes of opening 31-33 Diameter (Slot No.)	er 34-38 Length 39-40
at - feet	Kind of water diam inches	Material thickness inches	From To	Material and type	Depth at top of screen 30
38	Salty & Gas	1 ZA Steel 2 Galvanized 3 Concrete		ด	feet
15-18 1 [2]	☐ Fresh ³ ☐ Sulphur ¹⁹ 4 ☐ Minerals ☐ Salty 5 ☐ Gas	4 Open hole 5 Plastic	+2-2 38	61 PLUGGING & SEALIN	
20-23 1	Fresh 3 Sulphur 24 4 Minerals	³ 1 □ Steel ¹⁹ 2 □ Galvanized 3 □ Concrete	38 76	Depth set at - feet Material and type (Abandonment Cement grout, bentonite, etc.)
25-28	Safty 6 Gas	4 Open hole 5 🗌 Plastic	50 70	From To Bentonite	2
2	4 ☐ Minerals 24-2 3 Salty 6 ☐ Gas 24-2	5 1 🗆 Steel 26 2 🗋 Galvanized	27-30	18-21 22-25	
30-33 1	□ Fresh 4 □ Minerals □ Salty 6 □ Gas	4 Open hole 5 Plastic		26-29 30-33 80	
Pumping test	method A + + + Pumping rate	Duration of pumping	[<u></u>
71 1 D Pump 2	Bailer 14 Gi	M Hours 30 Mins	In diagram	n below show distances of well from	n road and lot line.
Static level	end of pumping 22-24 15 minutes 30 minute	45 minutes 2 24 60 minutes 25.37		HWY# 115	i
	75 25 ²⁶⁻²⁸ 21 ²	feet 18.5 feet 17 feet			128
If flowing give	rate 38-41 Pump intake set at	Water at end of test 42 feet M Clear □ Cloudy			HIN
Recommended	pump type Recommended 72	3-45 Recommended 46-49 pump rate 12	m	wore DR.	
50-53	М. Deep	feet GPM		1 TO T	
FINAL STATU	JS OF WELL 54			1507	MONGRIEF
 Water su Water su Observa Test hold 	ipply ⁵ 🗋 Abandoned, insumcie tion well ⁶ 🗋 Abandoned, poor qua s ⁷ 🗌 Abandoned (Other)	lity ¹⁰ Replacement well		20	LINC .
✓☐ Recharg	e well ⁸ Dewatering				
WATER USE	c 5 Commercial	9 D Not use			
2 ∐ Stock 3 ☐ Irrigation 4 ☐ Industria	6 □ municipal 7 □ Public supply 1 8 □ Cooling & air conditio	ning			
METHOD OF					
	ol ⁵ Air percussion	⁹ □ Driving ¹⁰ □ Digaina			
³ ☐ Rotary (4 X Rotary (reverse) 7 Diamond air) 8 Diating	11 C Other			252375
L		Wall Contractoria License Ma	L	58 Contractor 59-62 Date	received 63-68 8
Name of Well Cor G.Hart &	Sons Well Drilling	Ltd. 2662	Source	2662 FE	B 1 9 2003
Address Box 850	Fenelon Falls. ON		Date of inspection	Inspector	
Name of Well Tec	hnician	Well Technician's Licence No.	Remarks		
Bryan Wa	tson	T-Z441 Submission date	NIST	CS	SS.ES3
Club	e water	day mo yr	Ĩ		0500 (07/00) Front Form

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Appendix C AquiferTest Pro[™] Results



194 S	ophia St.		Pumping Test Analysis Report			
Peterl	Peterborough, ON K9H1E5		Project: Water Supply Assessment, Kawartha Downs			
К9Н1			Number: 12579-001			
CAMBIUM			Client: Romspen In	vestment Corporation		
Location: Fraserville, ON	Pu	umping Test: Pump	ing Test - Well 2	Pumping Well: Well 2		
Test Conducted by: C. Ki	nsella	-		Test Date: 9/17/2021		
Analysis Performed by: N	. Heikoop Pu	umping Test - Well	2	Analysis Date: 10/6/2	021	
Aquifer Thickness: 11.33	m Di	scharge: variable,	average rate 17.17 [U.	S. gal/min]		
100 0.00 4.00- 8.00- E 12.00-		· · · · ·	2/t' [s] 1000	•		
16.00 - 20.00	•	••				
Calculation using Theis						
Observation Well	Transmissivity	Hydraulic Conductivity	Storage coefficient	Р	Radial Distance to PW	
	[m²/s]	[m/s]			[m]	
Well 2	2.03 × 10 ⁻⁶	1.79 × 10 ⁻⁷	5.21 × 10 ⁻¹	2.60 × 10 ⁰	0.08	