Civil and Municipal Engineering

# **ARK Engineering and Development**

### <u>Serviceability Report</u>: Potable Water Supply Assessment, Sewage, Stormwater Management and Grading

7564 Village Centre Place Block 63 Plan 4M-1398 Greely Village Centre Ottawa (Greely), Ontario

Prepared For Greely Family Farm Inc.

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#### POTABLE WATER SUPPLY ASSESSMENT, SEWAGE, STORMWATER MANAGEMENT AND GRADING

#### Serviceability Report

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#### SERVICEABILITY REPORT

#### 1.0 BACKGROUND

#### 1.1 <u>General</u>

The proposed site plan amendment situated on Block 63 with the Water's Edge Subdivision 4M-1398 consists of approximately 0.3049ha and is located on the Eastern side of the intersection of Village Centre Place and Vista Villagio St. (refer to the location map SK-1 in appendix A). The proposed site plan will consist of an additional 6,000ft<sup>2</sup> retail building. It will be serviced by an existing private sanitary sewer and well along with existing roadside drainage ditches.

#### 1.2 Existing Services

This area of commercial development in Greely has no City sanitary and watermain to service this proposed site plan. The proposed sanitary and water service will be privately owned. As for the storm service the existing roadside ditches will serve as an outlet for this development.

An internal Road Network as shown on the location map in Appendix A, will provide this site plan with one main connection access point from Bank St. An alternate access is located off of Parkway Rd.

All utilities (Hydro, Bell Cable and Gas) are available and have been installed up to the property line.

#### 2.0 PROPOSED SERVICES

#### 2.1 <u>Potable Water Supply Assessment</u>

ARK Engineering was retained by Greely Family Farm Inc. to provide a verification of water supply yield and well location for a proposed site plan application amendment to a commercial development located at 7564 Village Centre Place, Ottawa (Greely), Ontario, Block 63 Plan 4M-1398

The pump test was conducted in general accordance with Ontario Ministry of the Environment and Climate Change (MOECC) guidance document Procedure D-5-5: Technical Guideline for Private Wells: Water Supply Assessment (MOEE, 1996).

The scope of the report is limited to the description of the potential yield quantity and quality of the bedrock water supply aquifer intercepted by a drilled well, as it relates to the future servicing potential for the proposed building development within the area of the subject site.

#### 2.1.1 <u>Background</u>

There is a currently a City approved Consolidated Terrain Analysis and Hydrogeological Study Report dated October 8, 2008 by the Paterson Group for the plan of subdivision 4M-1398 in which this said Block 63 forms part of. Both the water quantity and quality have already been analyzed and deemed to be excellent for this development. Also, all new well construction recommendations within this plan of subdivision (either residential or commercial), along with required casing lengths have been determined and accepted and are registered on title for this Block.

It should also be noted that in Appendix 3, page 24 of this approved report Paterson Group concluded the following:

- 1) A suitable water supply aquifer exists within the sandstone formation underlying the limestone formation at the subject site.
- 2) The sandstone water supply aquifer has an aeral extent such that all portions of the site can access it.
- The sandstone water supply aquifer has <u>ample quantities</u> of water available for utilization by both the proposed residential and <u>commercial portions</u> of the site and has <u>excellent water quality</u>.

- 4) The sandstone water supply aquifer possesses significant upwards gradient that remains largely unaffected by maximum water taking estimates at the site and as agreed to by experts at the Ontario Municipal Board Hearing, is hydrogeologically isolated from surface activity.
- 5) The sandstone aquifer is considered to be an <u>excellent aquifer for this</u> <u>development.</u>

#### 2.1.2 <u>Supplemental Potable Water Supply Assessment</u>

As part of the commercial phasing within plan 4M-1398 for Block 65-64-63 another proposed building will be developed and serviced by a private well. The following will demonstrate once again that that the targeted aquifer is more than adequate to support this new commercial phase.

The scope of the report is limited to the description of the potential yield quantity and quality of the bedrock water supply aquifer intercepted by a drilled well, as it relates to the future servicing potential for the proposed development within the area of the subject site.

A new drilled well (designated TW1, refer to Appendix "B" for MOE well record) was installed at the site on July 23, 2019 by D & R Drilling of St-Albert, Ontario (Well Contractor License No.3773). The new well was drilled to a total depth of 104.54 m. Steel casing was installed to a depth of approximately 70m. The test well was constructed in general conformance with the well construction requirements for the adjacent development within plan 4M-1398. As per the approved "Consolidated Terrain Analysis and Hydrogeological Study Report", which requires all wells to be cased "through the limestone formation and extend into the sandstone formation".

Well ID	Year Drilled	Depth to Bedrock (m)	Depth of Water Bearing Fractures (m)	Total Depth (m)	Recommended Pumping Rate (L/min)
A258630	2019	7.87	103.63	104.54	45.0

Table	1:	Test	Well	summary
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The pump test was conducted in general accordance with Ontario Ministry of the Environment, Conservation and Parks (MECP) guidance document Procedure D-5-5: Technical Guideline for Private Wells: Water Supply Assessment (MOEE, 1996).

A pumping test at TW1 on July 23, 2019 was conducted. A pumping rate of 64 L/min was selected with the expectation that the rate would stress the aquifer enough to result in a demonstrable reduction in potentiometric head (i.e. a lowering of the static water level) within the test well. The pumping test was carried out for a 8 hour duration.

During the test the pumping rate was monitored at regular intervals to ensure the rate of discharge remained constant (i.e. < 5% variation). Drawdown observations during pumping and recovery were recorded using manual measurements taken with an electronic water level tape.

Drawdown observations during the pumping and recovery were recorded using manual measurements using an electronic water level tape. Over the course of the pumping test, the water level in the well dropped by 0.38m within minutes then it maintained its level through out the 8 hours in which it was then allowed to recover. No real recovery data was collected for the well following the completion of pumping since the 95% recovery was achieved almost immediately.

Field testing for chlorine was carried out at the time of sampling. Groundwater samples were collected in laboratory supplied bottles and preserved in the field using established sampling protocol. The samples were stored in a dedicated sample cooler maintained at a temperature between 4 and 10 degrees Celsius. The water samples were submitted to the Eurofins within one (1) hour of collection for standard "Sub. Package", refer to Appendix "B".

Turbidity measurements were taken using a Hanna C114 turbidity meter at the well head at regular intervals during the pumping test and the reading at the time of the sampling (8 hour mark) was below 1.0 NTU. Free chlorine residual measurements were taken using a HachTM Pocket Colorimeter IITM handheld unit immediately prior to the collection of each groundwater sample.

#### Table 1: Testing Results

Parameters	Results
Pumping Rate (L/min)	64.0
Static Water Level at start of test (m)	3.21
Static Water Level at end of test (m)	3.59
Total Drawdown during test (m)	0.38
Available Drawdown (m)	101.33
% Drawdown during pumping test	0.38%
Transmissivity	153
Specific Capacity (L/min/m)	168

The pumping test drawdown plot for TW1 is provided in Appendix "B". As for the recovery data since it was practically instantaneous no data was able to be recorded. The drawdown data provided was 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). This method provides a reasonable estimate of the aquifer transmissivity.

Transmissivity was calculated using the following relationship:

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

<u>Where</u>:

Q = pump rate, m<sup>3</sup>/day

ds = change in drawdown over one time log cycle, m

T = transmissivity, m<sup>2</sup>/day

Based on the pumping test drawdown data the transmissivity of the aquifer is estimated to be about  $153m^2/day$ .

For the new proposed commercial building the daily water demands have been estimated based on Section 4.4.1.2 of the City guidelines, Appendix 4-A. In accordance to Appendix 4-A, the proposed development would have a demand of 1.98 L/min. Refer to Section 2.2 Sewage for a summary of the estimated sewage flow.

This is approximately 97% less than the rate utilized during the pumping test (64 L/min.). Given that the well totally recovered practically immediately of termination of pumping at a rate of 64 L/min, the water supply aquifer intercepted will provide the necessary well yield without mining the aquifer in the long term.

Based on the above there is water of sufficient quantity present in the water supply aquifer beneath the site to support the new 6,000ft<sup>2</sup> commercial building.

#### 2.1.3 <u>Water Quality</u>

Water quality analysis data from TW1 is summarized in Table 2 (below). Laboratory certificates of analysis are included in Appendix "B".

Table	2:	Groundwater	Geochemistry	/ -	TW1
-------	----	-------------	--------------	-----	-----

	UNITS	ODW	/s	6045 Bank St.	6075 Bank St.	NEW
PARAMETER		ТУРЕ	LIMIT	Ex. Well*	Ex. Well**	TW1
MICROBIOLOGICAL PARAMET	ERS	•		n		
Escherichia Coli	ct/100 mL	MAC	0	0	0	0
Faecal Coliforms	ct/100 mL	-	-	0	0	0
Heterotrophic Plate Count	ct/100 mL	-	-	21	0	0
Total Coliforms	ct/100 mL	MAC	0	0	0	0
CHEMICAL PARAMETERS (HEA	LTH)					
F	mg/L	MAC	2.4	0.28	0.39	0.39
N-NO2	mg/L	MAC	10	<0.10	<0.10	<0.10
N-NO3 (Nitrate)	mg/L	MAC	10	<0.10	<0.10	<0.10
CHEMICAL PARAMETERS WIT	H AESTHETIC	C OBJECTIVES	/OPERATIO	NAL GUIDELINES	·	
Alkalinity	mg/L	OG	500	223	226	213
Cl	mg/L	AO	250	127	122	120
Colour	TCU	AO	5	<2	<2	<2
DOC	mg/L	AO	5	1.2	1.3	<0.5
рН		OG	6.5-8.5	8.0	8.5	8.49
504	mg/L	AO	500	82	78	89
Hardness	mg/L	OG	100	298	297	275
Na	mg/L	AO	200	76	84	80
Fe	mg/L	AO	0.30	0.20	0.66	0.64
Mn	mg/L	AO	0.05	0.03	0.03	0.05
TDS	mg/L	AO	500	606	625	565
Turbidity (lab)	NTU	AO/MAC	5/1	2.1	1.3	1.5
52-	mg/L	AO	0.05	<0.02	<0.01	<0.01

\* water results from 6045 Bank St. - Potable Water Supply Assessment prepared by Paterson Group

\*\* water results from 6075 Bank St. - Potable Water Supply Assessment prepared by ARK Engineering

The water results of this targeted aquifer are well in line with the results from the 6045 and 6075 Bank St. *Potable Water Supply Assessment*.

The analytical results show that water quality at the subject site is acceptable and that there are no exceedances of the applicable <u>health related parameter limits of the Ontario Drinking</u> <u>Water Standards (ODWS)</u>.

With respect to aesthetic objectives and operational guidelines, the analytical results indicate the following exceedances:

- Hardness
- TDS
- Iron

#### Hardness

Hardness, an operational guideline, does not appear in the ODWS. Rather it appears in the Technical Support Documents for Drinking Water Standards, Objectives, Guidelines (Technical Support Documents) as a parameter with an operational guideline of 100 mg/L. At the measured concentrations, the water is considered to be very hard, however it is below the reasonable treatment limit of 500 mg/L specified in Table 3 of the guidance document, titled, "Procedure D-5-5 Technical Guideline for Private Wells: Water Supply Assessment", published by MOECC (MOE, 1995).

#### TDS

Total dissolved solids (TDS) refers to the concentration of inorganic substances dissolved in water. The main constituents are typically chloride, sulphates, calcium, magnesium and bicarbonates. Procedure D-5-5 does not provide a 'treatability limit' for TDS, but it does require written rationale that corrosion, encrustation, or taste problems will not occur.

The Langelier Saturation Index is used to predict the calcium carbonate stability of water. It indicates whether the water will precipitate, dissolve, or be in equilibrium with calcium carbonate. The results of the Langelier calculation (LSI = +0.72) indicate that the water is supersaturated with respect to calcium carbonate (CaCO3) and scale forming may occur but non corrosive. Refer to Appendix "B".

#### Iron

The iron level at TW1 after the eight hours of pumping was 0.64mg/L, which exceeds the ODWS aesthetic objective of 0.30 mg/L. The iron level is well within the MOE treatability limit of 5.0 milligrams per litre using a water softener.

#### Sodium

The sodium level in the water was reported to be 80 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."

#### Well Water Treatment

The water within the bedrock aquifer displays slightly elevated hardness and iron. Installation of a standard commercial grade water softener will reduce the concentrations of hardness to acceptable levels. Some softeners can remove iron alternatively an iron filter can also installed. Conventional water softeners introduce sodium into the water supply, so it may be appropriate to bypass the water softener with a separate tap for drinking water.

#### 2.2 <u>Sewage</u>

The entire commercial development will be serviced by an existing private sanitary sewage treatment facility and an existing underground gravity sewer system all in accordance to MOE reference #2418-AVJRJ5.

As mentioned above, in order to determine the sanitary flows for this proposed building Section 4.4.1.2 of the City guidelines, Appendix 4-A was consulted.

	Area (m²)	Flows	L/day
Building	565	5 L/day per 1.0m²	2,825

0.033 L/s

#### 2.3 <u>Stormwater Management</u>

The following is to demonstrate that the proposed site plan application for 7564 Village Center Place meets the SWM criteria previously approved in the J.F Sabourin report SWM Pond Design Brief - Commercial Phase Ultimate Conditions.

It is important to note, that the subject land (Blocks 65, 64 and 63) on the Registered Plan of Subdivision 4M-1398 - Water's Edge Subdivision was clearly included in all of the subdivision reports.

On the first table found in Appendix C, of the approved J.F. Sabourin report (refer to Appendix A for this table), the author applied an impervious value of 69% for entire rural commercial area identified as COM-1. Applying a total impervious of 69% is a conservative approach in calculating runoff generated by different storm events for commercial development since it assumed a weighted runoff coefficient of C=0.70.

The Tables 1 and 2 summarizes the modeled/approved conditions vs the proposed conditions of the imperviousness for these Blocks.

Hard	Soft	Area
(m²)	(m²)	(m²)
-	-	8,579
Runoff Co	efficient	0.70
Total Im	pervious	69.0%

Table 1: Modeled Impervious for Block 65, 64 and 63

Table	2:	Proposed	Impervious	for
		Block 65, 6	64 and 63	

Hard (m²)	Soft (m²)	Total (m²)
5,364	3,215	8,579
Runoff Co	pefficient	0.64
Total In	pervious	63.0%

As shown above, once developed these blocks will still yield a "total impervious" below the value of 69% applied in the modeling. Thus, this will have no impact on stormwater management, since the ditches and pond have been designed and sized to accommodate this portion of the development.

#### 2.4 Site Grading

The installation of concrete curbs in a rural development which has no underground storm sewer as an outlet will definitely create problematic ponding areas especially in the vicinity of the depressed curb outlets where snow will block these outlets during the freeze thaw cycles in Winter/Spring. This ice built-up and unwanted ponding runoff will be become a safety hazard to the public. Therefore, in order to properly grade this site and to provide multiple drainage outlets via overland sheet drainage to all four corners of the site, no concrete curb are proposed along the perimeter of the parking. This will allow for runoff to simply sheet drain on a larger surface

This will allow for the surface runoff to drain away from the curbs and will promote infiltration/percolation as it reaches the edge of the asphalt onto the sodded or landscaped surface areas instead of concentrating all the precipitation towards narrow depressed curbs.

That being said, a Geotechnical investigation for this proposed site has been conducted which states that grade raises up to 1.5m would be permissible, which would in turn prevent any future possible settlement.

#### 3.0 CONCLUSION

From the above statements the following can be concluded:

- i) This entire site can be serviced as proposed above.
- ii) The buildings will be serviced by a private sanitary sewer and well.
- iii) The proposed site will drain overland towards the existing roadside ditch which ultimately discharges into an existing SWM pond which will provide adequate protection to the site and the environment.
- iv) The Geotechnical report revealed a permissible grade raise of up to 1.5m.

Prepared by:

#### **ARK Engineering and Development**

Danie Hayer

Daniel Payer, P.Eng. President



#### APPENDIX "A"

SK-1 Pond Sizing Location Map Excerpt from J.F. Sabourin



Project: Project No.:	Greely Village Centre - Commercial Phase 64707 Quality Pond Sizing	Ð					
Date: By:	May 28, 2008 JHF			POND ( Lands ( (Final C (All land	CMRC to be developp conditions) d is developped	peq	
Catchment No.	Description	Drainage Area (ha)	lmp. (%)	Area incl.	Area (ha) Im	, p (ha)	
COM-1	Commercial lands	14.64	69	X	14.64	10.10	
RES-1	Residential lands (Phase 1)	5.83	21				
RES-2	Residential lands (Phase 2 incl. Phase 1)	9.34	21				
POND-1	Pond block (Phase 1)	3.57	48				
POND-2	Pond block (Phase 2)	5.03	47				
PK-1	Green space	4.26	0				
UND-1	Undevelopped Lands (Phase 1 & 2)	6.85	0 6	>			Т
EX4	Existing Residential (EX4)	09.0	77	× >	09.0	0.11	Т
POND-C	Pond block (Commercial)	1.57	66	×	1.57	1.04	٦
	a			Totals=	16.71	11.25	
				Avg Imp	=0	67.31 %	
				<b>As per</b> Req'd F Total P Permar Ext.Det	MOEE, ond Vol.= ond Volume : ient Pool= . Volume=	219 cu.m/ha 3655 cu.m 2987 cu.m 668 cu.m	
J.F. Sabourin an	nd Associates Inc.					JFSAinc. Ref: 647	-07
Water Resources and I	Environmental Consultants					Client: Atrel Engineering	Lid
Ottawa, Ontario www	w itsa con					Dec	-08

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#### APPENDIX "B"

MOE Well Record Eurofins Laboratory Subdivision Package Results Drawdown Plot Langelier Saturation Index

Well Owr	ner's Inforr	nation								
First Name	e(v)	FA	ast Name /	Prganizatio	FAV	m	E-mail Addre	055		Well Constru
Mailing Add	ress (Street N	lumber/Name	a) Scor	++.		Municipality	Province	Postal Code	e Telep	phone No. (inc. area or
Well Local	tion Well Location	(Street Num	ber/Name)			Township			101	514614
County/Dist	Sank rict/Municipal	5-	<u>f</u>			Ossood	es	1	Conc	cession
077	14 /9 W 14	$\frac{1}{1}$ $\mathcal{O}_{i}$	ty			Gree (	, 		Province Ontario	Postal Code
NAD	8 3 / P	45 G9	7105		172	Municipal Plan and Suble Plarv Ne	$F^{+} 4M_{-}$	1390	Other	3/0c 6
Overburde General Co	in and Bedro blour	ock Materia Most Comm	ils/Abando on Material	onment Se	aling Reco	ord (see instructions on th her Materials	e back of this form)	General Description	n	Depth (m/ft)
Brou	UN	SM	nd			Boulders		1005	e	Prom To
Giey	<u> </u>	SAY	vd.		(	0/ay		Sof	4	1.30 6.0
biey		GI	90e		C.	under Laime		SOFI	<u> </u>	6.06 7. 0
ary		MACES	000		2.071	MOSTOR(		170110	4.	1.8 ( 10)
Depth Se	t at (m/it)		Annular Type of Sea	Space		Voluma Placed	After test of wells	Results of W	ell Yield Te	sting
From	To	1	(Material an	nd Type)		(m <sup>3</sup> /ft <sup>3</sup> )	Clear and s	and free	Time Wate	er Level Time Water L (m/l) (m/l)
0	67.67	qui	K 12	cuts	. /	30 Brg.	If pumping discor	ntinued, give reason;	Static 3	21 3.5
		ANC	<u>  /5 e.</u>	NEUM	it e	10 13Ag			13	58 1 3,2
	the second se		the second se					AND DESCRIPTION OF A DAY OF A		
							Pump intake set	at (m/tt) 1.30	2 3	59 2 32
Meth	od of Cons	truction			Well Us	5e	Pump intake set a	at (m/ft) J. <u>30</u> hin / GPM)	<sup>2</sup> 3 3 3	59 <sup>2</sup> 32 59 <sup>3</sup> 32
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Meth Cable Toc Rotary (C Rotary (C Rotar	od     of Cons       ol     conventional)       leverse)*     1       ssion     coirs       odd     coirs       Cons     coirs       Open Hole C     coirs       (Galvanized, Concrete, Pla     coirs       S     4     coirs       S     4     coirs       I at Depth     Kit       #)     Gas       I at Depth     Kit		Pul     Pul     Do     D	blic mestic estock gation ustrial ner, specify From Dept From Dept From Untested Untested Untested	Weil Us	se rrial   Nct used al   Dewatering le   Monitoring 3 Air Conditioning Status of Well   Artics uppy   Replacement Well   Dewatering Well   Dewatering Well   Deservation and/or Monitoring Hole   Abandoned, Poor Water Cuality   Abandoned, Poor Water Cuality   Abandoned, other, specify   Other, specify   Other, specify   Contractor's Licence No. 7   S   S   S, Y/C   International Structure   Contractor's Licence No. 7   S   S   S   S   S   S   S   S   S	Pump intake set i Pumping rate (Mr Duration of pump I hrs + 22 Final water rave ( Recommended p Recommended p (/min / GPM) Well production ( Disinfected? Disinfected? Disinfected? Disinfected? Disinfected? Disinfected? Comments: Comments:	at (m/t) $\int \frac{1}{3} \frac{30}{0}$ $\frac{1}{3} \frac{1}{3} \frac{1}{3}$ $\frac{1}{3} \frac{1}{3} \frac{1}{3}$ $\frac{1}{3} \frac{1}{3} $	2 3 3 3 4 3, 5 3, 10 3, 15 3, 20 3, 25 3, 30 3, 40 3, 50 3, 160 3,	$\begin{array}{c} 59 & 2 \\ 59 & 3 \\ 59 & 3 \\ 59 & 4 \\ 59 & 5 \\ 59 & 5 \\ 59 & 5 \\ 59 & 10 \\ 59 & 10 \\ 59 & 10 \\ 59 & 10 \\ 59 & 10 \\ 59 & 10 \\ 59 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 20 \\ 50 & 2$
Meth         □ Cable Toc         □ Cable Toc         □ Cable Toc         □ Rotary (C         □ Portary (C         □ Other, soe         □ Oth	Internet in the second	Inuction Reprint Provide A second contractor and co	Pul     Pul     Do     Do     Do     Cas     Wal     Thickness     (cm/in)	blic mestic estock gation ustrial ner, specify From C. 60 een Dept From Untested Untested Untested Untested C. 60 Seconside Comparison Comparis	Weil Us           Image: Contract of the second sec	Se  rrcial  Constraints  Provide and the second se	Pump intake set i Pumping rate life Duration of pump I hrs + 00 Final water level o Recommended p (Umin / GPM) Weil production (i Disinfected? Disinfected? Disinfected? Please provide a Comments: Weil owner's D package	at $(m/t)$ j = 30 j = 30 j = 30 j = 30 j = 30 j = 0 j	2 3 4 3, 5 3, 10 3, 20 3, 20 3, 25 3, 30 3, 40 3, 50 3, 16 3, 17 40 3, 16 3, 16 3, 17	$\begin{array}{c} 59 & 2 & 3 \\ 59 & 3 & 2 \\ 59 & 3 & 2 \\ 59 & 4 & 3 & 2 \\ 59 & 5 & 3 & 2 \\ 59 & 5 & 3 & 2 \\ 59 & 10 & 3 & 2 \\ 59 & 10 & 3 & 2 \\ 59 & 10 & 3 & 2 \\ 59 & 10 & 3 & 2 \\ 59 & 10 & 3 & 2 \\ 59 & 20 & 3 & 2 \\ 59 & 20 & 3 & 2 \\ 59 & 20 & 3 & 2 \\ 59 & 30 & 5 & 2 \\ 59 & 30 & 5 & 2 \\ 59 & 50 & 3 & 2 \\ 59 & 50 & 50 \\ 50 & 50 & 50 \\ 50 & 50 & 50$

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# **Certificate of Analysis**

Environment Testing

Sunset Lakes Development Corp.	6598 Pebble Trail Way	Greely, ON	K4P 0B6	Mr. Daniel Payer		Sunset Lakes Development Corp.
Client:				Attention:	PO#:	Invoiced to:

2019-08-06 2019-07-25 1913301 96089 Report Number: Date Submitted: Date Reported: Project: COC#

1443661 Water

LAB I.D.

Water 2019-07-25 TW1		120	0.39	<0.10	<0.10	68	213	<2	698	67.8	<0.01	265*	1.5	275*	96'0	64	0.64*	2	28	0.05	08	<u>2</u> .0≻	0.45	40.001	0.2	0.4
Sample Matrix Sample Type Sample Date: Sample ID:	Guideline	AO 250	MAC 1.5	MAC 1.0	MAC 10.0	AO 500	OG 500	AO 5		6.5-8.5	AO 0.05	AO 500	AO 5.0	OG 100			AO 0.3			AO 0.05	AO 200	AO 5				
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	TCU	uS/cm		mg/L	mg/L	NTU	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	MRL	۲-	0.10	0.10	0.10	٢	5	2	5	1.00	0.1	1	0.1	1	0.01	٢	0.03	1	1	0.01	2	0.5	0.01	0.001	0.1	0.1
	Analyte	C	ш	N-NO2	N-NO3	SO4	Alkalinity as CaCO3	Colour	Conductivity	Hq	S2-	TDS (COND-CALC)	Turbidity	Hardness as CaCO3	Ion Balance	Ca	Fe	К	Mg	Mn	Na	DOC	N-NH3	Phenols	Tannin & Lignin	Total Kjeldahl Nitrogen
	Group	Anions					General Chemistry							Hardness	Indices/Calc	Metals						Subcontract-Inorg				

\* = Guideline Exceedence Guideline = ODWSOG Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QAQC information available on request.

146 Colonnade Rd, Unit 8, Ottawa, ON, K2E 7Y1

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



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# LENNTECH

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Home / Calculators / Langelier index calculator

# Langelier Saturation Index Calculator

This calculator helps you determine the scaling potential of the water by using the Langelier Saturation Index.

Give the values of your water analysis. All the fields with \* are required.

Table 1: Input	table		lf you do	not have a way	ar analysia you	aan waa th						
рН	8.49 *		table 2. C	lick on a butto	n at the bottom	of table 2						
Conductivity /	565		Table 2 : Additional data									
TDS	*	mg/L	pH =	7.7	8	8.6						
[Ca <sup>2+</sup> ]	64		TDS =	20	34483	273 49						
	*		[Ca <sup>2+</sup> ]	5	400							
[HCO3 <sup>-</sup> ]	275	mg/L 🗸	=			121						
Watar			[HCO <sub>3</sub> ] =	10	140							
temperature	9 *	degree C 🗸	T =	20	20	20						
Calculate the	e Langlier Saturation Ir	ndex		Example	Seawater	Tap wat						
Erase input	values											
Table 3: Resul	ts Langelier Saturatio	on Index										
рН <sub>s</sub>		7.8										
LSI		0.72	<b>T</b> h - 1		- 4: 1 4							
Indication base (1936)	ed on Langelier	Water is supersaturated with respect to calcium carbonate (CaCO3) and		LSI =	= pH	]						
Indication base Langelier by C	ed on improved arrier (1965)	Scale forming but non corrosive.	For a	n explanation o	of the formula c	lick here.						

langelier saturation index

# 1