ORIOLE PARK RESORT

2021 WASTEWATER

ANNUAL REPORT

INTRODUCTION

This is the seventh annual report for the waste water system commencing Jan 1 2021 to December 31 2021 in Oriole Park Resort

Oriole Park Resort is located at 22790 Amiens Rd Komoka Ontario N0L1R0 in the township of Middlesex Center in the county of Middlesex. The system operates under the Certificate of Approval 4800-SEBLYF issued July 15, 2011. The system is rated for a daily discharge of 52,000 L of effluent into the tile beds. There are currently 4 operating beds. There is currently 148 hookups as of the end of the year. The system started in 2011 with 25. There is a full description of the processes incurred through the system in Table 1 at the end of the written portion

MONITORING WELLS

There are 4 monitoring wells throughout the park located in a way to sample for chloride and nitrates. These sampling are done 4 times a year to insure the waste water going into the tile bed reds are not impeding on neighbouring properties. The average result for nitrates was 1.4 mg/l and the chloride average was 83.2 mg/l. For the full sample results see table 2 at the end of this report.

WASTE WATER FLOWS

The Certificate of Approval stimulates maximum flow of 52,000 L per day to the tile beds. At the start of the year there were 123 hookups and at the end of the year there were 148. The average daily flow for 2020 was 41898 L into the tile beds well below the maximum.
The highest daily flow was 72663 L in June and the lowest flow was11638 L in September. Readings are taken daily form flow meters located in the STP building. See Table 3 at the end of the report for the full years readings.

WASTE WATER EFFLUENT QUALITY

The Certificate of Approval stipulates what kind of tests, number of tests and the limits on these tests. they are taken form the decant tank which is the last tank in the system before it goes out to the tile beds. Samples are taken every 2 weeks except for the months of May, July, August and October when samples are taken every week. Samples are checked for dissolved oxygen, total suspended solids, ammonia and nitrates/nitrites. These samples are taken to the SGS lab located in south London. Results are emailed to the Park approx 1 week after delivery. The results for 2020 can be seen in Table 4 at the end of this report. There was a total of 35 tests done in 2021.

OVERVIEW OF THE SUCESS AND ADEQUACY OF THE SYSTEM

The system is operating properly as can be seen from the monitoring well results, no leakage of contamination from the system. there was a total of 32 results from the tests that. Dissolved oxygen, total suspended solids, ammonium and nitrites were all within limits. The nitrates were sometimes higher than allowed but that is strictly from the operation of the tanks. The effluent wasn't being denitrified in the tank designed to do it.

This problem has been rectified as explained in the problem section of this report.

MAINTENACE

Regular maintenance was carried out over the year. Lubrication of motors and air filter cleaning and/or replaced were done according to supplier recommendations. Tanks were cleaned as well as flow sensors.

Daily checks were done to insure everything was operating properly.

PROBLEMS AND CORRECTIVE ACTIONS

Again this year the grinder pumps were put into alarm because of swiller pads being put into the sewer system. These things plug up these pumps very easily because of their construction. Even though their container says they are safe for sewer disposal that is not true.

Equipment was installed to alleviate the odour that sometimes come out of the system. They have helped in the situation.It was found that the net that contains the enzymes that help with the denitrification cycle was broke. Also a bypass pipe was on so effluent was not going through the tank. All has been corrected and operating properly.

Two pumps in the tanks failed and were replaced. there is a spare one on hand in order to keep the site in operation.

Appendix 1

PROCESS DESCRIPTION

The system is a modified SBR design with batch forwarding as required. The STP is structured in five precast concrete tanks as follows:

Tank A is a 40,000 L single chamber used for pre-treatment/balancing. Incoming influent is pumped into it from pumping stations. A Hydromatic SK50 pump transfers 2,250 L of liquid into Tank B at the rate of 5.6 L/sec every hour, and this is controlled by a panel adjacent to the tank with a low level off float.

Tank B is a 60,000 L single chamber and is used for aeration treatment. The tank is equipped with fine bubble diffusers, and air being supplied by a Gast R7100 regenerative blower equipped with a VFD drive unit installed in the shed beside the SBR panel to regulate the running rpm's. The tank is sized to allow liquid exposure to aeration treatment for 20 hrs, and regulated by blower rpm's and run times to maintain a Do level between 2-4 mg/l. Liquid passes to Tank C via a 150mm PVC pipe located 600mm o/c off the tank floor. Anticipated BOD into tank C is 50. Sludge is returned from the clarifier to the tank head to mix with incoming influent.

Tank C is a 60,000 L single chamber and is anoxic, used for de-nitrification. Encaged fixed film media, 3,600 units an equal combination of 4" open cell carbon impregnated cubes and pall rings from Allied Signal are suspended in the tank to augment the production of de-nitrifying bacteria that naturally occurs in the activated sludge process. Microbial Plate count is based on 10^12 population. The carbon cubes are a food source for de-nitrifying bacteria converting nitrates to nitrogen gas. Liquid passes to Tank D via a 150mm PVC pipe located at the top of the tank liquid.

Tank D is a 60,000 L single chamber and is used for post aeration treatment and draw down to the clarifier. The tank is equipped with fine bubble diffusers, and air being supplied by a RBS0-53U regenerative blower equipped with a VFD drive unit installed in the shed beside the SBR panel to regulate the running rpm's. Do levels in this tank will be maintained at between 1.5-2 mg/l by regulating the blower speed and run times. Liquid passes into the first chamber of Tank E (18,000 L) via 150mm PVC pipes located 600mm o/c off the tank floor.

Tank E is a 60,000 L. partitioned into equal 3 sections

First section (18,000L) is a continuation of Tank D, equipped with 2 transfer pumps (Goulds WS2012D3) duplexed and installed on rail systems. Liquid is transferred to the second section (clarifier) via 75mm forcemain at the rate of 25 L/sec.

Second section is the clarifier (18,000L), equipped with 2 decant pumps (Goulds 1DW51E1EA) duplexed and suspended to decant up to 9,000L of the settled effluent to the third section (dosing) via a 38mm forcemain at the rate of 6 L/sec. Also 2 sludge return pumps (Goulds WS2012D3) duplexed and installed on rail systems are in the clarifier basin returning +9,000L of the settled sludge to the head of Tank B via 75mm forcemain at the rate of 25 L/sec after the clarifier decanting is completed.

Third 18,000L section is the dosing compartment for final disposal. It is sized at 2X the processed batch and is equipped with 4 dosing pumps (Goulds 1DW51E1EA) suspended 300mm off tank floor that run in sequence via a 38mm forcemain at the rate of 6 L/sec to each of the 4 filter beds over a 3 hr period. A sediment return pump (Goulds WS1012B) is located in the dosing basin to return remaining liquid after final discharge is completed to the head of Tank A via a 50mm forcemain at the rate of 12 L/sec.

Creek Park Farm

TABLE 2

		MONITORING WELLS		**TEST RESULTS 2021**			
				NITRITES	NITRATES	AS N	CHLORIDES
May 03	**WEST**			<0.03	<0.06	<0.06	250.0
	SOUTH			<0.03	<0.06	<0.06	120.0
	NORTH			<0.03	<0.06	<0.06	120.0
	EAST			<0.03	0.070	0.070	9.0
Jul 12	**WEST**			<0.03	<0.06	<0.06	44.0
	SOUTH			<0.03	0.210	0.210	150.0
	NORTH			<0.03	<0.06	<0.06	130.0
	EAST			<0.03	0.100	0.100	12.0
Aug 14	**WEST**			<0.03	<0.06	<0.06	11.0
	SOUTH			<0.03	<0.06	<0.06	120.0
	NORTH			<0.03	<0.06	<0.06	110.0
	EAST			<0.03	0.180	0.180	0.4
Oct 18	**WEST**			<0.03	<0.06	<0.06	6.0
	SOUTH			<0.03	<0.06	<0.06	93.0
	NORTH			<0.03	<0.06	<0.06	150.0
	EAST			<0.03	0.200	0.200	7.0

TABLE 3

2021												
MONTH	# OF DAYS	NUMBER OF	TOTAL SEWAGE	AVERAGE DAILY	MAXIMUM DAILY	MINIMUM DAILY	AVERAGE FLOW	SEWAGE AS %	AV. DAILY WATER	AVERAGE DAILY	MAXIMUM DAILY	MINIMUM DAILY
		HOOKUPS	FLOW FOR MONTH	SEWAGE FLOW	FLOW	FLOW	PER HOOKUP	OF WATER USED	USE/HOOKUP	WATER USE	WATER USE	WATER USE
			(in liters)	(in liters)	(in liters)	(in liters)	(in liters)	%	(in liters)	(in liters)	(in liters)	(in liters)
JANUARY	31	125	1236792	39897	54533	13151	319.2	124	257	32100	40500	23800
FEBRUARY	28	128	1177765	42063	56115	13866	328.6	122	269	34440	41200	28300
MARCH	31	130	1466199	47297	59158	33289	363.6	119	305	39648	61000	27200
APRIL	30	132	1313813	43794	60689	29091	331.8	122	272	35857	51500	27200
MAY	31	133	1268247	40911	52545	25909	307.6	122	252	33574	45200	25100
JUNE	30	135	1296823	43294	72663	29063	320.7	126	254	34310	43400	27400
JULY	31	140	1305569	42115	54412	26467	300.8	125	241	33726	41700	29600
AUGUST	31	143	1233309	39784	52538	26293	278.2	129	215	30738	45200	19500
SEPTEMBER	30	143	1108448	36948	46861	11638	258.4	113	228	32643	39548	28700
OCTOBER	31	145	1289803	41607	53062	22627	286.9	127	226	32774	37200	22700
NOVEMBER	30	147	1250126	41671	51754	25056	283.5	107	265	38920	50333	31200
DECEMBER	31	148	1345440	43401	58984	26811	293.3	128	229	33955	46850	20350
		Average	1267663	41898	56635	23588	306	122	251	34115	45472	26311
MONTH												

TABLE 4

MONTH	DATE	LOCATION	CBOD5	TSS	NITRITE	NITRATE	NITRATE AS N	AMMOUNIA
WASTE WATER TEST RESULTS 2021								
		OBJECTIVE RESULTS	**15**	15			**10.0**	
JAN	**4**	DECANT TANK	<4	7	<0.03	15.6	15.6	0.1
	18	DECANT TANK	15	20	3.29	9.78	13.1	6.2
FEB	**1**	DECANT TANK	30	29	0.40	1.22	1.62	47.5
	16	DECANT TANK	18	41	13.3	14.0	27.3	9.8
MARCH	**3**	DECANT TANK	9	12	1.04	5.45	6.49	12.8
	15	DECANT TANK	11	13	0.22	2.68	2.90	9.8
	29	DECANT TANK	7	4	0.34	15.7	16.0	0.2
APRIL	**12**	DECANT TANK	26	13	0.58	20.1	20.7	0.8
	26	DECANT TANK	27	27	0.11	21.9	22	0.8
MAY	**10**	DECANT TANK	12	18	0.19	21.9	22.1	0.9
	17	DECANT TANK	18	20	0.34	28	28.3	0.5
	24	DECANT TANK	4	5	0.25	32.3	32.6	0.4
	31	DECANT TANK	<4	12	0.35	25.8	26.2	0.1
JUNE	**7**	DECANT TANK	<12	13	0.18	24.5	24.7	0.1
	21	DECANT TANK	12	15	1.81	29.1	31	0.3
July	**5**	DECANT TANK	13	16	0.18	16.1	16.2	8.8
	12	DECANT TANK	13	15	1.12	26.3	27.4	0.6
	19	DECANT TANK	14	20	1.18	17.2	18.4	8.0
	26	DECANT TANK	11	17	0.68	22.5	23.2	0.2