Township of Southgate

Dundalk Wastewater Treatment Plant

2021 Annual Report

Jim Ellis
Public Works Manager

Dundalk Wastewater Treatment Plant
2021 Annual Report

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Overview:
The Dundalk Wastewater Treatment Plant (WWTP) provided treatment in 2021 with an annual average influent daily flow of 1,220 m³/day, a 4.88% increase over the 2020 average influent daily flow of 1,161 m³/day.

Project Description:
The Dundalk WWTP is a four-cell waste stabilization pond facility flowing into an aeration cell pond with a chemical feed system and a flocculation tank with tertiary treatment consisting of sand filters.

Plant Facts:

Facilities: Waste Stabilization Ponds with Tertiary Treatment

Design Capacity: 1832 m³/day

Receiver Water: Foley Drain/Grand River

Environmental Compliance Approval: 5657-9D9LYE

Effluent Requirements:

	Ideal	Maximum	Maximum
Effluent Parameter	**Concentration Objective**	**Monthly Average Concentration (MAC)**	**Monthly Average Loading**
COBD5	5.0 mg/L	10.0 mg/L	18.32 kg/day
Total Suspended Solids (TSS)	5.0 mg/L	10.0 mg/L	18.32 kg/day
Total Phosphorous	0.30 mg/L + 5 degrees Celsius stream temperature 0.60 mg/L - 5 degrees Celsius stream temperature	0.40 mg/L + 5 degrees Celsius stream temperature 0.80 mg/L - 5 degrees Celsius stream temperature	0.73 mg/L + 5 degrees Celsius stream temperature 1.47 mg/L - 5 degrees Celsius stream temperature
Dissolved Oxygen	5.0 mg/L	4.0 mg/L	
Dissolved Ammonia	0.05 mg/L	0.1 mg/L	
pH	6.5 to 8.5 at all times	6.0 to 9.5 at all times	

Sampling Requirements:

Sampling Criteria for this system is in accordance with Ministry Policy for the Environmental Compliance Approval (ECA) No. 5657-9D9LYE

Final Effluent:
A grab sample is taken twice a month and tested for CBOD, Suspended Solids, Total Phosphorus, Total Ammonia Nitrogen, Ecoli, pH and temperature.

On site testing is performed twice a week on final effluent for Total Ammonia to determine Unionized Ammonia through lab testing, pH, temperature and Dissolved Oxygen.

Raw Sewage:
A grab sample is taken monthly and tested for BOD, Suspended Solids, Total Kjeldahl Nitrogen and Total Phosphorus.

Effluent Flows:
The total effluent flow treated in 2021 was 470,150m³. The annual average daily flow was 1,288 m³/day, which results in a 18.52% increase of total effluent over 2020.

Raw Sewage Quality:
- Annual average raw sewage BOD concentration to the lagoon system was 132 mg/l.
- Annual average raw sewage suspended solids (TSS) concentration to the lagoon system was 214 mg/l.
- Annual average raw total phosphorus was 3.85 mg/l concentration to the lagoon system.
- Annual average Total Kjeldahl Nitrogen (TKN) concentration was 41.6 mg/l.

Plant Performance and Effluent Quality:
- Annual average effluent CBOD concentration was 3.48 mg/l.
- Annual average effluent total suspended solids (TSS) concentration was 3.92 mg/l day with a removal efficiency of 97.96% with an annual monthly average loading of 7.82 kg/day.
- Annual average effluent total phosphorus concentration was 0.07 mg/l day with a removal efficiency of 90.31% with an annual monthly average loading of 0.1 kg/day.
- Annual average effluent concentration for Ammonia-nitrogen was 5.24 mg/l.
- Annual average Unionized Ammonia was 0.0594560 mg/l.
- Annual average pH was 7.57
- Annual monthly average Ecoli was 91 with the low being 2 and the high being 456.
- The summary for 2021 of the data for the systems plant operation performance is enclosed in this report.

Maintenance and Calibration Activities:

Regular monthly preventative maintenance and calibration of test equipment and flow meters are performed by municipal staff and outside certified suppliers.

Third party annual calibrations were performed on December 1, 2021.

There were no by-pass events to report.

There were 8 operator shutdowns in 2021:

Please reference below table for shutdowns and limit exceedances for 2021.

	Monthly Average Effluent Concentration					Monthly Average Effluent Loading (kg/d)				
	COBD5	**TSS**	**TP**	**Unionized Ammonia**	**pH**	**COBD5**	**TSS**	**TP**	**Lagoon Shutdown Duration**	**Comments**
	Limit	Limit	Limit	Limit	Limit	Limit	Limit	Limit		
	10.0 mg/day	10.0 mg/L	0.4 mg/L - >5 C 0.8 mg/L - <5 C	0.05 mg/L = daily testing 0.1mg/L = shutdown	<6.0 or >9.5	18.32 kg/day	18.32 kg/day	0.4 kg/L - >5 C 0.8 kg/L - <5 C		
JAN				0.095					**6 days**	6 days for being over 0.05 mg/L
FEB				0.202					**18 days**	18 days for being over 0.1 mg/L
MAR				0.108					**27.5 days**	27.5 days for being over 0.1 mg/L
APR				0.308					**30 days**	28 days for being over 0.1 mg/L 2 days for being over 0.05 mg/L
MAY				0.104					**7 days**	5 days for being over 0.05 mg/L 2 days for being over 0.1 mg/L
JUN										
JUL										
AUG					9.38				**25.5 days**	25.5 days for being over 8.5
SEP					8.55				**24 days**	24 days for being over 8.5
OCT										
NOV										
DEC										

No loading exceedances.

Discussion:

The Dundalk Wastewater Treatment Environmental Assessment (EA) is still ongoing for the Dundalk Sewage Works, to determine technologies to meet effluent compliance objectives and limits and expansion to meet future development needs. A Request for Proposals was issued by Triton Engineering in September 2021, with 8 proposals being received. The submissions were short listed to 4 proposals for further analysis and the preferred technology will then be submitted for Ministry approval in 2022 to complete the EA.

Rowes Lane sanitary sewer installation - $90,982.10

Purchased two new sewage pumps $33,296.58

Township of Southgate - Village of Dundalk

2021 General Wastewater Information

Plant # : 0-101006-67

ECA # : 5657-9D9LYE

Population: 2431 (Village of Dundalk)

Flows

	Design		2021	2020	2019	2018	2017
Capacity:	208,500						
Influent Average Daily:	-	m^3	1,220	1,161	1,114	1,105	1,168
Annual Influent Flow:	668,600	m^3	446,719	425,922	405,664	401,279	424,727
Influent Maximum Daily:	-	m^3	6,740	4,510	3,989	9,022	6,362
Effluent Average Daily:	1,832	m^3	1,288	1,087	1,315	1,355	1,230
Annual Effluent Flow:	-	m^3	470,150	396,688	407,659	404,853	420,598
% Discharge vs. Total Capacity:	-		70.3%	59.3%	61.0%	60.6%	62.9%
Influent Increase 2021 over 2020:	-		4.88%	4.99%	1.09%	-5.52%	17.94%
Effluent Increase 2021 over 2020:	-		18.52%	-2.69%	0.69%	-3.74%	25.67%

Township of Southgate

Loading Report - Dundalk Wastewater Plant

Municipality: Township of Southgate Year: 2021
Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Plant # : 0-101006-67
Works # : 110001471
System Description : Faculative Lagoons & Sand Filters

	Loading Influent			Effluent Loading		
Month	BOD kg/day	SS kg/day	T Phos. kg/day	Effluent CBOD kg/day	Effluent SS kg/day	Effluent T Phos. kg/day
January	93.4	202.4	4.2	9.7	16.6	0.25
February	62.0	153.1	0.1	2.2	2.6	0.04
March	738.4	357.1	11.0	16.6	10.7	0.21
April	172.9	247.8	7.3	0.0	0.0	0.00
May	104.0	262.5	3.5	8.0	13.3	0.13
June	81.5	308.3	1.1	3.2	3.2	0.24
July	186.8	323.9	5.9	2.2	3.6	0.02
August	83.5	167.1	3.7	7.4	7.4	0.10
September	109.6	163.7	3.2	5.7	5.7	0.10
October	152.7	202.7	7.8	13.9	15.5	0.12
November	183.1	333.2	7.4	8.5	8.5	0.06
December	159.8	204.2	5.5	6.7	6.7	0.11
Total	2127.7	2926.0	60.4	84.1	93.8	1.39
Average	177.3	243.8	5.0	7.0	7.8	0.12
Maximum	738.4	357.1	11.0	16.6	16.6	0.25

PS = Plant Shutdown

Township of Southgate

Performance Report - Dundalk Wastewater Plant

Municipality: Township of Southgate
Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Plant # : 0-101006-67
Works # : 110001471
System Description : Faculative Lagoons & Sand Filters

Year: 2021
Receiver: Foley Drain - Grand River
Design Average Day Flow (m3): 1832

	Flows				Discharge	Bio-Chemical Oxygen Demand			Suspended Solids			Phosphorus			E Coli	Temperature	Nitrogen Series			Loading		
	Raw			Effluent	Duration	Avg. Raw	Avg Effluent	Percent	Avg. Raw	Avg. Effluent	Percent	Avg. Raw	Avg. Effluent	Percent	average	< 5 C.	TKN	Avg. Effluent	Unionized	Effluent	Effluent	Effluent
Month	Total Flow m3	Avg. Flow m3	Max. Flow m3	Total Flow m3	Days	BOD mg/l	CBOD mg/l	Removal	SS mg/l	SS mg/l	Removal	T. Phos mg/l	T. Phos mg/l	Removal	Effluent Count	or > 5 C.	mg/l	$NH_3 + NH_4$ mg/l	Ammonia mg/l	CBOD kg/day	SS kg/day	T Phos. kg/day
January	32176	1038.00	1215.00	69184	25	90.0	3.5	96.11%	195.0	6.0	96.92%	4.00	0.09	97.75%	232	0.6	39.7	10.31	0.061170	9.7	16.6	0.2
February	20911	747.00	957.00	3972	9	83.0	5.0	93.98%	205.0	6.0	97.07%	0.10	0.09	10.00%	424	0.1	44.7	15.20	0.118467	2.2	2.6	0.0
March	57667	1860.00	6740.00	4936	2.3	397.0	7.7	98.05%	192.0	5.0	97.40%	5.90	0.10	98.31%	300	0.2	54.7	17.60	0.084840	16.6	10.7	0.2
April	36273	1209.00	1909.01	0	0	143.0	0.0	100.00%	205.0	0.0	100.00%	6.00	0.00	100.00%	PS	0.0	54.1	0.00	0.201880	0.0	0.0	0.0
May	32544	1050.00	1979.00	63815	24	99.0	3.0	96.97%	250.0	5.0	98.00%	3.30	0.05	98.48%	9	14.4	26.8	8.89	0.079504	8.0	13.3	0.1
June	20557	685.00	1675.00	31570	30	119.0	3.0	97.48%	450.0	3.0	99.33%	1.60	0.23	85.63%	3	21.3	56.3	3.40	0.042650	3.2	3.2	0.2
July	40489	1306.00	2440.00	22224	31	143.0	3.0	97.90%	248.0	5.0	97.98%	4.50	0.03	99.33%	5	22.4	40.7	0.03	0.000790	2.2	3.6	0.0
August	25646	827.00	972.00	13607	5.5	101.0	3.0	97.03%	202.0	3.0	98.51%	4.50	0.04	99.11%	4	20.7	41.6	0.04	0.073700	7.4	7.4	0.1
September	39590	1320.00	6301.00	10454	5.5	83.0	3.0	96.39%	124.0	3.0	97.58%	2.40	0.05	97.92%	12	14.4	19.7	0.04	0.001250	5.7	5.7	0.1
October	40783	1316.00	2464.00	95915	31	116.0	4.5	96.12%	154.0	5.0	96.75%	5.90	0.04	99.32%	6	12.9	50.1	0.05	0.006600	13.9	15.5	0.1
November	45034	1501.00	2520.00	85025	30	122.0	3.0	97.54%	222.0	3.0	98.65%	4.90	0.02	99.59%	2	3.7	42.8	1.1	0.009289	8.5	8.5	0.1
December	55049	1776.00	2968.00	69448	31	90.0	3.0	96.67%	115.0	3.0	97.39%	3.10	0.05	98.39%	2	1.3	28.5	6.25	0.033333	6.7	6.7	0.1
Total	446719			470150	224.3																	
Average	37227	1220		39179		132.2	3.5	97.02%	213.5	3.9	97.97%	3.85	0.07	90.32%	91	9.3	41.6	5.24	0.059456	7.0	7.8	0.1
Maximum	57667	1860	6740	95915		397.0	7.7		450.0	6.0		6.00	0.23		424	22.4	56.3	17.60	0.201880	16.6	16.6	0.2

PS = Plant Shutdown

Township of Southgate

Annual Report - Dundalk Wastewater Plant

Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Works: 110001471
Year: 2021
Location Type: Final Effluent Discharge Report

Month	Discharge Duration Days	Total Effluent m^3	Total Coagulant Used (kg)	Average Coagulant Dosage (mg/l)	Average CBOD mg/l	Average SS mg/l	Average T. Phos. mg/l	Average $NH_3 + NH_4$ as N (mg/l)	E Coli average Count	Average pH Reports	Average Temp. C	Average D.O. mg/l
January	25	69184	1.25	11.7	3.5	6.0	0.09	10.31	232	8.01	0.60	12.48
February	9	3972	0.45	73.6	5.0	6.0	0.09	15.20	424	7.93	0.10	11.62
March	2.3	4936	0.12	0.0	7.7	5.0	0.10	17.60	300	7.77	0.20	11.40
April	0	0	0.00	0.0	0.0	0.0	0.00	0.00	PS	0.00	0.00	0.00
May	24	63815	1.20	12.2	3.0	5.0	0.05	8.89	9	8.14	14.40	8.98
June	30	31570	1.50	30.9	3.0	3.0	0.23	3.40	3	8.03	21.30	6.36
July	31	22224	1.55	0.0	3.0	5.0	0.03	0.03	5	8.05	22.40	7.17
August	5.5	13607	0.28	13.1	3.0	3.0	0.04	0.04	4	8.97	20.70	7.83
September	5.5	10454	0.28	17.1	3.0	3.0	0.05	0.04	12	8.55	14.40	9.70
October	31	95915	1.55	10.5	4.5	5.0	0.04	0.05	6	9.13	12.90	10.27
November	30	85025	1.50	11.5	3.0	3.0	0.02	1.12	2	8.14	3.70	13.50
December	31	69448	1.55	14.5	3.0	3.0	0.05	6.25	2	8.13	1.30	13.59
Total	224.3	470150	11.22									
Average		39179	0.93	16.27	3.48	3.92	0.07	5.24	91	7.57	9.33	9.41
Maximum		95915			7.74	6	0.23	17.6	424	9.13	22.40	13.59

PS = Plant Shutdown

Township of Southgate - Village of Dundalk

Annual Report - Dundalk Wastewater Plant

Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Works: 110001471
Classification: Class 1 Wastewater Collection & Class 1 Wastewater Treatment
Receiver Foley Drain to Grand River

Year: 2021
Population Served: 2431

Raw Sewage Parameters		January	February	March	April	May	June	July	August	September	October	November	December	Summary
	Average	90	83	397	143	99	119	143	101	83	116	122.50	90.00	132
BOD	Minimum	90	83	397	143	99	119	143	101	83	116	96	90	130
mg/l	Maximum	90	83	397	143	99	119	143	101	83	116	149	90	134
Suspended	Average	195	205	192	205	250	450	248	202	124	154	222.50	115.00	214
Solids	Minimum	195	205	192	205	250	450	248	202	124	154	140	115	207
mg/l	Maximum	195	205	192	205	250	450	248	202	124	154	305	115	220
	Average	39.7	44.7	54.7	54.1	26.8	56.3	40.7	1.0	19.7	50.1	42.75	28.50	38.3
TKN	Minimum	39.7	44.7	54.7	54.1	26.8	56.3	40.7	1.0	19.7	50.1	37.9	28.5	37.9
mg/l	Maximum	39.7	44.7	54.7	54.1	26.8	56.3	40.7	1.0	19.7	50.1	47.6	28.5	38.7
Total	Average	4.01	0.04	5.9	6.05	3.29	1.62	4.55	4.50	2.49	5.89	4.90	3.17	3.87
Phosphorus	Minimum	4.01	0.04	5.9	6.05	3.29	1.62	4.55	4.50	2.49	5.89	4.27	3.17	3.82
mg/l	Maximum	4.01	0.04	5.9	6.05	3.29	1.62	4.55	4.50	2.49	5.89	5.52	3.17	3.92

PS = Plant Shutdown

Township of Southgate - Village of Dundalk

Annual Report - Dundalk Wastewater Plant

Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Works: 110001471
Classification: Class 1 Wastewater Collection & Class 1 Wastewater Treatment
Receiver Foley Drain to Grand River

Year: 2021
Population Served: 2431

Final Effluent Parameters		January	February	March	April	May	June	July	August	September	October	November	December	Summary
	Average	3.5	5.0	6.0	PS	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5
CBOD	Minimum	3.0	5.0	6	PS	3.0	3.0	3	3.0	3.0	3.0	3.0	3.0	3.0
mg/l	Maximum	4.0	5.0	6	PS	3.0	3.0	3	3.0	3.0	3.0	3.0	3.0	6.0
Suspended	Average	6.0	6.0	5.0	PS	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	4.3
Solids	Minimum	6.0	6.0	5	PS	4.0	3.0	3	3.0	3.0	3.0	3.0	3.0	3.0
mg/l	Maximum	6.0	6.0	5	PS	6.0	3.0	7	3.0	3.0	7.0	3.0	3.0	7.0
	Average	10.3	15.2	17.6	PS	8.9	3.4	0.03	0.04	0.04	0.05	1.3	5.1	5.63
NH3 + NH4	Minimum	8.72	15.20	17.6	PS	7.47	2.71	0.03	0.04	0.04	0.04	0.52	3.64	0.03
mg/l	Maximum	11.90	15.20	17.6	PS	10.30	4.09	0.03	0.04	0.04	0.05	2.14	6.47	17.60
	Average	13.95	20.60	20.20	PS	11.05	4.40	0.08	1.00	0.80	0.09	2.00	6.25	7.31
TKN	Minimum	12.40	20.60	20.2	PS	10.00	3.50	0.07	1.00	0.80	0.08	1.20	4.90	0.07
mg/l	Maximum	15.50	20.60	20.2	PS	12.10	5.30	0.08	1.00	0.80	0.09	2.80	7.60	20.60
Total	Average	0.09	0.09	0.10	PS	0.05	0.23	0.04	0.04	0.05	0.04	0.02	0.05	0.07
Phosphorus	Minimum	0.09	0.09	0.1	PS	0.05	0.06	0.02	0.04	0.05	0.03	0.01	0.04	0.01
mg/l	Maximum	0.09	0.09	0.1	PS	0.05	0.39	0.05	0.04	0.05	0.04	0.03	0.05	0.39
	Average	232.00	424.00	300.00	PS	9.00	3.00	5.00	4.00	12.00	6.00	2.00	2.00	91
Ecoli	Minimum	8	424	300	PS	2	2	2	4	12	4	2	2	2
	Maximum	456	424	300	PS	16	4	8	4	12	8	2	2	456
pH Lab Results	Average	8.01	7.93	7.74	PS	8.14	8.03	8.05	8.97	8.55	9.26	8.11	8.17	8.27
(In-house testing	Minimum	7.90	7.93	7.74	PS	8.06	7.86	7.97	8.97	8.55	9.13	7.94	8.07	7.74
not included)	Maximum	8.11	7.93	7.74	PS	8.22	8.20	8.13	8.97	8.55	9.38	8.27	8.27	9.38
	Average	12.90	10.80	11.20	PS	9.00	6.70	7.20	7.90	9.70	10.50	13.55	13.50	10.27
DO	Minimum	11.90	9.10	10.2	PS	7.00	5.40	6.2	7.40	9.60	8.90	11.90	12.80	5.40
mg/l	Maximum	13.90	12.50	12.2	PS	11.00	8.00	8.2	8.40	9.80	12.10	15.20	14.20	15.20
Unionized	Average	0.062456	0.117000	0.079100	0.198700	0.076400	0.042250	0.001050	0.073700	0.001250	0.007875	0.015200	0.031150	0.058844
Ammonia	Minimum	0.029400	0.032400	0.050200	0.088700	0.048000	0.012200	0.000000	0.004600	0.001200	0.000350	0.002400	0.016000	0.000000
mg/l	Maximum	0.095512	0.201600	0.108000	0.308700	0.104800	0.072300	0.002100	0.142800	0.001300	0.015400	0.028000	0.046300	0.308700

PS = Plant Shutdown