July 12, 2021

Mr. Scott MacCallum, P.Eng., M.B.A.
Clayton Developments Limited
255 Lacewood Drive, Suite 100C
Halifax, NS B3M 4G2

Dear Mr. MacCallum,

Re: Shannex Lands Sanitary Capacity Review
Bedford South, NS

INTRODUCTION

Strum Consulting has been commissioned by Clayton Developments Limited to review the implications of increasing the population density on the Shannex Lands near the corner of Larry Uteck Boulevard and Starboard Drive. This review was completed in conjunction with the previous "Bedford West Wastewater Pumping Stations and Forcemains/Gravity Sewer/Watermain Preliminary Design Report", completed by AECOM in 2013.

The Shannex Lands consist of 5 properties, including PID's 41316514, 41316522, 41316548, 41318049, and 41415274. An office facility is currently constructed on PID 41316514, with the remainder of the lands being currently undeveloped. Total area of all the Shannex Lands including the developed parcel is 37 acres.

Wastewater flow from this site is tributary to the sewer system on Starboard Drive, which subsequently drains along Larry Uteck Boulevard to a temporary lift station near the corner of Larry Uteck Boulevard and Highway 102. This temporary lift station pumps wastewater back up along Larry Uteck Boulevard before discharging into the gravity wastewater system, flowing to the Bedford Highway Trunk Sewer. The temporary lift station is to be decommissioned in the short term, at which time, flow from this area will run along Larry Uteck Boulevard, across Highway 102, down Hogan Court, and subsequently along Kearney Lake Road to the existing wastewater lift station near the former quarry on Kearney Lake Road.

20-7670-SA01, prepared by Strum Consulting, is provided as an attachment for graphical representation of the site area and a schematic of the wastewater system.

REVIEW OF HALIFAX WATER DESIGN CRITERIA

The gravity wastewater system throughout this area of Bedford South was designed using modified design criteria, which was agreed to by HRM staff at the time. This modified criteria includes the following allowances:

Safety Factor (Capacity Factor) - 1.0
Infiltration Allowance - 11,234 L/Ha/day (1000 imp.Gal/acre/day)
Average Sewerage Flow – 250 L/person/day (55 imp.Gal/person/day)

In addition to these values, an average population of 32.5 people per acre was applied to the Shannex Lands, leading to a total population of 1202 people contributing wastewater flow.

PROPOSED DEVELOPMENT AND REVIEW OF SYSTEM CAPACITY

Strum has reviewed the wastewater system in the area surrounding this site, and capacity of the existing system from the point of entry of the wastewater flows from the Shannex Lands to the existing temporary lift station at Larry Uteck Boulevard / Highway 102. Utilizing the modified design criteria noted above, it was previously calculated that the existing system would operate at approximately 60% capacity if the Shannex Lands were built to a population of 1202 people (32.5 people per acre).

The owners of the Shannex Lands are seeking to increase the density on these lands to 2275 people (61.5 people per acre). Utilizing the modified design criteria noted above, it was calculated that the existing gravity sanitary system between the Shannex Lands and the temporary lift station will operate at approximately 75% capacity if the increased population is permitted. Complete sanitary capacity calculations for the increased density scenario are included on drawing 20-7670-SA01, prepared by Strum Consulting.

CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis completed, the existing gravity system between the Shannex Lands and the temporary lift station is anticipated to have adequate capacity to accommodate the proposed increased density of 2275 people on the Shannex Lands.

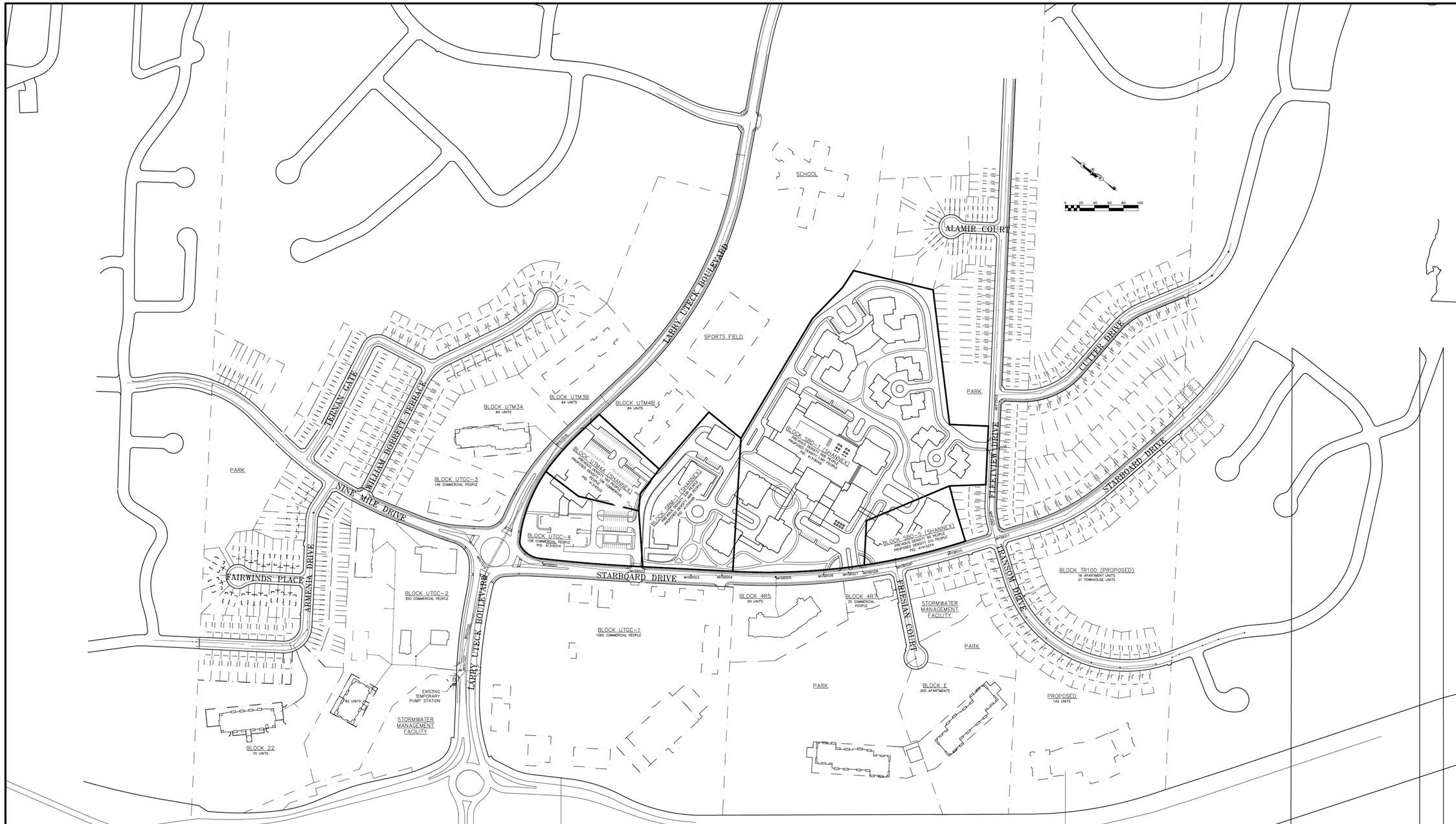
Based on the AECOM design report for this wastewater system (2013), an allowance of 5994 people and 107 L/s was made for the lands tributary from Bedford South and was derived using new design criteria. With the increased density on the Shannex Lands, and using the modified design criteria previously used to design the sewer, it is estimated that approximately 7979 people and 79 L/s will be tributary to the system. While complete analysis of the existing wastewater system between Highway 102 and the Kearney Lake Lift Station was not completed, it is anticipated that the existing gravity system and pumping station design would have adequate capacity for this increased population.

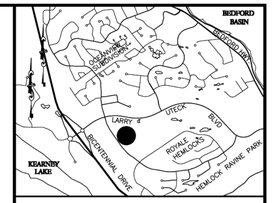
CLOSURE

If you have any questions or concerns regarding the above, please contact us.

Thank you,

Chris Boudreau, P.Eng.
Vice President of Engineering Services
cboudreau@strum.com





Key Plan NOT TO SCALE

LEGEND

- EXISTING SANITARY M.H. & SEWER
- EXISTING STORM M.H. & SEWER
- EXISTING HYDRANT
- EXISTING GATE VALVE & WATERMAIN
- EXISTING CATCHBASIN (CURB & FLAT)
- EXISTING U/G ELEC. LINES
- EXISTING GAS LINE
- EXISTING OVERHEAD WIRES
- EXISTING PAINT LINES
- EXISTING PROPERTY LINE
- EXISTING R.O.W. (RIGHT OF WAY)
- EXISTING TREE
- EXISTING POWER POLE
- EXISTING POLE ANCHOR
- EXISTING POLE WITH LIGHT FIXTURE
- EXISTING CONCRETE CURB
- EXISTING EDGE OF ASPHALT
- EXISTING SIDEWALK STRUCTURE
- EXISTING TOP OF SLOPE
- EXISTING TOE OF SLOPE
- EXISTING DRAINAGE DITCH
- EXISTING DRAINAGE CHANNEL
- EXISTING LIMIT OF DISTURBANCE
- MINOR CONTOUR LABEL
- MAJOR CONTOUR LABEL

NOTES:

1. Additional 325 people added at MHFVS02
2. Additional 120 people added at MHSBS09
3. Additional 301 people added at MHSBS06
4. Additional 379 people added at MHSBS04
5. Removed 52 people at MHUTS18

COMPUTATIONS FOR DESIGN OF SANITARY SEWERS

DESIGN SHEET # DRAWING #20-7670-SA01 CALCULATED BY: CTP CHECKED BY: CNBSRW DATE: July 7, 2021 JOB#: 20-7670

SHANNEX SEWER CAPACITY CHECK

FUTURE AVERAGE SEWERAGE FLOW 55.00 IGPCD INFILTRATION ALLOWANCE 1000.00 IGAPD

SEWER LOCATION			TRIBUTARY AREA (ACRE)		MAX RATE OF FLOW								DESIGN					
Road Name	FROM M.H.	TO M.H.	INCREMENT	TOTAL	CAPACITY FACTOR	DESIGN POPULATION PER ACRE (P.P.A.)	DESIGN POPULATION (P)	AVERAGE SEWERAGE FLOW (IMP.G.P.D.)	PEAK FLOW FACTOR	PEAK SEWERAGE FLOW (IMP.G.P.D.)	AVERAGE DRY WEATHER FLOW (IMP.G.P.D.)	PEAK DRY WEATHER FLOW (IMP.G.P.D.)	AVE. RATE OF FLOW (cu.m./s)	PEAK RATE OF FLOW (cu.m./s)	PIPE SIZE (mm)	SLOPE %	CAPACITY WHEN FULL (cu.m./s)	VELOCITY WHEN FULL (ft/sec)	PEAK RATE OF FLOW (MM)	Q/Qfull
Fleetview Drive	MHFVS03	MHFVS02	9.34	9.34	1.00	19.73	184	1084.98	4.16	4514.41	2084.98	5514.41	0.04	0.10	10	0.6	2.21	4.05	2.71	0.04
	MHFVS02	MHFVS01	18.31	27.65	1.00	29.26	309	1609.42	3.86	6206.24	2609.42	7206.24	0.13	0.37	10	0.6	2.21	4.05	10.47	0.17
	MHFVS01	MHSBS11	0.44	28.09	1.00	29.40	826	1617.01	3.85	6228.78	2617.01	7228.78	0.14	0.38	10	0.7	2.38	4.37	10.66	0.16
	from Transom		12.67				567													
Starboard Drive	MHSBS11	MHSBS10	7.26	48.22	1.00	31.17	1503	1714.27	3.68	6306.71	2714.27	7306.71	0.24	0.65	10	1.1	2.99	5.48	18.50	0.22
	MHSBS10	MHSBS09	0.67	48.89	1.00	31.02	1516	1705.85	3.68	6270.97	2705.85	7270.97	0.25	0.66	10	6.0	6.98	12.79	18.67	0.09
	from Friesen		5.81				710													
	MHSBS09	MHSBS08	2.74	57.44	1.00	42.42	2436	2332.86	3.52	8206.02	3332.86	9206.02	0.36	0.98	10	0.6	2.15	3.94	27.77	0.46
	MHSBS08	MHSBS07	0.07	57.51	1.00	42.36	2436	2330.02	3.52	8196.03	3330.02	9196.03	0.36	0.98	10	0.6	2.28	4.18	27.78	0.43
	MHSBS07	MHSBS06	0.15	57.66	1.00	42.25	2436	2323.96	3.52	8174.71	3323.96	9174.71	0.36	0.98	10	0.5	2.05	3.77	27.78	0.46
	MHSBS06	MHSBS05	7.23	64.89	1.00	45.93	2980	2526.30	3.44	8702.69	3526.30	9702.69	0.42	1.17	10	0.5	2.07	3.80	33.07	0.56
	MHSBS05	MHSBS04	3.73	68.62	1.00	45.08	3093	2479.15	3.43	8506.27	3479.15	9506.27	0.44	1.21	10	0.5	2.03	3.73	34.26	0.59
	MHSBS04	MHSBS03	6.94	75.56	1.00	50.42	3810	2773.37	3.35	9296.87	3773.37	10296.87	0.53	1.44	10	0.9	2.63	4.81	40.86	0.55
	MHSBS03	MHSBS02	0.44	76.00	1.00	50.13	3810	2757.31	3.35	9243.04	3757.31	10243.04	0.53	1.44	10	0.8	2.50	4.58	40.88	0.58
	MHSBS02	MHSBS01	9.39	85.39	1.00	45.88	3918	2523.65	3.34	8432.49	3523.65	9432.49	0.56	1.49	10	0.8	2.55	4.67	42.30	0.59
	MHSBS01	MHUTS19	0.94	86.33	1.00	45.38	3918	2496.17	3.34	8340.67	3496.17	9340.67	0.56	1.50	10	1.4	3.36	6.16	42.35	0.45
	from Nine Mile		30.25				933													
	from Larry Uteck		22.66				1384													
Larry Uteck Boulevard	MHUTS19	MHUTST20	0.84	140.28	1.00	44.45	6235	2444.53	3.15	7712.15	3444.53	8712.15	0.90	2.27	12	0.6	3.56	4.53	64.19	0.64
	MHUTST20	MHUTS21	0.35	140.63	1.00	44.34	6235	2438.44	3.15	7692.95	3438.44	8692.95	0.90	2.27	12	0.7	3.82	4.86	64.20	0.59
	from Dellridge		9.46				485													
	MHUTS21	Lift Station	21.37	171.46	1.00	46.54	7979	2559.58	3.05	7810.21	3559.58	8810.21	1.13	2.80	12	0.7	3.73	4.75	79.34	0.75
								Signifies where additional population added from Shannex (see notes)											

No	Description	Date	By
0.	Issued for Information	July 12, 2021	RM

Revision or Issue

Strum CONSULTING

Project
SHANNEX PROPERTIES
BEDFORD, NS

Drawing
SANITARY SEWER ANALYSIS

Scale 1:2500

Date	Drawn
July 12, 2021	GTP
Design / Check	Approv.
CTP / CNB	CNB
Project No.	Sheet
20-7670	1 Of 1
Drawing No.	Rev.
SA01	0