1415 WASHINGTON AVENUE
STUDENT HOUSING PROJECT

City of Albany

Albany County, N.Y.

ENGINEER'S REPORT
ON SEWER SYSTEM CAPACITY

APPLICANTS:
1415 Washington Property LLC

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August 30, 2020

INTRODUCTION

Hershberg & Hershberg, Consulting Engineers and Land Surveyors, were retained by 1415 Washington Property LLC (hereinafter the "Applicant") as site engineer in conjunction with the demolition of an existing 95 bed hotel (Cresthil Suites) an the construction of a 560 +/- bed student housing facility at No. 1415 Washington Avenue. This report is prepared to address the question of adequate sewer service to the site.

DESCRIPTION OF EXISTING SITE AND USE

No 1415 Washington Avenue is currently occupied by Cresthill Suites, an operating hotel.

DESCRIPTION OF INTENDED SITE DEVELOPMENT AND USE

Applicant proposes to demolish the existing 95 room hotel (Cresthill Suites) and construct a new dormitory. The new building will have 240+/- dwelling units being a mixture of 1, 2 & 4 bedroom units. The total number of beds would be 560 +/- beds. The building will be 5 stories and 4 stories over parking. There will be two partial levels of parking with a total parking for 207+/- cars. In addition to indoor amenity spaces, there will be an 8,000+/- SF Community Courtyard/Amphitheater and an 8,300 SF Plaza. Student housing units will fully furnished bedroom clusters sharing a fully furnished common living room and kitchen.

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EXISTING SEWER COLLECTION SYSTEM

The property at 1415 Washington Avenue is currently served by a connection to an 8" PVC sewer in an easement which runs through the site. The proposal would be to utilize the 8" Pipe which connects to a 21" VCP pipe located in an easement parallel to the original route of the Patroon Creek.

SANITARY FLOW ESTIMATE

The *New York State Design Standards for Intermediate Sized Wastewater Treatment Systems* (March 5, 2014) includes the following information on design flows

The design flow rate is typically based on the flow rates determined using one of the following three methods:[1]

- *Using the typical per-unit hydraulic loading rates provided in Table B-3 (Referred to as Method No. 1)*
- *Obtaining metered daily wastewater flow data from existing and similar facilities (Referred to as Method No. 2)*
- *Obtaining metered daily water usage data from existing and similar facilities (Referred to as Method No. 3)*

Based upon Method No. 3 data based on figures from facilities with similar sized units at 1475 Washington Avenue and 1385 Washington Avenue, the Average Daily Flow is 50 GPD/Bed as shown in Fig No. 1 below. For the 560 beds based upon 55 GPD per bed the Average Daily Flow is 30,800 GPD. Subtracting the Existing Average Daily Flow of 8,431 GPD from Cresthill Suites - 1415 Washington Avenue as shown below in Fig. No. 2. For the purpose of this analysis the Net Projected Average Daily Flow use of 22,369 GPD (15.53 GPM) is utilized. The peak flow of sanitary sewage would be 400% of the average or 62.14 GPM.

[1] *New York State Design Standards for Intermediate Sized Wastewater Treatment Systems* (March 5, 2014),Pg. B-15

Computation from Similar Uses on Washington Avenue
1385 Washington Avenue - 314 Beds

Period	Water Cost	100 Cubic Feet Units	Equivalent Gallons	Days	Usage (GPD)
1/07/19 to 5/03/19	$5,989.44	2,260	1,692,864	118	14,346
5/04/19 to 9/08/19	$5,067.36	1,912	1,432,246	118	12,138
9/08/19 to 1/02/20	$6,933.28	2,616	1,959,633	116	16,893
1/02/20 to 5/04/20	$6,143.58	2,259	1,691,743	124	13,643
			Totals		57,020
	Average Daily Usage				14,255
	Average Daily Usage per bed				45

Computation from Similar Uses on Washington Avenue
1475 Washington Avenue -292 Beds

Period	Water Cost	100 Cubic Feet Units	Equivalent Gallons	Days	Usage (GPD)
1/09/17 to 5/04/17	$5,364.03	2,024	1,516,098	117	12,958
5/05/17 to 9/8/17	$5,673.75	2,141	1,603,637	125	12,829
9/8/17 to 1/08/18	$6,327.90	2,388	1,788,527	122	14,660
1/08/18 to 5/08/18	$8,001.09	3,019	2,261,440	122	18,536
5/09/18 to 9/04/18	$7,510.71	2,834	2,122,838	121	17,544
9/05/18 to 1/7/19	$7,067.49	2,667	1,997,566	124	16,109
1/07/19 to 5/03/19	$6,318.56	2,384	1,785,887	118	15,135
5/04/19 to 9/03/19	$7,216.16	2,723	2,039,586	121	16,856
9/03/19 to 1/02/20	$8,268.80	3,120	2,337,106	121	19,315
1/02/20 to 5/04/19	$8,121.69	2,986	2,236,451	124	18,036
			Totals		69,342
	Average Daily Usage				17,335
	Average Daily Usage per bed				55
Based on rates:	$2.72 per 100 CF	Eff 1/1/20			
	2.65 per 100 CF	Prior to 1/1/20			

Fig. No. 1 – Average Daily Sewage flows from Water Use
1385 & 1475 Washington Avenue

Computation from Existing Uses on Washington Avenue
1415 Washington Avenue - Crestill Sites - 95 Units

Period	Water Cost	100 Cubic Feet Units	Equivalent Gallons	Days	Usage (GPD)
1/09/17 to 5/04/17	$2,747.13	1,037	776,453	117	6,636
5/05/17 to 9/08/17	$2,827.53	1,067	799,177	125	6,393
9/09/17 to 1/8/18	$3,446.97	1,301	974,257	121	8,052
1/9/18 to 5/8/18	$3,214.68	1,213	908,602	121	7,509
5/9/18 to 9/4/18	$3,882.18	1,465	1,097,265	117	9,378
9/5/18 to 1/7/19	$3,390.09	1,279	958,180	124	7,727
1/8/19 to 5/3/19	$2,894.08	1,092	817,987	118	6,932
5/04/19 to 9/3/19	$4,615.84	1,742	1,304,628	121	10,782
9/3/19 to 1/02/20	$4,545.12	1,715	1,284,640	116	11,074
1/02/20 to 5/04/20	$4,422.15	1,626	1,217,717	124	9,820
			Totals		84,305
	Average Daily Usage				8,431

Fig. No. 2 – Existing Average Daily Sewage flows from Water Use
Cresthill Suites – 1415 Washington Avenue

SEWAGE GENERATION
1415 Washington Avenue

Use	Unit	Value	Sewage Generation Per Unit per day(GPD) See Note 1	Daily Sewage Geneation (GPD)
Residential	Beds	560	55	30800
TOTAL ESTIMATED WATER USE				**30800**
LESS EXISTING USE AT 1415 WASHINGTON AVENUE				**-8431**
NET ESTIMATED WATER USE				**22369**
Average Daily Sewer Generation Increase in GPM		**15.53**		
Peak Sewer Generation Increase in GPM		**62.14**		
Average Daily Sewer Generation Increase in CFS		**0.03**		
Peak Sewer Generation Increase in CFS		**0.14**		
1) Source: Averages of uses for 1385 and 1475 Washington Avenue				

Fig. No. 3 – Project Sewer Generation

DOWNSTREAM PIPE CAPACITY

Immediately downstream from the site is a section of the 8" PVC pipe with the flattest grade of 0.69%. The capacity of this pipe is computed as shown below is 1.015 CFS. The net increased peak flow of 62.14 GPM (.136 CFS) utilizes 13.1% of pipe capacity.

PROJECT:	**1415 WASHINGTON AVENUE STUDENT HOUSING**							
FILE NAME:		**20200015 PIPE CALC**						
THE FOLLOWING, IS THE CALCULATION FOR PIPES FLOWING								
FULL AS STATED IN THE CHEZY-MANNING FORMULA, WHERE:								
Q MAX = DISCHARGE FOR PIPE FLOWING FULL IN C.F.S.								
n = COEFFICIENT OF ROUGHNESS								
A = CROSS SECTIONAL AREA OF FLOW IN SQUARE FEET								
R = HYDRAULIC RADIUS IN FT.								
S = SLOPE IN FT./FT.								
Vm = VELOCITY OF PIPE FLOWING FULL IN FT./SEC.								
D = PIPE DIAMETER IN INCHES								
LOCATION		**Q MAX**	**n**	**A**	**R**	**S**	**Vm**	**D**
Downstream MH's		1.0153	0.013	0.349	0.167	0.0069	2.9	8

Fig. No. 4 – Downstream Pipe Capacity

I-90 PUMP STATION CAPACITY

Based upon data provided by the City of Albany Department of Water & Water Supply shown below in Fig. No. 5 the Average Daily Flow for the I-90 Pump Station is 162.23 GPM or 233,611 GPD. In previous figures provided Albany County Sewer District (See Appendix No. 1) the Average Daily Flow to the I-90 Pump Station for 2015 is 225,800 GPD.

Fig. No. 3 – Chart from I-90 November 2019 to February 2020

In 2016, the force main from the I-90 pump station, which pumps sewage to the Patroon Creek Interceptor Sewer, was changed from a 6” pipe to a 10” pipe increasing flow capacity to 655 GPM. At the time, the level of use at peak flows has required pumps to operate for up to 20 hours a day leaving little protection against a pump outage which could lead to one pump becoming inadequate maintain flow. With an average daily flow of 233,611 GPD, the pumping time drops to 6 hours a day or 30% of operation time prior to the change. With the addition of 22,369 GPD the average pump operating time per day would 6.94 hours per day.

ENGINEER'S OPINION

It is the engineer's opinion that the construction of the proposed facilities can be accommodated by the existing collection sewers and by the I-90 Pump Station.

Prepared by

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APPENDIX 1
SANITARY SEWAGE FLOWS
IN I-90 PUMP STATION

2013-2014

Provided by Albany County Sewer District

I-90 Daily Flows (From Totalizer Data)

	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Sep 2013	Oct 2013	Nov 2013	Dec 2013
1	0.08	0.19	0.21	0.17	0.23	0.15	0.21	0.19	0.30	0.38	0.31	0.19
2	0.08	0.16	0.19	0.18	0.21	0.17	0.21	0.19	0.31	0.36	0.31	0.29
3	0.09	0.17	0.19	0.19	0.20	0.18	0.19	0.18	0.32	0.35	0.31	0.31
4	0.09	0.20	0.22	0.20	0.18	0.17	0.17	0.18	0.36	0.35	0.31	0.32
5	0.08	0.19	0.22	0.20	0.17	0.17	0.19	0.18	0.32	0.30	0.31	0.31
6	0.08	0.18	0.20	0.17	0.21	0.17	0.19	0.19	0.31	0.30	0.31	0.32
7	0.10	0.21	0.20	0.16	0.20	0.17	0.19	0.19	0.31	0.34	0.31	0.28
8	0.10	0.18	0.20	0.21	0.20	0.15	0.21	0.20	0.31	0.34	0.31	0.29
9	0.11	0.16	0.19	0.20	0.21	0.15	0.26	0.21	0.36	0.34	0.26	0.32
10	0.10	0.17	0.17	0.22	0.21	0.17	0.22	0.19	0.37	0.34	0.27	0.32
11	0.10	0.20	0.21	0.22	0.18	0.19	0.22	0.16	0.38	0.31	0.30	0.31
12	0.07	0.21	0.19	0.22	0.16	0.19	0.22	0.21	0.41	0.31	0.31	0.32
13	0.08	0.20	0.22	0.18	0.18	0.19	0.20	0.20	0.38	0.31	0.32	0.30
14	0.09	0.20	0.19	0.20	0.19	0.19	0.21	0.20	0.32	0.31	0.32	0.26
15	0.13	0.19	0.13	0.23	0.20	0.17	0.23	0.16	0.33	0.31	0.30	0.26
16	0.14	0.18	0.10	0.21	0.21	0.16	0.25	0.19	0.35	0.31	0.26	0.30
17	0.14	0.19	0.08	0.24	0.18	0.18	0.21	0.22	0.36	0.31	0.27	0.30
18	0.12	0.19	0.10	0.23	0.13	0.18	0.22	0.18	0.36	0.31	0.30	0.30
19	0.09	0.20	0.10	0.24	0.12	0.18	0.23	0.21	0.37	0.31	0.31	0.24
20	0.11	0.19	0.11	0.18	0.10	0.18	0.20	0.18	0.37	0.31	0.33	0.17
21	0.15	0.19	0.11	0.19		0.17	0.18	0.28	0.33	0.31	0.32	0.13
22	0.19	0.19	0.11	0.21	0.19	0.17	0.21	0.28	0.33	0.31	0.31	0.13
23	0.19	0.17	0.10	0.23	0.18	0.17	0.22	0.29	0.35	0.31	0.26	0.16
24	0.21	0.17	0.14	0.22	0.18	0.18	0.20	0.30	0.36	0.31	0.26	0.14
25	0.19	0.19	0.19	0.20	0.19	0.19	0.20	0.31	0.35	0.31	0.30	0.13
26	0.17	0.22	0.21	0.21	0.18	0.19	0.21	0.31	0.36	0.31	0.26	0.15
27	0.17	0.20	0.22	0.18	0.15	0.19	0.18	0.33	0.34	0.31	0.18	0.15
28	0.19	0.20	0.20	0.17	0.16	0.19	0.18	0.41	0.30	0.31	0.15	0.14
29	0.19		0.20	0.21	0.17	0.17	0.21	0.36	0.30	0.31	0.15	0.14
30	0.20		0.16	0.21	0.17	0.19	0.21	0.34	0.33	0.31	0.15	0.15
31	0.19		0.17		0.17		0.20	0.31		0.31		0.14
Avg	0.13	0.19	0.17	0.20	0.18	0.18	0.21	0.24	0.34	0.32	0.28	0.23
Max	0.21	0.22	0.22	0.24	0.23	0.19	0.26	0.41	0.41	0.38	0.33	0.32

	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
1	0.13	0.30	0.27	0.31	0.32	0.13	0.18	0.17	0.27	0.29
2	0.14	0.27	0.26	0.30	0.31	0.13	0.17	0.17	0.31	0.30
3	0.13	0.30	0.28	0.31	0.28	0.14	0.17	0.17	0.29	0.29
4	0.12	0.32	0.30	0.31	0.28	0.15	0.15	0.17	0.29	0.24
5	0.12	0.30	0.30	0.29	0.31	0.15	0.16	0.17	0.30	0.25
6	0.17	0.31	0.29	0.28	0.31	0.15	0.17	0.17	0.27	0.29
7	0.18	0.29	0.29	0.31	0.31	0.13	0.18	0.15	0.27	0.30
8	0.18	0.25	0.27	0.33	0.32	0.14	0.19	0.15	0.30	0.29
9	0.18	0.25	0.26	0.38	0.30	0.15	0.19	0.15	0.30	0.29
10	0.18	0.32	0.30	0.33	0.27	0.16	0.18	0.15	0.28	0.30
11	0.15	0.30	0.31	0.37	0.26	0.16	0.19	0.15	0.28	0.28
12	0.14	0.30	0.31	0.28	0.29	0.16	0.17	0.17	0.28	0.27
13	0.17	0.29	0.31	0.27	0.31	0.16	0.18	0.17	0.28	0.29
14	0.18	0.29	0.25	0.28	0.30	0.14	0.18	0.16	0.24	0.30
15	0.17	0.28	0.14	0.27	0.30	0.14	0.20	0.16	0.28	0.29
16	0.17	0.28	0.13	0.30	0.25	0.15	0.18	0.15	0.29	0.32
17	0.16	0.30	0.14	0.30	0.18	0.16	0.19	0.16	0.29	0.31
18	0.15	0.30	0.17	0.27	0.16	0.16	0.19	0.17	0.30	0.25
19	0.18	0.25	0.18	0.21	0.15	0.15	0.18	0.17	0.29	0.26
20	0.24	0.25	0.18	0.21	0.15	0.15	0.17	0.26	0.24	0.29
21	0.29	0.25	0.18	0.26	0.15	0.14	0.19	0.26	0.26	0.30
22	0.31	0.25	0.16	0.30	0.15	0.13	0.18	0.26	0.29	0.30
23	0.32	0.25	0.20	0.31	0.15	0.15	0.19	0.26	0.29	0.31
24	0.30	0.25	0.29	0.31	0.16	0.17	0.18	0.26	0.27	0.30
25	0.26	0.25	0.30	0.31	0.14	0.17	0.17	0.26	0.23	0.25
26	0.27	0.30	0.30	0.27	0.12	0.17	0.17	0.26	0.22	0.27
27	0.31	0.30	0.30	0.27	0.13	0.16	0.17	0.26	0.20	0.29
28	0.32	0.30	0.30	0.30	0.14	0.16	0.17	0.26	0.21	0.32
29	0.32		0.29	0.31	0.14	0.15	0.17	0.26	0.28	0.32
30	0.33		0.28	0.31	0.14	0.17	0.17	0.25	0.29	0.30
31	0.32		0.31		0.14		0.17	0.27		0.32
Avg	0.21	0.28	0.25	0.30	0.22	0.15	0.18	0.20	0.27	0.29
Max	0.33	0.32	0.31	0.38	0.32	0.17	0.20	0.27	0.31	0.32