SANITARY SEWER DESIGN REPORT

PRINCETON EXECUTIVE PARK

BLOCK 9, LOTS 12.01 and 12.03, BLOCK 9.03 LOT 12.02

TOWNSHIP of WEST WINDSOR, MERCER COUNTY, NJ

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Prepared by:
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I. INTRODUCTION

This report has been prepared to describe and document (through engineering calculations and related technical data) the sanitary sewer system design for Princeton Executive Park West Windsor Township, a proposed mixed use and multi-family development. The design makes provision for full build out of the subject site.

This report accompanies a set of site plans prepared by Bowman Consulting Group, LTD, which illustrates the existing and proposed conditions for the subject property, as well as providing details for the various appurtenances for the sanitary sewer system described herein. Therefore, this report must be reviewed and considered in conjunction with these plans.

A. Location of Project Site

The project site is located in the Township of West Windsor Mercer County New Jersey. The site is listed on the Tax maps as Block 9 Lots 12.01 and 12.02 and Block 9.03 Lot 12.02. It is bound on the west by US Route 1, on the north by Carnegie Drive, on the south by Old Meadow Road and is bifurcated by Meadow Road. The site is relatively flat but does grade from the northwest corner at Route 1 towards the southeast. There is an existing 24" trunk sewer on the south side of Old Meadow Road (the Duck Pond Run Interceptor). The proposed connection for this project is at an existing Manhole on the trunk sewer which we require a new outside drop connection.

B. Project Description

The project will consist of several phases beginning with a proposed hotel and restaurant on the northerly parcel at the intersection of Rout 1 north and Carnegie Drive. This will be followed by construction of the multifamily residential on the north side of Meadow Road. Later phases will include the southerly parcel. Since the sewer connection originates on the south side of the tract and the first use is in the northwest corner a substantial portion of the overall sanitary sewer system, approximately 2,400 feet will have to be constructed during the initial stage.

The sewage will drain by gravity from north to south to Old Meadow Road. This area of West Windsor Twp drains to the south and west eventually reaching the Stony Brook regional STP (NJ0031119) for treatment.

II. OVERVIEW OF REGULATORY REQUIREMENTS

The sanitary sewer system for the proposed project will be designed to comply with current regulatory requirements and standards. The applicable regulations and standards are as follows:

- The State of New Jersey's Sanitary Sewer Regulations "*N.J.A.C.7:14A Chapter 23".*

III. DESIGN CALCULATIONS – PHASES 1 AND 2

The average daily flow has been estimated using the number of each residential unit type and the estimated flow as per N.J.A.C. 7:14A-23.3. Non-residential flows have been added in to get the total flow. The detail breakdown of unit types and bedroom counts are attached in appendix 1.

PHASE 1 (North)

Type	Units	Design Flow	Average Daily Flow (gpd)
Apartment 1 bedroom	129	150 gpd/unit	19,350
Apartment 2 bedroom	185	225 gpd/unit	41,625
Apartment 3 bedroom	42	300 gpd/unit	12,600
Subtotal	356		73,575 gpd
Hotel	130 rooms	75 gpd/room	9,750
Restaurant	250 seats	35 gpd/seat	8,750
Retail	16,000 sf	0.10 gpd/sf	1,600
North Clubhouse	7,500 sf	0.10 gpd/sf	750
North pool	30 people	15 gpd/person	450
Subtotal			21,300
Total North side			**94,875 gpd (ave)**

PHASE 2 (South)

Type	Units	Design Flow	Average Daily Flow (gpd)
Apartment 1 bedroom	96	150 gpd/unit	14,400
Apartment 2 bedroom	166	225 gpd/unit	37,350
Apartment 3 bedroom	38	300 gpd/unit	11,400
Subtotal	300		63,150 gpd

South Clubhouse	7,500 sf	0.10 gpd/sf	750
South pool	30 people	15 gpd/person	450
Subtotal			1,200
Total South side			**64,350 gpd (ave)**

The total estimated daily flow for Phases 1 and 2 is **159,225 gpd** which is an average of **110.6 gpm** over the 24 hour day. Using a peaking factor of 2 this would yield a **peak** of **221 gpm** which would be the pipe design requirement at half full.

The lowest run of the proposed sewer carrying the full development flow is a gravity sewer line 8" diameter PVC line at a slope of 0.50%. This has a one-half full capacity of 249 gpm more than adequate for the expected peak flow 221 gpm. Lateral connections will be 6" at a minimum slope of 1% as per the Plumbing Code.

IV. PIPE DESIGN CALCULATIONS

Listed below is a check of pipe capacity at the point of connection to the existing trunk sewer. As per NJDEP Rules and Regulations the flow is calculated at junction points and the peak flow is determined (2x average). The pipe must be able to carry the peak flow while being no more than half full.

PIPE CHECK S-3 to Existing 24" Trunk Sewer on Old Meadow Road

S-3 to Existing 24" Trunk sewer. Design flow = Full Build out = 159,225 gpd

159,225 gpd/24 hours/60 minutes = 110.6 gpm x 2 = peak design flow = 221 gpm

Pipe = 8" PVC at 0.50% N=0.01 V= 3.18 fps Qfull = 499 gpm **Q1/2 = 249 gpm**

Conclusion: Pipe capacity is greater than design flow.

This pipe check is at the point of connection carrying the flow from the north side of the project under Meadow Road to the south side. NJDEP Rules and Regulations require that the pipe must be able to carry the peak flow while being no more than half full.

PIPE CHECK S-8 to S-5 Across Meadow Road

S-8 to S-5 Design flow = North side = 94,875 gpd

94,875 gpd/24 hours/60 minutes = 66 gpm x 2 = peak design flow = 132 gpm

Pipe = 8" PVC at 0.35% N=0.01 V= 2.66 fps Qfull = 417 gpm **Q1/2 = 209 gpm**

Conclusion: Pipe capacity is greater than design flow.

V. SUMMARY AND CONCLUSION

The sanitary sewer system has been designed for full buildout. The estimated daily flow for the TWA application is 159,225 gpd (0.159 MGD). The pipe design conforms to all NJDEP rules and regulations for sanitary sewer extensions.

APPENDIX

Princeton Executive Park 10/16/2019
West Windsor Twp, Mercer Cty NJ Revised 4/22/20
NORTH SIDE

Building ID	Type	Units/Type	1 Bedroom	GPD at 150/unit	2 Bedroom	GPD at 225/unit	3 Bedroom	GPD at 300/unit
1	C	24	8	1200	14	3150	2	600
2	D2	76	30	4500	38	8550	8	2400
3	D1	60	21	3150	31	6975	8	2400
4	B1	18	6	900	10	2250	2	600
5	A1	12	4	600	6	1350	2	600
6	A1	12	4	600	6	1350	2	600
7	D2	76	30	4500	38	8550	8	2400
8	A1	12	4	600	6	1350	2	600
9	A1	12	4	600	6	1350	2	600
10	C	24	8	1200	14	3150	2	600
11	B1	18	6	900	10	2250	2	600
12	A1	12	4	600	6	1350	2	600
Subtotals		**356**	129	19,350	185	41,625	42	12,600

TOTAL **73,575** gpd

SOUTH SIDE

Building ID	Type	Units/Type	1 Bedroom	GPD at 150/unit	2 Bedroom	GPD at 225/unit	3 Bedroom	GPD at 300/unit
13	A2	12	4	600	6	1350	2	600
14	B1	18	6	900	10	2250	2	600
15	A1	12	4	600	6	1350	2	600
16	B1	18	6	900	10	2250	2	600
17	A2	12	4	600	6	1350	2	600
18	A1	12	4	600	6	1350	2	600
19	B1	18	6	900	10	2250	2	600
20	A1	12	4	600	6	1350	2	600
21	B1	18	6	900	10	2250	2	600
22	C	24	8	1200	14	3150	2	600
23	B2	18	6	900	11	2475	1	300
24	B1	18	6	900	10	2250	2	600
25	A1	12	4	600	6	1350	2	600
26	B1	18	6	900	10	2250	2	600
27	D3	48	12	1800	28	6300	8	2400
28	A2	12	4	600	6	1350	2	600
29	B2	18	6	900	11	2475	1	300
Subtotals (no bldg 23)		**300**	96	14,400	166	37,350	38	11,400

TOTAL **63,150** gpd

NON-RESIDENTIAL USES

Building ID	Size		Rate gpd/unit	GPD
Hotel	130	Rooms	75	9750
Restaurant	250	Seats	35	8750
Retail 1	8000	Sq Ft	0.1	800
Retail 2	8000	Sq Ft	0.1	800
N Clubhouse	7500	Sq Ft	0.1	750
N Pool	30	People	15	450
N Subtotals				21,300
S Clubhouse	7500	Sq Ft	0.1	750
S Pool	30	People	15	450
S Subtotals				1,200

Total North	94,875
Total South	64,350
Total Site	**159,225 gpd (ave)**
	110.6 gpm (ave)
	221.1 gpm Peak (2x)

PIPE CAPACITY

RUN	SIZE	SLOPE	Q (FULL)	Q (HALF FULL)	PEAK FLOW	gpm
S-2 to EXIST	8"	0.50%	499	249	220	gpm
S-8 to S-5	8"	0.35%	417	209	132	gpm
S-14 to S-8	8"	0.35%	417	209	30	gpm
S-37 to S-2	8"	0.35%	417	209	44	gpm