SANITARY SEWER ENGINEER'S REPORT

For

Stack Storage, LLC
Proposed Self-Storage Facility

Vanderburg Road and Boundary Road
Block 360, Lots 7 & 8
Township of Marlboro
Monmouth County,
New Jersey

Prepared By:

DYNAMIC ENGINEERING

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DEC #3724-99-001

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I. INTRODUCTION

The subject property is known as Block 360, Lots 7 & 8 as shown on Sheet 93 of the Tax Maps of the Township of Marlboro, Monmouth County, New Jersey. The parcel consists of approximately 7.847 acres and is located in the LI (Light Industrial) Zoning District. The site currently consists of an undeveloped wood area and open space and is located at the southwesterly corner of the intersection of Vanderburg Road and Boundary Road. The parcel is bound to the west by various industrial buildings and commercial facilities; to the east by Boundary Road with agricultural land and residential dwellings beyond; to the north by Vanderburg Road with Vanderburg Soccer Complex with mixed industrial and residential uses beyond; and to the south by industrial uses.

The project includes the construction of three (3) single-story self-storage facilities, each 29,900 SF in size, and associated site improvements, including parking, driveways, sidewalks, landscaping, lighting and other associated site amenities.

II. PROPOSED SANITARY SEWERAGE FACILITES

The proposed development consists of the construction of a 6" SDR-35 PVC sanitary sewer lateral with a connection to the existing sanitary sewer main located along the westerly property boundary as shown on the associated Utility Plan, provided under separate cover. The sanitary sewer connection is intended to serve the office portion of the facility. According to the sanitary sewer demand calculations, the proposed daily sewerage flow is as follows:

Existing Average Daily Sewer Demand:	**Proposed Average Daily Sewer Demand:**
Undeveloped	Store, Office Building
0 GPD	0.1 GPD/SF X 700 SF = 70 GPD
TOTAL EXISTING = 0 GPD	**TOTAL PROPOSED = 70 GPD**

III. SANITARY SEWER PIPE DESIGN

Per NJDEP regulations, the criteria for establishing the size of gravity sanitary sewer is to convey two times the average daily flow with the pipe flowing half full. Utilizing Manning's Equation with a roughness coefficient of 0.010 for PVC pipe, the following is the minimum capacity of the proposed sanitary sewer gravity lateral:

Proposed Self-Storage Facility

Pipe Size	Slope	Roughness (n)	Capacity at ½ Full	ADF	2 X ADF
6"	2.08%	0.010	340,881 gpd	70 gpd	140 gpd

APPENDIX

CAPACITY OF CIRCULAR PIPE FLOWING AT ½ FULL

DYNAMIC ENGINEERING

Capacity of Circular Pipe Flowing 1/2 Full

Project: Proposed Self Storage Facility
Job #: 3724-99-001
Location: Marlboro Township, Monmouth County, NJ

Computed By: TJB
Checked By: RDM
Date: 6/22/2021

PIPE DESCRIPTION	SLOPE (%)	SIZE (IN)	MANNING'S COEFFICIENT (n)	VELOCITY (FT/S)	CAPACITY (CFS)	CAPACITY (GPD)	CAPACITY (MGD)
SDR-35 PVC	2.080%	6	0.010	5.37	0.53	340,881	0.34

Variables Defined

Q=Capacity of Pipe (CFS)
V=Velocity in Pipe Section (FT/S)
R=Hydraulic Radius of Pipe Section
S=Slope of Pipe Section (FT/FT)
D=Diameter of Pipe (FT)
d=Depth of Flow in Pipe (FT)
n=Manning's Coefficient
Wp=Wetted Perimeter (FT)

Typical Values for Manning's Coefficient (n)

n(RCP)=	0.013	
n(HDPE-Smooth Interior)=	0.012	*Varies with Manufacturer
n(DIP)=	0.013	
n(PVC)=	0.010	
n(CMP)=	0.024	

Equations used:

Q=VA
V=(1.49/n)*R^(2/3)*S^(1/2)
Q=(1.49/n)*R^(2/3)*S^(1/2)*A

Utilizing Appendix 16.A from the Civil Engineering Reference Manual-Seventh Edition, by Micheal Lindeburg, Copyright 1999
The following equations were utilized to calculate the Hydraulic Radius and Area of a Circular Pipe Section flowing 1/2 full

$A=(\pi*D^2/4)*0.5=0.3927*D^2$
$R=A/Wp=0.3927*D^2/((2*\pi*D/2)*0.5)=0.25*D$

Therefore:

$Q=(1.49/n)*(0.25*D)^(2/3)*S^(1/2)*(0.3927*D^2)$
$V=(1.49/n)*(0.25*D)^(2/3)*S^(1/2)$

Unit Conversion Equations

1 Cubic Foot=7.4805 Gallons
1 Day = 86,400 Seconds

Therefore:

$$\frac{\text{Cubic Foot}}{\text{Second}} \times \frac{\text{86,400 Seconds}}{\text{1 Day}} \times \frac{\text{7.4805 Gallons}}{\text{1 Cubic Foot}} = \frac{\text{Gallon}}{\text{Day}}$$

$$\frac{\text{Gallon}}{\text{Day}} \times \frac{\text{1 Million Gallons}}{\text{1,000,000 Gallons}} = \frac{\text{Million Gallons}}{\text{Day}}$$