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**ENGINEER'S REPORT
FOR
PROPOSED SANITARY SEWER SYSTEM**

**PROPOSED INDUSTRIAL REDEVELOPMENT
520 MAIN AVENUE**

**BOROUGH OF WALLINGTON
BERGEN COUNTY, NEW JERSEY**

PREPARED FOR

UMDASCH REAL ESTATE USA, LTD.

NOVEMBER 8, 2019

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License No. 54006

MC Project No. 16002631A



ENGINEER'S REPORT

A. Project Description

The project site is located at 520 Main Avenue in Wallington, New Jersey, and is defined as Block 70.01, Lots 1.01, 1.02, 4.02, and 4.03 on the Borough of Wallington tax maps. The site is 26.10 acres in size and is comprised of several industrial buildings with appurtenant site improvements throughout. The existing buildings were primarily used for manufacturing, with some office space as well. The applicant proposes to demolish the existing buildings and construct three new buildings for warehousing and office with typical appurtenant site improvements.

B. Scope

The work shall consist of installing approximately 423 linear feet of 6" sanitary pvc pipe, 868 linear feet of 8" sanitary pvc pipe, five (5) sanitary manholes, and four (4) 6" cleanouts.

The proposed sanitary sewer pipe is proposed to tie into the existing sanitary sewer manhole on-site near the southwest corner of the northern portion of the site, which connects to the main in Main Ave via a 4" sanitary DIP pipe. The contractor shall video the existing sanitary pipe from the manhole to the connection in the street and shall perform a test pit to confirm location, size, and invert of the existing connection to the main. The contractor shall provide findings to the Engineer so a determination can be made as to whether or not the existing connection needs any modification.

Work shall also include, but not be limited to excavation, backfilling, laying and jointing of pipe, installation of sewer manholes, installation of service lines, testing, restoration to existing structures and road surfaces, and all other incidental work required to complete this work specified on the plans and specifications.

C. Determination of Sewer Flows and Capacities

To size the proposed sewers and determine the capacity, Maser Consulting (MC) studied both the existing and proposed sewer demand at the site. The values used to determine projected flow were taken from the table provided in section 7:14A-23.3 of the New Jersey Administrative Code (N.J.A.C.).

The existing site consists primarily of manufacturing use with associated office space. For factories/warehouse/manufacturing uses, the projected sewer flow is 25 gallons per day (gpd) per employee, and for office uses, the projected flow is 0.1 gpd per square foot of gross floor area (gfa). Since limited information is known about the existing operations, the number of employees was estimated using the industry historical data, which indicates based on prior studies that manufacturing uses have an average site employment density of 1 employee per 1,000 sq. ft. gfa. The total area of the existing manufacturing buildings from the prior use is approximately 197,244 sq. ft. and the total area of the existing office space is approximately 4,378 sq. ft. Based on these numbers, the following calculation was performed to determine the total projected sewer flow:

$197,244 \text{ sq. ft.} / (1 \text{ employee} / 1,000 \text{ sq. ft.}) = 197.24, \text{ or } 197 \text{ employees}$



$$(197 \text{ employees}) \times (25 \text{ gpd} / \text{employee}) = 4,925 \text{ gpd}$$

$$(4,378 \text{ sq. ft.}) \times (0.1 \text{ gpd} / \text{sq. ft. gfa}) = 437.8, \text{ or } 438 \text{ gpd}$$

$$4,925 \text{ gpd} + 438 \text{ gpd} = 5,363 \text{ gpd}$$

The proposed development consists of 32,812 sq. ft. of office space and warehouse operations consist of 60 employees on average (two overlapping 40-employee shifts). Based on this information, the flowing calculation was performed to determine the total projected sewer flow:

$$(60 \text{ employees}) \times (25 \text{ gpd} / \text{employee}) = 1,500 \text{ gpd}$$

$$(32,812 \text{ sq. ft.}) \times (0.1 \text{ gpd} / \text{sq. ft. gfa}) = 3,281.2, \text{ or } 3,281 \text{ gpd}$$

$$1,500 \text{ gpd} + 3,281 \text{ gpd} = 4,781 \text{ gpd}$$

Since the proposed projected sanitary sewer flow (4,781 gpd) is less than the existing flow (5,363 gpd), the existing sanitary sewer system in Main Ave will have adequate capacity to handle the flow from the proposed development.

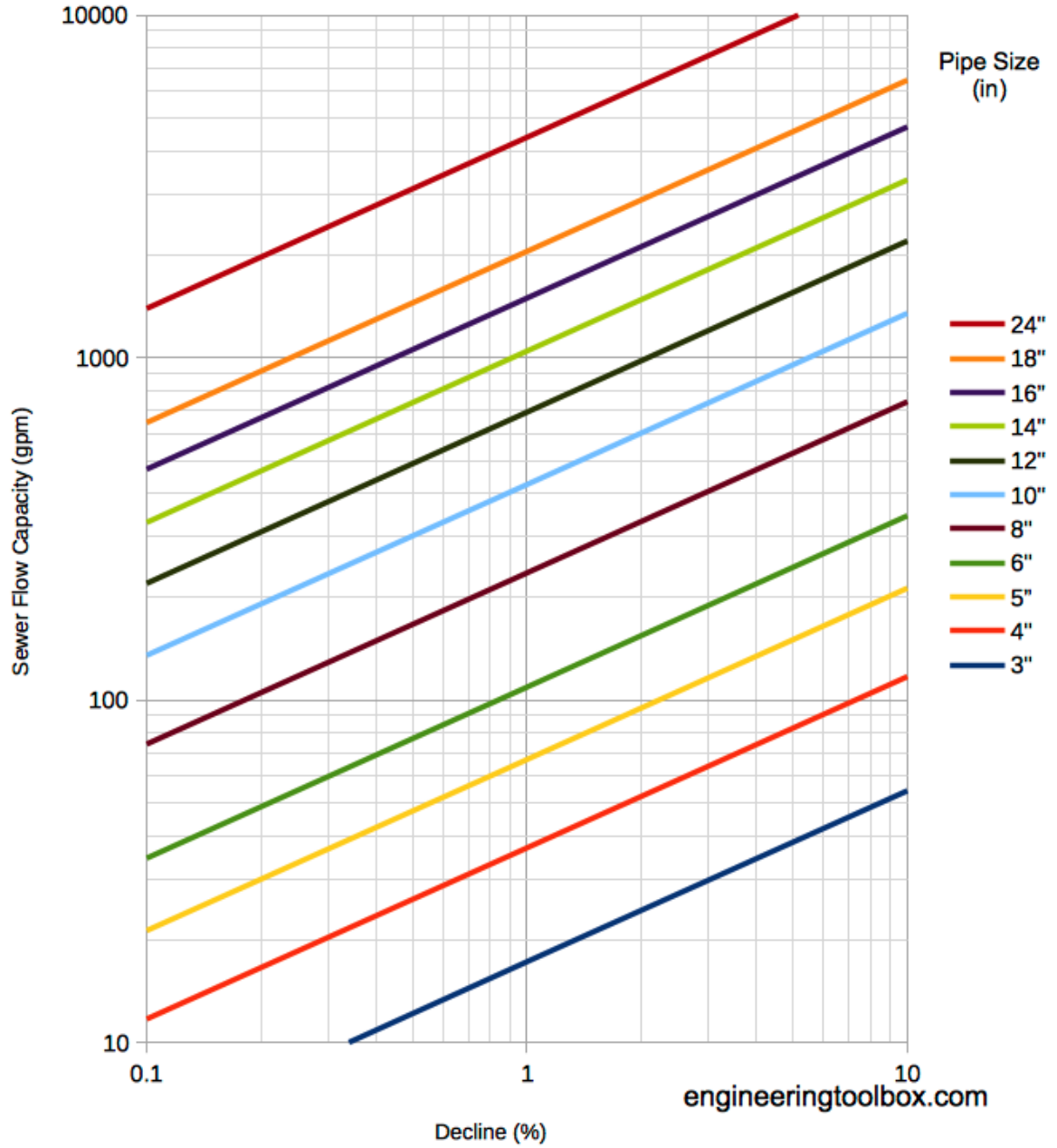
To determine capacity of the on-site pipes, a peaking factor is applied. According to N.J.A.C. 7:14A-23.6, gravity sanitary sewers shall be designed to carry at least twice the estimated average projected flow when flowing half full. Therefore, a peaking factor of 2 is applied in conjunction with the sewer pipe capacity chart provided below, which assumes the pipe flowing half full. After applying a peaking factor of 2, the proposed peak projected flow is 9,562 gpd (4,781 gpd x 2), or 6.64 gallons per minute (gpm).

Our analysis is based on the smallest, flattest pipes because capacity is directly proportional to the steepness of the slope and size of the pipe. As such, three different pipes are evaluated – proposed 6” pipe at 1.04% slope, proposed 8” pipe at 0.65% slope, and existing 4” pipe at an assumed 2.08% slope (typical minimum value for 4” sewer). As can be seen in the table below, a 6” pipe 50% filled with 1.04% slope has capacity for 115 gpm, an 8” pipe 50% filled with 0.65% slope has capacity for 190 gpm, and a 4” pipe 50% filled with 2.08% slope has capacity for 52 gpm. Therefore, all of the on-site pipes will have capacity to handle the proposed projected sewer flows.



Sewer Pipe Capacities (gpm)

50% filled





D. Installation and Testing

All installations, construction, and testing shall be in accordance with the requirements and standards set forth in the N.J.A.C., including the New Jersey Plumbing Code, and the standards of the Borough of Wallington.

The sewer mains shall be constructed of PVC class SDR 35 (see plans for sizes). The proposed sanitary sewer mains are of sufficient capacity to adequately serve the proposed development.

E. Horizontal and Vertical Separations

Horizontal separation between the proposed sewers and existing and/or proposed water mains will be a minimum of ten (10) feet where possible. Where this separation distance can not be provided, sewers shall be constructed in separate trenches from water mains and shall be a minimum of 18" below water mains, as noted on the site plans.

Vertical separation between proposed sanitary sewers and water main crossings will be maintained at 18" minimum.

F. Conclusions

Since the proposed projected sanitary sewer flow generated from the site is less than the existing flow, the existing sanitary sewer system in Main Ave will have adequate capacity to handle the flow from the proposed development.

The proposed on-site 6" and 8" sewers, as well as the existing on-site 4" sewer line, will have sufficient capacity to adequately serve the proposed development. All details and specifications are located on the project site plans.