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Engineering Report
Water and Sanitary Sewer

For

South Broadway Redevelopment
Saratoga Springs, New York

PB #18.XXX

Prepared For:

KCG Development, LLC
11555 N. Meridian Street, Suite 400
Carmel, IN 36032

Prepared By:

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May 3, 2018

PROJECT DESCRIPTION

The project proposes a mixed-use building at the southwest intersection of South Broadway and Canfield Street in the City of Saratoga Springs, NY. Access to the site is from South Broadway and Union Street to the west. The site was formally occupied by the Spa City Diner. Included is an internal parking structure on two levels with approximately 244 parking spaces. The building is proposed to have 110 affordable housing units, 21,000 square feet of commercial office, 7,000 square feet of retail, and 7,500 square feet for an eating and drinking establishment.

There will be a mix of one and two-bedroom apartments in the buildings. For this study, the breakdown is 66 two-bedroom and 44 one-bedroom units for a total of 176 bedrooms.

The restaurant and bar will have a capacity of 48 seats. In addition to the restaurant, there will be a total of 28,000 square feet of commercial and retail space.

EXISTING CONDITIONS

Water Distribution – A 12-inch ductile iron water main is present along the west side of South Broadway. A hydrant flow test was conducted on March 27, 2018 at the corner of South Broadway and Adelphi Street. The flow test indicated static pressures of 73 psi and a residual pressure of 63 psi with the hydrant flowing at 1,060 gallons per minute. The theoretical available fire flow at 20 psi is 2,607 gallons per minute. See Attachment A for hydrant flow test information.

Sanitary Sewer – An existing 10-inch sanitary sewer main runs along the sidewalk to the east of South Broadway and flows to the north, then west down Canfield Street where it picks up flows from Union Street and continues north along Union Street. The City gravity collection system eventually takes the wastewater to the Saratoga County Sewer District Pump Station at High Rock Avenue and Warren Street. From there the wastewater is pumped to County trunk lines and the treatment plant in Mechanicville.

SEWER AND WATER USAGE

The table below provides information on the anticipated average potable water use and wastewater flow rates for the project. Water use and wastewater flow are estimated to be equal for this study.

Table - Average Daily Flow (ADF)

Restaurant: (48 seats) x (35 gpd/seat)[1] =	1,680 gpd
Commercial: (28,000 square feet) x (0.10 gpd/sf)[1] =	2,800 gpd
Apartments: (176 bedrooms) x (110 gpd/ bedroom)[1] =	19,360 gpd
	Total = 23,840 gpd

Summary of Design Flows

Average daily flow for wastewater is estimated to be 22.1 gallons per minute (gpm) based on an 18-hour day. Estimated peak hourly flow is 89.9 gpm (4.07 x average).[2]

Average daily demand for water is estimated to be approximately equal to the wastewater flow or 22.1 gpm. Instantaneous peak demand is estimated at 548 gpm based on the table below:

Restaurant: (48 seats) x (1 gpm/seat)[3] =	48 gpm
Commercial: (28,000 square feet) x (0.01 gpm/sf)[3] =	280 gpm
Apartments: (110 residences) x (2 gpm/residence)[3] =	220 gpm
Total =	548 gpm

For the purposes of input into the City of Saratoga Springs water model, we offer the following estimated water demands for the project:

- Average Day Demand is 22.1 gallons per minute (GPM) over the 18-hour period.
- Max Day Demand is 44.2 gallons per minute (GPM) based on twice the average.
- Peak Hourly Flow is 89.9 gallons per minute (GPM) based on 4.07 times the average.
- Fire Flow Demand is 1,000 gallons per minute (GPM) per ISO guidelines.

PROPOSED CONDITIONS

Water Distribution – To service the project, the existing 12-inch main along the western portion of South Broadway will be tapped to provide a 6-inch combined fire protection and domestic service lateral to the building. A combined fire protection and domestic waterline will be brought to the building's mechanical room where the domestic line will tee off and be metered. Fire suppression for the building will be provided by fire sprinklers. The nearest fire hydrants are located on South Broadway just north of the intersection with Canfield Street (on the block in front of Saratoga National Bank); on South Broadway south of the project site in front of Mavis Tire; at the intersection of Union Street and Canfield Street and at the intersection of Union Street and Adelphi Street.

The minimum needed fire flow (NFF) is 1,000 gallons per minute at 20 psi for a duration of two hours according to the Insurance Services Office Guide for Determination of Needed Fire Flow for residential occupancies protected by an automatic fire sprinkler system. The existing hydrant on South Broadway in front of Mavis Tire was tested on March 27, 2018 and the estimated flow at 20 psi was 2,607 gpm which exceeds the minimum fire flow requirement.

Connections and appurtenances, including tapping sleeves, mechanical joints, tees, isolation valves, thrust blocks, trenching, bedding, as well as testing and disinfection will all be specified in accordance with City of Saratoga Springs standards.

Sanitary Sewer – Sanitary sewer service for the project will be provided by the City of Saratoga Springs sewer main along Canfield Street. A 6-inch PVC sewer service from the proposed building will wye into the existing 8-inch sewer main. The existing 10-inch main has a slope of 0.16%. The sewer lateral will maintain a minimum slope of 2%.

A grease trap will be provided for the restaurant kitchen wastewater. The interceptor will be sized according to current NYSDEC, PDI (Plumbing and Drainage Institute) and Uniform Plumbing Code requirements.

All sanitary sewer mains, laterals, manholes and manhole connections will be furnished, installed and tested according to City of Saratoga Springs standards.

1. *From Table B-3, NYSDEC Design Standards for Intermediate Sized Wastewater Treatment Systems, dated March 5, 2014*
2. *From Figure 1, GLUMRB Recommended Standards for Wastewater Facilities*
   Q = (18 + P ½) ÷ (4 + P ½) where P = population in thousands
3. *Table XIV - Ameen Community Water Systems Fifth Edition*

ATTACHMENT A

HYDRANT FLOW TEST DATA

North East Fire Protection Systems Inc.
P.O. BOX 508 BURNT HILLS, N.Y. 12027 (518) 885-1115 FAX (518) 885-0526

HYDRANT FLOW TEST REPORT

LOCATION: BROADWAY NEAR ADELPHI

TEST BY: NORTH EAST FIRE PROT. - B & B PLUMBING

DATE: 3/27/18 **TIME:** 2:10 PM

TARGET HYD. LOCATION (B) BROADWAY SOUTH OF ADELPHI

TEST RESULTS: **STATIC PRESSURE (B)** 73 **PSI**

RESIDUAL PRESSURE (B) 63 **PSI WITH** 1060 **GPM FLOWING AT (A)**

RESIDUAL PRESSURE (B) _____ **PSI WITH** _____ **GPM FLOWING AT (A)**

FLOW HYD. LOCATION (A) BROADWAY SOUTH OF CANFIELD

1) **PORT FLOWED (A)** 1 **DIAMETER** 2½

2) **PORT FLOWED (A)** _____ **DIAMETER** _____

3) **PORT FLOWED (A)** _____ **DIAMETER** _____

1) **PITOT or FLOW METER READING (A)** 40 **PSI AT** 1060 **GPM**

2) **PITOT or FLOW METER READING (A)** _____ **PSI AT** _____ **GPM**

3) **PITOT or FLOW METER READING (A)** _____ **PSI AT** _____ **GPM**

OUTLET COEFFICIENT USED 0.90
(smooth 0.90) (square & sharp 0.88) (projecting into barrel 0.77)

$$Q_{20} = Q\left(\frac{S-R_{20}}{S-R}\right)^{0.54} = 1060\left(\frac{73-20}{73-63}\right)^{0.54} = 1060\left(\frac{53}{10}\right)^{0.54} = 1060(2.46) = 2607 \text{ gpm}$$

ESTIMATED FLOW AT 20 PSI 2607 **GPM**

LOCATION SKETCH ATTACHED ? **YES** X **NO** _____

N1.85 GRAPH

CONTRACT NO. _____

NAME: BROADWAY NEAR ADELPHI

ADDRESS: _____

SHEET NO. ___ OF ___

SYSTEM NO. _____

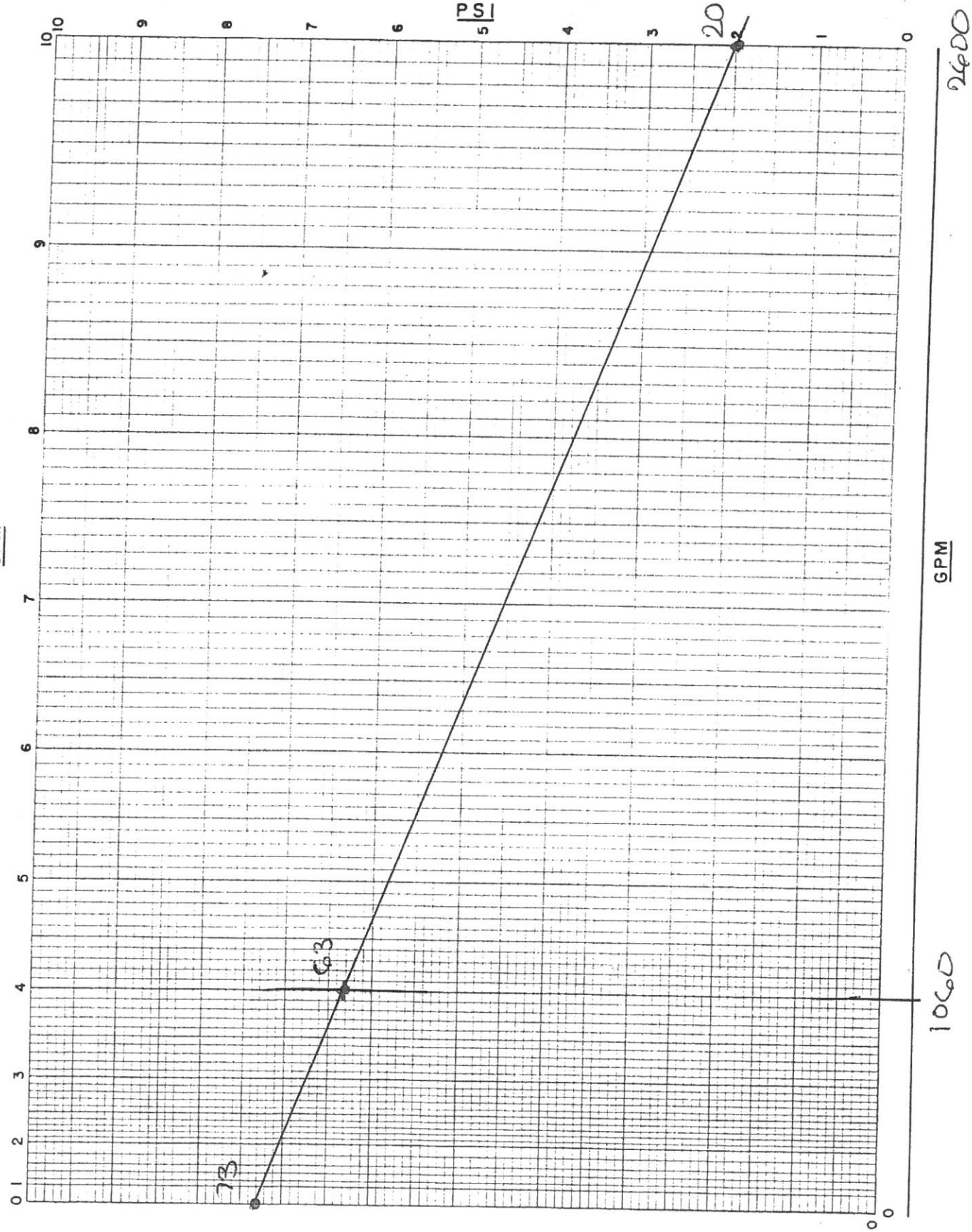
DATE: 3/27/18

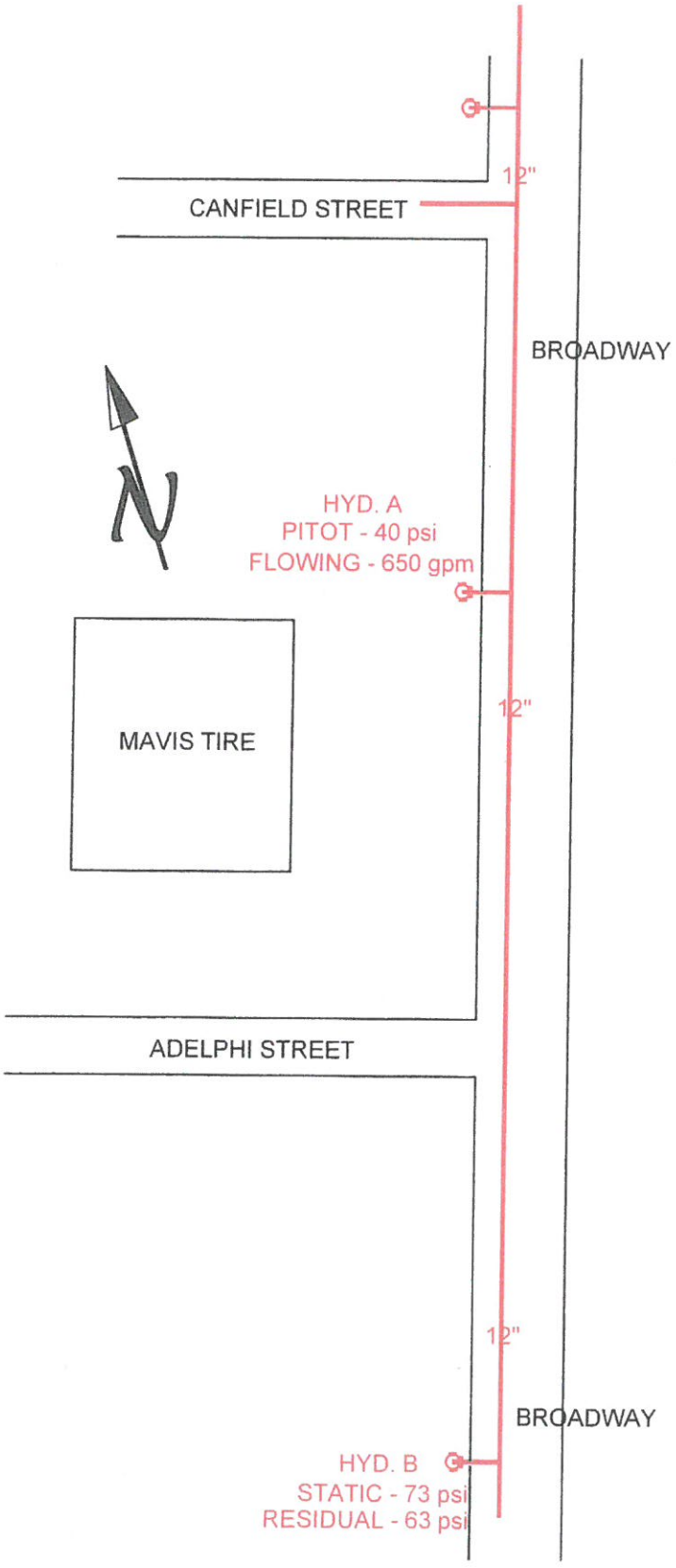
MULTIPLY SCALE BY 10

PSI

MULTIPLY SCALE BY 260

GPM





SARATOGA SPRINGS - WATER FLOW TEST - 3-27-2018