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TECHNICAL MEMORANDUM

PROJECT: City of Atlantic Beach
New Development at Kmart Center on Atlantic Blvd
Fire Flow Analysis

DATE: October 26, 2022

I. PURPOSE

J. Collins Engineering Associates (JCEA) has been tasked with evaluating the impact of the proposed development on the ability of the CoAB water distribution system to provide adequate fire flow (within the CoAB system) while meeting the demands of the proposed development.

II. BACKGROUND

The City of Atlantic Beach (CoAB) has been requested to provide potable water service to a proposed multi-use development located on the south side of Atlantic Blvd in the old Kmart shopping plaza.

The site is outside of the CoAB city limits and within the Neptune Beach city limits. The site was previously served from the City of Neptune Beach water system.

Although there are currently no active CoAB water system customers on the south side of Atlantic Blvd, there are two water lines crossing Atlantic Blvd. These pipes are located near Sherry Drive and Seminole Road.

The water demands of the proposed development are presented below. This information was provided to CoAB by the developments' engineer (Prosser):

- Hotel – 150 Rooms: (150 Rooms)*(200 GPD/Room) = 30,000 GPD
- Outparcel A Commercial – 4,000 SF: (4,000 SF)*(0.15 GPD/SF) = 600 GPD
- Outparcel B Quick Service Restaurant – 4,000 SF: (4,000SF)*(60% Seating) = 2,400 SF; (2,400SF)/(15SF/Seat) = 160 Seats. (160 Seats)*(40 GPD/Seat) = 6,400 GPD
- Outparcel C Commercial – 4,000 SF: (4,000 SF)*(0.15 GPD/SF) = 600 GPD
- Outparcel D Commercial – 4,000 SF: (4,000 SF)*(0.15 GPD/SF) = 600 GPD
- Outparcel E – 50,000 GPD
- **Total Demand Requested: 88,200 GPD**

The development demand is assigned to Node J-3512 in the model.

See figure 1 showing a schematic of the piping layout Node J-3512 location and hydrant locations.

III. METHODOLOGY

JCEA has previously modeled the CoAB water distribution system. This model was used to simulate the new, additional proposed development demand.

The fire hydrants selected for analysis are designated within the water system model as "Hyd-244" and "Hyd-335". These hydrants are located at the intersection of Sylvan Drive and Atlantic Blvd and the intersection of Sherry Drive and Atlantic Blvd, respectively.

Two 8” diameter pipes were added to the model to service the proposed development. The first pipe runs west from the stubout on the south side of Atlantic Blvd at Sherry Drive to the approximate center of the proposed development (approximately 1100 feet). The second pipe runs east from the stubout on the south side of Atlantic Blvd at Sylvan Drive to the approximate center of the proposed development (approximately 1200 feet) where it joins to the first pipe. This arrangement forms a loop within the system to better serve the demands of the proposed development.

Following is a summary of how the modelling software was configured for this analysis:

- 24 hour time period using the Extended Period Simulation (EPS) option
- Maximum Day system demand (ADF x 1.64) with the CoAB diurnal demand curve impressed upon this demand
- Proposed development flow rates are assumed to be Average Daily Flows (ADF). These flows were multiplied by 1.64 to convert to the CoAB Maximum Daily Flow.
- Because the area on the north side of Atlantic Blvd consists of predominantly commercial buildings the fire flow demand was set at 2000 gpm. As explained in the 2021 Supplement to the 2016 Water System Model report, the Florida Fire Code limits the maximum creditable flow from any fire hydrant to 1500 gpm. This means that at least two hydrants must be used to supply the 2000 gpm fire flow (Hyd-244 and Hyd-335). The demand at Hyd-244 was assigned a demand of 500 gpm while Hyd-335 was assigned 1500 gpm. These demands were programmatically set to occur over a 1 hour period from 8am to 9am (the period of maximum diurnal flow).
- Hydrant nozzle elevations are assumed to be 11.50 (NAVD88).
- No other fire flow demands were assigned to any hydrant in the system.
- The model was run assuming the improvements to WTP#1 are in-place and operating. These improvements are in the process of being implemented.

IV. RESULTS

The model predicts minimum residual pressures at Hyd-244 and Hyd-335 of 34.8 psi and 30.3 psi, respectively (see Figure 2). These pressures are well above the minimum required residual pressure of 20 psi.

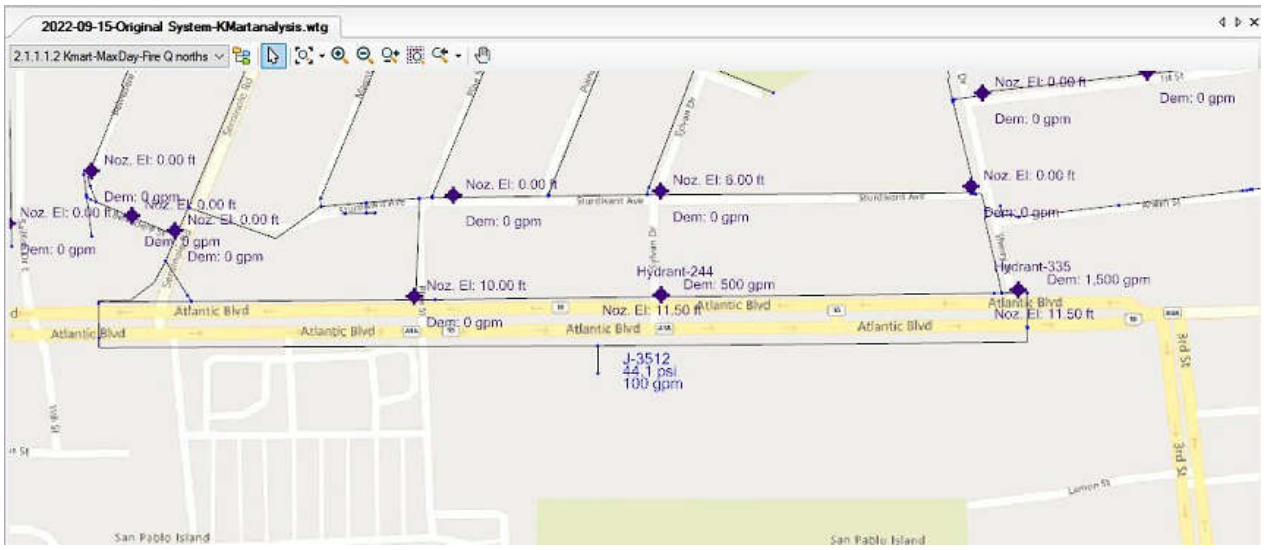

Figure 1 - System Configuration

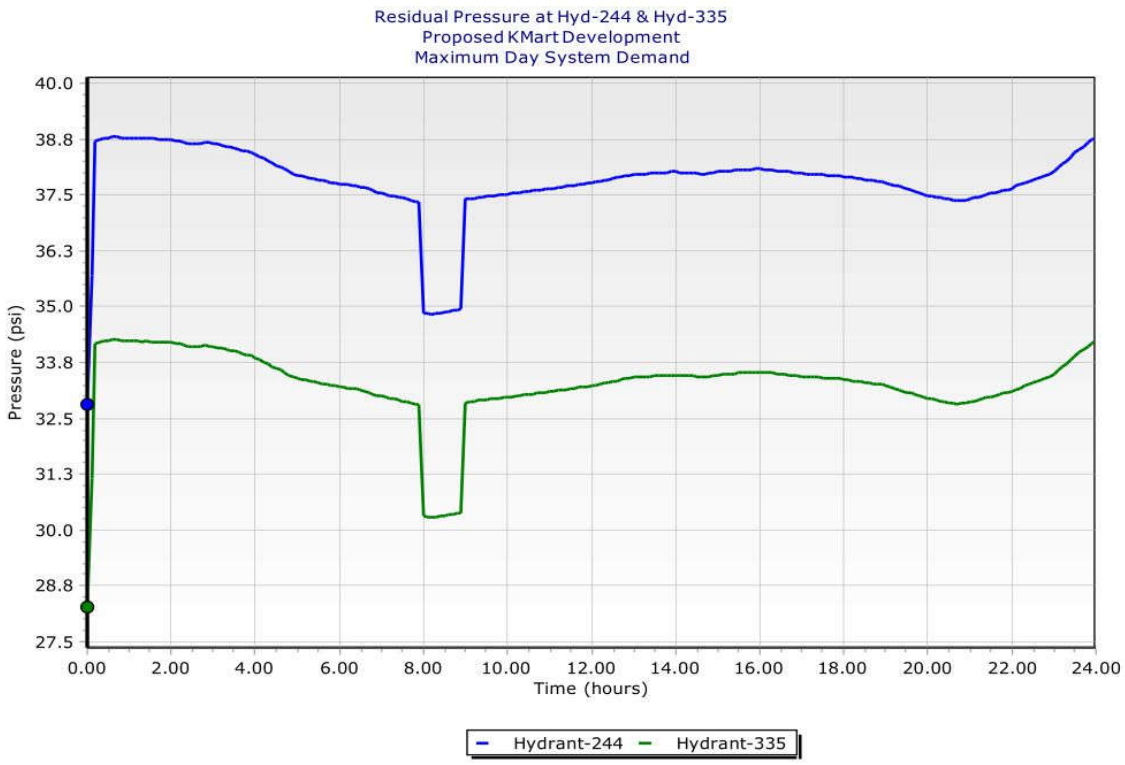

Figure 2 - Residual Pressures at Hyd-244 & 335