

MEMO

January 12, 2022

At one of the lift station inspections, it was noted there was infiltration within the valve vault, which drains to the wet well. Infiltration was also noticed near the bottom barrel section of the wet well, between the pump discharge piping.

High water level (HWL) alarm was active multiple times throughout the review period. HWL alarm summary is provided below. In June and September the City experienced issues with grit in the wet well which damaged the pumps, resulting in the many HWL alarms.

Table I: Commerce Drive Lift Station HWL Alarm Summary

Month/Year	Average Daily Flow	HWL Alarm
June 2021	5.30 GPM	12
July 2021	4.96 GPM	0
August 2021	4.84 GPM	0
September 2021	4.95 GPM	25

Proposed Conditions

Commerce Drive lift station is proposed to serve a service area for new development on the west side of town, along Poplar Avenue. The service areas are shown in the attached exhibits.

Future Service Areas

Future service area includes 95 acres of residential and a total of 23 acres of commercial. 8 acres of the commercial area is already developed. Iowa Department of Natural Resources (DNR) design recommendations state a sewer usage of 100 gpd per capita be used when sizing sewer infrastructure and 10 people per acre for single family residential. Iowa DNR design recommendations for commercial wastewater flow is 5,000 gpd/acre, however the City has existing flow information from the lift station for the current commercial properties. Peaking factors are applied to residential, but not commercial wastewater flow.

Based on existing topography, the area outlined for service is currently not able to be completely served by gravity. Exhibits provided within the memo show the proposed residential and commercial growth boundaries capable of being served by gravity based upon assumed conditions. If the City would like to serve the areas hatched in red, additional lift stations would need to be constructed or installation of low head grinder pumps with each customer.

Ultimate (Future) Design Flow

Based on the above stated planning area and Iowa DNR design recommendations, the additional residential flow anticipated would be 95,000 gpd and commercial flow would be 16,500 gpd (15 acres using existing commercial flow rate information of 1,100 gpd/acre). Iowa DNR also recommends adding capacity for inflow and infiltration (I/I), at a rate of 95 gallons/acre/day (95 gallons multiplied by 110 acres equals 10,500 gpd of I/I). Anticipate an additional wastewater flow for the currently undeveloped area of 122,000 gpd or 85 gpm.

In summary, the ultimate design flow for the Commerce Drive lift station is planned to be 130,800 gpd or 91 gpm.

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Recommendations

The Commerce Drive lift station pumps have proven to be capable of handling existing flows, however, recommend continuing to monitor high water level alarms and pump run times. When users are connected to the next sanitary sewer extension, whether for commercial or residential, the pumps will need to be upsized. Pumps are recommended to be sized for the proportion of the service area expected to develop within 20 years. Recommend reevaluating the proposed pump sizes as development occurs, especially if residential development is planned as the next step which often results in higher peak flows.

Recommend eliminating infiltration within the valve vault and wet well with hydrophilic grout. Recommendations on this material have been previously sent to the City.

Confirm the car wash has amended the issue with sand and grit entering the public sanitary system. If larger pumps are installed, they will continue to have the impellers wear and motors damaged due to the sand and grit.