RESULTS AND FINDINGS

PREPARED FOR

The City of Beaver Bay

FOR

SEWER MANHOLE INVENTORY

FOR

City of Beaver Bay
711 MacDonald Ave
Beaver Bay, MN 55601

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PREPARED BY

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Results and Findings

As part of the City of Beaver Bay's sanitary sewer manhole inventory, a survey of all manholes and grinder stations was conducted. Each asset was logged into Silversmith GIS, a web-based asset management and mapping platform, and detailed inspections and measurements were completed to document manhole conditions, invert elevations, and other attributes. The goal of this effort provides the City with an accurate and up-to-date record of their sewer infrastructure.

Silversmith allows this information to be viewed on a map and updated over time as inspections, maintenance, or system changes occur. The use of this platform provides an accurate and organized record of the City's infrastructure and can support ongoing operations and maintenance planning.

Attached items include:

- A map illustrating the manhole numbers and slopes
- An Excel table summarizing the collected data for each manhole for easy reference

Based on industry standards, sewer slopes were categorized as follows:

- **Compliant with 10 States Standards**: 0.40% or Greater
- **Substandard - City should plan to regularly clean and televise:** 0.35% - 0.39%
- **Requires Frequent Jetting – City should engage in a regular cleaning and develop a more frequent schedule as needed:** Less than 0.35%

Analysis of the system identified three segments classified as requiring frequent jetting and one segment classified as substandard. Adequate pipe slope is crucial for achieving flushing velocity, which is the minimum flow velocity required to keep solids suspended and prevent them from depositing within the pipe. When grades are sufficient, typical wastewater flows can periodically resuspend solids and transport them downstream without mechanical assistance.

Pipe segments designed with slopes below industry standards for flushing velocity are unable to consistently achieve these self-cleaning velocities under normal conditions. As a result, solids tend to accumulate, increasing the likelihood of blockages, odors, and maintenance issues. Segments that do not meet flushing velocity criteria will require routine jetting to remove deposited material, as proper cleaning cannot be achieved by itself. These segments should be placed on a regular, scheduled jetting program to maintain reliable system performance.

Conversely, excessively steep slopes may generate high flow velocities that pose a risk to manhole and pipe integrity due to erosion, abrasion, and long-term structural wear. For reference, slopes greater than approximately 8% for an 8-inch diameter pipe are generally considered steep and may require special attention. Because the City is built on a hillside, several segments within the system are steep. These segments should be monitored over time for signs of manhole degradation due to high speed flows.

Recommendations

Based on the sewer system inventory and slope analysis, the following actions are recommended to help support the longevity of the sewer system:

Buried and Unlocatable Manholes:

Several manholes on Club Road were buried under a foot of gravel, with only one visibly marked. In some cases, buried manholes are reasonable to avoid contact with graders, snowplows, or other road maintenance vehicles. This approach is practical, but buried manholes can be difficult to locate when access is needed. In addition, MH 28 on Club Road and DMH 7 on Old Towne Road were unable to be located. It is recommended that the City clearly mark manhole locations with roadside stakes or other similar markers to improve visibility for maintenance and emergency response. Where feasible, buried or unlocatable manholes should be uncovered and adjusted closer to finished grade.

Implement Routine Jetting for Low-Slope Segments:

Sewer segments with slopes below the 10 States Standards are susceptible to solids accumulation. A regular jetting and cleaning program is recommended for these pipe runs to maintain adequate flow and reduce the likelihood of blockages.

Annual Inspections Downstream of Steep Slopes:

Due to the hillside terrain of the City, some segments exhibit steep slopes that can result in increased flow velocities. Manholes located downstream of these segments should be inspected annually for signs of structural wear, erosion, or degradation.

Incorporate Findings into Capital Improvement Planning:

The results of this assessment should be incorporated into future capital improvement projects to help prioritize maintenance activities, repairs, and system upgrades and support long-term infrastructure planning.

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