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North Walnut Creek Stabilization Study

City of Windsor Heights

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I. BACKGROUND

North Walnut Creek is part of the Walnut Creek Watershed that covers nearly 83 square miles (53,000 acres) and is within 9 communities (spanning 2 counties). It consists of smaller streams and three tributaries. The Walnut Creek Watershed is one of the most quickly urbanizing watersheds in Iowa. The watershed is approximately 60 percent urban land use and 40 percent agricultural land use and is becoming more urbanized every year.



**Photo from Walnut Creek Watershed website*

North Walnut Creek generally runs from north to south, draining parts of Grimes, Johnston, Urbandale, Des Moines, Clive, and Windsor Heights. The drainage area of North Walnut Creek is approximately 14.3 square miles or 9,150 acres.

The intent of this study was to identify streambank restoration projects along North Walnut Creek between College Drive and Hickman Road. The identified projects are intended to protect public infrastructure. This portion of the creek lies entirely within City of Windsor Heights property. The creek south of College Drive is located on private property of both Windsor Heights and Clive residents.

II. DATA COLLECTION

As part of the study, field data was gathered with a GPS unit during December/January to help identify key elements along the creek. Those elements included:

- Storm Sewer Outfalls
- Storm Sewer Manholes
- Sanitary Sewer Manholes
- Large Diameter Trees
- Fencing
- Top of Streambank
- Bottom of Streambank
- Pedestrian Trail
- Washout Areas

Sanitary sewer and storm sewer mapping data from the City of Clive, City of Windsor Heights and the WRA was incorporated into the collected field data and field verified to determine what public infrastructure is in the area.

III. RECENT CREEK STABILIZATION PROJECTS

Over the last couple years, multiple locations of the creek bank have been stabilized. In 2018, approximately 150 feet of emergency streambank stabilization was completed to protect exposed sanitary sewer.

In 2020, another project was completed that included 2 locations of streambank stabilization. One location was completed to protect a sanitary manhole and the other location was completed to protect a storm outfall and the nearby trail. The project stabilized a total of 190 feet of stream bank at the 2 locations.



IV. IDENTIFIED PROJECT AREAS

The collected data was used to determine potential project areas within City property that affected public infrastructure including sanitary sewer infrastructure, storm sewer infrastructure and the trail. The following are the projects that were identified:

Project 1

This project includes protecting a storm sewer outfall and the trail. The storm sewer outfall has been undermining the pipe exposing the bottom 2-3 feet of the pipe. This pipe is approximately 36" in diameter and drains approximately 25 acres of watershed to the east and north of the creek. If the pipe collapses, it would damage a portion of the trail and require a full trail closure to repair.

The proposed project would include stabilization of the stream bank both upstream and downstream of the outfall and addition of rip rap at the end of the pipe to prevent erosion from both the creek and the storm sewer discharge. See Figure 3.

Estimated Project Cost: \$100,000



Project 2

This project includes protecting a storm sewer outfall and sanitary sewer infrastructure. The storm sewer outfall is sticking out of the bank into the middle of the creek and frequently catches debris, which causes issues for both the storm sewer outfall and the uninhibited flow of the creek. This pipe is a storm sewer outfall connected to the City of Clive's storm sewer system. The project also includes protecting sanitary sewer mains and manholes from future exposure due to erosion of the streambank. Currently the piping and manholes are not exposed, but the proposed project is intended to prevent the infrastructure from being exposed and causing an issue in the future.



The proposed project would include stabilizing the stream bank along the section shown in Figure 1 and rip rap addition to the storm sewer outfall.

Estimated Project Cost: \$110,000

Project 3

This project includes protecting the sanitary sewer and manhole from future exposure. The location is at the convergence of Rocklyn Creek with North Walnut Creek. The project will also include stabilization of the west streambank where this convergence occurs. Due to this convergence and the current alignment of each of the creeks, the scope of this project is larger than others identified in this report. During the project, a few large trees will need to be removed along with fencing and landscaping that is located on City property but that was installed by adjacent property owners.



The proposed project would include stabilizing the stream bank along the section shown in Figure 2. The cost estimate for this project is based on costs for similar projects that the City has completed to protect sanitary sewer infrastructure, as described in section III earlier.

Estimated Project Cost: \$175,000

Project 4



This project includes protecting sanitary sewer from future exposure. Currently the piping and manholes are not exposed, but the project is intended to prevent the infrastructure from being exposed and causing an issue in the future. The location is located 100 feet downstream of an emergency project that was completed in 2018 due to exposed sanitary sewer pipe.

The proposed project would include stabilizing the stream bank along the section shown in Figure 2. The cost estimate for this project is based on costs for similar projects that the City has completed to protect

sanitary sewer infrastructure, as described in section III earlier.

Estimated Project Cost: \$90,000

Project 5



This project includes protecting sanitary sewer from future exposure due to streambank erosion. Currently the piping and manhole is not exposed, but the project is intended to prevent the infrastructure from being exposed and causing an issue in the future.

The proposed project would include stabilizing the stream bank along the section shown in Figure 1. The cost estimate for this project is based on costs for similar projects that the City has completed to protect sanitary sewer infrastructure, as described in section III earlier.

Estimated Project Cost: \$100,000

Project 6



This project includes protecting sanitary sewer from future exposure. Currently the piping and manhole is not exposed, but the project is intended to prevent the infrastructure from being exposed and causing an issue in the future. See Figure 3 for location.

Estimated Project Cost: \$90,000

V. CONCLUSION

After reviewing the field data and performing a site visit, the six (6) projects were identified to protect public infrastructure. The projects are listed in order of importance at the time of this report with projects 4-6 being interchangeable. At this time none of the projects are urgent and can be completed when funds are available, but they should be monitored yearly or after large storm events. The order of importance may change depending on changes to the stream bank.

Access to these projects is difficult and will require temporary easements or access agreements to perform the work. Discussions with property owners will need to be completed prior to any construction. Trail closures and additional tree clearing may be required to complete the projects. Access to the sites can vary the cost of the projects.

Weather should also be considered when to complete the projects. Performing these projects during dry times of the year and even during the winter will need to be considered.

These projects may need to be permitted through regulatory agencies such as the IDNR, FEMA, and the ACOE. Any additional requirements from the IDNR, FEMA, and ACOE can change the scope of the project and add additional cost. The requirements can also change the impacts of the project. The cost estimates included in this report do not include permitting or modeling for each project but do include engineering and construction administration cost based on a percentage of total construction cost. The cost estimate for these projects were based on costs for similar projects that the City has completed in the last 3 years. Combining projects may benefit in lowering the construction cost.



Appendix A: Figures





