

## Village of Shorewood

### Combined Sewer Service Area Solutions Planning

#### Executive Summary

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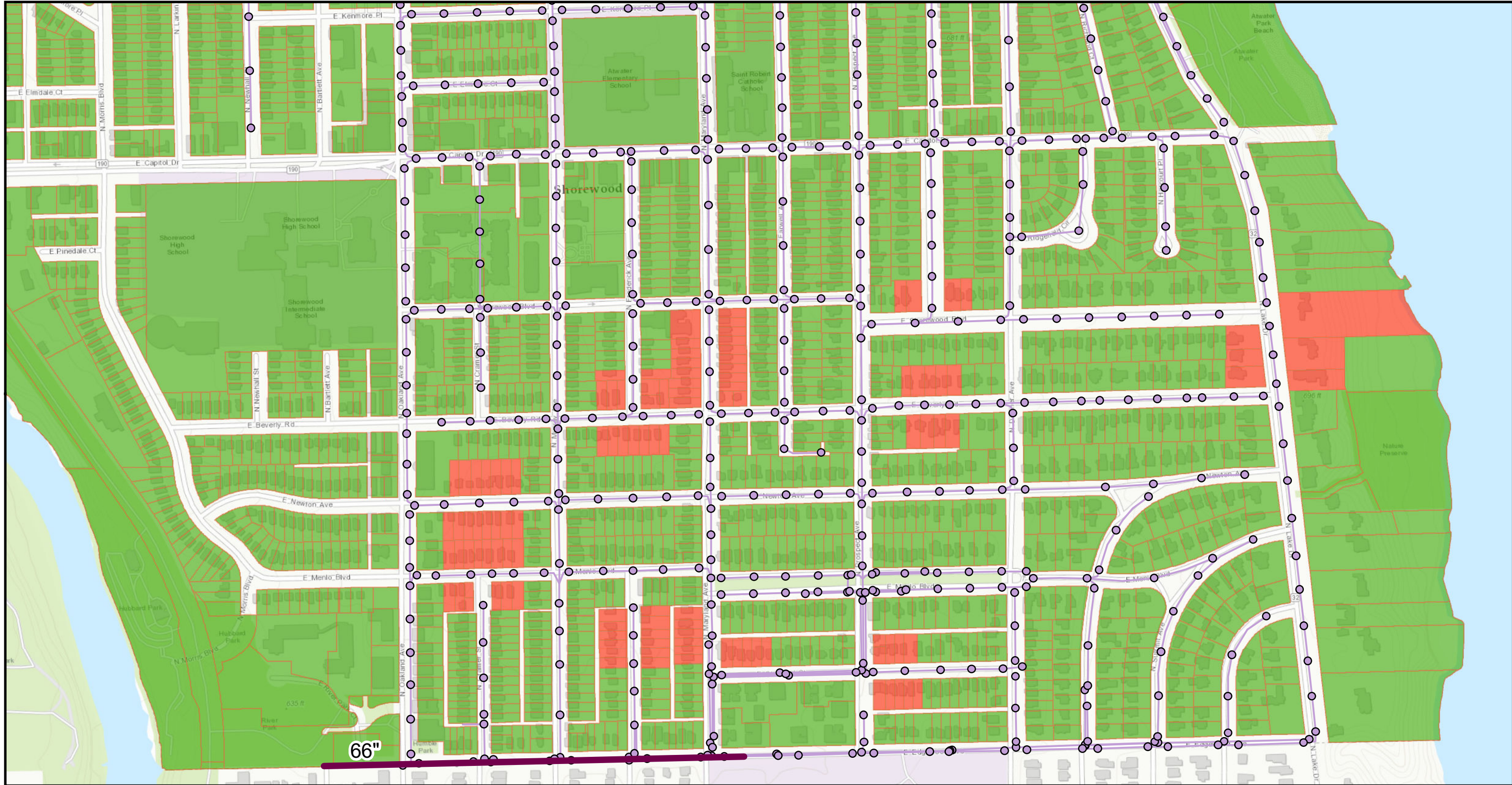
April 27, 2017

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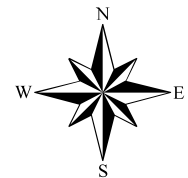
The purpose of this Executive Summary is to clarify the relationship between the Baxter & Woodman report commissioned by Shorewood and the recent work undertaken by MMSD regarding service improvements in the same service area.

- The Village of Shorewood has been working with MMSD and seeking capacity increases to the Edgewood system since 2001.
- In 2014, Shorewood, Milwaukee, UWM, and MMSD officials started a focus group to evaluate this capacity issue.
- In 2015, MMSD consultants verified the benefits and feasibility of capacity increase option on Edgewood, and 2016, MMSD has officially included Edgewood Avenue capacity improvements in their planning process.
- MMSD has led a separate study on the effectiveness of constructing a Municipal Intercepting Sewer (MIS) on Edgewood Avenue to allow the Village of Shorewood and the City of Milwaukee to increase service capacity in the Combined Sewer Service Area (CSSA).
- This pipe is planned to be designed, constructed, and owned by MMSD. The MMSD project is preliminarily called “Edgewood Avenue MIS”. The project is estimated at \$6.5 million, which will be entirely MMSD cost.
- This pipe would fill and flow during the types of rainfalls that typically cause basement backup risks in the Shorewood CSSA.
- The MMSD project is described in the Baxter & Woodman report in section 1.5.2.1 on page 16 and shown in the Exhibits 7 through 14 with a label reading “UNDER CONSIDERATION BY A SEPARATE STUDY”.
- The MMSD Planning report on the Edgewood Avenue MIS shows that the project will bring immediate and significant benefit to the Shorewood CSSA by increasing the rainfall amount that will cause basement backup risks. In other words, the MMSD project will increase the level of protection in Shorewood combined area.
- The benefits of the MMSD project to Shorewood residents are outlined in the MMSD planning report page 15 and the maps included as Basement Backup Risk Assessment maps at the end of that report.

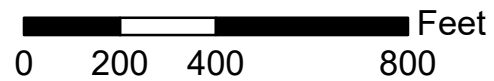
- Because of the timing of the MMSD effort, it is very likely that the Edgewood Avenue MIS will be in place before other Shorewood led initiatives.
- Therefore, based on the MMSD planning report, we are modifying the order in which the Shorewood CSSA improvements will take place.
- In the Baxter & Woodman Report, the improvements are split into Phase 1 and Phase 2. These are shown in Baxter & Woodman Exhibits 20 and 21.
- Phase 1 generally consists of the large storm sewer outfall to Milwaukee River shown in Exhibit 20.
- Phase 2 generally consists combined sewer construction and storm sewer additions throughout the service area as shown in Exhibit 21.
- With the Edgewood Avenue MIS in place, Shorewood now has an opportunity to achieve a significant basement backup protection by basically reversing the order in which projects are executed.
- Attached is Exhibit 20A, as the Alternative Phase 1, consisting of an extension of the MMSD MIS into the Shorewood CSSA and adding combined sewer improvements.
- The Alternative Phase 1 projects are estimated to cost \$5.4 million and achieve a protection level up to 2.5-inches compared the 1.6 to 2-inch level we have today. This is a Shorewood cost.
- Exhibit 21A shows the ultimate storm sewer diversion proposal with the new outfall to Milwaukee River, which is now proposed as Alternative Phase 2.
- The alternative Phase 2 is estimated at \$16.3 million and will consist of almost all the storm sewers identified in the Baxter & Woodman study. This is a Shorewood cost.
- When the implementation order is flipped, the Basement Backup Risk maps in the Baxter & Woodman report are also changed.
- Specifically, Baxter & Woodman Exhibits 5, 9, 10, and 14 are modified as Exhibits 5A, 9A, 10A, and 14A.
- Exhibit 5A represents the Basement Risk Map for a 2-inch rain AFTER the MMSD project, but without any Shorewood Projects. This represents a situation after the MMSD completes their project, but before Shorewood does anything in the area. The comparison shows the significant reduction in risk with just the MMSD project.
- Exhibit 9A represents the risk map for a 2-inch rainfall AFTER the Phase 1 Alternate is implemented by Shorewood. Because this leverages the MMSD project, the benefits of Phase 1 Alternate are more significant than the benefits of Phase 1 as shown in Baxter & Woodman Exhibit 9.
- Exhibit 10A represents the risk map for a 3-inch rainfall AFTER the Phase 1 Alternate is implemented by Shorewood. Though it shows widespread backup risks, the affected area is slightly smaller than the one shown in Exhibit 10.
- Exhibit 14A represents ultimate conditions with ALL improvements in place, including the outfall to Milwaukee River. The exhibit shows that all concerns are addressed when all improvement elements are implemented.



66"



1 in = 400 ft

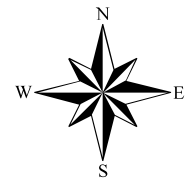


- Edgewood Ave. MIS (MMSD)
- Existing Combined Sewer

### Likely Basement Backup\*

- No
- Yes - 117 Parcels

\*Basement backup locations were determined by looking at combined sewer water levels. If the water levels were shown to be greater than 6 feet below the road surface, it was presumed that basement backups were unlikely in that area.



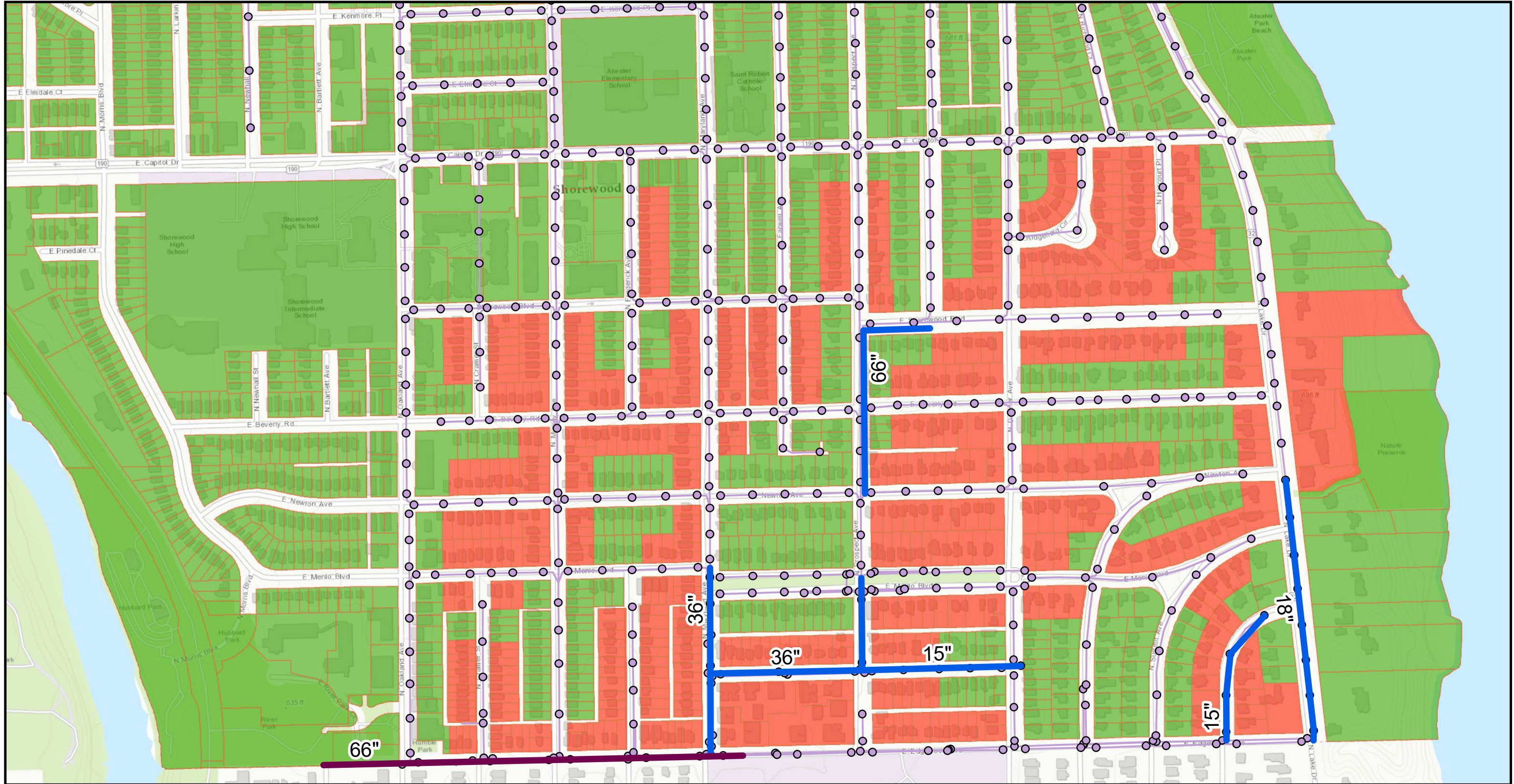
1 in = 400 ft  
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- Edgewood Ave. MIS (MMSD)
- Phase 1 ALT (Shorewood)
- Existing Combined Sewer

**Likely Basement Backup\***

- No
- Yes - 73 Parcels

\*Basement backup locations were determined by looking at combined sewer water levels. If the water levels were shown to be greater than 6 feet below the road surface, it was presumed that basement backups were unlikely in that area.



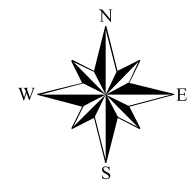
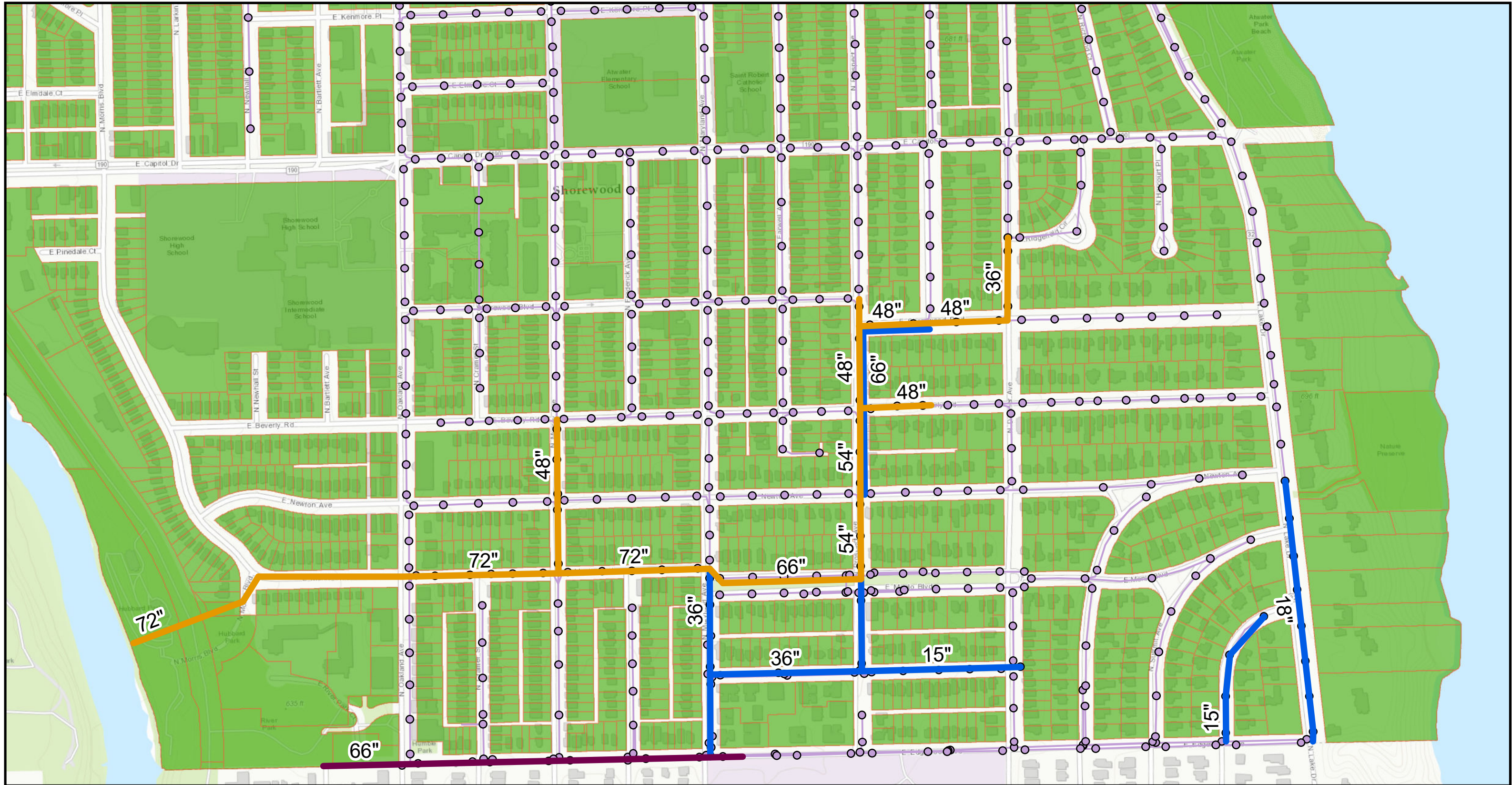
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- Edgewood Ave. MIS (MMSD)
- Phase 1 ALT (Shorewood)
- Existing Combined Sewer

Likely Basement Backup\*

- No
- Yes - 545 Parcels

\*Basement backup locations were determined by looking at combined sewer water levels. If the water levels were shown to be greater than 6 feet below the road surface, it was presumed that basement backups were unlikely in that area.



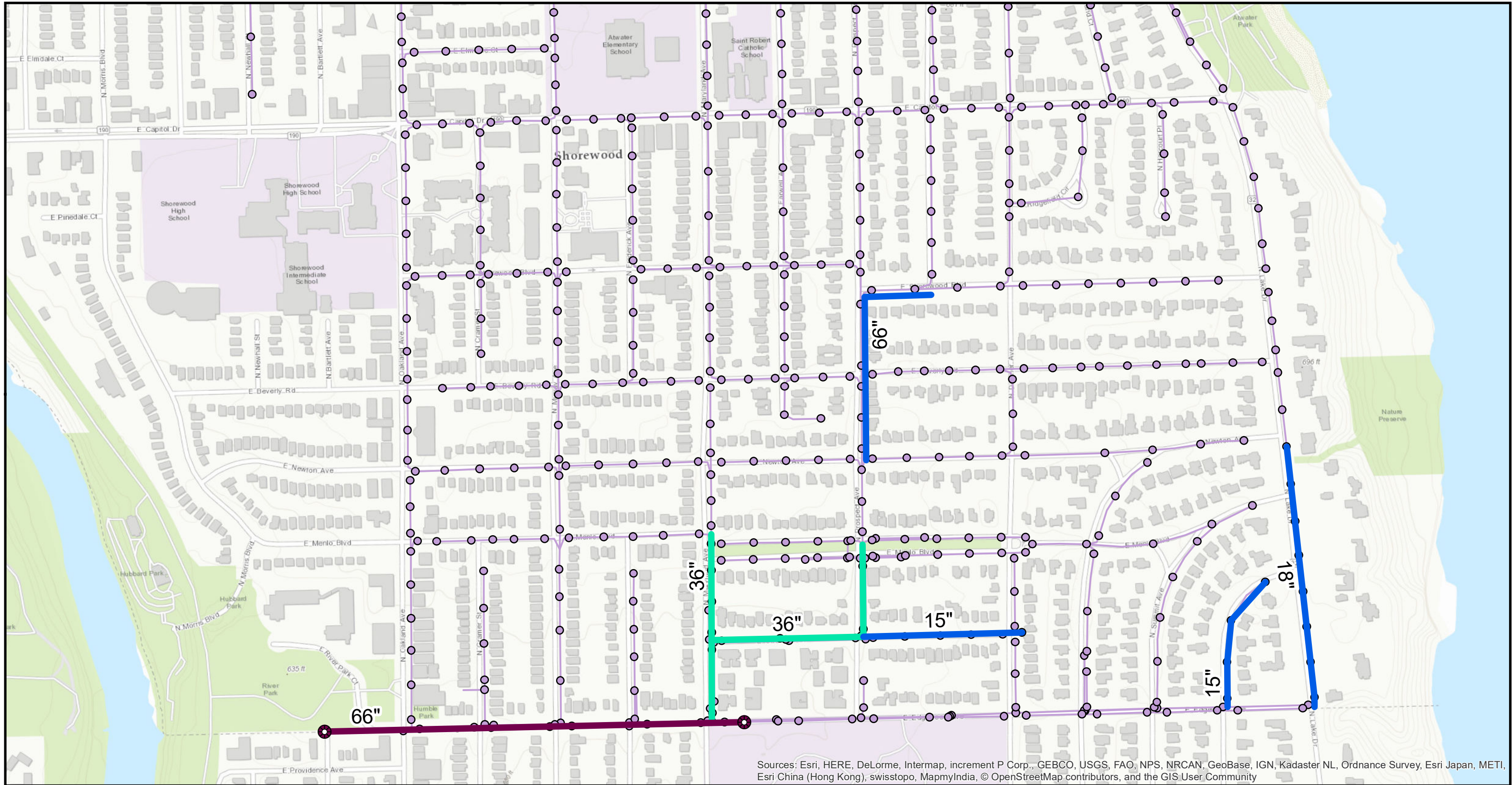
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- Edgewood Ave. MIS (MMSD)
- Phase 1 ALT (Shorewood)
- Phase 2 ALT (Shorewood)
- Existing Combined Sewer

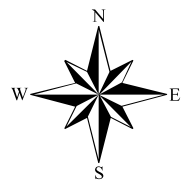
Likely Basement Backup\*

- No
- Yes - 0 Parcels

\*Basement backup locations were determined by looking at combined sewer water levels. If the water levels were shown to be greater than 6 feet below the road surface, it was presumed that basement backups were unlikely in that area.



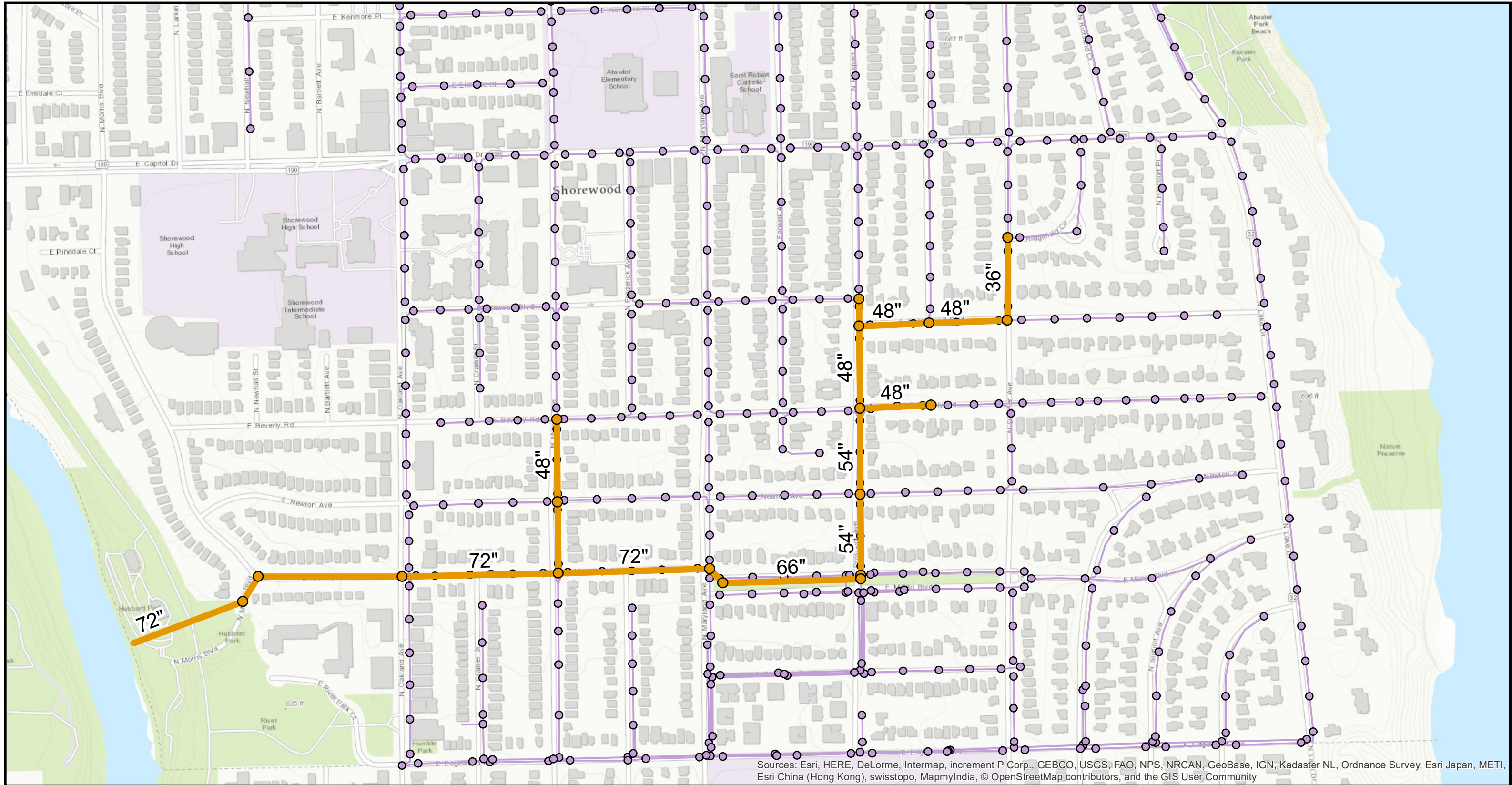
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



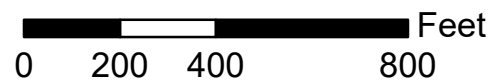
1 in = 400 ft  
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**Legend**

- Edgewood Ave. MIS (MMSD)
- Combined Sewer (Shorewood)
- Existing Combined Structure
- Relief Sewer (Shorewood)
- Existing Combined Sewer



1 in = 400 ft



**Legend**

- Proposed Overflow Storm Sewer
- Existing Combined Structure
- Existing Combined Sewer