



DATE: May 22, 2020

TO: Mike Braiman, Village Manager

FROM: Brigitte Berger-Raish, P.E., Director of Engineering and Public Works
Nabil Quafisheh, Director of Water Management

Subject: May 14-17 Storm Update

Executive Summary

Between May 14 and May 17, the Village received 6.23 inches of rain at the Water Plant and 7.09 inches of rain at the Stormwater Pumping Station, which are classified as 15-year and 30-year storms, respectively. Regionally, the rainfall totals represent the wettest week in May on record.

The Village's local sewer systems (combined, sanitary and storm) were challenged during this rainy period, as were the Metropolitan Water Reclamation District's (MWRDs) interceptor and deep tunnel and reservoir system.

During this event, the Village received over 700 reports of flooding and the breakdown is as follows:

- 182 sewer backups
- 307 overland flooding calls
 - 61 for street/right-of-way
 - 228 for private yard flooding
 - 27 for both street and private
- 243 reports of basement/lower level seepage
- 28 reports of sump failures
- 17 reports of water in basement from unknown source

Discussion

Operations-Water Management

Below is a discussion of the operation of the various storm/sanitary facilities and water plant during the rainfall events that occurred between May 14th through May 17th.

There were two rainfall events that occurred between May 14 and May 15 and one long rainfall event on May 17. The first event on May 14th started around 11:00 AM and ended around 9:00 AM, the second event started around 11:00 PM on May 14 and tapered off around 3:30 AM May 15. The May 17 event started around 12:00 AM

and tapered off around 9:00 PM. The tables below summarize the total rain amount received at the west side of the town (SWPS) and the east side of the town (water plant), see attachment 1:

(Please note that recurrence intervals don't take outside factors like saturated ground or regional sewer system capacity)

Table 1: Rain amounts analysis for May 14- 15

	Event #1 Rain Amount	Duration	Recurrence Interval	Event #2 Rain Amount	Duration	Recurrence Interval
SWPS	1.37"	~ 3 hour	6-month storm	2.42"	~ 4.5 hour	5-year storm
Water Plant	1.23"	~ 3 hour	6-month storm	1.8"	~ 4.5 hour	2-year storm

Table 2: Total rain amount for May 17

	Rain Amount	Duration	Recurrence Interval
SWPS	3.3"	~ 21 hour	2-year storm
Water Plant	3.2"	~ 21 hour	2- year storm

If you add all the rain totals from May 14 6:00 AM until Sunday May 17 9:00 PM, the following analysis can be performed:

Table 3: Total rain amount analysis from May 14-17

	Rain Amount	Duration	Recurrence Interval
SWPS	7.09"	~ 87 hour	30-year storm
Water Plant	6.23"	~ 87 hour	15- year storm

SWPS

No operational or power issues. The levels in the sumps were maintained by the on-call specialist and the station was manned for most of the event.

Pump over Lift Station (POLS)

The water level in the station reached above the overflow levels indicating surcharged conditions at the Harms interceptor:

- May 14: 7:00 AM to 1:00 PM
- May 14 – May 15: 11:00 PM to 3:00 PM May 15
- May 17-May 18: 6:00 PM to 1:30 PM May 18.

The pumping rate is approximately 700 gpm for this station. Therefore, it is estimated that the POLS pumped approximately 1.7 MG over the check valve during this event.

West Park Sanitary Storage Facility

The West Park received surcharged water from Manhole 7-52, on Lake Street, starting at approximately 11:00 pm May 14. Water is designed to overflow from the manhole to the tank once the level reaches above 608.5" elevation in that manhole (see attachment 2). The level in the tank reached 8.5 feet around 11 AM on May 15. Water

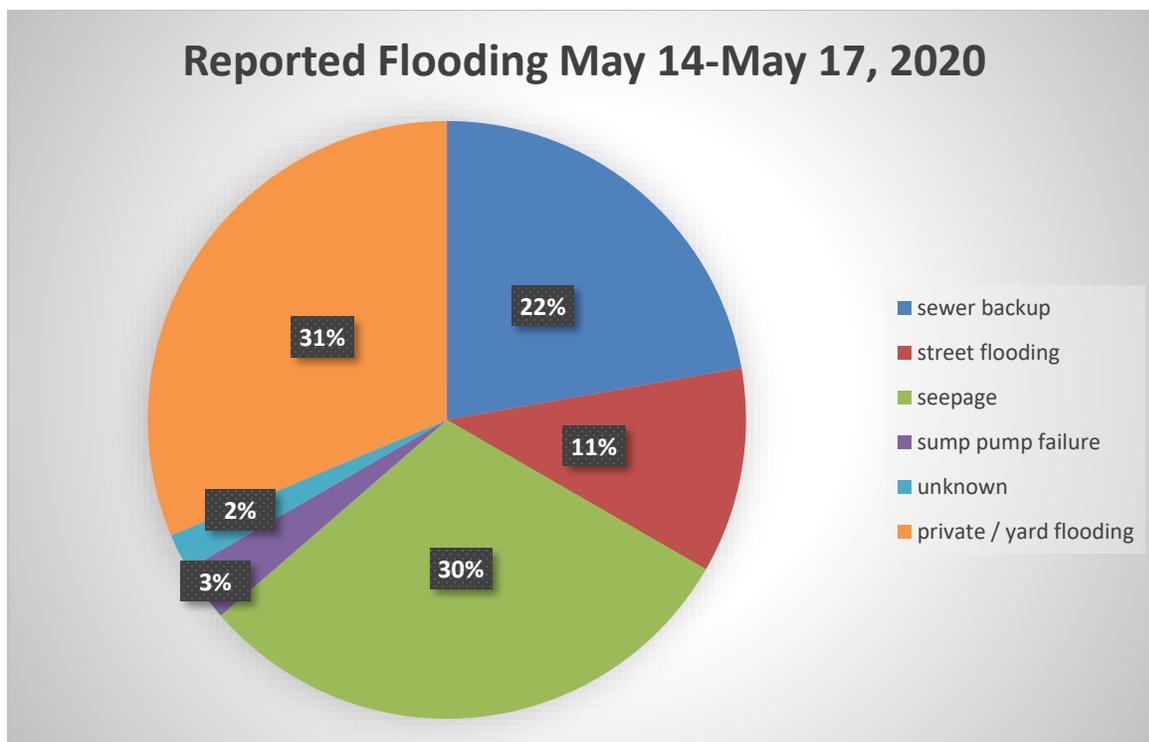
Management staff worked on pumping the tank down once the check valve was reopened and brought it down to 3.1' before the second wave storms arrived on Sunday. The surcharged sewer water started to overflow into the tank at approximately 2:00 PM on Sunday and reached a high level of 11.9'. Based on the levels mentioned above, the West Park tank stored and pumped around 6.94 MG of sewer water during the events from May 14-17.

Operations- Public Works

Public Works crews worked around the clock responding to reports of sewer backups and flooding. Critical manholes were routinely checked throughout the storm to observe flow elevations. Sewers were flowing full or surcharged after each event. In some locations, sewer elevations were not able to recede to "normal" flow before a subsequent storm further taxed the system. This was particularly true on Sunday, May 17 where the separate sanitary system was surcharged prior to the most intense rainfall in the evening. Homes without sanitary backup protection are vulnerable to basement backups when there are rising flow levels in the sanitary/combined sewer systems.

Flood Data

As with all intense rainstorms, the Village encourages residents to report their flooding experience, so the engineering team can evaluate the data. Residents contacted the Village through phone calls, emails, Tyler 311 services requests and an on-line Google Flood Survey. The data was logged into a spreadsheet and mapped. This data represents a sample of flooding as many residents choose not to report flooding.



Attachment 1 includes flood maps with notes and observations. Attachment 2 includes photos of street flooding west of Ridge Road.

Capital Projects—Neighborhood Storage Project

The Neighborhood Storage Project will provide 10-year storm protection for the separate storm sewer system located west of Ridge Road. Even during larger events, such as this past storm, there will be significantly less street and overland flooding once the underground vaults and large storm sewers are installed.

While there will be modest benefits as each phase is completed, the full benefits of the project will not be realized until 2022 after completion of the last storage basin.

Phase	Location	Construction Start	Completion Date
1 and 1A	Community Playfield	Fall of 2019	November, 2020
2	Hibbard Park	February 2021*	November 2021
3	Thornwood Park	Summer 2022**	December 2022

* Schedule requires Village Board decision in September, 2020

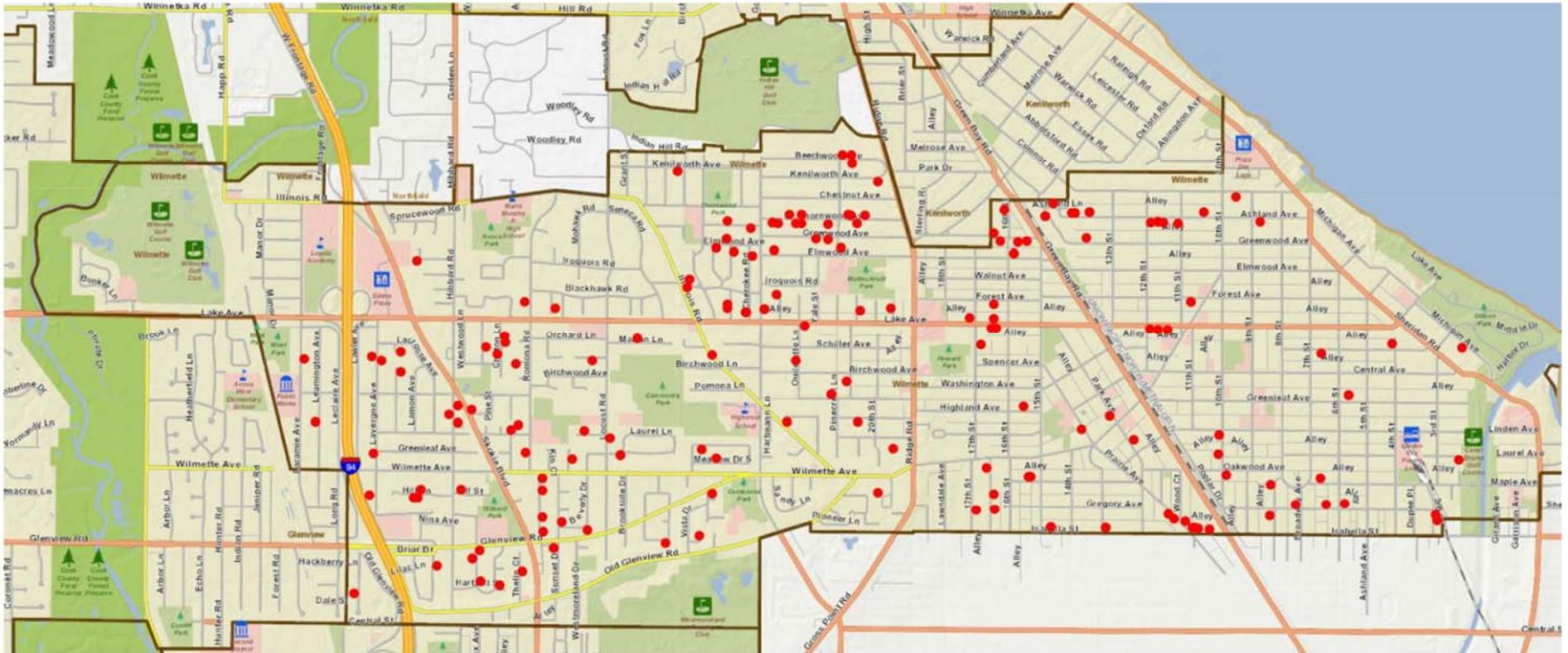
** Construction start is tentative as additional coordination with the Park District and School District 39 is necessary

Attachments

1. Flood maps
2. Street Flooding Photos
3. MWRD Press Release - Storm update

Reported Sanitary / Combined Sewer Backups

May 14-17, 2020

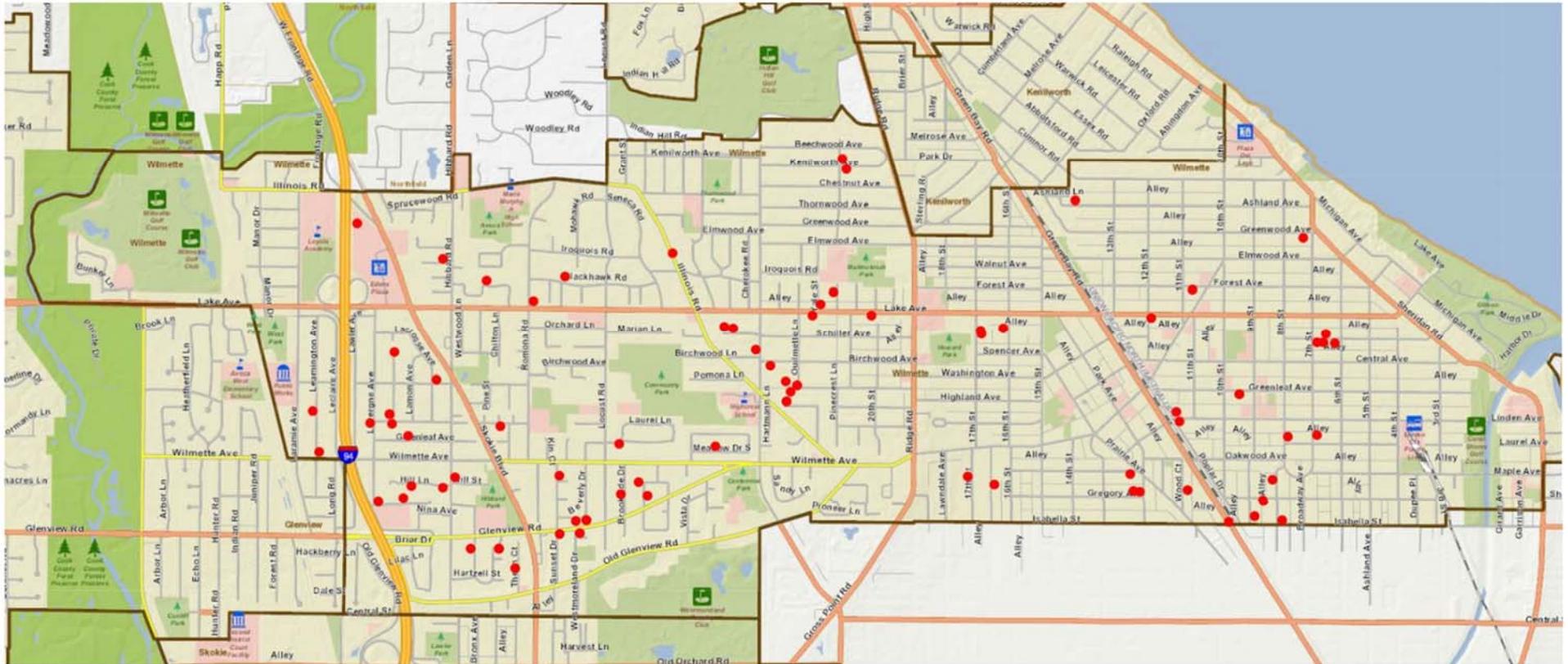


There are three sanitary systems: Harms Road Basin (west of Hibbard), Princeton Basin (betw Hibbard and Ridge) and combined sewer basin (East of Ridge).

- All three sewer systems experienced surcharging at various times throughout the storm.
- Harms Basin performed significantly better than in past storms because of the West Park Storage facility which stored nearly 7 million gallons of wastewater. The local sanitary collection system is still vulnerable to surcharging for storms greater than 5-years because of excessive inflow and infiltration (I/I). This can be addressed through future smoke testing programs. Private side sewer laterals continue to be a significant source of I/I.
- The Princeton Basin experienced a cluster of sewer backups in the Kenilworth Gardens subdivision. This is likely because excessive I/I and downstream conditions in the MWRD's North Shore Interceptor System. Staff will work with our consultant and reach out to MWRD to request additional study.
- The combined system experienced some clusters of sewer backups in the north and south portions of the system. Staff will review the overall relief sewer system map and determine if there are tributary relief sewers that have not yet been built that would benefit these areas.

Reported Street Flooding—Right of Way

May 14-17, 2020



West of Ridge Road – Separate Storm Sewer System

The capacity of the local storm sewer system was exceeded resulting in street flooding.

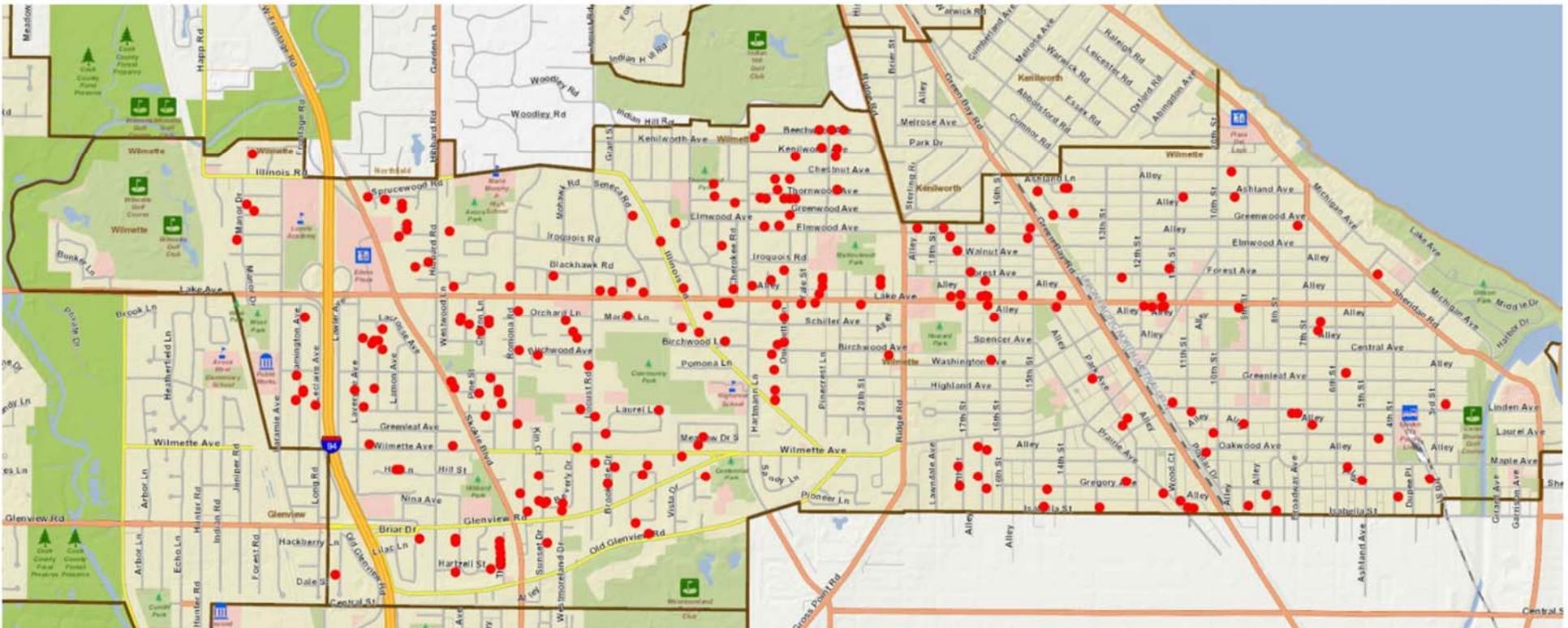
- Where street flooding elevations reached front yards, residents may have reported this as “yard flooding” which would result in under reporting street flooding and over reporting yard flooding.
- The following streets were observed as impassable: Thelin Ct, Washington (E of hunter), Hunter (N of Washington), Beechwood (E of Hunter), Kenilworth and 21st, Wilshire (N and S) of Glenview, Meadow Ln, Birchwood and Ouilmette, Schiller and Ouilmette
- All locations with street flooding will benefit from the Neighborhood Storage Project, which is underway.

East of Ridge Road—Combined Sewer System

- The combined sewer system performed as designed. Public Works responded to reports of street flooding and concluded that the relief sewer system, consisting of large diameter sewers, drainage berms and inlet restrictors, worked together to store water on the street. Crews did not observe water elevations beyond the sidewalk, which is consistent with the system design.

Reported Yard Flooding—Private Property

May 14-17, 2020



Yard or private property flooding represented the largest category of flooding with 31% of all flooding reports.

- The reports of localized yard flooding are not unexpected, given the amount of rain received over a short period.
- Back to back storms over several days exacerbates overland flooding because once the ground becomes super-saturated it can no longer absorb water.
- Wilmette's relatively flat topography, dense urban development and lack of comprehensive neighborhood stormwater management contribute to poor overland drainage.
- The Neighborhood Storage Project will help with yard flooding if residents can redirect the localized flooding from their yards toward the street.
- The Stormwater Incentive Program is a new program aimed at encouraging private improvements that will promote infiltration and relieve localized flooding during small rain events.
- Many of the reported drainage problems involve multiple neighbors and will require coordination between property owners in order to mitigate the flooding. The Engineering Division is available to assist by providing options, resources and assisting with permits.

5-17-20 Storm—West Side Street Flooding

Street Flooding:

Kilpatrick – impassable

Valley View – flooded but passable

Thelin – impassable

Washington east of hunter – impassable

Hunter north of Washington – impassable

Beechwood east of Hunter – impassable

Kenilworth and 21st – impassable

Wilshire north and south of Glenview – impassable

Meadow Ln – impassable

Birchwood and Ouilmette – impassable

Schiller and Ouilmette – impassable.

Kilpatrick



5-17-20 Storm—West Side Street Flooding

Valley View



North Wilshire



5-17-20 Storm—West Side Street Flooding

Meadow Lane



Hunter and Washington



5-17-20 Storm—West Side Street Flooding

Beechwood



Kenilworth and 21st



5-17-20 Storm—West Side Street Flooding

Ouilmette and Washington



Community Playfield





Metropolitan Water Reclamation District of Greater Chicago

Press Release

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For immediate release
May 18, 2020

MWRD Storm update

Over the last 96 hours, the Chicago metropolitan area has seen between 6 to 8 inches of rainfall. The levels of rainfall varied across the region with more falling in the northern suburbs and less in the south suburbs. From May 14 to May 17, the National Weather Service reports that 7.88 inches of rain fell at O'Hare and 6.22 inches of rain fell at Midway with higher localized totals across the area. For the entire month of May 2020, 8.19 inches of rain has fallen.

To mitigate the impact of the storm event, we have reversed the flow of the Chicago Area Waterway system to Lake Michigan at the Wilmette Pumping Station and at the Chicago River Controlling Works downtown to minimize overbank flooding. There are several factors we consider when determining to release floodwater to the lake, including the rate the river water level is rising at each lakefront control location, whether the rainfall intensity is continuing or beginning to decrease, and the storm conditions on the radar.

Reversal incidents at each location includes:

- Wilmette Pumping Station reversed from May 15, 2020 at 2:30 a.m. to May 15, 2020 at 5:45 a.m.
- Wilmette Pumping Station started reversing May 17, 2020 at 3:45 p.m. and is still ongoing.
- Chicago River Controlling Works, downtown Chicago, started reversing on May 17, 2020 at 7:20 p.m. and is still ongoing.

The Tunnel and Reservoir Plan is comprised of three systems and all are operating as designed. Combined they are currently holding more than 8 billion gallons. The current status of all TARP tunnels and reservoirs includes:

- McCook TARP System: 100% full, 4.970 billion gallons stored; Comprised of Mainstream Tunnel, Des Plaines Tunnel, and McCook Reservoir
- Calumet TARP System: 36% full, 3.017 billion gallons stored; comprised of Calumet Tunnel and Thornton Composite Reservoir
- Kirie TARP System: Tunnel - 100% full, 71 million gallons stored & Majewski CUP - 243 million gallons stored

Currently the North Shore Channel and the Chicago River are higher than the lake. In order for the MWRD to reverse the flow of the Chicago Area Waterways, the river must be higher than the lake.

The U.S. Army Corps of Engineers provides data on the lake level. This can be found at <https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/Monthly-Bulletin-of-Great-Lakes-Water-Levels/>.

Recovering Resources, Transforming Water

Established in 1889, the MWRD (www.mwr.org) is an award-winning, special purpose government agency responsible for wastewater treatment and stormwater management in Cook County, Illinois.