
July 22-23, 2011 Rainstorm and Flash Flood

August 2, 2011

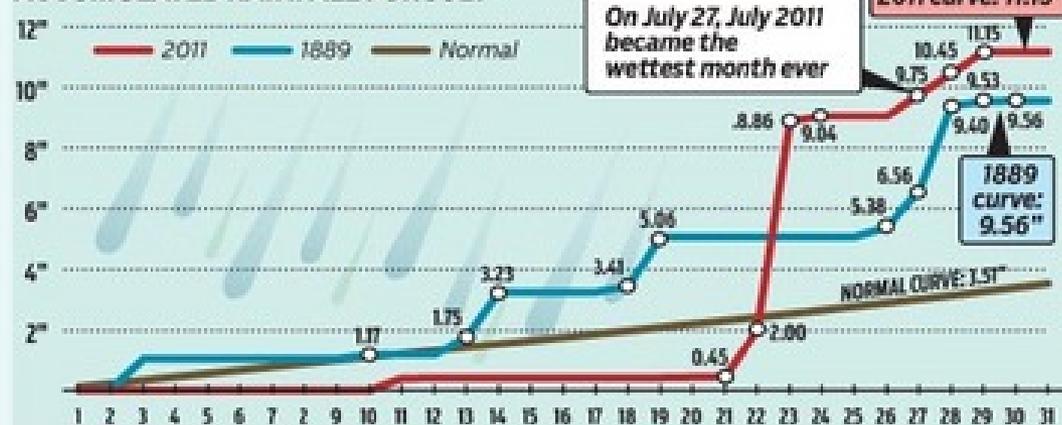
Rainfall Data

- Cook County Precipitation Network Gauge
 - Near Willow & Hibbard
 - Records every 10 minutes
 - 3.99 inches between 11pm and midnight
 - Including 0.98 inches from 11:40pm to 11:50pm
 - 5.99 inches between 11pm and 1:30am
 - 6.61 inches between 11pm and 10am
-

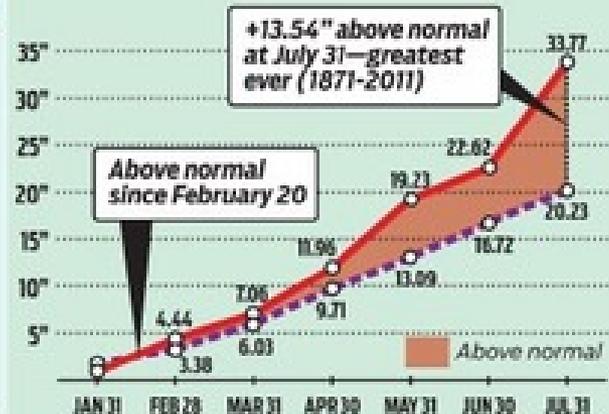
From one of driest to all-time wettest July in just six days

This July started off very dry and as of July 21 we had received only .45"—off to the 6th driest start ever. Then 8.41" on the 22-23 followed by another 2+" on the 27-29th lifted this July into the wettest ever by a wide margin (old record 9.56" in 1889).

ACCUMULATED RAINFALL FOR JULY

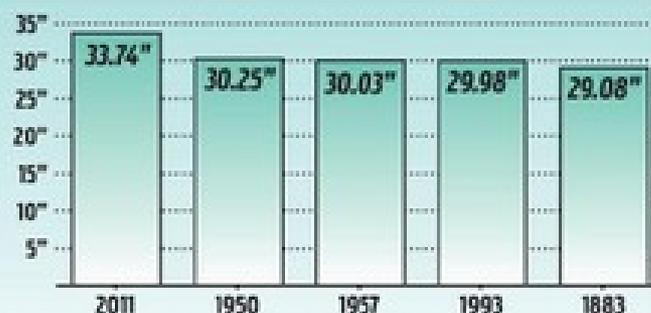


ACCUMULATED INCHES OF PRECIPITATION



CHICAGO'S WETTEST JAN. 1 – JULY 31

Never before has there been more precipitation in the first 7 months of the year than in 2011



WETTEST JULYS 1871-2011: 141 years

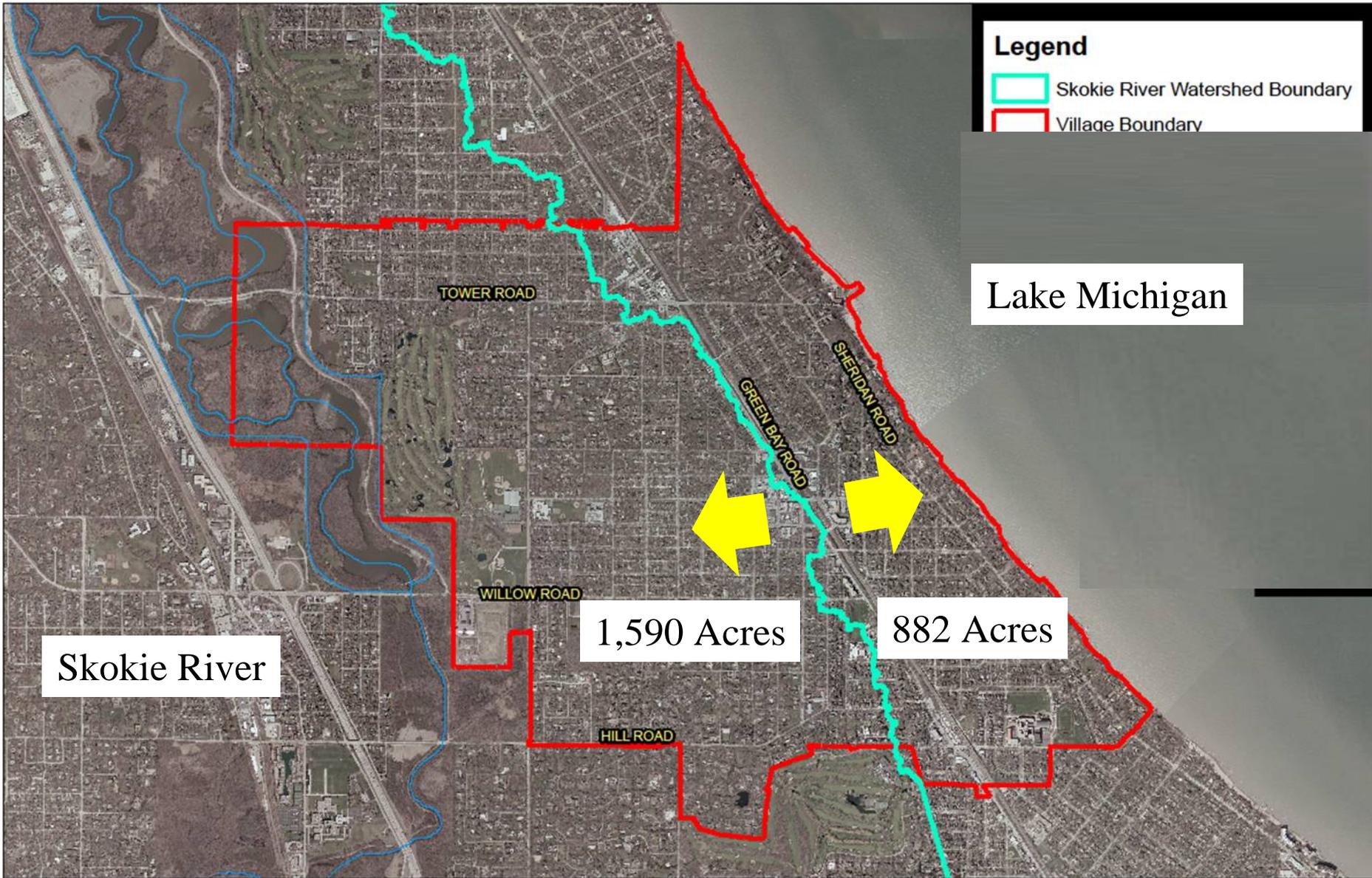


SOURCES: Frank Wachowski, National Weather Service archives

PAUL DAILEY, RICHARD KOENEMAN AND JENNIFER M. KOHNKE / WGN-TV

Comparison with Historical Rainfall

- 3-Hour Rainfall total
 - July 22-23, 2011: 6.08 inches
 - 1-percent chance rainfall: 4.85 inches
 - September 13, 2008
 - 7.04 inches in 24-hour period
 - August 19, 2007 (windstorm)
 - 2.17 inches
 - August, 1987
 - 9+ inches over 12 hours
-



Legend

- Skokie River Watershed Boundary
- Village Boundary

Lake Michigan

Skokie River

1,590 Acres

882 Acres

TOWER ROAD

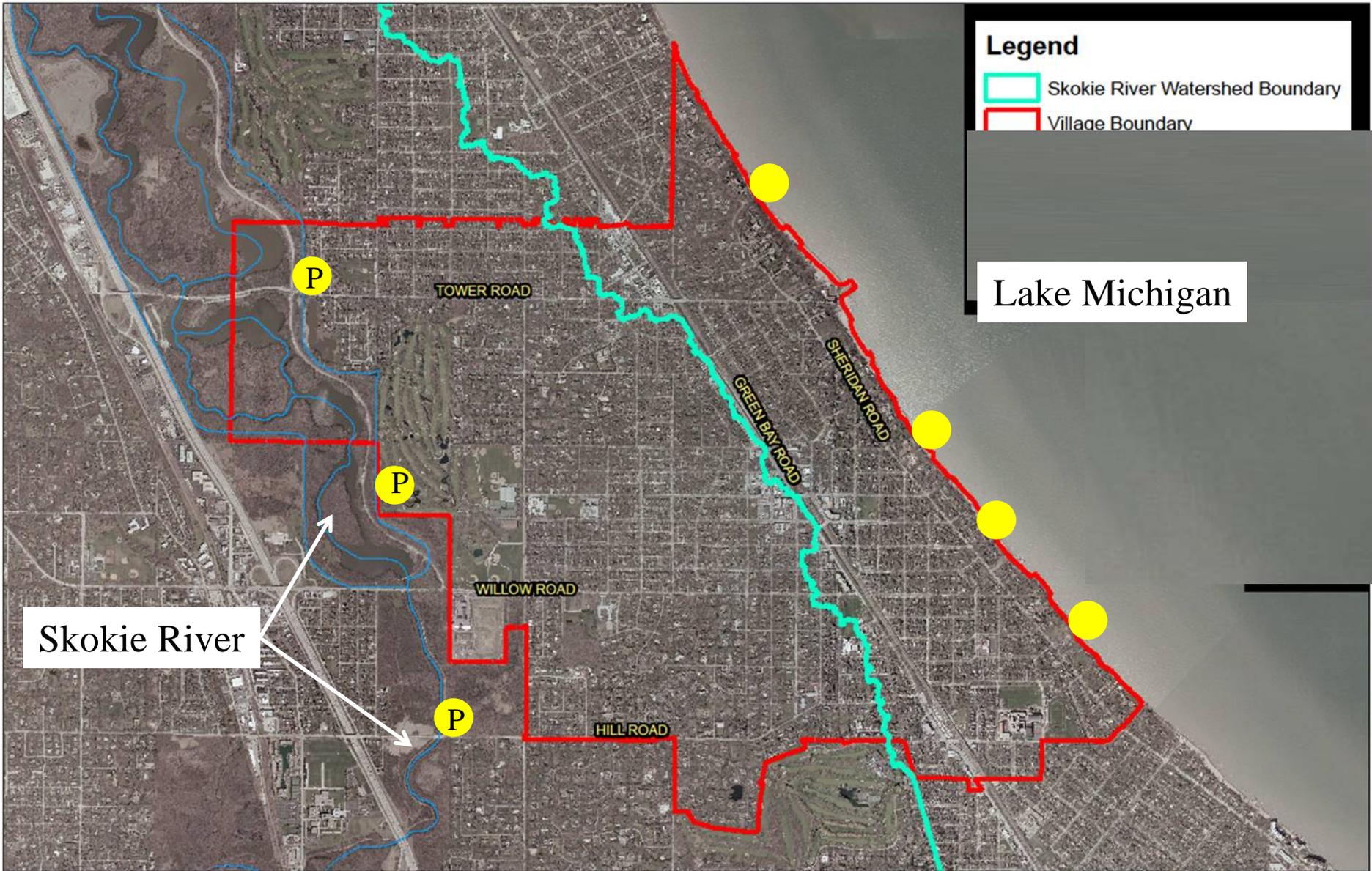
WILLOW ROAD

HILL ROAD

GREEN BAY ROAD

SHERIDAN ROAD

Winnetka Outlets



Winnetka Outlet at Willow Road

Winnetka, IL

Skokie River

West Fork North Branch

North Shore Channel

North Branch Chicago River

115 sq. mi.

3.02 mi

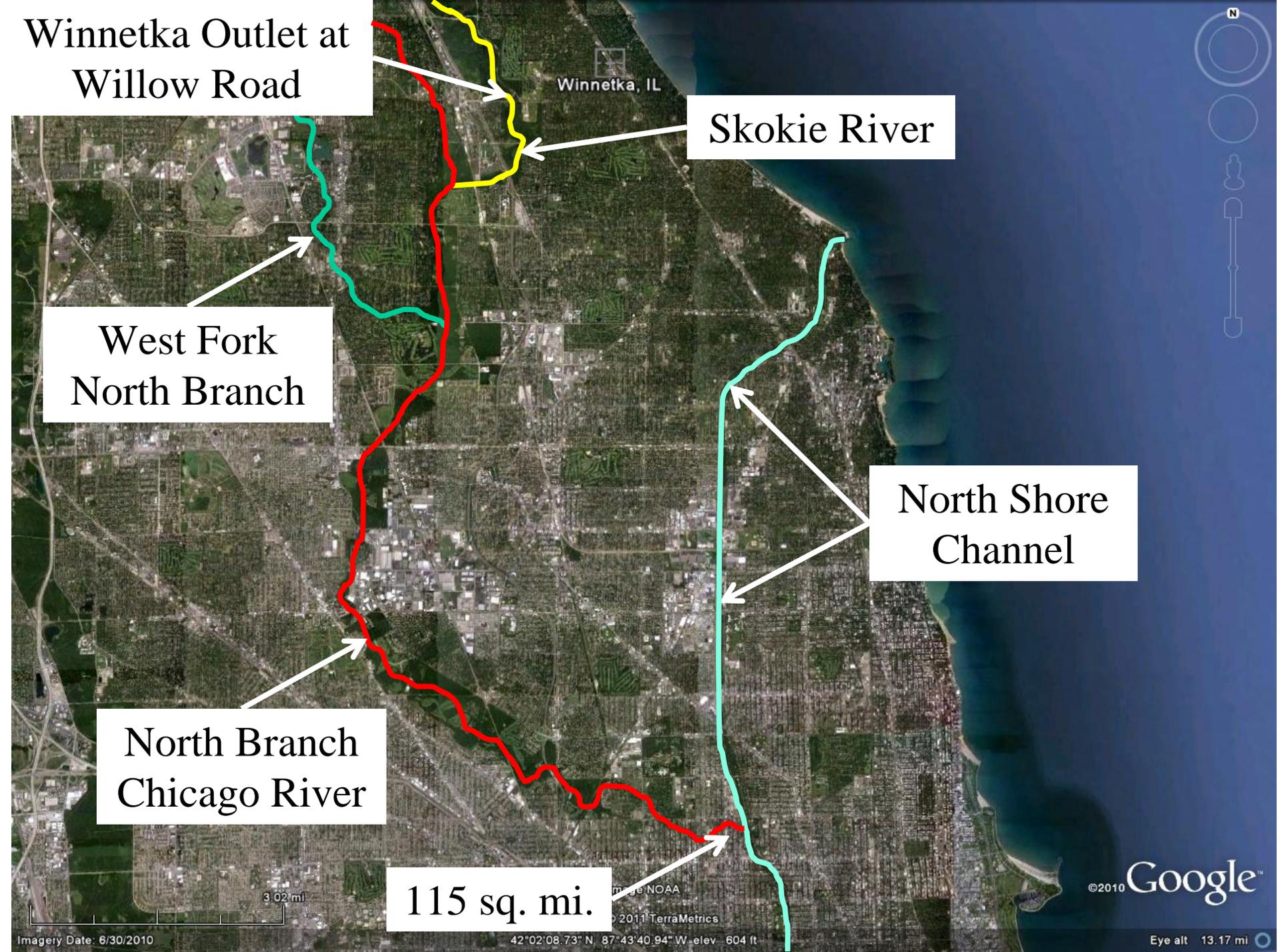
Image NOAA
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Imagery Date: 6/30/2010

42°02'08.73" N, 87°43'40.94" W elev. 604 ft

Eye alt 13.17 mi



What About the Wilmette “Locks”

- Located near Baha'i Temple on North Shore Channel
 - Not a lock, but a 32' gate that controls water level on North Shore Channel
 - Does not impact level of Lake Michigan or Skokie River, therefore no effect on Winnetka's storm sewers
 - Probably helps somewhat with sanitary backups
-

Operation July 22-23, 2011

- Gate was opened approximately 2:20am July 23
 - Second gate at Navy Pier opened approximately 1 hour later
 - Gates operated to prevent flooding on North Shore Channel
-



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Winnetka Outlet at Willow Road

Winnetka, IL

Skokie River

West Fork North Branch

North Shore Channel

North Branch Chicago River

3.02 mi

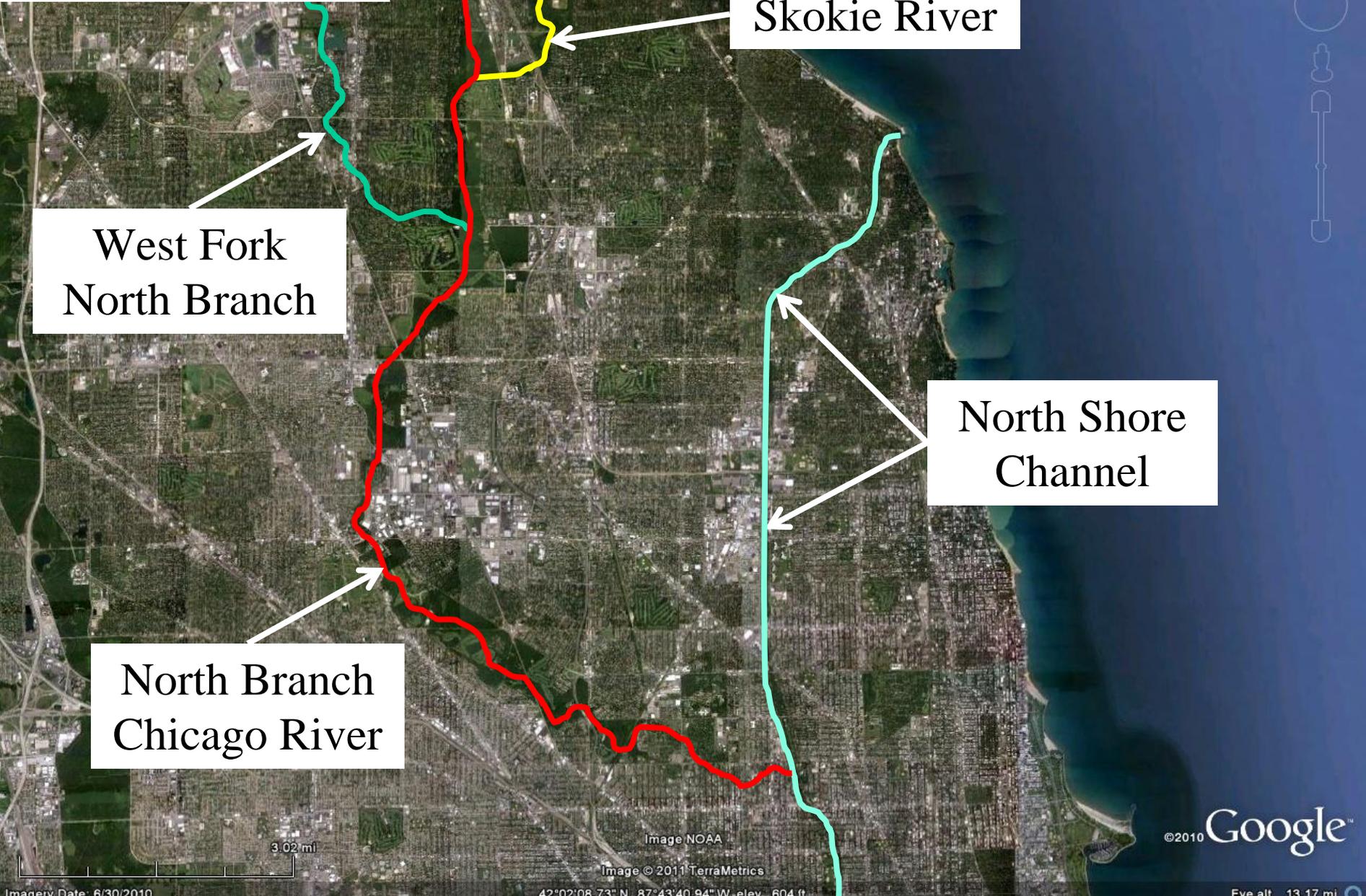
Image NOAA

Image © 2011 TerraMetrics

42°02'08.73" N, 87°43'40.94" W elev. 604 ft

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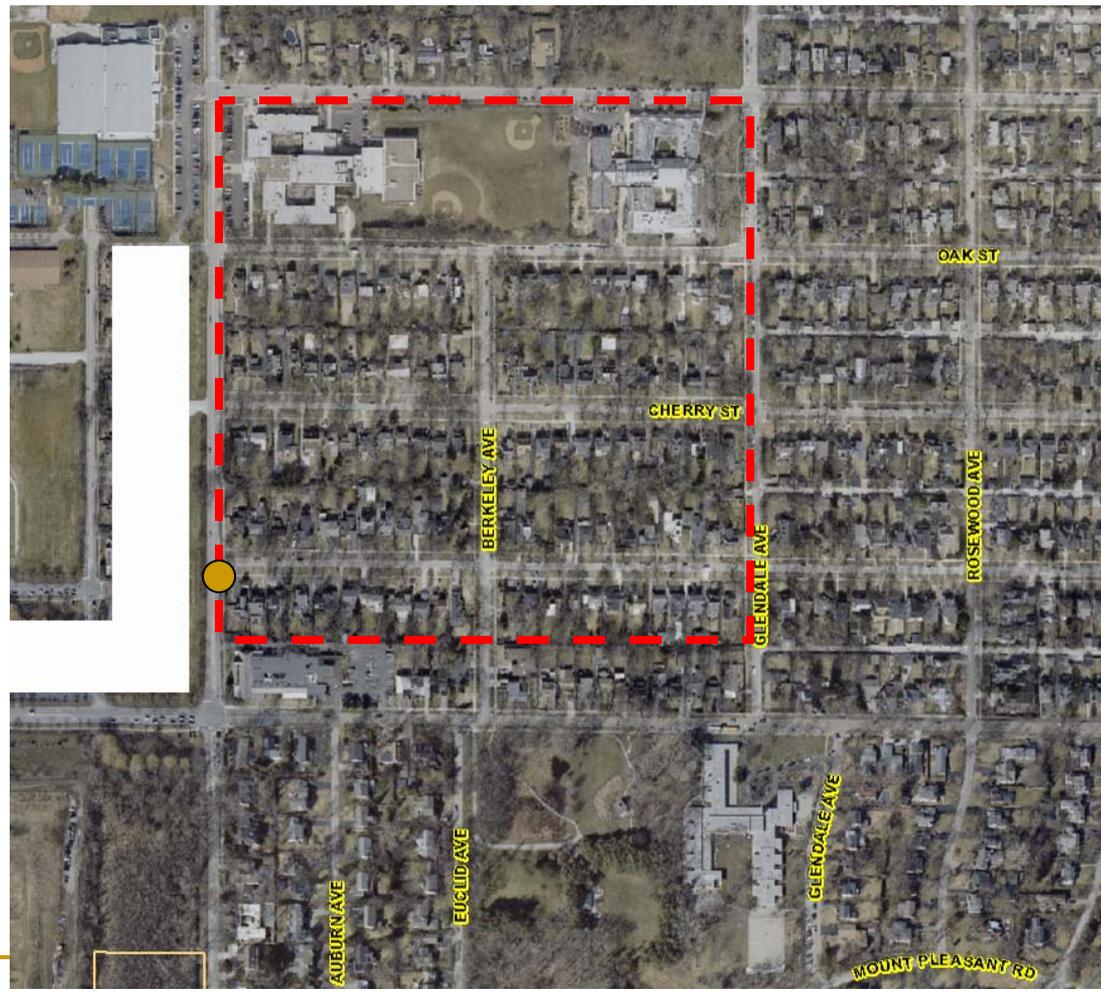
Eye alt 13.17 mi



Ash Street Pump

- Located at Ash & Hibbard
 - Pumps to Hibbard with overflow to ballfield
 - Drains area bounded by Glendale, Oak, Willow, Hibbard
 - Became clogged with debris at some point during morning of July 23
 - Restored and supplemented by 1pm Saturday
 - Pumped until 1am Sunday
-

Ash Street Pump Drainage Area



Supplemental Pumping



Miscellaneous Data

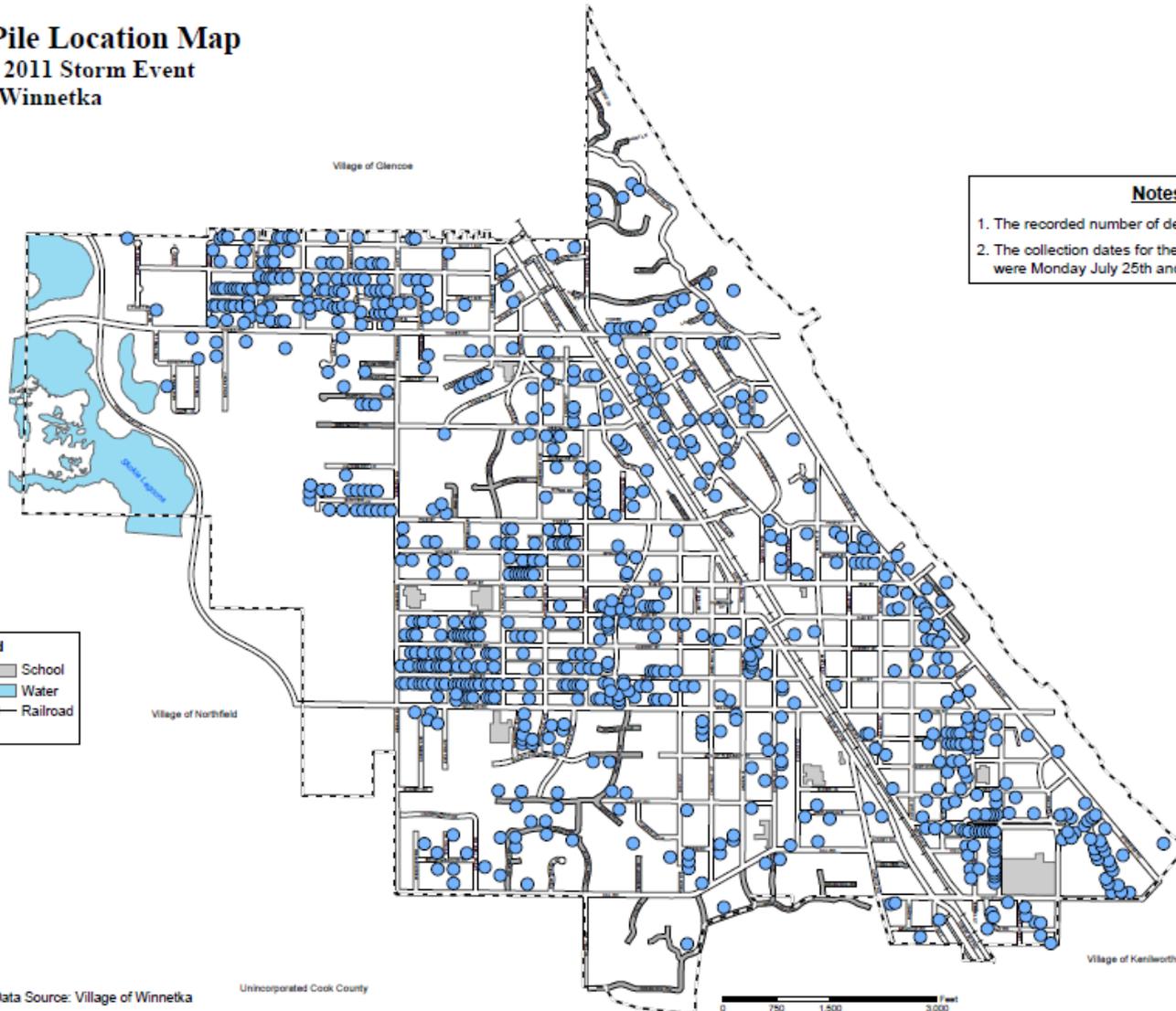
- Additional Pump Operating at Skokie River by 2am.
 - Pumped 3 million gallons per hour into Skokie River at Winnetka Avenue from 2am until about 6pm when additional pump was shut off.
 - By 2:50 am, PW response morphed from water management to well-being checks in areas where PD and FD could not respond
-

Damage Data



Debris Pile Location Map

July 23rd, 2011 Storm Event
Village of Winnetka



Notes

1. The recorded number of debris piles is 749
2. The collection dates for the debris pile information were Monday July 25th and Tuesday July 26th.

Map Legend

- Debris Pile
- School
- Village Boundary
- Water
- Roads
- Private Roads
- Railroad

Village of Winnetka



Data Source: Village of Winnetka

Unincorporated Cook County

0 750 1,500 3,000 Feet



State Plane NAD 83 Illinois East
July 26, 2011 8:00 AM DebrisPile

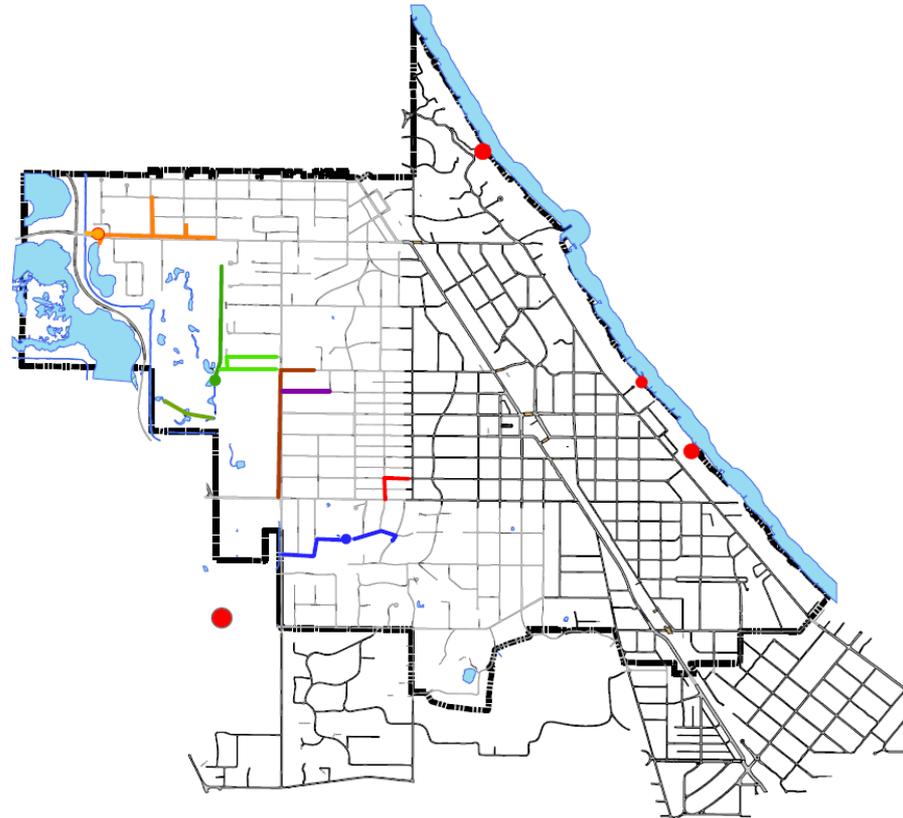
Public Comment

What has already been done?

- 1985 Sanitary Sewer Rehabilitation Program
 - \$4m public sewer repair, replacement, and lining program
 - Private I/I Disconnection Program
 - Identify illegal downspout, drain, and sump pump connections to sanitary system
 - Sewer Lining Program
 - Ongoing lining to seal and extend life of sewers
 - Laterals??
-

Stormwater Drainage Improvements 1994-2008 (\$3,567,000)

Winnetka Ave Pump Station (1994)	\$505,000
Sub-area 8 Improvements (1995)	\$354,000
Hibbard Road Improvement (1998)	\$414,000
Spruce Street Outfall (2001)	\$118,000
Tower Road Improvements (2002)	\$551,000
Golf Course Improvements (2003-04)	\$416,000
Ravines Outfall (2004)	\$147,000
Sunview Lane Improvements (2005)	\$230,000
Tower Pump Station (2005)	\$50,000
Cherry Street Outfall (2005)	\$186,000
Ash Street Improvements (2008)	\$151,000
Spruce Street Improvements (2008)	\$445,000



Proposed Improvements - \$14.1m

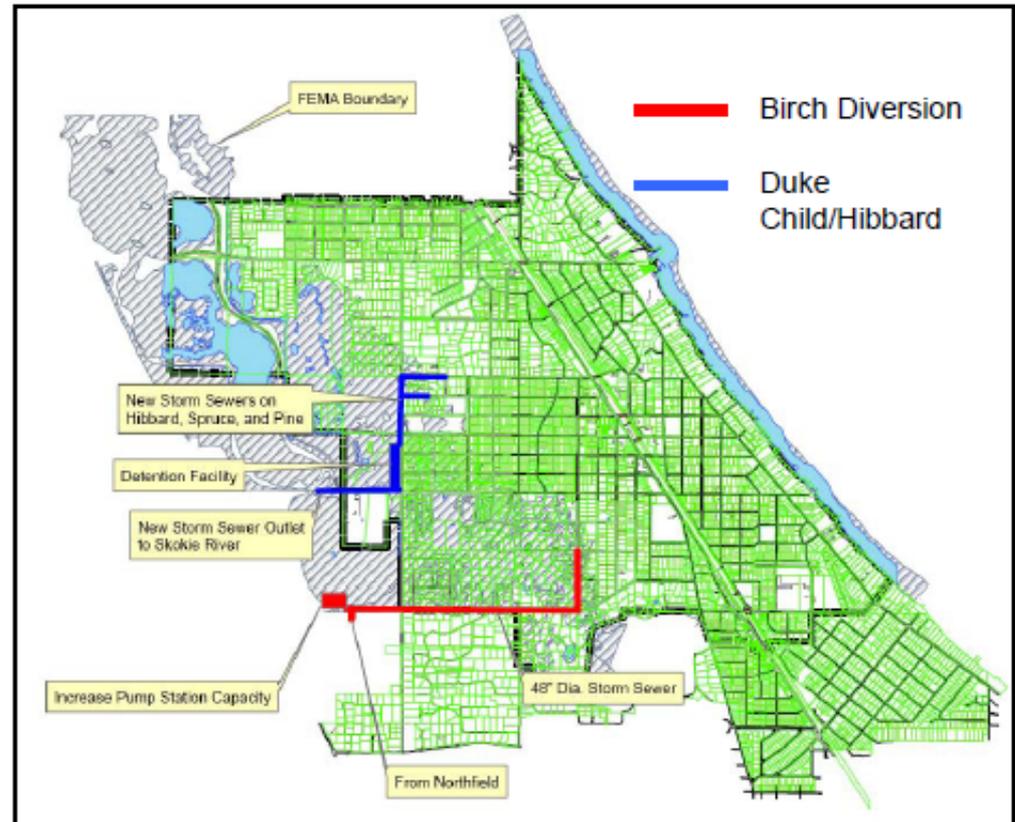
2009 Recommendations

■ Birch/Hill Diversion

- Construct new storm sewer along Birch and along Hill
- Increase pumping capacity
- Overbank storage in FPD
- Engineering FYE 2011
- Construction FYE 2012
- Benefits Birch, Alles, Sunset, Meadow, DeWindt, White Oak (pump also benefits north area)
- 10 year protection level
- **Cost \$3.5m**

■ Duke Child/Hibbard

- Pine, Spruce and Hibbard storm sewer
- Duke Child detention
- Ash Street Pump facility
- New pumped outlet via Willow Road
- Engineering FYE 2012
- Construction FYE 2013
- Benefits Pine-Willow e. of Hibbard, plus south area
- 5-10 year protection level
- **Cost \$4.5m**



Proposed Improvements - \$14.1m

2011 Recommendations

- Underpass Area (\$2.4m)
 - New sewer under Winnetka, Essex, Elder
 - Cherry Outlet Area (\$692k)
 - New sewer under Sheridan to Lake
 - Spruce Outlet Area (\$368k)
 - New outlet via Lloyd Park
 - Greenwood Area (\$67k)
 - New laterals for low areas east & west of Greenwood
 - Provident Area (\$6.8m incl. 2009 cost)
 - New sewer via Westmoor, Walden, Blackthorn, Pine, Glendale, Elm
 - Ravine Area (\$146k)
 - New grates and inlets
-

Effect of Proposed Improvements

Location	July 2011 Modeled	July 2011 after improvements
Birch near Hill	2.5 ft.	2.1 ft.
Pine near Hibbard	2.2 ft.	2.1 ft.
Spruce near Hibbard	1.3 ft	1.3 ft.
Cherry near Berkeley	1.9 ft	1.9 ft.
Greenwood N./ Tower	3.0 ft.	3.0 ft.
Winnetka Underpass	6.8 ft.	6.5 ft.
Sunset near DeWindt	4.4 ft.	1.4 ft.

What would be required to handle the July 2011 Event?

- \$14.1m improvements were designed to 10-year event (2.86 inches in 3 hours vs. 6.08 inches)
- Increased conveyance for all improvements
 - Unable to model yet
- Increased detention volumes
 - 19.9 ac-ft for Spruce/Hibbard
 - 37.0 ac-ft for Ash/Hibbard
 - 34.3 ac-ft for Sunset/DeWindt
 - Plus 10.4 ac-ft proposed = 101.6 ac-ft

An aerial photograph of a golf course and sports complex. A large, irregularly shaped area in the upper right quadrant is highlighted with a light blue semi-transparent overlay. This area contains a building and a parking lot. The text "Footprint 11 feet deep" is written in bold black font within this highlighted area. The surrounding landscape includes green fairways, sand traps, trees, and a residential neighborhood to the right.

**Footprint
11 feet deep**



**Footprint
4 feet deep**



**Footprint
16 feet deep**

Engineering Recommendations

- Cancel \$14,800 cost-benefit analysis contract awarded last month
 - Evaluate higher flood protection levels for 4 areas of most severe overland flooding
 - Sunset/DeWindt
 - “Tree Streets” (Ash, Cherry, Oak, Spruce, Pine)
 - Greenwood - Tower area
 - Tower Manor area
 - Cost \$25,000
 - 25-year, 50-year, 100-year improvements
 - Vigorously pursue open space for detention
 - Will require balancing diverse missions of other public bodies
-

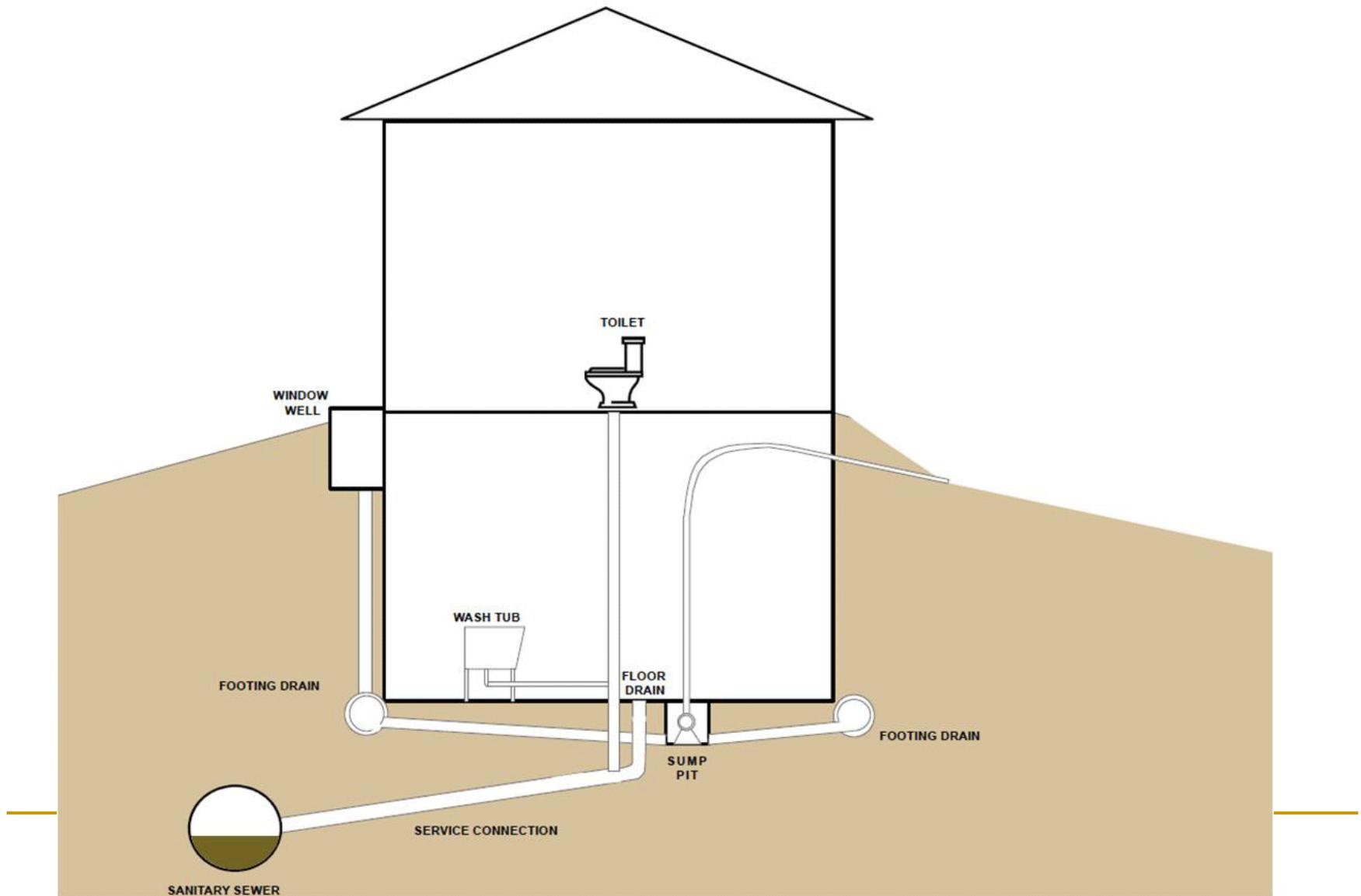
Council Discussion

Stormwater Utility & Financing of Improvements

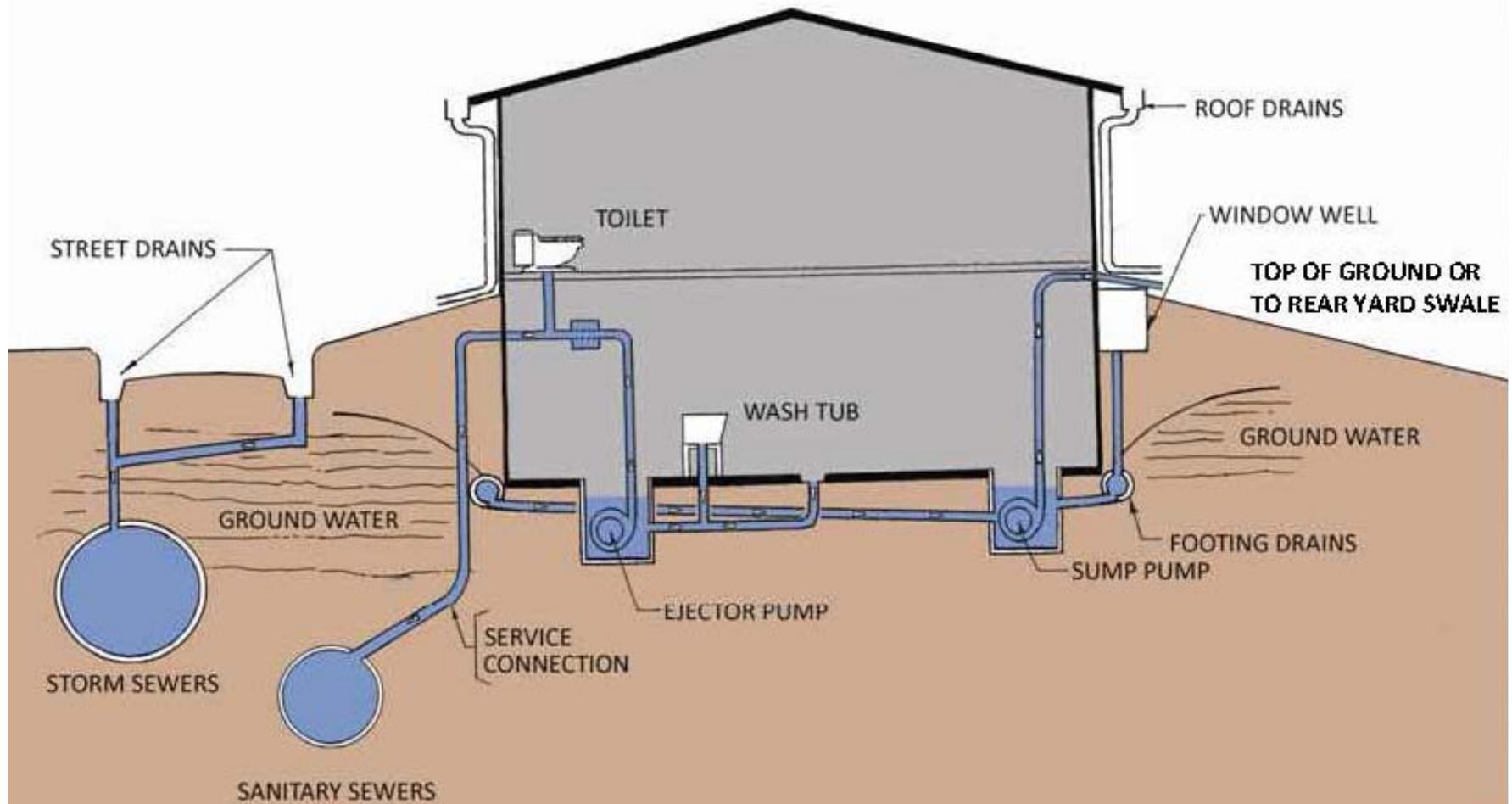
- Staff Presentation
- Council Questions/Discussion



Sanitary Sewer Backup Simulation

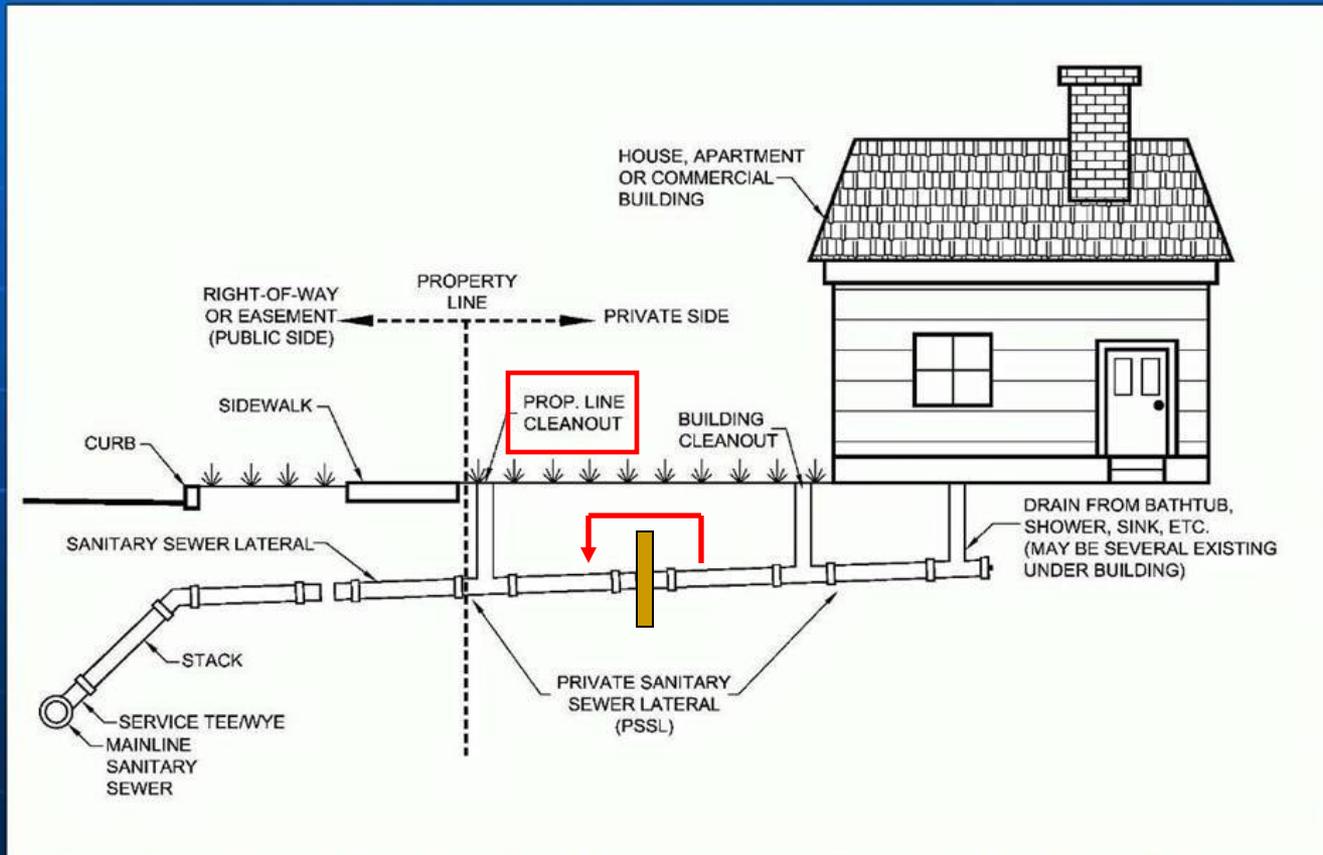


Overhead Sewer Schematic



Sanitary Backflow Prevention System

Typical Sanitary Sewer Lateral



Backflow Prevention/Overhead Sewer

- Retrofit prevents backup from sanitary sewers surcharged by stormwater
 - Cost varies, less expensive systems \$6,000
 - Village reimburses 50% of cost up to \$2,500
 - 13 Reimbursement Requests since 2006
-

Possible Enhancement

- Village could increase contribution level to encourage installation
 - 9 of 13 reimbursements were capped at \$2,500
 - Consider cap of \$4,000 to \$4,500
 - Village could bid to obtain standard price to help lower costs
 - Possible drawback: May increase flooding of unprotected homes
-

Property Evaluations

- Village could contract with engineering firm to provide flood protection evaluations for individual homes
 - Site visit by engineer
 - Internal & external inspection
 - Report detailing recommended improvements
 - Fee could be paid by Village, subsidized by Village, or passed along to property owner
 - \$250 to \$500+ per home, estimated
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