

Water Diversion **REPORT**



2020 Report on Water Diversion
March 2021

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2020 REPORT ON WATER DIVERSION

EXECUTIVE SUMMARY

The City of Racine (Racine) is submitting this report to satisfy the requirements in the Wisconsin Department of Natural Resources (DNR)'s approval of its diversion application.

The DNR's approval stipulated that Racine must annually report on the following items for the prior calendar year:

- 1) The total amount of water sold monthly or quarterly to each category of customer within the approved diversion area.
- 2) The total monthly sewerage flow to the City of Racine Wastewater Treatment Plant from the diversion area.
- 3) The total consumptive use as specified by the DNR.
- 4) A summary of the impact of the implemented conservation and efficiency measures required under Wisconsin Administrative Code NR 852.04 and NR 852.05, including quantifiable impacts to water use intensity, as defined in Wisconsin Administrative Code NR 852.03(29).
- 5) A description of any additional conservation and efficiency measures implemented.

The amount of water diverted in 2020 totaled just over 9 million gallons, an average of about 25,000 gallons per day. This amount represents 0.4% of the total permissible diversion of 7 million gallons per day. The amount diverted includes water sold and water used to flush the mains for system maintenance and testing purposes. In 2020, return gallons totalled over 5.2 million gallons through both sanitary wastewater return flow, and inflow and infiltration (I/I). The total consumptive use was just under 3.8 million gallons, representing a consumptive use coefficient of 42.1%. Return flow met all water quality discharge standards.

TOTAL AMOUNT OF WATER DIVERTED

The Racine Water Utility (RWU) diverted water to the Mississippi River basin, selling water to one industrial customer, Foxconn. The sales were properly coded within RWU's billing system to track the amount of water that was diverted. The total amount of water diverted is the sum of the water sold and the water flushed, which equals 9,003,122 gallons. That represents an average of 24,666 gallons diverted each day (Figures 1,2,3,4).

The reporting requirements specify the water sold should be segmented into months and/or quarters. RWU used temporary meters to track water demand associated with the operations and maintenance of the infrastructure, including gas line testing and flushing. Temporary meters are only measured once the meters are removed, so water demand can and often does span multiple months and quarters. As permanent meters are installed, water demand will be recorded by quarter or month. Currently, RWU bills its industrial customers monthly and all others quarterly. These permanent meters will measure the demand to calculate the total amount of water diverted. However, the use of temporary meters will continue due to the necessity of flushing these new water mains until enough customer connections are made to provide ample turnover to assure water quality. All water diverted in 2020 was measured by permanent or temporary metering.

Figure 1. 2020 Water Diversion Total (gallons)

Water sold (g)	2,646,566
Water flushed (g)	6,356,556
Water Diversion Total (g)	9,003,122

Figure 2. 2020 Water Sold (gallons)

Customer Class	Number of Permanent Customers	Total (g)
Industrial	1	2,646,566

Figure 3. 2020 Water Sold by Quarter (gallons)

Quarter in 2020	Water Sold (g)
Q1	270,877
Q2	216,143
Q3	1,018,811
Q4	1,140,735
Total	2,646,566

In addition to the water that was sold, RWU used water to flush mains for maintenance and testing purposes. The flushing was metered to record the correct amounts, but cannot be attributed to any customer and is instead considered a part of the RWU's operations and maintenance.

Figure 4. 2020 Water Flushed by Quarter (gallons)

Quarter in 2020	Water Flushed (g)
Q1	1,568,068
Q2	1,909,568
Q3	2,878,920
Q4	0
Total	6,356,556

TOTAL MONTHLY SEWERAGE FLOW

The return gallons totalled over 5.2 million gallons through both sanitary wastewater return flow, and I/I (Figures 5 & 6). The sanitary sewer infrastructure for the diversion area was completed in March 2020 with a return flow to the Racine Wastewater Utility WWTP. No holding tanks were used for wastewater transport. The Foxconn facility began to discharge sanitary wastewater in the fourth quarter of 2020. All other return flow was generated from WE Energies pipe flushing and a large volume of I/I in the newly constructed pipe, and cannot be attributed to any customer.

A permanent wastewater flow laser meter was installed by the Village of Mount Pleasant at the Hwy H metering site on March 1st, 2020. The Hwy H site records all wastewater return flow from the diversion area Mississippi River basin back to the Great Lakes basin. However, the Hwy H meter malfunctioned and did not provide accurate readings. The village has been working with the meter supplier to resolve service issues. Thus, sanitary wastewater flow return gallon numbers for 2020 are estimated based on pump runtime and pump curve output ratings at the Mount Pleasant KR lift station just downstream from the Hwy H meter site. The Hwy H meter will be repaired and recalibrated in 2021. The village also installed a permanent wastewater flow meter to record discharge out of Foxconn Gate 5 on November 19, 2020. Village personnel read the Hwy H and Foxconn meters daily Monday through Friday.

Figure 5. 2020 Water Returned (gallons)

Quarter in 2020	Wastewater Return, Foxconn (g)	Wastewater Return - Utility O&M, I/I (g)	Total Return (g)
Q1	0	542,523	542,523
Q2	0	970,498	970,498
Q3	0	1,787,882	1,787,882
Q4	632,298	1,282,340	1,914,638
Total	632,298	4,583,243	5,215,541

Figure 6. 2020 Water Returned by Month (gallons)

Month 2020	Water Returned (g)
January	0
February	0
March	542,523
April	25,696
May	494,945
June	449,857
July	520,683
August	866,687
September	400,512
October	443,266
November	693,649
December	777,723
Total	5,215,541

TOTAL CONSUMPTIVE USE

The total consumptive water use is the sum of the water sold and the water used for flushing (9,003,122 gallons, also referred to as “water diversion total”), minus the total return gallons (5,215,541 gallons) equals 3,787,581 gallons. This annual water supply and return equates to an average daily consumptive use of 10,377 gallons, and a consumptive use coefficient of 42.1% (Figure 7).

Figure 7. Total Consumptive Use (gallons)

Water Diversion Supply Total (g)	Return Gallons Total (g)	Total Consumptive Use (g)	Average Daily Consumptive Use (g)	Consumptive Use Coefficient
9,003,122	5,215,541	3,787,581	10,377	42.1%

The Foxconn facility’s total consumptive use is calculated by subtracting Foxconn’s wastewater returns (632,298 gallons) from the total gallons purchased (2,646,566 gallons) for a total consumptive use of 2,014,268 gallons. The average daily consumptive use is 5,519 gallons and the consumptive use coefficient is 76.1% (Figure 8).

Figure 8. Foxconn Total Consumptive Use (gallons)

Foxconn Water Sold Total (g)	Foxconn Return Gallons Total (g)	Foxconn Total Consumptive Use (g)	Foxconn Average Daily Consumptive Use (g)	Foxconn Consumptive Use Coefficient
2,646,566	632,298	2,014,268	5,519	76.1%

In a letter titled “2020 Documentation of Reporting Requirements for the City of Racine Diversion of Lake Michigan Water” dated August 28, 2020, the Wisconsin Department of Natural Resources assumed a 10-percent consumptive-use coefficient for Racine’s Diversion Application.

2020’s overall consumptive use coefficient, 42.1%, (and Foxconn’s consumptive use coefficient of 76.1%) far exceed the assumed 10% consumptive use coefficient. There are a number of reasons why this occurred in 2020. It is assumed that the high consumptive use coefficient had to do with landscaping use as construction of the Foxconn facilities and grounds remains underway. Water used for landscaping at the Foxconn site was not returned to the Racine Wastewater Treatment Plant from the diversion area. The RWU anticipates the overall consumptive use coefficient to decrease as infrastructure is completed, landscaping needs make up a smaller proportion of water use, normal industrial operations at the facility are underway, and more permanent customer connections are made. However, water main flushing will need to continue due to extremely low water supply volumes until the Mt. Pleasant TID #5 area develops.

SUMMARY OF THE IMPACT OF CONSERVATION AND EFFICIENCY MEASURES AND ADDITIONAL MEASURES IMPLEMENTED

The declining water use trends noted in the diversion application for RWU have continued. Per-person demand has fallen from 55 gallons per person per day in 2000 to 45.9 gallons per person per day in 2020 (Figure 9). However, this number has increased slightly from 2019's sales of 45 gallons per person per day, most likely due to the pandemic and the increase in time spent at home. The industrial decline has continued with demand falling from 9.1 million gallons per day in 2000 to 3.6 million gallons per day in 2020. The ratio of maximum day pumpage to average day pumpage equaled 1.39 in 2020, down from 1.55 in 2019 (Figure 10). The conservation and efficiency measures described later in the report help explain these trends.

Figure 9. Racine Water Sales Trend

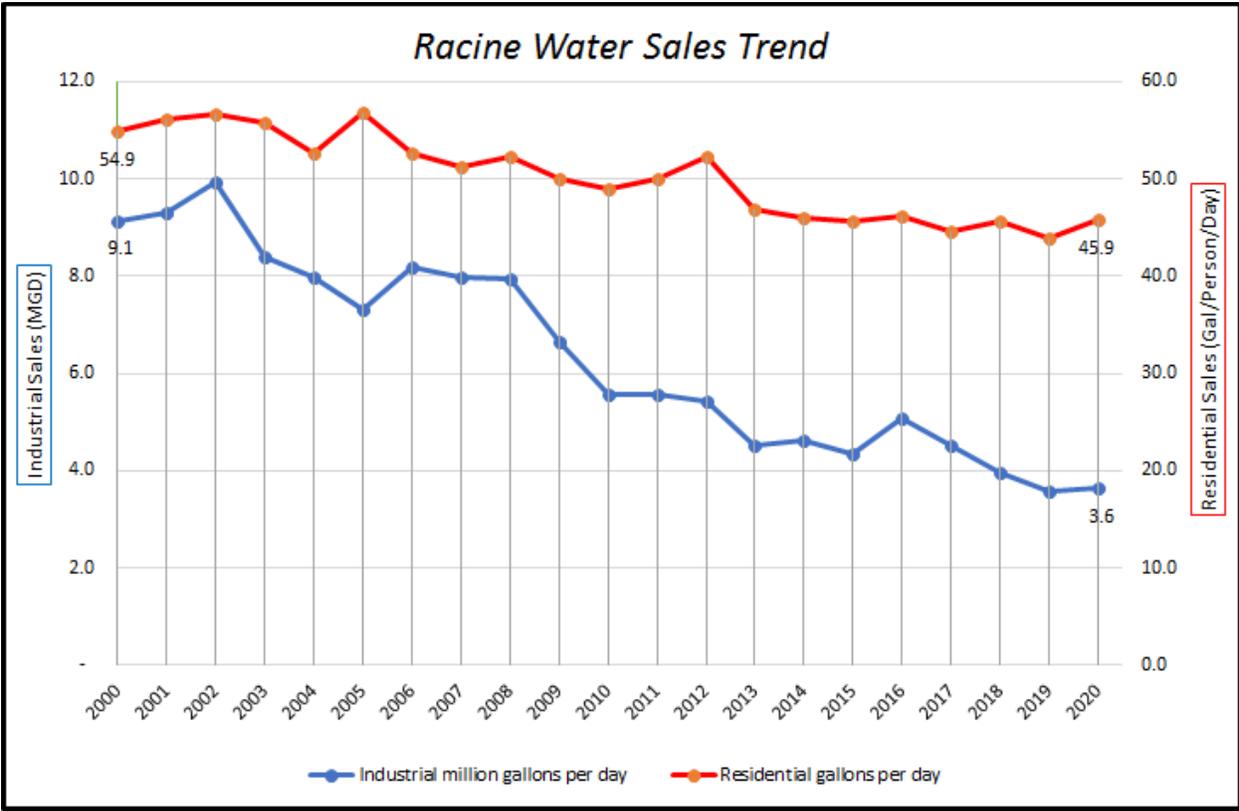


Figure 10. 2020 Pumpage Maximum to Average Day Ratio

Total Annual Pumpage (gallons)	Average Day Pumpage (gallons)	Max Day Pumpage (gallons)	Max to Average Day Ratio
6,126,000,000	16,783,562	23,380,000	1.39

Figures 11 and 12 provide data and calculations for water use per residential equivalent unit (REU). The calculation shows water use per REU to be 256.9 gallons per day in 2020, which is found by dividing average day water use by total REUs. This is an increase compared to 2019's water use per REU of 237.8 gallons per day, which likely can be attributed to the pandemic and the increase in time spent at home.

Figure 11. 2020 Residential Equivalent Units (REUs)

Meter size	Number of Meters	REU Ratio	REU
5/8	27106	1	27106
3/4	5241	1	5241
1	1009	2.5	2522.5
1 1/4	0	3.7	0
1 1/2	535	5	2675
2	533	8	4264
2 1/2	0	12.5	0
3	120	15	1800
4	61	25	1525
6	19	50	950
8	10	80	800
10	9	122	1098
12	2	160	320
Total	34,645	-----	48,302

Figure 12. Average Day Water Use REU

Average Day Water Use per REU		
Total Water Sales	4,528,450,000	gallons
Average Day Water Use	12,406,712	gallons/day
Water Use/REU	256.9	gpd/REU

RWU has worked to implement the conservation and efficiency measures it laid out in the diversion application that meet requirements in Wisconsin Administrative Code NR 852.04. Figure 13 below summarizes these efforts. It describes additional measures undertaken since the application was submitted, such as partnering with AECOM to perform a leak detection survey and a major industrial user’s efforts to reduce its demand by approximately 300 million gallons per year.

Figure 13. Conservation and Efficiency Measures

Abbreviation	Requirement	Location
PWS-1	Water-use audit	<p>RWU annually submits to the PSC its water production, sales, and nonrevenue water with its annual report as required by Wisconsin Administrative Code PSC 185.85(3). RWU also uses the American Water Works Association water audit software to conduct audits that help quantify losses and identify areas to improve efficiency and recovery.</p>
PWS-2	Leak detection and repair program	<p>RWU prepared a water loss control plan under Wisconsin Administrative Code PSC 185.85(4) and submitted it to the PSC prior to submitting its diversion application.</p> <p>RWU continued its efforts to upgrade water mains by replacing close to 2 miles of older main in 2019.</p> <p>RWU contracted with AECOM in 2020 to perform a leak detection survey on approximately 241 miles of water main as part of RWU’s efforts to reduce nonrevenue water. The 2020 work accounted for roughly half of the RWU water system with the other half to be completed in 2021. See Appendix A for a copy of the report.</p>
PWS-3	Information and education outreach	<p>RWU includes the information required by Wisconsin Administrative Code PSC 185.33(1) and (1m), e.g. rates and volume unit conversions, in its customer water bills. See Appendix B for an example of a customer bill.</p> <p>RWU has posted the conservation and efficiency information required by Wisconsin Administrative Code PSC 185.96 online. See https://www.cityofracine.org/Water/WaterConservation/ and click on the Water Conservation links labeled “Conservation Practices” and “Leak Detection Program” to view the conservation and efficiency information.</p> <p>The City of Racine is working to ensure green building standards are incorporated into city operations and all new private developments and is committed to the US Green Buildings Council Leadership in Energy and Environmental Design (LEED) certification system.</p>
PWS-4	Source measurement	<p>RWU meters water produced and pumped into the distribution system and verifies the accuracy of its station</p>

		<p>meters in accordance with Wisconsin Administrative Code PSC 185.83 and 185.85(2). RWU documents its compliance with these requirements in its annual report to the PSC on pages W-14, Sources of Water Supply-Statistics, and W-27, Water Conservation Programs.</p>
PWS-R1	Distribution system pressure management	<p>RWU analyzed distribution system pressure management in a 2017 water-system study. It operates the distribution system to meet pressure requirements in Wisconsin Administrative Code NR 811.70(4). The study concluded that pressure does not appear to be a major contributor to main breaks or leaks.</p>
PWS-R2	Residential demand management program	<p>RWU has posted residential water conservation information on its website. See explanation for PWS-3 for the link. RWU continues to notify customers of high-water use through mailings that accompany the water bills and survey residences for leaks on customer request. RWU generally sends mailings if water use has risen for the quarter over fifty percent of what it had been in the prior year.</p>
PWS-R3	Commercial and industrial demand management program	<p>RWU has spoken with the City of Racine's largest industrial water user, who began reducing demand mid-year in 2020. Implementing these plans will lead to an annual reduction in demand of approximately 300 million gallons.</p> <p>RWU will work with the communities in which it provides service to review their requirements for commercial and industrial landscaping and watering.</p>
PWS-R4	Water reuse	<p>RWU will continue to look for opportunities to work with individual large-volume commercial and industrial water users to explore opportunities for water reuse within their facilities.</p>

ADDITIONAL CONSERVATION MEASURES

Three major geothermal projects will result in water conservation: Geothermal for one major industrial water user, geothermal in a new hotel development, and investigating the possibility of geothermal for a new municipal healthcare clinic and community center. The City of Racine City Development Department recognizes that 14 percent of the world's potable water is used by buildings, and therefore the Department promotes green building certifications like USGBC's LEED and Wisconsin Green Built Homes, which include water conservation measures related to indoor use, outdoor use, specialized uses, and metering. One component of these certifications is the measurement of all sources of water relative to a building: cooling towers, appliances, fixtures, process water and irrigation. Using an "efficiency first" approach, projects are asked to first pursue water use reduction strategies and then to consider nonpotable and alternative sources of water. Metering at the whole-building level is an important goal ensuring projects can monitor and control water use to identify opportunities for water savings.



Final Report

Leak Detection Survey

Racine Water Utility



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1.0 Introduction

1.1 Background

The water distribution system, owned and operated by the Racine Water Utility, currently consists of approximately 445 miles of main and currently serves the City of Racine, Village of Mount Pleasant, Village of Caledonia, Village of Sturtevant, Village of Elmwood Park, Village of North Bay, and the Town of Somers. The total annual pumpage for the Utility in 2019 was 5.66 billion gallons or a daily average of approximately 15,496,529 gpd.

Throughout the months of March through June 2020, AECOM performed a leak detection survey on approximately half of the water distribution system, approximately 241 miles of water main. The survey area was generally bounded by water distribution systems located east of Hwy 31 and north of 21st Street (Caron Butler Drive). This report contains the results of the survey undertaken by AECOM for the Racine Water Utility in a continuing attempt to improve system accountability and reduce operating costs.

1.2 Scope of Project

The leak detection survey scope included the following:

1. Review of existing water distribution system maps, street maps, pertinent water system reports, and pumpage and storage records.
2. Completion of a leak detection and location survey with sonic detection and computer correlation equipment on the Racine Water Utility water distribution system. Physical contact was made with the system at exposed valves and fire hydrants. After a portion of the system was initially surveyed, all leak indications were verified a second time, after which all leaks were located with a computer programmed leak correlator designed to approximate leak locations without drill holes or excavations. Where leakage into a storm or sanitary sewer was suspected, a visual examination of the appropriate sewer was conducted. All equipment used was non-intrusive and valves and hydrants were not normally operated during the survey and pinpointing operations. This survey was conducted primarily during normal working hours with additional leak detection being conducted during late evening and/or early morning hours in areas of high traffic volume.
3. Inventory of defective system components such as valves, hydrants, meters, and curb stops that are noted in the course of carrying out other field activities.
4. Completion of individual leak reports with a sketch showing the leak location.
5. Preparation of a final report showing the investigation results. The report includes a project summary and a list of all leakage located by type, location, and estimated quantity. The final report contains recommendations for future work based on an analysis of the survey results.

2.0 Findings

2.1 Field Investigations

The leak location survey for the Racine Water Utility consisted of a general listening survey conducted on fire hydrants and system valves throughout the water distribution system. This general listening survey was conducted to detect areas where leakage was occurring. To pinpoint leakage, a detailed location survey was conducted where the general listening survey revealed leakage occurring. All leak locations identified during the field investigations are shown in Table 1. Leakage Summary by Type is shown in Table 2 and Figure 1. Individual leak reports are included in Appendix A.

The total leakage located during the survey was estimated at 815,000 gpd.

- Eight (8) main leaks were identified during the survey which accounted for an estimated 138,000 gpd or 17 percent of the total leakage identified.
- Thirty-seven (37) service leaks were identified during the survey which accounted for an estimated 544,000 gpd or 67 percent of the total leakage identified.
- Forty-one (41) hydrant leaks were located which accounted for an estimated 116,000 gpd or 14 percent of the total leakage identified.
- Twelve (12) valve leaks were located during the survey and accounted for an estimated 17,000 gpd or 2 percent of the total leakage identified.

During the field investigations, eighteen system defects were noted as shown in Table 3.

2.2 Total Annual Savings from Repair of Leakage

Utilizing the Racine Water Utility's cost for producing water of \$0.15 per 1,000 gallons, based on power for pumping and chemical costs in 2019 only, the 815,000 gpd of leakage identified during this survey represents an annual operating loss of approximately \$45,873.

Table 1
Leakage Summary by Location

Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
1	4/22/2020	Valve	1,000	Intersection of Harmony Dr. and Charles St.	GIS valve number 3715. The leak is located at or near the valve.
2	4/22/2020	Service	20,000	3431 8th Ave.	GIS Service Number 17466. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.
3	4/22/2020	Hydrant	4,000	Hydrant closest to 3429 3rd Ave.	GIS hydrant number 1133. Could not stop the leak.
4	4/22/2020	Hydrant	2,000	Hydrant closest to 2610 Fergus Ave.	GIS hydrant number 3684. Could not stop the leak.
5	4/22/2020	Service	15,000	2001 Young Ct.	GIS service number 34322. The leak is located on the Utility's side of service, approximately 5 feet from the curb stop. The leak's location is marked with a blue "X".
6	4/22/2020	Service	15,000	Near 1418 South St.	GIS service number 33430. The leak is located near the service connection at the water main (approximately 13 feet from the curb stop).
7	4/22/2020	Hydrant	2,000	Hydrant closest to 1000 Wilmor St.	GIS hydrant number 1177. The leak was stopped from adjusting the operating nut.
8	4/22/2020	Main	12,000	Intersection of Lombard Ave. and Geneva St.	The leak is located approximately 34 feet to the east of valve number 1669. The approximate leak location is marked with blue "X".
9	4/22/2020	Valve	2,000	Intersection of Melvin Ave. and Charles St.	GIS valve number 1786. The leak is located at or near the valve.
10	4/22/2020	Hydrant	1,000	Intersection of William St. and Erie St.	GIS hydrant number 1000. The leak was stopped from adjusting the operating nut.
11	4/22/2020	Main	15,000	Intersection of Melvin Ave. and North Wisconsin St.	Leak located 29 feet to the south of valve number 2125. The approximate leak location is marked with a blue "X".
12	4/22/2020	Hydrant	3,000	On Rapids Dr. near 2118 Rapids Dr.	GIS hydrant number 1284. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.
13	4/22/2020	Hydrant	3,000	End of Venus Cir.	GIS hydrant number 474. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.

Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
14	4/22/2020	Hydrant	1,000	Intersection of Douglas Ave. and Goold St.	GIS hydrant number 453. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.
15	4/22/2020	Service	15,000	1724 Blake Ave.	GIS service number 11630. The leak is located on the home-owner's side of the curb stop.
16	4/22/2020	Service	14,000	1318 Goold St.	GIS service number 14605. The leak is located on the home-owner's side of the curb stop.
17	4/22/2020	Main	15,000	Intersection of Goold St. and Superior St.	The leak is located 13.5 feet to the south of valve number 769. The leak's location is marked with a blue "X". The leak was repaired on 4/28/2020.
18	4/22/2020	Service	10,000	713 High St.	GIS Service Number 5009. The leak is located on the home-owner's side of the curb stop.
19	4/22/2020	Valve	3,000	Intersection of Martin Luther King Dr. and Saint Patrick St.	GIS valve number 1976. The leak is located at or near the valve.
20	4/22/2020	Hydrant	3,000	Hydrant closest to 2026 Michigan Blvd.	GIS hydrant number 658. Could not stop the leak.
21	4/22/2020	Service	20,000	1727 North Main St.	GIS Service Number 4923. The leak is located on the Utility's side of the service, at or near the curb stop.
22	4/22/2020	Hydrant	5,000	Intersection of Spring St. and Meadowbrook Blvd.	GIS hydrant number 2151. Could not stop the leak.
23	4/22/2020	Hydrant	1,000	Hydrant closest to 2009 Kewaunee St.	GIS hydrant number 4447. Could not stop the leak.
24	4/22/2020	Hydrant	3,000	Intersection of Hamilton St. and Blake Ave.	GIS hydrant number 523. Could not stop the leak.
25	4/22/2020	Hydrant	4,000	Intersection of West St. and Blake Ave.	GIS hydrant number 969. The leak was slowed by adjusting the operating nut but did not completely stop the leak.
26	4/22/2020	Service	18,000	1123 Brooker St.	GIS Service Number 22511. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.
27	4/22/2020	Valve	500	Intersection of Kewaunee St. and Geneva St.	GIS valve number 171. The leak is located at or near the valve.
28	4/22/2020	Valve	1,000	Intersection of Albert St. and Marquette St.	GIS valve number 156. The leak is located at or near the valve.
29	4/22/2020	Hydrant	1,000	The end of Nelson Ct.	GIS hydrant number 4448. Could not stop the leak.

Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
30	4/22/2020	Service	8,000	1022 Geneva St.	GIS Service Number 3699. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.
31	4/22/2020	Hydrant	4,000	Intersection of Jackson St. and Douglas Ave.	GIS hydrant number 382. Could not stop the leak.
32	4/22/2020	Hydrant	2,000	Intersection of State St. and Superior St.	GIS hydrant number 409. Could not stop the leak.
33	4/22/2020	Service	5,000	1100 Erie St. (service located on Prospect St.)	GIS Service Number 13946. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.
34	4/22/2020	Service	16,000	2505 Geneva St.	GIS Service Number 16418. The leak is located on the Utility's side of the service, at or near the curb stop.
35	4/22/2020	Service	6,000	716 High St.	GIS Service Number 4948. The leak is located on the home-owner's side of the curb stop.
36	5/13/2020	Service	15,000	1213 North Main St.	GIS service number 2755. The leak is located on the home-owner's side of the curb stop.
37	5/13/2020	Service	16,000	1523 North Main St.	GIS service number 2638. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.
38	5/13/2020	Valve	2,000	Intersection of Chatham St. and Barker St.	GIS valve number 22. The leak is located at or near the valve.
39	5/13/2020	Hydrant	3,000	Intersection of Michigan Blvd. and Barker St.	GIS hydrant number 322. Could not stop the leak.
40	5/13/2020	Main	8,000	Intersection of Hamilton St. and Michigan St.	The leak is located 12 feet north of valve number 6393. The approximate leak location is marked on the gravel with a blue "X" within the construction zone.
41	5/13/2020	Hydrant	1,000	On Ohio St. between Westway Ave. and Graceland Blvd.	GIS hydrant number 3192. Stopped the leak by adjusting the operating nut.
42	5/13/2020	Hydrant	3,000	Intersection of Graceland Blvd. and Echo Ln.	GIS hydrant number 1656. Could not stop the leak.
43	5/13/2020	Service	20,000	815 Crab Tree Ln.	GIS service number 25922. The leak is located on the home-owner's side of the curb stop.
44	5/13/2020	Main	50,000	Near 725 Virginia St.	The leak is located 249 feet south of valve number 3117. The approximate leak location is marked with a blue "X". Leak has been repaired.

Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
45	5/13/2020	Main	20,000	Intersection of Byron Ave. and Merrie Ln.	The leak is located 24 feet west of valve number 3567. The approximate leak location is marked with a blue "X".
46	5/13/2020	Service	16,000	703 Hayes Ave.	GIS service number 16181. The leak is located on the Utility's side of the service, at or near the curb stop.
47	5/13/2020	Valve	500	Intersection of Kentucky Street and Kinzie Ave.	GIS valve number 3605. The valve may not be closed completely, allowing a small amount of water to pass through the valve.
48	5/13/2020	Service	14,000	3417 Kinzie Ave.	GIS service number 10576. The leak is located on the home-owner's side of the curb stop.
49	5/13/2020	Service	18,000	1518 Liberty St.	GIS service number 5553. The leak is located on the home-owner's side of the curb stop.
50	5/13/2020	Service	18,000	701 North Memorial Dr.	GIS service number 3214. Could not access the curb stop. The Racine Water Utility will determine which side of the curb stop the leak is on.
51	5/13/2020	Service	14,000	1814 Clayton Ave.	GIS service number 9602. Could not access the curb stop. The Racine Water Utility will determine which side of the curb stop the leak is on.
52	5/13/2020	Valve	1,000	Intersection of 9th St. and Delamere Ave.	GIS valve number 1151. The leak is located at or near the valve.
53	5/13/2020	Hydrant	5,000	Intersection of 10th St. and Grand Ave.	GIS hydrant number 689. Could not stop the leak.
54	5/13/2020	Service	8,000	740 College Ave.	GIS service number 31. Leak was fixed by adjusting the curb stop.
55	5/13/2020	Hydrant	3,000	Hydrant closest to 929 Sycamore Ave.	GIS hydrant number 1884. The leak was stopped by adjusting the operating nut.
56	5/13/2020	Hydrant	2,000	Intersection of Lindermann Ave. and Ostergaard Ave.	GIS hydrant number 1871. The leak was slowed by adjusting the operating nut, but the leak did not completely stop.
57	5/13/2020	Hydrant	5,000	Hydrant closest to 5310 16th St.	GIS hydrant number 2044. The leak was slowed by adjusting the operating nut, but the leak did not completely stop.
58	5/13/2020	Service	10,000	426 Wisconsin Ave.	GIS service number 3576. The leak is located on the Utility's side of the service, approximately 3 feet from the main. The approximate leak location is marked with a blue "X".

Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
59	5/13/2020	Main	10,000	Near 1412 Riverview Terrace	The leak is located 101 feet west of hydrant number 1039. The approximate leak location is marked with a blue "X".
60	6/2/2020	Service	16,000	3800 Washington Ave.	GIS service number 11329. The leak is located on the Utility's side of the curb stop.
61	6/2/2020	Service	20,000	3525 Washington Ave.	GIS service number 11226. The leak is located on the Utility's side of the curb stop.
62	6/2/2020	Service	16,000	3501 Washington Ave.	GIS service number 11380. The leak is located on the Utility's side of the curb stop.
63	6/2/2020	Hydrant	2,000	Intersection of Russet St. and Wright Ave.	GIS hydrant number 1019. The leak was slowed by adjusting the operating nut, but the leak did not completely stop.
64	6/2/2020	Hydrant	3,000	Intersection of 16th Ave. and Quincy Ave.	GIS hydrant number 283. Could not stop the leak.
65	6/2/2020	Service	10,000	1617 Grange Ave.	GIS service number 11945. The leak is located on the home-owner's side of the curb stop.
66	6/2/2020	Hydrant	1,000	Intersection of Washington Ave. and Flett Ave.	GIS hydrant number 294. Could not stop the leak.
67	6/2/2020	Valve	2,000	Intersection of 11th Street and Harbridge Ave.	GIS valve number 1432. The leak is located at or near the valve.
68	6/2/2020	Hydrant	2,000	Intersection of Bluff Ave. and 13th. St.	GIS hydrant number 909. Could not stop the leak.
69	6/2/2020	Service	20,000	2107 Slauson Ave.	GIS service number 8571. The leak is located on the Utility's side of the curb stop.
70	6/2/2020	Hydrant	4,000	Hydrant closest to 1316 12th St.	GIS hydrant number 243. Could not stop the leak.
71	6/2/2020	Hydrant	2,000	Intersection of 12th St. and Schiller St.	GIS hydrant number 155. Could not stop the leak.
72	6/2/2020	Valve	1,000	On Racine St. between 15th St. and 16th St.	GIS valve number 5856. The leak is located at or near the valve.
73	6/2/2020	Hydrant	5,000	On 16th St. between Junction Ave. and Clark St.	GIS hydrant number 215. Could not stop the leak.
74	6/2/2020	Hydrant	2,000	Intersection of 16th St. and Racine St.	GIS hydrant number 184. Could not stop the leak.
75	6/2/2020	Hydrant	5,000	Intersection of 17th St. and Howe St.	GIS hydrant number 790. Slowed leak by adjusting the operating nut but could not completely stop the leak.

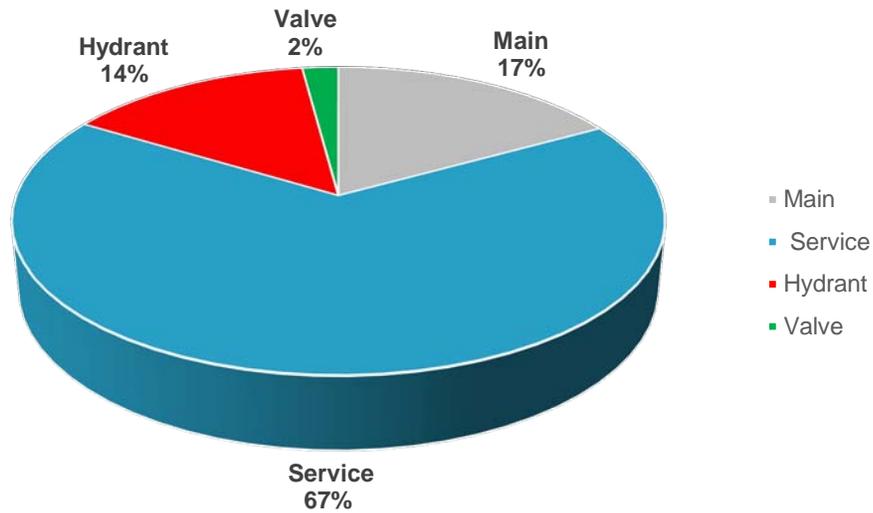
Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
76	6/2/2020	Valve	2,000	Intersection of 15th St. and Grand Ave.	GIS valve number 2428. Leak located at or near the valve.
77	6/2/2020	Hydrant	4,000	Intersection of 17th Ave. and Park Ave.	GIS hydrant number 75. Could not stop the leak.
78	6/2/2020	Hydrant	5,000	Intersection of Monroe Ave. and 19th St.	GIS hydrant number 1860. Slowed leak by adjusting operating nut but could not completely stop the leak.
79	6/2/2020	Service	6,000	1806 Grand Ave.	GIS service number 7791. The leak is located on the home-owner's side of the curb stop.
80	6/2/2020	Hydrant	1,000	Intersection of De Koven Ave. and Park Ave.	GIS hydrant number 73. Stopped leak by adjusting operating nut.
81	6/12/2020	Service	20,000	1620 Flett Ave.	GIS service number 13307. The leak is located on the Utility's side of the curb stop.
82	6/12/2020	Service	15,000	1409 12th St.	GIS service number 9610. The leak is located on the Utility's side of the service, at or near the curb stop.
83	6/12/2020	Service	14,000	1128 Park Ave.	GIS service number 3049. Unable to access the service. The Racine Water Utility will determine what side of the curb stop the leak is on.
84	6/12/2020	Service	30,000	1202 Main St.	GIS service number 2293. The leak is located on Utility's side of the service, at or near the connection to the main. The approximate leak location is marked on the road with a blue "X".
85	6/12/2020	Service	18,000	2824 21st St.	GIS service number 16752. The leak is located on Utility's side of the curb stop.
86	6/12/2020	Main	8,000	2824 21st St.	The leak is located approximately 36 feet to the north of valve number 772. The approximate leak location is marked with a blue "X".
87	6/12/2020	Service	20,000	2508 Jerome Blvd.	GIS service number 16238. The leak is located on Utility's side of the service, approximately 2 feet from the curb stop.
88	6/12/2020	Hydrant	2,000	Intersection of 21st St. and Thurston Ave.	GIS hydrant number 804. Could not stop the leak.
89	6/12/2020	Hydrant	5,000	Near 1717 Taylor Ave.	GIS hydrant number 3316. Slowed leak by adjusting the operating nut but could not stop the leak.
90	6/12/2020	Hydrant	1,000	Intersection of Meachem St. and Kearney Ave.	GIS hydrant number 932. Could not stop the leak.

Leak Number	Date	Type of Leak	Leakage (gpd)	Location	Comments
91	6/12/2020	Hydrant	4,000	Intersection of De Koven Ave. and Hickory Grove Ave.	GIS hydrant number 631. Could not stop the leak.
92	6/12/2020	Service	8,000	2013 De Koven Ave.	GIS service number 9207. The leak is located on the home-owner's side of the curb stop.
93	6/12/2020	Service	10,000	1928 Mead St.	GIS service number 9769. The leak is located on the Utility's side of the curb stop.
94	6/12/2020	Hydrant	3,000	Intersection of Mead St. and 20th St.	GIS hydrant number 176. Slowed the leak by adjusting the operating nut but could not stop the leak.
95	6/12/2020	Service	10,000	3801 N. Main St.	GIS service number 30651. Unable to operate the service. The Racine Water Utility will determine what side of the service the leak is on.
96	6/12/2020	Hydrant	3,000	Hydrant closest to 1609 SE Frontage Rd.	Hydrant located on the private water main. Could not stop the leak.
97	6/12/2020	Hydrant	1,000	Near 1570 International Dr.	GIS hydrant number 4499. Could not stop the leak.
98	6/12/2020	Valve	1,000	Near 5455 Durand Ave.	GIS valve number 6075. The leak is located at or near the valve.

Table 2
Leakage Summary by Type

Type	No. of Leaks	Total Estimated Leakage (gpd)	Percent of Total Leakage
Main	8	138,000	17%
Service	37	544,000	67%
Hydrant	41	116,000	14%
Valve	12	17,000	2%
Total	98	815,000	100%

Figure 1
Leakage Summary by Type



Total Estimated Leakage = 815,000 gpd

**Table 3
System Defects**

Type	Defect	Location
Valve	Cover damaged	GIS valve number 3540
Valve	Outer ring damaged	GIS valve number 3024
Valve	Outer ring missing	GIS valve number 6817
Valve	Outer ring damaged	GIS valve number 111
Valve	Cover missing	GIS valve number 6489
Valve	Outer ring damaged	GIS valve number 1538
Valve	Outer ring damaged	GIS valve number 3915
Valve	Outer ring damaged	GIS valve number 3156
Valve	Cover damaged	GIS valve number 2516
Valve	Cover damaged	GIS valve number 2518
Valve	Cover missing	GIS valve number 676
Valve	Cover damaged	GIS valve number 3111
Valve	Cover missing	GIS valve number 2621
Valve	Cover damaged	GIS valve number 3645
Valve	Outer ring damaged	GIS valve number 893
Valve	Outer ring damaged	GIS valve number 2772
Valve	Cover missing	GIS valve number 9587
Hydrant	Located in heavy brush	GIS hydrant number 39

3.0 Recommendations

3.1 Recommendations

Recommendations based on the findings and engineering analysis are:

1. Repair all leakage located by this survey in the Racine Water Utility water distribution system.
2. Because water system leakage is a continuing problem in most distribution systems, the Utility should continue its leak detection activities as part of an ongoing system maintenance program. Annual leak surveys can help maintain an acceptable level of water loss within the system. The frequency of conducting a comprehensive leak survey will depend on the amount of leakage found and the cost of producing water. Based on these studies and past studies performed by AECOM, a comprehensive leak detection survey should be conducted yearly.
3. The Utility should continue to stress proper methods of operating fire hydrants to anyone who may be involved with their use.
4. The cause for the main and service leaks should be investigated. Repair frequency should be observed on all distribution system piping to locate those segments of the distribution system which may require main or service replacement. Results of this survey do not indicate a concentration of main leaks in any specific area of the system. However, a thorough review of leakage records may reveal areas of the system with recurring leaks.
5. All water system meters used for measuring both production and consumption should be tested periodically for accuracy of registration. Recommended test frequencies are provided in Table 4. Efforts should be focused on significant water users and large meters which can represent a greater potential for water loss.

3.2 Future Control of Lost Water

The frequency of conducting future studies will vary with the amount of leakage in the system and the production cost of water. A model for evaluating the cost/benefit ratio of a leak detection study is included in Table 5. Potential benefits from recovered leakage on Line 11, in Table 5, can be compared to the estimated leak detection costs to aid in determining the frequency of conducting leak surveys.

Because controlling lost water represents cost savings and revenue gains for the Racine Water Utility, it is important that the Utility continue its efforts to reduce water loss. At least annually, a comparison should be made between metered water sales and total pumpage to determine the level of lost water and progress being made to reduce water loss through corrective action. Using the average of 15,496,529 gpd of pumpage in 2019, 815,000 gpd of leakage has been accounted for by this survey, representing approximately 5.3 percent of the Utility's total average day production.

Two major components of lost water are leakage and meter error, therefore, all meters in the system should be tested periodically for accuracy of registration. Generally, meters should be tested according to the schedule presented in Table 4.

Table 4
Recommended Meter Test Frequencies

Diameter	Approximate Testing Frequency
5/8" to 1"	6 to 10 years
1-1/2" to 3"	2 to 4 years
4" and larger	Annually

Meters should be tested not only for accuracy of registration, but also for proper sizing for each application. Although an improperly sized meter may perform well in a bench test, it may not be registering accurately in-place if it is not sized according to the consumers' water use patterns. A significant revenue loss to the Racine Water Utility can exist from under-registration on consumer meters. In addition, annual testing and calibration/repair of all master meters can give a utility an accurate assessment of lost water.

**Table 5
Evaluation Tool**

1.	What is total water volume entering the Distribution System gal/yr	_____gal/yr
2.	Total sales and other <u>metered</u> use (i.e., City Hall)	_____gal/yr
3.	Unaccounted-for Water (Line 1 minus Line 2)	_____
4.	Estimated leakage (50% of Line 3) - Allows for meter error and unmetered municipal use	_____
5.	Estimated recoverable leakage	_____
6.	Cost of chemicals for treatment/yr	_____
7.	Cost of electricity for pumpage/yr	_____
8.	Production/purchase cost/yr (Sum Lines 6 & 7)	_____
9.	Average production/purchase cost (Line 8 ÷ Line 1 x 1,000) per 1,000/gal.	_____
10.	One-year benefits from recovered leakage (Line 9 x Line 5 ÷ 1,000)	_____
11.	Total benefits from recovered leakage (Line 10 x 2 years)	_____
12.	Estimated total cost of leak detection	_____

Appendix A

Leak Reports

**Racine, Wisconsin
2020 Leak Report**

Leak No: 2

Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 3431 8th Ave.

Comments: GIS Service Number 17466. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 3

Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 4,000

Location: Hydrant closest to 3429 3rd Ave.

Comments: GIS hydrant number 1133. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 4

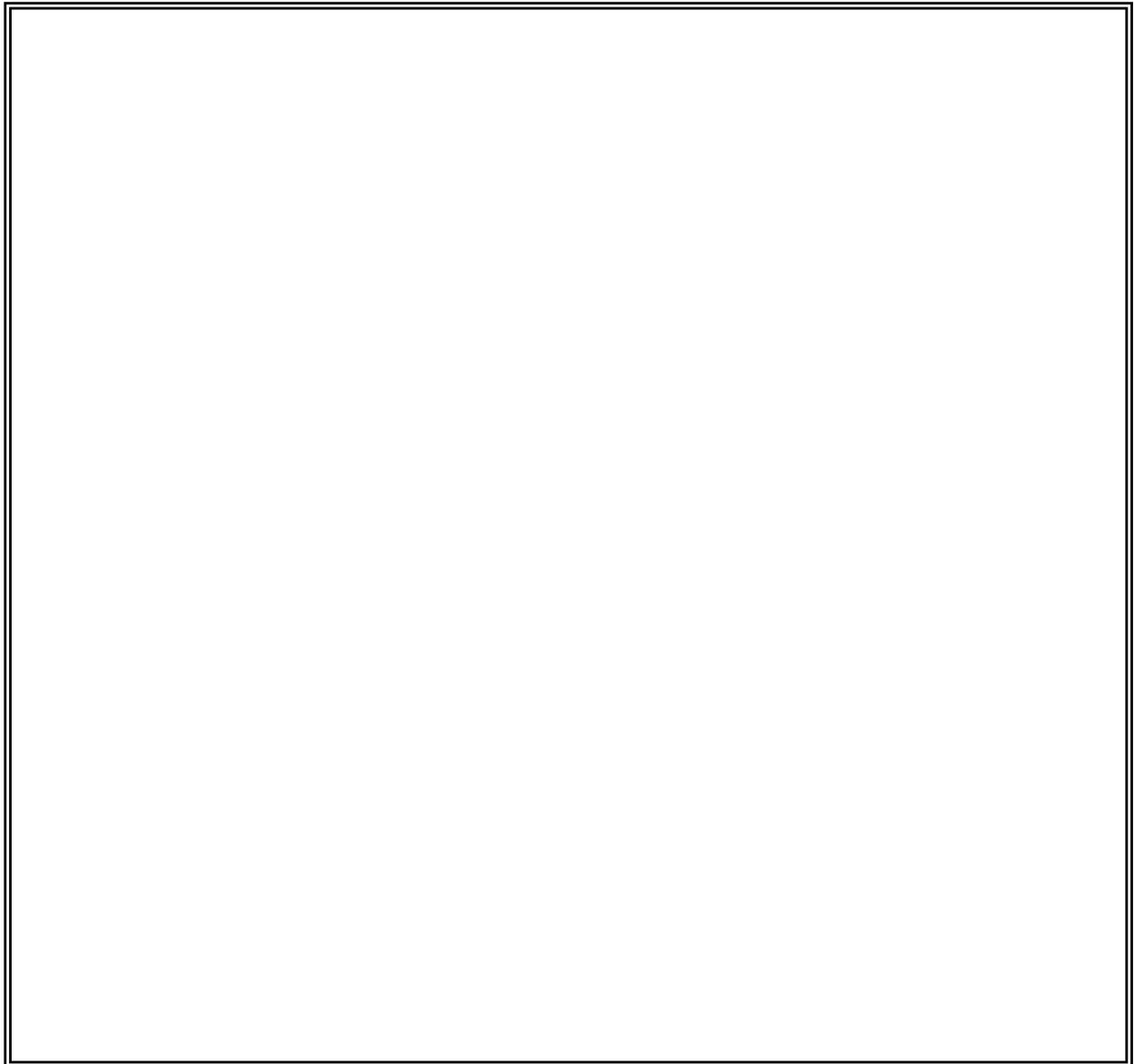
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Hydrant closest to 2610 Fergus Ave.

Comments: GIS hydrant number 3684. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 5

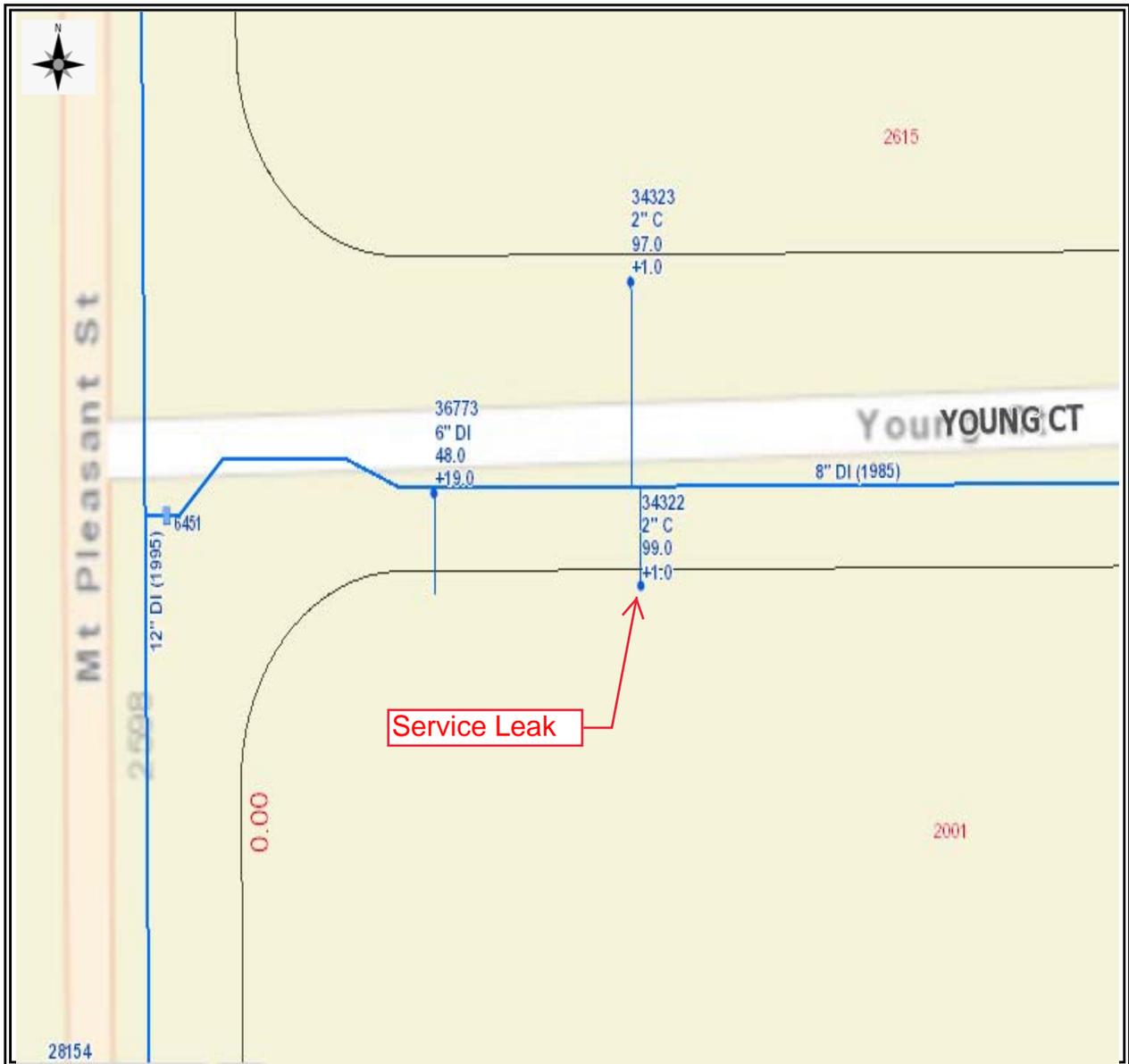
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 15,000

Location: 2001 Young Ct.

Comments: GIS service number 34322. The leak is located on the Utility's side of the service, approximately 5 feet from the curb stop. The leak's location is marked with a blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 6

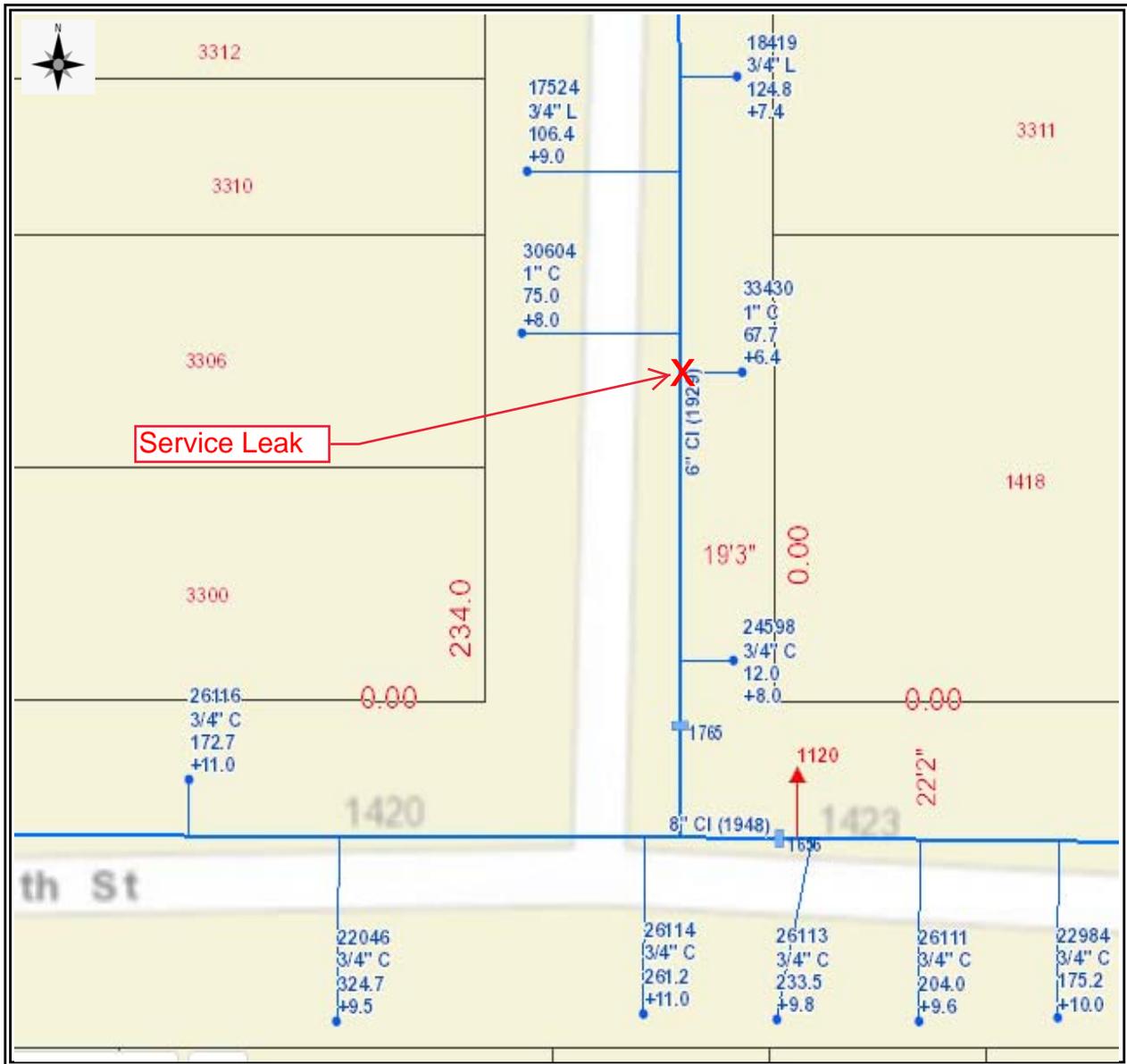
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 15,000

Location: Near 1418 South St.

Comments: GIS service number 33430. The leak is located near the service connection at the water main (approximately 13 feet from the curb stop).



**Racine, Wisconsin
2020 Leak Report**

Leak No: 7

Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Hydrant closest to 1000 Wilmor St.

Comments: GIS hydrant number 1177. The leak was stopped from adjusting the operating nut.

Fixed

**Racine, Wisconsin
2020 Leak Report**

Leak No: 8

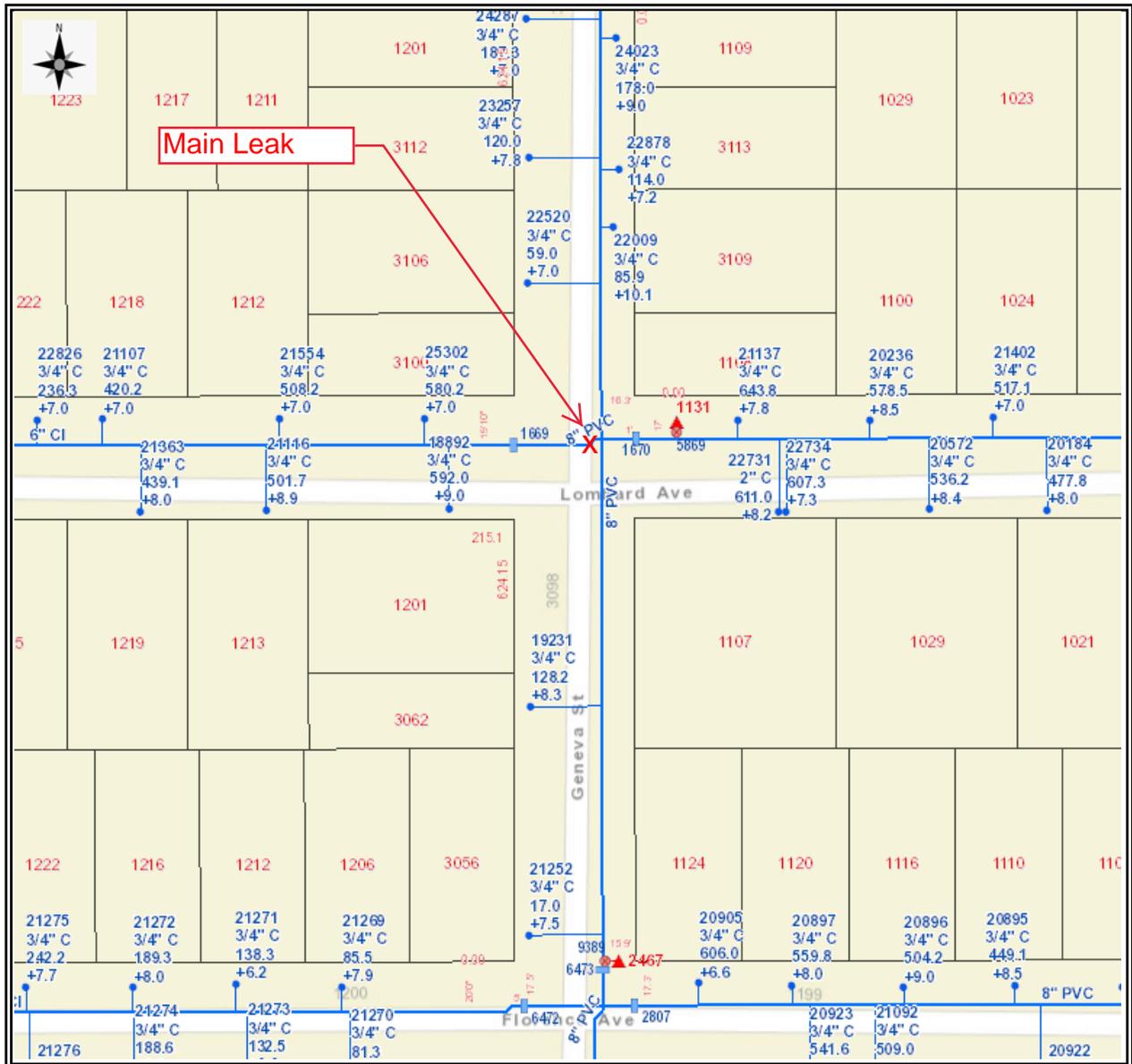
Date: 4/22/2020

Type of Leak: Main

Estimated Leakage (gpd): 12,000

Location: Intersection of Lombard Ave. and Geneva St.

Comments: The leak is located approximately 34 feet to the east of valve number 1669. The approximate leak location is marked with blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 10

Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Intersection of William St. and Erie St.

Comments: GIS hydrant number 1000. The leak was stopped from adjusting the operating nut.

Fixed

**Racine, Wisconsin
2020 Leak Report**

Leak No: 11

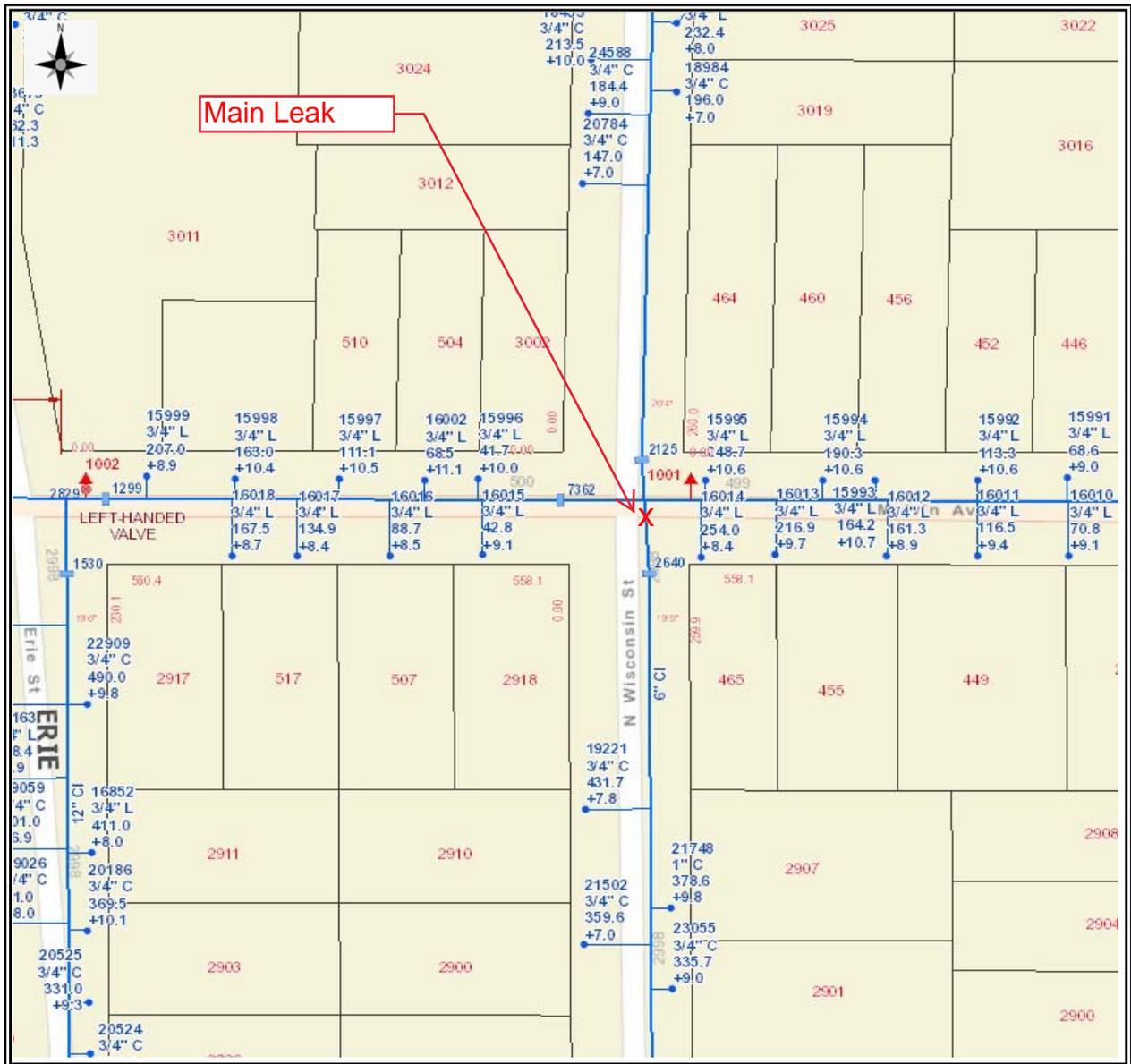
Date: 4/22/2020

Type of Leak: Main

Estimated Leakage (gpd): 15,000

Location: Intersection of Melvin Ave. and North Wisconsin St.

Comments: Leak located 29 feet to the south of valve number 2125. The approximate leak location is marked with a blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 12

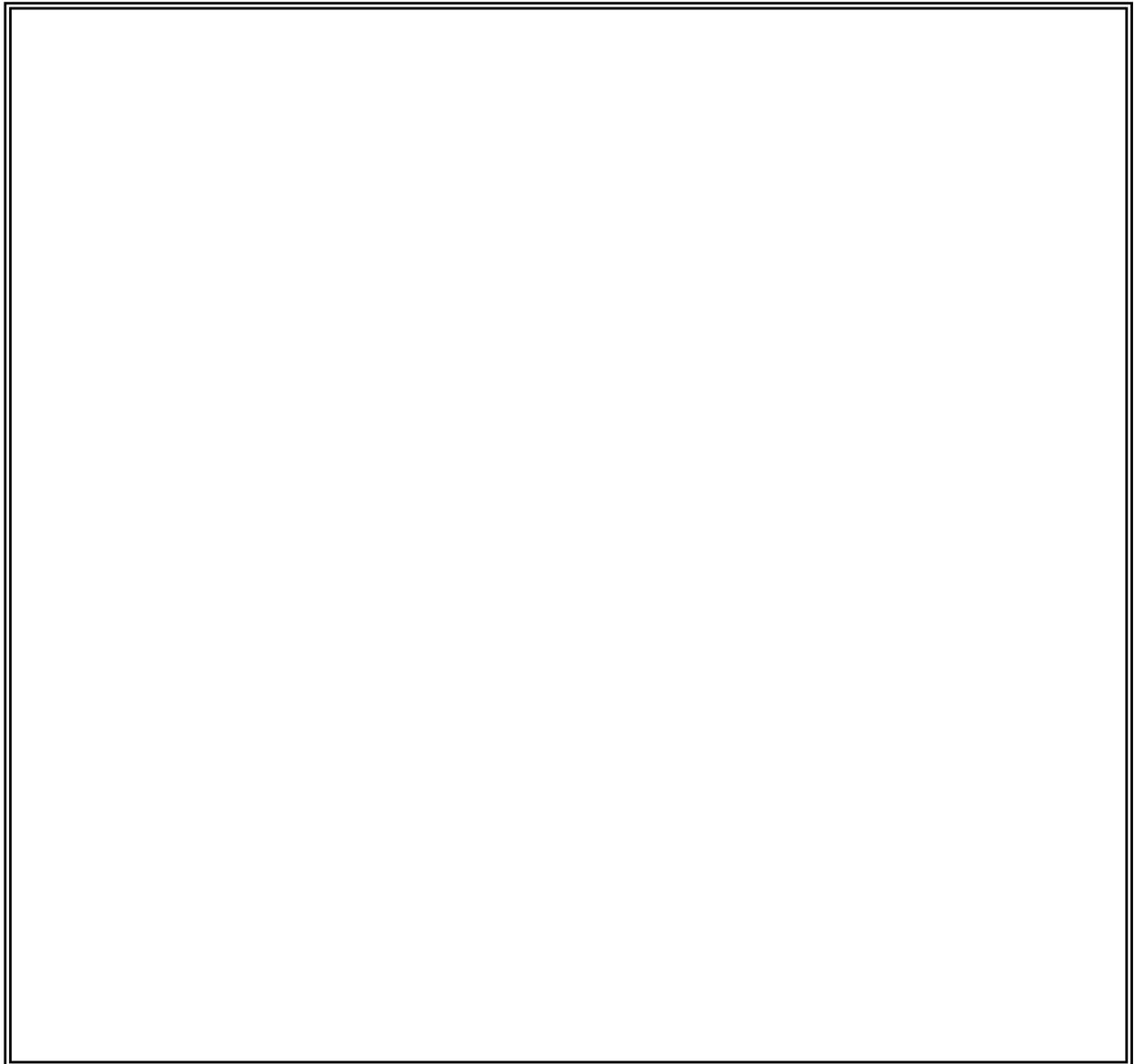
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: On Rapids Dr. near 2118 Rapids Dr.

Comments: GIS hydrant number 1284. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 13

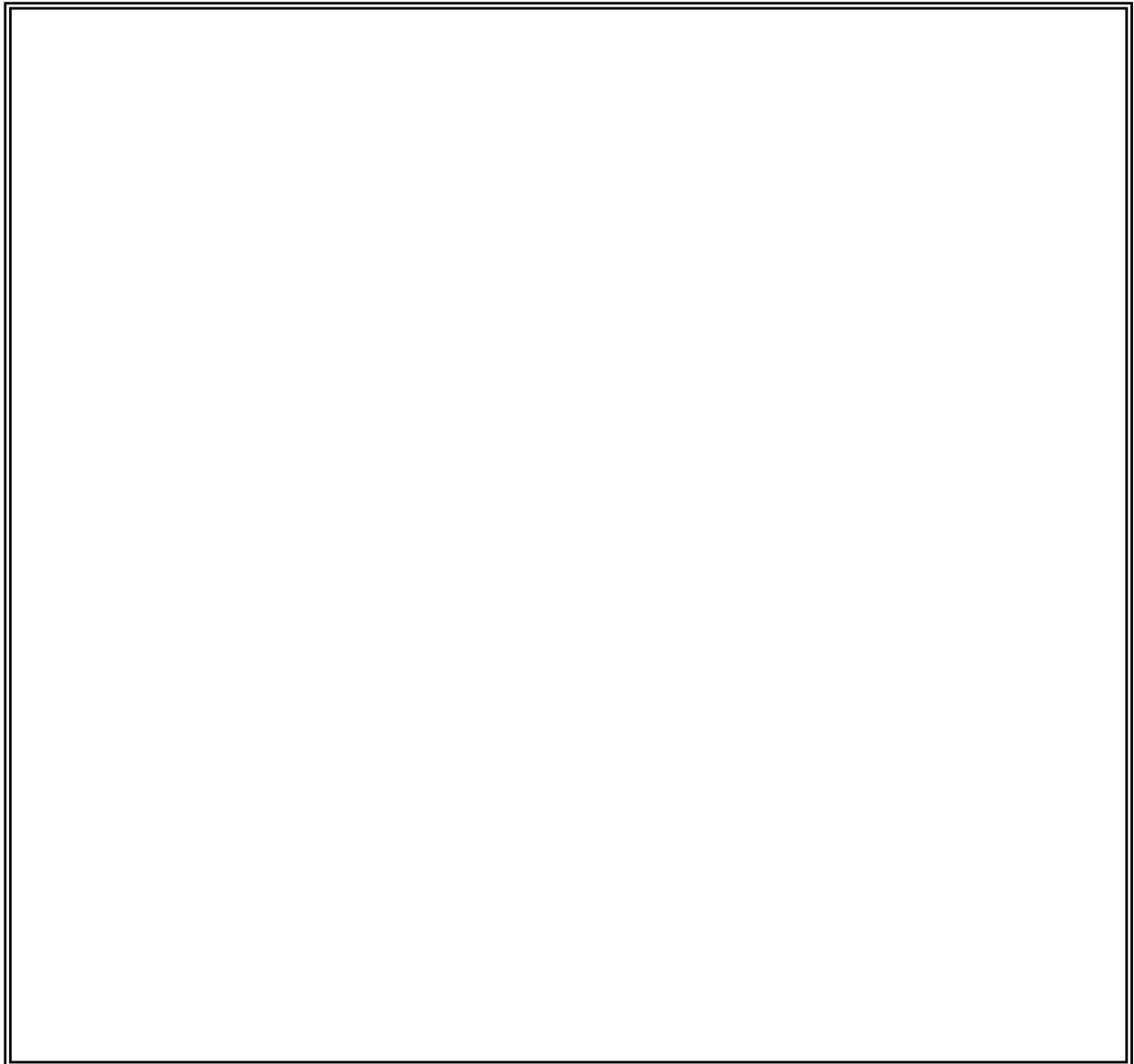
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: End of Venus Cir.

Comments: GIS hydrant number 474. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 14

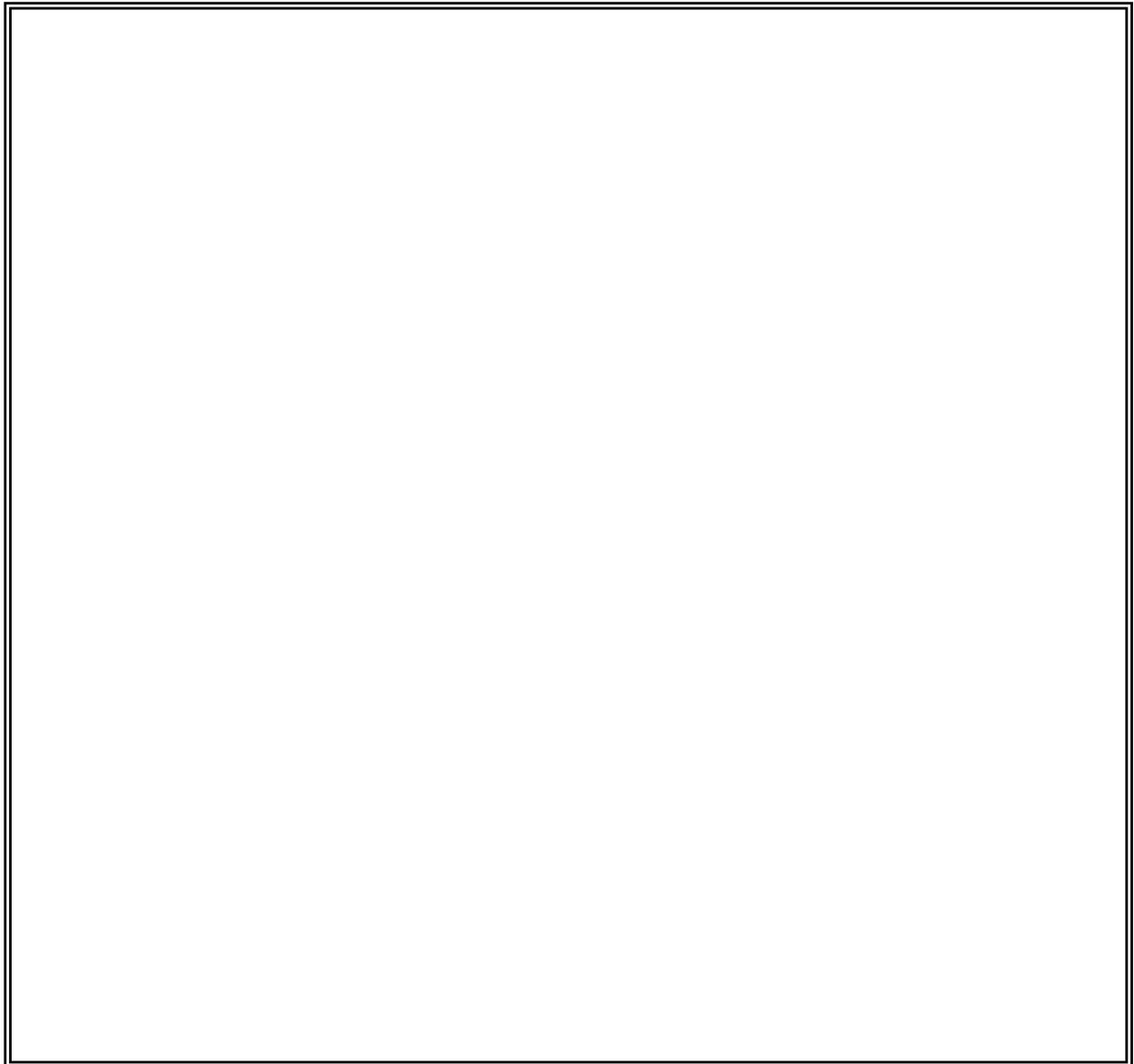
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Intersection of Douglas Ave. and Gould St.

Comments: GIS hydrant number 453. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 15

Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 15,000

Location: 1724 Blake Ave.

Comments: GIS service number 11630. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 16

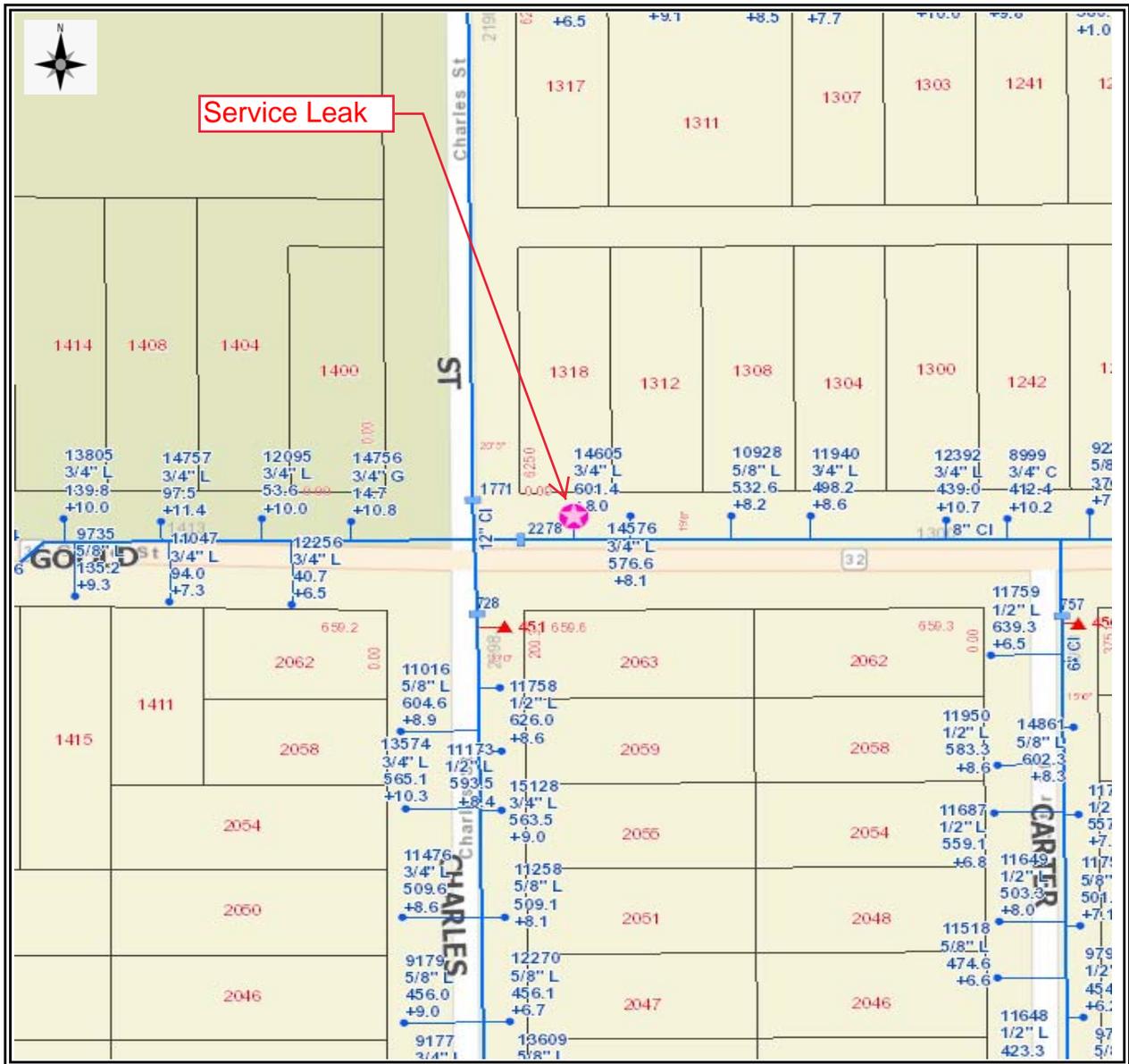
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 14,000

Location: 1318 Goold St.

Comments: GIS service number 14605. The leak is located on the homeowner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 17

Date: 4/22/2020

Type of Leak: Main

Estimated Leakage (gpd): 15,000

Location: Intersection of Goold St. and Superior St.

Comments: The leak is located 13.5 feet to the south of valve number 769. The leak's location is marked with a blue "X". The leak was repaired on 4/28/2020.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 18

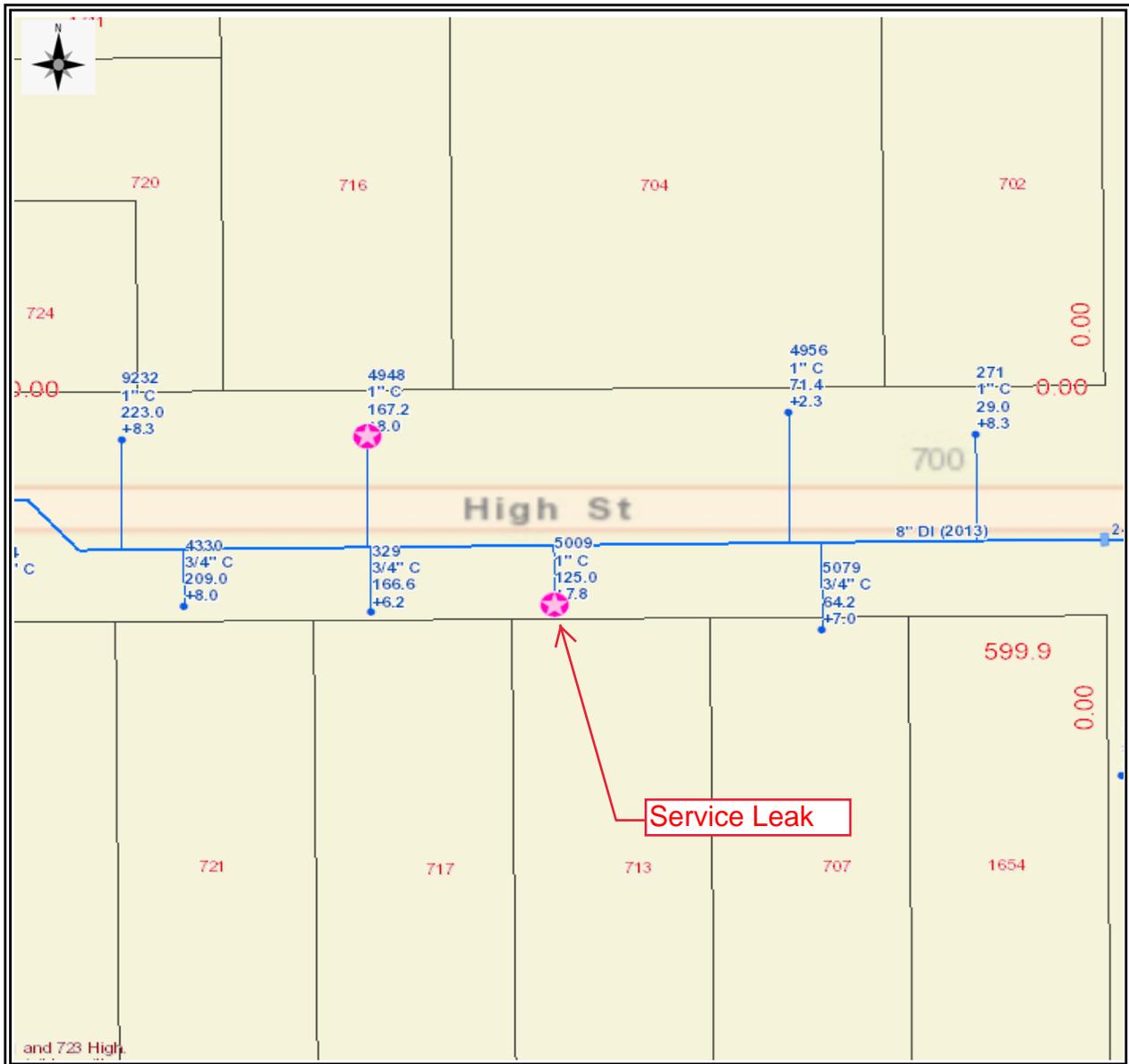
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 10,000

Location: 713 High St.

Comments: GIS Service Number 5009. The leak is located on the homeowner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 19

Date: 4/22/2020

Type of Leak: Valve

Estimated Leakage (gpd): 3,000

Location: Intersection of Martin Luther King Dr. and Saint Patrick St.

Comments: GIS valve number 1976. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 20

Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Hydrant closest to 2026 Michigan Blvd.

Comments: GIS hydrant number 658. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 21

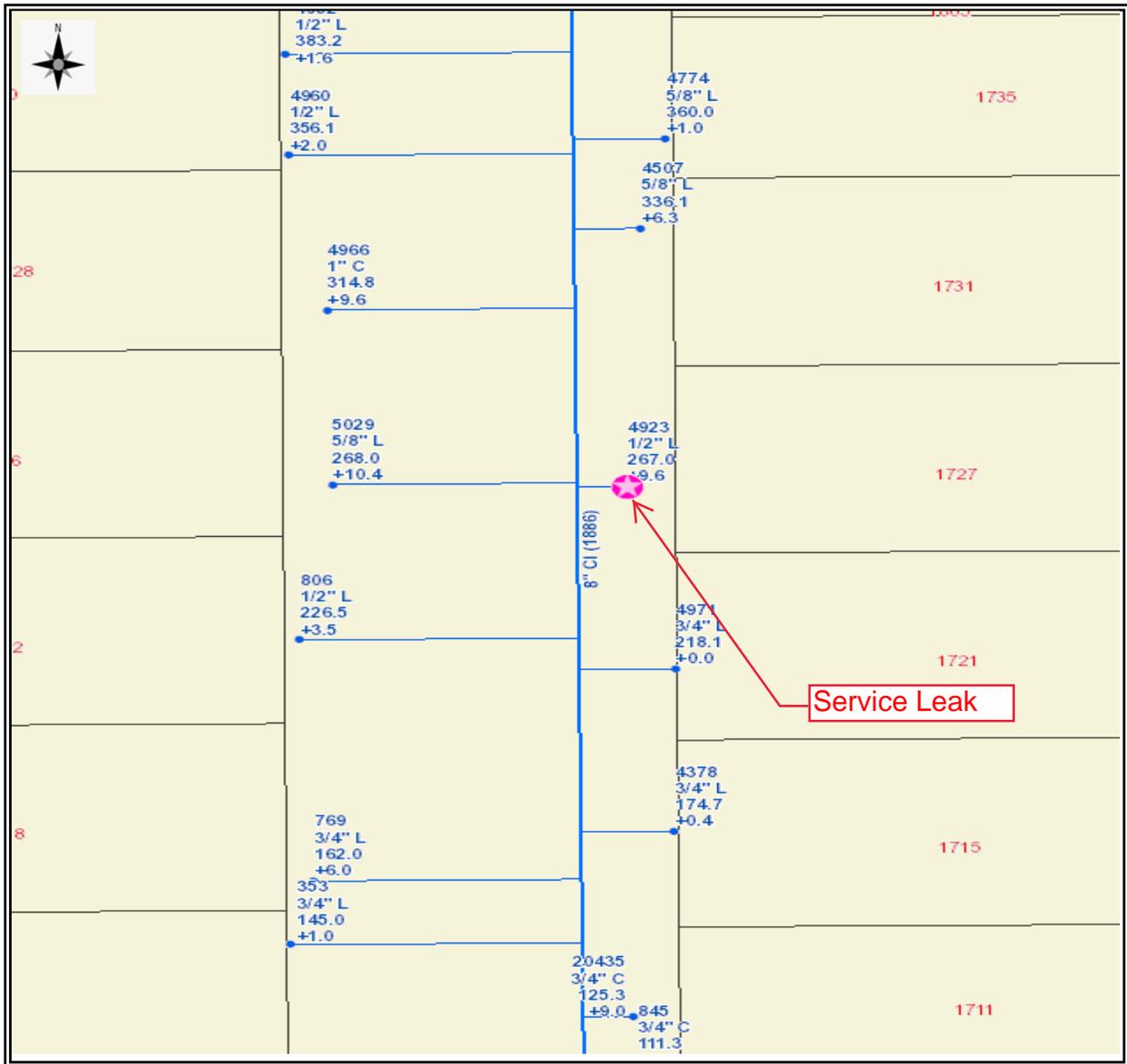
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 1727 North Main St.

Comments: GIS Service Number 4923. The leak is located on the Utility's side of the service, at or near the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 22

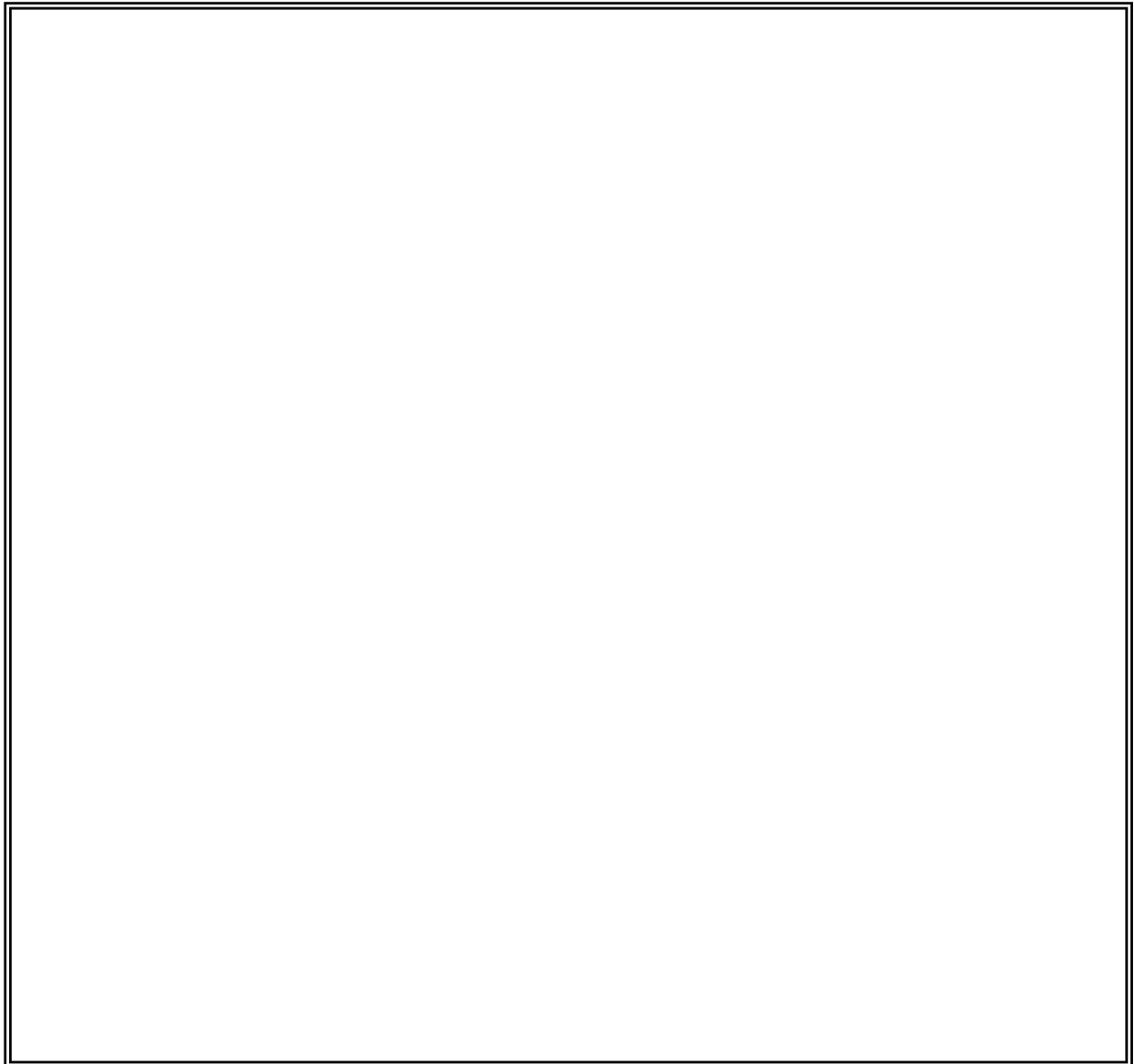
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: Intersection of Spring St. and Meadowbrook Blvd.

Comments: GIS hydrant number 2151. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 23

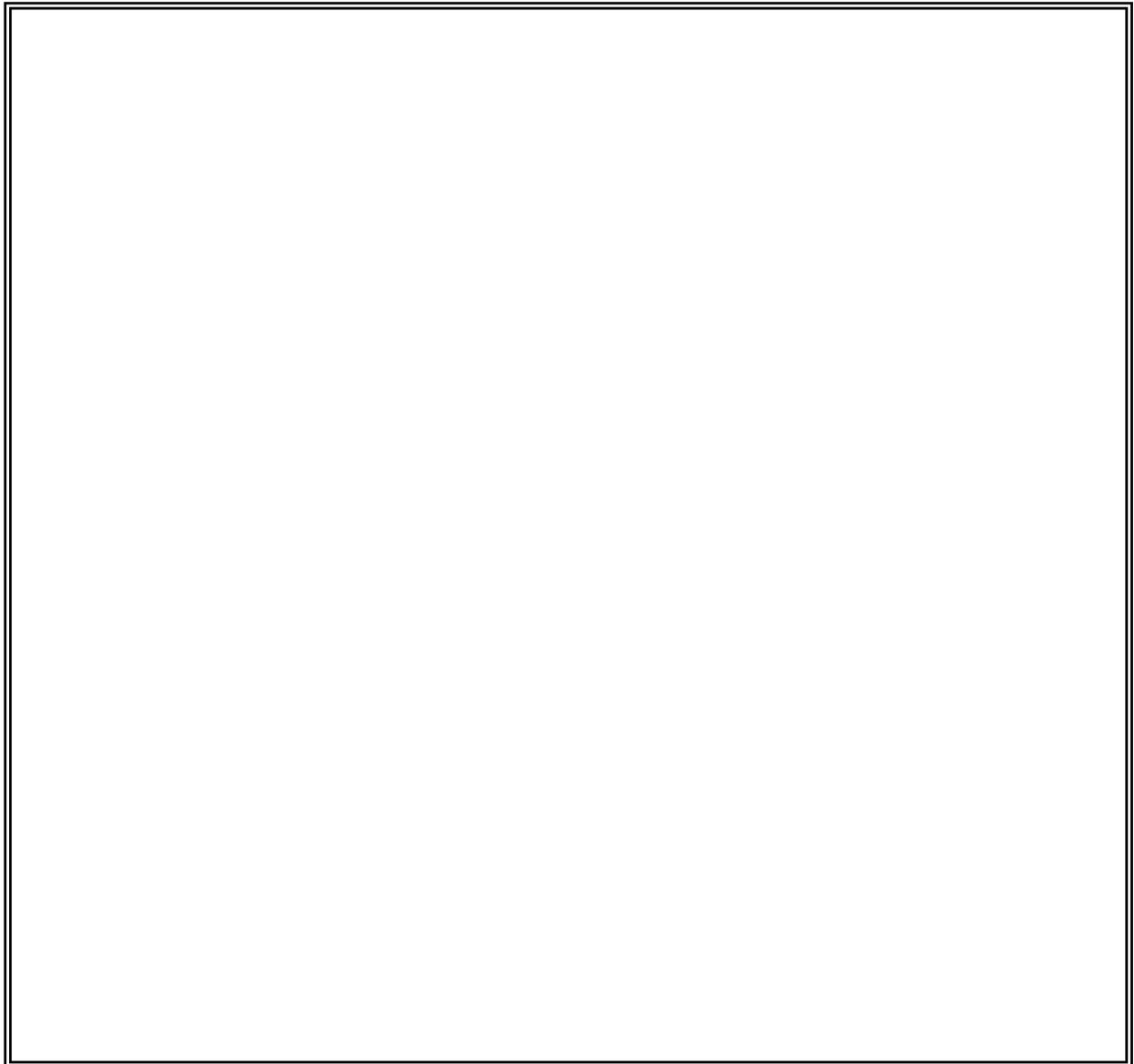
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Hydrant closest to 2009 Kewaunee St.

Comments: GIS hydrant number 4447. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 24

Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Intersection of Hamilton St. and Blake Ave.

Comments: GIS hydrant number 523. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 25

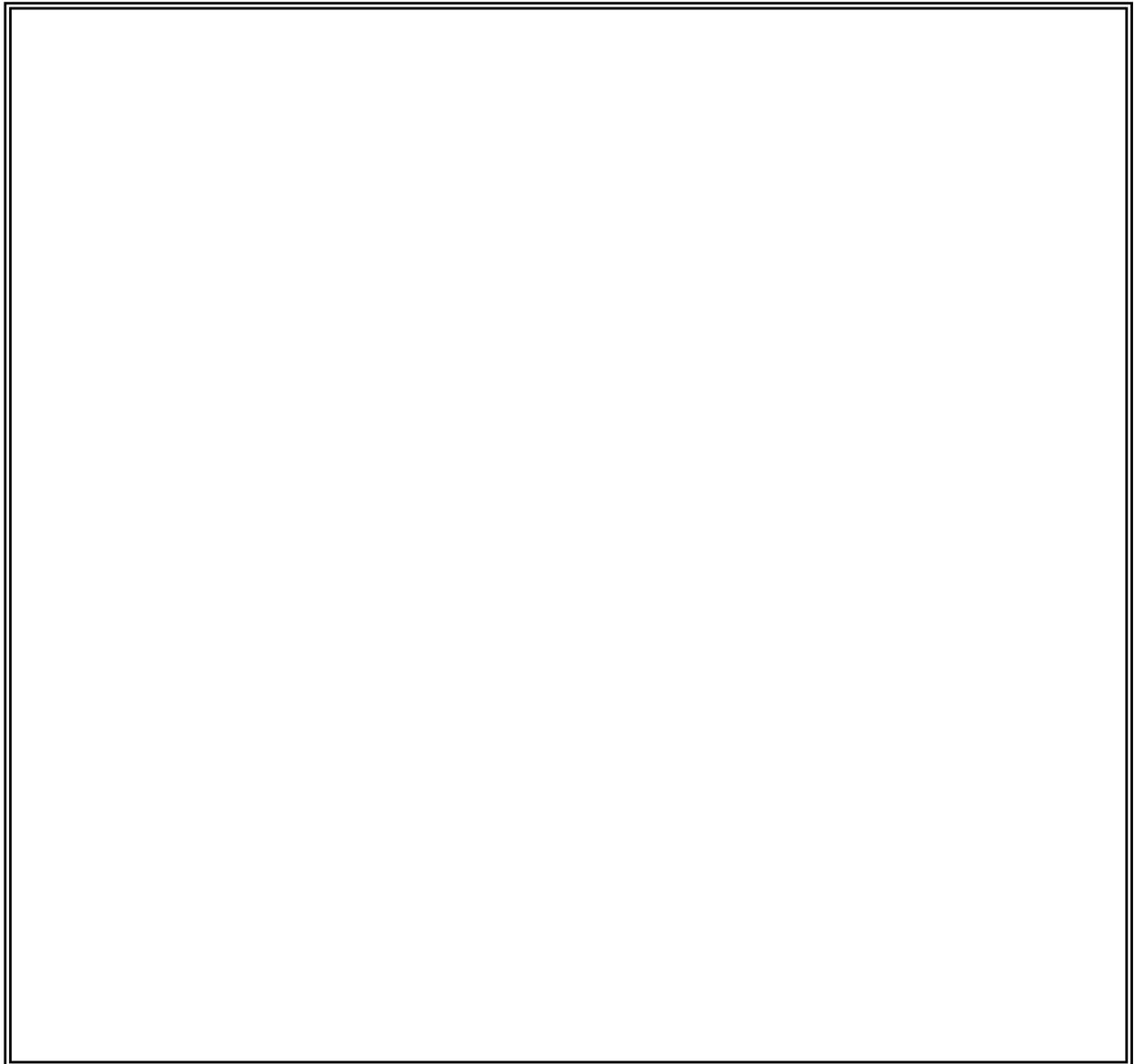
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 4,000

Location: Intersection of West St. and Blake Ave.

Comments: GIS hydrant number 969. Slowed the leak by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 26

Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 18,000

Location: 1123 Brooker St.

Comments: GIS Service Number 22511. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 27

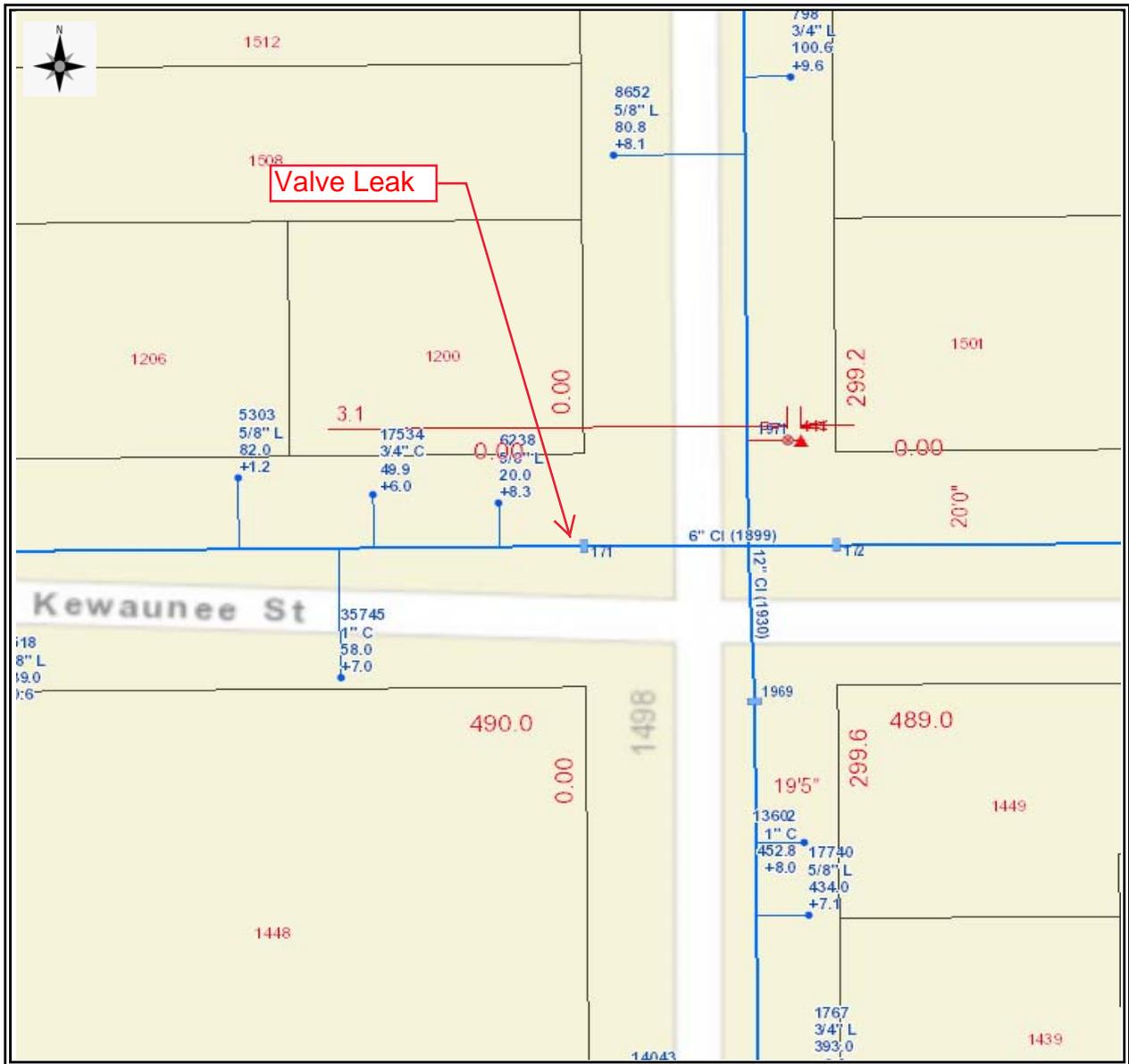
Date: 4/22/2020

Type of Leak: Valve

Estimated Leakage (gpd): 500

Location: Intersection of Kewaunee St. and Geneva St.

Comments: GIS valve number 171. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 28

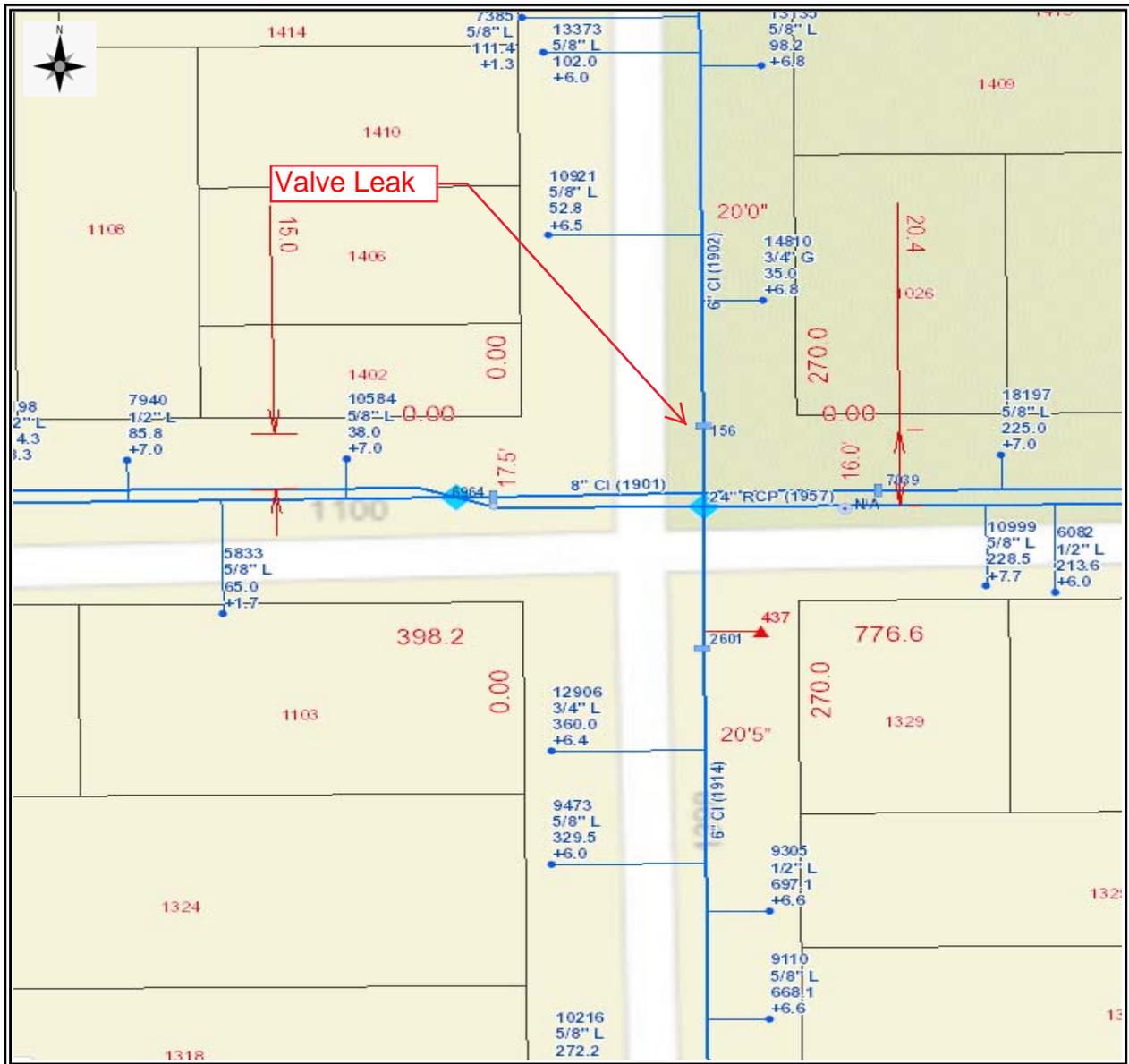
Date: 4/22/2020

Type of Leak: Valve

Estimated Leakage (gpd): 1,000

Location: Intersection of Albert St. and Marquette St.

Comments: GIS valve number 156. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 29

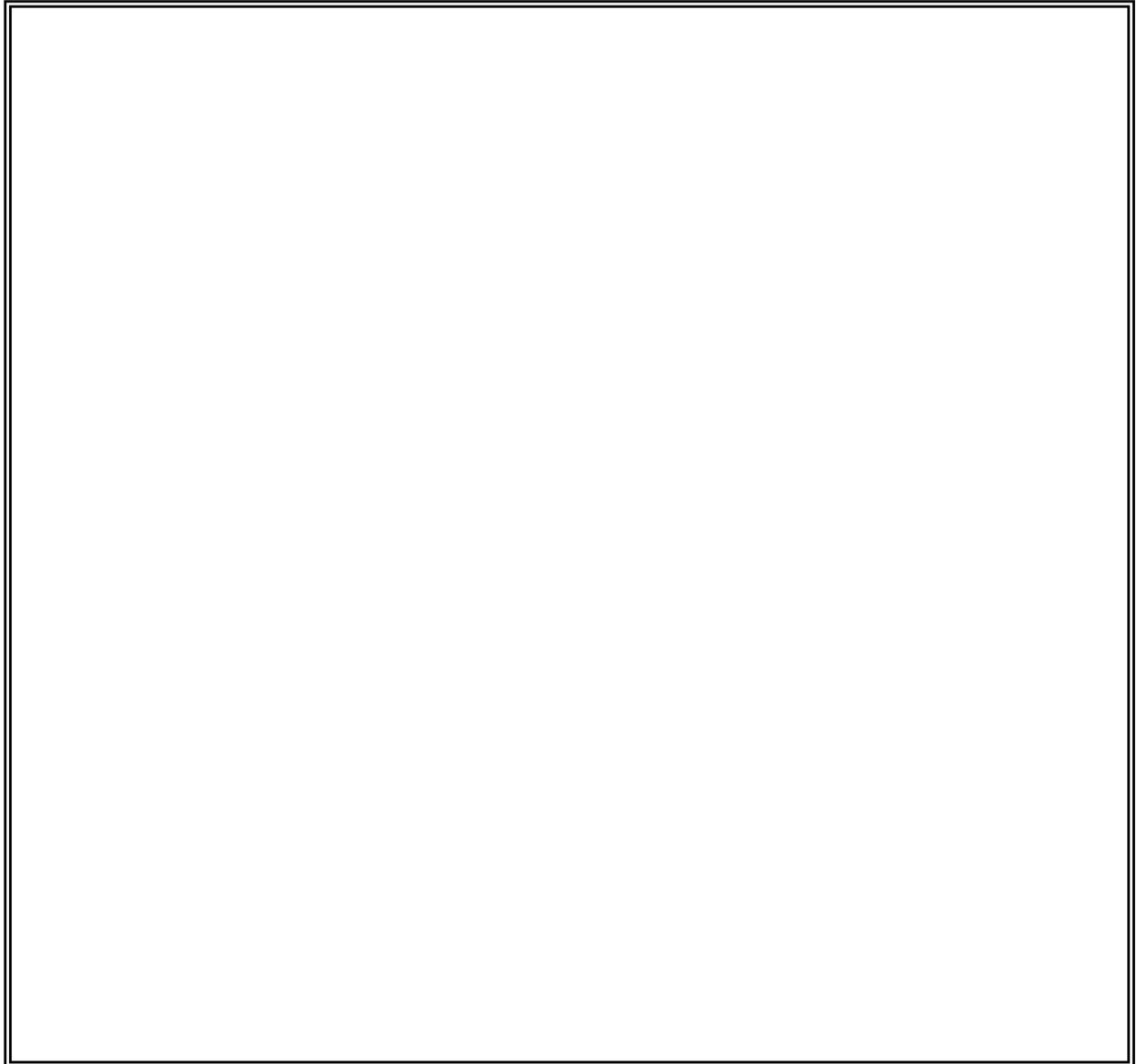
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: The end of Nelson Ct.

Comments: GIS hydrant number 4448. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 30

Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 8,000

Location: 1022 Geneva St.

Comments: GIS Service Number 3699. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 31

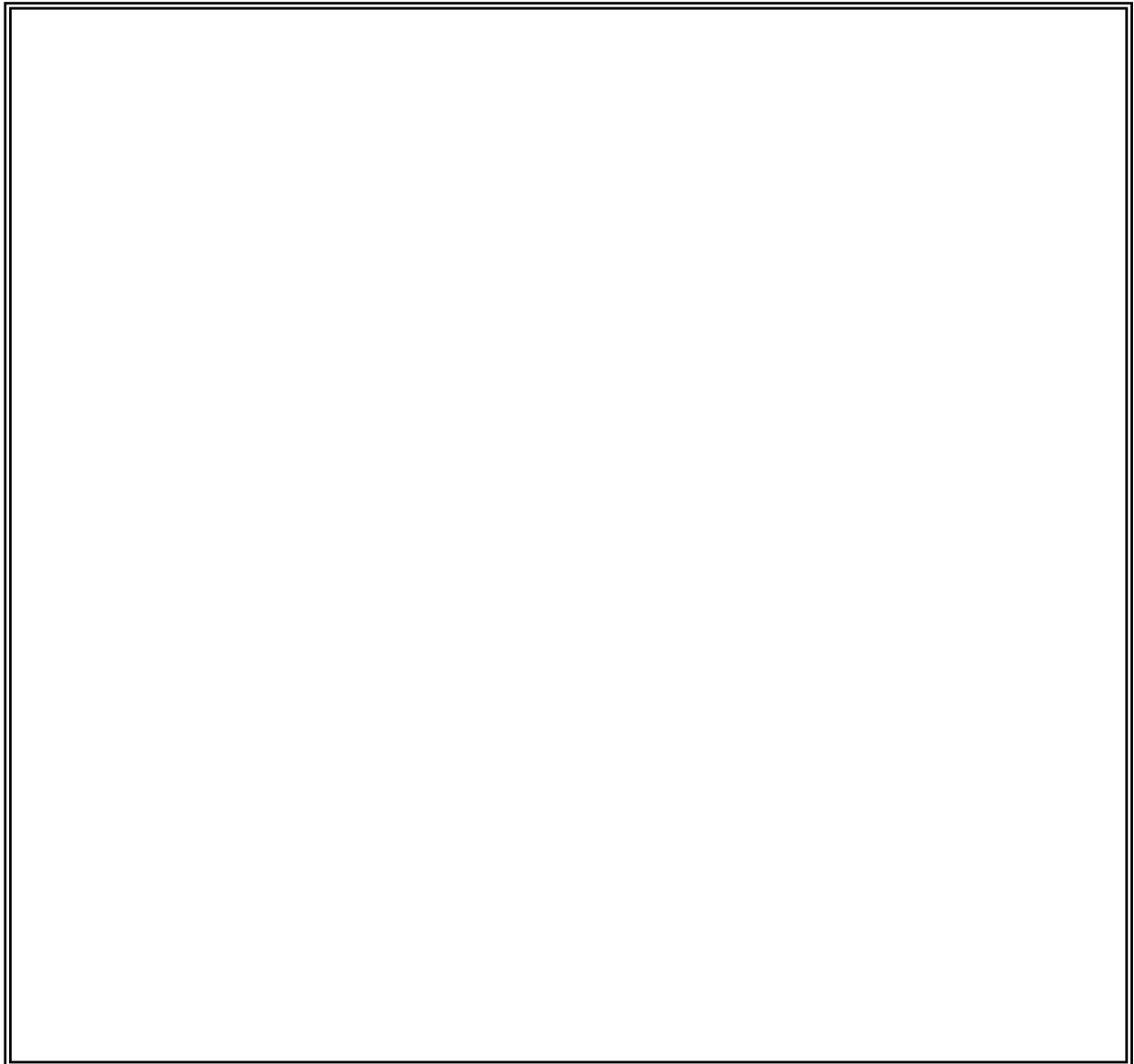
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 4,000

Location: Intersection of Jackson St. and Douglas Ave.

Comments: GIS hydrant number 382. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 32

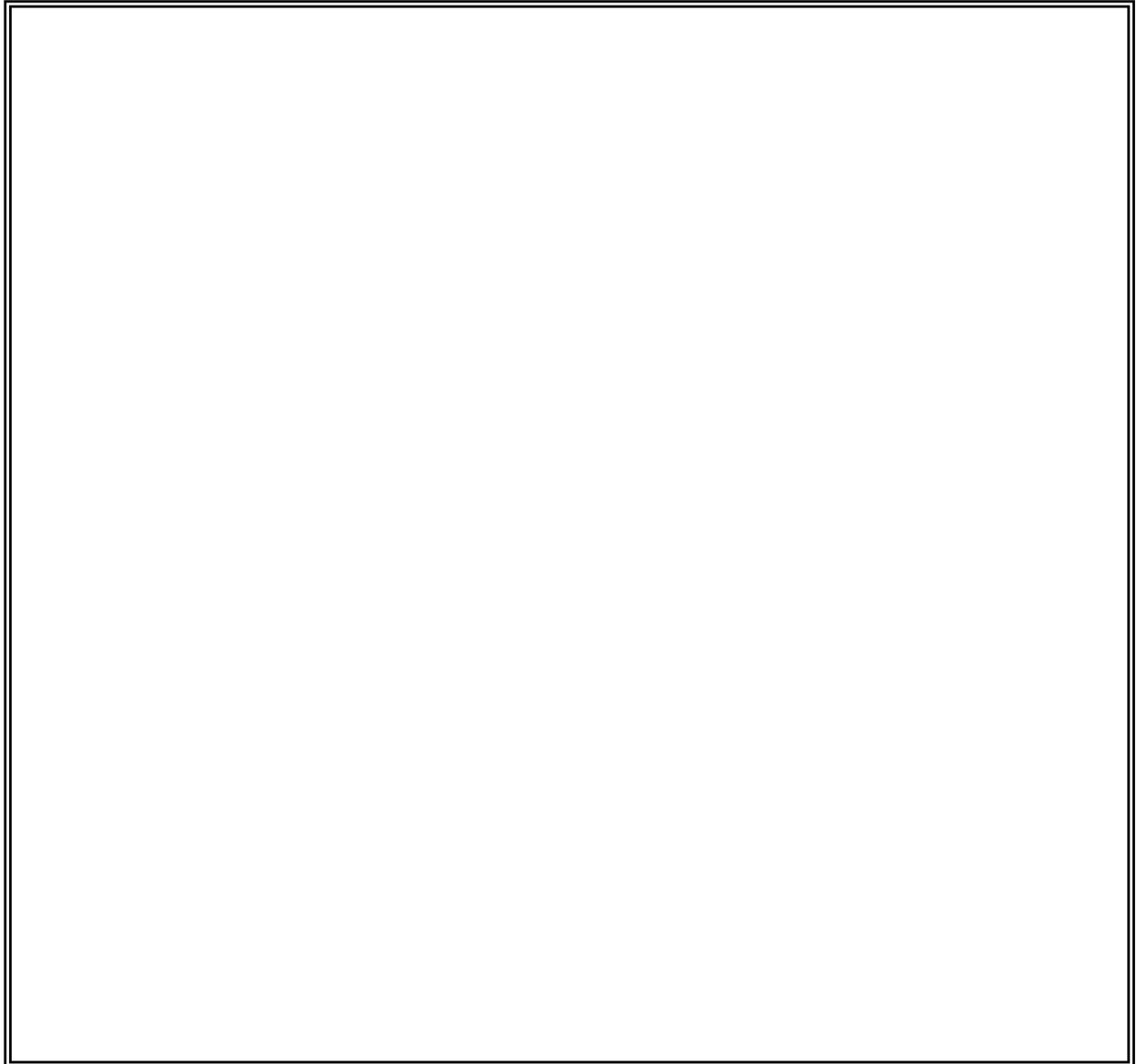
Date: 4/22/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of State St. and Superior St.

Comments: GIS hydrant number 409. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 33

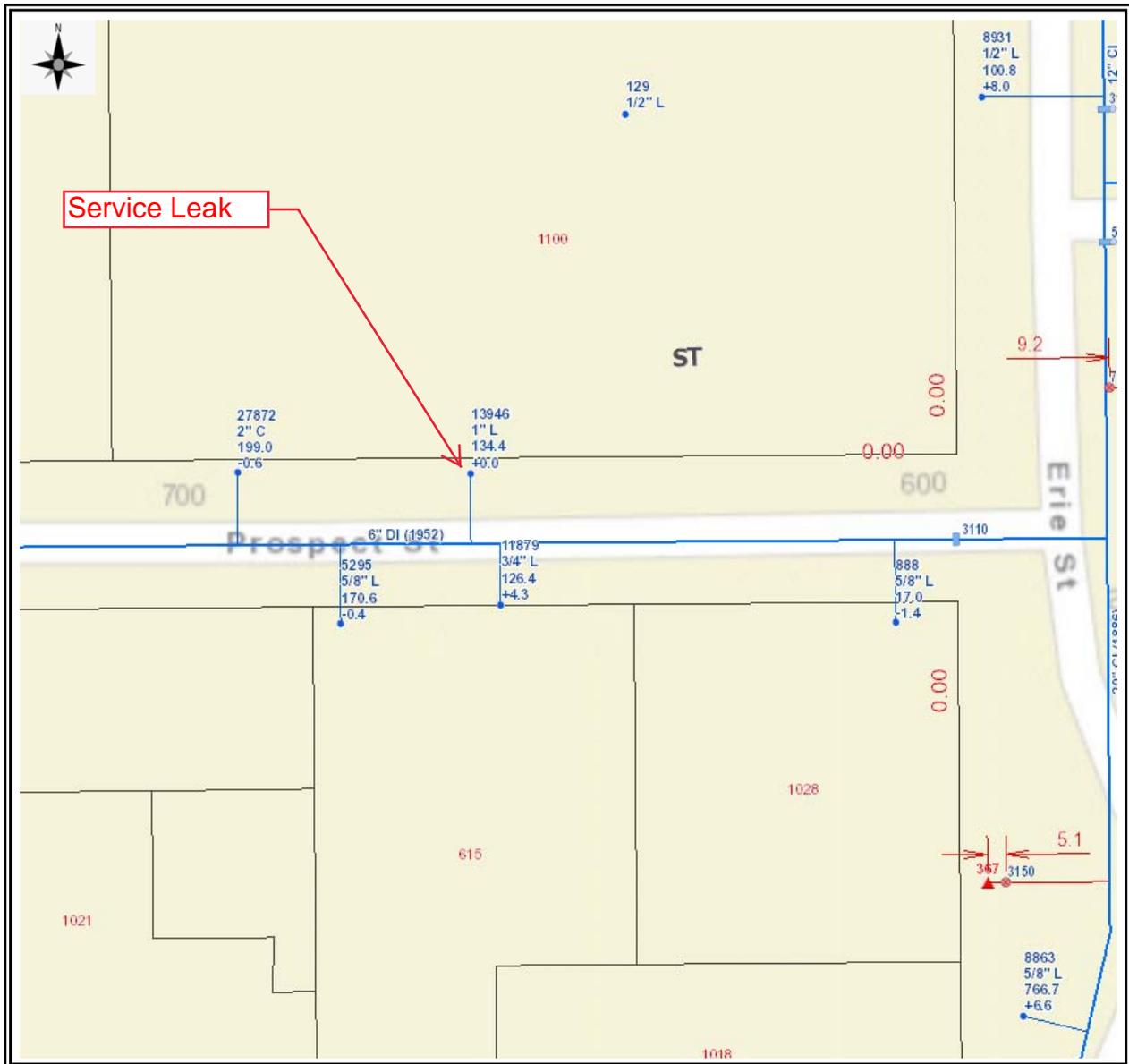
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 5,000

Location: 1100 Erie St. (service located on Prospect St.)

Comments: GIS Service Number 13946. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 34

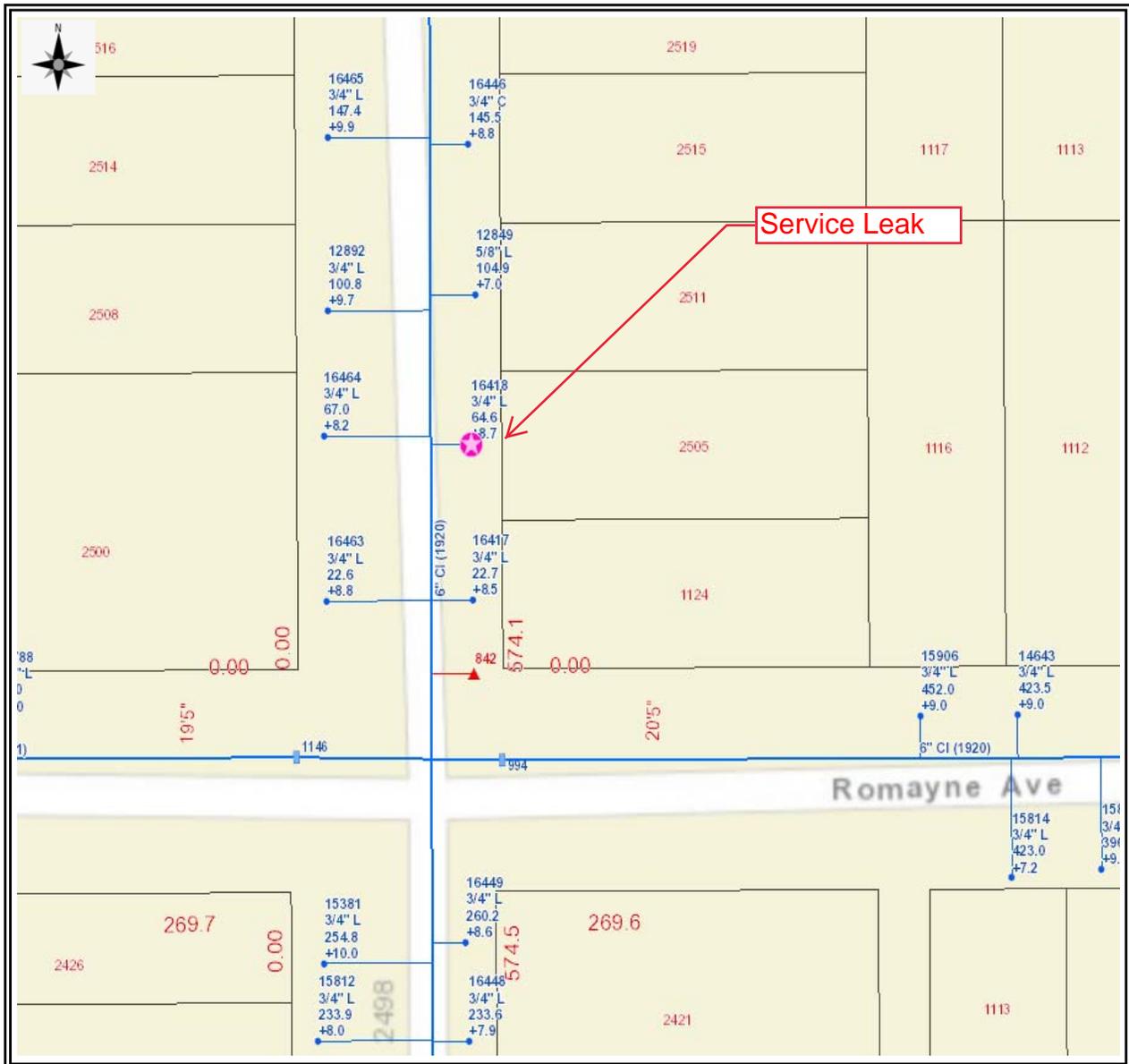
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 16,000

Location: 2505 Geneva St.

Comments: GIS Service Number 16418. The leak is located on Utility's side of the service, at or near the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 35

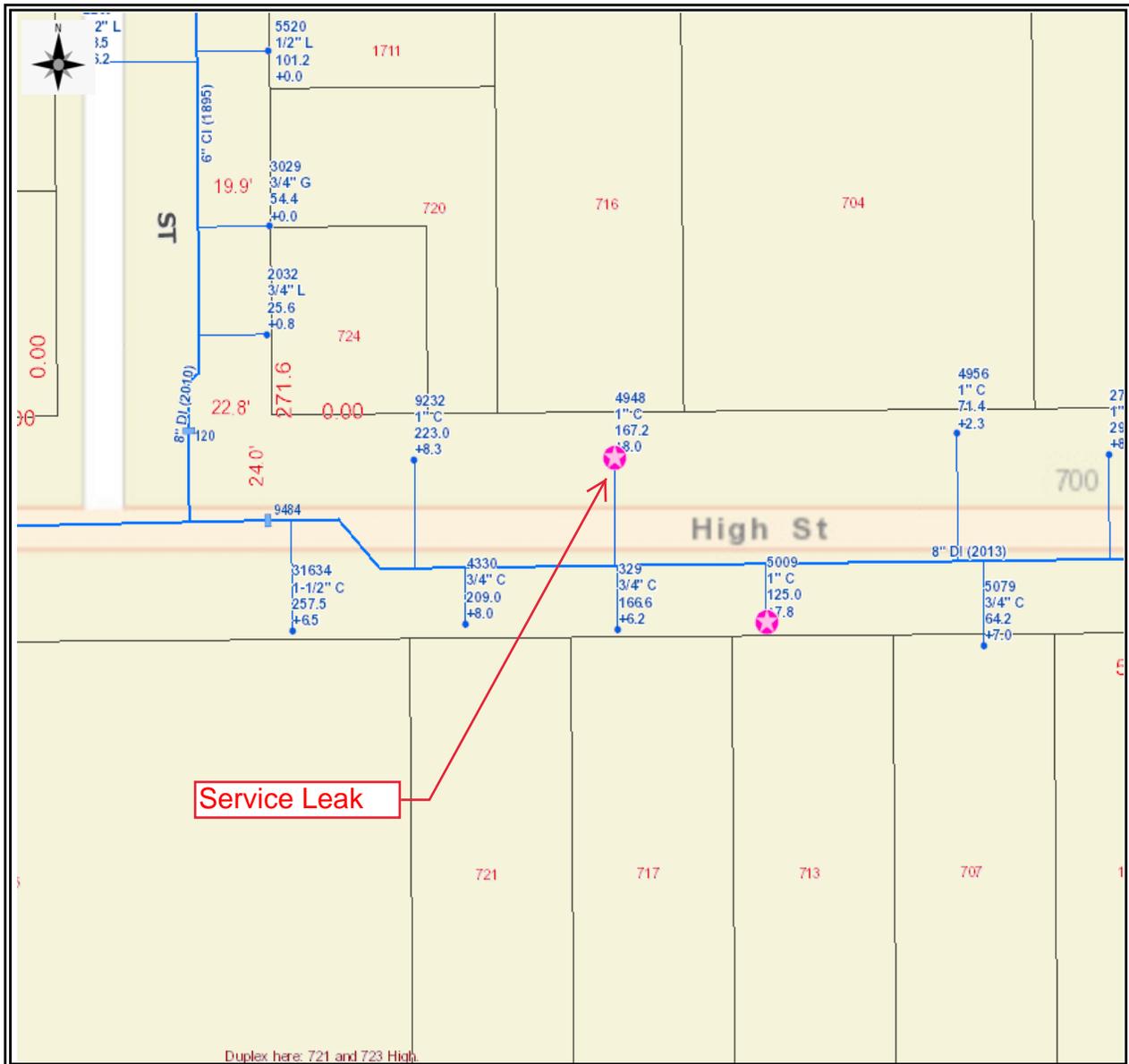
Date: 4/22/2020

Type of Leak: Service

Estimated Leakage (gpd): 6,000

Location: 716 High St.

Comments: GIS Service Number 4948. The leak is located on the homeowner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 36

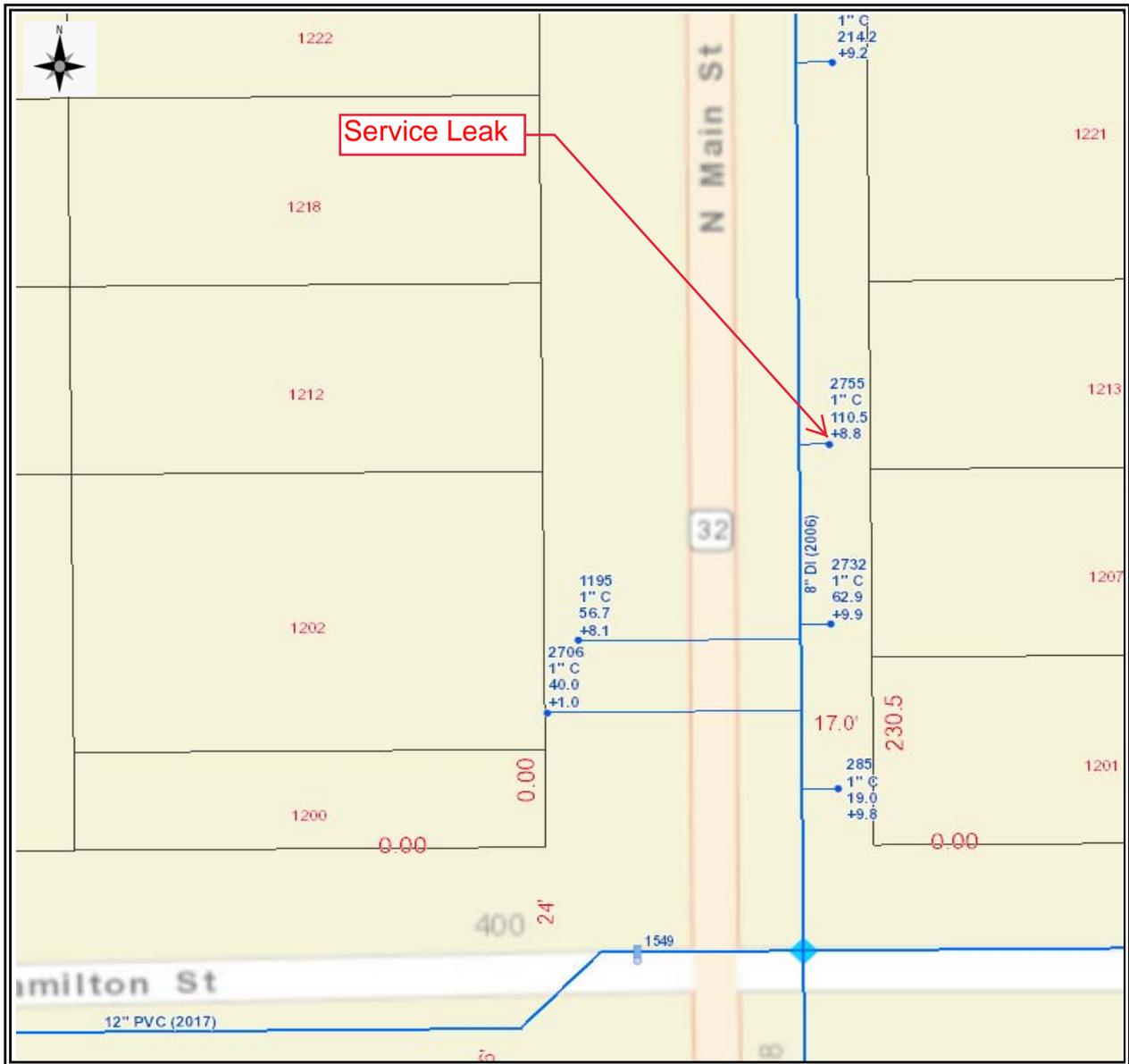
Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 15,000

Location: 1213 North Main St.

Comments: GIS service number 2755. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 37

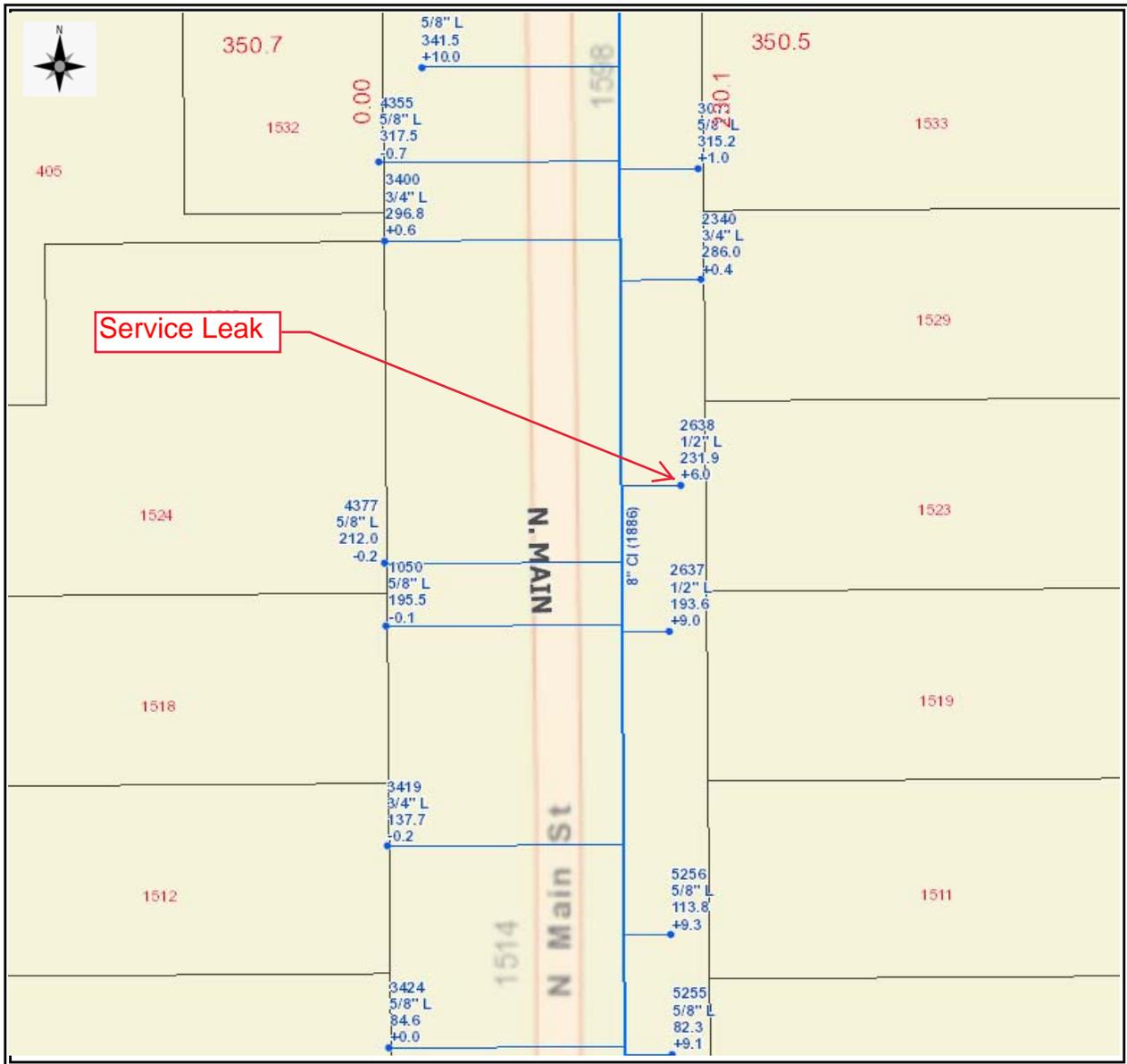
Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 16,000

Location: 1523 North Main St.

Comments: GIS service number 2638. Unable to access the curb stop. The Racine Water Utility will determine what side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 38

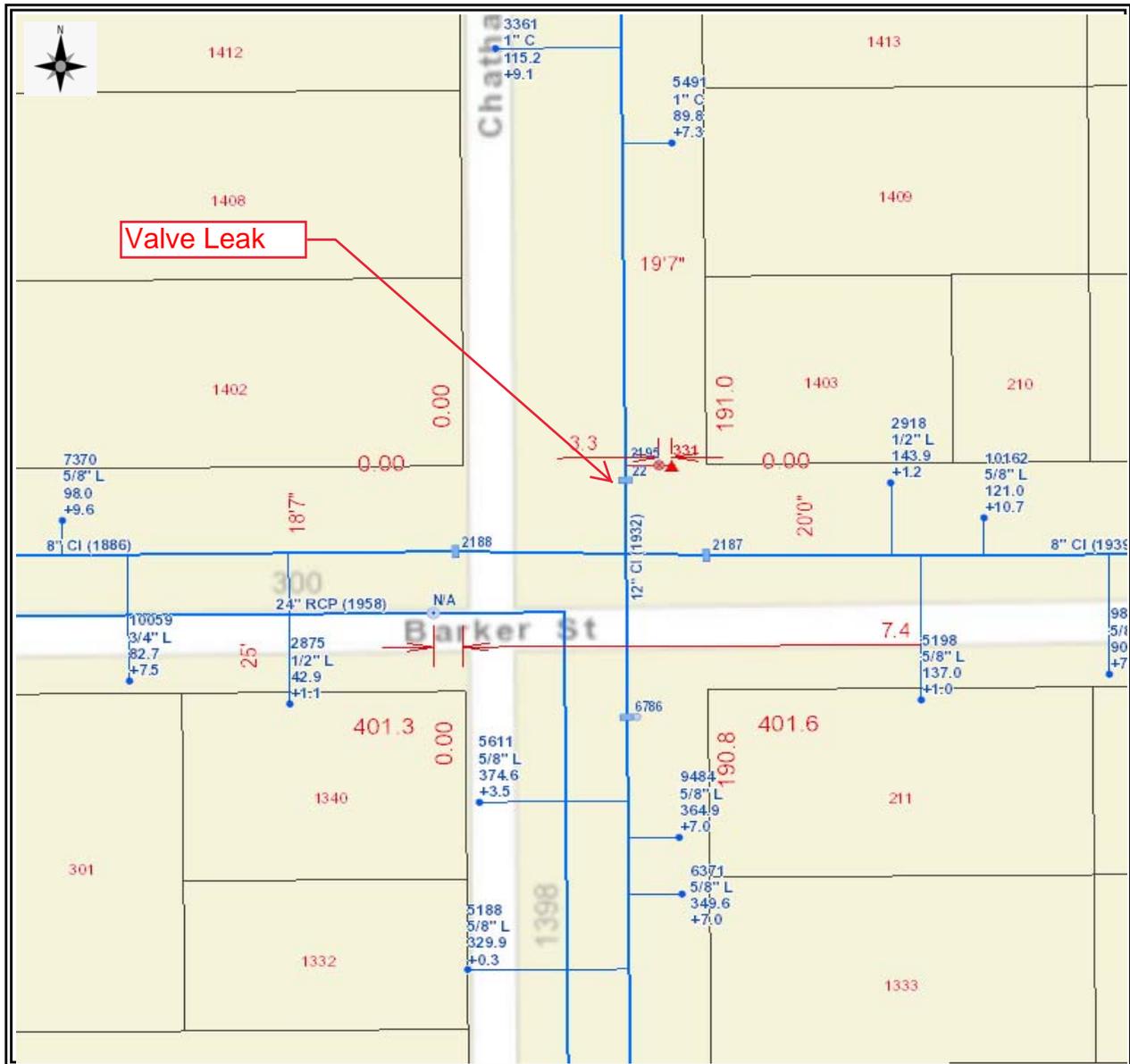
Date: 5/13/2020

Type of Leak: Valve

Estimated Leakage (gpd): 2,000

Location: Intersection of Chatham St. and Barker St.

Comments: GIS valve number 22. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 39

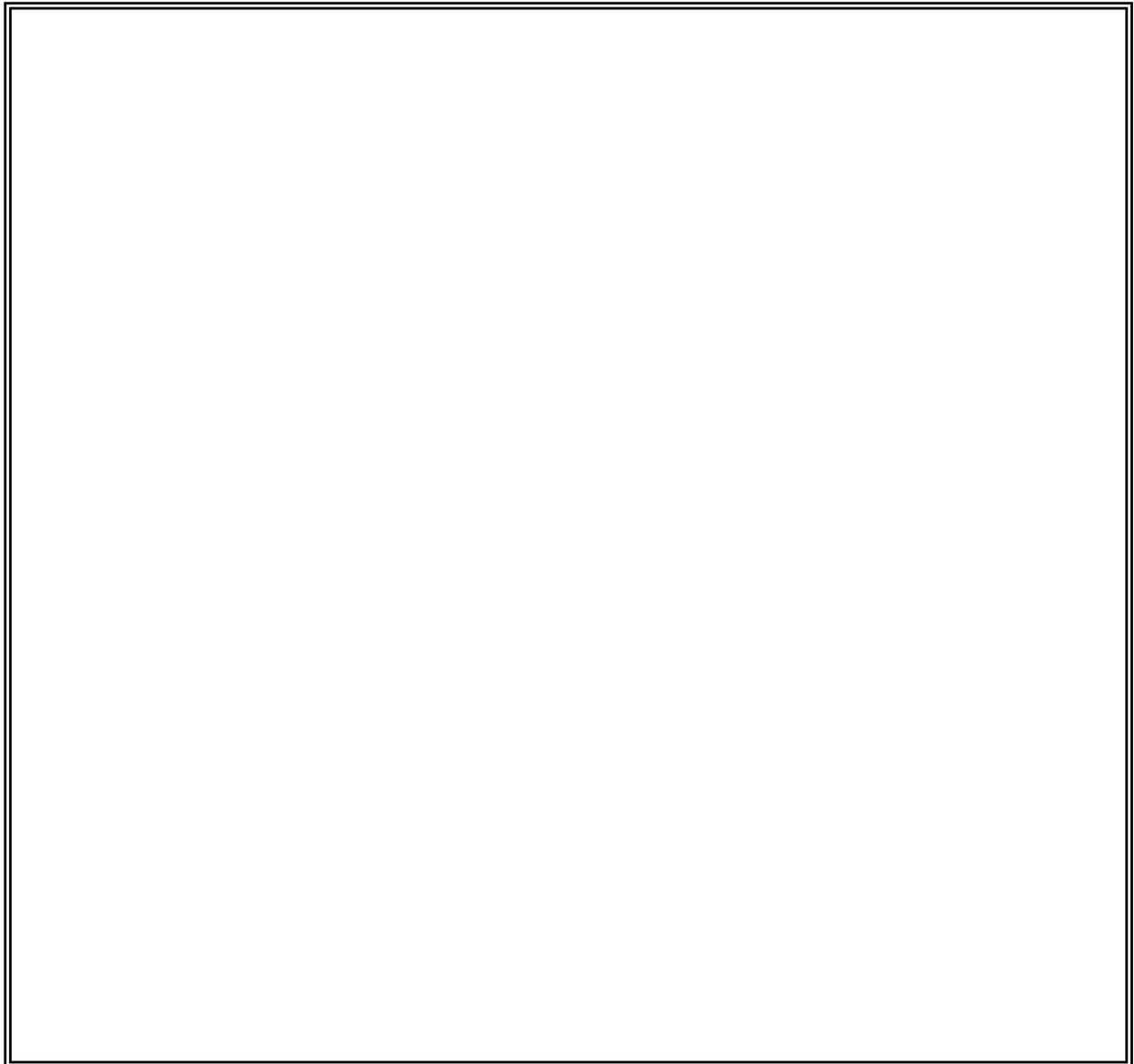
Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Intersection of Michigan Blvd. and Barker St.

Comments: GIS hydrant number 322. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 40

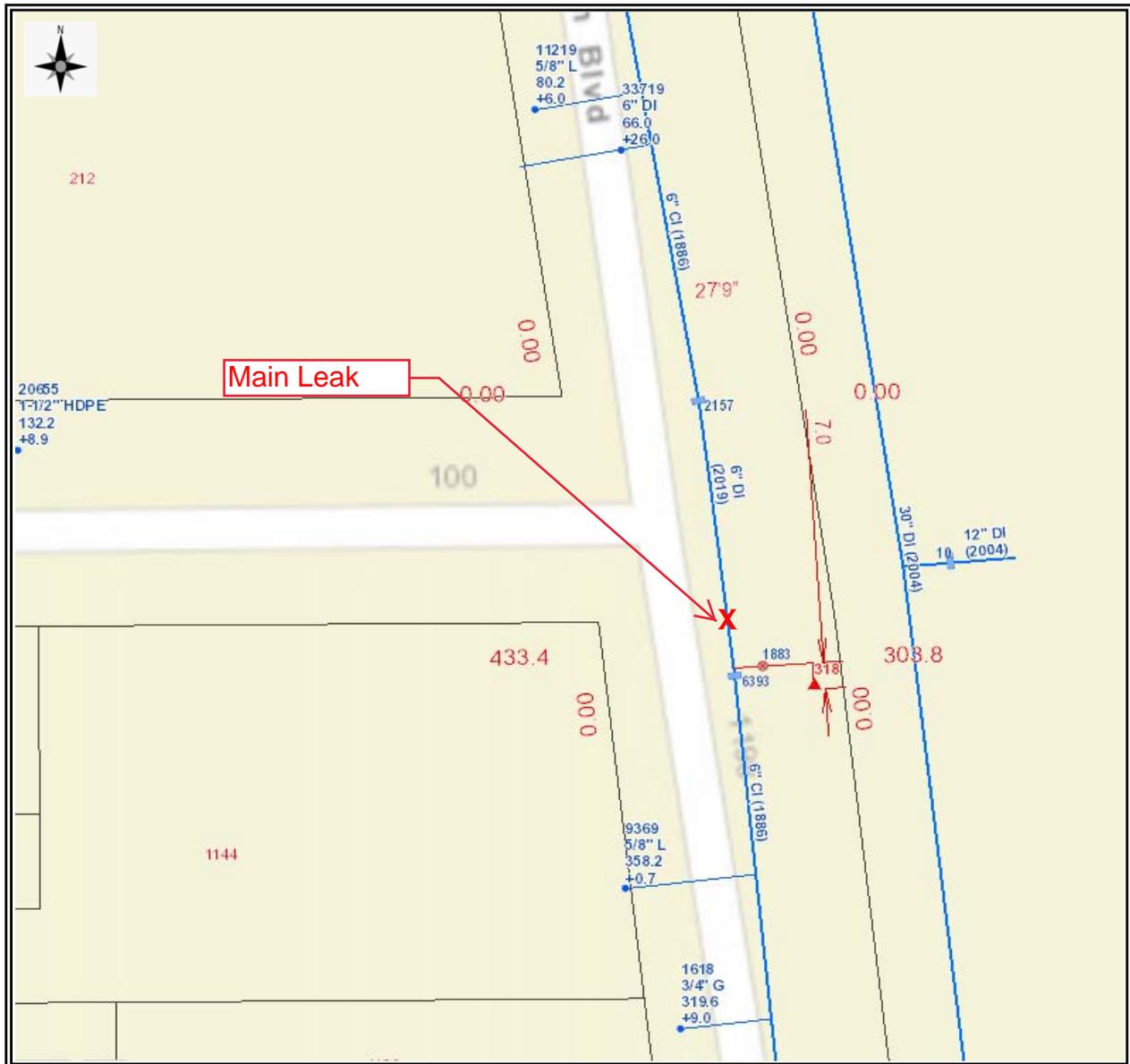
Date: 5/13/2020

Type of Leak: Main

Estimated Leakage (gpd): 8,000

Location: Intersection of Hamilton St. and Michigan St.

Comments: The leak is located 12 feet north of valve number 6393. The approximate leak location is marked on the gravel with a blue "X" within the construction zone.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 41

Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: On Ohio St. between Westway Ave. and Graceland Blvd.

Comments: GIS hydrant number 3192. Stopped the leak by adjusting the operating nut.

Fixed

**Racine, Wisconsin
2020 Leak Report**

Leak No: 42

Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Intersection of Graceland Blvd. and Echo Ln.

Comments: GIS hydrant number 1656. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 43

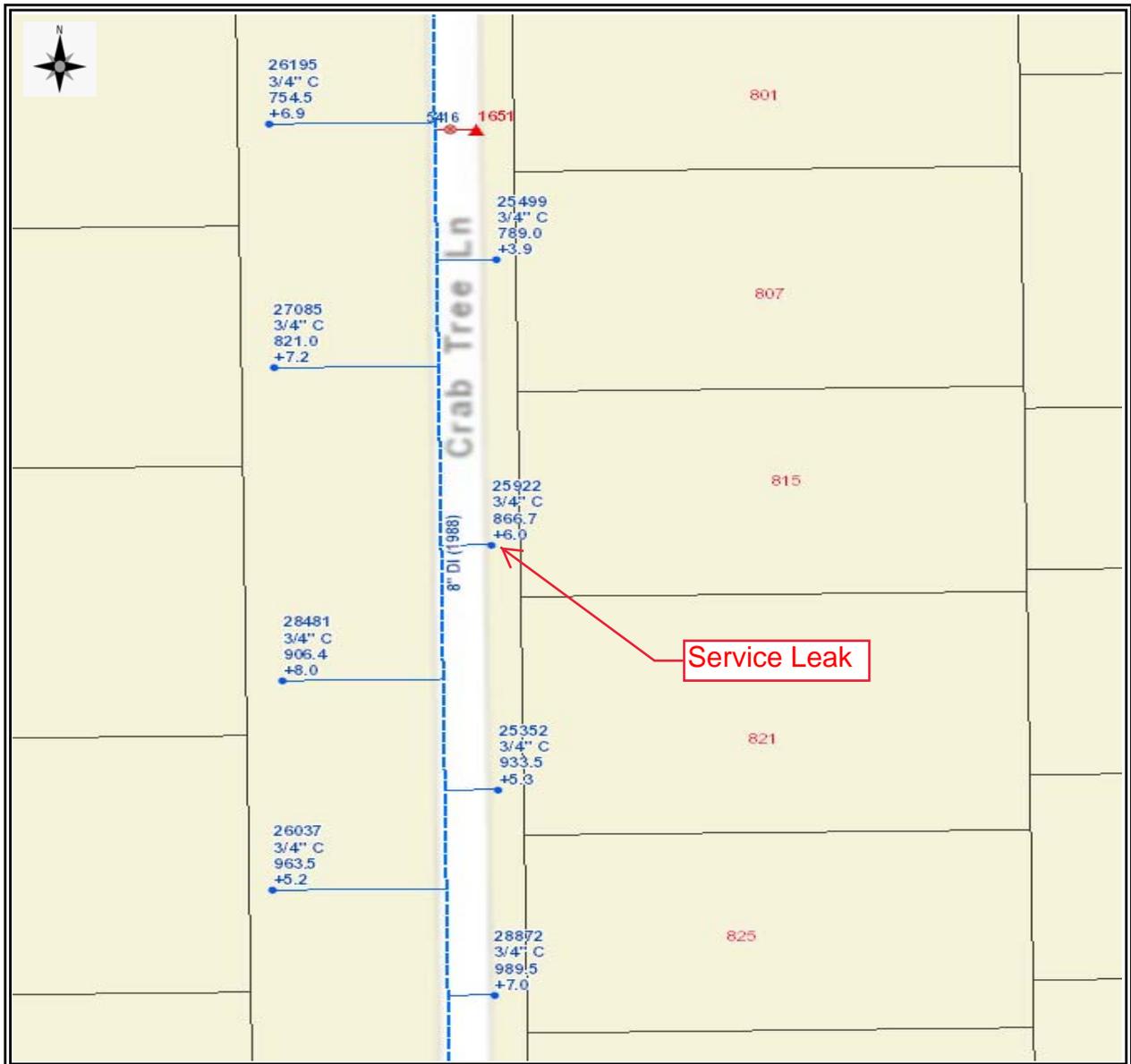
Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 815 Crab Tree Ln.

Comments: GIS service number 25922. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 45

Date: 5/13/2020

Type of Leak: Main

Estimated Leakage (gpd): 20,000

Location: Intersection of Byron Ave. and Merrie Ln.

Comments: The leak is located 24 feet west of valve number 3567. The approximate leak location is marked with a blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 47

Date: 5/13/2020

Type of Leak: Valve

Estimated Leakage (gpd): 500

Location: Intersection of Kentucky Street and Kinzie Ave.

Comments: GIS valve number 3605. The valve may not be closed completely, allowing a small amount of water to pass through the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 48

Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 14,000

Location: 3417 Kinzie Ave.

Comments: GIS service number 10576. The leak is located on the homeowner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 49

Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 18,000

Location: 1518 Liberty St.

Comments: GIS service number 5553. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 50

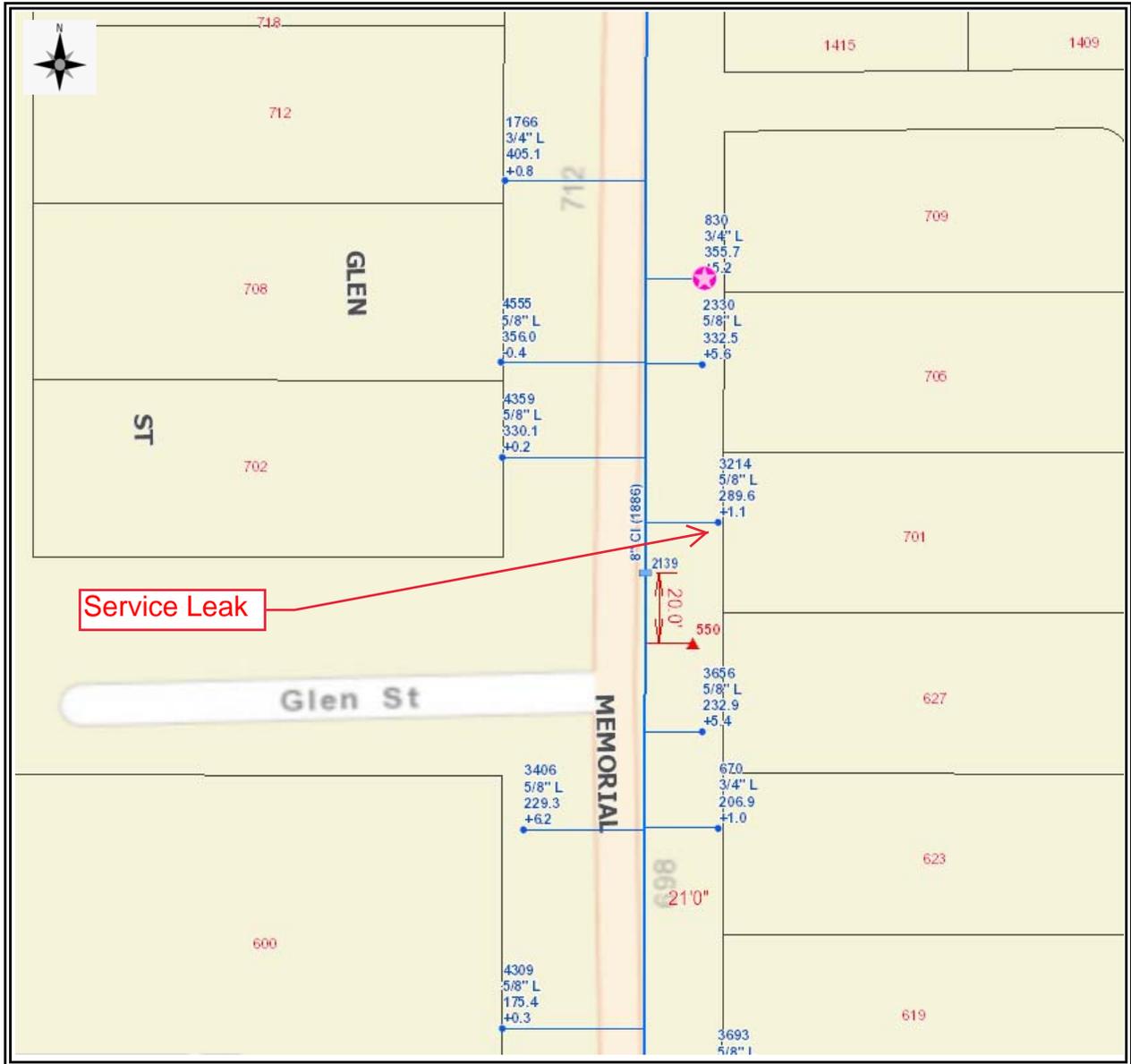
Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 18,000

Location: 701 North Memorial Dr.

Comments: GIS service number 3214. Could not access the curb stop. The Racine Water Utility will determine which side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 52

Date: 5/13/2020

Type of Leak: Valve

Estimated Leakage (gpd): 1,000

Location: Intersection of 9th St. and Delamere Ave.

Comments: GIS valve number 1151. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 53

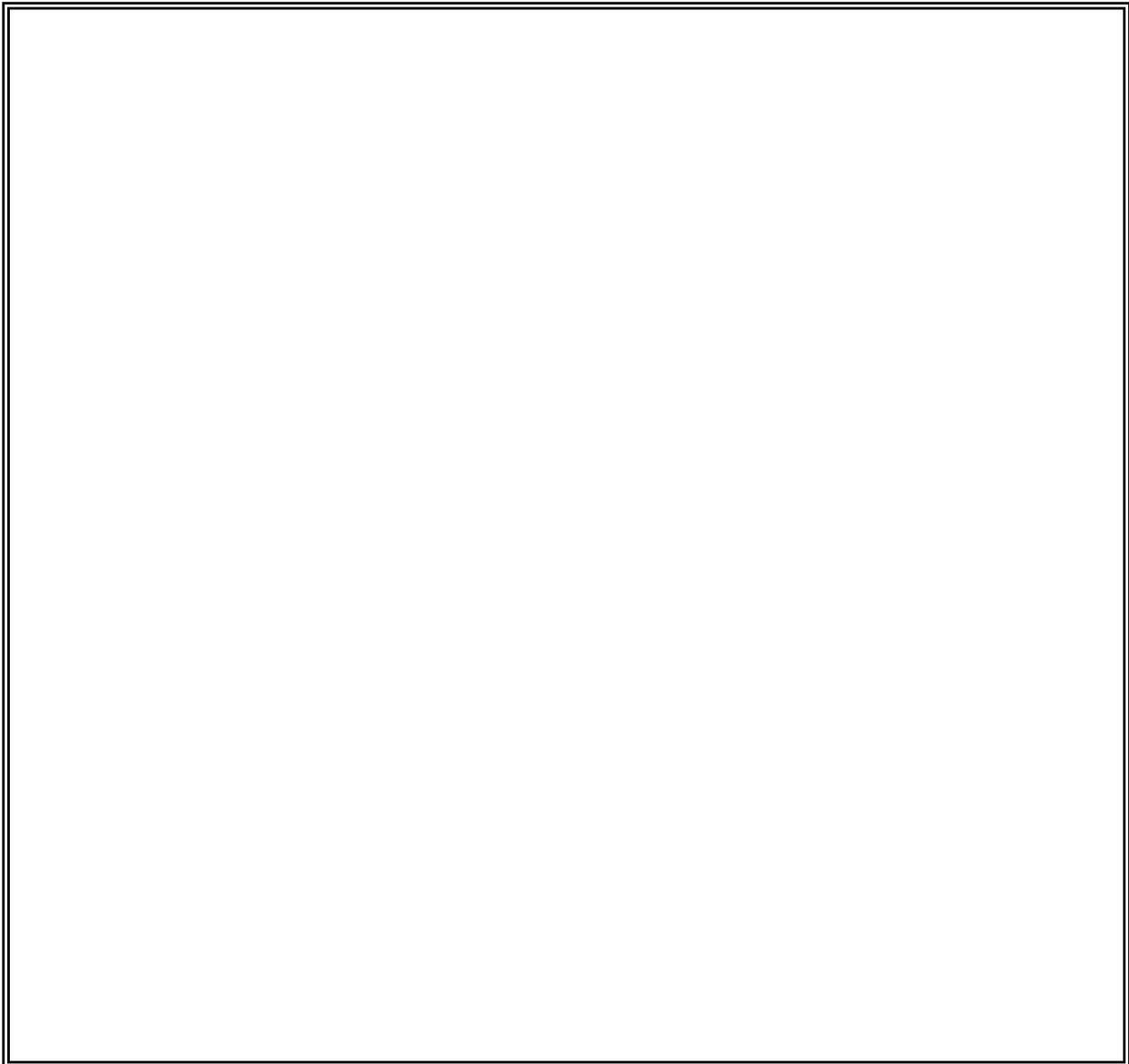
Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: Intersection of 10th St. and Grand Ave.

Comments: GIS hydrant number 689. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 54

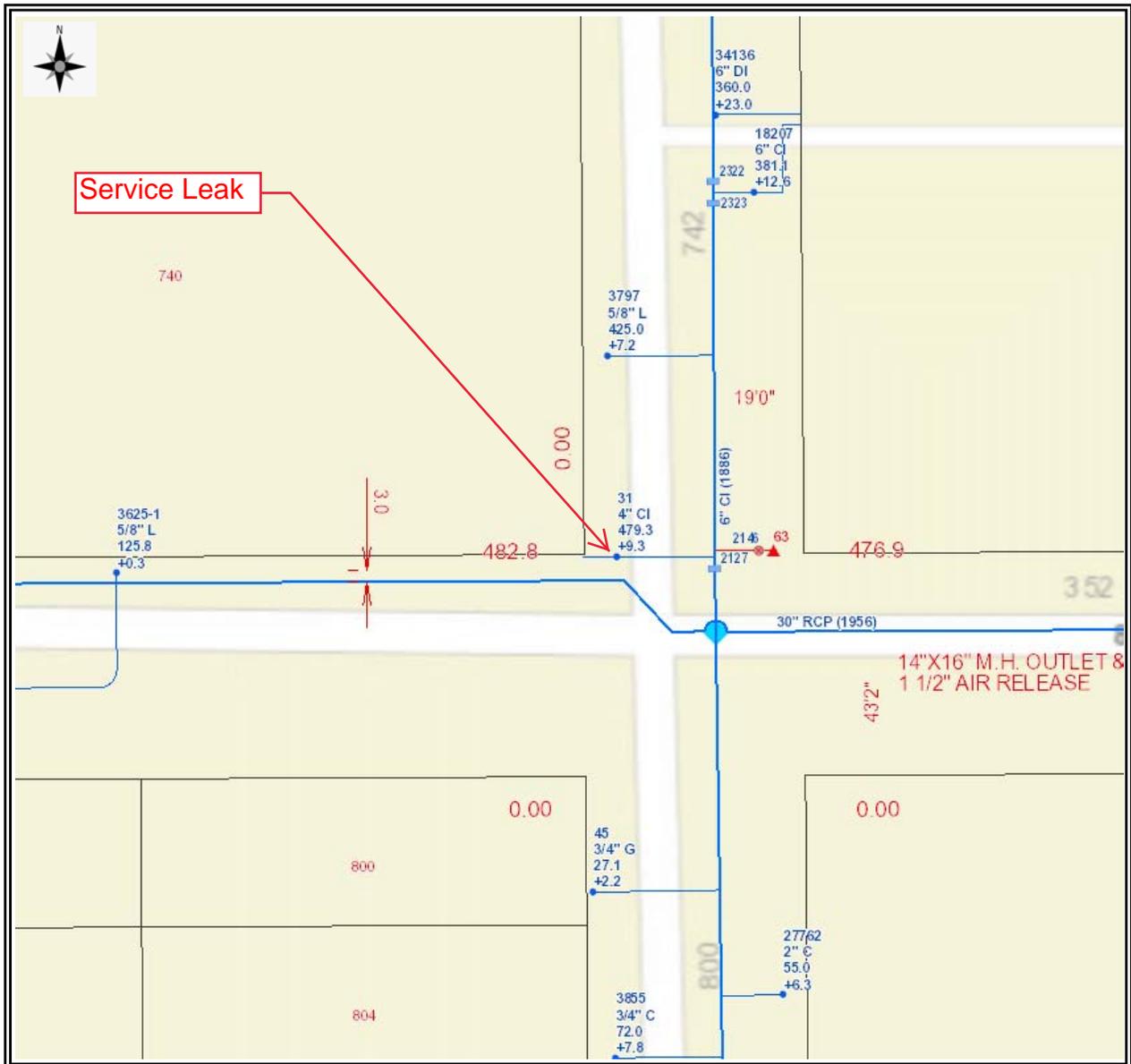
Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 8,000

Location: 740 College Ave.

Comments: GIS service number 31. The leak was fixed by adjusting the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 55

Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Hydrant closest to 929 Sycamore Ave.

Comments: GIS hydrant number 1884. The leak was stopped by adjusting the operating nut.

Fixed

**Racine, Wisconsin
2020 Leak Report**

Leak No: 56

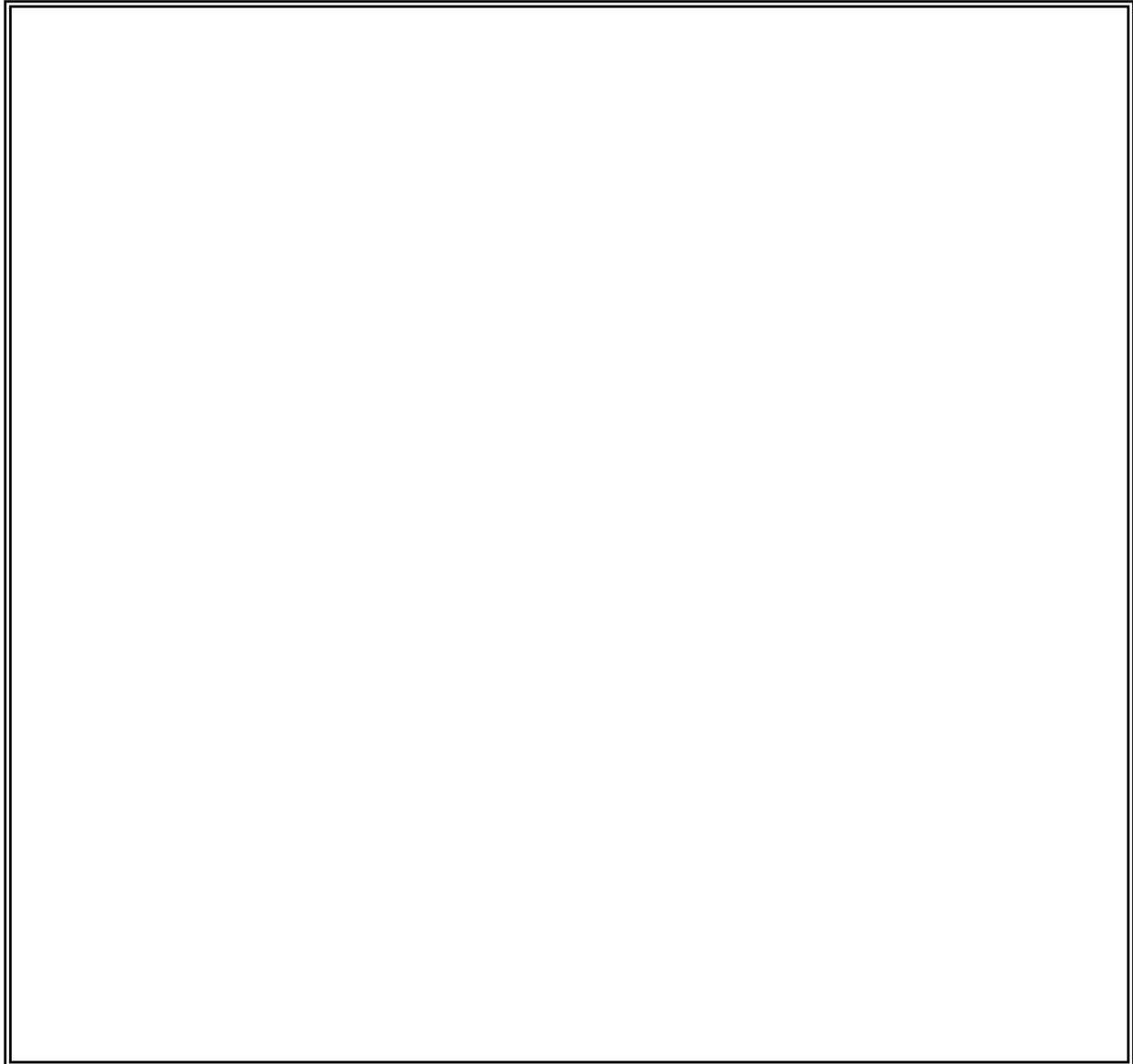
Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of Lindermann Ave. and Ostergaard Ave.

Comments: GIS hydrant number 1871. The leak was slowed by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 57

Date: 5/13/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: Hydrant closest to 5310 16th St.

Comments: GIS hydrant number 2044. The leak was slowed by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 58

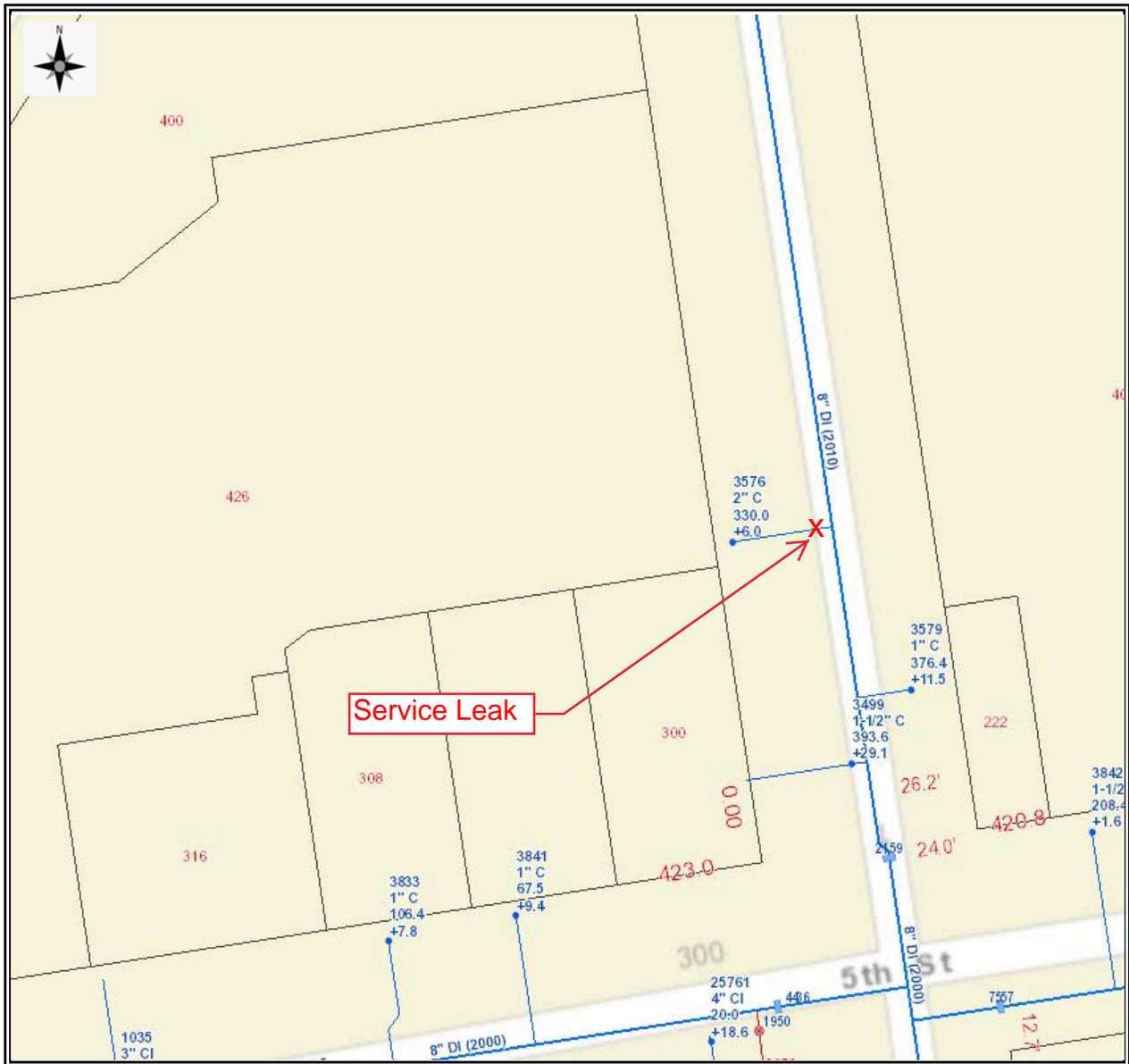
Date: 5/13/2020

Type of Leak: Service

Estimated Leakage (gpd): 10,000

Location: 426 Wisconsin Ave.

Comments: GIS service number 3576. The leak is located on the Utility's side of the service, approximately 3 feet from the main. The approximate leak location is marked with a blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 59

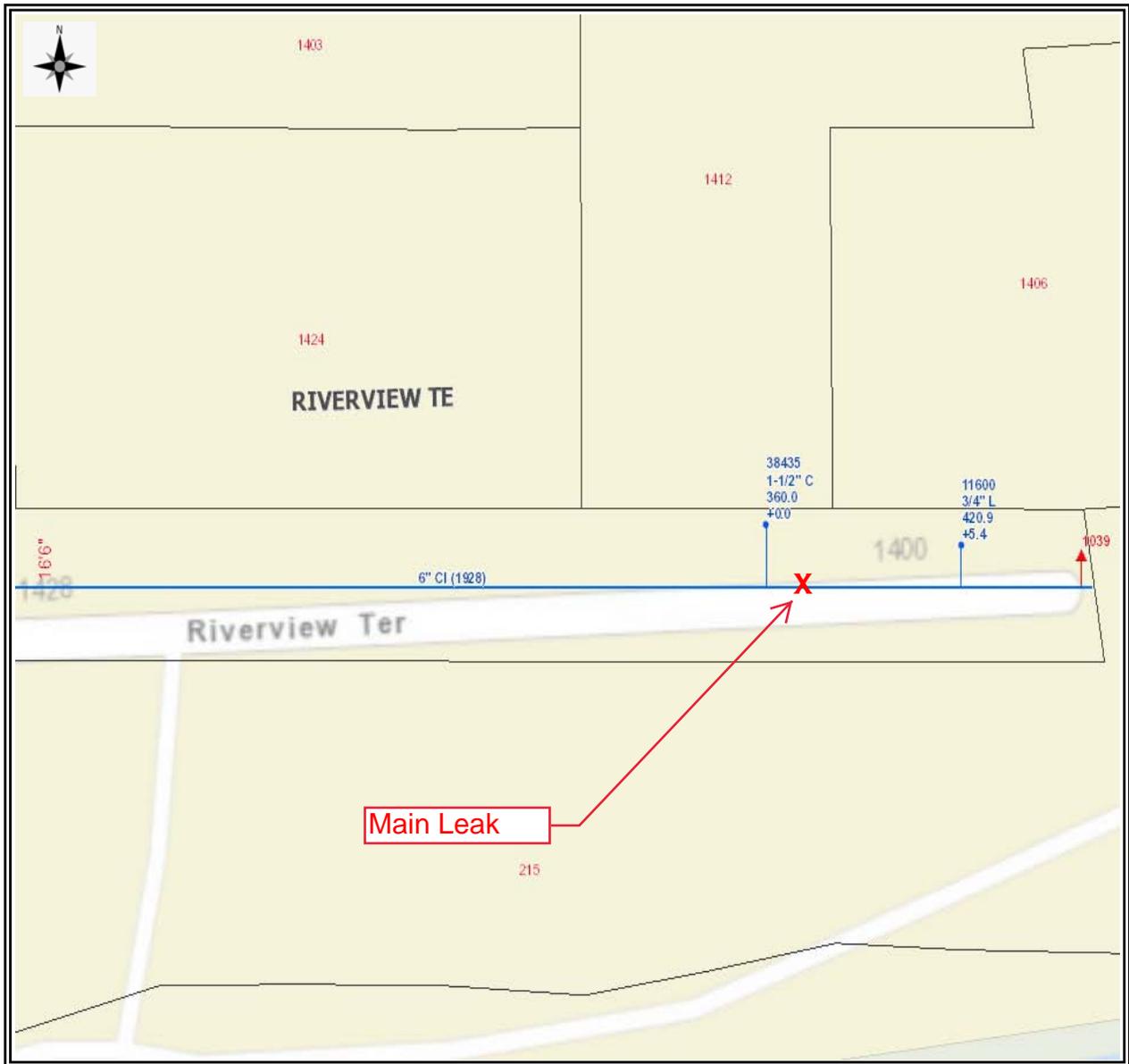
Date: 5/13/2020

Type of Leak: Main

Estimated Leakage (gpd): 10,000

Location: Near 1412 Riverview Terrace

Comments: The leak is located 101 feet west of hydrant number 1039. The approximate leak location is marked with a blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 60

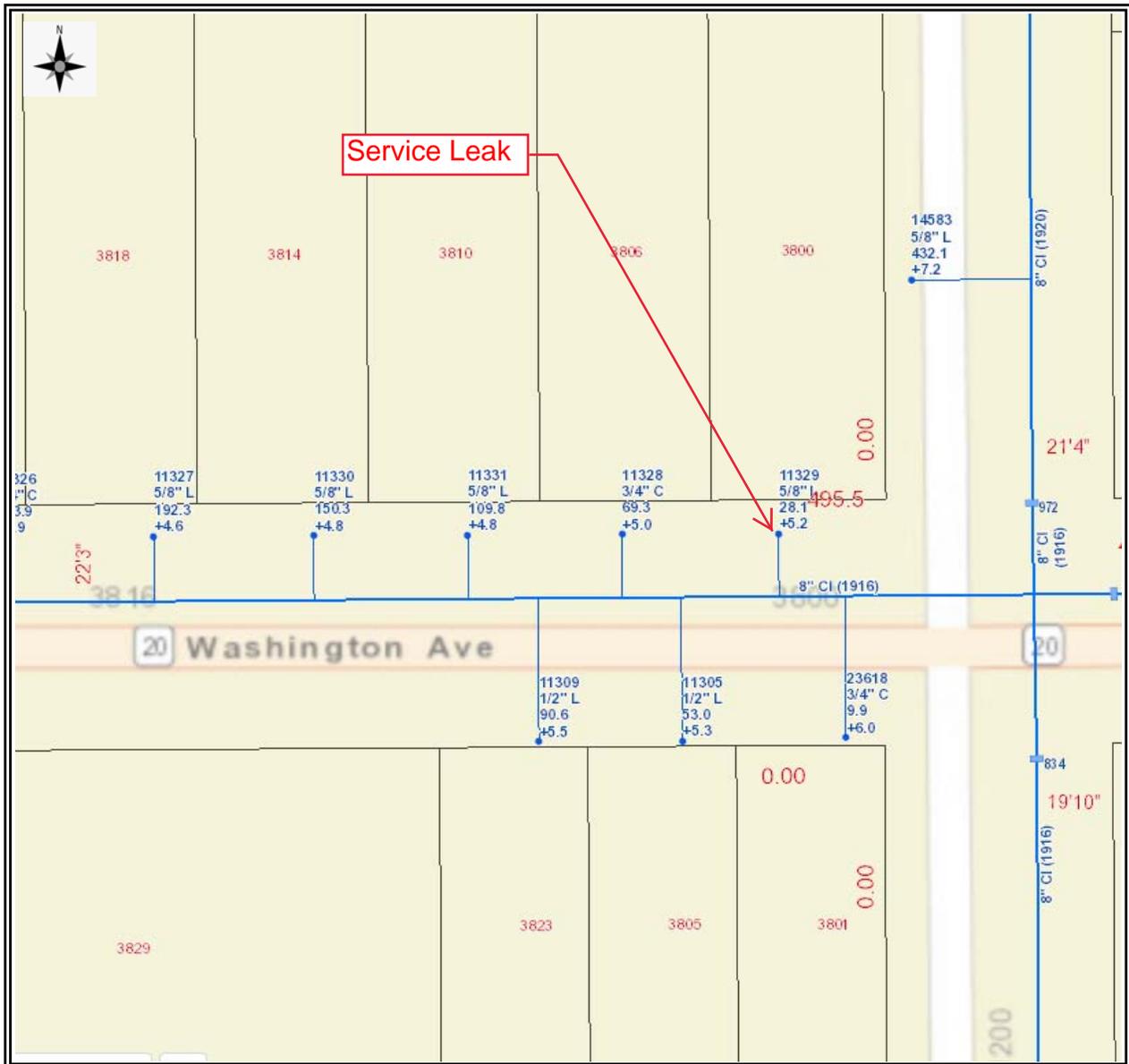
Date: 6/2/2020

Type of Leak: Service

Estimated Leakage (gpd): 16,000

Location: 3800 Washington Ave.

Comments: GIS service number 11329. The leak is located on the Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 61

Date: 6/2/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 3525 Washington Ave.

Comments: GIS service number 11226. The leak is located on the Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 62

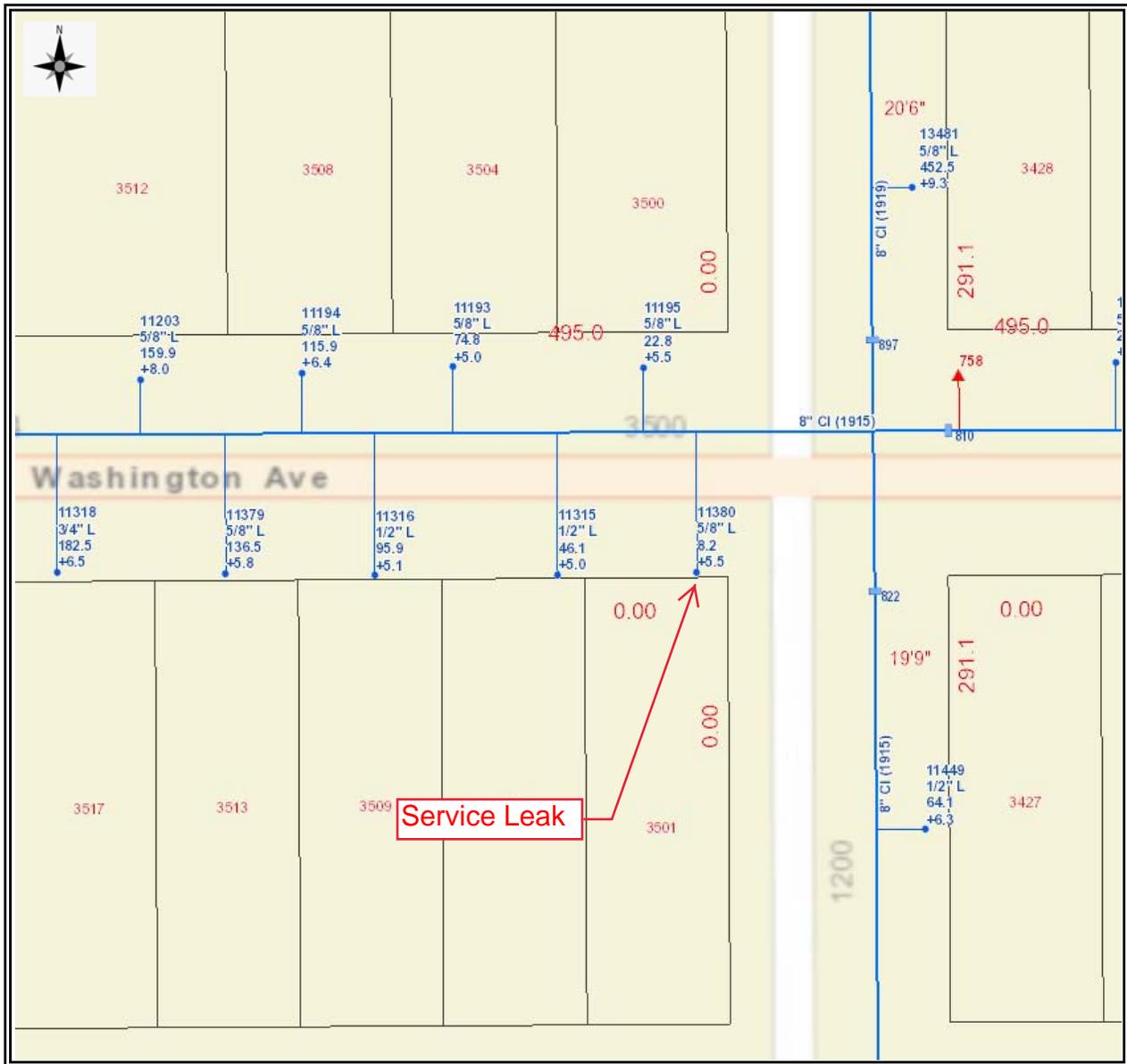
Date: 6/2/2020

Type of Leak: Service

Estimated Leakage (gpd): 16,000

Location: 3501 Washington Ave.

Comments: GIS service number 11380. The leak is located on the Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 63

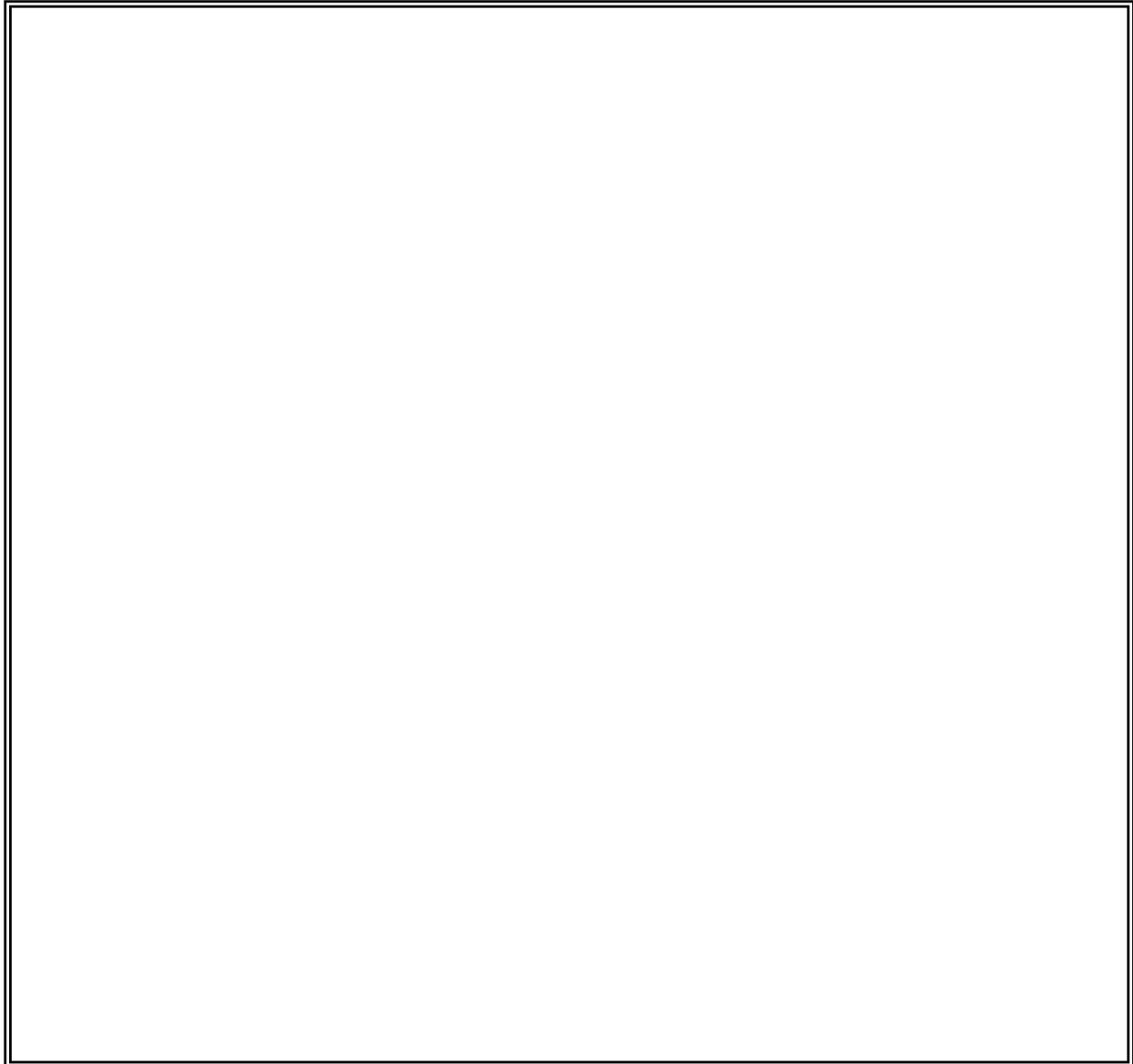
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of Russet St. and Wright Ave.

Comments: GIS hydrant number 1019. The leak was slowed by adjusting the operating nut, but the leak did not completely stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 64

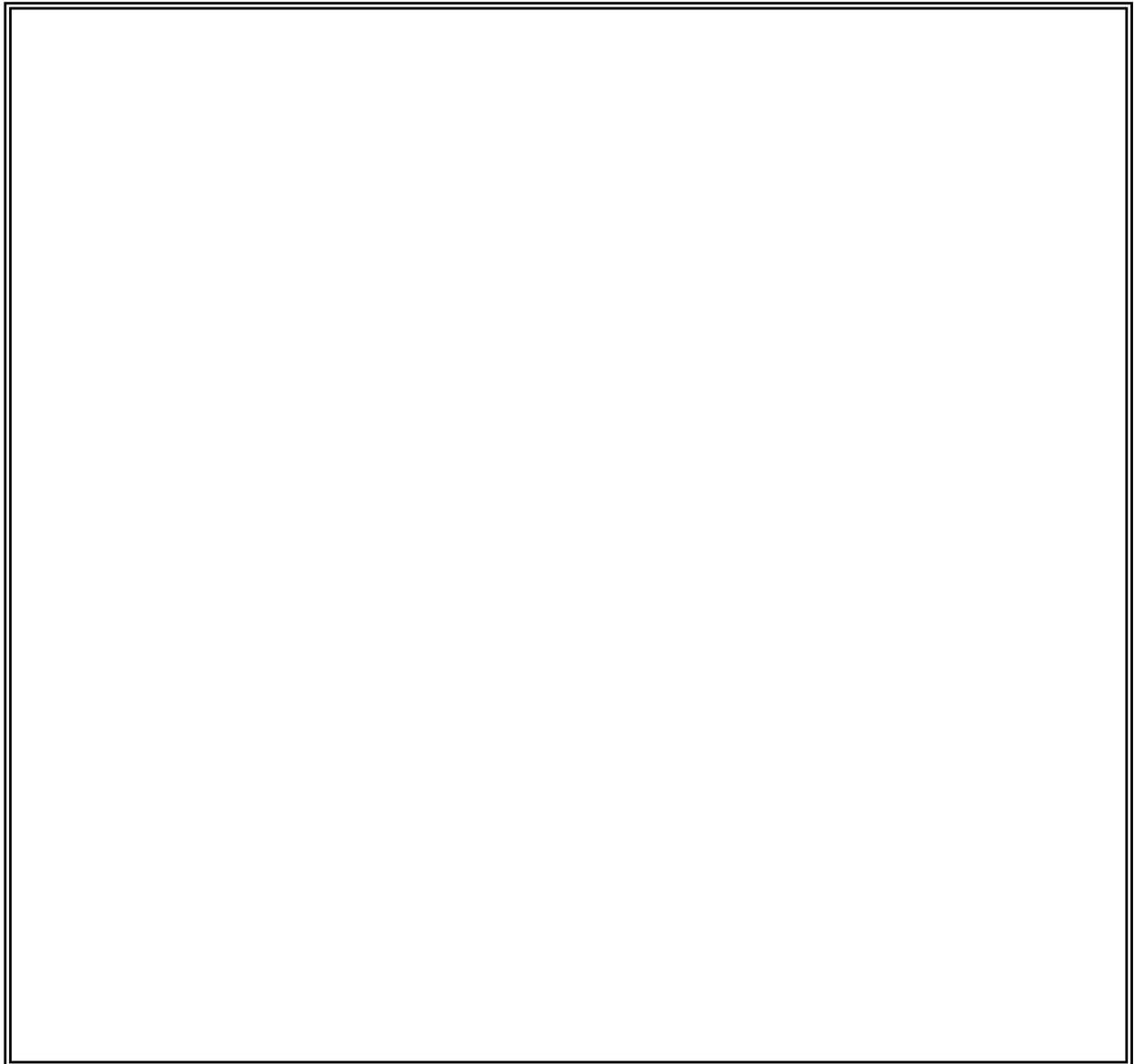
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Intersection of 16th Ave. and Quincy Ave.

Comments: GIS hydrant number 283. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 65

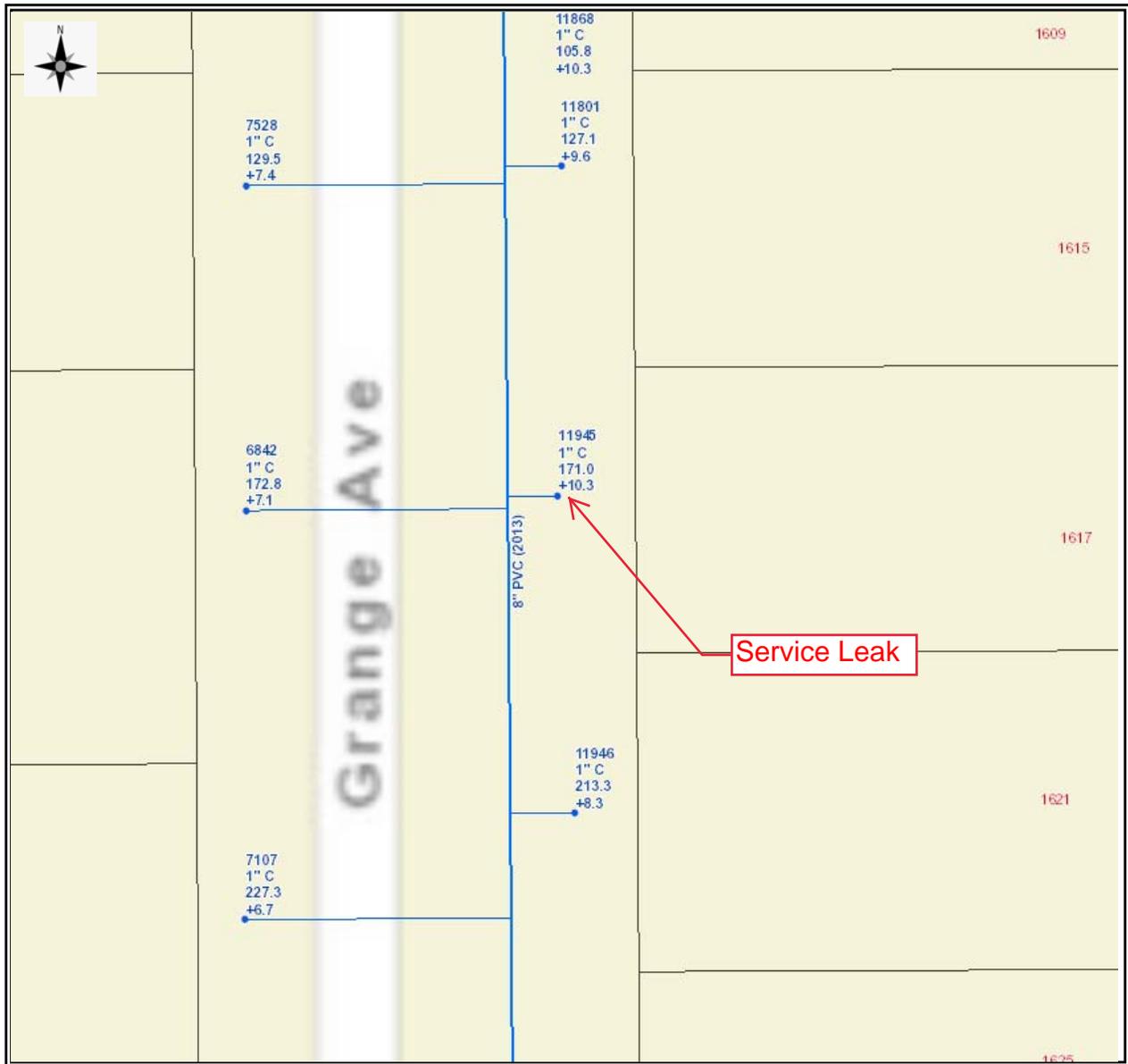
Date: 6/2/2020

Type of Leak: Service

Estimated Leakage (gpd): 10,000

Location: 1617 Grange Ave.

Comments: GIS service number 11945. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 66

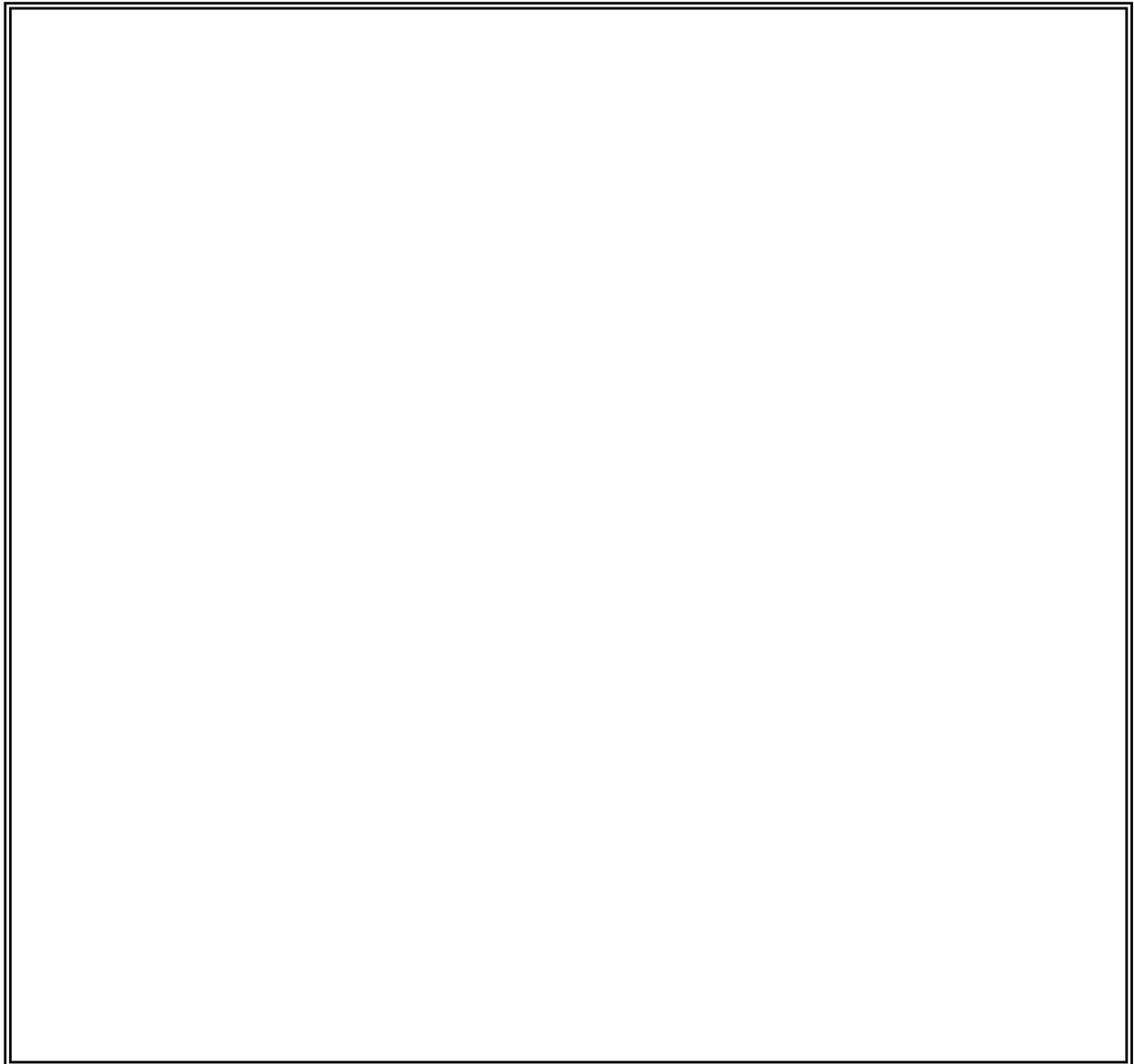
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Intersection of Washington Ave. and Flett Ave.

Comments: GIS hydrant number 294. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 67

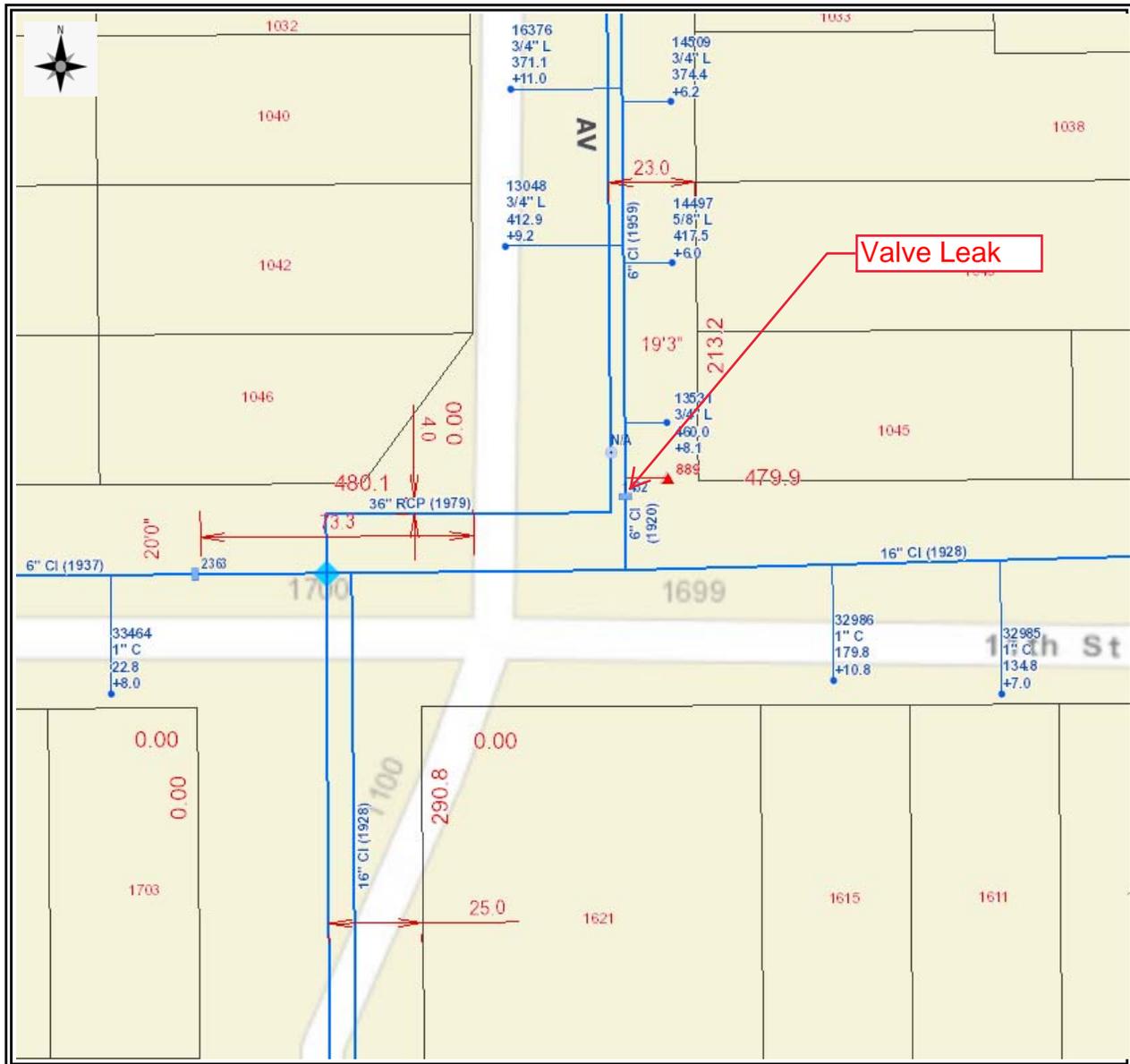
Date: 6/2/2020

Type of Leak: Valve

Estimated Leakage (gpd): 2,000

Location: Intersection of 11th Street and Harbridge Ave.

Comments: GIS valve number 1432. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 68

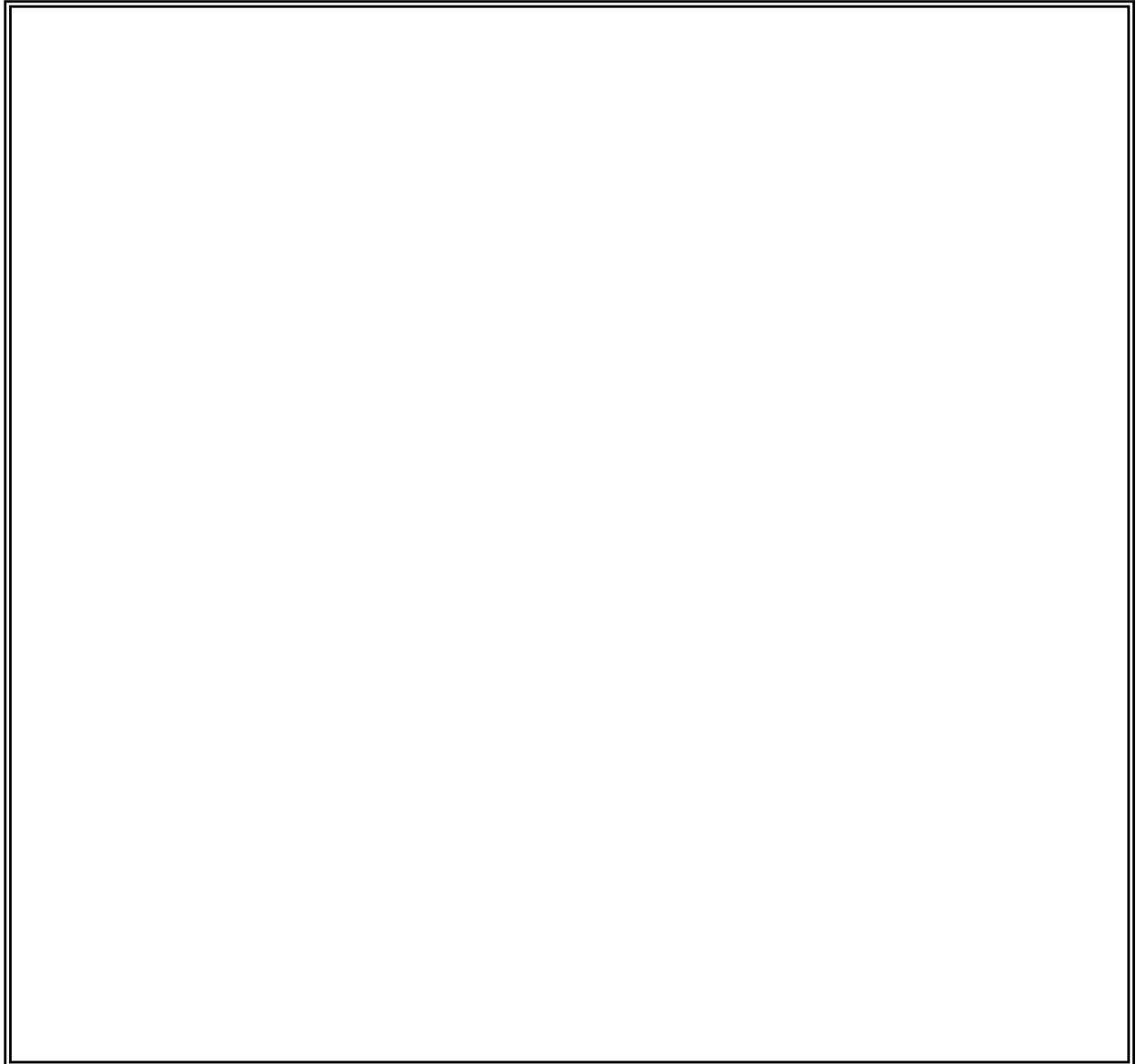
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of Bluff Ave. and 13th. St.

Comments: GIS hydrant number 909. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 69

Date: 6/2/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 2107 Slauson Ave.

Comments: GIS service number 8571. The leak is located on the Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 70

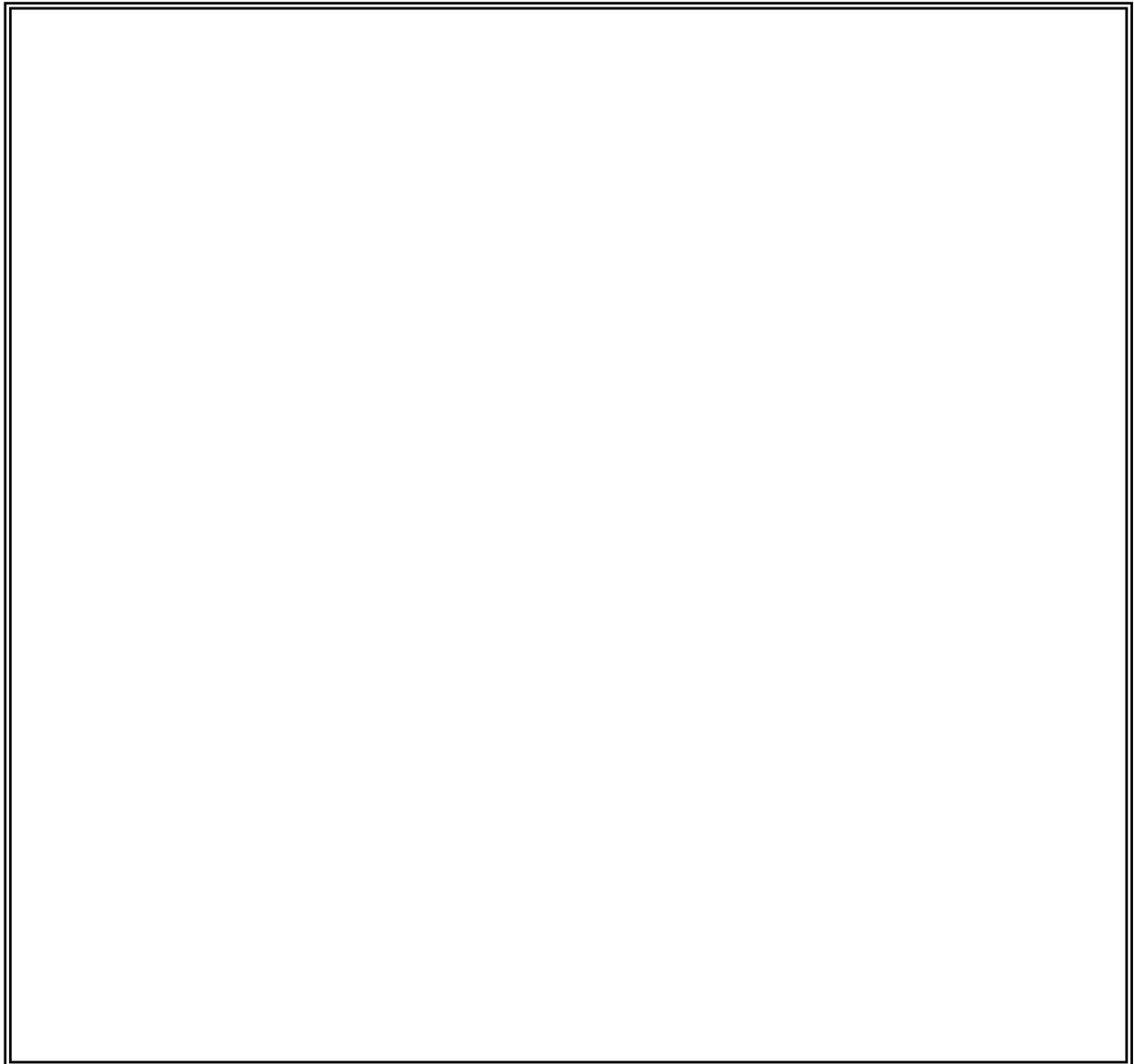
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 4,000

Location: Hydrant closest to 1316 12th St.

Comments: GIS hydrant number 243. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 71

Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of 12th St. and Schiller St.

Comments: GIS hydrant number 155. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 72

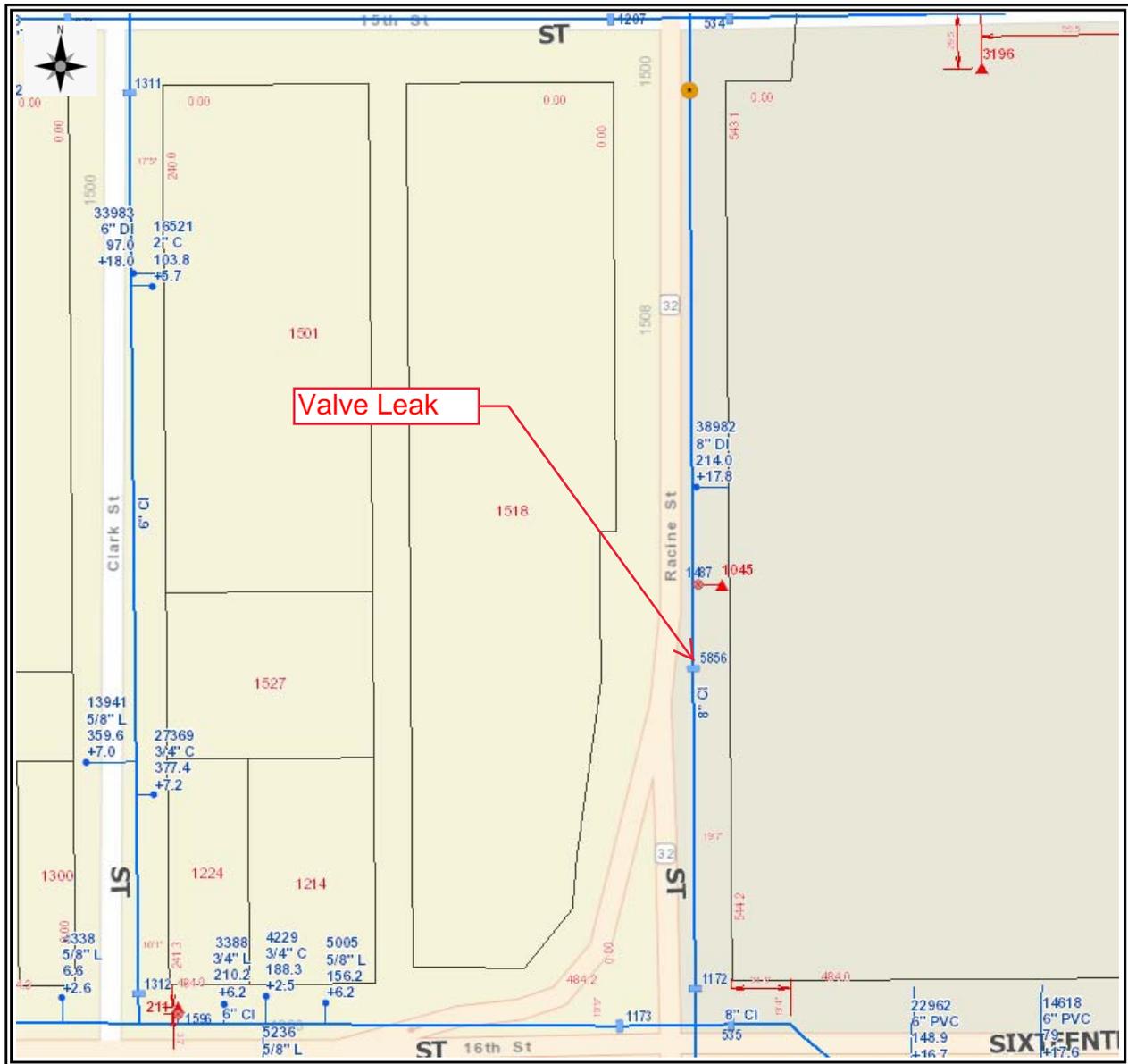
Date: 6/2/2020

Type of Leak: Valve

Estimated Leakage (gpd): 1,000

Location: On Racine St. between 15th St. and 16th St.

Comments: GIS valve number 5856. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 73

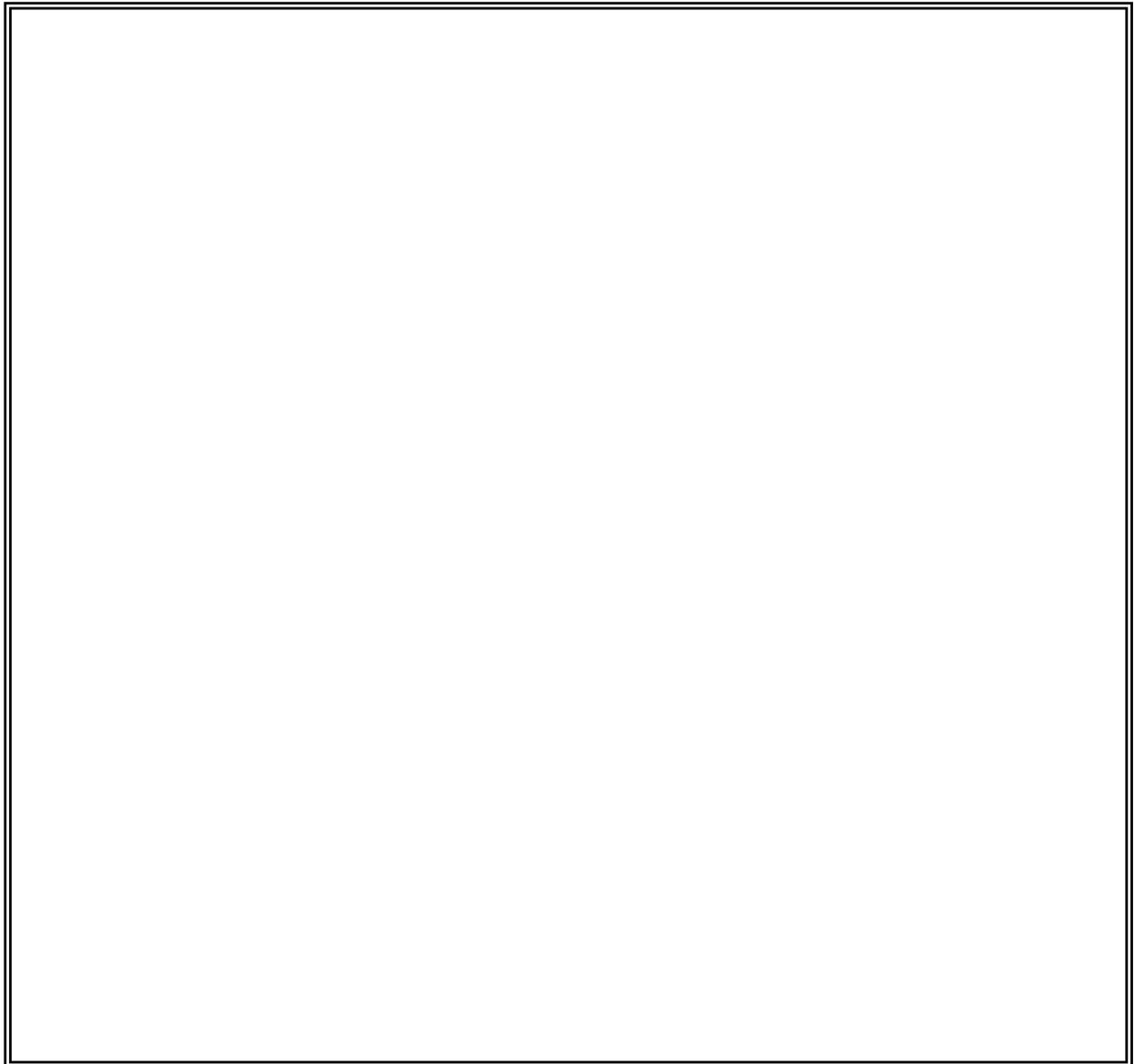
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: On 16th St. between Junction Ave. and Clark St.

Comments: GIS hydrant number 215. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 74

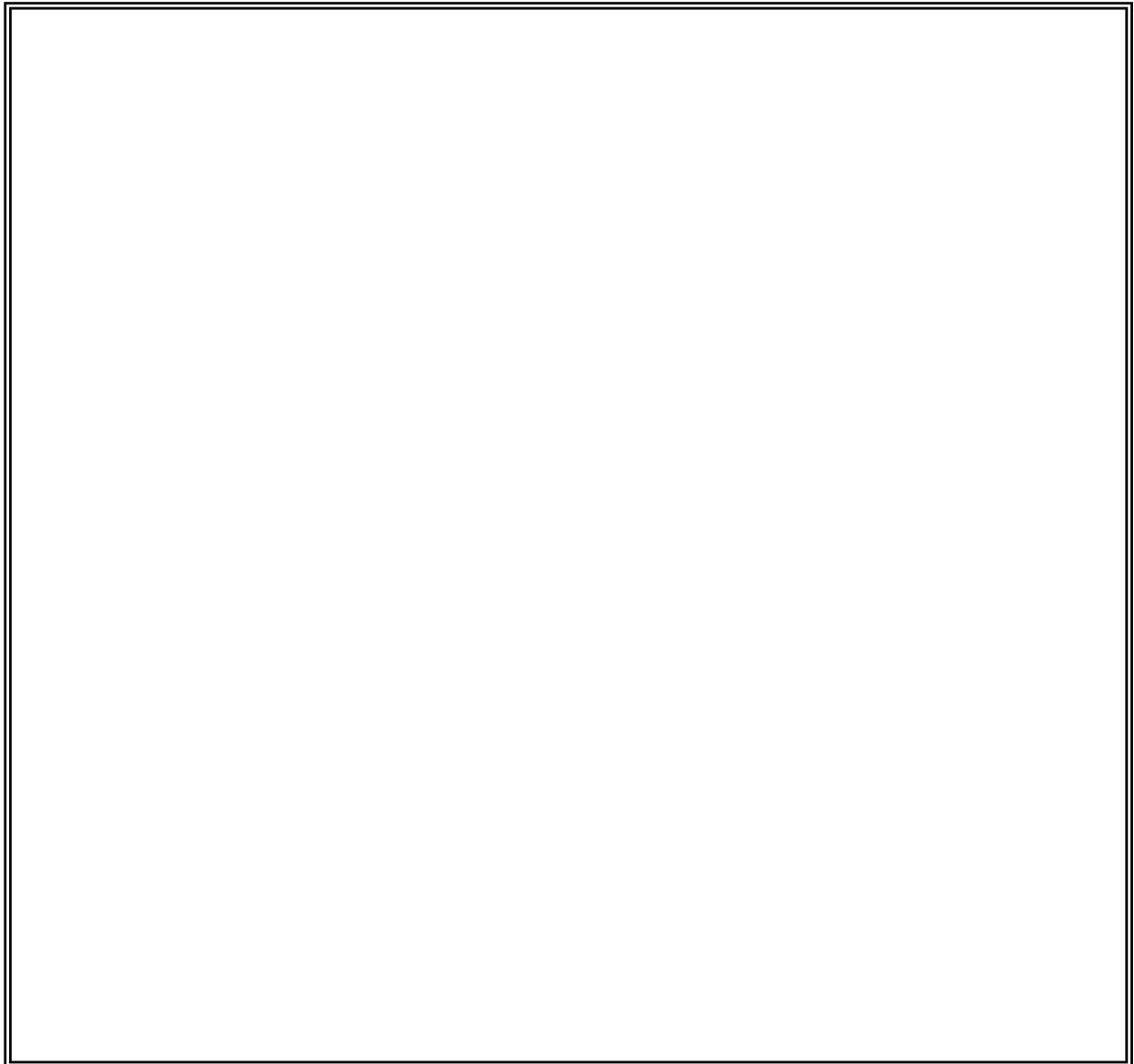
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of 16th St. and Racine St.

Comments: GIS hydrant number 184. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 75

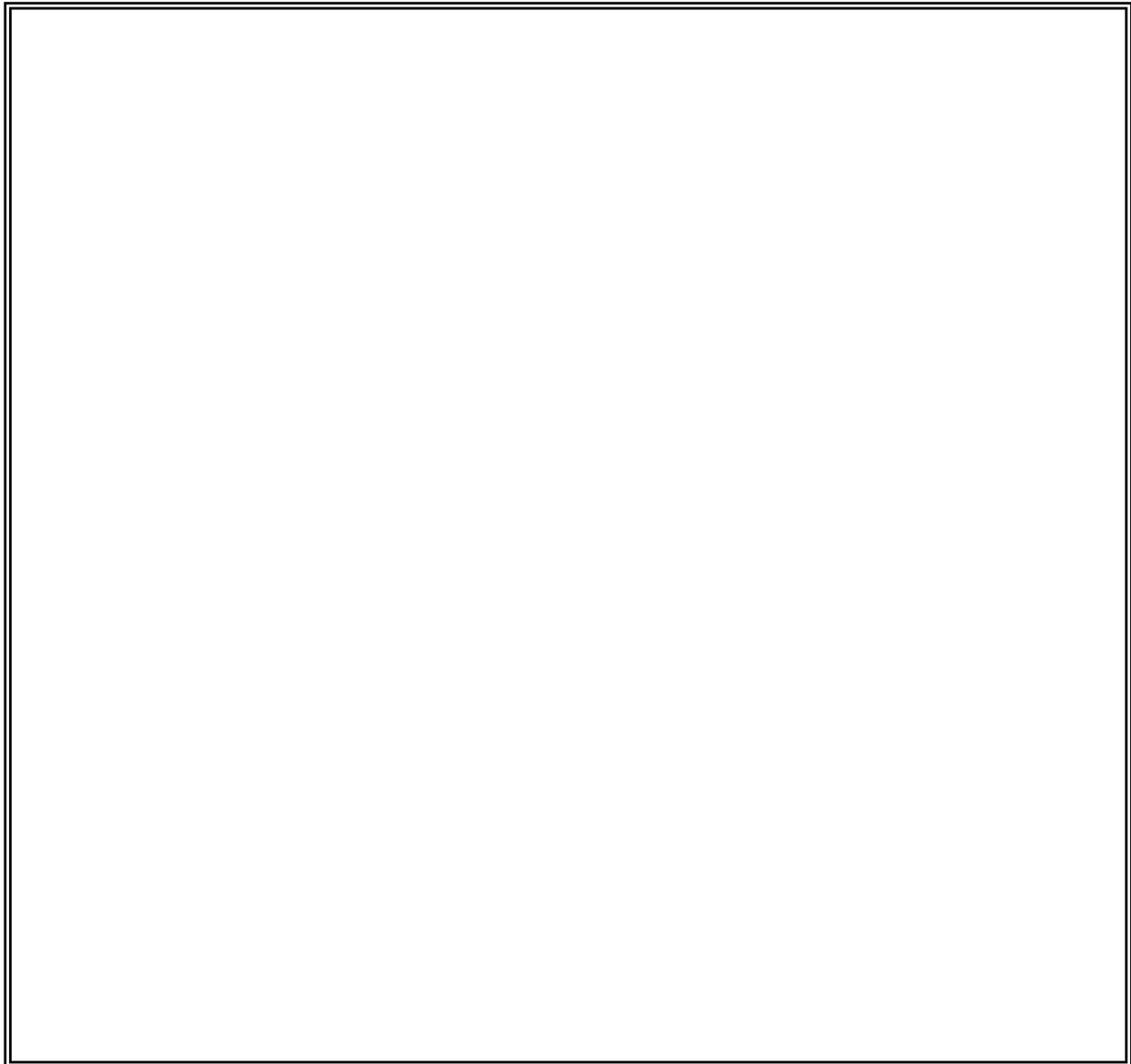
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: Intersection of 17th St. and Howe St.

Comments: GIS hydrant number 790. Slowed the leak by adjusting the operating nut but could not completely stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 76

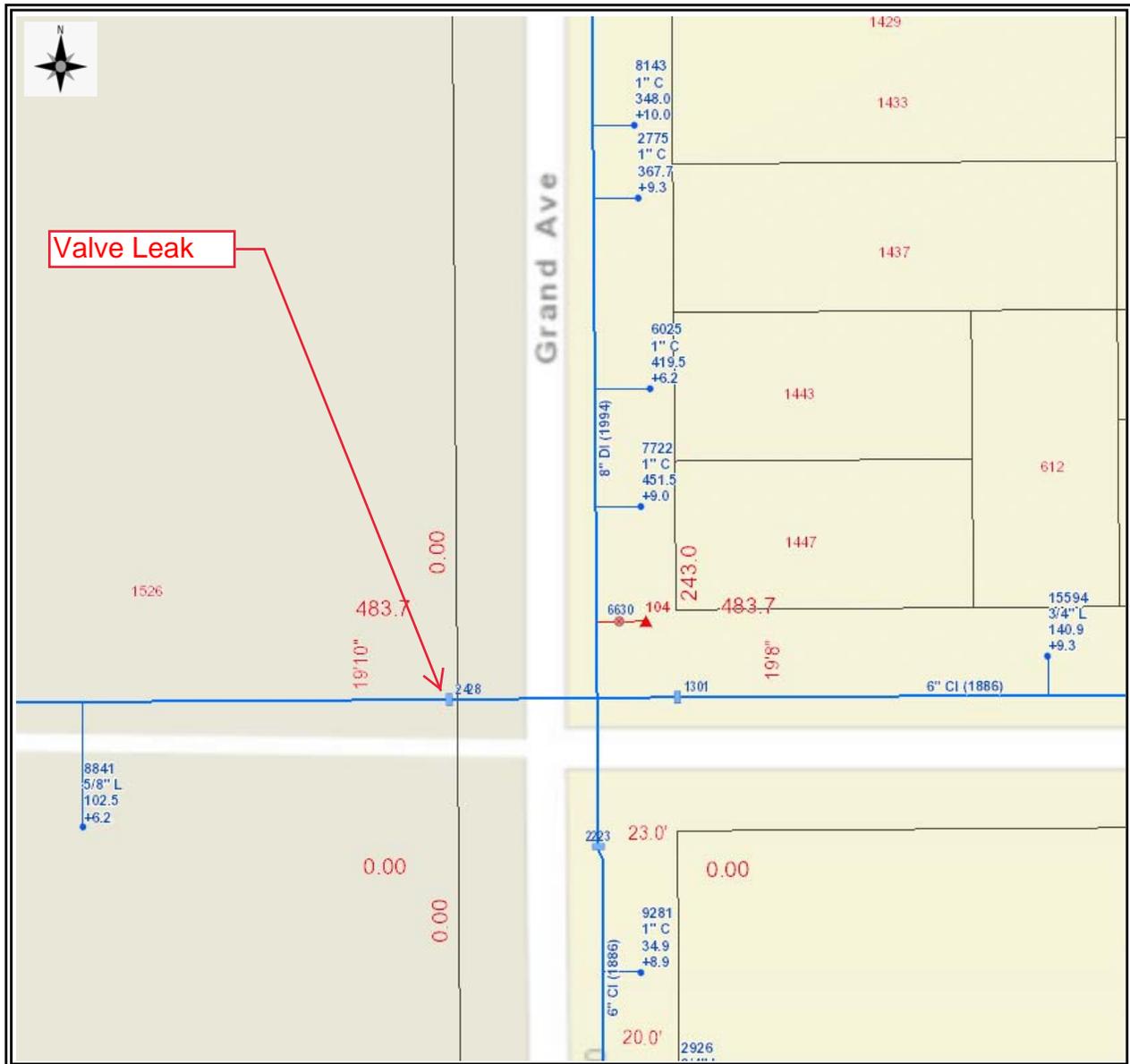
Date: 6/2/2020

Type of Leak: Valve

Estimated Leakage (gpd): 2,000

Location: Intersection of 15th St. and Grand Ave.

Comments: GIS valve number 2428. The leak is located at or near the valve.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 77

Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 4,000

Location: Intersection of 17th Ave. and Park Ave.

Comments: GIS hydrant number 75. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 78

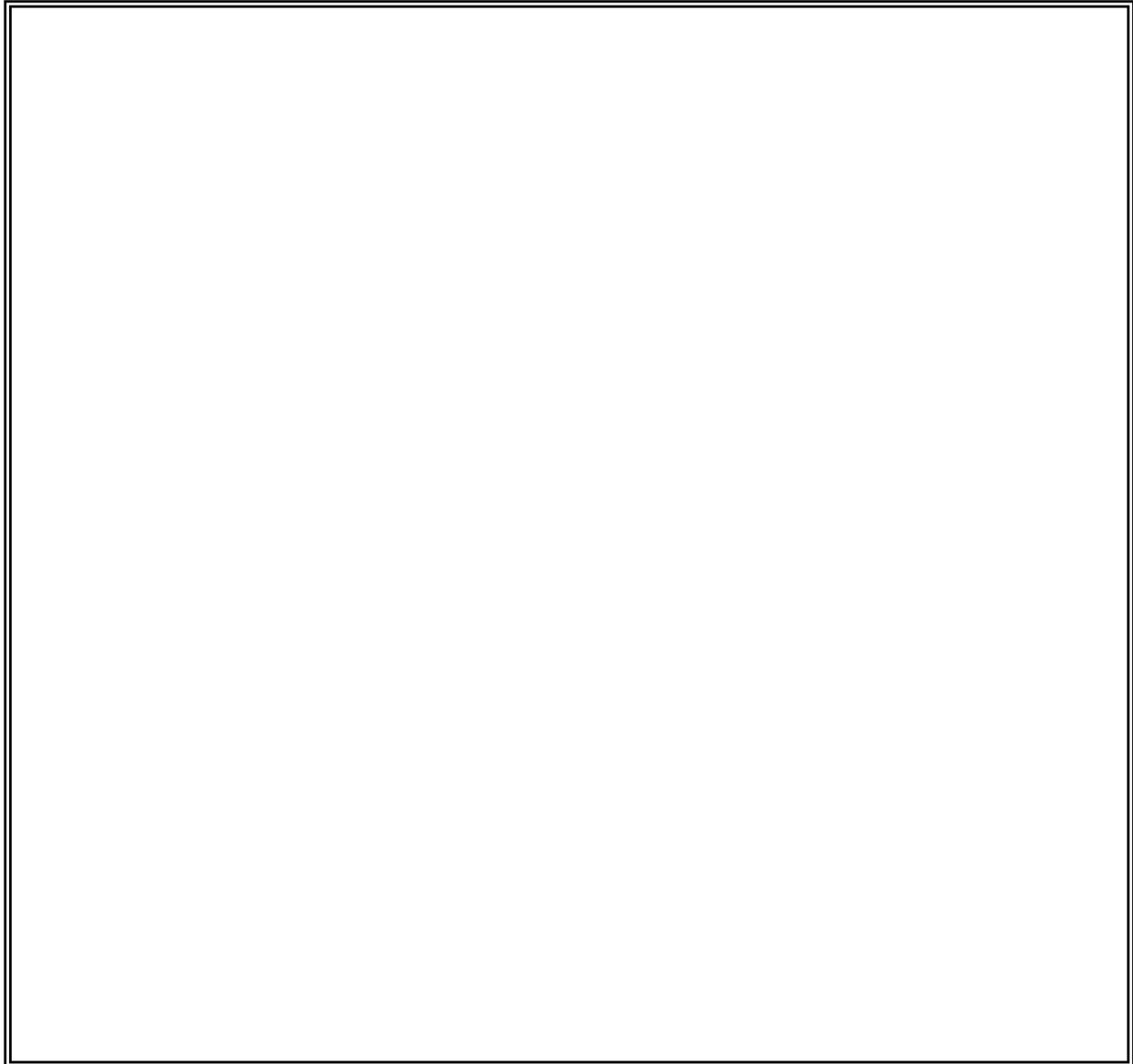
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: Intersection of Monroe Ave. and 19th St.

Comments: GIS hydrant number 1860. Slowed leak by adjusting the operating nut but could not completely stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 79

Date: 6/2/2020

Type of Leak: Service

Estimated Leakage (gpd): 6,000

Location: 1806 Grand Ave.

Comments: GIS service number 7791. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 80

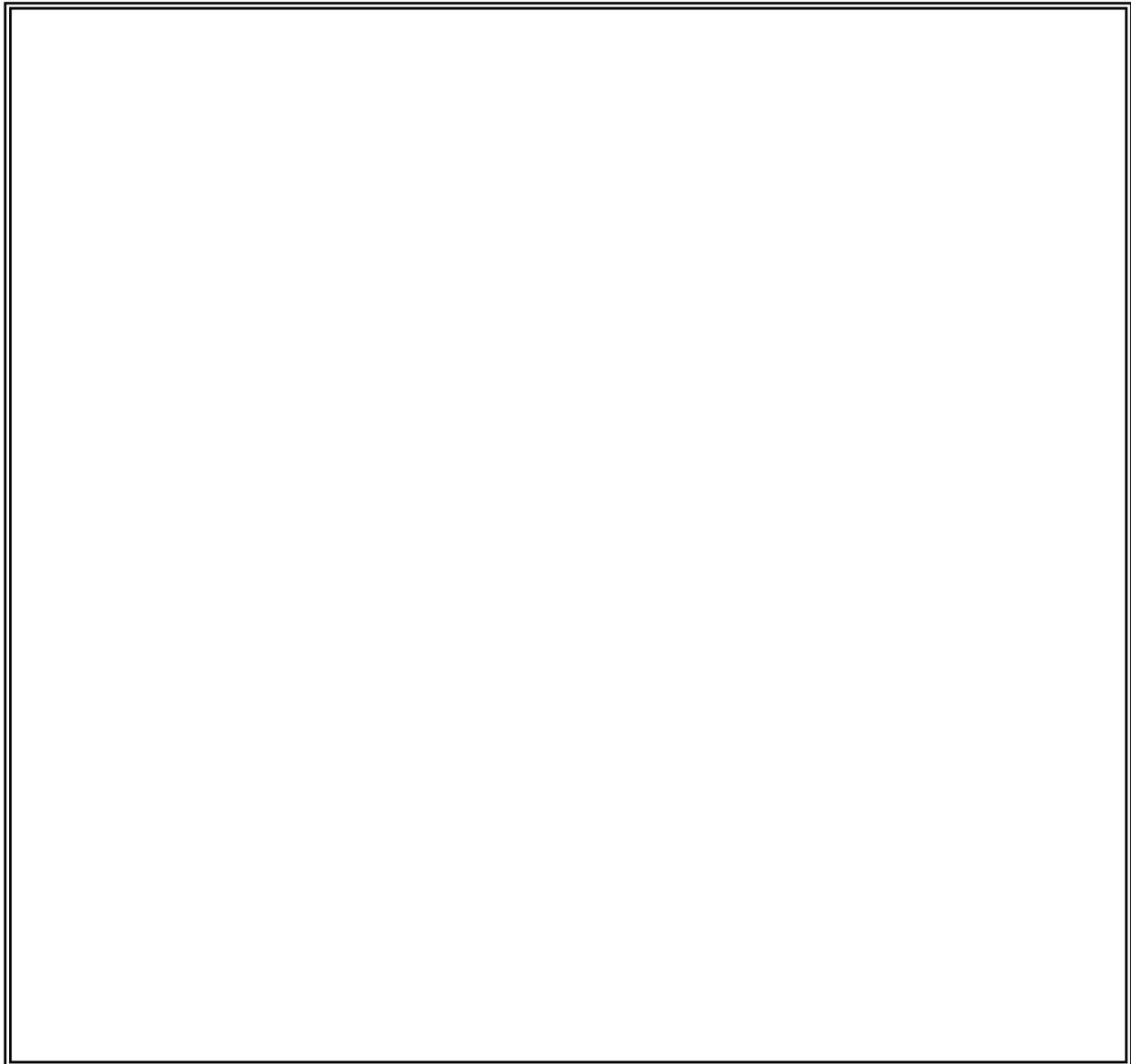
Date: 6/2/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Intersection of De Koven Ave. and Park Ave.

Comments: GIS hydrant number 73. Stopped leak by adjusting operating nut.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 81

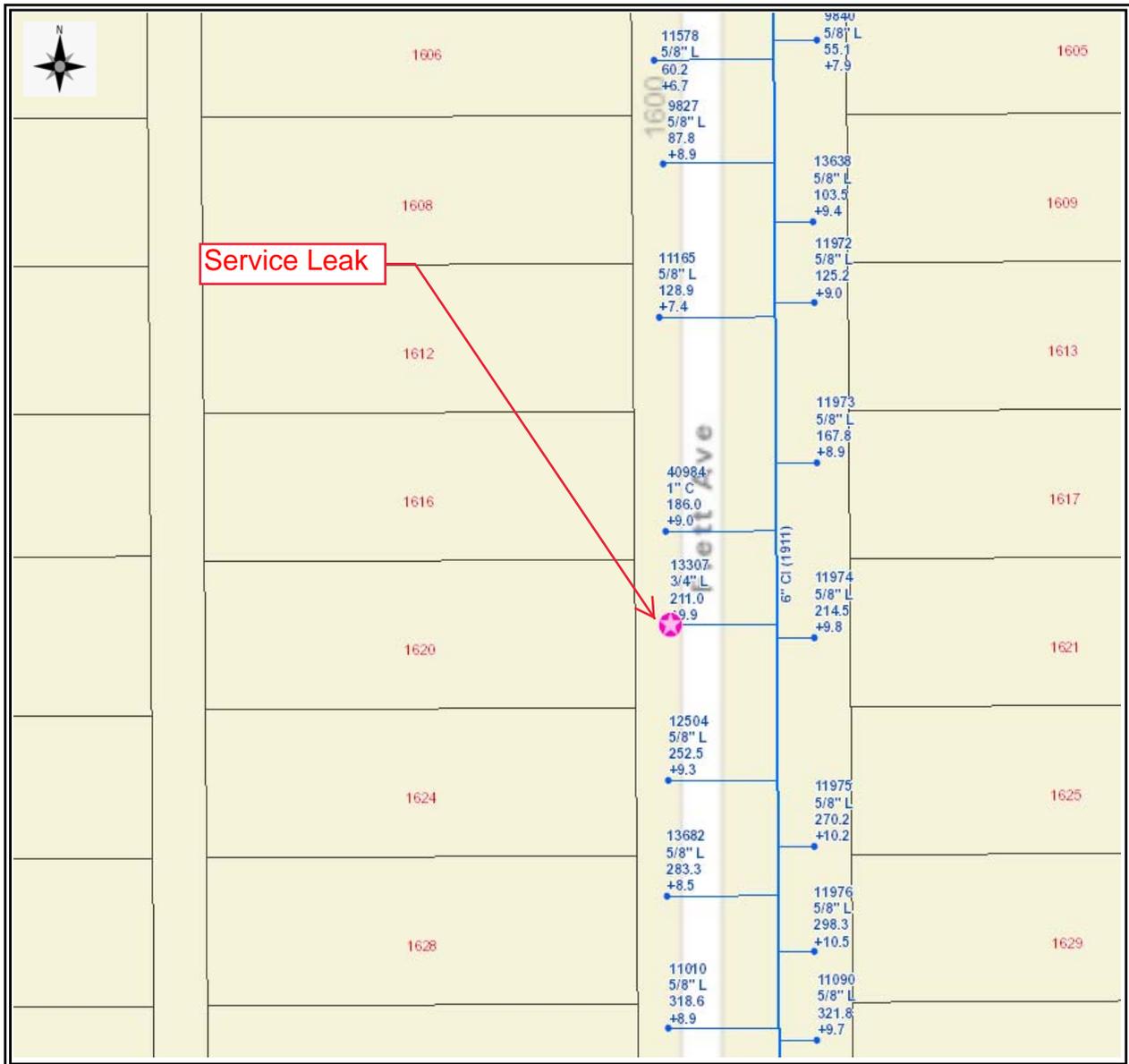
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 1620 Flett Ave.

Comments: GIS service number 13307. The leak is located on the Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 82

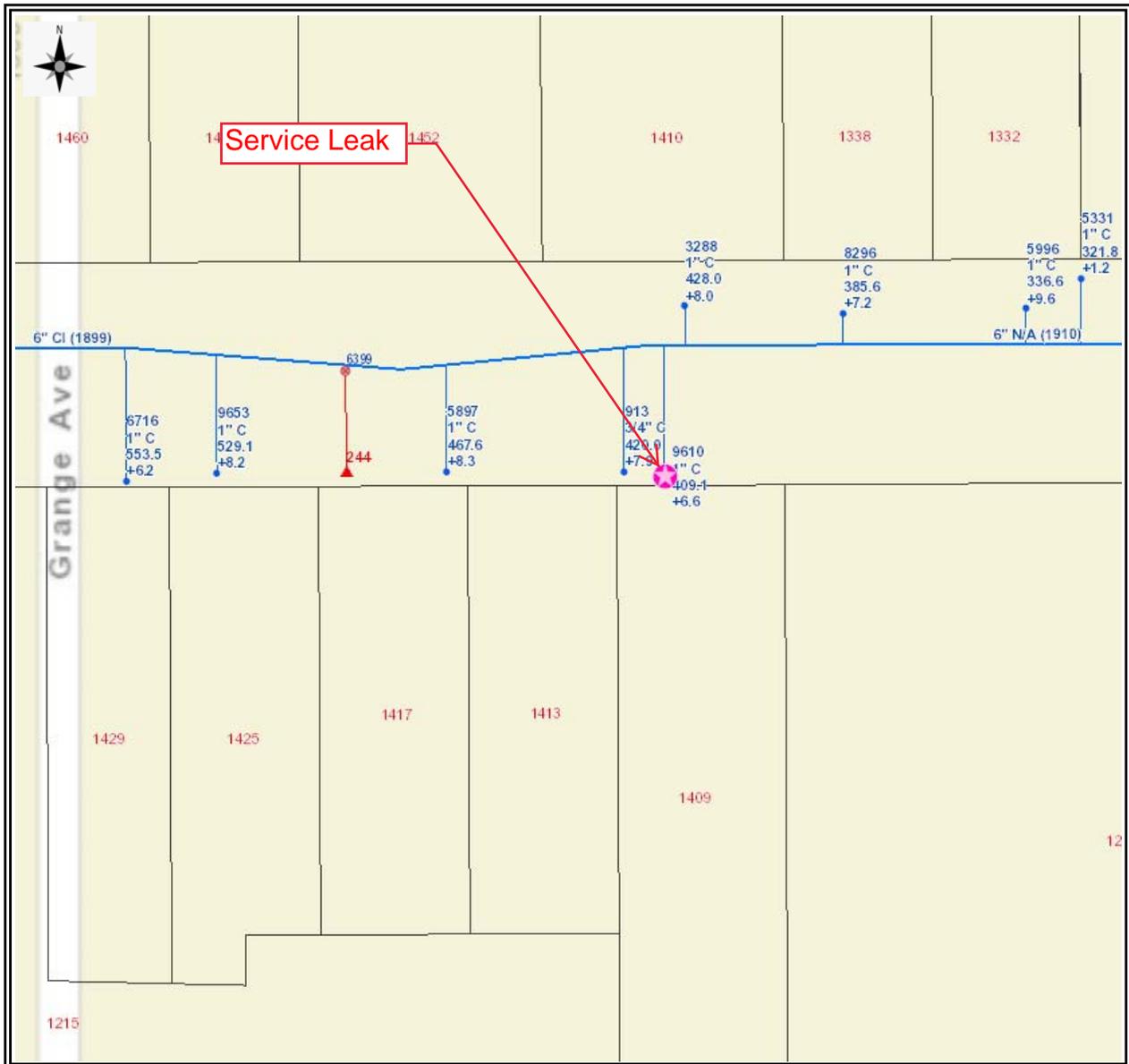
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 15,000

Location: 1409 12th St.

Comments: GIS service number 9610. The leak is located on the Utility's side of the service, at or near the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 83

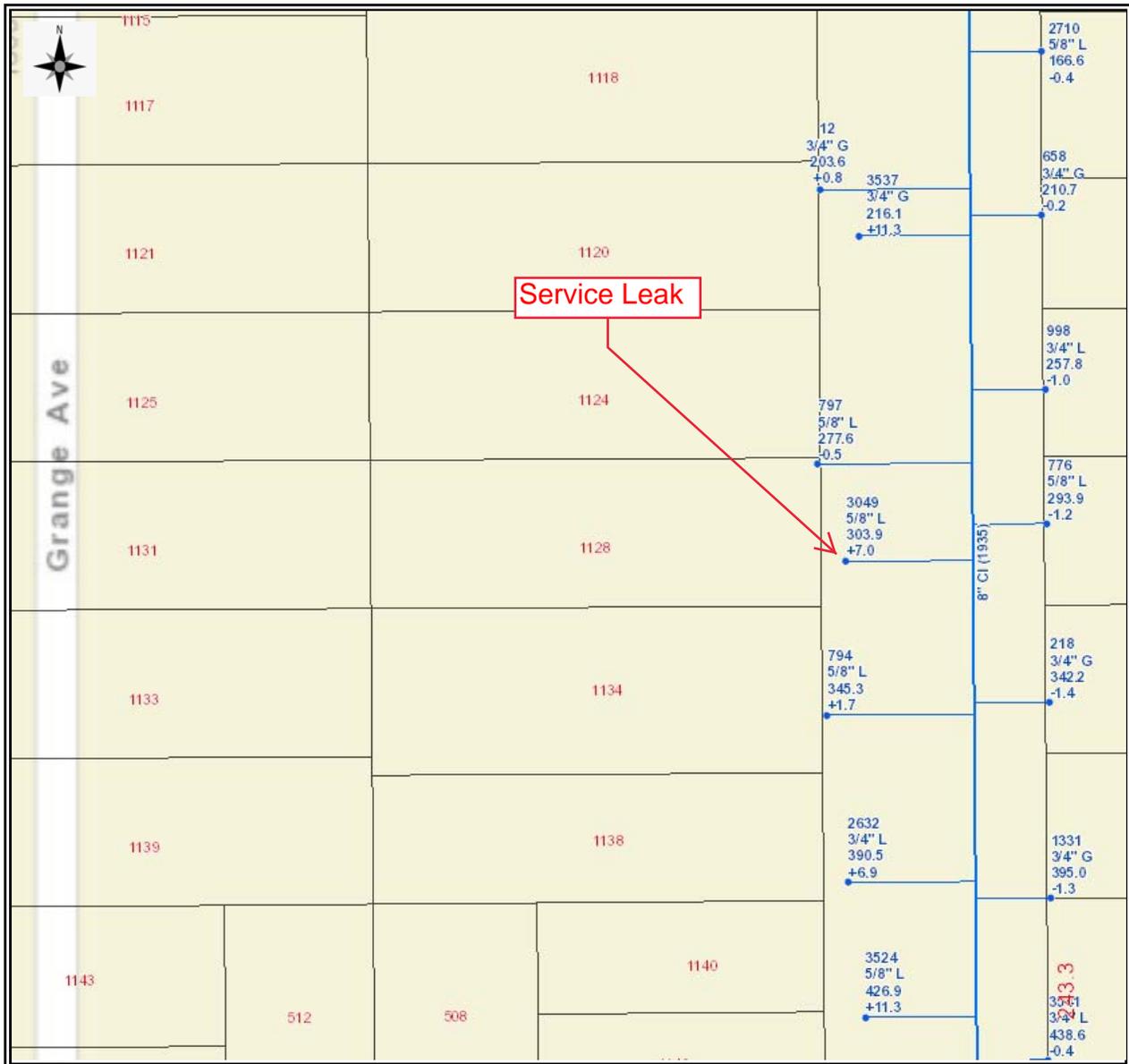
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 14,000

Location: 1128 Park Ave.

Comments: GIS service number 3049. Unable to access the service. The Racine Water Utility will determine what side of the curb stop the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 85

Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 18,000

Location: 2824 21st St.

Comments: GIS service number 16752. The leak is located on Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 86

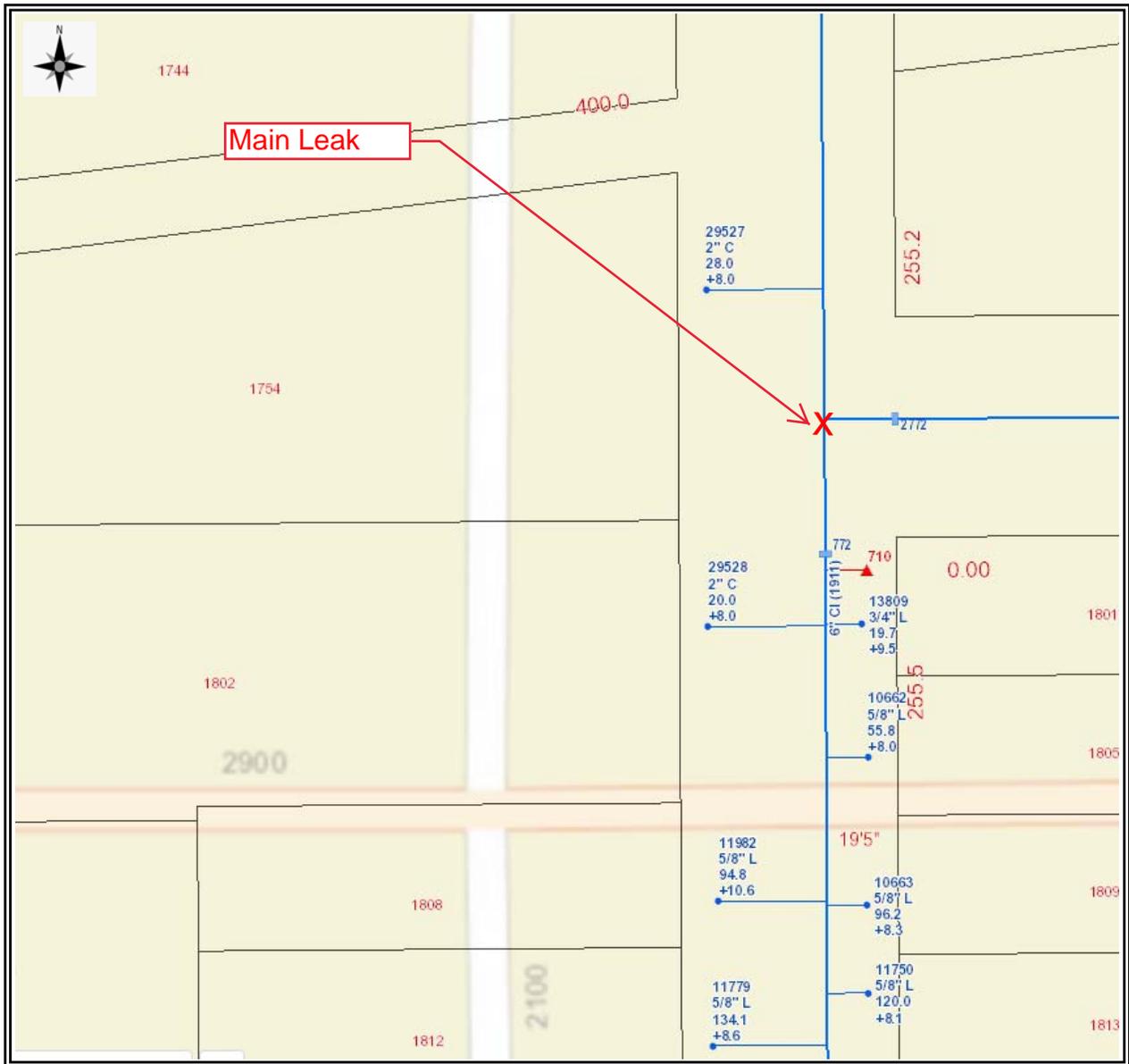
Date: 6/12/2020

Type of Leak: Main

Estimated Leakage (gpd): 8,000

Location: 2824 21st St.

Comments: The leak is located approximately 36 feet to the north of valve number 772. The approximate leak location is marked with a blue "X".



**Racine, Wisconsin
2020 Leak Report**

Leak No: 87

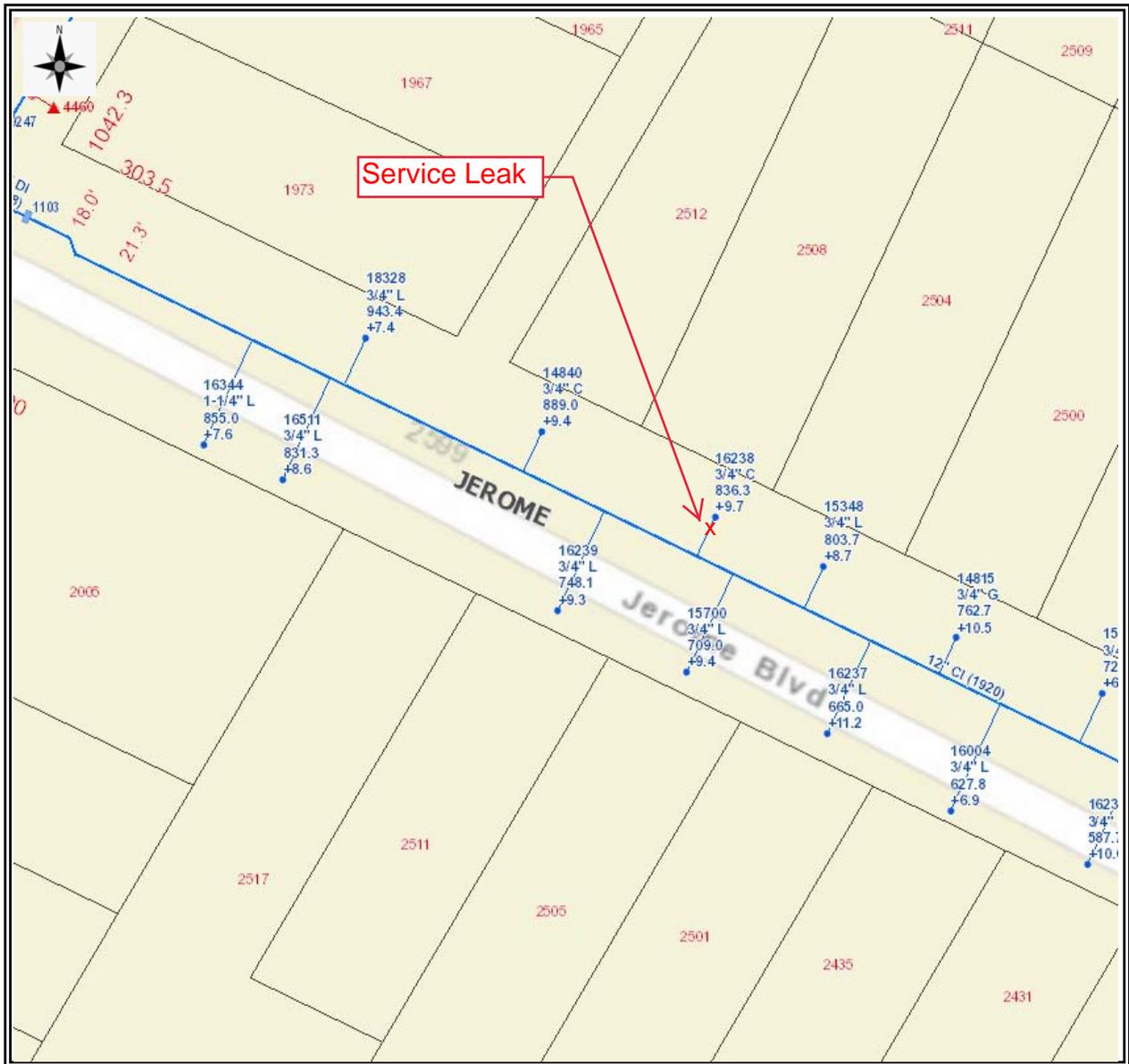
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 20,000

Location: 2508 Jerome Blvd.

Comments: GIS service number 16238. The leak is located on Utility's side of the service, approximately 2 feet from the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 88

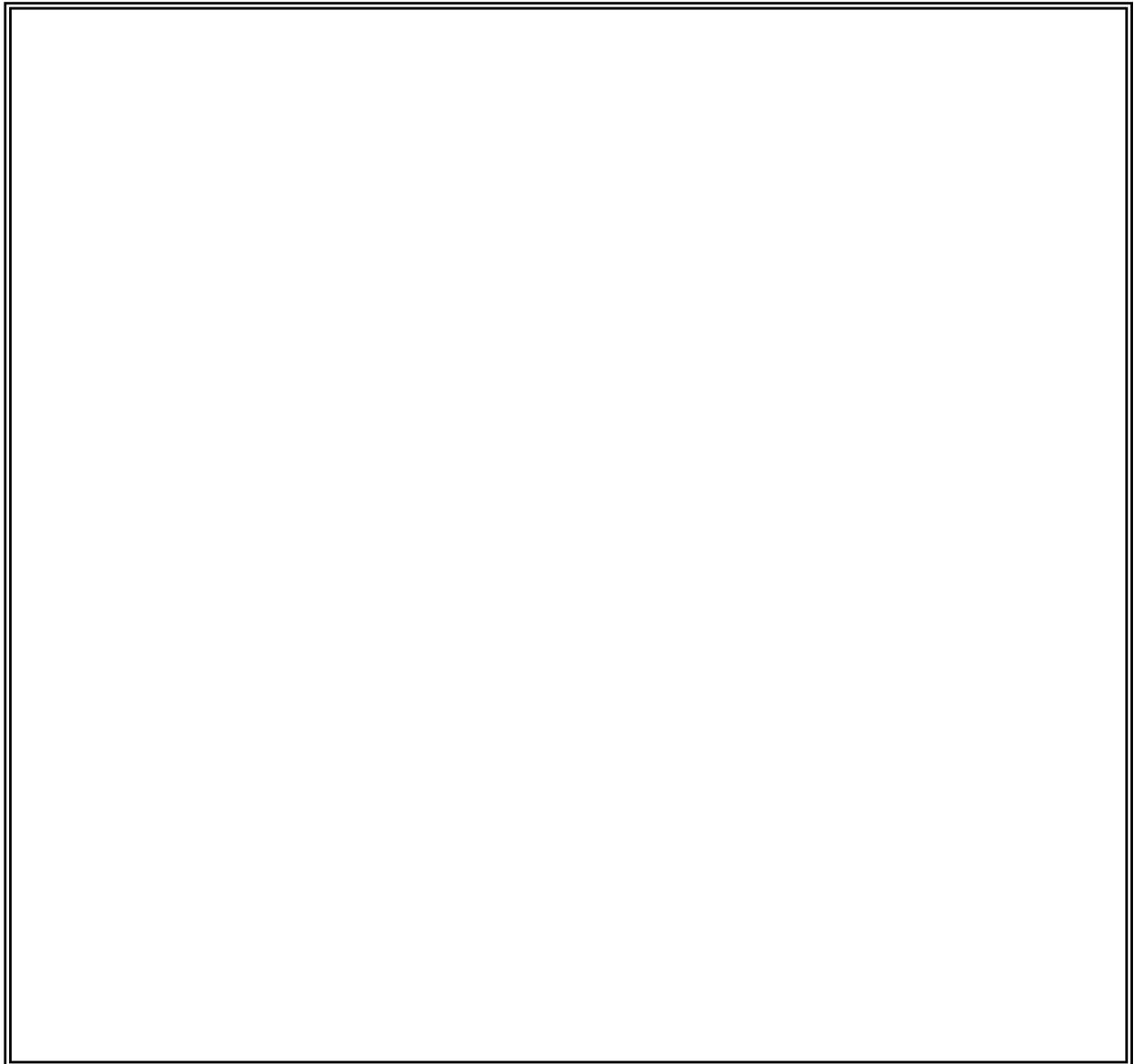
Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 2,000

Location: Intersection of 21st St. and Thurston Ave.

Comments: GIS hydrant number 804. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 89

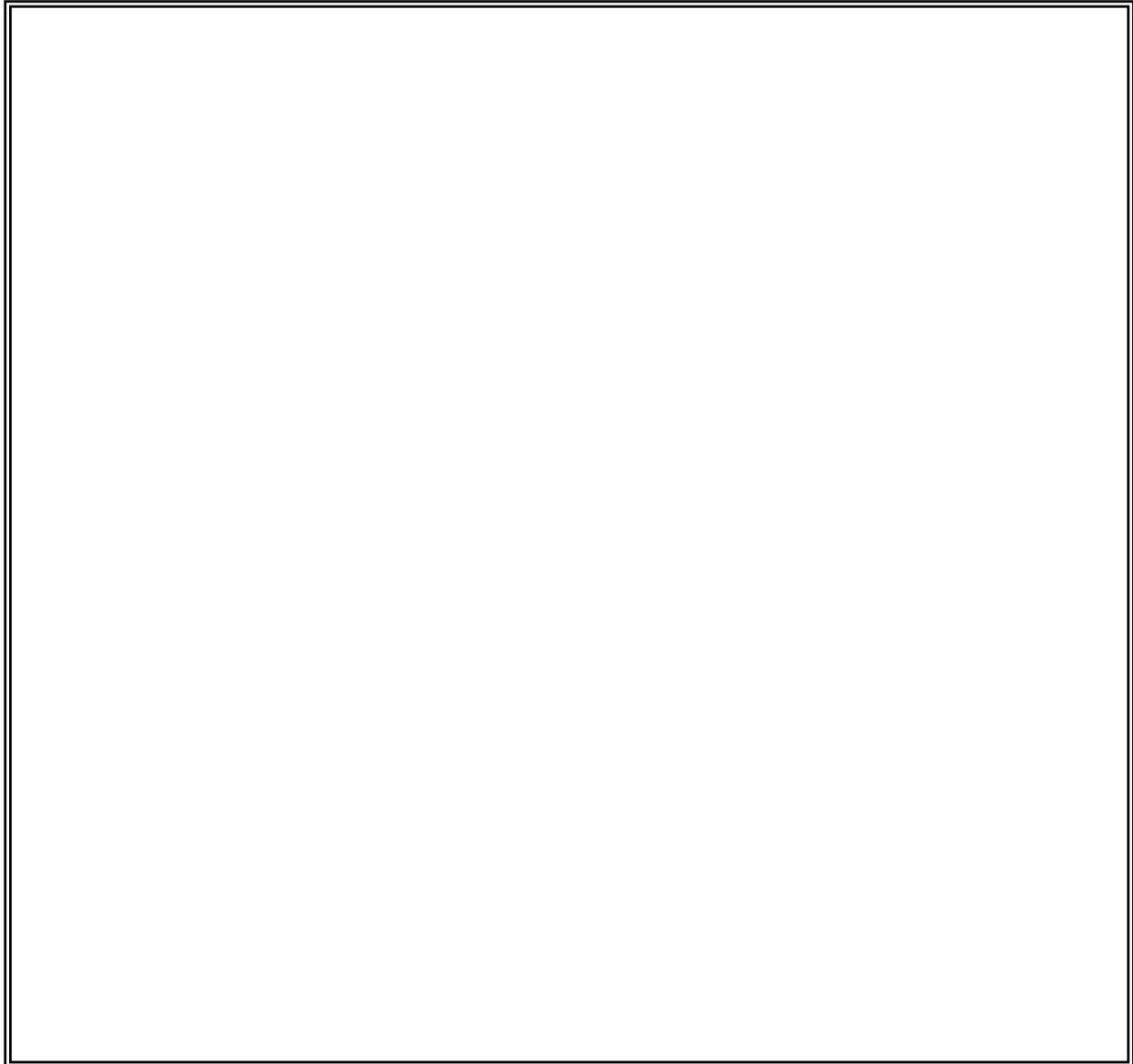
Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 5,000

Location: Near 1717 Taylor Ave.

Comments: GIS hydrant number 3316. Slowed leak by adjusting the operating nut but could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 90

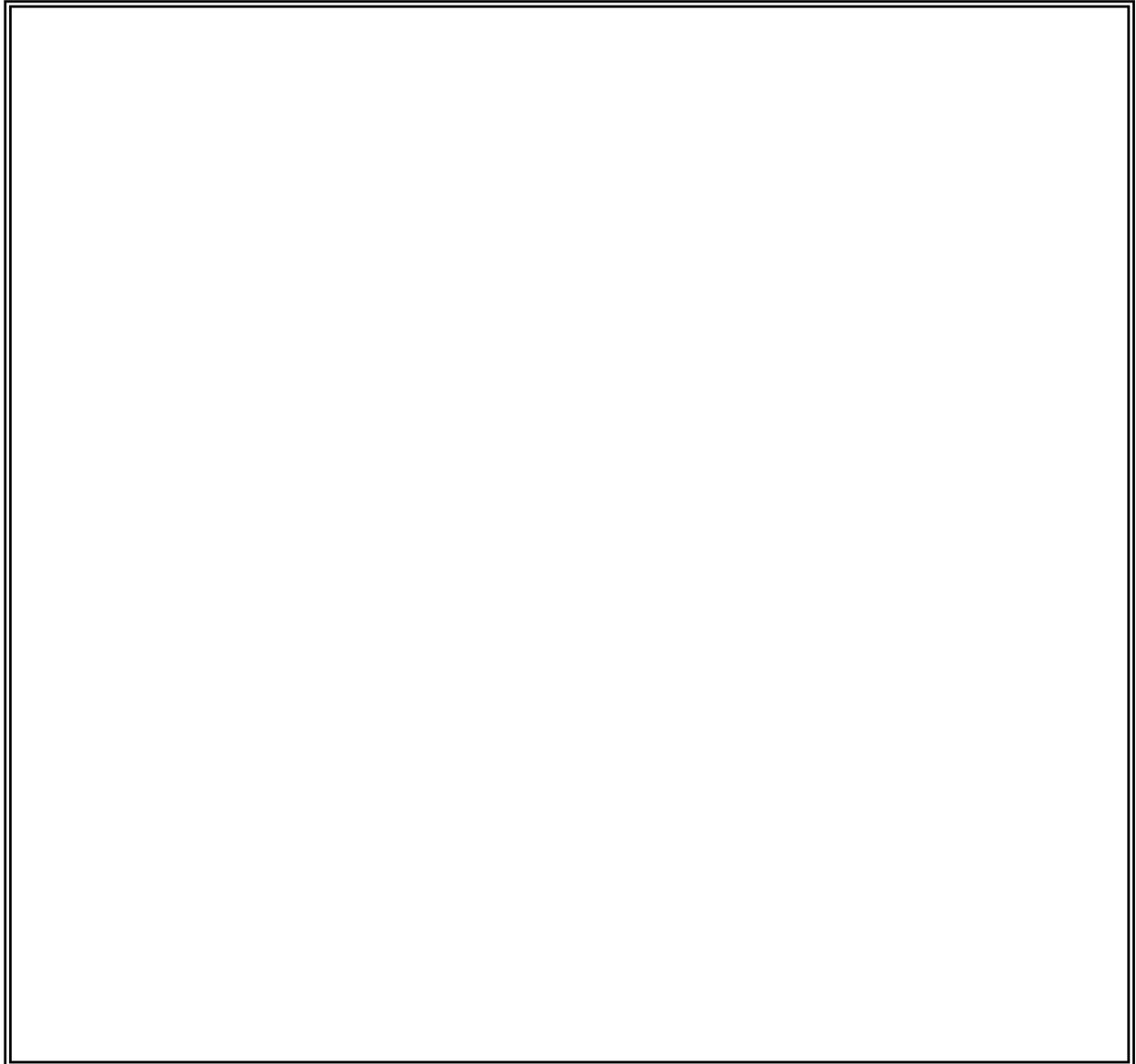
Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Intersection of Meachem St. and Kearney Ave.

Comments: GIS hydrant number 932. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 91

Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 4,000

Location: Intersection of De Koven Ave. and Hickory Grove Ave.

Comments: GIS hydrant number 631. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 92

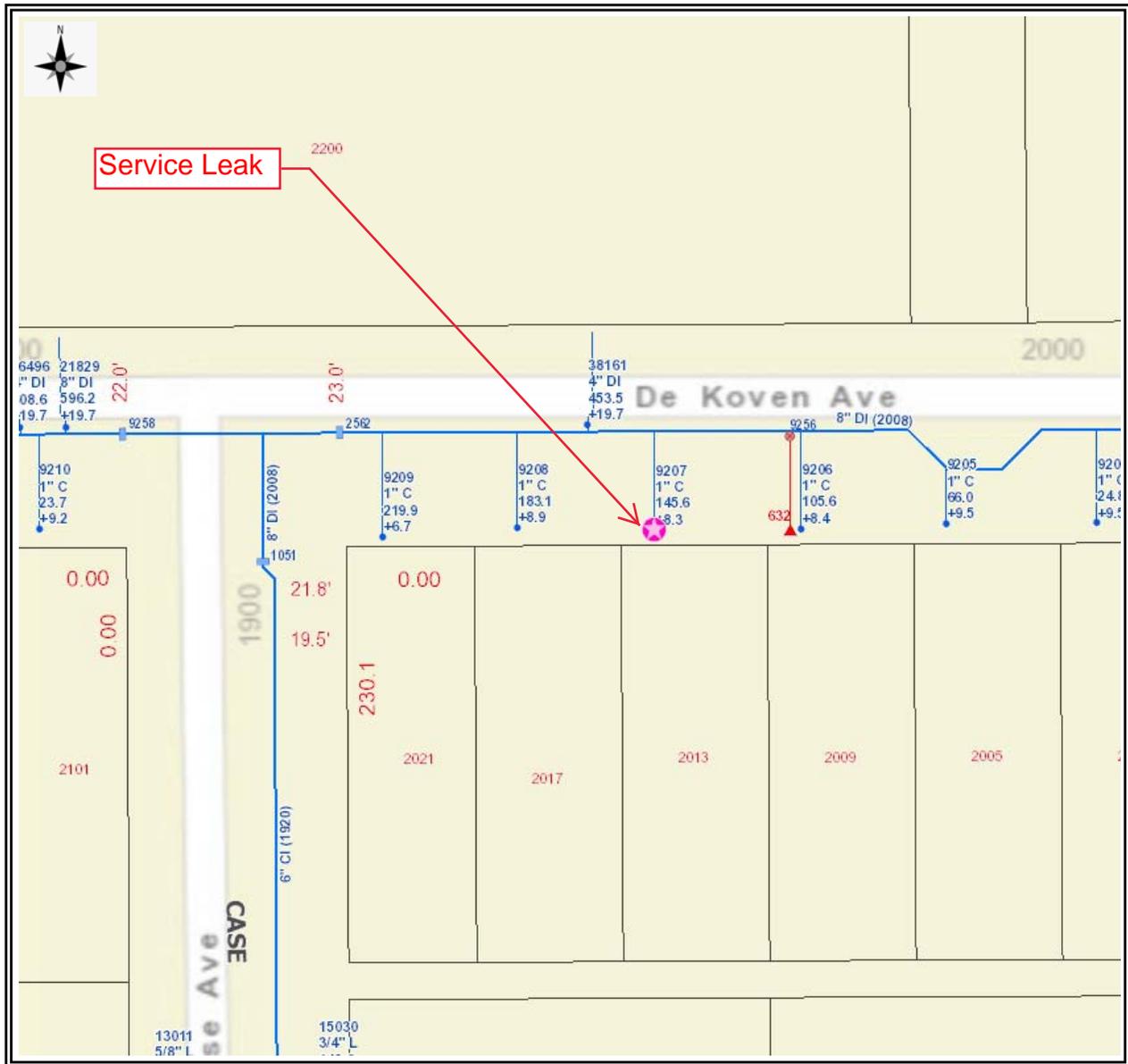
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 8,000

Location: 2013 De Koven Ave.

Comments: GIS service number 9207. The leak is located on the home-owner's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 93

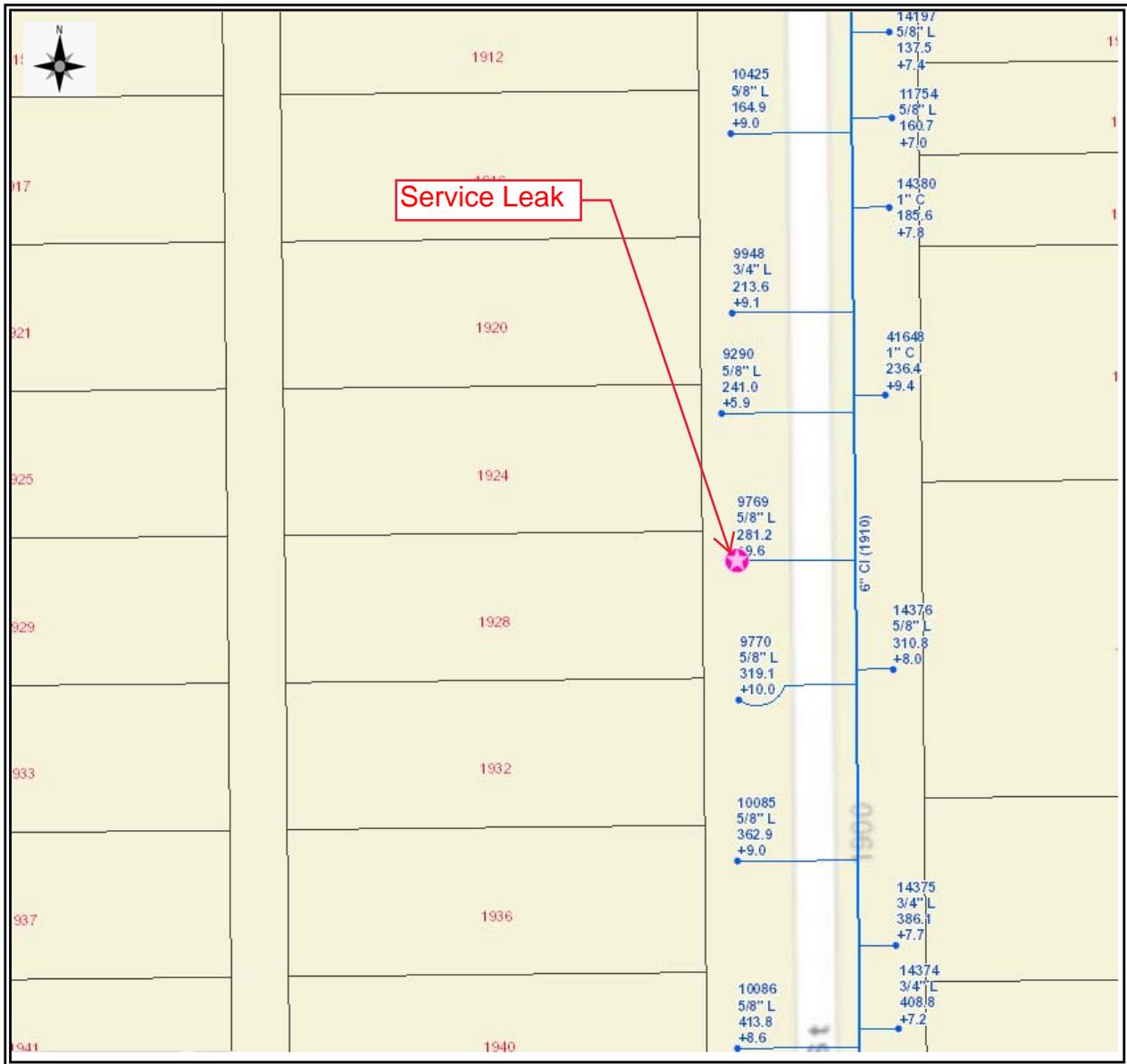
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 10,000

Location: 1928 Mead St.

Comments: GIS service number 9769. The leak is located on the Utility's side of the curb stop.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 94

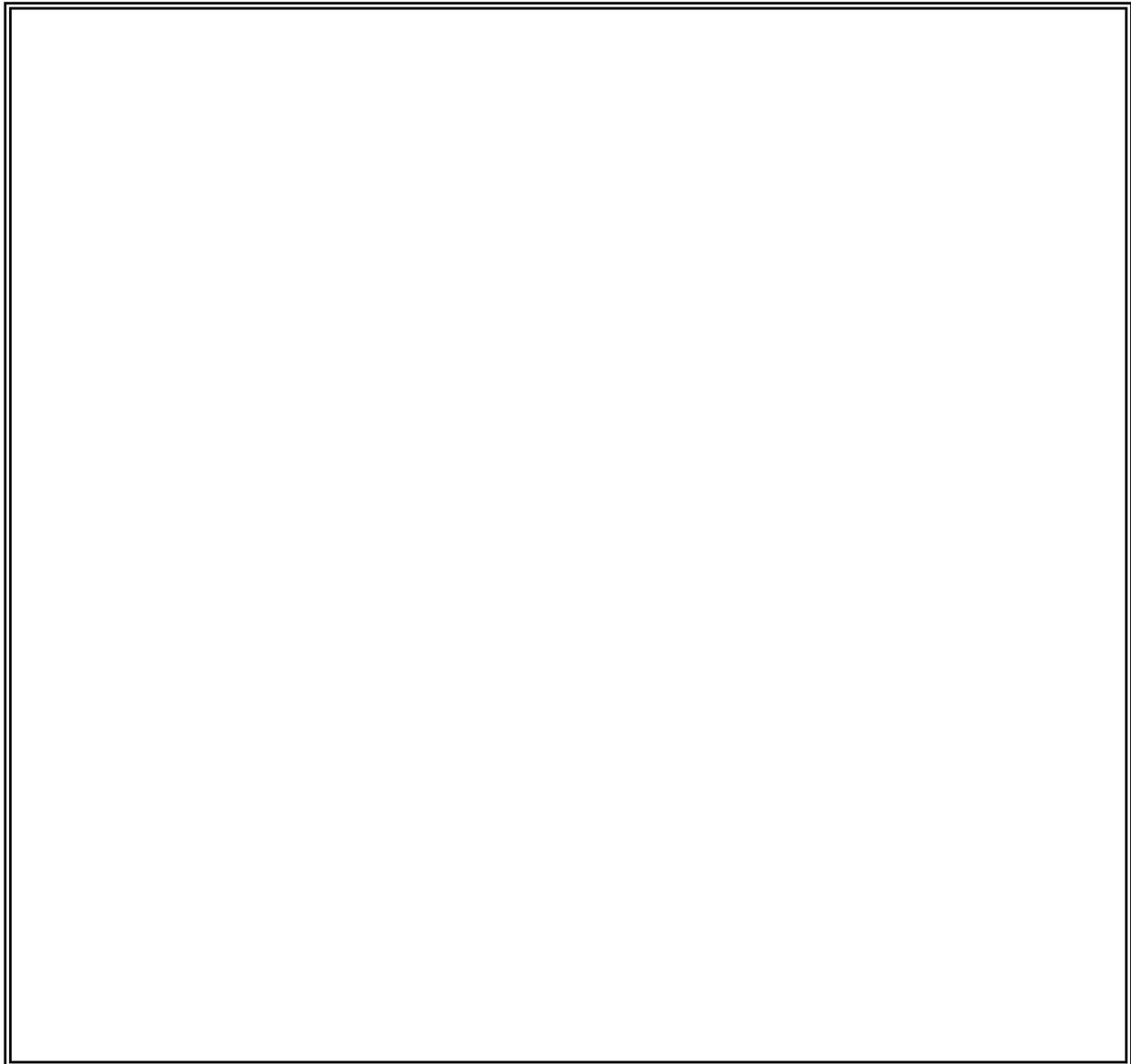
Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Intersection of Mead St. and 20th St.

Comments: GIS hydrant number 176. Slowed the leak by adjusting the operating nut but could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 95

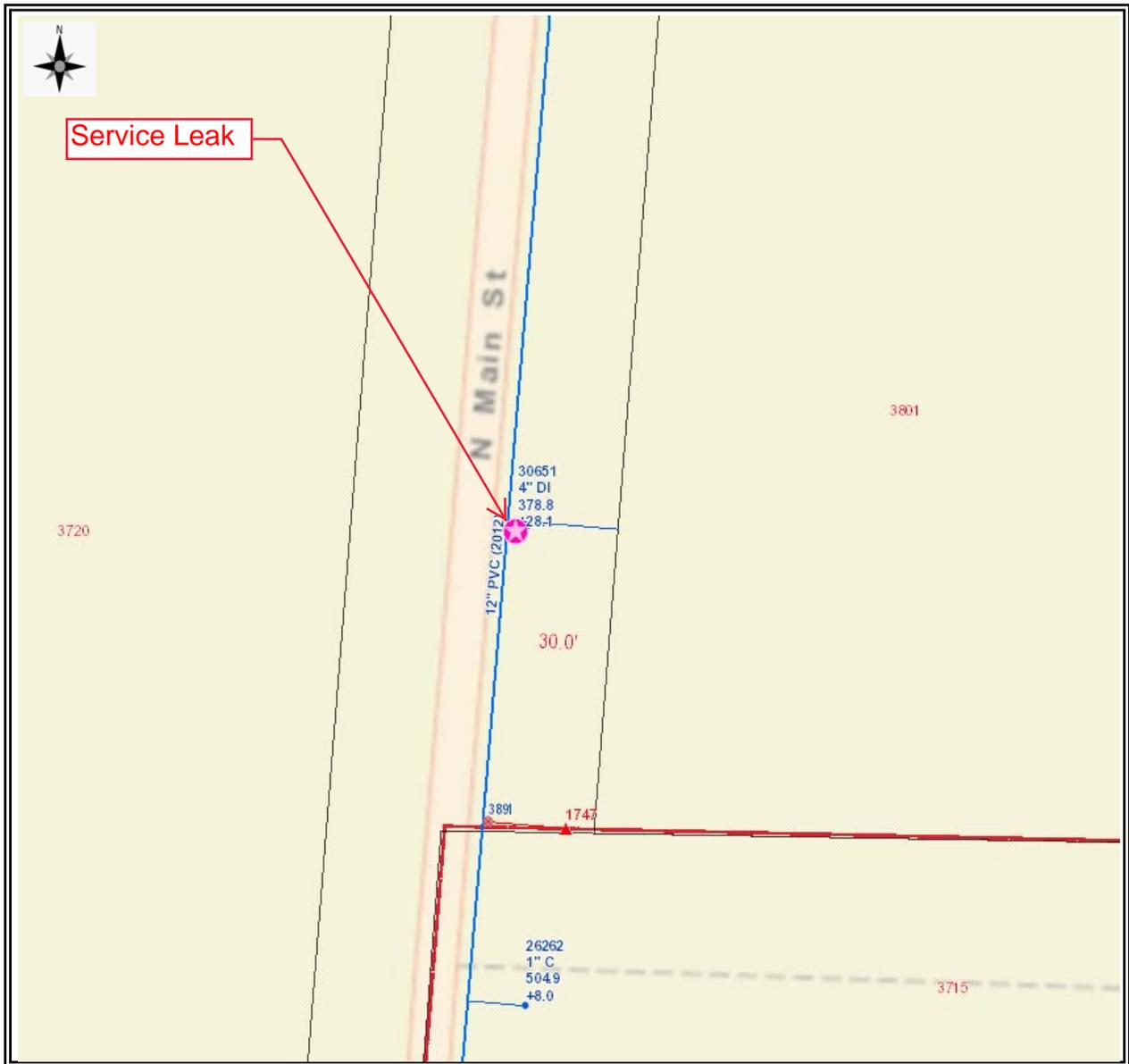
Date: 6/12/2020

Type of Leak: Service

Estimated Leakage (gpd): 10,000

Location: 3801 N. Main St.

Comments: GIS service number 30651. Unable to operate the service. The Racine Water Utility will determine what side of the service the leak is on.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 96

Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 3,000

Location: Hydrant closest to 1609 SE Frontage Rd.

Comments: Hydrant located on the private water main. Could not stop leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 97

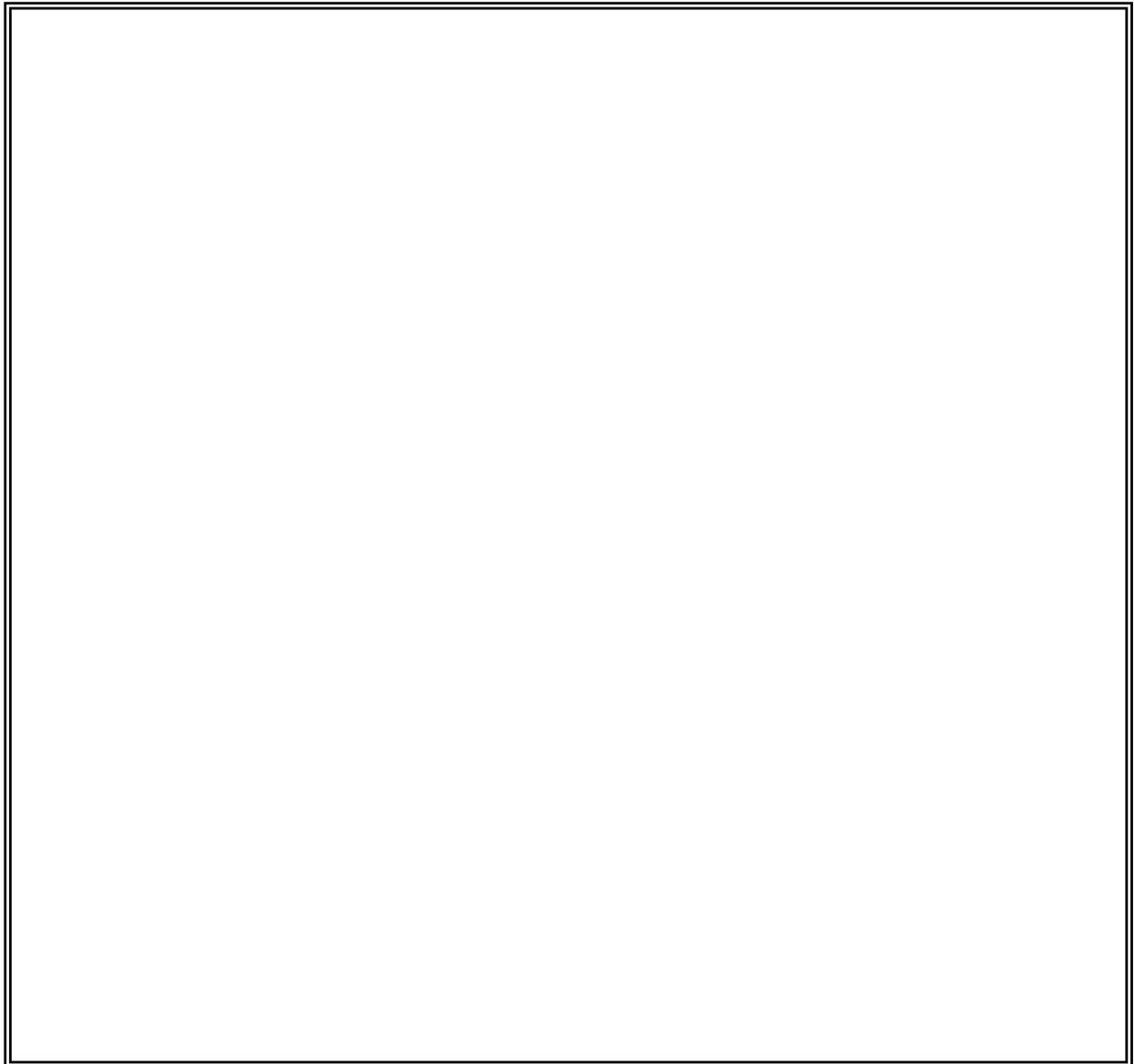
Date: 6/12/2020

Type of Leak: Hydrant

Estimated Leakage (gpd): 1,000

Location: Near 1570 International Dr.

Comments: GIS hydrant number 4499. Could not stop the leak.



**Racine, Wisconsin
2020 Leak Report**

Leak No: 98

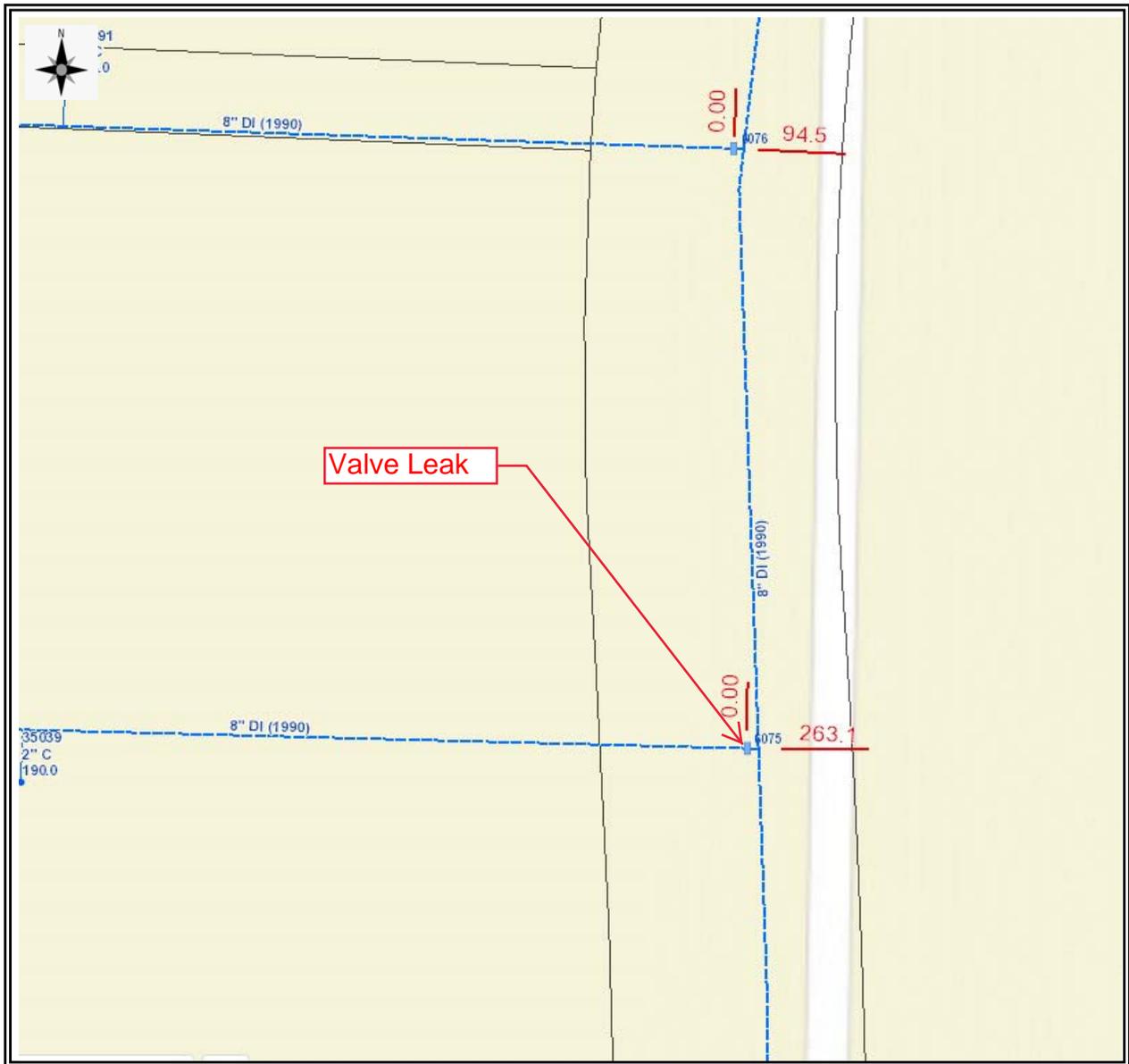
Date: 6/12/2020

Type of Leak: Valve

Estimated Leakage (gpd): 1,000

Location: Near 5455 Durand Ave.

Comments: GIS valve number 6075. The leak is located at or near the valve.





Racine Water & Wastewater Utilities
 800 Center Street, Rm. 227
 Racine, WI 53403
 (262) 636-9181

WATER/SEWER BILL

ACCT. NO	INVOICE
10110520	1976779
AMOUNT DUE	DUE DATE
186.12	08/21/2020

Occupant
 1014 Grand Ave
 Racine, WI 53403-1835

BILLED TO		FOR SERVICE AT				BILL DATE	
Occupant		1014 Grand Ave				08/01/2020	

METER NUMBER	SERVICE FROM	SERVICE TO	PREVIOUS READING	PRESENT READING	USAGE - CCF	NO. DAYS
10356538	03/31/2020	07/01/2020	687	705	18	92

INFORMATION & MESSAGES

HHW Collections will be held every 3rd Saturday, June through October, from 8-1 at 6200 21st St.

DETAIL

SUMMARY

Past Due Invoice Charges	0.00
Accumulated Late Charges	0.00
Water Usage	46.44
Water Service Charge	20.88
Public Fire	17.19
Sewer Usage	48.06
Sewer Service Charge	20.00
HHW Charge	0.75
Storm Water Charge	32.80
AMOUNT DUE	186.12

Return this portion with your check payable to **"Racine Water Utility"**

ACCT. NO	INVOICE
10110520	1976779
AMOUNT DUE	DUE DATE
186.12	08/21/2020

Racine Water & Wastewater
 P.O. Box 080948
 Racine, WI 53408-0948

1014 Grand Ave

For payment information visit:

www.cityofracine.org/water/paymentoptions

Payments can be made at any of the following locations:

Tri City National Banks (Racine & Kenosha locations)

Water & Wastewater Utilities - 800 Center St. Room 227

Payments can be made by mail to:

Water & Wastewater Utilities

P.O. Box 080948

Racine, WI 53408-0948

Online Payment Options:

PSN

Pay by credit card, a 2.6% processing fee will be applied

Pay by checking or savings account, zero processing fees

Visit www.PaymentServiceNetwork.com/login.aspx?acc=RT24143

Or call 1-877-390-7368 for credit card payments only.

Official Payments

Pay by credit card only, a \$4.95 processing fee will be applied

Visit www.officialpayments.com or call 1-800-272-9829

Jurisdiction Code 5894

Payments can be made by our ACH Autopay program.

Go to cityofracine.org/water/billing to download form.

Call our office at (262) 636-9181 for additional information.

Rates for General Sewer Service 01/01/2020

\$2.67 per 100 cubic feet – City of Racine

\$2.65 per 100 cubic feet – Village of Elmwood

Quarterly service charge – \$20.00

Summer sewer rates are based on winter usage.

Quarterly Residential Hazardous Waste Charge – \$.75

Rates for General Water Service 12/19/2019

Quarterly Service Charge

5/8" & 3/4" meter	\$ 20.88	4" meter	\$ 186.00
1" meter	\$ 33.60	6" meter	\$ 324.00
1 1/2" meter	\$ 56.40	8" meter	\$ 489.00
2" meter	\$ 85.50	10" meter	\$ 708.00
3" meter	\$ 123.00	12" meter	\$ 927.00

Volume Charge

First 150 CCF per quarter = \$2.58 per 100 cubic feet

Next 1,850 CCF per quarter = \$2.19 per 100 cubic feet

Over 2,000 CCF per quarter = \$1.75 per 100 cubic feet

Quarterly Public Fire Protection

5/8" & 3/4" meter	\$ 17.19	4" meter	\$ 429.00
1" meter	\$ 42.90	6" meter	\$ 858.00
1 1/2" meter	\$ 85.80	8" meter	\$ 1374.00
2" meter	\$ 137.40	10" meter	\$ 2061.00
3" meter	\$ 258.00	12" meter	\$ 2748.00

For storm water utility information please call 262-636-9121

A \$30 charge will be made to a customer account when a check rendered for service is returned for any reason.

A late payment charge of 1% per month will be added to bills not paid by the due date.

Failure to receive bill does not exempt customer from late charge. This charge is applicable to all customers.

All water passing through meter will be charged, whether used, wasted, or lost by leakage.

Failure to make payment or allow access to meter may result in disconnection of service.

1 CCF (Hundred Cubic Feet) = 748 Gallons

Example: A usage of 10 CCF = 7,480 Gallons of water used.

Water Utility Website cityofracine.org/water.aspx **Emergency 24hr # (262) 636-9185**

Wastewater Utility Website cityofracine.org/wastewater.aspx **Emergency 24hr # (262) 636-9550**