Memo

TO: Committee of the Whole

FROM: Ed Andrews, Public Works Director

SUBJECT: Infrastructure Review

DATE: January 5, 2018

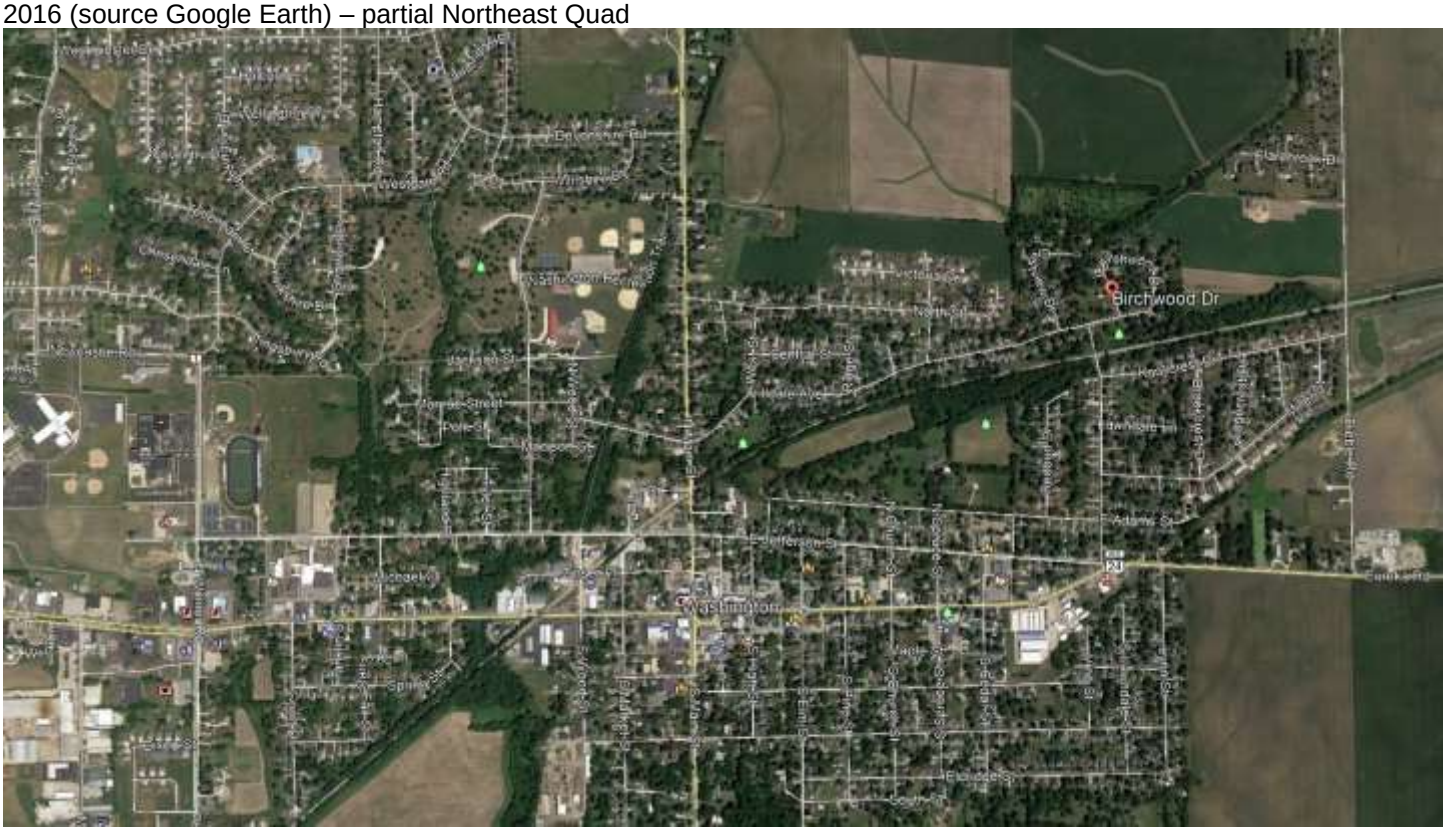
In follow-up to discussions concerning roadway rehabilitation considerations on the east side of the City of Washington, a variety of infrastructure review has been conducted (roadway, water main and sanitary sewer). The initial review was shared at a Special Public Works Meeting in November of 2017 for discussion in the forthcoming budget cycle and has also been updated to the Committee of the Whole.

It is felt that a look backwards would help define our look forwards. The following imagery and infrastructure inventory was compiled to help appreciate this undertaking.

1939 (Source ISGS) – North Half of City

Sanitary – none, private septic and clay wildcat discharge to streams, Unknown
Water Mains - 4" Cast Iron (CI); estimate 24mi based on current inventory.
Roadways - Unknown ratio of concrete and brick, asphalt paving industry just starting. est. 24mi
Storm – concrete and clay pipe, estimate same as current ratio of roads to storm, est. 12 mi
Bridges – 6 bridges, note: all of these, expect Candlewood, have been replaced in the last 50 years.

2016 (source Google Earth) – partial Northeast Quad



Sanitary – est. 78.6mi based on current inventory.
Water Mains – est. 84.7mi based on current inventory.
Roadways – primarily asphalt and overlay, est. 79.5 miles
Storm – concrete and clay pipe, est. 44 mi
Bridges – 10 bridges, Candlewood is at 22T and Stratford is at 12T.

Streets:

The following reflects pavements condition ratings in 2016. These ratings were updated by Roadbotics in Fall of 2017, but have remained consistent on the east end of the City. The exceptions would be with the resurfacing of Jefferson Street and a portion of North Main.

The IDOT Condition Rating Survey (CRS) Program was established in 1974 to assure the uniform collection and inventory of pavement condition data for use by the Department in planning functions. The CRS is a good measure of the subjective view of overall pavement distress conditions. The trend of CRS over time is useful in evaluating the existing pavement and in selecting the rehabilitation alternative.

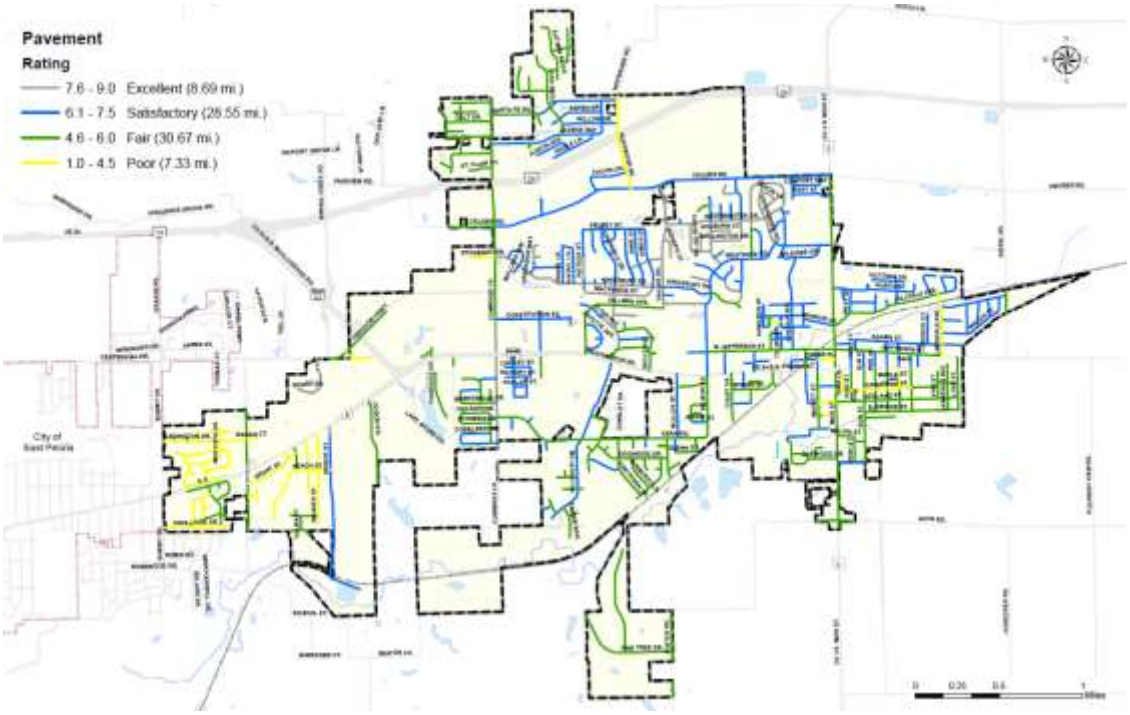
The pavement is categorized according to the following programmatic definitions:

1. Poor (1.0 ≤ CRS ≤ 4.5): The pavement is critically deficient and in need of immediate improvement.

2. Fair (4.6 ≤ CRS ≤ 6.0): The pavement is approaching a condition that will likely necessitate a major improvement over the short term.

3. Satisfactory (6.1 ≤ CRS ≤ 7.5): The pavement is in acceptable condition (low end) to good condition (high end) and not in need of a major improvement, but minimum level to apply pavement preservation treatments.

4. Excellent (7.6 ≤ CRS ≤ 9.0): The pavement is in excellent condition.



Traffic volumes and functional classifications:

IDOT Average Daily Traffic (ADT)
http://www.gettingaroundillinois.com/gai.htm?mt=aadt

IDOT Functional Classification (FC)
http://www.gettingaroundillinois.com/gai.htm?mt=fc

Traffic volumes and functional classification help to define possible funding sources for rehabilitation of the roadways. Roadways which have Functional Classifications above a Local Road are eligible for Federal Funding. A review of these roadways as mapped by FHWA & IDOT on the east side are:

- E. Holland St = 3,829LF, CRS = 7.0, approx. ADT = 600
- Lynn St = 1,282LF, CRS = 6.0, approx. ADT = 550
- Hilldale Av = 3,580LF, CRS = 5.0, approx. ADT = 500
- N. Lawndale Av = 1,998LF, CRS = 4.5, approx. ADT = 1040

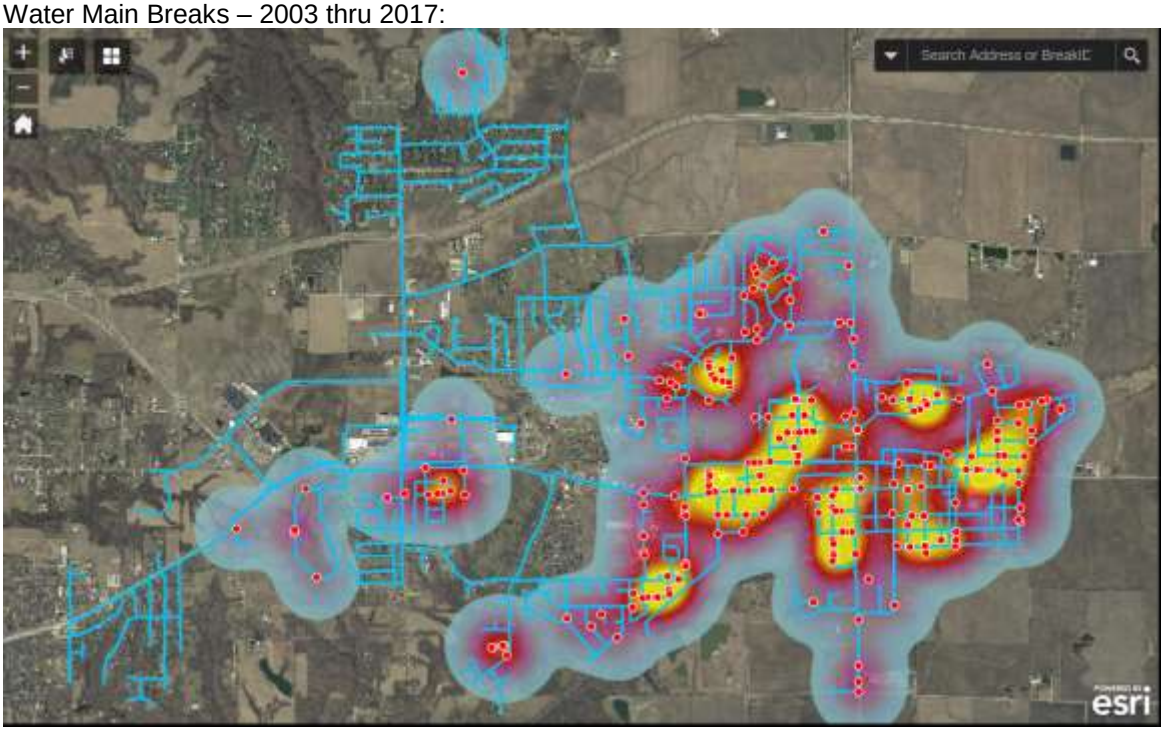
The following Local Roads (NOT Federal Aid Eligible) have been previously expressed at Committee level as of interest due to their brick surface:

- W. Holland St = 525LF, est. CRS = 3.0, approx. ADT = <500
- Catherine St = 2,375LF, est. CRS = 3.0, approx. ADT = <500
- Zinser Pl = 931LF (or 120LF from N Main to Lane Alley), est. CRS = 3.0, approx. ADT = <500

Water Main:

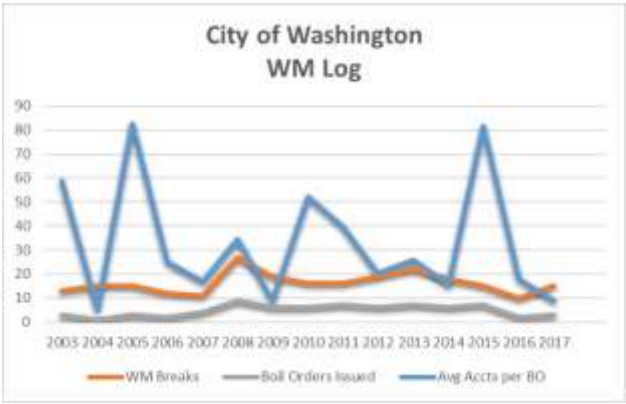
In addition to the street condition, watermain is another indication of roadway priority.

Water Main Breaks – 2003 thru 2017:



This data was generated from the following:

Year	# of Breaks	Boil Orders Issued	Break to B.O. Rate	Avg # Accts per B.O.
2003	13	3	23%	59
2004	15	1	7%	5
2005	15	3	20%	83
2006	12	2	17%	25
2007	11	4	36%	17
2008	27	9	33%	35
2009	19	6	32%	9
2010	16	6	38%	52
2011	16	7	44%	40
2012	19	6	32%	20
2013	22	7	32%	26
2014	18	6	33%	15
2015	15	7	47%	82
2016	10	2	20%	18
2017	15	3	20%	9
Avg	**17**	**5**	**30%**	**36**



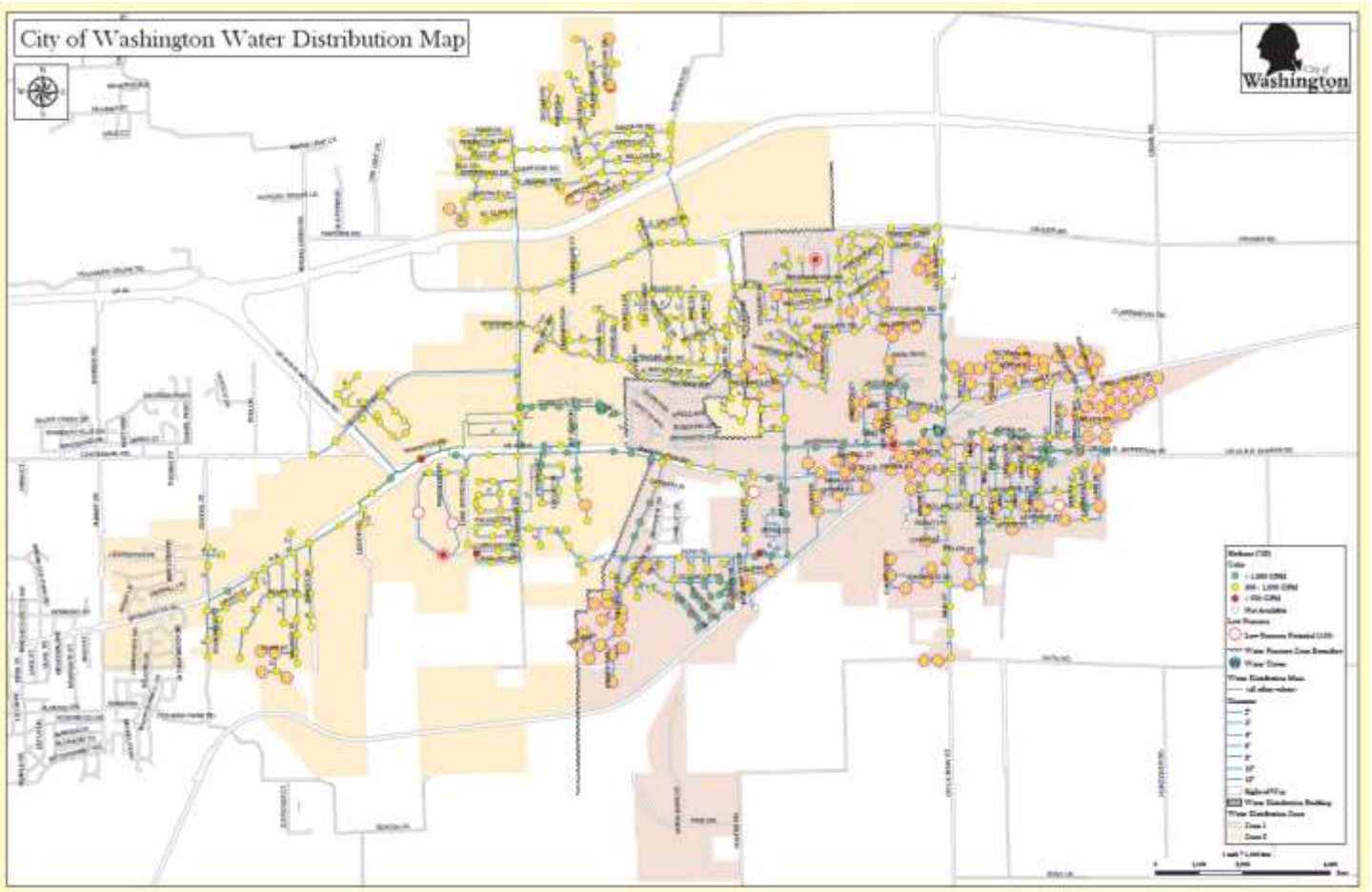
The AWWA annual estimate for water main breaks is 0.25 breaks per mile or for our system 21 breaks. However, this is an average of the entire system, when one drills down into the data it can be seen that there is a disproportionate number of breaks on the older cast iron water main.

	Cast Iron **CI**	Ductile Iron **DI**	Transite **AC**	Transite **TRANS**	PolyVinyl **PVC**	Service **SERV**	Copper **CO**	Unknown **UNKWN**
Totals	121	0	6	7	6	28	21	23
% of Tracked	57%	0%	3%	3%	3%	13%	10%	11%

So while Cast Iron represents 24mi of the current 77mi, or 30% of the system, it accounts for 2/3 of the breaks. In general, watermain in the east end of the City is of smaller diameter 4" Cast Iron and was constructed with the original water works in the 1920s. It is nearing the end of its anticipated useful life.

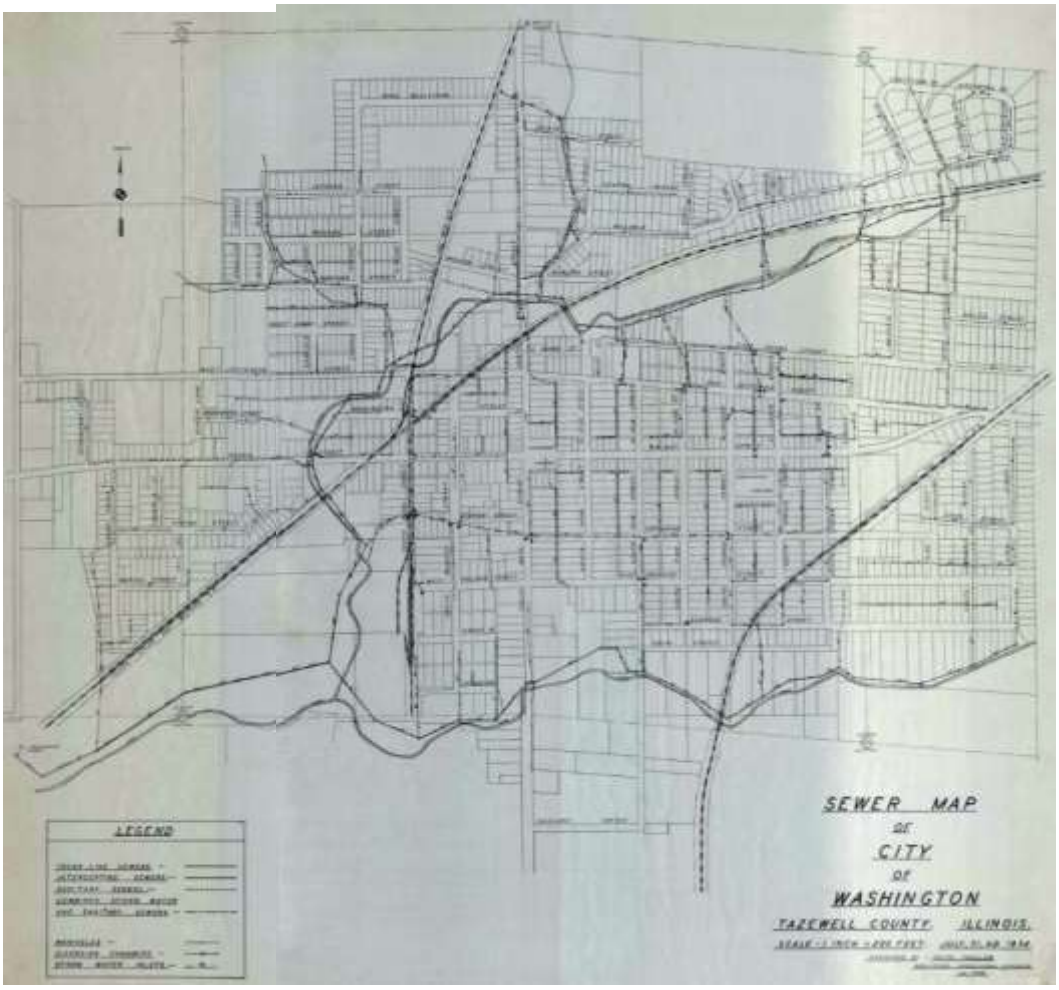
	Total (LF)	Cast Iron	Copper	Ductile Iron	PVC	PVC (C-900)	PE	Transite	Unknown
3"	5,225	0	0	0	0	0	0	5,225	0
4"	77,100	62,696	637	38	1,965	19	0	11,474	270
6"	165,903	21,525	264	2,131	102,427	31,837	3	5,434	2,283
8"	108,529	33,159	0	3,269	52,317	18,023	4	0	1,758
10"	28,623	7,823	0	3,367	9,477	7,336	0	0	620
12"	20,655	1,639	0	0	15,902	3,106	0	0	8

Rehabilitation of the roadways within the east end would afford the opportunity to upsize the water mains for enhanced fire flow. Ideally, we would target providing 1000+gpm (Green) hydrant flows at 20psi minimum, as shown below, much of the system is at 500 to 1000gpm (Yellow) hydrant flows with the potential to drop below minimum pressures if not monitored.



Sanitary Sewer

The east end of town has the most concentration of older clay pipe, some pre-dating the formal sanitary collection system established as a combined sanitary sewer (CSO) in the 1950s.



This was later separated in the 1980s to meet the requirements of the Clean Water Act. The general age of some of the original system warrants replacement or lining rehabilitation.