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Public Works

City Transit
263-8152

MEMORANDUM

Equipment Maintenance
Roadway Maintenance
Collection & Drainage
Building & Grounds
Engineering

To: Terry Jones, Environmental Specialist Sr. IDNR

CC: Gregg Mandsager, City Administrator

FROM: Brian Stineman, Public Works Director
Jon Koch, WPCP Director

DATE: November 15, 2017

RE: Update of Sanitary Sewer Force Main Repair

The City of Muscatine met with their contractor this morning to formulate and update the repair plan for the Papoose Force Main to the Water Pollution Control Plant. At this time due to the condition of the pipe we feel that the best course of action is to install a cured in place structural liner inside approximately 950 linear feet of 30-inch pipe from the Musser Park connection to a point west of Grandview Avenue. Lining this section alleviates open cutting around multiple utilities, railroad tracks, and streets. The remaining approximately 1,400 linear feet of 30-inch pipe will be open cut and replaced from the WPCP to the junction with the lined pipe.

In order to make this repair the existing line must be cleaned and televised so that the lining contractor can inspect it and order the liner. This process is anticipated to take approximately two weeks. After the cleaning has been completed a liner can be ordered. It typically takes three weeks for a liner to be manufactured and delivered to the site after it has been ordered. In order to speed up the process as much as possible while the liner is being manufactured crews will begin preparatory work including constructing a dewatering area, excavating the areas needed to access the pipe for lining and staging for the pipe connections.

Open trench construction and laying of the new pipe will also begin as soon as easements are secured from the property owners. At this time it is anticipated that the entire repair and installation of a new pipe will take up to six weeks. Unfortunately during this time period the City of Muscatine will need to continue to bypass flow from the Papoose Lift Station to the Mississippi River. There is no alternative to bypassing the flow due to the configuration of the collection system. The estimated bypass volume from the Papoose Lift Station is three million gallons per day. All remaining flow from the collection system is being treated at the WPCP.

City staff have evaluated all possible scenarios and options and have determined that this proposal will be the most rapidly completed and permanent solution.

**"I remember Muscatine for its sunsets. I have never seen any
on either side of the ocean that equaled them" — Mark Twain**



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MEMORANDUM

Equipment Maintenance
Roadway Maintenance
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Engineering

To: Mayor and City Council Members
CC: Gregg Mandsager, City Administrator
FROM: Brian Stineman, Public Works Director
DATE: November 13, 2017
RE: Update and Request for Funding of Sanitary Sewer Force Main Repair

INTRODUCTION:

On October 30, 2017 the City became aware of a sewer leak on the 30" force main sewer between the Musser Park Lift Station and the Water Pollution Control Plant. The break was located in the intersection of Day/Birch/Nebraska Streets.

BACKGROUND:

In order to assess the damage the line had to be shut down and drained. This process required closing the pipe to flow from the Papoose Creek Lift Station. This closing resulted in a direct discharge of sanitary sewer water to the Mississippi River at Papoose Creek. The Iowa Department of Natural Resources has been informed of this discharge and the city and DNR continue to monitor the situation.

Due to the condition of the pipe at the break and past experience with breakage of this type and age of pipe, the best repair option is to line the existing sewer pipe. At this time the city is requesting quotes from several lining companies to estimate the cost of lining from the Musser Park lift station to a point west of the railroad tracks and possibly all the way to the treatment plant. At this time it is the Public Works Department's estimate that this could range in cost from \$100,000 to \$750,000.

RECOMMENDATION/RATIONALE:

Staff recommends that council approve this request to fund emergency repairs to the 30" sanitary sewer force main in an amount up to \$750,000.

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Detailed summary of repair and replacement options for Papoose Lift Station line in Muscatine, IA.

11/16/17

Least favorable approach

Best long term approach

Fastest end to bypass approach

Banding known leak then line

Lining the entire pipe, 20 yr fix, full pumping

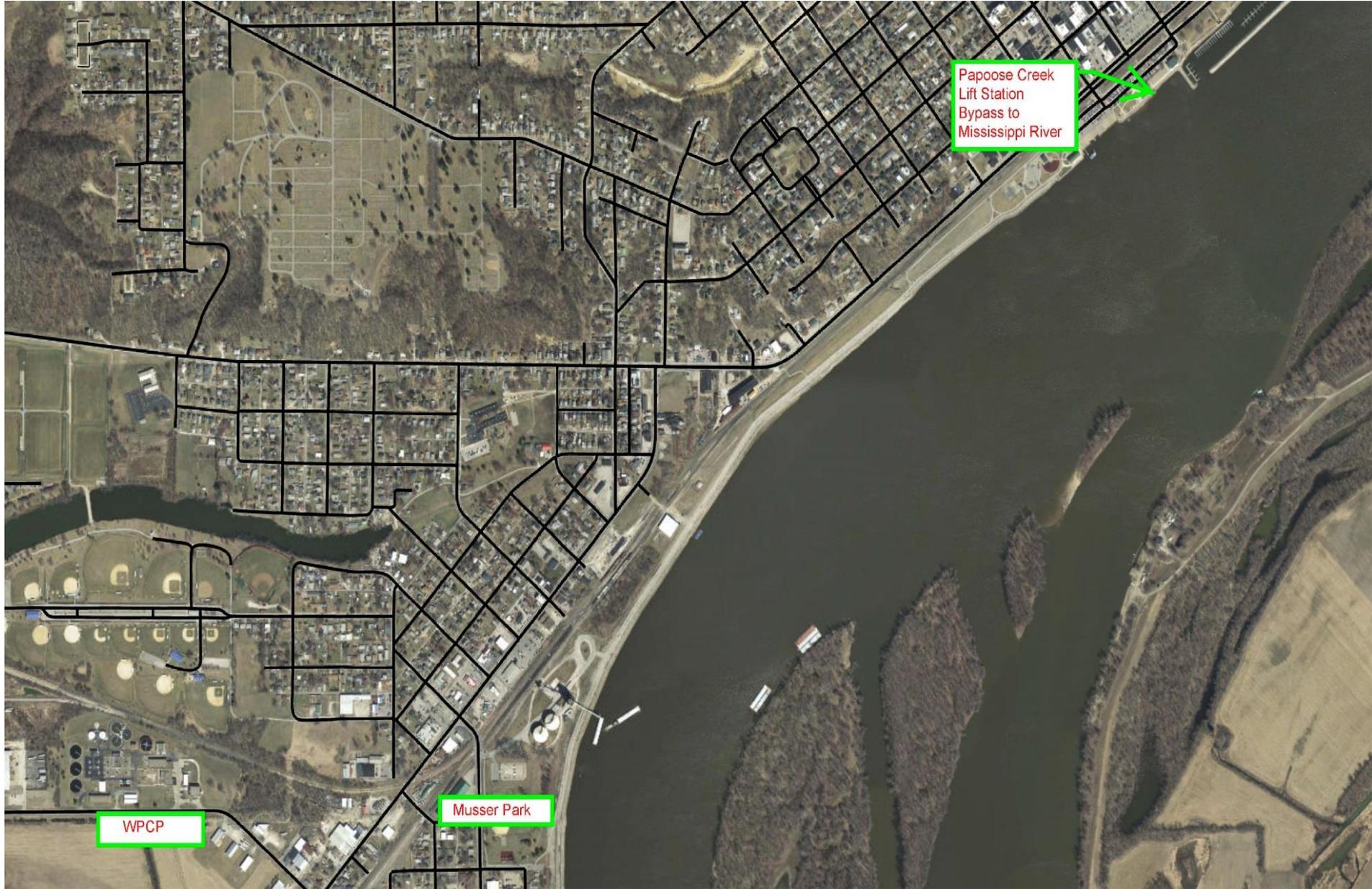
	#1 Emergency band now	#2 Prep for lining now	#3 Install 24" slip line now
Week 1	<p>-Bypassing. -Expose line at repair origin point (Musser Park). Expose line at repair completion point (north side of Grandviw Ave.). Construct dewatering area. Begin cleaning line for inspection and lining installation. Jetting pipe walls, debris removal, complete dewatering, camera inspection, detailing required parameters for lining contractors. 2 weeks. -Order banding, 1 week out. Order piping for new 30" from Grandview Ave to WPCP. 1 week out. Order re-connection parts for exposed pipe sections, 1 week out.</p>	<p>-Bypassing. -Expose line at repair origin point (Musser Park). Expose line at repair completion point (north side of Grandview Ave.). Construct dewatering area. Begin cleaning line for inspection and lining installation. Jetting pipe walls, debris removal, complete dewatering, camera inspection, detailing required parameters for lining contractors. 2 weeks. -Order piping for new 30" from Grandview Ave to WPCP, 1 week out. Order re-connection parts for exposed pipe sections, 1 week out. -Per lining manufacturer, line must be cleaned, inspected and data collected before ordering.</p>	<p>-Bypassing. -Obtain engineering approval for structural integrity of 24" slip line within 30" force main for this section of repair. -Expose line at slip origin point (Musser Park). Expose line at mid point (north side of Grandview Ave.). Determine pipe condition from there to WPCP for possible slip line as well. -Order pipe, valves and accessories. -Secure rental equipment for slip lining.</p>

<p>Week 2</p>	<ul style="list-style-type: none"> -Bypassing -Complete line cleaning and inspection Musser to Grandview. -Excavation of leak area (ongoing from Week 1). Dangerous to workers with sand fill. Large excavation area then shoring. Work done around 16" water main causing risk of contamination to drinking water supply. 16" water main needs sufficient supports to avoid damage causing leakage, breakage or stress due to bend in the line. Water supplier not confident in integrity of supporting vavles and line stop. A break around sewage contaminated area causes immediate health risks, boil orders, loss of service. Use of hydro-excavation safest technique if main can be supported, adds 1 week for excavation. Unsure of ability to sufficiently support the water line at this location. Determine length of damaged line section, order banding. -Begin install of new 30" pipe to WPCP. -Receive banding. Install banding. -Begin install of re-connection to exposed ends. -Order lining, 3 weeks out. 	<ul style="list-style-type: none"> -Bypassing -Complete line cleaning and inspection Musser to Grandview. -Begin install of new 30" pipe to WPCP. -Order lining, 3 weeks out. 	<ul style="list-style-type: none"> -Bypassing -Receiving pipe and accessories. As they are possibly scattered in multiple locations including out of state, pipe to be installed as it arrives.
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Week 3	<p>-Complete re-connection. Pressure test. Determine if leaking (anticipated) is acceptable for pumping over ground to sanitary. Leaking is anticipated due to multiple bands covering long section of pipe. Pump leaked water overground to sanitary sewer.</p> <p>-Not bypassing, possibly not until mid-week</p> <p>-Complete installation of new 30" to WPCP.</p>	-Bypassing.	<p>-Bypassing</p> <p>-Receiving pipe and accessories. As they are possibly scattered in multiple locations, pipe to be installed as it arrives.</p> <p>Best case scenario, quick delivery of parts:</p> <p>-Connect 24" line to 30" N of Grandview Ave if remaining line to WPCP is not compromised.</p> <p>-Pressure test.</p> <p>-Stop bypassing.</p>
Week 4	-Not bypassing	<p>-Bypassing.</p> <p>-Complete installation of new 30" to WPCP.</p>	<p>-If pipe from N Grandview Ave to WPCP is critical to fail, slip 24" line in the remaining line. More excavation openings needed for angle turns.</p> <p>Best case scenario, quick delivery of parts:</p> <p>-Finish 24" slip line to WPCP.</p> <p>-Stop bypassing.</p>
Week 5	<p>-Bypassing.</p> <p>-Begin draining, dewatering and re-cleaning of 30" line to prep for lining installation, 1 week.</p>	-Bypassing	<p>-Finish 24" slip line to WPCP.</p> <p>-Stop bypassing.</p>

Week 6	-Receive lining. -Install lining. Crews not readily available. Work done in 3-4 days. -Connect new and repaired line. -Pressure test. -Stop bypassing, end of week.	-Receive lining. -Install lining, 3-4 days. -Connect new and repaired line. -Pressure test. -Stop bypassing, end of week.	-Possible overrun time, pipe delivery delays, weather.
Week 7	-Possible overrun time, lining crew scheduling conflicts, weather.	-Possible overrun time, lining crew scheduling conflicts, weather.	
Week 8	-Possible overrun time, lining crew scheduling conflicts, weather.	-Possible overrun time, lining crew scheduling conflicts, weather.	

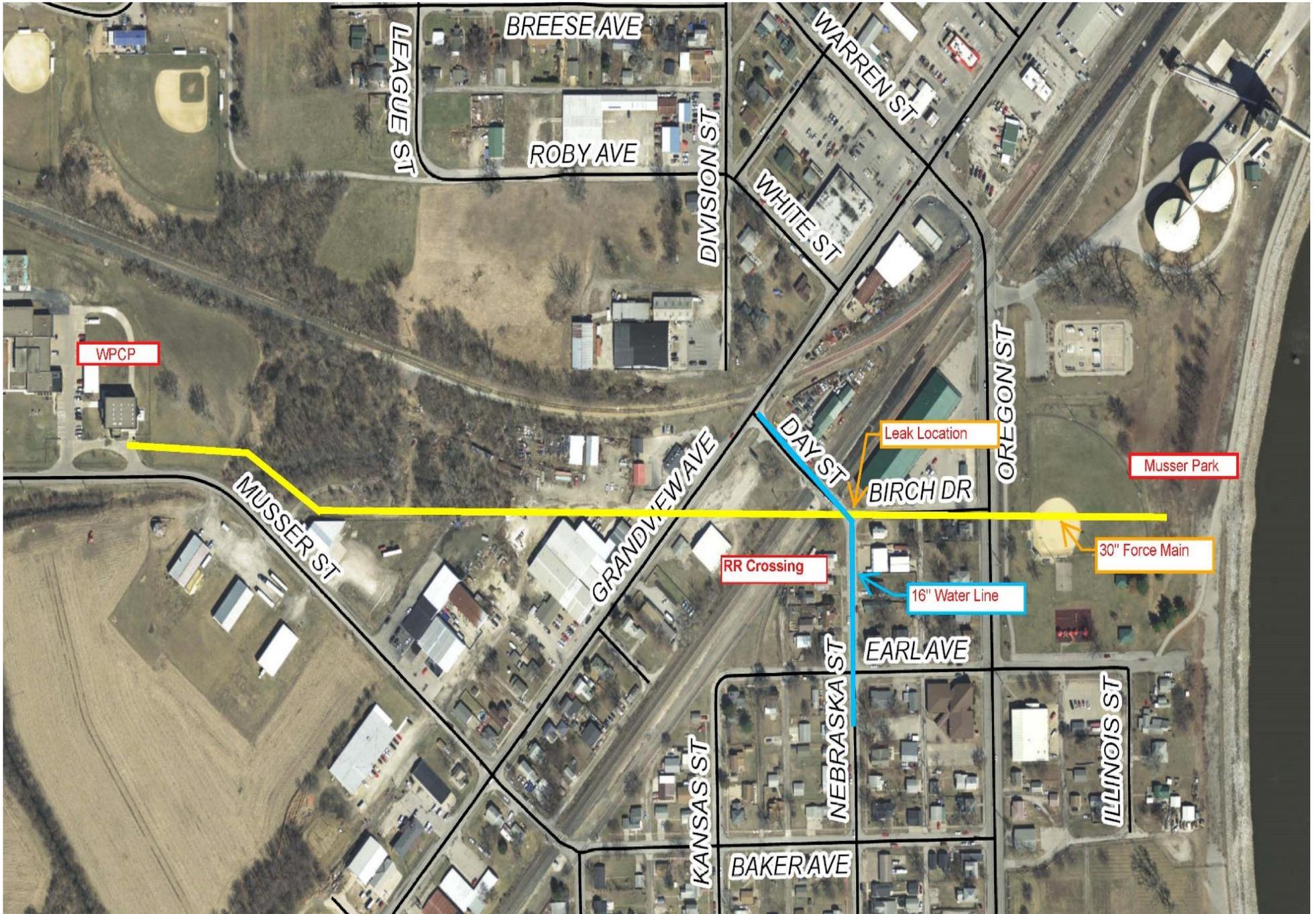
- Very aggressive construction schedule with multiple contractors, simultaneous work.
- The City is highly motivated to quickly end the bypass and create redundancy in the system, a goal that has been hindered by mandated separation project since 2005.
- City evaluated multiple options to compare risk to human health, environmental integrity and potential for success.
- City is well situated to handle this project financially due to very forward thinking council, administrator and staff. Rate structures have been carefully evaluated and adjusted to prepare for unforeseen events like this.
- A great deal of work on project #1 could gain one week with no bypass but puts human health and the drinking water suppl at risk.
- Project #3 stops the bypass most rapidly but reduces pumping capacity from the Papoose Lift Station. This will cause more frequent CSO's until a redundant line can be financed and installed (3-5 years). **Recommended Action**
- With a completely rehabilitated line, the City will plan for a new redudant 30" line from Musser Park to the WPCP. This will require extensive work crossing multiple streets and boring under multiple RR tracks. Expected construction in 2-3 years.
- 2300 ft total to rehabilitate or slip line. 1000 ft from Musser Park to north of Grandview Ave. 1300 ft from north of Grandview Ave to the WPCP.



WPCP

Musser Park

Papoose Creek
Lift Station
Bypass to
Mississippi River



WPCP

LEAGUE ST

BREESE AVE

ROBY AVE

DIVISION ST

WARREN ST

WHITE ST

OREGON ST

MUSSER ST

GRANDVIEW AVE

DAY ST

BIRCH DR

RR Crossing

Leak Location

Musser Park

30" Force Main

16" Water Line

EARL AVE

ILLINOIS ST

KANSAS ST

NEBRASKA ST

BAKER AVE

