

**W. Becher St. S 1<sup>st</sup> St to S 4<sup>th</sup> St  
16" Water Main – Shaft and Tunnel Below  
The Kinnickinnic River**

---

## BACKGROUND

The water main in W Becher St was installed in 1907 and has lead joints. The shafts are 10ft diameter (ID) with 1ft thick walls that were cast in place concrete. The tunnel section has an ID of 6.5 ft – 7ft at the narrowest point and has walls 1ft thick of cast in place concrete.

The Milwaukee Water Works identified a leaking vertical joint in the East Shaft of the W Becher St main November 2007. It was determined that the main should be taken OOS and options for repair/replacement should be evaluated. No repairs were implemented and the main has remained OOS.

## INSPECTION 2014

MWW hired a contractor to dewater the shafts and tunnel so that visual inspection could be performed on the pipe, shafts and tunnel.

### Observations

#### East Shaft

- Condition appeared to be sound
- Few circumferential cracks
- **Water Main on ES contained a Bell Joint Repair Clamp on the spigot joint on the top 45 degree elbow**
- **The next joint down (12 FT) was location of 2007 failure; noticeable movement of lead and lateral support from wood maple hearts appeared to have moved.**
- Wood supports intact and 4 -5 beams installed per joint installed on face of bell
- Shaft Ceilings Beams, brick arch and mortar?

#### Tunnel from East Shaft

- Water main installed towards North side of tunnel
- Water main supported with 2 concrete pipe supports per 12 foot pipe
- Concrete anchor at bottom 90 degree bend fully encased
- Tunnel appeared to be sound
- No entry was made further than 10ft
- With light could see 10-12 joints in tunnel
- Water leaking from cracks in tunnel several locations
- Observed drains at bottom of tunnel through wall

---

West Shaft

- Shaft Ladder Rungs noticeably deteriorated
- No noticeable joint repairs or movement
- Wood supports intact and 4 -5 beams installed per joint installed on face of bell
- Shaft Ceilings I-Beams, brick arch and mortar?

Tunnel from West Shaft

- Water main installed towards North side of tunnel
- Water main supported with 2 concrete pipe supports per 12 foot pipe
- Concrete anchor at bottom 90 degree bend fully encased
- Tunnel appeared to be sound
- No entry was made further than 10ft
- With light could see 10-12 joints in tunnel
- Water leaking from cracks in tunnel several locations
- Observed drains at bottom of tunnel through wall

---

PHOTOS EAST SHAFT -11/4/14 and 11/5/14



- East MH Looking Down



- Shaft Ceiling Beams and Brick/Mortar



- Shaft Ceiling Beams and Brick/Mortar



- Shaft Ceiling Beams and Brick/Mortar Arch



- 45 Degree Elbow with bell joint repair clamp



- Top of leaking joint
- Wood beams for lateral support



- Side of leaking joint



- Wood support at shaft wall



- Shaft Floor Looking Up



- Anchor Block at Bottom 90 degree bend



- Pipe in Tunnel to west
- Sleeve
- Pipe Supports



- Beam Supports



- Pipe Looking East
- Water Infiltration
- Pipe Supports



- Anchor Block at Bottom 90 degree bend