Sanitary Sewer Improvements

Preliminary Engineering Project

Darlington Neighborhood Public Meeting Summary

Pittsfield Elementary School

Wednesday, November 30, 2016 - 6:30 p.m. to 8:00 p.m.

1. Participant List – See Attachment #1

2. Welcome and Introduction to Project Team -- Brian Slizewski, City of Ann Arbor Project Manager
    a. Brian stated that the fieldwork is largely complete in this area. Fieldwork findings and options for improving the sanitary sewer system in this area will be presented at this meeting.

3. Meeting Desired Outcomes
    a. Provide background on sanitary sewer system and previous projects
    b. Provide overview of the SSIPE project
    c. Explain the findings in the Darlington area neighborhood
    d. Present sanitary sewer improvement options and gather feedback

4. Project Team Introduction
    a. Troy Baughman, City of Ann Arbor, Systems Planning
    b. Lori Byron, Public Engagement Consultant
    c. Robert Czachorski, Engineering Consultant
    d. Mackenzie Johnson, Engineering Consultant
    e. Jeannette Patterson, Engineering Consultant
    f. Brian Slizewski, City of Ann Arbor, Project Manager

5. Project Background – Troy Baughman
    a. City of Ann Arbor has two separate collection systems: a stormwater system and a sanitary system.
    b. The stormwater system conveys most of the stormwater runoff from buildings and streets. Stormwater flows into catch basins to trap debris before it enters the drainage pipes. The roof drains convey stormwater from the roof to the storm sewer or retaining area.
    c. The sanitary system conveys sewage, but some groundwater, as well as some stormwater that finds its way into the system. Footing drains are buried around a structure to move ground water away from the structure and houses built prior to the building code changes in the 1980s often had their footing drains connected directly to the sanitary sewer. Rainwater and groundwater leaks into sanitary pipes as they age. As more rainwater enters the sanitary sewer system, the pipes may be overwhelmed and may back-up into basements.

d. The property owner is responsible for maintenance and cleaning of footing drains, cleanout and sanitary sewer lateral connection, all the way until it taps into the sanitary main in the street.
e. City of Ann Arbor has 360+ miles of sewer pipes. In the Darlington neighborhood, most pipes were installed in the 1950s and 1960s.
f. Current and Recent Wet Weather Projects:
    - Sanitary Sewer Wet Weather Evaluation Project
    - Footing Drain Disconnection Program
    - Stormwater Model Calibration and Analysis
    - Upper Mallets Drainage Study
    - Sanitary and Stormwater Systems Asset Management Plan
    - Green Streets Program – when roads are completely reconstructed the construction takes into account infiltration of rainwater and incorporates rain gardens, porous foundations and surfaces to reduce stormwater runoff.
g. This project is a follow-up to the Sanitary Sewer Wet Weather Project done in 2013 and 2014. Any capital improvement projects that are identified as part of this monitoring, investigation and analysis will not occur until at least 2018.
h. Sanitary Sewer Wet Weather Evaluation (SSWWE) Project Findings
    - Evaluated the overall sanitary sewer system capacity and the past Footing Drain Disconnection (FDD) program to assess the future risk of sewer backups in the City.
    - Recommended methods to further reduce wet weather impacts to the sanitary sewer system.
    - Identified five areas with potential capacity issues during wet weather, including the Pittsfield Valley area. These five areas are being analyzed in depth in the current project.
i. Overview of Sanitary Sewer Improvements Preliminary Engineering Project:
    - The study in 2013-14 involved computer modeling of the sanitary sewer system in Ann Arbor. Five areas with potential capacity or hydraulic issues were identified, plus one area where the City wishes to reroute part of the flow to reduce the amount that must be pumped to the Wastewater Treatment Plant (WWTP.)
    - Project Goals:
        1. Use field engineering techniques to determine if capacity issues exist.
        2. Analyze field data and determine the cause of the capacity issues.
        3. Determine the best solution based on public input and solution effectiveness.
j. Darlington Area – Robert Czachorski
    - The SSWWE project's computer modeling showed that sanitary sewer pipes are overloaded during wet weather.
    - Field investigation was performed to answer the following questions:
        1. Is the computer model reflecting what is occurring in the real world? (Flow metering)

2. Are residents seeing impacts of overloaded pipes? In what areas? (Resident survey)
3. Where are the flows coming from? (CCTV, manhole inspections, smoke testing)

- Meters were installed in the areas identified as potentially having issues to determine flows in the pipes and confirm the computer modeling results.
- A survey of residents was completed to understand what is being experienced in this area. 396 surveys were mailed with 155 responses (39% response rate)
    1. 72% have a full basement
    2. 27% have experienced a sanitary sewer back-up in the last 10 years
    3. 32% experienced basement flooding in the last 10 years
    4. 42% have their service leads cleaned or rodded in the last 5 years
    5. 8% mentioned tree roots
    6. 10% reported that they had no issues after the service leads were replaced

k. Project Results:

- Field analysis was performed over the summer season:
    1. Flow metering – measure flows during wet weather events.
    2. CCTV review – closed circuit TV inspection of sewer pipes using a robotic device with a camera.
    3. Manhole inspections – crews inspect the condition of the manhole looking at depth and condition.
    4. Smoke testing – method to find ways that groundwater and stormwater are entering the sanitary sewer system. Non-toxic mist travels through the system identifying problems such as leaks, connected downspouts and roof drains.
- Field data was analyzed. Results show:
    1. Flow metering from August 16, 2016 rain event shows flows increasing to 10-15 times the normal dry weather flow in some areas, suggesting there is a significant amount of inflow and infiltration into the sanitary sewer system.
    2. CCTV is used to inspect and rate pipe defects on a scale of 1-5, with 5 being the most severe. A map of spot issues found shows a concentration of mostly grade 4 and a few grade 5 defects in the southeast corner of the Darlington neighborhood.
    3. Manhole inspections found few manhole defects.
    4. Smoke testing found about 20 uncapped cleanouts, a connected driveway drain, and several storm catch basins that may be migrating storm water to the sanitary sewer system. These items should be corrected or repaired, but are not likely to cause large amounts of inflow and infiltration.
    5. The Darlington neighborhood has about 400 parcels, with an estimated 360 connected footing drains. Footing drains collect groundwater and storm water and reroute it away from the house to prevent basement flooding. Many footing drains are connected to the sanitary sewer system contributing a significant amount of flow into the sanitary system. One

method of reducing I&I into the sanitary sewer system is to disconnect footing drains. Approximately 34 footing drains have been disconnected from the sanitary sewer system through the developer offset mitigation (DOM) program.

6. The project team developed a water budget, or an allocation of the components that make up the inflow and infiltration (I&I) in a system. In this area, the I&I sources are:
    a. Manhole defects – .1%
    b. Pipe defects – 7%
    c. Smoke testing – 2%
    d. Connected footing drains – 91%
7. Computer modeling – the project engineers performed computer modeling of the sanitary sewer system using design flows recommended by the 2013-2014 Sanitary Sewer Wet Weather Evaluation project's Citizens Advisory Committee (CAC):
    - 25 year event frequency
    - + 10% additional flow (for climate change, growth, etc.)
    - + system conditions observed in the field

Modeling results show most pipes in the neighborhood have capacity to handle the flows, except for several pipes on the eastern side of the neighborhood and a few pipes in an area northwest of the neighborhood. According to the model, the flow exceeds the capacity in these pipes during significant rain events.

l. Sanitary Sewer Improvement Options (For Darlington Sub and neighborhood to the northwest) – 2 options presented:

- Option A: Relief Sewers. Replace pipes with insufficient capacity. Approximately 4500 feet, at a cost of $500/foot = $2,250,000

- Options B: Disconnect footing drains. Disconnect approximately 30% (265) of footing drains to eliminate surcharging with the current pipe capacity. Cost is approximately $12,000 per FDD, for a rough estimate of $3,180,000.

m. Group Discussion of Improvement Options:

Option A – Relief Sewers

- May drive lead replacement
- Temporary loss of service (on the order of hours, not days)
- More significant disturbance if storm/water performed at the same time
- Possibility of re-routing to adjacent "blue pipe" (pipes with available capacity)
- Does not include "life cycle" cost of transport and treat

Option B – Footing Drain Disconnect

- Radon may be an issue
- Would still have old pipes to deal with

- City has a voluntary program to help address this topic

n. Q &A

- Q: What kind of pipe are these? A: All the pipes in this neighborhood are made of vitrified clay.
- Q: How large are these pipes? A: Mostly 8" & 12" in this neighborhood.
- Q: Do the estimated Option costs include life cycle costs? (Savings from not treating the groundwater.) A: No, these are simply very rough estimates of the engineering and construction costs.
- Q. Is people's access to the sewer system disrupted during a construction project, like upsizing? A: It can be, but it's a few hours at most.
- Q. What about radon? Is the risk increased with a sump pump?
  A. In the past City's Footing Drain Disconnection Program, the City had a policy of "do no harm" meaning that approved sump pump installations used a sealed lid. Washtenaw County is an area known to have a higher likelihood of radon and the County's Public Health department urges everyone to test their home for radon.
- Q. Can some of the flows from the high flows area be diverted to an area with lower flows? A. We can certainly look at a cross hybrid solution, however it's likely that a similar length of pipe would be needed to divert flows to another area, therefore, there would not be any advantages to diverting flow. Also, pipes may have to be routed through private property to achieve such a routing, which is not ideal.
- Q. What is done in new subdivisions? Do they have bigger pipes? A. No, newer developments, built after 1981 or so, do not have the footing drain flows connected to the sanitary sewer system, therefore the typical 8" pipe has adequate capacity.
- Q. If Option A, Relief Sewers, were selected, would the City also make any necessary repairs to the storm and water pipes in the Darlington neighborhood at the same time? A. Often when the City embarks on a project to repair sanitary sewer pipes, it also evaluates the storm and water pipes in that area. The City will do a similar evaluation for the streets affected in this neighborhood.
- Q. What about no digging pipe repairs? A. Directional drilling or pipe bursting could be an option. The feasibility of these options depend on the spacing of service leads, which require digging to reconnect. If service leads are too dense, it may not be an advantage to use a no-dig construction technique. These options will be reviewed during design.
- Q. Existing service leads may not be in good condition and have to be replaced. That is very expensive. A. Yes, replacing service leads can be expensive. The construction of a sewer upgrade would not specifically require that services leads be replaced. The replacement of service leads is dependent on the condition of the service lead and is the responsibility of the homeowner.
- Q. Even if you selected a footing drain disconnection project, you still have to repair the 4 and 5 pipe defects, right? A: Yes, correct.

- Q. With Option A, relief sewers, how many people would have to volunteer for a FDD? A. None. If any residents chose to volunteer for an FDD, it would improve the system's capacity, but performing FDDs wouldn't be necessary.
- Q. I have noticed several homes in my neighborhood having basements repaired, and seemed to be having their footing drain disconnected and sump pump installed. Are you required to do so when construction is performed on your home? A. Depending on the extent of the construction, the renovation may trigger the requirement to bring a home up to current building codes.
- Q. Did the FDD neighborhoods from 2001-2012 have similar pipe defects as the Darlington neighborhood? A. No, Robert doesn't think they had similar pipe defects, based on his reading of the 2001 SSO Task Force report. He gives background on 2001 SSO Task Force decision; both FDDs and storage options were recommended by Task Force, but during public meetings, residents objected to storage tanks disrupting green spaces.
- Q. What about the capacity you'd recover from the Waste Water Treatment Plant from footing drain disconnections? A. Yes, FDDs would reduce the amount of stormwater unnecessarily transported to the WWTP for treatment, however the plant has capacity to handle the projected flows.
- Q. It seems that even if you do a footing drain project, you may still have to replace sanitary sewer pipes in the next 20 years or so. A. Yes, that is possible.
- Q. The wild card for the homeowner is how complex and disruptive a footing drain disconnection would be in your basement. A. Yes, it depends on the location of the sump pump and the finish level of your basement. While developers continue to perform voluntary footing drain disconnections and sump pump installations at no cost to residents, the developer may decline homes requiring complex installations or those with a high level of finish in their basement.

6. Recommendations
    a. Three meeting participants voiced their support for Option A Relief Sewers, citing the condition of the surcharging pipes. No participants objected to this conclusion. The rationale cited by participants is that the pipes with the grade 4 and 5 defects must be repaired in either scenario and because of the age of the system in the area, would likely need to be replaced in the next 20 years anyway. Residents also supported recommending the voluntary DOM program to those who were interested in footing drain disconnections.

7. Next Steps

    a. Ongoing maintenance – clean, repair pipes with structural defects. City will perform spot repairs of these defects as a priority.

    b. Fix inflow sources found via smoke testing – connected catch basin, uncapped cleanouts.

    c. Voluntary Developer Offset Mitigation program is available now.

d. Capital Improvement Programming – More significant repairs, such as the Option A Relief Sewer will have to be programmed as part of the CIP and evaluated to be performed in conjunction with other capital improvements.

ATTACHMENT #1 – Public Meeting Attendees

Last name	**First name**
Baker	Jim
Dorian	David
Enos	Daniel
Himebaugh	Dan
Hway	Christina
Rowe	Judy