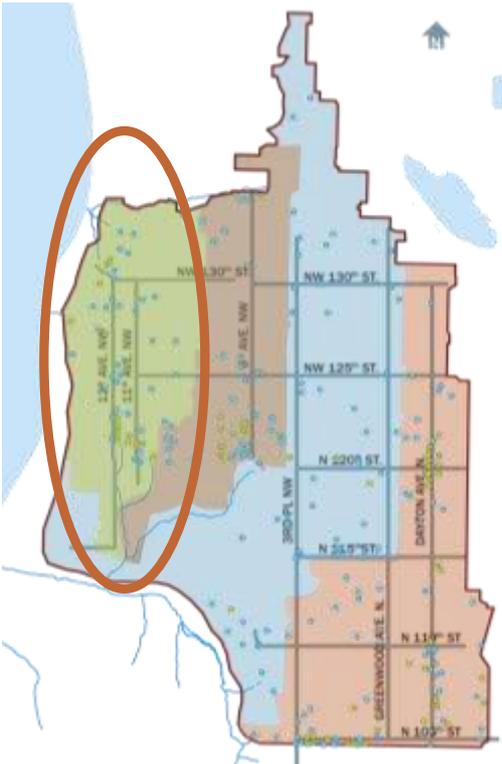


Broadview Sewer and Drainage Improvement Project

12th Ave NW Basin Leading Sewer Alternatives

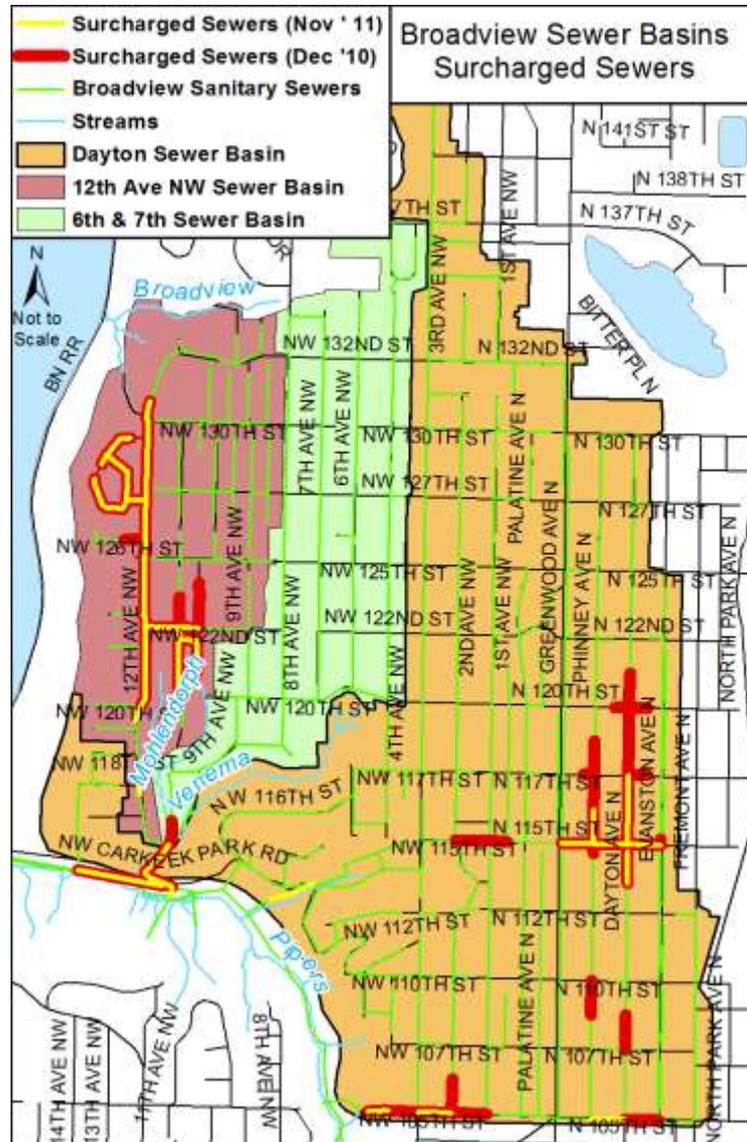


Why are improvements needed in Broadview?

- Sewer backups in homes, streets, yards and creeks
- Stormwater flooding into properties, streets, yards and creeks
- Caused by:
 - Stormwater and groundwater flowing into sewer pipes during significant storms
 - Insufficient drainage infrastructure in some places

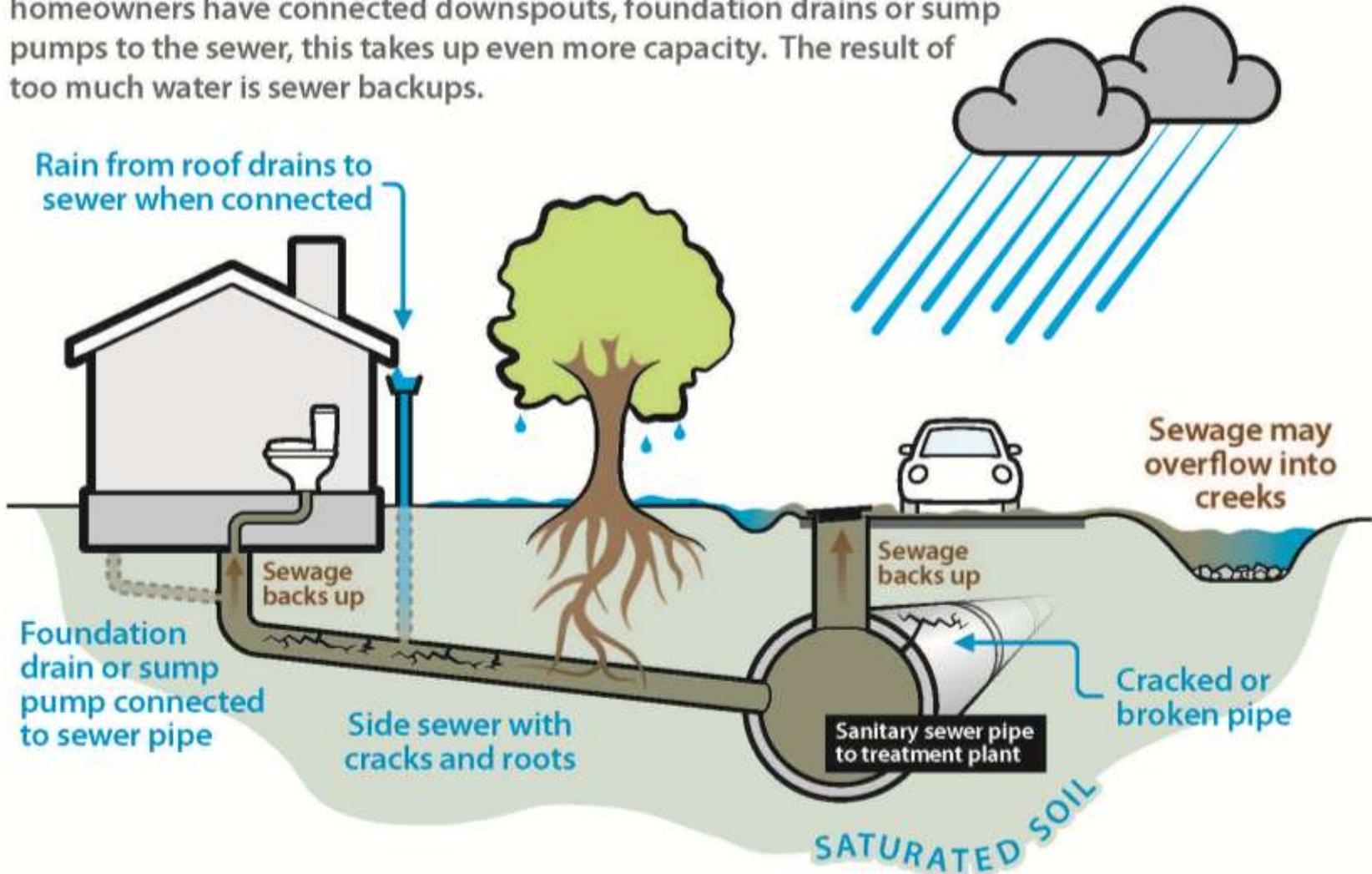


Where are sewer improvements needed?



CAUSES OF SEWER BACK UPS

During heavy rains, more than sewage flows into sewer pipes. Groundwater leaks through cracked sewer pipes. Tree roots take up additional space. And in some cases where homeowners have connected downspouts, foundation drains or sump pumps to the sewer, this takes up even more capacity. The result of too much water is sewer backups.



Project goals

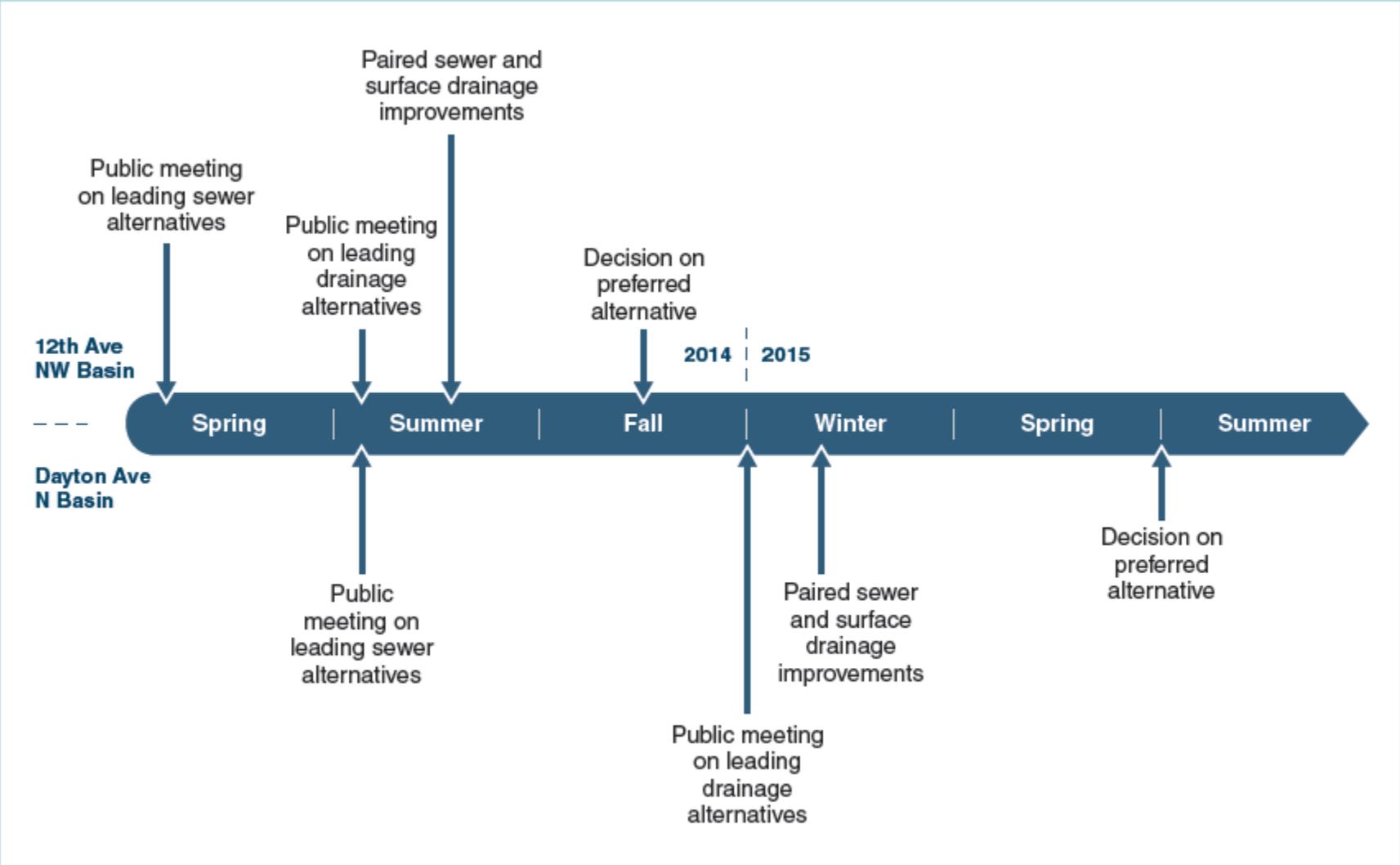
- Reduce frequency and quantity of sewer backups into homes, properties, streets, and creeks
- Reduce frequency and quantity of stormwater flooding to areas most impacted, especially building structures



Work that has been completed

- ✓ Measured direction and amount of sewer and stormwater flows
- ✓ Measured direction of groundwater flows and depths in 12th Ave NW basin (*summer 2013*)
- ✓ Created sewer and stormwater computer models of water flow
- ✓ Hosted public meetings, briefed Broadview Community Council, and held meetings with Broadview Sewer Task Force
- ✓ Conducted a *Flood Grouting Pilot Project* to seal mainline sewer pipes and side sewer lines (*late 2011 and early 2012*)
- ✓ Installed backflow valves to reduce likelihood of sewer backups into homes (*2012*)

Project Timeline



Sewer alternative evaluation criteria

- ✓ **Performance** — complexity and certainty of improvements, as well as future adaptability and impact during extreme events
- ✓ **Stakeholders** — support from internal and external stakeholders
- ✓ **Construction Impacts** — impacts to streets & private property
- ✓ **Environmental** — impacts to creeks and other natural resources
- ✓ **Operations and Maintenance** — need for specialized or frequent operations & maintenance; accessibility
- ✓ **Schedule** — length of time to build and permitting complexity

Leading 12th Ave NW basin sewer alternatives

- Reduce flows into sewer pipes and provide storage, if needed
- Upsize sewer pipes and build storage in 12th Ave NW basin
- Upsize sewer pipes and build storage in Carkeek Park or other centralized location

Significantly reduce flows into sewer pipes and provide storage, if needed

Preliminary cost estimate = \$32 – \$39 million

Phase one

- Improve drainage system
- Seal sewer mains in right of way
- Disconnect downspouts, foundation drains and certain sump pumps from side sewers
 - Reconnect these to drainage system
- Seal side sewers on private properties

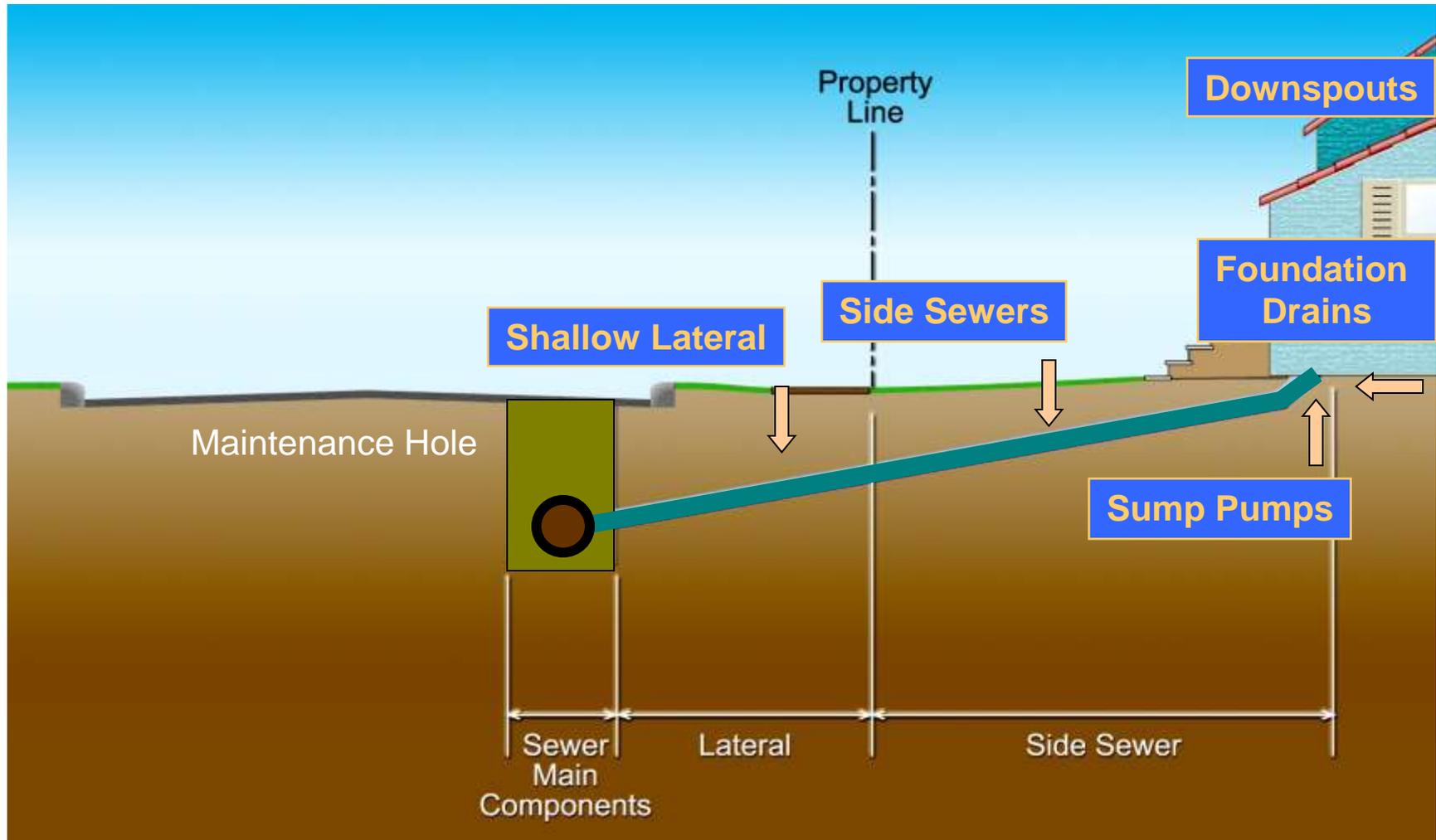
Phase two

- Monitor basin sewer flows for 1-2 years
- Determine need, if any, for sewer storage
 - *Tank would be considerably smaller than other alternatives*



Underground pipe after flood grouting

Significantly reduce flows into sewer pipes and provide storage, if needed



Significantly reduce flows into sewer pipes and provide storage, if needed

Components

- Improve drainage system
- Seal 18,500 feet (35 city blocks) of sewer mains
- Seal 44,000 feet of side sewers (440 private properties)
- Manage surface water/ground water removed from sewer
 - 500,000 gallons for stormwater pond
 - Property needed = approx. 16,000 square feet



NW 107th Street stormwater cascade

Significantly reduce flows into sewer pipes and provide storage, if needed

Benefits:

- Addresses problem at its source
- Refurbishes large area of public sewer system and private side sewers
- Sewer storage tank may not be needed, and if needed, would be much smaller than other alternatives
- Significantly less property needed

Challenges:

- Requires 440 private homeowners participate
- Requires drainage improvements to accommodate flows removed from the sewer
- Phased approach - may still need to build some sewer storage

Upsize sewer pipes and build storage in 12th Ave NW basin

Preliminary cost estimate = \$26 million

Components

- Increase size of sewer lines under 12th Ave NW
- Build underground sewer storage tank at south end of 12th Ave NW basin
- Manage stormwater and groundwater flows removed from sewer



Trenching



Pipe bursting



Example of pocket park over underground sewer storage tank.

Upsize sewer pipes and build storage in 12th Ave NW basin

Components

- Increase size of 2,500 feet (5 city blocks) of sewer lines under 12th Ave NW
- Build underground sewer storage tank & stormwater pond in 12th Ave NW Basin
 - 500,000 gallons of underground sewer storage (100 ft x 90 ft x 30 ft)
 - 50,000 gallons for stormwater pond
 - Total property needed = approx. 32,000 square feet
- Improve drainage system
- Odor control facility (approx. 40 ft x 40 ft) and a mechanical/electrical building (approx. 12 ft x 20 ft)
- Only work related to private side sewers are new connections to mainlines

Upsize sewer pipes and build storage in 12th Ave NW basin

Benefits:

- Minimal involvement of private property owners
- Lowest cost option

Challenges:

- Substantial amount of space in 12th Ave basin needed for underground sewer storage tank
- Improves only a small portion of sewer system in 12th Ave NW basin that is leaky
- Does not separate out stormwater/groundwater from sewer so all has to be stored and treated

Upsize sewer pipes and build storage in Carkeek Park or other centralized location

Preliminary cost estimate = \$32 million + \$ for Dayton basin storage

Components

- Build underground sewer storage tank in Carkeek Park or other centralized location
- Increase size of sewer lines to new tank
- Potentially redirect excess sewer flows from 12th Ave NW basin and Dayton Ave N basin to new tank
- Manage stormwater and groundwater flows removed from sewer
- Odor control facility and a mechanical/electrical building



Upsize sewer pipes and build storage in Carkeek Park or other centralized location

Components

- Increase size of 4,900 feet (9 city blocks) of sewer lines including lines through Carkeek Park
- Build underground sewer storage tank and stormwater pond
 - 500,000 gallons of sewer storage (100 ft x 90 ft x 30 ft)
 - 100,000 gallons for stormwater pond
 - Total property needed = approx. 32,000 square feet
- Improve drainage system
- Only work related to private side sewers are new connections to mainlines

Upsize sewer pipes and build storage in Carkeek Park or other centralized location

Benefits:

- Minimal involvement of private property owners
- Minimal space needs in 12th Ave basin
- May be able to address excess sewer flows from Dayton basin at the same location by expanding facility

Challenges:

- Construction in park space
- Steep slopes
- Environmental and permitting challenges could significantly extend schedule
- Limited space in park to accommodate sewer storage tank for 12 Ave and Dayton Ave N. basin excess flows.
- Improves only part of sewer in 12th Ave NW. basin that is leaky

Comments and questions

- Are there any clarifications you would like on the alternatives?
- What comments do you have on the sewer alternatives?

Next steps

- **Next public meeting— late spring/early summer 2014**
 - Leading drainage alternatives for 12th Ave NW basin
 - Leading sewer options for Dayton Ave N basin

What are the best ways to communicate with you?

- Mailed newsletter
- List serve messages
- Public meetings
- Website updates
- Other
- All of the above

**If you have a sewer backup or stormwater flooding,
please call Seattle Public Utilities' 24 -7 emergency
response number:**

(206) 386-1800

For more information about the Broadview project:

- Web: www.seattle.gov/util/broadviewprojects
- Email: spu_broadviewprojects@seattle.gov
- Call: 206-409-3651