Decennial Flow Monitoring and Conveyance System Improvement (CSI) Program Briefing

Regional Water Quality Committee
April 6, 2022

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

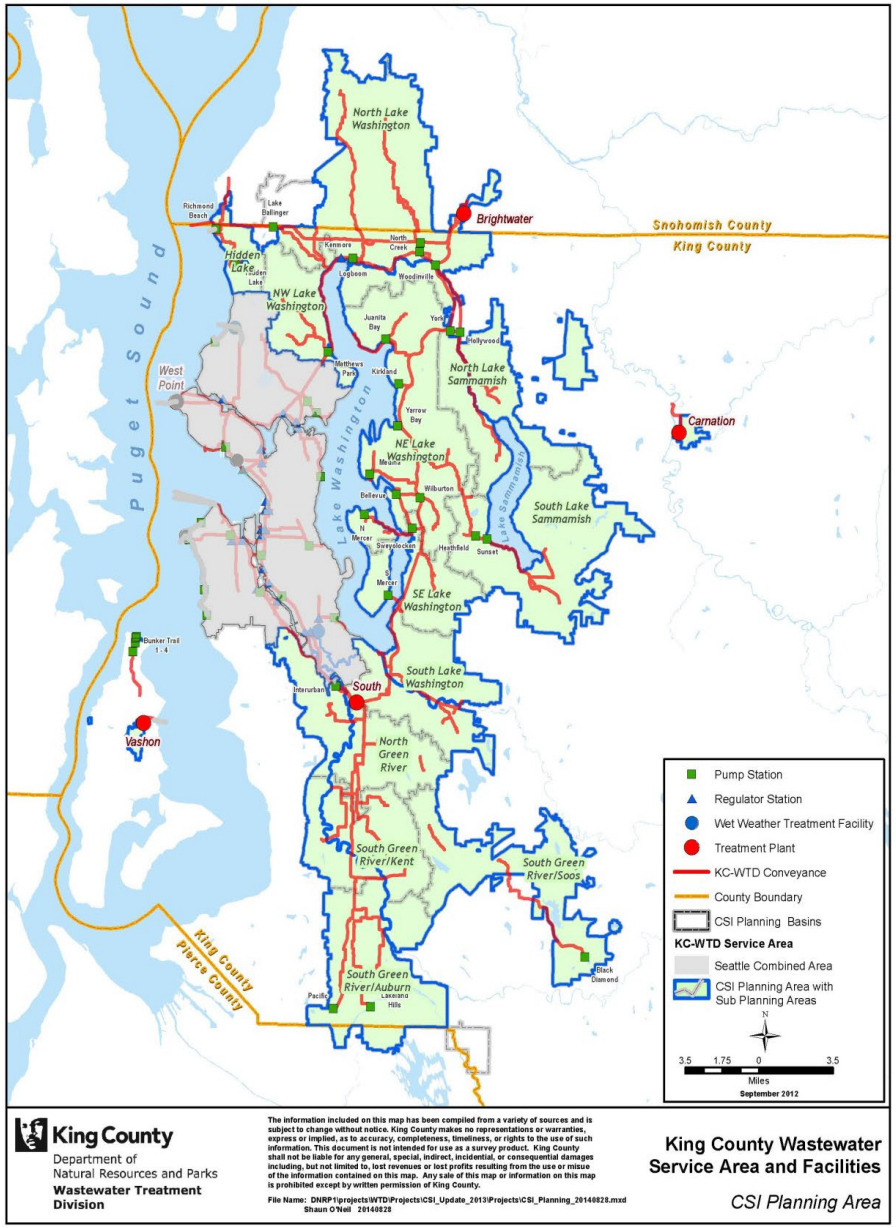
Todays Briefing

- Provides RWQC with an overview of the Conveyance System Improvement (CSI) Program that identifies the capacity needs in the regional wastewater system.

- Links to the policies in the Regional Wastewater Services Plan that guide the CSI program.

- Introduces the Decennial Flow Monitoring Program, which is directed by County policy to collect wastewater flow data.

CSI Program Overview



- Purpose: Guide major improvements to the separated portion of the conveyance system
  - Identifies near term projects for implementation
  - Determines long range investments required to ensure capacity

- Policy direction – **Conveyance System Policy CP-4**: The executive shall update the conveyance system improvement program… to ensure the program remains current.

CSI Program Update Process

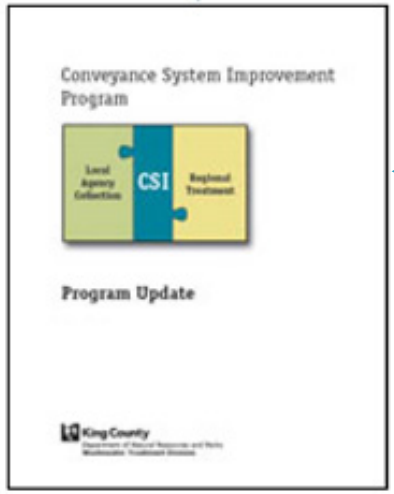
- Policy direction – **Conveyance System Policy CP-3**: King County shall periodically evaluate population and employment growth assumptions and development pattern assumptions…

Update Planning Assumptions

Complete Regional Conveyance System Needs Assessment

Develop Conceptual Projects and Planning Level Cost Estimates

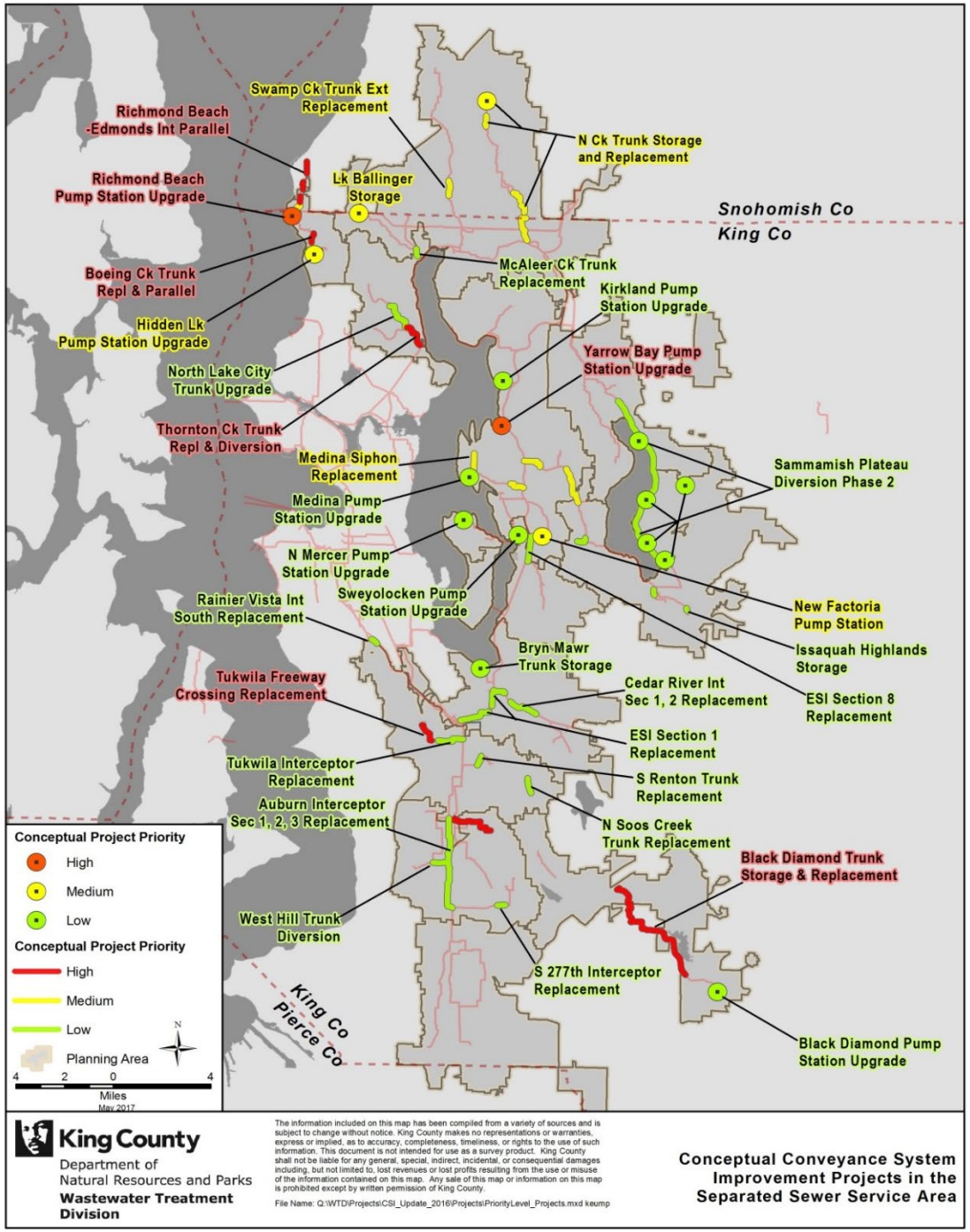
Conceptual Project Prioritization



- Policy direction – **Conveyance System Policy CP-2**: King County shall construct the necessary wastewater conveyance facilities, including, but not limited to pipelines, pumps and regulators…

2017 CSI Program Update

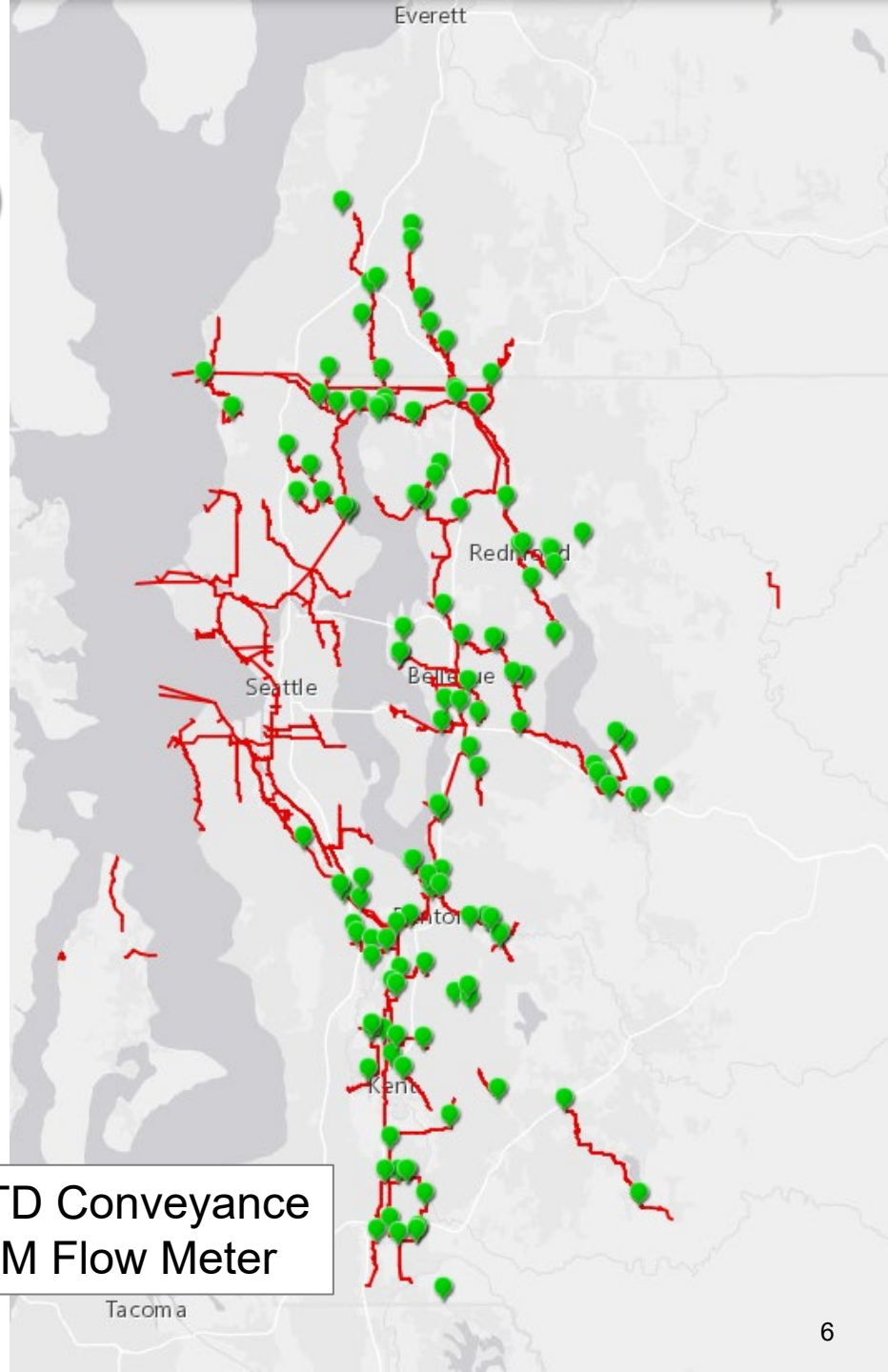
- Identified 8 high priority projects based on level of service and other considerations
- Identified additional medium and long-term needs to track in future program updates



2020 Decennial Flow Monitoring (DFM)

- Measuring flow in WTD's conveyance system
- 139 flow meters
- Three wet seasons

- Policy direction – **Conveyance System Policy CP-3**:
  …The following activities shall take place to confirm assumptions and conveyance improvement needs:
  …
  2. Decennial flow monitoring to correspond with the Federal Census conducted every ten years.



Typical Flow Meter Installations

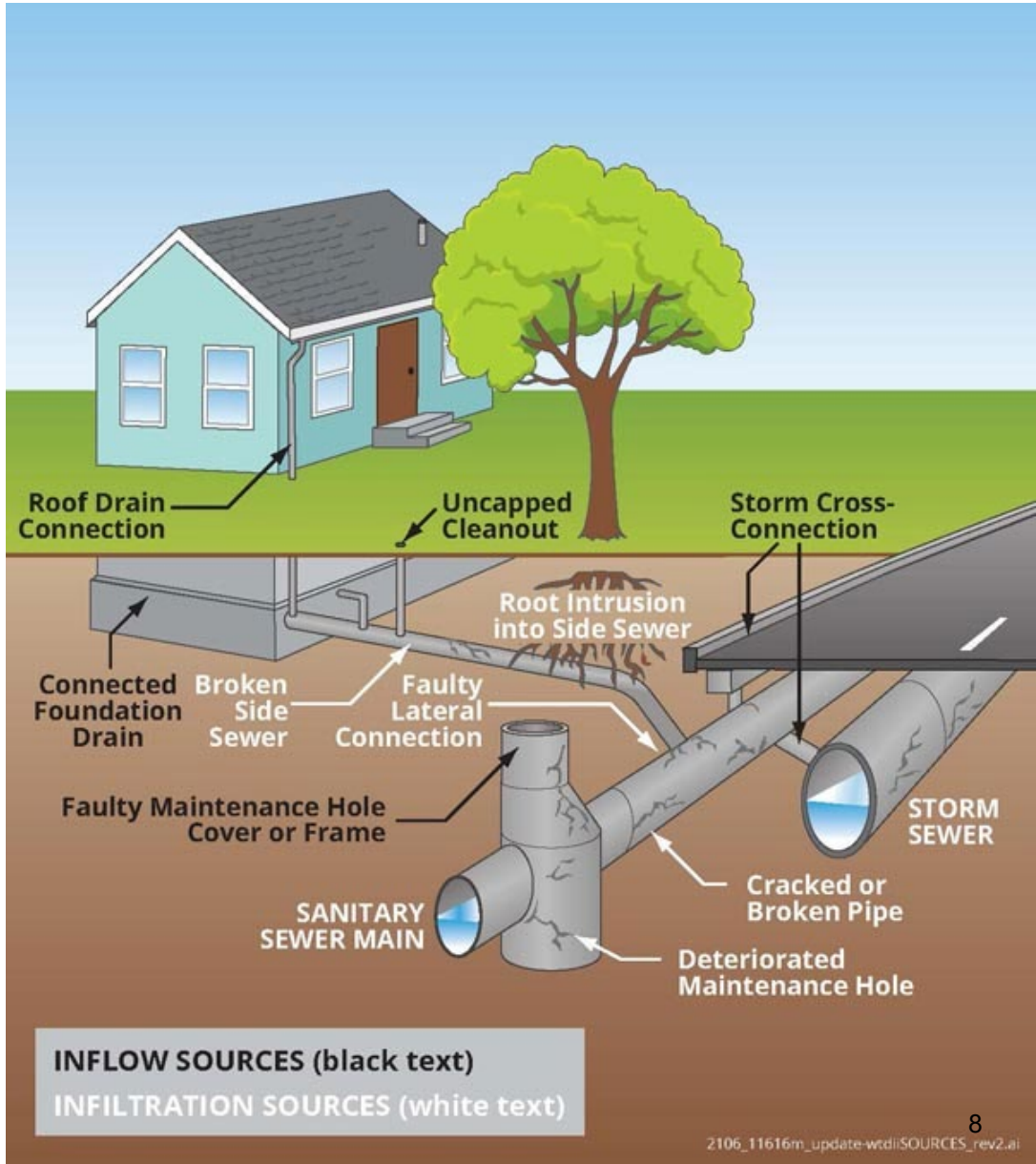
Flo-Dar Installation

Triton+ Installation
with Peak combo and
smart depth sensors

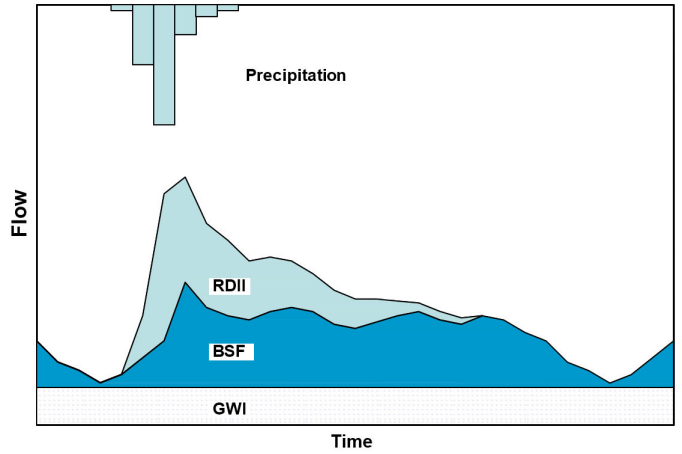
Components of Sewer Flows

- Sanitary flows
  - Household, commercial, industrial flows
  - Toilets
  - Sinks/showers
  - Laundry
  - etc.

- Infiltration and Inflow (I/I)
  - Groundwater and rainwater entering the sanitary system
  - Increased flow during wet weather
  - Can be several times larger than the sanitary flow



Sewer Modeling



- Policy direction – **Conveyance System Policy CP-1**:
  …King County shall plan, design and construct county wastewater facilities to avoid sanitary sewer overflows.

  1. The twenty-year peak flow storm shall be used as the design standard for the county's separated wastewater system.

- Calibrate model(s) to match observed flows
- Simulate flows with long-term rainfall records
- Estimate 20-year peak flow
  - Flow that occurs once every twenty years, on average
  - 5% probability of occurring in any year
- Compare with existing capacity

Components of Future Flows

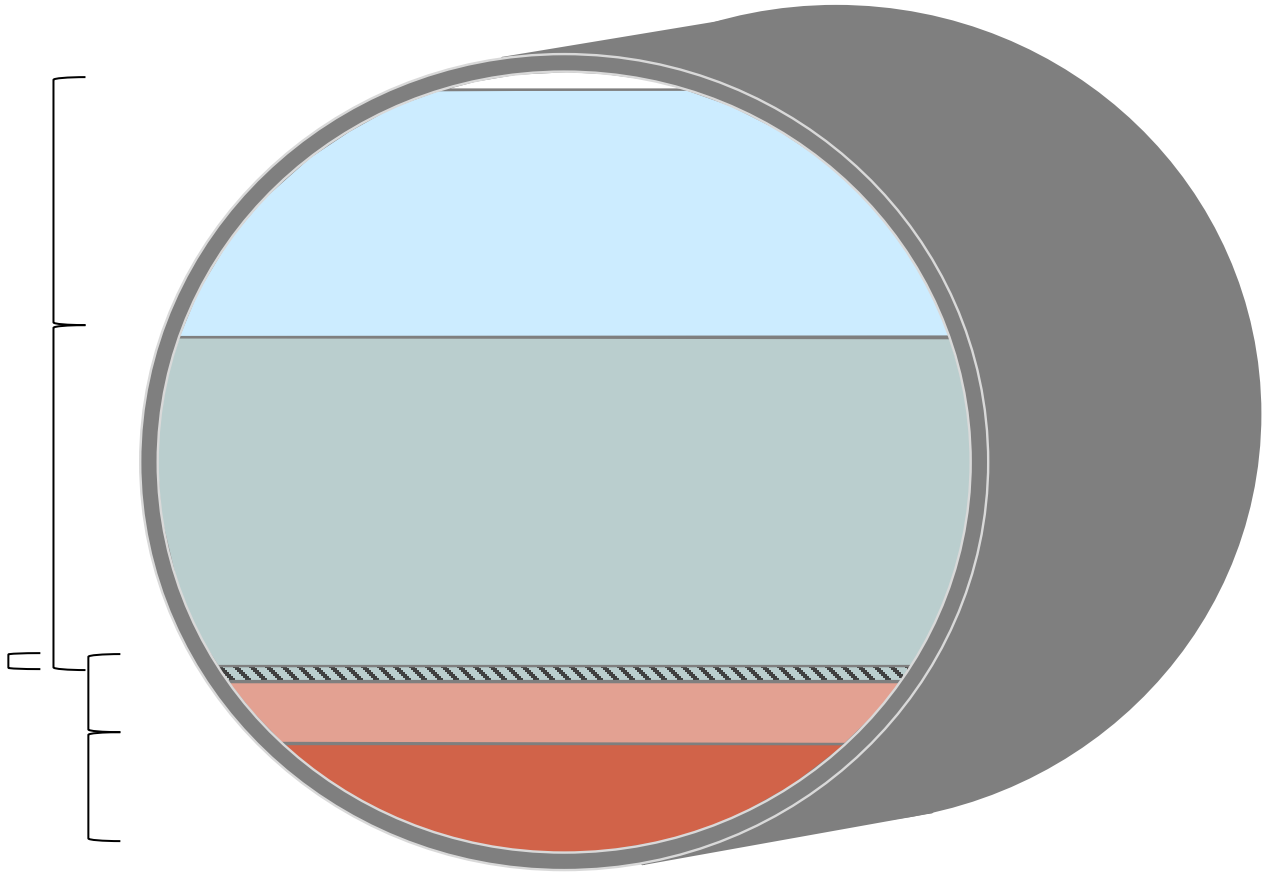
additional future I/I =
I/I degradation
+ additional sewered area

current I/I

water conservation reduction

future population and employment

current sewage flow

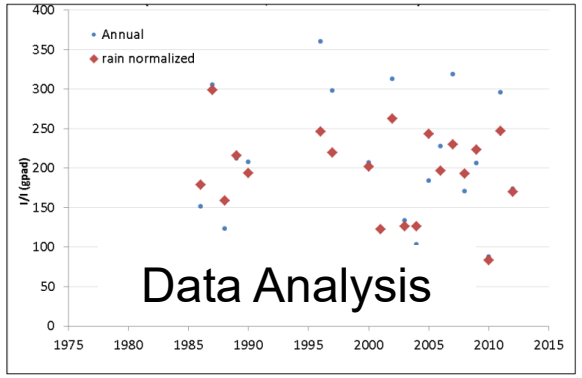


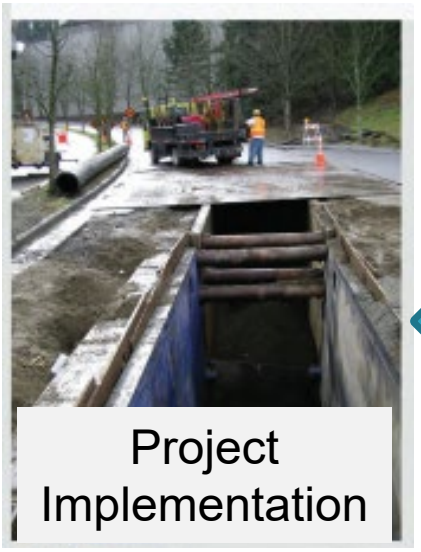
Projecting Future Flows

- Estimate per-capita flows from flow monitoring and Census data.
- Use population and employment projections to estimate future Sanitary flows
  - Projections from Puget Sound Regional Council (PSRC)
- I/I increases slowly over time due as pipes deteriorate
- Flows increase as additional areas are connected to the sewer system
- Project flows 50 years into the future

CSI Program – Look Ahead

- Planning:
  - 2022-23 – DFM data analysis and flow forecast assumption updates
  - 2024-25 – Regional Needs Assessment
  - 2026-27 – Conceptual Projects and prioritization
- Project implementation:
  - Projects in design and construction
  - Initiate additional CSI Projects in Capital Budget Requests





Reference Links

- General CSI Program Information
- Flow Forecast Assumptions
- Regional Needs Assessment
- Conceptual Projects to Address Identified Capacity Needs
- 2017 CSI Program Update

Questions/Discussion

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