City of Poulsbo

Sewer Comprehensive Plan Workshop

June 16, 2021

City Council

bhc CONSULTANTS

RH2

AGENDA

- WORKSHOP PURPOSE
- BACKGROUND
  - SYSTEM OVERVIEW & SEWER STRATEGY
  - EXISTING SYSTEM CAPACITY CONSTRAINTS
- APPROACH
  - PROCESS AND SCHEDULE
  - HYDRAULIC MODEL
  - I&I STUDY – PRELIMINARY RESULTS
  - GROWTH PROJECTIONS
- NEXT STEPS

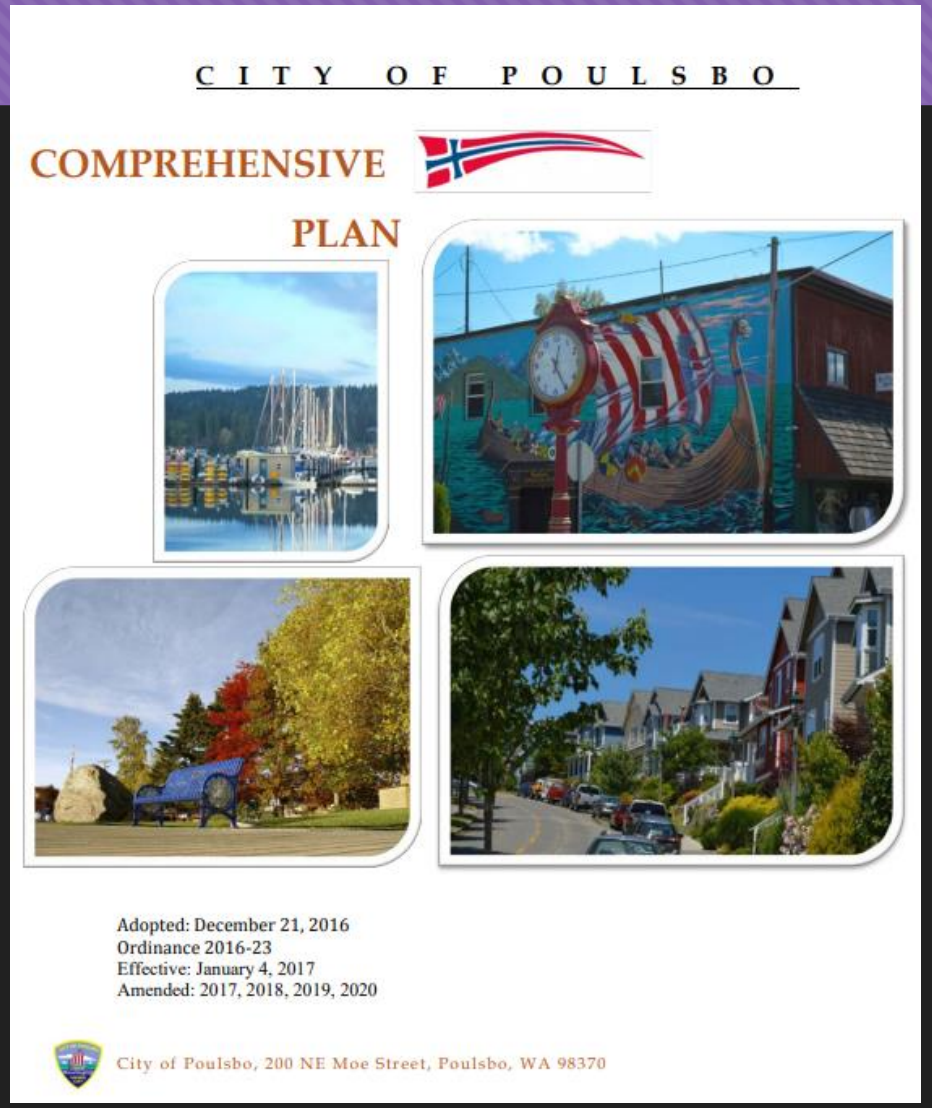
WORKSHOP PURPOSE

- Provide an overview of our on-going sewer planning efforts and schedule
- Share near term and long - term approach regarding sewer capacity efforts.
- Launch Sewer Comprehensive Plan Technical Advisory Committee to serve as a resource to our technical team

- FORMAT – Feel free to ask questions along the way. We have our consultants here tonight. We also have several members of our sewer advisory committee here to listen to the presentation and carry your thoughts forward

City of Poulsbo - Comprehensive Plan

- Growth Management Act (GMA) requires cities to plan for growth
- Utility Functional plans are incorporated into Comp Plan
  - Water
  - Sewer
  - Stormwater
  - Transportation
- 2016 – last comprehensive plan update
  - Updates required every 8 years with periodic reviews
  - 2024 Comp Plan – functional plans to be completed beforehand



Utility Functional Plan Schedule

Sewer:	Start 2020	→	Completion 2022
Water:	Start 2022	→	Completion 2023
Stormwater:	Start 2022	→	Completion 2023
Transportation:	Start 2022	→	Completion 2023

City Comprehensive Plan: Public Release 2023 → Adoption June 2024

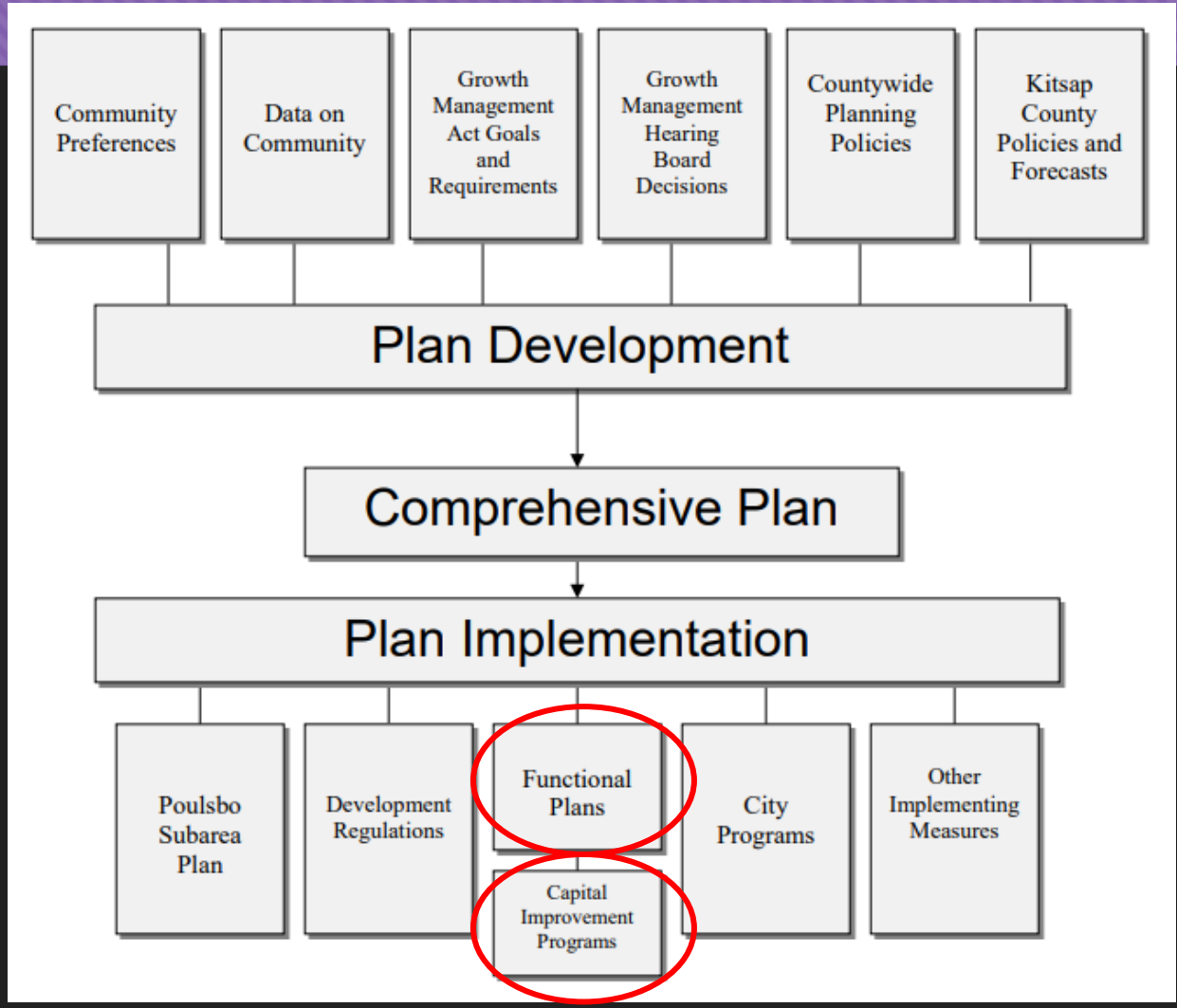
Note: Sewer required coordination with Kitsap County process so began early (KC comp plan 2022)

Previous Plans vs. Current

Previous Comprehensive Plans (2000, 2008, 2016) had population allocation = **14,808**

Current Comprehensive Plan (2024) anticipated population allocation = **~20,000**

Significant sewer improvement projects in the near future – detailed sewer functional plan is critical to successful implementation



Sewer Comp Plan Process + Timeline

Engage Consultant Team

Lead the technical work

Form a Technical Advisory Committee of local stakeholders + community members + Council members

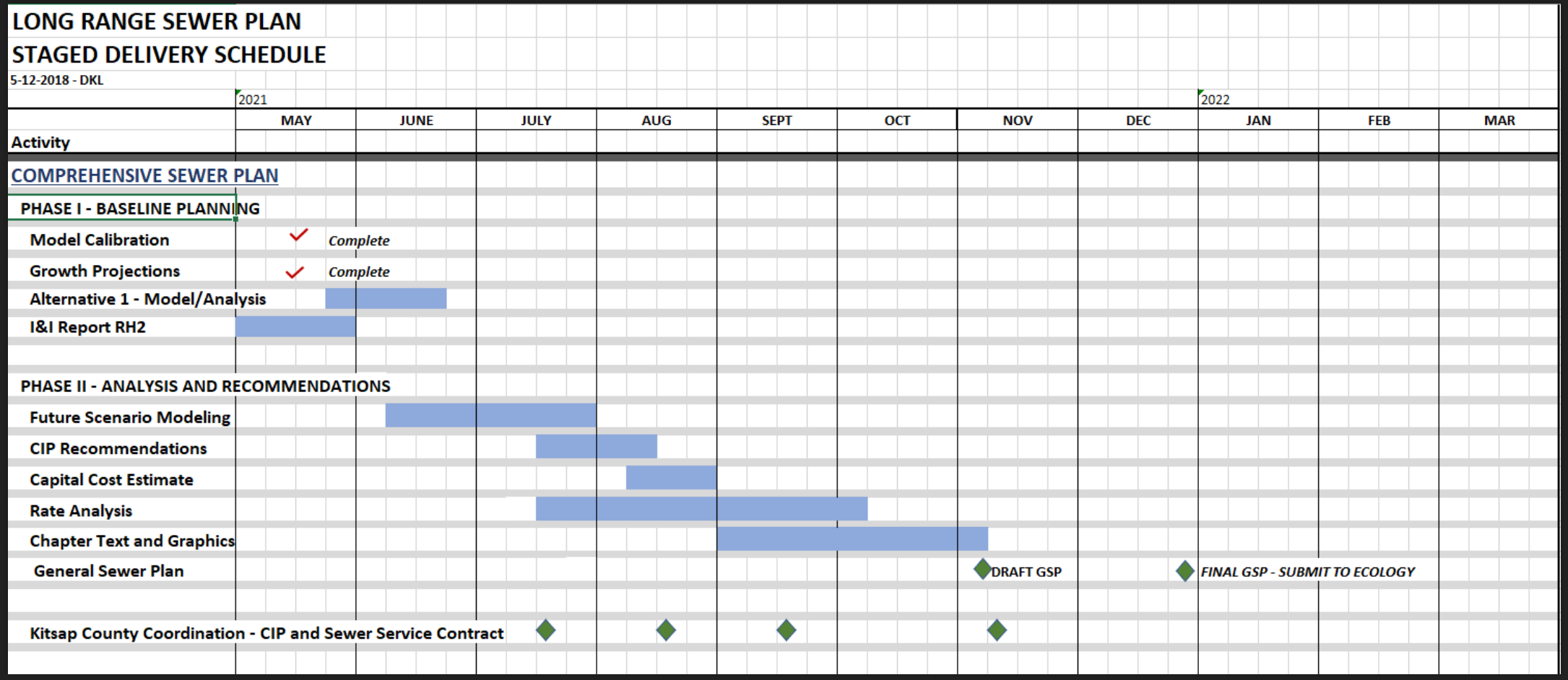
Advisory Committee Role: periodic updates, detailed data + modeling, "deep dive" into material, recommendations, etc.

Public outreach at key milestones

City Council Role:

- Policy Decisions
- Sewer Comprehensive Plan Approval
  - Target Draft Plan - December 2021
  - Council Approval 2022

SEWER COMPREHENSIVE PLAN



SEWER ADVISORY COMMITTEE (SAC)

ROLE: Provide candid feedback on sewer analysis technical results and sewer strategies

COMMITTEE MEMBERS:

- Mark Kipps, Poulsbo Resident, Planning Commission Member
- Jim Schlachter, Poulsbo Resident
- Kelly Clark, Local Property Owner/Developer
- Richard Best, Kitsap County/Lemolo Resident
- 3 City Council Members – David Musgrove, Gary McVey, Andrew Phillips

STAFF:

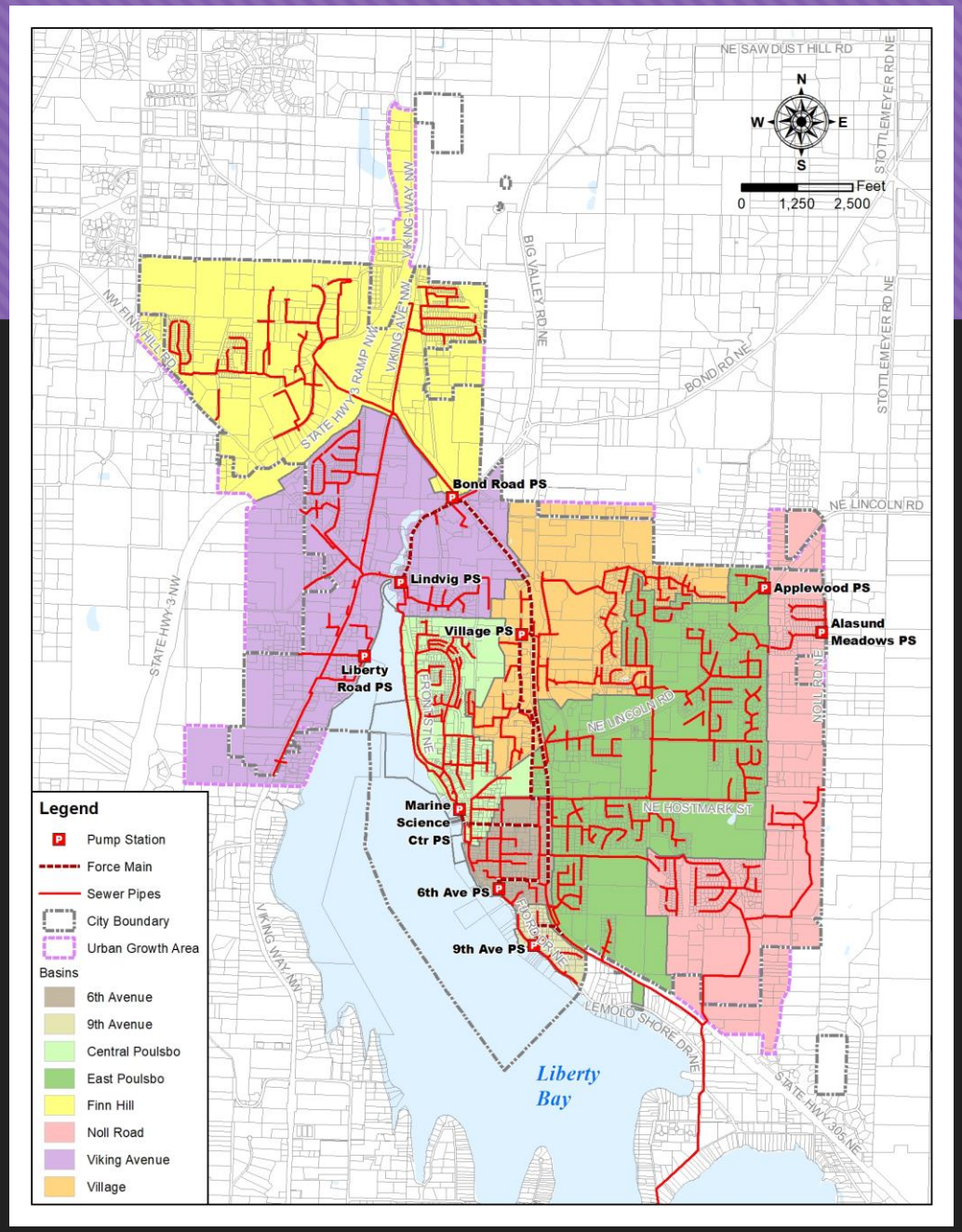
- Engineering, Public Works and Finance (DL, CR, PS, ML, DB)
- Consultant BHC – Chris Kelsey, P.E.
- Kitsap County Dept. of Public Works – David Tucker, Stella Vakarcs

Coordination & Updates with:
Department of Ecology
Suquamish Tribe
Kitsap Building Assoc (KBA)

City of Poulsbo Sewer System

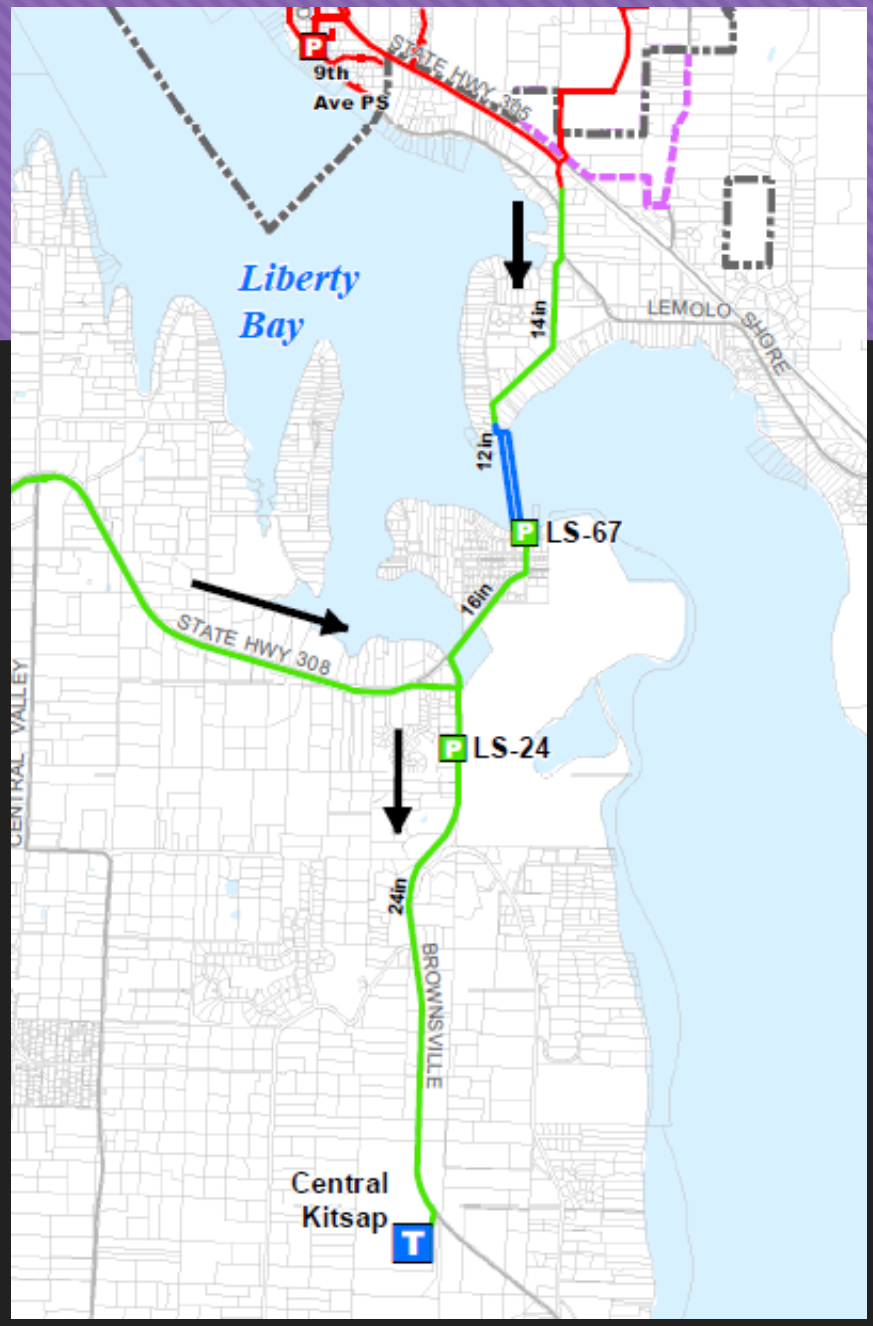
- 4 Square Miles
- 4,100 customers

- ~ 40 miles of Gravity Sewer Main
- ~ 3.8 miles of Force Main
- 8 Primary Drainage Basins
  - 6 controlled by Pump Stations
  - 2 gravity flow basins
- 9 Lift Stations



Downstream (County) Sewer System

- County Metering Station at Johnson Road
- Lemolo Shoreline conveyance pipe
- Twin 12" Siphons under Liberty Bay
- Pump Station 67 in Keyport
- Conveyance to Central Kitsap Wastewater Treatment Plant in Brownsville



Completed Sewer Projects

City of Poulsbo Projects

- Village Pump Station upgrades
- 6th Ave Pump Station upgrades
- 9th Ave Pump Station upgrades
- Liberty Bay Pump Station upgrades
- SR305 Central Interceptor CIPP Lining project
- SR305 Manhole Rehab project
- Harrison Force Main Replacement
- Camera Truck Purchase
- Annual I&I reduction program
- Annual Pump Station rehab/safety improvements

Kitsap County Projects

- Johnson Road Metering Station upgrade
- Pump Station 16 and 67 upgrades
- Central Kitsap Treatment Plant upgrades (Various)
  - UV Disinfection
  - Campus building upgrades

Challenges – Capacity & Growth

- Successes in I & I reduction program over past years resulted in delaying large capital projects
  - Offset by increased population growth
- Need for additional conveyance capacity in downstream system
  - Lemolo Shoreline Pipe
  - Siphon Under Liberty Bay
  - Central Interceptor/Bond Rd Force Main Extension
- Conveyance Capacity projects are large scale, extended duration improvements
  - Requires strategic implementation
  - Installation of wet weather storage to alleviate surcharge
- Capacity negotiations at Central Kitsap Wastewater Treatment Plant
  - Kitsap County currently reserves .95 MGD of the 6 MGD wastewater treatment plant for City of Poulsbo

Sewer Strategic Resources

BHC – Sewer Modeling and General Sewer Plan

RH2 – I&I Analysis

Parametrix – SR305 Sewer Wet Weather Storage Tank Design

Sewer Advisory Committee

Kitsap County

City Council

2020 – 2026 Sewer CIP – Capacity Constraints

City Projects

- SR305 Force Main Extension - $3 mil
- SR305 Storage Facility - $1 mil

County Projects

- Bangor/Keyport Forcemain Replacement - $5.5mil
- Lemolo Shore Pipeline Upgrade - $3.6 mil
- Lemolo Siphon - $9 mil

Total = $20 – 30 mil range

SEWER COMPREHENSIVE PLAN - GOAL

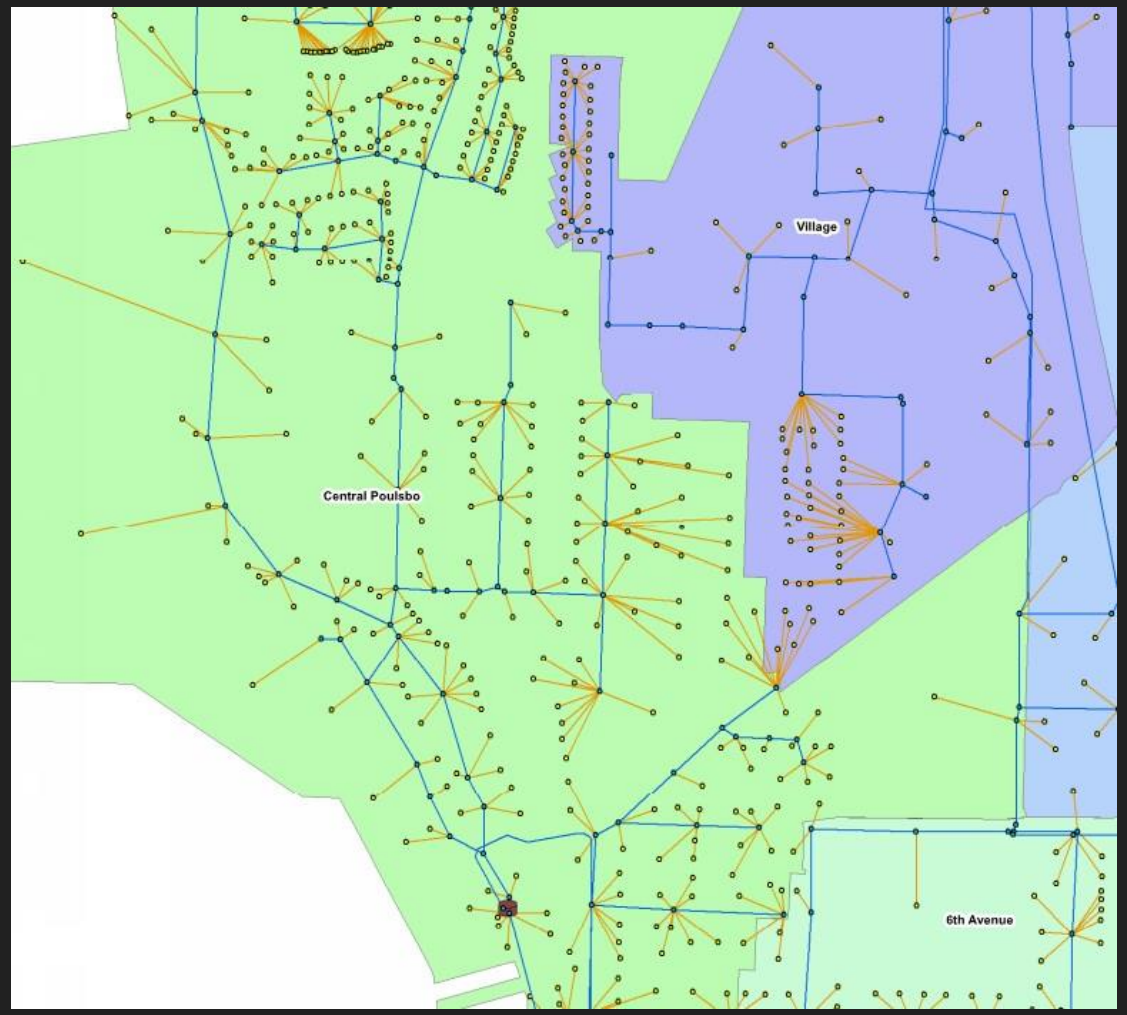
- Provide framework of required City planning efforts that put executable programs in place to accommodate growth
- Summarize the City's current sewer utility facilities and its capacity related challenges to handle current and projected future wastewater flows
- Generate a capital improvement program and supporting financial structure acceptable to the stakeholders

CHRIS KELSEY
PROJECT MANAGER

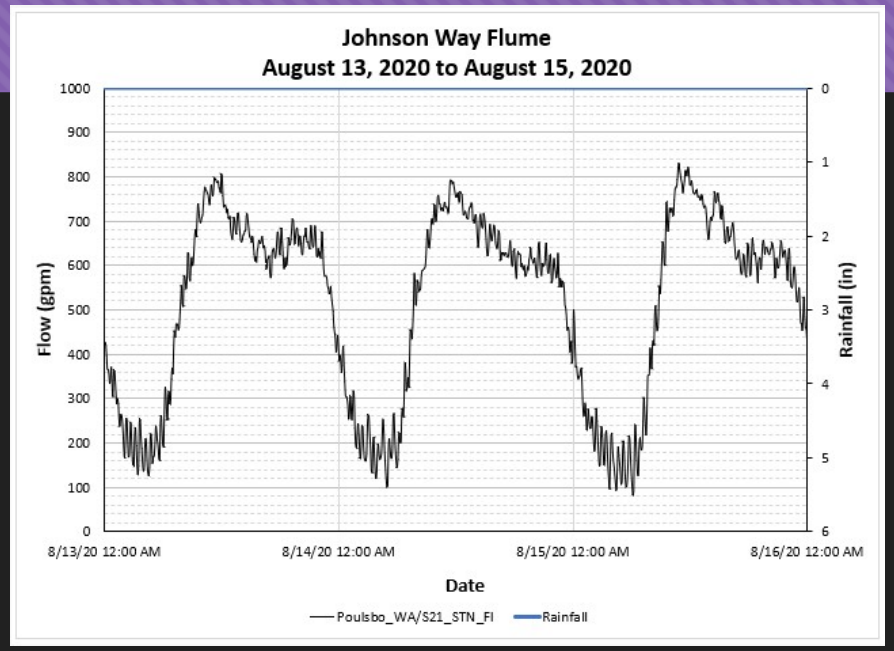
BHC HYDRAULIC MODEL UPDATE

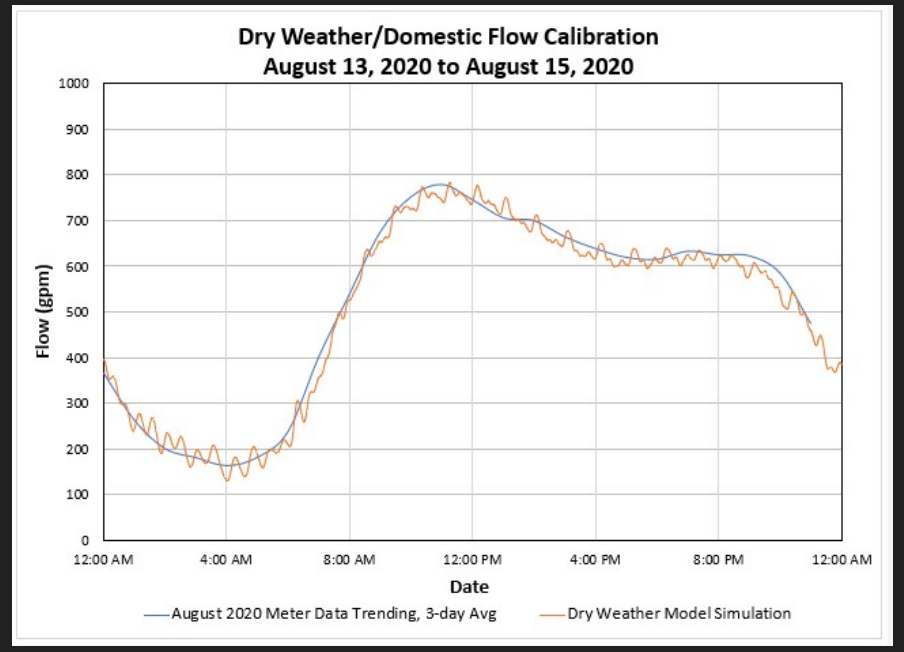
City Sewer Model – A Critical Tool

- Previous sewer plan analysis limited to spreadsheet-based capacity assessment of Central Interceptor
- Newly developed model (MIKE Urban):
  - All relevant sewer pipelines/manholes within the system, based on City's GIS database
  - Kitsap County Lemolo facilities added
  - Field verification to resolve anomalies
  - Domestic flow inputs based on actual sewer account/parcel information and water demand data
  - I/I flow inputs based on measured basin and Johnson Way data, dispersed by basin manholes
- RESULT: a more accurate tool to predict location and timing of system deficiencies!



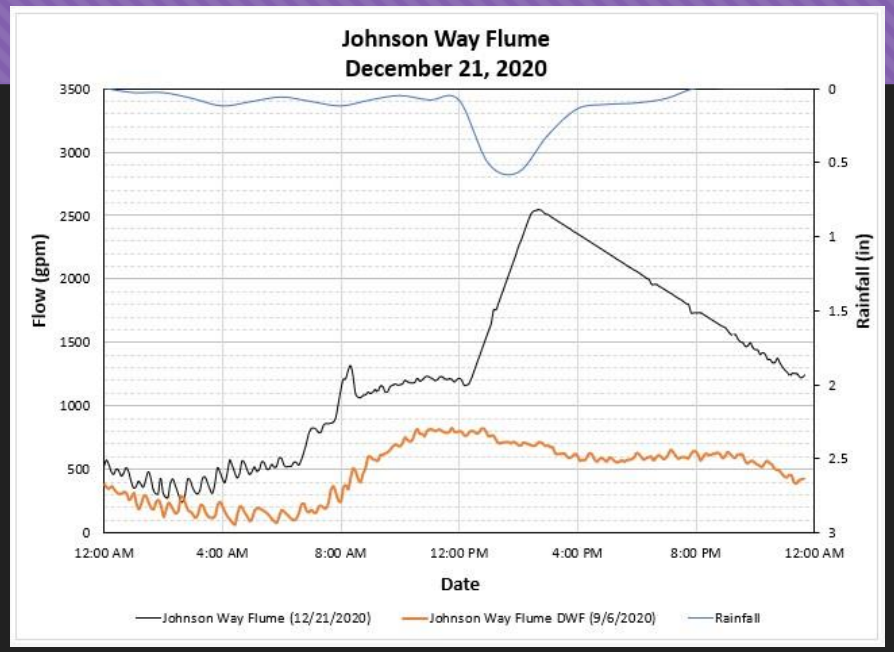
Sewer Model – Dry Weather Calibration

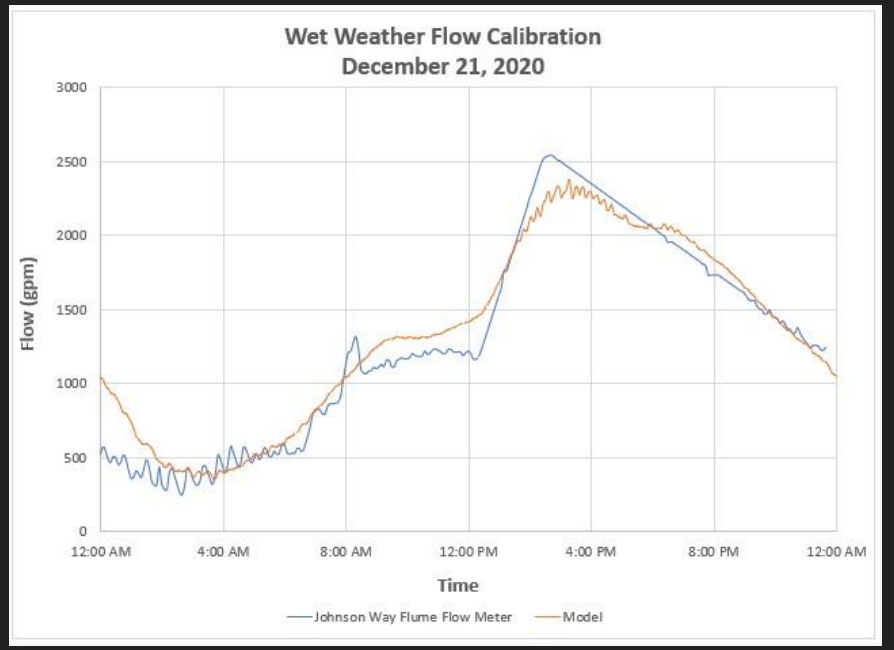




- Domestic flow diurnal curves established to match Johnson Way patterns, "shifted forward" to reflect system attenuation
- Winter average water usage used to represent sewer flow contributions
- Baseline I/I incorporated to match magnitude of flows at Johnson Way

Sewer Model – Wet Weather Calibration





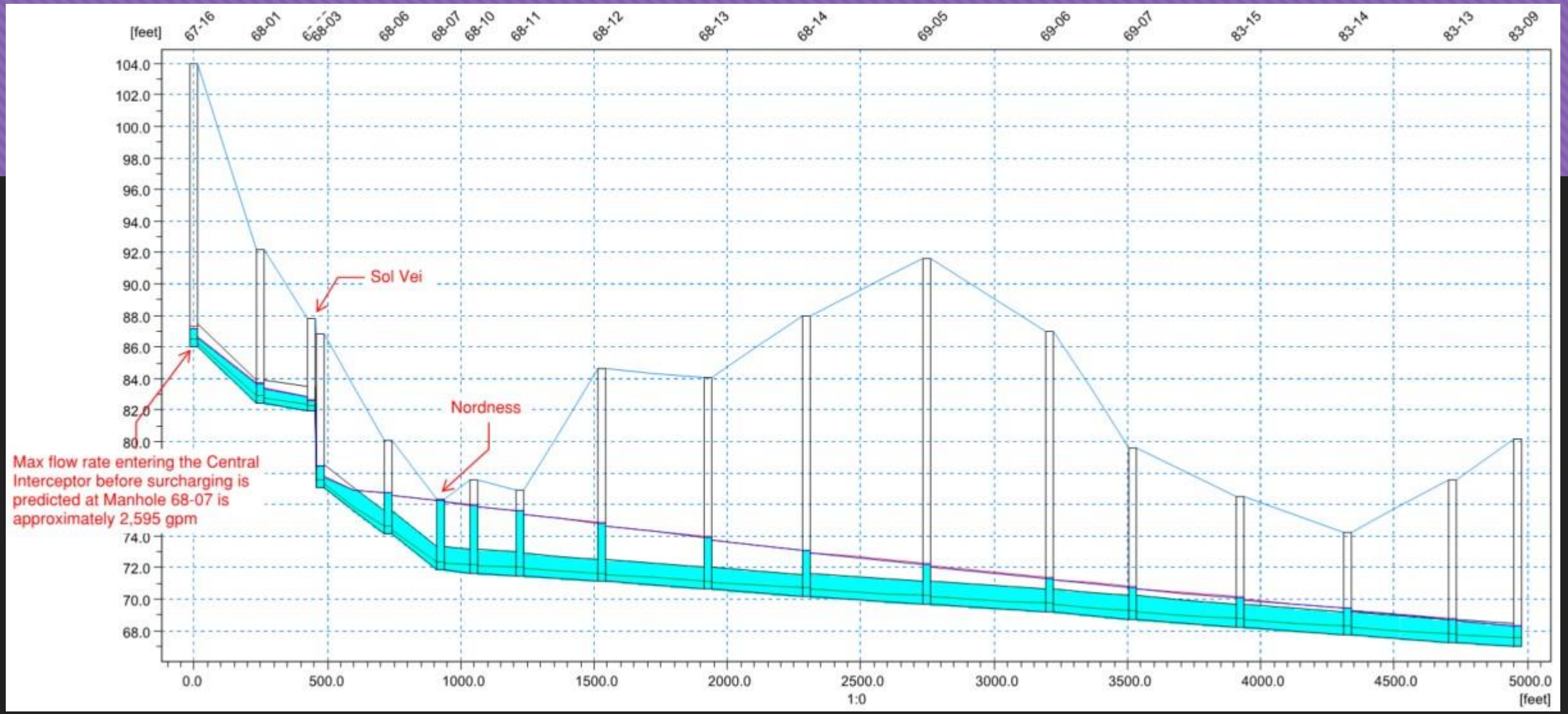
- Based on the 12/21/20 event
- Individual basin I/I curves established through pump station/instream measured flow data
- Basin I/I curve shapes normalized and adjusted to bring resultant Johnson Way flow meter curve for the event (established by RH2 I/I study) within acceptable level of accuracy

Calibrated Model

- Provides more realistic distribution of generated sewer flows and their attenuation through the system
- Based on real flow data measured within the system
- Peak flows are linked to storm events
- Facility capacity is linked to peak flows and surcharge tolerance

Model Support for Peak Storage Facility

- Central Interceptor sensitivity analysis used to determine peak flow rate capacity before daylight surcharge at Sol Vei
- RH2 used Johnson Way peak flow curve area above this peak rate to estimate a storage facility volume that might prevent daylight surcharge for typical design storm events
- Preferred site for storage facility offers limitations to constructible volume
- Storage facility is the most cost-effective surcharge mitigation project that can be expedited – PRELIMINARY DESIGN IS UNDERWAY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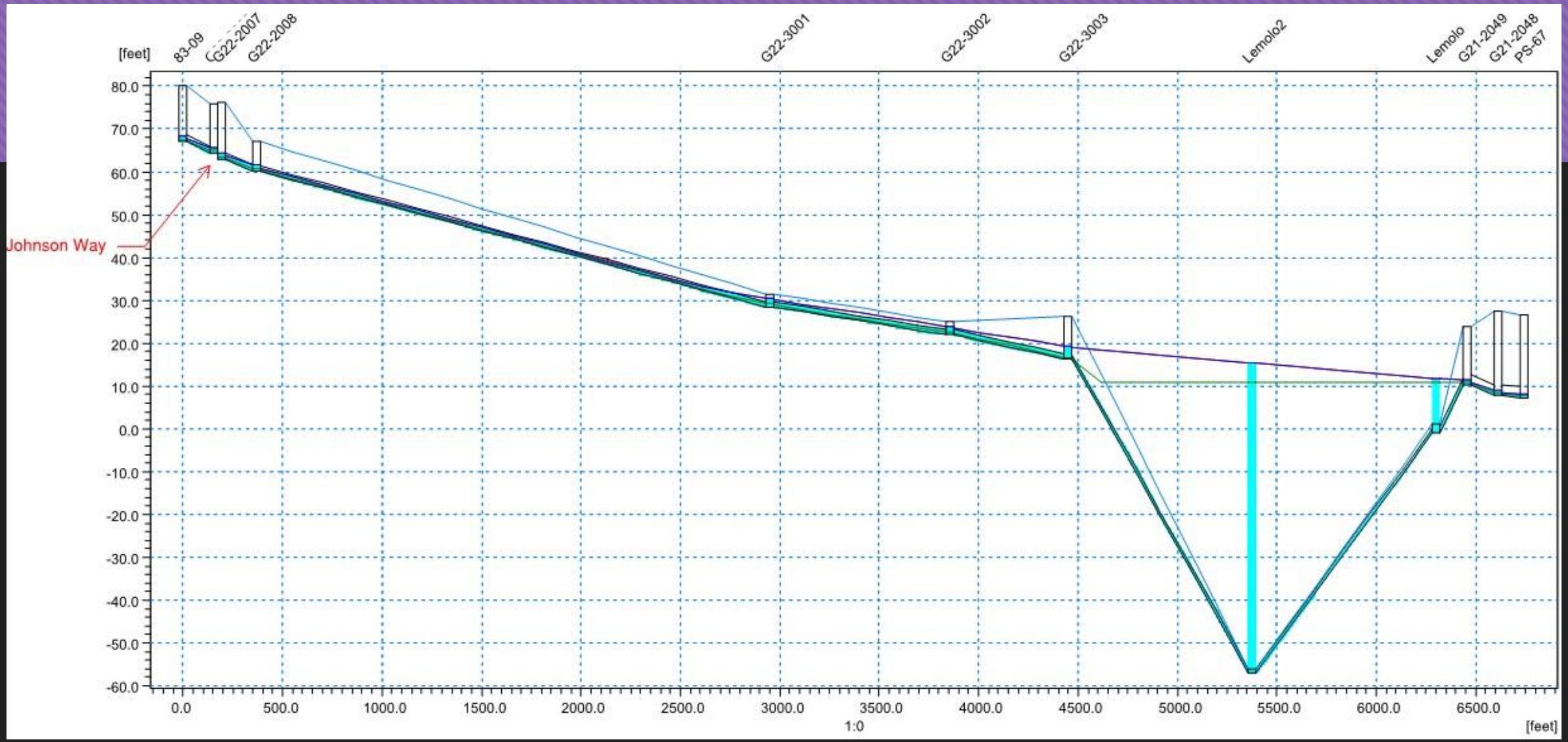
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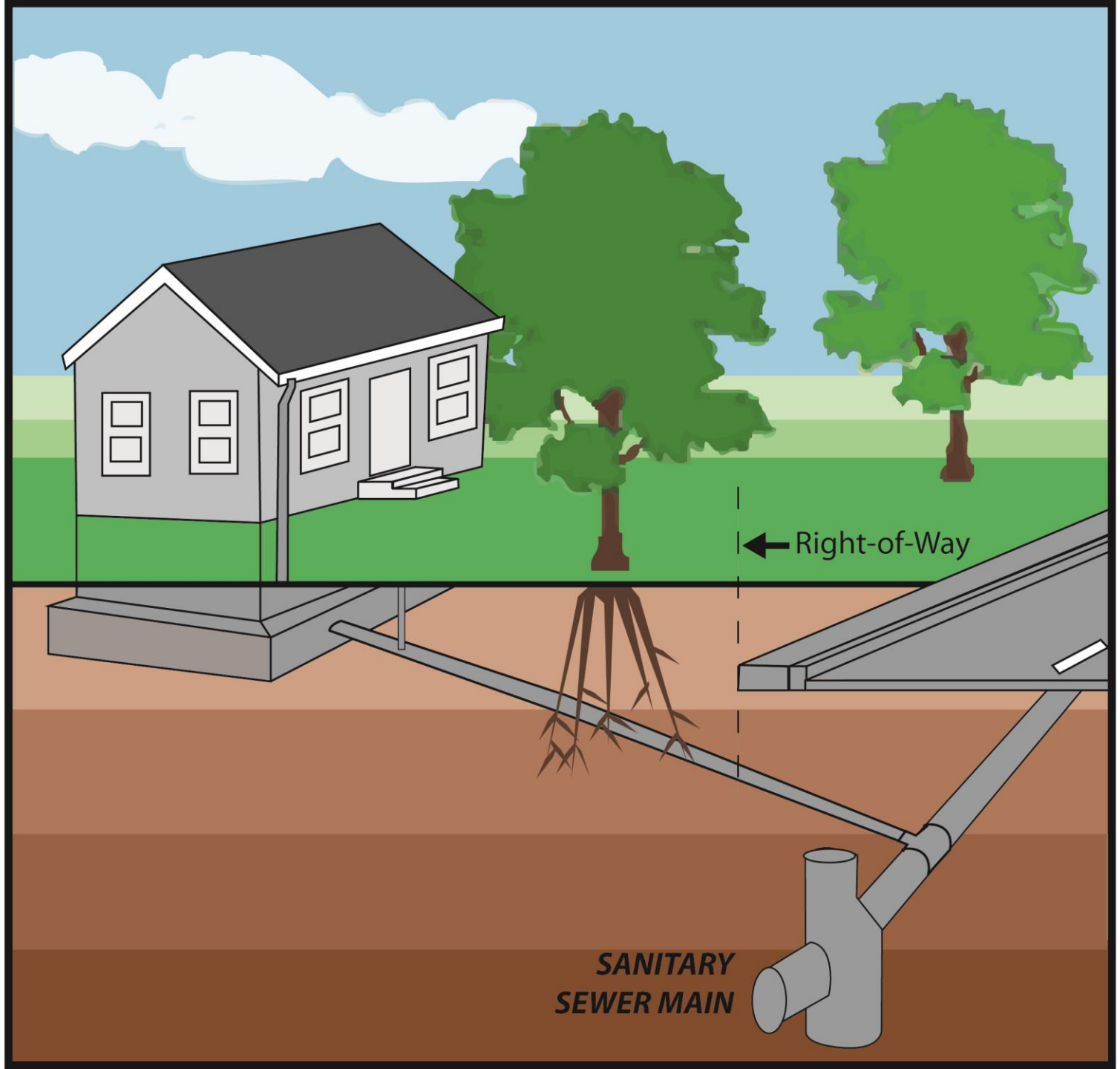
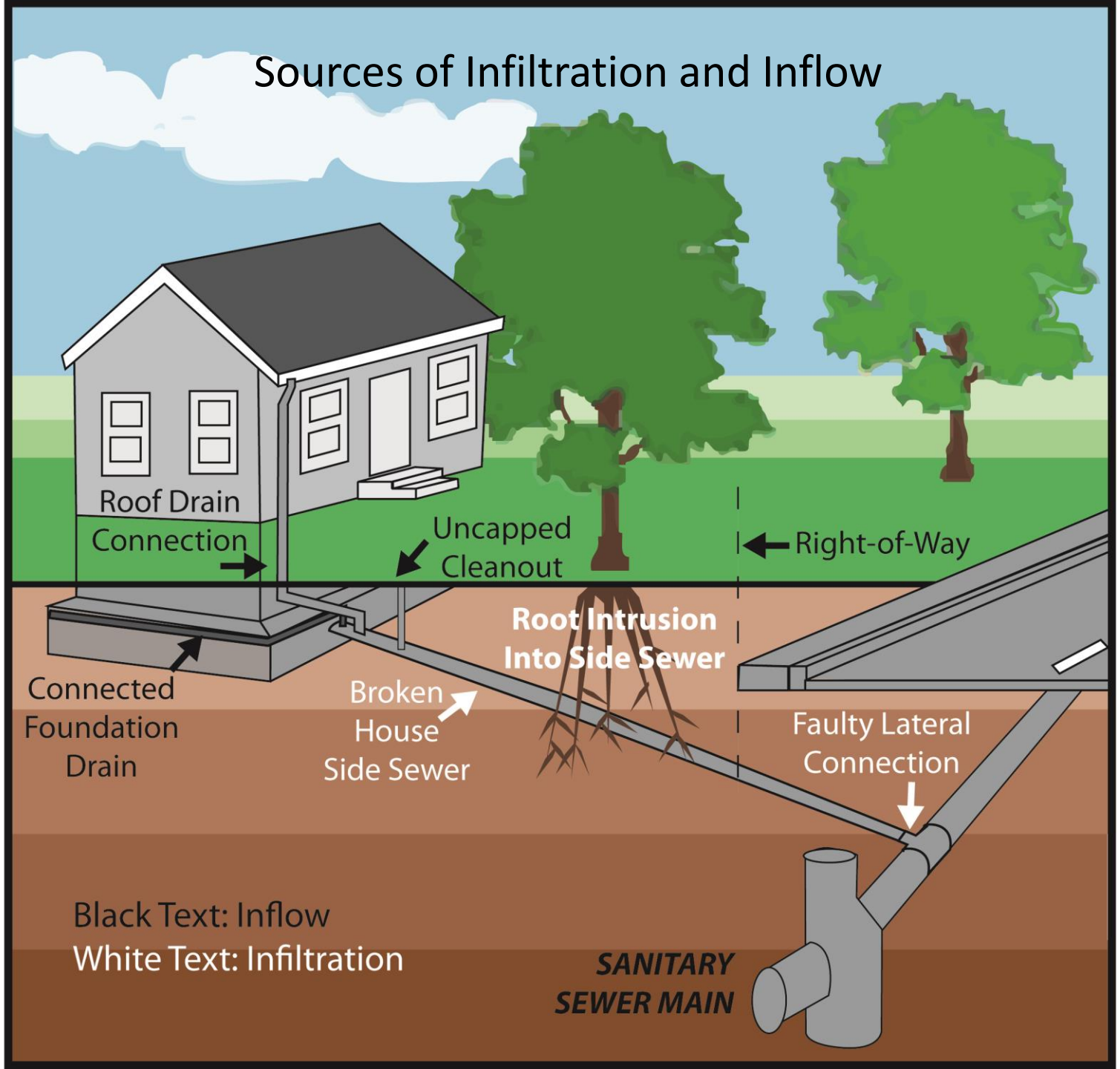
Charlie Roberts
and RH2

INFILTRATION AND INFLOW UPDATE


Right-of-Way
SANITARY
SEWER MAIN

Sources of Infiltration and Inflow



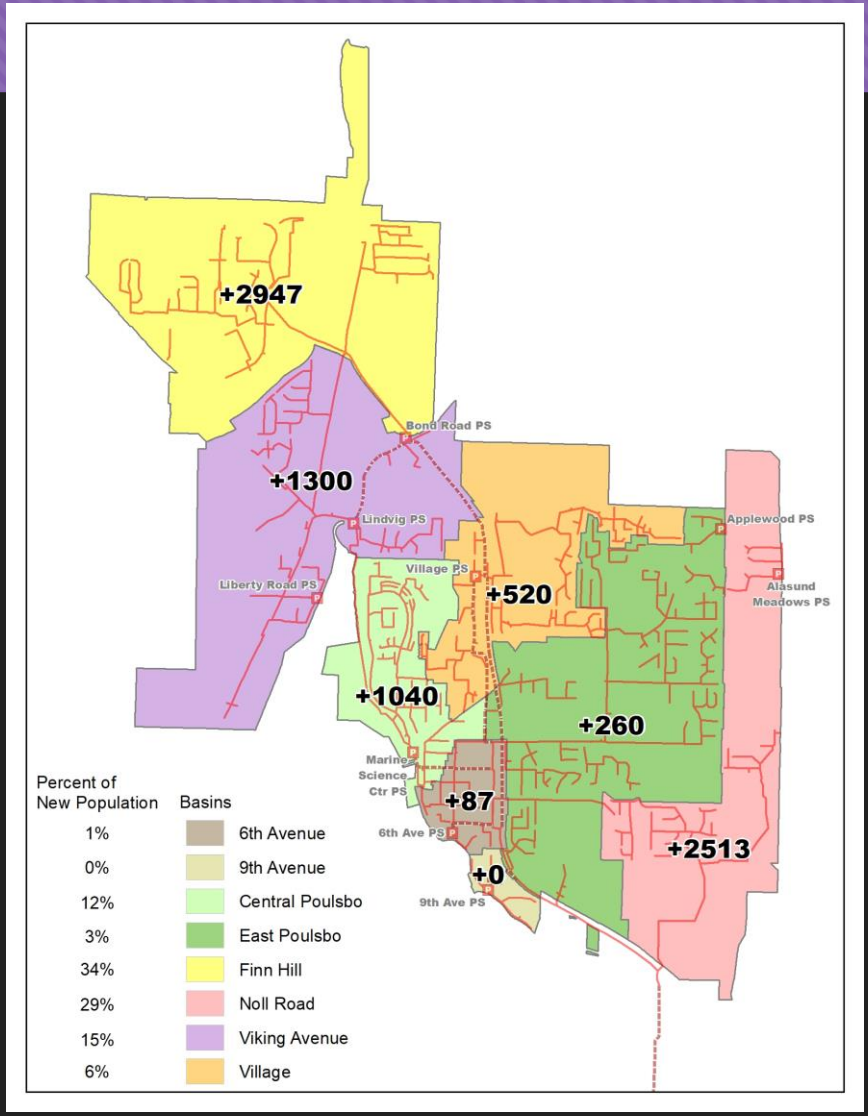
Infiltration and Inflow

- 2 years of data were obtained following meter upgrades post CIPP
- City Results show a reduction in I & I of 27% per capita from 2006 to 2020
  - City has inspected 60% of system and performed spot fixes along with other improvements
- Results show Inflow is below EPA standards and I&I is comparable to other jurisdictions
  - City (2020) = 160 gpd per person
  - EPA Standard = 275 gpd per person
- Results show that the primary infiltration and inflow is likely in the older basins and outside the city right of way
- RH2 and City staff will discuss cost/benefit of further I &I reduction as part of the prioritization of projects in the Capital Improvement Plan

GROWTH PROJECTIONS

Growth Projections/Basis for Future Flows

- City Planning Department basin analysis
- 2.36% recommended growth rate (based on 2014-2019 buildable lands analysis)
- Basis for future flow scenarios within model
- Model runs to identify capacity deficiency and needed capital improvements
- Schedule for timely improvements before deficiency occurs



Next Steps - BHC, County and Advisory Committee

- Establish future capacity design criteria – storm event/surcharge tolerance
- Determine sizing of main conveyance system to support ultimate flows – Central Interceptor/Bond Road FM, Lemolo Shore Pipeline, Lemolo siphon
- Identify 6- and 20-year system capacity deficiencies from model analysis
- Consider other necessary capital improvements to address obsolescence, O&M
- Evaluate County improvement projects with Poulsbo obligation
- Meet with advisory committee to present results of analysis and draft capital projects
- Consultant Activities
  - Peak Wet Weather Storage Facility Pre-Design and Permitting
  - BHC Phase 2 General Sewer Plan authorization

Summary

- Initial work and analysis accomplished provides a solid foundation and starting place for work ahead
- Defensible tool now established to evaluate critical, costly needs to address longer term capacity and pipeline upgrades that have been expected for some time
- Convened a strong strategic and technical team to complete the complex task ahead
- Close coordination with Kitsap County is key to success.

Initial Planning + Right Team = Sewer Comprehensive Plan

QUESTIONS?