

BUILDING A WORLD OF DIFFERENCE

MODELING PROJECT PRELIMINARY FINDINGS AND PRELIMINARY RECOMMENDATIONS

October 26, 2015

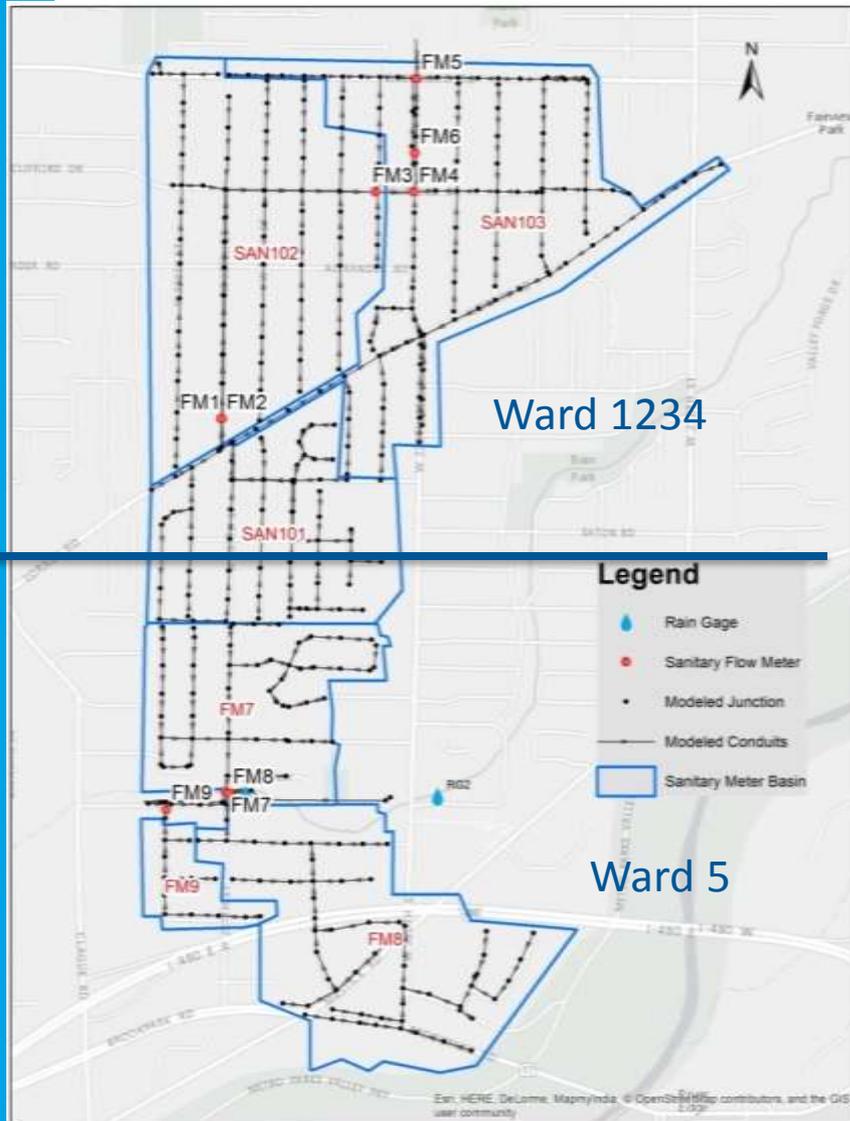


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AGENDA

- 2015 Flow Monitoring & Model Calibration
- Flooding Risks Analysis
- Recommendations

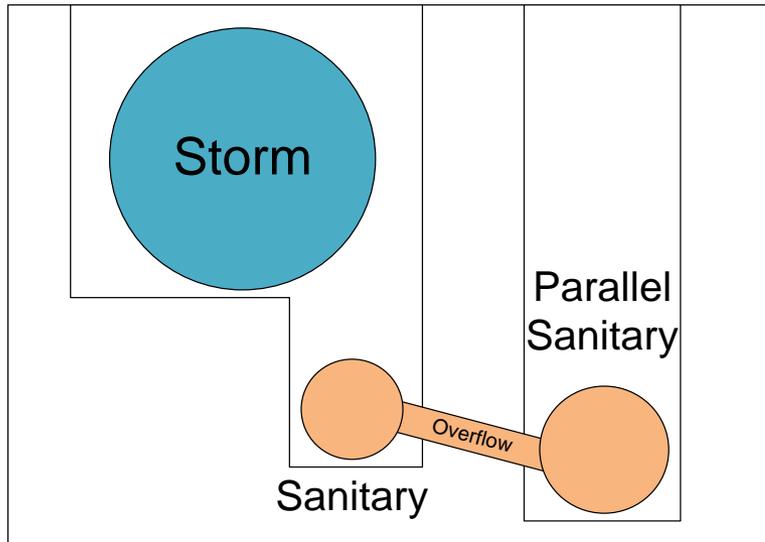
SANITARY FLOW METER LOCATIONS



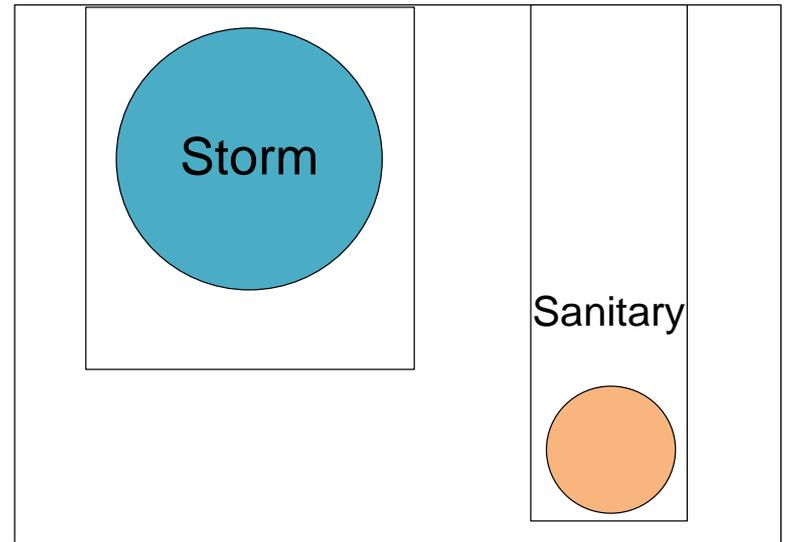
NAME	Diameter (INCH)	Basin	Comment
FM1	18	SAN101	Parallel Trunk lines in Ward 1234
FM2	15	SAN101	Parallel Trunk lines in Ward 1234
FM3	21	SAN102	Parallel Trunk lines in Ward 1234
FM4	15	SAN102	Parallel Trunk lines in Ward 1234
FM5	24	SAN103	Parallel Trunk lines in Ward 1234
FM6	15	SAN103	Parallel Trunk lines in Ward 1234
FM7	12	FM7	Ward 5
FM8	12	FM8	Ward 5
FM9	8	FM9	Ward 5

COLLECTION SYSTEM SCHEMATIC

Ward1234 Typical Cross Section

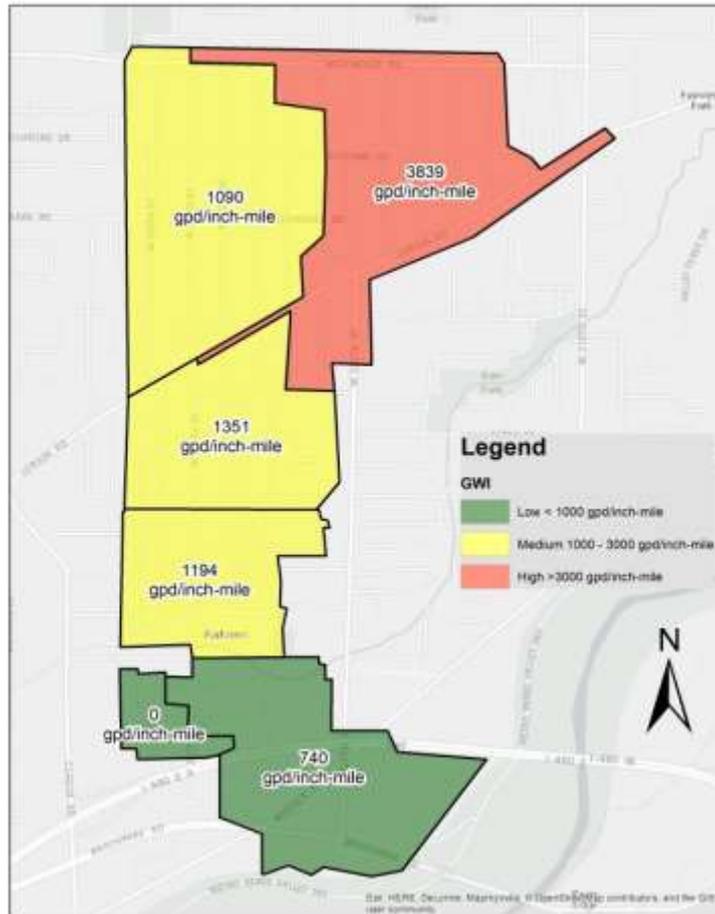


Ward5 Typical Cross Section

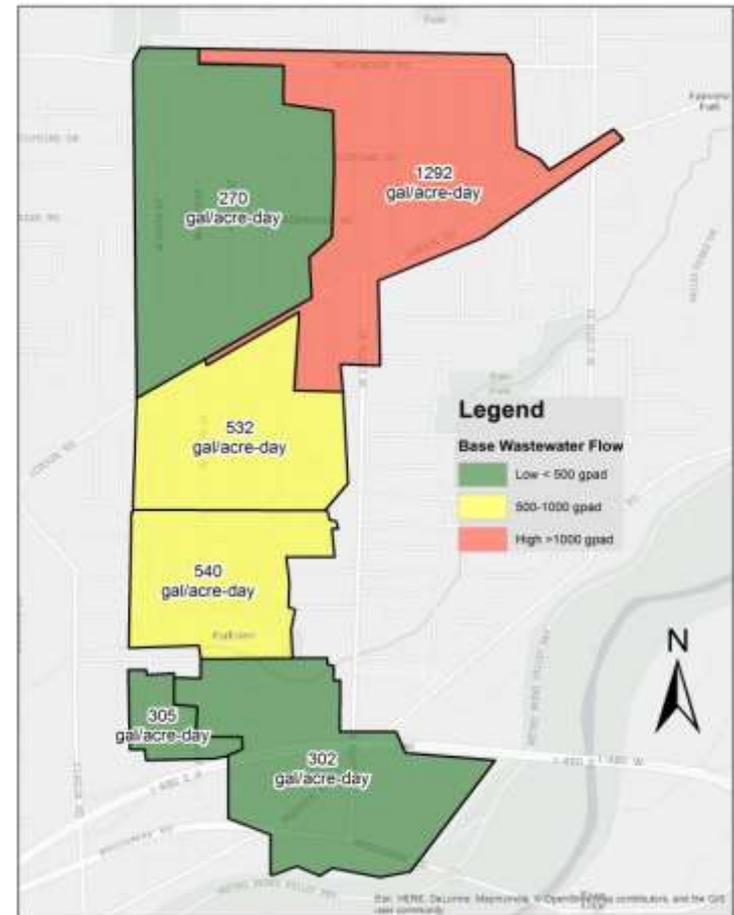


SANITARY DRY WEATHER FLOW (MEASURED FLOW)

Ground Water Infiltration (GWI) Calculated



Base Wastewater Flow = Measured Flow - GWI



WET WEATHER RTK UNIT HYDROGRAPH

R: is the fraction of rainfall volume entering the sewer system as RDII

T: is the time to peak

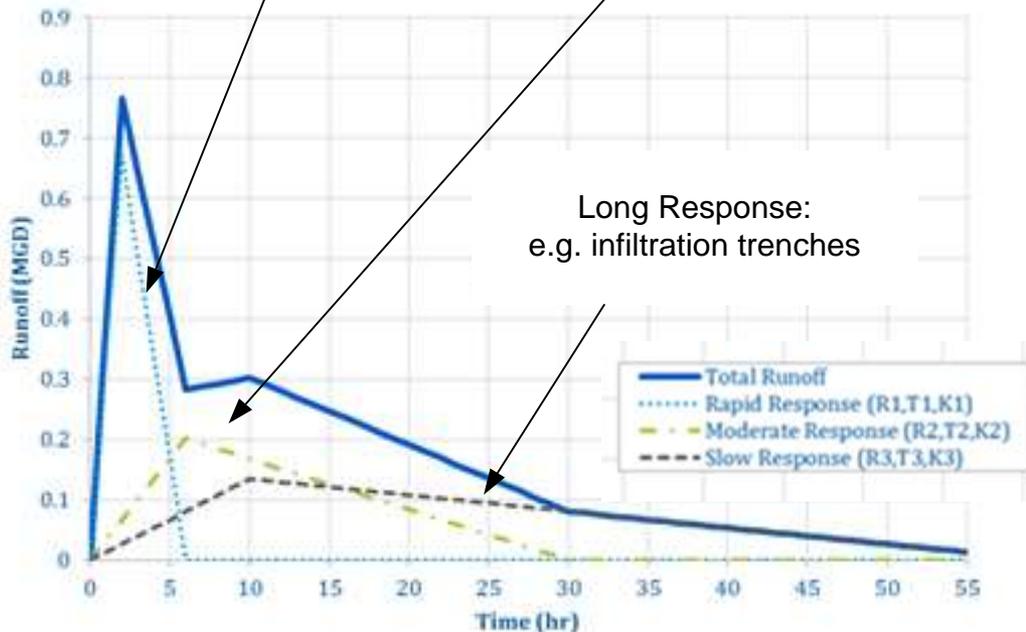
K: is the ratio of the time of recession to T



R1, T1, K1
Fast Response:
e.g. directly connected
downspouts

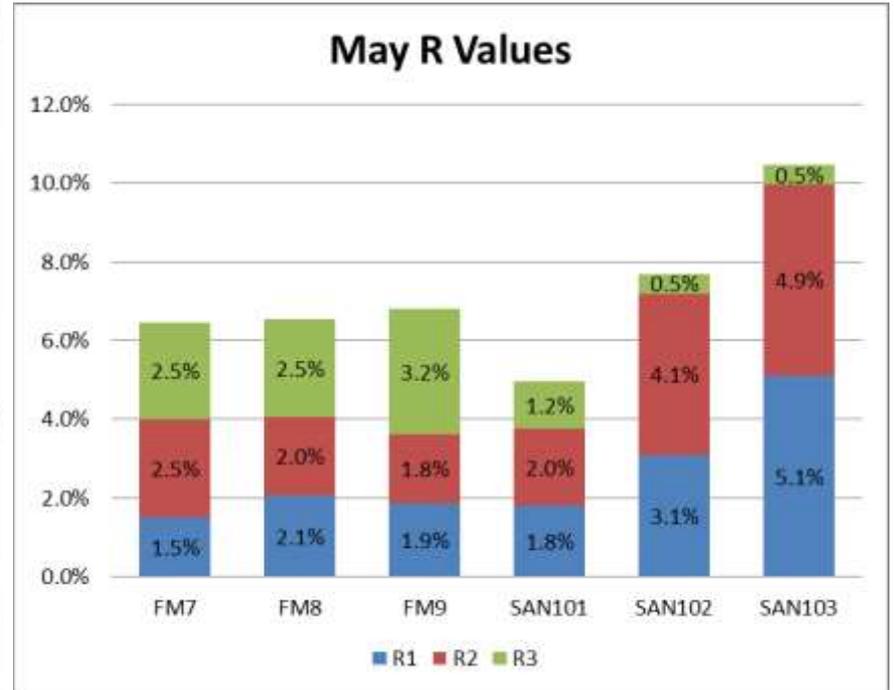
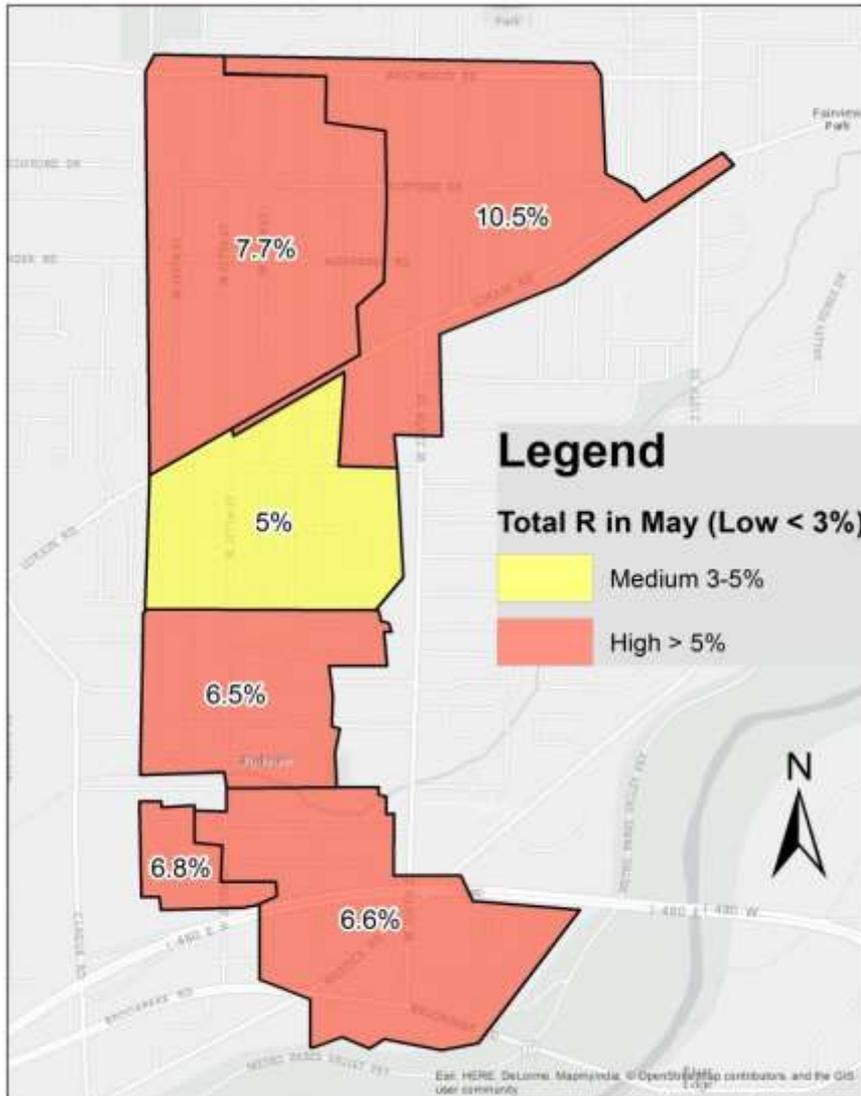
R2, T2, K2
Medium Response:
e.g. infiltration through
lateral defects

Long Response:
e.g. infiltration trenches



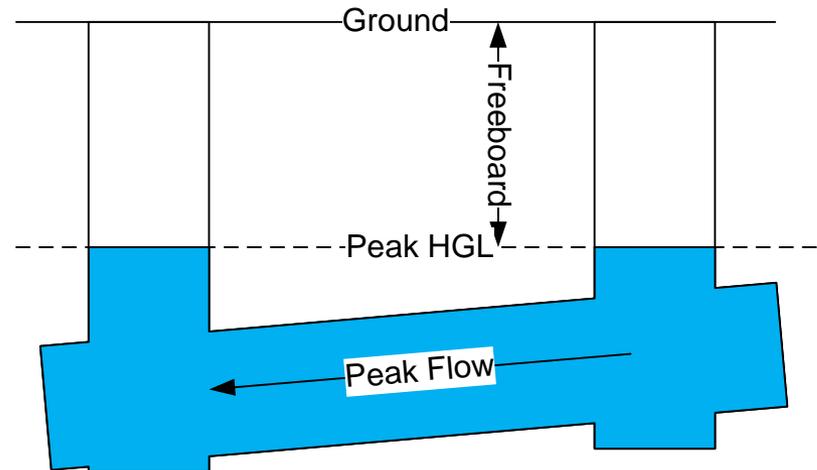
RDII RESPONSE	T	K
Fast	0.1 – 3	0.1 – 2
Medium	3 – 6	2 – 4
Long	6+	4+

CALIBRATED RTK VALUES

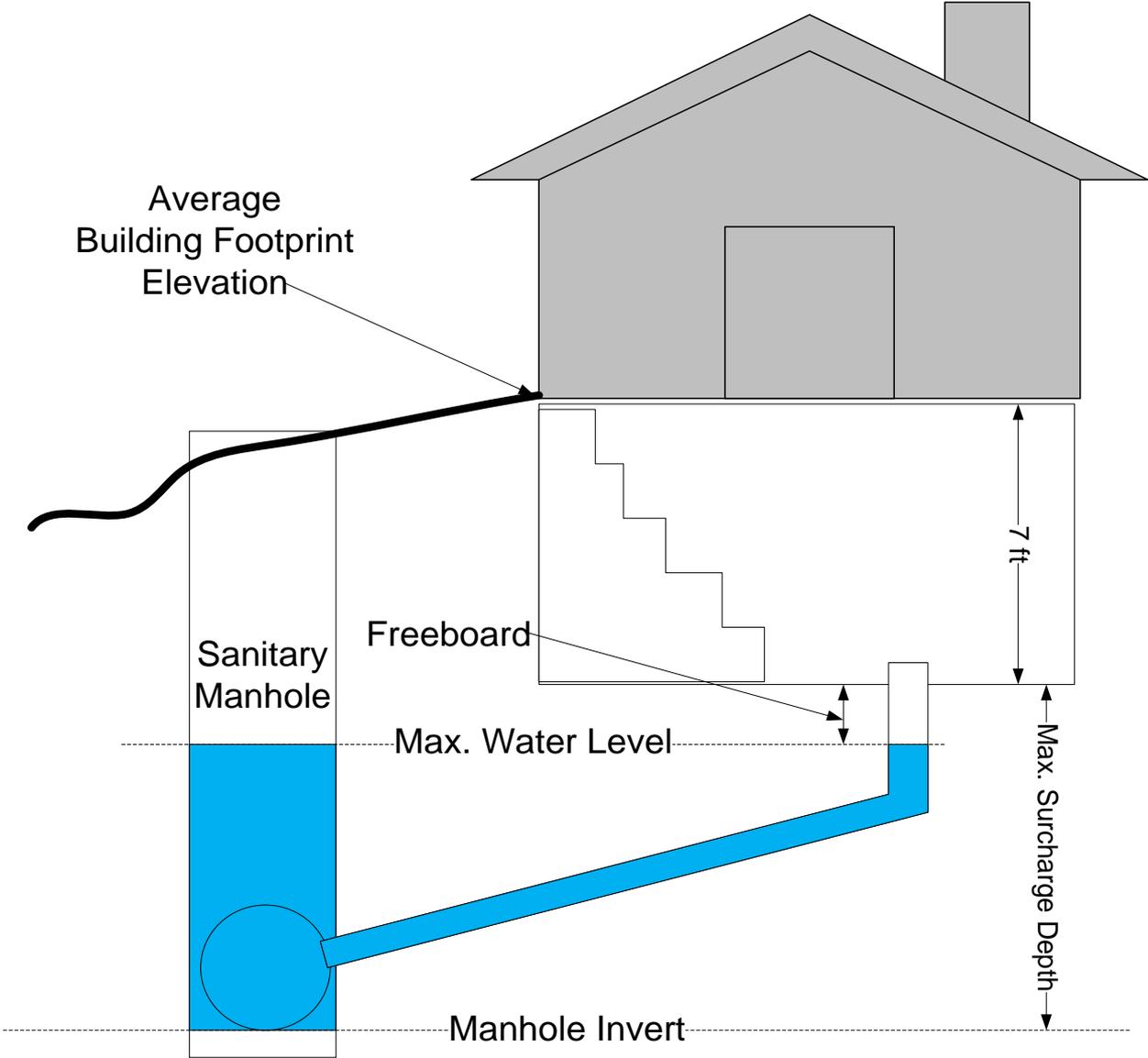


SANITARY SEWER FLOODING CAUSES

- **Shallow Sewer Pipe**
 - Basement flooding occurs before pipe is flowing full
- **Limited pipe capacity**
 - Pipes with debris, sediments and blockage
 - Small diameter and minimal slope pipe
- **Excessive Flow**
 - Excessive I/I
 - Storm connections
- **Private Issues**
 - Lateral blockage
 - Stormwater connection



BASEMENT FLOODING SCENERIO



11X17 Basement and Pipe Crown Comparison San_pipe_allowable_surcharge.pdf



RISK ASSESSMENT / ANALYSIS



Flooding Risk Groups

Recommendations

-  Short Term Project (13 Pipes)
-  Short Term Inspection (20 Pipes)
-  Medium Term Inspection (87 Pipes)
-  No Action (337 Pipes)

Refer to Handout

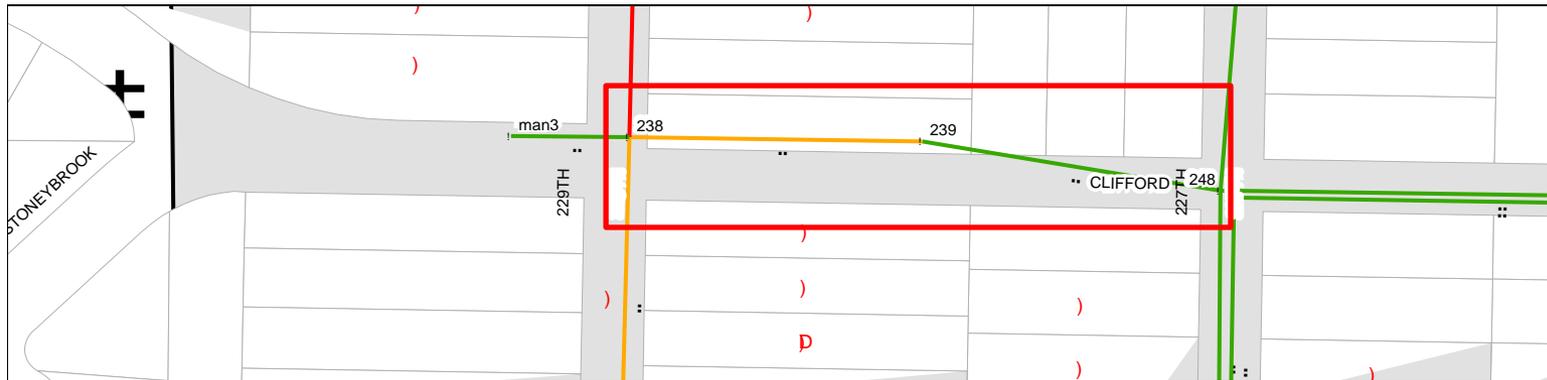
- Comparing various sources of information
 - Modeled Basement Flooding
 - Observed Basement Flooding
- Identify High Risk Areas
 - With good solutions from model simulations
 - With unknown conditions such as pipe blockages, I/I and connections

RECOMMENDED IMMEDIATE IMPROVEMENTS

229TH, 227TH AND CLIFFORD STREET PROJECT

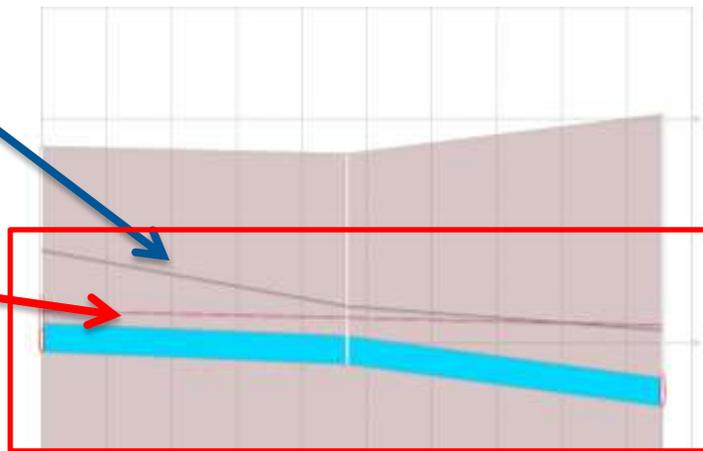


Clifford (Between 229th and 227th) – Bottleneck Area



Existing Condition

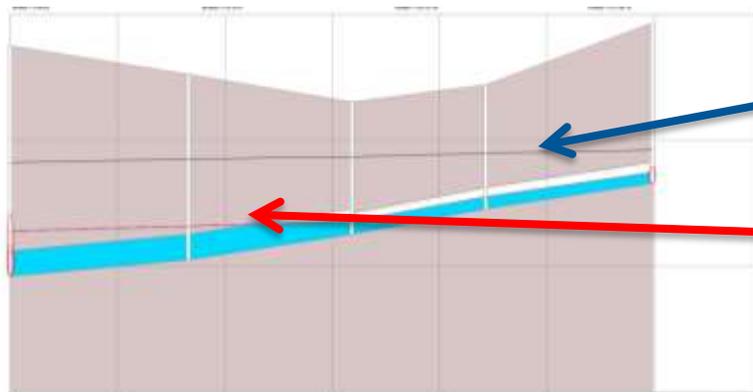
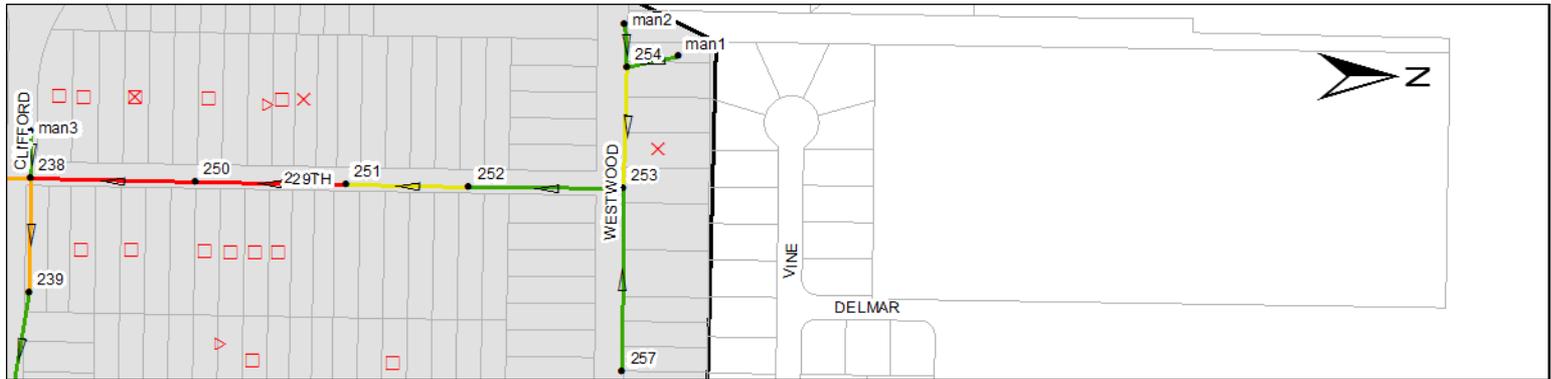
Solution: Upsizing Pipes



Benefits:

- Remove bottleneck
- Improved HGL
- Increased storage
- Reduction of basement back-ups on 229th Street

229th (Between Westwood and Clifford) Profile

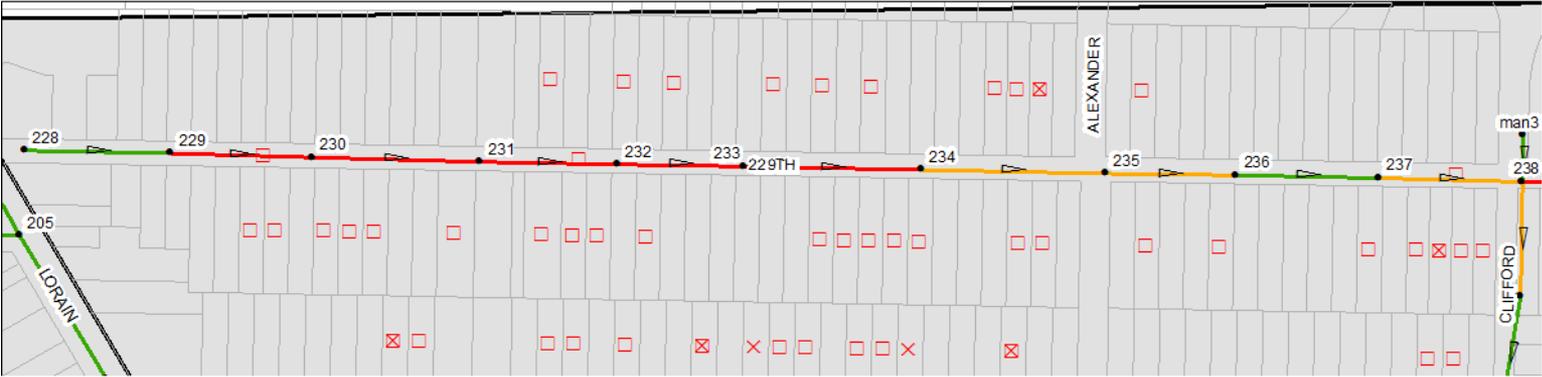


Existing Condition

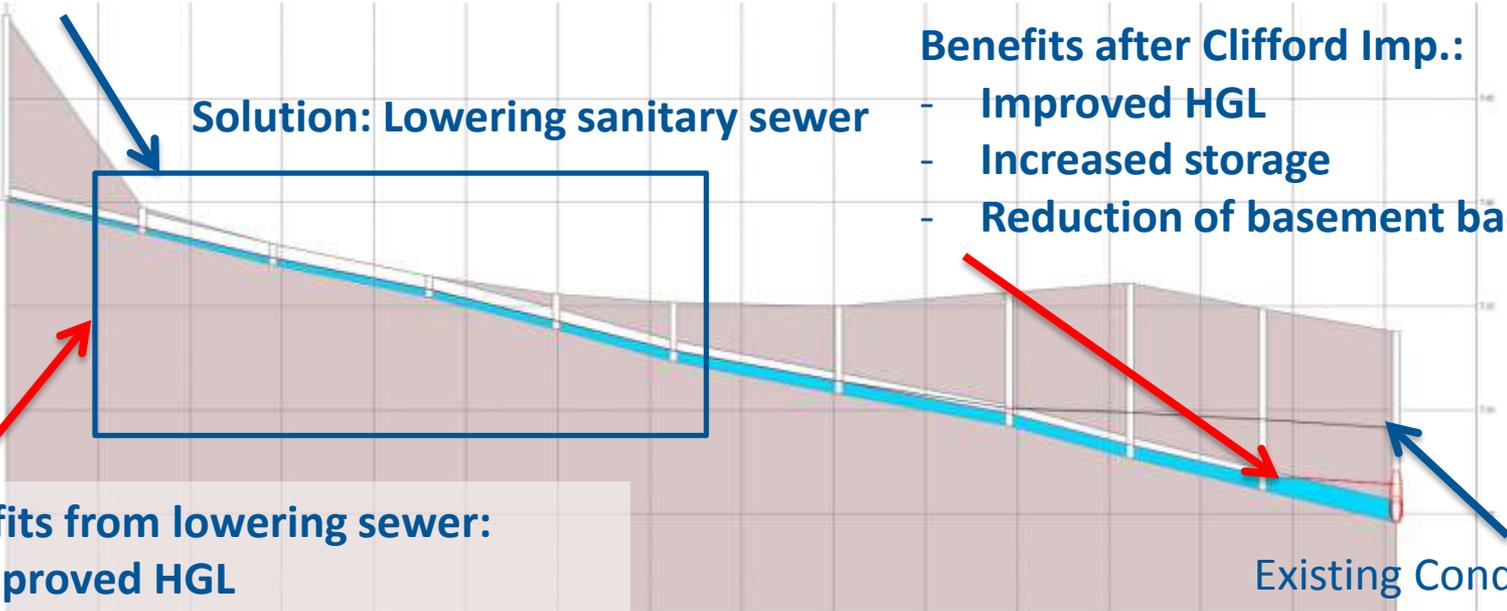
Benefits after Clifford Imp.:

- Improved HGL
- Increased storage
- Reduction of basement back-ups

229th (Between Lorain and Clifford) Profile



Problem: Shallow Sewer Lines



Benefits after Clifford Imp.:

- Improved HGL
- Increased storage
- Reduction of basement back-ups

Benefits from lowering sewer:

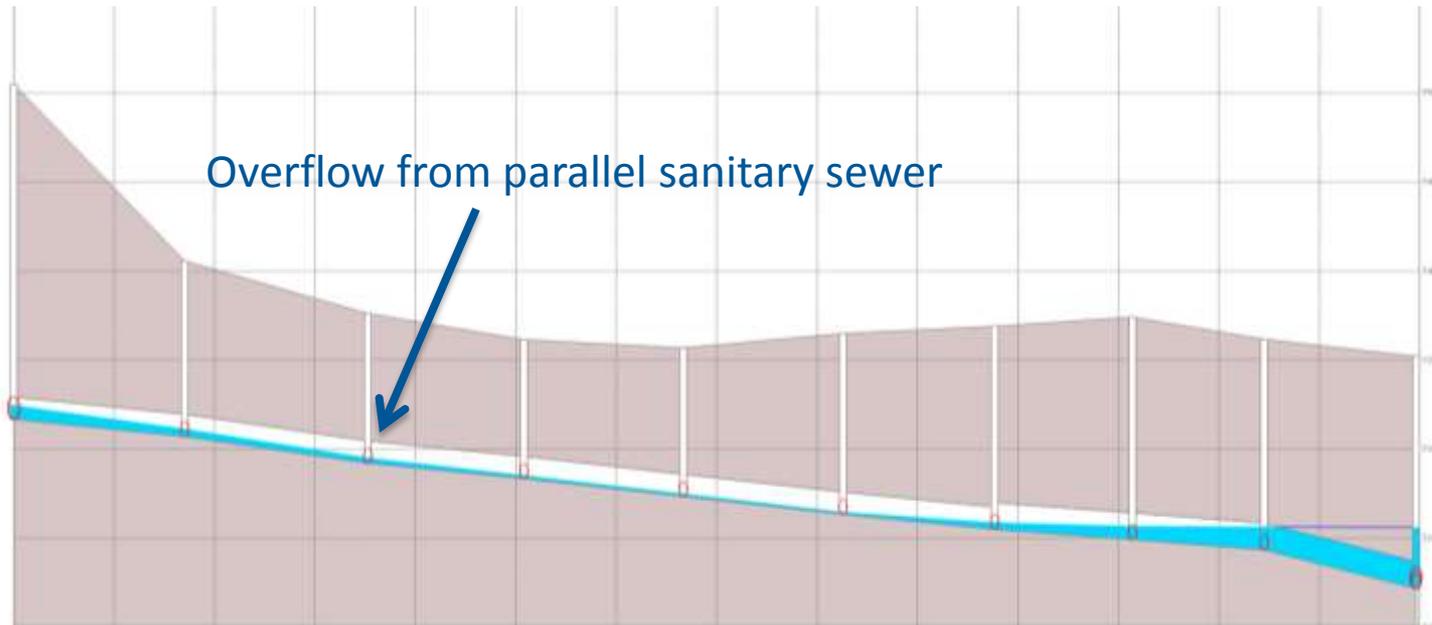
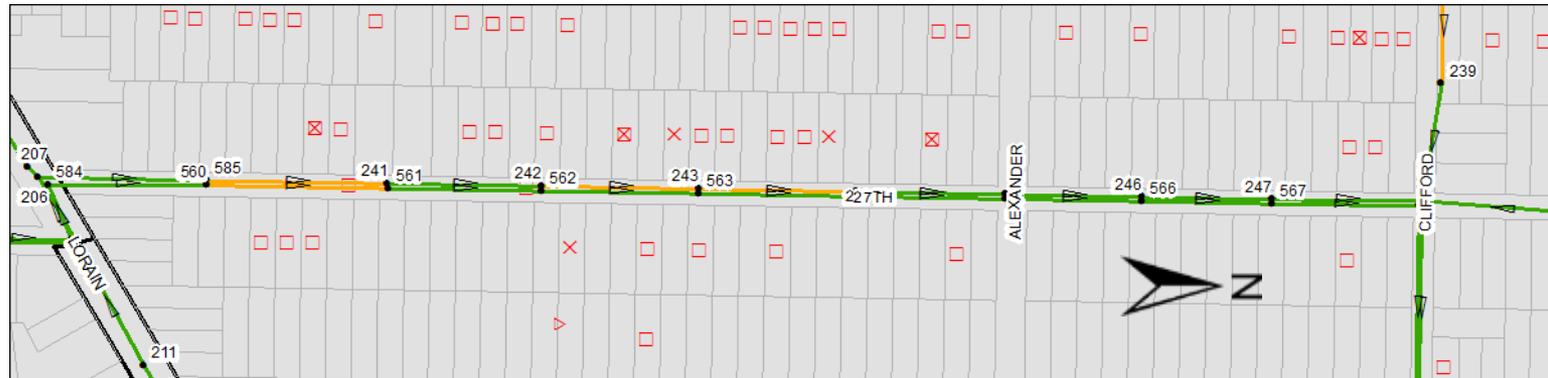
- Improved HGL
- Increased storage
- Reduction of basement back-ups

Existing Condition



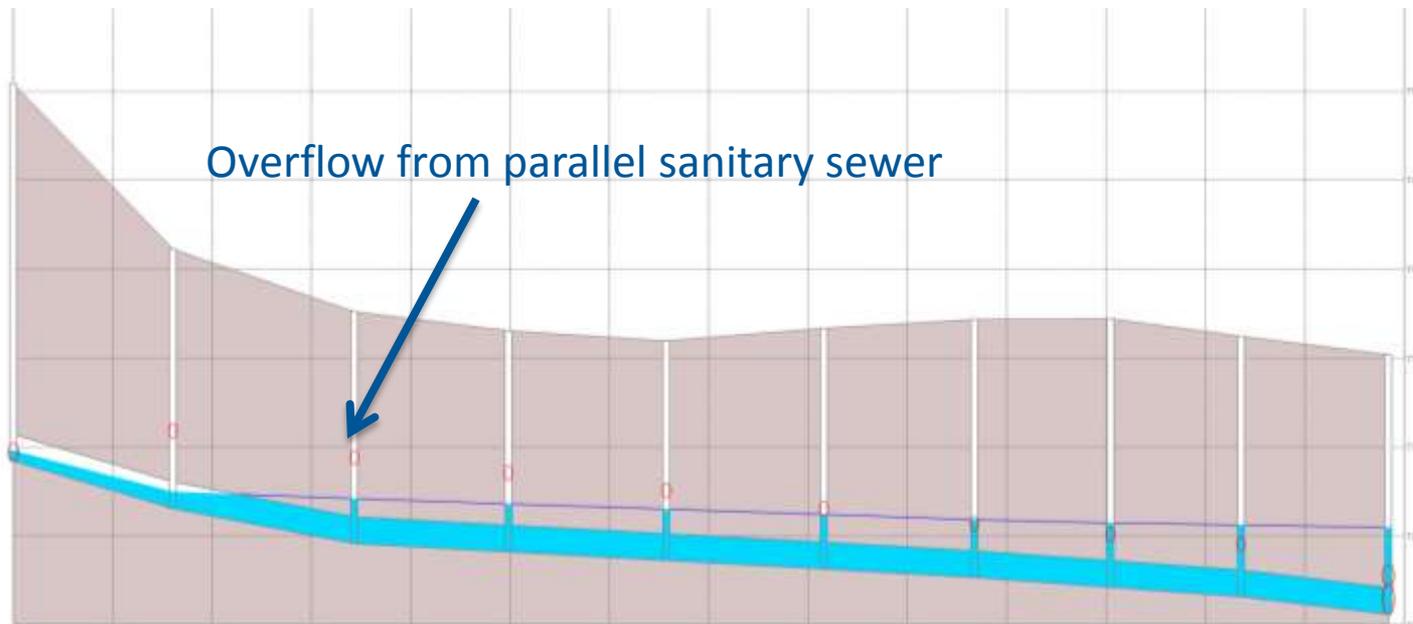
227th (Between Lorain and Clifford) – Investigation and CCTV Work

Shallow Sewer Profile



227th (Between Lorain and Clifford) – Investigation and CCTV Work

Deep Sewer Profile



CLIFFORD, 214TH, 215TH AND 217TH PROJECT



Clifford Street (Between 220th and 214th) Profile



Solution: Upsizing or lowering of sewer

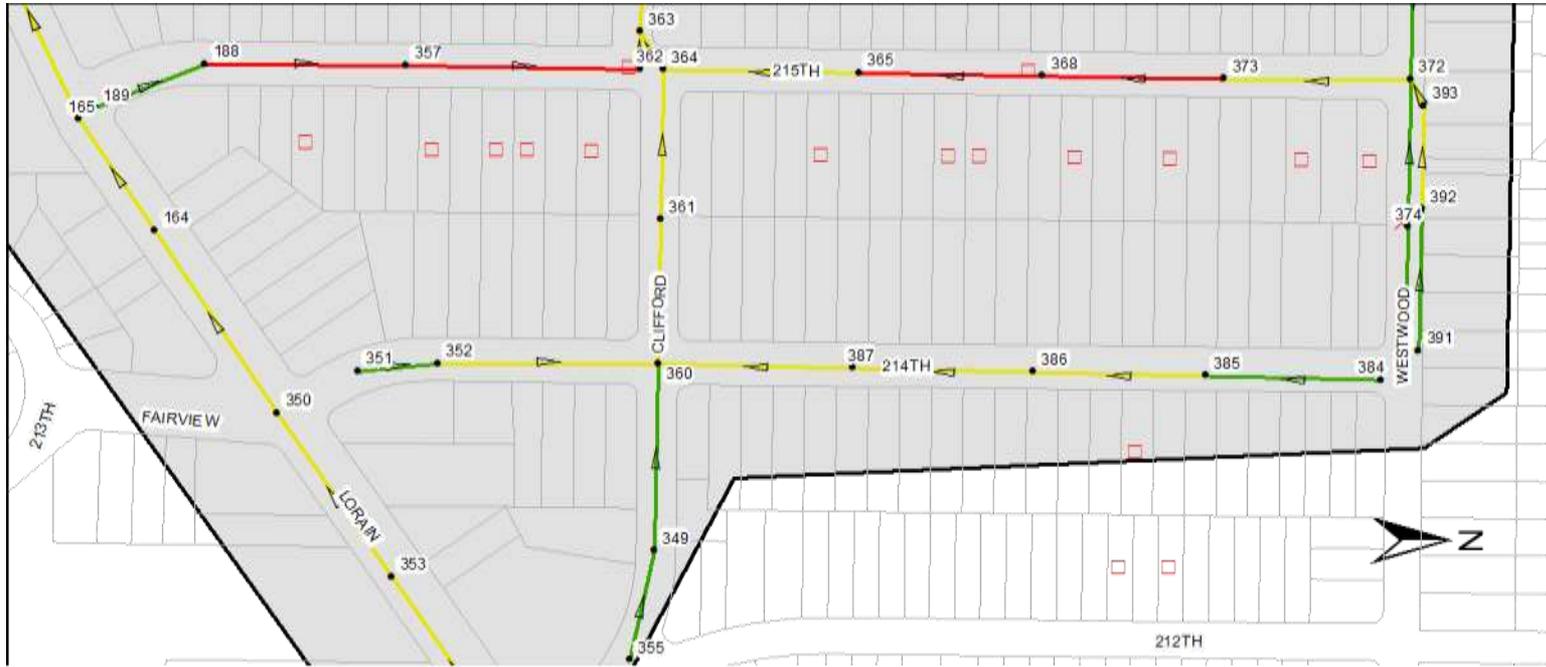
Benefits:

- Remove bottleneck
- Improved HGL
- Increased storage
- Reduction of basement back-ups on 214th, 215th and 217th Street

Existing Condition

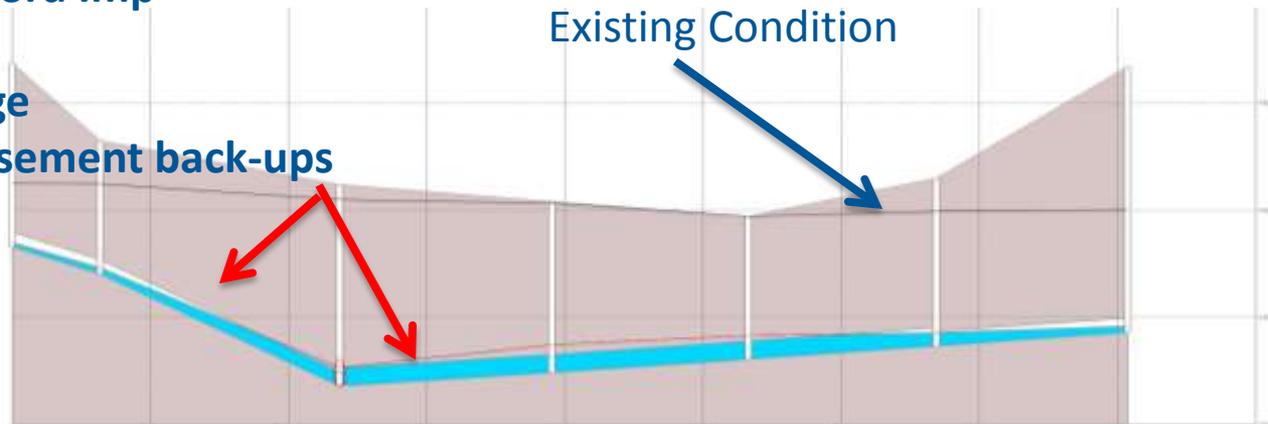


214th Street Profile



Benefits: After Clifford Imp

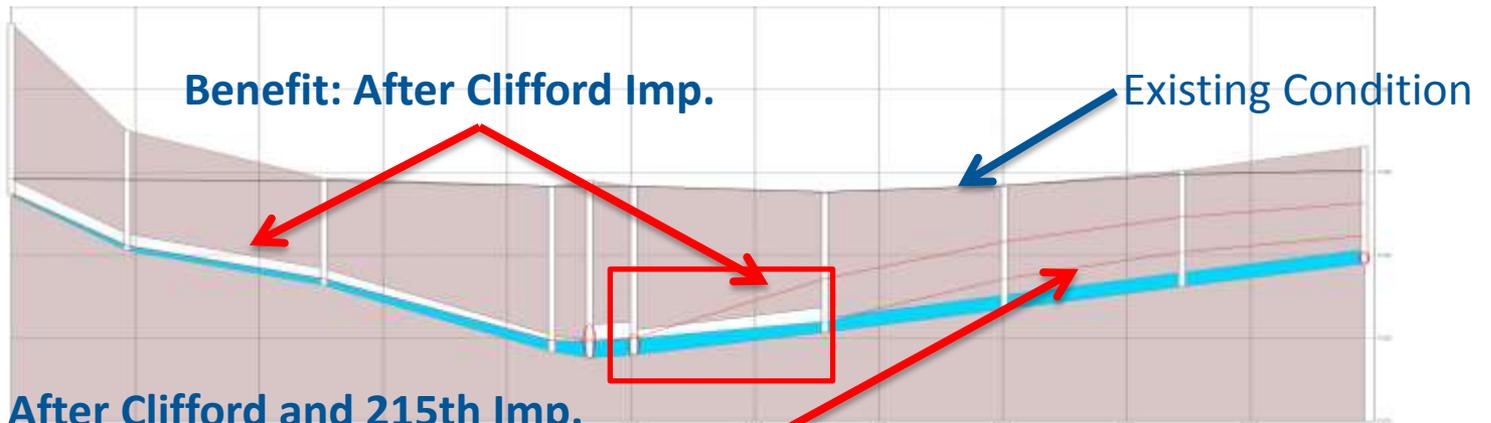
- Improved HGL
- Increased storage
- Reduction of basement back-ups



215th Street Profile



Solution: Upsize Pipe on 215th

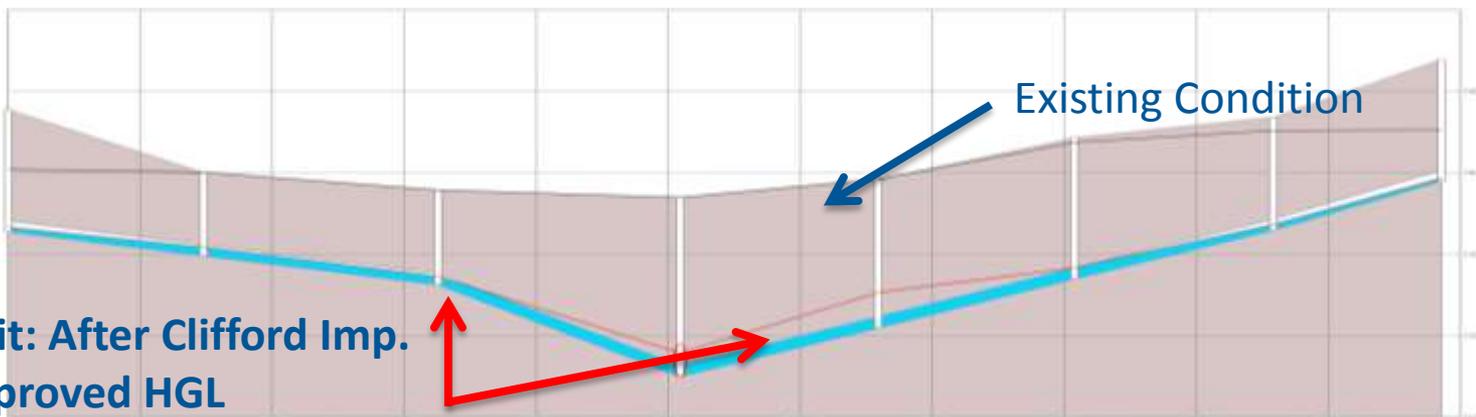


Benefit: After Clifford and 215th Imp.

- Improved HGL
- Increased storage
- Reduction of basement back-ups



217th Street Profile



Benefit: After Clifford Imp.

- Improved HGL
- Increased storage
- Reduction of basement back-ups



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