



Hamilton

# Binbrook Sanitary & Stormwater System Performance

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## Planning Committee Agenda Item 7.1

Tuesday, April 2, 2013

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## Presentation Overview

- July 22, 2012 Storm Event
- Flooding in Binbrook
- Flooding Investigations - AMEC
- Storm and Sanitary Drainage System Overview
- Investigations and Inspections by City



## Presentation Overview

- Mitigating Rainfall Entry into Sanitary Sewer System
- Ongoing/Future Work
- Reserve Capacity
- Discussion



## July 22, 2012 Storm

- Significant rainfall event on July 22, 2012 focusing in the Binbrook and Upper Stoney Creek Mountain
- Storm exceeded the previous July 26, 2009 storm which caused extensive flooding of the Red Hill corridor delivering 110mm of rain in a three hour period



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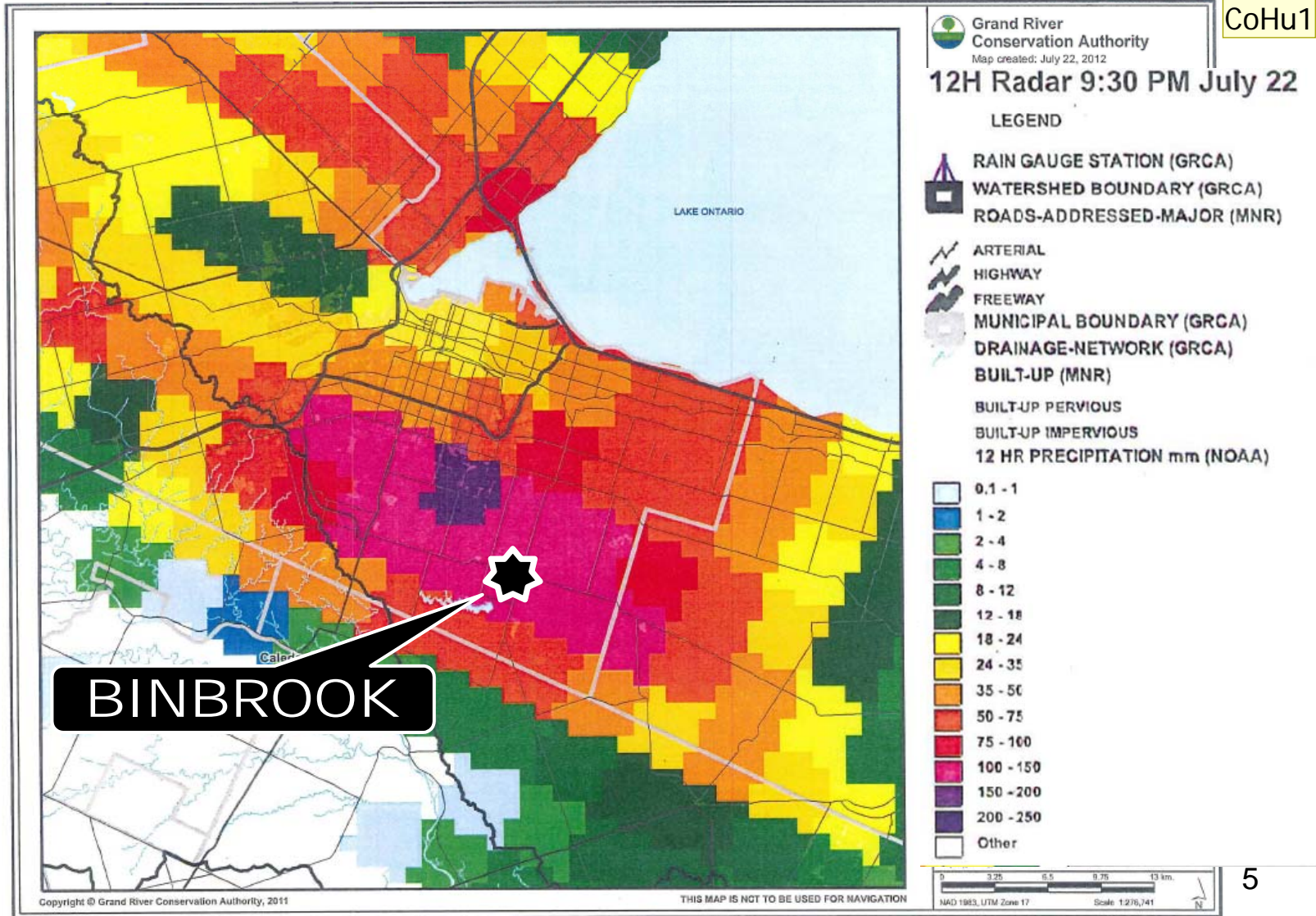
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- Rainfall gauges recorded 140mm and 116mm of rain at the Highland road and Valley Park Community Centre respectively
- Magnitude and intensity of storm broke all records with an extrapolated return period exceeding 1000 years



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Slide 6

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CoHu1

added larger legend

CG, 12/12/2012

## Binbrook Investigations

- Peer review of storm drainage design for Elizabeth Gardens Phase 1
- Questionnaire and follow-up interview and in-home inspections with homeowners to understand flooding mechanisms



## Peer Review

- Peer review conclusions:
- Stormwater infrastructure was designed using the appropriate parameters in the standards and guidelines at the time of approval
- Stormwater management facility performance is in accordance with MOE guidelines



## Questionnaire

- Questionnaire, follow-up interview and in-home inspections with homeowners to understand flooding mechanisms
- Findings:
- Properties west of RR56, clear/clean water originating from overwhelming of the sump pit



## Questionnaire

- Properties east of RR56, north of Ethering /Southbrook, clean water from overwhelming of the sump pit and properties southerly flood water was dirty originating from the floor drain or basement fixture (back up of the sanitary sewer)



## Storm Drainage System

- Storm drainage design is based on the “major/minor “ system
- Minor system consists of the pipe network, gutters and catch basins to collect and carry away storm runoff for minor rainfall events (5 year storms)

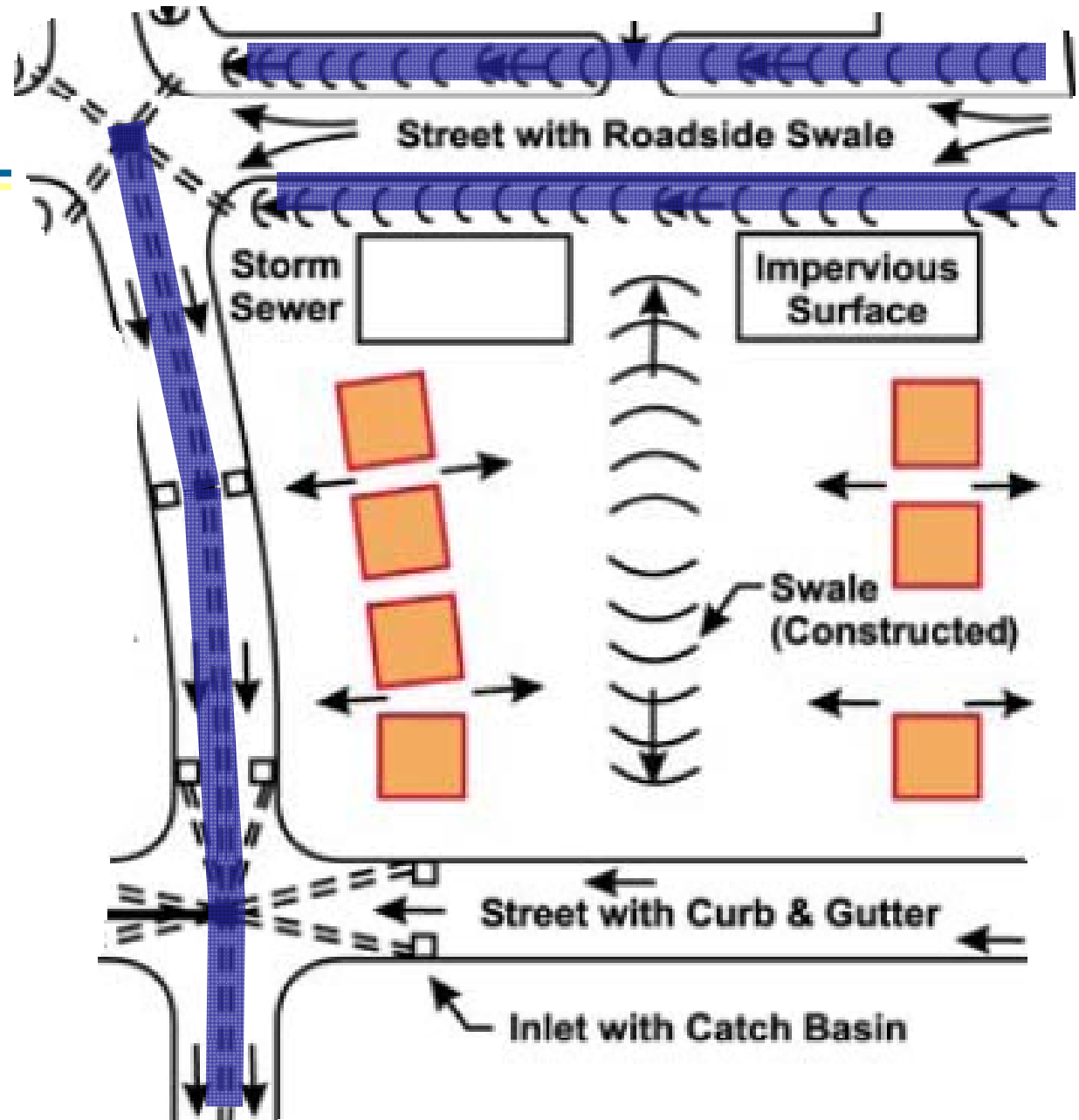


## Storm Drainage System

- Major system conveys run-off for a 1 in 100 year rainfall event which exceed the capacity of the minor system
- Major system consists of designated overland flow routes such as streets, ditches, swales which direct run-off to a pond or to a watercourse

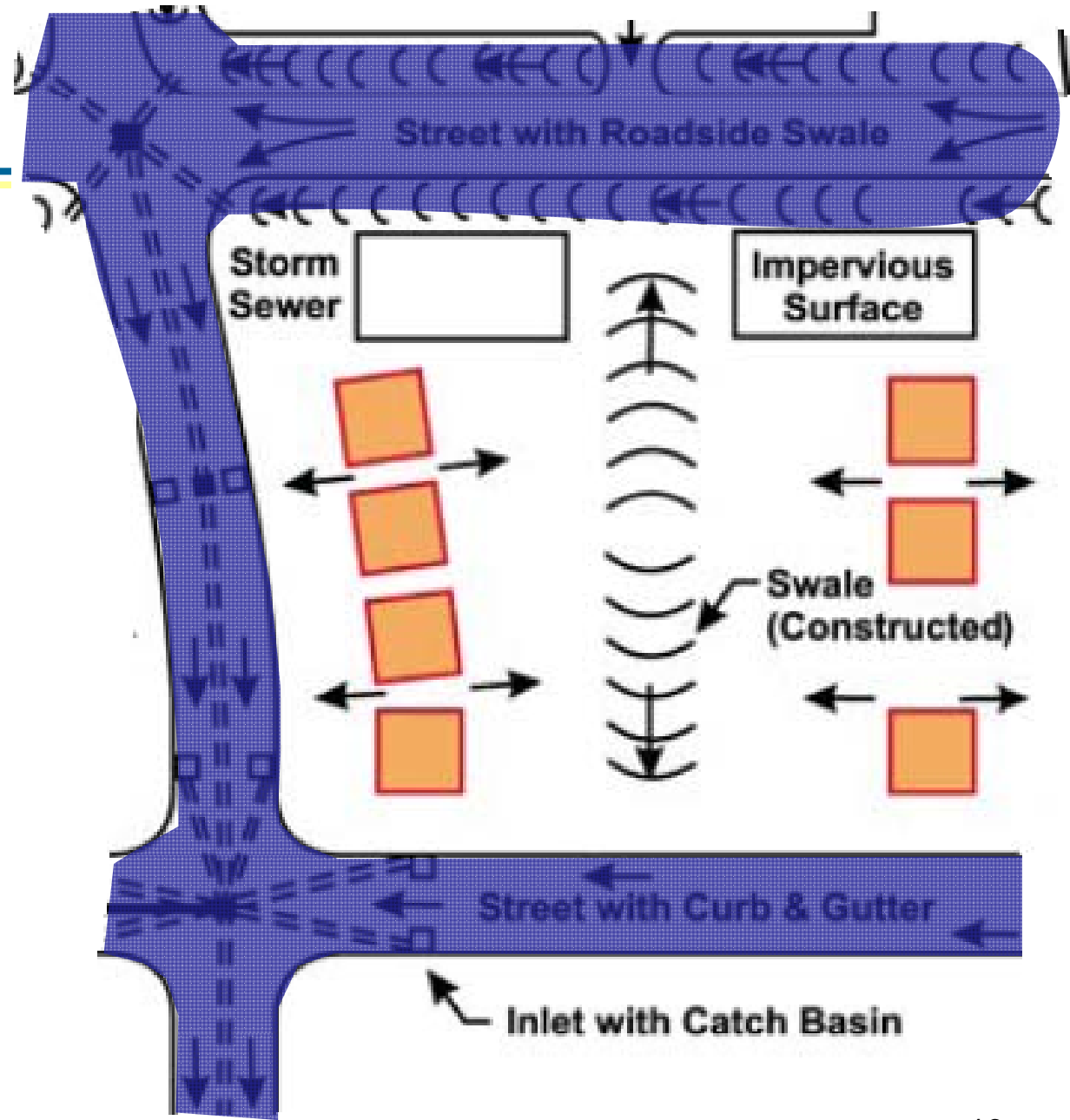


Minor System (piped)





Major System (overland)





## Sanitary Sewer System

- Sanitary sewage is conveyed by gravity sewers to the pump station at Southbrook and RR56
- Sewage is pumped along RR56 and Golf Club Road to the Trinity Church Road gravity sewer
- Ultimately conveyed to the WWTP



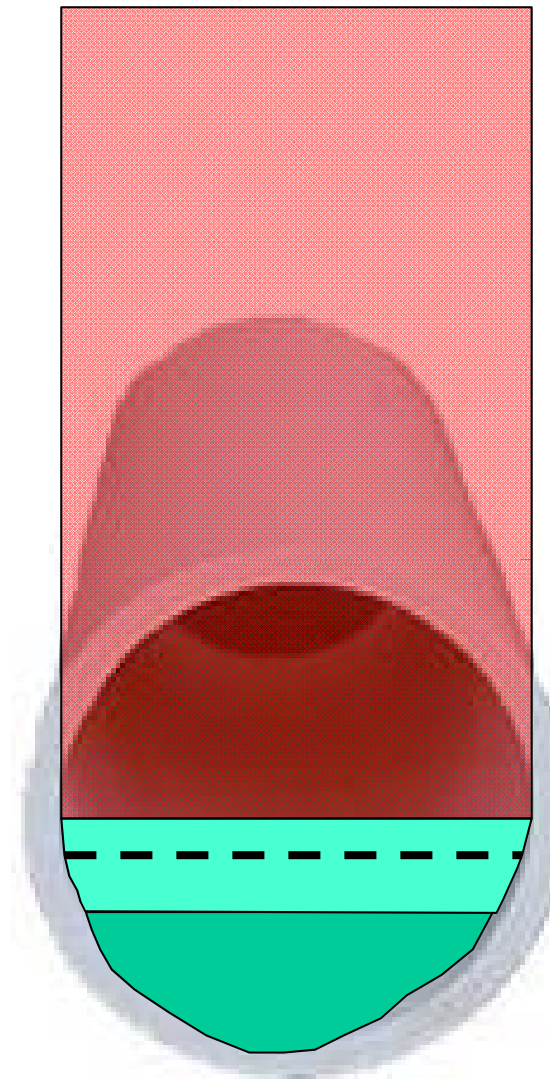


## Sewer Flow Monitoring

- Flow monitors have been in place in the Binbrook sanitary system since 2006
- Flow data indicate the system is reacting to wet weather; rainfall is entering into the sanitary system



# Binbrook Sanitary & Stormwater System Performance



## Exceptional Contributions (not included in design)

- Cross Connected Catchbasins
- Cross connected service laterals
- Incorrect manhole cover
- Low lying sanitary manholes
- Deteriorated joints and fractures
- Adhoc unpermitted connections
- Redirected sump pump

## Allowable Contributions (Included in designed)

- Allowable Infiltration
- Domestic flow



## Investigations and Inspections by City

- Smoke testing of sanitary sewers
- CCTV of sanitary and storm sewers
- Condition assessment of SWMPs and creek channel
- Review location of potential “open excavations”



## Investigations and Inspections by City

- Gather information on flooding mechanisms from homeowners
- Review SCADA records for the pump station
- Review the planned major storm overland flow route



## Mitigating Rainfall Entry into the Sanitary System

- Plugging of pic axe holes in sanitary manhole covers
- Correction of potential sources identified from the smoke testing
- Vegetation and sediment removal in SWMP and channel, east of RR56



## Mitigating Rainfall Entry into the Sanitary System

- Review construction practices
- Sealing of open joints (on-going)



## Ongoing/Future Works

- Continued flow monitoring to assess effectiveness of remedial measures
- Review feasibility of incorporating an “emergency overflow” at the pump station site

## Ongoing/Future Works

- Dye testing requirement to confirm connection to correct sewer prior to occupancy
- Review of stormwater infrastructure design criteria





## Ongoing/Future Works

- Sump pump standard to include a secondary relief valve, specify minimum rating for the pump, back-up power unit
- Understand relationship between the sanitary and storm systems



## Ongoing/Future Works

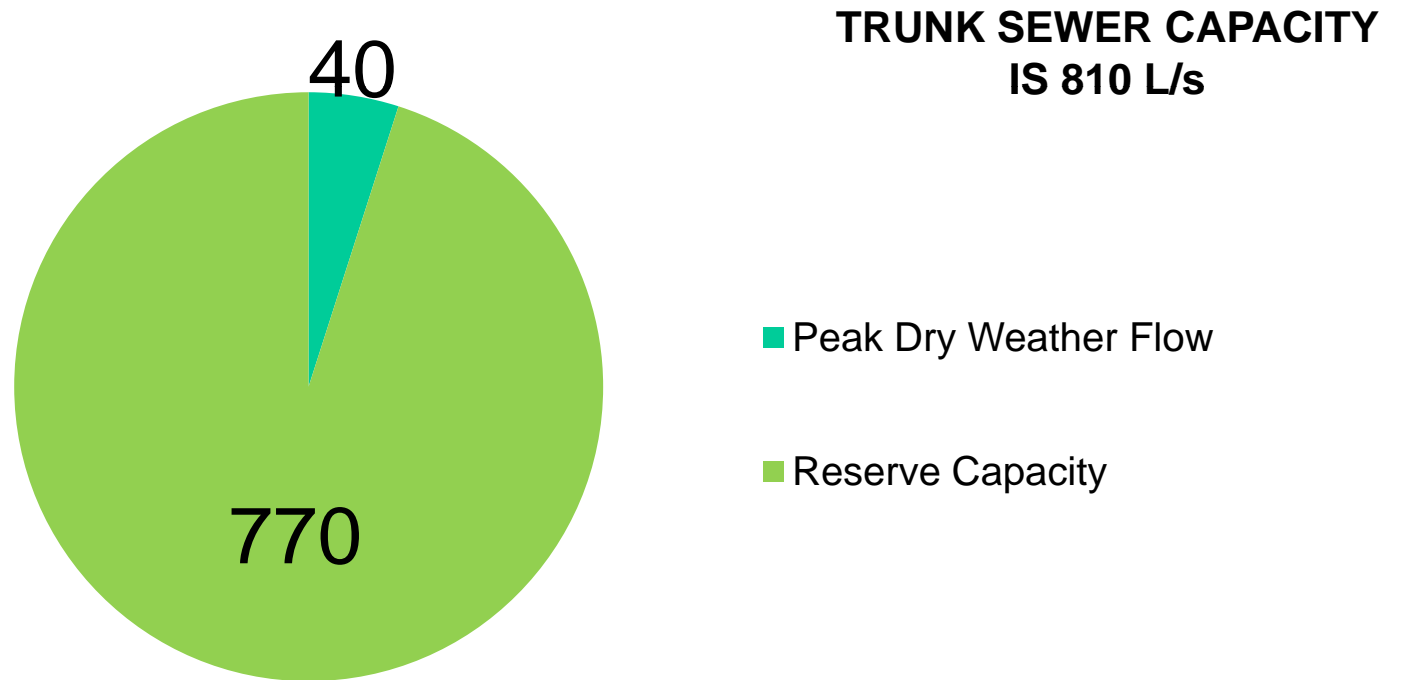
- Outreach and education to homeowners on how they can help reduce basement flooding (maintenance of ground for positive drainage, discharging downspouts away from the foundation, proper use of splash pads, backwater valve on sanitary connection program, disconnection of weeping tiles and downspouts from the sanitary system)

## Sanitary Reserve Capacity – Sewage Pumping Station

**FIRM CAPACITY IS 140 L/s**



## Sanitary Reserve Capacity – Trunk Sanitary Sewer





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Thank You

Questions