Municipal Servicing

Municipal Servicing Assessment

The Midtown in Focus study includes an assessment of the existing municipal servicing infrastructure (i.e. watermains, sanitary, storm and combined sewers) in the Yonge-Eglinton area, started in 2017. The on-going assessment focuses on understanding the existing municipal servicing infrastructure in terms of the capacity and performance of the existing system as well as identifying constraints, concerns and opportunities to accommodate potential future growth.

The study evaluates existing conditions (population and approved development as of 2016) and future conditions (2051 population and employment estimates).

What is being assessed?

The assessment of existing infrastructure includes:

- Testing hydrant flows (water pressure and capacity)
- Monitoring flows for sanitary, storm sewers and combined
- Performance of sanitary system under dry weather and wet weather conditions
- Performance of storm sewer and combined system under 2yr and 100yr storm
- events (32.4mm/6hr and 85.4mm/6hr, respectively)

Challenges in Midtown

- Infiltration and inflow of groundwater and stormwater
- Capacity inefficiency / undersized watermains
- Aging infrastructure

Study Process

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Project Initiation + Data Collection

- Infrastructure/System
- Layout: Pipe locations, sizes and ages
- Population data: existing (2016) and future (2051) condition

Evaluation of Existing Conditions

- Sanitary sewer system performance (dry weather flow and wet weather flow)
- Storm sewer system performance (2yr and 100yr storm events)
- Combined sewer system performance (2yr and100yr storm events)
- Watermains: Average daily and maximum daily pressure range; Minimum hour and peak hour pressure range; Fire flow minimum pressure and target flow rate

Evaluation of Future Conditions

- Sanitary sewer system performance (dry weather flow and wet weather flow)
- Storm sewer system performance (2yr and 100yr storm events)
- Combined sewer system performance (2yr and100yr storm events)
- Watermains: Average daily and maximum daily pressure range; Minimum hour and peak hour pressure range; Fire flow minimum pressure and target flow rate

Recommendations

- Sewer System:
  - Sewer upsizing and replacement.
  - In-line storage.
  - Flow diversion.
  - Application of Inlet Control Devices.
  - Sewer rehabilitation and replacement.
- Watermains:
  - Re-line, upsize and add new mains.
  - Design future building with lower required fire flow
  - Confirm Results with Pressure Monitoring and SCADA

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Existing Conditions - Sewer Systems Analysis

Sanitary Sewer System

Design Assessment Target:

- Sanitary sewers should be designed to operate under free flow conditions.
- Design flow for sanitary sewers is 0.26L/ha/s plus peak dry weather flow.
- Sanitary sewers should have a freeboard of 1.8m or higher, or no surcharge for shallow sewers to prevent basement flooding during wet weather flow condition (based on May 12, 2000 event).

Performance Results:

- All sanitary sewers in Yonge-Eglinton meet the assessment target under both dry weather flow and wet weather flow conditions (May 12, 2000 event).

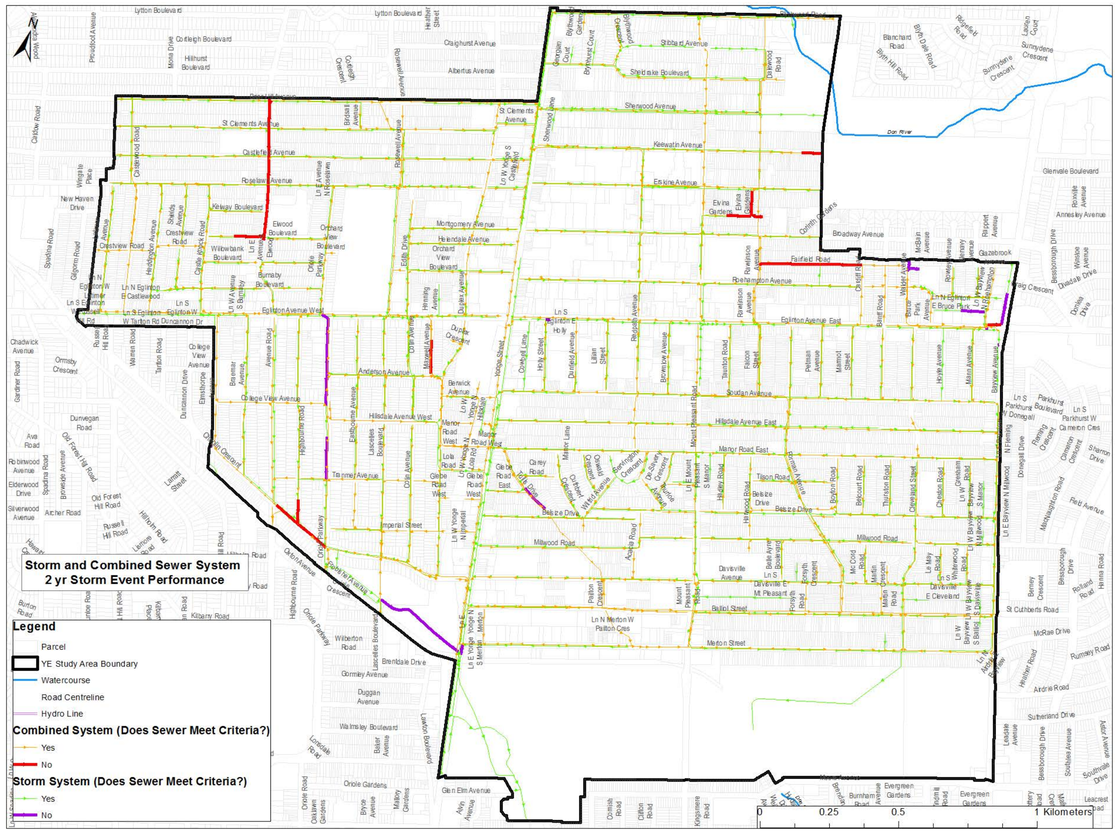
Storm and Combined Sewer System

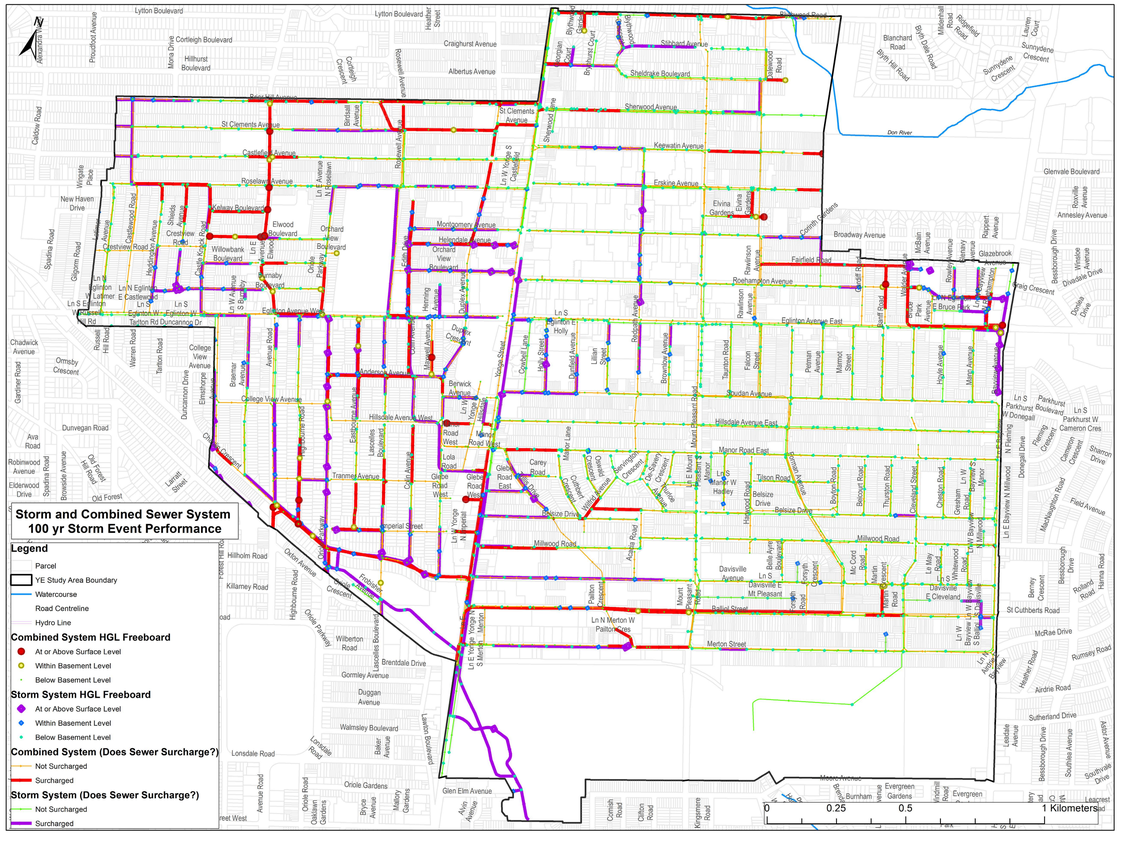
Design Assessment Target:

- Storm and combined sewers should be designed to convey the volume of a 2yr storm (32.4mm in 6hours) and should be designed to not surcharge during this event.
- Storm and combined sewers should have a freeboard of 1.8m or higher or no surcharge for shallow sewers to prevent basement flooding during a 100yr design storm event (85.4mm in 6 hours).

Performance Results:

- Under the 2yr design storm, the storm and combined sewer systems are surcharged in a few scattered areas.
- Under the 100yr design storm, the storm and combined sewer systems are surcharged in many areas with the surcharged level within basement level and at or above surface level in some areas. This is a common finding throughout Toronto. A separate study is currently being conducted by the City to address basement flooding issues, including in the Yonge-Eglinton area.





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Existing Conditions - Water System Analysis

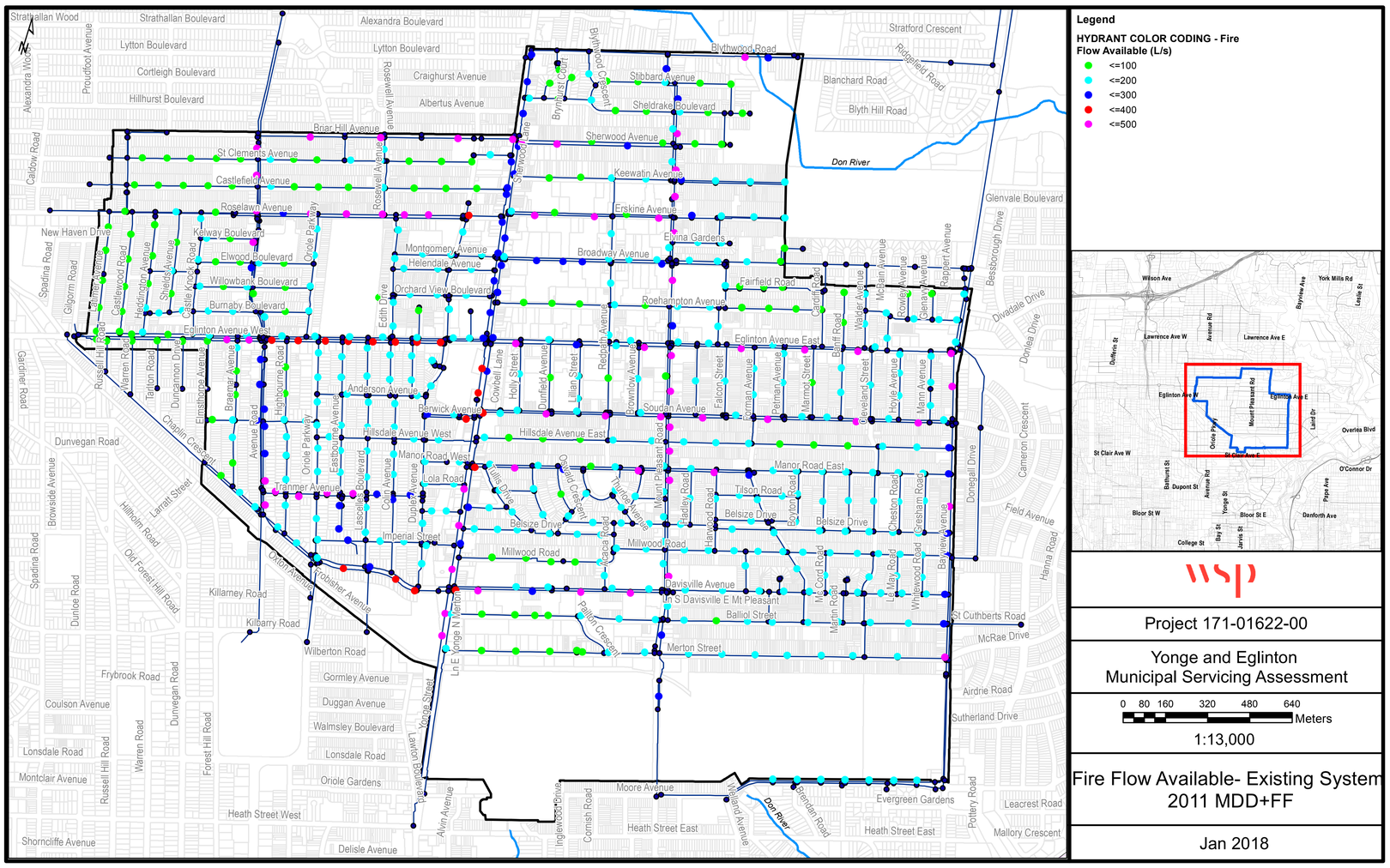
Water System

Design Assessment Target:

- Average daily and Maximum daily pressure range should be 350-550kPa (accepted range is 275-690kPa)
- Minimum hour and Peak hour pressure range should be 275-700kPa (accepted range is 275-690kPa)
- Fire flow minimum pressure should be 140kPa

Performance Results:

- Under all modeled conditions, pressures were within the accepted pressure requirements (275-690kPa).
- In some cases (modelled average daily water demand & modelled maximum daily water demand) some junctions were found to have pressures below or above the recommended range (350-550kPa), but still within the accepted range (275-690kPa)
- Overall, fire flows range between 45-500L/s (Fire flow pressure at or above 140 kPa).
- Some junctions were simulated with fire flows below the minimum targeted fire flow of 80L/s (Fire flow pressure at or above 140 kPa).



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Potential recommendations

Replacement of Existing Storm and/or Sanitary Sewers

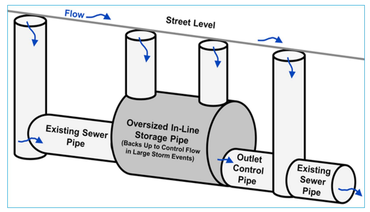
Existing storm and/or sanitary sewers with inadequate capacities to convey the required flows are replaced with the larger pipes.

Construction of New Sewers

Existing sewer pipes remain in place and a new sewer pipe is installed to provide additional flow capacity.

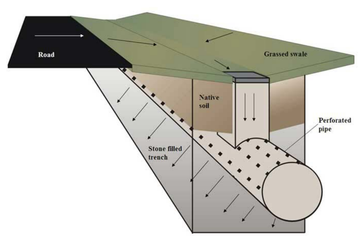
Oversized Storage Pipes

New oversized pipes are constructed to temporarily store water and help relieve overloading of the storm and/or sanitary sewer system.



Infiltration/Exfiltration Systems

Stormwater conveyed in storm sewers can be released underground via perforations (small holes) in the pipe to recharge the water table.

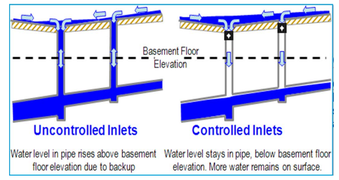


Surface Flow Path Diversion

Surface drainage is directed away from low lying areas that have no direct outlet to reduce surface ponding depths. “Curb Cuts” can be added to redirect overland flow to strategic locations.

Catchbasin Inlet Control

Catchbasin inlet controls are installed to limit stormwater runoff entering the storm system



Increasing Catchbasin Capacity

For existing storm sewers having capacity, the number of catchbasins are increased to capture more flow from the surface.

Sealing Maintenance Hole Covers

Maintenance hole cover with perforations in low lying areas are sealed to reduce the amount of stormwater runoff entering the sanitary sewer system and reduce the risk of sanitary sewer capacity overload.

Next Steps

- Future conditions assessment - evaluating the performance and capacity of the municipal servicing infrastructure using 2051population estimates.
- Evaluation of replacement and upgrades to the system.
- Refinement of recommendations, solutions and strategies for municipal servicing infrastructure in Yonge-Eglinton.