Black Creek Sanitary Drainage Area Servicing Improvements Class Environmental Assessment Study

The purpose of this Environmental Assessment Study is to recommend improvements for the Black Creek Sanitary Trunk Sewer (STS) system.

This Environmental Assessment Study is to address capacity of the Black Creek STS and the three Combined Trunk Sewers that are connected to the Black Creek STS

- The *Basement Flooding Protection Program* is a separate program that is addressing basement flooding issues at the local sewer and street level.
- The preferred solution will work in conjunction with the Basement Flooding Protection Program solutions to alleviate basement flooding.

Welcome

Black Creek Sanitary Drainage Area Servicing Improvements

Municipal Class Environmental Assessment Study

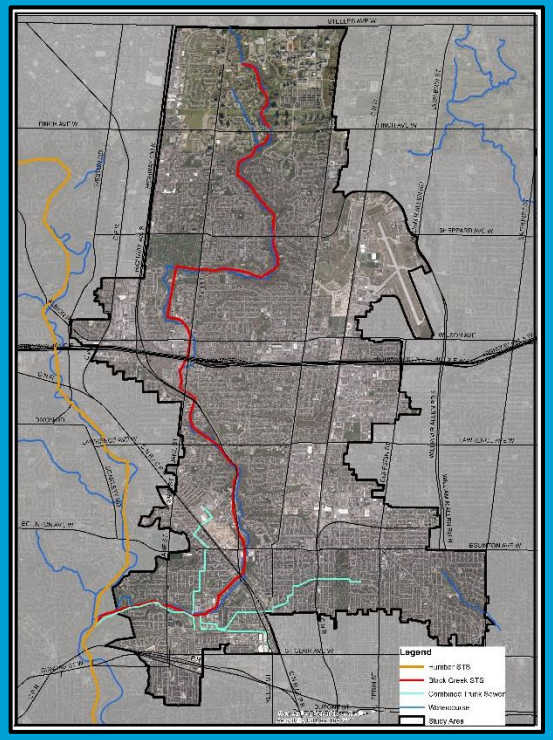
Public Information Event #2

Date: Thursday April 4, 2019

Time: 6:00 pm to 8:00 pm

Please sign in to receive project updates on the study. Please provide your comments by completing a comment sheet and placing it in the box or forwarding it to the Project Team by April 18, 2019.

TORONTO wsp JACOBS



Purpose of Today's Information Session

At Public Information Event (PIE) #1 held in 2016 the study purpose and objectives were presented. The purpose of today's event is to provide information on the following:

- Capacity and high water level issues identified for the Black Creek STS system
- Alternative solutions for long-term sanitary servicing and regulatory combined sewer overflow (CSO) compliance
- Evaluation of the alternative solutions
- Recommended alternative solution

We Want to Hear From You

- Sign in at the attendance register
- Review the display panels
- Ask questions/provide input to City Staff and their Consultants
- Complete a comment form

Study Purpose and Objectives

The purpose of this study is to assess capacity issues for the Black Creek Sanitary Drainage Area, identify solutions and develop a plan to achieve the following objectives:

- Reduce sewer water level in the Black Creek STS during wet weather events
- Reduce combined sewer overflow to Black Creek watercourse from the three combined trunk sewers
- Reduce stormwater Inflow and Infiltration (I&I) into the Black Creek STS
- Service projected population to the year 2041 and beyond

The study purpose is refined into a problem statement which guides the study and the solutions.

Municipal Class Environmental Assessment Process – Schedule C

The mandated process we are following to complete this project is described here:

Phase 1

- Identify the Problem
- Consult with Public, Agencies, Stakeholders
- **PIE #1 April 2016**

We are here

Phase 2

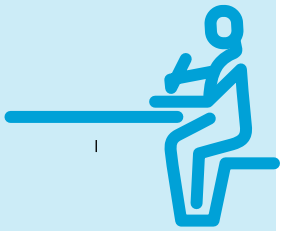
- Review of background studies, relevant EAs and existing conditions
- Develop and Evaluate Alternative Solutions
- Consult with Public, Agencies, Stakeholders
- **PIE #2 April 2019**
- Select a Preferred Solution

Phase 3

- Identify Design Concepts
- Consult with Public, Agencies, Stakeholders
- **PIE #3 Fall/Winter 2019**
- Select the Preferred Design Concept

Phase 4

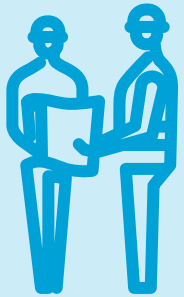
- Complete Environmental Study Report
- File Environmental Study Report for Review by Public, Agencies, Stakeholders



30 Day Review

Phase 5

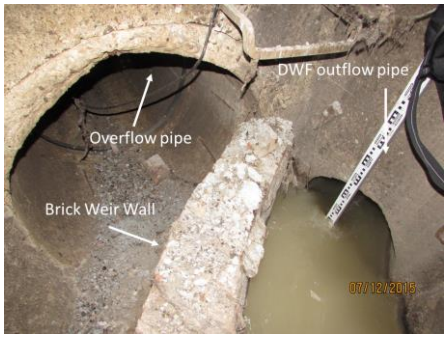
- Design, Construct and Monitor



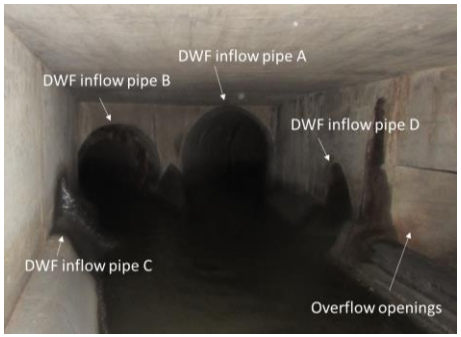
TORONTO

Black Creek Sanitary Trunk Sewer System and Drainage Area

- The Black Creek STS was built in the 1960s
- The Black Creek STS is 15 km long, from Finch Avenue West to Scarlett Road
- The Black Creek STS services a sanitary drainage area of 5,500 hectares (ha), the equivalent of approximately 4,000 soccer fields
- The Black Creek STS services a population of 351,000 in 2016 (approx. 75% residential, 25% employment)
- 2041 population projection is 418,500 (approx. 75% residential, 25% employment), or about a 14% increase by 2041
- 80% of the sanitary drainage area has separated local sanitary and storm sewers; 20% has local combined sewers
- There are 3 combined trunk sewers that connect to the Black Creek STS
- There are 8 combined sewer overflow structures, and 3 storage locations

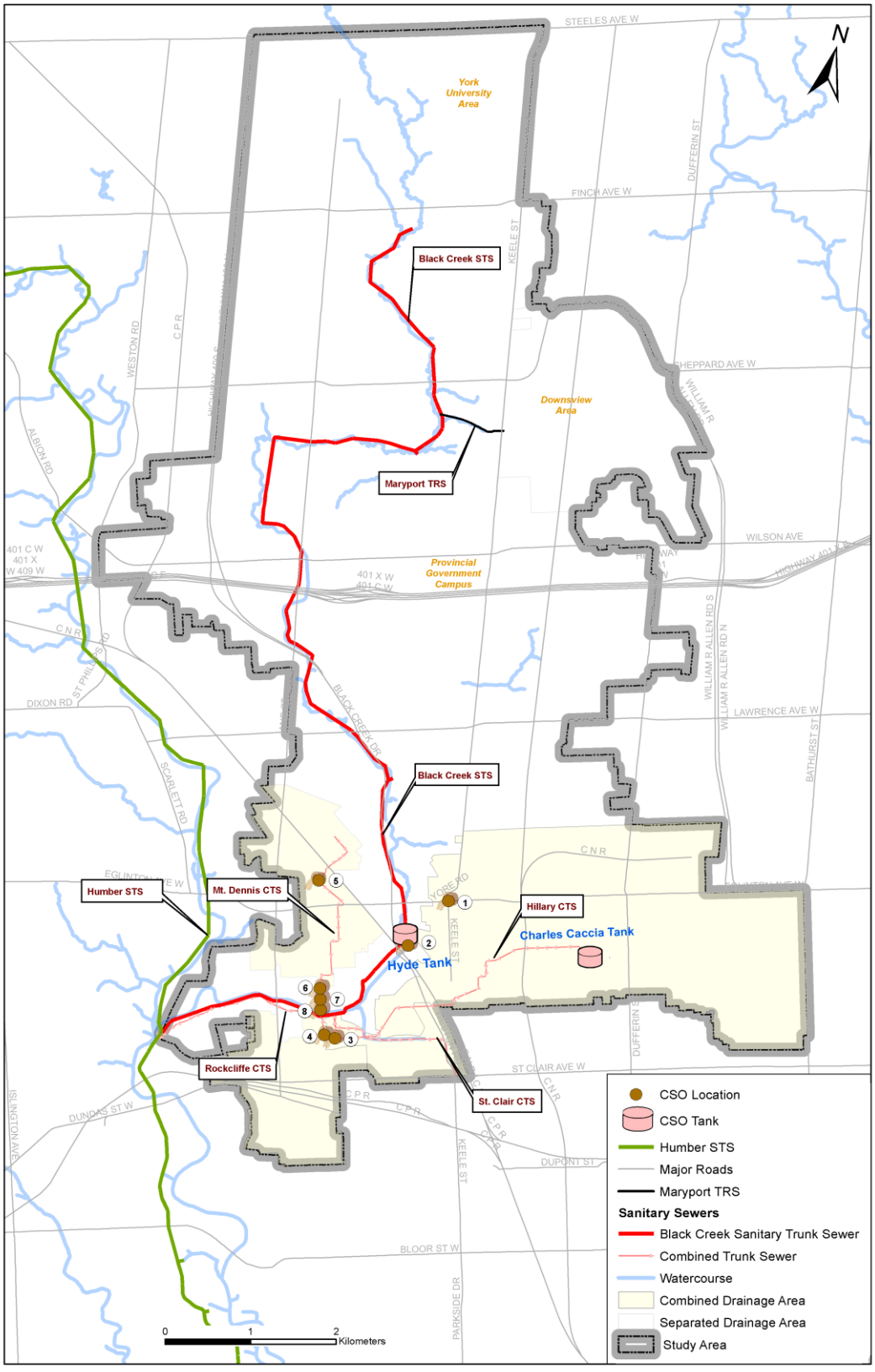


Overflow structure of the Mt. Dennis combined trunk sewer

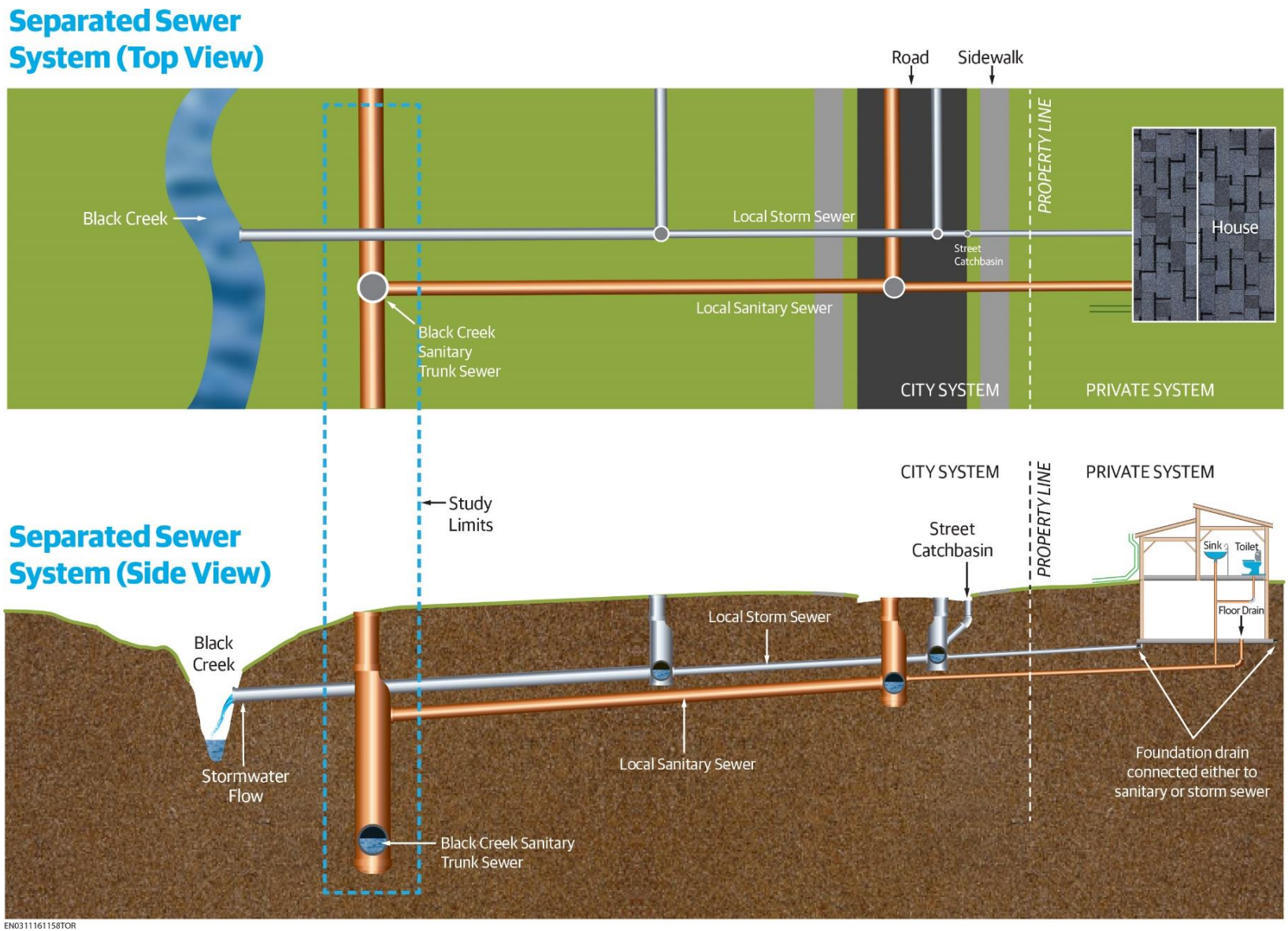


Overflow structures divert, or bypass flows to relieve an overloaded sewer (Shown: Hillary Combined Trunk Sewer Overflow Structure)

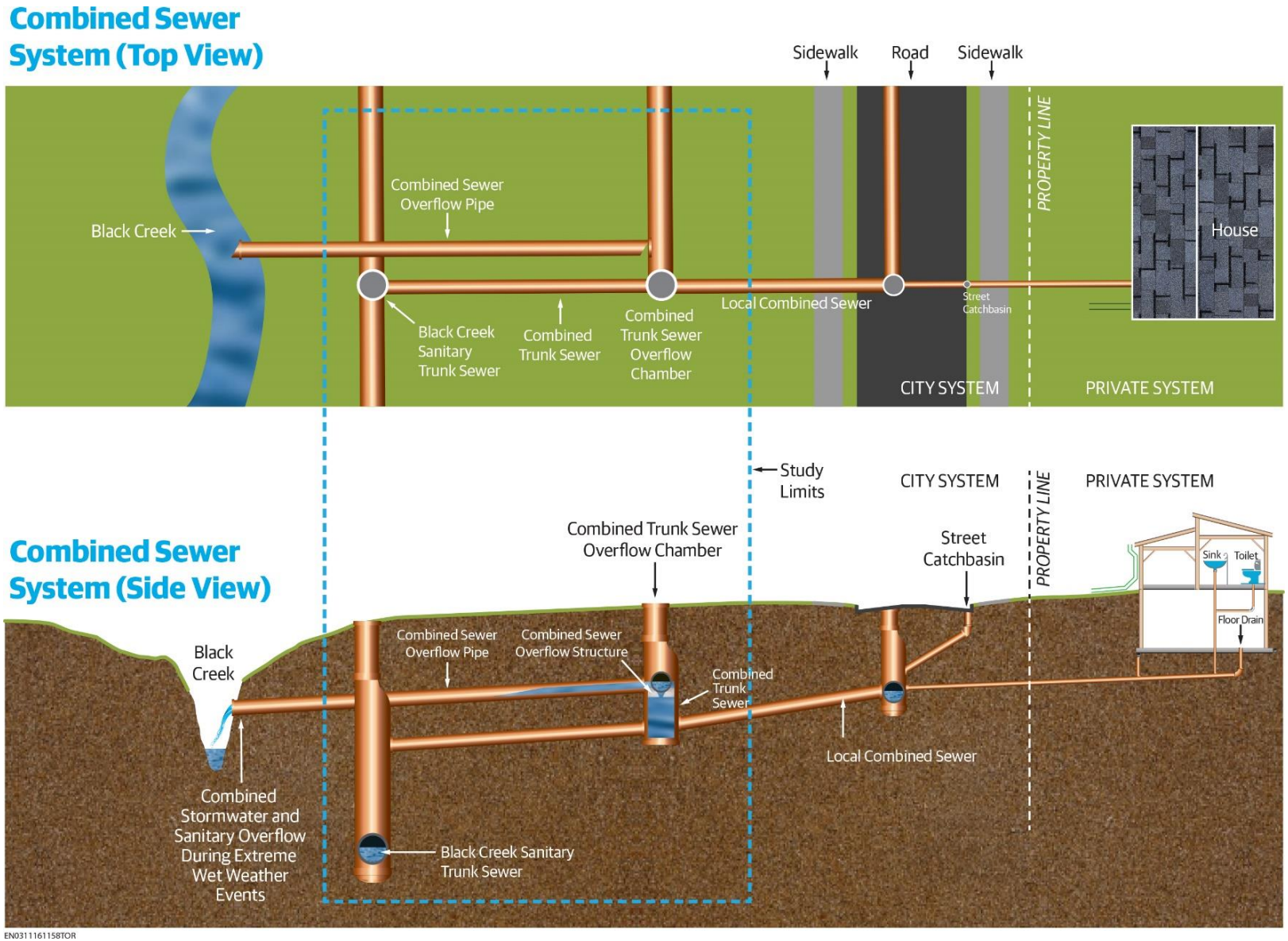
Study Area


STEELES AVE W
York University Area
FINCH AVE W
DUFFERIN ST
KEELE ST
Black Creek STS
Maryport TRS
HEPPARD AVE W
Downsview Area
WESTON RD
ALBION RD
C P R
WILSON AVE
Provincial Government Campus
401 C W
401 X
W 409 W
401 X W
401 C W
C N R
ST PHILLIPS RD
DIXON RD
BLACK CREEK DR
SCARLETT RD
WILLIAM R ALLEN RD S
WILLIAM R ALLEN RD N
LAWRENCE AVE W
BATHURST ST
Black Creek STS
Humber STS
Mt. Dennis CTS
Hillary CTS
Charles Caccia Tank
Hyde Tank
Rockcliffe CTS
St. Clair CTS
ST CLAIR AVE W
DUNDAS ST W
ISLINGTON AVE
DUPONT ST
BLOOR ST W
PARKSIDE DR
0
1
2
Kilometers
N
CSO Location
CSO Tank
Humber STS
Major Roads
Maryport TRS
Sanitary Sewers
Black Creek Sanitary Trunk Sewer
Combined Trunk Sewer
Watercourse
Combined Drainage Area
Separated Drainage Area
Study Area

Typical Separated Sanitary and Stormwater Sewer Systems



Combined Sanitary and Stormwater Sewer System



Phase 1: Problem Identification

- High water level in the Black Creek STS
  - High water level in the Black Creek STS occurs during wet weather events. The excess flows may cause backup into local sewer potentially causing basement flooding or cause spill in the low lying areas.
- Combined Trunk Sewers Overflow
  - Three combined trunk sewers carry a mixture of stormwater and domestic sewage. During rainstorms excess flow are discharged to the Black Creek watercourse to control flow going to the Black Creek STS.
- Stormwater inflow & infiltration to the Black Creek STS
  - Inflow and infiltration (I&I) are terms used to describe the ways that groundwater and stormwater enter the sanitary sewer system.
  - Key sources of inflow to the Black Creek STS are from leaking maintenance hole covers; creek water backing up to the trunk sewer; excess flows from combined sewer system and local sanitary sewers due to rainfalls
- Future population growth constraints
  - Population increases will put strain on the existing system capacity. Capacity must be available to service future population projections.

Example of sanitary trunk sewer overflow during a wet weather event

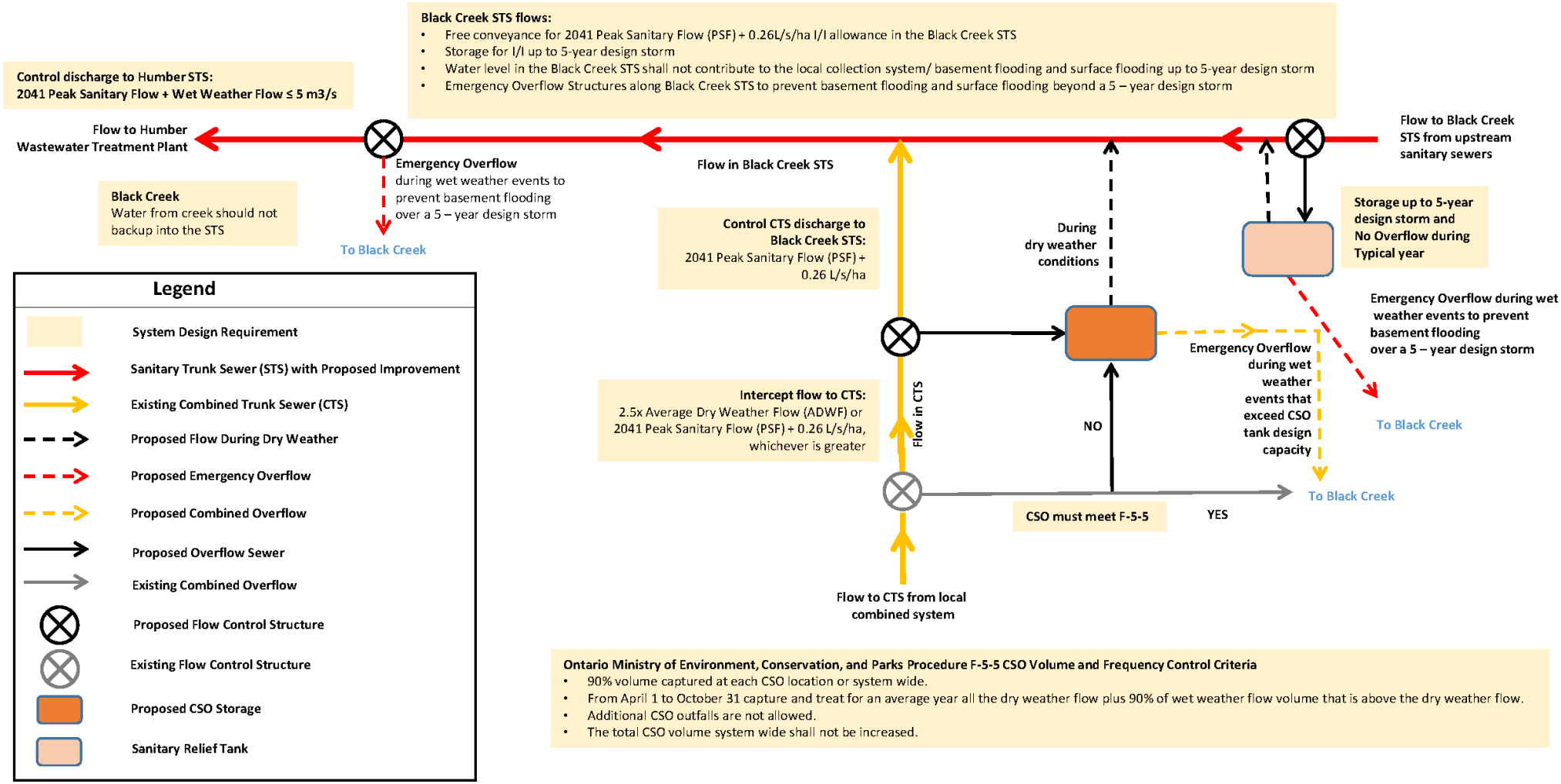
How We Developed Alternative Solutions

1. Reviewed existing conditions
2. Developed Design Criteria
3. Identified long-list of potential solutions:
   - I&I control measures (e.g. replacement of maintenance hole covers; installation of backwater valves, sewer separation , control excessive flow from the combined sewer system, and I&I reduction in local sanitary sewers)
   - new relief trunk
   - new storage facilities
   - diversion of flows
4. Developed short-list of feasible alternatives
5. Assessed the short-listed of alternatives in detail
6. Selected a Recommended Solution

Design Criteria

Design Criteria for the Development of Alternative Solutions (MCEA Phase 2)

- Assessment for the existing system capacity and development of alternative solutions will use 2041 population projections (from City's Official Plan)
- All alternative solutions (except DO NOTHING) will include I/I reduction measures on the trunk sewer

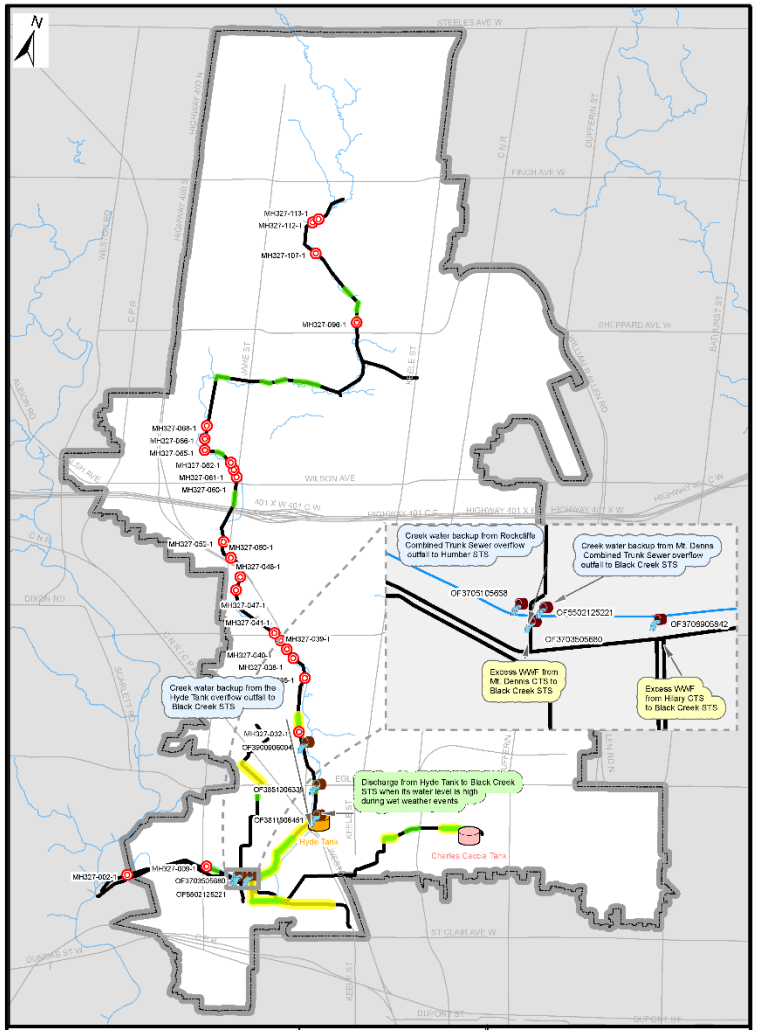


Ontario Ministry of Environment, Conservation, and Parks Procedure F-5-5 CSO Volume and Frequency Control Criteria

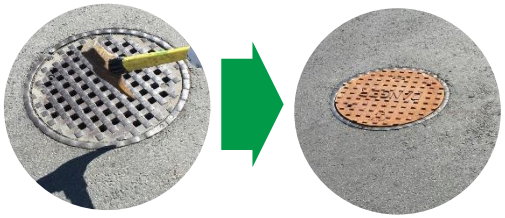
- 90% volume captured at each CSO location or system wide.
- From April 1 to October 31 capture and treat for an average year all the dry weather flow plus 90% of wet weather flow volume that is above the dry weather flow.
- Additional CSO outfalls are not allowed.
- The total CSO volume system wide shall not be increased.

Inflow & Infiltration and Wet Weather Flow Reduction

- **Replacement of 22 maintenance hole covers**
- **Prevention of creek water from flowing back to the STS at three locations**
- **Management of inflows from combined sewer system into Black Creek STS during wet weather**
- **Local sewer separation in combined sewer areas:**
  City's state of good repair and basement flooding protection programs (on-going)
- **I&I reduction in local sanitary sewer areas:**
  Cross connections, such as downspout, foundation drain, sump pump discharge, and area drain connections (on-going)



Example of maintenance hole cover replacement.



Example of backwater prevention.

TORONTO

Alternative Solutions

I&I and wet weather flow controls

- will be implemented for all solutions; however alone they are insufficient in solving the problem

New conveyance and storage infrastructure are also required

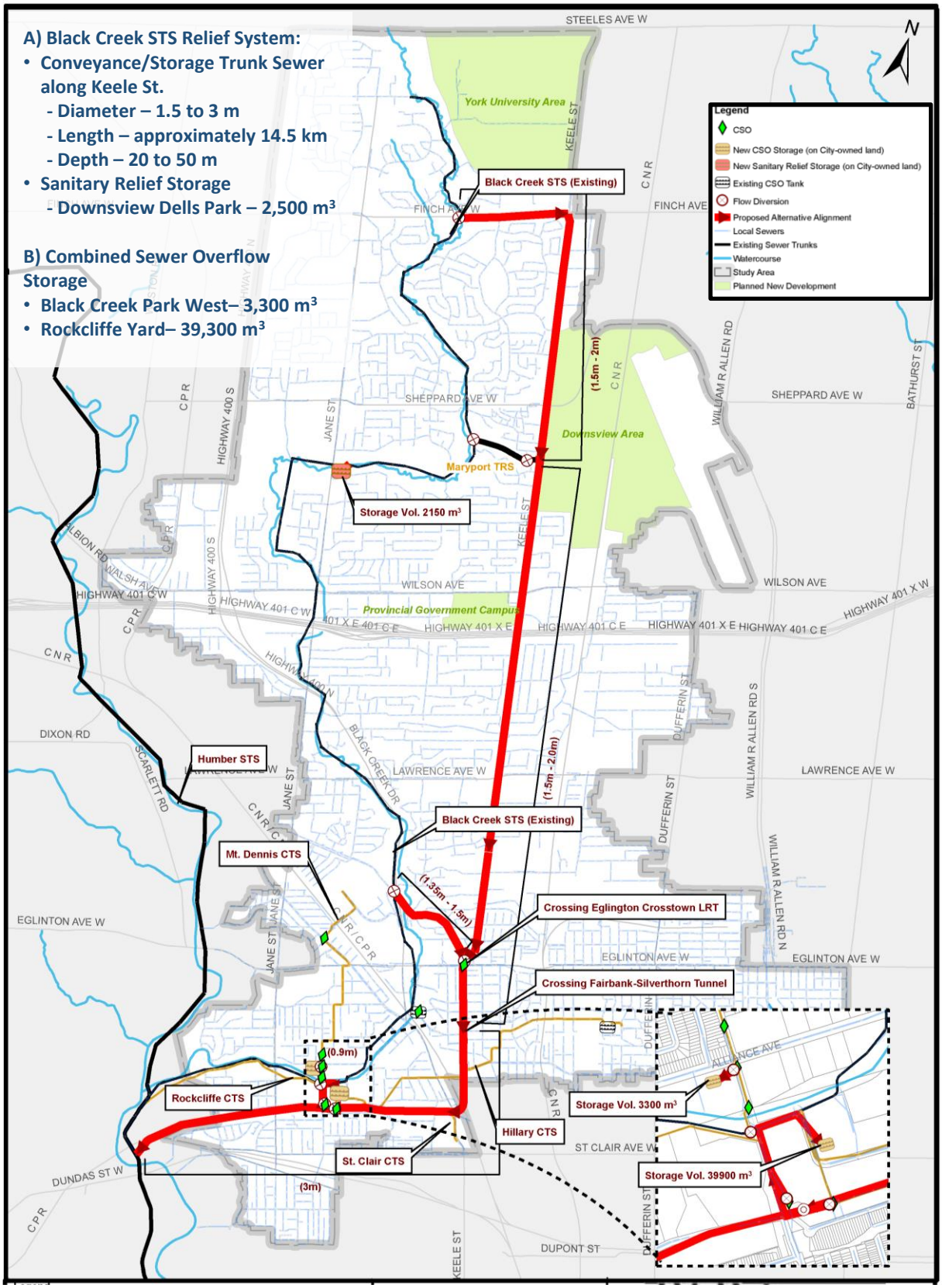
- New relief trunk sewer system to provide a relief to Black Creek STS
- Combined sewer overflow (CSO) storage to store overflow from combined trunk sewers during storm events until there is capacity in the downstream infrastructure
  - Construction of new CSO underground storages
  - Construction of large diameter storage pipes

Design features for the conveyance and storage infrastructure will be defined in Phase 3 of the Class EA and presented at the next public information event

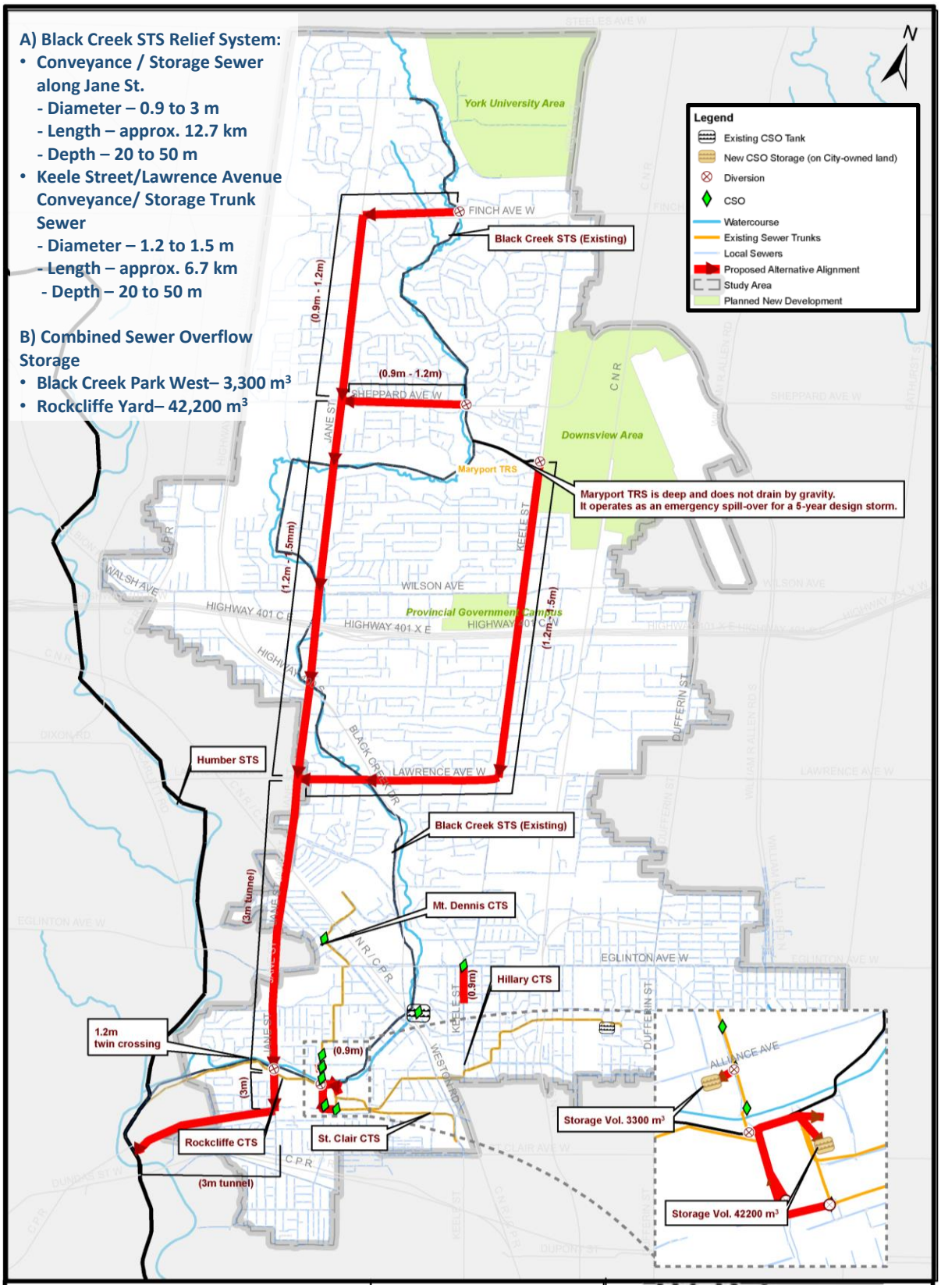
Example of underground storage tank design.

Example of tunnel construction site.

Alternative 2 – Keele Street



Alternative 3 – Keele/Jane Streets



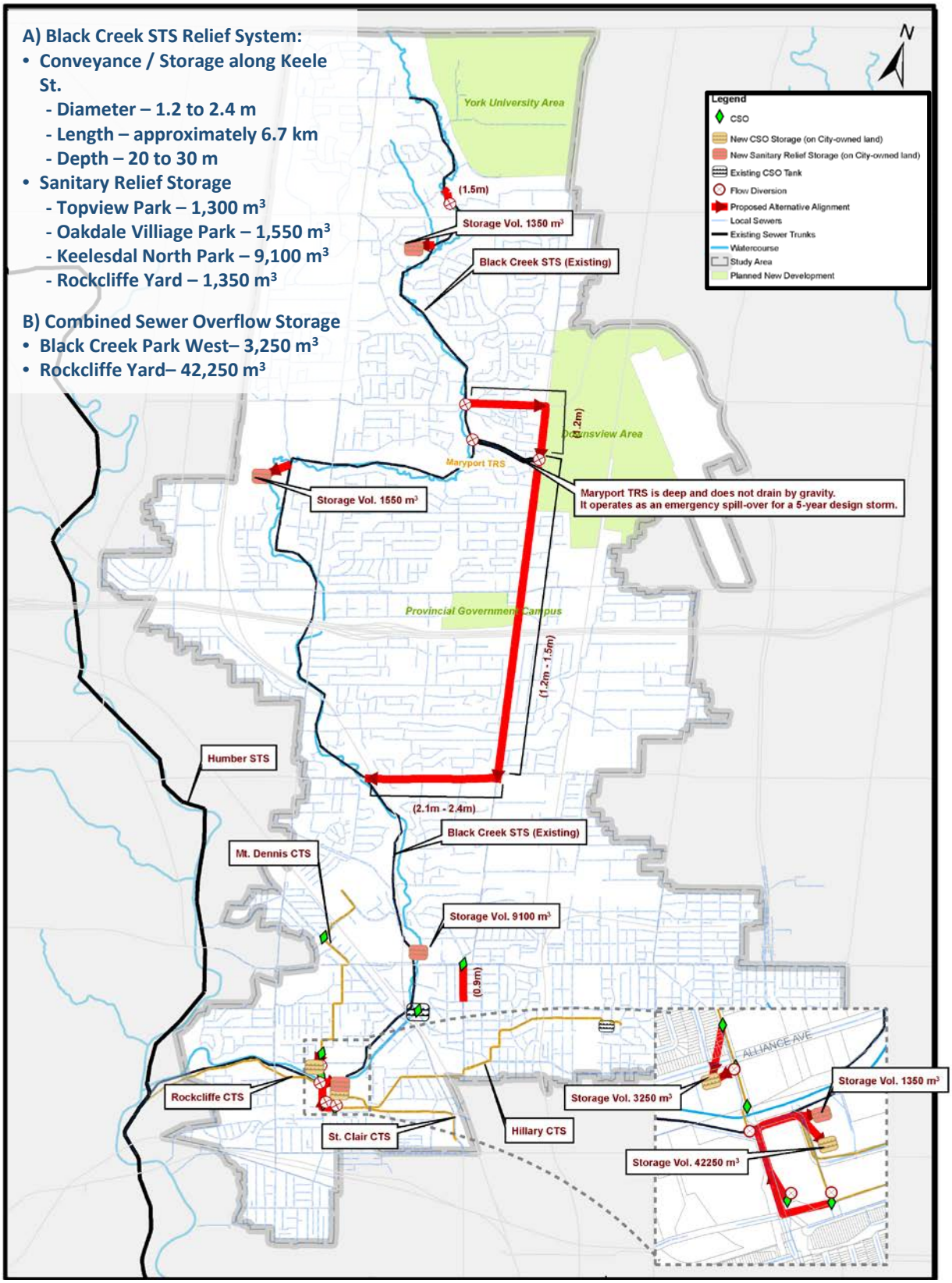
Alternative 4 – Satellite Storage Tanks

A) Black Creek STS Relief System:

- **Conveyance / Storage along Keele St.**
  - **Diameter – 1.2 to 2.4 m**
  - **Length – approximately 6.7 km**
  - **Depth – 20 to 30 m**
- **Sanitary Relief Storage**
  - **Topview Park – 1,300 m³**
  - **Oakdale Villiage Park – 1,550 m³**
  - **Keelesdal North Park – 9,100 m³**
  - **Rockcliffe Yard – 1,350 m³**

B) Combined Sewer Overflow Storage

- **Black Creek Park West– 3,250 m³**
- **Rockcliffe Yard– 42,250 m³**



Evaluation Criteria for Alternative Solutions

The following evaluation criteria were developed through stakeholder input, and have been used to evaluate alternative solutions.

Natural Environment

- Terrestrial impacts (e.g. trees, vegetation, wildlife)
- Aquatic habitat impacts (e.g. water quality, erosion and sedimentation impacts)
- Surface and Groundwater
- Air Quality

Social & Cultural

- Long-term community impact (e.g. noise, odour, aesthetics, green space)
- Construction related impacts
- Property Acquisition Requirements
- Cultural heritage and archaeological impacts

Technical

- Ability to Meet Projected Growth
- Surcharge Level and CSO Control
- I&I and Wet Weather Flow Management
- Constructability & risks of Conflicts with other infrastructure
- Implementation Complexity
- Regulatory approvals
- Long term system reliability and resilience
- System operational complexity
- System operational redundancy and flexibility
- Impacts to existing downstream sewer infrastructure and the Humber Wastewater Treatment Plant

Cost

- Capital cost
- Operations and maintenance costs
- Life Cycle Costs

Alternative Solutions Evaluation

Alternatives	Natural	Socio-Cultural	Technical	Economic		Summary
Alternative 1: Do Nothing	The existing problems of high water level of the Black Creek STS and combined sewer overflow to the Black Creek watercourse will continue to have impacts to the community and the environment.			Long term unquantifiable costs to the public and environment.		Used as a base scenario to compare benefits and cost with the proposed alternative solutions. Alternative 1 - Do Nothing, is not a solution to the existing problems.
Alternative 2: Keele Street				Capital O&M Life Cycle	$ 472,000,000 $ 581,000 $ 491,000,000	While has highest capital and life cycle costs; alternative solves the problem, improves water quality, has the least impacts on terrestrial and aquatic systems, the least disruption to property owners and is technically reliable, relatively easy to implement
Alternative 3: Keele/Jane Streets				Capital O&M Life Cycle	$ 414,000,000 $ 569,000 $ 432,000,000	Alternative has lower overall costs than alternative 2, but with two relief mains will have more potential for impacts to the natural and social environment. Also it is slightly more difficult technically to implement and more complex to operate.
Alternative 4: Satellite Storages				Capital O&M Life Cycle	$ 340,000,000 $ 609,000 $ 360,000,000	Alternative has lower overall costs than alternative 2 and 3, but multiple storage facilities will have more potential for impacts to the natural and social environment. Also it is slightly more difficult technically to implement and more complex to operate.

Notes:
O&M = Estimate of annual operation and maintenance cost
Life Cycle = Estimate of the total cost of an asset over the course of its useful life (useful life estimated to be 100 years)

	least impacts or greatest benefits compared to other alternatives; impacts can be mitigated
	moderate impacts or moderate benefits compared to other alternatives
	greatest impacts compared to other alternatives; difficult to mitigate

Benefits of Recommended Alternative 2 – Keele Street

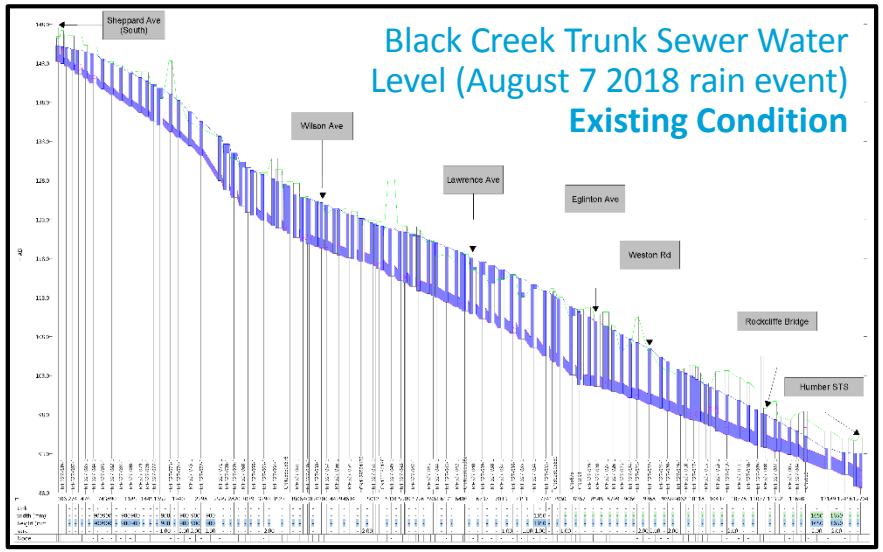
- Alternative 2 provides the greatest level of reliability and effectiveness. It meets all design criteria:
  - Surcharging to local sewer system reduced to mitigate / prevent basement flooding risk
  - Combined sewer overflows (discharges of sewage to watercourses) reduced in accordance with updated regulatory requirements
  - Water quality improvement due to reduced combined sewer overflows
  - Inflow & Infiltration is reduced
- Alternative 2 has the least impacts to natural and social environment; impacts during construction can be mitigated

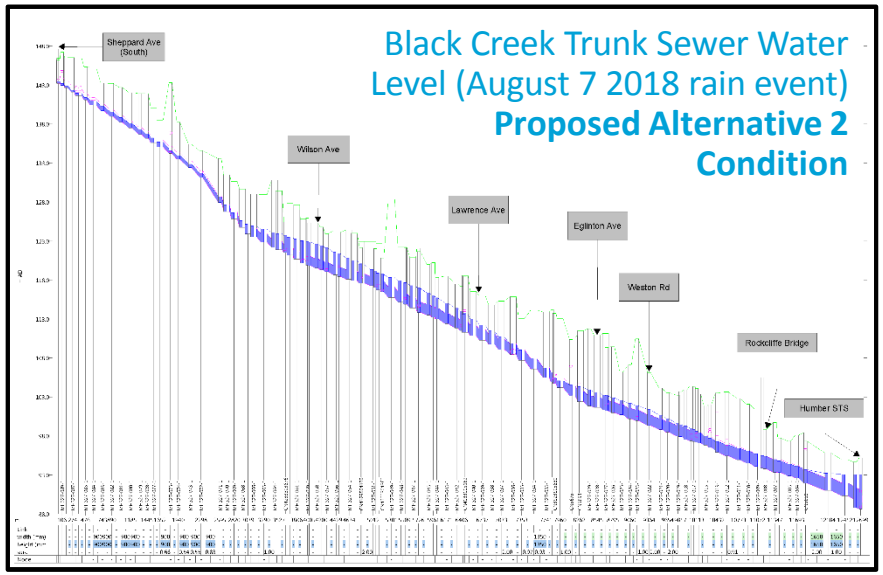
Example of art displayed on the hoarding as part of community engagement.

Example of underground storage with surface area landscaped to pre-construction conditions.

TORONTO

Benefits of Recommended Alternative 2 – Keele Street





CSO #	OVERFLOW LOCATION	TRUNK SEWERSHED	EXISTING CONDITION		ALTERNATIVE 2 CONDITION	
			OVERFLOW VOLUME (M^3)	% WWF CAPTURE	OVERFLOW VOLUME (M^3)	% WWF CAPTURE
1	Keele St and Eglinton Avenue	Hillary	40,664	75%	3,078	97%
2	Hyde tank	Hillary	16,379	91%	0	100%
3	Rockcliffe Crt and Lavender Creek Trail	Hillary	307,824	69%	49.021	92%
4	Rockcliffe Blvd and Woolner Avenue	Rockcliffe	131,189	53%	22,251	91%
5	Weston Road and Ray Ave	Mt. Dennis	0	100%	0	100%
6	Rockcliffe Blvd and Alliance Avenue	Mt. Dennis	411	100%	434	100%
7	Rockcliffe Blvd and Alliance Avenue	Mt. Dennis	3,569	98%	6,321	96%
8	Rockcliffe Blvd and Black Creek	Mt. Dennis	28,493	80%	10,160	93%
	Total		528,529	74%	91,265	94%

$$\text{WWF capture rate} = \frac{\text{wet weather flows that enter a trunk sewer}}{\text{Total wet weather flows (enter to the trunk + overflow)}}$$

TORONTO

Next Steps - Phase 3 Conceptual Design

After today's meeting:

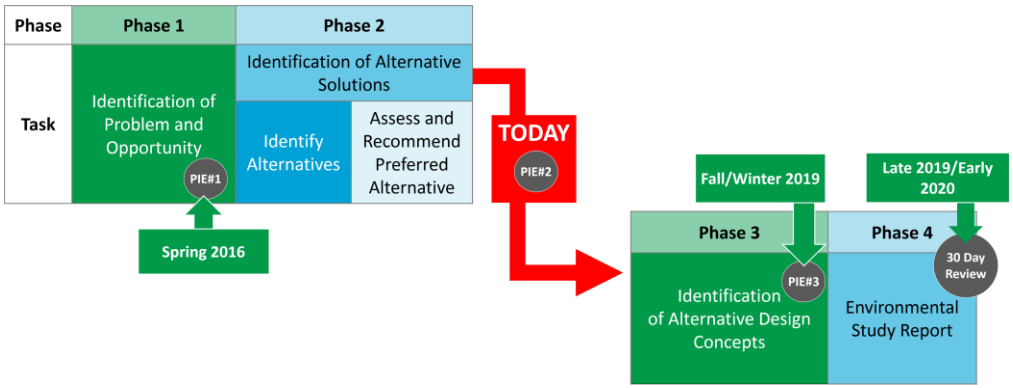
- Finalize the recommended solution, incorporating feedback received from the public and other stakeholders
- Proceed with Phase 3 Conceptual Design

Conceptual design process:

- Develop and assess design concepts for the preferred solution, including evaluation of storage options (underground tank storages or large diameter pipe storages)
- Provide design concept evaluation and preferred design concept at PIE #3 in fall/winter 2019
- Recommend a Preferred Design Concept

Conceptual design development considerations:

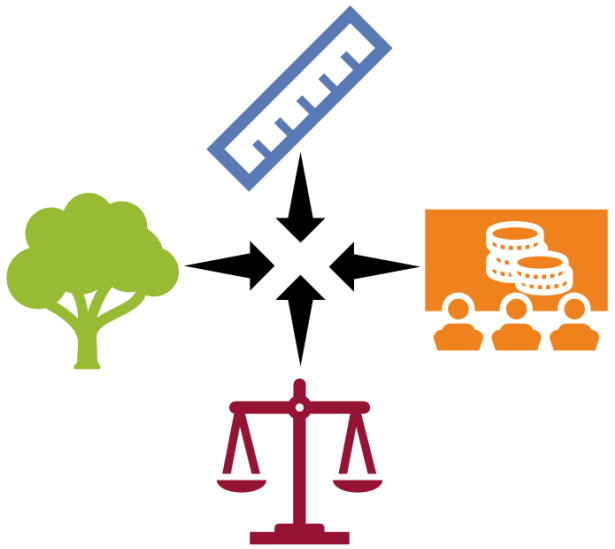
- Impacts to the community during construction will be minimized through the implementation of measures to reduce or avoid negative effects.
- Construction method / tunnel shaft locations
- Storages configuration and operation



Thank You for Attending

We welcome your feedback. Please fill out the comment sheet provided.

Following this PIE, the project team will review and consider your comments in the development of the conceptual design for the preferred solution.



Mae Lee
Public Consultation Unit
City of Toronto
55 John Street, Metro Hall 19th Floor, Toronto, ON M5V 3C6
Phone: 416-392-8210 Fax: 416-392-2974 TTY: 416-338-0889
Email: mae.lee@toronto.ca
Visit: toronto.ca/blackcreekstudy