Appendix B-1

Stakeholder Committee Meetings

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April 19, 2018

[redacted]

DILLON CONSULTING

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Windsor Ontario
Canada
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519.948.5000
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519.948.5054

Windsor Sewer Master Plan Stakeholder Advisory Committee

Dear [redacted],

Thank you for your interest in joining the City of Windsor Sewer Master Plan and the project Stakeholder Advisory Committee. We would like to invite you to participate on the committee for this important project.

The City of Windsor Sewer Master Plan is an important component of Mayor Dilkens' 8-point plan. The Sewer Master Plan will identify readily implementable and longer term infrastructure projects, that the City can undertake to reduce the risk of basement and excessive surface flooding caused by wet weather.

I would like to take this opportunity to introduce myself. My name is Karla Kolli and I am working with the City to implement the extensive consultation program for the Windsor Sewer Master Plan. I will be your facilitator for the Stakeholder Advisory Committee and I look forward to meeting you in person.

The Stakeholder Committee will provide an ongoing way to get feedback on the project from community representatives. As a member of the Stakeholder Advisory Committee you will:

- Provide advice and feedback to the City of Windsor Sewer Master Plan project team at key milestones;
- Review project materials and provide insight into key issues related to the Sewer Master Plan development process from the perspective of the members and the organizations/interests represented;
- Communicate project information back to your organization/community; and,
- Provide input on and participate in consultation events for the project.

We anticipate approximately 10 meetings over the two year project. Meetings will be held on weekday evenings approximately every other month. With meeting attendance and possibly some preparation time, this represents a commitment of approximately 25-30 hours over the life of the project. The draft Terms of Reference for the Stakeholder Advisory Committee is included with the letter.

Dillon Consulting Limited

The first Stakeholder Committee meeting will be held on Wednesday May 2, 2018 from 6:30 pm to 8:00 pm. The meeting will be held at 400 City Hall Square in Meeting Room 406. An agenda for the meeting is included with this letter.

Please confirm your availability for this initial meeting by responding to this email. If you have any questions please contact us at info@weatheringthestorm.ca.

We look forward to meeting you!

Yours sincerely,

DILLON CONSULTING LIMITED

Karla Kolli

Karla Kolli, MCIP, RPP
Facilitator

Enclosure(s): Draft Terms of Reference, Draft Agenda – Meeting #1

Our file: 17-6638

MEETING MINUTES

Subject:	Stakeholder Advisory Committee - City of Windsor Sewer Master Plan
Date and Time:	May 2, 2018 - 6:30 p.m. – 8:00 p.m.
Location:	400 City Hall Square, Windsor, ON – Meeting Room 406
Our File:	17-6638

A. endees

Tirupati Bolisetti	Committee Member
Ron Brant	Committee Member
Rajesh Seth	Committee Member
Tom Hensel	Committee Member
Frank Dattilo	Committee Member
Tom Markham	Committee Member
Amandeep Hans	Committee Member
Greg Plante	Committee Member
Bridget Scheuerman	Committee Member
David Hanna	Committee Member
Pete Karaeorgos	Committee Member (by phone)
Joshua Jacquot	Citizen
Anna Godo	City of Windsor
Janelle Coombs	City of Windsor
Wes Hicks	City of Windsor
Karina Richters	City of Windsor
Flavio Forest	Dillon Consulting Limited
Karla Kolli	Dillon Consulting Limited
Ryan Langlois	Dillon Consulting Limited
Ben Ouellette	Dillon Consulting Limited

Absent

Dave Hilton	Committee Member
John Holmes	Committee Member
Ray Bezaire	Committee Member
Stephen Laforet	Committee Member
Maria LeBlanc	Committee Member
Natalie Moudrak	Committee Member

Item	Discussion	Action By
1.	**INTRODUCTIONS**	
1.1.	The project team and Stakeholder Advisory Committee (SAC) members were introduced.	
1.2.	The presentation delivered as part of this meeting has been attached to these minutes which provide further details outlining the project.	
2.	**PURPOSE OF THE SAC; TERMS OF REFERENCE REVIEW**	
2.1.	**Purpose of the Stakeholder Advisory Committee**	
2.1.1.	The main objectives of the SAC are: · The main objectives of the SAC are: o Open exchange of information between the Project Team and committee members on topics related to the Sewer Master Plan. o Opportunity to receive input and feedback from representative perspectives of the community on the project o Opportunity to spread knowledge and awareness of flood reduction opportunities and measures Key project areas where the SAC can add valuable input include areas of surface and basement flooding, community consultation, and proposed solutions. · Key project areas where the SAC can add valuable input include areas of surface and basement flooding, community consultation, and proposed solutions · The SAC is meant to be a non-political body.	
2.2.	**Stakeholder Advisory Committee Membership**	
2.2.1.	The SAC membership was discussed including the community sectors that are intended to be involved as well as the anticipated perspectives that each of these sectors will bring to the meetings. · The committee recommended the addition of a landscape architect to the SAC to help promote at source methods of storm water management (ie. LID techniques). The Dillon team identified that there are Landscape Architects on staff that could be consulted on an as-needed basis to comment on LID methods.	**Dillon**
2.3.	**Stakeholder Advisory Committee Meetings**	
2.3.1.	This is the first of approximately 10 Stakeholder Advisory Committee (SAC) meetings for the City of Windsor's Sewer Master Plan which are to be held over the next 2 years.	
2.3.2.	Project material may be distributed for review prior to subsequent meetings.	**Dillon**

2.3.3. The discussion topics for the SAC meetings were reviewed with SAC members.

- It was suggested that Operation and Maintenance issues be added to the list of discussion topics. **Dillon**

2.3.4. The SAC presented the idea to bring in experts to make brief presentations during relevant meetings.

- Dillon asks that any requests are to be presented prior to the committee meeting, after which Dillon will incorporate the presentation into the meeting, as appropriate. **Committee**

2.3.5. SAC members are to speak freely, and encouraged to discuss issues relating to Windsor's Sewer Master Plan with their peers and also bring to the meeting any questions and/or comments. **Committee**

- It is encouraged that committee members direct their peers to the City's website (www.weatheringthestorm.ca) if they would like to find further information or report any issues they have come across. **Committee**

3. PROJECT OVERVIEW

3.1. Sewer Master Plan Problem Statement

3.1.1. The problem and opportunity statement that will be included at the next public meeting was presented for review by the SAC. **Dillon**

3.2. Mayor's 8-Point Plan

3.2.1. The Mayor's 8-point plan was reviewed with the SAC. The development and implementation of the Sewer Master Plan (Point No. 8) will be addressing the overall plan. Further information regarding the Mayor's plan can be found on the City's Website.

3.3. Project Overview

3.3.1. The Sewer Master Plan is being undertaken in 2018 and 2019 to help the City better understand the causes of basement and surface flooding throughout the City, determine what areas are most vulnerable, and recommend immediate and long-term solution to reduce the risk and impacts of flooding

3.3.2. There are two main components to the drainage conveyance system being addressed as part of this project:

1. The storm, sanitary and combined sewers that are intended to convey domestic sewage and runoff from more frequent storm events; and
2. Overland flow routes, primarily consisting of roads, for conveyance of surface runoff from higher intensity storm events.

3.3.3.	Windsor's Sewer Master Plan will employ a two-dimensional model that takes sewer systems and overland drainage into account. This is the first that takes the entire City of Windsor into consideration in defining problems and solutions to reduce the risk and impacts of flooding.	
3.3.4.	The design of remedial flooding solutions will be based on available storm data and the resiliency of the system will be tested using climate change models. Storm events will be applied uniformly across the City in the model.	
3.3.5.	The SAC suggested that the Sewer Master Plan should also consider emergency procedures in the event of a major storm. The procedures could include traffic diversions, road/bridge closures, emergency response plans and the garbage pickup.	**Dillon/Windsor**
3.3.6.	The SAC also agreed that the Sewer Master Plan should recognize the higher level of service that should be afforded to more critical infrastructure (ie. arterial roads for access) and facilities (ie. Hospitals) in defining the problems and solutions.	**Dillon/Windsor**
3.4.	**Model Systems Approach:**	
3.4.1.	The model of the sewer and overland flow systems will incorporate climate change considerations to test the resiliency of the drainage systems and solutions.	**Dillon**
3.4.2.	The SAC suggested that the design standards of other municipalities (ie. guidelines in Quebec, Michigan, Philadelphia, LaSalle, Oakville, Ottawa) be reviewed to identify best practices and standards that should be incorporated in this study.	**Dillon/Windsor**
3.5.	**Public Engagement to Achieve Shared Solutions:**	
3.5.1.	Successful flood risk reduction requires City and property owner involvement.	
3.5.2.	SAC members noted that property owners need to be educated on sump pumps and backflow valves in terms of maintenance, as well as their intended use and capacity.	**Windsor**
3.5.3.	Dillon asked for input on ways to increase public involvement, based on which the following input was provided: · Create partnerships to hold more appealing events for residents to attend. · Have food and drinks at meetings. · Get the media more involved in promoting community involvement and events. · Hold meetings soon after major events if possible. This is when people have the highest level of interest and are more likely to raise concerns.	**Dillon/Windsor**

3.6. **Study Process:**

3.6.1. This study is following the requirements of the Municipal Class Environmental Assessment (EA). A general description of the EA process was outlined, including problem/opportunity definition, public and stakeholder engagement, and identification and evaluation of alternative solutions (immediate and long-term) based on social, environmental, engineering and cost factors.

3.7. **Data Compilation:**

3.7.1. Reports of flooding are collected by the City, primarily through 311 calls.

3.7.2. Based on the experience of several Committee members in the insurance and restoration industries, many residents affected by the flood (up to half was suggested) did not report to the City. People often don't report a flood to avoid negatively impacting the resale value of their home, or to avoid having their community labeled as a flood zone with respect to the insurance companies.

3.7.3. To improve the accuracy of the data collection from flood-affected homes, the 311 calls could be compared with insurance claims in the area. **Dillon/Windsor**

3.7.4. Homes that were flooded in a previous event may not report to either the City or the insurance company or both if they have lost coverage and have no way of recouping any losses. This should be taken into consideration during the study. **Dillon/Windsor**

3.8. **The Master Plan**

3.8.1. The City has completed various studies focusing on individual districts. Not all of the results of these studies have been fully implemented and key items will be brought forward and integrated into the Sewer Master Plan. **Dillon**

3.8.2. The SAC suggested investigating the number of home owners that were flooded and who have backflow prevention valves installed. This could be an indication of several factors to consider, including: **Dillon/Windsor**

- The importance of educating the public on the proper maintenance of backflow valves and sump pumps;
- The installation practices and investigation required to confirm the appropriate positioning of these devices; and
- The quality of the devices being used.

3.8.3. The SAC identified the importance of reviewing the schedule for operation and maintenance on the City's storm drainage systems (ie. sewers, catchbasins, ponds, etc). **Windsor**

3.9. **Other Related Studies**

3.9.1. A brief overview of related studies was provided, including:

- Climate Change Adaptation Plan;
- Environmental Master Plan; and
- Combined sewer overflow studies.

4. **YOUR EXPERIENCE WITH FLOODING**

4.1. SAC members were asked to share their own experiences with flooding and thoughts on Windsor's Sewer Master Plan. The following items were noted during this portion of the meeting for consideration in the Master Plan, as appropriate: **Dillon/Windsor**

4.1.1. Some small businesses experience flooding that could have been avoided or minimized if road closures and other traffic management were put into effect. Wave action from flooding on the roadway and traffic travelling through flooded streets were carried into areas that would have seen much less water otherwise.

4.1.2. It appeared that there were opportunities to improve mitigation and cleanup efforts. Due to the extent of flooding that occurred, some homes remained with flooding in their basements for several days, presenting health risks to occupants.

4.1.3. An increase in public awareness and methods for mitigating floods would be valuable.

4.1.4. Suggestions that homeowners avoid finishing basement areas, or avoid building basements in new homes would reduce the impacts of basement flooding for new homes.

4.1.5. If downspout disconnection is required it should be made mandatory and put into a by-law and upheld uniformly across the City.

4.1.6. Existing storm water management facilities seem to be less efficient than when initially installed due to a lack of maintenance. Increased maintenance is recommended.

4.1.7. The City may want to consider increasing the size of existing storm water management ponds where space exists to do so.

4.1.8. Backflow valves should be installed on sanitary and storm sewer lines.

4.1.9. In areas where surface flooding occurs, downspout disconnections, backflow valves, and sump pumps are not sufficient to prevent flooding. Other methods of storm water prevention must be considered.

5. UPCOMING OPEN HOUSE & NEXT STEPS

5.1. A Shared Effort is Needed

5.1.1.	The City has and will continue to invest in storm water infrastructure across the city including monitoring, maintaining, and replacing old sewers.	**Windsor**
5.1.2.	The project team identified that the level of service of the flooding solutions will be an important aspect of the project. Some areas more susceptible to surface and basement flooding may require a greater level of service than areas where flooding less prominent.	
5.1.3.	The City is also helping property owners protect their homes with such programs as: · Basement Flooding Protection Subsidy Program; · Downspout Disconnection Program, and · Electrical Eel Service Program.	**Windsor**
5.1.4.	In addition to setting new development standards to improve storm water management in new developments, existing systems will be evaluated to determine the areas where improvements can provide the greatest benefit. The long-term solutions will be prioritized and implemented based on available funding.	**Dillon/Windsor**
5.1.5.	The Essex Region Conservation Authority (ERCA) and the municipalities in the area have begun developing and implementing new standards and guidelines. The Windsor-Essex Region Stormwater Management Standards Manual is expected to be released by the end of the year.	
5.1.6.	It was noted by a SAC member that federally backed programs exist to assist in the monetary needs of flood victims and these need to be kept in the discussion as part of the development of this Sewer Master Plan. The important role of the Insurance industry was also discussed, including how Sewer Master Plans like this could assist in providing parameters around whether/when insurance coverage could be re-introduced.	**Dillon/Windsor**

5.2. Flood Reduction Alternatives

5.2.1.	In addition to the measures implemented by the City to date, other immediate flooding solutions being considered in the Master Plan include: · Incorporation of inlet control devices on catchbasins · Installation of French drains · Window well guards · House hold LID private property measures (ie. rain barrels, rain gardens) · Manhole lid plugs · Sewage ejector pumps, and	

- Use of backup power supplies for sump pumps and sewage ejector pumps

5.2.2. The Master Plan will also address long term improvements, including:

- Surface/underground storage;
- Increased sewer conveyance;
- Improved pump station capacity; and
- LID systems to promote infiltration at source controls.

5.2.3. SAC members suggested that policies and by-laws also be considered as part of the alternative solutions **Dillon/Windsor**

5.3. **Key Engagement Activities**

5.3.1. The key engagement activities and strategies planned as part of the development of the Master Plan include:

- Public notices;
- Open houses;
- Pop-up events; and
- The interactive website.

5.3.2. The City's website was outlined in further detail, including number of views and visitor statistics since the website was first launched. Compared to other master plan projects, this has received a reasonable amount of attention. It is recognized that additional promotion of the website is required.. A SAC member suggested additional paid advertising, including the use of targeted Facebook ads and other social media outlets, be considered. **Dillon/Windsor**

5.3.3. The Partners for Action survey was also discussed and a handout was provided to the SAC members to encourage their participation in the Windsor Flood Survey. **Committee**

5.3.4. The upcoming public consultation schedule was reviewed with the SAC. Dillon is to provide a summary to all members via email outlining the times and locations of these public consultation events. **Dillon**

5.4. **Next Meeting**

5.4.1. No concerns were raised regarding the scheduling of future SAC meetings. Dillon will be setting dates for all of the remaining meetings. These dates will be sent out to all SAC members via email. **Dillon**

5.4.2. The next meeting will follow the pubic consultation being held in June. Feedback gathered from this consultation will be discussed with the SAC.

5.4.3. Dillon will be sending out an email requesting all SAC members add their contact information to a master contact list to be distributed to all SAC members. Names will be required at a minimum, but further contact information may be withheld from the group, if desired. **Dillon**

5.4.4. The SAC asked whether representatives of surrounding municipalities, including LaSalle and Tecumseh, should be included in these meetings in an effort to better understand the efforts being taken to mitigate floods issues in the area as a whole. It was noted that these surrounding municipalities and the Conservation Authority are already part of the project in a technical capacity and thus it is not proposed they be added to the SAC.

Errors and/or Omissions

These minutes were prepared by Ben Ouellette, who should be notified of any errors and/or omissions. The purpose of these minutes is to capture the themes that were discussed during each meeting. Therefore, no names will be included as part of these minutes.

Enclosure

May 2, 2018, Stakeholder Advisory Committee Meeting No. 1 – City of Windsor Sewer Master Plan – Presentation

Distribution

All

BRO:ks

May 29, 2018

STAKEHOLDER ADVISORY COMMITTEE

City of Windsor SEWER MASTER PLAN

degrees of CHANGE

MEETING #1

May 2, 2018, 6:30 to 8:00 pm

400 City Hall Square - Meeting Room 406

Presented by: DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

Agenda

AGENDA ITEM	APPROXIMATE TIME
1. Introductions	10 min
2. Purpose of the SAC; Terms of Reference Review	20 min
3. Project Overview	20 min
4. Your Experience with Flooding	30 min
5. Upcoming Open House & Next Steps	10 min

Introductions

- Welcome and thank you for joining the Stakeholder Advisory Committee (SAC) for the City of Windsor's Sewer Master Plan.
- This is the first of ten SAC meetings over the life of the two year project.

Purpose of the Stakeholder Advisory Committee

- Provide advice and feedback at key milestone points.
- Objectives of the Stakeholder Advisory Committee include:
  - Provide insight to the Project Team on the extent of flooding and its impact on the community;
  - Provide insight into key issues related to the Sewer Master Plan development process from the perspective of the members and the organizations/interests represented;
  - Discuss and provide feedback on elements of the Master Plan including evaluation criteria, potential solutions and ways to mitigate community concerns; and
  - Engage in discussion to increase project understanding.
- A non-political advisory body.

Stakeholder Advisory Committee Membership

COMMUNITY SECTORS	ANTICIPATED PERSPECTIVES
General Public	• Personal experience with basement or surface flooding • Potential impact of flooding on residents • Tax payer in Windsor
Business Community	• Experience with flooding from a business perspective • Potential impact of flooding on businesses
Community Groups	• Diversity of new Canadians and youth
Environmental Groups	• Potential impact of flooding on natural areas • Impacts of climate change
Emergency Service Providers	• Emergency response procedures and protocols
Insurance Providers/ Adjusters	• Role of insurance industry in flood situations
Public Health	• Potential impact of flooding on community wellbeing

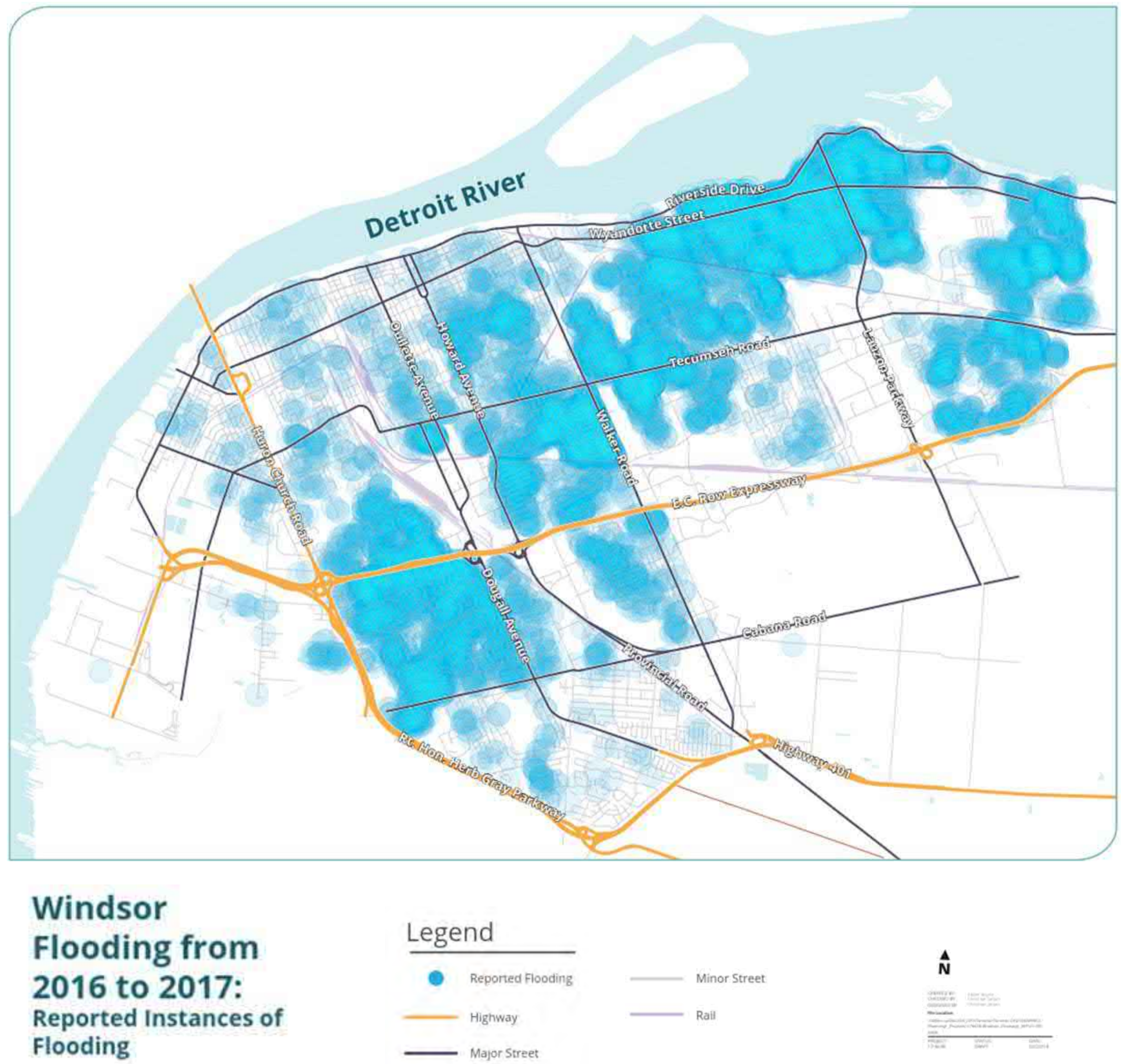
Stakeholder Advisory Committee Meetings

- 10 meetings over 2 years
- Some materials to review
- Potential Sewer Master Plan meeting discussion topics :
  - Key issues
  - Perspectives on existing conditions and sewer management practices
  - Alternatives and options
  - Evaluation methodology and decision criteria
  - Consultation activities and results
  - Other related project issues and items

Sewer Master Plan Problem Statement

Past and potential future significant storm events have caused increased surface runoff and groundwater infiltration that exceeds the capacity of the City's sewer systems; pump stations; overland drainage routes; and receiving watercourses.

This extra water has and may in the future flood basements and low-lying surface areas.



Windsor Flooding from 2016 to 2017:
Reported Instances of Flooding

Mayor’s 8-Point Plan

Following the August 2017 floods Mayor Dilkens released an 8-point plan aimed at addressing flooding in Windsor.

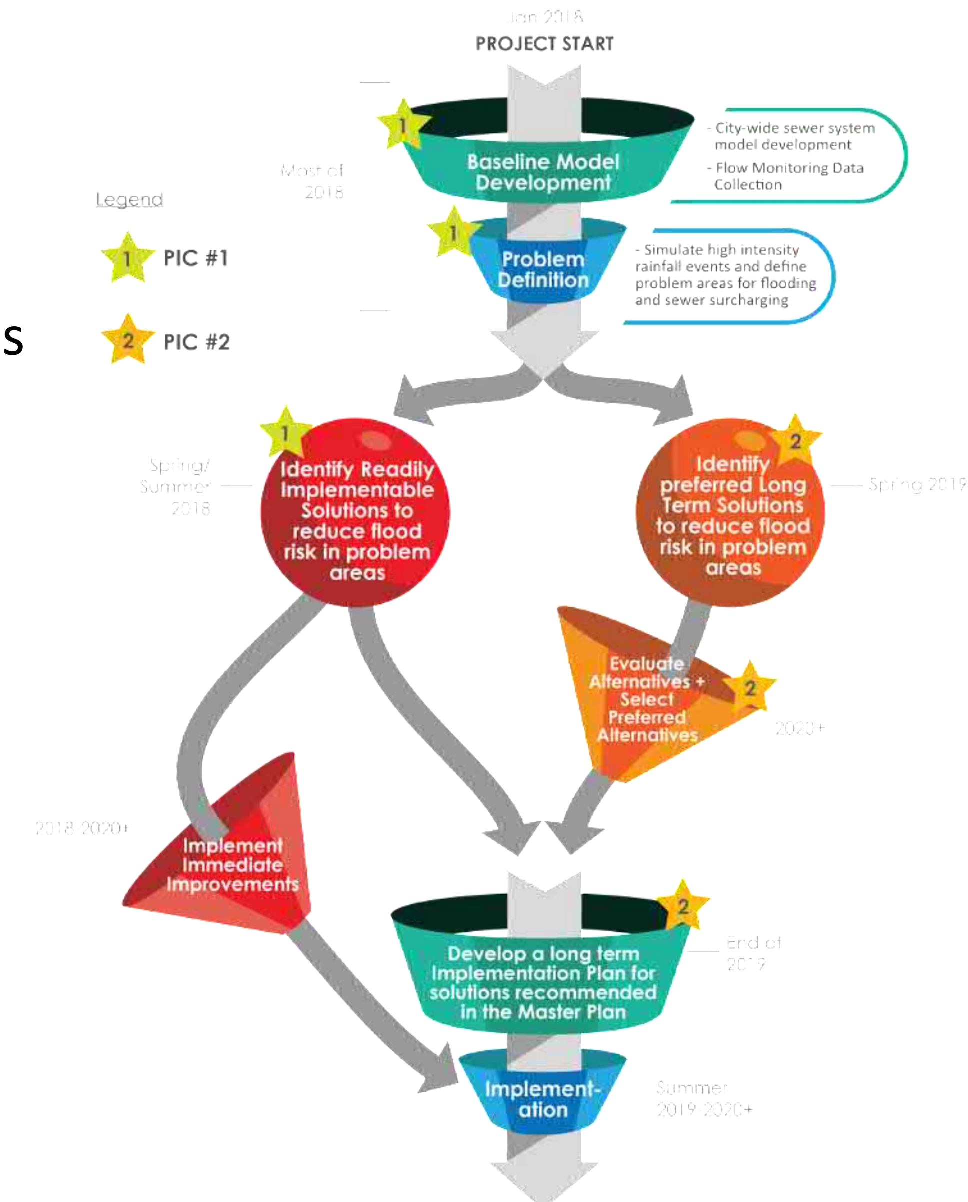
Project Overview

The Sewer Master Plan is being undertaken in 2018 and 2019 to help the City better understand the root causes of basement/surface flooding and the range of short-term and long-term solutions to reduce the impacts and risks of flooding.

Scope & Approach

- **Systems Approach** – include storm sewers, sanitary sewers, combined sewers, associated infrastructure (e.g. pumping stations), overland drainage systems, and watercourses
- **Model Today and Tomorrow** – development of a full model of the system, ground-truthed with flow data to test flood scenarios
- **Public Engagement to Achieve Shared Solutions** – engagement program aimed at information exchange and education; flood risk reduction requires City and property owner involvement

Scope & Approach



<u>Study Process</u>

- The study is following the requirements of the Municipal Class Environmental Assessment (EA).
- Being undertaken as a Master Plan

The Class EA Process considers:

- All relevant social, environmental and engineering factors are considered in the planning and design process
- Public and agency input is integrated into the EA process

The Master Plan

Over 2018 and 2019, the City will complete the necessary work to:

- Confirm the potential for future flooding
- Identify short-term and long-term improvements the City can take to reduce the impacts and risks of flooding
- Set standards for sewer operation and maintenance
- Identify actions homeowners can take to reduce their risk of flooding
- Confirm the cost for improvements
- Identify a plan and schedule for implementing improvements

Other Related Studies

- Climate Change Adaptation Plan
- Environmental Master Plan
- Combined sewer overflow studies

degrees of CHANGE

Your Experience with Flooding

A Shared Effort is Needed

- Investing to address the risk of flooding.
  - **spent approximately 500 million dollars to upgrade our sewer system since 2001 which included monitoring, maintaining and replacing old sewers.**
- Helping property owners protect their homes.
  - **Basement Flooding Protection Subsidy Program including Fast Track**
  - **Downspout (Eavestrough) Disconnection Program**
  - **Electrical Eel Service Program**

Back Flow Preventer

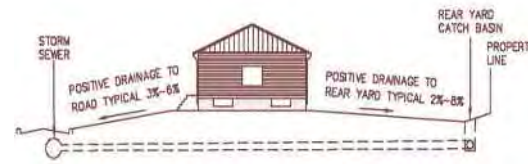
Disconnected Downspout

Flood Reduction Alternatives

The Master Plan will look at:

- Immediate Flooding Improvements - improvements that can be implemented easily with low capital costs will be identified early in the project.

Improved Lot Grading



Inlet Control

French Drain

Manhole Lid Plugs

Sewage Ejector Pumps

Soakaway Pits

Window Well Guards

…what else?

Flood Reduction Alternatives

The Master Plan will look at:

- Long Term Flooding Improvements - other more complex and cost intensive flooding improvements will be identified in later phases.

Surface or underground storage

Low Impact Development (LID) systems; promoting infiltration

Increased sewer conveyance

New or improved pump stations

…what else?

Making Decisions

Decisions will be based on evaluation criteria

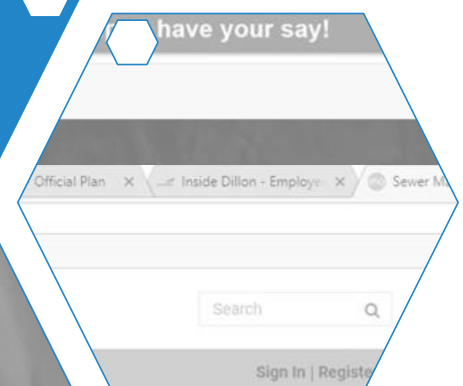
- Technical
- Environmental
- Cultural
- Social
- Cost

Key Engagement Activities

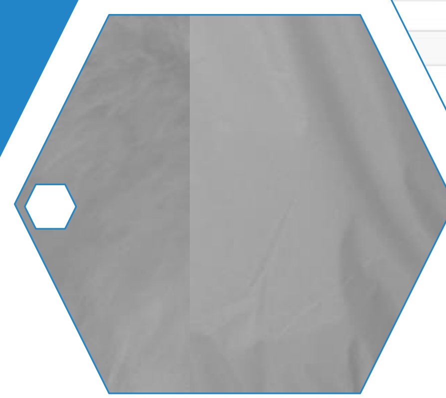
NOTICES

INTERACTIVE WEBSITE

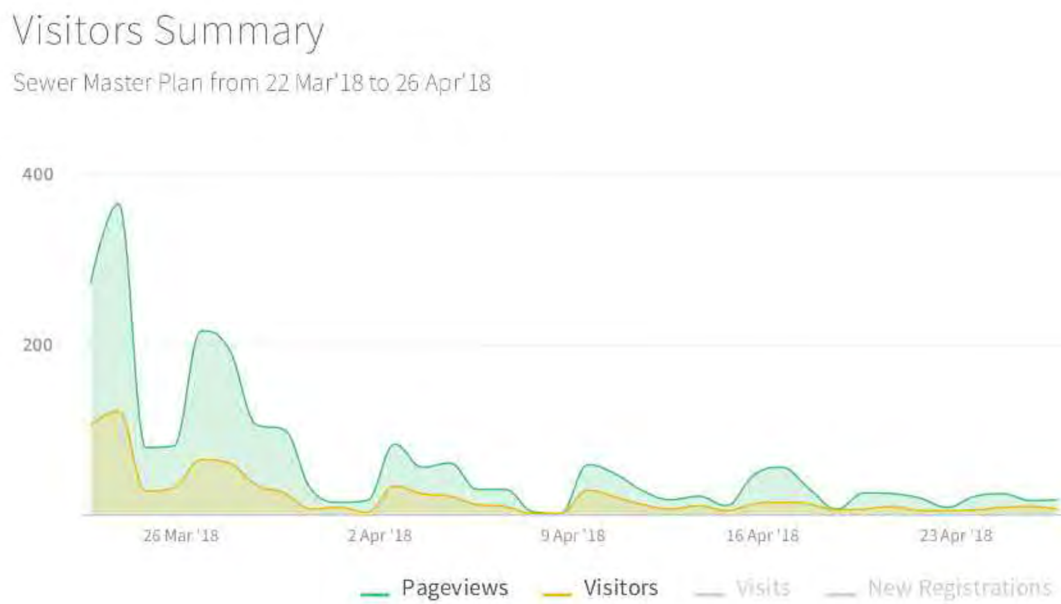
POP-UP EVENTS



OPEN HOUSES



Project Website Summary



Website Launch (March 22, 2018) to present.

Highlights

Total Visits: **855**	**Most Visitors in One Day:** **120**	**Registered Users:** **35**
Engaged Visitors: **20**	**Informed Visitors:** **190**	**Aware Visitors:** **625**

Direct Visitors: 53% **Referral Visitors: 34%** **Social Media and Search Engine: 13%**

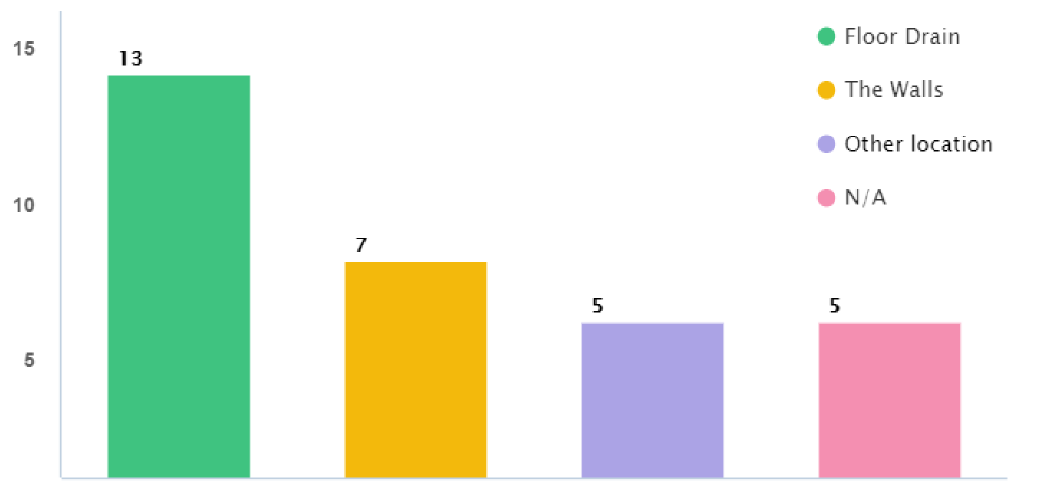
Project Website Summary

Map your Flood Story:

Comments/Questions:

- **"What's being done to stop this from happening again?"**
- **"I have done what I can as a homeowner; sump pump and backwater installed, floor drain disconnected, downspouts next. Bought three rain barrels to place around property. Need the city's help now!"**

Visitors	Contributors	Pins
129	20	34



Where did the water come from when you experienced basement flooding?

Social Media and Comment Summary

- Concern that the recommended actions for residents will still not prevent flooding.
- There is a hope that events have good attendance to allow citizens the opportunity to voice their opinions.
- Concern that there may be a major tax increase as the result of the Sewer Master Plan.
- Concern that existing sewer infrastructure has never been upgraded since original construction.
- Request to create a new bylaw to make the downspout disconnection mandatory as soon as possible.

City of Windsor
April 22 at 11:41am
Like Page

Those 'flushable' wipes aren't actually 'flushable.' #OnlyFlushToiletPaper. Learn more at www.weatheringthestorm.ca. #EarthDay #YQG #WeatheringWindsor.

Social Media Posts including #WeatheringWindsor.

Upcoming Public Consultation & Next Steps

City of Windsor Sewer Master Plan
Project Schedule

Task/Milestone	2018				2019			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Technical Work								
Data Collection and Background Data Review								
Field Investigations and Flow Monitoring Data Collection								
Baseline Model Expansion								
Assessment and Review of Readily Implementable Solutions								
Assessment and Review of Long Term Solutions								
Project Reporting and Functional Design								
Consultation & Engagement								
Project Launch (Notice of Commencement, web site)								
Collect Feedback on Website, from Emails, Calls, Letters, etc.								
Confirm Stakeholder Advisory Committee Membership								
Attend meetings (10)								
Community Pop-up Events								
Public Information Center (PIC) Events								

Next Meetings

- **Summer 2018**
  - Results of June public consultation
  - Flood vulnerability
  - Immediate flood reduction alternatives being considered

- **Fall 2018**
  - Long term flood reduction alternatives being carried forward
  - Evaluation criteria

MEETING MINUTES

DILLON CONSULTING

Subject:	City of Windsor Sewer Master Plan – Stakeholder Advisory Committee Meeting
Date and Time:	August 14, 2018 at 6:30 p.m.
Location:	Meeting Room 140, 350 City Hall Square W, Windsor, ON
Our File:	17-6638

At endees

General Public	
Ray Bezaire	Resident
Dr. Tirupati Bolisetti	Resident
Ron Brant	Resident
Frank Dattilo	Resident
David Hanna	Resident
David Hilton	Resident
John S. Holmes	Resident
Tom Markham	Resident
Randal Sasso	Resident
Business Community	
Bridget Scheuerman	Pillette, Riverside and Ford City BIA
Community Groups and Public Health	
Amandeep Hans	Windsor-Essex County Health Unit
Environmental Groups	
Dave Munro	Detroit River Canadian Cleanup
Dr. Rajesh Seth	University of Windsor
Emergency Service Providers	
Stephen Laforet	Windsor Fire & Rescue Services
Insurance Providers/Adjusters	
Maria LeBlanc	Easy Insure
Pete Karageorgos (by phone)	Insurance Bureau of Canada (IBC)
Windsor Sewer Master Plan Project Team	
Janelle Coombs	City of Windsor
Anna Godo	City of Windsor
Wes Hicks	City of Windsor
Shelair Sinjari	City of Windsor
Aakash Bagchi	Dillon Consulting Limited (Dillon)
Flavio Forest	Dillon
Karla Kolli	Dillon
Ian Wilson	Dillon
Dave Maunder	Aquafor Beech Limited

Absent

Greg Plante	Imaginative Imaging

Notes

Item	Discussion	Action By
1.	**Introductions**	
1.1.	The project team and attending Stakeholder Advisory Committee (SAC) members were introduced.	Info.
1.2.	The presentation delivered as part of this meeting has been attached to these minutes.	Info.
2.	**Review of previous SAC meeting minutes (May 2, 2018)**	
2.1.	All agreed that changes to the minutes from SAC members will be noted in the minutes of the following meeting. The following comments were made by SAC members regarding the May 2, 2018, meeting minutes: • Pete Karageorgos' name was misspelled. • At the first meeting, a member noted that there did not seem to be a regular maintenance program for storm detention ponds in subdivisions and that this needs immediate attention. This was not fully captured in the minutes. In addition to this, the following was added: o Dillon mentioned that City Operations and Maintenance (O&M) staff are involved in the Sewer Master Plan and a review of O&M will be undertaken. O&M is included in the short-term solutions being discussed at this meeting. o A committee member noted that they are planning to conduct a drone survey of the condition of the stormwater management facility in their subdivision.	Dillon
2.2.	Additional discussion related to the May 2, 2018, meeting minutes: • Are emergency procedures part of the Sewer Master Plan? (item 3.3.5 of May 2, 2018, minutes) o Dillon clarified that emergency procedures will not be part of the Sewer Master Plan recommendations. o It was further clarified that the City's emergency response team follows an all-hazards approach when dealing with emergencies. It does not have a specific plan for flooding events. Lesson-learned from previous flooding events included developing a list of residents who have home care so that they can ensure service is provided to those individuals. o It was noted that several arterial roads were impassable at some point during the last flooding event so Emergency Response Units used other available routes, as required. It was	Info.

agreed that consideration should be given to an adequate level of service that considers arterial road access during large storm events.

- How does the Riverside Vista project tie-in with the Sewer Master Plan?
  - The Vista project was approved by council on July 23, 2018. The City is hopeful of getting funding for this and another project (Pontiac-St.Paul Pump Station upgrades) through the Disaster Mitigation and Adaptation Fund.
  - The Pontiac-St. Paul project includes both pump station upgrades and new relief sewers.
  - Projects in the eastern part of the City were advanced due to the flooding history in this area. Solutions will be further refined as part of the Sewer Master Plan.

2.3. There should be a comparison between 311 calls and insurance claims (item 3.7.3 of May 2, 2018, minutes). — Dillon/City

- Insurance claims information may be available on a postal code basis, but must be coordinated with the Insurance Bureau of Canada.

3. **Overview of Engagement**

3.1. The public engagement aspects completed in spring and summer 2018 were discussed, including the pop-up event on Earth Day, Public Information Centres, the project website, and the Partners for Action Survey. An overview of the public engagement process and input received to date was presented, including: — Info.

- The Partners for Action flood resiliency study held two focus group meetings.
- Public Information Centre (PIC) meetings are a standard component of Master Plans. The Sewer Master Plan's first PIC meetings were held on June 12, 13, and 14.
  - A question was raised about potential opportunities to increase public turnout at the upcoming PIC events.

For the next PIC meetings, it was agreed that presentation materials would be reviewed in advance with the SAC.

3.1.1 A question was raised about the typical residential plumbing connections shown at the PIC meetings. — Dillon/City

- It was acknowledged that the plumbing connections vary throughout the City, though it hasn't been confirmed which connection scenario would be most commonly found. It was suggested that due to the limited depth of storm sewers in the area, that it may be unusual to find foundation drains connected to the storm sewer without a basement sump pump.

4.	**Draft Project Objectives**	
4.1.	The draft project objectives were developed through public input and technical input from the project team. The project objectives provide an overarching framework for the Sewer Master Plan and will be used to develop criteria for the evaluation of long-term solutions.	Info.
4.2.	The committee members were asked for their feedback on the project objectives: • Public awareness and education is an important objective. It was noted that since homes do not come with maintenance manuals, an objective of the Master Plan is to educate the public about a home's plumbing and drainage systems, including the shared responsibilities involved in implementing and maintaining flooding solutions. • Much of the information to date has been about what the homeowners should do, which may give the impression that flooding is their responsibility to address. o There was further discussion about how a partnership with the City and community is essential to reduce impacts due to extreme weather events and that the effort on behalf of residents could be considered as an investment in protecting themselves. Long-term solutions that focus on the City's capital works will be addressed in the next stages of this project. • Adopting short-term measures needs to be incentivised by the City to encourage their implementation. • Proposed solutions should be tailored to the characteristics and requirements of each specific area. • The impact of development was identified as a potential factor affecting the flood risks in the City, based on which it was suggested that further development control policies should be considered by the City.	Info.
5.	**Implementation of Short-Term Solutions**	
5.1.	An overview of the preliminary recommendations was presented, as outlined in the presentation materials. Consideration was given to short-term measures implemented by other municipalities, including five in Ontario and three from other provinces. Implementation strategies were grouped into 3 categories, namely Municipal Policies, Subsidy Programs, and Collaborative Improvements. • The draft recommendations presented were for discussion, with further input required from the City before being finalized.	Info.

6.	**Short-Term Solutions Feedback**	
6.1.	Committee members were divided into 3 groups, each moderated by a project team member. The following questions were considered: 1. What do you think about the suggested policy changes? 2. Are there other items you feel should be included in an enhanced subsidy program? 3. What type of information would be valuable to help you adopt the homeowner led measures? The following documents the feedback collected from the groups in response to the questions.	Dillon/City
6.2.	**Group 1**	

6.2.1	What do you think about the suggested policy changes?
	• Can there be a policy, group, etc. that reviews home developments and recommends lot level measures (including LIDs)?
	• Is there a policy where the City would be able to convert impervious areas to pervious areas?
	  o A development freeze may not be the solution; but new development should use green space as much as possible and set the standard for retrofitting existing development.
	• Can there be a green standards policy for specifying green space requirements for development?
	  o Could this apply to existing and/or retrofitting existing development?
	• Could there be a policy to enforce a regional green belt area in Windsor and neighbouring municipalities (Tecumseh, LaSalle, etc.)?
	• Concerns were raised about downspout disconnection having limited value in reducing the impact of flooding in Windsor and that a mandatory policy would not reduce the risk of flooding. Disconnection of downspouts that drain into inappropriate areas (i.e. walking paths, etc.) should be avoided.
	• There was support for the storm sewer surcharge (i.e. property owners pay storm sewer surcharge and be provided credits for use of LIDs).
		Info.

6.2.2	Are there other items you feel should be included in an enhanced subsidy program?
	• There was support for having a demonstration house or site that illustrates:
	  o How a home's plumbing system works; and
	  o How the basement flooding protection devices recommended by the City work to protect a home.
	• In regards to the subsidy program, there was interest in residents having options to build LIDs and receive a subsidy. LIDs of interest included green roofs, rain water storage devices, and permeable
		Info.

pavers.

- Could incentives for green spaces or disincentives for hardscapes be considered?

6.2.3 What type of information would be valuable to help you adopt the homeowner led measures? Info.

- This question was not addressed due to time limitations.

6.3. Group 2

6.3.1 What do you think about the suggested policy changes? Info.

- In regards to a stormwater surcharge:
  - It is a longer-term investment resource, and will not necessarily fix things immediately.
  - It is an added cost to homeowners.
  - There is no specific guarantee that funds will be used for infrastructure.
- Aggressive strategy of public education to change behaviours.
  - There is a need to understand short-term, medium-term, and long-term goals.
- The standards need to apply to all residents, but also need to be tailored to suit.
- Need to consider capacity of receiving watercourses.
- Development needs to consider more holistically the capacity constraints of downstream drainage systems.
- It was acknowledged that it may not be practical to implement a development freeze.
- Consider implementing development standards/policies to encourage LID use.
  - Permeable driveways are an option, but enforcing maintenance on private property might be an issue.
  - Limit on lot coverage of impervious area.

6.3.2 Are there other items you feel should be included in an enhanced subsidy program? Info.

- There was support for including PDC (private drain connection) investigations to confirm conditions of PDCs. Camera work is currently included in the BFP subsidy for foundation drain investigation. Extending this to PDCs should be considered.
- Consider increasing the BFP maximum rebate values to better represent actual costs and expand program.
- Consider preferred vendor list – may improve reliability and trust.
- Include an allowance for City staff or a plumber to investigate existing home plumbing systems.
  - This could also help to inform residents of how to maintain and improve a home's drainage and plumbing systems.
  - This would allow for tailored solutions that considers

conditions at each home and identifies appropriate recommendations.

6.3.3 What type of information would be valuable to help you adopt the homeowner led measures? Info.

- Give residents information on sewer location, condition, age, and outlets. Better stewardship if residents know about the infrastructure that serves them.
- Maintenance information for private property protection measures.
- Clarify and inform residents of the measures that help to satisfy insurance companies in regards to flooding risks to re-qualify residents for flood protection insurance coverage.
- Encourage residents to store food and supplies that would provide them with 72 hour self-sufficiency in the event of emergencies/floods.

6.4. Group 3

6.4.1 What do you think about the suggested policy changes? Info.

- Do not support the surcharge for stormwater as it is just another tax. Charges may be appropriate if it is demonstrated that the money goes directly toward stormwater improvements but it is difficult to trust that this would happen.
- It is important to prioritize. Fix what is already in place before doing new things.
- Maintaining the stormwater facilities already in place (e.g. drainage ditches) should be prioritized over new programs/policies.
- Prioritize easy design improvements – e.g. additional stormwater retention ponds in Roseland Golf Course.
- The policies/programs only work in conventional rainfall situations. Need to make that clear to people.
- For new developments, consider scaling the type/extent of basements allowed based on whether the area is vulnerable to flooding (e.g. if in a low area – less or no basement).
- For new developments in low lying areas, make sure that the type/size of system installed is adequate (e.g. make sure the sump pump size is large enough and back-up power is more than just a battery back-up).
- It was felt that sewage ejector pumps would not be effective.
- Blanket programs and policies are not favorable. Need to tailor measures to areas where they will make a difference to spend wisely.

6.4.2 Are there other items you feel should be included in an enhanced subsidy program? Info.

- Subsidy program should be focused in areas where the installations will make a difference.

- When there is a blanket program, contractors take advantage of residents by offering them systems they do not need for high prices.
- Consider mandating the type/size of pump particularly in low lying areas to make sure it is adequate.
- Consider whether the subsidy should be available to condo boards.
- The measures in the subsidy program are most appropriate for typical flooding situations.

6.4.3 What type of information would be valuable to help you adopt the homeowner led measures? — Info.

- Need to demonstrate to people that there is an improvement/benefit to installing these measures. Find people who have done installs and check/monitor them. Consider going back to those who received subsidy to find the stories of whether it worked or did not.
- Make sure the information provided to people is suitable/realistic. Do not misadvise people. Maintain trust.

6.5. **Insurance Industry Perspective**

6.5.1 The insurance industry representative on the committee provided an overview of their perspectives on flooding, as follows: — Dillon/City

- Insurance companies are currently speaking to their customers about the measures they can take to reduce their risk of flooding.
  - Conditions are being outlined for customers to qualify for flood protection insurance.
- Insurance companies would also benefit from a broader discussion with the City to understand what improvements have been implemented to reduce risks on a broader scale.
  - IBC can be involved in the dialogue with the City about public-level improvements.
  - There are opportunities in the future for considering insurance rate reductions due to installation of LID/green infrastructure.

7. **Technical Work Completed and Next Steps**

7.1. A brief overview of the work completed to date and the schedule was presented to the committee. — Info.

7.2. Engagement next steps: — Info.

- The next planned public event is a pop-up booth during the Open Streets Windsor 2018 (September 23, 2018).
- A committee member commented that there is a need to educate homeowners in a more hands-on way during the public interactions planned. For example, having a backwater valve at the booth for people to see and understand how it works.
- The City will coordinate with the Windsor Fire Department to have a link to the Sewer Master Plan's website and will provide information — City

about the Master Plan to be published on the Windsor Fire and Rescue Department website.

7.3. Next SAC meeting: — Dillon/City

- Planned in late 2018. Date and time will be confirmed with members via email.
- Draft assessment of the short-term solutions and a preliminary list of the proposed long-term solutions will be presented at the next meeting.
- The possibility of smaller working groups to talk about specific issues was discussed. It was agreed that if there are specific topics that committee members or the team believe would benefit from more discussion, a smaller working group would be an appropriate approach.
    - The technical team expressed appreciation that the SAC members might provide additional time to help the team validate ideas and proposals being made as part of the Sewer Master Plan.

7.4. It was decided through a unanimous show of hands that committee members do not have any objections in sharing email addresses and phone numbers among committee members. A sheet with contact information was distributed at the meeting. — Info.

Errors and/or Omissions

These minutes were prepared by Aakash Bagchi, P. Eng., and Ian Wilson, P. Eng, who should be notified of any errors and/or omissions.

Encl.

IDW:ks

August 30, 2018

STAKEHOLDER ADVISORY COMMITTEE

City of Windsor SEWER MASTER PLAN

MEETING #2

August 14, 2018, 6:30 to 8:30 pm

350 City Hall Square W, Meeting Room 140

Presented by: DILLON CONSULTING

Agenda

Agenda Item	Approximate Time
1. Introductions	5 min
2. Previous Minutes and Logistics	10 min
3. Overview of Spring Consultation • Activities and materials presented • Report on input received	15 min
4. Proposed Project Objectives	10 min
5. Implementation of Short-Term Solutions • Homeowner focused solutions • City focused solutions	60 min
6. Communication & Engagement Opportunities	15 min
7. Next Steps & Upcoming Meetings	5 min

Introductions
&
Confirm Meeting Note Process

Overview of Spring Engagement

Earth Day Pop-up
- Over 100 people learned about the project at the Weathering the Storm booth

Stakeholder Advisory Committee

weatheringthestorm.ca
- Over 1500 visits to the web site to date

Pop-up Events

Interactive Website

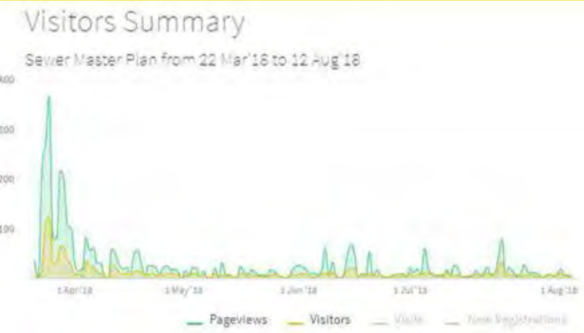
Project Notifications

Public Information Centres

Public Information Centres
- PIC No. 1: Short-term Alternative Solutions
- PIC No. 2: Long-term Alternative Solutions

Partners for Action Survey
- Over 400 people provided survey input valuable to the project

Project Website Summary



Website Launch (March 22, 2018) to present.

Highlights

Total Visits: **1.5 k**	**Most Visitors in One Day:** **121**	**Registered Users:** **46**
Engaged Visitors: **25**	**Informed Visitors:** **267**	**Aware Visitors:** **1 k**

Direct Visitors: 53% **Referral Visitors: 34%** **Social Media and Search Engine: 13%**

From April 26 - August 12 there has been about a 60% increase in Total Visitors and Aware Visitors

Overview of Input to Date

- There is awareness and an interest to be actively involved in making homes more flood resilient

51% of survey respondents in Windsor believe they live in an area at risk of flooding compared to 6% of Canadians

Many survey respondents and PIC attendees tried to prepare for flooding (sump pumps, downspout disconnection, etc.) but still had some damage

As a result of flood, many survey respondents have decided to prepare including purchasing a sump pump or backwater valve, raising expensive appliances off the floor and disconnecting downspouts

SEWER MASTER PLAN | *Stakeholder Advisory Committee* 7

Overview of Input to Date

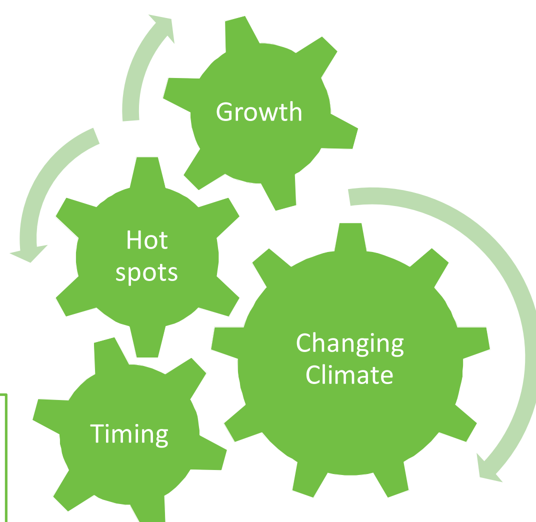
- Barriers to implementing flood reduction measures were identified including:
  - Cost
  - Space constraints (e.g., limited space to install rain barrel)
  - Reliability concerns of homeowner protection measures to withstand a severe weather event
  - Time intensive application process for basement subsidy program with no guarantee application is successful
  - Lack of a information on flood reduction opportunities & insurance processes

Many survey respondents who did not take action to protect themselves from flooding felt it was not their responsibility or they did not know how.

SEWER MASTER PLAN | *Stakeholder Advisory Committee* 8

Overview of Input to Date

- Flood solutions need to be tailored to specific needs and be effective into the future



The majority of survey respondents identified inadequate/aging infrastructure (43%), increasing development (25%), and climate change (23%) as the factors contributing to flooding in Windsor.

Draft Project Objectives

Objective	This Objective is Based on
Reduce Potential for Flooding	· Reducing the potential for damage in homes (generally basements) and reducing undesirable surface flooding (i.e. roadway flood depths greater than 0.30 m/1 ft).
Resilient	· Being forward looking and resilient considering climate change and growth/intensification.
Cost Effective	· Considering affordability for homeowners and tax payers.
Ease of Implementation	· Reducing homeowner and City challenges and barriers to flood reduction measures.
Ease of Maintenance	· Providing solutions that are relatively easy to maintain.
Tailored	· Identifying solutions that consider the needs of specific areas.
Collaborative	· Working collaboratively with residents, businesses and the City to find effective solutions.
Minimize Impacts	· Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.

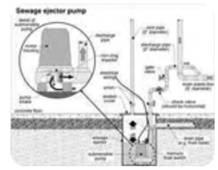
Implementation of Short-Term Solutions

- Three types of implementation strategies:
  - Municipal Policies
  - Subsidy Programs
  - Collaborative Improvements
- Preliminary recommendations based on technical team review of best practices
- Collect SAC feedback on implementation strategies

Implementation of Short-Term Solutions: Municipal Policies

Sewage Ejector Pumps:

- Mandatory use of sewage ejector pumps for all new developments with **basements** or **below grade living spaces**



Schematic: Sewage Ejector Pump

Mandatory Downspout Disconnection:

- Expand existing downspout disconnection program (DDP)
- Disconnection be made mandatory through use of City By-law
- Exceptions to the mandate be made subject to City Staff approval

Disconnected Downspout

Stormwater Surcharge and Green Infrastructure Credits

- By-laws to charge for use of City storm infrastructure
- Credits for low impact development measures
- Explanatory education materials

Implementation of Short-Term Solutions: Municipal Policies

Sanitary Rain Catchers:

- Reduce undesired sanitary sewer inflow all sanitary manholes covers be sealed with rain catchers

Rain Catcher: Manhole Insert

Inlet Control Devices:

- Continue current program and Sewer Master Plan study

Infrastructure Maintenance and Assessment

- Sewer Master Plan reviews, overland, and other drainage systems
- City's Operations identifying opportunities to enhance programs
- Focus in areas of higher flood vulnerability

Design Standards

- Update with local focus considering draft new guidelines:
  - ERCA stormwater
  - MOECP (previously MOECC) LID guidelines

Implementation of Short-Term Solutions: Subsidy Programs

Enhance the BFP Subsidy:

- Add sewage ejector pumps, window well protection and back up power supply.

Other Ontario Municipalities Basement Flood Subsidy's include:

- London sewage ejector pumps and back up power and same as Windsor
- Ottawa back up power for sump pump and same as Windsor
- Toronto same as Windsor currently
- Hamilton same as Windsor currently
- Guelph no basement flood protection grant

Window Well Protection

Sewage Ejector Pump

Implementation of Short-Term Solutions: Collaborative Improvements

Green Infrastructure/Low Impact Development:

- Provide comprehensive education package
- Develop demonstration project(s)/site(s)
- Provide in-kind support

Lot Grading:

- Provide comprehensive education package

Other Household Management Strategies:

- Provide comprehensive education package
- Develop demonstration project(s)/site(s)
- Provide contractor look-up; find a certified contractor
- Implement an “adopt-a-catch basin” program

Rain Barrel

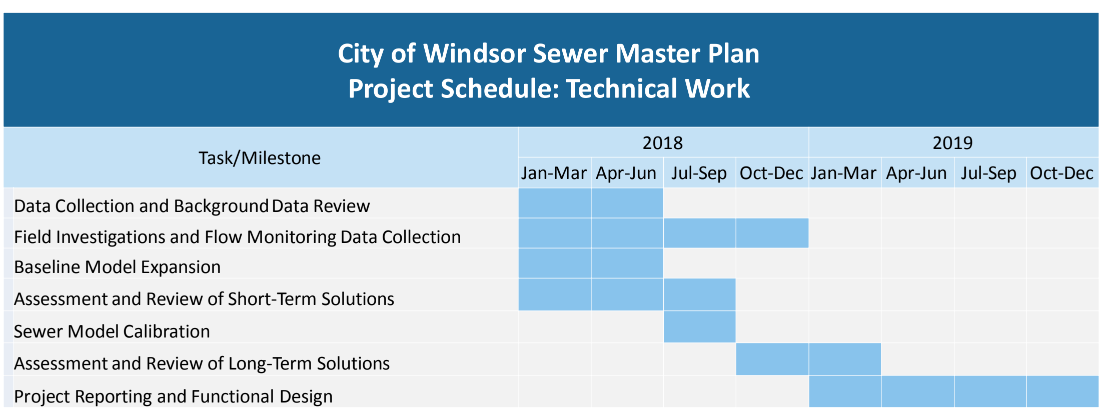
LID: Rain Garden

LID: Enhanced Swale

Implementation Discussion

- What do you think about the suggested policy changes?
- Are there other items you feel should be included in an enhanced subsidy program?
- What type of information would be valuable to help you adopt the homeowner led measures?

Technical Work Completed & Next Steps



Engagement Next Steps

Material for Consultation	SAC meeting	Other Consultation Methods
Reporting Back on PIC Round #1 Implementation of Short Term Solutions	August 2018	Newsletter *(gather input on implementation tools for short term solutions)* Web Update Pop-up
Draft Assessment of Short Term Solutions Initial List of Long Term Solution Types	Nov. 2018	Newsletter *(present short term solutions and encourage action)* Web Update
Criteria for Long Term Solutions Evaluation Problem Areas (Technical Report Vol.1)	January 2019	Newsletter *(present long term solutions and evaluation criteria/approach)* Web Update
Long Term Solutions Review of PIC Materials	March 2019	
Preliminary Evaluation Results	May 2019	Newsletter *(invite participation at PIC, long term solutions, preliminary evaluation)* Web Update Public Information Centre
Discussion on PIC Input Received Review Final Evaluation of Long Term Solutions	July 2019	Newsletter *(present the final evaluation of long term solutions)* Web Update Pop-up
Review of Draft Master Plan	September 2019	Newsletter *(present implementation strategy and opportunity to review master plan)* Web Update

Next Meetings

- **September**
  - Report to Council on Implementation of Short Term Solutions
  - Visit us at **Open Streets on Sept 23rd**.
- **November**
  - Next SAC meeting
    - Long term flood reduction alternatives being carried forward
    - Evaluation criteria

MEETING MINUTES

DILLON CONSULTING

Subject: City of Windsor Sewer Master Plan – Stakeholder Advisory Committee Meeting #3

Date and Time: January 24, 2018 at 6:00 p.m.

Location: Meeting Room 140, 350 City Hall Square West, Windsor, Ontario

Our File: 17-6638

At endees

General Public:	Ray Bezaire	Resident
	Ron Brant	Resident
	David Hanna	Resident
	David Hilton	Resident
	John S. Holmes	Resident
	Tom Markham	Resident
	Randal Sasso	Resident
Community Groups and Public Health:	Amandeep Hans	Windsor-Essex County Health Unit
Emergency Service Providers:	Stephen Laforet	Windsor Fire & Rescue Services
Insurance Providers/Adjusters:	Pete Karageorgos	Insurance Bureau of Canada (IBC)
Sewer Master Plan Project Team:	Janelle Coombs	City of Windsor
	Anna Godo	City of Windsor
	Shelair Sinjari	City of Windsor
	Karla Kolli	Dillon Consulting Limited (Dillon)
	Ian Wilson	Dillon Consulting Limited (Dillon)
	Laura Herlehy	Dillon Consulting Limited (Dillon)
	Dave Maunder	Aquafor Beech Limited

Absent

General Public:	Greg Plante	Imaginative Imaging
	Dr. Tirupati Bolisetti	Resident
	Frank Dattilo	Resident
	Bridget Scheuerman	Pillette, Riverside and Ford City BIA
Environmental Groups:	Dave Munro	Detroit River Canadian Cleanup
	Dr. Rajesh Seth	University of Windsor
Insurance Providers/Adjusters:	Maria LeBlanc	Easy Insure
Sewer Master Plan Project Team:	Wes Hicks	City of Windsor
	Aakash Bagchi	Dillon Consulting Limited (Dillon)
	Flavio Forest	Dillon Consulting Limited (Dillon)

Notes

Item	Discussion	Action By
1.	**Introductions**	
1.1.	The project team and attending Stakeholder Advisory Committee (SAC) members were introduced.	**Info.**
1.2.	The presentation delivered as part of this meeting are attached to these minutes.	**Info.**
2.	**Review Previous SAC Meeting Action Items (August 14, 2018)**	
2.1.	Follow up on Action Items highlighted during the last SAC meeting held on August 14, 2018, are as follows: • The City of Windsor Operation and Maintenance Staff are involved on a continuous basis. • A committee member completed a drone survey to assess the condition of the stormwater management facility in their subdivision. • Information from IBC regarding basement flooding claims from the previous flood events is not available for review: o Clarification was provided, the group would like to get an understanding of the number of homes that have flooded during the past events (information from 311 calls) that have already been retrofitted with Backflow Preventers (BFP) installed through the City's subsidy program. What is the success rate of these units? It was noted that BFPs must be maintained regularly. The proposed private solutions should be "user-friendly":	**Info.**
	▪ *The project team will collect this information and provide a BFPs vs. flooding comparison at the next SAC meeting.*	**Dillon/City**
	o It was noted that the attendance to the last PIC (June 12, 2018), was low and the project team needs to develop more public interest:	
	▪ *The team will brainstorm ways to increase public interest moving forward for discussion.*	**Dillon/City**
	o Question: Are monetary surcharges for new development being looked at? ▪ This is being reviewed through the City's Stormwater Financing Study. Separate public meetings related to that project will be scheduled.	
	o A demonstration house on Pierre Street will be open to the public this Spring. *Information on the Sewer Master Plan will be available at the demonstration house*.	**Dillon**

- *The team will confirm that the house storm/sanitary connection figure used in the last PIC shows a typical connection scenario.*
- The project team will continue to include IBC in discussions throughout the project to get their perspective regarding the basement flooding issues. **Dillon**
- Information regarding this project has been included on the Windsor Fire Department website.

3. Overview of Activities Since August 2018

3.1. Public Engagement

3.1.1 The last Council Report (dated January 7, 2019), was provided to the group for information. The Report details the results of the recent public engagement. **Info.**

3.1.2 The first project newsletter was distributed in the Fall of 2018. The project team held a Pop-Up event at the Open Streets in September 2018. Approximately 150 people stopped by, 100 of which signed up for the update email. **Info.**

3.2. Short-Term Alternative Solutions

3.2.1 The 2019 Capital Works Budget requested $1.0 Million to start implementing the short-term solutions that have been identified to date. *Dillon will provide the priority list of short-term solutions to the City for implementation based on the approved budget.* The City will start implementing the short-term solutions once the budget has been approved. **Info.**

3.2.2 A question was raised regarding making private side solutions mandatory vs. voluntary, specifically in specific high-risk areas. As part of the project, the team is looking at how, from a technical perspective, implementing these solutions will improve the system. Results will assist in the development of project recommendations **Info.**

3.2.3 Concern was raised that the application process for existing Basement Flooding Protection Subsidy Program takes too long. It was noted that as part of the project, existing programs such as this are being reviewed. **Info.**

3.2.4 SAC member noted that it is confusing how the Sewer Master Plan relates to other flooding projects in the City and that this is something that should be clarified to the public. The City provided clarification: **Info.**

- The Riverside Vista project was approved by Council on July 23, 2018. The City hopes to get funding for this and another project (Pontiac/St. Paul Pump Station upgrades) through the Disaster Mitigation and Adaptation Fund.
- Windsor is submitting a request to Infrastructure Canada's Disaster Mitigation and Adaptation Fund (DMAF) and the grant

funding will help offset the $89.3 million in planned flood mitigation projects.

3.2.5 It was noted that manhole sealing needs to be expedited. Other municipalities have already been implementing this solution. The Windsor Sewer Master Plan has identified areas of priority to focus on manhole sealing.

- The project team will keep the SAC updated on accomplishments as they happen, moving forward. **Dillon/City**

3.2.6 It was requested that the occurrence of emergency overflow events be posted on the Project Website. The City collects this information and provides to the Province monthly: **Dillon/City**

- The project team will review what information is available to the public for inclusion in the project website.

3.3. The website needs to be updated with current information. **Dillon/City**

3.4. A Pollution Control Plant "Doors Open" event is scheduled in May at the Lou Romano Pollution Control Plant. The scheduled date will be sent out to the group. **Dillon/City**

4. **Downspout Disconnection Pamphlets**

4.1. The City distributed a draft Downspout Disconnection Pamphlet to the group for discussion. SAC members will review the pamphlet independently and comments/questions will be sent to the Karina Richters and Karla Kolli by February 1, 2019. **All SAC Members**

4.2. Focus group sessions will be scheduled to get the public's perspective on disconnection pamphlets. Two sessions will be held, one with public members who have experienced flooding and one with public members who have not. The City will have the pamphlet completed within the next month. **City**

4.3. It was noted that new developments allow downspouts to be connected to the sewer. This is not consistent with the City's flood mitigation messaging. The City is working with the Building Department on prohibiting downspout connections unless at hard surface at-grade areas. It was suggested that the City look at solutions for downspouts at hard surfaces through this study. **Info.**

4.4. The pamphlet is part of a greater campaign where, in addition to the pamphlets, outreach will be implemented to more directly inform individuals. **Info.**

4.5. Initial comments:

- Pamphlet should include information regarding downspouts at hard surface grades (include figure/picture of Pop-Up solution). **Info./City**
- It was suggested that the information on the pamphlet be

included in the City's Recycling Calendar.
- Include re-direction of eaves to grassed or landscaped areas as a solution option for home owners.

5. **Level of Service Feedback**

5.1. Dillon provided overview of Level of Service criteria for existing and proposed conditions. Refer to presentation for details. **Info.**

5.2. Sewer flow monitoring is being completed as part of this project. Monitoring results show that stormwater is entering the sanitary system during rain events. The computer modelling is being calibrated with field data to confirm that results are in line with in-field conditions. **Info.**

5.3. Question: Systems are going to fail with age. What is the plan to replace damaged infrastructure? **Info.**
- The City has completed a sewer video for 85% of the sewers in the City installed prior to 1980. The results of those findings feed into a Condition Assessment Inventory. Immediate issues are addressed on an ongoing basis.

5.4. Question: How was the additional 40% stormwater control criteria for climate change developed? **Info.**
- ERCA (Essex Region Conservation Authority) has undertaken a study looking at IDF (Intensity-Duration-Frequency) Curves to develop a range of predictions of what system factors should be incorporated into design to accommodate climate change as it relates to fluctuations in severe storm events.

5.5. In cases of existing development, it is noted that the proposed Level of Service criteria are applied "where practical". There needs to be a more progressive perspective on what is practical in regards to implementing stormwater management: **Dillon**
- In response to the above, the Level of Service criteria can be clarified. A quantitative (number based) response is not appropriate in this case; however, providing descriptive procedure is most applicable. We will develop more prescriptive guidance on when practical solutions are to be considered in place of "where practical":
  - For example engineering judgement, coupled with political determination and relative improvement, must be considered. Specific examples of where appropriate modifications to established criteria can be provided.

5.6. A map was presented showing the sensitive land uses to be included in the Adaptive Approach. The following comments where received: **Dillon**
- The Airport lands should be removed from the sensitive land use map.

- It is not clear why roads would be considered vulnerable. (Note: roads have been considered vulnerable so that road access for vehicles be maintained during severe storm events).
- It was recommended that areas where vulnerable populations reside should be included as a sensitive area, because those individuals cannot recover as easily.
- Consider adding larger big revenue/employment properties to the list of sensitive lands uses.

6.	Dillon provided figures showing the model results of existing conditions for both the storm and sanitary system during a 1:5 year and 1:100 year events. Areas found to be under higher risk were highlighted. (Note: Dillon has reviewed the modelling results with 311 calls, storm rain gauges and flow data to confirm that model is showing the system operation accurately).	**Dillon**
7.	**Introduction to Long-Term Solutions**	
7.1.	Due to limited time, this item will be moved to the next SAC meeting.	**Dillon**
8.	**Next Steps and Upcoming Meetings**	
8.1.	An invite for all upcoming meeting will sent to the group.	**Dillon**
8.2.	The following information will be provided to the group: • Home Show and Earth Day Pop-Up events dates; • Pollution Control Plan Open House date; and • Demonstration House location and date.	**Dillon**

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P. Eng., who should be notified of any errors and/or omissions.

LMH:d
Encl.

March 1, 2019

STAKEHOLDER ADVISORY COMMITTEE

degrees of CHANGE

City of Windsor SEWER MASTER PLAN

MEETING #3

January 24, 2019, 6:00 to 8:00 pm

350 City Hall Square W, Meeting Room 140

Presented by: DILLON CONSULTING

Aquafor Beech

AMG ENVIRONMENTAL

Agenda

Agenda Item	Approximate Time
1. Introductions and Welcome to 2019!	5 min
2. Previous Minutes	5 min
3. Project Update/Activities since August 2018	10 min
4. Updated Downspout Disconnection Pamphlet	5 min
5. Level of Service – Background & Discussion	50 min
6. Review of Sewer Model Results	20 min
7. Introduction to Long Term Solutions	15 min
8. Next Steps & Upcoming Meetings	5 min

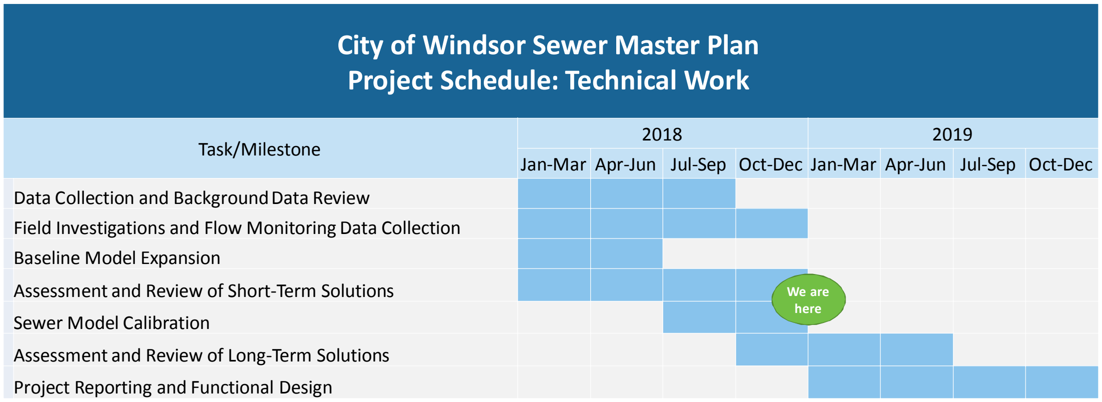
SEWER MASTER PLAN | *Stakeholder Advisory Committee* 3

1. Introductions and Welcome to 2019!

SEWER MASTER PLAN | *Stakeholder Advisory Committee* 4

2. Previous Minutes

3. Overview of Activities Since August 2018



3. Overview of Activities Since August 2018

1. Environmental Assessment and Consultation
   - Published the project's first newsletter
   - Held a pop-up event promoting the Plan
2. Short-Term Alternative Solutions
   - Draft recommendations for short-term solutions incorporating City Staff feedback
   - Identified higher-priority sanitary maintenance hole to eliminate inflow
   - Funding is being allocated based on immediate action recommendations
3. Sewer System Modelling
   - Finalized the 2018 flow monitoring
   - New sanitary sewer inflow and infiltration (I&I), per recently completed smoke tests
   - Finalized expanded model re-calibration

Open Streets – Pop Up

Age of Building Map

4. Downspout Disconnection Pamphlets

- Draft new marketing materials for downspout disconnections were developed
- Handouts distributed today
- Review and provide comments:
  - Email: krichters@citywindsor.ca
  - Phone: (519)-253-7111 x. 3226

5. Level of Service

- What is Level of Service (LoS)?
  - a definition of criteria or standards used to compare performance of sewers and drainage systems.

    Example: under a predefined rainfall how high is the water level (or HGL) in a sewer

- Sewer LoS various geographically (i.e. Provinces, Municipalities, etc.) and are updated over time

5. Level of Service – Definitions

HGL – Hydraulic Grade Line:

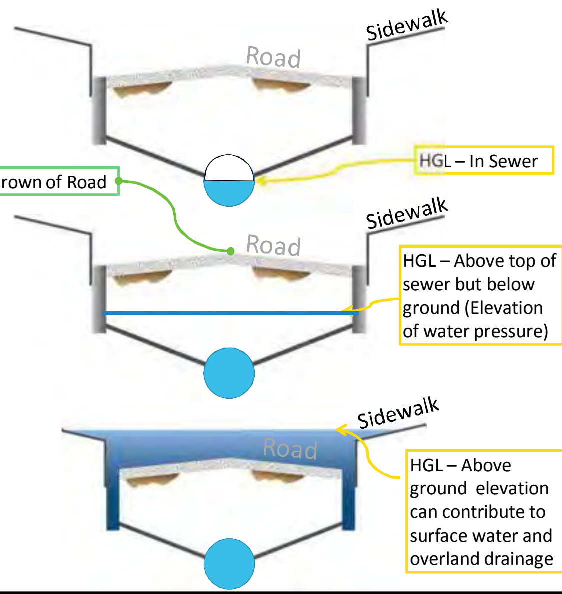
- Ø for a sewer pipe not flowing full, a measure of the surface of water in the pipe
- Ø for a sewer pipe flowing full, a measure of the water pressure pipe

Minor system – flow in sewer pipe

Major System – flow conveyed on ground surface (Overland Drainage)

Return period – an estimate of how likely a storm will occur in a given year

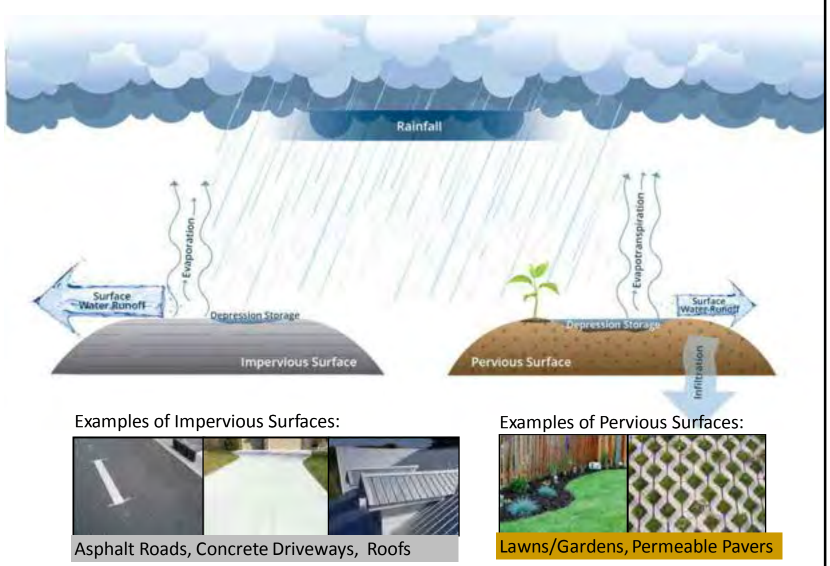
Public Right-of-Ways with Sewer



5. Level of Service – Definitions

Water Balance

- Measure of rainfall volume kept on-site and out of sewers
- Often measured in depth i.e. “mm” of rainfall and “mm” of water kept on-site



5. Current and Future LoS Criteria

- Windsor's Current Practice
- Preliminary Recommendations Moving Forward
- Group Discussion

5. Level of Service – Current Storm Sewer Design Criteria

	Consideration	Public Infrastructure (RoW Infrastructure, Residential Development, etc.)	Private Institutional, Commercial and Industrial Development
Established	**Minor System (Future:** 1:5 year event) (**Existing:** up to1:5 year event)	*Goal: No increase to HGL downstream.* **Future Development:** No surface flooding. HGL between top of pipe and 0.30 m below ground. **Existing Development:** Maintain or reduce existing surface flooding. HGL below ground, where practical.	*Goal: Controlled release of stormwater discharged from site.* **Future:** contained on-site (surface ponding acceptable in controlled locations).
Established	**Major System** (1:100 year event)	*Goal: Allows standard vehicles/traffic to cross; also under standard grading conditions lowest openings are protected.* **Future Development:** less than 0.30 m of ponding. **Existing Development:** Same as above, where practical.	*Goal: Safe controlled release of stormwater from site; allows for vehicles to cross. Protected lowest openings.* **Future:** contained on-site; less than 0.30 m of ponding; lowest opening 0.30 m higher than max.
Emerging	**Climate Change** (1:100 year event + 40%) – New from Essex Region Conservation	*Goal: Identify climate change vulnerability and provide mitigation.* **Future Development:** Increased storage volume and major system conveyance following preferred/safe route; ponding below lowest opening. **Existing Development:** Same as above, where practical.	*Goal: Identify climate change vulnerability and provide mitigation* **Future:** Increased storage volume and all water contained on-site**;** ponding below lowest opening.
Emerging	**Outlet Capacity Assessment** (1:100 year event + 40%)	*Goal: Mitigate potential for increasing flooding risk; ensures HGL in existing storm sewers are not increased.* **Future & Existing Development:** Complete an outlet capacity assessment as needed for sensitive developments to determine allowable release rate to downstream receiving infrastructure (sewer, ditch, etc.). Where practical for existing public infrastructure.	

5. Level of Service – Other Municipalities Storm Sewer Design Criteria

City	Maximum HGL	Return Period Storm	Major System	Water Balance
Toronto	**Minor System** – HGL below obvert (top) of sewer for local streets	**Minor System** (1:2 year storm) **Major System** (1:100 year storm)	**Maximum ponding:** **Local Roads:** 50 mm above road crown or water level up to ROW limit **Collector and Industrial Roads:** 100 mm above road crown or water level up to ROW **Arterial Roads**: Up to crown of road **Streets with reverse sloped driveways:** 150 mm above gutter	In most cases on-site retention systems required to capture the **first 5 mm**
Hamilton	**Minor System** – (not surcharged, < 85% of sewer capacity)	**Minor System** (1:5 year storm) **Major System** (1:100 year storm)	**Maximum ponding:** **Local/Rural Arterial or Collector Streets**: 150 mm above road crown **Urban Arterial or Emergency Streets**: 0 mm above road crown	No formal requirements
London	**Minor System** (ground elevations and openings higher than 1:250 year water levels)	**Minor System** (1:2 year storm) **Major System** (1:100 year storm flows within ROW & 1:250 year storm)	**1:2 year event**: No surface ponding **Larger than 1:2 year event:** Ponding on major overland flow routes, up to 300 mm on street CBs and parking areas of multi-family/commercial/institutional developments; 450 mm on rear-yard CBs, Cascading see-saw road profiles for new developments	No formal requirements

5. LoS– Recommended Adaptive Storm Sewer Design Criteria

	Consideration	Public Infrastructure (RoW Infrastructure, Residential Development, etc.)	Private Institutional, Commercial and Industrial Development
Established	**Minor System** (**Future:** 1:5 yr event) (**Existing:** up to 1:5 yr event)	*Goal: No surface flooding under minor storm* **Future and Existing Development:** Same as current criteria	*Goal: Control release of stormwater discharged from site* **Future Site Development:** Same as current criteria
Established	**Major System** (1:100 year event)	*Goal: Allows standard vehicles/traffic to cross; lowest openings are protected* **Future and Existing Development:** Same as current criteria.	*Goal: Safe controlled release of stormwater from site; allows for standard vehicles/traffic to cross, protected lowest openings.* **Future Site Development:** Same as current criteria.
Emerging	**Climate Change** (1:100 year event +40%)	*Goal: Identify climate change vulnerability and provide mitigation* **Future and Existing Development:** Same as current criteria	*Goal: Identify climate change vulnerability and provide mitigation* **Future and Existing Development:** Same as current criteria
Emerging	**Outlet Capacity Assessment** (1:100 year event +40%)	*Goal: Mitigate potential for increasing flooding risk downstream; ensures HGL in existing storm sewers are not increased.* **Future and Existing Development:** **Require completion of an outlet capacity assessment** to determine allowable release rate to downstream infrastructure (sewer, ditch, etc.)	
New	**Water Balance**	*Goal: Additional resiliency, water quality improvements, limit flooding risk under frequent storm events.* **Future Development:** Recommend **retention and/or infiltration of first 30mm** of rain generated within RoW; in-line with MECP **Existing Development:** Same as above, where practical.	*Goal: Additional resiliency, water quality improvements, limit flooding risk under frequent storm events.* **Future Site Development:** Recommend **retention and/or infiltration of first 30mm** of runoff generated from total site area; in-line with MECP

5. Level of Service – Current Sanitary Sewer Design Criteria

Consideration	Public Infrastructure (RoW Infrastructure, Residential Development, etc.)
Dry Weather Flow Capacity	*Goal: Insure dry weather flow conveyance capacity is provided.* Follow City's Development Manual to confirm available outlet capacity and establish sewer sizes and slopes.

Dry-Weather Sanitary Flows = Domestic Waste Water + Infiltration Flow Component

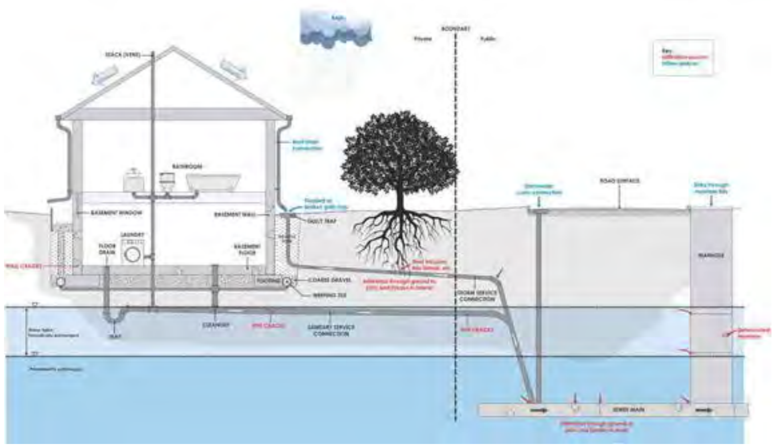
Sanitary sewers are NOT designed to convey:

Surface water through Manhole Covers.

Improper building Foundation Drain connections.

Improper Roof Downspout connections.

Improper Cross-connections from the storm system.



5. Level of Service – Other Municipalities Sanitary Sewer Design Criteria

City	Maximum HGL	Return Period / Design Storm
Toronto	**Dry Weather Flow:** Similar Dry-Weather formula as Windsor. **Wet Weather Flow:** 1.8 m below Ground Elevation for May 12, 2000 event.	• May 12, 2000 storm event (Return Period - 1:25 to 1:50 year; duration - 24 hours; Peak Intensity - [5 min] 160 mm/hr)
Kingston	**Dry Weather Flow:** • Similar Dry-Weather formula as Windsor • Flow < 85 % of pipe capacity. **Wet Weather Flow:** • HGL < 0.3 m above pipe obvert and • HGL > 2 m below finished ground	• Up to and including the **1:100 year event;** • Sensitivity to various storm events for the **1:10 year event** (considered a gap) and **1:25 year event** (consideration for sewer review).
Hamilton	**Dry Weather Flow:** • Similar Dry-Weather formula as Windsor Sewer Sizes up to 450 mm dia.: 75% of full design capacity. • Sewer sizes 525 mm dia. or greater: 60% of full design capacity. **Wet Weather Flow:** • No criteria	

5. Level of Service – Recommended Adaptive Sanitary Sewer Design Criteria

	Consideration	Public and Private Development
Established	**Dry Weather Flow Capacity**	*Goal: Insure dry weather flow conveyance capacity is provided.* **Future and Existing Development:** Same as current criteria.
New	**Wet Weather Flow Consideration** (1:100 year event)	*Goal: Limit risk of basement flooding. Identify climate change vulnerability and provide mitigation* **Future Development:** Must confirm wet weather flow HGL under proposed conditions is **deeper than 1.8 m below ground or HGL is not increased** in the existing sanitary sewer system. May require surcharge storage or larger pipes downstream. For the new sanitary sewers in the development confirm HGL is **deeper than 1.8 m below ground,** where possible. **Existing Development**: Wet weather flow HGL under proposed conditions is **deeper than 1.8 m below ground,** where practical.
	Climate Change (1:100 year event +40%)	*Goal: Limit risk of basement flooding from new developments.* **Future Development:** Identify additional surcharge storage required for the climate change event, to achieve an HGL **deeper than 1.8 m below ground or no increase** in the existing sanitary system. If the new service area or downstream area is high risk; consideration should be given to providing additional surcharge storage. **Existing Development**: Same as above, where practical.

5. Level of Service – Current Combined Sewer Design Criteria

	Consideration	Public Infrastructure Rehabilitation or Repair
Established	**Combined Sewer Overflow (CSO)**	*Goal: Compliance with MECP guidelines for controlling and limiting overflow to River. Improved water quality.* Through the retention treatment basin (RTB) and overflow control structures the combined system meets **F-5-5 criteria** for overflow discharge to the Detroit River, this includes: • Elimination of CSOs during dry weather conditions • Collection systems for storing wet weather flows • Capture and treat all dry-weather flow + wet-weather flow during the **average year** (7-month period)
	Sewer Hydraulic Grade Line	*Goal: Reduce total flow directed to the treatment plant.* Like for like-replacement of combined/sanitary sewer. New storm sewer designed to convey Right-of-Way flows and/or additional lands if planned. Storm sewer's designed **1:5 year event**.

Consideration	Existing Development or Infill - Private Institutional, Commercial and Industrial Development
Minor System	**Same as stormwater**
Major System	
Climate Change	
Water Balance	
Outlet Capacity Assessment	

5. Level of Service –
Other Municipalities Combined Sewer Design Criteria

City	Maximum HGL	Combined Sewer Overflows
Toronto	**Wet weather flow** • 1.8 m below Ground Elevation for May 12, 2000 event	CSO outfalls to meet **MECP Procedure F-5-5**: • Elimination of CSOs during dry weather conditions • Pollution Prevention Program to reduce pollution at source • Collection Systems for storing wet weather flows • Flow to Sewage Treatment Plant to be maximized • Capture and treat all DWF + 90% of WWF (that is above the DWF) during a 7-month period, commencing within first 15 days of April (1988 and 1989 used as average rainfall years)
Kingston	**Wet weather flow** • HGL < 0.3 m above pipe obvert and HGL > 2 m below finished ground for upto and including the **1:100 year event.** • Long-term goal **1:10 year** LoS as minimum throughout municipality.	CSO outfalls to meet **MECP Procedure F-5-5.**
Hamilton		CSO outfalls to meet **MECP Procedure F-5-5.**

5. Level of Service –
Recommended Adaptive Combined Sewer Design Criteria

	Consideration	Public Infrastructure
Established	**Combined Sewer Overflow**	*Goal: Compliance with MECP guidelines for controlling and limiting overflow to River. Improved water quality.* **Future and Existing Development:** Same as current criteria.
Emerging	**Sewer Hydraulic Grade Line (Outlet Capacity Assessment)** (1:100 year event)	*Goal: Reduce total flow entering the treatment plant. Ensures HGL in existing sewers are not increased.* **Future and Existing Development:** Meet public infrastructure requirements for storm and sanitary sewers, were possible. If not feasible insure new/replacement systems have no negative impact (i.e. will not increase HGL). For Existing development, were practical.
New	**Climate Change** (1:100 year event + 40%)	*Goal: Identify climate change vulnerability and provide mitigation. Limit risk of basement flooding.* **Future Development:** Consideration should be given to climate change event. If no storage is recommended for the improvements a review of HGL and overflow flow route should be completed to a preferred/safe outlet. If storage is provided, **volume should be sized for 1:100 year event +40%.** **Existing Development**: Same as above, where practical.

Consideration	Existing Development or Infill - Private Institutional, Commercial and Industrial Development
All	**Same as stormwater recommendations**

5. Level of Service –
Adaptive Approach to LoS Criteria

- Identifies **vulnerable areas, key transportation links, and sensitive land uses** for an **enhanced** level of service; current list:
  - Schools
  - Hospitals
  - Emergency service facilities (police, fire, etc.)
  - Long-term care facilities
  - Major roads (arterial and collector)
  - Emergency routes
  - Higher risk flooding areas
- Approach applied throughout City

TRADITIONAL

Engineering Approach

Static design criteria established by regulatory agencies

Standard level of service and flood risk mitigation

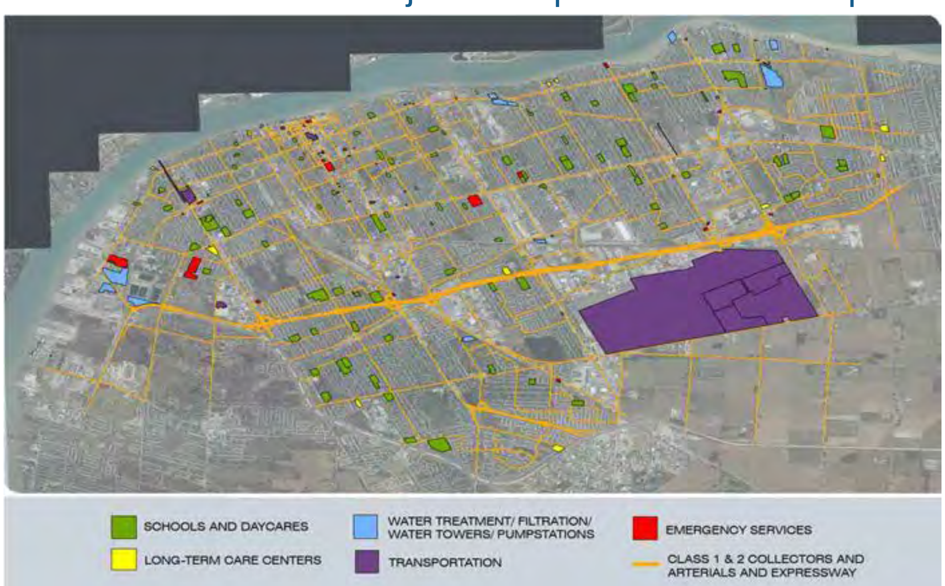
ADAPTIVE

Sewer Master Plan Approach

Flexible and **sustainable** solutions that account for a **reasonable degree of uncertainty** due to climate change

Enhanced and variable level of service and flood risk mitigation

5. Level of Service –
Land Use and Major Transportation Link Map



5. Level of Service – Discussion

Level of Service Criteria

- Do the recommended LoS criteria make sense?
- Are there any missing?

Adaptive Approach

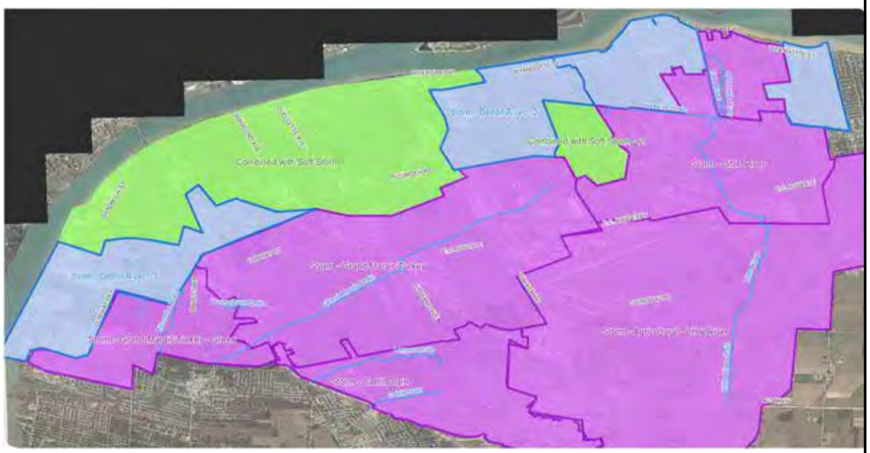
- Does the concept of focusing on sensitive locations/uses make sense?
- Do you agree with the sensitive locations/uses listed?

6. Review of Sewer Model Results

- Live GIS demonstration

7. Introduction to Long Term Solutions Storm Solutions

- Sewers that outlet to open drains (Municipal Drains) are limited to
  - storage,
  - source control, and/or
  - LIDs;
  - Additional discharge is not permitted
- Sewers that outlet to Detroit River will include
  - Same as above; and
  - Increased discharge to the River



Drainage Area Legend:
Areas Outlet to Municipal Drains
Areas Outlet to Detroit River
Combined Sewer Areas

7. Introduction to Long Term Solutions Sanitary Solutions

- Private property source controls (i.e. foundation drain disconnection programs, etc.)
- Sewer surcharge storage
- Additional conveyance to plant(s) and increased plant capacity
- Public infrastructure sealing and relining
- Satellite treatment plants

7. Introduction to Long Term Solutions Combined System Solutions

- Continued separation including LIDs where practical
- Sewer surcharge storage
- Additional conveyance capacity to plant(s) and increased plant capacity
- Satellite treatment plants

Sanitary Drainage Area Boundary

Drainage Area Legend:
Combined Sewer Drainage Area

8. Next Steps & Upcoming Meetings

Next Steps:

City of Windsor Sewer Master Plan
Project Schedule

Task/Milestone	2018				2019			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Data Collection and Background Data Review								
Field Investigations and Flow Monitoring Data Collection								
Baseline Model Expansion								
Assessment and Review of Short-Term Solutions				We are here				
Sewer Model Calibration								
Assessment and Review of Long-Term Solutions								
Project Reporting and Functional Design								
ENGAGEMENT NEXT STEPS								
Newsletters								
SAC Meetings								
Public Information Centre								

8. Next Steps & Upcoming Meetings

Upcoming Meetings:

- **March/April**
  - SAC Meeting - early introduction to long-term solutions
- **May/June**
  - SAC Meeting - long-term solutions and evaluation criteria
- **July/August**
  - SAC Meeting - discuss PIC consultation
- **September**
  - Public Information Centre # 2

MEETING MINUTES

Subject: City of Windsor Sewer Master Plan – Stakeholder Advisory Committee Meeting #4

Date and Time: May 8, 2019 at 6:00 p.m.

Location: Meeting Room 140, 350 City Hall Square West, Windsor, Ontario

Our File: 17-6638

At endees

General Public:	Ray Bezaire	Resident
	Ron Brant	Resident
	David Hanna	Resident
	Frank Dattilo	Resident
	John S. Holmes	Resident
	Randal Sasso	Resident
Community Groups and Public Health:	Amandeep Hans	Windsor-Essex County Health Unit
Sewer Master Plan Project Team:	Janelle Coombs	City of Windsor
	Anna Godo	City of Windsor
	Joe Cappalairen	City of Windsor
	Karla Kolli	Dillon Consulting Limited (Dillon)
	Ian Wilson	Dillon Consulting Limited (Dillon)
	Laura Herlehy	Dillon Consulting Limited (Dillon)
	Flavio Forest	Dillon Consulting Limited (Dillon)
	Dave Maunder	Aquafor Beech Limited

Absent

General Public:	Greg Plante	Imaginative Imaging
	David Hilton	Resident
	Dr. Tirupati Bolisetti	Resident
	Tom Markham	Resident
	Bridget Scheuerman	Pillette, Riverside and Ford City BIA
Environmental Groups:	Dave Munro	Detroit River Canadian Cleanup
	Dr. Rajesh Seth	University of Windsor
Emergency Service Providers:	Stephen Laforet	Windsor Fire & Rescue Services
Insurance Providers/Adjusters:	Maria LeBlanc	Easy Insure
	Pete Karageorgos	Insurance Bureau of Canada (IBC)
Sewer Master Plan Project Team:	Wes Hicks	City of Windsor
	Aakash Bagchi	Dillon Consulting Limited (Dillon)

Notes

Item	Discussion	Action By
1.	The presentation provided during this meeting is attached to these minutes.	**Info.**
2.	**Review Previous SAC Meeting Action Items (January 24, 2019)**	
2.1.	<u>Basement Flooding Subsidy Versus Reported Flooding</u>	
2.1.1.	90-95% of residents who have implemented basement flooding protection measures through the City's subsidy program have not subsequently reported flooding during the following major storm events. There is concern that this statistic is not correct, the team will review and follow up with the SAC.	**Dillon**
	There is concern that the installation of backflow preventers, sump pumps, etc. do not provide protection against basement flooding. *<u>Dillon:</u>* Basement flooding protection measures should work when maintained and installed properly. As part of this study, we are recommending the installation of sewage ejector pumps in new homes to provide an added level of protection in comparison to backflow preventers.	**Info.**
2.2.	Currently, the City does not have a Chief Resiliency Officer, the team will discuss further with Karina Richters (Supervisor, Environmental Sustainability and Climate Change) how that type of role plays into the work that she is involved in.	**Dillon/City**
2.3.	Regarding implementation of educational programs, the City is considering retaining a third party consultant to provide this type of service.	**Info.**
3.	**Short Term Solutions**	
3.1.	The project team provided an introduction to the immediate short term solution recommendations. <u>SAC Comments:</u> • Need to implement a green infrastructure policy. • Education materials should provide information on how both residential and commercial property owners can implement LIDs on their lands. • Foundation drain disconnection requires the cooperation of the property owners. • Provide incentives to implement private property improvements.	**Info.**

- Downspout disconnection needs to be mandatory everywhere.

4. **Level of Service**

4.1. The SAC cautioned that it should be clear to the public that solutions developed through this study are based on a combination of various levels of improvement (i.e. both private and public improvements). Also, it needs to be clear that the solutions are aimed at reducing risks associated with flooding but will not prevent flooding. **Info.**

4.2. As part of the educational program, it would be useful to show what CSOs (Combined Sewer Overflows) are and how they work. It is valuable to provide information on how high I&I impacts the system and environment. **Info.**

4.3. The City has been successful in leveraging tax dollars with provincial and federal programs. $90 Million in infrastructure improvements in the Riverside Area was approved. This program consists of stormwater infrastructure in the Riverside Area which will be constructed over a 10 year period. **Info.**

4.4. Planned improvements will need to be schedule based on the City's planned rate of spending. There may be some criticism that some solutions will not be implemented immediately. Solutions should first be implemented in areas that are most vulnerable and solutions that will have the greatest benefit on the system. Implementing the complete solutions may take several decades or more. **Info.**

4.5. We should provide information to the public on what level of rain their system can service. This information would provide context on the system's existing level of service. **Info.**

4.6. The City needs to commit to providing continued maintenance for all infrastructure. Infrastructure will not provide intended level of service without proper maintenance. Solutions where possible should rely on infrastructure that does not require extensive maintenance. **Info.**

4.7. Is there potential to have cisterns (underground storage) units that provide temporary storage of water to use for grey water use? **Info.**

5. **Mandatory Foundation Drain Disconnection Program**

5.1. The SAC team has concern regarding the level of benefit foundation drain disconnection will have on the sanitary system.

> *Dillon:* Ann Arbour, MI, completed a field analysis where the impact of completing foundation drain disconnection has on the sanitary system. Their findings were that in areas where full cooperation of property owners to complete the disconnection, approximately 70% of the wet weather inflow was reduced.

The team asked the SAC to provide feedback on the potential implementation of a Mandatory Foundation Drain Disconnection Subsidy Program. The team provided the following input:

- We need to make it clear on how long it will take to fully implement the recommended solutions;
- Communication on implementing private property solutions needs to include context on what the City is doing. The City needs to show action on public infrastructure improvements as well;
- People do not understand their foundation drain and where it goes so they need some education on why they should care, why disconnection is important;
- It is likely that existing weeping tiles and pipes are full of sediment and tree roots etc. Scope of disconnection work may require replacement/repair of existing foundation drain system. Homes may not have an appropriate foundation drain. Foundation drain repair work will be costly;
- People might be concerned that they will have to dig up their whole yard. Cost, inconvenience and violation of private property;
- There is a lack of trust, feeling that the City is not acting. The public wants the sewer system to be on the front burner. Need to demonstrate that the City is doing all it can to address basement flooding;
- Need to show success stories; consider pilot program to show local success by picking neighbourhoods or individuals within neighbourhoods to focus on;
- Need to manage public's expectations - sometimes it will flood;
- Mandatory disconnection should not be blanket across the City, implementation of this type of program should be focused in areas where the problem is the most significant and the system would get the most benefit from disconnection;
- Public not informed, currently no mechanism to inform public;
- Look at each neighbour's specific needs, space out costs;
- Test Sanitary Sewer Connections – Confirm Interconnections Exist; and
- A concern was raised that the comment of limiting development and/or restricting the building of new basements was not considered. It was identified both the consulting team and City staff that this was discussed at several meetings.

5.2.	**Level of Service Feedback**		**Info.**
	5.2.1.	Dillon provided high level overview of Level of Service criteria for existing and proposed conditions.	
	5.2.2.	The following feedback was provided by the SAC group: • The public expect that the City's improvements provided a 1:100 year level of service. • Newer developments should be designed to a higher level of service (1:100 Year). • It was noted that the Level of Service will still require home owners to protect their homes from basement flooding. • 1:100 year level of service is the gold standard, there is concern that there is limited funding available, high costs of infrastructure upgrades may be prohibitive or delay projects to obtain funding. • Consider higher intensity storms to capture potential changes to storm events due to climate change. • Public wants reassurance that the infrastructure is in good condition and pump stations, etc., are functioning optimally. The City should provide a "guarantee" that infrastructure is functioning.	
6.	**Next Steps and Upcoming Meetings**		
6.1.	An invite for all upcoming meeting will be sent to the group. The next meeting time will be extended to 2.5 hours.		**Dillon**

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

LMH:d

May 30, 2019

STAKEHOLDER ADVISORY COMMITTEE

City of Windsor SEWER MASTER PLAN

degrees of CHANGE

MEETING #4

May 8, 2019, 6:00 to 8:00 pm

350 City Hall Square W, Meeting Room 140

Presented by: DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

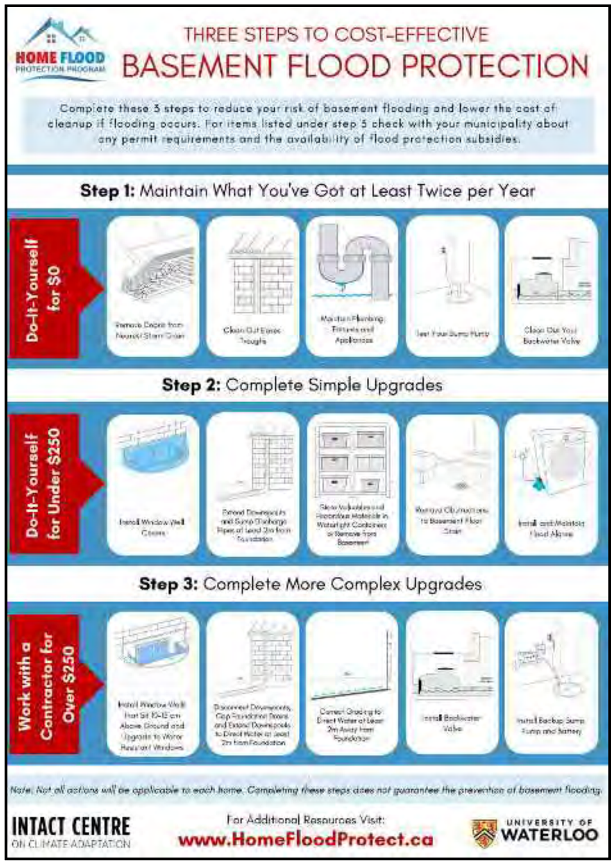
Agenda

Agenda Item	Approximate Time
1. Previous Minutes	10 min
2. Project Update/Activities since January 2019	10 min
3. Short Term Solutions	20 min
4. Long Term Solutions • Level of Service • Implementation Strategy	50 min
5. Next Steps & Upcoming Meetings	5 min

1. Previous Minutes

1. Previous Minutes

- Incorporate onto Project Website



2. Overview of Activities Since January 2019

Next Steps:

City of Windsor Sewer Master Plan
Project Schedule: Technical Work

Task/Milestone	2018				2019			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Data Collection and Background Data Review								
Field Investigations and Flow Monitoring Data Collection								
Baseline Model Expansion								
Assessment and Review of Short-Term Solutions								
Sewer Model Calibration								
Assessment and Review of Long-Term Solutions						We are here		
Project Reporting and Functional Design								
ENGAGEMENT NEXT STEPS								
Newsletters								
SAC Meetings								
Public Information Centre								

2. Overview of Activities Since January 2019

1. Environmental Assessment and Consultation
   - Published Newsletter # 2
   - Held two pop-up events promoting the Plan
     - Windsor Home and Garden Show
     - Earth Day 2109
   - Updated the project website
   - Finalized Downspout Disconnection Pamphlets

2019 Home Show– Pop Up

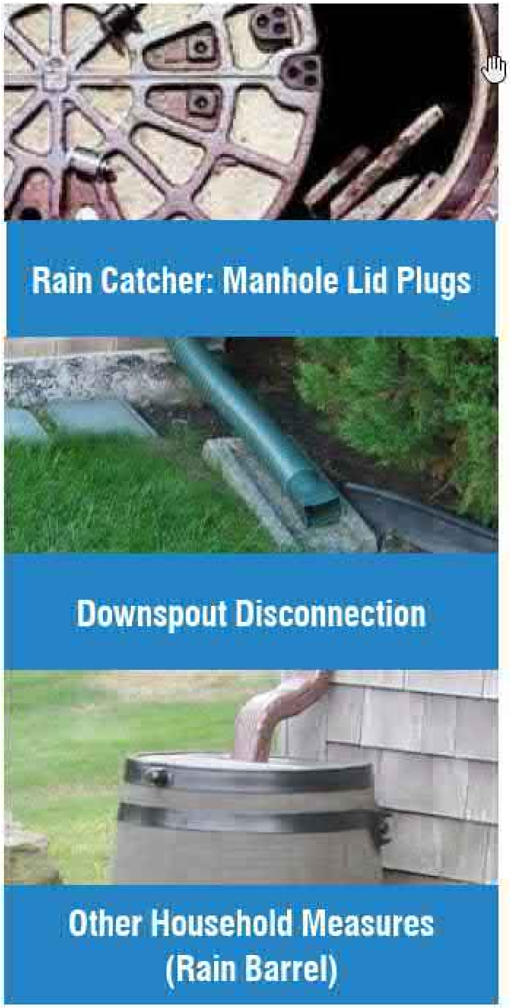
2. Sewer System Modelling
   - Updated to include findings from related studies
   - Confirmed benefit of Sanitary Sewer Manhole Sealing
   - Confirmed benefit of Foundation Drain Disconnection

Project Website

2. Overview of Activities Since January 2019

3. Short-Term Solution Recommendations
   - Established recommendations for short-term solutions incorporating City/Stakeholder feedback.
   - Developed a Recommended Immediate Action List.

4. Long-Term Alternative Solutions
   - Developed Level of Service Criteria
   - Established Problem Areas
   - Draft Evaluation Criteria



3. Short Term Solutions – Update and Implementation

Wide Range of Short Term Solutions - Reviewed with the Group (Aug 2017 – SAC Meeting)

1. Municipal Policies

- Mandatory Use of Sewage Ejector Pumps for New Development
- Mandatory Downspout Disconnection for New Development
- Stormwater Surcharges and Green Infrastructure Credits
- Sanitary Manhole Rain Catchers
- Inlet Control Devices
- Infrastructure Maintenance and Assessment Recommendations
- Update Design Standards

2. Subsidy Programs

- Basement Flooding Protection Subsidy
- Mandatory Downspout Disconnection
- Mandatory Foundation Drain Disconnection

3. Collaborative Improvements

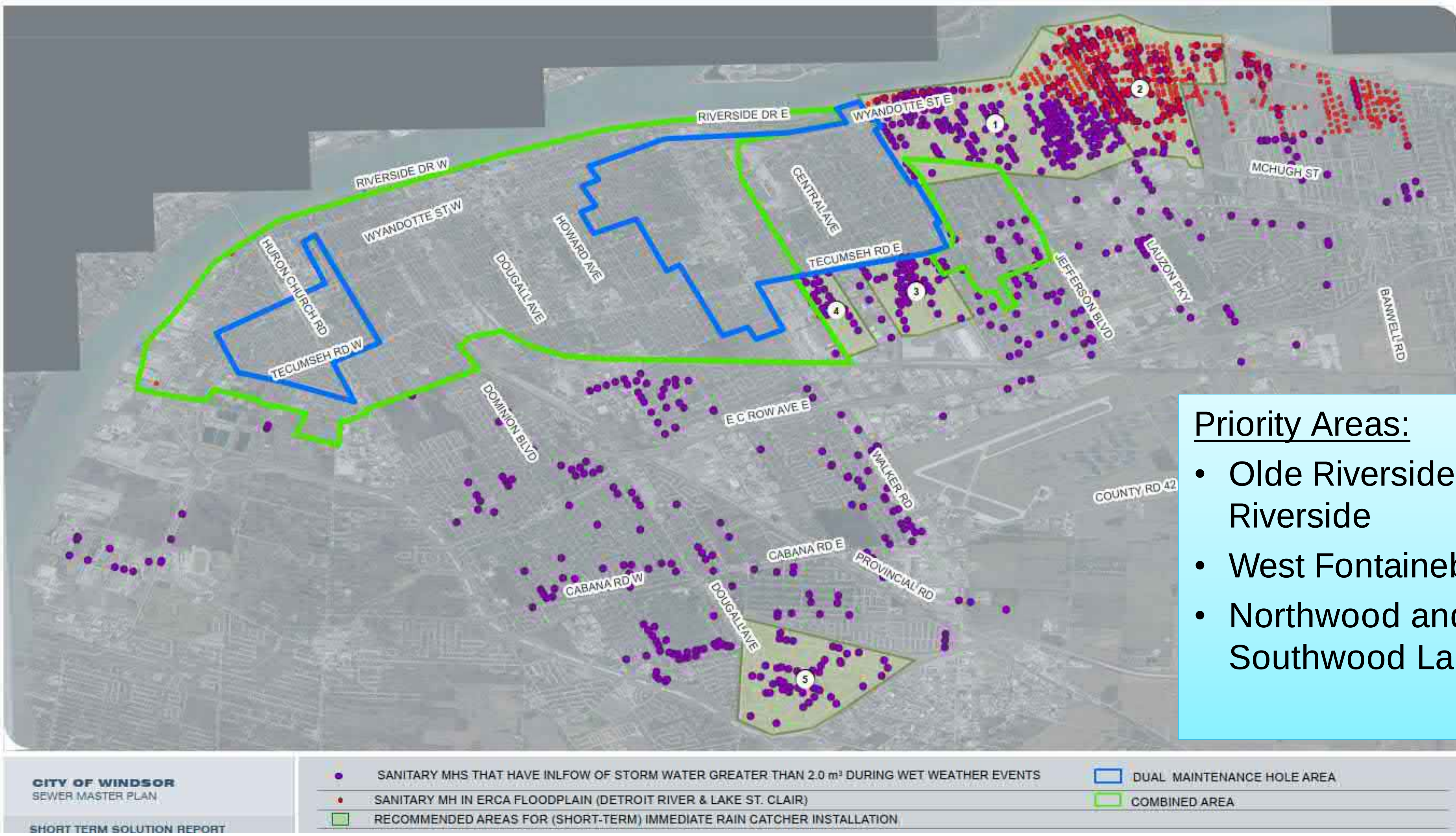
- Enhanced Education Program
- Low Impact Development (LID) Measures
- Lot Grading
- Other Household Management Strategies

RED – Recommended Immediate Action List (2019)

3. Short Term Solutions – 2019 Recommendations

- Sanitary Manhole Rain Catchers
- Mandatory Foundation Drain Disconnection Subsidy Program
- Update Design Standards and Municipal Policy
- Enhanced Public Education Program

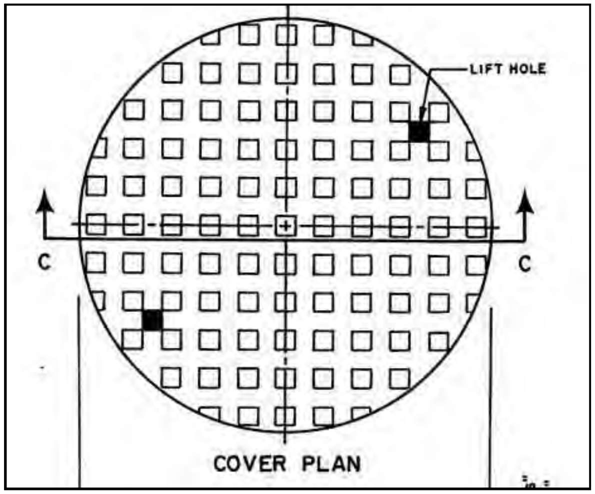
3. Short Term Solutions –2019 Recommendations Manhole Rain Catchers



Priority Areas:

- Olde Riverside and Riverside
- West Fontainebleau
- Northwood and Southwood Lakes

3. Short Term Solutions – 2019 Recommendations



Manhole Rain Catchers

- Reduce in rainwater entering Sanitary System
- Install in priority areas first (1500 manholes)
- 15-25% reduction of wet weather volume in priority areas
- 2-5% reduction of wet weather volume City Wide

Design Storm Event	Total Inflow Reduction (m^3)
1:5 Year	3,300
1:25 Year	6,900
1:100 Year	9,800

4. Long Term Solutions – Level of Service

Introduction:

- Confirm Level of Service Criteria
  - Problem Areas
- Alternative Solution Development Strategy
- Partnered Approach
- Foundations Drains

4. Long Term Solutions – Level of Service

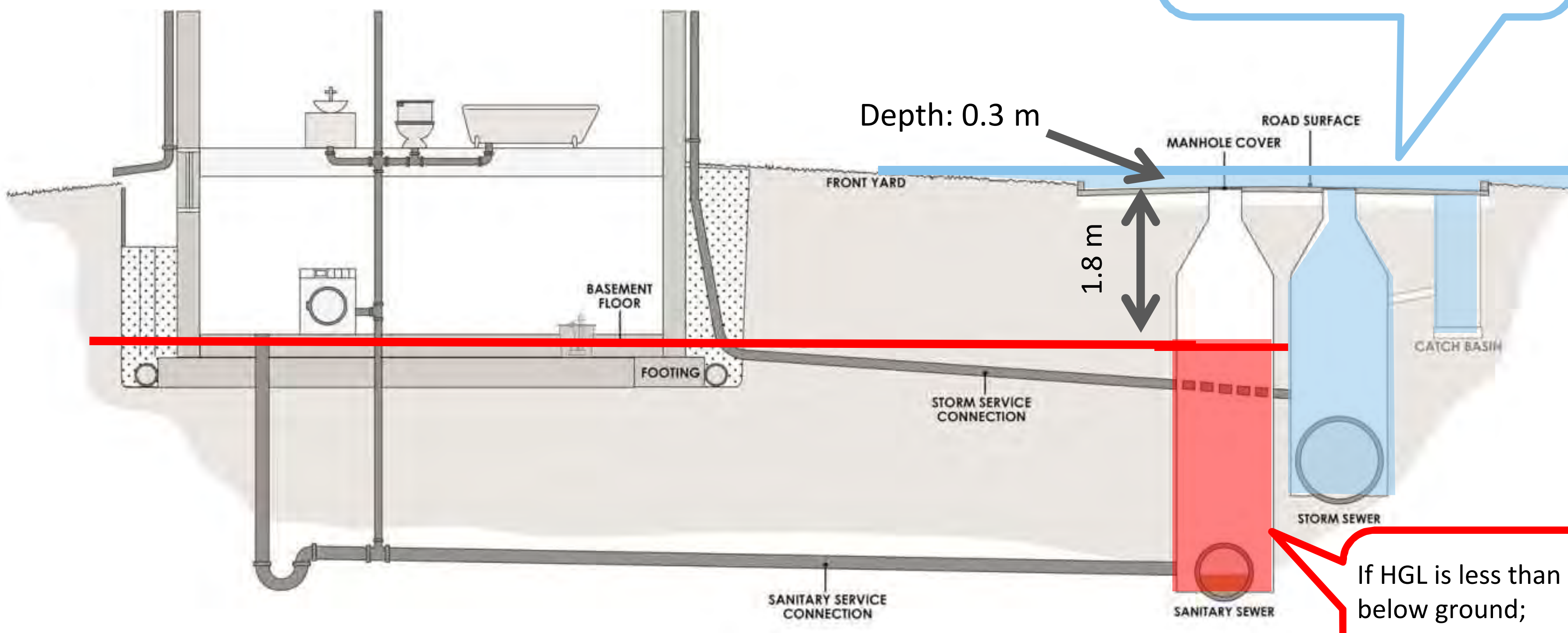
Developed Level of Service Criteria
– Based on Sewer Modelling, Public Input, City Input
– Adaptive Approach
– Identified Problem Areas

LEVEL OF SERVICE	CRITERIA
STANDARD	<u>1:100 Year Storm</u> STORM: < 0.3 m Ponding in Roadways SANITARY & COMBINED: HGL is > 1.8 m below grade
ADAPTIVE APPROACH	<u>CLIMATE CHANGE STORM EVENT</u> STORM: < 0.3 m Ponding in Major Roadways STORM: High Water Level < Building Lowest Opening SANITARY & COMBINED: SENSITIVE LAND USE AREAS HGL is > 1.8 m below ground

4. Long Term Solutions – Level of Service

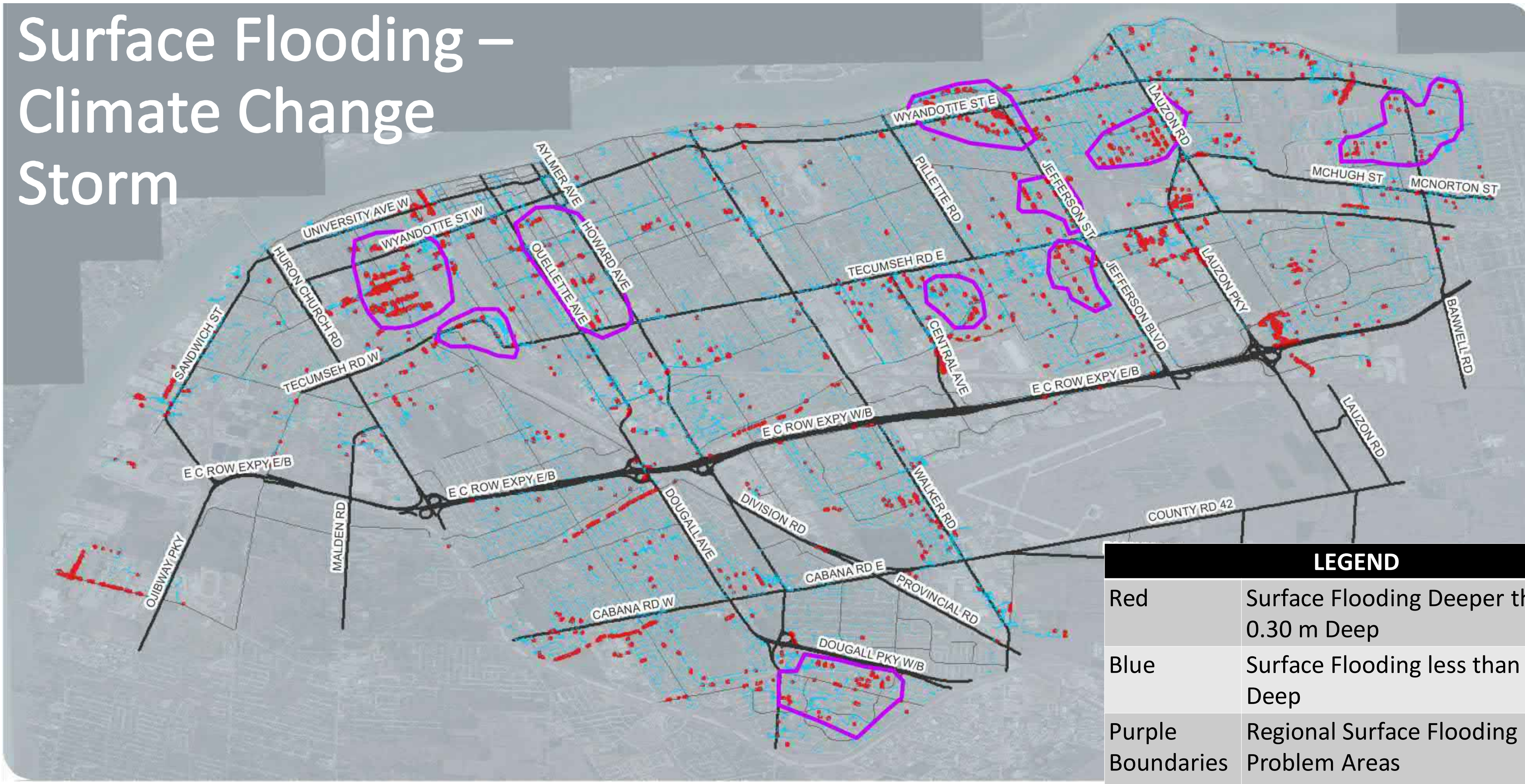
Level of Service – Homes

If stormwater surface ponding is greater than 0.30 m on road; Surface water approaches home elevations.



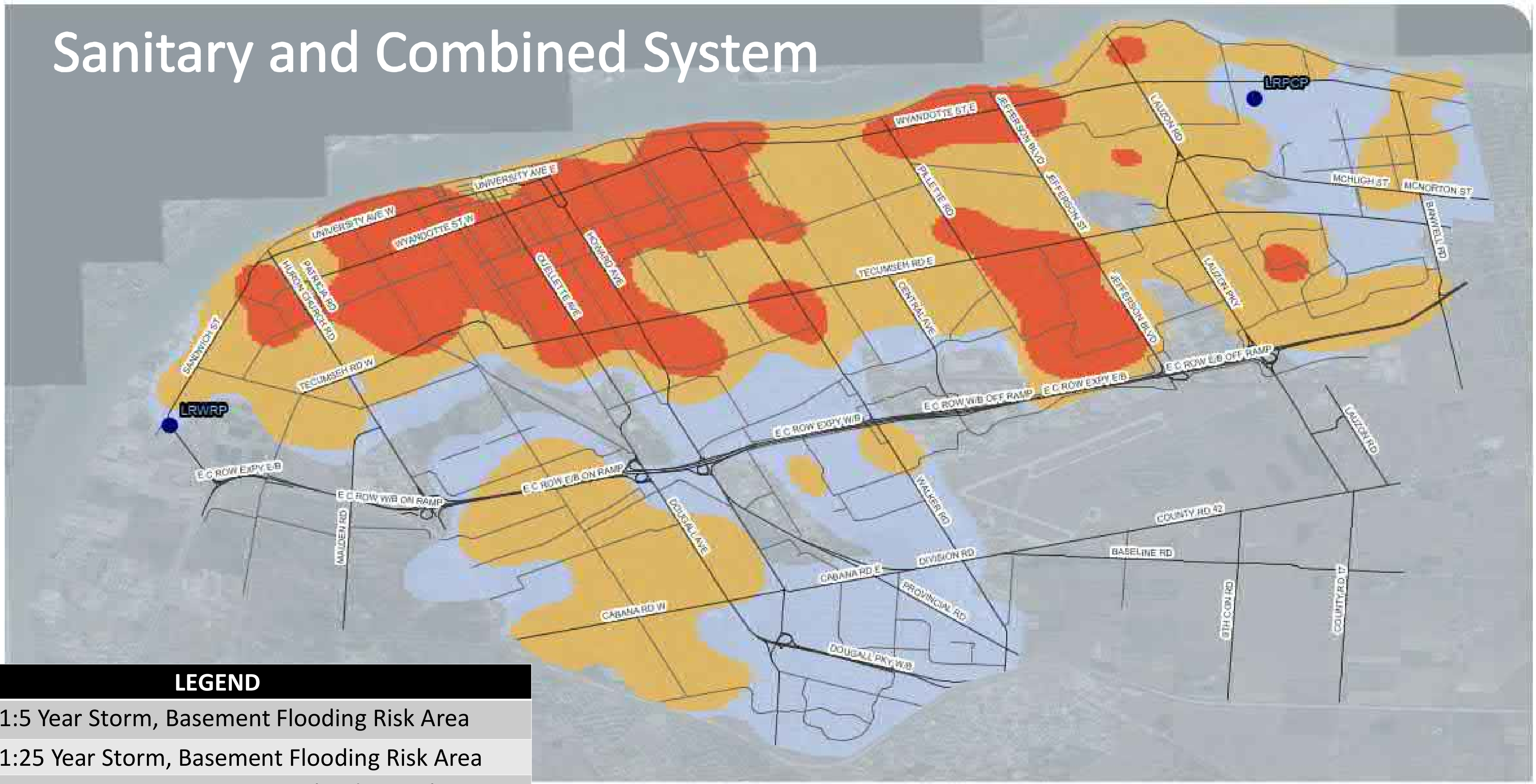
If HGL is less than 1.8 m below ground;
High risk for basement flooding

4. Long Term Solutions – Level of Service



LEGEND	
Red	Surface Flooding Deeper than 0.30 m Deep
Blue	Surface Flooding less than 0.30 m Deep
Purple Boundaries	Regional Surface Flooding Problem Areas

4. Long Term Solutions – Level of Service



LEGEND	
Red	1:5 Year Storm, Basement Flooding Risk Area
Orange	1:25 Year Storm, Basement Flooding Risk Area
Grey	1:100 Year Storm, Basement Flooding Risk Area

4. Long Term Solutions – Strategy

Comprehensive Solutions:

Control Rainwater Entering System (Private Property Improvements)

Examples:
- Foundation Drain Disconnection
- Downspout Disconnection

Increased Downstream Capacity

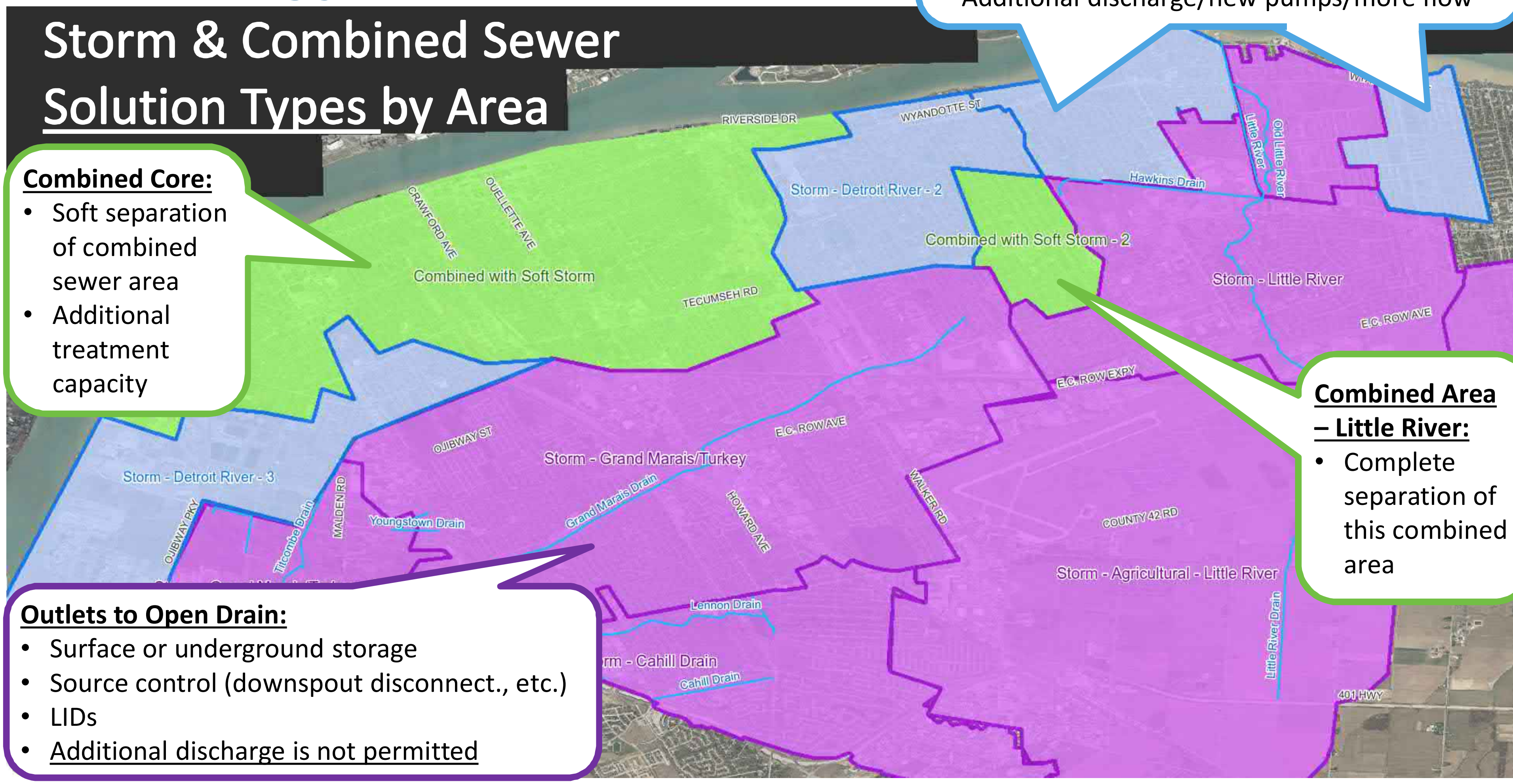
Examples:
- Treatment Plant Improvements
- Pump Station Improvements
- Add Retention Treatment Basins

Sewer System Improvements

Examples:
- Increase sewer sizes
- Underground facilities to store rain water
- Sealing public infrastructure
- Separate combined sewer areas
- Implement Low Impact Development Practices (LIDs)

4. Long Term Solutions – Strategy

Storm & Combined Sewer Solution Types by Area



Outlets to Detroit River:
- Surface or underground storage
- Source control (downspout disconnect., etc.)
- LIDs
- Additional discharge/new pumps/more flow

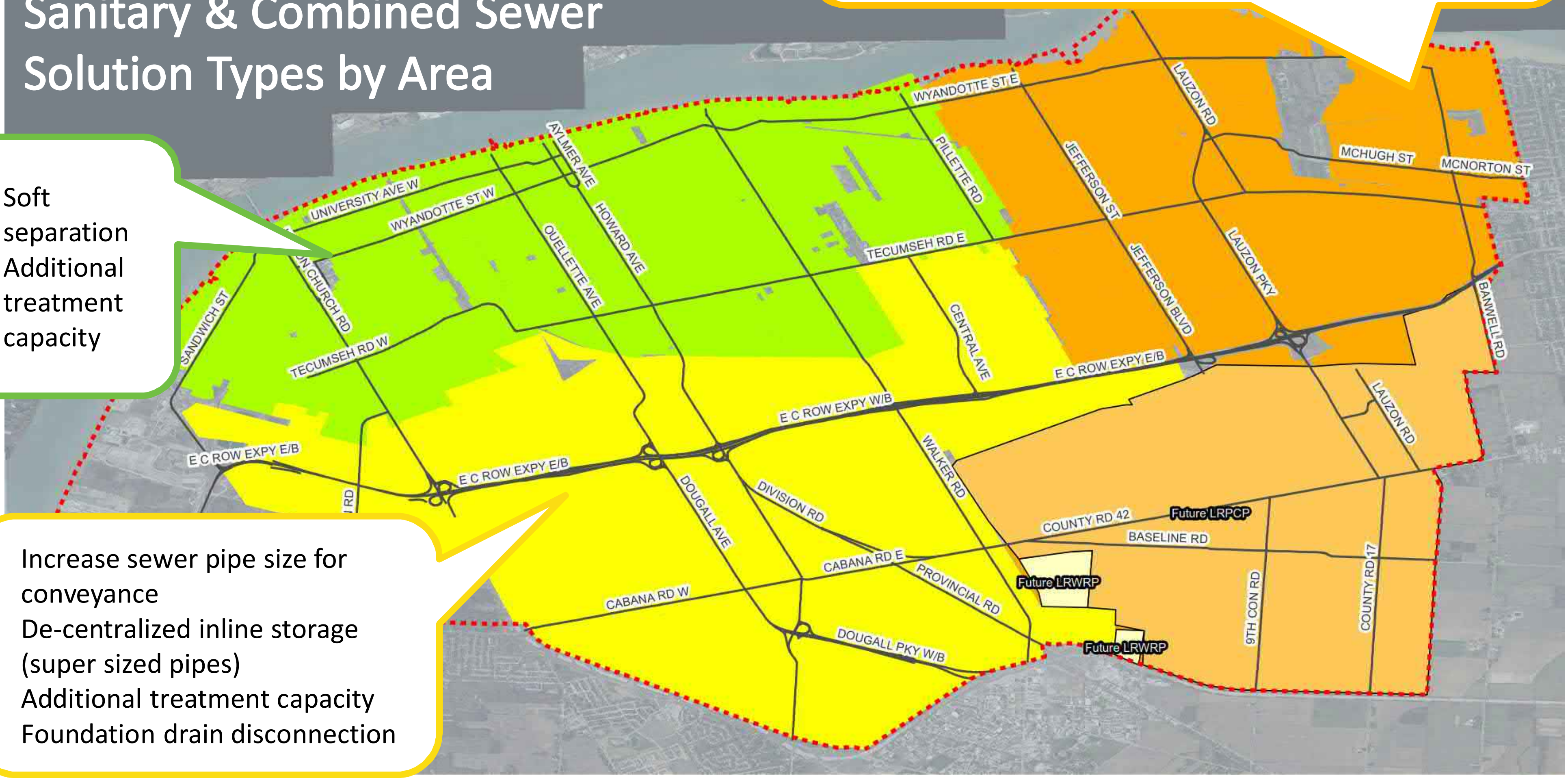
Combined Core:
- Soft separation of combined sewer area
- Additional treatment capacity

Combined Area – Little River:
- Complete separation of this combined area

Outlets to Open Drain:
- Surface or underground storage
- Source control (downspout disconnect., etc.)
- LIDs
- Additional discharge is not permitted

4. Long Term Solutions – Strategy

Sanitary & Combined Sewer Solution Types by Area



- Increase sewer pipe size for conveyance
- De-centralized inline storage (super sized pipes)
- Additional treatment capacity or storage (centralized)
- Complete separation of combined
- Foundation drain disconnection

- Soft separation
- Additional treatment capacity

- Increase sewer pipe size for conveyance
- De-centralized inline storage (super sized pipes)
- Additional treatment capacity
- Foundation drain disconnection

4. Long Term Solutions – Strategy

Solutions rely on both public and private improvements.

4. Long Term Solutions – Strategy

Foundation Drain Disconnection

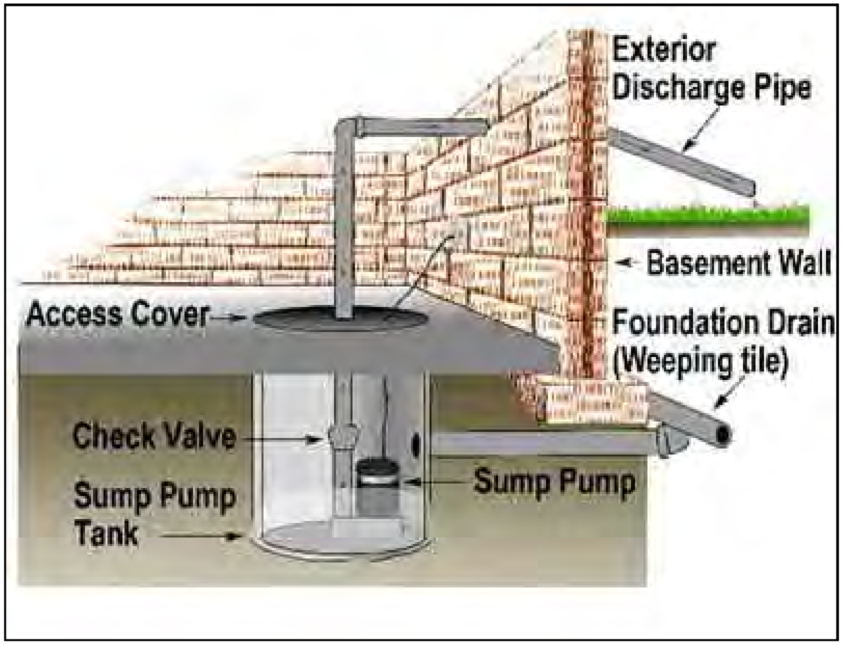
Major sources of Sanitary inflow and infiltration; foundation drains:

- 1980 or older connected to sanitary (**PURPLE AREA**)
- New than 1980, not connected

4. Long Term Solutions – Strategy

Foundation Drain Disconnection

- Require Reasonable % Uptake
- Partnered Approach
- Mandatory Program
- Subsidy Program Funded by City



4. Long Term Solutions – Strategy

Foundation Drain Disconnection

- Discussion:
  - Would public support mandatory programs?
  - What elements of these programs would be valuable?
  - How can we promote program uptake?
  - What could be challenging?

4. Long Term Solutions – Strategy

Level of Service

- Discussion:
  - What is a reasonable Level of Service?
  - What variables are important?
    - Storm Event, HGL Level

5. Next Steps & Upcoming Meetings

- Early July:
  - Review Draft Solution Alternatives
  - Evaluation Process
  - Tentative Dates: Thurs. June 27 or Wed. July 3
- Early August:
  - Review Preferred Solutions/PIC Materials.
  - Tentative Dates: July 30th – Scheduled
- September: Public Information Centre # 2
- Early October:
  - Review PIC Feedback
  - Review Preferred Solutions

5. Next Steps & Upcoming Meetings

- Other Events:

Little River Treatment Plant Tour

– June 1, 10:00 AM – 2:00 PM

Thank you!

MEETING MINUTES

Subject: City of Windsor Sewer Master Plan – Stakeholder Advisory Committee Meeting #5

Date and Time: July 3, 2019 at 6:00 p.m.

Location: Meeting Room 140, 350 City Hall Square West, Windsor, Ontario

Our File: 17-6638

At endees

General Public:	Ray Bezaire	Resident
	Ron Brant	Resident
	David Hanna	Resident
	John S. Holmes	Resident
	Tom Markham	Resident
	David Hilton	Resident
	Randal Sasso	Resident
Emergency Service Providers:	Stephen Laforet	Windsor Fire & Rescue Services
Environmental Groups:	Dr. Rajesh Seth	University of Windsor
	David Munro	Detroit River Canadian Cleanup
Community Groups and Public Health:	Amandeep Hans	Windsor-Essex County Health Unit
Sewer Master Plan Project Team:	Janelle Coombs	City of Windsor
	Joe Lappalainen	City of Windsor
	Karla Kolli	Dillon Consulting Limited (Dillon)
	Miriam Bart	Dillon Consulting Limited
	Ian Wilson	Dillon Consulting Limited
	Laura Herlehy	Dillon Consulting Limited
	Flavio Forest	Dillon Consulting Limited
	Dave Maunder	Aquafor Beech Limited
	Samir Dhanvantari	Aquafor Beech Limited

Absent

General Public:	Greg Plante	Imaginative Imaging
	Dr. Tirupati Bolisetti	Resident
	Frank Dattilo	Resident
	Bridget Scheuerman	Pillette, Riverside and Ford City BIA
Insurance Providers/Adjusters:	Maria LeBlanc	Easy Insure
	Pete Karageorgos	Insurance Bureau of Canada (IBC)
Sewer Master Plan Project Team:	Anna Godo	City of Windsor
	Wes Hicks	City of Windsor

Notes

Item	Discussion	Action By
1.	**Meeting Agenda and Past Meeting Minutes**	
1.1.	The presentation provided during this meeting is attached to these minutes.	**Info.**
1.2.	An overview of work completed since the last SAC meeting on May 9, 2019, was provided.	**Info.**
1.3.	Dillon acknowledged receiving email correspondence from D. Munro regarding the Southwinds Condo issues. The discussion regarding that property will be done separate from the SAC meeting.	**Info.**
2.	**Key Project Messages**	
2.1.	The three main messages that will be communicated to residents were presented and discussed. It was suggested that as part of the project implementation plan, the anticipated level of system improvements should be shown to help the public understand the benefit of implementing short-term and long-term solutions. Providing this comparison will help the public understand why the plan will take many decades to complete.	**Dillon/Aquafor**
3.	**Long-Term Solution Alternative Overview**	
3.1.	It was requested that the sanitary sewer shed area map include those areas within the Town of LaSalle and the Town of Tecumseh that contribute to the Windsor treatment plants.	**Dillon/Aquafor**
3.2.	Dillon confirmed that as part of the storm sewers system short-term and long-term solutions, that the use of the following types of measures are being considered: • Surface storage such as stormwater management ponds and depressed green areas to be used a flood plains; • LIDs (Low Impact Development Measures) to encourage infiltration of rain water; and • Inlet Control Devices (ICDs) to encourage temporary surface/road ponding in suitable locations.	**Dillon/Aquafor**
3.3.	It was recommended that terminology used to depict various storm intensities be revised to be easily understood (i.e. the depth of rain fall over a specific period of time) and that dimensions be in both metric and imperial units.	**Dillon/Aquafor**
3.4.	Based on the level of service, the type of house and depth of basements are factors that impact risk. This should be communicated to the public as it may encourage new home builders to use only partially buried basements.	**Info.**

3.5.	It was asked that solutions focus on reducing the amount of stormwater entering the storm and sanitary systems through surface storage. Dillon noted that initiative to reduce rain water getting into the sewer systems such as foundation drain disconnection, downspout disconnection and repair of public sewer infrastructure is being looked at. Also for the storm system, where practical, parks and other vacant areas are being considered for stormwater retention ponds.	**Info.**
3.6.	Costs included in the presentation do not factor inflation and are based on current day construction costs.	**Info.**
3.7.	It was asked that the amount of time required to implement the solutions be included as a factor for determining the preferred solution. Dillon confirmed that time is listed under the evaluation criteria.	**Info.**
3.8.	RTB Definition: Rapid Treatment Basin A unit that provides partial treatment to diluted sanitary sewer flows during rain events. This type of unit provides both settlement treatment as well as some chemical treatment. The purpose of this unit is to provide treatment to extraneous flows that the treatment plant cannot handle and to reduce the frequency of overflow events at the treatment plant.	**Info.**
3.9.	Storm problem areas have been identified through this Master Plan analysis. Where the surface ponding is causing property damage, safety concerns or access issues regional storm system solutions will be developed.	**Dillon/Aquafor**
3.10.	The storm solutions developed for Areas 1 and 2 include considerations to be included in the detailed design of the Riverside Vista Phase 2A project. The road and sewer system will be designed to reduce surface flooding to acceptable levels. Through a separate study being completed by Landmark Engineering, solutions to protect residents from high lake levels are being reviewed and incorporated into the overall strategy for this area. One solution alternative includes extending the existing landform barrier (berm) located along Riverside Drive, to the west. The proposed berm will be set at appropriate elevations to protect from current and future high water levels in the lake.	**Info.**
3.11.	A SAC member noted that on March 17, 1975, had extremely high lake levels and should be used as a reference. Dillon noted that historical lake levels were reviewed in determining a high water protection elevation. Landmark Engineering's, Lake Protection Study, projected potential future high lake levels to 2050 as a worst case scenario.	**Info.**
3.12.	It was noted that parks are good examples of places where surface storage could be used. Aquafor confirmed that parks and linear permeable systems (LIDs – Low Impact Development) solutions are being used.	**Dillon/Aquafor**

3.13.	It was noted that retention ponds are a cost effective solution for stormwater storage; however, they need to be maintained. It was also noted that these systems can fail during major rain events if not properly maintained or under extreme back-to-back rainfall events.	**Info.**
3.14.	There are several concurrent studies that are being undertaken to develop stormwater and sanitary servicing plans for various locations throughout the City. These studies include servicing and flood mapping studies for the Sandwich South Secondary Plan Area. The proposed hospital site off of County Road 42 will be utilizing on-site stormwater management measures to control stormwater runoff to the Upper Little River water course.	**Info.**
3.15.	The City is also undertaking a Stormwater Financing Study that is developing ways to finance stormwater management throughout the City. One type of incentive to reduce on-site stormwater runoff contributions for industrial/commercial/institutional sites that is being reviewed under this study includes the application of storm sewer rates according to the % imperviousness.	**Info.**
4.	**Public Consultation and Public Information Centre (PIC)**	
4.1.	To encourage public input and involvement, the following was recommended: • Develop a partnership between the City and the public by informing the public on the issues. • The City of Alexandria was highlighted as a good example of an effective way of communicating project information. • The Team needs to demonstrate the solutions are achievable and we should demonstrate the incremental benefits of implementing these solutions over time. • Communicate the implementation plan and inform the public that the plan includes continual monitoring to confirm effectiveness of solutions, specifically for short-term solutions that require private side investment and involvement. • Include success stories and provide positive results of other related studies. • More information on LIDs should be provided to the public including illustrative materials. • The public appreciates being made aware of proposed works and is key in the City being transparent to the public. This will build public trust.	**Dillon/Aquafor/City**
4.2.	The Team asked that SAC members review and provide comment on the evaluation criteria included in the presentation.	**SAC Members**

5.	**Next Steps and Upcoming Meetings**		
5.1.	An invite for the next SAC meeting will be sent to group members. The next presentation will be scheduled in advance of the PIC which is scheduled in late September 2019.	**Info.**	

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

LMH:d

July 30, 2019

Encl.

STAKEHOLDER ADVISORY COMMITTEE

degrees of CHANGE

City of Windsor SEWER MASTER PLAN

MEETING #5

July 3, 2019, 6:00 to 8:30 pm

350 City Hall Square W, Meeting Room 140

Presented by: DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

Agenda

Agenda Item	Approximate Time
1. Previous Minutes	10 min
2. Project Update/Activities since May 8, 2019	10 min
3. Draft Long Term Solution Alternatives A. South Windsor - Sanitary Sewer Solutions B. East Windsor - Sanitary Sewer Solutions C. East Windsor - Storm Sewer Solutions D. Road and Vulnerable Area – Surface Ponding E. Combined Sewer Solutions	60 min
4. Evaluation Criteria	20 min
5. PIC # 2 (Time Pending)	10 min
6. Next Steps & Upcoming Meetings	5 min

1. Previous Minutes

2. Overview of Activities Since January 2019

Next Steps:

City of Windsor Sewer Master Plan
Project Schedule: Technical Work

Task/Milestone	2018				2019			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Data Collection and Background Data Review								
Field Investigations and Flow Monitoring Data Collection								
Baseline Model Expansion								
Assessment and Review of Short-Term Solutions								
Sewer Model Calibration								
Assessment and Review of Long-Term Solutions						We are here		
Project Reporting and Functional Design								
ENGAGEMENT NEXT STEPS								
Newsletters								
SAC Meetings								
Public Information Centre								

2. Overview of Activities Since May 2019

1. Environmental Assessment and Consultation
   - Published Newsletter # 2
   - Little River Pollution Control Plant Tour
   - Meeting with City Re: Engagement Strategy
   - Developed Draft Evaluation Criteria

2. Sewer System Modelling
   - Updated model to include findings from related studies
   - Confirmed benefit of Sanitary Sewer Manhole Sealing
   - Confirmed benefit of Foundation Drain Disconnection
   - Confirmed benefit of Sewer and Manhole Sealing within the City's ROW.

2019 Home Show– Pop Up

Project Website

2. Overview of Activities Since May 2019

3. Short-Term Solution Recommendations
   - Established recommendations for short-term solutions incorporating City/Stakeholder feedback.
   - Developed a Recommended Immediate Action List.

4. Long-Term Alternative Solutions
   - Developing Long Term Solution Alternatives
     - See slides in section 3.

3. Long Term Solutions

Solutions have been developed based on the established Level of Service

- Sanitary System
- Storm System
- Combined System

Objective of this meeting:

– Get SAC feedback on
  - Solutions developed to date
  - Results of analysis to date
  - Feedback on messaging

3. Long Term Solutions

Key Messages for Public

1. Solutions will **reduce but not eliminate risk** of basement or surface flooding. Protection is key.
2. Solution rely on a **partnered approach**; solutions rely on a combination of private and public side improvement measures.
3. The plan will require **significant investment and take decades** to complete.

3. Long Term Solutions – Level of Service

Developed Level of Service Criteria

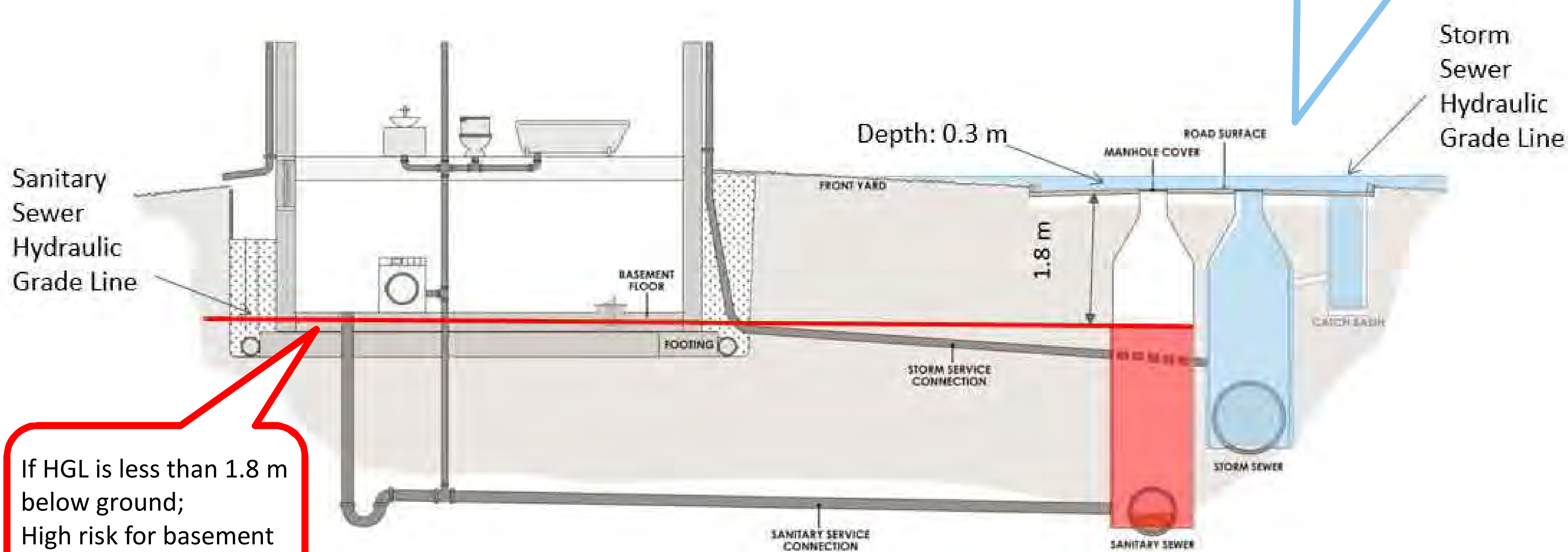
- Based on Sewer Modelling, Public Input, City Input
- Adaptive Approach
- Identified Problem Areas

LEVEL OF SERVICE	CRITERIA
STANDARD	1:100 Year Storm STORM: < 0.3 m Ponding in Roadways SANITARY & COMBINED: HGL is > 1.8 m below grade
ADAPTIVE APPROACH	CLIMATE CHANGE STORM EVENT STORM: < 0.3 m Ponding in Major Roadways STORM: High Water Level < Building Lowest Opening SANITARY & COMBINED: SENSITIVE LAND USE AREAS HGL is > 1.8 m below ground

3. Long Term Solutions – Level of Service

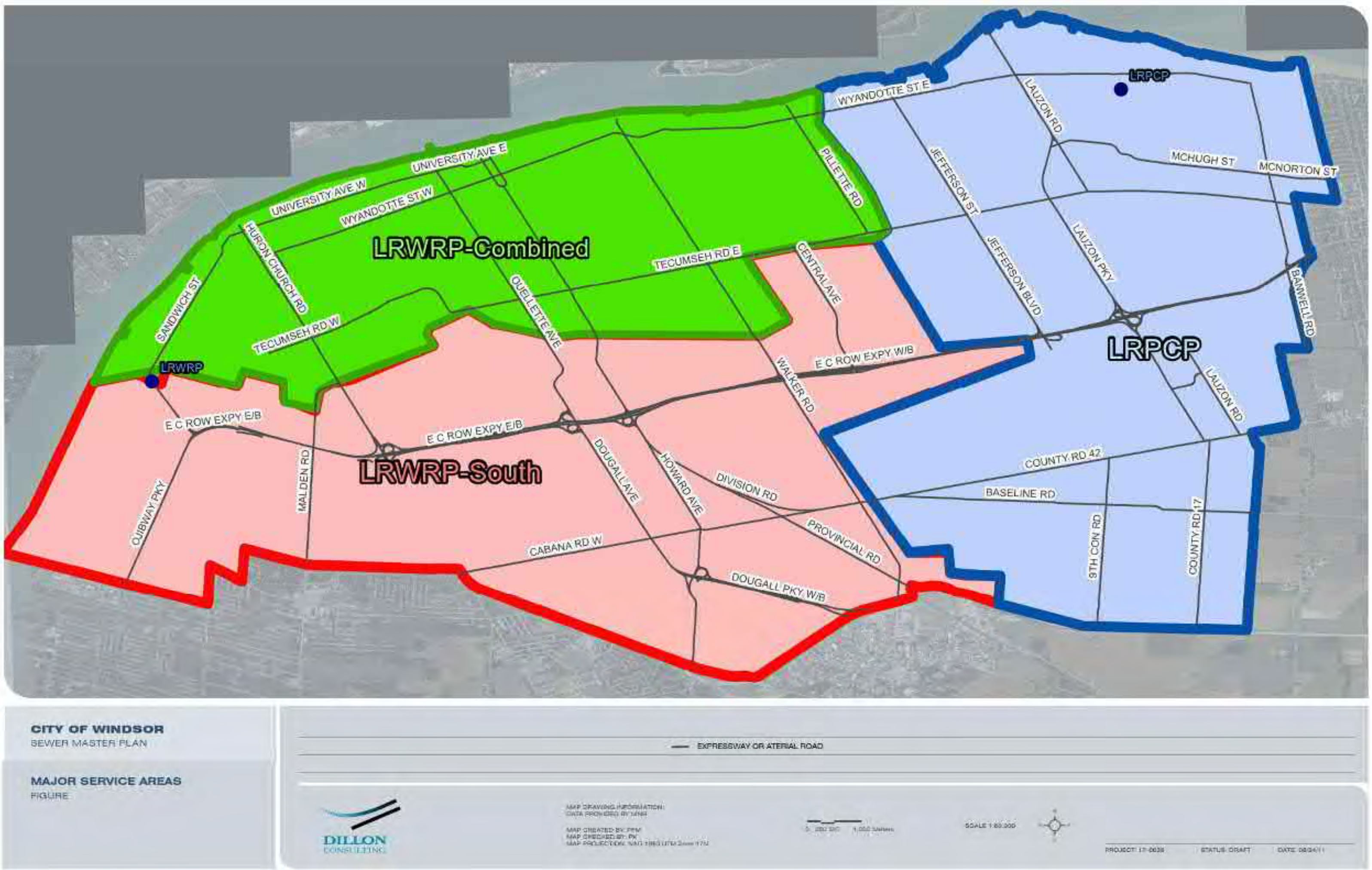
Level of Service – Homes

If stormwater surface ponding is greater than 0.30 m on road;
Surface water approaches home elevations.



If HGL is less than 1.8 m below ground;
High risk for basement flooding

3. Long Term Solutions – Sanitary Systems



3. Long Term Solutions - Sanitary Systems

Common to all separated sanitary sewer area solution alternatives:

Private Property:

- Foundation Drain Disconnection in all residential lots older than 1980 (70-90% of inflow and infiltration [I&I] in older areas)

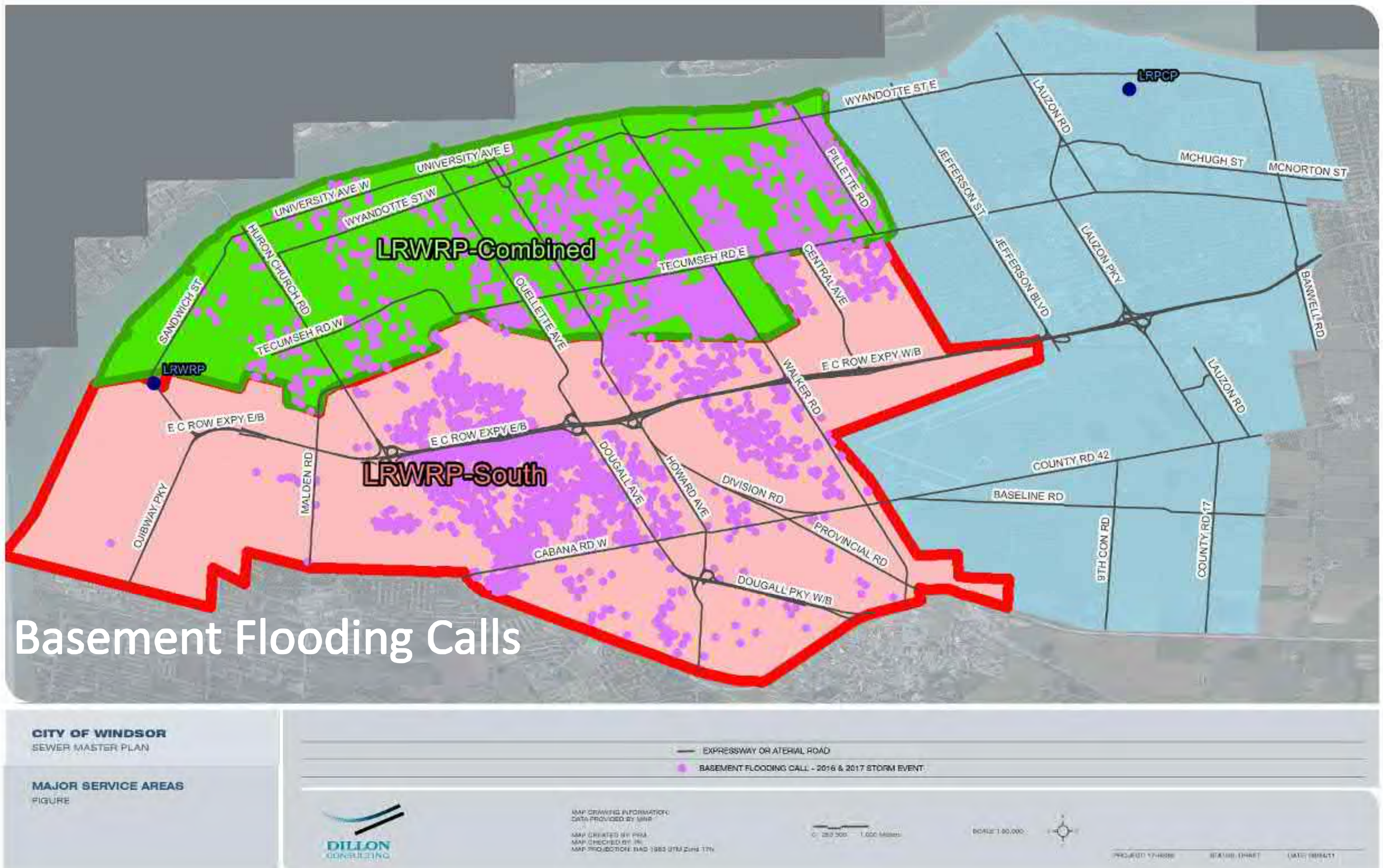
Public (City Owned) Property:

- All sanitary maintenance hole (MH) lids are sealed (5% of I&I)
- Future repair and relining of City sanitary sewers in right-of-way (i.e. under the road) (5-15% of I&I)
- Additional pumping/treatment capacity at the treatment plants

3A. South Windsor – Sanitary Solutions

<u>Sanitary Sewers – Problem:</u>

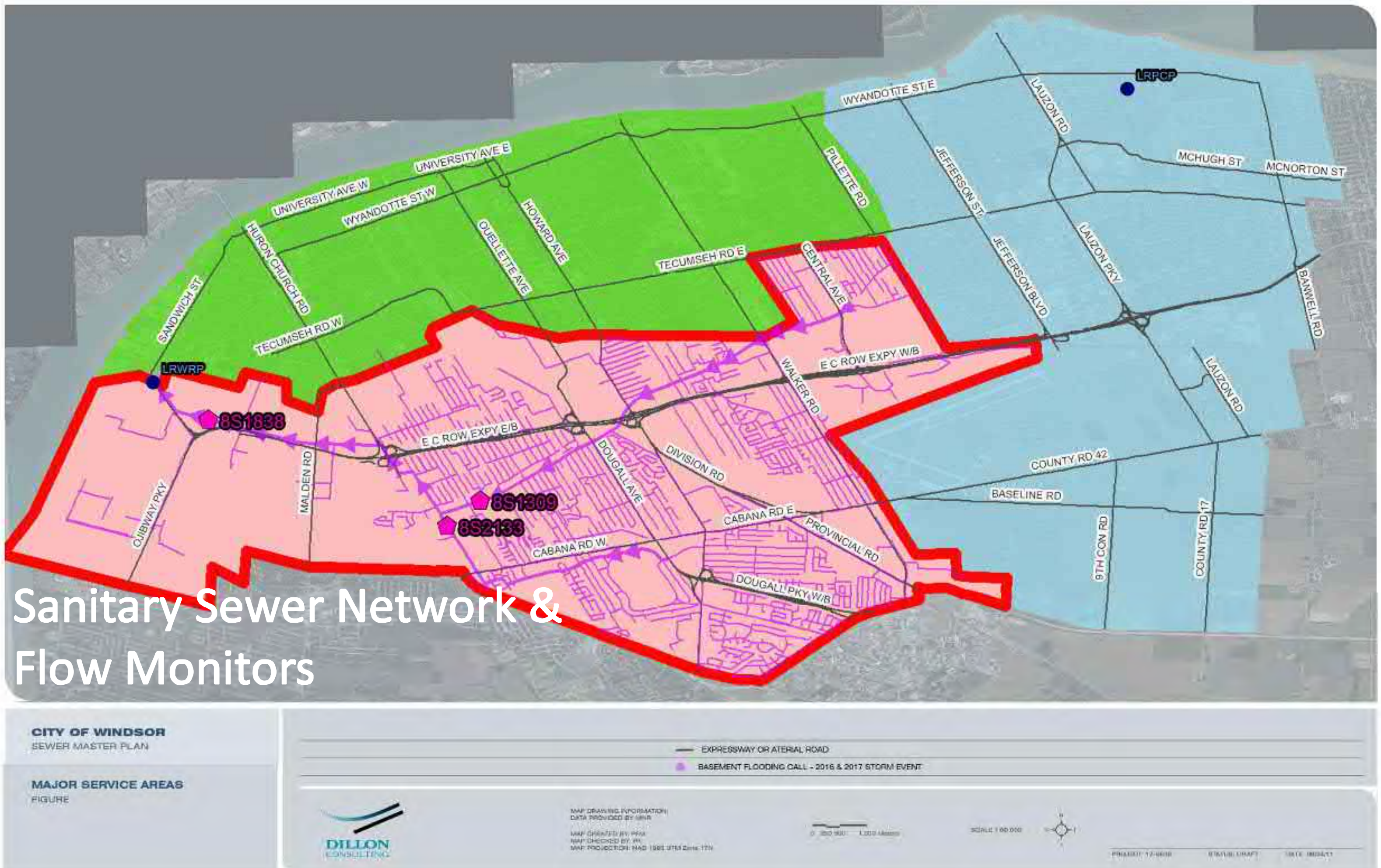
- In the Lou Romano WRP service area over 4,900 basement flooding reports from Sept 2016 & Aug 2017 storm events
- South in **RED**



3A. South Windsor – Sanitary Solutions

<u>Sanitary System:</u>

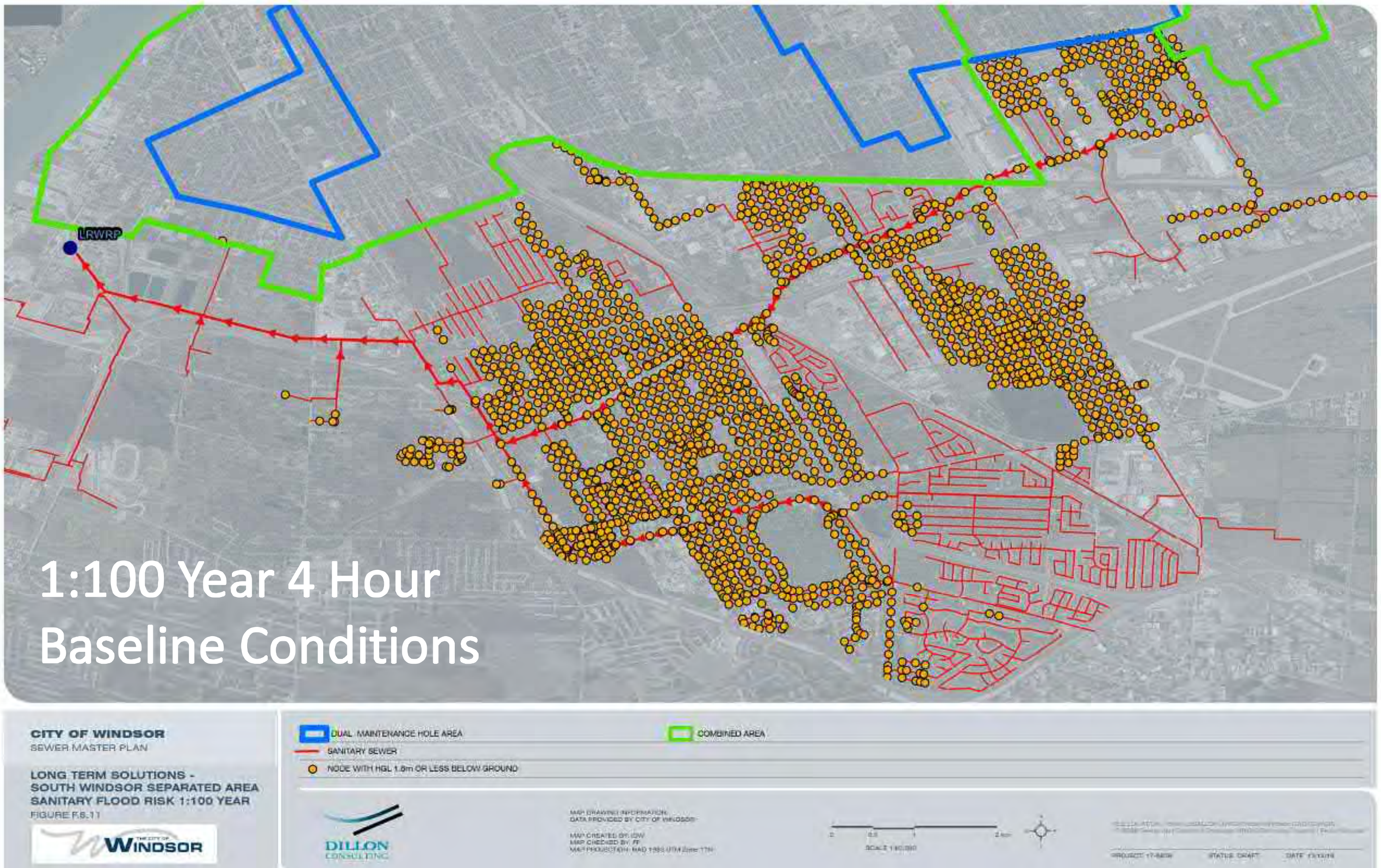
- 5,100 Hectares
- 340+ km of sewers
- Dry-weather Sewage Flows:
  - 50 to 60 ML/day
- Wet-weather Extraneous Flows:
  - 150 to 290 ML/day



3A. South Windsor – Sanitary Solutions

Existing Conditions:

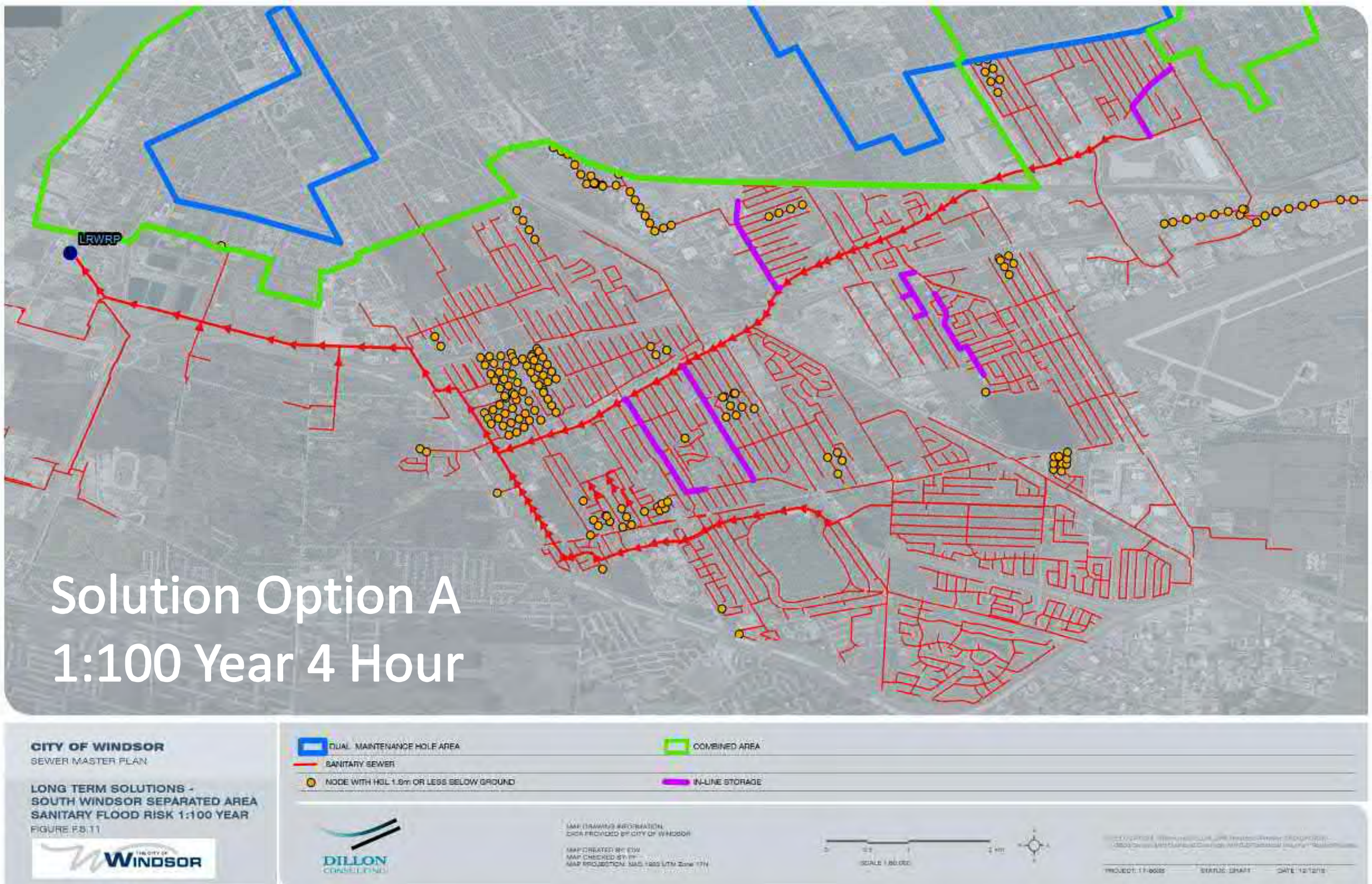
60% system wide basement flooding risk under 1:100 year storm



3A. South Windsor – Sanitary Solutions

<u>Alternative A:</u>

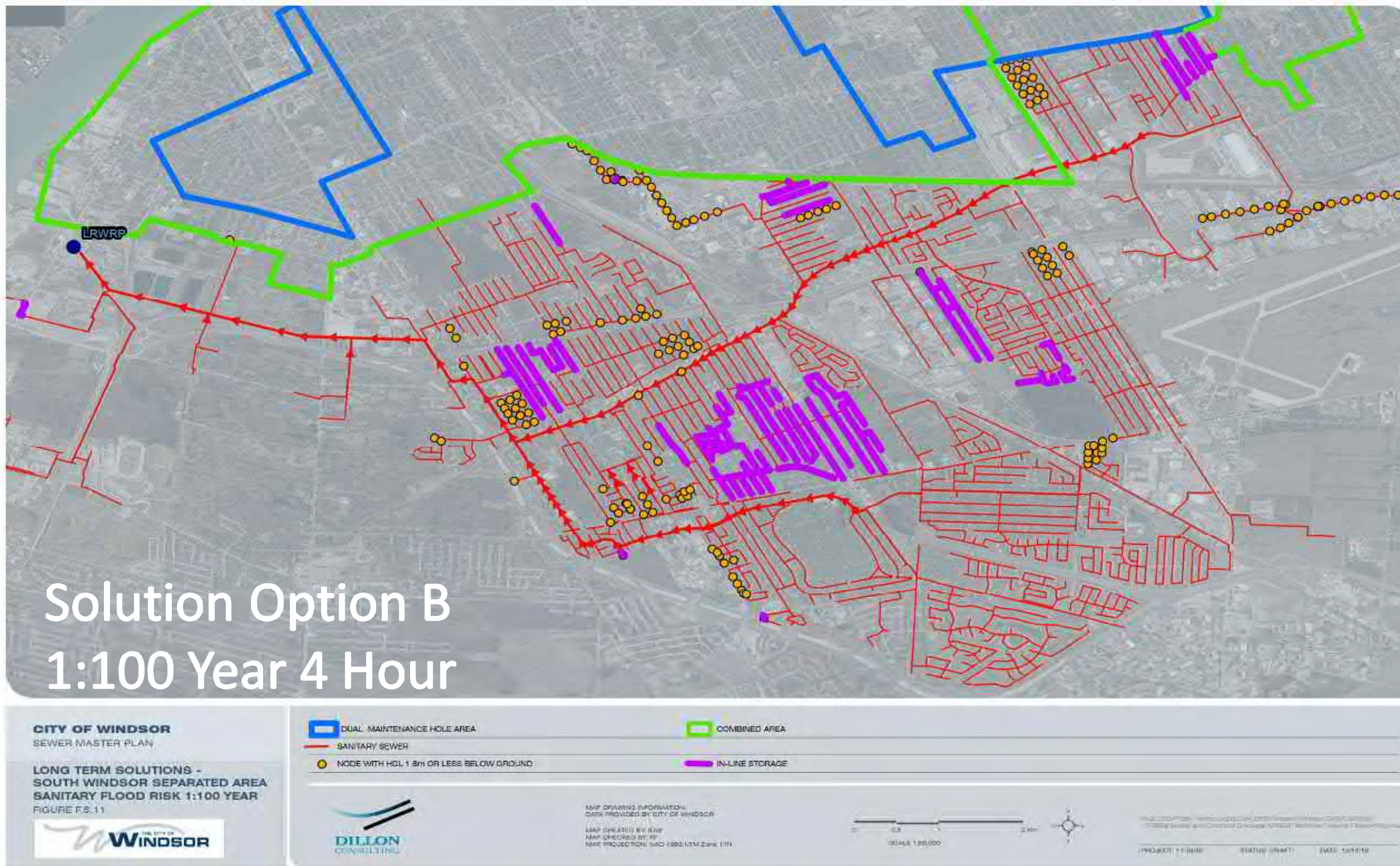
- Common conditions
- Targeted conveyance & storage in sub-trunks
- Lower system basement flooding risk under 1:100 year storm to 6%



3A. South Windsor – Sanitary Solutions

<u>Alternative B:</u>

- Common Conditions
- Decentralized Upstream Storage
- Lower system basement flooding risk under 1:100 year storm to 6%



3A. South Windsor – Sanitary Solutions

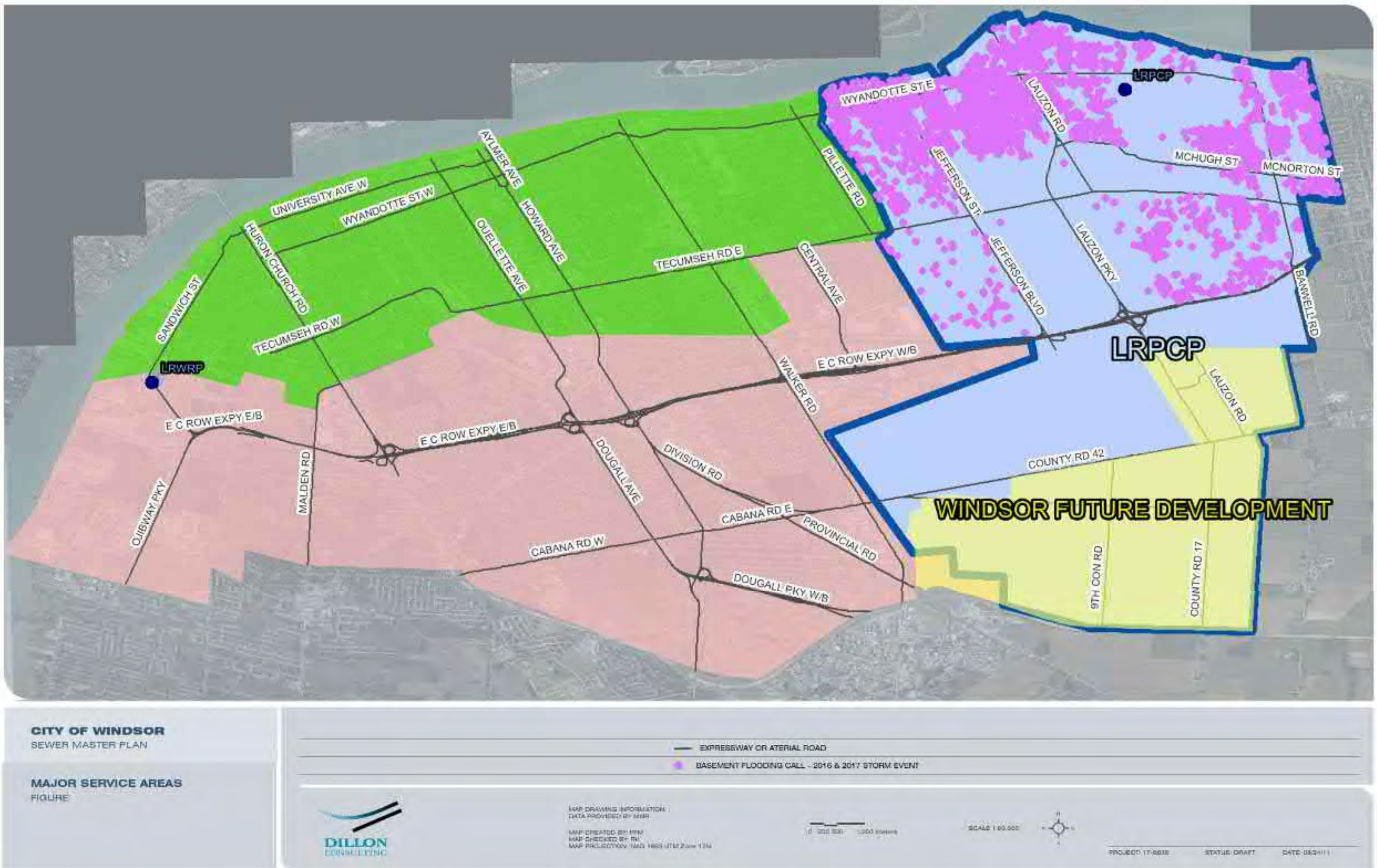
Criteria	Do Nothing No Improvements	Alternative A Targeted conveyance & storage in sub-trunks	Alternative B Decentralized Upstream Storage
1:100 Year storm basement flood risk over service area	59.6%	6.4%	6.4%
Climate Change storm basement flood risk over service area	91.2%	52.3%	53.8%
Cost Estimate ($ Million)			
Total including contingency	$0	$380 M	$450 M
Percent cost on public property	N/A	49%	41%
Percent cost on private property	N/A	51%	59%

Investment is a balance of public and private improvement measures.

3B. East Windsor – Sanitary Solutions

Basement Flooding

- Over 3,800 reports of basement flooding from Sept 2016 and Aug 2017 storm events



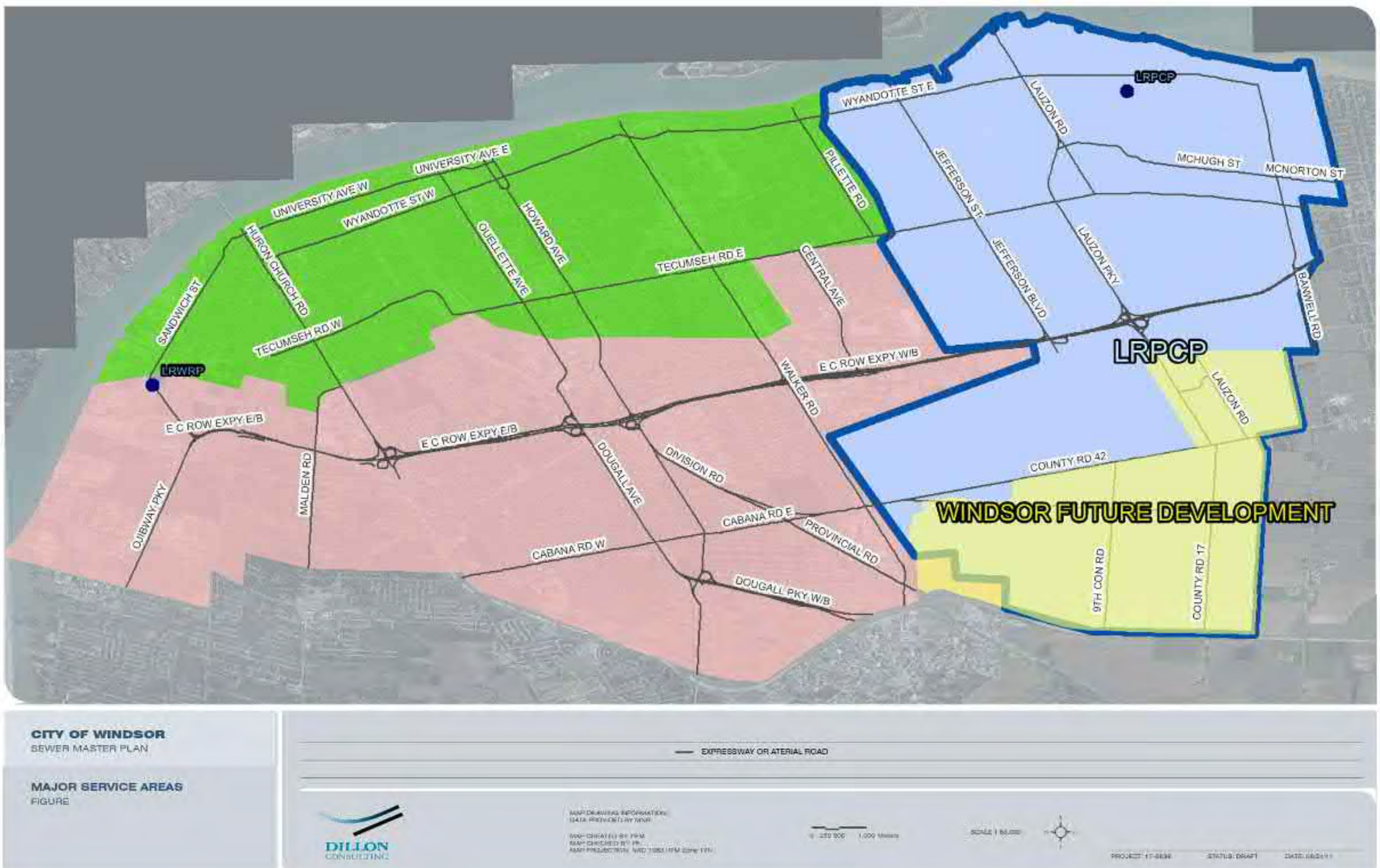
3B. East Windsor – Sanitary Solutions

East Windsor (Current)

- 3,000 ha service area with in Windsor
- 900 ha service area from Tecumseh
- 250+ km of Sanitary Sewer

East Windsor (Future)

- Significant future development from Tecumseh (not shown) and Windsor planned (yellow area)



3B. East Windsor – Sanitary Solutions

Background:

Little River Pollution Control Plan Sanitary Service Area

- Pontiac and St. Paul Pump Station & St. Rose Area Stormwater Study (Dillon, 2018).
  - Approved DMAF funding ($90M) for storm drainage improvements (10 year program)
  - Sewer Master Plan will address the following:
    - » Refinement/updating of storm drainage solutions
    - » Incorporate sanitary sewer improvements in these areas
    - » Satisfy Class EA requirements for any Schedule B projects

3B. East Windsor – Sanitary Solutions

Baseline Conditions

- Future Development flows incorporated
  - 1,150 ha new development
- Combined area separated as part of baseline alternatives

3B. East Windsor – Sanitary Solutions

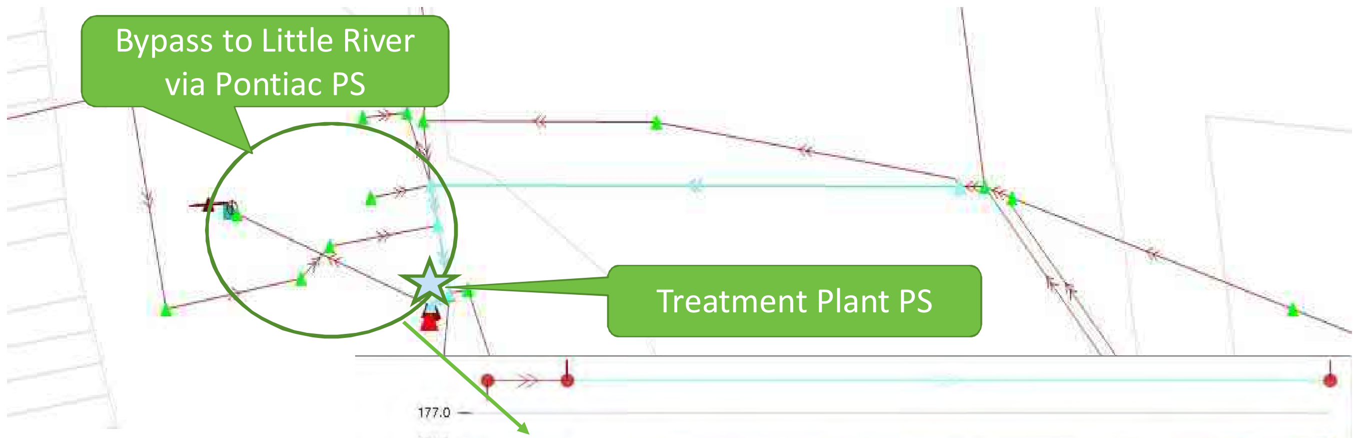
<u>Baseline Conditions Summary:</u>

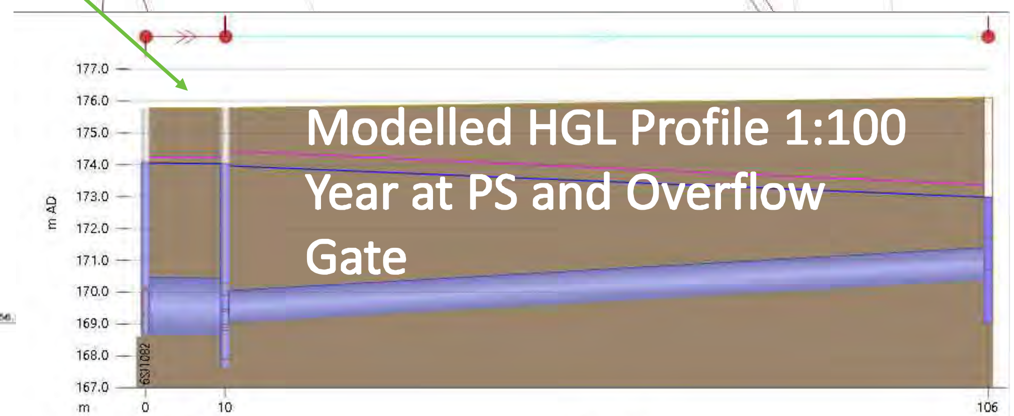
- Peak Flow to PCP = 4.7 cms
- Existing LRPCP pump station capacity = 2.6 cms
- Existing LRPCP treatment capacity = 1.17 cms

3B. East Windsor – Sanitary Solutions

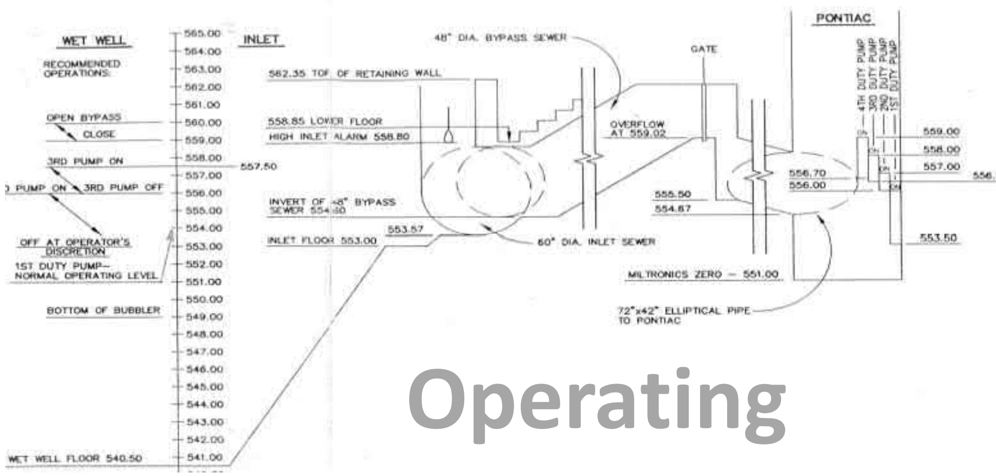
Existing Operations of Little River Pollution Control Plant

- Overflow event occurs when plant inflow exceeds 1.17 cms
- LRPCP has both by-pass (Pontiac PS) and plant overflow abilities
- Total plant overflow volume to Little River = 779,000 m^3 – 2017
- 22 occurrences of plant overflow totaling 342 hrs for the year





Link		6SJ1082.1	LRPCP-PS.5	
US flow (m3/s)		5.42697	2.76093	
r.pfc (m3/s)		3.635	-2.846	
Node	-	LRPCP-PS		Pontiac_Gate
Node ID	-	LRPCP-PS		Pontiac_Gate
ground (m AD)	-	175.780		176.100
level (m AD)	-	174.031		172.977
flood dep (m)	-	-1.749		-3.123



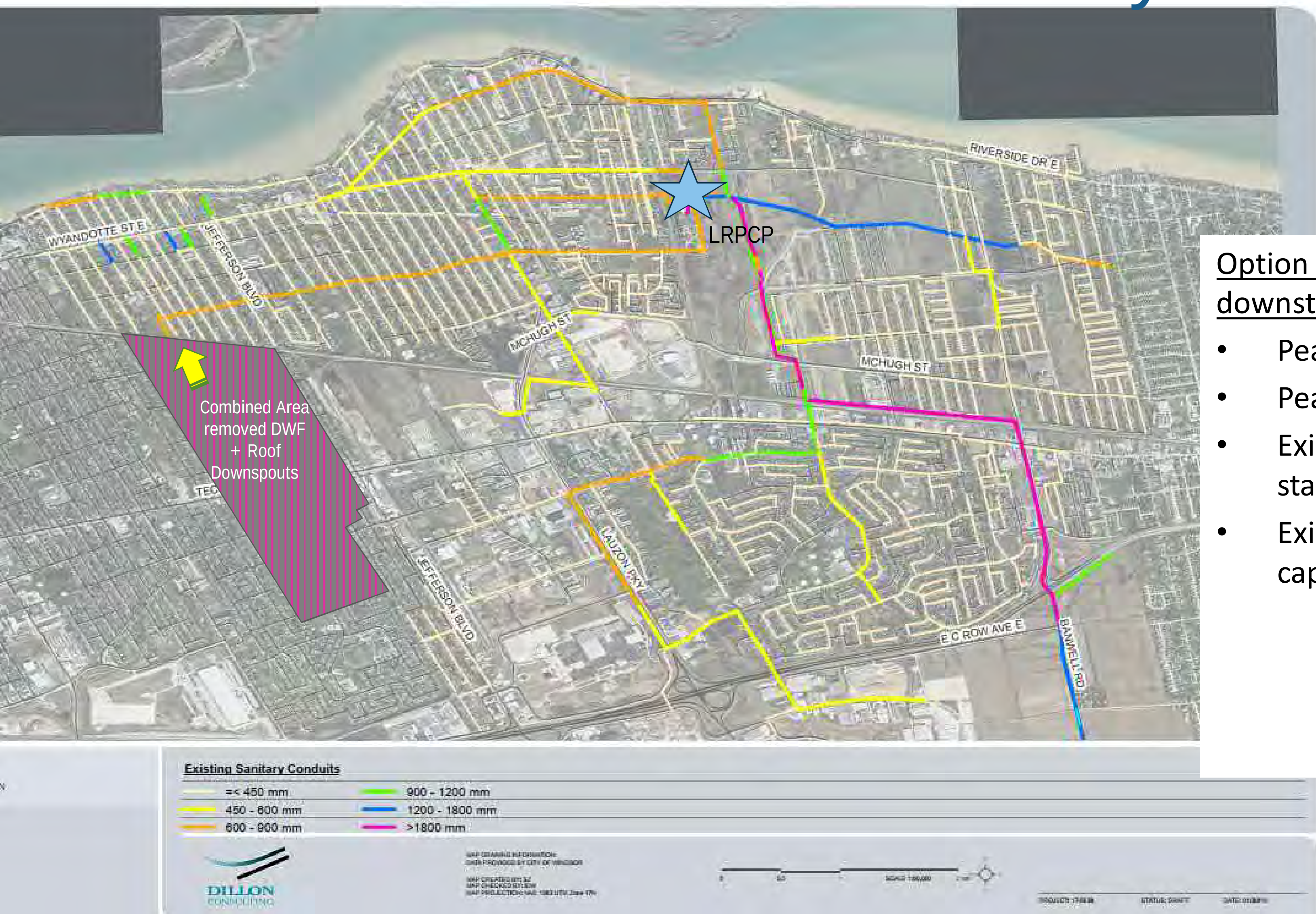
Operating Condition

3B. East Windsor – Sanitary Solutions

Alternatives:

- **Option 1** – Maintain existing infrastructure to the LRPCP with centralized downstream storage/treatment before the LRPCP pumping station
- **Option 2** – Improve conveyance of sanitary flows upstream to the LRPCP with treatment / overflow to the Detroit River
- **Option 3** – Upstream decentralized storage in the system for a controlled release to the LRPCP with treatment/overflow to the Detroit River

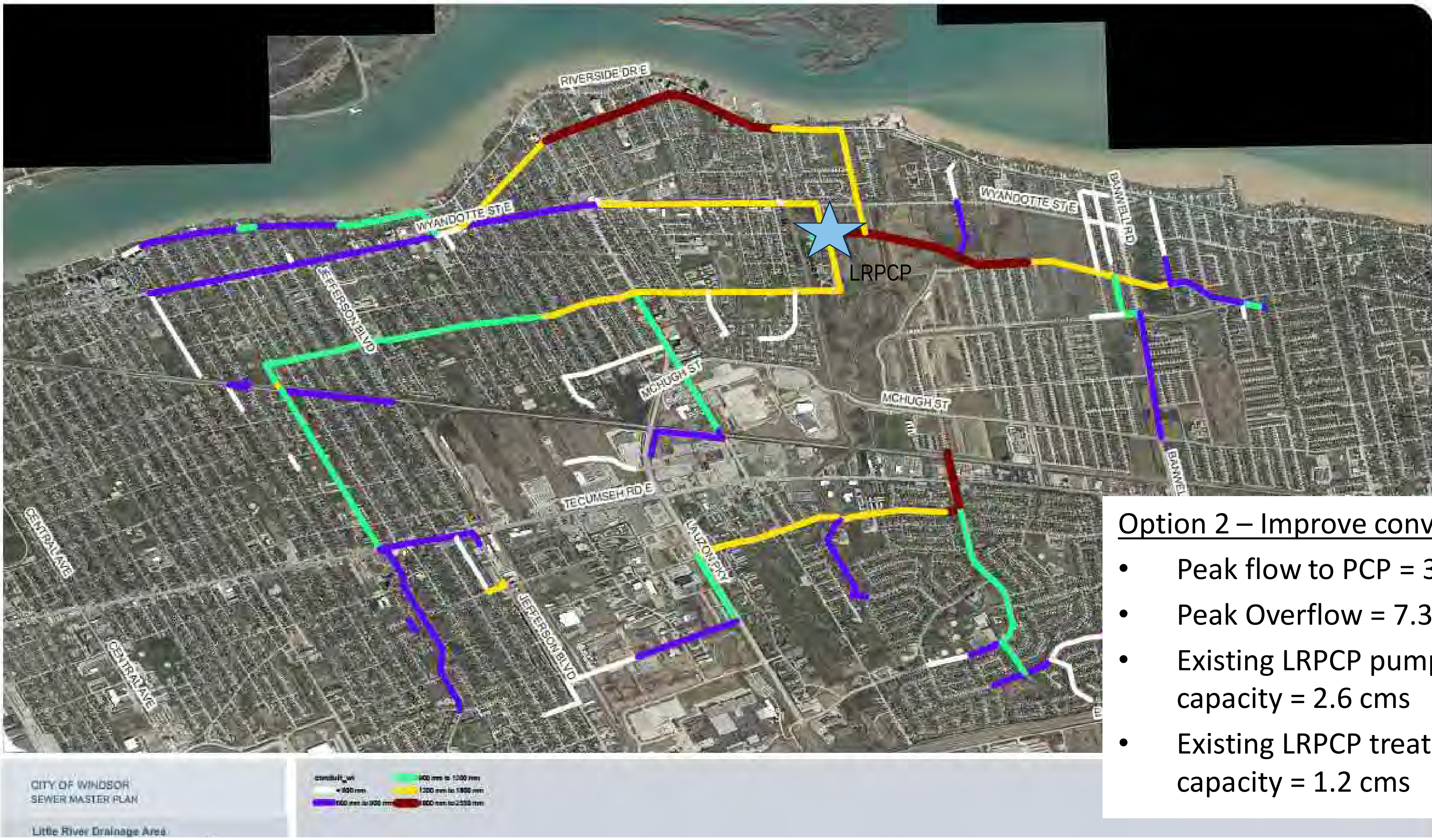
3B. East Windsor – Sanitary Solutions



<u>Option 1 – Centralized downstream storage/treatment</u>

- Peak flow to PCP = 2.8 cms
- Peak Overflow = 3.3 cms
- Existing LRPCP pump station capacity = 2.6 cms
- Existing LRPCP treatment capacity = 1.2 cms

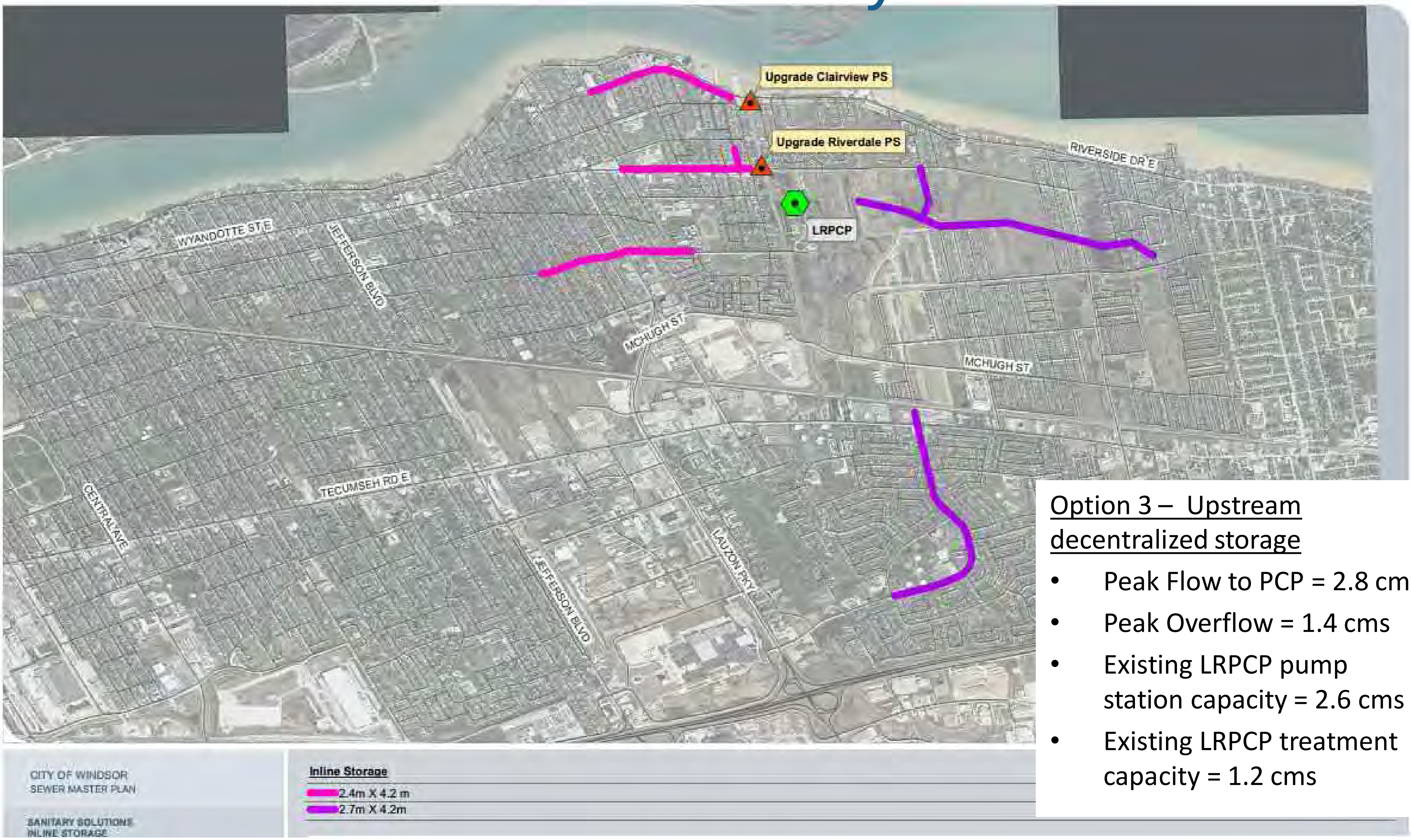
3B. East Windsor – Sanitary Solutions



<u>Option 2 – Improve conveyance</u>

- Peak flow to PCP = 3.0 cms
- Peak Overflow = 7.3 cms
- Existing LRPCP pump station capacity = 2.6 cms
- Existing LRPCP treatment capacity = 1.2 cms

3B. East Windsor – Sanitary Solutions



Option 3 – Upstream decentralized storage

- Peak Flow to PCP = 2.8 cms
- Peak Overflow = 1.4 cms
- Existing LRPCP pump station capacity = 2.6 cms
- Existing LRPCP treatment capacity = 1.2 cms

3B. East Windsor – Sanitary Solutions

Implications

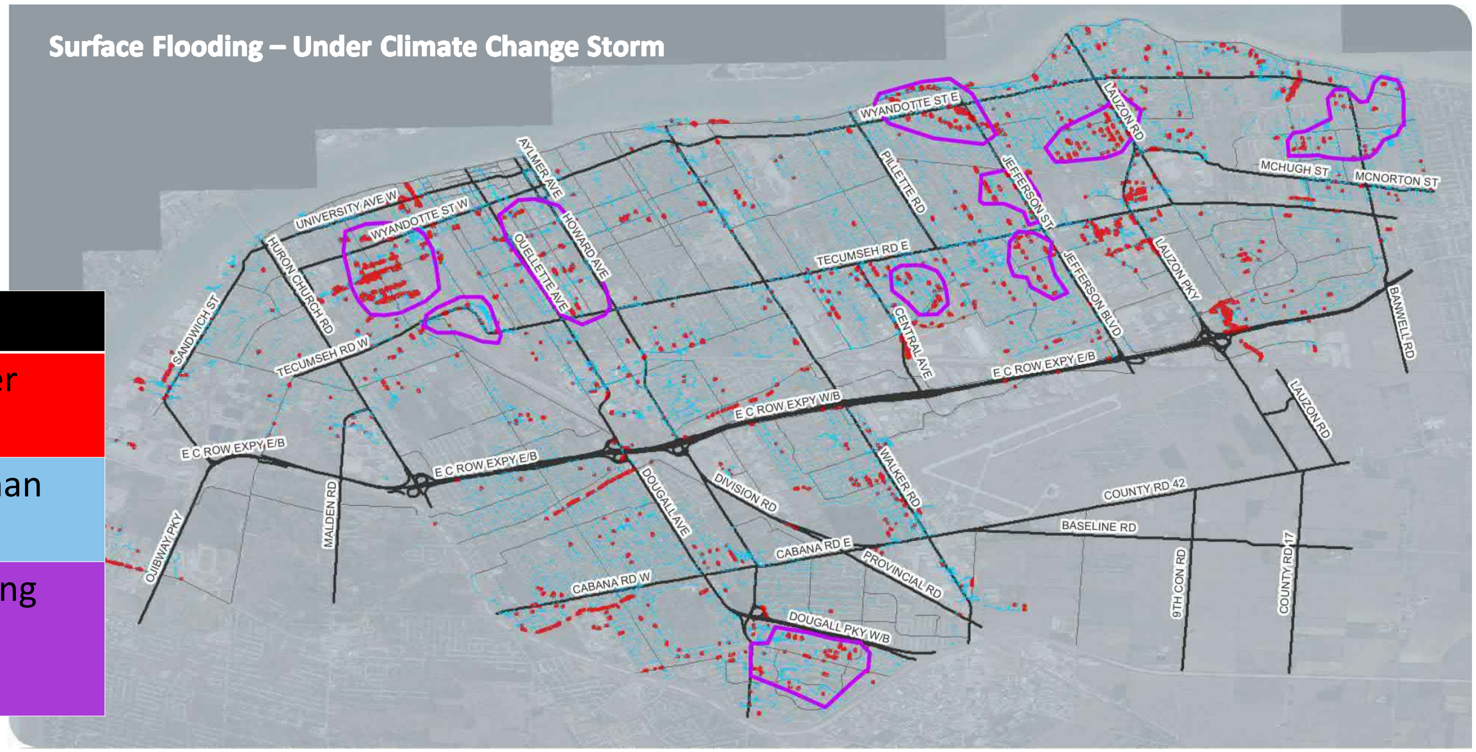
Evaluation - 100 year 4h Chicago Storm	Baseline Conditions No Overflow	Alternatives 1 Baseline w/ Overflow	2 Conveyance	3 Storage
STP Capacity (m3/s)	1.17			
PS Capacity @ STP (m^3/s)	2.6			
Total Volume DWF@ STP (m^3)	56,705	56,705	56,705	56,705
Peak DWF @ STP (m3/s)	1.0			
PS Volume (m3)	244,270	181,190	179,314	204,000
Overflow Volume @ STP (m^3)	0	66,758	102,491	41,365
PS Peak Flow @ STP (m3/s)	4.7	2.8	3.0	2.8
Overflow Peak Flow @ STP (m3/s)	0	3.3	7.3	1.4
Total Peak Flow to STP (m3/s)	4.7	6.1	10.3	4.2
Total WWF Volume (m3)	187,565	191,244	225,101	188,660
Total Volume	244,270	247,948	281,806	245,365
Total Drainage Area (ha)	7,393			
Replacement Sewer Length (m)			42,200	7,300
Estimated Cost ($M)				
Linear Infrastructure - Conveyance/Storage			$ 121.38	$ 117.10
Storage @ STP			$ 153.74	$ 144.51
Private Property Works (9,567 homes)				
Public Property Rehabilitation (16.7% of Linear Infrastructure)			$ -	$ -
Contingency 30%			$ 82.54	$ 78.48
Total Estimate ($M)			$ 357.65	$ 340.10

*Costs are preliminary

3. Long Term Solutions - Storm System

Objectives:

- Reduce max surface flooding to less than 0.30 m under 1:100 Year Storm.
- To provide resilient solutions for sensitive areas, by reducing max surface flooding to less than 0.30 m under Climate Change Storm



LEGEND	
Red	Surface Flooding Deeper than 0.30 m Deep
Blue	Surface Flooding less than 0.30 m Deep
Purple Boundaries	Regional Surface Flooding Problem Areas – Being Reassessed for Risk

3C. East Windsor - Surface Flooding

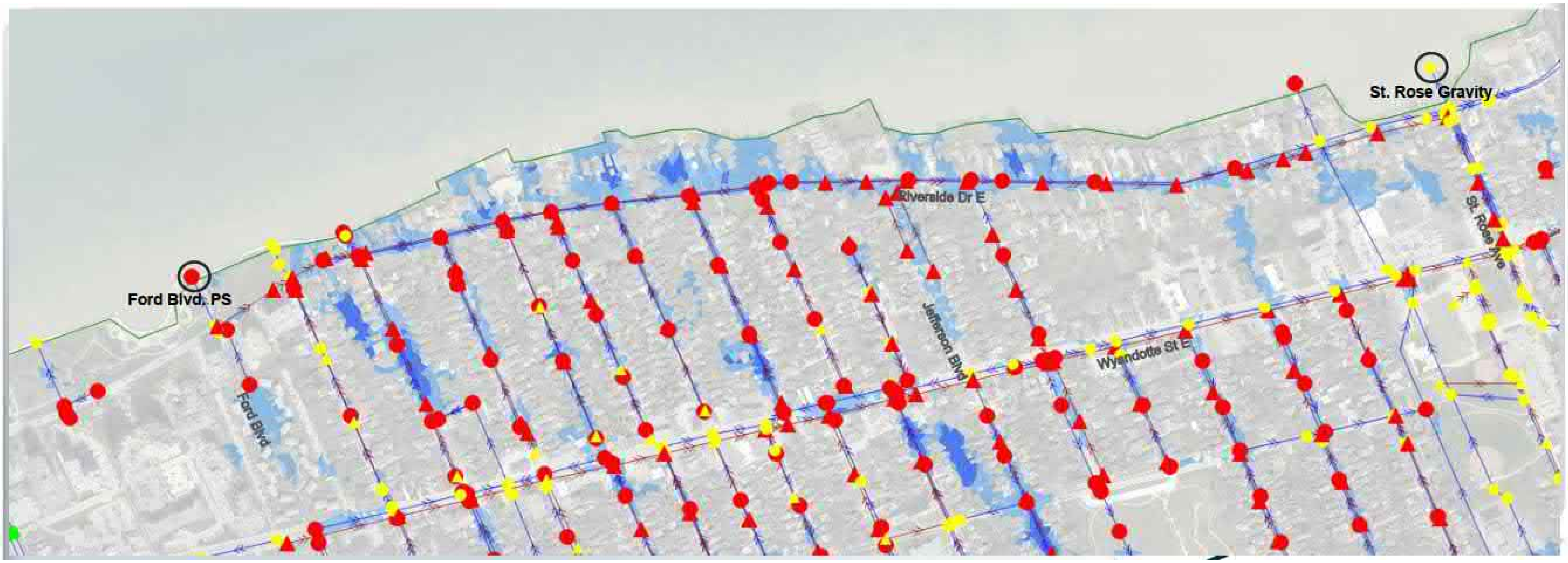
- Primary flooding locations

3C. East Windsor/Riverside – Storm – Areas 1&2

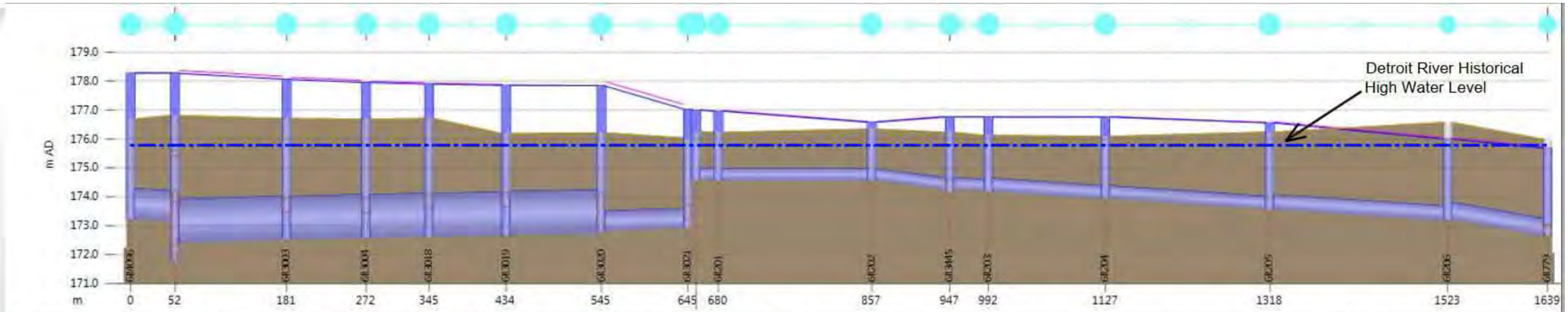
- Existing Storm Sewer System draining to Detroit River
  - o Ford Blvd. PS
  - o St. Rose Gravity Outfall
  - o St. Paul PS

3C. East Windsor - Surface Flooding

Riverside Vista Area Flooding – Major/Minor



3C. East Windsor - Surface Flooding Riverside Vista Flooding – Minor System



Link	-	6R3003.1	6R3004.1	6R3018.1	6R3019.1	6R3020.1	6R3021.1	-	6R201.1	6R202.1	-	6R203.1	6R204.1	6R205.1	6R206.1
System type	storm	storm	storm	storm	storm	storm	storm	-	storm	storm	storm	storm	storm	storm	storm
length (m)	51.5	129.1	91.8	72.9	89.0	110.4	100.0	-	177.6	89.9	44.7	135.2	190.4	205.6	115.4
width (mm)	1050	1500	1500	1500	1500	1500	675	-	400	400	400	450	450	500	600
height (mm)	1050	1500	1500	1500	1500	1500	675	-	400	400	400	450	450	500	600
us inv (m AD)	-	172.524	172.582	172.619	172.671	172.738	172.915	-	174.567	174.567	-	174.189	173.932	173.570	173.207
ds inv (m AD)	-	172.409	172.515	172.579	172.607	172.680	172.832	-	174.567	174.252	-	173.932	173.570	173.183	172.649
grad (m/m)	-	0.00090	0.00073	0.00054	0.00072	0.00052	0.00082	-	0.00000	0.00350	-	0.00190	0.00190	0.00188	0.00483
US flow (m3/s)	-	-2.81912	-2.38448	-1.82810	1.53777	1.52539	-0.74113	-	0.12972	0.12952	-	0.16594	0.21600	0.39175	0.48011
US velocity (m/s)	-0.388	-1.448	-1.228	0.950	0.922	1.004	-1.778	-	0.926	1.024	1.073	0.951	1.214	1.744	1.684
Max surcharg	1	2	2	2	1	1	2	1	2	2	2	2	2	2	2
r.pfc (m3/s)	1.008	2.118	1.912	1.648	1.896	1.619	0.241	-	0.000	0.123	0.066	0.124	0.124	0.164	0.427
DS flow (m3/s)	-	-2.81444	-2.38207	-1.82638	1.52858	1.51804	-0.74126	-	0.12889	0.12964	-	0.16598	0.21516	0.37977	0.48006
DS velocity (m/s)	-0.603	-1.439	-1.224	0.945	0.804	0.798	-1.730	-	1.015	0.970	1.085	0.961	1.259	1.828	1.620

3C. East Windsor - Surface Flooding

Primary Issues

- Undersized storm sewer system
- Excessive surface flooding
- Adverse lot grading along north side of Riverside Drive

3C. East Windsor - Surface Flooding

Recommended Works – Storm – Areas 1&2

- St. Paul and Pontiac Pump Station and St. Rose Storm Drainage Areas Study

3C. East Windsor - Surface Flooding Alternatives – Areas 1&2

- Upgrade the storm sewer infrastructure to provide adequate minor system capacity
- Increase or provide pumping stations
- Regrade Riverside Drive
- LID at selective locations (> 176.8 m, sewers older than year 2000)

3C. East Windsor - Surface Flooding

Riverside – Potential Upgrades

- Ford Blvd PS upgrade
  - Current capacity 0.3cms
  - Recommend upgraded capacity of 10cms

3C. East Windsor - Surface Flooding

Riverside – Potential Upgrades

- **St. Rose Outfall – potential new PS**

3C. East Windsor - Surface Flooding

Riverside – Potential Upgrades

- **St. Paul PS upgrade**
  - Current capacity 10cms
  - Recommended capacity 15cms

3C. East Windsor - Surface Flooding
Little River Combined Sewer Area– Areas 3&4

- **Combined Sewer**
  - Drains to LRPCP via Edgar Ave. Sanitary Sewer
- **Storm Sewer**
  - NW area drains to Detroit River via Ford Blvd Storm Trunk
  - Balance of system drains east to Little River

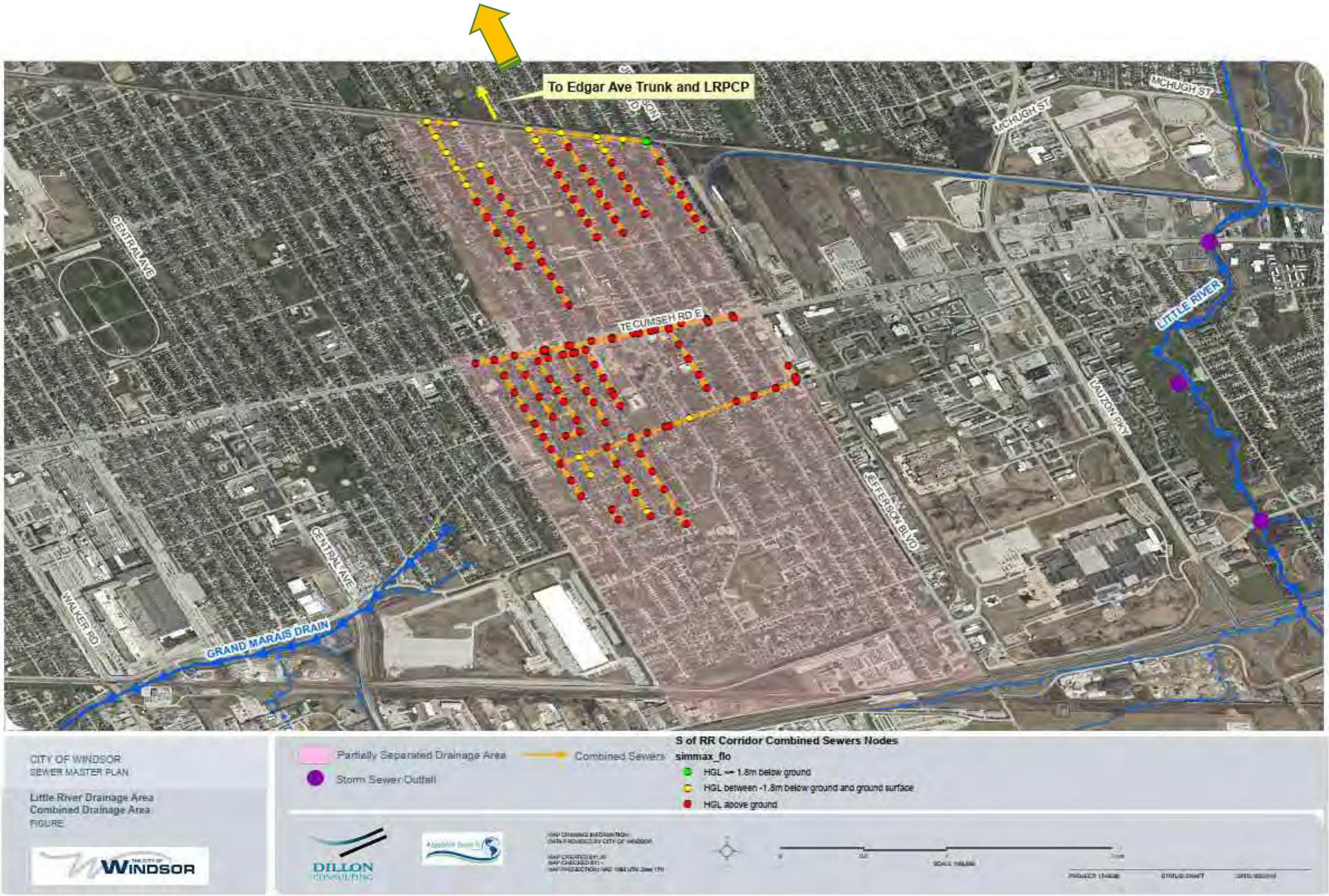
3C. East Windsor - Surface Flooding

Primary Issues

- Undersized combined and storm sewers
- Excessive surface flooding
- Combined sewer overflows

3C. East Windsor - Surface Flooding

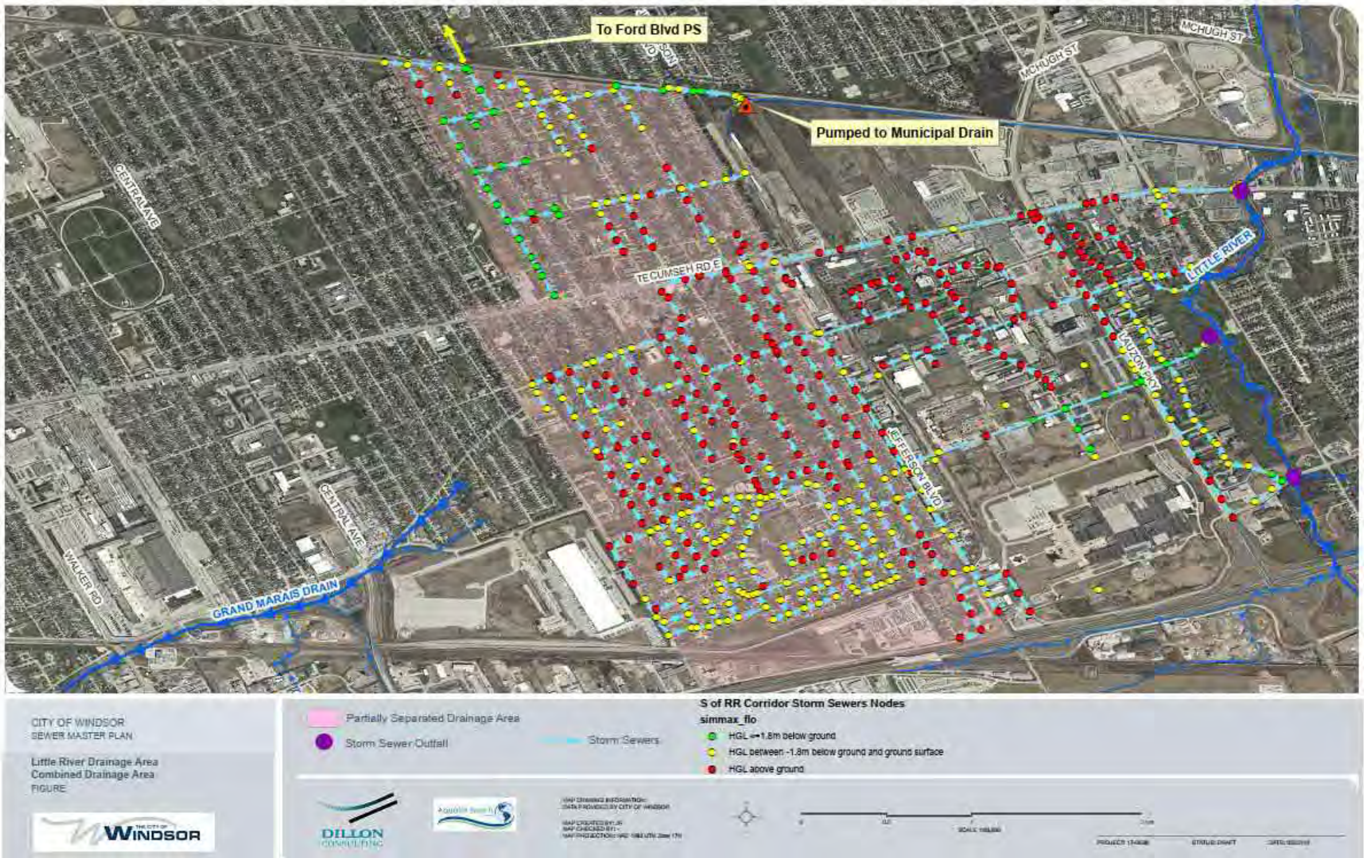
Combined Sewer System HGL



- HGL exceeds ground level in most of the system

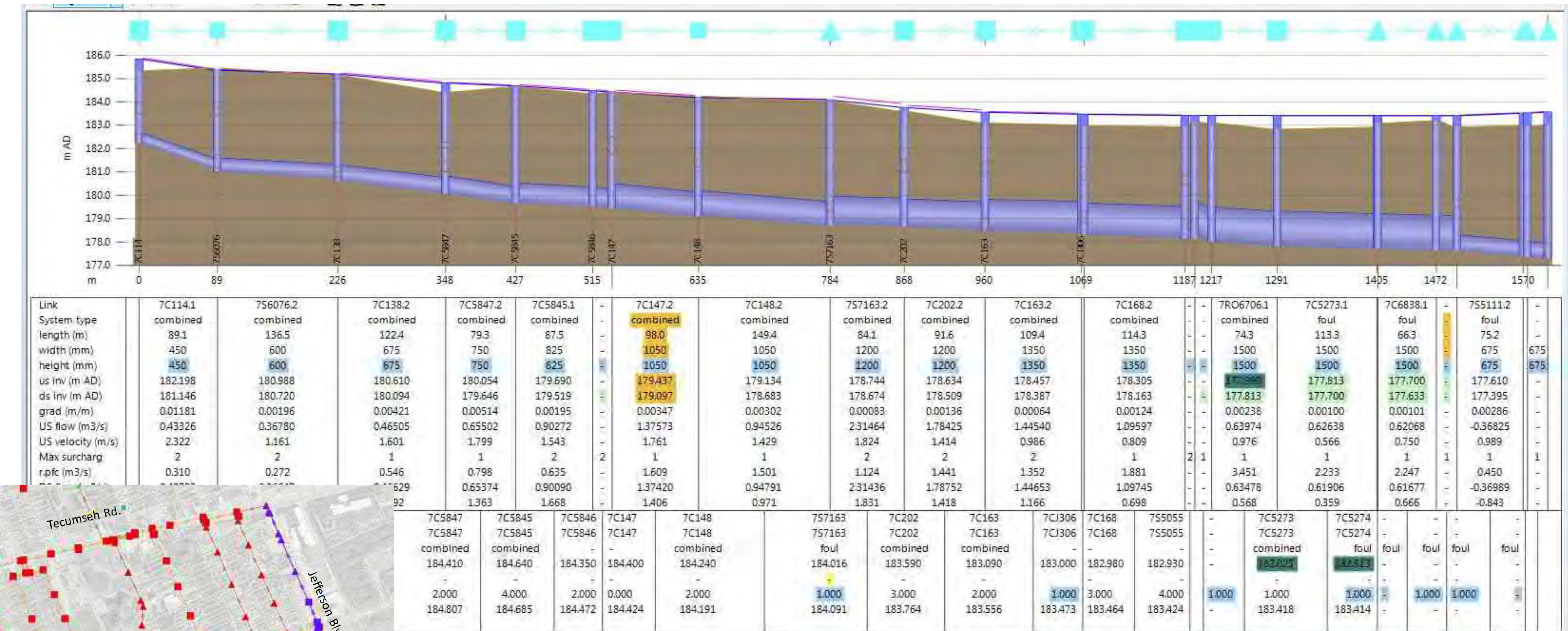
3C. East Windsor - Surface Flooding

Storm Sewer System HGL



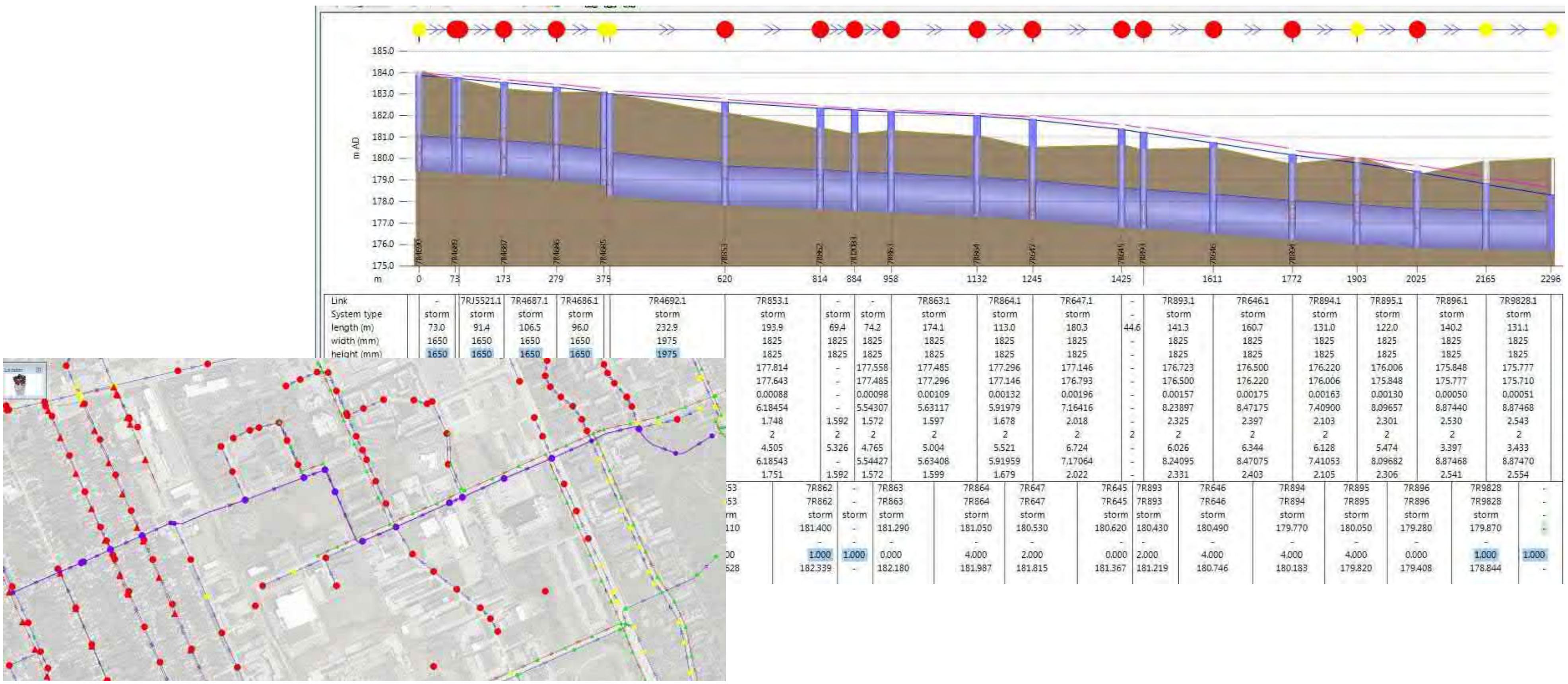
- Storm sewers are surcharged above the ground contributing to flooding

3C. East Windsor - Surface Flooding Combined Sewer – Rose St. & Jefferson Blvd.



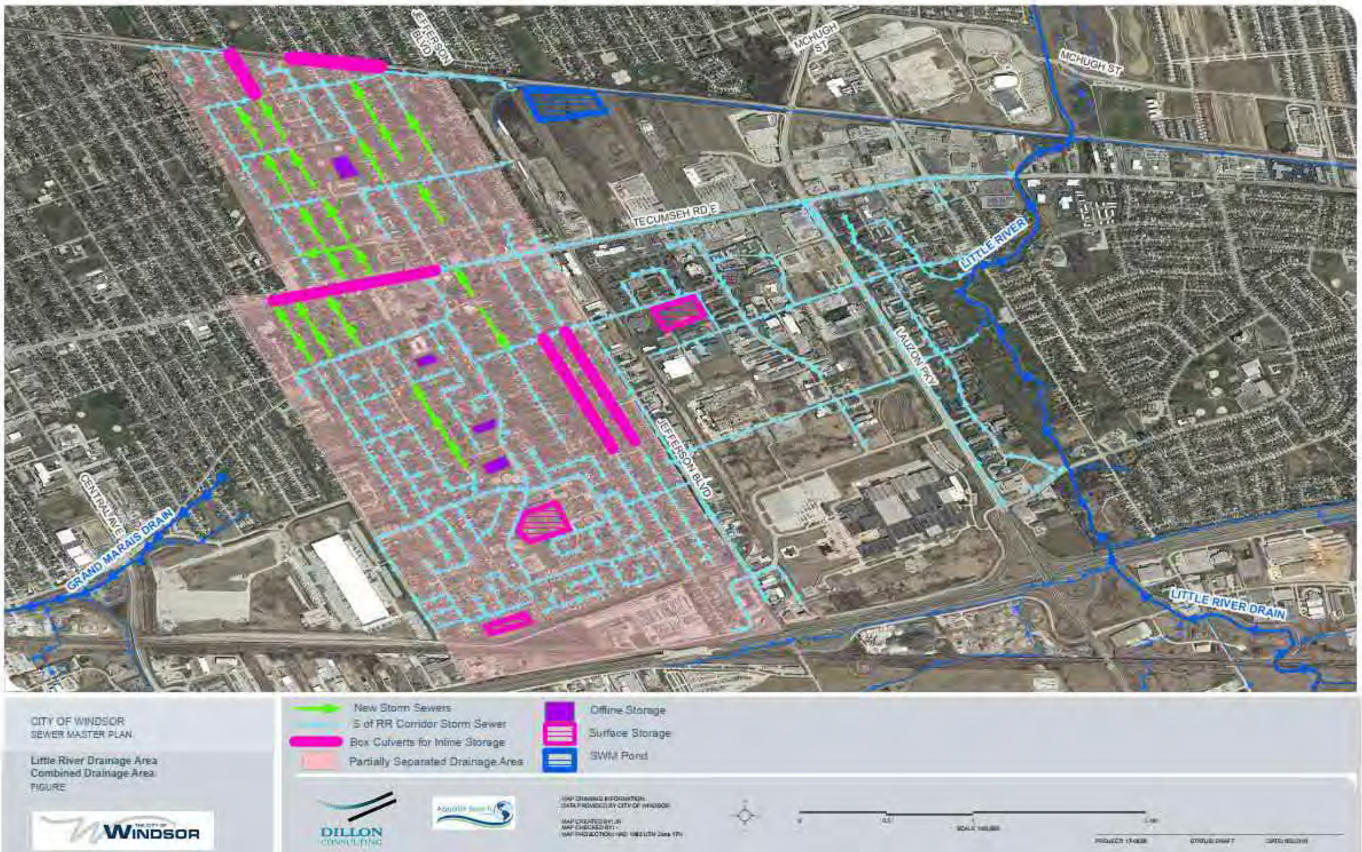
3C. East Windsor - Surface Flooding

Storm Sewer – Rose St. & Roseville Garden Dr.



3C. East Windsor - Surface Flooding

Potential Alternatives – Areas 3&4



- Storage requirement due to ERCA constraint at Little River (cannot increase flows to the Little River system)

3C. East Windsor - Surface Flooding Alternatives – Areas 3&4

- Provide storm sewer infrastructure to accommodate flows from combined sewers
- Low Impact Development
- Localized storage (inline or offline)
- Storage to meet ERCA – no increase in flows
- Increase pumping station capacity

3C. East Windsor - Surface Flooding Potential Alternatives – Areas 3&4

- Example – Terraview SWM pond (Toronto) Construction

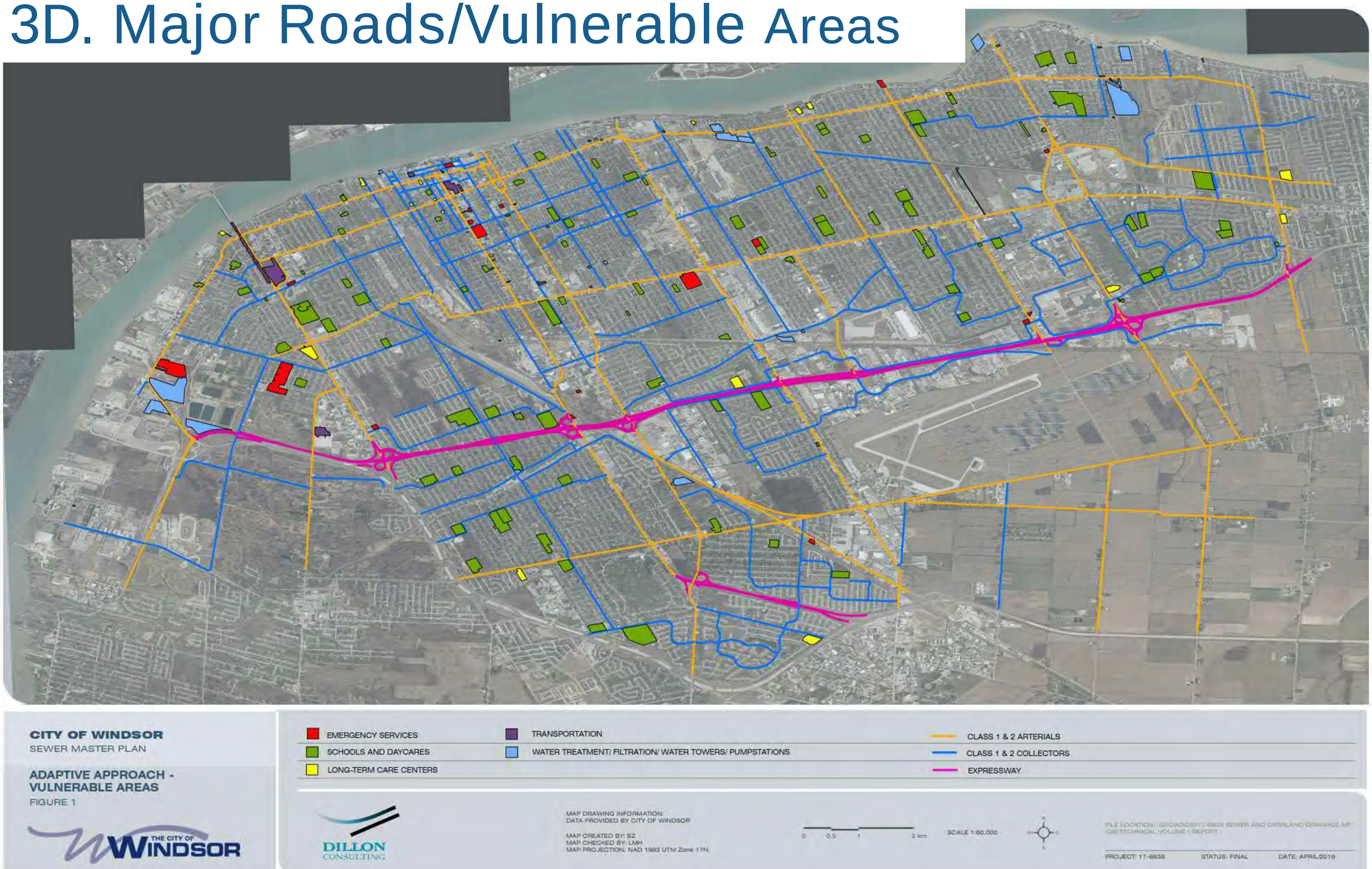
3C. East Windsor - Surface Flooding Potential Alternatives – Areas 3&4

- Example – Terraview SWM pond (Toronto)

3C. East Windsor - Surface Flooding Potential Alternatives – Areas 3&4

- Example – Copland Park (Aurora)

3D. Major Roads/Vulnerable Areas



3D. Major Roads/ Vulnerable Areas

SAMPLE LIST

Based on modelling results, determine where surface flooding is greater than 0.3 m in sensitive areas:

- Arterial Roads
- Collector Roads
- Vulnerable Areas

(Schools, hospitals)

Meet with EMS to Confirm Areas/Routes

Location Number	Class	Name	From	To
South Windsor Separated Sewershed Area				
STM-1A	Arterial	Dougall Ave (Rail Underpass and Road)	Ouellette Pl	South Cameron Blvd
STM-1B	Arterial	Ouellette Pl	Dougall Ave	Eugenie St E
STM-2A	Arterial	Howard Ave	Capitol St.	Charles St.
STM-2B	Arterial	Howard Ave	E. C. Row	Grand Marais Rd E
STM-3	Arterial	Howard Ave (Rail Underpass)	Eugenie St E	Memorial Dr
STM-4	Arterial	Central Ave	Grand Marais Rd E	Tecumseh Rd E
STM-6	Collector	Eugenie St E	McDougall St	Ouellette Ave
STM-7	Collector	Sydney Ave	Division Rd	Marentette Ave
STM-8	Collector	Dominion Blvd	Northwood St	Ojibway St
STM-9	Collector	Dominion Blvd	Cabana Rd W	Roselawn Dr
STM-10	Collector	McDougall St	Eugenie St E	Howard Ave
STM-11	Collector	Foster Ave	Turner Rd	Walker Rd
STM-12	Collector	Foster Ave	St Etienne Blvd	Walker Rd

3D. Storm Solutions:
Major Roads/Vulnerable Areas

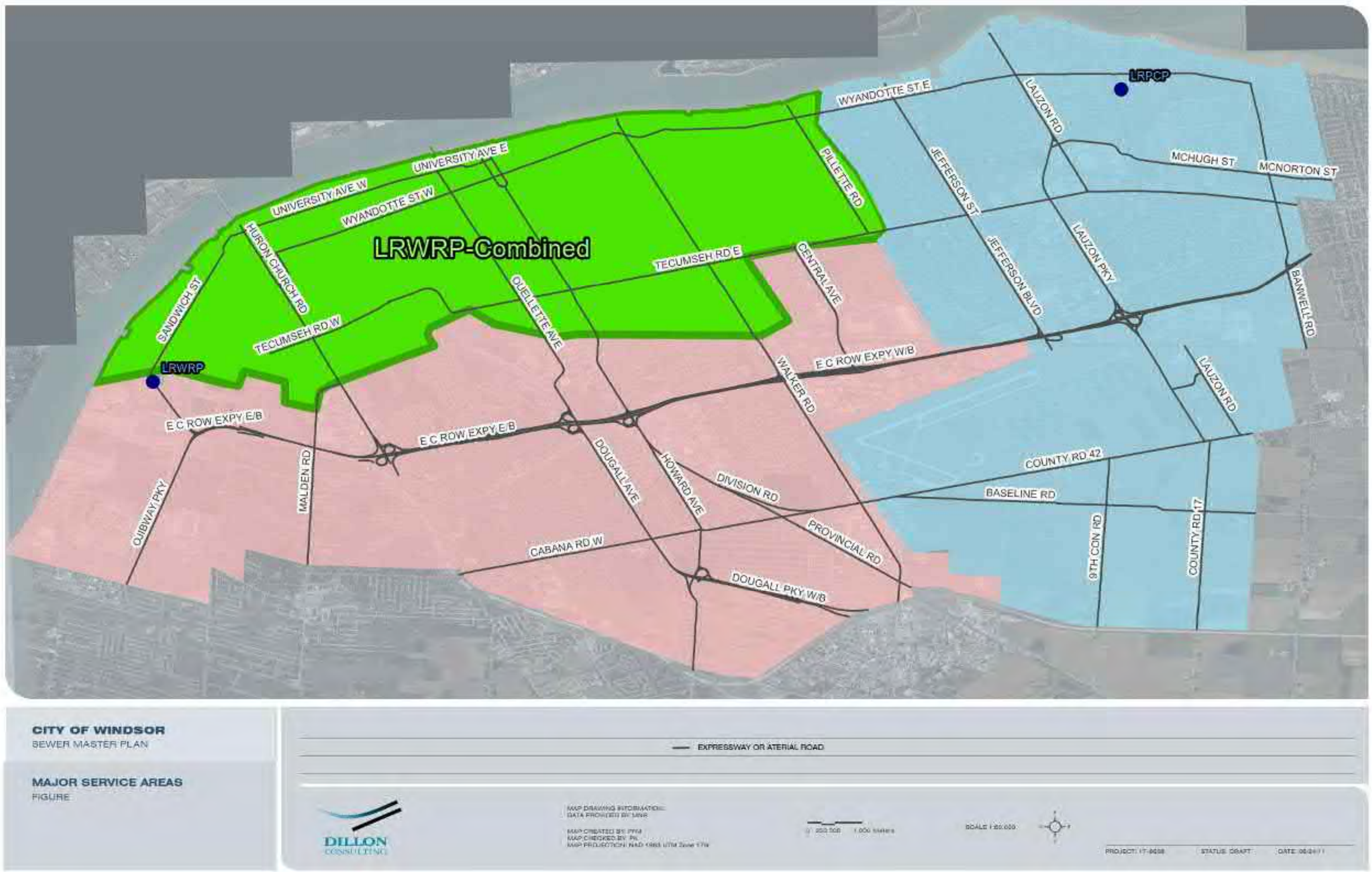
- Problem:
  - Based on Climate Change Storm
  - Dougall: 150m of surface flooding greater than 0.30 m on arterial road
  - Ouellette: 180m of surface flooding greater than 0.30 m on arterial road

3D. Storm Solutions: Roads/Vulnerable Areas

Ouellette Place and Dougall Ave.

- Potential Solution Alternative:
  - New storm sewer with increased conveyance from Eugenie St to proposed pond
  - Challenges
    - Cover and/or alignment of new sewer at underpass
    - Land acquisition of vacant property

3E. Long Term Solutions –Combined Area



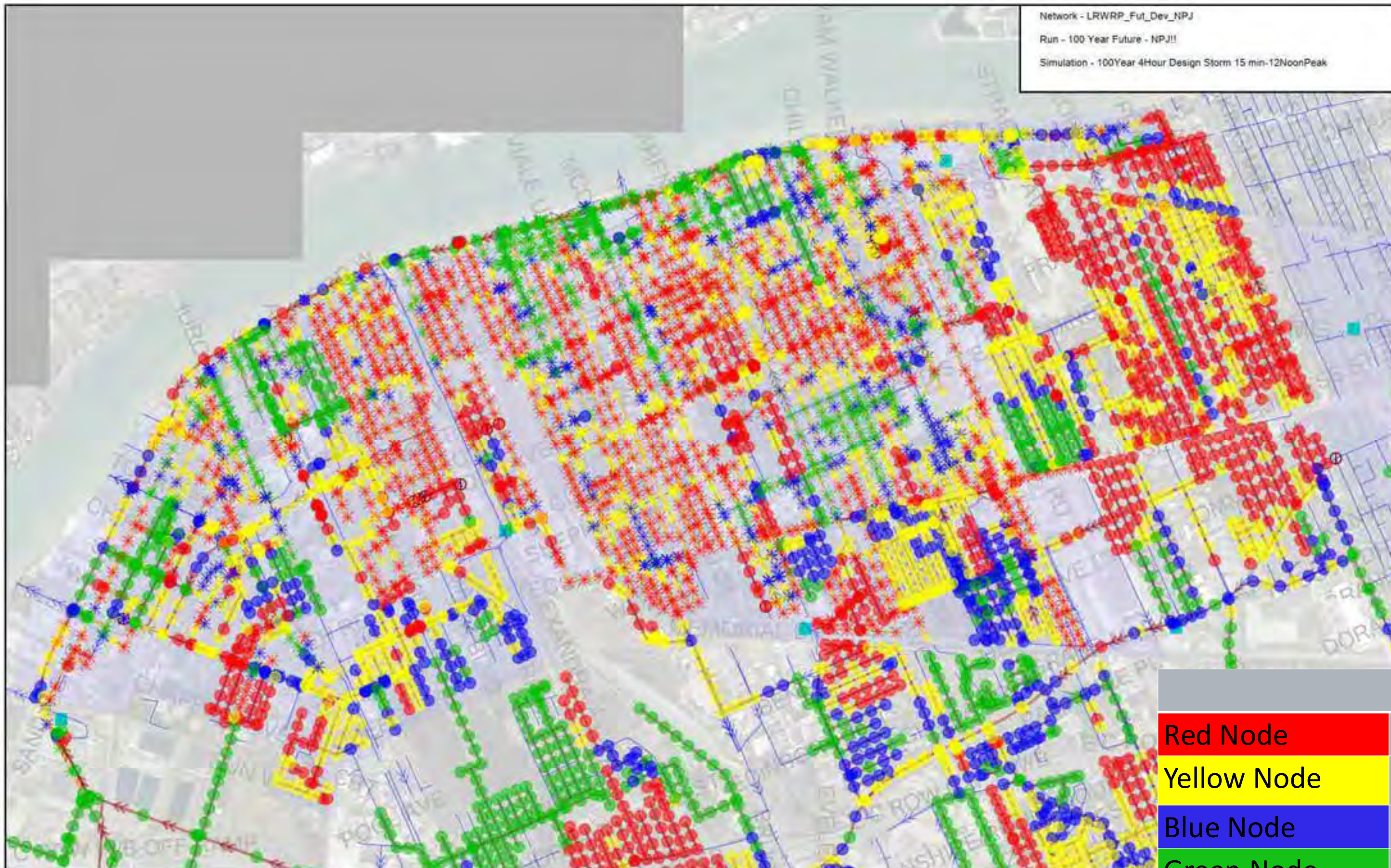
3E. Long Term Solutions –Combined Area

Combined System

- –13 Combined Sewer Trunks
- –Detroit River Sanitary Trunk / Interceptor System delivering flow to LRWRP
- –10 Storm Trunks

3E. Long Term Solutions –Combined Area

Existing Conditions (1:100 Year Storm Event)

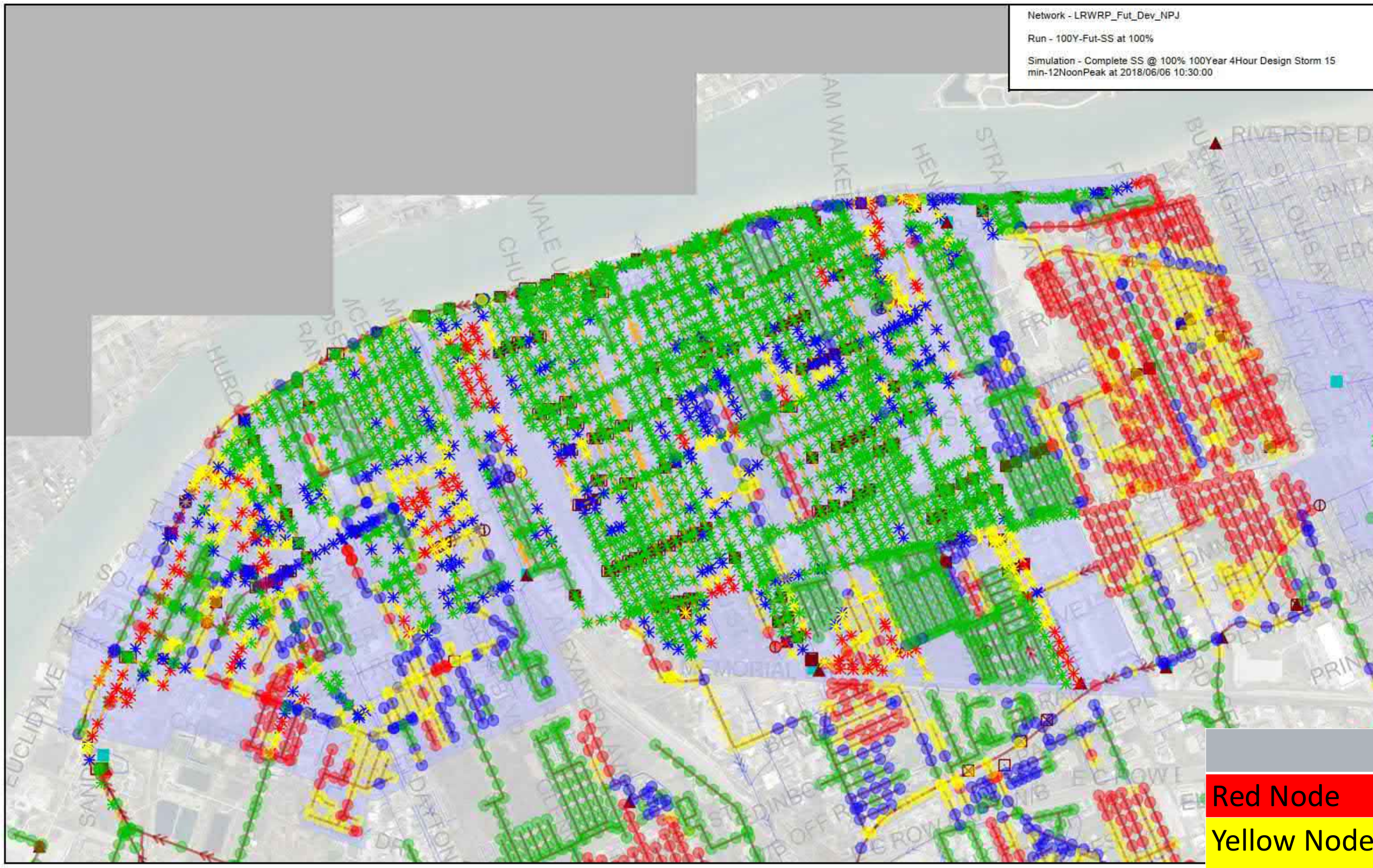


83% is at risk during major rain event, where the HGL in combined or sanitary sewer is <u>above</u> basement depths.

LEGEND	
Red Node	HGL above ground surface
Yellow Node	HGL between **0m** and **1m** below ground
Blue Node	HGL between **1 m** and **1.8 m** below ground
Green Node	HGL is deeper than **1.8 m** below ground

3E. Long Term Solutions –Combined Area

Alternative # 1 (1:100 Year Storm Event)



Solution Alternative Considers:

<u>Increased Treatment Capacity:</u>

RTB at the Lou Romano Water Reclamation Plant

<u>Increased System Capacity:</u>

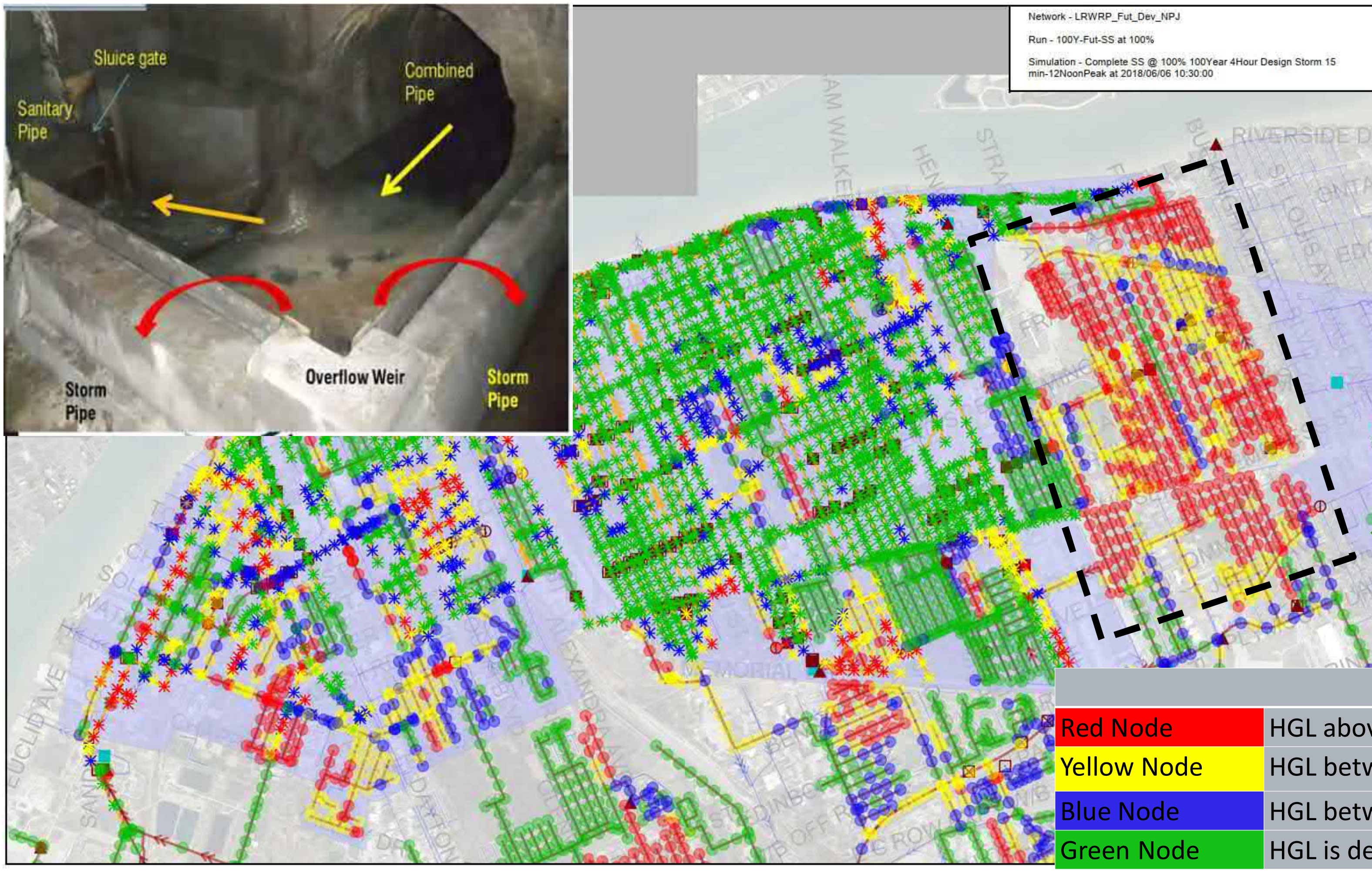
Soft Separation of Entire Drainage Area, including:

- Disconnection of all roof leaders;
- Re-direct all land drainage to storm system, Including:
  - Roadway Drainage
  - Rear Yards

LEGEND	
Red Node	HGL above ground surface
Yellow Node	HGL between **0m** and **1m** below ground
Blue Node	HGL between **1 m** and **1.8 m** below ground
Green Node	HGL is deeper than **1.8 m** below ground

3E. Long Term Solutions –Combined Area

Alternative # 1 (1:100 Year Storm Event)



Additional consideration to provide relief for Dual Manhole Area.

Dual Manhole Area

LEGEND	
Red Node	HGL above ground surface
Yellow Node	HGL between **0m** and **1m** below ground
Blue Node	HGL between **1 m** and **1.8 m** below ground
Green Node	HGL is deeper than **1.8 m** below ground

4. Evaluation Criteria

- Project objectives were developed.
  - input from public and technical team (discussed at a past meeting)
- Using Objectives as a foundation, evaluation criteria were developed.
- Evaluation criteria is used to compare Long Term Solution Alternatives.
- Criteria may be refined as we continue to develop the solutions.

GROUP INPUT:

- Is anything missing?
- Should an item NOT be considered?
- Does anything not make sense?

4. Evaluation Criteria

Objective	Draft Evaluation Criteria
Reduce Potential for Flooding	Extent of **basement flooding reduction** realized by alternative. Extent of **surface flooding reduction** realized by alternative.
Resilience	Flexibility of alternative to adjust to **climate change.** Flexibility of alternative to accommodate changes in **land use.**
Water Quality	Ability to maintain or **improve water quality.**
Cost Effective	Relative **capital cost.** Relative **operation and maintenance costs.**
Timely Implementation	Length of **time** required for implementation.

4. Evaluation Criteria

Objective	Draft Evaluation Criteria
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.).
Ease of Maintenance	Anticipated **extent of maintenance** required.
Tailored	Consideration for provided enhanced level of service for **sensitive land uses.** Consideration for servicing requirements for **future development**.
Collaborative	Commitment from stakeholders (Property Owners, City, Other Municipalities)
Minimize Impacts	Minimize disruption to **public infrastructure** during construction/operation. Minimize disruption to **aquatic systems.**

5. Upcoming SAC Meetings

- Late August or Early September:
  – Review Preferred Solutions/PIC Materials
- Mid October:
  – Review PIC Feedback
  – Review Preferred Solutions

6. Next Steps

- Engagement

- September: Public Information Centre # 2
  - September 24, 25 and 26, 2019

MEETING MINUTES

Subject:	City of Windsor Sewer Master Plan – Stakeholder Advisory Committee Meeting #6 - REVISED
Date and Time:	September 26, 2019 at 6:00 p.m.
Location:	Meeting Room 140, 350 City Hall Square West, Windsor, Ontario
Our File:	17-6638

A. endees

General Public:	David Hanna	Resident
	John S. Holmes	Resident
	Tom Markham	Resident
	David Munro	Resident
	Dr. Tirupati Bolisetti	Resident
	Randal Sasso	Resident
Community Groups and Public Health:	Amandeep Hans	Windsor-Essex County Health Unit
Sewer Master Plan Project Team:	Janelle Coombs	City of Windsor
	Anna Godo	City of Windsor
	Mia Marrocco	City of Windsor
	Karla Kolli	Dillon Consulting Limited (Dillon)
	Laura Herlehy	Dillon Consulting Limited
	Flavio Forest	Dillon Consulting Limited
	Samir Dhanvantari	Aquafor Beech Limited

Absent

General Public:	Greg Plante	Imaginative Imaging
	Frank Dattilo	Resident
	Ray Bezaire	Resident
	Ron Brant	Resident
	David Hilton	Resident
	Bridget Scheuerman	Pillette, Riverside and Ford City BIA
Environmental Groups:	Dave Munro	Detroit River Canadian Cleanup
	Dr. Rajesh Seth	University of Windsor
Emergency Service Providers:	Stephen Laforet	Windsor Fire & Rescue Services
Insurance Providers/Adjusters:	Maria LeBlanc	Easy Insure
	Pete Karageorgos	Insurance Bureau of Canada (IBC)
Sewer Master Plan Project Team:	Miriam Bart	Dillon Consulting Limited
	Ian Wilson	Dillon Consulting Limited
	Dave Maunder	Aquafor Beech Limited
	Nadia Islam	Aquafor Beech Limited

Notes

Item	Discussion	Action By
1.	**Project Update**	
1.1.	The project team was in attendance at the Open Streets event on September 22, 2019. Eighty families stopped and talked to the team about the Windsor Sewer Master Plan (WSMP).	**Info.**
1.2.	**Climate Resiliency House**	
1.3.	Suggestions to supplement features to include energy efficient measures/techniques.	**Info.**
1.4.	Karina Richters to be asked to follow-up and consider suggestions.	**City**
2.	**What Have We Heard?**	
2.1.	Detailed review of redevelopment plans within the City are not part of the scope of this project. Solutions developed will consider the expansion of the City's Secondary Plan Areas.	**Info.**
2.2.	Dillon is recommending that the City revise their development standards to mitigate impacts of new development.	**Info.**
2.3.	**Stormwater Financing Study**	
2.3.1.	The City is currently undertaking a study to look at incentivizing runoff reduction within private property. This program would provide incentives to property owners. This study is also looking at potential strategies to mitigate storm flows entering sanitary sewers by including measures such as foundation drain disconnection, etc.	**Info.**
3.	**Sandwich South Secondary Plan Area – Servicing Study**	
3.1.	This study is separate from the WSMP; however, the findings of this study will be integrated with this report. This study includes flood hazard mapping of the entire Little River watershed system. This study is anticipated to take 2 years and commenced mid-2019.	**Info.**
4.	**Opportunities and Constraints**	
4.1.	The following summarizes the unique opportunities and constraints that have been identified for each of the three main areas of the City.	
4.2.	**Central/Downtown Windsor**	
4.2.1.	This system is currently a combined sewer system which is proposed to be fully separated. The objectives of the separation is to reduce risks of basement flooding and to improve water quality by reducing the quantity of Combined Sewer Overflows (CSOs) to the Detroit River.	

4.2.2. The City has complete soft separation historically in this area, which includes construction storms sewers to collect road drainage; however, this study is proposing to re-direct all storm surface drainage within private properties (roof, rear yards) to the storm system as well.

4.2.3. Generally, the topography is higher in this area; therefore, high lake levels do not have a direct impact on surface flooding.

4.2.4. It will be challenging for home owners in this area to complete foundation drain disconnection due to the nature of internal plumbing within older buildings/homes.

4.2.5. Disconnecting roof drains is proposed to be implemented area-wide; however, it is understood that there are limits to the feasibility of this due to the high imperviousness.

4.3. **South Windsor – Separated Sewer System**

4.3.1. This area is serviced by separated storm and sanitary sewers. The storm sewers drain to drains (Grand Marais, Lennon, Cahill); therefore, the solutions developed to address storm servicing is limited to storage within the system.

4.3.2. Recent monitoring of the sewers system has demonstrated that the sanitary system acts like a storm system during wet weather events which means that there is considerable amounts of rainwater getting into the sanitary system.

4.4. **East Windsor – Separated Sewer System**

4.4.1. The East Riverside Flood Risk Assessment project completed by Landmark Engineers Inc., is being integrated into the WSMP. This study proposes the repair and extension of the dyke system that exists to protect east Windsor from high lake levels. Some areas within this system are constrained by the capacity of the existing Little River Drain; therefore, storage of stormwater flows is required.

4.4.2. A large portion of this area is undeveloped and will be reviewed as part of the Sandwich South Secondary Plan Study.

4.5. Dillon noted that the detailed sewer model that has been developed for this study will be a tool the City uses to provide guidance to developers on what they will be permitted to discharge. **Info.**

4.6. It was noted that through this study, the implementation of LIDs will reduce the volume of discharge entering the storm system by 10-20%. LIDs are being considered as a resiliency component to ensure the solutions are flexible to service the changing climate and City landscape.

4.7.	T. Bolisetti noted in a recent study completed, the reduction of stormwater entering the sewer system through the implementation of LIDs is only 2—3%.	**Info.**
4.8.	The flood risk protection study found that future high water levels including consideration for climate change factors is estimated to be 176.80. For comparison, the record high water levels that the area experienced this past Spring/Summer, was at a level of approximately 176.10.	**Info.**
5.	**Solution Alternatives - Expanded Scope Items**	
5.1.	The WSMP team discussed the solution alternatives related to the East Riverside Dyke System and the storage/treatment solution at the City's Sewage Treatment Plants.	**Info.**
5.2.	It was suggested that perhaps lagoons at existing industrial facility in West Windsor could be utilized as sewage lagoons. The City noted that this currently cannot be considered as it is a privately owned facility that cannot accommodate contaminated sewage flows.	**Info.**
6.	It was suggested that the team consider implementing no development in flood prone areas. Dillon noted that the new City Development Manual will include constraint and standards that should be applied to development and redevelopment.	
7.	**Evaluation Criteria**	
7.1.	It was suggested that solutions should be evaluated based on how much the proposed infrastructure improvements will displace existing residents.	
7.2.	Evaluation of solutions will be completed in advance of PIC #2. Preferred solutions will be presented to the public at that time. The team is meeting with property owners who may be directly impacted in October in advance of the PIC.	
7.3.	It was requested that reference and links to related reports be included in the final WSMP report.	**Dillon**
7.4.	Cost comparisons will relate cost contribution of private property costs and public/City costs.	
8.	**Public Consultation and Public Information Centre (PIC)**	
8.1.	It was suggested that we implement the following: • Do a better job of more practically relating property owner experience to solutions.	**Dillon/Aquafor/ City**

	• Describe storms in more relatable terms (i.e. 3 ½ - 4 hrs. vs. 1:100 year storm). Use more descriptive wording (i.e. critical, catastrophic storms). • Provide opportunity for public to provide feedback.	
8.2.	Suggestion for speaker series – public education: • On-going education and awareness will be part of the WSMP recommendations.	**Dillon/Aquafor/ City**
8.3.	The team reviewed the recent social media videos that were developed for this study. It was noted that videos do not communicate shared ownership/partnership as effectively as they should – too one sided. It was suggested that videos highlight all the good work that was completed to date be shared. Dillon will develop a forth video.	**Dillon/City**
9.	**Next Steps and Upcoming Meetings**	
9.1.	PICs are scheduled for November 2019. Final dates will be shared with this team and attendance is encouraged.	**Dillon**

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

LMH:d

Encl. October 1, 2019

STAKEHOLDER ADVISORY COMMITTEE

City of Windsor SEWER MASTER PLAN

degrees of CHANGE

MEETING #6

September 26, 2019, 6:00 to 8:30 pm

350 City Hall Square W, Meeting Room 140

Presented by: DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

Objectives

Today we are seeking group input on:

- Long Term Solutions (Continued and New)
- Evaluation Criteria - Feedback on Prioritizing
- The format and notification process of the PICs

Agenda

Agenda Item	Approximate Time
Project Update/Review Previous Minutes	5 mins
1. Solutions A. Opportunity Constraints Overview B. Continuation of Last SAC Solution Review • Surface Flooding Solutions C. Discuss New Study Scope Items I. Riverside Protection Measures II. High Lake Level Considerations III. Treatment Plant Improvements	60 mins
2. Evaluation Criteria • Review Evaluation Criteria • Criteria Prioritization Exercise • Complete Sample Evaluation as a Team	45 mins
3. Public Information Centres (PICs) • Review Objective of PIC • Review Presentation Strategy • Next Steps	10 mins
4. Schedule/Next Steps	5 mins

Project Update

1. Meeting with Emergency Services
   - July 23 –Emergency Services
   - August 21- Windsor Police Services
     - Reviewed the WSMP Strategy
     - Incorporated Comments

2. Consultation with Agencies
   - MECP
     - Treatment Plant Solutions
   - ERCA
     - High Lake Levels/Storm Solutions

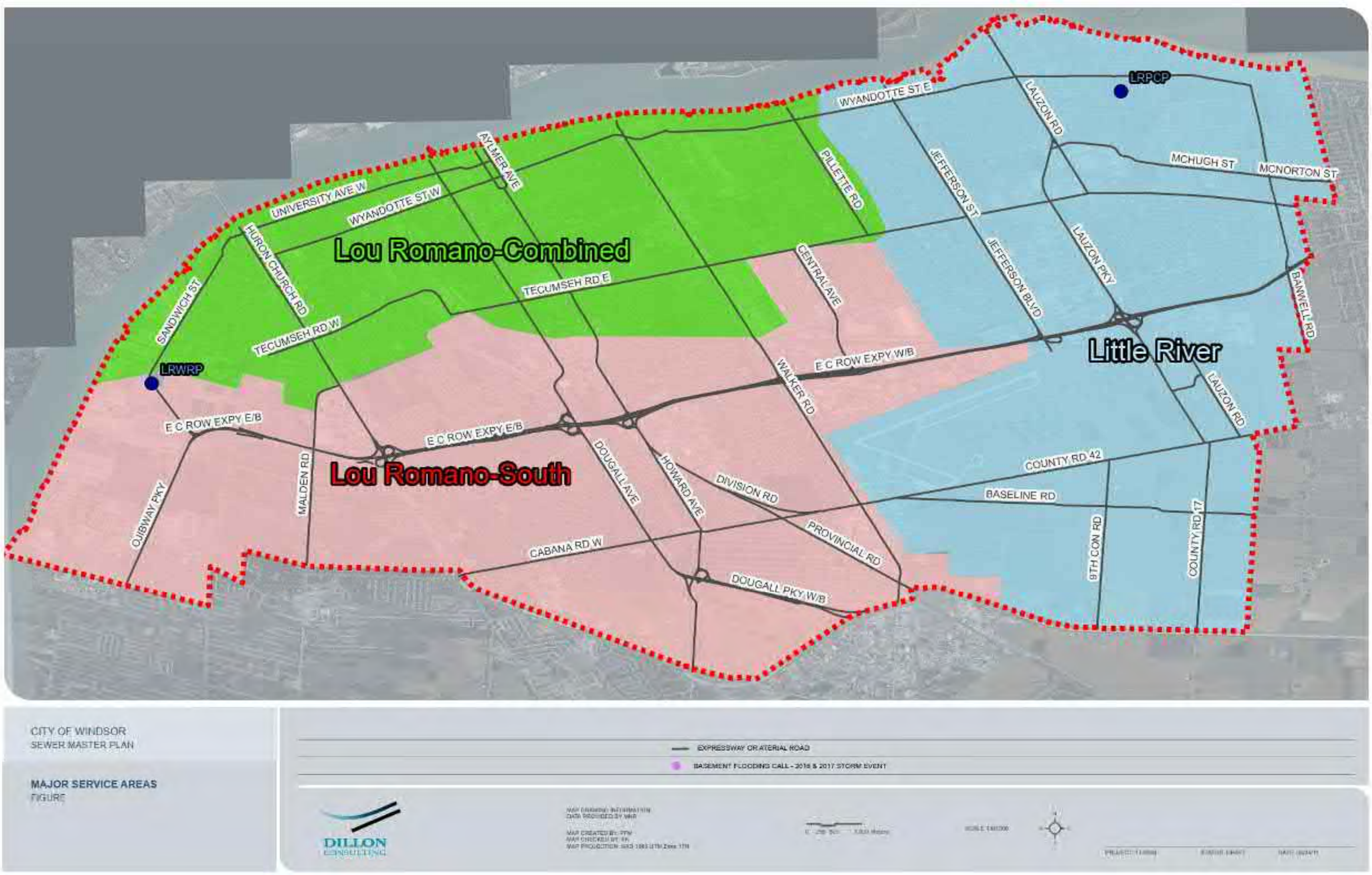
3. Communications
   - Open Streets Event – September 22, 2019
   - 3 Videos to Social Media– Highlighting Key Messages
   - Newsletter # 3
   - Council Presentation – August 26, 2019

Sept. 22, 2019 Open Streets

Project Update – What Have We Heard?

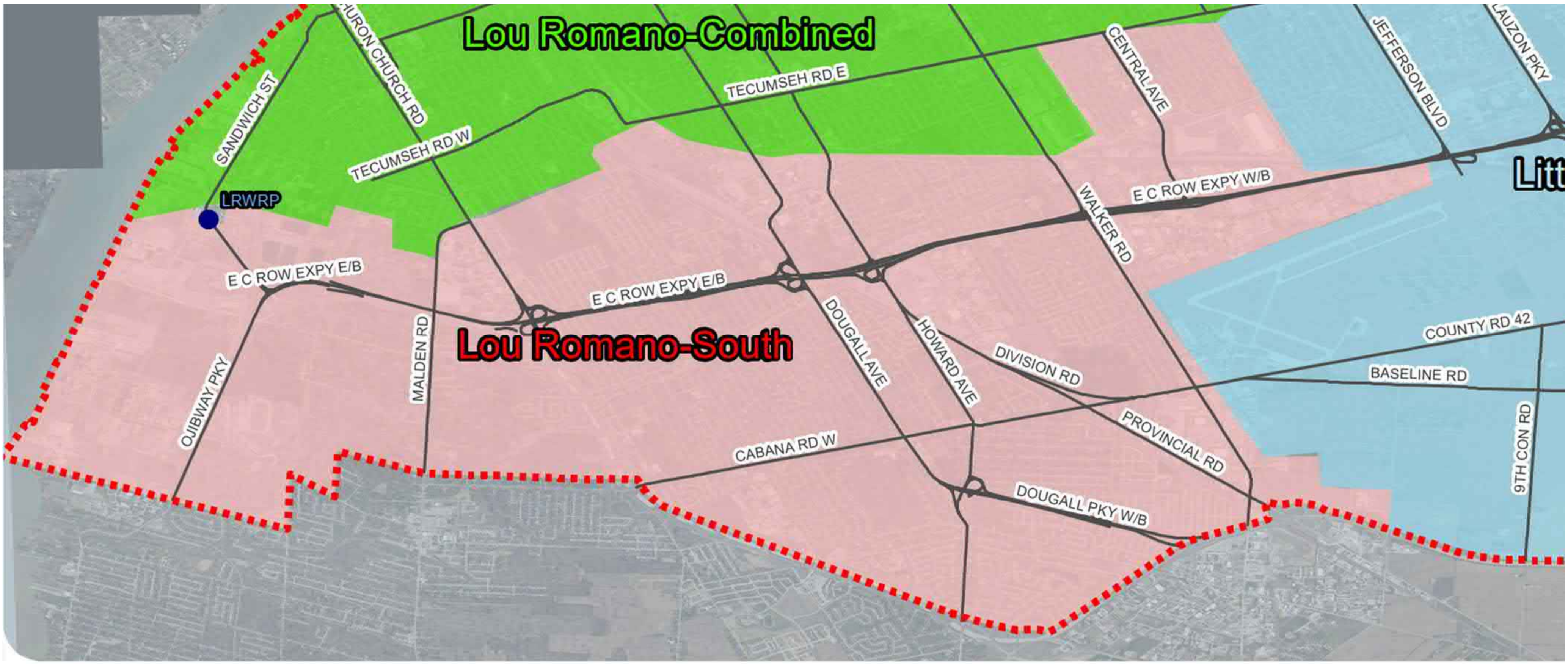
- Private Property Flood Protection Solutions - Innovative Solutions.
- City needs to be transparent, build public trust, show success stories, and manage expectations.
- Solutions should be tailored and focus on priority areas first.
- New development should not impact existing systems and they should be built to meet higher level of service.
- Solutions need to be tested to ensure they are meeting expectations.
- Public education is required. Provide more details on what the impacts are on homes/buildings.
- SAC Provided Comments On PIC Strategy (Later in Presentation)

1a) Opportunities and Constraints Overview



1a)Opportunities and Constraints Overview

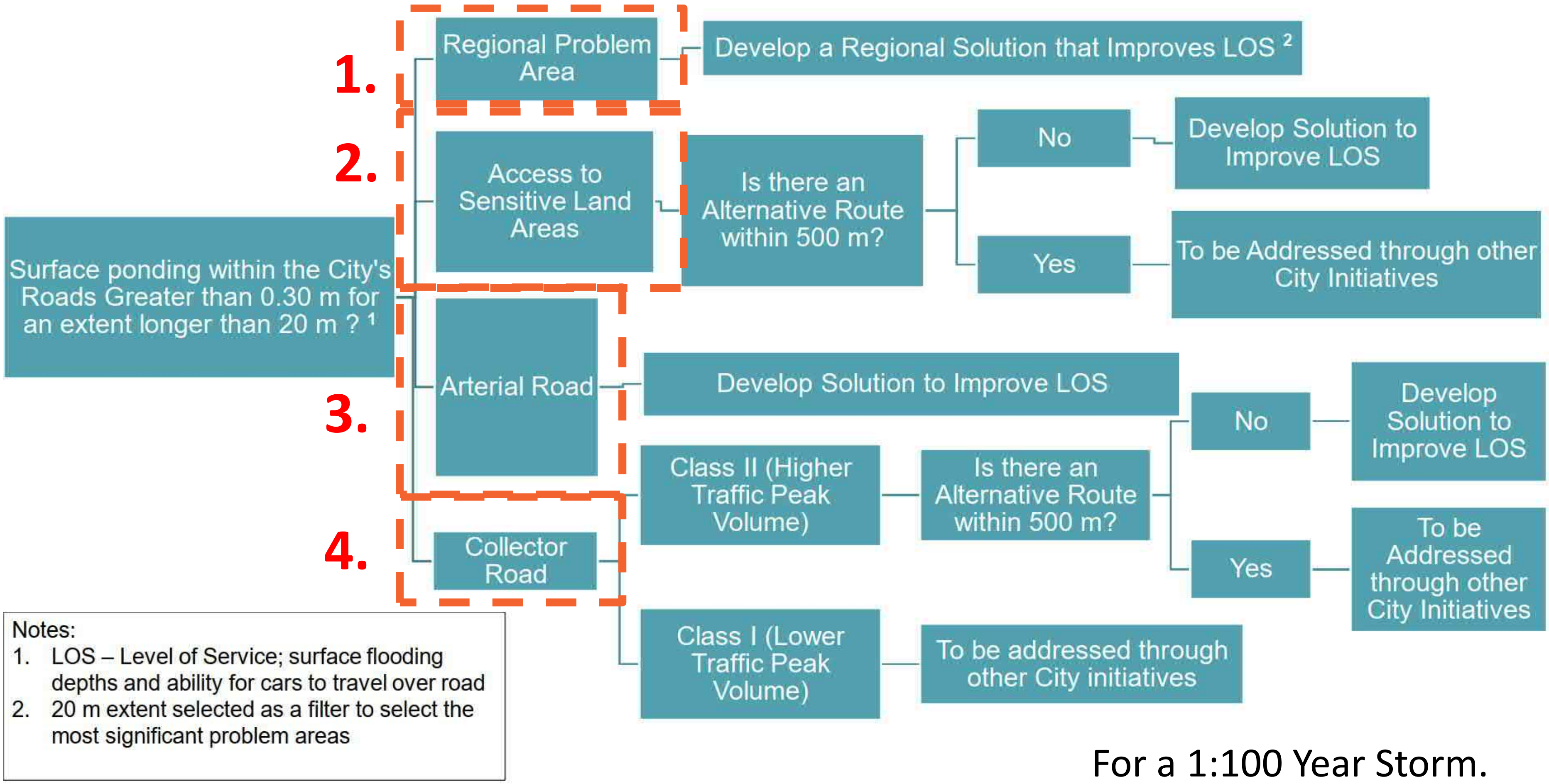
1a) Opportunities and Constraints Overview



1a) Opportunities and Constraints Overview

1.b) Solutions – Road Flooding Solutions

Decision Making Process Flow Chart - Surface Flooding Solutions

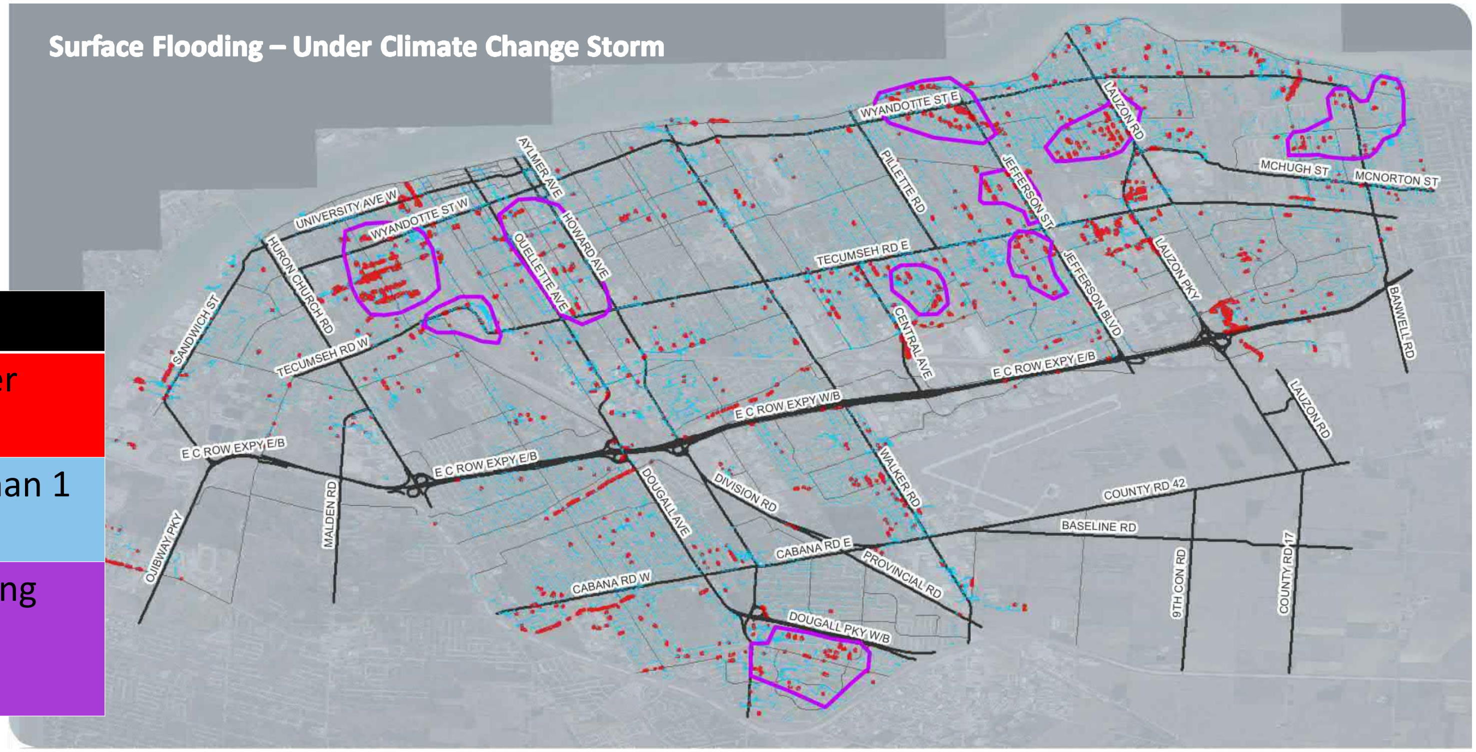


For a 1:100 Year Storm.

1.b) Solutions – Regional Problem Areas

Objectives:

- Reduce max surface flooding to less than 1 foot under 1:100 Year Storm (85 mm rain).
- To provide resilient solutions for sensitive areas, by reducing max surface flooding to less than 1 foot under Climate Change Storm

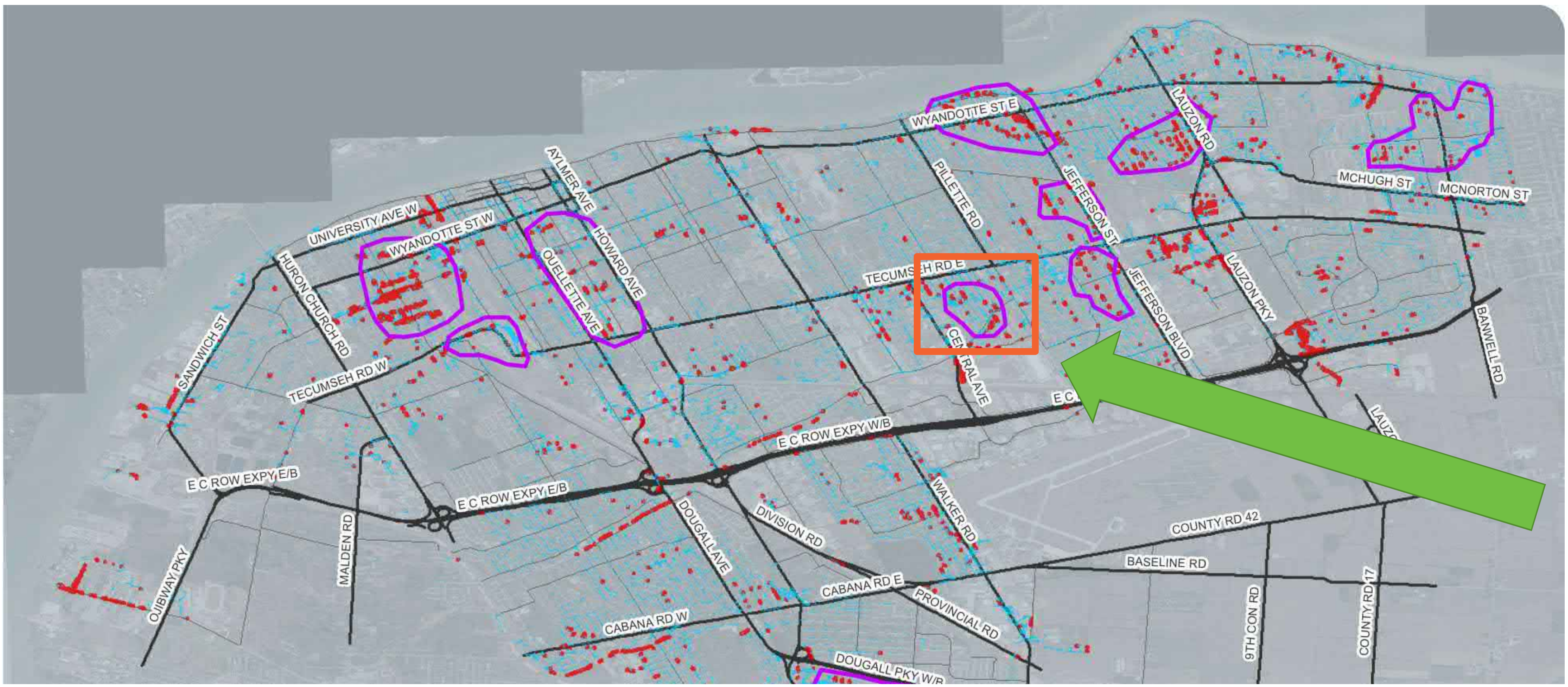


LEGEND	
Red	Surface Flooding Deeper than 1 ft Deep
Blue	Surface Flooding less than 1 ft Deep
Purple Boundaries	Regional Surface Flooding Problem Areas – Being Reassessed for Risk

1.b) Solutions – Regional Area Solution

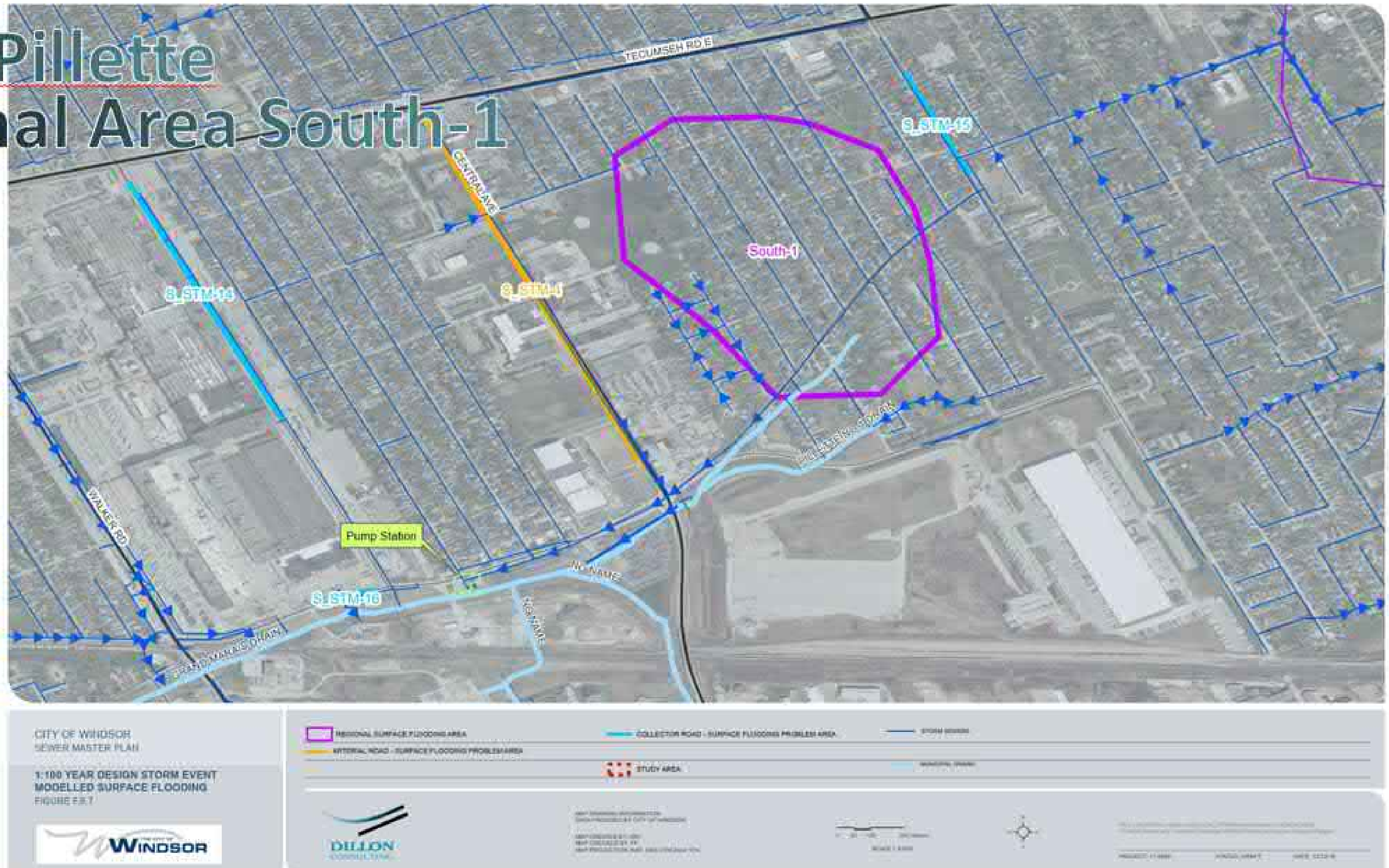
Sample Solution Alternatives

(Central Ave., Pillette Ave., Problem Area "South-1")



Central, Pillette & Regional Area South-1

- **Problem - Surface Flooding > 0.30 m:**
  - S_STM-4: 90m on arterial road (Central),
  - S_STM-15: 130 m on collector road (Pillette)
  - South-1 Regional Area, 100 Year Storm
- **System:**
  - Pumped drainage to Grand Marias



THE CITY OF WINDSOR

Windsor Sewer Master Plan 21
South Windsor Solution Update

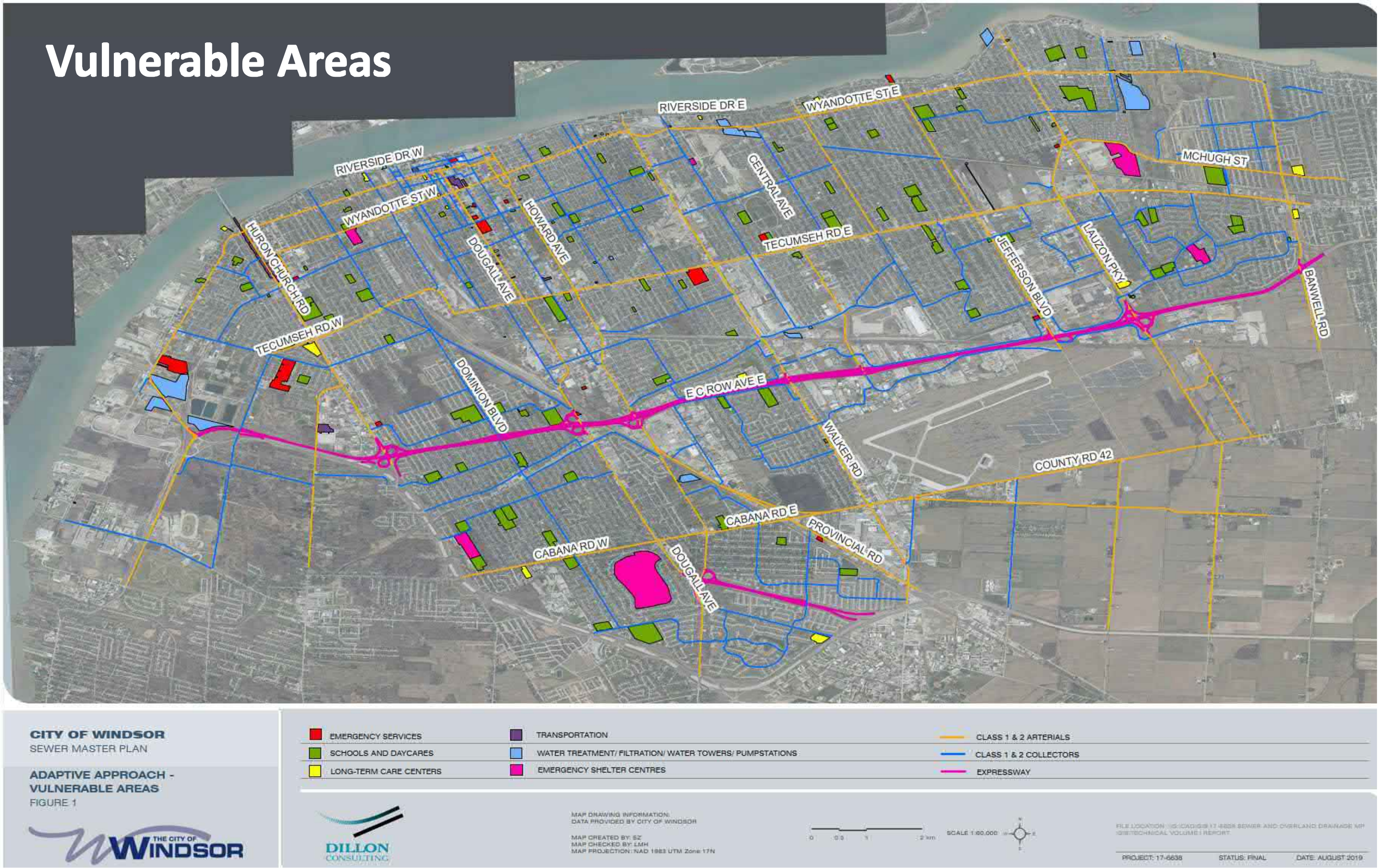
Central, Pillette & South-1– Alt A

- **Potential Solution:**
  - New storm sewer with increased conveyance to new surcharge underground storage & LIDs at all sewers
- **Challenges**
  - Limited park space
  - No additional release to GMD

Central, Pillette & South-1– Alt B

- **Potential Solution:**
  - New storm sewer with increased conveyance to new surcharge underground storage & LIDs at all sewers
- **Challenges**
  - Limited park space
  - No additional release to GMD

1. b) Solutions – Sensitive Land Uses



1. a) Solutions – Road Flooding Solutions

South Windsor – Separated Sewer System Area

Location Number	Class	Name	From	To
S_STM-1A	Arterial Class 2	Dougall Ave	Ouellette Pl	South Cameron Blvd
S_STM-1B	Arterial Class 2	Ouellette Pl	Dougall Ave	Eugenie St E
S_STM-6	Collector Class 1	Eugenie St E	McDougall St	Ouellette Ave
S_STM-2A	Arterial Class 2	Howard Ave	Capitol St.	Charles St.
S_STM-2B	Arterial Class 2	Howard Ave	E. C. Row	Grand Marais Rd E
S_STM-4	Arterial Class 2	Central Ave	Grand Marais Rd E	Tecumseh Rd E
S_STM-15	Collector Class 1	Pillette Rd	Adstoll Ave	Tecumseh Rd E
S_STM-14	Collector Class 1	Chrysler Centre	Grand Marais Rd E	Tecumseh Rd E
S_STM-16	Collector Class 1	Grand Marais Rd E	Chrysler Centre	Walker Rd

1. a) Solutions – Road Flooding Solutions

East Windsor – Separated Sewer System Area

Location Number	Class	Roadway	Location
STM-E01	Arterial	Jefferson Blvd	2535 Jefferson Blvd
STM-E02	Arterial	Lauzon Parkway	7740-7780 Tecumseh Rd E
STM-E03	Arterial	Lauzon Parkway	7201 Tecumseh Rd E
STM-E04A	Arterial	Lauzon Parkway	7411 Hawthorne Dr
STM-E04B	Collector Class 1	Hawthorne Dr	2651 Lauzon Parkway
STM-E04D	Collector Class 1	Hawthorne Dr	6720 Hawthorne Dr
STM-E04E	Collector Class 1	Kew Drive	6775 Hawthorne Dr
STM-E04F	Collector Class 1	Kew Drive	6775 Hawthorne Dr
STM-E01	Arterial	Jefferson Blvd	2535 Jefferson Blvd
STM-E02	Arterial	Lauzon Parkway	7740-7780 Tecumseh Rd E
STM-E03	Arterial	Lauzon Parkway	7201 Tecumseh Rd E
STM-E04A	Arterial	Lauzon Parkway	7411 Hawthorne Dr
STM-E04B	Collector Class 1	Hawthorne Dr	2651 Lauzon Parkway
STM-E04D	Collector Class 1	Hawthorne Dr	6720 Hawthorne Dr

1.a) Solutions – Road Flooding Solutions

Central/Downtown Windsor – Combined Sewer System Area

Location Number	Class	Name	From	To	Develop Solution?
S_STM-1A	Arterial Class 2	Dougall Ave	Ouellette Pl	South Cameron Blvd	Yes
S_STM-1B	Arterial Class 2	Ouellette Pl	Dougall Ave	Eugenie St E	Yes
S_STM-6	Collector Class 1	Eugenie St E	McDougall St	Ouellette Ave	Yes
S_STM-2A	Arterial Class 2	Howard Ave	Capitol St.	Charles St.	Yes
S_STM-2B	Arterial Class 2	Howard Ave	E. C. Row	Grand Marais Rd E	Yes
S_STM-4	Arterial Class 2	Central Ave	Grand Marais Rd E	Tecumseh Rd E	Yes
S_STM-15	Collector Class 1	Pillette Rd	Adstoll Ave	Tecumseh Rd E	Yes
S_STM-14	Collector Class 1	Chrysler Centre	Grand Marais Rd E	Tecumseh Rd E	Yes
S_STM-16	Collector Class 1	Grand Marais Rd E	Chrysler Centre	Walker Rd	Yes

1.b) Solutions – East Riverside Flood Protection

1. Riverside Flood Protection Measures

East Riverside Flood Risk Assessment - Landmark Engineers Inc.

- PIC June 2019
- Objective:
  - Assess existing dike system
  - Identify gaps based on various scenarios
  - Identify potential solutions to

Integrate solutions with the Windsor Sewer Master Plan

- Coordination stormwater solutions in common areas
- Size proposed infrastructure
- Property Acquisition

Data Source: Landmark Engineers Inc.

1.b) Solutions – East Riverside Flood Protection

Alternative Evaluation

Alt. # 1: Flood Protection Measure along Riverside Drive at 176.45 Elevation

Opportunity:

Provide inland flood protection for high water levels.

Constraints:

Impacts to private property, driveways, trees, landscape features

Alt. # 2: Flood Protection Measure along Riverside Drive at 176.80 Elevation

Opportunity:

Provide inland flood protection with added protection for potential climate change considerations.

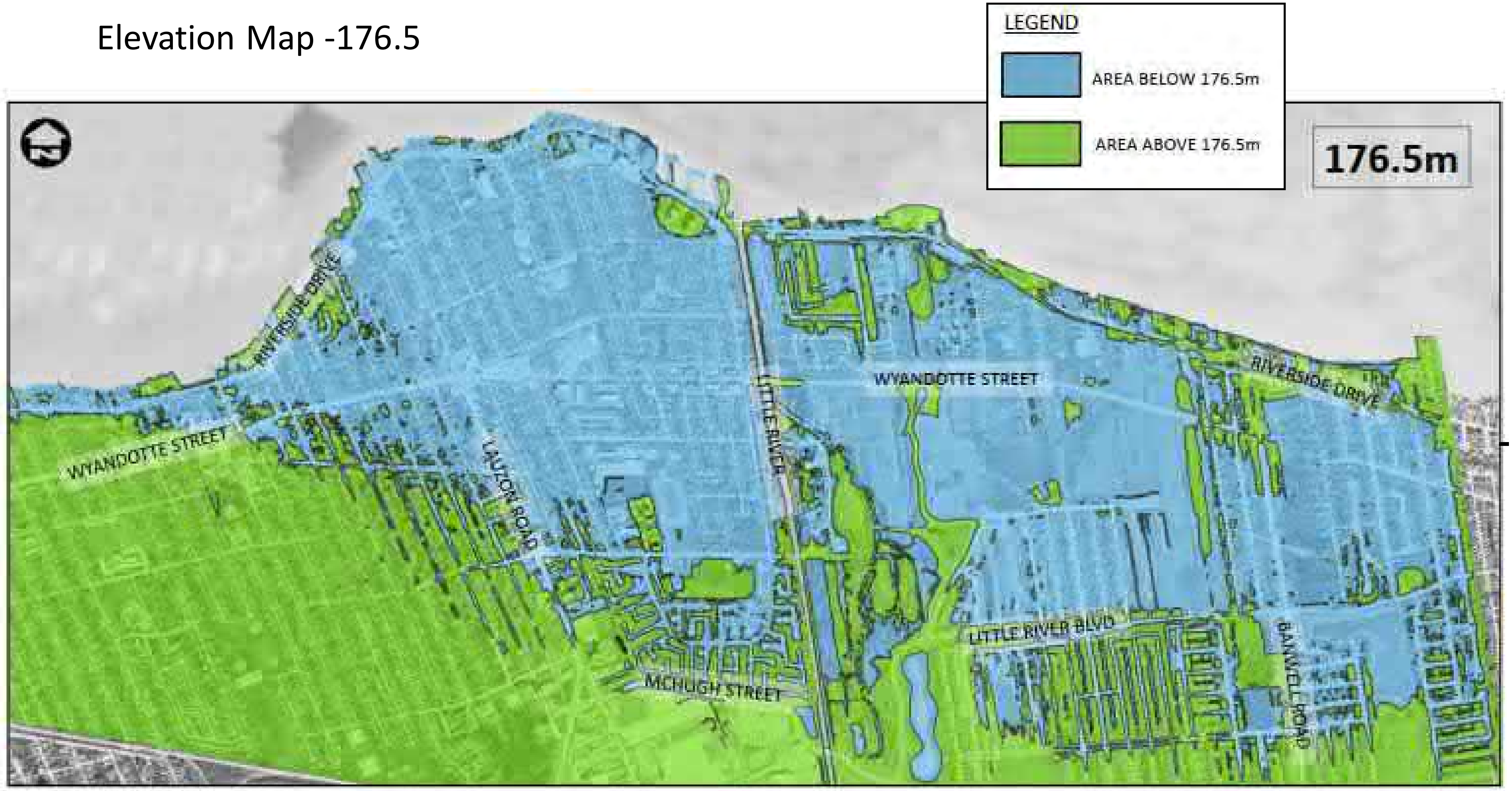
Constraints:

Greater impacts to private property, driveways, trees, landscape features

Data Source: Landmark Engineers Inc.

1.b) Solutions – East Riverside Flood Protection

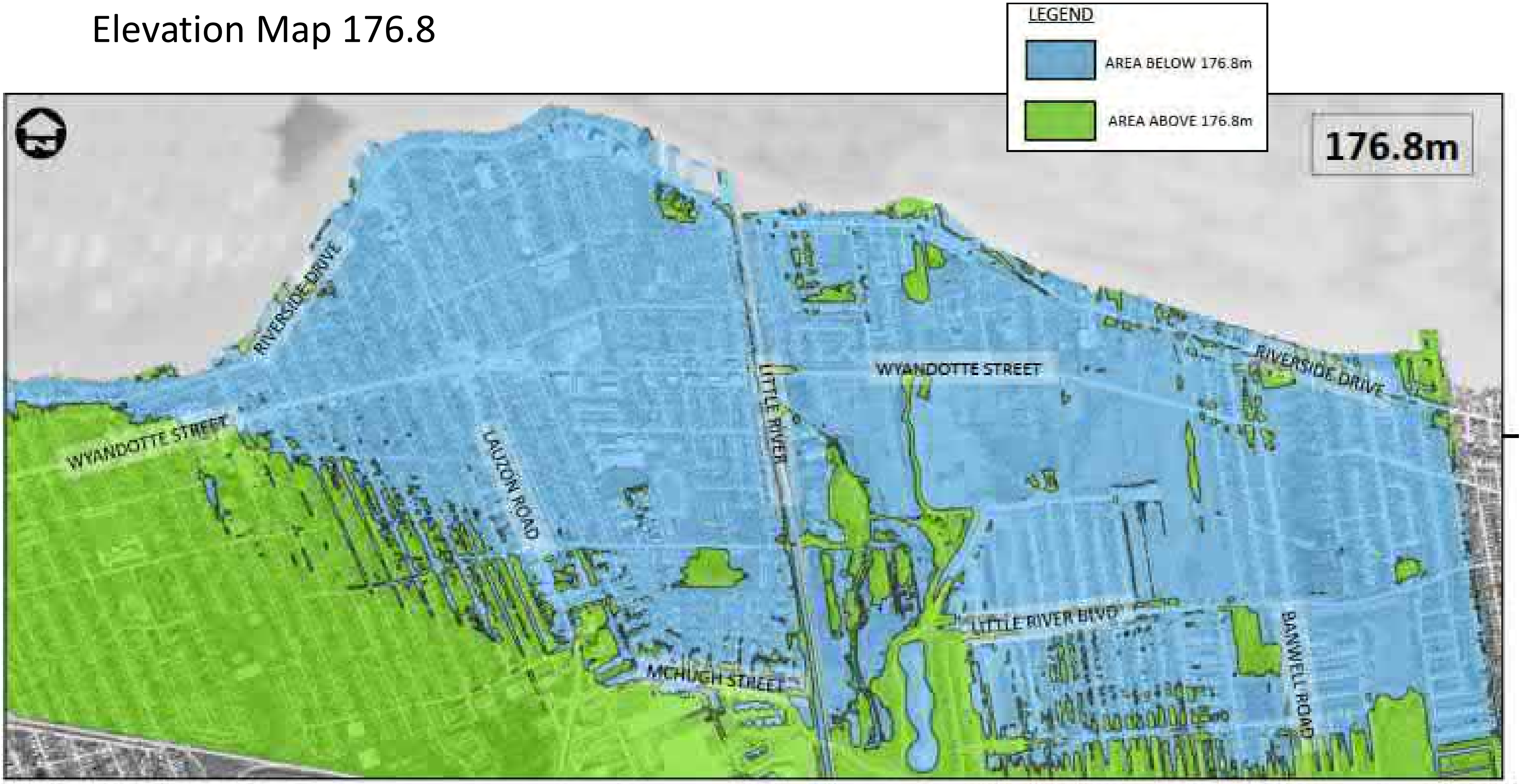
Elevation Map -176.5



Data Source: Landmark Engineers Inc.

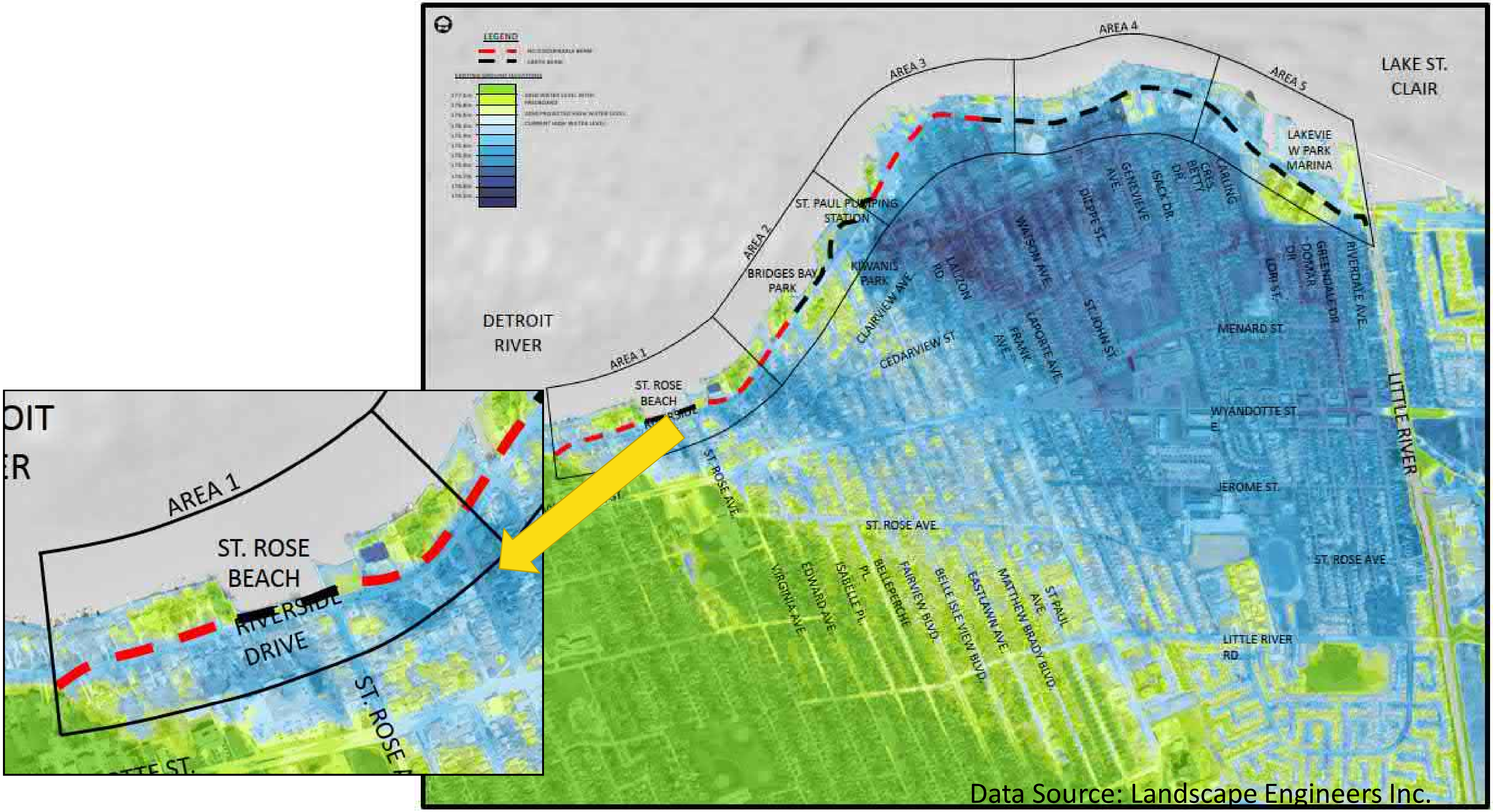
1.b) Solutions – East Riverside Flood Protection

Elevation Map 176.8

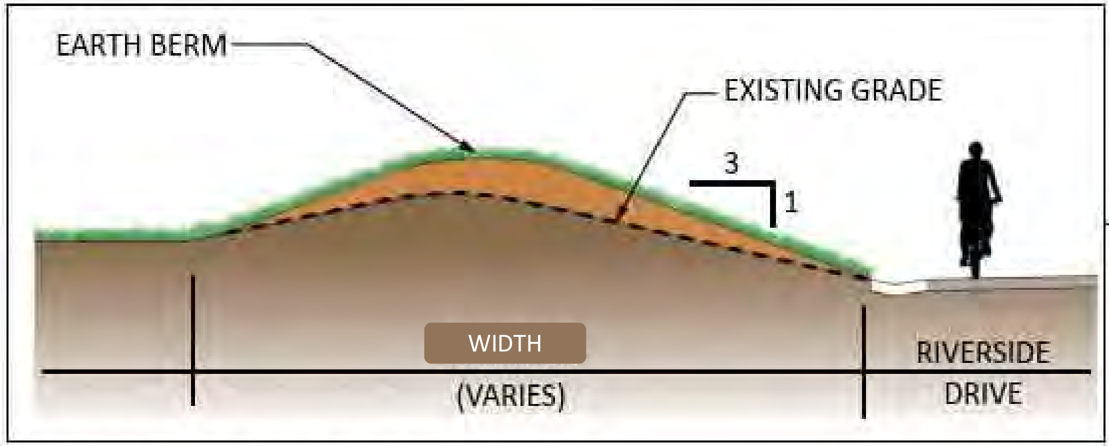


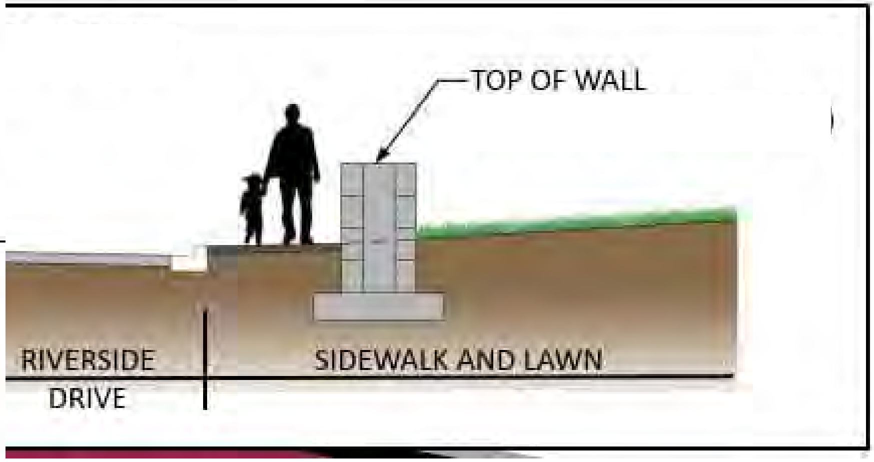
Data Source: Landmark Engineers Inc.

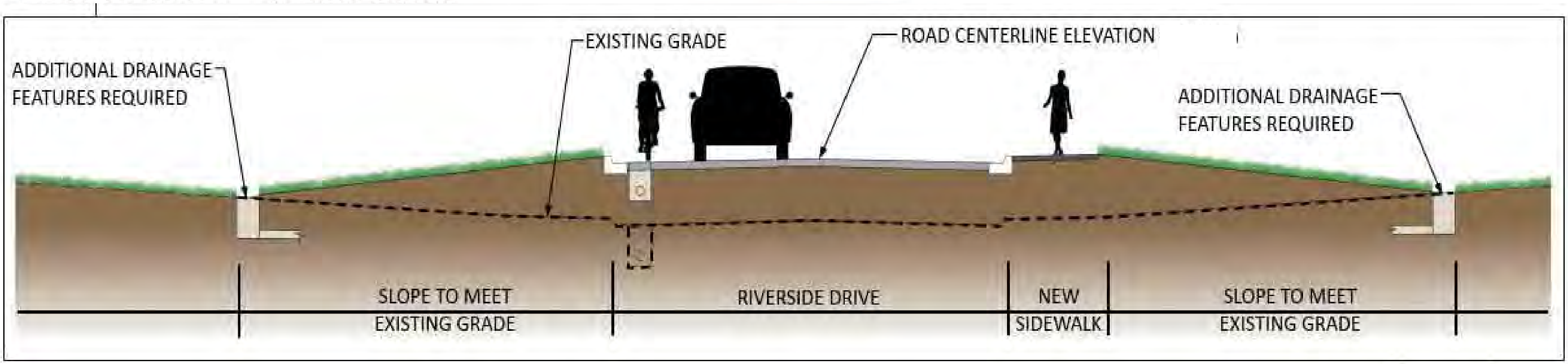
1.b) Solutions – East Riverside Flood Protection



1. Solutions – East Riverside Flood Protection







Data Source: Landmark Engineers Inc.

1.b) Solutions – Treatment Plants

Sanitary Solutions

– Require additional capacity at both treatment plants to relieve sanitary sewer system and accommodate greater system capacity.

- Capacity Improvement Alternatives:
  – Retention Treatment Basin (RTB)
  – Storage Lagoon

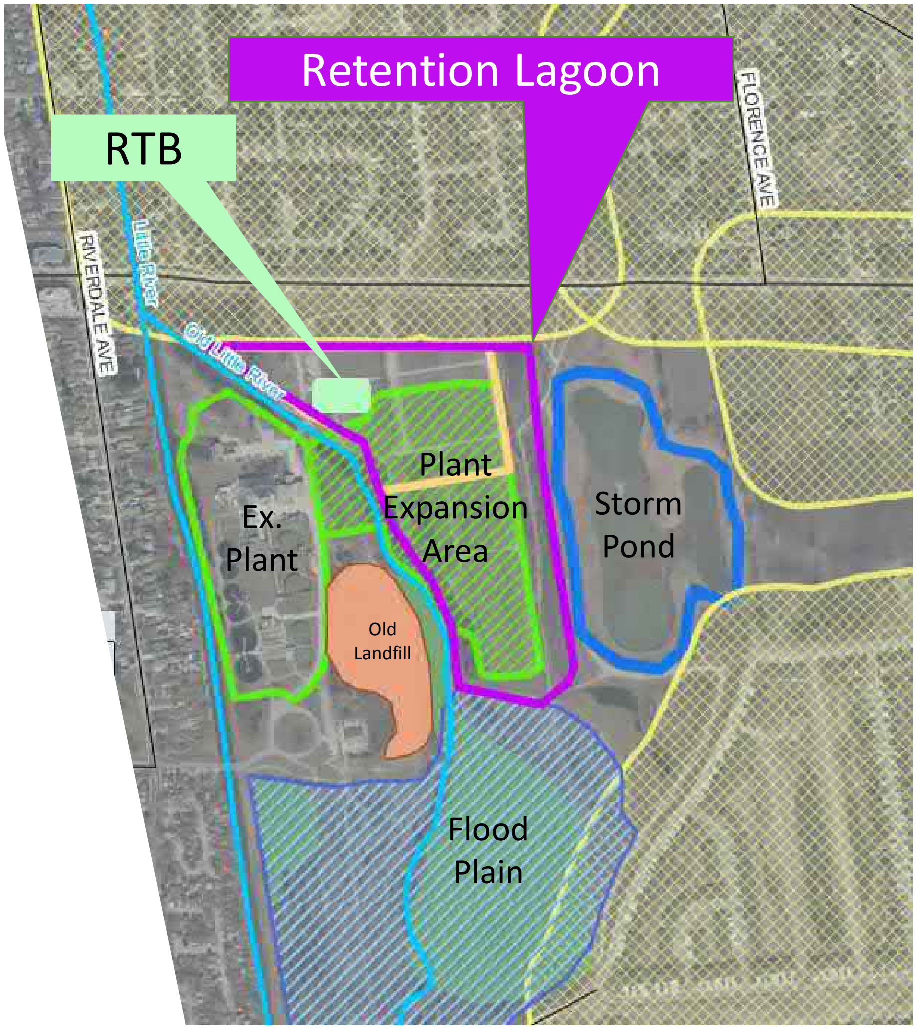
1.b) Solutions – Treatment Plants

Alternatives:

1. Retention Treatment Basin (RTB)
   - Provides Primary Treatment
   - Discharges to River, separate from plant discharge
   - Project Team is working with Ministry of Environmental, Conservation and Parks.

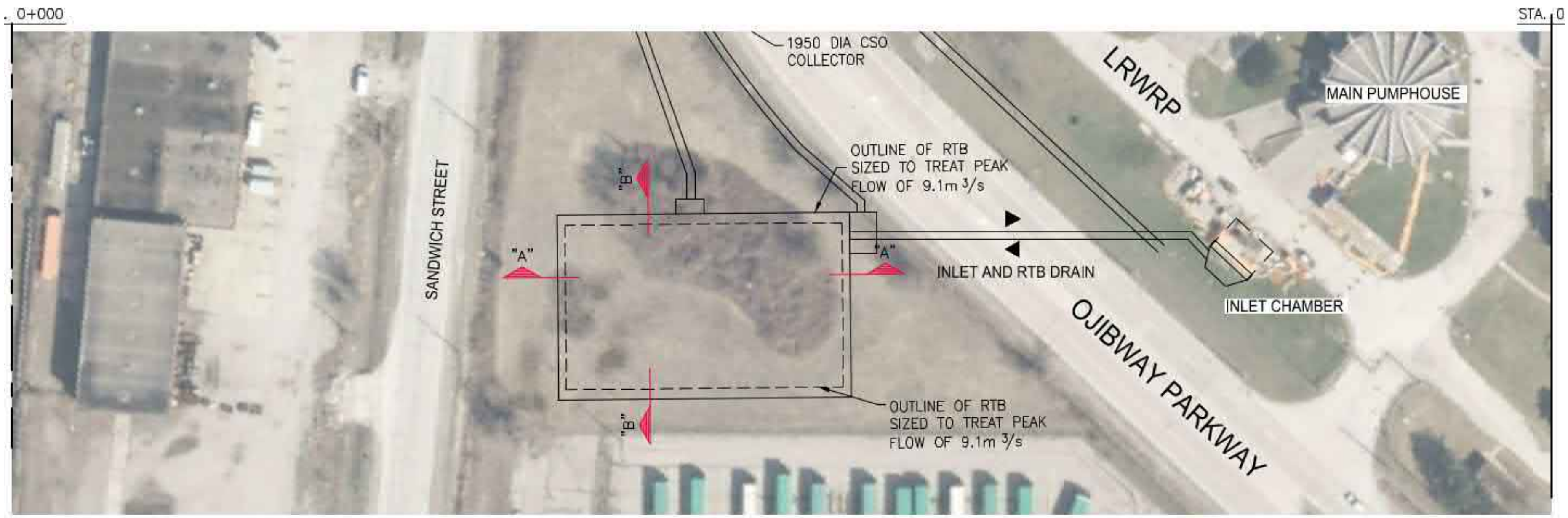
2. Storage Lagoon
   - Drawdown time: Approx. 1 month.
   - Leaves sanitary system vulnerable for subsequent storms.
   - Large Facility, Odor Issues.

1.b) Solutions – Treatment Plants – Little River



- Potential Lagoon:
  - Larger then full plant expansion.
- Potential RTB
  - Requires new outlet to Detroit River

1.b) Solutions – Treatment Plants – Lou Romano



- Proposed RTB
  - Developed through Caron Ave. Combined Overflow Relief EA – Completed Summer 2019.
  - Requires new outlet to Detroit River

3. Evaluation Criteria

Objective	Evaluation Criteria	Rationale
Reduce Potential for Flooding	Extent of basement and surface flood reduction realized by alternative.	Reducing the potential for damage to homes (generally basements).
Resilient	Flexibility of alternative to adjust to climate change.	Being forward looking and resilient considering climate change and growth/intensification.
Water Quality	The ability to maintain or improve water quality.	Solutions should meet environmental standards and minimize impact to water courses.
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.)	Reducing homeowner challenges and barriers to flood reduction measures.
Ease of Maintenance	Anticipated extent of maintenance required.	Providing solutions that are relatively easy to maintain.

3. Evaluation Criteria

Objective	Evaluation Criteria	Rationale
Timing	Length of time required for implementation.	Implement solutions as soon as possible to mitigate risks of flooding in a timely manner.
Minimize Impacts of Construction	Minimize disruption to public greenspaces and recreational uses during construction/operation.	Identifying solutions that can be implemented with minimal disruption to neighbours and the environment.
Social/Economic	Impact on Urban Community and Future Land Uses	Potential for disruption of displacement of existing residents, greenspaces, recreational uses (parks, open spaces, trees). Potential to influence infill or green field development
Built Heritage and/or Cultural Heritage Resources	Minimize Impacts to built heritage and/or cultural heritage resources	
Natural Environment	Minimize Impacts to Natural Environment Features	
Archaeological Resources	Mitigate impacts to Archaeological Sensitive Areas	
Cost	Relative capital municipal infrastructure and private property improvements cost. Relative cost of private property measures.	

3. Evaluation Criteria - Activity

Using your 5 sticky dots, please vote for the 5 criteria that you think are the most important to consider when evaluating the storm and sanitary solutions. Please do not vote for the same option more than once.

For those who are in attendance over the phone, your votes will be collected on the next slide.

3. Evaluation Criteria - Activity

Objective	Evaluation Criteria	Votes
Reduce Potential for Flooding	Extent of basement flood reduction realized by alternative	
Resilient	Flexibility of alternative to adjust to climate change.	
Water Quality	The ability to maintain or improve water quality.	
Ease of Implementation	Level of installation and operational complexity for homeowner or City (including consideration of space requirements, construction requirements, etc.)	
Ease of Maintenance	Anticipated extent of maintenance required.	
Timing	Length of time required for implementation.	
Minimize Impacts of Construction	Minimize disruption to public greenspaces and recreational uses during construction/operation.	
Social/Economic	Impact on Urban Community and Future Land Uses	
Built Heritage and/or Cultural Heritage Resources	Minimize Impacts to built heritage and/or cultural heritage resources	
Natural Environment	Minimize Impacts to Natural Environment Features	
Archaeological Resources	Mitigate impacts to Archaeological Sensitive Areas	
Cost	Relative capital municipal infrastructure and private property improvements cost. Relative cost of private property measures.	

PIC Comments – SAC Mtg #5 - July 3

	July 3 SAC Meeting Comment	Implementation
1	Develop a partnership between the City and the public by informing the public on the issues.	Provide clarity in PIC Notifications on the Active Role the Public will need to play.
2	The Team needs to demonstrate the solutions are achievable.	Working with Agencies to ensure that solutions are acceptable. Checking that solutions can be built.
3	Communicate the implementation plan.	Implementation Plan will be integrated into the Master Plan Document. Projects will be assigned priority (Immediate, Short-Term, Long-Term)
4	Include success stories and provide positive results of other related studies.	Use other studies to demonstrate potential benefits of proposed solutions.
5	More information on LIDs should be provided to the public including illustrative materials.	City's continued educational program will incorporate materials. Project's website provides several resources.
6	Show extent of LaSalle and Tecumseh Drainage Areas	PIC and Reporting will show full drainage areas
7.	Demonstrate the benefits of implementing these solutions over time.	Existing and ultimate conditions results will be presented to show benefit of Short and Long Term Solutions.
8.	User friendly terminology.	Incorporating in all public materials.

4. Public Information Centres (PICs)

Overview:

Objective:

- Description of Problems
- Updated on evaluation of alternative solutions
- Reminder of Partnering Role between City and Property Owners
- Next Steps

Goal:

- Story Boards
- Details on Solutions and Evaluations – Online, Handouts

4. Public Information Centres (PICs)

Videos:

Solutions Rely on a Partnership Approach

- https://www.youtube.com/watch?v=mFTZS99wVeQ

Working to Reduce Risk

- https://www.youtube.com/watch?v=dEBjg7gV_vE

Change Will Take Time and Money

- https://www.youtube.com/watch?v=XViyptrBcNY

Promoting PICs

- Project Website & Newsletters
- Social Media – including 3 videos
- Media Interviews
- Open Streets Event – postcards
- Notices to Residents & in community centres
- Newspaper Ad
- Councillor E-blast

6. Next Steps

Upcoming Meetings:

- Pre-Consultation: October 15, 16 & 30, 2019
- Public Information Centers: November 2019
- Reporting (Early 2020)

Thank you!

MEETING MINUTES

Subject: City of Windsor Sewer Master Plan – Stakeholder Advisory Committee Meeting #7

Date and Time: April 21, 2020 at 6:00 p.m.

Location: Virtual via Google Meet Platform

Our File: 17-6638

Attendees

General Public:	David Hanna	Resident
	John S. Holmes	Resident
	Tom Markham	Resident
	Ray Bezaire	Resident
Community Groups and Public Health:	Amandeep Hans	Windsor-Essex County Health Unit
Emergency Service Providers:	Stephen Laforet	Windsor Fire & Rescue Services
Environmental Groups:	Dr. Rajesh Seth	University of Windsor
Sewer Master Plan Project Team:	Anna Godo	City of Windsor
	Janelle Coombs	City of Windsor
	Karla Kolli	Dillon Consulting Limited (Dillon)
	Laura Herlehy	Dillon Consulting Limited (Dillon)
	Flavio Forest	Dillon Consulting Limited (Dillon)
	Chris Patten	Dillon Consulting Limited (Dillon)
	Ian Wilson	Dillon Consulting Limited (Dillon)
	Mariam Bart	Dillon Consulting Limited (Dillon)

Absent

General Public:	Greg Plante	Imaginative Imaging
	Frank Dattilo	Resident
	Ron Brant	Resident
	David Munro	Resident
	Bridget Scheuerman	Pillette, Riverside and Ford City BIA
Environmental Groups:	Dave Munro	Detroit River Canadian Cleanup
	tirupati@uwindsor.ca	University of Windsor
Insurance Providers/Adjusters:	Maria LeBlanc	Easy Insure
	Pete Karageorgos	Insurance Bureau of Canada (IBC)
Sewer Master Plan Project Team:	Janelle Coombs	City of Windsor
	Samir Dhanvantari	Aquafor Beech Limited
	Nadia Islam	Aquafor Beech Limited
	Dave Maunder	Aquafor Beech Limited

Notes

Item	Discussion	Action By
	Introduction Introduction to meeting format and greetings. Members shall email any comments not discussed at meeting to Laura Herlehy at **lherlehy@dillon.ca**, emails to be provided by May 1st, 2020.	
1.	**Project Update**	
1.1.	Last SAC meeting was held on Sept 26, 2019. Highlights of activities since the last SAC meeting include: • Meetings with affected property owners related to the proposed Ford Blvd. pump station, St Rose Ave. pump station, and the Riverside Drive landform in Fall 2019; • Public Information Centre (PIC) sessions held in February 2020; • Consultation with Agencies including the Essex Region Conservation Authority (ERCA) regarding the landform barrier and coastal flooding risks. Additional meetings with ERCA regarding source water protection. Multiple meetings with City Administration to collect input; • Environmental Assessment work completed in this time included evaluation and assessments of the alternative solutions addressing coastal, surface and basement flooding risk; and • Additional information provided in meeting slides.	**Info.**
2.	**Public Information Centre No. 2 (Feb 2020)**	
2.1.	There were over 320 attendees at the February 2020 PICs. A summary of what was heard from the PIC attendees was provided, see slides for details.	**Info.**
2.2.	The SAC members provided comments on recent PIC meeting, as follows: • There were compliments to the City Administration and Consulting Team for being proactive in explaining the PIC material to attendees. The materials were of good quality and detail; • The meeting format was good with plenty of material provided to explain the Master Plan. The events were well attended; and • There may be potential to improve future meetings with further attendance from elected officials. Consider inviting additional City Departments for attendance (i.e. planning, parks, etc.).	**Info.**

3. **Feedback on Flooding Solutions**

3.1. An overview of flooding solutions was presented and are generally divided into four categories, as identified below. See slides for more details.

- Source Control;
- Improve Sewer System Conveyance and Storage;
- Downstream Outlets; and
- Coastal Flood Protection.

3.2. Feedback in regards to the flooding solutions from the SAC committee members was provided during the meeting, as summarized below. Further members were encouraged to provide additional comments via email by May 1st, if they had more feedback. **Dillon/City/SAC Members**

- **Question:** What is the need for pilot projects? Why do low impact development (LID) measures need pilot projects? Especially if other projects i.e. big pipes can be built without the same tests?
- **Response:** The team discussed that there is a need to quantify the benefit of LIDs locally. We have taken a balanced approach in developing the flood risk reduction solutions, a conservative flood reduction benefit was accounted for using LID measures in the model. The pilot projects may find the benefit is greater than accounted for, and other "big pipe" projects, pump stations, etc. may be reduced in size in the future. Further, it is not just LIDs where pilot projects are recommended. The same approach is recommended to assess the benefits of foundation drain disconnection from the sanitary system.
- **Comment:** To legislate the need for infrastructure, we need to prove how it works. I agree with the need for pilot projects.
- **Question:** How will the City Administration know who has completed private property works? For example, I disconnected my downspout, and re-directed the outlet underground.
- **Response:** There are many potential methods to document private property work including permits and/or City databases that could be used to track this information about what works have been completed. For works that have not been documented, the City can use fog testing in the sewers to identify existing conditions.
- **Question:** How do we choose the problem areas? How do we prioritize where solutions are installed first, what sewers? There are old sewers in South Windsor.

- **Response**: As we developed the plan many metrics were considered. The City-wide model assessed both basement and surface flooding risk. The solutions were developed to reduce basement flooding risk for storm events up to a 1:100 year storm. Surface flooding solutions were targeted to major roadways and sensitive land uses, such as schools, hospitals and long-term care centres. We consulted with multiple City Departments, Public Works, Operations, Pollution Control, and others to confirm the flooding problems. Further, in consultation with City Administration and based on flooding risk, sewer condition, and cost-benefit a prioritization strategy is being drafted.
- **Question:** What is the practice for maintenance of open drains? Is that being addressed?
  Response: The City has implemented re-active type maintenance of the open drain systems for the past 50 years. This approach has resulted in a system where many drains may need cleaning or repair. The City is currently looking at developing a proactive and recurring maintenance program for open drains; potentially a 7-8 year schedule. This is on the City's priority list.

3.3. The SAC members were asked: "Is the information provided clear? - What can be added to make the project material clearer or easier to understand?" Responses are summarized below.

- Sewage Ejector Pump- confusion between sewage and stormwater. Provide additional information. Further, make private property solutions clearer in general.
  - **Response:** Ties into the value of an enhanced education program being proposed as part of this study's recommendations.
- It was not clear why there were changes to Ford Blvd. pump station recommendations.
  - **Response:** It was found that this outlet was different from other pumped outlets to the east. It was determined that since the drainage areas is higher and since most of the of Riverside Drive East drainage will now be re-directed to the proposed St. Rose Pump Station, it was found that only minor improvements to the Ford pump station were required to meet the established level of service.
- Impressed with the amount of consultation completed. Good job getting information back to SAC and the public.

4. **Implementation Plan**

4.1. To develop the flooding solution implementation plan, it was identified how solutions would be divided between immediate projects and long-term projects. Further, the long-term projects would be subdivided into high, medium, and low priority groupings. See more details in slides. **Dillon/City/SAC Members**

4.2. **Basement Flooding Prioritization Criteria**

4.2.1. The SAC was asked what should be considered when an implementation plan is developed? - Discussion below:

- The historical data (reported flooding calls) is important, same with age/condition of sewer and reduction of CSO. Solutions should hold homeowners who haven't done private property work responsible.
- What do we think is the most important criteria for basement flooding solutions? Want flood risk reduction to be the highest priority, but constructability and age are important.
- Can we play around with weightings; we have data for age of sewers? Flooding risk should have a higher weight but how much higher? Sensitivity test with GIS?
- It was identified by the consulting team that the prioritization plan was and will continue to be developed with input from City Administration.
- Perhaps before and after maps showing improvement can help with prioritization.
- Condition of sewer should be an important metric, perhaps more important than age of sewer.
- We should focus on getting the best bang for our buck from solutions.
- Concerns were identified about new developments' impact on outlets. It was noted for new development a new requirement was to examine outlet capacity of the accepting system as a screening for flooding risk.

4.3. **Surface Flooding Solutions Prioritization Criteria**

4.3.1. The SAC was asked what should be considered when an implementation plan is developed? - Discussion below:

- New roads underpasses and overpasses have created surface flooding issues. These should be a priority, should they all be considered short-term priority versus long-term.
- Surface flooding on major roadways should be a priority.

- General comment regarding prioritization is that cost should be an important factor for assessing all solutions.

4.4. **Coastal Flooding Prioritization Criteria**

4.4.1. Area 1 is immediate prioritization (construction work imminent due to available Disaster Mitigation and Adaptation Funding) and both Area 2 and Area 3 are high priorities.

5. **Recap of SAC Input**

5.1. Recap - What we have heard from the SAC members is summarized below. **Info./City/Dillon**

5.2. A question was asked for SAC member input: What type of enhanced educational program would be most effective? SAC members were to provide feedback to Laura over email.

5.3. It was asked by a SAC member: What is the current status of the demonstration house? **Response:** The City is working on a program for retrofit homes. City to follow up regarding the status of the demonstration house.

6. **Next Steps**

The next steps for the SAC members in the project were identified. **Info.**

- Complete implementation plan;
- Complete high level estimate of total infrastructure works;
- Final Council Presentation and Memo;
- Council Report for notice of completion;
- 30-Day Public Review Period; and
    - SAC members will be kept informed of key dates.

7. **Final Comments and Remarks**

<u>From the SAC Members:</u>

7.1. Thanks for organizing, and including us in this project. Value in understanding the issues. From the IBC perspective, sitting on this committee has helped understand how this study will provide benefit to insurees/residents. **Info.**

7.2. Lot of useful information from the project, good work with the sewer model.

7.3. This type of committee is helpful for and necessary when looking at a big problem like flooding. Windsor has a lot of low lying areas which need to be considered. Challenge with this project is people who have not flooded may not be engaged. Education is important; everyone has to pitch-in.

7.4. A lot of good information. Have seen high water before, hopefully this time we solve problems. Individuals need to take responsibility for their own home.

7.5. Whole City is in this together, not an individual or just a single neighbourhood. We need to work together with the City leading the way. This City leadership should include education related to flooding and best practices for residents.

7.6. This SAC process is a balanced and reasonable approach to get the community and agencies involved. Homeowners have responsibility too. Public education needs to meet the public under every single method possible, social media is great, but townhall meetings, etc. are also helpful. This information has helped me address questions.

- Emergency services willing to partner in future education programs.

7.7. Enjoyed the video with the City Engineer. My basement has never flooded, but I empathize with those who have. Education is important and has to be on-going. Majority of project has gone well.

7.8. Let us know when it goes to the City Council. Would like to attend. Congratulations to the whole committee. This SAC is a model for public input on future projects.

From City Administration

7.9. Thank you. We appreciate input from the SAC members. This is an exciting project laying the groundwork for decades of projects and improvements in the drainage system. **City Administration**

From Consultant Team

7.10. Given the large scale and complexity of this project we were looking for innovative ways to convey information to the public. The SAC group was wonderful for input and as a sounding board. Will use this approach going forward. Thank you for your time and feedback. **Consultant Team**

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

LMH:ldm

Encl.

April 28, 2020

STAKEHOLDER ADVISORY COMMITTEE

City of Windsor
SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

MEETING #7

April 21st, 2020, 6:00 to 8:00 pm

Virtual Meeting

Presented by: DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

Agenda

Agenda Item	Approximate Time for Presentation and Discussion
1. Project Update	5 mins
2. Public Information Centre Review	20 mins
3. Feedback on Long Term Solutions Alternatives	20 mins
Pause	
4. Implementation Plan	40 mins
Pause	
5. SAC Input	10 mins
6. Next Steps	10 mins

Objectives

- Provide an overview of the recommended solutions and what we heard at the PIC (recap of the PIC information)
- Obtain feedback on the recommendations
- Get your input on the Implementation Plan
- Get your input on a future Enhanced Educational Program (time permitting)

For those who cannot attend this meeting, we ask that you review this material and provide comment via email to Laura Herlehy at lherlehy@dillon.ca by May 1st, 2020.

1. Project Update

SAC Meeting # 6: Sept. 26, 2019

1. Public Consultation/Meeting with Property Owners
   - Meetings with Property Owners directly impacted by:
     - Riverside Dr. E Flood Protection Landform Barrier and
     - St. Rose Pump Station Improvements; and
     - Ford Pump Station Improvements. (Fall 2019)
   - Attended Ward 6 Town Hall Meeting in to discuss Coastal Flooding Solutions (November 2019)
   - Meet with property owners who are directly impacted by solutions. (January/February 2020)
     - FCA, Ford, Riverside Drive Residents, Public School Board
   - Public Information Centre No. 2

2. Consultation with Agencies/City Administration
   - ERCA – Source Water Protection
   - ERCA – Riverside Drive Berm and Riverside Area Storm Solution
   - Meeting with Parks, Property, Operations, Finance City Departments

3. Communications
   - 4th Video – City Engineer Update
     - https://youtu.be/yoN3gBcX4uA
   - Council Update – November 2019

Photo: PIC No. 2
Roseville Golf Course

1. Project Update

4. Environmental Assessment
    - Completed evaluations for all solution alternatives.
    - Completed draft archaeological and natural environment assessments.
5. Solution Development
    - Finalized City Wide sewer model.
    - Finalized functional design for all infrastructure including ponds, sewers, underground storage units and the Riverside Drive landform barrier.
6. Reporting
    - Underway

All past SAC meeting presentations and minutes have been saved in a shared file folder.

2. Public Information Centres - Recap

February 11, 12, and 13, 2020

- **Focus:**
  - Presenting the preliminary preferred options, evaluation criteria, solutions, expanded berm and new pump stations.

Number of Visitors: Total: 320
South PIC – Roseland Golf: 80
East PIC – WFCU Centre: 200
Centre PIC – Aquatic Centre: 40

Number of Comments: 27 Comment Sheets

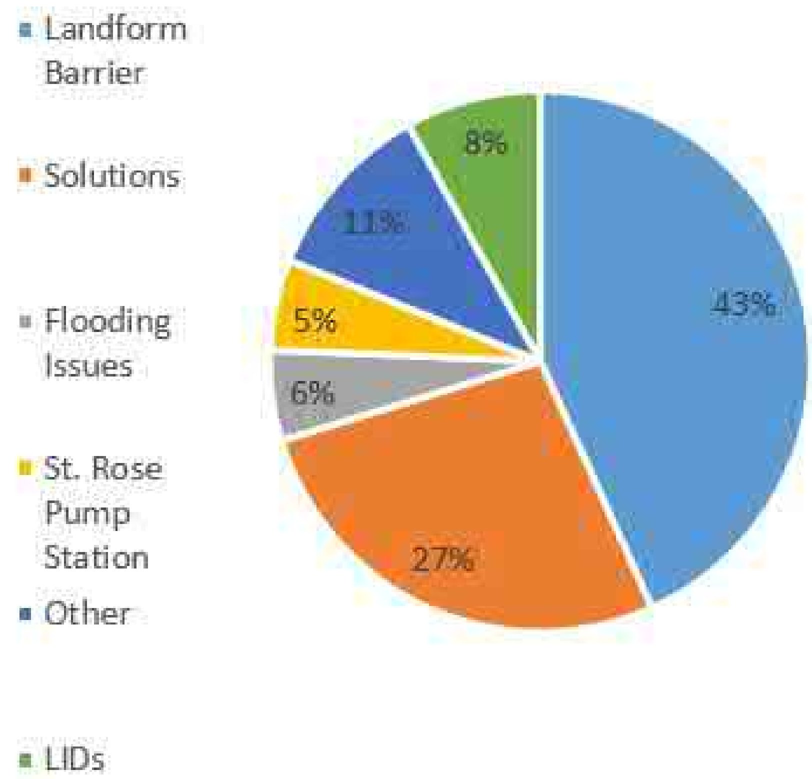
Photo: PIC No. 2
WFCU Centre

- **Meeting Materials:**
  - https://weatheringthestorm.ca/resources

2. Public Information Centres

What We Heard:

- Low Impact Development measures:
  - City should encourage home owners to minimize runoff to the City system.
  - Use surface storage and infiltration measures before upsizing sewers to accommodate storm flows.
- Private Property Improvements:
  - General support for mandatory downspout disconnection.
  - Many people had utilized Basement Flooding Subside Program
- Solutions:
  - Prioritize separation of combined sewers and Combined Sewer Overflows (CSOs) in the Central area.



2. Public Information Centres

What We Heard:

- St. Rose Pump Stations:
  - Interest in reconsidering the location of the St. Rose Pump Station, if possible.
  - Property owners want to have input on design.
- Coastal Flood Protection:
  - Requested more information about the city owned break wall.
  - General concern for residents on Riverside Drive.
    - Additional communications is required for property owners regarding property acquisition, property impacts.
    - Request for emergency assistance.
  - Interest in the rationale behind the higher berm height.

2. Public Information Centres

Discussion:

1. Did you attend?
2. Do you have any comments regarding:
   - Format
   - Materials presented
   - Communications

TIME: 5 Minutes

3. Flooding Solutions

- Flooding solutions are made up of a combination of various types of improvements.
- Details of solutions can be found here:
  https://weatheringthestorm.ca/resources

PUBLIC INFORMATION CENTRE - FEBRUARY 2020

- PIC Display Panels
- Preliminary Preferred Solutions Map
- Preliminary Preferred Solutions - South Windsor
- Preliminary Preferred Solutions - Central Windsor
- Preliminary Preferred Solutions - East Windsor
- Coastal Flood Protection - Landform Barrier Preliminary Solution
- Landform Barrier - Conceptual Mapping

Summary of Master Plan

Figures showing all recommendations.

Details of recommended solution and evaluations of alternatives on a site by site basis.

Landform barrier conceptual drawings.

THE FOLLOWING PANELS SUMMARIZE THE RECOMMENDED SOLUTIONS

3. Flooding Solutions - Solution Tool Box

There are four categories:

1. Source Control

Examples:

- Foundation Drain and Downspout Disconnection
- Correct Improper Plumbing Connections
- Low Impact Development (LID) measures
- Sealing Sanitary Sewer System Leaks
- Manhole Rain Catchers

2. Improve Sewer System Conveyance and Storage Capacity

Examples:

- Increase sewer sizes
- Combined sewer separation
- Surface/underground storage in open spaces
- Low Impact Development (LID) measures
- High water level protection

3. Increase Downstream Outlet Capacity

Examples:

- Pump Station Capacity Improvements
- Improved Outlet Sewers
- Treatment Plant Storage and Treatment Capacity Improvements

4. Coastal Flood Protection

Examples:

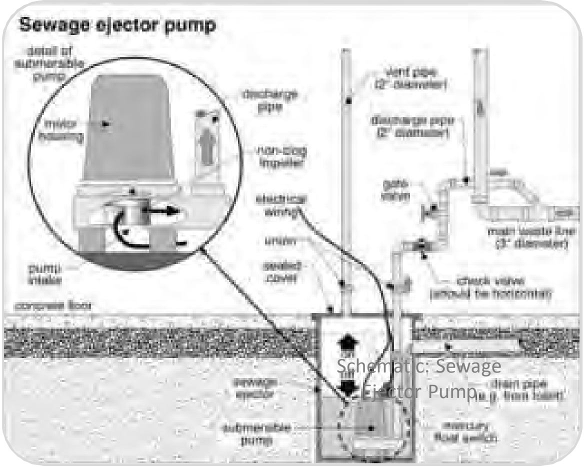
- Storm Sewer Backflow Prevention
- Dyke Protection System (Landform Barrier)

Coastal Flooding Photo Source: Windsor Star

3. Flooding Solutions - Solution Summary

Source Control: What the City is Doing

- ✓Updating and implementing new City by-laws:
  - ✓City-Wide Downspout Disconnection Policy.
  - ✓Foundation Drain Disconnection Policy.
  - ✓Pilot Projects to measure benefit of these measures.
- ✓Updating the City’s Development Standards.
  - ✓Mandatory sewage ejector pumps for new development.
  - ✓Install inlet control devices into the sewer system to control inflow of rainwater entering existing sewers.
  - ✓Low Impact Development measures



Schematic: Sewage Ejector Pump

Schematic: Example Downspout Pop-up
www.waterproof.com

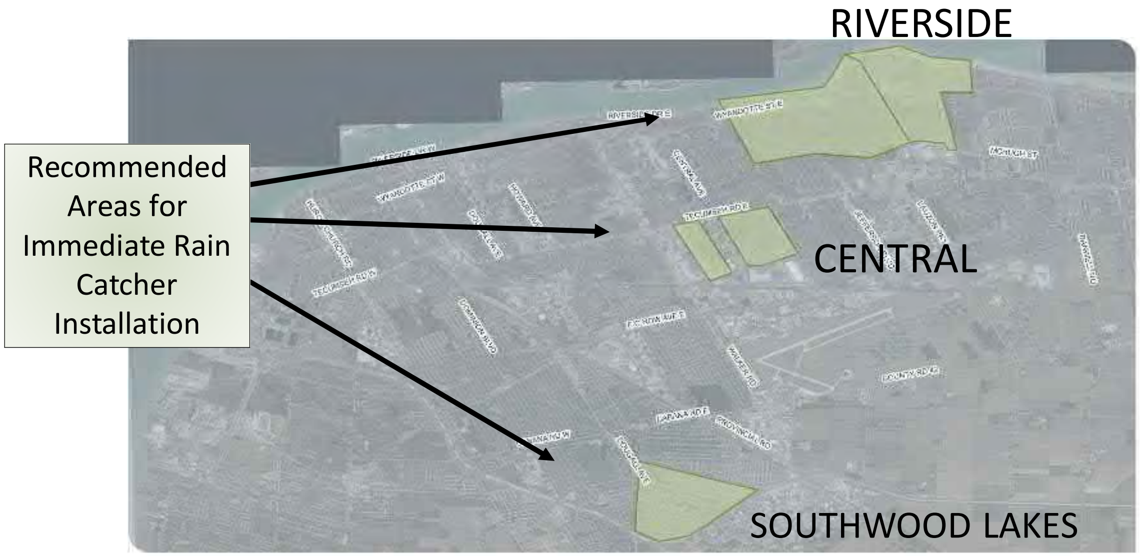
3. Flooding Solutions - Solution Summary

Source Control: What the City is Doing

Manhole Rain Catcher

- ✓Implementing Low Impact Development (LIDs) measures, such as:
  - ✓Exfiltration trenches (Example: Matthew Brady Construction)
  - ✓Bioswales/Stormwater Retention
  - ✓Permeable Pavements (Tranby Park Parking Lot)
- ✓Installing rain catchers on sanitary manholes in high priority areas and eventually all manholes.
- ✓Completing an extensive condition assessment on infrastructure to guide maintenance and upgrade decisions.

Installing rain catchers city-wide will reduce wet weather volume entering sanitary system up to 5% for a 1:100 year storm.



3. Flooding Solutions – Solution Summary

Source Control: Recommended Private Property Improvements

Basement Flooding
(SANITARY SYSTEM)

- ✓Foundation Drain Disconnection
- ✓Correct Improper Connections
- ✓Backflow Prevention Valves

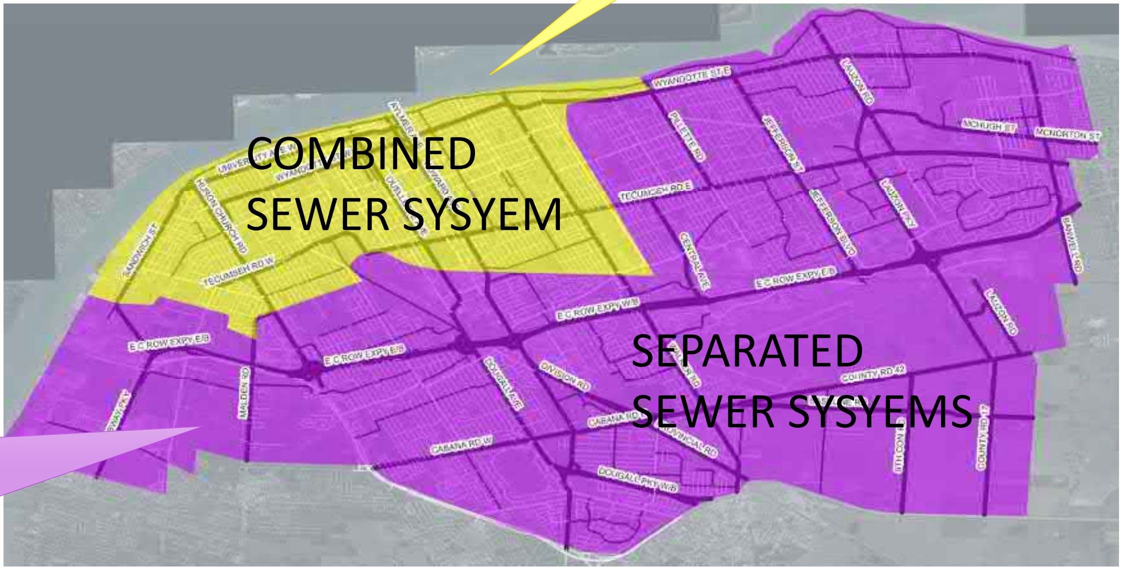
Surface Flooding
(STORM SYSTEM)

- ✓Downspout Disconnection
- ✓Improve Lot Grading
- ✓Low Impact Development (LID) measures, such as:
  - ✓Rain Barrels and Rain Gardens
  - ✓Seal window wells
  - ✓Permeable pavements
  - ✓Others

These measures are **key** components of the overall recommended solution strategy.

Recommended Mandatory Downspout Disconnection Policy Area

Recommended Mandatory Foundation Drain and Downspout Disconnection Policy Area



3. Flooding Solutions - Solution Summary

Sewer System Conveyance and Storage Improvements

Basement Flooding **(SANITARY SYSTEM)**

✓Enhanced sewer separation strategy for combined sewer areas;

- Downtown/Central Area and Fountainbleu Area.

✓Inline storage within sewers;

- 40 km of sanitary sewer upgrades in East Windsor.
- 8 km of sanitary sewer upgrades in South Windsor.

Enhanced sewer separation strategy definition:

– Removal of stormwater flows from the combined sewer. This is generally accomplished by directing roadway runoff to a new storm sewer.

– Removal of all surface and roof (downspout) drainage from the sewer.

– Where feasible removal of building foundation drainage from combined sewer.

3. Flooding Solutions - Solution Summary

Sewer System Conveyance and Storage Improvements

Surface Flooding **(STORM SYSTEM)**

✓Inline storage within sewers:
- 40 km in East Windsor and 8 km in South Windsor.
- 9 km of trunk storm sewer in Central Windsor.

✓3 New and 4 Upgraded stormwater management (SWM) ponds:
- Little River Golf Course New SWM Pond.
- Dougall Ave. and Howard Ave. SWM Ponds.
- Modifications to the ponds serving Southwood Lakes.
- Increase size of the Central Ave. SWM Pond.

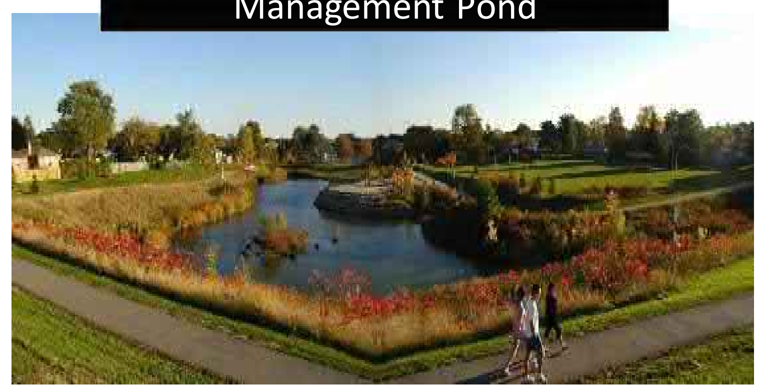
✓Underground storage systems under parks, parking lots, commercial properties.

✓Low impact development (LID) measures:
- Tranby Park Permeable Parking Lot, Matthew Brady Exfiltration Trenches.

✓Backflow Prevention Measures to protect from High Water Levels in the River.

Example: Stormwater Underground Storage Facility

Example: Stormwater Management Pond



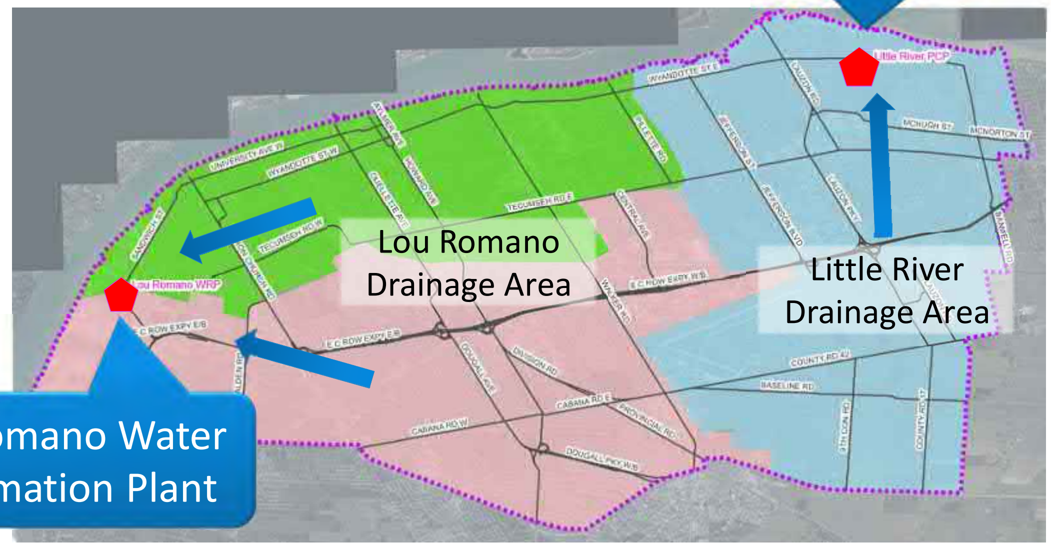
3. Flooding Solutions - Solution Summary

Downstream Outlet Capacity Improvements

Basement Flooding **(SANITARY SYSTEM)**

✓Little River Pollution Control Plant:
- Increase inlet pump station capacity
- Future plant expansion
- Interim overflow outlet improvements (Pontiac Pump Station improvements)

✓Lou Romano Water Reclamation Plant:
- Retention Treatment Basin Facility

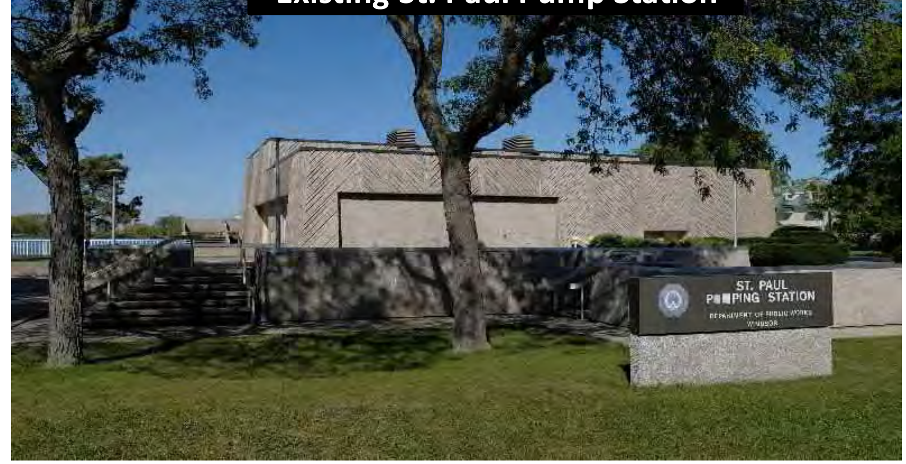


Surface Flooding **(STORM SYSTEM)**

✓Improved storm outlets to the Detroit River
- Detroit St., Bruce Ave., Cameron St., Albert Rd., Parent Ave.

✓New or improved stormwater pump station (PS) capacities
- New St. Rose PS
- Improve St. Paul PS
- Improve East Marsh PS
- Improve Drouillard PS
- Improve Lakeview PS
- Improve Ford PS

Existing St. Paul Pump Station



3. Flooding Solutions - Solution Summary

Coastal Flood Protection

Alternative flood protection solutions have been developed for 3 areas:

- Area 1: Riverside Vista Phase 2A, Ford Blvd. to St. Rose. Ave.
- Area 2: Riverside Drive East, St. Rose Ave. to Riverdale Ave.
- Area 3: East Riverside Area, Riverdale Ave. to East City limits.

Ganatchio Trail – Existing landform barrier built in 1980s

3. Flooding Solutions - Solution Summary

Coastal Flood Protection

Recommended flood protection for elevation of 176.50.

- Balance between flood protection provided and immediate property impacts.

Landform barrier proposed along Riverside Drive between Villaire Ave. to east City Limits

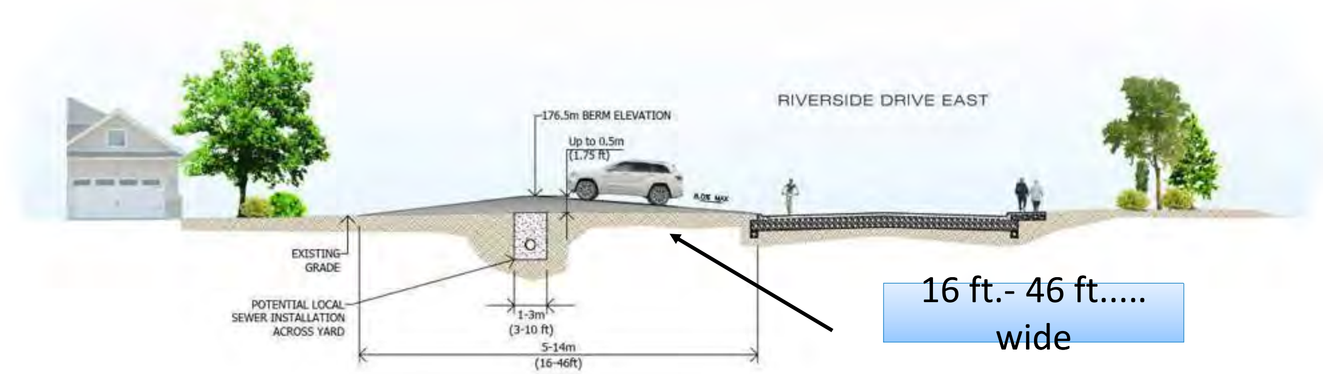
- Areas where landform barrier does not exist
- Areas that do not meet 176.50 protection level

3. Flooding Solutions - Solution Summary

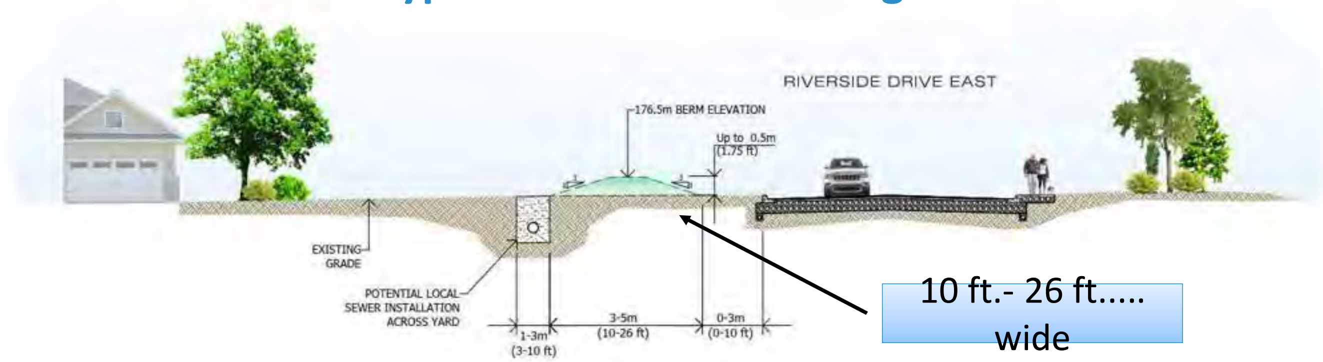
Coastal Flood Protection

Typical Cross Sections where berm is required:

Typical Driveway Grading



Typical Boulevard Grading



- ✓ Protects in-land areas from high lake/river levels.
- ✓ Protects low lying residents, who live North of Riverside Dr., from overland surface flooding on Riverside Dr.
- ✓ Utilizes existing private property grades to meet min. protection levels.
- ✓ Build up or infill existing barrier (Ganatchio Trail)

3. Flooding Solutions - Solution Summary

Coastal Flood Protection

- Landform barrier along Riverside Drive East is recommended:
  - Why isn't barrier proposed along waterline?
    - Measures need to be within established easements or ROW to permit regular inspection and maintenance.
    - Measures placed adjacent to water lines must to be 1ft to 3ft higher to account for wind and wave factors.
    - City maintain access and legal status to mitigate risks of damage or modifications to the structure.
    - Would impact private property amenities such as pools, docks, boat slips, structures.

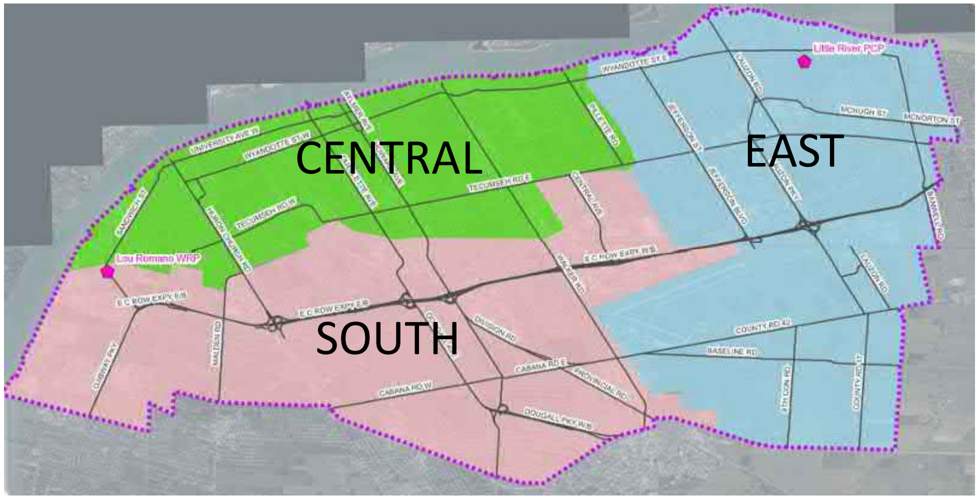
Summary of Recommended Solutions

The following figures shows all municipal infrastructure improvements recommended.

- Central Windsor Solutions
- South Windsor Solutions
- East Windsor Sanitary System Solutions
- East Windsor Storm System Solutions

Solutions will not be reviewed in detail. These figures are meant to provide an overview and understanding on the order of magnitude of the solutions developed.

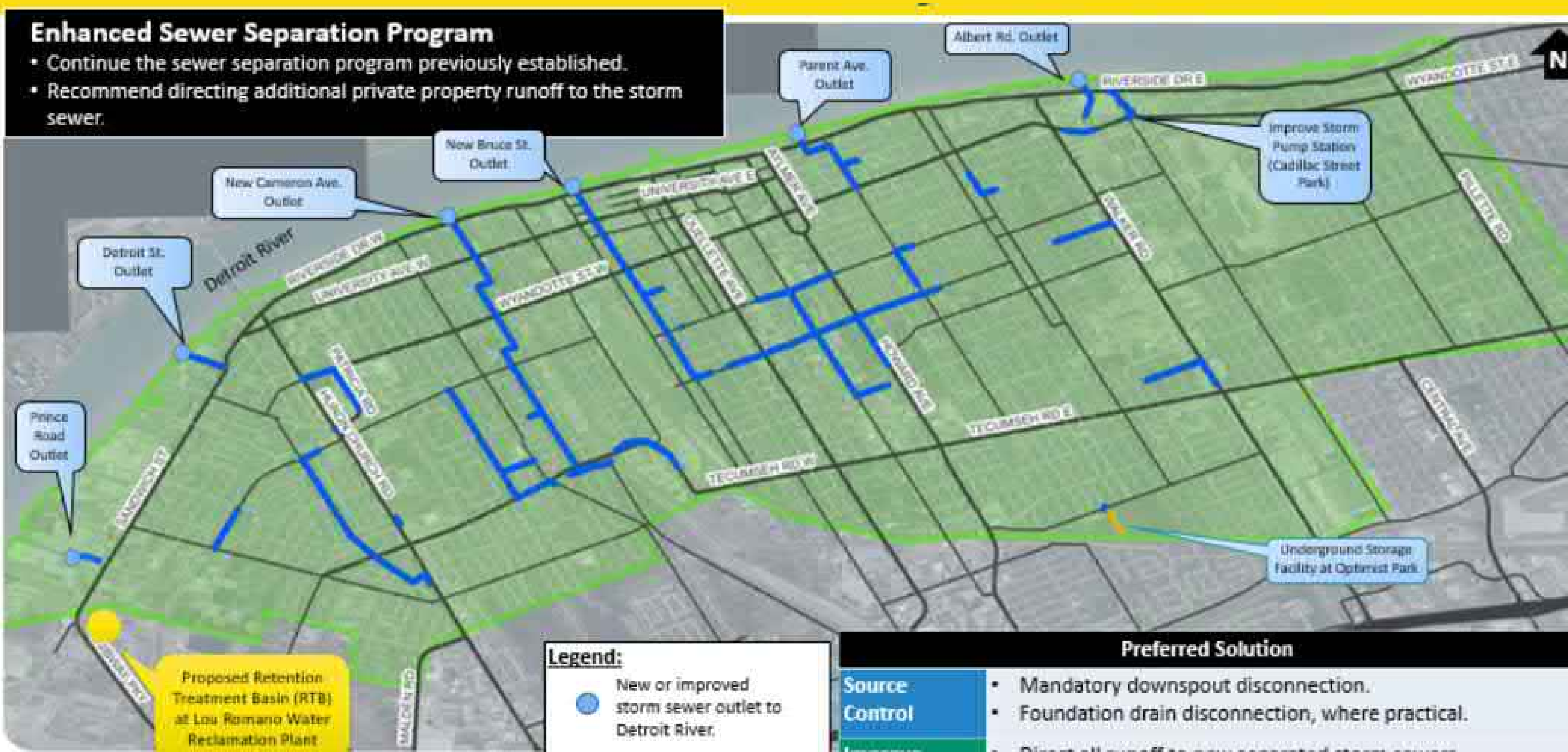
Three Distinct Sewershed Areas



Central Windsor Solutions:

Enhanced Sewer Separation Program

- Continue the sewer separation program previously established.
- Recommend directing additional private property runoff to the storm sewer.



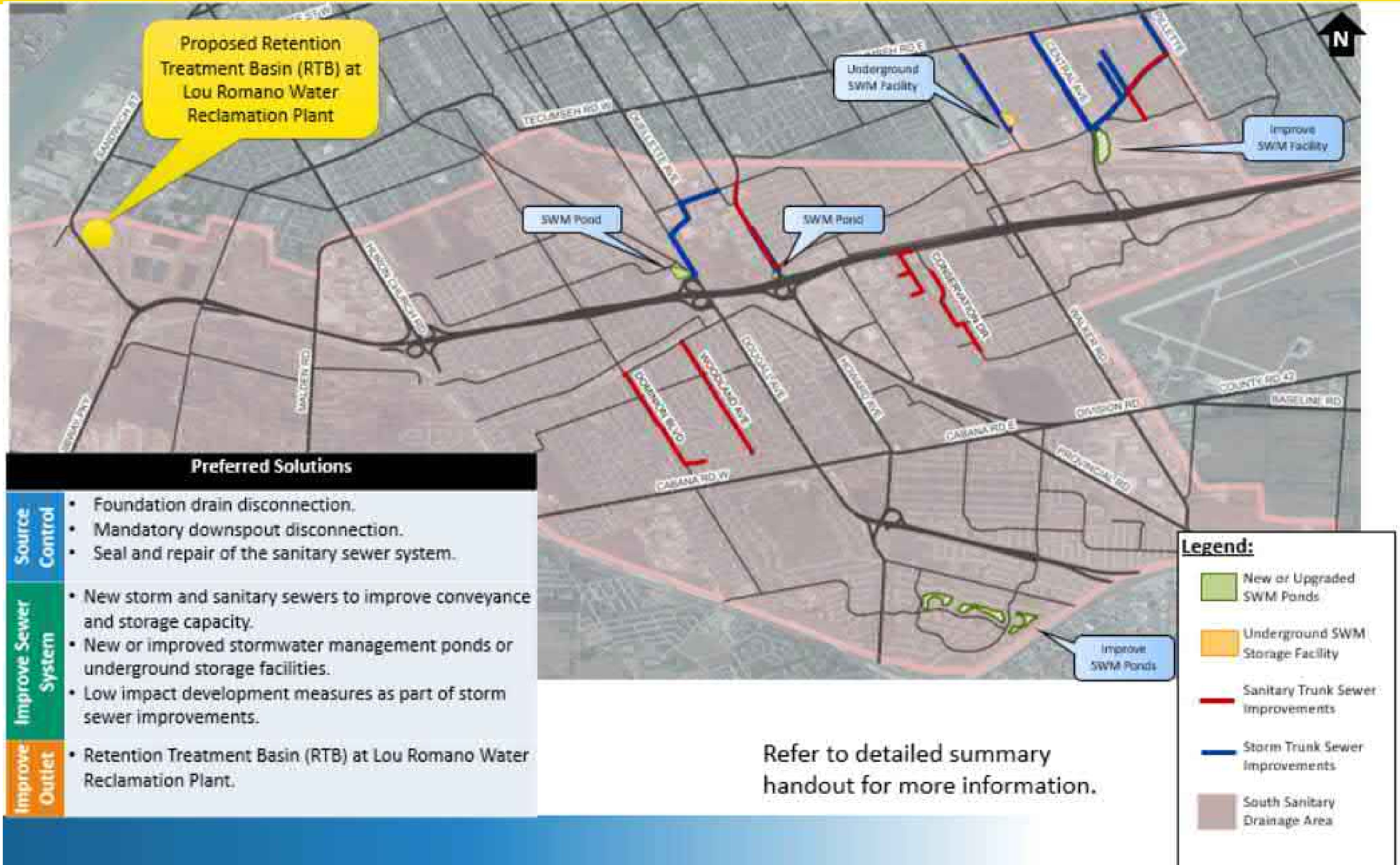
Refer to detailed summary handout for more information.

Legend:

- New or improved storm sewer outlet to Detroit River.
- Proposed storm trunk sewer improvements.
- Underground SWM Storage Facility
- Combined sewer area.

Preferred Solution	
Source Control	• Mandatory downspout disconnection. • Foundation drain disconnection, where practical.
Improve Sewer System	• Direct all runoff to new separated storm sewers. • Construct storm sewers along all roadways. • Direct alley drainage to storm sewer.
Improve Outlet	• Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant to better management of wet weather flows and reduce frequency of combined sewer overflows.

South Windsor Solutions



	Preferred Solutions
Source Control	• Foundation drain disconnection. • Mandatory downspout disconnection. • Seal and repair of the sanitary sewer system.
Improve Sewer System	• New storm and sanitary sewers to improve conveyance and storage capacity. • New or improved stormwater management ponds or underground storage facilities. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant.

Refer to detailed summary handout for more information.

East Windsor Sanitary Solutions

Preferred Solutions

Source Control	• Foundation drain disconnection. • Seal and repair of the sanitary sewer system.
Improve Sewer System	• New sanitary sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage.

Improve Outlet	• Improvements to the Little River Pollution Control Plant to manage wet weather flows.
	  • Improve existing bypass; OR
	  • Expand the plant treatment capacity.

Refer to detailed summary handout for more information.

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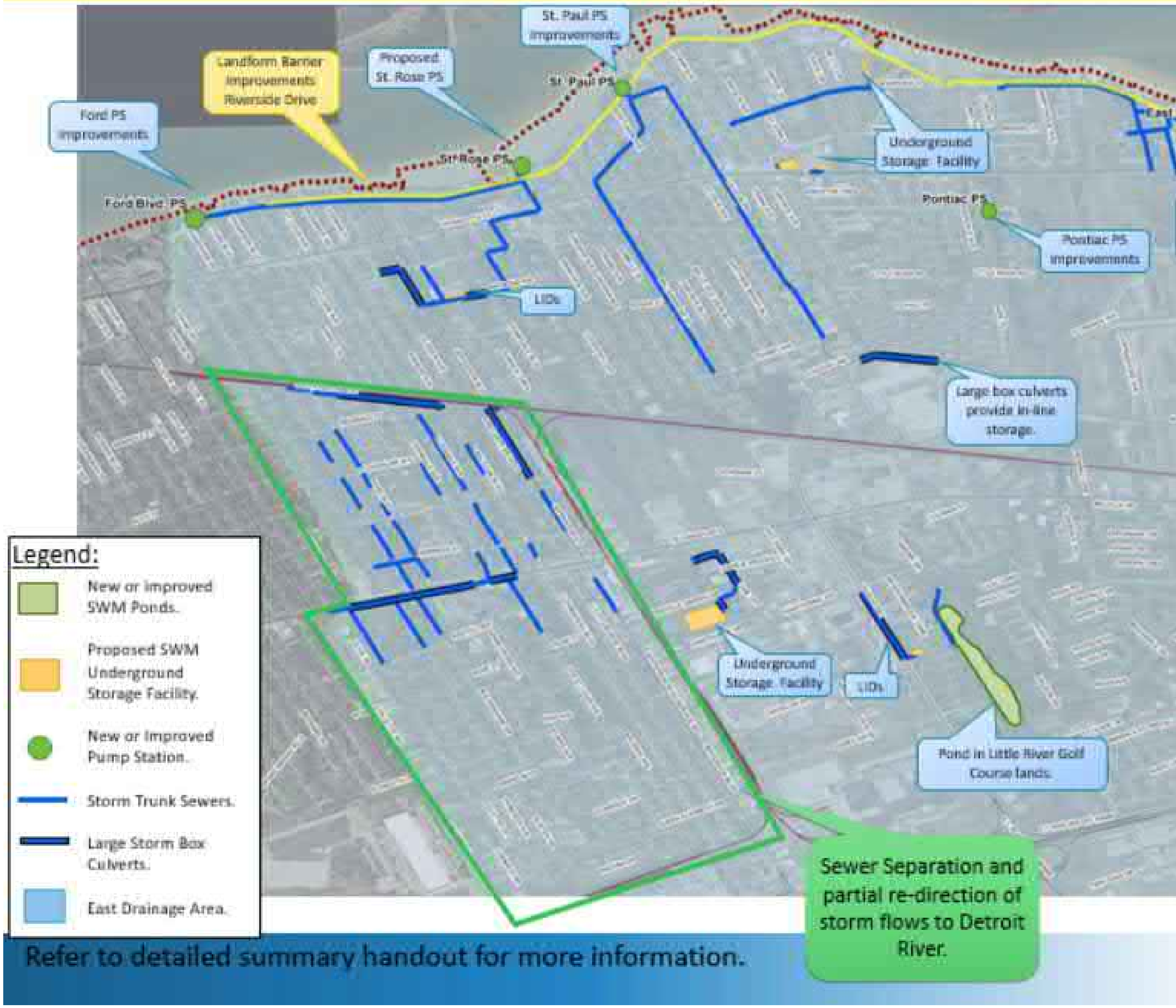


Refer to detailed summary handout for more information.

Preferred Solutions

Source Control
- Mandatory downspout disconnection.
- Improved Lot Grading.

Improve Sewer System
- New storm sewers to improve conveyance and storage capacity.
- Construct and improve existing stormwater management ponds or underground storage facilities.
- Large box culverts to provide in-line storage.
- Low impact development measures as part of sewer improvements.

Improve Outlet
- Improvements to existing Pump Stations; and
- New Pump station at St. Rose Ave.

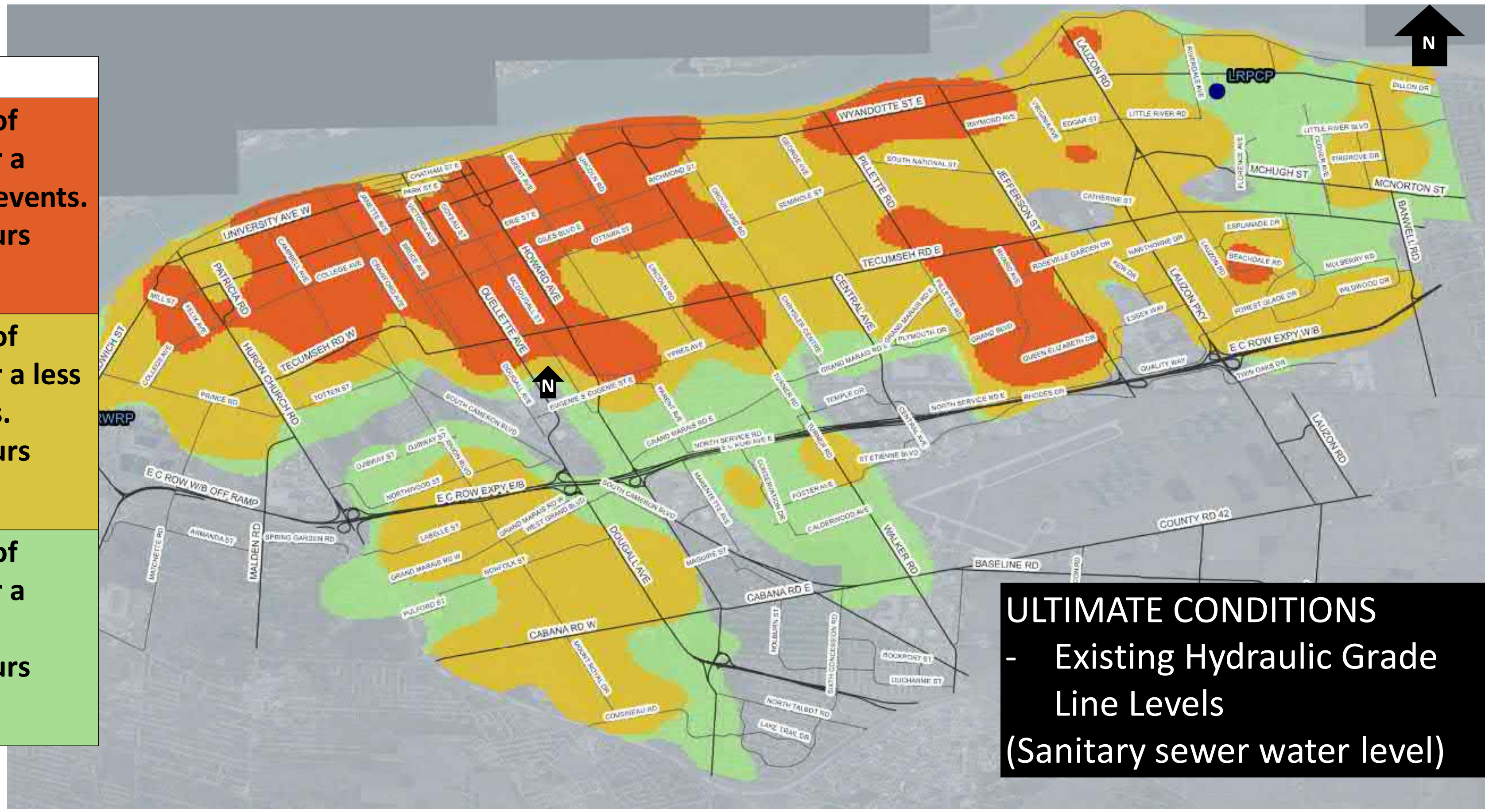
3. Flooding Solutions
Basement Flood Risk - Existing Conditions

LEGEND:

Areas that are at risk of basement flooding for a more frequent storm events. 50 mm rain over 4 hours (1:5 Year Storm)

Areas that are at risk of basement flooding for a less frequent storm events. 65 mm rain over 4 hours (1:25 Year Storm)

Areas that are at risk of basement flooding for a major storm events. 85 mm rain over 4 hours (1:100 Year Storm)



ULTIMATE CONDITIONS
- Existing Hydraulic Grade Line Levels

(Sanitary sewer water level)

Basement Flood Risk means that the water level in the sanitary sewer system is higher than typical basement depth (6ft below grade).

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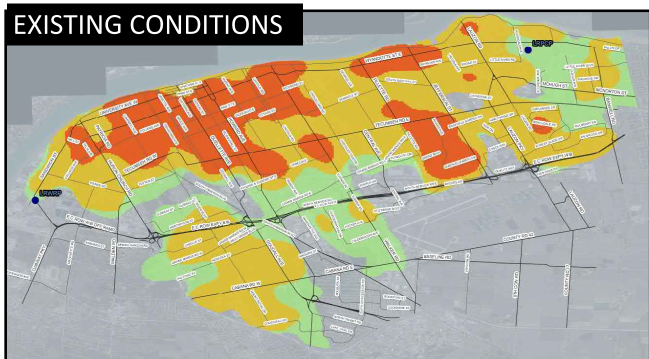
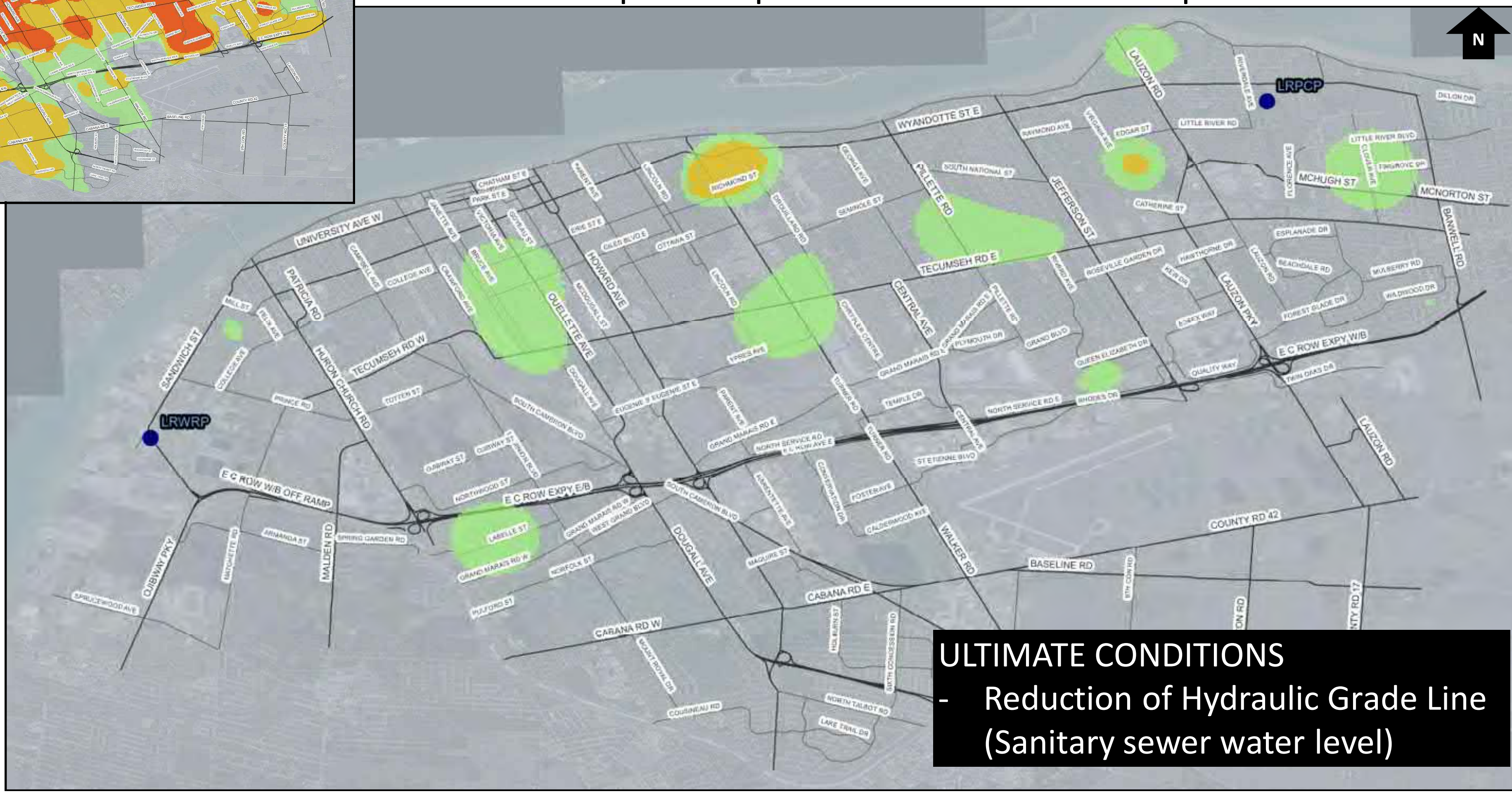
3. Flooding Solutions
Basement Flood Risk- Ultimate Conditions

EXISTING CONDITIONS



After all sewer improvements, private property measures and treatment plant improvements have been implemented.



ULTIMATE CONDITIONS
- Reduction of Hydraulic Grade Line (Sanitary sewer water level)

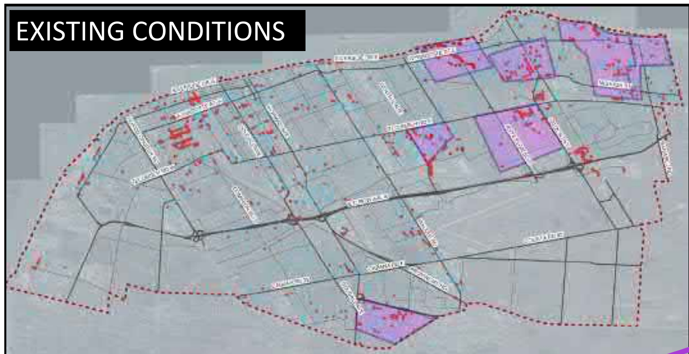
3. Flooding Solutions - Surface Flood Risk-

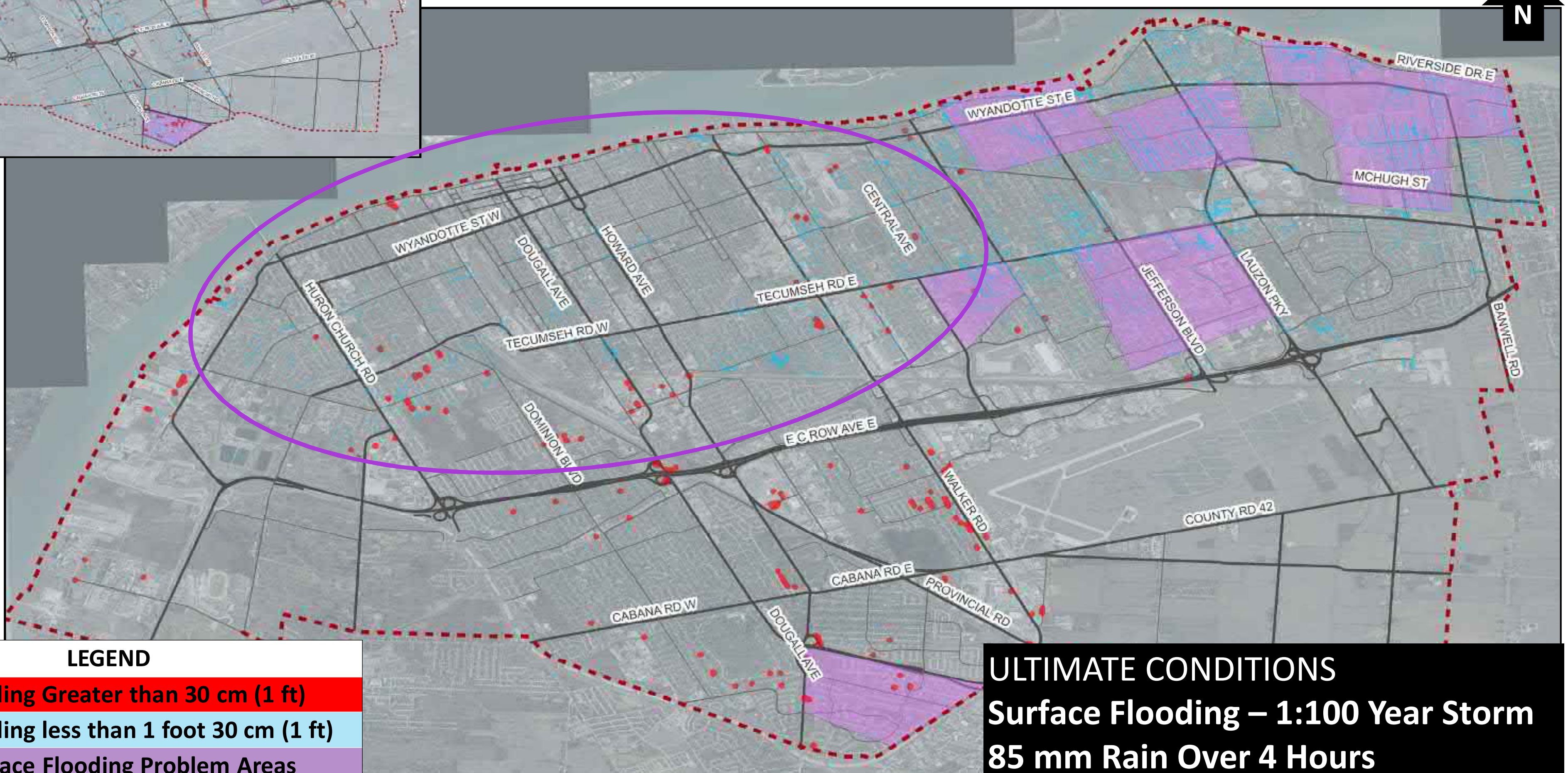
EXISTING CONDITIONS **Surface Flooding – 1:100 Year Storm**

3. Flooding Solutions - Surface Flood Risk

After all sewer improvements, storage facilities, downspout disconnection measures and pump stations improvements have been implemented.

EXISTING CONDITIONS





LEGEND

- Surface Flooding Greater than 30 cm (1 ft)
- Surface Flooding less than 1 foot 30 cm (1 ft)
- Regional Surface Flooding Problem Areas

ULTIMATE CONDITIONS
Surface Flooding – 1:100 Year Storm
85 mm Rain Over 4 Hours

3. Flooding Solutions – Discussion

- Is it clear that solutions rely on many components to address basement flooding?
- Is the level of reliance on Private Property measures reasonable?
- Is it clear how ‘preferred’ solutions where choose?
- Should any components be better explained?
- What other information would be useful to include in the master plan?

4. Implementation Plan

- Sewer Master Plan will include a implementation plan.
- Plan to provide guidance to City Administration to schedule works.

4. Implementation Plan – Categories

Recommended Solutions

- **Immediate Solutions (0 to 8 Years)**
- **Long-Term Solutions (8 to 50+ Years)**
  - **High Priority**
  - **Medium Priority**
  - **Low Priority**

Immediate solutions are those that:
- Included projects that are included in current Capital Works Plan
- Projects that have received DMAF (Disaster Mitigation and Adaptation Funding)

Balance of projects will be placed into three categories.

4. Implementation Plan – Immediate Priority Solutions

1. New or Updated City Policies

- Private Property Improvements Policy
  - Foundation Drain Disconnection, Lot Grading, etc.
- Downspout Disconnection Policy (City-wide policy, enforcement)
- Continue the Existing Basement Flood Protection Subsidy
- Development Standards Manual Update
- Approved/Recommended Contractor List
- Green Infrastructure/Low Impact Development (LID) Measures
- Stormwater Financing Study Initiatives

Why are these immediate solutions?

- Policies and standards enforce new development to comply with flood mitigation measures.
- Subsidy programs provide immediate relief to property owners.

4. Implementation Plan – Immediate Priority Solutions

Why are these immediate solutions?

2. Pilot Projects and Monitoring

- Measure benefit of proposed recommendations
  - Foundation drain and private property improvements
  - LIDs within the Public Right-of-Way

- Pilot programs help confirm that innovative measures will have sufficient benefit.
- Recommended infrastructure improvements can be refined based on monitored data.

3. Public Right-of-Way Improvements

- Sanitary Manhole Rain Catchers
- Backflow Prevention Devices (i.e.. Sewer Check Valves)

- Right-of-Way improvements have most "bang for your buck".

Sewer Check Valves

4. Implementation Plan – Immediate Priority Solutions

Why are these immediate solutions?

- Funding and capital costs have already been assigned to these projects.

4. Synergy with Road Reconstruction Projects

– Lauzon Parkway Reconstruction
– Giles/McDougall Reconstruction
– Prince Road Outlet

5. External Funding:

- Disaster Mitigation and Adaptation Funded Projects (see list below)

DMAF – Funding Round 1:

- Matthew Brady Phases 2 & 3,
- Belle Isle View Phases 1 & 2,
- Eastlawn Ave. and East Marsh Areas.
- Tranby Park Improvements
- Riverside and Belleperche Storm Trunk Sewer
- Pontiac Pump Station Overflow
- St. Paul Pump Station
- East Marsh Pump Station
- Cedarview Sewer and Brumpton Park Improvements

DMAF – Funding Round 2: (Pending)

- St. Rose Pump Station
- St. Rose Storm Trunk Sewer
- Ford Blvd Pump Station Upgrades
- Landform Barrier Area 1

4. Implementation Plan – Long-Term Solutions 8 - 50+ years

Remaining projects will be ranked based on established criteria listed in next slides.

The project team will use a scoring system to prioritize recommended projects.

High Priority

Medium Priority

Low Priority

Solutions address areas that have are most at risk of flooding, could experience the most property impact, impede emergency access the greatest.

Solutions that have lower comparative risks and have little to no impact to private property.

4. Implementation Plan – Long-Term Solutions

Table 1.0 Basement Flooding Solutions – Sanitary System Improvements Ranking Criteria

Criteria	High Priority will be assigned to:
Extent of Basement Flooding Reports	Areas with greater reported basement flooding.
Level of Basement Flooding Risk	Areas that have higher risk of basement flooding based on sewer model analysis.
Average Age of existing roadway/sewers	Areas that have older storm sewer infrastructure.
Reduction of wet weather flow to Treatment Plant.	Priority is given to those solutions that reduce the volume and frequency of Combined Sewer Overflows (CSOs).
Constructability	Improvements at the downstream end of their respective system will be high priority.

Reflects historical rain data. Let's discuss.

4. Implementation Plan – Long-Term Solutions

Table 2.0 Basement Flooding Solutions –
Combined (Central) System Improvements Ranking Criteria

Criteria	High Priority will be assigned to:
Extent of Basement Flooding Reports	Areas with greater reported basement flooding.
Level of Basement Flooding Risk	Areas that have higher risk of basement flooding based on sewer model analysis.
Average Age of existing roadway/sewers	Areas that have older storm sewer infrastructure.
Reduction of wet weather flow to Treatment Plant.	Priority is given to those solutions that reduce the volume and frequency of Combined Sewer Overflows (CSOs).
Constructability	Improvements at the downstream end of their respective system will be high priority.

4. Implementation Plan – Long-Term Solutions

Table 3.0 Road Flooding Solutions – Storm System Improvements Ranking Criteria

Criteria	High Priority will be assigned to:
Access to Vulnerable Area	Solutions that address surface flooding along roadways that are immediately adjacent to vulnerable land use sites, where alternative access routes are not available.
Roadway Classification	Solutions that address surface flooding along major arterial roadways that provide critical north/south connections within the City's road network. Due to the location of the CPR Rail and EC ROW expressway, minimal north south collectors or local road connections exist. Roadways that provide this connection are critical to providing emergency access to local hospitals or for emergency responders.
Extent of Surface Flooding	Areas where greater length of road flooding is anticipated.
Age of existing roadway/sewers	Areas that have older storm sewer infrastructure.
Cost	Solutions that have lower cost per meter of flood reduction.

4. Implementation Plan – Long-Term Solutions

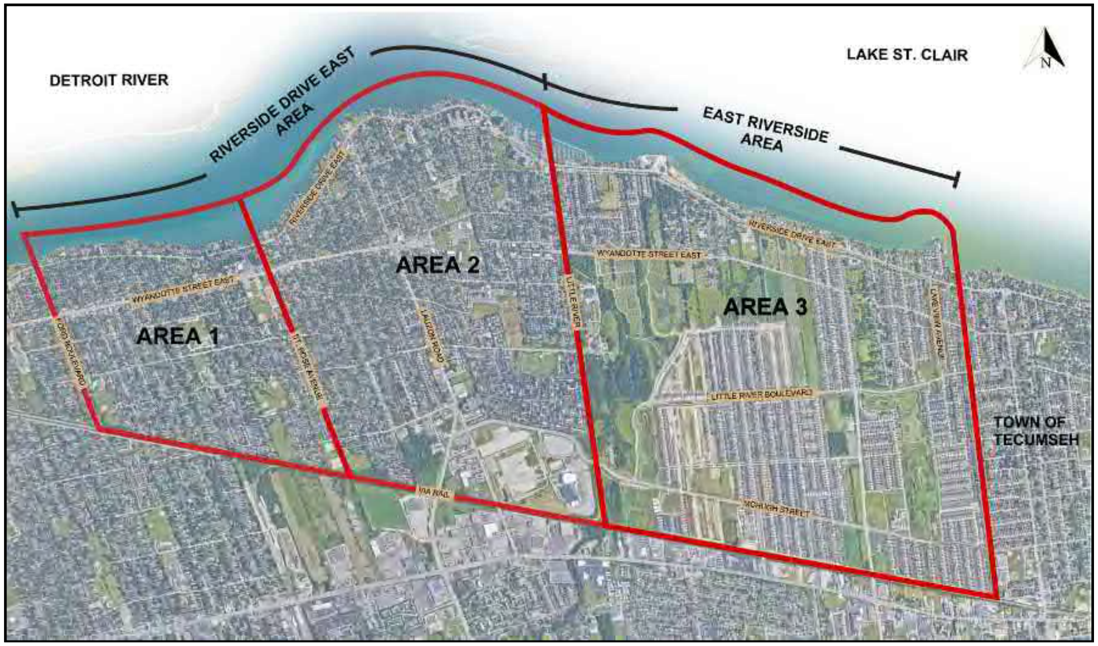
Table 4.0 Regional Problem Solutions – Storm System Improvements Ranking Criteria

Criteria	High Priority will be assigned to:
Extent of flooding	Areas that have highest amount of surface flooding.
Presence of Combined Sewer System	Areas that have a greater percentage of combined sewers. This is in keeping with the overall strategy to provide an enhanced sewer separation program throughout the City.
Risk of Private Property Damage	High priority to: • low-lying areas, • areas at risk of coastal flooding, and • areas where roadway ponding has most impact on private property.
Age of existing roadway/sewers	Areas where there is a higher proportion of older infrastructure.

4. Implementation Plan – Sample

- Review sample with team.

Implementation Plan – Coastal Flooding



Area 1:
Riverside Vista Phase 2A, Ford Blvd. to St. Rose. Ave.
Area 2:
Riverside Drive East, St. Rose Ave. to Riverdale Ave.
Area 3:
East Riverside Area, Riverdale Ave. to East City limits.

Area	High Priority will be assigned as follows:
Area 1: **Sewer Protection- Riverside Vista Phase 2A** **Berm Construction - Riverside Vista Phase 2A**	Immediate Prioritization (DMAF funding and consistent with existing City capital works)
Area 2: **Sewer Protection Measures and Berm Construction**	High Prioritization due to projected high lake water levels.
Area 3: **Sewer Protection Measures and Berm Infill (Ganatchio Trail)**	High Prioritization due to projected high lake water levels.

5. Future Enhanced Education Program (Time Permitting)

- Discussion:
  - Below are various types of engagement….
  - What type would be most effective? What topics should be covered? What type of information would be useful? How can we encourage the public to cooperate?

- **Flood Prevention Home Checkup Program**
- **Open Houses and Pop-Up Events**
- **City and Project Website**
- **Mail-outs to Homeowners**

5. SAC Input

- Recap of SAC Meetings:
  - WHAT WE HEARD:
    - Public education is important (provide public examples of private property measures)
    - Need plan for emergency access to mitigate risks and damage
    - Rely first on LIDs and Best Management Practices
    - Tailor solutions to specific problem
    - City needs to be transparent and gain public's trust
    - Share success stories

5. Input

- How will SAC comments/feedback be incorporated into the Master Plan?
  - Input has been integral in the development of the level of service, solution development, communication strategy and private property recommendations.
  - Examples:
    - Enhanced Level of Service – Agreed to achieve highest level of service (ie. 1:100 year storm) and climate change should be considered.
    - Private Property Improvements- SAC agreed property owners need to do their part, they need to be supported (subsidy/education) and the City needs to develop means to encourage cooperation.

6. Next Steps

- Complete Implementation Plan
- Complete high level of estimates of total infrastructure works.
- Final Council Presentation Memo and Presentation
  - Timing:
    - Dillon to provide draft to SAC for review late April/Early May
    - SAC to provide final comments by Mid-May

6. Next Steps

- Council Report for the Notice of Completion
- 30-Day Public Review Period
  - Timing: TBD
  - SAC Members will be kept informed of final dates.

Thank you!

The master plan team thanks you for your time and commitment.

Your involvement has provided great insight in the development of this master plan.

Appendix B-2

Public Information Centres (PICs) #1 and #2

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Sewer Master Plan
Notice of Public Information Centre No. 1

Over the past several years, the City of Windsor has experienced basement and surface flooding that resulted in property damage and disruption to the community. In late 2017, the Mayor released an 8-Point Plan aimed at addressing these concerns, a key element of which is the completion of the City's Sewer Master Plan.

The City of Windsor has now commenced the Sewer Master Plan project, which will confirm the nature of basement and surface flooding across the City and will explore achievable measures to reduce the risks and impacts of flooding by identifying and evaluating the following:

- **Short-term solutions** to reduce flows to sewer and drainage systems, as well as measures to protect property owners from the impacts of flooding; and
- **Long-term solutions** to improve the City's sewer and drainage systems.

Your participation in the Sewer Master Plan process will improve the results and help us create a comprehensive plan that can be implemented in partnership with the community. Consultation is an integral part of this process and members of the public, agencies, Indigenous communities and other interested persons are encouraged to participate in the master planning process.

The **first** Public Information Centre (PIC) meetings have been scheduled during the early stages of the Sewer Master Plan process, and will focus on the following:

- Information on the causes and factors being considered to address flooding;
- Preliminary model results identifying the problems in the sewer and overland drainage systems;
- **Short-term solutions**, including:
  - Existing City subsidy programs and practices
  - Other alternative short-term solutions being proposed
- Next steps

The **first** PIC meetings are being held at three separate dates, times and locations for your convenience, as follows. Information is also available at weatheringthestorm.ca

June 12, 2018	**June 13, 2018**	**June 14, 2018**
5 p.m. – 8 p.m	3 p.m. – 5 p.m. and 6 p.m. – 8 p.m.	5 p.m. – 8 p.m.
Tecumseh Mall, (former Ardene), 7654 Tecumseh Road East	Fogolar Furlan Windsor, 800 North Service Road	Roseland Golf + Curling Club, 455 Kennedy Drive West

This study is being carried out in accordance with the Master Plan Approach No. 2 of the Municipal Class Environmental Assessment (EA) (Municipal Engineers Association, 2015) process. This study will fulfill EA requirements for Schedule B projects and satisfy Phases 1 and 2 of the process for Schedule C projects.

If you have any questions, please contact either of the project representatives:

Flavio Forest, P.Eng.
Project Manager, Dillon Consulting Limited
3200 Deziel Drive, Suite 608
Windsor, ON, N8W 5K8
519.948.4243 ext. 3233
info@weatheringthestorm.ca

Anna M. Godo, P. Eng.
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
519.255.6100 ext. 6508
info@weatheringthestorm.ca

All comments and information received from individuals, stakeholder groups and agencies regarding this study are being collected to assist the City of Windsor in completing the Sewer Master Plan. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act and with the exception of personal information, all information provided will become part of the public record. This notice is also available on the City's website at: *https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans*, under 'Environmental Assessment Studies and Master Plans'.

NOTICE OF PUBLIC INFORMATION CENTRE NO. 1

SEWER MASTER PLAN

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City of Windsor SEWER MASTER PLAN

degrees of CHANGE

Welcome to Public Information Centre No. 1

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Project Overview

The City is completing a Sewer Master Plan to:

- Better understand the causes of basement & surface flooding;
- Identify the range of ways we can reduce the impacts and risks of flooding in the short-term and over the longer term; and
- Prepare an implementation strategy for City of Windsor Council consideration.

Tonight's PIC No. 1

This is the first of two planned Public Information Centres for the project. At this event you can visit:

- **Station 1: Project Overview**
- **Station 2: Learn about Flooding**
- **Station 3: Preliminary Problem Identification**
- **Station 4: Short-Term Alternative Solutions**

Ask questions and provide the team with your input

Mayor's 8-Point Plan

Following the August 2017 storm, Mayor Dilkens released an 8-point plan aimed at addressing flooding in Windsor.

The Sewer Master Plan integrates and forms a key part of the 8 elements in the Mayor's Plan.

1. Review development policies and the impact of development on sewers.
2. Fund 100% of the installation cost of backflow valves and sump pumps.
3. Consider adding weeping tile disconnection to the Basement Flooding Protection Subsidy program.
4. Consider adding sewage ejection pumps to the Basement Flooding Protection Subsidy program.
5. Implement a mandatory downspout disconnection policy.
6. Expedite the Riverside Vista project between St. Rose and Ford Blvd.
7. Strongly urge the province to establish an affordable flood insurance program and to make the Disaster Recovery Assistance program available to homeowners with sewer backup.
8. Expedite completion of the Sewer Master Plan

Problem & Opportunity Statement

The City of Windsor has experienced basement and surface flooding that resulted in property damage and disruption to the community.

This flooding generally results from significant storm events, which bring more water than our creeks and sewers have the capacity to manage.

The City is undertaking a Sewer Master Plan to identify specific problems and explore achievable measures to reduce the risks and impacts of flooding by identifying and evaluating the following:

- **Shorter-term** solutions that can reduce the amount of water going into our creeks and sewers, including partnering with homeowners to protect against the impacts of flooding; and
- **Longer-term** solutions to improve the sewer systems by increasing their capacity and/or identifying temporary storage measures.

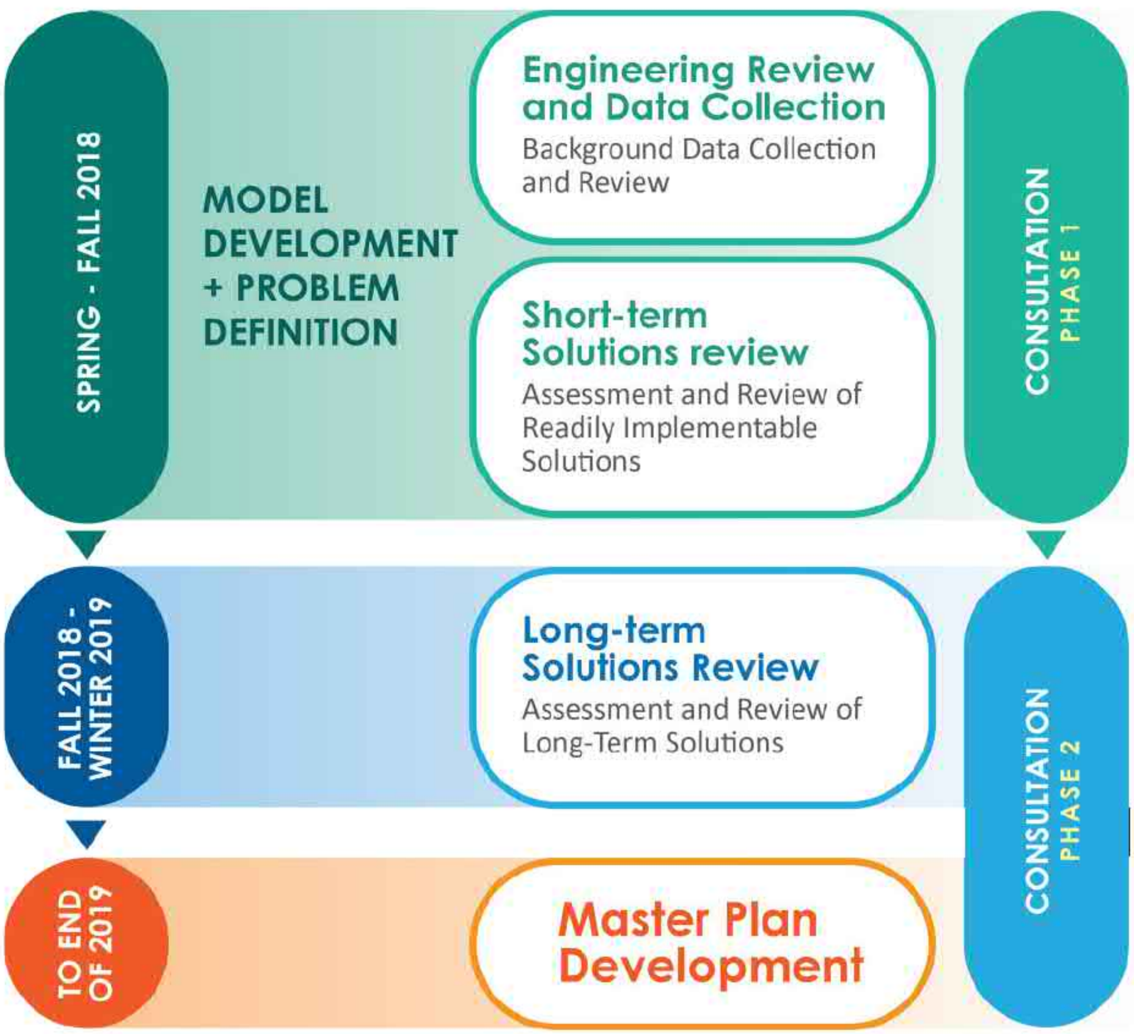
Riverside Drive; August 2017

Stanley Street; August 2017

Parkview Avenue; August 2017

Sewer Master Plan Study Process

- The study is following the requirements of the Municipal Class Environmental Assessment (EA), Master Plan Process (Approach No. 2)
- Public and agency input is integrated into the Class EA process



Key Engagement Activities

weatheringthestorm.ca
- Over 2000 visits to the web site to date
- Over 140 visited the "Map Your Story" page

Earth Day Pop-up
- Over 100 people learned about the project at the Weathering the Storm booth

Stakeholder Advisory Committee

Pop-up Events

Interactive Website

Project Notifications

Public Information Centres

Public Information Centres
- PIC No. 1: Short-term Alternative Solutions
- PIC No. 2: Long-term Alternative Solutions

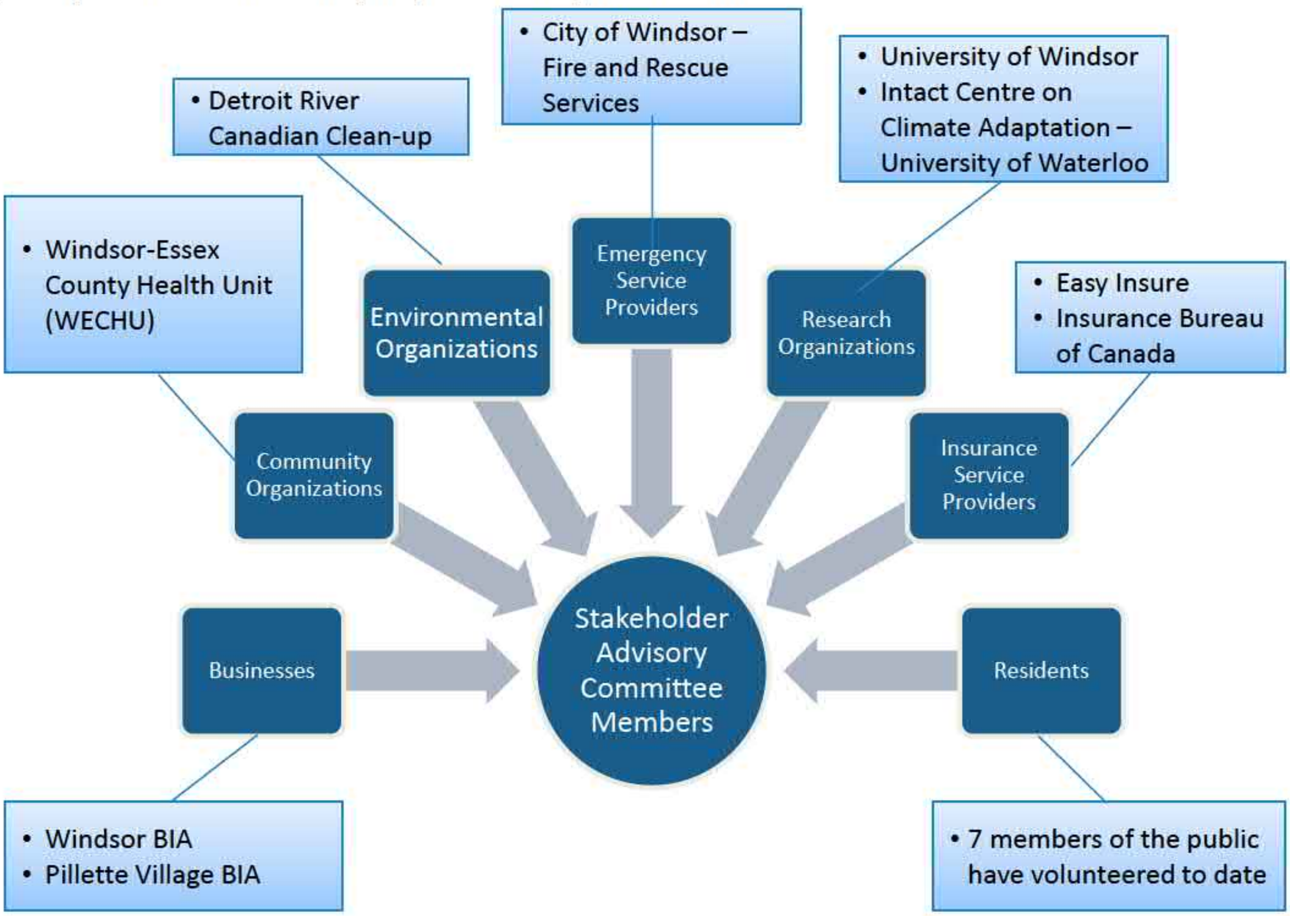
Partners for Action Survey
- Over 300 people provided survey input valuable to the project

Tell us your ideas on how to inform/involve the community.

Add your ideas below with sticky notes:

Stakeholder Advisory Committee

A Stakeholder Advisory Committee has been formed to provide diverse perspectives on the project as it proceeds.



The Stakeholder Advisory Committee will provide insight, advice and feedback on:

- The impact of flooding on the community;
- Key issues related to the Sewer Master Plan;
- Evaluation criteria, potential solutions and mitigation of community concerns; and
- Opportunities to increase public engagement and awareness.

Stay Informed and Involved

Stay involved and provide your feedback….

Visit us 24/7 at **weatheringthestorm.ca** to:

- Follow the project
- Provide input & ask questions

Visit the Website Today

Email us at: **info@weatheringthestorm**

Or **mail** a letter to the project team:

Anna M. Godo, P.Eng.,
Project Lead
City of Windsor
350 City Hall Square W,
Windsor, ON N9A 6S1

Flavio R. Forest, P.Eng.,
Project Manager
Dillon Consulting Ltd.
3200 Deziel Drive, Suite 608 Windsor, ON N8W 5K8

Sign-up to our contact list to receive updates on future events

Follow us on:

CityofWindsor

@CityWindsorON

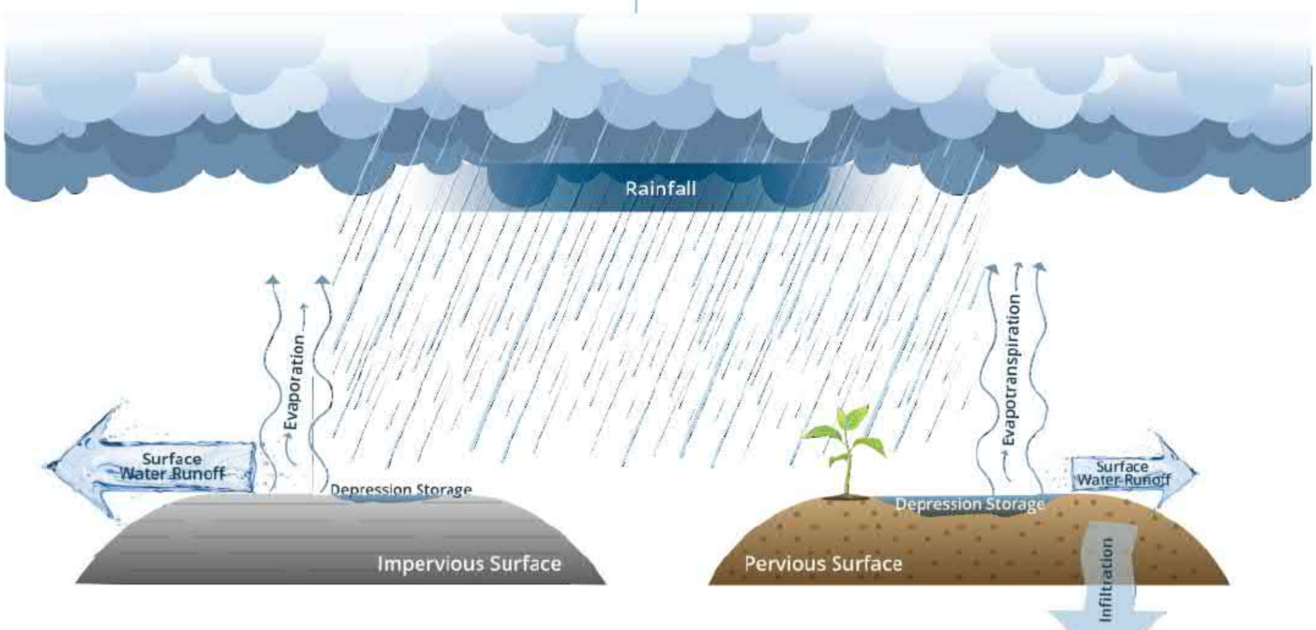
What Causes Flooding?

Conditions that may result in flooding

- High intensity, short duration, or long duration **rainfall events** that produce high runoff and infiltration.
- **Saturated or frozen ground conditions** that result in more runoff.
- **Snowmelt,** including **ice blockage** that may limit drainage.
- **Shoreline flooding** from high lake and river levels.

Where does the rain go? It can:

1. Vaporize into the atmosphere = *Evaporation* and *Evapotranspiration.*
2. Soak into the ground through pervious surfaces like grass or soil = *Infiltration.*
3. Flow overland into creeks and sewers = *Runoff or overland drainage.*
4. Stay temporarily in lower-lying areas = *Depression storage or overland storage.*



Examples of Impervious Surfaces:

Asphalt Roads, Concrete Driveways, Roofs

Examples of Pervious Surfaces:

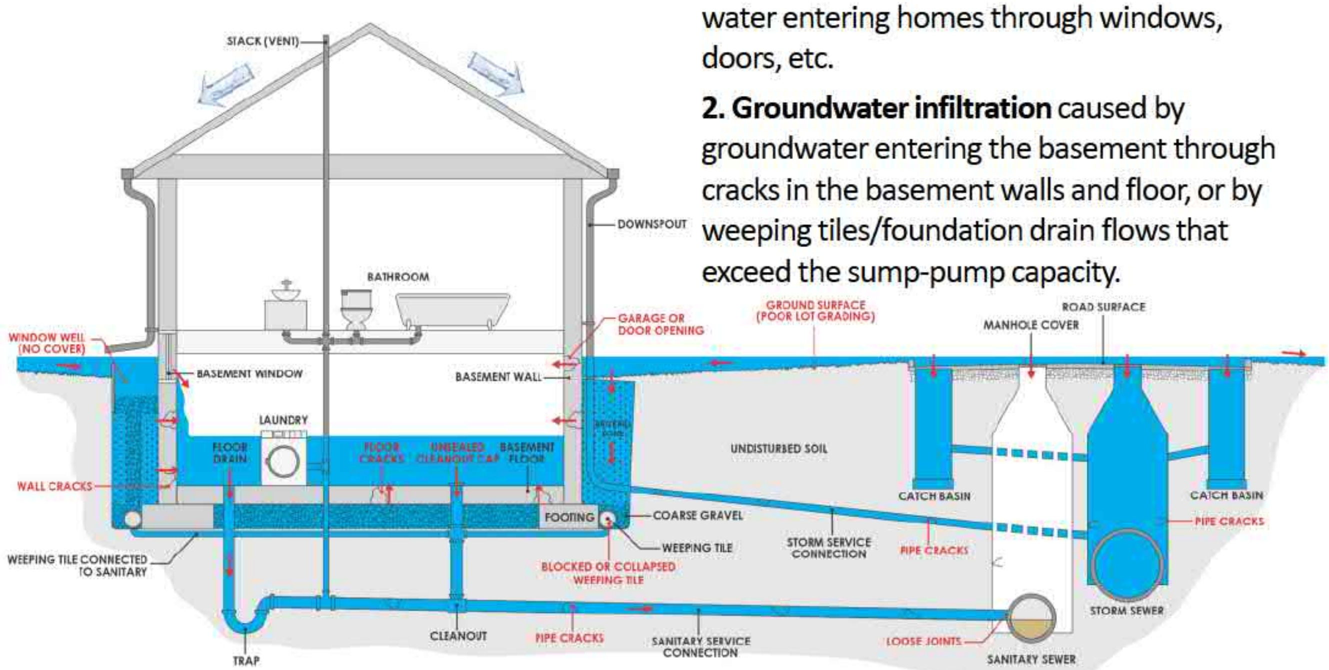
Lawns/Gardens Permeable Pavers

What Causes Basement Flooding?

There are 3 major causes of basement flooding:

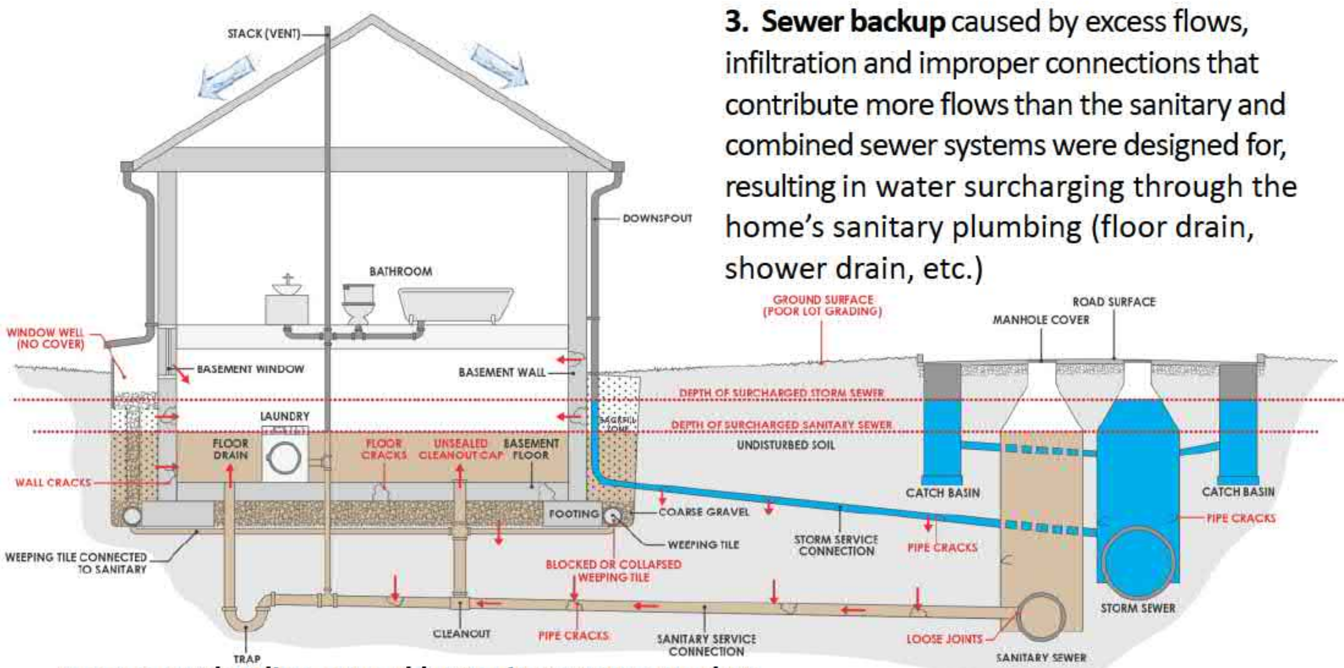
1. **Overland flooding** caused by a more intense rainfall than the sewer can manage or by improper grading, that results in surface water entering homes through windows, doors, etc.

2. **Groundwater infiltration** caused by groundwater entering the basement through cracks in the basement walls and floor, or by weeping tiles/foundation drain flows that exceed the sump-pump capacity.



Basement Flooding caused by Overland Flooding and Infiltration Flooding

3. **Sewer backup** caused by excess flows, infiltration and improper connections that contribute more flows than the sanitary and combined sewer systems were designed for, resulting in water surcharging through the home's sanitary plumbing (floor drain, shower drain, etc.)

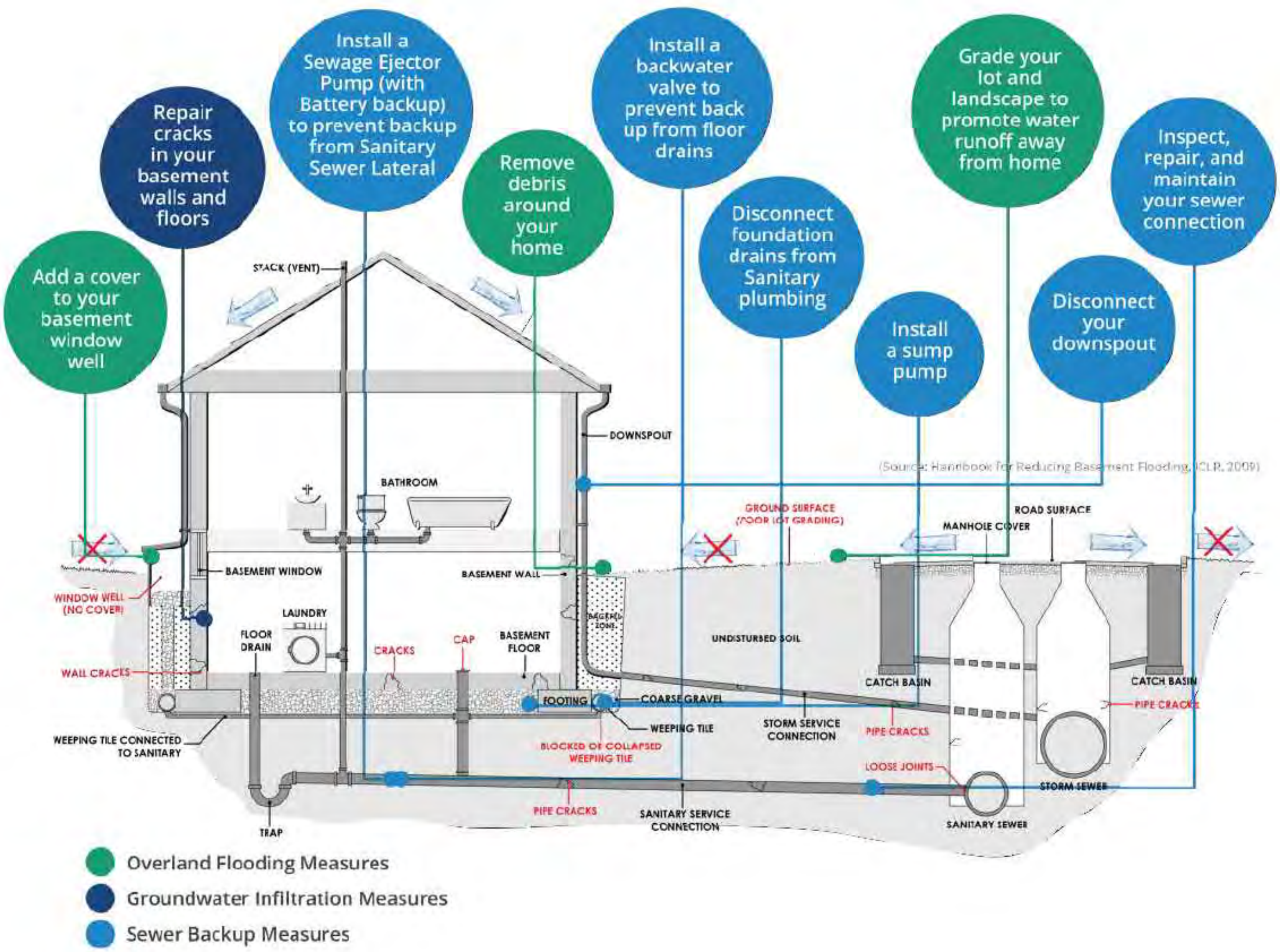


Basement Flooding caused by Sanitary Sewer Backup

Image Source: Handbook for Reducing Basement Flooding, Institute for Catastrophic Loss Reduction (ICLR), 2009

Mitigating Basement Flooding Risk

There are many ways a homeowner can reduce there risk of basement flooding, including:



Flooding Considerations

Thousands of Windsor residents have been impacted by flooding, including the recent major storms of 2016 and 2017. Last year's storm alone dumped 220 millimetres of rain in 48 hours, which resulted in more than 6,600 homes being flooded.

Flooding assessment in Windsor is complex.

To address the risk of flooding, various factors need to be considered, including:

1. River & Lake water levels, ground elevation, and capacity of receiving creeks and rivers
2. Rainfall amount, duration and distribution
3. Ground cover, soil type and soil moisture conditions
4. Storm and sanitary drainage design criteria and level of service
5. Climate change

These factors are described in the next panels.

FLOODING CONSIDERATIONS

1. River & Lake Water Levels, Ground Elevations and Receiving Watercourse Capacity

Ground Elevations:

The central portion of the City is as much as **15 m (about 50 ft)** higher than lands to the east and west.

Stormwater runoff from higher elevation areas can generally be managed by gravity measures.

River and Lake Water Levels:

To help drain lower-lying areas, the City has introduced the following strategies:

- Pump Stations
- Temporary Storage
- Barrier landforms (including the Ganatchio Trail and Little River Dykes) to protect low-lying areas from high River and Lake levels.

Capacity of Receiving Watercourses:

The capacity and water levels of receiving creeks and rivers (Little River, Grand Marais Drain, Lennon-Cahill Drain, Detroit River, etc.) will influence the range of solutions available for flood relief measures.

FLOODING CONSIDERATIONS

2. Rainfall Amount, Duration and Distribution

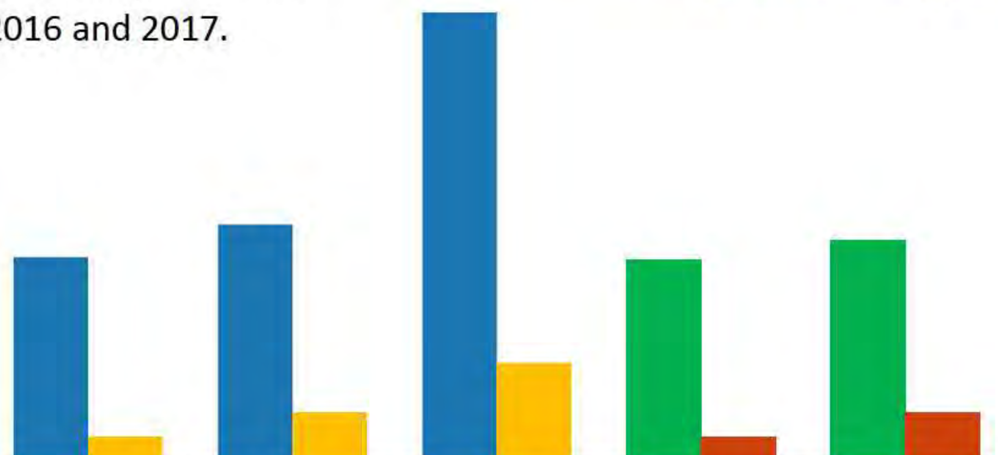
What is a 100 Year Storm?

- A "1 in 100" year storm means that there is **1% risk** (1 in 100 chance) that a storm of this size will occur in any year.
- The 1 in 100 year storm is a significant storm event that is currently used as a design standard for overland drainage systems.
- In the last 70 years, Windsor experienced three storm events with a greater volume of rainfall than a 1 in 100 year storm – 1957, 2016 and 2017.

Storms vary across the City

- The total rainfall during the August 2017 storm varied across the City from 73 mm to over 200 mm.

Riverside Drive; August 29, 2017



	1957	2016	2017	12 Hr Design	24 Hr Design
Rainfall (mm)	100	116	220	99	108
Duration (Hours)	12	24	48	12	24
	Historic Storms (>1:100 Year)			1:100 Year Design Storms	

FLOODING CONSIDERATIONS

3. Ground Cover, Soil Type and Soil Moisture Conditions

Ground conditions can significantly impact the volume and rate of runoff produced from a rain event.

- Hard, impervious surfaces (like pavement) allow limited infiltration and have less depression storage, and therefore result in more runoff than pervious surfaces (like grass and soil).
- The amount of water that can soak into the ground (i.e. infiltration capacity) varies based on the type of soils. Most of Windsor consists of clay soils, which have low infiltration rates (see map below).
- Soil moisture conditions also affect the amount of water that can soak into the ground, affecting the volume and rate of runoff.

FLOODING CONSIDERATIONS

4. Storm Drainage Design Criteria & Level of Service

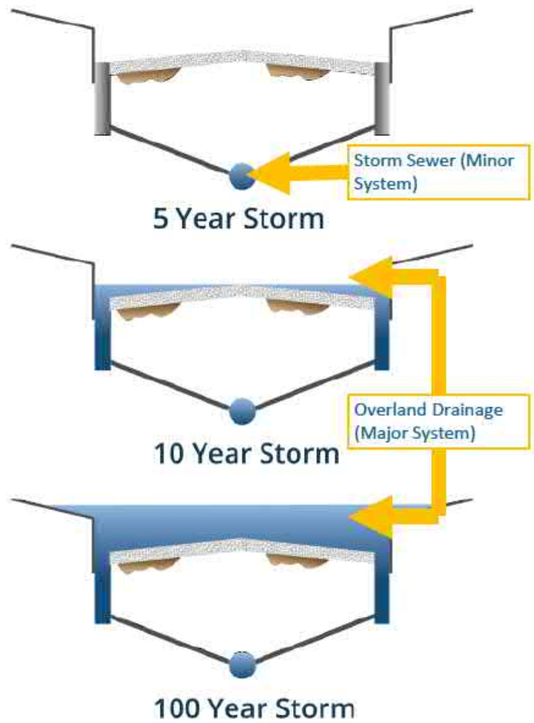
Sewer Drainage Design (Minor System)

Storm and combined sewer systems are currently designed to convey the 1:5 year design storm with no surface flooding.

Storm Pump Stations also work to limit surface (roadway) ponding to less than 0.30 m in larger 1:100 year storms.

Overland Drainage Design (Major System)

Overland Drainage Systems (roadways, low lying areas) are currently designed to reduce the amount of water from a 1:100 year storm to a surface ponding depth of less than 0.30 m.



Proposed Level Of Service Storm Drainage (Public Right-of-way)

Existing Developed Areas	New Development
• 1:2 year to 1:5 year storm **Goal:** **Reduce** any existing surface flooding	• 1:5 year storm **Goal:** **No** surface flooding
• 1:100 year storm **Goal:** **Reduce** surface flooding to less than 0.3 m, **where practical**	• 1:100 year storm **Goal:** **No more than 0.3 m** surface flooding depth (parking and roadways)
• Climate Change **Goal:** Enhanced/variable level of service for higher-risk areas	• Climate Change **Goal:** Enhanced/variable level of service for all new development

FLOODING CONSIDERATIONS

4. Sanitary Drainage Design Criteria & Level of Service

Sanitary Sewage Flows are made up of waste water discharge from domestic uses and an infiltration flow component:

Domestic Sewage Flows are determined by:

- Average design sewage flow rate based on land-use (e.g. residential or employment land uses)
- Total population
- Other land-use variable (e.g. floor area, time of day differences)

Infiltration flow is determined by:

- Average infiltration rate (e.g. it is common for some water to enter sewers through pipe cracks)
- Total area

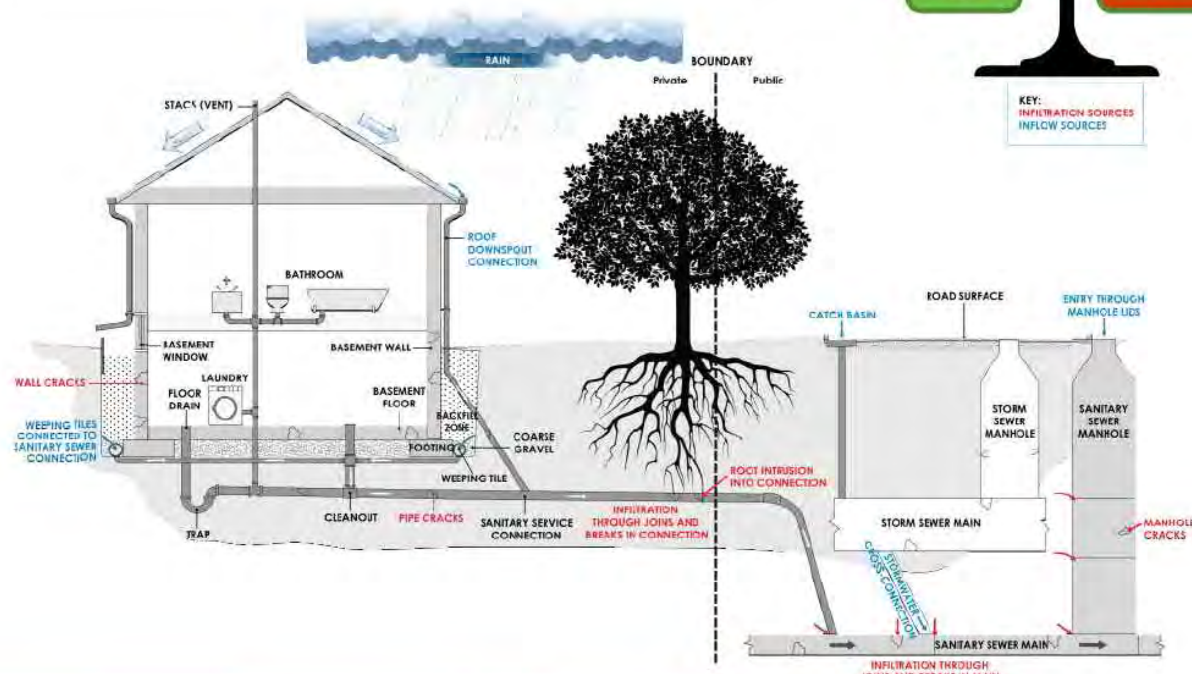
Sanitary sewers are NOT designed to convey:

- Surface water entering through Manhole Covers or other surface drains.
- Improper building Foundation Drain connections.
- Improper Roof Downspout connections.
- Improper Cross-connections from the storm system.

PROPOSED LEVEL OF SERVICE
Sanitary Drainage

Goal: Reduce surcharging in sanitary sewer system to a **reasonable/practical** degree.

- To be confirmed based on further understanding of sources of extraneous flows.



FLOODING CONSIDERATIONS

5. Climate Change

Climate change is the shift in weather patterns associated with an increase in global average temperatures. In Windsor, climate change appears to be increasing the intensity and severity of storms and flooding.

Though these climate change shifts may not be well-defined, the Sewer Master plan will look at ways to make our drainage infrastructure resilient to potential changes in more frequent and significant storms.

TRADITIONAL
Engineering Approach

Static design criteria established by regulatory agencies

Standard level of service and flood risk mitigation

ADAPTIVE
Sewer Master Plan Approach

Flexible and **sustainable** solutions that account for a **reasonable degree of uncertainty** due to climate change

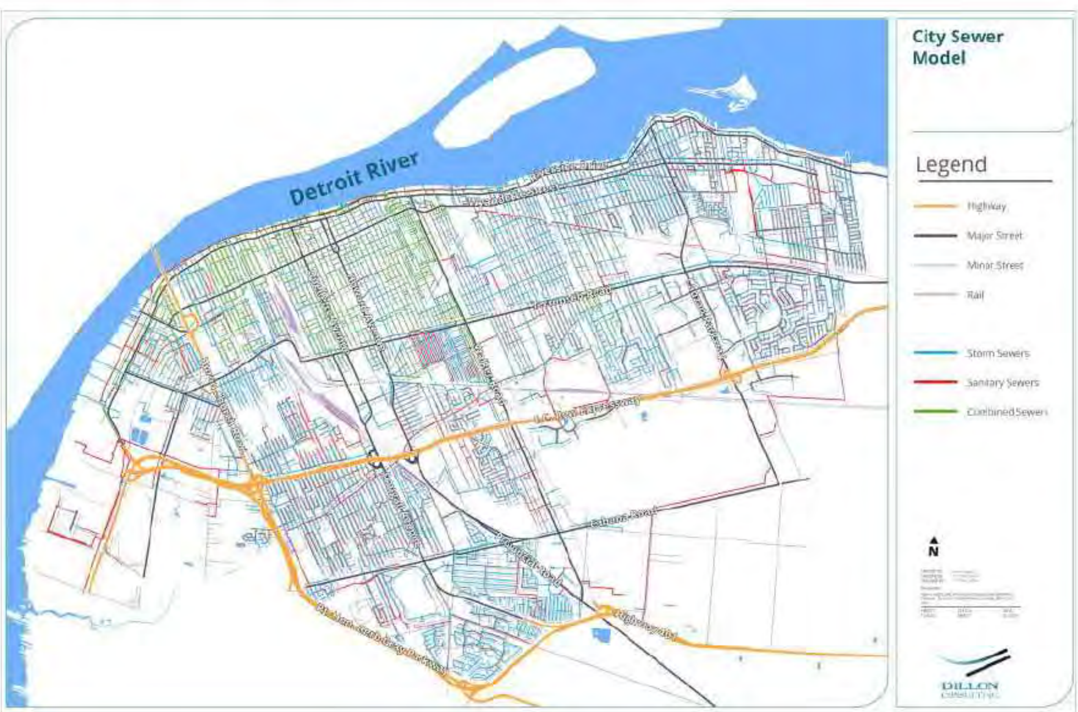
Enhanced and variable level of service and flood risk mitigation

City-Wide Sewer and Overland Drainage Model

A computer software model was developed to represent the City's sewer and overland drainage systems. The software model will help us understand the effectiveness of alternative solutions in reducing flooding risks.

The model includes:

- Over 690 km of storm sewers
- Over 550 km of sanitary sewers
- Over 190 km of combined sewers
- Over 11,000 ha of overland drainage area
- Over 40 Pumps Stations
- Over 30 Stormwater Management Ponds



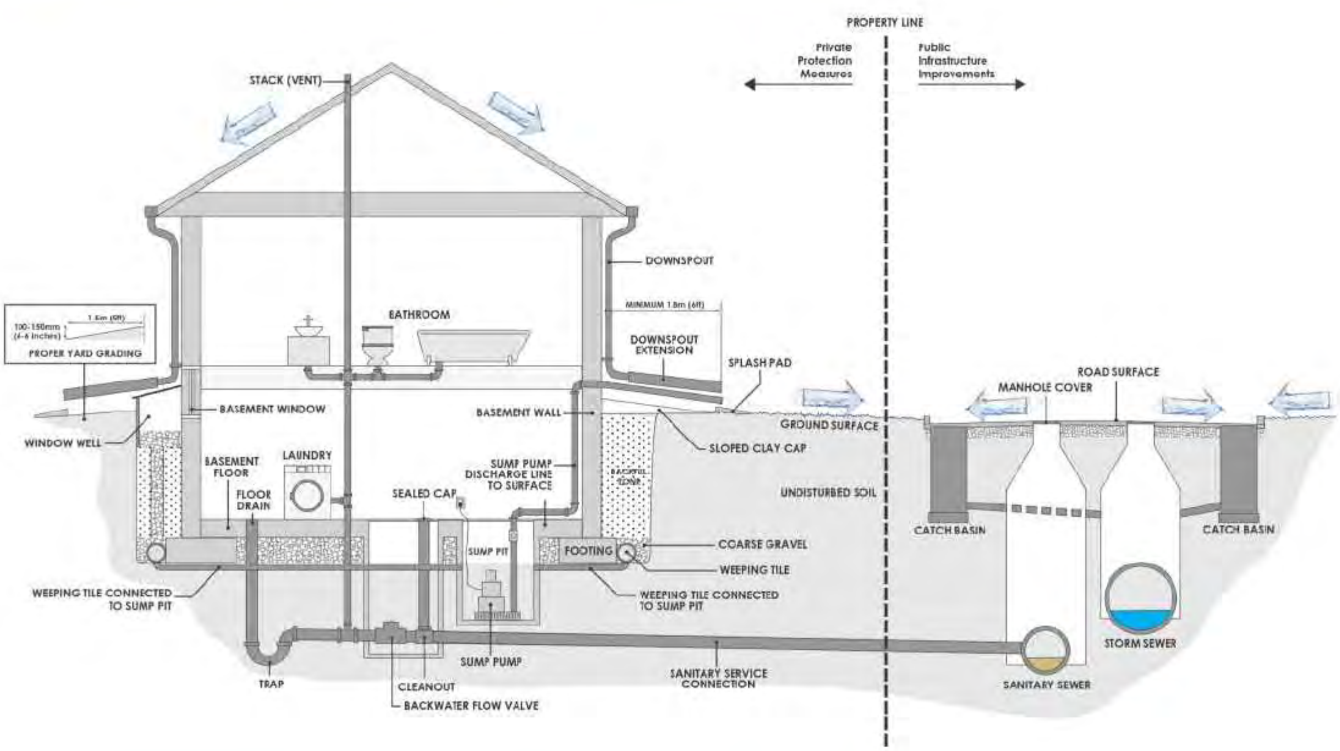
Comprehensive Approach to Flood Risk Reduction

A comprehensive approach to reducing the risk of flooding must involve both:

A. Homeowner Protection Measures; and
B. Public (Right-of-Way) Infrastructure Improvements.

A partnering approach with the community

Private Property Flood Protection Measures: Schematic



A. Homeowner Protection Measures

Existing City Programs to Help Homeowners

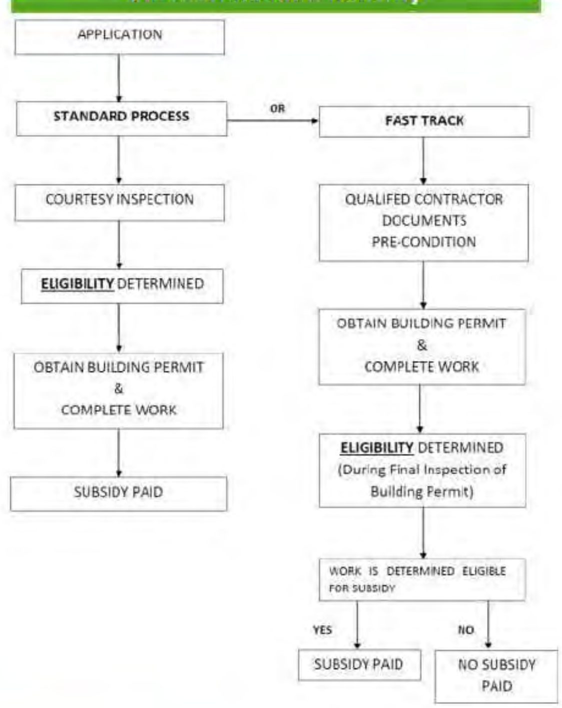
The City has a number of existing programs. The Sewer Master Plan will consider ways to build on these programs.

1. Basement Flooding Protection (BFP) Subsidy Program:

Eligible Works	Available Subsidy	Maximum Combined Subsidy
Install backwater valve(s)	$ 1,000.00	
Install sump pump with overflow and disconnect foundation drains to floor drains	$ 1,750.00	
Install only sump pump overflow to discharge outside to surface	$ 300.00	$ 2,800.00
Install backwater valve and sump pump with sump pump overflow	$ 2,800.00	
Disconnect foundation drains from floor drain and/or dye testing and camera work as required	$ 400.00	

For more details see:
https://www.citywindsor.ca/residents/maintenanceandfieldservices/Sewers-/Sewers.aspx
OR
For general information, call **311**.

Flow Chart: BFP Subsidy



A. Homeowner Protection Measures

Existing City Programs to Help Homeowners (cont'd)

2. Private Sewer Replacement Program:

- The City offers a rebate of up to 50% of the cost for replacement of your private sewer laterals (drain connections).

3. Rain Barrel Conservation Project:

- Rain barrels are available for purchase from the City (At the Ojibway Nature Centre).

4. Downspout (Eavestrough) Disconnection:

- The City provides a downspout disconnection service to its residents free of charge.

5. Public Education:

- The City's website provides information related to flooding and flood protection.

Rain Barrel

Disconnected Downspout

For more details about the City's existing programs visit:

- https://www.citywindsor.ca/residents/maintenanceandfieldservices/Sewers-/Sewers.aspx

OR Call 311 for general information and 519-255-6257 for detailed inquiries

A. Homeowner Protection Measures

Short-Term Alternative Solutions

The following additional short-term solutions are being considered in the Sewer Master Plan:

1. Support the Enhancements outlined in the Mayor's 8-Point Plan:

- Fund 100% of the installation of backflow valves and sump pumps, including the disconnection of weeping tiles from the sanitary sewer system.
- Add a subsidy to include the use of sewage ejector pumps as an alternative to backwater protection valves.

2. Green Infrastructure / Low Impact Development (LID) measures:

Use LIDs to promote infiltration, provide storage and reduce site-specific runoff. Examples include:

- Permeable pavers
- Enhanced swales
- Rain gardens (or bio-retention systems)
- Trench drainage/exfiltration system, including perforated pipe systems and soak-away pits

LID: Exfiltration Trench (French Drain)

LID: Rain Garden

LID: Soak-away Pit

LID: Enhanced Swale

A. Homeowner Protection Measures

Short-Term Alternative Solutions (cont'd)

The following additional short-term solutions are being considered in the Sewer Master Plan:

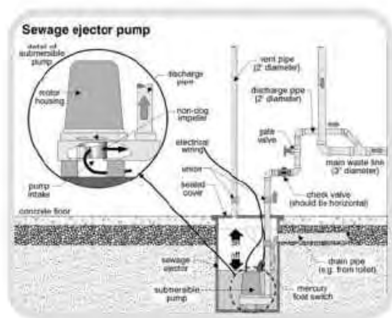
3. Window Well Protection:
- Protect window wells from surface water with guards.

4. Back-up Power and Pump Capacity:
- Use back-up power supplies for sump pumps and sewage ejector pumps.
- Increase sump pump capacity.

5. Lot Grading:
- Improve grading by providing positive drainage away from the home.

6. Other Household Management Strategies:
- Minimize water use during major storms.
- Limit storage of valuable items in the basement (i.e. items that could be damaged by flooding).
- Consider leaving your basement unfinished or use more resilient materials (i.e. tile compared to carpet).
- Regularly maintain private flood protection measures.

Window Well Protection



Schematic: Sewage Ejector Pump

A. Homeowner Protection Measures

Short-Term Alternative Solutions (cont'd)

The following additional short-term solutions are being considered in the Sewer Master Plan:

7. Sewage Ejector Pumps:

- Consider mandating the use of sewage ejector pumps for basement plumbing in all new developments.

Sewage Ejector Pump

8. New Municipal Policies:

Consider new municipal policies that reduce the risk of flooding, some of which are identified in the Mayor's 8-Point Plan:

- Mandatory downspout disconnection
- New development policies to reduce runoff from private properties, including:
    - Limit the % of allowable impervious (hard) surfaces
    - On-site water balance (volume storage) requirements
- Stormwater surcharges and green infrastructure credits.
- By-laws that allow the City to enforce plumbing standards and sewer use requirements.

Green Roof

Provide Your Input on Short Term Solutions

Please provide your input on the existing City flood protection programs and the short-term alternatives being considered.

- What do you think about the short-term alternatives?
- Are there any other alternatives that should be considered?
- Would you consider implementing the homeowner protection measures? (Tell us here or on your comment form)
- What information do you need to help you decide whether to implement these short-term solutions?

Add your ideas below with sticky notes.

B. Public (Right-of-Way) Infrastructure Improvements

Existing City Programs

The City has invested approximately $500 Million in public sewer infrastructure since 2001, and is continuing to invest. In addition, the City invests in the following programs:

1. Electrical Eel Service, or Eeling Program:

- The City will provide an eel cleaning service to clear the drainage connection from buildings to the sewer up to three times in any 24-month period.
- Service is free, provided the lateral service is blocked by tree roots.

Electrical Eel Service

2. Ditch/Drain Maintenance:

- Property owners are encouraged to call 311 immediately if they witness a blockage of a ditch or drain.

3. On-going Investigation to Confirm Improper Sewer Connections:

- Smoke and dye testing.
- Video camera inspection of sewers.

B. Public (Right-of-Way) Infrastructure Improvements

Short-term Alternative Solutions

The Sewer Master Plan will consider the following short-term alternative solutions for use in the public Right-of-Way:

1. Inlet Control Devices (ICD):

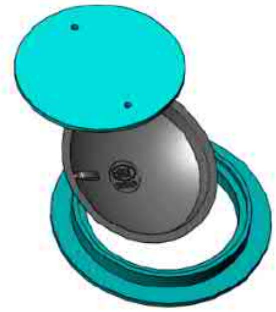
- Expand the use of ICDs to restrict catch basin flows to the storm sewer system, where appropriate.

2. Sanitary Rain Catchers or Plugs:

- Eliminate overland flow from entering the sanitary system through manhole covers.

3. City's Storm Water Management (SWM) Design Standards:

- Review level of service standards and design criteria.
- Update requirements for use of design tools and software.
- Consider climate change resiliency and vulnerability in developing sustainable solutions.



Rain Catcher: Manhole Insert

Rain Catcher: Manhole Lid Plugs

ICD: Plate Type

ICD: Plug Type

How Should We Decide?

What is important to the community when we make decisions on what alternatives to include in the Sewer Master Plan.

What should be considered when selecting alternative solutions?

Do you have any comments on the type of goals that should be considered for the level of service of the City's sewer system?

Do you consider certain land uses or buildings to be more vulnerable or sensitive to flooding and would therefore warrant a higher level of service?

Add your ideas below with sticky notes.

What's Next – Long-Term Alternative Solutions

Long-term public right-of-way alternative solutions will be developed in the next stages of the Sewer Master Plan. Information on long-term solutions will be presented at the next Public Information Centre in the Spring of 2019.

In general, these long-term alternative solutions will consist of:

1. **Increased Conveyance and Outlet Capacity:**
    - Increase sewer, open drain or major system (roadway) conveyance capacity.
    - Increase pump station capacity.
2. **Green Infrastructure / Low Impact Development (LID) Measures:**
    - Permeable pavers
    - Enhanced or vegetated swales
    - Bio-swales
    - Perforated pipes
    - Rain gardens or bio-retention
    - Exfiltration trenches
3. **Surcharge storage systems:**
    - Underground and surface storage systems for managing storm and sanitary surcharge conditions.

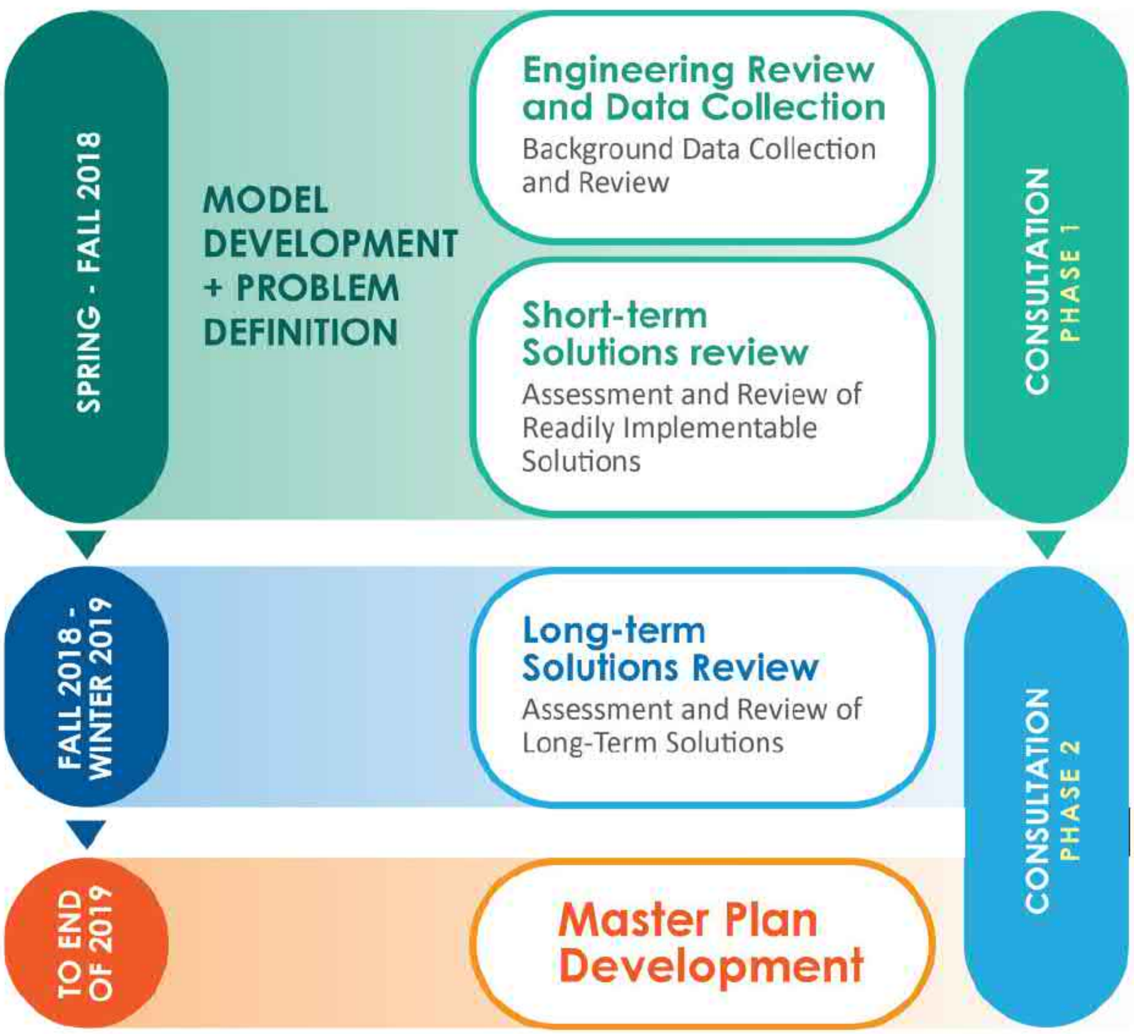
Schematic: Exfiltration System

Exfiltration System being installed with Perforated Pipes

Underground and surface storage

What's Next?

- Continue building the model to confirm problem areas
- Test the effectiveness of short-term solutions
- Develop and evaluate long-term alternative solutions
- Prepare for Public Information Centre No. 2 in Spring 2019



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Over the past few years, thousands of Windsor residents were impacted by flooding both in and around their homes. In early fall 2017, the Mayor released an 8-Point Plan aimed to assist the Windsor community to address flooding issues. The City of Windsor has now commenced the Sewer Master Plan project, which will confirm the nature of basement and surface flooding across the City and will explore achievable measures to reduce the risks and impacts of flooding by identifying and evaluating the following:

- **Short-term solutions** to reduce flows to sewer and drainage systems, as well as measures to protect property owners from the impacts of flooding; and
- **Long-term solutions** to improve the City's sewer and drainage systems.

Consultation is an integral part of this process and members of the public, agencies, Indigenous communities and other interested persons are encouraged to participate in the master planning process

The attached Public Information Centre notice provides you with information on the purpose, dates, times and locations of the first Public Information Centre meetings. Please visit the website ***weatheringthestorm.ca*** to learn more about upcoming events and to tell us your flooding story.

If you have any questions or would like to be added to the mailing list, please email us at:
info@weatheringthestorm.ca

Join us in weathering the storm and creating a plan that we can implement together.

Sincerely,

Anna M. Godo, P. Eng.
Sewer Master Plan Project Manager
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
519.255.6100 ext. 6508
info@weatheringthestorm.ca

DILLON CONSULTING

Buelles, Anni <abuelles@dillon.ca>

Fwd: Sewer Master Plan Public Information Centre

4 messages

Morgan Boyco <mwboyco@gmail.com> Thu, Jun 14, 2018 at 1:00 PM
To: abuelles@dillon.ca

---------- Forwarded message ---------
From: Communications <communication@citywindsor.ca>
Date: Wed, 6 Jun 2018 at 12:30
Subject: Sewer Master Plan Public Information Centre
To: Communications <communication@citywindsor.ca>

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NoticeofCommencement_PIC1_May2018.pdf
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City of Windsor

SEWER MASTER PLAN

Public Information Centre No.1 – Comment Form

degrees of CHANGE

Your participation in the Sewer Master Plan process will improve the results and help us create a plan that we can implement together. Please take a few minutes and provide us with your thoughts and comments on the following questions.

Your comments are appreciated. Please complete your form drop a copy in the comment box today at the PIC, request a postage paid envelope and mail back to us, or scan a copy at home and e-mail us at **info@weatheringthestorm.ca**

1. How did you hear about the Sewer Master Plan Public Information Centre?

- [x] Newspaper
- [ ] City or Project website
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Social media
- [ ] Other (please specify) ____________

2. Has your home been impacted by flooding? If so, what type of flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [ ] No

- [x] Basement flooding. Describe: 8 INCHES OF WATER. SEPT. 2016 $30,000 damage (Furnace, water heater, household items etc.
- [ ] Surface flooding. Describe: ____________

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; ✓ • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump ✓ pump with overflow; • Disconnect foundation drains ✓	[x] Yes [ ] No	I applied for the backwater valve + overflow a week before the flood. Bad timing on my part
Downspout (Eavestrough) Disconnection	[ ] Yes* [ ] No	THE DOWNSPOUT AT FRONT ENTRY CAN NOT BE DISCONNECTED DANGER OF ICE. SLIP & FALL HAZARD BY INSPECTOR
Rain Barrel Conservation Project	[ ] Yes [x] No	NO ROOM AT SIDE OF HOUSE ONLY 4' WIDE BARREL BLOCKS ACCESS
Private Sewer Replacement Program	[ ] Yes [ ] No	
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [ ] No	DO NOT KNOW OF THIS PROGRAM

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☒ Yes ☐ No	ALREADY HAVE ON 2 SIDES OF HOUSE FRONT AND SOUTH SIDE
Window well protection	☐ Yes ☒ No	WINDOW ARE NOT BELOW GRADE
Back-up power/Increased sump pump capacity	☒ Yes ☐ No	HAVE BATTERY BACK UP ON SUMP PUMP ALSO HAVE 2ND PUMP (NO BACKUP) CAN BE USED IF NEEDED
Lot grading improvements	☒ Yes ☐ No	IF POSSIBLE WOULD CONSIDER
Limit basement storage of valuable items or use more resilient basement finishes	☒ Yes ☐ No	HAVE SHELVES NOW - LEAVING LOWER LEVELS EMPTY.
Sewage ejector pump	☒ Yes ☐ No	WILL CONSIDER DOING THIS IF THE COST IS UNDER $500.00

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

I HAVE IMPLEMENTED WHAT THE CITY PROGRAMS ASKED FOR

6. Did you find valuable information at this Public Information Centre?

☐ Yes ☐ No ☒ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

I WILL WAIT TILL THE RESULTS OF THIS STUDY IS COMES OUT BEFORE CONSIDERING DOING MORE IMPROVEMENTS IF THE SEWER SYSTEM DOES NOT IMPROVE IT WON'T MATTER WHAT I DO. WATER WILL FLOOD ANYWAY WHEN SEWER CAN NOT KEEP UP

Name: [redacted]
Email Address:
Postal Code:

We will be sending occasional project update newsletters throughout the study via email. May we add you to the mailing list? Yes ☐ No ☐

City of Windsor

SEWER MASTER PLAN

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- [ ] Social media
- [ ] Other (please specify) ______

2. Has your home been impacted by flooding? If so, what type of flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [ ] No

- [x] Basement flooding. Describe: 14" during 2017 August storm
- [ ] Surface flooding. Describe: ______

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; ✓ • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains ✓	[x] Yes [ ] No	
Downspout (Eavestrough) Disconnection	[x] Yes [ ] No	
Rain Barrel Conservation Project	[ ] Yes [ ] No	
Private Sewer Replacement Program	[ ] Yes [ ] No	
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [ ] No	

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☐ Yes ☐ No	
Window well protection	☐ Yes ☐ No	
Back-up power/Increased sump pump capacity	☐ Yes ☐ No	
Lot grading improvements	☐ Yes ☐ No	
Limit basement storage of valuable items or use more resilient basement finishes	☐ Yes ☐ No	
Sewage ejector pump	☐ Yes ☐ No	

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

____

____

____

____

____

6. Did you find valuable information at this Public Information Centre?

☐ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

____

____

____

____

____

Name: ______________________

Email Address: ______________________

Postal Code: ______________________

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City of Windsor
SEWER MASTER PLAN
Public Information Centre No.1 – Comment Form

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- [ ] Other (please specify) ______

2. Has your home been impacted by flooding? If so, what type of flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [ ] No

- [ ] Basement flooding. Describe: Sewage backup from private line during rain of 2017
- [ ] Surface flooding. Describe: ______

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains	☑ Yes ☐ No	Back water Valve
Downspout (Eavestrough) Disconnection	☑ Yes ☐ No	Done already
Rain Barrel Conservation Project	☐ Yes ☑ No	Had not heard about this
Private Sewer Replacement Program	☐ Yes ☑ No	Not sure I can do this now
Eeling Program (Sewer Service Connection Cleaning)	☑ Yes ☐ No	City of Windsor 2014

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☑ Yes ☐ No	
Window well protection	☑ Yes ☐ No	
Back-up power/Increased sump pump capacity	☐ Yes ☐ No	We have a good system but open to more ideas
Lot grading improvements	☐ Yes ☐ No	Recently did work on this. May be room for improvement
Limit basement storage of valuable items or use more resilient basement finishes	☑ Yes ☐ No	
Sewage ejector pump	☐ Yes ☐ No	We have a new backwater valve. No sure this is possible now.

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

We have a finished basement. We don't want to have to fix it again.

6. Did you find valuable information at this Public Information Centre?

☑ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

The plan to find the bottlenecking areas. Would like to know more about this.

Name: [redacted]
Email Address:
Postal Code:

We will be sending occasional project update newsletters throughout the study via email. May we add you to the mailing list? Yes ☑ No ☐

*Under the Freedom of Information and Protection of Privacy Act, **all comments and questions submitted regarding this project will be used for the purposes of creating a consultation report** that will be a part of the public record and will be made available to individuals or organizations with an interest in this project. **Personal information such as name, address, and telephone number will not be included in the environmental assessment report** but will be released, if requested, to any person as part of the review of the Sewer Master Plan.*

City of Windsor
SEWER MASTER PLAN
Public Information Centre No.1 – Comment Form

degrees of CHANGE

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- [ ] Social media
- [ ] Other (please specify) ______

2. Has your home been impacted by flooding? If so, what type of flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [ ] No

- [x] Basement flooding. Describe: NO MORE THAN 1 INCH -SUCKED UP WATER IN BASEMENT FOR 3 HOURS.
- [x] Surface flooding. Describe: HALF WAY UP DRIVEWAY

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains	[ ] Yes [x] No	CONTACTED PLUMBING - TOO BUSY
Downspout (Eavestrough) Disconnection	[x] Yes [ ] No	
Rain Barrel Conservation Project	[ ] Yes [x] No	
Private Sewer Replacement Program	[ ] Yes [x] No	
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [x] No	

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☐ Yes ☑ No	WOULD NOT HAVE HELPED DURING FLOOD.
Window well protection	☐ Yes ☑ No	LIMITED HELP
Back-up power/Increased sump pump capacity	☑ Yes ☐ No	PUMPING WATER OUT LESSENS DAMAGE
Lot grading improvements	☑ Yes ☐ No	GET LARGE AMOUNT OF WATER AWAY FROM HOUSE
Limit basement storage of valuable items or use more resilient basement finishes	☑ Yes ☐ No	WATERPROOF PAINT HELPS KEEPS WATER OUT. LESS VALUABLE ITEMS LESS LOSS.
Sewage ejector pump	☑ Yes ☑ No	COULD BREAK DOWN POSSIBLE FLOW OUT OF HOUSE GOOD

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

WATER AWAY FROM HOUSE IN FLOOD. CITY'S SEWERS HAVE TO WORK PROPERLY OR IT WILL BACK UP INTO MY HOUSE.

6. Did you find valuable information at this Public Information Centre?

☑ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

DICCO IN NOT RESPONSIBLE FOR GRAND MARAIS DRAIN OR LITTLE RIVER. IN ERCA IS RESPONIBLE THEY SHOULD BE HERE. NEED UPDATES OF RESULTS FROM CAMERAS IN OUR SEWERS

Name: [redacted]
Email Address:
Postal Code:

We will be sending occasional project update newsletters throughout the study via email. May we add you to the mailing list? Yes ☑ No ☐

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City of Windsor

SEWER MASTER PLAN

Public Information Centre No.1 – Comment Form

degrees of CHANGE

Your participation in the Sewer Master Plan process will improve the results and help us create a plan that we can implement together. Please take a few minutes and provide us with your thoughts and comments on the following questions.

Your comments are appreciated. Please complete your form drop a copy in the comment box today at the PIC, request a postage paid envelope and mail back to us, or scan a copy at home and e-mail us at info@weatheringthestorm.ca

1. How did you hear about the Sewer Master Plan Public Information Centre?

- [ ] Newspaper
- [x] City or Project website
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Social media
- [ ] Other (please specify) ____________

2. Has your home been impacted by flooding? If so, what type of flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [x] No

- [ ] Basement flooding. Describe: ____________
- [ ] Surface flooding. Describe: ____________

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains	☐ Yes ☒ No	~~[illegible]~~ Moved to a new place was not aware of the program
Downspout (Eavestrough) Disconnection	☑ Yes ☐ No	
Rain Barrel Conservation Project	☐ Yes ☒ No	
Private Sewer Replacement Program	☐ Yes ☒ No	Recently started renting a new place
Eeling Program (Sewer Service Connection Cleaning)	☐ Yes ☒ No	" "

THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☑ Yes ☐ No	Keeping water on site, reduces stormwater entering sewers
Window well protection	☐ Yes ☑ No	Do not have window wells
Back-up power/Increased sump pump capacity	☑ Yes ☐ No	
Lot grading improvements	☑ Yes ☐ No	
Limit basement storage of valuable items or use more resilient basement finishes	☑ Yes ☐ No	
Sewage ejector pump	☑ Yes ☐ No	

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

Costs to me
The effectiveness of the solution / proof that it will work

6. Did you find valuable information at this Public Information Centre?

☑ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

The description of solutions and things that are being considered to reduce flooding.
I would have liked more information about the model, its development and any results.

Name: [redacted]
Email Address:
Postal Code:

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1. How did you hear about the Sewer Master Plan Public Information Centre?

- [x] Newspaper
- [ ] City or Project website
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Social media
- [ ] Other (please specify) __________

2. Has your home been impacted by flooding? If so, what type of flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [x] No

- [ ] Basement flooding. Describe: __________
- [ ] Surface flooding. Describe: __________

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains	[ ] Yes [ ] No	
Downspout (Eavestrough) Disconnection	[ ] Yes [x] No	I called to have them disconnected, but inspector said it couldn't be done unless some brackets were installed so I didn't do it. because I had to call someone else & pay them
Rain Barrel Conservation Project	[ ] Yes [x] No	
Private Sewer Replacement Program	[ ] Yes [x] No	
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [x] No	

You need to redefine a 100 yr storm, if we have had 3 in 70 years. Our infrastructure is clearly not adequate and for sure better methods of protection are needed for any new development.

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☐ Yes ☒ No	Not needed. I already have a heavily wooded lot & gardens to soak up water
Window well protection	☐ Yes ☐ No	I don't have a basement or floor drain, so I don't think
Back-up power/Increased sump pump capacity	☐ Yes ☐ No	these are applicable
Lot grading improvements	☐ Yes ☐ No	
Limit basement storage of valuable items or use more resilient basement finishes	☐ Yes ☐ No	
Sewage ejector pump	☐ Yes ☐ No	

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

I was forced to connect my downspouts in the early 1990's by the City, against my protests and at my cost. Now you want me to disconnect them? Who is responsible for the bad planning and costs time? If you want me now to disconnect you can have workers qualified, with the drill, brackets, screws, etc to do the job properly, even if you must charge a reasonable fee for supplies. Don't force me to hire a private contractor to do this work. I was told I need to hire someone to do this, to disconnect the spouts this is not reasonable

6. Did you find valuable information at this Public Information Centre?

☒ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

Explanation of the different methods to prevent basement flooding will help me if I move. I had never heard of an ejector pump

Name: [redacted]
Email Address:
Postal Code:

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- [ ] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [x] No

- [ ] Basement flooding. Describe: ______________________
- [ ] Surface flooding. Describe: ______________________

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains	[ ] Yes [x] No	
Downspout (Eavestrough) Disconnection	[ ] Yes [x] No	
Rain Barrel Conservation Project	[ ] Yes [x] No	
Private Sewer Replacement Program	[ ] Yes [x] No	
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [x] No	

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☑ Yes ☐ No	
Window well protection	☐ Yes ☑ No	NO WELLS
Back-up power/Increased sump pump capacity	☐ Yes ☑ No	NO EXISTING ISSUES
Lot grading improvements	☑ Yes ☐ No	
Limit basement storage of valuable items or use more resilient basement finishes	☑ Yes ☐ No	
Sewage ejector pump	☐ Yes ☑ No	OVERKILL

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

6. Did you find valuable information at this Public Information Centre?

☑ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

CROSS SECTION VIEWS OF PLUMBING SYSTEM

Name:
Email Address:
Postal Code:
[redacted]

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City of Windsor
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Public Information Centre No.1 – Comment Form

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- [ ] Received information in the mail
- [ ] Social media
- [ ] Other (please specify) ____________________

2. Has your home been impacted by flooding? If so, what type of flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [x] No

- [ ] Basement flooding. Describe: ____________________
- [ ] Surface flooding. Describe: ____________________

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & sump pump with overflow; • Disconnect foundation drains	[ ] Yes [x] No	
Downspout (Eavestrough) Disconnection	[ ] Yes [ ] No	
Rain Barrel Conservation Project	[ ] Yes [ ] No	
Private Sewer Replacement Program	[ ] Yes [ ] No	
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [ ] No	

City of Windsor

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- [x] Newspaper
- [x] City or Project website
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [x] Social media
- [ ] Other (please specify) ______

2. Has your home been impacted by flooding? If so, what type of flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes, but more than 5 years ago
- [ ] No

- [x] Basement flooding. Describe: Aug. "100 yr" RAINSTORM. WATER CAME UP Thru storm and sanitary drains; 4 sumps couldn't in flow - drained to
- [x] Surface flooding. Describe: water pooled in back yard 1½ ft flooded road & under sidewalk, undermining swim pool walls

- no insurance covered costs to repair

3. Have you taken advantage of any of the City's existing programs to reduce the risk of flooding to your home?

		Please tell us Why or Why not?
Basement Flooding Protection Subsidy Program. If you know which part of the program was used please circle: • Backwater valve; • Sump pump with overflow & disconnect foundation drains; • Sump pump overflow only; • Backwater valve & "sump pump with overflow;" • Disconnect foundation drains	[x] Yes [ ] No	City only paid $1000.00; inspectors 1 before and @ backwater installation thought I would qualify for disconnects etc.!! I added this feature to current sump with second sump pit & 3 pumps added to already present sump did this myself
Downspout (Eavestrough) Disconnection	[x] Yes [x] No	I applied, no service provided ∴ did it myself.
Rain Barrel Conservation Project	[ ] Yes [ ] No	Already in place
Private Sewer Replacement Program	[ ] Yes [x] No	Had local company cut in "O" channel inside basement walls & add 2nd pit, pumps & backwater valve
Eeling Program (Sewer Service Connection Cleaning)	[ ] Yes [x] No	

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☑ Yes ☑ No	Clay base keeps absorption to minimum with flash/long rainfall flooding
Window well protection	☑ Yes ☑ No	-not applicable in my case but would help many others
Back-up power/Increased sump pump capacity	☑ Yes ☐ No	We have all pumps evacuate discharge water to front lawn
Lot grading improvements	☑ Yes ☐ No	Working on that now. We have wide soffit overhangs which generally helps
Limit basement storage of valuable items or use more resilient basement finishes	☑ Yes ☐ No	-"live & learn"; no carpets on floor "Now!"; wainscotting along base of walls now!; added shelving to raise off floor
Sewage ejector pump	☑ Yes ☐ No	pumps & backups; they will only last so long in event of power failure

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

- Power failures are concern, capacity of pumps evacuate to lawn & road - unless they are beyond capacity like 2017; sewage & storm systems overflowing into each other!
- ground drainage capacity is limited due to clay base
- invested ~~ment of~~ $16,000 in water infiltration - "Will it now work!"? I hope so!!!

6. Did you find valuable information at this Public Information Centre?

☑ Yes ☐ No ☑ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

- It demonstrated householders' responsibilities but didn't demonstrate how the city will work to alleviate flow from storm system into sanitary
- I contend we are receiving excess water from EC Row drainage into our storm sewers (3 houses from Dominion on-ramp & overpass - why else didn't the rest of street sewers overflow 1½ feet for 4 hours & Dominion Rd was seriously flooded? What will the City do?!!

Name: [redacted]
Email Address:
Postal Code:

We will be sending occasional project update newsletters throughout the study via email. May we add you to the mailing list? Yes ☑ No ☐

*I offered to join the "citizen" task force. Please re-consider.

4. Several short-term alternative solutions for homeowners were presented. Please comment whether you would consider implementing these solutions to reduce flooding in your basement/property.

		Please tell us Why or Why not?
Measures to let water soak into the ground such as rain-gardens or permeable pavers	☒ Yes ☐ No	
Window well protection	☒ Yes ☐ No	
Back-up power/Increased sump pump capacity	☒ Yes ☐ No	
Lot grading improvements	☒ Yes ☐ No	
Limit basement storage of valuable items or use more resilient basement finishes	☐ Yes ☐ No	
Sewage ejector pump	☐ Yes ☐ No	

5. What is the main consideration(s) you have when deciding what flooding solution to implement in your home/business/property?

6. Did you find valuable information at this Public Information Centre?

☒ Yes ☐ No ☐ Not Sure

Please describe what you found to be of most value and any suggestions that we should consider for the next public event?

STEPS ARE BEING TAKEN TO FIND SOLUTIONS

Name: [redacted]
Email Address:
Postal Code:

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ON LIST

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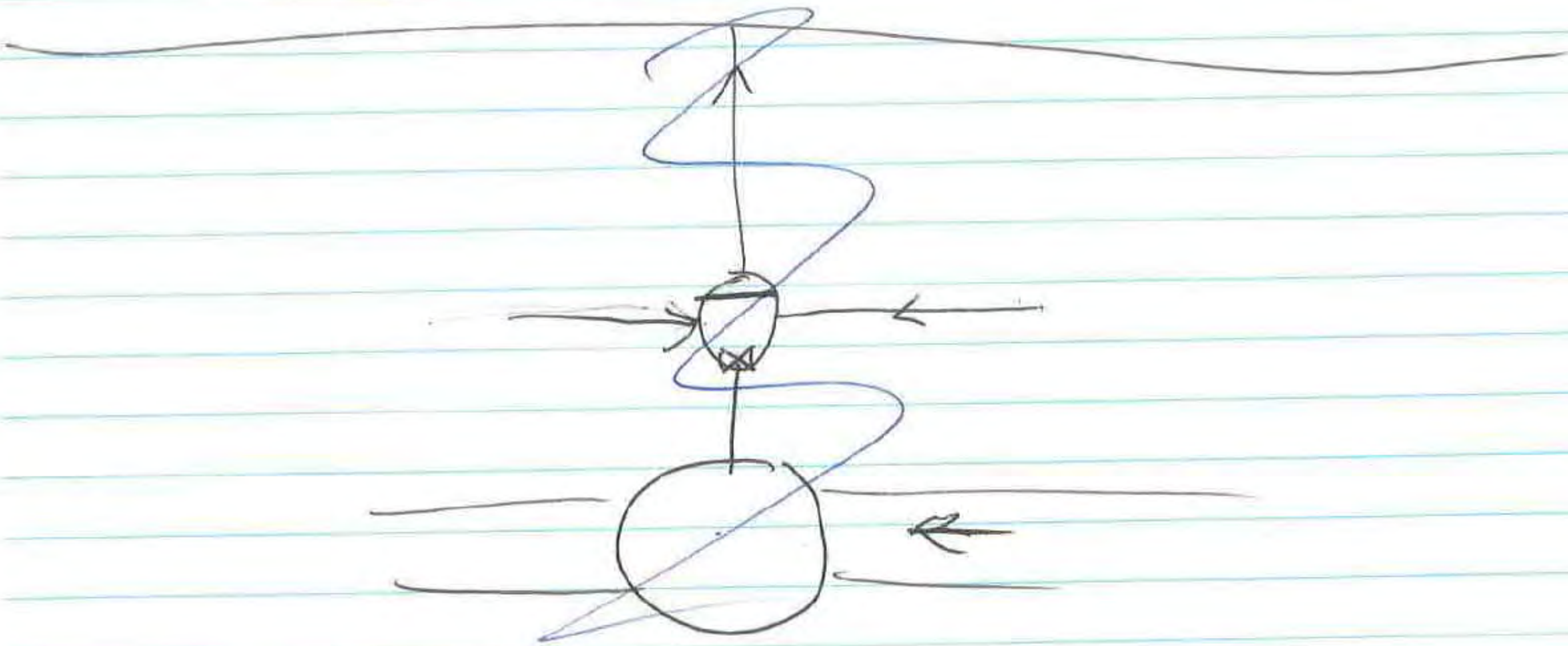
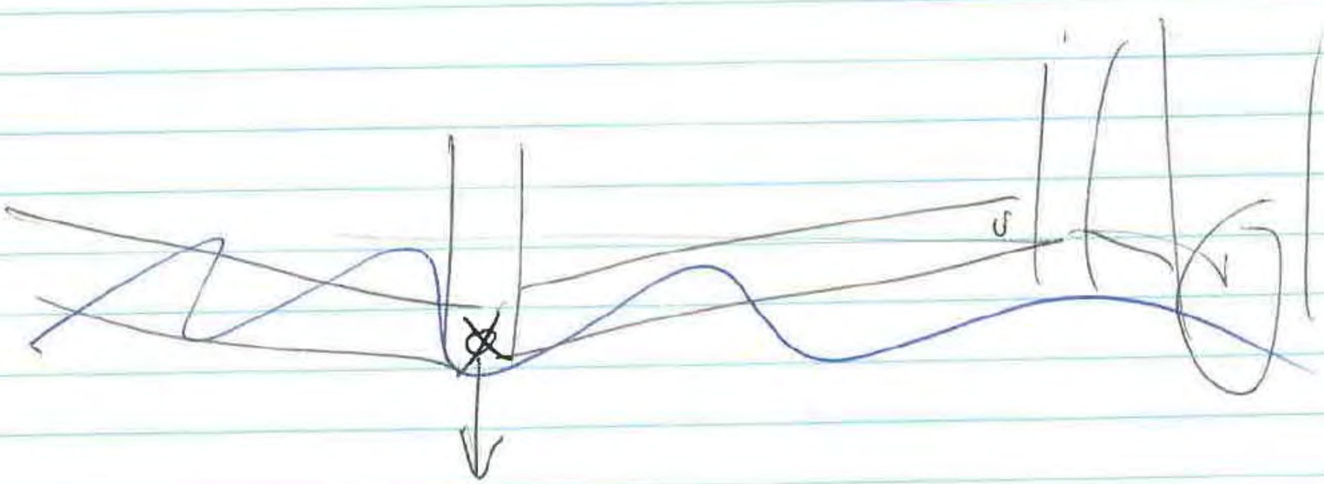
June 12

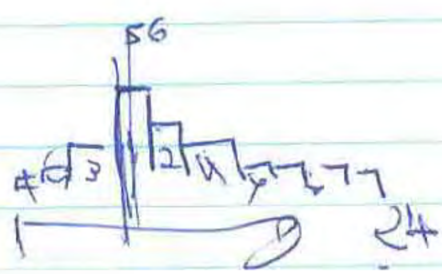
Resident
20 years
ago

Little River
Ice Blockage

@ Little River R
& @ Louzon Road







June 12/18
Karla

→ neighbor disconnected downspout + now backyard floods

→ frustration that fix ~~road~~ road then tear up to put something under

↳ need to consider in implementation of ~~the~~ SMP

→ too much development – it's part of the reason for flooding

June 12 - Resident Comments

[redacted] - hydroplan on roads, standing water

- 3 Floods, CB 2018
  Feb
  Apr
  May

[redacted] - Mandatory Downspout disconnection

- More pump capacity

PIC No.1 - Flavio Forest. June 12'18

Royal Timbers - new development - still require downspouts to be connected
- why not update dw. stds. for City

[redacted] - Low-lying property
- collects water from adjoining properties.

January 23, 2020

Re: Sewer and Coastal Flood Protection Master Plan
Notice of Public Information Centre No. 2

The City of Windsor is continuing to develop its Sewer and Coastal Flood Protection Master Plan project, which has been initiated to address basement, surface and coastal flooding across the City. To date, measures to reduce the risks and impacts of flooding have been developed and are ready for public review and input.

Your participation in the master plan process will improve the results and help us create a comprehensive plan that can be implemented in partnership with the community. Consultation is an integral part of this process and members of the public, agencies, Indigenous communities and other interested persons are encouraged to participate in the master planning process and attend the PIC.

These Public Information Centre (PIC) meetings will focus on the following:

- Findings of our analysis, showing where flood risks are greatest;
- Proposed short-term solutions and long-term solutions, including;
  - Private property solutions that rely on cooperation from residents and property owners to implement; and
  - Improvements to municipal infrastructure such as pump stations, sewers, stormwater management ponds, and treatment plants;
- Implementation Plan and Next steps

These PIC meetings are being held at three separate dates, times and locations for your convenience:

February 11, 2020	**February 12, 2020**	**February 13, 2020**
5pm - 8pm	**3pm - 8pm**	**5pm - 8pm**
Roseland Golf & Curling Club	**WFCU Centre Second Floor**	**Windsor International Aquatic and Training Centre**
455 Kennedy Dr. W	**8787 McHugh St.**	**401 Pitt St. W**

This study is being carried out in accordance with the Master Plan Approach No. 2 of the Municipal Class Environmental Assessment (EA) (Municipal Engineers Association, 2015) process. This study will fulfill EA requirements for Schedule B projects and satisfy Phases 1 and 2 of the process for Schedule C projects.

For more information, visit www.WeatheringTheStorm.ca.

If you have any questions, please contact either of the project representatives:

Flavio Forest, P.Eng.
Project Manager, Dillon Consulting Limited
3200 Deziel Drive, Suite 608
Windsor, ON, N8W 5K8
519.948.4243 ext. 3233
info@weatheringthestorm.ca

Anna M. Godo, P. Eng.
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
519.255.6100 ext. 6508
info@weatheringthestorm.ca

All comments and information received from individuals, stakeholder groups and agencies regarding this study are being collected to assist the City of Windsor in completing the Sewer Master Plan. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act and with the exception of personal information, all information provided will become part of the public record. This notice is also available on the City's website at: *https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans*, under 'Environmental Assessment Studies and Master Plan

Proposed Tweets to Notify on WSMP February 2020 PICs

ID	Date	Message	Character Count (Max 280	Send from Account	Focus
TWITTER					
1	Tuesday, January 21, 2020	The City is looking at improvements to limit the amount of rain that gets into our sewers to reduce basement flooding. Visit www.WeatheringTheStorm.ca for more information on the Windsor Sewer Master Plan.	206	@CityWindsorON	Study General
2	Tuesday, January 28, 2020	On February 11, 12 and 13 the City wants to talk to you about surface and basement flooding. Save the date and check out www.WeatheringTheStorm.ca for more information!	169	@CityWindsorON	PICs
3	Tuesday, February 4, 2020	The Sewer Master Plan has identified lots of improvements to help reduce flooding that will require your help. Come to our events next week to learn, ask and provide feedback. Check out www.WeatheringTheStorm.ca for event details!	231	@CityWindsorON	PICs
4	Friday, February 7, 2020	If you would like know what the City is doing to protect low lying areas from high river levels. Come to our public meetings next week to learn, ask and provide feedback. Check out www.WeatheringTheStorm.ca for event details!	226	@CityWindsorON	PICs
5	Monday, February 10, 2019	On February 11th from 5pm and 8 pm come by the Roseland Golf & Curling Club to learn about the Windsor Sewer Master Plan project and the part you can play in reducing flooding! City staff will be available to answer any questions you may have.	244	@CityWindsorON	PICs
6	Tuesday, February 11, 2020	Come to the Sewer Master Plan PIC for an update on the project and to provide feedback. Today we are at the Roseland Golf & Curling Club between 5 pm and 8 pm. Visit www.WeatheringTheStorm ca for more information about the other two PICs this week!	249	@CityWindsorON	PICs
7	Wednesday, February 12, 2020	The Windsor Sewer Master Plan PIC is taking place today from 3pm to 8 pm at the WFCU Centre. Be sure to swing by to learn about project updates and provide your feedback! Visit www.WeatheringTheStorm.ca for more information about the PIC tomorrow!	247	@CityWindsorON	PICs
8	Thursday, February 13, 2020	Visit us today at the third and final Windsor Sewer Master Plan PIC from 5 pm and 8 pm at the Windsor International Aquatic Training Centre. Be sure to swing by to learn about project updates and provide your feedback! Visit www.WeatheringTheStorm ca for more information!	272	@CityWindsorON	PICs
9	Friday, February 14, 2020	Thank you to everyone who came out to the Windsor Sewer Master Plan PICs this week! The project team will be analyzing and reporting on your feedback in the coming weeks. Check out www.WeatheringTheStorm.ca for more opportunities to get involved!	246	@CityWindsorON	PICs/General
	OTHERS:	Significant investment is being made by the City to reduce risks of flooding. The City now needs your help. Check out www.WeatheringTheStorm ca to get involved!	161	@CityWindsorON	PICs/General
		Want to know how you can protect your home from basement flooding? www.WeatheringTheStorm.ca has great information on what the you can do and how the City can help.	164	@CityWindsorON	PICs/General
		Lake levels have reached record highs, to see what the City is doing to protect low lying areas visit www.WeatheringTheStorm ca.	130	@CityWindsorON	PICs/General

City of Windsor

Sewer and Coastal Flood Protection Master Plan

degrees of CHANGE

Welcome to:

Public Information Centre No. 2

February 2020

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Purpose of Today's Meeting

This is the second and final Public Information Centre (PIC) for the Sewer and Coastal Flood Protection Master Plan project.

At this event you will:

- **Learn about the measures you can take to reduce the risk of flooding in your home;**
- **Learn about the what the City is proposing to do to reduce the risk of flooding, and how they have selected these solutions;**
- **Provide input and comments on the alternative solutions; and**
- **Ask questions and provide the team with your feedback.**

Additional detailed solution summary handouts are also available.

Display Panel Summary

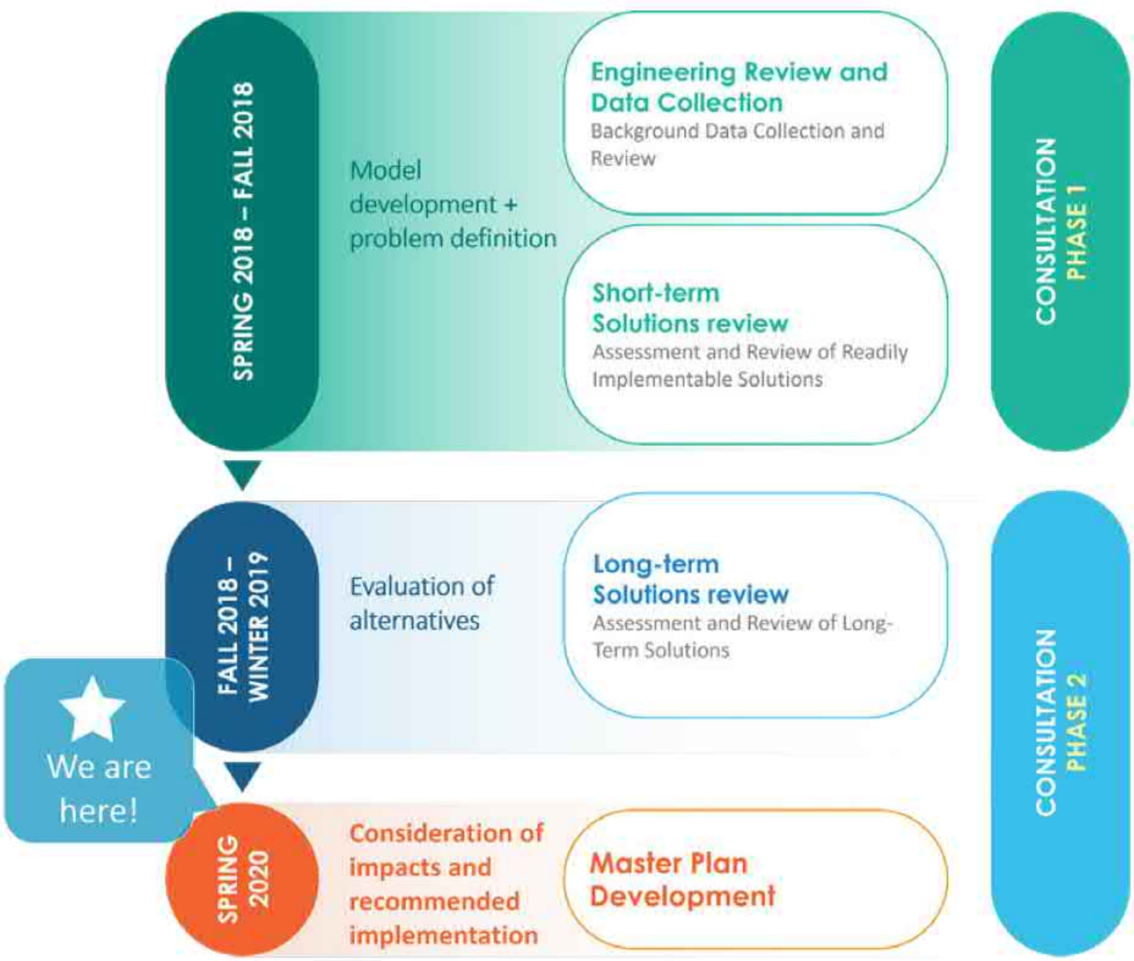
- Project Objectives – ***What is the purpose of this project?***
- Background – ***What has been done to date?***
- Problem Identification – ***What are the problems?***
- Solutions – ***How are the problems being addressed?***
- Evaluations – ***How were the preferred solutions chosen?***
- Implementation – ***How will these solutions be implemented?***

Master Plan Objectives

- Understand the causes of basement, surface and coastal flooding.
- Identify and evaluate short-term and long-term solutions to reduce the impacts and risks of this flooding.
- Develop preliminary designs and cost estimates for the recommended infrastructure improvements.
- Recommend an implementation strategy.

Master Plan Process

The study is following the requirements of the Municipal Class Environmental Assessment, Master Plan Process (Approach No. 2).



What Have We Heard?

Key things we have heard from residents so far:

- Cost efficient solutions are a top priority
- Focus on areas that are most vulnerable to flooding
- Provide incentives and assistance
- Solutions need to be implemented quickly
- Residents want to be involved and kept informed
- Educational programs and materials would be useful
- New development should not negatively impact the existing system
- Mitigate impacts to park land

Coordination with Other Projects

- ✓ East Riverside Flood Protection Risk Assessment
- ✓ Caron Ave. Combined Sewer Overflow Study
- ✓ Campbell/University Stormwater Study
- ✓ Stormwater Financing Study
- ✓ Sandwich South Master Servicing Plan
- ✓ Little River Flood Plain Mapping Study
- ✓ Climate Change Adaptation Plan
- ✓ Pontiac and St. Paul Drainage Area Stormwater Study

Public Outreach

- ✓ Interactive Website
- ✓ Partners for Action Survey (Spring 2018)
- ✓ Pop Up Events such as Earth Day and Open Streets
- ✓ PIC No. 1 (June 2018)
- ✓ Stakeholder Advisory Committee Consultation
- ✓ Regular City Council presentations and quarterly updates

Images: PIC in June 2018 at Tecumseh Mall (Left); Earth Day Pop Up in April 2019.

Study Area

Sewershed Area Characteristics:

East Area

- Separate storm and sanitary sewer system.
- Sanitary sewers drain to the Little River Pollution Control Plant.
- Storm sewers drain to Detroit River or Little River Drain.
- Large portion of this area is currently undeveloped.

Central Area

- A single 'combined' sewer system collects sewage and rainwater.
- Existing Retention Treatment Basin (RTB) intercepts and treats combined sewer overflows to meet regulatory requirements.
- Additional RTB proposed at Lou Romano Water Reclamation Plant.

South Area

- Separate storm and sanitary sewer system.
- Sanitary sewers drain to the Lou Romano Water Reclamation Plant.
- Storm sewers drain to municipal drains (Grand Marais, Lennon, Cahill).

Considerations for Future Development

Future growth and intensification has been considered based on:

1. Development of Secondary Plan Areas;
2. New developments proposed based on recent proposal; and
3. Projected intensification within developed areas.

Level of Service

Level of Service = the benchmark used to decide when improvements are needed to mitigate the risks of flooding.

Level of Service - 1:100 Year Storm:

Sanitary System:

Sewer surcharge below basement floor level (1.8 m (6.0 ft) below ground).

Storm System:

Limit surface (roadway) ponding to less than 30 cm (1 ft).

Coastal Flood Protection Infrastructure:

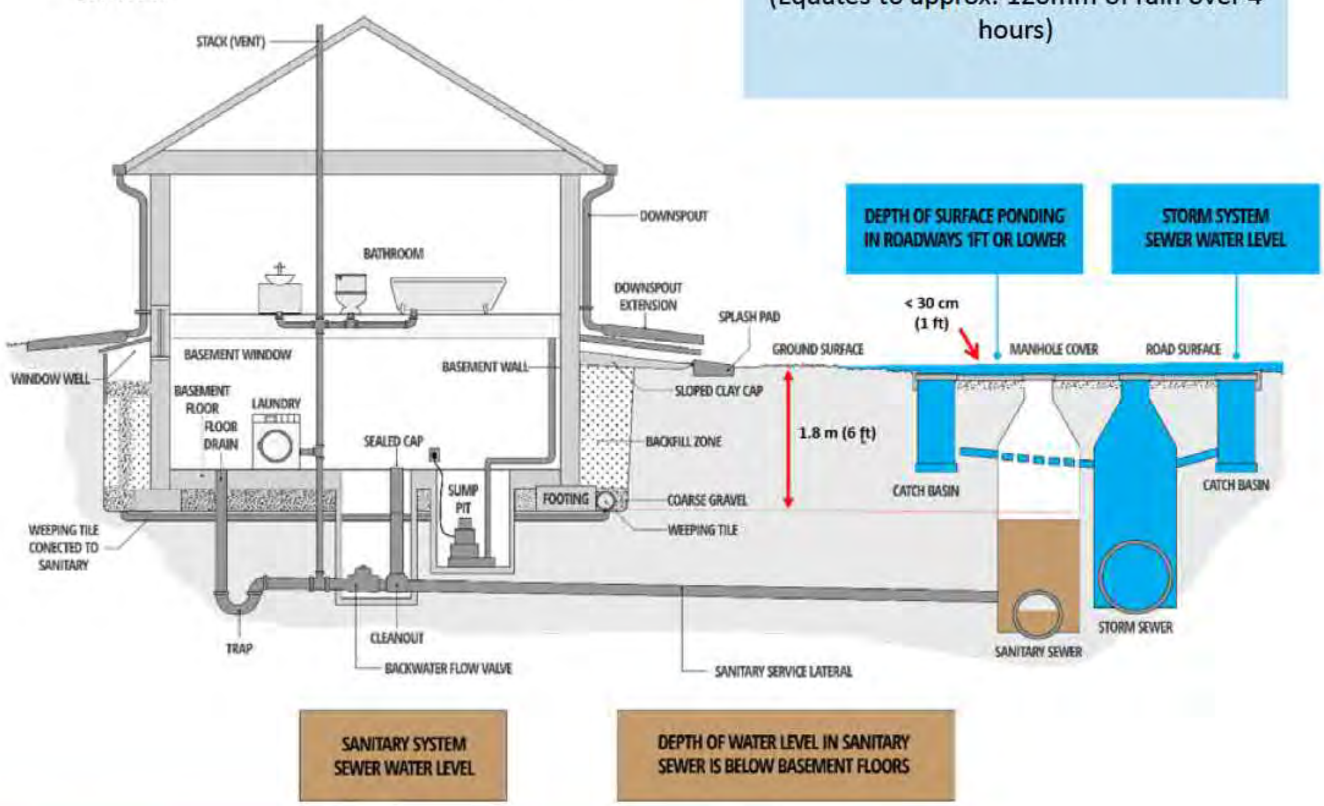
Protect lower-lying inland areas from impacts of high lake levels (176.50 m)

What is a 1:100 Year Storm?
A rainfall that has a 1 in 100 chance (or a 1% risk) of occurring in any given year.
Equates to approximately 85 mm of rain over 4 hours.

Enhanced Level of Service – Under "Climate Change" Storm:

More severe storm criteria were used for **major roadways** and **vulnerable areas.**
Vulnerable areas include schools, hospitals, long term care centres, emergency services, evacuation centres.

What is a "Climate Change" Storm?
We have applied a 40% factor on a 1:100 year storm to simulate very severe and intense storms.
(Equates to approx. 120mm of rain over 4 hours)



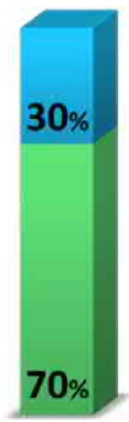
Types of Flooding - Basement

Extreme rainfall events cause rainwater to enter the sanitary and/or combined sewer systems. This results in more flow than the sewers and treatment plants can manage, causing back-ups into people's basements. **More than 6,600 homes were flooded during the major rain events in 2016 and 2017.**

A City Wide sewer computer model identified basement flooding problems based on:

- Reports of flooding from residents.
- City input on observed and reported flooding issues;
- In-sewer monitoring devices.

How does the water get into the sewer?



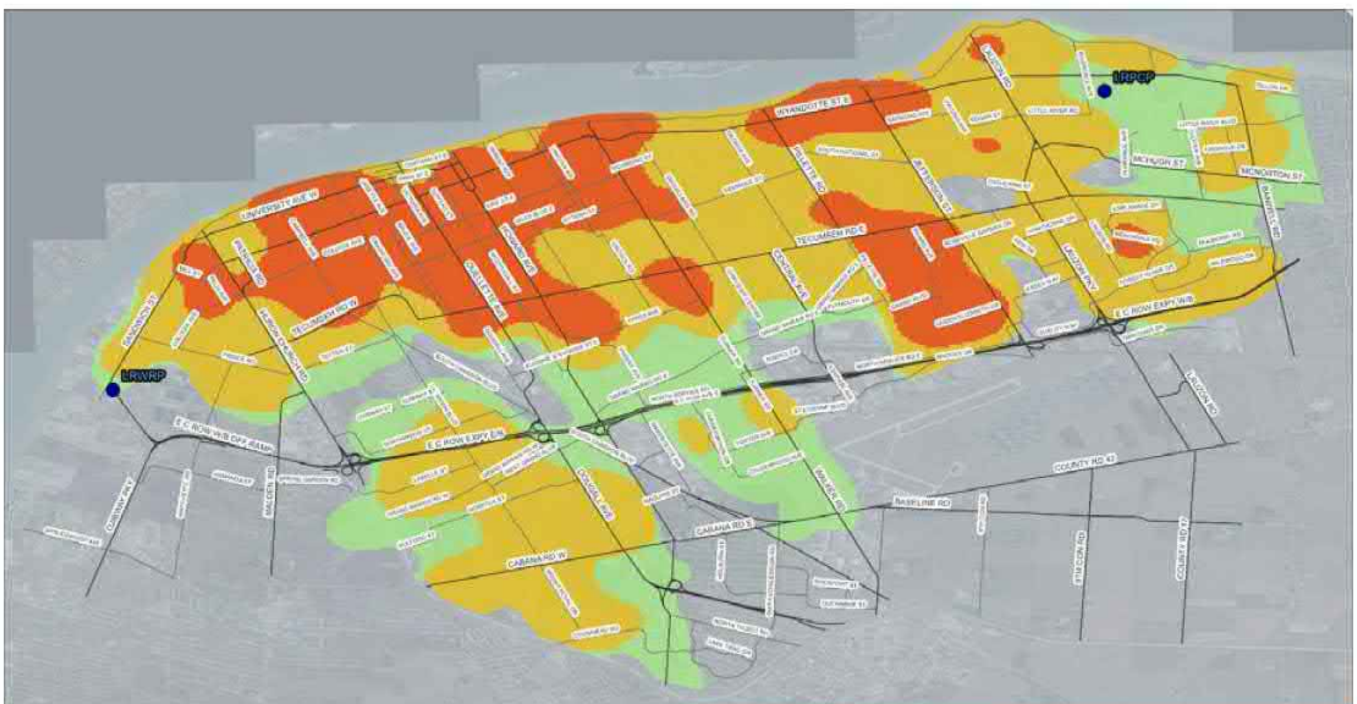
PUBLIC RIGHT OF WAY

- ✓ Manhole covers
- ✓ Sewer system leaks
- ✓ Improper storm connections

PRIVATE PROPERTIES

- ✓ Connected foundation drains
- ✓ Improper plumbing connections
- ✓ Leaks in private drain pipes

Estimate based on studies of sewer systems.



Basement Flood Risk Areas
Sewer Surcharging Within 1.8m (6ft) of the Ground Surface

50 mm rain (1:5 Year Storm)
65 mm rain (1:25 Year Storm)
85 mm rain (1:100 Year Storm)

Types of Flooding - Surface

Extreme rainfall events overwhelm the storm sewer system. This impacts emergency access and private properties, where flooding exceeds a *depth of 30 cm (1.0 foot)* within the municipal right-of-way.

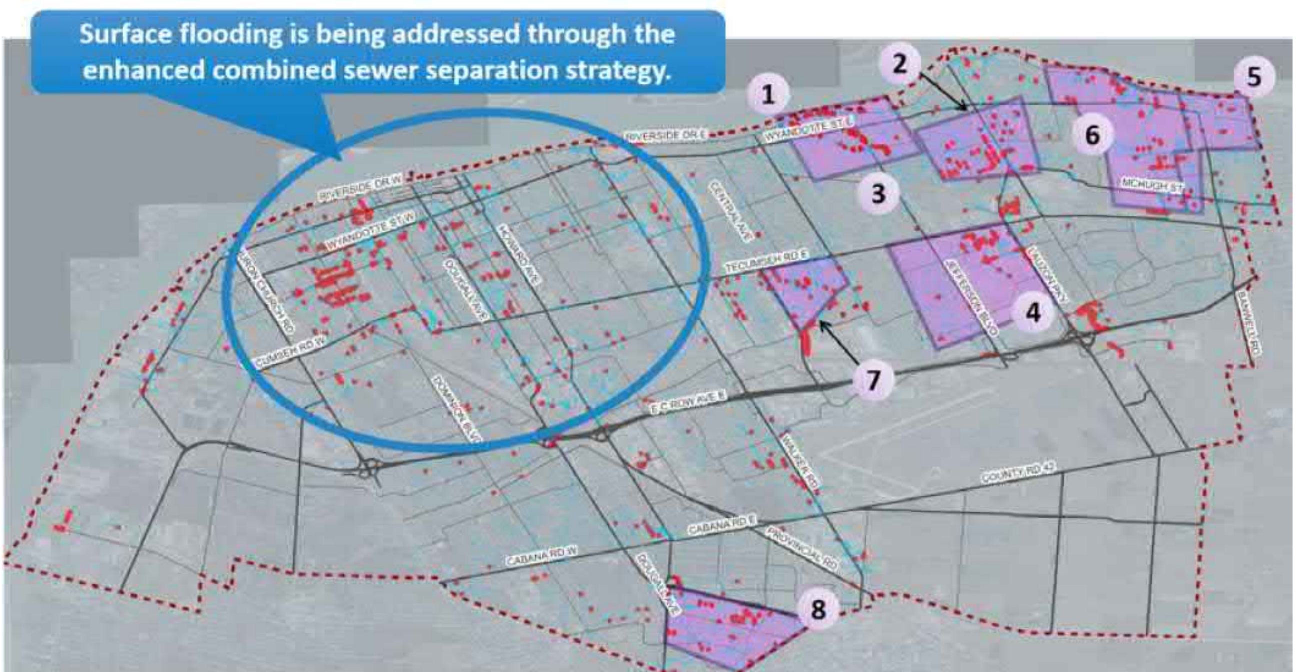
Computer modeling identified surface flooding problems based on:

- 2D surface elevation mapping;
- City input on observed and reported flooding issues.

Riverside Area – September 2017 Rain Event

Solutions focused on addressing surface ponding:

1. Regional areas where there is a concentration of surface flooding
   1:100 Yr Level of Service (Purple areas shown on map below.)
2. Major Roadways (Arterial and Collector Roads) – Climate Change Level of Service
   Examples: Lauzon Road, Riverside Drive, Dougall Ave.
3. Roadways that provide access to sensitive land use areas –
   (Climate Change Level of Service)
   Examples: Schools, hospitals, emergency shelters and long term care centres, public works yards.



LEGEND

- Surface Flooding Deeper than 30 cm (1 ft)
- Surface Flooding less than 30 cm (1 ft)
- Regional Surface Flooding Problem Areas

Surface Flooding – 1:100 Year Storm
85 mm Rain Over 4 Hours

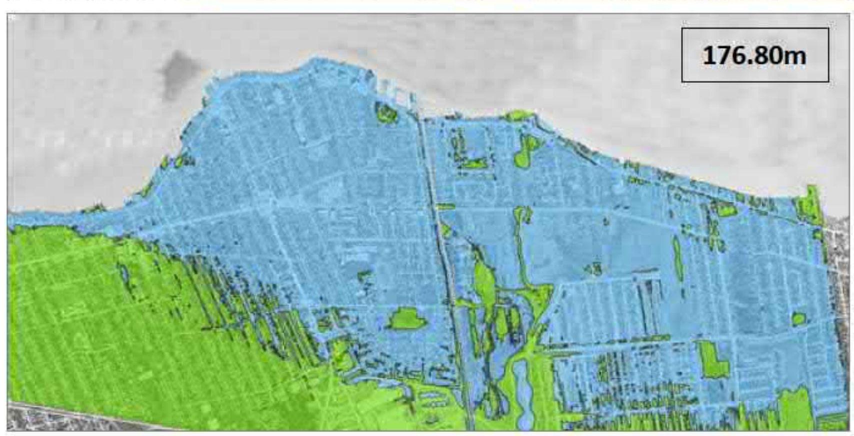
Types of Flooding – Coastal

High lake and river levels can result in surface flooding of low lying areas which can mean extra water entering the storm and/or combined sewer systems and that storm sewer outfalls are underwater.

In late-Spring 2019, water levels in the Lake Erie, Detroit River and Lake St. Clair system reached an historic high water surface elevation above **176.0 meters (m)**.

By 2050, studies project static high water levels of **176.50m,**

with instantaneous high water levels from wind effects as high as **176.80m.**



LEGEND:

Area Above Noted High Water Elevations

Area Below Noted High Water Elevations

Solution Tool Box

Flooding solutions are made up of a combination of various types of improvements.

Increase Downstream Outlet Capacity

Examples:
- Pump Station Capacity Improvements
- Improved Outlet Sewers
- Treatment Plant Storage and Treatment Capacity Improvements

Source Control

Examples:
- Foundation Drain and Downspout Disconnection
- Correct Improper Plumbing Connections
- Low Impact Development (LID) measures
- Sealing Sanitary Sewer System Leaks
- Manhole Rain Catchers

Coastal Flood Protection

Examples:
- Storm Sewer Backflow Prevention
- Dyke Protection System (Landform Barrier)

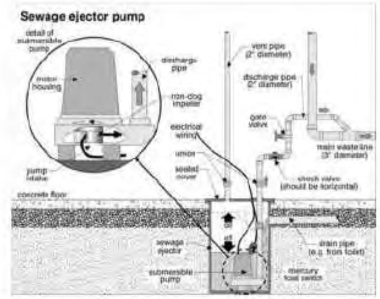
Improve Sewer System Conveyance and Storage Capacity

Examples:
- Increase sewer sizes
- Combined sewer separation
- Surface/underground storage in open spaces
- Low Impact Development (LID) measures
- High water level protection

Coastal Flooding Photo Source: Windsor Star

Source Control: What the City is Doing

- ✓ Updating and implementing new City by-laws:
  - ✓ City-Wide Downspout Disconnection Policy.
  - ✓ Foundation Drain Disconnection Policy.
  - ✓ Pilot Projects to measure benefit of these measures.
- ✓ Updating the City's Development Standards.
  - ✓ Mandatory sewage ejector pumps for new development.
  - ✓ Install inlet control devices to control flow of rainwater entering existing sewers.
- ✓ Implementing Low Impact Development (LIDs) measures, such as:
  - ✓ Exfiltration trenches (Matthew Brady Construction)
  - ✓ Bioswales/Stormwater Retention
  - ✓ Permeable pavements (Tranby Park Parking Lot)
- ✓ Installing rain catchers on manholes in high priority areas and eventually all manholes.
- ✓ Completing an extensive condition assessment on infrastructure to guide maintenance and upgrade decisions.



Schematic: Sewage Ejector Pump

Schematic: Example Downspout Pop-up
www.waterproof.com

Recommended Areas for Immediate Rain Catcher Installation

Manhole Rain Catcher

Installing rain catchers city-wide will reduce wet weather volume entering sanitary system up to 5% for a 1:100 year storm.

Source Control: Recommended Private Property Improvements

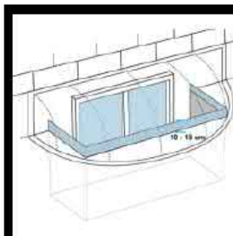
Basement Flooding (Sanitary System)

- ✓ ***Foundation Drain Disconnection***
- ✓ Correct Improper Connections
- ✓ Backflow Prevention Valves

These measures are <u>**key**</u> components of the overall recommended solution strategy.

Surface Flooding (Storm System)

- ✓ ***Downspout Disconnection***
- ✓ Improve Lot Grading
- ✓ Low Impact Development (LID) measures, such as:
  - ✓ Rain Barrels and Rain Gardens
  - ✓ Seal window wells
  - ✓ Permeable pavements



Install Window Wells that Sit 10–15 cm Above Ground and Upgrade to Water Resistant Windows

The City will review the benefit of these solutions through pilot projects and continued monitoring and evaluation.

Recommended Mandatory Downspout Disconnection Policy Area

Disconnection of downspouts significantly reduces the volume of rainwater entering the combined sewer system.

Disconnection of foundation drains is a critical measure to reduce basement flooding.

Recommended Mandatory Foundation Drain and Downspout Disconnection Policy Area

DILLON CONSULTING Aquafor Beech

Sewer System Conveyance and Storage Improvements

Solutions necessary to achieve flood risk reduction objectives:

Basement Flooding **(Sanitary System)**

✓ Enhanced sewer separation strategy for combined sewer areas;

- Downtown/Central Area and Fountainebleu Area.

✓ Inline storage within sewers;

- 40 km of sanitary sewer upgrades in East Windsor.
- 8 km of sanitary sewer upgrades in South Windsor.

Example: Stormwater Underground Storage Facility

Example: Stormwater Management Pond

Surface Flooding **(Storm System)**

✓ Inline storage within sewers:

- 40 km in East Windsor and 8 km in South Windsor.
- 9 km of trunk storm sewer in Central Windsor.

✓ 3 New and 4 Upgraded stormwater management (SWM) ponds:

- Little River Golf Course New SWM Pond.
- Dougall Ave. and Howard Ave. SWM Ponds.
- Modifications to the ponds serving Southwood Lakes.
- Increase size of the Central Ave. SWM Pond.

✓ Underground storage systems under parks, parking lots, commercial properties.

✓ Low impact development (LID) measures:

- Tranby Park Permeable Parking Lot, Matthew Brady Exfiltration Trenches.

✓ Backflow Prevention Measures to protect from High Water Levels in the River.

Downstream Outlet Capacity Improvements

Solutions necessary to achieve flood risk reduction objectives:

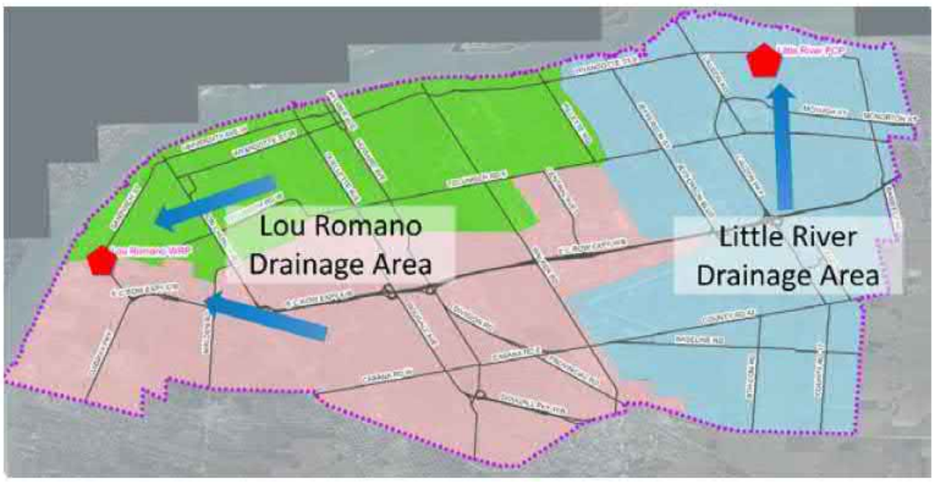
Basement Flooding (Sanitary System)

✓ Little River Pollution Control Plant:

- Increase inlet pump station capacity
- Future plant expansion
- Interim overflow outlet improvements (Pontiac Pump Station improvements)

✓ Lou Romano Water Reclamation Plant:

- Retention Treatment Basin Facility



Surface Flooding (Storm System)

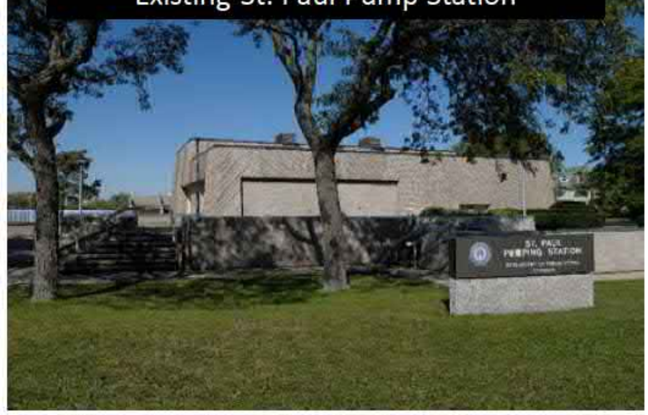
✓ Improved storm outlets to the Detroit River

- Detroit St., Bruce Ave., Cameron St., Albert Rd., Parent Ave.

✓ New or improved stormwater pump station (PS) capacities

- New St. Rose PS
- Improve St. Paul PS
- Improve East Marsh PS
- Improve Drouillard PS
- Improve Lakeview PS
- Improve Ford PS

Existing St. Paul Pump Station



DILLON CONSULTING Aquafor Beech

Coastal Flood Protection

The area of Riverside Drive East and inland, from St. Rose Beach easterly to the City limit, has a landform barrier system consisting of the Ganatchio Trail (constructed in the 1980's).

A flood risk assessment was completed in 2019 to evaluate the integrity of the existing landform barrier system and to determine whether the existing system will be adequate to provide protection under various conditions.

Alternative flood protection solutions have been developed for 3 areas:

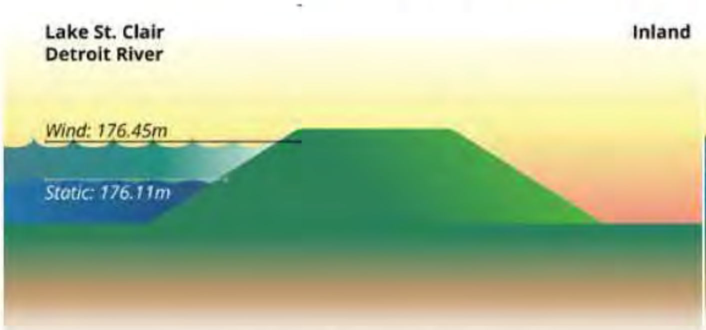
- Area 1: Riverside Vista Phase 2A, Ford Blvd. to St. Rose. Ave.
- Area 2: Riverside Drive East, St. Rose Ave. to Riverdale Ave.
- Area 3: East Riverside Area, Riverdale Ave. to East City limits.

Landform Barrier Elevations

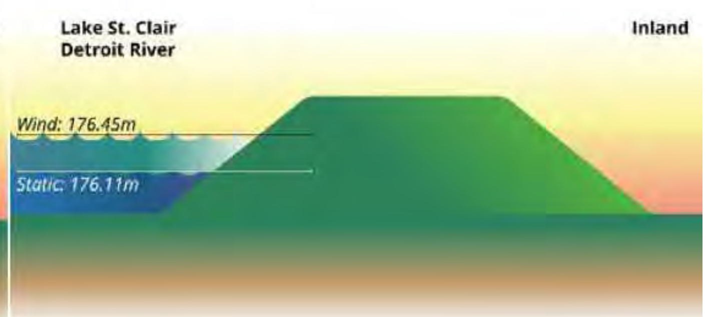
Two flood protection elevation scenarios have been evaluated based on the existing regulatory flood protection levels and recent climate change projections.

Landform Barrier Elevation 176. 50m	Landform Barrier Elevation 176.80m
Preliminary Preferred	

Historical High Lake Levels:

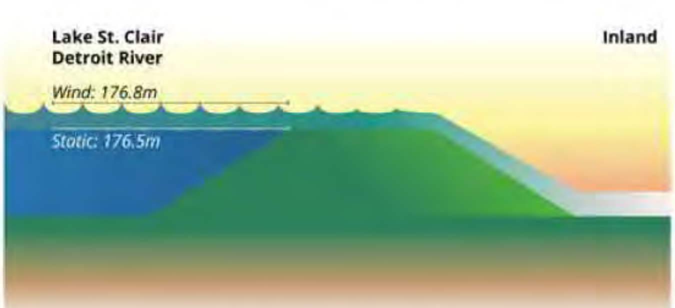


1:100 Year High Water Level

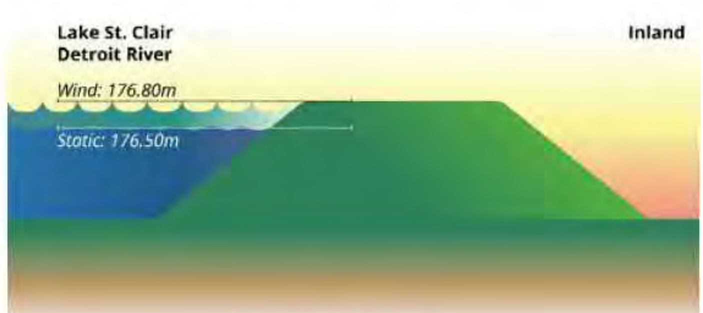


1:100 Year High Water Level

2050 Projected Climate Change High Lake Levels:



1:100 Year High Water Level



1:100 Year High Water Level

Drawings are not to scale, for illustrative purposes only.

Definitions:

Static Water Level: Lake or river level during normal weather and undisturbed conditions.

Wind Water Level: Lake or river level during short duration wind/storm events.

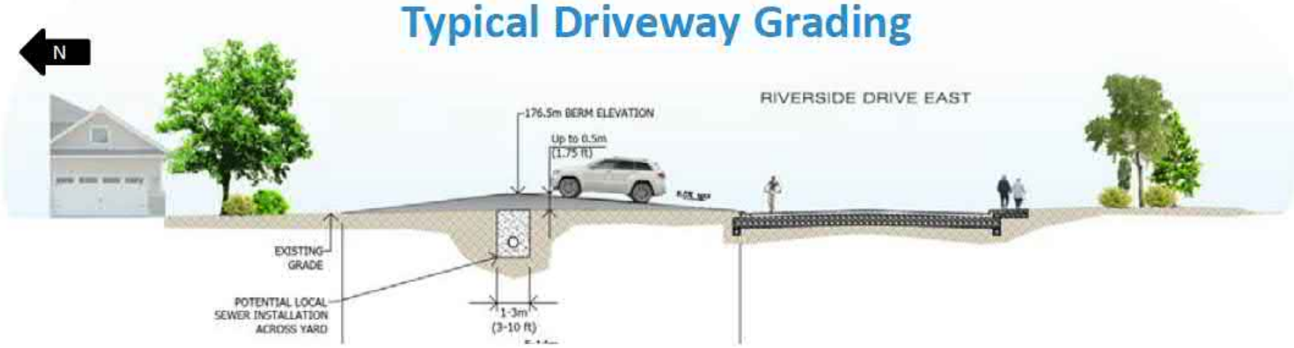
Area 1: Flood Protection Preferred Solutions

Ford Blvd. to St. Rose Ave.

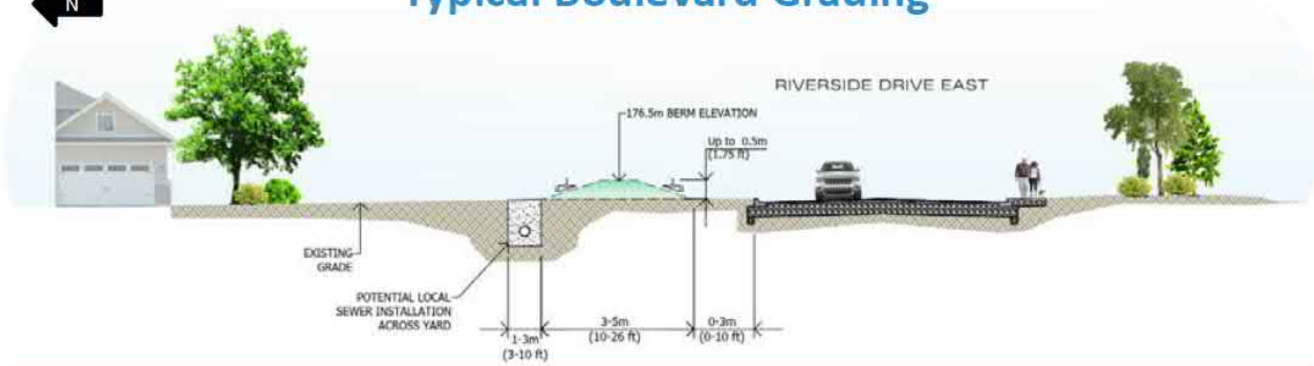
Earth Berm along the North boulevard of Riverside Drive East.

- Requires acquisition of an easement north of the right of way.
- Where properties are ***above*** the established protection elevation, the earth berm will not be required.
    - The City will work with these property owners to incorporate lot elevation as part of the property's legal status.
- Maintain acceptable driveway grades for vehicle access.
- Local storm sewers to capture drainage north of the berm may be required.
- The berm construction will be integrated into the reconstruction of Riverside Drive (Vista Phase 2A).

Typical Driveway Grading



Typical Boulevard Grading



- ✓ Protects in-land areas from high lake/river levels.
- ✓ Protects low lying residents, who live North of Riverside Dr., from overland surface flooding on Riverside Dr.
- ✓ Utilizes existing private property grades to meet min. protection levels.

Area 2: Flood Protection Preferred Solutions

St. Rose Ave. to Riverdale Ave.

St. Rose to Frank Ave.

Earth Berm along the North boulevard of Riverside Drive East.

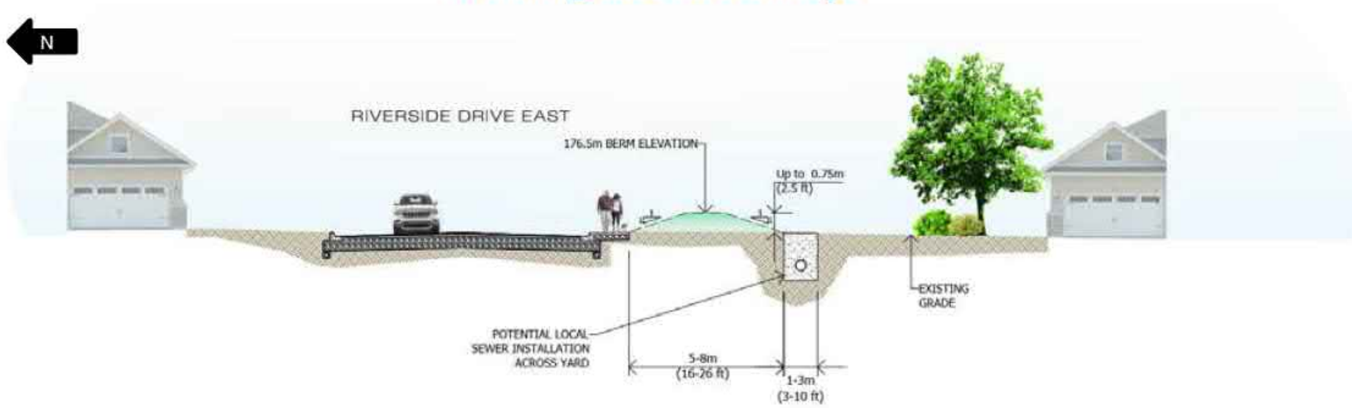
- Requires acquisition of an easement north of right of way;
- Where properties are ***above*** the established protection elevation the earth berm will not be required.
    - The City will work with property owners to incorporate lot elevation as part of the property's legal status.
- Maintain acceptable driveway grades for vehicle access.
- Where required, local storm sewers are proposed to capture local property runoff.

Frank Ave. to Riverdale Ave.

Earth Berm along the South boulevard of Riverside Drive East.

- A portion of the berm, east of Watson Ave. has been built.
- Maintain acceptable driveway grades for vehicle access.
- Requires acquisition of an easement south of right of way, in some areas;
- Where required, local storm sewers are proposed to capture local property runoff.

Grading at Driveways



- ✓ Protects in-land areas from high lake/river levels.
- ✓ Utilize existing private property grades to meet min. protection levels.
- ✓ Barrier has been constructed in portions of Area 2.

Area 3: Flood Protection Preferred Solutions

Riverdale Ave. to East City Limits (Ganatchio Trail)

Existing earth berm along south boulevard of Riverside Drive East.

- Infill, where the existing berm or side streets do not meet minimum protection grades.
- No property acquisition required.
- Where required, backflow devices will be used to protect the local storm sewer system.

✓ Protects in-land areas from high lake/river levels.

Flood Protection Along North Shoreline Limitations- All Areas – Ford to East City Limits

Providing protection along the north shoreline was considered, however this is not a feasible option due to the following factors:

Inspection & Maintenance	Measures need to be within established easements or ROW to permit regular inspection and maintenance.
Design	Measures placed adjacent to water lines must to be 1ft to 3ft higher to account for wind and wave factors.
Management & Jurisdiction	City maintain access and legal status to mitigate risks of damage or modifications to the structure.
Impacts	Would impact private property amenities such as pools, docks, boat slips, structures.

Evaluation Criteria

To assist with the decision making process, each potential solutions was evaluated through a series of questions. Based on the answers to these questions, the solutions were compared and the ones that had the most positive responses were identified as preferred.

To meet the objectives of this study these two criteria must be met.

Class EA Project Schedules

This master plan will satisfy the EA requirements for **Schedule B** projects.

SCHEDULE B PROJECTS:

The following is a general description of Schedule B projects that have been identified among the preferred solutions:

- New and Improved Stormwater Pump Stations;
- New Stormwater Management Ponds and Underground Storage on Private Property;
- New Low Impact Development (LID) Measures on Private Property;
- New Sanitary/Storm Trunk Sewers and Box Culverts Requiring Additional Property;
- New Storm Sewers including Upgrades to Existing Outlets to the Detroit River; and
- Barrier Landform Improvements on Riverside Drive that Require Additional Property.

SCHEDULE C PROJECTS:

The following is a general description of Schedule C projects that have been identified among the preferred solutions, and which will require additional Class EA studies prior to implementation:

- New Storm Sewers including New Outlets to the Detroit River
- Improvements to the Little River Pollution Control Centre wastewater treatment facility, including:
- Improvements to the existing bypass at the Pontiac pump station;
- Interim measures to optimize the operation of the Little River Pollution Control Plant for existing wet weather flows; and
- Future treatment plant expansion to meet the ultimate development needs.

The project schedules for the preferred solutions will be confirmed prior to finalizing this Master Plan, and identified in the Notice of Completion.

During the 30 Day Review period, any person who has significant concerns about the project may request a Part II Order to request the change the status of the project.

If no objections are received these projects are approved for construction.

Mitigation of Impacts

The City of Windsor is committed to minimizing potential impacts on people and the environment and will implement the following where appropriate:

Construction and Maintenance

- Considering input from neighbours in discussions on design and landscaping for pumping stations and ponds;
- Informing neighbours about upcoming construction and any temporary impacts on access;
- Using construction best management practices to minimize disruption such as controlling dust and following noise by-laws; and
- Expansion of maintenance programs to include proposed infrastructure.

Property Impacts

- Easements for proposed infrastructure for maintenance;
- Property acquisition or easements where necessary to implement solutions; and
- Incorporating legal status onto flood protection features on private property.

Archaeological Resources

- Completing in-field archaeological assessments prior to construction and notifying appropriate agencies should unexpected resources be recovered during construction.

Little River Drain

Natural Environment

- Minimizing tree removal and replacing any trees removed;
- Development of mitigation plans to protect terrestrial and aquatic habitat.

Implementation

A recommended implementation plan will be developed which will prioritize projects based on the following:

- Problem areas with greater flooding impact;
- Implement projects in coordination with the City's planned capital works schedule and asset management plan.
- Available funding.

The City needs you!

The effectiveness of **solutions rely on a partnering approach** between private property owners and the City.

Protect your property

Solutions will **reduce, but not completely eliminate flooding risks.**

Investment for the future

The infrastructure improvements are expected to require an **extended period of time to implement** due to the scope and costs.

Resilient Solutions

Solutions have taken the risk of climate change into consideration.

What You Can Do Now

A wide range of solutions for your property are recommended based on input from residents, stakeholders and City staff. These solutions will have measureable benefits on the sewer systems.

Immediate solutions that will protect your home and reduce excess water getting into our sewer system.

1. **Protect your basement with a sump pump and/or backwater valve.**
   Take advantage of the City's Basement Flooding Protection (BFP) Subsidy Program.

2. **Disconnect your downspout (eavestrough).**
   Its **free** of charge for City residents! Disconnection will be mandatory in new development areas and areas where sewer separation will be completed (Central Windsor).

3. **Disconnect your foundation drain.**
   This is part of the BFP Subsidy program. A mandatory disconnection program for homes older than 1980) is recommended.

4. **Grade your lot.**

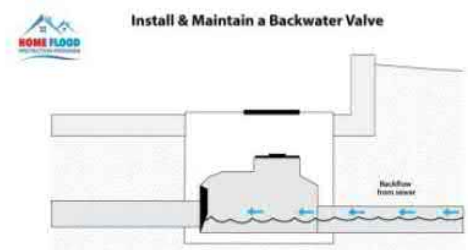
   Direct rain away from your home.

5. **Slow the flow.**

   Let rain soak into the ground with rain gardens, permeable pavers or collect in rain barrels for later use.

6. **Learn more about flooding.**

   The City will be providing more information for homeowners to learn about how to protect against flooding.



Backflow Preventer
www.homefloodprotect.ca

Disconnected Downspout

Rain Barrel

For more details about the City's existing programs visit:
https://www.citywindsor.ca/residents/maintenanceandfieldservices/Sewers-/Pages/Sewers.aspx

Public Education Input

The City will offer public education for homeowners on private property solutions. In what ways would you prefer to be engaged?

Put a sticky dot next to the option(s) you prefer, or leave a sticky note with your own suggestion in the space below.

Dedicated Website	**Workshops/ Seminars**	**Brochure/Guidebook**

Provide your own suggestion by placing a sticky note here:

Priorities and Project Schedule

First Steps:

- ✓ Sealing 1,500 manhole covers in low lying areas.
- ✓ Determining how to fund stormwater projects (Stormwater Financing Study).
- ✓ Completing the extensive condition assessment on sewer infrastructure to guide maintenance and upgrade decisions (70% of City's sewers have been assessed).
- ✓ Preparing educational material to share with the community.
- ✓ Updating the City's Development Standards.
- ✓ Implementing Pilot Projects, Continuous Monitoring and Evaluation of Solutions

Timeline	Project

0-5 Years	• Riverside Vista Phase 2A: Road Construction and Landform Barrier (2020-2024)
	• Tranby Park Improvements (2020)
	• Continue Sealing Manholes and Sewers
	• Drainage area storm improvements:
	    • Matthew Brady Phases 2 & 3,
	    • Belle Isle View Phases 1 & 2,
	    • Eastlawn Ave. and East Marsh Areas.

5-8 Years	Disaster Mitigation and Adaptation Fund - Round 1: • Riverside and Belleperche Storm Trunk Sewer • Pontiac Pump Station Overflow • St. Paul Pump Station • East Marsh Pump Station • Cedarview Sewer and Brumpton Park Improvements Disaster Mitigation and Adaptation Fund - Round 2: (Pending) • St. Rose Pump Station • St. Rose Storm Trunk Sewer • Ford Blvd Pump Station Upgrades
Long Term 9 – 50+ Years	• Schedule storm/sanitary sewer improvements in conjunction with scheduled road reconstruction projects. • Prioritize projects based on areas of higher flood risk and constructability. • Refine solutions based on findings from pilot projects and monitoring. • Expansion and infill of the landform barrier in Areas 2 and 3. • Little River Treatment Plant Expansion. • RTB at Lou Romano Water Reclamation Plant.

What's Next

Functional Design of Preferred Solutions

- ✓ Review comments from today's PIC and other consultation
- ✓ Confirm functionality; and
- ✓ Develop cost estimates for the proposed infrastructure improvements.

Implementation plan for Short and Long Term Solutions

- ✓ Identify priority projects.
- ✓ Recommend implementation plan for high priority projects.

Complete the Master Plan

- ✓ Document consultation and design process
- ✓ Present final Master Plan to Council.

30 Day Review (Summer 2020)

- ✓ Notice of Completion
- ✓ Provide public opportunity to review

Stay involved and provide your feedback….

Visit us at **weatheringthestorm.ca**

Email us at: **info@weatheringthestorm**

Follow us on: CityofWindsor @CityWindsorON

City of Windsor
SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

Public Information Centre No. 2- Comment Form

Your participation in the *Windsor Sewer and Coastal Flood Protection Master Plan* will improve the results and help us create a plan that we can implement together. Please take a few minutes to provide us with your thoughts and comments on the following questions. Thank you for your input.

Please complete your form and drop a copy in the comment box today or scan a copy at home and e-mail us at **info@weatheringthestorm.ca.**

1. **Please provide your name and contact information to be added to the project contact list.**

Name ______________________________ Email ______________________________

Address ______________________________ Phone ______________________________

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

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3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.

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4. Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?

____

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5. Other comments, questions or suggestions?

____

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6. In the future, how would you like to be notified about project updates or upcoming events related to this project?

- ○ Project Website (weatheringthestorm.ca)
- ○ Email
- ○ Mail Outs (Letters and/or Flyers)
- ○ **Newspaper**
- ○ **Other:** ________________________

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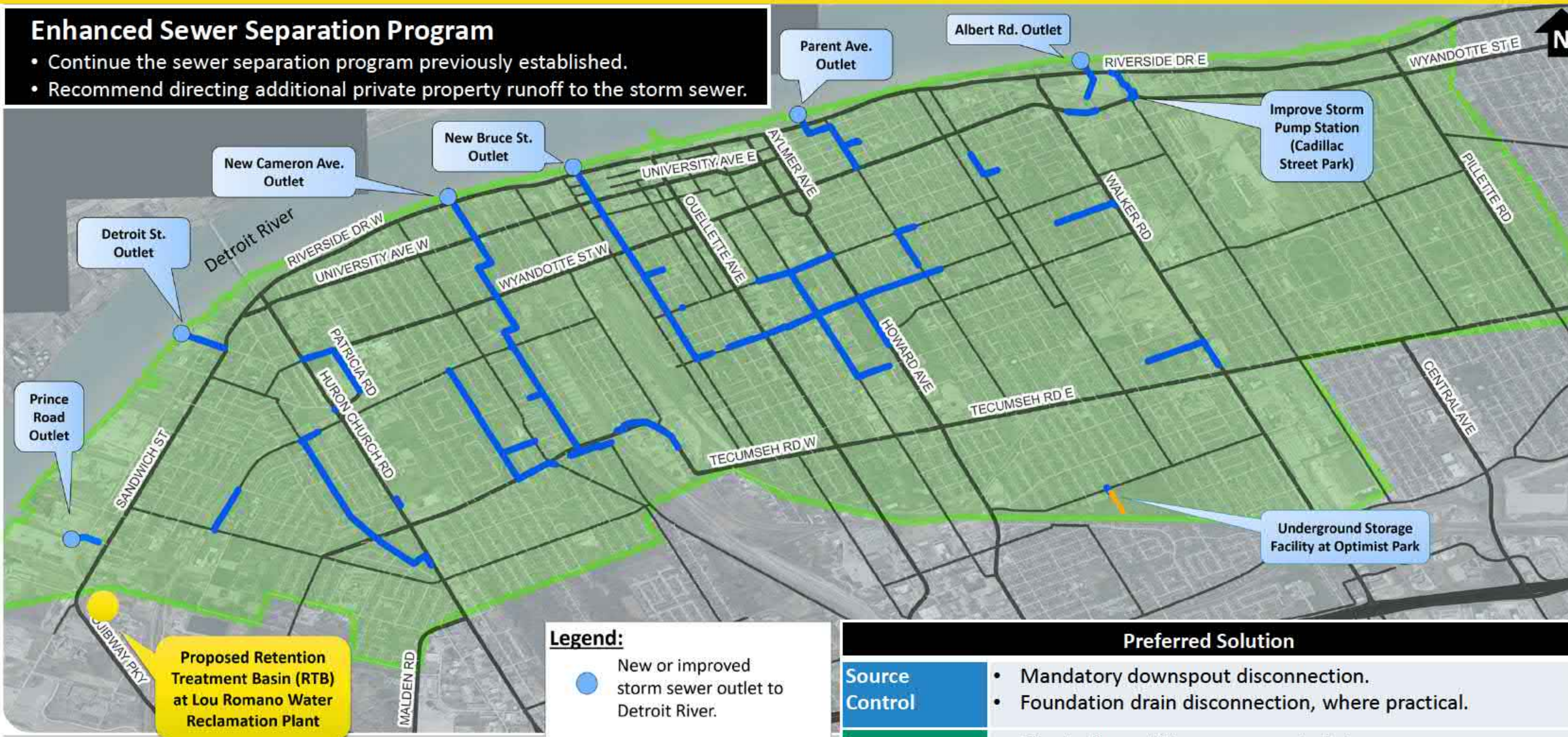
Central Area – Preliminary Preferred Solutions

Enhanced Sewer Separation Program

- Continue the sewer separation program previously established.
- Recommend directing additional private property runoff to the storm sewer.



Legend:

- New or improved storm sewer outlet to Detroit River.
- Proposed storm trunk sewer improvements.
- Underground SWM Storage Facility
- Combined sewer area.

Preferred Solution	
Source Control	• Mandatory downspout disconnection. • Foundation drain disconnection, where practical.
Improve Sewer System	• Direct all runoff to new separated storm sewers. • Construct storm sewers along all roadways. • Direct alley drainage to storm sewer.
Improve Outlet	• Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant to better management of wet weather flows and reduce frequency of combined sewer overflows.

Refer to detailed summary handout for more information.

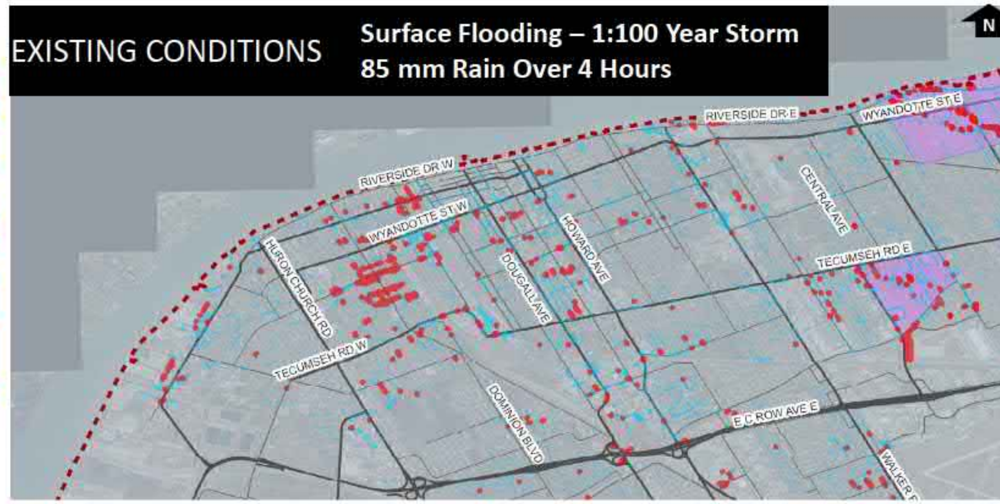
Central Area – Benefit

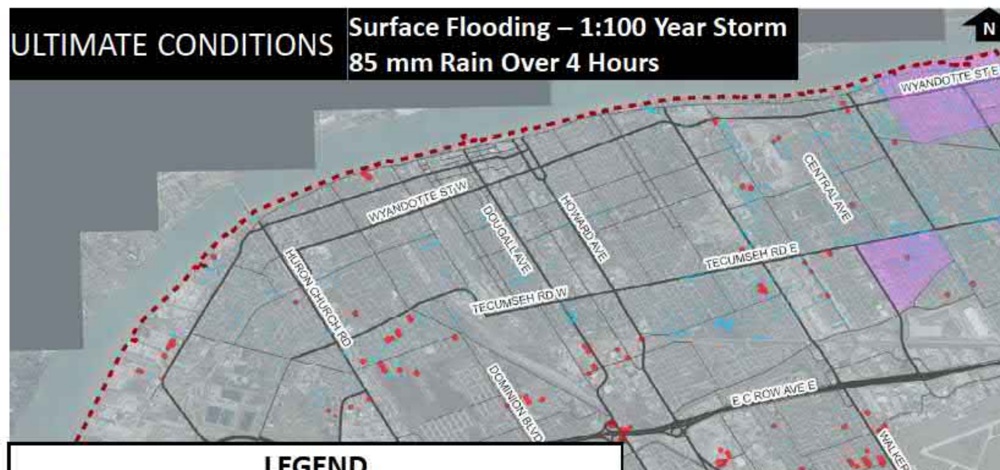
Enhanced Sewer Separation Program

Basement Flood Risk Areas:

LEGEND	
Basement Flood Risk Areas Sewer Surcharging Within 1.8m (6ft) of the Ground Surface	50 mm rain (1:5 Year Storm)
	65 mm rain (1:25 Year Storm)
	85 mm rain (1:100 Year Storm)

Surface Flooding Risk Areas:



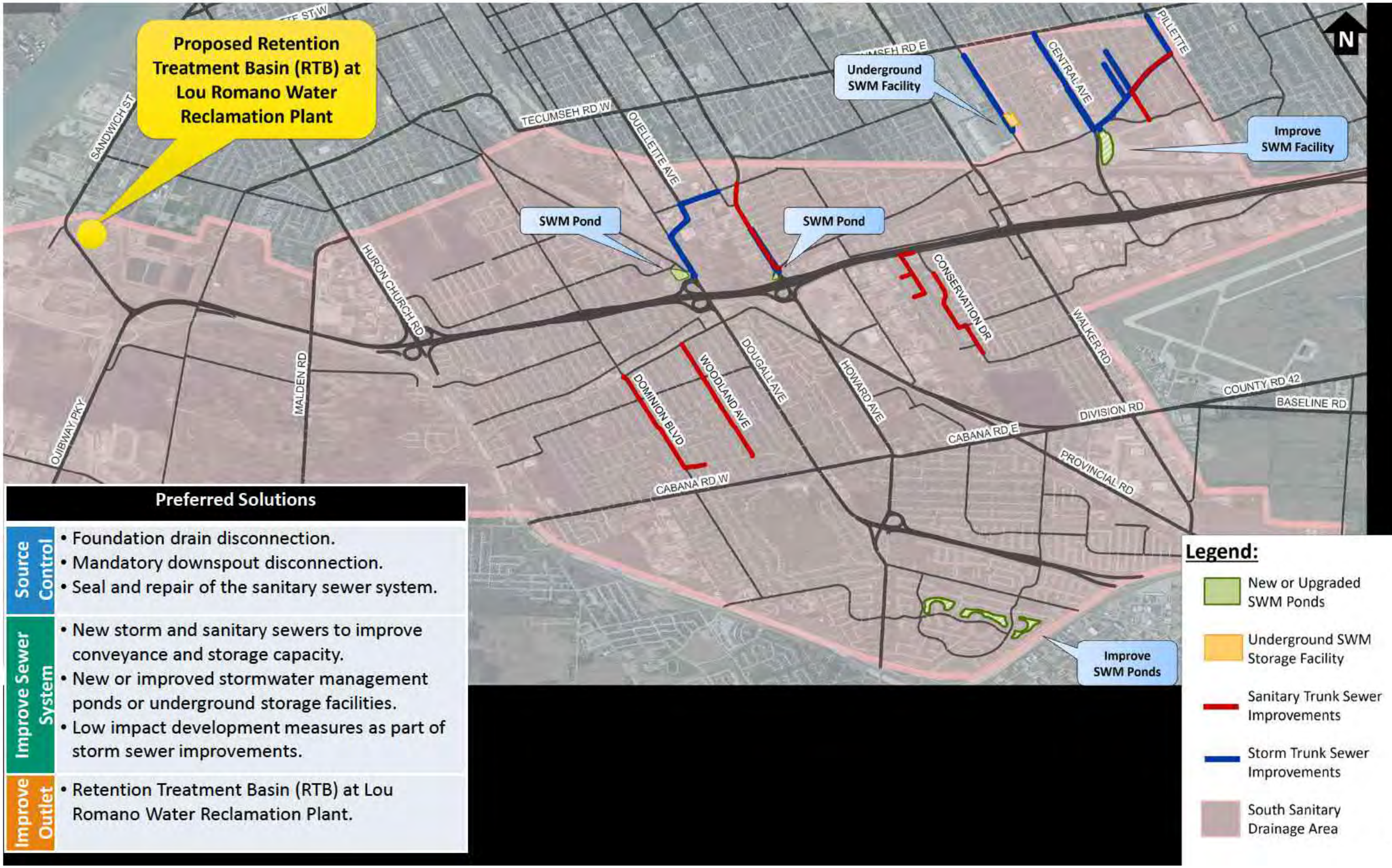


LEGEND
Surface Flooding Greater than 30 cm (1 ft)
Surface Flooding less than 1 foot 30 cm (1 ft)
Regional Surface Flooding Problem Areas

DILLON CONSULTING

Aquafor Beech

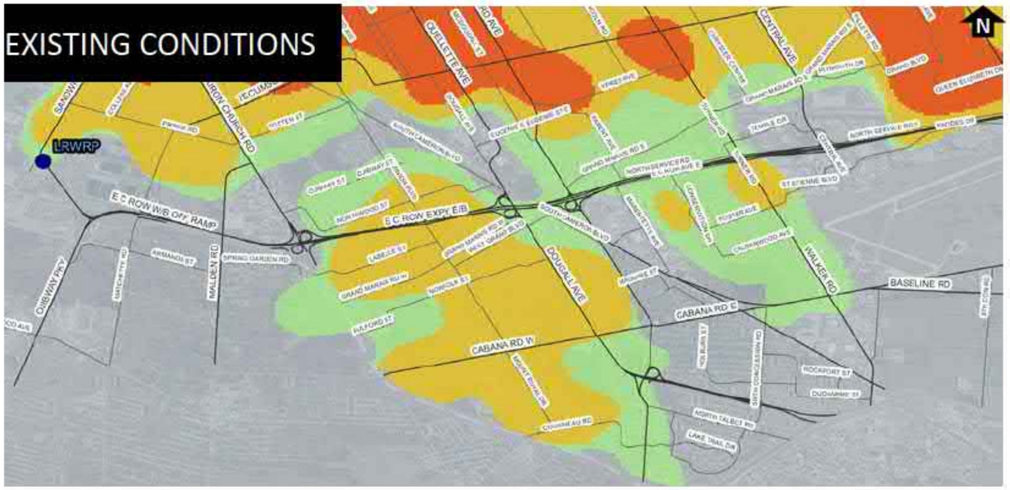
South Area – Preliminary Preferred Solutions



Preferred Solutions	
Source Control	• Foundation drain disconnection. • Mandatory downspout disconnection. • Seal and repair of the sanitary sewer system.
Improve Sewer System	• New storm and sanitary sewers to improve conveyance and storage capacity. • New or improved stormwater management ponds or underground storage facilities. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant.

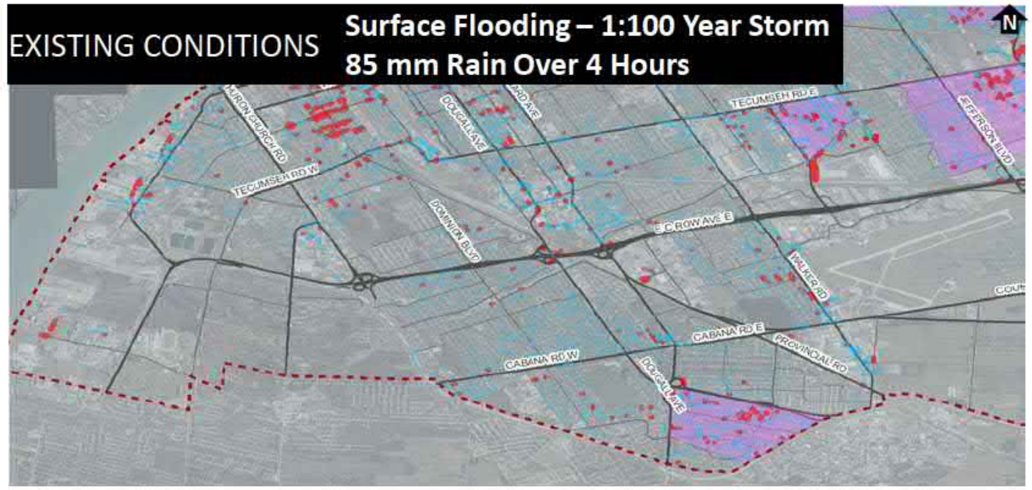
South Area – Benefit

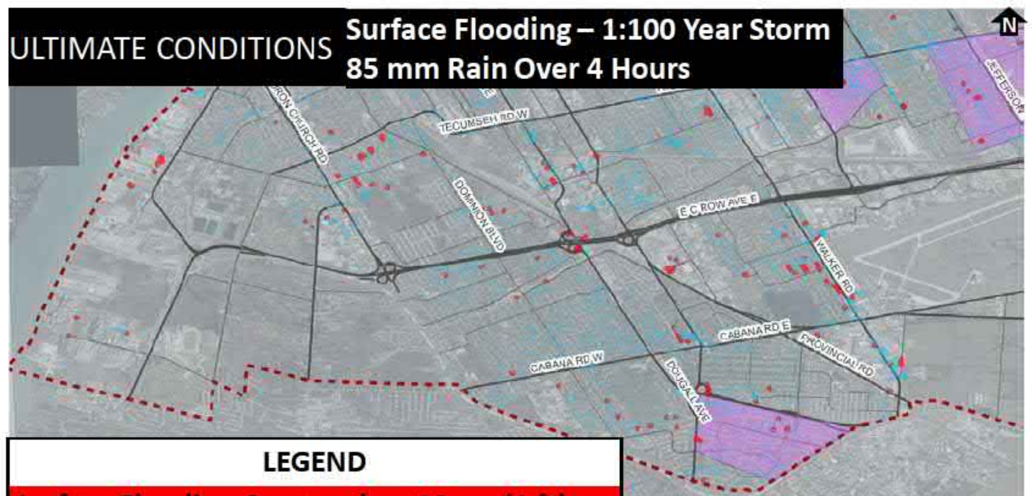
Basement Flood Risk Areas:



LEGEND	
Basement Flood Risk Areas Sewer Surcharging Within 1.8m (6ft) of the Ground Surface	50 mm rain (1:5 Year Storm)
	65 mm rain (1:25 Year Storm)
	85 mm rain (1:100 Year Storm)

Surface Flooding Risk Areas:





LEGEND
Surface Flooding Greater than 30 cm (1 ft)
Surface Flooding less than 1 foot 30 cm (1 ft)
Regional Surface Flooding Problem Areas

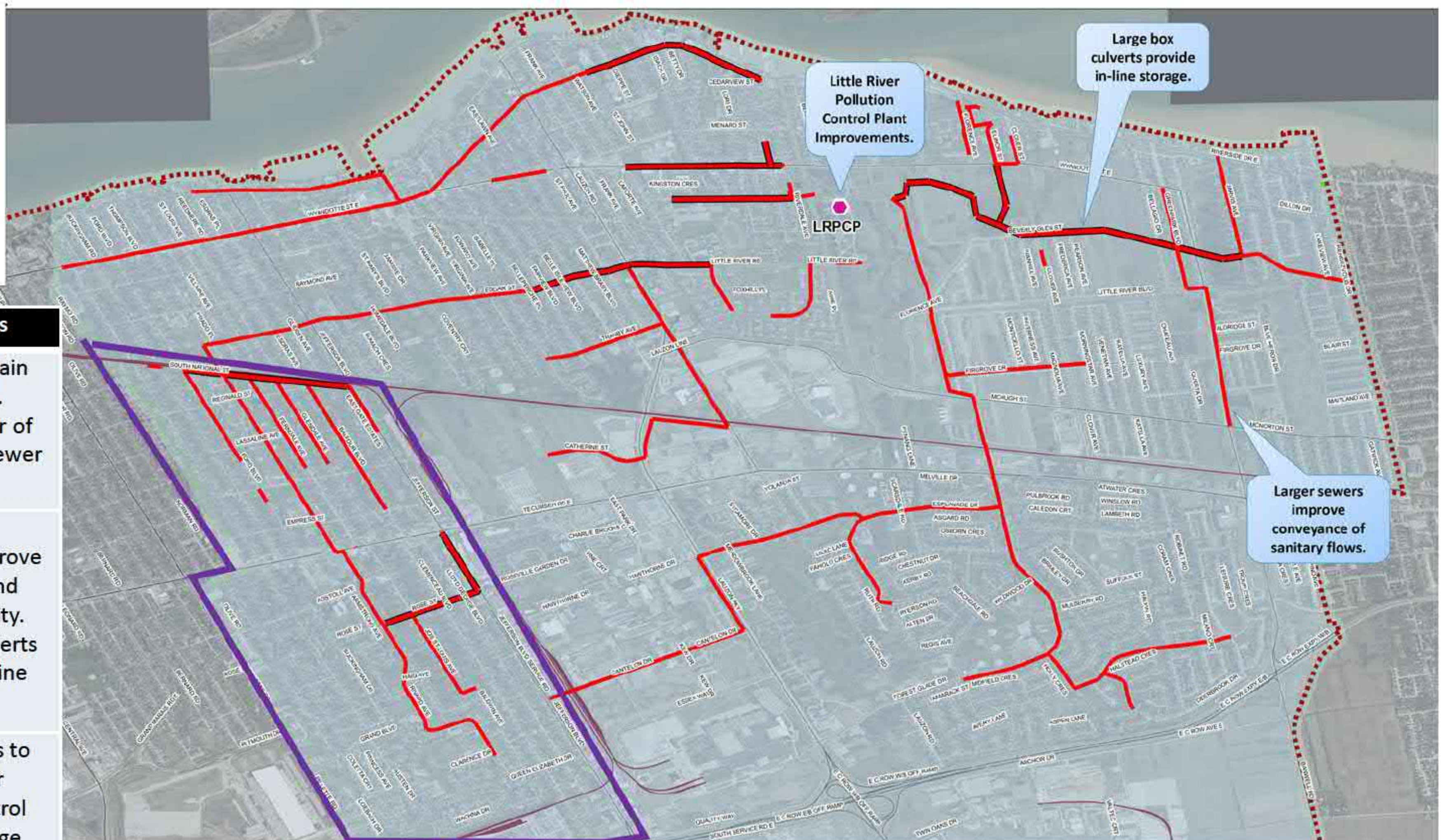
East Area – Preliminary Preferred Solutions (Basement Flooding)

Legend:

- Sanitary Trunk Sewers
- Large Sanitary Box Culverts
- East Windsor Drainage Area

Preferred Solutions	
Source Control	• Foundation drain disconnection. • Seal and repair of the sanitary sewer system.
Improve Sewer System	• New sanitary sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage.

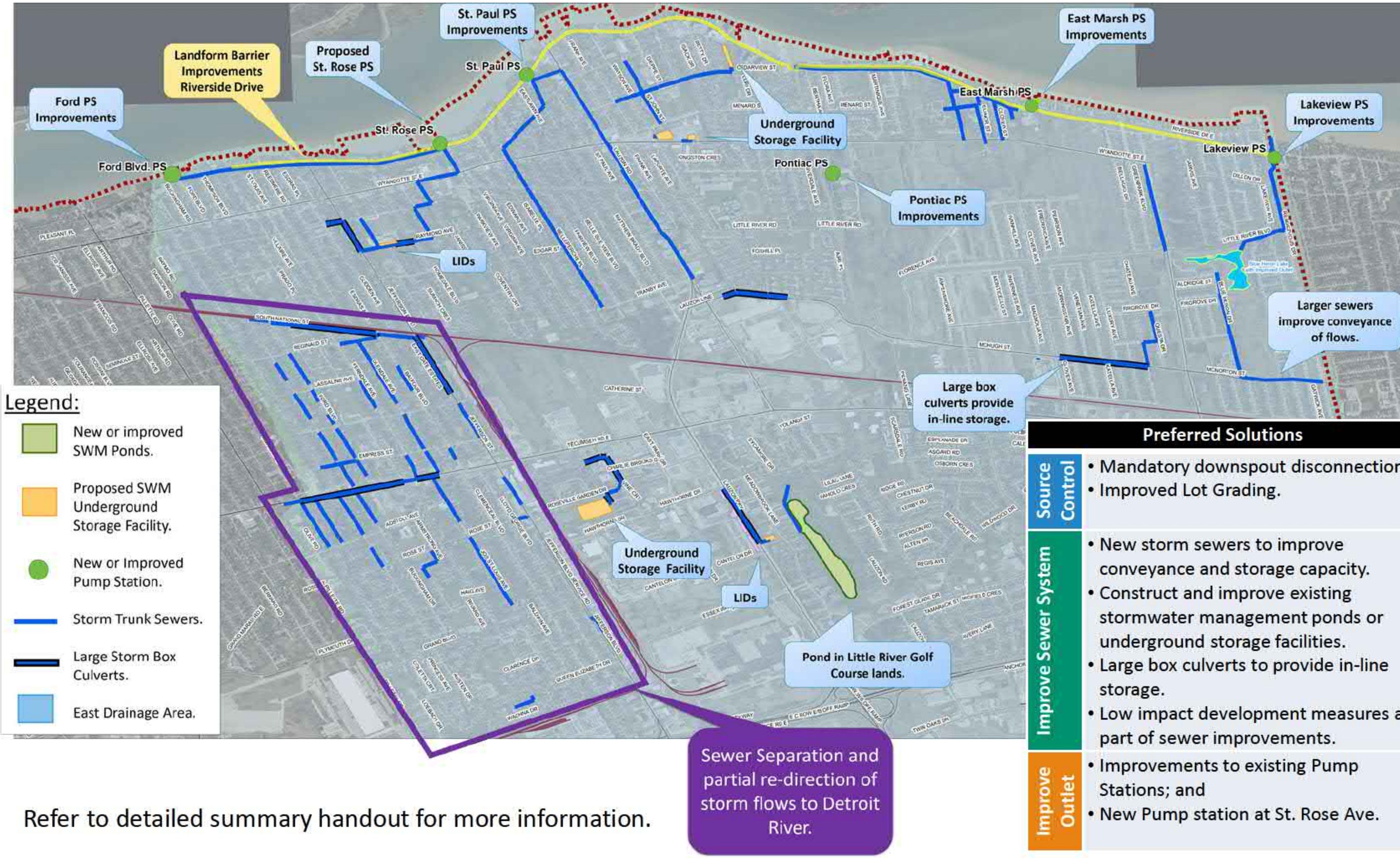
Improve Outlet	• Improvements to the Little River Pollution Control Plant to manage wet weather flows.
	  • Improve existing bypass; OR
	  • Expand the plant treatment capacity.



Sewer Separation and partial re-direction of storm flows to Detroit River.

Refer to detailed summary handout for more information.

East Area – Preliminary Preferred Solutions (Surface Flooding)

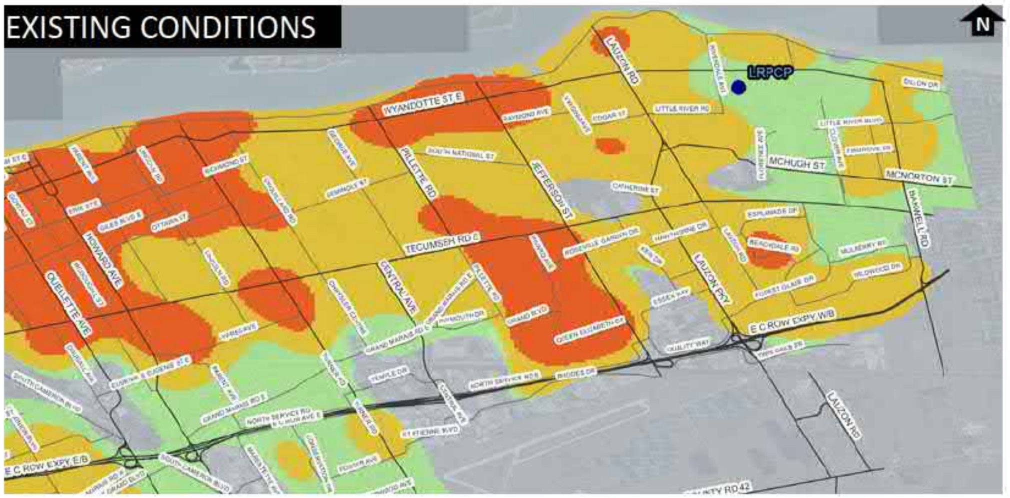


	Preferred Solutions
Source Control	• Mandatory downspout disconnection. • Improved Lot Grading.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Construct and improve existing stormwater management ponds or underground storage facilities. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements.
Improve Outlet	• Improvements to existing Pump Stations; and • New Pump station at St. Rose Ave.

Refer to detailed summary handout for more information.

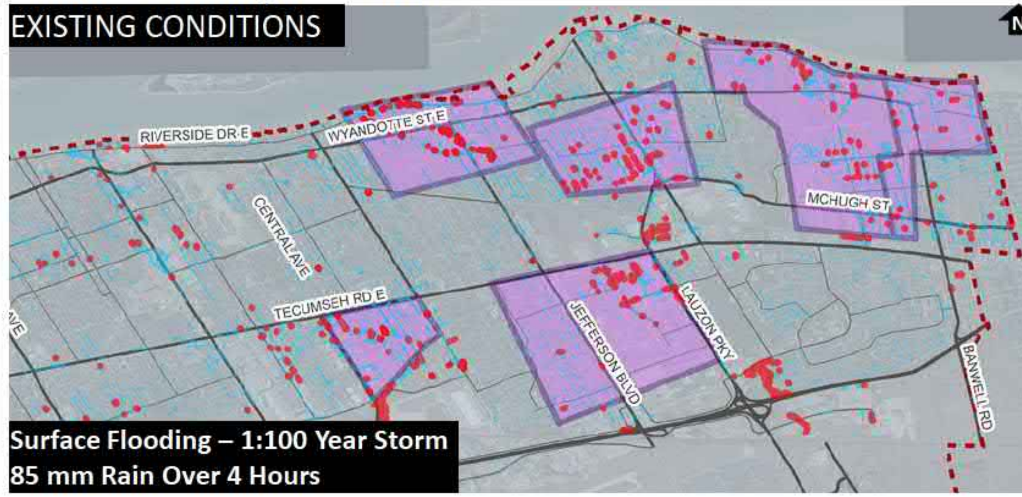
East Area – Benefit

Basement Flood Risk Areas:



LEGEND	
Basement Flood Risk Areas	50 mm rain (1:5 Year Storm)
Sewer Surcharging Within 1.8m	65 mm rain (1:25 Year Storm)
(6ft) of the Ground Surface	85 mm rain (1:100 Year Storm)

Surface Flooding Risk Areas:



LEGEND
Surface Flooding Greater than 30 cm (1 ft)
Surface Flooding less than 1 foot 30 cm (1 ft)
Regional Surface Flooding Problem Areas

Public Information Centre No. 2 – Supplementary Solution Alternative Evaluation Packages

In addition to the Public Information Centre No. 2 Displays included in this appendix, four additional information packages were available for public review. These packages show the individual project alternatives, level of service criteria, evaluations, preliminary recommended solutions and individual solution maps for all projects. These documents are available for download from the project website at weatheringthestorm.ca.

THE CITY OF WINDSOR ONTARIO, CANADA

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

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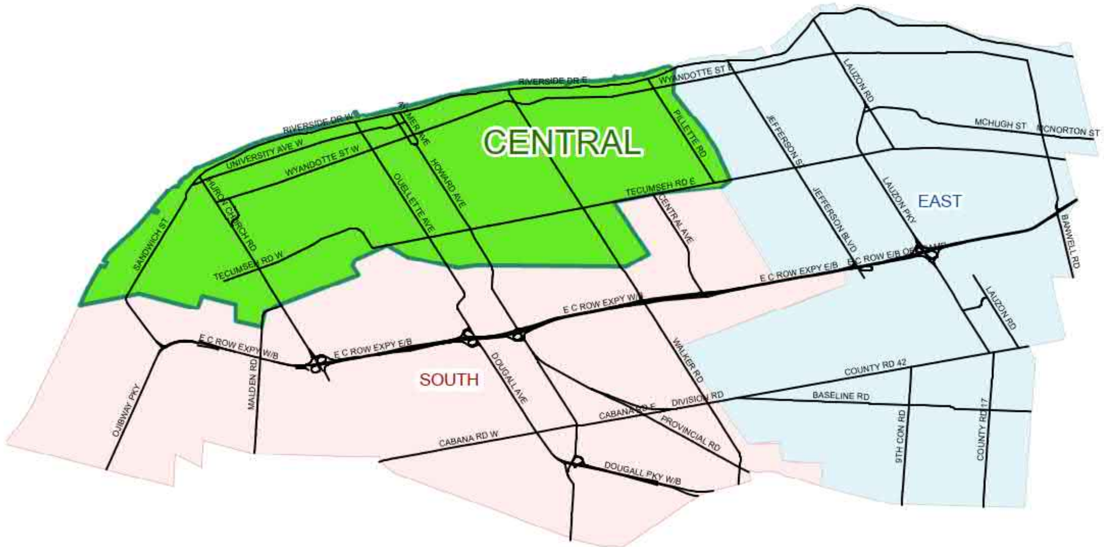
Central Windsor Preliminary Preferred Solution Summary

FEBRUARY 2020



Presented by:

DILLON CONSULTING

Aquafor Beech Limited

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THE CITY OF WINDSOR ONTARIO, CANADA

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

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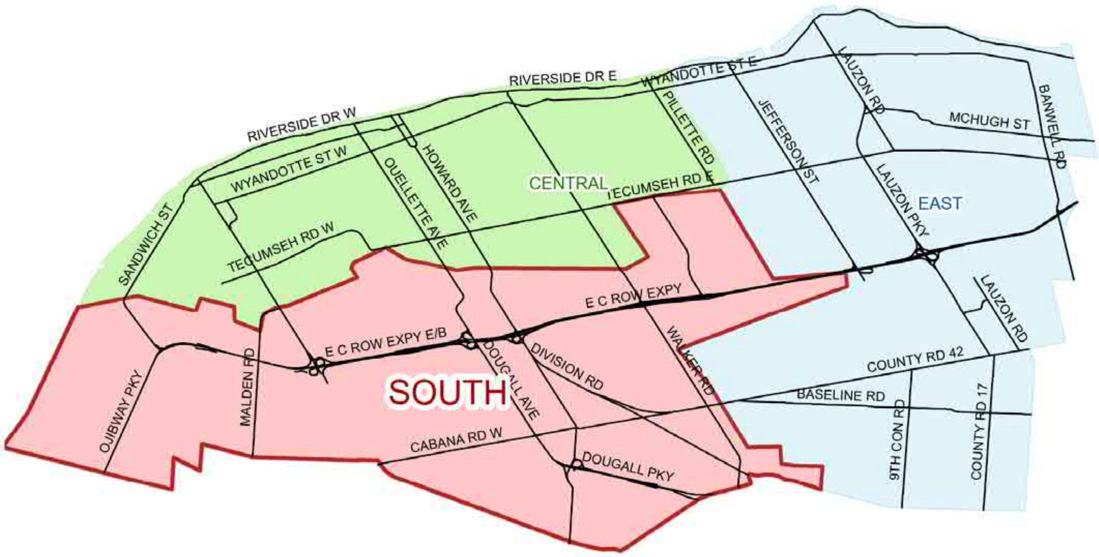
SOUTH WINDSOR PRELIMINARY PREFERRED SOLUTION SUMMARY

FEBRUARY 2020



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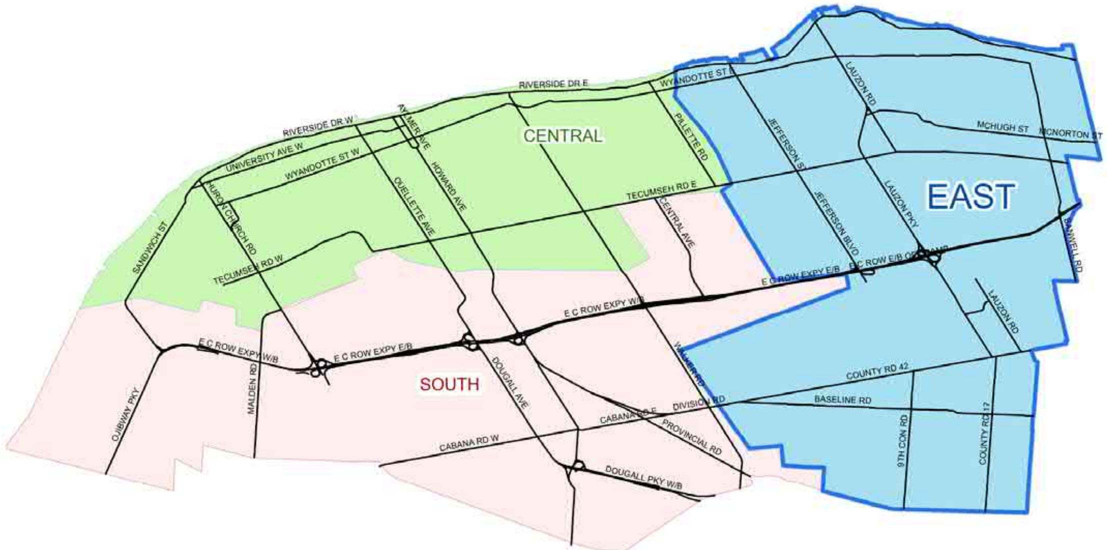
City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

EAST WINDSOR PRELIMINARY PREFERRED SOLUTION SUMMARY

FEBRUARY 2020



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DILLON CONSULTING

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

Riverside Drive East (Ford Blvd To East City Limits) Landform Barrier Preliminary Preferred Solution Summary

February 2020

Presented by: DILLON CONSULTING Aquafor Beech

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City of Windsor

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Public Information Centre No. 2- Comment Form

Your participation in the *Windsor Sewer and Coastal Flood Protection Master Plan* will improve the results and help us create a plan that we can implement together. Please take a few minutes to provide us with your thoughts and comments on the following questions. Thank you for your input.

Please complete your form and drop a copy in the comment box today or scan a copy at home and e-mail us at **info@weatheringthestorm.ca.**

1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted] m

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Pumping station should be located @ St Rose & Wyandotte
1- Does not "eliminate" the park
2- Destroy the asthetics of the neighbours
3- Would be placed in a commercial vs residential area
4 impact of industrial generator and pumps on surrounding structures

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

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4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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5. **Other comments, questions or suggestions?**

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6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

- O **Project Website (weatheringthestorm.ca)**
- O **Email**
- O **Mail Outs (Letters and/or Flyers)**
- O **Newspaper**
- O **Other:** ____________________

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Name [redacted]

Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

PRESENTATION SHOWING WATER LEVELS AT VARIOUS HIGHTS OF WATER SEEM TO BE THE BIG STOREY 176.5M. IS A HUGE WARNING! EVERYONE SHOULD BE VERY CONCERNED.

WE EXPACT TO HAVE. THE. EXPANSION OF THE PROJECT AT OUR HOME. RIVERSIDE AT WATSON.
PLEASE KEEP US INFORMED AND UPDATED THANK YOU.
CHEERS.

THE CITY OF WINDSOR   Aquafor Beech   DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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Name [redacted]

Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

THE BEST SOLUTION is

MANDATORY DOWNSPOUT DISCONNECTION!!

STORMS are going to get WORSE

BECAUSE OF CLIMATE CHANGE

TORONTO HAS MANDATORY DOWNSPOUT DISCONNECTION!

SO DOES DETROIT!

WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

TERRIBLE FLOODING FROM SEWERS!
I LOST OVER $10,000 WORTH OF MERCHANDISE

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

- SUMP PUMP
- BACK-UP VALVE
- LIBERTY SYSTEM

5. **Other comments, questions or suggestions?**

MAYOR AND COUNCIL SHOULD DO THEIR JOB AND FORCE MANDATORY DOWNSPOUT DISCONNECTION

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

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- ☑ **Email**
- O **Mail Outs (Letters and/or Flyers)**
- ☑ **Newspaper**
- O **Other:** ______________

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City of Windsor
SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

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1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

THE WATER LOT BETWEEN 7320 & 7280 IS NOTHING MORE THAN A COLLECTOR OF GARBAGE & DEBRIS FROM THE RIVER.

SUGGEST THAT A PILING WALL BE CONSTRUCTED IN THE LINE OF THE EXISTING NORTH PILING WALLS AT 7320 & 7280 THEN FILL IN THIS ENTIRE AREA TO THE NECESSARY LEVEL. ALSO BERM ALONG THE SEAWALL AT 7280 & 7250 SO THESE PROPERTIES ARE PROTECTED.

PLEASE A TOPO MAP OF 7250 TO 7380 SO I CAN DISCUSS WITH THESE NEIGHBOURS.

D. Woodall

THE CITY OF WINDSOR Aquafor Beech Limited DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

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4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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5. **Other comments, questions or suggestions?**

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6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

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1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Ward 7 (Forest Glade, Banwell, East Riverside) is at risk for further flooding. This isn't a secret. The 2020 Budget passed in January. Currently I am in campaign mode. I need to assure Ward 7 Citizens they are being taken care of ASAP!

What can I say about anti flooding measures for basements? This is a huge concern for people. I want everyone to be informed with detail.

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

My home was fine.
My car wasn't. Had to get a new one.

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

My home is at a good elevation point, as are the homes of my neighbors. However, I worry about a repeat of 2017. This is everyone's #1 concern!

5. **Other comments, questions or suggestions?**

Tell the public every week what is being done.
Updates are crucial.

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

- [ ] Project Website (weatheringthestorm.ca)
- [x] Email
- [x] Mail Outs (Letters and/or Flyers)
- [ ] Newspaper
- [ ] Other: ______________________

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

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1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Your representative was very helpful answering my questions

However my question that I've been asking since 2016 still could not be answered - "How do I get an overview (map) of the perameters of areas draining to Blue Heron Lake"

We were told conflicting answers over the last 3 yrs ie. Approved plaza, 2 4story apts + 2 2storey townhomes at McNorton + Banwell would be the last to feed into Blue Heron". Now we're told that the three 7 story condominiums will drain into Blue Heron also" Thank you

WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

2016 - 8" basement flooding - our road never flooded but the rear yards were a lake.

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

back up, over flow, stronger sump pump, battery back up, extensions on overflow and downspout - 10' away from foundation - front down spout under sidewalk into flower bed has been extended over 6' into a [illegible] system [illegible] water flows out front lawn

5. **Other comments, questions or suggestions?**

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

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- ☑ Email
- ○ Mail Outs (Letters and/or Flyers)
- ○ Newspaper
- ○ Other: ____________________

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

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Name [redacted]

Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

YOUR PRESENTATION MAKES IT CLEAR THAT THE PROPOSED LOWER BERM HEIGHT ALTERNATIVE WILL PROBABLY BE INADEQUATE. I THINK YOU SHOULD BE USING THE HIGHER BERM.

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

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4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Why is the City-owned crumbling breakwall not being addressed

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

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4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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Name [redacted]

Address [redacted] .m

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

- Riverside Dr residents on north side
- be involved in a discussion about re-inforced protection for the advancement of the river

CONSIDER:

- subsidize and/or encourage north side residents to invest in protection of shoreline

The City seems to have concluded the situation will get worse. This berm could be as useless as the one at the Scarsatchio Trail built nearly 40 yrs. ago. How does this impact Vista?

WINDSOR Aquafor Beech DILLON CONSULTING

3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.

only flooding we have had is from the road side

4. Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?

pumps., back flow.

5. Other comments, questions or suggestions?

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2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Suggest that they build the higher landform elevation 1st time - don't do it twice - think long-term future.

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.

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4. Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?

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   Name [redacted]

   Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

   Would like to be notified regarding breakwall condition, repairs, and council report when made public for review.

WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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Name [redacted] n

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.** [redacted]

- provide [redacted] info on whether or not property acquisition is required as part of Riverside Vista project.

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

- Water under the house - crawl space
2016 flood - cleared a few hours later
- same some time around [redacted] - high water.

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

5. **Other comments, questions or suggestions?**

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Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

"No" solution provided for Residents on waterfront properties. I find this dissappointing that Nothing has been offered to these Residents - myself included. We Also pay taxes to city but seemed to be left out to fend for ourselves.
Water levels are high and go over breakwall, some neighbors More than others. Even if we raise our location we are still at the mercy of the neighbours who choose not to fix and/or elevate their breakwall or Burm.
* It would be nice to have breakwall elevated for all residents in area.

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3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

Rainfall has caused flooding in yard (front and back).
High lake/River levels are going over breakwall and eroding ~~lawn~~ / berm.

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

Tried to place retaining wall at end of property (before cement walkway at breakwall)
-> Waves have already damaged retaining wall knocking it down.

5. **Other comments, questions or suggestions?**

-> residents along riverside Dr on waterfront could use assistance in putting up a higher breakwall. NOTE: Some of the residents/neighbours breakwalls are already eroding and water will eventually get through and will flood all residents along lakefront area
* water will travel down eroded berm.

RB

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

- O **Project Website (weatheringthestorm.ca)**
- O **Email** ✓
- O **Mail Outs (Letters and/or Flyers)**
- O **Newspaper**
- O **Other:** ✓ sure, if there is anything you can do to help us too.

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Name [redacted]

Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Landform Barrier Elevations:
the preferred elevation should be changed to the higher land barrier elevation.
Do the job once.

3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.

4. Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?

5. Other comments, questions or suggestions?

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Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

- Please prioritize sewer separation in the Central Windsor area in such a way that minimizes polluted water (~~e~~ combined sewer overflows) entering the Detroit River.
- Prioritize separation of combined sewers ~~over~~ separation of dual manhole sewers.
- Prioritize construction/use of open drains (as opposed to pipes) where feasible (e.g., to outfall at McKee Creek ~~S~~, College ave ~~S~~, Detroit St.)

p18 • Re. Ypres Ave, I prefer alternative #2 (surface flooding at Optimist Park woodlot), creating a swamp forest vegetation community

p7 • Re. Basement flooding risk reduction, I prefer alternative 1, with more (much more) effort on Low Impact Development design elements to encourage infiltration of stormwater into the soil.

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

n/a; rain garden floods during heavy rain events, however, this is intentional (same with a section of rear yard where rain barrel overflow is directed)

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

YES 1) Rain garden in front lawn to allow infiltration of roof runoff. 2) permeable pavers in front + back yard. 3) downspout disconnection of 2/3 downspouts. 3) drywell and infiltration trench in rear yard. 4) rain barrel, 5) gravel parking area.

5. **Other comments, questions or suggestions?**

• re Dougall Ave alternatives, I prefer alternative 1, due to wildlife habitat potential of that site.
• re Howard Ave and Chrysler Centre improvements, I prefer neither of the alternatives and would prefer aboveground stormwater ponds in close proximity to Grand Marais Drain (for wildlife benefits)
(Same Central, Pillette & Regional 7 Area) → Alt #3 preferred.

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Name [redacted]

Address

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

For the most part I like the plan, however, there are two issues I see at first glance. Your recommendations to have personal property waters redirected to sewer systems seems to be a way to "tax" the system: Wiser to direct property owners to modify property whenever possible. Creating rain gardens, planting trees and shrubs, etc. This introduces my second issue; the Parks Department (and others) should be providing examples for the residents to mimic. I have "carved" the clay surrounding my property with a fish pond, 3 small pond areas that dry after a few hours, and another that will retain the overflow for a week or more. I believe in planting plants next to foundations rather than sidewalks, and driveways. The more trees and larger plants the more water will be naturally absorbed rather than transported to a sewer that will require both enhanced pipes and pump stations. Just a thought!

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3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

Basement flooding due to two faulty eaves between the houses. Basement cracks, water floods in. Being a renter I had no control over eavestrough repairs.

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

- landlord has since disconnected downspout (but never repaired eaves) with an overflow outlet which flooded the front yard & sidewalk until I dug a hole in the clay, lined it with rocks and now it captures the water.

5. **Other comments, questions or suggestions?**

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- ☑ Mail Outs (Letters and/or Flyers)
- ○ Newspaper
- ☑ Other: RADIO + BUS ADS (inside)

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Name A [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

The preferred method makes sense.
It would also be good if all municipalities in Essex Co. and the City of Windsor could coordinate their coastal flood protection Master Plan in terms of investment infrastructure in areas of current shared use and future development

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

5. **Other comments, questions or suggestions?**

Good Presentation

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

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Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

There are 3 properties East of my address that have removed thier water front berm. Are there any plans to re-install the berms or can the City of Windsor force the home owner to replace the berm?

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3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

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Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

All the actions that have been proposed look sensible and should be effective if water levels in the Detroit River are within predictions.
The time frame of the changes and improvements seems to be too long considering the current levels of Lake St Claire and the Detroit River.
Are the projects shown funded by all levels of government or only by City of Windsor?

3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.

Basement flooded in storm of Sept 2016

4. Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?

- Had sump well and pump installed with battery backup.
- Had backwater valve installed.
- All downspouts are disconnected.

5. Other comments, questions or suggestions?

6. In the future, how would you like to be notified about project updates or upcoming events related to this project?

- [x] Project Website (weatheringthestorm.ca)
- [ ] Email
- [ ] Mail Outs (Letters and/or Flyers)
- [x] Newspaper
- [ ] Other: ______________________

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

Public Information Centre No. 2-
Comment Form

Your participation in the *Windsor Sewer and Coastal Flood Protection Master Plan* will improve the results and help us create a plan that we can implement together. Please take a few minutes to provide us with your thoughts and comments on the following questions. Thank you for your input.

Please complete your form and drop a copy in the comment box today or scan a copy at home and e-mail us at **info@weatheringthestorm.ca.**

1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

- Please consider putting the pumping station at St. Rose & Wyandotte. The Park is an important part of our neighborhood.
- Can you please send me a rendering of the current plan for the pumping station? Thank you
- Who Did the study for the city?

THE CITY OF WINDSOR   Aquafor Beech   DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

5. **Other comments, questions or suggestions?**

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

- O **Project Website (weatheringthestorm.ca)**
- O **Email**
- O **Mail Outs (Letters and/or Flyers)**
- O **Newspaper**
- O **Other:** ______________________

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

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1. **Please provide your name and contact information to be added to the project contact list.**

   Name [redacted]

   Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

   ST ROSE BEACH IS LOGICAL SITE
   HOWEVER. THINK THIS SHOULD BE REGARDED
   AS A CHALLENGE IN ORDER TO PLACE THIS
   OTHER SIDE OF PARK WHERE IT WILL NOT
   IMPACT THE RIVER PROPERTIES THAT EXIST -
   ALSO - TO KEEP THE STRUCTURE WITH THE LOWEST
   PROFILE POSSIBLE.
   UNDERSTAND WATER HAS TO BE DEALT WITH
   BUT SURE PLANNERS WILL COME UP WITH
   SOMETHING BETTER THAN IS BEING OFFERED AT
   THE MOMENT

THE CITY OF WINDSOR Aquafor Beech DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

NONE

NO BASEMENT OR CRAWL SPACE

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

NO

5. **Other comments, questions or suggestions?**

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

- ○ Project Website (weatheringthestorm.ca)
- ● Email
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1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

1) Protection to ensure rising level of water in Detroit river does not cause surface flooding in our area

2) Improved drainage to stop creation of Lake Jefferson during heavy rain

3) Anything that can be done to lower the ground water level in the area as we have concerns about water coming in from underneath the foundation

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

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1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address [redacted]

2. **Please comment on the preliminary preferred alternatives and/or solutions that have been presented.**

Living in far East End - beside getting higher berms & we won't see any major sewer work done for probably 10 - 20 years.
I am more concernd now about surface water flooding in my area.
The back water valve program assistance from the city helped the sewer back up problem.
My pump do not even go on now during storm.

THE CITY OF WINDSOR · Aquafor Beech · DILLON CONSULTING

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event or high lake/river levels.**

Rainfall event ~ foot water in basement 2016

" 4 in Water " 2010

4. **Do you have any flood proofing measures already installed on your property, either internally or externally? (YES/NO) If yes, can you provide a description of these measures?**

2016 - Back water valve + new sump pump w/backup

5. **Other comments, questions or suggestions?**

6. **In the future, how would you like to be notified about project updates or upcoming events related to this project?**

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- ○ Email
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- ○ Other: ______________________

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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN – PIC STAFF COMMENT FORM
WINTER 2020

PIC Date:	Feb 11, 2020
Name of Note-Taker:	Ian Wilson
Name of Commenter:	
Contact Information of Commenter:	
Role of Commenter (if applicable, e.g., Councillor):	

Issues, concerns, or follow-up items raised during the PIC:

Concerns about flow under parkway

GMD is the system purpose

was the pump running

email: jesewell@sympatico.ca JOHN SEWELL

azahorouski@gmail.com Alan Zahorouski

- Question: about GMD & Herb Gray Parkway impact

WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN – PIC STAFF COMMENT FORM
WINTER 2020

PIC Date:	
Name of Note-Taker:	
Name of Commenter:	
Contact Information of Commenter:	
Role of Commenter (if applicable, e.g., Councillor):	

Issues, concerns, or follow-up items raised during the PIC:

- Esdras / property
  ↳ move berm to RoW, reduce Riverside Dr. width.

WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN – PIC STAFF COMMENT FORM
WINTER 2020

PIC Date:	Feb 12
Name of Note-Taker:	Karla Kolli
Name of Commenter:	
Contact Information of Commenter:	
Role of Commenter (if applicable, e.g., Councillor):	

Issues, concerns, or follow-up items raised during the PIC:

- Council/city should let residents know what is being done this year, especially given high water levels

- should have more consultation w/ homeowners on north side of Riverside. They are 1st line of defense + if shore can be protected berm is not needed

MASTER PLAN
Riverside Drive East/East Riverside Area
Coastal Flood Protection Property Owner Meeting
Comment Form

degrees of CHANGE

Your participation in the Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting will be valuable in improving our common understanding of the issues, opportunities and constraints that are being considered in evaluating the alternative solutions.
Please provide us with your thoughts and comments on the following questions.
Thank you for your input.

Please complete your form and drop it in the comment box today at the PIC, or scan and e-mail it to us at info@weatheringthestorm.ca.

1. **Please provide your name and contact information to be added to the project contact list.**

Name __

Address

2. **Please indicate if your comments apply to a specific area, or all areas:**

AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
⊗	○	○	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

1986 Coastal flooding from Detroit River

Urban flooding: 9/30/16-17.5" flood depth @ carport & house; 8/24/17 - 21.0" depth @ c/h;

8/25/17 - 21.0" depth @ carport/house; 9/26/18 - 13.3" depth at carrport/house; 4/30/18 - 12.0"

depth @ carprt/house.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

Alternate solutions are well presented, what about private/public propsosals?

The preliminary preferred proposals could be challenged in court since they exhibit preferencial

and unequal treatment of property owners.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

All of your public proposals to protect Windsor from high lake & river levels are sacrificing all the homes north of Riverside Drive, from Ford Blvd. to the eastern boundary of Windsor. Protection of these properties requires private funding by the property owners. This is double dipping! You want them to help pay the public funding proposals via property taxes & at the same time pay for private protection of their owm properties.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

See Attachment , Item#1.

7. **Other comments, questions or suggestions?**

See Attachment, Item #2.

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	○	X	○

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ATTACHMENT

ITEM #1:

1986: Raised height of breakwall & grade of property. Successful so far, but concerned about the future.

2019: Installed new drainage system at both property lines to compensate for the inadequate Windsor storm sewer system & run off from improper street design/grade & the run off from the adjacent properties.

The new system consists of 4 new catch basins connected via 6" diameter sewage pipes to 3 new pump basins near the breakwall containing 2 x 2.0 HP sewage pumps with automatic, alternating cycle control panel. This in addition to an existing 0.5 HP sewage pump in a fourth pump basin, now tied in to the new system.

A16 kW standby generator was installed to insure continuous electrical power the the pumps.

ITEM #2:

To reiterate: your proposals render all properties north of Riverside Drive perishable, requiring private investment for protection. With this as preamble, I'd like to address my primary area of concern, Ford Blvd to St. Rose. Again, why not consider private/public investment to address this area?

For example. A contiguous breakwall at the 176.45m level from St. Rose to Ford Blvd would eliminate the need for a 176.45m northside berm in this area; thus eliminating the need to acquire residental properties to avoid structure conflicts, landscape conflicts, tree conflicts & their associated costs.

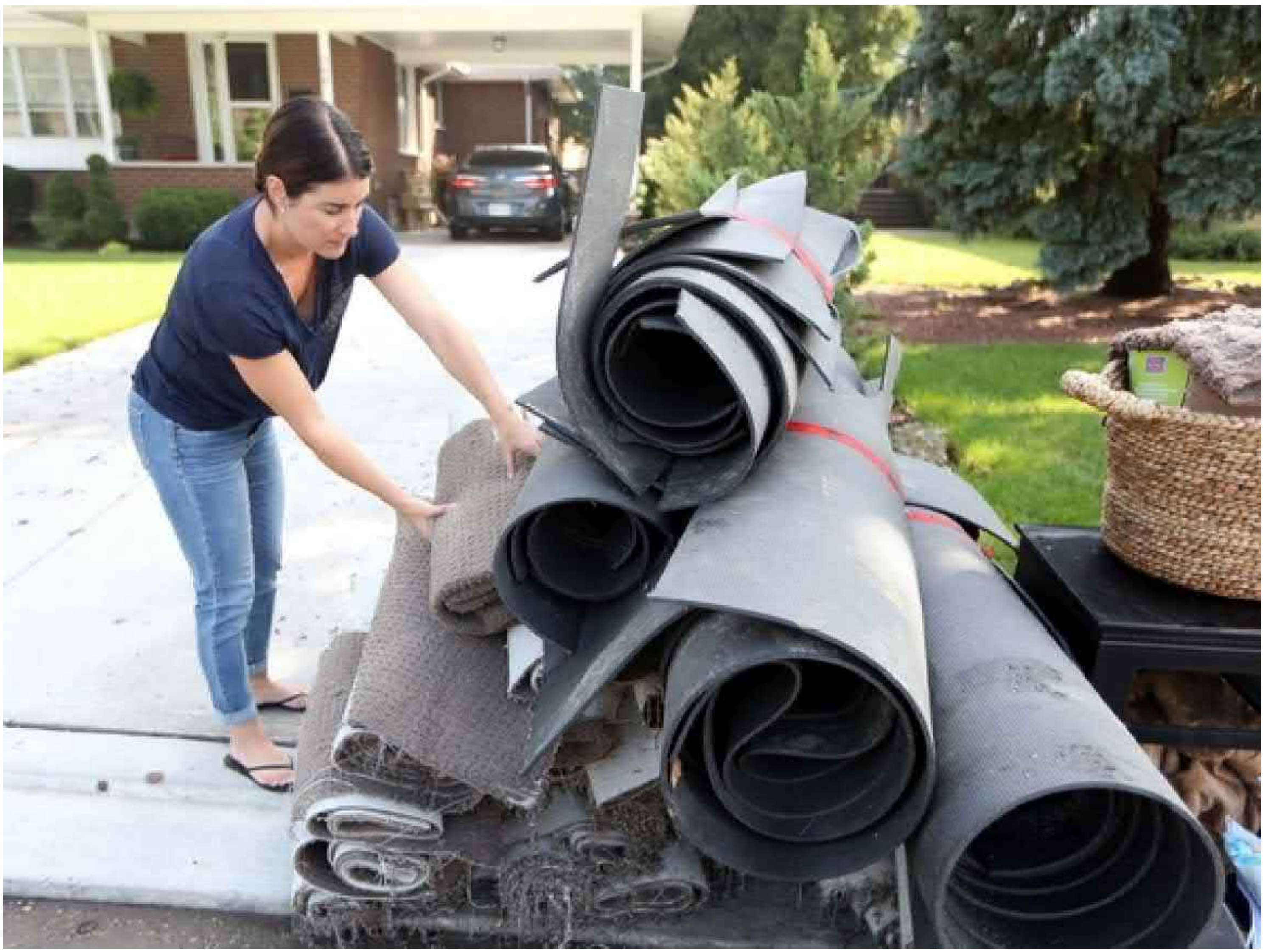
If the costs of propery expropriation, the constructing of a 21 foot wide by 2.5 ft high berm, plus the costs of the previously mentioned confilcts are all applied to the construction of a contiguous breakwall, the remaining private investment may be containable by the propery owners in this area.

It would also be a much more attractive and less disruptive solution.

Local News

Homeowners encouraged to provide feedback as city moves to finalize sewer master plan

Dave Battagello • Windsor Star
Feb 04, 2020 • Last Updated 9 months ago • 2 minute read



A new report points to millions of dollars of work needed to upgrade dikes to prevent future flooding in Riverside. In this Aug. 30, 2017, photo, Jennifer Zazula stacks rolls of carpet from her basement after her Windsor home was flooded during heavy rainfall. PHOTO BY JASON KRYK /Windsor Star

“Obviously we will be looking for senior (government) levels of funding. Having this plan in place also better allows us to do that.”

The sewer plan has been in the works for months through a combined effort involving city officials and outside consulting firms.

Public feedback will be gathered from residents at open house sessions scheduled next week from Tuesday through Thursday at three different locations across Windsor.

The effort to create the sewer master plan was launched after hundreds of homes across the city suffered significant damage due to major rainstorms that occurred in back-to-back years of 2016 and 2017.

City of Windsor engineer Mark Winterton at City Council meeting June 18, 2018. PHOTO BY NICK BRANCACCIO /Windsor Star

Riverfront properties in the city have also experienced flooding due to high water levels on the Detroit River.

“Addressing basement flooding that we saw through two catastrophic events really fast-tracked the need for the sewer master plan,” Winterton said. “We are looking at this as being something bad that happened as leading to something good.”

An initial effort under the master plan is already underway involving sewer work across Riverside and East Riverside — currently in the area of Tranby Park — that has $32 million in funding support from the federal governmen, which will cover about one-third of the project’s overall costs, he said.

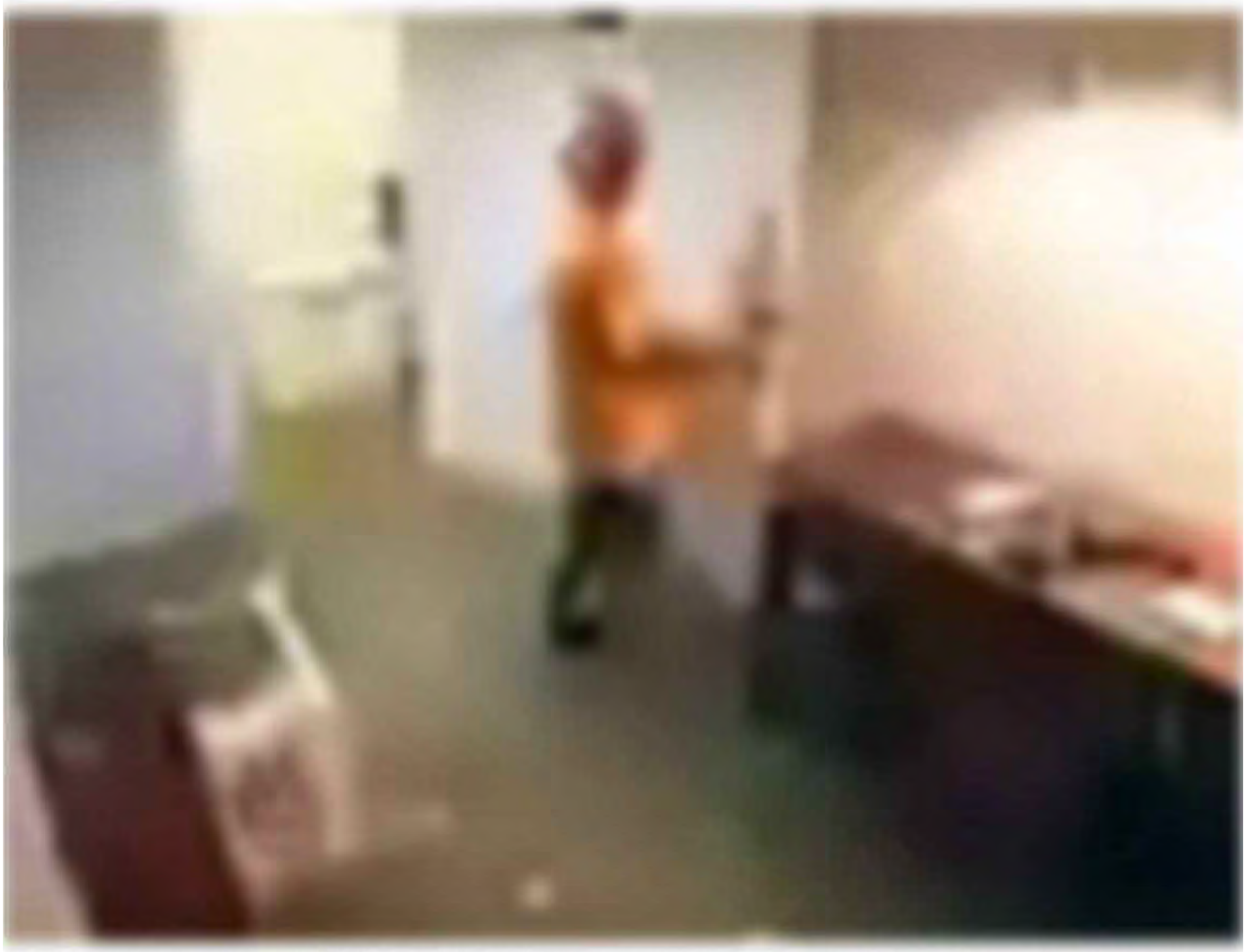
The work began last year and will take more than eight years for the city to budget and fully complete, Winterton said.

Winterton said.

The master plan researched areas of the city most vulnerable to flooding, identified reasons for the flooding and provides a serious of short-term and long-range solutions.

Feedback gathered at next week’s open house meetings will assist in finalizing the master plan which Winterton expects will go in front of city council for final approval, likely in June.

No area of the city is a priority under the plan as Winterton emphasized that “virtually every area of the city” proved vulnerable during the 2016 and 2017 storms.

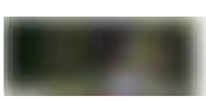


Ray Piche, of St. Rose Avenue in Windsor, had almost finished renovating his basement, which was damaged by flood water in September 2016, when it was hit again Aug. 29, 2017. PHOTO BY NICK BRANCACCIO /Windsor Star

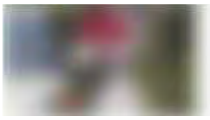
He also said that despite all the sewer work the city will undertake in the years ahead, it remains critical that homeowners also do their part or risk still being vulnerable to flooding.

Disconnecting downspouts — which the city does for free — is one way. Another option is tapping into the city's basement flooding protection subsidy program which offers up to $2,800 in funding support and includes such work as installing backwater valves.

MORE ON THIS TOPIC



Windsor residents invited to participate in national flood survey



The sewer master plan open house sessions will Tuesday (5-8 p.m.) inside Roseland Golf & Curling Club, on Wednesday (3-8 p.m.) inside the Michigan Room at the WFCU Centre and Thursday (5-8 p.m.) at the Windsor International Aquatic Centre in the lower east atrium.

For more on the master plan, visiting online at weatheringthestorm.ca.

dbattagello@postmedia.com

TRENDING

THIS WEEK IN FLYERS

COMMENTS

Postmedia is committed to maintaining a lively but civil forum for discussion and encourage all readers to share their views on our articles. Comments may take up to an hour for moderation before appearing on the site. We ask you to keep your comments relevant and respectful. We have enabled email notifications—you will now receive an email if you receive a reply to your comment, there is an update to a comment thread you follow or if a user you follow comments. Visit our Community Guidelines for more information and details on how to adjust your email settings.

365 Bloor Street East, Toronto, Ontario, M4W 3L4

City officials are asking anyone struggling in recent years with basement flooding or waterlogged properties to come visit a series of open houses scheduled for next week and learn more about the city's Sewer Master Plan.

"The sewer master plan is not only short-term solutions, but covers the next 50 years of planning and work we will do," said city engineer Mark Winterton. "The scale of this goes into the billions of dollars — not millions — so we are strategically looking at attacking the problems.

"Obviously we will be looking for senior (government) levels of funding. Having this plan in place also

Local News

'This is huge.' Windsor approves multi-generational $4.9B sewer plan

Trevor Wilhelm
Jul 27, 2020 • • 4 minute read

Don Wilson, a power of attorney for an elderly woman who lives on Riverside Drive East, and whose Windsor property was being threatened by flooding, stands behind a wall of sandbags on April 16, 2020. PHOTO BY DAX MELMER /Windsor Star

The overall plan includes increasing downstream outlet capacity, private property and public infrastructure improvements, coastal flood protection, and larger sewer pipes and storage facilities.

It includes surface flooding solutions such as construction of large storm trunk sewers for underground storage, including 40 kilometres in east Windsor, nine kilometres in South Windsor and 17 kilometres in central Windsor.

The plan also involves construction of three new and four upgraded stormwater management ponds. That would include a new pond at Little River Golf Course.

In the short term, staff recommends setting aside $1.5 million to proceed with immediate projects. These include a pilot program and monitoring for mandatory downspout disconnection, sealing maintenance hole covers in low lying areas, and developing an educational program to outline measures that can be done on private property.

Staff recommended council “pre-commit” to spending $3.4 million in 2021 for engineering and land acquisition for Lauzon Parkway sewer and road rehabilitation.

The plan also calls for $15.9 million in placeholder funding to leverage as a matching portion for potential grants. The placeholder funding would include $530,000 in 2021, $3,970,000 for 2022 and 2023, $6.5 million in 2024 and $890,000 for 2025.

This is going to take generations

City engineer Mark Winterton, who presented the report to council with Flavio Forest from Dillon Consulting, said the current eight-year plan already has $150 million earmarked for the sewer master plan.

“I think the beauty of this report is it looks over the entire city and prioritizes the best bang for the buck in terms of how we’re going to attack this,” said Winterton.

“The reality is this isn’t going to be done overnight. This is going to take generations. But we’ve already begun.”

The report from administration notes that climate change has caused an increase of “significant rainfall events” over the last decade, including two major storms in September 2016 and August 2017 that caused massive flooding and insured losses totalling $300 million.

“This is really exciting for me because it feels like the culmination of 10 years of effort,” said Dilkens. “Every single one of you here on this call today, you’ve all received the calls at some point in the past about basement flooding, about overland flooding and the concern that residents have.

“You’ve had to deal with stuff on front lawns and people losing their life’s possessions, things they had saved for a long, long time.”

Ward 4 Coun. Chris Holt, noting it’s the biggest budget project he’s ever voted on, said the city has an “infrastructure deficit” with many holes that need to be filled.

“It might not seem so, but it’s clear that the way we construct our cities, our transportation land use patterns, have a direct effect on the infrastructure that we need to invest in to support it,” said Holt. “We’ve been making some great strides. Whether or not they are enough right now is yet to be seen.”

STORY CONTINUES BELOW

There's no doubt that nearly $5 billion of spending is a huge number

Holt said it's important to learn from mistakes going back decades.

"How do we ensure that we're learning from our mistakes, that we are going to make decisions a little bit differently with the new reality in mind?" said Holt. "We don't want to have a council come back in 50 years and fix the mistakes that we are in a position now to at least address."

Dilkens said the plan will help address problems that have "plagued the city for a long time."

"The number looks daunting, and it is," he said. "There's no doubt that nearly $5 billion of spending is a huge number. But chunked down over time in a reasonable way, I think it's doable."

"Every one of these investments will lead to some incremental improvement which means fewer people will have problems. At the end of the day, that's a good sign that we're moving forward and doing the right thing for the residents of the city."

twilhelm@postmedia.com

twitter.com/WinStarWilhelm

City council has approved a historic “multi-generational” sewer master plan to avert flooding disasters that will take decades to complete and cost nearly $5 billion.

Councillors endorsed the plan during a virtual meeting on Monday.

“This is huge, this is $4.9 billion,” Mayor Drew Dilkens said during the online meeting.

“Look at all the pictures on the screen right now. Even if we all have a very long life, I suspect most of us probably won’t be here to see the final outcome of all of these projects when completed, unless you have huge support for the next 30 or 40 years from every level of government.”

The report from city administration states the recommendations “provide a roadmap to follow over the next 50 years or more.”

The Sewer and Coastal Flood Protection Master Plan recommendations would reduce — but not eliminate — future flooding and related losses. It’s expected to be available for public review in the fall.

TRENDING

THIS WEEK IN FLYERS

COMMENTS

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Appendix B-3

Partners for Action Survey

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VOICES OF FLOODING IN WINDSOR, ONTARIO:

RESULTS OF A SURVEY ON FLOOD EXPERIENCES AND PREPARING FOR THE FUTURE.

AMBER SILVER AND SHAWNA PEDDLE | PARTNERS FOR ACTION | JULY 2018

PARTNERS FOR ACTION

IN PARTNERSHIP WITH:

THE CITY OF WINDSOR ONTARIO, CANADA

CANADIAN RED CROSS CROIX-ROUGE CANADIENNE

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5. Impacts of Recent Flooding in the City of Windsor
8. Preparations, Then and Now
10. Information Sources and Needs
11. Conclusions and Next Steps
13. References

SUMMARY

Citizens of the City of Windsor have been through many flood events in recent years. The latest events, in 2016 and 2017, resulted in over $225 million in insured damages. In 2016, Partners for Action (P4A) conducted a national survey of residents who had experienced flooding. Results from this survey indicate that almost half of the costs of recent floods have been paid out-of-pocket, potentially doubling these losses to well over $400 million in the past 2 years. In 2018, P4A conducted a survey with the City of Windsor and the Canadian Red Cross to gain a better understanding of flood risk perception and preparation among Windsor residents. Understanding the risk of flooding in a community is the first step to being prepared for future flood events. Just over half of respondents to the Windsor survey believed they lived in an area that was at risk, which is significantly greater risk awareness than Canadians living in flood-prone areas (6%). The survey results also show that more than half of respondents had done something to prepare before the last flood, and many are currently protecting their homes and families following the latest flood. Experiencing a flood seems to raise risk awareness, and drive action to protect homes and possessions.

Windsorites who have been through a flood had honest, simple advice for their friends, family, and neighbours, like installing sump pumps and backwater valves. These types of actions are made more affordable for homeowners with support from the City through the Basement Flooding Protection Subsidy Program. Residents also recommended the disconnection of downspouts, which can be completed for free by Windsor staff under the Downspout Disconnection Program. Additional recommendations from the survey included keeping valuables out of the basement or raising items off the floor, and investing in floodproofing property, rather than finishing basement living spaces. Finally, flood survivors advised others to understand personal flood risk and insurance options.

Everyone has a role to play in managing flood risk. P4A recommends clarifying those roles and working together to make Windsor stronger for the next flood. There are many actions homeowners can take to protect their homes and reduce the financial burden of flooding. We recommend that these actions, including why they are needed, how they work, their cost, and their role in creating a more flood resistant home, are made very clear to Windsorites. Many Windsor residents are preparing for the next flood, and this should be celebrated, along with promoting subsidy programs offered by the City. Finally, the City should form close relationships with local media, community leaders, and social media leaders, and determine roles for communicating what to do before, during and after a flood. These actions will help Windsor residents get the information they need and when they need it most.

KEY FINDINGS:

1. Flood risk awareness in Windsor is almost nine times the national average - 51% of respondents believe they live in an area at risk for flooding, compared to only 6% of Canadians.

2. Many respondents tried to prepare for flooding in their home (by installing sump pumps and backwater valves, purchasing sewer backup insurance, or raising valuables off the floor) but still had some damage.

3. Respondents that had not made flood and evacuation plans, or shared these plans with their neighbours, felt these were **ineffective** or **unimportant**. Those that did not purchase flood insurance, install sump pumps, use water-resistant materials, or grade their property, felt these actions were too **expensive**, or too **difficult**. Many who did not take action to protect themselves from flooding felt it was **not their responsibility**, or they **did not now how**.

4. While just over half of respondents were acting to protect themselves from flooding, many did nothing, mostly because they felt they had done enough or were safe from flooding because it had never happened to them before.

5. Twenty-four percent of respondents do not have an emergency kit, mostly because they feel an it is **unnecessary** because they will never have to evacuate their homes or they have enough supplies on hand.

6. **People use different sources for information about floods and daily weather.** The Weather Network and local radio and television stations were key for information before a flood; local radio and television and social media for information during a flood; and the City of Windsor's website and local radio and television stations for information after a flood.

7. **Friends, family and neighbours** are the most important source of support before, during and after a flood, followed by **municipal representatives** before and after a flood, and **Emergency Services** during a flood event. **Community volunteers** and **non-profit organizations** are also valued during and after floods.

8. **As a result of the most recent flood, many respondents have decided to prepare**, including purchasing a sump pump or backwater valve; raising expensive appliances off the floor; and disconnecting their downspouts.

INTRODUCTION

Flooding is one of the most common environmental hazards to affect people, their properties, and their livelihoods. Between 1918 and 2018, there were 302 major flood events in Canada, accounting for approximately 37% of all natural disasters to occur in the country during that time (Public Safety Canada, 2018).

Federal payments for flood assistance have skyrocketed over the last four decades, from $300 million during the 1970s to $3.7 billion during the 2010s, with floods now accounting for 76% of total disaster spending nationally (IBC, 2016). Impacts on federal budgets will only continue to grow, with estimates of flood losses expected to be approximately $673 million annually over the next five years (PBO, 2016). On average, flooding in Canada costs over $1.2 billion every year, with homeowners covering most of the losses themselves (Swiss Re, 2016).

The causes, size, location, and consequences of every flood is different. Urban flooding in particular is a growing concern as urban centres continue to develop with increasing populations, putting pressure on infrastructure and nature's ability to soak up water where it falls. Between 2003 and 2012, flooding in Canada cost more than $20 billion in damages (Public Safety Canada, 2016). Two floods in particular, the 2013 flooding in southern Alberta and the 2013 flash flood in Ontario, cost approximately $2.8 billion in insured losses (IBC, 2017) and affected or displaced hundreds of thousands of Canadians. In 2016 alone, insured losses for natural catastrophes, including flood, approached $5 billion (IBC, 2017).

In 2018, Partners for Action partnered with the Canadian Red Cross and the City of Windsor to examine the perception that many Canadians fail to prepare against flood risks. The partners sought to understand how to improve their risk messaging to encourage more residents to take protective actions before, during, and after flood events. Partners for Action developed a survey that examined several important themes, including:

- individual experiences with flooding in the City of Windsor;

- perceptions of household flood risk and likelihood of future flooding;

- current and future protective actions;

- preferred sources for information before, during, and after a flood event; and,

- awareness of or participation in City-led initiatives (e.g., Downspout Disconnection Program, Basement Flooding Protection Subsidy Program, Sewer Master Plan, and Climate Change Adaptation Plan).

The online survey was available from April 5 to May 15, 2018, and promoted through a variety of outlets, including the City of Windsor main website and Sewer Master Plan website, social media platforms, print and radio, and numerous public outreach events. A total of 420 respondents with postal codes located in the City of Windsor completed the survey, and their responses were analyzed for this report.

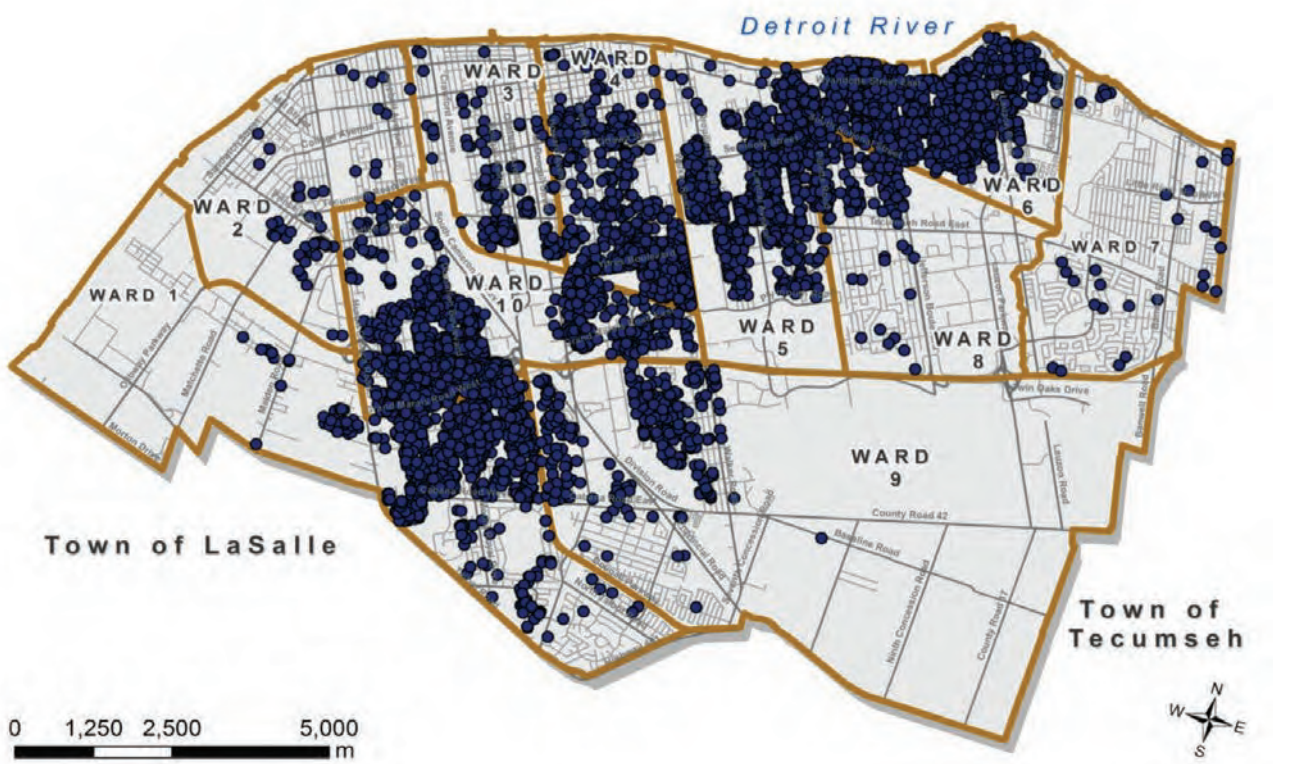
Respondents provided input for survey questions that were relevant to their particular situation. Results presented throughout this report are based on the percentage of the 420 respondents who answered each individual question. In terms of their representativeness of the study area as a whole, the percentages provided are generally accurate within +/- 5.7% at a 95% confidence level.

Source: Insurance Bureau of Canada

Insured Catastrophic Losses in Canada

FLOODING IN THE CITY OF WINDSOR

The City of Windsor is located in southwestern Ontario, with an area of approximately 146 km^2 and a population of 217,188 (2016 Census). Windsor has a long history of flooding, and has experienced several large floods within the last five years, including the wide-spread September 2016 and August 2017 floods. Together, these storms resulted in over 9,000 reported incidences of flooding that resulted in over $225 million in insured losses (IBC, 2016, 2017).

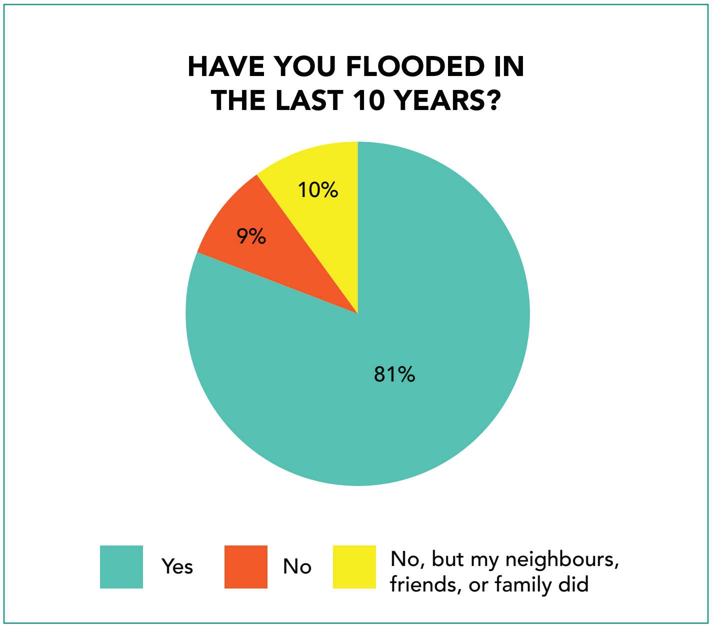


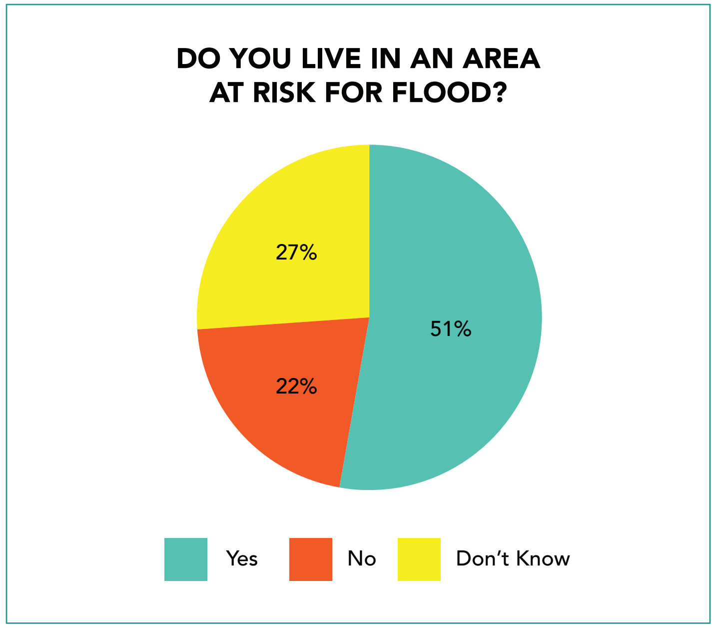
Reported flooded homes in Windsor, September 2017
Source: City of Windsor

In an effort to reduce the losses from flooding, the City of Windsor has launched a number of initiatives aimed at homeowners. In 2011, the Basement Flooding Protection Subsidy Program began, providing a financial subsidy to residents who install sump pumps, and overflow or backwater valves, up to $2,800 per household. Approximately 4,000 homes have taken advantage of the subsidy program (M. Winterton, City of Windsor, personal communication, June 8, 2018).

The Downspout Disconnection Program began in 2013, intended to both reduce the amount of runoff entering the sewer system and to raise homeowner awareness on the benefits of downspout disconnection for the City of Windsor. Approximately 4,000 homes (5-10% of total homes that could benefit from disconnection) have participated in this free program to date (M. Winterton, City of Windsor, personal communication, June 8, 2018).

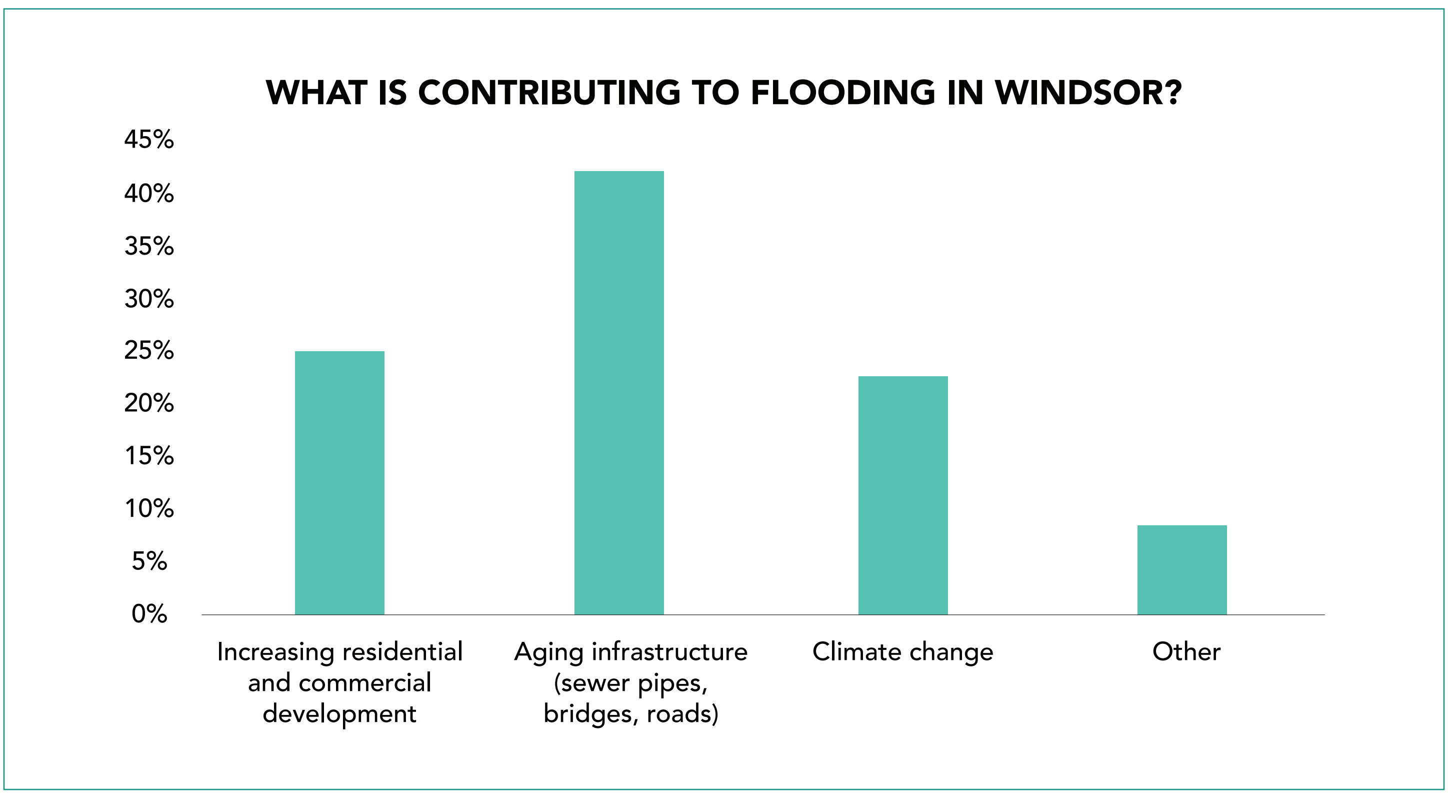
The study partners identified the need to understand residents' risk perceptions and overall levels of concern about future flood events. The survey asked several questions about residents' household flood risk, the perceived likelihood of future flooding, and concern about future flooding. Although 81% of respondents experienced a flood at their home since 2010, only 51% felt they lived in an area that is at risk for flooding. This is still significantly greater risk awareness than Canadians in flood-risk areas surveyed in 2016, with 6% believing they lived in an area at risk for flooding (Thistlethwaite et. al., 2017). Also, many of the respondents indicated that this was the first time their home had been flooded, and that the flood they had experienced was "extremely unexpected" and a "once in a lifetime" event.





While the majority of respondents were concerned about flooding (95%), only 81% felt that their community could flood within the next five years. Previous research has shown that people who go through many small flood events can overestimate their ability to handle larger events (e.g., Mileti and O'Brien, 1993; Paton et al., 2000). Respondents who believe flooding is likely in the next five years were less likely to be concerned, but those who felt a flood was less likely in the next five years were more concerned, perhaps because they were thinking about floods like the 2016 and 2017 events, which many respondents believed were "once in a lifetime".

Respondents were also asked to share their thoughts on what factors are contributing to flooding in the City of Windsor. Respondents blamed inadequate and/or aging infrastructure (43%), increasing residential and commercial development (25%), and climate change (23%). Seventy respondents provided more details on their responses, including blaming construction of new highways. There was also a strong belief held by a small minority that the 2017 flood occurred because the pumping station was turned off - either due to human error or negligence.



IMPACTS OF RECENT FLOODING IN THE CITY OF WINDSOR

The study partners also wanted to understand the socio-economic impacts of the flooding experienced by Windsor residents. Approximately 81% of respondents had experienced flooding at their home since 2010, and almost half had experienced more than one flood during this period. Over 60% of respondents said flooding had interfered with their daily activities. The most common impacts included: 1) being unable to use the washer, dryer, furnace, or hot water heater, which meant respondents were unable to do laundry, wash dishes, bathe, or clean; 2) missing work, either to clean up after the flood or to deal with contractors, insurance adjustors, or City workers; and, 3) being unable to access the basement, which was used as a recreational and/or bedroom space.

The economic impact of flooding since 2010 is substantial. Sixty-nine percent of respondents who provided details faced over $10,000 in damages, with 17% having $50,000 or more in damages. Windsor residents paid for these damages with personal savings (41%) and insurance (45%), but some indicated that they could not pay for the damages to their homes and property, and only 0.6% received government disaster assistance. Others had to take out second mortgages on their homes, apply for lines of credit and/or credit cards, or borrow money from friends and family. For those individuals with limited resources, the flooding since 2010 has had negative financial consequences.

Respondents were asked to think back to the most recent flood that affected their home or community, and share information about how they prepared for the flood. Almost half of respondents indicated that they did nothing to prepare. When asked why, these respondents said they had thought they were safe or that they had lived in their homes for years without a flood, so they were not expecting this one to impact them:

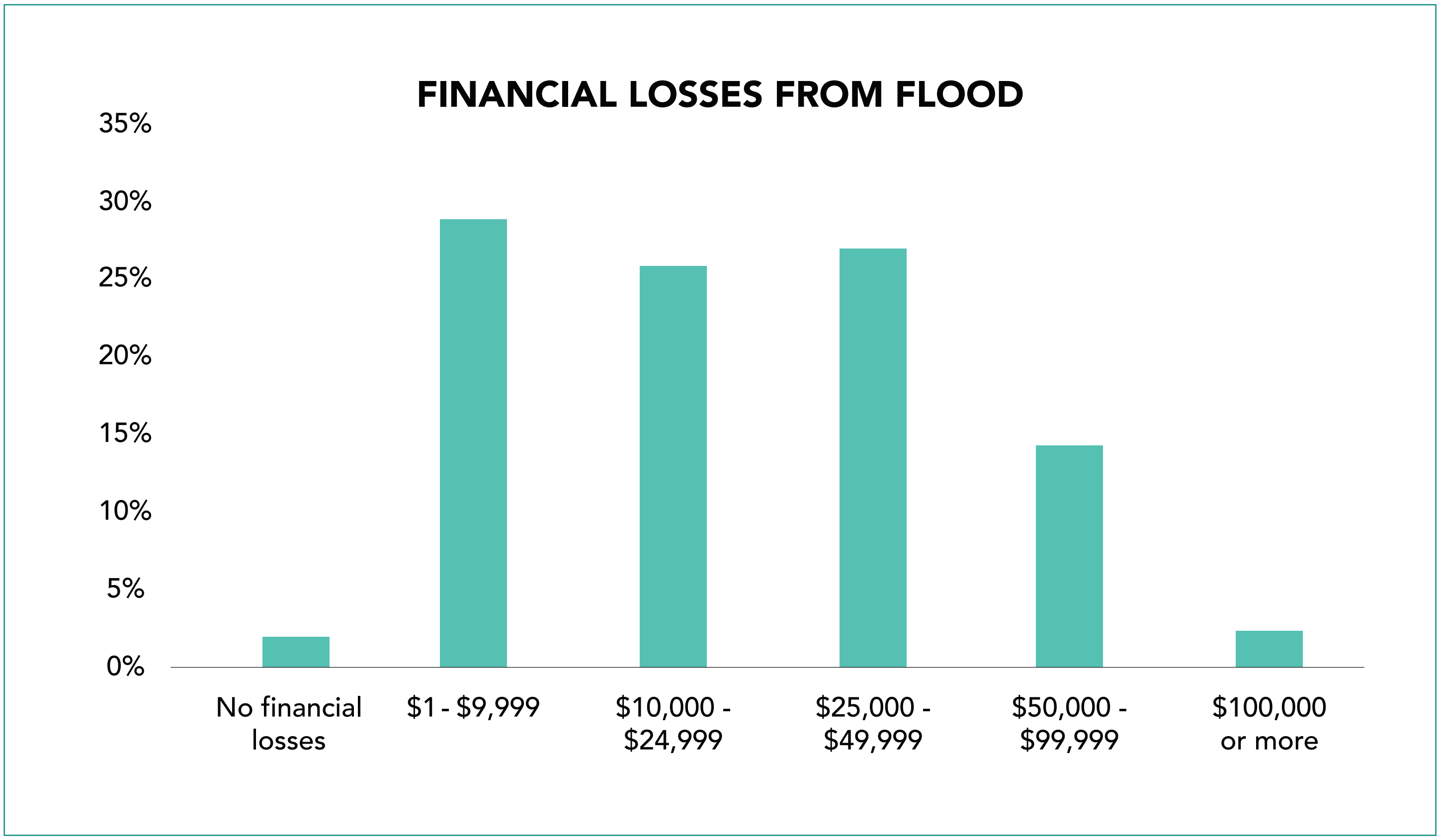
"We had not prepared. We have lived in the house for fifteen years and had never flooded. Our neighbours have lived in the neighbourhood for over 50 years and never flooded. We did not expect to flood."
(Homeowner, 35-44 years old)

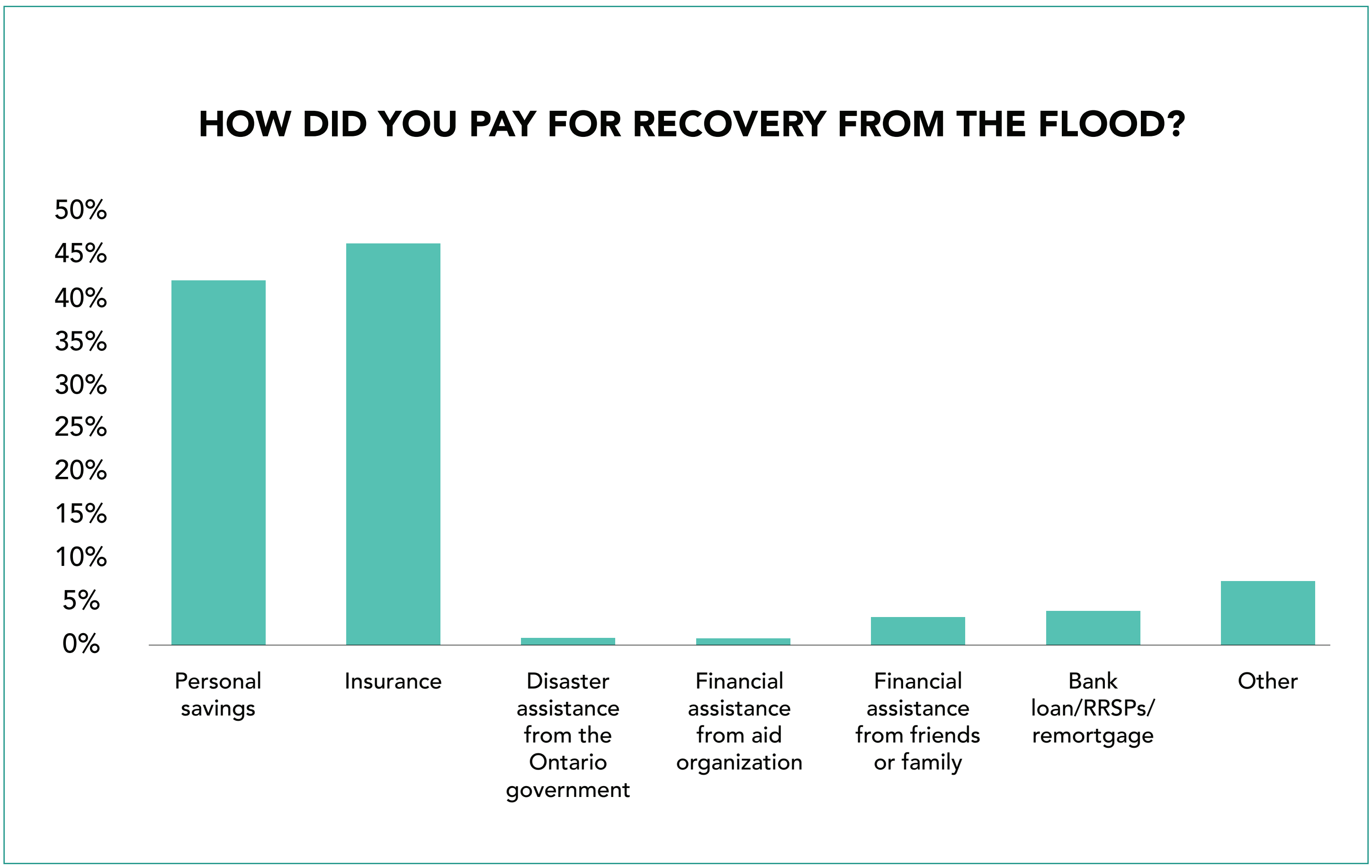
"My home is 34 years old and had never previously flooded. I did not think it ever would flood – no special flood prevention was in place."
(Homeowner, 65-74 years old)

However, many respondents indicated that they did prepare prior to the most recent flood. These preparations ranged from installing sump pumps and backflow valves, fixing drainage on their property, disconnecting downspouts, and waterproofing. It is important to note, however, that preparations cannot eliminate all flood risk:

"We were flooded less than a year before the most recent event. We purchased a back-up sump pump (even though ours has always worked properly) and installed a routing system that allowed any water from the sump pump to be directed into the backyard immediately, should the infrastructure become over capacity. We also have a back flow valve. Despite all this, we flooded again. The water was coming up from our washbasins."
(Homeowner, 35-44 years old).

Respondents also said that, prior to the flood, they put items in bins and/or moved them to higher elevations, put heavy appliances such as washers and dryers on blocks, and purchased insurance. Only four respondents indicated that they had existing emergency supplies in their home.


FINANCIAL LOSSES FROM FLOOD
35%
30%
25%
20%
15%
10%
5%
0%
No financial losses
$1 - $9,999
$10,000 - $24,999
$25,000 - $49,999
$50,000 - $99,999
$100,000 or more


HOW DID YOU PAY FOR RECOVERY FROM THE FLOOD?
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Personal savings
Insurance
Disaster assistance from the Ontario government
Financial assistance from aid organization
Financial assistance from friends or family
Bank loan/RRSPs/ remortgage
Other

The survey also asked respondents to share what they did immediately before, during, and after the most recent flood. Most respondents did nothing out of the ordinary immediately before the flood. Although many of these respondents felt their homes would not flood, some said they wanted to prepare, but could not leave work to do so. The most common actions taken in the hours before the flood included: remaining vigilant (e.g., checking sump pumps, watching the rain, turning on the weather forecast); and moving things to higher ground or putting them in tubs. Some respondents talked about their emotional state, saying that they were "worried", "panicked", or that they spent time "hoping and praying".

When asked what they did during the most recent flood, 47% of respondents said that they did "Nothing". The main reason was that the water came too quickly (230mm in 24 hours), and that they were unable to stop the flooding once it had started. The most common actions taken during the flood were damage control: mopping, bailing water with buckets, getting extra sump pumps, and blocking areas where water was coming into the home. Respondents also took items and furniture to higher ground or put them into bins.

"We were helpless. All we could do was sit back and watch. My husband is not in the best of health, so he could only move so much physically by himself."
(Homeowner, 45-54 years old)

"My parents were pushing the water that came up from the drains to the sump pump. We also put a bunch of towels on the drain [...] to stop the water from coming up. It wasn't working water was coming up fast. My brother-in-law and myself was moving furniture and boxes up off the floor and pushing water. My sister was on the phone with our insurance company."
(Homeowner, 35-44 years old)

Lastly, respondents shared their experiences in the days and weeks following the flood. Almost all engaged in some form of clean-up, including: throwing out personal belongings and furniture; sanitizing and bleaching floors and walls; calling insurance and/or the City; ripping out carpet and drywall; and buying dehumidifiers and fans. Many said that they decided to prepare for the next flood by purchasing a sump pump/backwater valve; raising heavy appliances onto platforms; or waterproofing.

Unsurprisingly, respondents had many concerns about possible future flooding. The three most common concerns were:

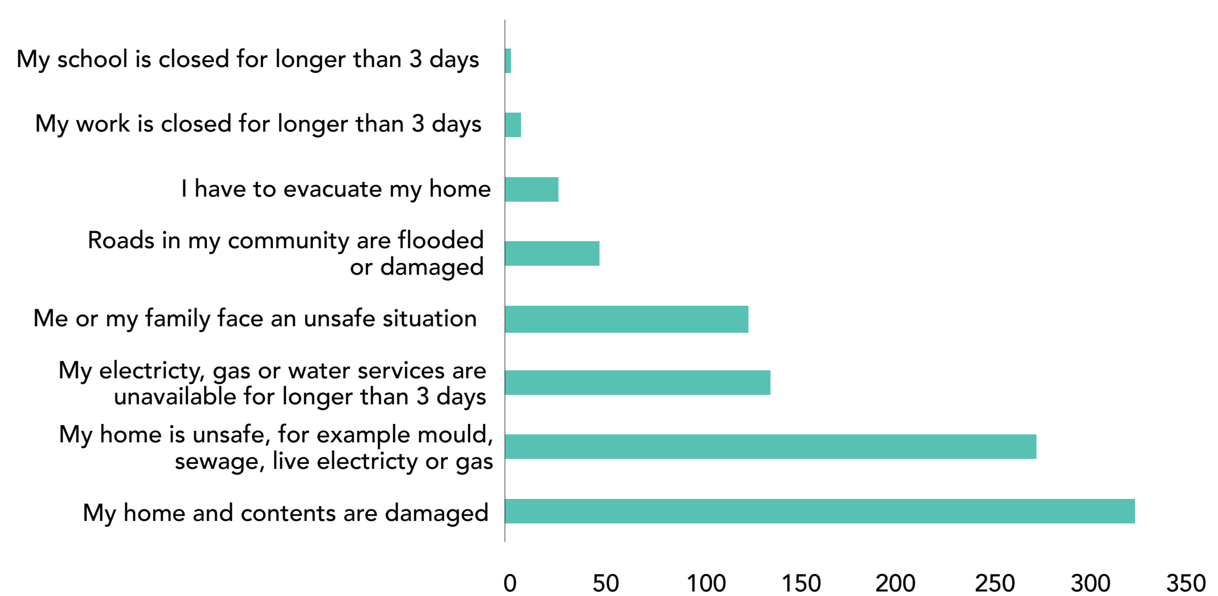
1) damages to homes and their contents (34%);

2) homes being unsafe due to mold or sewage (28%); and,

3) electricity, gas, or water being unavailable for long periods (13%).

There was much less concern about issues such as work or school closures, evacuations, or impacts to public roads.

WHAT IS YOUR BIGGEST WORRY FOR FUTURE FLOODING?



PREPARATIONS, THEN AND NOW

Although it is impossible to completely eliminate flood risk, being prepared can drastically reduce flood impacts. Respondents were asked about what preparations they had taken prior to the most recent flood, and what actions they had taken or planned to take to prepare for the next flood. Most people wanted the actions to limit the financial impact and damage to their homes and belongings, and to improve their family's safety during a flood event. The majority of respondents seemed well informed about flood risk and preparedness, as many have already learned about their flood risk (76%) and have gathered information on what can be done to protect their homes (83%). They also have or will soon have a flood plan (84%), make and share an evacuation plan (68%), and gather enough emergency supplies for several days (76%). The majority of respondents (69%) also have some form of sewer backup insurance. These results are similar to those for people impacted by the 2013 Calgary flood (City of Calgary, 2016).

MOST RESPONDENTS HAVE TAKEN SOME ACTIONS TO PREPARE FOR FLOODING:

76% learned about their flood risk

83% gathered information on what can be done to protect their homes

84% will, or soon will, have a flood plan

68% have or will soon have and share an evacuation plan

76% already have, or plan to gather enough emergency supplies for several days

69% have some form of sewer backup insurance

Many respondents have already learned about flood insurance (82%), identified safe spaces (87%), placed valuables in tubs (79%), disconnected downspouts (74%), and installed sump pumps and/or backwater valves (65%). Fewer respondents use water-resistant building materials (57%) or cover basement window wells/seal basement windows (44%).

Respondents were also asked why they did not prepare, and the reasons varied by preparation type. For those that had not prepared, actions such as gathering flood-related information, making and sharing flood plans, evacuation plans and plans with neighbours, and placing valuable documents in waterproof containers, were thought to be unimportant or ineffective in protecting respondents' homes or families.

There were a number of other barriers to preparedness that were identified by respondents. Purchasing flood insurance, disconnecting downspouts, using water-resistant building materials, and grading property were seen as being too expensive, too difficult, or requiring too much time. Some respondents felt that certain preparations were also not their responsibility, such as gathering flood-related information, purchasing flood insurance, and disconnecting downspouts.

Lastly, some respondents felt they did not know how to prepare, including learning about their flood risk, disconnecting downspouts, grading property, and covering and sealing basement windows.

Twenty-four percent of respondents were uninterested in an emergency kit, and do not have one or plan to purchase one. When asked why, these respondents overwhelmingly felt that emergency kits were unimportant or ineffective. Many respondents indicated that floods in the City of Windsor were too small to warrant evacuation or that they had enough groceries in the house.

The City of Windsor has several city-led initiatives and programs, such as the Downspout Disconnect and Basement Flood Protection Subsidy programs. Most respondents had heard about these programs, but only 52% had taken advantage of them. Although these numbers are significantly higher than the City of Windsor overall, almost 14% of respondents still have never heard of these programs before.

WHAT ADVICE DO YOU HAVE FOR YOUR FRIENDS, FAMILY AND NEIGHBOURS TO HELP THEM PREPARE FOR THE FUTURE?

1. Install and maintain sump pumps and backwater valves (along with having battery-operated generators and back-up pumps).

2. Keep valuables out of the basement. If there are valuables in the basement, keep these items and appliances elevated off of the floor, in waterproof containers.

3. Avoid furnishing or finishing basements into living spaces, instead, invest in waterproofing your property.

4. Take advantage of City subsidy programs.

5. Disconnect your downspouts (the City will do it for free!).

6. Understand your insurance coverage and purchase extra coverage if available.

7. Check your household drains and eavestroughs often.

8. Ask about flood risk when purchasing a home.

9. Know how to shut off the electricity in the event of a flood.

INFORMATION SOURCES AND NEEDS

When faced with environmental uncertainty, such as a potential flood, people seek out information to try to minimize this uncertainty. Every person's information needs, preferences, and habits are unique, and no two individuals obtain and interpret information in exactly the same way. It is important to understand from what source and in what format residents want information about floods and flood risk. When asked about the most important source of weather information, respondents indicated that The Weather Network (20%), weather "apps" (18%), local TV (15%), and local radio (10%) were most common. Internet websites (8%) and social media (5%) featured less prominently.

Respondents were also asked about where they get information before, during, and after a flood. Most people preferred to get information before a flood from The Weather Network and local radio and television. During a flood, local radio and television and social media were seen as the most valuable sources of information, followed closely by The Weather Network and Emergency Services. Respondents also indicated that they relied on their personal networks during a flood (e.g., family and friends, telephone calls, text messages). After the flood had passed, respondents relied on the City of Windsor's website, and local radio and television.

Respondents were also asked who would be most helpful to them before, during, and after a flood as a source of information, support, or guidance. Family, friends and neighbours were considered to be the most important source of help before (42%), during (45%), and after (33%) a flood event. Municipal representatives and elected officials were also relied upon before a flood event (17% and 14%, respectively). During a flood, respondents also relied on fire and police services (21%), and community volunteers and non-profit organizations (9%). Finally, after a flood, respondents also relied on municipal representatives (14%) and community volunteers and non-profit organizations (13%).

Next, respondents were asked what information they lacked that could have helped them prepare for, respond to, or recover from the most recent flood that affected their home or community. Most respondents wanted to know their local flood risk and what they could do to protect their home and belongings. Many felt that they needed more information about local weather, including warnings of heavy rainfall. Only a small portion of respondents wanted additional information about how to protect their families or when/where to evacuate.

WHAT INFORMATION COULD HAVE HELPED YOU PREPARE?

My local flood risk (32%)

What I could do to protect my home and belongings (23%)

Local weather information/warning that heavy rain was coming (18%)

What I could do to protect my possessions (15%)

CONCLUSIONS AND NEXT STEPS

Over the last decade, the City of Windsor has experienced several large flood events that affected thousands of families and caused over $225 million in insured losses (IBC, 2016, 2017). Researchers at Partners for Action asked Windsor residents for their thoughts on flood risk and preparation for flooding within the city. This section summarizes the most important findings from this survey, and discusses the implications of this work in terms of flood risk communication and encouraging homeowners to protect themselves from flooding.

1. Flood risk awareness in Windsor is almost nine times the national average - 51% of respondents believe they live in an area at risk for flooding, compared to only 6% of Canadians. .

2. While just over half of respondents were acting to protect themselves from flooding, many did nothing, mostly because they felt they had done enough or were safe from flooding because it had never happened to them before.

3. Respondents that had not made flood and evacuation plans, or shared these plans with their neighbours, felt these were **ineffective** or **unimportant.** Those that did not purchase flood insurance, install sump pumps, use water-resistant materials, or grade their property, felt these actions were too **expensive**, or too **difficult**. Many who did not take action to protect themselves from flooding felt it was **not their responsibility**, or they **did not now how**.

4. Many respondents did nothing to prepare for the most recent flooding to affect their home. Overwhelmingly, this was because they **felt they were safe from flooding**.

5. Twenty-four percent of respondents do not own or plan to own an emergency kit, mostly because they **feel an emergency kit is unnecessary** because they will never have to evacuate their homes or they have enough supplies on hand.

6. People do not obtain information about floods from the same sources that they obtain information about daily weather. Respondents rely on The Weather Network and local radio and television stations for information before a flood; local radio and television and social media for information during a flood; and the City of Windsor's website and local radio and television stations for information after a flood.

7. Respondents indicated that **friends, family and neighbours** are the most important source of support before, during and after a flood, followed by **municipal representatives** before and after a flood, and **Emergency Services** during a flood event. **Community volunteers** and **non-profit organizations** are also valued during and after floods.

8. As a result of the most recent flood, many respondents have decided to engage in additional preparedness actions, such as: purchasing a sump pump or backwater valve; raising expensive appliances off the floor; and disconnecting their downspouts.

People rarely prepare on their own, even when they perceive themselves to be at risk for flooding, so increasing risk awareness is not enough to drive community preparedness. Information should consider what community members need to cope – knowing whether actions will be effective, but also understanding their cost (in time and money). This survey found that many respondents believe that certain actions (such as having an emergency kit, putting valuable items in bins, and having emergency plans) are not effective at reducing their risk. Accordingly, it is important to highlight the usefulness and effectiveness of these measures for flood preparation, and also linking emergency preparedness to other events, such as a major winter storm, tornado, or blackout.

Other adjustments were perceived to be too expensive, such as installing sump pumps and backwater valves, and disconnecting downspouts. This study found that 14% of respondents did not know about Windsor's Downspout Disconnection Program or the Basement Flooding Protection Subsidy Program. Increasing awareness of these campaigns, including the costs and benefits to residents, may demonstrate their affordability and effectiveness for homeowners.

Lastly, respondents indicated that friends/family/neighbours, municipal representatives, and community/non-profit organizations are most helpful after a flood has occurred. The City and the Canadian Red Cross should focus efforts on communicating about flood risk and what to do before, during, and after a flood to well in advance of flooding, to ensure residents know what to do, and who to turn to for advice and guidance. The City and its partners should also host preparedness events for families, friends and neighbours that encourage learning how to prepare and reduce risk, together.

We offer the following recommendations to the City of Windsor towards effective flood risk communication in their community:

1. Clarify roles and responsibilities for managing flood risk by explaining what residents can do, what the City can do, and how to work together to make the community stronger.

2. Demonstrate that flood protection is for everyone, everywhere, and has many components – we cannot assume we are doing enough to protect ourselves, and being prepared for flooding also extends to other emergencies.

3. Provide information on solutions that will allow residents to make informed decisions about their ability to protect themselves – the effectiveness and importance of protection, and also the time, effort, and cost involved.

4. Promote incentive programs offered by the City, and how effective they are in reducing flood risk – many saw disconnecting downspouts as beyond the responsibility of the homeowner, and installing backflow valves and sump pumps was seen as too expensive. Explaining why these efforts can help reduce flood risk, and how the City can help reduce costs and effort will help overcome these obstacles.

5. Form strong relationships with local media, social media leaders, and community groups to communicate not just weather information, but updates before, during, and after flood events. Work with partners to notify residents about upcoming flooding online, and through the Essex Region Conservation Authority.

6. Host preparedness events and training opportunities for families, friends, and neighbours that encourage learning how to prepare and reduce risk, together.

7. Celebrate the Windsor residents that have prepared since the last flood, and challenge the remainder to join the movement.

We offer the following recommendations to the Canadian Red Cross towards effective flood risk communication nationally:

1. Demonstrate that flood protection is for everyone, everywhere, and has many components – we cannot assume we are doing enough to protect ourselves, and being prepared for flooding also extends to other emergencies.

2. Provide information on solutions that will allow residents to make informed decisions about their ability to protect themselves – why action is needed, the effectiveness and importance of protection, and also the time, effort, and cost involved.

3. In a recent Red Cross survey, 25% of respondents identified the Red Cross as their first source of information following a disaster (Canadian Red Cross, 2018). We recommend expanding this trust further by forming strong local relationships with municipalities, traditional and social media outlets, and community groups to communicate not just following a disaster, but also through materials and the Be Ready App for weather information/watches and warnings, and updates before, during, and after flood events.

4. Build disaster risk reduction and natural hazard awareness raising events into the CRC volunteer model, empowering volunteers to work within their communities to raise awareness and reduce risk.

5. Celebrate success stories of those that have prepared since the last flood, and challenge Canadians to join the movement.

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PARTNERS FOR ACTION

IN PARTNERSHIP WITH:

THE CITY OF WINDSOR ONTARIO, CANADA

CANADIAN RED CROSS CROIX-ROUGE CANADIENNE

Project: Get Involved
map: Survey for Map - 453
Question: What would you like us to know about flooding in this location?

No.	Contribution	Author	Posted at
1	The water also came up through the sanitary sewer (basement toilet). Despite 4 active sump pumps that evacuated water out the basement window to the driveway, the water in the basement rose 12 inches.	[redacted]	22 Mar 2018, 03:32 PM
2	Frequency of floods increasing. Frustrated Ward 6 Councillor Jo-Anne Gignac voted on September 28th a few weeks after the flood against increasing staffing for basement flooding. Need a more aware and compassionate councillor.	[redacted]	23 Mar 2018, 07:08 AM
3	Flooding occurs throughout the area. Water pools in our backyard whenever it rains causing a risk for mosquitos as well	[redacted]	23 Mar 2018, 07:08 AM
4	What's being done to stop this from happening again.	[redacted]	24 Mar 2018, 08:33 AM
5	Why is it that everytime we have water past our curbs on to our lawns, its as if someone flips a switch and the water whirl pools down the sewers in a matter of min. Someone is asleep at the bumps guys!	[redacted]	27 Mar 2018, 05:18 AM
6	Start up ALL the pumps before the rain comes, this way we don't get flooded...OR install new ones and more of them.	[redacted]	27 Mar 2018, 05:24 AM
7	City Pumps that work or need to be newer	[redacted]	27 Mar 2018, 05:37 AM
8	This location often floods with less severe rains than occurred in 2016 & 2016. The problem is surface water coming down St. Louis & Riverside Drive & flowing directly onto our property. The lack of curbs & insufficient sewer capacity is the problem	[redacted]	27 Mar 2018, 10:23 AM
9	We had approx. one inch of water in a few locations in the basement. Next door neighbours had 7-14 inches of water in basements.	[redacted]	28 Mar 2018, 12:02 PM
10	3476 Charlevoix Ave.	[redacted]	28 Mar 2018, 12:12 PM
11	I have done what I can as a homeowner; sump pump and backwater installed, floor drain disconnected, downspouts next. Bought three rain barrels to place around property. Need the city's help now!	[redacted]	14 Apr 2018, 11:34 AM
12	Please fix our road, and Garden Court, to reflect a 21st Century road surface. It would be truly appreciated.	[redacted]	14 Apr 2018, 11:39 AM
13	Thank you for taking the time to hear from us. Please take my neighbourhoods' request into consideration.	[redacted]	14 Apr 2018, 11:40 AM
14	Unsure of whether new home construction in the area or the new Herb Gray Parkway are factors. Within the last 3years or so, we noticed that heavier rains caused small "ponds" of water n our back yard as well as neighbours backyards	[redacted]	15 Apr 2018, 08:07 AM
15	We have had two substantial floods in this neighbourhood. Please upgrade the infrastructure.	[redacted]	15 Apr 2018, 11:46 AM
16	Resurfacing and sewer upgrades to makes these roads compatible with 21st Century storm standards would be greatly appreciated.	[redacted]	15 Apr 2018, 11:53 AM
17	Noticed surface flooding west of St. Rose to Jefferson Blvd, and south on Jefferson at least as far as Ontario. Power failing during the rainstorm did not help at all. Thank goodness for battery backup	[redacted]	15 Apr 2018, 02:33 PM
18	How can the drainage be improved, we did all recomended flood protections after 1st flood Sep.2016 & still flooded in Aug.2017.	[redacted]	19 Apr 2018, 06:00 AM
19	Overland water from the Road, pooling and entering into the house	[redacted]	29 Apr 2018, 05:08 AM
20	Need to add an outlet to the River in low lying areas - Esdras Park.	[redacted]	29 Apr 2018, 05:12 AM
21	Stom sewer is undersized, Road elevation collecting water, need outlet to the river during flood events.	[redacted]	29 Apr 2018, 05:17 AM
22	I generally contact 311 on flooding on street	[redacted]	20 Jun 2018, 11:29 AM

23	Every house on our street has experienced basement flooding at some point.	[redacted]	26 Jun 2018, 07:21 AM

END OF REPORT

Project: Get Involved
map: Survey for Map - 453
Question: Your Comment

No.	Contribution	Author	Posted at
1	Would be open to membership on Group Panel that was advertised on Twitter/media.	[redacted]	22 Mar 2018, 03:32 PM
2	During a heavy rain, street often will be covered over with water.	[redacted]	23 Mar 2018, 03:50 AM
3	.	[redacted]	23 Mar 2018, 06:36 AM
4	Flooded Basement	[redacted]	23 Mar 2018, 06:38 AM
5	Parkview Ave was fully inundated from Edgar to Tranby	[redacted]	23 Mar 2018, 06:38 AM
6	We have had flooding from the floor drain 3x. After the 1st time we had back flow protection added. 2nd and 3rd water issues were less intense -water seeped up floor drain, around base of basement toilet and tub drain In all three situations water level in sump pomp pit remained low.	[redacted]	23 Mar 2018, 07:02 AM
7	August 2017 basement flooding. Insurance claim paid was more than $40K.	[redacted]	23 Mar 2018, 07:08 AM
8	We are unsure of where the flooding came from.	[redacted]	23 Mar 2018, 07:08 AM
9	Keeping tabs on what's being done to fix this. If this happens again because of the sewer system in this city, I can't even imagine the uproar it will cause.	[redacted]	24 Mar 2018, 08:33 AM
10	I had about 4inchs of water in my basement.	[redacted]	25 Mar 2018, 10:28 AM
11	aug 2017 1"water in bsmt	[redacted]	25 Mar 2018, 04:39 PM
12	water inTimber Trail	[redacted]	25 Mar 2018, 04:40 PM
13	Theris a drain on Cousineau rd. I have been told by city administrators in the Engineeing Dept. that this drain gets cleaned out every 12 years.People living on Cousineau that have been living on Cousineau Rd.say they have never seen the drain cleaned out. @ years ago the city did a minor clean.	[redacted]	25 Mar 2018, 04:45 PM
14	The water rose to 3 feet in my basement. It came up from the floor drains, and in through the back door and crawlspace access.	[redacted]	26 Mar 2018, 06:50 AM
15	The water was deep enough to stall cars during the storm. My house seems to be at the low point of the street. When trucks and cars could make it past the flooding, it would send a wake to my porch steps. There has always been more water in front of my house than the rest of the street and there is usually a constant puddle at the end of my driveway.	[redacted]	26 Mar 2018, 06:54 AM
16	The catch basin that is here is usually blocked. Because the area is very flat and because of the absence of curbs, the water goes where ever it wants.	[redacted]	26 Mar 2018, 06:58 AM
17	Hello: I am letting you know that we had flooding last year Aug/2017 and the year before in Sept/2016. This was through our sub pump. We has our down spouts redirected to the lawns, we had a check valve and we had a sub pump that was working and STILL we got flooded. This is after we had NEW sewers and streets put in 4-5yrs ago. We also got flooded in 2010 Sept. as well.	[redacted]	27 Mar 2018, 05:18 AM
18	We have had surface flooding due to water NOT being able to flow down the NEW sewers that had been redone in the last 4years. Then, it was if someone flipped a switch and the sewers began to whirl pool and relieve the water that was up past out curbs onto our lawns. There something going on here that the City is NOT letting us know. We then have to use OUR insurance to help with our basement flooding....this is wrong!.	[redacted]	27 Mar 2018, 05:24 AM

19	Since 2010 we have had 3 floods in out basement. In 2016 and again in 2017. This has to stop and the City needs to take the blame with why?. There seems to be an issue with OLD or in-OP Pumps that City Employee's do not operate at the time of the rain storms. I don't care what you tell us or how you lie to us, this is the problem. We have had NEW sewers put in 4 years ago and still we flood. I asked the City to put in larger sewers tubes and I was told this is regulation and it enough. Apparently, its NOT. I have been told that pumps where NOT turned on or that one pump was in-op at the time of flooding...this I truly believe and OUR City Officials are ALL lying to us. Our pumps need to be larger, newer, operated by a human at the time of flooding/rain storms and not turned on AFTER we have a down poor. Our City sewers need to be LARGER, not "regulation size" that is no longer suited for this water/rain/storms. Stop lying to the Citizens of Windsor and own up to what is really going on. Stop telling us that OUR Government will help with the assisted flood funds, THEY WILL NOT HELP US because OUR basements are not a "main living quarters". Making us put in "check valves" and " sub pumps" ARE NOT THE ANSWER either. Its OUR City infrastructure/pumps/sewers that are the problem.	[redacted]	27 Mar 2018, 05:37 AM
20	We had between 4-6 inches of water after the Aug 2017 storm. This was the 4th time in 3 years, the last 2 being after installing a sump pump and back flow valve.	[redacted]	27 Mar 2018, 08:55 AM
21	2016: Flood-water came down St Louis & Riverside Drive onto our property @ 5720 Riverside Drive E flooding us to a depth of about 2' then on into the Detroit River. 2017: same as above but this this the sewers were so overwhelmed they blew off the manhole covered and geysered up to a height of 2' - 4' above the road surface	[redacted]	27 Mar 2018, 10:23 AM
22	Just relocating the pin & sending another photo	[redacted]	27 Mar 2018, 10:25 AM
23	Basement floor and crawl space flooding.	[redacted]	28 Mar 2018, 12:02 PM
24	this was taken earlier in the day before maximum flooding on the street. It came up about 6 feet onto our from lawn, over the curb.	[redacted]	28 Mar 2018, 12:06 PM
25	Back yard flooding	[redacted]	28 Mar 2018, 12:12 PM
26	I have lived here for seven years. Over the past year and a half, we have had two significant floods (the last of which we had 18" of water in the basement). The roads (Sumach and Garden Court) have never been resurfaced and we have no sidewalks for my children to safely travel away from vehicles. We need upgrades on these roads, as nearly all surrounding roads have been improved.	[redacted]	14 Apr 2018, 11:34 AM
27	I realize that many areas looked like this on August 29, 2017. However, our road is in terrible shape and gets completely ignored by the city in spite of our high property taxes. All surrounding roads and sewers have been upgraded. I speak for all of my neighbours when I say, please help!	[redacted]	14 Apr 2018, 11:39 AM
28	Just another view from August 29, 2017.	[redacted]	14 Apr 2018, 11:40 AM
29	Our home was built in 1984. The storm of August 29, 2017 caused it's very first basement flood. This was the case for 4 neighbours around us as well.	[redacted]	15 Apr 2018, 08:07 AM
30	This is a picture of Garden Court during the rainfall on April 15, 2018. The state of this road and Sumach Crescent are not meant to withstand any significant rainfall before massive pooling of water takes place. Add to this the constant patchwork of potholes, and roads not conducive to kids playing on rollerblades/scooters, etc. and the need exists for resurfacing. The curbs are broken and my kids have tripped and fallen while walking to school.	[redacted]	15 Apr 2018, 11:46 AM

31	Just another close-up picture of the state of the roads at Garden Court and Sumach. This is the curb that keeps getting patched rather than properly fixed. The city's help in upgrading this neighbourhood, so that we're better prepared to handle significant water events, would be much appreciated.	[redacted]	15 Apr 2018, 11:53 AM
32	It seems strange to me that sump pumps bring water into the house and then (attempt to) expel it. It sounds like a disaster waiting to happen.	[redacted]	15 Apr 2018, 02:33 PM
33	I don't know how water came in the house, but our back yard drain was not draining & back yard was covered with lots of water, it looked like a lake. Our back yard drain always works fine & we don't get flooded. But both times when we flooded, back yard water was not draining (see picture). We have 2 sump pumps, 2 back water valves & overflow. We would appreciate some city help & review.	[redacted]	19 Apr 2018, 06:00 AM
34	Street	[redacted]	20 Apr 2018, 11:01 AM
35	At the foot of Reedmere and Riverside Dr, significant pooling of overland water from the entire area, flooding residences house and basements. Property damage extensive	[redacted]	29 Apr 2018, 05:08 AM
36	Overland flooding along Riverside Drive, drowning homes	[redacted]	29 Apr 2018, 05:12 AM
37	Large pooling of street and overland water pooling at the foot of Reedmere and Esdras from Wyandootte. Current Residence flooding basements and craw spaces become retention ponds	[redacted]	29 Apr 2018, 05:17 AM
38	surface and basement flooding	[redacted]	13 Jun 2018, 12:30 PM
39	water coming in through my foundation wall	[redacted]	13 Jun 2018, 01:28 PM
40	1972 Jefferson street floods two three times a year in fact well over the curbs, I have three systems in my sump pit and if loose hydro have generator ,have back up check valve in sewer pipe which I check yearly. Rain water leaders are directed over lawn, on this street this should be enforced . Sewer system is a combination sanitary/storm	RP	20 Jun 2018, 11:29 AM
41	2013 flood due to sump pump being overwhelmed.	[redacted]	26 Jun 2018, 07:21 AM
42	SW Corner of Eastlawn Avenue and Wyandotte street East.	[redacted]	07 Jul 2018, 09:39 AM
43	Flooding in previous years, at least 3 times. Installed backwater valve with support of city, no floods for last 3 yrs after install.	[redacted]	11 Jul 2018, 01:26 PM
44	I have water seeping into my basement through the foundations, mostly where the walls meet the floor. Seepage is only on the front and back sides of the house (the sides share walls with the neighbours and so are not in contact with groundwater).	[redacted]	01 May 2019, 08:55 AM

END OF REPORT

Project: About the Master Plan
Qanda: Q&A

No.	**Contribution**	**Author**	**Posted at**
1	Are sewers going to be replaced on Chilver Road?	[redacted]	27 Jan 2019, 12:01 PM

END OF REPORT

WINDSOR FLOOD SURVEY

Help us understand what flooding in Windsor means to you and your community.

Participate in a short, voluntary survey between
April 5th to May 15th, 2018:

floodsurvey.ca/windsor

Participants can enter for a chance to win one of five
$50 Tim Hortons gift cards!

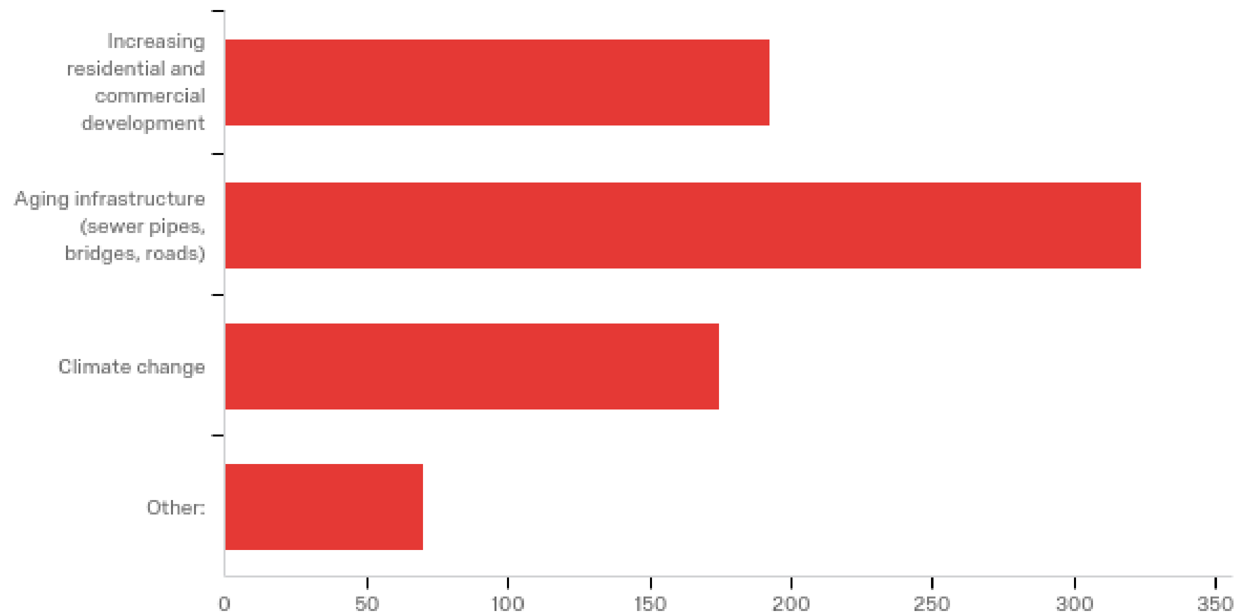
If you are unable to complete the survey online, please call the City of Windsor's 311 service (dial 311) – Operators will be happy to assist you over the phone.

Brought to you by Partners for Action, University of Waterloo
in partnership with the Canadian Red Cross and the City of Windsor

For more information, please contact Shawna Peddle at 519-888-4567 ext. 38938 or shawna.peddle@uwaterloo.ca.

This study has been reviewed by, and received ethics clearance through a
University of Waterloo Research Ethics Committee.

Q12 - What do you think is contributing to flooding in the City of Windsor? (select all the apply)



#	Answer	%	Count
1	Increasing residential and commercial development	25.33%	193
2	Aging infrastructure (sewer pipes, bridges, roads)	42.52%	324
3	Climate change	22.97%	175
4	Other:	9.19%	70
	Total	100%	762

Q12_4_TEXT - Other:

Other: - Text
I believe the pumping station was turned off.
lack of residential flood mitigation, e.g. swales, back flow valves, sump pumps, etc.
Failure of backup system at all of the municipalities

Don’t know

Perhaps main sewers are not large enough to handle the heavy rains caused by global warming

I love behind a park that floods every time there’s a heavy rain. I have put in an incident report with the city yet have heard nothing back and the park continues to flood

A lot of people do not clean out the drains in the city streets so they are plugged when needed.

Poor planing on city's part - sewer pumping stations not turned on? There has never been a flood in my neighbourhood in over 55 years that people have lived there.

Lack of response from city

Bad planning for areas at risk (new developments need to account for basement protection in most areas of town, plus use heftier infrastructure to channel away the substantial downpours we receive regularly).

Climate change is debateable, but something is different

The city needs another pumping unit to clear the water out. I think the water ends up in a traffic jam so to speak because the city’s pumps don’t remove it fast enough. It leaves low risk homes flooding. Build more pumping stations

Combination storm/sanitary sewers that hve not been fixed.

All of the above. My street had not flooded in 45 years. A new school and fireball was built on former parkland across the street. I recognize the storms and volume of rain is unprecedented. I am relieved a city wide master plan is planned. My opinion is recent sewer repairs in my neighbourhood were bandaids and have not taken into consideration the demographic changes in my neighbourhood or development.

major drainage channels are greatly undersized in several key locations i.e bottlenecks

City allowing houses to be built with deep basement in an area that was reportedly a wetland/swamp.

aging homes

Storm sewers only for road catch basins. No storm drainage for house and yard.

Inadequate City Pumps to discharge into sewers and no outlets for retention ponds when they are filled to capacity.

Cities lack of money towards infrastructure to achieve a fake 0% tax increase in property taxes.

they won't admit it but i believe it to be a pump failure

Homes built in flood plains with basements / Zero lot line properties with small properties prevent proper drainage i.e., neighbour's sump pump drains into my yard, I drain into theirs.

Not turning extra pumps at pumping station on soon enough

over the years various areas have flood i.e riverside

paid personnel are not clearing storm drains

home is at end of a street near a park where there are baseball diamonds; they raise the level of the diamonds with top soil, so water runs off into the street and affects their homes

gutter drain tied to sewer
STUPIDITY
suburban sprawl
since they started building a road to the Herb Gray Parkway, they averted piping to South Windsor area which has caused flooding issues
the amount of rain that fell in one day was unhead of
Residents who have not taken measures to change downspouts, returning water into the sewer
I feel someone or something failed and this caused the flooding. We had new sewers and street put in in 2016. never had water before
Improper infrastructure. They got rid of the huron drain and replaced it with an inadequate pumping station
lack of regular maintenance to sewers (cleaning, overgrown trees/roots, etc)
failure to "overbuild" new infrastructure to account for changing weather patterns
First 2 of the above plus recent work on Herb Gray Parkwy
The new Parkway
poor grading of properties, lack of proper drainage
Highway development parkway
storm sewers too slow to remove water.
Poor water management infrastructure.
The new 401 and all the work the did on Huronline. Grand Maris ditch does not drain like it used to.
New 401 Highway
all of the above
Combined Storm and Sewer piping
test
riverside 1966 sewers system
We need larger pumping stations and sewers for increased capacity in high risk zones it is not good enough to say it is all because of climate change we have to adapt
mismanagement by Municipality
Someone or something did not do their job.We had new roads and sewers put in in 2016. Before this we never had water in the 30 years we have lived in this house.
Overland water from city streets due to insufficient sewer capacity

I have had many roads replaced in my area recently and I think it was poor design. I have been in my house 20 yrs and had never had any water before then I flooded twice in one year even after I put in a new sump pump and a check valve after first flood

They have not been putting the property taxes paid toward sewer infrastructure for years. They rather put it towards Legacy Projects that marks in the red. I'd like to see an audit of the sewer surcharges and taxes of 20 years. Where's the money? The casino put in 25 million as did the province put 10 million. This is going to legacy projects? Why not roads (MEGA) post holes. What a joke Windsor has become.

improperly designed and size of sewer system

City failure to act to minimize flooding in the past ven though there was flooding before in storms

Our street was torn up a few years ago for repaving. At the time, the construction company noted that additional sewer work was required. I notified my city counsellor of the issue, who followed up indicating there was no additional funds in the budget to upgrade. Shortly after project completion, the road immediately adjacent to our home had to be torn up again, twice, to repair the sewer system.

pumping station not efficient

Combination of the above

our city trying to hold taxes from increase and not keeping up the infostructure

the city spends too much money on fina events and memorial cup parades

Gross negligence on water controls and systems - valve tampered with

construction work on street

Poor engineer plans

New 401 highway

development of the Herb Grey Parkway has impacted South Windsor

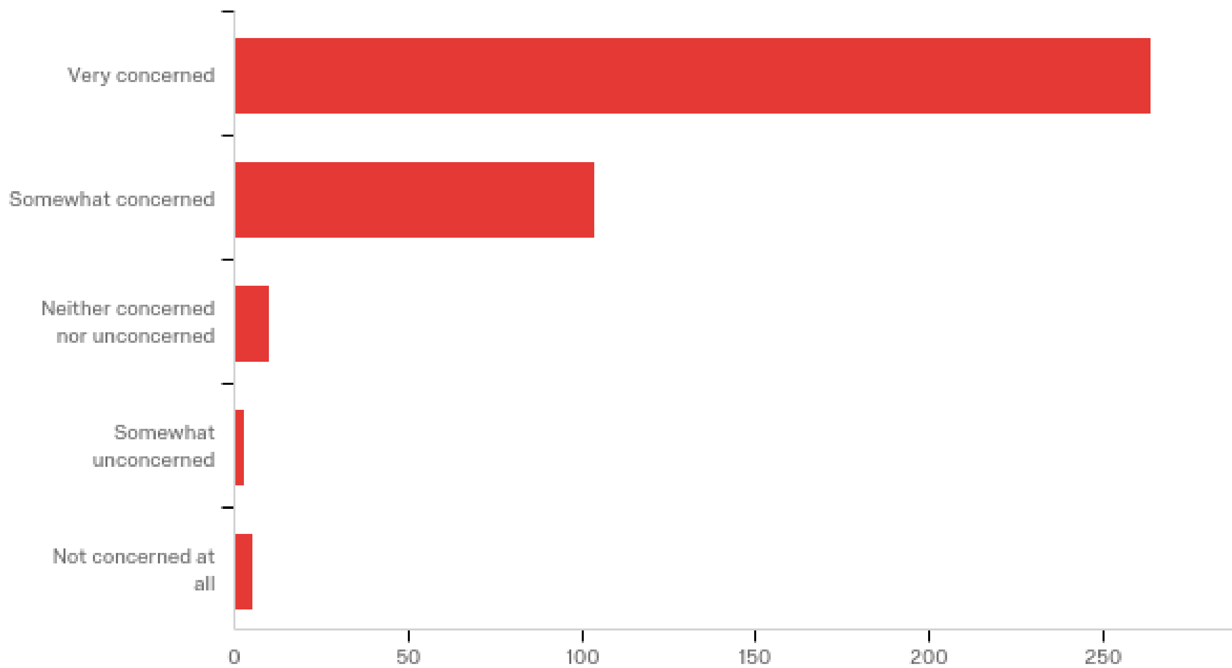
House is over 60 years old and nobody knows how it floods

I had a backyard drain (that we weren't aware of) that was connected to our weeping tile. This back yard drain caused my house to flood the second time in 11 months even after a sump pump and back water valve was installed after our first flood in 20 years of owning our home. The back yard drain didn't show up on the any documentation that the City of Windsor had on file

lack of sewer infrastructure

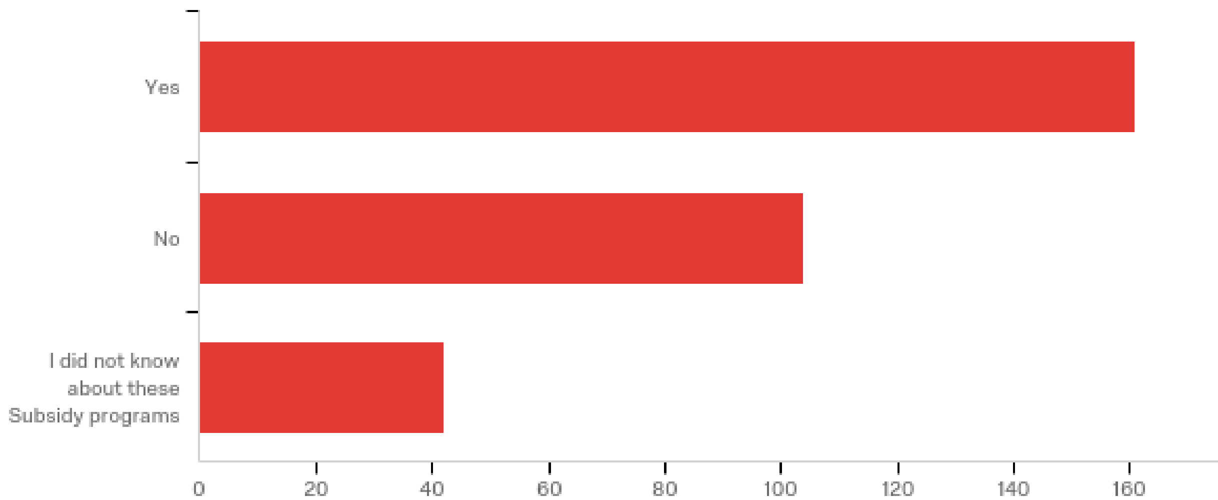
Pumps not turned on

Q13 - How concerned are you about future flooding? (select one)



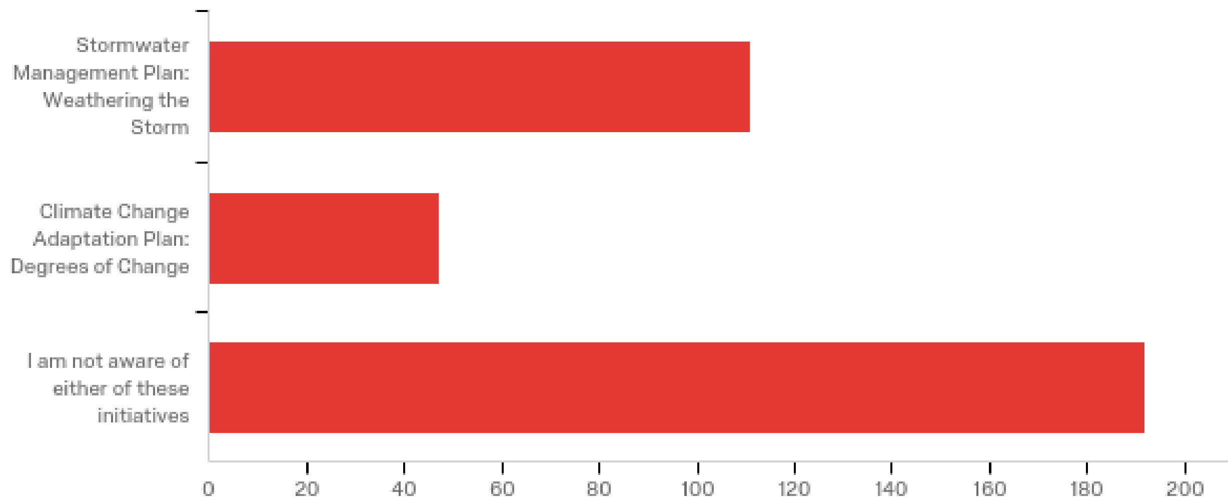
#	Answer	%	Count
1	Very concerned	68.39%	264
2	Somewhat concerned	26.94%	104
3	Neither concerned nor unconcerned	2.59%	10
4	Somewhat unconcerned	0.78%	3
5	Not concerned at all	1.30%	5
	Total	100%	386

Q28 - Have you taken advantage of Downspout Disconnect and Basement Flood Protection Subsidy programs offered by the City of Windsor? (select one)



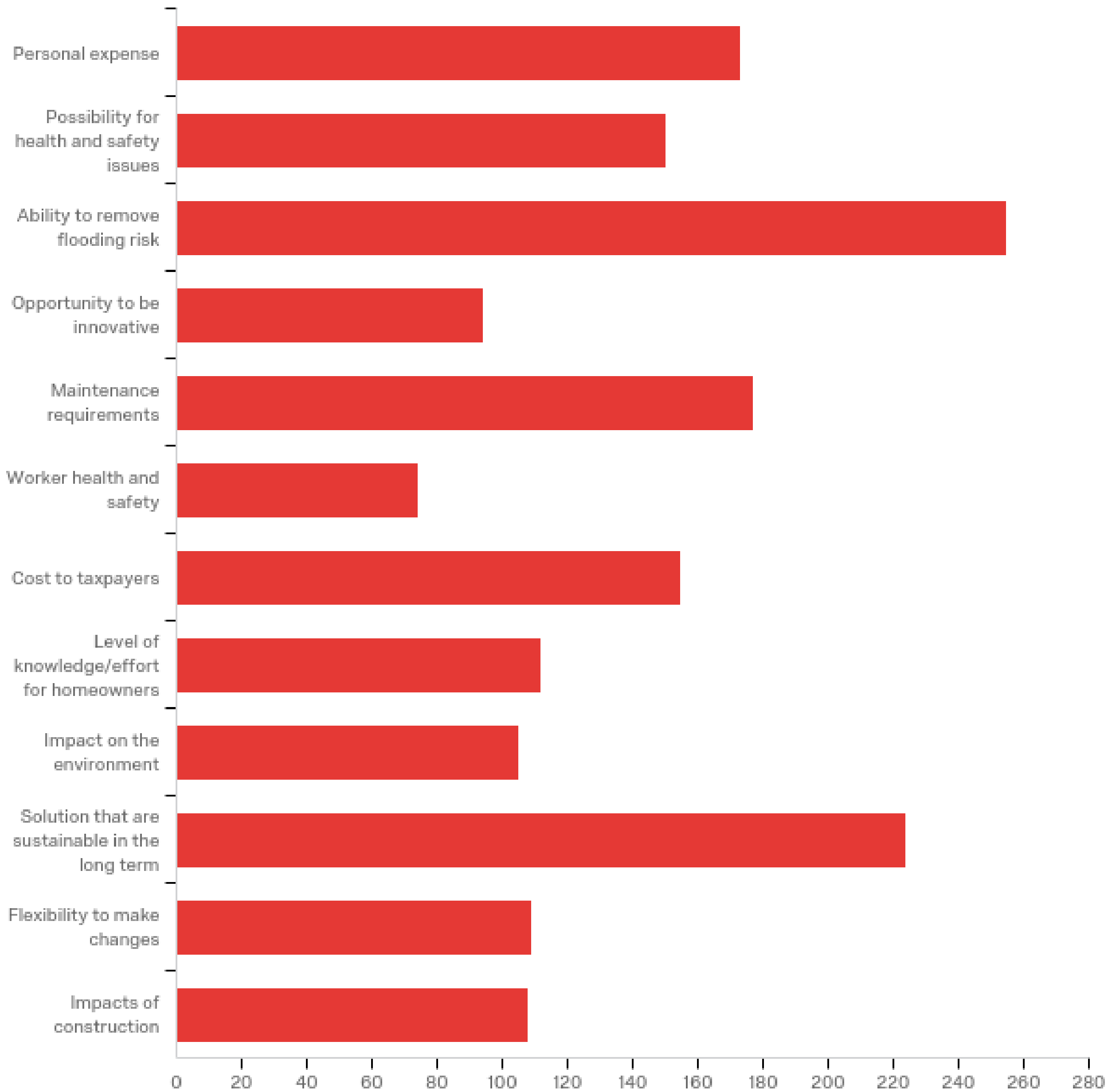
#	Answer	%	Count
1	Yes	52.44%	161
2	No	33.88%	104
3	I did not know about these Subsidy programs	13.68%	42
	Total	100%	307

Q29 - Are you aware of the following City-led initiatives to plan for a changing climate and future flood risk? (select all that apply)



#	Answer	%	Count
1	Stormwater Management Plan: Weathering the Storm	31.71%	111
2	Climate Change Adaptation Plan: Degrees of Change	13.43%	47
3	I am not aware of either of these initiatives	54.86%	192
	Total	100%	350

Q34 - The City of Windsor is preparing the City's Sewer Master Plan. The following two questions are in support of this plan. As part of the Sewer Master Plan the City of Windsor will need to make decisions about how to reduce flooding. Ongoing conversations with the City of Windsor community and technical experts so far have identified the following subjects that the City should consider when making these decisions. Please select all items from the list that you agree with:



#	Answer	%	Count
1	Personal expense	9.97%	173
2	Possibility for health and safety issues	8.64%	150
3	Ability to remove flooding risk	14.69%	255
4	Opportunity to be innovative	5.41%	94
5	Maintenance requirements	10.20%	177
6	Worker health and safety	4.26%	74
7	Cost to taxpayers	8.93%	155
8	Level of knowledge/effort for homeowners	6.45%	112
9	Impact on the environment	6.05%	105
10	Solution that are sustainable in the long term	12.90%	224
11	Flexibility to make changes	6.28%	109
12	Impacts of construction	6.22%	108
	Total	100%	1736

Q63 - Are there any other subjects or issues that matter to you which should be considered in the decision making process? Please explain.

Are there any other subjects or issues that matter to you which should be considered in the decision making process? Please explain.
They should be prioritizing spending at City Hall and ensuring tax dollars are being spend on improving the infrastructure that is having negative impacts on residents.
none
The city should consider enlarging the sewer systems if it allows more housing construction to begin
na
No
NO
Should not allow inappropriate construction in flood plains Promote planting of trees and having green spaces. They are like natural sponges. concrete and pavement does not absorb water, they shed it.
Not my expertise so unaware
Make landlord fix their rental property. I need them to fix my house it's a matter of health and safety for my son who have repository problem always
When planning development, make sure an area can safely handle the influx of homes, buildings, etc.
I would like to know how an insurance company can refuse to provide coverage for floods that was previously provided. Even if I get the back flow valve installed they will no longer cover me
na
I think there needs to be a larger emphasis on planning for future growth of the city. I feel that we are in the position we are today because people never really planned properly on how much the use of cement and the growth of the city would effect the drainage situation.
How viable are these ideas.
No
Not sure.
No
No
University of Windsor has an Environmental Engineering program that could work with the city in diverting water from our homes.
The cost of opportunity. For example, worker health and safety of 10 people is ok to be at risk if that saves the lives of 100. Impact on the environment is nothing compared to the garbage being thrown out of homes and the cost involved in repairing flood damage. Prioritize based on the cost of

omission... the cost of opportunities not taken is often greater than the small sacrifices to prevent an issue.

None

City Christmas lights and other quality of life issues must come after quality of life issues like sewage in your home. The Coty needs to prioritize the spending of the money they already receive to BASIC quality of life concerns and upgrade these systems.

Nothing else I can think of.

please refer to my comments on previous page

Want to know if there are any conditions that will cause me to be flooded and what I can do to prevent it.

no

No

Response time to when flooding / Emergency by public works to observe the disaster.

the last massive rain, the great flood of 17, there was nothing that could be done. it was just an issue of volume, which is something that the city should be able to adapt and manage. I can install all the back flow valves, and cover my windows and disconnect my downspouts, and it doesn't mean a drowned rat's ass if the GODDAMN STREET IS UNDERWATER.

No

n/a

No

give credit to the City for installing retention ponds in the East Side. However the retention ponds need an outlet to the Lake if they hit their capacity- otherwise as what happened in September of 2016- when the ponds are full they force water into the street drainage system and as they are at capacity the water is forced up into basement drains etc.

Overgrown trees that roots effect drainage systems. Overflow drainage retention ponds

Street cleaning

No

I think the city could rethink allowing further home building in flood areas without first having a levee/dyke in place BUT these costs should be borne via the home builders and owners. Alternatively, home building credits could be offered to rebuild in areas of the city that are no longer viable for commercial purposes.

No

Consultation with homeowners who have been directly impacted by the flooding over the last two years.

No, but the opportunity to hear your opinion are appreciated, especially through email or the internet, as with small kids it would be difficult to attend a public meeting.

They need to act quickly...

People in areas prone to flooding have to take real steps to protect their property, before and after flooding and not just rebuild the same after a flood occurs leaving the same vulnerability.

Already have stated this.

Nothing

A major artery in our city had over two feet of water. Never happened in all the years we have lived in our home. Then, in fifteen minutes, it disappeared. I do believe the somehow, someone goofed up and either turned the pumps back on that had been turned off.

Like I've said we on Jefferson Blvd 900 block have a new road, with up to date storm and sewer systems hover Ontario St had old storm sewer system, 800 block of Jefferson Blvd has old storm sewer systems, all putting back pressure on our 900 block Jefferson blvd storm sewers, causing water to be forced back into basement drains etc. Like I have already mentioned Dr. David Suzuki school grading was raised almost 2 feet, with drainage going north to south on the property, causing water to flow into Ontario St storm sewer system. Homes on Homedale behind hill that was built next to their backyards flooded to the point of completely flooding basements. The 900 block residents due to the severity of the rainfall, saw their backyards flood due to water from rainstorm planing over the surface of play yard of Dr. David Suzuki due to hard clay surface etc. The City has allowed in the Dr. David Suzuki school scenario, all the play area water to flow to Ontario St drains, and with the amount of rain that fell in a short period of time, caused the storm sewers in this area to be overwhelmed, as in the case of the 900 block of Jefferson Blvd, a new road etc, completely flooded with water lapping at out foundations, water flowing into basements that have not flooded before the David Suzuki School changes allowed by City engineers.

Be honest about what caused the floods, besides the weather.

Hard to create infrastructure for extraordinary events, however, the sewer/drain infrastructure is outdated in many areas and needs to be upgraded, sooner rather than later.. The peril is that extraordinary events may become ordinary events in the future, due to climate change.

They are NOT AUTHORIZED TO TOUCH ANGELL CONSTRUCTION PROPERTY WITB THEM PRESENT

barriers to obtaining flooding insurance

Nil

More park areas should have retention ponds; also been a problem in the City regarding the pumps being on or off during flooding -- not sure if the City is being honest about what they are reporting. Environmental people are so concerned about the sewer water entering the river, but it's better than the water going into their basements.

I've seen the city sewer trucks cleaning up. Awsome. Remind citizens to please take the time to clean grates. Arms Buminlang, sorry if I spelt it wrong. All four seasons. Clean your gutters pay someone to do so. Jobs for young safety minded entrapreners. I used to charge $100.00 they were happy to pay. We did do charitable work from time to time. We're people we help those in need. P.S. people need to shovel their sub pump drain lines in the winter.

Herb Gray Parkway pipe diversion to South Windsor

Stop building up the city so much. Maybe if we had some empty spaces, we wouldn't flood so much.

get it done

I think they have been covered in foregoing.

no

Don't reinvent the wheel - Look at what the Netherlands has done for the past 70 years... Some things are really simple and cheap.

Focus on flooding hot spots and most effective short-term solutions while long term solutions are developed

upgrade infrastructure to accommodate changing water levels which is a massive undertaking; definitely a civil engineering feat to be done

None

when the city allows future building for development that they include retention ponds for storm water for any major construction project relieving the strains on local tributaries to remove water from the area. this is sorely lacking in windsor.

Local area improvements vs overall sewer capacity improvements.

The cost to taxpayers is an excuse as with around 6000 flooded homes must taxpayers are paying to have their house fixed, its easier to pay increases in taxes than thousands to fix your house

Expense. Health. Safety

Responsible land use management. Stop urban sprawl, especially in low lying areas.

Impact of roads development to surrounding communities

No

Identify areas at highest risk

Communication.

Do not to lose anymore personal items. We have been flooded 3 times.

screw this question i wanna jerk it

Higher taxes are probably needed to solve this problem, but if it isn't solved, property values will decrease and people will move out of the city. The city engineers have known for decades that there is a problem and it is hard to deny climate change is getting worse - so lets not limit the solutions to little things homeowners can do individually. Let's do the big things only the city can do with the land and sewer systems to be prepared for the future.

Upgrading existing sewer infrastructure.

Na

No

n/a

What is it going to cost me as a taxpayer

No

restitution to the new tax payer who bought new homes in RIVERSIDE and were hosed by the city.

Add capacity not Xmas lights

Training and preparation of City staff in areas of retention ponds.

They should consult with the flood experts in the Netherlands

No

The City of Windsor has an acronym for a reason COW. It's a cash cow. They really don't care about my opinion. What I have to say therefore, is not relevant. I don't believe them as has been my experience for the past several years. Their priority is Legacy Projects not protect the services for the taxpayers. They have paid out 400 supervisors backdated pay for 2.8 workers each. Hence services don't matter to this current council and mayor.

To build more single family homes and less multi unit town houses. City is making East Riverside too dense. Overloading the sewer capacity

Main objectives, length of time before it is all done, who pays for the work required.

That our insurance companies can't deny us flood coverage or raise rates cause of flood risk area we live in

When town hall meetings were held post flood, it appeared the city counsellors did not wish to hear from the community, but just wished to state that this was an unusual event and would never happen again. Many residents were angry, so in future I think a more effective communication strategy should be considered.

Please: The city board should consider using the fond from our PROPERTY TAX for city improvements and safety before using our TAX MONEY for different uses like: CHRISTMAS DECORATION ETC...ETC..

1st fix what we have and keep the pumps running

Will new sewer line on Riverside Drive cause flooding problems for nearby streets during or after construction? Has future development and increased storm activity (climate change) been factored into the size of this sewer line?

No

There is No set process site for property owners, you have to research every step! In this case your Insurance Adjuster provides this info but due to so many claims this was left up to the home owner to find out on their own

will this lower insurance for homeowners.

The basement subsidy program isn't all it's cracked up to be. It's first come first serve, so you're not guaranteed a reimbursement if you have the work done. It's also a huge headache to get all of the paperwork filed, and it takes the city FOREVER to do inspections and pay people out. This area has a lot of people who struggle financially and can't wait 3-4 months to see that money come back to them, especially when it means a mortgage payment

No

The most important issues are the ability to reduce flooding risk, impact on the environment and sustainable solutions in the long term. I don't envision worker health and safety to be a big issue with public work projects in this day and age, but I could be wrong...

Infrastructure
Emergency electrical generators for residents to share or use in power outages.
They already know Riverside area is one of the worst spots in Windsor.
no
What areas will be getting improved first. It seems the areas that are prone to this aren't the same areas that are priority.
no
Proper pump management.
Better response time when you call the city with a concern regarding sewers in your neighbourhood
Consider the neighbourhood age
no
Make sure pumping stations are able to handle all the hundreds of new builds. Too many new buildings and no updates to infrastructure
2 “100 year” storms in a year should be carefully considered as it will surely be more frequent and infrastructure needs to preventative instead of reactive.
No.
I think that any issues that my husband and I may have are covered in the above question.
What does steaming the sewer lines do? And how are they going to be able to handle the extra water from all the new construction and all the refugees you keep brining in. They bring new diseases that we are force to get shots from. You wonder why our crime rate has increased. They bring there ways of living to us. Thanks for that.
Adding more houses to an already taxed sewer system is not helping. More pumping stations are needed
No
No.
Replacement cost for homeowners who cant get insurance due to being cancelled for floiding so often
no
None
Will our taxes go up and how much?
sewer diameters are too small and do not support large rain falls.
Urban planning and the abundance of surface parking lots.
The City needs to be quicker in there refunding of subsidy programs.
Not that I can Think of.

No.

In times of greater flooding, add staff to deal with inflation of subsidy applications and calls.

no

Our street has no storm sewers. We have ditches. We would like storm sewers to be put in.

how to minimize the impact to city streets?

No

no

The current 50 year storm model used by the city works department is outdated and needs to be amended in light of two storms in the past two years which exceeded to model. The infrastructure in my neighbourhood has not been updated since the homes on my street were built in 1952 and could not handle demand on the day if the storm, city needs to articulate their plan to ensure the likelihood of another similar event in the near term is reduced to the extent possible. My insurer has informed me that another flooded basement due to the same issues will cause them to remove my flood coverage from my home policy. I have neighbours who have already had their coverage revoked

no put more money into the sewers in the city

looking at areas that are more susceptible and what those residents can do about insurance, etc. many people have had multiple floods since 2016 - luckily not in my neighbourhood.

I want to see a plan that replaces infrastructure and reduces Flooding NOW.

No

NA

Severely restricting designation of future development lands to limit urban sprawl. There is insufficient population growth to support increasing the size and area of the city infrastructure. Windsor is like a family building a 5 bedroom house when the need and can only afford a 3 bedroom house. Better plans to revitalize areas where existing sewer infrastructure is in place.

N/A

Volume the system can handle.

no

I think the City of Windsor tax payers need to understand that it won't get better if our taxes don't go up. I have no issue with taxes going up to facilitate having the risk of flooding to decrease

Hire people that actually know what they are doing and be transparent. Stop the constant lies, corruption and incompetence.

After a flood, garbage is a huge problem. Waste management needs a plan to minimize this impact. People threw out items that could have easily been salvaged.

Sewage systems needs fixing prior to adding more neighborhoods.. city did not take any blame for the flooding and really didn’t help the citizens

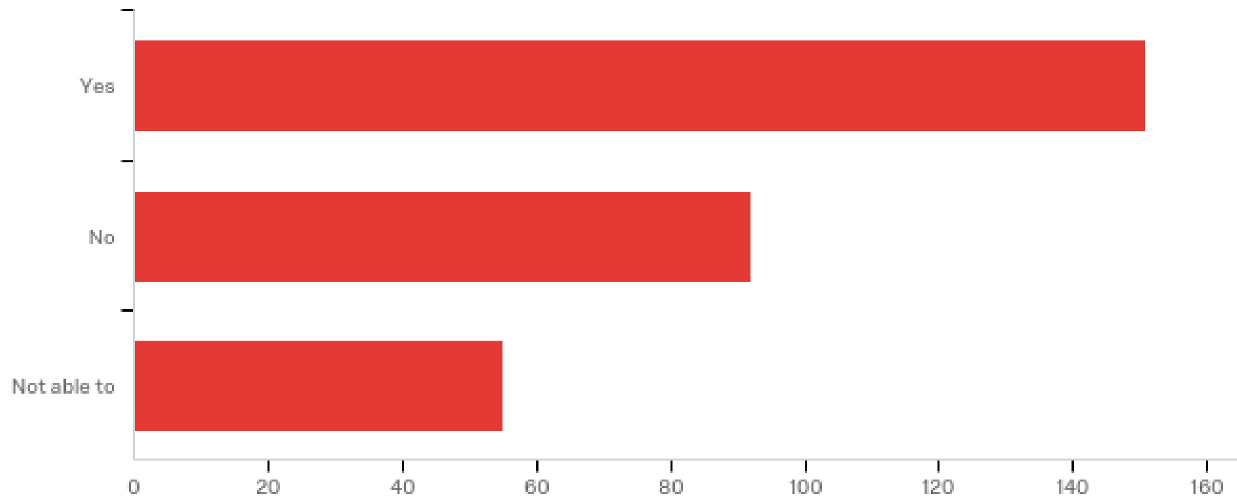
Please no "lipstick on pig" expenditures like Christmas lights, Aquatic Centre, etc until our base services in the city are working. Our roads are also embarrassing.

na

Worrying about tax freezes for city residents that have been done for many years in Windsor. Bearing annual tax increases to ensure improved infrastructure is happening is a greater priority than making people feel that they are saving money.

not that I can think of

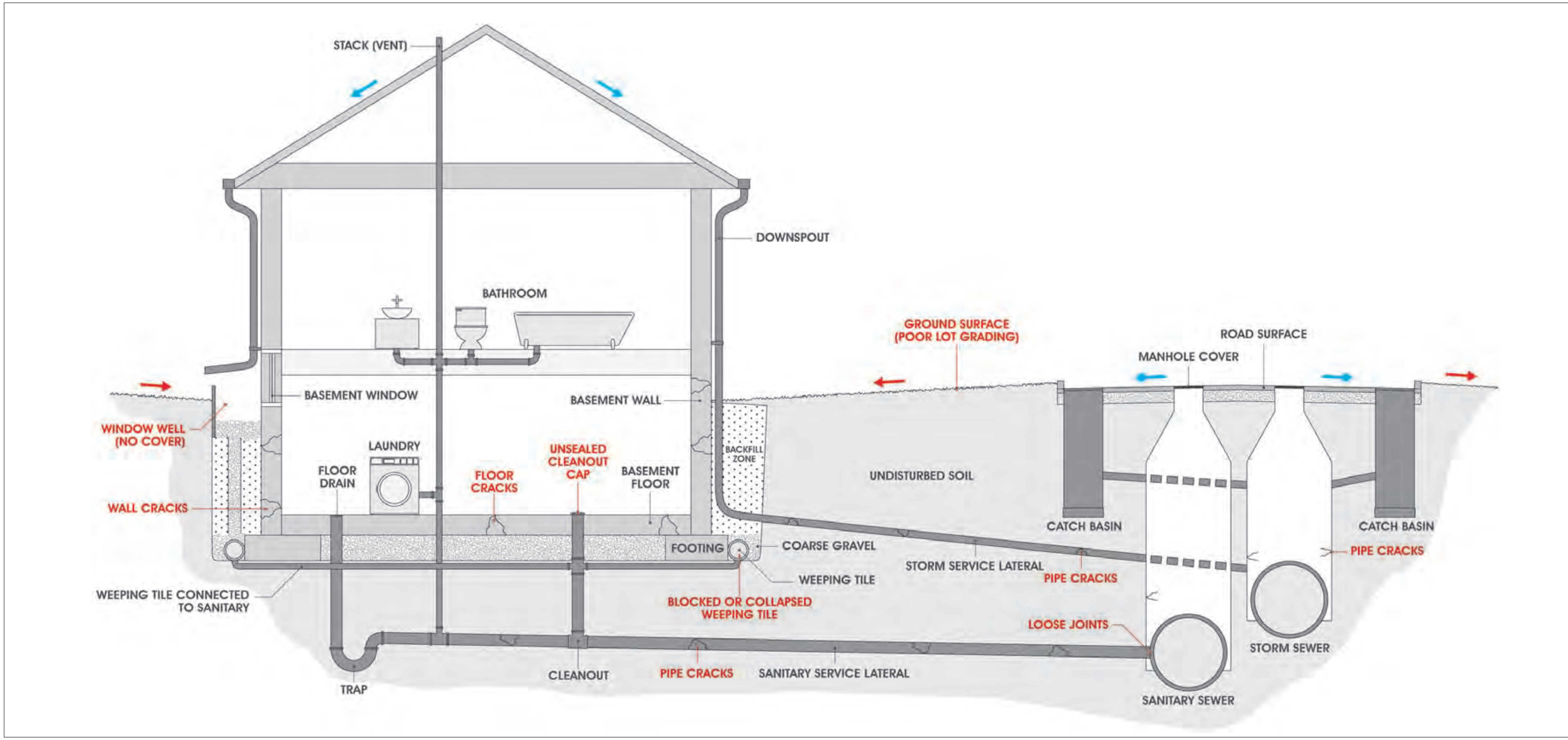
Q64 - The City of Windsor is currently developing a Sewer Master Plan to better understand flooding issues and serve as a guiding document to support decisions on how municipal servicing for wastewater and stormwater will be maintained and expanded. Public meetings will be held to obtain feedback from residents and business owners. Do you plan on attending a public meeting? (select one)



#	Answer	%	Count
1	Yes	50.67%	151
2	No	30.87%	92
3	Not able to	18.46%	55
	Total	100%	298

How flooding can occur in a home: Infiltration flooding, overland flooding and sewer backup

Some conditions that can lead to basement flooding

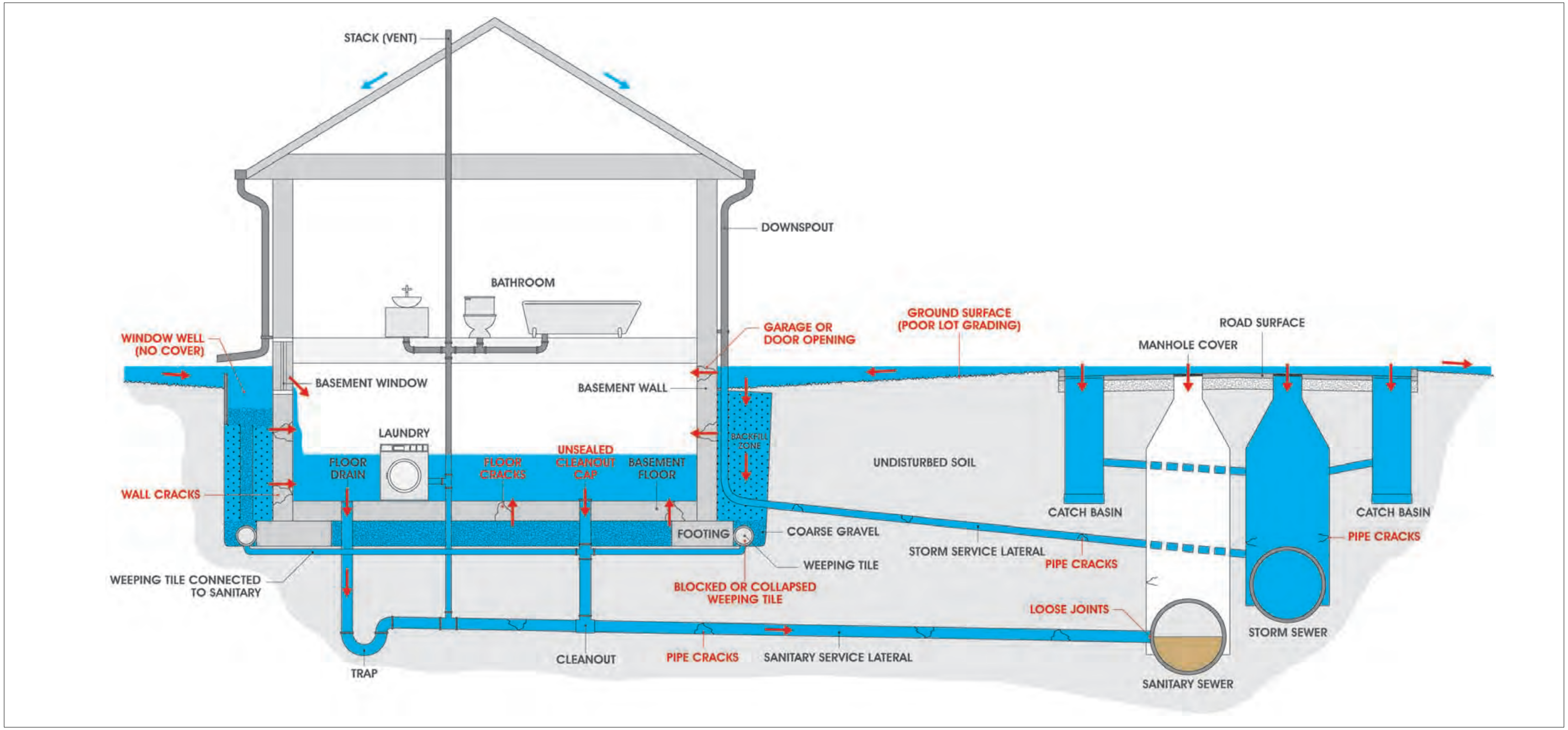


What to look for in this diagram

This diagram shows a home that is at risk of basement flooding from infiltration flooding, overland flooding and sewer backup. In this diagram:

- The cracks in the foundation wall and basement floor are unsealed.
- Downspouts are connected to the municipal sewer system or are discharging too close to the foundation.
- The yard is improperly graded and sloped toward the home.
- The weeping tiles are connected to the sanitary sewer lateral.
- The weeping tiles have not been maintained and are damaged.
- There is no backwater valve in place.
- The sewer laterals have not been maintained, are cracked and have loose joints.
- The storm sewer lateral has not been severed and is prone to exfiltration.
- The backfill area beside the foundation wall is uncapped.
- The sewer cleanout is uncapped and unsealed.
- There is no window well cover in place.

Overland flooding

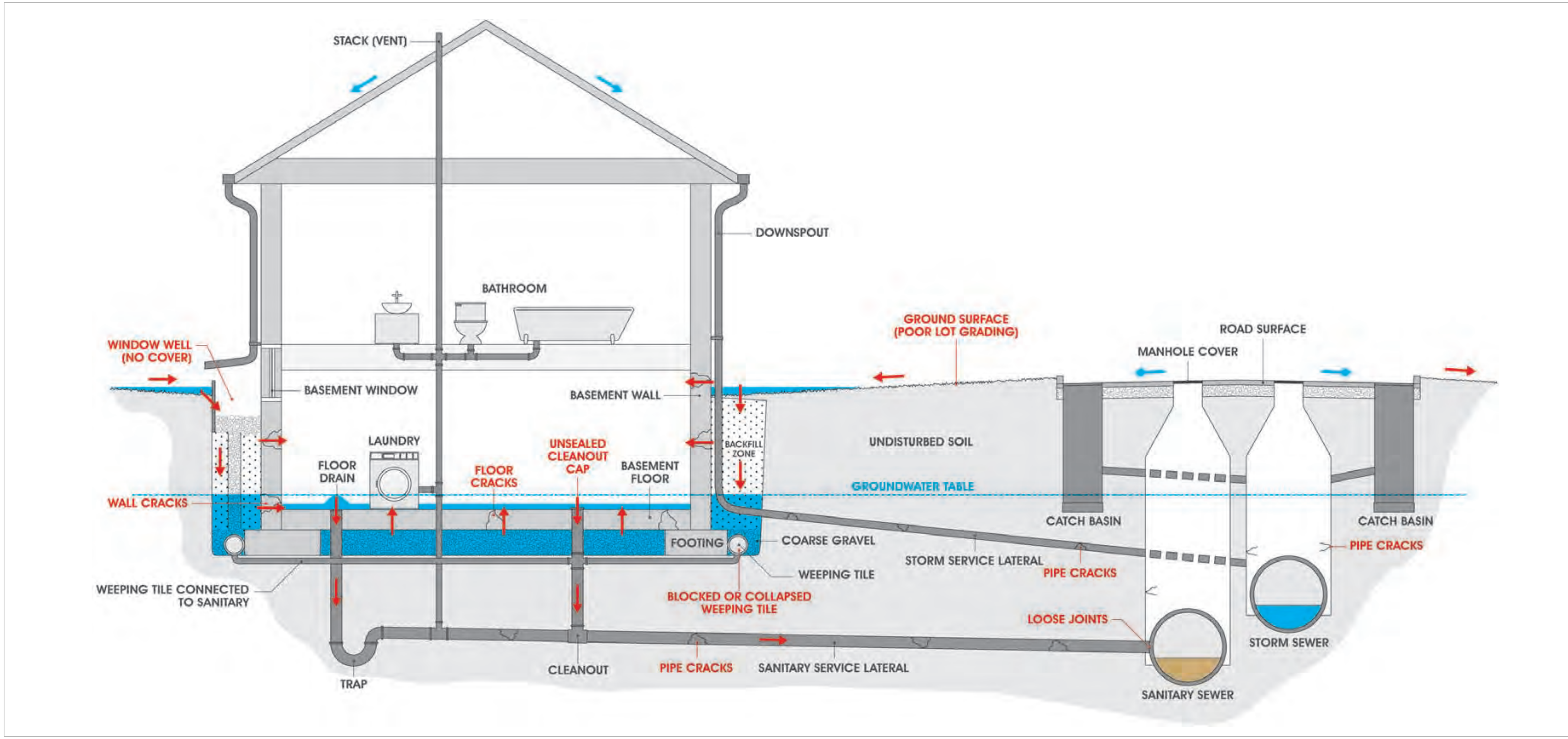


What to look for in this diagram

This diagram shows how overland flooding can enter a home, and how overland flooding can increase the risk of sewer backup in a neighbourhood. In this diagram:

- Excess surface water caused by snow-melt or a heavy downpour has caused the underground storm sewer to surcharge, and it is no longer able to convey water from the surface.
- Improper lot grading is directing surface water toward the home.
- Flood water is entering the home through the uncovered window well and the basement window. Flood water is also entering the home through other openings, including doors.
- Flood water has entered the backfill zone, and is entering the home through cracks in the foundation wall.
- Flood water in the basement is entering the sanitary sewer lateral through the basement floor drain and is entering the municipal sanitary sewer system. Excess water in the sanitary sewer system will increase sewer backup risk in the neighbourhood.

Infiltration flooding

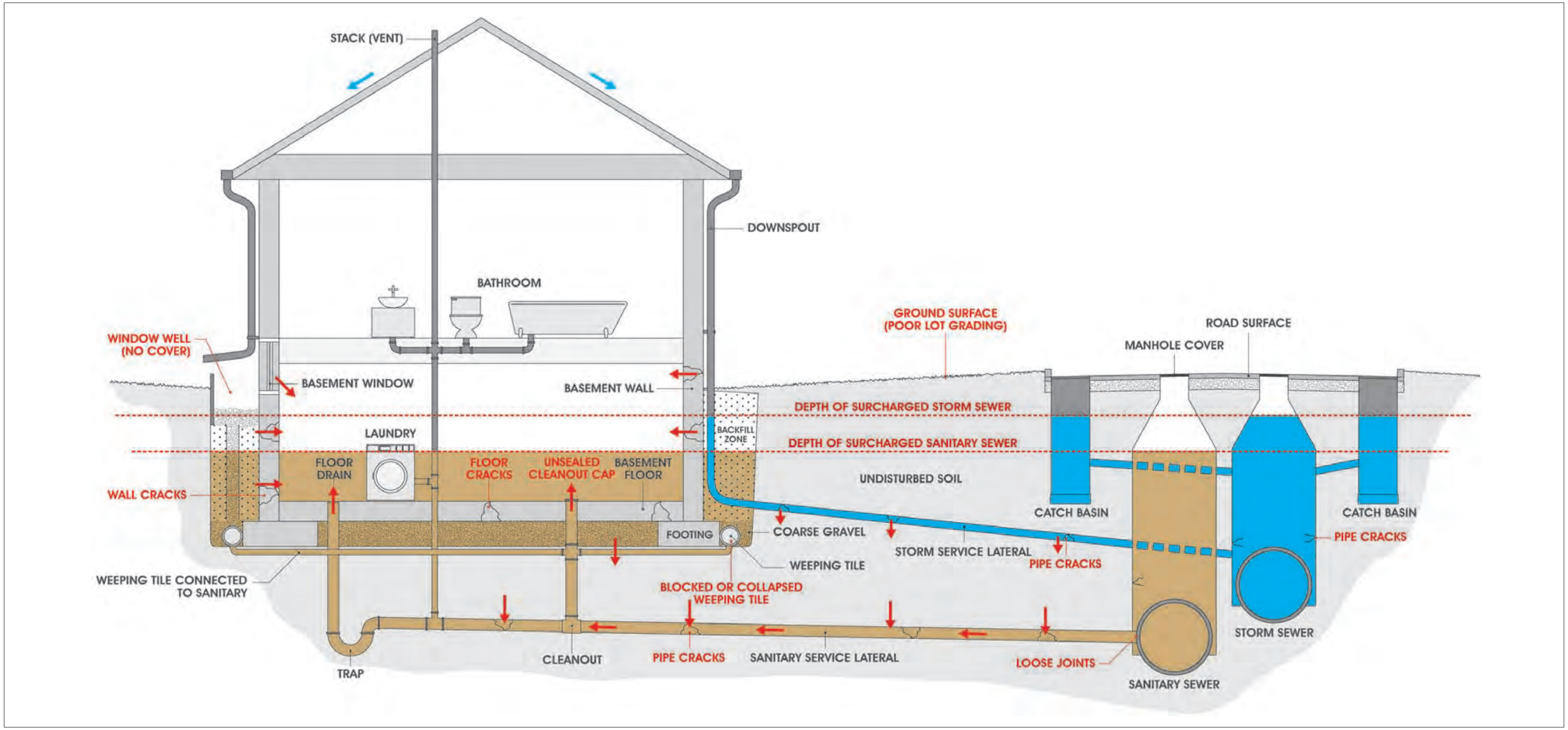


What to look for in this diagram

This diagram shows how infiltration flooding can enter a home. In this diagram:

- The groundwater level is higher than the basement floor.
- This groundwater is entering the home through cracks in the basement floor and foundation walls.
- Surface water has entered the backfill zone and is entering the basement through cracks in the foundation walls.
- The weeping tile is in disrepair and is unable to remove water from the foundation area.

Sewer backup

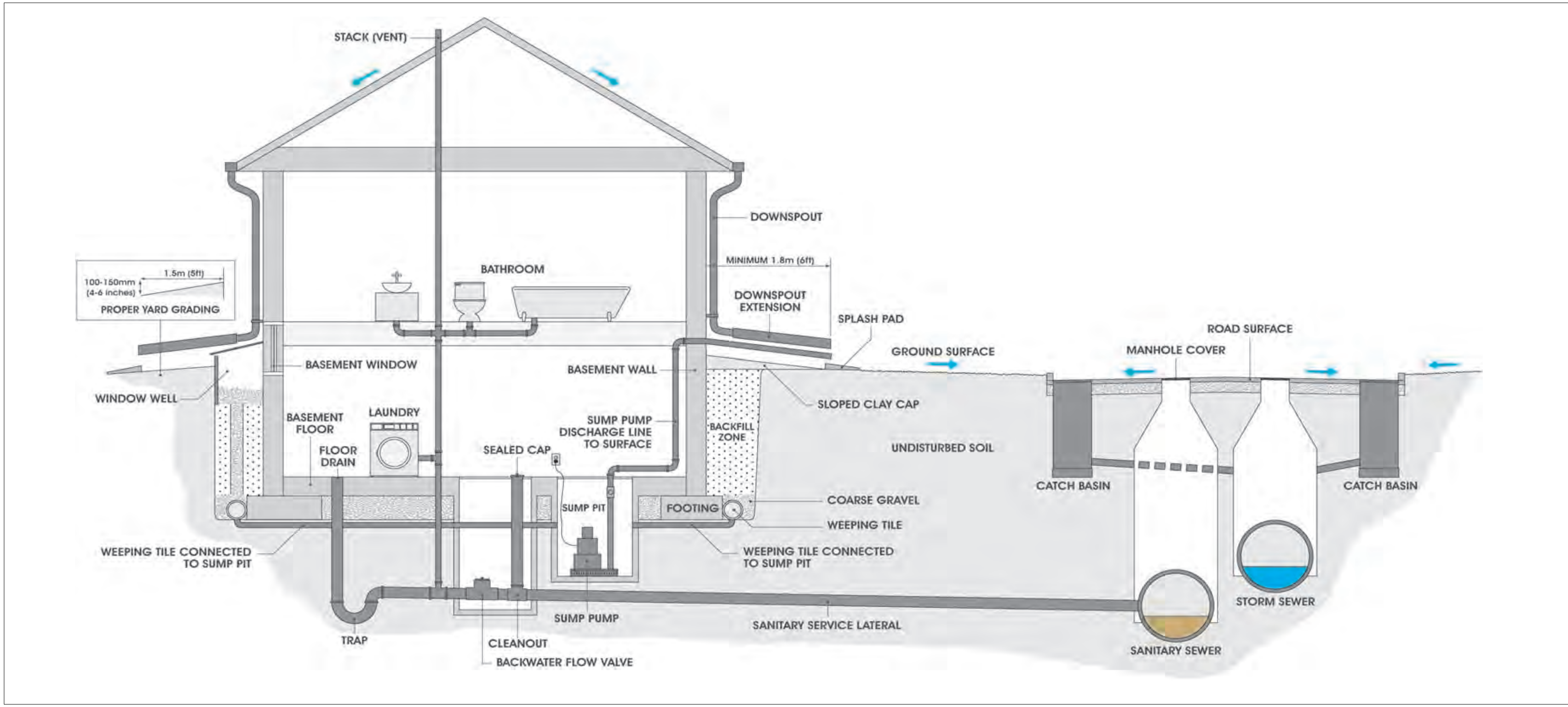


What to look for in this diagram

This diagram shows how sewer backup can enter a home. In this diagram:

- The sanitary sewer is surcharging and pushing sewage back into the home through the sanitary sewer lateral.
- Sewage is entering the basement through plumbing fixtures, including the basement floor drain and the unsealed sewer cleanout.
- Because the weeping tiles are connected to the sanitary sewer, sewage has been forced into the weeping tiles and is infiltrating into the basement through cracks in the basement walls.
- In this instance, the municipal storm sewer is also surcharging, and forcing storm sewage into the home`s storm sewer lateral. High pressure storm sewage is exfiltrating from the storm sewer lateral and entering the sanitary sewer lateral, thereby increasing the amount of sewage that enters the basement.
- The home`s sanitary sewer lateral is also in disrepair, and water is entering through cracks and loose joints.

Basement flood reduction in a typical two-storey home



What to look for in this diagram

The home in this image has been retrofitted with options recommended in this handbook.

To reduce overland flooding, infiltration flooding and sewer backup:

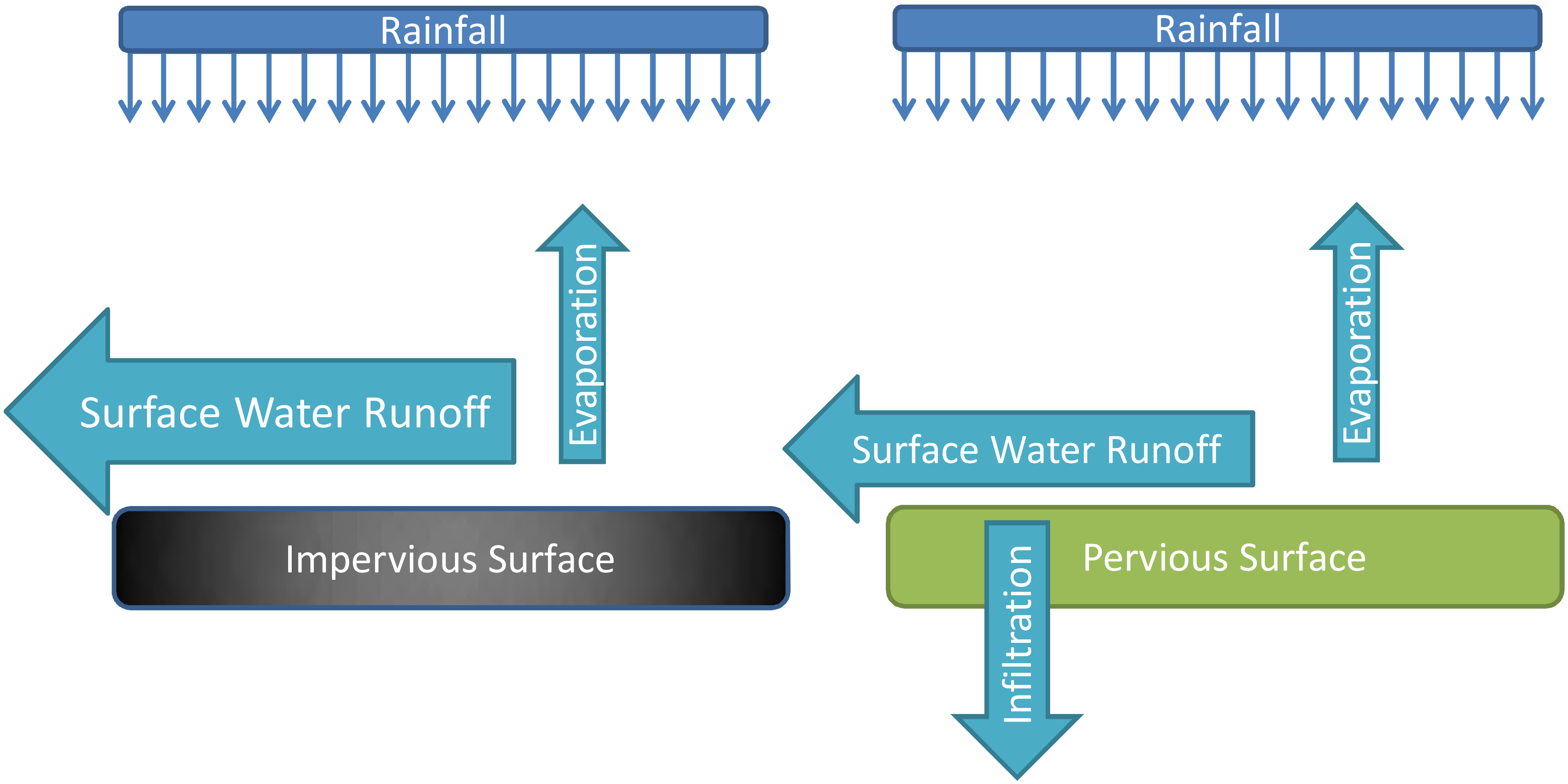
- A properly graded yard directs water away from the home.
- The backfill zone has been capped with an impermeable soil.
- The downspouts have been disconnected from the municipal sewer system.
- Extensions on the eavestrough downspouts and sump-pump discharge pipe keep water away from the home.
- A cover has been placed on the window well.

To reduce infiltration flooding:

- Cracks in the foundation walls and basement floor have been sealed.
- Weeping tiles have been repaired and are in good working order.

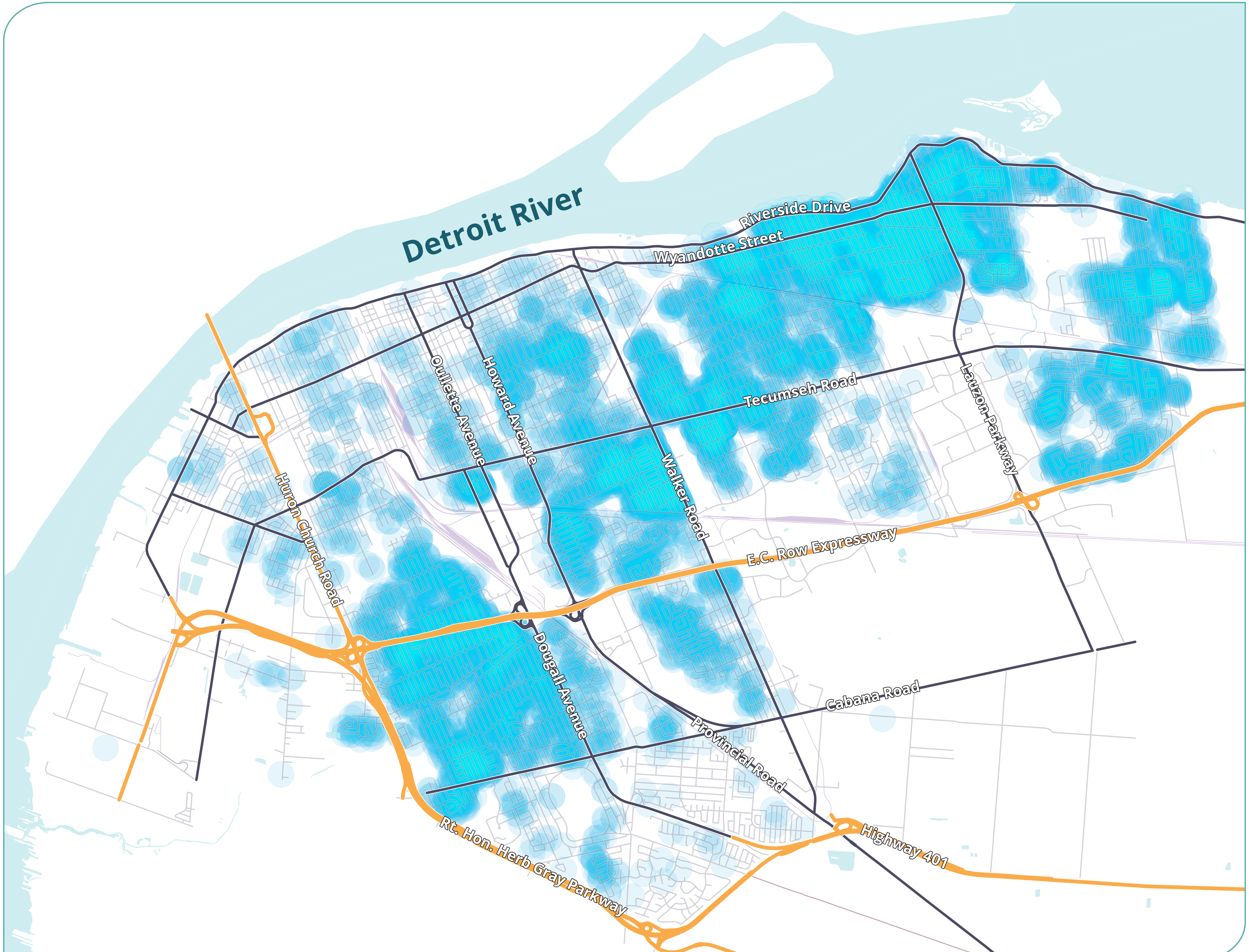
To reduce sewer backup:

- A mainline, normally open backwater valve has been installed in the sanitary sewer lateral.
- Weeping tiles are drained into a sump-pit, and water is pumped from the basement to the lot's surface using a sump-pump.
- Cracks and loose joints in the sanitary sewer lateral have been repaired.
- The storm sewer lateral has been severed.



Rainfall
Rainfall
Evaporation
Evaporation
Surface Water Runoff
Surface Water Runoff
Impervious Surface
Pervious Surface
Infiltration

Windsor Flooding from 2016 to 2017:
Reported Instances of Flooding



Legend

- Reported Flooding
- Highway
- Major Street
- Minor Street
- Rail

N

CREATED BY: Adam Boyce
CHECKED BY: Christian Jattan
DESIGNED BY: Christian Jattan

File Location:
\\dillon.ca\DILLON_DFS\Toronto\Toronto CAD\GRAPHICS - Planning_Projects\176638 Windsor_Drainage_MP\01-DE-SIGN

PROJECT:	STATUS:	DATE:
17-6638	DRAFT	02/23/18

DILLON
CONSULTING

ONE Since 2010, have you experienced flooding at your home?

- Yes
- No
- Don’t know/can’t recall
- No, but my neighbours, friends, or family experienced a flood at their home

IF NO, OR NOT AT YOUR HOME, SKIP TO QUESTION 9 (skip capability is built into online survey program)

TWO If yes, did flooding impact your daily activities, such as preventing you from going to school or work, preparing meals, bathing, doing laundry, or other activities?

- Yes
- No

PLEASE DESCRIBE__________________

THREE Since 2010, how often have you experienced flooding that caused property damage, financial loss, or negative impacts on your daily life?

- Never
- 1 time
- 2-5 times
- More than 5 times

FOUR Have you ever had to evacuate your home during a flood?

- Yes
- No
- Don’t know/can’t recall

FIVE If you answered yes to Question 4, how long were you away from your home?

- 1-2 days
- 3-5 days
- 6-10 days
- More than 10 days
- Have not yet returned home

SIX If you answered yes to Question 4, where did you go?

- Friends/family
- Community shelter
- Hotel
- Other: ______________________

SEVEN If your home has been flooded since 2010, what were the total financial losses for damage to your home from flooding?

- No financial losses
- Less than $499
- $500 - $999
- $1,000 – $4,999
- $5,000 – $9,999
- $10,000 – $24,999
- $25,000 – $49,999
- $50,000 – $99,999
- More than $100,000

EIGHT How did you pay for your recovery from the flood (check all that apply)?

- Personal savings
- Insurance
- Disaster assistance from the Ontario government
- Financial assistance from aid organization
- Financial assistance from friends or family
- Bank loan/RRSPs/remortgage
- Other: _______________

NINE If you own a business, has it been impacted by flooding since 2010?

- Yes
- No
- Don’t know/can’t recall
- Not applicable, I do not own a business associated with a property in Windsor

TEN Do you currently have flood insurance for your home?

- Yes
- No
- I am unable to get flood insurance for my home
- Don’t know

ELEVEN Do you live in an area that is at risk for flooding?

- Yes
- No
- Don’t know

TWELVE What do you think is contributing to flooding in the City of Windsor? (check all that apply)

- Increasing residential and commercial development
- Aging infrastructure (sewer pipes, bridges, roads)
- Climate change
- Don’t know
- Other: ___________________

THIRTEEN How concerned are you about future flooding?

- Very concerned
- Somewhat concerned
- Neither concerned nor unconcerned
- Somewhat unconcerned
- Not at all concerned

FOURTEEN How likely do you think it is that your community will flood again in the next five years?

- Very unlikely
- Somewhat unlikely
- Neither likely nor unlikely
- Somewhat likely
- Very likely

FIFTEEN What is your biggest worry regarding future flooding? (Check your top 3)

Your home and contents are damaged	
You or your family face an unsafe situation	
You have to evacuate your home	
Your work is closed for longer than 3 days	
Your school is closed for longer than 3 days	
Roads in your community are flooded or damaged	
Your electricity, gas or water services are unavailable for longer than 3 days	
Your home is unsafe due to mold, sewage, live electricity or gas	

SIXTEEN Think back to the most recent flood that impacted your home or community. How did you prepare before the flood?

SEVENTEEN Think back to the most recent flood that impacted your home or community. What did you do immediately before the flood?

EIGHTEEN Think back to the most recent flood that impacted your home or community. What did you do during the flood?

NINETEEN Think back to the most recent flood that impacted your home or community. What did you do after the flood?

TWENTY (A) There are many things you can do to protect yourself from flooding. Do you plan to do any of the following?

	Have already done this	Plan to do this over the next 6 months	Do not plan to do this over the next 6 months
KNOW YOUR RISKS			
Learn about your flood risk at home, on vacation, at school and at work			
Gather information on what you can do to protect your home and family from flooding			
If you rent, discuss your plans and responsibilities with your landlord			
PROTECT YOUR FAMILY			
Make and share a plan for what you would do in case of flooding			
Make and share a plan to evacuate from your home, condo, or apartment			
Make and share a plan with family, friends or neighbours for how you can help each other during a flood			
Gather enough emergency supplies for several days (food, water, first aid kit, portable radio, medications, important documents, etc.)			
PROTECT YOUR HOME			
Learn about your flood insurance options			
Identify a safe place for valuable items and documents			
Place valuable documents (e.g., marriage and birth certificates, passports) in waterproof containers			
Use water-resistant building materials in your basement			
Disconnect your downspouts from the municipal water system and extend them more than six feet from your foundation			
Grade your property so water drains away from your foundation			
Install a sump pump and/or backwater valve, and maintain it regularly			
Clear snow away from your foundation and keep storm drains clear			
Cover basement window wells and seal basement windows			

***If participants select "Do not plan to do this over the next 6 months" for any of the above options, they will be redirected to the following questions (skip capability is built into online survey program):**

TWENTY (B) Why do you not plan to do this over the next 6 months (check all that apply)?

- Not important
- Another flood won't happen here
- Not my responsibility
- Not effective to protect my home or family
- Won't protect me from other risks, like a fire or tornado
- Too expensive
- Takes too much time/effort
- Don't know how to do this
- Too difficult – not physically able/need help from others

TWENTY-ONE When preparing for floods, it most important to (check all that apply):

- Improve my (and my family's) safety during an evacuation or a flood
- Limit the financial impact and damage to my home and belongings
- Be useful for events other than floods
- Be inexpensive
- Take little time and effort
- Require little knowledge and skills
- Require little help and cooperation from others

TWENTY-TWO What is your most important source for weather information (select one)?

- Personal observations - storm clouds or heavy rain
- The Weather Network
- Internet websites
- Social media (e.g., Twitter, Facebook, Instagram)
- Local radio stations
- Local television stations
- Watches and Warnings from Essex Region Conservation Authority

- Cell phone/text messages
- Weather apps
- Family/friends/neighbours/coworkers
- Other: ___________________

TWENTY-THREE What are your top 3 ways to receive information on what to do before, during and after a flood (select three for each category - before, during, and after)?

	Before a flood	During a flood	After a flood
The Weather Network (website or television station)			
Resources on the City's website			
Emergency Services – Fire, Police, Paramedics			
Non-profit Organizations			
Pamphlets/brochures			
Social media (e.g., Twitter, Facebook, Instagram, YouTube)			
Community Meetings			
Local radio stations			
Local television stations			
Watches and Warnings from Essex Region Conservation Authority			
E-mail			
Text message			
Sirens			
Home or mobile phone call			
Family/friends/neighbours/coworkers			
Community organizations			
Faith organizations			
Cell phone "app" notification			
Other: ___________			

TWENTY-FOUR Who would be most helpful to you before, during or after a flood (check all that apply)?

	Before a flood	During a flood	After a flood
Friends/family/neighbours			
Fire or Police Services			
Faith leaders			
Community leaders			
Co-workers			
Municipal representatives			
Elected officials			
Community volunteers/non-profit organizations			

TWENTY-FIVE Think of the most recent flood to affect your home or community. What information did you lack that could have helped you prepare, respond to or recover from the flood?

- My local flood risk
- Local weather information/warning that heavy rain was coming
- What I could do to protect my home
- What I could do to protect my possessions
- What I could do to protect my family
- Evacuation information

TWENTY-SIX Have you taken advantage of Downspout Disconnect and Basement Flood Protection Subsidy programs offered by the City of Windsor?

- Yes
- No
- I did not know about these Subsidy programs.

TWENTY-SEVEN Are you aware of the following City-led initiatives to plan for a changing climate and future flood risk?

- Sewer Master Plan: Weathering the Storm
- Climate Change Adaptation Plan: Degrees of Change
- I am not aware of either of these initiatives

TWENTY-EIGHT What do you think the City could do to help you better prepare for floods?

- Online notifications of weather events
- More information on City websites
- Better cooperation with the Essex Region Conservation Authority to let you know when floods may happen
- Better advertising of City programs, such as the Downspout Disconnect and Basement Flood Subsidy programs
- Other:________________

TWENTY-NINE What would you do differently to prepare for the next flood?

THIRTY What advice would you give your friends and neighbours to help them prepare for flooding?

THIRTY-ONE Is there anything else you would like to tell us about flooding and being prepared in Windsor?

The City of Windsor is preparing the City's Sewer Master Plan. The following two questions are in support of this plan.

THIRTY-TWO As part of the Sewer Master Plan the City of Windsor will need to make decisions about how to reduce flooding. Ongoing conversations with the City of Windsor community and technical experts so far have identified the following subjects that the City should consider when making these decisions. Please select all items from the list that you agree with.

- Personal expense
- Possibility for health and safety issues
- Ability to remove flooding risk
- Opportunity to be innovative
- Maintenance requirements
- Worker health and safety
- Cost to taxpayers
- Level of knowledge/effort for homeowners
- Impact on the environment
- Solution that are sustainable in the long term
- Flexibility to make changes
- Impacts of construction

Are there any other subjects or issues that matter to you which should be considered in the decision making process? Please explain. Open ended box (300 character limit)

THIRTY-THREE The City of Windsor is currently developing a Sewer Master Plan to better understand flooding issues and serve as a guiding document to support decisions on how municipal servicing for wastewater and stormwater will be maintained and expanded. Public meetings will be held to obtain feedback from residents and business owners. Do you plan on attending a public meeting?

- Yes
- No
- Not able to

DEMOGRAPHICS

The following questions are intended to place your answers within the broader social context. The information in this section will not be used to identify you or your household. You may skip any question(s) that you do not wish to answer.

ONE How do you identify?

- Male
- Female
- Other
- Prefer not to say

TWO Are you a tenant or homeowner?

THREE What are the first 3 digits of your postal code?

FOUR How long have you lived at this residence?

- 0-2 years
- 3-5 years
- 6-10 years
- More than 10 years
- Prefer not to say

FIVE How many people (including children) live in your household?

SIX What is the size of your home?

- 0-999 square feet
- 1000-1,999 square feet
- 2000-2,999 square feet
- More than 3000 square feet
- Prefer not to say

SEVEN What type of property is your home?

- Apartment
- Condominium
- Townhouse
- Duplex
- Single story detached residence
- Double story detached residence
- Mobile home
- Social housing/seniors home/assisted living
- Other: ______________
- Prefer not to say

EIGHT What is your age?

- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45-64 years old
- 65-74 years old
- 75 years or older
- Prefer not say

NINE What is the highest level of formal education that you have completed?

- Completed grade school
- Some high school
- Completed high school
- Some college/university/trades school
- Completed college/university/trades school
- Completed post-graduate university degree
- Prefer not to say

TEN What is your current work status?

- Working full-time (35 or more hours per week)
- Working part-time (less than 35 hours per week)
- Self employed
- Student attending full time school (not working)
- Unemployed and not looking for work
- Full-time caregiver/parent
- Retired
- Prefer not to say
- Other: _____________

ELEVEN Which of the following categories best describes your total household income? That is, the total income of all persons in your household combined, before taxes?

- Under $20,000
- $20,000 to $39,999
- $40,000 to $59,999
- $60,000 to $79.999
- $80,000 to $99,999
- $100,000 to $119,999
- $120,000 or above
- Prefer not to say

MATRIX – LINKS BETWEEN RESEARCH QUESTIONS AND SURVEY QUESTIONS

RESEARCH LINK	QUESTION #	QUESTION TOPIC
Threat appraisal Flood experience	1 3	Have you flooded? How often?
Threat appraisal Understanding consequences	2 4 5 6 7 8 9	Did the flood impact your family? Did you have to evacuate? For how long? Did you have to pay to recover? Where did you find the funds? Was your business impacted? Do you have flood insurance?
Threat appraisal Understanding risk	10 11 12 13 14	Are you at risk? What's contributing to risk in Windsor? Are you concerned about future flooding? How likely is future flooding? How do you think future flooding would impact your life?
Coping appraisal Barriers to preparedness	15 16 17 18 19A 19B 19C 20	What did you do to prepare for the last flood? What did you do immediately before? What did you do during? What did you do after? What have you done to prepare/plan to do over the next 6 months/don't plan to do over the next 6 months? WHY don't you plan to do these over the next 6 months? What's the most important reason why you do not plan to do these over the next 6 months? When preparing, it's most important that these actions…
Messages, channels and champions	21 22 23 24 25 26	What's your most important source of weather information? What are your top 3 ways to receive information about how to prepare for, response to, and recover from floods? Who would be most helpful to you before, during, and after a flood? What information could have helped you prepare? Have you taken advantage of City programs to reduce basement flooding? Do you know of City initiatives to plan for a changing climate and increasing flood risk?

RESEARCH LINK	QUESTION #	QUESTION TOPIC
	27	How could the City help you prepare?
Advice	28 29 30	What would you do differently? Is there any advice you would give your friends/family/neighbours? Is there anything else you would like to tell us about flooding and being prepared in Windsor?
Volunteer for testimonial video?	31	
Demographics		

Appendix B-4

Pop-Ups Community Events

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THE CITY OF WINDSOR
ONTARIO, CANADA

BE PART OF THE CONVERSATION

The City of Windsor is undertaking 2 Plans with the goal of increasing resiliency and we want to hear from you.

degrees of CHANGE

The City's Climate Change Adaptation Plan (v.2)

Learn about the Climate Change Adaptation Plan here:
www.windsorenvironmentalmasterplan.ca

The City's Sewer Master Plan

Learn about the Sewer Master Plan here:
https://weatheringthestorm.ca/

#WeatheringWindsor

Weathering the Storm
THE SEWER MASTER PLAN

The City of Windsor is developing a Sewer Master Plan in order to identify remedial works to reduce the risk of flooding in the City. This important component of Mayor Dilkens' 8-point plan will help guide decision making for municipal budgets for these remedial works. The plan will be completed over the next 2 years and will identify improvement opportunities for both public infrastructure and private property in order to reduce the risks and impacts of flooding caused by wet weather.

Flooding Matters to All of Us

Intense storms over the last 2 years affected many homes and businesses in Windsor. On September 29, 2016, and August 29, 2017 we saw 144% and over 200%, respectively of the normal monthly rainfall amount in parts of Windsor within a 24 hour period.

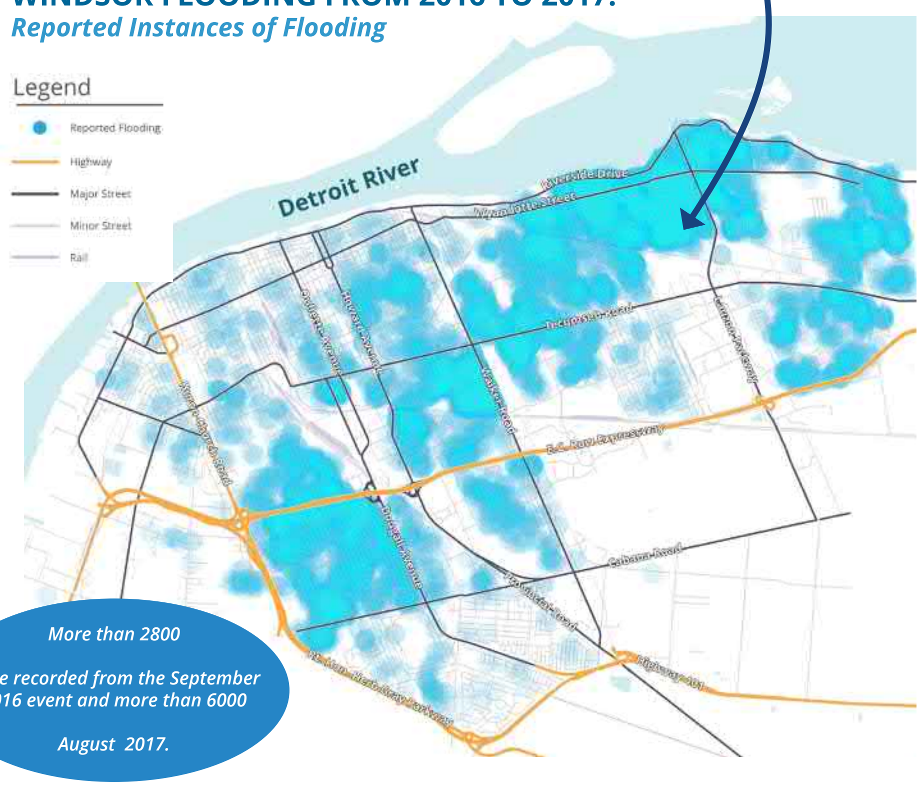
The result... widespread flooding of roads, homes and businesses across many areas of the City.

Windsor's Sewer System and Roads are Designed to Take the Water Away

The City maintains a sewer network system with over 1,800 km of storm, sanitary and combined sewers. Windsor's sewer systems are designed to carry rainfall from the size and intensity of storms that typically occur on average once in every five years. When storms are more intense than this, our roadways are designed to provide temporary storage of the extra water.

The reality is... the types of storms we are seeing are changing.

WINDSOR FLOODING FROM 2016 TO 2017:
Reported Instances of Flooding



More than 2800

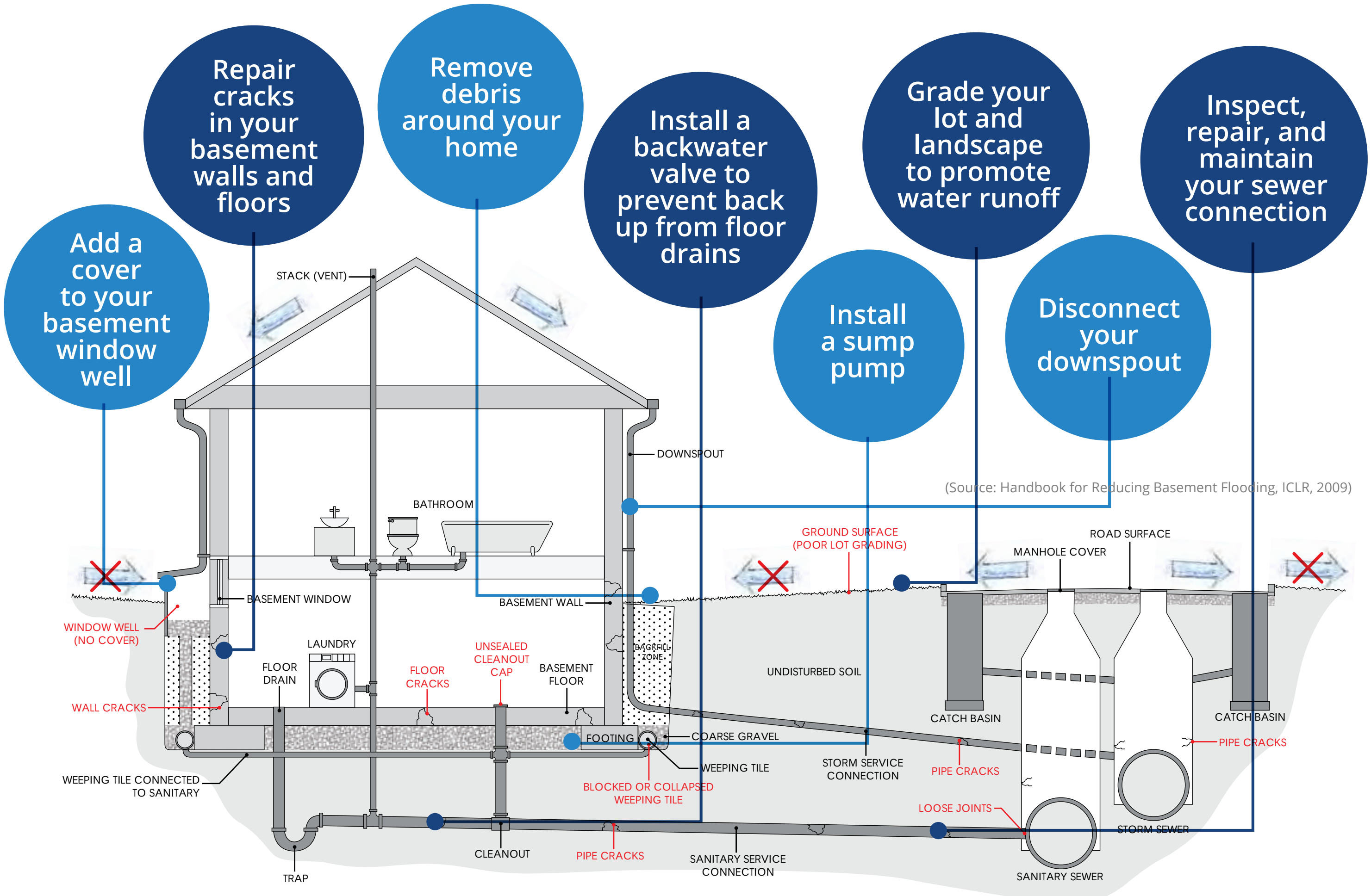
were recorded from the September 2016 event and more than 6000

August 2017.

THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

What Can I Do to Reduce the Risk of Flooding on my Property?



What is the City Doing to Help Private Property Owners?

- Offering a subsidy program for the installation of a sump pump and backwater valve,
- Downspout disconnection service is free of charge to residential homeowners,
- Providing free eeling of sanitary sewer connection, and
- Rebating part of the cost of replacement of the sewer lateral.

Stay Informed and Involved:

- Learn about the project by visiting the website at www.WeatheringtheStorm.ca or coming to an event
- Provide your ideas, insights and feedback at events, on-line or send an email to info@weatheringthestorm.ca
- Sign-up to the contact list today or through our website to get information on upcoming events

For more information and project updates visit
www.WeatheringtheStorm.ca

If you are interested in being placed on the e-mail list to receive future information, or if you have any questions regarding the Sewer Master Plan, please contact the project representatives:

Anna M. Godo, P.Eng
Project Lead
City of Windsor
350 City Hall Square W, 3rd Floor
Windsor, ON N9A 6S1

Flavio Forest, P.Eng
Project Manager
Dillon Consulting Ltd.
3200 Deziel Drive, Suite 608
Windsor, ON N8W 5K8

degrees of CHANGE

#WeatheringWindsor
CityofWindsor

THE CITY OF WINDSOR ONTARIO, CANADA
DILLON CONSULTING

THE CITY OF WINDSOR
ONTARIO, CANADA

degrees of CHANGE

Weathering the Storm

THE SEWER MASTER PLAN

Help us develop a plan to reduce the risks and impacts of flooding.

For more information and project updates visit
www.WeatheringtheStorm.ca

Let us know your thoughts by using the hashtag #WeatheringWindsor or email us at info@weatheringthestorm.ca

CityofWindsor

@CityWindsorON

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Pop-Up Event –Spin Wheel - 12 Questions

The spinning wheel activity is meant to provide an opportunity for kids to learn about flooding. The idea is for kids to spin the wheel 3x in exchange for a stamp in their event passport. Each question corresponds to a number on the spinning wheel. The questions are meant for kids around 12 years and under.

Guidance should be given as needed since to make it a fun learning opportunity.

1) Which of the following contains the most water?

- The world's oceans
- The Great Lakes
- The Grand Marais Drain
- The Nile River

2) Which natural disaster causes the most expensive damage to property?

- Floods
- Hurricanes
- Earthquakes
- Tornadoes

3) When heavy rain falls on an area in a short amount of time, floods can happen ______?

- Very quickly
- Very slowly
- Over a few days
- Over a week

4) Where were floods really appreciated for bringing in richer soil to the farmlands?

- Ancient Egypt
- Mesopotamia
- France
- The Golden Horseshoe

In ancient Egypt, people liked the floods along the Nile River because the floods brought rich soil for farming.

5) Why should you stay away from riverbanks and streams during heavy rain fall.

- Flash flooding
- Tsunamis
- Risk of thunder storms
- Sinkholes

6) Who is responsible for Flood Forecasting in Windsor?

The Essex Region Conservation Authority is responsible for monitoring the flow of streams and the level of water in lakes and rivers. This information is provided to municipalities, such as the City of Windsor, to prepare for potential flooding.

7) How does rain form?
Water droplets form from warm air. As the warm air rises in the sky it cools. Water vapor (invisible water in the air) always exists in our air. Warm air holds quite a bit of water. For example, in the summer it is usually very humid. When enough of these droplets collect together, we see them as clouds. If the clouds are big enough and have enough water droplets, the droplets bang together and form even bigger drops. When the drops get heavy, they fall because of gravity, and you see and feel rain.
8) What causes rain?
When clouds develop or rain occurs, something is making the air rise. Several things can make this happen. Mountains, low-pressure areas, cold fronts, and even the jet stream.
9) How fast do raindrops fall within one second?
• 3 to 8 meters • 15 meters • 20 meters Not including wind-driven rain, raindrops fall between 7 and 18 miles per hour (3 and 8 meters per second) in still air. The range in speed depends on the the size of the raindrop. Air friction breaks up raindrops when they exceed 18 miles per hour.
10) How do you measure rain?
Rain gauges provide the most accurate method of measuring rainfall at a single geographic point. To have operational value, the rain gauge report must be available in real time, and automated reporting networks are increasing.
11) How can I be safe in a flood?
Never play around lakes, streams and rivers without an adult. Go to higher ground if heavy rainfall and flooding occur. If you get caught in a flood, head to higher ground.
12) What should you do if you come upon flood waters?
Stop! Turn around and go another way.

Sources:

http://www.weatherwizkids.com/?page_id=66

http://easyscienceforkids.com/floods-quiz-fun-free-online-earth-science-kids-quizzes/

https://www.ngdc.noaa.gov/hazard/kidsquiz/#/quiz/Flash%20Floods

Weathering the Storm
The Sewer Master Plan

Date:	SEPT 25/18
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [x] Newspaper
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MASTER PLAN TO PROVIDE MORE EMERGENCY RELIEVE TO BYPASS ~~BY~~ ROAD FLOODING USING THE RIVER AND DITCHES TO BYPASS ROUTES

- MORE RELIEF PONDS IN OLDER RESIDENTAL AREARS

Mail to: Anna M. Godo, Project Lead, City of Windsor, 350 City Hall Square W, 3rd Floor, Windsor, ON N9A 6S1

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	23/SEPT 2018
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 23, 2018
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

[redacted]

1. How did you hear about the Sewer Master Plan?

☐ Newspaper
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☐ Direct mail invitation
☑ Other (please specify) Open streets.

2. Has your home been impacting by flooding?

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Needs upgrade.

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Ceiling caved in due to the one big rainfall that happened!

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More presence on Social media to spread the word.

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Good

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☐ Other (please specify) ______________

2. Has your home been impacting by flooding?

☐ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☐ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

Jan x2

Mail to: Anna M. Godo, Project Lead, City of Windsor, 350 City Hall Square W, 3rd Floor, Windsor, ON N9A 6S1

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [x] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [ ] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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Weathering the Storm
The Sewer Master Plan

Date:	23/9/18
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) open street windsor

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

I think it is a good idea and would be of great benefit to the Community

Mail to: Anna M. Godo, Project Lead, City of Windsor, 350 City Hall Square W, 3rd Floor, Windsor, ON N9A 6S1

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 23 2016
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) O.S.

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	22 Sep 2018
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [x] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☑ Other (please specify) email

2. Has your home been impacting by flooding?

☑ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☐ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 23/18
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) Open Streets Windsor 2018

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	9/23/18
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) Open Streets

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 23 2018
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) on anversary

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
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- [x] No

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THE CITY OF WINDSOR ONTARIO, CANADA

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Weathering the Storm
The Sewer Master Plan

Date:	Sept 23/19
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

- [x] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

we did our basement 3yrs ago

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

Nice flyer, but not enough info to comment past a point. Bit "fluffy", to be kind.

Ask questions of staff: very concerned about your process and for example skimpy short-term solutions @ this phase of the ~~plan~~ plan development

First suggestion: have union representation from relevant unions CUPE, IBEW, involved in process at front end. They know the system & process

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The Sewer Master Plan

Date:	Sept 23, 2018
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Local media
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- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) ______________

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The Sewer Master Plan

Date:	
Name:	[redacted]
Email Address:	
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Telephone:	

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- [x] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

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- [ ] Yes but more than 5 years ago
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DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Newspaper
- [ ] Local media
- [x] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

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6

Weathering the Storm
The Sewer Master Plan

Date:	Sept 22/2019
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [x] Direct mail invitation
- [ ] Other (please specify) ____________

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

More Green ways, less pavement.

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	
Email Address:	
Mailing Address:	
Telephone:	

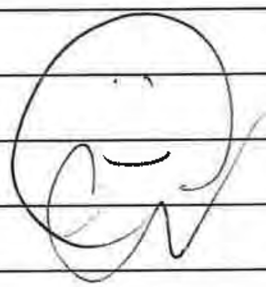
1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☒ Other (please specify) Open Streets

2. Has your home been impacting by flooding?

☐ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☒ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?



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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- ☐ Newspaper
- ☐ Local media
- ☐ From a friend or neighbour (word of mouth)
- ☐ Received information in the mail
- ☐ Direct mail invitation
- ☑ Other (please specify) openstreet

2. Has your home been impacting by flooding?

☐ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☒ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☐ Other (please specify) ______________

2. Has your home been impacting by flooding?

☐ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☐ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

____

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____

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Weathering the Storm
The Sewer Master Plan

Date:	Sept 22 /2019 [redacted]
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear abo [redacted]

- [ ] Newspaper
- [x] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
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Weathering the Storm
The Sewer Master Plan

Date:	Sept 22
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

- ☐ Newspaper
- ☐ Local media
- ☐ From a friend or neighbour (word of mouth)
- ☐ Received information in the mail
- ☐ Direct mail invitation
- ☐ Other (please specify) on open streets day

2. Has your home been impacting by flooding?

☐ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☑ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

With civil engineers included in solutions & we have professional ideas. Excellent

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 22/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

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- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) Open Streets

2. Has your home been impacting by flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [ ] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

Need more green space → more farm land
→ more park land

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept. 23
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) Open Streets

2. Has your home been impacting by flooding?

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DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 22/19
Name:	[redacted]
Email Address:	
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1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☑ Other (please specify) open streets

2. Has your home been impacting by flooding?

☑ Yes, at least once within the past 5 years ☐ Yes but more than 5 years ago ☐ No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

Mail to: Anna M. Godo, Project Lead, City of Windsor, 350 City Hall Square W, 3rd Floor, Windsor, ON N9A 6S1

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Weathering the Storm
The Sewer Master Plan

Date:	Sept 22 - [redacted]
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [x] Newspaper
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- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

2. Has your home been impacting by flooding?

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- [ ] Yes but more than 5 years ago
- [ ] No

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Basement Flooding Subsidy program has been great.

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 22 2019
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [x] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) Booth open streets

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

I Think this is a Great Idea.
With The Increase in Rain Water these Past Few Years, we Really need to invest in the Sewer Systems.
The Floods that happened in the Walker ville Area could have been Prevented with better Planning in our Sewer Infrastructer.

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) Booth - event

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- [x] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [ ] No

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Great idea. Especially in this area.
~~Rain~~ Need to seperate the rain water ~~&~~ sewer

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DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 22/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Local media
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- [ ] Direct mail invitation
- [x] Other (please specify) Open Streets

2. Has your home been impacting by flooding?

- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

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Good that they offer options to Home Owners to protect against flooding (sewer back-up).

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Weathering the Storm
The Sewer Master Plan

Date:	2019/09/22
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Received information in the mail
- [x] Direct mail invitation
- [x] Other (please specify) ______________

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- [ ] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [x] No

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

- SMP NEEDS MORE 'GREEN INFRASTRUCTURE ELEMENTS, POLICY + INCENTIVES
- CITY ENVIRO DEPT NEEDS TO CONSTRUCTIVELY CONNECT WITH BOTH CITIZENS AND SEWER M.P. COMMITTEE
- SMP COMMITTEE NEEDS DETAILS ON SUBSIDIARY EA + PLANS IE. SANDWICH SOUTH SECONDARY PLAN
- SMP COMM. NEEDS TO HAVE INDEP. EXPERT SPEAKER SERIES (SMP COM CITIZEN MEMBERS HAVE IDEAS - CONCERN TAKEN PLEASE)

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Sept 22 2019
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Direct mail invitation
- [x] Other (please specify) Openstreets

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DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date: Sep 22, 2019	[redacted]
Name:	
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Direct mail invitation
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- [ ] Yes but more than 5 years ago
- [x] No

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I think older parts of city need better drainage, esp. for lower-lying areas & basements. The embankments need reinforcements as flooding occurs every year! Plus, if all humans should wake up to the threat that global warming is, a lot can be done before it's too late. But humans are slow to learn, contrary to what they believe!

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Weathering the Storm
The Sewer Master Plan

Date:	
Name:	[redacted]
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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	APRIL 13 / 19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☐ Other (please specify) ______________

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DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name:	
Email Address:	
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Telephone:	

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The Sewer Master Plan

Date:	[redacted]
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Email Address:	
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Telephone:	

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- [ ] Yes but more than 5 years ago
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already Completed the backwater Valve/ Sumppump Program.

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Weathering the Storm
The Sewer Master Plan

Date:	4-13-19
Name:	[redacted]
Email Address:	[redacted]
Mailing Address:	[redacted]
Telephone:	[redacted]

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
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- [ ] Direct mail invitation
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- [x] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [ ] No

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it was an awful experience to endure :-

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	April 12 2019
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [x] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [ ] Other (please specify) ______________

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	April 12/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) Home Show

2. Has your home been impacting by flooding?

- [x] Yes, at least once within the past 5 years
- [ ] Yes but more than 5 years ago
- [ ] No

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This looks promising given we are no longer dealing with the once every 100 year storms

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	Apr 12/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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- [ ] Local media
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- [ ] Direct mail invitation
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- [ ] Yes but more than 5 years ago
- [ ] No

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Good Idea!!

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DILLON CONSULTING

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The Sewer Master Plan

Date:	April 12, 2019
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

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Weathering the Storm
The Sewer Master Plan

Date:	Apr 14/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [ ] Local media
- [ ] From a friend or neighbour (word of mouth)
- [ ] Received information in the mail
- [ ] Direct mail invitation
- [x] Other (please specify) home Show

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

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The Sewer Master Plan

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	April 28/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

- [ ] Newspaper
- [x] Local media
- [ ] From a friend or neighbour (word of mouth)
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- [ ] Direct mail invitation
- [ ] Other (please specify) ____________

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	April 28, 2019
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

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- [ ] Direct mail invitation
- [x] Other (please specify) Event

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	April 28/19
Name:	[redacted]
Email Address:	
Mailing Address:	
Telephone:	

1. How did you hear about the Sewer Master Plan?

☐ Newspaper
☐ Local media
☐ From a friend or neighbour (word of mouth)
☐ Received information in the mail
☐ Direct mail invitation
☒ Other (please specify) Earthday

2. Has your home been impacting by flooding?

☐ Yes, at least once within the past 5 years ☒ Yes but more than 5 years ago ☐ No

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Mail to: Anna M. Godo, Project Lead, City of Windsor, 350 City Hall Square W, 3rd Floor, Windsor, ON N9A 6S1

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The Sewer Master Plan

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The Sewer Master Plan

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The Sewer Master Plan

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Weathering the Storm
The Sewer Master Plan

Date:	[redacted]
Name: WINSTON	
Email Address:	
Mailing Address:	
Telephone:	

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The City of Windsor Ontario, Canada

Dillon Consulting

Weathering the Storm
The Sewer Master Plan

Date:	April 22./2018
Name:	[redacted]
Email Address:	
Mailing Address:	
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But know people who have,

3. Please share your comments and any feedback you have in regards to the Sewer Master Plan?

→ Not Able to register for meetings.
→ Already part of the Committee. (registered)
→ Grand Marais drain @ Huron Church
blocked. Not flowing to capacity.

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THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

Appendix B-5

Newsletters

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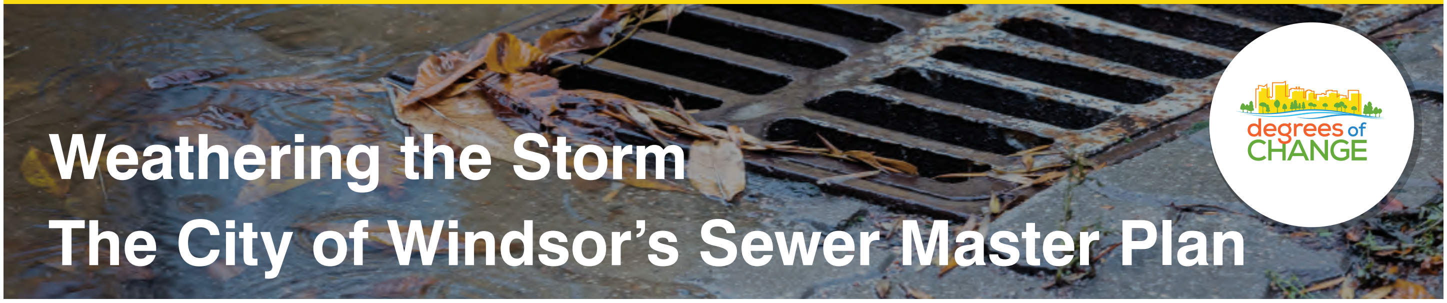
Newsletter #1 September 2018



Weathering the Storm
The City of Windsor's Sewer Master Plan

Background

Over the past few years, thousands of Windsor residents were impacted by flooding both in and around their homes. In early fall 2017, the Mayor released an **8-Point Plan** aimed to assist the Windsor community to address flooding issues. A key element of the plan is completing the City's Sewer Master Plan. The Master Plan will confirm the areas that are vulnerable to basement and surface flooding, identify causes of flooding, generate and evaluate short and long-term alternative solutions, and develop a long-range implementation strategy to manage flooding in the City.

Flooding Matters to All of Us – What We've Heard from You

Since Spring 2018 the Windsor Sewer Master Plan team has:

- Been to Earth Day on April 22nd At Malden Park where over 100 people learned about the project at the Weathering the Storm pop-up booth.
- Hosted three Public Information Centres from June 12th-14th, at different locations across Windsor to receive feedback on short-term solutions to flooding.
- Received information from the community through a Partners for Action survey taken by over 400 people.
- Provided information to over 1500 visitors through the project website.

UPCOMING EVENT: The Windsor Sewer Master Plan will be attending Windsor Open Streets on Sunday, September 23 from 10:00am to 3:00pm! Come to the Healthy Communities District on University Avenue at Crawford Street to learn about the project updates, interact with a sewer model and have your questions answered by staff. In addition, you can win prizes for spin-the-wheel trivia participants and have your face painted by a local artist!

Key Themes we've heard to date:

There is awareness and an interest to be actively involved in making homes more flood resilient.	There are barriers to implementing flood reduction measures.	Solutions to flooding need to be tailored to specific needs and be effective into the future.
51% of survey respondents in Windsor believe they live in an area at risk of flooding, compared to the national average of 6%.	These include cost, space constraints, reliability concerns of measures, time intensive process, lack of information on flood reduction and insurance processes.	Need to consider climate change, how growth/ intensification will impact infrastructure, and local area improvements and the city-wide system as a whole.

Objectives

Based on the feedback we've received through a combination of public and technical input, we developed objectives to help guide decision-making for this project. Using these objectives will help us integrate environmental, social, economic and technical perspectives. These objectives will be used to assess the short-term solutions and evaluate long-term solutions.

Consideration of Short-term Solutions

Short-term solutions are things that homeowners and the city can do without large capital investments. The Sewer Master Plan will assess these to determine how they can be implemented in Windsor. In order to develop these short-term solutions the project team has investigated what other municipalities are doing to address flooding, considered a range of opportunities and put forward preliminary recommendations. Some examples of short-term alternative solutions are listed below. For more information on all of the short-term solutions being recommended visit: www.weatheringthestorm.ca

Municipal Policies

- **Sewage Ejector Pumps** – Implement the mandatory installation of sewage ejector pumps for all new developments with basements or below grade living spaces.
- **Stormwater surcharge and green infrastructure credits** – Add by-laws to charge for use of City storm infrastructure.

Subsidy Programs

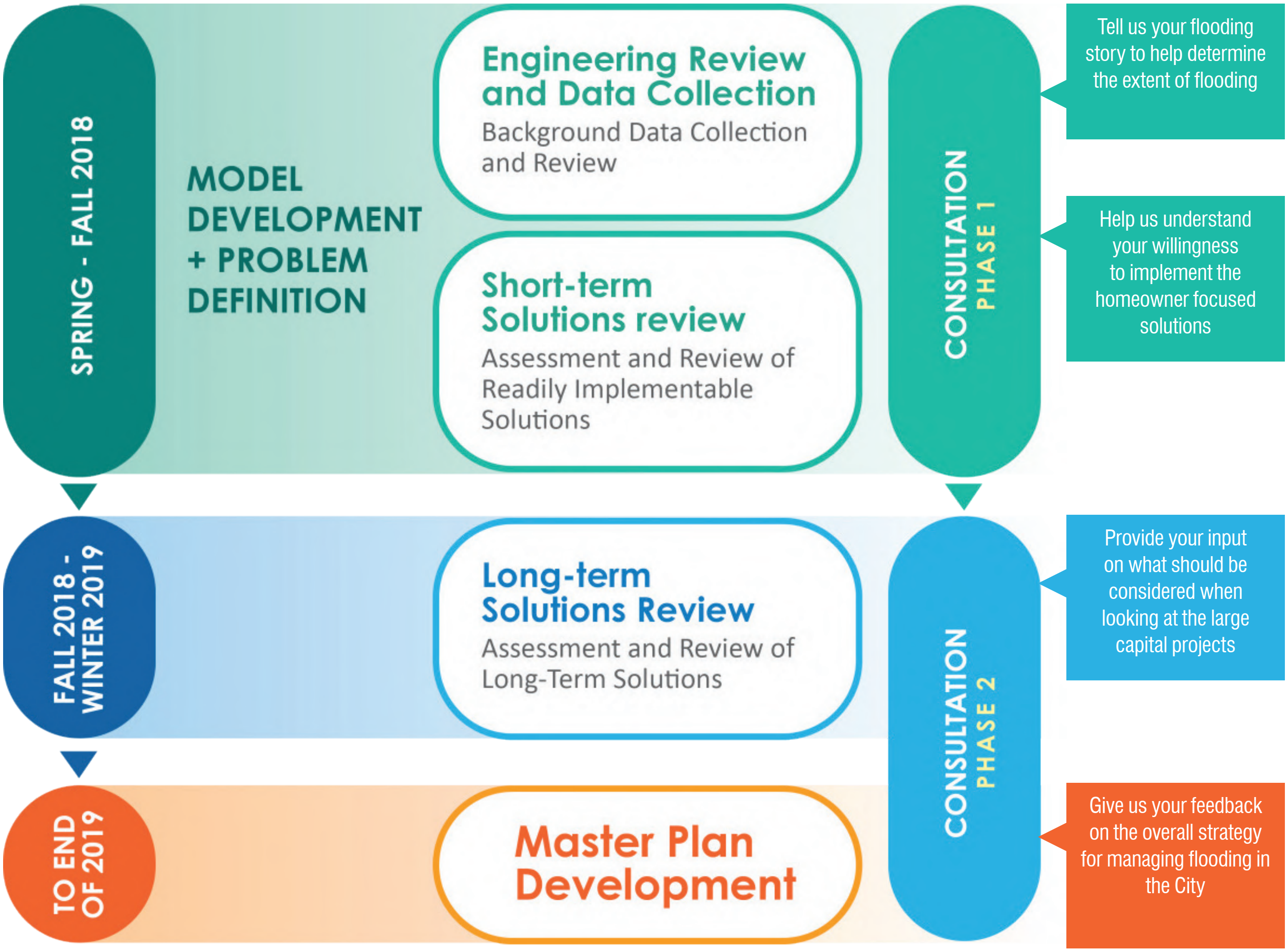
- **Enhance the BFP Subsidy** – Add sewage ejector pumps, window well protection and back up power supply.

Collaborative Improvements

- **Green Infrastructure/Low Impact Development** – Provide comprehensive education package, develop demonstration project(s), provide in-kind support.
- **Lot Grading** – Provide comprehensive education package.
- **Other Management Strategies** – Implement stewardship programs including "adopting-a-catch basin".

What's Next and How to Participate

The Windsor Sewer Master Plan study is following the requirements of the Municipal Class Environmental Assessment (EA). Public and agency input is an important part of the Class EA Process.



Stay Informed & Get Involved

- Come to our booth at Windsor Open Streets on Sunday, September 23rd from 10:00am to 3:00pm. At our booth you will be able to learn more about the project, play spin-the-wheel trivia and have your face painted
- Sign up to be on the contact list, receive project updates and participate on our interactive website: weatheringthestorm.ca
- Email us at info@weatheringthestorm.ca
- Follow us on social media for the latest news! **#WeatheringTheStorm**

Windsor Sewer Master Plan Activity Sheet

Word Search

Weathering the Storm

P	M	J	U	K	R	O	Z	N	O	U	T	S	S	D
X	H	E	U	Y	R	Y	Q	I	S	O	K	B	S	C
Y	N	D	U	L	V	F	Z	Z	V	U	C	U	V	M
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E	D	L	C	I	M	X	D	E	T	A	W	E	Y	V
U	E	Z	Y	P	Y	M	D	P	G	Q	B	R	X	L

FLOOD
STORM
SEWER
WATER
RIVER
OVERFLOW
WINDSOR
SAFETY
DOWNSPOUT
PUMP
GROUND

Unscramble the Word

Unscramble all the letters to discover a word related to the Windsor Sewer Master Plan!

1. USINOLOST ____________
2. EATNSBEM ____________
3. AAYDORSW ____________
4. GHUONIESRB ____________
5. ULIIGSBND ____________
6. GNAEHTWREI ____________

Newsletter #2 April 2019

Weathering the Storm
The City of Windsor's Sewer Master Plan

Background

Over the past few years, thousands of Windsor residents were impacted by flooding both in and around their homes. In early fall 2017, the Mayor released an **8-Point Plan** aimed to assist the Windsor community to address flooding issues. A key element of the plan is completing the City's Sewer Master Plan. The Master Plan will confirm the areas that are vulnerable to basement and surface flooding, identify causes of flooding, generate and evaluate short and long-term alternative solutions, and develop a long-range implementation strategy to manage flooding in the City.

Flooding Matters to All of Us – What We've Heard from You

The Windsor Master Plan Team has been gathering public feedback since Spring 2018:

- Earth Day on April 22nd, 2018 at Malden Park where over 100 people learned about the project at the Weathering the Storm pop-up booth.
- Three Public Information Centres from June 12th-14th at different locations across Windsor to receive feedback on short-term solutions to flooding.
- One Partners for Action survey taken by over 400 people provided information on priorities and perceptions of flooding.
- Open Streets on September 23rd, 2018 where over 140 people visited the pop-up booth and spoke to a project team member.
- A stakeholder advisory committee was established as an advisory group comprised of members of the public and community/business groups. This group meets regularly to review the developments of the project as it progresses.
- www.WeatheringtheStorm.ca provided information to over 4,400 website visitors!

UPCOMING EVENT:
Come to the Windsor Sewer Master Plan booth at Windsor Earth Day on Sunday, April 28 from 10:00am to 3:00pm! The project team will be there to share project updates, answer questions and facilitate demonstrations with a sewer model. In addition, you can play spin-the-wheel for a chance to win prizes!

Key Themes we've heard to date:

Windsor residents want to be updated and actively involved in making homes more flood resilient.

There are barriers to implementing flood reduction measures such as cost, space constraints, reliability concerns, time, and lack of information and insurance processes.

Solutions to flooding need to be tailored to specific needs and consider how climate change, growth/ intensification and local area improvements will impact the system as a whole.

Objectives

Based on the feedback we've received through a combination of public and technical input, we developed objectives to help guide decision-making for this project. Using these objectives will help us integrate environmental, social, economic and technical perspectives. These objectives are being used to assess the short-term solutions and evaluate long-term solutions.

Consideration of Short-term Solutions

Short-term solutions are things that homeowners and the City can do without large capital investments. The Sewer Master Plan has assessed these to determine how they can be implemented in Windsor. The list of "first step" short-term solutions are listed below. For more information on all of the short-term solutions being recommended visit: **www.WeatheringtheStorm.ca**.

2019 Implementation Plan

Manhole Rain Catchers Installation Program
- To reduce amount of rainwater entering the sanitary system, approximately 1400 rain catchers will be installed in vulnerable areas.

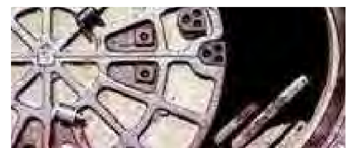
Implement a Foundation Drain Disconnection Program
- Reduce number of foundation drains (home weeping tiles) connected to the sanitary system.

The City will continue providing Downspout Disconnection Subsidy Program
- City provides free disconnection services. Call 311.

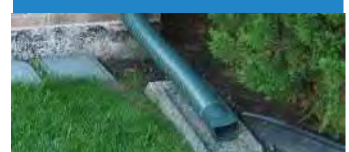
The City will continue to provide the Basement Flooding Protection Subsidy Program
- Offering residents a financial subsidy to install a sump pump and/or backwater valve.

Revise Sewer Design Standards
- Update standards to mitigate flooding in existing and new development areas.

Develop an Enhanced Education Program
- Provide educational materials and public consultation to assist homeowners in protecting their homes.



Rain Catcher: Manhole Lid Plugs



Downspout Disconnection

Other Household Measures (Rain Barrel)

How Can You Take Action on Flooding?

Homeowners play a key role in reducing excess rainwater entering the sewer system. Below is a list of home improvements you could do to protect your home and reduce the risk of basement flooding in your neighbourhood.

- Make sure your lot drains away from the home rather than towards it.
- Clean your eaves troughs so they don't overflow.
- Disconnect your downspouts and foundation drains from the sewer.
- Keep your downspouts clean and flowing away from the house.
- Regularly check for and fix cracks/leaks in your foundation, basement walls, and basement windows and doors.
- Install backwater valves to prevent sewage back-up from your floor drains.
- Limit the flow of excess water into the municipal sanitary sewers by reducing overall water usage.

Long Term Solutions

The development and evaluation of long term solutions is currently underway. Solutions developed will include a comprehensive plan for infrastructure improvements and initiatives to address basement flooding. Long term solutions fall under three types; Control Rainwater Entering System, Sewer System Improvements, Increased Downstream Capacity.

Control Rainwater Entering System (Private Property Improvements)

Examples:
- Foundation Drain Disconnection
- Downspout Disconnection

Increased Downstream Capacity

Examples:
- Treatment Plant Improvements
- Pump Station Improvements
- Add Retention Treatment Basins

Sewer System Improvements

Examples:
- Increase sewer sizes
- Underground facilities to store rain water
- Sealing public infrastructure
- Separate combined sewer areas
- Implement Low Impact Development Practices (LIDs)

Stay Informed & Get Involved

- **Come to our booth at Windsor Earth Day on Sunday, April 28th from 10:00am to 3:00pm. At our booth you will be able to learn more about the project, play spin-the-wheel trivia and have your questions answered by project staff.**
- Sign up to be on the contact list, receive project updates and participate on our interactive website: weatheringthestorm.ca
- Email us at **info@weatheringthestorm.ca**
- Follow us on social media for the latest news! **#WeatheringTheStorm**

What's Next and How to Participate

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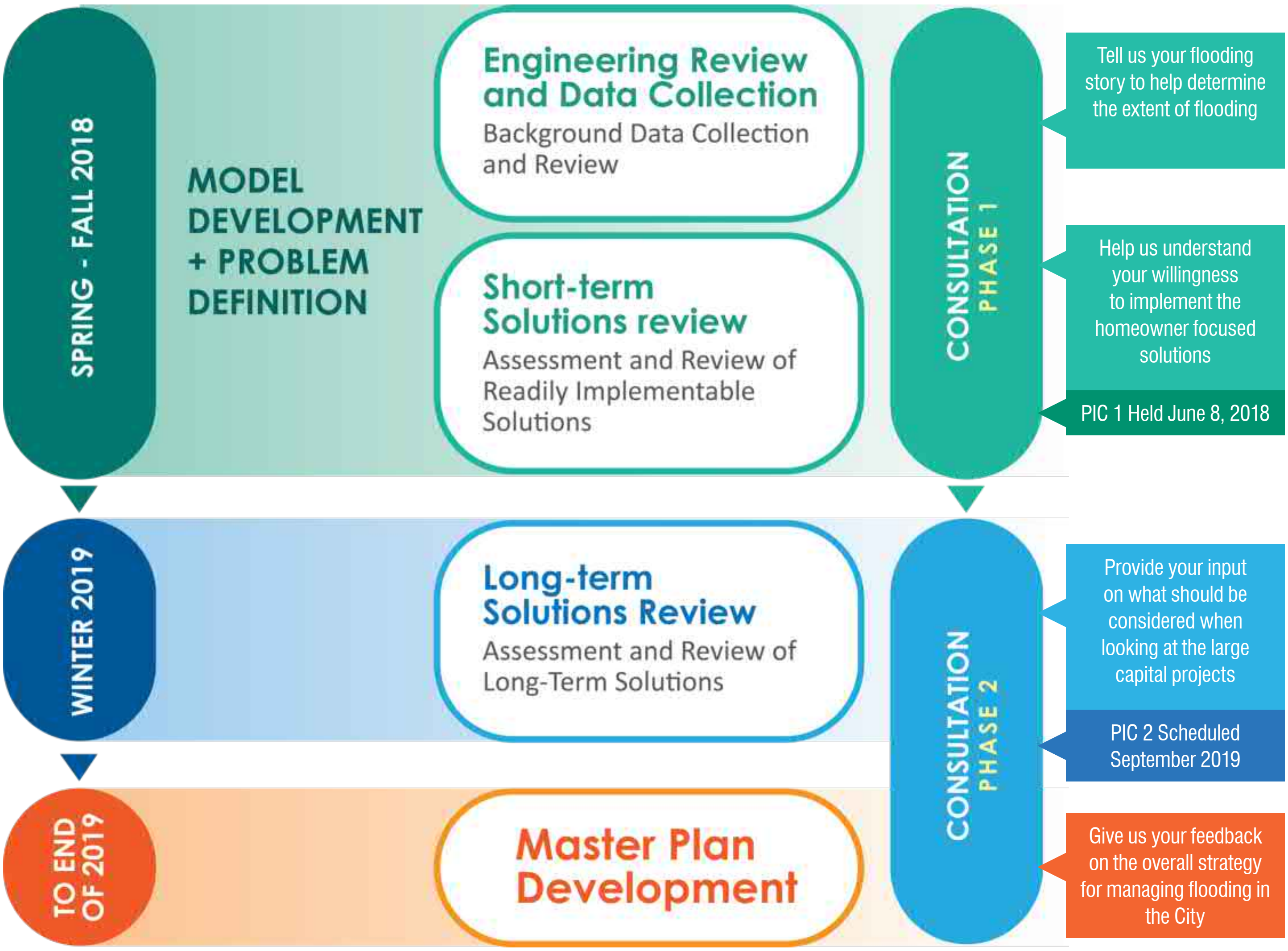


Unscramble the Word

Unscramble all the letters to discover words related to the Windsor Sewer Master Plan!

1. RRRDTEIVETOI ____________
2. GLDOFINO ____________
3. AANTINMENEC ____________
4. TCREURINFSRTUA ____________
5. AERWT ____________
6. LLAAINRF ____________

1. DETROIT RIVER | 2. FLOODING | 3. MAINTENANCE | 4. INFRASTRUCTURE | 5. WATER | 6. RAINFALL

Newsletter #3 July 2019

Weathering the Storm
City of Windsor Sewer Master Plan

UPCOMING EVENT: Come to a Windsor Sewer Master Plan Public Information Centre (PIC) in Fall 2019. The project team will be there to share project updates, answer questions and guide you through the panels. This is your chance to be involved, provide your feedback on the flooding solutions and learn more about protecting your property.

Background

Over the past few years, thousands of Windsor residents were impacted by flooding both in and around their homes. In early fall 2017, the Mayor released an 8-Point Plan aimed to assist the Windsor community to address flooding issues. A key element of the plan is completing the City's Sewer Master Plan. The Master Plan will confirm the areas that are vulnerable to basement and surface flooding, identify causes of flooding, generate and evaluate short and long-term alternative solutions, and develop a long-range implementation strategy to manage flooding in the City.

Project Update

To date we have completed the following:

- Finalized factors and criteria for evaluation of the long-term alternative solutions.
- Met with various agencies such as the Ministry of Environment, Conservation and Parks (MECP) and Essex Region Conservation Authority (ERCA), to review the City's strategy to reduce basement and surface flooding and obtain feedback on fundamental solution strategies being considered.
- Developed level of service criteria to meet the City's objectives of reducing basement and surface flooding.
- Incorporated provisions for the development of future Secondary Plan Areas identified in the City's Official Plan.
- Developed long term alternative solutions for the sanitary systems in the South Windsor and East Windsor separated sewer areas.
- Determined the benefit of completing the City's established plans to separate sewers within the Central Downtown areas.
- Identified locations where roadway flooding does not meet the level of service and developed solution alternatives to address issues.
- Determined how impact of climate change should be considered in the development of solutions. This included identifying areas that are more vulnerable and have a higher risk of flooding.

What We've Heard from You

The Windsor Sewer Master Plan team has been out at events to provide the public with project updates and collect feedback:

- Pop-up events were held in Spring 2019 to discuss the Sewer Master Plan:
  - Windsor Home and Garden Show (April 12-14, 2019)
  - City of Windsor's Earth Day (April 28, 2019)
  - Little River Pollution Control Plant Open House (June 1, 2019)
- Approximately 350 visitors learned and provided feedback
- The project website was promoted as a resource for more information: www.weatheringthestorm.com

Long Term Solutions

Long term solutions are being developed to address basement and surface flooding throughout the City of Windsor.

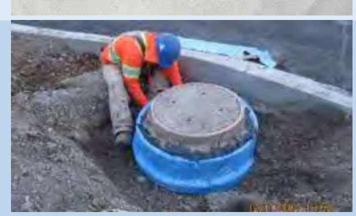
There are three considerations that are fundamental to the implementation of solutions being developed:

1. Solutions rely on a **partnering approach** and require a combination of private (homeowner) and public (municipal) improvement measures in order to work.
2. Solutions will **not eliminate risk** of basement or surface flooding. Implementing measures to **protect** your property is key.
3. The extent of improvements needed to reduce the risk and impacts of flooding will **be costly and take many years** to implement.

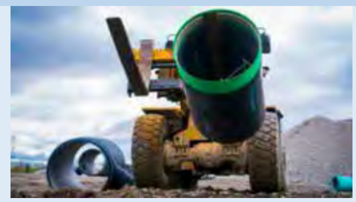
Below is a summary of the types of solutions that are being proposed as part of the solution alternatives.

1. Proposed Public Improvements

a) Control of rainwater getting into the sanitary sewer system

Rain Catchers on Sanitary Manholes	Reduce the amount of rainwater entering sanitary manholes.	
Repairs to Existing Sewers and Manholes	Reduce the amount of rainwater entering pipes and manholes through cracks and damaged pipes.	

b) Sewer system improvements

Stormwater Management Ponds	Stormwater management ponds will hold rainwater and slowly drain over time. Ponds improve water quality and can be used as a community feature.	
Underground Storage Systems	Underground storage facilities in parks and other areas. These types of systems are completely underground and don’t impact park use.	
Oversize Sewer Pipes	Replace existing sewers with larger sewers that will hold more rainwater in the storm system and sanitary system. These will help lower the water level in the sewers.	
Low Impact Development Measures	Low impact development measures such as exfiltration trenches are being proposed. Exfiltration trenches are underground sewer systems that have perforated pipes that allow infiltration of runoff into the ground. Excess flows that cannot be infiltrated are collected in the sewer and discharged through the sewer system.	

c) Increase Downstream Capacity

Treatment Plant Improvements	Increasing the amount of sewage that can be treated so the sanitary sewer system can drain faster. Greater capacity at the treatment plants lower the risk of sewer overflows to the river.	
Stormwater Pump Station Improvements	Provide added storm sewer outlet capacity allowing the system to drain faster.	

2. Proposed Private Side Measures

Indoor Measures	In older homes, disconnection of foundation drains and installation of a sump pump provides significant relief to the sanitary sewer system.	
Outdoor Measures	Disconnection of roof downspouts reduces the amount of rainwater getting into the storm sewer which offsets the needs to implement other public infrastructure.	

What's Next

The study is following the Municipal Class EA (Schedule B) requirements.

- Develop a prioritization and implementation strategy for the recommended long-term solutions.
- Document and report on the Sewer Master Plan process.
- Consider how climate change impacts will be incorporated into this study. This includes identification of areas having higher vulnerability and impacts associated with flooding.
- Evaluate long-term solution alternatives and determine the preferred solutions.
- Fall PICs to present preferred solutions and get feedback from the public.
- Incorporate public feedback into evaluation and confirm recommended solutions.
- Complete functional design and cost estimates for recommended solutions.

Stay Informed & Get Involved

- Sign up to receive project updates on our interactive website: weatheringthestorm.ca
- Email us at info@weatheringthestorm.ca
- Follow us on social media for the latest news! #WeatheringTheStorm

Appendix B-6

Property Owner Meetings

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THE CITY OF WINDSOR ONTARIO, CANADA

Office of the City Engineer

October 16, 2019

Re: City of Windsor Sewer Master Plan – Neighbouring Properties Meeting Riverside Flood Protection - Proposed Berm along Riverside Drive

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Dear Property Owner:

The City of Windsor retained Dillon Consulting Limited in 2018 to complete a Sewer Master Plan that will consider alternative solutions to reduce the risk of basement and surface flooding in the community.

These alternative solutions include the extension of the flood protection berm alongside Riverside Drive. We are meeting local property owners to preview this information before the Public Information Centres taking place later this year. The property owners in the immediate area of the proposed berm are invited to attend the following meeting:

Date:	**Wednesday, October 30th, 2019**
Time:	**Drop-in from 5:00pm – 8:00pm**
Location:	**WFCU Centre, 8787 McHugh Street, Michigan/Superior Room**

WHAT TO EXPECT AT THE MEETING WITH LOCAL PROPERTY OWNERS

As noted above, residents in close proximity to the proposed new berm along Riverside Drive are being invited to a meeting to receive information and provide comments on the proposed solution. Information will be available to describe the proposed berm, the alternative locations being considered, the evaluation criteria, and the preliminary identification of a preferred solution.

Members of the project team will be available to address your questions and consider your comments as we prepare for the formal public meetings that will take place in December 2019.

ABOUT THE SEWER MASTER PLAN PROJECT

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that have resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan.

The Sewer Master Plan is being undertaken under the Municipal Class Environmental Assessment (EA) process to address the following objectives:

- To confirm the causes of basement and surface flooding based on the City's storm, sanitary and combined sewer systems, as well as the overland drainage network;
- To identify and evaluate short-term and long-term measures to the reduce the impacts and risks of flooding; and
- To recommend an implementation strategy for the City's consideration.

The sewer master plan is integrating solutions to address flooding protection related to high lake levels as part of the comprehensive solution. This study is incorporating recommendations developed through the East Riverside Flood Assessment Study recently undertaken by Landmark Engineering.

For further information related to this project, you may visit the project website at www.weatheringthestorm.ca.

PROJECT CONTACTS

If you are unable to attend this meeting and would like to meet a member of the project team at another time or to address any further questions that you may have, please contact Ms. Laura Herlehy, P.Eng., Project Coordinator at (519) 948-5000 or by email at lherlehy@dillon.ca

In addition, you may also contact the below project representatives for any general inquiries about this project.

Flavio Forest, P.Eng.
Project Manager, Dillon Consulting Limited
3200 Deziel Drive, Suite 608
Windsor, ON, N8W 5K8
519.948.4243 ext. 3233
info@weatheringthestorm.ca

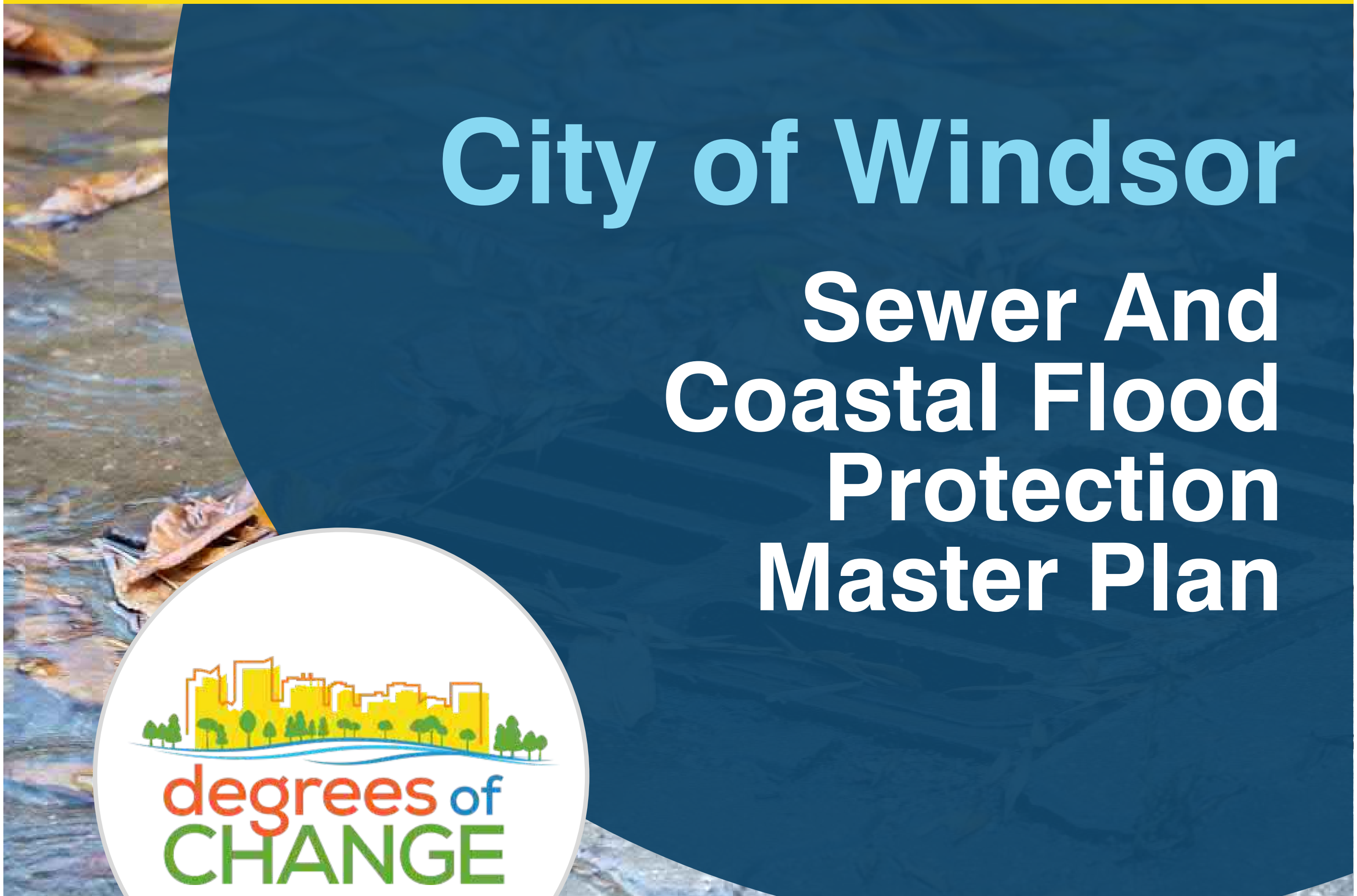
Anna M. Godo, P. Eng.
Sewer Master Plan Project Manager
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
519.255.6100 ext. 6508
info@weatheringthestorm.ca

Sincerely,

Fahd Mikhael, P. Eng., P.E., M. Sc.
Manager of Design and Development

amy

cc: City Engineer, Mark Winterton
Ward 6 Councillor Jo-Anne Gignac
Ward 7 Councillor Irek Kusmierczyk
Dillon Consulting Limited, Attn: Laura Herlehy



City of Windsor

Sewer And Coastal Flood Protection Master Plan

degrees of CHANGE

Welcome to the

Riverside Dr. East/East Riverside Area Coastal Flood Protection Property Owner Meeting

October 30, 2019

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Landmark Engineers Inc.

Focus of Today's Meeting

The City of Windsor is developing alternative solutions to address urban and coastal flooding through the Sewer and Coastal Flood Protection Master Plan.

Urban Flooding

(Sewer Master Plan)

Caused by:

Extreme Rainfall Events

Riverside Area – September 2017 Rain Event

Results in:

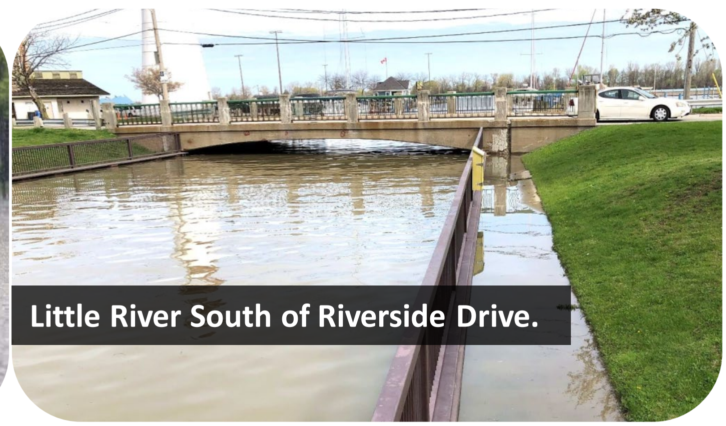
- Surface Flooding –
  Storm runoff that exceeds the capacity of the sewer and overland drainage systems.
- Basement Flooding –
  Inflow and infiltration that exceeds the capacity of the sanitary and/or combined sewer systems.

Coastal Flooding

(Coastal Flood Protection Master Plan)

Caused by:

High Lake and River Levels



Little River South of Riverside Drive.

Results in:

- Surface flooding of low lying areas from high water levels.
- Backflow into storm and/or combined sewer systems.
- Compromised sewer outlet capacity.

Integrated Master Plan Overview

Sewer and Coastal Flood Protection Master Plan

Study Objectives

- Understand the causes of basement and surface flooding.
- Identify and evaluate short-term and long-term measures to reduce the impacts and risks of flooding.
- Evaluate the integrity of the existing landform barrier system.
- Develop a functional design of landform barrier improvements.
- Recommend an implementation strategy.

What has been done to date?

- ✓ Developed comprehensive sewer and overland drainage system model.
- ✓ Confirmed flood risk areas.
- ✓ Developed alternative short-term and long-term solutions.
- ✓ Engaged the public through various events, social media, newsletters and project website.
- ✓ First Public Information Center (PIC) held in June 2018.
- ✓ Coordinated with regulatory agencies regarding alternative solutions.
- ✓ Flood Risk Assessment Study Public Information Meeting held on June 26, 2019.
- ✓ East Riverside Flood Risk Assessment Study adopted by Council October 7, 2019.
- ✓ Integrated the coastal flooding solutions as part of the Sewer Master Plan.
- ✓ Further refined the coastal flood protection solutions in consultation with the City and ERCA.

Coastal Flooding and Drainage Considerations for Low-Lying Areas

The central portion of the City is as much as **15 m (about 50 ft.)** higher than lands to the east and west.

To protect and provide drainage for lower-lying areas (**dark green**), the City has introduced the following strategies:

- Flood protection landforms (including the Ganatchio Trail and Little River landform barriers) to protect low-lying areas from high River and Lake levels;
- Pump stations; and
- Temporary storage ponds.

Area higher than 176.40m

Area lower than 176.40m

Coastal Flooding Solutions

The area of Riverside Drive East and inland, from St. Rose Beach easterly to the City limit has historically been protected by a landform barrier system, including the Ganatchio Trail that was constructed in the 1980s.

A flood risk assessment was completed in 2019 to evaluate the integrity of the existing landform barrier system and to determine whether the existing system will be adequate to provide protection under various conditions.

Alternative flood protection solutions have been developed for 3 areas:

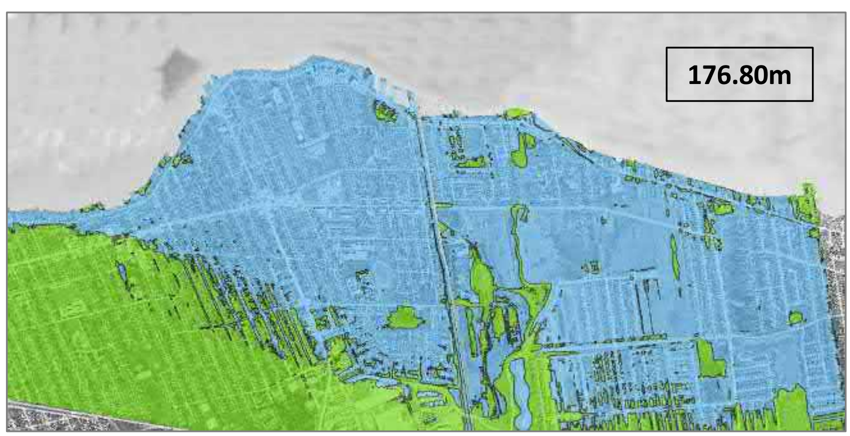
- Area 1: Riverside Vista Phase 2A, Ford Blvd. to St. Rose. Ave.
- Area 2: Riverside Drive East, St. Rose Ave. to Riverdale Ave.
- Area 3: East Riverside Area, Riverdale Ave. to East City limits.

High Lake Levels

In 2019, water levels in the Lake St. Clair, Detroit River, and Lake Erie system reached historic highs. Lake St. Clair set a record high monthly mean level of above **176.0**m.

These water levels can also be influenced by wind, with instantaneous high water levels potentially reaching **176.45m** on Lake St. Clair.

By 2050, studies project static high water levels of **176.5m**, with instantaneous high water levels from wind effects as high as **176.8m.**



LEGEND:

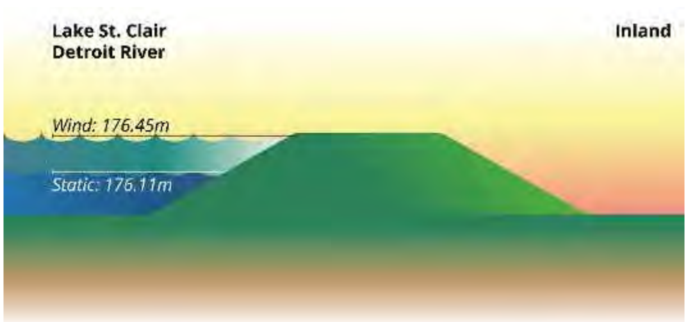
- Area Above Noted High Water Elevations
- Area Below Noted High Water Elevations

Landform Barrier Elevations

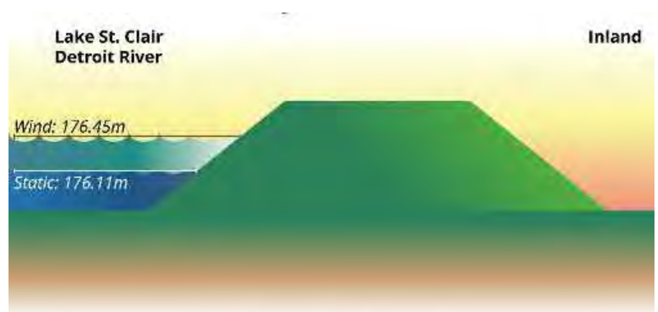
Two flood protection elevation scenarios have been evaluated based on the existing regulatory flood protection levels and the recent climate change projections.

Landform Barrier Elevation 176.45m	Landform Barrier Elevation 176.80m

Historical High Lake Levels:

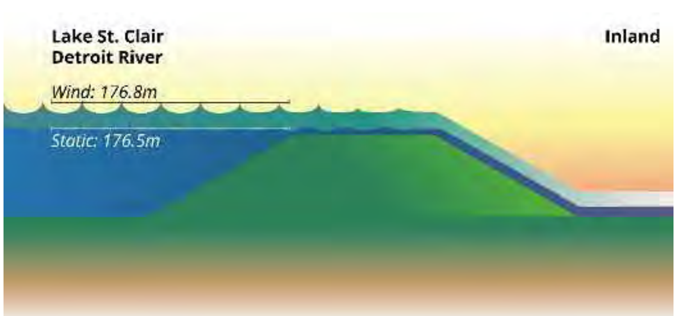


1:100 Year High Water Level

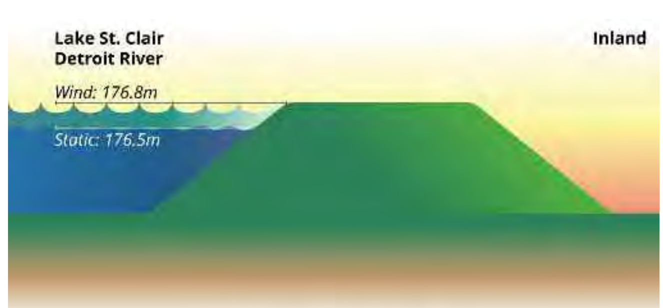


1:100 Year High Water Level

2050 Projected Climate Change High Lake Levels:



1:100 Year High Water Level



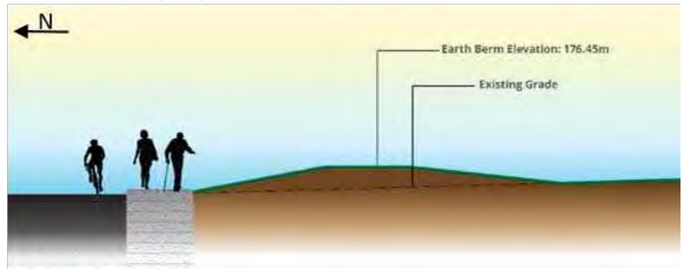
1:100 Year High Water Level

Definitions:
Static Water Level: Lake or river level during normal weather and undisturbed conditions.
Wind Water Level: Lake or river level during short duration wind/storm events.

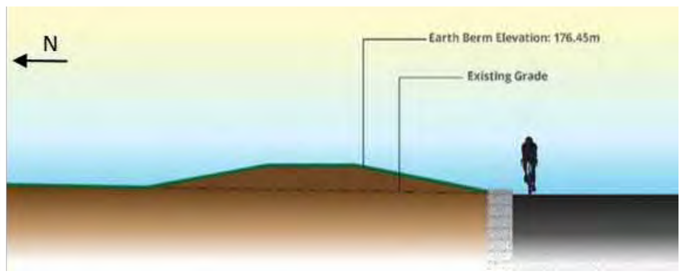
Drawings are not to scale, for illustrative purposes only.

Alternatives: Area 1
Ford Blvd. to St. Rose Ave.

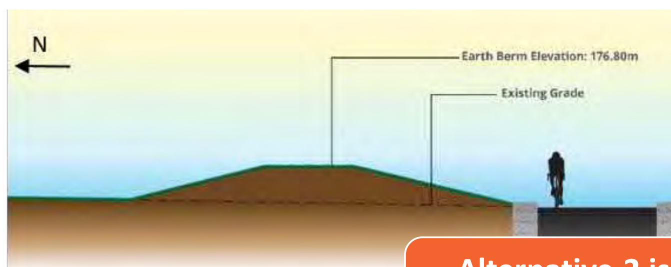
Alternative 1:
Barrier landform, at 176.45m. South boulevard of Riverside Drive.



Alternative 2:
Barrier landform, at 176.45m. North boulevard of Riverside Drive.



Alternative 3:
Barrier landform, at 176.80m. North boulevard of Riverside Drive.



Drawings are not to scale, for illustrative purposes only.

Alternative 2 is the preliminary preferred

Evaluation Criteria

Effectiveness: Coastal Flood Mitigation	Alt 1	Alt 2	Alt 3
Historical High Lake Levels	🟢/🔴	🟢/🔴	🟢
Climate Change Projections	🔴	🔴	🟢
Protects Storm Sewer and Drainage Systems	🔴	🟢/🔴	🟢

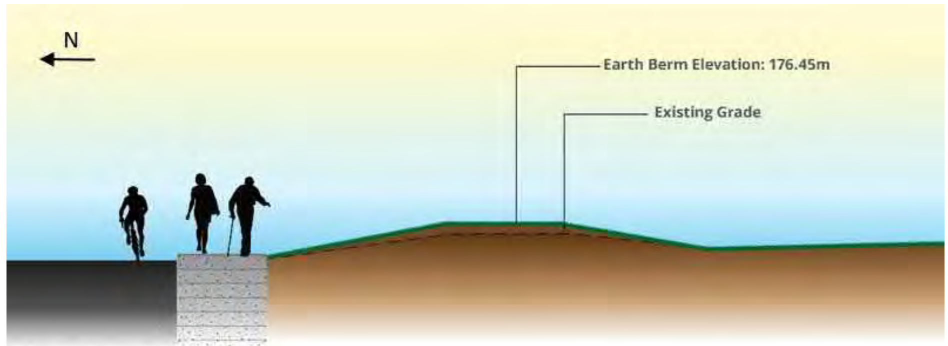
Urban Flood Mitigation	Alt 1	Alt 2	Alt 3
Effectiveness: Management of Overland Drainage	🔴	🟢	🟢

Impacts	Alt 1	Alt 2	Alt 3
Ease of Construction	🟢	🟢/🔴	🔴
Impacts to Potential Development (Inland)	🔴	🟢/🔴	🟢
Impacts to Properties (Trees, Landscape, Structures)	🟢	🟢/🔴	🔴
Property Acquisition Impacts	🟢	🟢/🔴	🔴
Cost	🟢	🟢/🔴	🔴

Alternatives: Area 2
St. Rose Ave. to Riverdale Ave.

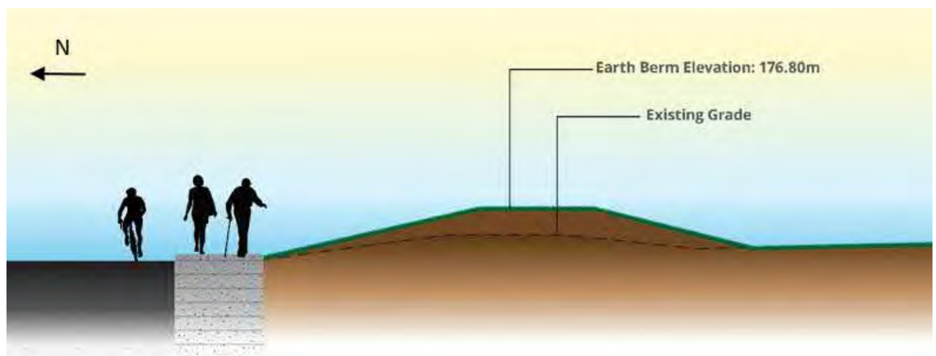
Alternative 1:

Barrier landform at 176.45m.
North Boulevard, West of Frank Ave. & South Boulevard, East of Frank Ave.



Alternative 2:

Barrier landform at 176.80m.
North Boulevard, West of Frank Ave. & South Boulevard, East of Frank Ave.



Drawings are not to scale, for illustrative purposes only.

Alternative 1 is the preliminary preferred

Evaluation Criteria

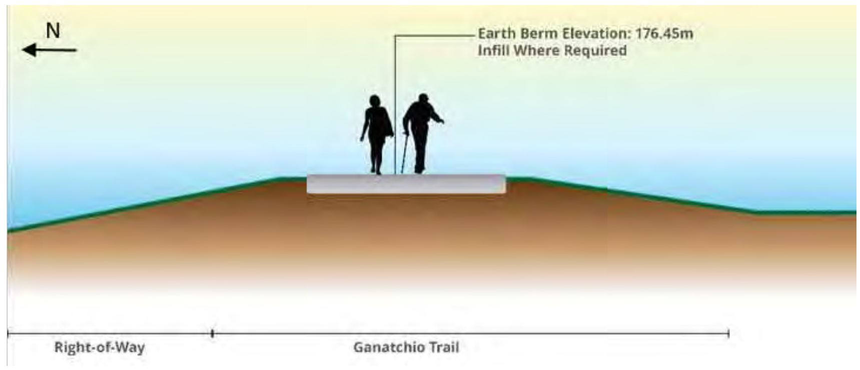
Effectiveness: Coastal Flood Mitigation	Alt 1	Alt 2
Historical High Lake Levels	🔴	🟢
Climate Change Projections	🔴	🟢
Protects Storm Sewer and Drainage Systems	🟢	🟢

Urban Flood Mitigation	Alt 1	Alt 2
Effectiveness: Management of Overland Drainage	🔴	🟢

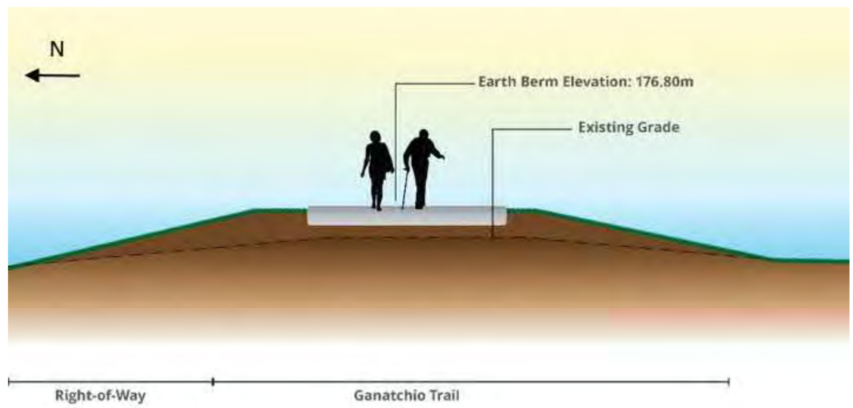
Impacts	Alt 1	Alt 2
Ease of Construction	🟢	🔴
Impacts to Potential Development (Inland)	🔴	🟢
Impacts to Properties (Trees, Landscape, Structures)	🟢	🔴
Property Acquisition Impacts	🟢	🔴
Cost	🟢	🔴

Alternatives: Area 3
Riverdale Ave. to East City Limits

Alternative 1:
Maintain existing barrier landform, infill where required. South boulevard of Riverside Drive at 176.45m



Alternative 2:
Enhance existing barrier landform. South boulevard of Riverside Drive at 176.80m.



Drawings are not to scale, for illustrative purposes only.

Alternative 1 is the preliminary preferred

Evaluation Criteria

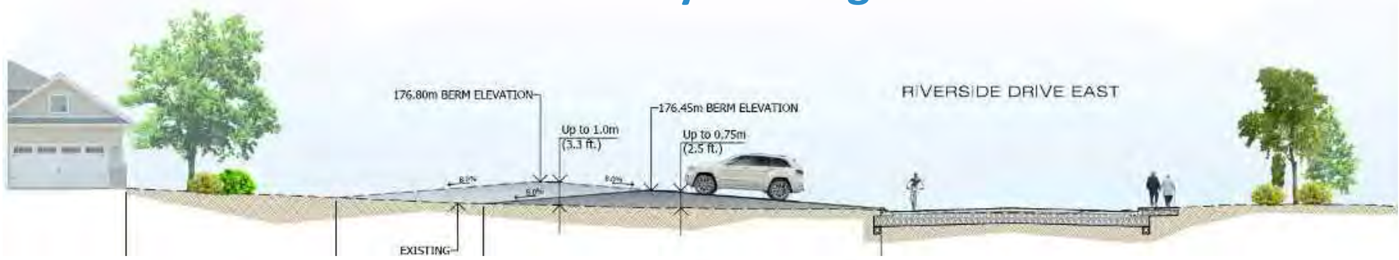
Effectiveness: Coastal Flood Mitigation	Alt 1	Alt 2
Historical High Lake Levels	🔴	🟢
Climate Change Projections	🔴	🟢
Protects Storm Sewer and Drainage Systems	🟢	🟢

Urban Flood Mitigation	Alt 1	Alt 2
Effectiveness: Management of Overland Drainage	🔴	🟢

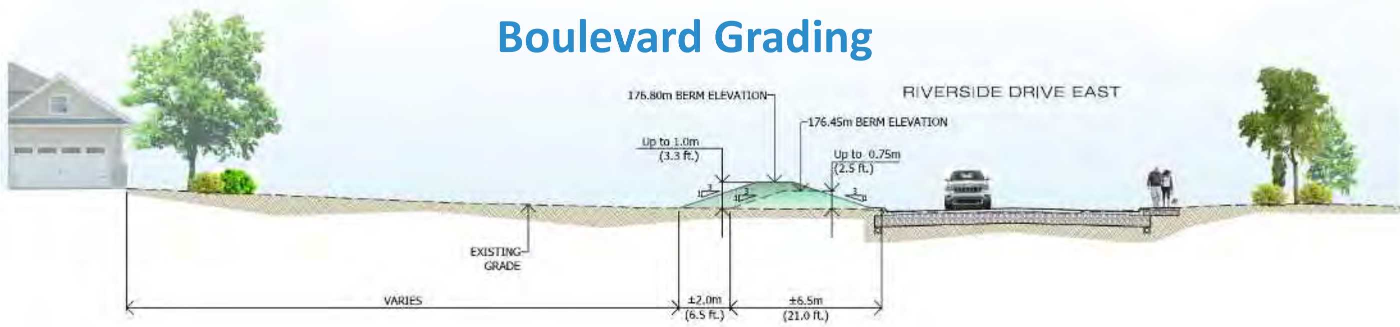
Impacts	Alt 1	Alt 2
Ease of Construction	🟢	🔴
Impacts to Potential Development (Inland)	🔴	🟢
Impacts to Properties (Trees, Landscape, Structures)	🟢	🔴
Property Acquisition Impacts	🟢	🔴
Cost	🟢	🔴

Impacts and Mitigation

Driveway Grading



Boulevard Grading



Trees, Landscape and Structures

The extents of required property acquisition will be refined through detailed design of the landform barrier. Opportunities to mitigate impacts to trees, landscape and structures will be reviewed.

Storm Sewer System Protection

Measures to prevent high water levels from entering the inland sewers system will be implemented:

- Flap Gates and Sewer Backflow Prevention Devices; and/or
- Separate storm sewers servicing north side of the berm.

For more details, refer to the landform barrier maps available.

City of Windsor
SEWER AND COASTAL FLOODING MASTER PLAN
Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting Comment Form

degrees of CHANGE

Your participation in the Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting will be valuable in improving our common understanding of the issues, opportunities and constraints that are being considered in evaluating the alternative solutions.
Please provide us with your thoughts and comments on the following questions.
Thank you for your input.

Please complete your form and drop it in the comment box today at the PIC, or scan and e-mail it to us at info@weatheringthestorm.ca.

1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

2. Please indicate if your comments apply to a specific area, or all areas:

AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
☒	☒	○	○

3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).

Point #3 URBAN FLOODING
Water was over the curb on the road due to excessive rain
Water entered my house coming in the electrical room thru the under ground conduits for hydro and other.
Issue was created because the storm water drainage system at the road in our area is inadequate .
The storm water management system, urban flooding , must be improved and this is independent of coastal floodir

4. Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.

SEE ATTACHMENT FOR REPLY TO #4 & 5

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

SEE Attachment

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

Back water value
Generator
Quick dam water gate for driveway entrance

7. **Other comments, questions or suggestions?**

Many of the properties on the Drive already have a great potential for coastal flooding .
For example ,part of my neighbors ;lands are currently under water from the current high level of the river. Any additional rising of the water level of the river will result in the water flowing directly on to the street. This can happen .
The first priority must be better storm water management to remove all water that can accumulate on the road

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
☒	○	○	○	○

Under the Freedom of Information and Protection of Privacy Act, ***all comments and questions submitted regarding this project will be used for the purposes of creating a consultation report*** *that will be a part of the public record and will be made available to individuals or organizations with an interest in this project.* ***Personal information such as name, address, and telephone number will not be included in the environmental assessment report*** *but will be released, if requested, to any person as part of the review of the Sewer and Coastal Flood Protection Master Plan.*

Point #3 URBAN FLOODING
Water was over the curb on the road due to excessive rain
Water entered my house coming in the electrical room thru the under ground conduits for hydro and other.
Issue was created because the storm water drainage system at the road in our area is inadequate .
The storm water management system, urban flooding , must be improved and this is independent of coastal flooding

Point #4 RANGE OF ALTERNATIVE SOLUTIONS
POINT #5 EVALUATION OF ALTERNATIVE SOLUTIONS INCLUDING THE SELECTION OF THE PRELIMINARY PREFERRED SOLUTIONS
Alternate solutions for the area from little River to Pillette road
The earth berm can be somewhat effective but will require the acquisition or land owners agreements .
This plan will impact and destroy property owners values for those affected.
The current proposal will fail because of these points .
As an alternate solution that has <u>not been evaluated</u> ,I would suggest the road surface be completely reviewed .
I would suggest that the engineers and designers re think the issue of dedicated bike lanes on the road surface in this area, when they consider the berm proposal.
I asked one of the presenters if the bike lanes where considered and the reply was no .
They where not allowed to consider the use of the surface area for dedicated bike lanes in the engineering proposal before us
The engineers and designers <u>must have the latitude</u> to explore all options and there should be no sacredness of the area designated for bike lanes on this section of the road surface .
The magnitude of the flooding issue and great property damage has been huge .
It has affect the lives of a great many of Windsor's residents .
The city must re think the issue of bike lanes for the better good of all it's effected citizens.
If the engineers can use the surface area for bike lanes , to construct the berm there maybe a better solution.
The re constructed berm will have adequate width to minimize the berm's elevation issues and provide better access to the property owners .
This may also solve the problem of property acquisition ,land owners agreements and legal rights .
The bikers would still have the ability to bike on the road ,continuing the same practice that they enjoy today.
The City's master plan for bike use in this neighborhood is a decade old ,out dated and definitely did not consider the issue of the flooding that we experience today
A large part of the city's bike plan is in place today ,properly designed and is one block away from the drive on Wyandotte street.
It is in place and paid for .
Any solution will be very expensive for the tax payers , so we must get the best value for our tax dollar.
We need the best solution to prevent flooding and all option should be explored.

Another option is proposal #5.
Raise Riverside drive but narrow the road surface to enhance the ability of the engineers to provide better drainage and storm water management

City of Windsor
SEWER AND COASTAL FLOODING MASTER PLAN
Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting Comment Form

RECEIVED NOV 07 2019

Your participation in the Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting will be valuable in improving our common understanding of the issues, opportunities and constraints that are being considered in evaluating the alternative solutions.
Please provide us with your thoughts and comments on the following questions.
Thank you for your input.

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1. **Please provide your name and contact information to be added to the project contact list.**

Name [redacted]

Address [redacted]

2. **Please indicate if your comments apply to a specific area, or all areas:**

AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
O	O	X	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

SINCE 1980'S THE FLOODING I HAVE EXPERIENCED HAS ALL BEEN FROM THE ROAD — NOT THE LAKE AS WE WERE FORTUNATE TO HAVE A BERM PUT IN (EARLY 80'S)

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

I DO NOT BELIEVE ADEQUATE MEASURES HAVE BEEN TAKEN TO CONTAIN THE WATER COMING IN FROM THE LAKE AND RIVER PARK LANDS AND BEACHES WHICH ARE CITY PROPERTIES. THESE AREAS ARE OFTEN BREACHED! - WITH THE EXTENSIVE BUILDING GOING ON (DEVELOPMENTS) SHOULD THERE NOT BE ANOTHER WATER PROCESSING PLANT PUT IN PLACE IN THIS EASTERN AREA?? COULD WE NOT PURCHASE MORE "GUTTER CLEANING" MACHINES AS BLOCKED GUTTERS ARE A PROBLEM.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

I WONDER ABOUT THE EFFECT OF BLDG-UP THE BERM ON THE GANATCHIO TRAIL ON THE NORTH SIDE (LAKE FAIRWAY) WILL HAVE ON THE RESIDENTS ALONG THE SHORELINE AS RIV. DRIVE IS ALREADY HIGHER THAN ALOT OF DRIVEWAYS. IF THE NORTH SIDE IS BUILT-UP A CANAL WILL BE FORMED FLOODING SHORELINE RESIDENTS. — IF THE BERM (SUGGESTED BY CITY) IS ~~ALL~~ PUT ALONG THE SOUTH SIDE OF THE TRAIL, BOTH INLAND + SHORELINE RESIDENTS WOULD BE PROTECTED. LAKE SIDE

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

① I HAVE BUILT UP MY SECONDARY BREAKWALL — (3 CEMENT BLOCKS HIGHER) ACROSS THE WIDTH OF MY PROPERTY — ② I HAD A SIDE DOOR BRICKED IN TO PREVENT HOUSE INTERIOR FLOODING ③ I HAVE RAISED THE BERM HEIGHT VIA TOPSOIL AND GARDEN-PLANTING — EROSION IS STILL OCCURRING DUE TO THE INACTIVITY OF MY NEIGHBOUR TO THE EAST AND MY CEMENT DECK HAS BEEN ERODED TO THE POINT OF TOTAL DAMAGE

7. **Other comments, questions or suggestions?**

#1 More machinery purchased to keep Riverside Drive drains clean (gutters) and ∴ streets clear.

#2. Berming of parks & beaches along the waterfront shoreline (including the "Little River" bridge areas

#3 The sloping of (crowning of) the Riverside Drive away from houses (if this is poss.)

#4. Legislation to force residents to maintain their property so that neighbours are not punished by a residents negligence

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	⊗	○	○

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Attention [redacted]

NB

PS. Please add
. to comments
- sand bags obtained
in May & Aug. of this year
have ROTTED

→ bags obtained in early 80's still
usable!! & intact.

City of Windsor
SEWER AND COASTAL FLOODING MASTER PLAN
Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting Comment Form

degrees of CHANGE

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☒	○	○	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

AUGUST 2017 - CITY SEWAGE FLOODED ENTIRE PROPERTY - WHOLE HOUSE INSIDES GUTTED + REPLACED - OVER 800K in damages. It took 1.5 yrs to get into house + landscaping/outside flood prevention started

At ~~a~~ our house:

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

- from river - raised break wall, put in drainage along east side of house, west to do shortly -
- need city ~~on~~ specs so can do Rv. Dr (South) of house - ie. how much to raise driveway to meet city specs, where to locate berms etc.

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

Have complete specs, but need city input re:
South side (driveway, berms etc) - see point 4

7. **Other comments, questions or suggestions?**

Please call us - we would very much like to meet
Someone at the house to discuss city steps re our
property as we would like to finish outside
renovation as quickly as possible 519-945-7404
519-817-6100

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	○	○	⊗

Would like

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3. Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).

SEPT 2016 FLOODED BY A MAJOR RAINFALL EVENT RESULTING IN 3"-4" OF FLOOD WATER ENTERING FROM THE STREET ENTERING THE FIRST / MAIN LIVING FLOOR OF 6260 RIVERSIDE DRIVE.
AUGUST 2017 SAME AS ABOVE HOWEVER WATER REMAINED AROUND + IN THE HOUSE FOR A LONGER PERIOD AND IT WAS HIGHER
CAR DESTROYED BY HEIGHT OF WATER

4. Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.

1) URBAN FLOOD: WATER HAS COME FROM THE STREET 2X RESULTING IN WATER ENTERING HOUSE. A HIGHER/HIGHEST BERM WOULD BE BENEFICIAL I BUILT A 3/4 BERM IN 2018 TO PROTECT HOUSE
2) COASTAL FLOOD A RISK ALSO. CONCERN OPEN BEACH NO BREAKWALL ONLY PARTIAL BERM FROM 1970'S FLOODING AND 2019 SANDBAGS. THE BERM IN FRONT IF FLOODED WILL ONLY ASSIST THOSE LIVING TO THE SOUTH OF RIVERSIDE DRIVE.

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

ALTERNATIVE 3

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

THE PROPOSE HIGHER BERM IS BETTER. HOWEVER I HAVE ALREADY INSTALLED A 3'-4' BERM NORTH OF THE PROPOSED LOCATION. THIS BERM WAS POSITIONED IN ORDER TO SAVE A LARGE OLD COTTONWOOD TREE THAT NEEDS TO BE SAVED. PLEASE CONTACT DON WILSON TO DISCUSS THIS DETAIL TO TRY TO SAVE THIS TREE. PLEASE REVIEW WITH CITY FORESTOR. AND MOVE BERM FURTHER NORTH.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

3'± BERM POSITIONED IN FRONT OF HOME IN 2018 TO ASSIST WITH STOPPING FLOOD WATER FROM STREET ENTERING PROPERTY. NO BASEMENT JUST PARTIAL CRAWL SPACE.
SANDBAGS INSTALLED ON WATERSIDE IN 2019

7. **Other comments, questions or suggestions?**

1) THE HOUSE AT 6260 WAS BUILT IN THE EARLY 1930s. AT THE TIME IT WAS BUILT HIGHER THAN ADJOINING LANDS. OVER THE YEARS ADJOINING LANDS AND STRUCTURES HAVE BEEN BUILT UP TO CURRENT STANDARDS (ERCA ETC) RESULTING IN A VERY NEGATIVE AFFECT ON 6260.
2) CONCERN WITH SIZE OF PUMPING STATION PROPOSED AT FORD BLVD. AND HOW IT WILL AFFECT VIEW LINES + AESTHETICS

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	○	✓	○

3) NEED TO UNDERSTAND POTENTIAL FOR IF EVER REDEVELOPMENT OF 6260 RIVERSIDE DR. HEIGHT REQUIREMENTS

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MASTER PLAN
Riverside Drive East/East Riverside Area
Coastal Flood Protection Property Owner Meeting
Comment Form

degrees of CHANGE

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AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
ⓧ	○	○	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

1986 Coastal flooding from Detroit River

Urban flooding: 9/30/16-17.5" flood depth @ carport & house; 8/24/17 - 21.0" depth @ c/h;

8/25/17 - 21.0" depth @ carport/house; 9/26/18 - 13.3" depth at carrport/house; 4/30/18 - 12.0"

depth @ carprt/house.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

Alternate solutions are well presented, what about private/public propsosals?

The preliminary preferred proposals could be challenged in court since they exhibit preferencial

and unequal treatment of property owners.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

All of your public proposals to protect Windsor from high lake & river levels are sacrificing all the homes north of Riverside Drive, from Ford Blvd. to the eastern boundary of Windsor. Protection of these properties requires private funding by the property owners. This is double dipping! You want them to help pay the public funding proposals via property taxes & at the same time pay for private protection of their owm properties.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

See Attachment , Item#1.

7. **Other comments, questions or suggestions?**

See Attachment, Item #2.

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	○	X	○

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ATTACHMENT

ITEM #1:

1986: Raised height of breakwall & grade of property. Successful so far, but concerned about the future.

2019: Installed new drainage system at both property lines to compensate for the inadequate Windsor storm sewer system & run off from improper street design/grade & the run off from the adjacent properties.

The new system consists of 4 new catch basins connected via 6" diameter sewage pipes to 3 new pump basins near the breakwall containing 2 x 2.0 HP sewage pumps with automatic, alternating cycle control panel. This in addition to an existing 0.5 HP sewage pump in a fourth pump basin, now tied in to the new system.

A16 kW standby generator was installed to insure continuous electrical power the the pumps.

ITEM #2:

To reiterate: your proposals render all properties north of Riverside Drive perishable, requiring private investment for protection. With this as preamble, I'd like to address my primary area of concern, Ford Blvd to St. Rose. Again, why not consider private/public investment to address this area?

For example. A contiguous breakwall at the 176.45m level from St. Rose to Ford Blvd would eliminate the need for a 176.45m northside berm in this area; thus eliminating the need to acquire residental properties to avoid structure conflicts, landscape conflicts, tree conflicts & their associated costs.

If the costs of propery expropriation, the constructing of a 21 foot wide by 2.5 ft high berm, plus the costs of the previously mentioned confilcts are all applied to the construction of a contiguous breakwall, the remaining private investment may be containable by the propery owners in this area.

It would also be a much more attractive and less disruptive solution.

City of Windsor
SEWER AND COASTAL FLOODING MASTER PLAN
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O	✓	O	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

NONE

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

A WASTE OF TAXPAYER MONEY & (BY NON-RESIDENTS) (legally) HAZARDOUS TO RESIDENTS COMING OUT OF THEIR DRIVEWAYS THERE IS NO PLAN FOR FIRST LINE DEFENSE AT THE RIVER, FEDERAL INTERVENTION IS REQUIRED & should be endorsed by City to support the highest taxpayers.

THE CITY OF WINDSOR · Aquafor Beech · Landmark Engineers Inc. · DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

ALL POOR choices for purported professionals.

Not Yet

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

7. **Other comments, questions or suggestions?**

commercial
Water balloons could be placed along rivers
"No" breakwall but this is necessary AND NO
pricey construction would be necessary.
Inexpensive. Easily put up & taken down & STORED
Should be Supplied by City, PROVINCIAL or
Feds.
we aren't the Non comprehensive group

And this won't cost city taxpayers

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	✓	○	○

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⊗	O	O	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

During heavy rain/flood last year we did get water in basement, but we have shot all downspouts away now, swailing, and have blocked ancient drains under driveway. Confident this will fix flood at back, front 2/3 of home were bone dry. Neither neighbour adjacent flooded.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

Look reasonable, the 2050 predictive water levels are an eye opener.

WINDSOR · Aquafor Beech · Landmark · DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

As per #3, plus backflow valve, 2 sump pumps

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
O	O	O	X	O

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2. **Please indicate if your comments apply to a specific area, or all areas:**

AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
○	○	●	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

The only flooding is between the grass hill + the lake due to the high lake levels

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

I come from a city w/ pump stations + have confidence that the mixture of stations, run offs, and enhancing the existing land barriers will be effective

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

I would definitely like to know more about how everything will be carried out + get more info about the decision

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

We have increased the height of our sea wall, added stone flower box barrier, enforced the soil by the water, + added a pump + back up pump in the basement. These + the grass hill have prevented the house itself from flooding.

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	●	○	○

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* will allow site visit * (Tyler)

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[redacted]

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O	O	☒	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).** or lake level heights

- Downspout overflowing due to sewer surcharge (flooding laundry room)
- Existing private berm 10 ft from breakwall (elevation not sufficient)
- had to replace breakwall 3 times (getting undermined)

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

- Very impressed with solutions provided
- raise areas if you have to to meet protection levels

THE CITY OF WINDSOR Aquafor Beech Landmark Engineers Inc. DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

I like the preliminary preferred ~~[illegible]~~ option because ~~to~~ [illegible] doesn't need to be raised.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

- Berm in ~~[illegible]~~ left from breakwall
  - ↳ Needs to be raised

7. **Other comments, questions or suggestions?**

N/A

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	○	○	☒

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○	○	✓	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

NONE TO DATE

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

THE CITY OF WINDSOR · Aquafor Beech Limited · Landmark Engineers Inc. · DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

I UNDERSTAND

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

NONE INSTALLED

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
O	O	O	O	☑

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degrees of CHANGE

Your participation in the Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting will be valuable in improving our common understanding of the issues, opportunities and constraints that are being considered in evaluating the alternative solutions.
Please provide us with your thoughts and comments on the following questions.
Thank you for your input.

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2. **Please indicate if your comments apply to a specific area, or all areas:**

AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
O	O	X	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

No problem with a major rainfall event
My concern is high lake levels.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

I live on the "water" side of Riverside Drive so am very concerned that the berm ~~to~~ on the south side of the road will ~~stop~~ keep the water in my property

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

I have the City's break wall + a 8-10 foot yard and then a 2½ foot wall ~~[illegible]~~ at the lake side of my property. I have no a crawl space + a sump pump

7. **Other comments, questions or suggestions?**

I ~~I am~~ interested to know if there will be repairs to ~~[illegible]~~ the breakwalls - if people will pay for them

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
O	O	X	O	O

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SIGNIFICANT BASEMENT & YARD FLOODING IN 2016. SIGNIFICANT YARD FLOODING IN 2017 WITH MINIMAL BASEMENT ISSUES (AFTER EXTENSIVE WORK POST-2016).

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

ALL APPEAR TO BE WELL CONSIDERED. I AM SUPPORTIVE OF WHATEVER SOLUTIONS DELIVER THE BEST PROTECTIONS — HOWEVER WE CHOOSE TO DEFINE "BEST"

5. Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.

AS IN PREVIOUS ANSWER. #2 LOOKS GOOD(?)

6. Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?

YES. BACK FLOW CHECK VALVE REPLACED W NEW IN 2016. NEW SUMP PIT/PUMP ALSO INSTALLED - NON EXISTED PREVIOUSLY.

7. Other comments, questions or suggestions?

PLEASE ADD MY NAME TO FUTURE MAIL LISTS.

GOOD WORK ON THIS VERY COMPLEX & DYNAMIC PROBLEM. APPRECIATE THE CITY'S LEADERSHIP ON THIS.

8. Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?

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I have a back-flow valve & 2 sump pumps in my basement (built in 1890). I have NO flooding in my home. There is flooding in the park (Coventry gardens) near the riverside sidewalk.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

I am not impacted by the berm. I am very concerned about the proposed pumphouse across from my Heritage property. The property proposed is part of the original Janisse farm tract. My home is the house built by the Janisse family.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

I am confused about the Sewer & Pump house alternatives, but will attend next week's meeting which will hopefully be more illuminating.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

Yes. The back-flow valves and sump pump are very effective. There is NO flooding issue on my property.

7. **Other comments, questions or suggestions?**

During the 2017 flood, I lived in Walkerville, which experienced severe flooding. I do not understand why (as I have been told tonight) the Ford Blvd. pumphouse must be in a specific location that will devalue homes and impact our views. Why can't this be done a block to the West where there is already a city bldg in use only four months a year. There is a much larger site at a significantly higher elevation which would not impact the beauty of the park in any way.

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The City of Windsor | Aquafor Beech | Landmark Engineers Inc. | Dillon Consulting

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- rainfall flooding - in basement in 2016 and 2017 - in 2017 - front 10-15 ft of property flooded along with the boulevard, sidewalk and road

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

- don't know enough to comment on the effectiveness of the alternatives
- Alternative 3 seems to provide long term solution

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

preferred solution looks like it is addressing situation today. Not planning for Climate change, not planning for future.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

- backwater valve, new sewer connections, downspouts disconnected, sump pump - all installed before 2017 flood

7. **Other comments, questions or suggestions?**

Could a ~~Gratio~~ Ganatchio trail type facility be installed instead of berm and bikelanes?

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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2017 Rainfall event – Flooded basement + 2 feet

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Alternative 2 with an option to proceed to 3 if levels continue to rise

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

Concern that properties on north side of the Drive are not protected.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

rain barrels with diversion of water.
removed drains from basement level.
poured new driveway with covered drainage.
2 permanent pumps + 3 portable pumps.
Swim lessons.

7. **Other comments, questions or suggestions?**

good work
would suggest a breakwall at the river that would be wide enough to accomodate a bike path

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CRAWL SPACE FLOODING DUE TO HIGH WATER LEVELS

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

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Crawl space floods with excess rain because my home is at 1935 grade level and surrounded by newer homes which are graded down - no soil removed for basements.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

Glad to know St Rose will have pumping station - the old one worked to drain my crawl space.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

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6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

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2017, 2018 - BASEMENT FLOODING FROM OVERLAND WATER FROM THE ROAD - 8 FT OF WATER IN BASEMENT.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

- NOT ACCEPTABLE.
- REMOVE BIKE LANE AND ADD BURM TO ROAD
- CHANGE ROAD TO SINGLE LANE - ONE WAY.
- USE WYANDOTTE AVE FOR BIKE LANE.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

- NONE.
- COMPENSATION FOR LAND OWNERS.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

YES RETAINING WALL.

7. **Other comments, questions or suggestions?**

- MUST REDUCE TAXES - FOR PROPERTY VALUE DECREASE.
- BUILD OUTLETS TO RIVER FOR OVERLAND FLOODING - OPEN COURT
- REMOVE BIKE LANE WITH OPEN COURTS.

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- DO NOT AGREE WITH SOLUTION

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ROAD SEWER IN FRONT DURING HEAVY RAIN HAS A HARD TIME HANDLING THE HEAVY RAIN. SLOW TO DRAIN HENCE FLOODING OVER THE STREET.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

PUMPING STATION AT MOUNTBATTEN SHOULD NOT BE INCREASED IN SIZE AS THERE IS SOME NOISE FROM IT. IF IT NEEDS TO BE MADE BIGGER, RELOCATE IT.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

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BASEMENT FLOODED AUG 29/2017 DUE TO THE MAJOR RAINFALL EVENT AND A DEFECTIVE BACK-UP VALVE.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

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NOT AFFECTED YET - NEW HOME 2011 GOOD SYSTEM IN PLACE & HIGHER ELEVATION DETERMINED BY ERCA AND EXISTING BERMS IN PLACE BUT CONCERNED FOR OUR NEIGHBORS. WE ALSO DO NOT CURRENTLY HAVE ACCESS TO OUR HOME/ DRIVEWAY FROM RIVERSIDE DR. SO WE ARE OK.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

SUGGEST GOING AS HIGH AS POSSIBLE WITH INFILL AND BERMS THAT YOU CAN GET AWAY WITH.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

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AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
○	○	●	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

-erosion / high waters
-no beach left

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
O	O	O	O	O

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City of Windsor
SEWER AND COASTAL FLOODING MASTER PLAN
Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting Comment Form

degrees of CHANGE

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Minor flooding in crawlspace Aug 2017 flood

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Good -

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

Good -

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

—

7. **Other comments, questions or suggestions?**

—

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2016 - SEWER WATER BACKED UP INTO OUR GARAGE & CRAWL SPACE

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

INSTALLING A BURM ON THE RIVERSIDE DR WILL ONLY MAKE IT WORSE FOR ALL THE HOMES ON THE WATER SIDE

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

IMPROVING SEWER SYSTEM SHOULD BE THE PRIORITY, WAITING TIL 2023 SEEMS TOO FAR AWAY IN VIEW OF THE FREQUENT HEAVY RAINFALLS

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

SUMP PUMPS IN ACCESS AREA TO CRAWL SPACE

7. **Other comments, questions or suggestions?**

EXCELERATE THE SEWER SYSTEM PROJECT BEFORE WE HAVE ANOTHER BIG DISASTER LIKE SUMMER 2016

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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7. **Other comments, questions or suggestions?**

Please lower or get rid of my taxes Since you have abandoned us. After all the years of the highest taxes of the city we are left out. Thank you

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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O	O	O	O	O

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~~The comments provided~~ I feel that the solutions presented gave the residents a good understanding of what impacts will be encountered under the different options.

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

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Talking to a number of residents, it seems as though there are existing measures along the back side of the properties (North side) in some areas. Some existing berms are present and may be options to raise existing berm in back yards.

7. **Other comments, questions or suggestions?**

- Some comments were to raise breakwalls
- Another suggestion was to add water ballons to back of breakwall

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4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

THE CITY OF WINDSOR · Aquafor Beech Limited · Landmark Engineers Inc. · DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

7. **Other comments, questions or suggestions?**

- Numerous north side residents concerned about being "abandoned" by the City - asking about reduced taxes
- most residents understand Landform benefits, no real preference ~~[illegible]~~ identified between 176.45 vs 176.60 but do not want significant property impacts.
- limited concerns about landscaping
- 1 person had concerns about Mount Batten P/S.

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- also concerns about new/proposed P/S locations

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– Main problem of flooding to the homes north of Riverside Drive.

– Many people seemed to have problems with the locations of the pump stations.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

THE CITY OF WINDSOR   Aquafor Beech Limited   Landmark Engineers Inc.   DILLON CONSULTING

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7. ~~**Other comments, questions or suggestions?**~~

Frequent Comments that were heard from residents:

① Why North Shore is not protected from high lake levels.

② Why South side residents don't get berm to protect against overland flooding

③ Why were basements allowed along Riverside Drive.

④ taxpayers shouldn't have to pay for any improvements

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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O	O	O	O	O

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O	O	O	O

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- Main issue - protect N. side w/ breakwall
- People, very few, wanted bike lanes removed and traffic / lane reductions.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

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✓	O	O	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

None

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

• Diagrams/presenters were presented however written reasons explaining the options were not. I'm still unclear as to why building the existing breakwalls or the alternative berms were not preferred. No financials/costs provided. ~~No clear~~

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

Again not clear.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

Purchased the home summer 2019. Installed a second Sump pump & purchased a back up generator. Used the city's sandbag program. No inside/outside flooding to date

7. **Other comments, questions or suggestions?**

-> Financial compensation to north Riverside properties. Offering no coastal flood protection, decreasing property size, removing landscaping. Will taxes go down for these properties?

-> What options do these citizens have in involving themselves. Again nothing written / provided

-> Please provide the preferred plan & alternatives to each indiv property owner. I would like a snapshot outlining (at a min) the preferred option will affect the property. Alternative impacts would also be appreciated.

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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WATER ACCUMULATED IN THE CROWLING SPACE
NORTH PART OF THE HOUSE FACING RIVERSIDE DR. EAST.

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My entire basement flooded & I lost everything & my children's stuff in 2016 & 2017 floods & my entire property continues to flood from the road on Riverside Drive back to the apartments on Wyandotte. Mark Winterton has photos => I can send more if you like & videos too.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

They do not protect my property at 6515. But everything looks pretty on paper.

Things have to happen much faster.

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

Again, none of the proposed plans benefit my property from urban flooding. In fact, that proposed as it will likely worsen flooding on my property.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

Backflow valves, sump pumps, backup sump pump, electric water pump, gas water pump, tonnes of tubing. & City portion of my front yard, city sidewalk, city road continues to flood despite new paving along road, water continues to pool and not drain into nearby catch basins.

7. **Other comments, questions or suggestions?**

By the time flooding measures begin to be implemented in the most flooded areas (not just my property) but the city sidewalk & road outside my home that floods, someone is going to DIE from ~~[illegible]~~ hydroplaning out front of my home on the bend that people speed and it will be very tragic & sad.

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least) — 2 — 3 — 4 — 5 (Most)

☑ 1 ○ 2 ○ 3 ○ 4 ○ 5

→ as none of them will protect / benefit my property from the SIGNIFICANT RECURRING flooding

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City of Windsor
SEWER AND COASTAL FLOODING MASTER PLAN
Riverside Drive East/East Riverside Area Coastal Flood Protection Property Owner Meeting Comment Form

degrees of CHANGE

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[redacted]

2. **Please indicate if your comments apply to a specific area, or all areas:**

AREA 1 Ford to St.Rose	AREA 2 St.Rose to Riverdale	AREA 3 Riverdale to East City Limit	ALL AREAS
✓	O	O	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

MAJOR RAINFALL IN 2017 CAUSED BACKYARD SEWERS TO OVERFLOW INTO BASEMENT

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

WILL NEED TO COME BACK NEXT WEEK TO GET BETTER UNDERSTANDING of PUMPING STATION PROPOSAL
CONCERN IS TH AESTETICS OF THE BUILDING AND HOW IT AFFECTS VIEWS OF RIVER

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

WOULD NEED TO SEE ALTERNATIVES TO PUMPING STATION

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

SUMP PUMP INSTALLED AFTER LAST FLOOD SEEMS TO BE EFFECTIVE

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	○	○	☑	○

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◉	○	○	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

We are OK.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

Beautiful Plan.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

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3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

In the 34 years that I have lived in my home, I have never had flooding until August 2017 due to the major rainfall. We appreciate that plans are being made.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

We appreciate that the city is coming up with some solutions now and for the long term. However the proposal for a large pumping station at the foot of our street ~~[illegible]~~ is a concern on how it will destroy our View and impact our property values. We already have paid a premium price for this location, and high taxes. We would like to listen to the alternatives.

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

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6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

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7. **Other comments, questions or suggestions?**

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O	⊗	O	O

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

1987 - water over breakwall and ran between houses - both neighbours had significant problems with water - our seemp sump kept our crawl space dry.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

DO NOT RAISE WATSON OR DIEPPE - THAT will only flood us out more - also current height of both street cause a major problem getting onto the Drive when rain, snow are occuring currently the Drive was suppose to be better - traffic drives more than speed limit - almost impossible to get out of Drive during rush hours. -

NEED SOME SPEED BUMPS

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

current hight is currently higher than I wont we pay the higher taxes and are being left out to dry.

Please put in a traffic tabl to slow down traffic

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

only flood measure is a seeng pump

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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none

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

THE CITY OF WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

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6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

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7. **Other comments, questions or suggestions?**

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✓	○	○	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

Urban flooding two years in a row

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

Alt 2 ✓✓

WINDSOR Aquafor Beech Landmark DILLON CONSULTING

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

Alt 1 appears to be least effective and essentially gives up the most property to the flood waters.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

No major floodproofing - house is on a slight hill.
Have worked to improve drainage.

7. **Other comments, questions or suggestions?**

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

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○	○	○	☒	○

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○	○	☑	○

3. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/ river levels (coastal flooding).**

Coastal flooding - NE wind brings lakewater onto deck at water/lake edge BUT does not go beyond breakwall onto property
Urban flooding - heavy rains pool in yard then drain away.

4. **Please comment on the range of alternative solutions that have been presented, both in terms of their effectiveness in addressing the coastal/urban flood risks, as well as their impacts.**

It becomes evident there are no alternative solutions for lake-front properties. I quote the responses from staff at the WFCU meeting. Those on the northside of Riverside Drive "are on their own", "they chose to live there"

→

5. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solutions that have been identified.**

4 - "They are responsible" for protective measures, there are "no plans" for them.

The impacts: Abandonment, Discrimination/Divisiveness "us and them" Unfairness/lack of Equal Justice.

6. **Do you have any flood proofing measures installed either inside or outside of your home? If so, can you provide a description of these measures and whether or not they have been effective?**

New build 1980 on property purchased 1974. Protection by raising land 4 feet. Foundation/crawl space all concrete - floor/walls, as mandated by City building regulator. Bi-annual inspections, crawlspace dry. Lake front concrete dock restored and maintained

7. **Other comments, questions or suggestions?**

Real estate values and the City's property tax base are under direct attack by the City itself. Property owners' major asset is diminished in value, Prospective buyers are scared off.

Property taxes are high, eg. $10,000 annually. For what? Certainly not inclusion in this "Master Plan."

Think harder.

8. **Overall, how well do you feel you understand the reasons for the alternative solutions and the basis for the selection of the preliminary preferred solution in each area of this study?**

1 (Least)	2	3	4	5 (Most)
○	☑	○	○	○

Oct 30, 2019 - PIC Comments

1. Work to fix surface flooding from rain always enters property N of Riverside Dr @ Prado

2. ~~2~~ 3 Properties to south no comment, agree, no concerns

3. What is impact to trees that were shown

4. Strong concerns re Pump Station @ Ford & St. Rose
   impact to view
   concerns for noise / vibration
   → Ex. Ford PS too loud

Karla Kolli

- What happens along Little River - is there a berm there too?

- Speeding up to 80Km ~~on~~ around # 8350 - 3 speed bumps suggested

- Ford Pump Station
  - put it at other end near Pillette or in RCMP parking lot
  - it is across from American Flag - dirty water will flow toward flag
  - explain why it has to be here
- Don't raise Dieppe or Watson already dangerous & people can't get up when icy

- the city owns the waterfront so why not put along there - should take 1st line of defence

- city should fix their breakwall

- sacrificing the ~~to~~ property owners along the water who pay the highest taxes

THE CITY OF WINDSOR ONTARIO, CANADA

Office of the City Engineer

October 16, 2019

Dear Property Owner:

Re: City of Windsor Sewer Master Plan – Neighbouring Properties Meeting
Proposed Stormwater Pump Station at St. Rose Avenue and Riverside Drive

---

The City of Windsor retained Dillon Consulting Limited in 2018 to complete a Sewer Master Plan that will consider alternative solutions to reduce the risk of basement and surface flooding in the community.

These alternative solutions include a proposed new stormwater pump station in the area of St. Rose Avenue and Riverside Drive. We are meeting local property owners to preview this information before the Public Information Centres taking place later this year. The property owners in the immediate area of the proposed stormwater pump station are invited to attend the following meeting:

Date: **Tuesday, November 5, 2019**
Time: **Open from 5:00pm – 8:00pm**
Location: **WFCU Centre, 8787 McHugh Street,**
Erie Room

WHAT TO EXPECT AT THE MEETING WITH LOCAL PROPERTY OWNERS

Information will be available to describe the proposed stormwater pump station, the alternative locations being considered, the evaluation criteria, and the preliminary identification of a preferred solution.

Members of the project team will be available to address your questions and consider your comments as we prepare for the formal public meetings that will take place in December 2019.

ABOUT THE SEWER MASTER PLAN PROJECT

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan.

The Sewer Master Plan is being undertaken under the Municipal Class Environmental Assessment (EA) process to address the following objectives:

- To confirm the causes of basement and surface flooding based on the City's storm, sanitary and combined sewer systems, as well as the overland drainage network;
- To identify and evaluate short-term and long-term measures to reduce the impacts and risks of flooding; and
- To recommend an implementation strategy for the City's consideration.

For further information related to this project, you may visit the project website at www.weatheringthestorm.ca.

PROJECT CONTACTS

Please contact Ms. Laura Herlehy, P.Eng., Project Coordinator at (519) 948-5000 or by email at lherlehy@dillon.ca if you would like to meet a member of the project team at another time or to address any further questions that you may have.

In addition, you may also contact the below project representatives for any general inquiries about this project.

Flavio Forest, P.Eng.
Project Manager, Dillon Consulting Limited
3200 Deziel Drive, Suite 608
Windsor, ON, N8W 5K8
(519) 948-4243 ext. 3233
info@weatheringthestorm.ca

Anna M. Godo, P. Eng.
Sewer Master Plan Project Manager
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor Windsor, Ontario, N9A 6S1
(519) 255-6100 ext. 6508
info@weatheringthestorm.ca

Sincerely,

Fahd Mikhael, P. Eng., P.E., M. Sc.
Manager of Design and Development

AMG/mh

cc: Mark Winterton, City Engineer
Ward 6 Councillor, Jo-Anne Gignac
Dillon Consulting Limited, Attn: Laura Herlehy

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

Welcome to the

Riverside Drive East
Storm Pump Station Alternatives
Property Owner Meeting

November 2019

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Urban and Coastal Flooding

The City of Windsor is developing alternative solutions to address urban and coastal flooding through the Sewer and Coastal Flood Protection Master Plan.

Urban Flooding

(Sewer Master Plan)

Caused by:

Extreme Rainfall Events

Riverside Area – September 2017 Rain Event

Results in:

- Surface Flooding – Storm runoff that exceeds the capacity of the sewer and overland drainage systems.
- Basement Flooding – Inflow and infiltration that exceeds the capacity of the sanitary and/or combined sewer systems.

Coastal Flooding

(Coastal Flood Protection Master Plan)

Caused by:

High Lake and River Levels

Little River South of Riverside Drive

Results in:

- Surface flooding of low lying areas from high water levels.
- Backflow into storm and/or combined sewer systems.
- Compromised sewer outlet capacity.

Overview of Integrated Master Plan

Sewer and Coastal Flood Protection Master Plan

Study Objectives

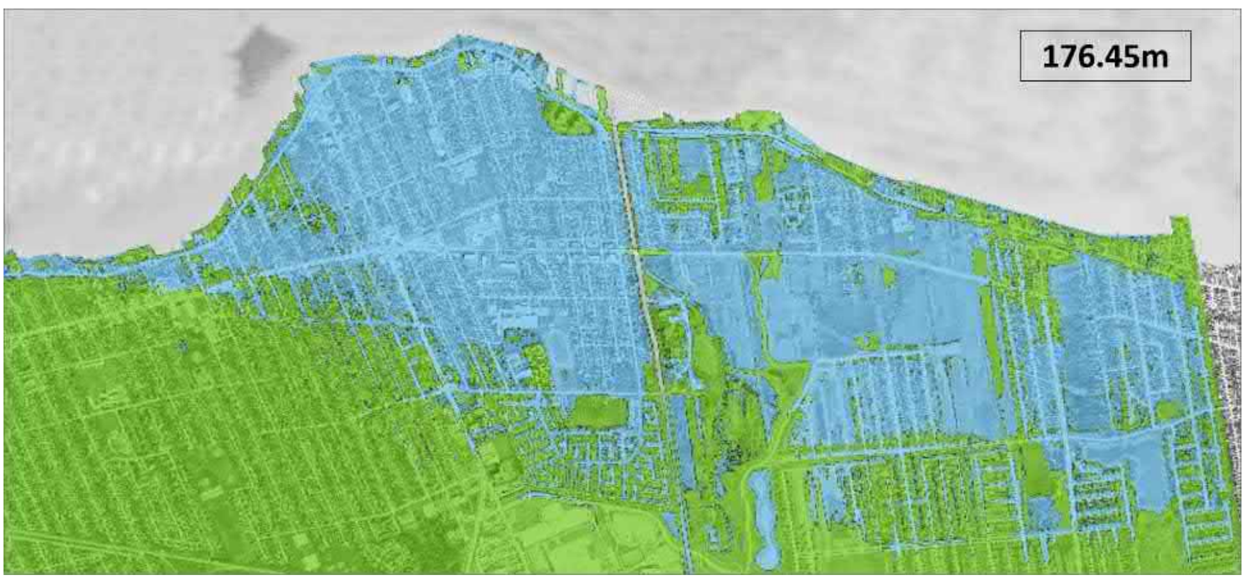
- Understand the causes of basement and surface flooding.
- Identify and evaluate short-term and long-term measures to reduce the impacts and risks of urban flooding.
- Evaluate the need to improve the existing coastal flood protection landforms on Riverside Drive East.
- Recommend an implementation strategy.

What has been done to date?

- ✓ Developed comprehensive sewer and overland drainage system model.
- ✓ Confirmed urban flood risk areas.
- ✓ Developed alternative short-term and long-term solutions.
- ✓ Engaged the public through various events, social media, newsletters and project website.
- ✓ First Public Information Center (PIC) held in June 2018.
- ✓ Coordinated with regulatory agencies regarding alternative solutions.
- ✓ Flood Risk Assessment Study Public Information Meeting held on June 26, 2019.
- ✓ East Riverside Flood Risk Assessment Study adopted by Council October 7, 2019.
- ✓ Integrated the coastal flooding solutions as part of the Sewer Master Plan.
- ✓ Held pre-consultation meeting with property owners on October 30, 2019 to obtain initial feedback and input.
- ✓ Refining alternative coastal flood protection alternatives.

Drainage for Low-Lying Areas

The central portion of the City is as much as **15 m (about 50 ft.)** higher than lands to the east and west.



To protect and provide drainage for lower-lying areas (**BLUE**), the City has introduced the following strategies:

- Flood protection landforms (including the Ganatchio Trail and Little River landform barriers) to protect low-lying areas from high River and Lake levels;
- Pump stations; and
- Temporary storage ponds.

LEGEND:

Area Above Noted High Water Elevation

Area Below Noted High Water Elevation

Focus of Today's Meeting

The focus of today's meeting is on **urban surface flooding** resulting from significant rainfall events.

The purpose of today's meeting is to obtain feedback from property owners that may be directly affected by proposed **storm pump station solutions** that are being recommended to address surface flooding risks in the **St. Paul, St. Rose and Ford storm drainage areas**.

Storm Drainage Area Map

- St. Paul Storm Drainage Area
- St. Rose Ave. Storm Drainage Area
- Ford Blvd. Storm Drainage Area

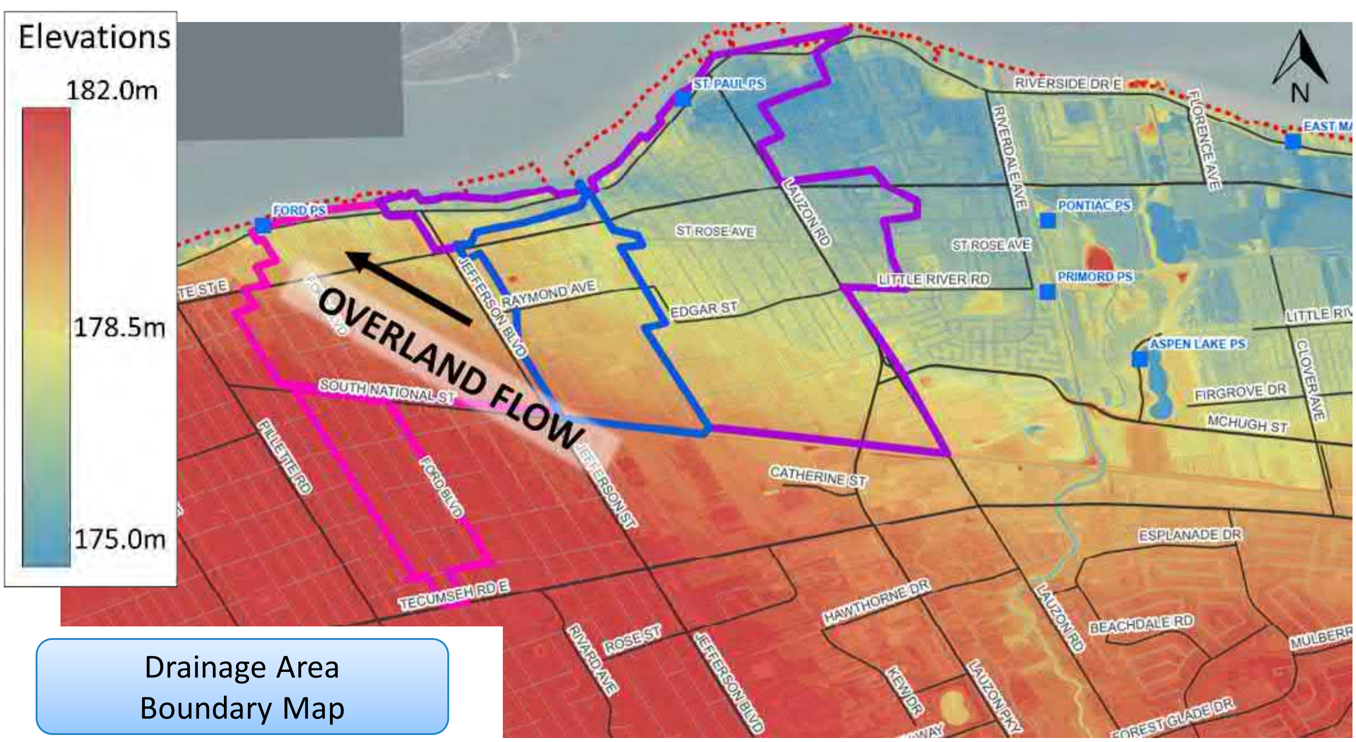
Surface Flooding

In 2016 and 2017, the City experienced two major rain events that caused extensive surface flooding, limiting emergency access and resulting in damage to private properties.

Surface flooding can be caused by:

- Storm runoff that exceeds the capacity of the sewer and overland drainage system.
- Excess overland flow that directs runoff to low lying areas.
- High lake or river levels that backflow into the City's sewer system and compromise the capacity of the drainage systems.

Event	Rainfall (mm)
September 2016	100 mm over 37 hours
August 2017	212 mm over 29 hours

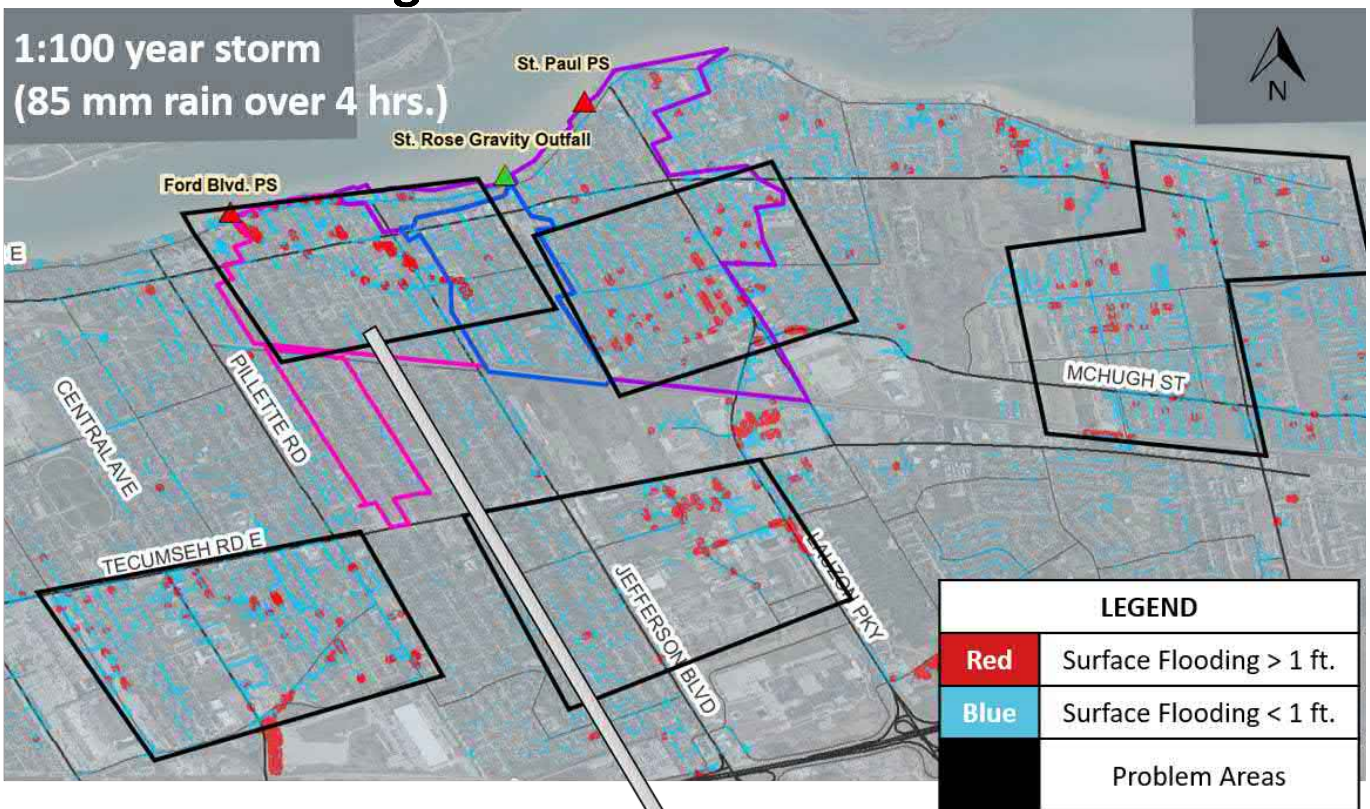


Drainage Area Boundary Map

St. Paul Pump Station
St. Rose Ave. Trunk Sewer
Ford Blvd Trunk Sewer

Storm System - Level of Service

Surface Flooding Problem Areas:



Riverside Vista Phase 2A (Ford Blvd. to St. Rose Ave.): This *problem area* is being addressed to an *enhanced* level of service:

- Significance of overland flow contribution.
- Impact to properties.
- Impact to access on Riverside Drive.

Riverside Area Solutions

1. Improvements to Outlet Capacity

- New Ford Pump Station *(existing PS serves different function)*
- New St. Rose Pump Station *(PS previously existed)*
- Increase capacity of St. Paul Pump Station

What are the benefits?

✓ ***Resiliency:***
- Improved drainage capacity, including enhanced level of service in vulnerable areas.
- Address outlet capacity limitations caused by high Lake/River levels.
- Improved effectiveness of discharging runoff in a more timely fashion.

2. Improvements to the Sewer Conveyance and Storage Capacity

- Over 5 kilometers of large storm trunk sewers.
- Tranby Park and Brumpton Park Underground Storage Facility.
- LIDs within the Municipal ROW. (exfiltration trenches and bio-swales.)

3. Source Control

- Downspout Disconnection Program.
- Partnering Approach with homeowners to implement LIDs on private property.

4. Riverside Drive Barrier Landform

What are the benefits?

- ✓ ***Improved drainage***
- ✓ ***Retention of rainwater***
- ✓ ***Treatment of runoff***
- ✓ ***Capture Overland Flow***
- ✓ ***Protect Area from high river levels***
- ✓ ***Directs overland flow to sewer, away from homes***

Alternative Evaluation
St. Rose Ave. Pump Station

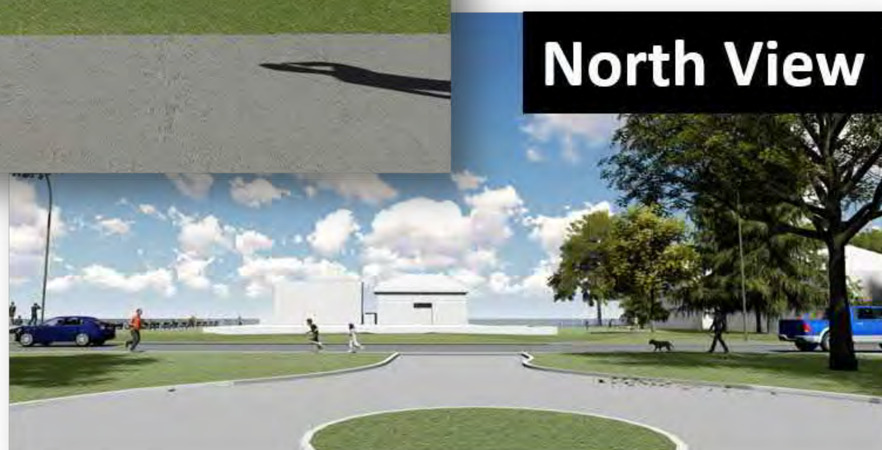
PRELIMINARY PREFERRED

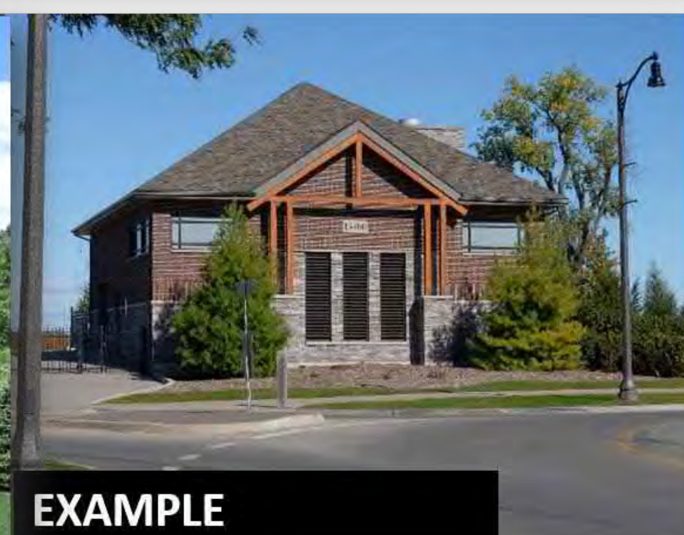
Evaluation Criteria	Alt 1	Alt 2	Alt 3
Meets Flood Mitigation Objectives	✓	✓	✓
Resiliency to Climate Change	✓	✓	✓
Ease of Construction	✓		
Disruption to Residents	✓		
Impact to Riverfront View		✓	✓
Impact to Recreational Space		✓	✓
Impact to Existing Infrastructure	✓		
Cost	✓		

Pump Station Conceptual Design
St. Rose Pump Station

The proposed pump station(s) design will fit the aesthetic of the local neighbourhood and nature of the Riverside Vista Area.

The City wants **your feedback** on the design of the pump station and site amenities, such as landscape or other features.



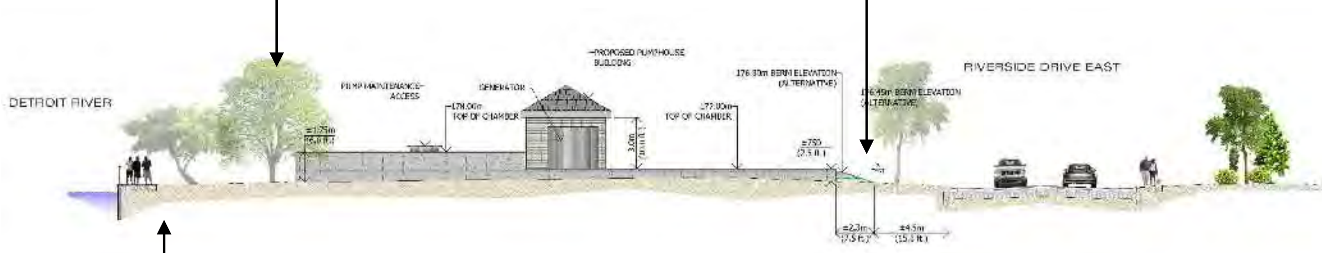


Impacts and Mitigation

Parkland and Site Access

Landscape and other amenities will be incorporated.

Landform Barrier will be incorporated into the proposed site.



Walkways will be maintained/improved

A virtual tour of the proposed pump station site can be viewed on the project website.

weatheringthestorm.ca

Noise and Vibration

Through the detailed design of the proposed pump station necessary design elements will be incorporated mitigate noise and vibration impacts.
Measures include:

- Sound enclosures for standby power generators.
- Noise baffles on building ventilation.

What's Next

Timing of construction for the proposed pump stations are dependent on available funding. The City has applied for funding through the ***Disaster Mitigation and Adaptation Fund (DMAF)*** to proceed with pump station improvements.

The following outlines a preliminary schedule for implementation of these improvements.

Task		Estimated Timeline
Public Information Centres (PIC)		Winter 2020
Complete Functional Design of Recommended Solutions		Winter 2020
Complete Sewer and Coastal Flood Protection Master Plan		Spring 2020
Riverside Vista Phase 2A	Property Acquisition	Spring 2020 to Mid-2021
Riverside Vista Phase 2A	Advance Utility Relocation	2022
Riverside Vista Phase 2A	Road Construction, including storm trunk sewer.	2023-2024
St. Paul Pump Station Improvements		2024-2025
St. Rose Pump Station		Pending Funding
St. Rose Drainage Area Trunk Storm Sewer		Pending Funding
Ford Blvd. Pump Station Improvements		Pending Funding

Stay involved and provide your feedback….

Visit us at **weatheringthestorm.ca**

Email us at: **info@weatheringthestorm**

Sign-up to our contact list to receive updates on future events

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City of Windsor
Riverside Drive East
Storm Pump Station Alternatives
Property Owner Meeting – Comment Form

degrees of CHANGE

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[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

The proposed + pending pumping station at St. Rose and Riverside Dr. is a much needed addition.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

I hope the time frame for the St. Rose pump station can be expedited somehow.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

I experienced overland floodings as a result of a sunken patio drain that was overwhelmed by storm sewer back flooding as well as 18" of water in my crawl space.

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

6. **Other comments, questions or suggestions?**

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[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

Much needed, looks good, esp. the proposed new St. Rose station

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

Alt 1 looks good

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

almost all houses around me. I have to manually switch to pump outside to the front with a second pump when it rain a great amount. Then I go and help neighbours.

WINDSOR Aquafor Beech DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

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3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

locations identified include the location, of my house – we're not ready or planning on selling

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

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ALL ARE BAD.
#1 would BE OK only if you go further underground - green space on Top. You Don't get rid of Park land along the river.
= #2 is the least obtrusive to Riverside

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

NO. ALL ARE BAD

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

THE CITY OF WINDSOR Aquafor Beech Limited DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

6. **Other comments, questions or suggestions?**

This sucks.
Sorry for the language but it
SUCKS - We Pay a lot in
Taxes & Paid a lot for our
Properties.
Don't Do Anything

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2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

OK with park location.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

Using park seems inherently more sensible that acquiring and tearing down nice houses.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

Both major rainfall events led to ≈ 6 inches of water in our finished basement.

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

Our lot has high elevation compared to most of the area

6. **Other comments, questions or suggestions?**

(1) Consider incorporating boat access to water, making it a park enhancement rather than just a utility.
(2) Most important - make all surfaces consistent with residential setting (brick, false windows, etc), not industrial flat brick walls, cement surfaces, etc.

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I do not like the location as it blocks water view & eats up park/greenspace.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

I have not experienced flooding since ~~an~~ living at my current address.

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5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

Sump Pump

6. **Other comments, questions or suggestions?**

We should always be working to protect parks & greenspace. I feel it would be a loss to the neighbourhood to replace the greenspace c̄ a pump station.

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2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

SEEMS APPROPRIATE, DEFINITELY NEED TO GET ON THIS,

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

MAY GET PUSH BACK FROM RESIDENTS N.I.M.B.Y. AS WELL AS POTENTIAL EXPROPRIATED PROPERTY OWNERS

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

2017 AUG FLOOD

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5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

SUMP PUMP + BACK FLOW VALVE

6. **Other comments, questions or suggestions?**

THANKS FOR BEING OPEN WITH RESIDENTS

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ST ROSE PUMP STATION WILL REMOVE PARKLAND
OTHER 2 OPTIONS MOVE HOUSES. NONE ARE GOOD

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

SEWERS NEED TO BE DONE + UPGRADED
WILL THIS RAISED LOCATION FORCE WATER ONTO THE ROAD

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

NONE BUT I AM A NEW RESIDENT TO THE AREA
+ HAVE NO BASEMENT.

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

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6. **Other comments, questions or suggestions?**

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2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

PS @ ST. ROSE BEACH PARK ONLY

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

Alternative solutions are not acceptable.
On preferred solution, height above ground should be ~~g~~ kept to a minimum.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

Toilet and sink in basement overflowed from major rainfall event.

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

Basement sump ~~pump~~ pump.

6. **Other comments, questions or suggestions?**

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[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

Prelimnary first option is best but needs to be closer to house and more green space west of station. to walk way. The green space east of station is a waste.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

option 2 and 3 are not good ideas. Too much money to expropriate houses. Also distrupts residential neighbourhoods

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

Urban flood twice

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

Sump pump, Backwater Valve.

6. **Other comments, questions or suggestions?**

Better positioning of station to keep as much green space and good sightline from road / St. Rose Street

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2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

Would prefer solution #1 (St. Rose Park) but would like to see it burried under ground. (possibly with a green roof & an observation platform. (less above ground)

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

16" in basement; ~~fro~~ front & back yard (landscape rocks floated away) were flooded.

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5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

no.
tried for back flow vaulve but was denied because what we call basement isn't considered basement by city.

6. **Other comments, questions or suggestions?**

pump station should have very little above ground showing. It should be built as a series of platforms with green roofs so that it remains park land.

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PREFER THE SMALLER PUMP STATION EXAMPLE FOR BUILDING CLADDING. WOULD LIKE TO SEE PUMP STATION TURNED 90° SO PUMP & GENERATOR LINE UP NORTH/SOUTH RATHER THAN EAST.WEST

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

ST ROSE PARK IS NOT UTILIZED BY MANY KIDS AS A PLAY AREA, THUS, ATTENTION SHOULD BE ON MAINTAINING OPEN VIEWS TO WATERFRONT FOR PUBLIC AND ST-ROSE, RIVERSIDE DR. HOMEOWNERS

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

Sept 2016 1' BASEMENT

AUG 2016 1 1/2' BASEMENT.

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5. Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?

NEW SUMP PUMP / BACKWATER VALVE

AND WEEPING TILE PROJECT COMPLETED APRIL 2018

6. Other comments, questions or suggestions?

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DID NOT LIKE ANY OF 3
MOST PREFERRED WAS IN PARK ON RIVER

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

NONE!!!

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5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

NONE

WE DO NOT HAVE BASEMENT OR CRAWL SPACE

6. **Other comments, questions or suggestions?**

OF THE 3 SUGESTED ST ROSE

1) - WOULD BE LOOKING AT IT NOT RIVER

2) - IMMEDIATELY IN FRONT OF OUR HOUSE

3) - IMMEDIATLEY BESIDE US - NOISE - NOISE - NOISE

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Sir Rose Bud park - suggest people-appealing additions to park - re recreation, history, interesting architecture, to ~~help~~ help mitigate effect of disrupted view.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

2 major basement floods - costing us $7-8000 DESPITE city subsidy program!

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted] m

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

The preferred pump station is bigger than some of the ones around the city. I'm not sure if this is going to happen regardless of what is said today, but I'd consider putting some of it underground (like clairview pump station). I'm not sure why we would put it (the station) right in the middle of the park and not segregate it to one corner/tucking it away, leaving more park space for the public & better view for the res.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

The alternative solutions seem logical, from my property, my view wouldn't change with alternative (2) & (3), but if I'm stuck w/ ALTERNATIVE (1), I move the station to the back right corner.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

~~there~~ I have not experienced any flooding at my location... any flooding yet.

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5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

No I do not.

6. **Other comments, questions or suggestions?**

If my house was part of any of the alternative solutions, I'd sell it to you.

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City of Windsor
Riverside Drive East
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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

I'd prefer to Keep the green space as a community asset.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

As much underground as possible to keep as much green space to remain is my preference

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

NO FLOODING IN '17

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

we have no basement, but a crawl space so we are up a few feet from the road.

6. **Other comments, questions or suggestions?**

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THE CITY OF WINDSOR ONTARIO, CANADA

Office of the City Engineer

October 16, 2019

Dear Property Owner:

Re: City of Windsor Sewer Master Plan – Neighbouring Properties Meeting
Proposed Stormwater Pump Station at Ford Boulevard and Riverside Drive

---

The City of Windsor retained Dillon Consulting Limited in 2018 to complete a Sewer Master Plan that will consider alternative solutions to reduce the risk of basement and surface flooding in the community.

These alternative solutions include a proposed new stormwater pump station in the area of Ford Boulevard and Riverside Drive. We are meeting local property owners to preview this information before the Public Information Centres taking place later this year. The property owners in the immediate area of the proposed stormwater pump station are invited to attend the following meeting:

Date:	**Wednesday, November 6, 2019**
Time:	**Open from 5:00pm – 8:00pm**
Location:	**WFCU Centre, 8787 McHugh Street, Erie Room**

WHAT TO EXPECT AT THE MEETING WITH LOCAL PROPERTY OWNERS

Information will be available to describe the proposed stormwater pump station, the alternative locations being considered, the evaluation criteria, and the preliminary identification of a preferred solution.

Members of the project team will be available to address your questions and consider your comments as we prepare for the formal public meetings that will take place in December 2019.

ABOUT THE SEWER MASTER PLAN PROJECT

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan.

The Sewer Master Plan is being undertaken under the Municipal Class Environmental Assessment (EA) process to address the following objectives:

- To confirm the causes of basement and surface flooding based on the City's storm, sanitary and combined sewer systems, as well as the overland drainage network;
- To identify and evaluate short-term and long-term measures to reduce the impacts and risks of flooding; and
- To recommend an implementation strategy for the City's consideration.

For further information related to this project, you may visit the project website at www.weatheringthestorm.ca.

PROJECT CONTACTS

Please contact Ms. Laura Herlehy, P.Eng., Project Coordinator at (519) 948-5000 or by email at lherlehy@dillon.ca if you would like to meet a member of the project team at another time or to address any further questions that you may have.

In addition, you may also contact the below project representatives for any general inquiries about this project.

Flavio Forest, P.Eng.
Project Manager, Dillon Consulting Limited
3200 Deziel Drive, Suite 608
Windsor, ON, N8W 5K8
(519) 948-4243 ext. 3233
info@weatheringthestorm.ca

Anna M. Godo, P. Eng.
Sewer Master Plan Project Manager
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor Windsor, Ontario, N9A 6S1
(519) 255-6100 ext. 6508
info@weatheringthestorm.ca

Sincerely,

Fahd Mikhael, P. Eng., P.E., M. Sc.
Manager of Design and Development

amg AMG/mh

cc: Mark Winterton, City Engineer
Ward 6 Councillor, Jo-Anne Gignac
Dillon Consulting Limited, Attn: Laura Herlehy

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

Welcome to the

Riverside Drive East
Storm Pump Station Alternatives
Property Owner Meeting

November 2019

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Urban and Coastal Flooding

The City of Windsor is developing alternative solutions to address urban and coastal flooding through the Sewer and Coastal Flood Protection Master Plan.

Urban Flooding

(Sewer Master Plan)

Caused by:

Extreme Rainfall Events

Riverside Area – September 2017 Rain Event

Results in:

- Surface Flooding – Storm runoff that exceeds the capacity of the sewer and overland drainage systems.
- Basement Flooding – Inflow and infiltration that exceeds the capacity of the sanitary and/or combined sewer systems.

Coastal Flooding

(Coastal Flood Protection Master Plan)

Caused by:

High Lake and River Levels

Little River South of Riverside Drive

Results in:

- Surface flooding of low lying areas from high water levels.
- Backflow into storm and/or combined sewer systems.
- Compromised sewer outlet capacity.

Overview of Integrated Master Plan

Sewer and Coastal Flood Protection Master Plan

Study Objectives

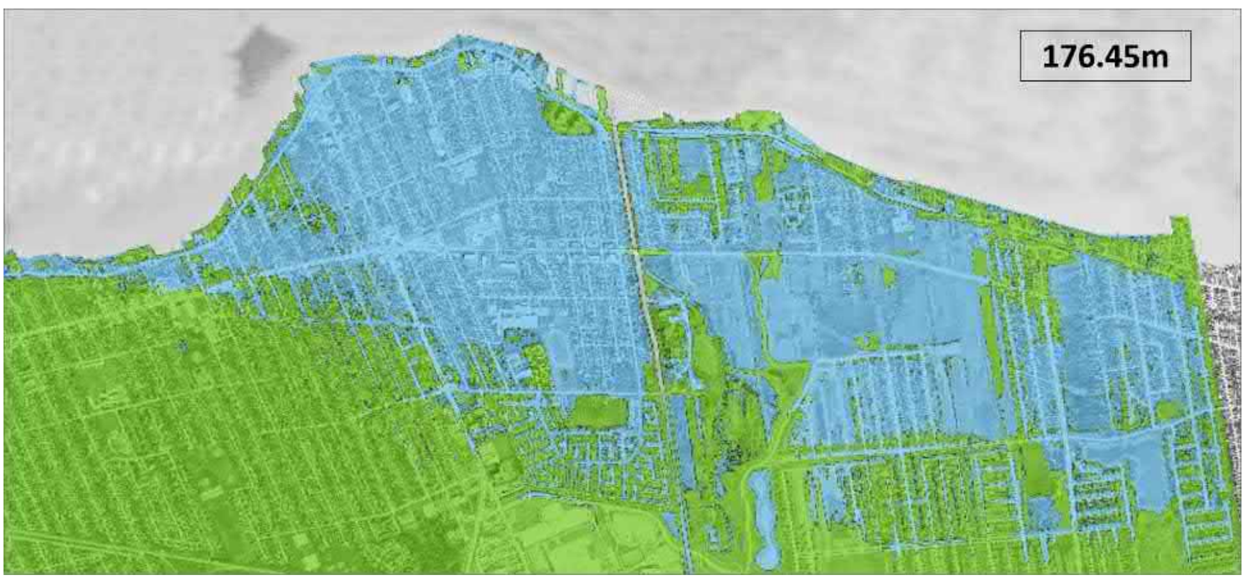
- Understand the causes of basement and surface flooding.
- Identify and evaluate short-term and long-term measures to reduce the impacts and risks of urban flooding.
- Evaluate the need to improve the existing coastal flood protection landforms on Riverside Drive East.
- Recommend an implementation strategy.

What has been done to date?

- ✓ Developed comprehensive sewer and overland drainage system model.
- ✓ Confirmed urban flood risk areas.
- ✓ Developed alternative short-term and long-term solutions.
- ✓ Engaged the public through various events, social media, newsletters and project website.
- ✓ First Public Information Center (PIC) held in June 2018.
- ✓ Coordinated with regulatory agencies regarding alternative solutions.
- ✓ Flood Risk Assessment Study Public Information Meeting held on June 26, 2019.
- ✓ East Riverside Flood Risk Assessment Study adopted by Council October 7, 2019.
- ✓ Integrated the coastal flooding solutions as part of the Sewer Master Plan.
- ✓ Held pre-consultation meeting with property owners on October 30, 2019 to obtain initial feedback and input.
- ✓ Refining alternative coastal flood protection alternatives.

Drainage for Low-Lying Areas

The central portion of the City is as much as **15 m (about 50 ft.)** higher than lands to the east and west.



To protect and provide drainage for lower-lying areas (**BLUE**), the City has introduced the following strategies:

- Flood protection landforms (including the Ganatchio Trail and Little River landform barriers) to protect low-lying areas from high River and Lake levels;
- Pump stations; and
- Temporary storage ponds.

LEGEND:

Area Above Noted High Water Elevation

Area Below Noted High Water Elevation

Focus of Today's Meeting

The focus of today's meeting is on **urban surface flooding** resulting from significant rainfall events.

The purpose of today's meeting is to obtain feedback from property owners that may be directly affected by proposed **storm pump station solutions** that are being recommended to address surface flooding risks in the **St. Paul, St. Rose and Ford storm drainage areas**.

Storm Drainage Area Map

- St. Paul Storm Drainage Area
- St. Rose Ave. Storm Drainage Area
- Ford Blvd. Storm Drainage Area

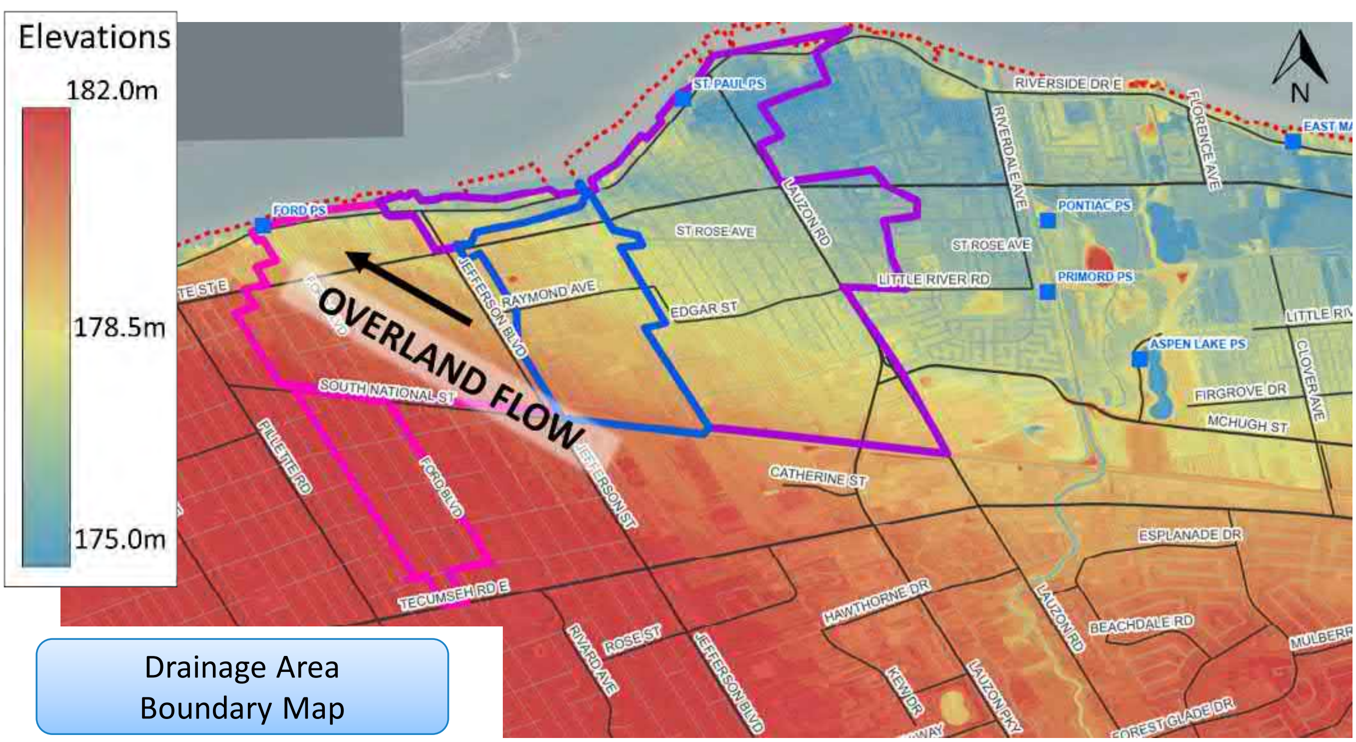
Surface Flooding

In 2016 and 2017, the City experienced two major rain events that caused extensive surface flooding, limiting emergency access and resulting in damage to private properties.

Surface flooding can be caused by:

- Storm runoff that exceeds the capacity of the sewer and overland drainage system.
- Excess overland flow that directs runoff to low lying areas.
- High lake or river levels that backflow into the City's sewer system and compromise the capacity of the drainage systems.

Event	Rainfall (mm)
September 2016	100 mm over 37 hours
August 2017	212 mm over 29 hours

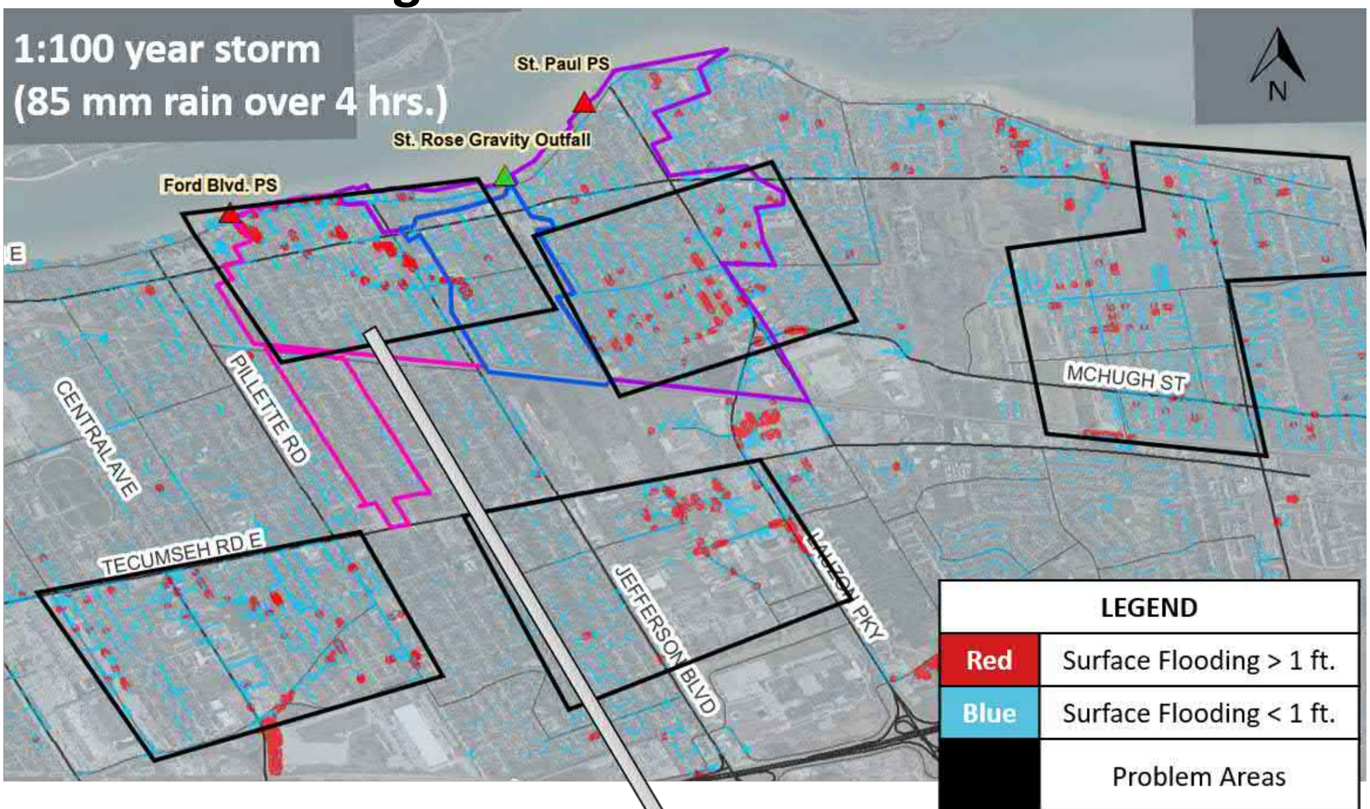


Drainage Area Boundary Map

- St. Paul Pump Station
- St. Rose Ave. Trunk Sewer
- Ford Blvd Trunk Sewer

Storm System - Level of Service

Surface Flooding Problem Areas:



Riverside Vista Phase 2A (Ford Blvd. to St. Rose Ave.): This *problem area* is being addressed to an *enhanced* level of service:

- Significance of overland flow contribution.
- Impact to properties.
- Impact to access on Riverside Drive.

Riverside Area Solutions

1. Improvements to Outlet Capacity

- New Ford Pump Station *(existing PS serves different function)*
- New St. Rose Pump Station *(PS previously existed)*
- Increase capacity of St. Paul Pump Station

What are the benefits?

✓ ***Resiliency:***
- Improved drainage capacity, including enhanced level of service in vulnerable areas.
- Address outlet capacity limitations caused by high Lake/River levels.
- Improved effectiveness of discharging runoff in a more timely fashion.

2. Improvements to the Sewer Conveyance and Storage Capacity

- Over 5 kilometers of large storm trunk sewers.
- Tranby Park and Brumpton Park Underground Storage Facility.
- LIDs within the Municipal ROW. (exfiltration trenches and bio-swales.)

3. Source Control

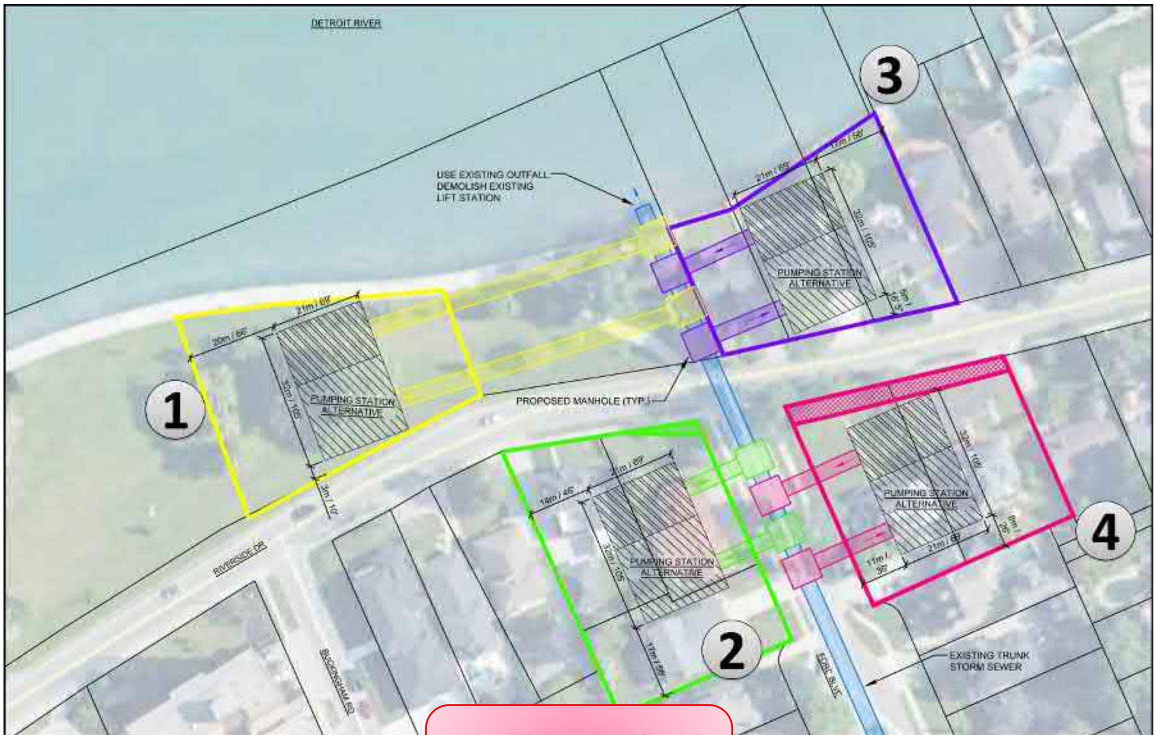
- Downspout Disconnection Program.
- Partnering Approach with homeowners to implement LIDs on private property.

4. Riverside Drive Barrier Landform

What are the benefits?

✓ ***Improved drainage***
✓ ***Retention of rainwater***
✓ ***Treatment of runoff***
✓ ***Capture Overland Flow***
✓ ***Protect Area from high river levels***
✓ ***Directs overland flow to sewer, away from homes***

Alternatives Evaluation
Ford Blvd. Pump Station



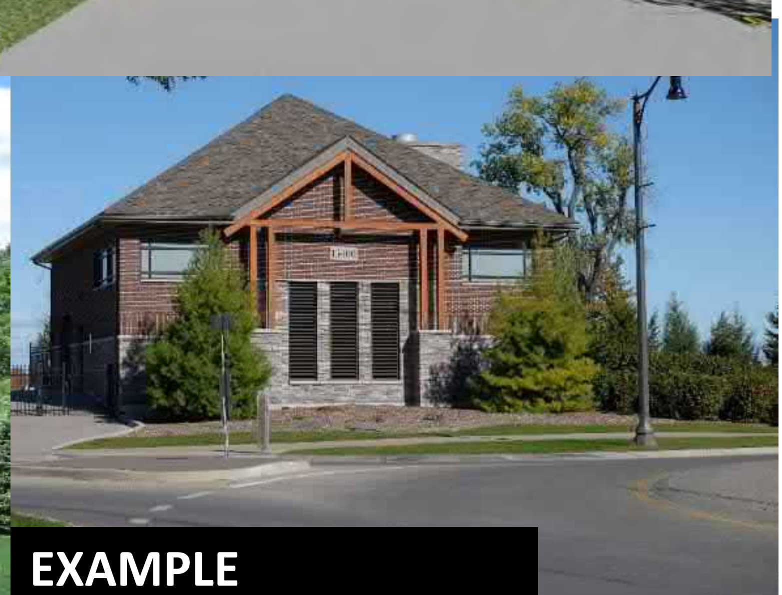
PRELIMINARY PREFERRED

Evaluation Criteria	Alt 1	Alt 2	Alt 3	Alt 4
Meets Flood Mitigation Objectives	✓	✓	✓	✓
Resiliency to Climate Change	✓	✓	✓	✓
Ease of Construction	✓			
Impact to Heritage Resources	✓		✓	
Disruption to Residents	✓			
Impact to Riverfront View		✓	✓	✓
Impact to Recreational Space		✓	✓	✓
Impact to Existing Infrastructure	✓			
Cost	✓			

Pump Station Conceptual Design
Ford Blvd. Pump Station

The proposed pump station(s) design will fit the aesthetic of the local neighbourhood and nature of the Riverside Vista Area.

The City wants **<u>your feedback</u>** on the design of the pump station and site amenities, such as landscape or other features.

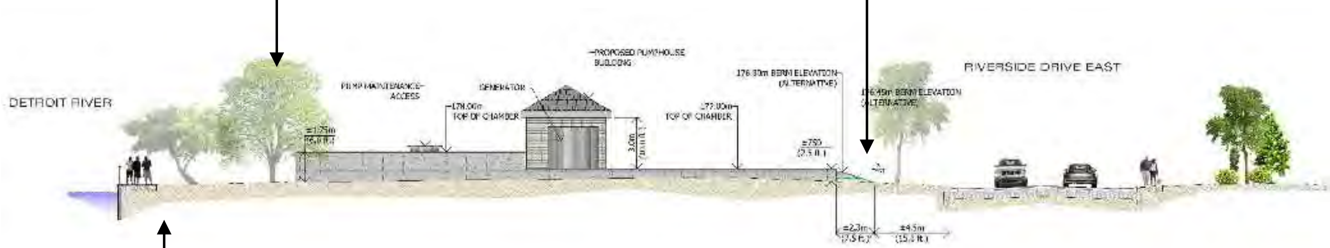


Impacts and Mitigation

Parkland and Site Access

Landscape and other amenities will be incorporated.

Landform Barrier will be incorporated into the proposed site.



Walkways will be maintained/improved

A virtual tour of the proposed pump station site can be viewed on the project website.

weatheringthestorm.ca

Noise and Vibration

Through the detailed design of the proposed pump station necessary design elements will be incorporated mitigate noise and vibration impacts.
Measures include:

- Sound enclosures for standby power generators.
- Noise baffles on building ventilation.

What's Next

Timing of construction for the proposed pump stations are dependent on available funding. The City has applied for funding through the ***Disaster Mitigation and Adaptation Fund (DMAF)*** to proceed with pump station improvements.

The following outlines a preliminary schedule for implementation of these improvements.

Task		Estimated Timeline
Public Information Centres (PIC)		Winter 2020
Complete Functional Design of Recommended Solutions		Winter 2020
Complete Sewer and Coastal Flood Protection Master Plan		Spring 2020
Riverside Vista Phase 2A	Property Acquisition	Spring 2020 to Mid-2021
	Advance Utility Relocation	2022
	Road Construction, including storm trunk sewer.	2023-2024
St. Paul Pump Station Improvements		2024-2025
St. Rose Pump Station		Pending Funding
St. Rose Drainage Area Trunk Storm Sewer		Pending Funding
Ford Blvd. Pump Station Improvements		Pending Funding

Stay involved and provide your feedback….

Visit us at **weatheringthestorm.ca**

Email us at: **info@weatheringthestorm**

Sign-up to our contact list to receive updates on future events

Follow us on

CityofWindsor

@CityWindsorON

City of Windsor
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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

We prefer to locate pumping station on the area of River side Park(west of Buckingham street

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?** NO

6. **Other comments, questions or suggestions?**

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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

I live on Ford Blvd & would like to see if the electrical could be moved further west for example @ the foot of Dillette & put the pumping station near the parking lot of the park.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

I don't feel that the alternative solutions are viable as no one wants a pumping station on their street.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

We experienced flooding due to rainfall June of 2012(?) but took advantage of the city subsidy for sumppump & back flow valves & haven't had an issue since.

THE CITY OF WINDSOR   Aquafor Beech   DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

We have two sump pumps & a back flow valve.

6. **Other comments, questions or suggestions?**

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[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

The ~~#~~1 listed alternative is the only one that is even remotely acceptable, as the others put the pumping station in the middle of residences as well as expropriating substantial personal property. What should be examined is moving the station or components (electrical?) further West where the park is wider and put as much below grade as possible

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

The other solutions are an insult to our community.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

I had major flooding in August 2017 for the first time in 34 years, due to a major rainfall event. A solution must be found. That is not in dispute but with modern technology, something that has the least negative impact on our park view and home values.

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

6. **Other comments, questions or suggestions?**

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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

The preferred location, as explained to us, would impede property owners view & property values would go down as a result of the obstruction. Everyone owning property btwn. Ford & Buckingham would prefer the project to be located a bit farther west from Buckingham.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

~~#~~ I really don't understand why the pump house can't be located slightly west of Buckingham in front of high rises, where the view wouldn't be impeded. The apt's at Buckingham are rentals, not real estate -

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

We have 2 Sump pumps & 2 back flow valves in our basement. They seem to do the trick because we haven't had any flooding.

THE CITY OF WINDSOR   Aquafor Beech Limited   DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

See answer 4

6. **Other comments, questions or suggestions?**

I hope there is an opportunity for continued input, as this project is undertaken. We all understand the need. It is clear something must be done. The park is enjoyed by many. It would seem that locating it in the widening part of the park, would ~~have~~ be less of an impact, as it wouldn't take up the whole space. See below.

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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

Option 1 is preferred but the above ground building structures should be moved to the western edge of the footprint if they cannot be located at the Peace Fountain area. This way they would block the view ~~iA~~ in front of Buckingham street rather than being directly in front of homes. over →

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

If the footprint of option 1 could be moved to be in front of the Buckingham apartments it would not affect views of homeowners who have paid premium prices for the view. The apt. contains renters and the lower floor has security and a lobby area.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

No flooding has occurred at our property. We have 2 sump pumps and 2 backflow valves

WINDSOR Aquafor Beech DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

Yes. See answer to #4, above.

6. **Other comments, questions or suggestions?**

There are many areas that are inland where stormwater management ponds could be constructed that would add value to the area homes.

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~~Continued~~

Continued

2. There are already structures in the Peace Fountain area so it makes sense to put the above ground electrical control rooms etc. in that area. It should be feasible to have wiring that connects to the pumping station. This would preserve the aesthetics of the area between Ford and Buckingham. Along with our neighbors, we have paid premium prices for property in the area with a river view.

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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

The prefered location in the park, a few suggestions:
① Restrict to pad, move mechanicals/electrical to mechanical room at Peace Fountain. That way park avoids an eyesore, and view for neighbours across street not affected.
② If not, push just 25m further west. That way view of homes (ground level) not affected; would be in front of apartment building where people are up looking over building, view not ruined for anyone that way as well.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

For the above, bear in mind these solutions make sure tax property values not negatively affected. You're talking 70+ years, that adds up!

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

Major rainfall; was solved by shooting downspouts away and swailing. Adjacent neighbours did not flood.

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5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

Yes swailing, downspouts away, 2 sump pumps etc. backflow valve

6. **Other comments, questions or suggestions?**

Please take my suggestions seriously, you already have an electrical / mechanical room right there at fountain, please use it!

Under the Freedom of Information and Protection of Privacy Act, ***all comments and questions submitted regarding this project will be used for the purposes of creating a consultation report*** *that will be a part of the public record and will be made available to individuals or organizations with an interest in this project.* ***Personal information such as name, address, and telephone number will not be included in the environmental assessment report*** *but will be released, if requested, to any person as part of the review of the Sewer and Coastal Flood Protection Master Plan.*

THE CITY OF WINDSOR Aquafor Beech Limited DILLON CONSULTING

City of Windsor
Riverside Drive East
Storm Pump Station Alternatives
Property Owner Meeting – Comment Form

degrees of CHANGE

Your participation in the Storm Pump Station Alternatives Property Owner Meeting will improve the results and help us create a plan that we can implement together. Please take a few minutes and provide us with your thoughts and comments on the following questions. Thank you for your input.

Please complete your form drop a copy in the comment box today at the PIC or scan a copy at home and e-mail us at **info@weatheringthestorm.ca.**

1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

Would like to see concrete pad ~~and~~ ~~[illegible]~~ look like the concrete circles in front of peace fountain. To serve as good looking gathering area with seating and flower areas.
- move #1 further east infront of high rise buildings do not block residential homes.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

Do not want any structure blocking ford BLVD area.
#4 not going to sell my house.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

leaking throught basement concrete blocks due to rainfall (major)

THE CITY OF WINDSOR Aquafor Beech Limited DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

- we had back up valve installed 14 years ago.
- have sump pump. Still need do do work on inside of basement to redirect water that leaks in through concrete blocks during major rainfall.

6. **Other comments, questions or suggestions?**

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City of Windsor
Riverside Drive East
Storm Pump Station Alternatives
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1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

1) I like the conversion of ford system to a pumping station
2) I suggest you move the pump Station more to the West and change the outfall to immediately north of the new pump Station

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

No Comment

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

Our home flooded during both events. We have taken actions to move drainage away from the house and have added a ~~pump~~ sump pump

THE CITY OF WINDSOR   Aquafor Beech Limited   DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

As noted in #4 we have added a sump pump and sewer check valve.

6. **Other comments, questions or suggestions?**

*Under the Freedom of Information and Protection of Privacy Act, **all comments and questions submitted regarding this project will be used for the purposes of creating a consultation report** that will be a part of the public record and will be made available to individuals or organizations with an interest in this project. **Personal information such as name, address, and telephone number will not be included in the environmental assessment report** but will be released, if requested, to any person as part of the review of the Sewer and Coastal Flood Protection Master Plan.*

City of Windsor

Riverside Drive East
Storm Pump Station Alternatives
Property Owner Meeting – Comment Form

degrees of CHANGE

Your participation in the Storm Pump Station Alternatives Property Owner Meeting will improve the results and help us create a plan that we can implement together. Please take a few minutes and provide us with your thoughts and comments on the following questions. Thank you for your input.

Please complete your form drop a copy in the comment box today at the PIC or scan a copy at home and e-mail us at **info@weatheringthestorm.ca.**

1. **Please provide your name and contact information to be added to the project contact list.**

[redacted]

P.S. The notice for this mtg. would have been more effective if circulated to all the houses on Ford Blvd.

2. **Please comment on the preliminary preferred pump station alternative and storm system solution that has been presented.**

location of pumping station might be better if integrated with existing infrastructure at Peace Ftn.
Also better for that block (E. of Ford) as there are NO pumping stations for that entire 2 blocks of high rise apt. bldgs on the Drive → another exacerbating aspect for flooding.

3. **Please comment on the evaluation of the alternative solutions, including the selection of the preliminary preferred solution that has been identified.**

Canterbury Gardens is a public park. Its access should not be hindered by a gigantic building placed its entrance.

4. **Please describe flooding that you may have experienced on your property or in your home and whether it was caused by a major rainfall event (urban flooding) or high lake/river levels (coastal flooding).**

- in basemt 2 yr. ago (the Big One)

THE CITY OF WINDSOR · Aquafor Beech Limited · DILLON CONSULTING

5. **Do you have any flood proofing measures already installed on your property, either internally or externally? If so, can you provide a description of these measures?**

6. **Other comments, questions or suggestions?**

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Babcock, Joshua <jbabcock@dillon.ca>

Fwd: Survey - storm pump station alternatives

2 messages

Herlehy, Laura <lherlehy@dillon.ca> Wed, Nov 13, 2019 at 10:05 AM
To: Joshua Babcock <jbabcock@dillon.ca>, Student CO-OP <studentcoop@dillon.ca>, Miriam Bart <mbart@dillon.ca>, Alessia Mussio <amussio@dillon.ca>

FYI see below, from the project website. Please save and record.
Thanks,
Laura

Laura Herlehy, P. Eng.
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
LHerlehy@dillon.ca
www.dillon.ca

-

--------- Original Message ---------
Subject: Survey - storm pump station alternatives

Date: 11/10/19 4:45 pm
To: info@weatheringthestorm.ca

r. Please answers to questionnaire below:

2. We think that the best location for a new pump station is adjacent to the peace fountain pump station already in the river bank. The city engineer (Adam Mourd) said that this is something that could be investigated. Try to landscape this new building into the existing landscape for minimal impact. This would also be best to reduce noise near residents and not impair people's view.

3. More options need to be presented - eg moving this structure further to the west into the existing peace fountain pump structure.

4. We experienced extensive basement flooding 2 years in a row due to the weather - excessive rainfall. We also have high water flooding issues at our home (used 130 sand bags - as stop gap measure). Note that a lot of the water that damaged our break wall came from the city park adjacent to our property whenever where was a high

> west wind. It did extensive damage to our stone break wall.
>
> 5. Yes sand bags and an internal battery operated sump pump for emergencies- if the power goes out.
>
> 6. Can the City help us to repair our break wall as the damage was caused from water coming from the park side onto our property. I discussed this problem with city park employees and they put a few sand bags on the park side but they continued to wash out and did little to stop the water. Please let me know who to speak with about this issue - thank you.
>
> Sent from my iPhone

Babcock, Joshua <jbabcock@dillon.ca> Thu, Nov 14, 2019 at 1:34 PM
To: "Herlehy, Laura" <lherlehy@dillon.ca>
Cc: Student CO-OP <studentcoop@dillon.ca>, Miriam Bart <mbart@dillon.ca>, Alessia Mussio <amussio@dillon.ca>

No problem.

Josh

DILLON CONSULTING

CANADA BEST MANAGED COMPANIES
Platinum member

Joshua Babcock
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.5000 ext. 3222
F - 519.948.5054
JBabcock@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

[Quoted text hidden]

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

Welcome to the

Riverside Dr. East/East Riverside Area Coastal Flood Protection Property Owner Meeting

October 30, 2019

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Landmark Engineers Inc.

Focus of Today's Meeting

The City of Windsor is developing alternative solutions to address urban and coastal flooding through the Sewer and Coastal Flood Protection Master Plan.

Urban Flooding

(Sewer Master Plan)

Caused by:

Extreme Rainfall Events

Riverside Area – September 2017 Rain Event

Results in:

- Surface Flooding – Storm runoff that exceeds the capacity of the sewer and overland drainage systems.
- Basement Flooding – Inflow and infiltration that exceeds the capacity of the sanitary and/or combined sewer systems.

Coastal Flooding

(Coastal Flood Protection Master Plan)

Caused by:

High Lake and River Levels

Little River South of Riverside Drive.

Results in:

- Surface flooding of low lying areas from high water levels.
- Backflow into storm and/or combined sewer systems.
- Compromised sewer outlet capacity.

Integrated Master Plan Overview

Sewer and Coastal Flood Protection Master Plan

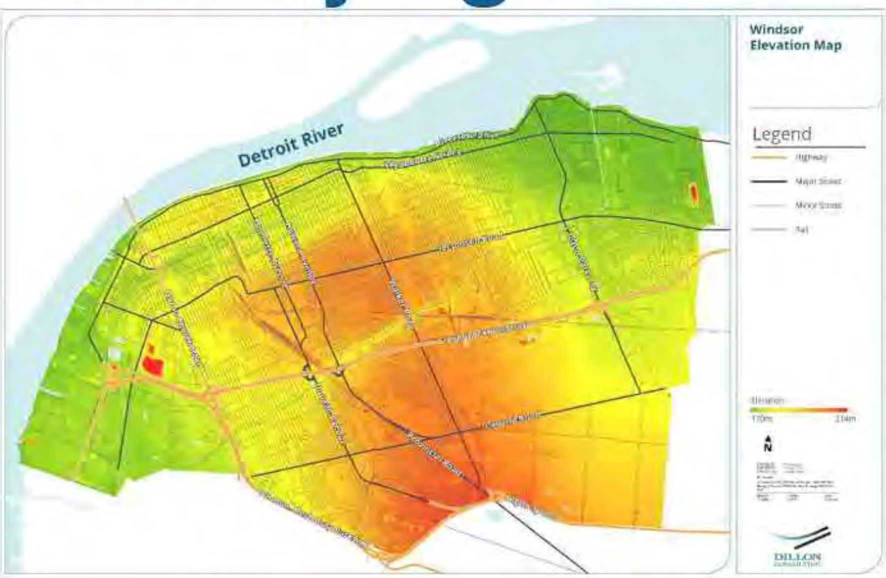
Study Objectives

- Understand the causes of basement and surface flooding.
- Identify and evaluate short-term and long-term measures to reduce the impacts and risks of flooding.
- Evaluate the integrity of the existing landform barrier system.
- Develop a functional design of landform barrier improvements.
- Recommend an implementation strategy.

What has been done to date?

- ✓ Developed comprehensive sewer and overland drainage system model.
- ✓ Confirmed flood risk areas.
- ✓ Developed alternative short-term and long-term solutions.
- ✓ Engaged the public through various events, social media, newsletters and project website.
- ✓ First Public Information Center (PIC) held in June 2018.
- ✓ Coordinated with regulatory agencies regarding alternative solutions.
- ✓ Flood Risk Assessment Study Public Information Meeting held on June 26, 2019.
- ✓ East Riverside Flood Risk Assessment Study adopted by Council October 7, 2019.
- ✓ Integrated the coastal flooding solutions as part of the Sewer Master Plan.
- ✓ Further refined the coastal flood protection solutions in consultation with the City and ERCA.

Coastal Flooding and Drainage Considerations for Low-Lying Areas



The central portion of the City is as much as **15 m (about 50 ft.)** higher than lands to the east and west.

To protect and provide drainage for lower-lying areas (**dark green**), the City has introduced the following strategies:

- Flood protection landforms (including the Ganatchio Trail and Little River landform barriers) to protect low-lying areas from high River and Lake levels;
- Pump stations; and
- Temporary storage ponds.

Coastal Flooding Solutions

The area of Riverside Drive East and inland, from St. Rose Beach easterly to the City limit has historically been protected by a landform barrier system, including the Ganatchio Trail that was constructed in the 1980s.

A flood risk assessment was completed in 2019 to evaluate the integrity of the existing landform barrier system and to determine whether the existing system will be adequate to provide protection under various conditions.

Alternative flood protection solutions have been developed for 3 areas:

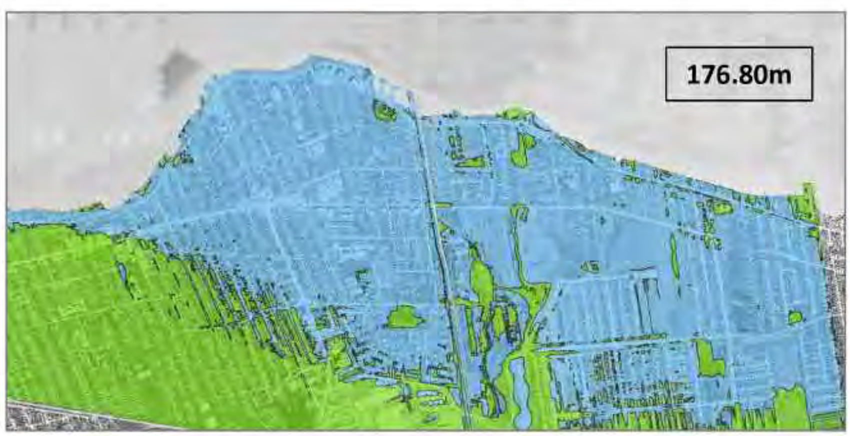
- Area 1: Riverside Vista Phase 2A, Ford Blvd. to St. Rose. Ave.
- Area 2: Riverside Drive East, St. Rose Ave. to Riverdale Ave.
- Area 3: East Riverside Area, Riverdale Ave. to East City limits.

High Lake Levels

In late-Spring 2019, water levels in the Lake Erie, Detroit River and Lake St. Clair system reached an historic high water surface elevation above **176.0 meters (m)**.

These water levels can also be influenced by wind, with record instantaneous high water levels reaching **176.45m**.

By 2050, studies project static high water levels of **176.5m**, with instantaneous high water levels from wind effects as high as **176.8m.**



LEGEND:

Area Above Noted High Water Elevations

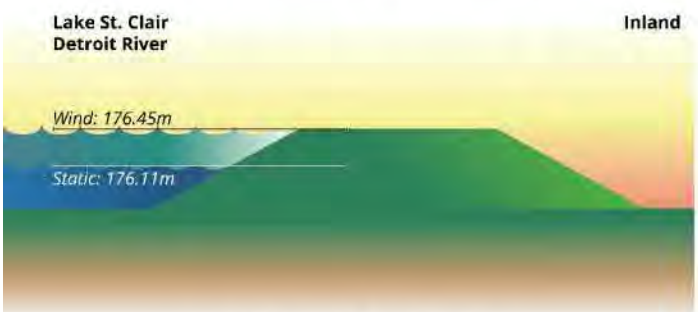
Area Below Listed Elevation High Water Elevations

Landform Barrier Elevations

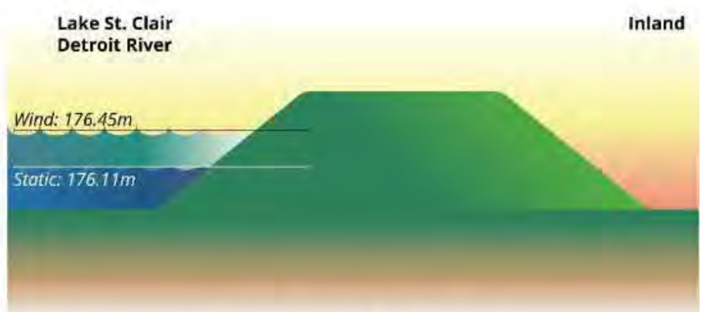
Two flood protection elevation scenarios have been evaluated based on the existing regulatory flood protection levels and the recent climate change projections.

Landform Barrier Elevation 176.45m	Landform Barrier Elevation 176.80m

Historical High Lake Levels:

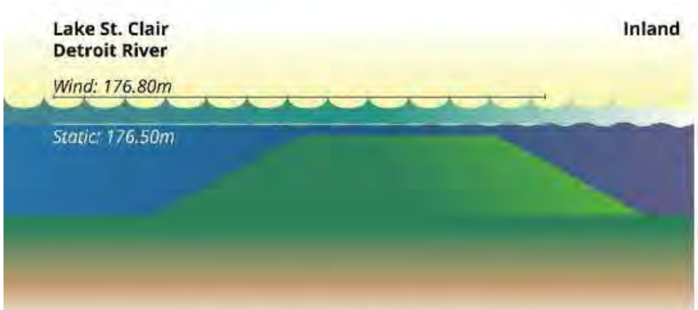


1:100 Year High Water Level

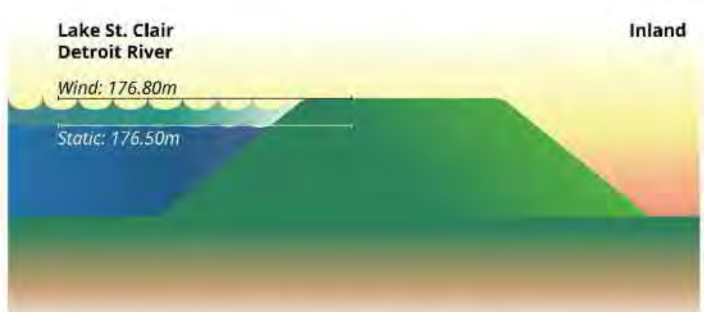


1:100 Year High Water Level

2050 Projected Climate Change High Lake Levels:



1:100 Year High Water Level



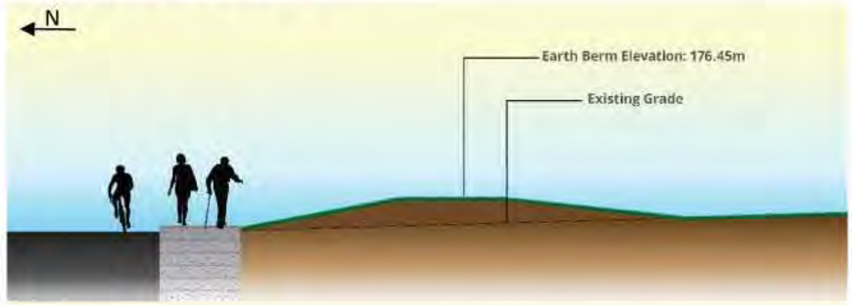
1:100 Year High Water Level

Definitions:
Static Water Level: Lake or river level during normal weather and undisturbed conditions.
Wind Water Level: Lake or river level during short duration wind/storm events.

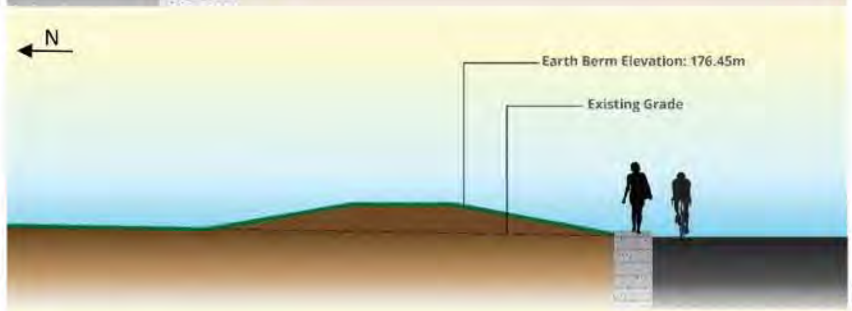
Drawings are not to scale, for illustrative purposes only.

Alternatives: Area 1
Ford Blvd. to St. Rose Ave.

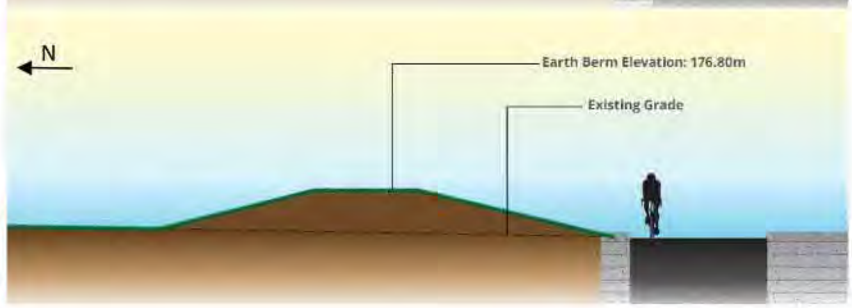
Alternative 1:
Barrier landform, at 176.45m. South boulevard of Riverside Drive.



Alternative 2:
Barrier landform, at 176.45m. North boulevard of Riverside Drive.



Alternative 3:
Barrier landform, at 176.80m. North boulevard of Riverside Drive.



Drawings are not to scale, for illustrative purposes only.

Opportunity/Constraints	Alt 1	Alt 2	Alt 3
Flood Protection (Historical Conditions)	✓	✓	✓
Flood Protection (Projected Conditions)			✓
Protects Inland Drainage Systems		✓	✓
Constructability	Green	Green/Red	Red
Impacts to Potential Development (Inland)	Red	Green/Red	Green
Impacts to Properties (Trees, Landscape, Structures)	Green	Green/Red	Red
Property Acquisition Impacts	Green	Green/Red	Red
Cost	Green	Green/Red	Red

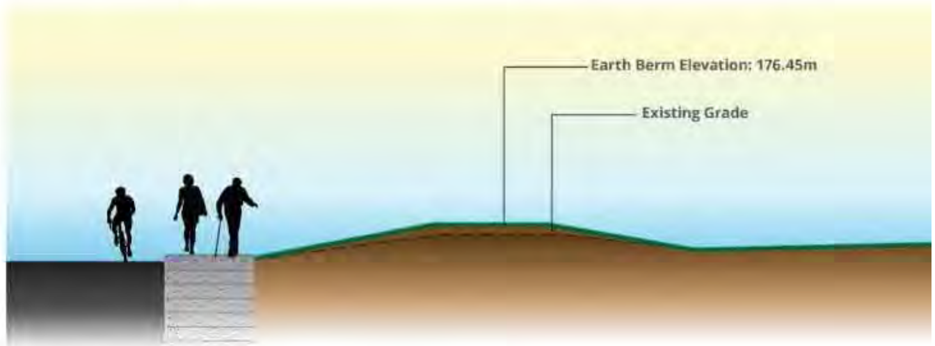
PRELIMINARY PREFERRED

Alternatives: Area 2
St. Rose Ave. to Riverdale Ave.

Alternative 1:

Barrier landform at 176.45m.

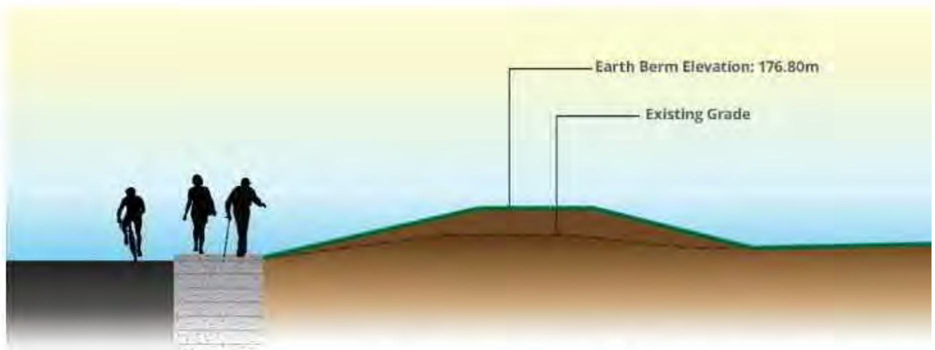
North Boulevard, West of Frank Ave. & South Boulevard, East of Frank Ave.



Alternative 2:

Barrier landform at 176.80m.

North Boulevard, West of Frank Ave. & South Boulevard, East of Frank Ave.



Drawings are not to scale, for illustrative purposes only.

Opportunity/Constraints	Alt 1	Alt 2
Flood Protection (Historical Conditions)	✓	✓
Flood Protection (Projected Conditions)		✓
Constructability	🟢	🔴
Impacts to Potential Development (Inland)	🔴	🟢
Impacts to Properties (Trees, Landscape, Structures)	🟢	🔴
Property Acquisition Impacts	🟢	🔴
Cost	🟢	🔴

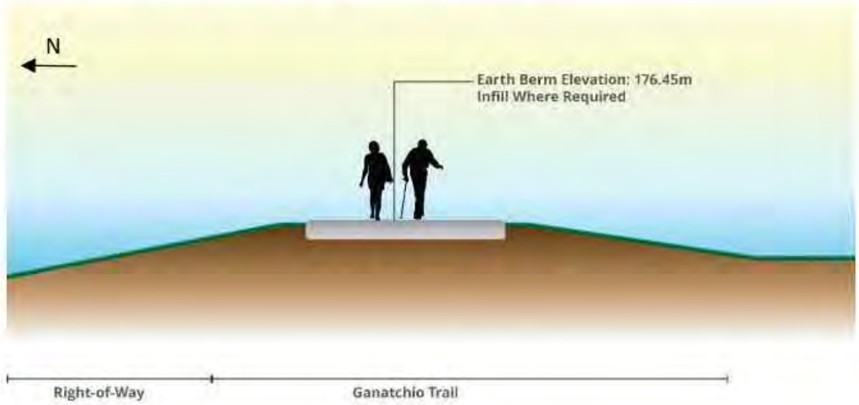
PRELIMINARY PREFERRED

Alternatives Area 3:
Riverdale Ave. to East City Limits

Alternative 1:

Maintain existing barrier landform, infill where required.

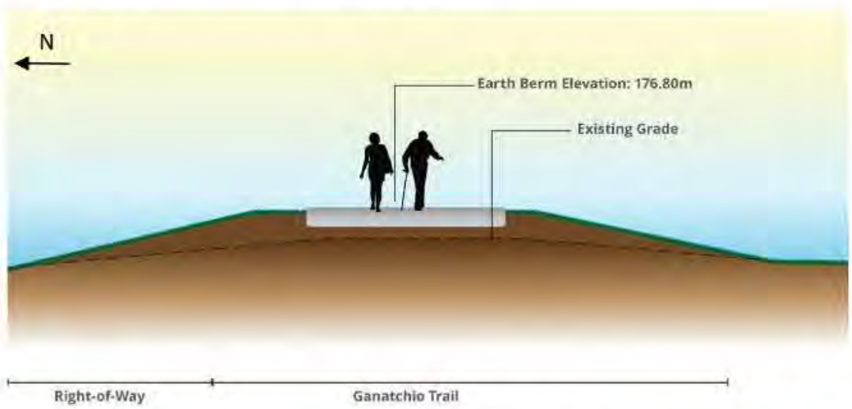
South boulevard of Riverside Drive at 176.45m



Alternative 2:

Enhance existing barrier landform.

South boulevard of Riverside Drive at 176.80m.



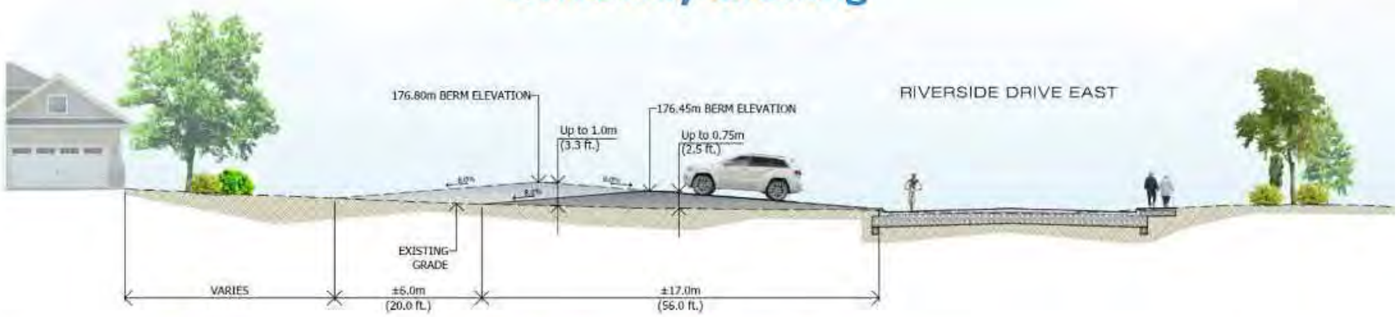
Drawings are not to scale, for illustrative purposes only.

Opportunity/Constraints	Alt 1	Alt 2
Flood Protection (Historical Conditions)	✓	✓
Flood Protection (Projected Conditions)		✓
Constructability	Green	Red
Impacts to Potential Development (Inland)	Red	Green
Impacts to Properties (Trees, Landscape, Structures)	Green	Red
Property Acquisition Impacts	Green	Red
Cost	Green	Red

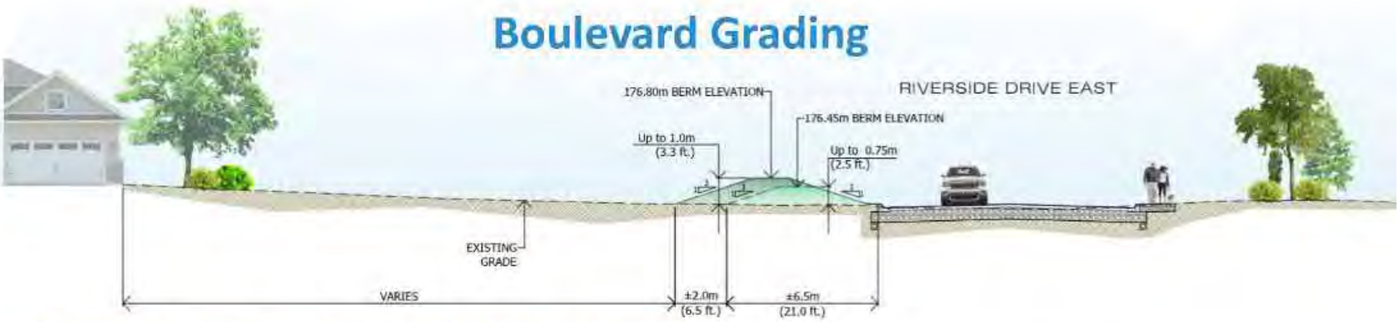
PRELIMINARY PREFERRED

Impacts and Mitigation

Driveway Grading

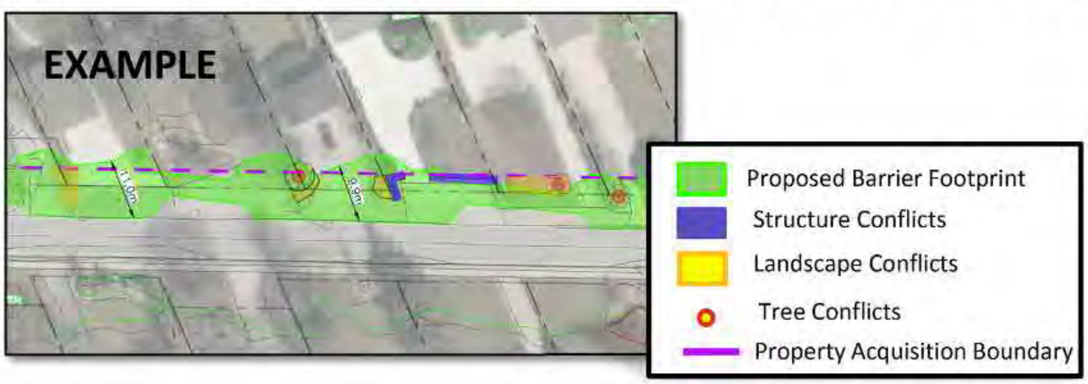


Boulevard Grading



Trees, Landscape and Structures

The extents of required property acquisition will be refined through detailed design of the landform barrier. Opportunities to mitigate impacts to trees, landscape and structures will be reviewed.



Storm Sewer System Protection

Measures to prevent high water levels from entering the inland sewers system will be implemented:

- Flap Gates and Sewer Backflow Prevention Devices; and/or
- Separate storm sewers servicing north side of the berm.

For more details, refer to the landform barrier maps available.

What's Next

The landform barrier construction will be integrated into the construction of Riverside Vista Phase 2A. The City has applied for funding through the ***Disaster Mitigation and Adaptation Fund (DMAF)*** to proceed with landform barrier improvements in conjunction with the scheduled Riverside Vista Phase 2A project.

Task		Estimated Timeline
Public Information Centres (PIC)		December 3, 4 and 5, 2019
Complete Functional Design of Recommended Solutions		Winter 2020
Complete Sewer and Coastal Flood Protection Master Plan		Spring 2020
Area 1 Riverside Vista Phase 2A	Property Acquisition	Spring 2020 to Mid-2021
	Advance Utility Relocation	2022
	Road Construction, including the Landform Barrier.	2023-2024
Area 2 and Area 3 Improvements St. Rose Ave. to East City Limits	Sewer Backflow Prevention Measures	To Be Determined
	Landform Barrier Improvements	To Be Determined

Stay involved and provide your feedback....

Visit us at **weatheringthestorm.ca**

Email us at: in**fo@weatheringthestorm**

Sign-up to our contact list to receive updates on future events

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

Welcome to the

Riverside Drive East Storm Pump Station Alternatives Property Owner Meeting

November 2019

Presented by:

DILLON CONSULTING

Aquafor Beech Limited

Urban and Coastal Flooding

The City of Windsor is developing alternative solutions to address urban and coastal flooding through the Sewer and Coastal Flood Protection Master Plan.

Urban Flooding

(Sewer Master Plan)

Caused by:

Extreme Rainfall Events

Riverside Area – September 2017 Rain Event

Results in:

- Surface Flooding –
  Storm runoff that exceeds the capacity of the sewer and overland drainage systems.
- Basement Flooding –
  Inflow and infiltration that exceeds the capacity of the sanitary and/or combined sewer systems.

Coastal Flooding

(Coastal Flood Protection Master Plan)

Caused by:

High Lake and River Levels

Little River South of Riverside Drive

Results in:

- Surface flooding of low lying areas from high water levels.
- Backflow into storm and/or combined sewer systems.
- Compromised sewer outlet capacity.

Overview of Integrated Master Plan

Sewer and Coastal Flood Protection Master Plan

Study Objectives

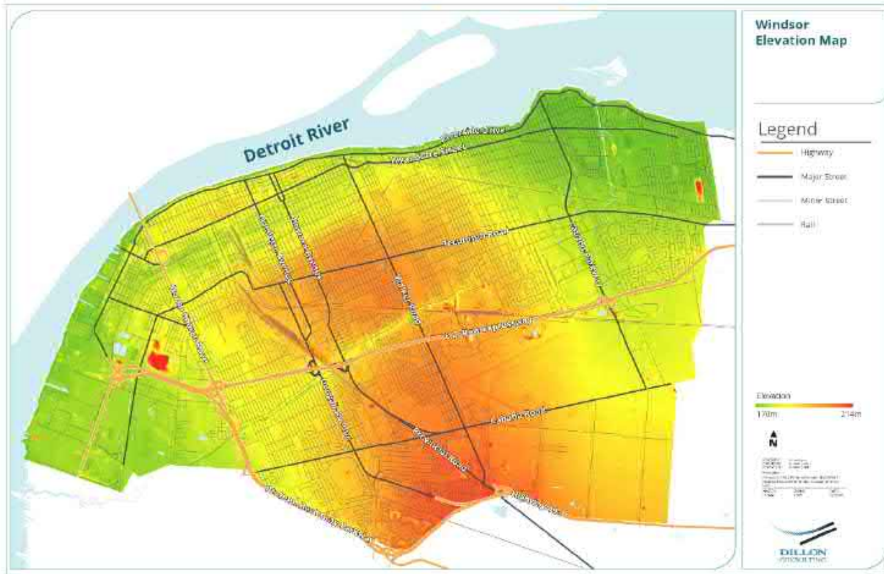
- Understand the causes of basement and surface flooding.
- Identify and evaluate short-term and long-term measures to reduce the impacts and risks of urban flooding.
- Evaluate the need to improve the existing coastal flood protection landforms on Riverside Drive East.
- Recommend an implementation strategy.

What has been done to date?

- ✓ Developed comprehensive sewer and overland drainage system model.
- ✓ Confirmed urban flood risk areas.
- ✓ Developed alternative short-term and long-term solutions.
- ✓ Engaged the public through various events, social media, newsletters and project website.
- ✓ First Public Information Center (PIC) held in June 2018.
- ✓ Coordinated with regulatory agencies regarding alternative solutions.
- ✓ Flood Risk Assessment Study Public Information Meeting held on June 26, 2019.
- ✓ East Riverside Flood Risk Assessment Study adopted by Council October 7, 2019.
- ✓ Integrated the coastal flooding solutions as part of the Sewer Master Plan.
- ✓ Held pre-consultation meeting with property owners on October 30, 2019 to obtain initial feedback and input.
- ✓ Refining alternative coastal flood protection alternatives.

Drainage for Low-Lying Areas

The central portion of the City is as much as **15 m (about 50 ft.)** higher than lands to the east and west.



To protect and provide drainage for lower-lying areas (BLUE), the City has introduced the following strategies:

- Flood protection landforms (including the Ganatchio Trail and Little River landform barriers) to protect low-lying areas from high River and Lake levels;
- Pump stations; and
- Temporary storage ponds.

LEGEND:

Area Above Noted High Water Elevation

Area Below Noted High Water Elevation

Focus of Today's Meeting

The focus of today's meeting is on **urban surface flooding** resulting from significant rainfall events.

The purpose of today's meeting is to obtain feedback from property owners that may be directly affected by proposed **storm pump station solutions** that are being recommended to address surface flooding risks in the **St. Paul, St. Rose and Ford storm drainage areas**.

Storm Drainage Area Map

- St. Paul Storm Drainage Area
- St. Rose Ave. Storm Drainage Area
- Ford Blvd. Storm Drainage Area

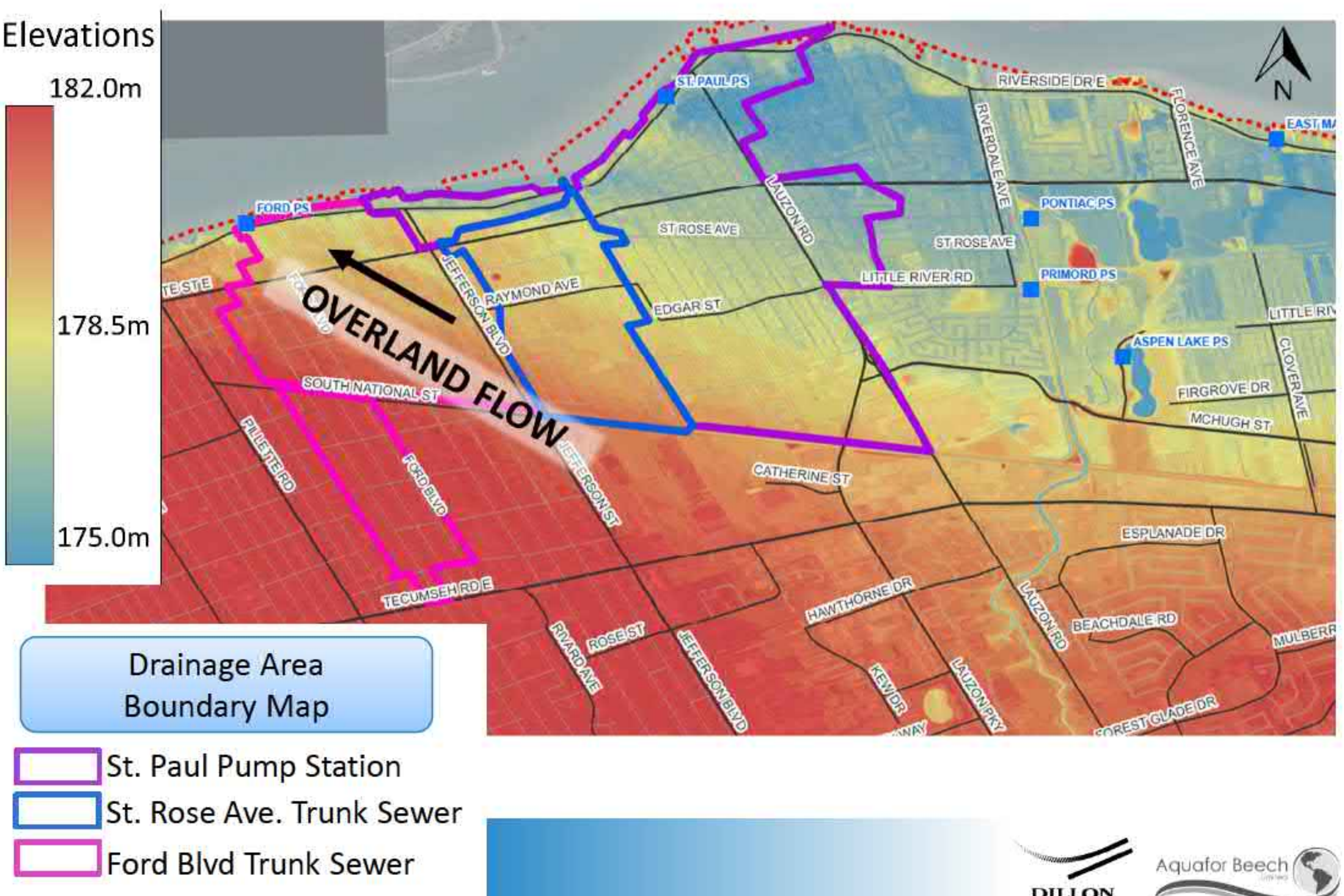
Surface Flooding

In 2016 and 2017, the City experienced two major rain events that caused extensive surface flooding, limiting emergency access and resulting in damage to private properties.

Surface flooding can be caused by:

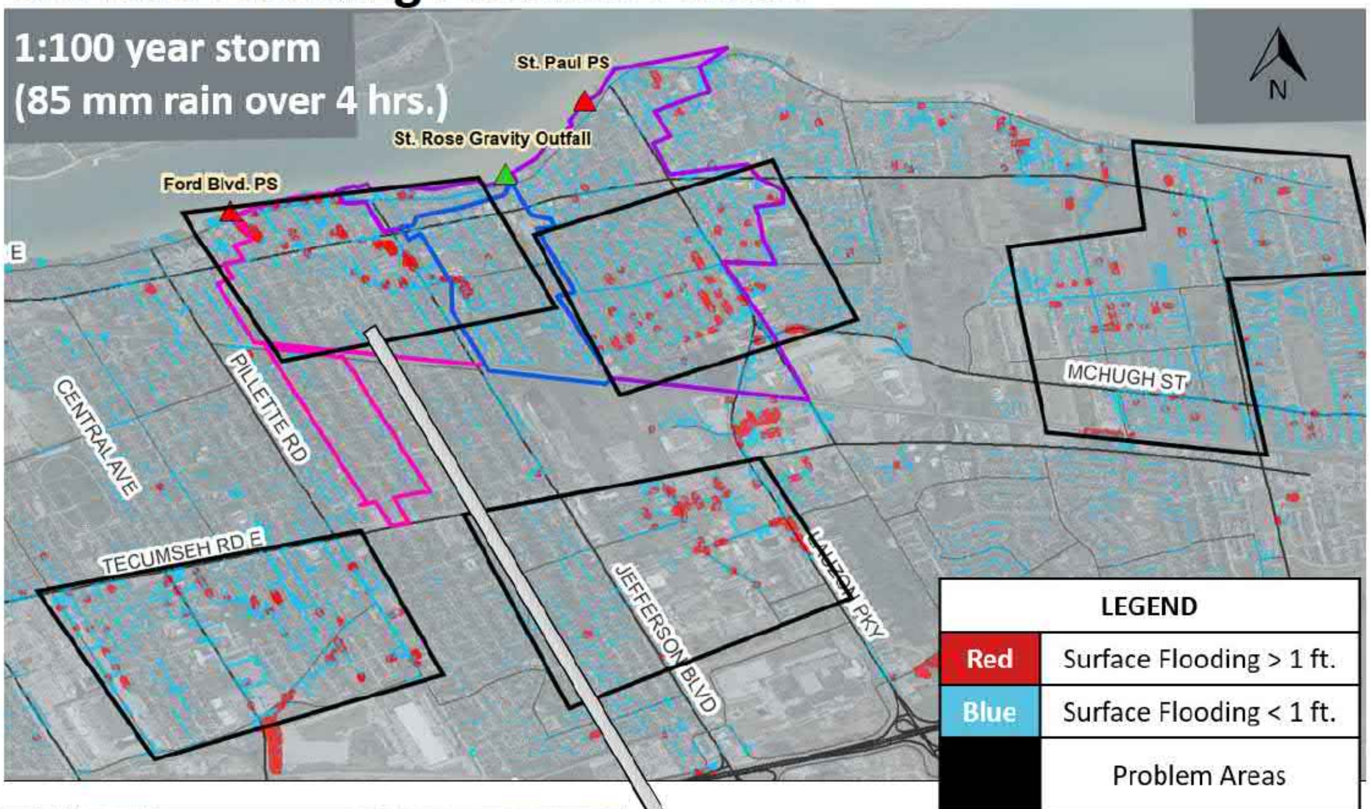
- Storm runoff that exceeds the capacity of the sewer and overland drainage system.
- Excess overland flow that directs runoff to low lying areas.
- High lake or river levels that backflow into the City's sewer system and compromise the capacity of the drainage systems.

Event	Rainfall (mm)
September 2016	100 mm over 37 hours
August 2017	212 mm over 29 hours



Storm System - Level of Service

Surface Flooding Problem Areas:



Riverside Vista Phase 2A (Ford Blvd. to St. Rose Ave.): This *problem area* is being addressed to an *enhanced* level of service:

- Significance of overland flow contribution.
- Impact to properties.
- Impact to access on Riverside Drive.

Riverside Area Solutions

1. Improvements to Outlet Capacity

- New Ford Pump Station *(existing PS serves different function)*
- New St. Rose Pump Station *(PS previously existed)*
- Increase capacity of St. Paul Pump Station

What are the benefits?

✓ ***Resiliency:***
- Improved drainage capacity, including enhanced level of service in vulnerable areas.
- Address outlet capacity limitations caused by high Lake/River levels.
- Improved effectiveness of discharging runoff in a more timely fashion.

2. Improvements to the Sewer Conveyance and Storage Capacity

- Over 5 kilometers of large storm trunk sewers.
- Tranby Park and Brumpton Park Underground Storage Facility.
- LIDs within the Municipal ROW. (exfiltration trenches and bio-swales.)

3. Source Control

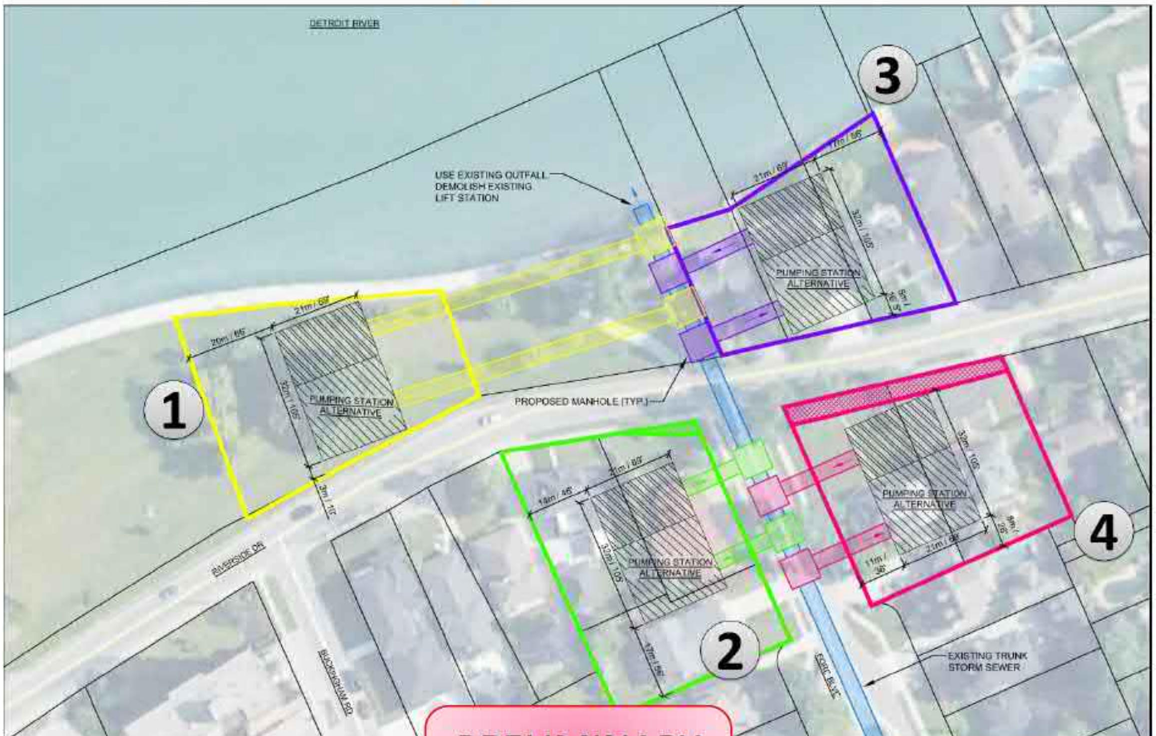
- Downspout Disconnection Program.
- Partnering Approach with homeowners to implement LIDs on private property.

4. Riverside Drive Barrier Landform

What are the benefits?

✓ ***Improved drainage***
✓ ***Retention of rainwater***
✓ ***Treatment of runoff***
✓ ***Capture Overland Flow***
✓ ***Protect Area from high river levels***
✓ ***Directs overland flow to sewer, away from homes***

Alternatives Evaluation
Ford Blvd. Pump Station



PRELIMINARY PREFERRED

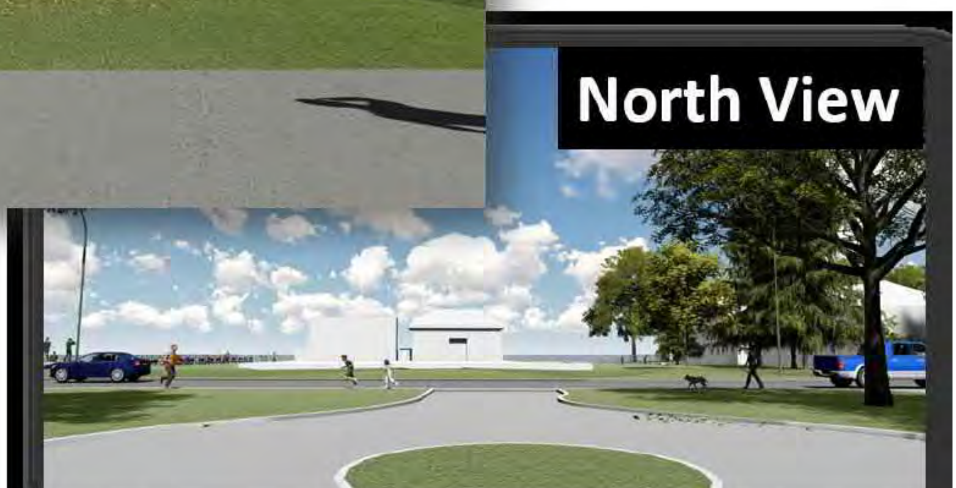
Evaluation Criteria	Alt 1	Alt 2	Alt 3	Alt 4
Meets Flood Mitigation Objectives	✓	✓	✓	✓
Resiliency to Climate Change	✓	✓	✓	✓
Ease of Construction	✓			
Impact to Heritage Resources	✓		✓	
Disruption to Residents	✓			
Impact to Riverfront View		✓	✓	✓
Impact to Recreational Space		✓	✓	✓
Impact to Existing Infrastructure	✓			
Cost	✓			

Pump Station Conceptual Design
St. Rose Pump Station

The proposed pump station(s) design will fit the aesthetic of the local neighbourhood and nature of the Riverside Vista Area.

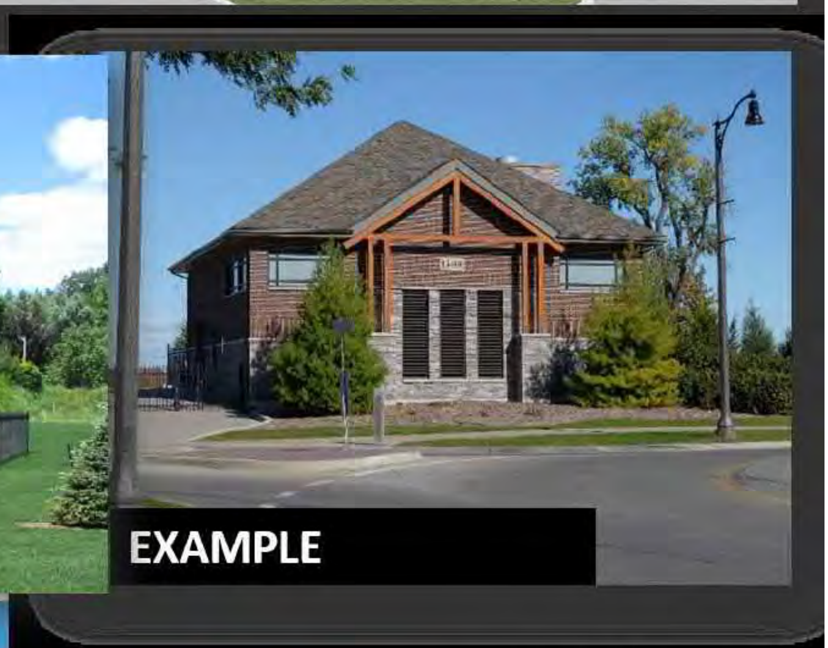
The City wants **your feedback** on the design of the pump station and site amenities, such as landscape or other features.

East View



North View

EXAMPLE



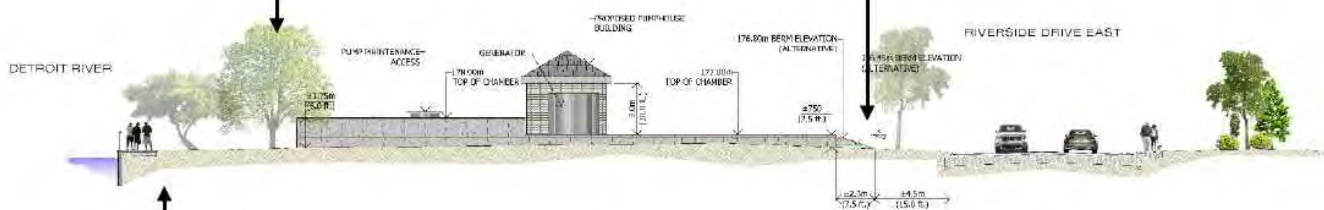
EXAMPLE

Impacts and Mitigation

Parkland and Site Access

Landscape and other amenities will be incorporated.

Landform Barrier will be incorporated into the proposed site.



Walkways will be maintained/improved

A virtual tour of the proposed pump station site can be viewed on the project website.

weatheringthestorm.ca

Noise and Vibration

Through the detailed design of the proposed pump station necessary design elements will be incorporated mitigate noise and vibration impacts.

Measures include:

- Sound enclosures for standby power generators.
- Noise baffles on building ventilation.

What's Next

Timing of construction for the proposed pump stations are dependent on available funding. The City has applied for funding through the ***Disaster Mitigation and Adaptation Fund (DMAF)*** to proceed with pump station improvements.

The following outlines a preliminary schedule for implementation of these improvements.

<table>
<tr><th colspan="2">Task</th><th>Estimated Timeline</th></tr>
<tr><td colspan="2">Public Information Centres (PIC)</td><td>Winter 2020</td></tr>
<tr><td colspan="2">Complete Functional Design of Recommended Solutions</td><td>Winter 2020</td></tr>
<tr><td colspan="2">Complete Sewer and Coastal Flood Protection Master Plan</td><td>Spring 2020</td></tr>
<tr><td rowspan="3">Riverside Vista Phase 2A</td><td>Property Acquisition</td><td>Spring 2020 to Mid-2021</td></tr>
<tr><td>Advance Utility Relocation</td><td>2022</td></tr>
<tr><td>Road Construction, including storm trunk sewer.</td><td>2023-2024</td></tr>
<tr><td colspan="2">St. Paul Pump Station Improvements</td><td>2024-2025</td></tr>
<tr><td colspan="2">St. Rose Pump Station</td><td>Pending Funding</td></tr>
<tr><td colspan="2">St. Rose Drainage Area Trunk Storm Sewer</td><td>Pending Funding</td></tr>
<tr><td colspan="2">Ford Blvd. Pump Station Improvements</td><td>Pending Funding</td></tr>
</table>

Stay involved and provide your feedback….

Visit us at **weatheringthestorm.ca**

Email us at: **info@weatheringthestorm**

Sign-up to our contact list to receive updates on future events

Follow us on

CityofWindsor

@CityWindsorON

CITY OF WINDSOR
SEWER MASTER PLAN

UPDATED - POTENTIAL FORD PUMP STATION LOCATIONS
FIGURE 1

THE CITY OF WINDSOR

- EXISTING PROPERTY FABRIC
- CITY OF WINDSOR BORDER
- EXISTING STORM SEWERS
- ALT 1 - ALL IN PARK, LOCATION TO BE REFINED
- ALT 2 - THREE PROPERTIES AT SOUTHWEST CORNER OF FORD BLVD & RIVERSIDE DR
- ALT 3 - THREE PROPERTIES AT SOUTHEAST CORNER OF FORD BLVD & RIVERSIDE DR

DILLON CONSULTING

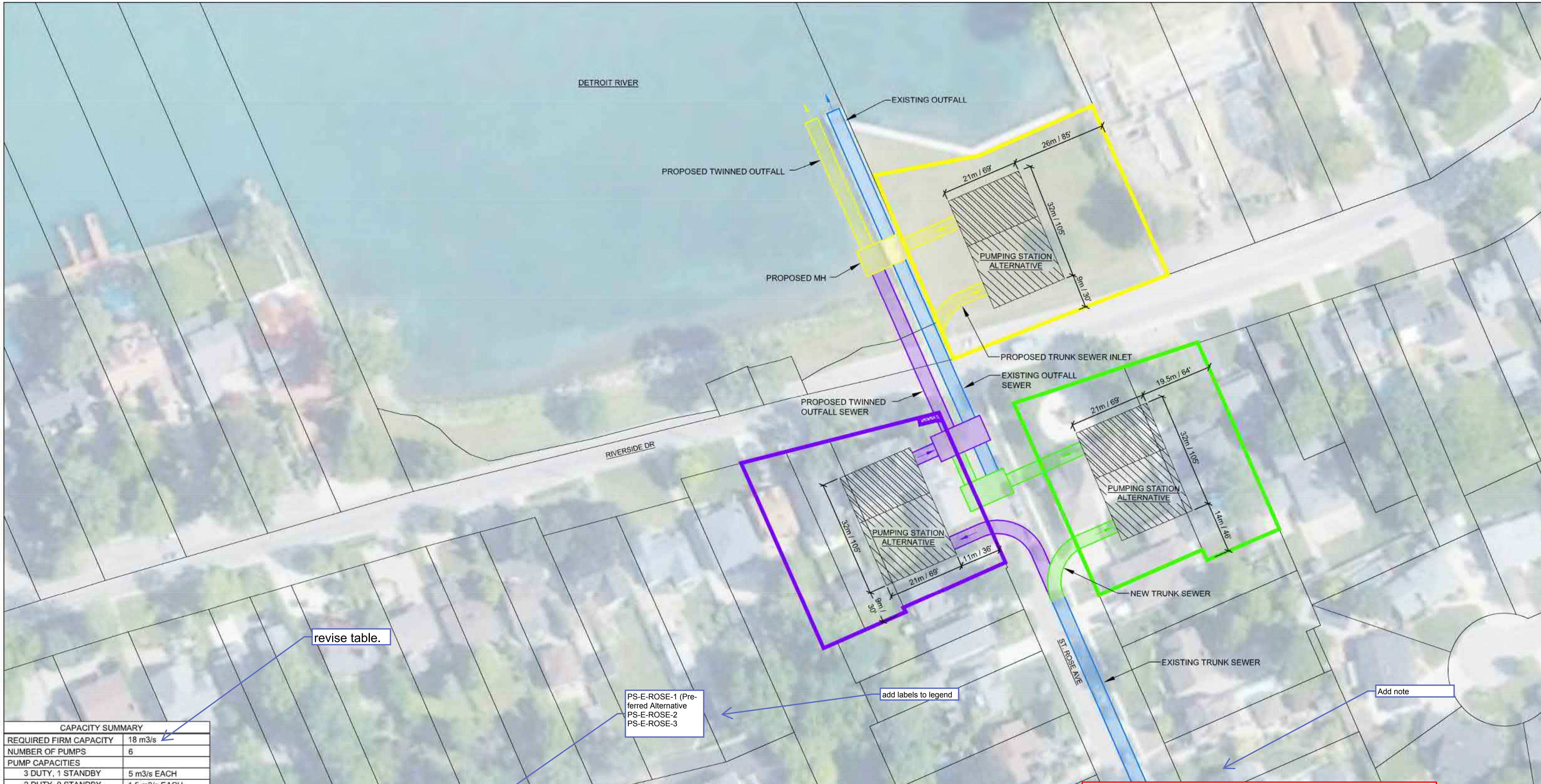
MAP DRAWING INFORMATION:
DATA PROVIDED BY CITY OF WINDSOR

MAP CREATED BY: IDW
MAP CHECKED BY: FF
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 25 50 100 Meters
SCALE 1:1,500

N W E S

PROJECT: 17-6638 STATUS: FINAL DATE: 09/20/19



revise table.

PS-E-ROSE-1 (Preferred Alternative
PS-E-ROSE-2
PS-E-ROSE-3

add labels to legend

Add note

CAPACITY SUMMARY	
REQUIRED FIRM CAPACITY	18 m3/s
NUMBER OF PUMPS	6
PUMP CAPACITIES	
3 DUTY, 1 STANDBY	5 m3/s EACH
2 DUTY, 0 STANDBY	1.5 m3/s EACH

Note: Alternative site plan configurations are based on preliminary site plans and should be used for reference only.
The more refined conceptual design of the preferred alternative St. Rose Pump Station is included in the Technical Volume 3 report.

CITY OF WINDSOR
SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

Riverside Drive East - Storm Alternatives
PROPOSED ALTERNATIVES
ST. ROSE PUMP STATION LOCATIONS

THE CITY OF WINDSOR

ALTERNATIVE 1	PROPERTY ACQUISITION	PROPERTY LINE
ALTERNATIVE 2	HIGHER PORTION OF PUMP STATION	
ALTERNATIVE 3	LOWER PORTION OF PUMP STATION	

DILLON CONSULTING

Aquafor Beech Limited

CREATED BY: SMZ
CHECKED BY: TC

0m 5m 10m 20m

N W E S

FILE LOCATION:
C:\PROJECTWISE\WORKING DIRECTORY\ACTIVE\10SMZ\D0728006\176638-02-SITE-CON.DWG
November. 04, 2019 11:47 AM

PROJECT: 17-6638 STATUS: DRAFT DATE: October 2019

DILLON CONSULTING

Lavoie, Stephani <slavoie@dillon.ca>

[redacted]

---------- Forwarded message ---------
From: **Herlehy, Laura** <lherlehy@dillon.ca>
Date: Tue, Sep 29, 2020 at 2:30 PM
Subject: Fwd: WSMP-[redacted] Recommended flood mitigation measures
To: <cdavison@firststopservices.ca>, <medavison@firststopservices.ca>
Cc: Mark Hernandez <mhernandez@dillon.ca>, Patten, Chris <cpatten@dillon.ca>, Hawco, Tina <thawco@dillon.ca>, Godo, Anna <agodo@citywindsor.ca>, Coombs, Janelle <jcoombs@citywindsor.ca>, Mourad, Adam <amourad@citywindsor.ca>

Hello,
Yesterday we met onsite at [redacted] to discuss grading and the proposed Riverside Drive Improvements, as it relates to the proper[redacted]elow is a summary of our discussions:

- As part of the Riverside Vista Ph. 2A Reconstruction project and the City's Sewer and Coastal Flood Protection Master Plan, the following improvements will be made within the City's Right-of-Way.
  - The new roadway will be curbed on both sides and lowered (approximately 6 inches);
  - A new large sized trunk storm sewer will be constructed along Riverside Drive, between Ford Blvd and St. Rose Ave., to capture major rain events (1:100 Year storm) with ponding along the roadway being 1 ft maximum, and
  - Larger catchbasins will be installed to help drain the roadway.
- At [redacted] help channelize the overland flow along Riverside Dr., away from the [redacted] Riverside Dr. property, it is proposed that the grade of the front yard be raised approximately 4-8 inches along the property line.
- The grades will need to ensure that driveway access is maintained and safe to use. The raised area may need to be offset within the private property area in order to accomplish this.
- Riverside Drive reconstruction is scheduled for 2023.
- Pupatello Construction has installed a new drainage system within the property that drains both the front and rear yards to the river via an onsite drainage system.
- Pupatello will be completing the final grading within the front yard shortly. Pupatello will look for opportunities to raise the grades along the front property line to provide some protection from Riverside Dr. overland flows in the interim, before the Riverside Vista Ph. 2A construction is complete. Grades along the west property line will also be raised to mitigate flooding from the adjacent property owners's property.
- Dillon's surveyor will be obtaining survey grades of the property's front yard on 9/29/20.
- The Property owner requested that the previous second driveway access, on the west side of the property, be reinstated upon Riverside Dr. reconstruction. Dillon noted that driveway access points will need to be reviewed with the City.
- The Property owner requested that the brick wall at the property line be maintained. Dillon will review.
- The garage at the south/east corner of the site does not require vehicle drive-in access.
- Dillon will be completing the detailed design for the Riverside Dr. reconstruction in next upcoming year.
- The earth berm required to provide in-land coastal flood protection is not required along this section of Riverside Drive.

Please let me know if you would like to add anything to our discussion. We will keep in touch as we progress with the design of the roadway as it relates to your property.
Thanks
Laura

Laura Herlehy
Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

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---------- Forwarded message ---------
From: **Herlehy, Laura** <lherlehy@dillon.ca>
Date: Wed, Sep 23, 2020 at 10:43 AM
Subject: Fwd: WSMP- 5484 Riverside Drive- Recommended flood mitigation measures
To: [redacted]
Cc: Godo, Anna <agodo@citywindsor.ca>, Mark Hernandez <mhernandez@dillon.ca>, Mourad, Adam <amourad@citywindsor.ca>, Coombs, Janelle <jcoombs@citywindsor.ca>

Good Morning Christine,

Per my voicemail earlier today, we are following up with you regarding flooding issues at your property, [redacted] Drive. Based on the letter attached and discussions during the past Public Information Centres with City and Dillon Consulting project team members, we have recommended measures to mitigate risk of overland flooding along your property. See below for more details on the proposed measures that will be integrated into the detailed design of the Riverside Vista Phase 2A project.

Riverside Dr. Vista Reconstruction - Phase 2A

- Full road reconstruction of Riverside Drive including curbs on both sides of the roadway. The new curbed road cross section will allow the roadway to be lowered and will improve channelization of overland flow to new roadway catchbasins.
-The new roadway will be equipped with larger capacity catchbasins to improve drainage of the roadway.
- Upsize the existing storm sewer along Riverside Drive. This larger sewer will improve the conveyance of flows as well as act as a storage tank during major rain events.
- Improve the storm sewer outlet at St. Rose Ave. with a new stormwater pump station (construction timeline is pending federal funding).
- Placement of a landform barrier along the north side of Riverside Drive, in areas that do not meet the high river level flood protection elevations. The barrier will also assist in channelizing the overland flow and mitigating spill over into properties north of Riverside Drive.

A higher level of service has been applied to the design of the infrastructure proposed to provide surface drainage to Riverside Drive. To size the storm sewer infrastructure, listed above, a "Climate Change" storm intensity has been used, this is equivalent to a 120 mm rain over a 4 hour period which is similar to the larger storms the City has experienced previously in 2016 and 2017.

Recommended solutions at [redacted]. (Refer to attached schematic plan)
- Due to the existing local topography, the landform barrier is not required west of Villaire Ave., however due to the low lying nature of the [redacted] property and because it is located at the foot of Prado, it is proposed that the front portion of the property along the City's right of way boundary be raised to mitigate risk of water draining into the property It is proposed that the property grades along the front property line be raised in the range of 4 - 8 inches. This will require the regrading of the front yard and driveway to accommodate this grade change and to meet minimum slope requirements. The extent of re-grading will be determined during detailed roadway design.
- In addition, a local catch basin will be required to capture drainage north of this elevated area. The catchbasin will be equipped with a backflow preventer to prevent backflow of the City's storm sewer on to the private property.

It should be noted that all proposed improvements and flood mitigation measures are based on the design criteria noted above. This provides a high level of service however due to the uncertainty related to weather and the proposed improvements will not completely eliminate risk of surface or basement flooding. Also, these improvements will not mitigate the risks associated with coastal flooding associated with high river levels.

At this stage, we will need additional topographic survey information within your front yard area to better place the infrastructure listed above. A surveyor from Dillon Consulting will be on your property next week (Sept. 28 to Oct. 2) to gather this information.

Feel free to call me at 519-818-3105 to discuss. If you would like I can meet you at your property to discuss further.
Thank you,
Laura

Laura Herlehy
Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

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2 attachments

DOC061919-06192019121916.pdf
51K

[redacted]**Grading Recommendations.pdf**
847K

June 19, 2019

Re: [redacted]

Sent via e-mail: Mark Hernandez, Dillon Consulting – mhernandez@dillon.ca
Anna Godo, City of Windsor – agodo@citywindsor.ca

Mr. Hernandez and Ms. Godo,

Thank you for meeting with us at the Public Information Centre (PIC) on Thursday May 23, 2019. It was very helpful and the staff was very receptive to questions.

As we discussed at the meeting, our entire house and yard was flooded with 5-6" of sewage that came flowing down Prado, overflowing the City sewers in front of our house, [redacted] on August 29, 2017. This is the first time the house has taken on any water/sewage from City sewers. We were very fortunate to have replacement cost insurance, but will probably not be able to get that again.

The City water/sewage overrun flowed thru the house and down both sides of the house to the river. The house had to be completely gutted and remediated as the sewage water was approx. 6" high throughout the entire house and garage. Additionally, as the house is one floor with an attached two car garage and situated on a concrete pad, the floors had to be dug out and all mechanical systems removed and replaced. The insurance claim for the inside is still ongoing and approx. $800,000 in damages have been paid out to date for the house, contents, garage and two cars that were in the garage. We were unable to live in our home for 18 months.

The outside areas were also completely destroyed by the city sewage water and the replacement cost and addition of drainage techniques is estimated at approx. 75k. We have already consulted with an engineer and have added many drainage measures and will be doing more (i.e. driveway work to slope and have water directed to drainage controlled areas on our property).

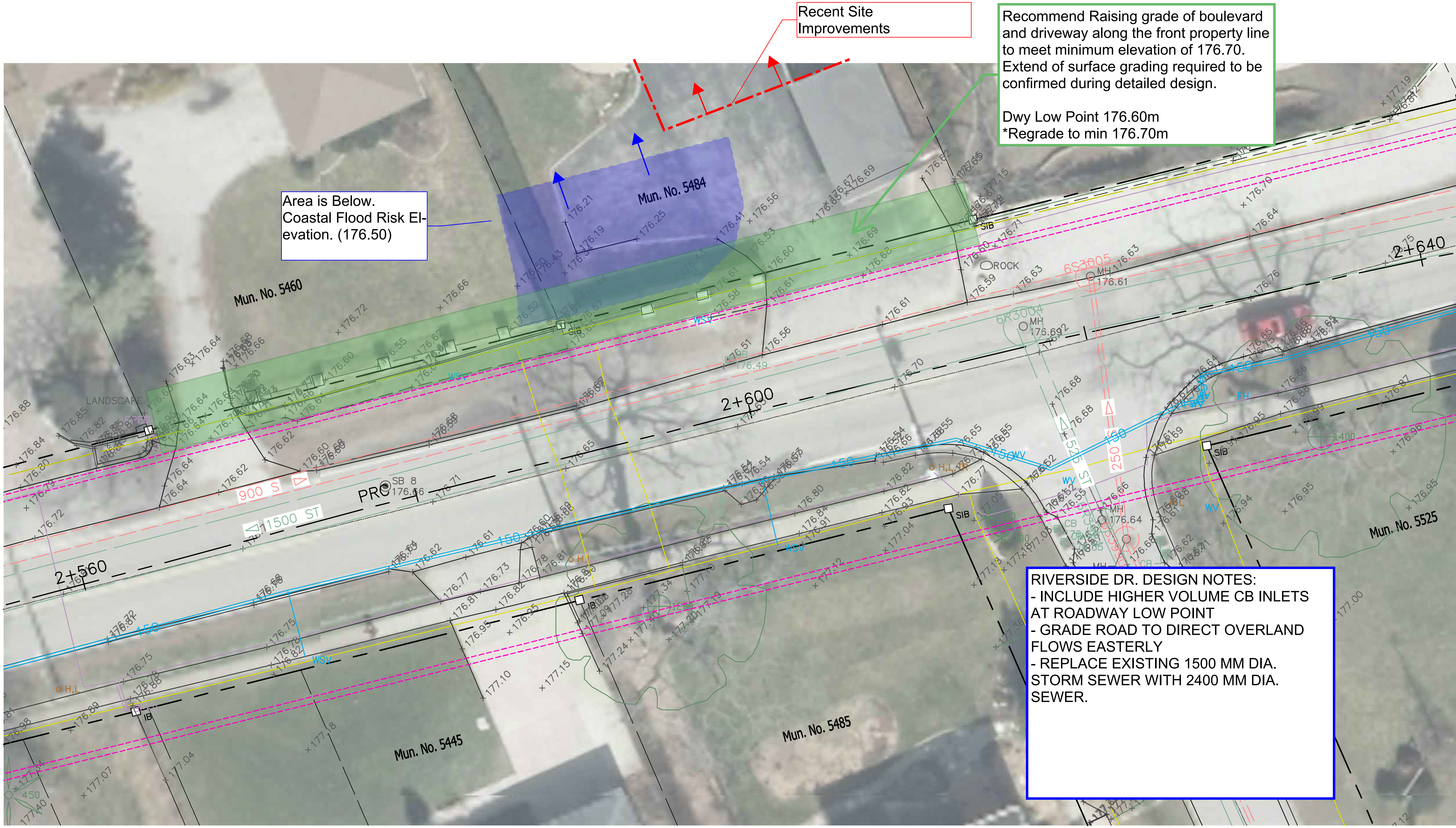
We would like to work with the City to ensure that city water does not overflow onto our property again and a meeting at the premises with your engineers and road designers would assist in that regard. We are not sure that higher curbs, new sewers and containment pits will be enough to mitigate against future storms, given one route for the area's water overflow is [redacted] to the Detroit River. As a heavily hit area, we would suggest that all extra precautions should be taken to prevent future damage.

We look forward to meeting further with you to improve the area's drainage,

Kind regards,

[redacted]

cc. Jo-Anne Gignac – joagignac@citywindsor.ca
Mark Winterton – mwinterton@citywindsor.ca



Recent Site Improvements
Recommend Raising grade of boulevard and driveway along the front property line to meet minimum elevation of 176.70. Extend of surface grading required to be confirmed during detailed design.
Dwy Low Point 176.60m
*Regrade to min 176.70m
Area is Below. Coastal Flood Risk Elevation. (176.50)
Mun. No. 5484
Mun. No. 5460
Mun. No. 5445
Mun. No. 5485
Mun. No. 5525
2+560
2+600
2+640
900 S
1500 ST
ROCK
LANDSCAPE
RIVERSIDE DR. DESIGN NOTES:
- INCLUDE HIGHER VOLUME CB INLETS AT ROADWAY LOW POINT
- GRADE ROAD TO DIRECT OVERLAND FLOWS EASTERLY
- REPLACE EXISTING 1500 MM DIA. STORM SEWER WITH 2400 MM DIA. SEWER.

City of Windsor
SEWER COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

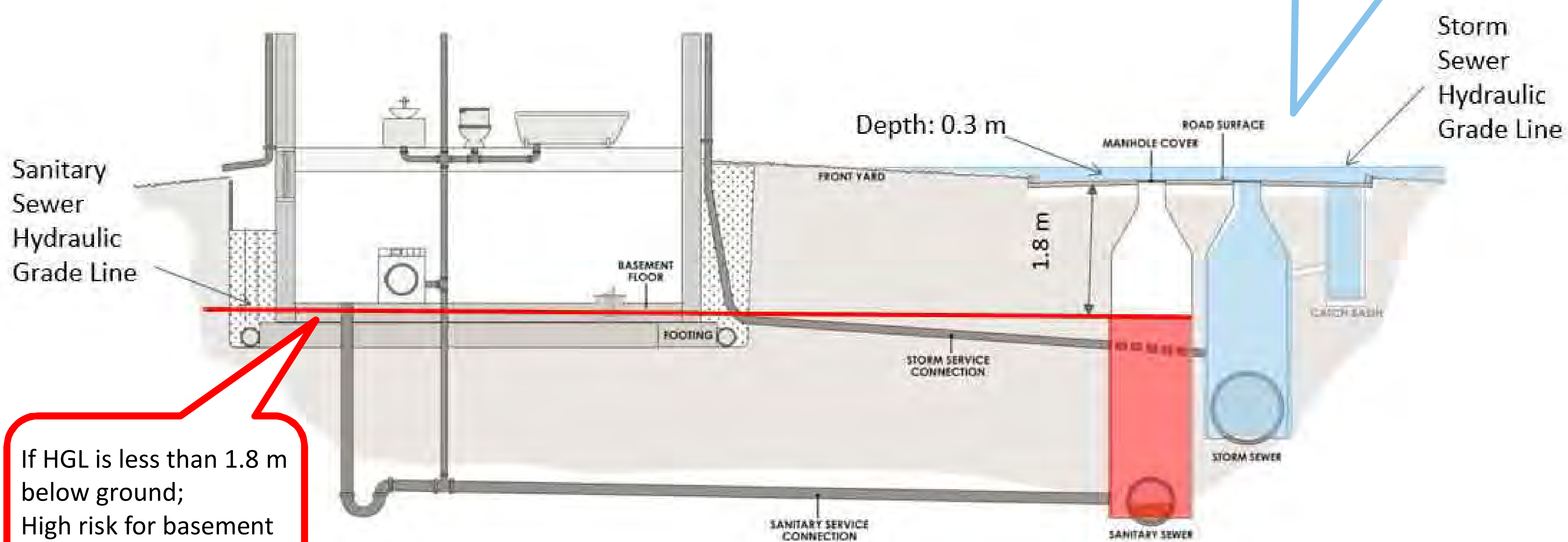
Pre-Consultation
Property Owner Meeting
Jan. 15, 2020

Presented by:

Long Term Solutions – Level of Service

Level of Service – Homes

If stormwater surface ponding is greater than 0.30 m on road; Surface water approaches home elevations.



If HGL is less than 1.8 m below ground; High risk for basement flooding

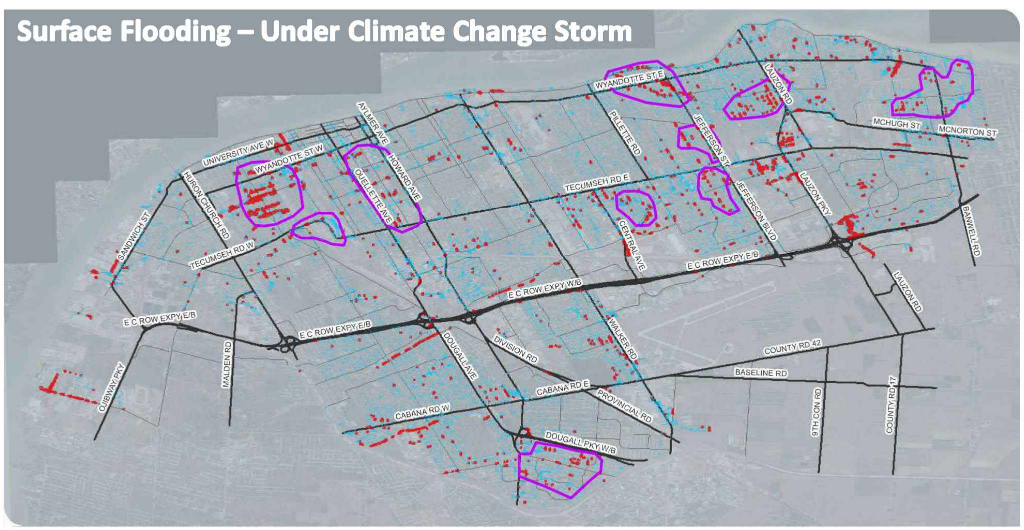
Long Term Solutions - Storm System

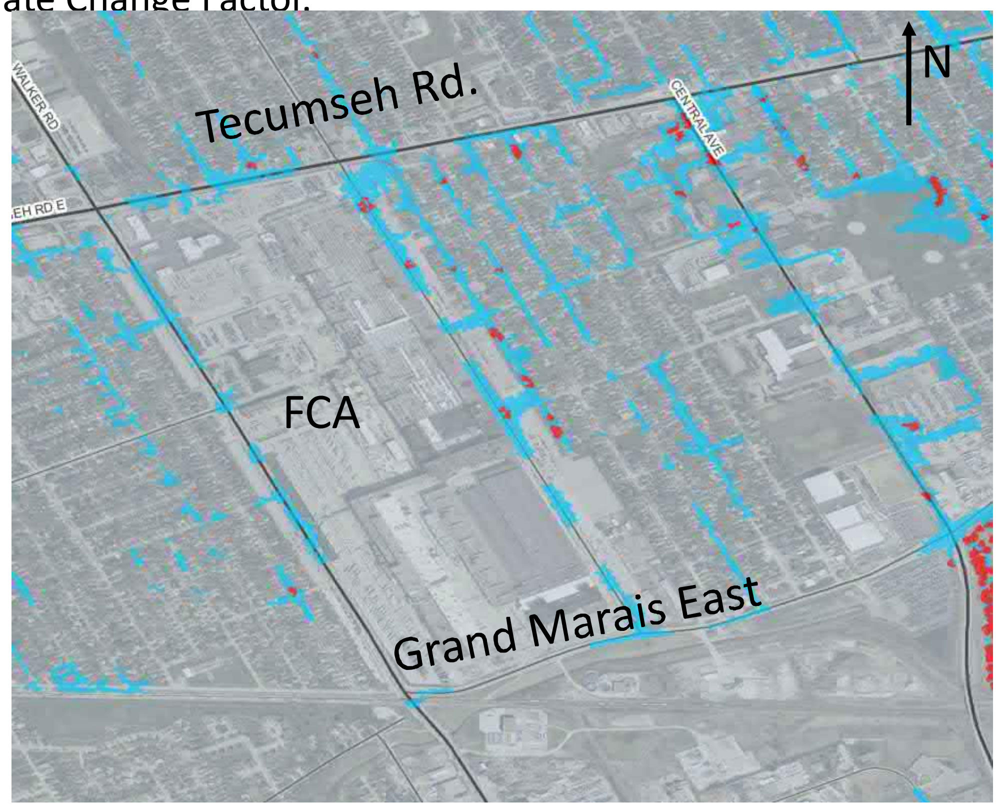
Objective:

– Reduce max surface flooding to less than 0.30 m

- Neighbourhood Flooding: 1:100 Year Storm.
- Arterial/Collector Road: 1:100 Year Storm + 40% Climate Change Factor.

LEGEND	
Red	Surface Flooding Deeper than 0.30 m Deep
Blue	Surface Flooding less than 0.30 m Deep
Purple Boundaries	Regional Surface Flooding Problem Areas





Long Term Solutions - Surface Flooding

Based on modelling results, determine where surface flooding is greater than 0.3 m in sensitive areas:

- Arterial Roads
- Collector Roads
- Vulnerable Areas

(Schools, hospitals)

Location Number	Class	Name	From	To
South Windsor Separated Sewershed Area				
STM-1A	Arterial	Dougall Ave (Rail Underpass and Road)	Ouellette Pl	South Cameron Blvd
STM-1B	Arterial	Ouellette Pl	Dougall Ave	Eugenie St E
STM-2A	Arterial	Howard Ave	Capitol St.	Charles St.
STM-2B	Arterial	Howard Ave	E. C. Row	Grand Marais Rd E
STM-3	Arterial	Howard Ave (Rail Underpass)	Eugenie St E	Memorial Dr
STM-4	Arterial	Central Ave	Grand Marais Rd E	Tecumseh Rd E
STM-6	Collector	Eugenie St E	McDougall St	Ouellette Ave
STM-7	Collector	Sydney Ave	Division Rd	Marentette Ave
STM-8	Collector	Dominion Blvd	Northwood St	Ojibway St
STM-9	Collector	Dominion Blvd	Cabana Rd W	Roselawn Dr
STM-10	Collector	McDougall St	Eugenie St E	Howard Ave
STM-11	Collector	Foster Ave	Turner Rd	Walker Rd
STM-12	Collector	Foster Ave	St Etienne Blvd	Walker Rd
STM-13	Collector	Ypres Ave	Parent Ave	Parkwood Ave
STM-14	Collector	Chrysler Centre	Grand Marais Rd E	Tecumseh Rd E
STM-15	Collector	Pillette Rd	Adstoll Ave	Tecumseh Rd E
STM-16	Collector	Grand Marais Rd E	Chrysler Centre	Walker Rd
STM-19	Collector	Holburn St	Nova Dr	Nova Dr

Preferred Solution

EXAMPLES:

- Proposed Improvements
  - Upgrade existing storm sewer along Chrysler Centre Rd.
  - Incorporate underground storage within the parking areas, east of Chrysler Centre Rd.

StormTech
Detention • Retention • Water Quality
An ADS company

Discussion

- Are findings consistent with observations?
  - Historical flooding issues?
- Constructability
  - Underground infrastructure within private property areas
- Timing/Implementation
- Comments/Questions?

Next Steps

Functional Design of Preferred Solutions

- ✓ Review and comments from Today's PIC and other consultation
- ✓ Confirm functionality; and
- ✓ Develop cost estimates for the proposed infrastructure improvements.

Implementation plan for Short and Long Term Solutions

- ✓ Identify priority projects.
- ✓ Recommend implementation plan for high priority projects.

Complete the Master Plan

- ✓ Document consultation and design process
- ✓ Present final Master Plan to Council.

30 Day Review

- ✓ Provide public opportunity to review
- ✓ Notice of Completion

Stay involved and provide your feedback….

Visit us at **weatheringthestorm.ca**
Email us at: **info@weatheringthestorm**
Follow us on
CityofWindsor
@CityWindsorON

PUBLIC INFORMATION CENTRES

LOCATIONS

Tuesday February 11th, 5-8pm
Roseland Golf & Curling Club - Wansbrough Hall
455 Kennedy Dr W, Windsor ON N9G 1S8

Wednesday February 12th, 3-8pm
WFCU Centre - Michigan Room
8787 McHugh St, Windsor ON N8S 0A1

Thursday February 13th, 5-8pm
Windsor International Aquatic and Training Centre - Lower East Atrium
401 Pitt St W, Windsor ON N9A 0B2

THE CITY OF WINDSOR
ONTARIO, CANADA

degrees of CHANGE

City of Windsor
SEWER COASTAL FLOOD PROTECTION MASTER PLAN

Pre-Consultation
Property Owner Meeting
Feb. 2020

Presented by: DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

Level of Service

Level of Service – Homes

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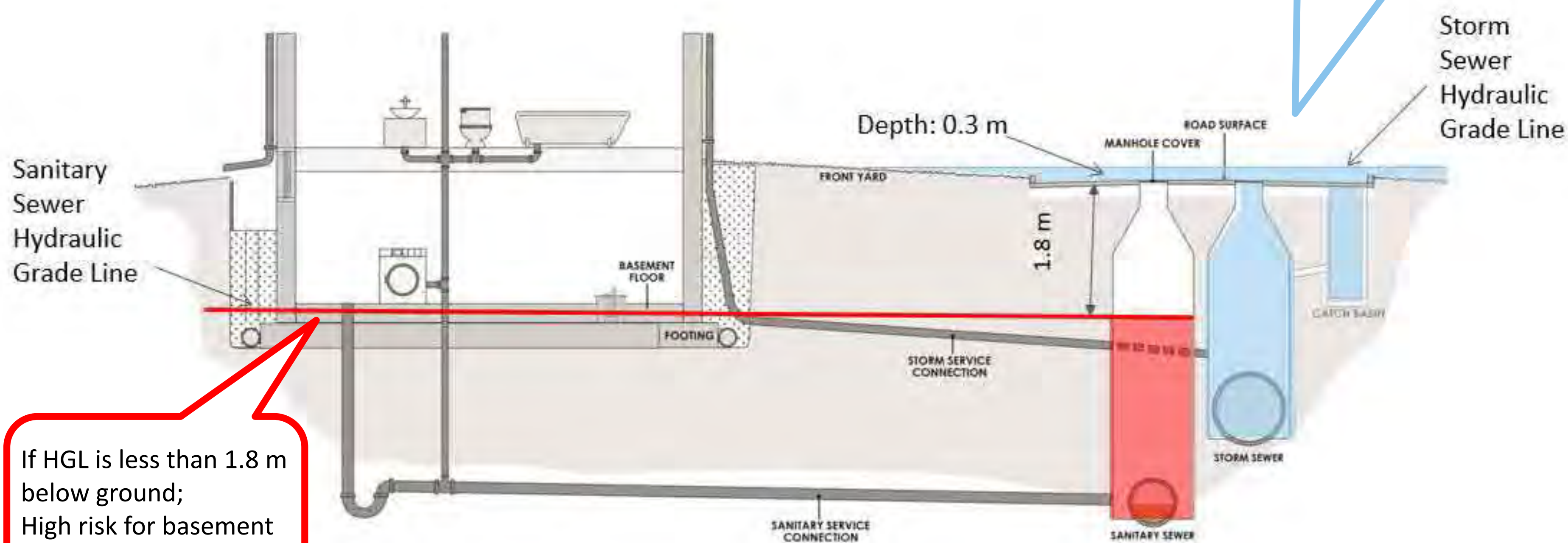
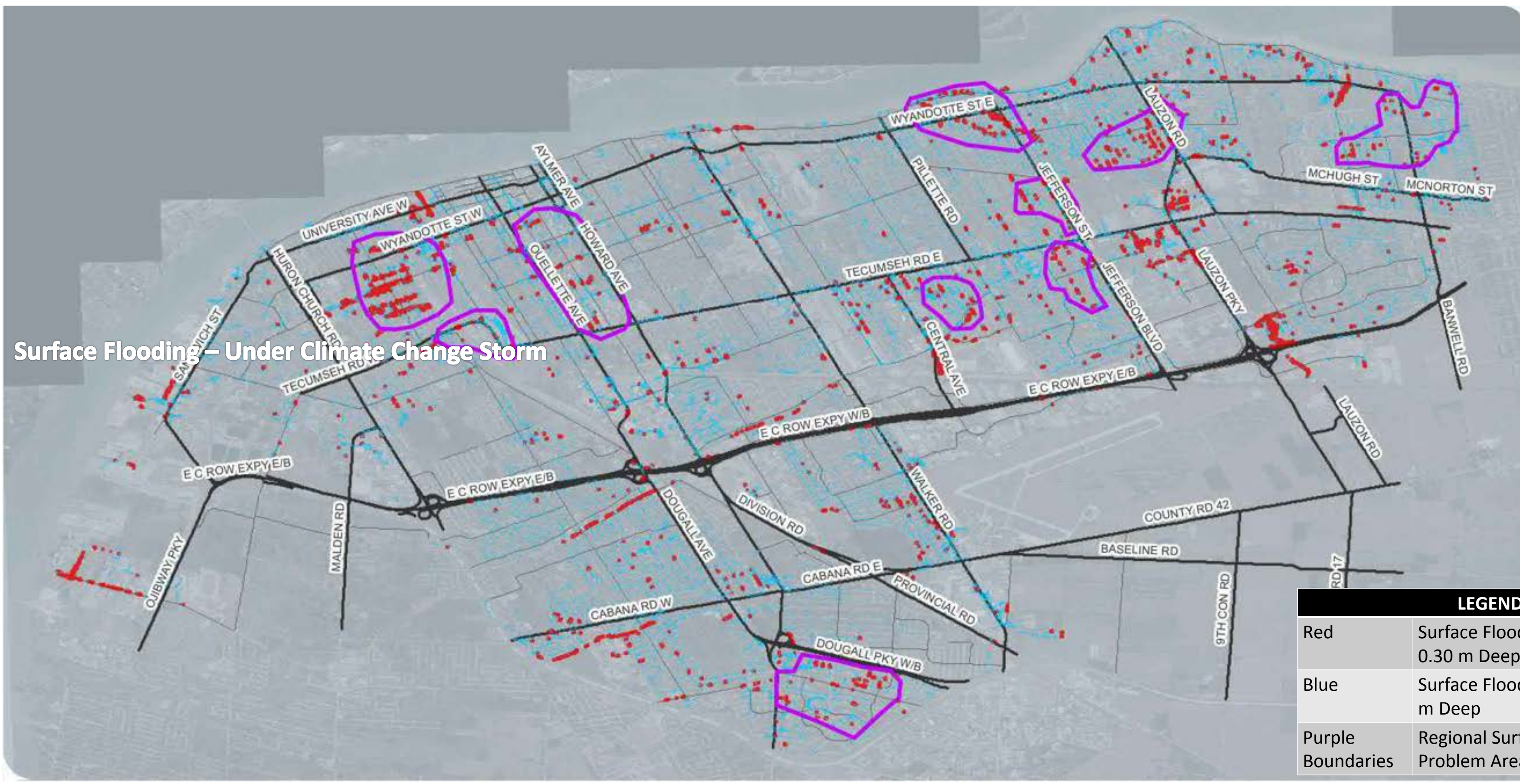


If HGL is less than 1.8 m below ground;
High risk for basement flooding

Surface Flooding

– Reduce max surface flooding to less than 0.30 m
  - Neighbourhood Flooding: 1:100 Year Storm.
  - Arterial/Collector Road: 1:100 Year Storm + 40% Climate Change Factor.

What is a 1:100 Year Storm?
A rainfall that has 1 in 100 chance (or a 1% risk) of occurring in any given year.
Equates to 85 mm of rain over 4 hours.



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Surface Flooding

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STM-15	Collector	Pillette Rd	Adstoll Ave	Tecumseh Rd E
STM-16	Collector	Grand Marais Rd E	Chrysler Centre	Walker Rd
STM-19	Collector	Holburn St	Nova Dr	Nova Dr

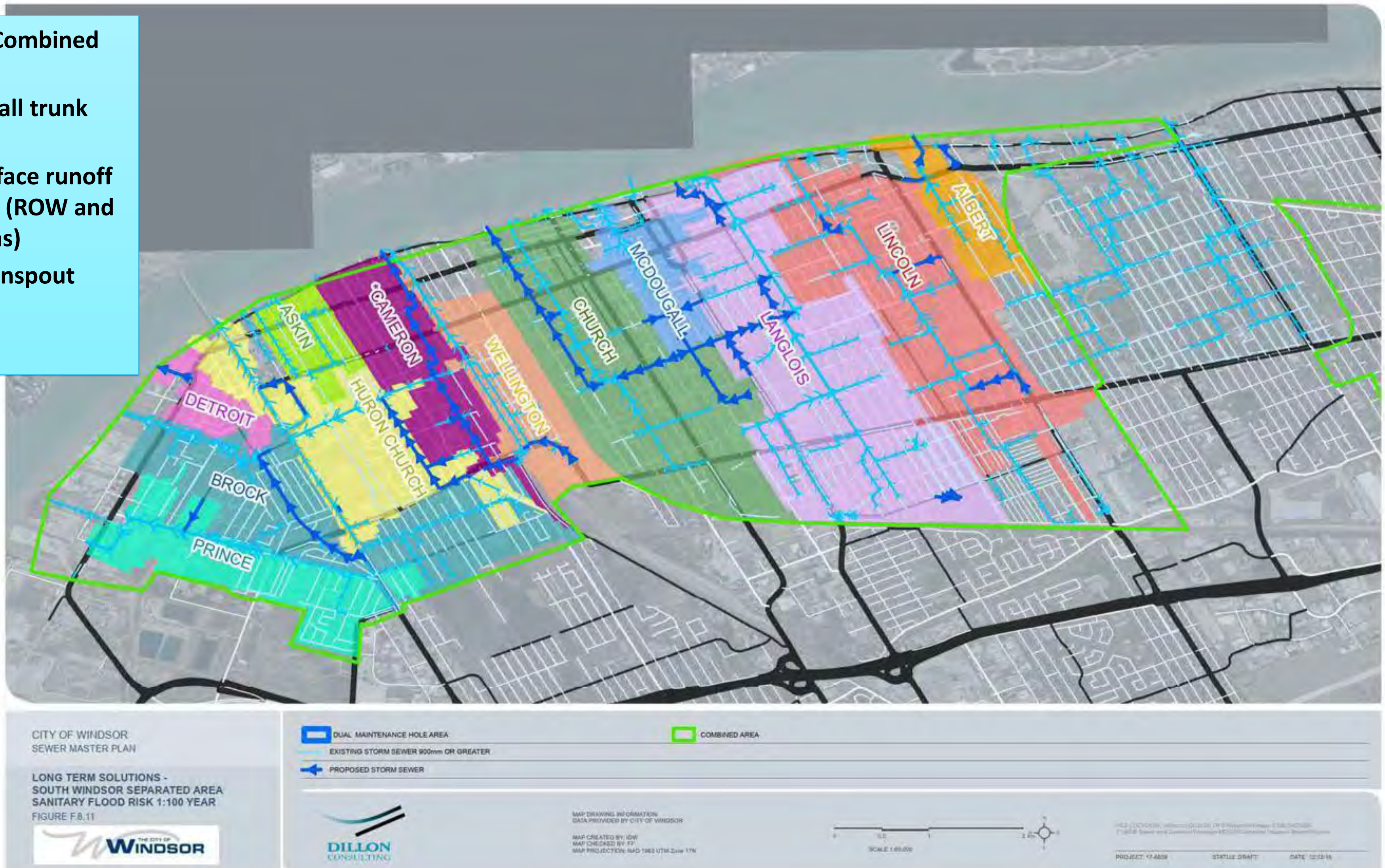
Long Term Solutions – Basement Flooding

Basement Flood Risk Areas	50 mm rain (1:5 Year Storm)
Sewer Surcharging Within 1.8m	**65 mm rain (**1:25 Year Storm)
(6ft) of the Ground Surface	**85 mm rain (**1:100 Year Storm)

Long Term Solutions – Sewer Separation

Sewer Separation of Combined Sewer System Areas

- **Continue to install trunk storm sewers**
- **Re-direct all surface runoff to storm system (ROW and Residential Areas)**
- **Mandatory downspout disconnection**



Long Term Solutions – Sewer Separation

Albert Trunk

Provide Outlet for Existing Trunk Storm Sewer.
Increase Size of Outlet pipe.

Long Term Solutions – Sewer Separation Albert Trunk

Discussion

- Constructability
  - Underground infrastructure within private property areas
- Timing/Implementation
- Easement
- Comments/Questions?

Next Steps

Functional Design of Preferred Solutions

- ✓ Review and comments from Today's PIC and other consultation
- ✓ Confirm functionality; and
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Implementation plan for Short and Long Term Solutions

- ✓ Identify priority projects.
- ✓ Recommend implementation plan for high priority projects.

Complete the Master Plan

- ✓ Document consultation and design process
- ✓ Present final Master Plan to Council.

30 Day Review

- ✓ Provide public opportunity to review
- ✓ Notice of Completion

Stay involved and provide your feedback….

Visit us at **weatheringthestorm.ca**
Email us at: **info@weatheringthestorm**

Follow us on CityofWindsor @CityWindsorON

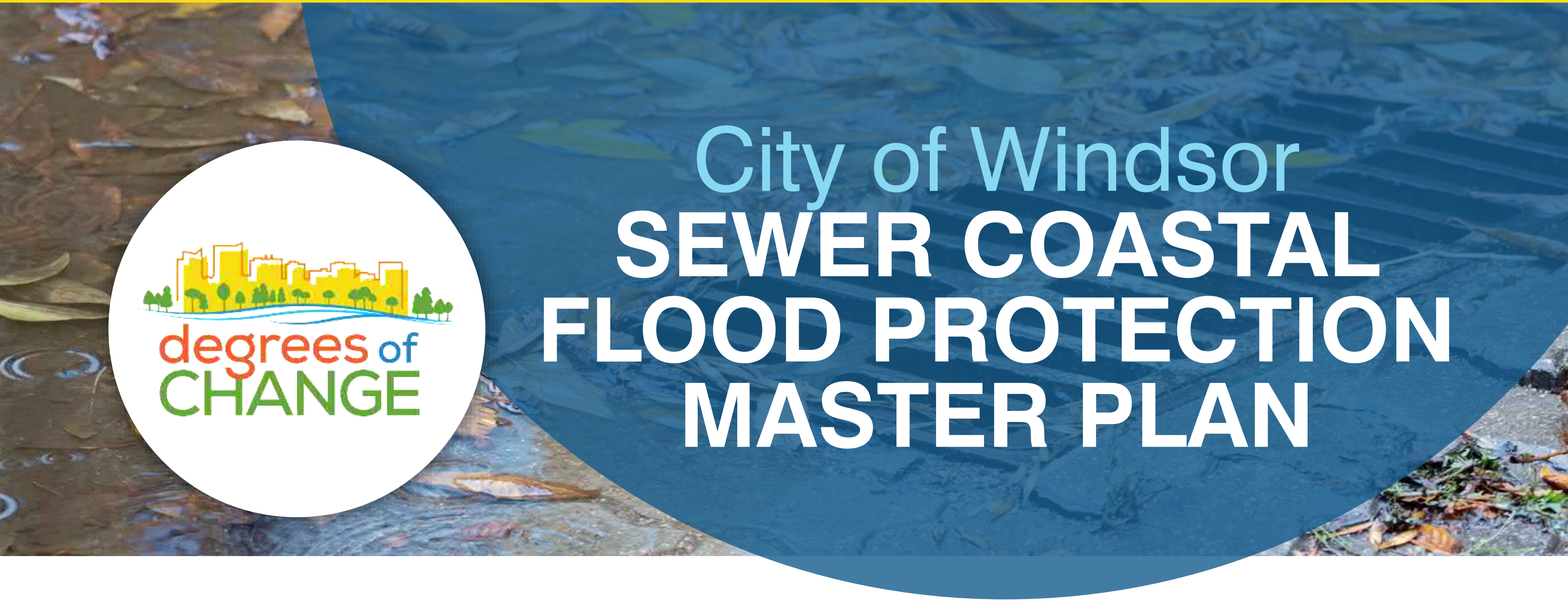
PUBLIC INFORMATION CENTRES

LOCATIONS

Tuesday February 11th, 5-8pm
Roseland Golf & Curling Club - Wansbrough Hall
455 Kennedy Dr W, Windsor ON N9G 1S8

Wednesday February 12th, 3-8pm
WFCU Centre - Michigan Room
8787 McHugh St, Windsor ON N8S 0A1

Thursday February 13th, 5-8pm
Windsor International Aquatic and Training Centre - Lower East Atrium
401 Pitt St W, Windsor ON N9A 0B2



City of Windsor
SEWER COASTAL FLOOD PROTECTION MASTER PLAN

Pre-Consultation
Property Owner Meeting
Feb. 2020

Presented by:

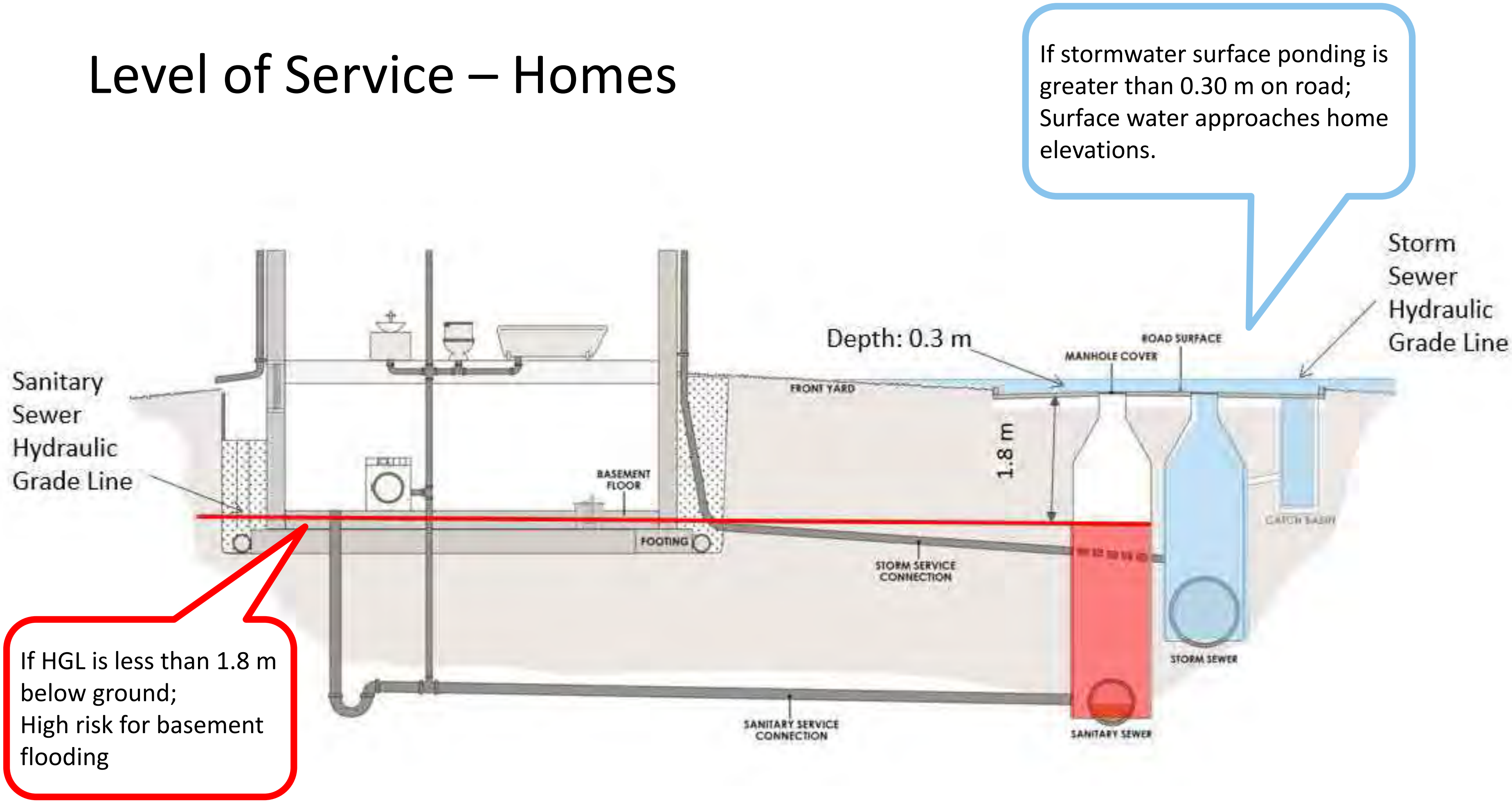
DILLON CONSULTING

Aquafor Beech Limited

AMG ENVIRONMENTAL ADVANCED MONITORING GROUP

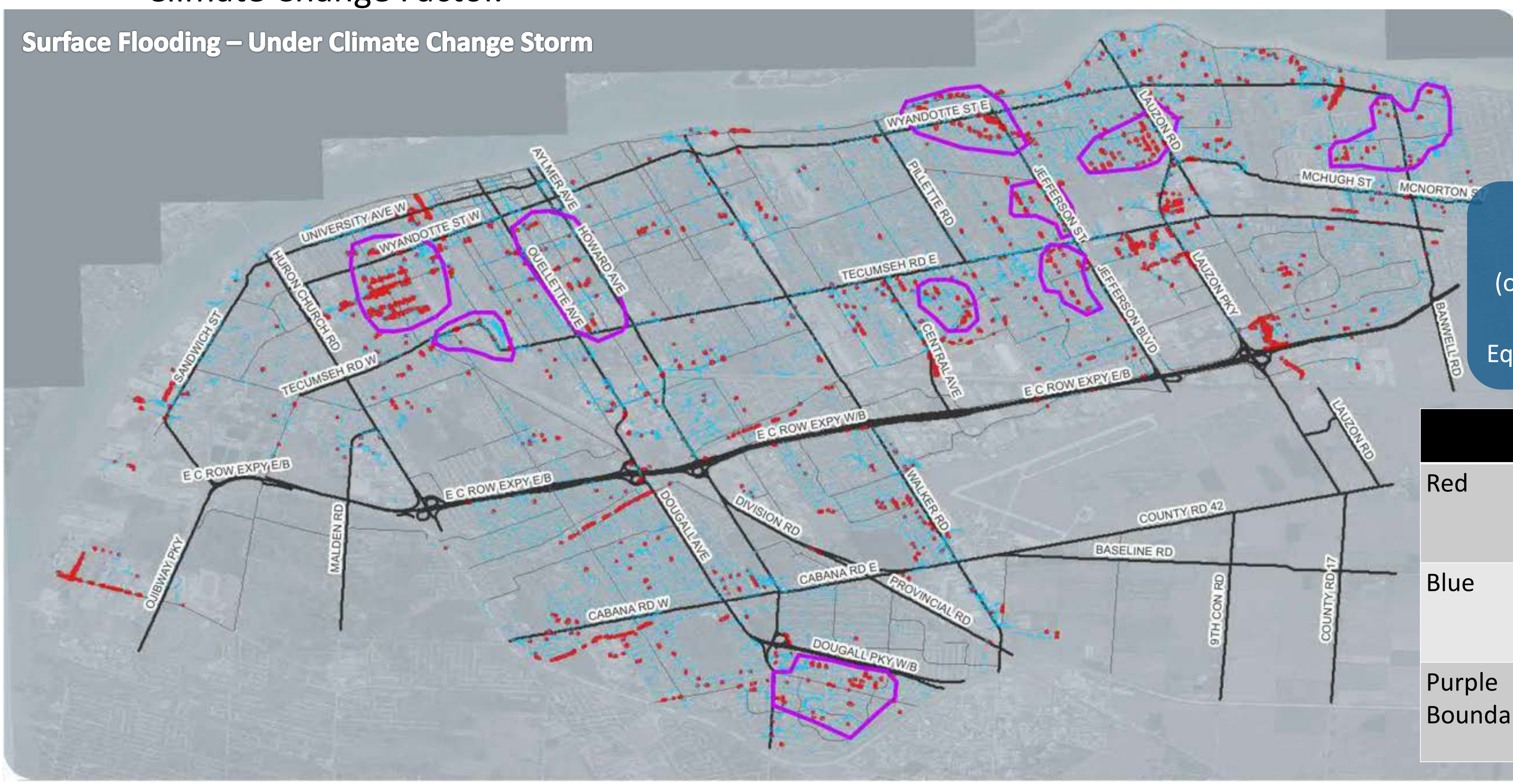
Level of Service

Level of Service – Homes



Surface Flooding

– Reduce max surface flooding to less than 0.30 m
  - Neighbourhood Flooding: 1:100 Year Storm.
  - Arterial/Collector Road: 1:100 Year Storm + 40% Climate Change Factor.
  - Access to Sensitive Land Uses (schools, hospitals, long-term care centers, etc.): 1:100 Year Storm + 40% Climate Change Factor.

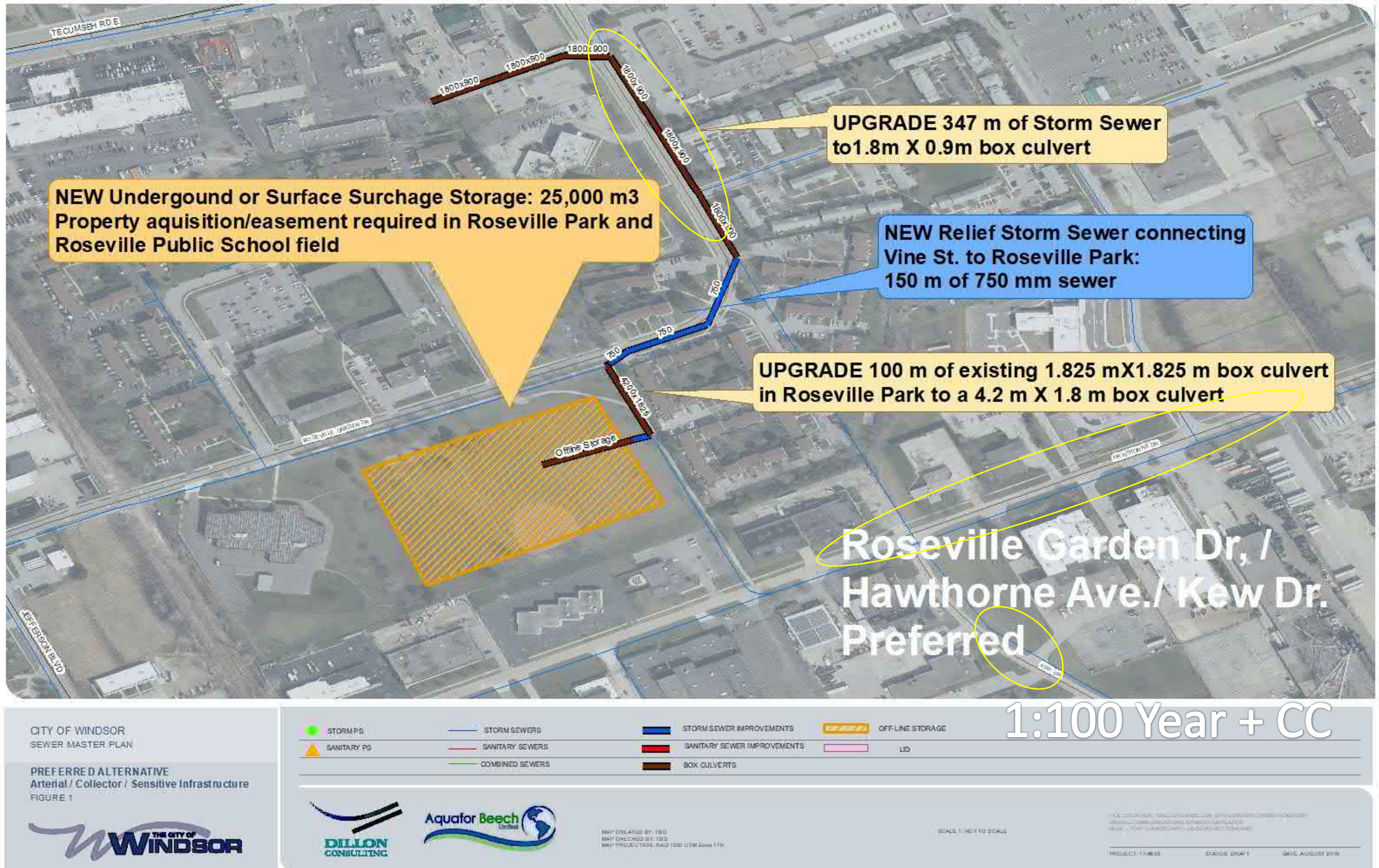


What is a 1:100 Year Storm?
A rainfall that has 1 in 100 chance (or a 1% risk) of occurring in any given year.
Equates to 85 mm of rain over 4 hours.

LEGEND	
Red	Surface Flooding Deeper than 0.30 m Deep
Blue	Surface Flooding less than 0.30 m Deep
Purple Boundaries	Regional Surface Flooding Problem Areas

Surface Flooding Solution – Roseville Area

- Problem - Surface Flooding > 0.30 m:
  - Hawthorn Ave.
  - Kew Dr.
  - Roseville Garden Dr.
- Potential Solution:
  - Conveyance upgrades and underground surcharge storage
- **EA Schedule B Classification**



Surface Flooding Solution – Jefferson/David Suzuki School

- Problem - Surface Flooding > 0.30 m:
  - Jefferson Blvd., Raymond Ave.,
  - Public school access
- Potential Solution:
  - Conveyance upgrades and underground surcharge storage
- **EA Schedule B Classification**

Preferred Solution

EXAMPLES:

- Proposed Improvements
  - Upgrade existing storm sewers
  - Incorporate underground storage within grassed areas.

StormTech
Detention • Retention • Water Quality
An ADS company

Discussion

- Constructability
  - Underground infrastructure within private property areas
- Timing/Implementation
- Easement
- Comments/Questions?

Next Steps

Functional Design of Preferred Solutions

- ✓ Review and comments from Today's PIC and other consultation
- ✓ Confirm functionality; and
- ✓ Develop cost estimates for the proposed infrastructure improvements.

Implementation plan for Short and Long Term Solutions

- ✓ Identify priority projects.
- ✓ Recommend implementation plan for high priority projects.

Complete the Master Plan

- ✓ Document consultation and design process
- ✓ Present final Master Plan to Council.

30 Day Review

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MEETING MINUTES

Subject:	Central Pond Meeting With Rosati Group
Date and Time:	May 19, 2020 – 1:30 p.m.
Location:	Conference Call
Our File:	17-6638

Attendees

Anna Godo	City of Windsor (City)
Janelle Coombs	City of Windsor
Chris Carpenter	City of Windsor
Frank Scarfone	City of Windsor
Tony Rosati	Rosati Group (Rosati)
Kyle Edmunds	Dillon Consulting Limited (Dillon)
Chris Patten	Dillon Consulting Limited
Ian Wilson	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	**Introduction**	**Info.**
1.1.	Rosati is completing draft development plans for the existing industrial lands south of Plymouth Drive, immediately east of the Central Pond.	
1.1.1.	Dillon (Kyle Edmunds) is working separately from the Master Plan Team, as an Engineer for Rosati on this development application.	
1.2.	Dillon is working with the City to complete the Windsor Sewer and Coastal Flood Protection Master Plan.	
1.2.1.	To meet the objectives of the Master Plan to reduce surface flooding risk on major roads, it was proposed to expand Central Pond; three alternatives were presented at the project's Public Information Centres in February 2020. The preferred alternative included an expanded pond which used a portion of lands identified in the draft development plans.	
2.	**Central Avenue Industrial Subdivision**	**Info.**
2.1.	It was noted the submission for the industrial subdivision is on hold pending this meeting and resolution.	

2.2.	Rosati asked if they were mailed a letter explicitly for the February 2020 PIC meeting.	
2.2.1.	Dillon noted that the Central Pond expansion became part of the Master Plan in January 2020, and with the PIC in the first half of February 2020, timing constraints limited in-person meetings prior to the PIC.	
2.2.2.	Dillon will confirm if the Rosati Group was directly mailed an invitation to the PIC.	**Dillon**
3.	**Expanded Pond Design and Layout**	**Info.**
3.1.	Two potential expanded pond layouts were presented, one per the PIC and a second with the pond expansion on the southern property limit.	
3.2.	Rosati asked if lands at the northwest corner of the property or an easement under and west of Central Avenue could be used in lieu of the PIC alternative. It was noted that all alternatives discussed would take more land than the option presented at the PIC. The north western option may include use of the existing private pond lands.	
3.2.1.	It was noted volume from the private pond cannot be double counted in both the development's stormwater management measures and as flood risk reduction measures for the Master Plan.	
3.3.	A precise area for required land acquisitions cannot be expressly provided at this time as a specific pond volume is required to reduce the flooding risk and the ultimate pond geometry will impact the needed surface area. The City to review what level of design the ultimate pond design/geometry is to be advanced to.	**City/Dillon**
3.4.	A question was asked about the waterfowl in the pond and their potential impact on the Windsor Airport. It was noted the existing dry pond was vegetated with woody plants which mitigated the risks for birds in the pond. Any pond expansions would also be designed with this criteria.	
4.	**Next Steps**	
4.1.	Rosati will provide Dillon a sketch of their preferred layout for the expanded pond.	**Rosati**

4.2. Dillon and the City will review Rosati's layout and follow up. **Dillon/City**

Errors and/or Omissions

These minutes were prepared by Ian Wilson, P.Eng., who should be notified of any errors and/or omissions.

Distribuon

All Present
Laura Herlehy - Dillon Consulting Limited

IW:d

May 20, 2020

CBC

Windsor

Volunteers sought for Windsor's sewer master plan committee

Homeowners to be offered sewer and water line insurance

CBC News · Posted: Mar 27, 2018 6:28 AM ET | Last Updated: March 27, 2018

The city is moving ahead with sewer master plan to protect against flooding like what was seen last summer. (Chris Ensing/CBC)

The City of Windsor is inviting the public to apply to be members of a stakeholder advisory committee on the city's sewer master plan.

The committee will be comprised of between 12 and 20 members of the public, including BIA members and community groups.

- **22 reports of flooding after Windsor breaks rainfall record**

It will include people from different wards and different types of housing.

The committee will report to Dillon Consulting Ltd. which is putting the master plan together.

Coun. Irek Kusmierczk said it's important for community members to get involved.

"They may have ideas. They may have best practices. They may also have concerns to bring to the table so again fundamentally what's important is that their voices are heard and they are part of this process," said Kusmierczyk.

- **Ward 7 residents question delay for basement flooding subsidy payouts**

Applications will be put on the city's new website dedicated to the sewer master plan — weatheringthestorm.ca.
The committee would meet on a quarterly basis.

> "We think that this is something that is a relatively low cost solution for people to be able to provide insurance related to their private drain connections."
>
> *- Mark Winterton, city engineer*

Mayor Drew Dilkens said public input is important in the master plan process.

"There's a whole process here that includes public feedback quite frankly it's essential to the whole process here," said Dilkens. "We want to the public to get involved and be part of this solution."

New insurance plan

Council gave administration the go ahead to implement an insurance plan that homeowners could pay for to protect themselves from damage to their sewer and water lines.

- **Flood follow-up: 8 ways Windsor will fix its sewer system to prevent future floods**

City engineer Mark Winterton said they it would be a voluntary program.

"We think that this is something that is a relatively low cost solution for people to be able to provide insurance related to their private drain connections," said Winterton.

Water line insurance would cost $55 a year or $5 a month and provide up to $5,000 of coverage. Sewer line insurance would cost $8.75 monthly or $97 a year and provide $8,000 of coverage.

An information display on the sewer master plan will be set up at the upcoming Earth Day event on April 22. A public meeting to give an update will be held in June.

"We're intending to present the results from the modelling exercise. So we're working on developing a model of the sewer system and the overland drainage system," said Flavio Forest, Project Manager with Dillon Consulting Ltd.

---

with files from Dale Molnar

Herlehy, Laura <lherlehy@dillon.ca>

Sewer and Coastal Flood Protection Master Plan - [redacted] Riverside Drive

1 message

Herlehy, Laura <lherlehy@dillon.ca> Wed, Aug 12, 2020 at 4:56 PM
To: David Pecnik <davidapecnik@gmail.com>
Cc: "Patten, Chris" <cpatten@dillon.ca>, "Godo, Anna" <agodo@citywindsor.ca>, "Coombs, Janelle" <jcoombs@citywindsor.ca>

Hi David,
I am following up with you regarding the City of Windsor's Sewer and Coastal Flood Protection Master Plan. As you recall, we met February 6, 2020 at the City Hall with Councillor Gignac and City staff, to discuss the recommendations of the master plan and its potential impact to your property. We reviewed the preliminary recommendations of this master plan which included the construction of an earth berm along the south side of Riverside Dr. E which would potentially require the acquisition of your property due to the land constraints and the proximity of your home to the City's right-of-way boundary. Since that time, we have presented the preliminary recommendations to the public and progressed with the functional design and development of an implementation plan. On July 27th, the final recommendations were presented and accepted by City Council.

As discussed in February, we were going to follow up with you as we understood more about the timeline and implementation of projects in the master plan. The City has reviewed the Master Plan's recommended projects and priorities and developed a plan for infrastructure projects. The construction of the earth berm along Riverside Drive in the vicinity of your property is not part of the City's next 10-year capital works plan. There are no immediate plans to proceed with this berm between now and 2030, however should the City obtain federal or provincial funding assistance for coastal flood protection measures, they may choose to expedite this project. The City will continue to monitor the Lake/River water levels and reassess the need for the berm on an ongoing basis.

If you could call me to discuss further that would be great. You can reach me at 519-818-3105.
Thank you,
Laura

Laura Herlehy
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

DILLON CONSULTING

Herlehy, Laura <lherlehy@dillon.ca>

Fwd: WSMP- [redacted]- Recommended flood mitigation measures

1 message

Herlehy, Laura <lherlehy@dillon.ca> Tue, Sep 29, 2020 at 2:30 PM
To: cdavison@firststopservices.ca, medavison@firststopservices.ca
Cc: Mark Hernandez <mhernandez@dillon.ca>, "Patten, Chris" <cpatten@dillon.ca>, "Hawco, Tina" <thawco@dillon.ca>, "Godo, Anna" <agodo@citywindsor.ca>, "Coombs, Janelle" <jcoombs@citywindsor.ca>, "Mourad, Adam" <amourad@citywindsor.ca>

Hello,
Yesterday we met onsite, at [redacted] Riverside Drive, to discuss grading and the proposed Riverside Drive Improvements, as it relates to the property [redacted] Riverside Drive. Below is a summary of our discussions:

- As part of the Riverside Vista Ph. 2A Reconstruction project and the City's Sewer and Coastal Flood Protection Master Plan, the following improvements will be made within the City's Right-of-Way.
  - The new roadway will be curbed on both sides and lowered (approximately 6 inches);
  - A new large sized trunk storm sewer will be constructed along Riverside Drive, between Ford Blvd and St. Rose Ave., to capture major rain events (1:100 Year storm) with ponding along the roadway being 1 ft maximum, and
  - Larger catchbasins will be installed to help drain the roadway.
- At [redacted] Riverside Drive, to help channelize the overland flow along Riverside Dr., away from the [redacted] Riverside Dr. property, it is proposed that the grade of the front yard be raised approximately 4-8 inches along the property line.
- The grades will need to ensure that driveway access is maintained and safe to use. The raised area may need to be offset within the private property area in order to accomplish this.
- Riverside Drive reconstruction is scheduled for 2023.
- Pupatello Construction has installed a new drainage system within the property that drains both the front and rear yards to the river via an onsite drainage system.
- Pupatello will be completing the final grading within the front yard shortly. Pupatello will look for opportunities to raise the grades along the front property line to provide some protection from Riverside Dr. overland flows in the interim, before the Riverside Vista Ph. 2A construction is complete. Grades along the west property line will also be raised to mitigate flooding from the adjacent property owners's property.
- Dillon's surveyor will be obtaining survey grades of the property's front yard on 9/29/20.
- The Property owner requested that the previous second driveway access, on the west side of the property, be reinstated upon Riverside Dr. reconstruction. Dillon noted that driveway access points will need to be reviewed with the City.
- The Property owner requested that the brick wall at the property line be maintained. Dillon will review.
- The garage at the south/east corner of the site does not require vehicle drive-in access.
- Dillon will be completing the detailed design for the Riverside Dr. reconstruction in next upcoming year.
- The earth berm required to provide in-land coastal flood protection is not required along this section of Riverside Drive.

Please let me know if you would like to add anything to our discussion. We will keep in touch as we progress with the design of the roadway as it relates to your property.
Thanks
Laura

DILLON CONSULTING
BEST MANAGED COMPANIES CANADA
Platinum member

Laura Herlehy
Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

---------- Forwarded message ---------
From: **Herlehy, Laura** <lherlehy@dillon.ca>
Date: Wed, Sep 23, 2020 at 10:43 AM
Subject: Fwd: WSMP- [redacted] Riverside Drive- Recommended flood mitigation measures
To: [redacted]
Cc: Godo, Anna <agodo@citywindsor.ca>, Mark Hernandez <mhernandez@dillon.ca>, Mourad, Adam <amourad@citywindsor.ca>, Coombs, Janelle <jcoombs@citywindsor.ca>

Good Morning Christine,

Per my voicemail earlier today, we are following up with you regarding flooding issues at your property, [redacted] Riverside Drive. Based on the letter attached and discussions during the past Public Information Centres with City and Dillon Consulting project team members, we have recommended measures to mitigate risk of overland flooding along your property. See below for more details on the proposed measures that will be integrated into the detailed design of the Riverside Vista Phase 2A project.

Riverside Dr. Vista Reconstruction - Phase 2A
- Full road reconstruction of Riverside Drive including curbs on both sides of the roadway. The new curbed road cross section will allow the roadway to be lowered and will improve channelization of overland flow to new roadway catchbasins.
-The new roadway will be equipped with larger capacity catchbasins to improve drainage of the roadway.
- Upsize the existing storm sewer along Riverside Drive. This larger sewer will improve the conveyance of flows as well as act as a storage tank during major rain events.
- Improve the storm sewer outlet at St. Rose Ave. with a new stormwater pump station (construction timeline is pending federal funding).
- Placement of a landform barrier along the north side of Riverside Drive, in areas that do not meet the high river level flood protection elevations. The barrier will also assist in channelizing the overland flow and mitigating spill over into properties north of Riverside Drive.

A higher level of service has been applied to the design of the infrastructure proposed to provide surface drainage to Riverside Drive. To size the storm sewer infrastructure, listed above, a "Climate Change" storm intensity has been used, this is equivalent to a 120 mm rain over a 4 hour period which is similar to the larger storms the City has experienced previously in 2016 and 2017.

Recommended solutions at [redacted] Riverside Drive. (Refer to attached schematic plan)
- Due to the existing local topography, the landform barrier is not required west of Villaire Ave., however due to the low lying nature of the [redacted] Riverside Dr property and because it is located at the foot of Prado, it is proposed that the front portion of the property along the City's right of way boundary be raised to mitigate risk of water draining into the property. It is proposed that the property grades along the front property line be raised in the range of 4 - 8 inches. This will require the regrading of the front yard and driveway to accommodate this grade change and to meet minimum slope requirements. The extent of re-grading will be determined during detailed roadway design.
- In addition, a local catch basin will be required to capture drainage north of this elevated area. The catchbasin will be equipped with a backflow preventer to prevent backflow of the City's storm sewer on to the private property.

It should be noted that all proposed improvements and flood mitigation measures are based on the design criteria noted above. This provides a high level of service however due to the uncertainty related to weather and the proposed improvements will not completely eliminate risk of surface or basement flooding. Also, these improvements will not mitigate the risks associated with coastal flooding associated with high river levels.

At this stage, we will need additional topographic survey information within your front yard area to better place the infrastructure listed above. A surveyor from Dillon Consulting will be on your property next week (Sept. 28 to Oct. 2) to gather this information.

Feel free to call me at 519-818-3105 to discuss. If you would like I can meet you at your property to discuss further.
Thank you,
Laura

Laura Herlehy
Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216

F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

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Platinum member

Please consider the environment before printing this email

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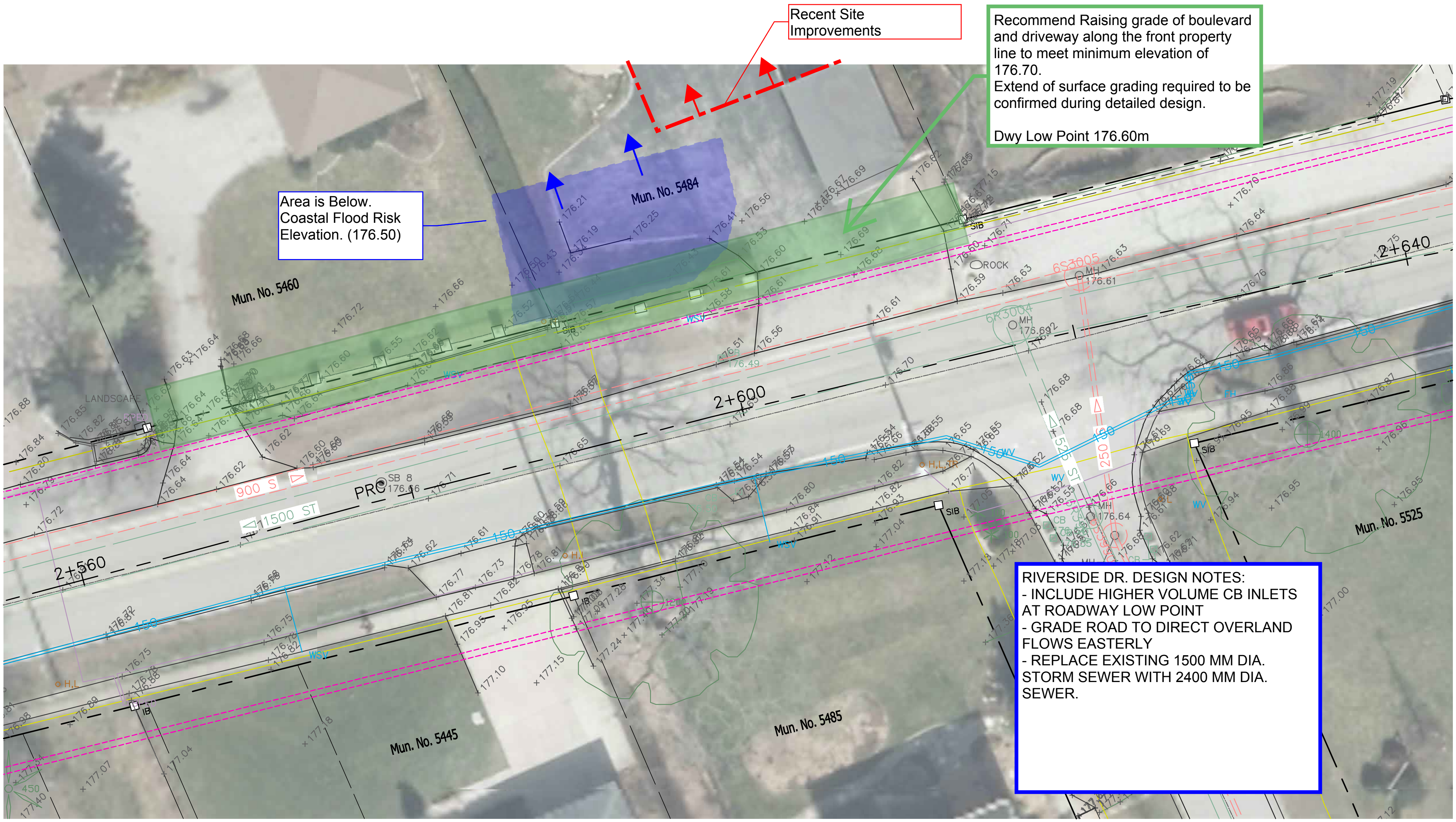
2 attachments

DOC061919-06192019121916.pdf
51K

[redacted] Riverside Booulevard Grading Recommendations.pdf
847K


Recent Site Improvements
Recommend Raising grade of boulevard and driveway along the front property line to meet minimum elevation of 176.70.
Extend of surface grading required to be confirmed during detailed design.
Dwy Low Point 176.60m
Area is Below. Coastal Flood Risk Elevation. (176.50)
Mun. No. 5484
Mun. No. 5460
Mun. No. 5445
Mun. No. 5485
Mun. No. 5525
2+560
2+600
2+640
900 S
1500 ST
RIVERSIDE DR. DESIGN NOTES:
- INCLUDE HIGHER VOLUME CB INLETS AT ROADWAY LOW POINT
- GRADE ROAD TO DIRECT OVERLAND FLOWS EASTERLY
- REPLACE EXISTING 1500 MM DIA. STORM SEWER WITH 2400 MM DIA. SEWER.

June 19, 2019

Re: Flooding at [redacted] Dr. E.

Sent via e-mail: Mark Hernandez, Dillon Consulting – mhernandez@dillon.ca
Anna Godo, City of Windsor – agodo@citywindsor.ca

Mr. Hernandez and Ms. Godo,

Thank you for meeting with us at the Public Information Centre (PIC) on Thursday May 23, 2019. It was very helpful and the staff was very receptive to questions.

As we discussed at the meeting, our entire house and yard was flooded with 5-6" of sewage that came flowing down Prado, overflowing the City sewers in front of our house, on Riverside Drive, on August 29, 2017. This is the first time the house has taken on any water/sewage from City sewers. We were very fortunate to have replacement cost insurance, but will probably not be able to get that again.

The City water/sewage overrun flowed thru the house and down both sides of the house to the river. The house had to be completely gutted and remediated as the sewage water was approx. 6" high throughout the entire house and garage. Additionally, as the house is one floor with an attached two car garage and situated on a concrete pad, the floors had to be dug out and all mechanical systems removed and replaced. The insurance claim for the inside is still ongoing and approx. $800,000 in damages have been paid out to date for the house, contents, garage and two cars that were in the garage. We were unable to live in our home for 18 months.

The outside areas were also completely destroyed by the city sewage water and the replacement cost and addition of drainage techniques is estimated at approx. 75k. We have already consulted with an engineer and have added many drainage measures and will be doing more (i.e. driveway work to slope and have water directed to drainage controlled areas on our property).

We would like to work with the City to ensure that city water does not overflow onto our property again and a meeting at the premises with your engineers and road designers would assist in that regard. We are not sure that higher curbs, new sewers and containment pits will be enough to mitigate against future storms, given one route for the area's water overflow is via 5484 Riverside Dr. E. to the Detroit River. As a heavily hit area, we would suggest that all extra precautions should be taken to prevent future damage.

We look forward to meeting further with you to improve the area's drainage,

Kind regards,

[redacted]

[redacted]

Herlehy, Laura <lherlehy@dillon.ca>

FW: Prince Road sewer outlet at [redacted], Windsor

1 message

Godo, Anna <agodo@citywindsor.ca> Fri, Mar 6, 2020 at 9:07 AM
To: "Herlehy, Laura" <lherlehy@dillon.ca>
Cc: "Coombs, Janelle" <jcoombs@citywindsor.ca>

FYI

Anna M. Godo, P. Eng. |Engineer III

Engineering Department

350 City Hall Square West | Suite 310 | Windsor, ON N9A 6S1

519-255-6100 Ext. 6508

www.citywindsor.ca

From: [redacted]
Sent: Thursday, March 5, 2020 6:54 PM
To: Godo, Anna <agodo@citywindsor.ca>; Anthony Rossi <ARossi@cocogroup.com>
Subject: RE: Prince Road sewer outlet at [redacted]

Anna,

Please send the information to Anthony and copy myself.

[redacted]

[redacted]

From: Godo, Anna <agodo@citywindsor.ca>
Sent: Thursday, March 5, 2020 5:28 PM
To: Anthony Rossi <ARossi@cocogroup.com>
Cc: [redacted]
Subject: Prince Road sewer outlet at 3800 Russel Street, Windsor

****EXTERNAL SENDER****

Anthony,

Are you still the appropriate contact for this file?

We are working on the Sewer Master Plan and documenting the proposed Prince Road Storm Sewer Outlet and Pumping Station in the report. Dillon is our consultant. We would like to obtain permission to enter the property and conduct a stream assessment of the McKee Creek slip that would provide an outlet for the proposed sewer and pump station that we had discussed in 2018.

With regards,

Anna

Anna M. Godo, P. Eng. |Engineer III

THE CITY OF WINDSOR ONTARIO, CANADA

Engineering Department

350 City Hall Square West | Suite 310 | Windsor, ON N9A 6S1

519-255-6100 Ext. 6508

www.citywindsor.ca

Appendix B-7

Indigenous Communities and Organizations

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Ministry of the Environment and Climate Change

733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministèrede l'Environnement et de l'Action en matière de changement climatique

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Fax: 519 873-5020

March 23, 2018

City of Windsor
350 City Hall Square W, 3rd Floor
Windsor, ON N9A 6S1

Attention: Anna Godo, Project Lead

Re: Class EA for the City of Windsor Sewer Master Plan

Dear Anna Godo:

This letter acknowledges this ministry's receipt of the Notice of Commencement for the above noted project. It is this ministry's understanding that the City of Windsor is initiating a Class EA process to develop a Master Plan for wastewater/sewer to determine flood risk and increase resiliency.

As you know, the Class Environmental Assessment (Class EA) planning process includes consultation with interested stakeholders, evaluation of alternatives, assessment of the effects of the proposed works and identification of measures to mitigate any adverse impacts. In addition to consultation with public agencies and the general public, consultation with Aboriginal communities is required.

Aboriginal Consultation

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

Your proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to your proposed project**, the MOECC is delegating the procedural aspects of rights-based consultation to you through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information you have provided to date and the Crown`s preliminary assessment you are required to consult with the following communities who have been identified as potentially affected by your proposed project:

Nation	Contact Information
Aamjiwnaang First Nation	Aamjiwnaang First Nation 978 Tashmoo Ave. Sarnia, ON N7T 7H5 519-336-8410 Chief Joanne Rogers chief@aamjiwnaang.ca Other Contacts: Sharilyn Johnston, Environment Coordinator sjohnston@aamjiwnaang.ca Christine Rogers, Enviroment Worker crogers@aamjiwnaang.ca (same mailing address for all)
Bkejwanong Territory (Walpole Island First Nation)	Bkejwanong Territory 117 Tahgahoning Road R.R.#3 Wallaceburg, ON N8K 4K9 519-627-1481 Chief Dan Miskokomon drskoke@wifn.org Other Contacts: Dean Jacobs, Consultation Manager Walpole Island Heritage Centre 2185 River Road R.R.#3 Wallaceburg, ON N8K 4K9 519-627-1475 dean.jacobs@wifn.org and Janet Macbeth, Project Review Coordinator janet.macbeth@wifn.org
Chippewas of Kettle and Stony Point First Nation	Chippewas of Kettle and Stony Point First Nation 6247 Indian Lane, R.R.#2 Forest, ON N0N 1J1 519-786-2125 Chief Tom Bressette thomas.bressette@kettlepoint.org Other Contact: Valerie George Consultation Coordinator valerie.george@kettlepoint.org
Chippewas of the Thames First Nation	Chippewas of the Thames First Nation 320 Chippewa Rd., Muncey, ON N0L 1Y0 519-289-5555 Chief Myeengun Henry myeengun@cottfn.com Other Contacts: Kelly Riley, Acting Director - Lands & Environment kriley@cottfn.com 519-289-2662 ext. 209 Rochelle Smith, Consultation Coordinator rsmith@cottfn.com 519-289-2662 ext 213
Caldwell First Nation	Caldwell First Nation P.O. Box 388 Leamington, ON N8H 3W3 519-322-1766 or 1-800-206-7522 Chief Mary Duckworth chief.duckworth@caldwellfirstnation.ca Director of Operations, Allen Deleary allen.deleary@caldwellfirstnation.ca
Oneida Nation of the Thames ONYOTA'A:KA	Oneida Nation of the Thames 2212 Elm Ave. Southwold, ON N0L 2G0 519-652-3244 Chief Randall Phillips randall.phillips@oneida.on.ca Other Contact: Political Chief Assistant: Catherine Cornelius catherine.cornelius@oneida.on.ca

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link:

https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process

Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

You must contact the Director of Environmental Approvals Branch under the following circumstances subsequent to initial discussions with the communities identified by MOECC:

- aboriginal or treaty rights impacts are identified to you by the communities;
- you have reason to believe that your proposed project may adversely affect an aboriginal or treaty right;
- consultation has reached an impasse;
- a Part II Order request or elevation request is expected.

The Director of the Environmental Approvals Branch can be notified either by email with the subject line "Potential Duty to Consult" to EAASIBgen@ontario.ca or by mail or fax at the address provided below:

Email:	EAASIBGen@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Approvals Branch 135 St. Clair Avenue West, 1st Floor Toronto, ON, M4V 1P5

The MOECC will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play in them.

Source Water Protection

As per the recent amendments to the Municipal Engineers Association (MEA) Class Environmental Assessment parent document approved October 2015, proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a Project File report or ESR. If the project is occurring in a vulnerable area, then there may be policies in the local Source Protection Plan (SPP) that need to be addressed (requirements under the Clean Water Act). The proponent should contact and consult with the appropriate Conservation Authority/Source Protection Authority (CA/SPA) to discuss potential considerations and policies in the SPP that apply to the project.

Please include a section in the report on Source Water Protection. Specifically, it should discuss whether or not the project is located in a vulnerable area or changes or creates new vulnerable areas, and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (this should be consulted on with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the Project File Report/ESR how the project adheres to or has regard to applicable policies in the local SPP. If creating or changing a vulnerable area, proponents should document whether any existing uses or activities may potentially be affected by the implementation of source protection policies. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. As a note, even if the project activities in a vulnerable area are deemed not to be a drinking water risk, there may be other policies that apply and so consultation with the local CA/SPA is important.

Climate Change

The Municipality is strongly encouraged to include climate change in this EA. Climate change should be considered in the context of mitigation and the context of adaptation. The Ministry has recently released a guidance document to support proponents in including climate change in environmental assessments. The guide can be found online: https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process. It should be noted that Climatic Features is identified in Appendix 2 of the Municipal Class EA page 2-7 (2015).

Other

MOECC commends the City's use of visually pleasing media both in the notice of commencement and the accompanying website!

Please ensure that all notices issued as a requirement of the Class EA process contain the necessary information, including the date a notice is issued, and that all notices are sent to the appropriate office as per Appendix 6-1 of the Municipal Class EA. Notices of commencement should be sent to the appropriate regional office, in this case, the Southwest Regional Office in London.

Also, MOECC recommends the City consider adding a link from the Environmental Assessment Studies & Master Plans page on the City's website to the project specific webpage (weatheringthestorm.ca) for increased transparency that the project is, in fact, an Environmental Assessment.

Conclusion

Thank you for the opportunity to comment on this project. Please keep this office fully informed of the status of this project as it proceeds through the Class EA process.

Please send all future correspondence with respect to this project to my attention, as I am this ministry's one window contact for this project: Anneleis Eckert, Regional Environmental Planner / Regional EA Coordinator at the address below; email address: anneleis.eckert@ontario.ca; telephone number: 519-873-5115.

Yours truly,

Anneleis Eckert

Anneleis Eckert
Regional Environmental Planner / Regional EA Coordinator
Ministry of Environment and Climate Change
733 Exeter Road
London ON, N6E 1L3
519-873-5115

Copy:
Flavio Forest, Dillon Consulting
Mark Smith, MOECC
Marc Bechard, MOECC
Bruce Harman, MOECC
Scott Abernethy, MOECC

Chippewas of the Thames First Nation	**Chief**	Chief	Jacqueline	French	**jfrench@cottfn.com**	**519-289-5555**	**320 Chippewa Road**	**Muncey**	**ON**	**N0L 1Y0**	**EMAIL + Mail**
	Acting Director - Lands & Environment	Ms.	Kelly	Riley	kriley@cottfn.com	519-289-2662 x. 209		Muncey	ON	N0L 1Y0	EMAIL
	Consultation Coordinator	Ms.	Rochelle	Smith	rsmith@cottfn.com	519-289-2662 x. 213		Muncey	ON	N0L 1Y0	EMAIL
	Consultation Coordinator	Mr.	Fallon	Burch	consultation@cottfn.com	519-289-5555 x. 251		Muncey	ON	N0L 1Y0	EMAIL
Chippewas of Kettle & Stony Point First Nation	**Chief**	**Chief**	**Thomas**	**Bressette**	**thomas.bressette@kettlepoint.org**	**519-786-2125**	**6247 Indian Lane R.R.#2**	**Forest**	**ON**	**N0N 1J1**	**EMAIL + Mail**
	Consultation Coordinator	Ms.	Valerie	George	valerie.george@kettlepoint.org	519-786-2125	6247 Indian Lane R.R.#2	Forest	ON	N0N 1J1	EMAIL
Chippewas of Aamjiwnaang First Nation	**Chief**	**Chief**	**Joanne**	**Rogers**	**chief@aamjiwnaang.ca**	**519-336-8410**	**978 Tashmoo Avenue**	**Sarnia**	**ON**	**N7T 7H5**	**EMAIL + Mail**
	Environmental Coordinator	Ms.	Sharilyn	Johnston	sjohnston@aamjiwnaang.ca	519-336-8410	978 Tashmoo Avenue	Sarnia	ON	N7T 7H5	EMAIL
	Environment Worker	Ms.	Christine	Rogers	crogers@aamjiwnaang.ca	519-336-8410	978 Tashmoo Avenue	Sarnia	ON	N7T 7H5	EMAIL
Bkejwanong Territory (Walpole Island First Nation)	**Chief**	**Chief**	**Daniel**	**Miskokomon**	**drskoke@wifn.org**	**519-627-1481**	**117 Tahgahoning Road R.R. #3**	**Wallaceburg**	**ON**	**N8A 4K9**	**EMAIL + Mail**
	Consultation Manager	Mr.	Dean	Jacobs	dean.jacobs@wifn.org	519-627-1475	Walpole Island Heritage Centre, 2185 River Road R.R.#3	Wallaceburg	ON	N8K 4K9	EMAIL
	Project Review Coordinator	Ms.	Janet	Macbeth	janet.macbeth@wifn.org						EMAIL
Caldwell First Nation	**Chief**	**Chief**	**Mary**	**Duckworth**	**chief.duckworth@caldwellfirstnation.ca**	**519-322-1766**	**P.O Box 388**	**Leamington**	**ON**	**N8H 3W3**	**EMAIL + Mail**
	Director of Operations	Mr.	Allen	Deleary	allen.deleary@caldwellfirstnation.ca	519-322-1766	P.O Box 388	Leamington	ON	N8H 3W3	EMAIL
Oneida Nation of the Thames	**Chief**	**Chief**	**Randall**	**Phillips**	**Randall.phillips@oneida.on.ca**	**519-652-3244**	**2212 Elm Avenue**	**Southwold**	**ON**	**N0L 2G0**	**EMAIL + Mail**
	Chief	**Chief**	**Jessica**	**Hill**	**jessica.hill@oneida.on.ca**	**519-652-3244**	**2212 Elm Avenue**	**Southwold**	**ON**	**N0L 2G0**	**EMAIL + Mail**
	Political Chief Assistant	Ms.	Catherine	Cornelius	catherine.cornelius@oneida.on.ca	519-652-3244	2212 Elm Avenue	Southwold	ON	N0L 2G0	EMAIL

August 28, 2019

Bkejwanong Territory (Walpole Island First Nation)
117 Tahgahoning, R.R. #3
Wallaceburg, ON
N8A 4K9

Attention: Chief Daniel Miskokomon

RE: City of Windsor Sewer Master Plan Project Update

Dear Chief Daniel Miskokomon,

On behalf of the City of Windsor, we are hereby providing you with an update on this project and to invite your input related to our preliminary findings and alternative solutions as part of the next stage of public and agency engagement.

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan which commenced in early 2018.

The Sewer Master Plan is being undertaken under the Municipal Class Environmental Assessment (EA) process to address the following objectives:

- To confirm the causes of basement and surface flooding based on the City's storm, sanitary and combined sewer systems, as well as the overland drainage network;
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- To recommend an implementation strategy for the City's consideration.

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Input from the public, agencies and indigenous communities will be an important consideration in our assessment of the alternative solutions, as well as to define the required commitments associated with the implementation of the preferred solutions.

For further information related to this project, you may visit the project website at www.weatheringthestorm.ca.

Please contact the undersigned should you have any questions, or to confirm your interest in arranging a meeting to discuss this project in further detail. Alternatively, you may also contact Ms. Anna Godo, P.Eng., City of Windsor Project Lead, at agodo@citywindsor.ca, or at 519-255-6100 Ext. 6508.

Sincerely,

Flavio Forest, P.Eng.,
Partner & Project Manager
Dillon Consulting Limited

cc: Mr. Dean Jacobs
Ms. Janet Macbeth

August 28, 2019

Caldwell First Nation
P.O Box 388
Leamington, ON
N8H 3W3

Attention: Chief Mary Duckworth

RE: City of Windsor Sewer Master Plan Project Update

Dear Chief Mary Duckworth,

On behalf of the City of Windsor, we are hereby providing you with an update on this project and to invite your input related to our preliminary findings and alternative solutions as part of the next stage of public and agency engagement.

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan which commenced in early 2018.

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Sincerely,

Flavio Forest, P.Eng.,
Partner & Project Manager
Dillon Consulting Limited

cc: Mr. Allen Deleary

August 28, 2019

Chippewas of Aamjiwnaang First Nation
978 Tashmoo Avenue
Sarnia, ON
N7T 7H5

Attention: Chief Joanne Rogers

RE: City of Windsor Sewer Master Plan Project Update

Dear Chief Joanne Rogers,

On behalf of the City of Windsor, we are hereby providing you with an update on this project and to invite your input related to our preliminary findings and alternative solutions as part of the next stage of public and agency engagement.

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan which commenced in early 2018.

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Sincerely,

Flavio Forest, P.Eng.,
Partner & Project Manager
Dillon Consulting Limited

cc: Ms. Sharilyn Johnston
Ms. Christine Rogers

August 28, 2019

Chippewas of Kettle & Stony Point First Nation
6247 Indian Lane, R.R. #2
Forest, ON
N0N 1J1

Attention: Chief Thomas Bressette

RE: City of Windsor Sewer Master Plan Project Update

Dear Chief Thomas Bressette,

On behalf of the City of Windsor, we are hereby providing you with an update on this project and to invite your input related to our preliminary findings and alternative solutions as part of the next stage of public and agency engagement.

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan which commenced in early 2018.

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Sincerely,

Flavio Forest, P.Eng.,
Partner & Project Manager
Dillon Consulting Limited

cc: Ms. Valerie George

August 28, 2019

Chippewas of the Thames First Nation
320 Chippewa Road
Muncey, ON
N0L 1Y0

Attention: Chief Jacqueline French

RE: City of Windsor Sewer Master Plan Project Update

Dear Chief Jacqueline French,

On behalf of the City of Windsor, we are hereby providing you with an update on this project and to invite your input related to our preliminary findings and alternative solutions as part of the next stage of public and agency engagement.

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan which commenced in early 2018.

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For further information related to this project, you may visit the project website at www.weatheringthestorm.ca.

Please contact the undersigned should you have any questions, or to confirm your interest in arranging a meeting to discuss this project in further detail. Alternatively, you may also contact Ms. Anna Godo, P.Eng., City of Windsor Project Lead, at agodo@citywindsor.ca, or at 519-255-6100 Ext. 6508.

Sincerely,

Flavio Forest, P.Eng.,
Partner & Project Manager
Dillon Consulting Limited

cc: Ms. Kelly Riley
Ms. Rochelle Smith
Mr. Fallon Burch

CHIPPEWAS OF THE THAMES FIRST NATION

September 3, 2018

VIA EMAIL

Flavio Forest, P.Eng
Partner & Project Manager
Dillon Consulting Limited
3200 Deziel Drive
Suite 608
Windsor, Ontario
N8W 5K8

RE: City of Windsor Sewer Master Plan Project Update

Dear Mr. Forest,

We have recently received the project update for the aforementioned project, dated August 28th, 2019. As previously mentioned, this project is located within the Mckee Treaty Area (1827) to which Chippewas of the Thames First Nation (COTTFN) is a signatory, it is also located within the Big Bear Creek Additions to Reserve (ATR) land selection area, as well as COTTFN Traditional Territory.

I have reviewed the information provided, *and at this stage of the project* we have identified minimal concern. However, we look forward to reviewing the completed Municipal Class Environment Assessment. We request that an electronic copy of each Notice or Report be sent to COTTFN via e-mail at consultation@cottfn.com. We also ask that if there are any changes to this Study that are of a substantive nature that you keep us informed.

To implement meaningful consultation, COTTFN has developed its own protocol — a document and a process that will guide positive working relationships. We would be happy to meet with you to review COTTFN's Consultation Protocol.

We look forward to continuing this open line of communication. We would like the opportunity to discuss your project in more detail once the EA is complete. Thank you for engaging Chippewas of the Thames First Nation.

CHIPPEWAS OF THE THAMES FIRST NATION

Please do not hesitate to contact me if you need further clarification of this letter.

Sincerely,

Fallon Burch
Consultation Coordinator
Chippewas of the Thames First Nation
(519) 289-5555 Ext. 251
consultation@cottfn.com

August 28, 2019

Oneida Nation of the Thames
2212 Elm Avenue
Southwold, ON
N0L 2G0

Attention: Chief Jessica Hill

RE: City of Windsor Sewer Master Plan Project Update

Dear Chief Jessica Hill,

On behalf of the City of Windsor, we are hereby providing you with an update on this project and to invite your input related to our preliminary findings and alternative solutions as part of the next stage of public and agency engagement.

The City of Windsor has experienced widespread basement and surface flooding caused by significant rainfall events that resulted in property damage and disruption to the community. The extreme storm events that recently occurred in September 2016 and August 2017 prompted the City's Mayor to announce an 8-point plan aimed at addressing these flooding risks, a key element of which was the completion of the City's Sewer Master Plan which commenced in early 2018.

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Please contact the undersigned should you have any questions, or to confirm your interest in arranging a meeting to discuss this project in further detail. Alternatively, you may also contact Ms. Anna Godo, P.Eng., City of Windsor Project Lead, at agodo@citywindsor.ca, or at 519-255-6100 Ext. 6508.

Sincerely,

Flavio Forest, P.Eng.,
Partner & Project Manager
Dillon Consulting Limited

cc:	Ms. Catherine Cornelius

Appendix B-8

Correspondence (Agencies, Stakeholders, Other

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THE CITY OF WINDSOR ONTARIO, CANADA

Office of the City Engineer

March 22, 2018

Dear Sir / Madame:

The City of Windsor is excited to inform you that we are launching a Sewer Master Plan for the City of Windsor.

Following recent flooding events in 2016 and 2017, which had major impact on the Windsor community, Mayor Dilkens, issued an 8-point plan to reduce flood risk. This Sewer Master Plan is an important piece of this 8-point plan. It will take a system-wide approach to identify specific improvement projects that can be undertaken by the City to improve efficiency and reduce the risk of flooding caused by wet weather.

The attached Notice of Commencement provides you with information on how to get involved and participate in the Sewer Master Plan. We are also very excited to share our project website with you, which is your source for project updates, information about events and interactive opportunities to engage with the project. Please visit the website ***weatheringthestorm.ca*** to take a survey and tell us your flooding story.

If you have any questions or would like to be added to the mailing list, please email us at: *info@weatheringthestorm.ca*

Join us in weathering the storm and creating a plan that we can implement together.

Sincerely,

W. [signature]

Wesley Hicks, P. Eng.
Senior Manager, Infrastructure & Geomatics/Deputy City Engineer

amg AMG/mb
attachment

NOTICE OF COMMENCEMENT

SEWER MASTER PLAN

The City of Windsor is initiating a Sewer Master Plan to confirm the risk of flooding across Windsor and look at ways to make the city more resilient.

Over the past few years, thousands of Windsor residents were impacted by flooding both in and around their homes. In early fall 2017, the Mayor released an 8-Point Plan aimed to assist the Windsor community to address flooding issues. A key element of the plan is completing the City's Sewer Master Plan. The Master Plan will confirm the areas that are vulnerable to flooding, identify reasons for the flooding, generate and evaluate short and long-term alternative solutions, and develop a long-range implementation strategy to manage flooding in the City.

Your participation in the Sewer Master Plan process will improve the results and help us create a plan that we can implement together. Consultation is an integral part of this process and members of the public, agencies, Indigenous communities and other interested persons are encouraged to participate in the master planning process:

- Find out more about the project and tell us your flooding story by visiting the project web site: **weatheringthestorm.ca**
- Come talk to us at the *weathering the storm* booth at the **Earth Day 2018 event on April 22nd at Malden Park**
- Sign up to the project contact list for future information through our website or by contacting one of our team members on the back of this notice
- Apply by April 13, 2018 to be a member of the project Stakeholder Advisory Committee *(application on the project website or contact team representatives on back of this notice)*

Public Information Centres (PIC) will also be held to present information and obtain your input. The first PIC is anticipated for spring 2018.

This study will be carried out over a 24 month period and will be conducted in accordance with the Master Plan Approach No. 2 of the Municipal Class Environmental Assessment (EA) (Municipal Engineers Association, 2015) process. Work will fulfill EA requirements for Schedule B projects and complete Phases 1 and 2 of the process for Schedule C projects.

All comments and information received from individuals, stakeholder groups and agencies regarding this study are being collected to assist the City of Windsor in completing the Sewer Master Plan. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act and with the exception of personal information, all information provided will become part of the public record. This notice is also available on the City's website at: https://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans, under 'Environmental Assessment Studies and Master Plans'.

If you are interested in being placed on the project contact list to receive future information, or if you have any questions, please contact either of the project representatives:

Flavio Forest, P.Eng.
Project Manager
3200 Deziel Drive, Suite 608
Windsor, ON, N8W 5K8
519.948.4243 ext. 3233
info@weatheringthestorm.ca

Anna M. Godo, P. Eng.
Senior Engineer, City of Windsor
350 City Hall Square West, 3rd Floor
Windsor, Ontario, N9A 6S1
519.255.6100 ext. 6508
info@weatheringthestorm.ca

July, 11 2019

DILLON CONSULTING

3200 Deziel Drive
Suite 608
Windsor, Ontario
Canada
N8W 5K8
Telephone
519.948.5000
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519.948.5054

Ministry of Environment, Conservation and Parks
Environmental Assessment and Permissions Branch
Approval Services
135 St Clair Ave W,
Toronto, Ontario
M4V 1P5

Attention: Mohammed Nizamuddin and Yuefeng Zhang,
Sr. Wastewater Engineers

City of Windsor Sewer Master Plan
Alternative Solutions to Mitigate Basement Flooding Risks
Sanitary Sewer Collection and Treatment Systems

The City of Windsor has retained Dillon Consulting Limited (Dillon), who have partnered with Aquafor Beech Limited (Aquafor), to complete a comprehensive Sewer Master Plan for the City's storm, sanitary and combined sewer systems, and the overland drainage network. The primary objective of this project is to develop short-term and long-term solutions to reduce the risks and impacts of basement and surface flooding resulting from significant storm events.

The project team met with Ministry of Environment, Conservation and Parks (MECP) representatives of the Surface Water Unit and Air, Pesticides and Environmental Planning group on June 6, 2019. Presentation Slides and Minutes from this meeting are provided in **Attachment A** following this letter. The purpose of that meeting was to explore the range of alternative solutions that were being considered, particularly those related to the sanitary sewer system and the associated basement flooding risks. A copy of the minutes from that meeting is attached.

The purpose of this letter is to further clarify MECP's position on these alternative basement flooding solutions which involve a balanced approach that includes:

- Source controls to reduce the amount of extraneous flows in the sanitary collection system;
- Sewer system improvements to increase conveyance and storage capacity; and
- Outlet capacity improvements, with associated increased storage and/or supplementary treatment of extraneous flows.

In particular, we are requesting MECP input on the acceptability of incorporating flow-through treatment options to supplement the available capacity of the existing wastewater treatment facilities to relieve and treat a portion of the excess extraneous wet weather flows in the separated sanitary sewer system resulting from major storm events.

Background

This Master Plan is being completed in accordance with Approach 2, as defined in the Municipal Class Environment Assessment process, which would address associated requirements for specific Schedule B projects. The scope of work for this project includes:

- Development of a calibrated model of the City's sewer systems and surface drainage network;
- Identification of problem areas that have higher risks for basement and surface flooding;
- Identification and evaluation of alternative short-term and long-term solutions to mitigate the risks and impacts of basement and surface flooding arising from major storm events;
- Public and agency consultations; and
- Functional design and preparation of cost estimates for preferred solutions, including potential treatment options.

Sanitary Sewer Collection and Treatment Systems

There are two wastewater treatment facilities serving the west and east portions of the City of Windsor, as illustrated in **Figure 1: Major Sanitary Service Areas** following this letter, and as outlined below:

- The Lou Romano Water Reclamation Plant (LRWRP) serves the westerly portion of the City, which includes a separated sanitary sewer system to the south, as well as the combined sewer system to the north. In addition, the Town of LaSalle and a small area in the Town of Tecumseh are served by this facility; and
- The Little River Pollution Control Plant (LRPCP) serves the easterly portion of the City, which is primarily a separated sanitary sewer system with a smaller combined sewer service area. In addition, a sizeable urban area in the Town of Tecumseh is served by this facility.

It has been observed that during significant storm events, the sanitary collection and treatment systems become overwhelmed with a significant increase in peak flows and volumes of rainfall derived inflow and infiltration (RDII). The resulting surcharged conditions in the collection systems cause widespread basement flooding.

Utilizing the calibrated model of the sanitary collection system, alternative solutions to reduce the risks and impacts of basement flooding have been identified. The targeted level of service for these solutions is based on limiting the degree of sanitary sewer surcharging to a level that is below the depth of a typical basement floor (1.8 meters below grade) for the 1:100 year design storm event.

Further details of the existing conditions and proposed alternative solutions are outlined in further detail below.

Little River Pollution Control Plant (LRPCP)

The existing sanitary sewers served by the LRPCP experience an increase in extraneous inflow and infiltration as a result of significant rainfall events. The calibrated model of the City's sewer system was utilized to estimate the RDII contribution rates under a 100-year design storm, including accounting for the expected reduction in RDII that may be achieved by the source control measures outlined above. The results of this modeling analysis are summarized below:

Table 1: LRPCP Inlet Flow Conditions

Flow Condition	Flow
Current ECA nominal treatment capacity	72,800 m^3/d
Current inlet pump station capacity (peak wet weather)	225,000 m^3/d
Anticipated peak inlet flow rate under 100-year design storm	890,000 m^3/d
Anticipated total stormwater volume reaching the LRPCP under a 100-year design storm	282,000 m^3

Operational data obtained from LRPCP staff indicates that peak wet weather flows are primarily comprised of stormwater, which results in considerably dilution of typical sanitary wastewater characteristics. As an example, the table below compares influent quality from the August 2017 peak flow event (greater than 1:100 year storm) and average 2017 influent quality.

Table 2: LRPCP Influent Quality

Influent Quality Parameter	2017 Average Condition (mg/L)	Peak Wet Weather Condition (mg/L) (August 29, 2017)
BOD	103	12
TSS	131	20
TP	2.82	0.4
TKN	20.7	4.5
NH3-N	12.5	1.8
NO3-N	0.28	0.4

Lou Romano Water Reclamation Plant (LRWRP)

As outlined above, the LRWRP serves the west portion of the City of Windsor, which is comprised of the combined sewer system to the north, as well as the separated sanitary sewer system to the south.

During major storm events, there are significant increases in extraneous flows that have, at times, required the plant inflow to be restricted by as much as 95 percent to protect the operation of the treatment facility. This treatment plant does not have bypass capabilities upstream of the plant to provide relief during major storm events, therefore this inlet restriction results in additional impacts on surcharge conditions within these existing sewer systems.

Sanitary Sewer System

The existing separated sanitary sewer system served by the LRWRP also experiences an increase in extraneous inflow and infiltration as a result of significant rainfall events. The calibrated model of the City's sewer system was utilized to estimate the RDII contribution rates for the western main trunk sanitary sewer that serves as an outlet from this area under a 100-year design storm, including accounting for the expected reduction in RDII that may be achieved by the source control measures outlined above. The results of this modeling analysis are summarized below:

Table 3: City's Separated Sanitary Sewer System Flows at the LRWRP

Flow Condition	Flow
Current ECA nominal treatment capacity	218,000 m^3/d
Current inlet pump station capacity (serves sanitary and combined sewer system flows)	786,000 m^3/d
Current capacity of western main trunk sanitary sewer[1]	225,000 m^3/d
Anticipated western main trunk sanitary sewer peak flow rate under 100-year design storm	415,000 m^3/d
Anticipated total stormwater volume reaching the LRWRP via western main trunk sewer under a 100-year design storm	330,000 m^3

[1]The western main trunk sanitary sewer is the separated sanitary sewer inlet to the LRWRP.

Wastewater influent quality reaching the LRWRP through both the western main trunk sanitary sewer and combined sewer areas is substantially diluted relative to typical sewage water quality. The quality of wastewater originating from the western main trunk sanitary sewer is not monitored separately from blended plant inflows. The table below compares influent quality from the August 2017 peak flow event (greater than 1:100 year storm) and average 2017 influent quality.

Table 4: LRWRP Influent Quality

Influent Quality Parameter	2017 Average Condition (mg/L)	Peak Wet Weather Condition (mg/L) (August 29, 2017)
BOD	146	31
TSS	245	86
TP	4.23	0.9
TKN	23.0	5
NH3-N	11.9	1.2
NO3-N	0.45	0.59

Combined Sewer System

The City of Windsor has implemented a flow-through treatment facility for the treatment of combined sewer overflows in the downtown area to meet MECP Procedure F-5-5 requirements.

A separate Environmental Assessment and Functional Design Study was recently completed to address the balance of the City of Windsor's combined sewer overflow strategy located west of the downtown area. The "Combined Sewer Overflow Control in the Riverfront Area West of Caron Avenue, Class EA" identified a preferred solution to achieve MECP's F-5-5 criteria for this westerly portion of the combined sewer system. The preferred solution includes the implementation of a similar RTB facility at the LRWRP to provide combined sewer flow relief and treatment, including a new discharge to the Detroit River. Public consultation materials outlining the proposed RTB design features are provided in **Attachment B**, following this letter.

The proposed capacity of the new RTB facility is 9.1 m^3/s, which is approximately equal to the treatment capacity of the existing LRWRP. This capacity is more than what would be required for the relief of the combined sewer system to meet the MECP's F-5-5 criteria, which would be approximately 3 m^3/s.

Based on discussions with the City of Windsor, we understand that the increased capacity of the proposed RTB facility is intended to provide for the following opportunities:

- Redundancy for the existing LRWRP; and
- Relief and treatment of a portion of the excess extraneous flows in the separated sanitary sewer system for major storm events, thereby eliminating the need to restrict inflows to the LRWRP.

Solutions under Consideration

Alternative solutions to reduce the risks and impacts of basement flooding are proposed to involve a balanced approach that includes:

- Source controls to reduce the amount of extraneous flows in the sanitary collection system;
- Sewer system improvements to increase conveyance and storage capacity; and
- Outlet capacity improvements, with associated increased storage and/or supplementary treatment of extraneous flows.

The following is a summary of the measures being considered as part of the City Sewer Master Plan's alternative solutions in the sewer systems served by each of the existing wastewater treatment facilities:

Table 5: Balanced Solutions Approach for LRPCP and LRWRP Service Areas

<table>
<tr><th></th><th>LITTLE RIVER PCP</th><th>LOU ROMANO WRP</th></tr>
<tr><td colspan="3">A. SOURCE CONTROLS</td></tr>
<tr><td>• Separated Sanitary Sewer System</td><td colspan="2">• Sealing of sanitary manhole covers;
• Repairs to the condition of the sanitary sewer system;
• Removal of improper connections; and
• Mandatory disconnection of foundation drains, which are expected to be connected to the sanitary sewer in homes built before 1980.
  • This represents approximately 60 percent of the homes in the City of Windsor.
  • A success rate of 80% has been assumed for the purposes of this study.</td></tr>
<tr><td>• Combined Sewer System</td><td>• Same as above.</td><td>• Same as above, except for NO mandatory disconnection of foundation drains.</td></tr>
<tr><td colspan="3">B. CONVEYANCE SYSTEM IMPROVEMENTS</td></tr>
<tr><td>• Separated Sanitary Sewer System</td><td colspan="2">• Increased sanitary sewer conveyance capacity; and
• Large diameter surcharge storage sewers.</td></tr>
<tr><td>• Combined Sewer System</td><td>• Full separation of ALL storm and sanitary flows from private properties and public right of way.
  o Also known as "hard" separation.</td><td>• Partial separation, focused on diverting up to 100% of all surface drainage from private properties and public right of ways to a separate storm sewer and outlet.
  o Also known as "soft" separation.</td></tr>
<tr><td colspan="3">C. OUTLET CAPACITY AND STORAGE/TREATMENT IMPROVEMENTS</td></tr>
<tr><td></td><td>• Increase pump station capacity for influent to LRPCP, including plant expansion in the future, as required to accommodate future development areas.
• Temporary storage or flow-through treatment of excess extraneous flows during extreme storms (see below).</td><td>• Flow-through treatment of excess extraneous flows during extreme storms (see below).</td></tr>
</table>

On behalf of the City of Windsor, we are hereby requesting MECP input on the acceptability of incorporating flow-through treatment options to supplement the available capacity of the existing wastewater treatment facilities to relieve and treat a portion of the RDII flows in the separated sanitary sewer system, as described below:

- Construction of separate, dedicated processes providing flow-through treatment of a portion of wet weather flows:
  - In the case of the LRPCP, this facility would address excess flows that exceed the capacity of the existing facility, as well the needs of a potential expansion to dry-weather facility capacity as development within the sewershed proceeds.
  - In the case of the LRWRP, the use of the excess capacity of the proposed RTB facility would mitigate the need to restrict inflows to the existing facility.
- The system implemented at the LRPCP may be an RTB similar to the process proposed at the nearby LRWRP (as noted above) and may be sized using hydraulic surface overflow rate or treatment basin retention contact time as the basis for design rather than total storm event volume capture; and
- Both the LRPCP and the LRWRP RTB facilities would discharge through new outfalls to the Detroit River. In the case of the LRPCP, there is limited capacity to discharge additional effluent from a new system to the Little River receiver.

Further clarification from the MECP regarding the general acceptability of an offline treatment system (RTB) or similar for management of peak storm flows originating from inflow/infiltration-impacted separated sanitary sewershed areas would be appreciated. In particular:

- Is construction of a RTB processes functioning as parallel satellite facilities separate from the LRPCP or LRWRP under peak storm conditions acceptable (as described in Procedure F-5-5, Section 7)?
- Can RTBs be sized based around Combined Sewer Overflow (CSO) level of treatment outlined in Procedure F-5-5 with a BOD removal of 30% and a TSS removal of 50% relative to influent concentrations under wet weather conditions?

We would appreciate this clarification to allow our team to develop and present alternatives that may be eligible for an Environmental Compliance Approval (ECA) following subsequent environmental assessment and detailed design. We plan to complete the development and assessment of the system solution alternatives by end of August 2019, with a Public Information Centre scheduled in September 2019. The functional design of the preferred solution and associated reporting will take place in Fall 2019.

We look forward to receiving feedback and comments from the MECP that can be reflected in the development of our solutions. Please feel free to contact the undersigned at 519-438-1288 ext. 1347 or bbontje@dillon.ca if there are any questions about our request.

Sincerely,

DILLON CONSULTING LIMITED

Flavio R. Forest, P.Eng.
Project Manager

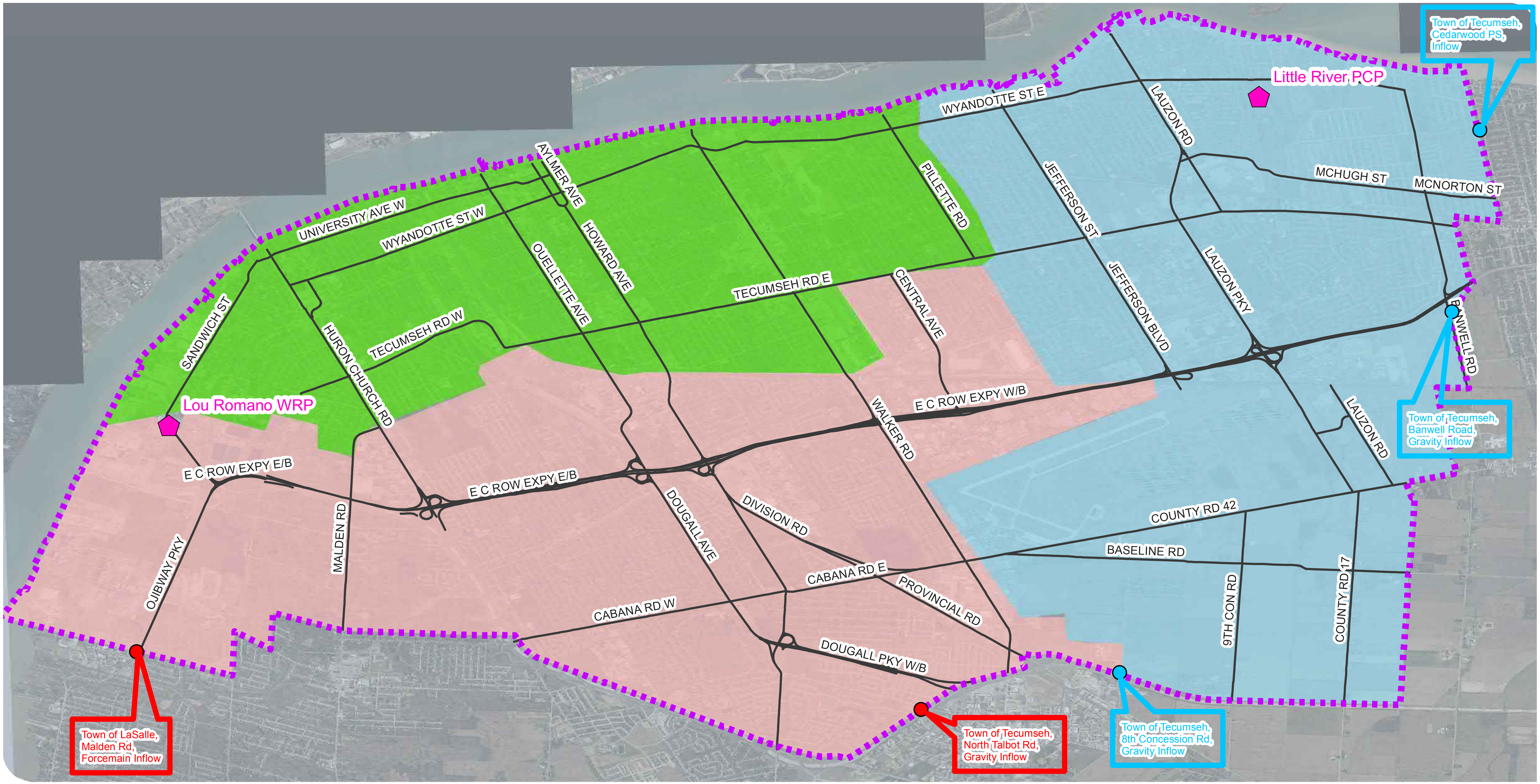
Bram Bontje, P.Eng.
Project Wastewater Engineer

Enclosure(s)

cc: Anna Godo – City of Windsor
Mark Winterton – City Engineer, City of Windsor
Dave Maunder – Aquafor Beech Limited

IW:ldm
Our file: 17-6638-3000

Figures



CITY OF WINDSOR
SEWER MASTER PLAN

MAJOR SANITARY SERVICE AREAS
FIGURE 1

LOU ROMANO WRP - COMBINED SEWER AREA
LOU ROMANO WRP - SEPARATED SANITARY SEWERS
LITTLE RIVER PCP - SANITARY SEWER AREA
TREATMENT PLANT
EXPRESSWAY OR ATERIAL ROAD
CITY OF WINDSOR BOUNDARY

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: PFM
MAP CHECKED BY: PK
MAP PROJECTION: NAD 1983 UTM Zone 17N

0 0.5 1 2 Kilometers

SCALE 1:60,000

PROJECT: 17-6638 STATUS: DRAFT DATE: 08/24/11

Attachment A

MEETING MINUTES

Subject: Windsor Sewer Master Plan: Short-Term Solution Alternatives Review
Date and Time: June 6, 2019 (10:00 a.m.)
Location: MECP Office: 733 Exeter Road, London, Ontario
Our File: 17-6638-1000

Attendees

Scott Abernethy	Ministry of Environment, Conservation and Parks (MECP)
Craig Newton	Ministry of Environment, Conservation and Parks
Marc Bechard	Ministry of Environment, Conservation and Parks
Emily Awad	Ministry of Environment, Conservation and Parks
Ed Valdez	City of Windsor (City)
John Albidone	City of Windsor
Sergio Mannina	City of Windsor
Anna Godo	City of Windsor
Janelle Coombs	City of Windsor
Dave Maunder	Aquafor Beach Limited (Aquafor)
Flavio Forest	Dillon Consulting Limited (Dillon)
Bram Bontje	Dillon Consulting Limited
Ian Wilson	Dillon Consulting Limited
Nick Krygsman	Dillon Consulting Limited
Laura Herlehy	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	**Welcome and Meeting Objectives**	

1.1.	The meeting objectives and introductions were discussed. The meeting objectives were:
	• Provide background information and present preliminary findings for areas of surface flooding and basement flooding;
	• Review problem areas;
	• Review City's CSO strategy and retention treatment basin (RTB) solutions, including MECP Procedure F-5-5 requirements; and
	• Review and obtain feedback on the range of alternative solutions for reducing flooding risks (storm, sanitary and combined sewer systems):
	    o Source level controls.
	    o Conveyance improvements and storage.
	    o Combined sewer separation (partial and complete separation).	

- o Outlet capacity improvements.
- o High-Rate retention treatment basin for relief/treatment of excess extraneous flow (sanitary and combined sewers).

2. **Background – Windsor Sewer Master Plan**

2.1. The City has received funding to complete $90 million dollars of storm system improvements over a 10 year period through the federal DMAF program. Improvements were based on a previous study completed by Dillon and Aquafor to address surface flooding with the Riverside Area. These solutions will be refined through this Master Plan and completed to address Schedule B EA requirements. **Project Team**

2.2. Through our study, it was found that there is a strong relationship between the age of homes within the City and the volume of RDII (Rain Derived Inflow and Infiltration) measured within the system. Ground water is not a major contribution to the RDII problem as Windsor is mostly comprised of heavy clay. **Info.**

2.3. Based on historical local construction practices, it is assumed that homes built before 1980 have foundation drains (weeping tiles) connected to the sanitary or combined sewer systems. **Info.**

2.4. Between the August 2016 event and the September 2017 event, approximately 8,000 home owners reported basement flooding. **Info.**

2.5. **Lou Romano Water Reclamation Plan (LRWRP)**

2.5.1. Based on the plant's annual report, the current plant is at 60% capacity accounting for average annual flows to the plant. Under extreme rain events, as required, the plant must throttle the total flow entering the plant to avoid damage to the plant. The inflow is controlled by a sluice gate that can restrict up to 95% of the flows entering the plant. There are other ways flows within the system are controlled during a rain event to provide balance within the system, including upstream pump stations and sewers. **Info.**

2.6. **Little River Pollution Control Plan (LRPCP)**

2.6.1. This plant has an emergency by-pass system that can divert excess inflow from the treatment plant to the Pontiac Pump Station which discharges to the Little River. This by-pass is engaged depending on the water levels within the system. By-pass can only occur when the storm sewer water level is below the sanitary water elevation. The two major storm events (greater than 1:100 year event) in 2016 and 2017, required by-pass. **Info.**
During heavy rain events, the excess flows that cannot be treated, by-pass primary treatment through a separate overflow system. In this scenario, excess flows go through grit removal and chlorination

before discharge.

3. **Background – LRWRP Service Area**

3.1. During rain events, significant RDII enters the system. The system acts similar to a combined system but does not have the additional capacity to accommodate stormwater. **Info.**

3.2. Through this study, it was found that the pattern of basement flooding mirrors the track of the associated storm event. **Info.**

3.3. The established level of service for the sewer Hydraulic Grade Line (HGL) is 1.8 m below the manhole ground surface (to represent estimated basement depths), under a 1:100 year rain event. Under these conditions, it was found most of the City is at risk for basement flooding. **Info.**

4. **Discussion – LWRWP Wet-Weather Treatment and Flood Reduction**

4.1. **Basement Flooding Solutions**

4.1.1. Solutions developed through this study will be a combination of three levels of system improvements: **Info.**

1. **Source Control**
   Through various studies, it was found that 70% or more of the RDII is from private property foundation drain disconnection. The objective of source control measures is to reduce the amount of rainwater getting in to the sanitary system.
2. **Conveyance System**
   Inline storage pipes is recommended to lower the HGL. It is anticipated larger pipes will be equipped with low flow channels to convey dry weather flow.
3. **Treatment Plants**
   Downstream improvements, at the treatment plant are anticipated to be part of the solution. The project team requires feedback on proposed solutions.

4.2. The Master Plan is a City Wide study that is looking into solutions that have a broader, neighbourhood wide level of benefit. It is assumed that subsequent to this study that local issues identified through this study, will need to be reviewed and solutions will need to be determined. **Info.**

4.3. As part of the implementation LIDs (as part of the DMAF funding projects) a monitoring program will be implemented to test the benefits of LIDs so that measured benefits can be better represented in the model to determine if the use of these measures elsewhere in the City is valuable. **Project Team**

4.4.	Foundation drain disconnection is an integral component of the private property source control. The City is proposing to implement a mandatory program where subsidies may be provided to home owners. This program will be presented at the next PIC for this project, scheduled for September.	**Project Team**
4.5.	The implementation of this plan will take decades to implement and therefore, the City plans to first implement foundation drain disconnection in key areas and measure the benefit of completing these measures. Residents will still be encouraged to protect their homes from flooding by implementing measures such as backflow preventers.	**Project Team**
4.6.	The Town of Tecumseh is completing similar work and considering the implementation of a foundation drain disconnection program. To reach the objectives of this project, there needs to be a cooperative effort from all neighbouring municipalities.	**Info.**
5.	**South Windsor Separated Sewer Area – Solutions**	
5.1.	It was found for the south separated portion of the City, that reducing the source of rainwater within private property areas provides benefit to the system, is cost effective and was found to be resilient to potential climate change conditions with more severe storms.	**Info.**
5.2.	This Master Plan will include recommendations on standards that should be implemented to reduce the RDII contributions from commercial, industrial and institutional lands.	**Project Team**
6.	**Central Downtown Combined Sewer Area - Solutions**	
6.1.	Through a recently completed EA, a new RTB unit at the LRWRP is being proposed to address MECP F-5-5 requirements for the west side of the combined sewer service area. The RTB will double the inlet capacity of the existing plant, where the additional 9 cms will be used as an overflow during extreme wet weather events. It is anticipated that this unit will require its own separate Environmental Compliance Approval (ECA).	**Info.**
6.2.	The existing RTB services the east portion of the City's combine sewer service area. The RTB is equipped with a flushing system that flushes solids into the existing sanitary sewer when flow conditions downstream allow.	**Info.**
6.3.	The City is undertaking a separate Stormwater Financing Study that is looking at the implementation of incentives for home owners to implement LIDs on their property.	**City**
6.4.	Foundation drain disconnection is not being considered for the combined sewer service area.	**Info.**
6.5.	The system is being designed to consider a high water level within	

	the Detroit River. The current water level in the river may be at record high.	
6.6.	Beyond F-5-5, the MECP did not identify additional design criteria for combined sewer systems. Further, level of service criteria for flood risk reduction and volume/peak flow stormwater management were not identified. These criteria most commonly coming from municipalities and/or consultants.	**Info.**
6.7.	In regards to the technical implementation of LIDs, the MECP made reference and recommendation for the Low Impact Development (LID) Stormwater Management Guidance Manual. In public infrastructure project, LIDs should be incorporated wherever possible.	**Project Team**
6.8.	ERCA has been engaged through this Master Plan, they will be consulted on the development of solutions.	**Project Team**
6.9.	MECP recommends discussing solutions with their engineering representatives.	**Project Team/MECP**
6.10.	Complete soft separation of the combined areas does not provide an adequate level of service. Implementation of LIDs and system storage is being considered to reduce flood risk within the area. Through implementation of these improvements, the project team needs to balance the system to confirm that F-5-5 requirements are still being met.	**Project Team**
7.	**Background – LRPCP Service Area**	
7.1.	An overview of the LRPCP service was skipped in the interest of time.	**Info.**
8.	**Discussion – LRPCP Wet-Weather Treatment and Flood Reduction**	
8.1.	Through this analysis, it was determined that to reduce basement flooding risk, within the east Windsor area, an approximate breakdown of infrastructure improvements would be as follows: • 25% private property source control; • 25% improved sewer conveyance and inline storage; and • 50% increased storage or conveyance at the treatment plant.	**Info.**
8.2.	On average, the LRPCP plant experiences about 22 overflow events (overflow within the treatment plant) annually. By-pass events occur during extreme rain events, there have been two such events to date in 2019.	**Info.**
8.3.	Under ultimate conditions, the LRPCP plant is expected to double in capacity; however, this increase will not provide adequate capacity	**Info.**

to accommodate and treat heavy wet weather events. The project team is proposing the use of a RTB type unit which will have a separate stormwater outlet to the Detroit River.

8.4.	Currently the treatment plant is at 60% capacity based on the annual average. During hot summer months there are times when not enough influent is entering the plant to support the biological treatment process.	**Info.**
8.5.	During rain events, due to the extent of residential foundation drains connected to the sanitary system and a large combined sewer area generating flow at the upstream end of the service area, the flows at the plant are considered similar to a combined system.	**Info.**
8.6.	The project team is requesting that the MECP provide feedback on this strategy to address basement flooding within this area.	**MECP**
8.7.	Based upon the material and strategy outlined for the LRPCP service area, the MECP did not object to the flood risk reduction approach. However, this was not a technical review of the material.	
8.8.	In regards to the use of an RTB for treatment of diluted wet weather sanitary flow, it was recommended the project team discuss the technical approach with the approvals branch in Toronto.	**Project Team**
8.9.	A separate servicing study is being completed for the large Sandwich South Secondary Plan Area in the south portion of the East Windsor sewer shed area. This study will look at that level of development that can be accommodated before the treatment plant will need to be expanded.	**Project Team**

9. **Stormwater Solutions**

9.1.	The project team is currently refining the storm service areas that will be addressed through this Master Plan. Focus on maintaining access during major events is integral.	**Project Team**
9.2.	The MECP staff noted that as part of the ECA application review, the MECP focuses on water balance calculations and water quality. This is covered in the LID stormwater management manual.	**Info.**
9.3.	The project team noted that Windsor has limited infiltration capacity due to the clayey soils. The project team has asked to what level LIDs can be relied on to address flooding.	**Info.**

10. **Master Plan – Public Consultation**

10.1.	A PIC was held in June 2018, and the project team recently had pop-ups at three events throughout the City. The next PIC is schedule for September 2019. The project team is strategizing on	**Project Team**

how to encourage the public to attend and be involved. The project team is meeting next week to develop a plan.

11.	**Next Steps**		
11.1.	The MECP can assist with the approval process for the major ECA approvals that will be required for the major infrastructure improvements.	**MECP/Project Team**	
11.2.	The MECP has offered to complete a preliminary review of the Master Plan in advance of formal completion to confirm that the report is complete and there are not red flags.	**MECP/Project Team**	

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

Distribuon

All Present

Mark Winterton	-	City of Windsor
Jake Renaud	-	City of Windsor
Samir Dhanvantari	-	Aquafor Beech Limited

LMH:d

June 10, 2019

Windsor – Sewer Master Plan

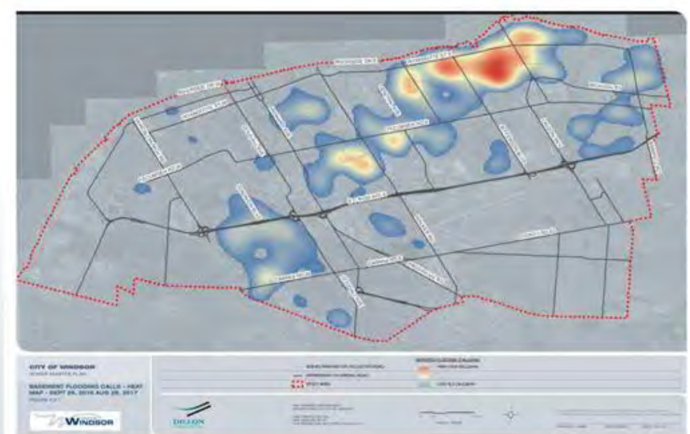
MECP Technical Meeting

June 6, 2019

1. Welcome and Meeting Objective

- **Introductions**
- **Handouts**

Solutions – Balanced Approach



Heat Map - Basement Flooding Calls

1. Welcome and Meeting Objective

Agenda:

1. Meeting Objectives
2. Background – Sewer Master Plan
3. Background – LRWRP Service Area
4. Discussion – Balanced Approach to Reduce Basement Flooding in LRWRP Area
5. Background – LRPCP Service Area
6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area
7. Background – Storm Sewers & Flooding
8. Discussion – Surface Flooding Solutions
9. Next Steps

1. Welcome and Meeting Objective

Meeting Objectives:

- Provide background information and present preliminary findings related to basement and surface flooding risks
- Review City's CSO strategy and retention treatment basin (RTB) solutions that satisfy MECP Procedure F-5-5
- Review and obtain feedback on the balanced approach to developing solutions that reduce basement and surface flooding risks (storm, sanitary and combined sewers):
  - Source Controls
  - Conveyance System Capacity and Storage Improvements
  - Outlet Discharge and Treatment Capacity Improvements

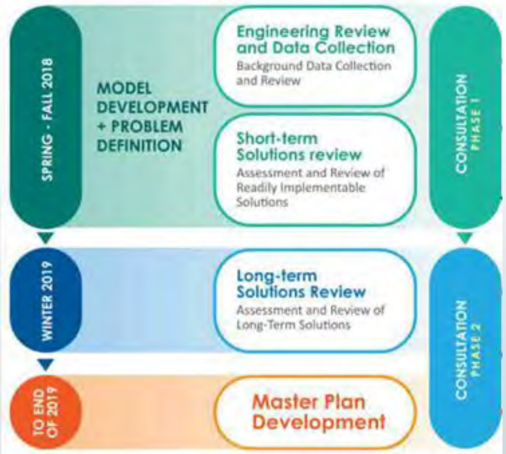
2. Background – Sewer Master Plan

The City is completing a Sewer Master Plan to:

- Better understand the causes of basement & surface flooding.
- Identify short-term & long-term solutions to reduce flood risks.
- Establish an implementation strategy for Council consideration.

The study will follow the Municipal Class EA, Master Plan Process (Approach No. 2) requirements:

- Public & agency input is integrated into the Class EA process.
- Will satisfy Class EA requirements for Schedule B projects.



Approved DMAF projects will be incorporated in the Master Plan process to satisfy any Class EA Schedule B requirements

2. Background – Sewer Master Plan

<u>**Problem and Opportunity Statement**</u>

The City has experienced basement and surface flooding resulting in property damage and disruption to the community.

The Sewer Master Plan will identify specific problems and explore achievable measures to reduce the risks of flooding by identifying and evaluating:

- **Short-term** solutions – Reduce excess flow to the sewer system, including partnering with homeowners to protect against flooding; and
- **Long-term** solutions – Improve the sewer systems by increasing their conveyance, storage and treatment capacity, including partnering with private property owners to reduce excess flows to the sewer systems.

Parkview Avenue; August 2017

2. Background – Sewer Master Plan

- **Sewer Master Plan Phase 2 InfoWorks Model:**
  - Expanded storm, sanitary and combined sewers –2016 / 2017 flooding areas
    - Storm sewers: 695 km
    - Sanitary and Combined: 830 km
  - Added 2D overland flow mesh
    - 11,000 ha, with buildings considered as obstructions
    - Sewer surcharge able to spill to surface and re-enter sewers

2. Background – Sewer Master Plan

Phase 1 Sewer Model Development (2013-2016):

- WWF catchments for storm, sanitary and combined sewers
- Dry Weather Flow (DWF) diurnal flow patterns
- City's Pump Stations, ponds, and overflow structures
- Flow monitoring and calibration (2013 & 2014 records)

2. Background – Sewer Master Plan

- **Model calibrated to representing flood conditions under extreme wet weather events**
- **Primary data for flooding calibration:**
  - In-sewer flow monitors and WWTP records
  - Basement flooding records (calls to City)
  - Surface flooding records (photos, calls to City, individual observations)
  - Rainfall data from City rain gauge network

2. Background – Sewer Master Plan

- **2013 & 2014 Monitor Data – Storm & Combined WWF:**
  - 28 temporary FMs
- **2018 Monitor Data – focused on RDII:**
  - 30 temporary FMs & DSs
  - 2 temporary RGs
- **On-Going Monitor Data:**
  - 12 permanent sanitary FMs, City operated
  - 13 RGs, City operated

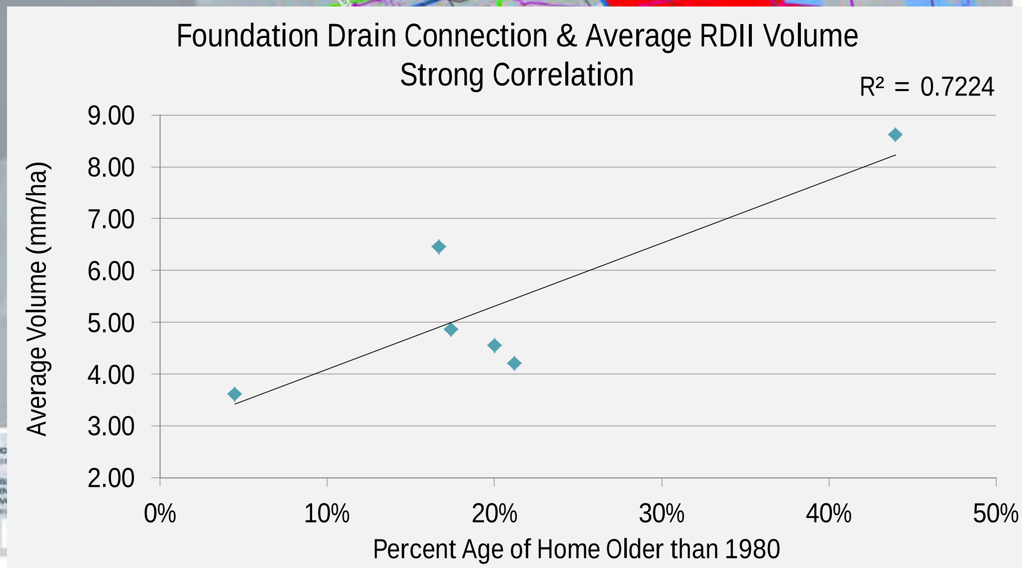
2. Background – Sewer Master Plan

Foundation Drains & RDII Findings:

- Strong correlation between foundation drain connection and RDII volume

Other RDII Observations:

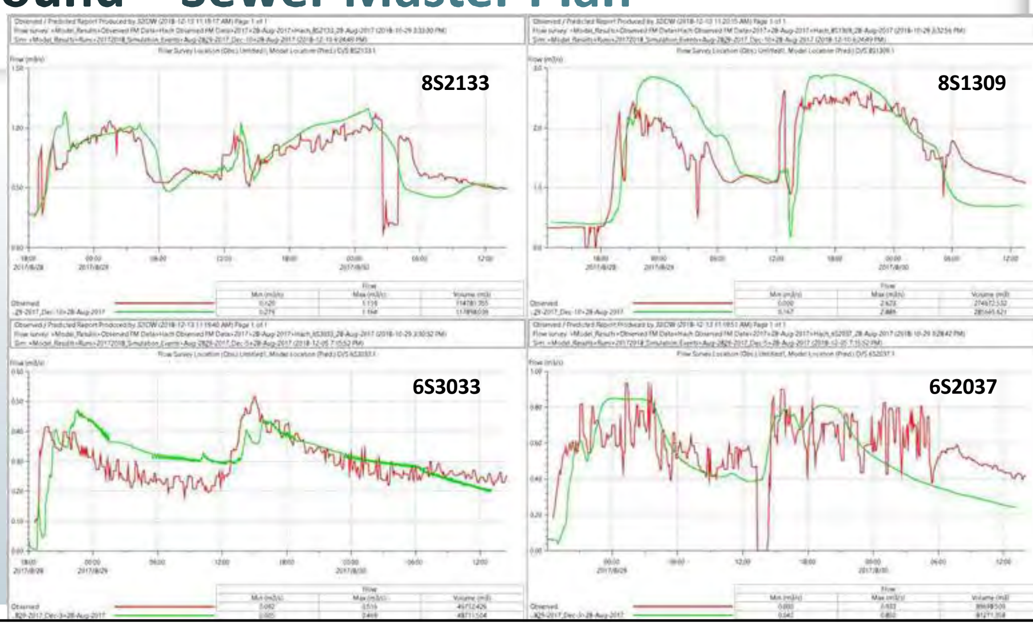
- "New" areas have high Qpeak, lower volume
- Small catchments show higher Qpeak



2. Background – Sewer Master Plan

Model Calibration

- Sanitary sewer wet weather flows during August 28, 2017 storm event and model results.



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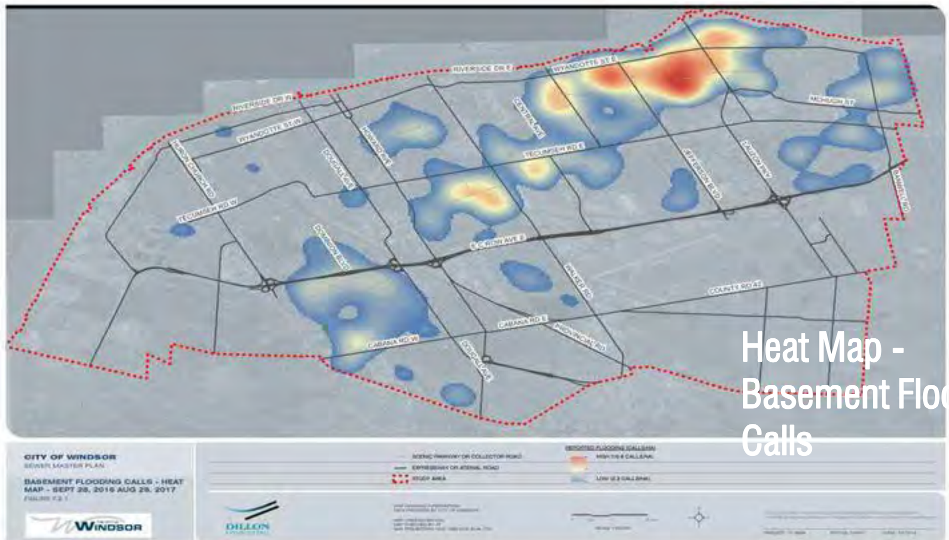
MECP Technical Meeting 13

2. Background – Sewer Master Plan

- **Reported basement flooding**
  - September 2016 and August 2017 events



Heat Map - Basement Flooding Calls

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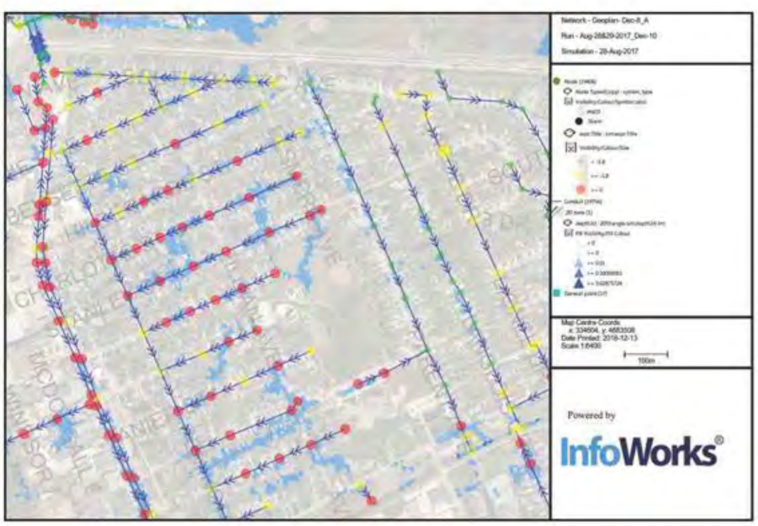
2. Background – Sewer Master Plan

Surface Flooding 2D Outputs – Stanley St, near Howard



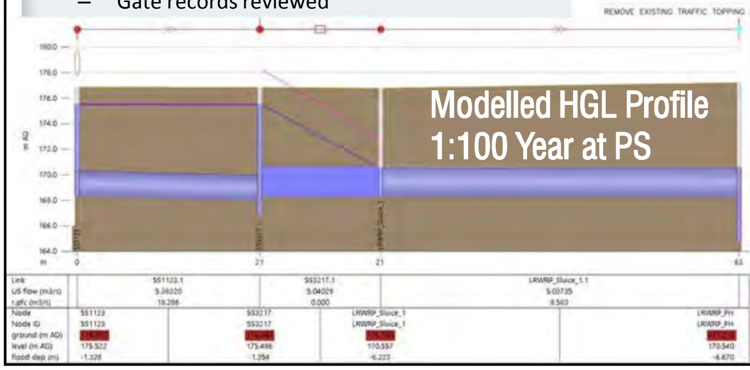
2. Background – Sewer Master Plan

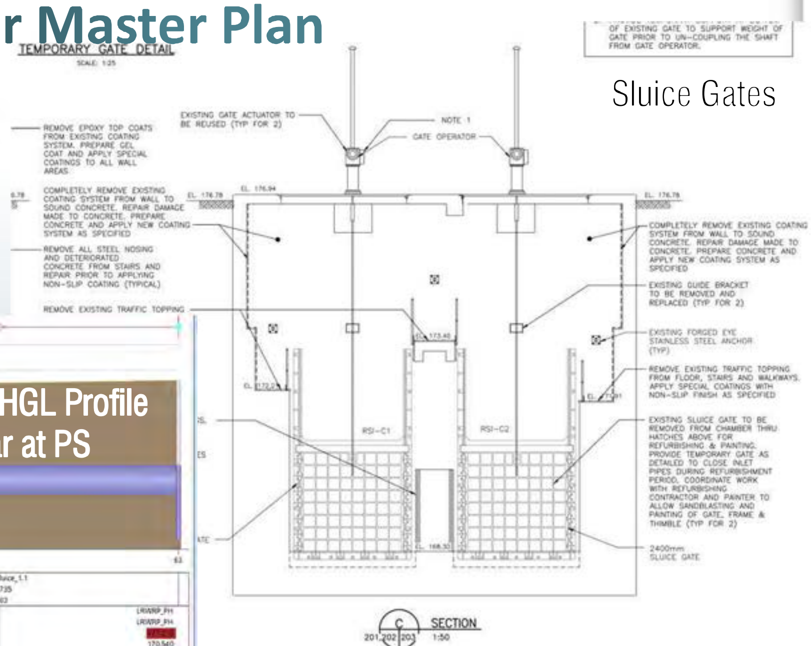
- **Operations at Lou Romano WRP (2017 Annual Report):**
  - Rated maximum capacity :
    - **273,000 m³/d primary treatment**
    - **218,000 m³/d secondary treatment**
  - Three year average daily flow:
    - **138,500 m³/d**
  - Total population served: 179,200 people, 61,000 households
    - **150,200 people – Windsor**
    - **29,000 people – Other Municipalities**
  - Total Number of approved unconnected lots: 5,000
  - Average per capita flow: 0.77 m³/d
  - Hydraulic reserve capacity: 79,500 m³/d
  - Uncommitted hydraulic reserve capacity: 68,200 m³/d

- 2008 – 2017 average annual total primary plant overflow:
  - **38,800 m³**
- 2008 – 2017 average annual total secondary plant overflow:
  - **1,183,000 m³**

2. Background – Sewer Master Plan

- **WWF operations at Lou Romano WRP:**
  - Head at plant PS controlled via sluice gates
  - LRWCP PS, peak flow = 9.1 cms
  - Gate records reviewed





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2. Background – Sewer Master Plan

- **Operations at <u>Little River</u> PCP (2017 Annual Report):**
  - Rated maximum capacity, 2 plants:
    - **Each 36,400 m^3/d, total 72,800 m^3/d**
  - Three year average daily flow:
    - **41,900 m^3/d**
  - Total population served: 89,300 people, 26,700 households
    - **67,000 people – Windsor**
    - **22,400 people – Other Municipalities**
  - Total Number of approved unconnected lots: 2,300
  - Average per capita flow: 0.49 m^3/d
  - Hydraulic reserve capacity: 30,900 m^3/d
  - Uncommitted hydraulic reserve capacity: 27,300 m^3/d

- 2008 – 2017 average annual total plant overflow:
  - **790,400 m^3**

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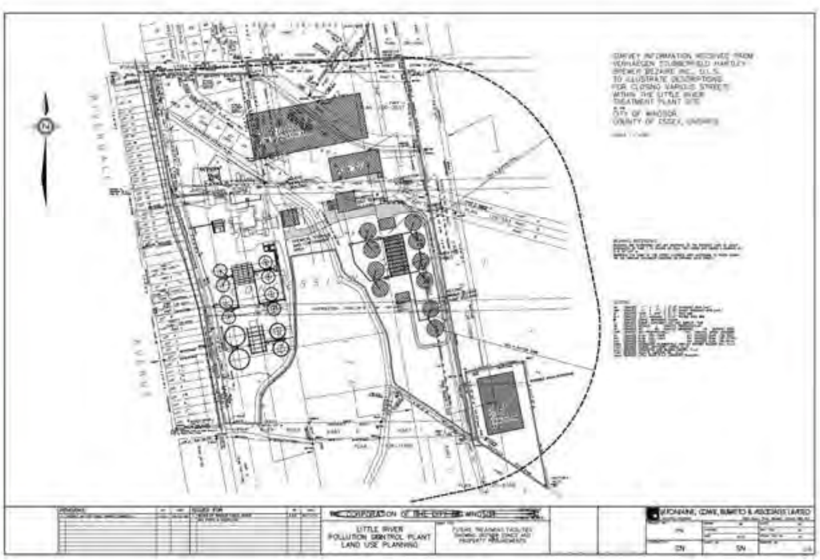
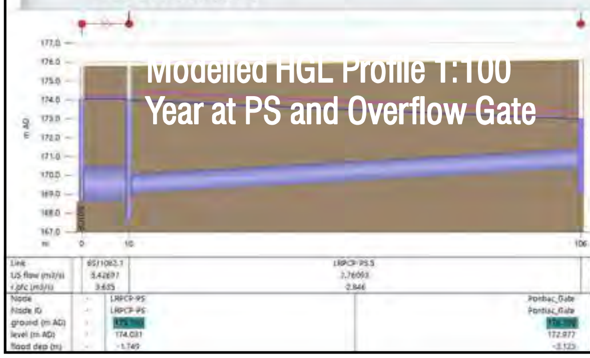
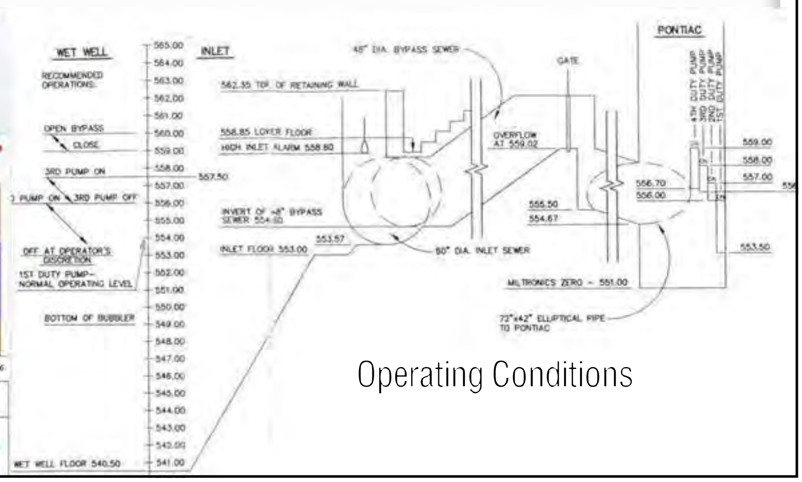
2. Background – Sewer Master Plan



2. Background – Sewer Master Plan

- **WWF operations at Little River PCP:**
  - Flow controlled by PS and bypass gate to Pontiac PS
  - LRPCP PS, peak flow = 2.7 cms
  - Bypass gate included in model which is limited by HGL at Pontiac PS





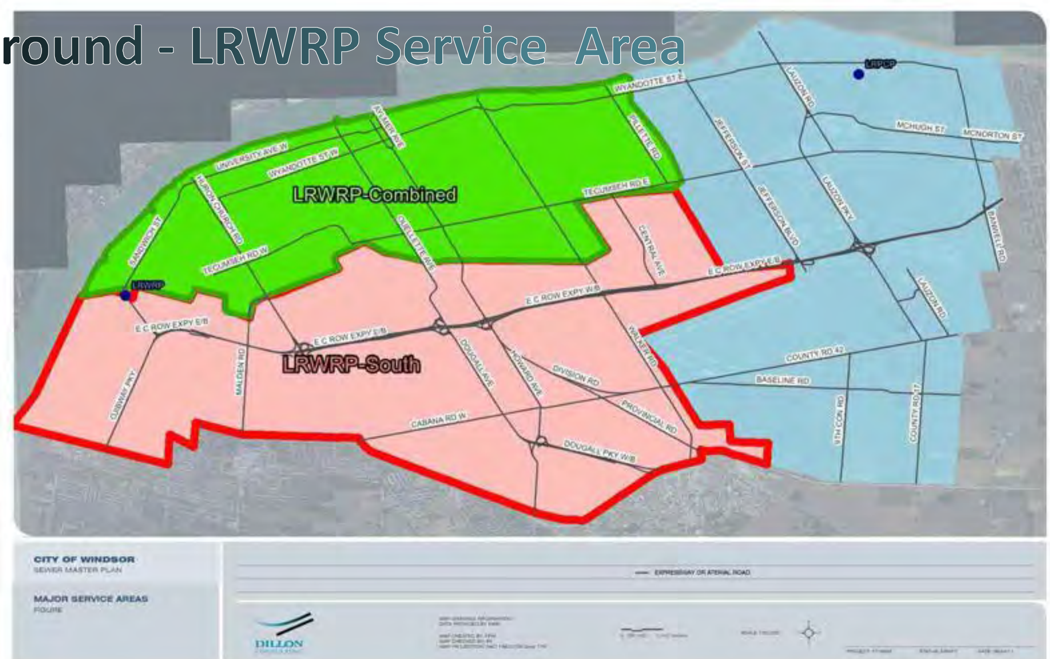
3. Background - LRWRP Service Area

South "Separate" Sanitary System

- 5,100 ha service area
- 340+ km of Sanitary Sewers

Combined System

- 3,300 ha service area
- 570+ km of Storm, Sanitary and Combined Sewers



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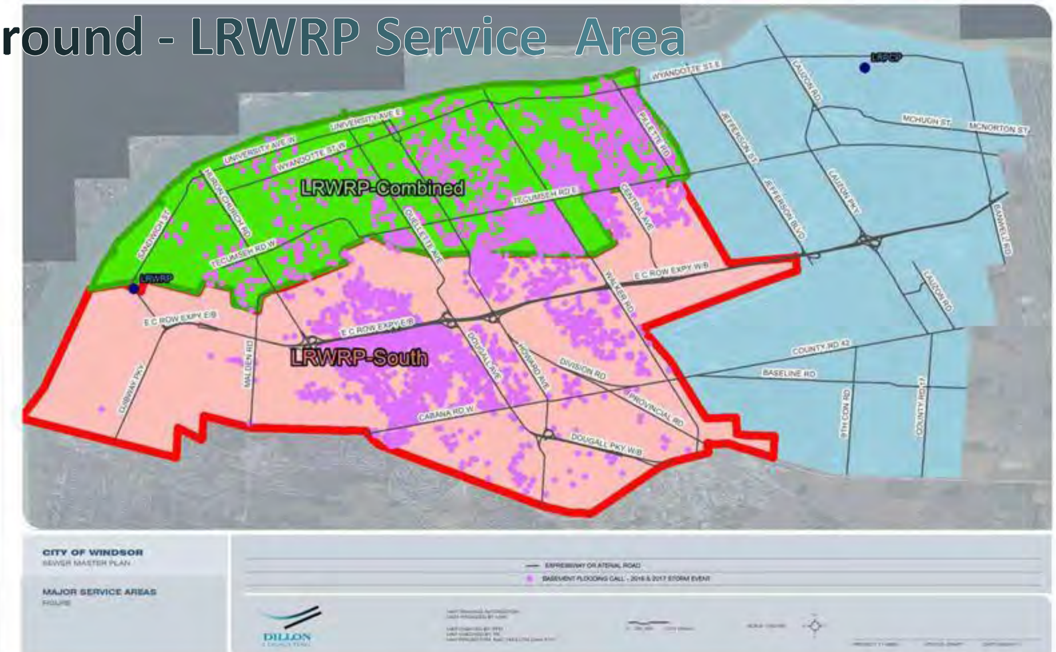
3. Background - LRWRP Service Area

- **Basement Flooding**
  - Over 4,900 reports of basement flooding from Sept 2016 and Aug 2017 storm events



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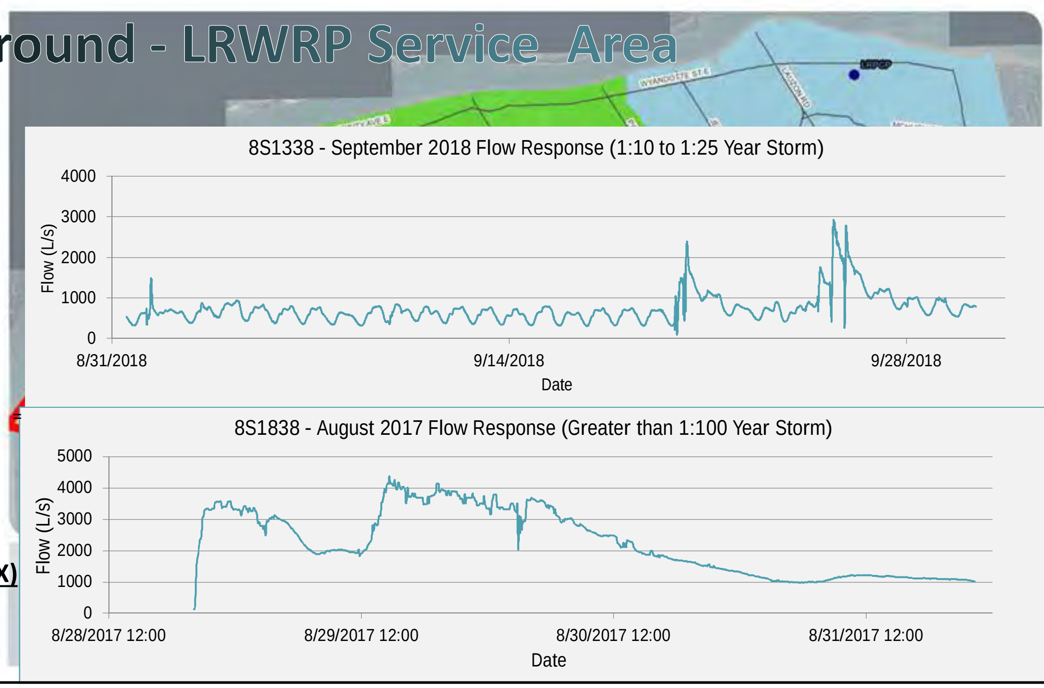
3. Background - LRWRP Service Area

South "Separate" Sanitary Flow Monitors

- FM 8S1838 (2013-18)
  - 4,600 ha of 5,100 ha
  - Avg DWF = 50 to 60 ML/d
  - WWF = 150 to 290 ML/d
  - Peak DWF = 1000 L/s
  - Peak WWF (extended) = 3000 to 4500 L/s
  - Other FMs similar data
- **"Combined"** storm & sanitary flows during storm events **(3X to 4.5X)**



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3. Background - LRWRP Service Area

Sanitary Drainage Level Of Service for Existing Development		
CONSIDERATION	CRITERIA	OBJECTIVE
Wet Weather Flow	1:100 year storm event · Sewer hydraulic grade line (HGL) is more than 1.8 m below existing ground elevations	Reduce the risk of basement flooding for storm events up to and including the 1:100 year storm event.
	Adaptive Approach: For Vulnerable Land Use Areas Use Climate Change Storm (1:100 year storm event + 40% factor for BOTH volume [1] and intensity [2] · Sewer hydraulic grade line (HGL) is more than 1.8 m below existing grades.	Provide enhanced/variable level of service where there is a higher risk associated with basement flooding.

Basis for Today's Preliminary Solutions

Windsor Sewer Master Plan
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3. Background - LRWRP Service Area

Combined Sewer Drainage Area Level Of Service for Existing Development		
CONSIDERATION	CRITERIA	OBJECTIVE
Primary Storm Drainage Component		
Major Overland Drainage System	1:100 year storm event · Less than 0.30 m of surface flooding in the Right of Way (ROW), where feasible.	Standard criteria for access and risks of property damage.
	Climate Change: 1:100 year storm event + 40% factor for BOTH volume[1] and intensity [2] · Surface flooding below lowest building opening elevations where feasible, but in particular for any higher risk uses. · Less than 0.30 m of surface flooding in the ROW for arterial and collector roads.	Provide enhanced/variable level of service where there is a higher consequence of surface flooding.
Sanitary Drainage Component		
Wet Weather Flow	1:100 year storm event Sewer hydraulic grade line (HGL) is more than 1.8 m below existing grades.	Reduce the risk of basement flooding for storm events up to and including the 1:100 year storm event.
	Adaptive Approach: For Vulnerable Land Use Areas Use Climate Change Storm (1:100 year storm event + 40% factor for BOTH volume [1] and intensity [2]) · Sewer hydraulic grade line (HGL) is more than 1.8 m below existing grades.	Provide enhanced/variable level of service where there is a higher risk associated with basement flooding.

Basis for Today's Preliminary Solutions

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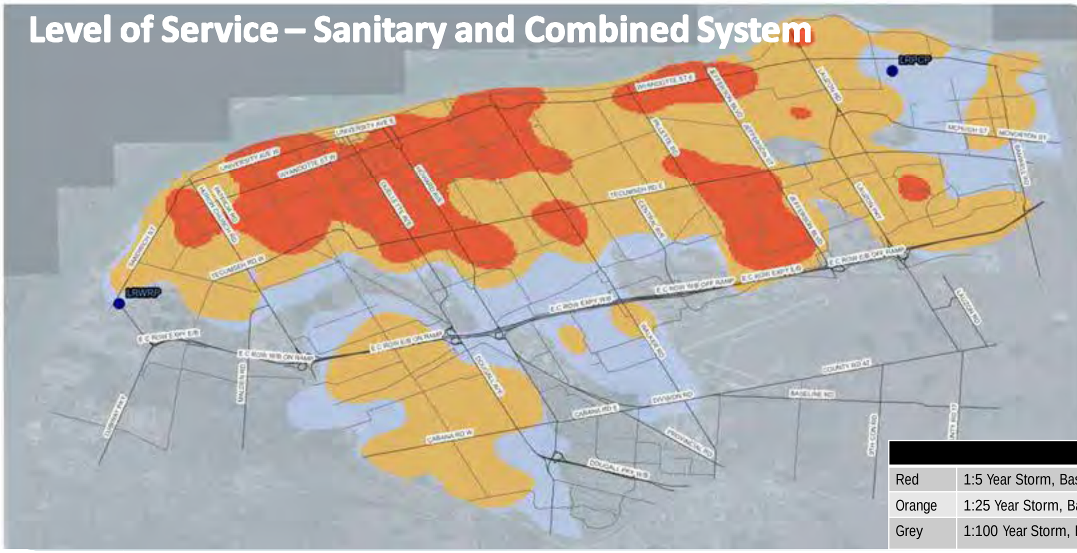
3. Background - LRWRP Service Area

Level of Service – Sanitary and Combined System



LEGEND	
Red	1:5 Year Storm, Basement Flooding Risk Area
Orange	1:25 Year Storm, Basement Flooding Risk Area
Grey	1:100 Year Storm, Basement Flooding Risk Area

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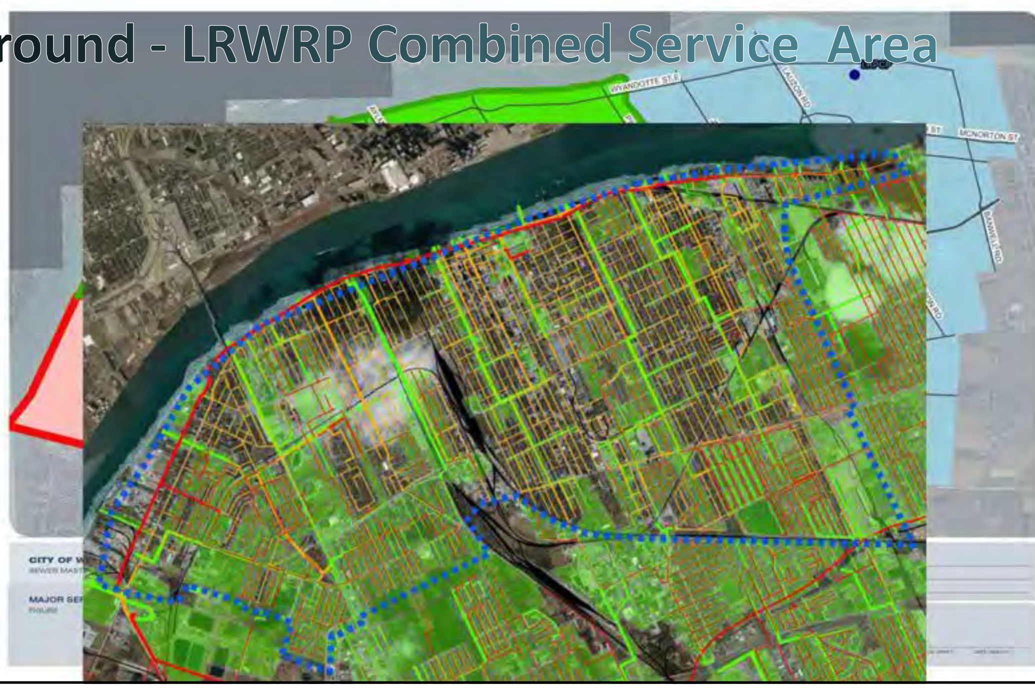
3. Background - LRWRP Combined Service Area



Combined System

- –13 Combined Sewer Trunks
- –Detroit River Sanitary Trunk / Interceptor System delivering flow to LRWRP
- –10 Storm Trunks

3. Background - LRWRP Related Environmental and Sewer Studies

Combined System

– Windsor Riverfront West CSO Control: "Schedule C" Class EA: Environmental Study Report (Stantec, March 2019)

– Windsor Riverfront Retention Treatment Basin: Class Environmental Assessment: Environmental Study Report (Stantec, September 2008)

- **Above documents identify CSO and strategy to meet F55 criteria**

– Windsor Riverfront Pollution Control Planning Study Phase 1, 2 & 3 – Problem Definition (La Fontaine, various years)

– Campbell/University combined sewer separation and stormwater management (Stantec, 2019) – Draft

South "Separate" Sanitary System

– N/A

4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

- **South "Separate" Sanitary System Solution**
  - **Source Control** to reduce RDII:
    - Foundation drain disconnection
    - Lot level grading improvements
    - Downspout disconnection
  - **Conveyance System** Improvements:
    - Increase sewer pipe size for improved conveyance
    - De-centralized inline storage (super sized pipes)
  - **Outlet discharge/treatment** Improvements:
    - Increased conveyance capacity
    - Utilize proposed RTB at Lou Romano WRP to provide additional treatment capacity for "combined" extraneous flows resulting from storm events.

Long Term Solutions – Balance of Measures

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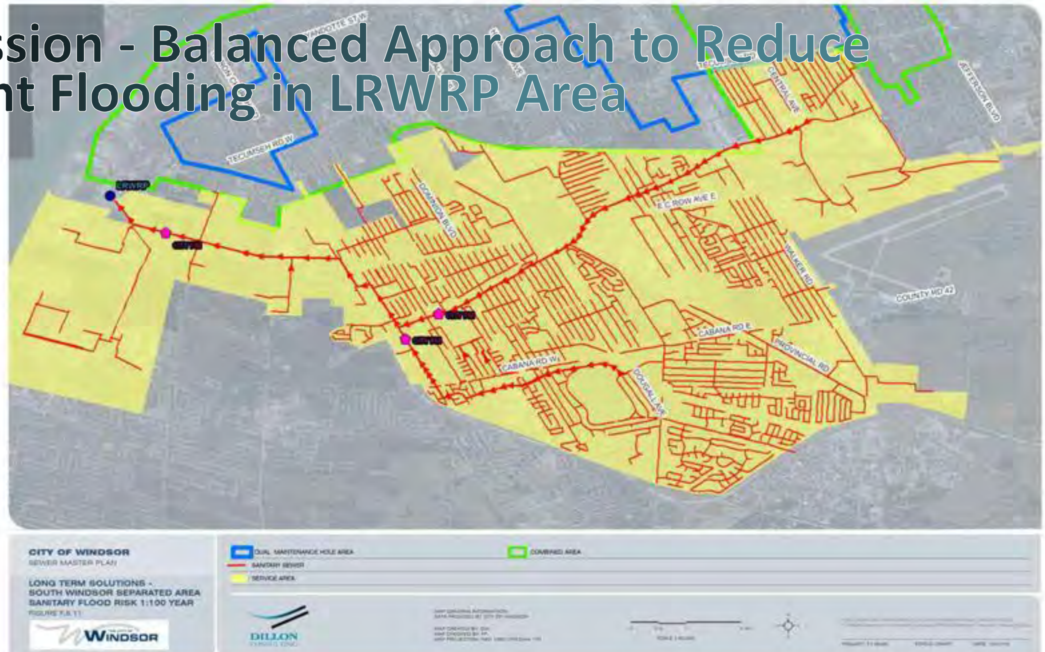
4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

- **South "Separate" Sanitary System**
  - –5,100 ha service area
  - –340+ km of Sanitary Sewer
  - –3 Sanitary Sewer FMs
  - –LaSalle (1,550 ha): forcemain to LRWRP
  - –Tecumseh (200 ha): gravity, North Talbot
  - –2016 & 2017 Storm: 2,700 basement flood calls



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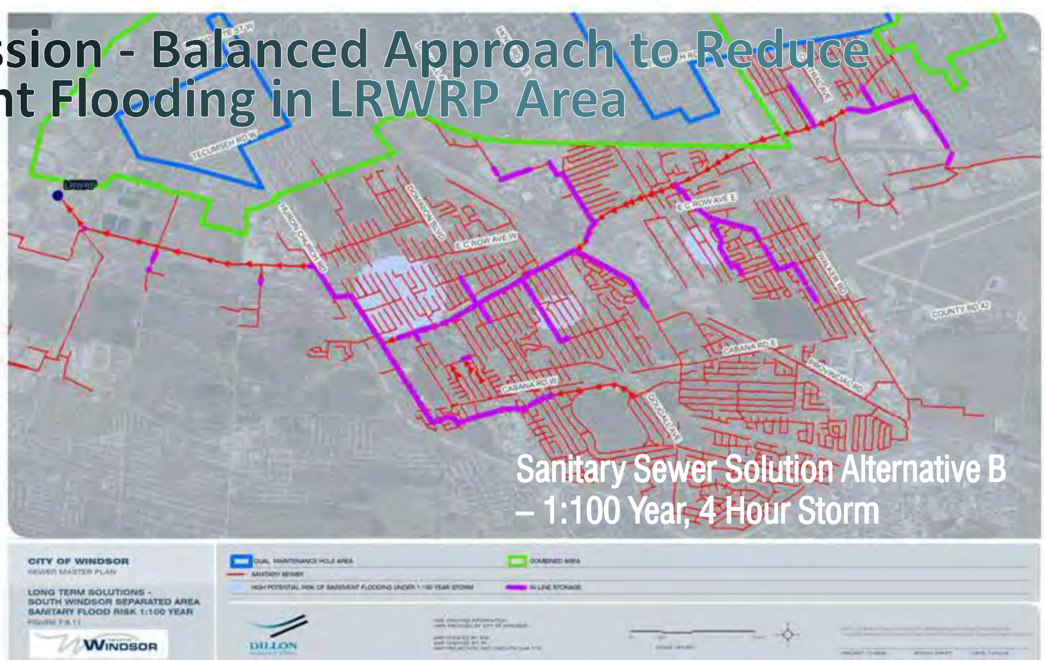
4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

- **South "Separate" Sanitary System - SAMPLE (Alt B)**
  - – 80% Foundation drain disconnect
  - – New RTB @ LRWRP
  - – Moderate in-line storage
  - – Public infrastructure sealing
- **1:100 Year Flood Risk:**
  - – 8 % of system



4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Preliminary Sanitary Solutions – **South "Separate" Sanitary System**

	Do Nothing	Solution A	Solution B	Solution C
Foundation Drain Disconnection	0%	0%	80%	40%
Estimated No. Lots for Foundation Drain Disconnection	0	0	8,400	4,200
Linear Infrastructure Improvements (km)	0	73	23	70
% Surcharged to Basement - 100 Year, 4 Hour Design Storm – High Intensity Rainfall	59.7%	4.9%	8.1%	2.5%
% Surcharged to Basement – 100 Year, 24 Hour Storm – High Volume Rainfall	58.6%	5.6%	3.4%	1.8%
% Surcharged to Basement - Climate Change	86.3%	43.9%	25.9%	27.0%
Climate Change Resiliency	**Existing Level**	**Limited**	**Resilient**	**Resilient**

4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Discussion – **South "Separate" Sanitary System**

– Is there MECP support for the following:
  - The balanced solutions approach (source, conveyance, and outlet/treatment)?
  - Utilizing the proposed RTB at the LRWRP for surcharge relief and treatment of excess extraneous ("combined") flows resulting from storm events?

– Are there any other private property source controls and/or infrastructure improvement alternatives that could be considered.

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4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Combined System High Priority Soft Separation Areas

- Locations where excessive surface flooding identified (+0.3m)
- Historic basement flooding
- Existing Trunk Storm Sewer Infrastructure with Capacity to handle separated storm flows
- Campbell/University Study Area (Stantec Draft Recommendations)
- McDougall Ave Drainage Area

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4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

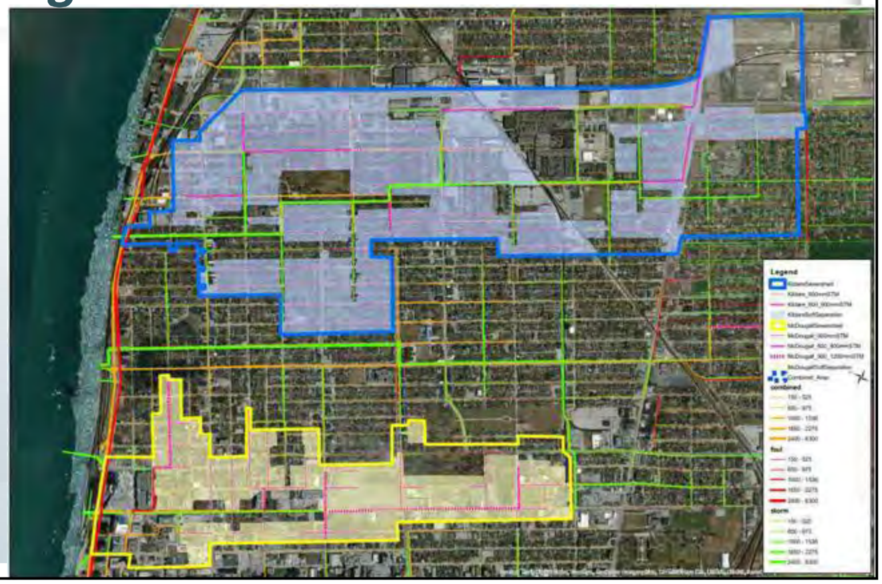
Combined System - 50% of Combined Area Soft Separation

- Includes Drouillard, Kildare, Langlois, and McDougall Combined Drainage Areas
- Located Upstream of Caron Ave RTB and Pump Station
- Historic Engineering Drawings and Drainage Area Plans supporting planning for future sewer separation
- Existing Trunk Storm Sewers clearly identified as have capacity for storm flows

4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Combined System Approach to Cost Estimate

- Kildare and McDougall Drainage Area Plans and (1960's) recommendations used as framework
- Added Storm Laterals and Local storm sewers as per Original Design
- Applied Unit Costs based on pipe size range and pipe length
- Established a general cost of \$500,000/Ha of Soft Separation



4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Combined System 100% of Combined Area Soft Separation

- 1,760 Ha of area removed from the combined sewer system
- Significant WWF removed from LRWRP treatment
- Significant reduction in CSO volumes
- Utilizes existing trunk storm sewers to receive surface water runoff

4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Combined System Solution Summary (in progress)

	Do Nothing	Solution A – High Prior Soft Sep	Solution B – 50% Soft Sep	Solution C – 100% Soft Sep
Area Removed from Combined Sewers	0	0	440	1750
Linear Infrastructure Improvements (m)	0	17,000	32,300	A whole Bunch
% Surcharged to Basement – 100 Year, 4 Hour Design Storm – High Intensity Rainfall	82.88%	82.35%	77.38%	59.35%
% Surcharged to Surface – 5 Year, 4 Hour Design Storm – High Intensity Rainfall	39.65%	38.43%	33.61%	19.50%
Reduction in CSO Discharge Volume	n/a	Minor	Modest	Significant
Climate Change Resiliency	**Existing Level**	**Limited**	**Resilient**	**Resilient**
Cost Estimate ($M)	**$0**	**$144 M**	**$221 M**	**$860 M**

4. Discussion - Balanced Approach to Reduce Basement Flooding in LRWRP Area

Discussion Combined System

Separation of sewer was not found to adequately reduce flooding risk for the current criteria.

- **Solutions to reach current flood risk reduction criteria will require additional measures, we would like to get feedback on the use of the following solution alternative components that will be coupled with separation:**
  - Combined sewer in-line storage and/or centralized storage
  - Upgrading or increasing combined sewer conveyance capacity
  - Incorporation of proposed LRWRP RTB
  - Upgrading or increasing capacity at existing sanitary/combined sewer pump stations
- **What would the requirements for new storm sewers in this area be? Would LIDs be required?**
- **Is the level of service with a HGL 1.8 m below ground under a 1:100 year storm the correct approach?**
  - Does the MECP have a recommended level of service for combined sewers.

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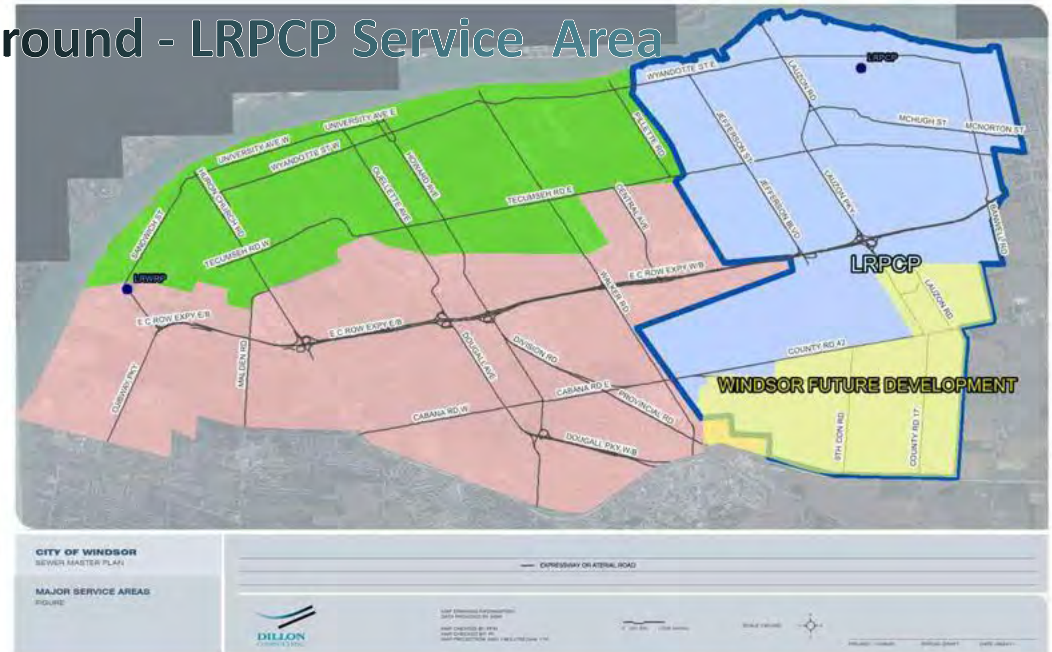
5. Background - LRPCP Service Area



LRPCP Sanitary Service Area

- 3,000 ha service area in Windsor (Current)
- 900 ha service area from Tecumseh (Current)
- 250+ km of Sanitary Sewer (Current)
- Significant future development from Tecumseh and Windsor planned.

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MECP Technical Meeting
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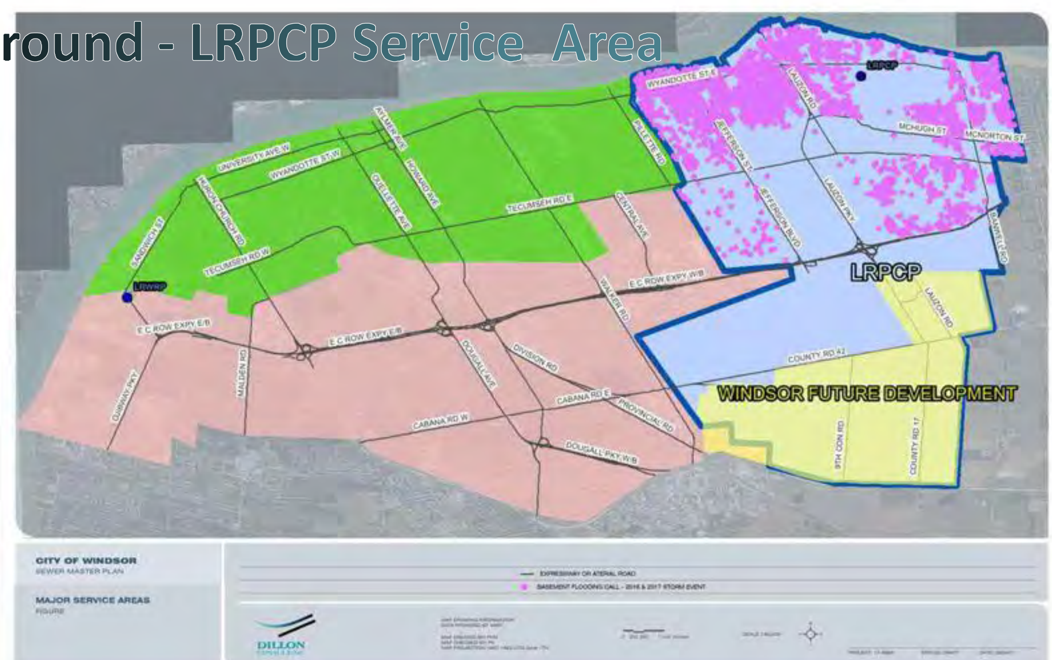
5. Background - LRPCP Service Area



- **Basement Flooding**
  - Over 3,800 reports of basement flooding from Sept 2016 and Aug 2017 storm events

Windsor Sewer Master Plan
MECP Technical Meeting
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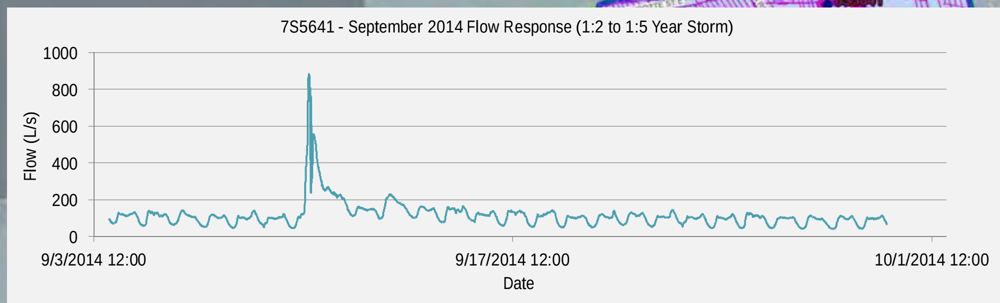
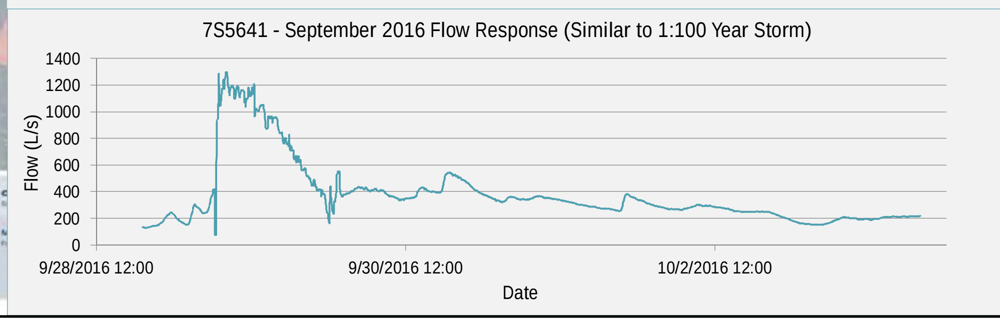
5. Background - LRPCP Service Area

LRPCP Sanitary Service Area

– FM 7S5641 (2013-18)
  - 4,600 ha of 5,100 ha
  - 1,040 ha of 3,000 ha
  - Average DWF = 7 to 10 ML/d
  - WWF = 30 to 65 ML/d
  - DWF daily peak = 140 L/s
  - WWF peaks (extended) = 500 to 1,200 L/s
  - Other FMs similar data

– **"Combined"** storm & sanitary flows during storm events **(3X to 6X)**





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MECP Technical Meeting
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5. Background - LRPCP Service Area

LRPCP Sanitary Service Area

- Pontiac and St. Paul Pump Station & St. Rose Area Stormwater Study (Dillon, 2018).
  – Approved DMAF funding ($90M) for storm drainage improvements (10 year program)
  – Sewer Master Plan will address the following:
    » Refinement/updating of storm drainage solutions
    » Incorporate sanitary sewer improvements in these areas
    » Satisfy Class EA requirements for any Schedule B projects

Windsor Sewer Master Plan
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6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

LRPCP Sanitary Service Area

- **Source Control** to reduce RDII:
  - Foundation drain disconnection, lot level grading improvements, and downspout disconnection
- **Conveyance System** Improvements:
  - Increase sewer pipe size for improved conveyance
  - De-centralized inline storage (super sized pipes)
- **Outlet discharge/treatment** Improvements:
  - Increased outlet conveyance capacity
  - Implement plant expansion (when required)
  - Utilize new RTB/storage at LRPCP for additional treatment capacity of "combined" extraneous flows resulting from storm events.
    - **New Outlet to Detroit River**

Long Term Solutions – Balance of Measures

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6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

Baseline Conditions Model:

- **Existing Sanitary Sewer Network**
- **Future Development flows incorporated**
  - 1,150 ha new development
- **Combined area separated as part of baseline alternatives**

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Aquafor Beech

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6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

Baseline Conditions Summary:

- Existing LRPCP pump station capacity = 2.6 cms
- Existing LRPCP treatment capacity = 1.2 cms
- DWF peak = 0.22 cms

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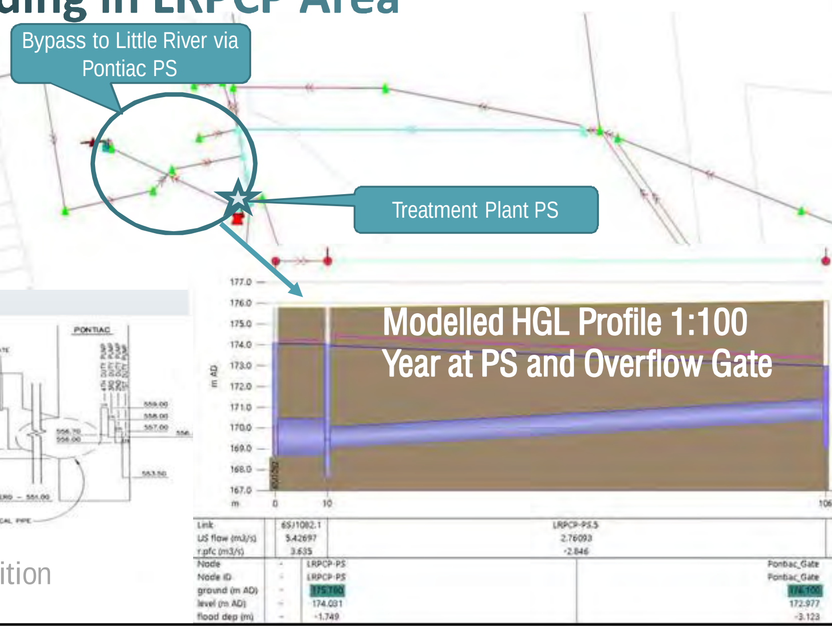
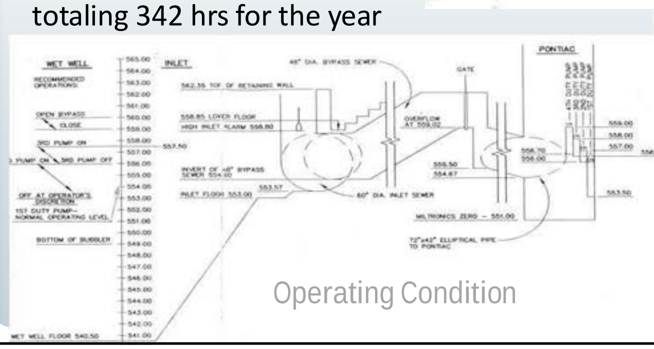
6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

- Overflow event occurs when plant inflow exceeds 1.17 cms
- LRPCP has both by-pass (Pontiac PS) and plant overflow abilities
- Total plant overflow volume to Little River = 779,000 m^3 – 2017
- 22 occurrences of plant overflow totaling 342 hrs for the year





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6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

Sewershed Alternatives

Scenario 1

- Infrastructure upgrades within Municipal RoW (sewer & pumping station upgrade)
- 0% uptake of private property disconnection

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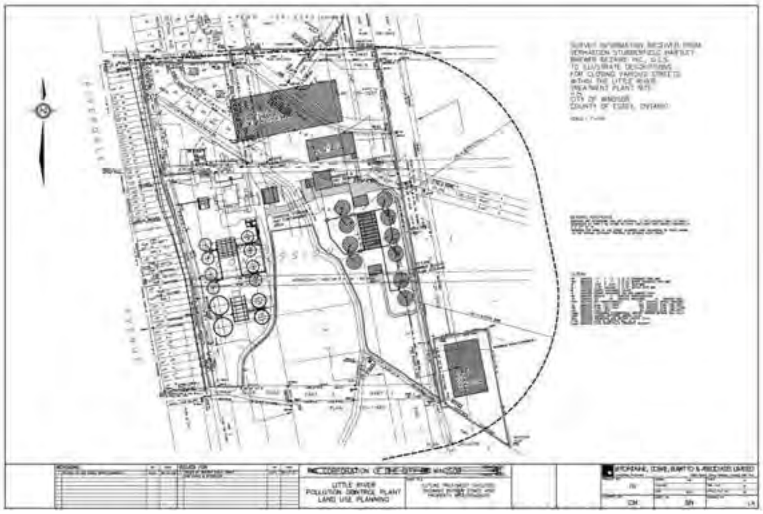
6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

Sewershed Alternatives

Scenario 1

- Infrastructure upgrades within Municipal RoW (sewer & pumping station upgrade)
- 0% uptake of private property disconnection

6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area



PCP-specific Alternatives

- Plant expansion for increased treatment capacity to service future development
- Increased pump capacity
- Flow equalization
- Retention / treatment

6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

Long Term Solutions – Improvement Summary

Little River PCP Pumping Station Firm Capacity = 2.6 cms (CURRENT)

Little River Drainage Area - Separated Area Solution Assessment

Evaluation - 100 year 4h Chicago Storm	Baseline Solution Future Conditions	Infrastructure Solutions w/ Disconnection Uptake Future Conditions, Sanitary MH Sealed (w/ 20% leakage)		
		0% Uptake 1	40% Uptake 2	80% Uptake 3
No. Nodes Surcharged (< 1.8m HGL)	1607	216	181	159
% Nodes Surcharged (< 1.8m HGL)	74%	10%	8%	7%
PS Capacity @ STP (m^3/s)	2.6			
Total Volume DWF@ STP (m^3)	56,705			
Total Volume WWF from Tecumseh	66,655			
Total Volume DWF from Tecumseh	6,655			
Total Extraneous Flow Volume (Study Ar	172,032			
$Q_{WWFPeak}$ @ STP (m^3/s)	4.923	10.36	10.16	9.97
Total Volume @ STP (m^3)	288,736	211,993	205,421	199,977
Total Storage Required (m^3)		142,233	133,001	119,611
Total Volume	288,736	354,226	338,423	319,588

Little River Drainage Area - Separated Area Solution Assessment

Evaluation - 100 year 4h Chicago Storm	Baseline Solution Future Conditions	Infrastructure Solutions Future Conditions, Sanitary MH Sealed (w/ 20% leakage)		
		0% Uptake 1	40% Uptake 2	80% Uptake 3
No. Nodes Surcharged (< 1.8m HGL)	1607	216	181	159
% Nodes Surcharged (< 1.8m HGL)	74%	10%	8%	7%
PS Capacity @ STP (m^3/s)	5.2			
Total Volume DWF@ STP (m^3)	56,705			
Total Volume WWF from Tecumseh	66,655			
Total Volume DWF from Tecumseh	6,655			
Total Extraneous Flow Volume (Study Ar	172,032			
$Q_{WWFPeak}$ @ STP (m^3/s)	4.923	10.36	10.16	9.97
Total Volume @ STP (m^3)	288,736	211,993	205,421	199,977
Total Storage Required (m^3)		71,000	56,000	45,000
Total Volume	288,736	282,993	261,421	244,977

Little River PCP Pumping Station Firm Capacity = 5.2 cms (PROPOSED)

6. Discussion – Balanced Approach to Reduce Basement Flooding in LRPCP Area

Discussion

- Is there MECP support for the following:
  - The balanced solutions approach (source, conveyance, and outlet/treatment)?
  - Utilizing a new RTB at the LRPCP for surcharge relief and treatment of excess extraneous (“combined”) flows resulting from storm events?
- Are there any other infrastructure alternatives that should be considered for the Little River PCP sewershed?

7. Background – Storm Sewers and Surface Flooding

Storm Drainage Level Of Service for Existing Development

CONSIDERATION	CRITERIA	OBJECTIVE
Primary Objectives		
Major Overland Drainage System	1:100 year storm event · Less than 0.30 m of surface flooding in the Right of Way (ROW), where feasible.	Standard criteria for access and risks of property damage.
	Climate Change: 1:100 year storm event + 40% factor for BOTH volume [1] and intensity [2] · Surface flooding below lowest building opening elevations where feasible, but in particular for any higher risk uses. · Less than 0.30 m of surface flooding in the ROW for arterial and collector roads.	Provide enhanced/variable level of service where there is a higher consequence of surface flooding.

Basis for Today’s Preliminary Solutions

Notes:
•The “Urban Stress Test” storm defined in the Regional Stormwater Management Standards Manual (2018) would test the resiliency of the storm drainage system under higher volume storm conditions.
•It is proposed that a 1:100 Year, 4 Hour Chicago Storm, with rainfall intensity increased by a factor of 40% would be considered to test the resiliency of the storm drainage systems under higher intensity storm conditions.

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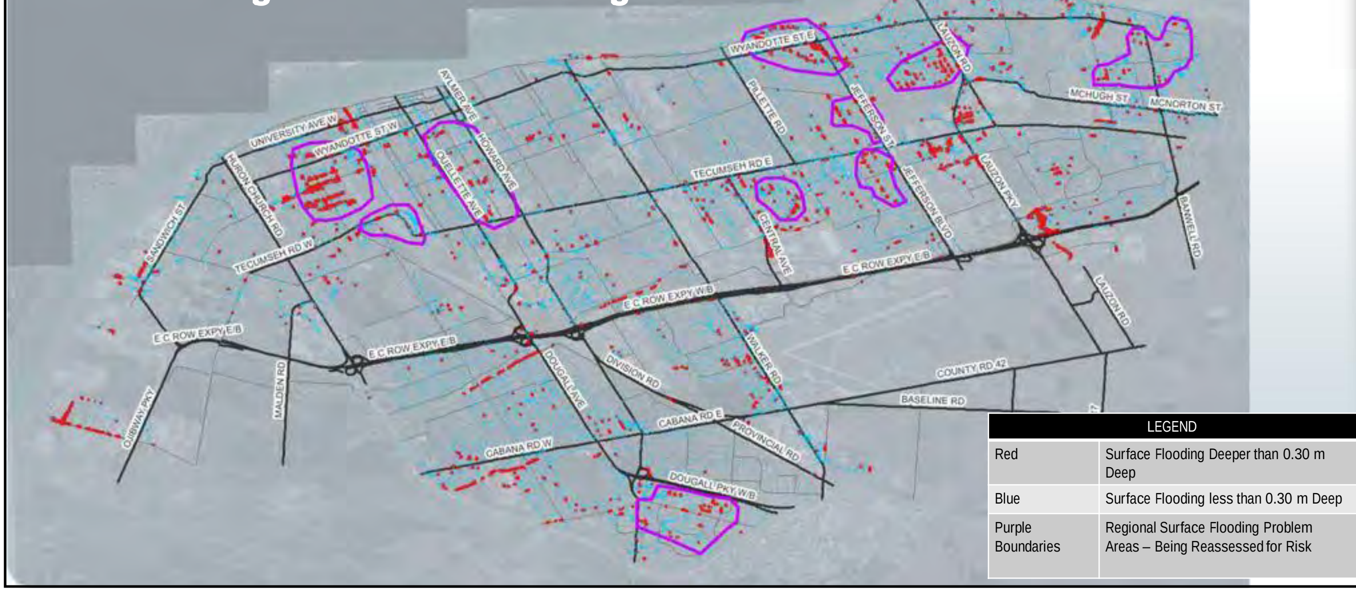
7. Background – Storm Sewers and Surface Flooding

Surface Flooding – Under Climate Change Storm



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7. Background – Storm Sewers and Surface Flooding

- **Storm Solution Problem Areas – Sample List (on right)**
  - Major Streets with over 0.30 m of ponding over a distance of 15 m or greater, under 1:100 year 4 hour storm

Class	Name	From	To	Severity	Length (m)
Arterial	Dougall Ave	E. C. Row Off-Ramp	E. C. Row On-Ramp	Moderate	200
Arterial	Ouellette Pl	Dougall Ave	Eugenie St E	Moderate	200
Arterial	E. C. Row W/B Off-Ramp	Howard Ave	Remington Ave	Small	35
Arterial	Walker Rd	Melinda Ave	Ledyard Ave	Small	75
Arterial	Howard Ave	Capitol St.	Charles St.	Small	30
Arterial	Dougall Pky N/B On-Ramp	Howard Ave	Sarah Ct.	Moderate	190
Arterial	Provincial Road	Fontana Ave	Walker Rd	Small	40
Arterial	Walker Rd	Concession Rd 7	Division Rd	Small	40
Arterial	Ojibway Pkwy	Prospect Ave	Sandwich St.	Small	80
Arterial	Central Ave	Tecumseh Rd E	Ypres St.	Small	90
Arterial	Central Ave	Plymouth Dr	Temple Dr	Heavy	425
Collector	Sydney Ave	Division Rd	Marentette Ave	Moderate	120
Collector	Eugenie St W	Dougall Ave	Ouellette Ave	Small	20
Collector	Eugenie St E	McDougall St	Ouellette Ave	Small	55
Collector	McDougall St	Eugenie St E	Howard Ave	Small	15
Collector	Grand Marais Rd E	Central Ave	Plymouth Dr	Moderate	240
Collector	Pillette Rd	Grand Marias Rd E	Plymouth Dr	Moderate	100
Collector	Foster Ave	St Etienne Blvd	Walker Rd	Small	75
Collector	7th Con Rd	Baseline Rd	Walker Rd	Small	90
				Sum	2120

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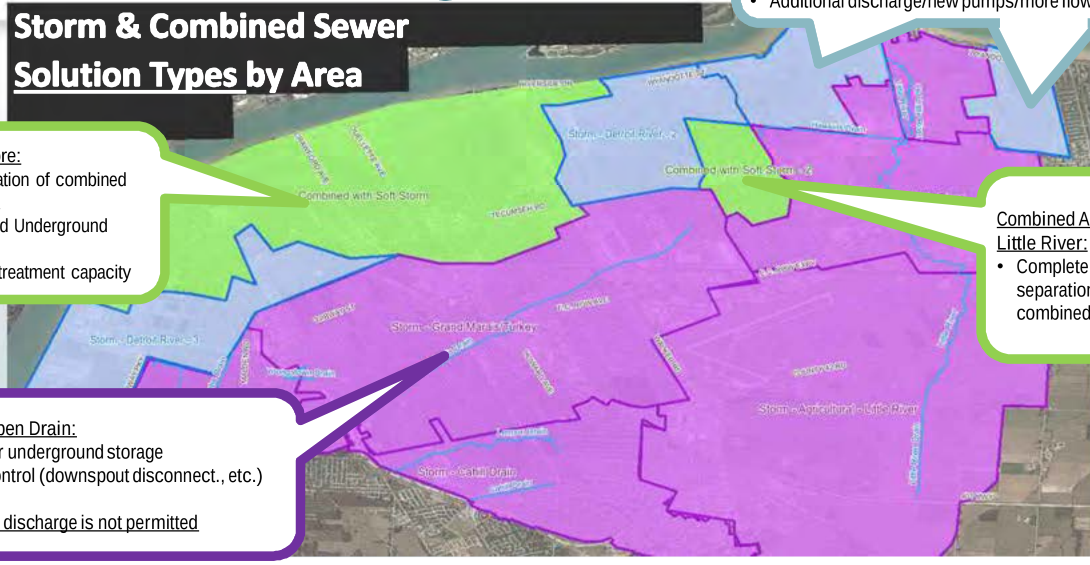
7. Background – Storm Sewers and Surface Flooding

Storm & Combined Sewer Solution Types by Area



Outlets to Detroit River:
- Surface or underground storage
- Source control (downspout disconnect., etc.)
- LIDs
- Additional discharge/new pumps/more flow

Combined Core:
- Soft separation of combined sewer area
- Surface and Underground Storage
- Additional treatment capacity

Combined Area – Little River:
- Complete separation of this combined area

Outlets to Open Drain:
- Surface or underground storage
- Source control (downspout disconnect., etc.)
- LIDs
- Additional discharge is not permitted

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8. Discussion – Surface Flooding Reduction Alternatives

Preliminary Storm Solution Option – Outleting to Open Drains

- LIDs including exfiltration trenches with perforated pipe, upstream of ponds
- Complete downspout disconnection, ensure grading to storm sewer
- Enhancing existing pond storage or new storage systems

Figure 6.6: Parallel Perforated Pipe System

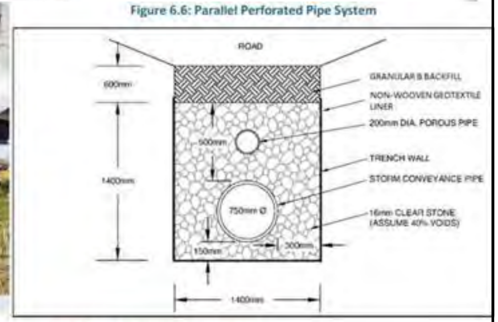

Figure 6.4: Perforated Storm Sewer

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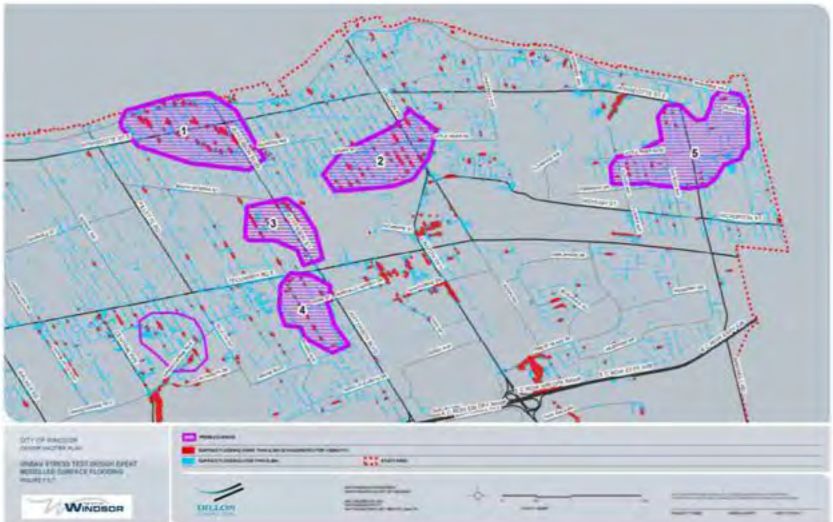
8. Discussion – Surface Flooding Reduction Alternatives



Storm Sewers Discharging to Open Drains – East Windsor Problem Areas

- **Primary flooding locations**
  - Areas still being refined based on risk

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8. Discussion – Surface Flooding Reduction Alternatives

- **Existing Storm Sewer System draining to Detroit River – Area 1&2**
  - o Ford Blvd. PS
  - o St. Rose Gravity Outfall
  - o St. Paul PS

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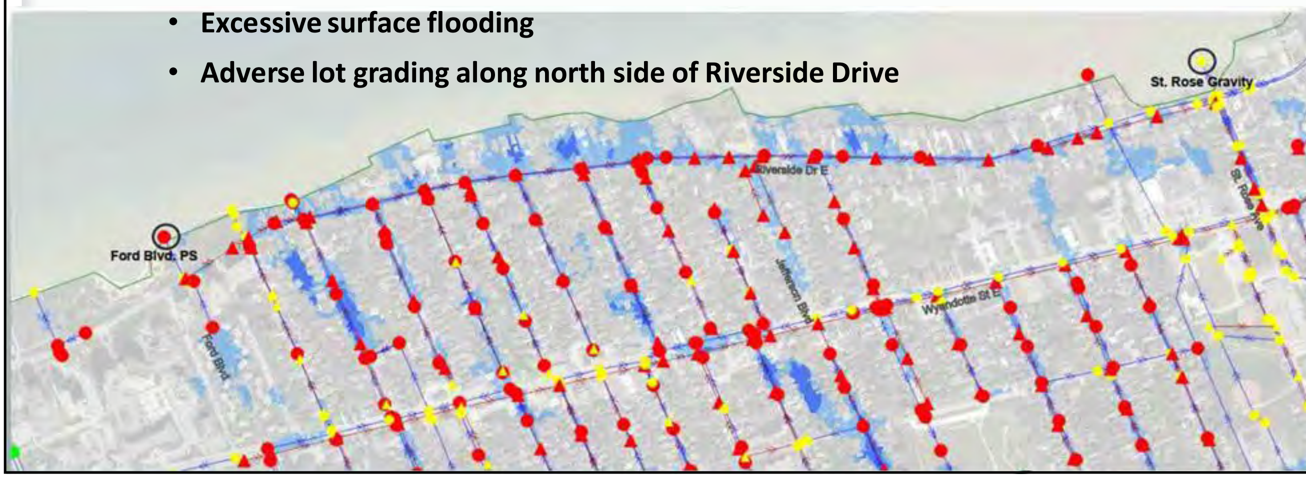
8. Discussion – Surface Flooding Reduction Alternatives

Primary Issues – Riverside Vista:

- **Undersized storm sewer system**
- **Excessive surface flooding**
- **Adverse lot grading along north side of Riverside Drive**



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8. Discussion – Surface Flooding Reduction Alternatives

Recommended Works – Areas 1&2

- **St. Paul and Pontiac Pump Station and St. Rose Storm Drainage Areas Study**

8. Discussion – Surface Flooding Reduction Alternatives

Alternatives – Area 1& 2

- Upgrade the storm sewer infrastructure to provide adequate minor system capacity
- Provide new storm pump stations, and increase existing pump station capacity
- Regrade Riverside Drive to intercept and channel overland flows
- Provide emergency overland overflows (> 100 year event) along Riverside Drive (outlet to Detroit River)
- LID at selective locations (> 175.8 m, sewers older than year 2000)

8. Discussion – Surface Flooding Reduction Alternatives

Riverside Potential Upgrades

- **Ford Blvd PS upgrade**
  - Current capacity 0.5cms
  - Recommend upgraded capacity of 10cms
- **St. Rose Gravity Outfall**
  - Replace with new PS (6 cms)
- **St. Paul PS upgrade**
  - Current capacity 10cms
  - Recommended capacity 15cms

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8. Discussion – Surface Flooding Reduction Alternatives

- **Potential Overland Outlets:**
  1. Coventry Gardens
  2. Esdras Pl. @ Riverside Dr. E.
  3. St. Rose Beach

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8. Discussion – Surface Flooding Reduction Alternatives

Discussion:

- **Are there any comments or recommendations related to the use of LIDs for new storm sewers?**
  - Will this be something the MECP asks for everywhere that is feasible, only in select strategic locations, etc.?
- **Are there any comments or recommendations related to new storm sewer outlets to Detroit River or other open water ways?**
- **Any comments about the design level of service (return period storm)?**
- **Any comments about considerations for climate change?**

9. Next Steps – Schedule

9. Next Steps – Project Milestones

- **July 2019 Council Project Status Update**
- **Stakeholder Advisory Committee Meetings:**
  – Meeting # 5 (July 3, 2019): Review Draft Solution Alternatives and Evaluation Process
  – Meeting # 6 (August 2019): Review Preferred Solutions/PIC Materials
  – Meeting # 7 (October 2019): Review PIC Feedback and Preferred Solutions
- **Public Information Centre # 2 – September 2019**

9. Next Steps – Actions Arising from Meeting

Based on meeting objectives confirm actions and commitments moving forward

Meeting Objectives:

- **Provide background information and present preliminary findings related to basement and surface flooding risks**
- **Review City's CSO strategy and retention treatment basin (RTB) solutions that satisfy MECP Procedure F-5-5**
- **Review and obtain feedback on the balanced approach to developing solutions that reduce basement and surface flooding risks (storm, sanitary and combined sewers):**
  - Source Controls
  - Conveyance System Capacity and Storage Improvements
  - Outlet Discharge and Treatment Capacity Improvements

Attachment B

City of Windsor

COMBINED SEWER OVERFLOW CONTROL IN THE RIVERFRONT AREA WEST OF CARON AVENUE

PUBLIC OPEN HOUSE #2

WELCOME

Municipal Class Environmental Assessment

February 27, 2019

3:00pm -7:00pm

Study Overview

Purpose of this Study

Select the preferred means and preferred design to control Combined Sewer Overflows (CSOs) in the Riverfront Area west of Caron Avenue

Revisit wet weather flow conditions at Lou Romano Water Reclamation Plant (LRWRP) to determine if any CSO control alternatives may also help to alleviate wet weather flows at the LRWRP

Purpose of this Open House

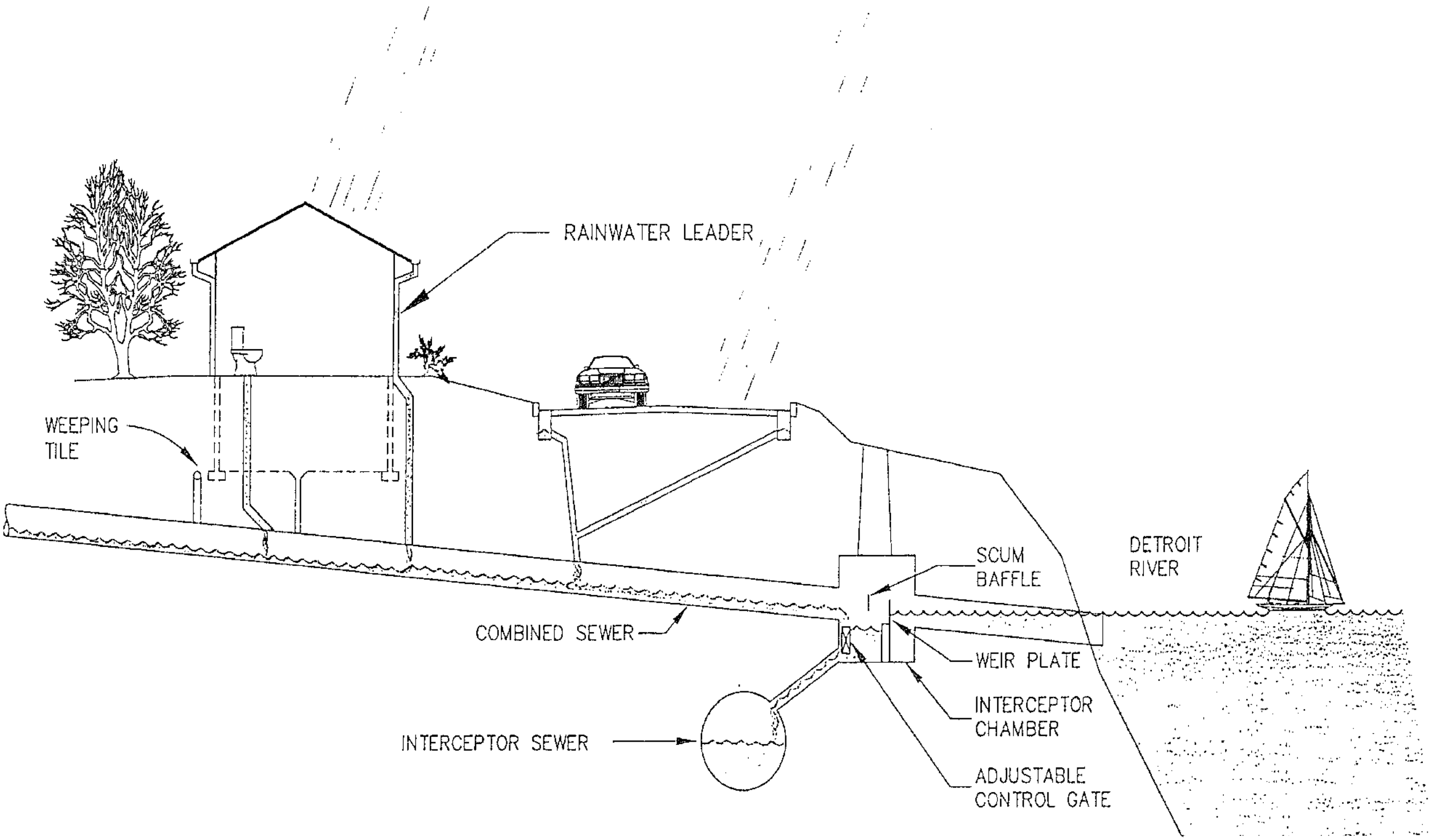
- Review alternative designs for CSO collection and treatment facilities

- Input gained through this public Open House and feedback from review agencies and will be included in the evaluation process to finalize the selection of the preferred design.

- Preferred design is one that satisfies CSO control criteria, minimizes undesirable impacts on the natural, social and economic environment, and is acceptable to the public and regulatory agencies.

BACKGROUND

TYPICAL COMBINED SEWER SYSTEM



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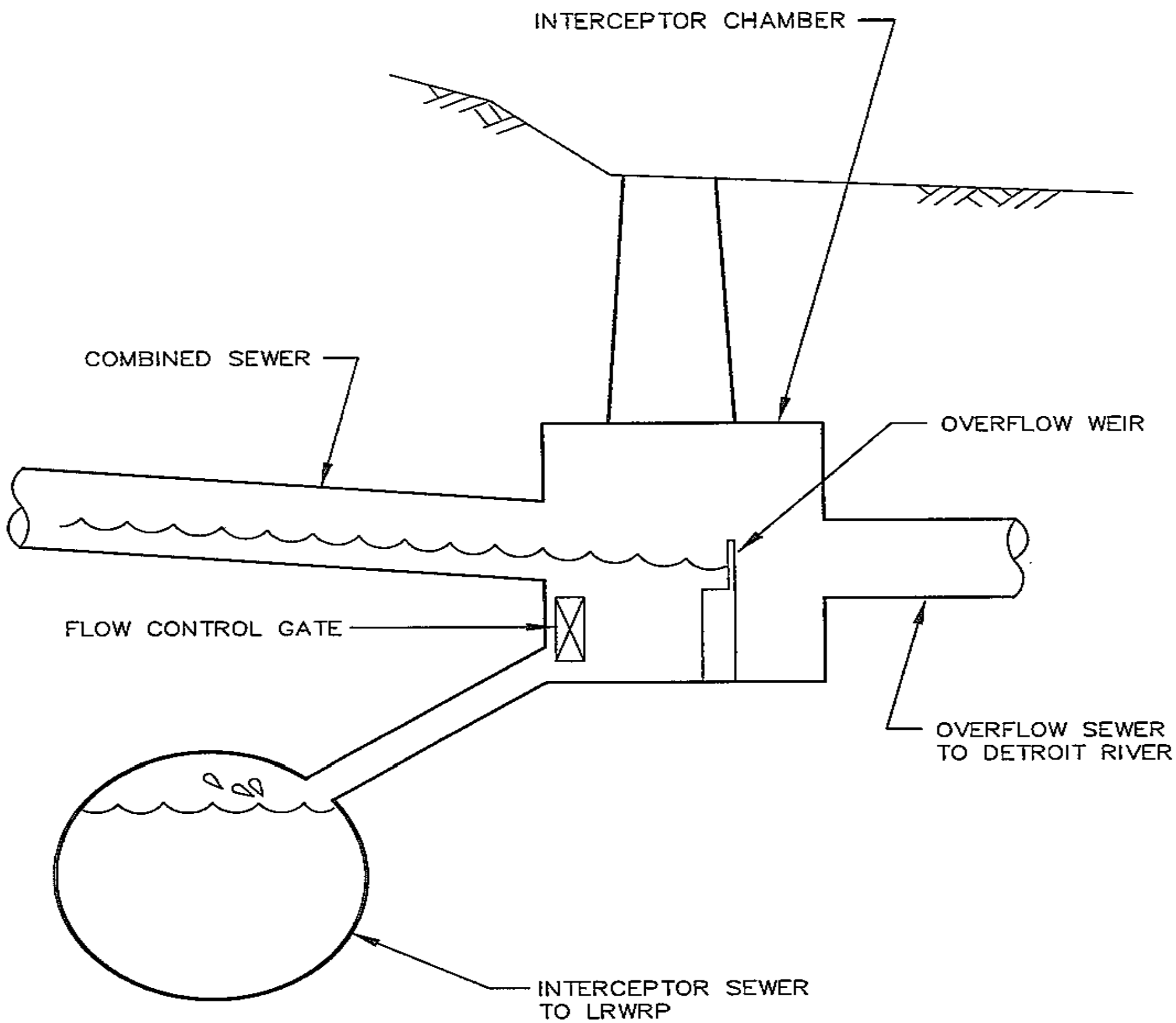
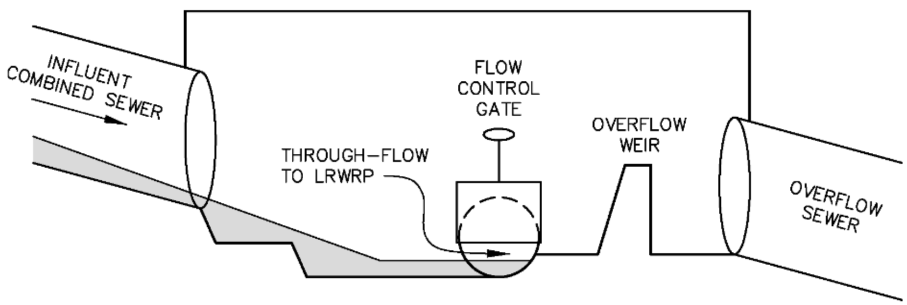
BACKGROUND

INTERCEPTOR CHAMBER SCHEMATIC

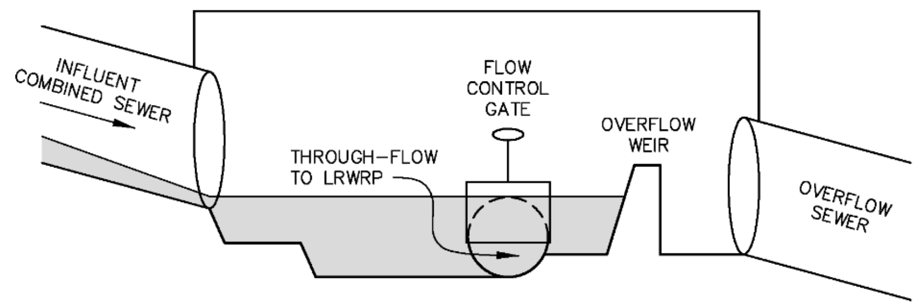


BACKGROUND

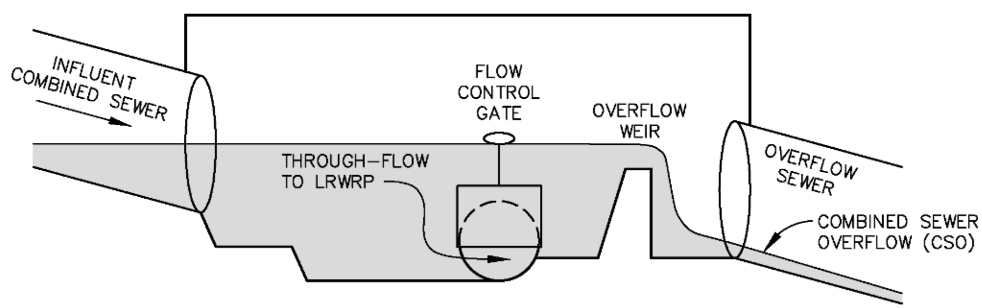
INTERCEPTOR CHAMBER FLOW CONDITIONS



DRY WEATHER FLOW (DWF)



2 1/2 TO 4 TIMES DWF



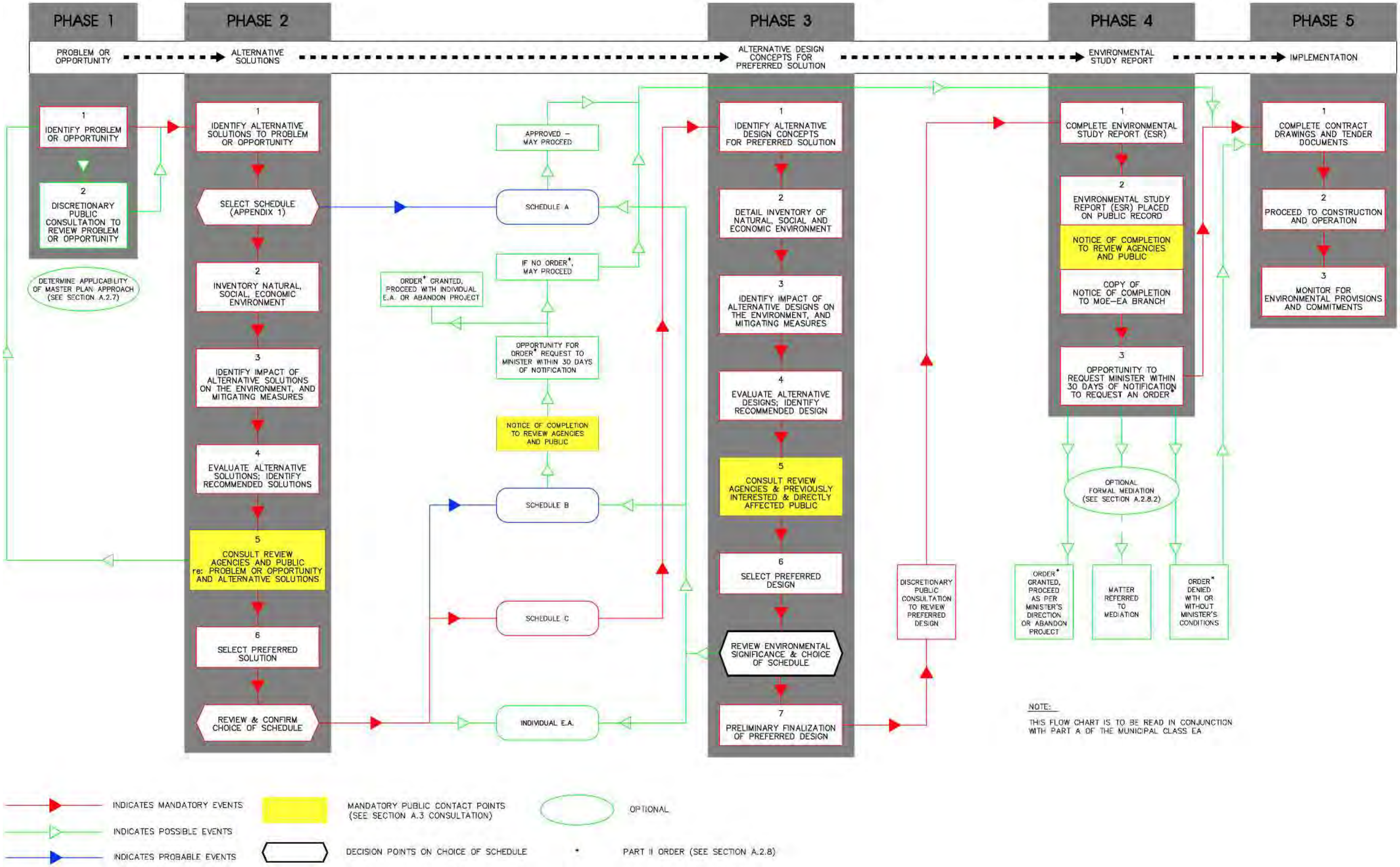
GREATER THAN 2 1/2 TO 4 TIMES DWF

CSO Control Guidelines

MOECC PROCEDURE F-5-5

- The Ontario Ministry of the Environment, Conservation and Parks (MECP), [formerly the Ontario Ministry of the Environment and Climate Change (MOECC)], publishes guidelines that outline the requirements for CSO control in Ontario under "PROCEDURE F-5-5" that includes:
  - Development of a Pollution Prevention and Control Plan
  - During a seven-month period commencing within 15 days of April 1, capture & treat for an average year all the dry weather flow plus 90% of the volume resulting from wet weather flow above the dry weather flow
  - Provide primary treatment or equivalent - i.e. – 50% total suspended solids (TSS) removal & 30% biochemical oxygen demand (BOD5) removal
  - TSS of the effluent not to exceed 90 mg/l for more than 50% of the time

OVERVIEW OF THE CLASS ENVIRONMENTAL ASSESSMENT PROCESS



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ENVIRONMENTAL STUDY REPORT (ESR) PROCESS

Phase 1 & 2 Class EA

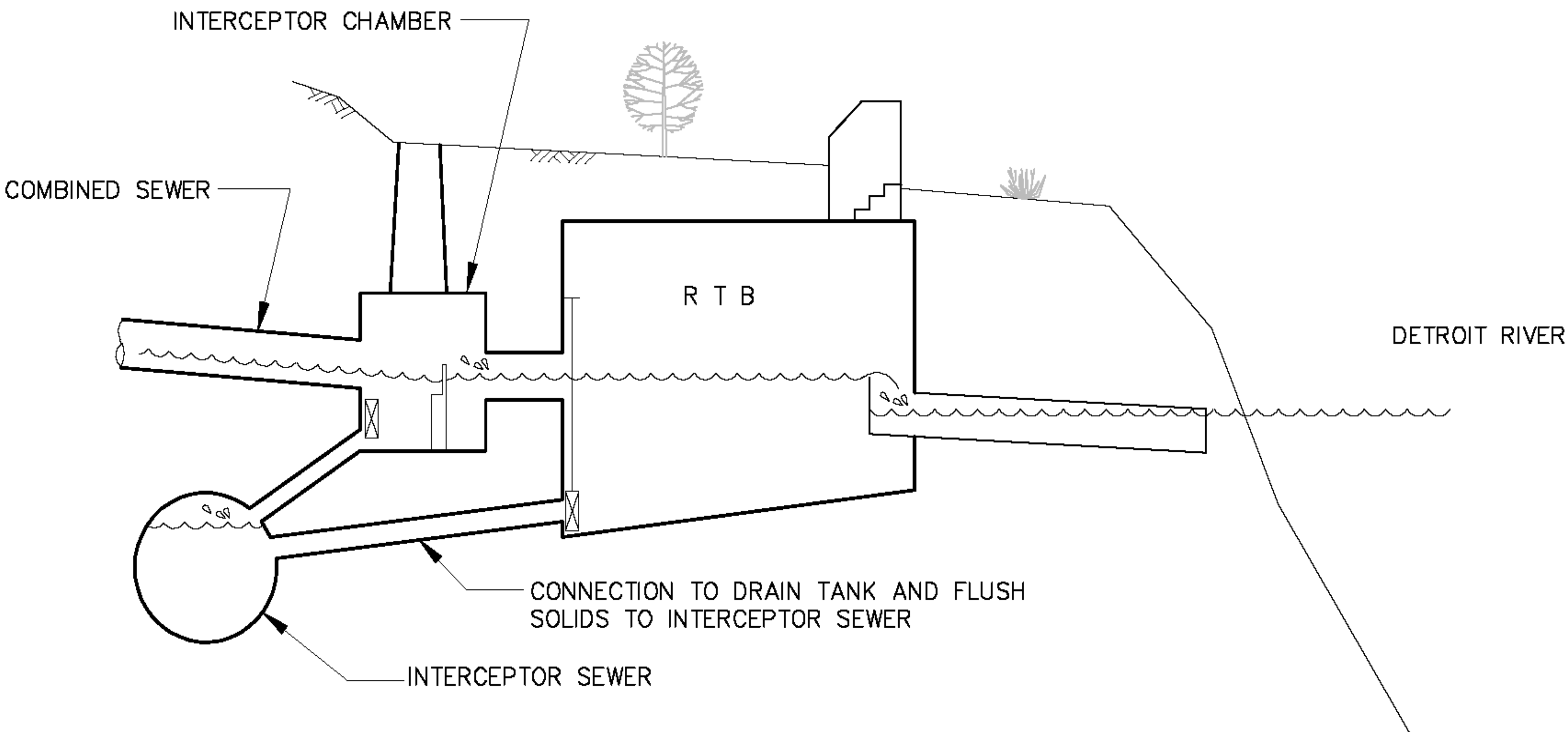
Identified the preferred means of implementing CSO control west of Caron Avenue:

- Retention Treatment Basin (RTB) - Combination of storage and treatment

- Treatment and storage facilities to be located on City owned Lands on the riverfront and/or adjacent to the Lou Romano Water Reclamation Plant (LRWRP).

BACKGROUND

SKETCH OF A RETENTION TREATMENT BASIN (RTB)



ENVIRONMENTAL STUDY REPORT (ESR) PROCESS

Phase 3 Class EA Report

- Review alternative designs for CSO collection and treatment facilities
- Select the preferred design
- Preferred design is one that satisfies CSO control criteria, minimizes undesirable impacts on the natural, social and economic environment, and is acceptable to the public and regulatory agencies

DESIGN ALTERNATIVES
Overview

CSO COLLECTION
- Interceptor Chambers
- Conveyance Sewer

CSO TREATMENT
- Pumping Station
- Retention Treatment Basin and appurtenances
- Effluent outfall to river

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DESIGN ALTERNATIVES

CSO INTERCEPTION

- 12 existing Interceptor Chambers on Riverfront Interceptor Sewer west of Caron Avenue
- Chambers serve areas ranging in size from 1.5 ha to 234 ha
- Procedure F-5-5 calls for 90% capture of CSOs at each overflow point <u>or</u> 90% system-wide capture
- Windsor Riverfront PCP Study based on 90% system-wide criteria
- Computer model determined that 90% system-wide control can be achieved by increasing CSO capture at 3 locations
- Same degree of pollution control, reduced construction and operating costs, reduced impacts along the waterfront

DESIGN ALTERNATIVES

CSO INTERCEPTION

CSO Interceptor Chambers	Volumetric Interception Rate	
	Existing	Proposed
A (Hill)	49%	88%
D (Detroit)	53%	90%
F (Bridge)	69%	93%

Required 90% capture of CSOs from area west of Caron Avenue can be achieved by increasing volumetric interception rate at Chambers A, D and F

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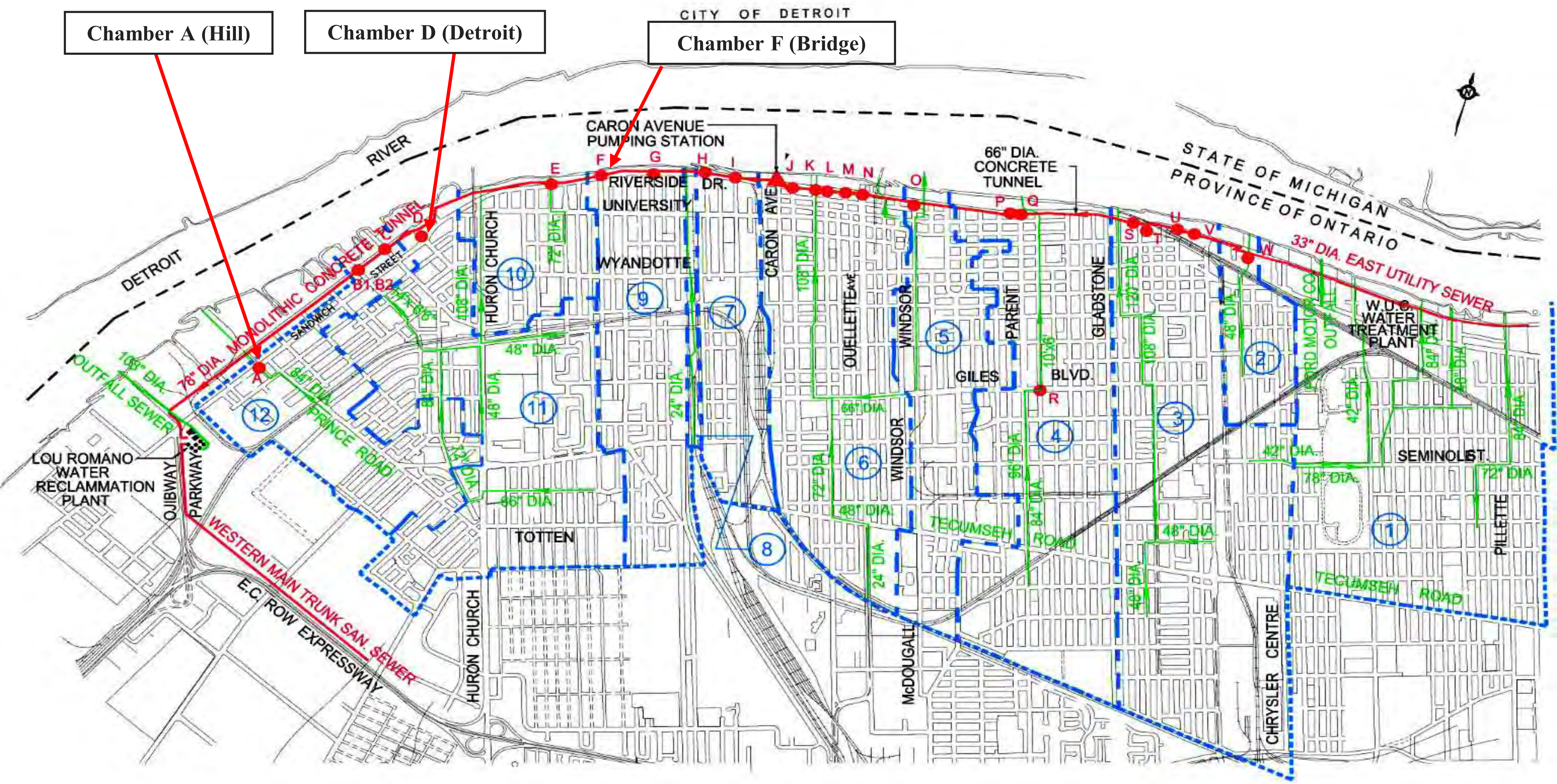
DESIGN ALTERNATIVES

CSO INTERCEPTION



Increasing volumetric interception rate at Chambers A, D and F

DESIGN ALTERNATIVES
CSO Collection

- Transport CSOs from interceptor chambers A,D and F to the RTB, extending from Bridge Avenue on the east to the LRWRP on the west

- Alignment generally north of and parallel to existing Riverfront Interceptor Sewer

- Congested area - numerous existing north-south sewers crossing the path of the proposed new CSO Collector

- Must include pumping at some point in the collection and treatment system – cannot flow by gravity from the interceptor chambers to the RTB and then through the RTB to the river.

DESIGN ALTERNATIVES

CSO COLLECTION - Alternative Design Possibilities

1. Construct pumping facilities at CSO Interceptor Chambers A, D and F to lift CSOs up into a shallow gravity sewer leading to the RTB or complete with forcemains to carry CSOs from the Interceptor Chambers to the RTB.

2. Utilize existing riverfront interceptor sewer and construct a deep sewer from Chamber A to the RTB together with pumping facilities at the RTB to either lift flow into the RTB or to convey treated effluent from the RTB to the river.

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DESIGN ALTERNATIVES

EXISTING AND NEW RIVERFRONT INTERCEPTOR SEWER

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DESIGN ALTERNATIVES

CSO COLLECTION

Alternative 1 – multiple pumping stations & shallow sewer(s)

+ May be possible to cross above existing sewers

+ Shallower and potentially less costly sewer construction

- 3 major pumping stations – initial and ongoing impact on waterfront and surrounding area

- Open cut construction through existing waterfront features and areas of archaeological significance

Not carried forward for detailed consideration

DESIGN ALTERNATIVES

CSO COLLECTION

Alternative 2 – Deep sewer and single pumping station

+ Construction of deep sewer from Chamber A to the LRWRP to carry increased flow from Chambers A, D and F
+ Construction of deep sewer by tunneling under existing utilities will significantly reduce surface disturbances and impacts along the waterfront and existing streets
+ Utilize existing riverfront interceptor sewer to convey CSOs from the Interceptor Chambers D and F to the CSO collector sewer at Chamber A
+ Pumping facilities only required at RTB site – savings in economy of scale and ongoing O&M costs
- Sewer construction by tunneling generally more expensive than open cut construction – offsetting factors include reduced cost for pumping facilities and less cost to mitigate disturbances along the waterfront and areas of archaeological significance

This alternative recommended as the preferred design

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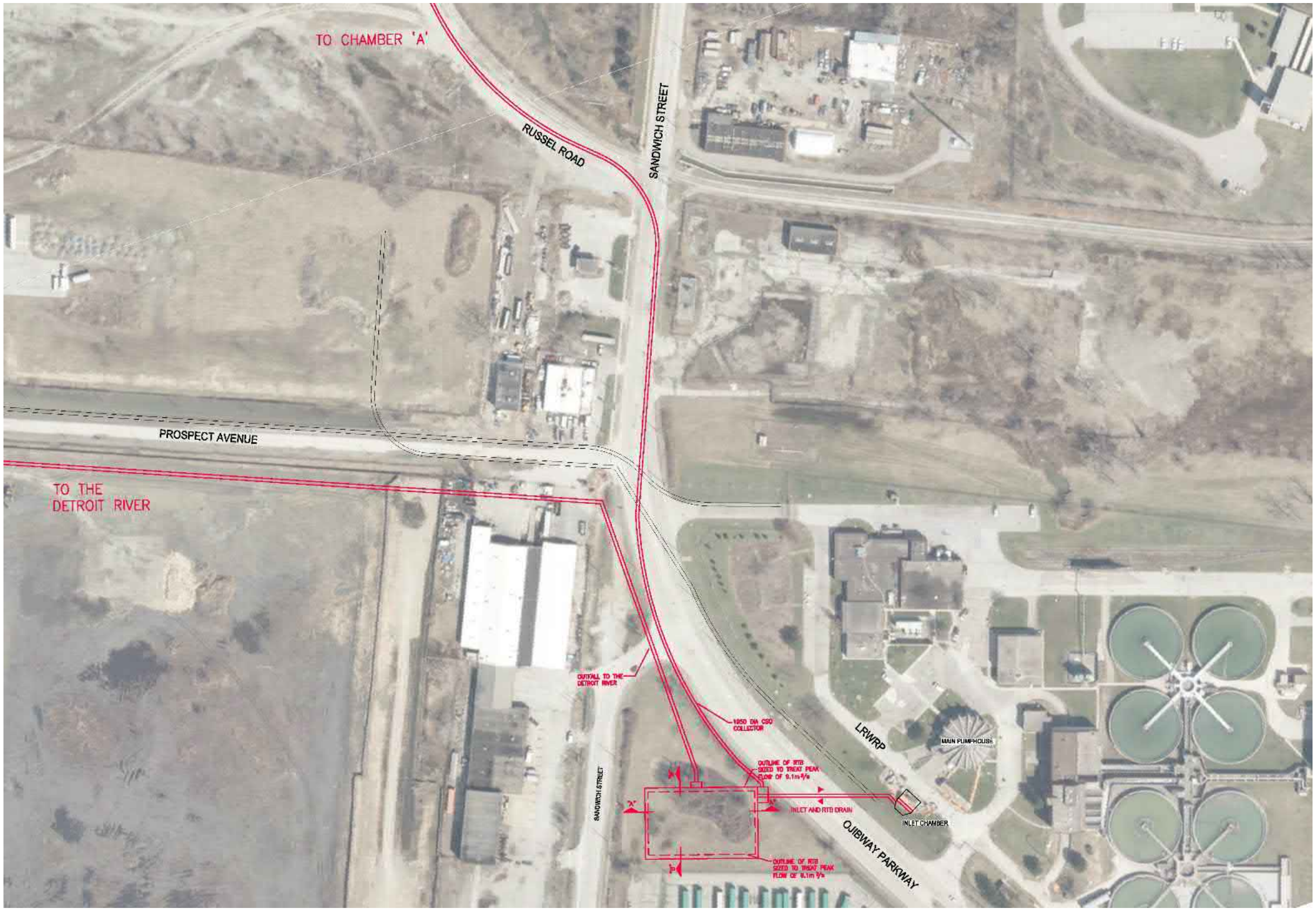
PREFERRED DESIGN

Aerial Plan showing Proposed CSO Collector and RTB



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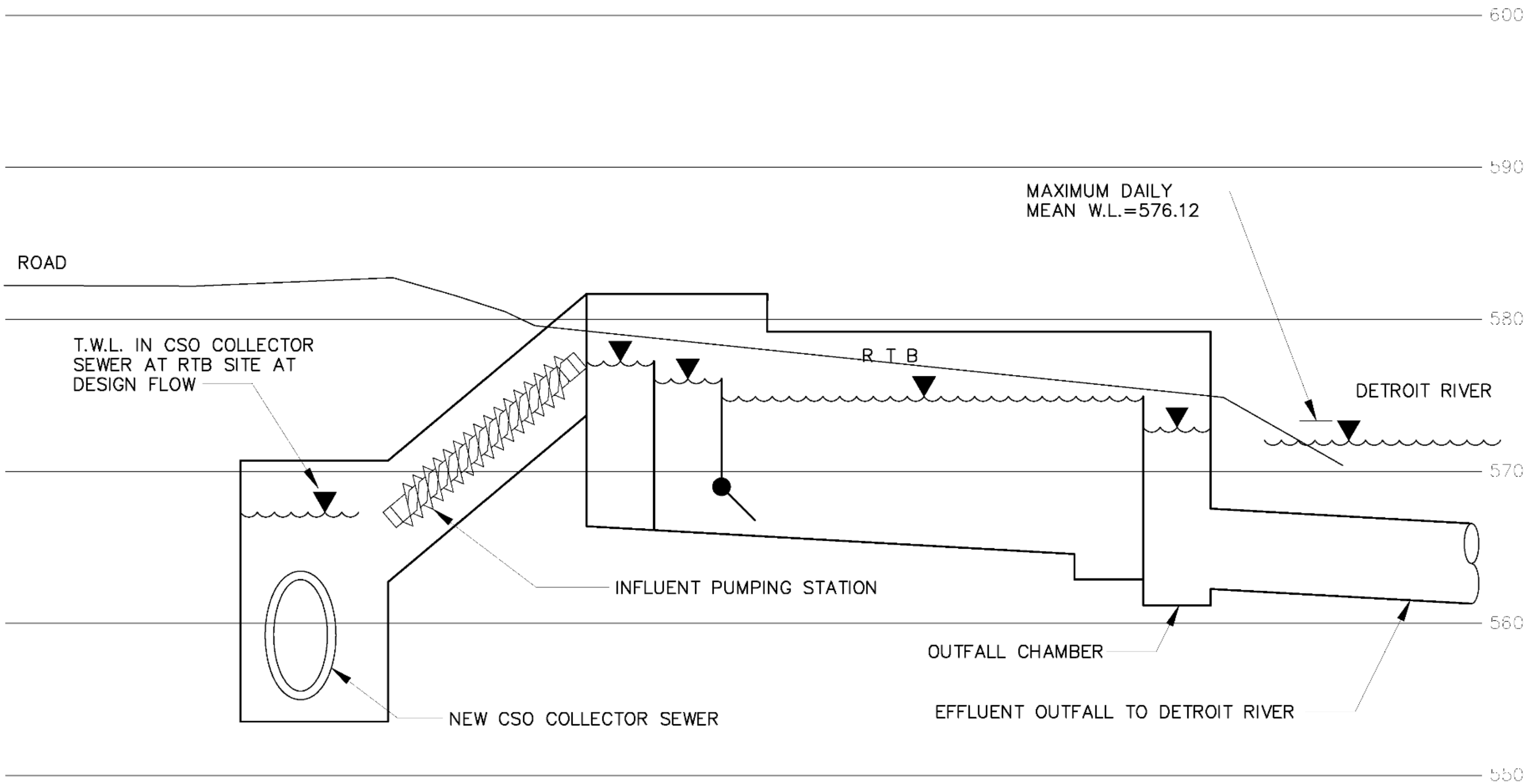
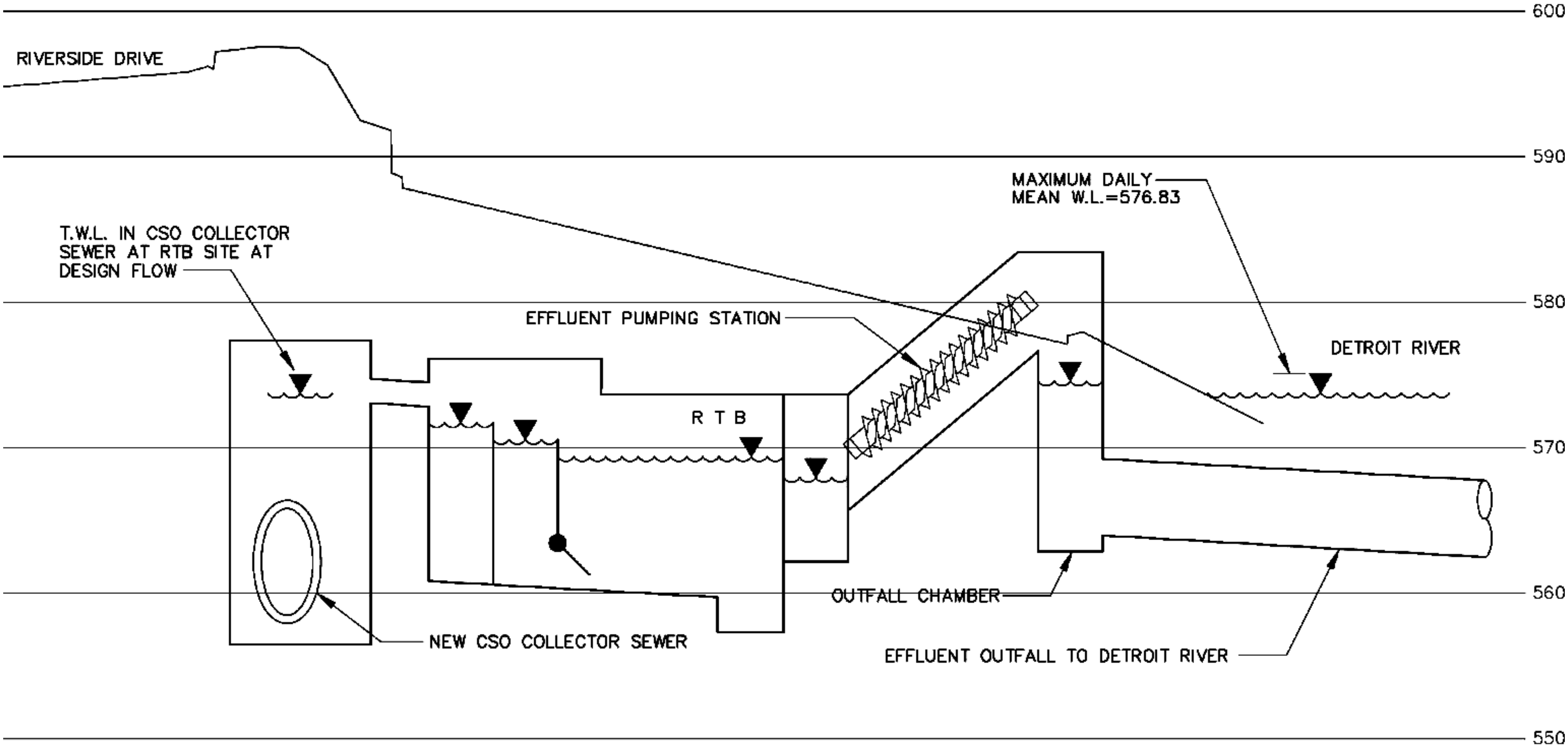
DESIGN ALTERNATIVES

CSO PUMPING - INFLUENT PUMPING ALTERNATIVE



DESIGN ALTERNATIVES

CSO PUMPING - Effluent Pumping Alternative



DESIGN ALTERNATIVES

CSO PUMPING - COMPARISON OF ALTERNATIVES

INFLUENT Pumping Station	EFFLUENT Pumping Station
Pumping CSO	Pumping cleaner RTB effluent
Bottom of RTB 3 to 4.5 m below grade	Bottom of RTB over 7.5 m below grade below grade ~ $5 million higher construction cost
Provides better drainage and flushing conditions for RTB	
Easier access to shallower RTB	
Reduces provisions needed to prevent basin uplift and floatation	

RECOMMENDED DESIGN – influent pumping station using screw pumps to handle solids and debris in CSO

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DESIGN ALTERNATIVES

RETENTION TREATMENT BASIN

Basin Sizing

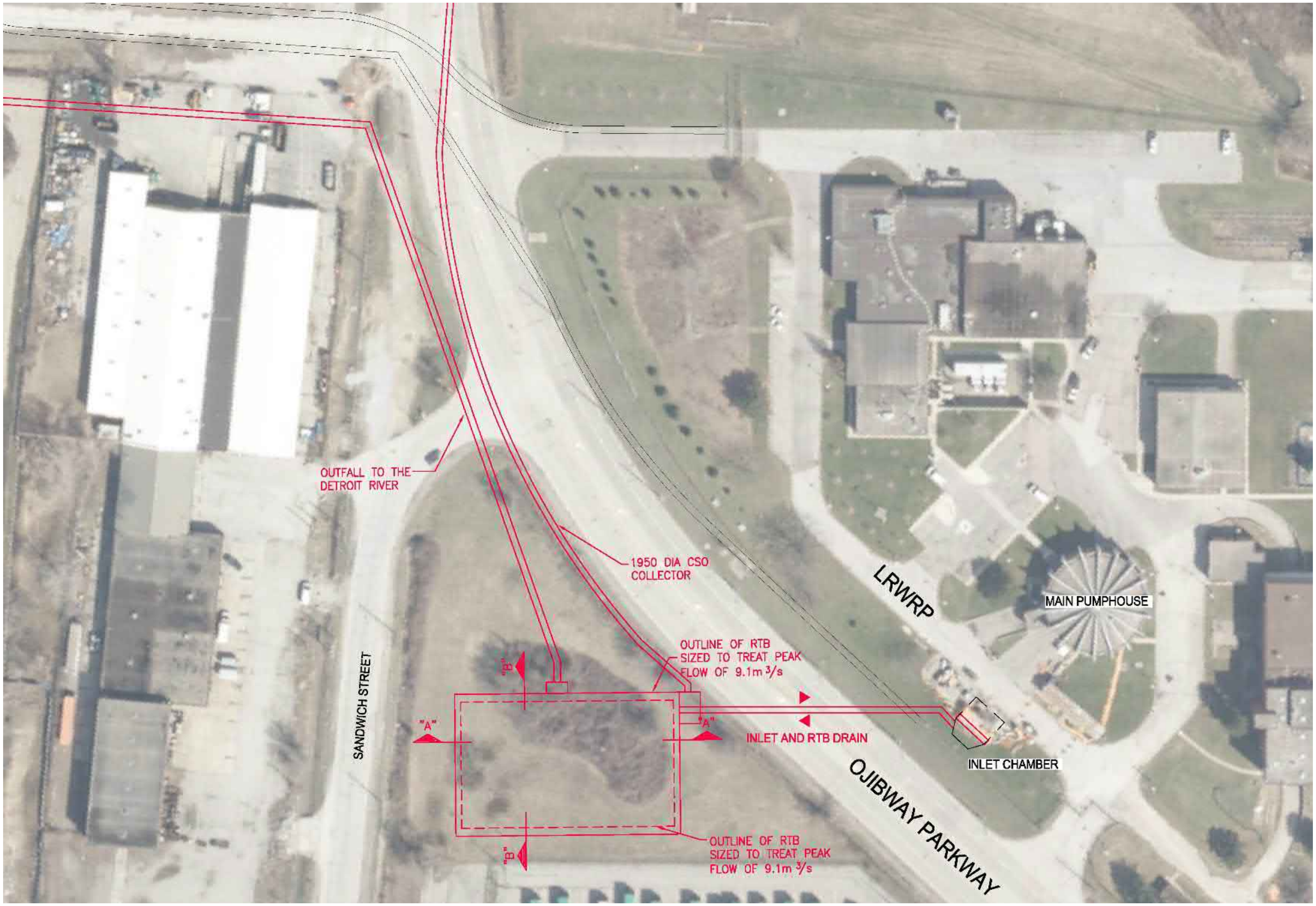
- Sized to handle a flow of 9.1 m^3/s for both CSO and wet weather flow, which is proposed to be equivalent to total capacity of LRWRP influent pumping station

Basin Features

- Influent distribution channel, overflow weir and baffle system
- Multi RTB cells each complete with a flushing water storage compartment and two flushing gates
- Scum baffle and effluent finger weir arrangement
- Sloping floor, training walls, drainage channel, sluice gates
- Mechanical/Electrical room integrated with pumping station headworks to house mechanical, electrical and process equipment including polymer storage and feed facilities

PREFERRED DESIGN

Aerial Plan showing Proposed RTB at the LRWRP



DESIGN ALTERNATIVES

OUTFALL SEWER

Alternative 1 – Outfall Sewer Along McKee Street

- Conflicts with current Gordie Howe International Bridge and perimeter access road (GHIB PAR) storm water outlet and the property to the north's new outlet
- Conflicts with other construction and access restrictions due to other utility infrastructure and their proposed easements (Hydro One)

Not carried forward for detailed consideration

DESIGN ALTERNATIVES - OUTFALL SEWER

Alternative 2 – Outfall Sewer Along Prospect Avenue

- New outfall sewer in parallel with existing LRWRP outfall sewer
- New outfall sewer to match existing LRWRP outfall sewer for redundancy and backup under emergency situation
- Need easement for new outfall sewer
- Final design subject to review and approval by local, provincial and federal regulatory agencies

This alternative recommended as the preferred design

THE CITY OF WINDSOR

Stantec

SUMMARY OF RECOMMENDED DESIGN

- Upgrade interceptor chambers A and D to automated flow control
- A CSO Collection Sewer extending from Chamber A to RTB west of LRWRP across Ojibway Parkway
- A valved interconnection across Ojibway Parkway between the LRWRP Inlet Chamber and the RTB to divert wet weather flow during a storm event or drain the RTB to the LRWRP Inlet Chamber after a storm event
- A RTB, on the west of the LRWRP between Ojibway Parkway and Sandwich Street, sized to handle a maximum wet weather flow of 9.1 m^3/s

THE CITY OF WINDSOR

Stantec

SUMMARY OF RECOMMENDED DESIGN

- A pumping station with a firm pumping capacity of 9.1 m^3/s utilizing screw pumps to raise flow from the Riverfront Interceptor Sewer into the RTB
- Flushing gate equipment to flush accumulated solids from the RTB after a storm event
- An effluent outfall to the Detroit River
- Polymer storage and feed equipment and ancillary mechanical, electrical and control systems required for operation of the CSO pumping station and RTB facilities.

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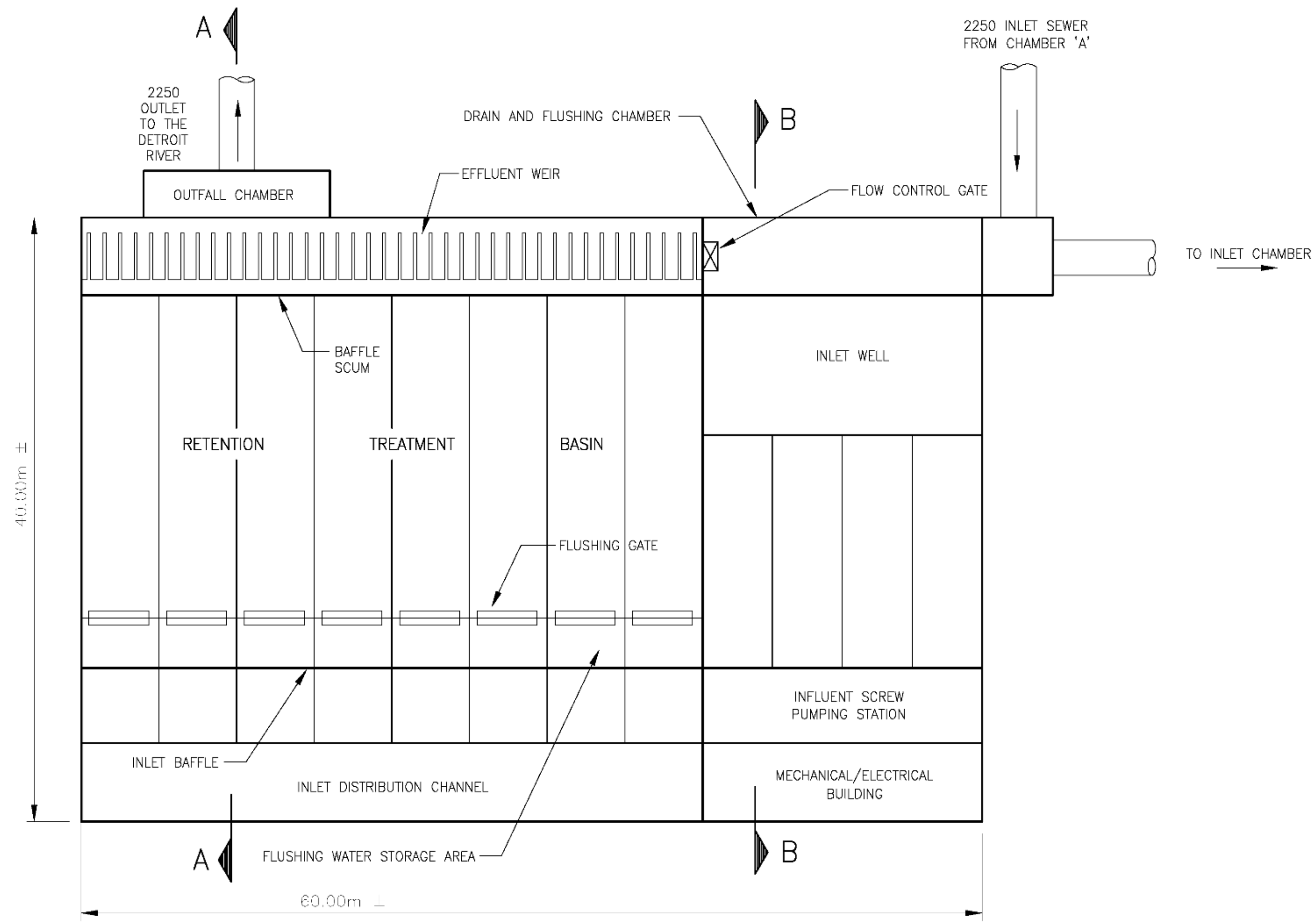
DESIGN ALTERNATIVES

PLAN VIEW OF RTB



NOTE:

THE DIMENSIONS SHOWN ARE INTENDED TO PROVIDE AN INDICATION OF THE OVERALL SIZE OF THE FACILITIES. THESE DIMENSIONS ARE FOR ILLUSTRATION PURPOSES AND WILL BE SUBJECT TO VERIFICATION AND MODIFICATIONS DURING FINAL DESIGN.

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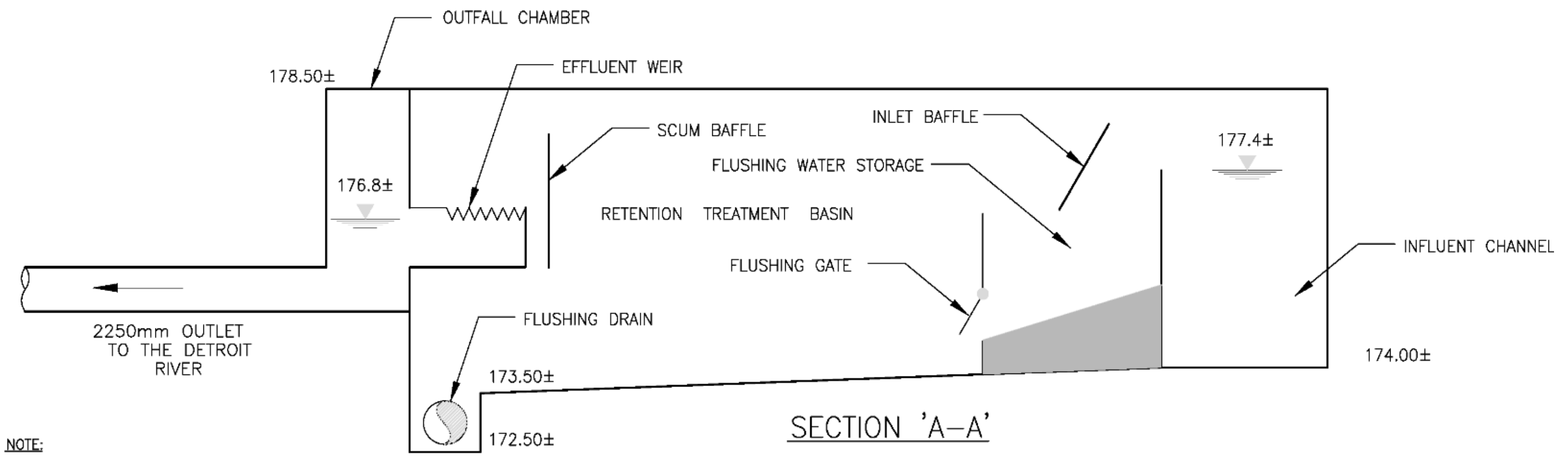
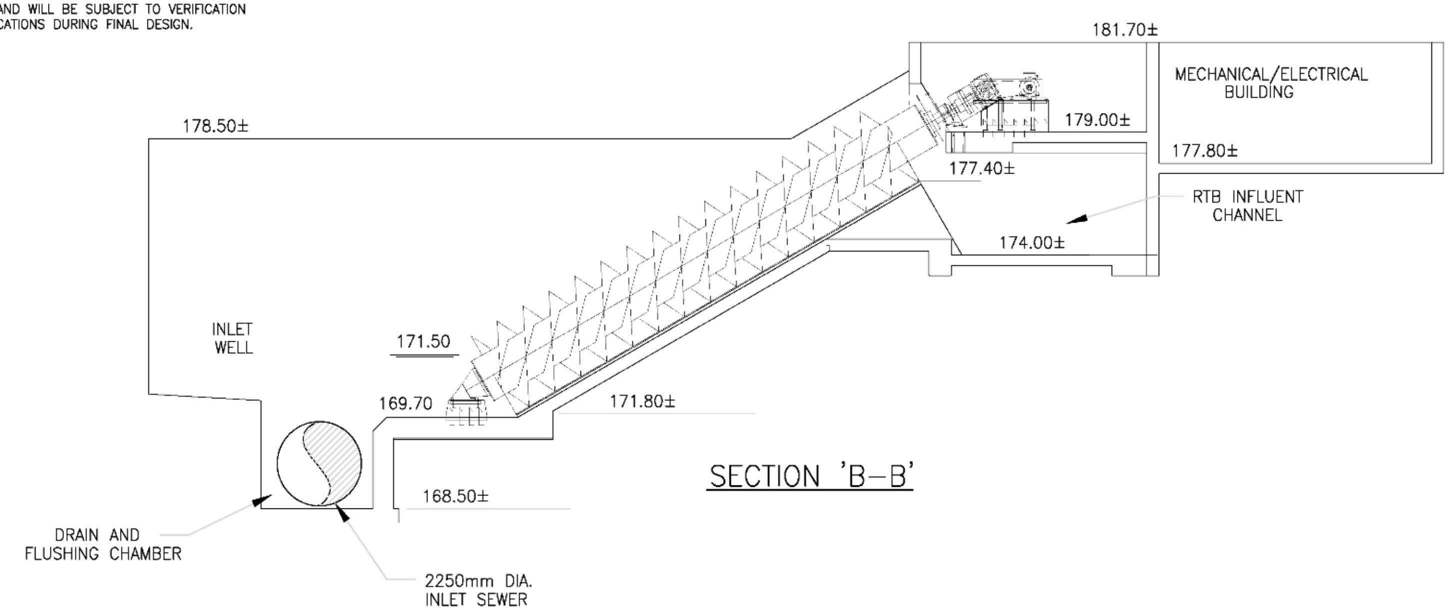
DESIGN ALTERNATIVES

SECTIONAL VIEW OF RTB



NOTE:
THE ELEVATIONS SHOWN ARE INTENDED TO PROVIDE AN INDICATION OF THE OVERALL SIZE OF THE FACILITIES. THESE ELEVATIONS ARE FOR ILLUSTRATION PURPOSES AND WILL BE SUBJECT TO VERIFICATION AND MODIFICATIONS DURING FINAL DESIGN.



THE CITY OF WINDSOR

Stantec

OPINION OF PROBABLE COST

ITEM	PROBABLE COST
Upgrade Interceptor Chambers A, D and F	$4,000,000
CSO Collector Sewer from Chamber A to RTB	$10,000,000
Influent Pumping Station, RTB and Outfall Sewer	$36,000,000
Contingency Allowance	$5,000,000
Engineering Allowance	$7,800,000
HST (13%)	$8,200,000
Total	$71,000,000

STEPS TO COMPLETE CLASS EA WORK

- Open house being held to present information and solicit public input on preferred design
- Draft Environmental Study Report (ESR) being distributed to mandatory and discretionary contacts and agencies for review
- Complete the ESR including modifications as necessary to reflect inputs from the public and review agencies
- Place ESR on public record and issue notice of completion

MEETING MINUTES

Subject:	Windsor Sewer Master Plan: Short-Term Solution Alternatives Review
Date and Time:	June 6, 2019 (10:00 a.m.)
Location:	MECP Office: 733 Exeter Road, London, Ontario
Our File:	17-6638-1000

Attendees

Scott Abernethy	Ministry of Environment, Conservation and Parks (MECP)
Craig Newton	Ministry of Environment, Conservation and Parks
Marc Bechard	Ministry of Environment, Conservation and Parks
Emily Awad	Ministry of Environment, Conservation and Parks
Ed Valdez	City of Windsor (City)
John Albidone	City of Windsor
Sergio Mannina	City of Windsor
Anna Godo	City of Windsor
Janelle Coombs	City of Windsor
Dave Maunder	Aquafor Beach Limited (Aquafor)
Flavio Forest	Dillon Consulting Limited (Dillon)
Bram Bontje	Dillon Consulting Limited
Ian Wilson	Dillon Consulting Limited
Nick Krygsman	Dillon Consulting Limited
Laura Herlehy	Dillon Consulting Limited

Notes

Item **Discussion** **Action By**

1. **Welcome and Meeting Objectives**

1.1. The meeting objectives and introductions were discussed. The meeting objectives were:

- Provide background information and present preliminary findings for areas of surface flooding and basement flooding;
- Review problem areas;
- Review City's CSO strategy and retention treatment basin (RTB) solutions, including MECP Procedure F-5-5 requirements; and
- Review and obtain feedback on the range of alternative solutions for reducing flooding risks (storm, sanitary and combined sewer systems):
  - Source level controls.
  - Conveyance improvements and storage.
  - Combined sewer separation (partial and complete separation).

- Outlet capacity improvements.
- High-Rate retention treatment basin for relief/treatment of excess extraneous flow (sanitary and combined sewers).

2. **Background – Windsor Sewer Master Plan**

2.1. The City has received funding to complete $90 million dollars of storm system improvements over a 10 year period through the federal DMAF program. Improvements were based on a previous study completed by Dillon and Aquafor to address surface flooding with the Riverside Area. These solutions will be refined through this Master Plan and completed to address Schedule B EA requirements. **Project Team**

2.2. Through our study, it was found that there is a strong relationship between the age of homes within the City and the volume of RDII (Rain Derived Inflow and Infiltration) measured within the system. Ground water is not a major contribution to the RDII problem as Windsor is mostly comprised of heavy clay. **Info.**

2.3. Based on historical local construction practices, it is assumed that homes built before 1980 have foundation drains (weeping tiles) connected to the sanitary or combined sewer systems. **Info.**

2.4. Between the August 2016 event and the September 2017 event, approximately 8,000 home owners reported basement flooding. **Info.**

2.5. **Lou Romano Water Reclamation Plan (LRWRP)**

2.5.1. Based on the plant's annual report, the current plant is at 60% capacity accounting for average annual flows to the plant. Under extreme rain events, as required, the plant must throttle the total flow entering the plant to avoid damage to the plant. The inflow is controlled by a sluice gate that can restrict up to 95% of the flows entering the plant. There are other ways flows within the system are controlled during a rain event to provide balance within the system, including upstream pump stations and sewers. **Info.**

2.6. **Little River Pollution Control Plan (LRPCP)**

2.6.1. This plant has an emergency by-pass system that can divert excess inflow from the treatment plant to the Pontiac Pump Station which discharges to the Little River. This by-pass is engaged depending on the water levels within the system. By-pass can only occur when the storm sewer water level is below the sanitary water elevation. The two major storm events (greater than 1:100 year event) in 2016 and 2017, required by-pass. **Info.**
During heavy rain events, the excess flows that cannot be treated, by-pass primary treatment through a separate overflow system. In this scenario, excess flows go through grit removal and chlorination

before discharge.

3. **Background – LRWRP Service Area**

3.1. During rain events, significant RDII enters the system. The system acts similar to a combined system but does not have the additional capacity to accommodate stormwater. **Info.**

3.2. Through this study, it was found that the pattern of basement flooding mirrors the track of the associated storm event. **Info.**

3.3. The established level of service for the sewer Hydraulic Grade Line (HGL) is 1.8 m below the manhole ground surface (to represent estimated basement depths), under a 1:100 year rain event. Under these conditions, it was found most of the City is at risk for basement flooding. **Info.**

4. **Discussion – LWRWP Wet-Weather Treatment and Flood Reduction**

4.1. **Basement Flooding Solutions**

4.1.1. Solutions developed through this study will be a combination of three levels of system improvements: **Info.**

1. **Source Control**
   Through various studies, it was found that 70% or more of the RDII is from private property foundation drain disconnection. The objective of source control measures is to reduce the amount of rainwater getting in to the sanitary system.
2. **Conveyance System**
   Inline storage pipes is recommended to lower the HGL. It is anticipated larger pipes will be equipped with low flow channels to convey dry weather flow.
3. **Treatment Plants**
   Downstream improvements, at the treatment plant are anticipated to be part of the solution. The project team requires feedback on proposed solutions.

4.2. The Master Plan is a City Wide study that is looking into solutions that have a broader, neighbourhood wide level of benefit. It is assumed that subsequent to this study that local issues identified through this study, will need to be reviewed and solutions will need to be determined. **Info.**

4.3. As part of the implementation LIDs (as part of the DMAF funding projects) a monitoring program will be implemented to test the benefits of LIDs so that measured benefits can be better represented in the model to determine if the use of these measures elsewhere in the City is valuable. **Project Team**

4.4.	Foundation drain disconnection is an integral component of the private property source control. The City is proposing to implement a mandatory program where subsidies may be provided to home owners. This program will be presented at the next PIC for this project, scheduled for September.	**Project Team**
4.5.	The implementation of this plan will take decades to implement and therefore, the City plans to first implement foundation drain disconnection in key areas and measure the benefit of completing these measures. Residents will still be encouraged to protect their homes from flooding by implementing measures such as backflow preventers.	**Project Team**
4.6.	The Town of Tecumseh is completing similar work and considering the implementation of a foundation drain disconnection program. To reach the objectives of this project, there needs to be a cooperative effort from all neighbouring municipalities.	**Info.**
5.	**South Windsor Separated Sewer Area – Solutions**	
5.1.	It was found for the south separated portion of the City, that reducing the source of rainwater within private property areas provides benefit to the system, is cost effective and was found to be resilient to potential climate change conditions with more severe storms.	**Info.**
5.2.	This Master Plan will include recommendations on standards that should be implemented to reduce the RDII contributions from commercial, industrial and institutional lands.	**Project Team**
6.	**Central Downtown Combined Sewer Area - Solutions**	
6.1.	Through a recently completed EA, a new RTB unit at the LRWRP is being proposed to address MECP F-5-5 requirements for the west side of the combined sewer service area. The RTB will double the inlet capacity of the existing plant, where the additional 9 cms will be used as an overflow during extreme wet weather events. It is anticipated that this unit will require its own separate Environmental Compliance Approval (ECA).	**Info.**
6.2.	The existing RTB services the east portion of the City's combine sewer service area. The RTB is equipped with a flushing system that flushes solids into the existing sanitary sewer when flow conditions downstream allow.	**Info.**
6.3.	The City is undertaking a separate Stormwater Financing Study that is looking at the implementation of incentives for home owners to implement LIDs on their property.	**City**
6.4.	Foundation drain disconnection is not being considered for the combined sewer service area.	**Info.**
6.5.	The system is being designed to consider a high water level within	

	the Detroit River. The current water level in the river may be at record high.	
6.6.	Beyond F-5-5, the MECP did not identify additional design criteria for combined sewer systems. Further, level of service criteria for flood risk reduction and volume/peak flow stormwater management were not identified. These criteria most commonly coming from municipalities and/or consultants.	**Info.**
6.7.	In regards to the technical implementation of LIDs, the MECP made reference and recommendation for the Low Impact Development (LID) Stormwater Management Guidance Manual. In public infrastructure project, LIDs should be incorporated wherever possible.	**Project Team**
6.8.	ERCA has been engaged through this Master Plan, they will be consulted on the development of solutions.	**Project Team**
6.9.	MECP recommends discussing solutions with their engineering representatives.	**Project Team/MECP**
6.10.	Complete soft separation of the combined areas does not provide an adequate level of service. Implementation of LIDs and system storage is being considered to reduce flood risk within the area. Through implementation of these improvements, the project team needs to balance the system to confirm that F-5-5 requirements are still being met.	**Project Team**
7.	**Background – LRPCP Service Area**	
7.1.	An overview of the LRPCP service was skipped in the interest of time.	**Info.**
8.	**Discussion – LRPCP Wet-Weather Treatment and Flood Reduction**	
8.1.	Through this analysis, it was determined that to reduce basement flooding risk, within the east Windsor area, an approximate breakdown of infrastructure improvements would be as follows: • 25% private property source control; • 25% improved sewer conveyance and inline storage; and • 50% increased storage or conveyance at the treatment plant.	**Info.**
8.2.	On average, the LRPCP plant experiences about 22 overflow events (overflow within the treatment plant) annually. By-pass events occur during extreme rain events, there have been two such events to date in 2019.	**Info.**
8.3.	Under ultimate conditions, the LRPCP plant is expected to double in capacity; however, this increase will not provide adequate capacity	**Info.**

to accommodate and treat heavy wet weather events. The project team is proposing the use of a RTB type unit which will have a separate stormwater outlet to the Detroit River.

8.4.	Currently the treatment plant is at 60% capacity based on the annual average. During hot summer months there are times when not enough influent is entering the plant to support the biological treatment process.	**Info.**
8.5.	During rain events, due to the extent of residential foundation drains connected to the sanitary system and a large combined sewer area generating flow at the upstream end of the service area, the flows at the plant are considered similar to a combined system.	**Info.**
8.6.	The project team is requesting that the MECP provide feedback on this strategy to address basement flooding within this area.	**MECP**
8.7.	Based upon the material and strategy outlined for the LRPCP service area, the MECP did not object to the flood risk reduction approach. However, this was not a technical review of the material.	
8.8.	In regards to the use of an RTB for treatment of diluted wet weather sanitary flow, it was recommended the project team discuss the technical approach with the approvals branch in Toronto.	**Project Team**
8.9.	A separate servicing study is being completed for the large Sandwich South Secondary Plan Area in the south portion of the East Windsor sewer shed area. This study will look at that level of development that can be accommodated before the treatment plant will need to be expanded.	**Project Team**
9.	**Stormwater Solutions**	
9.1.	The project team is currently refining the storm service areas that will be addressed through this Master Plan. Focus on maintaining access during major events is integral.	**Project Team**
9.2.	The MECP staff noted that as part of the ECA application review, the MECP focuses on water balance calculations and water quality. This is covered in the LID stormwater management manual.	**Info.**
9.3.	The project team noted that Windsor has limited infiltration capacity due to the clayey soils. The project team has asked to what level LIDs can be relied on to address flooding.	**Info.**
10.	**Master Plan – Public Consultation**	
10.1.	A PIC was held in June 2018, and the project team recently had pop-ups at three events throughout the City. The next PIC is schedule for September 2019. The project team is strategizing on	**Project Team**

how to encourage the public to attend and be involved. The project team is meeting next week to develop a plan.

11.	**Next Steps**		
11.1.	The MECP can assist with the approval process for the major ECA approvals that will be required for the major infrastructure improvements.	**MECP/Project Team**	
11.2.	The MECP has offered to complete a preliminary review of the Master Plan in advance of formal completion to confirm that the report is complete and there are not red flags.	**MECP/Project Team**	

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

Distribuon

All Present

Mark Winterton	-	City of Windsor
Jake Renaud	-	City of Windsor
Samir Dhanvantari	-	Aquafor Beech Limited

LMH:d

June 10, 2019

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519.948.5054

Our File: 17-6638 (Corr.)

November 10, 2020

Corporation of the Town of LaSalle
5950 Malden Road
LaSalle, ON
N9H 1S4

Attention: Peter Marra, P.Eng.,
Director of Public Works

Windsor Sewer and Coastal Flood Protection Master Plan
Consultation with the Town of LaSalle and
Impact Assessment of Receiving Watercourses

On behalf of the City of Windsor, Dillon Consulting Limited (Dillon) is providing this letter as a formal response to the comments provided by the Town of LaSalle as it relates to the Windsor Sewer and Coastal Flood Protection Master Plan (SMP). This letter includes details regarding the consultations held to date between the Town of LaSalle, ERCA and the project team regarding the City's SMP and the assessment of downstream impacts from the preferred flood mitigation solutions on receiving watercourses.

1.0 Background

The City of Windsor has experienced several significant storm events in recent years that have resulted in widespread basement and surface flooding throughout the City. In addition to these events, current high Lake St. Clair and Detroit River water levels are affecng` the performance of municipal sewer systems and posing risks to property owners in coastal and low lying areas. The City has undertaken this SMP to understand the causes of flooding, identify and evaluate alternave` soluons,` complete high level design and cost estimates for the preferred soluons` and to provide an implementation strategy.

On November 6, 2017, Windsor City Council authorized Dillon Consulng` Limited (Dillon) to complete Phase 2 of the SMP (CR660/2017).

The scope of the City's SMP includes the assessment of the City's exisng` sanitary, combined, and storm sewer systems, as well as the exisng` overland drainage systems, including the identificaon` of problem areas that are vulnerable to basement, surface and coastal flooding. Findings were used to develop a long term implementaon` strategy to improve the City's sewer infrastructure to mitigate flood risks. The SMP follows Approach No. 2 of the Municipal Class Environmental Assessment (MCEA) Master Plan process, which served as a framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of basement, surface and coastal flooding.

The scope of this project does not include the evaluaon` of the open watercourses that serve as outlets for the City's storm sewer systems, though it was recognized that consideraon` must be given to the boundary conditions they present. As a result of the Town of LaSalle's comments of April 5, 2018, the the scope and direcon` of the SMP was influenced as follows:

- In order to ensure that the City's flood mitigaon` soluons` would not have a negative impact to downstream watercourses, the range of alternative soluons` would be limited to temporary storage soluons` that would not result in increased peak flows.
- The scope of our project was expanded to include an evaluaon` of the preferred flood mitigaon` solutions to confirm that they would not negatively impact the downstream watercourses, including the Grand Marais Drain (GMD).

It should be noted that any measures to address improvements to existing flow regimes in the open watercourses within the City of Windsor and neighbouring municipalities was beyond the scope of the City's SMP project. The scope of the SMP is limited to addressing the risk of basement and surface flooding associated with the storm, sanitary and combined sewer systems, as well as protecons` from coastal flooding related to high water levels in the Detroit River.

2.0 Sewer Master Plan Solution Strategy

As part of the SMP, the Town of LaSalle was consulted as a project stakeholder. The Notice of Commencement for this study was distributed to all relevant stakeholders, including the Town of LaSalle, on March 22, 2018.

On April 5, 2018, in response to the SMP Notice of Commencement, the Town of LaSalle provided the attached email to the SMP project team (Exhibit 1).

The project team forwarded these comments to ERCA (Essex Region Conservation Authority) on May 2, 2018 (Exhibit 1), noting the need to coordinate with the Town of LaSalle and confirm solution parameters for this study.

ERCA has been involved throughout the duration of this project as a member of the Technical Steering Committee (TSC), which included their attendance at regular Technical Steering Committee (TSC) meetings. Discussions with ERCA regarding confirmation of boundary conditions and the constraints related to discharging flows to downstream watercourses started as early as April 4, 2018 (Meeting Minutes - Exhibit 2).

Since the Town's comments came at the early stages of this project, the project team was able to incorporate these aspects in our design criteria and project constraints, but we were not yet in a position to respond directly until such time that the existing condition InfoWorks sewer system model could be developed to confirm the problem areas of flooding. From early in 2018 to May 2019, the project team focused on the following tasks:

- Refinement and calibration of the existing sewer system model (developed in Phase 1 of the City's SMP).
- Consultation with the public regarding past flooding events, the problem definition, and the development of short-term solutions (example: downspout disconnection):
  - Public Information Centre sessions were held over three days on June 12, 13 and 14, 2018, for which a Notice was sent to the Town on June 6, 2018.
- Identification of problem areas based on modelling and reported flooding.
- Development of design criteria and level of service factors.

These tasks were required to inform the development of long-term alternative solutions to mitigate the risks of basement, surface and coastal flooding.

On June 27, 2019 (TSC Meeting Minutes – Exhibit 3), the project team held a meeting with ERCA regarding preliminary surface flooding solutions that would not rely on discharging additional flows to downstream water courses (with the exception of Detroit River). It was agreed that alternative solutions must not negatively impact receiving watercourses, which is consistent with comments received from the Town of LaSalle, and that an evaluation of the outlet watercourses would be required to confirm this. It was agreed during this meeting that the results of the Landmark Engineering Study for the Grand Marais Drain (March 2019) should be used to complete the downstream impact assessment required to address the Town of LaSalle's concern and to meet ERCA's requirements.

To address the initial comments provided by the Town of LaSalle (April 5, 2018 - Exhibit 1), it was agreed that the following approach would be taken:

- Solutions to reduce surface flooding risk on major roadways and within regional flooding problem areas would be based on a combination of source control and storage measures with no increase in peak flows, as required to avoid impacts to downstream watercourses (other than for areas served by the Detroit River). It should be noted that:
  - These measures often result in additional costs and more land than an approach based on increased sewer conveyance and discharge capacity.
  - Solutions were designed to meet a minimum 1:100 year level of service, with major roadway flood mitigation measures designed for a Climate Change Stress Test storm (1:100 year plus 40% increase in

volume and intensity factors) to provide added resiliency to the solutions developed, which exceeds the current Regional Stormwater Guidelines.

- The original scope of the SMP did not include the assessment of open drains, but did recognize the need to incorporate the associated boundary conditions for the upstream storm sewer systems they served. In order to confirm that the flood mitigation solutions would not negatively impact the receiving watercourses, additional modelling and reporting was added to the project scope. The assessment of the receiving watercourses confirmed that the preferred solutions from the SMP had no negative impact, as outlined in the Outlet Capacity Impact Assessment (Dillon, Revised June 2020).
- The tailwater conditions in the outlet watercourses were considered in the City's sewer model based on the 2019 GMD Hydrologic and Hydraulic Model (GMD H&H) study, based on which the extent of surface flooding and solutions to mitigate the risks of that flooding were developed based on no increases to peak discharge rates.

Measures to address improvements to existing flow regimes in the open watercourses within the City of Windsor and neighboring municipalities was beyond the scope of the City's SMP project. The scope of this project is limited to addressing the risk of basement and surface flooding associated with the storm, sanitary and combined sewer systems, as well as protections from coastal flooding related to high water levels in the Detroit River.

The SMP project team developed alternative solutions, evaluated these solutions, and identified the preliminary preferred solutions. These solutions were presented to the City of Windsor and ERCA on October 17, 2019 (Meeting Minutes – Exhibit 4), for comment. The project team refined the alternative solutions and preliminary preferred solutions in January 2020. The process was documented and presented to the Public at the second set of Public Information Centre meetings held on February 11, 12, and 13, 2020, which the Town was notified of on January 30, 2020.

The Outlet Capacity Assessment was completed for the preferred solutions that were presented at PIC 2. This assessment was completed during March 2020 and April 2020. The completed assessment was forwarded to the Town of LaSalle for review on April 22, 2020.

Subsequently, a meeting was scheduled on May 8, 2020 with the Town of LaSalle, ERCA and the City of Windsor. This meeting was held 2 weeks after the first draft of the Outlet Capacity Assessment Report (Dillon) was completed, to review the findings and preferred solutions of the SMP. During the meeting, it was identified that the preferred solutions would have no negative impacts on the outlet watercourses, and in the longer term, are expected to result in reduced potential for downstream flooding and erosion. Minutes of this meeting were provided to all attendees on May 15, 2020 (Exhibit 5).

3.0 Responses to the Town of LaSalle Memorandum (May 22, 2020) (Exhibit 6)

The Town of LaSalle confirmed their understanding of the project and presentation materials in a memorandum sent to the Dillon project team on May 22, 2020 (Exhibit 6).

The response to the comments regarding the Cahill Drain are outlined below:

- Through this SMP, only one solution was proposed within the Cahill Drain drainage area, namely that the existing normal water levels in the Southwood Lakes pond system be lowered to provide additional active storage by altering the pump control elevations, while maintaining the same pump discharge flow rates. There is not expected to be a negative downstream impact from this recommended solution, as peak flows are maintained.
- A review of background reports was completed as part of flood risk assessment works supporting the SMP, where fixed high water levels were taken from existing studies and used as the boundary condition under extreme rainfall events. The relative impact assessment was limited to sections of open drain within the City of Windsor:
    - A drainage report on the upper Cahill Drain within the City of Windsor along Cousineau Road to the Herb Gray Parkway (north limit) had been adopted in 2019 (Rood Engineering). It recommended improvements to enlarge several existing drain crossings (culverts) but no alterations were made to improve the drain channel capacity.

The response to the comments provided regarding the Grand Marais Drain are outlined below:

- The Outlet Capacity Impact Assessment (Dillon, Revised June 2020) identified the proposed solutions from the SMP had no negative impact on the receiving watercourses. This hydraulic modelling completed as part of the Outlet Capacity Impact Assessment included the portion of the Grand Marais Drain from Central Avenue to Huron Church Road.
- City By-Law 119-2019 adopted the Drainage Act Report (completed by Landmark Engineers Inc., dated October 14, 2019) for the portions of the Grand Marais Drain within Windsor, as presented at the November 18, 2019 City Council Meeting. This Drainage Act Report is available on the City's website.
- Landmark developed a PCSWMM model of the Grand Marais Drain (GMD) to assess the watercourses hydrology and hydraulics as part of their independent, separate project (March 2019). This PCSWMM model was used in the outlet capacity assessment, where hydrographs from the SMP could be

directly inputted. The Town of LaSalle has acknowledged in their email dated Oct. 30, 2020 (under Item 11.2) that they have provided input to that study.

- As outlined previously, measures to address improvements to existing flow regimes in the open watercourses within the City of Windsor and neighboring municipalities was beyond the scope of the City's SMP project.
- A review of background reports was completed as part of flood risk assessment works supporting the Master Plan. High water levels were taken from the (GMD H&H) (2019) as it was the most up to date data available.
- As with any other changes to the natural, social, and environmental conditions that may arise in the future following the completion of any Master Plan or Class Environmental Assessment study, updated information resulting from the Town's study of the Turkey Creek Watershed will be considered by the City as part of the design and implementation of the preferred solutions. Subject to the need/extent of any changes required to the preferred solutions as result of any changes to the boundary conditions on which these solutions were based, revisions to the preferred solutions may either be deemed a design revision, or may require a scoped Addendum under the Master Plan process if the change is considered significant.
- The SMP team were aware of the Grand Marais Drain Hydraulic and Hydrology Study (Landmark March 2019), the Drainage Report for the Grand Marais Drain (Landmark October 2019), the Drainage Act Works underway for the Municipal Drains downstream of the Herb Gray Parkway, and the Howard Bouffard Drainage Master Plan. The GMD H&H (March 2019) model for the Grand Marais Drain was used in the outlet assessment provided to the Town of LaSalle.
- The focus of the City's SMP is to address the risks of surface and basement flooding from the storm, sanitary and combined sewer infrastructure based on existing conditions, and does not include assessment or improvements to the open watercourses within the City and neighbouring municipalities.

Response to the Town's May 22, 2020 memo was delayed to allow sufficient time for meetings to be held in July 2020 to discuss a coordinated study and address concerns raised by the Town of LaSalle. We understand that the Town of LaSalle, Town of Tecumseh, the City of Windsor and ERCA are now proceeding with the completion of a separate study of the Turkey Creek Watershed (TCW).

As the City's SMP recommendations are reviewed and refined through future Master Plan updates and prior to detailed design and implementation of solutions, the findings and recommendations of the TCW report will be considered in updates to the City's sewer model and the recommendations of the SMP. The City's model is a dynamic tool that will be updated on a regular basis to reflect the most up to date conditions and sewer data. The model will be used to confirm solutions remain effective as conditions change and that they have no negative impact prior to detailed design and implementation of infrastructure projects.

4.0 Town of LaSalle Memorandum (June 10, 2020, Update) (Exhibit 7)

An update to the May 22, 2020 Memorandum from the Town of LaSalle was provided on June 10, 2020, (Exhibit 7). This update from the Town was provided to ensure accurate information is being conveyed.

SMP flood mitigation solutions for the Southwood Lakes development are not introducing any additional flows to this system, therefore the conditions leading to this are not related to the scope of the SMP.

In regards to the GMD, the assessment of conditions in open drains or watercourses, including the GMD, is beyond the scope of the SMP project. The Outlet Capacity Impact Assessment (Dillon, Revised June 2020), was a comparative evaluation of the conditions pre and post implementation of the preferred SMP improvements to understand the relative change that could be expected. It was found there was no negative impact to the Grand Marais Drain upon implementation of the proposed improvements. The SMP project team used a reasonable standard of care in the use of the most up to date model results (2019 GMD H&H Study) in completing this assessment, as agreed with ERCA and the City of Windsor.

5.0 Town of LaSalle and City of Windsor Coordination Meeting (October 22, 2020)

The Town provided further comments by email on October 14, 2020, (Exhibit 8) in relation to the Windsor Sewer Master Plan, a subsequent coordination meeting was held on October 22, 2020 (Meeting Minutes - Exhibit 9 and Presentation – Exhibit 10).

The following clarifications were made through this meeting:

- The City is proceeding with the completion of the SMP in order to meet deadlines associated with Disaster Mitigation and Adaptation Funding (DMAF) for projects recommended in the East Windsor Area. These projects have been identified as high priority due to the presence of significant flood risks due to high Lake St. Clair/Detroit River water levels and improvements must be completed/constructed by 2028 to be eligible for this funding.
- As part of the Outlet Capacity Assessment (Dillon, 2020), a sensitivity analysis was completed to understand the relative impacts of recommended solutions on the GMD and conversely, the GMD on the solutions, under various conditions. This was completed to demonstrate that solutions developed as part of this SMP are not materially affected by water levels and flows within the downstream water course (Grand Marais Drain) and vice versa.
- The SMP Implementation Plan notes that the solutions proposed within the South Windsor (Turkey Creek Watershed Study) area are not planned for design/construction within the City’s current 10-Year Capital Works Plan. The City would only consider expediting implementation of these solutions if

external funding resources were obtained. It is understood that the TCW study would be completed in 2021. Prior to the implementation of these recommended solutions, the City is expected to consider the findings of that report and any other report, study or assessment that relates to those areas, and update the City's model and SMP recommendations accordingly. This is a standard expectation for any material changes to the environment that may arise in the future that are deemed to influence the recommendations of the SMP.

- The strategy taken to develop South Windsor solutions (solutions within the upper Turkey Creek Watershed area) is similar to the strategy being used for solutions recommended within the Little River Watershed area for which it was agreed that the assessment of the Little River will be completed as part of the Little River Floodplain Assessment Study that is currently underway.

6.0 Closure and Next Steps

In closing, the City will finalize the SMP for presentation at the November 23, 2020 City of Windsor Council Meeting. Subject to City Council approval, the EA Notice of Completion will be tentatively posted on December 2, 2020. The SMP report will include commentary regarding the completion of a regional study that has been initiated to address concerns related to the Turkey Creek Watershed. The sewer model outlet boundary conditions will be updated based on the findings of that study, including the assessment of any influence on the preferred solutions.

The methodology used in the development of flood mitigation solutions was completed in accordance with the MCEA, Approach 2 requirements. Prior to detailed design and implementation of solutions, the City will confirm that the recommended solutions are consistent with the natural, social and environmental conditions on which they were based. Any changes in these conditions, regulatory requirements, or other physical site conditions may require modifications to those recommended infrastructure improvements. Subject to the need/extent of any changes required to the preferred solutions, as result of any changes to the conditions on which these solutions were based, revisions to the preferred solutions may either be required. These revisions may require design revisions, or may require a scoped Addendum under the Master Plan process if the change is considered significant. If an addendum is warranted, the City would follow the MCEA (A.1.5.2) to issue an addendum to his Master Plan.

The Environmental Assessment and Part 2 Order Process (PIIOR) has now changed and now only applies to requests related to aboriginal or treaty rights. All other project related requests must be addressed directly to the proponent. Should the above letter not satisfy the Town of LaSalle's concerns or the Town has other questions/comments upon reviewing the SMP report, the Town may issue a formal request to the City. The Ministry of Environment, Conservation and Park (MECP) and MCEA have yet to provide further clarification or guidance on this new process;

however, the City will continue to work with the Town. The City confirms that the solutions recommended in the SMP, within the TCW drainage area, will be re-evaluated based on the updated findings of the TCW study.

We trust that we have addressed the comments provided by the Town of LaSalle. Please contact the undersigned at lherlehy@dillon.ca or by cell phone at 519-818-3105.

Regards,

DILLON CONSULTING LIMITED

Flavio Forest, P.Eng.
Project Manager

Laura Herlehy, P.Eng.
Project Engineer

LMH:d
Encl.
Cc: Barb Slattery, EA/Planning Coordinator, Ministry of Environment, Conservation and Parks
James Bryant, P.Eng., Essex Region Conservation Authority
Tim Byrne, Essex Region Conservation Authority
Mark Winterton, P.Eng., City of Windsor
France Isabelle-Tunks, P.Eng., City of Windsor
Fahd Mikhael, P.Eng., City of Windsor
Anna Godo, P.Eng., City of Windsor
Jonathan Osborne, P.Eng., Town of LaSalle

Exhibit 1

Herlehy, Laura <lherlehy@dillon.ca>

Fwd: Sewer Master Plan City of Windsor Notice of Commencement

1 message

Wilson, Ian <iwilson@dillon.ca> Mon, Apr 22, 2019 at 12:25 PM
To: James Bryant <JBryant@erca.org>
Cc: Laura Herlehy <LHerlehy@dillon.ca>, "Forest, Flavio" <fforest@dillon.ca>, Tim Byrne <tbyrne@erca.org>

Hi James,

Hope you had a good long weekend. This email chain related to the Windsor Sewer Master Plan and questions regarding storm water solutions in existing development, is what I was referring to a few weeks ago. We aren't explicitly modelling watercourses/drains for this project, just sewers and surface drainage with fixed tailwater conditions at outlets.

We were previously focusing on problem area confirmation and model development but have now moved on to preliminary solution development. Once we have a better idea of solutions we want to have a meeting with the Town of LaSalle and ERCA; likely end of May or Early June, to be schedule later.

Please see the previous correspondence from LaSalle and Dillon. Thanks and take care,

Ian Wilson, P. Eng., M.A.Sc.
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---------- Forwarded message ---------
From: **Forest, Flavio** <fforest@dillon.ca>
Date: Wed, May 2, 2018 at 4:39 PM
Subject: Re: Sewer Master Plan City of Windsor Notice of Commencement
To: jhenderson@erca.org <jhenderson@erca.org>, Tim Byrne (tbyrne@erca.org) <tbyrne@erca.org>
Cc: Anna Godo <agodo@city.windsor.on.ca>, Wilson, Ian <iwilson@dillon.ca>, Ryan Langlois <rlanglois@dillon.ca>, Hicks, Wes <whicks@citywindsor.ca>

John/Tim, I would appreciate your thoughts on this so that we can reply to the Town of LaSalle, as well as confirm the parameters for the solutions in the Sewer Master Plan.
Please note that our next technical steering committee meeting is on Monday, May 14 at 1:30, so please let us know if you can make it to that meeting to address this, or whether a separate meeting is preferred.
Thanks

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Partner
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Please consider the environment before printing this email

On Mon, Apr 16, 2018 at 2:38 PM, Forest, Flavio <fforest@dillon.ca> wrote:

John/Tim, please see the following comments from the Town of LaSalle related to the City's Sewer Master Plan project.

As discussed, the scope of the City's Sewer Master Plan does not include the modelling of existing watercourses, for which we would rely on existing studies to establish the boundary conditions that would dictate the range of solutions that would be available in mitigating the risks of flooding in the City's sewer and overland drainage systems. Specifically, we expected that for the Grand Marais and Lennon/Cahill sub-drainage areas, that we would not be permitted to increase the release rate into these watercourses to relieve the storm sewer systems, which would leave us with temporary storage solutions to manage excess flows (above or below grade, including LID strategies). While these strategies would address the peak flow constraint, there would be changes to the discharge flow characteristics with storage solutions,much like the influence of SWM facilities.

In the case of the Little River Drain, we were trying to establish whether increased flows to this watercourse could be permitted, particularly given the previously proposed Pontiac Pump Station upgrades and the future expansion of the Little River PCP. To date, we have not been able to confirm the boundary conditions to which we are to be held to in developing the alternative solutions in the Little River sub-watershed.
It is important for us to confirm ERCA's direction on the opportunities and constraints with these watercourses based on the direct influence this has on the solutions that would be available in addressing the flooding risks in the City's sewer and overland drainage systems.

We are progressing with our Sewer Master Plan and need to finalize this boundary condition criteria as soon as possible.

Please let us know how soon you would be available to meet to discuss this in more detail.

Thanks

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Please consider the environment before printing this email

---------- Forwarded message ----------
From: **Peter Marra** <pmarra@lasalle.ca>
Date: Thu, Apr 5, 2018 at 11:57 AM
Subject: Sewer Master Plan City of Windsor Notice of Commencement
To: "info@weatheringthestorm.ca" <info@weatheringthestorm.ca>
Cc: "Hicks, Wes" <whicks@citywindsor.ca>, "fforest@dillon.ca" <fforest@dillon.ca>, "Godo, Anna" <agodo@citywindsor.ca>, Jonathan Osborne <josborne@lasalle.ca>

I have received a copy of the notice of commencement for this Master Plan.

I would like to be informed of the project as it relates to the Basin Drain, Lennon Drain and Cahill Drain watersheds, which ultimately outlets to the Turkey Creek and any identified deficiencies and planed improvements within these watersheds within the City boundaries. We specifically are interested in negating increased storm flows through these exiting drainage systems to reduce or at least maintain existing drainage scheme with respect to flow quantities, quality and addressing additional erosion from additional prolonged period of peak flows, etc. through each respective watershed.

We are hoping that when modeling occurs in these respective watersheds, they will be brought to the Detroit River. The Town will be happy to provide any documentation you need from our system in order to complete this successfully.

As you may know, the storm of 2017 saw record high water levels in Turkey Creek through LaSalle and into the Detroit River. A significant portion of the Turkey watershed lies within the City and outlets through LaSalle.

You may circulate an additional information on this project to myself and Jonathan Osborne, P.Eng. at josborne@lasalle.ca

Thank-you for your time.

Regards,

Peter Marra, P.Eng.
Director of Public Works

Town of LaSalle

5950 Malden Road, LaSalle, Ontario N9H 1S4

Phone: 519-969-7770 ext. 1475 Fax: 519-969-4469

Email: pmarra@lasalle.ca

www.lasalle.ca

Visit Us On Social Media:

Exhibit 2

DILLON CONSULTING

MEETING MINUTES

Subject: Technical Meeting - Sewer Master Plan
Date and Time: April 4, 2018 at 1:00 p.m.
Location: Dillon Consulting Limited (Windsor Office)
Our File: 17-6638

A. endees

Andrew Dowie	City of Windsor (City)
Anna Godo	City of Windsor
Chris Manzon	City of Windsor
Karina Richters	City of Windsor
John Henderson	Essex Region Conservation Authority (ERCA)
Dave Maunder	Aquafor Beech Limited (Aquafor)
Victor Hebert	Dillon Consulting Limited (Dillon)
Karla Kolli	Dillon Consulting Limited
Ryan Langlois	Dillon Consulting Limited
Ian Wilson	Dillon Consulting Limited

Item	Discussion	Action By
1.	**Project Website Uptake/Traction**	
	Project Website Update:	
	· The project website has had nearly 600 total visits from its March 22, 2018, launch to April 4, 2018. 15 people have participated in the map my flood story with 25 pins used.	**Info.**
	· Dillon will review the benefits and use of Facebook ads to promote project website, the Master Plan, and upcoming events.	**Dillon**
2.	**Stakeholder Advisory Committee**	
	Applications and Steps to First Meeting:	
	· There have been 39 downloads of the Stakeholder Advisory Committee (SAC) application form, but only received 5 emails noting application. Key dates for the committee are as follows: o April 13, 2018, public applications are due. o April 17, 2018, acceptance letters and agendas are mailed. o May 1-3, 2018, anticipated first SAC meeting.	**Dillon/City**
	· The location for the first SAC meeting will be at City Hall. The City will book/confirm room.	**City**

- A draft SAC agenda was provided for review. **Info.**

3. **Other Project Public Engagement Updates (Pop Up Event, etc.)**

<u>Pop-up Events:</u>

- Details of the proposed April 22, 2018, pop-up event were discussed. This will include the use of a banner, with post cards, 2 panels, and potential children's activity. Dillon will provide draft materials for City review by April 9, 2018. **Dillon/City**
- There may be an opportunity to do a second pop-up event at the open house for the climate change demonstration house. **Info.**

4. **Project Problem and Opportunity Statement**

- A draft problem and opportunity statement was provided to the attendees for comment and review. A copy of that state is included as an attachment. **Info.**
- Comments in regards to updating the draft problem and opportunity statement included: **Dillon/Aquafor/City**
  - o In regards to comment "not all flooding risk can be eliminated", it should be noted every achievable measure to reduce the risk of flooding will be considered/implemented.
  - o Considering including past design standards were applied at time of construction. For old sewers, these are different than current design standards.
  - o Add reference to basement flooding.

5. **June 2018 PIC Event Plan**

- A schedule identifying milestones was presented and included the key steps to prepare for the PIC events for the week of June 4, 2018, or June 11, 2018. The schedule is attached. **Info.**
- The City noted the upcoming Lou Romano open house (May 26, 2018) and the Climate Change House (date TBA), as potential events to join with the Sewer Master Plan PIC. Dillon and Aquafor will review project schedule to confirm if this can be completed. **Dillon/Aquafor/City**
- A draft PIC event plan memo was reviewed. Comments were as follows: **Dillon/Aquafor/City**
  - o An additional purpose of the event is to educate the public on the need to balance risk reduction and

cost.
- o There are measures we can implement with limited additional study.
- o Public and private property LID measures, stormwater credits/surcharges, and updates of development standards should not be considered measures that can implement with limited additional study.
- o The PIC presentation material should consider impact of climate change.

6. **Data Collection Update: Flow Monitoring, Field Survey, and Background Study Summary**

- A summary update was provided. Refer to the attached graphics for additional details of data collection: **Info.**
  - o The flow monitors will be installed by April 5, 2018. One of the AMG rain gauges will be installed on the Coronation Public School building's roof; the other location had yet to be confirmed. (Note this rain gauge was ultimately installed at the East Banwell Pump Station).
  - o Field survey work is being completed to identify downspout connection/disconnection rates throughout the City. This also includes spot checks of GIS data catchbasin type, and identification of lot grading.
  - o The background study review has been completed, a summary report and GIS data identifying areas for improvement and where construction has occurred. The data and report are undergoing QC/QC.

7. **Model Development Update**

- A summary update was provided. Expansion of the minor system (sewer) one-dimensional model is well underway, approximately 75% complete. This includes refining upstream catchments and the addition of upstream sewers in flood vulnerable areas. **Info.**

8. **Other Business**

- The question of whether solutions from the Master Plan should consider releasing additional flow to the open waterways was discussed and if allowed, would additional assessment of the waterways be required. It was asked if **Dillon/City/ERCA**

relative-change type assessment could be completed using the InfoWorks model of the drains to assess impacts in change of release rates to the waterways. The following was included in the discussion:
  - Releasing a higher peak flow rate directly to the Detroit River would be acceptable.
  - In regards to the other major waterways in the City, including but not limited to Grand Marais, Little River, Turkey Creek, and Cahill, concerns for increasing peak flow discharge were noted.
  - The Grand Marais concrete lined portion was noted to have conveyance capacity for the Hazel storm event; however, other portions of the drain including Turkey Creek were only assessed under a 1:100 year design storm. With development generally being fully built out in the headwaters of the Grand Marais Watershed, an increase in the release rate to the drain may not be acceptable.
  - In regards to Little River, it was noted a Flood Hazard Assessment Study would likely be required to assess any change in flow regime in waterway.

- In regards to readily implementable solutions or "short-term" solutions, it was noted that a cost-benefit understanding should be developed for each solution.

Errors and/or Omissions

These minutes were prepared by Ian Wilson, P.Eng., who should be notified of any errors and/or omissions.

Enclosure

Supplemental presentation figures and slides.

Distribution

All Present

Tim Byrne	–	Essex Region Conservation Authority
Janelle Combs	–	City of Windsor
Anni Buells	–	Dillon Consulting Limited
Flavio Forest	–	Dillon Consulting Limited

IDW:d

April 11, 2018

Exhibit 3

MEETING MINUTES

DILLON CONSULTING

Subject: Windsor Sewer Master Plan – ERCA Technical Meeting – Review of Surface Flooding Findings and Strategies for Surface Flood Reduction

Date/Time: June 27, 2019, 9:00 AM

Location: Dillon Consulting Offices

Our File: 17-6638

A endees

Anna Godo	City of Windsor (City)
Janelle Coombs	City of Windsor
James Bryant	Essex Region Conservation Authority (ERCA)
Dave Maunder	Aquafor Beach Limited (Aquafor)
Flavio Forest	Dillon Consulting Limited (Dillon)
Ian Wilson	Dillon Consulting Limited
Laura Herlehy	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	**Project Introduction and Objectives**	
1.1.	Dillon and Aquafor have been retained by the City to complete the Windsor Sewer Master Plan. This plan aims to develop solutions to reduce basement and surface flooding and develop an implementation plan to implement these solutions. Solutions developed will look at both private and public side improvements to meet the goals of this project. A copy of the presentation provided during this meeting is attached.	**Info**
2.	**Problem Areas and Level of Service**	
2.1.	<u>Background</u> As part of the Phase 1 of this Master Plan, a sewer model was developed for the entire City. The storm system outfalls included in this model are based on a number of other previously completed studies provided by the City (including drainage reports, basement flooding studies, stormwater management reports, etc.) To complete the modelling, monitoring of storm and sanitary sewers throughout the City was completed including level monitors in some channels.	**Info**

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2.2.	<u>Outlet Conditions</u> 1:100 year water levels for along the Detroit River, Grand Marais, Lennon, Cahill, Wolfe and Little River were inputted into the model. Recently the model high lake levels were raised to reflect the values used in the related Landform Barrier Study being completed by Landmark Engineering on behalf of the City.	**Info**
	ERCA asked that Dillon and Aquafor summarize the boundary conditions used for the outfalls to they can verify if they are suitable for this study.	**Dillon/Aquafor**
2.3.	Based on previous discussion with ERCA, it was understood that in general, solutions should not increase the peak flow discharge to municipal drains. This point will be confirmed and discussed further at our next meeting.	**Info.**
2.4.	The City will provide a copy of Landmark's updated Grand Marais drain study to ERCA and Dillon.	**City**
2.5.	ERCA has some records including photos for recent major storm events. They will be provided to Dillon for reference.	**ERCA**
2.6.	Surface flooding problem areas were determined based on the developed model and input from the City's Operation Staff. The problem areas were based on the established level of service: more than 0.30 m of ponding within roadway right-of-ways for storms up to 1:100 year storm.	**Info.**
2.7.	Dillon explained that the Stress Test Storm that is provided through the Regional Stormwater Management Guide was found to be less severe than the outlined 1:100 year storm, therefore an Intensity Stress Test storm was used to test the resiliency of the solutions developed.	**ERCA/Dillon**
2.8.	Level of service criteria was established to identify problem areas. For the storm sewer system, a maximum 0.30 m surface ponding level under a 1:100 year storm was established. For major roadways and vulnerable land use areas, the Stress Test (rainfall intensity) was used to determine where 0.30 m of ponding is.	**Info**
3.	**Preliminary Stormwater Solutions Strategies**	
3.1.	One challenge identified were those areas that currently are serviced by a stormwater management pond that are drained via a pump station. Specifically, it generally takes 3-5 days for these systems to recover from major storm events, which leaves them vulnerable in instances where there are two major rain events back to back. One method of addressing these	**ERCA/Dillon/ Aquafor**

	issues is increasing the pump station discharge rates once the storm subsides to drain these systems faster. For this type of solution it needs to be demonstrated that these changes will not impact the downstream systems. ERCA will review this strategy and provide feedback to the project team.	
3.2.	The Town of LaSalle requested that as part of this study it is demonstrated that changes within Windsor's system does not impact their downstream system. Previous correspondence between the Town and Dillon will be forwarded to ERCA again for their review.	**ERCA/Dillon**
3.3.	Regarding the use of LIDs, Aquafor noted that similar types of measures were used in Mississauga, ON. Approximately 10-15 mm of was shaved off the peak flow. LIDs are being proposed to be implemented as part of the DMAF Funding project; once LIDs are constructed they will be monitored to confirm benefit on the system.	**Info/City**
3.4.	Solutions are being developed for the area along Riverside between the Ford and St. Paul Pump Stations (Ford Blvd to Lauzon Rd). The solutions for this area will coordinate with the proposed Landform Barrier extension being proposed (i.e. the Landmark's separate study). The Landform Barrier Study PIC was held on June 26, 2019. ERCA noted that they met with Landmark in advance of the PIC.	**Info**
3.5.	ERCA will coordinate internally regarding how to address rising lake levels and how it will impact the solutions we are developing.	**ERCA**
3.6.	The City asked that where mitigation measures developed cannot practically meet the established level of service that the emergency measures and road closures that would be required need to be determined and EMS will need to be in agreement.	**Dillon/Aquafor**
3.7.	The Phase 2A Riverside Vista project is currently in the design stage. To complete the design, ERCA will need to provide direction on the critical water level elevations and necessary level of protection is required. The design will aim to lower Riverside Dr. as much as possible to provide overland flow route and to provide the landform barrier on north side of the Road. Potential alternatives including constructing a new pump station and outfall at St. Rose Beach which would serve the Riverside Vista Phase 2 A Area and increasing the capacity of the Ford and St. Paul Pump stations.	**ERCA/Dillon/ Aquafor**

Errors and/or Omissions

These minutes were prepared by Ian Wilson, P.Eng., who should be notified of any errors and/or omissions.

Next Mee ng

A follow up meeting will be held on July 15th. ERCA will be invited to subsequent project technical meetings.

IDW:jb
Encl.

Exhibit 4

MEETING MINUTES

DILLON CONSULTING

Subject: Windsor Sewer Master Plan – South and Central Windsor Technical Meeting

Date and Time: October 17, 2019, 1:00 p.m.

Location: Dillon Consulting Limited Offices

Our File: 17-6638

Attendees

Anna Godo	City of Windsor (City)
Chris Carpenter	City of Windsor
Mia Marrocco	City of Windsor
Karina Richters	City of Windsor
Janelle Coombs	City of Windsor
Denise Wright	City of Windsor
Roberta Harrison	City of Windsor
Michael Cappucci	City of Windsor
Tian Martin	ERCA
James Bryant	ERCA
Tim Byrne	ERCA
Flavio Forest	Dillon Consulting Limited (Dillon)
Ian Wilson	Dillon Consulting Limited
Laura Herlehy	Dillon Consulting Limited
Sarah Zaarour	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	**Project Coordination**	
1.1.	Landform barrier property owner meeting is scheduled for October 30.	**Info**
1.2.	Pump station property owner meetings are scheduled for November 5 and 6, for the St. Rose PS and Ford PS.	**Info**
2.	**Review of South Windsor Sanitary Solutions**	
2.1.	It was identified to the group that through discussions with multiple MECP departments that the solution developed for the east Windsor sanitary system to increase treatment capacity at the treatment plant using an RTB (Retention Treatment Basin) is not acceptable for the nominally separated drainage system.	**Info**

Item	Discussion	Action
2.2.	Dillon confirmed that the baseline conditions used to develop solutions included the sealing of sanitary manholes, which was modelled as an 80% reduction in manhole cover inflow rates.	**Info**
2.3.	Through the previous model iterations, 40% uptake in foundation drain disconnection did not demonstrate a significant improvement in the flooding risk reduction, therefore an 80% disconnect uptake is recommended. A pilot area is recommended to be implemented and monitored first to confirm the benefit of foundation disconnection.	**Dillon**
2.4.	The old alignment of the Huron Estates sanitary sewer was shown in the figures; however, the alignment has already been updated in the model to reflect existing conditions.	**Info.**
2.5.	Sanitary options were reviewed (refer to slides): • Option A: Targeted sub-trunks storage, with RTB or Lagoon • Option B: Decentralized upstream storage, with RTB or Lagoon • Further it was noted the above options will be investigated without an RTB or lagoon.	**Info.**
2.6.	In sanitary sewer storage "oversized" pipes it was identified low flow channels would likely be included and designed for cleansing velocity. Additional research may be required.	**Dillon**
2.7.	The sanitary sewer South of Cabana (at Northway) was identified as experiencing high water levels during smaller and more frequent storm events. However, the downstream flow monitor does not show the same high water levels. This will be investigated further including inspecting the sewer with a camera.	**Dillon**
2.8.	Sanitary system solutions are based on providing hydraulic grade lines 1.8 m or deeper below ground for a 1:100 year storm. The operation of the alternatives were also reviewed using the model under the 1:100 year + 40% intensity climate change storm.	**Info.**
3.	**Review of South Winsor Storm Solutions**	
3.1.	The preferred option for the Dougall Ave. underpass (Alternative A) would require land acquisition. Concern about the recent sponsored tree plantings affected under Alternative B were identified. Both alternatives will release lower peak flow rates compared to existing conditions via gravity drainage with the use of surcharge pond systems; no pumping would be required.	**Info.**

3.2.	The City confirmed that issues were experienced along Howard Ave in the vicinity of the Grand Marais Drain. The City noted that an hydraulic assessment of the drain was completed and recommendations were developed. Dillon will confirm the recommendations, by obtaining the most recent report from Landmark Engineers Inc., and incorporate as applicable; further it was identified additional infrastructure improvements in the drain are anticipated.	**Dillon**
3.3.	Concerns were identified with LIDs. These concerns included: • That exfiltration of stormwater would not occur, given unknown and potentially high groundwater conditions; and • That the additional storage would fill once and would remain full with the storage capacity unavailable during following storms. Dillon identified the following: • That the LIDs measures were modelled as Etobicoke exfiltration trenches; however the type of LIDs would be confirmed later in subsequent designs. o It was noted that the model is conservative and assumes that 15 mm of rainwater will be captured, MECP recommends 32 mm. This translates into a 10% total reduction in runoff flows for a climate change storm; • That the acceptability of LIDs within each area will need to be confirmed during detailed design based on in situ soil conditions for each site; and • The systems will have underdrains and even under high groundwater a stone trench could be drained.	**Dillon**
3.4.	LIDS were implemented along Matthew Brady Blvd and data loggers will be installed soon to monitor the benefit of the new system.	**City**
3.5.	For the Central/Pillette problem area, solutions included providing underground storage within McDonald Park or storage within the vacant property, north of the YMCA, north of central. The City advised that due to the proximity of the property to the airport that underground storage should be utilized.	**Dillon**
3.6.	Within the Southwood lakes area, the recommendation is to lower the normal water level of all ponds servicing this development. The City noted that for even more frequent storms both Lisa Cres and Christina Cres experience ponding.	**Dillon**

3.7.	Regarding the surface flooding proposed for Optimist park, it was noted that impact on trees from ponding over long periods of time and frequency will need to be reviewed.	**Dillon**
3.8.	The storm solutions assumed all land in individual properties are included in the storm system drainage area; however, based on the flow monitoring date many rear yards do not contribute flow, and these areas where calibrated out of the model as non-contributing. For example an 85% factor may be applied to a sub-catchment to reduce total flow volume and peak flow if rear yards are not contributing flow to the storm sewer. • Further, new development's rear yard drainage will be accounted for those development's future stormwater management measures.	**Info**
4.	**Review of Central Windsor Solutions**	
4.1.	For the central Windsor area the recommendation of complete separation of sewer systems was presented as required to achieve the basement flood risk reduction criteria. This included the removal of all direct inflows (catch basins) and downspouts from the combined sewer to existing or new storm sewers. This also included the separation of the dual manhole systems draining to Lou Romano.	**Info.**
4.2.	It was identified foundation drains may be very difficult to disconnect in older neighbours with houses in close proximity. However, this option is still to be reviewed with a neighbourhood by neighbourhood approach; as disconnection of foundation drains will be more easily achieved in certain developments.	**Dillon**
5.	**Next Steps**	
5.1.	Capital budget projects are being reviewed by the City. The City will provide the project team with a list of budgeted project so the implementation plan can reflect already identified projects.	**City/Project Team**
5.2.	Finalize preferred solutions and associated environmental assessments.	**Dillon**
5.3.	Riverside Drive RTB Unit: High water level assessment and operational recommendations will be sent out shortly.	**Dillon**

MEETING MINUTES

Exhibit 5

DILLON CONSULTING

Subject: LaSalle/ERCA Outlet Meeting
Date and Time: May 8, 2020 – 1:00 p.m. – 2:15 p.m.
Location: Via Conference Call
Our File: 17-6638

Attendees

Anna Godo	City of Windsor
Janelle Coombs	City of Windsor
Peter Marra	Town of LaSalle
Jonathan Osborne	Town of LaSalle
James Bryant	ERCA
Chris Patten	Dillon Consulting Limited
Laura Herlehy	Dillon Consulting Limited
Ian Wilson	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	**Introduction**	
1.1.	Dillon provided the group background on the Windsor Sewer and Coastal Flooding Master Plan (MP) and provided details on project scope and level of service related to basement and surface flooding.	**Info.**
1.2.	The last PIC was held in February 2020 to present the preferred solutions for public comment.	
1.3.	Dillon provided a presentation (attached) to the group regarding the Impact Assessment of Receiving Watercourses.	
1.4.	It was identified that modelling and assessment of open drains and watercourses was not included in the Master Plan scope. However, based on the email correspondence received from the Town of LaSalle, additional assessment of the receiving systems outletting to that municipality was completed. The correspondence is provided below: I have received a copy of the notice of commencement for this Master Plan. I would like to be informed of the project as it relates to the Basin Drain, Lennon Drain and Cahill Drain watersheds, which ultimately outlets to the Turkey Creek	

and any identified deficiencies and planned improvements within these watersheds within the City boundaries. We specifically are interested in negating increased storm flows through these exiting drainage systems to reduce or at least maintain existing drainage scheme with respect to flow quantities, quality and addressing additional erosion from additional prolonged period of peak flows, etc. through each respective watershed.

We are hoping that when modeling occurs in these respective watersheds, they will be brought to the Detroit River. The Town will be happy to provide any documentation you need from our system in order to complete this successfully.

As you may know, the storm of 2017 saw record high water levels in Turkey Creek through LaSalle and into the Detroit River. A significant portion of the Turkey watershed lies within the City and outlets through LaSalle.

You may circulate an additional information on this project to myself and Jonathan Osborne, P.Eng. at josborne@lasalle.ca

Thank-you for your time.

Regards,

Peter Marra, P.Eng.
Director of Public Works
Town of LaSalle

2. **Landmark Engineering Inc. – Role in the Master Plan**

2.1. The City retained Landmark Engineering (Landmark) to complete a coastal flood risk assessment for the east area of Windsor, east of Ford Boulevard. Historically, the City has implemented flood protection in this area and due to the existing topography, many lands are lower than the current high water levels. The City has included the coastal flood protection infrastructure improvements as part of this Master Plan to provide municipal authority to acquire necessary lands to complete this work. **Info.**

2.2. Further, Landmark provided a model that supported the outlet capacity assessment, detailed below.

3. Background – Grand Marais Drain and Turkey Creek Assessment

3.1. Landmark developed a PCSWMM model of the Grand Marais Drain (GMD) to assess the watercourses hydrology as part of an independent project. This PCSWMM model was modified and used in the outlet capacity assessment, where hydrographs from the Sewer and Coastal Flood Projection MP sewer model could be directly inputted. **Info.**

- Four projects were identified in the GMD service area where additional storage and low impact development measures were proposed.
- The impact assessment included the GMD from its headwater near Central Avenue to the border of the City at Huron Church, of the GMD found that there was no negative impact from the proposed flooding solutions developed as part of the MP; further, it was found the measure would reduce the potential for flooding and erosion in the GMD.
    - It should be noted that these measures are part of a City-wide plan and may not be installed for many decades.

3.2. In regards to other tributaries of the GMD and Turkey Creek system, it was identified only a single alteration outside the GMD is proposed as part of the MP.

- It is proposed the Southwood Lakes ponds have their normal water levels (NWL) lowered coupled with recommended downspout disconnection of the residential properties. The existing pump station that draws down the ponds is not proposed to change. There would be only additional stormwater storage in this system that ultimately drains to the Cahill Drain. Therefore, no assessment was completed for this improvement.

4. **Discussion – GMD and Turkey Creek**

4.1. The Town of LaSalle identified the following studies related to this work: **Info.**

- The GMD assessment being completed by Landmark, and that as this is not a public study, that the Town had limited knowledge of this report. Landmark had some discussions with LaSalle.
- The Drainage Act study (being completed by Dillon) and works currently underway for the portion of the GMD downstream of Huron Church with the Town of LaSalle boundaries.
- The Howard Bouffard Drainage Master Plan study being completed by Dillon for the Town of LaSalle.

4.2. Dillon identified that internal discussions were held with the Drainage Act and Howard Bouffard teams. The solutions from the Windsor MP were developed to reduce roadway flooding risks in Windsor, while not having a negative impact on the receiving systems. Further, in regards to timing, the Windsor MP solutions would likely be implemented decades or more from now.

4.3. The assessment of municipal drains was not part of the scope of this project and that the project team incorporated boundary conditions from existing drainage models/studies at sewer outfalls to account for the effect of high water levels in the InfoWork's model.

4.4. The Town of LaSalle requested that ERCA ensure that improvements proposed upstream of the Town of LaSalle do not have negative impacts on the downstream watercourses. ERCA agreed that it is their mandate to coordinate and confirm that proposed works will not have negative impacts.

4.5. Dillon stated that the intent of this outlet capacity assessment was to complete a comparative assessment of the conditions pre and post-sewer Master Plan improvement to understand the relative change that could be expected after the implementation of Master Plan solutions.

- The outlet capacity assessment shows an improvement in the GMD. The results did not consider the implementation of LIDs. LIDs will be mandated by the City to be installed where practical; therefore, the findings from the outlet assessment were conservative, where not all potential improvements were not accounted for in the model.

4.6. Dillon has compared this assessment with the findings of Landmark's GMD H&H Study, and a summary was included in the draft report.

4.7. LaSalle inquired why the GMD outlet capacity assessment was terminated at the City of Windsor border, at Huron Church Line; it was identified that changes were in the upper 2/3's of the GMD service area in the City of Windsor and the assessment found an improvement in the system, that became relatively smaller the further downstream you examined. It was identified, the Windsor MP study's limits were scoped to be within the City of Windsor.

- Further discussions or assessments beyond this outlet capacity assessment of the GMD and Turkey Creek Service area, including lands external to Windsor's borders were identified as outside of the scope of the Windsor MP.

4.8. The City reiterated that solutions developed through the Master Plan will take 50+ years to be implemented and therefore, there will unlikely be any relief to the GMD in the near future. Changes to the upstream drainage areas will be incremental. A project prioritization plan is being developed through the Master Plan which will provide more details.

5. Next Steps – GMD and Turkey Creek

5.1. The project team will finalize prioritization of projects and finalizing recommendations for City Administration's review at the beginning of June 2020 for Council Report in July 2020.

5.2. This Master Plan is following an Approach No. 2 and therefore, all Schedule B projects will be approved through this process.

5.3. The Town of LaSalle asked to be updated on the project and progress.

5.4. The Town of LaSalle identified that they will coordinate with other stakeholders and parties related to a coordinated assessment of the Turkey Creek and GMD open drainage system. The stakeholders could include the Town of Tecumseh, ERCA, Dillon per the Howard Bouffard Study, and the City of Windsor.

6. **Little River Drain - Discussion**

6.1. A quick discussion related to the proposed Windsor MP improvements impacting the Little River Drain was held and identified the following major recommendations:

- The proposed Little River Golf Course Pond and other underground storage areas, adding storage to the Little River service area, reducing peak flow rates to the drain.
- The proposed reallocation of drainage area, approximately 80 ha, from the Little River service area, to a direct outlet to the Detroit River.2
- The proposed new Pontiac Pump Station expansion dedicated to sewage by-pass from the Little River Pollution Control Plant.

6.2. It was identified that ERCA could not comment on the impact of additional flow to the Little River drain from the new Pontiac Pump Station expansion without additional information.

6.3. The new Pontiac Pump Station expansion is a preferred solution from the MP, a fundamental component of reducing basement flooding risk, and a project with approved funding support from the DMAF program. As this project falls under Schedule C requirements, the following was proposed:

- That the reporting of the MP identify the second storage based alternative for basement flooding in the Littler River PCP service area:
- That the preferred solutions be kept as identified with the following notes:
  - o An assessment of impact to the Little River drain be completed showing no impact before the project is completed; or
  - o An alternative outlet directly to the Detroit River be provided.

Errors and/or Omissions

These minutes were prepared by Ian Wilson, P.Eng., who should be notified of any errors and/or omissions.

Distribuon

All Attendees

Tim Byrne	-	ERCA
Flavio Forest	-	Dillon Consulting Limited
Tim Oliver	-	Dillon Consulting Limited

IW:d

May 14, 2020

Town of LaSalle - Memorandum

From: Peter Marra
To: Ian Wilson, P.Eng. – Dillon Consulting
Issued: May 22, 2020

Exhibit 6

Town of LaSalle – Review of the
Windsor- Sewer and Coastal Flood Protection Master Plan
ERCA and Town of LaSalle Consultation:
Impact Assessment of Receiving Watercourses
May 8, 2020

Dillon presented the above note power point presentation to LaSalle and ERCA with representatives from the City present on May 8, 2020.

<u>The Town of LaSalle understands the following;</u>

1. This process was initiated through the EA process;
2. The Town received the notice of study commencement for the project and this project covered the entirety of the City of Windsor. Therefore, the Town of LaSalle offered comments at the time of commencement notice, that the Town would want to know more about any of the revisions as it relates to any drainage being directed through LaSalle and the existing receiving watercourses.
3. May 8, 2020, is the first known contact with LaSalle as it relates to our initial comments offered.

<u>May 8, 2020 presentation;</u>

The May 8, 2020, presentation was geared to the Grand Marais Drain and the Cahill Drain only.

It appears that there is limited improvements on the Cahill Drain system with no changes to the Cahill Drain itself except for isolated changes only to Southwood Lake pond revisions.

The improvements to the Grand Marais drainage system is limited to a number of localized areas in the upper reaches of the system. These improvements provide some minor changes and lowering of peak flows in the limited study area as part of this master plan.

It is noted that there are a number of proposed future LID improvements proposed along both drainage systems which have not been accounted for in the current calculations. However the timing of LID implementation is not anticipated for a few decades.

<u>Cahill Drain</u>

The Town is currently underway with our own master drainage study, the Howard/Bouffard Master Drainage Study, through the Howard/Bouffard area. This area is the next green field development area in the Town's urban boundary slated for development. The current concerns with the area are a significant overflow from the Cahill Drain into the Canard River watershed, thus effecting the existing conditions of the existing landowners and residents without any development occurring. The existing conditions need to be addressed in order to allow development.

The overflow was known to be present, however, the quantum of the overflow is some 3 to 4 times higher than originally anticipated amounts. The location of the overflow occurs in LaSalle, however, the drainage area upstream of the overflow location is approximately 95% within the City of Windsor.

The Town of LaSalle is negatively effected from drainage currently occurring through the Cahill Drain and that more effort is required in the City to reduce flows within the City and in the Cahill Drain to relate back to the original designs.

We understand that there was a report prepared by Knowles sometime ago outlining Cahill drain improvement and identifying the said overflow. It is this identified overflow that is now some 3 to 4 time higher.

It also appears that detailed storm modeling efforts, as part of your study, may have been isolated to within the City boundary only and course modeling outside of the City's jurisdiction. Likewise, the modelling efforts as part of our master drainage study has been isolated within LaSalle to a detailed level of modelling and a more course model outside of our boundaries.

There exists an opportunity for a combined modelling effort on the Cahill Drain and the Town is interested to working with Windsor on how best to manage flows generated within our respective municipalities so not to negatively affect the other and develop solutions so that each of us can be assessed properly for these improvements. Hopefully, the City is interested in finding a combined solution.

We believe the City may be responsible for some of the overflow occurrence in the Town of LaSalle and believe that the City should contribute towards it's solution, whether that solution lies in LaSalle or within the City.

Furthermore, the Town of Tecumseh, is modelling the Oldcastle area which eventually flows through the Cahill Drain. While the Town of LaSalle has provided limited comments on Tecumseh's master drainage study in Tecumseh, the effects are greater on Windsor as the immediate downstream receiving municipality. We are unaware on how, and if the, Tecumseh study was taken into account through your master plan.

Please refer to Exhibit A attached.

On the Cahill Drain the Town has a drainage act report in progress and the City also has a drainage act report in progress.

We are unclear on how the various reports on the Cahill Drain have been incorporated and aligned within this study?

Grand Marais Drain

The Grand Marais analysis appears to have been terminated at Huron Church Line and has not been extended beyond that point. It is noted that the drain continues and eventually transitions into Turkey Creek. The Town is interested on the effects of this proposed project as it relates to the lower reaches of Turkey Creek as it passes through LaSalle. No information was available as part of the above noted presentation.

The Town noted that we are aware of a City initiated hydrologic review of Turkey Creek, however, never knew what the outcome of that assessment was and if it was connected into this proposed project.

The Town also noted, there is a current drainage act process on the Grand Marais Drain/Turkey Creek initiated by the Town a few years ago. There has been no communication with the Town on the City's study and how this will fold into the current drainage act report.

The City also indicated that they have completed a drainage act process on the Grand Marais Drain upstream of Huron Church Line. The Town noted that they have never heard anything of that process. Again, how will this be tied into the current drainage act report and how was it tied into current master plan.

Not discussed at the meeting, the Town is also aware of proposed changes to soften the appearance of the Grand Marais Drain, the concrete lined portion. The Town is unaware of the status of this proposal and the effects of this on the current study.

The Town is concerned with the effects beyond the limits of this study. The Town has a significant system through the heart of our existing development area and the effects of these improvements, need to be balanced and reviewed with the effects of the existing current conditions of Turkey Creek through LaSalle, effects on existing flood lines, ability to continue to develop along the Turkey Creek corridor in LaSalle, etc.

Also as noted, there are a number of studies underway or completed and the integration of these various studies should be coordinated to properly align all assumptions, modeling efforts, outcomes, improvements, etc. A sufficient outlet needs to be clearly identified, and in the Town's opinion is the Detroit River.

Please refer to Exhibit B attached.

Turkey Creek underwent a significant expansion, flood line mapping effort in the 80's. The Town wants to ensure the flood lines and assumptions of that previous study have not changed as a result of this masterplan.

We are unclear on how the various reports on the Grand Marias Drain have been incorporated and aligned within this study?

Closure

We trust that the enclosed information is self-explanatory, however if you wish to have another meeting to review this information or for us to clarify our concerns, I would be happy to attend such a meeting.

Regards,

Peter Marra, P.Eng.
Director of Public Works

encls;

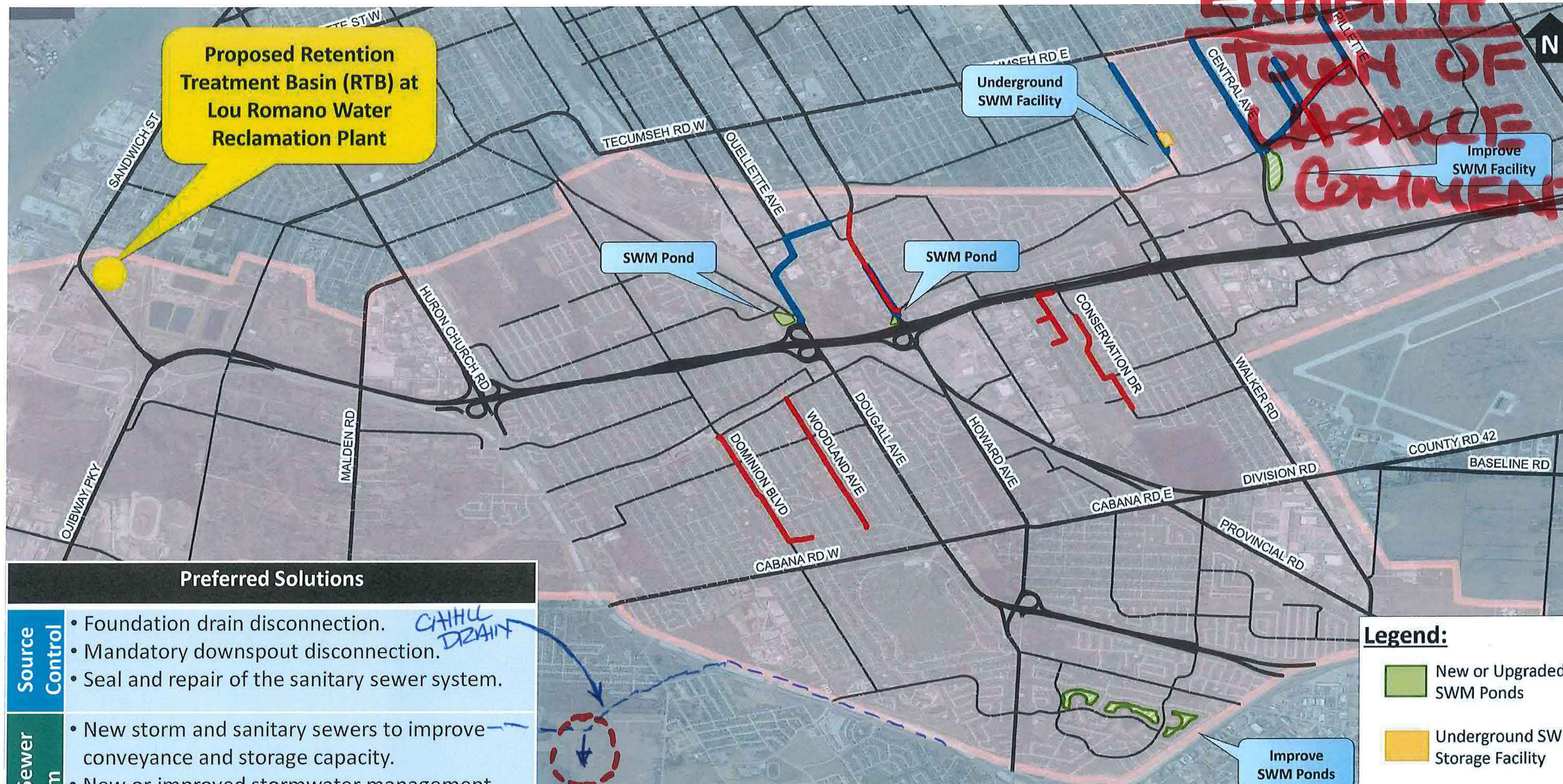
cc + encls: Ms Anna Godo, P.Eng. - City of Windsor

THE CITY OF WINDSOR ONTARIO, CANADA

South Area – Preliminary Preferred Solutions

Exhibit A

TOWN OF LASALLE COMMENTS.



Preferred Solutions	
Source Control	• Foundation drain disconnection. • Mandatory downspout disconnection. • Seal and repair of the sanitary sewer system.
Improve Sewer System	• New storm and sanitary sewers to improve conveyance and storage capacity. • New or improved stormwater management ponds or underground storage facilities. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant.

OVERFLOW LOCATION +/-

Refer to detailed summary handout for more information.

SUBJECT OF HOWARD/BOUFFARD MASTER DRAINAGE STUDY

Legend:

- New or Upgraded SWM Ponds
- Underground SWM Storage Facility
- Sanitary Trunk Sewer Improvements
- Storm Trunk Sewer Improvements
- South Sanitary Drainage Area

Exhibit B
TOWN OF LASALLE COMMENTS
WINDSOR SEWER MASTERPLAN
GRAND MARAIS DRAIN OUTLET ASSESSMENT
IMPACTED EXISTING SUB-WATERSHEDS
FIGURE 2
Legend
Grand Marais Drain Watershed within the City of Windsor
Comparison Point
Inflow Point
Grand Marais Drain
Central Pond Sub-Watershed
Grand Marais Pump Sub-Watershed
Chrysler Sub-Watershed
Dougall Sub-Watershed
Howard Sub-Watershed
DRAFT
ChryslerA
Central Pump
ChryslerB
Central Pond
Howard
Dougall
CP1
CP2
CP3
CP4
Waterford
Sterling Heights
Farmington Hills
Livonia
Southfield
Canton
Westland
Detroit
Windsor
Lake St. Clair
WYANDOTTE ST W
ERIE ST E
ERIE ST W
GILES BLVD E
GILES BLVD W
OTTAWA ST
GLADSTONE AVE
DROUILLARD RD
GEORGE AVE
COLLEGE AVE
CAMPBELL AVE
CRAWFORD AVE
JANETTE AVE
BRUCE AVE
OUELLETTE AVE
MCDOUGALL ST
PARENT AVE
LINCOLN RD
TECUMSEH RD E
TECUMSEH RD W
CHRYSLER CENTRE
CENTRAL AVE
PILLETTE RD
ROSE ST
RIVARD AVE
GRAND BLVD
PLYMOUTH DR
YPRES AVE
MEMORIAL DR
TOTTEN ST
SOUTH CAMERON BLVD
EUGENIE ST W
EUGENIE ST E
OUELLETTE PL
GRAND MARAIS RD E
TURNER RD
TEMPLE DR
NORTH SERVICE RD
MALDEN RD
HURON CHURCH RD
OJIBWAY ST
DOMINION BLVD
NORTHWOOD ST
E C ROW EXPY W/B
E C ROW EXPY E/B
E C ROW AVE E
HOWARD AVE
ELSMERE AVE
CONSERVATION DR
WALKER RD
DEZIEL DR
RHODES DR
ST ETIENNE BLVD
DOUGALL AVE
MARENTETTE AVE
SYDNEY AVE
FOSTER AVE
CALDERWOOD AVE
LABELLE ST
SPRING GARDEN RD
GRAND MARAIS RD W
WEST GRAND BLVD
NORFOLK ST
MAGUIRE ST
DIVISION RD
COUNTY RD 42
BASELINE RD
PULFORD ST
CABANA RD E
CABANA RD W
MOUNT ROYAL DR
DOUGALL PKY W/B
HOLBURN ST
SIXTH CONCESSION RD
DURFORME ST
PROVINCIAL RD
ROCKPORT ST
0 200 1,200 Meters
MAP DRAWING INFORMATION
DATA PROVIDED BY CITY OF WINDSOR
MAP CREATED BY: ARC
MAP CHECKED BY:
MAP PROJECTION:
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User
DILLON CONSULTING
PROJECT: 17-6638
STATUS: DRAFT
DATE: 04/08/20
WINDSOR
LaSALLE
GRAND MARAIS DRAIN CONTINUES AS TURKEY CREEK.
THIS IS SUBJECT OF CURRENT DRAINAGE PROCESS THROUGH TOWN OF LaSALLE.

Town of LaSalle - Memorandum

Exhibit 7

From: Peter Marra
To: Ian Wilson, P.Eng. – Dillon Consulting
Issued: June 10, 2020

Town of LaSalle – Review of the
Windsor- Sewer and Coastal Flood Protection Master Plan
ERCA and Town of LaSalle Consultation:
Impact Assessment of Receiving Watercourses
May 8, 2020

Please accept this memo as a supplement/updated submission to our May 22, 2020 Memo on this project.

With the expectation of the corrections and/or additions contained in this memo, all other info in our May 22, 2020 memo remains as Town concerns.

Cahill Drain

Correction/clarification provided

In our May 22, 2020 memo, the Town indicated the overflow/spillover from the Cahill Drain into the Canard River watershed is "some 3 to 4 times higher than originally anticipated". The Town would like to correct that statement and say that the overflow is about 40% to 50% higher than originally anticipated.

Grand Marais Drain

Supplemental/additional concern provided

The Town understands that this project is building upon the Landmark Engineering Hydrologic model for the Grand Marais Drain.

In discussion with Landmark, the Town has just become aware that the hydrologic model has calculated flows in the Grand Marais Drain within the City's boundary to be approximately 70% higher then what is was originally designed for and what the flood line and flood plain mapping used to calculate the same in the early 90's.

The Town is now noting that a great deal more needs to be done within the Grand Marais Drain watershed to get those flows down and to not have any negative impacts on the downstream reaches and the flood line mapping and more in line with the flows generated in the 90's.

Closure

We apologize for this supplemental/updated submissions, but we wanted to ensure the most accurate information is being conveyed between us in a timely manner.

Regards,

Peter Marra, P.Eng.
Director of Public Works

cc: Ms Anna Godo, P.Eng. - City of Windsor

Exhibit 8

DILLON CONSULTING

Herlehy, Laura <lherlehy@dillon.ca>

RE: Windsor Sewer Master Plan supplemental/updated comments

1 message

Peter Marra <pmarra@lasalle.ca> Wed, Oct 14, 2020 at 10:42 AM

To: "Herlehy, Laura" <lherlehy@dillon.ca>

Cc: "Godo, Anna" <agodo@citywindsor.ca>, "Coombs, Janelle" <jcoombs@citywindsor.ca>, Mark Hernandez <mhernandez@dillon.ca>, "Patten, Chris" <cpatten@dillon.ca>

Laura, thank-you for your response.

Also, thank-you for the clarification that the latest flooding that occurred in the Roseland area was resulting from the City's sanitary sewer system and issues are not issue related to the drainage systems and associated downstream issued, as has been contemplated, reported and/or relayed.

With respect to the Windsor Sewer Master Plan, I understand the purpose of a master plan is to give a solution to a problem with a longer term vision to guide all future investments, future projects, etc. in implementing the items within any given master planning document. This master plan document is prepared with public consultation and those that have interest in any such master plan have the opportunity through the EA process to give input, concerns and have them adequately addressed to avoid long term potential negative effects on others.

As such, LaSalle, has expressed such concerns in a hopes to have them addressed.

The notion of acknowledging additional studies being required to be completed, in your master plan, falls short of adequately addressing concerns from LaSalle. Because, we have the opportunity now to express our concerns and any later studies, may be out of LaSalle's control to provide adequate comments and have them addressed. All this does, is put caveats on your proposed solutions, puts questions into the adequacy of the solution, and raises more questions. I believe LaSalle is realising the questions now and prior to you finalizing your study and this should be addressed now.

In fact, this was also agreed to through other City staff, the conservation authority, and other municipalities involved in this watershed. City staff have anecdotally indicated, that actual flows in the Grand Marais drain, they are actually observing, are in fact higher then they have ever been modelled or calculated in the past.

I draw your attention to the 2019, Grand Marias Drain Hydrologic/Hydraulic Study, conducted by Landmark Engineering for the City of Windsor. I understand this document is being used at face value in your study. This study was conducted without input from LaSalle and in May of 2020, the Town became aware of the results of this H&H study. The 2019 study shows an increase in flows in the Grand Marais Drain within the City and the study stopped short of bringing these flow through LaSalle. This change in flows, water levels, etc. is a result of modeling improvements, previous calibration errors, etc. The flow increase was reported to LaSalle in the magnitude of being about 70% higher at the City/Town border. Regardless of the reason for change in flows and water elevations, there is a change that needs to be understood holistically through the entire Turkey Creek Watershed prior to finalizing your study.

If you were to propose solutions in your Windsor Sewer Master Plan study to get the City's flow back down to the existing conditions, prior to the 2019 H&H update, and then provide caveats that additional studies are required to allow for greater flows, then LaSalle may be able to work with that. But I don't think that is what is being proposed on Grand Marias/Turkey Creek as part of your study.

I also draw your attention to the Cahill drain which is a tributary of Turkey Creek/Grand Marais Drain and part of your study. Again, there is a reliance on hydrologic/hydraulic studies completed for the Windsor/Essex Mobility Group as part of the Herb Grey Parkway construction. It is being report to the Town that there are errors in those parkway reports, assumption are off then what is actually happening today, etc. Again, if you were to propose solutions in your Windsor Sewer Master Plan study to get the City's flow back down to the existing conditions, prior to the Parkway reports, and then provide caveats that additional studies are required to allow for greater flows, then LaSalle may be able to work with that. But I don't think that is what is being proposed on the Cahill Drain through your current study.

The additional, more comprehensive study on the entire Turkey Creek watershed, was supported by City, Tecumseh, LaSalle and ERCA staff. As such ERCA is in the process of bringing the terms of reference forward for this additional study. This has been in fact sent to consultants already. ERCA even reported this to their board on Sept 10, 2020, copy of ERCA report provided for your convenience. It was agreed that this supplemental more comprehensive report would better inform Windsor, LaSalle, Tecumseh on our currently underway master drainage studies.

Recognizing this, LaSalle, has elected to pause our master drainage study until this more comprehensive study can be completed. Hopefully the other municipal partners in this watershed can look at this additional study prior to finalizing their current master drainage studies underway.

LaSalle has expressed comments on this Windsor Sewer Master Plan on a number of occasions;

1. Memo issued May 22, 2020 – issued to Ian Wilson (Dillon)
2. Memo issued June 10, 2020 – issued Ian Wilson (Dillon) with clarifications of our May 22nd memo.
3. LaSalle letter issued June 10, 2020 – issued Mark Winterton (Windsor) on the Turkey Creek Watershed
4. LaSalle letter issued June 10, 2020 – issued Mark Winterton (Windsor) and Phil Bartnik (Tecumseh) on the Cahill Drina watershed
5. Meeting agenda of July 6, 2020 – issued to representatives of Windsor, Tecumseh, LaSalle and ERCA
6. July 6, 2020, meeting minutes issued on July 9, 2020 to all attendee of the July 6th meeting.
7. Various other emails, meeting, etc. occurring with City, Tecumseh, ERCA, Dillon.

The Town of LaSalle, is extremely interested in the finalization of the City's Sewer Master Plan, in receiving a copy of the final report, with a comprehensive response letter to our concerns and where, within the report our concerns are being addressed. We are also interested in receiving a copy of the notice of study completion and be notified of the timeline for review and issuance of objections through the EA process.

Turkey Creek watershed, is a very important and well developed watershed within the context of Windsor, LaSalle and Tecumseh. Arguably the largest urbanized watershed in Essex County to date. LaSalle, lies at the downstream reach of this large watershed and all of its tributaries. We need to ensure we protect ourselves from external influences on the quantum of flows, flooding elevations, etc.

We look forward to continuing to work cooperatively with the City, and Dillon in finding a well coordinated solution for all of our residents and the region.

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

From: Herlehy, Laura <lherlehy@dillon.ca>
Sent: October 5, 2020 6:01 PM
To: Peter Marra <pmarra@lasalle.ca>
Cc: Godo, Anna <agodo@citywindsor.ca>; Coombs, Janelle <jcoombs@citywindsor.ca>; Mark Hernandez <mhernandez@dillon.ca>; Patten, Chris <cpatten@dillon.ca>
Subject: Re: Windsor Sewer Master Plan supplemental/updated comments

Hi Peter,

Sorry for the late reply, the Master Plan is being completed at this time. This includes areas that drain to the Cahill, Turkey Creek and Lennon drains. The final report will be brought to Council at the Nov. 9, 2020 Council Meeting with the 30 day review period ending mid-December.

The Master Plan report will list next steps related to the integration of the various studies/assessments and drainage reports that are required for those drains including reference to the upcoming Turkey Creek Study. Any findings/conclusions of future studies will need to be considered in advance of the detailed design of applicable recommended solutions. The master plan will need to be reviewed on a regular basis and solutions will need to be refined based on downstream conditions and other factors. The infrastructure improvements proposed for the South Windsor areas are not included in the list of "immediate projects" which includes projects that are scheduled within the City's next 10 year capital works plan. It is recommended that once the City obtains more understanding of the benefit of LIDs, foundation drain disconnection and other recommendations that the Master Plan will be reviewed and solutions will be refined accordingly. This will include refinement to the downstream outlet conditions per the Turkey Creek Watershed study.

In consultation with Anna, related to the Councillor's question regarding the Aug. 2020 flooding event, through further investigation, the basement flooding that occurred was due to issues related to the sanitary sewer system surcharging, this is a known issue and was reviewed in more detail as part of this Master Plan.

Hope this answers your question.

Thanks,
Laura

DILLON CONSULTING

CANADA BEST MANAGED COMPANIES
Platinum member

Laura Herlehy

Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

On Tue, Sep 15, 2020 at 2:09 PM Peter Marra <pmarra@lasalle.ca> wrote:

Laura, further to my email yesterday, do you have a status update on where this master drainage study process is in the EA process for the portions that outlet through Turkey Creek, Cahill, Lennon, etc?

How does the council question from Councillor Francis at yesterday's meeting affect this study on the Lennon Drain?

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

From: Peter Marra
Sent: September 14, 2020 3:16 PM
To: 'Herlehy, Laura' <lherlehy@dillon.ca>
Cc: Godo, Anna <agodo@citywindsor.ca>; Jonathan Osborne <josborne@lasalle.ca>; Chris Patten <CPatten@dillon.ca>; 176638 <176638@dillon.ca>
Subject: RE: Windsor Sewer Master Plan supplemental/updated comments

Yes, I have had discussion with the City, Tecumseh and the ERCA. It was agreed that another more wholesome study is required on the Turkey Creek watershed to better inform your study, LaSalle's study and Tecumseh's study. In fact ERCA has prepared a terms of reference for this additional study and brought something to their board of directors last week.

This additional study will better inform all of us, and I have a hard time understanding how we each finalize our studies without the pertinent information which was agreed by all parties is necessary to ensure no negative impacts on the ever changing Turkey Creek watershed. No analysis has been carried through LaSalle to date to show the effect on flood lines with the already known greater flows.

It is evident and acknowledged by City staff that the water levels in Grand Marais drain are higher then previously calculated and as such that would hold true as you move downstream through LaSalle to its outlet into Detroit River.

I await the formal response on this matter.

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

From: Herlehy, Laura <lherlehy@dillon.ca>
Sent: September 14, 2020 1:15 PM
To: Peter Marra <pmarra@lasalle.ca>
Cc: Godo, Anna <agodo@citywindsor.ca>; Jonathan Osborne <josborne@lasalle.ca>; Chris Patten <CPatten@dillon.ca>; 176638 <176638@dillon.ca>
Subject: Re: Windsor Sewer Master Plan supplemental/updated comments

Hi Peter, I wanted to give you an update on our formal response to the questions and concerns you have raised related to the Cahill Drain and the City's Sewer Master Plan. We are waiting for final direction and feedback from the City to respond however it is Dillon's understanding that you have had discussions with the City directly. I will still provide a formal response before the completion of this master plan.

Sorry for the delay we hope to get back to you shortly.
Thanks
Laura

Laura Herlehy
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Windsor, Ontario, N8W 5K8
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F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

On Wed, Jun 10, 2020 at 9:10 AM Wilson, Ian <iwilson@dillon.ca> wrote:

> Thank you Pete for the comments and will include these in the project documentation. We will provide a letter response to this and May 22nd Memo. Take care,

Ian Wilson, P. Eng., M.A.Sc.
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M - 519.791.2169
IWilson@dillon.ca
www.dillon.ca

On Wed, Jun 10, 2020 at 8:27 AM Peter Marra <pmarra@lasalle.ca> wrote:

Ian/Anna,

Please accept this as an update to our May 22, 2020 memo submission with our comments.

I apologize for this update, but want to ensure we are both working with accurate information and that these be conveyed to you in a timely manner.

Regards,

Peter Marra, P.Eng.
Director of Public Works

Town of LaSalle

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Phone: 519-969-7770 ext. 1475 Fax: 519-969-4469

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Ce message est destiné uniquement aux personnes indiquées dans l'entête et peut contenir une information privilégiée, confidentielle ou privée et ne pouvant être divulguée. Si vous n'êtes pas le destinataire de ce message ou une personne autorisée à le recevoir, veuillez communiquer avec le soussigné et ensuite détruire ce message.

BD24_20.pdf
1677K

Exhibit 9

MEETING MINUTES

Subject: LaSalle and Windsor Sewer Master Plan Coordination Meeting
Date and Time: October 22, 2020 – 2:00 p.m. – 3:00 p.m.
Location: Via Conference Call
Our File: 17-6638

Attendees

Mark Winterton	City of Windsor
France Isabelle Tunks	City of Windsor
Fahd Mikhael	City of Windsor
Anna Godo	City of Windsor
Peter Marra	Town of LaSalle
Jonathan Osborne	Town of LaSalle
Mark Hernandez	Dillon Consulting Limited
Chris Patten	Dillon Consulting Limited
Laura Herlehy	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	The purpose of this meeting is to confirm next steps as it relates to the completion of the Windsor Sewer and Coastal Flood Protection Master Plan (WSMP).	**Info.**
2.	Dillon provided the group an overview of the correspondence which we have to date as is relates to the WSMP. It was noted, that based on coordination between the Town of LaSalle, the Town of Tecumseh, ERCA and the City of Windsor, that a Turkey Creek Watershed study is being initiated to confirm the existing conditions of the drains within this watershed, holistically through all municipal boundaries.	**Info.**
3.	Dillon reviewed the methodology behind the development of solutions within the South Windsor (Grand Marais Drain Watershed) area with the group, which includes: – Solutions cannot negatively impact downstream watercourses as mandated by ERCA (Essex Region Conservation Authority). – Outlet Capacity Assessments must be completed for watercourses that are accepting modified flow regimes.	**Info.**
4.	Solutions include, the addition of stormwater storage using oversized sewers, new and/or expanded stormwater management ponds and underground storage. Solutions were sized using a conservative level of service, including using a Climate Change Street Test Storm to size proposed	**Info.**

infrastructure (1:100 year storm + 40 % factor on both the volume and intensity of the proposed storm) required to mitigate surface flooding within major (Arterial/Collector) roadways.

It was also noted that the solutions recommended in this area are not part of the City's 10 Year Capital Works Plan but could proceed if external funding sources become available.

5. Dillon completed an Outlet Capacity Impact Assessment, dated June 2020, to confirm that recommended solutions would not have a negative impact to the Grand Marais Drain watercourse. The baseline conditions used to complete this assessment are based on the results of the Landmark Hydrologic and Hydraulic Models Report (March 2019) and Drainage Report for the Grand Marais Drain (October 2019). This study confirms that the implementation of solutions recommended within the WSMP, would not increase flows to the Grand Marais Drain and therefore, will not pose any negative impacts on the watercourse. **Info.**

6. The Town of LaSalle does not have concerns regarding the methodology and solutions developed as part of the WSMP.

7. The Town of LaSalle is concerned about the use of the 2019 GMD study results as the baseline for the WSMP Outlet Capacity Report. The Town noted that they were not contacted or involved in the completion of the 2019 study and were not made aware of the results of that study until May 2020. The Town noted that those results should not be used as the basis for the development of solutions as part of the WSMP as they have not been accepted via a public or coordinated process and has no official status. **Info.**

The Town also noted that the Original Turkey Creek Channel Improvements Study (1993 Drainage Act Report prepared by McLaren Engineers Inc.) shows flow conditions within the drain much lower than the results of the 2019 study (40 cms difference at Malden Road and 25 cms (36%) difference at Front Road). The Town noted that it is understood that the change in conditions is related to errors within the original 1993 report and does not question the change in elevations/flows.

The Town also noted that through the Oldcastle Study, increased flows are being proposed to the Wolfe Drain.

The City noted that the 2019 GMD study was completed as part of the National Disaster Relief funding.

8.	To complete the Outlet Assessment, Dillon used the latest information that was available and did not consider the use of older studies that report lower/less flow within the GMD. Dillon's assessment also included a sensitivity analysis to test the impacts of changing conditions within the GMD on the functionality of the WSMP solutions.	**Info.**
9.	The City also noted that they were considering having the City's Sewer model be ran and updated regularly, in-house, to have a real time understanding of the systems' conditions. Dillon noted that the completion of the Master Plan within the current timeline is necessary to move forward with DMAF (Disaster Mitigation and Adaptation Fund) projects that are within the East Windsor Area.	**Info.**
10.	**Next Steps**	
10.1.	The group discussed options that could potentially satisfy the Town's concerns such as an Opinion Letter from Landmark regarding the GMD study, separation of the WSMP to postpone the approval of South Windsor solutions, amendment to the WSMP to amend findings based on results of the TCW Study, a formal agreement, or Commitment from City Council. Dillon suggested that the Turkey Creek Study could be used to help resolve this concern.	**Info.**
10.2.	The City will discuss internally and determine what would be possible and follow up with the Town of LaSalle and Dillon. The WSMP is scheduled to go to Council on November 23, 2020, with the review period ending mid-January.	**City**
10.3.	The Town noted that their Master Drainage Study is being postponed to await the results of the Turkey Creek, as much of their system is influenced by external sources.	**Info.**

Errors and/or Omissions

These minutes were prepared by Laura Herlehy, P.Eng., who should be notified of any errors and/or omissions.

Distribuon

All Attendees

James Bryant	-	ERCA
Andrew Dowie	-	City of Windsor
Janelle Coombs	-	City of Windsor
Flavio Forest	-	Dillon Consulting Limited

LMH:d

October 27, 2020

Exhibit 10

THE CITY OF WINDSOR

DILLON CONSULTING

Windsor – Sewer and Coastal Flood Protection Master Plan

Town of LaSalle Consultation:
Turkey Creek Watershed

October 22, 2020

Meeting Agenda & Objectives

Agenda:

1. Overview of Previous Discussions
2. Solutions and Findings of the Windsor Sewer Master Plan
3. Turkey Creek Watershed Study Coordination
4. Next Steps

Meeting Objectives:

Confirm next steps related to the completion of the Windsor Sewer Master Plan.

Overview of Previous Discussions

- **WSMP Overview and Impact Assessment Meeting:***
  - **May 8, 2020 (LaSalle, Windsor, ERCA, and Dillon)**
  - **Meeting minutes and final Outlet Capacity Assessment sent June 1,2020.**
- **LaSalle Memo Issued May 22, 2020 – Issued to Dillon***
- **LaSalle Memo issued June 10, 2020 (Additional Clarification) – Issued to Dillon***
- LaSalle letter issued June 10, 2020 – issued Mark Winterton (Windsor) on the Turkey Creek Watershed
- LaSalle letter issued June 10, 2020 – issued Mark Winterton (Windsor) and Phil Bartnik (Tecumseh) on the Cahill Drain watershed
- Meeting agenda of July 6, 2020 – Issued to representatives of Windsor, Tecumseh, LaSalle and ERCA
- July 6, 2020, meeting minutes issued on July 9, 2020 to all attendee of the July 6th meeting

*Correspondence received by the WSMP Team.

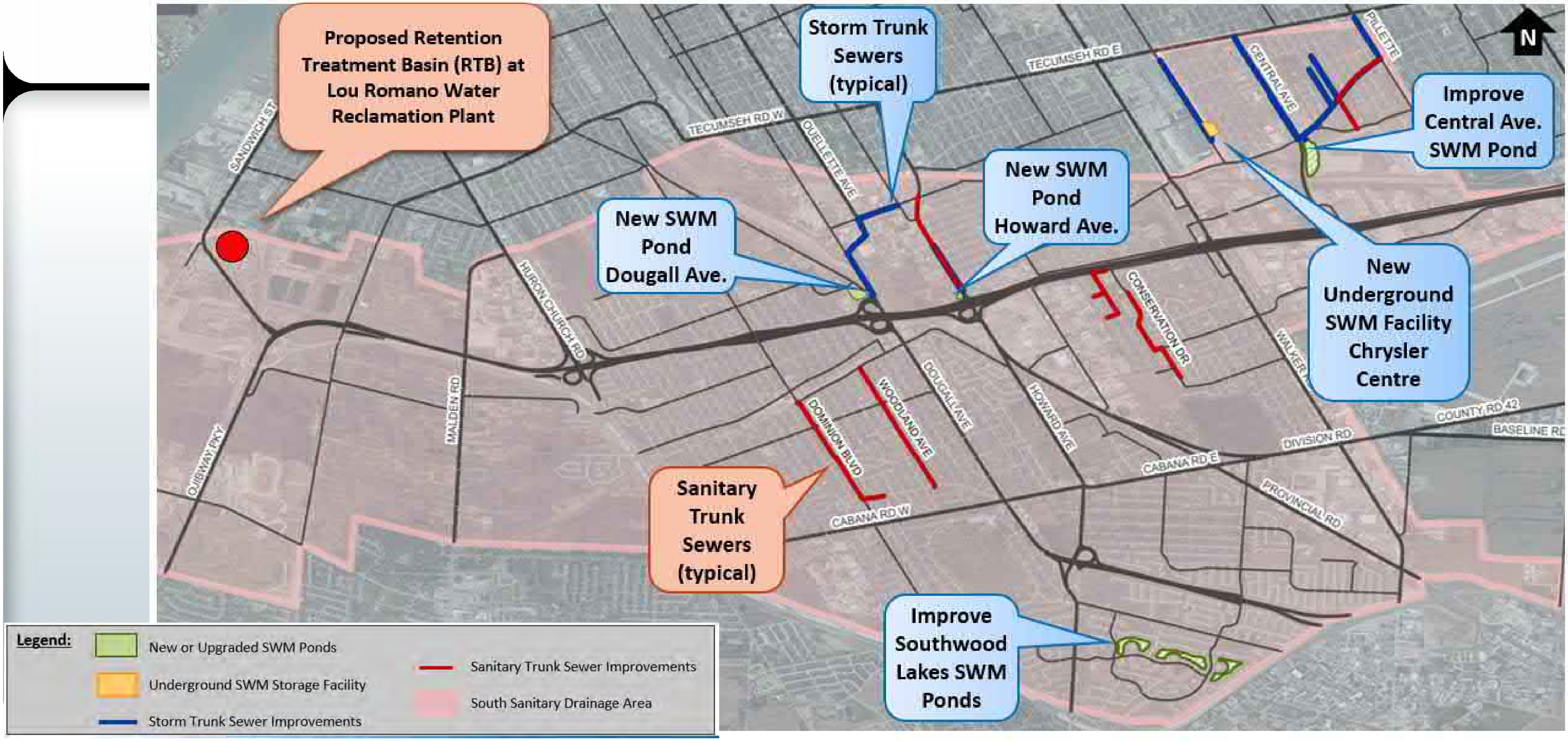
Master Plan – Stormwater System Solutions Assumptions/Considerations

- ERCA Solution Mandate:
  - Solutions cannot negatively impact downstream watercourses.
  - Outlet Capacity Assessment must be completed for watercourses that are accepting modified flow regimes.
- WSMP Solutions
  - Add inline storage (large pipes, new and expanded SWM ponds, underground storage)
  - No increase of existing outflows, no new outflow sewers
  - No new development approved via WSMP plan
  - LIDs recommended area-wide to improve conditions over time.

Master Plan – Stormwater System Solutions Assumptions/Considerations

- Solutions to mitigate existing surface flooding under conservative level of service criteria:
  - 1:100 Year Storm for Regional Areas
  - Climate Change Storm for Major Roadways
    - Climate Change Storm = 1:100 year storm + 40% Volume and Intensity Factor
    - (Dougall Ave., Howard Ave., Chrysler Centre, Central Ave., Pillette Ave.)
- Coordination with ERCA, understanding the need to mitigate risks to downstream watercourses.

Master Plan – Recommended Solutions



Master Plan – Implementation

- Not currently within City's 10 Year Capital Works plan.
- MP to be updated every 10 years or earlier if engineering, environmental, or social conditions change to an extent that would warrant updates to the solutions.

Priority	Regional Surface Flooding Solutions
Immediate	DMAF Round 1 Projects and Round 3 Projects (Pending Funding)
High	Storm Problem Areas 1 and 2 - Riverside Ford Blvd to Lauzon Road
	Storm Problem Area 3 and 4 - Fontainebleau and Lauzon Parkway
Medium	Storm Problem Area 7 - Central/Pillette/Grand Marais
	Storm Problem Area 8 - Southwood Lakes
Low	Storm Problem Area 5 - Blue Heron Pond
	Storm Problem Area 6 - Pontiac and East Marsh Drainage Area

Surface Flooding - Project Prioritization

Priority	Road Surface Flooding Solutions		
Immediate Projects (0-10 Years)	Dorchester Rd. - Prince Rd. to Huron Church Rd. Sewer Separation Improvements	Ellis St. and Giles Blvd. - McDougall Ave. to Howard Ave. Sewer Separation Improvements	
	Totten St. - Betts Ave. to East of Partington Road Sewer Separation Improvements	Prince Rd. Storm Relief System and Schedule C EA Chappell Ave. - West of Sandwich St. to McKee Creek (Detroit River Outlet)	
	Felix Ave. at Marlborough Blvd.. Sewer Separation Improvements	Lauzon Parkway Storm Sewer	
High	Dougall Ave. at the CN Rail Crossing and Eugenie St. E.	Howard Ave. at EC Row Expressway	
		Tecumseh Rd. W. at Crawford Ave.	
Medium	McNorton St., East of Banwell Ave.	Banwell Ave.	Lauzon Rd.
	Roseville School and Rose-Ville Garden Dr.	Jefferson Blvd. and Raymond Ave.	Jefferson Blvd. and South National St.
	Giles Blvd.	Huron Church Rd.	Ypres Ave.
	Mc Hugh St., East of Lauzon Rd.	Parent Ave.	
Low	Chrysler Centre	College Ave.	Patricia Rd.
	Mc Hugh St., West of Banwell Ave.	Drouillard Rd.	Lincoln Rd.
	Wyandotte St. East at Watson Ave.	Walker Rd.	Ontario St.

Outlet Capacity Assessments

- Grand Marais Drain – Completed an Outlet Impact Assessment
- Cahill Drain – Solution within Southwood Lakes, controlled by existing pump station at Howard Ave. drain, no change to outlet.
- Little River Drain – Solutions provide no net increase to peak flow.
  - Assessment to be completed in conjunction with the Little River Floodplain assessment.

GMD - Outlet Capacity Assessment

- Watercourse water levels were based on Grand Marais Drain – PCSWMM (2019) model results in that report.
- Results under ultimate conditions:
  - Reduction of flow rates and HGL elevations entering the GMD.
  - Reduction of flow and HGL along the GMD within the Windsor boundaries.

Location	Return Period	Change Peak HGL Existing Conditions	Change Peak Flow Ultimate Conditions
CP4	1:5 Year	-0.02 m (decrease)	-0.44 m^3/s (1.5% decrease)
	1:100 Year	-0.02 m (decrease)	-0.91 m^3/s (1.5% decrease)
	Climate Change (1:100 +40% Year)	-0.01 m (decrease)	-0.73 m^3/s (1.0 % decrease)

GMD - Sensitivity Analysis

Sensitivity Analysis was completed to test the impacts of changing conditions within the GMD on the functionality of the WSMP solutions.

Map - Comparison Points (CPs) within the City of Windsor

GMD - Outlet Capacity Assessment Sensitivity Analysis

- Adjusted GMD inflow points for 4 WSMP solutions +/- 50%
  - Climate Change Storm (1:100 Year + 40% factor) + 50% increase to inflow:
    - **4% (CP 4) - 30% (CP 1) increase in peak flow within GMD.**
    - **0.06 m (CP 4) - 0.42m (CP 1) increase in HGL within GMD.**
      - ~0% increase in peak flow and HGL at Windsor/LaSalle Boundary

- Adjusted LaSalle/Windsor boundary condition
  - 1:100 high water level + 0.3 m = 179.23 (Climate Change Condition)
    - **0 m (CP 3,4) to 0.29m (CP 1) increase in HGL at inflow points for 4 WSMP solutions**

Turkey Creek Watershed Discussion

Discussion

Next Steps

1. Complete Windsor Sewer Master Plan, including:

- Document consultation with the Town of LaSalle:
- Future Updates to the MP:
  - Confirm design of the recommended solutions based on Turkey Creek Study and other studies/conditions/regulatory requirements that may be applicable.
- Final Notice of Completion to Council Nov. 23
- Notice of Completion and Final Report - Week of Nov. 23, 2020
- Review Period Ending Mid-Jan 2021

On Tue, Nov 10, 2020 at 12:08 PM Herlehy, Laura <lherlehy@dillon.ca> wrote:

Hi Peter,

Please see Dillon's responses below in bold to your comments related to the meeting minutes provided for the meeting held on Oct. 22, 2020. I have attached the presentation provided during that meeting and the associated minute for which these comments refer to.

I have CC'd Barb Slattery from the MECP on this email as well to aid in her understanding of the Town of LaSalle's concerns.

Thanks,
Laura

Laura Herlehy, P. Eng.
Associate
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Windsor, Ontario, N8W 5K8
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LHerlehy@dillon.ca
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On Mon, Nov 2, 2020 at 7:59 AM Peter Marra <pmarra@lasalle.ca> wrote:

I noticed a reference to the incorrect date in my 4th point under comments on item 11.2……please accept this as revision to my 4th point, it should have read;

- Furthermore, LaSalle's April 5, 2018 comments appear to have been issued prior to even the Landmark 2019 GMD report being finalized. Again, yes we were aware of this occurring, and LaSalle did provide some input, but after that point in time, no information came forward to LaSalle until May 8, 2020. The 2019 GMD was not a public process.

See comments below.

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

From: Peter Marra
Sent: October 30, 2020 12:26 PM
To: Herlehy, Laura <lherlehy@dillon.ca>; Dowie, Andrew <adowie@citywindsor.ca>; Godo, Anna

<agodo@citywindsor.ca>; Patten, Chris <cpatten@dillon.ca>; Flavio Forest <fforest@dillon.ca>; Mikhael, Fahd <fmikhael@citywindsor.ca>; Tunks, France Isabelle <ftunks@citywindsor.ca>; jbryant@erca.org; Coombs, Janelle <jcoombs@citywindsor.ca>; Jonathan Osborne <josborne@lasalle.ca>; Mark Hernandez <mhernandez@dillon.ca>; Mark Winterton <mwinterton@citywindsor.ca>
Subject: RE: WSMP - LaSalle Coordination Meeting

Laura, thanks for the minutes and I offer the following comments.

On item 7;

- The Town does have concern with the 2019 GMD study. The Town understands why the flows have significantly increased, because of previous incorrect info, but the Town does not see how flows increase and water level actually go down in some areas and go up in others. I have compiled a comparison chart based on Table 4 from the 2019 GMD report relating what was calculated in the 2019 GMD report to the current regulated flood line mapping elevations and flows. This comparison chart is filled in with info that LaSalle is aware of. Certainly you can see from a couple of the key locations, there is some very inconsistent information. And certainly, at one location, the 2019 GMD does have a negative effect on LaSalle in the area of Front Road by raising the flood line by 1.63m, thus now putting addental properties under water during the extreme event.
- When we met on May 8, 2020, I asked for a comparison chart to be prepared and to date, the only thing I have is what LaSalle has manually completed, which is attached.

The scope of the City's Sewer Master Plan does not include the evaluation of the outlet watercourses, though it was recognized that consideration must be given to the boundary conditions they present to the upstream storm sewer systems under design storm events.
As a result of the Town's comments of April 5, 2018, the scope and direction of the City's Sewer Master Plan was influenced as follows:

- **The City agreed to expand the scope of our project to include an evaluation of the proposed flood mitigation solutions to confirm that they would not negatively impact the watercourses, including the Grand Marais Drain (GMD).**
- **In addition, the Town's comments led to several discussions with ERCA, based on which it was made clear that the City's flood mitigation solutions could not rely on increasing discharge rates to these watercourses, but rather would need to be based on temporary storage solutions.**
  - **This direction from ERCA set the stage for the development of alternative solutions.**
- **The additional work to confirm these solutions had no negative impacts could not be undertaken until such time that the most up to date information was available for the GMD (confirmed in a meeting held in July 2019 - Minutes Attached, Items 2.3, 2.4 and 3.2).**
- **In addition, this evaluation would be conducted on the preferred solutions, which were not identified until the latter stages of this project.**
  - **These solutions were designed to provide storage and flood mitigation during more extreme climate change storm events (1:100 year storm plus 40% factors for volume and intensity), which is more conservative than the current ERCA Stormwater Guidelines and provides for more resilient flood mitigation solutions in the City.**

Accordingly, we initiated our evaluation in early 2020, based on which it was confirmed that the preferred flood mitigation strategies in the areas served by the GMD would not result in negative downstream impacts.
The more detailed evaluation of the outlet watercourses that the Town is concerned with, including the differences in the current conditions that the Town has noted, are expected to be addressed through the Turkey Creek Watershed study that is now being undertaken.
Based on the findings of that study, there will be opportunities to reconfirm the functionality of the flood mitigation solutions identified in the City's Sewer Master Plan based on any differences in the boundary conditions, including reconfirmation that there continue to be no negative downstream impacts.

On item 11.1;

- I don't recall a discussion of an opinion letter from Landmark being discussed.

This was a suggestion from Mark Winterton. Minutes will not be revised.

On item 11.2;

- It was clarified that the Nov 23rd submission to City Council is only to issue the notice of study completion
- The report's recommendations have already been submitted to City Council for approval at the July 23, 2020 Council meeting. It should be noted, that as a mater of process, although the report is currently not yet finalized, the final recommendations were noted to City Council at the July 23rd meeting and the date of the staff report was July 9, 2020. Therefore, it appears to be evident, that the Town of LaSalle first point of contact from this project team on May 8, 2020 was an exercise to check a box. And that the Town's comments have yet and were not addressed in the final recommendations.

As noted above, the Town of LaSalle's comments at the outset of this project had a direct influence on the scope and direction of the City's Sewer Master Plan. The timing of our evaluations to confirm that the flood mitigation strategies would not have any downstream impacts could not be undertaken until early 2020. Once we had the information available to address the Town's comments, Dillon provided the Town a copy of the Downstream Impact Assessment report on April 22, 2020 as a draft for the Town's review therefore May 8, 2020 was not the first point of contact (email attached).

- As a further point of clarification, the Town issued an email/comments upon receipt of the Notice of Study Commencement, back on April 5, 2018, requesting our involvement on this study with anything that outlets through LaSalle. It is noted that the first point of contact on the WSMP only occurred on May 8, 2020, only two month before the report was finalized with final recommendations to City Council. See LaSalle's initial response to notice of study commencement, as noted as item 1.4 in previous meeting minutes.
- Furthermore, LaSalle's May 8, 2020 comments appear to have been issued prior to even the Landmark 2019 GMD report being finalized. Again, yes we were aware of this occurring, and LaSalle did provide some input, but after that point in time, no information came forward to LaSalle until May 8, 2020. The 2019 GMD was not a public process.

Dillon would like to reiterate that the concerns and needs of the Town of LaSalle were understood from the onset of this project. These concerns were communcated with ERCA at the early stages of this project. Despite not having been directly provided materials until April 22, 2020, the Town's interests have shaped the solution strategy for this project. The use of in-line storage (large culverts and storm sewers and the use stormwater surcharged ponds) were recommended in lieu of improving stormwater conveyance with the intent to mitigate any downstream impacts. Futhur details regarding this is included in Dillon's letter dated, Nov. 10, 2020. The 2019 GMD study was finalized in March 2020, prior to the meeting with the Town of LaSalle, ERCA , the City of WIndsor and DIllon on May 8, 2020.

I trust these comments and all previously submitted comments from LaSalle will make it into the final report once that occurs.

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

5950 Malden Road, LaSalle, Ontario N9H 1S4

Ph: 519-969-7770, ext 1475 Fax: 519-969-4469

Email: pmarra@lasalle.ca

www.lasalle.ca

Visit Us On Social Media:

Please consider the environment before printing this email.

From: Herlehy, Laura <lherlehy@dillon.ca>
Sent: October 29, 2020 9:32 AM
To: Dowie, Andrew <adowie@citywindsor.ca>; Godo, Anna <agodo@citywindsor.ca>; Patten, Chris <cpatten@dillon.ca>; Flavio Forest <fforest@dillon.ca>; Mikhael, Fahd <fmikhael@citywindsor.ca>; Tunks, France Isabelle <ftunks@citywindsor.ca>; jbryant@erca.org; Coombs, Janelle <jcoombs@citywindsor.ca>; Jonathan Osborne <josborne@lasalle.ca>; Mark Hernandez <mhernandez@dillon.ca>; Mark Winterton <mwinterton@citywindsor.ca>; Peter Marra <pmarra@lasalle.ca>
Subject: WSMP - LaSalle Coordination Meeting

Good Morning,

Please see attached for minutes of the coordination meeting held October 22, 2020 regarding the Windsor Sewer Master Plan and the LaSalle comments. Dillon will follow up with a formal response letter to the Town of LaSalle related to the comments provided and to supplement meetings and discussions had to date.

Thanks,
Laura

BEST MANAGED COMPANIES
CANADA
Platinum member

Laura Herlehy, P. Eng.

Associate
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4 attachments

Minutes - ERCA Meeting (June 27, 2019).pdf
578K

LaSalle Coordination Meeting Presentation Oct 22.pdf
1368K

LaSalle-WSMP Coord Oct. 22 Mtg Mins.pdf
47K

2019 GMD report Table 4, expanded.pdf
539K

DILLON CONSULTING

Bart, Miriam <mbart@dillon.ca>

Fwd: WSMP - Town of LaSalle Response Letter

[redacted]

[redacted]

[redacted]

---------- Forwarded message ---------
From: **Peter Marra** <pmarra@lasalle.ca>
Date: Thu, Nov 19, 2020 at 3:53 PM
Subject: RE: WSMP - Town of LaSalle Response Letter
To: Winterton, Mark <mwinterton@citywindsor.ca>, Herlehy, Laura <lherlehy@dillon.ca>
Cc: Jonathan Osborne <josborne@lasalle.ca>, Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>, jbryant@erca.org <jbryant@erca.org>, Tim Byrne <tbyrne@erca.org>, Tunks, France Isabelle <ftunks@citywindsor.ca>, Mikhael, Fahd <fmikhael@citywindsor.ca>, Godo, Anna <agodo@citywindsor.ca>, Coombs, Janelle <jcoombs@citywindsor.ca>, Dowie, Andrew <adowie@citywindsor.ca>, Flavio Forest <fforest@dillon.ca>, Patten, Chris <cpatten@dillon.ca>

Mark, again thanks for continuing the dialogue with LaSalle on this master plan.

LaSalle has been encouraged to continue the discussion regarding our concerns, through the master plan EA process, with the proponent and consultant in an effort to avoid any formal MECP objections, etc. But it seems that the City is now going to solely rely on the process. The Town of LaSalle is OK with this approach and I have faith in the process, the Essex Region Conservation Authority and the MECP. When LaSalle was finally formally involved in the SMP EA process we have consistently provided timely feedback on our concerns and recognized the importance of this master plan EA for the City. LaSalle wants to be a partner in finding an appropriate solution for all involved and wants to be engaged to avoid any delays on the City's behalf. We also wanted to be open and upfront with our concerns in a concise manner.

The following is provided to clarify a couple of point in your email.

<u>Landmark 2019 GMD report</u>

I would like to clarify what I mean as this report having no status. The report was prepared by Landmark engineering in an assignment solely paid for by the City of Windsor. I believe this report was prepared in order to recognize the inconsistency of the previous modeling efforts and what has been observed in the Grand Maris Drain and Turkey Creek during large rainfalls and the actual observed water levels. This report was not prepared through a public process. If it was developed through a public process, then LaSalle would've expressed our concerns with this report at that time. The main concern is that this report shows that there are increased flows and increased flood levels in Turkey Creek through LaSalle. These increased flood levels and flows are above what is currently regulated on Turkey Creek.

There also seems to be some inconsistencies, because for sure flows have increased, but water levels have both went up and down in areas. Primarily flood levels go up in the lower reaches of Turkey Creek in LaSalle and have drop as we progress upstream into the City all while the flows having increased by an average of 70% from previous developed models used to establish the regulated flood line mapping. With the flows increasing to this extent and the drain characteristic having not changed since the original flood plain mapping, I hope the engineering science can be seen that echoes LaSalle's concerns.

My issues is that Dillon, through this master plan EA process, has relied on the 2019 GMD report and demonstrated no negative effects on downstream reaches. But LaSalle's point is that while that is true when comparing Dillon outlet analysis with the 2019 GMD report, the negative effects are on the existing regulated flood line mapping for the area. It was not until Dillon's presented LaSalle with their outlet capacity analysis in April 2020, did the Town of LaSalle become aware of the completion of the 2019 GMD report.

Yes, LaSalle did provide LIDAR info in 2018 to Landmark Engineering, for the 2019 GMD report, but that was the extent of our involvement until we heard of it's completion in April/May 2020. There was no contact with LaSalle while preparing this 2019 GMD report throughout 2018 and 2019 and the report was finalized in March 2019. In 2018, when LaSalle shared our LIDAR info with Landmark and the City, LaSalle was being a good neighbour and trying to help. The premise to sharing this info, was that LaSalle would get a copy of the hydraulic model and a copy of the report. We still don't have a copy of the hydraulic model and the report was not provided until we asked for it in May 2020, when we became aware of its completion.

So LaSalle's argument, is what you are proposing in the current master plan EA is not sufficient to control flows and flood levels in Turkey Creek through LaSalle to the regulated limits. If you were proposing solutions to get the flows and flood levels back to the current regulated limits we would have no issues.

Once the solutions are approved though this master plan EA, LaSalle's right to be involved beyond this is nonexistent, because you can then proceed to design and construction of the solutions. I know you said it won't happen for sometime, but if grants are obtained, I see that changing quickly.

To reiterate, it is very important to ask the question, "does the 2019 GMD report increase the major event flood lines in LaSalle from the current regulated flood line, for both water levels and extreme event flows?" If the answer is **yes**, because Dillon used this report as comparison for baseline information, then there is extreme negative effects on the downstream reaches of Turkey Creek in LaSalle. Currently the comparison chart that LaSalle has provided to date shows that the flood levels and flows have increased.

Removal of Turkey Creek from current master plan EA

I don't understand why you can't remove the Turkey Creek watershed from the current master plan EA. I understand the EA process is a proponent driven process, and it is up to the proponent to satisfy the requirements, regardless of scope changes, consulting fees, delays, schedule, etc.

To date, LaSalle has not seen any formal response on why this can't be done, except the reply "for a number of valid reasons".

I suspect, you have a larger issue, since the final solutions have been already presented and approved by the City of Windsor Council. Now given LaSalle's concern, which were known prior to going to Council and have not been addressed prior to going to Council, someone may have to potentially say the solutions may need to change and/or something needs to be removed. This is not a good position to be in, but that is the process.

Separate Turkey Creek Watershed Study

It was LaSalle that initiated this discussion. This was initiated between the City of Windsor, the Town of Tecumseh, LaSalle and the Essex Region Conservation Authority. This was initiated by LaSalle, when we became aware of the current situation in May 2020. It was agreed by all three municipalities, and the conservation authority, that a larger more comprehensive study is needed. You assigned certain City staff to work on preparing the terms of reference between the 3 municipalities and ERCA. This occurred through the months of June, July, August and September of 2020. A proposal was just submitted in October 2020.

You can confirm with your City staff involved, this separate study is not set-up under the auspice of the drainage act and as such we have no current mechanism, in place to get the City to share in their part. This study will do a more comprehensive look at the entire Turkey Creek watershed, given the known 2019 GMD report and will better inform all of us and ERCA if more details are needed, if new flood line mapping should be prepared, how best to solve rising flood waters, how best to deal with increased flows, rising Detroit River levels, climate change, changes and updates to what you currently provide for in your WSMP EA process, etc.

Hence, that is why LaSalle feels the larger Turkey Creek watershed study needs to be completed, prior to identifying/finalizing anything in the City's sewer master plan EA.

Closure

In closing, we are now all aware of the current changes in flows and water levels in Turkey Creek through LaSalle. I hope that we do not experience any significant storm event that proves this current 2019 modelling to be correct.

LaSalle remains committed in working with our neighbours and ERCA to best deal with regional concerns such as storm drainage. As you are aware, drainage knows no municipal jurisdictions, and only follows the law of gravity and flows downhill. Unfortunately, LaSalle is at the bottom of the hill in this particular case.

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

5950 Malden Road, LaSalle, Ontario N9H 1S4

Ph: 519-969-7770, ext 1475 Fax: 519-969-4469

Email: pmarra@lasalle.ca

www.lasalle.ca

Visit Us On Social Media:

From: Winterton, Mark <mwinterton@citywindsor.ca>
Sent: November 17, 2020 5:13 PM
To: Peter Marra <pmarra@lasalle.ca>; Herlehy, Laura <lherlehy@dillon.ca>
Cc: Jonathan Osborne <josborne@lasalle.ca>; Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>; jbryant@erca.org; Tim Byrne <tbyrne@erca.org>; Tunks, France Isabelle <ftunks@citywindsor.ca>; Mikhael, Fahd <fmikhael@citywindsor.ca>; Godo, Anna <agodo@citywindsor.ca>; Coombs, Janelle <jcoombs@citywindsor.ca>; Dowie, Andrew <adowie@citywindsor.ca>; Flavio Forest <fforest@dillon.ca>; Patten, Chris <cpatten@dillon.ca>
Subject: RE: WSMP - Town of LaSalle Response Letter

Peter: Firstly, I want to say that I appreciate and respect your concerns. As we had spoken about recently, the City of Windsor cannot remove the Turkey Creek component of the SMP until all of the down stream components are completed for a number of valid reasons. In order to address your concerns, it would quire a major change in scope and most of your concerns will be addressed by the Turkey Creek Watershed study. I can advise you that the City of Windsor currently has no plans to undertake any significant works that would affect LaSalle within at least a 5 year horizon (outside of the time frame of the Turkey Creek Watershed study). The Sewer Master Plan is intended to be a "living" document and will be updated and modified over time. Obviously the City of Windsor will modify any proposed works affected by the outcome of the study during final design or as updates to the SMP are completed every decade or so. As the Turkey Creek study is being completed under the auspices of the Drainage Act, it stands to reason that the City of Windsor would be assessed for any contributory impacts under the Act. Also, I took the opportunity to call Dan Krutsch from Landmark Engineering to discuss the Grand Marais Drain and your statement that the Landmark Study "has no status". Neither of us understand this statement. The Landmark study informs all other studies affected by it. As you have indicated that the Town intends to file a formal objection to the EA, we will have to allow the process to unfold, however, The City of Windsor believes that the process currently in place has several safeguards for LaSalle. Although some of these are iterative in nature, both from a technical and financial perspective the interests of LaSalle appear to be protected. Ideally, LaSalle would continue to work cooperatively with the City of Windsor to address all of our stormwater management concerns. Thank you for your consideration.

Mark

MARK WINTERTON P.ENG

City Engineer and Corporate Leader for Environmental, Transportation and Transit

1266 McDougall Street | Windsor, ON | N8X 3N7

P: (519)-255-6247 ext. 6356 | E: mwinterton@citywindsor.ca | F: 519-973-5476

www.citywindsor.ca | **facebook** | **twitter** | **youtube** |

From: Peter Marra <pmarra@lasalle.ca>
Sent: Monday, November 16, 2020 2:35 PM
To: Herlehy, Laura <lherlehy@dillon.ca>
Cc: Jonathan Osborne <josborne@lasalle.ca>; Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>; jbryant@erca.org; Tim Byrne <tbyrne@erca.org>; Winterton, Mark <mwinterton@citywindsor.ca>; Tunks, France Isabelle <ftunks@citywindsor.ca>; Mikhael, Fahd <fmikhael@citywindsor.ca>; Godo, Anna <agodo@citywindsor.ca>; Coombs, Janelle <jcoombs@citywindsor.ca>; Dowie, Andrew <adowie@citywindsor.ca>; Flavio Forest <fforest@dillon.ca>; Patten, Chris <cpatten@dillon.ca>
Subject: RE: WSMP - Town of LaSalle Response Letter

Laura,

Thank-you for this follow-up, and you are in fact correct that those are two key points of concerns for LaSalle. All of which lies in the Essex Region Conservation Authority mandate. All approvals along Turkey Creek in LaSalle have been issued and granted, over the last 4 decades have been based on the current flood line mapping prepared in the 1990's. Then along comes a 2019 GMD report that shows issues with what is known for the last 4 decades. Shows flood line going up and down along with increase in flows.

Yes I do understand the flood lines is not part of Dillon's requirements and you used a report, more specifically the 2019 GMD Landmark Engineering, that in LaSalle's opinion has no status. The preparation of this 2019 GMD report was an exercise completed between a consultant and client. Unfortunately, Dillon's work rely's on this 2019 GMD report so that Dillon can demonstrate no negative impacts downstream. But that is not the entirely true story.

All I want is for a consulting professional engineer to write under stamp and seal, "that flood lines in Turkey Creek that are currently known and used for development purposes, by ERCA, for the last 4 decades remain unchanged". If no engineer will do this, then I think you see my point. Whether that is an engineer from Dillon or Landmark.

You are acknowledging that the solutions contained within your sewer master plan for the Turkey Creek watershed are subject to change pending the larger Turkey Creek watershed study currently underway. I do want to point out, that the larger turkey creek watershed study is just a proposal at this stage and is not underway. So if you are acknowledging prior to issuing the notice of study completion that your sewer master plan report will need to change pending some other report still to be completed I believe you are acknowledging the sewer master plan is premature to be finalized.

I understand there are a number of other areas within the City as part of the sewer master plan, pending DMAF grants, and I feel that the rest of the master plan can be finalized in short order with the exception of what is contained within the Turkey Creek Watershed. If the City and Dillon removed the Turkey Creek watershed from the sewer master plan as pat of the notice of study completion then LaSalle can rest until the larger study is complete.

The Town still intends to issue a formal objection, during the notice of study completion stage on the larger sewer master plan if the Turkey Creek watershed remains within the context of the finalized report.

There is one other concern I have at this stage and that is the EA process followed on this study. As I noted, the Town issued our intent early on in the study, and is was not until the final stages, some two years later, when we were engaged in the process. You recognized that our initial submission helped guide your project, but is would have been good to get LaSalle involved earlier to identify that what you were doing, did truly in fact, work on addressing our concerns. When LaSalle was actually engaged in the process, April/May 2020, it was only a mere two month later when the final solution were presented to the City of Windsor Council. LaSalle issued our concern immediately in May/June 2020, and no consideration was given to them when finalizing the solutions. Hopefully, you can see from the Town's point of view, the process was not open and transparent. You mentioned, that there was a technical steering committee, this is new information to LaSalle. I would ask, if LaSalle's initial comments drove the decisions, why LaSalle was not part of it?

The quick and easy solution, to continue moving forward your sewer master plan process, is remove all storm related improvements within the Turkey Creek Watershed from your study and complete that portion at a later date when this other, stand alone study is completed under the Conservation Authority guidance.

Regards,

Peter Marra, P.Eng.

Director of Public Works

Town of LaSalle

From: Herlehy, Laura <lherlehy@dillon.ca>
Sent: November 12, 2020 4:23 PM
To: Peter Marra <pmarra@lasalle.ca>
Cc: Jonathan Osborne <josborne@lasalle.ca>; Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>; jbryant@erca.org; Tim Byrne <tbyrne@erca.org>; Mark Winterton <mwinterton@citywindsor.ca>; Tunks, France Isabelle

<ftunks@citywindsor.ca>; Mikhael, Fahd <fmikhael@citywindsor.ca>; Godo, Anna <agodo@citywindsor.ca>; Coombs, Janelle <jcoombs@citywindsor.ca>; Dowie, Andrew <adowie@citywindsor.ca>; Flavio Forest <fforest@dillon.ca>; Patten, Chris <cpatten@dillon.ca>
Subject: Re: WSMP - Town of LaSalle Response Letter

Hi Peter,

To provide further clarification, it is our understanding that there are two negative impacts to the downstream Turkey Creek Watershed that you are referring to as detailed below (#1 and #2). It is not the intention of the Sewer Master Plan team to glaze over any concerns raised however it is expected that the Turkey Creek Watershed Study will assess the impacts, risks, and solutions related to these current issues.

1) Grand Marais Drain: Is related to the changes to water levels from previously completed floodplain studies (completed in 1990's) as compared to the latest 2019 Grand Marais Drain H&H study, completed by Landmark Engineering with the City of Windsor. Below in italics is the latest comment you have provided to Dillon on Nov. 2, 2020.

- *The Town does have concern with the 2019 GMD study. The Town understands why the flows have significantly increased, because of previous incorrect info, but the Town does not see how flows increase and water level actually go down in some areas and go up in others. I have compiled a comparison chart based on Table 4 from the 2019 GMD report relating what was calculated in the 2019 GMD report to the current regulated flood line mapping elevations and flows. This comparison chart is filled in with info that LaSalle is aware of. Certainly you can see from a couple of the key locations, there is some very inconsistent information. And certainly, at one location, the 2019 GMD does have a negative effect on LaSalle in the area of Front Road by raising the flood line by 1.63m, thus now putting addental properties under water during the extreme event.*

The City's Sewer Master Plan project team is not disputing that there may be changes that have occurred with the Turkey Creek water levels that differ from those identified in previous studies. We have used the latest available information to estimate the current conditions through the use of the 2019 Landmark model results to design flood mitigation solutions in the City as part of their Sewer Master Plan and have confirmed that those solutions do not result in any further changes/impacts to the Grand Marais Drain watercourse. Addressing any historical changes that have occurred in the Grand Marais Drain and Turkey Creek watershed are beyond the scope of the City's Sewer Master Plan, the focus of which is on mitigating the risks of flooding relative to the current outlet conditions.

The more detailed evaluation and identification of recommended solutions related to any negative impacts that have occurred to the outlet watercourses that the Town is concerned with, including the differences in the conditions that the Town has noted, are expected to be addressed through the Turkey Creek Watershed study that is now being undertaken.

Based on the findings and recommendations of that study, there will be opportunities to reconfirm the functionality of the flood mitigation solutions identified in the City's Sewer Master Plan based on any differences in the boundary conditions, including reconfirmation that there continue to be no negative downstream impacts.

2) Cahill Drain: The Town has also raised concern regarding significant overflow from the Cahill Drain that overflows into the Canard River watershed. The Town included comment in a memo dated May 22, 2020 as follows:

- *The Town of LaSalle is negatively affected by drainage currently occurring through the Cahill Drain and that more effort is required in the City to reduce flows within the City and in the Cahill Drain to relate back to the original design.*

Similar to the comments for #1 above, we do not dispute that these conditions need to be reviewed. The Sewer Master Plan only recommends one project within the Cahill drainage area, which includes the expansion of three existing stormwater ponds within the Southwood Lakes development for which the outlet is controlled by an existing pump station.

This overflow condition is expected to be assessed through the Turkey Creek Watershed Study and again prior to implementation, the functionality of the Sewer Master Plan's recommended solutions will be confirmed based on the results of the Turkey Creek Watershed study.

Thanks,
Laura

Laura Herlehy, P. Eng.

Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

On Tue, Nov 10, 2020 at 11:46 AM Peter Marra <pmarra@lasalle.ca> wrote:

> Laura,
>
> Thank-you for your letter.
>
> LaSalle still has concerns. It appears that everyone is glazing over the concerns of LaSalle when we say, **"there is negative impacts on the downstream reaches of Turkey Creek"**. I will endeavour to simplify them in my response and also bring forward the concerns previously submitted to Dillon and the City that have been omitted from the your response.
>
> Regards,
>
> **Peter Marra, P.Eng.**
>
> Director of Public Works
>
> Town of LaSalle
>
> ---
>
> **From:** Herlehy, Laura <lherlehy@dillon.ca>
> **Sent:** November 10, 2020 9:37 AM
> **To:** Peter Marra <pmarra@lasalle.ca>
> **Cc:** Jonathan Osborne <josborne@lasalle.ca>; Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>; jbryant@erca.org; Tim Byrne <tbyrne@erca.org>; Mark Winterton <mwinterton@citywindsor.ca>; Tunks, France Isabelle <ftunks@citywindsor.ca>; Mikhael, Fahd <fmikhael@citywindsor.ca>; Godo, Anna <agodo@citywindsor.ca>;

Coombs, Janelle <jcoombs@citywindsor.ca>; Dowie, Andrew <adowie@citywindsor.ca>; Flavio Forest <fforest@dillon.ca>; Patten, Chris <cpatten@dillon.ca>
Subject: WSMP - Town of LaSalle Response Letter

Good Morning Peter,

In response to the comments we have received, regarding the Windsor Sewer and Coastal Flood Protection Master Plan, please see the attached letter. We hope this addresses the Town's comments and provides clarification on the scope and findings of this Master Plan.

Thanks,
Laura

Laura Herlehy, P. Eng.

Associate
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
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This message is directed in confidence solely to the person(s) named above and may contain privileged, confidential or private information which is not to be disclosed. If you are not the addressee or an authorized representative thereof, please contact the undersigned and then destroy this message.

Ce message est destiné uniquement aux personnes indiquées dans l'entête et peut contenir une information privilégiée, confidentielle ou privée et ne pouvant être divulguée. Si vous n'êtes pas le destinataire de ce message ou

une personne autorisée à le recevoir, veuillez communiquer avec le soussigné et ensuite détruire ce message.

image004.png
8K

TABLE 4 - Summary of Predicted Water Levels

River Station	Station Location	1:100 year		1:25 year		1:5 year	
		Q Total (m3/s)	W.S. Elev (m)	Q Total (m3/s)	W.S. Elev (m)	Q Total (m3/s)	W.S. Elev (m)
18	US County Road 20	100	**176.74**	75	176.38	50	175.92
1482.2	DS ETR Bridge	100	**176.97**	75	176.60	50	176.14
1729	US ETR Bridge	96	**177.13**	71.6	176.71	47.1	176.21
2208	DS Matchette Bridge	96	**177.18**	71.6	176.75	47.1	176.26
2280.9	US Matchette Bridge	96	**177.21**	71.6	176.77	47.1	176.28
2901.8	Cahill Drain Confluence	96	**177.33**	71.6	176.91	47.1	176.43
3271	DS Sprucewood Bridge	84	**177.39**	63	176.98	42	176.51
3287	US Sprucewood Bridge	84	**177.41**	63	176.99	42	176.51
3617	Basin Drain Confluence	84	**177.50**	63	177.08	42	176.58
4138.2	DS Malden Bridge	80	**177.58**	60	177.19	40	176.72
4163	US Malden Bridge	80	**177.63**	60	177.23	40	176.75
4561	DS Todd Bridge	80	**177.80**	60	177.40	40	176.91
4606	US Todd Bridge	80	**177.88**	60	177.44	40	176.94
6151.5	DS Herb Gray Pkwy Culverts	75.2	**178.86**	56.1	178.47	36.9	178.00
6291.6	US Herb Gray Pkwy Culverts	75.2	**178.93**	56.1	178.49	36.9	178.01
6636.2	DS Balmoral Culverts	63.6	**179.01**	47	178.58	27.3	178.11
6804.5	US Balmoral Culvert	63.6	**179.08**	47	178.65	27.3	178.16
7040.9	DS Rankin Bridge	56.6	**179.23**	42.2	178.80	24.3	178.29
7157.8	US Rankin Bridge	56.6	**179.26**	42.2	178.85	24.3	178.34
7564	DS Curry Bridge	56.6	**179.50**	42.2	179.13	24.3	178.65
7578.9	US Curry Bridge	56.6	**179.51**	42.2	179.15	24.3	178.67
7762.1	DS Dominion Bridge	50.6	**179.72**	38.5	179.36	22.3	178.87
7885.5	US Dominion Bridge	50.6	**179.77**	38.5	179.42	22.3	178.94
8696.4	DS Bruce Bridge	38.4	**180.35**	29.8	180.03	18	179.54
8722.4	US Bruce Bridge	38.4	**180.36**	29.8	180.04	18	179.55
8872.8	DS Dougall Bridge	34.8	**180.50**	28	180.18	17	179.69

ERCA Flood Line Mapping

(Source)

100 year

M.M. Dillon 1981 model	
Q (m³/s)	W.S. Elev (m)
	175.11
	176.29
	176.69
	176.84
	176.84
	177.09
	177.27
	177.27
	177.52
	177.73
	177.73
	178.34
	178.49

D/S 66.9

U/S 43.6

100 year

MacLaren 1990 Model	
Q (m³/sec)	W.S. Elev (m)
73.5	175.11
	176.35
	176.96
	177.08
	177.09
	177.28
	177.39
	177.40
	177.56
39.8	177.65
39.8	177.69
	177.99
	178.17

(A) River Station 18 all development to date has been designed and allowed to occur base on a flood line of 175.11 and a flow of 73.5 m³/sec in Turkey Creek. New Landmark 2019 analysis says flow has increased 36% from 73.5 to 100 and flood line goes up by 1.63m.

(B) River Station 2901.8 flows increase by 43% from 1990 to 2019 and flood lines remain fairly unchanged.

(C) River Station 4163 flows increase by 200% from 1990 to 2019 and flood lines decrease.

MEETING MINUTES

Subject: Windsor Sewer and Coastal Flood Protection Master Plan: Project Consultation with Source Water Protection

Date and Time: March 25, 2020 at 1:30 pm

Location: Virtual Meeting

Our File: 17-6638

Attendees

Janelle Coombs	City of Windsor (City)
Anna Godo	City of Windsor
Katie Stammler	Essex Region Conservation Authority: Source Water Protection
Chris Patten	Dillon Consulting Limited (Dillon)
Ian Wilson	Dillon Consulting Limited

Notes

Item	Discussion	Action By
1.	**Overview of Windsor Sewer and Coastal Flood Projection Master Plan**	
1.1.	An overview of the Master Plan (MP) project was provided, as follows: • Dillon Consulting and Aquafor Beech Limited were retained by the City of Windsor to develop the MP project, which will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process. • The MP project will provide city-wide recommendations to reduce the risk of basement and surface flooding, and coastal flooding. • Three Public Information Centres were held as part of the project. The most recent identified preliminary preferred solutions which included new or upgraded outfalls to the Detroit River. A map of these locations was provided prior to the meeting.	Info.
2.	**Source Water Protection Policies**	
2.1.	A preliminary review of Source Water Protection (SWP) policies related to recommendations from the MP were discussed. A summary is provided below: • Policy 1 Prescribed Instrument (Provincial implementation) – Prohibition policy; no new combined sewers in Windsor IPZ-1 or IPZ-2. Based on project recommended improvements this was not seen as a concern. • Policy 4 Prescribed Instrument (Provincial implementation) – Mitigation Policy; ECA's for stormwater management facilities in	Info.

IPZ-1 or IPZ-2 adequately manage stormwater to protect drinking water, including consideration for MECP 2003 SWMPD Manual. This will be addressed when future individual ECAs for projects are obtained.

- Policy 5&6 Prescribed Instrument (Provincial implementation) are for industrial uses (i.e. industrial coolant and industrial sewage); these are not considered applicable to project recommendations.
- Policy 7 Prescribed Instrument (Provincial implementation); policy related to waste water treatment facility and designed by-pass in Windsor IPZ-2. The proposed improved by-pass for the Little River Pollution Control Plan may be impacted by this policy, where mitigation measures may be required. ECA approvals/alterations will be required for any improvements at LRPCP.
- Policy 12 Prescribed Instrument (Provincial implementation) are for hauled sewage; these are not considered applicable to project recommendations.
- Other policy identified included policies 34 -37.

3. **Next Steps**

3.1. The Following were identified as next steps in the Source Water Protection consultation process: — Dillon/City/Source Water

- Source Water will provide a letter identifying impacted policies, and other preliminary recommendations. Dillon may follow up with Source Water to confirm an understanding of the provided.
- Draft section(s) from the MP EA Report related to Source Water consultation will be prepared by Dillon and provided to ERCA Source Water Protection for input and review.
- Updated MP EA Report section(s) related to Source Water Protection will be prepared based on comments received.
- The MP Report will then be posted on the EBR for Source Water Protection's final comments, as required.

Errors and/or Omissions

These minutes were prepared by Ian Wilson, P. Eng. who should be notified of any errors and/or omissions.

Distribuon

All attendees
Laura Herlehy – Dillon Consulting Limited

Re: Sewer Master Plan Question

[redacted]

Sent: 2/26/2020 3:28 PM

To: ""Godo, Anna"" <agodo@citywindsor.ca>

Cc: ""info@weatheringthestorm.ca"" <info@weatheringthestorm.ca>

Thank you for the info.

> On Feb 26, 2020, at 1:07 PM, Godo, Anna <agodo@citywindsor.ca> wrote:
>
> LIDs are Low Impact Development features, or Green Infrastructure, for stormwater management.
>
> In the material from PIC #1, Page 23 notes examples i.e. permeable pavers, enhanced swales, rain gardens, and trench drainage.
>
> With regards,
> Anna
>
> Anna M. Godo, P. Eng. |Engineer III
>
>
> Engineering Department
> 350 City Hall Square West | Suite 310 | Windsor, ON N9A 6S1
> 519-255-6100 Ext. 6508
> www.citywindsor.ca
>
>
> -----Original Message-----
> From: [redacted]
> Sent: Wednesday, February 26, 2020 9:57 AM
> To: info@weatheringthestorm.ca
> Subject: Sewer Master Plan Question
>
> CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.
>
>
> What are LIDs?
>
> Must have missed it somewhere in the documents online.
>
> Thanks.
>

Fwd: North of Riverside

[redacted]

Sent: 10/30/2019 9:45 PM

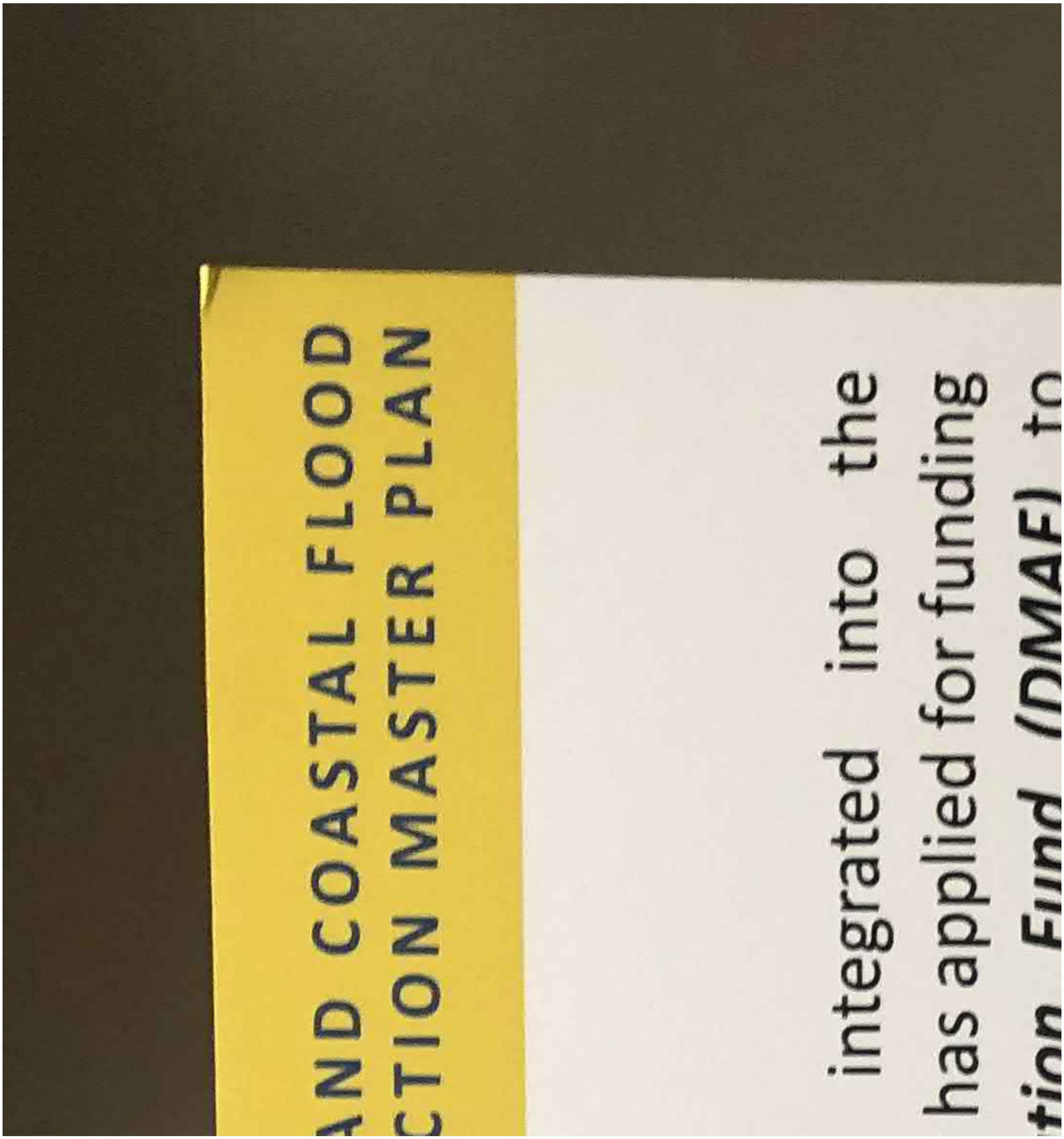
To: info@weatheringthestorm.ca

Please see my email below for the request of my husband and I to be informed of any and all Information and updates on the project. We would like to be put on the contact list.

Please also note that your flyer at tonight's meeting does not have a complete/accurate email address. See the attached image (my original email bounced back).

> [redacted]

[redacted]



Allan, Catherine <callan@dillon.ca>

[FWD: Flooding]

1 message

info@weatheringthestorm.ca <info@weatheringthestorm.ca> Mon, Apr 2, 2018 at 11:17 AM
To: callan@dillon.ca

Project Representative
350 City Hall Square W, 3rd Floor | Windsor, ON | N9A 6S1
(519)-255-6100
www.citywindsor.ca

> -------- Original Message --------
> Subject: Flooding
> From: [redacted]
> Date: Mon, April 02, 2018 9:07 am
> To: <info@weatheringthestorm.ca>
>
> I live at [redacted] and was flooded last year and the storm the year before in september. Never happened before, only some ground water seepage from heavy rains, never backwater like last year. My street and sewer havent been touched since original install, a joke. [redacted]

DILLON CONSULTING

Babcock, Joshua <jbabcock@dillon.ca>

Fwd: away now

2 messages

Herlehy, Laura <lherlehy@dillon.ca> Mon, Feb 3, 2020 at 11:08 AM
To: Joshua Babcock <jbabcock@dillon.ca>
Cc: Miriam Bart <mbart@dillon.ca>, 176638 <176638@dillon.ca>

Josh,
please add to WSMP correspondence.
Thanks,
Laura

DILLON CONSULTING
CANADA BEST MANAGED COMPANIES
Platinum member

Laura Herlehy, P. Eng.
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
LHerlehy@dillon.ca
www.dillon.ca

---------- Forwarded message ---------
From: **Forest, Flavio** <fforest@dillon.ca>
Date: Mon, Feb 3, 2020 at 8:41 AM
Subject: Re: away now
To: [redacted]
Cc: Patten, Chris <CPatten@dillon.ca>, Laura Herlehy <lherlehy@dillon.ca>

Hello [redacted], I hope you're both doing well.
Based on the updated approach being taken to utilize the higher elevation of the homes built in your immediate area, we are not proposing a separate berm in front of your home. There may be a need to register something on title for your property that provides the City with assurances that the elevations on these properties would not be compromised in the future, as they would now be part of the flood protection measures.
Please call me if you would like to discuss this in further detail.
Best regards,
Flavio

DILLON CONSULTING
CANADA BEST MANAGED COMPANIES
Platinum member

Flavio Forest
Partner
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Windsor, Ontario, N8W 5K8
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M - 519.791.2166
FForest@dillon.ca
www.dillon.ca

On Sun, Feb 2, 2020 at 4:53 PM [redacted]

> Flavio, we are away till the end of March. Do we have to be concerned about project plans for impact on our home at [redacted]
> Warm regards from us both,
> [redacted]

[redacted]

Babcock, Joshua <jbabcock@dillon.ca> Mon, Feb 3, 2020 at 11:13 AM
To: "Herlehy, Laura" <lherlehy@dillon.ca>

Thanks Laura.

Josh

DILLON CONSULTING

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Platinum member

Joshua Babcock
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JBabcock@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

[Quoted text hidden]

Wed Nov 6th meeting

[redacted]

Sent: 11/4/2019 6:29 PM

To: info@weatheringthestorm.ca

Hello
Can you provide me with details of pump area near Pillette Park prior to this meeting
[redacted]

DILLON CONSULTING

Babcock, Joshua <jbabcock@dillon.ca>

Fwd: flooding plan

1 message

Herlehy, Laura <lherlehy@dillon.ca> Mon, Jan 6, 2020 at 8:54 AM
To: Joshua Babcock <jbabcock@dillon.ca>
Cc: Miriam Bart <mbart@dillon.ca>

Hi Josh,
Please add to the Sewer Master Plan file.
Thanks,
Laura

DILLON CONSULTING

BEST MANAGED COMPANIES CANADA
Platinum member

Laura Herlehy, P. Eng.
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LHerlehy@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

---------- Forwarded message ---------
From: **Herlehy, Laura** <lherlehy@dillon.ca>
Date: Mon, Jan 6, 2020 at 8:53 AM
Subject: Re: flooding plan
To: [redacted]
Cc: 176638 <176638@dillon.ca>

Hello [redacted]
Thank you for reaching out regarding the proposed Riverside Drive Berm. We held an open house meeting on October 30, 2019 which you may have attended. If not, you can review the materials that were presented during this meeting on the Window Sewer Master Plan website. Link: https://weatheringthestorm.ca/resources

Since this public meeting we have reviewed the comments received and completed a more detailed review and update of the functional design of the proposed berm. More detailed information will be available at the next general public information centre which is scheduled over three days (February 11, 12, and 13). Below is a listing of the times and locations:

Tuesday, February 11th
Roseland Golf & Curling Club - Wansbrough Hall
455 Kennedy Dr W, Windsor, ON N9G 1S8
5-8pm

Wednesday, February 12th
WFCU Centre - Michigan Room
8787 McHugh St, Windsor, ON N8S 0A1
3-8pm

Thursday, February 13th
Windsor International Aquatic and Training CentreLower East Atrium
401 Pitt St W, Windsor, ON N9A 0B2
5-8pm

If you have any specific questions please feel free to email or call me.

Thanks,
Laura

Laura Herlehy, P. Eng.
Dillon Consulting Limited
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F - 519.948.5054
LHerlehy@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

On Mon, Dec 30, 2019 at 11:49 PM [redacted] wrote:

> Hello,
>
> I would like to receive updates about the proposed berm along Riverside Drive.
>
> Thank you.
>
> Sincerely,
>
> [redacted]

November 6th Presentation on Ford Blvd Pumphouse Location

[redacted]

Sent: 11/7/2019 1:58 PM

To: info@weatheringthestorm.ca

Anna/Janelle/Flavio:

Could I get a copy of the slides showing the 4 proposed locations for the Ford Blvd pump house that were on display at the Neighbouring Properties Meeting last night at the WFCU Centre?

If they are available online, you can just send me a link.

Thanks,

[redacted]

Sewer Master Plan

[redacted]

Sent: 1/6/2020 12:40 PM

To: ""info@weatheringthestorm.ca"" <info@weatheringthestorm.ca>

Hello,

Please include me on the e-mail list to receive information regarding the proposed stormwater pump station at St. Rose Avenue and the proposed berm along Riverside Drive.

Thank you.

[redacted]

"One kind word can warm three winter months." ~ Japanese Proverb

Survey - storm pump station alternatives

[redacted]

Sent: 11/10/2019 4:45 PM

To: info@weatheringthestorm.ca

Cc: [redacted]

Hello from [redacted]Riverside Drive, Windsor. Please answers to questionnaire below:

1. [redacted]

2. We think that the best location for a new pump station is adjacent to the peace fountain pump station already in the river bank. The city engineer (Adam Mourd) said that this is something that could be investigated. Try to landscape this new building into the existing landscape for minimal impact. This would also be best to reduce noise near residents and not impair people's view.

3. More options need to be presented - eg moving this structure further to the west into the existing peace fountain pump structure.

4. We experienced extensive basement flooding 2 years in a row due to the weather - excessive rainfall. We also have high water flooding issues at our home (used 130 sand bags - as stop gap measure). Note that a lot of the water that damaged our break wall came from the city park adjacent to our property whenever where was a high west wind. It did extensive damage to our stone break wall.

5. Yes sand bags and an internal battery operated sump pump for emergencies- if the power goes out.

6. Can the City help us to repair our break wall as the damage was caused from water coming from the park side onto our property. I discussed this problem with city park employees and they put a few sand bags on the park side but they continued to wash out and did little to stop the water. Please let me know who to speak with about this issue - thank you.

Sent from my iPhone

From: Forest, Flavio <fforest@dillon.ca>
Sent: Wednesday, February 12, 2020 8:30 AM
To: Godo, Anna <agodo@citywindsor.ca>
Cc: Laura Herlehy <lherlehy@dillon.ca>; Wilson, Ian <iwilson@dillon.ca>; Pa en, Chris <CPatten@dillon.ca>
Subject: East Windsor Shorewall Status - Resident Call

Anna, I received a call yesterday from [redacted], who lives on the north side of Riverside Drive at [redacted] (east of Little River).

She was inquiring about the taxes/fees she's been paying for over over 50 yrs to the City on the existing shorewall. She was asking about the City's obligations to maintain that shorewall and berm on private property. She indicated that the City owns that shorewall and 6" of property along the shoreline. She's concerned that some residents in the area have eliminated the berm, resulting in flood risks, and that the in some areas, the shorewall is at risk of failing.

I told her that the condition/status of this shorewall is beyond the scope of the Master Plan, but she would like someone to get back to her to advise her of the City's intentions in addressing the condition of the shorewall and the berm on private property that is being modified by some residents in the area.

Her phone no. is [redacted]

Please let me know if you would like to discuss this further, and let me know what the City's position is on this in case this comes up at our public meeting tonight.

Thanks

DILLON CONSULTING

BEST MANAGED COMPANIES CANADA
Platinum member

Flavio Forest
Partner
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www.dillon.ca

Please consider the environment before printing this email

DILLON CONSULTING

Babcock, Joshua <jbabcock@dillon.ca>

Fwd: Fw: I am sharing 'Sand Point and Vanderbilt issuesFLOODING.pdf' with you

2 messages

Herlehy, Laura <lherlehy@dillon.ca> Wed, Jul 17, 2019 at 3:25 PM
To: Joshua Babcock <jbabcock@dillon.ca>, Miriam Bart <mbart@dillon.ca>

Communication Re: Windsor Sewer Master Plan

---------- Forwarded message ---------
From: **Forest, Flavio** <fforest@dillon.ca>
Date: Sun, Jul 14, 2019 at 11:50 AM
Subject: Fwd: Fw: I am sharing 'Sand Point and Vanderbilt issuesFLOODING.pdf' with you
To: Wilson, Ian <iwilson@dillon.ca>, Laura Herlehy <lherlehy@dillon.ca>, Dave Maunder <maunder.d@aquaforbeech.com>

Please see below and let's discuss in advance of our meeting with these residents.
Thanks
Flavio

---------- Forwarded message ---------
From: **Kusmierczyk, Irek** <irek@citywindsor.ca>
Date: Sun, Jul 14, 2019, 11:14 AM
Subject: Fw: I am sharing 'Sand Point and Vanderbilt issuesFLOODING.pdf' with you
To: Forest, Flavio <fforest@dillon.ca>

Good Morning Flavio,

Just sending along some comments - see attached - from Mr. Mel Figar of Vanderbilt ahead of our meeting. Mr. Figar will not be in attendance.

In particular, I wanted to draw your attention to two concerns that will likely be raised:

(1) the concept that the sewer systems "dead head" at Sandpoint and Vanderbilt AND

(2) that Vanderbilt & Sandpoint were constructed at a much lower elevation than surrounding streets

CONSEQUENTLY both of these cause storm & sanitary water from the system to back up at Sandpoint and Vanderbilt.

I wanted to bring this to your attention ahead of time, as this is a widely shared explanation among the neighbourhood that will likely be one of the first concerns raised by the residents.

Looking forward to our neighbourhood meeting, and thank you once again to you and your team for taking the time.

Best,

Irek

Irek Kusmierczyk
Councillor for Ward 7
City of Windsor

E: irek@citywindsor.ca
T: 519.946.1111

From: [redacted]
Sent: July 13, 2019 9:15 PM
To: [redacted]
Subject: Fwd: I am sharing 'Sand Point and Vanderbilt issuesFLOODING.pdf' with you

Attached are comments from [redacted] our neighbor on [redacted].
I send these to you as a reference when attending the meeting at [redacted] home next Tuesday at 5pm.
As I mentioned I expect to return from Kalamazoo around 5pm, so I felt it important to get a perspective from [redacted].
[redacted] will not attend.
My opinion is the reference [redacted] makes re:, dead heading and what can be done to keep storm and sanitary from coming back into our Sandpoint and Vanderbilt lines.
Some kind of a back check valve on our system so that water can't come back from Riverside drive once it leaves SP(Sandpoint) and VP(Vanderbilt).
Or using the idea of Tranby park reservoir, just announced. We have space to create a reservoir on the other side of the Ganatchio trail, East of us.
There are things that can be done, to eliminate flooding and fears for SP and VP.
Thankfully Irek, who has arranged this meeting is prepared to help us.
See you all on Tuesday night.
[redacted]

---------- Forwarded message ---------
From: [redacted]

Shared from Word for Android
https://office.com/getword

Sand Point and Vanderbilt issuesFLOODING.pdf
210K

Babcock, Joshua <jbabcock@dillon.ca> Wed, Jul 17, 2019 at 3:39 PM
To: "Herlehy, Laura" <lherlehy@dillon.ca>
Cc: Miriam Bart <mbart@dillon.ca>

Thanks Laura.

Joshua Babcock
Dillon Consulting Limited
3200 Deziel Drive Suite 608
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JBabcock@dillon.ca
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Please consider the environment before printing this email

[Quoted text hidden]

Sand Point and Vanderbilt issues.

There are 2 issues that confront these 2 streets:

- Storm water flooding
- Sanitary system back ups

What is root cause for both of these issues?

Root cause – these 2 developments were built at the lowest allowable height above sea level.

- Storm rainwater - Being so low in the ground, storm rainwater saturates the ground and then backs itself up underneath the basement floors and then the sump pumps cannot move that volume of water out of the sump pit and into the storm sewer or outside on the lawn.

  As an example – on 09/16/2016 I had 8 inches of water in my basement because my pump could not move it out. Next door, because the unit (through a screw up) is 8 inches higher out of the ground than me got no rainwater and in fact their sump pump did not even activate.

  Why did flood and not him – because his unit and basement floor are 8 inches higher than mine and water did not reach that level.

  What is the solution / relief to cure this – **there is none** other than having mega pumps installed and redundant water transfer systems to pump water out
  IMO – the city allowed the developers to build these units at the minimum height above sea level so they could capitalize on moving and selling as much topsoil as they could for profit.

- Sanitary back up – there are 2 root causes here
  1) Same as above – homes at minimum above sea level and the sanitary pipes are lowest in the ground compared to surrounding developments. Once the storm sewers fill up the water inundates the sanitary system and backs up into people's basements on these 2 streets. Once again – because the sanitary pipes are the lowest and fill up first
  2) Deadheading – VB and SP are cul de sacs and the sanitary / storm systems on these 2 streets are a closed loop. The flow of liquids leaving the streets is from south to north which then empty into the storm / sanitary systems which run east and west. When the east and west pipes are overwhelmed, the water runs into the VB SP closed loop. Water enters from the north and travels south until the system is full and then it backs up into the basements. The reason for this is that this loop deadheads, IE – since the system does not continue on into other systems (EG Martinique, Breezewood, the Villages, onto the Little River water treatment plant, the sewage back up into basements.

Back water valves – these are not 100% effective. These valves are simple plastic flaps and float up into a closed position to "seal" off the pipe.

THEY DO NOT SEAL OFF THE SEWER!!!!!!!!! These are not made to seal like in the space shuttle or a submarine and I wish people would get that into their brains.

On 04/30/2019 many of us on Vanderbilt had seepage into our basements through the backwater valve. They contain 90% of the backup

Solutions:

1) Deadheading – connect VB and SP into main sanitary systems that run north to south. This will allow even distribution of sewage going to Little River plant
2) Pumping Station – dedicated to VB SP to take storm water away quickly
3) Storm overflow lake basin – similar to the water retention ponds along the Ganatchio that were built to accommodate storm water for Aspen lakes etc., but nothing done for the VB SP developments

Final Conclusion:

What is the root cause for storm and sanitary back ups and flooding?

THE CITY ALLOWED THESE TO DEVELOPMENTS TO BE BUILT AT THE LOWEST POSSIBLE HEIGHT ABOVE SEA LEVEL KNOWING FULL WELL THAT THESE WOULD BE SURRPOUNDING BY HIGHER GROUND IN ALL DIRECTIONS – MARTINIQUE AT WEST, GANATCHIO TRAIL AT EAST, RIVERSIDE BERM AT NORTH, AND BREEZEWOOD AT SOUTH.

Sewer Master Plan- Proposed Pumping Station St. Rose Park

[redacted]

Sent: 12/16/2019 11:53 AM

To: ""info@weatheringthestorm.ca"" <info@weatheringthestorm.ca>

Dear Ms. Godo & Mr. Forest,

I am enclosing information on a possible alternative to the Sewer Master Plan's suggested above ground pumping station at St. Rose Park. Jerome Baillargeon, architect and owner of Design Group 547 has researched underground pumping stations currently in use through out Canada. I'm enclosing the pdf file he sent me about the different systems. I'm also enclosing his rough schematic for your consideration.

The benefit of an underground system is that it adds a layer of insurance, because of the storage capacity of millions of gallons of water. When storms are too much for the pumping system to handle, the storage can take on the extra rainfall, and pump after the storm. Another benefit is by filling in part of the bay, our park would be expanded. I hope this information is useful. Thank you for your consideration.

Sincerely,
[redacted]

Attachments: stormtraps_casestudies.pdf DOC191115.pdf

Underground pump station at St Rose

[redacted]

Sent: 12/16/2019 3:30 PM

To: ""info@weatheringthestorm.ca"" <info@weatheringthestorm.ca>

Hello. I have recently received information regarding another option for the pumping station for St Rose Park/beach.
The underground storage and pumping system would be perfect for this location.

Please consider this option.

[redacted]

Oct 30 meeting

[redacted]

Sent: 10/22/2019 1:37 PM

To: info@weatheringthestorm.ca

I received a note today about this meeng which is about the pr oposed Riverside Drive berm. I went to the suggested web site but found no pernen t informaon on the berm. I liv e on Riverside Drive E [redacted] and am interested to see a detailed large scale map if there are any suggested changes near me that might impact me.

Can you provide me with pernen t informaon on the berm?

Thank You

[redacted]

My Flooding on September 25, 2018
1 message

[redacted]   Wed, Sep 26, 2018 at 2:58 AM
To: info@weatheringthestorm.ca
Cc: [redacted]

It happened again today, I had 15 inches of rain in my yard at [redacted] Riverside Drive E. due to the storm sewers backing up at the end of St. Louis at Riverside Drive.
This is my 3rd serious flood in the last 3 years.HELP!!!

[redacted]

Allan, Catherine <callan@dillon.ca>

Re: Project Updates - Sewer Master Plan
1 message

[redacted] Mon, Aug 27, 2018 at 11:22 AM

Hello Janelle,

Is it still possible to register for updates pertaining to the Sewer Master Plan? Are there any meeting scheduled in the coming weeks?

Thank you for your response.

[redacted]

Re: City of Windsor Sewer Master Plan - Notice of PIC

[redacted]

Sent: 1/27/2020 5:03 PM

To: ""info@weatheringthestorm.ca"" <info@weatheringthestorm.ca>

---

we are concerned about the master plan, especially the pumping station at St. Rose beach. We won't be able to attend the public meeting because we are away for February. Would it be possible to get the information presented at the meeting sent via email to me.
Thank you
[redacted]

On Fri, Jan 24, 2020 at 4:21 PM <info@weatheringthestorm.ca> wrote:

> Hello,
>
> Please see the attached notice for the upcoming Windsor Sewer Master Plan Public Information Centre (PIC). **Attend a PIC to provide your input at this critical stage in the project.**
>
> The purpose of these PIC meetings will be to focus on the findings of our analysis, proposed short- and long-term solutions, implementation, and next steps.
>
> The meetings are being held at three separate dates, times and locations:
>
> **February 11, 2020**
> **5pm - 8pm**
> **Roseland Golf & Curling Club**
> **455 Kennedy Dr. W**
>
> **February 12, 2020**
> **3pm - 8pm**
> **WFCU Centre**
> **Second Floor**
> **8787 McHugh St.**
>
> **February 13, 2020**
> **5pm - 8pm**
> **Windsor International Aquatic and Training Centre**
> **401 Pitt St. W**
>
> Thank you all for your interest and involvement in this project. For more information, visit www.WeatheringTheStorm.ca.
>
> - The Windsor Sewer Master Plan Project Team

DILLON CONSULTING

Allan, Catherine <callan@dillon.ca>

[FWD: Fw: Flooding in Riverside]

1 message

info@weatheringthestorm.ca <info@weatheringthestorm.ca> Mon, Apr 2, 2018 at 11:15 AM

To: callan@dillon.ca

THE CITY OF WINDSOR ONTARIO, CANADA

Project Representative

350 City Hall Square W, 3rd Floor | Windsor, ON | N9A 6S1

(519)-255-6100

www.citywindsor.ca

> -------- Original Message --------
> Subject: Fw: Flooding in Riverside
> From: [redacted]
> Date: Tue, March 27, 2018 11:08 am
> To: "info@weatheringthestorm.ca" <info@weatheringthestorm.ca>
>
> My concerns about Flooding in Riverside!.
>
> ---
>
> From [redacted]
> Sent: March 27, 2018 11:04 AM
> To: info@weatheringthestorm.com
> Subject: Flooding in Riverside
>
> Hello Mr. Forest, Mrs. Coombs, Mrs. Godo:
>
> I email you with concerns to the flooding and the "new sewer master plan" weathering the storm website you now have online.
> My name is [redacted] and I live in Windsor /Riverside, [redacted]
> My Family and I have lived in this home for the past 54 plus years.
> Within the past 7 years, we have had three major floods, the most recent was Sept. 2016 and this past Aug. 2017.
> We had NEW streets/sewers done approximately 4-5 yrs ago.
> In the flood of 2010, we where told by our insurance adjuster that a pump/gate was in-op at the Kawanis Park pumping station. This caused the flood due to a seized pump/gate. We where told this was false by the City.
> In 2016, a home owner saw an "Enwin" Employee get out of his truck with a valve key and turn some valve at Cederview and Watson Ave. This caused the standing water on that part of the street to whirl pool down the sewers in a matter of minutes.
> Once again, the City denied anything was wrong with manning the pumps or a faulty pump.
> I also seen my corner of Menard at Watson flooded that year and in 2017 with water reaching over on to our lawns.
> In these moments, when it appeared that someone flipped a switch, the sewers began to whirlpool and our flooded intersection was clear in a matter of minutes. Its very strange that it takes hours for the three sewers to flood over capacity at this corner and a matter of minutes to drain.
> Each time, we have heard the same "conspiracy theory" there was someone asleep at the switch or the pumps were NOT fully functioning.
> Once again, the City took NO blame on anything with concerns to faulty pumps or unmanned station.
> I have cut my down spouts to drain onto the lawn years ago.
> I had a check valve for years and put in a new one in 2010.
> I have had a sump pump in this home since the beginning of time and still we flood.
> These three things are NOT the answer to what is going on here. We are forced to put them in place but it just does NOT work.
> The City offers subsidies that in my opinion are NOT the issues here. The issues are the inability for the City to improperly monitor storms and have working pumps and man them, at the time of these storms.
> Its the inability to put in place a larger, newer, sewer infrastructure when replacing the old street sewers and not throwing tax payer money down the drain when it doesn't work and we still flood.
> When we had our sewers redone, I sent an email to the manager in charge to tell him the tubes being used to replace the old ones are too small and will not work. I was told that I didn't know what I was taking about and that it was of "regulation size" that could handle any rain/storm. Well, HE WAS WRONG!!.
> So much time, money and public meetings are wasted when its the OLD pumps/infrastructure/ and unmanned stations that are the problem. These issues should have been taken care of years ago, not when its too late. Wasting money on stupid things and having arrogance within our City Elected, does not help when WE need help with water damage/insurance and having to replace OUR BASEMENTS OVER AND OVER.
> The once in a lifetime storm excuses are a joke and are excuses from the City....really!.

The Government subsidies for flood victims are another joke...ONLY lower income housing are covered under this act and we who pay into it with our taxes have to fend for ourselves.
The Government WILL NOT COVER BASEMENTS BECAUSE THEY ARE NOT MAIN LIVING QUARTERS.
Why is the City and the news still promoting a lie?.

What ever the reason the City comes up with, it will never be bought by its constituents.
I will never believe the City/Enwin was not in the know, about what really went wrong on these flood days in 2010/2016/2017.
The idea of having a check valve and sump pump in our homes to save the day, is a joke. I have had it for years and it does not work. I have even had new weeping time put in.....sorry, but its the infrastructure.

I have put in place a newer, BIGGER sump pump and a backup that I had to pay out of pocket....I don't even know if it will help. Do I get a rebate or refund from our wonderful City....not a chance. Once again, WE have to fit the bill while "OTHERS" are taken care.
Our insurance Companies are getting fed up with this and so are we. Having to fix my basement and then redoing it ALL OVER AGAIN, the following year, is not fun nor should we be having these problems.

Bigger is better and having my street ripped up to ensure "no more flooding" was a waist of time and money.
St. John street, [redacted] had just been finished and they flooded as well. This puts a lot of faith in our City, its new infrastructure projects and the Companies they hire.

This City has wasted money on so many other things rather than do what its supposed to do, fix our sewers/streets/pumping stations/clear ALL streets of ANY Snow, not just 4", as well as the catch basins. What does the City do...........................
....wait! till its too late.
They tell "US" to clean the catch basins.....really!.

This is not just my opinion but I was compelled to email it.
We are fed up with lies, double talk and wasting OUR money.
This City needs to step up and do what's right for its Citizens and fix the problems "one time" not guarantee Contractors they have a full time job of fixing there own mistakes.
The Contractors that are hired to fix OUR infrastructure should be liable if it breaks down and guarantee there work. If the cost is more, move on to another company, they'll get the picture. These Contractors have become filthy rich on the backs of tax payers and its time to stop the madness.
Time to face responsibility and take pride in the work they SHOULD be doing, not fix it AGAIN in the following year(s).

Thanks
A frustrated flooded Tax Payer
[redacted]
Windsor/Riverside
[redacted]

Allan, Catherine <callan@dillon.ca>

[FWD: Downspout disconnection]

1 message

info@weatheringthestorm.ca <info@weatheringthestorm.ca> Mon, Apr 2, 2018 at 11:15 AM
To: callan@dillon.ca

Project Representative
350 City Hall Square W, 3rd Floor | Windsor, ON | N9A 6S1
(519)-255-6100
www.citywindsor.ca

> -------- Original Message --------
> Subject: Downspout disconnection
> From: [redacted]
> Date: Tue, March 27, 2018 2:02 pm
> To: "info@weatheringthestorm.ca" <info@weatheringthestorm.ca>
>
> Please consider creating a new bylaw to make the downspout disconnection mandatory as soon as possible. Although the bylaw will not fix all of the problems with flooding events, any initiative that slows down the flow of water into the sewer system during a rain event should be acted on sooner than later. Since it would appear that these rain events are going to continue and other cities have created this bylaw (I.e. Toronto) and the bylaw does not need to wait for the sewer master plan to be completed, it would be in the best interest of the residents, businesses and institutions to move forward with this initiative.
>
> Thanks for listening.
>
> [redacted]

Appendix B-9

Quarterly Council Updates

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MEMO

TO: Anna Godo, P.Eng.
FROM: Flavio Forest, P. Eng.
Ian Wilson, P. Eng.
DATE: June 4, 2018
SUBJECT: Sewer Master Plan - Quarterly City of Windsor Council Update
OUR FILE: 17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. Arising from this rainfall event, the City's Mayor presented an eight-point plan to address the flooding risks, which included an accelerated schedule for completion of the Sewer Master Plan.

City Council approved that Dillon Consulting Limited (Dillon) be retained as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (March 26, 2018):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
    - Notice of Commencement.
    - Public and agency contact list.

- Interactive project website to provide a flexible and convenient public access to updated information and to provide comments related to this project.
- Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses.

Work Completed Since the Last Council Update (March 26, 2018):

- Pop-up event held at Malden Park Earth Day (April 22, 2018) promoting the Sewer Master Plan, including education materials about flooding and private property protection measures. 100 people visited the booth and learned about the project.
- The Stakeholder Advisory Committee, established as a non-political advisory group comprising various volunteer members of the public and community/business groups, held its first meeting on May 2, 2018, which included the following topics:
    - Confirming the objectives of this committee, as follows:
        - Provide insight to the project team on the extent of flooding and its impact on the community;
        - Provide insight into key issues related to the Sewer Master Plan development process from the perspective of the members and organizations/interests represented;
        - Discuss and provide feedback on elements of the Sewer Master Plan, including evaluation criteria, potential solutions, and ways to mitigate community concerns; and
        - Engage in discussions to increase project understanding.
    - Presenting an overview and obtaining feedback on the Sewer Master Plan project, including:
        - Project scope, schedule and overall study objectives;
        - Modelling approach being taken to confirm problems, opportunities, and solutions;
        - Public engagement strategy;
        - The Class Environmental Assessment (EA) study process;
        - Potential short-term and long-term flood reduction alternatives; and
        - Design standards, level of service expectations, and evaluation criteria.
    - Committee members shared their experiences and understanding of flooding in the City, and provided valuable feedback on improving the effectiveness of public engagement, as well as various other considerations that should be incorporated as part of the Sewer Master Plan.
- The Partners 4 Action flood survey was made available, with responses from over 300 participants collected. Feedback included the respondent's understanding of flooding, concerns with future flooding, their understanding and participation in the City's flood protection subsidy programs, and opinions on the importance of the Sewer Master Plan.

b) Short-Term Alternative Solutions

Work Completed Since the Last Council Update (March 26, 2018):

- A range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) was developed for public and agency input. The short-term alternative solutions include both public property and homeowner measures, including:
  - Homeowner Measures:
    - Support for measures to enhance the City's Basement Flooding Protection Subsidy Program, as outlined in the Mayor's 8-point plan, including:
      - Fund 100% of the installation of backflow valves and sump pumps;
      - Improved subsidy to support the disconnection of weeping tiles from the sanitary sewer system; and
      - Add a subsidy to include the use of sewage ejector pumps.
    - Green infrastructure (low impact development (LID)) techniques to reduce runoff from private property.
    - Improvements in lot grading for positive drainage away from the home.
    - Window well protection measures.
    - Use of back-up power supplies for sump pumps and sewage ejector pumps.
    - Enhanced public education (basement improvement alternatives, minimizing water use during major storms, etc.).
    - Use of sewage ejector pumps for all new development and/or as an alternative to backwater protection valves.
    - Consideration for new municipal policies that reduce the risk of flooding, some of which have been identified in the Mayor's 8-point plan, as follows:
      - Mandatory downspout disconnections;
      - New development policies to reduce runoff from private properties, including:
        - Limit the percent of allowable impervious (hard) surfaces; and
        - On-site water balance (volume storage) requirements.
      - Implement stormwater surcharges and green infrastructure credits;
      - New standards for on-site water balance (volume storage); and
      - Consider by-laws that allow the City to enforce plumbing standards and sewer use requirements.
  - Public Property (Right-of-Way) Measures:
    - Inlet control devices (ICDs) to restrict catch basin inlet flow entering the storm sewer system, where appropriate.
    - Sanitary rain catchers or plugs to eliminate overland flow from entering the sanitary system through manhole covers.
    - Update the City's Storm Water Management (SWM) design standards:
      - Review level of service standards and design criteria;
      - Review requirement for use of design tools and software; and
      - Consider climate change resiliency and vulnerability in developing sustainable solutions.

c) Sewer System Modelling

Work Completed Prior to the Last Council Update (March 26, 2018):

- Startup meeting with the City and the Essex Region Conservation Authority to review project scope, schedule, and deliverables.
- Problem identification of flood vulnerability based on basement flooding records, topographic conditions, and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Cambell/University storm drainage study, and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.

Work Completed Since the Last Council Update (March 26, 2018):

- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.
- Installation of two temporary rain gauges to supplement the City's existing rain gauge network.
- Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary, and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Evaluated the existing storm drainage system using the expanded model to identify problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- The project's first Public Information Centre (PIC) meetings are scheduled for June 12, 13, and 14, 2018, which will focus on the following:
    - Learning about the causes of basement and surface flooding, as well as the factors being considered in developing alternative solutions.
    - Preliminary model results for the storm sewer and overland drainage systems.
    - Short-term solutions, including:
        - Existing City subsidy programs and practices;
        - Other alternative short-term solutions being proposed; and
    - Next steps.

- Publish the project's first newsletter informing residents about the project, public information centre (PIC) meetings, the causes of flooding and how to reduce the risks.
- Next Stakeholder Advisory Committee meeting is proposed in August 2018.
- Future pop-up event(s) promoting the Sewer Master Plan, including education about flooding with associated private property protection measures. Location(s) and date(s) to be confirmed.
- Ongoing website and social media activity.

b) Short-Term Alternative Solutions

- Evaluate and further define the short-term alternative solutions presented at PIC No. 1.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Continue the flow monitoring program and collect hydraulic and precipitation data.
- Update and calibrate the City's sewer and overland drainage model based on information from the 2018 flow monitoring program, including a representation of the inflow and infiltration (I&I) sources entering the sanitary sewer system.
- Develop recommendations to reduce inflow and infiltration (I&I) sources to the sanitary sewer system, including implementation of the following short-term solutions:
  - Sanitary manhole rain shields;
  - Sewage ejector pumps or backflow preventer valves;
  - Weeping tile/foundation drain disconnection; and
  - Catch basin inlet control devices (ICDs).
- Develop long-term alternative solutions to reduce the risk and impacts of flooding.
- Develop factors and criteria for evaluation of the long-term alternative solutions.

City of Windsor
Sewer Master Plan
Quarterly City Council Update

June 2020

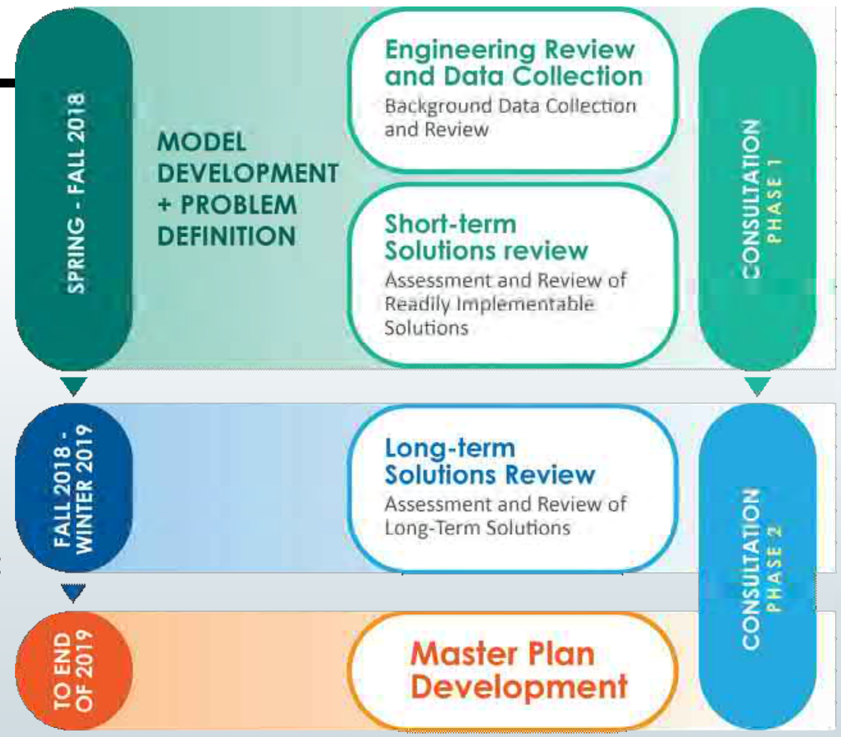
Project Overview

The City is completing a Sewer Master Plan to:

- Better understand the causes of basement & surface flooding;
- Identify the range of ways to reduce the impacts and risks of flooding through short-term and long-term measures; and
- Prepare an implementation strategy for City of Windsor Council consideration.

The study is following the requirements of the Municipal Class Environmental Assessment (EA), Master Plan Process (Approach No. 2):

- Public and agency input is integrated into the Class EA process.
- Will satisfy the Class EA requirements for Schedule B projects.



Problem & Opportunity Statement

The City of Windsor has experienced basement and surface flooding that resulted in property damage and disruption to the community.

This flooding generally arises from significant storm events, which bring more water than our creeks and sewers have the capacity to manage.

The City is undertaking a Sewer Master Plan to identify specific problems and explore achievable measures to reduce the risks and impacts of flooding by identifying and evaluating the following:

- **Shorter-term** solutions that can reduce the amount of water going into our creeks and sewers, including partnering with homeowners to protect against the impacts of flooding; and
- **Longer-term** solutions to improve the sewer systems by increasing their capacity and/or by temporary storage measures.

Parkview Avenue; August 2017

Work Completed

Public Consultation

- Stakeholder Advisory Committee Meeting
- Project Website Launch
- Partners 4 Action – flood survey
- Earth Day Pop-up Event
- Public Information Centre No. 1

Short-Term Alternative Solutions

- Identified alternative Homeowner Protection Measures
- Identified alternative Public (right-of-way) Infrastructure Strategies

Sewer & Surface Drainage Modelling

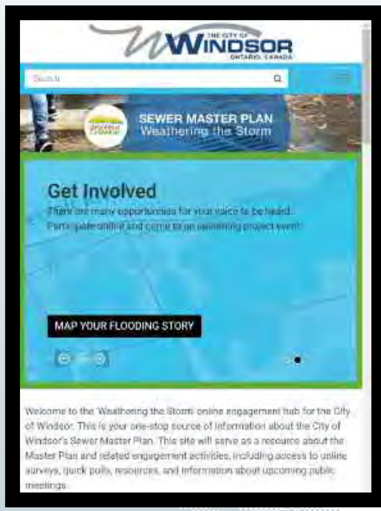
- Background information review and coordination
- Installation of over 30 sewer flow monitors and rain gauges
- Expanded one-dimensional sewer model
- Developed two-dimensional mesh to model surface flooding

Work Completed: Public Consultation

- **First Stakeholder Advisory Committee Meeting on May 2, included:**
  - Confirming the objectives of this committee
  - Overview of the Sewer Master Plan project
  - Members shared experiences of flooding in the City
- **Stakeholder Advisory Committee Membership**
  - Windsor and Pillette Village BIA
  - Windsor-Essex County Health Unit
  - Multicultural Council of Windsor Essex County
  - Detroit River Canadian Clean-up
  - University of Windsor
  - Intact Centre on Climate Adaptation – University of Waterloo
  - Insurance Bureau of Canada
  - Easy Insure
  - 7 Members of the Public

Work Completed: Public Consultation

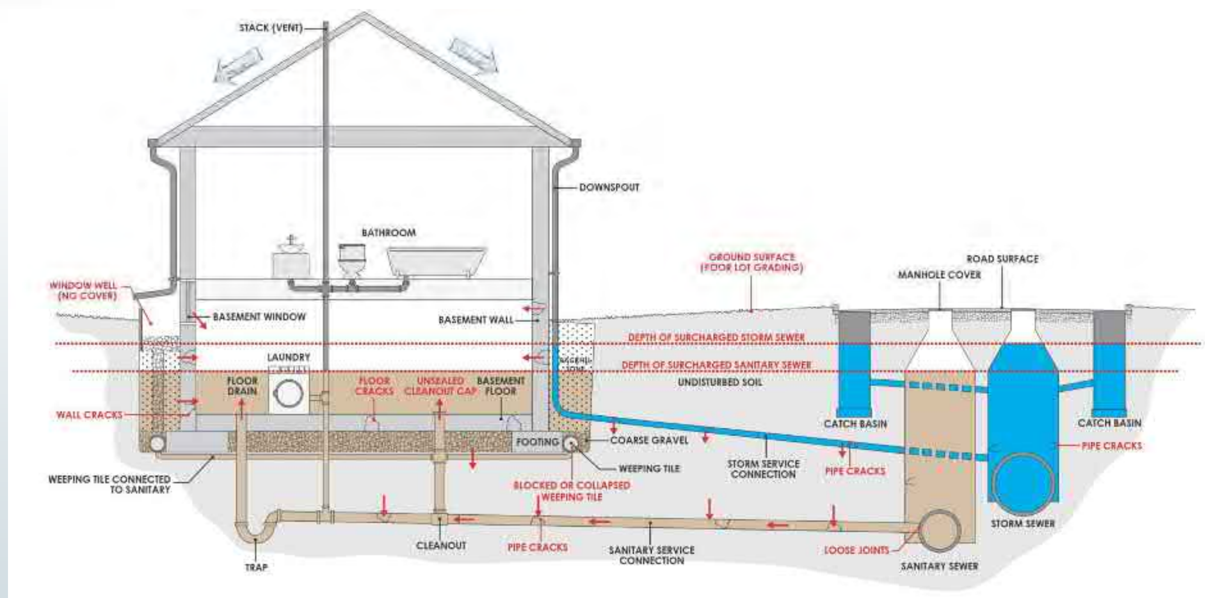
- **Project Website Launched** on March 22. Visit **weatheringthestorm.ca** to:
  - Follow the project
  - Provide input & ask questions
- Partners 4 Action – **flood survey.** Collected feedback from over 300 participants, including:
  - Respondent's understanding of flooding
  - Understanding and participation in the City's flood protection subsidy programs
  - Opinions on the importance of the Sewer Master Plan



- **Pop-up event** held at Malden Park Earth Day:
  - Provided information about the Sewer Master Plan and existing homeowner protection programs offered by the City
  - Over 100 people visited the booth and learned about the project

Work Completed: Public Consultation

- **Public Information Centre No. 1 was held on June 12, 13, and 14:**
  - Focus on four components:
    - Project Overview
    - Learn about Flooding
    - Problem Identification
    - Short-Term Alternative Solutions
  - Public feedback collected using various approaches
- **Approximately 50 residents visited the PICs**



Basement Flooding caused by Sanitary Sewer Backup
Image Source: Handbook for Reducing Basement Flooding, Institute for Catastrophic Loss Reduction (ICLR), 2009

Work Completed:
Short-Term Alternative Solutions

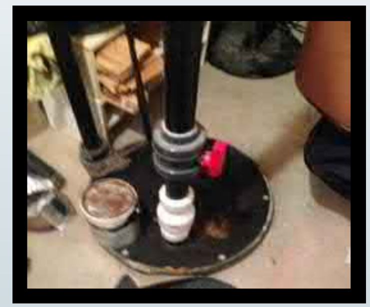
Homeowner Protection Measures:

- Promote existing City programs
- Short-term alternative solutions being considered in the Sewer Master Plan
  - Support Enhancements outlined in the Mayor's 8-Point Plan
  - Green Infrastructure / Low Impact Development (LID)
  - Window Well Protection
  - Back-up Power and Pump Capacity
  - Lot Grading
  - Household Management Strategies
  - Sewage Ejector Pumps
  - New Municipal Policies


LID: Rain Garden


LID: Soak-Away Pit


Window Well Protection


Sewage Ejector Pump

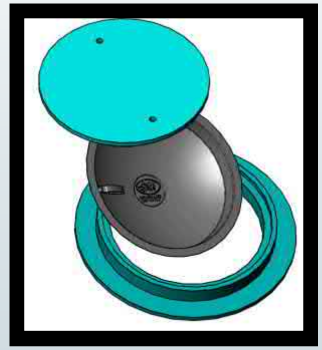
Work Completed: Short-term Alternative Solutions

Public (Right-of-Way) Infrastructure Improvements:

- **Promote existing City programs**
- **Short term alternative solutions being considered in the Sewer Master Plan**
  - **Inlet Control Devices (ICD)**
  - **Sanitary Rain Catchers or Plugs**
  - **Review City's Storm Water Management (SWM) Design Standards**
    - Level of service standards and design criteria
    - Update requirements for use of design tools and software
    - Consider climate change in developing sustainable solutions

Rain Catcher: Manhole Lid Plugs

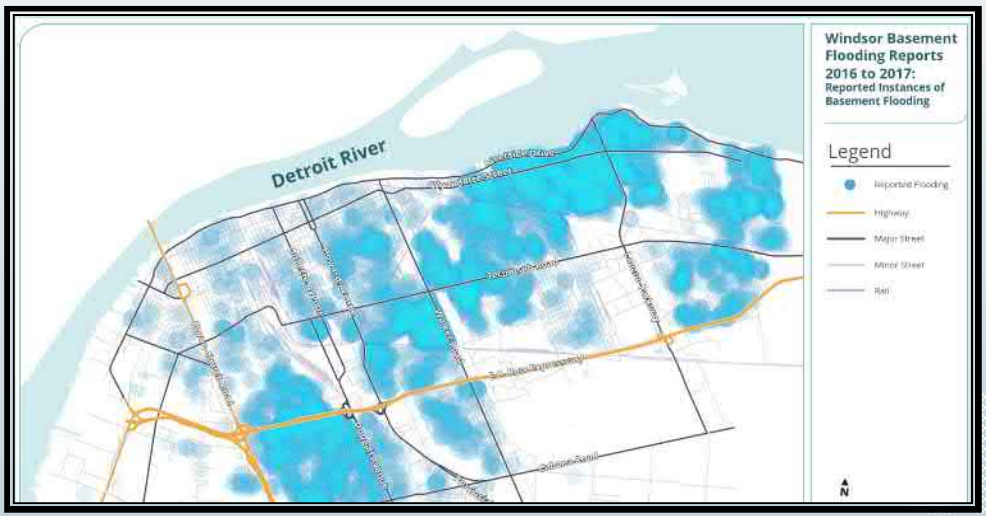
ICD: Plug Type



Rain Catcher: Manhole Insert

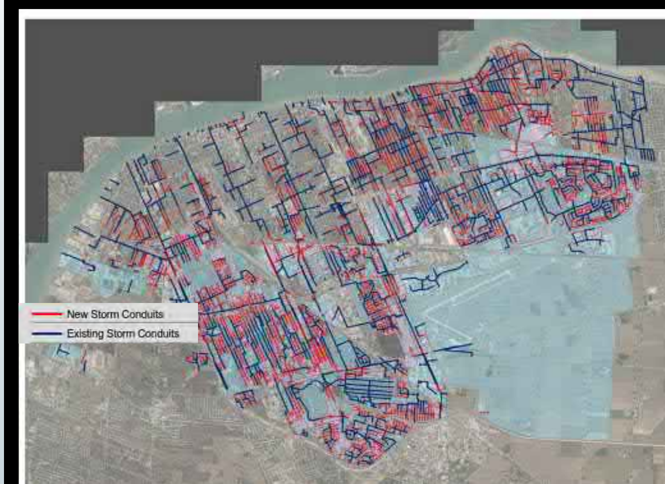
Work Completed: Sewer & Surface Drainage Model

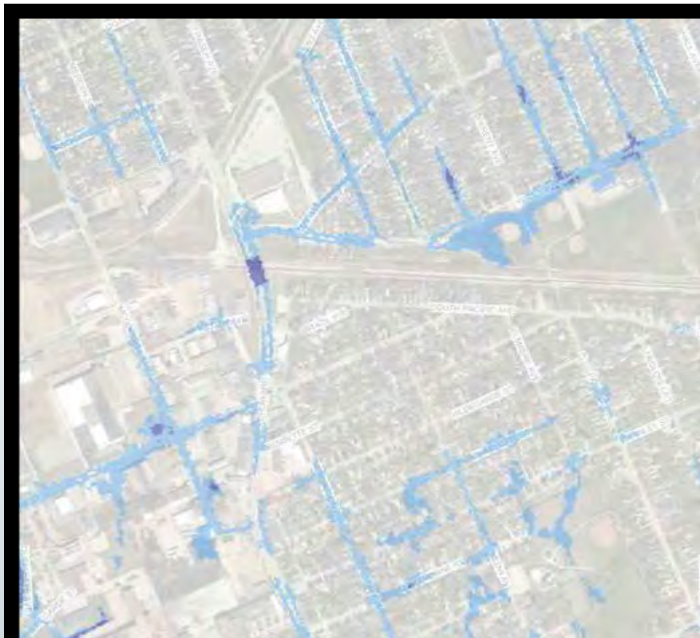
- Developed a GIS database of existing drainage studies.
- Obtained basement flooding records, topographic data, and observations of recent surface flooding conditions.
- 30 flow monitors installed for further model calibration & to confirm any inter-relationships between the sanitary and storm sewer systems.



Work Completed:
Sewer & Surface Drainage Model

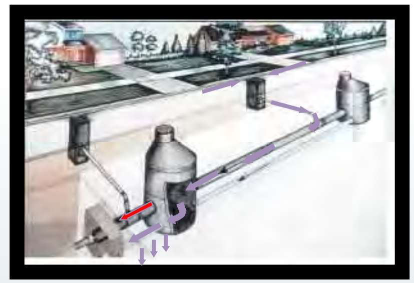
- Expanded Phase 1 sewer model by adding upstream sewers in areas of basement flooding.
- Developed two-dimensional mesh to model surface flooding conditions (based on LiDAR survey).





What's Next

- **Public and Agency Consultations:**
  - Review and incorporate input from the recent PIC No. 1 events
  - Continue Stakeholder Advisory Committee meetings
  - Update website and continue social media activity
- **Short-Term Alternative Solutions:**
  - Evaluate and further define short-term alternative solutions
- **Sewer & Surface Drainage Model:**
  - Incorporate flow monitoring results to further calibrate the Phase 1 sewer system model
  - Confirm the nature of the problems in the sewer and surface drainage systems
  - Develop and evaluate long-term alternative infrastructure solutions



Exfiltration Trench

Exfiltration Trench

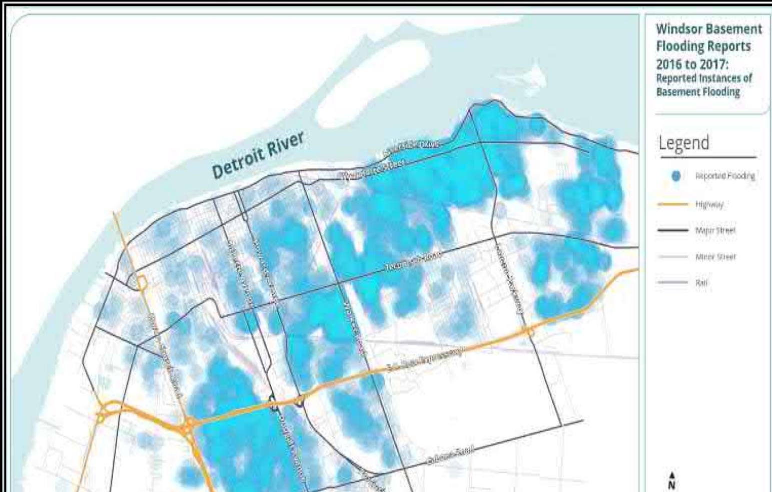
Underground and Surface Storage

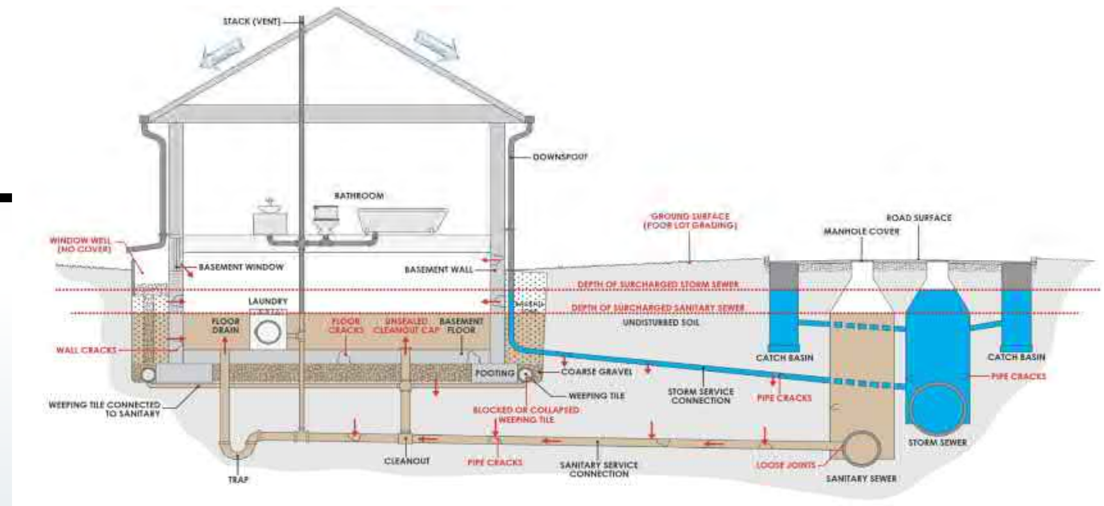
DILLON CONSULTING

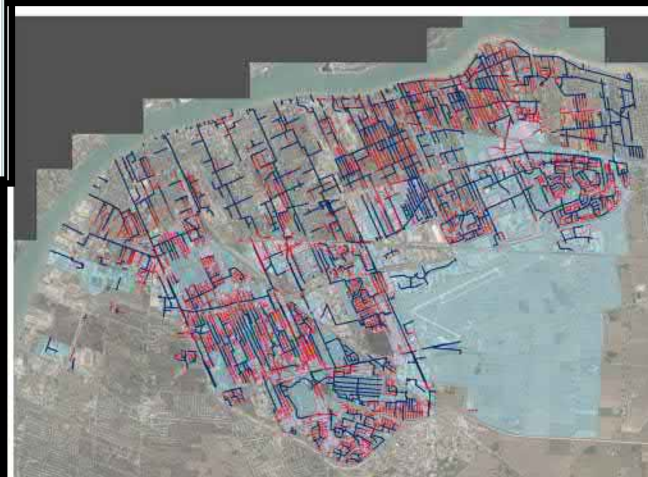
Aquafor Beech Limited

THE CITY OF WINDSOR

Questions







Underground and Surface Storage

DILLON CONSULTING

Aquafor Beech Limited

MEMO

TO: Anna Godo, P.Eng.

FROM: Flavio Forest, P. Eng.
Ian Wilson, P. Eng.

DATE: September 10, 2018

SUBJECT: Sewer Master Plan - Quarterly City of Windsor Council Update

OUR FILE: 17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. Arising from this rainfall event, the City's Mayor presented an eight-point plan to address the flooding risks, which included an accelerated schedule for completion of the Sewer Master Plan.

City Council approved that Dillon Consulting Limited (Dillon) be retained as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (June 4, 2018):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
  - Notice of Commencement;
  - Public and agency contact list; and

  - Interactive project website to provide flexible and convenient public access to updated information and to provide comments related to this project.
- Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses.
- Pop-up event held at Malden Park Earth Day (April 22, 2018) promoting the Sewer Master Plan, including education materials about flooding and private property protection measures.
- The first Stakeholder Advisory Committee meeting was held on May 2, 2018. The committee was established as a non-political advisory group comprising various volunteer members of the public and community/business groups. The first meeting included the following topics:
  - Confirming the objectives of this committee;
  - Presenting an overview and obtaining feedback on the Sewer Master Plan project; and
  - Committee members sharing experiences and understanding of flooding in the City, including valuable feedback on improving the effectiveness of public engagement.
- The Partners 4 Action flood survey was made available, with responses from over 400 participants collected. Feedback included the respondent's understanding of flooding, concerns with future flooding, their understanding and participation in the City's flood protection subsidy programs, and opinions on the importance of the Sewer Master Plan.

<u>Work Completed Since the Last Council Update (June 4, 2018):</u>

- The project's first round of Public Information Centre (PIC) meetings were held on June 12, 13, and 14, 2018, which focused on:
  - Learning about the causes of basement and surface flooding;
  - Factors being considered in assessing and mitigating the risk of flooding;
  - Short-term solutions for homeowners and for public infrastructure, including:
    - Existing City subsidy programs and practices; and
    - Other alternative short-term flooding solutions being proposed;
  - An overview of the next steps to address longer-term alternative solutions.
- The second Stakeholder Advisory Committee meeting was held on August 14, 2018. This meeting focused on the following:
  - Providing an overview of consultation activities completed since the last meeting;
  - Reviewing the draft project objectives for short-term and long-term solutions;
  - Reviewing draft implementation strategies for short-term solutions including examples and comparisons with other municipalities; and
  - Collecting member feedback through brainstorming sessions.
- Continued to update the project website, weatheringthestorm.ca, as the project progressed. Updates included posting presentation materials from the PIC meetings, the short-term solution comment form, and additional education materials.

b) Short-Term Alternative Solutions

Work Completed prior to the Last Council Update (June 4, 2018):

- Developed a range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) for public and agency input. The short-term alternative solutions include both public property and homeowner measures. The measures were presented for review to residents through the project website and PIC meetings.

Work Completed Since the Last Council Update (June 4, 2018):

- Completed a review of other municipalities' measures, subsidies, and programs related to implementing short-term flooding solutions. The review included five Cities in Ontario and four Canadian Cities in other provinces, as follows:
  - London, Hamilton, Toronto, Ottawa, and Guelph; and
  - Calgary, Edmonton, Winnipeg and Vancouver.
- Developed draft recommendations to implement short-term flooding solutions. Gathered preliminary feedback from City staff and Stakeholder Advisory Committee members. Additional review with other City staff and departments are required prior to finalizing recommendations.
- The draft recommendations to integrate additional short-term flooding solutions are subdivided into three categories municipal polices, subsidy programs and collaborative improvements, as follows:
  - **Municipal Policies:**
    - Mandate the installation of sewage ejector pumps for basement plumbing in new residential developments, with exceptions subject to City approval.
    - Mandatory downspout disconnection development policy, with exceptions subject to City approval.
    - Implement a program to promote the use of low impact development (green infrastructure) storm drainage solutions on private property, including:
      - Support the City's consideration for implementing a stormwater surcharge policy, including incentives (credits) for installation of low impact development infrastructure (including residential, commercial, industrial, and institutional properties); and
      - Comprehensive educational material explaining the details of the stormwater surcharge and credit.
    - Seal sanitary manholes covers using rain catcher devices to reduce inflow to the sanitary system.
    - Install inlet control devices (ICDs) in select areas where catch-basins may be allowing more runoff into the storm sewer system than there is capacity to convey.
    - Consider opportunities to tailor the City's maintenance programs based on the degree of flood vulnerability and critical infrastructure. Identified areas of concern from the Sewer Master Plan will support the City's existing programs.
    - Update the City's stormwater management design standards to incorporate the latest practices, including climate change considerations.

- **Subsidy Programs:**
  - Basement Flooding Protection (BFP) Subsidy
    - Recommended enhancements to the City's existing BFP subsidy including the following:
      - Add sewage ejector pumps;
      - Add window well protection;
      - Add back-up power supply for sump pumps; and
      - Add a home drainage and plumbing advisory service. This service would include an expert, going at a resident's request to their home and reviewing grading and plumbing (with camera inspection), ultimately providing recommendations to reduce flooding risks.
    - The current subsidy's maximum rebate is $2,800 per home/unit; this recommendation would require an increase to include the enhancements and will be confirmed at a later time.
  - Downspout Disconnection Program
    - Mandate the disconnection of downspouts within the City and continue the existing free downspout disconnection service to residents.
  - Private Sewer Replacement Program & Eeling Program
    - No further recommendations.
- **Collaborative Improvements:**
  - It is recommended that the City provide support for residents to install green infrastructure and low impact development (LID) measures with public education, as well as in-kind and planning support from the City, including:
    - A comprehensive education package to the public regarding the use, benefit, installation and maintenance of private property LIDs;
    - Provide details for the installation of LID measures, including rain gardens; and
    - Implement LID pilot project(s) on a voluntary basis for private properties and/or on public lands, particularly as part of public infrastructure improvement projects, including technical and/or financial support by the City to raise awareness/acceptance and to demonstrate the water quality and quantity benefits.
  - Provide advisory support for residents to improve lot grading, including public education.
  - Providing a comprehensive education package to the public for other household management strategies including:
    - Understanding your plumbing and maintenance requirements for your sump pump, sewage ejector pump and backwater valve;
    - Ensuring proper lot grading;
    - Inspecng` basement walls and floors for cracks that may lead to infiltration;
    - Avoid storing valuable items on the ground;
    - Using water resistant finishes in basements (leą floors, etc.);

  - Properly disposing fats, oils and grease and understanding what not to flush down the drain;
  - Minimizing water usage during major storm;
  - Promoting that residents become familiar with their insurance coverage and opons,` including advising insurers of any private measures that may have been implemented to reduce the risk of flooding; and
  - Ensuring water from disconnected downspouts drain away from your foundations.
- Implementing an "adopt a catch basin" program – where residents "adopt a catch basin" in the City to protect private and public property from flooding**.** This resident stewardship program would help ensure public property flow routes (curb and gutters) are clear of debris and vegetation.

c) Sewer System Modelling

Work Completed Prior to the Last Council Update (June 4, 2018):

- Startup meeting with the City and ERCA to review project scope, schedule and deliverables;
- Problem identification of flood vulnerability based on basement flooding records, topographic conditions and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Campbell/University storm drainage study and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.
- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.
- Installation of two temporary rain gauges to supplement the City's existing rain gauge network.
- Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Preliminary evaluation of the existing storm drainage system using the expanded model to identify potential problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.

Work Completed Since the Last Council Update (June 4, 2018):

- Continued re-calibration of the expanded and updated sewer and overland drainage model sewer using flow records from the 2013 and 2014 flow monitoring program.
- Continued collection and review of the on-going (2018) flow monitoring and rain gauge program.
- Continued refining the interaction between the City's storm and sanitary sewers. Work included meetings with City staff and data review.
- Reviewed draft model surface flooding results with City staff for verification and model improvement.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- Publish the project's first newsletter informing residents about the project, the causes of flooding and the proposed short-term flooding solution recommendations.
- Next Stakeholder Advisory Committee meeting is proposed in November 2018.
- Future pop-up event(s) promoting the Sewer Master Plan, including education about flooding with associated private property protection measures. The schedule includes a pop-up during Open Streets Windsor (September 23, 2018).
- Ongoing website and social media activity.

b) Short-Term Alternative Solutions

- Finalize the recommended implementation strategies for the short-term flooding solutions.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Continue the flow monitoring program and collect hydraulic and precipitation data.
- Update and calibrate the City's sewer and overland drainage model based on information from the 2018 flow monitoring program, including a representation of the inflow and infiltration (I&I) sources entering the sanitary sewer system.
- Continue working with City staff to collect and incorporate new sewer data from recent smoke tests and zoom camera inspections.
- Develop recommendations to reduce inflow and infiltration (I&I) sources to the sanitary sewer system.
- Develop long-term alternative solutions to reduce the risk and impacts of flooding.
- Develop factors and criteria for evaluation of the long-term alternative solutions.

IW:ldm

City of Windsor Sewer Master Plan
Quarterly City Council Update

October 1, 2018

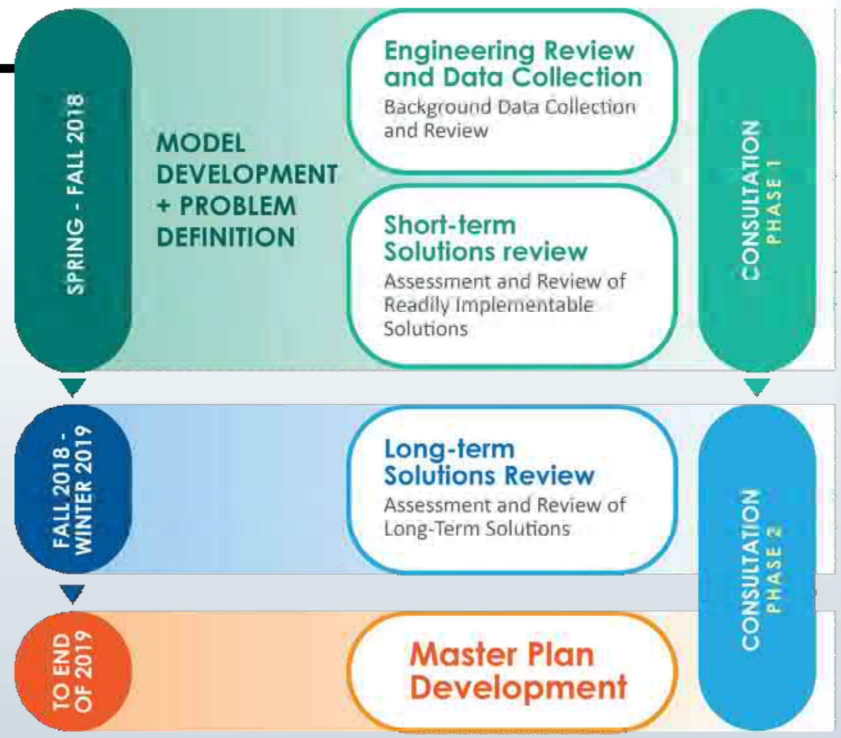
Project Overview

The City is completing a Sewer Master Plan to:

- Better understand the causes of basement & surface flooding.
- Identify short-term & long-term solutions to reduce flood risks.
- Prepare an implementation strategy for Council consideration.

The study follows Municipal Class Environmental Assessment (EA), Master Plan Process (Approach No. 2) requirements:

- Public & agency input is integrated into the Class EA process.
- Will satisfy Class EA requirements for select Schedule B projects.



Problem & Opportunity Statement

The City has experienced basement and surface flooding resulting in property damage and disruption to the community.

The Sewer Master Plan will identify specific problems and explore achievable measures to reduce the risks of flooding by identifying and evaluating:

- **Short-term** solutions – reduce water getting into the sewers, and partnering with homeowners to protect against flooding; and
- **Long-term** solutions – improve the sewer systems by increasing their capacity and/or storage of water.

Parkview Avenue; August 2017

Work Completed:
Class EA & Public Consultation

- **Project Website Launched and Notice of Commencement** issued on March 22
  - Visit **weatheringthestorm.ca**
- **Public Information Centre No. 1 was held on June 12, 13, and 14:**
  - Focus on four components:
    - Project Overview
    - Learn about Flooding
    - Problem Identification
    - Short-Term Alternative Solutions
- **Pop-up Events –** Earth Day & Open Streets Windsor
- **Partners 4 Action – flood survey** collected resident feedback
- On-going **Stakeholder Advisory Committee** meetings

Pop-up Event (Earth Day at Malden Park)

Work Completed: Sewer & Surface Drainage Modelling

- **Expanded Phase 1 sewer model**
  – Sewers and surface drainage systems
- **Compiled flooding records, topographic data, and previous drainage studies**
- **30 flow monitors installed and now calibrating model**

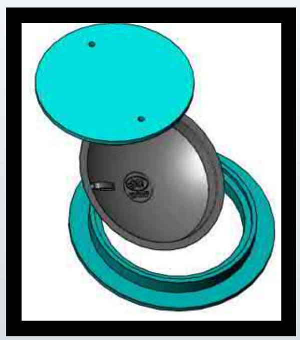
Flow Monitor

Tipping Bucket Rain Gauge

- **St. Rose, St. Paul and Pontiac Area Long-Term Solutions:**
  – Finalizing Study (including Riverside Vista – 2A)
  – Submitted Disaster Mitigation and Adaptation Fund (DMAF) grant application:
    - Nearly $90 Million investment to reduce surface flooding risks (10-year plan)
  – Designing Tranby Park pilot LID project
  – Phase 2 of the Sewer Master Plan will confirm the scope of these long-term solutions

Work Completed: Short-Term Alternative Solutions

LID: Rain Garden

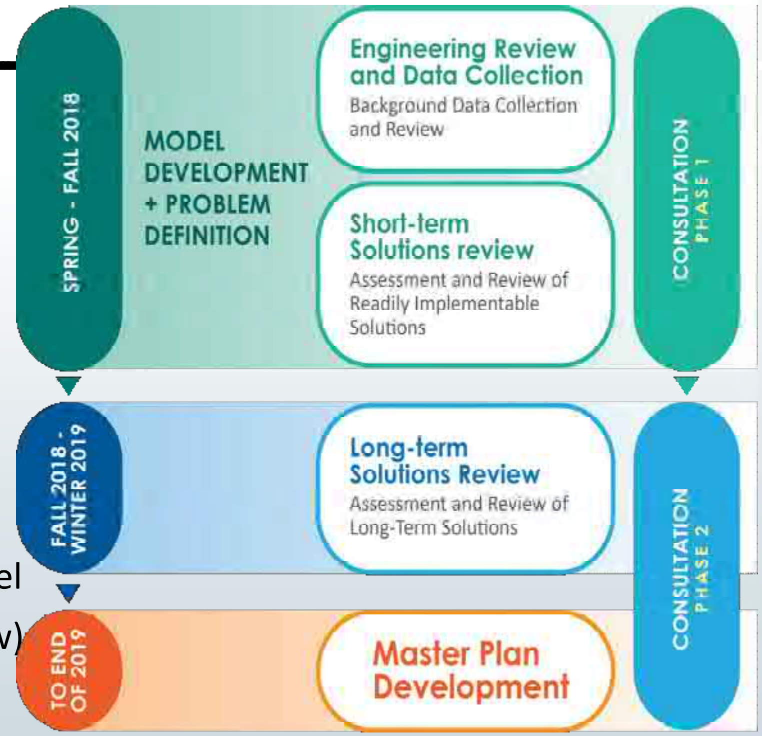


Manhole Rain Catcher

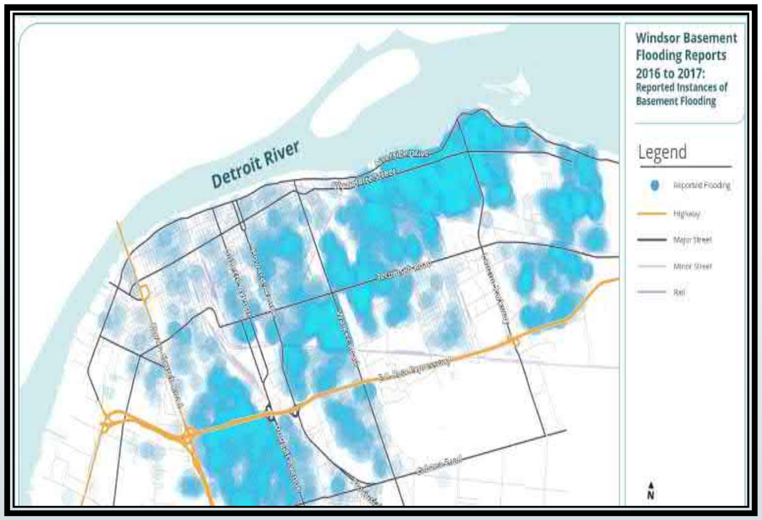
- **City's existing programs are quite comprehensive**
- **Alternative short-term solutions identified:**
  - Benchmarked best practices
  - Stakeholder feedback
  - Finalizing recommendations with the City
- **Short-term solutions divided into three categories:**
  - Municipal Policies
  - Subsidy Programs
  - Collaborative Improvements
- **Details of short-term solutions outlined in Council Report**

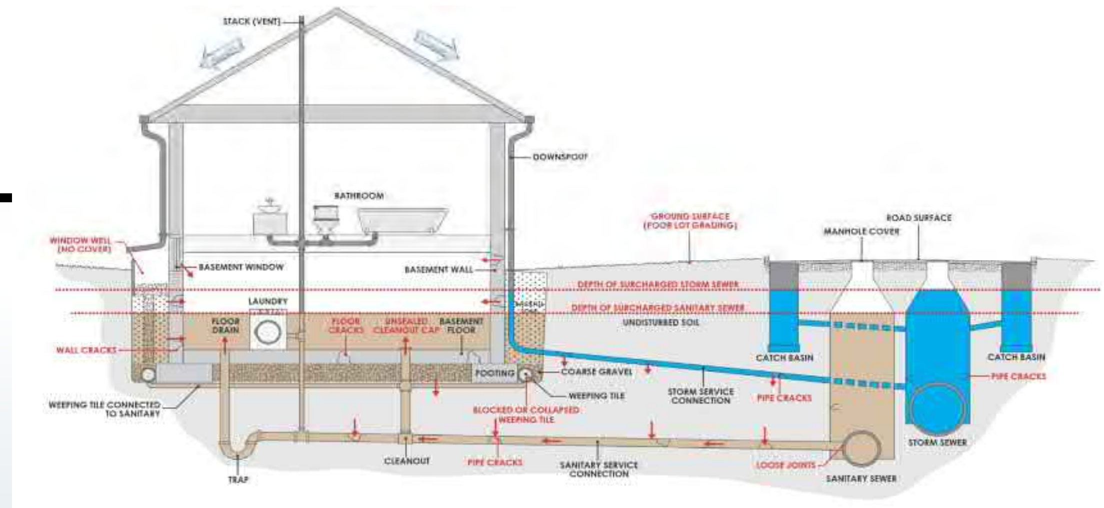
What's Next

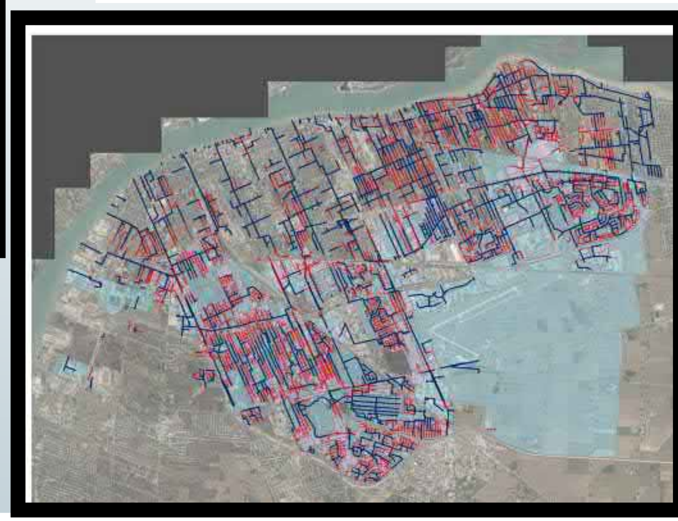
- **Class EA Process & Stakeholder Engagement:**
  - Stakeholder Advisory & Technical Committee meetings
  - Social media activities and Pop-up events
  - PIC meetings (Spring 2019)
- **Short-Term Alternative Solutions:**
  - Continue to work with City staff to finalize the recommendations
- **Sewer & Surface Drainage Model:**
  - Complete 2018 flow monitoring program and recalibrate sewer model
  - Incorporate sanitary sewer characteristics (sources of extraneous flow)
  - Confirm problem areas in the drainage systems
  - Confirm level of service standards (adaptive approach)
- **Develop long-term alternative solutions to reduce the risk of flooding**



Questions







DILLON CONSULTING

Aquafor Beech Limited

MEMO

DILLON CONSULTING

TO: Anna Godo, P.Eng.
FROM: Flavio Forest, P.Eng.
Ian Wilson, P.Eng.
DATE: December 5, 2018
SUBJECT: Sewer Master Plan - Quarterly City of Windsor Council Update
OUR FILE: 17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. As a result, the City's Mayor presented an eight-point plan to address flooding risks, which included a focus on completing the next stage of the City's Sewer Master Plan.

City Council retained Dillon Consulting Limited (Dillon) as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (September 10, 2018):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
  - Notice of Commencement;
  - Public and agency contact list; and

  - Interactive project website to provide flexible and convenient public access to updated information and to provide comments related to this project.
- Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses. The committee was established as a non-political advisory group comprising of various volunteer members of the public and community/business groups:
  - The first Stakeholder Advisory Committee meeting was held on May 2, 2018; and
  - The second Stakeholder Advisory Committee meeting was held on August 14, 2018.
- Pop-up event held at Malden Park Earth Day (April 22, 2018), promoting the Sewer Master Plan, including education materials about flooding and private property protection measures.
- The Partners 4 Action flood survey was made available, with responses from over 400 participants collected, providing insights on their understanding of flooding, concerns with future flooding, and level of participation in the City's flood protection subsidy program.
- The project's first round of Public Information Centre (PIC) meetings were held on June 12, 13, and 14, 2018, which focused on:
  - Learning about the causes of basement and surface flooding;
  - Factors being considered in assessing and mitigating the risk of flooding;
  - Short-term solutions for homeowners and for public infrastructure; and
  - An overview of the next steps to address longer-term alternative solutions.
- Continued to update the project website, weatheringthestorm.ca, including materials from the PIC meetings, the short-term solution comment form, and additional education materials.

<u>Work Completed Since the Last Council Update (September 10, 2018):</u>

- Published the project's first newsletter informing residents about the project, the causes of flooding and the alternative short-term flooding solutions being considered.
- Held a pop-up event promoting the Sewer Master Plan during the Open Streets Windsor event (September 23, 2018), including education about flooding and private property protection measures. Over 140 individuals visited the booth, with 28 who signed up for the project newsletter.
- Ongoing website updates and social media activity, including:
  - Tweets promoting the Open Streets pop-up event;
  - Over 110 visitors to the project website; and
  - Posting new education material to the website.

b) <u>Short-Term Alternative Solutions</u>

<u>Work Completed Prior to the Last Council Update (September 10, 2018):</u>

- Developed a range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) for public and agency input. The short-term alternative solutions include both public property and homeowner measures, which were presented for public input through the project website and PIC meetings.

- Completed a review of other Municipalities' measures, subsidies, and programs related to implementing short-term flooding solutions. The review included five Cities in Ontario and four Cities in other Provinces.
- Developed draft recommendations to implement short-term solutions. Gathered preliminary feedback from City staff and Stakeholder Advisory Committee members.
- The draft recommendations to integrate additional short-term solutions were categorized under municipal polices, subsidy programs and collaborative improvements. This information was presented in detail to City Council as part of the last quarterly update.

Work Completed Since the Last Council Update (September 10, 2018):

- Completed draft recommendations for the implementation of short-term solutions based on feedback from City staff.
- Identified higher-priority sanitary maintenance hole locations in which it was recommended that devices be installed beneath the covers to eliminate inflow to the sanitary sewer system.

c) Sewer System Modelling

Work Completed Prior to the Last Council Update (September 10, 2018):

- Start-up meeting with the City and ERCA to review project scope, schedule and deliverables.
- Problem identification of flood vulnerability based on basement flooding records, topographic conditions and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Campbell/University storm drainage study and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.
- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.
- Installation of two temporary rain gauges to supplement the City's existing rain gauge network.
- Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Preliminary evaluation of the existing storm drainage system using the expanded model to identify potential problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.
- Continued refining our understanding of the interaction between the City's storm and sanitary sewers, including meetings with City staff.
- Reviewed preliminary model results of surface flooding with City staff for verification and model refinement.

Work Completed Since the Last Council Update (September 10, 2018):

- Finalized the 2018 flow monitoring program, including removal of all temporary flow monitors and rain gauges.
- Incorporated new City data from Infrastructure Management Services (IMS) to help delineate and define local sources of inflow and infiltration (I&I) to the sanitary sewer system. Information was based upon the recently completed City-wide smoke tests and partial completed zoom camera inspection programs, as follows:
    - The smoke testing program was completed. This information was used to help identify locations with potential stormwater connections to the sanitary sewer system; and
    - The zoom camera inspection programs are still being completed. Data from these programs are being used by City staff to confirm and improve sewer asset records, including diameter, size, and material. At the time of model development only 30% of the total data from the City-wide inspection was incorporated in the asset records. It is anticipated the City will receive two more updates from the zoom camera programs one by February 2019 and another by May 2019. Once these records have been uploaded a check on the model will be completed; however this will not be received until the project is reviewing long-term solution alternatives.
- Finalized re-calibration of the expanded and updated sewer and overland drainage model. Model calibrated and validation used the following flow and precipitation records:
    - The 2018 flow monitoring and rain gauge program;
    - The City's sanitary sewer data from the August 28, 2017, storm event;
    - The 2017 Pontiac/St. Paul flow monitoring program;
    - The flow records from the 2013 and 2014 monitoring program; and
    - The City's rain gauge data 2013 to current.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- Next Stakeholder Advisory Committee meeting is proposed in January 2019, focusing on reviewing preliminary model results and the range of long-term alternative solutions.
- Future pop-up event(s) promoting the Sewer Master Plan, including education about flooding and property protection measures.
- Ongoing website updates and social media activity.
- Finalize factors and criteria for evaluation of the long-term alternative solutions.
- Reporting and documenting the public/agency consultation and Environmental Assessment work completed in accordance with the Master Plan process.

b) Short-Term Alternative Solutions

- Finalize the recommended implementation strategies for the short-term solutions.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Document the study approach, methodology and findings related to the sewer model expansion, calibration process, and definition of baseline conditions.
- Consider the potential impacts of climate change, including the identification of areas having higher vulnerability and impacts associated with flooding.
- Develop recommendations to reduce inflow and infiltration (I&I) to the sanitary sewer system.
- Develop long-term alternative solutions to reduce the risk and impacts of flooding. Work will include modelling of solutions to quantify potential flood reduction, developing functional designs, estimating costs, and recommending the preferred solutions based on a range of evaluation criteria:
    - Solutions will consider the impact of climate change and an adaptive solution approach will be implemented giving consideration to higher vulnerability areas.
- Develop a prioritization and implementation strategy for the recommended long-term solutions.
- Document the Master Plan process.

IDW:d

MEMO

TO:	Anna Godo, P.Eng., Project Lead, City of Windsor
FROM:	Flavio Forest, P. Eng., Project Manager, Dillon Consulting Limited Ian Wilson, P. Eng., Water Resources Engineer, Dillon Consulting Limited Laura Herlehy, P. Eng., Project Coordinator, Dillon Consulting Limited
DATE:	March 22, 2019
SUBJECT:	Sewer Master Plan - Quarterly City of Windsor Council Update
OUR FILE:	17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. As a result, the City's Mayor presented an eight-point plan to address flooding risks, which included a focus on completing the next stage of the City's Sewer Master Plan.

City Council retained Dillon Consulting Limited (Dillon) as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (December 5, 2018):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
  - Notice of Commencement;

- Public and agency contact list; and
- Interactive project website to provide flexible and convenient public access to updated information and to provide comments related to this project.

- Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses. The committee was established as a non-political advisory group comprising of various volunteer members of the public and community/business groups:
  - The first Stakeholder Advisory Committee meeting was held on May 2, 2018; and
  - The second Stakeholder Advisory Committee meeting was held on August 14, 2018.
- Pop-up event held at Malden Park Earth Day (April 22, 2018), promoting the Sewer Master Plan, including education materials about flooding and private property protection measures.
- The Partners 4 Action flood survey was made available, with responses from over 400 participants collected, providing insights on their understanding of flooding, concerns with future flooding, and level of participation in the City's flood protection subsidy program.
- The project's first round of Public Information Centre (PIC) meetings were held on June 12, 13, and 14, 2018, which focused on:
  - Learning about the causes of basement and surface flooding;
  - Factors being considered in assessing and mitigating the risk of flooding;
  - Short-term solutions for homeowners and for public infrastructure; and
  - An overview of the next steps to address longer-term alternative solutions.
- Continued to update the project website, weatheringthestorm.ca, including materials from the PIC meetings, the short-term solution comment form, and additional education materials.
- Published the project's first newsletter informing residents about the project, the causes of flooding and the alternative short-term flooding solutions being considered.
- Held a pop-up event promoting the Sewer Master Plan during the Open Streets Windsor event (September 23, 2018), including education about flooding and private property protection measures. Over 140 individuals visited the booth, with 28 signing up for the project newsletter.

<u>Work Completed Since the Last Council Update (December 5, 2018):</u>

- A third Stakeholder Advisory Committee meeting was held on January 24, 2019, which focused on reviewing preliminary model results and the range of long-term alternative solutions.
- Provided input related to the development of a Downspout Disconnection Pamphlet being developed by the City of Windsor.

b) <u>Short-Term Alternative Solutions</u>

<u>Work Completed Prior to the Last Council Update (December 5, 2018):</u>

- Developed a range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) for public and agency input. The short-term alternative solutions include both public property and homeowner measures, which were presented for public input through the project website and PIC meetings.
- Completed a review of other Municipalities' measures, subsidies, and programs related to implementing short-term flooding solutions. The review included five Cities in Ontario and four Cities in other Provinces.

- Developed draft recommendations to implement short-term solutions. Gathered preliminary feedback from City staff and Stakeholder Advisory Committee members.
- The draft recommendations to integrate additional short-term solutions were categorized under municipal polices, subsidy programs and collaborative improvements. This information was presented in detail to City Council as part of the last quarterly update.
- Completed draft recommendations for the implementation of short-term solutions based on feedback from City staff.

Work Completed Since the Last Council Update (December 5, 2018):

- Using the City-wide sewer and overland drainage model, quantified the potential benefit of sanitary sewer maintenance hole lid sealing in prioritization areas recommended for immediate action to reduce extraneous flow.

c) Sewer System Modelling

Work Completed Prior to the Last Council Update (December 5, 2018):

- Start-up meeting with the City and ERCA to review project scope, schedule and deliverables.
- Problem identification of flood vulnerability based on basement flooding records, topographic conditions and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Campbell/University storm drainage study and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.
- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.
- Installation of two temporary rain gauges to supplement the City's existing rain gauge network.
- Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Preliminary evaluation of the existing storm drainage system using the expanded model to identify potential problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.
- Continued refining our understanding of the interaction between the City's storm and sanitary sewers, including meetings with City staff.
- Reviewed preliminary model results of surface flooding with City staff for verification and model refinement.
- Finalized the 2018 flow monitoring program, including removal of all temporary flow monitors and rain gauges.

- Incorporated new City data from Infrastructure Management Services (IMS) to help delineate and define local sources of inflow and infiltration (I&I) to the sanitary sewer system. Information was based upon the recently completed City-wide smoke tests and partial completed zoom camera inspection programs, as follows:
    - The smoke testing program was completed. This information was used to help identify locations with potential stormwater connections to the sanitary sewer system; and
    - The zoom camera inspection programs are still being completed. Data from these programs are being used by City staff to confirm and improve sewer asset records, including diameter, size, and material. At the time of model development only 30% of the total data from the City-wide inspection was incorporated in the asset records. It is anticipated the City will receive two more updates from the zoom camera programs one by February 2019 and another by May 2019. Once these records have been uploaded a check on the model will be completed; however this will not be received until the project is reviewing long-term solution alternatives.
- Finalized re-calibration of the expanded and updated sewer and overland drainage model. Model calibrated and validation used the following flow and precipitation records:
    - The 2018 flow monitoring and rain gauge program;
    - The City's sanitary sewer data from the August 28, 2017, storm event;
    - The 2017 Pontiac/St. Paul flow monitoring program;
    - The flow records from the 2013 and 2014 monitoring program; and
    - The City's rain gauge data 2013 to current.

<u>Work Completed Since the Last Council Update (December 5, 2018):</u>

- Development of the draft report documenting the study approach, methodology and findings related to the sewer model expansion, calibration process, and definition of baseline conditions.
- Started our review of long-term solution alternatives, including understanding the relative benefits of improvements to sewer and pump station outlets, trunk sewers, and surcharge storage for the storm and sanitary sewer systems. Our review also considered the benefits of source controls, particularly reducing the number of foundation drains connected to the sanitary sewer system.
- Coordination with on-going studies including the Caron Avenue CSO Control Study, the Riverside Landform Barrier Study, Riverside Vista Phase 2A Design, Campbell/University Sewer Study, and the Stormwater Financing Study. Highlights include coordination with the recommended solutions being defined in the Caron Ave CSO Control project.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- Incorporated the Stormwater Financing Study into the Weathering the Storm Website.
- The next Stakeholder Advisory Committee meeting will be held in Spring, and will focus on the development of long term solution evaluation criteria, and obtaining input on promoting public education/involvement.
- Subsequent Stakeholder Advisory Committee meetings will be scheduled in late spring and early summer to obtain input on the long term solution alternatives, the evaluation of long-term solutions and the development of PIC materials.
- The Sewer Master Plan team will participate in the 2019 Earth Day event at Malden Park to promote the project and provide education on flooding and property protection measures.
- Ongoing website updates and social media activity.
- Hold the second project public information center (PIC) sessions to present long term solution alternatives to reduce the risk of basement and surface flooding. These sessions are scheduled for September 2019.
- Finalize factors and criteria for evaluation of the long-term alternative solutions.
- Reporting and documenting the public/agency consultation and Environmental Assessment work completed in accordance with the Master Plan process.
- Issue the Master Plan for review. Should any Schedule B projects be identified as part of the master plan a Notice of Completion for the specific projects will also be issued.

b) Short-Term Alternative Solutions

- Develop recommendations for locations in which storm sewer catch basin inlet control devices (ICDs) should be installed.
- Develop recommended prioritization areas for mandatory foundation drain disconnections.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Finalize how considerations for the potential impacts of climate change will be incorporated into the Study. This will include the identification of areas having higher vulnerability and impacts associated with flooding.
- Develop recommendations to reduce rainfall derived inflow and infiltration (RDII) to the sanitary sewer system. This will include both public property measures (i.e. new or relining of existing sewers, etc.) and private property measures (i.e. foundation drain disconnection programs).
- Develop long-term alternative solutions to reduce the risk and impacts of flooding. Work will include modelling of solutions to quantify potential flood reduction, developing functional designs, estimating costs, and recommending the preferred solutions based on a range of evaluation criteria:
    - Solutions will consider the impact of climate change and an adaptive solution approach will be implemented giving consideration to higher vulnerability areas.
- Develop a prioritization and implementation strategy for the recommended long-term solutions.
- Document the Master Plan process.

IDW:mi

MEMO

TO: Anna Godo, P.Eng., Project Lead, City of Windsor

FROM: Flavio Forest, P.Eng., Project Manager, Dillon Consulting Limited
Ian Wilson, P.Eng., Water Resources Engineer, Dillon Consulting Limited
Laura Herlehy, P.Eng., Project Coordinator, Dillon Consulting Limited

DATE: July 16, 2019

SUBJECT: Sewer Master Plan - Quarterly City of Windsor Council Update

OUR FILE: 17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. As a result, the City's Mayor presented an eight-point plan to address flooding risks, which included a focus on completing the next stage of the City's Sewer Master Plan.

City Council retained Dillon Consulting Limited (Dillon) as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (April 15, 2019):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
  - Notice of Commencement;

- Public and agency contact list;
- Interactive project website to provide flexible and convenient public access to updated information and to provide comments related to this project; and
- Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses. The committee was established as a non-political advisory group comprising of various volunteer members of the public and community/business groups. Meetings with the SAC group were held on May 2, 2018, August 14, 2018 and January 24, 2019.

- Pop-up event held at Malden Park Earth Day (April 22, 2018), promoting the Sewer Master Plan, including education materials about flooding and private property protection measures.
- The Partners 4 Action flood survey was made available, with responses from over 400 participants collected, providing insights on their understanding of flooding, concerns with future flooding, and level of participation in the City's flood protection subsidy program.
- The project's first round of Public Information Centre (PIC) meetings were held on June 12, 13, and 14, 2018, which focused on:
  - Learning about the causes of basement and surface flooding;
  - Factors being considered in assessing and mitigating the risk of flooding;
  - Short-term solutions for homeowners and for public infrastructure; and
  - An overview of the next steps to address longer-term alternative solutions.
- Continued to update the project website, weatheringthestorm.ca, including materials from the PIC meetings, the short-term solution comment form, and additional education materials.
- Published the project's first newsletter informing residents about the project, the causes of flooding and the alternative short-term flooding solutions being considered.
- Held a pop-up event promoting the Sewer Master Plan during the Open Streets Windsor event (September 23, 2018), including education about flooding and private property protection measures. Over 140 individuals visited the booth, with 28 signing up for the project newsletter.
- Provided input related to the development of a Downspout Disconnection Pamphlet being developed by the City of Windsor.

<u>Work Completed Since the Last Council Update (April 15, 2019):</u>

- A fourth Stakeholder Advisory Committee meeting was held on May 8, 2019, which focused on the strategy for long-term alternative solutions, including the integration of private property source control measures, such as mandatory foundation drain disconnection. Committee members also provided feedback on the strategy for improving public engagement and cooperation in the implementation of short-term solutions.
- Three pop-up events promoting the Sewer Master Plan were held. The project team spoke with more than 350 people over the course of the following three events:
  - Windsor Home and Garden Show (April 12-14, 2019);
  - City of Windsor's Earth Day (April 28, 2019); and
  - Little River Pollution Control Plant Open House (June 1, 2019).
- The project website (weatheringthestorm.ca) was updated to include:
  - Information regarding the short-term solutions being recommended as part of this study;
  - Types of long-term alternative solutions that are being considered; and

  - o Integration of the City's Stormwater Financing Study.
- The second newsletter for this project was published and provided to the public at the various pop-up events and through the project website.
- Finalized factors and criteria for evaluation of the long-term alternative solutions.
- Met with the City Engineering and Communications staff to develop a Communication and Engagement Plan for the next round of engagement to be completed as part of this project that will take place over the summer and fall of 2019.
- A fifth Stakeholder Advisory Committee meeting was held on July 3, 2019, to present and obtain feedback on the preliminary long-term alternative solutions, including the draft evaluation criteria that will be used in confirming the recommended solutions.

b) <u>Short-Term Alternative Solutions</u>

<u>Work Completed Prior to the Last Council Update (April 15, 2019):</u>

- Developed a range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) for public and agency input. The short-term alternative solutions include both public property and homeowner measures, which were presented for public input through the project website and PIC meetings.
- Completed a review of other Municipalities' measures, subsidies, and programs related to implementing short-term flooding solutions. The review included five Cities in Ontario and four Cities in other Provinces.
- Developed draft recommendations to implement short-term solutions. Gathered preliminary feedback from City staff and Stakeholder Advisory Committee members.
- The draft recommendations to integrate additional short-term solutions were categorized under municipal polices, subsidy programs and collaborative improvements. This information was presented in detail to City Council as part of the last quarterly update.
- Completed draft recommendations for the implementation of short-term solutions based on feedback from City staff.
- Using the City-wide sewer and overland drainage model, quantified the potential benefit of sanitary sewer maintenance hole lid sealing in prioritization areas recommended for immediate action to reduce extraneous flow.

<u>Work Completed Since the Last Council Update (April 15, 2019):</u>
- Refined the short-term solutions based on discussions with the Stakeholder Advisory Committee and the City of Windsor, as well as the findings from the sewer model.
- Refined the sewer model to reflect the implementation of recommended short-term solutions that contribute to a reduction in the amount of inflow and infiltration resulting from the recommended implementation of manhole rain catchers, mandatory foundation drain disconnection, and mandatory downspout disconnection.

c) <u>Sewer System Modelling</u>

<u>Work Completed Prior to the Last Council Update (April 15, 2019):</u>
- Start-up meeting with the City and ERCA to review project scope, schedule and deliverables.

- Problem identification of flood vulnerability based on basement flooding records, topographic conditions and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Campbell/University storm drainage study and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.
- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.
- Installation of two temporary rain gauges to supplement the City's existing rain gauge network. Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Preliminary evaluation of the existing storm drainage system using the expanded model to identify potential problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.
- Continued refining our understanding of the interaction between the City's storm and sanitary sewers, including meetings with City staff.
- Reviewed preliminary model results of surface flooding with City staff for verification and model refinement.
- Finalized the 2018 flow monitoring program, including removal of all temporary flow monitors and rain gauges.
- Incorporated new City data from Infrastructure Management Services (IMS) to help delineate and define local sources of inflow and infiltration (I&I) to the sanitary sewer system. Information was based upon the recently completed City-wide smoke tests and partial completed zoom camera inspection programs, as follows:
    - The smoke testing program was completed. This information was used to help identify locations with potential stormwater connections to the sanitary sewer system; and
    - The zoom camera inspection programs are still being completed. Data from these programs are being used by City staff to confirm and improve sewer asset records, including diameter, size, and material. At the time of model development, only 30% of the total data from the City-wide inspection was incorporated in the asset records. It is anticipated the City will receive two more updates from the zoom camera programs one by February 2019 and another by May 2019. Once these records have been uploaded, a check on the model will be completed; however, this will not be received until the project is reviewing long-term solution alternatives.
- Finalized re-calibration of the expanded and updated sewer and overland drainage model. Model calibrated and validation used the following flow and precipitation records:
    - The 2018 flow monitoring and rain gauge program;
    - The City's sanitary sewer data from the August 28, 2017, storm event;
    - The 2017 Pontiac/St. Paul flow monitoring program;
    - The flow records from the 2013 and 2014 monitoring program; and

  - The City's rain gauge data 2013 to current.
- Development of the draft report documenting the study approach, methodology and findings related to the sewer model expansion, calibration process, and definition of baseline conditions.
- Started our review of long-term solution alternatives, including understanding the relative benefits of improvements to sewer and pump station outlets, trunk sewers, and surcharge storage for the storm and sanitary sewer systems. Our review also considered the benefits of source controls, particularly reducing the number of foundation drains connected to the sanitary sewer system.
- Coordination with on-going studies including the Caron Avenue CSO Control Study, the Riverside Landform Barrier Study, Riverside Vista Phase 2A Design, Campbell/University Sewer Study, and the Stormwater Financing Study. Highlights include coordination with the recommended solutions being defined in the Caron Ave CSO Control project.

Work Completed Since the Last Council Update (April 15, 2019):

- Established and accounted for the benefit of private property source control measures as a common aspect of the long-term alternative solutions.
- Developed level of service criteria to meet the City's objectives of reducing the risk of basement and surface flooding.
- Identified problem areas for basement and surface flooding based on the level of service criteria.
- Incorporated provisions for the development of future Secondary Plan Areas identified in the City's Official Plan, including coordination with the City's Planning Department to confirm development proposals and areas of expected intensification within the City.
- Updated the high water level boundary conditions in the Detroit River to reflect recent conditions based on consultation with the City and ERCA.

d) Long Term Solutions

Work Completed Since the Last Council Update (April 15, 2019):

- Developed long-term alternative solutions for the sanitary systems in the South Windsor and East Windsor separated sewer sheds.
- Determined the benefit of completing the City's established plans to separate sewers within the Central Downtown sewer shed areas.
- Developed recommendations to reduce rainfall derived inflow and infiltration (RDII) to the sanitary sewer system. This will include both public property measures (through sewer repair or replacement, and sealing manhole covers) and private property measures (through mandatory foundation drain disconnection programs).
- The project team met with the Ministry of the Environment, Conservation and Parks (MECP) on June 6, 2019, to provide an overview of the project, review the City's strategy to reduce basement and surface flooding and obtained feedback on fundamental solution strategies.
- The project team met with ERCA on June 27, 2019 and July 15, 2019, to discuss the surface ponding solution strategies proposed as part of this study. The team received feedback regarding constraints and boundary conditions associated with the major receiving watercourses (Detroit River, Little River, Grand Marais Drain, Lennon/Cahill Drain), level of service criteria, and roadway flooding standards for access and ingress/egress.

- Assessed the observed and modelled roadway surface flooding conditions on arterial and collector roadways within the City and scheduled a meeting with Emergency Services representatives to review the approach and methodology for addressing their access requirements during extreme storm events.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- The next Stakeholder Advisory Committee meeting scheduled for early September 2019, will focus on the long-term alternative solutions that are proposed to be recommended to the public at the upcoming Public Information Centre meetings in September 2019.
- Based on the Communication and Engagement Plan, the project team will develop materials to educate and inform the public about this project. Specifically, this plan will focus on:
    - Communicating the key elements of this project;
    - Providing education to property owners on how to protect their homes from flooding and promoting their important role in partnering with the City to achieve the objectives of this project;
    - Encourage participation at the upcoming September 2019 Public Information Centre meetings; and
    - Ensure that the public is involved in providing input on the solutions developed through this study.
- Hold the second Public Information Center (PIC) sessions to present long-term alternative and recommended solutions to reduce the risk of basement and surface flooding. These sessions are scheduled for September 24, 25 and 26, 2019.
- Reporting and documenting the public/agency consultation and Environmental Assessment work completed in accordance with the Master Plan process.
- Finalize the Sewer Master Plan, including the identification of any Schedule B projects.

b) Short-Term Alternative Solutions

- Develop recommendations for locations in which storm sewer catchbasin inlet control devices (ICDs) should be installed.
- Develop recommended prioritization areas for mandatory foundation drain disconnections.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Finalize how considerations for the potential impacts of climate change will be incorporated into the study. This will include the identification of areas having higher vulnerability and impacts associated with flooding.
- Continue discussions with the MECP to confirm that the solutions we are developing, specifically with respect to the proposed Retention Treatment Basin concept being proposed, is acceptable in meeting regulatory requirements.

- Refine the recommended solutions to confirm functionality and commitments for future detailed design and implementation, estimating costs, and developing a prioritization and implementation strategy for the recommended long-term solutions.

LMH:d

City of Windsor
Sewer Master Plan
Quarterly City Council Update

August 26, 2019

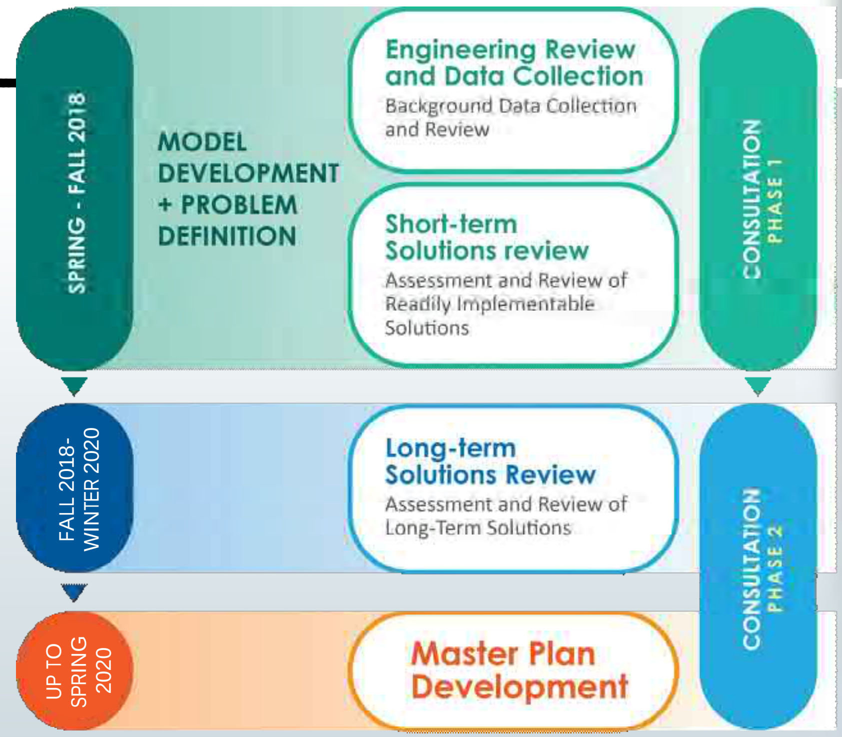
Project Overview

Sewer Master Plan Objectives:

- Understand the **causes of basement and surface flooding**;
- Identify and evaluate **short-term and long-term measures** to reduce the impacts and risks of flooding; and
- Recommend an **implementation strategy** for the City's consideration.

Municipal Class Environmental Assessment (EA), Master Plan Process (Approach No. 2):

- Public and agency consultation.
- Satisfy the Class EA requirements for Schedule B projects.



Public Consultation

Project Website:

Updated **weatheringthestorm.ca**:

- Integrated the City's Stormwater Financing Study
- Project Newsletters
- New details on short-term and long-term solutions

Pop-up events in 2019:

- Malden Park Earth Day
- Windsor Home and Garden Show
- Little River Pollution Control Plant Tour

The project team spoke to 350 families regarding this Study and the City's available subsidy programs.

Stakeholder Advisory Committee:

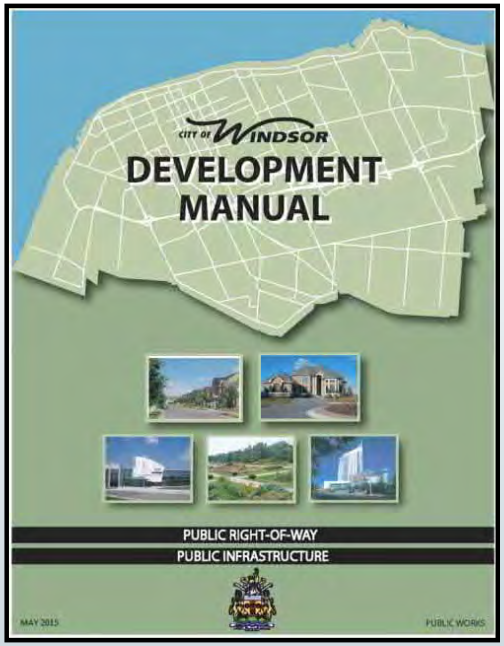
- Held 3 meetings in 2019.
- Provided detailed updates and obtained feedback regarding:
  - Private property inflow source control and protection measures;
  - Long-term solution strategies; and
  - Public education and communication programs.

Short-Term Alternative Solutions

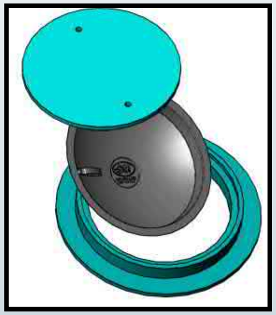
Building on the City's existing programs & policies:

1. Municipal Policies
2. Subsidy Programs
3. Collaborative Improvements

Benchmarked to best practices in other communities



LID: Rain Garden



Manhole Rain Catcher

DILLON CONSULTING

Aquafor Beech Limited

Short-Term Alternative Solutions

Priority Short-Term Solutions:

- Sanitary Manhole Rain Catchers
  - Prioritize installation of 1,400 devices in problems areas.
- Mandatory Foundation Drain Disconnection
  - Develop a mandatory program, including by-laws, resources, and homeowner subsidies.
- Update Sewer Design Criteria & Development Standards
- Develop a Public Education Program
  - Develop and deliver public education programs and resources.

Sewer & Surface Drainage Modelling – Works Completed

City Wide Sewer Model:

- Sewers and overland drainage systems
- Calibrated to recorded sewer flows & observed flooding
- Incorporated proposed future development

Coordinated with Related Projects:

- St. Rose, St. Paul & Pontiac Pump Station Drainage Study
- Campbell/University Sewer Separation and SWM Strategy
- Combined Sewer Overflow Class EA (West of Caron Ave.)
- East Riverside Flood Risk Assessment
- Riverside Vista Phase 2A (Ford Blvd to St. Rose Ave.)
- Approved projects in DMAF funding for East Riverside area

Long-Term Alternative Solutions:

- Finalized evaluation criteria for long-term alternative solutions
- Established Level of Service Criteria
- Identified problem areas that have a higher risk of flooding
- Now finalizing the long term alternative solutions
- Met with various agencies
  - Ministry of Environment, Conservation and Parks
  - Essex Region Conservation Authority
  - Emergency Services

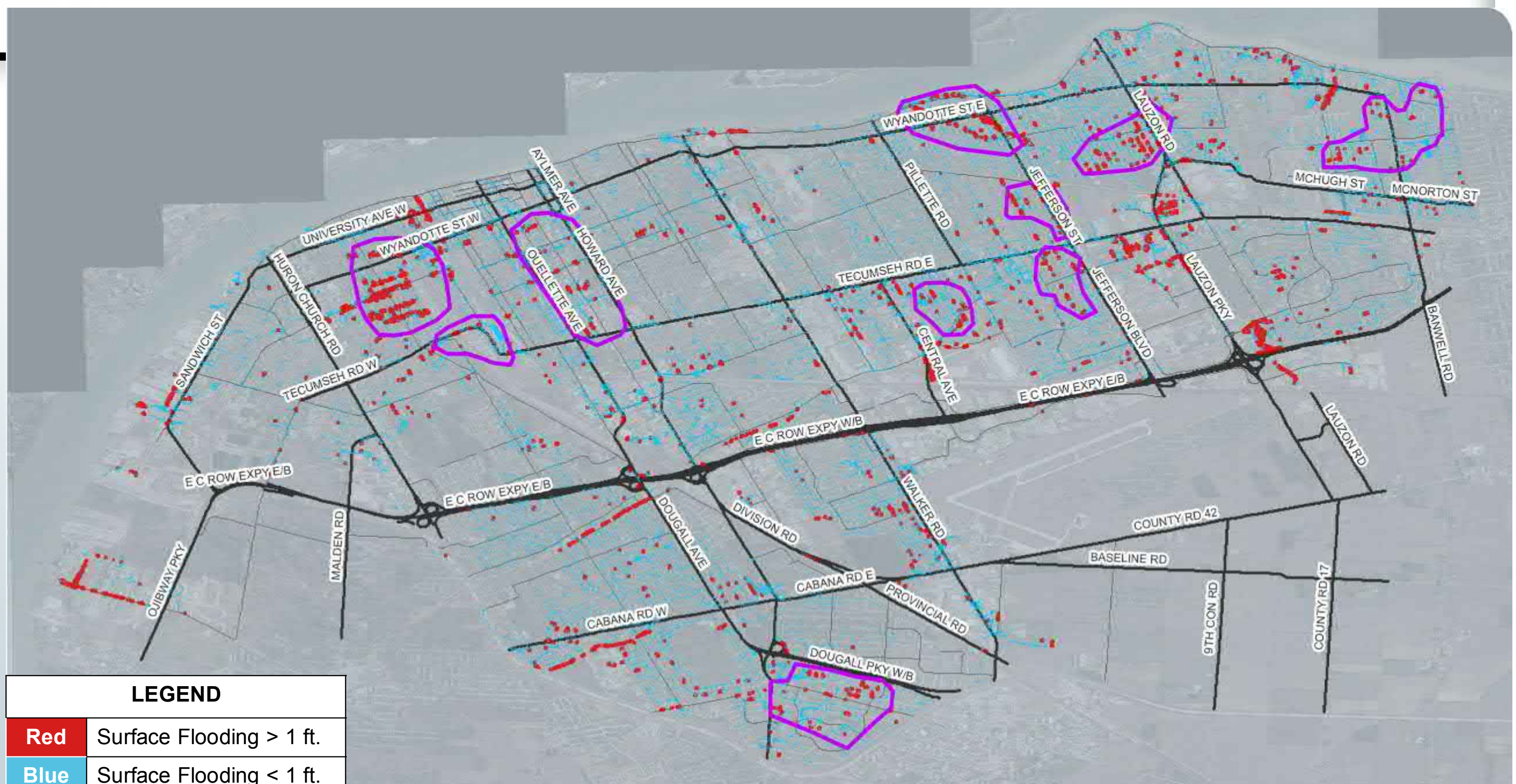
Problem Areas - Surface Flooding

Climate Change Storm:

- 1:100 yr + 40%, equates to a **120 mm** (4.7 inches) rainfall over a **4 hour** period.

Problem Areas Include:

- Areas with increased concentration of surface flooding > 1 ft. depth
- Vulnerable uses:
  - Arterial/Collector roads
  - Schools, hospitals, EMS, and care facilities
  - Emergency shelters



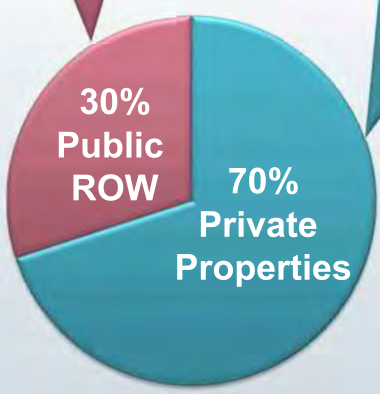
LEGEND	
Red	Surface Flooding > 1 ft.
Blue	Surface Flooding < 1 ft.

CONSULTING

Problem Areas - Basement Flooding

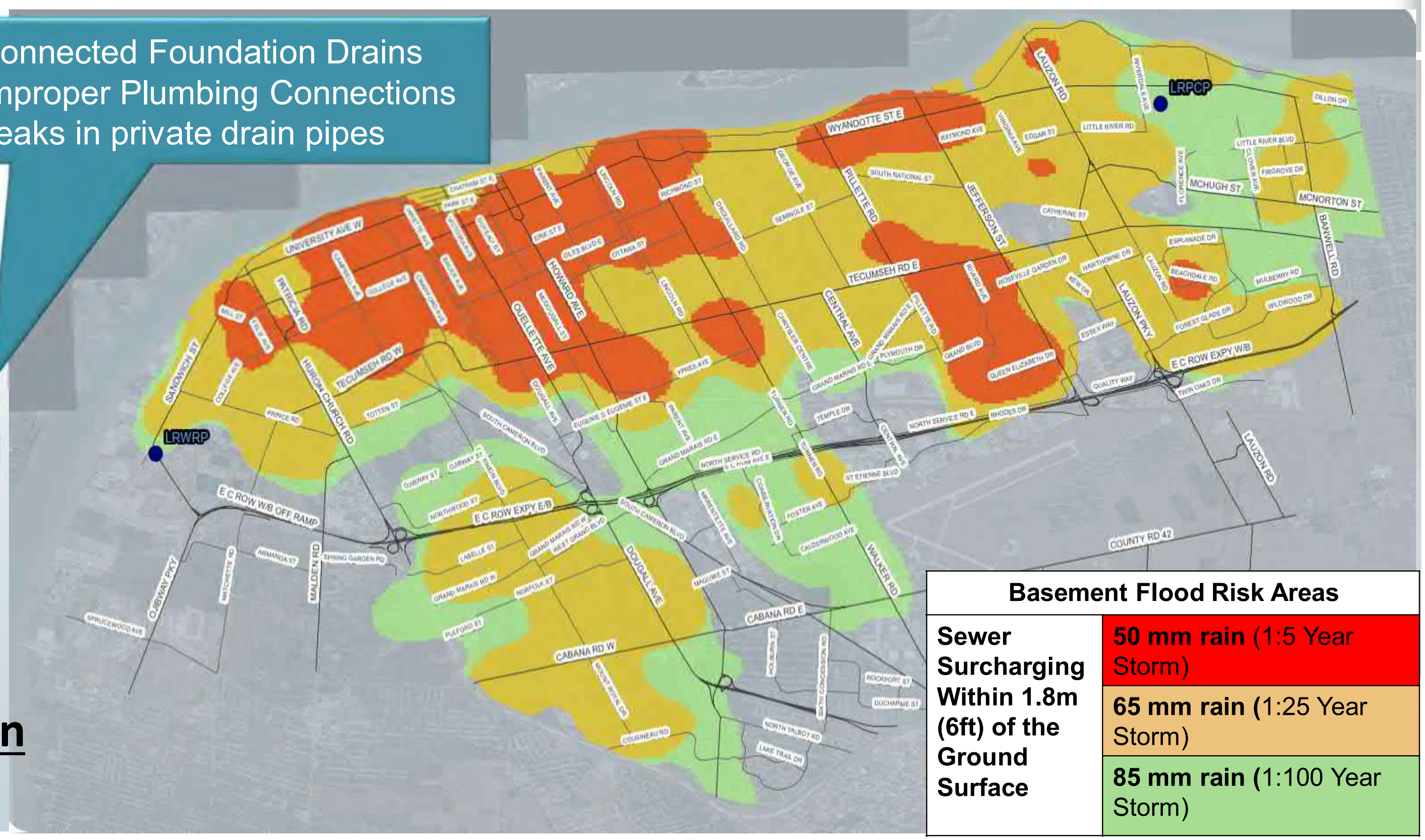
- Manhole Covers
- Leaks in the sewer system

- Connected Foundation Drains
- Improper Plumbing Connections
- Leaks in private drain pipes



Rainfall Derived

Inflow and Infiltration



Long-Term Alternative Solutions

Reduce Inflow & Infiltration (Source Control)

Examples:
- Foundation Drain and Downspout Disconnection
- Correct Improper Plumbing Connections
- Low Impact Development (LID) measures
- Sealing Sanitary Sewer System Leaks

Increase Downstream Outlet Capacity

Examples:
- Pump Station Capacity Improvements
- Treatment Plant Storage and Treatment Capacity Improvements

Improve Sewer System Conveyance and Storage Capacity

Examples:
- Increase sewer sizes
- Combined sewer separation
- Surface/underground storage in open spaces
- Low Impact Development (LID) measures
- High water level p

Solutions – Key Themes

1. The effectiveness of **solutions rely on a partnering approach** between private property owners and the City.
   - Integration of short-term and long-term measures are required to reduce the risk and impacts of basement and surface flooding.
2. Solutions will **reduce, but not completely eliminate flooding risks**.
3. The long-term solutions are expected to require an **extended period of time to implement** due to the scope and costs.

What's Next

August-October 2019:

– Evaluate long-term solutions and confirm preferred solutions
– Incorporate East Riverside flood protection solutions
– Pre-consultation with directly affected property owners
– **PIC No. 2** – Present findings and obtain feedback

October-December 2019:

– Refine preferred solution designs and prepare cost estimates
– Develop a recommended implementation plan
– On-going agency consultation
– Begin drafting the Sewer Master Plan report

January-April 2020:

– Finalize Sewer Master Plan report
– Provide opportunity for public/agency review and comment

Public Information Centre No. 2
October 2019
Times and locations to be confirmed.

Questions/Feedback

Sign-up to our contact list to receive updates on future events.

https://weatheringthestorm.ca/

MEMO

TO: Anna Godo, P.Eng., Project Lead, City of Windsor

FROM: Flavio Forest, P.Eng., Project Manager, Dillon Consulting Limited
Ian Wilson, P.Eng., Water Resources Engineer, Dillon Consulting Limited
Laura Herlehy, P.Eng., Project Coordinator, Dillon Consulting Limited

DATE: November 14, 2019

SUBJECT: Sewer Master Plan - Quarterly City of Windsor Council Update

OUR FILE: 17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. As a result, the City's Mayor presented an eight-point plan to address flooding risks, which included a focus on completing the next stage of the City's Sewer Master Plan.

City Council retained Dillon Consulting Limited (Dillon) as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (August 26, 2019):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
    - Notice of Commencement;

- Public and agency contact list;
- Interactive project website to provide flexible and convenient public access to updated information and to provide comments related to this project; and
- Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses. The committee was established as a non-political advisory group comprising of various volunteer members of the public and community/business groups. Meetings with the SAC group were held on May 2, 2018, August 14, 2018 and January 24, 2019.

- Pop-up event held at Malden Park Earth Day (April 22, 2018), promoting the Sewer Master Plan, including education materials about flooding and private property protection measures.
- The Partners 4 Action flood survey was made available, with responses from over 400 participants collected, providing insights on their understanding of flooding, concerns with future flooding, and level of participation in the City's flood protection subsidy program.
- The project's first round of Public Information Centre (PIC) meetings were held on June 12, 13, and 14, 2018, which focused on:
    - Learning about the causes of basement and surface flooding;
    - Factors being considered in assessing and mitigating the risk of flooding;
    - Short-term solutions for homeowners and for public infrastructure; and
    - An overview of the next steps to address longer term alternative solutions.
- Continued to update the project website, weatheringthestorm.ca, including materials from the PIC meetings, the short-term solution comment form, and additional education materials.
- Published the project's first newsletter informing residents about the project, the causes of flooding and the alternative short-term flooding solutions being considered.
- Held a pop-up event promoting the Sewer Master Plan during the Open Streets Windsor event (September 23, 2018), including education about flooding and private property protection measures. Over 140 individuals visited the booth, with 28 signing up for the project newsletter.
- Provided input related to the development of a Downspout Disconnection Pamphlet being developed by the City of Windsor.
- A fourth Stakeholder Advisory Committee meeting was held on May 8, 2019, which focused on the strategy for long-term alternative solutions, including the integration of private property source control measures, such as mandatory foundation drain disconnection. Committee members also provided feedback on the strategy for improving public engagement and cooperation in the implementation of short-term solutions.
- Three pop-up events promoting the Sewer Master Plan were held. The project team spoke with more than 350 people over the course of the following three events:
    - Windsor Home and Garden Show (April 12-14, 2019);
    - City of Windsor's Earth Day (April 28, 2019); and
    - Little River Pollution Control Plant Open House (June 1, 2019).
- The project website (weatheringthestorm.ca) was updated to include:
    - Information regarding the short-term solutions being recommended as part of this study;
    - Types of long-term alternative solutions that are being considered; and
    - Integration of the City's Stormwater Financing Study.
- The second newsletter for this project was published and provided to the public at the various pop-up events and through the project website.

- Finalized factors and criteria for evaluation of the long-term alternative solutions.
- Met with the City Engineering and Communications staff to develop a Communication and Engagement Plan for the next round of engagement to be completed as part of this project that will take place over the Summer and Fall of 2019.
- A fifth Stakeholder Advisory Committee meeting was held on July 3, 2019, to present and obtain feedback on the preliminary long-term alternative solutions, including the draft evaluation criteria that will be used in confirming the recommended solutions.

<u>Work Completed Since the Last Council Update (August 26, 2019):</u>

- The project team met with the MECP on September 16, 2019, to further discuss solution alternatives developed to improve the sanitary sewer system and mitigate risk of basement flooding. The project team has requested the MECP provide feedback regarding the potential implementation of a RTB (Rapid Treatment Basin) Unit at the Little River Pollution Control Plant (LRPCP) to provide treatment of excess flows at the treatment plant that arise during wet weather conditions. This is similar strategy to what is planned for the Lou Romano Treatment Plant as part of the Caron Avenue CSO Control Study:
    - The MECP informed the team that, due to the nature of the fully separated sewage system upstream of the LRPCP, that this type of treatment unit would not be acceptable. See Section D. Upcoming Tasks for more details regarding next steps.
- A sixth Stakeholder Advisory Committee meeting was held in September 2019, the remaining long-term alternative solutions proposed were presented to the committee. The project team obtained feedback from the group on the level of importance on various evaluation criteria which will aid in the assessment of preferred alternatives.
- A pop-up event promoting the Sewer Master Plan was held during the Open Streets Windsor event (September 22, 2019), including education about flooding and private property protection measures. Over 80 individuals visited the booth, with 15 signing up for the project newsletter.
- Three informative videos were developed to provide the public information on the key messages related to this project. These videos were released through the City's social media outlets and on the project website.
    - The three main messages that were conveyed through each video are as follows:
        - Flooding cannot be eliminated completely, but we can work to reduce the risk of damage to homes and businesses;
        - Solutions rely on a partnering approach; and
        - Considerable time and investment is needed to complete the proposed sewers' improvements.
- Completed environmental assessments and determine the preliminary preferred solutions for the landform barrier alternatives and proposed pump stations alternatives at St. Rose Avenue and Ford Boulevard.
- Updated the project website to include the materials from the Fall 2019 property owner meetings including the inclusion of the coastal flood protection aspect of this project.
- Met with property owners within the immediate vicinity to the proposed coastal flood protection landform barrier along Riverside Drive on October 30, 2019.
- Met with property owners within the immediate vicinity of the potential storm pump stations located at the St. Rose Avenue and Riverside Drive intersection and the Ford Boulevard and Riverside Drive intersection, on November 5 and 6, 2019, respectively.

- The project team attended the Ward 6 Council Meeting to provide residents additional opportunity to provide comments or ask questions related to the proposed storm pump stations and landform barrier located in the Riverside area.
- Engaged Fisher Archaeological to complete Stage 1 archaeological assessments of all proposed Schedule B and C projects outside of the City's road right-of-way.

b) <u>Short-Term Alternative Solutions</u>

<u>Work Completed Prior to the Last Council Update (August 26, 2019):</u>

- Developed a range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) for public and agency input. The short-term alternative solutions include both public property and homeowner measures, which were presented for public input through the project website and PIC meetings.
- Completed a review of other Municipalities' measures, subsidies, and programs related to implementing short-term flooding solutions. The review included five Cities in Ontario and four Cities in other Provinces.
- Developed draft recommendations to implement short-term solutions. Gathered preliminary feedback from City staff and Stakeholder Advisory Committee members.
- The draft recommendations to integrate additional short-term solutions were categorized under municipal policies, subsidy programs and collaborative improvements. This information was presented in detail to City Council as part of the last quarterly update.
- The draft recommendations to integrate additional short-term flooding solutions are subdivided into three categories municipal polices, subsidy programs and collaborative improvements, as follows:
    - **Municipal Policies:**
        - Mandate the installation of sewage ejector pumps for basement plumbing in new residential developments, with exceptions subject to City approval.
        - Mandatory downspout disconnection development policy, with exceptions subject to City approval.
        - Implement a program to promote the use of low impact development (green infrastructure) storm drainage solutions on private property, including:
            - Support the City's consideration for implementing a stormwater surcharge policy, including incentives (credits) for installation of low impact development infrastructure (including residential, commercial, industrial, and institutional properties); and
            - Comprehensive educational material explaining the details of the stormwater surcharge and credit.
        - Seal sanitary manholes covers using rain catcher devices to reduce inflow to the sanitary system.
        - Install inlet control devices (ICDs) in select areas where catchbasins may be allowing more runoff into the storm sewer system than there is capacity to convey.

  - Consider opportunities to tailor the City's maintenance programs based on the degree of flood vulnerability and critical infrastructure. Identified areas of concern from the Sewer Master Plan will support the City's existing programs.
  - Update the City's stormwater management design standards to incorporate the latest practices, including climate change considerations.
- **Subsidy Programs:**
  - Basement Flooding Protection (BFP) Subsidy:
    - Recommended enhancements to the City's existing BFP subsidy including the following:
      - Add sewage ejector pumps;
      - Add window well protection;
      - Add back-up power supply for sump pumps; and
      - Add a home drainage and plumbing advisory service. This service would include an expert, going at a resident's request to their home and reviewing grading and plumbing (with camera inspection), ultimately providing recommendations to reduce flooding risks.
    - The current subsidy's maximum rebate is $2,800.00 per home/unit; this recommendation would require an increase to include the enhancements and will be confirmed at a later time.
  - Downspout Disconnection Program:
    - Mandate the disconnection of downspouts within the City and continue the existing free downspout disconnection service to residents.
  - Private Sewer Replacement Program and Eeling Program:
    - No further recommendations.
- **Collaborative Improvements:**
  - It is recommended that the City provide support for residents to install green infrastructure and low impact development (LID) measures with public education, as well as in-kind and planning support from the City, including:
    - A comprehensive education package to the public regarding the use, benefit, installation and maintenance of private property LIDs;
    - Provide details for the installation of LID measures, including rain gardens; and
    - Implement LID pilot project(s) on a voluntary basis for private properties and/or on public lands, particularly as part of public infrastructure improvement projects, including technical and/or financial support by the City to raise awareness/acceptance and to demonstrate the water quality and quantity benefits.
  - Provide advisory support for residents to improve lot grading, including public education.
  - Providing a comprehensive education package to the public for other household management strategies including:
    - Understanding your plumbing and maintenance requirements for your sump pump, sewage ejector pump and backwater valve;
    - Ensuring proper lot grading;

- Inspecng` basement walls and floors for cracks that may lead to infiltration;
- Avoid storing valuable items on the ground;
- Using water resistant finishes in basements (leą floors, etc.);
- Properly disposing fats, oils and grease and understanding what not to flush down the drain;
- Minimizing water usage during major storm;
- Promoting that residents become familiar with their insurance coverage and opons,` including advising insurers of any private measures that may have been implemented to reduce the risk of flooding; and
- Ensuring water from disconnected downspouts drain away from your foundations.

▪ Implementing an "adopt a catchbasin" program – where residents "adopt a catchbasin" in the City to protect private and public property from flooding. This resident stewardship program would help ensure public property flow routes (curb and gutters) are clear of debris and vegetation.

- Completed draft recommendations for the implementation of short-term solutions based on feedback from City staff.
- Using the City-wide sewer and overland drainage model, quantified the potential benefit of sanitary sewer maintenance hole lid sealing in prioritization areas recommended for immediate action to reduce extraneous flow.
- Refined the short-term solutions based on discussions with the Stakeholder Advisory Committee and the City of Windsor, as well as the findings from the sewer model.
- Refined the sewer model to reflect the implementation of recommended short-term solutions that contribute to a reduction in the amount of inflow and infiltration resulting from the recommended implementation of manhole rain catchers, mandatory foundation drain disconnection, and mandatory downspout disconnection.

c) <u>Sewer System Modelling</u>

<u>Work Completed Prior to the Last Council Update (August 26, 2019):</u>

- Start-up meeting with the City and ERCA to review project scope, schedule and deliverables.
- Problem identification of flood vulnerability based on basement flooding records, topographic conditions and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Campbell/University storm drainage study and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.
- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.

- Installation of two temporary rain gauges to supplement the City's existing rain gauge network. Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Preliminary evaluation of the existing storm drainage system using the expanded model to identify potential problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.
- Continued refining our understanding of the interaction between the City's storm and sanitary sewers, including meetings with City staff.
- Reviewed preliminary model results of surface flooding with City staff for verification and model refinement.
- Finalized the 2018 flow monitoring program, including removal of all temporary flow monitors and rain gauges.
- Incorporated new City data from Infrastructure Management Services (IMS) to help delineate and define local sources of inflow and infiltration (I&I) to the sanitary sewer system. Information was based upon the recently completed City-wide smoke tests and partial completed zoom camera inspection programs, as follows:
    - The smoke testing program was completed. This information was used to help identify locations with potential stormwater connections to the sanitary sewer system; and
    - The zoom camera inspection programs are still being completed. Data from these programs are being used by City staff to confirm and improve sewer asset records, including diameter, size, and material. At the time of model development, only 30% of the total data from the City-wide inspection was incorporated in the asset records. It is anticipated the City will receive two more updates from the zoom camera programs one by February 2019 and another by May 2019. Once these records have been uploaded, a check on the model will be completed; however, this will not be received until the project is reviewing long-term solution alternatives.
- Finalized re-calibration of the expanded and updated sewer and overland drainage model. Model calibrated and validation used the following flow and precipitation records:
    - The 2018 flow monitoring and rain gauge program;
    - The City's sanitary sewer data from the August 28, 2017, storm event;
    - The 2017 Pontiac/St. Paul flow monitoring program;
    - The flow records from the 2013 and 2014 monitoring program; and
    - The City's rain gauge data 2013 to current.
- Development of the draft report documenting the study approach, methodology and findings related to the sewer model expansion, calibration process, and definition of baseline conditions.
- Started our review of long-term solution alternatives, including understanding the relative benefits of improvements to sewer and pump station outlets, trunk sewers, and surcharge storage for the storm and sanitary sewer systems. Our review also considered the benefits of source controls, particularly reducing the number of foundation drains connected to the sanitary sewer system.

- Coordination with on-going studies including the Caron Avenue CSO Control Study, the Riverside Landform Barrier Study, Riverside Vista Phase 2A Design, Campbell/University Sewer Study, and the Stormwater Financing Study. Highlights include coordination with the recommended solutions being defined in the Caron Avenue CSO Control project.
- Established and accounted for the benefit of private property source control measures as a common aspect of the long-term alternative solutions.
- Developed level of service criteria to meet the City's objectives of reducing the risk of basement and surface flooding.
- Identified problem areas for basement and surface flooding based on the level of service criteria.
- Incorporated provisions for the development of future Secondary Plan Areas identified in the City's Official Plan, including coordination with the City's Planning Department to confirm development proposals and areas of expected intensification within the City.
- Updated the high water level boundary conditions in the Detroit River to reflect recent conditions based on consultation with the City and ERCA.

Work Completed Since the Last Council Update (August 26, 2019):

- Completed an additional hydraulic assessment of the existing RTB to determine what potential weir protection elevations would need to be implemented to protect the structure from various high river level scenarios.
- Completed further evaluation of the downtown combined sewer system and refined the proposed soft separation strategy. This included the development of a more refined storm sewer system servicing plan that requires the construction of additional storm trunk sewers to capture the separated storm flows.

d) Long Term Solutions

Work Completed Prior to the Last Council Update (August 26, 2019):

- Developed long-term alternative solutions for the sanitary systems in the South Windsor and East Windsor separated sewer sheds.
- Determined the benefit of completing the City's established plans to separate sewers within the Central Downtown sewer shed areas.
- Developed recommendations to reduce rainfall derived inflow and infiltration (RDII) to the sanitary sewer system. This will include both public property measures (through sewer repair or replacement, and sealing manhole covers) and private property measures (through mandatory foundation drain disconnection programs).
- The project team met with the Ministry of the Environment, Conservation and Parks (MECP) on June 6, 2019, to provide an overview of the project, review the City's strategy to reduce basement and surface flooding and obtained feedback on fundamental solution strategies.
- The project team met with ERCA on June 27, 2019, and July 15, 2019, to discuss the surface ponding solution strategies proposed as part of this study. The team received feedback regarding constraints and boundary conditions associated with the major receiving

watercourses (Detroit River, Little River, Grand Marais Drain, Lennon/Cahill Drain), level of service criteria, and roadway flooding standards for access and ingress/egress.

- Assessed the observed and modelled roadway surface flooding conditions on arterial and collector roadways within the City and scheduled a meeting with Emergency Services representatives to review the approach and methodology for addressing their access requirements during extreme storm events.
- Provided assistance to the City for the application of funding through the second round of Disaster Mitigation and Adaptation Funding (DMAF). The application included technical information and high level costs estimates of the St. Rose Avenue Pump Station, Ford Boulevard Pump Station, Riverside Drive Storm Sewer Extension, St. Rose Storm Sewer Extension and Landform Barrier within the Riverside Vista Phase 2A project limits.

Work Completed Since the Last Council Update (August 26, 2019):

- Met with Little River Pollution Control Plant (LRPCP) staff and completed a plant tour to determine if additional improvements could be made within the treatment plant to eliminate internal bottle necks within the plant and to improve the rate of treatment or reduction of wet weather overflow events.
- An additional sanitary system alternative has been developed to mitigate the need for improvements at the LRPCP in response to the feedback obtained by the MECP.
- Complete concept plans for the proposed pump stations at St. Rose and Ford Boulevard Pump Stations preliminary preferred solutions.
- Developed 3D rendering simulations to provide better understanding on the footprint and height of the potential pump stations.

e) Coastal Flood Protection **NEW**

As requested, the coastal flood protection measures identified through the City's East Riverside Flood Protection Risk Assessment (ERFPRA) project completed by Landmark Engineers Inc. (Landmark), will be integrated in the Windsor Sewer Master Plan. The following work has been completed in relation to this initiative:

- The project team met with the City, ERCA, Landmark on August 27, 2019, to discuss the integration of the flood protection measures into the Sewer Master Plan. The team identified two potential elevations that could be achieved based on the constraints related to existing site conditions and development.
- Liaised with Landmark to incorporate recommendations highlighted from the ERFPRA report into the Master Plan functional design.
- To satisfy the Schedule B requirements, various location and elevation scenarios where identified which have become part of the environmental assessment portion of the Master Plan.
- Completed topographical survey to confirm elevations obtained from the City's Lidar mapping.
- Completed functional designs for the various alternatives to determine the relative impact of each scenario.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- Follow up with MECP regarding their recent feedback and provide the MECP an outline of how the team will proceed to develop solutions that are implementable.
- Work with the City's media team to develop an additional social media video to provide an update on all the work that has been completed as part of the Master Plan and to advertise the upcoming PIC.
- Follow up meetings with property owners to address concerns with proposed pump stations and flood protection measures.
- Meet with property owners who may be directly impacted by preliminary preferred solutions.
- Hold the second Public Information Centre (PIC) sessions to present long-term alternative and recommended solutions to reduce the risk of basement and surface flooding. These sessions are scheduled for mid-January 2020.
- Meet with ERCA's Source Water Protection group to discuss proposed solutions.
- The next Stakeholder Advisory Committee meeting is scheduled for Winter 2020, will focus on the results of the Public Information Centres and discuss how to incorporate feedback into the final Master Plan recommendations.
- Reporting and documenting the public/agency consultation and Environmental Assessment work completed in accordance with the Master Plan process.
- Finalize the Sewer Master Plan, including the identification of any Schedule B projects.

b) Short-Term Alternative Solutions

- Develop recommendations for locations in which storm sewer catchbasin inlet control devices (ICDs) should be installed.
- Develop recommended prioritization areas for mandatory foundation drain disconnections.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Complete remaining environmental assessment evaluations for the storm and sanitary system solutions.
- Complete functional design of proposed improvements.
- Develop high level cost estimates.

d) Coastal Flood Protection

- Refine functional design of proposed flood protection berm based on feedback form the City's Engineering, Operations and Legal Departments.
- Develop a strategy to provide local drainage and backflow prevention around the proposed berm.
- Determine easement setback requirements are to accommodate the proposed berm and drainage infrastructure.
- Develop high level cost estimates for proposed works.

E. PROJECT CHALLENGES AND SCHEDULE IMPACTS

a) Project Challenges

The Sewer Master Plan objectives requires coordination with a number of different agencies and confirmation that the solutions developed through this study will provide both short-term and long-term benefits to the City's system. There are a number of challenges and added complexities that have been identified as the final long-term solutions strategies are being developed. The following summarizes the number of considerations that need to be incorporated into the complete Master Plan Study.

- Considerations for High Lake Levels:
  - Strategies developed through this study are being revised to account for future high lake levels. Ultimate conditions are based on the high water elevations established in the recently completed East Riverside Flood Risk Assessment study as well as estimated projections based on today's record high lake levels.
  - The inclusion of a Flood Protection Landform Barrier:
    - Coordination with Landmark Engineering to incorporate the proposed landform barrier into the long-term solution strategy for the Riverside area.
    - Incorporating the landform barrier into the Master Plan to satisfy the Schedule B+ requirements of the Municipal Class Environmental Assessment.
  - **Status Update: On-going.**

- The City has requested that the existing weir elevations in the combined sewer overflow outlets be evaluated to protect against extreme high water level conditions:
  - The existing condition sewer model is being utilized to develop a strategy to address high water levels. This assessment is time sensitive due to the risks associated with the current high water levels.
  - **Status Update: Completed November 2019.**

- Water Course – Outlet Assessments:
  - Essex Region Conservation Authority (ERCA) has requested that additional impact assessments be completed to confirm there are no impacts to the downstream water courses.
  - High level impact assessments of the downstream watercourses will be completed for the preferred solutions.
  - **Status Update: To be completed December 2019.**

- Additional consultation with the Ministry of Environment, Conservation and Parks (MECP):
  - For this Master Plan, additional consultation with the MECP has been undertaken to confirm that the solution alternatives that are being considered are acceptable and satisfy the requirements of the MECP. Specifically, the implementation of necessary treatment plant improvements and the management of extraneous flows at the City's Lou Romano and Little River Treatment Plants.
  - **Status Update: Completed October 2019.**

- Coordination with other City Projects and Initiatives:
  - Riverside Drive Vista - Phase 2a:
    - Storm servicing solutions are in development and will need to be finalized in advance of finalizing the detailed design of this project.
    - **Status Update: On-going.**
  - Caron Avenue Combined Sewer Overflow Study:
    - Solutions developed through this Master Plan rely on the final recommendation from this study. The proposed Rapid Treatment Basin at the Lou Romano Treatment Plant is assumed to be implemented and part of the comprehensive solutions for both the central combined sewer shed areas and the South Windsor sanitary sewershed area.
    - **Status Update: Completed September 2019.**

- Pre-Consultation: Property Owner Meetings: ****NEW****
  - In advance of the scheduled Public Information Centre, the City has requested that the project team meet with property owners who are directly impacted by the proposed improvement alternatives.
  - Project team meetings presented the proposed improvements and provided background and explanation for the selection of the preferred solutions. Work including the organization, preparation and attendance to 3 - three hour sessions requiring various notifications, displays and staff to provide adequate support and explanation of the proposed works.
  - There are a number of additional sites and affected property owners who will need to be engaged.
  - **Status Update: To be completed December 2019.**

b) <u>Schedule Implications</u>

Due to the number of project considerations that will be incorporated into the Sewer Master Plan, additional time will be required to ensure that all various components are addressed adequately.

The Public Information Centre No. 2 had originally been scheduled for September 2019; however, in order to implement the above noted project components, the public sessions are now tentatively scheduled for January 14, 15, and 16 2019. Preferred long-term solutions strategies, based on the evaluation of alternatives, will be presented to the public. In order to complete the functional design and implementation strategy for these proposed solutions, we will need to complete the necessary assessments, refine the design criteria outlined above and ensure that we are assisting the City with addressing the challenges that it is currently being faced with; high water levels and flood proofing.

Based on the expanded scope of this project, the following summarizes the revised project timeline:

<u>Windsor Sewer Master Plan – Schedule of Remaining Work</u>

Winter 2020:

- Complete downstream water course assessments;

- PIC No. 2 – Present preferred solutions to public and get feedback;
- Complete functional design and cost estimates for preferred solutions;
- Develop a recommended implementation plan;
- Finalize Master Plan Report; and
- Provide opportunity for public/agency review and comment.

For more information on the Windsor Sewer Master Plan or to learn about what you can do to protect your home, visit www.weatheringthestorm.ca.

LMH:d

MEMO

TO: Anna Godo, P.Eng., Project Lead, City of Windsor
FROM: Flavio Forest, P.Eng., Project Manager, Dillon Consulting Limited
Ian Wilson, P.Eng., Water Resources Engineer, Dillon Consulting Limited
Laura Herlehy, P.Eng., Project Coordinator, Dillon Consulting Limited
DATE: February 5, 2020
SUBJECT: Sewer Master Plan - Quarterly City of Windsor Council Update
OUR FILE: 17-6638

A. PROJECT INTRODUCTION

In recent years, Windsor has experienced several significant rainfall events, including the record breaking rainfall event of August 28, and 29, 2017, which resulted in wide-spread basement and surface flooding. As a result, the City's Mayor presented an eight-point plan to address flooding risks, which included a focus on completing the next stage of the City's Sewer Master Plan.

City Council retained Dillon Consulting Limited (Dillon) as the lead consultant to complete Phase 2 of the Sewer Master Plan (CR660/2017). The Sewer Master Plan will follow Approach No. 2 of the Municipal Class Environmental Assessment (EA) Master Plan process, which provides a recognized framework for engaging the public and agencies in considering alternative solutions that would reduce the risk of flooding.

B. PROJECT OBJECTIVES

The Sewer Master Plan will identify both short-term and long-term alternative solutions that would reduce the risks and impacts of basement and surface flooding in the City of Windsor, while also considering the impacts of climate change, low impact development (LID) best management practices, and water quality. A comprehensive public and agency engagement program forms an important element of this project, both to inform the public and also to obtain valuable input to the evaluation and selection of the preferred solutions. The final report will serve to document the planning and design process that was undertaken, including a recommended implementation strategy.

C. TASKS COMPLETED SINCE THE START OF THIS PROJECT

a) Environmental Assessment and Public/Agency Consultation

Work Completed Prior to the Last Council Update (December 2, 2019):

- Completed an outline of the proposed public engagement strategy for this project.
- Public launch of this project on March 22, 2018, in conjunction with World Water Day. Materials/activities completed as part of this launch:
    - Notice of Commencement;

  - Public and agency contact list;
  - Interactive project website to provide flexible and convenient public access to updated information and to provide comments related to this project; and
  - Established a Stakeholder Advisory Committee, including a terms of reference, promotional material, and a proposed membership list based on responses. The committee was established as a non-political advisory group comprising of various volunteer members of the public and community/business groups. Meetings with the SAC group were held on May 2, 2018, August 14, 2018 and January 24, 2019.
- Pop-up event held at Malden Park Earth Day (April 22, 2018), promoting the Sewer Master Plan, including education materials about flooding and private property protection measures.
- The Partners 4 Action flood survey was made available, with responses from over 400 participants collected, providing insights on their understanding of flooding, concerns with future flooding, and level of participation in the City's flood protection subsidy program.
- The project's first round of Public Information Centre (PIC) meetings were held on June 12, 13, and 14, 2018, which focused on:
  - Learning about the causes of basement and surface flooding;
  - Factors being considered in assessing and mitigating the risk of flooding;
  - Short-term solutions for homeowners and for public infrastructure; and
  - An overview of the next steps to address longer-term alternative solutions.
- Continued to update the project website, weatheringthestorm.ca, including materials from the PIC meetings, the short-term solution comment form, and additional education materials.
- Published the project's first newsletter informing residents about the project, the causes of flooding and the alternative short-term flooding solutions being considered.
- Held a pop-up event promoting the Sewer Master Plan during the Open Streets Windsor event (September 23, 2018), including education about flooding and private property protection measures. Over 140 individuals visited the booth, with 28 signing up for the project newsletter.
- Provided input related to the development of a Downspout Disconnection Pamphlet being developed by the City of Windsor.
- A fourth Stakeholder Advisory Committee meeting was held on May 8, 2019, which focused on the strategy for long-term alternative solutions, including the integration of private property source control measures, such as mandatory foundation drain disconnection. Committee members also provided feedback on the strategy for improving public engagement and cooperation in the implementation of short-term solutions.
- Three pop-up events promoting the Sewer Master Plan were held. The project team spoke with more than 350 people over the course of the following three events:
  - Windsor Home and Garden Show (April 12-14, 2019);
  - City of Windsor's Earth Day (April 28, 2019); and
  - Little River Pollution Control Plant Open House (June 1, 2019).
- The project website (weatheringthestorm.ca) was updated to include:
  - Information regarding the short-term solutions being recommended as part of this study;
  - Types of long-term alternative solutions that are being considered; and
  - Integration of the City's Stormwater Financing Study.
- The second newsletter for this project was published and provided to the public at the various pop-up events and through the project website.

- Finalized factors and criteria for evaluation of the long-term alternative solutions.
- Met with the City Engineering and Communications staff to develop a Communication and Engagement Plan for the next round of engagement to be completed as part of this project that will take place over the Summer and Fall of 2019.
- A fifth Stakeholder Advisory Committee meeting was held on July 3, 2019, to present and obtain feedback on the preliminary long-term alternative solutions, including the draft evaluation criteria that will be used in confirming the recommended solutions.
- The project team met with the MECP on September 16, 2019, to further discuss solution alternatives developed to improve the sanitary sewer system and mitigate risk of basement flooding. The project team has requested the MECP provide feedback regarding the potential implementation of a RTB (Rapid Treatment Basin) Unit at the Little River Pollution Control Plant (LRPCP) to provide treatment of excess flows at the treatment plant that arise during wet weather conditions. This is similar strategy to what is planned for the Lou Romano Treatment Plant as part of the Caron Avenue CSO Control Study:
  - The MECP informed the team that, due to the nature of the fully separated sewage system upstream of the LRPCP, that this type of treatment unit would not be acceptable. See Section D. Upcoming Tasks for more details regarding next steps.
- A sixth Stakeholder Advisory Committee meeting was held in September 2019, the remaining long-term alternative solutions proposed were presented to the committee. The project team obtained feedback from the group on the level of importance on various evaluation criteria which will aid in the assessment of preferred alternatives.
- A pop-up event promoting the Sewer Master Plan was held during the Open Streets Windsor event (September 22, 2019), including education about flooding and private property protection measures. Over 80 individuals visited the booth, with 15 signing up for the project newsletter.
- Three informative videos were developed to provide the public information on the key messages related to this project. These videos were released through the City's social media outlets and on the project website:
  - The three main messages that were conveyed through each video are as follows:
    - Flooding cannot be eliminated completely, but we can work to reduce the risk of damage to homes and businesses;
    - Solutions rely on a partnering approach; and
    - Considerable time and investment is needed to complete the proposed sewers' improvements.
- Completed environmental assessments and determine the preliminary preferred solutions for the landform barrier alternatives and proposed pump stations alternatives at St. Rose Avenue and Ford Boulevard.
- Updated the project website to include the materials from the Fall 2019 property owner meetings including the inclusion of the coastal flood protection aspect of this project.
- Met with property owners within the immediate vicinity to the proposed coastal flood protection landform barrier along Riverside Drive on October 30, 2019.
- Met with property owners within the immediate vicinity of the potential storm pump stations located at the St. Rose Avenue and Riverside Drive intersection and the Ford Boulevard and Riverside Drive intersection, on November 5 and 6, 2019, respectively.
- The project team attended the Ward 6 Council Meeting to provide residents additional opportunity to provide comments or ask questions related to the proposed storm pump stations and landform barrier located in the Riverside area.

- Engaged Fisher Archaeological to complete Stage 1 archaeological assessments of all proposed Schedule B and C projects outside of the City's road right-of-way.

Work Completed Since the Last Council Update (December 2, 2019):

- Completed the remaining environmental assessment evaluations for the proposed surface and basement flooding solutions.
- Met with City's Parks and Property Departments to review impacts to municipal parks and private properties.
- Provided letter notifications to property owners directly impacted by the preliminary preferred solutions. The letter requested that property owners contact the project team to schedule a pre-consultation meeting to review the findings prior to PIC No. 2.
- Meetings were held with individual property owners where easements or property acquisitions are required to accommodate the preferred solutions. The project team met with the following:
  - Fiat/Chrysler Windsor Assembly Plant; and
  - Ford Motor Company – Windsor Engine Plant.
- Archaeological and natural environment field assessments were completed for all proposed Schedule B projects.
- Worked with the City's media team to develop a social media video that provides an update on the Master Plan and to raise awareness for the upcoming PIC meetings.
- Scheduled and developed materials for the upcoming Public Information Centre. PIC No. 2 is scheduled for February 11, 12 and 13.
- Provide direct notification of PIC No. 2 to those on the project contact list, the Stakeholder Advisory Committee, property owners that are directly affected, and those we have spoken to during previous pre-consultation meetings.

b) Short-Term Alternative Solutions

Work Completed Prior to the Last Council Update (December 2, 2019):

- Developed a range of short-term alternative solutions to reduce the risk of flooding (in addition to the City's existing programs) for public and agency input. The short-term alternative solutions include both public property and homeowner measures, which were presented for public input through the project website and PIC meetings.
- Completed a review of other Municipalities' measures, subsidies, and programs related to implementing short-term flooding solutions. The review included five Cities in Ontario and four Cities in other Provinces.
- Developed draft recommendations to implement short-term solutions. Gathered preliminary feedback from City staff and Stakeholder Advisory Committee members.
- The draft recommendations to integrate additional short-term solutions were categorized under municipal policies, subsidy programs and collaborative improvements. This information was presented in detail to City Council as part of the last quarterly update.

- The draft recommendations to integrate additional short-term flooding solutions are subdivided into three categories: municipal policies, subsidy programs and collaborative improvements, as follows:
  - **Municipal Policies:**
    - Mandate the installation of sewage ejector pumps for basement plumbing in new residential developments, with exceptions subject to City approval.
    - Mandatory downspout disconnection development policy, with exceptions subject to City approval.
    - Implement a program to promote the use of low impact development (green infrastructure) storm drainage solutions on private property, including:
      - Support the City's consideration for implementing a stormwater surcharge policy, including incentives (credits) for installation of low impact development infrastructure (including residential, commercial, industrial, and institutional properties); and
      - Comprehensive educational material explaining the details of the stormwater surcharge and credit.
    - Seal sanitary manholes covers using rain catcher devices to reduce inflow to the sanitary system.
    - Install inlet control devices (ICDs) in select areas where catchbasins may be allowing more runoff into the storm sewer system than there is capacity to convey.
    - Consider opportunities to tailor the City's maintenance programs based on the degree of flood vulnerability and critical infrastructure. Identified areas of concern from the Sewer Master Plan will support the City's existing programs.
    - Update the City's stormwater management design standards to incorporate the latest practices, including climate change considerations.
  - **Subsidy Programs:**
    - Basement Flooding Protection (BFP) Subsidy:
      - Recommended enhancements to the City's existing BFP subsidy including the following:
        - Add sewage ejector pumps;
        - Add window well protection;
        - Add back-up power supply for sump pumps; and
        - Add a home drainage and plumbing advisory service. This service would include an expert, going at a resident's request to their home and reviewing grading and plumbing (with camera inspection), ultimately providing recommendations to reduce flooding risks.
      - The current subsidy's maximum rebate is $2,800.00 per home/unit; this recommendation would require an increase to include the enhancements and will be confirmed at a later time.
    - Downspout Disconnection Program:
      - Mandate the disconnection of downspouts within the City and continue the existing free downspout disconnection service to residents.
    - Private Sewer Replacement Program and Eeling Program:
      - No further recommendations.

- **Collaborative Improvements:**
  - § It is recommended that the City provide support for residents to install green infrastructure and low impact development (LID) measures with public education, as well as in-kind and planning support from the City, including:
    - A comprehensive education package to the public regarding the use, benefit, installation and maintenance of private property LIDs;
    - Provide details for the installation of LID measures, including rain gardens; and
    - Implement LID pilot project(s) on a voluntary basis for private properties and/or on public lands, particularly as part of public infrastructure improvement projects, including technical and/or financial support by the City to raise awareness/acceptance and to demonstrate the water quality and quantity benefits.
  - § Provide advisory support for residents to improve lot grading, including public education.
  - § Providing a comprehensive education package to the public for other household management strategies including:
    - Understanding your plumbing and maintenance requirements for your sump pump, sewage ejector pump and backwater valve;
    - Ensuring proper lot grading;
    - Inspec. ng basement walls and floors for cracks that may lead to infiltration;
    - Avoid storing valuable items on the ground;
    - Using water resistant finishes in basements (tile floors, etc.);
    - Properly disposing fats, oils and grease and understanding what not to flush down the drain;
    - Minimizing water usage during major storm;
    - Promoting that residents become familiar with their insurance coverage and options, including advising insurers of any private measures that may have been implemented to reduce the risk of flooding; and
    - Ensuring water from disconnected downspouts drain away from your foundations.
  - § Implementing an “adopt a catchbasin” program – where residents “adopt a catchbasin” in the City to protect private and public property from flooding**.** This resident stewardship program would help ensure public property flow routes (curb and gutters) are clear of debris and vegetation.
- Completed draft recommendations for the implementation of short-term solutions based on feedback from City staff.
- Using the City-wide sewer and overland drainage model, quantified the potential benefit of sanitary sewer maintenance hole lid sealing in prioritization areas recommended for immediate action to reduce extraneous flow.
- Refined the short-term solutions based on discussions with the Stakeholder Advisory Committee and the City of Windsor, as well as the findings from the sewer model.
- Refined the sewer model to reflect the implementation of recommended short-term solutions that contribute to a reduction in the amount of inflow and infiltration resulting from the

recommended implementation of manhole rain catchers, mandatory foundation drain disconnection, and mandatory downspout disconnection.

c) Sewer System Modelling

Work Completed Prior to the Last Council Update (December 2, 2019):

- Start-up meeting with the City and ERCA to review project scope, schedule and deliverables.
- Problem identification of flood vulnerability based on basement flooding records, topographic conditions and observed surface flooding.
- Drafted a background review report summarizing the results of previous studies.
- Planning and selection of flow monitoring locations for the 2018 program.
- Held coordination meetings related to the Campbell/University storm drainage study and the combined sewer overflow Environmental Assessment study for the area west of Caron Avenue.
- Installation of 30 flow monitors in the City's sewer system and open drains to record hydraulic conditions between April and October. This flow monitoring program will focus on developing an understanding of the interaction between the sanitary and storm sewer systems.
- Installation of two temporary rain gauges to supplement the City's existing rain gauge network. Developed a GIS database outlining the findings of previous sewer, flooding and drainage studies, including the scope and status of recommended improvements.
- Completed expansion of the Phase 1 sewer model by adding smaller diameter sewers (storm, sanitary and combined systems) in areas having higher basement flooding.
- Developed a two-dimensional overland flooding model mesh connected to the one-dimensional sewer model. This two-dimensional model mesh will be used to represent surface flooding conditions within the City.
- Preliminary evaluation of the existing storm drainage system using the expanded model to identify potential problem areas in the sewer and overland drainage systems based on the 1:5 year and 1:100 year design storm events.
- Continued refining our understanding of the interaction between the City's storm and sanitary sewers, including meetings with City staff.
- Reviewed preliminary model results of surface flooding with City staff for verification and model refinement.
- Finalized the 2018 flow monitoring program, including removal of all temporary flow monitors and rain gauges.
- Incorporated new City data from Infrastructure Management Services (IMS) to help delineate and define local sources of inflow and infiltration (I&I) to the sanitary sewer system. Information was based upon the recently completed City-wide smoke tests and partial completed zoom camera inspection programs, as follows:
    - The smoke testing program was completed. This information was used to help identify locations with potential stormwater connections to the sanitary sewer system; and
    - The zoom camera inspection programs are still being completed. Data from these programs are being used by City staff to confirm and improve sewer asset records, including diameter, size, and material. At the time of model development, only 30% of the total data from the City-wide inspection was incorporated in the asset records. It is anticipated the City will receive two more updates from the zoom camera programs one by February 2019 and another by May 2019. Once these records have been

uploaded, a check on the model will be completed; however, this will not be received until the project is reviewing long-term solution alternatives.

- Finalized re-calibration of the expanded and updated sewer and overland drainage model. Model calibrated and validation used the following flow and precipitation records:
  - The 2018 flow monitoring and rain gauge program;
  - The City's sanitary sewer data from the August 28, 2017, storm event;
  - The 2017 Pontiac/St. Paul flow monitoring program;
  - The flow records from the 2013 and 2014 monitoring program; and
  - The City's rain gauge data 2013 to current.
- Development of the draft report documenting the study approach, methodology and findings related to the sewer model expansion, calibration process, and definition of baseline conditions.
- Started our review of long-term solution alternatives, including understanding the relative benefits of improvements to sewer and pump station outlets, trunk sewers, and surcharge storage for the storm and sanitary sewer systems. Our review also considered the benefits of source controls, particularly reducing the number of foundation drains connected to the sanitary sewer system.
- Coordination with on-going studies including the Caron Avenue CSO Control Study, the Riverside Landform Barrier Study, Riverside Vista Phase 2A Design, Campbell/University Sewer Study, and the Stormwater Financing Study. Highlights include coordination with the recommended solutions being defined in the Caron Avenue CSO Control project.
- Established and accounted for the benefit of private property source control measures as a common aspect of the long-term alternative solutions.
- Developed level of service criteria to meet the City's objectives of reducing the risk of basement and surface flooding.
- Identified problem areas for basement and surface flooding based on the level of service criteria.
- Incorporated provisions for the development of future Secondary Plan Areas identified in the City's Official Plan, including coordination with the City's Planning Department to confirm development proposals and areas of expected intensification within the City.
- Updated the high water level boundary conditions in the Detroit River to reflect recent conditions based on consultation with the City and ERCA.
- Completed an additional hydraulic assessment of the existing RTB to determine what potential weir protection elevations would need to be implemented to protect the structure from various high river level scenarios.
- Completed further evaluation of the downtown combined sewer system and refined the proposed soft separation strategy. This included the development of a more refined storm sewer system servicing plan that requires the construction of additional storm trunk sewers to capture the separated storm flows.

<u>Work Completed Since the Last Council Update (December 2, 2019):</u>

- Completed the sewer separation strategy for the combined system which includes new storm trunk sewers and outlets to the Detroit River.
- Utilized the sewer model to complete more detailed analysis of areas identified by the City's Operations Department, including the Lambton Subdivision, the sanitary trunk sewer at

Northway and Cabana, and a new alternative solution based on expanding the existing Central Avenue stormwater pond.

- Refined for the proposed storm pump station solutions in the East Windsor area.
- Refined basement flooding solutions for the Little River Pollution Control Plant service area based on feedback from the Ministry of the Environment, Conservation and Parks (MECP), considerations for future development, and discussions with the City's Pollution Control group.

d) Long Term Solutions

Work Completed Prior to the Last Council Update (August 26, 2019):

- Developed long-term alternative solutions for the sanitary systems in the South Windsor and East Windsor separated sewer sheds.
- Determined the benefit of completing the City's established plans to separate sewers within the Central Downtown sewer shed areas.
- Developed recommendations to reduce rainfall derived inflow and infiltration (RDII) to the sanitary sewer system. This will include both public property measures (through sewer repair or replacement, and sealing manhole covers) and private property measures (through mandatory foundation drain disconnection programs).
- The project team met with the Ministry of the Environment, Conservation and Parks (MECP) on June 6, 2019, to provide an overview of the project, review the City's strategy to reduce basement and surface flooding and obtained feedback on fundamental solution strategies.
- The project team met with ERCA on June 27, 2019, and July 15, 2019, to discuss the surface ponding solution strategies proposed as part of this study. The team received feedback regarding constraints and boundary conditions associated with the major receiving watercourses (Detroit River, Little River, Grand Marais Drain, Lennon/Cahill Drain), level of service criteria, and roadway flooding standards for access and ingress/egress.
- Assessed the observed and modelled roadway surface flooding conditions on arterial and collector roadways within the City and scheduled a meeting with Emergency Services representatives to review the approach and methodology for addressing their access requirements during extreme storm events.
- Provided assistance to the City for the application of funding through the second round of Disaster Mitigation and Adaptation Funding (DMAF). The application included technical information and high level costs estimates of the St. Rose Avenue Pump Station, Ford Boulevard Pump Station, Riverside Drive Storm Sewer Extension, St. Rose Storm Sewer Extension and Landform Barrier within the Riverside Vista Phase 2A project limits.
- Met with Little River Pollution Control Plant (LRPCP) staff and completed a plant tour to determine if additional improvements could be made within the treatment plant to eliminate internal bottle necks within the plant and to improve the rate of treatment or reduction of wet weather overflow events.
- An additional sanitary system alternative has been developed to mitigate the need for improvements at the LRPCP in response to the feedback obtained by the MECP.
- Complete concept plans for the proposed pump stations at St. Rose and Ford Boulevard Pump Stations preliminary preferred solutions.
- Developed 3D rendering simulations to provide better understanding on the footprint and height of the potential pump stations.

Work Completed Since the Last Council Update (December 2, 2019):

- Refined sanitary sewer system alternatives based on alternative strategies for managing excess wet weather flows at the Little River Pollution Control Plant.
- Confirmed the need to expand the Little River Pollution Control Plant in the future to accommodate build-out of the Sandwich South Secondary Plan Area and the Town of Tecumseh.
- Met with the project Technical Steering Committee and the City Engineer on January 20, 2020, to review the preliminary preferred solutions.
- To date, a total of 25 Schedule B Projects have been established to address identified flooding risks.
- Golder Associates Limited has been retained to complete a desktop geotechnical assessment of all Schedule B projects.

e) Coastal Flood Protection **NEW**

Work Completed Prior to the Last Council Update (December 2, 2019):

- As requested, the coastal flood protection measures identified through the City's East Riverside Flood Protection Risk Assessment (ERFPRA) project completed by Landmark Engineers Inc. (Landmark) will be integrated in the Windsor Sewer Master Plan. The following work has been completed in relation to this initiative:
  - The project team met with the City, ERCA and Landmark on August 27, 2019, to discuss the integration of the flood protection measures into the Sewer Master Plan. The team identified two potential elevations that could be achieved based on the constraints related to existing site conditions and development.
  - Liaised with Landmark to incorporate recommendations highlighted from the ERFPRA report into the Master Plan functional design.
  - To satisfy the Schedule B requirements, various location and elevation scenarios were identified which have become part of the environmental assessment portion of the Master Plan.
  - Completed topographical survey to confirm elevations obtained from the City's Lidar mapping.
  - Completed functional designs for the various alternatives to determine the relative impact of each scenario.

Work Completed Since the Last Council Update (December 2, 2019):

- Refined the functional design for the preliminary preferred solutions to better understand the impacts to properties, extent of property acquisition and local drainage requirements.
- Completed archaeological Stage 1 for the extent of the proposed berm improvements.
- Meetings with property owner groups to review the proposed coastal flood protection measures, obtain public feedback, and update the solutions.

D. UPCOMING TASKS

a) Environmental Assessment and Public/Agency Consultation

- Follow up with MECP regarding their recent feedback and provide the MECP an outline of how the team will proceed to develop solutions that are implementable.
- Follow up with property owners to address concerns with proposed pump stations and flood protection measures at the upcoming PIC No. 2.
- Additional meetings with property owners who may be directly impacted by preliminary preferred solutions. Upcoming meetings include the Greater Windsor Essex School Board, property owners with 8057 and 8085 Riverside Drive East, where future property acquisition may be required to accommodate earth berm flood protection measures.
- Hold the second Public Information Centre (PIC) sessions to present long-term alternative and recommended solutions to reduce the risk of basement and surface flooding. These sessions are scheduled for mid-January 2020.
- Meet with ERCA's Source Water Protection group to discuss proposed solutions.
- The next Stakeholder Advisory Committee meeting is scheduled for late Winter 2020, will focus on the results of the Public Information Centres and discuss how to incorporate feedback into the final Master Plan recommendations.
- Reporting and documenting the public/agency consultation and Environmental Assessment work completed in accordance with the Master Plan process.
- Finalize the Sewer Master Plan, including the refinement of Schedule B projects.

b) Short-Term Alternative Solutions

- Develop recommendations for locations in which storm sewer catchbasin inlet control devices (ICDs) should be installed.
- Develop recommended prioritization areas for mandatory foundation drain disconnections.

c) Sewer System Modelling and Long-Term Alternative Solutions

- Complete functional design of proposed improvements and Schedule B projects.
- Develop high level cost estimates.
- Develop an implementation plan.

d) Coastal Flood Protection

- Develop a strategy to provide local drainage and backflow prevention around the proposed berm.
- Develop high level cost estimates for proposed works.

E. PROJECT CHALLENGES AND SCHEDULE IMPACTS

a) Project Challenges

The Sewer Master Plan objectives requires coordination with a number of different agencies and confirmation that the solutions developed through this study will provide both short-term and long-term benefits to the City's system. There are a number of challenges and added complexities that have been identified as the final long-term solutions strategies are being developed. The following summarizes the number of considerations that need to be incorporated into the complete Master Plan Study:

- Considerations for High Lake Levels:
    - Strategies developed through this study are being revised to account for future high lake levels. Ultimate conditions are based on the high water elevations established in the recently completed East Riverside Flood Risk Assessment study as well as estimated projections based on today's record high lake levels.
    - The inclusion of a Flood Protection Landform Barrier:
        - Coordination with Landmark Engineering to incorporate the proposed landform barrier into the long-term solution strategy for the Riverside area.
        - Incorporating the landform barrier into the Master Plan to satisfy the Schedule B+ requirements of the Municipal Class Environmental Assessment.
    - **Status Update: On-going.**

- The City has requested that the existing weir elevations in the combined sewer overflow outlets be evaluated to protect against extreme high water level conditions:
    - The existing condition sewer model is being utilized to develop a strategy to address high water levels. This assessment is time sensitive due to the risks associated with the current high water levels.
    - **Status Update: Completed November 2019.**

- Water Course – Outlet Assessments:
    - Essex Region Conservation Authority (ERCA) has requested that additional impact assessments be completed to confirm there are no impacts to the downstream water courses.
    - A high level hydrologic impact assessment of the receiving watercourses will be completed for the preferred solutions. The Little River watercourse will not be assessed through this study. Necessary assessments will be completed as part of the Little River Flood Plain Mapping project.
    - **Status Update: To be completed March 2019.**

- Additional consultation with the Ministry of the Environment, Conservation and Parks (MECP):
    - For this Master Plan, additional consultation with the MECP has been undertaken to confirm that the solution alternatives that are being considered are acceptable and satisfy the requirements of the MECP. Specifically, the implementation of necessary treatment plant improvements and the management of extraneous flows at the City's Lou Romano and Little River Treatment Plants.
    - **Status Update: Completed October 2019.**

- Coordination with other City Projects and Initiatives:
    - Riverside Drive Vista - Phase 2A:
        - Storm servicing solutions are in development and will need to be finalized in advance of finalizing the detailed design of this project.
        - **Status Update: On-going.**

- o Caron Avenue Combined Sewer Overflow Study:
  - § Solutions developed through this Master Plan rely on the final recommendation from this study. The proposed Rapid Treatment Basin at the Lou Romano Water Treatment Plant is assumed to be implemented and part of the comprehensive solutions for both the central combined sewer shed areas and the South Windsor sanitary sewer shed area.
  - § **Status Update: Completed September 2019.**

- Pre-Consultation: Property Owner Meetings: ****NEW****
  - o In advance of the scheduled Public Information Centre, the City has requested that the project team meet with property owners who are directly impacted by the proposed improvement alternatives.
  - o Project team meetings presented the proposed improvements and provided background and explanation for the selection of the preferred solutions. Work including the organization, preparation and attendance to 3 - three hour sessions requiring various notifications, displays and staff to provide adequate support and explanation of the proposed works.
  - o There are a number of additional sites and affected property owners who will need to be engaged.
  - o **Status Update: To be completed February 2020.**

b) <u>Schedule</u>

Based on the expanded scope of this project, the following summarizes the revised project timeline:

<u>Windsor Sewer Master Plan – Schedule of Remaining Work</u>

Winter 2020:

- Complete downstream water course assessments;
- PIC No. 2 – Present preferred solutions to public and get feedback; and
- Complete functional design and cost estimates for preferred solutions

Spring 2020

- Provide final Council presentation summarizing findings and outlining the recommended long-term solution strategy;
- Develop a recommended implementation plan;
- Finalize Master Plan Report; and
- Provide opportunity for public/agency review and comment.

For more information on the Windsor Sewer Master Plan or to learn about what you can do to protect your home, visit www.weatheringthestorm.ca.

LMH:d

Council Report: C 127/2020

Subject: Sewer Master Plan – Final Recommendations Solution Summary – City Wide

Reference:

Date to Council: July 27, 2020
Author: Anna Godo
Engineer III
(519) 255-6257 ext. 6508
agodo@citywindsor.ca
Design and Development
Report Date: July 9, 2020
Clerk's File #: SW/12983

To: Mayor and Members of City Council

Recommendation:

1. THAT Council **ENDORSE** the 'Final Council Recommendation Summary of the Sewer and Coastal Flood Protection Master Plan' prepared by Dillon Consulting Limited dated July 20, 2020 included within Appendices 1 through 4; and,

2. THAT Administration **BE DIRECTED** to develop an implementation strategy for the Final Council Recommendations Summary of the Sewer and Coastal Flood Protection Master Plan to be considered as part of the 2021 Capital Budget process; and,

3. THAT Council **APPROVE** $1,500,000 to proceed with immediate short term projects/programs to be charged to Sewer Master Plan Implementation Project, Project ID#7199004 which will include the following:
   i. Mandatory downspout disconnection pilot program and monitoring
   ii. Contract to seal maintenance hole covers in low lying areas
   iii. Develop an educational program to outline measures that can be implemented on private property to reduce the risk of flooding

4. THAT City Council **APPROVE** the funding, as outlined below, from the Sewer Master Plan Implementation Project (ENG-002-19), in order to proceed with the engineering and land acquisition for the Lauzon Parkway Sewer and Road Rehabilitation Project as well as identified City matching funding to apply for any grants which may become available for this project:
   a. **PRECOMMIT** for immediate use $3,440,000 in 2021 for engineering and land acquisition, and

b. Establish the following funding as **PLACEHOLDER** totalling $15,860,000 in funding to be leveraged as the City's matching portion of a grant, should any grant opportunities become available for this project:
    i. $530,000 in 2021
    ii. $3,970,000 in 2022 and 2023 and;
    iii. $6,500,000 from 2024 and;
    iv. $890,000 from 2025

5. THAT City Council **APPROVE** the following recommendations in the event a grant for this project becomes available, and the placeholder funding identified above has not be redirected by a subsequent report to City Council,:
    a. THAT the Chief Administrative Officer, under Delegation of Authority 3.25, approve the grant submission for the project and;
    b. THAT the City's matching funding for the grant be deemed to be the placeholder funding identified above and;
    c. THAT Administration provide a report to City Council as soon as possible post grant submission to advise of the submission and obtain approval on additional recommendations required should the City's grant submission be successful, and

6. THAT the Chief Administrative Officer and City Clerk **BE AUTHORIZED** to sign any agreements necessary to achieve the above purposes, subject to the contract being within the approved budget, satisfactory in legal form to the City Solicitor, in financial content to the Chief Financial Officer and City Treasurer, and in technical content to the City Engineer.

Executive Summary: N/A

Background:

Windsor has experienced a number of significant rainfall events in the last decade including:

- **June 4, 5 and 6, 2010**. The following amounts of rainfall were recorded;

Date	Windsor Airport	Riverside Drive @ Jefferson
June 4	14.2 mm	26.2 mm
June 5	45.4 mm	89.6 mm
June 6	11.2 mm	3.4 mm

  The City received approximately 2,200 reporting basement flooding.

- **November 29 and 30, 2011** - 75 mm of rain and approximately 360 calls reporting basement flooding were received.
- **August 11, 2014**; The amount of rain received varied throughout the City with areas on the east side of the City receiving up to 55 mm, central Windsor receiving up to 77 cm of rain and the west side of the City being hardest hit with areas receiving just above 92 mm of rain. Approximately 595 calls reporting basement flooding were received.

- **September 29, 2016**; The rain gauge at the Windsor Airport measured 78 millimetres of rain in 24 hours; the rain gauge in the east end of the City measured 106mm. Approximately 2,800 calls reporting basement flooding were received.
- **August 29, 2017** - more than 200 millimetres of rain in parts of Windsor-Essex and caused more than $175 million in insured damages in Windsor alone. More than 6,000 calls reporting basement flooding were received. This was the largest single flood event in our City's recorded history.

As a result of the 2016 and 2017 floods in Windsor, Insurers paid claims totalling approximately **$300 million.**

In response to the record 2017 flood event, City Council approved the following 8-Point Plan to address flooding in Windsor.

1. The City of Windsor will undertake an immediate review of development policies in conjunction with the Town of Tecumseh as it relates to sewer management to ensure the system can handle increased development.
2. The City will fund 100% of the cost of installing a backflow valve and sump pump through the Basement Flooding Protection Subsidy. First priority will be to residents who have experienced basement flooding.
3. The City of Windsor is investigating adding the disconnection of weeping tiles from the sanitary to the storm sewer to the Basement Flooding Protection Subsidy program.
4. The City of Windsor is also investigating the addition of sewage ejection pumps to the Basement Flooding Protection Subsidy program as well as the possibility for inclusion for future development projects.
5. The City of Windsor will implement a mandatory downspout disconnection policy with exemptions on a case-by-case basis.
6. The City of Windsor will expedite completion of the Riverside Vista project between St. Rose and Ford Blvd at an additional cost of approximately $7 million outside of what's currently included in the 5-year capital budget.
7. The City of Windsor will expedite completion of the Sewer Master Plan. City Council will be asked to sole-source phase II to Dillon Consulting who is currently undertaking the phase I report.
8. The City of Windsor strongly urges the Government of Ontario to establish a provincial insurance plan that will allow affected residents to purchase affordable flood insurance where no option is available. The City also urges the Government of Ontario to make immediate changes to the Disaster Recovery Assistance program that currently excludes coverage for homeowners who experience sewer backup.

As a result of Point #7 of the 8-Point Plan above, on November 6, 2017, Council provided approval to retain Dillon Consulting Limited to develop the Sewer Master Plan (CR660/2017).

The objectives of the Sewer Master Plan were to:

1. Understand the causes of basement, surface and coastal flooding
2. Identify vulnerable areas
3. Identify and evaluate short-term and long-term solutions to reduce the impacts and risks of flooding
4. Identify improvements to City infrastructure
5. Identify actions that homeowners can take to reduce their risk of flooding
6. Develop preliminary designs and cost estimates for the recommended infrastructure improvements
7. Develop recommendations for an implementation strategy

Updates on the progress of the project were reported to Council on a quarterly basis.

In addition, public consultation was undertaken through Public Information Centre (PIC) Meetings that were held in June of 2018 and February of 2020 and at eight meetings of the Stakeholder Advisory Committee.

Levels of service were established and used as a benchmark to determine where problem areas exist and where improvements are needed in order to reduce the risk of flooding.

Alternate solutions were evaluated following the Municipal Class Environmental Assessment process, comparing each solution based on natural, social, cultural and economic environment considerations.

Discussion:

The Sewer and Coastal Flood Protection Master Plan has identified both short-term and long-term alternative solutions that will reduce the risk of basement and surface flooding in the City of Windsor, while also considering the ongoing impacts of climate change, low impact development (LID) best management practices, and water quality.

The recommended solutions focus on improvement in the following areas:

1. **Increase downstream outlet capacity**
    - o Treatment Capacity Improvements
    - o Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant
    - o New or upgraded pumping stations – 12 sites
2. **Source control, with both private property and public infrastructure improvements**
    - o Mandatory Foundation Drain Disconnection
    - o Downspout Disconnection
    - o Low Impact Development (LID) Measures
    - o Sealing Sanitary Sewer Systems (1500 units)
3. **Improve sewer system, for conveyance and storage**
    - o Increase sewer sizes
        - ▪ Sanitary Sewer System improvements – 48 km

        - Storm Sewer System improvements – 61 km
    - o Combined sewer separation
    - o Surface/underground storage
        - New or modified stormwater underground or surface storage – 8 sites

4. **Coastal flood protection**
    - o Earth berm to protect low lying areas from high river water levels (6kms)

In order to develop an implementation plan, recommended solutions were assigned a priority level based on the following criteria:

1. Construction staging
2. Condition of existing sewers
3. Flood reduction effectiveness
4. Emergency access
5. Focus on major roadways
6. Cost efficiency
7. Reduction of combined sewer overflows (CSOs)
8. Access to vulnerable areas

The recommended solutions have been prioritized in four categories:

1) Immediate – existing and upcoming (0 to 8 years) programs and construction
2) High
3) Medium
4) Low

The detailed evaluation noted above is provided in the attached '**Final Council Recommendations Summary"** included within the series of **Appendices 1 through 4.**

The total estimated cost of the recommended solutions identified in the Sewer and Coastal Flood Protection Master Plan is **$4.9 billion**. While the cost and scope of the identified works may seem overwhelming and unattainable, it is important to recognize that these recommended solutions are not intended to be completed overnight but rather to be undertaken over many years. The recommendations provide a roadmap to follow over the next 50 years or more.

For perspective, the City of Windsor's Capital program typically exceeds $100 million annually. Over the next 10 years, there is approximately $100 million of available or unallocated funding which could be allocated to works recommended by the Sewer and Coastal Flood Protection Master Plan. Additionally, the Stormwater Financing Study, currently underway, may also result in providing an additional funding source.

Further, the City was awarded grant funding through the first Disaster Mitigation and Adaptation Fund (DMAF) to complete $90M in projects identified in the Sewer and Coastal Flood Protection Master Plan by 2027. The City is further awaiting a decision on DMAF 3 – Targeting Success Application, which is expected to be received by end of August 2020. If approved, this will be additional grant funding of approximately $24.4M, allowing an additional $80M in projects from the Sewer and Coastal Flood Protection Master Plan to proceed and be completed by 2027. It is anticipated that continued assistance from upper levels of government through future programs such as; Disaster Mitigation and Adaptation Fund (DMAF), Investing in Canada Infrastructure Program (ICIP) Green Stream or other stimulus funding programs will continue to reduce the City's portion of the flood-related capital works. The Sewer and Coastal Flood Protection Master Plan will allow the City to quickly rank and bundle qualifying projects together and be ready to apply for any announced infrastructure programs.

It should be noted that residents and property owners play a significant role in achieving the goals of the Sewer and Coastal Flood Protection Master Plan. Integration of private property measures and public infrastructure upgrades are required to reduce the risk and impacts of flooding. The work on private property includes foundation drain disconnection and downspout disconnection. The estimated costs associated with City-wide foundation drain and enhanced private property improvement program along with the City-wide Downspout Disconnection Subsidy Program contained in the Plan total approximately **$1 billion.**

In addition, various engineering initiatives and programs that remain a priority, which are ongoing such as:

Inflow and Infiltration Reduction Program: The City of Windsor has undertaken a number of efforts to address inflow and infiltration (I/I) measures in recent years. These efforts have included downspout disconnection, catchbasin / inlet restrictor installation, fog and dye testing for cross-connections and sewer deficiencies, closed circuit camera work and data analysis. In 2019, 38 locations were identified as being in need of remedial work, which can include trenchless remediation through relining or pipe bursting, inline repair and grouting. These locations do not require the outright replacement of the existing infrastructure and are not easily identified through regular asset management procedures used to select candidate streets for reconstruction.

The creation of a dedicated and ongoing capital funding account to implement inflow and infiltration mitigation measures across the City would enable meaningful progress with respect to inflow and infiltration measures within known problem areas. Such measures are currently unfunded. A more comprehensive report regarding the Inflow and Infiltration program is expected to be supplied to City Council in the near future.

Downspout Disconnection Program: The existing program is offered to residents. Participation is on a voluntary basis and very low. A mandatory disconnection program is a high priority recommendation within the Sewer Master Plan.

Basement Flooding Subsidy Program: To assist homeowners, council approved a Basement Flooding Protection Subsidy Program (BFPSP) in 2011. To date, over 7,000 subsidy payments totalling over $15.1 million have been issued. The program remains highly successful.

Next Steps:

The next step in the Municipal Class Environmental Assessment process will be to complete the documentation. The Sewer and Coastal Flood Protection Master Plan is expected to be submitted to Council in Fall 2020 in order to file the Notice of Completion and commence the start of the 30-day public review period.

Further, Administration recommends a comprehensive implementation strategy be developed that incorporates these recommendations into City's Asset Management Plan. This strategy will include expansion of the current data modelling of roads and sidewalks to include sewers and potentially water assets as well. The system will model deterioration and project recommendations for the individual assets. We will then create a 'Corridor' model that will tie roads, sewers and water together to model recommended projects in order to maximize use of funding and reduce risks. The data-modelling project is starting in summer 2020 and is expected to significantly influence the 2022 capital budget, although some efforts may be able to inform in part the 2021 capital budget as well.

In the interim, Administration is recommending pre-approval of funding to proceed with the following projects;

1. Contract to sealing maintenance hole covers in low lying areas
2. Develop an educational program to outline measures that can be implemented on private property to reduce the risk for flooding
3. Update the Development Standards Manual
4. Mandatory downspout disconnection pilot program and monitoring
5. The engineering and land acquisition for the Lauzon Parkway Sewer and Road Rehabilitation Project, from Hawthorne to Cantelon: There is an opportunity to incorporate the design of the recommended storm sewer, sanitary sewer, Low Impact Development(LID) with a proposed roadwork project. As this area is currently in need of road repairs, there are some cost efficiencies in completing the full design of sewers to reduce risk of flooding in this area as part of the overall project.

Risk Analysis:

Climate change is causing severe weather events to happen more frequently and with greater intensity. The most recent two storms (2016 and 2017) resulted in insured losses totalling $300 million. As the short-term and long-term solutions contained in the Sewer and Coastal Flood Protection Master Plan are implemented, incremental benefits to the system will be realized thereby reducing the risk of basement, surface and coastal flooding. The recommended solutions will reduce, but not eliminate instances of flooding and therefore reduce future flood losses.

The Sewer and Coastal Flood Protection Master Plan has set a clear path for reducing the risk of flooding in the City of Windsor. Implementing the recommendations contained in the Plan will take many decades to complete. Events such as a significant storm event or perhaps the sustained absence thereof may present a distraction to sticking with the recommendations contained in the plan. In order to reduce the risk and impact of future flood events, careful consideration by future Councils should be given to implementing the short-term and long-term recommendations contained in the Plan.

As with any pre-commitment of funds, the approval reduces the future funding available for other initiatives not already approved.

Financial Matters:

In 2019 and 2020 City Council approved changes to the Sewer Surcharge funding resulting in a dedicated allocation of approximately $11M annually for the implementation of projects recommended in the Sewer and Coastal Flood Protection Master Plan. To date a portion of this funding has been identified for the City's matching portion for the DMAF Targeting Success grant submission, as well as for the Sandwich Sewer Replacement project.

This report recommends a further use of this funding in the amount of $19.3M for the Lauzon Parkway Sewer and Road Rehabilitation project. It should be noted that only $3.44M of the $19.3M is recommended to be pre-committed for immediate use allowing Administration to complete the necessary engineering and land acquisition to properly scope and cost this project. The remaining $15.86M is recommended to be placeholder funding and only leveraged for use should a grant opportunity become available for this project. Should a higher priority project develop, prior to needing the funding for the Lauzon Parkway Sewer and Road Rehabilitation project, Administration can provide a report to City Council redirecting these funds if necessary.

There also remains additional funding in the Sewer Master Plan Implementation project from 2025 through 2030 in the amount of $41M, to be considered for other projects during the 2021 10-year Capital Budget development. Additionally, funding allocated to the Basement Flooding Abatement Program, City Wide Sewer Rehabilitation and Local Improvement project funding, may in part be leveraged to implement additional programs and or projects recommended in the Sewer and Coastal Flooding Protection Master Plan as appropriate.

Recommendations on which Sewer and Coastal Flood Protection Master Plan projects to undertake and in which order will be presented annually to Council as part of the City's Capital Budget process where they will be considered amongst the City's other infrastructure, planning and growth management responsibilities. When establishing the priority of the recommendations contained in the Sewer Master Plan work, Administration will use a set of Guiding Principles taking into consideration not only the priority assigned to it as part of the Sewer Master Plan but also other factors such as harmonizing capital projects with overlapping goals. In addition, the results of pilot projects and other Sewer Master Plan recommendations already undertaken will be considered. (i.e. downspout disconnection, maintenance hole sealing, foundation drain disconnection).

It is also important to note that the operational and maintenance costs resulting from the implementation of these various recommendations, as well as the capital requirements to sustain them may result in additional operational and or capital costs. As is consistent with the City's asset management policy and procedures, Public Works, Operations and Pollution Control will continue to track the impact new assets and or practices may have on their costs. These will be reported to City Council as part of the annual operational budget and or the 2023 Asset Management Plan, as appropriate, to ensure the City is able to keep these assets in good working order to achieve the benefits associated with them.

Consultations:

Melissa Osborne – Senior Manager of Asset Planning
Victor Ferranti – Manager of Capital Budget & Reserves
Carrie McCrindle – Financial Planning
Dwayne Dawson – Operations
Rob Slater – Executive Initiatives Coordinator

Conclusion:

The Sewer and Coastal Flood Protection Master Plan will serve as a guiding document for the City of Windsor through having identified recommendations both short-term and long-term that will reduce the risk and impact of flooding in the municipality.

The 'Final Recommendations Summary' of the Sewer and Coastal Flood Protection Master Plan is provided to Council for endorsement and consideration during future capital planning.

The implementation of immediate short term projects/programs, which includes mandatory downspout disconnection pilot program and monitoring, sealing of maintenance hole covers in low lying areas and the development of an educational program, will provide both relief to the system as well as valuable information to be used to prioritize future projects. Further, there is an opportunity to incorporate recommended storm sewer, sanitary sewer, LID's and regrading as part of the Lauzon Parkway Road Rehabilitation and there would be efficiencies in completing this work under one contract.

In summary, the following outlines the significant progress that has been made on each of the 8 Points Plan.

Point #1 - Develop policies in conjunction with the Town of Tecumseh: Annual meetings are held with the Town of Tecumseh and Town of Lakeshore where sewer system issues are discussed.

Point #2 Basement Flooding Protection Subsidy: To date, 7,053 subsidy payments totalling $15,145,309 have been issued to subsidy applicants since the program's inception.

Point #3 Disconnection of Weeping Tiles: As part of the Sewer Master Plan, priority areas for initial pilot program are being identified.

Point #4 Sewage Ejector Pumps: As part of the Sewer Master Plan, a policy requiring that new developments and new construction with basements be constructed with sewage ejector pumps as a means of reducing the risk of basement flooding is being recommended.

Point #5 Downspout Disconnection: A recommendation of this report is that council authorize Administration to proceed with developing a mandatory downspout disconnection pilot program.

Point #6 Riverside Vista Project, Phase 2A: Riverside Vista Project, Phase 2A, from Ford Boulevard to St. Rose Avenue is currently in the design phase. The City has been awarded grant funding through the first Disaster Mitigation and Adaptation Fund (DMAF) for the trunk storm sewer work. The City is also awaiting a decision on DMAF 3 – Targeting Success for additional grant funding.

Point #7 Sewer Master Plan: This report provides the Final Council Recommendations Summary of the Sewer and Coastal Flood Protection Master Plan.

While fully implementing the recommendations contained in the Master Plan is expensive, the study provides a practical outline of recommendations using cost/benefit analysis that is achievable over time. As the recommended short-term and long-term solutions are implemented, incremental benefits to the system will be achieved and the risk of costly basement, surface and coastal flooding will be reduced.

Planning Act Matters:

N/A

Approvals:

Name	Title
Fahd Mikhael	Manager of Design and Development
France Isabelle-Tunks	Senior Manager of Engineering / Deputy City Engineer
Mark Winterton	City Engineer and Corporate Leader Environmental Protection and Infrastructure Services
Joe Mancina	City Treasurer/Chief Financial Officer
Onorio Colucci	Chief Administrative Officer

Notifications:

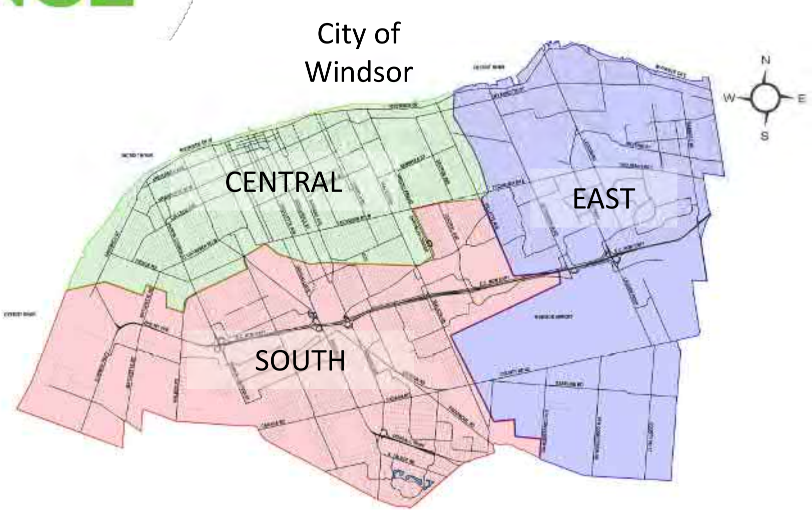
Name	Address	Email
Flavio Forest		fforest@dillon.ca

Appendices:

1. WSMP Final Council Report July 20, 2020
2. WSMP Final Council Report July 20, 2020 – Appendix A
3. WSMP Final Council Report July 20, 2020 – Appendix B – 1
4. WSMP Final Council Report July 20, 2020 – Appendix B – 2

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN



Final Recommendation Council Presentation

July 27, 2020

Presented by:

Solution Toolbox

Short-Term and Long-Term Recommendations

Increase Downstream Outlet Capacity

Source Control and Private Property Measures

Coastal Flood Protection

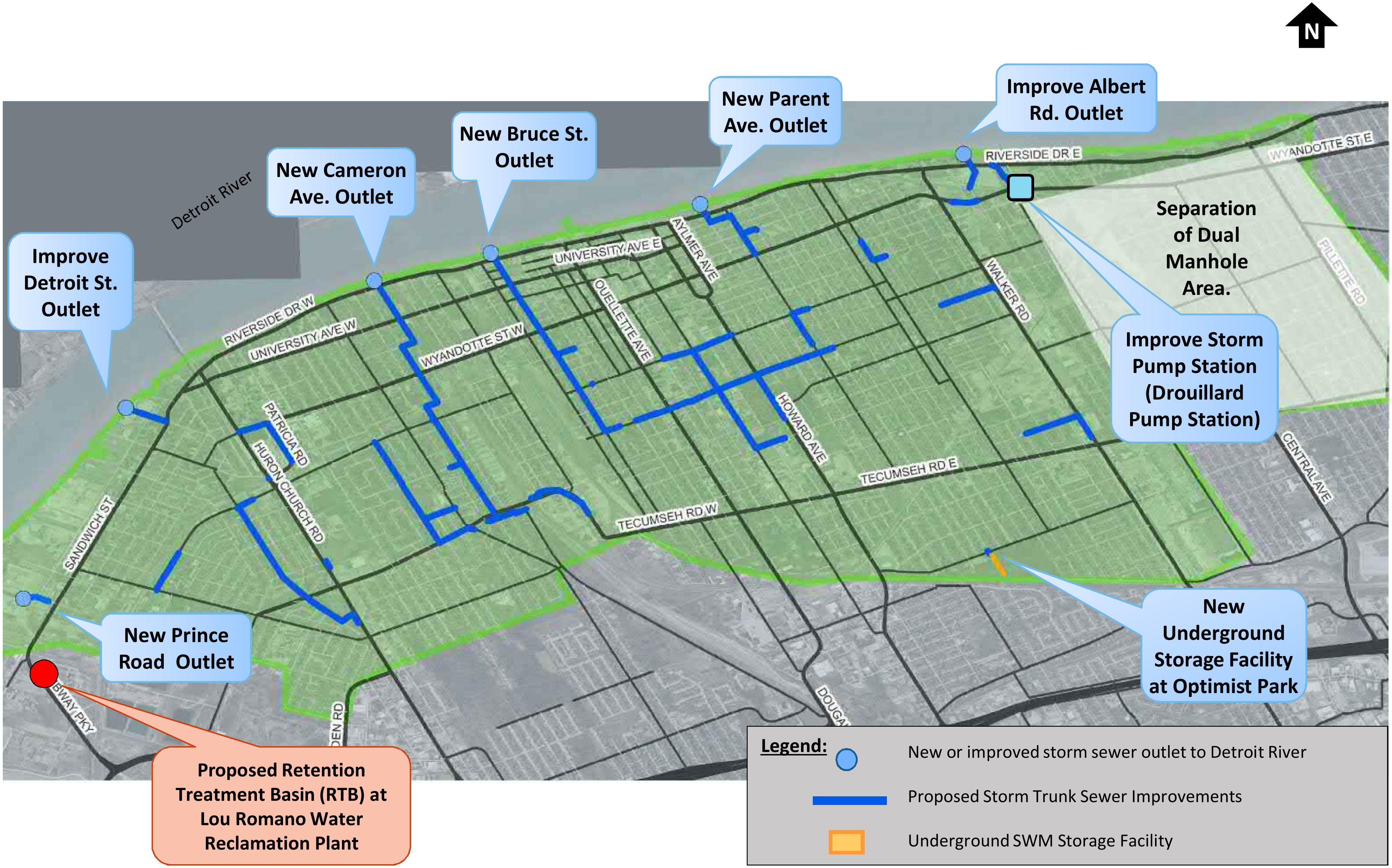
Improve Sewer Conveyance and Storage Capacity

Recommended Infrastructure Projects

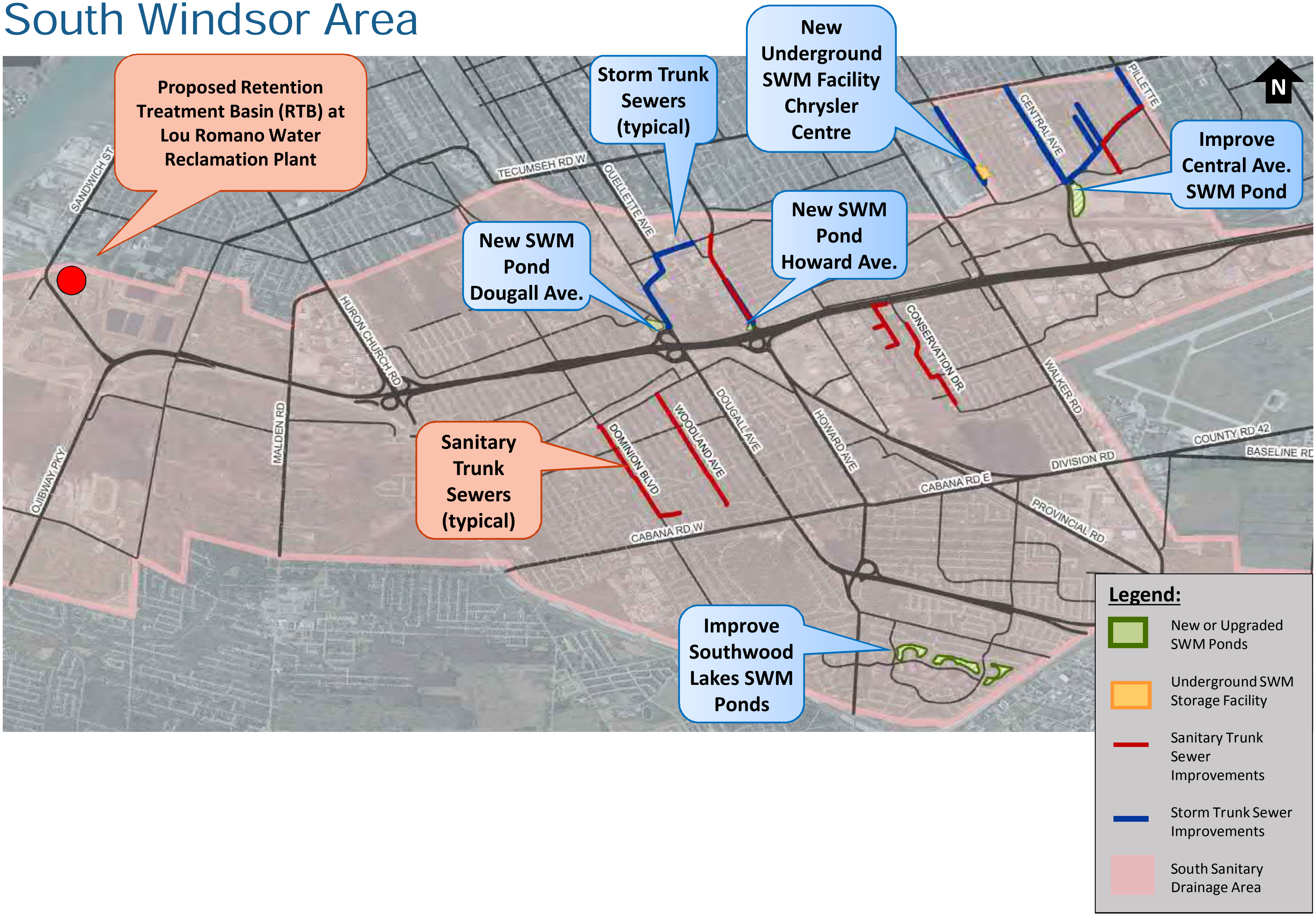
- Separation of the combined sewer area.
- 48 km of trunk sanitary sewers.
- 61 km of trunk storm sewers.
- New Retention Treatment Basin at LRWRP.
- 10 Stormwater Storage Facilities.
- 7 new or improved Storm Pump Stations.
- 6 km barrier landform along Riverside Dr.

Recommended Infrastructure Projects

Central Windsor Area – Sewer Separation Program

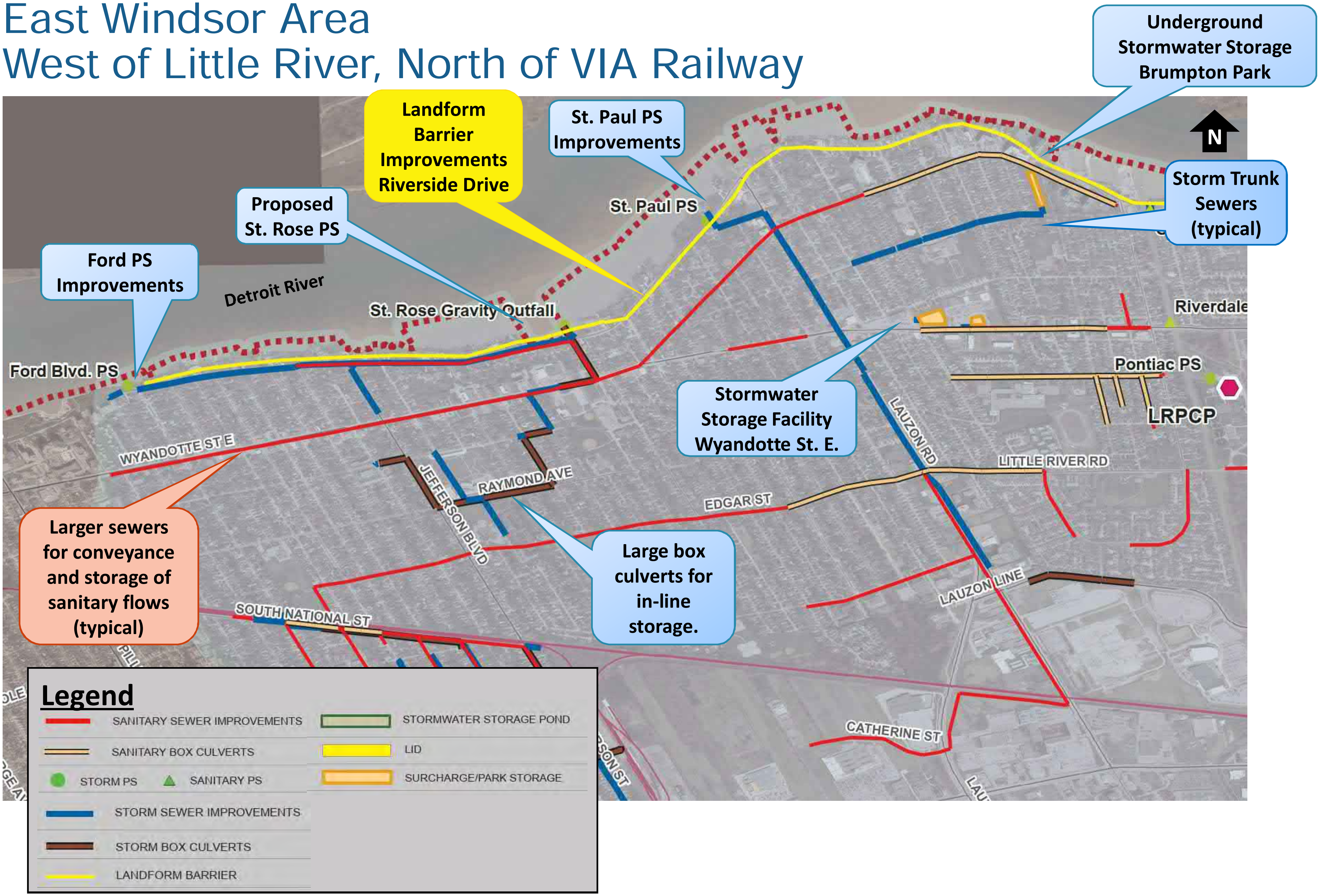


South Windsor Area

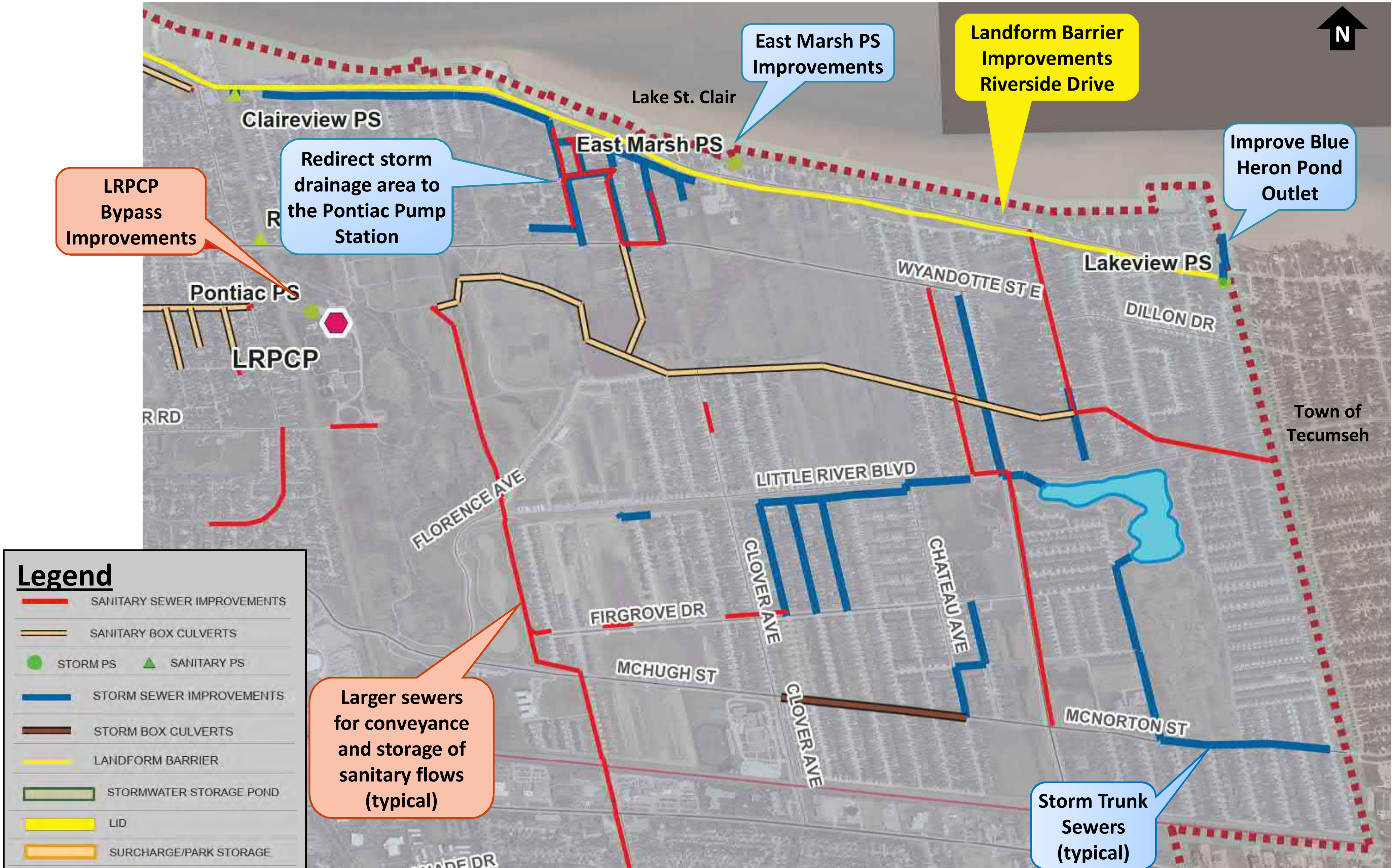


Recommended Infrastructure Projects

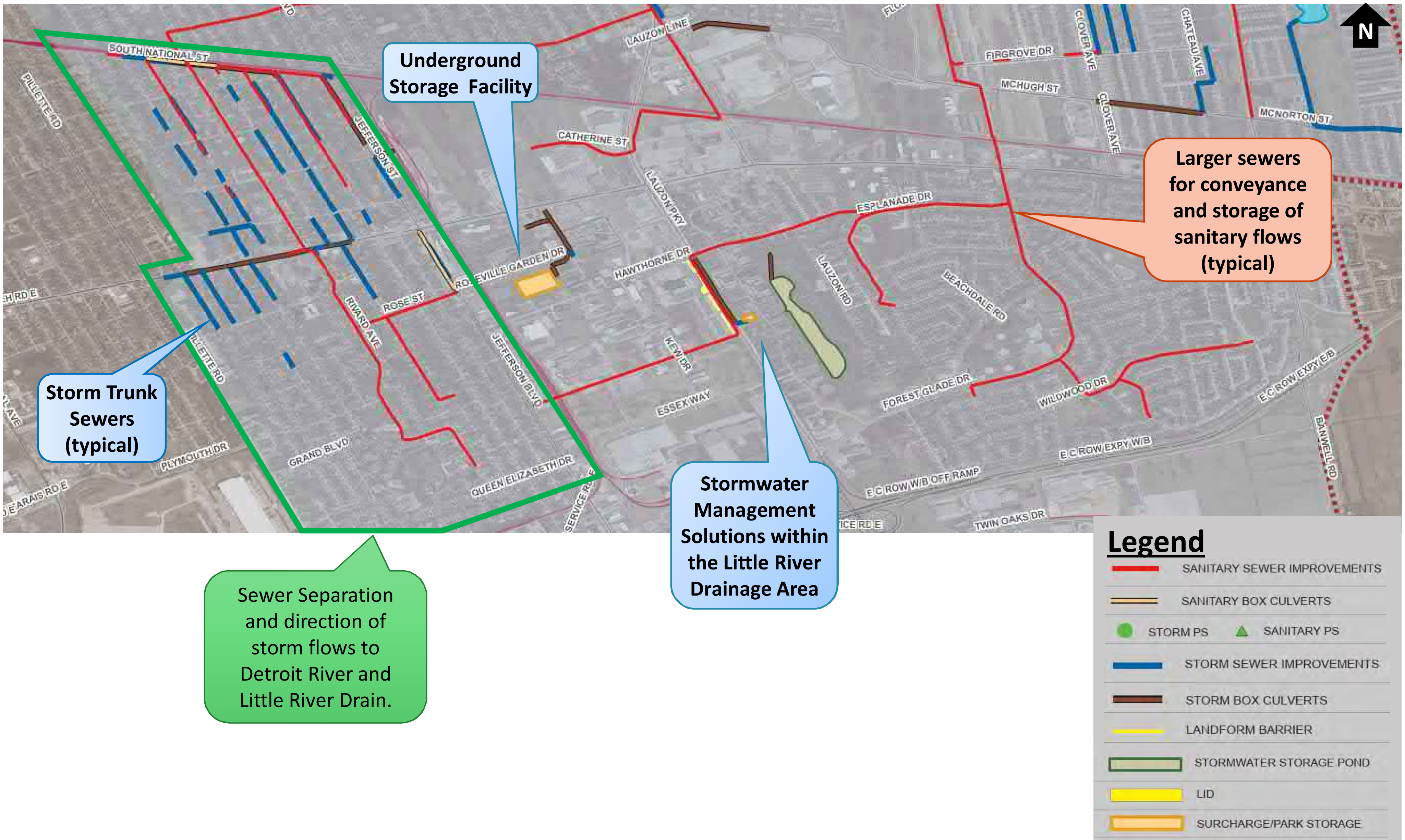
East Windsor Area
West of Little River, North of VIA Railway



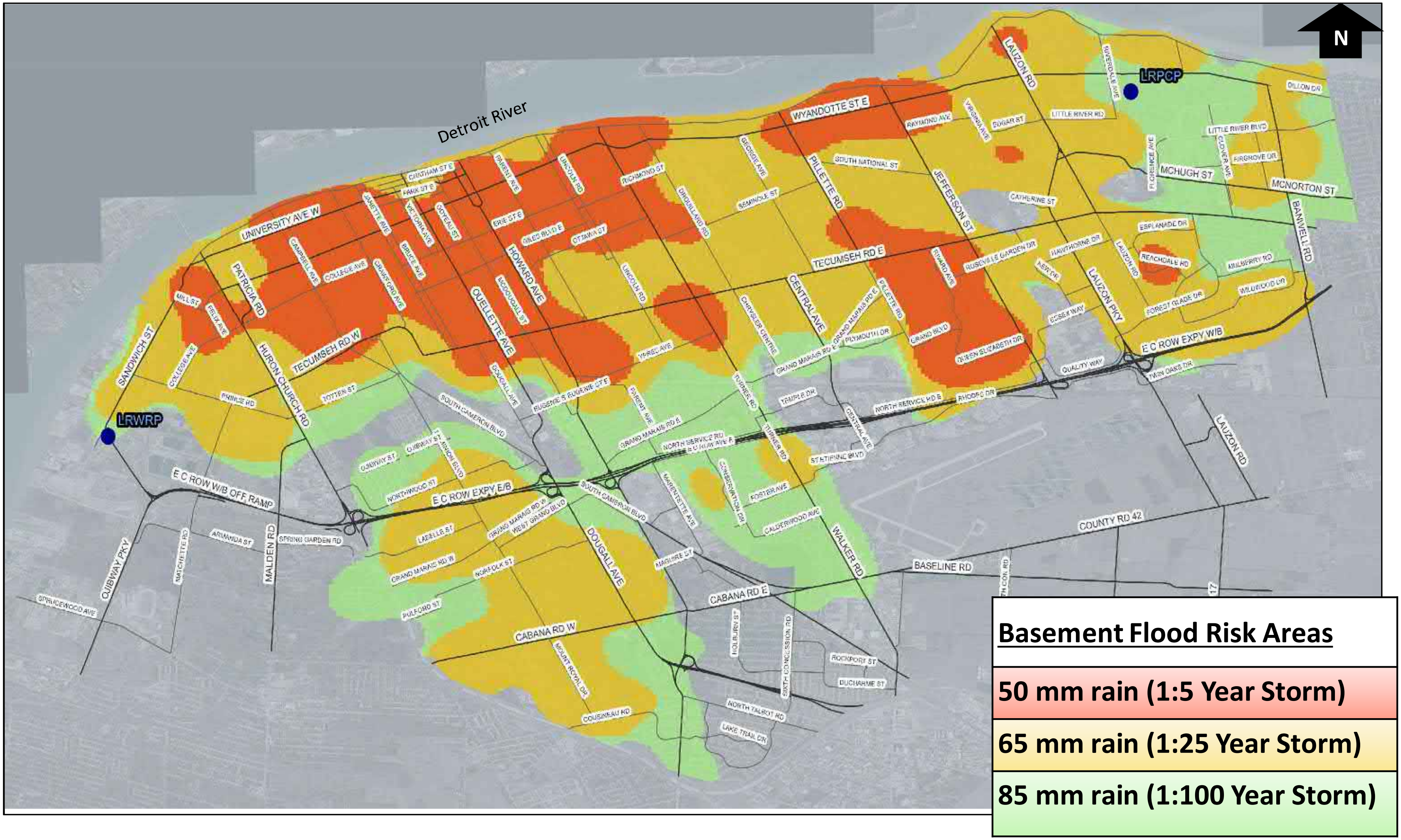
East Windsor Area – East of Little River, North of Via Railway



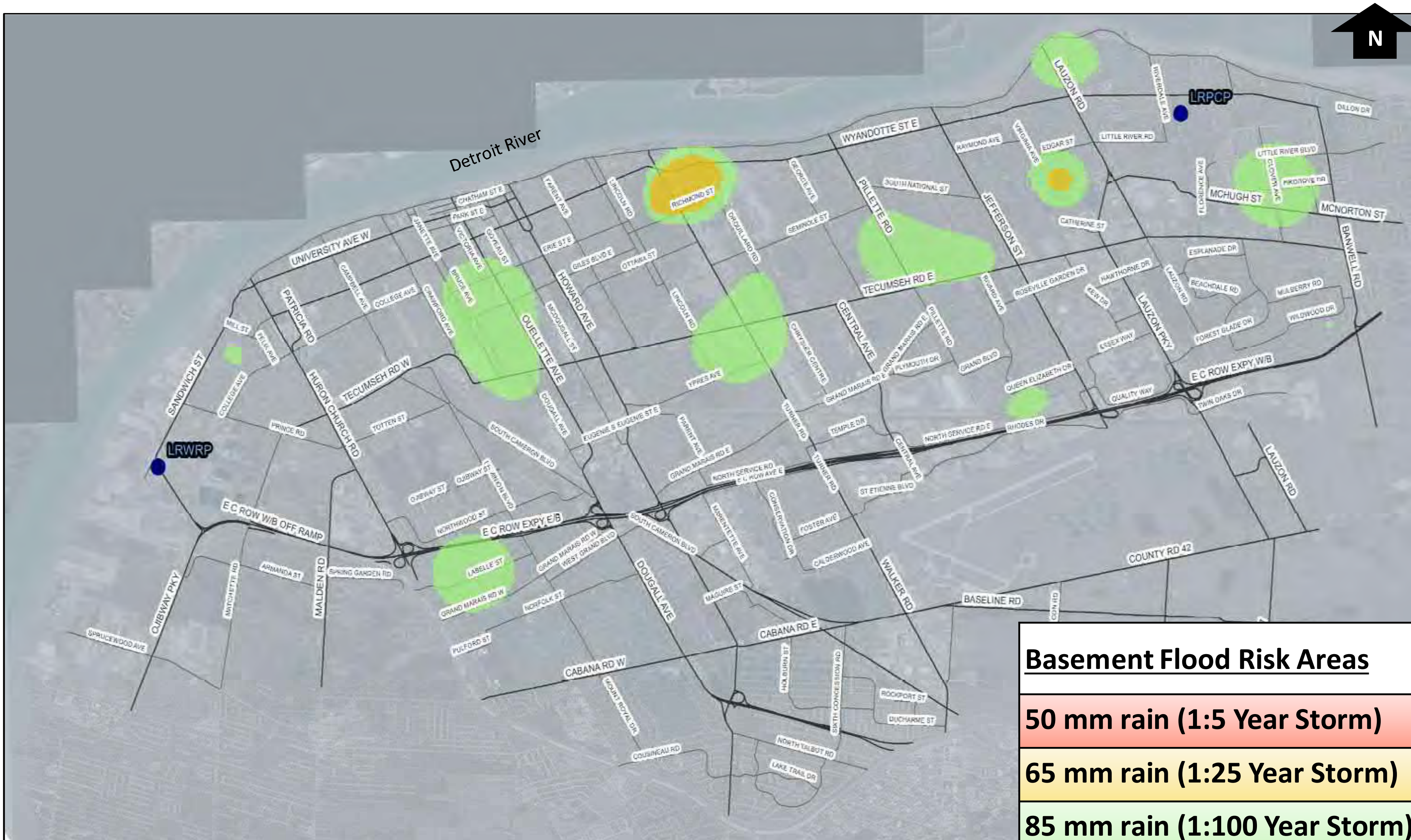
East Windsor Area - South of VIA RAIL



Basement Flooding Risk Areas
Existing Conditions



Basement Flooding Risk Areas
Ultimate Conditions



Basement Flood Risk Areas

Basement Flood Risk Areas
50 mm rain (1:5 Year Storm)
65 mm rain (1:25 Year Storm)
85 mm rain (1:100 Year Storm)

Estimated Construction Costs – Source Control/Private Property Improvements

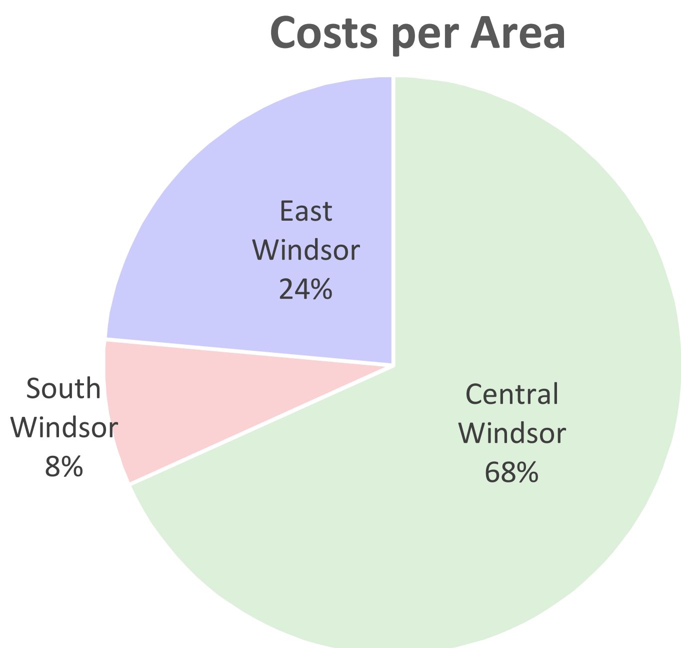
Solution Component	Sub-Total Costs
Private Property Programs:	
City-wide Foundation Drain Program	**$950M**
City-wide Downspout Disconnection Program	**$50M**
Public Infrastructure Improvements	
Sanitary Manhole Sealing Program	**$0.5M**
Sewer Backflow Prevention Device Program Allowance	**$8M**
Sub-Total	**$1,009M**

Sewer System and Downstream Improvements

Solution Component	Sub-Total Costs
Conveyance and Storage	
Sanitary System Improvements	**$3,061M**
Storm System Improvements	**$718M**
Coastal Flood Protection	
Barrier Landform and Sewer Backflow Protection	**$9M**
Outlet Capacity	
LRWRP - Retention Treatment Basin	**$70M**
LRPCP - Improved Bypass	**$5M**
New or Upgraded Stormwater Pump Stations	**$44M**
Grand Total	**$3,907M**

Summary

Recommended Solutions	Central Windsor	South Windsor	East Windsor	Total Costs
Grand Total	$3,356M	$401M	$1,158M	**$4,916M**



Flooding Solution Considerations

- Flooding solutions are based on a **partnering approach** between private property owners and the City.
- Flooding solutions will require an **extended period of time** to be fully implemented due to the overall scope and costs.
- Flooding solutions will **reduce**, but not completely eliminate flooding risks.
- Flooding solutions will require that operations and maintenance programs be **adapted** to support infrastructure improvements.

Implementation and Prioritization

Recommended projects were assigned priority based on the following criteria:

- Flood Reduction Effectiveness
- Condition of Existing Sewers
- Emergency Access
- Cost Effectiveness
- Reduction of Combined Sewer Overflows (CSOs)
- Access to Vulnerable Areas

High, Medium and Low priority was assigned to projects based on an objective rating system.

What's Next

Project Contacts:

Anna M. Godo, P.Eng
Project Lead
City of Windsor

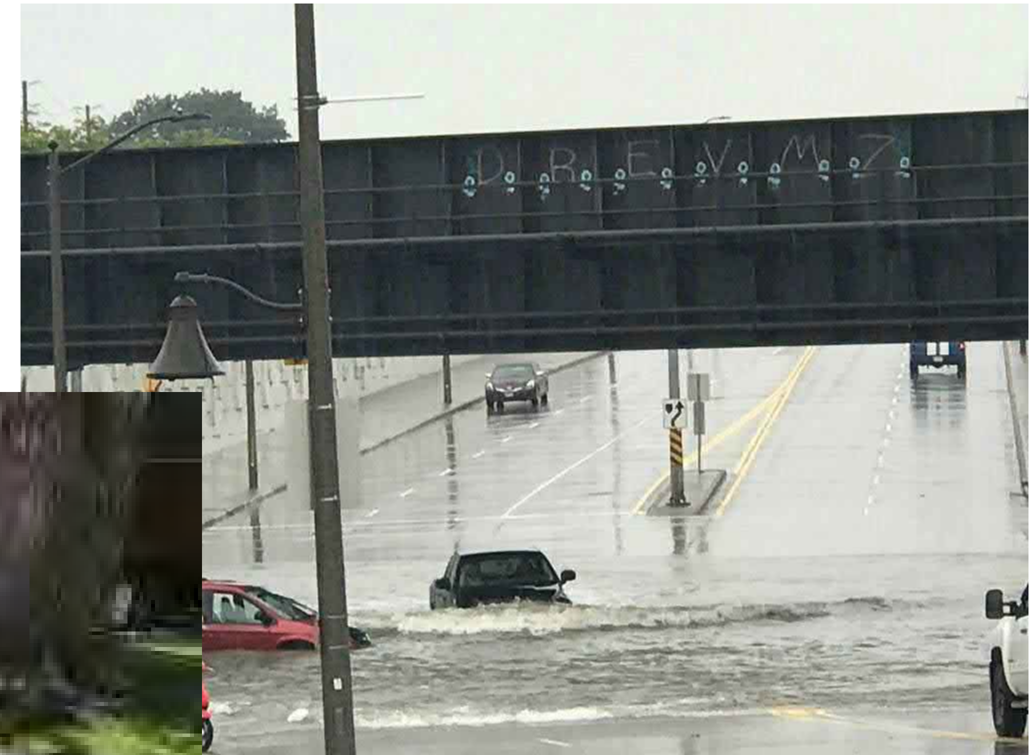
Flavio Forest, P.Eng
Project Manager
Dillon Consulting Limited

For more information:

Visit us at: **weatheringthestorm.ca**

Email us at: **info@weatheringthestorm.ca**

Significant Flooding



Significant insured damages

- **$300 million** from 2016 & 2017 storms alone

Photo credits windsoriteDOT.ca, CTV News, AM800, The Windsor Star

Area of Focus

Bigger pipes,
bigger pumps

Residential, industrial,
commercial
improvement
opportunities

Mitigating high
river/lake/creek
water levels

Options to safely
divert stormwater

Estimated Costs

Total **$4.9 billion over 50+ years**.

- $3.9 B for public infrastructure

Immediate (0-8 years)		$150 Million
High priority (9-19 years)		$335 Million
Medium priority (20-29 years)		$515 Million
Low priority (30+ years)		$2.9 Billion

- $1 B for private property (source control) works

THE CITY OF WINDSOR ONTARIO, CANADA

Funding Plan

- $90M - DMAF 1 projects ($57.9M City $32.1M grant)
- $50M - City funding for DMAF 3 ($24.4M pending grant request)
- $25.3M - Average annual uncommitted Sewer Surcharge funding*
- Asset Management Plan Integration
- Stormwater Financing Study underway

* Includes funding for approved in principle projects

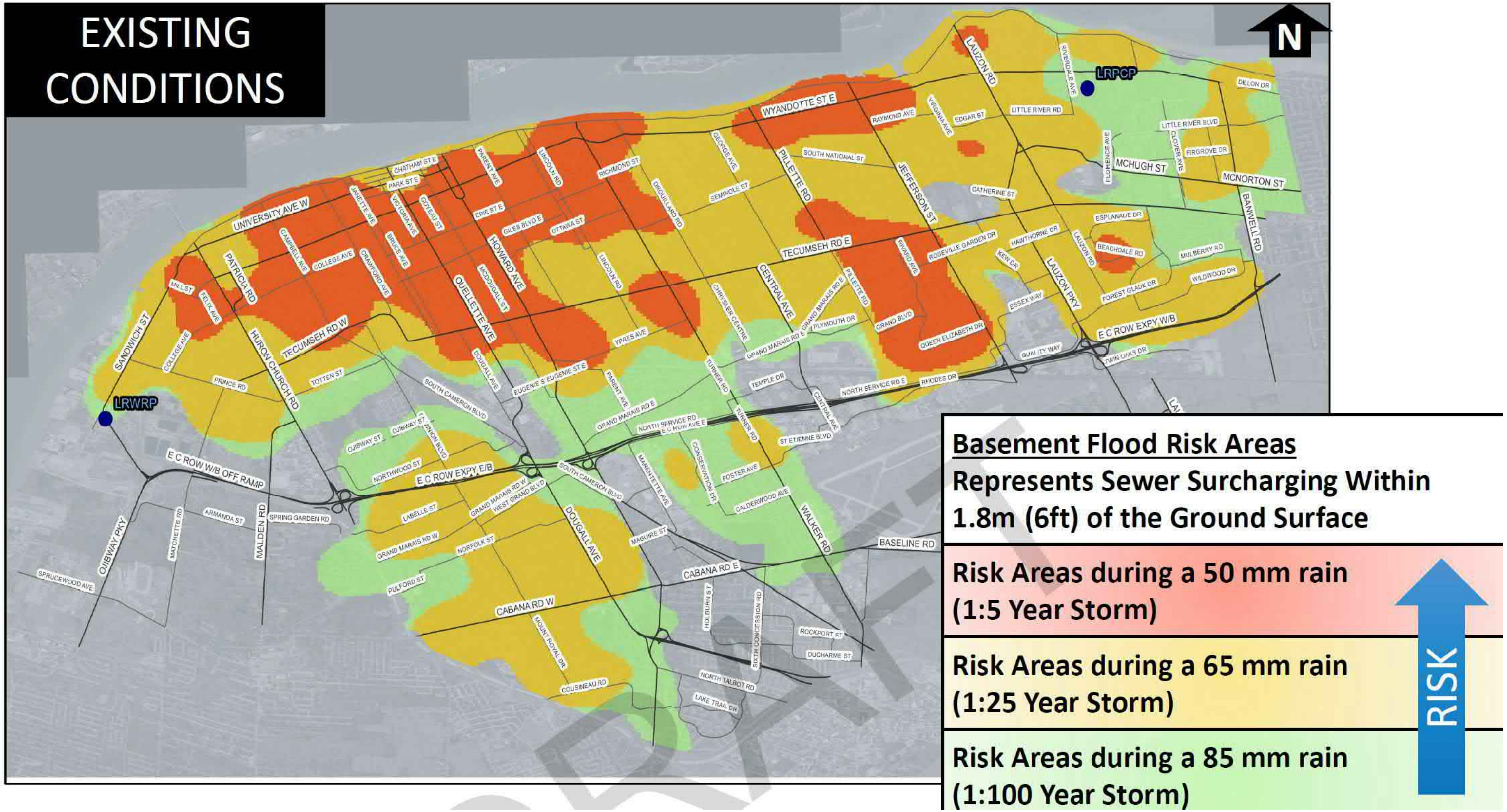
Grants

- Pending Application
    - DMAF 3 $24.4 M grant on $80 M project

- Continue to pursue future grant opportunities to leverage funding for the SMP projects and programs

Ongoing Programs

- Infiltration & Inflow (I&I) program - Reduce stormwater getting into the sewer system
- Annual condition inspection of sewers program
- Targeted maintenance program
- Basement flooding protection subsidy program
- Downspout Disconnection program (voluntary)


EXISTING CONDITIONS
N
Basement Flood Risk Areas
Represents Sewer Surcharging Within 1.8m (6ft) of the Ground Surface
Risk Areas during a 50 mm rain (1:5 Year Storm)
Risk Areas during a 65 mm rain (1:25 Year Storm)
Risk Areas during a 85 mm rain (1:100 Year Storm)
RISK
LRWRP
LRPCP
UNIVERSITY AVE W
WYANDOTTE ST E
TECUMSEH RD E
TECUMSEH RD W
HOWARD AVE
OUELLETTE AVE
DOUGALL AVE
HURON CHURCH RD
PATRICIA RD
SANDWICH ST
LAUZON RD
LAUZON PKY
PILLETTE RD
JEFFERSON ST
CENTRAL AVE
WALKER RD
E C ROW EXPY E/B
E C ROW EXPY W/B
E C ROW W/B OFF RAMP
CABANA RD W
CABANA RD E
BASELINE RD
MCHUGH ST
MCNORTON ST
BANWELL RD
OJIBWAY PKY
MALDEN RD
DRAFT

ULTIMATE CONDITIONS

City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

Final Recommendation Summary Report Council Review

July 20, 2020

Presented by:

Welcome to the Sewer and Coastal Flood Protection Master Plan

The City of Windsor has experienced several significant storm events in recent years that have resulted in widespread basement and surface flooding throughout the City. In addition to these events, current high Lake St. Clair and Detroit River Water Levels are putting strain on the municipal sewer system and posing risks to property owners in coastal and low lying areas. The City has undertaken this master plan to understand the causes of flooding, identify and evaluate solutions, complete high level design and cost estimates for proposed infrastructure improvements and to provide an implementation strategy for the recommended solutions.

This Sewer and Coastal Flood Protection master plan follows the Municipal Class Environmental Assessment process which provides the framework for the public to have an active role in the development of the solutions.

This document is intended to provide a summary of the findings and final recommendations of this master plan. Further details will be available in the Master Plan Environmental Assessment report which will be available for public review in Fall 2020.

Blue Heron Pond

Riverside Area

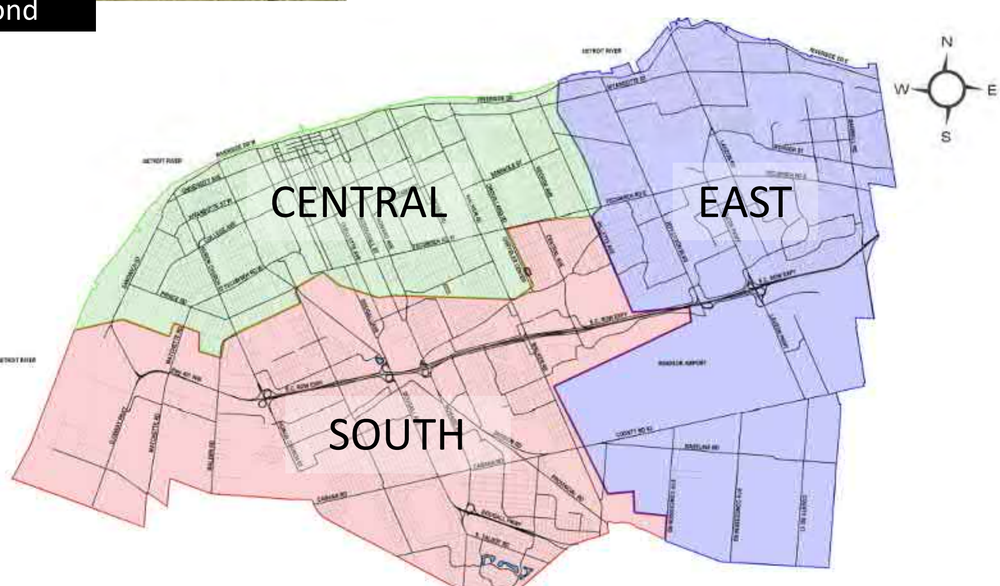


Photo Credit: Windsor Star

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- Sewer System Conveyance and Storage Solutions (Page 11)
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For Detailed information on each solution refer to the Appendices.

Appendix A:Recommended Solutions Summary

Includes detailed figures of the recommended infrastructure improvements for the Central, South and East Windsor Areas.

Appendix B:

Riverside Landform Barrier Functional Design

Master Plan Objectives

- Understand the causes of basement, surface and coastal flooding.
- Identify areas vulnerable to basement, surface and coastal flooding.
- Identify and evaluate short-term and long-term solutions to reduce the risks and impacts of this flooding.
- Identify improvements to City infrastructure.
- Identify actions homeowners can take to reduce their risk of flooding and reduce strain on the City's system.
- Develop preliminary designs and cost estimates for the recommended infrastructure improvements.
- Recommend an implementation strategy.

Master Plan Process

The study is following the requirements of the Municipal Class Environmental Assessment, Master Plan Process (Approach No. 2).

Community Engagement at a Glance

How we engaged the public:

2 Public Information Centres

with over 250 Attendees.

15 **meetings** with applicable property owner and agency groups.

590 **Resident interactions** at Pop-Up Events

3 Newsletters distributed

306 Residents Completed the **Partners for Action Survey**

7,100+ website visits over the course of this project.

Key things we have heard from residents:

- Coastal Flood Protection measures need to be implemented quickly
- Cost efficient solutions are a top priority
- Focus on areas that are most vulnerable to flooding
- Residents need to play a role in protection their home and relieving the system
- Provide incentives and financial assistance
- Use Low Impact Development measures wherever possible
- Residents want to be involved and kept informed
- Educational programs and materials would be useful
- Mitigate impacts to park land
- New development should not negatively impact the existing system

Problem Identification

Principles to identify problem areas and mitigate flood risk:

Adaptive Approach
More stringent design criteria is used to mitigate flooding for vulnerable areas (such as schools, hospitals, long-term care centres).

Cooperative Approach
Solutions recognize that residents and property owners play an integral part in achieving the goals of this initiative.

Balanced Approach
Solutions do not rely on only one level of intervention. Improvements are recommended for all components of the drainage system, including the inlets and outlets.

Decision-Making Process

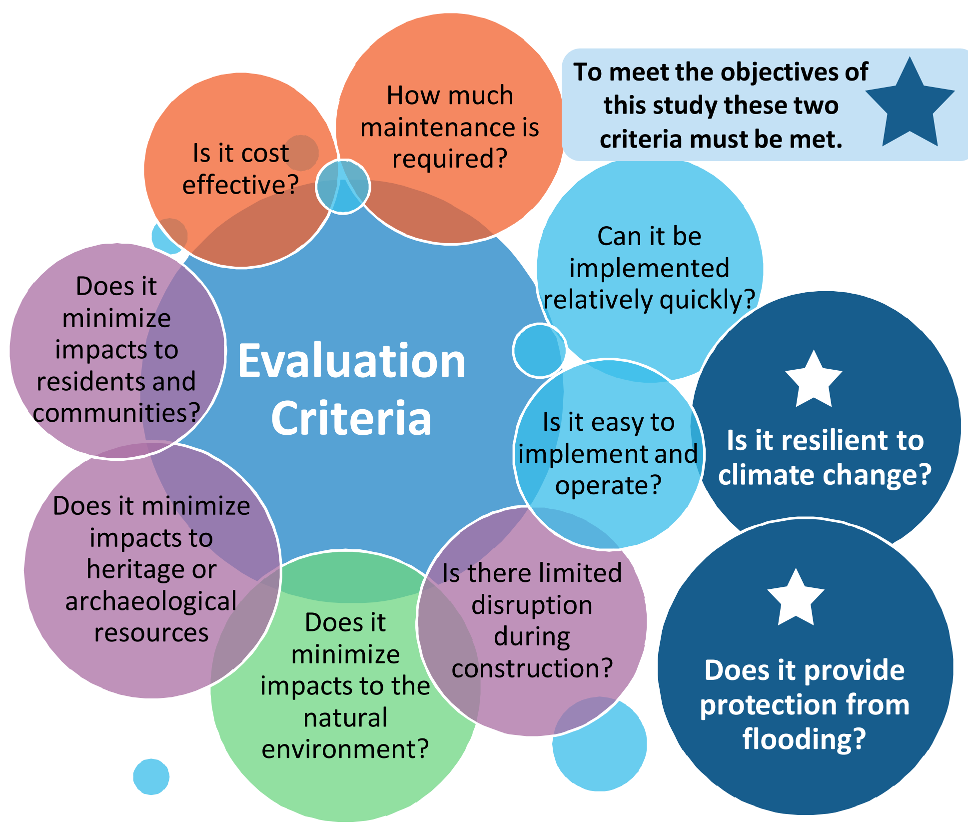
Identify Problem Areas based on the Level of Service → **Determine Alternative Solutions to Mitigate Risk of Flooding** → **Evaluation Alternatives using Evaluation Criteria** → **Select Preferred Solution**

Evaluation of Alternative Solutions

Using the City-Wide Sewer Computational Model, various alternative solutions were developed to meet the established level of service.

Alternative solutions were evaluated following the Municipal Class Environmental Assessment process, comparing each solution based on a number of evaluation criteria.

The recommended solutions summarized in this document represent the preferred solution determined through this process.



Level of Service

What is Level of Service? A benchmark used to determine where problem areas exist and determine where improvements are needed to mitigate the risks of flooding.

Level of Service: 1:100 Year Storm:

Sanitary System:
Sewer surcharge below typical basement floor level (1.8 m (6.0 ft) below ground).

Storm System:
Limit surface (roadway) ponding to less than 30 cm (1 ft).

Coastal Flood Protection Infrastructure:
Protect lower-lying inland areas from impacts of high lake levels based on projected high lake level elevation. (176.50 m)

What is a **1:100 Year** Storm?
A rainfall that has a 1 in 100 chance (or a 1% risk) of occurring in any given year.
Equates to approximately 85 mm of rain over 4 hours.

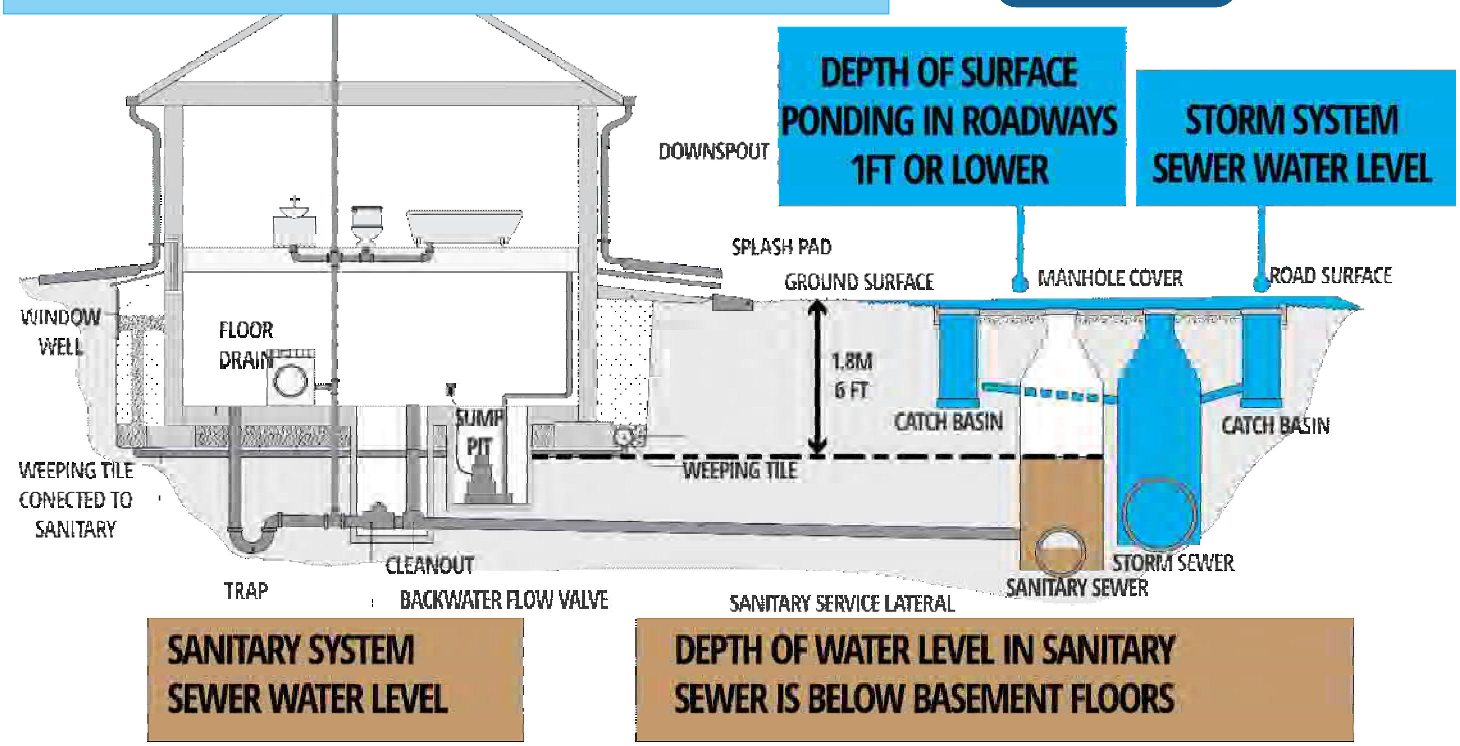
Enhanced Level of Service: "Climate Change" Storm:

More severe storm criteria were used for **major roadways** and **vulnerable areas**.
Vulnerable areas include schools, hospitals, long term care centres, emergency services, evacuation centres.

What is a 'Climate Change' Storm?
We have applied a 40% factor on a 1:100 year storm to simulate very severe and intense storms.
Equates to approx. 120 mm of rain over 4 hours.

Adaptive Solutions

Individual property owner flood risk is dependent on individual property characteristics and severity of actual rain events. Recommended solutions do not replace recommended private property protection measures.



Recommended Solutions

Flooding solutions are made up of a combination of various types of improvements.

Increase Downstream Outlet Capacity
(Increased treatment capacity or larger outlets to receiving water bodies)

Source Control Measures
(Private Property and Public Infrastructure Improvements)

Coastal Flood Protection (Overland flood barriers and backflow prevention)

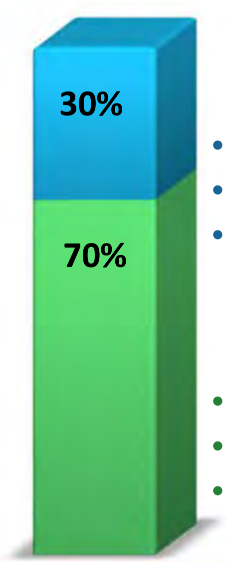
Improve Sewer System Conveyance and Storage Capacity
(Large sewer pipes and storage facilities)

BALANCED SOLUTIONS

Key Assumptions:

1. The effectiveness of solutions rely on a partnering approach between private property owners and the City. Integration of private property measures and public infrastructure upgrades are required to reduce the risk and impacts of flooding.
2. Solutions will reduce, but not completely eliminate flooding risks.
3. The infrastructure improvements are expected to require an extended period of time to implement due to the scope and costs. The City will incorporate these improvements into their asset management plan and implement projects in conjunction with other initiatives.
4. The City will need to enhance their current operation and maintenance programs for new and larger infrastructure.
5. Recommended solutions do not eliminate the need for property owners to implement property protection measures and plumbing improvements.

Sources of Inflow and Infiltration into the Sanitary System



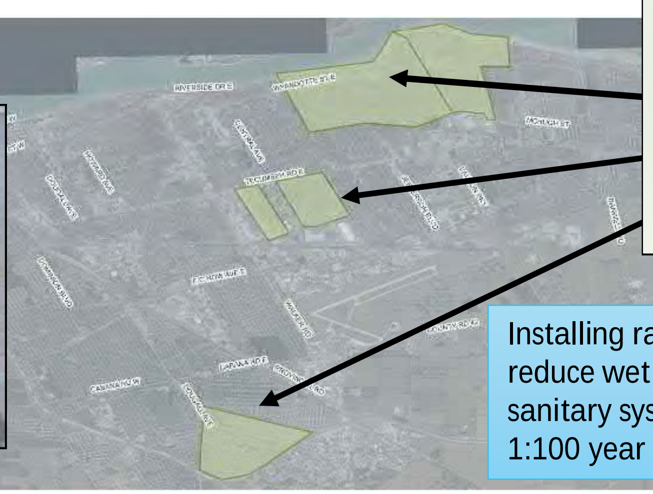
PUBLIC RIGHT OF WAY
- Manhole covers
- Sewer system leaks
- Improper storm connections

PRIVATE PROPERTIES
- Connected foundation drains
- Improper plumbing connections
- Leaks in private drain pipes

Source Control: City Projects

- ✓ Pilot Projects to measure benefit of Downspout Disconnection, Foundation Disconnection and Low Impact Development (LID) Measures.
  - ✓ Confirm the criteria and assumptions used in the development of these solutions are valid local and that measurable reductions in inflow are observed.
- ✓ Updating and implementing new City by-laws:
  - ✓ City-Wide Downspout Disconnection By-Law (By-law 26-2008)
  - ✓ Foundation Drain Disconnection By-Law
- ✓ Updating the City's Development Standards to reflect new flood mitigation criteria.
  - ✓ Revise new sewer design criteria and mechanisms to control excess inflow.
  - ✓ Developers must demonstrate that new builds will not impact downstream areas.
  - ✓ Mandatory sewage ejector pumps for new development.
  - ✓ Develop Standards for the implementation of LIDs.
- ✓ Enhanced Educational Program
  - ✓ Homeowner and Contractor Information Sessions.
  - ✓ Develop and Distribute Education Materials and Guidelines.
  - ✓ Continue Project Website: Weatheringthestorm.ca.
- ✓ Implementing Low Impact Development (LIDs) measures, such as:
  - ✓ Exfiltration trenches (Example: Matthew Brady Construction).
  - ✓ Bioswales, Rain Gardens and Stormwater Retention Features.
  - ✓ Permeable Pavements (Example: Tranby Park Parking Lot).
- ✓ Installing rain catchers on manholes in high priority areas and eventually all manholes.
- ✓ Placement of Backflow Prevention Devices, to:
  - ✓ Protect the City's Sewer System from high river levels.
  - ✓ Place at storm and sanitary sewer system interconnections.

Manhole Rain Catcher



Areas Recommended for Immediate Rain Catcher Installation

Installing rain catchers city-wide will reduce wet weather volume entering sanitary system up to 5% under a 1:100 year storm (85 mm rain event).

Source Control: Private Property Improvements

In order to meet the level of service and to mitigate the risks of flooding property owners will need to take an active role to mitigate their property's strain on the municipal system.

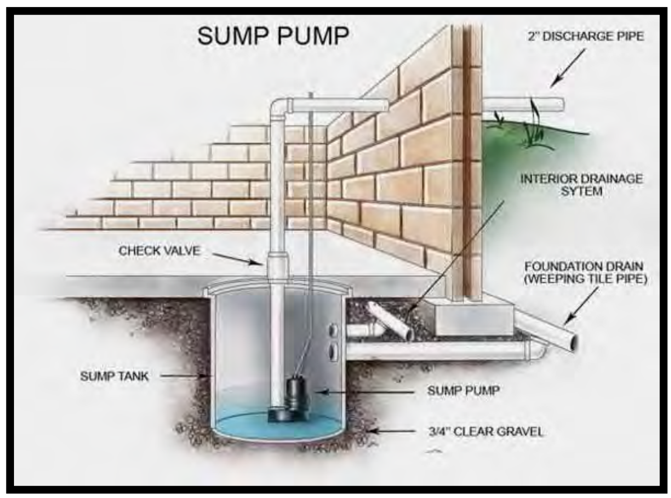
These measures are **key** components of the overall recommended solution strategy. The City will need to partner with property owners to meet flood reduction goals.

Basement Flooding Solution

- ✓ Foundation Drain Disconnection
- ✓ Correct Improper Connections
- ✓ Backflow Prevention Valves

Surface Flooding Solution

- ✓ Downspout Disconnection
- ✓ Improve Lot Grading
- ✓ Low Impact Development (LID) measures, such as:
  - ✓ Rain Barrels and Rain Gardens
  - ✓ Seal window wells
  - ✓ Permeable pavements



Private property measures and property owner cooperation are an integral part of the comprehensive recommended solutions. Foundation drain disconnection and downspout disconnection will have a benefit to the City's system if implemented City-wide.

Is it recommended that the City move forward with the following:

- Implement necessary By-Law to provide the framework for a City Wide policy.
- Coordinate with neighbouring municipalities to implement source control measures (Town of Tecumseh and Town of LaSalle).
- Complete Pilot Projects, whereby the City shall implement this bylaw in an isolated area, which will be monitored and assessed to confirm benefit of these measures.
- Implement a subsidy program.
- Develop a program to inspect and enforce compliance with the new by-law.
- Develop an Approved Contractor List for residents.

Source Control: Private Property Improvements

What is Foundation Drain Disconnection?

Generally, homes built before 1980, were permitted to drain foundations (weeping tiles) to their sanitary plumbing connection. Standard home building practices have improved since that time, however it is assumed most older homes still have this improper connection. Foundation drains (weeping tiles) are a major contributor of rainwater getting into the sanitary sewer system during wet weather events. The volume of rainwater entering the sanitary system causes the system to become overwhelmed and therefore increases risk of basement and surface flooding.

What is Downspout Disconnection?

Downspout disconnection is the process of separating roof downspouts from the sewer system and redirecting roof runoff onto pervious surfaces, such as a lawn or garden. In some cases, additional work is required, as it is not recommended that disconnected downspouts direct rainwater towards hard surfaces such as sidewalks and driveways, where a slip and fall situation may occur. Implementing measures such French drains or pop-up devices are recommended in these situations.

Schematic: Example Downspout Pop-up www.waterproof.com

COOPERATIVE SOLUTIONS

Role of the Resident/Property Owner

- ✓ Take advantage of the City's existing Basement Flooding Subsidy and Downspout Disconnection Programs.
- ✓ Participate in the proposed foundation drain disconnection subsidy program.
- ✓ Implement flood protection measures on your property including sump pumps, backflow preventers and other plumbing fixtures and property flood mitigation measures. Complete regular maintenance on protection measures.
- ✓ Understand how your home's plumbing works and how to reduce strain on the municipal system.
- ✓ Learn more about what you can do to protect your home and how you can help! Visit weatheringthestorm.ca.

Effectiveness of proposed infrastructure solutions relies on property owner cooperation.

Coordination with Other Municipalities

- ✓ The City encourages neighbouring municipalities to implement similar source control programs to mitigate impacts on the shared sanitary and stormwater drainage systems.
- ✓ The City will partner with the Town of Tecumseh and the Town of LaSalle on this initiative.

Sewer System Conveyance and Storage Improvements

Basement Flooding Solutions

✓ Enhanced sewer separation strategy for combined sewer areas (Downtown/Central Area and Fontainebleau Area).

✓ Construction of large sanitary trunk sewers to provide underground storage and improve flow conveyance:

- 47 km of sanitary sewer upgrades in East Windsor area.
- 8 km of sanitary sewer upgrades in South Windsor area.

Surface Flooding Solutions

✓ Construction of large storm trunk sewers to provide underground storage and improve flow conveyance:

- 40 km in East Windsor area and 9 km in South Windsor area.
- 17 km of trunk storm sewer in Central Windsor area.

✓ Construction of 3 New and 4 Upgraded stormwater management (SWM) ponds:

- Little River Golf Course New SWM Pond.
- Dougall Ave. and Howard Ave. SWM Ponds.
- Modifications to ponds serving Southwood Lakes (Lake Como, Lake Laguna and Lake Grande).
- Increase size of the Central Ave. SWM Pond.

✓ Underground storage systems under parks, parking lots, and commercial properties.

✓ Construction of Low impact development (LID) measures:

- Tranby Park Permeable Parking Lot, Matthew Brady Exfiltration Trenches.

What is Enhanced Sewer Separation?
Removal of all surface and roof (downspout) drainage from the combined sewer system
Where feasible removal of building foundation drainage from combined sewer.

Example: Stormwater Underground Storage Facility

Example: Stormwater Management Pond

Recommended Little River Golf Course Stormwater Management Pond

Downstream Outlet Capacity Improvements

Basement Flooding Solutions

✓ Little River Pollution Control Plant:

- Future plant expansion to provide service for population growth and to provide some wet weather treatment capacity.
- In the interim, improve the existing bypass outlet at the treatment plant (Pontiac Pump Station improvements).

✓ Lou Romano Water Reclamation Plant:

- Construct a Retention Treatment Basin Facility and Sandwich Street Combined Relief Trunk Sewer. (Combined Sewer Overflow Control in the Riverfront Area, West of Caron Avenue, Class EA).

Existing St. Paul Pump Station

Treatment Plant Service Areas

Surface Flooding Solutions

✓ Improved or construct new storm sewer outlets to the Detroit River.

- Detroit St., Bruce Ave., Cameron St., Albert Rd., Marentette Ave.

✓ New or improved stormwater pump station (PS) capacities including emergency back-up power.

- New St. Rose Ave. PS (St. Rose Park) – New pump station to provide improved outlet capacity and provide relief for significant surface flooding issues.
- Improve St. Paul PS – Pump Station Expansion to provide relief to drainage area.
- East Marsh PS – Maintain pump station for a reduced drainage area.
- Improve Ford Blvd. PS (Reaume Park) – Replace pumps station with larger pump station to improve resiliency of the drainage area.
- Improve Drouillard PS (Cadillac Park) – Replace existing pump station with new pump station to improve flooding along Drouillard Rd.

Coastal Flood Protection

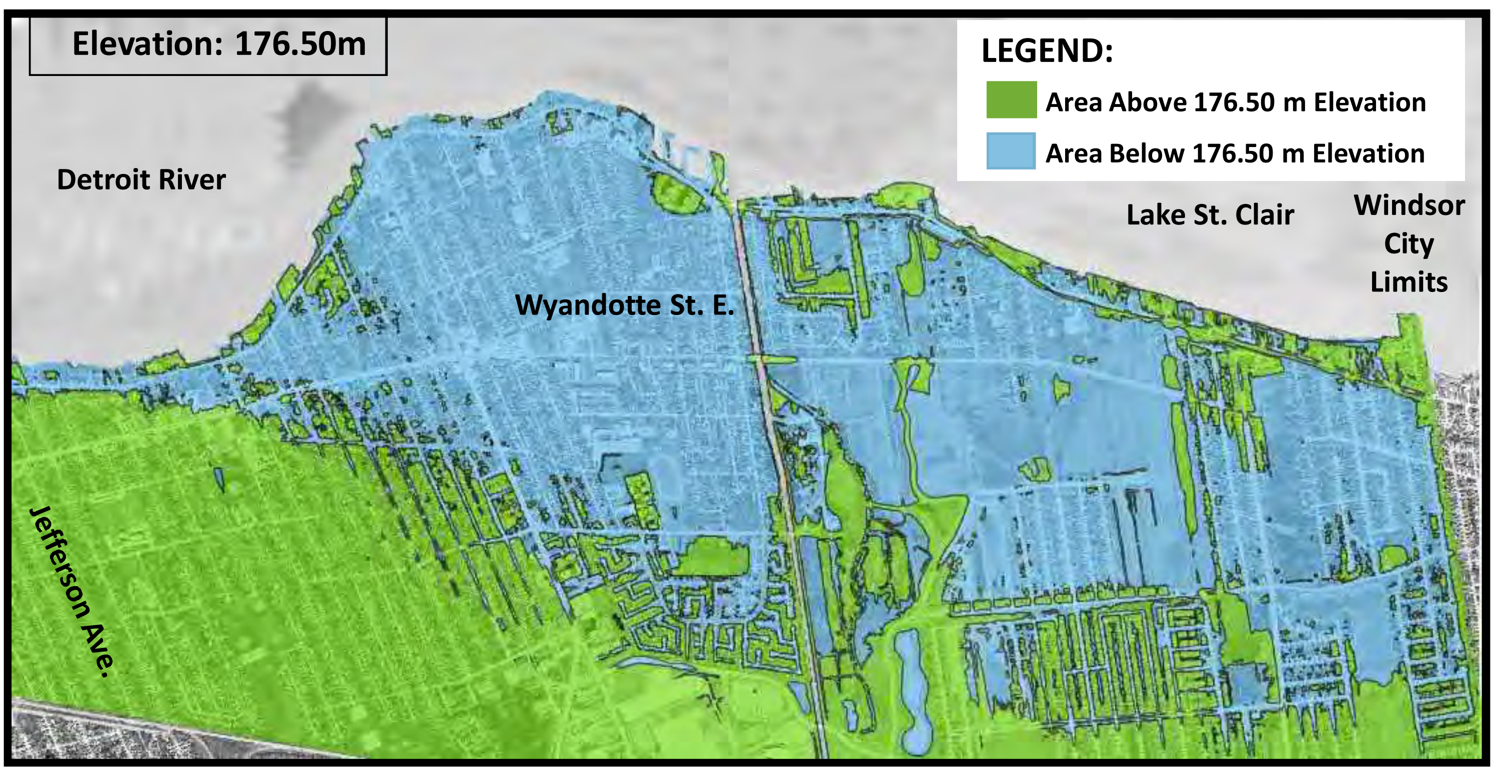
A flood risk assessment was completed in 2019 (East Riverside Flood Risk Assessment Study) to evaluate the integrity of the existing landform barrier system and to determine whether it will be adequate to provide protection under various conditions. Based on recommendations of this study and further review of the City's overland drainage system, opportunities to expand this coastal flooding system were identified.

In late-Spring 2020, water levels in the Lake Erie, Detroit River and Lake St. Clair system reached a historic high water surface elevation above **176.0 meters (m)**. By 2050, studies project static high water levels of **176.50m,** with instantaneous high water levels from wind effects as high as **176.80m.** Water level elevations will be continuously monitored and flood protection elevations will be reassessed in 2030.

Based on these elevations, a large portion of the Riverside Area is at risk of basement flooding. (See map below)

The purpose of Coastal Flood Protection:

- ✓ Protect in-land areas from high lake/river levels.
- ✓ Protect low lying residents, who live North of Riverside Dr., from overland surface flooding on Riverside Dr.
- ✓ Utilize existing private property grades to meet minimum protection levels.
- ✓ Prevent backflow of high lake levels into the sanitary and storm sewers systems.



Coastal Flood Protection

Landform Barrier Elevations

Two flood protection elevation scenarios have been evaluated based on the existing regulatory flood protection levels and recent climate change projections.

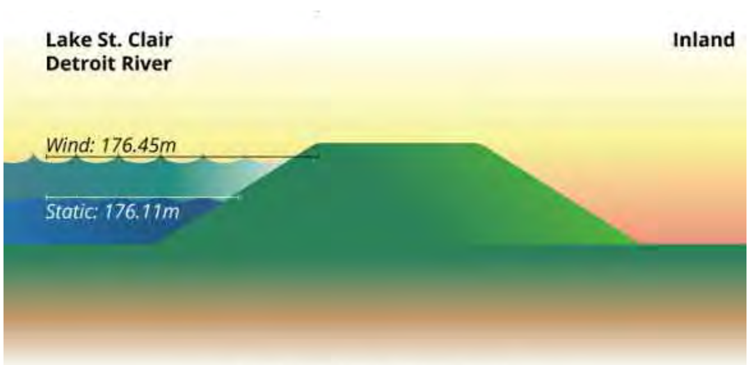
Based on the environmental assessment, the barrier elevation of 176.50 was found to be preferred. The landform barrier elevation of 176.80 m would have significant impacts on private property as it would require extensive surface area to construct.

Landform Barrier Elevation 176. 50 m

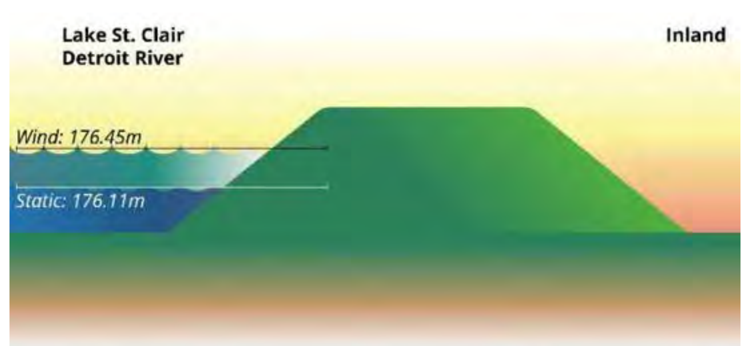
Recommended

Landform Barrier Elevation 176.80 m

Historical High Lake Levels:

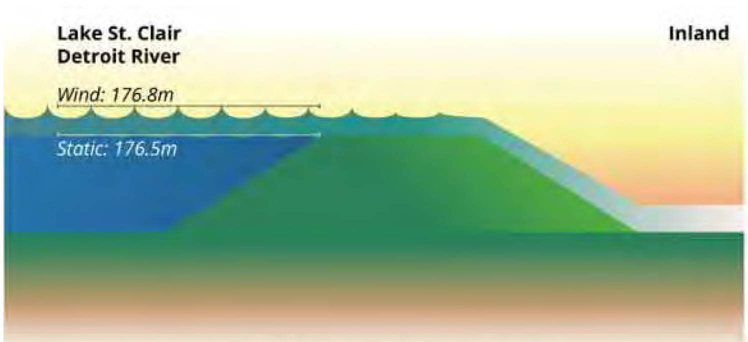


1:100 Year High Water Level

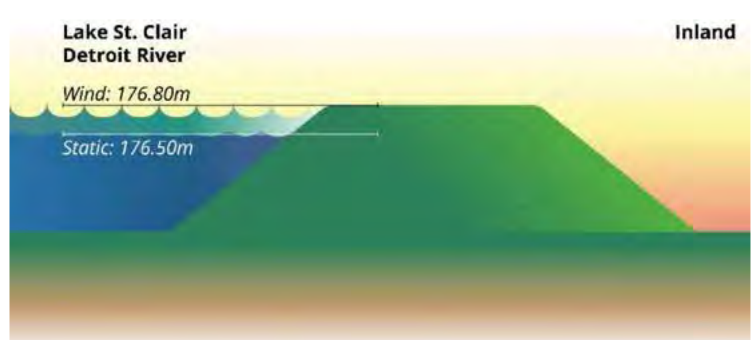


1:100 Year High Water Level

2050 Projected Climate Change High Lake Levels:



1:100 Year High Water Level



1:100 Year High Water Level

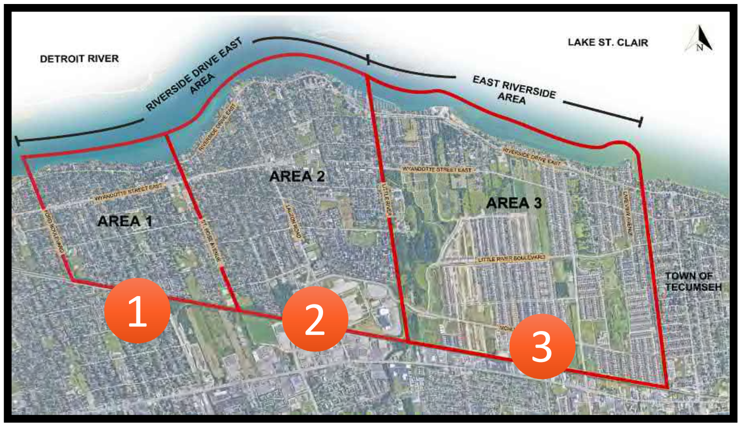
Definitions:
Static Water Level: Lake or river level during normal weather and undisturbed conditions.
Wind Water Level: Lake or river level during short duration wind/storm events.

Drawings are not to scale, for illustrative purposes only.

Coastal Flood Protection

Flood protection solutions have been divided into 3 areas:

- Area 1: Riverside Drive East, Ford Blvd. to St. Rose. Ave. (Riverside Vista 2A Construction Area).
- Area 2: Riverside Drive East, St. Rose Ave. to Riverdale Ave.
- Area 3: East Riverside Area, Riverdale Ave. to East City limits (Ganatchio Trail).



Flood Protection Along North Shoreline Limitations- All Areas – Ford Blvd. to East City Limits

Providing protection along the north waterline was considered, however this is not a feasible option due to the following factors:

Inspection & Maintenance	• The City must have full access for regular inspection and maintenance of the any flood protection infrastructure. Structures will need to be constructed within established easements or right-of-way.
Size/Height	• Where flood protection measures are constructed at the lake/river water line the structure must be 1 ft to 3 ft higher to account for wind and wave factors.
Management & Jurisdiction	• The City must be able to maintain access and legal status of the flood protection features to mitigate risks of damage or modifications to the structure which would leave the in-land areas vulnerable.
Impacts	• Would impact private property amenities such as pools, docks, boat slips and structures. Higher barrier would require property acquisition and removal of structures.

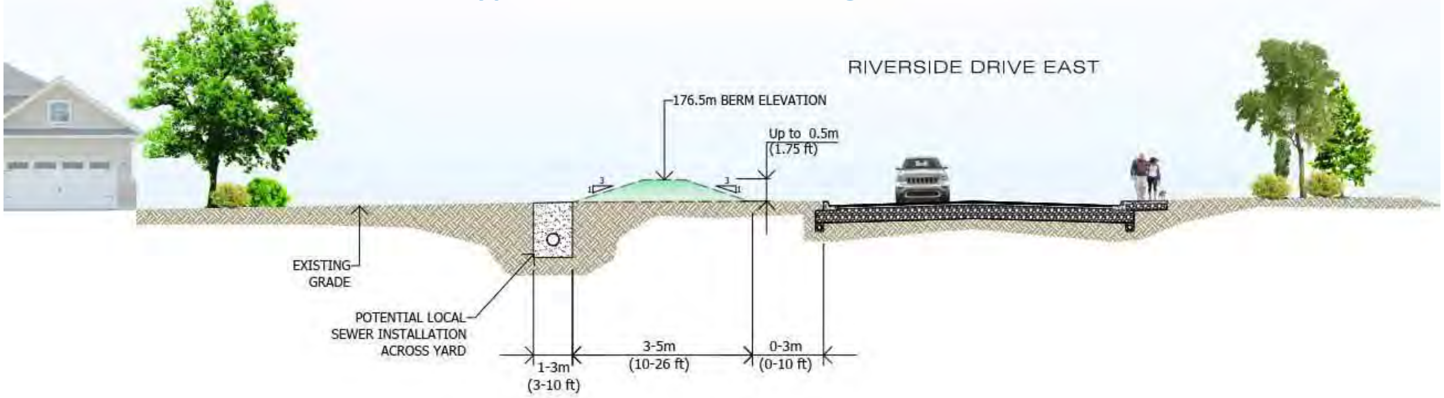
Emergency Flood Preparedness for those properties adjacent to the water is being considered under a separate City initiative.

Coastal Flood Protection

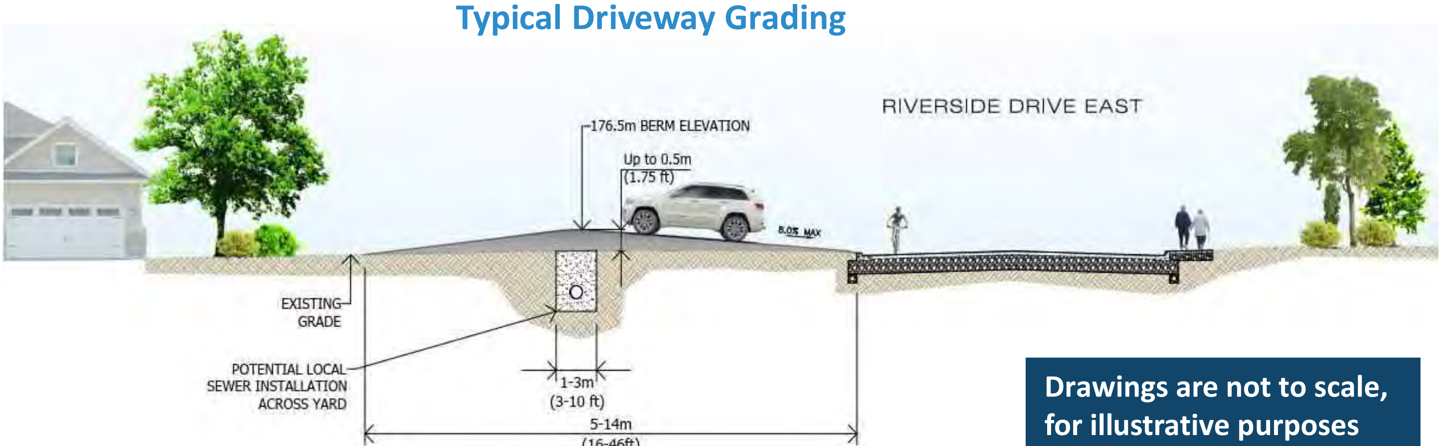
The recommended landform barrier will be an earth berm built to an elevation of **176.50,** located along the North or South boulevard of Riverside Drive East. Construction of the berm will require:

- Acquisition of property or an easement along the Riverside Drive East right of way.
- Where properties are above the established protection elevation, the earth berm will not be required. The City will work with these property owners to incorporate lot elevation as part of the property's legal status.
- Maintenance of acceptable driveway grades for vehicle and barrier free access.
- Storm sewers and catch basins to capture local drainage north of the berm.
- In Area 1, berm construction will be integrated into the reconstruction of Riverside Drive (Vista Phase 2A Construction Limits).
- In Area 2, much of the berm construction has been completed as part of the recent Riverside Vista Phase 1 construction.
- In Area 3 (Ganatchio Trail), construction will require infill where the existing berm or intersection streets do not meet minimum protection grades.

Typical Boulevard Grading



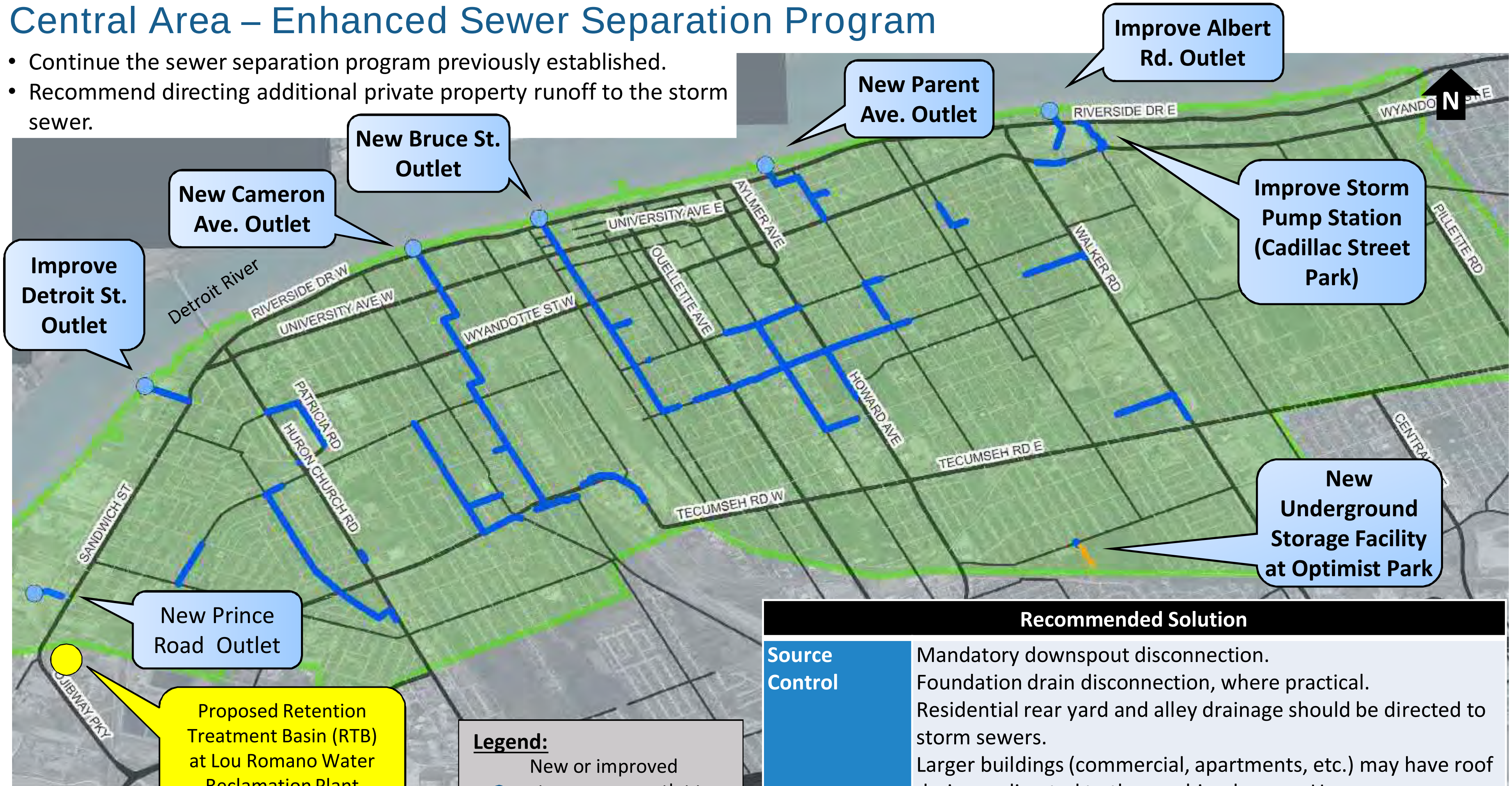
Typical Driveway Grading



Drawings are not to scale, for illustrative purposes only.

Central Area – Enhanced Sewer Separation Program

- Continue the sewer separation program previously established.
- Recommend directing additional private property runoff to the storm sewer.

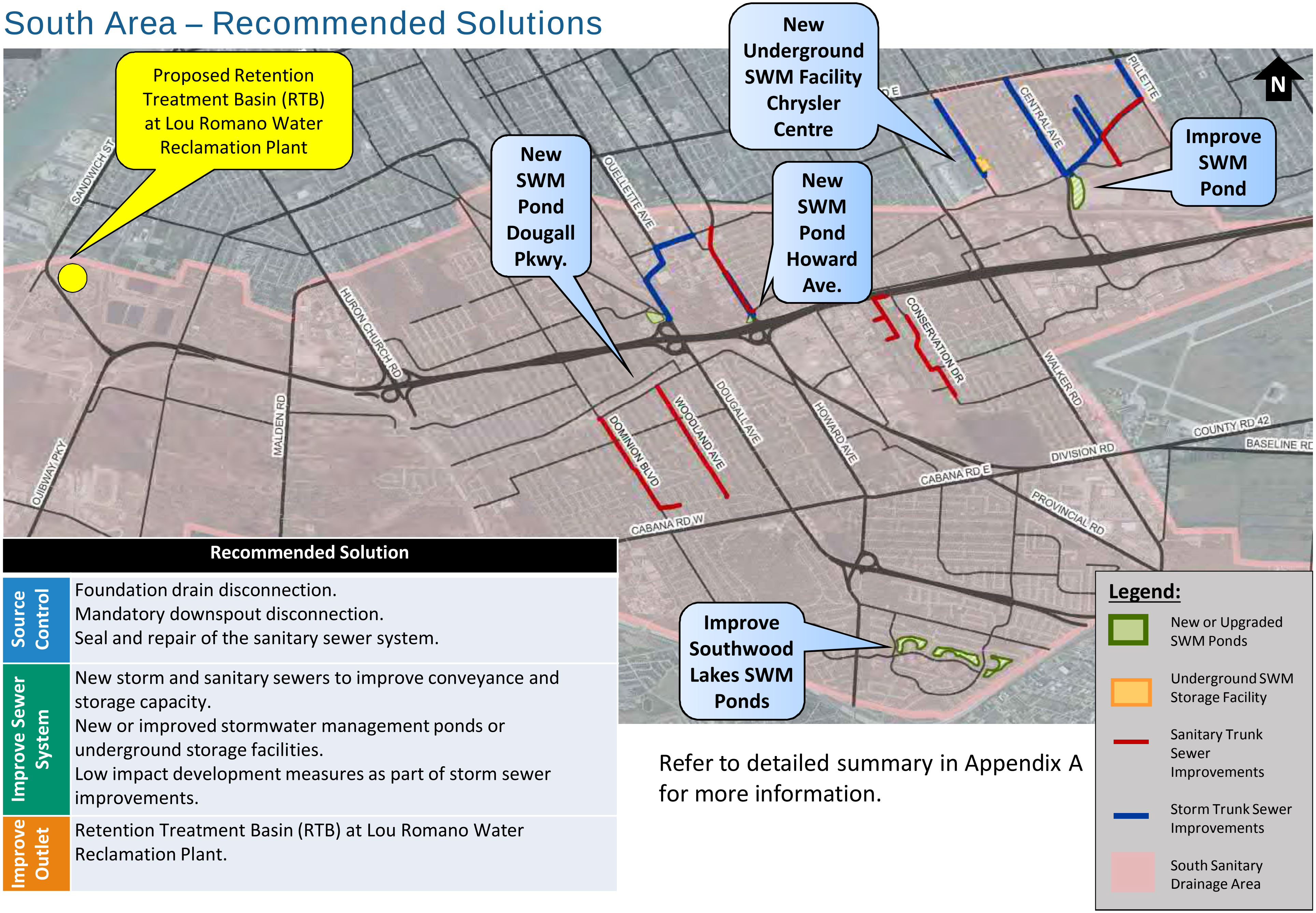


Refer to detailed summary Appendix A for more information.

Legend:
- New or improved storm sewer outlet to Detroit River
- Proposed Storm Trunk Sewer Improvements
- Underground SWM Storage Facility
- Combined Sewer Area.

Recommended Solution	
Source Control	Mandatory downspout disconnection. Foundation drain disconnection, where practical. Residential rear yard and alley drainage should be directed to storm sewers. Larger buildings (commercial, apartments, etc.) may have roof drainage directed to the combined sewer. Upon redevelopment separate internal plumbing.
Improve Sewer System	Direct all runoff to new separated storm sewers. Construct storm sewers along all roadways. Direct alley drainage to storm sewer.
Improve Outlet	Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant and Sandwich St. Trunk Sewer to better manage wet weather flows and reduce frequency of combined sewer overflows.

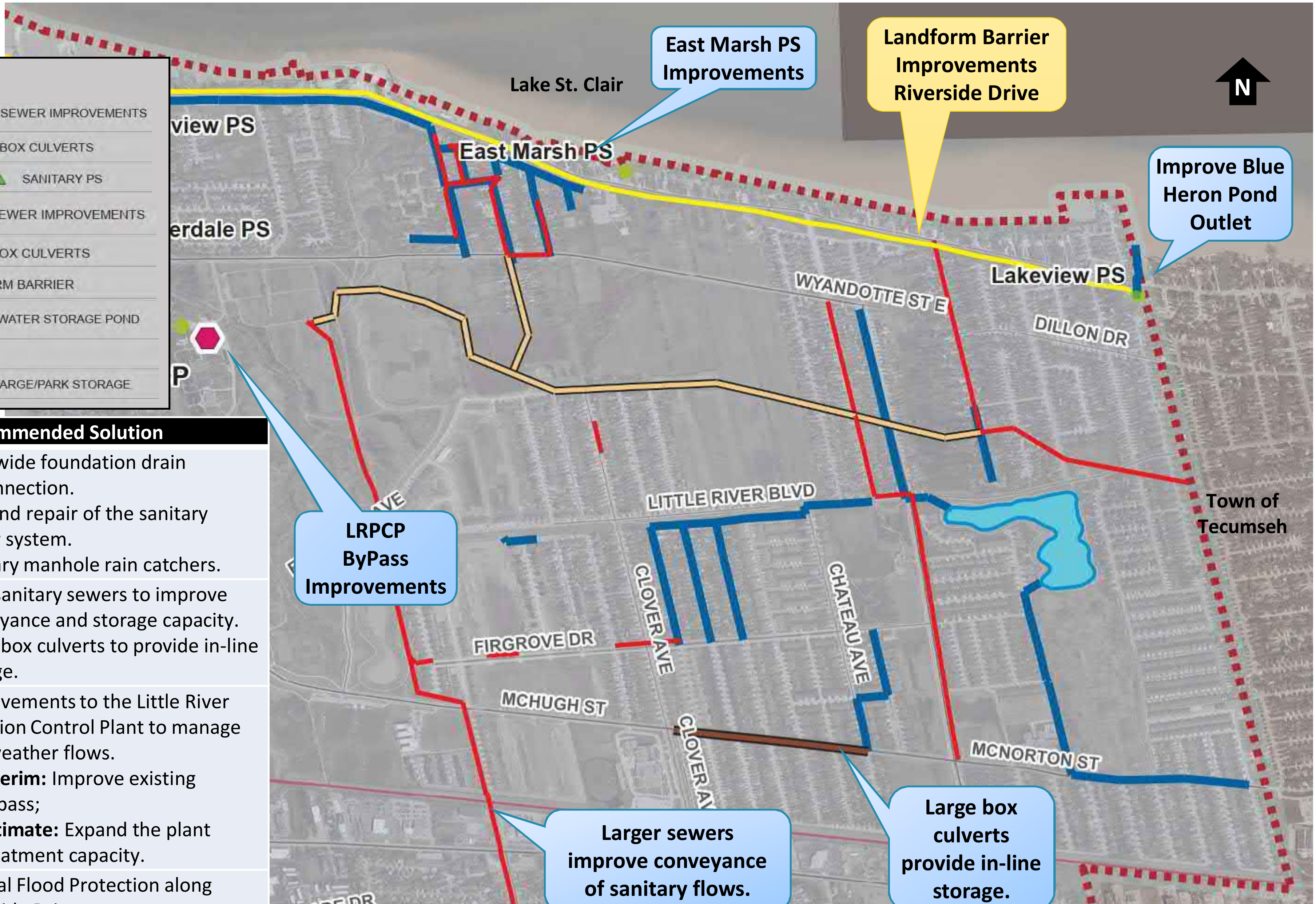
South Area – Recommended Solutions



	Recommended Solution
Source Control	Foundation drain disconnection. Mandatory downspout disconnection. Seal and repair of the sanitary sewer system.
Improve Sewer System	New storm and sanitary sewers to improve conveyance and storage capacity. New or improved stormwater management ponds or underground storage facilities. Low impact development measures as part of storm sewer improvements.
Improve Outlet	Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant.

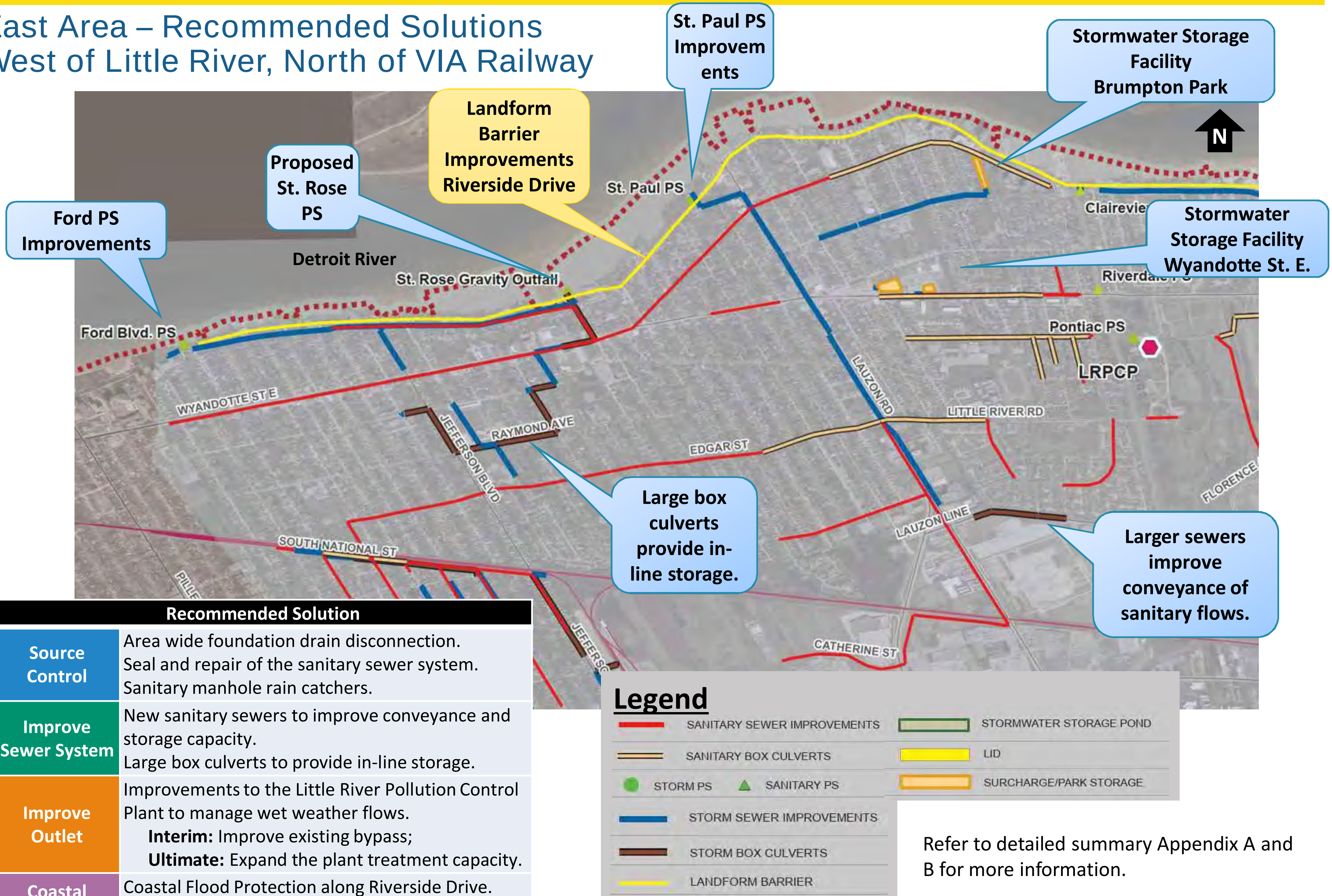
Refer to detailed summary in Appendix A for more information.

East Area – Recommended Solutions: East of Little River, North of Tecumseh Road E.



Recommended Solution	
Source Control	Area wide foundation drain disconnection. Seal and repair of the sanitary sewer system. Sanitary manhole rain catchers.
Improve Sewer System	New sanitary sewers to improve conveyance and storage capacity. Large box culverts to provide in-line storage.
Improve Outlet	Improvements to the Little River Pollution Control Plant to manage wet weather flows. **Interim:** Improve existing bypass; **Ultimate:** Expand the plant treatment capacity.
Coastal	Coastal Flood Protection along Riverside Drive.

East Area – Recommended Solutions West of Little River, North of VIA Railway



Recommended Solution	
Source Control	Area wide foundation drain disconnection. Seal and repair of the sanitary sewer system. Sanitary manhole rain catchers.
Improve Sewer System	New sanitary sewers to improve conveyance and storage capacity. Large box culverts to provide in-line storage.
Improve Outlet	Improvements to the Little River Pollution Control Plant to manage wet weather flows. **Interim:** Improve existing bypass; **Ultimate:** Expand the plant treatment capacity.
Coastal	Coastal Flood Protection along Riverside Drive.

Refer to detailed summary Appendix A and B for more information.

East Area – Recommended Solutions South of VIA RAIL

Refer to detailed summary Appendix A for more information.

Recommended Solution	
Source Control	Area wide foundation drain disconnection. Seal and repair of the sanitary sewer system. Sanitary manhole rain catchers.
Improve Sewer System	New sanitary sewers to improve conveyance and storage capacity. Large box culverts to provide in-line storage.
Improve Outlet	Improvements to the Little River Pollution Control Plant to manage wet weather flows. **Interim:** Improve existing bypass; **Ultimate:** Expand the plant treatment capacity.

Legend

- SANITARY SEWER IMPROVEMENTS
- SANITARY BOX CULVERTS
- STORM PS
- SANITARY PS
- STORM SEWER IMPROVEMENTS
- STORM BOX CULVERTS
- LANDFORM BARRIER
- STORMWATER STORAGE POND
- LID
- SURCHARGE/PARK STORAGE

Estimated Costs - Source Control Measures Private and Public Improvements

Private Property Improvements: (Costs are in Millions of $)

Solution Component	Central Windsor	South Windsor	East Windsor	Sub-Total Costs
City-wide Foundation Drain and Enhanced Private Property Improvement Program (Note 1)	$480.00	$220.00	$250.00	$950.00
City-wide Downspout Disconnection Subsidy Program	$15.30	$20.80	$13.70	$49.80
Sub-Total Private Property Source Control Solutions	**$495.30**	**$240.80**	**$263.70**	**$999.80**

Public Infrastructure Improvements: (Costs are in Millions of $)

Solution Component	Central Windsor	South Windsor	East Windsor	Sub-Total Costs
Sanitary Manhole Sealing Program	$0.00	$0.13	$0.35	$0.48
Backflow Prevention Device Program Allowance	$3.50	$0.00	$3.50	$7.00
Sub-Total Public Infrastructure Source Control Solutions	**$3.50**	**$0.13**	**$3.85**	**$7.48**

Notes:

1. An allowance of $20,000 per home held for the implementation of a subsidy program to disconnect foundation drains for older homes.

Estimated Construction Costs Sewer System Infrastructure and Downstream Improvements

Sewer System Infrastructure Solutions (Costs are in Millions of $)

Solution Component	Central Windsor	South Windsor	East Windsor	Sub-Total Costs
Basement Flooding Solutions - Sanitary System Improvements	$2,561.60	$30.10	$469.20	$3,060.90
Surface Flooding Solutions - Storm System Improvements	$222.10	$130.20	$366.20	$718.50
Sub-Total In-Line Sewer Improvements	**$2,783.70**	**$160.30**	**$835.40**	**$3,779.40**

Coastal Flood Protection Solutions (Costs are in Millions of $)

Solution Component	Central Windsor	South Windsor	East Windsor	Sub-Total Costs
Landform Barrier and Backflow Protection	$0.00	$0.00	$9.00	$9.00
Sub-Total Coastal Flood Protection Measures	$0.00	$0.00	$9.00	$9.00

Downstream Improvements Solutions (Costs are in Millions of $)

Solution Component	Central Windsor	South Windsor	East Windsor	Sub-Total Costs
Lou Romano Water Reclamation Plant - Retention Treatment Basin and Sandwich St. Trunk Sewer	$70.00	$0.00	$0.00	$70.00
Little River Pollution Control Plant - Improved Bypass	$0.00	$0.00	$5.10	$5.10
New or Upgraded Stormwater Pump Stations	$2.40	$0.00	$41.10	$43.5
Sub-Total Downstream Improvements	**$72.40**	**$0.00**	**$46.20**	**$118.60**

Notes:

1. The landform barrier excludes costs for wall structures and/or mechanical gates. Mechanical gates or other flood protection measures required at road crossings are excluded from this estimate.

Summary of Estimated Infrastructure Costs

Sewer System Infrastructure Solutions (Costs are Millions of $)

Solution Component	Central Windsor	South Windsor	East Windsor	Sub-Total Costs
City-wide Foundation Drain and Enhanced Private Property Improvement Program	$480.00	$220.00	$250.00	**$950.00**
City-wide Downspout Disconnection Program	$15.30	$20.80	$13.70	**$49.80**
Sanitary Manhole Sealing Program	$0.00	$0.13	$0.35	**$0.48**
Backflow Prevention Device Program Allowance	$3.50	$0.00	$3.50	**$7.00**
Basement Flooding Solutions - Sanitary System Improvements	$2,561.60	$30.10	$469.20	**$3,060.90**
Surface Flooding Solutions – Storm System Improvements	$222.10	$130.20	$366.20	**$718.50**
Landform Barrier and Backflow Protection	$0.00	$0.00	$9.00	**$9.00**
Lou Romano Water Reclamation Plant - Retention Treatment Basin and Sandwich St. Sanitary Trunk Sewer	$70.00	$0.00	$0.00	**$70.00**
Little River Pollution Control Plant - Improved Bypass	$0.00	$0.00	$5.10	**$5.10**
New or Upgraded Stormwater Pump Stations	$2.40	$0.00	$41.10	$43.5
Grand Total	**$3,354.90**	**$401.23**	**$1,158.15**	**$4,914.28**

Details on the planned expenditure and timing of projects are further detailed in the City Administration July 20, 2020 Council Report.

Estimated Construction Cost Assumptions

- These high level budgetary costs shall be used for capital works planning however they are not based on detailed design of proposed infrastructure.
- Cost estimates are based on 2020 construction prices and exclude applicable taxes.
- Construction cost estimates are Class D Estimates and a +30% contingency has been added.
- An allowance of 20% has been included for engineering including design and site construction observation.
- Landform barrier estimates assume that the flood protection will be provided with an earth berm only. Flood protection measure estimates do not include costs for walls, partial walls or mechanical gate structures.

- Construction costs include:
    - Full road reconstruction of ensure City right-of-way including removals, pavement restoration, sidewalks, bike lanes, local road drainage, streetlights, street trees, manhole rain catchers and traffic control.
    - Storm sewer improvements includes an allowance to implement Low Impact Development (LID) measures. The type of LID suitable for each project will need to be evaluated on a site by site basis.

- Construction costs exclude:
    - Costs for relocating/abandoning utility or railway infrastructure will be over and above the cost estimates provided herein.
    - Land acquisition, land appraisal, legal costs, and expropriation costs.
    - Additional studies including fees to complete Schedule C assessments for applicable projects.
    - Additional site environmental assessments, Record of Site Condition (RSC) assessments or archaeological Stage 2 assessments.
    - Demolition of existing buildings and houses within the project limits have not been included.
    - Fees associated with any required third party agency reviews, permits, and approvals.
    - Costs for annualized maintenance of identified improvements has not been included in the construction cost estimates.
    - Phasing and staging works have not been included.

Implementation

To assist City administration in planning and scheduling recommended solutions projects have been a priority level based on various criteria. Immediate priority projects have been identified first. The remaining projects were ranked using a ranking system developed to score projects based on the below criteria. Projects were assigned a priority (High, Medium and Low) based on this system.

Condition of Existing Sewers	Flood Reduction Effectiveness	Emergency Access
Cost Efficiency	Reduction of Combined Sewer Overflows (CSOs)	Access to Vulnerable Areas

Criteria was based on feedback from City Administration and the SAC (Stakeholder Advisory Committee).

It is recommended that the City continuously review and re-evaluate the prioritization list, especially as it relates to future climate change projections, and how the list overlaps with other road/capital projects or maintenance programs.

It is important to note that public infrastructure improvements are only one part of the comprehensive solution to mitigate flooding and that the implementation of private property source control and protection measures are critical in achieving the established level of service. Continuous sewer system monitoring and modelling analysis will be required to confirm that the anticipated benefit is achieved.

As projects and source control measures are implemented, the risk of flooding will be reduced.

Project Prioritization

Immediate Solutions

- Assigned to projects that have already received funding or includes programs/initiatives that set the stage to reduce

Non Immediate Projects are ranked as High, Medium and Low Priority based on detailed ranking system.

High Priority Solutions	Medium Priority Solutions	Low Priority Solutions

Implementation: The City has already begun!

Existing Programs and Construction Projects Already Underway

- ✓ Inflow and Infiltration Reduction Program: Completing the extensive condition assessment on sewer infrastructure to guide maintenance and upgrade decisions (70% of City's sewers have been assessed).
- ✓ Basement Flooding Subsidy Program: (Uptake: 10% City residents).
- ✓ Downspout Disconnection Program (Uptake: 8% City residents).
- ✓ Disaster Mitigation and Adaption Fund:
  - ✓ Matthew Brady Storm Sewer and LIDs – Phase 1.
  - ✓ Tranby Park Stormwater Management Improvements (2020).

Upcoming Programs and Construction Projects (0-8 years)

- ✓ Sealing manhole covers in low lying area.
- ✓ Determining how to fund stormwater projects (Stormwater Financing Study).
- ✓ Prepare and facilitate an Enhanced Educational Program to educate the community on measures residents can do in their home.
- ✓ Updating the City's Development Standards Manual.
- ✓ Implementing Pilot Projects, Sewer Monitoring and Evaluation of Solutions to test benefit of recommended source control measures.
- ✓ Storm Sewer System Improvement in Riverside Area funded by Disaster Mitigation and Adaptation Fund (DMAF), see below.

Disaster Mitigation and Adaptation Fund - Round 1

- Little River Pollution Control Plant Overflow Improvements.
- St. Paul Pump Station Improvements.
- East Marsh Pump Station- Pump Replacement.
- Brumpton Park Stormwater Management Improvements.
- Riverside Vista Reconstruction -Phase 2A: Large storm trunk sewer between St. Rose Ave. and Ford Blvd. including the construction of the Landform Barrier in applicable areas along the north boulevard. (2020-2024).
- Storm sewer improvements along Belleperche Place, Cedarview St., Matthew Brady Blvd., Belle Isle View Blvd., Eastlawn Ave. and within the East Marsh Drainage Areas.

Tranby Park
Underground Stormwater
Management Facility Construction
(May 2020)

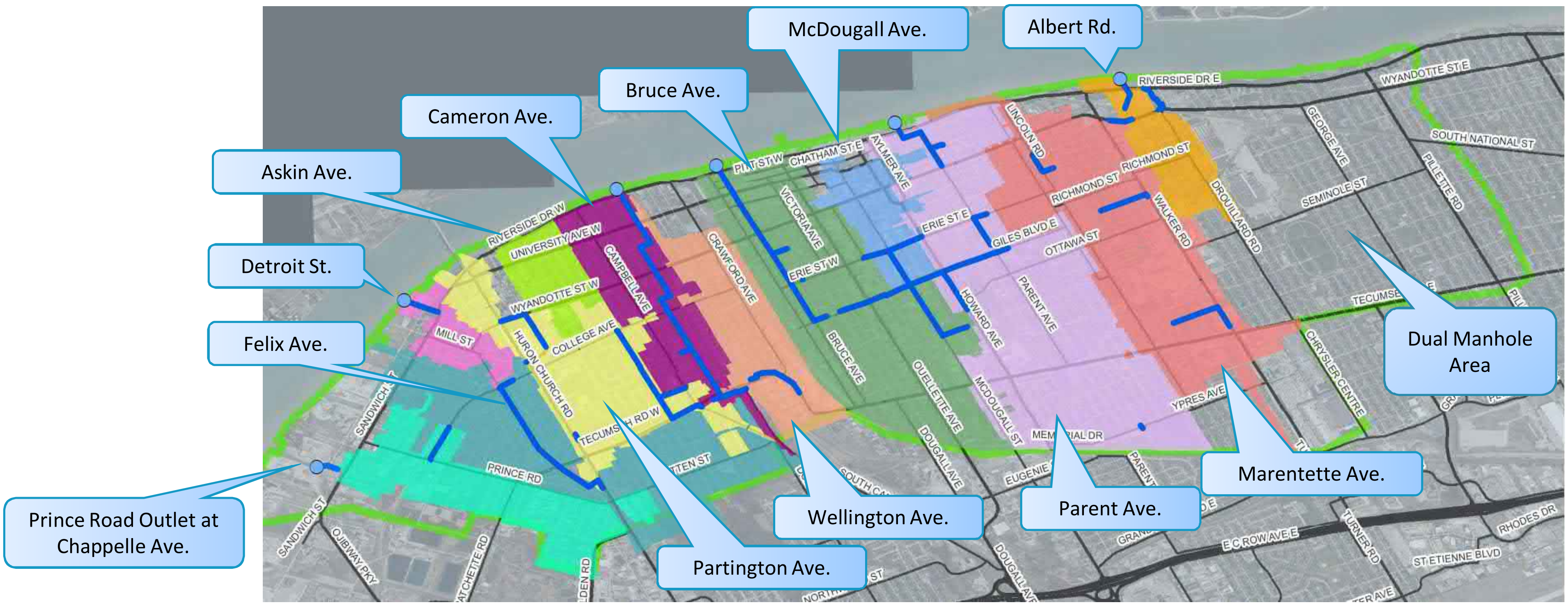
Disaster Mitigation and Adaptation Fund - Round 3 (Funding Pending)

- St. Rose Ave. Pump Station.
- St. Rose Ave. Storm Trunk Sewer.
- Ford Blvd Pump Station Upgrades.
- Sanitary Trunk Sewer within the Riverside Vista Phase 2A limits.
- Sanitary Trunk Sewer along the St. Rose Ave. Storm Sewer Trunk.

Basement Flood Risk Mitigation Projects Prioritization

Priority	Central Area: Enhanced Sewer Separation
Immediate Priority (0 – 8 Years)	Lou Romano Water Reclamation Plant Retention Treatment Basin and Sandwich St. Sanitary Sewer
	Prince Road Storm Trunk Sewer Outlet at Chappelle Ave.

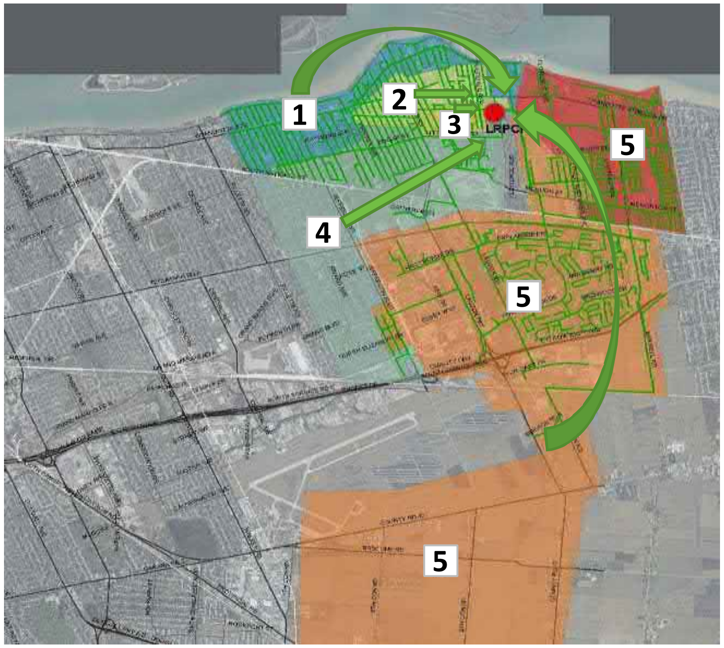
Priority	Trunk Storm Sewer Improvement and Drainage Area Enhanced Sewer Separation
High Priority	Cameron Ave. Trunk Sewers
Medium Priority	Wellington Ave. Trunk Sewers
	McDougall Ave. Trunk Sewers
	Marentette Ave. Trunk Sewers
	Parent Ave. Trunk Sewers
	Bruce Ave. Trunk Sewers and Separation
	Detroit St. Outlet and Separation
	Partington Ave. Trunk Sewers and Separation
Low Priority	Albert Rd. Outlet and Separation
	Dual Manhole Area Separation
	Askin Ave. Sewer Separation
	Felix Ave. Sewer Separation



Basement Flood Risk Mitigation Projects Prioritization

Priority	East and South Area Sewer System Improvements
Immediate Priority Projects (0 – 8 Years)	Little River Pollution Control Plant Overflow Improvements Riverside Drive Sanitary Trunk Sewer - Ford Blvd. To St. Rose Blvd. St. Rose Ave. Sanitary Trunk Sewers- Riverside Drive to Wyandotte Street East.
High Priority	**East Windsor Area 1: Martinique Inlet Sanitary Sewer Infrastructure** Riverside Dr E, St. Rose Ave, Ganatchio Trail, Clairview Ave)
Medium Priority	**South Windsor Area: Sanitary Sewer Infrastructure** (Howard Ave., Dominion Blvd., Roselawn Dr., Woodland Ave., Parkwood Ave., Sydney Ave., Malcolm Ave., Foster Ave., Calderwood Ave., EC Row Ave. E, Conservation Dr., Grand Marais Rd. E., Tourangeau Rd.) **East Windsor Area 2: Wyandotte Inlet Sanitary Sewer Infrastructure** (Wyandotte St. E., Carling Cres.) **East Windsor Area 4: Edgar Inlet Sanitary Sewer Infrastructure** (Edgar St., Tranby Ave., Little River Rd., Little River Acres Dr., Catherine St., Lauzon Pkwy., Lauzon Rd., South National St., Jefferson St., Balfour Blvd., Glendale Ave., Ferndale Ave., Ford Blvd., Tecumseh Rd. E., Rivard Ave., Grandview St., Courtland Cres., Coronation School Yard/Pikes Park/WECHC, Rose St., Jos St. Louis Ave.) **East Windsor Area 3: Jerome Inlet Sanitary Sewer Infrastructure** (Jerome St., Westchester Dr., Rholaine Dr., Greendale Dr., Thompson Park)
Low Priority	**Sanitary Sewer Infrastructure East Area 5:** **East/South Inlet via Aspenshore and Beverly Glen** (East Riverside, Forest Glade and Sandwich South)

East Windsor Sanitary Sewer Areas:



The East Windsor area is broken into 5 areas which correspond to the individual inlets to the Little River Pollution Control Plant (LRPCP).

Major Roadway Flood Risk Mitigation Prioritization

Priority	Road Surface Flooding	
Immediate Priority	Dorchester Rd. - Prince Rd. to Huron Church Rd. Sewer Separation Improvements	Ellis St. and Giles Blvd. - McDougall Ave. to Howard Ave. Sewer Separation Improvements
	Totten St. - Betts Ave. to East of Partington Road Sewer Separation Improvements	Prince Rd. Storm Relief System and Schedule C EA Chappell Ave. - West of Sandwich St. to McKee Creek (Detroit River Outlet)
	Felix Ave. at Marlborough Blvd.. Sewer Separation Improvements	
	Lauzon Parkway Reconstruction	
High Priority	Dougall Parkway at the CN Rail Crossing and Eugenie St. E.	Tecumseh Rd. W. at Crawford Ave.
	Howard Ave. at EC Row Expressway	
Medium Priority	Mc Norton St., East of Banwell Ave.	Banwell Ave.
	Roseville School and Rose-Ville Garden Dr.	Ypres Ave.
	Giles Blvd.	Huron Church Rd.
	Mc Hugh St., East of Lauzon Rd.	Parent Ave.
	Jefferson Blvd.	Lauzon Rd.
	Jefferson Blvd. and South National St.	
Low Priority	Chrysler Centre	College Ave.
	Mc Hugh St., West of Banwell Ave.	Patricia Rd.
	Wyandotte St. East at Watson Ave.	Lincoln Rd.
	Drouillard Rd.	Ontario St.
	Walker Rd.	

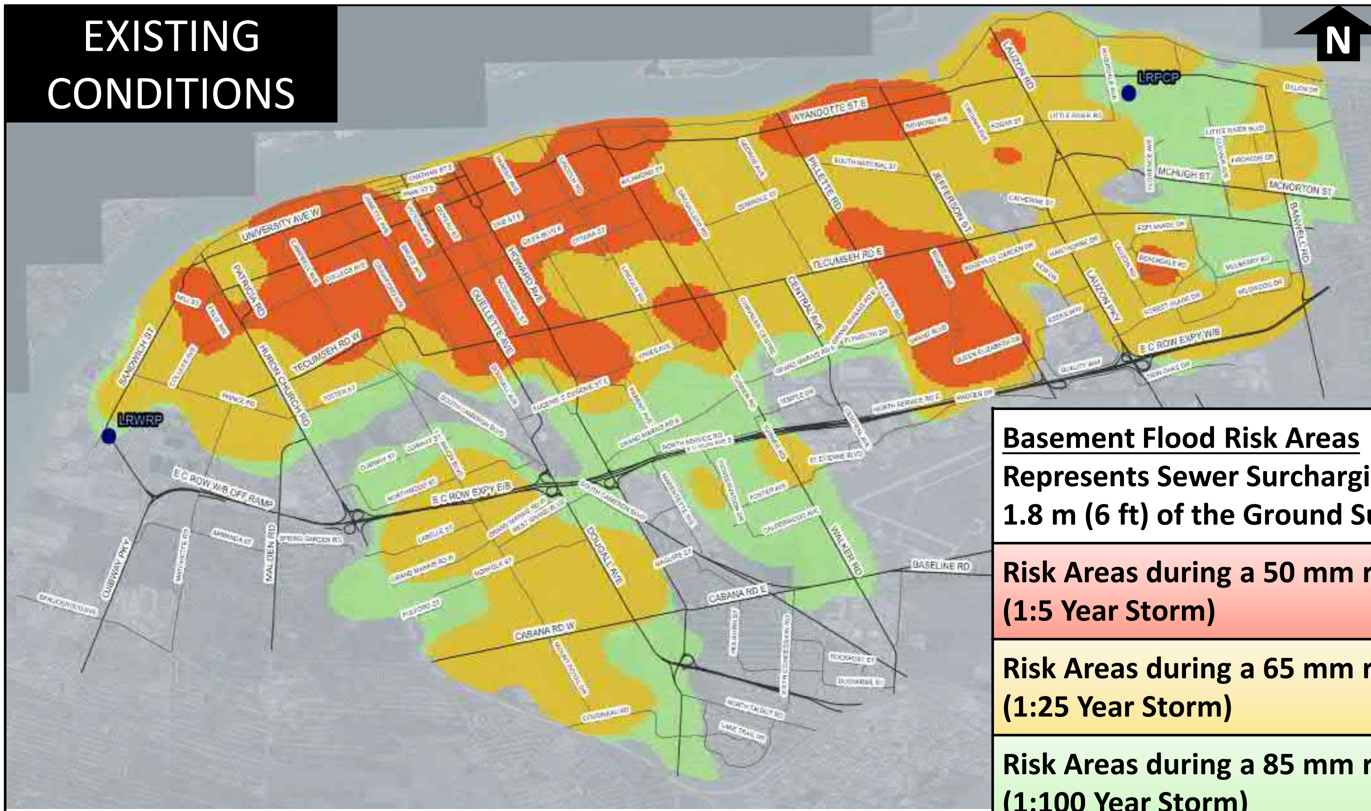
Regional Area Flood Risk Mitigation Projects Prioritization

Priority	Regional Area Surface Flooding
Immediate Priority	DMAF Round 1 Projects DMAF Round 3 Projects (Pending Funding)
High Priority	Storm Problem Areas 1 and 2 - Riverside Ford Blvd to Lauzon Road
	Storm Problem Area 3 and 4 - Fontainebleau and Lauzon Parkway
Medium Priority	Storm Problem Area 7 - Central/Pillette/Grand Marais
	Storm Problem Area 8 - Southwood Lakes
Low Priority	Storm Problem Area 5 - Blue Heron Pond
	Storm Problem Area 6 - Pontiac and East Marsh Drainage Area

Coastal Flood Risk Mitigation Project Prioritization

Priority	Projects
Immediate Priority (0- 8 years)	Area 1: Riverside Drive East, Ford Blvd. to St. Rose. Ave. (To be constructed as part of the Riverside Vista Phase 2A Project and pending funding through DMAF)
High Priority	Area 2: Riverside Drive East, St. Rose Ave. to Riverdale Ave. and Backflow Prevention Measures. Area 3: East Riverside Area, Riverdale Ave. to East City limits (Ganatchio Trail) and Backflow Prevention Measures.

What is the benefit?
Basement Flooding Risk Areas



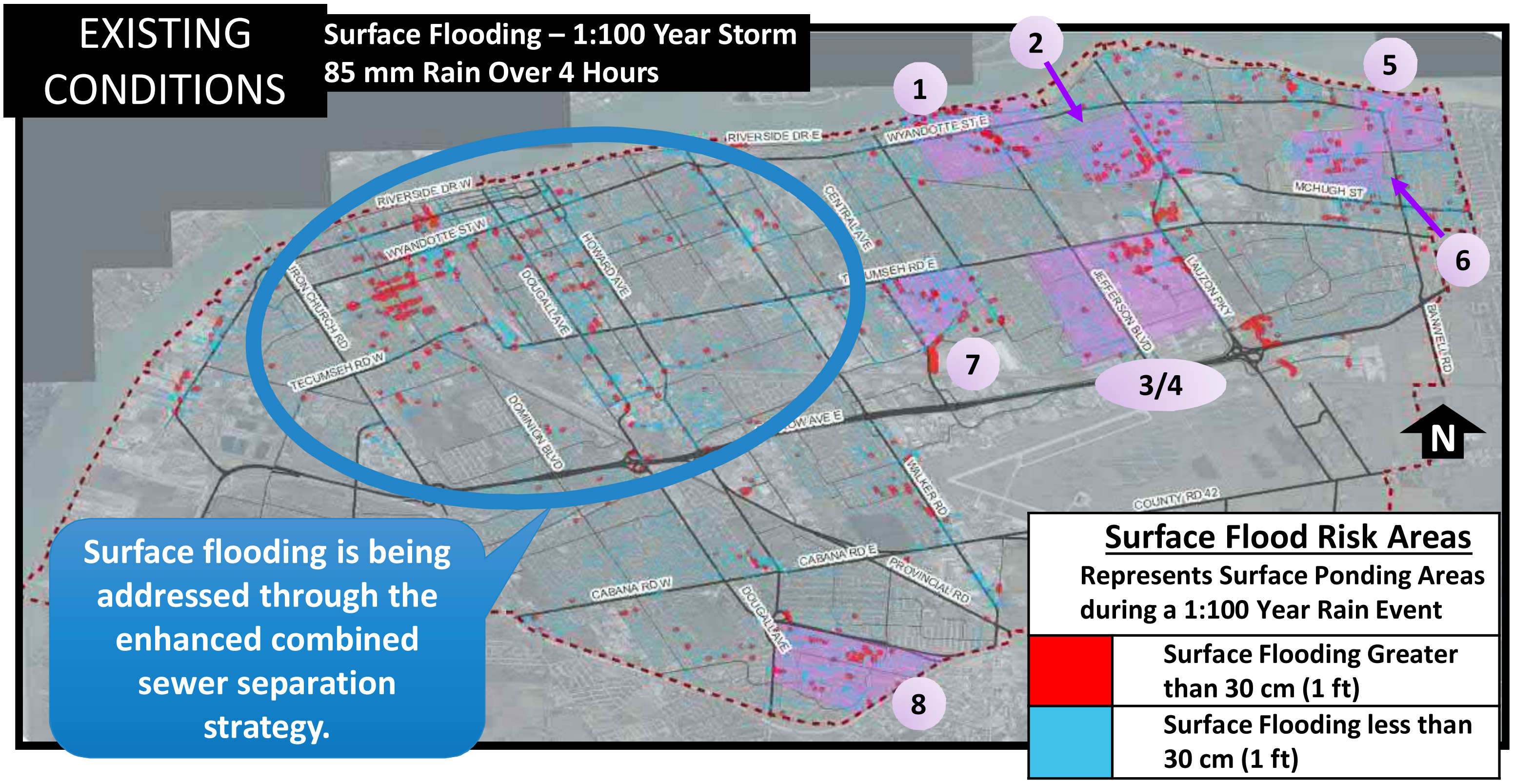
Basement Flood Risk Areas
Represents Sewer Surcharging within 1.8 m (6 ft) of the Ground Surface

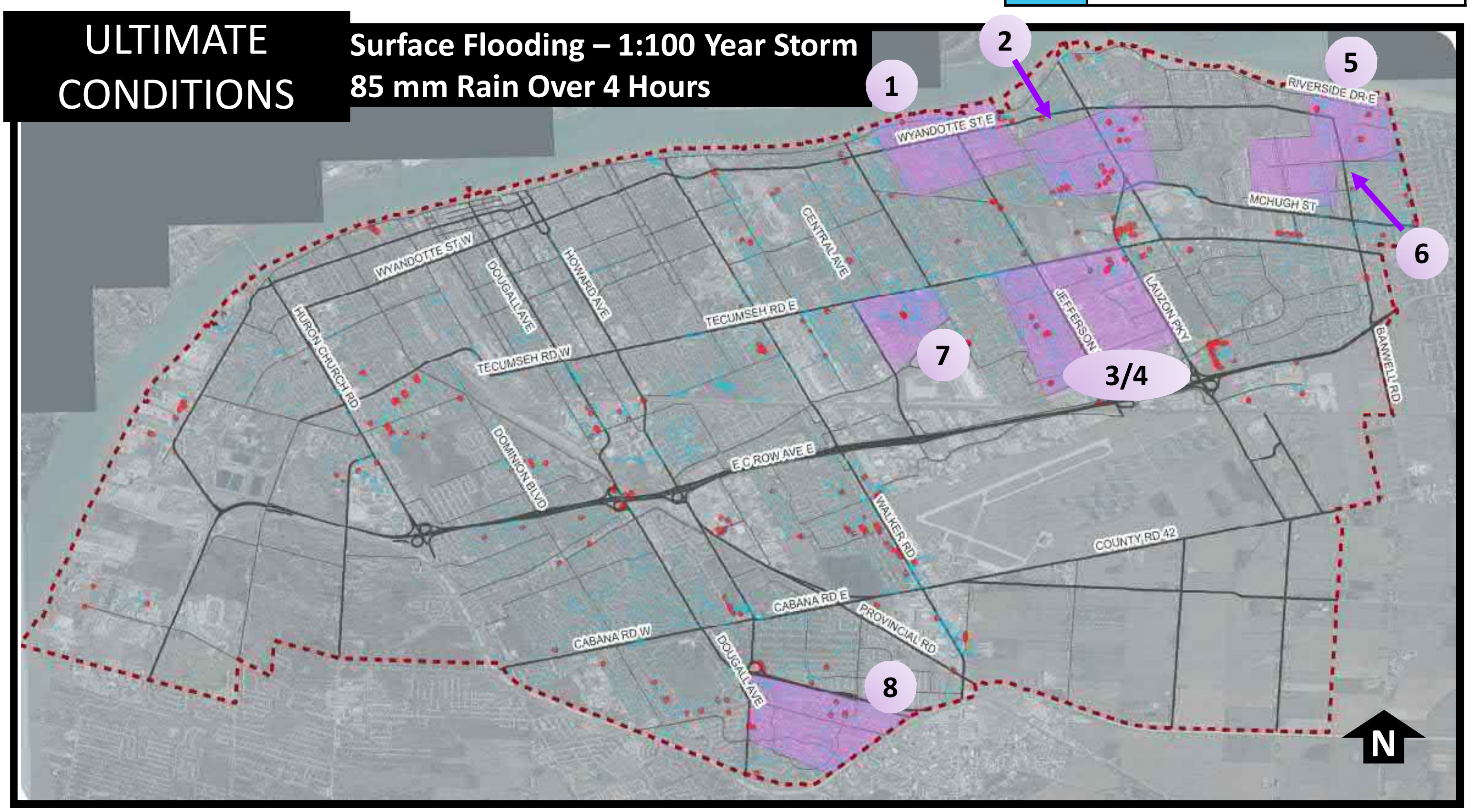
Risk Areas during a 50 mm rain (1:5 Year Storm)

Risk Areas during a 65 mm rain (1:25 Year Storm)

Risk Areas during a 85 mm rain (1:100 Year Storm)

What is the benefit?
Surface Flooding Risk Areas





Mitigation of Impacts

The City of Windsor is committed to minimizing potential impacts on people and the environment and will implement the following where appropriate:

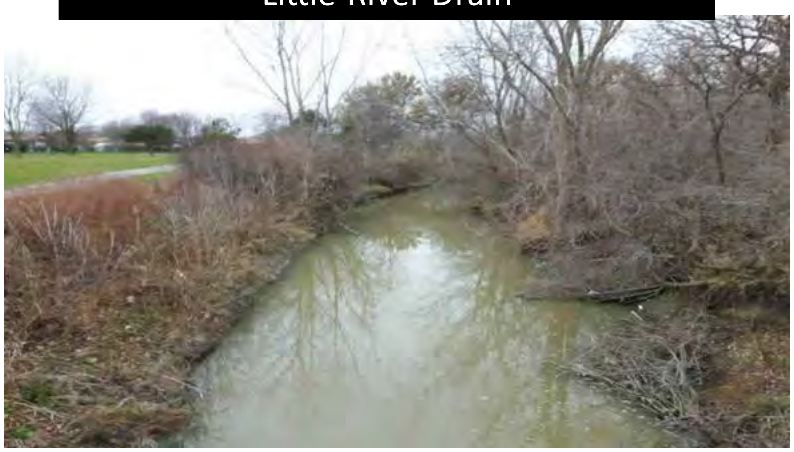
Construction and Maintenance

- Considering input from neighbours in discussions on design, landscaping and park improvements for pumping stations and ponds;
- Informing neighbours about upcoming construction and any temporary impacts on access;
- Using construction best management practices to minimize disruption such as controlling dust and following noise by-laws; and
- Expansion of maintenance programs to include proposed infrastructure.

Property Impacts

- Easements for proposed infrastructure for maintenance;
- Property acquisition or easements where necessary to implement solutions; and
- Incorporating legal status onto flood protection features on private property.

Little River Drain



Archaeological Resources

- Completing in-field archaeological assessments prior to construction and notifying appropriate agencies, should unexpected resources be recovered during construction.

Natural Environment

- Minimizing tree removal and replacing any trees removed.
- Development of mitigation plans to protect terrestrial and aquatic habitat.

Class EA Project Schedules

This master plan will satisfy the EA requirements for **Schedule B** projects.

Schedule B Projects:

The following is a general description of Schedule B projects that have been identified among the preferred solutions:

- New and Improved Stormwater Pump Stations;
- New Stormwater Management Ponds and Underground Storage Facilities on Private Property;
- New Low Impact Development (LID) Measures on Private Property;
- New Sanitary/Storm Trunk Sewers and Box Culverts Requiring Additional Property;
- New Storm Sewers including Upgrades to Existing Outlets to the Detroit River; and
- Barrier Landform Improvements on Riverside Drive that Require Additional Property.

Schedule C Projects:

The following is a general description of Schedule C projects that have been identified among the preferred solutions, and which will require additional Class EA studies prior to implementation:

- New Trunk Storm Sewers that require new outlets to the Detroit River;
- Improvements to the Little River Pollution Control Plant wastewater treatment facility, including:
    - Improvements to the existing bypass at the Pontiac pump station;
    - Interim measures to optimize the operation of the Little River Pollution Control Plant for existing wet weather flows; and
    - Future treatment plant expansion to meet the ultimate development needs.

The project schedules for the recommended solutions are noted in Appendix A for each solution and will be identified in the Notice of Completion. Prior to implementing any Schedule C project, additional consultation and investigation, which will fulfill Phases 3 and 4 of the Municipal Cass EA, will need to be completed and provided for public review.

During the 30 Day Review period, any person who has significant concerns about the project may request a Part II Order to request a change in the status of a the project.

If no objections are received, these projects are approved for construction.

Conclusions

- ✓ Recommendations to mitigate risk of basement, surface and coastal flooding have been developed based on the established level of service.
- ✓ The effectiveness of solutions rely on a partnership between private property owners and the City.
- ✓ The total cost of recommendation solutions will be $4.90 Billion Dollars, which will be integrated into the City's capitals works program.
- ✓ The ultimate solution recommendations will need to be integrated into the City's asset management program.
- ✓ City will need to enhance their current operation and maintenance programs for new and larger infrastructure.

What's Next

Complete Master Plan (Sept 2020)	Notice of Completion (Oct 2020)	30-Day Review (Oct 2020)	Implement Immediate Recommended Solutions

The City will review the need to complete a detailed formal review and/or update of the master plan every 5 years. Potential changes which may trigger the need for a detailed review are as follows:

- Major changes to original assumptions;
- Major changes to components of the Master Plan;
- Significant new environmental effects; and
- Major changes in proposed timing of projects within the Master Plan.

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City of Windsor

SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

degrees of CHANGE

APPENDIX A
FINAL RECOMMENDATION REPORT
SOLUTION SUMMARY

July 2020

Presented by:

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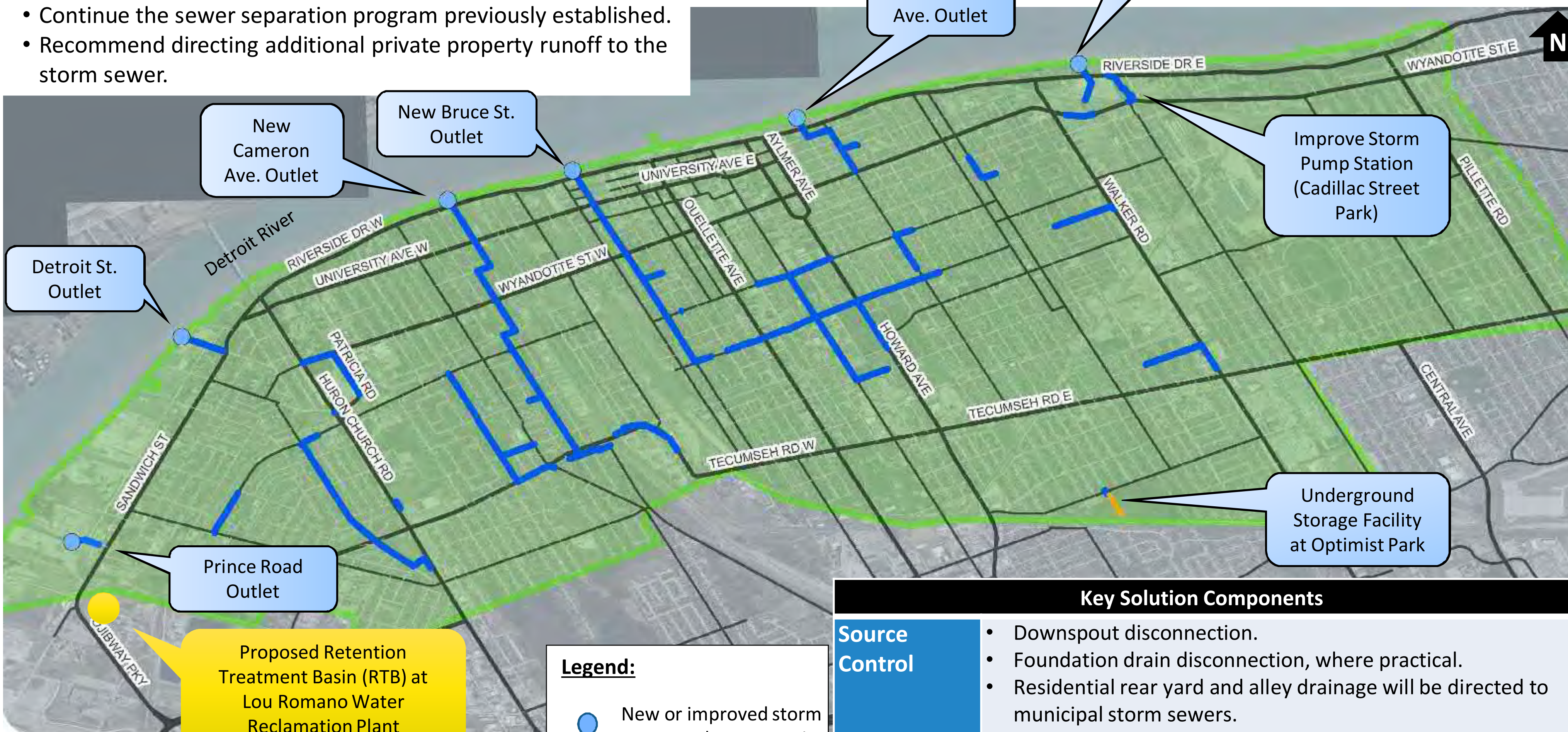
Enhanced Sewer Separation (SAN-C-1)

- Continue the sewer separation program previously established.
- Recommend directing additional private property runoff to the storm sewer.



Solutions Objectives:
Under the Climate Change Storm (1:100 year + 40% Factor) conditions, surface flooding on major roadways and sensitive land uses should be less than 30 cm (1 ft.).

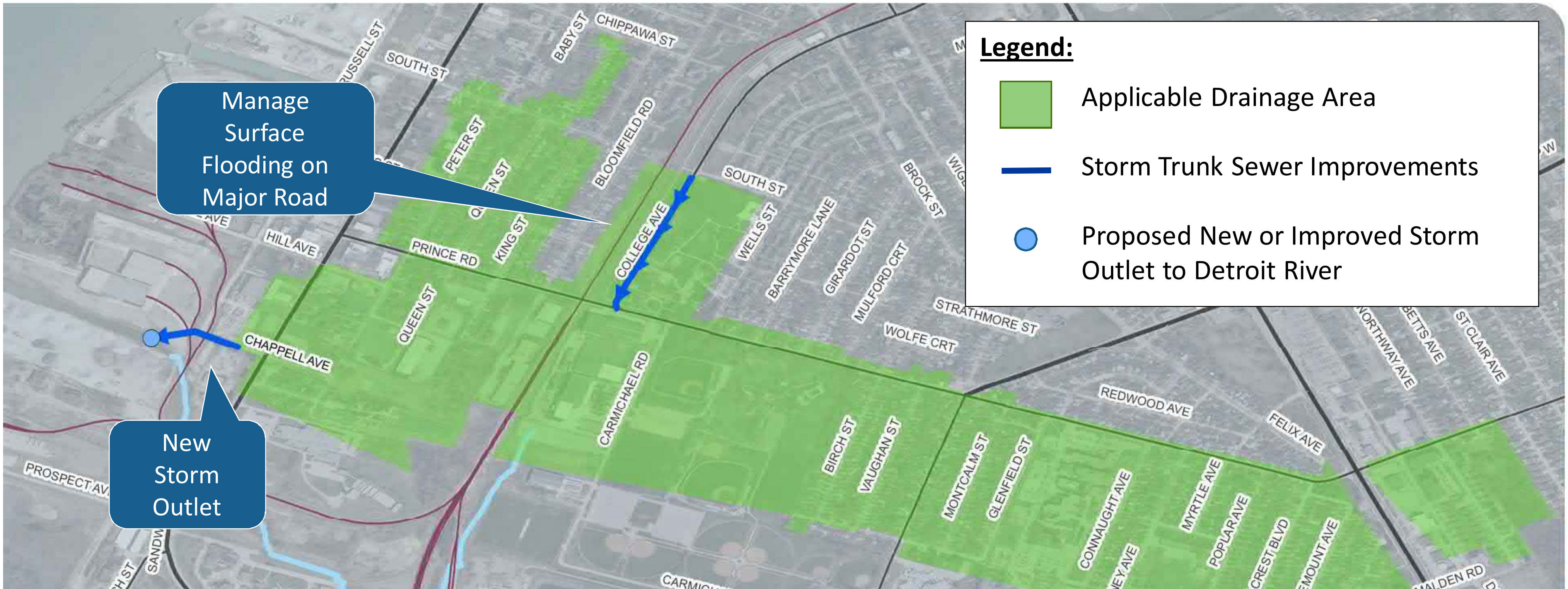
Under 1:100 year storm, surface flooding with the new sewer should be less than 30 cm (1 ft.).

Legend:

- New or improved storm sewer outlet to Detroit River.
- Proposed storm trunk sewer improvements.
- Underground SWM Storage Facility.
- Combined sewer area.

Key Solution Components	
Source Control	• Downspout disconnection. • Foundation drain disconnection, where practical. • Residential rear yard and alley drainage will be directed to municipal storm sewers. • Larger buildings (commercial, apartments, etc.) may have roof drainage directed to the combined sewer. Upon redevelopment separate internal plumbing.
Improve Sewer System	• Direct all runoff to new separated storm sewers. • Construct storm sewers along all roadways. • Replace combined sewers with separated sanitary sewers. • Direct alley drainage to storm sewer.
Improve Outlet	• Retention Treatment Basin (RTB) at Lou Romano Water Reclamation Plant to better management of wet weather flows and reduce frequency of combined sewer overflows.

Prince Road Outlet and College Avenue Trunk Storm Sewer Improvements



Recommended Improvements:

College Ave. (STM-C9): Schedule A+ Project

- Approximately 400 m of new storm sewers, with low impact development (LID) measures, to manage surface. flooding under the Climate Change Storm (1:100 year + 40% Factor).
- Schedule A+ Project.

- West of the intersection of Chappell Ave. and Sandwich St. (STM-C1):
  - Approximately 200 m of new storm sewers to an outfall to the McKee Creek.
  - Proposed outlet to provide storm sewer outlet for proposed separation of the Prince Road Drainage Area.
  - Enhanced sewer separation of drainage area.
  - Schedule C Project – Additional Environmental Assessment Requirements

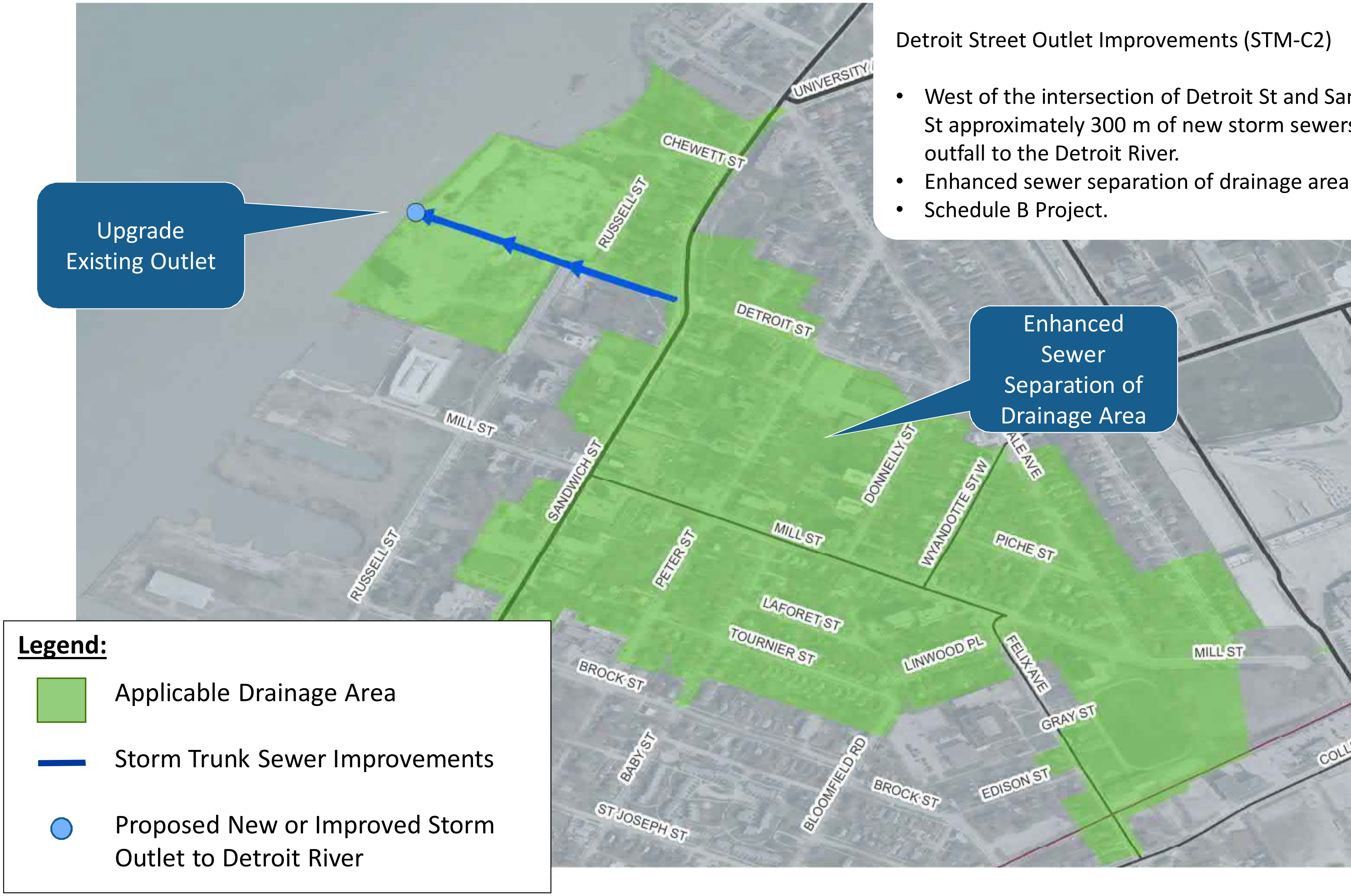
Felix Avenue Trunk Storm Sewer Improvements

<u>Recommended Improvements:</u>

Felix Ave. Storm Sewer Improvements (STM-C10)

- Construction of approximately 1600 m of new storm sewers, starting just south of the intersection of Huron Church Rd and Dorchester Rd., heading westerly along Dorchester Rd and Felix Ave., connecting to the existing sewer at College Ave.
- Enhanced sewer separation of drainage area.
- Schedule A+ Project.

Detroit Street Trunk Storm Sewer Outlet Improvements

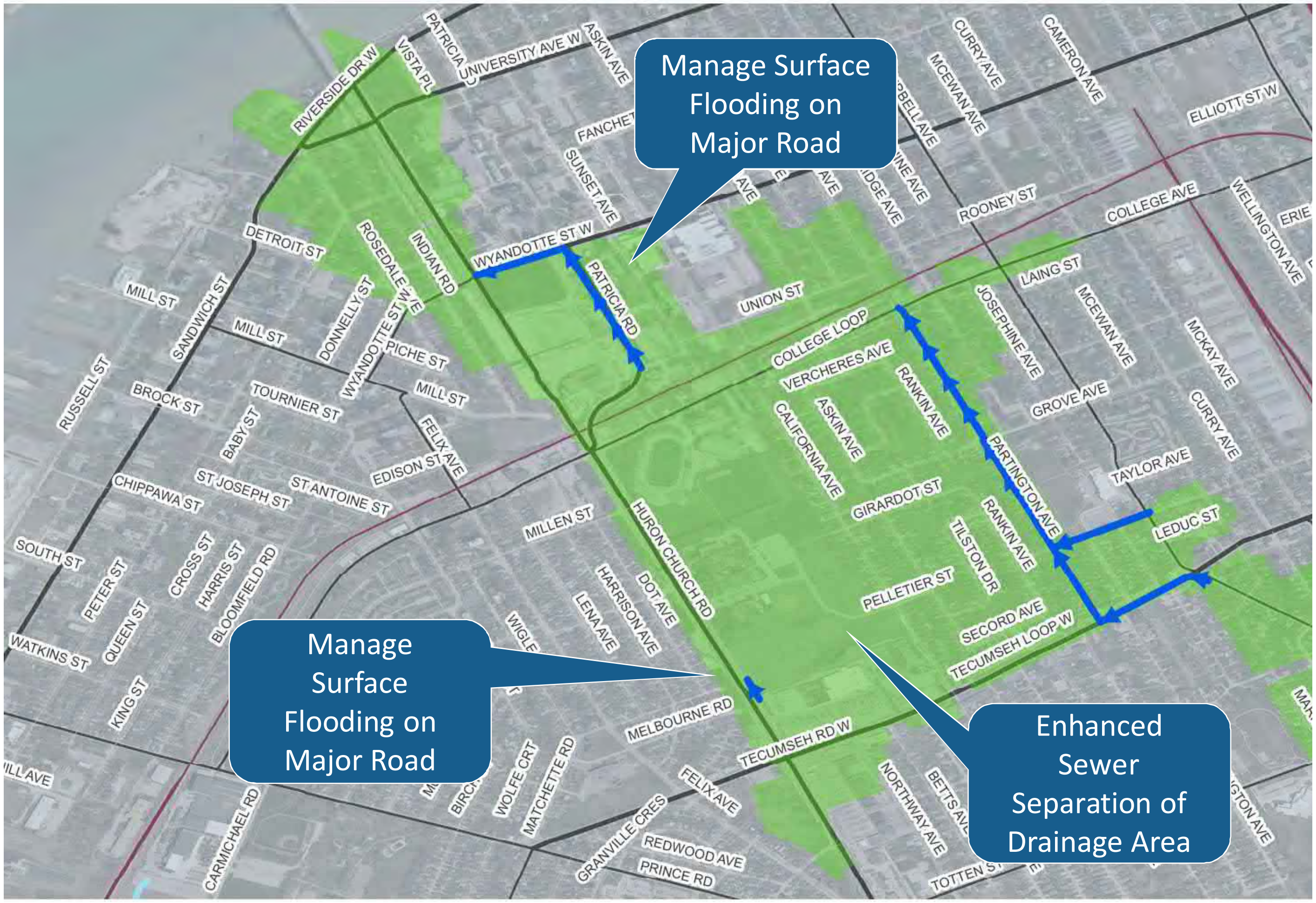


<u>Proposed Improvements:</u>

Detroit Street Outlet Improvements (STM-C2)

- West of the intersection of Detroit St and Sandwich St approximately 300 m of new storm sewers to an outfall to the Detroit River.
- Enhanced sewer separation of drainage area.
- Schedule B Project.

Partington Avenue, Patricia Road and Huron Church Rd. Storm Sewers Improvements



Legend:

Applicable Drainage Area

Storm Trunk Sewer Improvements

Recommended Improvements:

Partington Ave. (STM-C11)

- 1300 m of new storm sewers starting just south of the intersection of Tecumseh Rd. W. and Dominion Blvd. heading westerly along Tecumseh Rd. W., then connecting to existing storm sewer at College Ave.
- Enhanced sewer separation of drainage area.
- Storm Sewers to manage surface flooding under the Climate Change Storm (1:100 year + 40% Factor):

  Patricia Rd. (STM-C12)

  - Construction of 650 m sewer along and Wyandotte St. W and Patricia Rd. connecting to the existing storm sewer at Huron Church Rd.

  Huron Church Rd. (STM-C13)

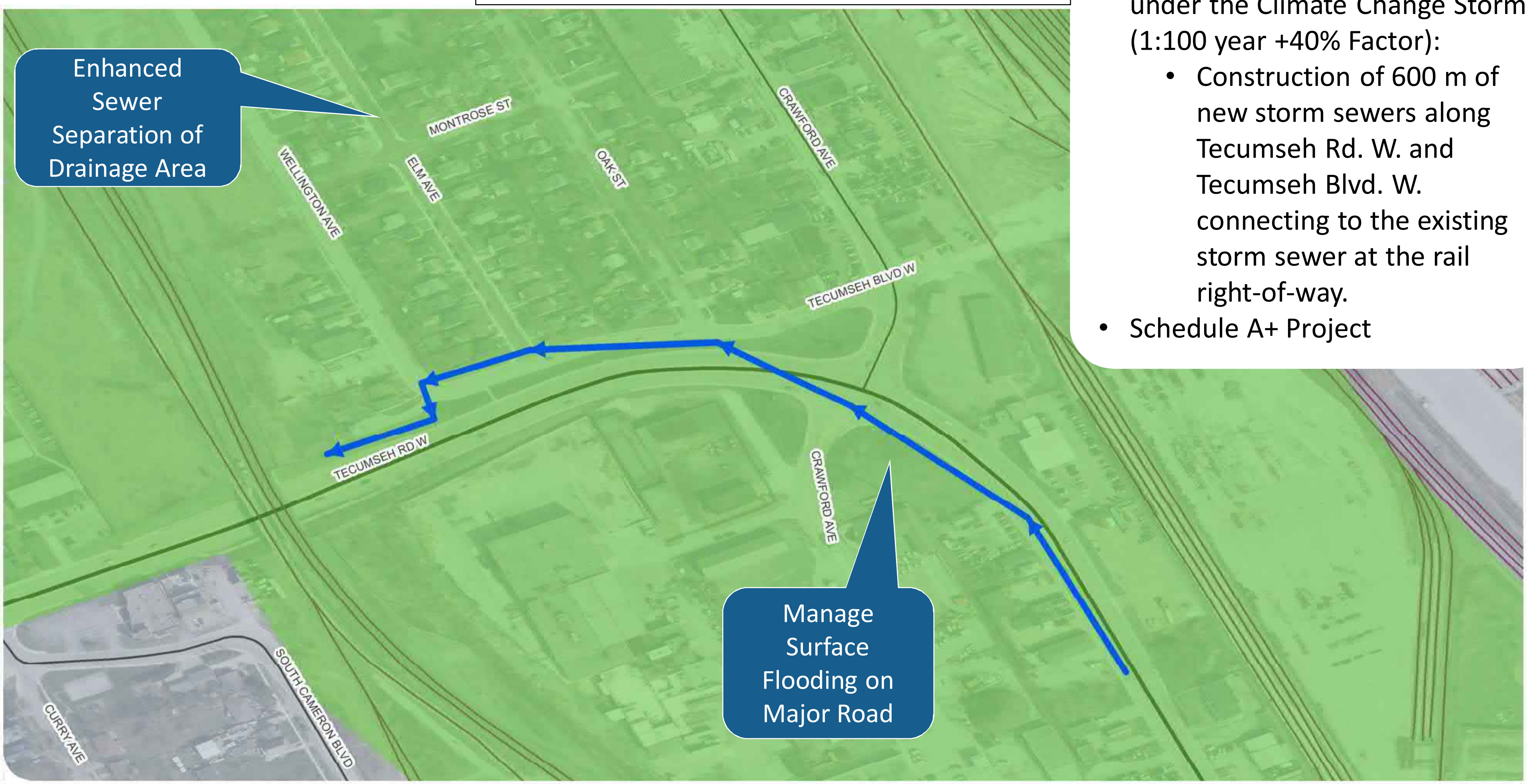
  - Construction of 70 m of large sized storage pipes and low impact development measures, north of the intersection of Huron Church and Tecumseh Rd. W.

- All Schedule A+ Projects

Tecumseh Road West Storm Sewer Improvements

Legend:

- Applicable Drainage Area
- Storm Trunk Sewer Improvements



Recommended Improvements:

Tecumseh Road (STM-C14)

- To manage surface flooding under the Climate Change Storm (1:100 year +40% Factor):
  - Construction of 600 m of new storm sewers along Tecumseh Rd. W. and Tecumseh Blvd. W. connecting to the existing storm sewer at the rail right-of-way.
- Schedule A+ Project

Cameron Avenue Storm Sewer Improvements

Legend:

- Applicable Drainage Area
- Storm Trunk Sewer Improvements
- Proposed New or Improved Storm Outlet to Detroit River

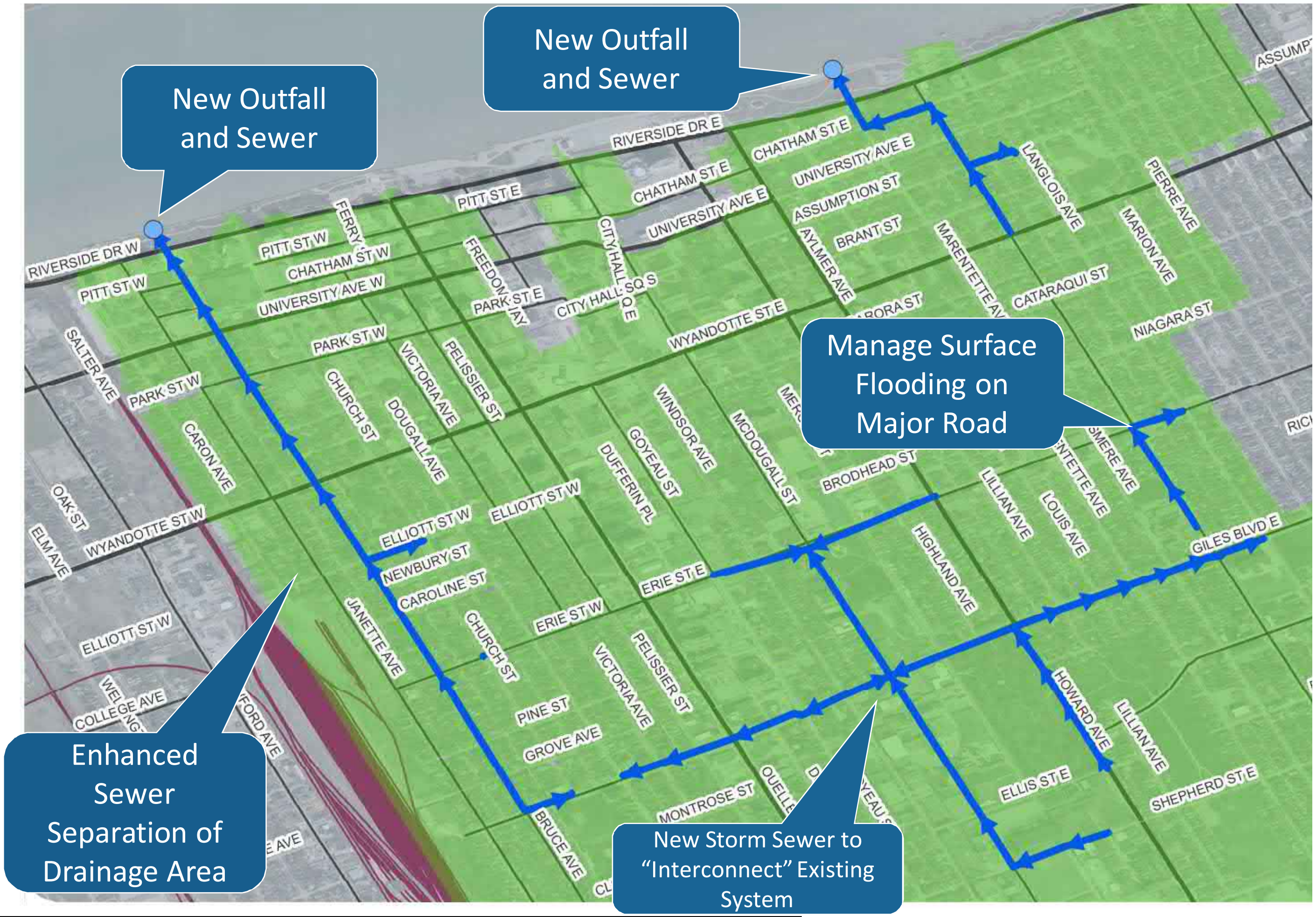
<u>Recommended Improvements</u>

Cameron Ave. Storm Trunk Sewer (STM-C3)

- Construction of 2700 m of new storm sewers along Tecumseh Road, Curry Ave., McKay Ave. and Cameron Ave to new outfall at Detroit River.
- New outlet to the Detroit River.
- Enhanced sewer separation of drainage area.

Schedule C Project – Additional Environmental Assessment Requirements

Bruce Avenue and Marentette Avenue Drainage Area Improvements



Legend:

- Applicable Drainage Area
- Storm Trunk Sewer Improvements
- Proposed New or Improved Storm Outlet to Detroit River

<u>Recommended Improvements</u>

Bruce Ave. (STM-C4)

- Construction of 2000 m of new storm sewers along Bruce Ave. to a proposed outlet to Detroit River.
- Schedule C Project.

Giles Blvd., Erie St. and McDougall St. (STM-C15)

- Construction of 1500 m of new storm sewers along Giles Blvd., Erie St. and McDougall St. This sewer is designed to "interconnect" the existing storm sewers to better equalize flows in the system.
- Schedule A+ Project.

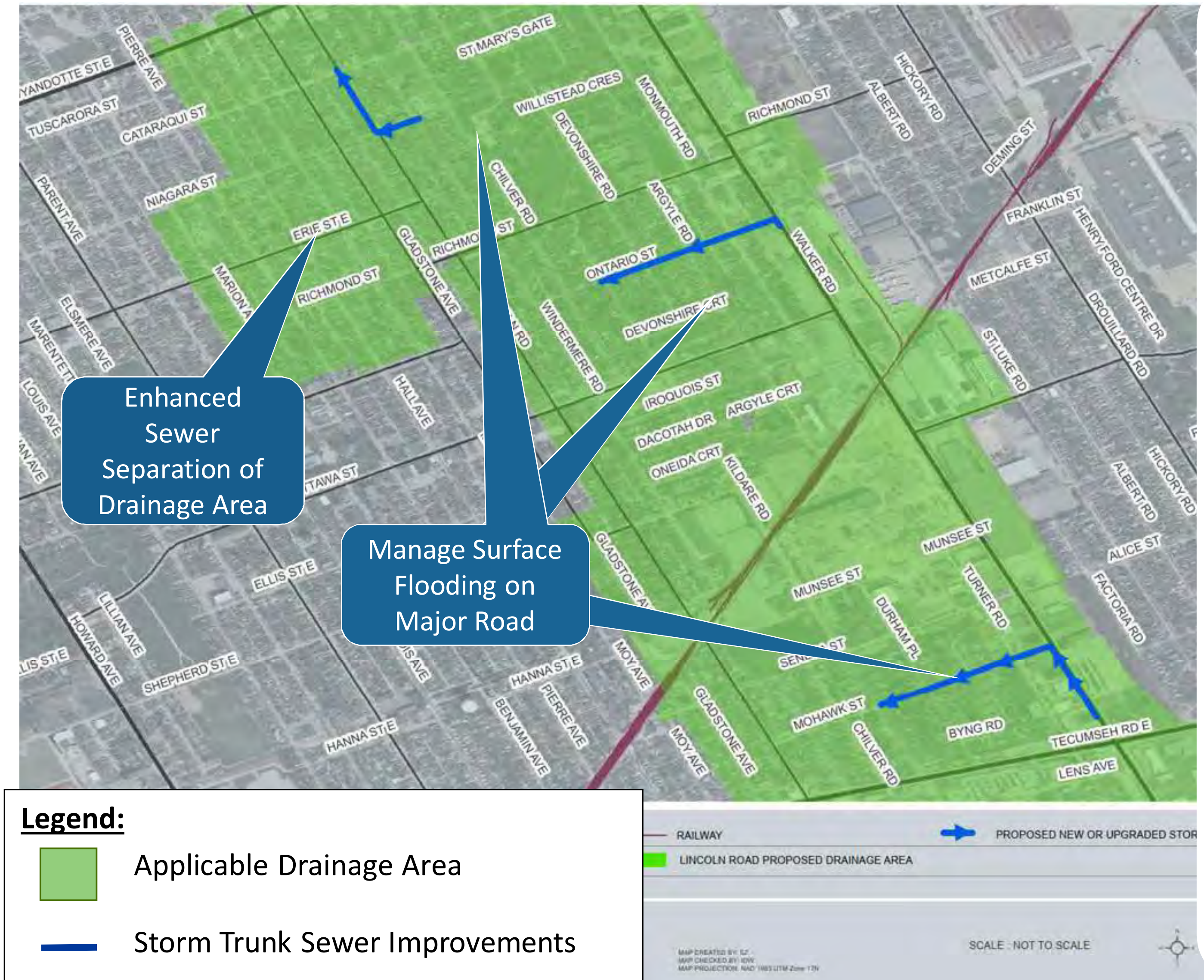
Marentette Ave. Outlet Improvements (STM-5)

- Construction of 800 m of new storm sewers along Parent Ave. to a proposed outfall at the Detroit River.
- Schedule C Project.

Parent Ave. (STM-16)

- To manage surface flooding under the Climate Change Storm (1:100 year +40% Factor):
    - Construction of 450 m of new storm sewers along Parent Ave. north of Giles.
- Schedule A+ Project.
- Enhanced sewer separation of entire drainage area.

Lincoln Road, Ontario Street and Walker Road Storm Sewer Improvements



Legend:

- Applicable Drainage Area
- Storm Trunk Sewer Improvements
- Proposed New or Improved Storm Outlet to Detroit River

Recommended Improvements

- To manage surface flooding under the Climate Change Storm (1:100 year + 40% Factor) on Walker Rd.:

Lincoln Rd. (STM-C17)

- `Construction of 300 m of new storm sewers along **Lincoln Rd.** between Niagara St. and Cataraqui St.

Ontario St. (STM-C18)

- Construction of 440 m of new storm sewers along **Ontario St.** between Walker Rd. and Kildare Rd.

Walker Rd.

- Construction of 640 m of new storm sewers along **Walker Rd.** between Tecumseh Rd. E and Mohawk St. and along **Mohawk St.** between Walker Rd and Kildare Rd.

- Enhanced sewer separation of drainage area.
- All Schedule A+ Projects.

Ypres Avenue Stormwater Management Facility Improvements

Recommended Solution:

- Reduce surface flooding risk on Ypres Ave. under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.).

Schedule B Project

	Key Solution Components
Source Control	• Disconnection of roof downspouts. • Foundation Drain Disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New underground storage facility under the existing parking lot.
Improve Outlet	• No changes to the system outlet.

Legend:

New Underground Storage Facility

Storm Trunk Sewer Improvements

Drouillard Road Storm Sewer and Pump Station

Solution Objective:

Reduce surface flooding risk for major roadways.

- Under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm(1 ft.) along the Drouillard Rd. and Wyandotte St. E underpass.

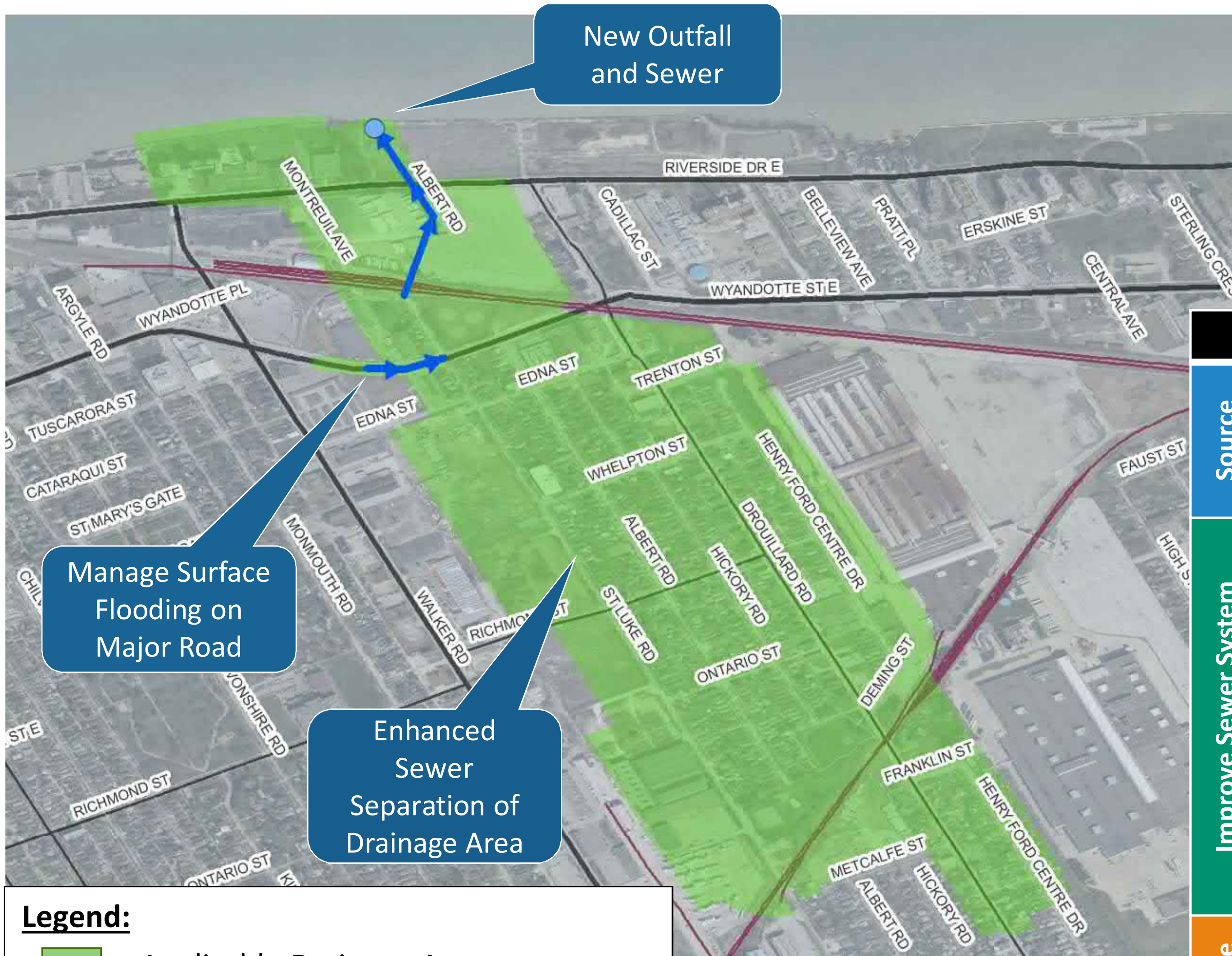
Key Solution Components	
Source Control	• Disconnection of roof downspouts. • Foundation Drain Disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• Improve storm sewers from Wyandotte Road to the pump station and from the pump station to Riverside Drive Storm Connection.
Improve Outlet	• Upgrading the existing storm pump station within Cadillac Street Park, recommend backup generator.

Legend:

Upgraded Storm Pump Station Location

Storm Trunk Sewer Improvements

Albert Road Outlet Storm Sewer Improvements



Legend:

- Applicable Drainage Area
- Storm Trunk Sewer Improvements
- Proposed New or Improved Storm Outlet to Detroit River

Recommended Solution:

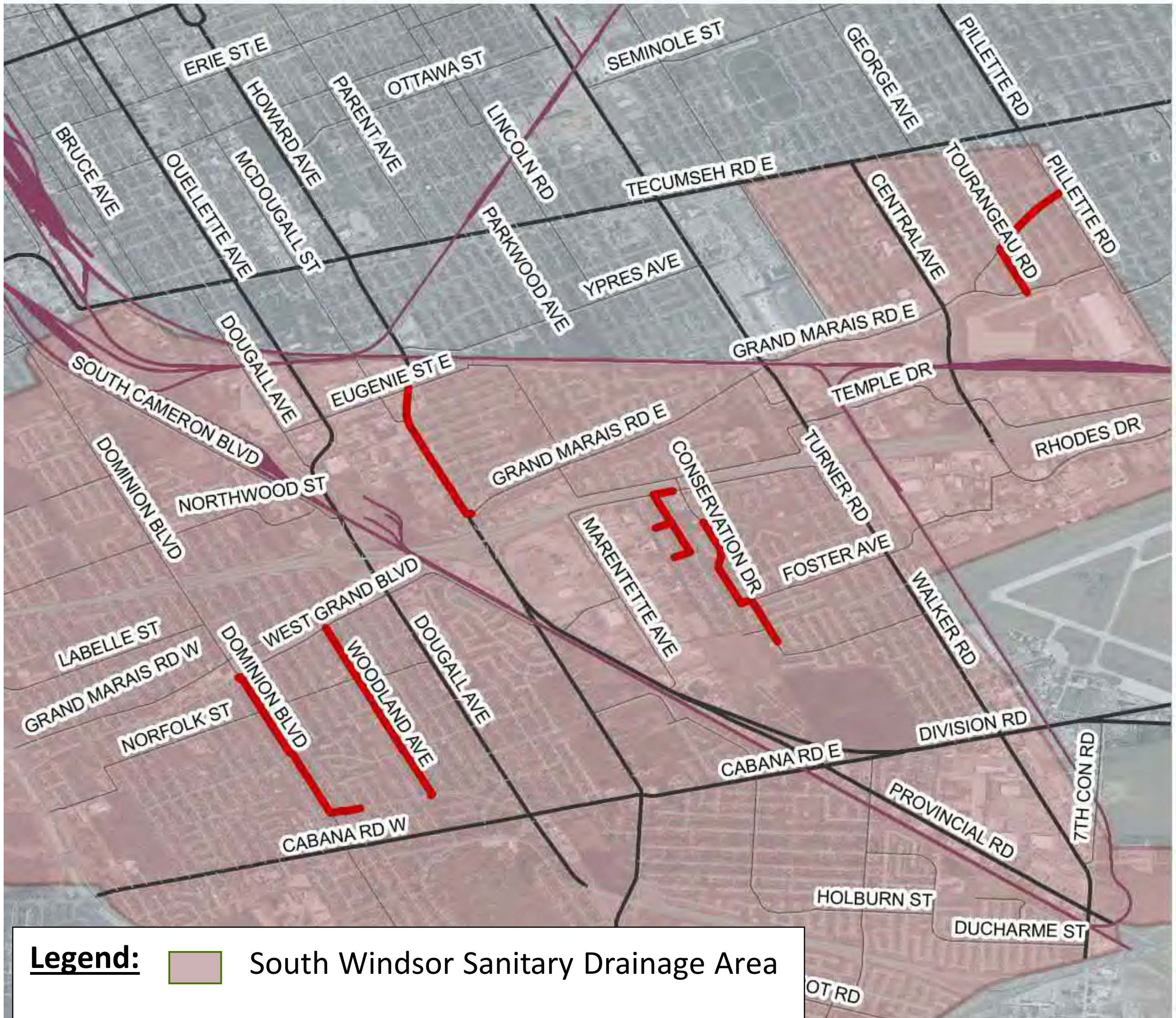
- To manage surface flooding under the Climate Change Storm (1:100 year + 40% Factor) on **Wyandotte St. E.**

Schedule B Project

Key Solution Components	
Source Control	• Disconnection of roof downspouts. • Foundation Drain Disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• Construction of 200 m of new storm sewers along **Wyandotte St. E** between Walker Rd. and St. Luke St. • Construction of 350 m of new storm sewers starting just south of the railway tracks, north of St Luke Rd, northerly towards **Albert Rd**. until reaching the sewer's outfall at the Detroit River. • Enhanced sewer separation of drainage area.
Improve Outlet	• Upsize the existing storm sewer outlet at Detroit River.

Sanitary Sewer System Improvements (SAN-S-1)

New trunk sanitary sewers (750 to 900 mm, diameter) on Dominion Blvd, Woodland Ave, Howard Ave, Parkwood Ave, Conservation, Grand Marais Rd E, and Tourangeau Rd. Construction of approximately 8 km of road ways.



Legend: South Windsor Sanitary Drainage Area

Storm Trunk Sewer Improvements

Solution Objective:
Under 1:100 year storm, reduce the water levels in the South Windsor sanitary sewer system, such that 10% or less of the sewers surcharge to levels that could result in basement flooding.

Schedule A+ Projects

	Key Solution Components
Source Control	• Disconnection of all existing residential foundation drainage from the sanitary system. • Reduced inflow into the sanitary system following sealing of manhole lids and continued repair and sealing of existing leaky sewer pipes and manhole structures.
Improve Sewer System	• New sanitary sewers to improve conveyance and storage capacity.
Improve Outlet	• Increased sewage treatment capacity of the Lou Romano Water Reclamation Plant by constructing a new Retention Treatment Basin (RTB). This RTB was evaluated through a separate City project.

Dougall Avenue Storm Sewer and Stormwater Management Pond Improvements

STM-S1-1 Proposed trunk storm sewer from Eugenie Street to proposed stormwater management pond within vacant property south of Northwood St.

Solution Objective:

Reduce surface flooding risk under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Dougall Ave., Eugenie St. E, and Ouellette Pl.

Schedule B Project

Key Solution Components	
Source Control	• Recommend disconnection of roof downspouts and Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • New stormwater management pond or underground storage facilities. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Solutions would not increase the peak flow of stormwater runoff entering the Grand Marais Drain.

Legend:

- New Stormwater Management Pond
- Storm Trunk Sewer Improvements

Howard Avenue Storm Sewer and Stormwater Management Pond Improvements

Solution Objective:

Reduce surface flooding risk under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm(1 ft.) on Howard Ave.

Schedule B Project

	Key Solution Components
Source Control	• Disconnection of roof downspouts. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • New stormwater management pond. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Solutions shall not increase the peak flow of stormwater runoff entering the Grand Marais Drain.

STM-S2-2

Proposed trunk sewers on Howard Ave. to proposed stormwater pond within exisitng commercial property.

Legend:

- New Stormwater Management Pond
- Storm Trunk Sewer Improvements

Chrysler Centre Storm Sewer and Stormwater Management Facility Improvements

Solution Objective:

- Reduce surface flooding risk for major roadways under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Chrysler Centre road.

Schedule B Project

Key Solution Components	
Source Control	• Disconnection of roof downspouts. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • New underground storage facility within the parking lot area. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Solutions shall not increase the peak flow of stormwater runoff entering the Grand Marais Drain.

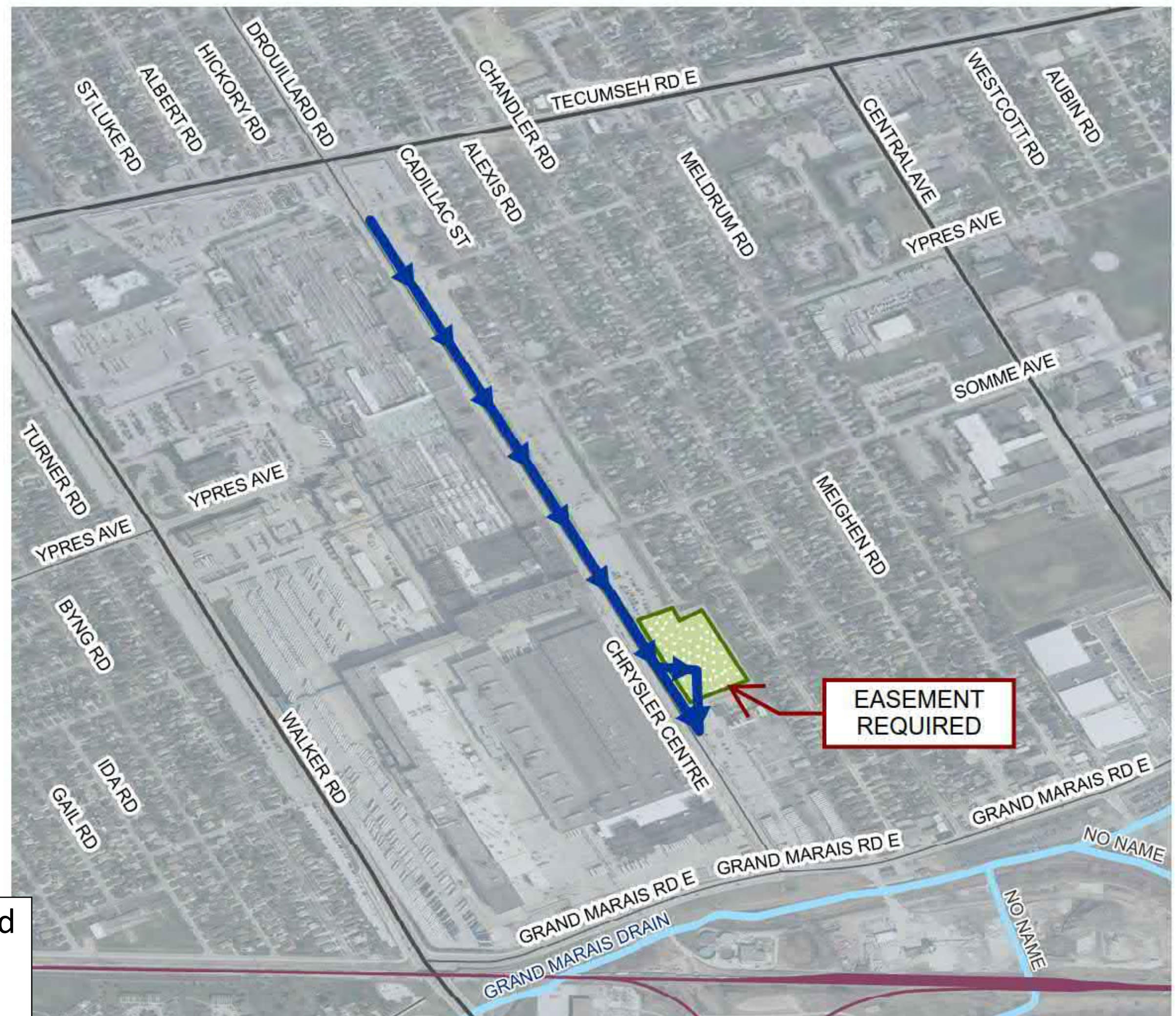
Legend:

New Stormwater Management Pond

Storm Trunk Sewer Improvements

STM-S3-2

Proposed storm sewer on Chrysler Centre from Tecumseh Road to one proposed underground stormwater management facilities within privately owned parking lot area.



Central Avenue, Pillette Road & Regional Area 7 Storm Sewers and Stormwater Management Pond Improvements

Solution Objective:

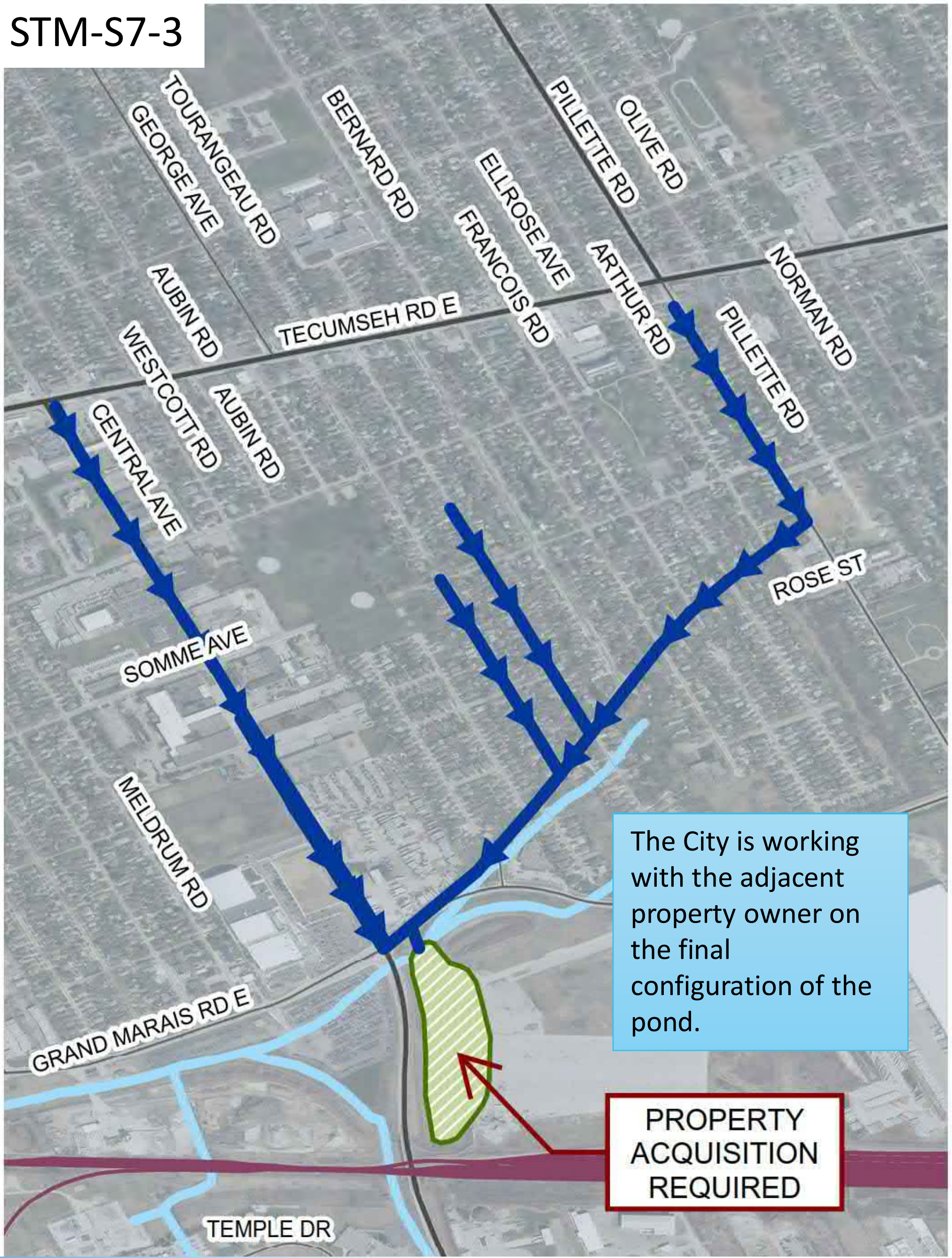
- Reduce surface flooding under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Central Ave and Pillette Rd. (Major Roads)
- Reduce surface flooding to less than 30 cm (1 ft.) under 1:100 year storm conditions in Regional Area 6.
- Schedule B Project

Key Solution Components	
Source Control	• Disconnection of roof downspouts. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Expand the existing stormwater pond at the southeast corner of Plymouth and Central Ave. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• Solutions shall not increase the peak flow of stormwater runoff entering the Grand Marais Drain.

Legend: New Stormwater Management Pond; Storm Trunk Sewer Improvements

Proposed storm sewers to expanded exisitng Central Ave. stormwater pond.

STM-S7-3



Regional Area 8 Storm Sewer and Stormwater Management Pond Improvements

Solution Objective:

Reduce surface flooding risk for Regional Area 8 – Southwood Lakes.

Schedule A+

Key Solution Components	
Source Control	• Disconnection of roof downspouts. • Low Impact development measures within private property areas.
Improve Sewer System	• Increase the storage capacity of three (3) of the existing ponds (Laguna, Grande, Como) by lowering the normal water line. Construction includes the lowering of the ponds and lowering sewer interconnecting each pond.
Improve Outlet	• Solutions shall not increase the peak flow of stormwater runoff entering the Lennon Drain. No improvements to the existing outlet are recommended.

Legend:

- Stormwater Management Pond Upgrades
- Storm Trunk Sewer Improvements

STM-S8-2 Lower pond normal water levels and downspout disconnection.

Sanitary Sewer Improvements (SAN-E-2)

Solutions Objective:
Under 1:100 year storm, reduce the water levels in the East Windsor sanitary sewer system, such that 10% or less of the sewers surcharge to levels that could result in basement flooding.

Assumptions:

- Allowances for full future development within vacant lands from both Windsor and Tecumseh were included in the assessment of alternatives.
- Schedule A+ Projects

Key Solution Components	
Source Control	• Disconnection of foundation drains. • Reduced inflow into the sanitary system by sealing manhole lids and repairing and sealing leaky sewer pipes and manholes.
Improve Sewer System	• Replacement of trunk sanitary sewers with large box culverts or sewers. Sanitary sewers shall be equipped with low flow channels accommodate typical dry weather conditions, where applicable.
Improve Outlet	• Improvements to treatment plan to manage wet weather flow: Interim Condition: • Improve existing bypass at the Little River Pollution Control Plant. Ultimate Condition: • Expand Little River Pollution Control plant to improve management of wet weather flow.

LRPCP By Pass Improvements at Pontiac PS (SAN-E-2)

- Part of the comprehensive recommended solution to mitigate basement flood risk in the East Windsor Area.
- Schedule C Project

Improvements include:
- Improve existing Little River Pollution Control Plant By-Pass to Little River.
- Construct lift station adjacent to the existing Pontiac Pump Station.
- New Outlet to Little River.

Assumptions:

Pump stations will provide improved interim relief of wet weather overflows at the Little River Treatment Plant. Ultimately, management of wet weather flow will be integrated into future plant expansion. Timing of plant expansion is dependent on population growth and servicing needs within the East Windsor Drainage Area.

Through the City's Little River Flood Plain study, the capacity of the drain will be assessed to confirm if this proposed outlet is feasible. If the Little River does not have excess capacity to receive additional flows, the pump station by pass will need to be directed to the Detroit River through existing road allowances. This will be confirmed during the Schedule C Environmental Assessment stage of this project.

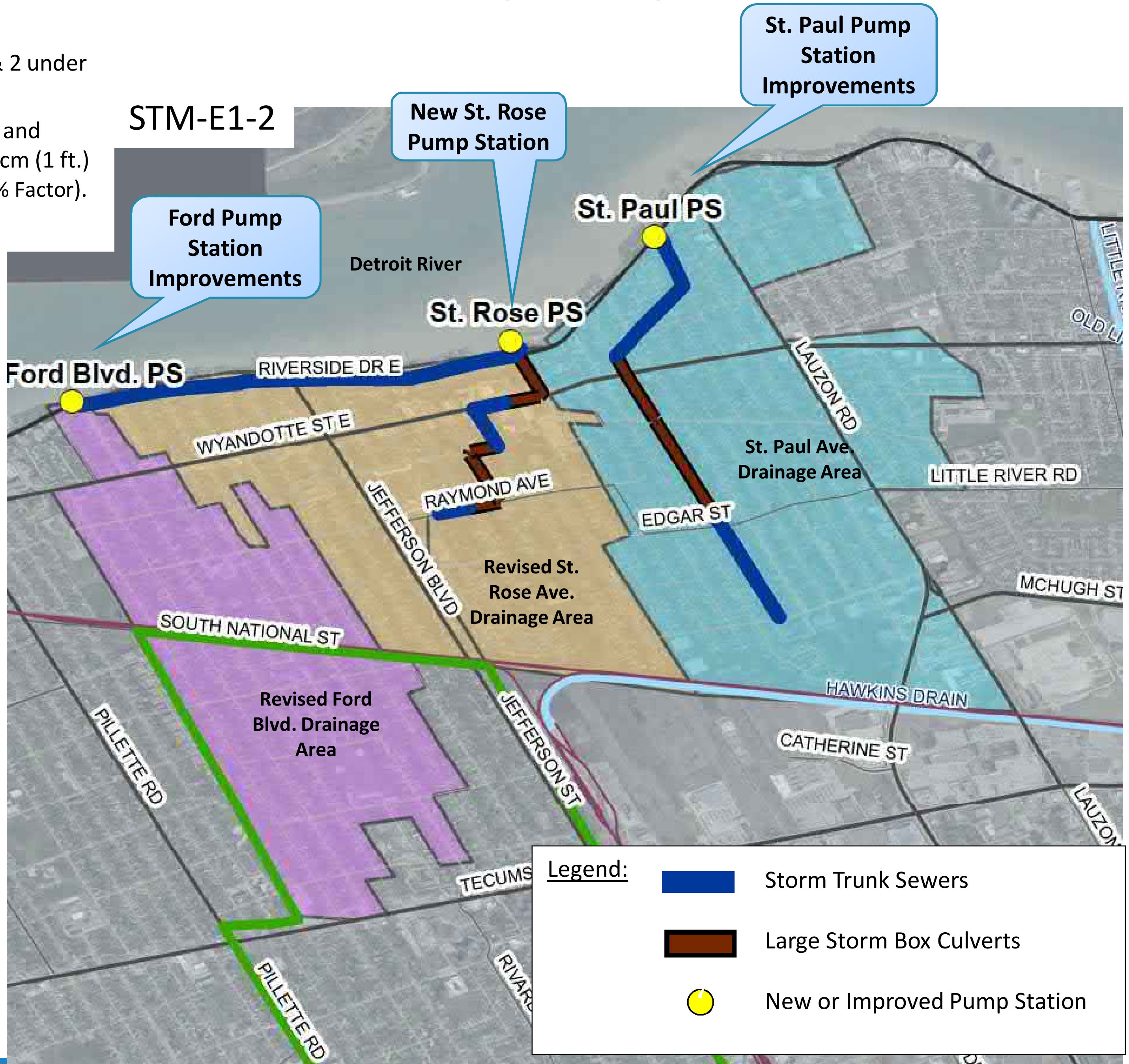
Regional Areas 1 & 2 (Ford St. Rose and St Paul Drainage Areas)

Solution Objectives

- Reduce surface flooding in Regional Areas 1 & 2 under the 1:100 year storm in Regional Area 1 & 2.
- Reduce surface flooding along Jefferson Blvd. and Riverside Dr. E. (Major Roads) to less than 30 cm (1 ft.) under Climate Change Storm (1:100 year + 40% Factor).

Schedule B Project

Key Solution Components	
Source Control	• Area Wide disconnection of roof drains. • Low impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Low impact development measures as part of storm sewer improvements.
Improve Outlet	• St. Paul Pump Station Expansion. • New St. Rose Pump Station and Improved outlet. • Ford Blvd. Pump Station Upgrade. • Emergency Backup Power for all pump stations.
Coastal	• Coastal Flood Protection along Riverside Drive.



Regional Area 1 & 2 – Ford Pump Station

Proposed Improvements to the Ford Blvd. Pump Station are part of the comprehensive preferred solution alternative for **Regional Area 1 and 2**.

Assumptions:

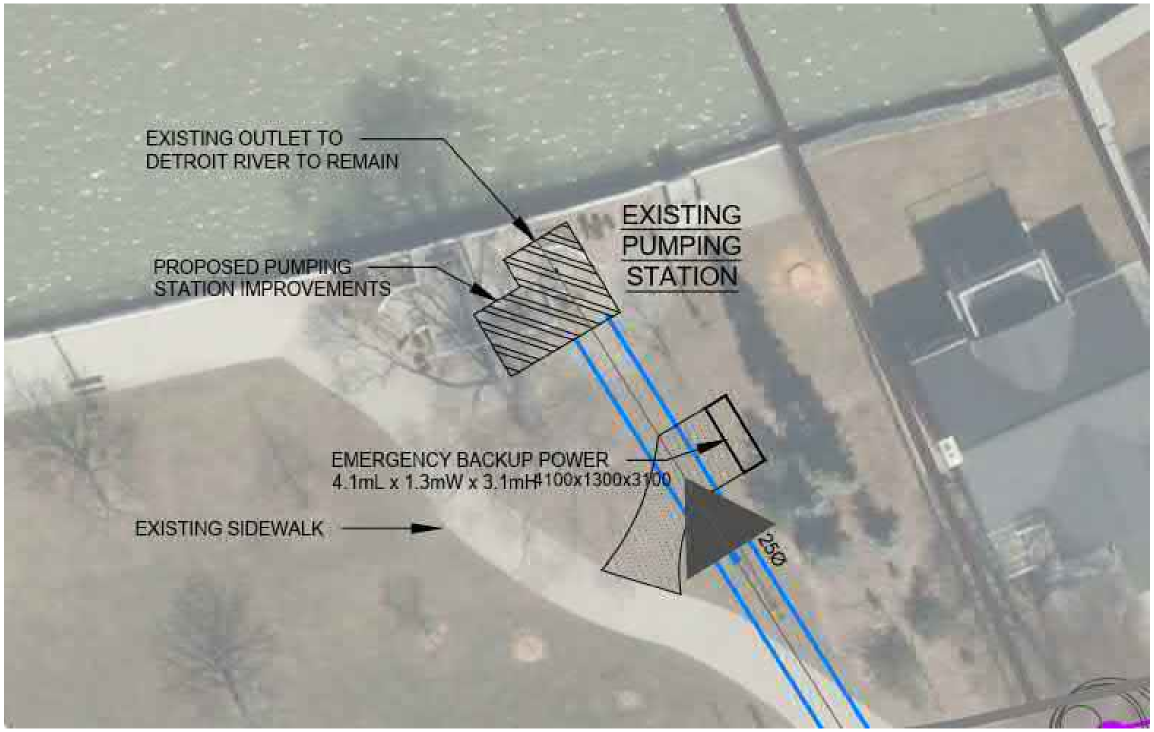
- The capacity of the proposed pump station is based on providing a 1:100 year storm level of service
  - This includes added reliance for major roadways to mitigate surface flooding during a Climate Change Storm (1:100 year + 40% Factor)

Ford Pump Station Improvements include:

- Replacement of existing pumps with higher capacity pumps within the existing underground structure.
- Addition of control to better monitor and control the operation of the pump station.
- Consider the addition of an emergency back up power generator.

Schedule A Project

STM-E1-FORD 1



This pump station has been identified as an immediate priority and is included in the Application for Disaster Mitigation and Adaptation Funding – Intake 3 (Funding Pending)

Regional Areas 1 & 2 – St. Rose Avenue Pump Station

Proposed Improvements to the St. Rose Pump Station are part of the comprehensive recommended solution for **Regional Areas 1 & 2.**

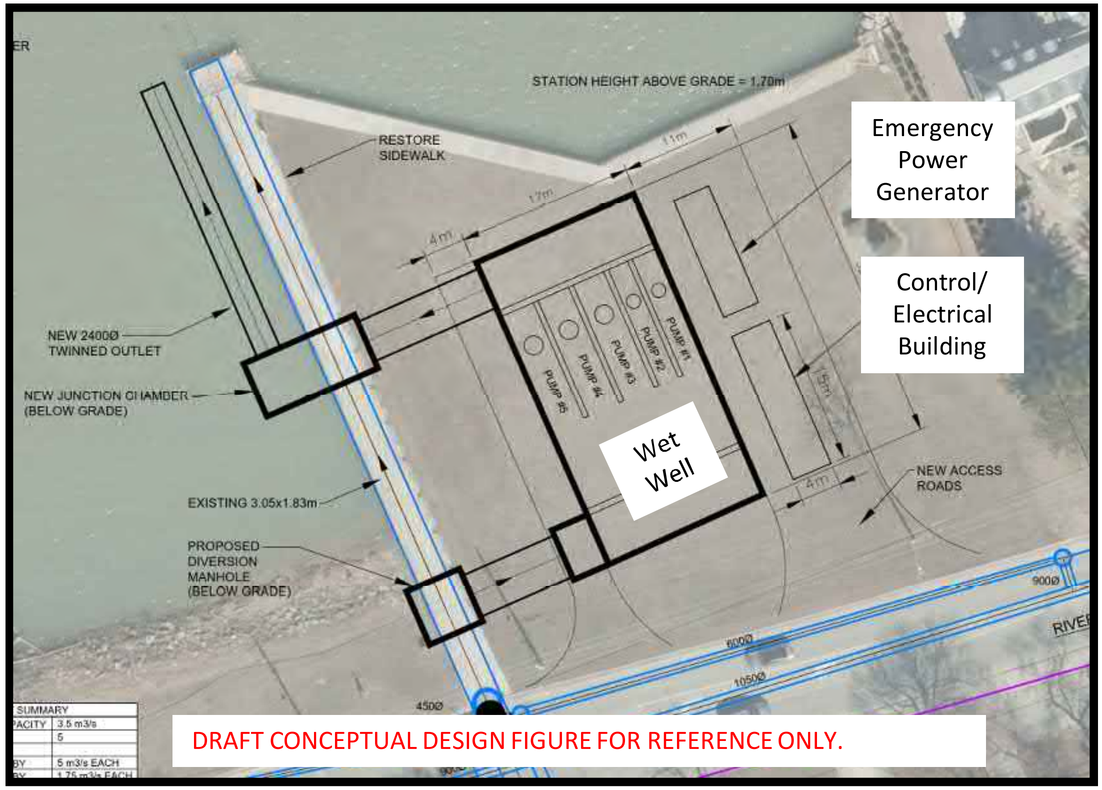
<u>Assumptions:</u>

- The capacity of the proposed pump station is based on providing a 1:100 year storm level of service area wide.
  - This includes added reliance for major roadways, to mitigate surface flooding during a Climate Change Storm (1:100 year + 40% Factor)

<u>Improvements include:</u>

- A wet well structure that ranges from 1 m - 1.6 m in height.
- Emergency Backup Power Generator proposed to provide standby power during power outages. The shown footprint based on 1:100 year level of service. The City must complete a risk assessment to determine if a smaller generator is suitable for this site.
- Building is proposed to house the control and electrical equipment.
- Additional Pump Station Outlet adjacent to the existing storm sewer outlet.
- Architectural design of this pump station will need to be determined during detailed design. It is recommended that the pump station be designed to fit the aesthetic of the park and neighbourhood. Considerations for safety, park access and noise shall be implemented. Local residents must be actively involved during the detail design stage.

STM-E1-ROSE 1



Schedule B Project

This pump station has been identified as an immediate priority and is included in the Application for Disaster Mitigation and Adaptation Funding – Intake 3 (Funding Pending)

Regional Areas 1 & 2 – St. Paul Avenue Pump Station

Proposed Improvements to the St. Paul Pump Station are part of the comprehensive preferred solution alternative for **Regional Area 1 and 2**.

Assumptions:

- The capacity of the proposed pump station is based on providing a 1:100 year storm level of service.
  - This includes added reliance for major roadways to mitigate surface flooding during a Climate Change Storm (1:100 year + 40% Factor)

St. Paul Pump Station Improvements include:

- Expansion of the existing pump station, east of the existing building.
- New outlet sewers to Detroit River from the proposed expansion.
- Expansion of electrical systems within the existing system.
- New emergency back up power generator to accommodate additional electrical loading.

Schedule B Project

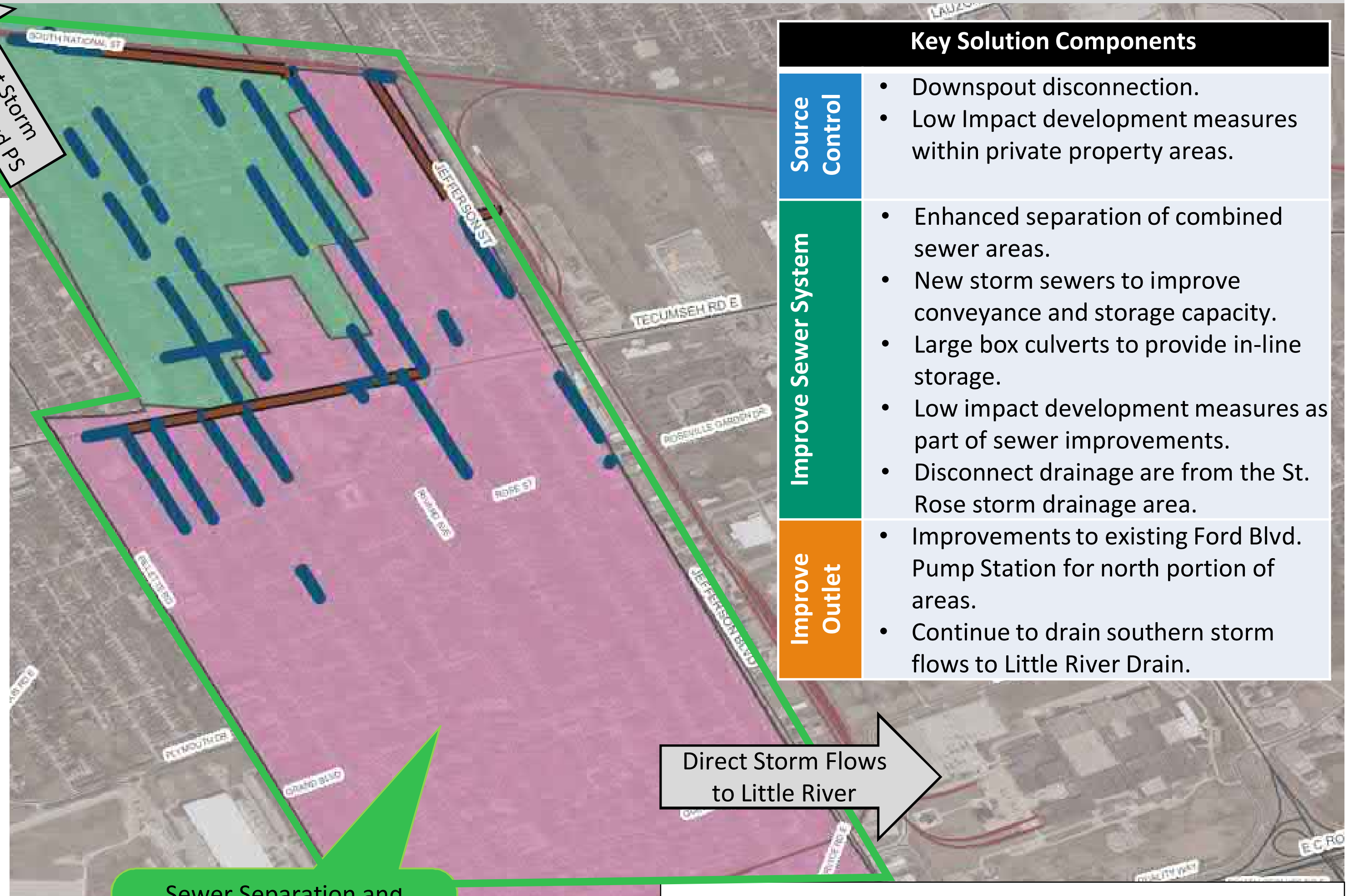
STM-E1-PAUL 1

This pump station has been identified as an immediate priority and is part of the Disaster Mitigation and Adaptation Funding Projects.

Regional Area 3 Storm Sewer Improvements and Sewer Separation

Complete separation of combined sewage flows into separated storm and sanitary sewer systems. New storm sewer (ranging from 450 mm dia. to 1800 X 3000 mm box culverts). Redirection of flows to Little River has been partially re-directed to the Ford Blvd. storm system. Construction includes approx. 9.5 km of new sewers.

STM-E3-2
ROAD-E3



Direct Storm Flows to Ford PS

Direct Storm Flows to Little River

Sewer Separation and direction of storm flows to Detroit River and Little River Drain.

<u>Solution Objective</u>

- Reduce surface flooding to less than 30 cm (1 ft.) for Regional Area 3 under 1:100 year storm.
- Reduce surface flooding for major roadways under Climate Change Storm (1:100 year + 40% Factor) on South National St., Jefferson Blvd. and Tecumseh Rd E.
- New separated storm sewers to separate the existing combined sewer area.
- Schedule B Project

<u>Assumptions:</u>

- No increase in stormwater peak flow entering the Little River Watercourse, achieved with new stormwater storage (outlined on other pages).

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• Enhanced separation of combined sewer areas. • New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements. • Disconnect drainage are from the St. Rose storm drainage area.
Improve Outlet	• Improvements to existing Ford Blvd. Pump Station for north portion of areas. • Continue to drain southern storm flows to Little River Drain.

<u>Legend:</u>

Storm Trunk Sewers

Large Storm Box Culverts

Regional Area 5 Storm Sewer Improvements

STM-E5-1

Solution Objective

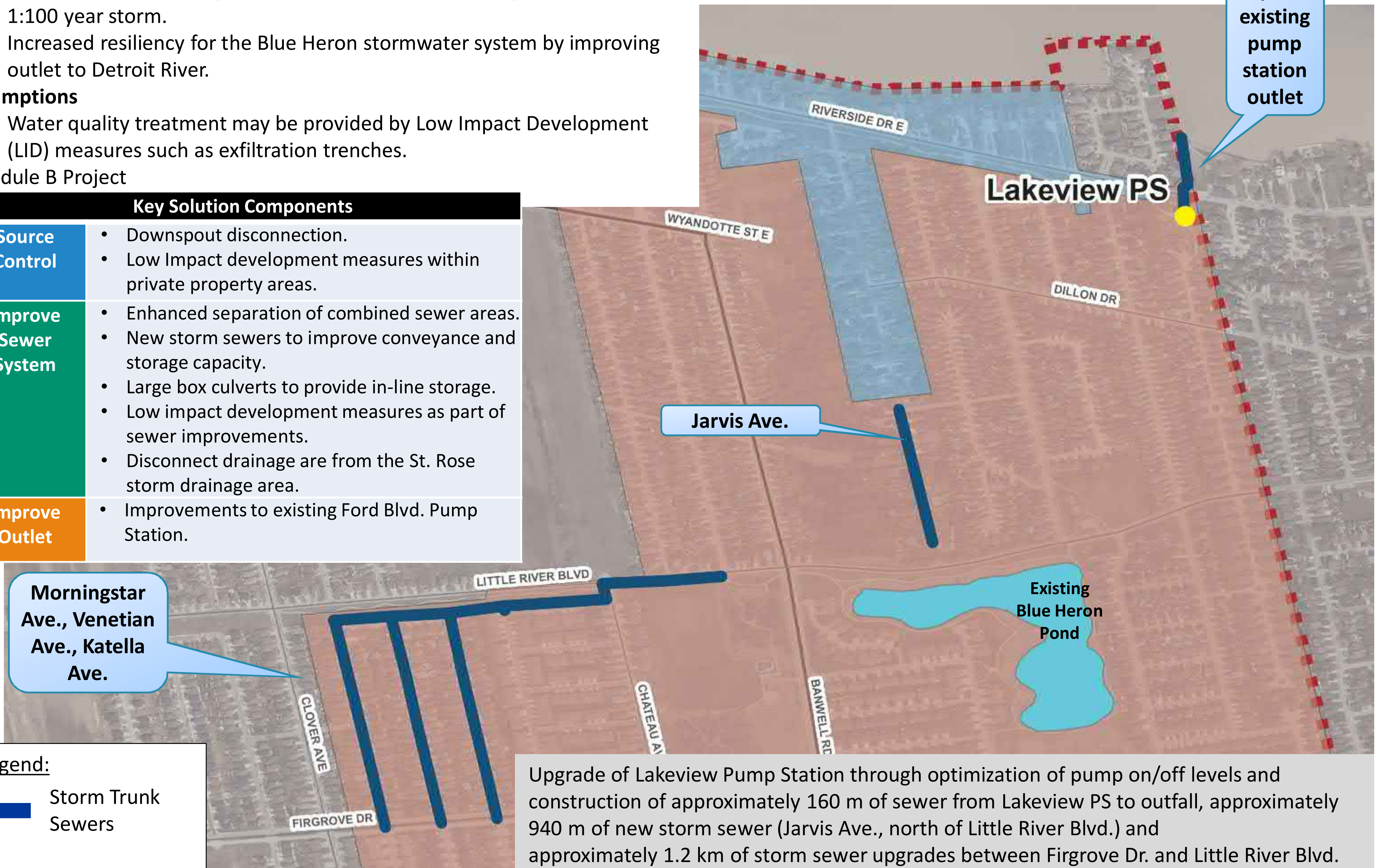
- Reduce surface flooding to less than 30 cm (1 ft.) for Regional Area 5 under 1:100 year storm.
- Increased resiliency for the Blue Heron stormwater system by improving outlet to Detroit River.

Assumptions

- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches.

Schedule B Project

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• Enhanced separation of combined sewer areas. • New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements. • Disconnect drainage are from the St. Rose storm drainage area.
Improve Outlet	• Improvements to existing Ford Blvd. Pump Station.



Legend:
Storm Trunk Sewers

Upgrade of Lakeview Pump Station through optimization of pump on/off levels and construction of approximately 160 m of sewer from Lakeview PS to outfall, approximately 940 m of new storm sewer (Jarvis Ave., north of Little River Blvd.) and approximately 1.2 km of storm sewer upgrades between Firgrove Dr. and Little River Blvd.

Regional Area 6 Storm Sewer Improvements

Re-direction of storm sewers from East Marsh Pump Station to the Pontiac Pump Station. New sewers servicing the North and South Neighbourhoods. Upgrade of Cedarview St. storm sewer and underground storage in Brumpton Park. Construction of approximately 4 km of new sewers.

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New surface storage stormwater surface storage in Brumpton Park. • Upgraded sewers along Cedarview St. • New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements. • Disconnect drainage are from the St. Rose storm drainage area.
Improve Outlet	• North Neighbourhood Pond and Pontiac Pump Station: • Reallocation of drainage area from East Marsh system to Pontiac system with new storm sewers. • Upgrade Existing East Marsh Pump Station.
Coastal	• Coastal Flood Protection along Riverside Drive.

Solution Objective

- Reduce surface flooding to less than 30 cm (1 ft.) under 1:100 year storm conditions in Regional Area 6.

Assumptions

- Consideration for 1:100 year Detroit River high water level conditions.
- No increase in stormwater peak flow entering the Little River Watercourse.
- Allowances for full future development of vacant lands were considered.
- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches.

Schedule B Project

Regional Area 6 - East Marsh Pump Station Improvements

Proposed Improvements to the East Marsh Pump Station are part of the comprehensive preferred solution alternative for **Regional Area 6.**

Level of Service:

Reduce the drainage area going to the East Marsh Pump Station to protect areas against High Water Levels and overland flooding along Riverside Drive.

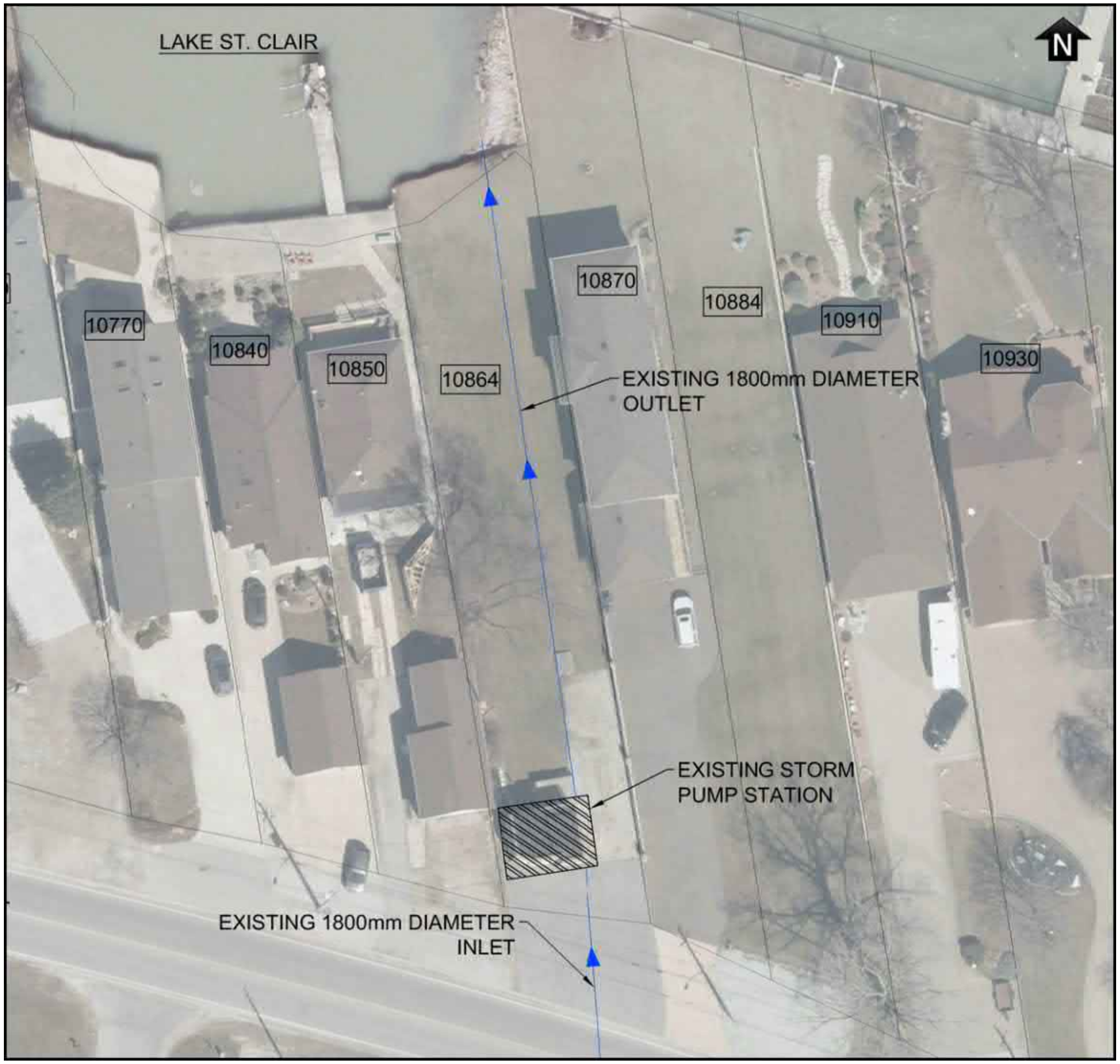
Pump Station Improvements include:

- Replacing existing pumps based on revised drainage area.
- Consider the addition of back up power generator.

Assumptions:

- The capacity of the proposed pump station is based on providing a 1:100 year storm level of service.

This pump station has been identified as an immediate priority and is part of the Disaster Mitigation and Adaptation Funding Projects.



Jefferson Blvd. and Raymond Ave. Storm Sewer Improvements

Solution Objective:

- Reduce surface flooding risk under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Jefferson Blvd.

Assumptions:

- Improvements for the St. Rose drainage system including new pump station and trunk sewers are constructed.
- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches.

Schedule A+ Project

ROAD-E2-1

Conveyance upgrade through David Suzuki PS and re-direction of flows from David Suzuki PS and Garden Court Drive from west to east; In-line storage / box culverts upgrade of Jefferson Blvd. trunk sewer.

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements.

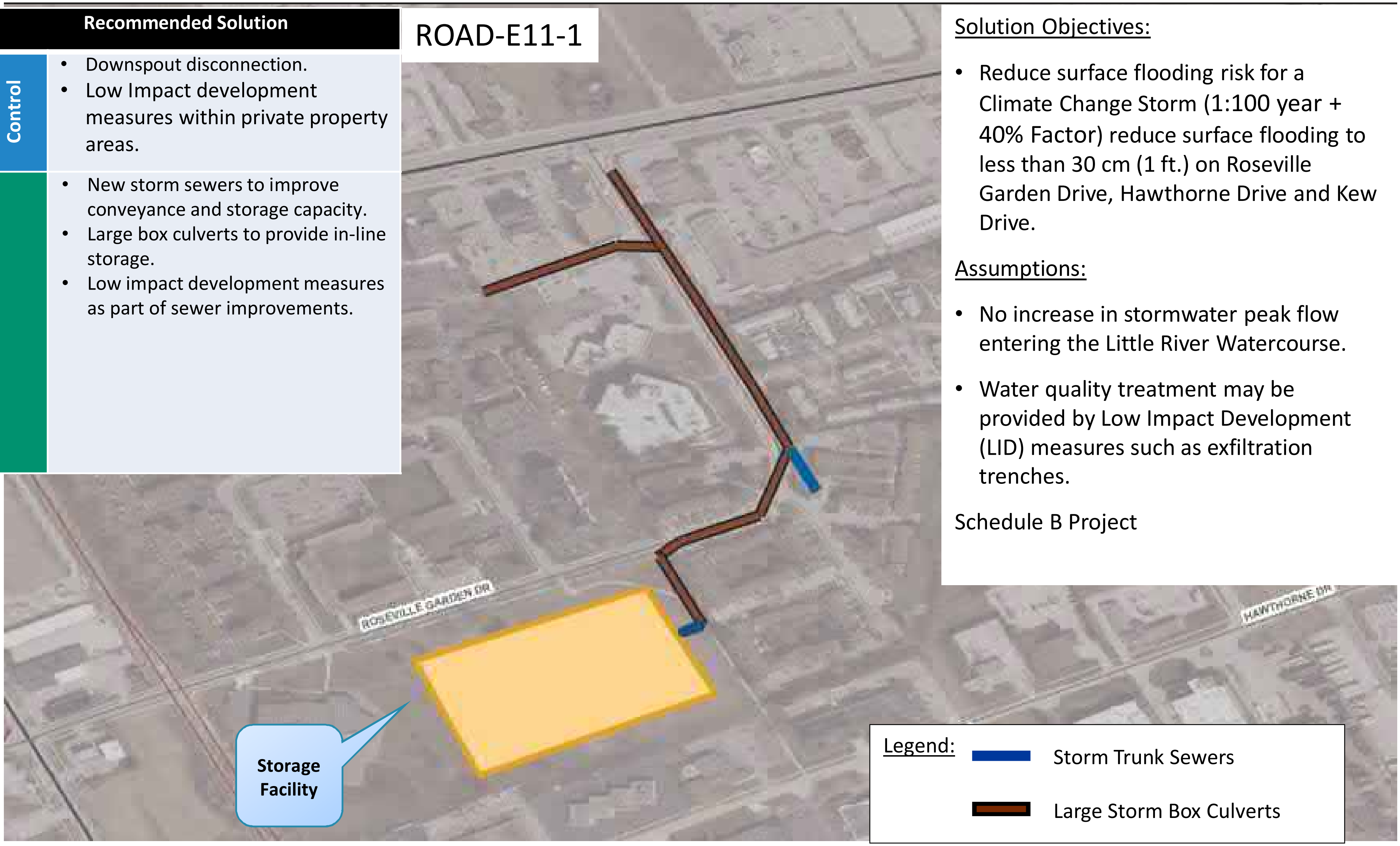
Legend:
- Storm Trunk Sewers
- Large Storm Box Culverts

Roseville Garden Storm Sewer and Storage Facility Improvements

Construction of a 25,000 cubic metre underground stormwater management facility in Roseville Park and Roseville Public School property along with upstream sewer upgrades and LID implementation.

	Recommended Solution
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements.

ROAD-E11-1



Solution Objectives:

- Reduce surface flooding risk for a Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Roseville Garden Drive, Hawthorne Drive and Kew Drive.

Assumptions:

- No increase in stormwater peak flow entering the Little River Watercourse.
- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches.

Schedule B Project

Legend:
- Storm Trunk Sewers
- Large Storm Box Culverts

Lauzon Road Storm Sewer Improvements

<u>Solution Objectives:</u>

- Under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Lauzon Rd.

<u>Assumptions:</u>

- Improvements for the St. Paul drainage system including new pump station and trunk sewers are constructed.
- Water quality treatment may be provided by low impact development (LID) measures such as exfiltration trenches. Confirmed later in design.

Schedule A Project

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements.
Improve Outlet	• Improvements to St. Paul Pump Station.

<u>Legend:</u>

Storm Trunk Sewers

New or Improved Pump Station

Wyandotte St. E. at Watson Ave. Stormwater Management Facilities

Key Solution Components

Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements.

Solution Objectives

- Under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Wyandotte Rd E.

Assumptions:

- Improvements for the St. Paul drainage system including new pump station and trunk sewers are constructed.
- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches.

Schedule B Project

Legend: Storm Trunk Sewers; Underground Stormwater Management Facility

Banwell Rd., McHugh St., & McNorton Ave. Storm Sewer Improvements

Solution Objective:

- Under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Banwell Rd., McHugh St. and McNorton St.
- Includes 2.6 km of sewer upgrades (900 mm to 2400 mm diameter) and over 500 m of box culverts (4.6m x 2.4m).

Assumptions:

- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches.

Schedule A+ Projects

	Key Solution Components
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• New storm sewers to improve conveyance and storage capacity. • Large box culverts to provide in-line storage. • Low impact development measures as part of sewer improvements.

Lauzon Parkway Storm Sewer Improvements, LID Swales, Storage Facility and Little River Golf Course Pond

Solution Objectives:

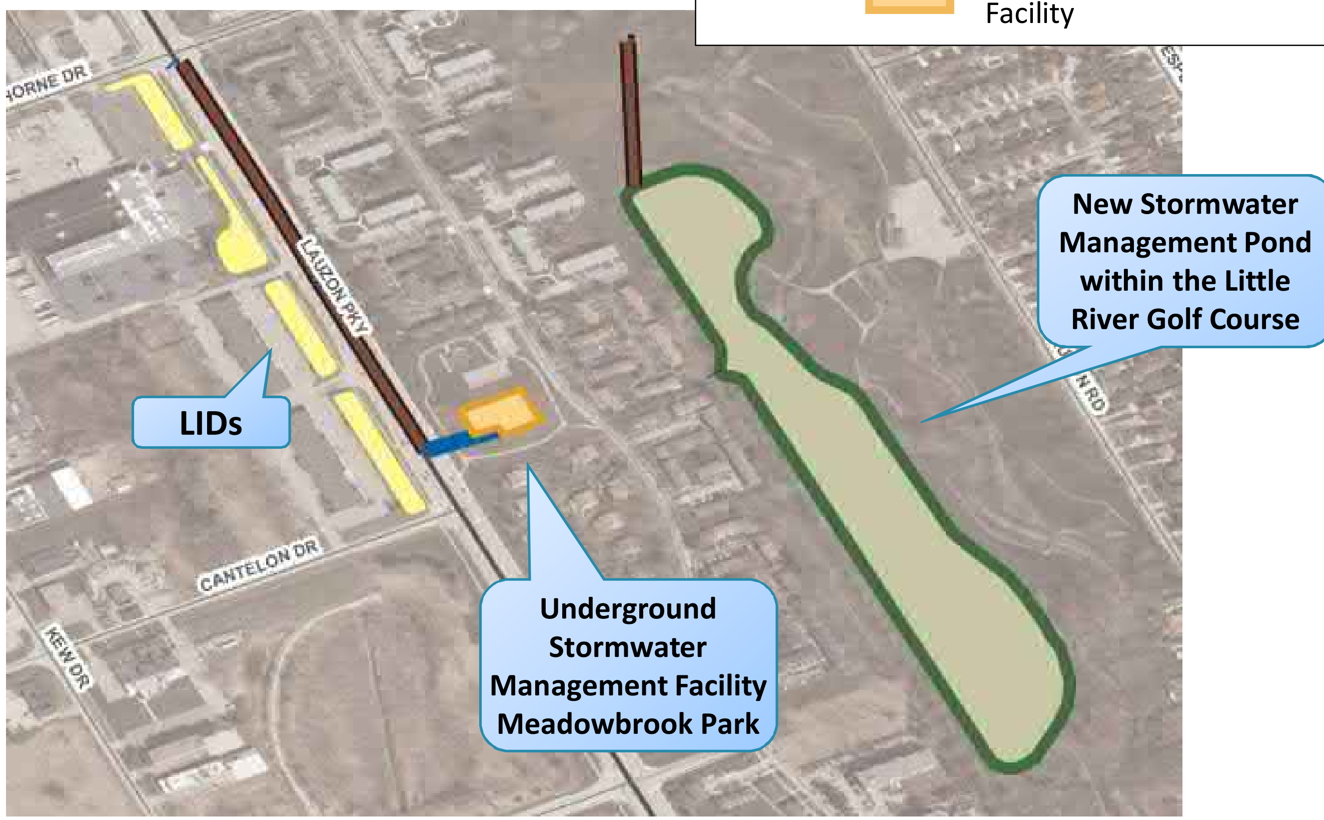
- Reduce surface flooding risk for under a Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on Lauzon Pkwy., Hawthorn Dr. and Jefferson Blvd.

Schedule B Project

Legend:

- Storm Trunk Sewers
- Large Storm Box Culverts
- LID Swales
- Stormwater Management Pond
- Stormwater Management Facility

ROAD-E4-3



Upgrade storm sewer on Lauzon Pkwy to box culvert with underground surcharge storage in Meadowbrook Park. 500 m of LID on commercial properties and re-grading of 250 m of road
New SWM pond in golf course lands to control flows to Little River.

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• Construction of box culvert on Lauzon Pkwy. • Surcharge storage at Meadowbrook Park. • Stormwater management pond in the Little River Golf Course. • Re-grading of 250 m on Lauzon Pkwy. • Low Impact Development (LID) infiltration swales on the west side Lauzon Pkwy.
Improve Outlet	• Solutions shall not increase the peak flow of stormwater runoff entering the Little River Drain.

East Windsor – Surface Flooding Risk Reduction: McHugh at Darfield Recommended Solutions

ROAD-E6-2 New box culvert storage and conveyance with re-grading of 350 m of road.

Solution Objectives:

- Reduce surface flooding risk for a Under Climate Change Storm (1:100 year + 40% Factor) reduce surface flooding to less than 30 cm (1 ft.) on McHugh St. (Lauzon Rd. to east to Darfield Dr.)

Assumptions:

- Water quality treatment may be provided by Low Impact Development (LID) measures such as exfiltration trenches. Confirmed later in design.

Schedule A+ Project

Key Solution Components	
Source Control	• Downspout disconnection. • Low Impact development measures within private property areas.
Improve Sewer System	• Construction of box culvert on McHugh St. for increased storage capacity. • Low impact development measures as part of sewer improvements.
Improve Outlet	• Solutions shall not increase the peak flow of stormwater runoff entering the Little River Drain.

Legend:

Large Storm Box Culverts

City of Windsor

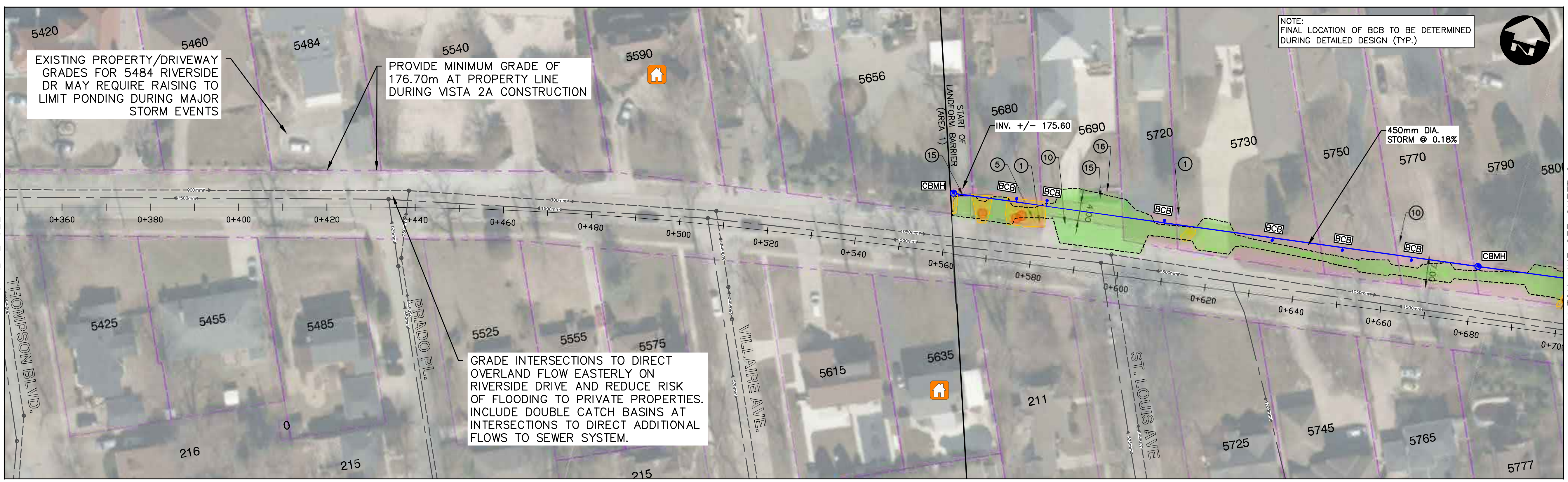
SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

APPENDIX B
Riverside Drive Landform Barrier Functional Design Drawings

July 2020

Presented by:

RIVERSIDE DRIVE
(STA. 0+000 TO 0+350)



RIVERSIDE DRIVE
(STA. 0+350 TO 0+700)

KEYED NOTES:

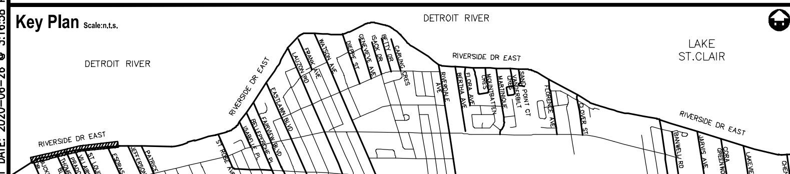
BELOW LEGEND IDENTIFIES REQUIRED SITE WORKS NOTED ON PLANS AS A PART OF THE LANDFORM BARRIER CONSTRUCTION WORKS.

1. RELOCATE EXISTING UTILITY POLE
2. RELOCATE EXISTING GUY WIRE/POLE
3. RELOCATE EXISTING FH
4. RELOCATE EXISTING WV
5. RELOCATE EXISTING BELL PEDESTAL
6. RELOCATE EXISTING GAS METER
7. RELOCATE EXISTING GAS VALVE
8. RELOCATE EXISTING TRAFFIC SIGNAL
9. RELOCATE EXISTING TEST STATION
10. RELOCATE/REPLACE EXISTING CB
11. RELOCATE EXISTING ROAD SIGN
12. REMOVE EXISTING TREE
13. REMOVE EXISTING SHRUB
14. REMOVE/RELOCATE EXISTING LANDSCAPING
15. REMOVE/RELOCATE EXISTING FENCE
16. REMOVE/RELOCATE EXISTING STONE/BRICK LANDSCAPE WALL
17. ADJUST EXISTING MH
18. ADJUST EXISTING CB
19. ADJUST EXISTING CO

LEGEND

	176.50m (CONTOUR)
	MAJOR CONTOURS (0.5m)
	MINOR CONTOURS (0.25m)
	PROPERTY/ROW LINE
	RECOMMENDED SOLUTION
	HERITAGE PROPERTY
	EXISTING STORM SEWER
	EXISTING SANITARY SEWER
	EXISTING COMBINED SEWER
	EXISTING MANHOLE
	PROPOSED LOCAL STORM SEWER
	PROPOSED CATCHBASIN MANHOLE
	PROPOSED BOULEVARD CATCHBASIN (BCB)
PROPERTY IMPACTS	
	LANDSCAPE IMPACTS
	STRUCTURE IMPACTS
	TREE IMPACTS
	PROPERTY ACQUISITION/EASEMENT

Key Plan Scale n.t.s.



THE CITY OF WINDSOR ONTARIO, CANADA

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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

PROJECT NO. 17-6638

RIVERSIDE DRIVE LANDFORM BARRIER
5270 to 5790 Riverside Drive

SHEET NO. 1

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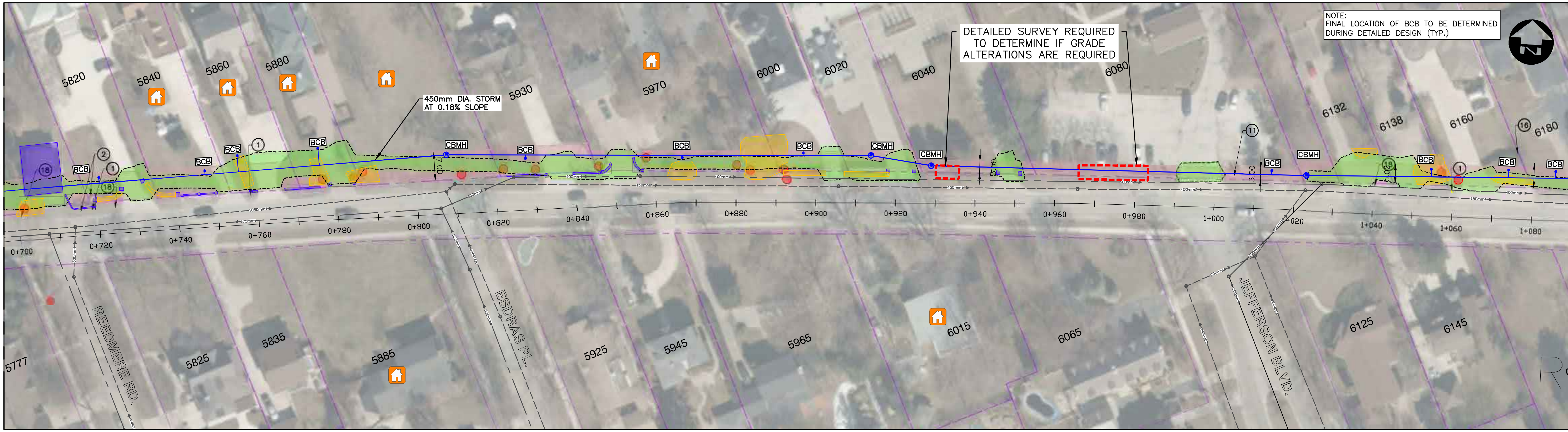
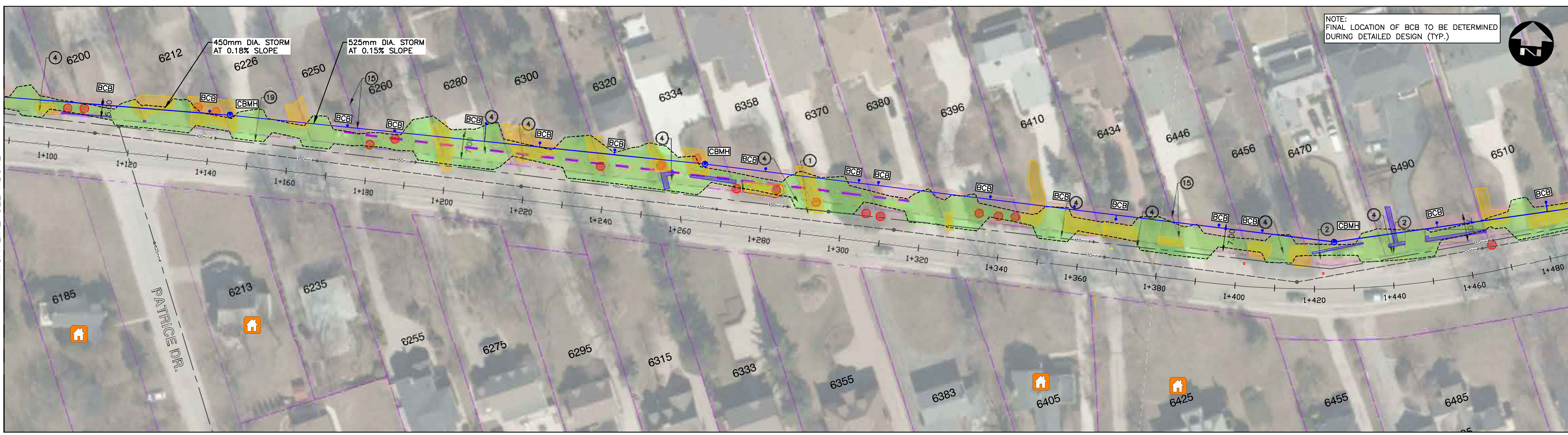
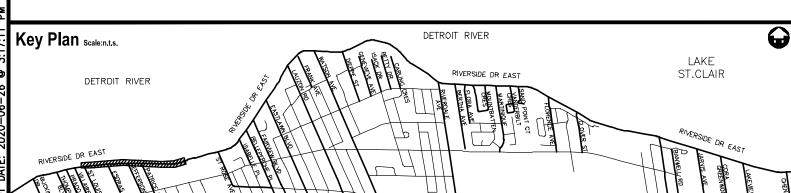


RIVERSIDE DRIVE
(STA. 0+700 TO 1+090)



RIVERSIDE DRIVE
(STA. 1+090 TO 1+480)

Key Plan Scale N.T.S.



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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
5800 to 6510 Riverside Drive

PROJECT NO. 17-6638

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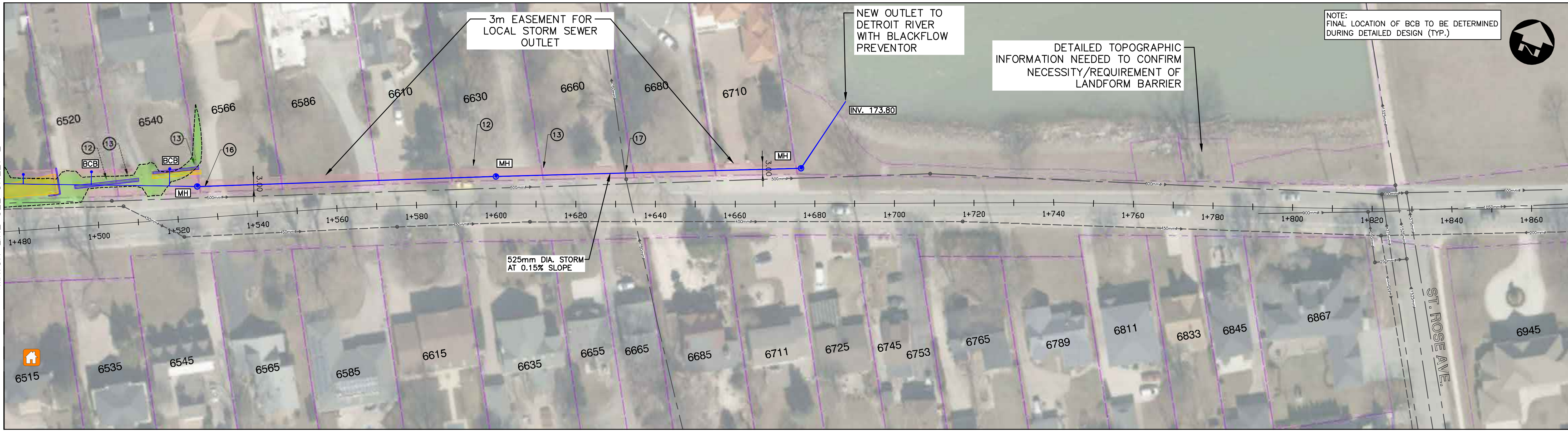

RIVERSIDE DRIVE
(STA. 1+480 TO 1+870)

RIVERSIDE DRIVE
(STA. 1+870 TO 2+180)

Key Plan Scale N.T.S.

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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
6520 to 7375 Riverside Drive

PROJECT NO. 17-6638

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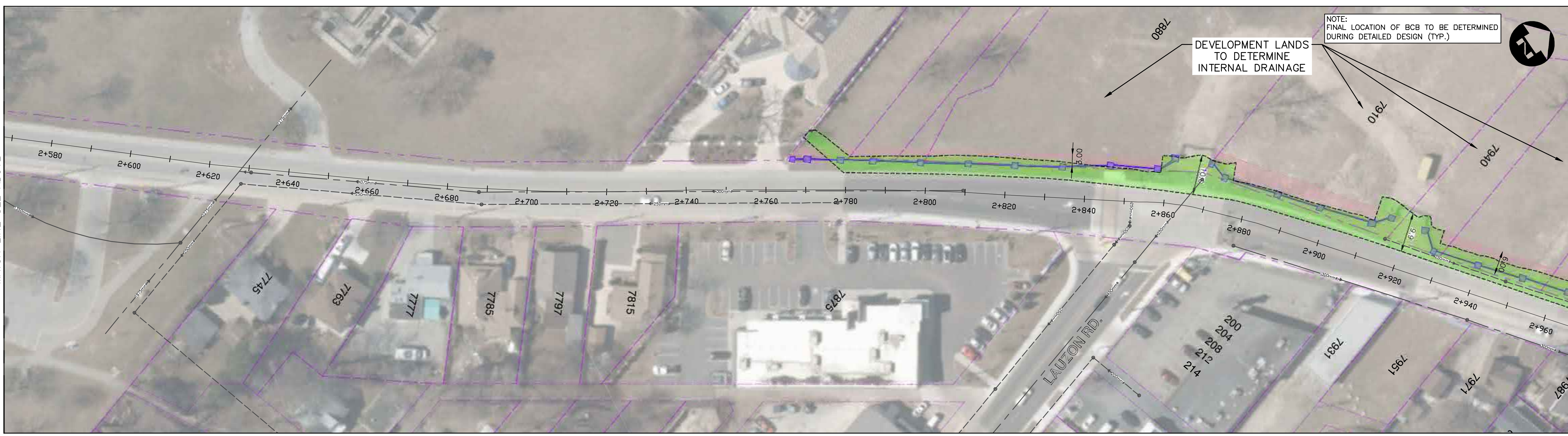
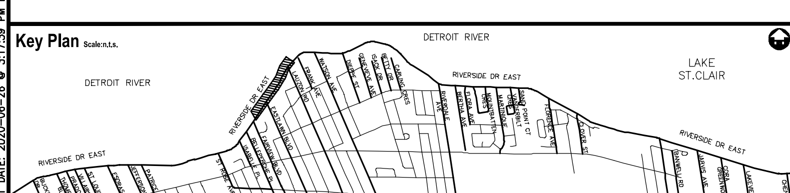
RIVERSIDE DRIVE
(STA. 2+180 TO 2+570)



RIVERSIDE DRIVE
(STA. 2+570 TO 2+970)



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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

PROJECT NO. 17-6638

RIVERSIDE DRIVE LANDFORM BARRIER
7280 to 7987 Riverside Drive

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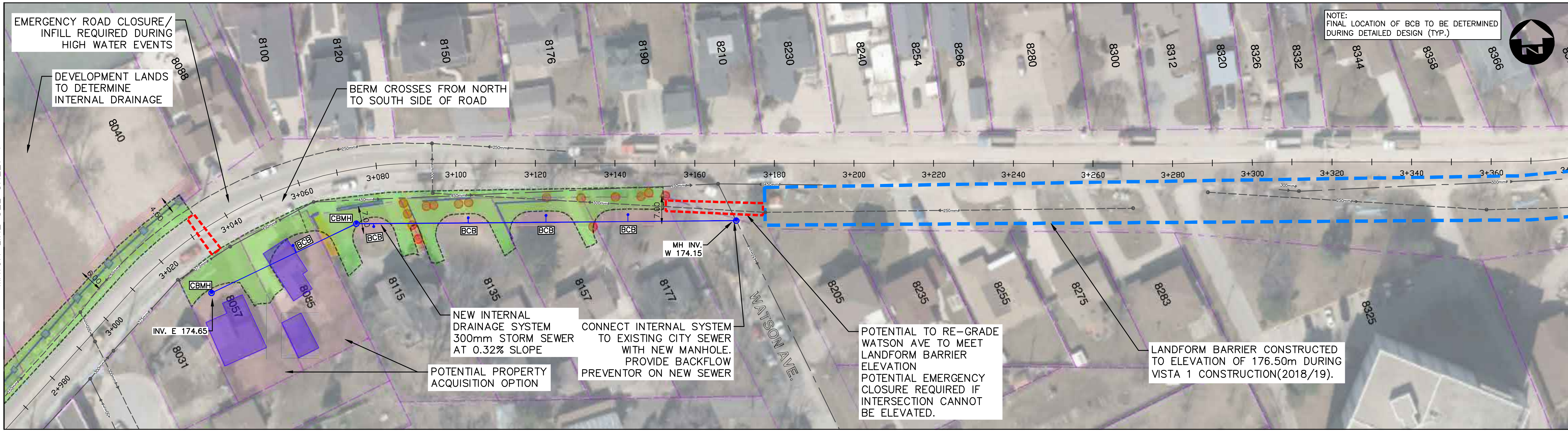
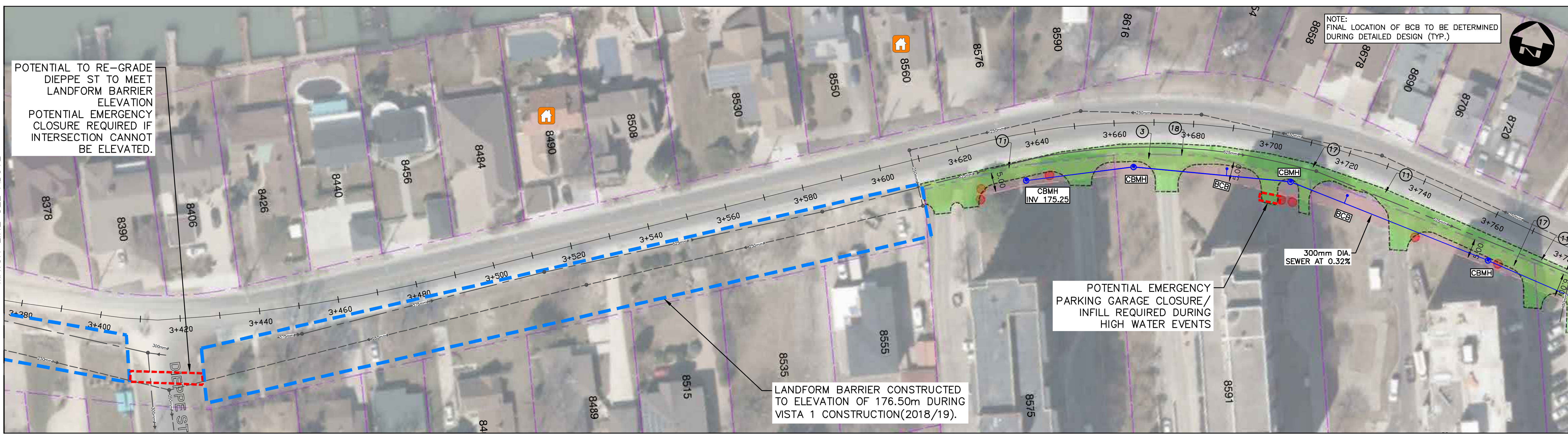


RIVERSIDE DRIVE
(STA. 2+970 TO 3+380)



RIVERSIDE DRIVE
(STA. 3+380 TO 3+780)

Key Plan Scale N.T.S.

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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
8031 to 8734 Riverside Drive

PROJECT NO. 17-6638

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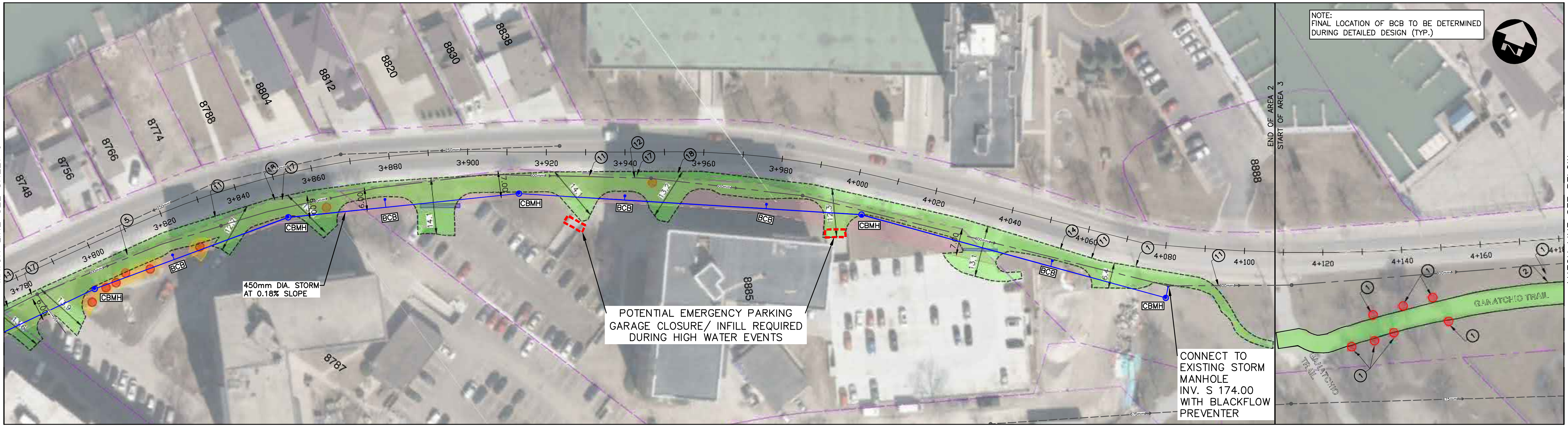
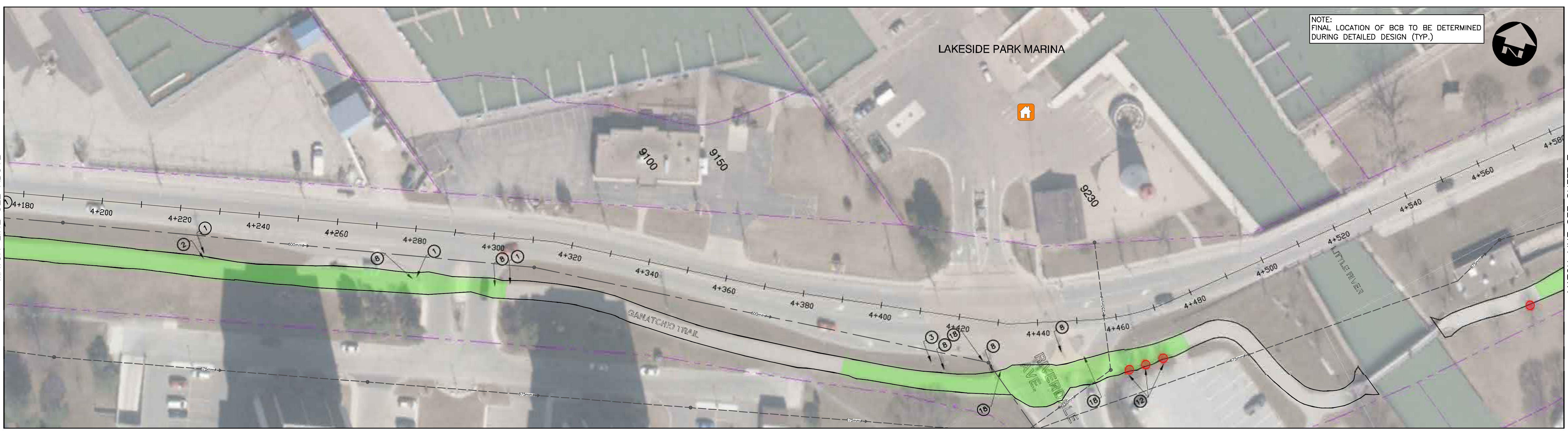
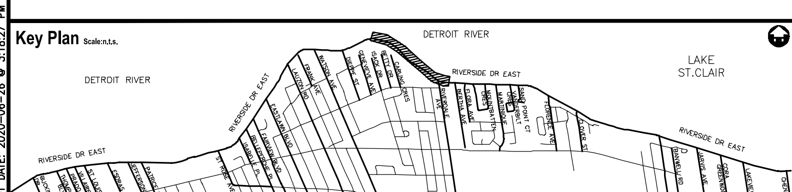


RIVERSIDE DRIVE
(STA. 3+780 TO 4+180)



RIVERSIDE DRIVE
(STA. 4+180 TO 4+580)

Key Plan Scale N.T.S.



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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
8748 Riverside Drive to Little River

PROJECT NO. 17-6638

SHEET NO. 6

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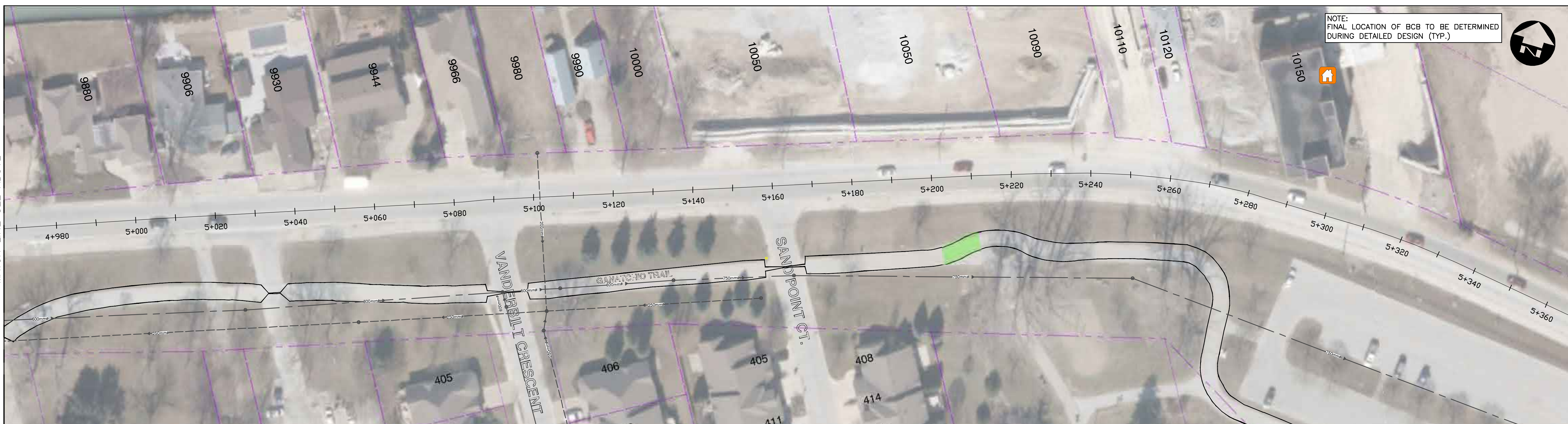
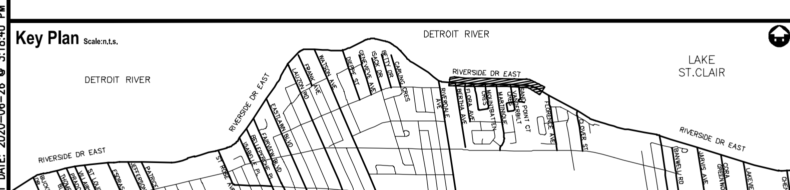
RIVERSIDE DRIVE
(STA. 4+580 TO 4+970)



RIVERSIDE DRIVE
(STA. 4+970 TO 5+370)

Key Plan Scale N.T.S.



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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
9550 to 10150 Riverside Drive

PROJECT NO. 17-6638

SHEET NO. 7

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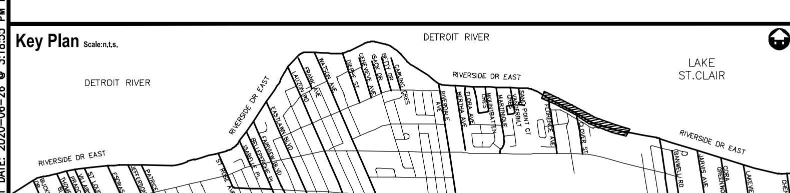
RIVERSIDE DRIVE
(STA. 5+370 TO 5+760)

RIVERSIDE DRIVE
(STA. 5+760 TO 6+150)

Key Plan Scale N.T.S.



THE CITY OF WINDSOR ONTARIO, CANADA

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WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
10300 to 10976 Riverside Drive

PROJECT NO. 17-6638

SHEET NO. 8

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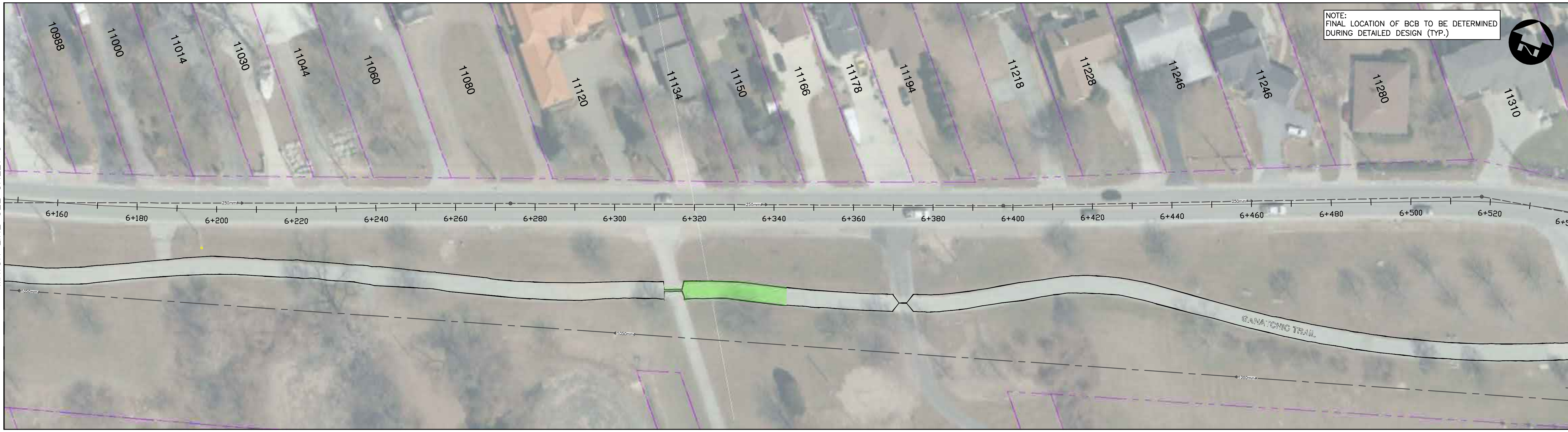
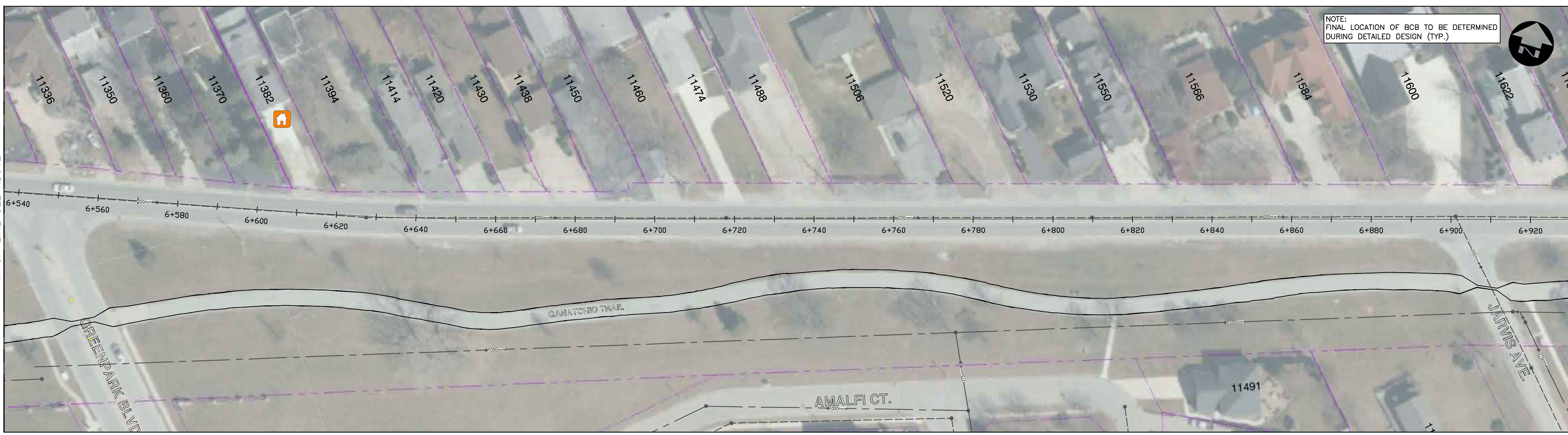
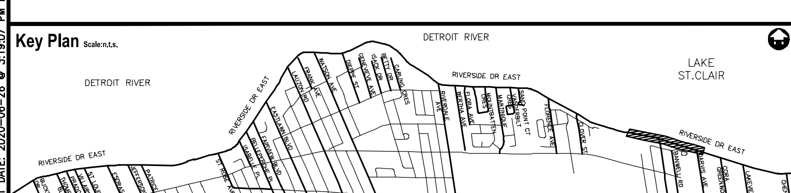


RIVERSIDE DRIVE
(STA. 6+150 TO 6+540)



RIVERSIDE DRIVE
(STA. 6+540 TO 6+930)



THE CITY OF WINDSOR ONTARIO, CANADA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
A	JUNE 2020 REVIEW	JUN 25/20	CDP

DESIGN: TJN | REVIEWED BY: | DRAWN: JTB | CHECKED BY: CDP | DATE: JAN 2020 | SCALE: 1:500 (22X34) 1:1000 (11X17)

WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
10988 to 11622 Riverside Drive

PROJECT NO. 17-6638

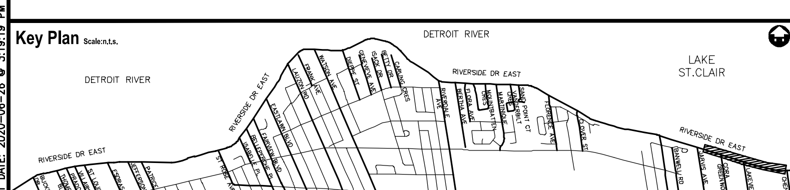
SHEET NO. 9

FILENAME: C:\PROJECTWISE\WORKING DIRECTORY\ACTIVE\32MM\D0731671\176638-00-LAYOUT.DWG PLOTTED BY: MUELHAUPT, MANFRED
PLOT DATE: 2020-06-26 @ 3:19:07 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

RIVERSIDE DRIVE
(STA. 6+930 TO 7+320)

RIVERSIDE DRIVE
(STA.7+320 TO 7+710)

Key Plan Scale N.T.S.



THE CITY OF WINDSOR
ONTARIO, CANADA

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
A	JUNE 2020 REVIEW	JUN 25/20	CDP

DESIGN	TJN
REVIEWED BY	
DRAWN	JTB
CHECKED BY	CDP
DATE	JAN 2020
SCALE	1:500 (22X34) 1:1000 (11X17)

WINDSOR SEWER AND COASTAL FLOOD PROTECTION MASTER PLAN

RIVERSIDE DRIVE LANDFORM BARRIER
11636 Riverside Drive to Windsor/Tecumseh Border

PROJECT NO. 17-6638

SHEET NO. 10

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