



The Regional Municipality of Durham

COUNCIL INFORMATION PACKAGE

November 10, 2016

Information Reports

[2016-INFO-34](#) Commissioner of Planning and Economic Development – re: Durham Economic Development E-Newsletter – Q3 October 2016

Early Release Reports

[2016-COW-**](#) Commissioner of Planning and Economic Development – re: Application to Amend the Durham Regional Official Plan to permit a contractors yard and office uses in the Major Open Space Areas designation at 4560 Thickson Road North in the Town of Whitby, File: OPA 2016-003

Early release reports will be considered at the December 7, 2016 Committee of the Whole meeting.

Staff Correspondence

1. [Memorandum from Ashley Yearwood](#), Project Planner (Acting), Planning Division – New Application for a Regional Official Plan Amendment submitted by Clara and Nick Conforti (Optilinx Systems) for property located at Lot 21, Concession 4, Town of Whitby. The purpose of the application is to amend the Durham Regional Official Plan to include an exception in the Major Open Space designation to permit the continuation and expansion of an existing contractors yard and office.
2. [Memorandum from M. Gaskell](#), Commissioner of Corporate Services – re: Electronic Voting in the Council Chambers
3. [Memorandum from M. Gaskell](#), Commissioner of Corporate Services – re: Committee of the Whole – November 2, 2016 Resolution – Release of Documents from the December 22, 2015 and January 27, 2017 Committee of the Whole Meetings
4. [Memorandum from Dr. R. Kyle](#), Commissioner and Medical Officer of Health – re: Health Information Update – November 4, 2016
5. [Memorandum from Dr. R. Kyle](#), Commissioner and Medical Officer of Health – re: Snapshot on Harm Reduction Program

6. [Memorandum from Dr. R. Kyle](#), Commissioner and Medical Officer of Health – re: Basic Income Pilot
7. [Memorandum from Dr. R. Kyle](#), Commissioner and Medical Officer of Health – re: Chief Public Health Officer’s Report on the State of Public Health in Canada 2016: Focus on Family Violence in Canada

Durham Municipalities Correspondence

1. [Town of Whitby](#) – Resolution passed at their Council meeting held on October 31, 2016, regarding Lakeridge Health Integration

Other Municipalities Correspondence/Resolutions (For Information)

There are no Other Municipalities Correspondence/Resolutions

Miscellaneous Correspondence (For Information)

1. [Ministry of Transportation](#) e-mail re: Ontario’s Climate Change Action Plan (CCAP), released on June 8, 2016, committed to creating a cleaner transportation sector in Ontario, in part by promoting cycling
2. [Metrolinx Public Meetings Notice](#) – November 2016

Advisory Committee Minutes (For Information)

1. Durham Region Roundtable on Climate Change (DRRCC) minutes – [October 14, 2016](#)
2. Transit Advisory Committee (TAC) minutes – [October 25, 2016](#)

Action Items from Council (For Information Only)

[Action Items](#) from Committee of the Whole and Regional Council meetings

Members of Council – Please advise the Regional Clerk at clerks@durham.ca by 9:00 AM on the Monday one week prior to the next regular Committee of the Whole meeting, if you wish to add an item from this CIP to the Committee of the Whole agenda.



The Regional Municipality of Durham Information Report

From: Commissioner of Planning and Economic Development
Report: #2016-INFO-34
Date: November 2, 2016

Subject:

Durham Economic Development E-Newsletter – Q3 October 2016

Recommendation:

Receive for information

Report:

1. Purpose

- 1.1 The Durham Economic Development E-Newsletter is a quarterly snapshot of the Division's initiatives and activities. It provides a simple means of relaying information regarding the latest news on economic development activity and initiatives to Council and the public.
- 1.2 It serves as an environmentally-conscious, cost-effective marketing tool to promote economic development activity in Durham Region.
- 1.3 The E-Newsletter was distributed to over 1,200 subscribers.
- 1.4 The E-Newsletter is circulated to the Planning & Economic Development Committee and Council for information. It is also distributed to the business community, stakeholders, and via social media channels through Corporate Communications staff.
- 1.5 This E-Newsletter is produced in cooperation with Corporate Communications.

1.6 This Q3 E-Newsletter was newly created in a mobile-friendly version allowing it to be viewed easily on a smart phone. It is anticipated that this new template should increase the opening rate and boost readership.

2. Attachments

Attachment #1: Q3 Oct. 2016 Durham Economic Development E-Newsletter.

Respectfully submitted,

Original signed by

B.E. Bridgeman, MCIP, RPP
Commissioner of Planning and
Economic Development



DURHAM REGION
ECONOMIC DEVELOPMENT
C A N A D A

Economic Development
NEWSLETTER
Q3, 2016



Unifor, GM Reach Deal



Autoworkers concerned about the future of the Oshawa Assembly can now breathe a sigh of relief. With negotiations reaching past the midnight deadline, Unifor and General Motors were able to reach a tentative deal for a new contract that will see new product and jobs come to Oshawa...

Source: Oshawa Express

[READ MORE](#)

Durham College receives multi-million dollar investment from feds for new building

Durham College has received the largest ever contribution to a single project in its half-century history. Celina Caesar-Chavannes, MP for Whitby, was on



hand at Durham College's north Oshawa campus to announce the federal government would be contributing \$13 million toward the college's Centre for Collaborative Education (CFCE).

Source: Oshawa Express

[READ MORE](#)

Economic impact resulting from mega projects in Clarington

Three of the top 100 of the largest infrastructure projects in Canada are located in Clarington. Totalling over \$14 Billion dollars in investment, these projects will be creating thousands of jobs spanning over a decade and beyond.

Part of the Port Hope Area Initiative, the \$270 Million Federal Project in Port Granby is an environmental remediation project that has been underway since the spring. The site is being prepared for the relocation of the low level radio active waste to an engineered aboveground mound. Several local companies have been awarded contracts to provide supplies and services to the project. Prime Contractor AMEC-CB&I Joint Venture has already awarded over \$35 million in subcontracts. Many Clarington businesses are providing products and services such as Durham Fuels, Safe & Sound Manufacturing, and St Marys Cement who are providing over 165,000 tonnes of high quality clay to line the cells of the mound.



The 407 East Extension project is progressing quickly. By late 2019 Highway 407 to Highway 35/115 and Highway 418 (link to Hwy 401) will be open to traffic. To date, Blackbird Constructors 407 General Partnership has awarded nearly \$250,000 in subcontracts to Clarington businesses - Langley Utilities, Clarington Promotions and ML Excavating & Construction to name a few. As the need for materials and supplies grow for the project, Blackbird continues to make efforts to source locally.

Ontario Power Generation Darlington Nuclear Generating Station is ready to commence refurbishment on Unit 2 reactor on October 15, 2016 (breaker open). Key project activities are being initiated in preparation for and after breaker opening. There will be an average of 8,800 jobs that will be created over the life of the project. The number of employees based out of offices in Clarington serving the Project has grown from two to more than 135 employees in four years. On-site, there is a workforce of over 2,600 - generated through Project contractors and subcontractors outside of Clarington.

Centre for Advanced Research, Innovation and Entrepreneurship (CARIE)



The University of Ontario Institute of Technology in Oshawa has announced plans for a new \$100 million Centre for Advanced Research, Innovation and Entrepreneurship (CARIE). CARIE will act as a catalyst for a new cluster of advanced manufacturing, research and development in strategic industries such as nuclear,

electrical and alternative energy systems, automotive and transportation, new materials and robotics.

At CARIE, faculty, students and industry partners will tackle complex industry challenges to develop solutions to real-world problems. CARIE will provide Durham Region and Northumberland County with a large scale entrepreneurial convergence facility, comparable to the MaRS Discovery District, Digital Media Zone at Ryerson University, OCADU Imagination Catalyst, and the Hatchery and Creative Destruction Lab at the University of Toronto.

Whitby company predicts success

August marked the expansion and grand opening of one of Whitby's software development companies - Predictive Success Corporation - along Byron Street. Predictive Success develops behavioural assessment software to help businesses find and keep talented people. Pictured is David Lahey (centre) with members of Town Council and Chamber of Commerce CEO Tracy Hanson (second to left) during the ribbon cutting ceremony.



Defying gravity and creating jobs in Whitby



Canada's third indoor skydiving facility is coming to Whitby. iFLY Whitby is expected to attract 60,000 visitors and create 35 jobs in 2017.

iFLY gives guests as young as four years old the thrill of skydiving in a safe, supervised setting. Large indoor wind tunnels simulate the feeling skydivers experience during free-fall. iFLY hosts events from birthday parties to corporate team building and is the leading training facility for Ontario's military personnel. "iFLY is top notch and will attract people from across the province to Whitby," said Mayor Don Mitchell. "The location of the new facility is highly visible and will make a major mark in our town."

Construction of iFLY's new 11,000 square foot building begins this summer in the Whitby Entertainment Centrum on Consumers Drive west of Thickson Road.

"The location couldn't be better!" confirms Alain Guérin, CEO of iFLY Toronto, Oakville and Montreal. "We can't wait to have people from all over the province come to Whitby and discover what it feels like to fly," added Guerin.

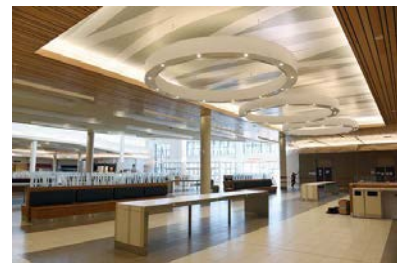
Oshawa Centre expansion

With an airy new food court flooded with natural light serving as the centerpiece, the newly revamped Oshawa Centre officially [opened] on Sept. 29 with the addition of 60 new retailers.

During a sneak-peak tour of the \$230-million renovation, which brings the mall's square footage to 1.25 million...

Source: Metroland Media Group's Durham Region Division

[READ MORE](#)



Business Growth Initiative

Rapid changes in technology and globalization are reshaping Ontario's economy. The Business Growth Initiative is the government's new economic strategy to fast-track Ontario's knowledge-based economy by tapping into the creativity, education and skills of our people.

The strategy will commit \$400 million over the next five years and leverage Ontario's highly skilled workforce to compete through innovation...

Source: Province of Ontario

[READ MORE](#)

Local craft brewer Brock Street Brewing Co. expanding into downtown Whitby



Whitby has been benefitting from the recent craft beer consumer enthusiasm. Brock Street Brewing Co. opened to the public in April 2015. Since opening, this craft brewer has built a customer base. Earlier this year, Brock Street Brewing Co. submitted a site plan application to the Town of Whitby for the construction of a three-storey, 25,000

sq.ft. craft brewery, restaurant and lounge. The business will accommodate organized tours throughout the brewery and allow patrons to view the production area from the dining areas. Brock Street Brewing's owners anticipate that the potential number of employees would approach 20 full and part time employees when in full operation.

Energy Innovation Program (EIP) clean tech grants

The Energy Innovation Program (EIP) provides up to 50-75% of project costs to a maximum of \$5 million for businesses completing cleantech research, development, and demonstration projects. Projects that are eligible for the program will seek to produce/use energy in a cleaner and more efficient way previously unavailable.

EIP's Clean Energy Innovation program has an upcoming application deadline set for October 31, 2016. Continue reading to discover if your business and project are a good fit for the Energy Innovation Program...

Source: Mentor Works

[READ MORE](#)

TMIG opens Whitby-based office



The Municipal Infrastructure Group Ltd. is pleased to announce the acquisition of Dionne Bacchus and Associates Consulting Engineers Ltd. Through this acquisition, TMIG gains a dedicated group of transportation engineering and transportation planning professionals, with experience in both the public and private sectors.

This merger brings together high level, professional services, that fully complement each other's range of practice areas, and establishes a Whitby-based TMIG office (located at 110 Scotia Court, Unit 27). Dale Dionne and Jim Bacchus along with their highly knowledgeable and professional team, bring with them well established relationships within Durham Region, which opens the door for exciting municipal, land development, transportation, and water resource engineering opportunities in the area.

FOR MORE INFORMATION

Jan/Feb: Automation/Robotics Mission to India

The Ontario Ministry of International Trade will lead a mission of 6-12 Ontario companies and institutions in the Automation and Robotics to India from January 30 - February 4, 2017. The purpose of the mission is to help Ontario companies to target the rapidly growing Indian Automation and Manufacturing opportunities and to assist Ontario companies to partner and access export opportunities in these sectors. The mission will promote Ontario's capabilities in Artificial Intelligence, Robotics and Automation. For more information, please contact Akhil Tyagi, akhil.tyagi@ontario.ca Tel: 416 327-2371.

March 12-15, 2017: Ontario trade mission to SxSW (South by South West)

The Ontario Ministry of International Trade and the Canadian Consulate in Texas invite you to be part of the Ontario interactive trade mission to South by South West - SxSW (www.sxsw.com). With over 60,000 attendees, and more than 500 exhibits, SxSW brings together the best innovative new companies and established industry leaders from the music, film and interactive fields. Eight new and established companies will have the opportunity to exhibit in the Ontario Pavilion (booth # tbd).

Participants will also receive several value-added services including an up-to-date database, promotion at the Ontario Business Reception and a market intelligence briefing. Cost: \$2,400 only for first time participants in an Ontario IT mission to the U.S. (deadline for "Early Bird" is December 31, 2016). Regular fee is \$2,700.

Past participants have priority registration only if applying with a first time participant approved to join the mission. Financial assistance to eligible companies from the may be available

through Ontario's www.exportaccess.ca and Canada's CanExport Program To apply for this trade mission contact Mauricio.Ospina@ontario.ca



Select your wording carefully. Most people scan their emails very quickly. Keep your paragraphs to seven lines or less. If you have more information, include a link to your website where your readers can get further details.

SHARE THIS EMAIL

SIGN UP FOR EMAILS

The Regional Municipality of Durham, 605 Rossland Rd. E., Whitby, Ontario L1N 6A3 Canada

[SafeUnsubscribe™ {recipient's email}](#)

[Forward this email](#) | [Update Profile](#) | [About our service provider](#)

Sent by investdurham@durham.ca in collaboration with

Constant Contact 

Try it free today

EARLY RELEASE OF REPORT



The Regional Municipality of Durham Report

To: Committee of the Whole
From: Commissioner of Planning and Economic Development
Report: #2016-COW-**
Date: December 7, 2016

Subject:

Public Meeting Report

Application to Amend the Durham Regional Official Plan to permit a contractors yard and office uses in the Major Open Space Areas designation at 4560 Thickson Road North in the Town of Whitby, File: OPA 2016-003

Recommendations:

- A) That Public Meeting Report #2016-COW-** be received for information; and
 - B) That all submissions received be referred to the Planning Division for consideration.
-

Report:

1. Purpose

1.1 On September 23, 2016, an application to amend the Regional Official Plan (ROP) was submitted by Valerie Cranmer and Associates on behalf of Clara and Nick Conforti (Optilinx Systems). The purpose of the proposed amendment is to allow for an exception to the Major Open Space Areas designation to recognize and permit the expansion of an existing contractors yard and office uses on the subject site.

1.2 A "Notice of Complete Application" has been advertised in the Oshawa/Whitby This Week. Notice of this meeting has also been mailed to those who own land

within 120 metres (400 feet) of the subject site. This report was made available to the public prior to the meeting.

2. Background

- 2.1 The subject site is located on the west side of Thickson Road North, approximately 900 metres north of Taunton Road East. The property is municipally recognized as 4560 Thickson Road North and legally described as Part of Lot 21, Concession 4, in the Town of Whitby (refer to Attachment #1). The site is approximately 4.8 hectares (12 acres) in size.
- 2.2 The site is irregular in shape, relatively flat and is largely vegetated. The site contains a number of buildings including:
- a one-storey dwelling and associated buildings situated at the southern portion of the property; and
 - a one-storey office, associated buildings and outdoor storage, situated at the north central portion of the property.
- 2.3 A hydro line easement (in favour of Hydro One) bisects the property through the north central portion of the property and a Trans-Canada Pipeline easement passes through the northeast corner of the property (refer to Attachment #1).
- 2.4 Surrounding land uses include:
- north – woodlots, wetlands, an animal shelter (Ajax and Whitby Animal Services Centre), and industrial uses (i.e. Dufferin Concrete and Sunup Services);
 - east – Thickson Road North, woodlots, wetlands, low density residential and a stormwater management pond;
 - south – woodlots, wetlands and low density residential; and
 - west – woodlots, wetlands, and a hydro corridor.
- 2.5 The subject site is serviced by municipal water and private sanitary services.
- 2.6 The current owners purchased the property in 2002 and established a home-based business (Optilix Systems) specializing in fibre optic cable installation. Since then, the business has grown to a point that it now exceeds the provisions for a home-based business as provided for in the Whitby Zoning By-law. The owners have pre-consulted with the Town and Region on a number of occasions in an attempt to seek proper permissions for their business operation.

3. Reports Submitted in Support of the Application

3.1 The following reports were submitted in support of the application:

- Planning Justification Report, prepared by Valerie Cranmer & Associates Inc. (September 2016);
- Environmental Impact Study, prepared by Oakridge Environmental Ltd. (March, 2016);
- Phase I Environmental Site Assessment, prepared by Oakridge Environmental Ltd (May 2016);
- Phase II Environmental Site Assessment, prepared by Oakridge Environmental Ltd (July 2016);
- Stage 1-2 Archaeological Assessment, prepared by Amick Consultants Limited (June, 2016);
- Stormwater Management Report, prepared by GHD (September, 2016); and
- Traffic Impact Study, prepared by Paradigm Transportation Solutions Limited (April 2016).

4. Durham Regional Official Plan Context

4.1 The subject site is designated “Major Open Space Areas” (MOSA) in the Regional Official Plan (ROP). The MOSA designation applies to both urban and rural areas throughout the Region. The predominant use of land within this designation is conservation in urban and rural areas, however other uses such as major recreational uses, commercial kennels and landscape industry uses may be considered, subject to the policies of the ROP. Area municipal official plans may further distinguish between uses which are compatible with the character of the MOSA in urban and rural areas.

4.2 Schedule ‘B’ – Map ‘B1d’ of the ROP recognizes that the subject site contains key natural heritage and/or hydrologic features (KNHHF). Policy 10A.2.2 of the ROP requires that any development proposal in a MOSA shall demonstrate that:

- there will be no negative effects on KNHHF or their functions;
- the connectivity between KNHHF is maintained, or enhanced for the movement of native features or their functions;

- the removal of other natural features not identified as KNHFF should be avoided and incorporated into the planning and design of the proposed use, wherever possible; and
- the disturbed area of any site does not exceed 25 percent, and the impervious surface does not exceed 10 percent of the total developable area.

5. Provincial Policies

- 5.1 The Provincial Policy Statement (PPS) requires the protection of natural features and areas for the long term. The PPS also states that development and site alteration shall not be permitted in significant: wetlands; woodlands; wildlife habitat; and areas of natural and scientific interest (ANSI) unless it can be demonstrated that there will be no negative impacts on the natural features or their ecological functions.
- 5.2 The 2006 Growth Plan for the Greater Golden Horseshoe (Growth Plan) requires municipalities to identify natural systems for the Greater Golden Horseshoe and develop additional policies for their protection. The Growth Plan also encourages Planning authorities to identify natural heritage features and areas that complement, link, or enhance natural systems.
- 5.3 Both the PPS and the Growth Plan requires planning authorities to provide opportunities for a diversified economic base, which includes maintaining a range and choice of suitable sites for employment uses which support a wide range of economic activities and ancillary uses, and take into account the needs of existing and future businesses.

6. Proposed Official Plan Amendment

- 6.1 The applicant has proposed that the ROP be amended by adding a policy exception to the ROP that would:

“Permit the development of employment uses that includes the continuation of an existing contractor’s yard and office uses, subject to the approval of an amendment to the Town of Whitby Official Plan and Zoning By-law, as well as an approved Site Plan for the subject property.”

7. Consultation

- 7.1 This application has been circulated to a variety of agencies for review and comment, including: the Ministry of Municipal Affairs and Housing; the Town of Whitby; and the Central Lake Ontario Conservation Authority (CLOCA). Additional technical comments on this application will be provided by the Works and Health Departments.

8. Public Participation

- 8.1 Anyone who attends the Region's public meeting may present an oral submission, and/or provide a written submission to the Committee of the Whole on the proposed amendment. Also, any person may make written submissions at any time before Regional Council makes a decision.
- 8.2 If a person or public body does not make oral submissions at a public meeting, or does not make written submissions before the proposed official plan amendment is adopted, the person or public body:
- is not entitled to appeal the decision of the Ontario Municipal Board; and
 - may not be added as a party to the hearing of an appeal before the Ontario Municipal Board unless, in the opinion of the Board, there is reasonable grounds to add the person or public body as a party.
- 8.3 Anyone wishing to be notified of Regional Council's decision on the subject amendment must submit a written request to:

Brian Bridgeman, MCIP, RPP
Commissioner of Planning and Economic Development
Planning and Economic Development Department
Regional Municipality of Durham
Durham Region Headquarters
605 Rossland Road East
Whitby, ON L1N 6A3

9. Future Regional Council Decision

9.1 The Committee of the Whole will consider the subject applications at a future meeting, and will make a recommendation to Regional Council. Council's decision will be final unless appealed.

9.2 All persons who made oral or written submissions, or have requested notification in writing, will be given written notice of the future meetings of Committee of the Whole and Regional Council at which the subject application will be considered.

10. Attachments

Attachment #1: Location Sketch

Attachment #2: Location of Contractors Yard on the Subject Site

Attachment #3: Applicant's Conceptual Plan

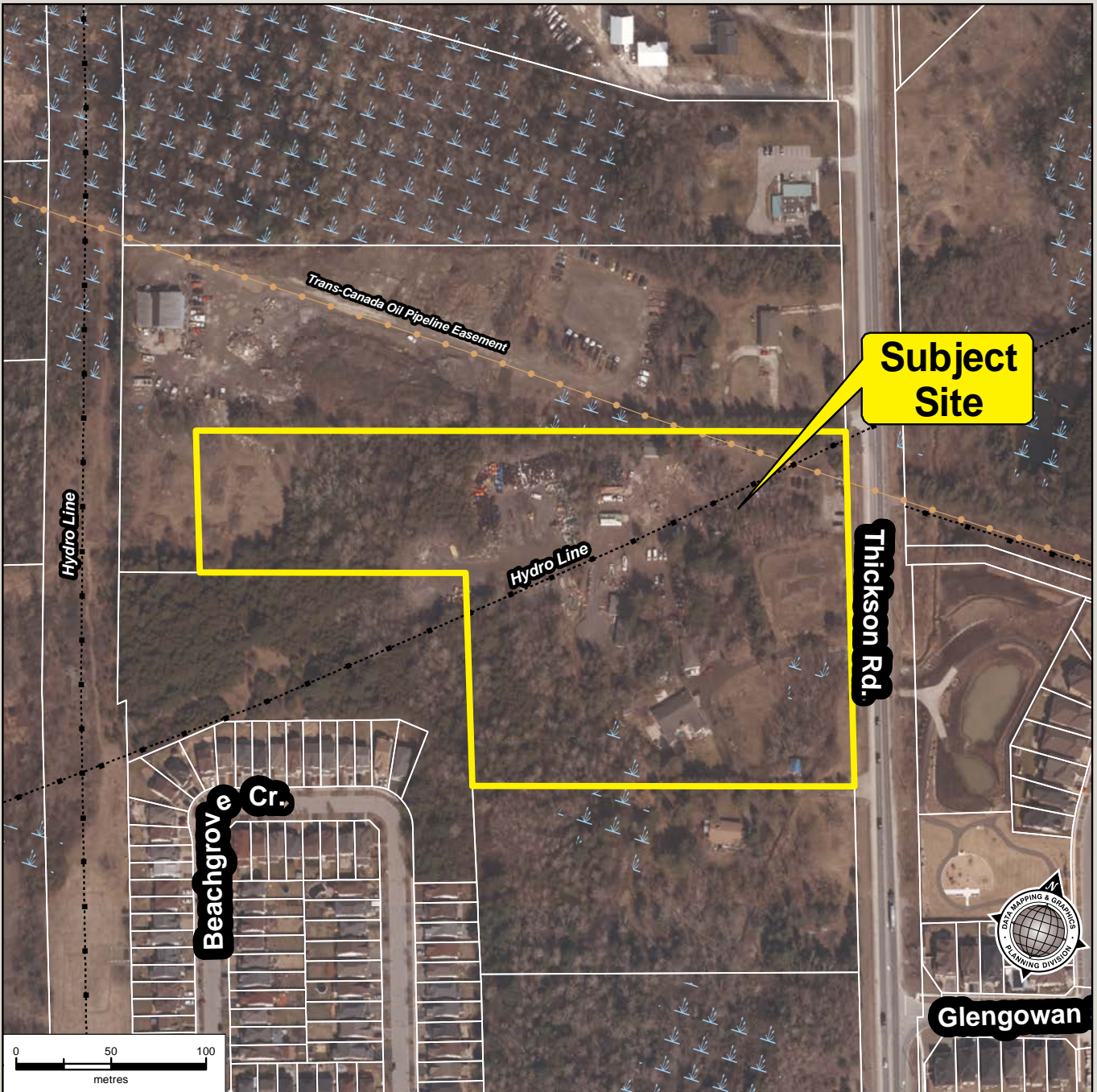
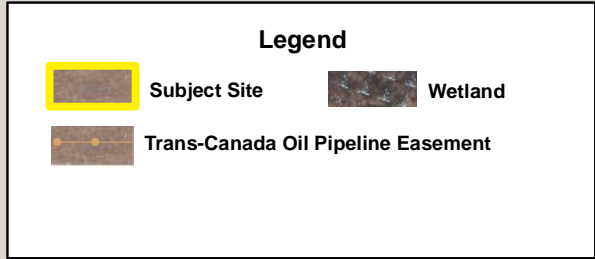
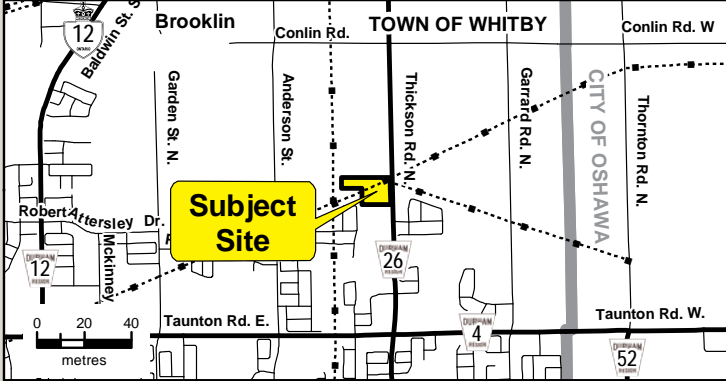
Respectfully submitted,

Original signed by

B. E. Bridgeman, MCIP, RPP
Commissioner of Planning and
Economic Development

Attachment:1
 Commissioner's Report: 2016-COW-XX
 File: OPA 2016-003
 Municipality: Town Of Whitby

Municipal Context

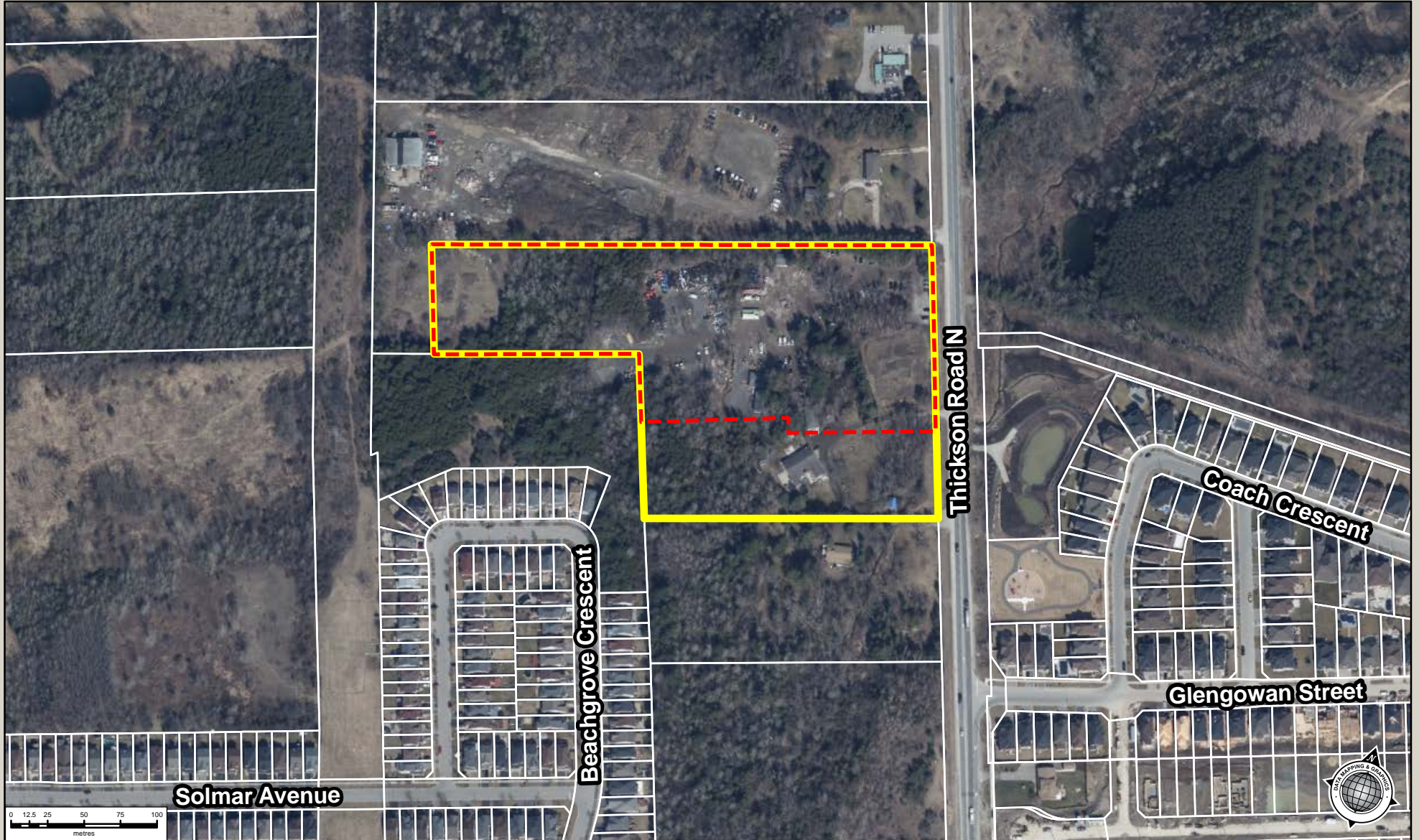


Data Sources:
 PARCEL DATA: Ownership © Teranel Inc. and its suppliers. Assessment © 2015 MPAC and its suppliers.
 ORTHOPHOTO: © 2016 First Base Solutions. All rights reserved. May not be reproduced without permission. This is not a plan of survey.

This map has been produced from a variety of sources.
 The Region of Durham does not make any representations concerning the accuracy, likely results, or reliability of the use of the materials.
 The Region hereby disclaims all representations and warranties.

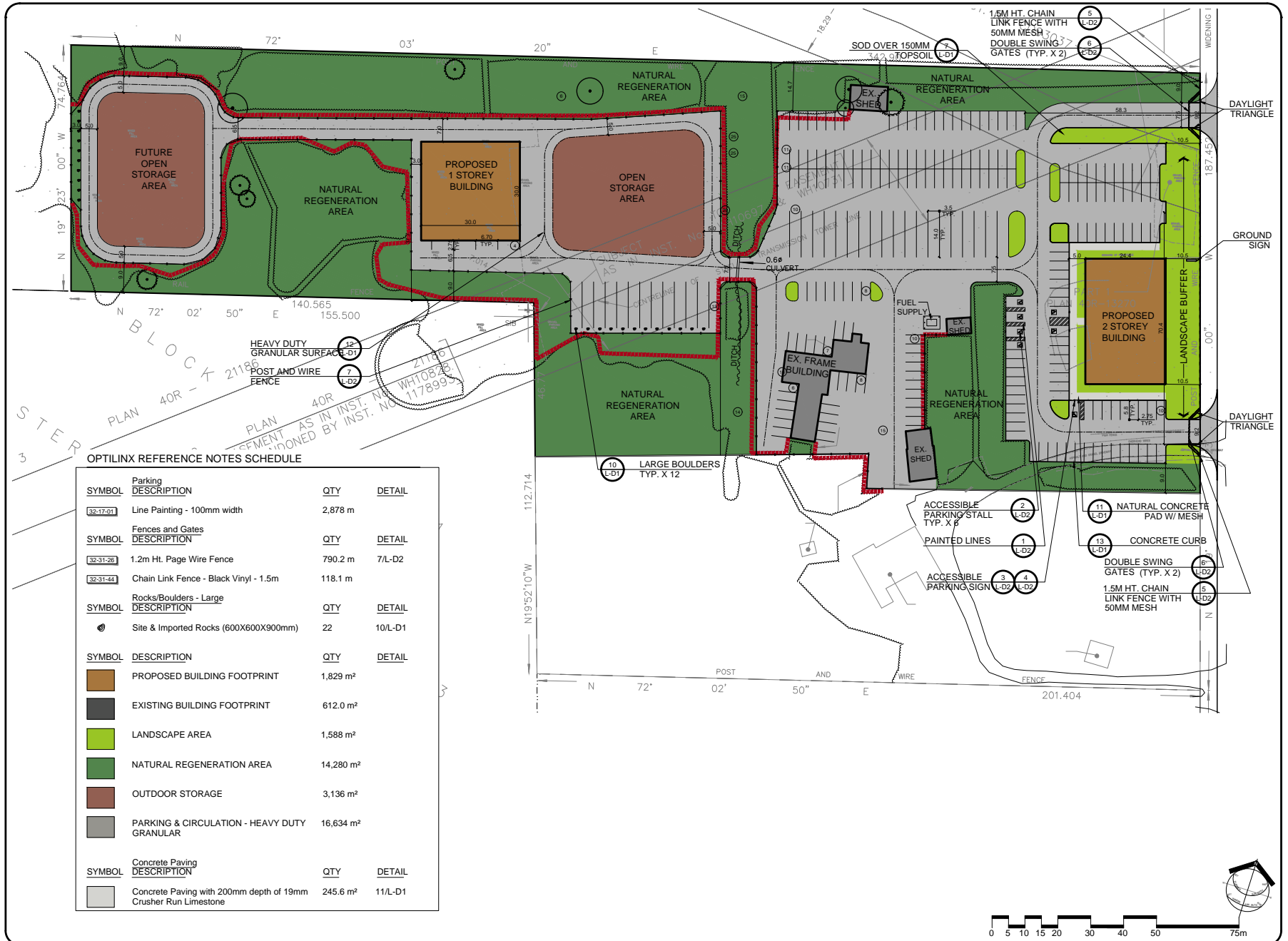
Legend

 Subject Site  Location of Contractors Yard



Data Sources:
ORTHOPHOTO: © 2016 First Base Solutions.
PARCEL DATA © Teranet Enterprises Inc. and its suppliers
All rights reserved. May not be reproduced without permission.
This is not a plan of survey.

Attachment:3
Commissioner's Report: 2016-COW-XX
File: OPA 2016-003
Municipality: Town of Whitby





Interoffice Memorandum

NOV 3 13 2016

To: Debi Wilcox, Regional Clerk/Director
Legislative Services

From: Ashley Yearwood, MCIP, RPP
Project Planner (Acting)

Date: November 3, 2016

Re: **New Application for a Regional Official Plan Amendment**
File Number: **OPA 2016-003**
Applicant: Clara and Nick Conforti (Optilinx Systems)
Location: Lot 21, Concession 4
Municipality: Town of Whitby

The Regional Municipality of Durham

Planning and Economic Development Department

Planning Division

This is to advise that we have received the above noted application.

The application was deemed complete October 24, 2016.

The purpose of the application is to amend the Durham Regional Official Plan to include an exception in the Major Open Space designation to permit the continuation and expansion of an existing contractors yard and office. Applications for a Whitby Official Plan Amendment and Zoning By-law Amendment were also received by the Town of Whitby for this proposal.

If your department receives any submissions regarding this application, please forward the original copies to the Planning and Economic Development Department.

Please call me if you have any questions.

Ashley Yearwood, MCIP, RPP
Project Planner (Acting)

Encl: Application package

C.S. - LEGISLATIVE SERVICES

Original
To: J. FRASER
Copy
To: CIP
C.C. S.C.C. File
Take Appr. Action

"Service Excellence for our Communities"

FRASER



Interoffice Memorandum

Date: November 10, 2016

To: Regional Chair Anderson and Members of Council

From: M. Gaskell, Commissioner of Corporate Services

Subject: Electronic Voting in the Council Chambers

Corporate
Services –
Legislative
Services

At the May 18, 2016 meeting of Regional Council, staff were requested to investigate and report back on the logistics and costs to implement electronic voting in the Council Chambers.

Electronic voting can be activated on our current system based on upgrades completed in 2013. However, additional programming has been requested to include additional administrative and operational features requested by Legislative Services, and enabling their management of the system. The upper estimated cost is \$15,877 before tax to complete specialized AV system programming and engineering. It would take approximately one month to get the system operational and fully tested if Council desires this to be done.

In order for the system to be activated to record a vote, Members of Council would be required to utilize a special access card to activate and record their vote. The following functional requirements of the system were requested:

- System will be activated for the vote by the Regional Clerk and not through the AV booth
- Ability for each member to vote Yes or no
- If a member is absent, including absent for the vote, the system shall record the member as not voting
- Voting results shall be displayed on the projection screen
- An identifying agenda number will be displayed with the voting results, in order for Legislative Services to have an audit trail.

A number of comparator municipalities were contacted to determine if electronic voting is utilized for all motions, including procedural motions and if electronic voting is utilized at Standing Committee/Committee of the Whole or Council. Attached is a summary of the comments received to date.

Along with the ability to add electronic voting, the upgraded system also allows for the ability to implement an electronic speakers list, providing Members of Council with the ability to push a button when they wish to speak and for the list to be clearly displayed for the Regional Chair to follow.

The above is provided for your information at this time.

Original signed by

Matthew Gaskell
Commissioner of Corporate Services

Attachment #1 – Survey of Comparator Municipalities

Attachment #1

Questions Regarding Electronic Voting

The two questions asked on electronic voting are:

Question 1: Do you utilize electronic voting in Council Chambers?

Question 2: Do you have electronic voting on all motions?

CLERK/MUNICIPALITY	Q1-Yes/No	Q2-Yes/No	Comments
Barrie-Dawn McAlpine	No	No	None
Chatham-Kent-Judy Smith	Yes	No	None
Guelph-Stephen O'Brien	Yes	Yes	They vote on all motions except routine procedural matters (like adjournment). Do not record in Closed unless asked (as per the Act)
Halton-Karyn Bennett	No	No	None
Hamilton-Rose Caterini	No	No	
Kingston-J. Bolognone	Yes	Yes	None
London-Cathy Saunders	Yes	Yes	None
Mississauga-Crystal Greer	Yes	Yes	As of January 2017
Muskoka-Debbie Crowder	No	No	None
Niagara Region-Ralph Walton	Yes	No	RV-as requested-manually
Ottawa-Rick O'Connor	No	Yes	eAgenda for Electronic Voting but do not use it
Peel Region-Kathryn Lockyer	No	No	Electronic voting system, but do not use it.
Sudbury-Caroline Hallsworth	No	No	No Electronic system
Thunder Bay-John Hannam	No	No	None
Vaughan- Jeff Abrams	Yes	No	Just at Council, upon request
Waterloo-Kris Fletcher	Yes	No	None
Windsor-Valerie Critchley	No	No	None



Corporate Services –
Legislative Services

Interoffice Memorandum

TO: Members of Durham Regional Council

FROM: Matthew Gaskell, Commissioner of Corporate Services

DATE: November 9, 2016

RE: Committee of the Whole – November 2, 2016
Resolution – Release of Documents from the December 22,
2015 and January 27, 2016 Committee of the Whole
Meetings

At the November 2, 2016 meeting of the Committee of the Whole, the following motion was approved.

- “B) That staff be directed to release the following documents to the public:
1. The HDR Technical memo dated December 17, 2015;
 2. The HDR presentation “DYEC Acceptance Test Report Review” dated December 17, 2015;
 3. The covering memorandum to Council from the Acting Director – Legal Services dated December 18, 2015;
 4. The memorandum entitled “DYEC Acceptance Test Report” dated December 11, 2015 including Attachments 1 and 2;
 5. The undated four-page document related to the long term sampling system and the AMESA cartridges; and
 6. The DYEC Acceptance Test Supplemental Report dated December 18, 2015; and
- C) That only confidential data be redacted from the above noted documents.”

Based on a review of the documents by Corporate Services staff, please find the following attachments which are being released to the public:

1. **The HDR Technical memo dated December 17, 2015**
2. **The HDR presentation “DYEC Acceptance Test Report Review” dated December 17, 2015**
3. **The covering memorandum to Council from the Acting Director – Legal Services dated December 18, 2015**
4. **The memorandum entitled “DYEC Acceptance Test Report” dated December 11, 2015 including Attachments 1 and 2**

The memorandum was released previously subject to redaction on pages 210-213 of the Committee of the Whole agenda dated

Memo – M. Gaskell – Release of Documents

November 2, 2016. Attachment #1 and #2 noted within the memorandum are attached hereto.

5. The undated four-page document related to the long term sampling system and the AMESA cartridges provided by Councillor Diamond

There is no record of this document in the master Legislative Services agenda file. It is not clear where this document originates from.

6. The DYEC Acceptance Test Supplemental Report dated December 18, 2015

Please advise if you require anything further.

Matthew Gaskell

Matthew Gaskell,
Commissioner of Corporate Services

Item #1



Technical Memorandum

Date: Thursday, December 17, 2015

Project: Durham York Energy Centre (DYEC)

To: Mirka Januszkiewicz, PEng, Region of Durham (Durham)
Laura McDowell, PEng, Region of York (York)

From: Bruce Howie, P.E., HDR Corporation (HDR)

Cc: Gioseph Anello, PEng; Greg Borchuk, PEng (Durham)
Luis Carvalho, PEng; Seth Dittman, PEng (York)
Shawn Worster, John Clark, P.E.; Kirk Dunbar (HDR)

Subject: **Durham York Energy Centre (DYEC)**
Summary Review of Acceptance Test Report

Covanta conducted the Acceptance Test of the Durham York Energy Center (DYEC) from September 27, 2015 through November 2, 2015, and submitted the Acceptance Test Report (Report), the Source Test (including Odour) and the Acoustic Audit on November 26, 2015, along with the Acceptance Test Declaration. The Report summarized findings and results of the testing, and provided Covanta's certification that these tests demonstrated that the DYEC achieved all of the Performance Guarantees as stipulated in Exhibit 2 to Appendix 19 of the Project Agreement (PA).

HDR Corporation (HDR) as the Owner's Consultant for the Regions of Durham and York (the Regions), was responsible for monitoring Covanta and their operating personnel throughout the entire Acceptance Test to assess whether the DYEC was being operated under normal conditions and that the testing was being conducted in accordance with the agreed-upon final Acceptance Test Protocol, dated January 2015. This technical memorandum and the attached presentation (Attachment A) have been prepared for the Regions to provide a concise summary of our evaluation of the Test Report and Covanta's compliance with the Acceptance Test Criteria as stipulated in the PA and Test Protocol. A list of the sections of the Test Report and the supporting data that HDR reviewed as part of our assessment is provided as Attachment B. Table 1 below summarizes the Acceptance Test Criteria in the PA, the results as presented by Covanta in the Acceptance Test Report, and the results based upon HDR's independent calculations based on the Test data included in the Acceptance Test Report.

Based on HDR's review of the results presented by Covanta in the Report (as shown in column 2 of Table 1, below), the supporting data/documentation, our observations during the testing period, and our independent calculations of the results (as shown in Column 3 of Table 1), we generally concur with the results presented by Covanta in the Test Report. It is HDR's opinion that Covanta has demonstrated that the DYEC has met or exceeded the requirements of the Minimum Acceptance Test Criteria as defined by Section 1.15 of the Acceptance Test Protocol for Reliability, Throughput Capacity, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance. However, HDR contends that Covanta has not met the criteria for the 30-Day and 5-Day Residue Quantity Guarantees, and therefore did not pass the Acceptance Test Criteria as stipulated in the Acceptance Test Protocol and Section 1.14, Appendix 10 of the PA.

TABLE 1 - SUMMARY OF RESULTS

Pursuant to Section 1.14 of Appendix 10 to the PA, “The Facility shall be deemed to have passed the Acceptance Test Criteria if the Acceptance Test demonstrates that, each of the following criteria has been met or exceeded”

CRITERIA	TEST RESULT	
	COVANTA	HDR
The 30-day Reliability Test has demonstrated during the test period that the Facility has operated at a minimum of 95% of the Demonstrated Design Steam Flow (DDSF) with a Facility availability greater than 95%.	101.6% DDSF 99.9% Reliability PASS	101.6% DDSF 99.9% Reliability PASS
The Throughput Capacity Guarantee Test has demonstrated the ability of the Facility to process waste in accordance with the Throughput Capacity Guarantee in Exhibit 2 to Appendix 19 during a consecutive five (5)-day test period, and that the amount of Reference waste (in tonnes) processed during the testing period is 2,180 tonnes (and no less than 1,000 tonnes per unit).	Exceeded Facility Criteria by 6.4% Each boiler exceeded 1,000 tonnes reference waste PASS	Exceeded Facility Criteria by 6.3% Each boiler exceeded 1,000 tonnes reference waste PASS
The Energy Recovery Test has demonstrated that the average net electrical production rate (in kWh/tonne) is not less than the Electrical Production Guarantee identified in Exhibit 2 to Appendix 19	840 kWh/tonne exceeded adjusted Guarantee of 821 kWh/tonne by 2.3% PASS	846 kWh/tonne exceeded adjusted Guarantee of 828 kWh/tonne by 2.1% PASS
The Residue Quality Guarantee has demonstrated that the unburned carbon content is less than 3%, and moisture content is less than 25%	16.7% moisture and 0.41% Combustibles PASS	16.7% moisture and 0.83% Combustibles PASS
The Metals Recovery Guarantee is demonstrated if the measured recovery efficiency percentages for ferrous metals and for non-ferrous metals comply with those identified by the DBO Contractor in Exhibit 2 to Appendix 19. (80% Ferrous, 60% Non Ferrous)	Ferrous - 87.8% Non-Ferrous - 84.7% PASS	Ferrous - 83.0% Non-Ferrous - 84.7% PASS
The Environmental Compliance Guarantee is demonstrated if the results of the air emissions, noise, and general test requirements are in compliance with the CofA	All Environmental Requirements Satisfied PASS	MoECC deemed all reports acceptable - CO spikes accepted PASS
The Residue Quantity Guarantee is demonstrated if the quantity of Residue generated (in tonnes) is less than or equal to 30% of Waste processed (in tonnes), adjusted for the measured waste HHV in accordance with Table A10-2.	30-Day period- 26.6% vs 29.4% guarantee PASS 5-Day period- 26.8% vs 29.4% guarantee PASS	30-Day period- 31.8% vs 29.3% guarantee FAIL 5-Day period- 29.9% vs 29.7% guarantee FAIL

Debi Wilcox

Attachment A

HDR Presentation: DYEC Acceptance Test Report Review



DYEC ACCEPTANCE TEST REPORT REVIEW

DECEMBER 17, 2015

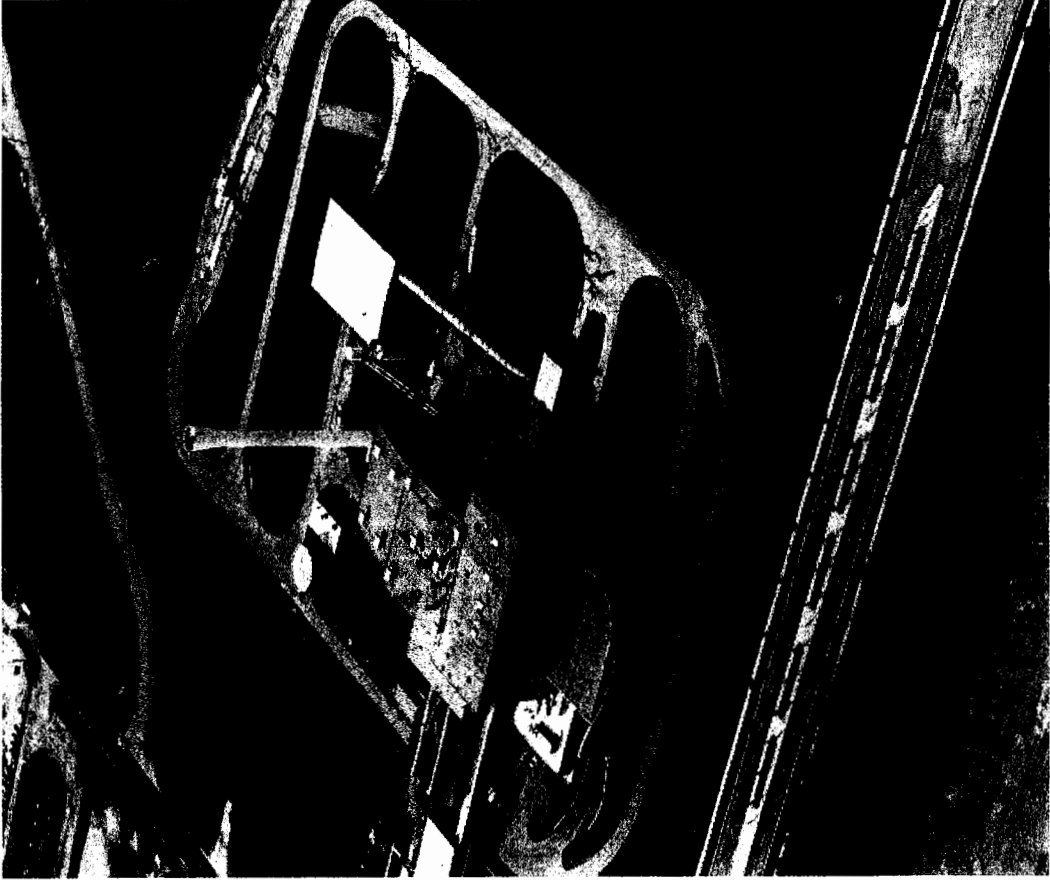
HDR

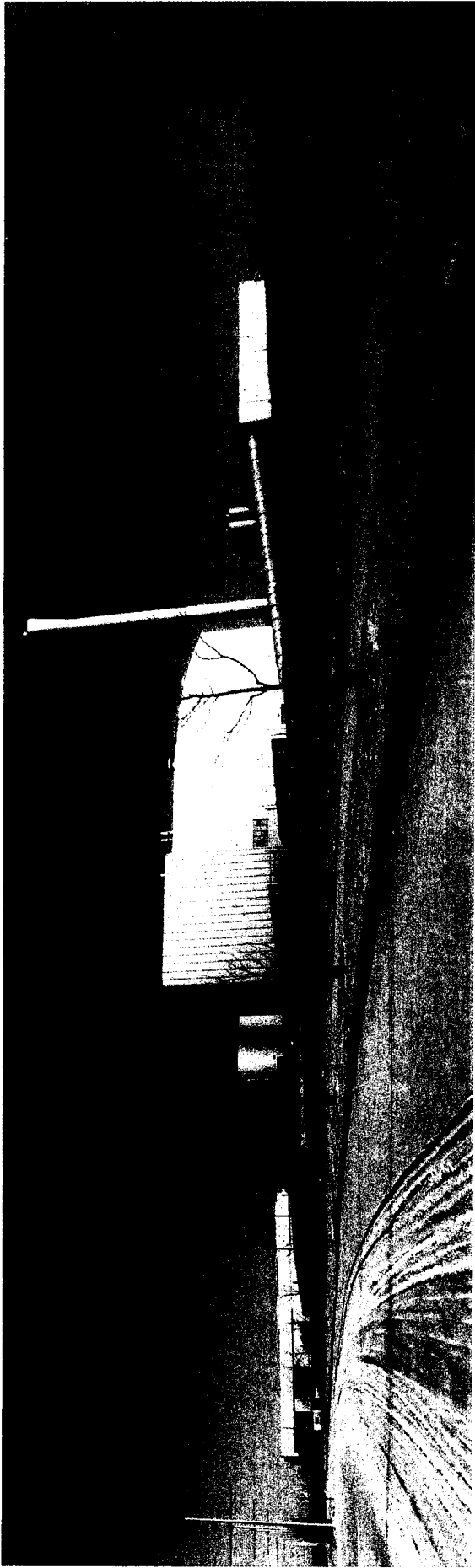
Background

Test Results Summary

Discussion of Results

Conclusions





BACKGROUND

ACCEPTANCE TEST SCHEDULE

- Acceptance Testing Period: September 27th through November 2nd
(Total Testing Period: 37-Days)
- Acceptance Test Declaration (by Covanta): November 25, 2015
- Acceptance Test Report Issued (by Covanta): on November 26, 2015
- Full Air Emissions Report (including the Odour Test and the Acoustic Audit Results) were also submitted to the MOECC and the Regions on November 26, 2015

HDR REVIEW OF ACCEPTANCE TEST AND REPORT

- On-site monitoring of plant operations during full 37-Day Test Period. Collected pertinent Control room and facility data.
- On-site monitoring of Source Testing performed by Ortech.
- Review and input daily test data submitted by Covanta.
- Perform independent calculations for Boiler as Calorimeter and Facility HHV correlation to confirm Covanta calculations.
- November 30th: HDR performed a review of the Test Report and confirmed that the information required to assess the results of the Acceptance Test was provided and complete.
- Perform detailed review of data and calculations in Covanta Report



02

ACCEPTANCE TEST RESULTS

ACCEPTANCE TEST REQUIREMENTS - OVERVIEW

30-Day Reliability Test	Steam Flow (MCR) & Availability \geq 95%
5-Day Throughput Capacity Test	Throughput \geq 100% ⁽¹⁾
Three (3) – 8-hour Energy Recovery Tests	767 kWh/tonne @ HHV of 13 MJ/kg ⁽¹⁾
5-Day Residue Quality Test	<25% Moisture & <3% Unburned Carbon
Residue Quantity Test-5-Day Residue Quantity Test-30-Day	Total Residue (Bottom Ash + Fly Ash) of <30% ⁽¹⁾
Three (3) – 8-hour Metals Recovery Tests	Ferrous \geq 80% ; Non-Ferrous \geq 60%
Environmental Compliance Tests	Meet all ECA requirements
Noise, Odour	Meet all EA and ECA requirements

(1) = Adjusted based on waste higher heating value (HHV) measured during test.

SUMMARY OF ACCEPTANCE TEST RESULTS

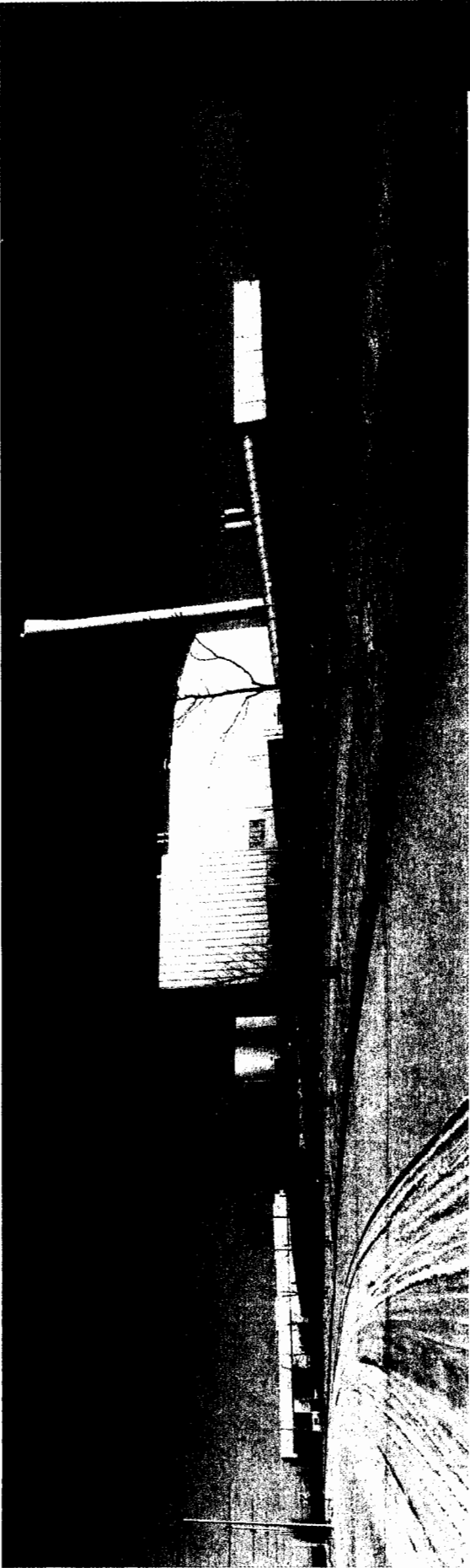
30-Day Reliability Test	PASS	PASS
5-Day Throughput Capacity Test	PASS	PASS
Three (3) – 8-hour Energy Recovery Tests	PASS	PASS
5-Day Residue Quality Test	PASS	PASS
Residue Quantity Test-5-Day	PASS ⁽¹⁾	FAIL
Residue Quantity Test-30-Day	PASS ⁽¹⁾	FAIL
Three (3) – 8-hour Metals Recovery Tests	PASS	PASS
Environmental Compliance Tests (Source Test, Ash Tests)	PASS	PASS ⁽²⁾
Noise, Odour	PASS	PASS ⁽²⁾

(1) = Based on Covanta assertion that Pozzolan/Cement is excluded from the calculation for fly ash quantity.

(2) = Source Test Report, Ash, Noise and Odour Testing all deemed acceptable by MOECC

SUMMARY OF ACCEPTANCE TEST RESULTS

- Based on HDR's review of the test documentation, HDR generally concurs with the results presented by Covanta in the Test Report.
- Covanta has met or exceeded the criteria for Reliability, Capacity, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance.
- Covanta has not met the criteria for the 30-Day and 5-Day Residue Quantity Guarantees.
- Covanta did not pass the Acceptance Test Criteria as stipulated in the Acceptance Test Protocol and Section 1.14, Appendix 10 of the PA.
- Covanta has met or exceeded the requirements of the Minimum Acceptance Test Criteria.



03

DISCUSSION OF RESULTS

APPROACH

- 30-Day Reliability Test
- 5-Day Throughput Capacity Test
- Energy Recovery Tests
- Residue Quantity and Quality Tests
- Metals Recovery Tests
- Emissions Compliance Demonstration and Tests
- Noise Test
- Odour Test



30-DAY RELIABILITY

Demonstrate Facility can Reliably Process Waste and Generate Steam - Passage Based On:

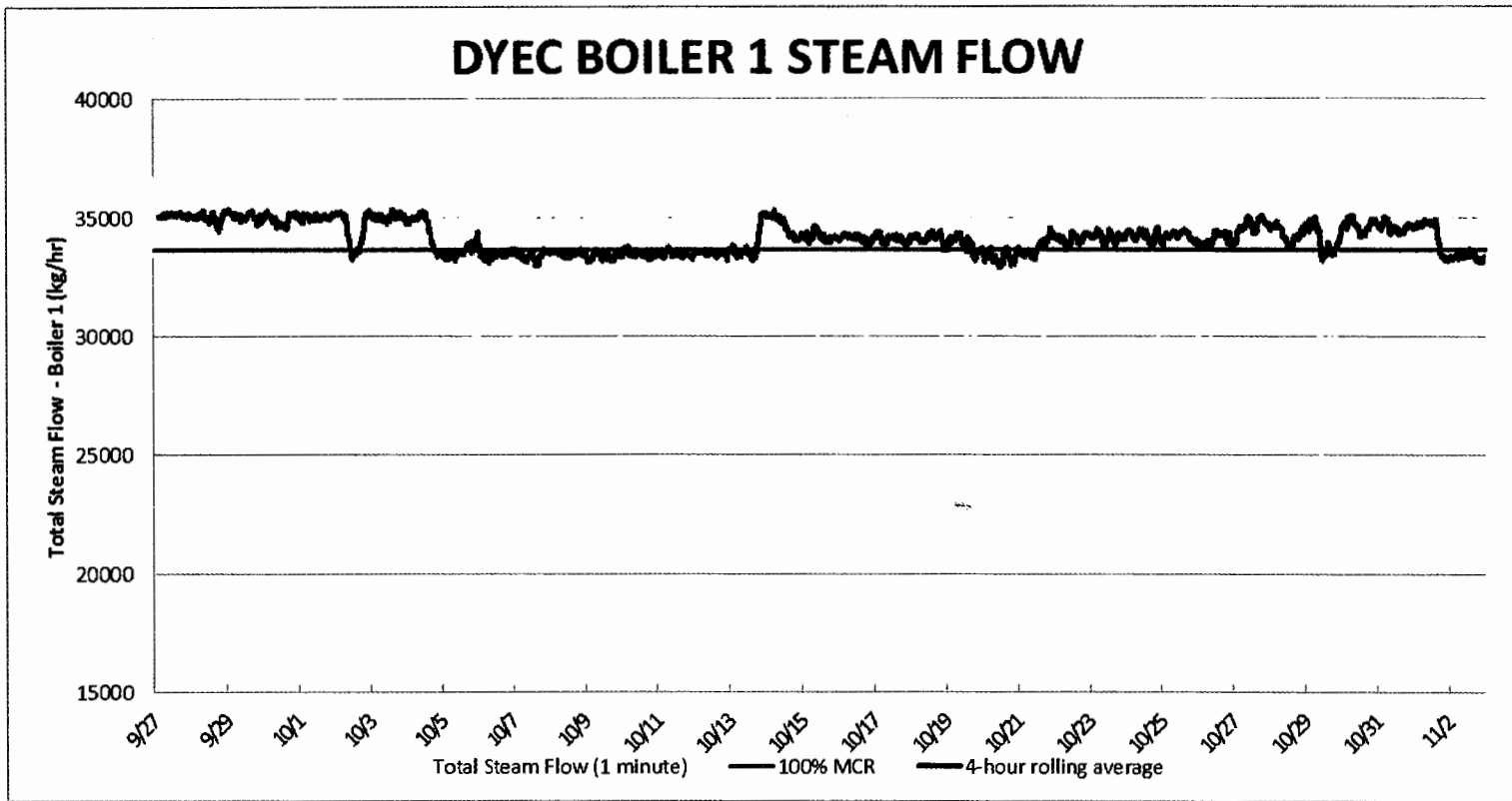
- 95% Design Steam Flow
 - Average during on-line hours during 30-days
- 95% Availability
 - (No more than 72 hours of total boiler downtime)

RESULTS:

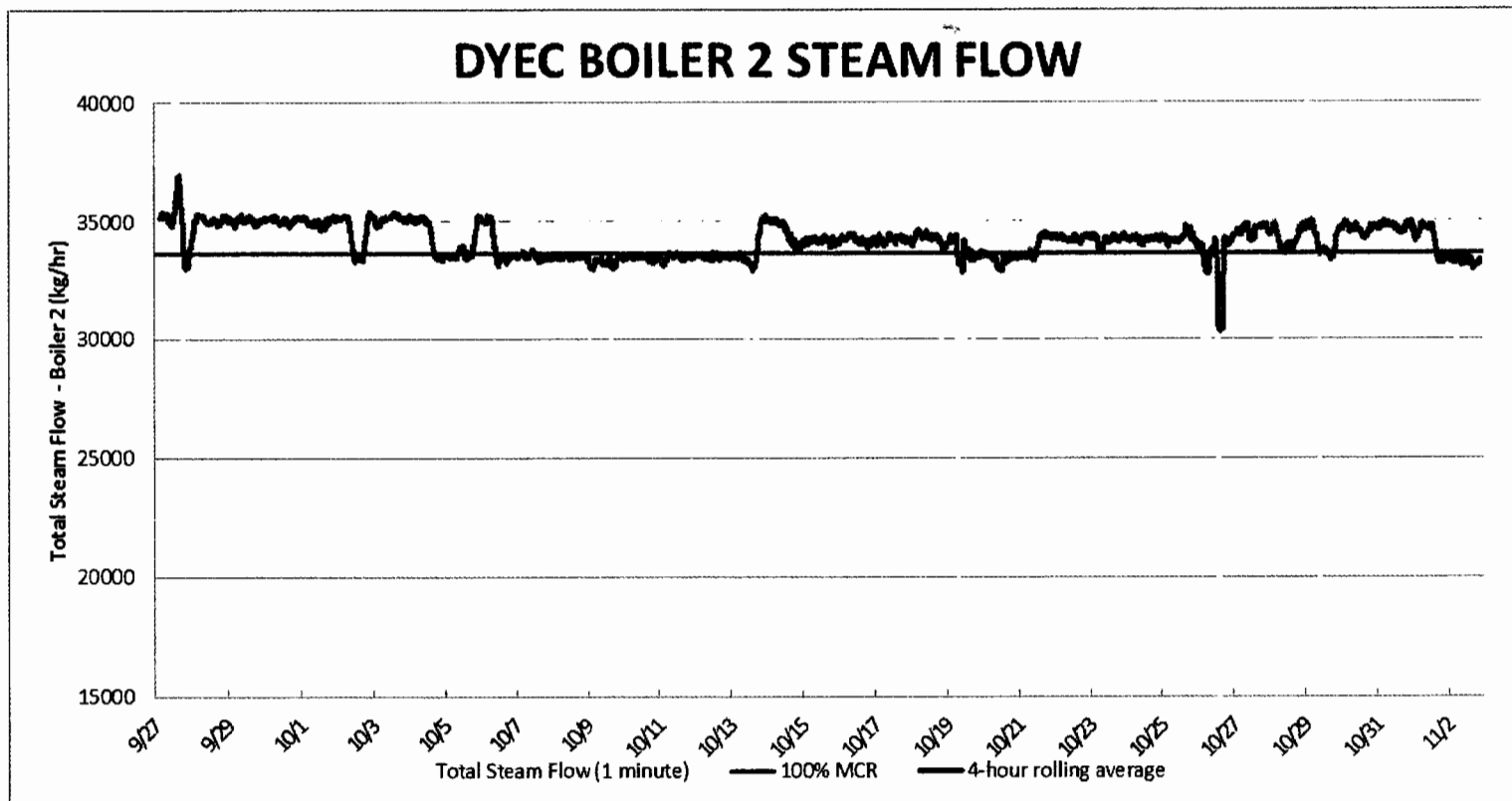
30-Day Capacity	>95% MCR steam flow	HDR	101.6%	HDR –	PASS
		Covanta	101.6%	Covanta-	PASS
30-Day Availability	> 95% Availability	HDR - Boilers	99.9%	HDR –	PASS
		HDR – Turbine⁽¹⁾	96.5%		
		Covanta	99.9%	Covanta-	PASS

⁽¹⁾ Provided for information, not required by protocol but would meet a 95% criteria

BOILER 1 OPERATION DURING 37-DAY PERIOD



BOILER 2 OPERATION DURING 37-DAY PERIOD



5-DAY THROUGHPUT CAPACITY

Demonstrate Facility can Process Waste and Generate Steam At 100% Design Throughput- Passage Based On:

- Process a minimum of 2,180 tonnes of Reference Waste
- Process a minimum of 1,000 tonnes of Reference Waste in Each Boiler
- Throughput Guarantee adjusted to correspond to actual waste HHV during 5-day period based on Exhibit 2 to Appendix 19

RESULTS:

5-Day Throughput	>100% Design Throughput	HDR – 2,251 > 2,117 tonnes Covanta- 2,260 > 2,124 tonnes	HDR – PASS Covanta- PASS
5-Day Throughput	Each Boiler > 1,000 tonnes	HDR #1 - 1,131 tonnes #2 - 1,120 tonnes Covanta #1 - 1,136 tonnes* #2 - 1,125 tonnes*	HDR – PASS Covanta- PASS

* Incorrectly reported as 1,252 and 1,240 tonnes in Covanta Report – corrected for this table

ENERGY RECOVERY TESTS

Demonstrate Compliance with Electricity Production Guarantees in Exhibit 2 to Appendix 19 of the Project Agreement during 8-hour periods. Passage based on:

- Demonstration that Gross Energy Recovery meets guarantee in Exhibit 2 (kWh/tonne)
- Demonstration that Net Energy Recovery meets guarantee in Exhibit 2 (kWh/tonne)
- Energy Recovery Guarantees adjusted to correspond to actual waste HHV during 8-hour period based on Exhibit 2 to Appendix 19

RESULTS:

Energy Recovery	Gross Energy >Guarantee	HDR – 965>937 @ 13.8 MJ/kg	HDR – PASS (3.1%)
		Covanta- 961>928 @ 13.7 MJ/kg	Covanta- PASS (3.5%)
	Net Energy >Guarantee	HDR – 846>829 @ 13.8 MJ/kg	HDR – PASS (2.1%)
		Covanta- 840>821 @ 13.7 MJ/kg	Covanta- PASS (2.3%)

HHV OF WASTE DURING TEST PERIOD

HHV of waste varied through the test period and averaged 13.32 MJ/kg for the 37-Day Test period.

	HHV (MJ/kg)
1st 5-Day Test (Test Day 1-5)	13.407
30-Day Test (Test Days 1-30)	13.384
2nd 5-Day Test (Test Days 26-30)	13.249
30 Day Test (Test Days 6-35)	13.346
37-day Test Period (Days 1-37)	13.323
35-day Test Period (Days 1-35)	13.354
3rd 5-Day Test (Test Days 31-35)	13.175

RESIDUE QUANTITY AND QUALITY TESTS

Demonstrate Compliance with Residue Quantity and Quality Guarantees in Exhibit 2 to Appendix 19 of the Project Agreement Passage based on:

- **5-Day and 30-Day Residue Quantity Test**
 - Demonstrate Total Residue <30% of MSW combusted (with HHV adjustments)
- **5-Day Residue Quality Test**
 - Unburned Carbon (<3%), Moisture (<25%)
- **“Bottom Ash”** means the solid residue left after the incineration burning process, except Fly Ash, grate siftings, and APC Plant waste.
- **“Fly Ash”** means solid residue removed by the air pollution control devices after the incineration burning process and which may contain traces of materials burned in the Facility and their combustion products and reacted and unreacted products from the APC Plant, including lime and carbon.
- **“Residue”** means Bottom Ash, Fly Ash, grate siftings, APC Plant waste and **other material that remains after combustion of waste and recovery of metals in the Facility.**

RESIDUE QUANTITY AND QUALITY TESTS (CONT)

- Covanta Appendix data shows Residue Quantity failed.
- Covanta claims cement, pozzolan and the associated water are not part of the definition of Residue.
- Report incorporates a correction to account for cement, pozzolan and water added to the flyash.
 - Correction is a deviation from the protocol.
 - Correction incorporates several assumptions for cement, pozzolan and water calculations.
 - Covanta claims passage of Residue Quantity criteria with correction.
- HDR disagrees with Covanta's interpretation that cement, pozzolan and water are not included in the calculation of Total Residue.

RESIDUE QUANTITY AND QUALITY TESTS (CONT)

RESULTS:

30- Day Residue Quantity	Quantity% < Guarantee %	HDR - 31.8 % > 29.3%	HDR - FAIL
	Covanta Appendix Data	Covanta - 31.3% > 29.4%	Covanta- FAIL
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.6% vs 29.4%	Covanta - PASS ⁽¹⁾
5-Day Residue Quantity	Quantity% < Guarantee %	HDR - Test 1 32.1% > 29.3%	HDR FAIL ⁽²⁾
		HDR - Test 3 29.9% > 29.7%	FAIL ⁽²⁾
	Covanta Appendix Data	Covanta - 31.6% > 29.4%	Covanta- FAIL
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.8% < 29.4%	Covanta - PASS ⁽¹⁾
5-Day Residue Quality	<25% Moisture	16.7 % Moisture	HDR - PASS
	< 3% Unburned Combustibles	0.83% Unburned Combustibles	Covanta- PASS

(1) = Based on Covanta assertion that Pozzolan/Cement is excluded from the calculation for fly ash quantity.

(2) = Includes HDR interpretation of contract that returned ash from Ferrous metals is included (per PA)

RESIDUE QUANTITY (CONTINUED)

HDR Calculation Based on Raw Data:

RESIDUE QUANTITY *1

Test	MSW Throughput tonnes	Bottom Ash tonnes	Bottom Ash %	Fly Ash tonnes	Fly Ash %	Total Residue %	MSW HHV MJ/kg	Guar. %	PASS/ FAIL	Including ferrous ash *2		
										tonnes	%	P/F
1st 5-Day Test (Test Day 1-5)	2,251	470	20.9%	240	10.7%	31.6%	13.41	29.3%	FAIL	722	32.1%	FAIL
30-Day Test (Test Days 1-30)	13,294	2,649	19.9%	1,506	11.3%	31.3%	13.38	29.3%	FAIL	4,221	31.8%	FAIL
2nd 5-Day Test (Test Days 26-30)	2,238	433	19.4%	256	11.4%	30.8%	13.25	29.6%	FAIL	700	31.3%	FAIL
30 Day Test (Test Days 6-35)	13,300	2,610	19.6%	1,497	11.3%	30.9%	13.35	29.4%	FAIL	4,174	31.4%	FAIL
35-day Test Period (Days 1-35)*3	15,551	3,080	19.8%	1,738	11.2%	31.0%	13.35	29.4%	FAIL	4,896	31.5%	FAIL
3rd 5-Day Test (Test Days 31-35)	2,257	432	19.1%	232	10.3%	29.4%	13.18	29.7%	PASS	675	29.9%	FAIL

*1 HDR maintains that the cement and pozzolan are included in the Residue, as this material must be disposed. Excluded materials are materials not disposed

*2 Project Agreement states that Residue is to be "Residue from the Facility, excluding ferrous and non ferrous materials recovered, but including any returned or disposed ash resulting from the ferrous cleanup."

*3 Residue from last 2 days of 37-Day extended test period was not included due to residue building coordination limitations

METALS RECOVERY TESTS

Demonstrate Compliance with Metals Recovery Guarantee in Exhibit 2 to Appendix 19 of the Project Agreement during 8-hour periods. Passage based on:

- Ferrous recovery $\frac{\text{(ferrous recovered)}}{\text{(ferrous in residue)}} > 80\%$
- Non-Ferrous recovery $\frac{\text{(non-ferrous recovered)}}{\text{(non-ferrous in residue)}} > 60\%$

RESULTS:

Ferrous Recovery	Recovery > 80%	HDR -	83.0%	HDR -	PASS
		Covanta -	87.8%	Covanta-	PASS
Non-Ferrous Recovery	Recovery > 60%	HDR -	84.7%	HDR -	PASS
		Covanta -	84.7%	Covanta-	PASS

DYEC- ACCEPTANCE TEST REQUIREMENTS – REQUIREMENTS DURING 5-DAY

5-Day Throughput	>100% Design Throughput	HDR – 2,251 > 2,115 tonnes Covanta- 2,260 > 2,124 tonnes	HDR – PASS Covanta- PASS
5-Day Throughput	Each Boiler > 1,000 tonnes	HDR #1 - 1,131 tonnes #2 - 1,120 tonnes Covanta #1 - 1,136 tonnes* #2 - 1,125 tonnes*	HDR – PASS Covanta- PASS
Energy Recovery	Gross Energy > Guarantee	HDR – 965 > 937 @13.8 MJ/kg Covanta- 961 > 928 @13.7 MJ/kg	HDR – PASS (3.1%) Covanta- PASS (3.5%)
	Net Energy > Guarantee	HDR – 846 > 829 @13.9 MJ/kg Covanta- 840 > 821 @13.7 MJ/kg	HDR – PASS (2.1%) Covanta- PASS (2.3%)
5-Day Residue Quantity	Quantity% < Guarantee %	HDR – Test 1 32.1% > 29.3% HDR – Test 3 29.9% > 29.7%	HDR – FAIL FAIL
	Covanta Appendix Data	Covanta – Test 1 31.6% > 29.4% Test 3 29.4% > N/R	Covanta- FAIL not reported
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.8% < 29.4%	Covanta - PASS
5-Day Residue Quality	<25% Moisture < 3% Unburned Combustibles	16.7 % Moisture 0.83% Unburned Combustibles	HDR – PASS Covanta- PASS

*Incorrectly reported as 1,252 and 1,240 tonnes in Covanta Report – corrected for this table

DYEC- ACCEPTANCE TEST REQUIREMENTS – REQUIREMENTS DURING 30-DAY

30-Day Capacity	>95% MCR steam flow	HDR 101.6% Covanta 101.6%	HDR – PASS Covanta- PASS
30-Day Availability	> 95% Availability	HDR 99.9% Covanta 99.9%	HDR – PASS Covanta- PASS
30- Day Residue Quantity	Quantity% < Guarantee % Covanta Appendix Data Covanta Report (no Cem/Poz/wtr)	HDR - 31.8 % vs 29.3% Covanta - 31.3% vs 29.4% Covanta - 26.6% vs 29.4%	HDR – FAIL Covanta- FAIL Covanta - PASS
Flyash and Bottom Ash Testing (Environmental)	Demonstrate Compliance with applicable requirements		HDR – PASS Covanta- PASS
Ferrous Recovery	Recovery > 80%	HDR - 83.0% Covanta - 87.8%	HDR – PASS Covanta- PASS
Non-Ferrous Recovery	Recovery > 60%	HDR - 84.7% Covanta - 84.7%	HDR – PASS Covanta- PASS
Stack Test Each Unit	All Emissions in compliance with CofA		HDR – PASS Covanta- PASS
CEMS Parameters	Continuous Compliance with all CEMS parameters	Two (2) separate CO excursion events – test extended 1 week.	HDR – PASS Covanta- PASS

SOURCE TEST RESULTS

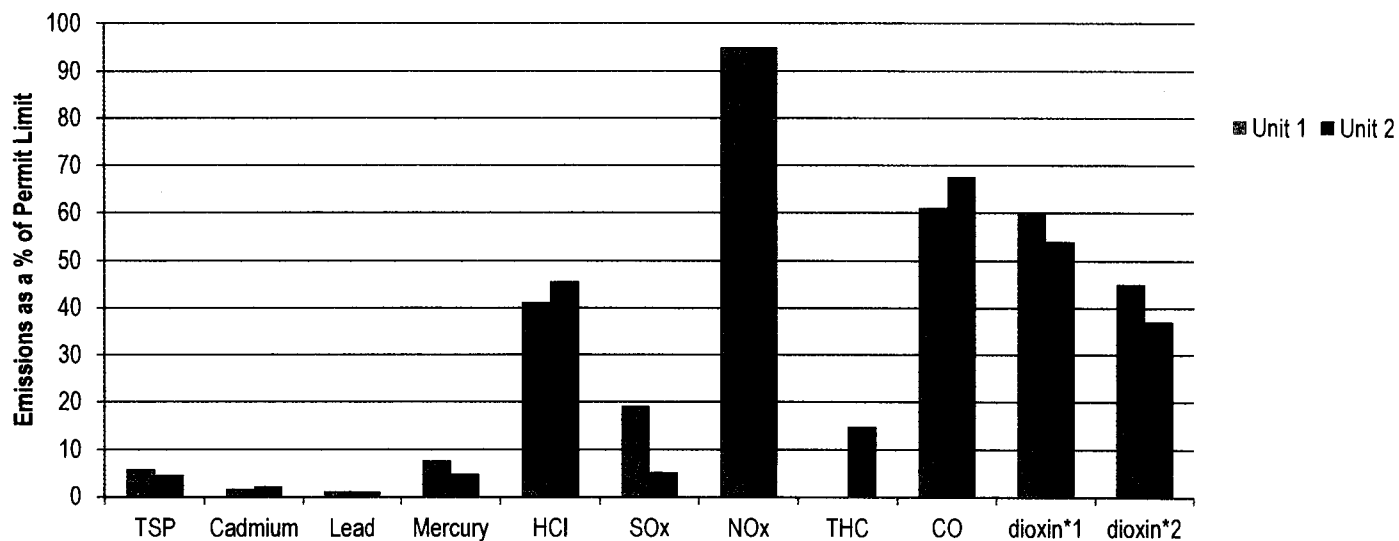
Parameter			Unit 1		Unit 2	
	Limit	Units	Result*	% of Limit	Result*	% of Limit
TSP	9	mg/Rm ³	0.53	6	<0.41	5
Cadmium	7	µg/Rm ³	0.12	2	0.15	2
Lead	50	µg/Rm ³	0.57	1	0.51	1
Mercury	15	µg/Rm ³	1.16	8	0.72	5
HCl	9	mg/Rm ³	3.7	41	4.1	46
SOx	35	mg/Rm ³	6.7	19	1.8	5
NOx	121	mg/Rm ³	115	95	115	95
THC	33	mg/Rm ³	0	0	4.9	15
CO	40	mg/Rm ³	24.4	61	27.0	68
October 21 to October 22, 2015 Test Results						
Dioxins and Furans	60	pg I-TEQ/Rm ³	< 36.0	60	< 32.4	54
October 28 to October 29, 2015 Test Results						
Dioxins and Furans	60	pg I-TEQ/Rm ³	< 27.0	45	< 22.2	37

SOURCE TEST SUMMARY

- ORTECH Consulting Inc. completed a source testing program during the Acceptance Test period to demonstrate compliance with ECA requirements for DYEC air emissions.
- HDR monitored testing and confirmed that testing was performed in accordance with Pre-Test Plan and applicable Reference Methods.
- ORTECH's report to MoECC indicates that the facility complied with the ECA emission limits and demonstrated modeled compliance of point of impingement impacts.
- Covanta passed two of three dioxin runs. The first set of runs was deemed invalid or "compromised".
- The three sets of dioxin, furan, and dioxin-like PCB testing programs were conducted at different lime and carbon feed rates.

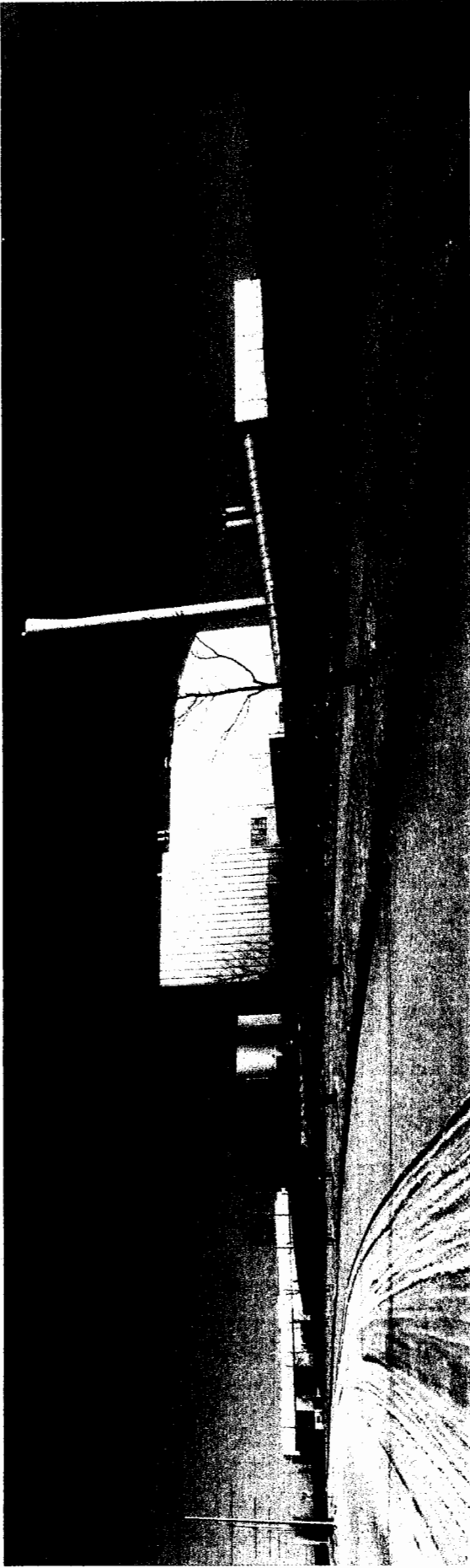
SOURCE TEST RESULTS (CONTINUED)

DYEC Compliance Test Results as % of Permit Limit (Sept 29-Oct 2, 2015)



*1 - Oct 21-22

*2 - Oct 28-29



04 CONCLUSIONS

SUMMARY - RESIDUE QUANTITY

- Covanta: Pozzolan, cement and water are not included in calculation and they **PASS** the Residue Quantity Test.
- HDR: Based on the Test Protocol the cement, pozzolan and water is included in the calculation and Covanta **FAIL** the Total Residue Quantity Test for the 5-Day and 30-Day Test Periods.
- Covanta has demonstrated that that the amount of cement and pozzolan can be reduced to drop the tonnes of fly ash residue and still achieve satisfactory ash characteristics.
- Further reductions of cement and pozzolan would require additional testing to demonstrate that lower fly ash rates are achievable.

SUMMARY

Covanta:

- Claims passage of Acceptance Test Criteria and demonstration of Performance Guarantees per the Project Agreement.
 - Adjustment made to the 5-Day and 30-Day Residue Quantity to exclude cement, pozzolan and water from the fly ash mixture.
-

HDR:

- Covanta has met the Minimum Acceptance Test Criteria (per Section 1.15 of the Appendix 10) for Reliability, Throughput, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance.
- Covanta has failed the 5-Day and 30-Day Residue Quantity Tests and did not meet the Acceptance Test Criteria per the Test Protocol & PA

Debi Wilcox

Attachment B

Index of Reviewed Acceptance Test Report Information

DATA RECEIVED DURING ACCEPTANCE TEST

Document Dates	# of Documents	Major 4*	Additional Documents
<u>9/27</u>	49	✓	HHV Data (Ortech)
<u>9/28</u>	53	✓	HHV Data (Ortech)
<u>9/29</u>	34	✓	HHV Data (Ortech)
<u>9/30</u>	54	✓	HHV Data (Ortech)
<u>10/1</u>	65	✓	HHV Data (Ortech)
<u>10/2</u>	14	✓	CEMS Corrected Data
<u>10/3</u>	6	✓	
<u>10/4</u>	4	✓	
<u>10/5</u>	6	✓	
<u>10/6</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/7</u>	15	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/8</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/9</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/10</u>	19	✓	Complete 5-day residue quantity data
<u>10/11</u>	8	✓	Crane Span Check Sheets
<u>10/12</u>	7	✓	
<u>10/13</u>	10	✓	SGS Ash Analysis
<u>10/14</u>	10	✓	SGS Ash Analysis
<u>10/15</u>	8	✓	Manual Net Gross Meter Reading for Capacity Check
<u>10/16</u>	7	✓	
<u>10/17</u>	7	✓	
<u>10/18</u>	6	✓	
<u>10/19</u>	8	✓	
<u>10/20</u>	7	✓	
<u>10/21</u>	7	✓	
<u>10/22</u>	7	✓	
<u>10/23</u>	8	✓	
<u>10/24</u>	16	✓	BA FEL Scalehouse Photos, DYEC Truck Scale Notes
<u>10/25</u>	7	✓	
<u>10/26</u>	18	✓	Feed Hopper Level and Residue Building Photos
<u>10/27</u>	7	✓	
<u>10/28</u>	7	✓	
<u>10/29</u>	7	✓	
<u>10/30</u>	7	✓	
<u>10/31</u>	13	✓	Residue Quality Test BA Sampling, Feed Hopper Photos
<u>11/1</u>	6	✓	
<u>11/2</u>	10	✓	BA Weight Photos
<u>11/3</u>	13		Plant Summaries, Plant Logs, Plant Records and Residue Photos
Total Documents	581		

*Major 4 documents: DCS data, U1 CEMS, U2 CEMS, Crane Weight
 Not part of testing period, testing ended Nov. 2nd

Missing Documents

Debi Wilcox

DATA PROVIDED WITH TEST REPORT

Category	Document Description	# of Docs
General Documents	Acceptance-Report-Cover-Page.pdf	1
	Appendix-14-Acceptance-Declaration-Executed.pdf	1
	Durham-York-Demonstrated-Performance.pdf	1
	File-Listing.html	1
	Transmittal-Letter-Executed.pdf	1
Operations Reports	Covanta-30Day-Reliability-Residue-Quantity-Report.pdf	1
	Covanta-5Day-Test-Report.pdf	1
	Covanta-8hour-Test-Report.pdf	1
	Covanta-Metals-Recovery-Test-Report.pdf	1
Environmental-Reports	AMESA Evaluation FINAL 151125.pdf	1
	Covanta DYEC Compliance RATA_19Oct15.pdf	1
	Environmental Compliance Final 151125.pdf	1
	Odour Source Test Report - Final 151124.pdf	1
	Residence-Time-and-Temperature-Test-Report.pdf	1
	Residue-Report.pdf	1
Procedures	Supplemental Acoustic Audit Final 151123.pdf	1
	Durham-York FINAL Acceptance Test Procedures Rev 3.pdf	1
Data	Cement and pozzolan Deliveries	2
	CEMS Data - Unit 1 (37 files)	37
	CEMS Data - Unit 1 (37 files)	37
	Crane Span Check (2 files)	2
	DCS Summary Data (39 files)	39
	MWH Meter Reading 0927-10012015.xlsx	1
	Air Temp after Fan (5 files)	5
	Ash Discharger Temp (5 files)	5
	Charg Flr Ambient (5 files)	5
	Ortech flue gas (6 files)	6
	UFA Temp (5 files)	5
	Fer Non Fer Raw Data (3 files)	3
	Instrument Calibration (6 files)	6
	Logs (3 files)	3
	Residue Date Quality (15 files)	15
	Residue Date Quantity (35 files)	35
	Turbine Performance (5 files)	5
	Waste Feed Data - Crane Log (excel) (37 files)	37
	Waste Feed Data - Crane Log (PDF) (37 files)	37
	Total Documents	

Item #2

Debi Wilcox

Attachment A

HDR Presentation: DYEC Acceptance Test Report Review



DYEC ACCEPTANCE TEST REPORT REVIEW

DECEMBER 17, 2015

HDR

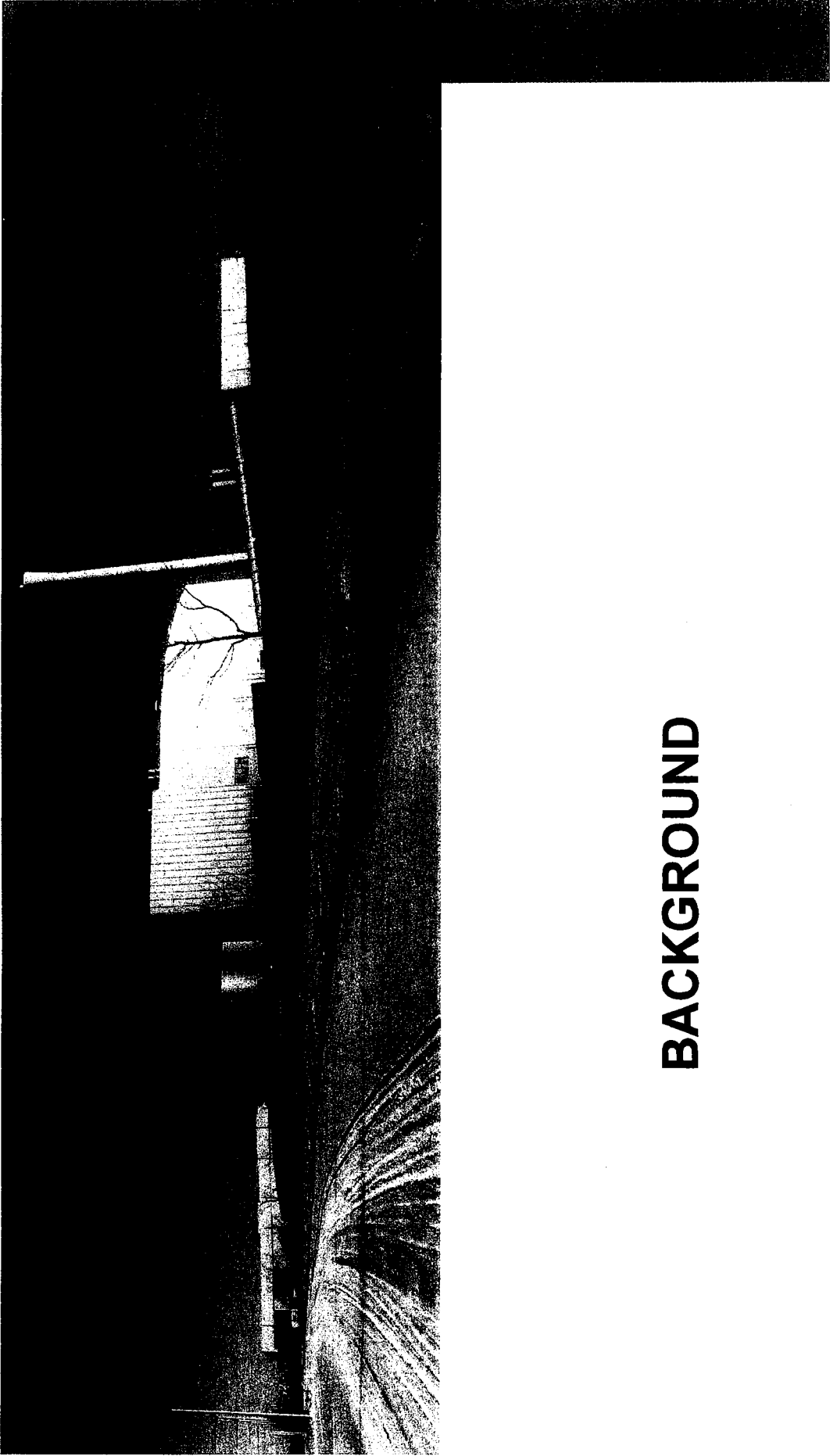
Background

Test Results Summary

Discussion of Results

Conclusions





BACKGROUND

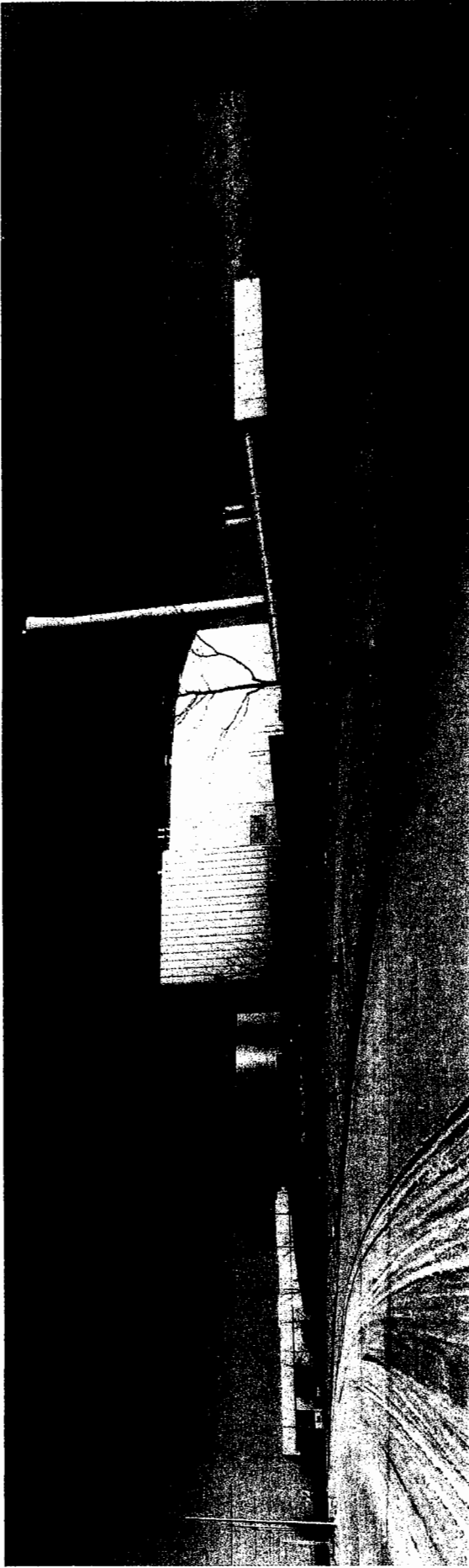
ACCEPTANCE TEST SCHEDULE

- Acceptance Testing Period: September 27th through November 2nd
(Total Testing Period: 37-Days)
- Acceptance Test Declaration (by Covanta): November 25, 2015
- Acceptance Test Report Issued (by Covanta): on November 26, 2015
- Full Air Emissions Report (including the Odour Test and the Acoustic Audit Results) were also submitted to the MOECC and the Regions on November 26, 2015

HDR REVIEW OF ACCEPTANCE TEST AND REPORT

- On-site monitoring of plant operations during full 37-Day Test Period. Collected pertinent Control room and facility data.
- On-site monitoring of Source Testing performed by Ortech.
- Review and input daily test data submitted by Covanta.
- Perform independent calculations for Boiler as Calorimeter and Facility HHV correlation to confirm Covanta calculations.
- November 30th: HDR performed a review of the Test Report and confirmed that the information required to assess the results of the Acceptance Test was provided and complete.
- Perform detailed review of data and calculations in Covanta Report





02

ACCEPTANCE TEST RESULTS

ACCEPTANCE TEST REQUIREMENTS - OVERVIEW

30-Day Reliability Test	Steam Flow (MCR) & Availability \geq 95%
5-Day Throughput Capacity Test	Throughput \geq 100% ⁽¹⁾
Three (3) – 8-hour Energy Recovery Tests	767 kWh/tonne @ HHV of 13 MJ/kg ⁽¹⁾
5-Day Residue Quality Test	<25% Moisture & <3% Unburned Carbon
Residue Quantity Test-5-Day Residue Quantity Test-30-Day	Total Residue (Bottom Ash + Fly Ash) of <30% ⁽¹⁾
Three (3) – 8-hour Metals Recovery Tests	Ferrous \geq 80% ; Non-Ferrous \geq 60%
Environmental Compliance Tests	Meet all ECA requirements
Noise, Odour	Meet all EA and ECA requirements

(1) = Adjusted based on waste higher heating value (HHV) measured during test.

SUMMARY OF ACCEPTANCE TEST RESULTS

30-Day Reliability Test	PASS	PASS
5-Day Throughput Capacity Test	PASS	PASS
Three (3) – 8-hour Energy Recovery Tests	PASS	PASS
5-Day Residue Quality Test	PASS	PASS
Residue Quantity Test-5-Day	PASS ⁽¹⁾	FAIL
Residue Quantity Test-30-Day	PASS ⁽¹⁾	FAIL
Three (3) – 8-hour Metals Recovery Tests	PASS	PASS
Environmental Compliance Tests (Source Test, Ash Tests)	PASS	PASS ⁽²⁾
Noise, Odour	PASS	PASS ⁽²⁾

(1) = Based on Covanta assertion that Pozzolan/Cement is excluded from the calculation for fly ash quantity.

(2) = Source Test Report, Ash, Noise and Odour Testing all deemed acceptable by MOECC

SUMMARY OF ACCEPTANCE TEST RESULTS

- Based on HDR's review of the test documentation, HDR generally concurs with the results presented by Covanta in the Test Report.
- Covanta has met or exceeded the criteria for Reliability, Capacity, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance.
- Covanta has not met the criteria for the 30-Day and 5-Day Residue Quantity Guarantees.
- Covanta did not pass the Acceptance Test Criteria as stipulated in the Acceptance Test Protocol and Section 1.14, Appendix 10 of the PA.
- Covanta has met or exceeded the requirements of the Minimum Acceptance Test Criteria.



03

DISCUSSION OF RESULTS

APPROACH

- 30-Day Reliability Test
- 5-Day Throughput Capacity Test
- Energy Recovery Tests
- Residue Quantity and Quality Tests
- Metals Recovery Tests
- Emissions Compliance Demonstration and Tests
- Noise Test
- Odour Test

30-DAY RELIABILITY

Demonstrate Facility can Reliably Process Waste and Generate Steam - Passage Based On:

- 95% Design Steam Flow
 - Average during on-line hours during 30-days
- 95% Availability
 - (No more than 72 hours of total boiler downtime)

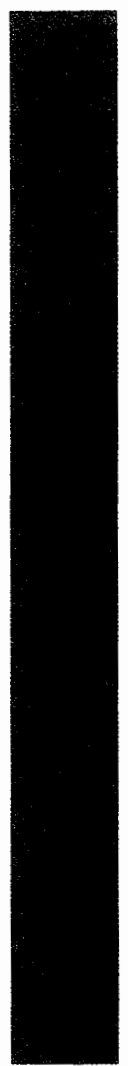
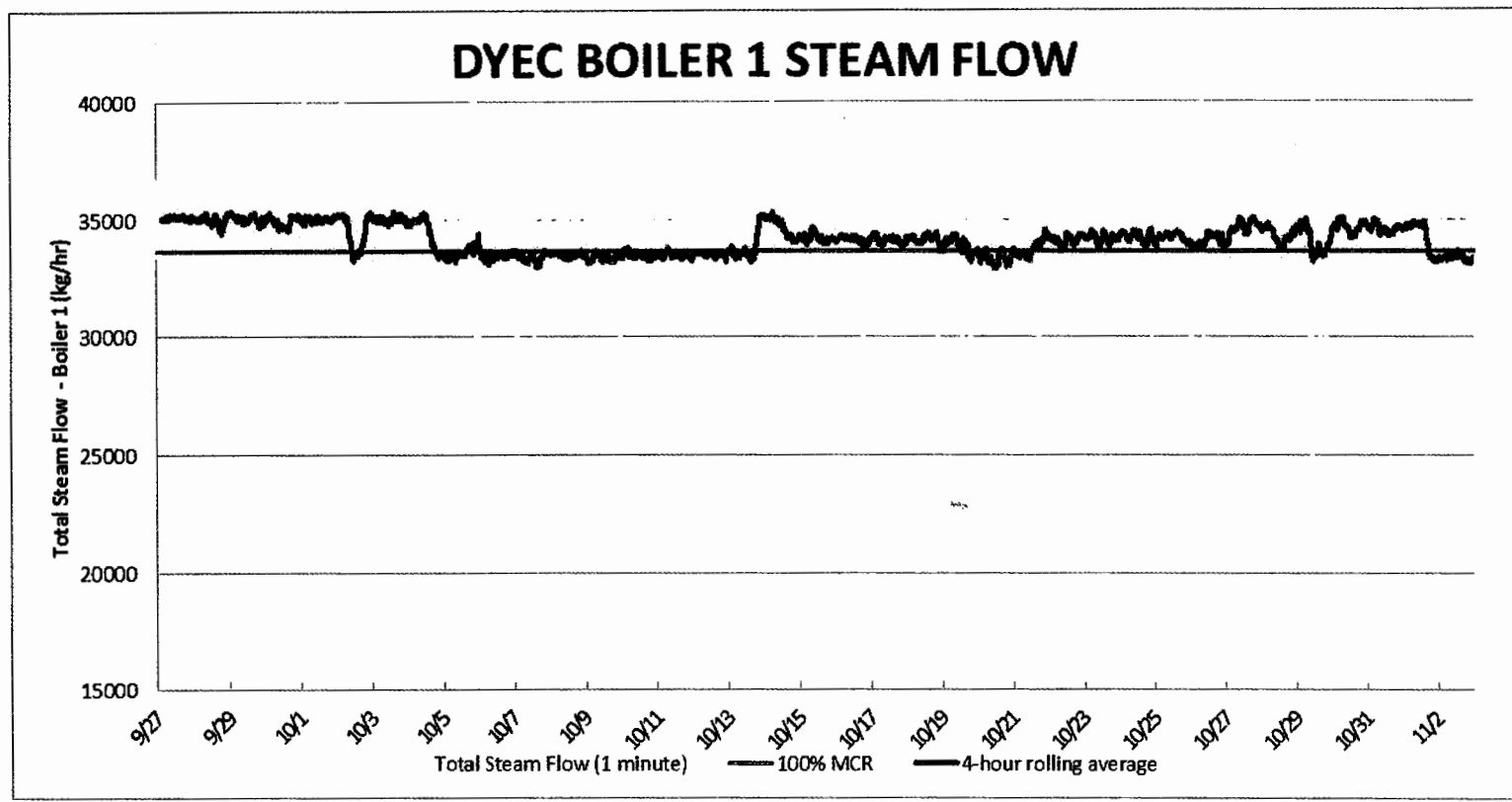
RESULTS:

30-Day Capacity	>95% MCR steam flow	HDR	101.6%	HDR –	PASS
		Covanta	101.6%	Covanta-	PASS
30-Day Availability	> 95% Availability	HDR - Boilers	99.9%	HDR –	PASS
		HDR – Turbine⁽¹⁾	96.5%		
		Covanta	99.9%	Covanta-	PASS

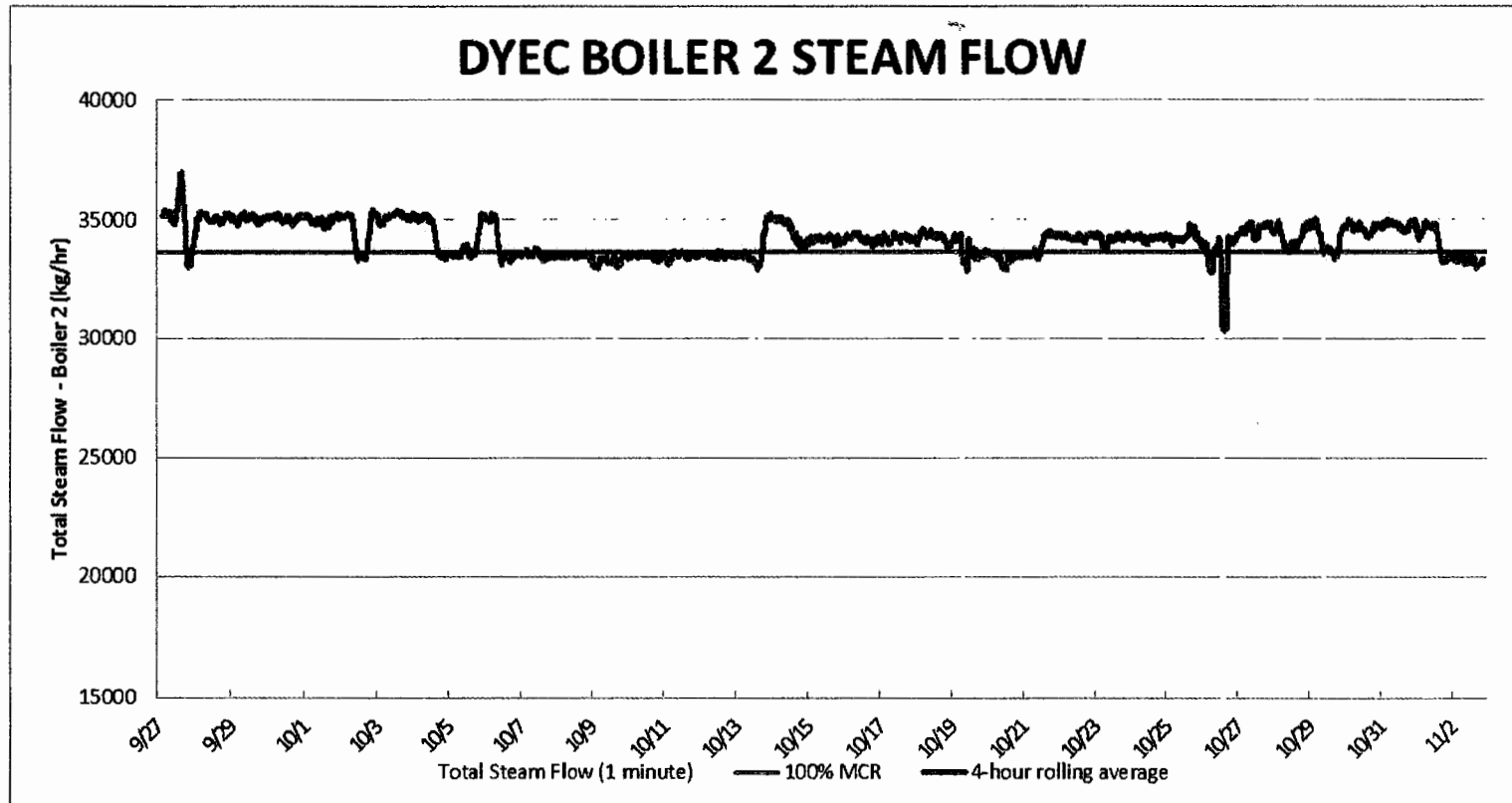
⁽¹⁾ Provided for information, not required by protocol but would meet a 95% criteria

CONFIDENTIAL

BOILER 1 OPERATION DURING 37-DAY PERIOD



BOILER 2 OPERATION DURING 37-DAY PERIOD



5-DAY THROUGHPUT CAPACITY

Demonstrate Facility can Process Waste and Generate Steam At 100% Design Throughput- Passage Based On:

- Process a minimum of 2,180 tonnes of Reference Waste
- Process a minimum of 1,000 tonnes of Reference Waste in Each Boiler
- Throughput Guarantee adjusted to correspond to actual waste HHV during 5-day period based on Exhibit 2 to Appendix 19

RESULTS:

5-Day Throughput	>100% Design Throughput	HDR – 2,251 > 2,117 tonnes Covanta- 2,260 > 2,124 tonnes	HDR – PASS Covanta- PASS
5-Day Throughput	Each Boiler > 1,000 tonnes	HDR #1 - 1,131 tonnes #2 - 1,120 tonnes Covanta #1 - 1,136 tonnes* #2 - 1,125 tonnes*	HDR – PASS Covanta- PASS

* Incorrectly reported as 1,252 and 1,240 tonnes in Covanta Report – corrected for this table

ENERGY RECOVERY TESTS

Demonstrate Compliance with Electricity Production Guarantees in Exhibit 2 to Appendix 19 of the Project Agreement during 8-hour periods. Passage based on:

- Demonstration that Gross Energy Recovery meets guarantee in Exhibit 2 (kWh/tonne)
- Demonstration that Net Energy Recovery meets guarantee in Exhibit 2 (kWh/tonne)
- Energy Recovery Guarantees adjusted to correspond to actual waste HHV during 8-hour period based on Exhibit 2 to Appendix 19

RESULTS:

Energy Recovery	Gross Energy >Guarantee	HDR – 965>937 @ 13.8 MJ/kg	HDR – PASS (3.1%)
		Covanta- 961>928 @ 13.7 MJ/kg	Covanta- PASS (3.5%)
	Net Energy >Guarantee	HDR – 846>829 @ 13.8 MJ/kg	HDR – PASS (2.1%)
		Covanta- 840>821 @ 13.7 MJ/kg	Covanta- PASS (2.3%)

Test Results

HHV OF WASTE DURING TEST PERIOD

HHV of waste varied through the test period and averaged 13.32 MJ/kg for the 37-Day Test period.

	HHV (MJ/kg)
1st 5-Day Test (Test Day 1-5)	13.407
30-Day Test (Test Days 1-30)	13.384
2nd 5-Day Test (Test Days 26-30)	13.249
30 Day Test (Test Days 6-35)	13.346
37-day Test Period (Days 1-37)	13.323
35-day Test Period (Days 1-35)	13.354
3rd 5-Day Test (Test Days 31-35)	13.175

RESIDUE QUANTITY AND QUALITY TESTS

Demonstrate Compliance with Residue Quantity and Quality Guarantees in Exhibit 2 to Appendix 19 of the Project Agreement Passage based on:

- **5-Day and 30-Day Residue Quantity Test**
 - Demonstrate Total Residue <30% of MSW combusted (with HHV adjustments)
- **5-Day Residue Quality Test**
 - Unburned Carbon (<3%), Moisture (<25%)
- **“Bottom Ash”** means the solid residue left after the incineration burning process, except Fly Ash, grate siftings, and APC Plant waste.
- **“Fly Ash”** means solid residue removed by the air pollution control devices after the incineration burning process and which may contain traces of materials burned in the Facility and their combustion products and reacted and unreacted products from the APC Plant, including lime and carbon.
- **“Residue”** means Bottom Ash, Fly Ash, grate siftings, APC Plant waste and **other material that remains after combustion of waste and recovery of metals in the Facility.**

RESIDUE QUANTITY AND QUALITY TESTS (CONT)

- Covanta Appendix data shows Residue Quantity failed.
- Covanta claims cement, pozzolan and the associated water are not part of the definition of Residue.
- Report incorporates a correction to account for cement, pozzolan and water added to the flyash.
 - Correction is a deviation from the protocol.
 - Correction incorporates several assumptions for cement, pozzolan and water calculations.
 - Covanta claims passage of Residue Quantity criteria with correction.
- HDR disagrees with Covanta's interpretation that cement, pozzolan and water are not included in the calculation of Total Residue.

RESIDUE QUANTITY AND QUALITY TESTS (CONT)

RESULTS:

30- Day Residue Quantity	Quantity% < Guarantee %	HDR - 31.8 % > 29.3%	HDR - FAIL
	Covanta Appendix Data	Covanta - 31.3% > 29.4%	Covanta- FAIL
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.6% vs 29.4%	Covanta - PASS ⁽¹⁾
5-Day Residue Quantity	Quantity% < Guarantee %	HDR – Test 1 32.1% > 29.3%	HDR FAIL ⁽²⁾
		HDR – Test 3 29.9% > 29.7%	FAIL ⁽²⁾
	Covanta Appendix Data	Covanta – 31.6% > 29.4%	Covanta- FAIL
	Covanta Report (no Cement/Pozzolan/water)	Covanta – 26.8% < 29.4%	Covanta - PASS ⁽¹⁾
5-Day Residue Quality	<25% Moisture	16.7 % Moisture	HDR – PASS
	< 3% Unburned Combustibles	0.83% Unburned Combustibles	Covanta- PASS

(1) = Based on Covanta assertion that Pozzolan/Cement is excluded from the calculation for fly ash quantity.

(2) = Includes HDR interpretation of contract that returned ash from Ferrous metals is included (per PA)

RESIDUE QUANTITY (CONTINUED)

HDR Calculation Based on Raw Data:

RESIDUE QUANTITY *1

Test	MSW Throughput tonnes	Bottom Ash tonnes	Bottom Ash %	Fly Ash tonnes	Fly Ash %	Total Residue %	MSW HHV MJ/kg	Guar. %	PASS/ FAIL	Including ferrous ash *2		
										tonnes	%	P/F
1st 5-Day Test (Test Day 1-5)	2,251	470	20.9%	240	10.7%	31.6%	13.41	29.3%	FAIL	722	32.1%	FAIL
30-Day Test (Test Days 1-30)	13,294	2,649	19.9%	1,506	11.3%	31.3%	13.38	29.3%	FAIL	4,221	31.8%	FAIL
2nd 5-Day Test (Test Days 26-30)	2,238	433	19.4%	256	11.4%	30.8%	13.25	29.6%	FAIL	700	31.3%	FAIL
30 Day Test (Test Days 6-35)	13,300	2,610	19.6%	1,497	11.3%	30.9%	13.35	29.4%	FAIL	4,174	31.4%	FAIL
35-day Test Period (Days 1-35) *3	15,551	3,080	19.8%	1,738	11.2%	31.0%	13.35	29.4%	FAIL	4,896	31.5%	FAIL
3rd 5-Day Test (Test Days 31-35)	2,257	432	19.1%	232	10.3%	29.4%	13.18	29.7%	PASS	675	29.9%	FAIL

*1 HDR maintains that the cement and pozzolan are included in the Residue, as this material must be disposed. Excluded materials are materials not disposed

*2 Project Agreement states that Residue is to be "Residue from the Facility, excluding ferrous and non ferrous materials recovered, but including any returned or disposed ash resulting from the ferrous cleanup."

*3 Residue from last 2 days of 37-Day extended test period was not included due to residue building coordination limitations

METALS RECOVERY TESTS

Demonstrate Compliance with Metals Recovery Guarantee in Exhibit 2 to Appendix 19 of the Project Agreement during 8-hour periods. Passage based on:

- Ferrous recovery $\frac{(\text{ferrous recovered})}{(\text{ferrous in residue})} > 80\%$
- Non-Ferrous recovery $\frac{(\text{non-ferrous recovered})}{(\text{non-ferrous in residue})} > 60\%$

RESULTS:

Ferrous Recovery	Recovery > 80%	HDR -	83.0%	HDR -	PASS
		Covanta -	87.8%	Covanta -	PASS
Non-Ferrous Recovery	Recovery > 60%	HDR -	84.7%	HDR -	PASS
		Covanta -	84.7%	Covanta -	PASS

DYEC- ACCEPTANCE TEST REQUIREMENTS – REQUIREMENTS DURING 5-DAY

5-Day Throughput	>100% Design Throughput	HDR – 2,251 > 2,115 tonnes Covanta- 2,260 > 2,124 tonnes	HDR – PASS Covanta- PASS
5-Day Throughput	Each Boiler > 1,000 tonnes	HDR #1 - 1,131 tonnes #2 - 1,120 tonnes Covanta #1 - 1,136 tonnes* #2 - 1,125 tonnes*	HDR – PASS Covanta- PASS
Energy Recovery	Gross Energy > Guarantee	HDR – 965 > 937 @ 13.8 MJ/kg Covanta- 961 > 928 @ 13.7 MJ/kg	HDR – PASS (3.1%) Covanta- PASS (3.5%)
	Net Energy > Guarantee	HDR – 846 > 829 @ 13.9 MJ/kg Covanta- 840 > 821 @ 13.7 MJ/kg	HDR – PASS (2.1%) Covanta- PASS (2.3%)
5-Day Residue Quantity	Quantity% < Guarantee %	HDR – Test 1 32.1% > 29.3% HDR – Test 3 29.9% > 29.7%	HDR – FAIL FAIL
	Covanta Appendix Data	Covanta – Test 1 31.6% > 29.4% Test 3 29.4% > N/R	Covanta- FAIL not reported
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.8% < 29.4%	Covanta - PASS
5-Day Residue Quality	<25% Moisture < 3% Unburned Combustibles	16.7 % Moisture 0.83% Unburned Combustibles	HDR – PASS Covanta- PASS

*Incorrectly reported as 1,252 and 1,240 tonnes in Covanta Report – corrected for this table

DYEC- ACCEPTANCE TEST REQUIREMENTS – REQUIREMENTS DURING 30-DAY

30-Day Capacity	>95% MCR steam flow	HDR 101.6% Covanta 101.6%	HDR – PASS Covanta- PASS
30-Day Availability	> 95% Availability	HDR 99.9% Covanta 99.9%	HDR – PASS Covanta- PASS
30- Day Residue Quantity	Quantity% < Guarantee % Covanta Appendix Data Covanta Report (no Cem/Poz/wtr)	HDR - 31.8 % vs 29.3% Covanta - 31.3% vs 29.4% Covanta - 26.6% vs 29.4%	HDR – FAIL Covanta- FAIL Covanta - PASS
Flyash and Bottom Ash Testing (Environmental)	Demonstrate Compliance with applicable requirements		HDR – PASS Covanta- PASS
Ferrous Recovery	Recovery > 80%	HDR - 83.0% Covanta - 87.8%	HDR – PASS Covanta- PASS
Non-Ferrous Recovery	Recovery > 60%	HDR - 84.7% Covanta - 84.7%	HDR – PASS Covanta- PASS
Stack Test Each Unit	All Emissions in compliance with CofA		HDR – PASS Covanta- PASS
CEMS Parameters	Continuous Compliance with all CEMS parameters	Two (2) separate CO excursion events – test extended 1 week.	HDR – PASS Covanta- PASS

SOURCE TEST RESULTS

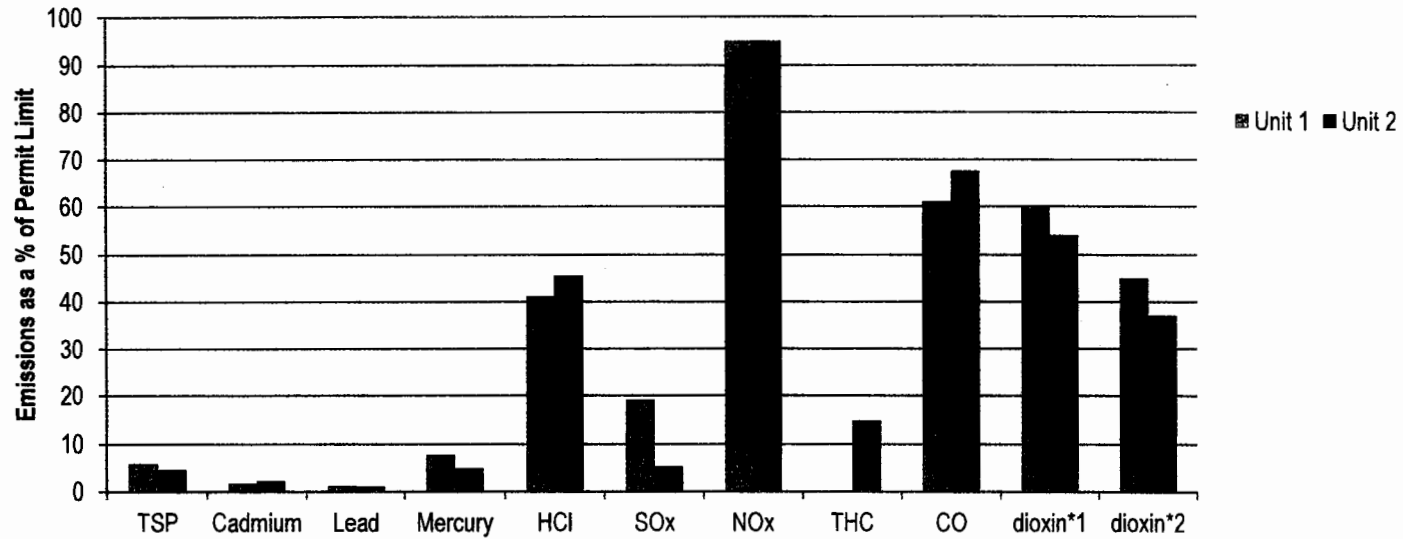
Parameter			Unit 1		Unit 2	
	Limit	Units	Result*	% of Limit	Result*	% of Limit
TSP	9	mg/Rm ³	0.53	6	<0.41	5
Cadmium	7	µg/Rm ³	0.12	2	0.15	2
Lead	50	µg/Rm ³	0.57	1	0.51	1
Mercury	15	µg/Rm ³	1.16	8	0.72	5
HCl	9	mg/Rm ³	3.7	41	4.1	46
SOx	35	mg/Rm ³	6.7	19	1.8	5
NOx	121	mg/Rm ³	115	95	115	95
THC	33	mg/Rm ³	0	0	4.9	15
CO	40	mg/Rm ³	24.4	61	27.0	68
October 21 to October 22, 2015 Test Results						
Dioxins and Furans	60	pg I-TEQ/Rm ³	< 36.0	60	< 32.4	54
October 28 to October 29, 2015 Test Results						
Dioxins and Furans	60	pg I-TEQ/Rm ³	< 27.0	45	< 22.2	37

SOURCE TEST SUMMARY

- ORTECH Consulting Inc. completed a source testing program during the Acceptance Test period to demonstrate compliance with ECA requirements for DYEC air emissions.
- HDR monitored testing and confirmed that testing was performed in accordance with Pre-Test Plan and applicable Reference Methods.
- ORTECH's report to MoECC indicates that the facility complied with the ECA emission limits and demonstrated modeled compliance of point of impingement impacts.
- Covanta passed two of three dioxin runs. The first set of runs was deemed invalid or "compromised".
- The three sets of dioxin, furan, and dioxin-like PCB testing programs were conducted at different lime and carbon feed rates.

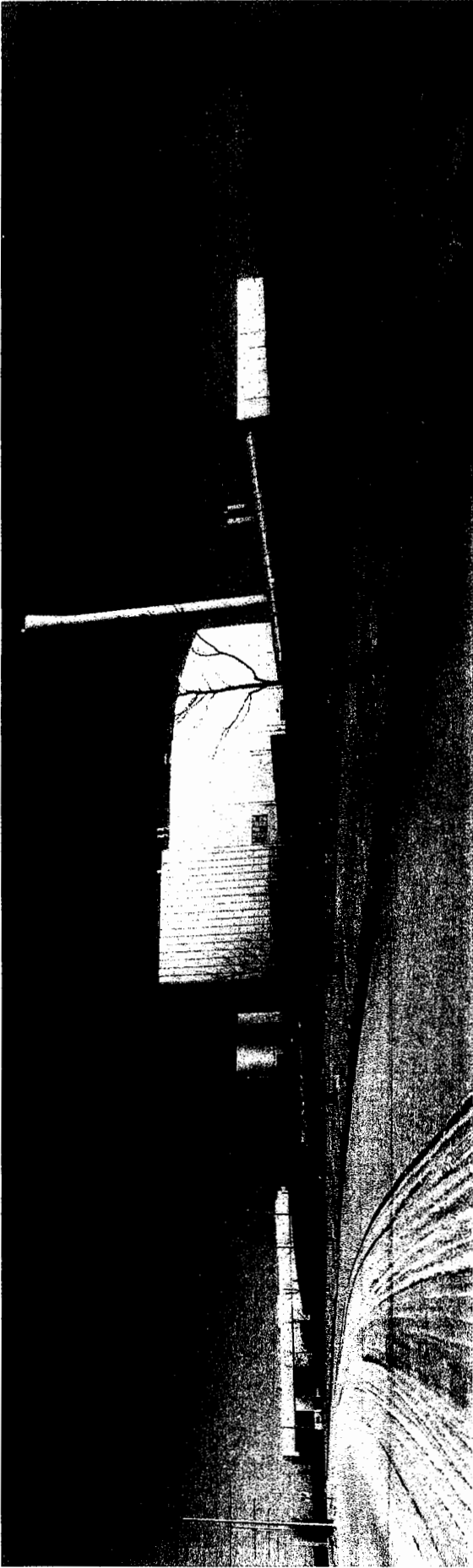
SOURCE TEST RESULTS (CONTINUED)

DYEC Compliance Test Results as % of Permit Limit (Sept 29-Oct 2, 2015)



*1 - Oct 21-22

*2 - Oct 28-29



04 CONCLUSIONS

SUMMARY - RESIDUE QUANTITY

- Covanta: Pozzolan, cement and water are not included in calculation and they **PASS** the Residue Quantity Test.
- HDR: Based on the Test Protocol the cement, pozzolan and water is included in the calculation and Covanta **FAIL** the Total Residue Quantity Test for the 5-Day and 30-Day Test Periods.
- Covanta has demonstrated that that the amount of cement and pozzolan can be reduced to drop the tonnes of fly ash residue and still achieve satisfactory ash characteristics.
- Further reductions of cement and pozzolan would require additional testing to demonstrate that lower fly ash rates are achievable.

SUMMARY

Covanta:

- Claims passage of Acceptance Test Criteria and demonstration of Performance Guarantees per the Project Agreement.
 - Adjustment made to the 5-Day and 30-Day Residue Quantity to exclude cement, pozzolan and water from the fly ash mixture.
-

HDR:

- Covanta has met the Minimum Acceptance Test Criteria (per Section 1.15 of the Appendix 10) for Reliability, Throughput, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance.
- Covanta has failed the 5-Day and 30-Day Residue Quantity Tests and did not meet the Acceptance Test Criteria per the Test Protocol & PA

Debi Wilcox

Attachment B

Index of Reviewed Acceptance Test Report Information

DATA RECEIVED DURING ACCEPTANCE TEST

Document Dates	# of Documents	Major 4*	Additional Documents
<u>9/27</u>	49	✓	HHV Data (Ortech)
<u>9/28</u>	53	✓	HHV Data (Ortech)
<u>9/29</u>	34	✓	HHV Data (Ortech)
<u>9/30</u>	54	✓	HHV Data (Ortech)
<u>10/1</u>	65	✓	HHV Data (Ortech)
<u>10/2</u>	14	✓	CEMS Corrected Data
<u>10/3</u>	6	✓	
<u>10/4</u>	4	✓	
<u>10/5</u>	6	✓	
<u>10/6</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/7</u>	15	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/8</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/9</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/10</u>	19	✓	Complete 5-day residue quantity data
<u>10/11</u>	8	✓	Crane Span Check Sheets
<u>10/12</u>	7	✓	
<u>10/13</u>	10	✓	SGS Ash Analysis
<u>10/14</u>	10	✓	SGS Ash Analysis
<u>10/15</u>	8	✓	Manual Net Gross Meter Reading for Capacity Check
<u>10/16</u>	7	✓	
<u>10/17</u>	7	✓	
<u>10/18</u>	6	✓	
<u>10/19</u>	8	✓	
<u>10/20</u>	7	✓	
<u>10/21</u>	7	✓	
<u>10/22</u>	7	✓	
<u>10/23</u>	8	✓	
<u>10/24</u>	16	✓	BA FEL Scalehouse Photos, DYEC Truck Scale Notes
<u>10/25</u>	7	✓	
<u>10/26</u>	18	✓	Feed Hopper Level and Residue Building Photos
<u>10/27</u>	7	✓	
<u>10/28</u>	7	✓	
<u>10/29</u>	7	✓	
<u>10/30</u>	7	✓	
<u>10/31</u>	13	✓	Residue Quality Test BA Sampling, Feed Hopper Photos
<u>11/1</u>	6	✓	
<u>11/2</u>	10	✓	BA Weight Photos
<u>11/3</u>	13		Plant Summaries, Plant Logs, Plant Records and Residue Photos
Total Documents	581		

*Major 4 documents: DCS data, U1 CEMS, U2 CEMS, Crane Weight

Not part of testing period, testing ended Nov. 2nd

Missing Documents

Debi Wilcox

DATA PROVIDED WITH TEST REPORT

Category	Document Description	# of Docs
General Documents		
	Acceptance-Report-Cover-Page.pdf	1
	Appendix-14-Acceptance-Declaration-Executed.pdf	1
	Durham-York-Demonstrated-Performance.pdf	1
	File-Listing.html	1
	Transmittal-Letter-Executed.pdf	1
Opertions Reports		
	Covanta-30Day-Reliability-Residue-Quantity-Report.pdf	1
	Covanta-5Day-Test-Report.pdf	1
	Covanta-8hour-Test-Report.pdf	1
	Covanta-Metals-Recovery-Test-Report.pdf	1
Environmental-Reports		
	AMESA Evaluation FINAL 151125.pdf	1
	Covanta DYEC Compliance RATA_19Oct15.pdf	1
	Environmental Compliance Final 151125.pdf	1
	Odour Source Test Report - Final 151124.pdf	1
	Residence-Time-and-Temperature-Test-Report.pdf	1
	Residue-Report.pdf	1
	Supplemental Acoustic Audit Final 151123.pdf	1
Procedures		
	Durham-York FINAL Acceptance Test Procedures Rev 3.pdf	1
Data		
	Cement and pozzolan Deliveries	2
	CEMS Data - Unit 1 (37 files)	37
	CEMS Data - Unit 1 (37 files)	37
	Crane Span Check (2 files)	2
	DCS Summary Data (39 files)	39
	MWH Meter Reading 0927-10012015.xlsx	1
	Air Temp after Fan (5 files)	5
	Ash Discharger Temp (5 files)	5
	Charg Flr Ambient (5 files)	5
	Ortech flue gas (6 files)	6
	UFA Temp (5 files)	5
	Fer Non Fer Raw Data (3 files)	3
	Instrument Calibration (6 files)	6
	Logs (3 files)	3
	Residue Date Quality (15 files)	15
	Residue Date Quantity (35 files)	35
	Turbine Performance (5 files)	5
	Waste Feed Data - Crane Log (excel) (37 files)	37
	Waste Feed Data - Crane Log (PDF) (37 files)	37
Total Documents		302

Item #3



Memorandum

SOLICITOR AND CLIENT PRIVILEGED

TO: All Members of Regional Council
FROM: Jason Hunt, Acting Director, Corporate Services
– Legal Services
DATE: December 18, 2015
RE: **Durham York Energy Centre**

Corporate Services
Human Resources

For the purposes of the closed session of the Committee of the Whole meeting, please find attached the following:

- 1) HDR Technical Memorandum dated December 17, 2015;
- 2) Memo to Laura McDowell and Mirka Januszkiewicz from Luis Carvalho and Gioseph Anello re Durham York Energy Centre (DYEC) – Acceptance Test Report, dated December 11, 2015;
 - Durham York Energy Center - Acceptance Test Table (Attachment 2)
- 3) Memo to Laura McDowell and Mirka Januszkiewicz from Luis Carvalho and Gioseph Anello re Durham York Energy Centre (DYEC) – Acceptance Test Supplemental Report, dated December 18, 2015; and
 - Durham York Energy Center - Acceptance Test Table (Attachment 1)
- 4) Letter to Erin Mahoney and Clifford Curtis from Mirka Januszkiewicz and Laura McDowell re Durham York Energy Centre – Acceptance Test Report, dated December 18, 2015.

Please be advised that the above are **Confidential and subject to Solicitor and Client Privilege**. Any such documents cannot be released or discussed outside of a closed session.

Respectfully submitted,



J. Hunt,
Acting Director, Corporate Services – Legal Services

Enc.

Item #4



Privileged and Confidential

Memorandum

TO: L. McDowell, Director, Environmental Promotion and Protection,
The Regional Municipality of York
and
M. Januskiewicz, Director, Waste Management Services, The
Regional Municipality of Durham

FROM: Luis Carvalho, Senior Project Manager, Capital Planning and Delivery,
The Regional Municipality of York
and
Giuseppe Anello, Manager, Waste Planning and Technical Services,
The Regional Municipality of Durham

DATE: December 11, 2015

RE: Durham York Energy Centre (DYEC) – Acceptance Test Report

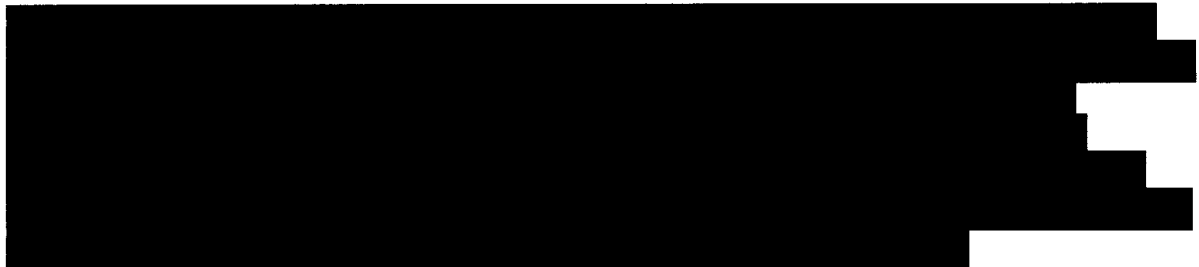
The Owners' technical assessment was completed with input from HDR and Durham/York staff representatives from Waste Management, Capital Delivery, Finance and Legal. The following assessment is consistent with the results of HDR's technical assessment of the Operational and Environmental Compliance components as summarized in HDR's enclosed report (Attachment #1).

The Acceptance Test Report was received by the Owners on November 26, 2015. It was determined that the report contained the necessary contents and associated data as required by the Project Agreement and related Acceptance Test Procedure, including those set out in Appendix 10 Article 1.13. HDR and the Owners have provided an assessment of the facility's performance relative to the environmental and operational performance guarantees, which is summarized in the attached Table (Attachment #2).

Covanta's report maintains that the Acceptance Test met all the compliance and contractual guarantees and therefore the Acceptance Test Certificate should be awarded. The Owners, however, believe that we cannot complete the assessment of the Environmental Compliance Test results permitting the issuance of the Acceptance Test Certificate (assuming all other conditions are met) until the Ministry of the Environment and Climate Change (MOECC) has determined the status of compliance.

As noted in the Table (Attachment #2), all the Operational categories of the Acceptance Test met their contractual guarantees with the exception of the Residue Quantity for both the 5 and 30-day test periods.

The Acceptance Test Report, as prepared by Covanta, indicates that they modified the test procedures to exclude the Fly Ash treatment materials of cement, pozzolan, and water from the calculation of Residue Quantity. HDR and the Owners do not accept this modification. According to the approved Acceptance Test Protocol, which was prepared by Covanta in consultation with the Owners, cement, pozzolan, and water are included in the calculation of Residue Quantity. There are also references to the use of cement and pozzolan to stabilize Fly Ash in the Request for Proposal (RFP), Covanta's proposal, the Project Agreement, and the Environmental Compliance Approval (ECA) application.



In light of the failure to meet all of the Performance Guarantees and in order to move forward towards Service Commencement, the Owners will need to ascertain the following:

1. What options are available to the Owners in the event of a failed Acceptance Test? What is the process following a failure of the Acceptance Test?
2. What are the financial and operational impacts of the failure to meet the Residue Quantity guarantee?
 - a. It must be noted that the Residue Disposal Cost and Residue Haulage Diesel Fuel Cost is identified within the Project Agreement and forms part of the Total Annual Operating Fee. These costs form part of Covanta's operational responsibility and the Owners' costs for residue disposal and residue haulage diesel do not fluctuate based on residue quantity, and change on an annual basis based only on set annual Statistics Canada benchmarks. As a result, staff do not anticipate any additional cost for residue disposal during the operating term of the contract.
 - b. The Performance Liquidated Damages also includes a formula to calculate damages owing to the Owners if Covanta fails to annually meet the Residue Quantity guarantee during commercial operations.
 - c. Cement and pozzolan are used to stabilize fly ash by encapsulating contaminants, rendering the material non-hazardous.
 - d. Are there any associated Operations and Maintenance or Life-cycle costs.

The Environmental Compliance Tests dealt with all emission and operating parameters in accordance with the requirements established by the ECA. The MOECC has received the test documentation that deals with the Source Test, Odour Test, Noise Test, and Residue Quality Test (bottom ash combustibility and fly ash TCLP). As illustrated in the attached Table (Attachment #2), it is Covanta's contention that they have met all the environmental compliance requirements. HDR and the Owners observed the conduct of these tests and reviewed the results as they related to the Project Agreement. The MOECC has not yet determined the compliance status for each of the following tests:

- a. Source Test
- b. Continuous Emissions Monitors
- c. Odour Test
- d. Noise Test
- e. Bottom Ash Combustibility
- f. Fly Ash TCLP

As of the date of this memo, the Owners have not yet received a determination of compliance from the MOECC, and therefore, cannot make a recommendation on the Environmental Compliance Test. Once the MOECC determination has been received, the Owners Technical team will forward a supplemental memo.

Conclusion

The Owners' technical assessment cannot be completed until the MOECC has addressed the state of compliance with the ECA components of the Acceptance Test.



The options available to the Owners in the event of a failed Acceptance Test and the next steps towards Service Commencement must be investigated and an appropriate strategy accepted.

The Owners should discuss and develop a strategy to resolve outstanding issues prior to Service Commencement.

Recommendation

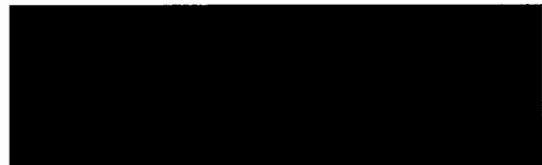
The Technical Committee cannot at this time recommend the issuance of the Acceptance Test Certificate in light of the Facility failure to meet all of the Performance Guarantees.

Management Committee direct that a strategy be developed in consultation with Covanta, such that this project can move to Service Commencement.

Sincerely,



Gioseph Anello, M.Eng., P.Eng., PMP
Manager, Waste Planning and
Technical Services
Works Department
The Regional Municipality of Durham
905.668.7711 ext. 3445
Gioseph.Anello@durham.ca



Luis Carvalho, M.Sc., P.Eng., PMP
Senior Project Manager
Capital Planning & Delivery Branch
Environmental Services Department
The Regional Municipality of York
905.830.4444 ext. 75015
Luis.Carvalho@york.ca

Encl.



Technical Memo

Date: Friday, December 11, 2015

Project: Durham York Energy Centre (DYEC)

To: Mirka Januszkiewicz, PEng, Region of Durham (Durham)
Laura McDowell, PEng, Region of York (York)

From: Bruce Howie, P.E., HDR Corporation (HDR)

Cc: Gioseph Anello, PEng; Greg Borchuk, PEng (Durham)
Luis Carvalho, PEng; Seth Dittman, PEng (York)
Shawn Worster, John Clark, P.E.; Kirk Dunbar (HDR)

Subject: **Durham York Energy Centre (DYEC)**
Summary Review of Acceptance Test Report

Covanta conducted the Acceptance Test of the Durham York Energy Center (DYEC) from September 27, 2015 through November 2, 2015, and submitted the Acceptance Test Report (Report), the Source Test (including Odour) and the Acoustic Audit on November 26, 2015, along with the Acceptance Test Declaration. The Report summarized findings and results of the testing, and provided Covanta's certification that these tests demonstrated that the DYEC achieved all of the Performance Guarantees as stipulated in Exhibit 2 to Appendix 19 of the Project Agreement (PA).

HDR Corporation (HDR) as the Owner's Consultant for the Regions of Durham and York (the Regions), was responsible for monitoring Covanta and their operating personnel throughout the entire Acceptance Test to assess whether the DYEC was being operated under normal conditions and that the testing was being conducted in accordance with the agreed-upon final Acceptance Test Protocol, dated January 2015. This technical memorandum and the attached presentation (Attachment A) have been prepared for the Regions to provide a concise summary of our evaluation of the Test Report and Covanta's compliance with the Acceptance Test Criteria as stipulated in the PA and Test Protocol. A list of the sections of the Test Report and the supporting data that HDR reviewed as part of our assessment is provided as Attachment B. Table 1 below summarizes the Acceptance Test Criteria in the PA, the results as presented by Covanta in the Acceptance Test Report, and the results based upon HDR's independent calculations based on the Test data included in the Acceptance Test Report.

Based on HDR's review of the results presented by Covanta in the Report (as shown in column 2 of Table 1, below), the supporting data/documentation, our observations during the testing period, and our independent calculations of the results (as shown in Column 3 of Table 1), we generally concur with the results presented by Covanta in the Test Report. It is HDR's opinion that Covanta has demonstrated that the DYEC has met or exceeded the requirements of the Minimum Acceptance Test Criteria as defined by Section 1.15 of the Acceptance Test Protocol for Reliability, Throughput Capacity, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance (pending MoECC approval). However, HDR contends that Covanta has not met the criteria for the 30-Day and 5-Day Residue Quantity Guarantees, and therefore did not pass the Acceptance Test Criteria as stipulated in the Acceptance Test Protocol and Section 1.14, Appendix 10 of the PA.

TABLE 1 - SUMMARY OF RESULTS

Pursuant to Section 1.14 of Appendix 10 to the PA, "The Facility shall be deemed to have passed the Acceptance Test Criteria if the Acceptance Test demonstrates that, each of the following criteria has been met or exceeded"

CRITERIA	TEST RESULT	
	COVANTA	HDR
The 30-day Reliability Test has demonstrated during the test period that the Facility has operated at a minimum of 95% of the Demonstrated Design Steam Flow (DDSF) with a Facility availability greater than 95%.	101.6% DDSF 99.9% Reliability PASS	101.6% DDSF 99.9% Reliability PASS
The Throughput Capacity Guarantee Test has demonstrated the ability of the Facility to process waste in accordance with the Throughput Capacity Guarantee in Exhibit 2 to Appendix 19 during a consecutive five (5)-day test period, and that the amount of Reference waste (in tonnes) processed during the testing period is 2,180 tonnes (and no less than 1,000 tonnes per unit).	Exceeded Facility Criteria by 6.4% Each boiler exceeded 1,000 tonnes reference waste PASS	Exceeded Facility Criteria by 6.3% Each boiler exceeded 1,000 tonnes reference waste PASS
The Energy Recovery Test has demonstrated that the average net electrical production rate (in kWh/tonne) is not less than the Electrical Production Guarantee identified in Exhibit 2 to Appendix 19	840 kWh/tonne exceeded adjusted Guarantee of 821 kWh/tonne by 2.3% PASS	846 kWh/tonne exceeded adjusted Guarantee of 828 kWh/tonne by 2.1% PASS
The Residue Quality Guarantee has demonstrated that the unburned carbon content is less than 3%, and moisture content is less than 25%	16.7% moisture and 0.41% Combustibles PASS	16.7% moisture and 0.83% Combustibles PASS
The Metals Recovery Guarantee is demonstrated if the measured recovery efficiency percentages for ferrous metals and for non-ferrous metals comply with those identified by the DBO Contractor in Exhibit 2 to Appendix 19. (80% Ferrous, 60% Non Ferrous)	Ferrous recovery 87.8% Non-Ferrous 84.7% PASS	Ferrous recovery 83.0% Non-Ferrous 84.7% PASS
The Environmental Compliance Guarantee is demonstrated if the results of the air emissions, noise, and general test requirements are in compliance with the CofA	All Environmental Requirements Satisfied PASS	Pending MoECC approval CO spikes accepted HOLD
The Residue Quantity Guarantee is demonstrated if the quantity of Residue generated (in tonnes) is less than or equal to 30% of Waste processed (in tonnes), adjusted for the measured waste HHV in accordance with Table A10-2.	30-Day period- 26.6% vs 29.4% guarantee PASS 5-Day period- 26.8% vs 29.4% guarantee PASS	30-Day period- 31.8% vs 29.3% guarantee FAIL 5-Day period- 29.9% vs 29.7% guarantee FAIL

Attachment A

HDR Presentation: DYEC Acceptance Test Report Review



DYEC ACCEPTANCE TEST REPORT REVIEW

DECEMBER 11, 2015

HDR

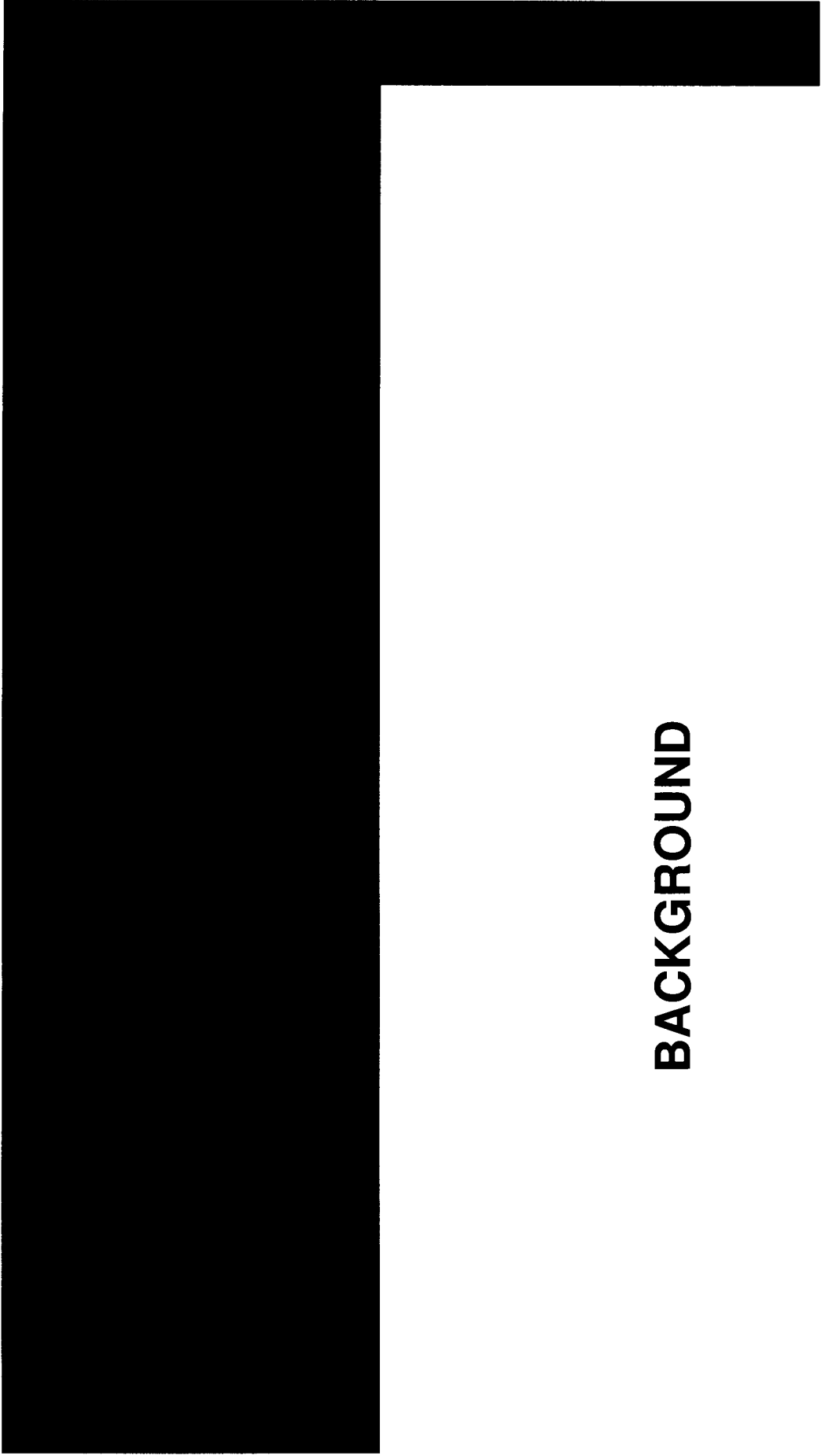
Background

Test Results Summary

Discussion of Results

Conclusions





BACKGROUND

ACCEPTANCE TEST SCHEDULE

- Acceptance Testing Period: September 27th through November 2nd
(Total Testing Period: 37-Days)
- Acceptance Test Declaration (by Covanta): November 25, 2015
- Acceptance Test Report Issued (by Covanta): on November 26, 2015
- Full Air Emissions Report (including the Odour Test and the Acoustic Audit Results) were also submitted to the MOECC and the Regions on November 26, 2015

HDR REVIEW OF ACCEPTANCE TEST AND REPORT

- On-site monitoring of plant operations during full 37-Day Test Period. Collected pertinent Control room and facility data.
- On-site monitoring of Source Testing performed by Ortech.
- Review and input daily test data submitted by Covanta.
- Perform independent calculations for Boiler as Calorimeter and Facility HHV correlation to confirm Covanta calculations.
- November 30th: HDR performed a review of the Test Report and confirmed that the information required to assess the results of the Acceptance Test was provided and complete.
- Perform detailed review of data and calculations in Covanta Report

02

ACCEPTANCE TEST RESULTS

ACCEPTANCE TEST REQUIREMENTS - OVERVIEW

30-Day Reliability Test	Steam Flow (MCR) & Availability \geq 95%
5-Day Throughput Capacity Test	Throughput \geq 100% ⁽¹⁾
Three (3) – 8-hour Energy Recovery Tests	767 kWh/tonne @ HHV of 13 MJ/kg ⁽¹⁾
5-Day Residue Quality Test	<25% Moisture & <3% Unburned Carbon
Residue Quantity Test-5-Day Residue Quantity Test-30-Day	Total Residue (Bottom Ash + Fly Ash) of <30% ⁽¹⁾
Three (3) – 8-hour Metals Recovery Tests	Ferrous \geq 80% ; Non-Ferrous \geq 60%
Environmental Compliance Tests	Meet all ECA requirements
Noise, Odour	Meet all EA and ECA requirements

(1) = Adjusted based on waste higher heating value (HHV) measured during test.

SUMMARY OF ACCEPTANCE TEST RESULTS

30-Day Reliability Test	PASS	PASS
5-Day Throughput Capacity Test	PASS	PASS
Three (3) – 8-hour Energy Recovery Tests	PASS	PASS
5-Day Residue Quality Test	PASS	PASS
Residue Quantity Test-5-Day	PASS ⁽¹⁾	FAIL
Residue Quantity Test-30-Day	PASS ⁽¹⁾	FAIL
Three (3) – 8-hour Metals Recovery Tests	PASS	PASS
Environmental Compliance Tests (Source Test, Ash Tests)	PASS	HOLD ⁽²⁾
Noise, Odour	PASS	HOLD ⁽²⁾

(1) = Based on Covanta assertion that Pozzolan/Cement is excluded from the calculation for fly ash quantity.

(2) = Pending review and approval of MOECC of Source Test Report.

SUMMARY OF ACCEPTANCE TEST RESULTS

- Based on HDR's review of the test documentation, HDR generally concurs with the results presented by Covanta in the Test Report.
- Covanta has met or exceeded the criteria for Reliability, Capacity, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance (pending MoECC approval).
- Covanta has not met the criteria for the 30-Day and 5-Day Residue Quantity Guarantees,
- Covanta did not pass the Acceptance Test Criteria as stipulated in the Acceptance Test Protocol and Section 1.14, Appendix 10 of the PA.
- Covanta has met or exceeded the requirements of the Minimum Acceptance Test Criteria.

03

DISCUSSION OF RESULTS

APPROACH

- 30-Day Reliability Test
- 5-Day Throughput Capacity Test
- Energy Recovery Tests
- Residue Quantity and Quality Tests
- Metals Recovery Tests
- Emissions Compliance Demonstration and Tests
- Noise Test
- Odour Test



30-DAY RELIABILITY

Demonstrate Facility can Reliably Process Waste and Generate Steam - Passage Based On:

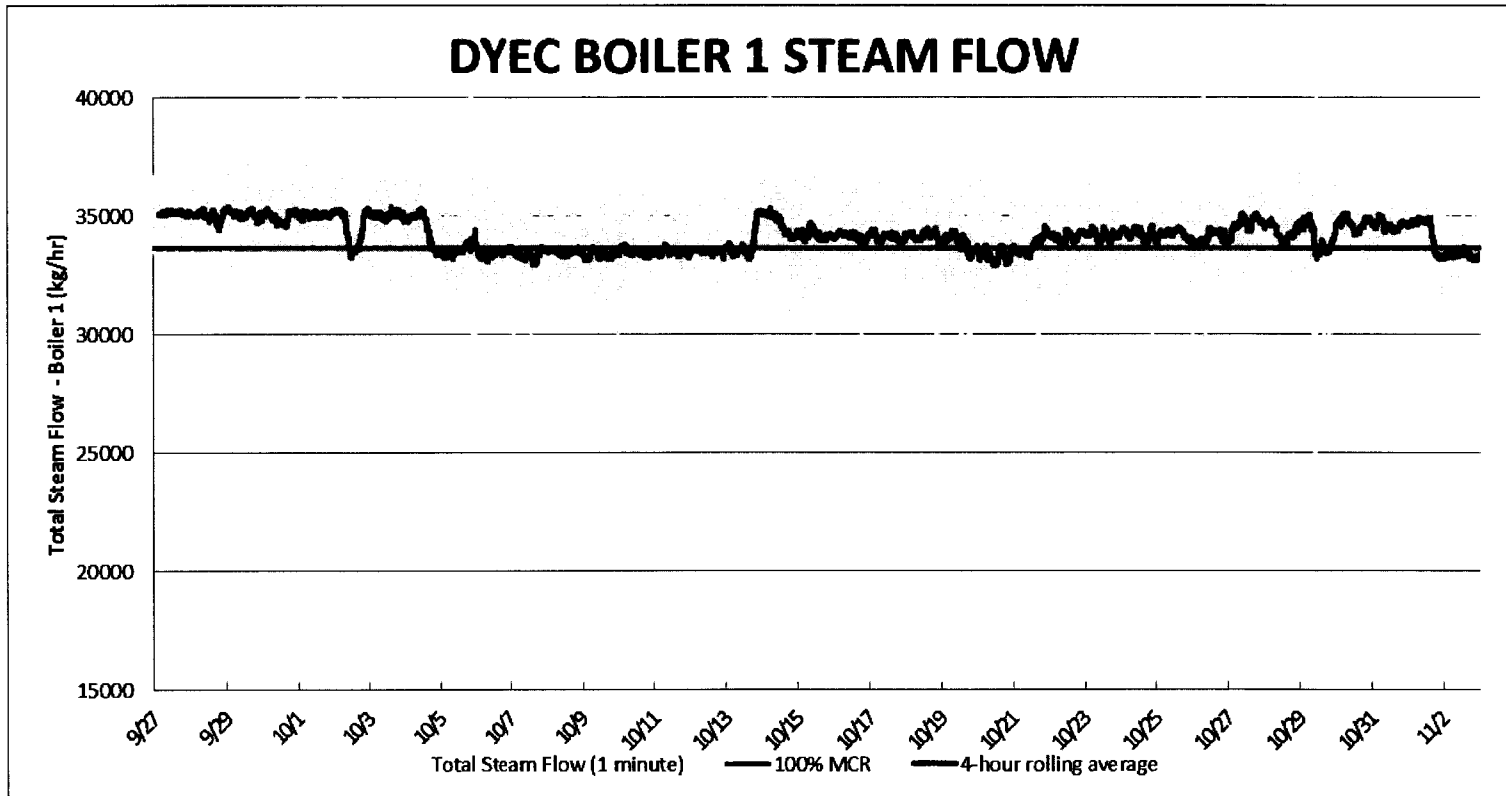
- 95% Design Steam Flow
 - Average during on-line hours during 30-days
- 95% Availability
 - (No more than 72 hours of total boiler downtime)

RESULTS:

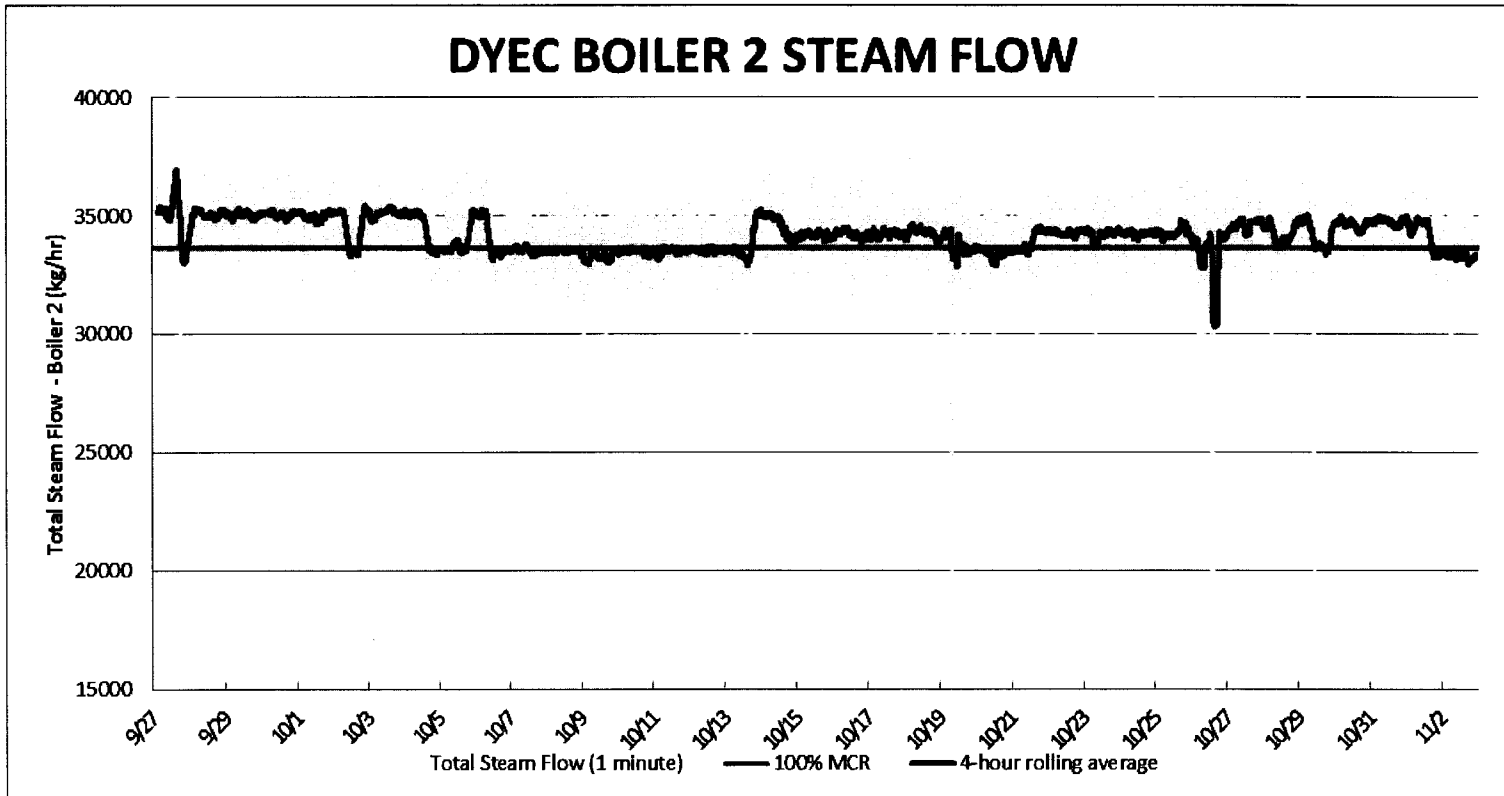
30-Day Capacity	>95% MCR steam flow	HDR	101.6%	HDR –	PASS
		Covanta	101.6%	Covanta-	PASS
30-Day Availability	> 95% Availability	HDR - Boilers	99.9%	HDR –	PASS
		HDR – Turbine⁽¹⁾	96.5%		
		Covanta	99.9%	Covanta-	PASS

(1) Provided for information, not required by protocol but would meet a 95% criteria

BOILER 1 OPERATION DURING 37-DAY PERIOD



BOILER 2 OPERATION DURING 37-DAY PERIOD



5-DAY THROUGHPUT CAPACITY

Demonstrate Facility can Process Waste and Generate Steam At 100% Design Throughput- Passage Based On:

- Process a minimum of 2,180 tons of Reference Waste
- Process a minimum of 1,000 tons of Reference Waste in Each Boiler
- Throughput Guarantee adjusted to correspond to actual waste HHV during 5-day period based on Exhibit 2 to Appendix 19

RESULTS:

5-Day Throughput	>100% Design Throughput	HDR – 2,251 > 2,117 tonnes Covanta- 2,260 > 2,124 tonnes	HDR – PASS Covanta- PASS
5-Day Throughput	Each Boiler > 1,000 tonnes	HDR #1 - 1,131 tonnes #2 - 1,120 tonnes Covanta #1 - 1,136 tonnes* #2 - 1,125 tonnes*	HDR – PASS Covanta- PASS

* Incorrectly reported as 1,252 and 1,240 tonnes in Covanta Report – corrected for this table

ENERGY RECOVERY TESTS

Demonstrate Compliance with Electricity Production Guarantees in Exhibit 2 to Appendix 19 of the Project Agreement during 8-hour periods. Passage based on:

- Demonstration that Gross Energy Recovery meets guarantee in Exhibit 2 (kWh/tonne)
- Demonstration that Net Energy Recovery meets guarantee in Exhibit 2 (kWh/tonne)
- Energy Recovery Guarantees adjusted to correspond to actual waste HHV during 8-hour period based on Exhibit 2 to Appendix 19

RESULTS:

Energy Recovery	Gross Energy >Guarantee	HDR – 965>937 @ 13.8 MJ/kg	HDR – PASS (3.1%)
		Covanta- 961>928 @ 13.7 MJ/kg	Covanta- PASS (3.5%)
	Net Energy >Guarantee	HDR – 846>829 @ 13.8 MJ/kg	HDR – PASS (2.1%)
		Covanta- 840>821 @ 13.7 MJ/kg	Covanta- PASS (2.3%)

HHV OF WASTE DURING TEST PERIOD

HHV of waste varied through the test period and averaged 13.32 MJ/kg for the 37-Day Test period.

	HHV (MJ/kg)
1st 5-Day Test (Test Day 1-5)	13.407
30-Day Test (Test Days 1-30)	13.384
2nd 5-Day Test (Test Days 26-30)	13.249
30 Day Test (Test Days 6-35)	13.346
37-day Test Period (Days 1-37)	13.323
35-day Test Period (Days 1-35)	13.354
3rd 5-Day Test (Test Days 31-35)	13.175

RESIDUE QUANTITY AND QUALITY TESTS

Demonstrate Compliance with Residue Quantity and Quality Guarantees in Exhibit 2 to Appendix 19 of the Project Agreement Passage based on:

- **5-Day and 30-Day Residue Quantity Test**
 - Demonstrate Total Residue <30% of MSW combusted (with HHV adjustments)
- **5-Day Residue Quality Test**
 - Unburned Carbon (<3%), Moisture (<25%)
- **“Bottom Ash”** means the solid residue left after the incineration burning process, except Fly Ash, grate siftings, and APC Plant waste.
- **“Fly Ash”** means solid residue removed by the air pollution control devices after the incineration burning process and which may contain traces of materials burned in the Facility and their combustion products and reacted and unreacted products from the APC Plant, including lime and carbon.
- **“Residue”** means Bottom Ash, Fly Ash, grate siftings, APC Plant waste and **other material that remains after combustion of waste and recovery of metals in the Facility.**

RESIDUE QUANTITY AND QUALITY TESTS (CONT)

- Covanta Appendix data shows Residue Quantity failed.
- Covanta claims cement, pozzolan and the associated water are not part of the definition of Residue.
- Report incorporates a correction to account for cement, pozzolan and water added to the flyash.
 - Correction is a deviation from the protocol.
 - Correction incorporates several assumptions for cement, pozzolan and water calculations.
 - Covanta claims passage of Residue Quantity criteria with correction.
- HDR disagrees with Covanta's interpretation that cement, pozzolan and water are not included in the calculation of Total Residue.

RESIDUE QUANTITY AND QUALITY TESTS (CONT)

RESULTS:

30- Day Residue Quantity	Quantity% < Guarantee %	HDR - 31.8 % > 29.3%	HDR - FAIL
	Covanta Appendix Data	Covanta - 31.3% > 29.4%	Covanta- FAIL
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.6% vs 29.4%	Covanta - PASS ⁽¹⁾
5-Day Residue Quantity	Quantity% < Guarantee %	HDR - Test 1 32.1% > 29.3%	HDR FAIL ⁽²⁾
		HDR - Test 3 29.9% > 29.7%	FAIL ⁽²⁾
	Covanta Appendix Data	Covanta - 31.6% > 29.4%	Covanta- FAIL
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.8% < 29.4%	Covanta - PASS ⁽¹⁾
5-Day Residue Quality	<25% Moisture < 3% Unburned Combustibles	16.7 % Moisture 0.83% Unburned Combustibles	HDR - PASS Covanta- PASS

(1) = Based on Covanta assertion that Pozzolan/Cement is excluded from the calculation for fly ash quantity.

(2) = Includes HDR interpretation of contract that returned ash from Ferrous metals is included (per PA)

RESIDUE QUANTITY (CONTINUED)

HDR Calculation Based on Raw Data:

RESIDUE QUANTITY *1

Test	MSW Throughput tonnes	Bottom Ash tonnes	Bottom Ash %	Fly Ash tonnes	Fly Ash %	Total Residue %	MSW HHV MJ/kg	Guar. %	PASS/ FAIL	Including ferrous ash *2		
										tonnes	%	P/F
1st 5-Day Test (Test Day 1-5)	2,251	470	20.9%	240	10.7%	31.6%	13.41	29.3%	FAIL	722	32.1%	FAIL
30-Day Test (Test Days 1-30)	13,294	2,649	19.9%	1,506	11.3%	31.3%	13.38	29.3%	FAIL	4,221	31.8%	FAIL
2nd 5-Day Test (Test Days 26-30)	2,238	433	19.4%	256	11.4%	30.8%	13.25	29.6%	FAIL	700	31.3%	FAIL
30 Day Test (Test Days 6-35)	13,300	2,610	19.6%	1,497	11.3%	30.9%	13.35	29.4%	FAIL	4,174	31.4%	FAIL
35-day Test Period (Days 1-35) *3	15,551	3,080	19.8%	1,738	11.2%	31.0%	13.35	29.4%	FAIL	4,896	31.5%	FAIL
3rd 5-Day Test (Test Days 31-35)	2,257	432	19.1%	232	10.3%	29.4%	13.18	29.7%	PASS	675	29.9%	FAIL

*1 HDR maintains that the cement and pozzolan are included in the Residue, as this material must be disposed. Excluded materials are materials not disposed

*2 Project Agreement states that Residue is to be "Residue from the Facility, excluding ferrous and non ferrous materials recovered, but including any returned or disposed ash resulting from the ferrous cleanup."

*3 Residue from last 2 days of 37-Day extended test period was not included due to residue building coordination limitations

METALS RECOVERY TESTS

Demonstrate Compliance with Metals Recovery Guarantee in Exhibit 2 to Appendix 19 of the Project Agreement during 8-hour periods. Passage based on:

- Ferrous recovery $\frac{\text{(ferrous recovered)}}{\text{(ferrous in residue)}} > 80\%$
- Non-Ferrous recovery $\frac{\text{(non-ferrous recovered)}}{\text{(non-ferrous in residue)}} > 60\%$

RESULTS:

Ferrous Recovery	Recovery > 80%	HDR -	83.0%	HDR -	PASS
		Covanta -	87.8%	Covanta-	PASS
Non-Ferrous Recovery	Recovery > 60%	HDR -	84.7%	HDR -	PASS
		Covanta -	84.7%	Covanta-	PASS

DYEC- ACCEPTANCE TEST REQUIREMENTS – REQUIREMENTS DURING 5-DAY

5-Day Throughput	>100% Design Throughput	HDR – 2,251 > 2,115 tonnes Covanta- 2,260 > 2,124 tonnes	HDR – PASS Covanta- PASS
5-Day Throughput	Each Boiler > 1,000 tonnes	HDR #1 - 1,131 tonnes #2 - 1,120 tonnes Covanta #1 - 1,136 tonnes* #2 - 1,125 tonnes*	HDR – PASS Covanta- PASS
Energy Recovery	Gross Energy > Guarantee	HDR – 965 > 937 @13.8 MJ/kg Covanta- 961 > 928 @13.7 MJ/kg	HDR – PASS (3.1%) Covanta- PASS (3.5%)
	Net Energy > Guarantee	HDR – 846 > 829 @13.9 MJ/kg Covanta- 840 > 821 @13.7 MJ/kg	HDR – PASS (2.1%) Covanta- PASS (2.3%)
5-Day Residue Quantity	Quantity% < Guarantee %	HDR – Test 1 32.1% > 29.3% HDR – Test 3 29.9% > 29.7%	HDR – FAIL (-9.6%) FAIL (-0.7%)
	Covanta Appendix Data	Covanta – Test 1 31.6% > 29.4% Test 3 29.4% > N/R	Covanta- FAIL not reported
	Covanta Report (no Cement/Pozzolan/water)	Covanta - 26.8% < 29.4%	Covanta - PASS
5-Day Residue Quality	<25% Moisture < 3% Unburned Combustibles	16.7 % Moisture 0.83% Unburned Combustibles	HDR – PASS Covanta- PASS

*Incorrectly reported as 1,252 and 1,240 tonnes in Covanta Report – corrected for this table

DYEC- ACCEPTANCE TEST REQUIREMENTS – REQUIREMENTS DURING 30-DAY

30-Day Capacity	>95% MCR steam flow	HDR 101.6% Covanta 101.6%	HDR – PASS Covanta- PASS
30-Day Availability	> 95% Availability	HDR 99.9% Covanta 99.9%	HDR – PASS Covanta- PASS
30- Day Residue Quantity	Quantity% < Guarantee % Covanta Appendix Data Covanta Report (no Cem/Poz/wtr)	HDR - 31.8 % vs 29.3% Covanta - 31.3% vs 29.4% Covanta - 26.6% vs 29.4%	HDR – FAIL Covanta- FAIL Covanta - PASS
Flyash and Bottom Ash Testing (Environmental)	Demonstrate Compliance with applicable requirements		HDR – PASS Covanta- PASS
Ferrous Recovery	Recovery > 80%	HDR - 83.0% Covanta - 87.8%	HDR – PASS Covanta- PASS
Non-Ferrous Recovery	Recovery > 60%	HDR - 84.7% Covanta - 84.7%	HDR – PASS Covanta- PASS
Stack Test Each Unit	All Emissions in compliance with CofA		HDR- hold for MoE Covanta- PASS
CEMS Parameters	Continuous Compliance with all CEMS parameters	Two (2) separate CO excursion events – test extended 1 week.	HDR – PASS Covanta- PASS

SOURCE TEST RESULTS

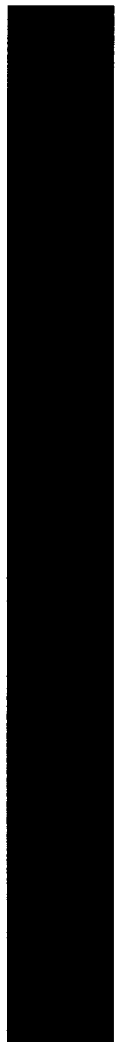
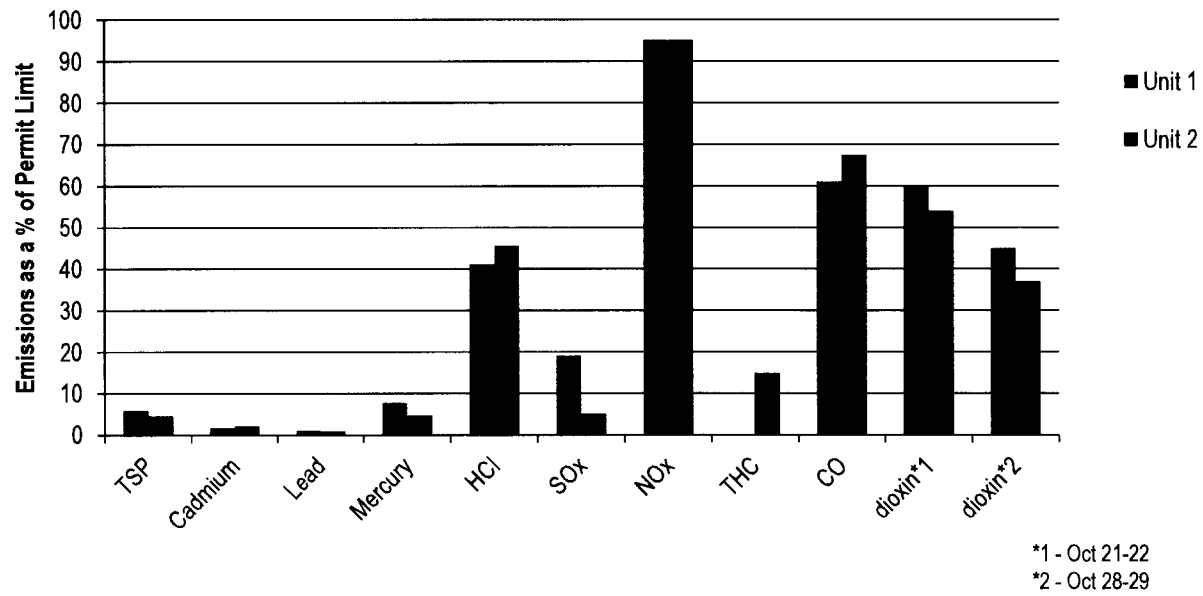
Parameter			Unit 1		Unit 2	
	Limit	Units	Result*	% of Limit	Result*	% of Limit
TSP	9	mg/Rm ³	0.53	6	<0.41	5
Cadmium	7	µg/Rm ³	0.12	2	0.15	2
Lead	50	µg/Rm ³	0.57	1	0.51	1
Mercury	15	µg/Rm ³	1.16	8	0.72	5
HCl	9	mg/Rm ³	3.7	41	4.1	46
SOx	35	mg/Rm ³	6.7	19	1.8	5
NOx	121	mg/Rm ³	115	95	115	95
THC	33	mg/Rm ³	0	0	4.9	15
CO	40	mg/Rm ³	24.4	61	27.0	68
October 21 to October 22, 2015 Test Results						
Dioxins and Furans	60	pg I-TEQ/Rm ³	< 36.0	60	< 32.4	54
October 28 to October 29, 2015 Test Results						
Dioxins and Furans	60	pg I-TEQ/Rm ³	< 27.0	45	< 22.2	37

SOURCE TEST SUMMARY

- ORTECH Consulting Inc. completed a source testing program during the Acceptance Test period to demonstrate compliance with ECA requirements for DYEC air emissions.
- HDR monitored testing and confirmed that testing was performed in accordance with Pre-Test Plan and applicable Reference Methods.
- ORTECH's report to MoECC indicates that the facility complied with the ECA emission limits and demonstrated modeled compliance of point of impingement impacts.
- Covanta passed two of three dioxin runs. The first set of runs was deemed invalid or "compromised".
- The three sets of dioxin, furan, and dioxin-like PCB testing programs were conducted at different lime and carbon feed rates.

SOURCE TEST RESULTS (CONTINUED)

DYEC Compliance Test Results as % of Permit Limit (Sept 29-Oct 2, 2015)



04

CONCLUSIONS

SUMMARY

Covanta:

- Claims passage of Acceptance Test Criteria and demonstration of Performance Guarantees per the Project Agreement.
 - Adjustment made to the 5-Day and 30-Day Residue Quantity to exclude cement, pozzolan and water from the fly ash mixture.
-

HDR:

- Covanta has met the Minimum Acceptance Test Criteria (per Section 1.15 of the Appendix 10) for Reliability, Throughput, Energy Recovery, Residue Quality, Metals Recovery, and Environmental Compliance (pending MoECC approval).
- Covanta has failed the 5-Day and 30-Day Residue Quantity Tests and did not meet the Acceptance Test Criteria per the Test Protocol & PA

SUMMARY - RESIDUE QUANTITY

- Covanta: Pozzolan, cement and water are not included in calculation and they **PASS** the Residue Quantity Test.
- HDR: Based on the Test Protocol the cement, pozzolan and water is included in the calculation and Covanta **FAIL** the Total Residue Quantity Test for the 5-Day and 30-Day Test Periods.
- Covanta has demonstrated that that the amount of cement and pozzolan can be reduced to drop the tonnes of fly ash residue and still achieve satisfactory ash characteristics.
- Further reductions of cement and pozzolan would require additional testing to demonstrate that lower fly ash rates are achievable.

Attachment B

Index of Reviewed Acceptance Test Report Information

DATA RECEIVED DURING ACCEPTANCE TEST

Document Dates	# of Documents	Major 4*	Additional Documents
<u>9/27</u>	49	✓	HHV Data (Ortech)
<u>9/28</u>	53	✓	HHV Data (Ortech)
<u>9/29</u>	34	✓	HHV Data (Ortech)
<u>9/30</u>	54	✓	HHV Data (Ortech)
<u>10/1</u>	65	✓	HHV Data (Ortech)
<u>10/2</u>	14	✓	CEMS Corrected Data
<u>10/3</u>	6	✓	
<u>10/4</u>	4	✓	
<u>10/5</u>	6	✓	
<u>10/6</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/7</u>	15	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/8</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/9</u>	17	✓	Final Sample/Weights FE and Non-Fe Test
<u>10/10</u>	19	✓	Complete 5-day residue quantity data
<u>10/11</u>	8	✓	Crane Span Check Sheets
<u>10/12</u>	7	✓	
<u>10/13</u>	10	✓	SGS Ash Analysis
<u>10/14</u>	10	✓	SGS Ash Analysis
<u>10/15</u>	8	✓	Manual Net Gross Meter Reading for Capacity Check
<u>10/16</u>	7	✓	
<u>10/17</u>	7	✓	
<u>10/18</u>	6	✓	
<u>10/19</u>	8	✓	
<u>10/20</u>	7	✓	
<u>10/21</u>	7	✓	
<u>10/22</u>	7	✓	
<u>10/23</u>	8	✓	
<u>10/24</u>	16	✓	BA FEL Scalehouse Photos, DYEC Truck Scale Notes
<u>10/25</u>	7	✓	
<u>10/26</u>	18	✓	Feed Hopper Level and Residue Building Photos
<u>10/27</u>	7	✓	
<u>10/28</u>	7	✓	
<u>10/29</u>	7	✓	
<u>10/30</u>	7	✓	
<u>10/31</u>	13	✓	Residue Quality Test BA Sampling, Feed Hopper Photos
<u>11/1</u>	6	✓	
<u>11/2</u>	10	✓	BA Weight Photos
<u>11/3</u>	13		Plant Summaries, Plant Logs, Plant Records and Residue Photos
Total Documents	581		

*Major 4 documents: DCS data, U1 CEMS, U2 CEMS, Crane Weight

Not part of testing period, testing ended Nov. 2nd

DATA PROVIDED WITH TEST REPORT

Category	Document Description	# of Docs
General Documents	Acceptance-Report-Cover-Page.pdf	1
	Appendix-14-Acceptance-Declaration-Executed.pdf	1
	Durham-York-Demonstrated-Performance.pdf	1
	File-Listing.html	1
	Transmittal-Letter-Executed.pdf	1
Operations Reports	Covanta-30Day-Reliability-Residue-Quantity-Report.pdf	1
	Covanta-5Day-Test-Report.pdf	1
	Covanta-8hour-Test-Report.pdf	1
	Covanta-Metals-Recovery-Test-Report.pdf	1
Environmental-Reports	AMESA Evaluation FINAL 151125.pdf	1
	Covanta DYEC Compliance RATA_19Oct15.pdf	1
	Environmental Compliance Final 151125.pdf	1
	Odour Source Test Report - Final 151124.pdf	1
	Residence-Time-and-Temperature-Test-Report.pdf	1
	Residue-Report.pdf	1
	Supplemental Acoustic Audit Final 151123.pdf	1
Procedures	Durham-York FINAL Acceptance Test Procedures Rev 3.pdf	1
Data	Cement and pozzolan Deliveries	2
	CEMS Data - Unit 1 (37 files)	37
	CEMS Data - Unit 1 (37 files)	37
	Crane Span Check (2 files)	2
	DCS Summary Data (39 files)	39
	MWH Meter Reading 0927-10012015.xlsx	1
	Air Temp after Fan (5 files)	5
	Ash Discharger Temp (5 files)	5
	Charg Flr Ambient (5 files)	5
	Ortech flue gas (6 files)	6
	UFA Temp (5 files)	5
	Fer Non Fer Raw Data (3 files)	3
	Instrument Calibration (6 files)	6
	Logs (3 files)	3
	Residue Date Quality (15 files)	15
	Residue Date Quantity (35 files)	35
	Turbine Performance (5 files)	5
	Waste Feed Data - Crane Log (excel) (37 files)	37
	Waste Feed Data - Crane Log (PDF) (37 files)	37
	Total Documents	

Durham York Energy Centre - Acceptance Test Table (Attachment #2)

Test	Project Agreement Guarantee	Covanta	HDR	HDR Recommendation	Owners' Technical Recommendation	Comments
Operations						
Reliability	Facility-wide operations at a minimum of 95% Design Steam Flow	101.6% of design steam flow	101.9% of design steam flow	Pass	Pass	
	95% Availability of Boiler	The Facility achieved a 99.93% average boiler availability	The Facility achieved a 99.93% average boiler availability	Pass	Pass	
Throughput Capacity	Full load for 5 consecutive days HHV of 13,327 kJ/kg 2,124 tonnes and a minimum of a 1,000 tonnes per boiler	total actual throughput 2,260 tonnes	total actual throughput 2,251 tonnes Boilers #1 and #2 was 1,131 tonnes and 1,120 tonnes, respectively.	Pass	Pass	
Energy Recovery	gross energy: 937 kWh/Tonne (HHV of 13.8)	961 kWh/Tonne at 13.7 MJ/kg	965 kWh/Tonne at 13.8 MJ/kg	Pass	Pass	
	net energy: 829 kWh/Tonne (HHV of 13.8)	840 kWh/Tonne at 13.7 MJ/kg	846 kWh/Tonne at 13.8 MJ/kg	Pass	Pass	
Residue Quality	Unburned Combustible less than 3%	less than 0.83%	less than 0.83%	Pass	Pass	
	Moisture less than the 25%	averaged 16.7%	averaged 16.7%	Pass	Pass	
Residue Quantity	HHV of 13,359 kJ/kg 30- days: maximum of 29.4%	quantity was 26.7%	quantity was 31.87%	Fail	Fail	
	HHV of 13,180 kJ/kg 5 – days: maximum of 29.7%	quantity was 26.8%	quantity was 29.9%	Fail	Fail	
Metals Recovery	Ferrous : 80% by weight	87.7% by weight	83.0% by weight	Pass	Pass	
	Non-ferrous: 60% by weight	84.7% by weight	84.7% by weight	Pass	Pass	

Durham York Energy Centre - Acceptance Test Table (Attachment #2)

Test	Regulatory Requirement	Covanta	HDR Observations	MOECC Compliance Assessment	Owners' Technical Recommendation	Comments
Environmental Compliance						
Source Test	Meet the ECA requirements	Passed all parameters after the retesting for dioxins and furans	Test conducted in accordance with the approved Pre-Test Plan			
CEMS	ECA Schedule C parameters and limits	Passed all compliance parameters	Two CO excursions Root Cause Analysis reviewed along with corrective action	CO is an operational limit and not compliance	Pass	CO excursions were dealt with at the time of occurrence
Odour	Acceptable range of 0.020 to 0.080 ppm	Detection threshold for n-butanol of 0.053 ppm	Followed procedures in the Odour Monitoring and Mitigation Plan			
Noise	Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (urban)	Receptor based and up-close measurements and subjective observations indicate compliance with the sound level limits	Followed procedures in the Noise Monitoring and Reporting Plan			
Ash	Bottom: less than 10% by weight Combustible materials Fly: TCLP analysis included the 88 listed organic compounds and metals	Loss of Ignition testing: 2.85% All 88 analytes were below their corresponding regulatory thresholds	Followed procedures in the Ash Testing Protocol			

Item #5

**No Copy in
Agenda File.**

Item #6



Privileged and Confidential

Memorandum

TO: **L. McDowell, Director, Environmental Promotion and Protection, The Regional Municipality of York**

M. Januszkiewicz, Director, Waste Management Services, The Regional Municipality of Durham

FROM: **Luis Carvalho, Senior Project Manager, Capital Planning and Delivery, The Regional Municipality of York**

Gioseph Anello, Manager, Waste Planning and Technical Services, The Regional Municipality of Durham

DATE: **December 18, 2015**

RE: **Durham York Energy Centre (DYEC) – Acceptance Test Supplemental Report**

The Technical team can now complete the assessment of the Environmental Compliance Test results given that the Ministry of the Environment and Climate Change (MOECC) has determined the status of compliance for each of the following tests:

- a. Source Test;
- b. Odour Test;
- c. Noise Test; and
- d. Residue Quality;
 - i. Bottom Ash Combustibility
 - ii. Fly Ash Toxicity characteristic leaching procedure (TCLP)

The Environmental Compliance Tests dealt with all emission and operating parameters in accordance with the requirements established by the ECA. The MOECC has received the test documentation that deals with the Source Test, Odour Test, Noise Test, and Residue Quality Test (bottom ash combustibility and fly ash TCLP). The Residue Quality Test report was revised and resubmitted to the MOECC on December 16, 2015.

There are several MOECC observations that do not affect compliance status but do require further clarification and follow-up;

- a. The combustion temperature assessment appears to have been conducted on non-correlated data and therefore needs to be reviewed;

- b. The stack flow rates for the Odour modeling demonstrate the worst case scenario and not the actual flow rates. We will request MOECC confirmation that the protocol was followed as approved; and
- c. Discussion with the MOECC Technical Standards Section will be undertaken to clarify the contents of the long term sampling system for dioxins and furans which must be in place prior to the next regulatory source test.
- d. The MOECC memo states that “The emission measurements were conducted satisfactorily ... following the pre-test plan prepared by ORTECH ... approved by the Technology Standards Section on 2014/10/31.” Earlier in the memo, and consistent with the approved pre-test plan, MOECC indicates that OSTC Method ON-5 was used for TSP, OSTC Method ON-7 was used for PM_{2.5}/PM₁₀, and US EPA 40CFR60 Method 13B was used for HF. However, the ORTECH Compliance Report indicates that US EPA Method 26A was used for TSP and halides (i.e., HF) and that US Method 201A was used for PM_{2.5}/PM₁₀.

As illustrated in the attached Table (Attachment #1), it is the technical team’s conclusion that the Facility has met all the environmental compliance requirements. HDR and the Owners observed the conduct of these tests and reviewed the results as they related to the Project Agreement and the approved Pre-Test Plan.

The MOECC has determined that the DYEC has met the regulatory requirements and therefore can operate in compliance with its Environmental Compliance Approval (ECA) limits.

Sincerely,

Gioseph Anello, M.Eng., P.Eng., PMP
Manager, Waste Planning and
Technical Services
Works Department
Department
The Regional Municipality of Durham
905.668.7711 ext. 3445
Gioseph.Anello@durham.ca

Luis Carvalho, M.Sc., P.Eng., PMP
Senior Project Manager
Capital Planning & Delivery Branch
Environmental Services

The Regional Municipality of York
905.830.4444 ext. 75015
Luis.Carvalho@york.ca

Encl.

Durham York Energy Centre - Acceptance Test Table (Attachment #1)

Test	Regulatory Requirement	Covanta	HDR Observations	MOECC Compliance Assessment	Owners' Technical Recommendation	Comments
Environmental Compliance						
Source Test	Meet the ECA requirements	Passed all parameters after the retesting for dioxins and furans	Test conducted in accordance with the approved Pre-Test Plan	MOECC letter dated December 15, 2015 Pass	Pass	Capable of operating in compliance with ECA limits
CEMS	ECA Schedule C parameters and limits	Passed all compliance parameters	Two CO excursions Root Cause Analysis reviewed along with corrective action	CO is an operational limit and not a compliance limit	Pass	CO excursions were dealt with at the time of occurrence
Odour	Acceptable range of 0.020 to 0.080 ppm	Detection threshold for n-butanol of 0.053 ppm	Followed procedures in the Odour Monitoring and Mitigation Plan	MOECC letter dated December 15, 2015 Pass	Pass	Compliant with Reg. 419/05 including ECA odour limit
Noise	Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (urban)	Receptor based and up-close measurements and subjective observations indicate compliance with the sound level limits	Followed procedures in the Noise Monitoring and Reporting Plan	MOECC letter dated December 11, 2015 Pass	Pass	Report confirms that sound levels from operation are in compliance
Ash	Bottom: less than 10% by weight Combustible materials Fly: TCLP analysis included the 88 listed organic compounds and metals	Loss of Ignition testing: 2.85% All 88 analytes were below their corresponding regulatory thresholds	Followed procedures in the Ash Testing Protocol	MOECC letter dated December 17, 2015 Pass	Pass	Ash testing report is acceptable to the MOECC



Interoffice Memorandum

Date: November 10, 2016

To: Committee of the Whole

From: Dr. Robert Kyle

Subject: Health Information Update – November 4, 2016

Health
Department

Please find attached the latest links to health information from the Health Department and other key sources that you may find of interest. Links may need to be copied and pasted directly in your web browser to open, including the link below.

You may also wish to browse the online Health Department Reference Manual available at [Health Department Reference Manual](#), which is continually updated.

In addition, we have attached the following documents:

- Influenza Vaccine Now Available for High Risk Clients Only (Oct 12)
- Naloxone Distribution (Oct 13)
- Central East LHIN Welcomes New Board Chair (Oct 18)
- Immunization Notices are Near for the 2016/17 School Year! (Oct 19)
- Reminder: Concussion Workshop (Oct 20)
- Influenza vaccine is now available for ordering! (Oct 24)
- Pharmacy Flu... What's New? (Oct 24)
- Monthly Vaccine Order Form Now Includes Shingles Vaccine (Oct 26)
- Fall Back... Change your Batteries (Nov 1)

Boards of health are required to “superintend, provide or ensure the provision of the health programs and services required by the [Health Protection and Promotion] Act and the regulations to the persons who reside in the health unit served by the board” (section 4, clause a, HPPA). In addition, medical officers of health are required to “[report] directly to the board of health on issues relating to public health concerns and to public health programs and services under this or any other Act” (sub-section 67.(1), HPPA). Accordingly, the Health Information Update is a component of the Health Department’s ‘Accountability Framework’, which also may include program and other reports, Health Plans, Quality Enhancement Plans, Durham Health Check-Ups, Performance Reports, business plans and budgets; provincial performance indicators and targets, monitoring, compliance audits and assessments; RDPS certification; and accreditation by Accreditation Canada.

Respectfully submitted,

original signed by

R.J. Kyle, BSc, MD, MHSc, CCFP, FRCPC, FACPM
Commissioner & Medical Officer of Health

UPDATES FOR COMMITTEE OF THE WHOLE
November 4, 2016

Health Department Media Releases/Advisories/Publications

<https://goo.gl/SulAdR>

- Health Department reminds residents and businesses near nuclear generating stations to obtain supply of KI pills (Oct 12)

<https://goo.gl/iz72mp>

- Help “break the chain of transmission” during National Infection Control Week – Oct. 17 to 21 (Oct 17)

<https://goo.gl/0Uckak>

- Grade 5 Action Pass returns for the 2016-17 school year (Oct 25)

<https://goo.gl/JOsnsL>

- Keep you and your family healthy this flu season by getting your flu shot (Oct 28)

<https://goo.gl/Og7qmx>

- Groundbreaking ceremony to be held for new Sunderland Paramedic Response Station (Nov 1)

FAX Abouts (attached)

- Influenza Vaccine Now Available for High Risk Clients Only (Oct 12)
- Naloxone Distribution (Oct 13)
- Immunization Notices are Near for the 2016/17 School Year! (Oct 19)
- Reminder: Concussion Workshop (Oct 20)
- Influenza vaccine is now available for ordering! (Oct 24)
- Pharmacy Flu... What's New? (Oct 24)
- Monthly Vaccine Order Form Now Includes Shingles Vaccine (Oct 26)
- Fall Back... Change your Batteries (Nov 1)

GOVERNMENT OF CANADA

Employment and Social Development Canada

<https://goo.gl/IKObHX>

- Government of Canada announces new Canada Pension Plan Disability service standards (Oct 31)

Environment and Climate Change Canada

<https://goo.gl/cCfsa>

- Canada and the world agree to phase down the world's fastest growing source of greenhouse gas emissions (Oct 15)

Finance Canada

<https://goo.gl/yqiVd1>

- Minister Morneau Updates Plan for Middle Class Progress (Nov 1)

Health Canada

<https://goo.gl/ms9zfq>

- Government of Canada Announces Mental Wellness Help Line for Indigenous Peoples (Oct 17)

<https://goo.gl/jAKhgF>

- Government takes action to develop national guidelines for concussion management (Oct 20)

<https://goo.gl/lmcG3r>

- Minister of Health announces revision of the Food Guide, Healthy Eating initiatives, as part of a vision for a healthy Canada (Oct 24)

<https://goo.gl/U9sshH>

- Statement from the Minister of Health on Corded Window Coverings (Oct 31)

<https://goo.gl/xK0E5M>

- Government of Canada moves forward with proposal to ban menthol in tobacco products (Nov 4)

Public Health Agency of Canada

<https://goo.gl/SS2EuT>

- Statement from the Chief Public Health Officer of Canada (Oct 21)

<https://goo.gl/QqDBmF>

- Minister of Health announces Social Impact Bond for heart and stroke health (Oct 28)

<https://goo.gl/eibsmN>

- Teach your kids how to avoid the flu (Nov 2)

Public Safety Canada

<https://goo.gl/y3TGCo>

- Statement by Public Safety Minister Ralph Goodale on the ruling of the Federal Court of Canada, published November 3, 2016, with respect to the Canadian Security Intelligence Service (CSIS) and the handling of “associated data”

Transport Canada

<https://goo.gl/MZ9IGX>

- Increasing safety of Canadians by investing in rail improvements (Oct 12)

<https://goo.gl/HtCh9Q>

- Minister Garneau gives Canadians Halloween treat that improves road safety (Oct 31)

<https://goo.gl/EeO8cl>

- Minister Garneau responds to Transportation Safety Board of Canada's Watchlist (Oct 31)

<https://goo.gl/OBPekk>

- Transport Minister delivers on promise to accelerate removal of legacy DOT-111 tank cars from crude oil transport (Oct 31)

<https://goo.gl/CG7HQQ>

- Minister Garneau presents his strategy for the future of transportation in Canada: Transportation 2030 (Nov 3)

GOVERNMENT OF ONTARIO

Office of the Premier

<https://goo.gl/PHWZPG>

- Ontario and Québec Working Together to Drive Economic Growth (Oct 21)

Ontario Ministry of Community Safety and Correctional Services

<https://goo.gl/1cgPdk>

- Province Marks Fire Prevention Week (Oct 11)

<https://goo.gl/UebTuc>

- Protect Your Family From Carbon Monoxide (Nov 1)

Ontario Ministry of Education

<https://goo.gl/hSylcw>

- Ontario Building New and Improved Durham Schools (Oct 28)

Ontario Ministry of Energy

<https://goo.gl/e3sFyp>

- Help Develop Ontario's Long-Term Energy Plan (Oct 13)

<https://goo.gl/XlpYuw>

- Nuclear Refurbishment Begins At Darlington Generating Station (Oct 14)

Ontario Ministry of the Environment and Climate Change

<https://goo.gl/pAXqiC>

- Ontario Taking Action to Protect Clean Water (Oct 17)

Ontario Ministry of Health and Long-Term Care

<https://goo.gl/f81fk0>

- Ontario Taking Action to Prevent Opioid Abuse (Oct 12)

<https://goo.gl/iUM6cO>

- Province Increasing Access to Primary Care for Ontario Families (Oct 14)

<https://goo.gl/SSV32k>

- Free Flu Vaccine Available Across Ontario (Oct 24)

<https://goo.gl/tF4CXt>

- Ontario Establishing Patient and Family Advisory Council (Oct 26)

Ontario Ministry of Housing

<https://goo.gl/oV0ygi>

- Province Combating Homelessness in Ontario Communities (Nov 2)

Ontario Ministry of Transportation

<https://goo.gl/2PrQxN>

- Stay Safe on the Roads This Winter (Oct 11)

<https://goo.gl/rwORqA>

- Keep the Roads Safe for Trick-Or-Treaters (Oct 28)

<https://goo.gl/Glbvd6>

- Province Improving Public Transit in Communities Across Ontario (Nov 2)

OTHER ORGANIZATIONS

Canada Health Infoway

<https://goo.gl/2mJgFt>

- Majority of Canada's Clinicians Using Electronic Health Records (Oct 13)

Canadian Cancer Society

<https://goo.gl/3HW211>

- HPV not just a threat to women: mouth and throat cancers rising sharply in men (Oct 19)

Canadian Institutes of Health Research

<https://goo.gl/6bRUoi>

- Building a healthier future for First Nations, Inuit and Métis peoples (Nov 4)

Cancer Care Ontario

<https://goo.gl/2mJgFt>

- A simple Pap test can help prevent cervical cancer (Oct 17)

<https://goo.gl/mDajDu>

- New report highlights opportunities to improve cancer prevention across various sectors in Ontario (Oct 18)

Central East LHIN (attached)

- Central East LHIN Welcomes New Board Chair (Oct 18)

Conference Board of Canada

<https://goo.gl/lyTzve>

- Canada is ill-prepared to keep an aging population moving (Oct 19)

<https://goo.gl/BK5nmi>

- A 20 per cent reduction in calories consumed from beverages by 2025 will require effort (Oct 24)

Health Quality Ontario

<https://goo.gl/Co8wTo>

- In its annual review of Ontario's health system, Health Quality Ontario reveals a new perspective on quality care for all (Oct 13)

National Energy Board

<https://goo.gl/GxO8iL>

- National Energy Board evaluates full scale emergency exercise in Kingston, Ontario (Oct 13)

<https://goo.gl/1Unm7c>

- NEB releases new report on Canada's renewable power landscape (Oct 14)

Office of the Environmental Commissioner of Ontario

<https://goo.gl/IRF0qU>

- Urgent Attention Needed to Protect Wildlife and Combat Invasive Species, Reports Ontario's Environmental Commissioner (Oct 26)

Office the Parliamentary Budget Officer of Canada

<https://goo.gl/QgFXm7>

- Legalized Cannabis: Fiscal Considerations (Nov 1)

Ombudsman Ontario

<https://goo.gl/OuwjbZ>

- Ombudsman Reports on First Year of Expanded Mandate; Pledges Continued Effectiveness as Agent of Positive Change Annual Report 2015-2016 (Nov 2)

Ontario Power Generation

<https://goo.gl/QAeb4a>

- OPG starts work on Canada's largest clean energy project (Oct 14)

ParticipACTION

<https://goo.gl/M0jYmu>

- Let's create the ParticipACTION 150 Play List (Oct 12)

Public Health Ontario

<https://goo.gl/IDi9e4>

- PHO Connections (Oct 2016)



Influenza Vaccine Now Available for High Risk Clients Only

Influenza vaccine can now be ordered for **high risk clients only**. High risk clients include:

- **persons at high risk of influenza-related complications or more likely to require hospitalization** (e.g., young children under five years of age, individuals with neurologic or neurodevelopmental conditions, children and adolescents undergoing treatment with acetylsalicylic acid for long periods, adults 65 years of age and older, individuals of any age who are residents in long-term care home or other chronic facilities, individuals with underlying health conditions, pregnant women and indigenous peoples);
- **persons capable of transmitting influenza to those at high risk** (e.g., healthcare workers, household contacts of those at high risk and persons who provide child care to kids less than five years of age); and
- swine and poultry industry workers.

Submit your completed order form (attached) and your temperature logs with at least **7 days of temperatures between +2°C and +8°C**. Keep in mind the **size of your fridge** when ordering vaccine. Please allow **4 business days** for orders to be processed before picking up influenza vaccine. Subsequent orders of influenza vaccine require a copy of your **vaccine fridge temperature logs since the date of the previous order**. You must indicate on the order form the quantity of influenza vaccine needed for your **high risk clients only**. As per the Ontario Ministry of Health and Long-Term Care, influenza immunization of the general population **will begin in late October**, at which time **additional** influenza vaccine orders can be placed. A subsequent FAX About will be sent to indicate when healthcare providers can start ordering for the general population. The publicly funded influenza vaccines available through Ontario's Universal Influenza Immunization Program (UIIP) for **2016-2017** are:

Influenza Vaccine	Vaccine Formulation	Package Description	Route of Administration	Equipment Needed	Eligibility	Notes
Agriflu® (Novartis)	TIV*	Multi-dose vial	IM Injection	Syringes with needles	6 months and older***	Discard open multi-dose vials after 28 days
Fluviral® (GSK)	TIV*	Multi-dose vial	IM Injection	Syringes with needles	6 months and older***	Discard open multi-dose vials after 28 days
Influvac® (BGP Pharma ULC)	TIV*	Single dose pre-filled syringe with luer tip	IM Injection	Needles	18 years and older	
Fluad® (Novartis)	TIV* (adjuvanted)	Single dose syringes	IM Injection	Needles	65 years and older who reside in a long-term care home	
FluLaval Tetra® (GSK)	QIV**	Multi-dose vial	IM Injection	Syringes with needles	6 months through 17 years	Discard open multi-dose vials after 28 days
Fluzone® Quadrivalent (Sanofi Pasteur)	QIV**	Multi-dose vial	IM Injection	Syringes with needles	6 months through 17 years^^	Up to expiry date indicated on vial label

* TIV=trivalent influenza vaccine

** QIV=quadrivalent influenza vaccine

*** Unless specifically requested the TIVs are primarily targeted to adults 18 years of age and older.

^^ Nominal supply of thimerosal free, single-dose prefilled syringe of Fluzone quadrivalent vaccine is available for children aged 6 months to 17 years who have known thimerosal allergies.

To access the product monographs for the publicly funded influenza vaccine, please visit the manufacturer websites:

Publicly Funded Influenza Vaccine	Influenza Vaccine Manufacturer	Manufacturer Web Link for Product Monograph
Influvac® (TIV)	BGP Pharma	www.mylan.ca
Agriflu® (TIV) Fluad® (TIV-adjuvanted)	Novartis Canada	www.novartis.ca
Fluviral® (TIV) FluLaval Tetra® (QIV)	GlaxoSmithKline Inc.	www.gsk.ca
Fluzone Quadrivalent® (QIV)	Sanofi Pasteur	www.sanofipasteur.ca

The 2016/2017 UIIP implementation information is posted on the Ministry website (ontario.ca/influenza).

For more information visit: DurhamMD.ca user id: drhd; password: health.

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 12, 2016



FAX about ...



Naloxone Distribution

Did you know?

- Use of opioids to treat chronic pain has **risen** significantly in recent years, leading to an **increase** in abuse, misuse and addiction.
- Opioid prescribing rates in Durham Region for patients of the Ontario Public Drug Program **increased 36%** in patients ages 15 to 64 and **increased 7%** in patients ages 65 and older between 2006-2010 and 2011-2013.
- Visits to Durham Region emergency departments for opioid and other prescription drug misuse **increased** from **228 visits** in 2003 to **440 visits** in 2015.
- Between 2005 and 2014 an average of **28 deaths per year** were attributed to drug toxicity in Durham Region residents.
- Distribution of naloxone has been shown to **reverse opiate overdoses** and allows time for emergency medical response.

As of June 24, 2016, pharmacists in Ontario are allowed to **provide naloxone without a prescription** and **at no cost** to eligible Ontarians. Pharmacies can submit claims through the Health Network System subject to their compliance with the Ministry's policy.

Who is eligible?

- Those who are currently **using opioids**
- Past opioid users **at risk** of **returning** to opioid use
- Family members, friends or others in a position to **assist a person at risk** of opioid overdose

While naloxone no longer requires a prescription, distribution of the drug still requires the **intervention of a pharmacist**. Given that naloxone is administered intramuscularly, training from a pharmacist on how to **properly inject the drug** is necessary.

The Ontario Pharmacists Association has developed a ***Take-Home Naloxone in Community Pharmacies*** online learning module. This module provides education on naloxone in the treatment of opioid overdose and assists with educating patients and/or patient representatives on this life-saving drug. **There are no pre-requisites for this module.**

To access the online module and additional resources for naloxone distribution, please visit:

<https://www.opatoday.com/professional/resources/for-pharmacists/tools-and-forms/naloxone>

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 14, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613

CENTRAL EAST LHIN WELCOMES NEW BOARD CHAIR Louis O'Brien appointed by Order in Council on October 4th

NEWS

October 18, 2016

The Central East Local Health Integration Network (Central East LHIN) is pleased to announce that Mr. Louis O'Brien has been appointed, through an Order in Council from the Lieutenant Governor, as the Chair of the Board of Directors of the Central East LHIN effective October 4, 2016.

Mr. O'Brien will now serve a three-year term, leading the Board and the LHIN in its continuing mission of leading the advancement of an integrated sustainable health care system that ensures better health, better care and better value.

A resident of Peterborough, Mr. O'Brien was on the Board of the Peterborough Regional Health Centre (June 2012 – September 2016) and most recently served as the Chair of the hospital's Stewardship and Audit Committee. A francophone, his health care governance background also includes serving as Chair of the Board of the former Sisters of Charity of Ottawa (SCO) Health Services (now the Bruyère Continuing Care group) in Ottawa.

With a Bachelor of Engineering degree, an MBA from Queen's University, and the ICD.D accreditation from the Institute of Corporate Directors, Mr. O'Brien's corporate background includes senior roles at Canada Post Corporation (CPC) including Senior Vice President and Chief Customer Officer from 2009 – 2011, Senior Vice President and President of the Parcels Division from 2006 – 2009 and Vice President of Business Transformation and Sourcing Management from 2003 – 2005. His career at CPC began in 1992 after previously serving as VP Corporate Planning for a group of Irving companies based in Moncton, New Brunswick.

Currently a member of the Audit Committee for Canada Border Services Agency, Mr. O'Brien has served on a number of industry boards including Waste Diversion Ontario, SCI Logistics and Purolator Courier Ltd.

QUOTES

"I want to thank Louis O'Brien for taking on this new important leadership role in his LHIN's health system. I look forward to working with him as Ontario's health care system transforms to become more integrated and patient-focused."

- Dr. Eric Hoskins, Minister of Health and Long-Term Care

“I am honoured to have been appointed as the Chair of the Central East LHIN Board of Directors. My role will be to ensure that we continue to advance integrated systems of care to help local residents live healthier at home. Working with health service providers, physicians, nurses, community leaders and other organizations, the LHIN continues to ensure that the health care system is effectively managed.”

- Louis O’Brien, Chair, Central East LHIN Board of Directors

QUICK FACTS

- The role of the LHIN Board of Directors is to oversee, advise on and govern the strategic direction and priorities of the LHIN.
- Directors are appointed by an Order-in-Council through a process administered by the Public Appointment Secretariat for a term of up to three years, and may be appointed for one further term.
- The Chair and the Directors are appointed based on their expertise, experience, leadership skills and the needs of each LHIN. They must also demonstrate an understanding of local health issues, needs and priorities.

LEARN MORE

Please visit the Central East LHIN website – www.centraleastlhin.on.ca and click on “Board and Governance” to learn more about the Central East LHIN Board of Directors.

For more information:
Katie Cronin-Wood
Communications Lead
Central East LHIN
1-866-804-5446 ext. 218
katie.croninwood@lhins.on.ca



Durham MD.ca

FAX *about...*

HEALTH DEPARTMENT

Immunization Notices are Near for the 2016/2017 School Year!

The *Immunization of School Pupils Act* requires that students attending school be immunized as per the **Ontario's Publicly Funded Immunization Schedule** against the following diseases:

- Tetanus, diphtheria, pertussis, polio
- Measles, mumps, rubella
- Meningococcal Group C
- Meningococcal Group ACYW-135 (i.e., Menactra)
- Varicella

--	Notices sent home	Suspension Dates
Secondary Students	November	February - March
Elementary Students	December	March - May

Please consider:

- **Ordering additional vaccine** to prepare for increased immunization requests
- **Reminding parents to report updates** to the Health Department (use DRHD tear-offs)
- If a child cannot receive immunization(s) for medical reasons, a medical exemption must be completed using a *Statement of Medical Exemption – Immunization of School Pupils Act*.

Most Common Reasons Parents Receive Notice:

- MMR, Varicella and Men-C-C was given **prior to** the 1st birthday
- 4-6 year booster Tdap-IPV, was given **prior to** the 4th birthday
- Student over 7 years old and **no record** of 4-6 year boosters (Tdap-IPV & MMRV)
- Two live vaccines were given **less than 28 days** apart (e.g., Varicella, MMR)
- High school student has **not received** 14-16 year booster (Tdap)
- Student did not receive vaccines according to **Ontario's Publicly Funded Immunization Schedule** (e.g., foreign/out of province record)

All forms and immunization schedules can be found on DurhamMD.ca

User ID: drhd; **Password:** health



FAX about ...



Reminder: Concussion Workshop

Concussions are on the rise and often occur in youth that are engaged in sports such as hockey, football, lacrosse, rugby and soccer. In Durham Region, the rate of concussion-related emergency room visits has been increasing since 2010 (Durham Health Department, 2016). Physicians have a key role to play in the prevention, diagnosis, treatment and management of concussions, and in the implementation of Ontario Policy/Program Memorandum No. 158 – School Board Policies on Concussion.

To support physicians, the following workshop will be held on Friday November 18, 2016, 7.30am -12noon at Deer Creek Golf & Banquet Facility, Ajax.

Heads Up 2016-Concussion 101: What Health Care Providers Need to Know

This continuing education event has been designated as a University of Toronto Accredited event and awarded with the following credits:

The College of Family Physicians of Canada – 3.5 Mainpro-M1 credits

and

Royal College of Physicians & Surgeons of Canada – 3.5 Section 1 credits

- See attached invitation and registration form

Registration for this education workshop is open to **all primary allied healthcare providers.**

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 20, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613.



FAX about ...



Influenza vaccine is now available for ordering!

The official launch of the 2016/2017 Universal Influenza Immunization Program (UIIP) will be the week of October 24, 2016. As in previous years, **high priority groups** should be immunized first followed by the general public. The high priority groups include: persons at **high risk of influenza-related complications** or **more likely to require hospitalization** and persons capable of **transmitting influenza to those at high risk**.

The Durham Region Health Department receives deliveries of flu vaccine from the Ontario Government Pharmacy in several shipments, therefore you may receive any of the publicly funded trivalent (TIV) and quadrivalent (QIV) influenza vaccines based on supply. FluMist[®] will also be released based on supply; it may be substituted with an alternative QIV.

Submit your completed order form (attached) and your temperature logs ensuring temperatures are between +2°C and +8°C.

- Orders submitted prior to receiving this Fax About will need to be resubmitted with temperature logs.
- Keep in mind the size of your fridge when ordering vaccine (order no more than one month's supply).
- Please allow 4 business days for orders to be processed before picking up influenza vaccine.
- Subsequent orders of influenza vaccine require a copy of your vaccine fridge temperature logs since the date of the previous order (see order form attached).

If you have not received the UIIP Implementation Package please visit <http://www.health.gov.on.ca/en/pro/programs/publichealth/flu/uiip/>

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 24, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613

The publicly funded influenza vaccines, available through the UIIP for 2016-2017 are:

	Agriflu® / Fluviral®	Influvac®	FluLaval Tetra® / Fluzone Quadrivalent®	Flumist® Quadrivalent
Influenza Vaccine Formulation	Trivalent inactivated vaccine (TIV)	Trivalent inactivated vaccine (TIV)	Quadrivalent inactivated vaccine (QIV)	Quadrivalent live attenuated vaccine (Q-LAIV)
Dosage	0.5mL	0.5mL	0.5mL	0.2mL (0.1mL in each nostril)
Route of Administration	Intramuscular Injection	Intramuscular Injection	Intramuscular Injection	Intranasal spray
Eligibility (see "Vaccines for Specific Age Groups" below)	6 months and older*	18 years and older	6 months through 17 years	2 through 17 years**
Package Description	Multi-dose vial	Single dose syringe	Multi-dose vial, single dose prefilled^	Single dose glass sprayer
Equipment needed	Syringes with needles	Needles	Syringes with needles	n/a
Once punctured, discard vial after	28 days	n/a	FluLaval: 28 days Fluzone: expiry date indicated on vial	n/a

*Unless specifically requested, TIVs are primarily targeted to adults 18 years of age and older.

**Flumist® is no longer preferentially recommended in children

^Nominal supply of thimerosal free, single-dose prefilled syringe of Fluzone Quadrivalent vaccine is available for children aged 6 months to 17 years who have known thimerosal allergies.

For further information on flu vaccine, such as the flu vaccine order form, product monographs, National Advisory Committee on Immunization (NACI) statement and Ministry of Health and Long Term Care documents, please visit DurhamMD.ca user id: drhd; password: health.

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 24, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613



FAX about ...



Pharmacy Flu...What's New?

The official launch of the 2016/2017 Universal Influenza Immunization Program (UIIP) will be the week of October 24, 2016. As in previous years, **high priority groups** should be immunized first followed by the general public. The high priority groups include: persons at **high risk of influenza-related complications** or more **likely to require hospitalization** and persons capable of **transmitting influenza to those at high risk**. Please note as in previous years, **trained pharmacists can only administer publicly funded vaccine to individuals five years of age and older**. Please refer clients 5 years of age and younger to their health care provider or the Health Department.

To increase the efficiency of Ontario's vaccine distribution system, the Ministry of Health and Long Term Care (MOHLTC) has implemented a **one-year third-party influenza vaccine distribution pilot** for pharmacies. During this distribution pilot, the 35 public health units that are located outside of Toronto **will not be distributing** publicly funded influenza vaccine to their approved participating pharmacies. Pharmacies will order and receive vaccine **directly from their wholesale distributor**.

Starting on November 7th, all pharmacies will be required to **submit temperature logs each month throughout the entire influenza season to the Health Department** based on the following schedule:

First Monday of the month – Ajax/Pickering Pharmacies

Second Monday of the month – Clarington/North Pharmacies

Third Monday of the month – Whitby Pharmacies

Fourth Monday of the month – Oshawa Pharmacies

Submit your temperature logs via fax to the Durham Region Health Department at 905- 666-6214 ensuring temperatures are between +2°C and +8°C.

- Keep in mind the size of your fridge when ordering vaccine (order no more than one month's supply)
- Please continue to report all cold chain failures to the Health Department

If temperature logs are not received on the date specified, vaccine distribution will be suspended until the required submissions are received. The Health Department **will not** notify pharmacies of the suspensions.

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 24, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613

Please note that during this pilot DRHD nurses will be completing drop in visit(s) to ensure compliance with the Vaccine Storage and Handling Guidelines (current).

If you have not received the UIIP Implementation Package please visit:
<http://www.health.gov.on.ca/en/pro/programs/publichealth/flu/uiip/>

The publicly funded influenza vaccines, available through the UIIP for 2016-2017 are:

	Agriflu® / Fluviral®	Influvac®	FluLaval Tetra® / Fluzone Quadrivalent®	Flumist® Quadrivalent
Influenza Vaccine Formulation	Trivalent inactivated vaccine (TIV)	Trivalent inactivated vaccine (TIV)	Quadrivalent inactivated vaccine (QIV)	Quadrivalent live attenuated vaccine (Q-LAIV)
Dosage	0.5mL	0.5mL	0.5mL	0.2mL (0.1mL in each nostril)
Route of Administration	Intramuscular Injection	Intramuscular Injection	Intramuscular Injection	Intranasal spray
Eligibility (see "Vaccines for Specific Age Groups" below)	6 months and older*	18 years and older	6 months through 17 years	2 through 17 years**
Package Description	Multi-dose vial	Single dose syringe	Multi-dose vial, single dose prefilled [^]	Single dose glass sprayer
Equipment needed	Syringes with needles	Needles	Syringes with needles	n/a
Once punctured, discard vial after	28 days	n/a	FluLaval: 28 days Fluzone: expiry date indicated on vial	n/a

*Unless specifically requested, TIVs are primarily targeted to adults 18 years of age and older.

**Flumist® is no longer preferentially recommended in children

[^]Nominal supply of thimerosal free, single-dose prefilled syringe of Fluzone Quadrivalent vaccine is available for children aged 6 months to 17 years who have known thimerosal allergies.

For Vaccine Storage and Handling issues i.e. cold chain failures, VSH questions call 905-668-7711 ext. 3063

For General Inquires: Durham Health Connection Line 1-800-841-2729 or 905-666-6241

For more VSH information visit DurhamMD at www.durhammd.ca: user id: drhd; password: health

Durham Region Health Department: 905-668-7711, 1-800-841-2729

October 24, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613



FAX about ...



Monthly Vaccine Order Form Now Includes Shingles Vaccine

The Durham Region Health Department will no longer be releasing shingles vaccine through the special release process. The shingles vaccine can **now be ordered through the routine monthly vaccine order form.**

Through the Shingles Immunization Program, **a single dose of Zostavax® II vaccine is publicly funded in Ontario for:**

- 1) Seniors between 65 to 70 years of age** (i.e., up to the day prior to the 71st birthday)
- 2) On a one-time basis, until December 31, 2016, individuals born in 1945** (i.e., those who are already 71 or will be turning 71 in 2016) will also be eligible to receive the publicly funded Shingles vaccine. Note: This is to ensure that those who are at or close to the upper age eligibility cut-off have sufficient time to access the vaccine.

The updated monthly vaccine order form is now available on durhammd.ca **user name: drhd; password: health.** Please ensure when submitting vaccine order, the most current order form is used. Please note there is a **10 business day turn-around time for processing monthly vaccine orders.** Please continue to order only a one month's supply of vaccine.

Thank you for your support in helping to keep Durham healthy! Please call the Durham Region Health Department for inquires and/or assistance.

For General Inquires: Durham Health Connection Line 1-800-841-2729 or 905-666-6241

For Vaccine Storage and Handling (VSH) issues: call 905-668-7711 ext. 3063

For more VSH information: visit durhammd.ca (user id: drhd; password: health)

Durham Region Health Department: 905-668-7711, 1-800-841-2729

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613

October 26, 2016



FAX about ...



Fall Back...Change your batteries!

Your fridge thermometer and back-up cooler thermometer should have their batteries changed every 6 months. An easy way to remember this is to change your battery at each day light savings time change.

Be Prepared for Power Disruptions!

Make sure you are prepared by following the steps below:



- 1) Have a contingency plan in place in case of a building wide power outage or fridge failure
- 2) Have back up coolers (large enough to hold your vaccine supply), ice packs (store in a freezer), water blankets and thermometer ready to go
- 3) Only keep one month supply of vaccine on hand to prevent wastage if power failure occurs
- 4) Call the Durham Region Health Department immediately if your fridge temperature goes outside of +2 or above 8 °C.

Remember coolers may only hold their temperature for 3 to 4 hours, if vaccines need to be stored longer than this find another monitored fridge to store them in.

For Vaccine Storage and Handling issues i.e. cold chain failures, VSH questions call 905-668-7711 ext. 3063

For General Inquires: Durham Health Connection Line 1-800-841-2729 or 905-666-6241

For more VSH information visit DurhamMD at www.durhammd.ca: user id: drhd; password: health

Durham Region Health Department: 905-668-7711, 1-800-841-2729

November 1, 2016

If you prefer to receive this information in an electronic format please submit your request to healthresources@durham.ca

If you require this information in an accessible format, contact 1-877-777-9613



Interoffice Memorandum

Date: November 10, 2016

To: Committee of the Whole

From: Dr. Robert Kyle

Subject: Snapshot on Harm Reduction Program

Health
Department

In October, 2016, the Durham Region Health Department released Snapshot on Harm Reduction Programming (attached). Harm reduction is “policies, programs and practices that aim to reduce the negative health, social and economic consequences that may ensue from the use of legal and illegal psychoactive drugs, without necessarily reducing drug use.” Key highlights of this new health information product, which pertain to Durham Region, include:

- Opioid prescribing rates increased between 2006-2010 and 2011-2013 in both younger Ontario Public Drug Program beneficiaries ages 15 to 64 years and beneficiaries ages 65 and older.
- The number of emergency department visits per year for opioid prescription drug misuse increased from 228 visits in 2003 to 440 visits in 2015.
- Between 2005 and 2014, there was an average of 28 deaths each year due to drug toxicity.
- An average of 170 new cases of hepatitis C was identified each year between 2011 and 2015.
- In 2015, the Project X-Change needle exchange program reported 538,984 clean needles distributed and 473,564 needles collected.
- In 2015, Project X-Change provided 9,929 counselling sessions representing more than 99% of all client contacts.
- Harm reduction activities include the needle exchange program, opioid patch return program, naloxone distribution and support programs for sex trade workers.

In Ontario, medical officers of health are required to “[report] directly to the board of health on issues relating to public health concerns and to public health programs and services under this or any other Act” (sub-section 67.(1), *Health Protection and Promotion Act*).

Respectfully submitted,

Original signed by

R.J. Kyle, BSc, MD, MHSc, CCFP, FRCPC, FACPM
Commissioner & Medical Officer of Health

SNAPSHOT

on

Harm Reduction Programming



HIGHLIGHTS

- Harm reduction is “policies, programs and practices that aim to reduce the negative health, social and economic consequences that may ensue from the use of legal and illegal psychoactive drugs, without necessarily reducing drug use”.
- Among patients who were active beneficiaries of the Ontario Public Drug Program, opioid prescribing rates in Durham Region increased between 2006-2010 and 2011-2013 in both younger beneficiaries ages 15 to 64 (107.3 to 146.2 per 100,000 beneficiaries; 36% increase) and beneficiaries ages 65 and older (13.0 to 13.9 per 1,000 beneficiaries; 7% increase).
- The number of emergency department visits per year in Durham Region for opioid prescription drug misuse increased from 228 visits in 2003 to 440 visits in 2015.
- Between 2005 and 2014 there was an average of 28 deaths in Durham Region residents each year due to drug toxicity.
- An average of 170 new cases of hepatitis C (a disease commonly associated with injection drug use) were identified each year between 2011 and 2015.
- In 2015, the Project X-Change needle exchange program reported 538,984 clean needles distributed and 473,564 needles collected; a substantial increase since 1997, when the program distributed 6,017 needles and received 6,254 (90 times as many needles distributed and 75 times as many needles received).
- In 2015, Project X-Change provided 9,929 counselling sessions representing more than 99% of all client contacts, more than double the number of sessions in 2005 when there were 4,435 counselling sessions representing 86% of client contacts.
- Harm reduction activities in Durham Region include the needle exchange program, opioid patch return program, naloxone distribution and support programs for sex trade workers.
- Many Durham Region community agencies are involved in harm reduction programming, including Durham Region Health Department, the AIDS Committee of Durham Region, the John Howard Society of Durham Region, Pinewood Centre of Lakeridge Health, Carea Community Health Centre, and the Positive Care Clinic Lakeridge Health.

Table of Contents

Overview	2
Why do we need Harm Reduction?.....	3
Prevalence of Drug Use	3
Health Consequences of Drug Use	4
Incidence of Infectious Diseases	6
Harm Reduction Programs	8
Project X-Change	8
Opioid Patch Return Programs.....	13
Naloxone Distribution	14
HIV Pre-Exposure Prophylaxis	14
Support Programs for Sex Trade ...	
Workers	15
What is Durham Region Health Department Doing?	16
Community Resources in Durham Region	17
Addictions/Substance Use.....	17
HIV/AIDS/Hepatitis C.....	17
Methadone.....	19
Shelters	19
Data Sources & Notes	20
Mortality Data	20
Hospitalization Data.....	20
Ambulatory Care Data	20
Population Estimates & Projections.	20
Project X-Change Data.....	20
Reportable Disease Data	20
Key Resources	21
Documents	21
Websites	21
Appendices.....	22
References	24

Harm reduction is “policies, programs and practices that aim to reduce the negative health, social and economic consequences that may ensue from the use of legal and illegal psychoactive drugs, without necessarily reducing drug use”¹. Harm reduction strategies are a collection of activities and services aimed towards reducing personal, interpersonal, and societal consequences related to drug use.

The personal medical risks associated with drug use include overdose or acquiring blood-borne infections such as HIV or hepatitis C from sharing contaminated drug paraphernalia. In Canada, injection drug use accounts for 17% of all positive HIV reports. According to 2014 national HIV estimates, 20% of HIV-positive people whose infection was attributable to injection drug use remain undiagnosed. This represents an estimated 2,312 people in Canada. Among people who use injection drugs, 11% are living with HIV and 68% either have or have had hepatitis C². Three percent (3%) of Canadians aged 15 years and older report experiencing harm due to their illicit drug use³.

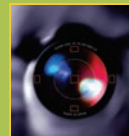
Community and interpersonal consequences occur when discarded contaminated needles infect community members, when criminal activity affects public safety, or when family relationships suffer as a result of drug use. In 2015, there were 1,405 reported or known violations of the Controlled Drugs and Substances Act⁴, and in 2014, there were 17 community complaints of needles found in public spaces across Durham Region⁵.

Harm reduction has been a controversial subject for some as drug use is illegal; however, the reality is that there are substance users all over Canada. One of the defining features of harm reduction is the focus on the prevention of harm, rather than the prevention of drug use itself, and the focus on people who continue to use drugs⁶. Providing access to sterile equipment and proper disposal methods helps decrease the risk of infectious diseases among substance users, their peers, and ultimately the general public.

Types of harm reduction programming include:

- Needle and syringe exchange programs (Project X-Change)
- Opioid patch return programs
- Naloxone distribution
- HIV pre-exposure prophylaxis
- Support programs for sex trade workers
- Safe injection site

Why do we need Harm Reduction?



Harm reduction is one of the most effective tools in addressing the health and social problems related to risky activities⁷. Harm reduction is based on working with the client 'where they are at', while respecting, honouring and supporting their ability to make decisions. One of these decisions may be to use drugs or to engage in other higher-risk behaviours. People become involved in substance use for many social, economic, physical health, mental health, and personal reasons. Drug problems occur along a continuum of risk, ranging from minimal to extreme. It may not be possible to stop someone from using drugs, but the risks associated with their drug use may be reduced using a harm reduction approach. A harm reduction philosophy allows service providers to maintain the same level of availability, quality of service and treatment that they provide to every client without discrimination.

One of the key roles of health and social service providers is to help people live healthier lives. Service providers can recognize that small improvements in a person's health can pave the path for further reductions of drug use and an improved lifestyle.

Harm reduction strategies can effectively reduce the physical, social, and economic consequences of injection drug use, including reducing the transmission of HIV and other blood-borne infections. Harm reduction strategies are also effective in minimizing issues related to other "risky" behaviours, such as other substance use, sexual behaviour, and smoking.

Prevalence of Drug Use

Although there is no specific data on injection drug use in Durham Region, results from the 2011/12 Canadian Community Health Survey show that 11.5% of Durham Region residents 12 years and older reported using an illicit drug in the past 12 months. Results from the Ontario Student Drug Use and Health Survey show that during the 2010-2011 school year, 4% of Durham Region secondary school students reported using cocaine in the last 12 months⁸. During the 2014-15 school year 13% of Durham Region students reported using prescription opioid pain relievers non-medically at least once in the past 12 months⁹. These include pain relief pills such as Percocet®, Percodan®, Tylenol #3®, Demerol®, OxyNeo®, OxyContin®, and Codeine®. Since 2008, the rates of non-medical use of opioid pain relief pills in Durham Region students significantly decreased (20% in 2008). The proportion of elementary students and secondary students who used OxyContin specifically, the proportion that used Attention Deficit/ Hyperactivity Disorder (ADHD) drugs and the proportion who reported using an illegal drug by injection or needle were unreliable and not releasable due to small numbers.

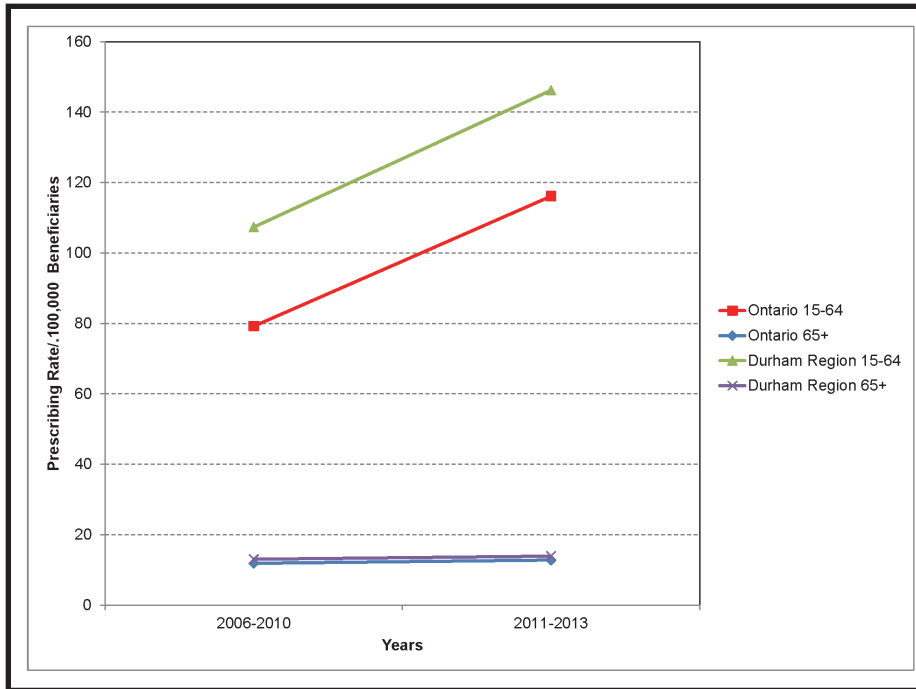
Use of opioids to treat chronic pain has risen significantly in recent years. Provincial studies have shown that rates of opioid prescribing are on the rise¹⁰. The increased prevalence of abuse, misuse, and addiction related to opioids has driven concerns regarding accidental opioid overdoses that may lead to hospitalization for toxicity, and sometimes death. Among patients who were active beneficiaries of the Ontario Public Drug Program, opioid prescribing rates in Durham Region increased between 2006-2010 and 2011-2013 in both younger beneficiaries ages 15 to 64 (107.3 to 146.2 per 100,000 beneficiaries; 36% increase) and older beneficiaries ages 65 and older (13.0 to 13.9 per 1,000 beneficiaries; 7% increase). Prescribing rates were higher in Durham Region than Ontario, especially among younger beneficiaries.





Why do we need Harm Reduction?

Figure 1: Annualized Opioid Prescribing Rates among Public Drug Plan Beneficiaries, Durham Region and Ontario, 2006-2010 to 2011-2013



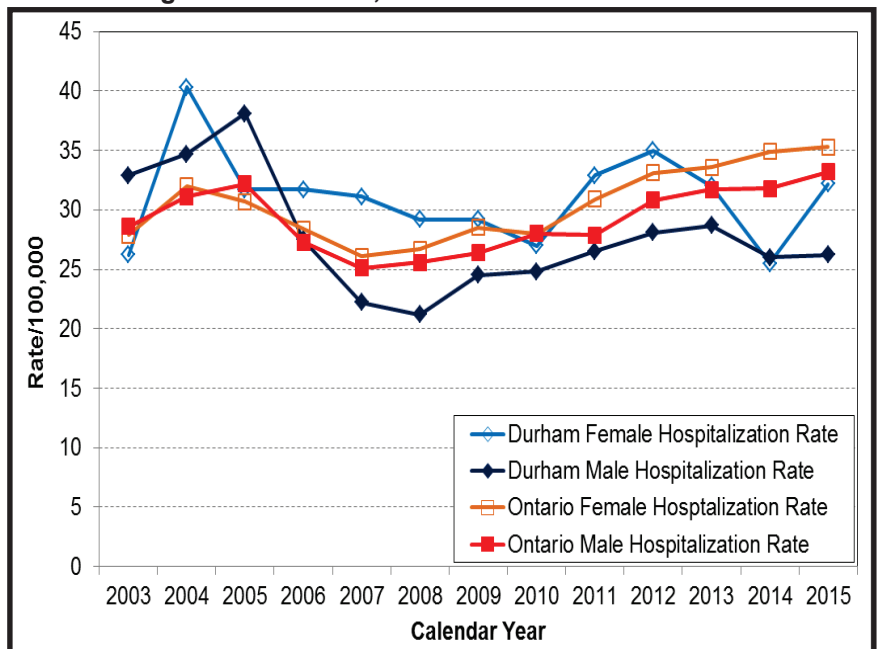
Data Source: Ontario Drug Benefit (ODB) claims database, 2006-2013, Ontario Drug Policy Research Network.

Health Consequences of Drug Use

Opioid Use

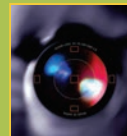
In Durham Region, data shows increases in hospitalizations and emergency department visits due to opioid misuse and deaths due to drug toxicity in the past several years. Between 2003 and 2015 there was an average of 190 hospitalizations each year of Durham Region residents for opioid prescription drug misuse. Hospitalizations varied somewhat year to year but rates have increased among Ontario and Durham Region males and females since 2007.

Figure 2: Hospitalizations for Prescription Drug Misuse - Opioids, Durham Region and Ontario, 2003 to 2015



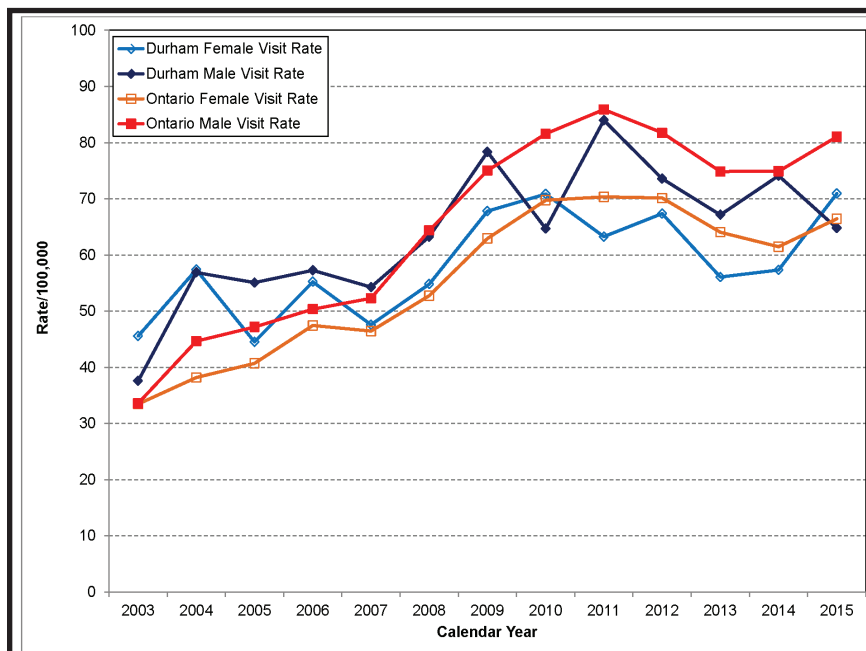
Data Source: Inpatient Discharges 2003-2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario; Ontario Population Estimates 2003-2015, Ontario Ministry of Health and Long-Term Care.

Why do we need Harm Reduction?



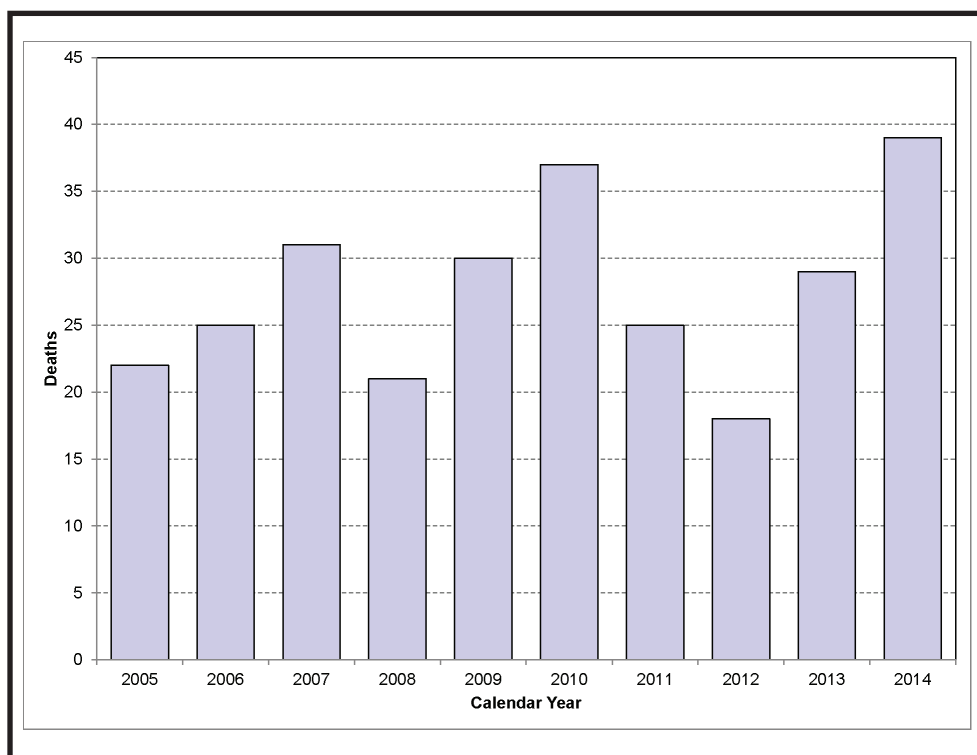
In the same time period there was an average of 370 emergency department visits each year in Durham Region residents for opioid prescription drug misuse. The rate of emergency department visits per year increased from 45.6/100,000 in 2003 (128 visits) to 70.9/100,000 in 2015 (242 visits) among Durham Region females, and increased from 37.6/100,000 in 2003 (100 visits) to 64.8/100,000 in 2015 (198 visits) among Durham Region males. Ontario emergency department visit rates showed similar increases over the same time period and were similar to Durham Region rates in most years.

Figure 3: Emergency Department Visits for Prescription Drug Misuse - Opioids, Durham Region and Ontario, 2003 to 2015



Data Source: Emergency Department Visits 2003-2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario; Ontario Population Estimates 2003-2015, Ontario Ministry of Health and Long-Term Care.

Figure 4: Deaths Due to Drug Toxicity, Durham Region, 2005 to 2014



According to data from the Office of the Chief Coroner, between 2005 and 2014 there was an average of 28 deaths each year due to drug toxicity in Durham Region residents. The number of deaths has fluctuated from year to year in Durham Region with a peak of 39 deaths in 2014.

Data Source: Coroner's Data, 2005-2014, Office of the Chief Coroner for Ontario.



Why do we need Harm Reduction?

Incidence of Infectious Diseases

Injection drug use, defined as recreational/illicit drug use or steroids administered using a syringe and needle pierced through the skin into the body, is captured as a risk factor for a variety of reportable infectious diseases. These diseases include anthrax, botulism, invasive group A streptococcal disease, hepatitis B and C, human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), malaria, meningitis (bacterial, viral and other), invasive meningococcal disease, invasive pneumococcal disease, and tetanus¹¹.

Many of these diseases are not common in Durham Region. Average counts are provided in Table 1.

Hepatitis C and HIV/AIDS are the diseases most commonly associated with injection drug use.

Table 1: Average Annual Count of Reportable Infectious Diseases with Injection Drug Use as a Potential Risk Factor, Durham Region, 2011-2015

Reportable Disease	Average Annual Count
Anthrax	0.0
Botulism	0.0
Group A Streptococcal Disease, Invasive	20.0
Hepatitis B	2.0
Hepatitis C	170.4
HIV/AIDS	10.4
Malaria	7.6
Meningitis, Bacterial	2.3
Meningitis, Viral	8.6
Meningitis, Other	0.2
Meningococcal Disease, Invasive	2.0
Streptococcus pneumonia, Invasive	49.8
Tetanus	0.2

Data Source: integrated Public Health Information System (iPHIS), Durham Region, 1991-2015, Extracted: April 2015.

Hepatitis C

Hepatitis C is a virus which is carried in the blood and attacks the liver¹². Most cases of hepatitis C are reported some months or years following infection since many cases are asymptomatic or have only mild illness with a slow onset of symptoms such as anorexia, vague abdominal discomfort, nausea and vomiting, and fatigue¹³. Hepatitis C is spread when the blood of an infected person gets into the bloodstream of another person, which can occur by using injection drugs and sharing drug-related equipment¹². In Durham Region there was an average of 170 new cases of hepatitis C identified each year between 2011 and 2015. However, most cases of hepatitis C are diagnosed months or years following infection so higher or lower rates can be misleading.



Why do we need Harm Reduction?

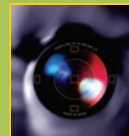
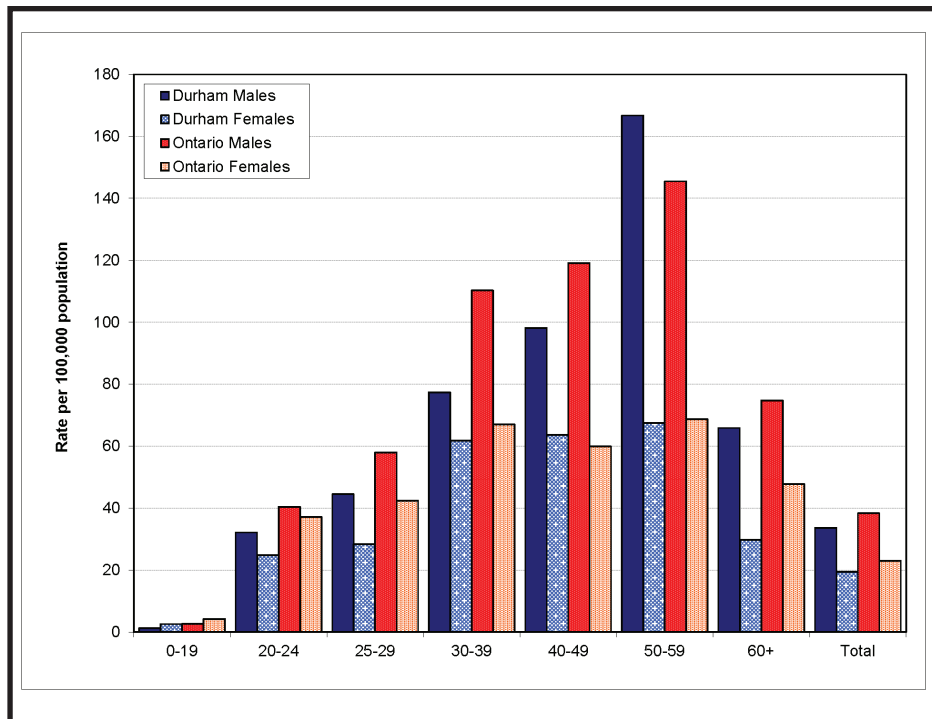


Figure 5: Age-Specific Incidence Rate for Hepatitis C, Durham Region and Ontario by Age and Sex, 2011-2015 Combined

Figure 5 shows that overall rates are higher among males than females; this pattern is consistent across all age groups with the exception of children and youth under 20. Overall rates are higher in Ontario than Durham Region for both sexes. This pattern holds across all age groups with the exception of females 40-49 and males 50-59, where Durham Region rates are higher than Ontario. Incidence increases with age up to age 50 to 59 and then decreases among those 60 years and older.



Data Source: integrated Public Health Information System (iPHIS), Durham Region, 1991-2015, Extracted: April 2015.

Figure 6: Crude Incidence Rates for Hepatitis C, Durham Region by Municipality and Ontario, 2010-2014 Combined

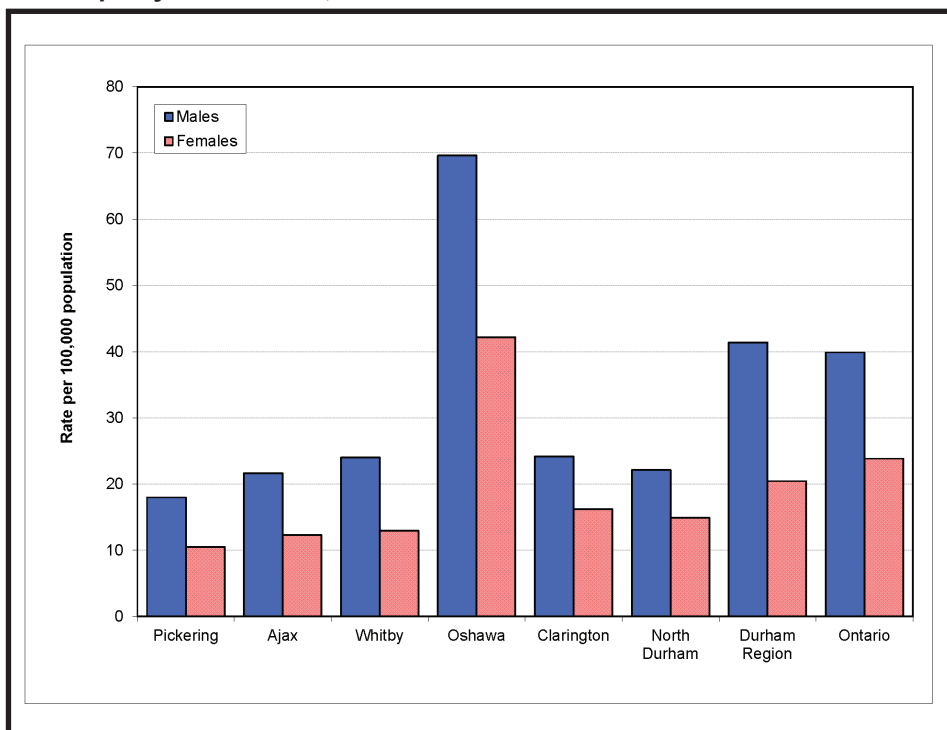


Figure 6 shows that the rate of hepatitis C infection is higher in Oshawa among both males and females than in other Durham Region municipalities, Durham Region as a whole and Ontario.

Between 2013 and 2015 injection drug use was the most common risk factor reported by 41% of hepatitis C cases in Durham Region. Other common risk factors included tattoos and piercings reported by 28% and inhalation drug use by 20%.

Data Source: integrated Public Health Information System (iPHIS), Durham Region, 1991-2015, Extracted: April 2015.



Why do we need Harm Reduction?

HIV/AIDS

AIDS (Acquired Immune Deficiency Syndrome) is a disease of the immune system caused by infection with the Human Immunodeficiency Virus (HIV) which slowly destroys the body's ability to fight illnesses¹⁴. By weakening the immune system, HIV causes other infections and diseases to attack the body. When people are first infected with HIV, they usually feel well and often do not know that they are infected. It can take up to 10 or more years before the person develops AIDS. Once infected, people are infected for life and can spread HIV to others. The only way to become infected with HIV is to get the virus into your blood. One of the ways that HIV is spread is by sharing contaminated needles and syringes. In Durham Region there were an average of 13 new cases of HIV/AIDS identified each year between 2011 and 2015. The majority of these cases (86%) occurred among males. Cases ranged in age from 17 to 77 with an average age of 41 years. The rate of HIV/AIDS was higher in Ontario (6.4/100,000) than Durham Region (2.5/100,000) during this time period. Between 2011 and 2015 injection drug use was reported as a risk factor by 3% of Durham Region HIV/AIDS cases however, no risk factors were reported for 32% of cases. Inhalation drug use was reported by 6% of cases.

Harm Reduction Programs

The Ontario Public Health Standards (OPHS) and Protocols establish the minimum requirements for fundamental public health programs and services to be delivered by Ontario's 36 boards of health, which include assessment and surveillance, health promotion and policy development, disease and injury prevention, and health protection. The OPHS and Protocols are published by the Minister of Health and Long-Term Care, pursuant to Section 7 of the Health Protection and Promotion Act, R.S.O. 1990, c. H.7.¹⁵

The OPHS for Sexual Health, Sexually Transmitted Infections, and Blood-borne Infections (including HIV) mandates programs that local boards of health must deliver to prevent or reduce the burden of sexually transmitted infections and blood-borne infections, and to promote healthy sexuality. One of the requirements for this standard states that the board of health shall ensure access to a variety of harm reduction program delivery models, which shall include the provision of sterile needles and syringes and may include other evidence-informed harm reduction strategies in response to local surveillance. In Durham Region, this program standard is met through the operation of the Project X-Change program.

Project X-Change

Project X-Change is a harm reduction program offered through John Howard Society of Durham Region and funded by the Durham Region Health Department (DRHD).

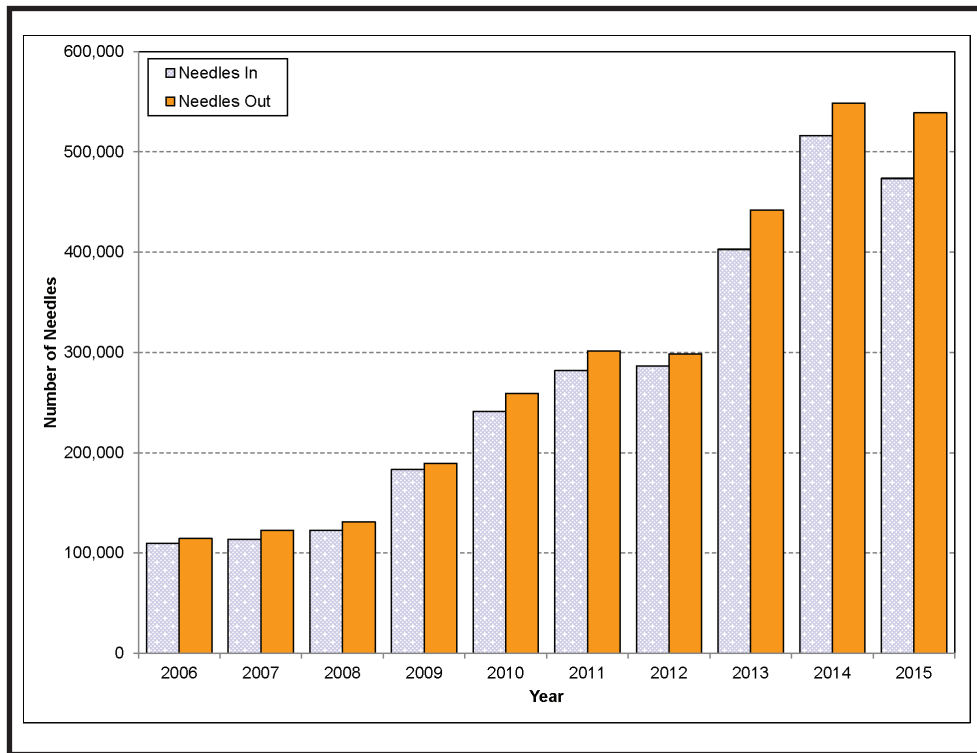
Project X-Change has been operating in Durham Region since 1997. This program offers sterile needles, alcohol swabs, sterile water, and other equipment for safer drug use and safe disposal of products. The purpose of Project X-Change is to protect the general public and substance users from unsafe disposal of drug paraphernalia, to protect substance users by decreasing sharing of unsterile products, and to reduce infections and hospitalizations due to shared products.

In 2015, the program reported 538,984 clean needles distributed and 473,564 needles collected. The number of needles exchanged has increased substantially since 1997, when the program distributed 6,017 needles and received 6,254 (90 times as many needles distributed and 75 times as many needles received). In 2015, Project X-Change added the provision of safer inhalation equipment to its services. 10,452 glass stems, 23,305 brass screens and 16,638 mouth pieces were provided to clients throughout the year.

Harm Reduction Programs



Figure 7: Needle Exchanges at Project X-Change, 1997 to 2015

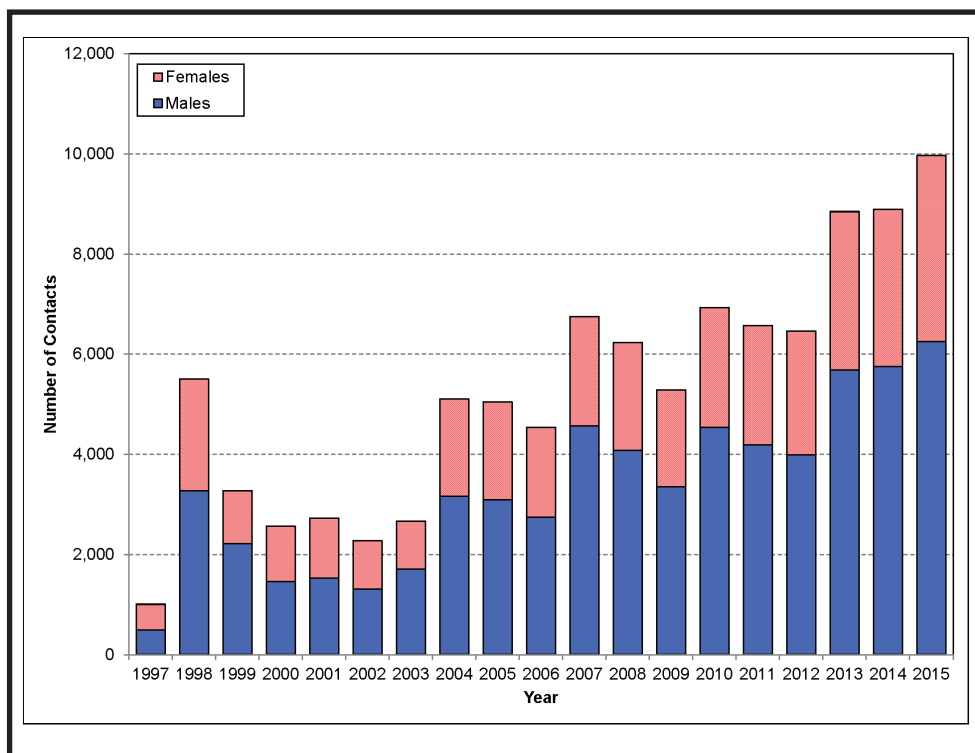


Data Source: Project X-Change, 1997-2015



Figure 8: Contact Count by Sex at Project X-Change, 1997 to 2015

The number of client contacts at Project X-Change varies year to year but has generally increased since 1997. In 2015 there were a total of 9,965 client contacts, an increase from the previous year when there were a total of 8,891 and a significant increase from 1997 when there were a total of 1,006. Most years there are almost twice as many male client contacts as female. In 2015 there were 6,250 male client contacts and 3,715 female client contacts for a male to female ratio of 1.7.

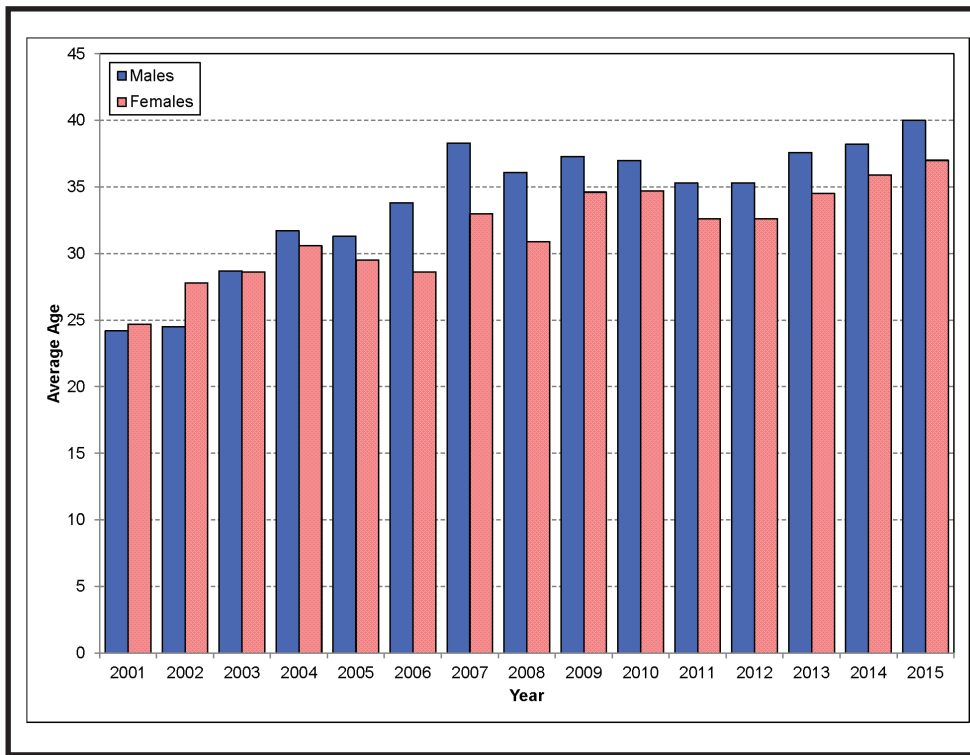


Data Source: Project X-Change, 1997-2015



Harm Reduction Programs

Figure 9: Average Age of Clients at Project X-Change, 2001 to 2015

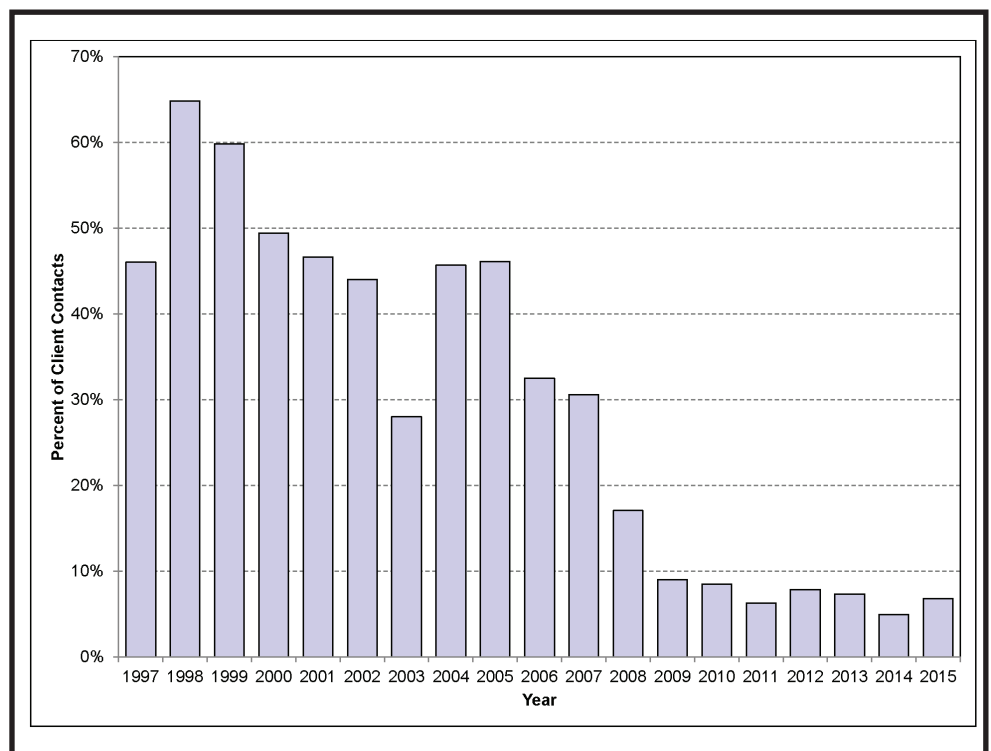


The average age of Project X-Change clients has increased since 1997. In 1997 the average age of male clients was 24 and the average age of female clients was 25. In comparison, in 2015 the average age of male clients was 40 and the average age of female clients was 37. The average age of females has remained consistent at two to five years younger than males.

Data Source: Project X-Change, 2001-2015

Figure 10: Percent of Client Contacts at Project X-Change That Are New Clients, 1997 to 2015

In 2001 new clients made up 46% of all client contacts. This proportion gradually decreased over time with the percent of new clients remaining fairly stable between 2009 and 2015 at between 6 and 9%.



Data Source: Project X-Change, 1997-2015

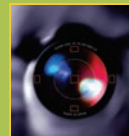
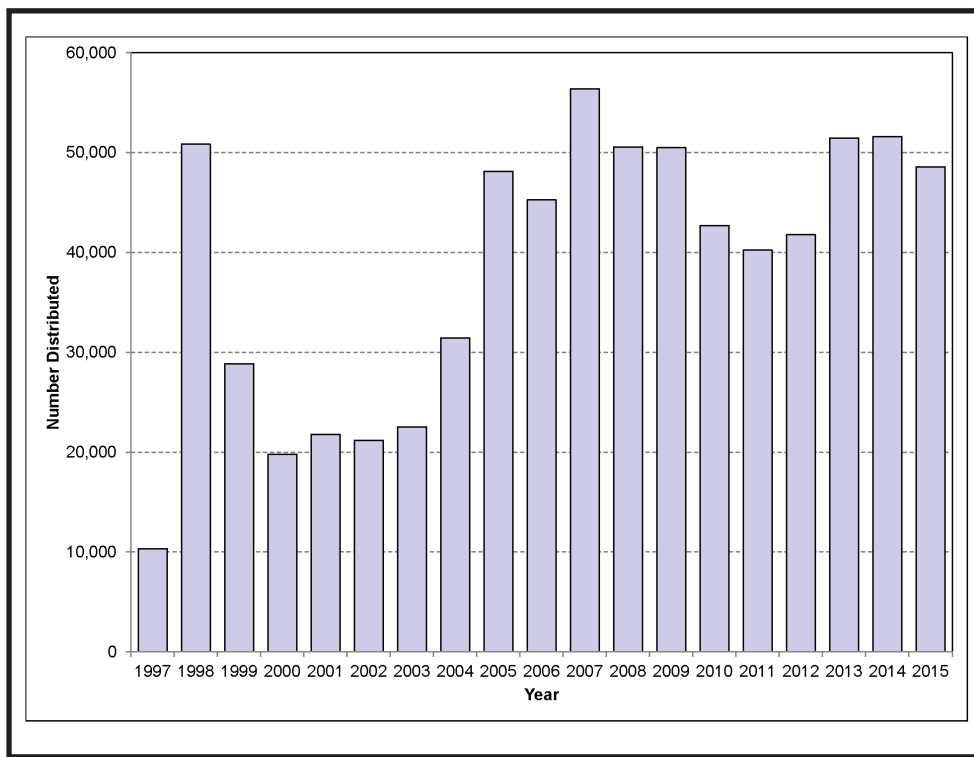


Figure 11: Condoms Distributed at Project X-Change, 1997 to 2015

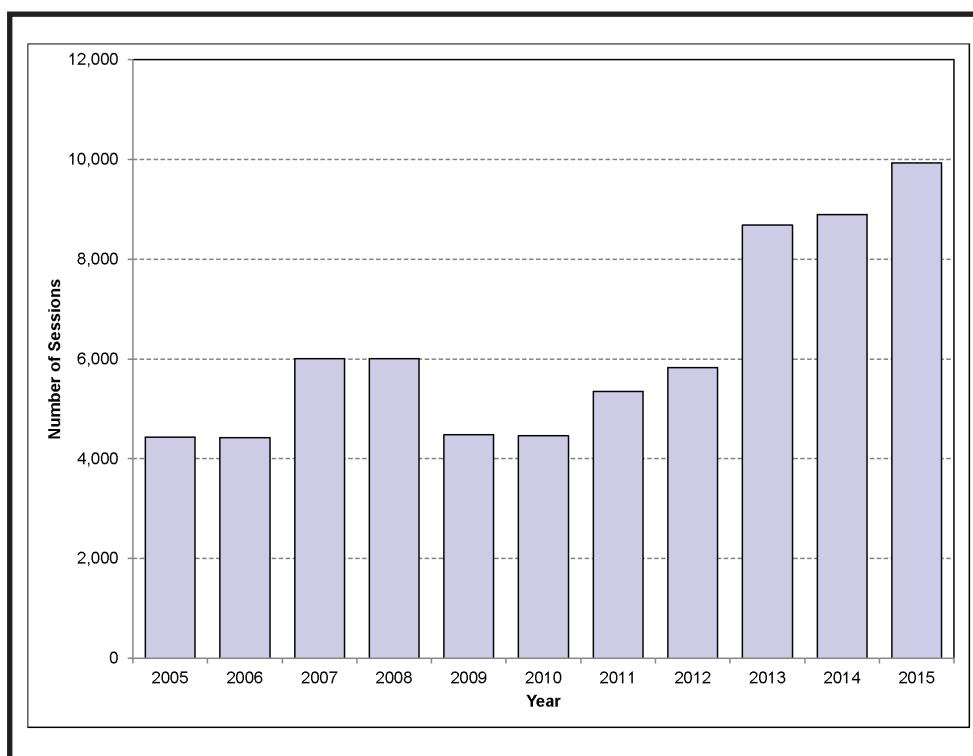


The number of condoms distributed by Project X-Change has fluctuated somewhat over time. In 1997, 10,326 condoms were distributed or approximately 10 per client. In 2015, 48,575 condoms were distributed or approximately 5 per client.

Data Source: Project X-Change, 1997-2015

Figure 12: Counselling/Education Sessions Provided at Project X-Change, 2005 to 2015

The number of counselling sessions at Project X-Change increased in 2015 compared to previous years. In 2015 there were 9,929 counselling sessions representing more than 99% of all Project X-Change client contacts, more than double the number of sessions in 2005 when there were 4,435 counselling sessions representing 86% of client contacts.



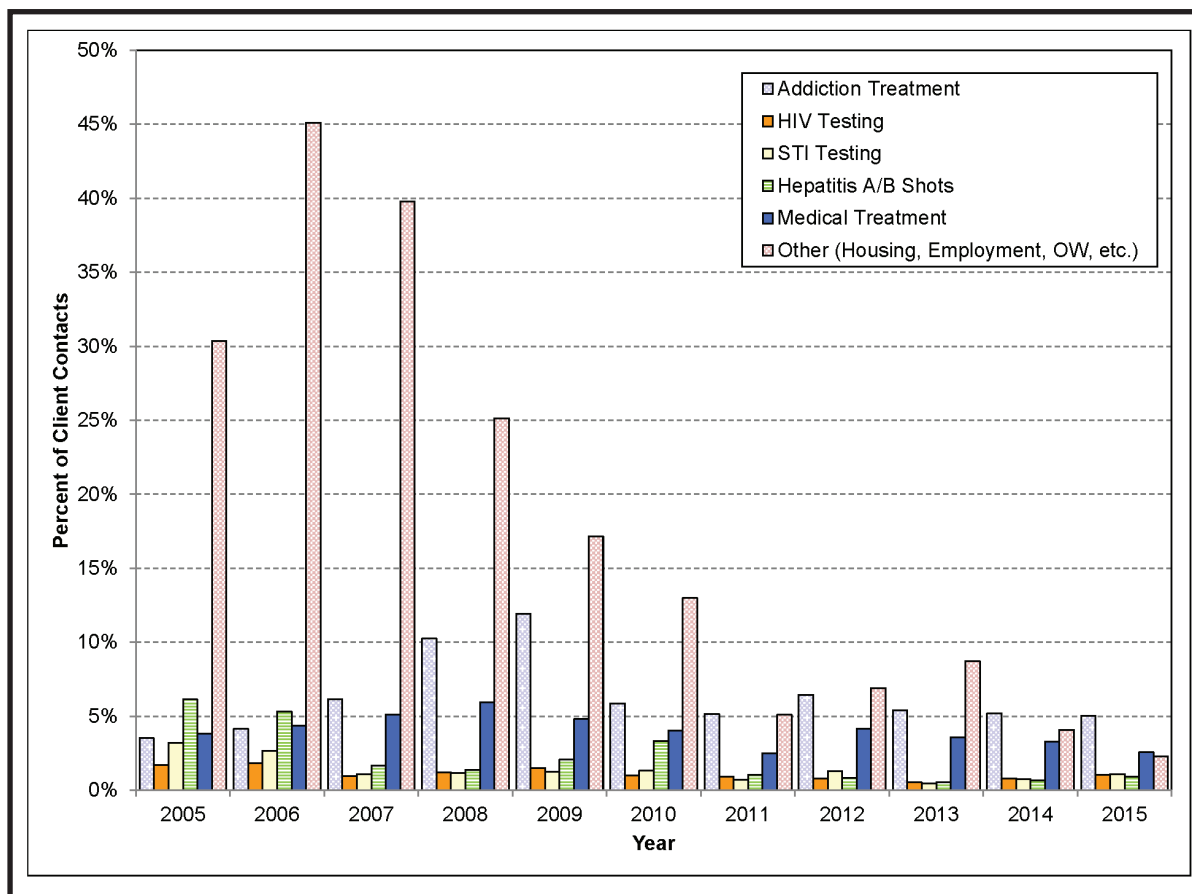
Data Source: Project X-Change, 1997-2015



Harm Reduction Programs

The most commonly provided referrals at Project X-Change are for addiction treatment. The number of referrals and percent of client contacts who received a referral for addiction treatment increased up to 2009 when 631 or 12% of clients received such a referral. Since then, between 300 and 500 referrals for addiction treatment were provided each year representing 5 to 6% of client contacts. Between 2005 and 2015 an average of 273 referrals were provided per year for medical treatment or 3.9% of client contacts. Referrals for HIV testing, testing for other sexually transmitted infections, and hepatitis A/B vaccines are less common in recent years with averages of 60-70 referrals each per year representing approximately 1% of client contacts. Referrals for other reasons including housing, employment or Ontario Works have decreased substantially since 2006 when there were over 2,000 referrals representing 45% of client contacts. In comparison, in 2015 there were 227 referrals for other reasons representing 2% of client contacts.

Figure 13: Percent of Client Contacts with Referrals Provided at Project X-Change, 2005 to 2015



Data Source: Project X-Change, 1997-2015



Opioid Patch Return Programs

Fentanyl and other strong opioid medications are made available to patients in the form of a patch which when applied to the skin releases medication slowly over several days. Fentanyl is a powerful opiate, much stronger than codeine, oxycodone, and hydromorphone.

Opiate patches not returned to a pharmacy after use can be used for illicit drug purposes. The opiate can be removed from the patch and inhaled or injected. The Durham Region opiate patch return program was launched in 2015, in response to increasing numbers of deaths due to fentanyl use in Durham Region. The opiate patch return program is a collaborative effort among DRHD, Durham Regional Police Service, Lakeridge Health Corporation, community pharmacists and physicians. The program requires patients to return all used opiate patches, and is aimed to decrease diversion and illicit use of fentanyl and other opiate patches.



With this program, patients need to return their used patches to the pharmacy before receiving new ones. For each used patch they return, patients will receive a new one. For example, if a patient returns 10 used patches, they will be given 10 new patches. If a patient brings in 8 used patches, they will get 8 new ones. Patients that find it difficult to return all their patches are encouraged to speak with their pharmacist.

Used patches are an environmental concern. They should not be put in the garbage or flushed down the toilet. If used patches are not disposed of correctly, they can end up in our environment where they pose a danger to children and animals. This also creates an opportunity for illegal reselling and distribution of used patches. When patches are returned to the pharmacy, the pharmacy staff can take the used patches and dispose of them in a safe and environmentally friendly way. More information about the patch return program can be found at durham.ca/fentanyl.

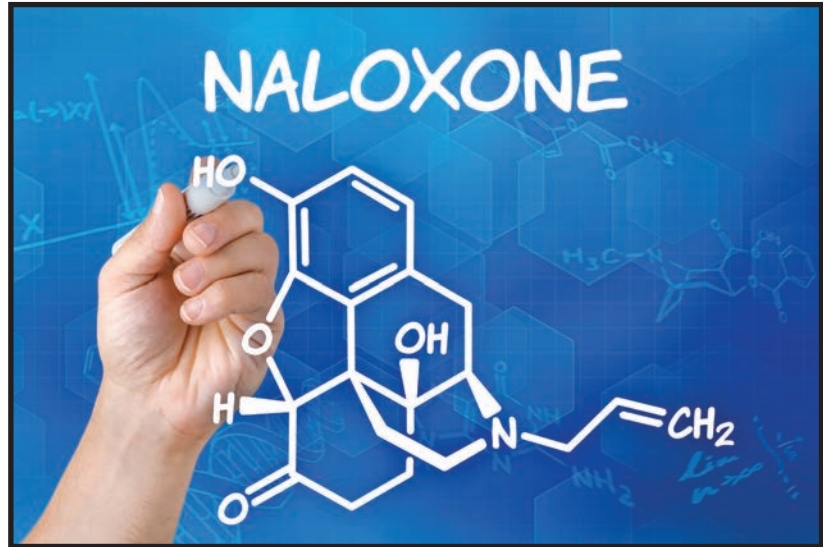
Legislation has recently been passed in Ontario that will soon require all pharmacies to implement patch exchange programs. Bill 33, Safeguarding our Communities Act (Patch for Patch Return Policy), was introduced in the Ontario legislature in 2014 and received Royal Assent in December 2015¹⁶.



Harm Reduction Programs

Naloxone Distribution

Naloxone is a prescription medication. It is an opiate antagonist, typically given via intramuscular (IM) injection. It's indicated use is in response to respiratory depression caused by opiate overdose. It reverses the effects of the opiate overdose by displacing opioids from their receptor sites. To be effective, Naloxone should be administered as soon as possible following an opioid overdose. When administered via IM injection, the onset of action of Naloxone is between 2-4 minutes. The duration of the Naloxone is up to 45 minutes, which allows time for the victim to be attended to by paramedics and transported to hospital. Naloxone is a very safe medication. The only known contraindication to receiving Naloxone is previous hypersensitivity or allergy.



Several community agencies are currently working towards implementing naloxone distribution programs across Durham Region. Naloxone is currently available in Durham Region for clients of the Carea Community Health Centre's Hepatitis C program. It is also available through the Project X-Change program at the John Howard Society of Durham Region.

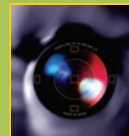
In 2016, Health Canada announced that naloxone has been reclassified as an over the counter medication¹⁷, and the Ontario Ministry of Health and Long-Term Care announced that they will make it available for free in pharmacies¹⁸. Distribution of naloxone has been shown to reverse opiate overdoses in the community, and allow time for users to access emergency medical response.

HIV Pre-Exposure Prophylaxis

HIV pre-exposure prophylaxis (PrEP) is a medication that can be taken on an ongoing daily basis to prevent the user for acquiring HIV type 1. The use of PrEP should be used in conjunction with other HIV prevention methods. In Canada, PrEP was recently approved for use in March 2016 for prevention of HIV among men having sex with men, and heterosexual sero-discordant couples¹⁹.



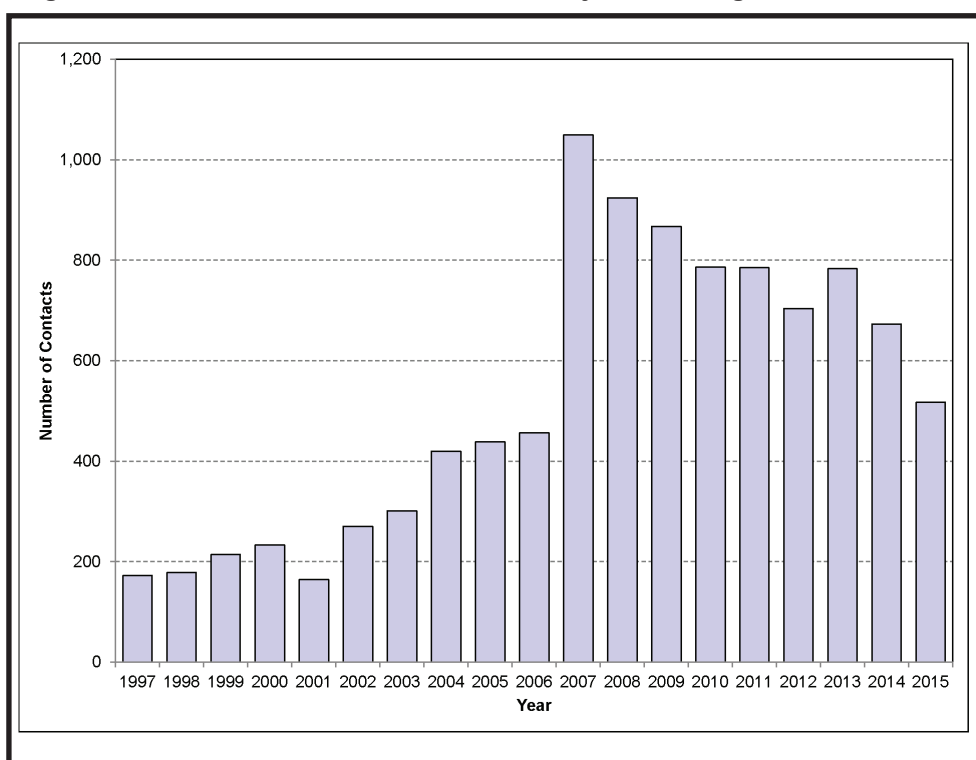
Although PrEP has not been approved for use among the injection drug population, risk for HIV transmission remains high with those who share drug paraphernalia. Literature and best practices support the use of PrEP among injection drug users. For instance, with the use of PrEP among injection drug users, HIV incidence has been shown to decline by 48.9%²⁰.



Support Programs for Sex Trade Workers

Women who use injection drugs and participate in survival street level sex work are considered to be at increased risk for sexual and drug-related harms, including HIV infection. The number of sex trade worker contacts at Project X-Change increased gradually between 1997 (172) and 2006 (456) and then rose substantially in 2007 (1,049), which can be attributed to the hiring of an additional outreach worker that year who was able to access this population. Since 2007, numbers have gradually decreased to 517 sex trade worker contacts in 2015. In Ontario, rates of human trafficking have increased in recent years²¹. Durham Region community programs promote health and offer support to sex trade workers to lead a healthy lifestyle and engage, if needed, in harm reduction programming.

Figure 14: Sex Trade Worker Contacts at Project X-Change, 1997 to 2015



Data Source: Project X-Change, 1997-2015

The Sex Trade Worker Support Circle of Durham Region



The Sex Trade Worker Support Circle is a committee made up of various community agencies and organizations servicing and supporting women working in sex work or directly affected by sex work in Durham Region. The support circle provides education in the community to increase awareness of health needs of sex workers, and provides education on effective strategies to engage sex workers in their health. The circle advises the Durham Referrals Education Advocacy Mentorship & Support (D.R.E.A.M.S.) program that offers a weekly drop-in program for sex workers. Various committee members attend the D.R.E.A.M.S. program to promote access to their services and offer education to those attending the D.R.E.A.M.S program.



Harm Reduction Programs

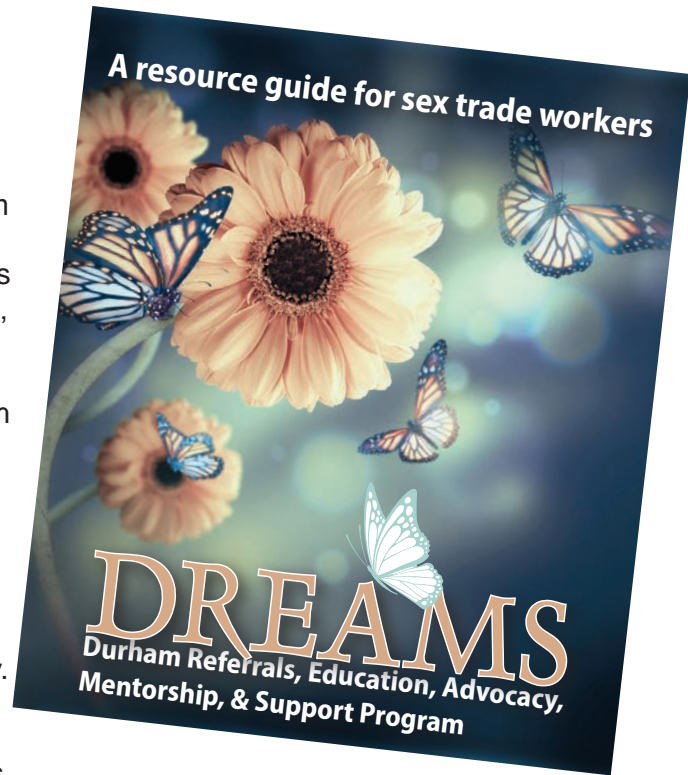
Support Programs for Sex Trade Workers (cont'd.)

Durham Referrals Education Advocacy Mentorship & Support (D.R.E.A.M.S.) Program

This program offers support to women affected by, and involved in sex trade work across Durham Region. A weekly drop-in centre for sex workers every Friday from 2:00-5:00 pm is available. The drop-in services include: a nutritious meal, condoms, harm reduction supplies, clothing donations, access to showers, access to laundry, OW/ODSP application support, housing support, assistance to access health care and referrals, education, skill building workshops, and counselling upon request. The drop in program is consistent with the harm reduction approach.

Sex Trade Housing Support Program

The Sex Trade Housing Support Program is offered through the John Howard Society of Durham Region. This program targets individuals and families involved in the sex trade industry to support them to acquire long term housing stability. The program offers outreach workers, housing support, pre-employment support, education and training, life skills, and social support through referrals made by community agencies.



What is Durham Region Health Department Doing?

DRHD is an advocate of harm reduction, promoting policies, programs and practices that aim to reduce the negative health, social, and economic consequences of drug use in Durham Region.

The Health Department is an active member on multiple coalitions and committees supporting the harm reduction approach, including the Durham Overdose Prevention Committee, the Sex Trade Worker Support Circle, and the Durham Harm Reduction Coalition (DHRC). The harm reduction activities of these committees and coalitions include advocacy, capacity-building, policy and program development, as well as addressing risks and stigma associated with drug use among vulnerable populations. DRHD also participates in planning and implementing a biennial "What's the Harm" Conference. This conference aims to raise awareness of harm reduction programming and strategies for community agencies across Durham.

DRHD Sexual Health Clinics provide clinical services aimed at diagnosing blood-borne infections commonly spread by contaminated injection equipment, including HIV/AIDS and hepatitis C. Nurses offer counselling, testing, treatment and referrals to harm reduction services and supports as identified. In 2015, 833 HIV tests were completed for clients of the three Durham Region Sexual Health Clinics. Free condoms and vaccinations are also provided as prevention methods for clients engaged in drug use.

DRHD's future goals include advocacy, policy development, and strengthening community capacity to support harm reduction programming. Increased access to harm reduction programs aim to improve the health and well-being of our residents, and ultimately to decrease rates of infectious diseases and accidental deaths due to substance use.



The following agencies provide support and services related to harm reduction.

Addictions/Substance Use

Pinewood Centre for Addiction

One of Ontario's largest treatment programs, helping thousands of people cope with substance use, concurrent disorders and problem gambling concerns. Many of the counsellors have been specially trained to work with youth, women and those with mental health issues.

Staff work with people to create treatment plans that reflect their strengths, concerns and preferences. Sites are located in the community, not in a hospital setting, offering a safe, supportive environment to work towards treatment goals.

For crisis support and withdrawal management services at 300 Centre St. S, call 905-723-8195 or 1-888-881-8878.

For general information, to discuss concerns and/or to book an assessment appointment:

Ajax	905-683-5950
Bowmanville	905-697-2746
Oshawa	905-571-3344
Port Perry	905-985-4721
Scarborough	416-431-8200 ext. 6321 or 6516



www.lakeridgehealth.on.ca/en/ourservices/Pinewood-Centre-for-Addictions.asp

HIV/AIDS/Hepatitis C

AIDS Committee of Durham Region (ACDR)

ACDR is a community-based, non-profit, charitable organization. They work in partnership with individuals and organizations that support, in principle or in practice, their mission and goals. They create an inclusive environment for a collaborative approach to education, support and outreach. They build on the strengths and abilities of people living with HIV, AIDS and related co-infections, those at risk and their support networks in Durham Region.

22 King Street West, Suite 202
Oshawa, ON L1H 1A3
Tel: 905-576-1445
Toll free: 1877-361-8750

www.aidsdurham.com





Community Resources in Durham Region

HIV/AIDS/Hepatitis C (cont'd.)

Carea Community Health Centre Hep C Team

The Hep C Team was created in response to an urgent need for more programs and services focused on active intervention in disease management in relation to the increased diagnosis of people infected with hepatitis C. The Hep C Team provides programs and services to people of all ages and stages of the virus including at risk screening, pre-treatment, on-treatment and post-treatment. Programs and services can be accessed throughout the Central East LHIN (Durham, Peterborough, and the 4 Counties). Programs and services include: screening, treatment, fibroscan clinics, counseling, support groups, community outreach, harm reduction strategies and education.

1-855-808-6242 Press 4, then 5

www.careachc.ca



Positive Care Clinic

The Positive Care Clinic is designed to be a “one stop shop” for clients seeking HIV, AIDS, and hepatitis C care. They work closely with people to give them the information and care they need to manage their health and live full and happy lives. The clinic is staffed by an interdisciplinary team that includes infectious diseases specialists, registered nurses, social workers, dietitians, pharmacists, and administrative support. The Positive Care Clinic provides individual assessment and follow-up care, nutrition and medication counselling, onsite laboratory work (blood work), a retail pharmacy and education opportunities.

Lakeridge Health Whitby
300 Gordon Street, Whitby ON L1N 5T2
905-668-6831 ext. 3127 or 1-866-303-2420

www.lakeridgehealth.on.ca/en/ourservices/positivecareclinic.asp





Methadone

Methadone belongs to the opioid family of drugs. It is used to treat addiction to other opioid drugs such as heroin, oxycontin & hydromorphone and can last between 24-36 hours per dose. It's an effective and legal substitute for heroin or other narcotics (such as heroin, methadone, oxycontin, opium, percocet, percodan, morphine, codeine, etc.).

Methadone works by decreasing drug cravings, which helps users eliminate heroin and other narcotics and prevents physical withdrawal symptoms. Methadone maintenance treatment works best when combined with other services and interventions. As part of a methadone maintenance program, clients are able to freely access addiction counselling, crisis intervention and management, as well as various medical services.

First Step Medical Clinic

32 Simcoe Street South, Oshawa, ON L1H 4G2
905-720-0506

South Oshawa Clinic

777 Simcoe St. South, Oshawa, ON L1H 4K5
905-721-0003

OATC Clinic

45 Bloor Street East, Unit 2., Oshawa, ON L1H 3L9
905-443-0223

New Direction Addiction Clinic

540 King St. W., Oshawa, ON L1J 7J1
905-579-4900

Parkwood Clinic

11 Colborne St. E., Oshawa, ON L1G 1M1
Phone 905-728-5147

TrueNorth Clinic at Scott's Pharmacy

1000 Simcoe St N., Oshawa, ON L1G 4W4
905-576-7000

Beaverton OATC

371 Simcoe Street, Beaverton Ontario, L0K 1A0
705-426-2362

Shelters

Cornerstone Community Association

Offering services for single men over 16 years of age, single men with dependent children, and couples with children in their care.
905-433-0254 ext. 228

www.cornerstonedurham.com

Muslim Welfare Home

Providing shelter for single women with or without children.

905-665-0424

www.muslimwelfarecentre.com

DYHSS (Durham Youth Housing and Support Services)

Shelter available for youth ages 16 to 24, 13 beds.
905-239-9477

www.durhamyouth.com





Data Sources & Notes

Mortality Data

Source: Coroner's Data, 2005-2014, Office of the Chief Coroner for Ontario. Provided: March 2016. The Office of the Chief Coroner for Ontario serves the living through high quality death investigations and inquests to ensure that no death will be overlooked, concealed or ignored. The findings are used to generate recommendations to help improve public safety and prevent deaths in similar circumstances.

Hospitalization Data

Source: Hospital In-Patient Data, 2003-2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Extracted: June 2016. In-patient hospitalization data capture all hospital separations; a separation may be due to discharge home, death or transfer to another facility. The most responsible diagnosis (MRD) is the one diagnosis which describes the most significant condition of the patient which caused the stay in hospital. The International Classification of Diseases (ICD), specifically ICD-10-CA is used to code the diagnosis. All hospitalizations for poisoning by opioids and other narcotics were selected using ICD-10-CA codes T40.0-T40.6 as the MRD.

Ambulatory Care Data

Source: Ambulatory Visits, 2003-2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Extracted: June 2016. Ambulatory care data representing utilization of ambulatory services in Ontario's hospitals includes but is not limited to emergency department (ED) visits and day surgery visits. The patients' main problem or diagnosis is coded using ICD-10-CA. ED visits and day surgery visits for poisoning by opioids and other narcotics were selected using ICD-10-CA codes T40.0-T40.6 as the main problem.

Population Estimates & Projections

Source: Ontario Population Estimates, 2003-2014, Ontario Population Projections 2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Extracted: April 2016.

Project X-Change Data

Source: Project X-Change, 1997-2015. Project X-Change tracks their distribution of all the equipment and supplies they distribute including sterile needles, alcohol swabs, sterile water, condoms, and other equipment for safer drug use and safe disposal of products as well as monitoring the used needles that they collect. They also collect information about their clients and the services that they provide to them.

Reportable Disease Data

Source: integrated Public Health Information System (iPHIS), Durham Region, 1991-2015, Extracted: April 2015. Each board of health is responsible for collecting case information on reportable communicable diseases. This information is summarized for provincial and national surveillance. Physicians, nurses, other regulated health professionals, hospitals and laboratories are required by law to report all cases of tuberculosis to the local medical officer of health. This information is collected in iPHIS (Reportable Disease Information System (RDIS) prior to 2005) and is kept strictly confidential. The most common source of case identification is through laboratory notification of confirmed test results (serology, microbiology cultures, etc.). There may be considerable under-reporting of cases because an infected person with mild or no clinical symptoms may not seek medical care and/or laboratory testing may not be performed. The numbers of cases in iPHIS may change over time due to case updates; however any changes are expected to be minimal. Cases may have been underreported in 2005 as a result of the conversion from RDIS to iPHIS.



Documents

Best Practice Recommendations for Canadian Harm Reduction Programs, Part 1: Available at www.catie.ca/sites/default/files/BestPracticeRecommendations_HarmReductionProgramsCanada_Part1_August_15_2013.pdf

Best Practice Recommendations for Canadian Harm Reduction Programs, Part 2: Available at www.catie.ca/sites/default/files/bestpractice-harmreduction-part2.pdf

Canada's Low-Risk Alcohol Drinking Guidelines: Available at www.ccsa.ca/Resource%20Library/2012-Canada-Low-Risk-Alcohol-Drinking-Guidelines-Brochure-en.pdf

Harm Reduction Training Manual: A Manual for Frontline Staff Involved with Harm Reduction: Available at www.bccdc.ca/NR/rdonlyres/C8829750-9DEC-4AE9-8D00-84DCD0DF0716/0CompleteHRTRAININGMANUALJanuary282011.pdf

Websites



AIDS Committee of Durham Region:
aidsdurham.com

Canadian Harm Reduction Network:
canadianharmreduction.com

DRHD Sexual Health Clinics:
durham.ca/sexualhealth

Durham Harm Reduction Coalition:
whatstheharm.ca

John Howard Society of Durham Region:
jhsd.ca

Ontario Harm Reduction Distribution Program:
ohrdp.ca



Appendices

Appendix A: Age-Standardized Hospitalization Rates and Counts for Prescription Drug Misuses - Opioids, Durham Region, 2003-2015

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Durham Female Rate/100,000	26.2	40.3	31.7	31.7	31.1	29.2	29.2	27.0	32.9	35.0	32.0	25.5	32.2
Durham Male Rate/100,000	32.9	34.7	38.1	27.5	22.2	21.2	24.5	24.8	26.5	28.1	28.7	26.0	26.2
Ontario Female Rate/100,000	27.9	32.0	30.7	28.4	26.1	26.7	28.5	28.0	30.9	33.1	33.6	34.9	35.3
Ontario Male Rate/100,000	28.6	31.1	32.2	27.3	25.1	25.6	26.4	28.0	27.9	30.8	31.7	31.8	33.2
Durham Female Count	77	117	93	99	108	99	106	96	121	140	127	102	129
Durham Male Count	78	91	98	77	62	65	69	73	84	88	93	91	92

Data Source: Inpatient Discharges 2003-2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario; Ontario Population Estimates 2003-2015, Ontario Ministry of Health and Long-Term Care.

Appendix B: Age-Standardized Emergency Department Visit Rates and Counts for Prescription Drug Misuse - Opioids, Durham Region and Ontario, 2003-2015

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Durham Female Rate/100,000	45.6	57.4	44.5	55.2	47.6	54.8	67.8	70.8	63.2	67.3	56.1	57.3	70.9
Durham Male Rate/100,000	37.6	56.9	55.1	57.3	54.3	63.2	78.3	64.7	84.0	73.6	67.1	74.1	64.8
Ontario Female Rate/100,000	33.4	38.2	40.7	47.4	46.4	52.7	62.9	69.7	70.3	70.1	64.0	61.5	66.4
Ontario Male Rate/100,000	33.6	44.7	47.2	50.3	52.3	64.4	75.0	81.6	85.9	81.7	74.9	74.9	81.0
Durham Female Count	128	160	124	167	149	173	205	224	203	226	187	200	242
Durham Male Count	100	149	152	155	152	181	220	183	249	219	196	223	198

Data Source: Emergency Department Visits 2003-2015, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH Ontario; Ontario Population Estimates 2003-2015, Ontario Ministry of Health and Long-Term Care.

Appendix C: Deaths Due to Drug Toxicity, Durham Region, 2005-2014

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Deaths	22	25	31	21	30	37	25	18	29	39

Data Source: Coroner's Data, 2005-2014, Office of Chief Coroner for Ontario.

Appendix D: Age-Specific Incidence Rate/100,000 for Hepatitis C, Durham Region and Ontario by Age and Sex, 2011-2015 Combined

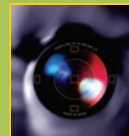
Age Group	0-19	20-24	25-29	30-39	40-49	50-59	60+	Total
Durham Males	1.2	32.2	44.4	77.3	98.1	166.7	65.9	33.6
Durham Females	2.5	24.8	28.4	61.8	63.6	67.4	29.8	19.4
Ontario Males	2.7	40.3	57.9	110.2	119.1	145.5	74.7	38.3
Ontario Females	4.2	37.2	42.4	67.0	59.9	68.6	47.8	23.0

Data Source: Integrated Public Health Information System (iPHIS), Durham Region, 1991-2015, Extracted: April 2015.

Appendix E: Crude Incidence Rates/100,000 for Hepatitis C, Durham Region by Municipality and Ontario, 2010-2014 Combined

Municipality	Pickering	Ajax	Whitby	Oshawa	Clarington	North Durham	Durham Region	Ontario
Males	18.0	21.6	24.0	69.6	24.1	22.1	41.4	39.9
Females	10.5	12.3	13.0	42.2	16.2	14.9	20.5	23.8

Data Source: Integrated Public Health Information System (iPHIS), Durham Region, 1991-2015, Extracted: April 2015.



Appendix F: Project X-Change Data, Durham Region, 1997-2015										
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Needles In	6,254	13,876	16,352	30,048	31,395	37,260	37,260	63,680	102,923	109,782
Needles Out	6,017	15,325	16,751	30,286	32,285	39,952	39,952	63,707	102,254	114,464
Male Contacts	492	3,268	2,216	1,460	1,530	1,309	1,309	3,161	3,093	2,746
Female Contacts	514	2,233	1,061	1,102	1,197	962	962	1,940	1,949	1,795
Average Age Males	--	--	--	--	24.2	24.5	24.5	31.7	31.3	33.8
Average Age Females	--	--	--	--	24.7	27.8	27.8	30.6	29.5	28.6
Percent New Clients	46.0%	64.8%	59.8%	49.4%	46.6%	44.0%	44.0%	45.7%	46.1%	32.5%
Number Condoms	10,326	50,848	28,827	19,784	21,799	21,188	21,188	31,444	48,115	45,261
Sex Trade Worker Contacts	172	178	214	233	164	270	270	420	438	456

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Needles In	113,388	122,596	183,177	240,933	281,915	286,581	402,841	515,843	473,564
Needles Out	122,395	131,025	189,558	258,934	301,456	298,523	441,908	548,377	538,984
Male Contacts	4,569	4,079	3,355	4,535	4,193	3,993	5,688	5,756	6,250
Female Contacts	2,185	2,156	1,932	2,393	2,380	2,464	3,157	3,135	3,715
Average Age Males	38.3	36.1	37.3	37.0	35.3	35.3	37.6	38.2	40.0
Average Age Females	33.0	30.9	34.6	34.7	32.6	32.6	34.5	35.9	37.0
Percent New Clients	30.6%	17.1%	9.0%	8.5%	6.3%	7.9%	7.4%	5.0%	6.8%
Number Condoms	56,382	50,582	50,497	42,707	40,223	41,772	51,466	51,602	48,575
Sex Trade Worker Contacts	1049	924	867	786	785	704	783	673	517

Data Source: Project X-Change, 1997-2015

Appendix G: Project X-Change Counseling and Referrals, Durham Region, 2005-2015											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Counseling/Education Session Provided	4,435	4,420	6,003	6,008	4,480	4,461	5,352	5,825	8,688	8,891	9,929
Percent of Clients Referred to Addiction Treatment	3.5%	4.1%	6.2%	10.2%	11.9%	5.9%	5.2%	6.4%	5.4%	5.2%	5.0%
Percent of Clients Referred for HIV Testing	1.7%	1.8%	1.0%	1.2%	1.5%	1.0%	0.9%	0.8%	0.5%	0.8%	1.0%
Percent of Clients Referred for STI Testing	3.2%	2.7%	1.1%	1.2%	1.2%	1.3%	0.7%	1.3%	0.5%	0.8%	1.1%
Percent of Clients Referred for Hepatitis A/B Shot	6.1%	5.3%	1.7%	1.4%	2.1%	3.3%	1.0%	0.9%	0.5%	0.7%	0.9%
Percent of Clients Referred for Medical Treatment	3.8%	4.4%	5.1%	5.9%	4.8%	4.0%	2.5%	4.2%	3.6%	3.3%	2.6%
Percent of Clients Referred for Other	30.4%	45.1%	39.8%	25.1%	17.2%	13.0%	5.1%	6.9%	8.7%	4.1%	2.3%

Data Source: Project X-Change, 2005-2015

References

1. The Canadian Harm Reduction Network (2013). What is harm reduction? Retrieved February 27, 2015. Available at: <http://canadianharmreduction.com/>
2. Challacombe, L. (2015). The epidemiology of HIV in people who inject drugs in Canada. Retrieved June 16, 2016. Available at: <http://www.catie.ca/en/fact-sheets/epidemiology/injection-drug-use-and-hiv-canada>
3. Government of Canada. (2013). Canadian Tobacco, Alcohol and Drug Survey (CTADS): Summary of results for 2013. Retrieved June 14, 2016. Available at: <http://healthycanadians.gc.ca/science-research-sciences-recherches/data-donnees/ctads-ectad/summary-sommaire-2013-eng.php>
4. DRPS (2015). Durham regional police services annual report 2015. Retrieved July 11, 2016 Available at: http://www.drps.ca/annual_report/2015/Annual_report_2015_WEB.pdf
5. DRHD (2014). Unpublished data. Personal communication with environmental health division.
6. International Harm Reduction Association. (2015). What is harm reduction? A position statement from Harm Reduction International. Retrieved July 16, 2016. Available from: <http://www.ihra.net/what-is-harm-reduction>
7. Harm Reduction Coalition. (2015). Principles of Harm Reduction. Retrieved June 16, 2016. Available at: <http://harmreduction.org/about-us/principles-of-harm-reduction>
8. Durham Region Health Department. Quick Facts: Drug Use – Other. January 2013. Retrieved June 15, 2016. Available at http://www.durham.ca/departments/health/health_statistics/quickFacts/DrugUseOther.pdf
9. Durham Region Health Department. Trends In: Non-Medical Use of Prescription Opioid Pain Relief Pills. March 2016 Retrieved June 15, 2016. Available from: http://www.durham.ca/departments/health/health_statistics/trendsIn/NonMedicalPerscriptionDrugUse.pdf
10. Ontario Drug Policy Research Network. Opioid Prescribing and Opioid-Related Hospital Visits in Ontario. March 2016. Retrieved June 15, 2016. Available from: <http://odprn.ca/research/research-reports/opioid-prescribing-and-hospital-visits/>
11. Public Health Ontario. iPHIS Risk Factor Entry Guide. April 2013.
12. Durham Region Health Department. Facts About...Hepatitis C. October 2014. Retrieved June 13, 2016. Available from: http://www.durham.ca/health.asp?nr=/departments/health/facts_about/hepatitis_c.htm&setFooter=/includes/health/healthFooterDHCL2.inc
13. Ontario Ministry of Health and Long-Term Care. Infectious Diseases Protocol, 2015. Appendix A: Disease-Specific Chapters. Chapter: Hepatitis C. Toronto, ON: Queen's Printer for Ontario, 2009. Retrieved June 13, 2016. Available from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/hep_c_chapter.pdf
14. Durham Region Health Department. Facts About...HIV/AIDS. December 2015. Retrieved June 13, 2016. Available from: http://www.durham.ca/health.asp?nr=/departments/health/facts_about/hiv_aids.htm&setFooter=/includes/health/healthFooterDHCL2.inc
15. Ontario Ministry of Health and Long-Term Care. Ontario Public Health Standards. 2008. Retrieved July 11, 2016 from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/
16. Safeguarding our Communities Act (Patch for Patch Return Policy), 2015, S.O. 2015, c. 33. Retrieved June 13, 2016. Available from: <https://www.ontario.ca/laws/statute/15s33>
17. Health Canada. Notice: Prescription Drug List (PDL): Naloxone. March 22, 2016. Retrieved June 13, 2016. Available from: <http://www.hc-sc.gc.ca/dhp-mps/prodpharma/pdl-ord/pdl-ldo-noa-ad-naloxone-eng.php>
18. White P, Howlett K. Ontario, Ottawa expand free access to antidote for opioid overdoses. The Globe and Mail [Internet]. May 18, 2016. Retrieved June 15, 2016. Available from <http://www.theglobeandmail.com/news/national/ontario-to-make-free-antidote-to-opioid-overdose-available/article30076911/>
19. Health Canada. Regulatory decision summary TRUVADA. February 2016. Retrieved June 15, 2016. Available from <http://www.hc-sc.gc.ca/dhp-mps/prodpharma/rds-sdr/drug-med/rds-sdr-truvada-187173-eng.php>
20. Choopanya K, Martin M, Suntharasamai P, et al. Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok Tenofovir study): a randomized, double-blind, placebo-controlled phase 3 trial. Lancet. 2013 Jun 15; 381(9883):283-90.
21. Statistics Canada. Table 252-0077: Incident-based crime statistics, by detailed violations and police services, Ontario. July 2015. Retrieved June 15, 2016. Available from <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=2520077>



Durham Health Connection Line
905-666-6241 or 1-800-841-2729
durham.ca

If you require this information in an accessible format, contact 1-800-841-2729.



Oct. 16



Interoffice Memorandum

Date: November 10, 2016

To: Committee of the Whole

From: Dr. Robert Kyle

Subject: Basic Income Pilot

Health
Department

On November 3, 2016, the Ontario Ministry of Community and Social Services announced that it is seeking public input to help inform the design of a basic income pilot (attached).

The pilot would test whether a basic income is a more effective way of lifting people out of poverty and improving health, housing and employment outcomes.

The Ministry is consulting on key questions, including who should be eligible, where the pilot should take place, what the basic income level should be and how best to evaluate it.

The consultations will be guided, in part, by a discussion paper by the Honourable Hugh Segal, *Finding a Better Way: A Basic Income Pilot Project for Ontario* (attached – Executive Summary).

The consultation will run from November 2016 to January 2017. People can participate by:

- Attending a regional in-person discussion hosted by the Ministry
- Commenting online at ontario.ca/basic income.

In Ontario, medical officers of health are required to “[report] directly to the board of health on issues relating to public health concerns and to public health programs and services under this or any other Act” (sub-section 67.(1), *Health Protection and Promotion Act*).

Respectfully submitted,

Original signed by

R.J. Kyle, BSc, MD, MHSc, CCFP, FRCPC, FACPM
Commissioner & Medical Officer of Health

Ontario Seeking Input on Basic Income Pilot

Province Launching Consultations on Innovative Way to Deliver Supports

November 3, 2016 1:20 P.M.

Ontario is seeking public input to help inform the design of a basic income pilot, which is an innovative new approach to providing income security.

The pilot would test whether a basic income is a more effective way of lifting people out of poverty and improving health, housing and employment outcomes. Through the consultations, Ontario is seeking input from across the province, including from people with lived experience, municipalities, experts and academics. The province will also work with Indigenous partners to tailor a culturally appropriate engagement process that reflects the advice and unique perspective of First Nations, urban Indigenous, Métis and Inuit communities.

The province is consulting on key questions, including: who should be eligible, where the pilot should take place, what the basic income level should be and how best to evaluate it. The consultations will be guided, in part, by a discussion paper by the Hon. Hugh Segal, [Finding a Better Way: A Basic Income Pilot Project for Ontario](#), and will run from November 2016 to January 2017. People can participate by:

- Attending a [regional in-person discussion](#) hosted by the province.
- Commenting online at ontario.ca/basicincome.

Exploring innovative ways to deliver supports and services is part of our government's plan to create jobs, grow our economy and help people in their everyday lives.

QUOTES

" We are always looking for innovative, evidence-based solutions that can help us end poverty and improve public services to make them simpler, more efficient and more effective for the people who need them the most. This pilot is an opportunity to test that approach, and we look forward to hearing as many views as possible, including from people with lived experience, community partners and experts, to ensure we get it right."

- Dr. Helena Jaczek

Minister of Community and Social Services

" We know that many Ontarians are still living in poverty and that we must continue to look for ways to address this challenge. A basic income pilot is an innovative, evidence-generating tool that will help us identify what's working, measure our progress and expand our toolbox as we explore better ways to build a foundation for Ontarians to reach their full potential."

- Hon. Chris Ballard

Minister of Housing and the Minister Responsible for the Poverty Reduction Strategy

QUICK FACTS

- Finland, the Netherlands and Kenya are also looking at developing pilot projects that test the idea of a basic or guaranteed annual income.
- Y-Combinator, a California technology company has announced it will be piloting a Basic Income project that is expected to run for five years.
- The government will prepare a final report on what we heard during the consultations, and introduce a plan for the pilot by April, 2017.
- Organizations interested in hosting their own basic income pilot consultations can go to ontario.ca/basicincome for the consultation [guide](#).

LEARN MORE

- Join the [online consultations](#)
- Read the [summary of the Hon. Hugh Segal's recommendations](#)
- [About social services](#)

Lyndsay Miller Minister's Office
416-325-5572
Daniel Schultz Communications
416-212-3325

[Available Online](#)
[Disponible en Français](#)

Executive Summary

Finding a Better Way: A Basic Income Pilot Project for Ontario

A discussion paper by Hugh D Segal

1. Overall Considerations

- A pilot project must begin with an understanding of the costs of poverty, not only in present welfare and disability payments, but also in terms of added pressures on our health system, and the Ontario economy as a whole, through its impacts on economic productivity and existing government revenues.
- A pilot must take into consideration how the Guaranteed Annual Income Supplement in Ontario in the mid-1970s, aimed at residents over the age of 65, radically reduced poverty for this group. This led the way to the federal Guaranteed Income Supplement, for all Canadian residents over the age of 65.
- The main purpose of a Basic Income Pilot must be to test replacing the broad policing, control, and monitoring now present in Ontario Works and the Ontario Disability Support Program (ODSP), with a modestly more generous Basic Income, disbursed automatically to those living beneath a certain income threshold. Will a Basic Income reduce poverty more effectively, encourage work, reduce stigmatization, and produce better health outcomes and better life chances for recipients?
- Ontario should not duplicate similar pilots taking place over the same time period in other democracies, such as Finland or the Netherlands. What we test should be different, to maximize the diversity of various different data sets generated by such endeavours.
- The pilot should be structured to test the impacts of a Basic Income on the net fiscal position of the province, on labour market/work behaviours, on health and educational outcomes for recipients, on food security, on mobility and housing, and on net economic and community outcomes in targeted areas of the pilot.
- A pilot should take into consideration important new Ontario initiatives to reduce poverty, such as the Ontario Child Benefit (OCB), increases in the minimum wage, and constructive changes to student financial aid assistance, to name only a few.

- Age eligibility for the pilot should 18 to 65 years of age.¹
- While not specifically within the remit of an Ontario pilot, it is nevertheless recommended that the federal government consider partnering with any willing province on any Basic Income pilots now being considered or contemplated. This recommendation is motivated by the central role that federal agencies, such as Canada Revenue Agency (CRA), Statistics Canada, Employment and Social Development Canada and others, might well be invited to play in any provincial pilots. As was recently the case with discussions on the Ontario Retirement Pension Plan (ORPP) and the Canada Pension Plan (CPP), constructive provincial-federal engagement could well facilitate effective national action on poverty abatement.

2. Organization of a Basic Income Pilot

- The legitimacy of the pilot would be enhanced if it were managed by an arm's length consortium of not-for-profit research organizations. Various organizations in Canada and Ontario, university-based and free-standing, have the experience, expertise, and professional credentials to accomplish this task effectively.
- The Ministers should appoint two key groups to advise and oversee the pilot project.
 - The first group should be a Basic Income Pilot Advisory Council, whose main function should be to advise on and oversee the operations of the pilot. The Council should meet quarterly, and comprise a maximum of 35 individuals whose membership, once established, should be non-transferable. Members should include people with lived experience of poverty, First Nations peoples, community agencies who serve those in poverty, public sector actors, trade unions, business organizations, municipalities, health practitioners and health-focused organizations, agricultural associations, the Ministry of Finance (MOF), and the Ministry of Health and Long Term Care (MOHLTC).
 - The second group should be a Research Operations Group, which should be given the responsibility to run the pilot. This Research Operations Group should be headed by a competent researcher with standing and experience. Representatives of not-for-profit

¹ However, special attention should be given to ensure that the program does not represent a disincentive to education and training for young adults.

research organizations, such as the Institute for Clinical Evaluative Sciences (ICES), the Social Research and Demonstration Corporation of Canada (SRDC), universities and academic departments, and Statistics Canada should be invited to join this group.

- These two groups should each delegate two representatives to sit on a small joint steering committee. A Project Leader should also sit on the steering committee. The Project Leader should be selected based on recommendations received from the two groups, and from the Secretary of Cabinet.
- The government should also ensure that an Ethics Advisor and a Financial Officer be identified as part of the pilot's governance team. They would respectively ensure the protection of participants' privacy and rights, and ensure due financial diligence and probity in the pilot's operations.
- The pilot's key governing principles should include:
 - All participation is voluntary.
 - No individual will be made worse off during or after the pilot, as a result of participation in the pilot.
 - All personal data collected or accessed will be kept private by the research team.
 - Aggregate data in the form of preliminary results, once it starts to flow, must be accessible to Ontarians in a transparent fashion.

3. Key Evidence the pilot should generate

- The investigation of the Basic Income impacts should consider the following types of outcomes:
 - Health outcomes for participants in the pilot compared to those living in poverty and not in the pilot. Measurable outcomes should include: the number of primary care visits (for psycho-social, mental and physical health), the number of acute care/emergency departments visits, prescription drug use, utility-based measures of health, etc.

- Life and career choices made over the duration of the pilot by participants, such as training, family formation, fertility decisions, living arrangements, parenting time, etc.
- Education outcomes for participants and their children. Measurable outcomes should include high school completion, nature and number of courses taken by adults, etc.
- Work behaviour, job search and employment status. Measurable outcomes should include: the number of hours of paid work, the number of jobs held, the income earned on the labour market, the intensity and length of job search activities, etc. Participation in the underground economy should also be investigated.
- Community level impacts where the pilot operates in local areas, on a focused basis.
- Direct administrative costs or savings of replacing, for pilot recipients, ODSP and Ontario Works with a Basic Income.
- Changes in food security status for pilot participants.
- Perceptions of citizenship and inclusion for participants.
- Impact on mobility and housing arrangements.
- Impact for Basic Income participants in terms of their relationship to Employment Insurance, provincial and federal child benefits, and other existing social programs.

4. What the pilot should and should not test

- The pilot should test:
 - A Basic Income replacing Ontario Works and ODSP, paid to individuals.
 - A negative income tax (NIT), or refundable tax credit, that tops up all recipients to 75 percent of the Low-Income Measure, (LIM) regardless of their status in the labour market. For a single individual on Ontario Works, for example, this would correspond to having income support move from roughly 45 percent to 75 percent of the LIM, and to receive a minimum of approximately \$1320 per month, non-taxable, with an opportunity to keep partial additional income earned from participation in the labour market.
 - Individuals with disabilities receiving an additional monthly sum of at least \$500.

- A Basic Income that would not be associated with rules limiting earned income and work participation, such as those associated with Ontario Works and ODSP.
 - In a Randomized Control Trial (RCT) held in a major urban neighbourhood/community, different treatment arms should test for various levels of Basic Income (starting at 75 percent of the LIM) and different tax rates on income earned on top of the Basic Income. Testing different parameters should help identify the best combinations to reduce poverty, while not discouraging people from improving their incomes through labour force participation.
 - The pilot should also include saturation sites in which the community-level impacts of a Basic Income could be investigated. Ideally, one saturation site would be located in southern Ontario, one in northern Ontario, and one would be chosen and planned in close collaboration with First Nations communities.
- The pilot should not test:
 - A “Big Bang” approach, in which all social supports, including those not specifically related to poverty, would be replaced with a single monthly cheque.
 - A universal demogrant, under which all adult Ontarians, living in poverty or otherwise, would receive a fixed amount, taxed according to a general income tax schedule.

5. Implementation of the pilot

- The pilot should comprise three phases:
 1. Planning and selecting the pilot sites, seeking approval from privacy commissioners and data custodians to access and link the key existing data sources for the pilot evaluation, recruiting researchers and analysts, structuring the sample, recruiting participants, and obtaining their consent to access administrative data and records.
 2. Proceeding with the distribution of Basic Income payments (for a period of, minimally, three years), gathering quantitative and qualitative data through access to administrative records, questionnaires and interviews, making aggregate data/preliminary results available broadly and transparently.

3. Evaluating the pilot's results through data analysis, projecting long-term outcomes and consequences through micro-simulation and other analytical tools, evaluating the costs and benefits of replacing the current system of social assistance with a Basic Income.

6. Next Steps

- Upon the publication of this discussion paper, the province should seek suggestions and recommendations from the public.
- Ideally, the province should move forward to commence Phase 1 of the pilot before the end of March 2017.
- The three phases of the pilot should be given an operational duration, allowing for BI payments to flow for three years, at a minimum.
- In discussions with the federal government on poverty abatement initiatives, the idea of a Canadian Social Data Research Initiative (SDRI) should be pursued. Canada and all of the provinces would benefit immensely from a broad unit under federal-provincial sponsorship (as in the case of Canada Health Infoway and the Canadian Institutes for Health Research) that ensured the availability of current integrated social data sets. These data sets are necessary to make informed public, social, and economic policy decisions. They would be used by governments of any affiliation, at the municipal, provincial and federal levels, and by the private and not-for-profit sectors.



Interoffice Memorandum

Date: November 10, 2016

To: Committee of the Whole

From: Dr. Robert Kyle

Subject: Chief Public Health Officer's Report on the State of Public Health in Canada 2016: A Focus on Family Violence in Canada

Health
Department

On October 21, 2016, Dr. Gregory Taylor, Chief Public Health Officer of Canada released his Report on the State of Public Health in Canada 2016 (attached). Its focus is on family violence in Canada. The key messages of the report include the following:

- Family violence is an important public health issue.
- Family violence takes many forms, ranges in severity, and includes neglect as well as physical, sexual, emotional and financial abuse.
- Family violence is a complex issue that can happen at any point in a lifetime.
- Women, children, Indigenous peoples, people with disabilities and people who identify as lesbian, gay, bisexual, trans or questioning are at greater risk of experiencing family violence and its impacts.
- Violence against women and children is a public health issue of global importance.
- Family violence is complicated – no single factor can accurately predict when it will happen.
- People are reluctant to talk about family violence, meaning it often goes unreported.
- Preventing family violence includes changing beliefs and attitudes, building safe and supportive communities, supporting our youth, healthy families and relationships and promoting good health and well-being.
- More knowledge is needed about the effectiveness of prevention strategies and interventions in different situations.

In Ontario, medical officers of health are required to “[report] directly to the board of health on issues relating to public health concerns and to public health programs and services under this or any other Act” (sub-section 67.(1), *Health Protection and Promotion Act*).

Respectfully submitted,

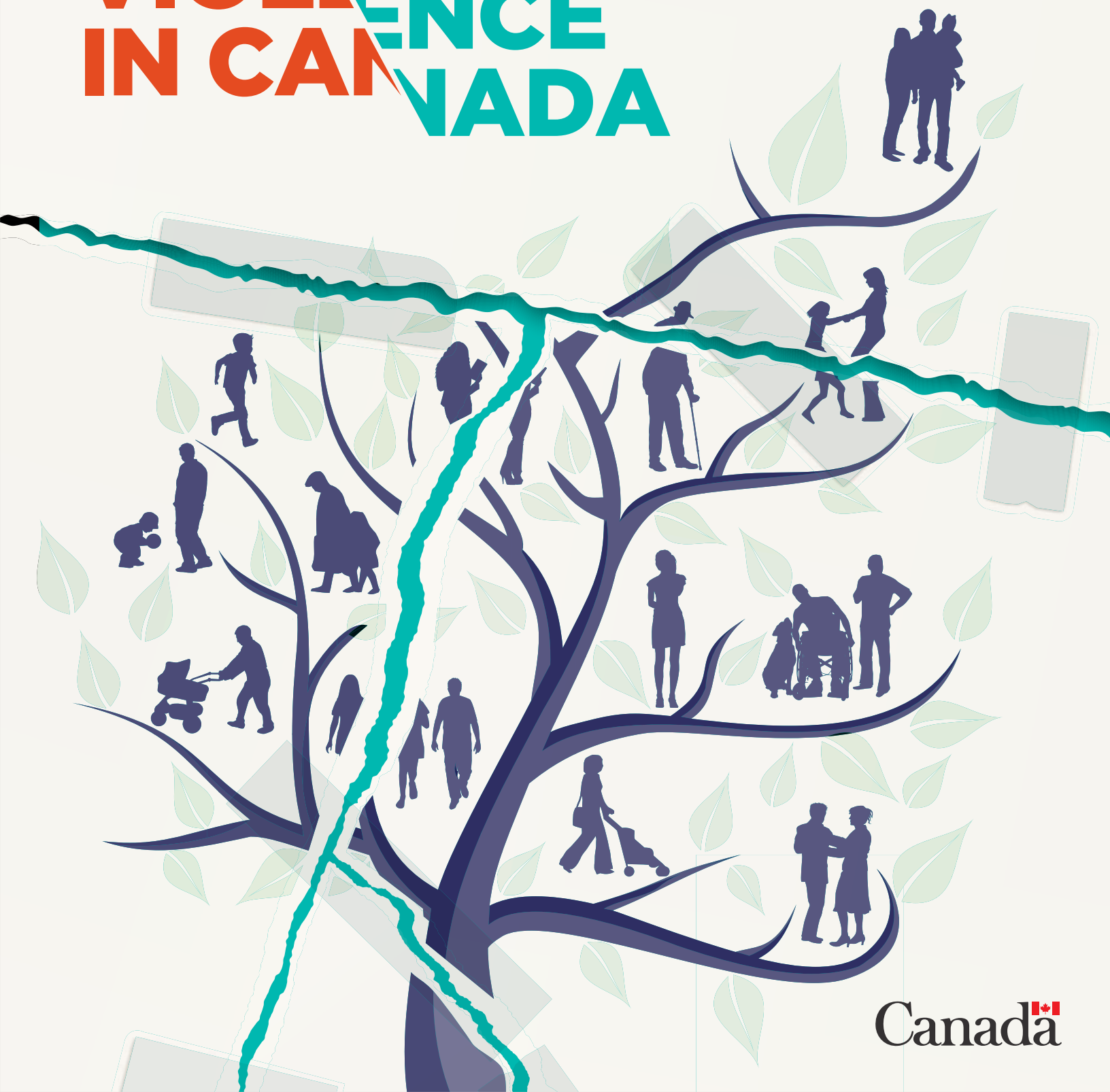
Original signed by

R.J. Kyle, BSc, MD, MHSc, CCFP, FRCPC, FACPM
Commissioner & Medical Officer of Health

The Chief Public Health Officer's Report on
the State of Public Health in Canada 2016

A FOCUS ON

FAMILY VIOLENCE IN CANADA



Également disponible en français sous le titre:

Rapport de l'administrateur en chef de la santé publique sur l'état de la santé publique au Canada 2016 — Regard sur la violence familiale au Canada

To obtain additional information, please contact :

Public Health Agency of Canada
Address Locator 0900C2
Ottawa ON K1A 0K9
Tel.: 613-957-2991
Toll free: 1-866-225-0709
Fax: 613-941-5366
TTY: 1-800-465-7735
Email: publications@hc-sc.gc.ca

This publication can be made available
in alternative formats upon request.

© Her Majesty the Queen in Right of Canada
as represented by the Minister of Health, 2016

Publication date: October 2016

This publication may only be reproduced for personal
or internal use without permission if the source is
fully acknowledged.

Cat: HP2-IDE-PDF
ISSN: 1924-7087
Pub: 160152

A MESSAGE FROM CANADA'S CHIEF PUBLIC HEALTH OFFICER

Families are the building blocks of our society and a safe haven to nurture children and our intimate relationships. Yet, some Canadians families are in crisis and the statistics are staggering. For many, this report may be difficult and disturbing to read.

In 2014, 131 Canadians died at the hands of a family member and there were 133,920 reported victims of dating or family violence, with the majority of victims being women. Just under 9 million Canadians have reported experiencing abuse before the age of 15 years.

Family violence impacts health beyond just immediate physical injury, and increases the risk for a number of conditions, including depression, anxiety, post-traumatic stress disorder, as well as high blood pressure, cancer and heart disease. Despite the work of many researchers, health care professionals, organizations and communities, we still do not have a good understanding of why family violence happens, nor do we know how best to intervene.

This report sheds light on a topic that can be hard to talk about. Family violence often remains hidden. Working together, we can unravel why, when, where, how, and to whom family violence happens and improve our efforts to support healthy Canadian families.



Dr. Gregory Taylor

Canada's Chief Public Health Officer



TABLE OF CONTENTS

2

ACKNOWLEDGEMENTS

3

KEY MESSAGES

4

CHALLENGES WITH DATA ON FAMILY VIOLENCE

5

WHAT THIS REPORT IS ABOUT

9

IMPACTS ON CANADIANS

20

INFLUENCING THE RISK FOR FAMILY VIOLENCE

25

LIFE COURSE PERSPECTIVE

32

PREVENTING FAMILY VIOLENCE

36

CLOSING COMMENTS

37

REFERENCES



ACKNOWLEDGEMENTS

Many individuals and organizations have contributed to the development of *The Chief Public Health Officer's Report on the State of Public Health in Canada, 2016: A Focus on Family Violence in Canada*.

I would like to express my appreciation to the consultants who provided invaluable expert advice:

- Dr. David Mowat, Canadian Partnership Against Cancer;
- Dr. Daryl Pullman, Memorial University;
- Dr. Elizabeth Saewyc, University of British Columbia;
- Dr. Harriet MacMillan, McMaster University, the Preventing Violence Across the Lifespan Research (PreVAiL) Network;
- Dr. Jeff Reading, University of Victoria;
- Dr. John Frank, University of Edinburgh;
- Dr. Margo Greenwood, University of Northern British Columbia, National Collaborating Centre for Aboriginal Health;
- Dr. Michael Routledge, Chief Provincial Public Health Officer, Manitoba;
- Dr. Peter Donnelly, President and Chief Executive Officer of Public Health Ontario, and;
- Dr. Peter Glynn, Health Systems Consultant.

In addition, I would also like to recognize contributions made by partners and stakeholders who were consulted on the report under tight timelines, including Status of Women Canada, Health Canada, the Royal Canadian Mounted Police, Justice Canada, Statistics Canada, the Canadian Institutes of Health Research, Canadian Women's Foundation, Dr. Nadine Wathen from Western University and the PreVAiL Network, Dr. Debra Pepler from York University and the Promoting Relationship and Eliminating Violence Network (PREVNet) and Dr. Wendy Craig from Queen's University and PREVNet.

I would also like to sincerely thank the many individuals and groups within the Public Health Agency of Canada for all of their efforts related to the development of my report, including representatives from the Family Violence Prevention program and the Health Promotion and Chronic Disease Prevention Branch: Dr. Lil Tonmyr, Jennifer Shortall, Jessica Laurin, Matthew Enticknap, Natasha Kuran, Shanna Sunley, Shannon Hurley, Sherrill MacDonald, Simone Powell, Sydney Millar, Tanya Lary, Tracey Reynolds and Dr. Wendy Hovdestad; and notably the members of my report unit and support staff: Dr. Stephanie Rees-Tregunno, Michael Halucha, Judith O'Brien, Rhonda Fraser, Meheria Arya, Fatimah Elbarrani, Crystal Stroud, Michelle MacRae and Lori Engler-Todd.



KEY MESSAGES

Family violence is an important public health issue. Its impacts on health go beyond direct physical injury, are widespread and long-lasting and can be severe, particularly for mental health. **Even less severe forms of family violence can affect health.**

Some Canadian families are experiencing unhealthy conflict, abuse and violence that have the potential to affect their health. Known collectively as family violence, it takes many forms, ranges in severity and **includes neglect as well as physical, sexual, emotional, and financial abuse.** People who experience family violence need to be supported while people who are abusive or violent need to be held accountable.

Family violence is a complex issue that can happen at any point in a lifetime. In Canada:

- An average of **172 homicides is committed every year by a family member.**
- For approximately **85,000 victims of violent crimes, the person responsible for the crime was a family member.**
- **Just under 9 million, or about one in three Canadians,** said they had experienced abuse before the age of 15 years.
- **Just under 760,000 Canadians** said they had experienced unhealthy spousal conflict, abuse or violence in the previous five years.
- More than **766,000 older Canadians** said they had experienced abuse or neglect in the previous year.

Women, children, Indigenous peoples, people with disabilities, and people who identify as lesbian, gay, bisexual, trans or questioning are at greater risk of experiencing family violence and its impacts. **Women are more likely than men to be killed by an intimate partner and more likely**

to experience sexual abuse, more severe and chronic forms of intimate partner violence, particularly forms that include threats and force to gain control. Women are also more likely to experience health impacts.

Violence against women and children is a public health issue of global importance. Global data show that one out of every three women will experience physical or sexual abuse in their lifetime. Approximately 18% of women and almost 8% of men say they have been victims of sexual abuse as children.

Family violence is complicated — no single factor can accurately predict when it will happen. Different combinations of factors at the individual, family, relationship, community and societal level affect the risk for family violence. Examples of factors include beliefs about gender and violence, and relationship characteristics such as power and control.

People are reluctant to talk about family violence, meaning it often goes unreported.

Reasons for not reporting family violence include fear and concerns about safety, stigma, and not being believed. In some cases, people believe it is a personal matter or not important enough. They may also be dependent on the person who is being abusive or violent.

Using what we know about the social determinants of health can help prevent family violence and build effective ways to address it.

Approaches to prevention include changing beliefs and attitudes, building safe and supportive communities, supporting our youth, healthy families and relationships and promoting good health and well-being.

More knowledge is needed about the **effectiveness of prevention strategies and interventions** in different situations.

Challenges with data on family violence

[Statistics Canada](#) regularly reports on family violence in Canada through the analysis of data from police reports and population surveys. These two data sources complement each other, but are not directly comparable. Information from child welfare investigations are collected through the Public Health Agency of Canada's [Canadian Incidence Study of Reported Abuse and Neglect](#).

Collecting and interpreting data on family violence can be challenging for many reasons, including:

People are reluctant to talk about family violence.¹⁻⁶

- They fear for their safety or the safety of their children.
- They depend on the family member who was abusive or violent.
- They have feelings of blame, shame or denial.
- They think that no one will believe them, that they will be blamed or judged or that they will be arrested.
- They do not want anyone to know and feel that it is a personal matter.
- They feel it was minor or not important enough. They addressed it through other means.

There are different definitions of family violence. Not all surveys use the same definition of family violence. Nor do they all measure the same types of family violence.^{7,8} Emotional abuse and neglect are the most difficult types to measure because they are hard to define and identify.^{7,9}

Family violence is difficult to measure.^{7,10-20}

- Police and child welfare data only capture incidents that come to the attention of authorities. Population surveys capture a wider range of incidents, including those that are not reported. Both are important for understanding the scope of family violence in Canada.
- Population surveys do not always measure all forms of family violence or information on how often someone is experiencing it. One piece of data can include a wide range of behaviours.
- Changes in survey data over time can reflect changes in reporting methods or in attitudes that may affect how people answer questions.
- It can be difficult to interpret rates of family violence in small populations. High rates of family violence in small populations can be due to a small number of incidents. In these cases, a small change in the number of incidents can lead to a large change in the rate.
- Data are not always divided into sub-groups. This means there can be limited information for groups at higher risk for family violence, such as Indigenous populations.
- How questions are worded in population surveys can affect the results. This means comparing across different surveys can be a problem.
- Population surveys rely on people's memory of past events. For family violence, these surveys provide reasonably good estimates. If anything, they likely underestimate the issue.



WHAT THIS REPORT IS ABOUT

This report explores why family violence is an important [public health](#) issue for Canadians.

Healthy families are the backbone of strong and productive individuals, communities and societies.²¹⁻²⁵ They come in many shapes and sizes and are safe havens that provide food, warmth, shelter, security, support, safety and love.

Family violence is an indicator of families in crisis and in need of help. In 2014, 323,643 Canadians were victims of a violent crime reported to the police. For approximately 85,000 of these victims, the person responsible for the crime was a family member.¹⁰

Only 30% of Canadians said that the police became aware of incidents where their spouse had been violent or abusive. This means that many incidents of family violence never come to the attention of the police.¹⁰

NEED HELP OR MORE INFORMATION ON FAMILY VIOLENCE?

Please see the following websites:

- The Public Health Agency of Canada's [Stop Family Violence](#) website.
- The Department of Justice's [Family Violence](#) website.
- The Status of Women's [Preventing Abuse](#) website.
- The Royal Canadian Mounted Police's [Family Violence](#) website.
- The [National Aboriginal Circle Against Family Violence](#) website.

If you or someone you know are in immediate need of help, call 911 or your local police emergency number.

WHAT IS FAMILY VIOLENCE?

For this report, **family violence includes violence, abuse, unhealthy conflict or neglect by a family member toward a family member that has the potential to lead to poor health.** In this context, family members include intimate partners. Research on [family violence](#) most often focuses on child maltreatment (also known as child abuse and neglect), intimate partner violence (also known as spousal violence, dating violence, domestic violence or abuse) and mistreatment of older adults (also known as elder abuse and neglect).

The following are common types of family violence.

Physical abuse: a physical act such as pushing, hitting, slapping, kicking, pinching, choking, stabbing, shooting, throwing objects or burning.

Sexual abuse: any type of forced sexual activity or sexual coercion at any age. Any sexual contact with a child under the age of 16 years is a crime as is sexual activity that exploits children under the age of 18 years*.

Emotional abuse: words or actions to control, frighten or destroy someone's self-respect.

Financial abuse: control or misuse of someone's money or property.

Neglect: not providing basic needs (e.g., food, adequate clothing, health care, protection from harm).

Exposure to intimate partner violence: when children are aware of intimate partner violence that is happening in their home.

* There are exceptions for non-family members who are close in age. See the [Criminal Code of Canada](#).

WHO EXPERIENCES FAMILY VIOLENCE IN CANADA?

To understand how many Canadians are at risk for poor health from family violence, we need to know how many Canadians have experienced it.

When Canadians were asked questions about family violence, abuse and conflict, data showed that:



An estimated 9 million or a third of Canadians over the age of 15 years said they had experienced abuse before the age of 15 or 16 years.^{2,26,27}



About 760,000 or 4% of Canadians over the age of 15 years said they had experienced intimate partner violence in the previous five years.¹⁰



Over 766,000 or 8% of Canadians over the age of 55 years said they had experienced abuse or neglect in the previous year.²⁷

Some Canadians are at higher risk for family violence.



Women are more likely than men to experience more severe and frequent violence from a spouse or someone they are dating.¹⁰



Indigenous women are more likely to experience family violence than non-Indigenous people.¹⁰



People with disabilities are more likely to experience violence from a spouse, especially more severe types of violence, than people without a disability.²⁸



People who identify as lesbian, gay, bisexual, trans or questioning (LGBTQ) are more likely to experience abuse or neglect during childhood, bullying and violence from a spouse or someone they are dating.^{10,29-31}

Why focus on family violence?

Family violence has widespread and long-lasting effects on health. It is more likely to affect those who are more vulnerable, marginalized or facing inequities. People who experience family violence are more likely to have:^{10,26,32-71}

- Mental health issues like depression, post-traumatic stress disorder and anxiety;
- Physical health issues like injuries as well as diseases and conditions such as cancer and arthritis, and;
- A shorter life expectancy.

Some people are at higher risk for health impacts, especially for mental health issues. Examples include women, young children, Indigenous peoples and people who experience more severe types of family violence.^{10,26,32,60,72-81}

How family violence leads to poor health is complicated. This makes it hard to know how many Canadians are in poor health due to family violence. Economic costs related to coping with poor health from family violence in Canada are significant.^{82,83} For child abuse and neglect, costs for health care, social services, and personal costs (e.g., therapy) in 1998 were estimated at almost \$4 billion per year.⁸² For spousal violence, costs for health care in 2009 were estimated at \$200 million per year. Costs related to pain, suffering and loss of life were estimated to be \$5.5 billion per year.⁸³

Addressing violence against women and children is a global priority: Global data estimate that 35% of women have experienced physical or sexual violence in their lifetime. About 23% of women and men experienced physical abuse in childhood and 18% of women and almost 8% of men said they had experienced sexual abuse in childhood.⁸⁴⁻⁸⁶ Beliefs that discriminate against women and children, that support violence and that lead to power and control issues in relationships are some reasons why women and children are at high risk for experiencing violence.⁶⁹ In Canada, addressing violence against Indigenous women and girls has become a priority. In 2016, the Government of Canada launched an independent national inquiry into missing and murdered Indigenous women and girls.

Can family violence be prevented?

There is no one reason that can explain why family violence happens. What leads to family violence is a mix of individual, family, social, community and societal factors.^{e.g., 87-89} The complexity of family violence has made it difficult to develop effective ways to prevent it. Research is evolving to better identify opportunities and challenges to address family violence.

Because family violence involves individuals, families, communities and societies, everyone is responsible for stopping it. Reinforcing the [principles of public or population health](#) can play an important role. Changing beliefs and attitudes, creating safe and supportive communities, promoting healthy families and relationships and targeting populations at risk are all ways to work towards preventing family violence.

What this report covers:

This report explores how and why family violence is an important public health issue for Canadians and what can be done about it. Included in this report are the following sections:

- **Impacts on Canadians** explores the extent of family violence in Canada and its impacts on the health and well-being of Canadians.
- **Influencing the risk for family violence** examines various individual, family/social, community and societal factors that influence the risk for family violence.
- **Life course perspective** provides a snapshot of family violence over the lifespan by exploring child maltreatment, intimate partner violence and mistreatment of older adults.
- **Preventing family violence** looks at how approaches and practices are addressing family violence through [primary prevention](#).



IMPACTS ON CANADIANS

To stop family violence and its effects on health, we need to understand who is experiencing it and how it affects health. Outlined in this section is a snapshot of who in Canada is experiencing family violence, how much it is costing Canadians and how it can lead to early death and poor health.

Family violence in Canada

In 2014, police reports showed that there were over 85,000 victims of family violence in Canada.¹⁰ When dating violence is included, this number increases to 133,920 victims.¹⁰ About 96,000 of these victims were women and almost 20,000 were under the age of 20 years.¹⁰ Like other types of violent crime, family violence reported to the police has decreased across Canada over the past four years (see Figure 1).^{10,20}

Recent population survey data show that:

- An estimated 9 million or 30% of Canadians over the age of 15 years said they had experienced abuse before the age of 15 or 16 years.^{2,26,27}
- An estimated 760,000 or 4% of Canadians over the age of 15 years said they had experienced spousal conflict, abuse or violence in the previous five years.¹⁰
- An estimated 4.2 million or 14% of Canadians over the age of 15 years said they had experienced emotional abuse from a spouse or common-law partner at some point in the past.¹⁰
- An estimated 900,000 or 3% of Canadians over the age of 15 years said they had experienced financial abuse from a spouse or common-law partner at some point in the past.¹⁰

- An estimated 766,000 or 8% of Canadians over the age of 55 years said they had or neglect from a family member in the previous year.²⁷

When Canadians were asked about their experiences of conflict, abuse and violence in their current or population surveys show that rates have decreased in the provinces, but not the territories (see Figure 2). This decrease appears to be mostly due to the fact that severe spousal violence decreasing.^{4,5,10}

Why family violence is decreasing is not clear. One reason could be that younger generations are less likely to have experienced family violence than older generations. There are some data to support this idea. In the territories in 2014, 45% of Indigenous peoples between the ages of 45 to 64 years and 26% between the ages of 15 to 34 years said they had experienced abuse or neglect before the age of 15 years.³ This is not solely related to family violence and may also reflect the residential schools experience. Data from the United States show that women born between 1966 and 1975 were less likely to have experienced intimate partner violence than women born between 1946 and 1955.⁹¹

FIGURE 1:
POLICE-REPORTED FAMILY VIOLENCE, 2010 AND 2014.^{10, 20}

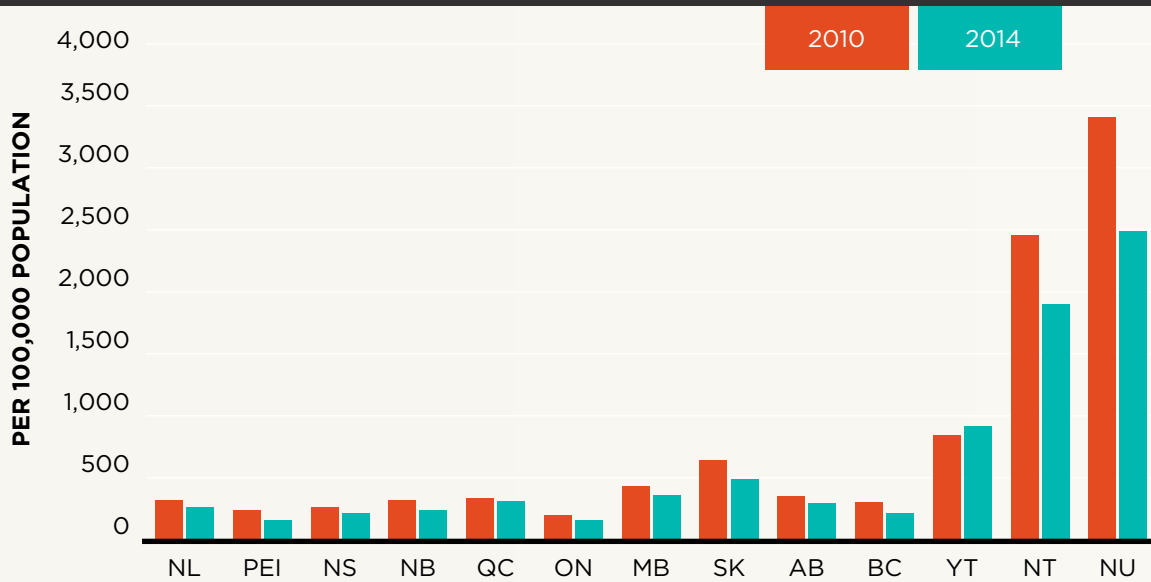
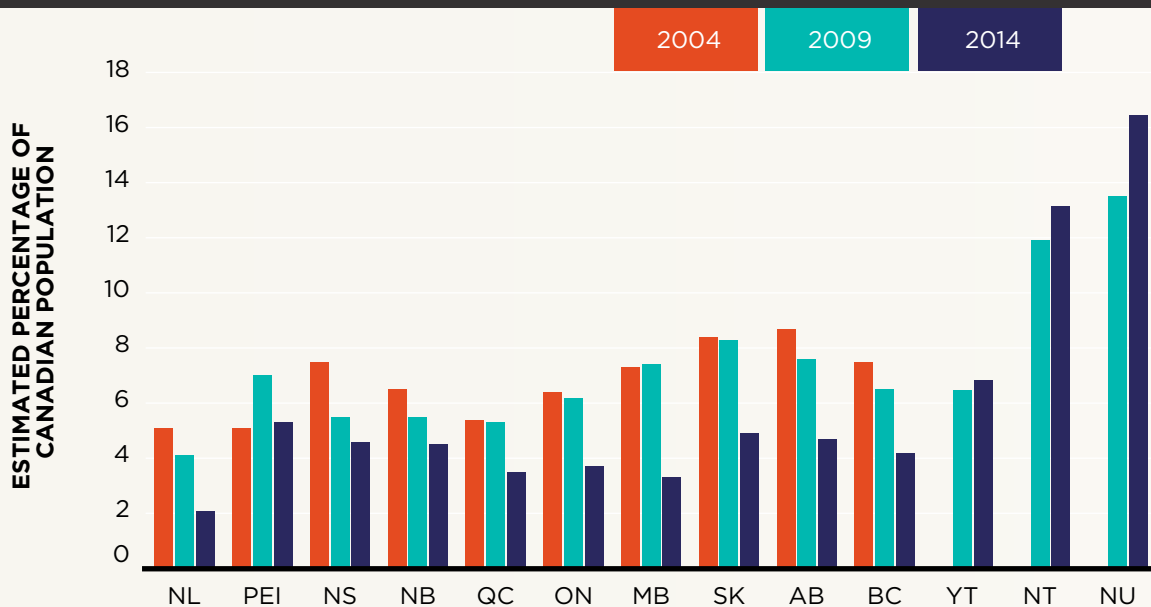


FIGURE 2:
SELF-REPORTED SPOUSAL VIOLENCE IN CANADA, 2004, 2009 AND 2014.^{3, 10, 90}



Notes on the data: Information was collected from Canadians ages 15 years and older and represents spousal violence experienced in the previous five years. Includes legally married, common-law, same-sex, separated and divorced spouses. Information for the territories was not available for all years. For 2009, caution is needed for comparisons of data because data were collected slightly differently in the provinces and territories.

Canadian populations and family violence

Certain populations in Canada are more likely to experience family violence, more severe types and/or more severe impacts. Examples include:

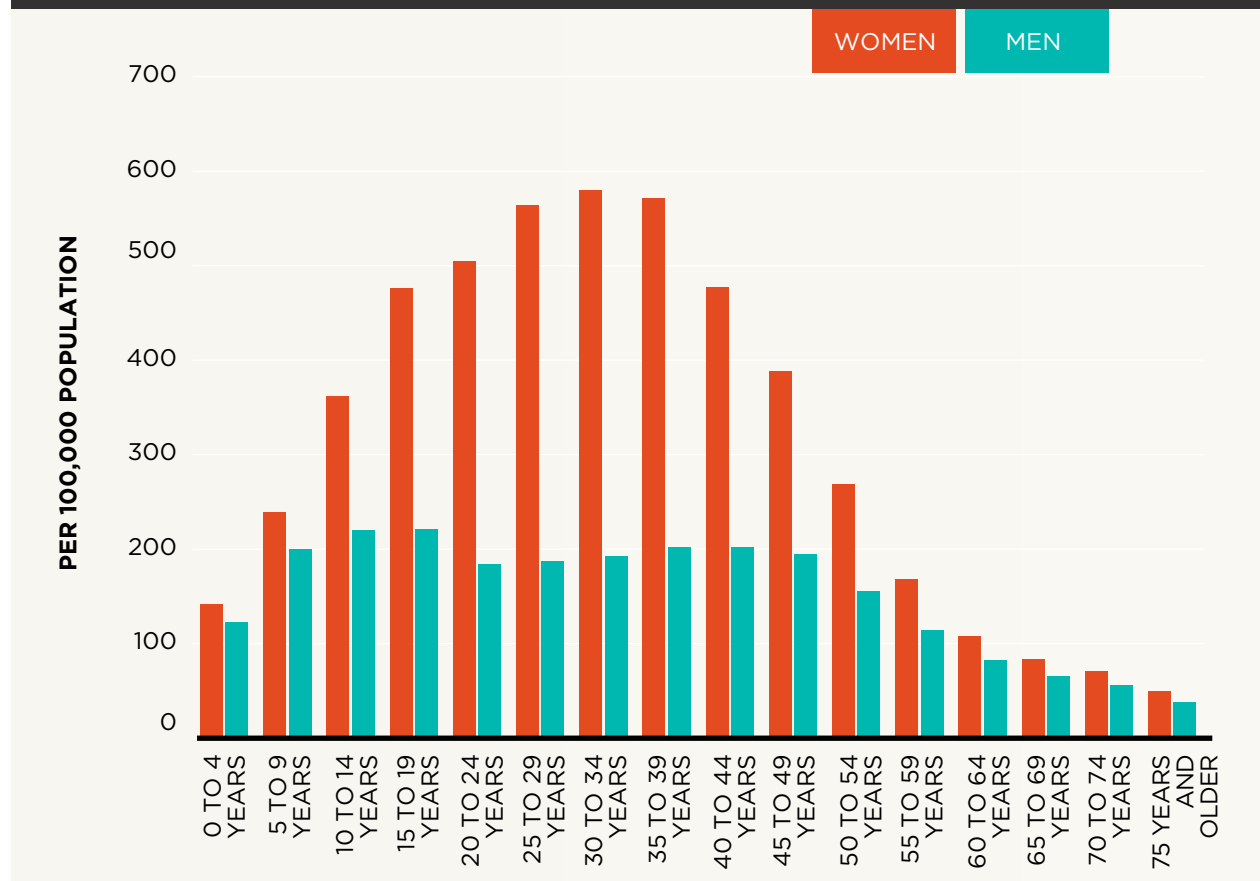
Women: For family violence that is reported to police, women are more likely than men to experience family violence at all ages (see Figure 3).¹⁰ In 2014, 57,835 women and 27,567 men were victims of police-reported family violence.¹⁰

Population surveys show that in their lifetime, women are more likely to be a victim of family violence than men.^{84,85,92} In 2010, global data estimated that 30% of women experience physical or sexual intimate partner violence at some point in their life.^{84,85} In high income countries, which included Canada, the proportion was 21%.⁸⁵ In 2012, data from two cities in Ontario and Quebec showed the following:⁹²

- 29% of women and 15% of men said they had experienced emotional abuse from a family member at least once in their lifetime.
- 15% of women and 6% of men said they had experienced physical abuse from a family member at least once in their lifetime.

Canadian data show that women are two to four times more likely than men to experience sexual abuse in childhood or in their marriage or common-law relationship.^{10,26,93} Police reports and child welfare investigations find that girls and boys are equally likely to have experienced other types of abuse.^{58,71} Population surveys show that women are more likely than men to say they experienced sexual abuse or were aware of their parents' intimate partner violence in childhood. They were less likely to say they had experienced physical abuse in childhood (see Figure 4).²⁶

FIGURE 3:
POLICE-REPORTED FAMILY VIOLENCE, 2014.¹⁰

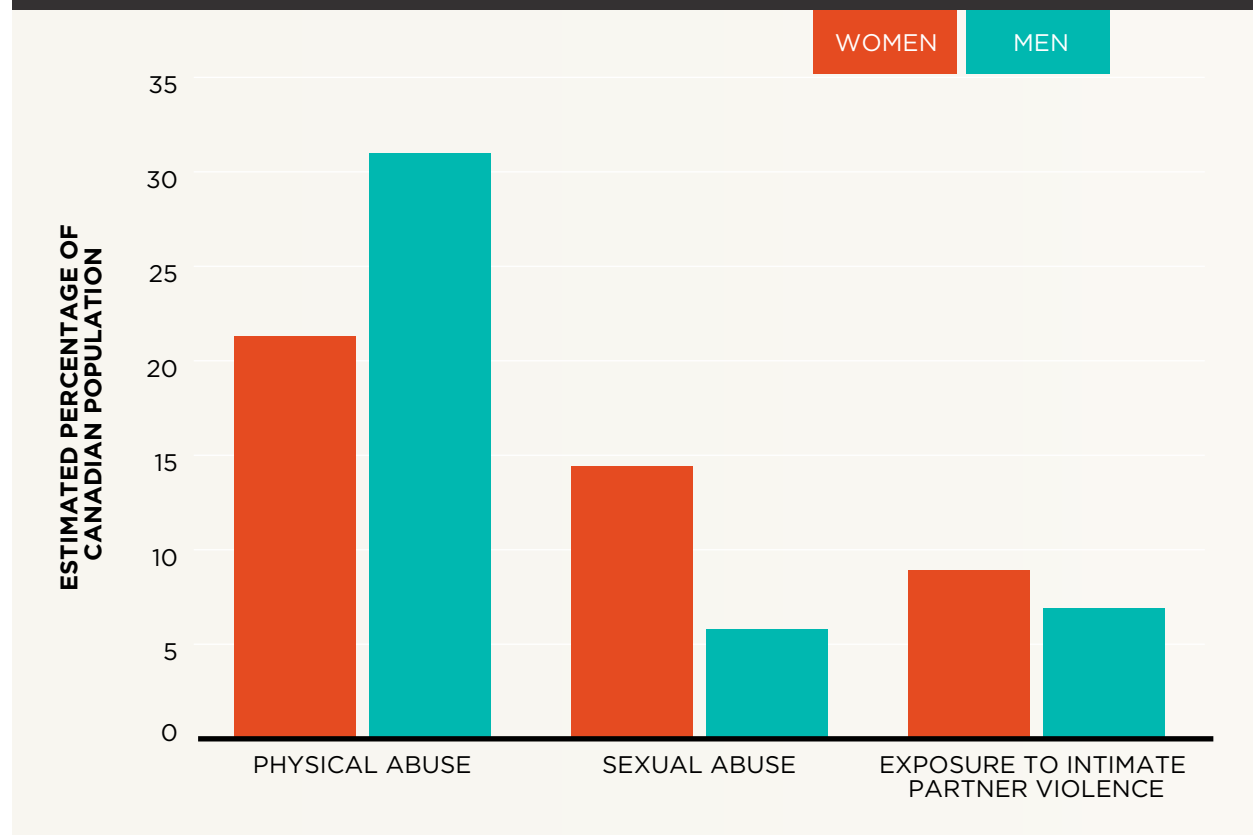


Data from a population survey in 2014 showed that 341,502 or 4% of Canadian women and 418,163 or 4% of Canadian men said they had been a victim of unhealthy conflict, abuse or violence within their marriage or common-law partnership at least once in the previous five years.¹⁰ Women were more likely than men to experience more severe types of intimate partner violence, to experience poor health as a result of intimate partner violence and to be killed by an intimate partner.^{4,10}

Indigenous women are also more likely to experience child abuse or violence within their marriage or common-law partnership than Indigenous men. In 2014:⁷²

- 14% of Indigenous women and 5% of Indigenous men said they had experienced physical and sexual abuse in childhood.
- 10% of Indigenous women and 8% of Indigenous men said they had experienced violence committed by a spouse or common-law partner in the previous five years.

FIGURE 4:
SELF-REPORTED CHILD ABUSE OR EXPOSURE TO INTIMATE PARTNER VIOLENCE, 2012.²⁶



Notes on the data: Information was collected from Canadians ages 18 years and older. Excludes Canadians living in the territories, Indigenous communities or institutions. Does not include full-time members of the Canadian Forces.

Indigenous populations: [Indigenous populations](#) are diverse and include First Nations, Métis and Inuit. Family violence in Indigenous communities is the result of many factors including gaps in health and social services, lack of safe places or housing, political and historical context, concerns about the justice system and violence being seen as a normal way to behave. Indigenous women who seek help often need to leave their community. This can mean that they have to leave their sources of support and culture behind.⁹⁴ Indigenous peoples may be reluctant to seek help due to the stigma and discrimination they can experience in the health care system.⁹⁵

Indigenous peoples are more likely to experience child abuse and spousal violence than non-Indigenous people. In 2014:^{10,72}

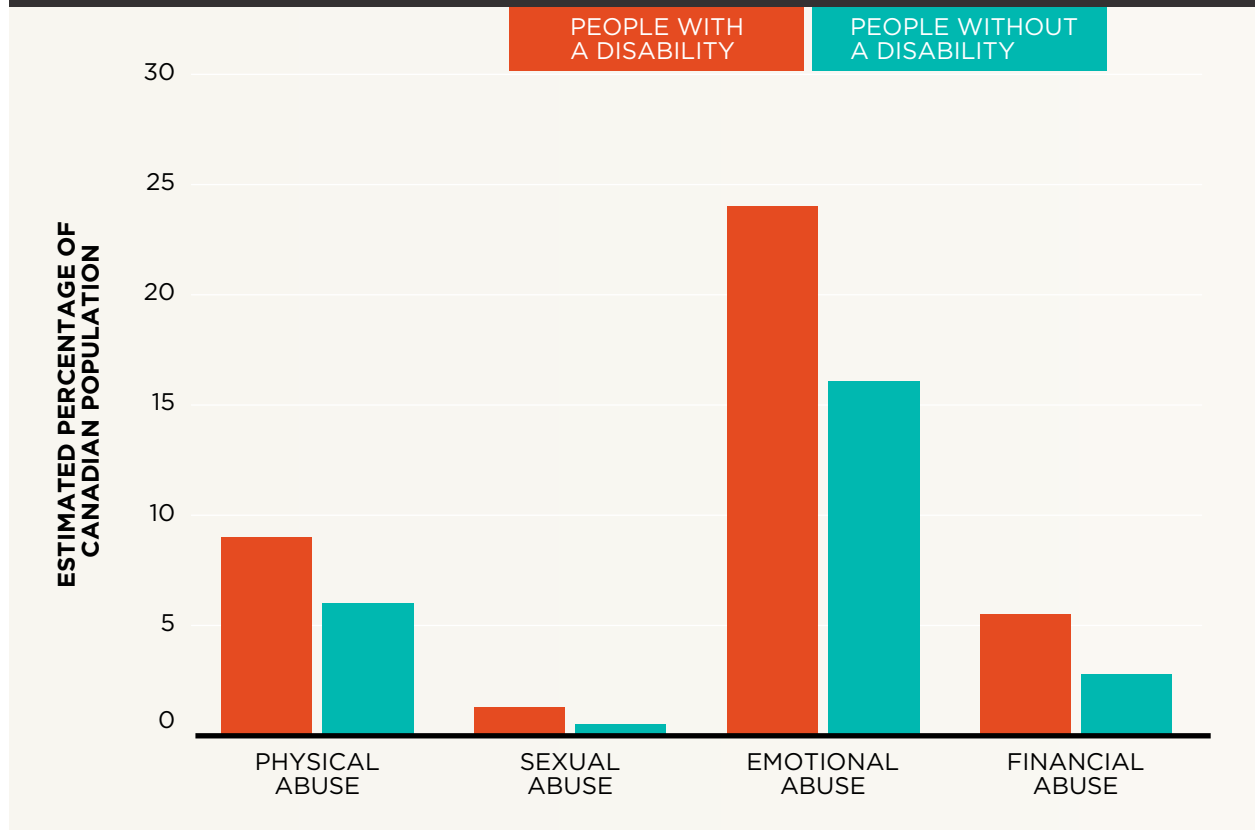
- 40% of Indigenous peoples and 29% of non-Indigenous people said they had experienced abuse before the age of 15 years.
- 9% of Indigenous peoples and 4% of non-Indigenous people said they had experienced unhealthy conflict, abuse or violence committed by a spouse or common-law partner in the previous five years.
- 10% of Indigenous women and 3% of non-Indigenous women said they had experienced unhealthy conflict, abuse or violence committed by a spouse or common-law partner in the previous five years.

- Indigenous women were also more likely to report experiencing more severe types of spousal violence and more severe impacts on health than non-Indigenous women.
- Unlike for non-Indigenous women, spousal violence for Indigenous women has not decreased over time.

People with disabilities: People who have a physical disability, health problem or mental health issue that limits their daily activity are more likely to experience spousal violence or sexual violence than people without these types of health issues (see Figure 5).^{28,111-113} This is especially true for women.¹¹⁴

Intergenerational trauma is a significant issue for some Indigenous communities. For these communities, it is often related to [residential schools](#) as well as historical and political contexts.⁹⁶⁻¹⁰⁸ Intergenerational trauma happens when a traumatic event not only affects people who experience it, but when it also affects their children and sometimes, grandchildren. For example, children of Indigenous peoples who experienced trauma from residential schools are at higher risk for depression.¹⁰⁰ Other examples of the long-term effects of the residential school experience include loss of traditional knowledge, poor community health, intergenerational stress, disparities in the social determinants of health and disruptions to ethnic and cultural identity.^{99,103,109,110}

FIGURE 5:
SELF-REPORTED SPOUSAL VIOLENCE, 2004.²⁸



Notes on the data: A person with a disability is defined as people who said they had difficulty in their daily lives or had a physical disability, health problem or mental health issue that affected their daily activities. Information was collected from Canadians ages 15 years and older and represents spousal violence experienced in the previous five years. Incidents of physical or sexual abuse happened within the previous five years while incidents of emotional or financial abuse happened at any point.

Lesbian, Gay, Bisexual, Transgendered, Queer, Questioning, Intersex and Two-spirited (LGBTQQI2S) community: Data on family violence in the LGBTQQI2S community are limited in Canada, so it is hard to know the full scope of the issue. In 2014, 8% of same-sex partners said they had experienced intimate partner violence in the previous five years compared to 4% of heterosexual partners.¹⁰ For same-sex partners, this is a decrease from 21% in 2004.¹⁰ Research shows that people who identify as LGBTQ are more likely to experience child abuse and neglect, bullying, sexual harassment from peers, dating violence and violence in a marriage or common-law relationship.^{10,29-31}

For people who identify as LGBTQ, there are several additional factors that can affect their risk for family violence:^{29-31,115-120}

- Family acceptance is a key issue for LGBTQ youth. It can influence self-esteem and social support as well as physical and mental health.
- Lesbian or bisexual women and gay or bisexual men can face challenges related to gender stereotypes. For women, it can be the belief that women are not violent. For men, it can be the belief that men are violent and do not talk about experiencing violence or abuse.

- Other factors include:
 - Stress from being part of a minority group;
 - The threat of being exposed as being LGBTQ;
 - Disclosure of HIV status if relevant;
 - Gender role conflict;
 - Social stigma;
 - Violence external to the relationship, and;
 - Lack of specific support services.

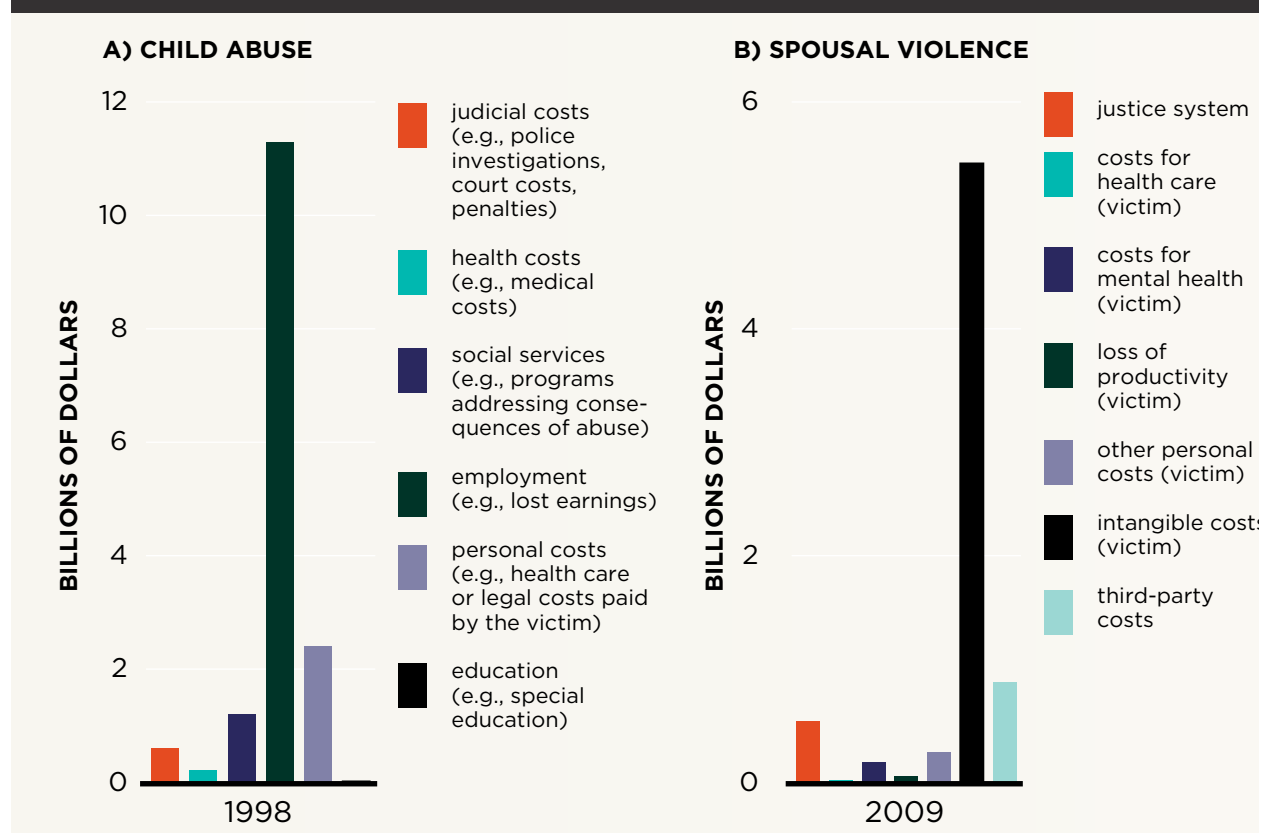
in Canada is high. It is unclear whether or not these costs have changed over time, as data are not available to make the comparison. Data from 1998 estimate that child abuse and neglect costs Canadians almost \$16 billion per year (see Figure 6).⁸² Data from 2009 estimate that spousal violence costs Canadians almost \$7.4 billion per year (see Figure 6).⁸³

For child abuse and neglect, the largest costs are related to lost earnings.⁸² For spousal violence, the largest costs are related to intangible costs. These costs include an estimate of how much pain, suffering and loss of life that is caused by spousal violence costs Canadians.⁸³

Economic costs of family violence

To date, studies on how much family violence costs Canadians have been limited. Older data suggest that the economic cost of family violence

FIGURE 6:
ESTIMATED TOTAL COSTS IN CANADA PER YEAR OF:
A) CHILD ABUSE AND NEGLECT IN 1998;
B) SPOUSAL VIOLENCE IN 2009.^{82, 83}



Mortality

Violence, abuse and neglect increase the risk for early death by homicide and suicide, as well as from diseases and conditions that are related to family violence.^{94,121-129} Data on suicides related to family violence, deaths by diseases and conditions related to family violence and deaths due to neglect are limited or lacking.

In 2014, there were 516 homicides in Canada. Of these, 131 or 34% of victims were killed by a family member. Like homicides in general, the number of family homicides have been decreasing, from 229 in 1985 to 131 in 2014.^{10,121} Which family member is mostly likely to be accused of a family homicide depends on the age and gender of the victim:

- For infants and children, parents are most likely to be accused of the crime.¹³⁰
- Women are more likely than men to be killed by a spouse, common-law partner or dating partner.¹⁰
- For older adults, a spouse was most likely to be accused of the crime when older women were victims of family homicide. Adult children were most likely to be accused when older men were victims.¹⁰

Impacts on physical and mental health

Family violence has widespread and long-lasting impacts on health. When thinking about these impacts, there are a few points to keep in mind:

- Because it happens early in life, child maltreatment provides the clearest example of family violence having long-lasting effects on physical and mental health.^{e.g., 59,131} Child maltreatment changes how children develop, increasing the risk for poor health later in life.¹²⁹
- Even less severe forms of violence can affect health. For example, physical punishment can negatively affect a child's health.^{34,132,133}
- Research on how intimate partner violence affects health has largely focused on women. When men's health is affected by intimate partner violence, the effects are mostly the same types of diseases and conditions as those experienced by women.^{e.g., 73,146} Women tend to

experience a wider range of and more severe impacts on their health than men.^{4,10,73,147}

- Not much research is available on how the mistreatment of older adults affects their health and well-being.

Outlined in Figure 7 is a simplified picture to show how family violence directly and indirectly affects health.

Can health impacts be 'reversed'?

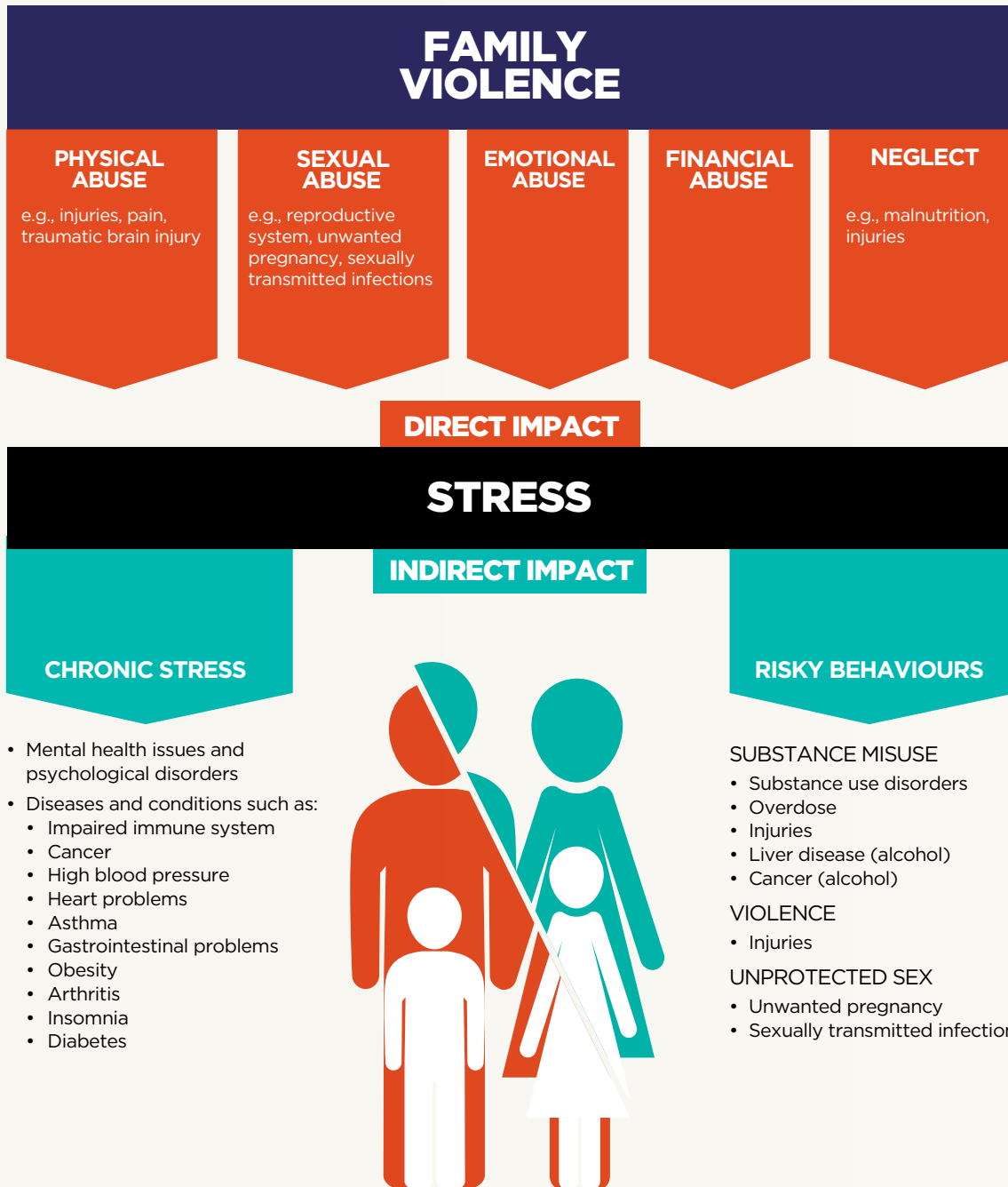
The [English and Romanian Adoptees](#) studies examined neglect in a group of Romanian orphans. These orphans showed many developmental delays and difficulties bonding with caregivers. Adoption in the United Kingdom before the age of six months improved many of these delays in most children. Some children who were adopted at a later age also showed improvement.¹³⁴⁻¹⁴⁵

Health impacts on Canadians: In 2014, almost 250,000 or one out of three Canadians who had experienced spousal violence also experienced physical injuries such as bruises, cuts or broken bones. Between 129,000 and 281,000 or 17% to 37% said they were upset, confused, frustrated, angry, hurt, disappointed, depressed, fearful or shocked. About 59,000 or 32% of Canadians who experienced more severe spousal violence said they had similar effects as the symptoms of post-traumatic stress disorder.¹⁰ This represents only a portion of the impacts of family violence on the health of Canadians.

Indirect impacts: It might seem incredible that family violence increases the risk for getting diseases such as cancer and arthritis and that different types of child maltreatment can all affect health in the same way.^{32,61,160} Researchers think this is happening because different types of family violence are all stressful and increase the risk for risky and unhealthy behaviours:

- **Family violence as a chronic stressor:** Family violence is stressful. Chronic stress, especially early in life, can lead to poor health.^{43,129,161-199}

FIGURE 7:
 A SIMPLIFIED PICTURE OF HOW FAMILY VIOLENCE LEADS TO HEALTH IMPACTS.^{26, 32-71, 127, 128, 131, 132, 147-159}



There are many theories on why this happens. Examples of the effects of chronic stress include changes to how the immune system works and how cells in the human body divide.^{129,162,165,200-203} This might explain how experiencing family violence can increase the risk for getting diseases such as heart disease or dementia.¹²⁹

- **Family violence and risky behaviour:** Family violence can lead to risky and unhealthy behaviours such as heavy alcohol consumption, drug use, smoking, unhealthy eating and unsafe sex.^{60,204-211} These behaviours increase the risk for a wide range of diseases and conditions. Examples include sexually transmitted diseases through unsafe sex and liver disease through heavy alcohol consumption.^{60,206}

Mental health: Family violence strongly affects mental health.^{60,73,74,149,206,212} Both child maltreatment and intimate partner violence are more likely to increase the risk for depression, anxiety and post-traumatic stress disorder than the risk for other diseases and conditions.^{60,73,149} Child maltreatment increases the risk for mental health issues at any age and for all types of abuse.¹³¹ It also increases the risk for problem and delinquent behaviours such as violence, aggression and other types of antisocial behaviour, particularly in boys.^{58,213-215}

Stigma: Family violence can lead to stigma and discrimination, including false ideas that victims are trapped, passive, helpless, depressed, weak or responsible for being a victim.²²⁹⁻²³³ The potential for experiencing stigma and discrimination can lead to people being reluctant to seek help.²³⁴

Other types of impacts

Family violence can affect people's relationships and lives at school and work.

Social relationships: Family violence can affect people's relationships and friendships. Child maltreatment can affect a person's ability to develop healthy relationships and increase the risk for experiencing or being responsible for intimate partner violence. This may be because it also increases the risk for problems dealing with emotions and stress as well as for poor social skills and lower self-esteem.^{151,213,217-226} People who experience child maltreatment or harsh parenting can have trouble parenting their own children, which can impact the health and well-being of these children.²²⁷ Women who experience intimate partner violence can be socially isolated. They are also more likely to have difficulties in their family and social relationships.^{149,228}

School: Child maltreatment can lead to poor academic performance and problems at school. This is likely due to the fact it affects learning, memory, problem solving, attention and emotion.^{129,213,235-241} This can lead to increased risks for financial problems and unemployment in adulthood.²⁴²

Work: In Canada, over 50% of people who experienced intimate partner violence said that this violence also occurred at or near where they worked. Women were more likely to experience this than men.^{243,244} People who are experiencing intimate partner violence may often miss or be late for work, be less productive at work, and have trouble concentrating on their work or keeping a job.²⁴⁴⁻²⁴⁸ Having a job and being financially independent can be important as it provides people with the means to end a violent or abusive relationship.²⁴⁹ Co-workers can also be affected by people experiencing intimate partner violence, most often by being stressed or concerned about the situation.²⁴⁴

Factors that affect the health impacts of family violence

Not everyone is at equal risk for poor health from family violence.²⁵⁰ Outlined below are some examples of factors that affect this risk:

Resilience: Resilience is when someone is able to cope with or recover from a negative experience or stressful situation with little effect to his or her health.^{250,251} While family violence affects the health of many people who experience it, some people are resilient.^{87,151-154,252-255} Researchers are interested in figuring out why this happens and how this could prevent family violence from leading to poor health.²⁵⁶

Genetics and epigenetics: Researchers have found that person's genetic makeup (their genotype) can increase the risk that child maltreatment will lead to depression in adulthood or problem behaviours in adolescence.²⁵⁷⁻²⁵⁹ Other genotypes are thought to reduce the risk that child abuse will affect health.^{260,261} Epigenetics may also play a role.^{129,258,262-269} Stressful experiences in childhood might affect how genes are activated and expressed, which can lead to poor health later in life.¹²⁹

What is 'epigenetics'? Epigenetics is the study of how human biology adapts to a changing environment by altering gene expression and activation. These changes can be passed on to future generations.²⁷⁰

Frequency and severity of abuse: There is evidence that the more types of abuse experienced or the more severe and frequent the abuse a child experiences, the higher the risk that child abuse will lead to poor health.^{26,50,60,73,75-77,203,271,272} Other stressful or negative events experienced early in life can add to this effect.^{78,79} A similar pattern exists for intimate partner violence. The more severe and more frequent the abuse, the more likely intimate partner violence will lead to mental health issues.⁷⁴

Understanding early adversity: Child maltreatment is not the only form of early stress or adversity that leads to impacts on health.²⁷³ The Adverse Childhood Experiences studies were important for showing the link between early adverse experiences and health impacts in adulthood.²⁷³⁻²⁷⁸

Age: Whether or not child maltreatment affects later health can depend on what age the abuse or neglect is experienced.^{148,224, 229,235,236} In some cases, the earlier the maltreatment occurs in childhood, the more likely it will lead to mental health issues.²³⁷

Gender: Women are more likely than men to experience health impacts from child abuse and intimate partner violence.^{10,26,32,73,74,80,87,279,280} In 2014, a Canadian population survey showed that in the previous five years:¹⁰

- 40% of women and 24% of men said they had experienced physical injuries as a result of spousal violence.
- 22% of women and 9% of men who experienced spousal violence said they had also experienced effects similar to the symptoms of post-traumatic stress disorder.

Women are also more likely than men to be emotionally affected and to experience fear in response to intimate partner violence.^{4,10,281-283}



INFLUENCING THE RISK FOR FAMILY VIOLENCE

No single factor can accurately predict when, how or to whom family violence will occur. What leads to family violence is a mix of individual, family, social, community, and societal factors (see Figure 8).^{e.g., 44,87-89} How these factors interact is not simple.^{44,87,89} Research that aims to understand this complexity is still evolving.

This section outlines factors that influence the risk for experiencing and perpetrating family violence.

Individual factors

Examples of factors that increase the risk for family violence include:^{4,10,11,27,44,68,74,81,87,92,93,151,254,286,293-297}

- A history of child abuse or neglect
- Age
- Gender
- Traits, beliefs and behaviour
- Physical and mental health
- Substance use
- Stress

Many of the same factors increase the risk for being abusive or violent and being a victim of family violence.^{4,10,11,44,68,73,74,81,87,92,93,151,286,293-339}

Why this occurs is not clear, but it could be important for preventing family violence and its impacts. Some factors increase the risk for family violence in some people and not others. For example:

- In 2014, Indigenous peoples were more likely to be a victim of a violent crime, including family violence, than non-Indigenous people. For Indigenous women but not men, identifying as being Indigenous increased this risk. For Indigenous men, other factors such as experiencing child abuse, social disorder in

communities and neighbourhoods, being homeless, using drugs, or poor mental health increased their risk for being a victim of a violent crime.⁷²

- In the United States, certain ethnic groups have higher rates of intimate partner violence. In some cases, factors related to ethnicity (e.g., age, marital status, income) and not ethnicity itself were related to these higher rates.^{73,87}
- Problems with alcohol use such as heavy drinking, are often thought to increase the risk for family violence, but this could be because heavy drinking and family violence have many other risk factors in common.^{4,87,324,333} It may also depend on drinking context (e.g., where drinking is taking place, who is drinking).³⁴⁰

Why does family violence happen? It is important to understand why family violence happens in order to prevent it. There are many theories about family violence, but none of them can fully explain it.^{44,284-290} At this time, theories that state that family violence is a result of interactions between individual, family, social, and community factors best predict why violence happens.^{87,88,285,291,292}

FIGURE 8: MANY FACTORS CONTRIBUTE TO THE RISK FOR FAMILY VIOLENCE.

WHO WE ARE

**EVERYONE HAS DIFFERENT
BACKGROUNDS AND EXPERIENCES.**

GENETICS
GENDER
BIOLOGY



BIOLOGY
AGE
LIFE EXPERIENCES
HEALTH



HOW OUR RELATIONSHIPS FUNCTION

**EVERYONE HAS A DIFFERENT
PATTERN OF RELATIONSHIPS.**

- Relationship quality
- Resolving conflict
- Power and control
- Family and friends
- Stress

WHERE WE LIVE

EVERY COMMUNITY IS UNIQUE.

- Availability and accessibility of services
- Population characteristics
- Safety, poverty
- Beliefs and behaviour related to family violence

WHAT WE THINK AND BELIEVE

**EVERY SOCIETY HAS BELIEFS
AND ATTITUDES THAT RELATE
TO FAMILY VIOLENCE.**

- Beliefs, attitudes and behaviour related to violence and gender
- Laws and policies
- Awareness and knowledge

Three of the more commonly discussed risk factors include:

Gender and intimate partner violence: The United Nations through the [Declaration on the Elimination of Violence Against Women](#) and the [World Health Organization](#) state that violence against women is a major global public health problem and human rights violation that happens because women are women. It is an act of gender-based violence that increases the risk for harm or suffering in women who experience it. Women are more likely to experience and men are more likely to be responsible for sexual abuse and more severe or controlling intimate partner violence.^{280,328,341,342} For less severe forms of intimate partner violence, it is less clear whether or not there are gender differences.^{10,73,280,341,342} Currently, there is much discussion in the research literature about this issue.^{10,12-14,87,298,306,328,342-345}

History of child abuse or neglect: Many people who are abused or neglected as children do not experience abuse or become violent later in life. For some, there is an increased risk.^{e.g.,87,271,284-286,292,295,296,346} Why some people who experience abuse or neglect are at higher risk is not known.

What does risk mean? Research suggests that the higher the number of risk factors someone has, the greater chance for experiencing family violence.^{293,294} However, someone can have all the risk factors for family violence and never experience it. Someone else can have few or no risk factors and still experience family violence.

What about socioeconomic factors?

Family violence is often discussed in the context of poverty, low education and unemployment. Evidence on how these socioeconomic factors influence an individual's risk for family violence is conflicting or complicated.^{4,69,87,125,305,351,352} It may depend on other factors such as type of abuse, neighbourhood socioeconomic status and beliefs and attitudes on gender and violence.^{87,293,353,354}

Some research has shown that:

- Children who experience more types of abuse, or more severe abuse, are more likely to become violent later in life than children who experience fewer types or less severe abuse.^{44,271,292,347,348}
- Children who experience abuse and have access to safe and stable family relationships or develop supportive relationships in adulthood appear to be less likely to experience or be responsible for family violence later in life.^{295,349,350}

Problem behaviour in adolescence: Problem behaviours in adolescence such as being violent, criminal behaviour or anti-social behaviour are strongly related to being abusive or violent in relationships later in life. This may be because being violent is seen as a normal way to behave.⁸⁷

Family and social factors

Family and social relationships bring together people with unique backgrounds and experiences. This adds further complexity to the risk for family violence. Outlined below are examples of family and social factors that increase the risk for family violence.

Family dynamics and child maltreatment:

Examples of factors that increase the risk for child maltreatment happening in a family include:^{44,68,313,355}

- Poor parenting and parental attachment;
- Low parental warmth and responsiveness;
- Parental absence, not being available, lack of involvement;
- Family conflict, low family cohesion;
- Disputes about child custody;
- Dissatisfaction with child(ren), unrealistic expectations, a lack of understanding of the child(ren)'s needs;
- Physical punishment and harsh discipline, and;
- Intimate partner violence between parents.

Strong and stable family relationships can decrease the risk for experiencing child maltreatment or violence later in life.^{68,73,87,253,310,311,357}

Relationship dynamics, intimate partner violence and mistreatment of older adults:

How the dynamics of a relationship influences the risk for family violence is complicated and hard to study. Explanations and descriptions of what happened can differ between the person who is the victim and the person who is responsible for the abuse.^{1,7,345,358,359} Many of the same factors influence the risk for both intimate partner violence and mistreatment of older adults. Examples include:^{69,87,92,290,298,324,325,357,360}

- Stress in the relationship;
- Marital status;
- Amount of relationship conflict;
- Trust;

- Dependency, and;
- Relationship quality.

Social factors: Several factors related to friends and family can increase the risk for all forms of family violence. Examples include: ^{27,68,69,87,92,125,313,325,352,360}

- Having friends who are abusive or violent;
- Unsupportive friendships and unhealthy relationships with other family members, and;
- Being socially isolated and lacking social support.

Community and societal factors

Individuals form families and relationships that form communities and societies. Outlined below are examples of community and societal factors that have been found to affect the risk for family violence.

Cultural differences: How culture affects the risk for family violence is not clear. Some cultural factors that are thought to be related to family violence include:

- Beliefs related to gender, children, relationships and older adults.^{68,69,87,333,354,361-363}
- The mixing of cultures and cultural change.^{364,365}

Parenting can be seen as a continuum.³⁵⁶

- Healthy parenting includes some forms of discipline.
- Poor parenting begins to include some forms of irresponsible actions.
- Emotional abuse or neglect involves actions that put a child at risk or expose him or her to trauma, do not meet a child's needs or are harsh or uncaring.

Looking at national rates of family violence could help determine the role of culture, but calculating rates across different countries is challenging. Data are not collected in the same way and different definitions are used.^{84-86,351,354,367-369} This limits our ability to understand how culture affects family violence across the world. Generally, it is likely that Canada's rates of family violence are similar to global rates:

- The global rate of self-reported physical abuse in childhood was calculated to be almost 230 per 1000 children with little difference found across continents. North America's rate was about 240 per 1000 children.⁸⁶
- The global rate of self-reported intimate partner violence experienced at some point in their lifetime was 30% for women. In high income countries, which included Canada, the rate was 21%.⁸⁵

Rates of intimate partner violence against women are higher in countries where gender inequality is higher.^{354,363} Rates of intimate partner violence against men are higher in countries where there is more gender equality.³⁶³ This means that different countries likely need to consider different approaches to prevention.

Social acceptability and normalization of violence: The belief that violence is acceptable and a normal way to behave can increase the risk for child abuse and intimate partner violence.^{68,69,87} Exposure to violence can lead to it being seen as normal. Research suggests that men and women

who are abusive or violent tend to think being violent is a normal way to behave. They also tend to minimize its impacts.^{370,371} People who experience family violence can also see it as being normal or as an expression of love by their abusive partner.^{1,69,372,373}

Neighbourhoods: There are many neighbourhood characteristics that can influence the risk that a family will experience family violence. Examples of these characteristics include:^{4,68,69,87,374-379}

- Lack of services (e.g., legal, health care);
- Lack of willingness to intervene by community members;
- Lack of community connectedness, support and control of behaviour;
- Social disorder (e.g., noisy neighbour, vandalism, people using or dealing drugs, prostitution);
- Neighbourhood disadvantage (e.g., poverty);
- Instability (e.g., people moving in and out of the community);
- Exposure to or worry about violence in the neighbourhood, and;
- Having many stores in the area that sell alcohol.

What do people believe? In 2014, global data from developing countries suggested that more than half of teenage girls and boys think intimate partner violence is justified under certain conditions. In many of these countries, girls were more likely to believe this than boys. More education or higher income was linked to teenagers being less likely to hold these beliefs.³⁶⁶



LIFE COURSE PERSPECTIVE

This section highlights family violence over the life span by exploring some of the complexity related to child maltreatment, intimate partner violence and mistreatment of older adults. The life course perspective explores how experiences can accumulate and interact over the life time.^{351,380,381} It supports the idea that people can adapt and change and that there is potential to prevent, “reverse” or reduce the effects of negative and stressful experiences such as family violence.^{264,382,383}

Understanding how people and their families change and grow over a life time is important for understanding family violence. Currently, knowledge about family violence over the life course is fragmented. Research most often focuses on child maltreatment, intimate partner violence and mistreatment of older adults as separate topics. Other forms of family violence, such as teenagers abusing parents or abuse between siblings, are also common, but are less recognized and studied.^{264,382,383}

Family violence and the life course perspective: Some evidence suggests that the impacts of family violence can accumulate over the lifespan. For example, women who experienced intimate partner violence were more likely to become depressed if they had also experienced maltreatment in childhood.³⁸⁴

Child maltreatment

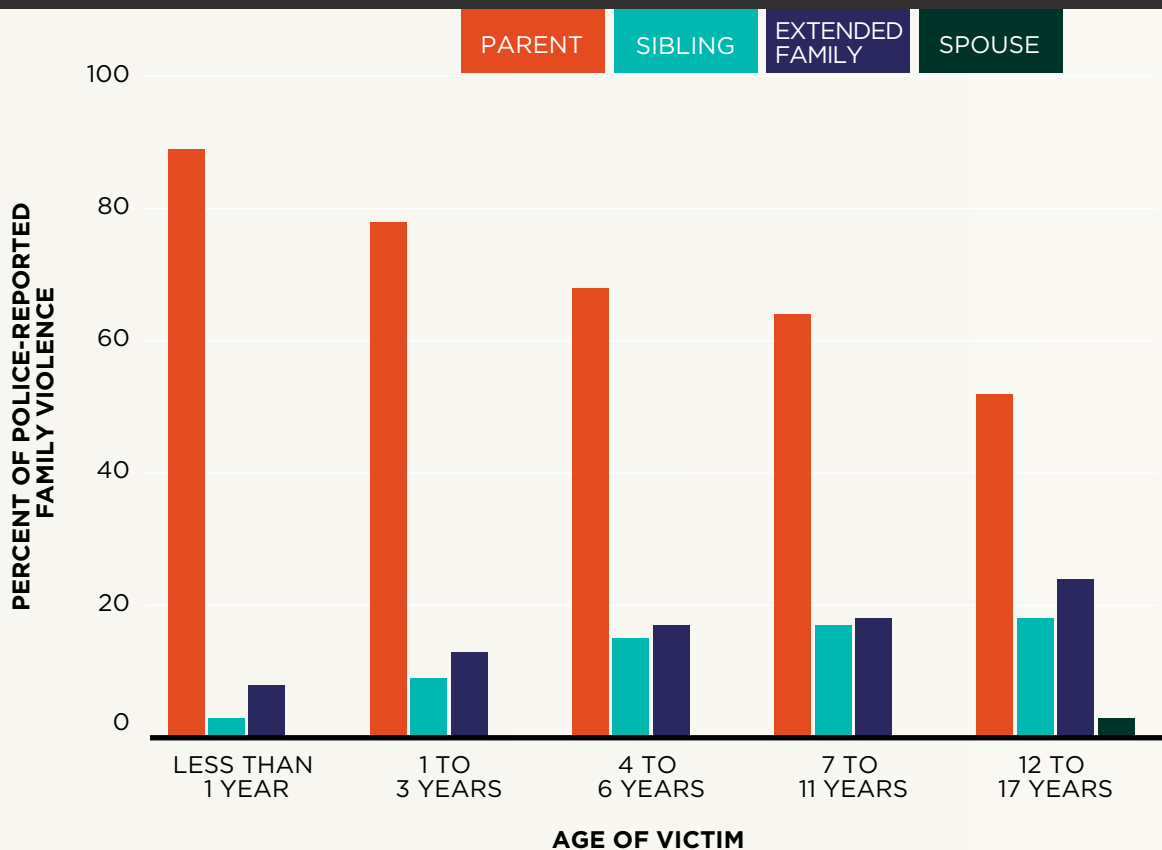
Police and child welfare data show that parents are most likely to be responsible for family violence involving children that is reported to the authorities (see Figure 9).¹⁰

Child abuse beyond adolescence: Many surveys on child maltreatment ask about experiences that happen before the age of 15 or 16 years.^{10,26} Abuse by parents does not always stop once children reach late adolescence or adulthood. A recent population survey showed that a small portion of Canadian seniors aged 55 years and older experience abuse from their parents.²⁷ There is a need to look beyond childhood in terms of parents maltreating their children.

Changes in families over time: Families can change over time and children can be raised in a variety of situations, some of which can increase the risk for child maltreatment. Examples include:

- Blended households (e.g., households with stepparents) with many family problems can have an increased risk for child maltreatment.³⁸⁵⁻³⁸⁷
- Negative family experiences such as divorce increased the risk that child maltreatment will lead to mental health issues.^{388,389}

FIGURE 9:
RELATIONSHIP TO THE VICTIM IN POLICE-REPORTED FAMILY VIOLENCE, 2014.¹⁰



Notes on the data: Parent — includes biological, step, adoptive and foster parents. Sibling — includes biological, step, half, adoptive, and foster brothers and sisters. Extended family — includes all family members related by blood, marriage or adoption. Spouse — includes current or former legally married and common-law spouses.

In some cases, family violence can happen after a separation or divorce. Partners who are violent can also use access to children as a form of control or punishment against the other parent. When separation or divorce removes a child from a violent environment, this can lead to the end of child maltreatment.³⁹⁰

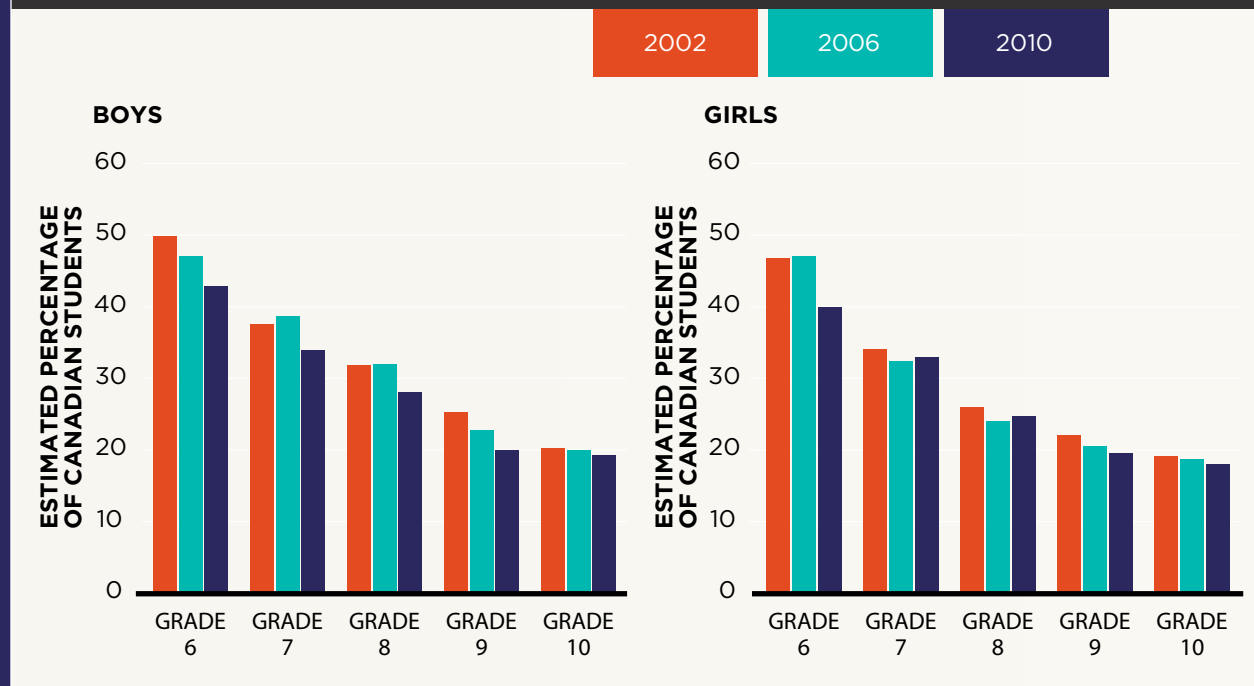
Siblings: Siblings can be a key source of support that continues into adulthood.³⁹¹⁻³⁹⁵ Sibling abuse is often overlooked as a form of family violence. It can be seen as a normal part of sibling behaviour, even by siblings themselves.^{391,394} Like other forms of family violence, it can also affect behaviour and health.³⁹¹⁻³⁹⁵

Parent abuse: Abuse of parents by teenagers is different from other forms of family violence because parents still have to parent and often hold power (e.g., parents' salary supports the family). Parent abuse can affect health and create strain within the family.³⁹⁸ Experiencing child abuse or being aware of violence in their parents' relationships can increase the risk of teenagers being abusive towards their parents. Problem behaviour, a weak bond with parents and certain parenting practices are examples of other risk factors.³⁹⁸⁻⁴⁰⁰

Indigenous children: Indigenous populations as a whole are younger than non-Indigenous populations. Some Indigenous children are growing up in a different environment than non-Indigenous children where they can experience inequalities such as less access to health and support services, higher rates of poverty, lower life expectancy and higher rates of some diseases and conditions.³⁹⁶ These inequalities result as part of a broader context that includes marginalization, discrimination as well as social, economic, political and historical factors.^{396,397}

Healthy relationships and Canadian youth: Most Canadian youth say they have good relationships at home. Girls are less likely to report this (see Figure 10). As youth get older, relationships with parents tend to become worse (see Figure 10). Youth with high quality relationships with family, friends and a sense of connection and belonging to their schools and neighbourhood were more likely to say they were in better health than youth without these high quality relationships. Youth in Canada are less likely to report having a high quality relationship with their parent than in the past (see Figure 10).⁴⁰¹

FIGURE 10:
PROPORTION OF STUDENTS WHO SAY THEY HAVE A
HIGH QUALITY RELATIONSHIP WITH THEIR PARENTS,
2002, 2006, 2010.⁴⁰¹



Intimate partner violence

In 2014, police data showed that:¹⁰

- Women were more likely to be a victim of a violent crime committed by a family member than by someone outside their family.
- Men were more likely to be a victim of a violent crime by someone outside their family than by a family member.

Which family member is more likely to be responsible for intimate partner violence also differs for men and women (see Figure 11).¹⁰

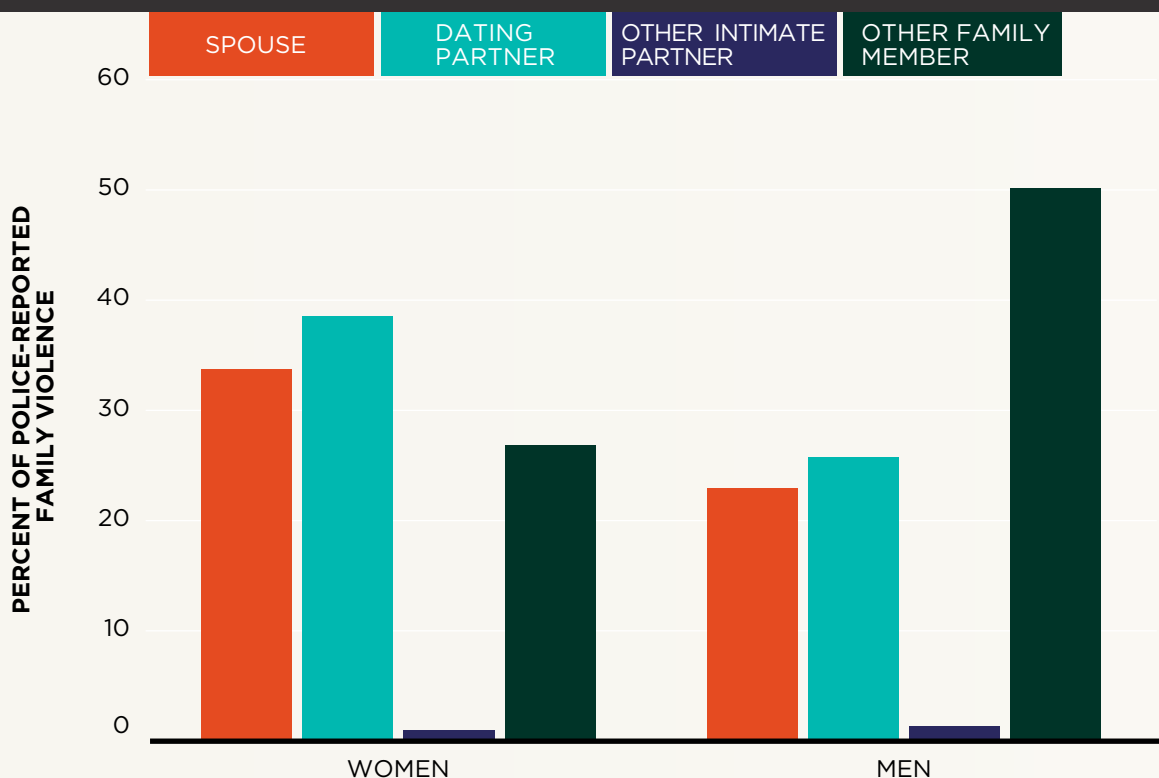
Dating violence: In 2014, 15% of police-reported incidents of violent crime were committed by a dating partner. For almost 80% of these incidents, women were victims.¹⁰ Dating violence is a concern for teenagers as adolescence is an important time for establishing good relationship skills and patterns.⁴⁰² Risk factors for dating

violence are mostly similar to those for spousal violence. Friends and parents can play an important role in dating violence.^{87,403} For example:⁸⁷

- A strong relationship with parents can decrease a teenager’s risk for experiencing dating violence.
- Having friends who are violent can increase a teenager’s risk for being abusive or violent towards someone they are dating or for experiencing violence or abuse by someone they are dating.

Pregnancy: For many women who experience intimate partner violence, this violence stops or decreases during pregnancy. Survey data from 2006/2007 show that about 1.4% of Canadian women said they had experienced intimate partner violence during pregnancy.^{407,408} Intimate partner violence during pregnancy puts both the pregnant woman and the developing fetus at risk.

FIGURE 11: RELATIONSHIP TO VICTIM IN POLICE-REPORTED FAMILY VIOLENCE INCIDENTS, 2014.¹⁰



Notes on the data: Information collected from Canadians aged 15 to 89 years. Spouse and dating partner include former and current partners.

Problems can include low birth weight, premature birth, poor prenatal care, poor maternal nutrition, inadequate weight gain, risky behaviour, and postpartum depression.⁴⁰⁹⁻⁴¹²

Bilateral violence: Bilateral violence is a controversial concept and experts do not agree about its characteristics.^{12-14,306,345,413} It occurs when both partners within a relationship are violent towards each other. Understanding this issue is challenging. Data on intimate partner violence are not always collected to reflect that relationships can be complex and dynamic.^{87,345,414} Data can also span a wide spectrum of behaviours, from unhealthy conflict (sometimes known as common couple violence) in a relationship to severe physical and psychological abuse (sometimes known as intimate terrorism).^{342,415}

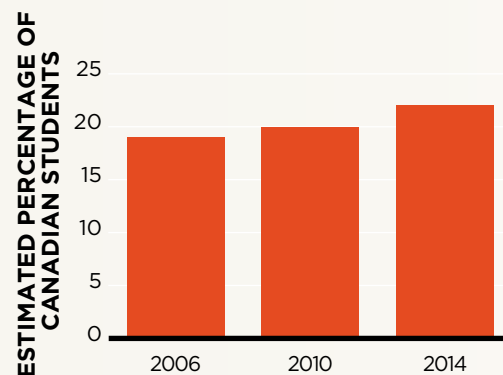
Bilateral violence is more common than initially thought.⁴¹⁷ It most often occurs as unhealthy conflict and not as severe abuse or attempts to gain power or control in a relationship.^{283,309,343,344,416,417} Without question, severe, frequent and controlling intimate partner violence is more likely to be experienced by women and committed by men. It is also most often one sided.⁴¹⁷ Women are also much more likely to be affected by intimate partner violence than men, even when the type and severity of the violence experienced is the same.^{279,280}

Men and women are equally likely to experience less severe forms of intimate partner violence, such as unhealthy conflict.^{10,343,417} Evidence is mixed and controversial about whether men or women are more likely to initiate bilateral violence. It may depend on the severity and type of abuse or how questions are asked in surveys.^{12-14,298,343-345} Bilateral violence can affect health.^{343,418,419}

What about bullying? Being bullied can increase the risk for experiencing dating violence. Being a bully or being bullied can both increase the risk of being responsible for teen dating violence.^{87,404-406}

Canadian youth are more likely to report being bullied than in the past (see Figure 12).²⁴ Girls are more likely to experience bullying than boys. Boys are more likely to engage in bullying than girls.²⁴ Youth with poor family and social support are more likely to be involved in bullying.^{24,401}

FIGURE 12:
PERCENTAGE OF STUDENTS WHO REPORT BEING BULLIED AT LEAST TWICE A WEEK.²⁴



Mistreatment of older adults

Police data show that 4% of victims of police-reported family violence were 65 years or older in 2014. Adults over the age of 65 years are more likely to experience family violence that has been committed by an adult child or a spouse than by other family members (see Figure 13).¹⁰

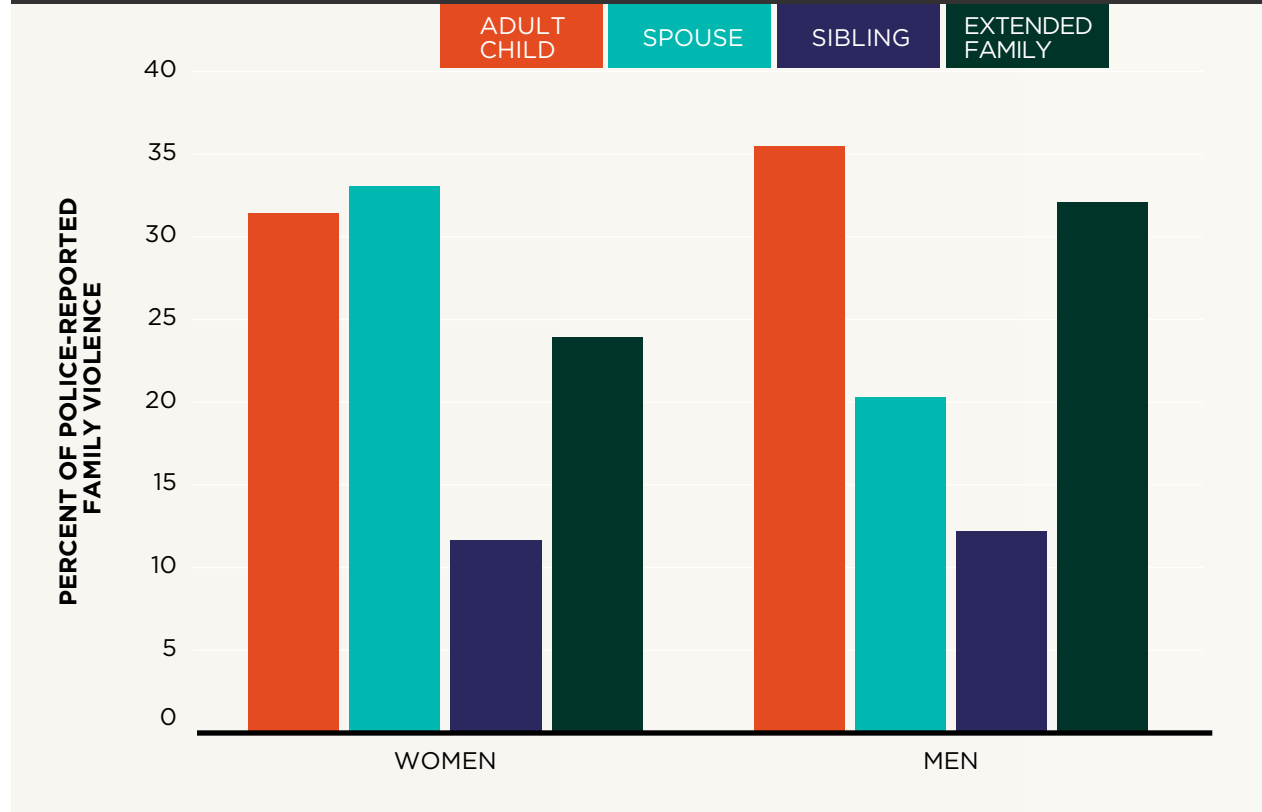
Family and social structure: Older adults can have a complicated family and social structure. For some older adults, institutional care is part of the aging process.³⁶⁰ Living with family members other than a spouse can also be a reality for some older adults. A shared living arrangement can increase the risk for abuse of older adults, particularly in terms of physical and financial abuse.^{92,125,351,352}

Caregivers: In 2012, almost 50% or 13 million Canadians over the age of 15 years said they had

at some point in their life, provided care to a family or friend with a chronic health condition, disability or age-related needs. Of those surveyed, almost all caregivers said they are coping well. The more hours spent on caregiving, the less likely they were to say they were coping well. Almost 30% found caregiving to be stressful and almost 20% said their health had suffered as a result of their responsibilities.⁴²¹

Canada's population is getting older: In 2013, 15% of the Canadian population was over the age of 65 years. By 2030, it is expected this will increase to 22%–24%.⁴²⁰ An aging population means that cases of mistreatment of older adults may also increase.³⁶⁰

FIGURE 13: RELATIONSHIP TO VICTIM IN POLICE REPORTED FAMILY VIOLENCE INCIDENTS, 2014.¹⁰



Notes on the data: Information collected from Canadians aged 65 to 89 years. Adult child includes biological, step, adopted, and foster children. Spouse includes current or former legally married and common-law spouses. Siblings include biological, step, adoptive, and foster brothers or sisters. Extended family includes any family member related by blood, marriage, or adoption.



PREVENTING FAMILY VIOLENCE

Family violence is complex, so it is not surprising that there are few interventions that effectively prevent it.^{256,367,422-424} This section focuses on [primary prevention](#) by providing a snapshot of approaches that have been used to prevent family violence at the societal and community level, in families and relationships and for populations at risk.

Creating and enforcing laws and policies

How laws affect rates of family violence can be complicated and it is not clear if they prevent it from happening.^{69,425-430} Evidence from low- and middle-income countries show that laws alone do not appear to prevent family violence. Effectively enforcing these laws and creating societal attitudes that help stop family violence are also needed.⁴³¹

What is happening in Canada? Canada has a strong legal system in place that makes many forms of family violence illegal. The *Criminal Code* outlines what are [violent crimes](#). [Family violence](#) is not addressed by specific laws, but is covered by various criminal offences under the *Criminal Code*. Most forms of physical punishment are also a crime in Canada.⁴³²⁻⁴³⁴

A number of other laws and policies are relevant to family violence. For example, the *Criminal Code* also contains laws that can protect victims after the offence has taken place. Several provinces and territories have laws specifically targeting family violence and the protection of children.⁴³⁷ Mandatory reporting laws are in place in Canada, but it is not clear whether or not they are effective at helping to prevent family violence.⁴³⁶⁻⁴³⁸

Developing strategies, frameworks and initiatives

Strategies, frameworks and initiatives aim to provide examples of effective, evaluated and promising practices that programs can use to prevent family violence. It is unclear whether or not as a whole, strategies, frameworks and initiatives help prevent family violence.^{68,439}

What is happening? The [World Health Organization](#) (WHO) has identified [violence](#) as an important global issue. Its [Global status report on violence prevention 2014](#) provides an overview of all legal, policy, programmatic and other approaches being taken by participating countries. The WHO has also developed several [publications](#) related to preventing violence. Working with many partners, the WHO recently published a [resource](#) that outlines seven strategies for preventing or reducing violence against children.

In 2014, the World Health Assembly adopted a [resolution](#) on strengthening the role of health systems in addressing violence, particularly for violence against women and children. A global action plan was developed and supporting its implementation was part of a [resolution](#) at the 69th World Health Assembly in 2016.

The United Nations includes within its [sustainable development goals](#) several that address issues related to family violence. Examples include:

- Eliminating all violence against women and girls, including trafficking and sexual and other types of exploitation, and;
- Eliminating all harmful practices such as child, early and forced marriage and female genital cutting.

Examples of United Nations Conventions and Covenants related to family violence include: [Convention on the Rights of the Child](#), [Convention on the Rights of Persons with Disabilities](#), [Universal Declaration of Human Rights](#), [International Covenant on Civil and Political Rights](#), [International Covenant on Economic, Social and Cultural Rights](#), [Convention on the Elimination of All Forms of Discrimination Against Women](#) and [Convention Against Torture](#).

The Government of Canada's [Family Violence Initiative](#) is a 15 department federal initiative that began in 1988 and is led by the Public Health Agency of Canada. As part of this initiative, the Public Health Agency of Canada also hosts the [Stop Family Violence](#) website. This initiative aims to prevent family violence, promote public awareness on its risk and protective factors, work across sectors, and support data collection, research, and evaluation. Canada's provinces and territories have also developed a variety of strategies and frameworks to address family violence, a list of which can be found [here](#).

Impact of the media: The media can influence beliefs and attitudes about family violence.^{445,446} Media tend to report on more severe cases and represent them as single events. Experts are also rarely involved and cases can be sensationalized. Violence can be discussed using stereotypes, victims can be blamed and excuses provided for those who are responsible for the violence.⁴⁴⁵⁻⁴⁵³

Increasing knowledge and awareness

The goal of increasing knowledge and awareness is to change beliefs, attitudes and behaviours. This includes changing societal beliefs so that family violence is less socially acceptable and not seen as a normal part of everyday life.

What is happening? Public awareness campaigns aim to prevent family violence by raising awareness of the issue. Whether or not they are successful is not clear and difficult to measure.^{439,440} Bystander programs aim to prevent family violence by increasing awareness and encouraging bystanders to act. Some evidence suggests that bystander programs may have promise. Evaluations have shown them to be effective in increasing people's willingness to intervene, but it is not clear whether this prevents violence from happening.⁴⁴¹⁻⁴⁴⁴

For intimate partner violence, feminist activism has played a strong role in influencing policies on violence against women.⁴⁵⁴ It has also brought attention to problems with research methods, such as data collection and analyses that do not provide enough detail about gender differences.³⁴² Some promising practices exist that support boys and men in helping prevent violence against women.⁴³⁹

School-based programs exist that aim to increase knowledge and awareness in order to prevent abuse. One focus of these programs is sexual abuse. These programs work to increase children's knowledge and help them develop skills to recognize, avoid and deal with situations that may put them at risk of sexual abuse. These programs appear to have promise, but more evidence needs to be collected on their effectiveness.⁴⁵⁵ For programs that aim to prevent violence against women and sexual assault on post-secondary campuses, evaluations have not effectively focused on whether or not they prevent these types of violence.^{456,457}

Surveillance data can provide important information on rates, impacts and risk and protective factors related to family violence. Without quality data, programs are less likely to be successful in achieving their goals.⁴⁵⁸

Creating safe and supportive communities

Neighbourhoods that are united, stable and supportive and that have community members who are willing to intervene tend to have lower rates of family violence.^{87,361} There are gaps in knowledge on how addressing community factors could prevent family violence.⁴⁵⁹

Approaches that aim to address risk factors for family violence and improve community safety exist, but they have not been evaluated to see if they prevent family violence.⁴⁶⁰⁻⁴⁶²

Promoting healthy families and relationships

Supporting and building healthy relationships, particularly by improving parenting and dating skills, appears to be one of the more promising means of preventing family violence.

What is happening? There are many programs that support parents or promote positive parenting skills, but for most of them, it is not clear whether or not they prevent child maltreatment.^{426,464-468} Two examples of evaluated programs include:

- **Nurse Family Partnership:** Developed in the United States, this home-visit program aims to help young, first-time, socially and economically disadvantaged mothers. It was found to prevent child maltreatment and improve other childhood health outcomes.^{423,467} Evidence has shown it to be effective in the United States and the Netherlands over the long term, but not effective over the short term in the United Kingdom.⁴⁶⁷⁻⁴⁶⁹ A randomized control trial is currently taking place to evaluate its effectiveness in Canada.⁴⁷⁰

What about siblings? Some promising practices exist that can help reduce conflict and aggression between siblings. They may also improve relationships with friends and family.⁴⁶³

- **Triple P Parenting program:** This is a program for all parents that provides a variety of ways to promote positive parenting skills. Evidence suggests that this program can decrease child maltreatment, foster care placements and hospitalizations, reduce problem behaviour in children, decrease stress in parents and reduce harsh discipline.^{440,471-475} It has been shown to be promising in several countries, but more analyses are warranted.⁴⁷⁶⁻⁴⁷⁹

Teen dating violence prevention programs have not been found to be effective as a whole, but a few programs have shown promise.⁴⁸⁰⁻⁴⁸⁹ Two examples of evaluated programs that target students from grade 8 to the end of high school include:

- **Safe Dates program:** This school-based program covers topics such as dating violence, gender stereotyping, healthy relationships, conflict resolution, and communication skills. It was found to have no overall effect after a year, but did decrease sexual and physical abuse in teens with a history of dating violence. It did not decrease emotional abuse. The program also changed beliefs on dating violence, improved skills for conflict resolution and increased awareness of support services. It may also decrease other forms of violence.⁴⁸⁵⁻⁴⁸⁷
- **Fourth R program:** Developed in Canada, this school-based program covers topics such as dating violence, violence and sexuality, healthy relationships, and conflict resolution. Parents and schools are also provided with information. This program was found to increase knowledge on dating violence and reduce dating violence in terms of physical abuse, more so for boys than girls.⁴⁸⁸ It was also effective for at-risk youth.⁴⁸⁹

Relationship or couple therapy has been found to improve relationships and may be useful for couples at risk for intimate partner violence, although there is conflicting evidence on its effectiveness. Care needs to be taken because therapy can increase violence in some situations.^{23,490,491} Relationship education aims to prevent problems before they happen. This approach has been found to help couples adjust to becoming parents and reduce negative behaviour and less severe forms of abuse in some cases.^{23,490-496}

Targeting at-risk populations

Approaches for preventing family violence that target at-risk populations such as women, children and youth, older adults, Indigenous communities, the LGBTQQI2S community or people with disabilities are few, not evaluated, need more study or evidence on their effectiveness is conflicting.^{115,125,351, 360,423,424,439,469,497-503} For some populations, priorities for action have been identified.

- The health care system has been identified as a key point for better identifying families at risk for family violence. Some promising programs exist. For example, in the United States, the [Safe Environment for Every Kid](#) (SEEK) model has been found to prevent or reduce child maltreatment for high risk families, but less so for low risk families. The SEEK model involves providing on-going training to health care professionals on parental risk factors that affect children's health.⁵¹⁷⁻⁵¹⁹
- **Women:** There is a lack of evaluated approaches for all types of intimate partner violence (e.g., perpetrated by men or women, bilateral violence).^{424,439} Preventing violence against women is an important priority and needs a targeted approach due to the fact that women are more likely to experience severe abuse and violence.³⁴²

- **Child and youth:** The World Health Organization's [INSPIRE: Seven strategies for ending violence against children](#) outlines seven strategies for preventing or reducing violence against children. These strategies include effective, promising or prudent approaches in the areas of laws, norms and values, safe environments, parent and caregiver support, income and economic strengthening, response and support services, and education and life skills.
- **Indigenous communities:** Communities and experts have noted that culturally relevant interventions that are developed by or with communities are important and needed.⁴⁹⁸ Addressing other risk factors such as the availability of and access to services, safe and adequate housing, concerns about the justice system, impacts of colonization, the legacy of residential schools and intergenerational trauma may be effective. Many of these issues were highlighted as part of the [calls to action](#) of the [Truth and Reconciliation Commission of Canada](#).

What about targeting risk and protective factors? Programs exist that show promise by targeting factors that increase the risk for family violence, but it is not clear if they are effective at preventing it.^{e.g.,69,504-516} There is little research on how approaches to prevention can target protective factors.^{255,256}



CLOSING COMMENTS

Family violence in Canada is cause for concern, especially for those who are most vulnerable — women, girls and Indigenous women, but there are reasons to be optimistic for the future.

Family violence over the life course is a relatively new field of research. Since the 1970s, the body of evidence has been growing. Even though we don't yet have a clear sense of why, statistics tell us that severe forms of family violence are decreasing in Canada, as is violent crime. Evidence also suggests that it is possible to prevent, reverse or reduce the impacts of family violence and that some people are resilient to its effects.

This report has raised more questions than it has answered. Why is violence aimed at fellow family members, including children and intimate partners? How can we challenge our assumptions to build new approaches for prevention? Why are certain people more likely to experience family violence? Why are some people resilient to its effects? Why do most people who experience child maltreatment not become violent later in life?

Clearly we need a better understanding of the causes of family violence and how best to help those families in crisis and prevent the violence from happening in the first place. Our understanding is evolving as families and relationships change. Younger generations are growing up in a very different world.

Talking about family violence can be painful. However, it is the only way that we can become a society that accepts nothing less than safe and healthy families for everyone.



REFERENCES

Challenges with data on family violence

1. Chan, K. L. (2011). Gender differences in self-reports of intimate partner violence: a review. *Aggression and Violent Behavior, 16*(2), 167-175.
2. Perreault, S. (2015). Criminal victimization in Canada, 2014. (Statistics Canada).
3. Perreault, S. & Simpson, L. (2016). Criminal victimization in the territories, 2014. (Statistics Canada).
4. Sinha, M. (2013). Measuring violence against women: statistical trends. (Statistics Canada).
5. Sinha, M. (2015). Trends in reporting criminal victimization to police, 1999 to 2009. (Statistics Canada).
6. Canadian Centre for Justice Statistics. (2000). Family violence in Canada: a statistical profile, 2000. (Statistics Canada).
7. Follingstad, D. R. & Rogers, M. J. (2013). Validity concerns in the measurement of women's and men's report of intimate partner violence. *Sex Roles, 69*(3), 149-167.
8. Hovdestad, W., Campeau, A., Potter, D. & Tonmyr, L. (2015). A systematic review of childhood maltreatment assessments in population-representative surveys since 1990. *PLoS One, 10*(5), e0123366.
9. Hobbs, C. J. & Wynne, J. M. (2001). Neglect of neglect. *Current Paediatrics, 12*(2), 144-150.
10. Canadian Centre for Justice Statistics. (2016). Family violence in Canada: a statistical profile, 2014. (Statistics Canada).
11. Public Health Agency of Canada. (2010). Canadian Incidence Study (CIS) of reported child abuse and neglect - 2008: major findings. (Public Health Agency of Canada).
12. Winstok, Z. (2015). Critical review of Hamby's 2014 article titled Intimate partner and sexual violence research, scientific progress, scientific challenges, and gender. *Trauma, Violence, & Abuse.*
13. Hamby, S. (2015). A scientific answer to a scientific question: the gender debate on intimate partner violence. *Trauma, Violence, & Abuse.*
14. Hamby, S. (2014). Intimate partner and sexual violence research: scientific progress, scientific challenges, and gender. *Trauma, Violence, & Abuse, 15*(3), 149-158.
15. McKinney, C. M., Harris, T. R. & Caetano, R. (2009). Reliability of self-reported childhood physical abuse by adults and factors predictive of inconsistent reporting. *Violence and Victims, 24*(5), 653-668.
16. Shields, M., Hovdestad, W. & Tonmyr, L. (2015). Assessment of the quality of the childhood physical abuse measure in the National Population Health Survey. (Statistics Canada).
17. Havari, E. & Mazzonna, F. (2015). Can we trust older people's statements on their childhood circumstances? Evidence from SHARELIFE. *European Journal of Population, 31*(3), 233-257.
18. Hardt, J., Sidor, A., Bracko, M. & Egle, U. T. (2006). Reliability of retrospective assessments of childhood experiences in Germany. *The Journal of Nervous and Mental Disease, 194*(9).
19. Hardt, J. & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *Journal of Child Psychology and Psychiatry, 45*(2), 260-273.
20. Devries, K. M., Mak, J. Y., Bacchus, L. J., Child, J. C., Falder, G., Petzold, M., Astbury, J. & Watts, C. H. (2013). Intimate partner violence and incident depressive symptoms and suicide attempts: a systematic review of longitudinal studies. *PLoS Medicine, 10*(5), e1001439.
21. Barr, A. B., Sutton, T. E., Simons, L. G., Wickrama, K. A. & Lorenz, F. O. (2016). Romantic relationship transitions and changes in health among rural, white young adults. *Journal of Family Psychology.*

What this report is about

22. Barr, A. B., Culatta, E. & Simons, R. L. (2013). Romantic relationships and health among African American young adults: linking patterns of relationship quality over time to changes in physical and mental health. *Journal of Health and Social Behavior*, 54(3), 369-385.
23. Halford, W. K. & Snyder, D. K. (2012). Universal processes and common factors in couple therapy and relationship education. *Behavior Therapy*, 43(1), 1-12.
24. Freeman, J., King, M. & Pickett, W. (2016). Health Behaviour in School-Aged Children (HBSC) in Canada – focus on relationships. (Public Health Agency of Canada).
25. Philips, N., Sioen, I., Michels, N., Sleddens, E. & De Henauw, S. (2014). The influence of parenting style on health related behavior of children: findings from the ChiBS study. *International Journal of Behavioral Nutrition and Physical Activity*, 11(1), 1-14.
26. Afifi, T. O., MacMillan, H. L., Boyle, M., Taillieu, T., Cheung, K. & Sareen, J. (2014). Child abuse and mental disorders in Canada. *Canadian Medical Association Journal*, 186(9), E324-E332.
27. McDonald, L., Beaulieu, M., Goergen, T., Lowenstein, A., Thomas, C., Lombardo, A., Bergeron-Plateaued, J. & Kay, T. (2016). Into the light: national survey on the mistreatment of older Canadians 2015. (National Initiative for the Care of the Elderly).
28. Perreault, S. (2009). Criminal victimization and health: a profile of victimization among persons with activity limitations or other health problems. (Statistics Canada).
29. Saewyc, E., Poon, C., Wang, N., Homma, Y., Smith, A. & Liebel, A. (2007). Not yet equal – the health of lesbian, gay, and bisexual youth in BC. (McCreary Centre Society).
30. Schneeberger, A. R., Dietl, M. F., Muenzenmaier, K. H., Huber, C. G. & Lang, U. E. (2014). Stressful childhood experiences and health outcomes in sexual minority populations: a systematic review. *Social Psychiatry and Psychiatric Epidemiology*, 49(9), 1427-1445.
31. Williams, T., Connolly, J., Pepler, D. & Craig, W. (2003). Questioning and sexual minority adolescents: high school experiences of bullying, sexual harassment and physical abuse. *Canadian Journal of Community Mental Health*, 22(2), 47-58.
32. Afifi, T. O., MacMillan, H. L., Boyle, M., Cheung, K., Taillieu, T., Turner, S. & Sareen, J. (2016). Child abuse and physical health in adulthood. *Health Reports*, 27(3), 10-8.
33. Afifi, T. O., Enns, M. W., Cox, B. J., Asmundson, G. J., Stein, M. B. & Sareen, J. (2008). Population attributable fractions of psychiatric disorders and suicide ideation and attempts associated with adverse childhood experiences. *American Journal of Public Health*, 98(5), 946-952.
34. Afifi, T. O., Brownridge, D. A., Cox, B. J. & Sareen, J. (2006). Physical punishment, childhood abuse and psychiatric disorders. *Child Abuse & Neglect*, 30(10), 1093-1103.
35. Black, M. C. (2011). Intimate partner violence and adverse health consequences: implications for clinicians. *American Journal of Lifestyle Medicine*, 5(5), 428-439.
36. Bonomi, A. E., Anderson, M. L., Rivara, F. P. & Thompson, R. S. (2007). Health outcomes in women with physical and sexual intimate partner violence exposure. *Journal of Women's Health*, 16(7), 987-997.
37. Carr, C. P., Martins, C. M., Stingel, A. M., Lemgruber, V. B. & Jurueña, M. F. (2013). The role of early life stress in adult psychiatric disorders: a systematic review according to childhood trauma subtypes. *The Journal of Nervous and Mental Disease*, 201(12), 1007-1020.
38. Cisler, J. M., Begle, A. M. & Amstadter, A. B. (2012). Mistreatment and self-reported emotional symptoms: results from the National Elder Mistreatment Study. *Journal of Elder Abuse & Neglect*, 24(3), 216-230.
39. Comijs, H. C., Penninx, B. W., Knipscheer, K. P. & van Tilburg, W. (1999). Psychological distress in victims of elder mistreatment: the effects of social support and coping. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 54(4), P240-P245.
40. Dillon, G., Hussain, R., Loxton, D. & Rahman, S. (2013). Mental and Physical Health and Intimate Partner Violence against Women: A Review of the Literature. *International Journal of Family Medicine*.
41. Dong, X., Chen, R., Chang, E. S. & Simon, M. (2013). Elder abuse and psychological well-being: a systematic review and implications for research and policy—a mini review. *Gerontology*, 59(2), 132-142.

42. Dong, X. (2005). Medical implications of elder abuse and neglect. *Clinics in Geriatric Medicine*, 21(2), 293-313.
43. Dutton, M. A., Green, B. L., Kaltman, S. I., Roesch, D. M., Zeffiro, T. A. & Krause, E. D. (2006). Intimate partner violence, PTSD, and adverse health outcomes. *Journal of Interpersonal Violence*, 21(7), 955-968.
44. Etherington, N. & Baker, L. (2016). From “buzz-word” to best practice: applying intersectionality to children exposed to intimate partner violence. *Trauma, Violence, & Abuse*.
45. Exley, D., Morman, A. & Hyland, M. (2015). Adverse childhood experience and asthma onset: a systematic review. *European Respiratory Review*, 24(136), 299-305.
46. Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P. & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245-258.
47. Fisher, B. S. & Regan, S. L. (2006). The extent and frequency of abuse in the lives of older women and their relationship with health outcomes. *The Gerontologist*, 46(2), 200-209.
48. Fulmer, T., Rodgers, R. F. & Pelger, A. (2014). Verbal mistreatment of the elderly. *Journal of Elder Abuse & Neglect*, 26(4), 351-364.
49. Gonzalez, A., Boyle, M. H., Kyu, H. H., Georgiades, K., Duncan, L. & MacMillan, H. L. (2012). Childhood and family influences on depression, chronic physical conditions, and their comorbidity: findings from the Ontario Child Health Study. *Journal of Psychiatric Research*, 46(11), 1475-1482.
50. Greenfield, E. A. (2010). Child abuse as a life-course social determinant of adult health. *Maturitas*, 66(1), 51-55.
51. Hemmingsson, E., Johansson, K. & Reynisdottir, S. (2014). Effects of childhood abuse on adult obesity: a systematic review and meta-analysis. *Obesity Reviews*, 15(11), 882-893.
52. Herrenkohl, T. I., Hong, S., Klika, J. B., Herrenkohl, R. C. & Russo, M. J. (2013). Developmental impacts of child abuse and neglect related to adult mental health, substance use, and physical health. *Journal of Family Violence*, 28(2).
53. Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., Aguilar-Gaxiola, S., Alhamzawi, A. O., Alonso, J., Angermeyer, M., Benjet, C., Bromet, E., Chatterji, S., de Girolamo, G., Demyttenaere, K., Fayyad, J., Florescu, S., Gal, G., Gureje, O., Haro, J. M., Hu, C., Karam, E. G., Kawakami, N., Lee, S., Lépine, J. P., Ormel, J., Posada-Villa, J., Sagar, R., Tsang, A., Üstün, T. B., Assilev, S., Viana, M. C. & Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British Journal of Psychiatry*, 197(5), 378-385.
54. Kwako, L. E., Glass, N., Campbell, J., Melvin, K. C., Barr, T. & Gill, J. M. (2011). Traumatic brain injury in intimate partner violence: a critical review of outcomes and mechanisms. *Trauma, Violence & Abuse*, 12(3), 115-126.
55. Lang, C. M. & Sharma-Patel, K. (2011). The relation between childhood maltreatment and self-injury: a review of the literature on conceptualization and intervention. *Trauma, Violence & Abuse*, 12(1), 23-37.
56. MacMillan, H. L., Fleming, J. E., Streiner, D. L., Lin, E., Boyle, M. H., Jamieson, E., Duku, E. K., Walsh, C. A., Wong, M. Y. & Beardslee, W. R. (2001). Childhood abuse and lifetime psychopathology in a community sample. *The American Journal of Psychiatry*, 158(11), 1878-1883.
57. Mason, R. & O'Rinn, S. E. (2014). Co-occurring intimate partner violence, mental health, and substance use problems: a scoping review. *Global Health Action*, 7.
58. Moylan, C. A., Herrenkohl, T. I., Sousa, C., Tajima, E. A., Herrenkohl, R. C. & Russo, M. J. (2010). The effects of child abuse and exposure to domestic violence on adolescent internalizing and externalizing behavior problems. *Journal of Family Violence*, 25(1), 53-63.
59. Murphy, K., Waa, S., Jaffer, H., Sauter, A. & Chan, A. (2013). A literature review of findings in physical elder abuse. *Canadian Association of Radiologists Journal*, 64(1), 10-14.
60. Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J. & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis. *PLoS Medicine*, 9(11), e1001349.
61. Plichta, S. B. (2004). Intimate partner violence and physical health consequences. Policy and practice implications. *Journal of Interpersonal Violence*, 19(11), 1296-1323.

62. Sarkar, N. N. (2008). The impact of intimate partner violence on women's reproductive health and pregnancy outcome. *Journal of Obstetrics and Gynaecology*, 28(3), 266-271.
63. Schofield, M. J. & Mishra, G. D. (2004). Three year health outcomes among older women at risk of elder abuse: women's health Australia. *Quality of Life Research*, 13(6), 1043-1052.
64. Schofield, M. J., Powers, J. R. & Loxton, D. (2013). Mortality and disability outcomes of self-reported elder abuse: a 12-year prospective investigation. *Journal of the American Geriatrics Society*, 61(5), 679-685.
65. Scott, K. M., Smith, D. R. & Ellis, P. M. (2010). Prospectively ascertained child maltreatment and its association with DSM-IV mental disorders in young adults. *Archives of General Psychiatry*, 67(7), 712-719.
66. Vaughn, M. G., Salas-Wright, C. P., DeLisi, M. & Larson, M. (2015). Deliberate self-harm and the nexus of violence, victimization, and mental health problems in the United States. *Psychiatry Research*, 225(3), 588-595.
67. Widom, C. S. (2014). Long-term consequences of child maltreatment. In *Handbook of Child Maltreatment*, (pp. 225-247). [Korbin, J. E. & Krugman, R. D. (Eds.)]. (Dordrecht: Springer Science+Business Media).
68. Butchart, A., Phinney Harvey, A., Mian, M., Furniss, T. (2006). Preventing child maltreatment. A guide to taking action and generating evidence. (World Health Organization).
69. World Health Organization & London School of Hygiene and Tropical Medicine. (2010). Preventing intimate partner and sexual violence against women: taking action and generating evidence. (World Health Organization).
70. Wong, J. Y., Fong, D. Y., Lai, V. & Tiwari, A. (2014). Bridging intimate partner violence and the human brain: a literature review. *Trauma, Violence & Abuse*, 15(1), 22-33.
71. Wong, J. & Mellor, D. (2014). Intimate partner violence and women's health and wellbeing: impacts, risk factors and responses. *Contemporary Nurse*, 46(2), 170-179.
72. Boyce, J. (2016). Victimization of Aboriginal people in Canada, 2014. (Statistics Canada).
73. Coker, A. L., Davis, K. E., Arias, I., Desai, S., Sander-son, M., Brandt, H. M. & Smith, P. H. (2002). Physical and mental health effects of intimate partner violence for men and women. *American Journal of Preventive Medicine*, 23(4), 260-268.
74. Lagdon, S., Armour, C. & Stringer, M. (2014). Adult experience of mental health outcomes as a result of intimate partner violence victimisation: a systematic review. *European Journal of Psycho-traumatology*, 5, 10.
75. Cowell, R. A., Cicchetti, D., Rogosch, F. A. & Toth, S. L. (2015). Childhood maltreatment and its effect on neurocognitive functioning: timing and chronicity matter. *Development and Psychopathology*, 27(Special Issue 02), 521-533.
76. Jaffee, S. R. & Maikovich-Fong, A. K. (2011). Effects of chronic maltreatment and maltreatment timing on children's behavior and cognitive abilities. *Journal of Child Psychology and Psychiatry*, 52(2), 184-194.
77. Thornberry, T. P., Ireland, T. O. & Smith, C. A. (2001). The importance of timing: the varying impact of childhood and adolescent maltreatment on multiple problem outcomes. *Development and Psychopathology*, 13(4), 957-979.
78. Davies, E. A. & Jones, A. C. (2013). Risk factors in child sexual abuse. *Journal of Forensic and Legal Medicine*, 20(3), 146-150.
79. Scott-Storey, K. (2011). Cumulative abuse: do things add up? An evaluation of the conceptualization, operationalization, and methodological approaches in the study of the phenomenon of cumulative abuse. *Trauma, Violence, & Abuse*, 12(3), 135-150.
80. Chartier, M. J., Walker, J. R. & Naimark, B. (2007). Childhood abuse, adult health, and health care utilization: results from a representative community sample. *American Journal of Epidemiology*, 165(9), 1031-1038.
81. Ehrensaft, M. K., Knous-Westfall, H. M., Cohen, P. & Chen, H. (2014). How does child abuse history influence parenting of the next generation? *Psychology of Violence*, 5(1), 16-25.
82. Bowlus, A., McKenna, K., Day, T. & Wright, D. (2003). The economic costs and consequences of child abuse in Canada. (Law Commission of Canada).
83. Zhang, T., Hoddenbagh, J., McDonald, S. & Scrim, K. (2012). An estimation of the economic impact of spousal violence in Canada, 2009. (Department of Justice Canada).
84. World Health Organization, United Nations Office on Drugs and Crime & United Nations Development Programme. (2014). Global status report on violence prevention 2014. (Geneva: World Health Organization).

85. World Health Organization, Department of Reproductive Health and Research, London School of Hygiene and Tropical Medicine & South African Medical Research Council. (2013). Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. (World Health Organization).
86. Stoltenborgh, M., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H. & Alink, L. R. A. (2013). Cultural-geographical differences in the occurrence of child physical abuse? A meta-analysis of global prevalence. *International Journal of Psychology*, 48(2), 81-94.
87. Capaldi, D. M., Knoble, N. B., Shortt, J. W. & Kim, H. K. (2012). A systematic review of risk factors for intimate partner violence. *Partner Abuse*, 3(2), 231-280.
88. Copp, J. E., Kuhl, D. C., Giordano, P. C., Longmore, M. A. & Manning, W. D. (2015). Intimate partner violence in neighborhood context: the roles of structural disadvantage, subjective disorder, and emotional distress. *Social Science Research*, 53, 59-72.
89. Cheng, T. C. & Lo, C. C. (2016). Racial Disparities in Intimate Partner Violence Examined Through the Multiple Disadvantage Model. *Journal of Interpersonal Violence*, 31(11), 2026-2051.
94. Moffitt, P., Fikowski, H., Mauricio, M. & Mackenzie, A. (2013). Intimate partner violence in the Canadian territorial north: perspectives from a literature review and a media watch. *International Journal of Circumpolar Health*, 72.
95. Allan, B. & Smylie, J. (2015). First Peoples, second class treatment - the role of racism in the health and well-being of Indigenous peoples in Canada. (Toronto, ON): (The Wellesley Institute).
96. Four Worlds Centre for Development Learning, Bopp, M., Bopp, J. & Lane, P. (2003). Aboriginal domestic violence in Canada. (Aboriginal Healing Foundation).
97. Aguiar, W. & Halseth, R. (2015). Aboriginal Peoples and historic trauma: the process of intergenerational transmission. (National Collaborating Centre for Aboriginal Health).
98. Health Canada & Assembly of First Nations. (2015). First Nations mental wellness continuum framework. (Health Canada, Assembly of First Nations).
99. Bombay, A., Matheson, K. & Anisman, H. (2009). Intergenerational trauma: convergence of multiple processes among First Nations peoples in Canada. *Journal of Aboriginal Health*, 5(3), 6-47.
100. Bombay, A., Matheson, K. & Anisman, H. (2011). The impact of stressors on second generation Indian residential school survivors. *Transcultural Psychiatry*, 48(4), 367-391.

Impacts on Canadians

90. Perreault, S. & Hotton Mahony, T. (2012). Criminal victimization in the territories, 2009. (Statistics Canada).
91. Rivara, F. P., Anderson, M. L., Fishman, P., Reid, R. J., Bonomi, A. E., Carrell, D. & Thompson, R. S. (2009). Age, period, and cohort effects on intimate partner violence. *Violence and Victims*, 24(5), 627-638.
92. Miszkurka, M., Steensma, C. & Phillips, S. P. (2016). Correlates of partner and family violence among older Canadians: a life-course approach. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy, and Practice*, 36(3), 45-53.
93. Afifi, T. O., Taillieu, T., Cheung, K., Katz, L. Y., Tonmyr, L. & Sareen, J. (2015). Substantiated reports of child maltreatment from the Canadian Incidence Study of Reported Child Abuse and Neglect 2008: examining child and household characteristics and child functional impairment. *Canadian Journal of Psychiatry*, 60(7), 315-323.
101. Chansonneuve, D. (2005). Reclaiming connections: understanding residential school trauma among Aboriginal People. (The Aboriginal Healing Foundation).
102. Elias, B., Mignone, J., Hall, M., Hong, S. P., Hart, L. & Sareen, J. (2012). Trauma and suicide behaviour histories among a Canadian Indigenous population: an empirical exploration of the potential role of Canada's residential school system. *Social Science & Medicine*, 74(10), 1560-1569.
103. Hatala, A. R., Desjardins, M. & Bombay, A. (2015). Reframing narratives of Aboriginal health inequity: exploring Cree Elder resilience and well-being in contexts of historical trauma. *Qualitative Health Research*.
104. Kirmayer, L. J., Gone, J. P. & Moses, J. (2014). Rethinking historical trauma. *Transcultural Psychiatry*, 51(3), 299-319.
105. Marsh, T. N., Coholic, D., Cote-Meek, S. & Najavits, L. M. (2015). Blending Aboriginal and Western healing methods to treat intergenerational trauma with substance use disorder in Aboriginal peoples who live in Northeastern Ontario, Canada. *Harm Reduction Journal*, 12(1), 1-12.

106. Native Women's Association of Canada. (2015). Fact sheet: root causes of violence against Aboriginal women and the impact of colonization. (Akwasasne, Ontario): (Native Women's Association of Canada).
107. Truth and Reconciliation Commission of Canada. (2015). The survivors speak: a report of the Truth and Reconciliation Commission of Canada. (Truth and Reconciliation Commission of Canada).
108. Truth and Reconciliation Commission of Canada. (2015). What we have learned: principles of truth and reconciliation. (Truth and Reconciliation Commission of Canada).
109. Bombay, A., Matheson, K. & Anisman, H. (2014). The intergenerational effects of Indian residential schools: implications for the concept of historical trauma. *Transcultural Psychiatry*, 51(3), 320-338.
110. Brassard, R., Montminy, L., Bergeron, A. & Sosa-Sanchez, A. I. (2015). Application of intersectional analysis to data on domestic violence against Aboriginal women living in the province of Quebec. *Aboriginal Policy Studies*, 4(1), 3-23.
111. Basile, K. C., Breiding, M. J. & Smith, S. G. (2016). Disability and risk of recent sexual violence in the United States. *American Journal of Public Health*, 106(5), 928-933.
112. Hahn, J. W., McCormick, M. C., Silverman, J. G., Robinson, E. B. & Koenen, K. C. (2014). Examining the impact of disability status on intimate partner violence victimization in a population sample. *Journal of Interpersonal Violence*, 29(17), 3063-3085.
113. Krnjacki, L., Emerson, E., Llewellyn, G. & Kavanagh, A. M. (2016). Prevalence and risk of violence against people with and without disabilities: findings from an Australian population-based study. *Australian and New Zealand Journal of Public Health*, 40(1), 16-21.
114. Breiding, M. J. & Armour, B. S. (2015). The association between disability and intimate partner violence in the United States. *Annals of Epidemiology*, 25(6), 455-457.
115. Lorenzetti, L., Wells, L., Callaghan, T. & Logie, C. (2014). Domestic violence in Alberta's gender and sexually diverse communities: towards a framework for prevention. (Shift: The Project to End Domestic Violence).
116. Ryan, C., Russell, S. T., Huebner, D., Diaz, R. & Sanchez, J. (2010). Family acceptance in adolescence and the health of LGBT young adults. *Journal of Child and Adolescent Psychiatric Nursing*, 23(4), 205-213.
117. Dank, M., Lachman, P., Zweig, J. M. & Yahner, J. (2014). Dating violence experiences of lesbian, gay, bisexual, and transgender youth. *Journal of Youth and Adolescence*, 43(5), 846-857.
118. Edwards, K. M. & Sylaska, K. M. (2013). The perpetration of intimate partner violence among LGBTQ college youth: the role of minority stress. *Journal of Youth and Adolescence*, 42(11), 1721-1731.
119. Whitton, S. W., Newcomb, M. E., Messinger, A. M., Byck, G. & Mustanski, B. (2016). A longitudinal study of IPV victimization among sexual minority youth. *Journal of Interpersonal Violence*.
120. Oliffe, J. L., Han, C., Maria, E. S., Lohan, M., Howard, T., Stewart, D. E. & Macmillan, H. (2014). Gay men and intimate partner violence: a gender analysis. *Sociology of Health & Illness*, 36(4), 564-579.
121. Miladinovic, Z. & Mulligan, L. (2015). Homicide in Canada, 2014. (Statistics Canada).
122. Dong, X., Simon, M., Mendes de Leon, C. F., Fulmer, T., Beck, T., Hebert, L., Dyer, C., Paveza, G. & Evans, D. (2009). Elder self-neglect and abuse and mortality risk in a community-dwelling population. *The Journal of American Medical Association*, 302(5), 517-526.
123. Dong, X. Q., Simon, M. A., Beck, T. T., Farran, C., McCann, J. J., Mendes de Leon, C. F., Laumann, E. & Evans, D. A. (2011). Elder abuse and mortality: the role of psychological and social wellbeing. *Gerontology*, 57(6), 549-558.
124. Lachs, M. S., Williams, C. S., O'Brien, S., Pillemer, K. A. & Charlson, M. E. (1998). The mortality of elder mistreatment. *The Journal of the American Medical Association*, 280(5), 428-432.
125. Lachs, M. S. & Pillemer, K. A. (2015). Elder abuse. *The New England Journal of Medicine*, 373(20), 1947-1956.
126. Welch, G. L. & Bonner, B. L. (2013). Fatal child neglect: characteristics, causation, and strategies for prevention. *Child Abuse & Neglect*, 37(10), 745-752.
127. Rhodes, A. E., Boyle, M. H., Bethell, J., Wekerle, C., Goodman, D., Tonmyr, L., Leslie, B., Lam, K. & Manion, I. (2012). Child maltreatment and onset of emergency department presentations for suicide-related behaviors. *Child Abuse & Neglect*, 36(6), 542-551.
128. Martin, M. S., Dykxhoorn, J., Afifi, T. O. & Colman, I. (2016). Child abuse and the prevalence of suicide attempts among those reporting suicide ideation. *Social Psychiatry and Psychiatric Epidemiology*, 1-8.

129. Moffitt, T.E. & Klaus-Grawe 2012 Think Tank (2013). Childhood exposure to violence and lifelong health: Clinical intervention science and stress biology research. *Development and Psychopathology*, 25(4pt2), 1619-1634.
130. Sinha, M. (2012). Family violence in Canada: a statistical profile, 2010. (Statistics Canada).
131. Clark, C., Caldwell, T., Power, C. & Stansfeld, S. A. (2010). Does the influence of childhood adversity on psychopathology persist across the lifecourse? A 45-year prospective epidemiologic study. *Annals of Epidemiology*, 20(5), 385-394.
132. Afifi, T. O., Mota, N., MacMillan, H. L. & Sareen, J. (2013). Harsh physical punishment in childhood and adult physical health. *Pediatrics*, 132(2), e333-e340.
133. Afifi, T. O., Mota, N. P., Dasiewicz, P., MacMillan, H. L. & Sareen, J. (2012). Physical punishment and mental disorders: results From a nationally representative US sample. *Pediatrics*, 130(2), 184-192.
134. Beckett, C., Maughan, B., Rutter, M., Castle, J., Colvert, E., Groothues, C., Kreppner, J., Stevens, S., O'Connor, T. G. & Sonuga-Barke, E. J. S. (2006). Do the effects of early severe deprivation on cognition persist into early adolescence? Findings from the English and Romanian adoptees study. *Child Development*, 77(3), 696-711.
135. Beckett, C., Bredenkamp, D., Castle, J., Groothues, C., O'Connor, T. G., Rutter, M. & and the English and Romanian Adoptees (E.R.A.) Study Team. (2002). Behavior patterns associated with institutional deprivation: a study of children adopted from Romania. *Journal of Developmental & Behavioral Pediatrics*, 23(5).
136. Beckett, C., Maughan, B., Rutter, M., Castle, J., Colvert, E., Groothues, C., Hawkins, A., Kreppner, J., O'Connor, T. G., Stevens, S. & Sonuga-Barke, E. J. S. (2007). Scholastic attainment following severe early institutional deprivation: a study of children adopted from Romania. *Journal of Abnormal Child Psychology*, 35(6), 1063-1073.
137. Colvert, E., Rutter, M., Beckett, C., Castle, J., Groothues, C., Hawkins, A., Kreppner, J., O'Connor, T. G., Stevens, S. & Sonuga-Barke, E. J. S. (2008). Emotional difficulties in early adolescence following severe early deprivation: findings from the English and Romanian adoptees study. *Development and Psychopathology*, 20(02), 547-567.
138. Croft, C., Beckett, C., Rutter, M., Castle, J., Colvert, E., Groothues, C., Hawkins, A., Kreppner, J., Stevens, S. E. & Sonuga-Barke, E. J. S. (2007). Early adolescent outcomes of institutionally-deprived and non-deprived adoptees. II: Language as a protective factor and a vulnerable outcome. *Journal of Child Psychology and Psychiatry*, 48(1), 31-44.
139. O'Connor, T. G. & Rutter, M. (2000). Attachment disorder behavior following early severe deprivation: extension and longitudinal follow-up. English and Romanian Adoptees Study Team. *Journal of the American Academy of Child Adolescent Psychiatry*, 39(6), 703-712.
140. O'Connor, T. G., Rutter, M., Beckett, C., Keaveney, L. & Kreppner, J. M. (2000). The effects of global severe privation on cognitive competence: extension and longitudinal follow-up. *Child Development*, 71(2), 376-390.
141. Rutter, M. (1998). Developmental catch-up, and deficit, following adoption after severe global early privation. *Journal of Child Psychology and Psychiatry*, 39(4), 465-476.
142. Rutter, M., O'Connor, T. G. & English and Romanian Adoptees (ERA) Study Team. (2004). Are there biological programming effects for psychological development? Findings from a study of Romanian adoptees. *Developmental Psychology*, 40(1), 81-94.
143. Rutter, M. L., Kreppner, J. M. & O'Connor, T. G. (2001). Specificity and heterogeneity in children's responses to profound institutional privation. *The British Journal of Psychiatry*, 179(2), 97-103.
144. Sonuga-Barke, E. J. S., Beckett, C., Kreppner, J., Castle, J., Colvert, E., Stevens, S., Hawkins, A. & Rutter, M. (2008). Is sub-nutrition necessary for a poor outcome following early institutional deprivation? *Developmental Medicine & Child Neurology*, 50(9), 664-671.
145. Stevens, S. E., Sonuga-Barke, E. J. S., Kreppner, J. M., Beckett, C., Castle, J., Colvert, E., Groothues, C., Hawkins, A. & Rutter, M. (2008). Inattention/overactivity following early severe institutional deprivation: presentation and associations in early adolescence. *Journal of Abnormal Child Psychology*, 36(3), 385-398.
146. Afifi, T. O., Macmillan, H., Cox, B. J., Asmundson, G. J. G., Stein, M. B. & Sareen, J. (2009). Mental health correlates of intimate partner violence in marital relationships in a nationally representative sample of males and females. *Journal of Interpersonal Violence*, 24(8), 1398-1417.
147. Bebbington, P. (2009). Childhood sexual abuse and psychosis: aetiology and mechanism. *Social Psychiatry and Psychiatric Epidemiology*, 18(4), 284-293.
148. Bonomi, A. E., Cannon, E. A., Anderson, M. L., Rivara, F. P. & Thompson, R. S. (2008). Association between self-reported health and physical and/or sexual abuse experienced before age 18. *Child Abuse & Neglect*, 32(7), 693-701.

149. Bonomi, A. E., Anderson, M. L., Reid, R. J., Rivara, F. P., Carrell, D. & Thompson, R. S. (2009). Medical and psychosocial diagnoses in women with a history of intimate partner violence. *Archives of Internal Medicine*, 169(18), 1692-1697.
150. Enns, M. W., Cox, B. J., Afifi, T. O., De Graaf, R., Have, M. T. & Sareen, J. (2006). Childhood adversities and risk for suicidal ideation and attempts: a longitudinal population-based study. *Psychological Medicine*, 36(12), 1769-1778.
151. Maniglio, R. (2009). The impact of child sexual abuse on health: a systematic review of reviews. *Clinical Psychology Review*, 29(7), 647-657.
152. Nikulina, V. & Widom, C. S. (2013). Child maltreatment and executive functioning in middle adulthood: a prospective examination. *Neuropsychology*, 27(4), 10.
153. Paras, M. L., Murad, M. & Chen, L. P. (2009). Sexual abuse and lifetime diagnosis of somatic disorders: a systematic review and meta-analysis. *JAMA*, 302(5), 550-561.
154. Read, J., Fink, P., Rudegeair, T., Felitti, V. & Whitfield, C. (2008). Child maltreatment and psychosis: a return to a genuinely integrated bio-psycho-social model. *Clinical Schizophrenia & Related Psychoses*, 2(3), 235-254.
155. Read, J., Bentall, R. P. & Fosse, R. (2009). Time to abandon the bio-bio-bio model of psychosis: exploring the epigenetic and psychological mechanisms by which adverse life events lead to psychotic symptoms. *Epidemiology and Psychiatric Sciences*, 18(04), 299-310.
156. Roos, L. E., Afifi, T. O., Martin, C. G., Pietzrack, R. H., Tsai, J. & Sareen, J. (2016). Linking typologies of childhood adversity to adult incarceration: findings from a nationally representative sample. *American Journal of Orthopsychiatry*.
157. Young, J. C. & Widom, C. S. (2014). Long-term effects of child abuse and neglect on emotion processing in adulthood. *Child Abuse & Neglect*, 38(8), 1369-1381.
158. Wathen, C. N. (2012). Health impacts of violent victimization on women and their children. (Department of Justice).
159. Wegman, H. L. & Stetler, C. (2009). A meta-analytic review of the effects of childhood abuse on medical outcomes in adulthood. *Psychosomatic Medicine*, 71(8).
160. McTavish, J. R., MacGregor, J. C. D., Wathen, C. N. & MacMillan, H. L. (2016). Children's exposure to intimate partner violence: an overview. *International Review of Psychiatry*, 1-15.
161. Tarullo, A. R. & Gunnar, M. R. (2006). Child maltreatment and the developing HPA axis. *Hormones and Behavior*, 50(4), 632-639.
162. Gonzalez, A. (2013). The impact of childhood maltreatment on biological systems: implications for clinical interventions. *Paediatrics & Child Health*, 18(8), 415-418.
163. Danese, A. & McEwan, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior*, 106(1), 29-39.
164. Kim, H. K., Tiberio, S. S., Capaldi, D. M., Shortt, J. W., Squires, E. C. & Snodgrass, J. J. (2015). Intimate partner violence and diurnal cortisol patterns in couples. *Psychoneuroendocrinology*, 51, 35-46.
165. De Bellis, M. D. & Zisk, A. (2014). The biological effects of childhood trauma. *Child and Adolescent Psychiatric Clinics of North America*, 23(2), 185-222.
166. Springer, K. W. (2009). Childhood physical abuse and midlife physical health: testing a multi-pathway life course model. *Social Science & Medicine*, 69(1), 138-146.
167. Borsini, A., Hepgul, N., Mondelli, V., Chalder, T. & Pariante, C. M. (2014). Childhood stressors in the development of fatigue syndromes: a review of the past 20 years of research. *Psychological Medicine*, 44(9), 1809-1823.
168. Catalina-Romero, C., Calvo, E., Sánchez-Chaparro, M. A., Valdivielso, P., Sainz, J. C., Cabrera, M., González-Quintela, A. & Román, J. (2013). The relationship between job stress and dyslipidemia. *Scandinavian Journal of Public Health*, 41(2), 142-149.
169. Dimsdale, J. E. (2008). Psychological stress and cardiovascular disease. *Journal of the American College of Cardiology*, 51(13), 1237-1246.
170. Esler, M., Eikelis, N., Schlaich, M., Lambert, G., Alvarenga, M., Dawood, T., Kaye, D., Barton, D., Pier, C., Guo, L., Brenchley, C., Jennings, G. & Lambert, E. (2008). Chronic mental stress is a cause of essential hypertension: presence of biological markers of stress. *Clinical and Experimental Pharmacology & Physiology*, 35(4), 498-502.
171. Galtrey, C. M., Mula, M. & Cock, H. R. (2016). Stress and epilepsy: fact or fiction, and what can we do about it? *Practical Neurology*.
172. Gameiro, G. H., da Silva Andrade, A., Nouer, D. F. & Ferraz de Arruda Veiga, M. C. (2006). How may stressful experiences contribute to the development of temporomandibular disorders? *Clinical Oral Investigations*, 10(4), 261-268.

173. Groesz, L. M., McCoy, S., Carl, J., Saslow, L., Stewart, J., Adler, N., Laraia, B. & Epel, E. (2012). What is eating you? Stress and the drive to eat. *Appetite*, 58(2), 717-721.
174. Hannibal, K. E. & Bishop, M. D. (2014). Chronic stress, cortisol dysfunction, and pain: a psychoneuroendocrine rationale for stress management in pain rehabilitation. *Physical Therapy*, 94(12), 1816-1825.
175. Haynes, C., Lee, M. D. & Yeomans, M. R. (2003). Interactive effects of stress, dietary restraint, and disinhibition on appetite. *Eating Behaviors*, 4(4), 369-383.
176. Juster, R. P., McEwen, B. S. & Lupien, S. J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience and Behavioral Reviews*, 35(1), 2-16.
177. Kelly, S. J. & Ismail, M. (2015). Stress and type 2 diabetes: a review of how stress contributes to the development of type 2 diabetes. *Annual Review of Public Health*, 36, 441-462.
178. Kirkpatrick, H. A. & Heller, G. A. (2014). Post-traumatic stress disorder: theory and treatment update. *International Journal of Psychiatry in Medicine*, 47(4), 337-346.
179. Konturek, P. C., Brzozowski, T. & Konturek, S. J. (2011). Stress and the gut: pathophysiology, clinical consequences, diagnostic approach and treatment options. *Journal of Physiology and Pharmacology*, 62(6), 591-599.
180. Lagraauw, H. M., Kuiper, J. & Bot, I. (2015). Acute and chronic psychological stress as risk factors for cardiovascular disease: Insights gained from epidemiological, clinical and experimental studies. *Brain, Behavior and Immunity*, 50, 18-30.
181. Lo Sauro, C., Ravaldi, C., Cabras, P. L., Faravelli, C. & Ricca, V. (2008). Stress, hypothalamic-pituitary-adrenal axis and eating disorders. *Neuropsychobiology*, 57(3), 95-115.
182. Lupien, S. J., McEwen, B. S., Gunnar, M. R. & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews. Neuroscience*, 10(6), 434-445.
183. Martínez-Martínez, L.-A., Mora, T., Vargas, A., Fuentes-Iniestra, M. & Martínez-Lavín, M. (2014). Sympathetic nervous system dysfunction in fibromyalgia, chronic fatigue syndrome, irritable bowel syndrome, and interstitial cystitis: a review of case-control studies. *Journal of Clinical Rheumatology*, 30(3), 146-150.
184. McEwen, B. S. (2008). Central effects of stress hormones in health and disease: understanding the protective and damaging effects of stress and stress mediators. *European Journal of Pharmacology*, 583(2-3), 174-185.
185. McEwen, B. S. (2012). Brain on stress: how the social environment gets under the skin. *Proceedings of the National Academy of Sciences of the United States of America*, 109(Suppl 2), 17180-17185.
186. Palagini, L., Drake, C. L., Gehrman, P., Meerlo, P. & Riemann, D. (2015). Early-life origin of adult insomnia: does prenatal-early-life stress play a role? *Sleep Medicine*, 16(4), 446-456.
187. Rosenberg, S. L., Miller, G. E., Brehm, J. M. & Celedón, J. C. (2014). Stress and asthma: Novel insights on genetic, epigenetic, and immunologic mechanisms. *Journal of Allergy and Clinical Immunology*, 134(5), 1009-1015.
188. Powell, N. D., Tarr, A. J. & Sheridan, J. F. (2013). Psychosocial stress and inflammation in cancer. *Brain, Behavior and Immunity*, 30(Suppl), S41-S47.
189. Scott, K. A., Melhorn, S. J. & Sakai, R. R. (2012). Effects of chronic social stress on obesity. *Current Obesity Reports*, 1(1), 16-25.
190. Shalev, A. Y. (2009). Posttraumatic stress disorder and stress-related disorders. *The Psychiatric Clinics of North America*, 32(3), 687-704.
191. Sinha, R. & Jasterboff, A. M. (2013). Stress as a common risk factor for obesity and addiction. *Biological Psychiatry*, 73(9), 827-835.
192. Sparrenberger, F., Cichelero, F. T., Ascoli, A. M., Fonseca, F. P., Weiss, G., Berwanger, O., Fuchs, S. C., Moreira, L. B. & Fuchs, F. D. (2009). Does psychosocial stress cause hypertension? a systematic review of observational studies. *Journal of Human Hypertension*, 23(1), 12-19.
193. Spruill, T. M. (2010). Chronic psychosocial stress and hypertension. *Current Hypertension Report*, 12(1), 10-16.
194. Stockhorst, U. & Antov, M. I. (2015). Modulation of fear extinction by stress, stress hormones and estradiol: a review. *Frontiers in Behavioral Neuroscience*, 9.
195. Stults-Kolehmainen, M. A., Bartholomew, J. B. & Sinha, R. (2014). Chronic psychological stress impairs recovery of muscular function and somatic sensations over a 96-hour period. *Journal of Strength and Conditioning Research*, 28(7), 2007-2017.

196. Turecki, G. & Brent, D. A. (2016). Suicide and suicidal behaviour. *The Lancet*, 387(10024), 1227-1239.
197. Vachon-Pressseau, E., Roy, M., Martel, M. O., Caron, E., Marin, M. F., Chen, J., Plante, I., Sullivan, M. J., Lupien, S. J. & Rainville, P. (2013). The stress model of chronic pain: evidence from basal cortisol and hippocampal structure and function in humans. *Brain: A Journal of Neurology*, 136(Pt 3), 815-827.
198. Van Oudenhove, L. & Aziz, Q. (2013). The role of psychosocial factors and psychiatric disorders in functional dyspepsia. *Nature Reviews. Gastroenterology & Hepatology*, 10(3), 158-167.
199. Ye, Y., Pang, Z., Chen, W., Ju, S. & Zhou, C. (2015). The epidemiology and risk factors of inflammatory bowel disease. *International Journal of Clinical and Experimental Medicine*, 8(12), 22529-22542.
200. Ehlert, U. (2013). Enduring psychobiological effects of childhood adversity. *Psychoneuroendocrinology*, 38(9), 1850-1857.
201. Fagundes, C. P., Glaser, R. & Kiecolt-Glaser, J. K. (2013). Stressful early life experiences and immune dysregulation across the lifespan. *Brain, Behavior and Immunity*, 27(1), 8-12.
202. Nicolaidis, N. C., Kyratzi, E., Lamprokostopoulou, A., Chrousos, G. P. & Charmandari, E. (2015). Stress, the stress system and the role of glucocorticoids. *Neuroimmunomodulation*, 22(1-2), 6-19.
203. Shalev, I., Moffitt, T. E., Sugden, K., Williams, B., Houts, R. M., Danese, A., Mill, J., Arseneault, L. & Caspi, A. (2013). Exposure to violence during childhood is associated with telomere erosion from 5 to 10 years of age: a longitudinal study. *Molecular Psychiatry*, 18(5), 576-581.
204. Bensley, L. S., Van Eenwyk, J. & Simmons, K. W. (2000). Self-reported childhood sexual and physical abuse and adult HIV-risk behaviors and heavy drinking. *Addiction*, 18(2), 151-158.
205. Devries, K. M., Child, J. C., Bacchus, L. J., Mak, J., Falder, G., Graham, K., Watts, C. & Heise, L. (2014). Intimate partner violence victimization and alcohol consumption in women: a systematic review and meta-analysis. *Addiction*, 109(3), 379-391.
206. Dong, M., Dube, S. R., Felitti, V. J., Giles, W. H. & Anda, R. F. (2003). Adverse childhood experiences and self-reported liver disease: new insights into the causal pathway. *Archives of Internal Medicine*, 163(16), 1949-1956.
207. Dube, S. R., Miller, J. W., Brown, D. W., Giles, W. H., Felitti, V. J., Dong, M. & Anda, R. F. (2006). Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence. *Journal of Adolescent Health*, 38(4), 444.
208. Hamburger, M. E., Moore, J., Koenig, L. J., Vlahov, D., Schoenbaum, E. E., Schuman, P., Mayer, K. & HIV Epidemiology Research Study Group. (2004). Persistence of inconsistent condom use: relation to abuse history and HIV serostatus. *AIDS and Behavior*, 8(3), 333-344.
209. Klein, H., Elifson, K. W. & Sterk, C. E. (2007). Childhood neglect and adulthood involvement in HIV-related risk behaviors. *Child Abuse & Neglect*, 31(1), 39-53.
210. Strine, T. W., Edwards, V. J., Dube, S. R., Wagenfeld, M., Dhingra, S., Prehn, A. W., Rasmussen, S., McKnight-Eily, L. & Croft, J. B. (2012). The mediating sex-specific effect of psychological distress on the relationship between adverse childhood experiences and current smoking among adults. *Substance Abuse, Treatment, Prevention and Policy*, 7(30).
211. Strine, T. W., Dube, S. R., Edwards, V. J., Prehn, A. W., Rasmussen, S., Wagenfeld, M., Dhingra, S. & Croft, J. B. (2012). Associations between adverse childhood experiences, psychological distress, and adult alcohol problems. *American Journal of Health Behavior*, 36(3), 408-423.
212. Ouellet-Morin, I., Fisher, H. L., York-Smith, M., Fincham-Campbell, S., Moffitt, T. E. & Arseneault, L. (2015). Intimate partner violence and new-onset depression: a longitudinal study of women's childhood and adult histories of abuse. *Depression and Anxiety*, 32(5), 316-324.
213. Gonzalez, A., Macmillan, H., Tanaka, M., Jack, S. M. & Tonmyr, L. (2014). Subtypes of exposure to intimate partner violence within a Canadian child welfare sample: associated risks and child maladjustment. *Child Abuse & Neglect*, 38(12), 1934-1944.
214. Jung, H., Herrenkohl, T. I., Lee, J. O., Hemphill, S. A., Heerde, J. A. & Skinner, M. L. (2015). Gendered pathways from child abuse to adult crime through internalizing and externalizing behaviors in childhood and adolescence. *Journal of Interpersonal Violence*.
215. Lewis, T., McElroy, E., Harlaar, N. & Runyan, D. (2016). Does the impact of child sexual abuse differ from maltreated but non-sexually abused children? A prospective examination of the impact of child sexual abuse on internalizing and externalizing behavior problems. *Child Abuse & Neglect*, 51, 31-40.

216. Colman, R. A. & Widom, C. S. (2004). Childhood abuse and neglect and adult intimate relationships: a prospective study. *Child Abuse & Neglect*, 28(11), 1133-1151.
217. Cubellis, M. A., Peterson, B. E., Henninger, A. M. & Lee, D. (2016). Childhood sexual abuse and antisocial traits and behaviors: a gendered examination of the factors associated with perpetration of intimate partner violence. *Journal of Interpersonal Violence*.
218. Leonard, L. M. & Follette, V. M. (2002). Sexual functioning in women reporting a history of child sexual abuse: review of the empirical literature and clinical implications. *Annual Review of Sex Research*, 13, 346-388.
219. Loeb, T. B., Williams, J. K., Carmona, J. V., Rivkin, I., Wyatt, G. E., Chin, D. & Asuan-O'Brien, A. (2002). Child sexual abuse: associations with the sexual functioning of adolescents and adults. *Annual Review of Sex Research*, 13, 307-345.
220. McLeod, G. F., Fergusson, D. M. & Horwood, L. J. (2014). Childhood physical punishment or maltreatment and partnership outcomes at age 30. *American Journal of Orthopsychiatry*, 84(3), 307-15.
221. Rumstein-McKean, O. & Hunsley, J. (2001). Interpersonal and family functioning of female survivors of childhood sexual abuse. *Clinical Psychology Review*, 21(3), 471-490.
222. Whiffen, V. E. & MacIntosh, H. B. (2005). Mediators of the link between childhood sexual abuse and emotional distress: a critical review. *Trauma, Violence, & Abuse*, 6(1), 24-39.
223. Tardif-Williams, C. Y., Tanaka, M., Boyle, M. H. & MacMillan, H. L. (2015). The impact of childhood abuse and current mental health on young adult intimate relationship functioning. *Journal of Interpersonal Violence*.
224. Sperry, D. M. & Widom, C. S. (2013). Child abuse and neglect, social support, and psychopathology in adulthood: a prospective investigation. *Child Abuse & Neglect*, 37(6), 415-425.
225. Young, J. C. & Widom, C. S. (2014). Long-term effects of child abuse and neglect on emotion processing in adulthood. *Child Abuse & Neglect*, 38(8), 1369-1381.
226. Sudbrack, R., Manfro, P. H., Kuhn, I. M., de Carvalho, H. W. & Lara, D. R. (2015). What doesn't kill you makes you stronger and weaker: how childhood trauma relates to temperament traits. *Journal of Psychiatric Research*, 62, 123-129.
227. Lomanowska, A. M., Boivin, M., Hertzman, C. & Fleming, A. S. (2015). Parenting begets parenting: A neurobiological perspective on early adversity and the transmission of parenting styles across generations. *Neuroscience*.
228. Coohy, C. (2007). The relationship between mothers' social networks and severe domestic violence: a test of the social isolation hypothesis. *Violence and Victims*, 22(4), 503-512.
229. Dunn, J. L. (2004). "Victims" and "survivors": emerging vocabularies of motive for "battered women who stay". *Sociological Inquiry*, 75(1), 1-30.
230. Esqueda, C. W. & Harrison, L. A. (2005). The influence of gender role stereotypes, the woman's race, and level of provocation and resistance on domestic violence culpability attributions. *Sex Roles*, 53(11), 821-834.
231. Harrison, L. A. & Esqueda, C. W. (2000). Effects of race and victim drinking on domestic violence attributions. *Sex Roles*, 42(11), 1043-1057.
232. Harrison, L. A. & Esqueda, C. W. (1999). Myths and stereotypes of actors involved in domestic violence: implications for domestic violence culpability attributions. *Aggression and Violent Behavior*, 4(2), 129-138.
233. Murray, C. E., Crowe, A. & Overstreet, N. M. (2015). Sources and components of stigma experienced by survivors of intimate partner violence. *Journal of Interpersonal Violence*.
234. Overstreet, N. M. & Quinn, D. M. (2013). The intimate partner violence stigmatization model and barriers to help-seeking. *Basic and Applied Social Psychology*, 35(1), 109-122.
235. Maguire, S. A., Williams, B., Naughton, A. M., Cowley, L. E., Tempest, V., Mann, M. K., Teague, M. & Kemp, A. M. (2015). A systematic review of the emotional, behavioural and cognitive features exhibited by school-aged children experiencing neglect or emotional abuse. *Child: Care, Health and Development*, 41(5), 641-653.
236. Anthonysamy, A. & Zimmer-Gembeck, M. J. (2007). Peer status and behaviors of maltreated children and their classmates in the early years of school. *Child Abuse & Neglect*, 31(9), 971-991.
237. Kurtz, P. D., Gaudin, J. M. Jr., Wodarski, J. S. & Howing, P. T. (1993). Maltreatment and the school-aged child: school performance consequences. *Child Abuse & Neglect*, 17(5), 581-589.
238. Romano, E., Babchishin, L., Marquis, R. & Frechette, S. (2015). Childhood maltreatment and educational outcomes. *Trauma, Violence, & Abuse*, 16(4), 418-437.

239. Shonk, S. M. & Cicchetti, D. (2001). Maltreatment, competency deficits, and risk for academic and behavioral maladjustment. *Developmental Psychology*, 37(1), 3-17.
240. Tanaka, M., Georgiades, K., Boyle, M. H. & MacMillan, H. L. (2015). Child maltreatment and educational attainment in young adulthood: results from the Ontario Child Health Study. *Journal of Interpersonal Violence*, 30(2), 195-214.
241. Zolotor, A., Kotch, J., Dufort, V., Winsor, J., Catellier, D. & Bou-Saada, I. (1999). School performance in a longitudinal cohort of children at risk of maltreatment. *Maternal and Child Health Journal*, 3(1), 19-27.
242. Zielinski, D. S. (2009). Child maltreatment and adult socioeconomic well-being. *Child Abuse & Neglect*, 33(10), 666-678.
243. Wathen, C. N., MacGregor, J. C. D. & MacQuarrie, B. J. (2015). The impact of domestic violence in the workplace: results from a pan-Canadian survey. *Journal of Occupational and Environmental Medicine*, 57(7).
244. Wathen, C. N., MacGregor, J. C. D., MacQuarrie, B. J. & The Canadian Labour Congress. (2014). Can work be safe, when home isn't? Initial findings of a pan-Canadian survey on domestic violence and the workplace. (Centre for Research and Education on Violence Against Women and Children).
245. Borchers, A., Lee, R. C., Martsolf, D. S. & Maler, J. (2016). Employment maintenance and intimate partner violence. *Workplace Health & Safety*.
246. Reeves, C. & O'Leary-Kelly, A. M. (2007). The effects and costs of intimate partner violence for work organizations. *Journal of Interpersonal Violence*, 22(3), 327-344.
247. Swanberg, J. E., Logan, T. K. & Macke, C. (2005). Intimate partner violence, employment, and the workplace: consequences and future directions. *Trauma, Violence, & Abuse*, 6(4), 286-312.
248. Swanberg, J. E. & Logan, T. K. (2005). Domestic violence and employment: a qualitative study. *Journal of Occupational Health Psychology*, 10(1), 3-17.
249. Wathen, C. N., MacGregor, J. C. D. & MacQuarrie, B. J. (2016). Relationships among intimate partner violence, work, and health. *Journal of Interpersonal Violence*.
250. Herrman, H., Stewart, D. E., Diaz-Granados, N., Berger, E. L., Jackson, B. & Yuen, T. (2011). What is resilience? *The Canadian Journal of Psychiatry*, 56(5), 258-265.
251. Feder, A., Nestler, E. J. & Charney, D. S. (2009). Psychobiology and molecular genetics of resilience. *Nature Reviews Neuroscience*, 10(6), 446-457.
252. Walsh, W. A., Dawson, J. & Mattingly, M. J. (2010). How are we measuring resilience following childhood maltreatment? Is the research adequate and consistent? What is the impact on research, practice, and policy? *Trauma, Violence, & Abuse*, 11(1), 27-41.
253. Domhardt, M., Munzer, A., Fegert, J. M. & Goldbeck, L. (2015). Resilience in survivors of child sexual abuse: a systematic review of the literature. *Trauma, Violence, & Abuse*, 16(4), 476-493.
254. Klika, J. B. & Herrenkohl, T. I. (2013). A review of developmental research on resilience in maltreated children. *Trauma, Violence, & Abuse*, 14(3), 222-234.
255. Cicchetti, D. (2013). Annual research review: resilient functioning in maltreated children past, present, and future perspectives. *Journal of Child Psychology and Psychiatry*, 54(4), 402-422.
256. Wathen, C. N., MacGregor, J. C., Hammerton, J., Coben, J. H., Herrman, H., Stewart, D. E., MacMillan, H. L. & PreVAiL Research Network. (2012). Priorities for research in child maltreatment, intimate partner violence and resilience to violence exposures: results of an international Delphi consensus development process. *BMC Public Health*, 12(684).
257. Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., Taylor, A. & Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, 297(5582), 851-854.
258. Cruz-Fuentes, C. S., Benjet, C., Martinez-Levy, G. A., Perez-Molina, A., Briones-Velasco, M. & Suarez-Gonzalez, J. (2014). BDNF Met66 modulates the cumulative effect of psychosocial childhood adversities on major depression in adolescents. *Brain and Behavior*, 4(2), 290-297.
259. Uher, R., Caspi, A., Houts, R., Sugden, K., Williams, B., Poulton, R. & Moffitt, T. E. (2011). Serotonin transporter gene moderates childhood maltreatment's effects on persistent but not single-episode depression: replications and implications for resolving inconsistent results. *Journal of Affective Disorders*, 135(1-3), 56-65.
260. Polanczyk, G., Caspi, A., Williams, B., Price, T. S., Danese, A., Sugden, K., Uher, R., Poulton, R. & Moffitt, T. E. (2009). Protective effect of CRHR1 gene variants on the development of adult depression following childhood maltreatment: replication and extension. *Archives of General Psychiatry*, 66(9), 978-985.

261. Bradley, R. G., Binder, E. B., Epstein, M. P., Tang, Y., Nair, H. P., Liu, W., Gillespie, C. F., Berg, T., Evces, M., Newport, D. J., Stowe, Z. N., Heim, C. M., Nemeroff, C. B., Schwartz, A., Cubells, J. F. & Ressler, K. J. (2008). Influence of child abuse on adult depression: moderation by the corticotropin-releasing hormone receptor gene. *Archives of General Psychiatry*, 65(2), 190-200.
262. Binder, E. B., Bradley, R. G. & Liu, W. (2008). Association of fkbp5 polymorphisms and childhood abuse with risk of posttraumatic stress disorder symptoms in adults. *JAMA*, 299(11), 1291-1305.
263. Liberzon, I., King, A. P. & Ressler, K. J. (2014). Interaction of the adrb2 gene polymorphism with childhood trauma in predicting adult symptoms of posttraumatic stress disorder. *JAMA Psychiatry*, 71(10), 1174-1182.
264. Gershon, N. B. & High, P. C. (2015). Epigenetics and child abuse: Modern-day Darwinism—The miraculous ability of the human genome to adapt, and then adapt again. *American Journal of Medical Genetics. Part C, Seminars in Medical Genetics*, 169(4), 353-360.
265. Blaze, J., Asok, A. & Roth, T. L. (2015). The long-term impact of adverse caregiving environments on epigenetic modifications and telomeres. *Frontiers in Behavioral Neuroscience*, 9.
266. Galler, J. & Rabinowitz, D. G. (2014). Chapter Seven - The intergenerational effects of early adversity. In *Progress in Molecular Biology and Translational Science Epigenetics and Neuroplasticity: Evidence and Debate*, Volume 128, (pp. 177-198). [Akbarian, S. and Lubin, F. (Ed.)]. Academic Press.
267. Heim, C. & Binder, E. B. (2012). Current research trends in early life stress and depression: review of human studies on sensitive periods, gene-environment interactions, and epigenetics. *Experimental Neurology*, 233(1), 102-111.
268. Provencal, N. & Binder, E. B. (2015). The effects of early life stress on the epigenome: from the womb to adulthood and even before. *Experimental Neurology*, 268, 10-20.
269. Vaiserman, A. (2015). Epidemiologic evidence for association between adverse environmental exposures in early life and epigenetic variation: a potential link to disease susceptibility? *Clinical Epigenetics*, 7(1), 1-11.
270. Riddihough, G. & Zahn, L. M. (2010). What is epigenetics? *Science*, 330(6004), 611.
271. Maas, C., Herrenkohl, T. I. & Sousa, C. (2008). Review of research on child maltreatment and violence in youth. *Trauma, Violence & Abuse*, 9(1), 56-67.
272. Moylan, C. A., Herrenkohl, T. I., Sousa, C., Tajima, E. A., Herrenkohl, R. C. & Russo, M. J. (2010). The effects of child abuse and exposure to domestic violence on adolescent internalizing and externalizing behavior problems. *Journal of Family Violence*, 25(1), 53-63.
273. Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., Loo, C. M. & Giles, W. H. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse & Neglect*, 28(7), 771-784.
274. Brown, D. W., Anda, R. F., Tiemeier, H., Felitti, V. J., Edwards, V. J., Croft, J. B. & Giles, W. H. (2009). Adverse childhood experiences and the risk of premature mortality. *American Journal of Preventive Medicine*, 37(5), 389-396.
275. Edwards, V. J., Holden, G. W., Felitti, V. J. & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: results from the adverse childhood experiences study. *American Journal of Psychiatry*, 160(8), 1453-1460.
276. Felitti, V. J. (2009). Adverse childhood experiences and adult health. *Academic Pediatrics*, 9(3), 131-132.
277. Gilbert, L. K., Breiding, M. J., Merrick, M. T., Thompson, W. W., Ford, D. C., Dhingra, S. S. & Parks, S. E. (2015). Childhood adversity and adult chronic disease: an update from ten states and the District of Columbia, 2010. *American Journal of Preventive Medicine*, 48(3), 345-349.
278. Larkin, H., Shields, J. J. & Anda, R. F. (2012). The health and social consequences of Adverse Childhood Experiences (ACE) across the lifespan: an introduction to prevention and intervention in the community. *Journal of Prevention & Intervention in the Community*, 40(4), 263-270.
279. Johnson, H. (2006). Measuring violence against women: statistical trends, 2006. (Statistics Canada).
280. Ansara, D. L. & Hindin, M. J. (2011). Psychosocial consequences of intimate partner violence for women and men in Canada. *Journal of Interpersonal Violence*, 26(8), 1628-1645.
281. Canadian Centre for Justice Statistics. (2005). Family violence in Canada: a statistical profile 2005. (Statistics Canada).
282. Canadian Centre for Justice Statistics. (2006). Family violence in Canada: a statistical profile 2006. (Statistics Canada).

283. Vivian, D. & Langhinrichsen-Rohling, J. (1994). Are bi-directionally violent couples mutually victimized? A gender-sensitive comparison. *Violence and Victims*, 9(2), 107-124.
284. Widom, C. S. & Wilson, H. W. (2014). Intergenerational transmission of violence. In *Violence and Mental Health*, (pp. 27-45). [Lindert, J. and Levav, I. (Eds.)]. (Dordrecht: Springer Science+Business Media).
285. Haas, H. & Cusson, M. (2015). Comparing theories' performance in predicting violence. *International Journal of Law and Psychiatry*, 38, 75-83.
286. Narang, D. S. & Contreras, J. M. (2005). The relationships of dissociation and affective family environment with the intergenerational cycle of child abuse. *Child Abuse & Neglect*, 29(6), 683-699.
287. Schwartz, J. P., Hage, S. M., Bush, I. & Burns, L. K. (2006). Unhealthy parenting and potential mediators as contributing factors to future intimate violence: a review of the literature. *Trauma, Violence & Abuse*, 7(3), 206-221.
288. Boutwell, B. B., Beaver, K. M. & Barnes, J. C. (2012). More alike than different. Assortative mating and antisocial propensity in adulthood. *Criminal Justice and Behavior*, 39(9), 1240-1254.
289. Frisell, T., Pawitan, Y., Långström, N. & Lichtenstein, P. (2012). Heritability, assortative mating and gender differences in violent crime: results from a total population sample using twin, adoption, and sibling models. *Behavior Genetics*, 42(1), 3-18.
290. Schwartz, C. R. (2013). Trends and variation in assortative mating: causes and consequences. *Annual Review of Sociology*, 39, 451-470.
291. Cicchetti, D., Toth, S. L. & Maughan, A. (2000). An ecological-transactional model of child maltreatment. In *Handbook of Developmental Psychopathology*, (pp. 689-722). [Sameroff, A. J., Lewis, M. & Miller, S. M. (Eds.)]. (Boston, MA: Springer US).
292. Wright, E. M. & Fagan, A. A. (2013). The cycle of violence in context: exploring the moderating roles of neighborhood disadvantage and cultural norms. *Criminology; An Interdisciplinary Journal*, 51(2), 217-249.
293. Brown, J., Cohen, P., Johnson, J. G. & Salzinger, S. (1998). A longitudinal analysis of risk factors for child maltreatment: findings of a 17-year prospective study of officially recorded and self-reported child abuse and neglect. *Child Abuse & Neglect*, 22(11), 1065-1078.
294. Wathen, C. N., Jamieson, E., Wilson, M., Daly, M., Worster, A., MacMillan, H. L. & McMaster University Violence Against Women Research Group. (2007). Risk indicators to identify intimate partner violence in the emergency department. *Open Medicine*, 1(2), e113-e122.
295. Stith, S. M., Rosen, K. H., Middleton, K. A., Busch, A. L., Lundeberg, K. & Carlton, R. P. (2000). The intergenerational transmission of spouse abuse: a meta-analysis. *Journal of Marriage and Family*, 62(3), 640-654.
296. Haller, J., Harold, G., Sandi, C. & Neumann, I. D. (2014). Effects of adverse early-life events on aggression and anti-social behaviours in animals and humans. *Journal of Neuroendocrinology*, 26(10), 724-738.
297. MacMillan, H. L. & Wathen, C. N. (2014). Children's exposure to intimate partner violence. *Child and Adolescent Psychiatric Clinics of North America*, 23(2), 295-308.
298. Johnson, W. L., Giordano, P. C., Manning, W. D. & Longmore, M. A. (2015). The age-IPV curve: changes in the perpetration of intimate partner violence during adolescence and young adulthood. *Journal of Youth and Adolescence*, 44(3), 708-726.
299. Rivara, F. P., Anderson, M. L., Fishman, P., Reid, R. J., Bonomi, A. E., Carrell, D. & Thompson, R. S. (2009). Age, period, and cohort effects on intimate partner violence. *Violence and Victims*, 24(5), 627-638.
300. Shortt, J. W., Capaldi, D. M., Kim, H. K., Kerr, D. C. R., Owen, L. D. & Feingold, A. (2012). Stability of intimate partner violence by men across 12 years in young adulthood: effects of relationship transitions. *Prevention Science*, 13(4), 360-369.
301. Moretti, M. M., Catchpole, R. E. H. & Odgers, C. (2005). The dark side of girlhood: recent trends, risk factors and trajectories to aggression and violence. *The Canadian Child and Adolescent Psychiatry Review*, 14(1), 21-25.
302. Acierno, R., Hernandez, M. A., Amstadter, A. B., Resnick, H. S., Steve, K., Muzzy, W. & Kilpatrick, D. G. (2010). Prevalence and correlates of emotional, physical, sexual, and financial abuse and potential neglect in the United States: the national elder mistreatment study. *American Journal of Public Health*, 100(2), 292-297.

Influencing the risk for family violence

303. Laumann, E. O., Leitsch, S. A. & Waite, L. J. (2008). Elder mistreatment in the United States: prevalence estimates from a nationally representative study. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 63(4), S248-S254.
304. Sinha, M. (2012). Family violence in Canada – a statistical profile, 2010. (Statistics Canada).
305. Burnes, D., Pillemer, K., Caccamise, P. L., Mason, A., Henderson, C. R., Berman, J., Cook, A. M., Shukoff, D., Brownell, P., Powell, M., Salamone, A. & Lachs, M. S. (2015). Prevalence of and risk factors for elder abuse and neglect in the community: a population-based study. *Journal of the American Geriatrics Society*, 63(9), 1906-1912.
306. Dutton, D. G. (2012). The prevention of intimate partner violence. *Prevention Science*, 13(4), 395-397.
307. Hurme, T., Alanko, S., Anttila, P., Juven, T. & Svedstrom, E. (2008). Risk factors for physical child abuse in infants and toddlers. *European Journal of Pediatric Surgery*, 18(6), 387-391.
308. Davies, E. A. & Jones, A. C. (2013). Risk factors in child sexual abuse. *Journal of Forensic and Legal Medicine*, 20(3), 146-150.
309. Renner, L. M. & Whitney, S. D. (2012). Risk factors for unidirectional and bidirectional intimate partner violence among young adults. *Child Abuse & Neglect*, 36(1), 40-52.
310. Afifi, T. O. & MacMillan, H. L. (2011). Resilience following child maltreatment: a review of protective factors. *The Canadian Journal of Psychiatry*, 56(5), 266-272.
311. Haskett, M. E., Nears, K., Sabourin Ward, C. & McPherson, A. V. (2006). Diversity in adjustment of maltreated children: factors associated with resilient functioning. *Clinical Psychology Review*, 26(6), 796-812.
312. Howell, K. H. & Miller-Graff, L. E. (2014). Protective factors associated with resilient functioning in young adulthood after childhood exposure to violence. *Child Abuse & Neglect*, 38(12), 1985-1994.
313. Stith, S. M., Liu, T., Davies, L. C., Boykin, E. L., Alder, M. C., Harris, J. M., Som, A., McPherson, M. & Dees, J. E. M. E. G. (2009). Risk factors in child maltreatment: a meta-analytic review of the literature. *Aggression and Violent Behavior*, 14(1), 13-29.
314. Amstadter, A. B., Zajac, K., Strachan, M., Hernandez, M. A., Kilpatrick, D. G. & Acierno, R. (2011). Prevalence and correlates of elder mistreatment in South Carolina: the South Carolina elder mistreatment study. *Journal of Interpersonal Violence*, 26(15), 2947-2972.
315. Austin, A., Herrick, H., Proescholdbell, S. & Simmons, J. (2016). Disability and exposure to high levels of adverse childhood experiences: effect on health and risk behavior. *North Carolina Medical Journal*, 77(1), 30-36.
316. Breiding, M. J. & Armour, B. S. (2015). The association between disability and intimate partner violence in the United States. *Annals of Epidemiology*, 25(6), 455-457.
317. Hahn, J. W., McCormick, M. C., Silverman, J. G., Robinson, E. B. & Koenen, K. C. (2014). Examining the impact of disability status on intimate partner violence victimization in a population sample. *Journal of Interpersonal Violence*, 29(17), 3063-3085.
318. Johannesen, M. & LoGiudice, D. (2013). Elder abuse: a systematic review of risk factors in community-dwelling elders. *Age and Ageing*, 42(3), 292-298.
319. Mitra, M. & Mouradian, V. E. (2014). Intimate partner violence in the relationships of men with disabilities in the United States: relative prevalence and health correlates. *Journal of Interpersonal Violence*, 29(17), 3150-3166.
320. Smith, D. L. (2008). Disability, gender and intimate partner violence: relationships from the behavioral risk factor surveillance system. *Sexuality and Disability*, 26(1), 15-28.
321. Tonmyr, L., Jamieson, E., Mery, L. S. & MacMillan, H. L. (2005). The relation between childhood adverse experiences and disability due to mental health problems in a community sample of women. *The Canadian Journal of Psychiatry*, 50(12), 778-783.
322. Tonmyr, L., Jamieson, E., Mery, L. S. & MacMillan, H. L. (2005). The relationship between childhood adverse experiences and disability due to physical health problems in a community sample of women. *Women & Health*, 41(4), 23-35.
323. Lachs, M. S. & Pillemer, K. A. (2015). Elder abuse. *The New England Journal of Medicine*, 373(20), 1947-1956.
324. Edwards, P. (2012). Elder abuse in Canada – a gender-based analysis. (Public Health Agency of Canada).
325. Wang, X. M., Brisbin, S., Loo, T. & Straus, S. (2015). Elder abuse: an approach to identification, assessment and intervention. *Canadian Medical Association Journal*, 187(8), 575-581.
326. Caetano, R., Ramisetty-Mikler, S. & Field, C. A. (2005). Unidirectional and bidirectional intimate partner violence among White, Black, and Hispanic couples in the United States. *Violence and Victims*, 20(4), 393-406.

327. Choenni, V., Hammink, A. & van de Mheen, D. (2015). Association between substance use and the perpetration of family violence in industrialized countries: a systematic review. *Trauma, Violence, & Abuse*, 1-14.
328. Dixon, L. & Graham-Kevan, N. (2011). Understanding the nature and etiology of intimate partner violence and implications for practice and policy. *Clinical Psychology Review*, 31(7), 1145-1155.
329. Feder, L. & Henning, K. (2005). A comparison of male and female dually arrested domestic violence offenders. *Violence and Victims*, 20(2), 153-171.
330. Henning, K., Jones, A. & Holdford, R. (2003). Treatment needs of women arrested for domestic violence: a comparison with male offenders. *Journal of Interpersonal Violence*, 18(8), 839-856.
331. Kernsmith, P. (2005). Exerting power or striking back: a gendered comparison of motivations for domestic violence perpetration. *Violence and Victims*, 20(2), 173-185.
332. Simmons, C. A., Lehmann, P., Cobb, N. & Fowler, C. R. (2005). Personality profiles of women and men arrested for domestic violence. *Journal of Offender Rehabilitation*, 41(4), 63-81.
333. Stith, S. M., Smith, D., Penn, C. E., Ward, D. B. & Tritt, D. (2004). Intimate partner physical abuse perpetration and victimization risk factors: a meta-analytic review. *Aggression and Violent Behavior*, 10(1), 65-98.
334. Hovdestad, W., Shields, M., Williams, G. & Tonmyr, L. (2015). Vulnerability within families headed by teen and young adult mothers investigated by child welfare services in Canada. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy, and Practice*, 35(8-9), 143-150.
335. Thornberry, T. P., Matsuda, M., Greenman, S. J., Augustyn, M. B., Henry, K. L., Smith, C. A. & Ireland, T. O. (2014). Adolescent risk factors for child maltreatment. *Child Abuse & Neglect*, 38(4), 706-722.
336. Milaniak, I. & Widom, C. S. (2015). Does child abuse and neglect increase risk for perpetration of violence inside and outside the home? *Psychology of Violence*, 5(3), 246-255.
337. Hay, D. (2007). The gradual emergence of sex differences in aggression: alternative hypotheses. *Psychological Medicine*, 37, 1527-1537.
338. Bybee, D. & Sullivan, C. M. (2005). Predicting re-victimization of battered women 3 years after exiting a shelter program. *American Journal of Community Psychology*, 36(1-2), 85-96.
339. Cole, J., Logan, T. K. & Shannon, L. (2008). Women's risk for revictimization by a new abusive partner: for what should we be looking? *Violence and Victims*, 23(3), 315-330.
340. Mair, C., Cunradi, C. B., Gruenewald, P. J., Todd, M. & Remer, L. (2013). Drinking context-specific associations between intimate partner violence and frequency and volume of alcohol consumption. *Addiction*, 108(12), 2102-2111.
341. Swan, S. C., Gambone, L. J., Caldwell, J. E., Sullivan, T. P. & Snow, D. L. (2008). A review of research on women's use of violence With male intimate partners. *Violence and Victims*, 23(3), 301-314.
342. Johnson, H. (2015). Degendering violence. *Social Politics: International Studies in Gender, State & Society*, 22(3), 390-410.
343. Archer, J. (2000). Sex differences in aggression between heterosexual partners: a meta-analytic review. *Psychological Bulletin*, 126(5), 651-680.
344. Whitaker, D. J., Haileyesus, T., Swahn, M. & Saltzman, L. S. (2007). Differences in frequency of violence and reported injury between relationships with reciprocal and nonreciprocal intimate partner violence. *American Journal of Public Health*, 97(5), 941-947.
345. Langhinrichsen-Rohling, J. (2010). Controversies involving gender and intimate partner violence in the United States. *Sex Roles*, 62(3), 179-193.
346. Forsman, M. & Långström, N. (2012). Child maltreatment and adult violent offending: population-based twin study addressing the 'cycle of violence' hypothesis. *Psychological Medicine*, 42(9), 1977-1983.
347. Thornberry, T. P. & Henry, K. L. (2013). Intergenerational continuity in maltreatment. *Journal of Abnormal Child Psychology*, 41(4), 555-569.
348. Widom, C. S., Czaja, S. J. & DuMont, K. A. (2015). Intergenerational transmission of child abuse and neglect: real or detection bias? *Science*, 347(6229), 1480-1485.
349. Jaffee, S. R., Bowes, L., Ouellet-Morin, I., Fisher, H. L., Moffitt, T. E., Merrick, M. T. & Arseneault, L. (2013). Safe, stable, nurturing relationships break the intergenerational cycle of abuse: a prospective nationally representative cohort of children in the United Kingdom. *Journal of Adolescent Health*, 53(Suppl 4), S4-S10.

350. Thornberry, T. P., Henry, K. L., Smith, C. A., Ireland, T. O., Greenman, S. J. & Lee, R. D. (2013). Breaking the cycle of maltreatment: the role of safe, stable, and nurturing relationships. *Journal of Adolescent Health, 53*(Suppl 4), S25-S31.
351. Pillemer, K., Burnes, D., Riffin, C. & Lachs, M. S. (2016). Elder abuse: global situation, risk factors, and prevention strategies. *The Gerontologist, 56*(Suppl 2), S194-S205.
352. Guedes, D. T., Alvarado, B. E., Phillips, S. P., Curcio, C. L., Zunzunegui, M. V. & Guerra, R. O. (2015). Socioeconomic status, social relations and Domestic Violence (DV) against elderly people in Canada, Albania, Colombia and Brazil. *Archives of Gerontology and Geriatrics, 60*(3), 492-500.
353. Klein, S. (2011). The availability of neighborhood early care and education resources and the maltreatment of young children. *Child Maltreatment, 16*(4), 300-311.
354. Heise, L. L. & Kotsadam, A. (2015). Cross-national and multilevel correlates of partner violence: an analysis of data from population-based surveys. *The Lancet Global Health, 3*(6), e332-e340.
355. Hornor, G. (2002). Child sexual abuse: psychosocial risk factors. *Journal of Pediatric Health Care, 16*(4), 187-192.
356. Wolfe, D. A. & Mclsaac, C. (2011). Distinguishing between poor/dysfunctional parenting and child emotional maltreatment. *Child Abuse & Neglect, 35*(10), 802-813.
357. Harden, B. J. (2004). Safety and stability for foster children: a developmental perspective. *The Future of Children, 14*(1), 30-47.
358. Ryan, K. M. (2013). Issues of reliability in measuring intimate partner violence during courtship. *Sex Roles, 69*(3), 131-148.
359. Neal, A. M. & Edwards, K. M. (2015). Perpetrators' and victims' attributions for IPV: a critical review of the literature. *Trauma, Violence, & Abuse, 1*-29.
360. McDonald, L. (2011). Elder abuse and neglect in Canada: the glass is still half full. *Canadian Journal on Aging, 30*(3), 437-465.
361. Nadan, Y., Spilsbury, J. C. & Korbin, J. E. (2015). Culture and context in understanding child maltreatment: contributions of intersectionality and neighborhood-based research. *Child Abuse & Neglect, 41*, 40-48.
362. Ferrari, A. M. (2002). The impact of culture upon child rearing practices and definitions of maltreatment. *Child Abuse & Neglect, 26*(8), 793-813.
363. Harvey, A., Garcia-Moreno, C. and Butchart, A. (2006). Primary prevention of intimate-partner violence and sexual violence: background paper for WHO expert meeting May 2-3, 2007. (World Health Organization).
364. Caetano, R., Ramisetty-Mikler, S., Caetano Vaeth, P. A. & Harris, T. R. (2007). Acculturation stress, drinking, and intimate partner violence among Hispanic couples in the U.S. *Journal of Interpersonal Violence, 22*(11), 1431-1447.
365. Kimber, M., Henriksen, C. A., Davidov, D. M., Goldstein, A. L., Pitre, N. Y., Tonmyr, L. & Afifi, T. O. (2015). The association between immigrant generational status, child maltreatment history and intimate partner violence (IPV): evidence from a nationally representative survey. *Social Psychiatry and Psychiatric Epidemiology, 50*(7), 1135-1144.
366. United Nations Children's Fund. (2014). Hidden in plain sight - a statistical analysis of violence against children. (UNICEF).
367. Dong, X. Q. (2015). Elder abuse: systematic review and implications for practice. *Journal of the American Geriatrics Society, 63*(6), 1214-1238.
368. Sebre, S., Sprugevica, I., Novotni, A., Bonevski, D., Pakalniskiene, V., Popescu, D., Turchina, T., Friedrich, W. & Lewis, O. (2004). Cross-cultural comparisons of child-reported emotional and physical abuse: rates, risk factors and psychosocial symptoms. *Child Abuse & Neglect, 28*(1), 113-127.
369. Stoltenborgh, M., van Ijzendoorn, M. H., Euser, E. M. & Bakermans-Kranenburg, M. J. (2011). A global perspective on child sexual abuse: meta-analysis of prevalence around the world. *Child Maltreatment, 16*(2), 79-101.
370. Cauffman, E., Feldman, S. S., Jensen, L. A. & Arnett, J. J. (2000). The (un)acceptability of violence against peers and dates. *Journal of Adolescent Research, 15*(6), 652-673.
371. Pornari, C. D., Dixon, L. & Humphreys, G. W. (2013). Systematically identifying implicit theories in male and female intimate partner violence perpetrators. *Aggression and Violent Behavior, 18*(5), 496-505.
372. Dunlap, E., Golub, A. W., Johnson, B. D. & Benoit, E. (2009). Normalization of violence: experiences of childhood abuse by inner-city crack users. *Journal of Ethnicity in Substance Abuse, 8*(1), 15-34.
373. Wood, J. T. (2001). The normalization of violence in heterosexual romantic relationships: women's narratives of love and violence. *Journal of Social and Personal Relationships, 18*(2), 239-261.

374. Freisthler, B., Needell, B. & Gruenewald, P. J. (2005). Is the physical availability of alcohol and illicit drugs related to neighborhood rates of child maltreatment? *Child Abuse & Neglect*, 29(9), 1049-1060.
375. Freisthler, B., Holmes, M. R. & Price Wolf, J. (2014). The dark side of social support: understanding the role of social support, drinking behaviors and alcohol outlets for child physical abuse. *Child Abuse & Neglect*, 38(6), 1106-1119.
376. Beyer, K., Wallis, A. B. & Hamberger, L. K. (2015). Neighborhood environment and intimate partner violence: a systematic review. *Trauma, Violence & Abuse*, 16(1), 16-47.
377. Coulton, C. J., Crampton, D. S., Irwin, M., Spilsbury, J. C. & Korbin, J. E. (2007). How neighborhoods influence child maltreatment: a review of the literature and alternative pathways. *Child Abuse & Neglect*, 31(11-12), 1117-1142.
378. Freisthler, B., Merritt, D. H. & LaScala, E. A. (2006). Understanding the ecology of child maltreatment: a review of the literature and directions for future research. *Child Maltreatment*, 11(3), 263-280.
379. Gracia, E. & Musitu, G. (2003). Social isolation from communities and child maltreatment: a cross-cultural comparison. *Child Abuse & Neglect*, 27(2), 153-168.
380. Elder, G. (2001). Life course: sociological aspects. *International Encyclopedia of the Social and Behavioral Sciences*, 13.
381. Settersten, R. A. (2003). Age structuring and the rhythm of the life course. In *Handbook of the Life Course*, (pp. 81-98). [Mortimer, J. T. & Shanahan, M. J. (Eds.)]. (Boston, MA: Springer US).
382. Logan-Green, P., Nurius, P. S., Hooven, C. & Thompson, E. A. (2015). Life course associations between victimization and aggression: distinct and cumulative contributions. *Child & Adolescent Social Work Journal*, 32(3), 269-279.
383. Nurius, P. S., Green, S., Logan-Greene, P. & Borja, S. (2015). Life course pathways of adverse childhood experiences toward adult psychological well-being: a stress process analysis. *Child Abuse & Neglect*, 45, 143-153.
384. Ouellet-Morin, I., Fisher, H. L., York-Smith, M., Fincham-Campbell, S., Moffitt, T. E. & Arseneault, L. (2015). Intimate partner violence and new-onset depression: a longitudinal study of women's childhood and adult histories of abuse. *Depression and anxiety*, 32(5), 316-324.
385. Friedman, E. & Billick, S.B. (2015). Unintentional child neglect: literature review and observational study. *The Psychiatric Quarterly*, 86(92), 253-259.
386. Schnitzer, P.G. & Ewigman, B.G. (2008). Household composition and fatal unintentional injuries related to child maltreatment. *Journal of Nursing Scholarship*, 40(1), 91-97.
387. Turner, H.A., Finkelhor, D., Ormrod, R. (2007). Family structure variations in patterns and predictors of child victimization. *American Journal of Orthopsychiatry*, 77(2), 282-295.
388. Afifi, T.O., Boman, J., Fleisher, W., & Sareen, J. (2009). The relationships between child abuse, parental divorce, and lifetime mental disorders and suicidality in a nationally representative adult sample. *Child Abuse & Neglect*, 33(3), 139-147.
389. Oliver, W.J., Kuhns, L.R., Pomeranz, E.S. (2006). Family structure and child abuse. *Clinical Pediatrics*, 45(2), 111-118.
390. Jaffe, P., Scott, K., Jenney, A., Dawson, M., Straatman, A.L., & Campbell, M. (2014). Risk factors for children in situations of family violence in the context of separation and divorce. (Justice Canada).
391. Khan, R. & Rogers, P. (2015). The normalization of sibling violence: does gender and personal experience of violence influence perceptions of physical assault against siblings? *Journal of Interpersonal Violence*, 30(3), 437-458.
392. Recchia, H., Wainryb, C. & Pasupathi, M. (2013). "Two for flinching": children's and adolescents' narrative accounts of harming their friends and siblings. *Child Development*, 84(4), 1459-1474.
393. Tucker, C. J., Finkelhor, D., Turner, H. & Shattuck, A. M. (2013). Association of sibling aggression with child and adolescent mental health. *Pediatrics*, 132(1), 79-84.
394. Wolke, D. & Skew, A. J. (2012). Bullying among siblings. *International Journal of Adolescent Medicine and Health*, 24, 17-25.
395. Wolke, D., Tippett, N. & Dantchev, S. (2015). Bullying in the family: sibling bullying. *The Lancet Psychiatry*, 2(10), 917-929.
396. Greenwood, M., de Leeuw, S. & Fraser, T. N. (2007). Aboriginal children and early childhood development and education in Canada: linking the past and the present to the future. *Canadian Journal of Native Education*, 30(1), 5-190.

Life course perspective

397. Greenwood, M. L. & de Leeuw, S. N. (2012). Social determinants of health and the future well-being of Aboriginal children in Canada. *Paediatrics & Child Health*, 17(7), 381-384.
398. Kennair, N. & Mellor, D. (2007). Parent abuse: a review. *Child Psychiatry and Human Development*, 38(3), 203-219.
399. Ibabe, I. & Bentler, P. M. (2016). The contribution of family relationships to child-to-parent violence. *Journal of Family Violence*, 31(2), 259-269.
400. Ibabe, I., Jaureguizar, J. & Bentler, P. M. (2013). Risk factors for child-to-parent violence. *Journal of Family Violence*, 28(5), 523-534.
401. Craig, W. & Pepler, D. (2014). Trends in healthy development and healthy relationships - trend analysis of Canadian data from the Health Behaviour in School Aged Children (HBSC) survey from 2002, 2006, and 2010. (Public Health Agency of Canada).
402. Giordano, P. C., Manning, W. D., Longmore, M. A. & Flanigan, C. M. (2012). Developmental shifts in the character of romantic and sexual relationships from adolescence to young adulthood. In *Early Adulthood in a Family Context*, (pp. 133-164). [Booth, A., Brown, L. S., Landale, S. N., Manning, D. W. & McHale, M. S. (Eds.)]. (New York, NY: Springer New York).
403. Public Health Agency of Canada. (2006). *Violence in Dating Relationships*. (Public Health Agency of Canada).
404. Ellis, W. E. & Wolfe, D. A. (2015). Bullying predicts reported dating violence and observed qualities in adolescent dating relationships. *Journal of Interpersonal Violence*, 30(17), 3043-3064.
405. Foshee, V. A., Benefield, T. S., McNaughton Reyes, H. L., Eastman, M., Vivolo-Kantor, A. M., Basile, K. C., Ennett, S. T. & Faris, R. (2016). Examining explanations for the link between bullying perpetration and physical dating violence perpetration: do they vary by bullying victimization? *Aggressive Behavior*, 42(1), 66-81.
406. Foshee, V. A., McNaughton Reyes, H. L., Vivolo-Kantor, A. M., Basile, K. C., Chang, L. Y., Faris, R. & Ennett, S. T. (2014). Bullying as a longitudinal predictor of adolescent dating violence. *Journal of Adolescent Health*, 55(3), 439-444.
407. Daoud, N., Urquia, M. L., O'Campo, P., Heaman, M., Janssen, P. A., Smylie, J. & Thiessen, K. (2012). Prevalence of abuse and violence before, during, and after pregnancy in a national sample of Canadian women. *American Journal of Public Health*, 102(10), 1893-1901.
408. Kingston, D., Heaman, M., Urquia, M., O'Campo, P., Janssen, P., Thiessen, K. & Smylie, J. (2016). Correlates of abuse around the time of pregnancy: results from a national survey of Canadian women. *Maternal and Child Health Journal*, 20(4), 778-789.
409. Alhusen, J. L., Ray, E., Sharps, P. & Bullock, L. (2015). Intimate partner violence during pregnancy: maternal and neonatal outcomes. *Journal of Women's Health*, 24(1), 100-106.
410. Donovan, B. M., Spracklen, C. N., Schweizer, M. L., Ryckman, K. K. & Saftlas, A. F. (2016). Intimate partner violence during pregnancy and the risk for adverse infant outcomes: a systematic review and meta-analysis. *BJOG*, 123(8), 1289-1299.
411. Hill, A., Pallitto, C., McCleary-Sills, J. & Garcia-Moreno, C. (2016). A systematic review and meta-analysis of intimate partner violence during pregnancy and selected birth outcomes. *International Journal of Gynecology & Obstetrics*, 133(3), 269-276.
412. Urquia, M. L., O'Campo, P. J., Heaman, M. I., Janssen, P. A. & Thiessen, K. R. (2011). Experiences of violence before and during pregnancy and adverse pregnancy outcomes: An analysis of the Canadian Maternity Experiences Survey. *BMC Pregnancy and Childbirth*, 11(1), 1-9.
413. Myhill, A. (2015). Measuring coercive control: what can we learn from national population surveys? *Violence Against Women*, 21(3), 355-375.
414. Capaldi, D. M. & Kim, H. K. (2007). Typological approaches to violence in couples: a critique and alternative conceptual approach. *Clinical Psychology Review*, 27(3), 253-265.
415. Johnson, M. P. (1995). Patriarchal terrorism and common couple violence: two forms of violence against women. *Journal of Marriage and Family*, 57(2), 283-294.
416. Straus, M. A. (2015). Dyadic concordance and discordance in family violence: a powerful and practical approach to research and practice. *Aggression and Violent Behavior*, 24, 83-94.
417. Feder, G. & MacMillan, H. L. (2015). Intimate partner violence. In *Goldman-Cecil Medicine*, 25th Edition, (pp. 1629-1633) [Goldman L. & Schafer, A.I.(EDS.)]. (New York: Elsevier Saunders).
418. Temple, J. R., Weston, R. & Marshall, L. L. (2005). Physical and mental health outcomes of women in nonviolent, unilaterally violent, and mutually violent relationships. *Violence and Victims*, 20(3), 335-359.

419. Ulloa, E. C. & Hammett, J. F. (2016). The effect of gender and perpetrator-victim role on mental health outcomes and risk behaviors associated with intimate partner violence. *Journal of Interpersonal Violence*, 31(7), 1184-1207.
420. Bohnert, N., Chagnon, J. & Dion, P. (2015). Population projections for Canada (2013 to 2063), provinces and territories (2013 to 2038). (Statistics Canada).
421. Sinha, M. (2013). Spotlight on Canadians - results from the General Social Survey. (Statistics Canada).
430. Zeoli, A. M. & Webster, D. W. (2010). Effects of domestic violence policies, alcohol taxes and police staffing levels on intimate partner homicide in large U.S. Cities. *Injury Prevention*, 16(2), 90-95.
431. Ellsberg, M., Arango, D. J., Morton, M., Gennari, F., Kiplesund, S., Contreras, M. & Watts, C. (2018). Prevention of violence against women and girls: what does the evidence say? *The Lancet*, 385(9977), 1555-1566.
432. Department of Justice. (2016). The criminal law and managing children's behaviour. (Justice Canada).

Preventing family violence

422. Ayalon, L., Lev, S., Green, O. & Nevo, U. (2016). A systematic review and meta-analysis of interventions designed to prevent or stop elder maltreatment. *Age and Ageing*, 45(2), 216-227.
423. MacMillan, H. L. & Wathen, C. N. (2014). Research brief: interventions to prevent child maltreatment March 2014. (PreVAiL: Preventing Violence Across the Lifespan Research Network).
424. Wathen, C. N. & Macmillan, H. (2014). Research brief: identifying and responding to intimate partner violence against women. (PreVAiL: Preventing Violence Across the Lifespan Research Network).
425. Dugan, L., Nagin, D. S. & Rosenfeld, R. (2003). Exposure reduction or retaliation? The effects of domestic violence resources on intimate-partner homicide. *Law & Society Review*, 37(1), 169-198.
426. Iyengar, R. (2007). Does the certainty of arrest reduce domestic violence? Evidence from mandatory and recommended arrest laws. National Bureau of Economic Research Working Paper Series, 13186.
427. Maxwell, C. D., Garner, J. H. & Fagan, J. A. (2002). The preventive effects of arrest on intimate partner violence: research, policy, and theory. *Criminology & Public Policy*, 2(1), 51-80.
428. McPhedran, S. & Mauser, G. (2013). Lethal firearm-related violence against Canadian women: did tightening gun laws have an impact on women's health and safety? *Violence and Victims*, 28(5), 875-883.
429. Vigdor, E. R. & Mercy, J. A. (2006). Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide? *Evaluation Review*, 30(3), 313-346.
433. Public Health Agency of Canada and Department of Justice. (2015). What's wrong with spanking? (Public Health Agency of Canada).
434. Department of Justice. (2015). Child abuse is wrong: what can I do? (Justice Canada).
435. Department of Justice. (2015). Family violence laws. (Justice Canada).
436. Mathews, B. & Kenny, M. C. (2008). Mandatory reporting legislation in the United States, Canada, and Australia: a cross-jurisdictional review of key features, differences, and issues. *Child Maltreatment*, 13(1), 50-63.
437. Mathews, B., Lee, X. J. & Norman, R. E. (2016). Impact of a new mandatory reporting law on reporting and identification of child sexual abuse: a seven year time trend analysis. *Child Abuse & Neglect*, 56, 62-79.
438. Gilbert, R., Kemp, A., Thoburn, J., Sidebotham, P., Radford, L., Glaser, D. & MacMillan, H. L. (2009). Recognising and responding to child maltreatment. *The Lancet*, 373(9658), 167-80.
439. Wells, L., Claussen, C. & Sandham, S. (2012). Surveying the landscape: domestic violence plans from around the world. (Shift: The Project to End Domestic Violence).
440. Poole, M. K., Seal, D. W. & Taylor, C. A. (2014). A systematic review of universal campaigns targeting child physical abuse prevention. *Health Education Research*, 29(3), 388-432.
441. Peterson, K., Sharps, P., Banyard, V., Powers, R. A., Kaukinen, C., Gross, D., Decker, M. R., Baatz, C. & Campbell, J. (2016). An evaluation of two dating violence prevention programs on a college campus. *Journal of Interpersonal Violence*.

442. Borsky, A. E., McDonnell, K., Turner, M. M. & Rimal, R. (2016). Raising a red flag on dating violence: evaluation of a low-resource, college-based bystander behavior intervention program. *Journal of Interpersonal Violence*.
443. Coker, A. L., Bush, H. M., Fisher, B. S., Swan, S. C., Williams, C. M., Clear, E. R. & DeGue, S. (2016). Multi-college bystander intervention evaluation for violence prevention. *American Journal of Preventive Medicine*, 50(3), 295-302.
444. Storer, H. L., Casey, E. & Herrenkohl, T. (2016). Efficacy of bystander programs to prevent dating abuse among youth and young adults: a review of the literature. *Trauma, Violence, & Abuse*, 17(3), 256-269.
445. Wells, L., Koziey, L. & Ferguson, J. (2012). Engaging the news media to influence attitudes, norms and behaviours and reduce the rates of domestic violence. (Shift: The Project to End Domestic Violence).
446. Gillespie, L. K., Richards, T. N., Givens, E. M. & Smith, M. D. (2013). Framing deadly domestic violence: why the media's spin matters in newspaper coverage of femicide. *Violence Against Women*, 19(2), 222-245.
447. Bullock, C. F. & Cubert, J. (2002). Coverage of domestic violence fatalities by newspapers in Washington State. *Journal of Interpersonal Violence*, 17(5), 475-499.
448. Carlyle, K. E., Slater, M. D. & Chakroff, J. L. (2008). Newspaper coverage of intimate partner violence: skewing representations of risk. *Journal of Communication*, 58(1), 168-186.
449. Carlyle, K. E., Scarduzio, J. A. & Slater, M. D. (2014). Media portrayals of female perpetrators of intimate partner violence. *Journal of Interpersonal Violence*, 29(13), 2394-2417.
450. Lloyd, M. & Ramon, S. (2016). Smoke and mirrors: U.K. newspaper representations of intimate partner domestic violence. *Violence Against Women*.
451. Richards, T. N., Gillespie, L. K. & Smith, M. D. (2011). Exploring news coverage of femicide: does reporting the news add insult to injury? *Feminist Criminology*, 6(3), 178-202.
452. Roberto, K. A., McCann, B. R. & Brossoie, N. (2013). Intimate partner violence in late life: an analysis of national news reports. *Journal of Elder Abuse & Neglect*, 25(3), 230-241.
453. Wozniak, J. A. & McCloskey, K. A. (2010). Fact or fiction? Gender issues related to newspaper reports of intimate partner homicide. *Violence Against Women*, 16(8), 934-952.
454. Weldon, S. L. & Htun, M. (2013). Feminist mobilisation and progressive policy change: why governments take action to combat violence against women. *Gender & Development*, 21(2), 231-247.
455. Walsh, K., Zwi, K., Woolfenden, S. & Shlonsky, A. (2015). School-based education programmes for the prevention of child sexual abuse. *Cochrane Database of Systematic Reviews*,(4).
456. Vladutiu, C. J., Martin, S. L. & Macy, R. J. (2011). College- or university-based sexual assault prevention programs: a review of program outcomes, characteristics, and recommendations. *Trauma, Violence, & Abuse*, 12(2), 67-86.
457. Banyard, V. L. (2014). Improving college campus based prevention of violence against women: a strategic plan for research built on multipronged practices and policies. *Trauma, Violence, & Abuse*, 15(4), 339-351.
458. Langhinrichsen-Rohling, J. & Capaldi, D. M. (2012). Clearly we've only just begun: developing effective prevention programs for intimate partner violence. *Prevention Science*, 13(4), 410-414.
459. Vanderende, K. E., Yount, K. M., Dynes, M. M. & Sibley, LM. (2012). Community-level correlates of intimate partner violence against women globally: a systematic review. *Social Science & Medicine*, 75(7), 1143-1155.
460. Aiyer, S. M., Zimmerman, M. A., Morrel-Samuels, S. & Reischl, T. M. (2015). From broken windows to busy streets: a community empowerment perspective. *Health Education & Behavior*, 42(2), 137-147.
461. Ungar, M. (2011). Community resilience for youth and families: facilitative physical and social capital in contexts of adversity. *Children and Youth Services Review*, 33(9), 1742-1748.
462. Culross, P., Cohen, L., Wolfe, A. & Ruby, J. (2006). *Creating safe environments: violence prevention strategies and programs*. (Oakland, California: Prevention Institute).
463. Feinberg, M. E., Solmeyer, A. R., Hostetler, M. L., Sakuma, K. L., Jones, D. & McHale, S. M. (2013). Siblings Are Special: Initial test of a new approach for preventing youth behavior problems. *Journal of Adolescent Health*, 53(2), 166-173.
464. Altafim, E. R. P. & Linhares, M. B. M. (2016). Universal violence and child maltreatment prevention programs for parents: a systematic review. *Psychosocial Intervention*, 25(1), 27-38.

465. Klevens, J. & Whitaker, D. J. (2007). Primary prevention of child physical abuse and neglect: gaps and promising directions. *Child Maltreatment*, 12(4), 364-377.
466. Reynolds, A. J., Mathieson, L. C. & Topitzes, J. W. (2009). Do early childhood interventions prevent child maltreatment? A review of research. *Child Maltreatment*.
467. Olds, D. L. (2002). Prenatal and infancy home visiting by nurses: from randomized trials to community replication. *Prevention Science*, 3(3), 153-172.
468. Robling, M., Bekkers, M. J., Bell, K., Butler, C. C., Cannings-John, R., Channon, S., Martin, B. C., Gregory, J. W., Hood, K., Kemp, A., Kenkre, J., Montgomery, A. A., Moody, G., Owen-Jones, E., Pickett, K., Richardson, G., Roberts, Z. E. S., Ronaldson, S., Sanders, J., Stamuli, E. & Torgerson, D. (2009). Effectiveness of a nurse-led intensive home-visitation programme for first-time teenage mothers (Building Blocks): a pragmatic randomised controlled trial. *The Lancet*, 387(10014), 146-155.
469. Mejdoubi, J., van den Heijkant, S. C. C. M., van Leerdam, F. J. M., Heymans, M. W., Crijnen, A. & Hirasig, R. A. (2015). The effect of VoorZorg, the Dutch Nurse-Family Partnership, on child maltreatment and development: a randomized controlled trial. *PLoS One*, 10(4), 1-14.
470. Jack, S. M., Catherine, N., Gonzalez, A., MacMillan, H. L., Sheehan, D. & Waddell, D. (2015). Adapting, piloting and evaluating complex public health interventions: lessons learned from the Nurse-Family Partnership in Canadian public health settings. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy, and Practice*, 35(8-9), 151-159.
471. Sanders, M. R. (2008). Triple P-Positive Parenting Program as a public health approach to strengthening parenting. *Journal of Family Psychology*, 22(4), 506-517.
472. Sanders, M. R., Ralph, A., Sofronoff, K., Gardiner, P., Thompson, R., Dwyer, S. & Bidwell, K. (2008). Every family: a population approach to reducing behavioral and emotional problems in children making the transition to school. *The Journal of Primary Prevention*, 29(3), 197-222.
473. Prinz, R. J., Sanders, M. R., Shapiro, C. J., Whitaker, D. J. & Lutzker, J. R. (2009). Population-based prevention of child maltreatment: the U.S. Triple P System population trial. *Prevention Science*, 10(1), 1-12.
474. Prinz, R. J., Sanders, M. R., Shapiro, C. J., Whitaker, D. J. & Lutzker, J. R. (2016). Addendum to population-based prevention of child maltreatment: the U.S. Triple P system population trial. *Prevention Science*, 17(3), 410-416.
475. Zemp, M., Milek, A., Davies, P. T. & Bodenmann, G. (2016). Improved child problem behavior enhances the parents' relationship quality: a randomized trial. *Journal of Family Psychology*.
476. Bodenmann, G., Cina, A., Ledermann, T. & Sanders, M. R. (2008). The efficacy of the Triple P-Positive Parenting Program in improving parenting and child behavior: a comparison with two other treatment conditions. *Behaviour Research and Therapy*, 46(4), 411-427.
477. Leung, C., Sanders, M. R., Leung, S., Mak, R. & Lau, J. (2003). An outcome evaluation of the implementation of the Triple P-Positive Parenting Program in Hong Kong. *Family Process*, 42(4), 531-544.
478. Matsumoto, Y., Sofronoff, K. & Sanders, M. R. (2010). Investigation of the effectiveness and social validity of the Triple P Positive Parenting Program in Japanese society. *Journal of Family Psychology*, 24(1), 87-91.
479. MacMillan, H. L., Wathen, C. N., Barlow, J., Ferguson, D. M., Leventhal, J. M. & Taussig, H. N. (2009). Interventions to prevent child maltreatment and associated impairment. *The Lancet*, 373(9659), 250-266.
480. Lundgren, R. & Amin, A. (2015). Addressing intimate partner violence and sexual violence among adolescents: emerging evidence of effectiveness. *Journal of Adolescent Health*, 56(Suppl 1), S42-S50.
481. Fellmeth, G. L. T., Heffernan, C., Nurse, J., Habibula, S. & Sethi, D. (2013). Educational and skills-based interventions for preventing relationship and dating violence in adolescents and young adults. *Campbell Systematic Reviews*, 14.
482. De Koker, P., Mathews, C., Zuch, M., Bastien, S. & Mason-Jones, A. J. (2014). A systematic review of interventions for preventing adolescent intimate partner violence. *Journal of Adolescent Health*, 54(1), 3-13.
483. Leen, E., Sorbring, E., Mawer, M., Holdsworth, E., Helsing, B. & Bowen, E. (2013). Prevalence, dynamic risk factors and the efficacy of primary interventions for adolescent dating violence: An international review. *Aggression and Violent Behavior*, 18(1), 159-174.

484. De La Rue, L., Polanin, J. R., Espelage, D. L. & Pigott, T. D. (2016). A meta-analysis of school-based interventions aimed to prevent or reduce violence in teen dating relationships. *Review of Educational Research*.
485. Foshee, V. A., Bauman, K. E., Greene, W. F., Koch, G. G., Linder, G. F. & MacDougall, J. E. (2000). The Safe Dates program: 1-year follow-up results. *American Journal of Public Health*, 90(10), 1619-1622.
486. Foshee, V. A., Bauman, K. E., Ennett, S. T., Linder, G. F., Benefield, T. & Suchindran, C. (2004). Assessing the long-term effects of the Safe Dates Program and a booster in preventing and reducing adolescent dating violence victimization and perpetration. *American Journal of Public Health*, 94(4), 619-624.
487. Foshee, V. A., Reyes, L. M., Agnew-Brune, C. B., Simon, T. R., Vagi, K. J., Lee, R. D. & Suchindran, C. (2014). The effects of the evidence-based Safe Dates dating abuse prevention program on other youth violence outcomes. *Prevention Science*, 15(6), 907-916.
488. Crooks, C., Wolfe, D. A., Hughes, R., Jaffe, P. G. & Chiodo, D. (2008). Development, evaluation and national implementation of a school-based program to reduce violence and related risk behaviours: lessons from the Fourth R. *IPC Review*, 2, 109-135.
489. Wolfe, D. A., Wekerle, C., Scott, K., Straatman, A. L., Grasley, C. & Reitzel-Jaffe, D. (2003). Dating violence prevention with at-risk youth: a controlled outcome evaluation. *Journal of Consulting and Clinical Psychology*, 71(2), 279-291.
490. Bradford, A. B., Hawkins, A. J. & Acker, J. (2015). If we build it, they will come: exploring policy and practice implications of public support for couple and relationship education for lower income and relationally distressed couples. *Family Process*, 54(4), 639-654.
491. Dunford, F. W. (2000). The San Diego Navy experiment: an assessment of interventions for men who assault their wives. *Journal of Consulting and Clinical Psychology*, 68(3), 468-476.
492. Axelsen, S. F., Brixval, C. S., Due, P. & Koushede, V. (2014). Integrating couple relationship education in antenatal education: a study of perceived relevance among expectant Danish parents. *Sexual & Reproductive Healthcare*, 5(4), 174-175.
493. Halford, W. K. & Bodenmann, G. (2013). Effects of relationship education on maintenance of couple relationship satisfaction. *Clinical Psychology Review*, 33(4), 512-525.
494. Halford, W. K., Petch, J. & Creedy, D. K. (2010). Promoting a positive transition to parenthood: a randomized clinical trial of couple relationship education. *Prevention Science*, 11(1), 89-100.
495. Halford, W., Pepping, C. A., Hilpert, P., Bodenmann, G., Wilson, K. L., Busby, D., Larson, J. & Holman, T. (2015). Immediate effect of couple relationship education on low-satisfaction couples: a randomized clinical trial plus an uncontrolled trial replication. *Behavior Therapy*, 46(3), 409-421.
496. Rhoades, G. K. (2015). The effectiveness of the within our reach relationship education program for couples: findings from a federal randomized trial. *Family Process*, 54(4), 672-685.
497. O'Leary, K. D. & Slep, A. M. S. (2012). Prevention of partner violence by focusing on behaviors of both young males and females. *Prevention Science*, 13(4), 329-339.
498. Dong, X. Q., Chen, R. & Simon, M. A. (2014). Elder abuse and dementia: a review of the research and health policy. *Health Affairs*, 33(4), 642-649.
499. Shea, B., Nahwegahbow, A. & Andersson, N. (2010). Reduction of family violence in Aboriginal communities: a systematic review of interventions and approaches. *Pimatisiwin*, 8(2), 35-60.
500. Barr, R. G., Rivara, F. P., Barr, M., Cummings, P., Taylor, J., Lengua, L. J. & Meredith-Benitz, E. (2009). Effectiveness of educational materials designed to change knowledge and behaviors regarding crying and shaken-baby syndrome in mothers of newborns: a randomized, controlled trial. *Pediatrics*, 123(3), 972.
501. Barr, R. G., Barr, M., Fujiwara, T., Conway, J., Catherine, N. & Brant, R. (2009). Do educational materials change knowledge and behaviour about crying and shaken baby syndrome? A randomized controlled trial. *Canadian Medical Association Journal*, 180(7), 727-733.
502. Fujiwara, T., Yamada, F., Okuyama, M., Kamimaki, I., Shikoro, N. & Barr, R. G. (2012). Effectiveness of educational materials designed to change knowledge and behavior about crying and shaken baby syndrome: a replication of a randomized controlled trial in Japan. *Child Abuse & Neglect*, 36(9), 613-620.
503. Zolotor, A. J., Runyan, D. K. & Shanahan, M. (2015). Effectiveness of a statewide abusive head trauma prevention program in North Carolina. *JAMA Pediatrics*, 169(12), 1126-1131.
504. Cooper, M. & Wells, L. (2014). Preventing child maltreatment: a critical strategy for stopping intimate partner violence in the next generation. (Shift: The Project to End Domestic Violence).

505. Espelage, D. L., Low, S., Polanin, J. R. & Brown, E. C. (2013). The impact of a middle school program to reduce aggression, victimization, and sexual violence. *Journal of Adolescent Health, 53*(2), 180-186.
506. Saarento, S., Boulton, A. J. & Salmivalli, C. (2015). Reducing bullying and victimization: student- and classroom-level mechanisms of change. *Journal of Abnormal Child Psychology, 43*(1), 61-76.
507. Trip, S., Bora, C., Sipos-Gug, S., Tocai, I., Gradinger, P., Yanagida, T. & Strohmeier, D. (2015). Bullying prevention in schools by targeting cognitions, emotions, and behavior: evaluating the effectiveness of the REBE-ViSC program. *Journal of Counseling Psychology, 62*(4), 732-740.
508. Adelman, R. D., Tmanova, L. L., Delgado, D., Dion, S. & Lachs, M. S. (2014). Caregiver burden: a clinical review. *JAMA, 311*(10), 1052-1060.
509. Lindo, E. J., Kliemann, K. R., Combes, B. H. & Frank, J. (2016). Managing stress levels of parents of children with developmental disabilities: a meta-analytic review of interventions. *Family Relations, 65*(1), 207-224.
510. Hu, C., Kung, S., Rummans, T. A., Clark, M. M. & Lapid, M. I. (2015). Reducing caregiver stress with Internet-based interventions: a systematic review of open-label and randomized controlled trials. *Journal of the American Medical Informatics Association, 22*(e1), e194-e209.
511. Duggan, A. K., Berlin, L. J., Cassidy, J., Burrell, L. & Tandon, S. D. (2009). Examining maternal depression and attachment insecurity as moderators of the impacts of home visiting for at-risk mothers and infants. *Journal of Consulting and Clinical Psychology, 77*(4), 788-799.
512. Easterbrooks, M. A., Bartlett, J. D., Raskin, M., Goldberg, J., Contreras, M. M., Kotake, C., Chaudhuri, J. H. & Jacobs, F. H. (2013). Limiting home visiting effects: maternal depression as a moderator of child maltreatment. *Pediatrics, 132*(Suppl 2), S126-S133.
513. McFarlane, E., Burrell, L., Crowne, S., Cluxton-Keller, F., Fuddy, L., Leaf, P. J. & Duggan, A. (2013). Maternal relationship security as a moderator of home visiting impacts on maternal psychosocial functioning. *Prevention Science, 14*(1), 25-39.
514. Kearns, M. C., Reidy, D. E. & Valle, L. A. (2015). The role of alcohol policies in preventing intimate partner violence: a review of the literature. *Journal of studies on alcohol and drugs, 76*(1), 21-30.
515. Wilson, I. M., Graham, K. & Taft, A. (2014). Alcohol interventions, alcohol policy and intimate partner violence: a systematic review. *BMC Public Health, 14*, 881.
516. Bourey, C., Williams, W., Bernstein, E. E. & Stephenson, R. (2015). Systematic review of structural interventions for intimate partner violence in low- and middle-income countries: organizing evidence for prevention. *BMC Public Health, 15*(1), 1-18.
517. Dubowitz, H., Feigelman, S., Lane, W. & Kim, J. (2009). Pediatric primary care to help prevent child maltreatment: the Safe Environment for Every Kid (SEEK) Model. *Pediatrics, 123*(3), 858-864.
518. Dubowitz, H., Lane, W. G., Semiatin, J. N. & Magder, L. S. (2012). The SEEK Model of pediatric primary care: can child maltreatment be prevented in a low-risk population? *Academic Pediatrics, 12*(4), 259-268.
519. Dubowitz, H., Lane, W. G., Semiatin, J. N., Magder, L. S., Venepally, M. & Jans, M. (2011). The Safe Environment for Every Kid Model: impact on pediatric primary care professionals. *Pediatrics, 127*(4), e962-e970.



Town of Whitby
Office of the Town Clerk
 575 Rossland Road East, Whitby, ON L1N 2M8
 www.whitby.ca

C.S. - LEGISLATIVE SERVICES

Original
To: CIP
Copy
To: P.J. Kille
C.C. S.C.C. File
Take Appr. Action

November 3, 2016

The Honourable Eric Hoskins
 Minister of Health and Long-term Care
 Hepburn Block 10th Floor
 80 Grosvenor St
 Toronto ON M7A 2C4

Re: Lakeridge Health Integration

Please be advised that at a meeting held on October 31, 2016, the Council of the Town of Whitby adopted the following recommendation:

Whereas Lakeridge Health System and Rouge Valley Health system have been working collaboratively and dutifully toward the integration plans for several months in support of the Minister's direction;

Whereas the Boards of Directors of Lakeridge Health, Rouge Valley Health Systems and The Scarborough Hospital have made decisions in favour of integrations, following the advice of the Central East LHIN;

Whereas the Board's decisions would integrate Rouge Valley's Ajax and Pickering site with Lakeridge Health and amalgamate Rouge Valley's Centenary site with The Scarborough Hospital to form a new hospital corporation; and,

Whereas on October 14, the Minister of Health and Long-Term Care issued an integration order, directing that the Ajax and Pickering site of Rouge Valley Health System be operated by Lakeridge Health. The order endorses the decisions of all three hospital Boards in favour of the integration and follows the advice of the Central East Local Health Integration Network.

Therefore, be it resolved that the Town of Whitby, supports the decisions of the Boards of Directors and the Minister's integration order;

That the Board be requested to consider the merits of a re-branding exercise to recognize a Durham wide corporate brand for the integrated Lakeridge Health Corporation; and,

That this resolution be circulated to all Durham Region municipalities, including the Region of Durham, and to Lakeridge Health System, Rouge Valley Health Systems, The Scarborough Hospital, the Premier of Ontario, the Minister of Health and Long-term Care, and local area MPPs.

Should you require further information, please do not hesitate to contact the undersigned at 905-430-4302.

Christopher Harris
Town Clerk

Copy: Honourable Kathleen Wynn, Premier
Lorne Coe, MPP (Whitby-Oshawa)
Jennifer French, MPP (Oshawa)
Joe Dickson, MPP (Ajax-Pickering)
Granville Anderson, MPP (Durham)
Tracy MacCharles, MPP (Pickering- Scarborough East)
Laurie Scott, MPP (Haliburton-Kawartha Lakes-Brock)
Lakeridge Health System
Rouge Valley Health System
Scarborough Hospital
Debi Wilcox, Regional Clerk, Regional Municipality of Durham
Alec Harras, Deputy Clerk, Town of Ajax
Thom Gettinby, CAO/Clerk, Township of Brock
Anne Greentree, Municipal Clerk, Municipality of Clarington
Sandra Kranc, City Clerk, City of Oshawa
Debbie Shields, City Clerk, City of Pickering
Nicole Wellsbury, Municipal Clerk, Township of Scugog
Debbie Leroux, Clerk, Township of Uxbridge
Carlene Siopis, Executive Advisor to the Mayor

Ministry of
Transportation

Ministère des
Transports



Transportation Policy Branch
777 Bay Street, 30th Floor
Toronto, Ontario
M7A 2J8
Tel: 416 585-7177
Fax: 416 585-7204

Direction des politiques du transport
777, rue Bay, 30^e étage
Toronto (Ontario)
M7A 2J8
Tél. : 416 585-7177
Télec. : 416 585-7204

October 31, 2016

Dear valued partners,

Ontario's Climate Change Action Plan (CCAP), released on June 8, 2016, committed to creating a cleaner transportation sector in Ontario, in part by promoting cycling.

The Ministry of Transportation is ready to do its part to support the CCAP by implementing a number of initiatives that support reductions to transportation emissions. These initiatives will be funded by proceeds from the province's cap and trade program.

Through a discussion paper posted to the Environmental Registry, we are seeking your input on a proposed plan to implement actions identified in the CCAP to improve commuter cycling networks.

We encourage you to review the discussion paper, accessible through the Environmental Registry (EBR Registry Number: 012-8772) or the Ministry's Cycling Strategy web page and provide your comments by November 30, 2016. We look forward to hearing from you.

Sincerely,

Jill Hughes
Director

c. Sandi Jokic, Manager, Sustainable & Innovative Transportation Office,
Transportation Policy Branch

From: [Dan Beare](#)
To: [Clerks: Jim McGilton](#)
Cc: patricia.staite@HydroOne.com; [Amber Saltarelli](#)
Subject: RE: Metrolinx Public Meetings Notice – November 2016
Date: November-07-16 12:31:07 PM
Attachments: [Metrolinx Public Meetings Notice November 2016 FINAL.PDF](#)
[GO Network Electrification TPAP Municipal Package Durham.pdf](#)
[Oshawa Roll Plan.pdf](#)
[Pickering Roll Plan.pdf](#)
[Whitby Roll Plan.pdf](#)
[Ajax Roll Plan.pdf](#)

Good afternoon,

As an update to the community open house notification you received last week, the GO Rail Network Electrification EA project team has prepared a project update (attached) containing information on the following:

- Upcoming Public Meetings
- Project Status
- Environmental Project Report (EPR)
- Traction Power Facilities
- Bridges
- Tree Compensation Approach
- Noise Mitigation
- Next Steps

The roll plans for your municipality are also attached, which will be shown at the community open houses.

You will be receiving a copy of the draft EPR in December 2016/January 2017. Metrolinx is now targeting Winter/Spring 2017 for the TPAP Notice of Commencement, with TPAP Completion anticipated for Summer/Fall 2017.

For project updates please visit gotransit.com/electrification

Regards,
Dan Beare

Dan Beare BES., MASc.
Project Coordinator, Environmental Programs & Assessment, Capital Projects Group
Metrolinx | 20 Bay Street, Toronto, Ontario | M5J 2W3
T. 416-202-4891 | M. 647-539-1612 | E: dan.beare@metrolinx.com

From: Electrification
Sent: October-25-16 5:13 PM
Cc: ASaltarelli@morrisonhershfield.com; patricia.staite@HydroOne.com; mark.armstrong@hatch.com; Matt.Scoular@aecom.com; Carolina Daza Ortiz; Renee Pettigrew
Subject: Metrolinx Public Meetings Notice – November 2016

Metrolinx, an agency of the Government of Ontario, is bringing more transit and more connections to more places within the GTHA and surrounding communities. Every community transit project, big or small, plays a vital role in the regional transportation system. We want to share our plans and get your feedback.

Starting in November 2016, we will be hosting community open houses to share project updates and seek input on three of Metrolinx’s projects to build new track and electrification infrastructure:

- **GO Rail Network Electrification Transit Project Assessment Process (TPAP)** (Hydro One as co-proponents): gotransit.com/electrification
- **Barrie Rail Corridor Expansion TPAP:** metrolinx.com/RERBarrie
- **Lakeshore East -Don River to Scarborough Expansion TPAP:** metrolinx.com/DonRiverScarborough

These projects are being planned under the Transit Project Assessment Process, in accordance with *Ontario Regulation 231/08, Transit Projects and Metrolinx Undertakings*.

Please find attached a copy of the Public Meeting Notice containing the dates, times and locations for the meetings, as well as a location map and additional information. In the meantime, if you would like to submit a comment or question, or to receive additional information related to these projects, please visit www.metrolinxengage.com or contact us directly:

<p>GO Rail Network Electrification TPAP: James Hartley Manager, Environmental Programs and Assessment Metrolinx - GO Transit 20 Bay Street, Suite 600 Toronto, ON M5J 2W3 electrification@metrolinx.com</p>	<p>Barrie Rail Corridor Expansion TPAP: Carolina Daza Ortiz Manager (A), Environmental Programs and Assessment Metrolinx - GO Transit 20 Bay Street, Suite 600 Toronto, ON M5J 2W3 Carolina.DazaOrtiz@metrolinx.com</p>	<p>Lakeshore East -Don River to Scarborough Expansion TPAP: Renee Pettigrew Manager, Environmental Programs and Assessment Metrolinx - GO Transit 20 Bay Street, Suite 600 Toronto, ON M5J 2W3 Renee.Pettigrew@metrolinx.com</p>
---	--	--

This e-mail is intended only for the person or entity to which it is addressed. If you received this in error, please contact the sender and delete all copies of the e-mail together with any attachments.

Transit Project Assessment Process - Public Meetings

Our Greater Toronto and Hamilton Area (GTHA) is now home to nearly 7 million people – heading towards 10 million by 2041. This growth is a sign of success and opportunity. But as we grow, so too must our transportation network – the lifeblood that connects this great region and each of our communities.

MetroLinx, an agency of the Government of Ontario, is bringing more transit and more connections to more places within the GTHA. Every community transit project, big or small, plays a vital role in the regional transportation system. We want to share our plans and get your feedback.

Starting in November we will be hosting community open houses to share information and updates on three of MetroLinx's projects to build new track and electrification infrastructure. We will be seeking your input on these specific plans and feedback on proposed mitigation strategies:

GO Rail Network Electrification Transit Project Assessment Process (TPAP) (Hydro One as co-proponents): gotransit.com/electrification

- Environmental Baseline Condition Reports have been prepared, Impact Assessment Reports to evaluate potential environmental effects of the project are underway, and stakeholder consultation is in progress. The project is currently in the Pre-Planning Phase of the TPAP.
- The focus of this round of public meetings will be to provide an update on the project and conceptual design of the Traction Power Supply and Distribution components.

Barrie Rail Corridor Expansion TPAP: metrolinx.com/RERBarrie

- The environmental assessment studies are prepared, which include a detailed overview of impacts to evaluate the environmental effects of the preliminary design. The project is currently in the Pre-Planning Phase.
- The focus of this round of public meetings will be to provide an update on the project and seek feedback on the environmental impacts.

Lakeshore East-Don River to Scarborough Expansion TPAP:
metrolinx.com/DonRiverScarborough

- The project is currently in the Pre-Planning Phase with existing conditions studies completed.
- The focus of this round of public meetings will be on existing conditions.

These meetings will also include information on the Regional Transportation Plan (RTP) which guides the work being done to transform the transportation network in the GTHA. A review of the RTP is underway, providing the opportunity to formally incorporate new insights into the plan, while ensuring we maintain momentum on the projects underway. Information updates on other key studies and projects in your neighbourhood will also be provided.

We invite you to join us in person at the public meeting nearest you to find out more. (Or, participate online at metrolinxengage.com)

Meeting time: 6:30 p.m. – 9:00 p.m. / Presentation: 7:00 p.m.

Monday, November 7, 2016

Hope United Church
2550 Danforth Ave.
Toronto, ON M4C 1L2

Wednesday, November 9, 2016

Metro Toronto Convention Centre
(South Building)
Room 717A and 718
222 Bremner Boulevard
Toronto, ON M5V 3L9

Monday, November 14, 2016

Bramalea Secondary School
510 Balmoral Dr.
Brampton, ON L6T 1W4

Tuesday, November 15, 2016

Loretto College School
151 Rosemount Ave.
Toronto, ON M6H 2N1

Wednesday, November 16, 2016

Riverdale Collegiate Institute
1094 Gerrard St. E.
Toronto, ON M4M 2A1

Thursday, November 17, 2016

Birchmount Park Collegiate Institute
3663 Danforth Ave.
Scarborough, ON M1N 2G2

Thursday, November 17, 2016

Cornell Community Centre
3201 Bur Oak Ave.
Markham, ON L6B 0T2

Monday, November 21, 2016

Innisdale Secondary School
95 Little Ave.
Barrie, ON L4N 2Z4

Tuesday, November 22, 2016

Sacred Heart Catholic High School
908 Lemar Rd.
Newmarket, ON L3Y 1R9

Wednesday, November 23, 2016

Cardinal Carter Catholic High School
210 Bloomington Rd.
Aurora, ON L4G 0P9

Thursday, November 24, 2016

Vellore Village Community Centre
1 Villa Royale Ave.
Woodbridge, ON L4H 2Z7

Monday, November 28, 2016

Jean Vanier Catholic Secondary School
959 Midland Ave.
Scarborough, ON M1K 4G4

Tuesday, November 29, 2016

First United Church
151 Lakeshore Road West
Mississauga, ON L5H 1G3

For additional information about these projects, please visit metrolinx.com OR metrolinxengage.com

Stay Connected

All comments and feedback received will be documented and will help inform the Transit Project Assessment Process and the Environmental Project Reports that will be submitted to the Ministry of the Environment and Climate Change.

Comments Invited

Comments and information regarding these projects are being collected to assist in meeting the requirements of the *Environmental Assessment Act*. All personal information included in a submission – such as name, address, telephone number and property location – is collected, maintained and disclosed by the Ministry of the Environment and Climate Change for the purpose of transparency and consultation. The information is collected under the authority of the *Environmental Assessment Act* or is collected and maintained for the purpose of creating a record that is available to the general public as described in s. 37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential. For more information, please contact Georgina Collymore (contact information below) or the Ministry of the Environment and Climate Change Freedom of Information and Privacy Coordinator at 416-327-1434.

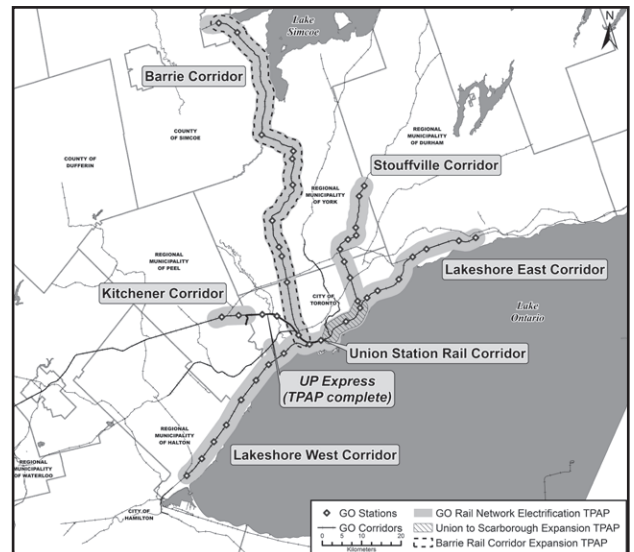
For more information, or to be added to the e-mail distribution list, please contact:

Georgina Collymore
Senior Advisor – Environmental Assessment Communications & Community Relations
tel: 416-202-4921 / e-mail: electrification@metrolinx.com

MetroLinx is working to provide residents and businesses in the GTHA with a transportation system that is modern, efficient and integrated. Find out more about MetroLinx's Regional Transportation Plan for the GTHA, as well as GO Transit, PRESTO and Union Pearson Express at www.metrolinx.com.

This Notice first issued on Thursday, October 27, 2016.

Pour plus de renseignements, veuillez composer le 416 874-5900 ou le 1 888 GET-ON-GO (438-6646).



November 3, 2016

The purpose of this package is to provide an update on Metrolinx Electrification EA.

Overview

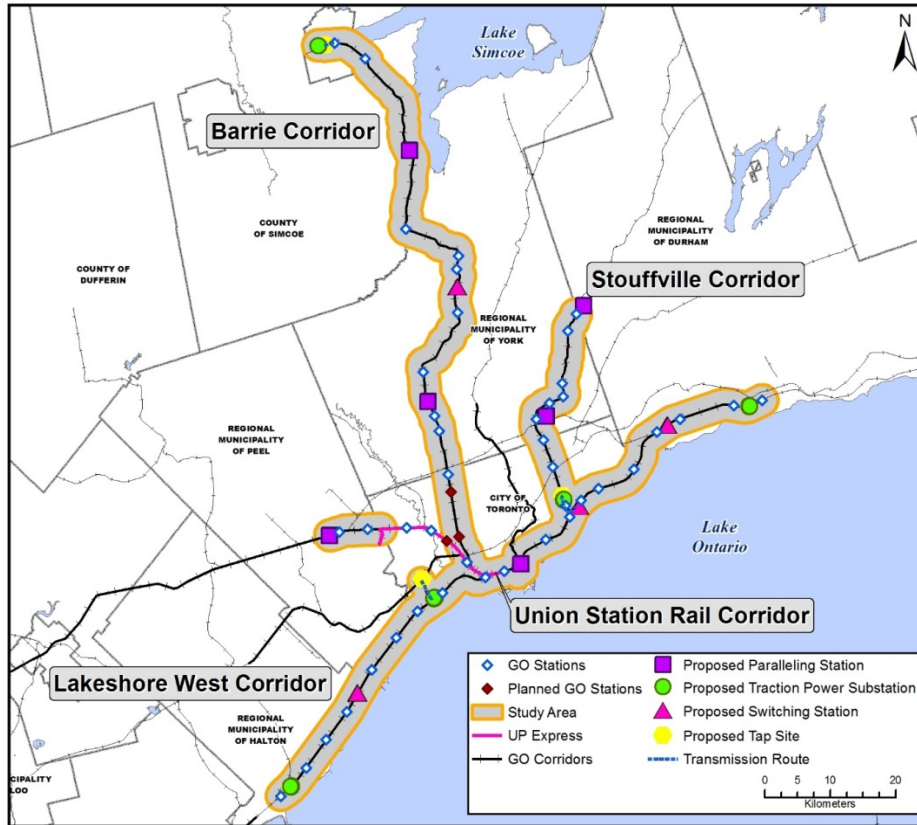
Metrolinx is carrying out an Environmental Assessment (EA) under the Transit Project Assessment Process (TPAP) in accordance with Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings for electrification of the GO Transit Rail Network (see Figure 1). Specifically, Metrolinx is examining the conversion of several rail corridors from diesel to electric propulsion. The GO Rail Network Electrification TPAP (the Project) is an undertaking that will entail design and implementation of traction power supply system and power distribution components including an Overhead Contact System (OCS) along the rail corridors, electrical feeder routes, as well as a number of electrical power supply/distribution facilities (i.e., traction power facilities) located within the vicinity of the rail corridors.

Electrification of the GO network requires electrical power to be supplied from Ontario's electrical system through Hydro One's existing high voltage grid via new 230 kV connection lines to the proposed Traction Power Substations. As such, Metrolinx and Hydro One are carrying out the TPAP as Co-Proponents and are working together on the conceptual design elements (tap locations) and environmental components of the project.

The Study Area (see key map below) includes six GO rail corridors, as well as proposed locations for the electrical power supply and distribution facilities:

- Union Station Rail Corridor
- Lakeshore West Corridor – From just west of Bathurst St (Mile 1.20) to Burlington
- Kitchener Corridor – UP Express Spur (at Highway 427) to Bramalea
- Lakeshore East Corridor – Don River to Oshawa GO Station
- Barrie Corridor – Parkdale Junction to Allandale GO Station
- Stouffville Corridor – Scarborough Junction to Lincolnville GO Station

GO Rail Network Electrification Study Area



As part of stakeholder outreach for the TPAP, Metrolinx has been engaging various review agencies including conservation authorities, municipalities, and provincial review agencies to provide a summary of the key updated information before the next round of public consultation scheduled for November 2016:

- Upcoming Public Meetings
- Project Status
- Environmental Project Report (EPR)
- Traction Power Facilities
- Bridges
- Tree Compensation Approach
- Noise Mitigation
- Next Steps

Upcoming Public Meetings

Metrolinx is holding a second round of Public Meetings in November 2016 to provide an update on the project, preliminary design elements, and technical studies completed, as well as to seek input and feedback on proposed mitigation strategies for this and other Metrolinx initiatives. A public meeting notice is attached.

Project Status

Since our last meeting work has continued during the Pre-Planning Phase of the TPAP. Work completed to date includes:

- Baseline Conditions Reporting
- First Round of Public Meetings held in Feb/Mar 2016
- Stakeholder consultation is underway and numerous meetings held to date with Conservation Authorities, Aboriginal Communities, and utilities.
- Continuing to meet with municipal, provincial and federal review agencies.
- Finalizing various conceptual design elements, such as bridge modifications.
- Impact Assessment studies are underway.
- Draft Environmental Project Report (EPR) development is underway, to be shared in 2017.

The schedule of the TPAP has been updated since our last meeting. Metrolinx is now targeting Winter/Spring 2017 for the TPAP Notice of Commencement, with TPAP Completion anticipated for Summer/Fall 2017.

Environmental Project Report (EPR)

In 2017 Metrolinx will be sharing the draft EPR with municipalities and other review agencies for comment. The EPR will be divided into five (5) volumes:

- Volume 1 – identification of traction power facility sites, description of the Study Area, detailed description of the project components/conceptual design, including: tap locations, traction power supply, power distribution and maintenance requirements associated with the electrification infrastructure and equipment. Includes Conceptual Electrification Roll Plans.
- Volume 2 – detailed description of the baseline environmental conditions (environment potentially affected) within the Study Area. Organized by rail corridor.
- Volume 3 – describes the potential environmental effects, recommended mitigation measures, net environmental effects, and monitoring activities associated with implementation of the project. Organized by rail corridor.

- Volume 4 – describes the consultation process and activities that were carried out including key consultation milestones. Overview of the input/comments/feedback received from various stakeholders (i.e., Review Agencies, Aboriginal Communities, the Public, Property Owners, etc.) and how they were considered by Metrolinx and Hydro One.
- Volume 5 – describes the proposed commitments and future work to be carried out during future project phases (e.g., detailed design, construction), addendum process, and outlines the additional anticipated approvals/permits required for implementing the project beyond EA Act requirements.

Twelve (12) technical/environmental supporting reports were produced that will be included as Appendices to the EPR. These reports include Natural Environment Assessment, Environmental Site Evaluation, Land Use and Socio-economic Assessment, Air Quality Assessment, Cultural Heritage and Archaeological Assessments, Visual Impact Assessment, Noise and Vibration Assessments, Utilities Assessment, Stormwater Management Report, and EMI/EMF Assessment.

Your Municipality will be receiving a copy of the draft EPR in December 2016/January 2017. Metrolinx will be seeking your comments within six weeks.

Traction Power Facilities

Metrolinx will require two Traction Power Facilities (TPFs) within your Municipal boundaries.

The Durham Switching Station (SWS) is to be located on a parcel of land at 1610 Bayly Street in Pickering (**Figure 1**). The site is primarily open space / hydro corridor, with recreational buildings / amenities (Pickering Playing Fields) in the southeast corner. The northeast corner has some tree cover / vacant lots, with ponding of water in a man-made structure. The site is entirely surrounded by industrial development and Highway 401.

Based on the conceptual design, the proposed positioning of the SWS facility is located in the triangular northeast corner of the parcel, adjacent to the rail corridor (**Figure 2**). It is currently vacant lot with some vegetation.

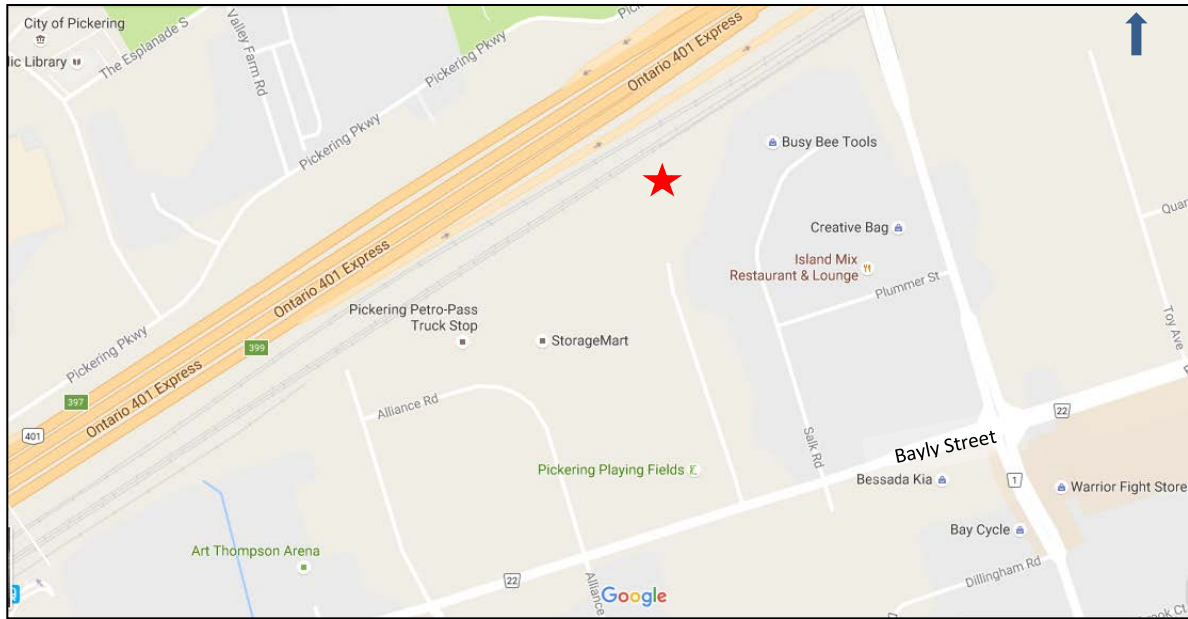


Figure 1 – Durham SWS

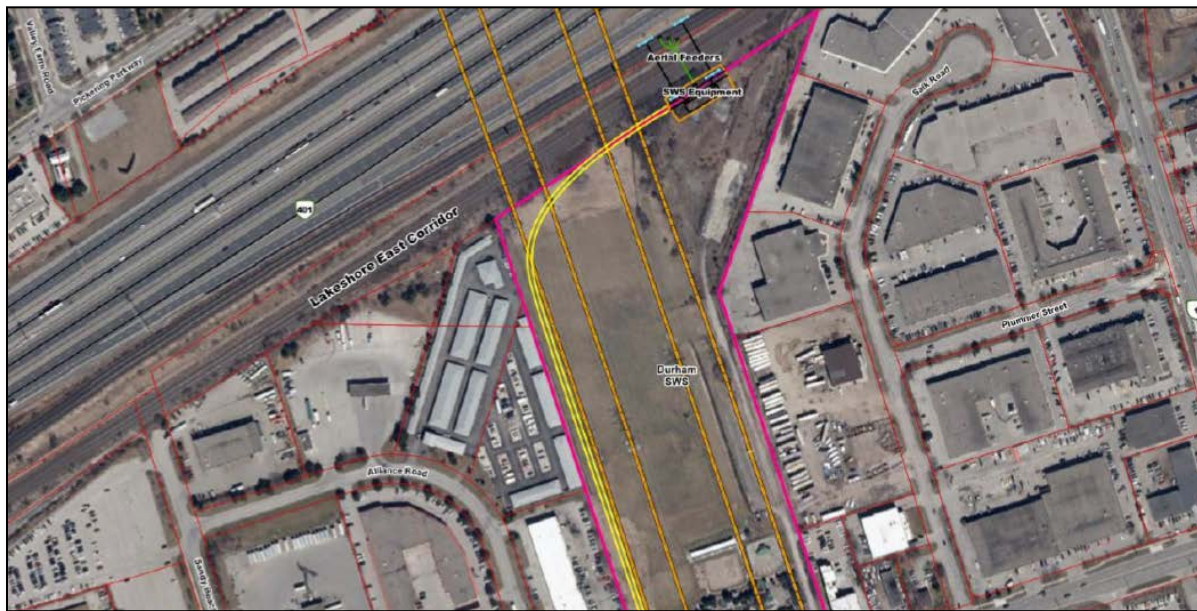


Figure 2 – Durham SWS

Switching Stations (SWS) are traction power facilities that are located between Traction Power Substations (TPS) to segregate power flow on the network. This is necessary to manage the utility power that supplies the railroad systems. Under normal operating conditions, the two supplies are separated by phase breaks. The SWS enables electrical energy to be supplied to an adjacent but normally separated electrical section during contingency power supply conditions. In the event there is a utility outage or failure of a supply transformer, the breakers/switches at the SWS can be closed to continue to supply power to the trains and maintain operational service for the public.

The following equipment is associated with the SWS facilities:

- SWS equipment (requiring an approximate footprint size of 22m X 55 m) including two 15 MVA autotransformers, medium voltage switchgear for connections to the OCS.
- Gantries
- Aerial or underground feeders connecting to the OCS;
- Access route.

The East Rail Maintenance Facility (ERMF) Traction Power Substation (TPS) is to be located on a parcel of land situated on a vacant piece of land north of the rail corridor and east of Hopkins Street (**Figure 3**). The ERMF, which is currently under construction, will be located on the opposite side of Hopkins Street. All development in the surrounding area is industrial, with a hydro corridor bordering the site to the east.

Based on the conceptual design, the proposed positioning of the TPS facility is located on the eastern side of the parcel, adjacent to the hydro corridor (**Figure 4**).



Figure 3 – ERMF TPS and Tap Sites



Figure 4 – ERMF TPS and Tap Sites

It should be noted that the ERMF is currently under construction by Metrolinx on this site. The location and infrastructure required for the ERMF Tap is described as follows:

- Tapping from existing Hydro One 230kV transmission line – Hydro One circuits H24C /H26C.
- Two Hydro One owned/constructed structures will be required at tap point, location to be determined by Hydro One (each approximately 10m², up to 30m tall) under/adjacent to the Hydro One 230kV transmission lines to facilitate tapping the 230kV transmission circuits.
- For purposes of the TPAP/conceptual design phase, it was assumed that underground 230kV connection cables via two duct banks (approx. 2m X 2m, 1m depth) will be installed from the Hydro One tap structures to two new Metrolinx tap structures (approximately 10m², up to 30m tall). If deemed feasible during detailed design, the connection may be installed via aerial feeders at this location, however no change to the potential environmental effects are anticipated in this scenario since the underground option is more intrusive.
- The tap location can be accommodated within same property boundary as the TPS facility.
- The site for TPS and Tap is owned by Metrolinx.

Bridges

In order to run OCS wires under bridges without attachments, there must be sufficient clearance between the messenger wire/catenary and the lowest part of the bridge structure. Where sufficient clearance does not exist, attachments (e.g., tunnel arms,) on the structure are required in order to support the OCS. In addition, for rail overpass structures, OCS support structures (portals/cantilevers) may need to be installed on the structure to support the OCS system.

There are four design options for installing OCS to bridge/rail overpass structures:

1. Wires 'free run' under the bridge with no modification required
2. Install attachments to bridge to support OCS wires running under the bridge
3. Install OCS support structures on rail overpass structures
4. Attach to tunnel with tunnel arm(s)

In the case of concrete bridges, if the vertical clearance between OCS conductors and concrete overpasses is less than 1m (3'3"), protection panels (flash plates) will be installed above the OCS, attached to the underside of the bridge, and interconnected to the static wire. For steel overpasses, the steel girders will be interconnected and bonded to the static wire.

A bridge protection barrier is required to protect pedestrians and travelers/infrastructure users within the public right-of-way on bridges from direct contact with adjacent live parts of the OCS for voltages up to 25 kV to ground. In addition, these barriers protect against damage to the OCS passing under bridges by providing an obstacle to debris that may be thrown onto the railway from overhead. The length of the protection barrier will extend a minimum of approximately 3m laterally beyond the live parts of the overhead contact system, on either side the bridge. The barriers will be made of solid-faced material, and will be a minimum height of approximately 2m (barriers of greater heights may be required in areas where vandalism is prevalent). High voltage signage will also be provided as an additional safety measure.

The following table identifies any required road bridge modifications in your Municipality:

Corridor	Mile	Primary Name	Type of Structures	Vertical Clearance Issue?	Flash Plate to be Attached to Bridge	Wires to Be Attached to Bridge?	Bridge Protection Barrier to Be Added or Modified?
LSE	0.84	Liverpool Road	Bridge	No	Yes	No	Yes
LSE	1.09	Pickering North Station	Bridge	No	Yes	No	Yes
LSE	1.92	Brock Road	Bridge	No	Yes	No	Yes
LSE	4.52	Harwood Avenue South	Bridge	No	Yes	No	Yes
LSE	6.60	Lakeridge Road -new	Bridge	No	Yes	No	Yes
LSE	8.72	Henry Street	Bridge	No	Yes	No	Yes
LSE	9.00	Brock Street South	Bridge	No	Yes	No	Yes
LSE	314.76	Whites Road	Bridge	No	Yes	No	Yes

Tree Compensation Approach

Metrolinx supports a sustainable and vibrant tree canopy across the region.

Trees and other vegetation are not always compatible with an electrified rail service as they can:

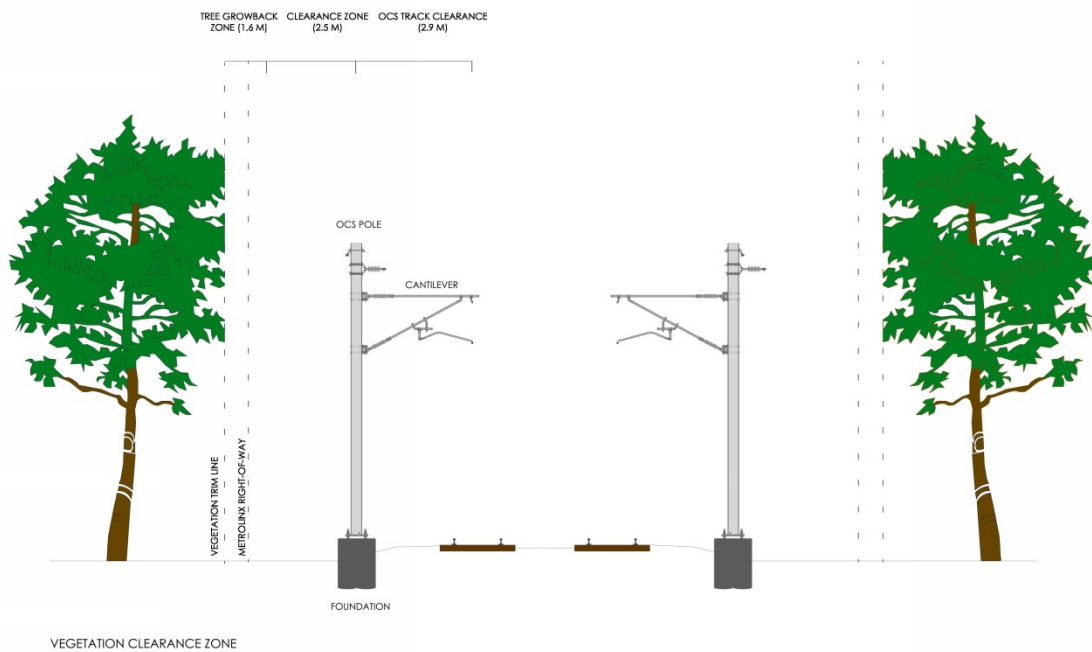
- Cause falling wires from overhead catenary system.
- Put the safety of our customers, workers and neighbours at risk.
- Potentially impact service to the thousands of residents who rely on GO service on a daily basis.

Vegetation adjacent to the railway tracks will be removed to enable the installation of the Overhead Contact System (OCS) and 25kV feeder routes to ensure the safety of rail operations and reliability of the system.

The vegetation clearance zone will be a maximum 7 meter zone from the centre of the outermost electrified track. This 7 m zone includes:

- 2.9 m clearance from the track to the OCS pole to ensure clearance of the train to the OCS pole;
- 2.5 m vegetation clearance from the OCS pole to the limits of the trees; and
- Up to 1.6 m to account for tree grow back (regrowth zone).

Vegetation Clearance Diagram



Noise Mitigation

GO Transit Expansion is bringing more train trips to every GO rail corridor. Trains will be running up to every 15 minutes, there will be service in both directions, more all-day service, and there will be electric trains. There will also be 150 km of new track (to allow for more uninterrupted service), new bridges and tunnels, and new and renovated stations. This expansion will bring more noise, and an important part of the Environmental Assessment process involves understanding noise impacts and identifying ways to mitigate them.

When new infrastructure is built, Metrolinx undertakes a Noise and Vibration Modelling study to understand the amount of noise that will be generated by the increased service.

The 1995 draft MOEE/GO Transit Noise Protocol stipulates that:

- Mitigation must be considered if the project is expected to cause a 5 dB increase or greater in the average noise (referred to as “Leq”) relative to the existing noise level or the MOE objectives of 55 dBA for daytime and 50 dBA for night-time
- The Protocol also states that noise mitigation is required if it is administratively, operationally, economically and technically feasible

Metrolinx is working to compare the noise generated by existing GO service to the amount of noise that will be generated once the new GO infrastructure has been built and the higher levels of service are provided.

The key in this analysis is to identify areas where noise is expected to increase by 5 dBA or more (as per the Province's Transit Noise and Vibration Protocol). Corridor Plans within your municipality/Region is attached and show the locations where the > 5 dB is expected. Areas with noise increases greater than > 5 dB will be considered for mitigation.

Next Steps

A copy of the Public Meeting display materials will be posted to the project website:
www.gotransit.com/electrification.

If you have any questions, comments or feedback for the Project Team, please contact James Hartley via e-mail James.Hartley@metrolinx.com by November 30, 2016.

Alternatively, if you would like to arrange a meeting to discuss the project in more detail, we would be happy to schedule a teleconference or in-person meeting.

Sincerely,

James Hartley

Manager, Environmental Programs and Assessment
Metrolinx - GO Transit
20 Bay Street, Suite 600
Toronto, ON M5J 2W3
electrification@metrolinx.com
www.gotransit.com/electrification

cc: P. Staite, Hydro One Networks Inc.
A. Saltarelli, Morrison Hershfield

Attachments:

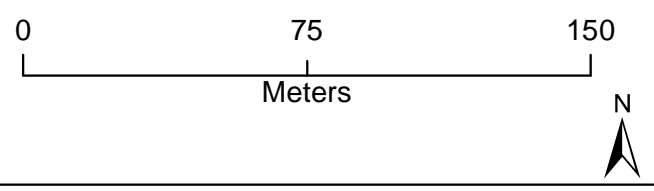
1. Public Meeting Notice
2. Roll Plans



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - ◆ GO Station



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 67

1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



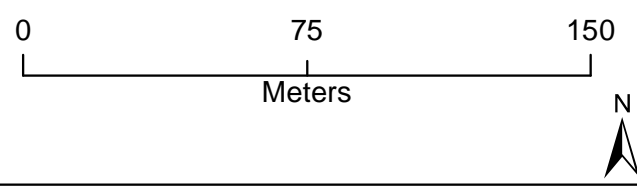
City of Pickering

LSE-5

Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

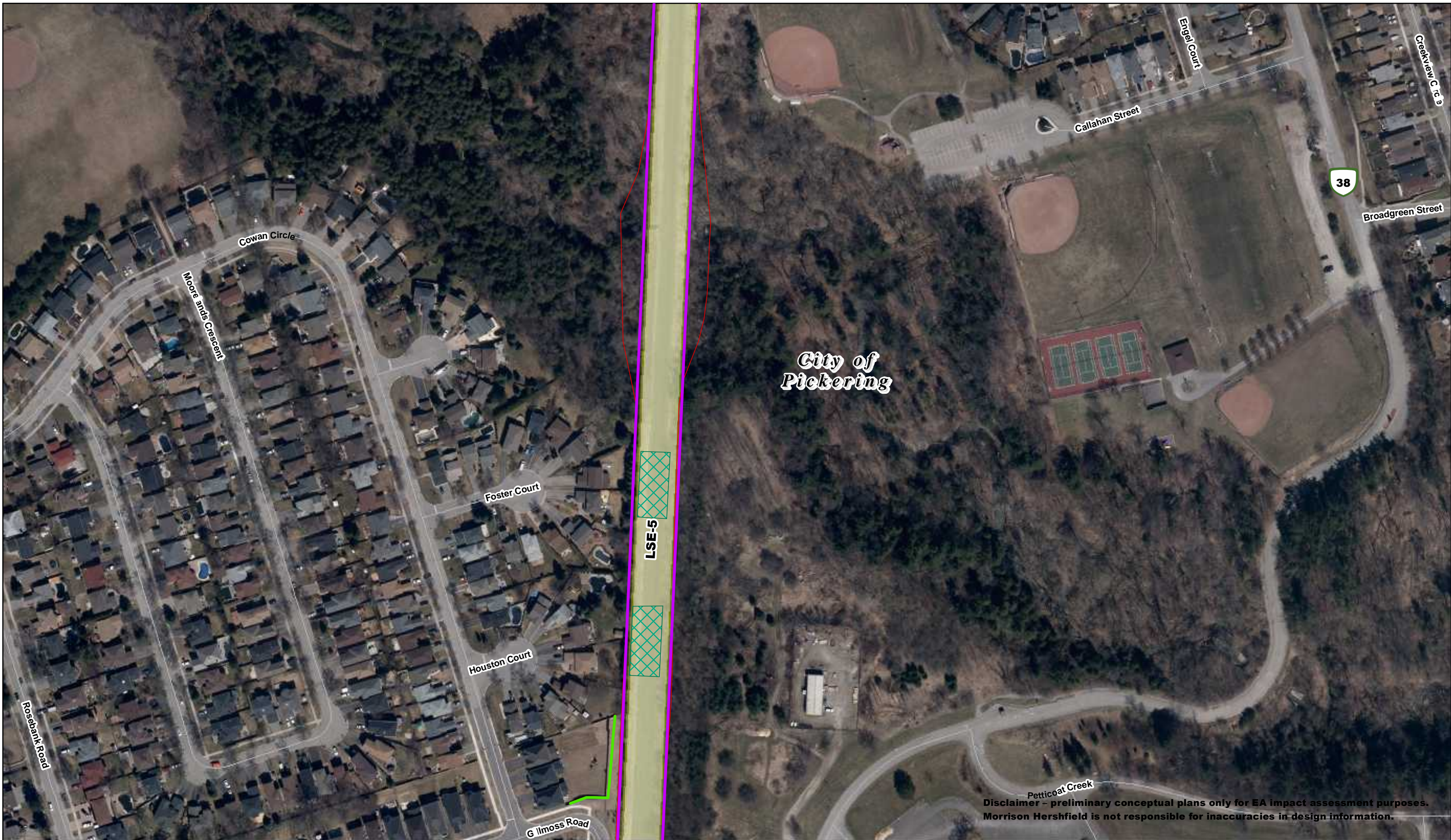
METROLINX
MORRISON HERSHFIELD
Gannett Fleming

- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure LSE- 40

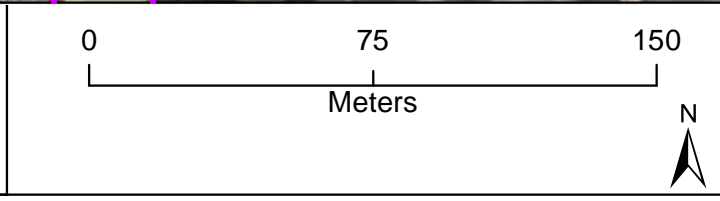


City of Pickering

Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

METROLINX
MORRISON HERSHFIELD
Gannett Fleming

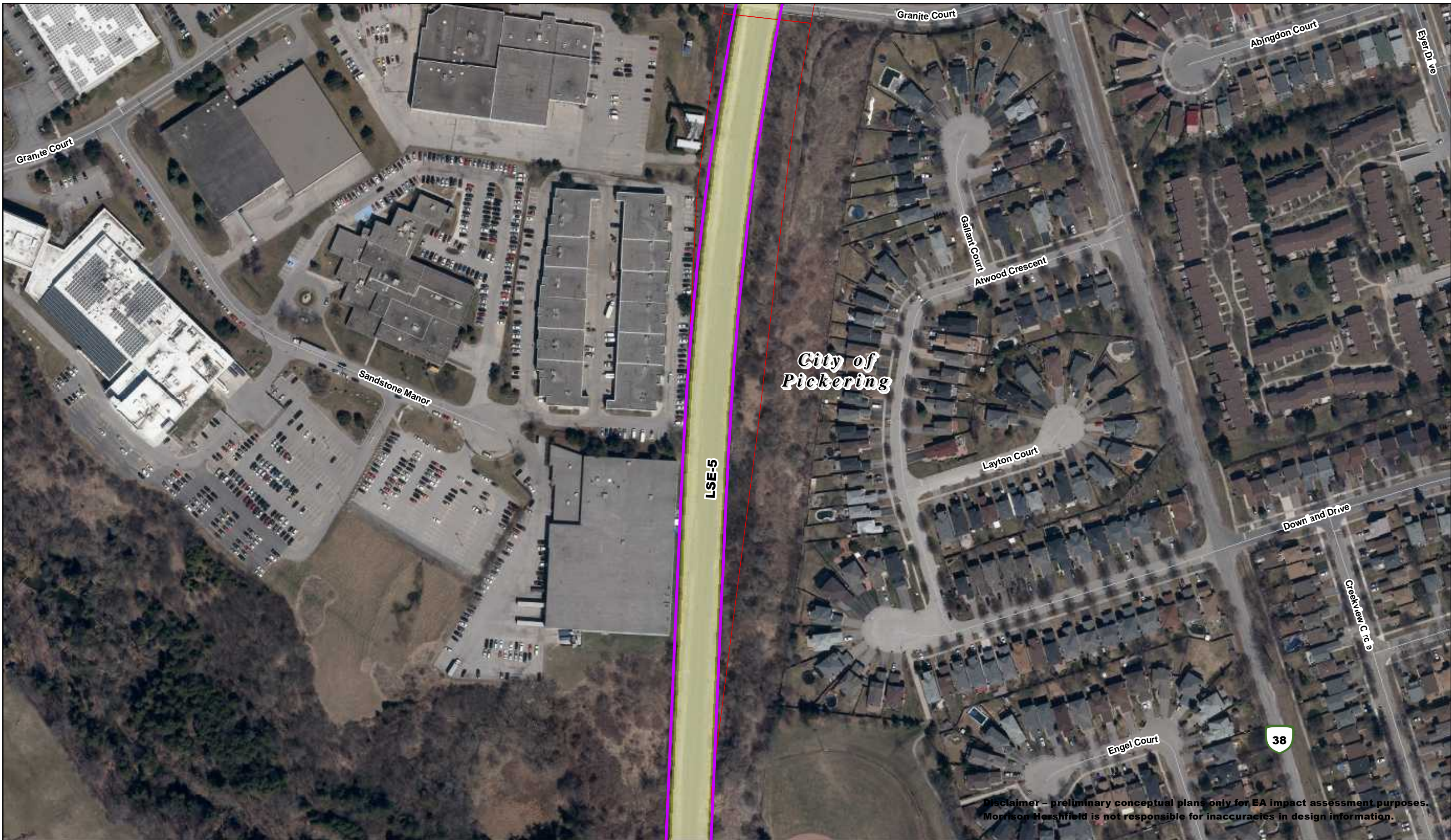
Legend	
	Existing GO Right of Way
	Vegetation Clearing Area
	OCS Infrastructure Area
	Existing/Planned Noise Barriers
	Potential Vibration Mitigation Location



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure LSE- 41

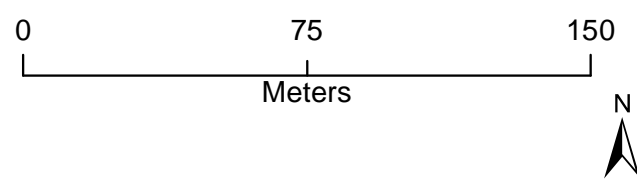
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 42

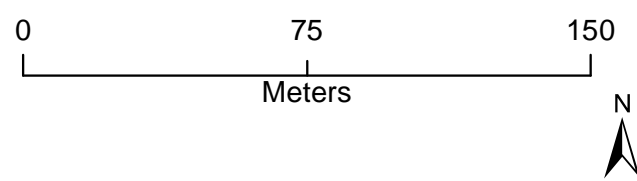
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

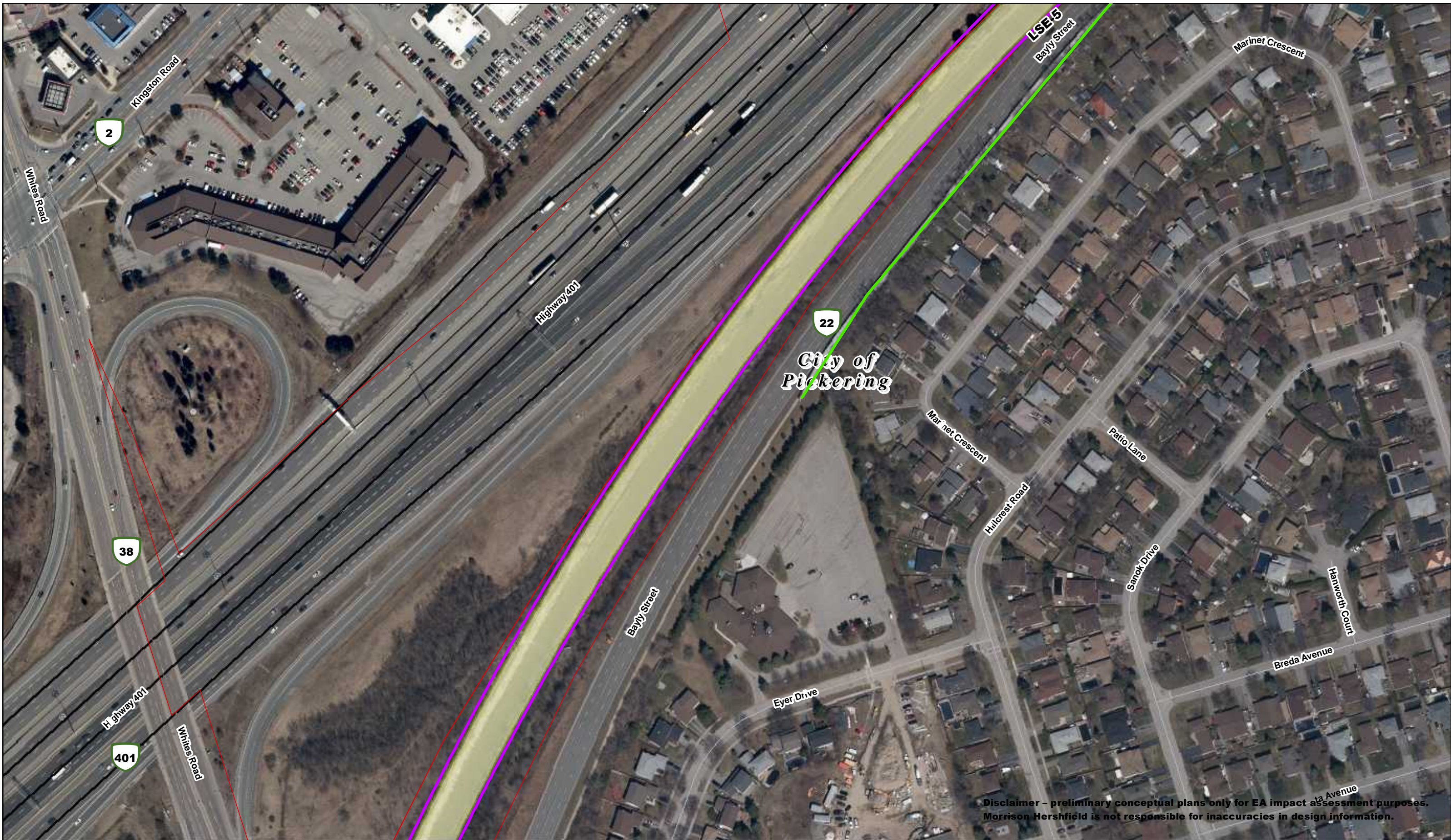


- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 43



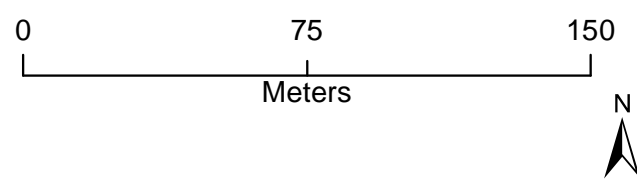
Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

METROLINX
MORRISON HERSHFIELD
Gannett Fleming

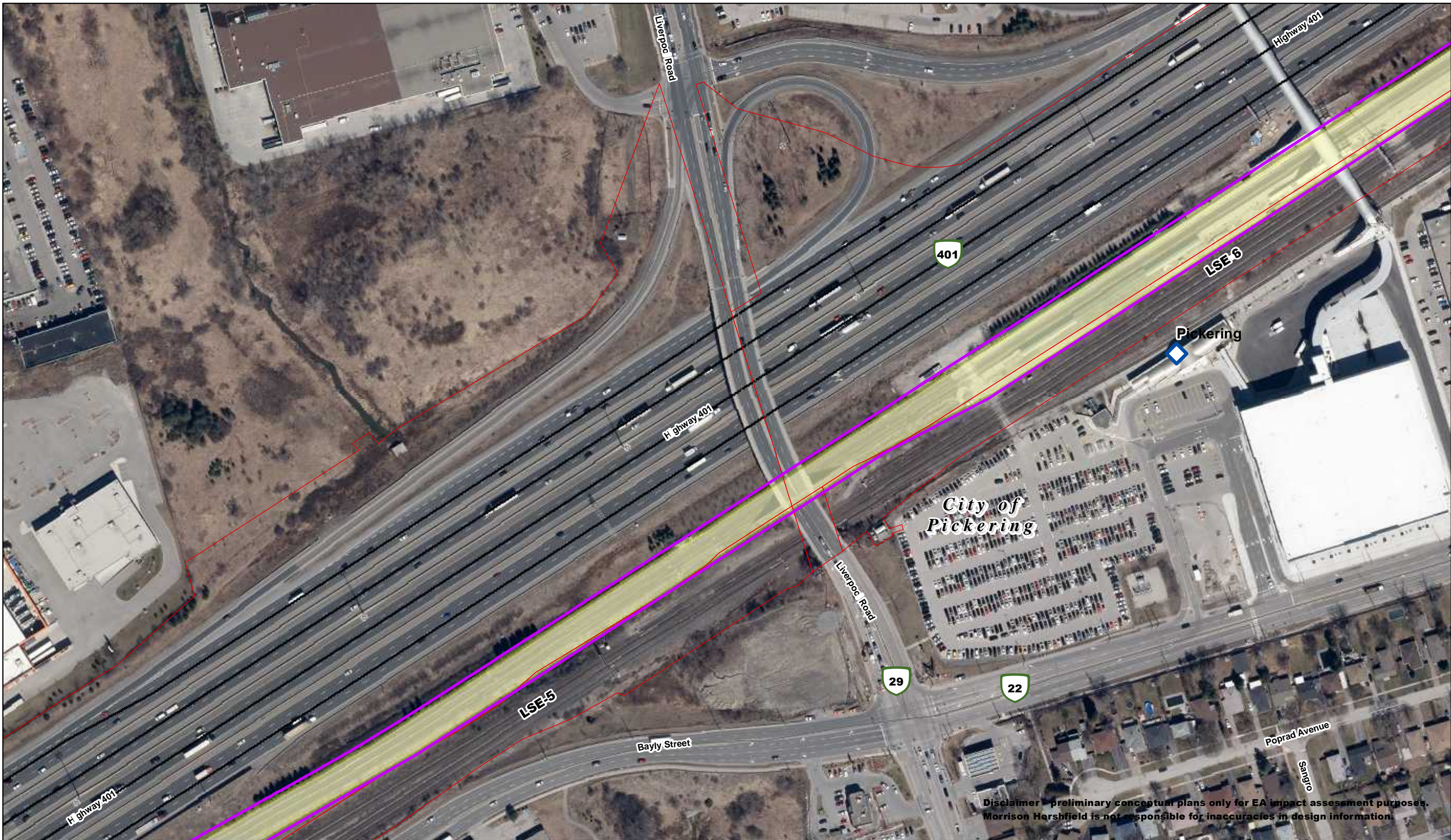
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 45

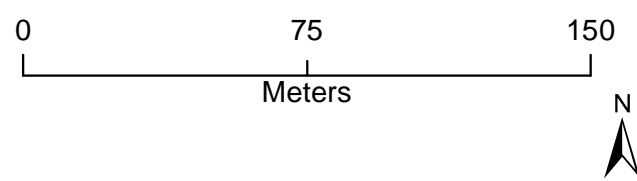
1150226.00



Disclaimer: preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



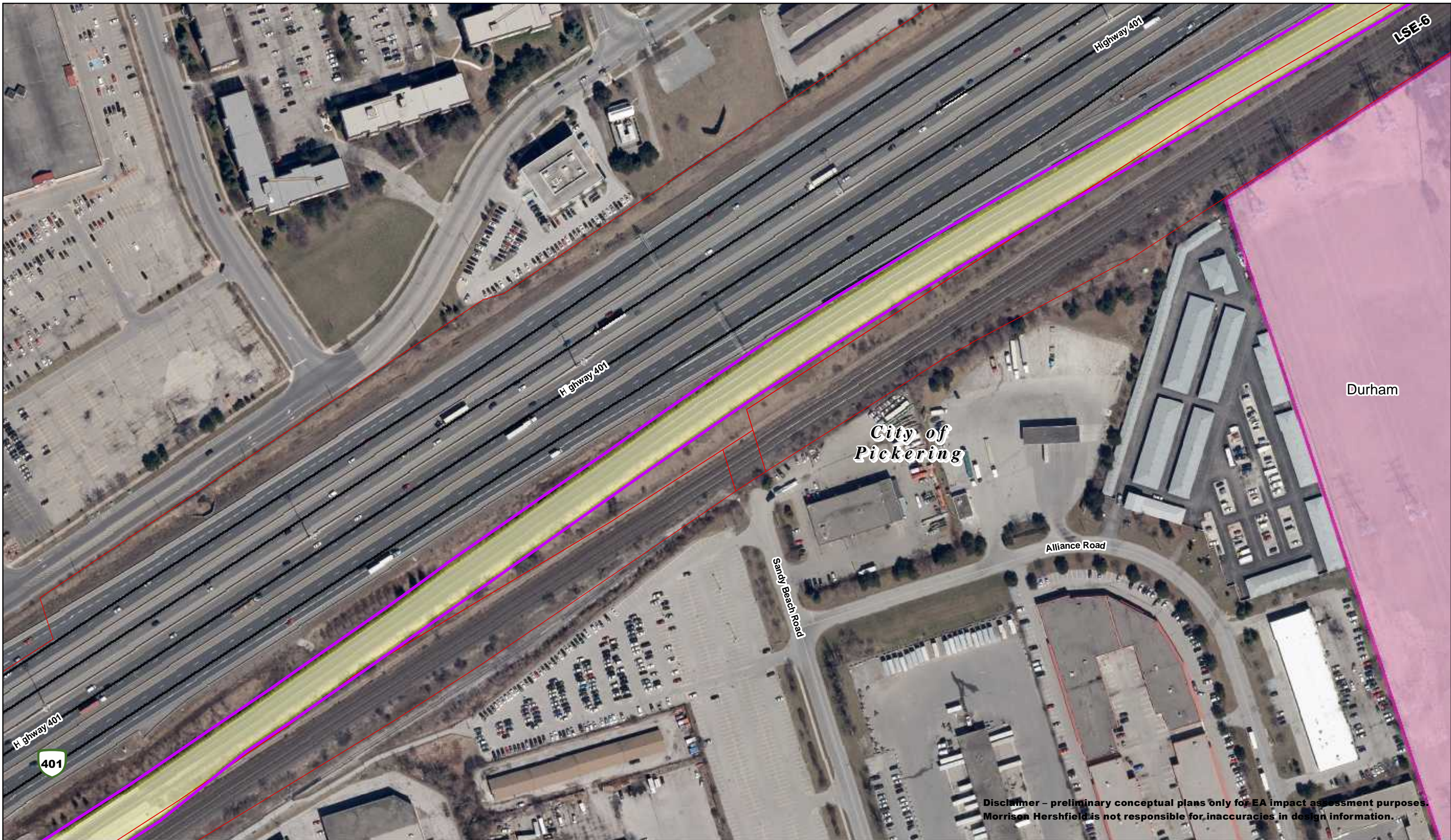
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - ◆ GO Station



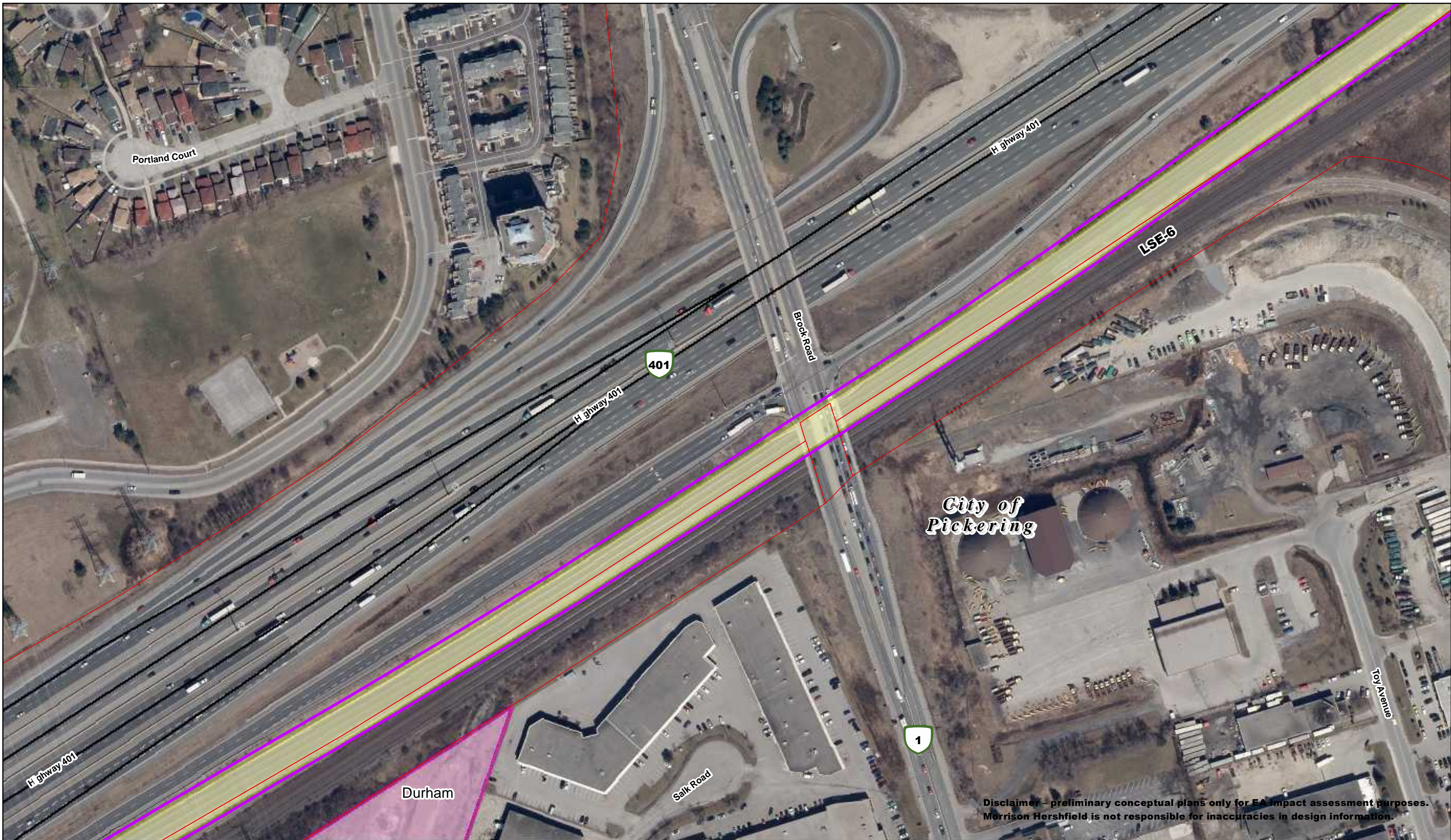
GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 47

1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes.
 Morrison Hershfield is not responsible for inaccuracies in design information.



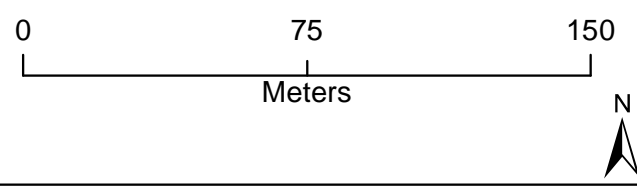
Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



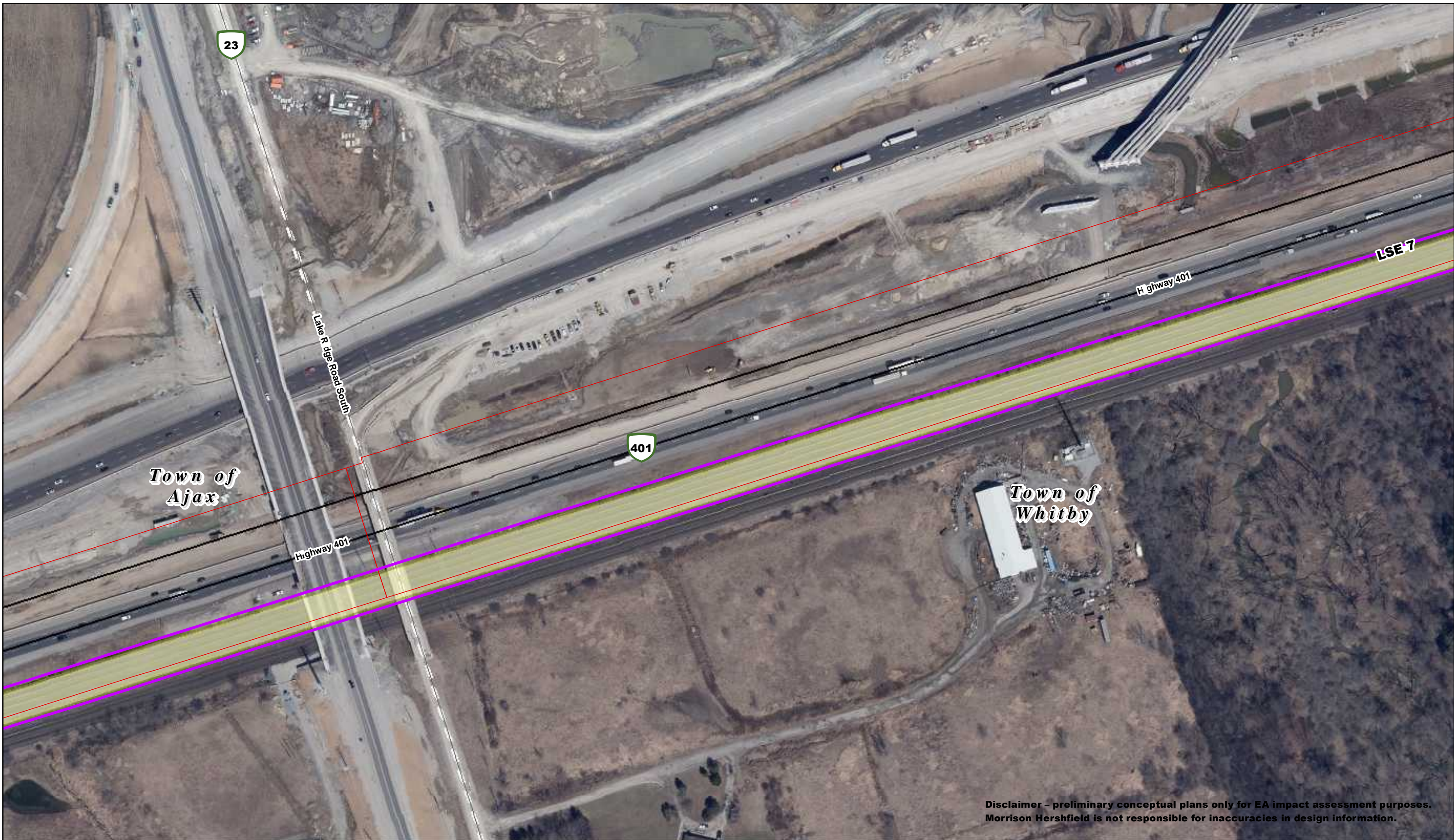
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 50

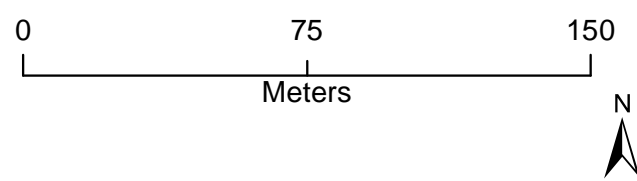
1150226.00



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 58

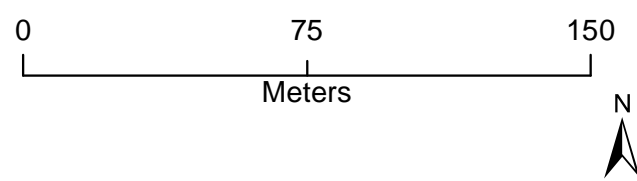
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 59

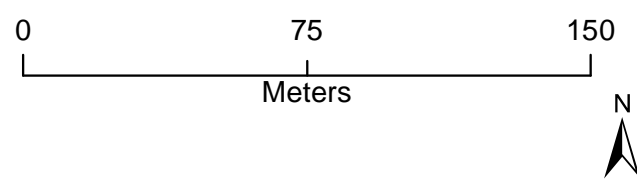
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



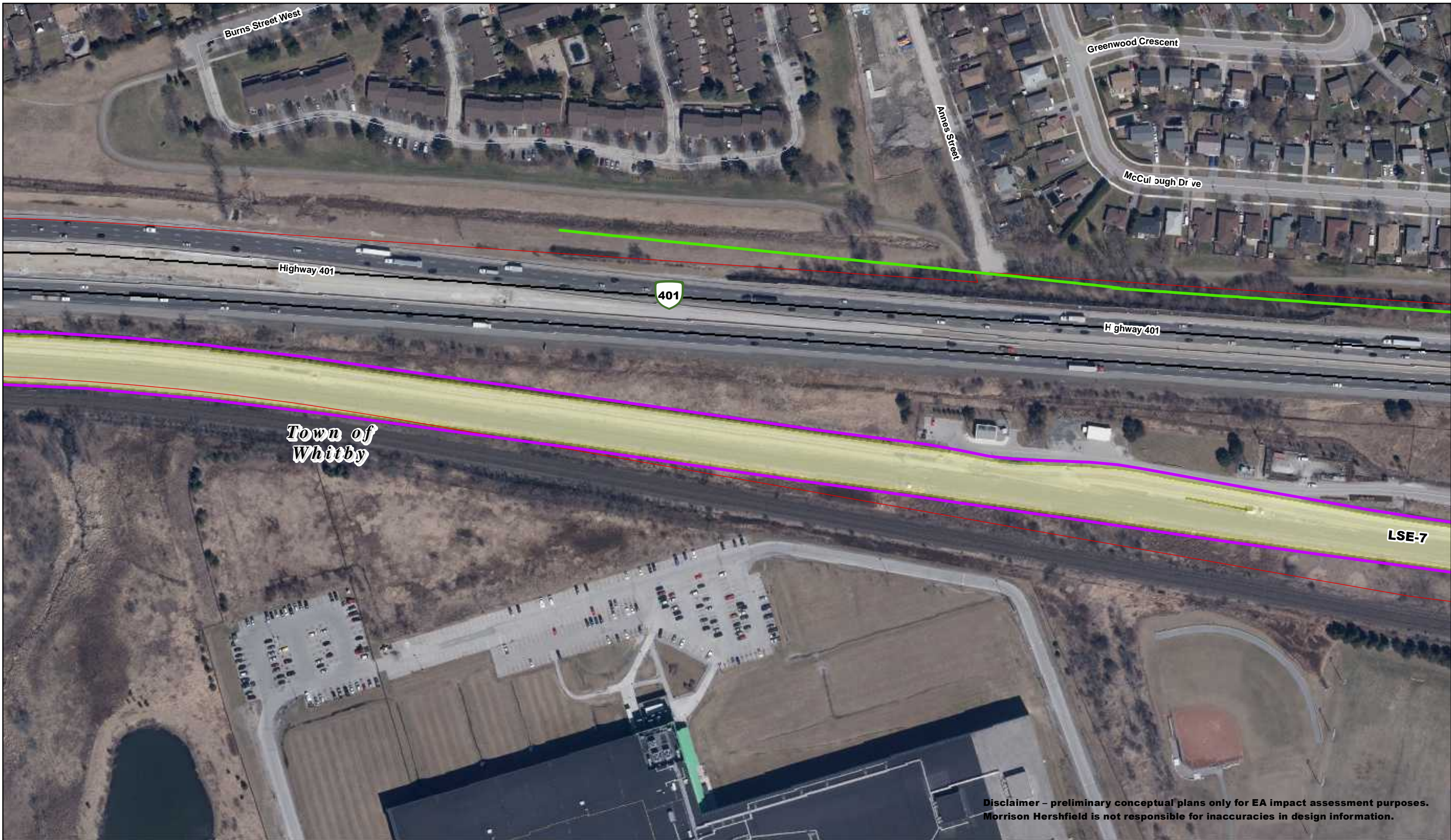
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 60

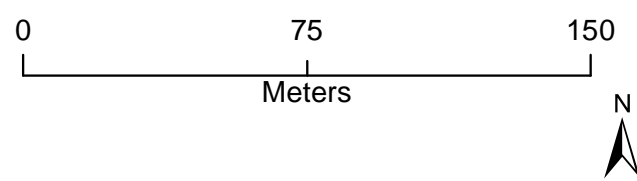
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



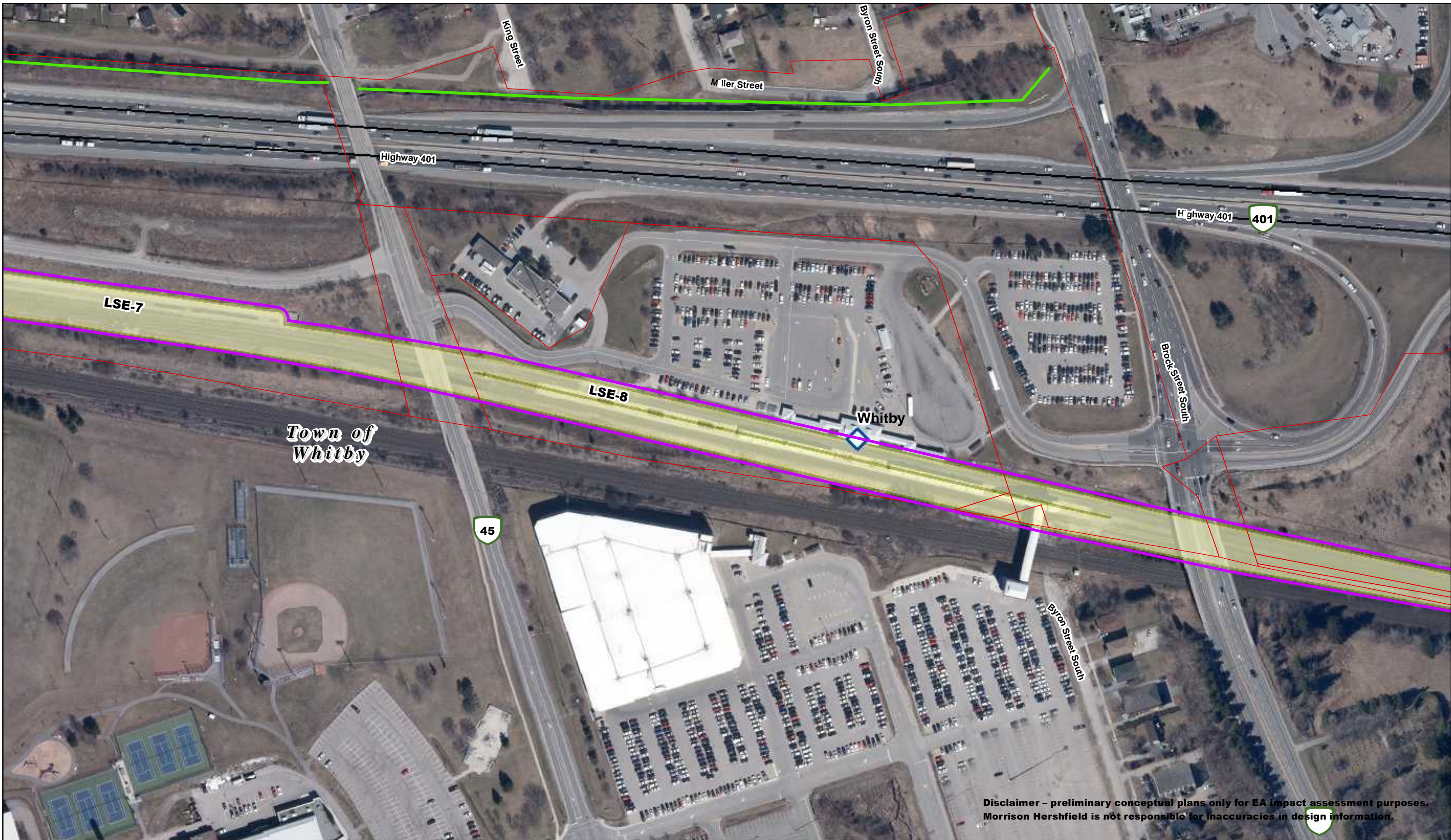
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 61

1150226.00



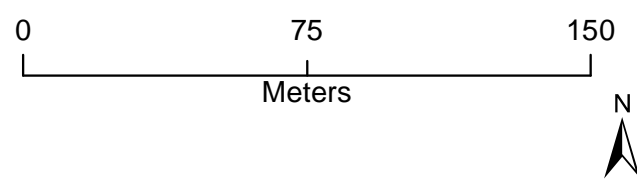
Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

METROLINX
MORRISON HERSHFIELD
Gannett Fleming

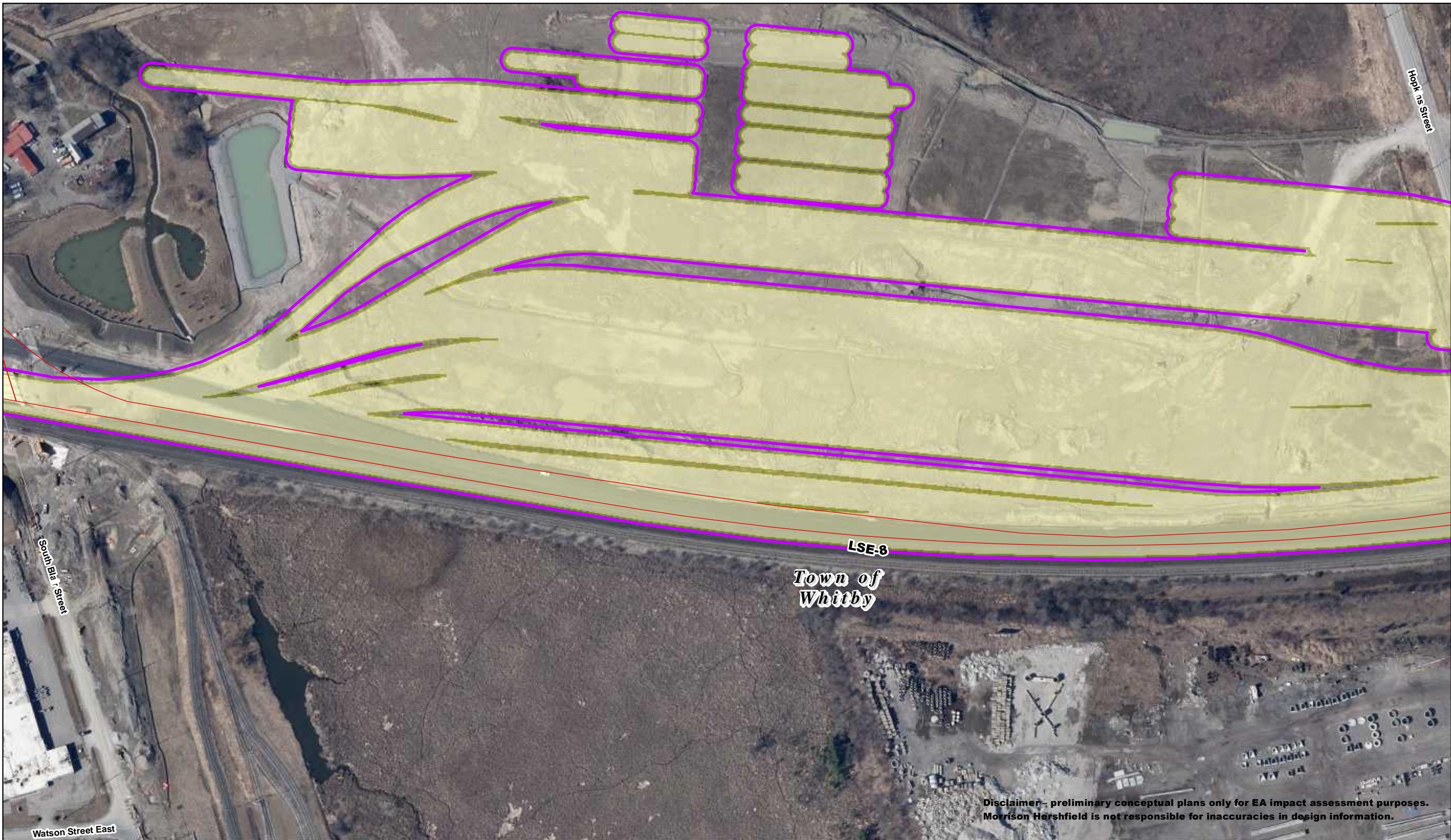
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure LSE- 63

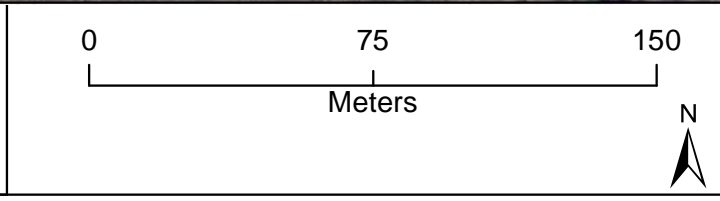
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

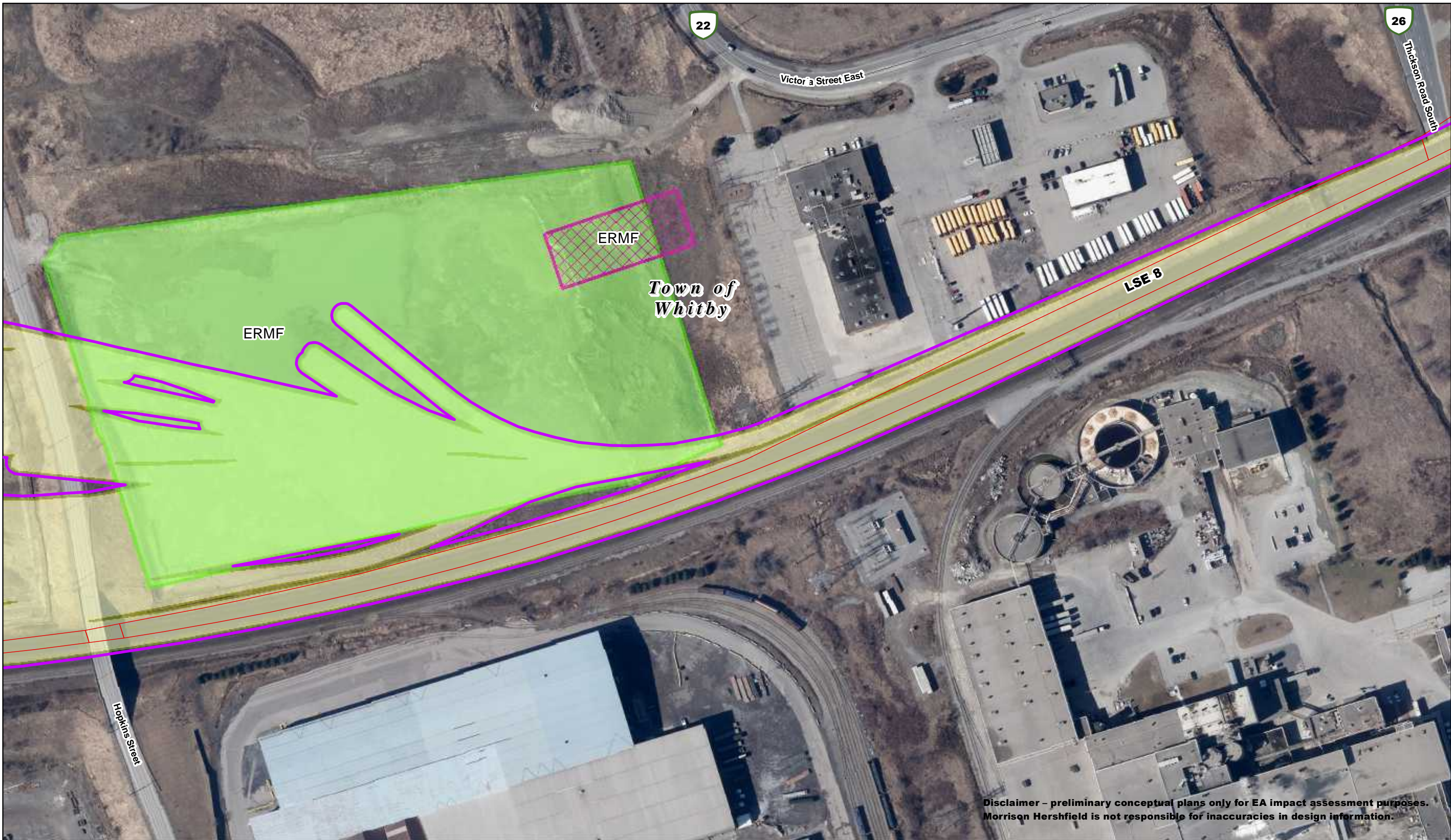
METROLINX
MORRISON HERSHFIELD
Gannett Fleming

Legend	
	Existing GO Right of Way
	Vegetation Clearing Area
	OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 64
 1150226.00



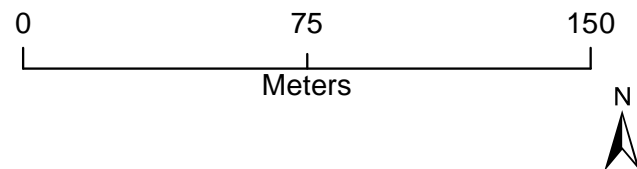
Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



Legend
 Existing GO Right of Way
 Vegetation Clearing Area
 OCS Infrastructure Area



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 66

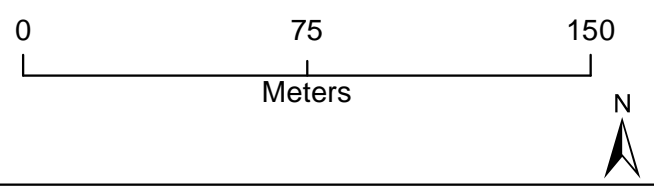
1150226.00



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

METROLINX
MORRISON HERSHFIELD
Gannett Fleming

- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - ◆ GO Station



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 67

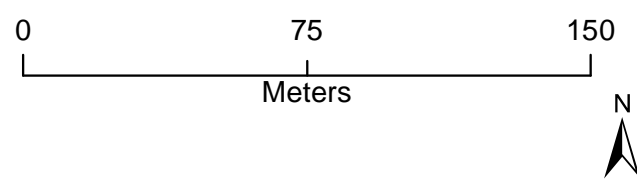
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



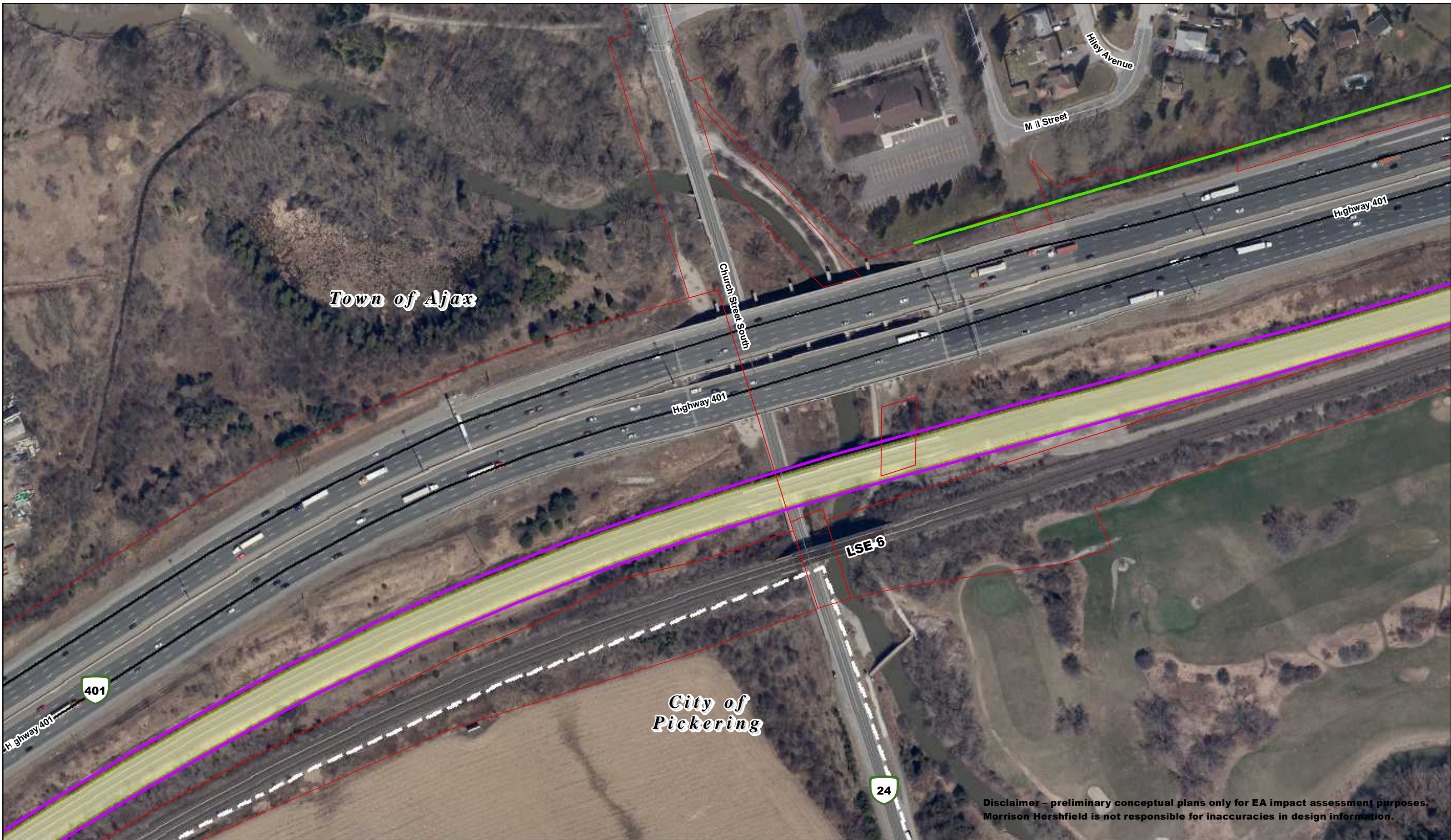
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 50

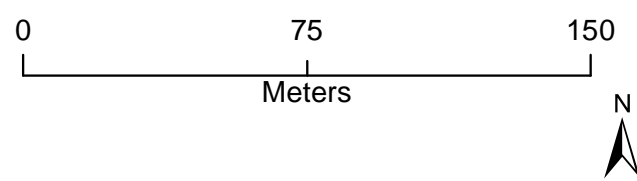
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



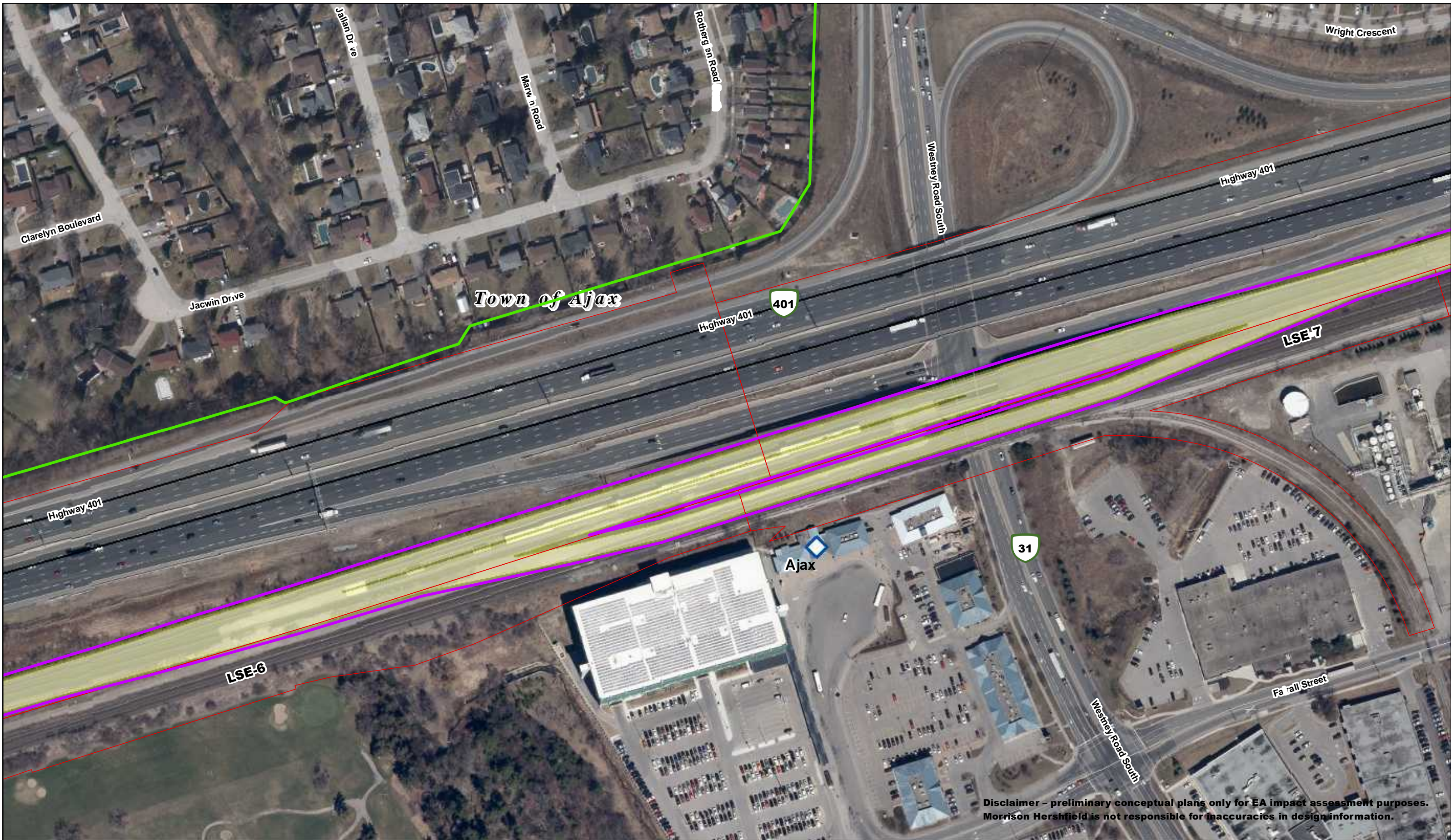
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 51

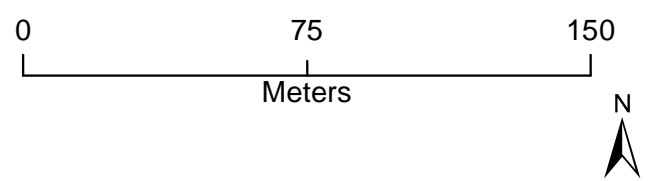
1150226.00



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



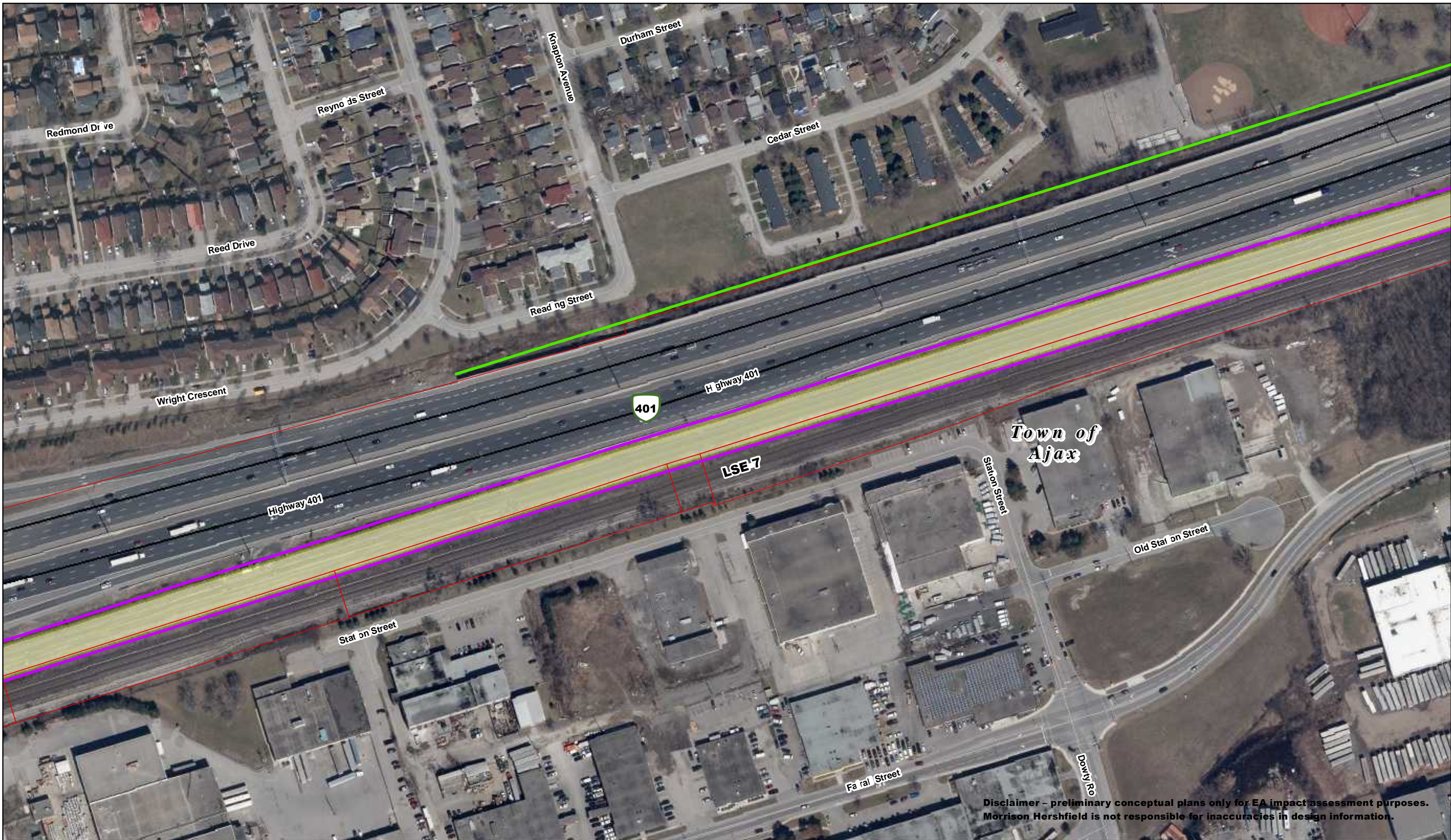
- Legend**
- Existing GO Right of Way
 - Existing/Planned Noise Barriers
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - ◆ GO Station



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 November, 2016

Figure
LSE- 52

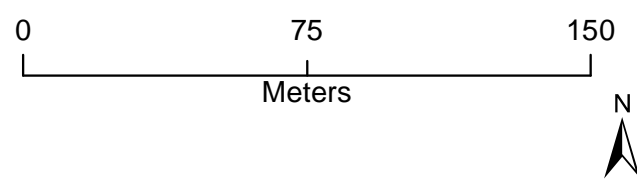
1150226.00



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



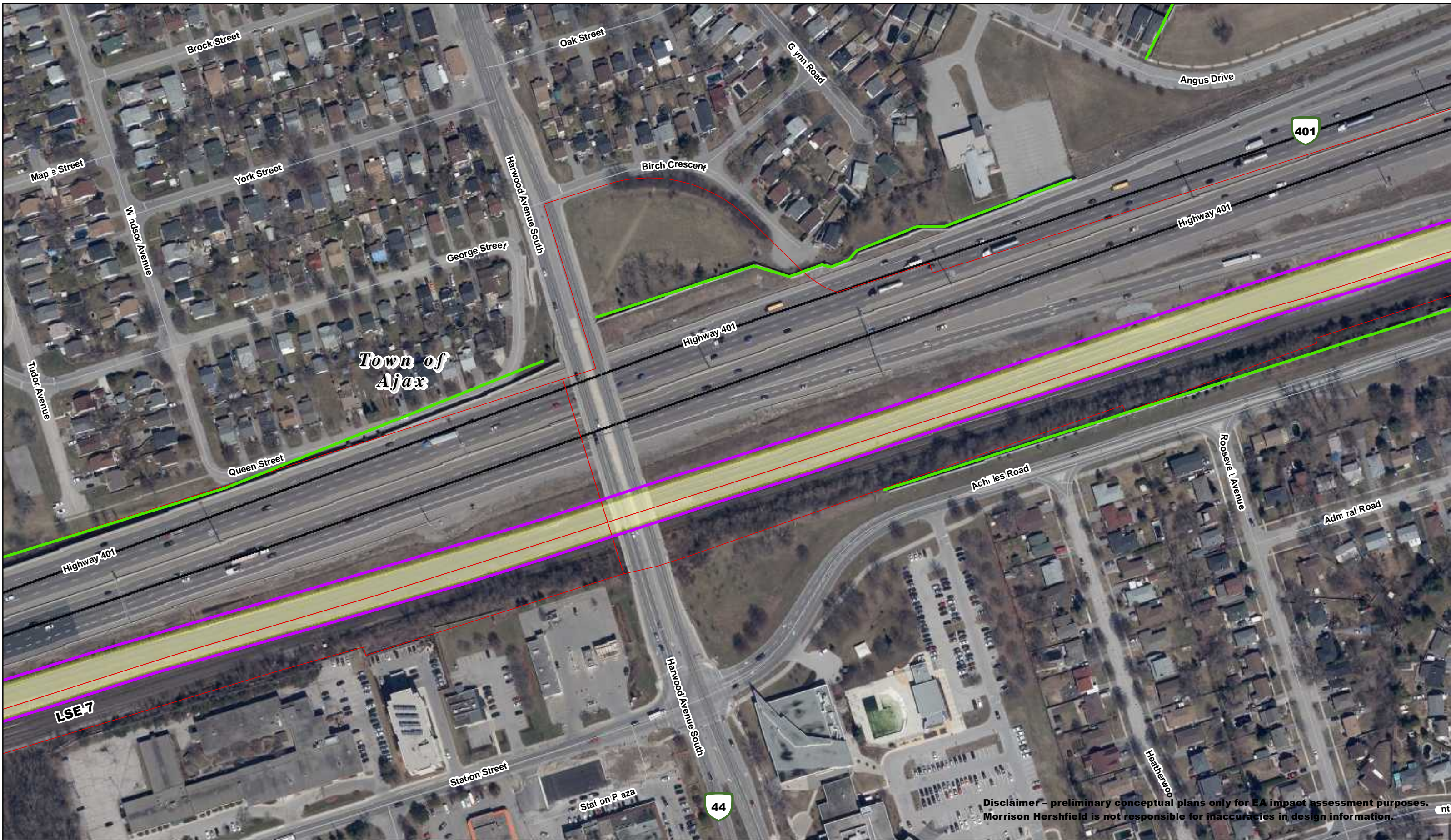
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 53

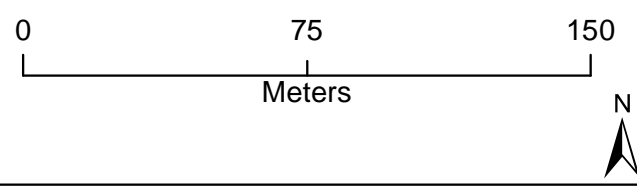
1150226.00



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

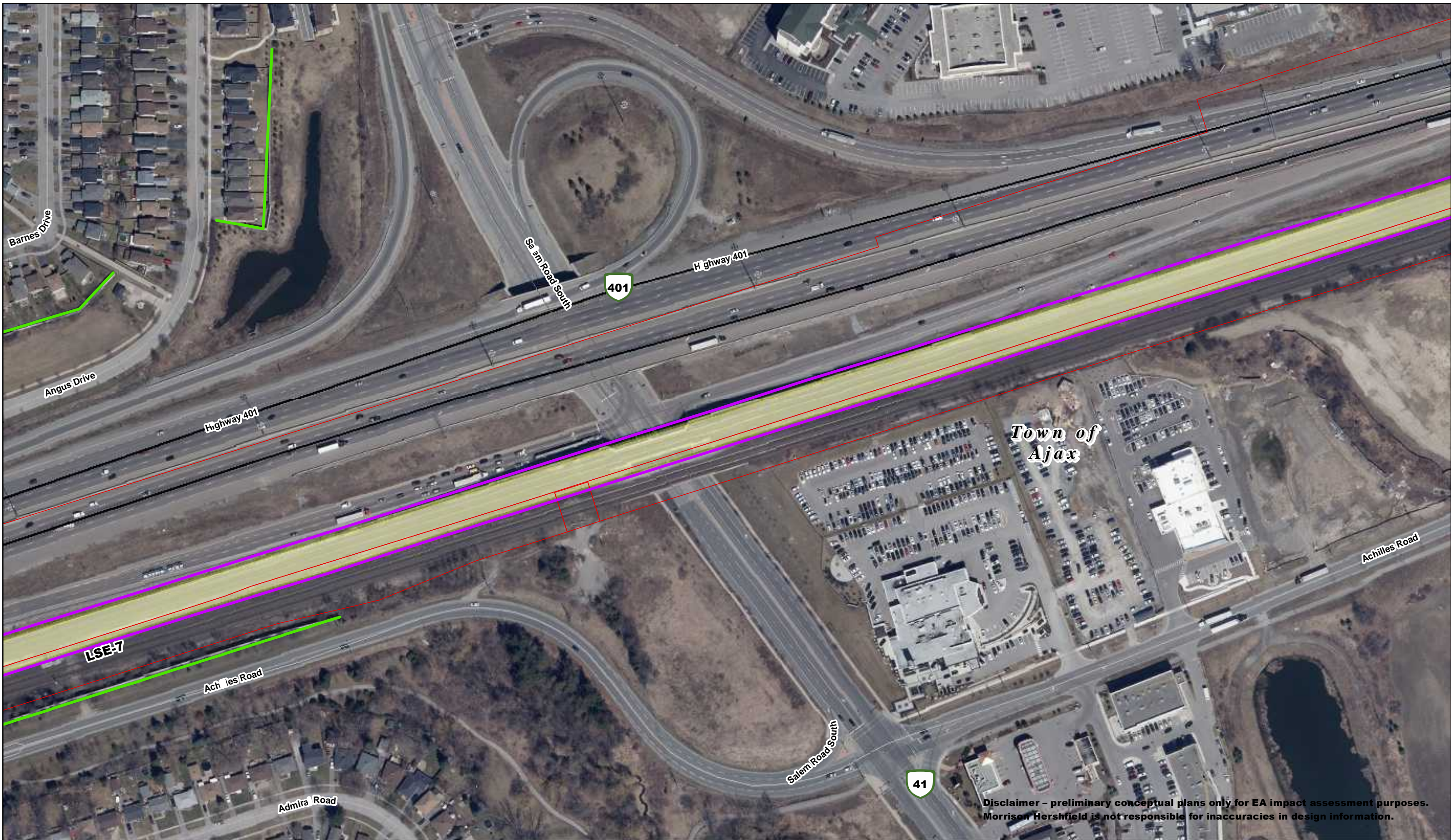
METROLINX
MORRISON HERSHFIELD
Gannett Fleming

- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

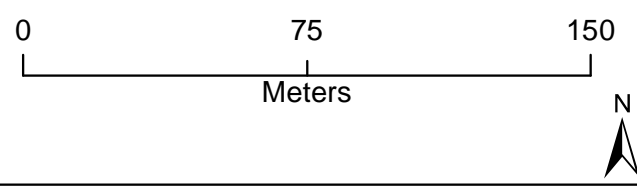
Figure
LSE- 54
 1150226.00



Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

METROLINX
MORRISON HERSHFIELD
Gannett Fleming

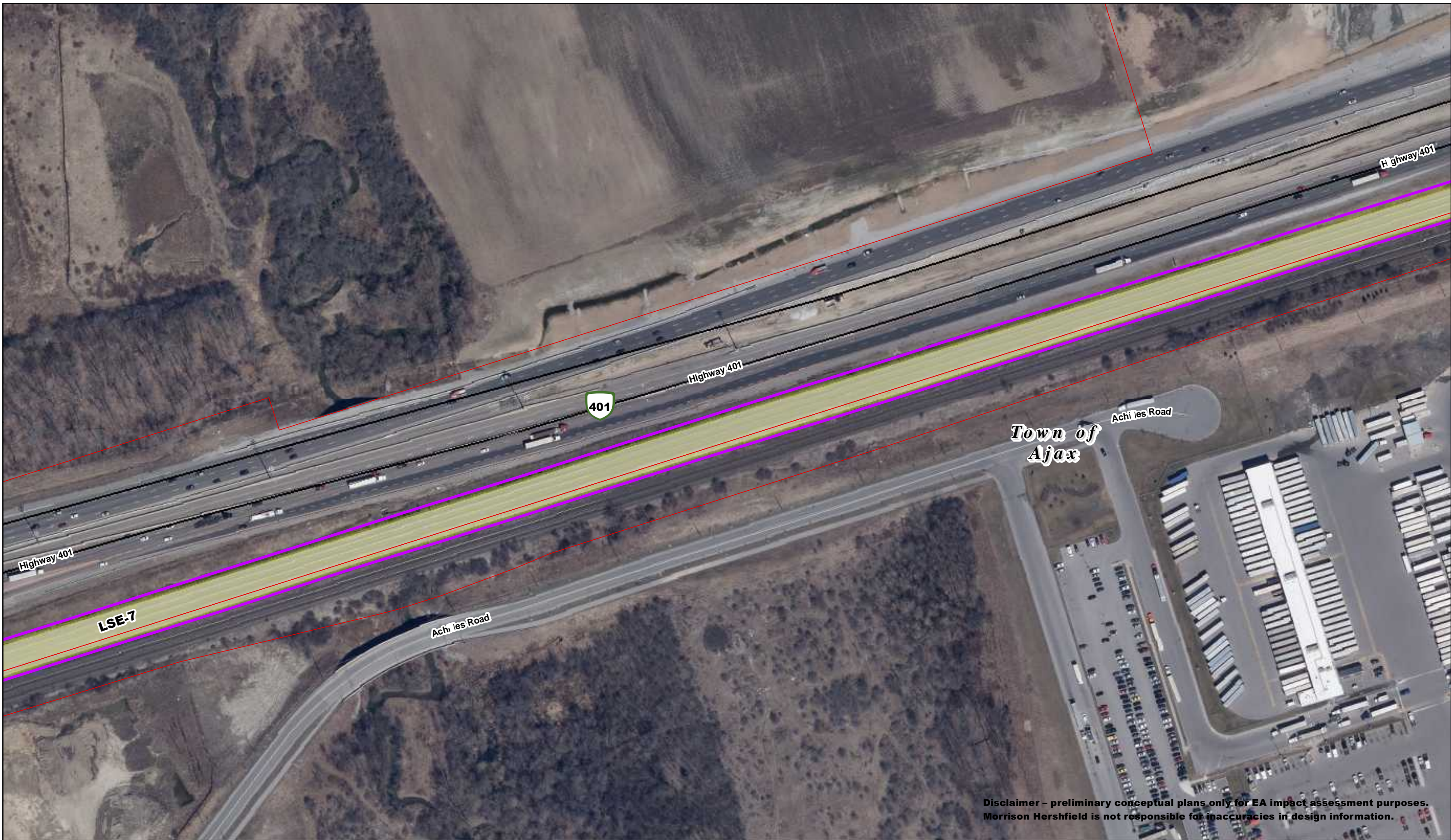
- Legend**
- Existing GO Right of Way
 - Vegetation Clearing Area
 - OCS Infrastructure Area
 - Existing/Planned Noise Barriers



GO Rail Network Electrification
Lakeshore East Corridor – DRAFT Electrification Roll Plans
& Potential Noise/Vibration Mitigation Locations
 October, 2016

Figure
LSE- 55

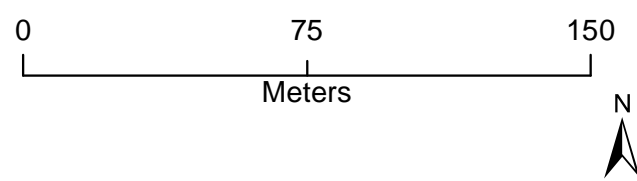
1150226.00

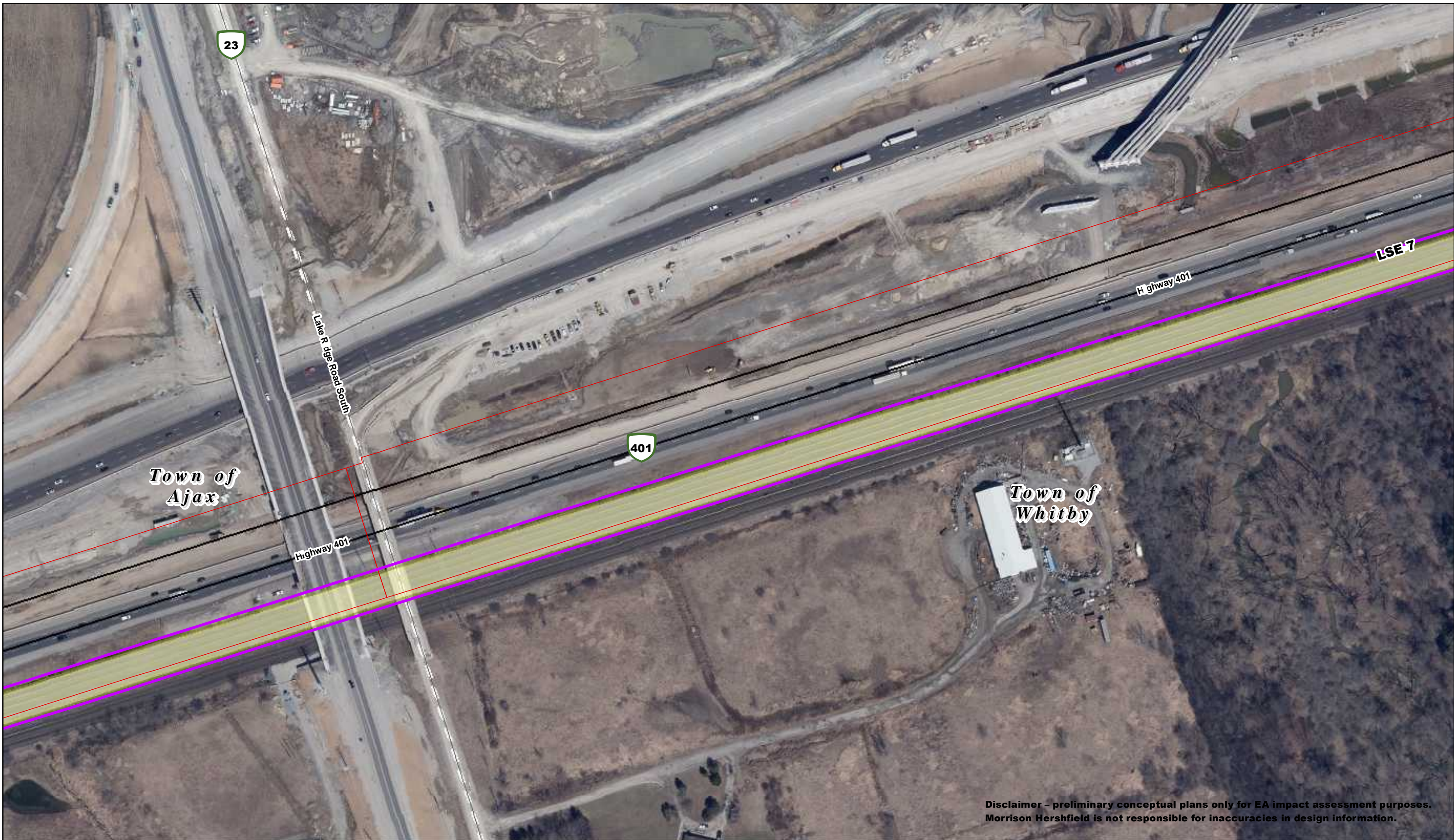


Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.



Disclaimer – preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.





Disclaimer - preliminary conceptual plans only for EA impact assessment purposes. Morrison Hershfield is not responsible for inaccuracies in design information.

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2097.

The Regional Municipality of Durham

MINUTES

DURHAM REGION ROUNDTABLE ON CLIMATE CHANGE

October 14, 2016

A regular meeting of the Durham Region Roundtable on Climate Change was held on Friday, October 14, 2016 in Boardroom LL-C, Regional Municipality of Durham Headquarters, 605 Rossland Road East, Whitby at 1:01 PM

Present: R. Gauder, Citizen Member, Chair
M. Vroegh, Citizen Member, Vice-Chair attended the meeting at 1:08 PM
Councillor Ashe, Finance & Administration Committee
Councillor Ballinger, Works Committee
G.H. Cubitt, Chief Administrative Officer
D. Gilbert, Citizen Member
Councillor Gleed, Health and Social Services Committee attended the meeting at 1:12 PM
T. Hall, Citizen Member
H. Manns, Citizen Member
S. Moore, Citizen Member
B. Neil, Citizen Member

Absent: C. Caneo, Citizen Member
D. Hoornweg, Citizen Member
E. Lacina, Citizen Member
Councillor Mitchell, Planning & Economic Development Committee
J. Solly, Citizen Member
Regional Chair Anderson

Staff

Present: C. Drimmie, Policy and Research Advisor, Office of the CAO
B. Kelly, Manager of Sustainability, Office of the CAO
N. Prasad, Committee Clerk, Corporate Services – Legislative Services

1. Adoption of Minutes

Moved by T. Hall, Seconded by J. Ballinger,
That the minutes of the regular Durham Region Roundtable on
Climate Change meeting held on September 9, 2016, be adopted.
CARRIED

2. Declarations of Interest

There were no declarations of interest.

3. Ontario Electricity Update

A) Luisa Da Rocha, Manager, Regional and Community Engagement, Joe Toneguzzo, Director, Transmission Integration, and Andrew Pietrewicz, Director, Resource Integration, Independent Electricity System Operator (IESO)

J. Toneguzzo, Director, Transmission Integration and A. Pietrewicz, Director, Resource Integration, Independent Electricity System Operator (IESO), provided a PowerPoint Presentation with regards to an Ontario Electricity Update. A copy of a booklet entitled "Ontario Planning Outlook – A Technical Report on the Electricity System Prepared by the IESO" was provided as a handout.

Highlights of the presentation included:

- Electricity Planning in Durham Region (GTA East)
 - Bulk Electricity Planning in GTA East
 - Regional Electricity Planning GTA East
 - Electricity Needs in GTA East
- Link Between Regional Electricity and Community Energy Plans
 - Community Energy Plans and IRRPs
 - Linkage – Electricity Planning and Community Energy Planning
 - GTA East Local Advisory Committee
- Ontario Planning Outlook and The Next LTEP
 - IESO's Ontario Planning Outlook
 - Planning Context Under Bill 135
- State of the System: 10-Year Review
 - Electricity Demand, 2005-2015 (TWh)
 - Change in Installed Supply Resources, 2005-2015 (GW)
 - Capacity Margins, 2002-2015 (MW)
 - Electricity Production by Fuel Type, 2005-2015 (TWh)
 - Conservation Savings, 2006-2016 (TWh)
 - Ontario Electricity Sector GHG Emissions, 2005-2015 (MT CO₂e)
 - Total Cost of Electricity Service, 2005-2015 (\$Billions, Real \$2016)
- Electricity System: 20-Year Outlook
 - The 20-year Outlook
 - Demand Outlook
 - Outlook for net electricity demand (TWh)
 - Outlook for net summer peak demand (MW)
 - Outlook for net winter peak demand (MW)
 - Conservation Outlook to meet LTEP 2013 Target (TWh)
 - Ontario Installed Capacity, projected to 2035 (GW)
 - Resource Adequacy Outlook Across Demand Outlooks (GW)
 - Anticipated Resource Turnover (GW)

- Nuclear Refurbishments and Retirements
- Capacity now under IESO Contract that reaches of term by 2035 (GW)
- Age Distribution of Ontario's Generator Fleet
- Electricity Sector GHG Emissions in Outlook B (MT CO₂e)
- Electricity Sector GHG Emissions in 2035 Across Range of Outlooks (MT CO₂e)
- Cost of Electricity Service in 2035 Across Demand Outlooks (\$ Billions, \$2016 Real)
- Recent LRP II Announcement
- Electricity Planning: Next Steps

J. Toneyguzzo stated that IESO works with Ontario's power system to ensure that there is enough power to meet the province's energy needs while also planning for and securing energy for the future. With respect to the GTA East, he stated that the Region is broken down into two sub-regions: Oshawa-Clarington; and Pickering-Ajax-Whitby. He stated that Durham Region has experienced a lot of growth and as a result, needs to look at new transformer stations to accommodate that growth.

J. Toneyguzzo stated that Community Energy Planning could significantly impact future electricity demand in the Region. He provided the following four factors that could impact electricity demand in the mid to long term in the Region:

- Climate change policies that affect electricity use;
- Continued intensification and development in Durham Region;
- Electrification of mass transit and personal use vehicles; and
- Retirement of Pickering GS and future use of site.

J. Toneyguzzo stated that in June 2016, the Minister of Energy requested IESO to submit a technical report on the adequacy and reliability of Ontario's electricity resources in support of the Long-Term Energy Plan (LTEP). He stated that the Ontario Planning Outlook (OPO) was submitted in September 2016 and provides planning context for the public, policy makers and industry stakeholders and serves as an early input into the Ministry's LTEP consultation process. The OPO looks at the needs of the electricity system over the next two decades associated with capacity, reliability, market and system operations, transmission and distribution, and includes a 10-year review and a 20-year outlook for Ontario's electricity system.

J. Toneyguzzo stated that actions taken over the past 10 years have left Ontario well positioned to meet future provincial needs but taking advantage of future opportunities and mitigating future risks will require ongoing efforts.

J. Toneyguzzo and A. Pietrewicz responded to questions of the Committee.

4. Comments on Proposed Community Climate Adaptation Plan

A) Brian Kelly, Manager of Sustainability, Durham Region re: Comments on Durham Community Climate Adaptation Plan

B. Kelly, Manager of Sustainability, provided a PowerPoint Presentation with regards to Comments on the Durham Community Climate Adaptation Plan. A copy of the Presentation was provided to Committee members via email.

Highlights of the presentation included:

- Comment Process
- Meetings and Briefings
- Responses to Date
- Upcoming Meetings and Briefings
- Nature of Comments
- Roles and Responsibilities
- Further Comments Expected
- The Way Forward

B. Kelly stated that the main purpose of his presentation is to advise the Committee where things stand as a result of the Committee's decision made on September 9th to provide more time for review and comment from the stakeholders. He stated that the proposed Plan was sent to regional departments, local municipalities, conservation authorities and electrical utilities for comments from their senior management and those comments were to be provided by October 11th. He stated that the comments received to date have been very supportive and most of the stakeholders recognize and accept their roles in the next phase.

B. Kelly stated that he has attended a number of meetings and provided presentations to the partners with regards to the Plan and that there are upcoming meetings and briefings in place. He stated that most of the partners have agreed to providing an annual report of their progress on implementing the programs. He also stated that some concerns were expressed about the 'new buildings' program.

B. Kelly stated that he recommends allowing a longer period of comment and feedback from partners as well as seeking opportunities for future presentations and feedback. He further stated that he will identify next steps to keep momentum and benefit from collective program development as well as to discuss reporting and renewal with the Durham Environmental Coordinating Committee (DECC). He stated that the Climate Adaptation Plan with appropriate amendments will be presented to Committee at the November meeting for approval.

B. Kelly responded to a question with respect to the written documentation received from local municipal partners.

5. Lessons Learned from Climate Adaptation Programs

A) Todd Hall, Chair of Climate Adaptation Subcommittee

T. Hall, Chair of the Climate Adaptation Subcommittee, provided a PowerPoint Presentation with regards to Lessons Learned from Climate Adaptation Programs. A copy of the Presentation was provided to Committee members via email.

Highlights of the presentation included:

- Literature Review
- Literature Review – Lessons
- Cost-Benefit Evaluation of Adaptation Measures in Germany: Results/Summary – January 2013 Vienna
- Lesson Transfer
- Assessment Approaches – UN Framework Convention on Climate Change
- Examples Supporting Durham Initiatives – Adaptation through Local Planning
- Durham Initiatives
- Low/No Cost Programs
- Cost-Benefit Evaluation of Adaptation Measures in Germany: Lessons Learned – January 2013 Vienna
- Domino Effect – After wildfires, Fort McMurray hit with Wasp Swarms & Flooding
- Infrastructure Resilience – ROI Urban Land Institute
- Economics of Building Resilience
- Summary – Key Takeaways

T. Hall stated that his presentation addresses a literature review of adaptation strategies and approaches taken in Durham Region compared to agencies around the globe. He stated that the literature review made use of case studies from the United Kingdom, Europe, Asia, Africa, and North America and reinforced that the approach taken by Durham Region is consistent with worldwide practices.

6. Other Business

A) Durham Community Energy Plan – Stakeholder Consultation #1

B. Kelly stated that the first Stakeholder Consultation with respect to the Durham Community Energy Plan was held on September 20, 2016 at the Brooklin Community Centre and Library. He stated that members can contact him should they be interested in the resulting report.

7. Date of Next Meeting

The next regular meeting of the Durham Region Roundtable on Climate Change will be held on Friday, November 18, 2016 starting at 1 PM in Room LL-C, Regional Headquarters Building, 605 Rossland Road East, Whitby.

8. Adjournment

Moved by G.H. Cubitt, Seconded by M. Vroegh,
That the meeting be adjourned.
CARRIED

The meeting adjourned at 2:56 PM.

R. Gauder, Chair, Durham Region
Roundtable on Climate Change

N. Prasad, Committee Clerk

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2097.

The Regional Municipality of Durham

MINUTES

TRANSIT ADVISORY COMMITTEE

Tuesday, October 25, 2016

A meeting of the Transit Advisory Committee was held on Tuesday, October 25, 2016 in the Lower Level Boardroom (LL-C), Regional Headquarters, 605 Rossland Road East, Whitby, Ontario at 7:00 PM

Present: Commissioner Collier, Chair
C. Antram, Ajax, Vice-Chair
M. Barba-Flores, Member at Large
D. Dowsley, Oshawa
J. Martin, Brock
M. Roche, AAC
M. Sutherland, AAC

Absent: K. Dekany, Scugog
R. Conohan, Whitby
J. Gaw, Pickering
B. Howes, Clarington
D. Leader, Member at Large
SA/Durham College & UOIT

Staff

Present: W. Holmes, Deputy General Manager, Operations, Durham Region Transit
D. D'Aliesio, Communications Coordinator, Durham Region Transit
M. Lee, Supervisor, Service Design, Durham Region Transit
C. Tennisco, Committee Clerk, Corporate Services – Legislative Services

1. Adoption of Minutes

Moved by D. Dowsley, Seconded by M. Sutherland,
(12) That the minutes of the Durham Region Transit Advisory Committee meeting held on May 31, 2016, be adopted.
CARRIED

Chair Collier provided clarification on the PRESTO negotiations with respect to the renewal of the Operating Agreement referred to in minutes of the May 31, 2016 TAC meeting.

2. Declarations of Interest

There were no declarations of interest.

3. Delegations

There were no delegations to be heard.

4. Presentations

A) Bill Holmes, Deputy General Manager, Durham Region Transit Re: [Durham Region Transit Update](#)

B. Holmes provided a PowerPoint presentation with an update on Durham Region Transit (DRT).

Highlights of the presentation included:

- Change in Year-to-Date Conventional Ridership
- Update on Service as School Returns
 - Service changes
 - Operational flexibility for GO train meets, full buses
 - Enhanced Communications
- DRT Objectives 2016-2018
 - Increase ridership
 - Increase operational effectiveness
 - Increase financial sustainability
- Construction of the new Raleigh Maintenance Facility is on Budget and on Schedule
- Seeking Public Transit Infrastructure Fund (PTIF), Funding for Fleet, Higher-Order Transit

B. Holmes responded to questions regarding the reasons for the decline in ridership; DRT's ridership versus the industry standards; ridership statistics for Durham specific service areas; whether DRT monitored the July and August ridership for Ajax in follow-up to the recent service changes; and eligible projects for PTIF funding.

Discussion ensued with respect to boardings per hour; on-time performance; the interlining of routes for operating efficiencies; hard surfacing at the bus stops; and the Five-Year Service Strategy to increase the frequency of service.

B. Holmes updated the Committee on the Request For Proposal recently awarded to PWTransit Canada Ltd. to provide contracted conventional transit services for DRT.

5. Correspondence Items

There were no items of correspondence to be considered.

6. General Manager's Reports

There were no reports of the General Manager to be considered.

7. Items of Information

A) Update on the Accessibility Advisory Committee (AAC) Meeting

M. Sutherland advised the Committee of her request to staff for the TAC agenda to include as a standing agenda item for regular updates from the AAC meetings regarding transit matters.

B) Revised Process for Support Person cards

B. Holmes reviewed staff's proposed revisions to the DRT Support Person Card program. The Accessibility for Ontarians with Disabilities Act (AODA) requires that Support Persons travel at no charge on DRT Conventional and Specialized Service buses when travelling with a rider with a disability. He stated that it is being recommended to replace the current annual paper Support Person card with a three year photo identification card. He noted that a report on the revisions for the Support Person cards will be brought forward at a future Transit Executive Committee meeting.

Discussion ensued regarding the photo card being valid for 3 years and linked to a rider's date of birth; being effective starting January 2018; and the process for the riders to apply for a card, and for DRT to implement a photo card.

B. Holmes responded to questions with respect to the identification of riders with hidden disabilities; whether the Support Person card will be valid with transit agencies outside of DRT boundaries; and how DRT intends to communicate the details of the Support Person card.

C) 2017 Annual Service Plans Re-cap

M. Lee provided a re-cap of the 2017 Annual Service Plan to serve new growth areas, the Northern municipalities, and urban areas in Durham; and future budget implications.

Highlights of the Plans included:

- Review and approval process
- Services in new growth areas

- Demand Response Service (DRS) in the Townships of Brock, Scugog and Uxbridge; Cannington to Kawartha Lakes, and Beaverton to Orillia
- Higher Frequency Network – Increasing frequency to every 30 minutes during most of off-peak periods

It was suggested that staff review the use of smaller buses in the Northern municipalities; changing the Route 950 service to utilize the Manilla arena as an extended bus connection; and, increased frequency of the Route 960 service between Uxbridge and Newmarket.

D) 2016 Durham Region Transit (DRT) Holiday Service

M. Lee advised that DRT will offer limited Sunday scheduled transit services for Christmas Day on the higher frequency routes and reduced service on the Route 900 services during the 2 week school Christmas break. He added that DRT will also continue to offer complimentary transit for New Year's Eve riders on all regional transit services, with select services operating to 2 AM New Year's Day to meet the last GO Train arrivals from Union Station to Pickering, Ajax, Whitby, and Oshawa stations.

D. D'Aliesio advised that DRT holiday schedule information is available on the DRT website.

Staff was asked to ensure that the holiday services be posted on the buses, and, to consider utilizing media options such as the local newspapers and radio stations for residents without internet service.

8. Other Business

A) Durham Region Transit Operator Training

The Committee inquired into what procedures staff has in place for responding to an accident or collision.

Staff provided a brief overview of DRT's incident response process, including investigation of incidents and implementation of remedial measures, which may include revisions to policies, procedures, and training.

Staff responded to additional questions regarding what alternate transit options are available if a DRT Conventional or Specialized Services bus is taken out of service.

B) Durham Regional Transit and Seniors Residences

Chair Collier advised that the Ajax Town Council passed a resolution requesting that DRT resume front door pick up at Seniors' residents to ensure fair and equal access to transit services. He further advised that the resolution was circulated to Regional Council and the lower-tier municipal Councils for consideration.

C) Durham Region Transit and Metrolinx Joint Public Meeting – November 17, 2016

DRT and Metrolinx will be hosting a joint public meeting at The Abilities Centre in Whitby on Thursday, November 17, 2016 to discuss accessible public transit.

Staff suggested that any persons with specific questions advise DRT in advance to ensure that DRT and Metrolinx are able to provide a response at the meeting.

9. Date of Next Meeting

January 24, 2017

10. Adjournment

Moved by C. Antram, Seconded by D. Dowsley,
(13) That the meeting be adjourned.

CARRIED

The meeting adjourned at 8:18 PM.

Commissioner S. Collier, Chair
Transit Advisory Committee

C. Tennisco, Committee Clerk

Action Items Committee of the Whole and Regional Council

Meeting Date	Request	Assigned Department(s)	Anticipated Response Date
September 7, 2016 Committee of the Whole	Staff requested to provide a report outlining how the \$100,000 in additional child poverty funds is being allocated.	Social Services	
September 7, 2016 Committee of the Whole	Business Case for Projects Managed Directly by the Region – Increasing the number of projects which are managed directly by the Region, whether through employees or contracted staff – referred to the 2017 budget process.	Works	2017 Budget Process
September 7, 2016 Committee of the Whole	It was requested that a copy of Ms. Gasser's delegation questions be referred to staff and that a report be presented to the Committee of the Whole with answers to Ms. Gasser's concerns.	Works	October 5, 2016
September 7, 2016 Committee of the Whole	Staff was requested to provide a report on the correspondence from the City of Pickering with respect to the Notice of Motion adopted at their Council meeting held on June 27, 2016, re: residential tax relief to eligible low income seniors and low income disabled persons (Pulled from August 19, 2016 Council Information Package)	Finance / Social Services	
September 7, 2016 Committee of the Whole	Staff was requested to provide information on the possibility of an educational campaign designed to encourage people to sign up for subsidized housing at the next Committee of the Whole meeting. (Region of Durham's Program Delivery and Fiscal Plan for the 2016 Social Infrastructure Fund Program) (2016-COW-19)	Social Services / Economic Development	October 5, 2016
September 7, 2016 Committee of the Whole	Section 7 of Attachment #1 to Report #2016-COW-31, Draft Procedural By-law, as it relates to Appointment of Committees was referred back to staff to review the appointment process.	Legislative Services	December 7, 2016

Meeting Date	Request	Assigned Department(s)	Anticipated Response Date
October 5, 2016 Committee of the Whole	Ms. Gasser appeared before the Committee with respect to Covanta's Diagnostic Source Testing Presentation that was made at the September 21, 2016 Energy from Waste - Waste Advisory Committee meeting. Staff was asked to provide a response back to Ms. Gasser's questions and that a copy of their response be provided to the Committee.	Works	
October 5, 2016 Committee of the Whole	That Correspondence (CC 65) from the Municipality of Clarington regarding the Durham York Energy Centre Stack Test Results be referred to staff for a report to Committee of the Whole	Works	
November 2, 2016	Staff advised that the joint Ministry of Transportation and the Ministry of the Environment and Climate Changes Air Monitoring results would be shared with Council.	Works	