Environment, Transportation & Public Safety Standing Committee Meeting Agenda

Date: Wednesday, September 25, 2024
Time: 4:30 o'clock p.m.

Location: Council Chambers, 1st Floor, Windsor City Hall

All members will have the option of participating in person in Council Chambers or electronically and will be counted towards quorum in accordance with Procedure By-law 98-2011 as amended, which allows for electronic meetings. The minutes will reflect this accordingly. Any delegations have the option to participate in person or electronically.

MEMBERS:

Ward 2 – Councillor Fabio Costante (Chairperson)

Ward 3 – Councillor Renaldo Agostino

Ward 4 – Councillor Mark McKenzie

Ward 8 – Councillor Gary Kaschak

Ward 9 – Councillor Kieran McKenzie

ORDER OF BUSINESS

Item # Item Description

1. CALL TO ORDER

READING OF LAND ACKNOWLEDGMENT

We [I] would like to begin by acknowledging that the land on which we gather is the traditional territory of the Three Fires Confederacy of First Nations, which includes the Ojibwa, the Odawa, and the Potawatomi. The City of Windsor honours all First Nations, Inuit and Métis peoples and their valuable past and present contributions to this land.

2. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

3. ADOPTION OF THE MINUTES OF THE ETPS STANDING COMMITTEE

3.1. Adoption of the Environment, Transportation & Public Safety Standing Committee minutes of its meeting held July 31, 2024 **(SCM 233/2024)**

4. REQUEST FOR DEFERRALS, REFERRALS OR WITHDRAWALS

5. COMMUNICATIONS

6. PRESENTATIONS AND DELEGATIONS

7. COMMITTEE MATTERS

7.1. Minutes of the Environment & Climate Change Advisory Committee of its meeting held July 30, 2024 **(SCM 256/2024)**

7.2. Minutes of the Windsor Licensing Commission of its meeting held August 28, 2024 **(SCM 260/2024)**

7.3. Report No. 157 of the Windsor Licensing Commission - Request to eliminate age limits for wheelchair accessible taxicabs **(SCM 259/2024)**

8. ADMINISTRATIVE ITEMS

8.1. Fire Master Plan **(C 112/2024)**
Clerk's Note: Appendix A available at www.citywindsor.ca due to size

8.2. Update to Windsor/Essex Region Stormwater Manual & Response to CR195/2022 Flood Risk Monitoring and Mitigation Measures and Programs - City Wide **(S 114/2024)**

8.3. Matchett Road and Malden Road Ecopassage Review Study **(S 115/2024)**

8.4. CQ 13-2023 - Front Yard Parking Best Practice 2.2.2 **(SCM 327/2023) & (S 150/2023)**
Clerk's Note: Administration is providing the ***attached*** additional information **(AI 15/2024)**

9. TRANSIT BOARD ITEMS

10. ADOPTION OF TRANSIT BOARD MINUTES

11. QUESTION PERIOD

12. ADJOURNMENT

Item No. 3.1

Committee Matters: SCM 233/2024

Subject: Adoption of the Environment, Transportation & Public Safety Standing Committee minutes of its meeting held July 31, 2024

Environment, Transportation & Public Safety Standing Committee Meeting

Date: Wednesday, July 31, 2024
Time: 4:30 o'clock p.m.

Members Present:

Councillors
Ward 2 - Councillor Fabio Costante (Chairperson)
Ward 3 - Councillor Renaldo Agostino
Ward 8 - Councillor Gary Kaschak
Ward 9 - Councillor Kieran McKenzie

Councillors Regrets
Ward 4 - Councillor Mark McKenzie

PARTICIPATING VIA VIDEO CONFERENCE ARE THE FOLLOWING FROM ADMINISTRATION:

Sandra Gebauer, Council Assistant

ALSO PARTICIPATING IN COUNCIL CHAMBERS ARE THE FOLLOWING FROM ADMINISTRATION:

Mark Winterton, Commissioner, Infrastructure & City Engineer (Interim)
David Simpson, Commissioner, Infrastructure & City Engineer
Tyson Cragg, Executive Director, Transit Windsor
Shawna Boakes, Executive Director, Operations & Deputy City Engineer
Stacey McGuire, Executive Director, Engineering & Deputy City Engineer
Adam Pillon, Manager of Right-of-Way
Mark Spizzirri, Manager, Performance Measurement & Business Case Development
Kathleen Quenneville, Active Transportation Coordinator
Clare Amicarelli, Transportation Planning Coordinator
Chris Gerardi, Policy Analyst
Anna Ciacelli, Deputy City Clerk

1. CALL TO ORDER

The Chairperson calls the meeting of the Environment, Transportation & Public Safety Standing Committee to order at 4:30 o'clock p.m.

2. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

None disclosed.

3. ADOPTION OF THE MINUTES OF THE ETPS STANDING COMMITTEE

3.1. Adoption of the Environment, Transportation & Public Safety Standing Committee minutes of its meeting held June 26, 2024

Moved by: Councillor Gary Kaschak
Seconded by: Councillor Kieran McKenzie

THAT the minutes of the Environment, Transportation & Public Safety Standing Committee meeting held June 26, 2024 **BE ADOPTED** as presented.
Carried.

Report Number: SCM 198/2024

4. REQUEST FOR DEFERRALS, REFERRALS OR WITHDRAWALS

8.2. CQ 13-2023 - Front Yard Parking Best Practice 2.2.2

Moved by: Councillor Renaldo Agostino
Seconded by: Councillor Gary Kaschak

Decision Number: CR11/2024 ETPS 972
THAT the report of the Technologist II dated November 9, 2023 entitled "Response to CQ 13-2023 - Front Yard Parking Best Practice 2.2.2" **BE DEFERRED** to a future meeting of the Environment, Transportation & Public Safety Standing Committee to allow all members of the committee to be in attendance.
Carried.

Report Number: SCM 327/2023, S 150/2023 & AI 15/2024
Clerk's File: ST2023 & ST2024

5. COMMUNICATIONS

None presented.

6. PRESENTATIONS AND DELEGATIONS

None presented.

7. COMMITTEE MATTERS

7.1. Minutes of the Environment & Climate Change Advisory Committee (ECCAC) of its meeting held May 21, 2024

Moved by: Councillor Renaldo Agostino
Seconded by: Councillor Kieran McKenzie

Decision Number: **ETPS 1014**
THAT the minutes of the Environment & Climate Change Advisory Committee (ECCAC) meeting held May 21, 2024 **BE RECEIVED**.
Carried.

Report Number: SCM 195/2024
Clerk's File: MB2024

7.2. Minutes of the Active Transportation Expert Panel of its meeting held May 30, 2024

Moved by: Councillor Gary Kaschak
Seconded by: Councillor Renaldo Agostino

Decision Number: **ETPS 1015**
THAT the minutes of the Active Transportation Expert Panel meeting held May 30, 2024 **BE RECEIVED**.
Carried.

Report Number: SCM 217/2024
Clerk's File: MB2024

7.3. Minutes of the Essex-Windsor Solid Waste Authority (EWSWA) Regular Board of its meeting held May 7, 2024

Moved by: Councillor Renaldo Agostino
Seconded by: Councillor Gary Kaschak

Decision Number: **ETPS 1016**
THAT the minutes of the Essex-Windsor Solid Waste Authority (EWSWA) Regular Board meeting held May 7, 2024 **BE RECEIVED**.
Carried.

Report Number: SCM 219/2024
Clerk's File: MB2024

7.4. Essex Windsor Solid Waste Authority (EWSWA) Annual Report - Essex-Windsor Residential Waste Diversion 2023

Councillor Gary Kaschak comments that the rates are not exactly where we want them to be, but when we discuss rates, revenues and commodity prices, it is enlightening.

Moved by: Councillor Gary Kaschak
Seconded by: Councillor Renaldo Agostino

Decision Number: **ETPS 1017**
THAT the Essex Windsor Solid Waste Authority (EWSWA) Annual Report – Essex Windsor Residential Waste Diversion 2023 **BE RECEIVED**.
Carried.

Report Number: SCM 220/2024
Clerk's File: MB2024

8. ADMINISTRATIVE ITEMS

8.1. Bike Parking Policy - City Wide

Councillor Kieran McKenzie inquires whether there are any policies related to bike parking requirements within city spaces during events. Chris Gerardi, Policy Analyst appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 15, 2024, entitled "Additional Information re: S 75/2023 - Bike Parking Policy – More detailed information related to the nine items of the Bicycle Parking Policy framework – City Wide" and indicates that there is not currently an event bike parking policy.

Councillor Kieran McKenzie inquires as to what the view of administration is on the impact of making bike parking a requirement for utilizing public city spaces. Mr. Gerardi indicates that the discussion with various parties is more voluntary and would depend on the needs of the event.

Councillor Kieran McKenzie inquires whether bike parking could be a provided as an in-house service for a fee. Mr. Gerardi responds that it is something that administration is considering, providing temporary bike racks that could be provided at a cost to the renter. Shawna Boakes, Executive Director Operations, appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 15, 2024, entitled "Additional Information re: S 75/2023 - Bike Parking Policy – More detailed information related to the nine items of the Bicycle Parking Policy framework – City Wide" and adds that they have provided bike racks at different events, there is a significant cost for security to monitor the bikes. Ms. Boakes

adds that they don't currently have the costing and funding sources, although If it is council's direction to explore it, they can report back.

Councillor Kieran McKenzie inquires as to what that would entail. Ms. Boakes indicates that an additional information memo could be prepared for the next council meeting including consultation with the CERT committee, risk management, and legal to determine a user fee structure.

Councillor Kieran McKenzie inquires as to what some of the municipality's tools are to be able to address the lack of bike parking in certain areas around the city to incentivize or compel businesses to provide bike parking. Ms. Boakes indicates that they are looking at policies for new construction, but for existing businesses it is an ongoing discussion.

Councillor Kieran McKenzie inquires whether there is an opportunity to remediate any deficiencies related to bike parking during a renovation permitting process. Ms. Boakes indicates that the planning department would need to help answer that question as it relates to current policies.

Councillor Kieran McKenzie inquires whether planning is coming back with a report related to bike parking and strengthening by-laws. Ms. Boakes indicates that they are working with planning to come up with new wording for existing policies and by-laws with respect to new developments.

Councillor Kieran McKenzie inquires what the rationale is behind not recommending bike corrals in on-street parking spaces in the winter months. Ms. Boakes indicates that bike corrals described in the program would be required to be placed in an on-street vehicular parking space and would be removed in the winter months to allow for snow removal.

Councillor Kieran McKenzie inquires whether there would be an estimated operational cost. Ms. Boakes responds that they can report back on estimated costs.

Councillor Kieran McKenzie inquires whether there are any BIA partners looking at opportunities to provide more secure bike parking in some of our garages. Ms. Boakes indicates that they have space in the Pelissier garage that is video monitored. The Goyeau garage would be more difficult as there is no ground level parking. Ms. Boakes adds that they can look at loss of revenue based on a parking space rate of $120-130 per space per month. Ms. Boakes indicates that those two are the only garages that are manned and monitored, and the lots are not monitored with cameras so they would be less secure.

Councillor Kieran McKenzie inquires whether there are enough spaces for people to park even with the addition of bike parking, if it can still be considered a loss. Ms. Boakes indicates that there are waiting lists for most garages although the garages are not full daily due to work from home programs. If people were to return to the office full-time, it would pose a problem.

Councillor Renaldo Agostino comments that if looking at our garages from the perspective of a potential source of revenue just as a vehicle space, one space at $130 for one vehicle vs $15 per bike for 20 bikes, that's a significant amount of revenue. Ms. Boakes responds that with council direction, bike parking for a fee is something that could be added to current by-laws. It is currently being offered as a free service. We could look at the current Pelissier bike parking area numbers to determine if paid parking would be successful.

Councillor Renaldo Agostino inquires as to what value-add the City could provide to incentivize people to use the paid service. Councillor Renaldo Agostino inquires whether a bike pump, outlets for e-bikes, security can be added, or can this be advertised as a service.

David Simpson, Commissioner, Infrastructure Services & City Engineer appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 15, 2024, entitled "Additional Information re: S 75/2023 - Bike Parking Policy – More detailed information related to the nine items of the Bicycle Parking Policy framework – City Wide" and indicates that this aligns well with a pilot-trial. Mr. Simpson adds that they can work with Council to scope the features of the trial and can report back with usage numbers, cost, and the potential for expanded application.

Councillor Gary Kaschak inquires about the concern that bike locker sizes are not big enough. Ms. Boakes responds that the City only owns one locker, and it is rarely used. Ms. Boakes indicates that they would have to determine if there is available data as to the reasons.

Councillor Gary Kaschak inquires whether any of the private garages offer bike parking. Ms. Boakes responds that she is not aware of any.

Councillor Renaldo Agostino inquires whether event providers are notified about the relationship with e-bike rental companies. Kathleen Quenneville, Active Transportation Coordinator appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 15, 2024, entitled "Additional Information re: S 75/2023 - Bike Parking Policy – More detailed information related to the nine items of the Bicycle Parking Policy framework – City Wide" and indicates that Bird Canada is notified of upcoming events to identify geo-fenced locations where the services are not permitted due to safety for pedestrians.

Councillor Renaldo Agostino inquires whether the City is discouraging them from coming to our events. Ms. Quenneville indicates that they are discouraged to enter core areas of events where it may not be safe for pedestrians.

Councillor Kieran McKenzie inquires whether we can go straight into implementing a pilot, or if a report back on pilot feasibility is needed. Mr. Simpson indicates that direction to scope out the pilot in more detail to seek specific council direction as it relates to budget implications would be required.

Moved by: Councillor Kieran McKenzie
Seconded by: Councillor Renaldo Agostino

Decision Number: **ETPS 1018** ETPS 1005
THAT the report of the Policy Analyst dated November 9, 2023 entitled “Bike Parking Policy – City Wide”, **BE RECEIVED** for information; and,

THAT the existing Policy for Bicycle Parking on Public Property **BE RESCINDED** and **BE REPLACED** with the Bike Parking Policy and associated attachments as appended in report S 75/2023; and,

THAT administration **REPORT BACK** to the Environment, Transportation and Public Safety Standing Committee on the costs to retro-fit existing facilities, to meet the new Bike Parking Policy requirements, including identifying priorities and funding requirements which would be required for installation and maintenance; and,

THAT administration **BE DIRECTED** to report back on the opportunity and feasibility to create a bike locker parking service pilot program in the City parking garages in the downtown core.
Carried.

Report Number: S 75/2023 & AI 16/2024
Clerk’s File: ST2023

8.3. Response to CQ 10-2024 - Property Owner sign-off on Permit Applications - City Wide

Councillor Gary Kaschak inquires whether there is a forced permit process for right-of-way construction for the owner or contractor. Administration responds that requiring a permit is completed through a violation. A complaint is received, then they attend the site, determine if a permit is in place, and take appropriate action. Educating and informing residents about the permitting requirement process is necessary. There are penalties for working without a permit and it is double the permit fee. Stacey McGuire, Executive Director of Engineering appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 12, 2024, entitled “Response to CQ 10-2024 - Property Owner sign-off on Permit Applications - City Wide” and adds that one of the problems is that agreements are made with the developer to have the necessary permits, but there is not a direct connection with the contractors that are completing the work.

Moved by: Councillor Kieran McKenzie
Seconded by: Councillor Gary Kaschak

Decision Number: **ETPS 1019**
THAT the report of the Technologist III dated July 12, 2024 entitled "Response to CQ 10-2024 - Property Owner sign-off on Permit Applications - City Wide" **BE RECEIVED** for information.
Carried.

Report Number: S 93/2024
Clerk's File: SB2024 & ACOQ2024

8.4. Response to CQ 11-2024 School Safety: Students and Drivers – City Wide

Councillor Kieran McKenzie inquires about what the conversation with the school board is with respect to permit requests for Kiss & Ride infrastructure. Ms. Boakes responds that the discussion with the ad hoc committee with the school boards includes the need for active transportation and when projects like a Kiss & Ride come up, the City directs them to other methods.

Councillor Kieran McKenzie inquires about the possibility of promoting a Kiss & Walk program, where parents can park a block away and walk with them to school. Allowing schools to use this Kiss & Ride model is creating safety concerns on public roadways. Ms. Boakes indicates that map my city is available online which provides a guide to parking areas near their child's school, this allows for possible drop off a block or two away and allow children to safely walk. Ms. Boakes indicates that possible further education and advertising could help to alleviate some of the problem.

Councillor Gary Kaschak inquires whether there are any members of council on the School Board Liaison Committee. Ms. Boakes responds that it is strictly an administrative committee. Mark Winterton, Commissioner, Infrastructure Services & City Engineer (Interim), appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 15, 2024, entitled "Response to CQ 11-2024 School Safety: Students and Drivers – City Wide" and provides a brief overview of the history of the committee. It included formal members of the school board and members of council. Currently the committee is an ad-hoc administrative committee that is comprised of administration of the school boards and City administration. Anna Ciacelli, Deputy City Clerk appears before the Environment, Transportation & Public Safety Standing Committee regarding the administrative report dated July 15, 2024, entitled "Response to CQ 11-2024 School Safety: Students and Drivers – City Wide" and adds that that committee did have a member of council at one point, but it hasn't met for some time.

Councillor Gary Kaschak indicates that there are issues with a couple of schools within his ward that are using plots of land that they don't own to park their vehicles and for pick-up and drop-offs and inquires whether there is enough representation from the different school boards on the liaison committee. Ms. Boakes responds that there is representation from all boards and Windsor Police also attends. Ms. Boakes adds that the schools are often directed by their principals without the board knowing about it. Administration gets into discussions about enforcement and what support

is needed. Mr. Winterton adds that the structure of the liaison committee is not the same as a council approved committee. It is more of an informal committee.

Councillor Gary Kaschak inquires whether the City is involved in any new school builds, renovations or constructions. Administration indicates that it would happen at site plan control process and through the *Planning Act* and the planning department.

Councillor Gary Kaschak inquires whether the schools let the City know about any plans. Administration responds that when there is an amendment to a site plan, it would go through planning and any other necessary departments for review, to provide comments and recommendations for that site plan.

Moved by: Councillor Renaldo Agostino
Seconded by: Councillor Gary Kaschak

Decision Number**: ETPS 1020**
THAT the report of the Active Transportation Engineer dated July 15, 2024 entitled "Response to CQ 11-2024 School Safety: Students and Drivers – City Wide" **BE RECEIVED** for information; and,

THAT administration **BE DIRECTED** to meet with the school boards through the City & School Board Liaison Committee regarding alternatives to the Kiss and Ride Program and their pilot project at Queen Victoria School currently being discussed; and,

THAT administration **BE REQUESTED** to send a letter the local School Boards outlining specific concerns from affected neighbours and the public regarding the Kiss and Ride Program related to safety in school neighbourhoods.
Carried.

Report Number: S 94/2024
Clerk's File: ME2024 & ACOQ2024

8.5. Niagara Street (Lincoln Road to Walker Road) Traffic Calming – Ward 4

Councillor Gary Kaschak inquires whether the four pending roads for speed humps will be completed before the end of 2024. Ms. Boakes responds that they are putting out tenders very shortly and adds that this traffic calming will be included and the four pending roads as provisional.

Councillor Kieran McKenzie comments about the "did not vote" responses and inquires whether administration has ever considered lowering the threshold to 50% of the residents who did participate in the vote. Ms. Boakes responds that the entire traffic calming policy is currently under review, and they will inquire with other municipalities regarding criteria and will recommend a policy change.

Councillor Kieran McKenzie inquires if there is any average speed data for pre and post speed hump installation. Ms. Boakes indicates they currently don't have any data but will endeavor to collect data prior to the installation and after the installation. Ms. Boakes adds that this data will be brought forward as part of their vision zero action plan update, and the traffic calming policy information.

Moved by: Councillor Kieran McKenzie
Seconded by: Councillor Renaldo Agostino

Decision Number: **ETPS 1021**
THAT Administration **BE DIRECTED** to install speed humps on Niagara Street between Lincoln Road and Walker Road; and,

Whereas on February 2, 2024, the 2024 Capital Budget was deemed approved via Mayoral Decision MD05-2024 and subsequently City Council **SUPPORTS** an expenditure of $74,950; and further,

THAT the City Treasurer **BE DIRECTED** to pre-commit $74,950 in 2025 Pay-As-You-Go funding from the Traffic Calming Initiatives project, OPS-021-07, and make available for immediate use; and,

THAT a budget issue with regards to annual maintenance of $5,400 **BE PRESENTED** as part of the 2025 operating budget development process and be considered a priority item based upon approval for the installations.
Carried.

Report Number: S 95/2024
Clerk's File: ST/13863

9. TRANSIT BOARD ITEMS

None presented.

10. ADOPTION OF TRANSIT BOARD MINUTES

None presented.

11. QUESTION PERIOD

None registered.

12. ADJOURNMENT

There being no further business, the Environment, Transportation & Public Safety Standing Committee is adjourned at 5:36 o'clock p.m. The next meeting of the Environment, Transportation & Public Safety Standing Committee will be held Wednesday, September 25, 2024.
Carried.

Ward 2 – Councillor Costante (Chairperson)	Deputy City Clerk / Supervisor of Council Services

Item No. 7.1

Committee Matters: SCM 256/2024

Subject: Minutes of the Environment & Climate Change Advisory Committee of its meeting held July 30, 2024

Environment and Climate Change Advisory Committee (ECCAC)
Meeting held July 30, 2024

A meeting of the Environment and Climate Change Advisory Committee is held this day commencing at 5:00 o'clock p.m. via Zoom video conference, there being present the following members:

Councillor Kieran McKenzie, Chair
Councillor Angelo Marignani
Glory Aimufua
Frank Butler
Mike Fisher
Masoumeh Mazandarani
Jennifer Nantais
Maria Boada
Kiemia Rezagian

Guest in attendance:

Derek Coronado

Also present are the following resource personnel:

Karina Richters, Supervisor, Environment Sustainability & Climate Change
Barbara Lamoure, Environment & Sustainability Coordinator
Aaron Farough, Senior Legal Counsel
Wadah Al-Yassiri, Manager Parks Development
Karen Cedar, Naturalist and Outreach Coordinator
Karen Kadour, Committee Coordinator

1. Call to Order

The Chair calls the meeting to order at 5:04 o'clock p.m. and the Committee considers the Agenda being Schedule A attached hereto, matters which are dealt with as follows:

2. Declaration of Conflict

None disclosed.

3. Adoption of the Minutes

Moved by Councillor Angelo Marignani, seconded by Frank Butler,

That the minutes of the Environment and Climate Change Advisory Committee of its meeting held May 21, 2024 **BE ADOPTED** as presented.

Carried.

4. Business Items

4.1 Black Oak Heritage Park Discussion

Karen Cedar, Naturalist and Outreach Coordinator provides the following salient points of discussion as it relates to Black Oak Heritage Park:

- Black Oak Heritage Park has been under the Administration of the City of Windsor since 1990.
- There is a geological feature that is over 4,000 years old (old shoreline for Lake Rouge).
- Some trees are over 260 years old.
- When they first acquired the property, dumping of very large tires, large vehicles on the property, and ATV's were evident.
- Administration then erected six foot heavy duty chain link fencing around the parcels that were to be part of the Black Oak Heritage Program. The fencing was critical at that time to stop the use of motorized vehicles getting onto the site and subsequently, there was push back.
- Did an outreach education campaign that involved school children who helped with massive cleanups and made an effort to increase the public awareness of the site being significant and special.
- The Police were helpful and community groups i.e. Friends of Ojibway, the Fields Naturalist Club consistently had strong support for Black Oak Heritage Park.
- This has been an ongoing process with the city since 1990.
- The current unauthorized trails are two metres wide (which is what an ATV would require) and involves many plants, animals and habitats being interrupted and destroyed. This type of damage takes some time to be rehabilitated which can be done.
- The city has spent hundreds of thousands of dollars towards the care of this property. Unfortunately, these funds have been spent on vandalism and on the repair of the destruction that has occurred.
- Thousands of signs have been destroyed that make people aware that they in areas that they should not be in due to being an endangered species habitat area.
- Police bicycle patrols have been present to provide education and to advise people to go back to the authorized trail. The Police presence has made a huge improvement in reducing the damage caused.

- When people are on these unauthorized trails, there are numerous hazards for personal liability and injury because this is city property, and the risk falls to the City of Windsor.
  The *Ontario Endangered Species Act* requires the city to maintain, preserve and protect the risk to habitat.

Wadah Al-Yassiri, Manager, Parks Development asks Karen Cedar to comment on the use of a "camera approach". Karen Cedar responds that they utilized the trail cams that were installed high in the trees and were stolen within two days

Councillor Kieran McKenzie asks if Administration has considered a strategy to address the foregoing challenges. Wadah Al-Yassiri responds that they have been approached by some cyclists and enthusiasts who were advised that this park is off limits for unauthorized use. For this purpose, City Councillors and Administration approved the use of hundreds of thousands of dollars to create bike trails at Malden Park, and at Little River Park. He adds that they met with many groups and advised that these locations are off limit and offered to work with them on other locations that have been approved.

Councilllor Kieran McKenzie reiterates that bikes are not allowed – no off road cycling is offered in that park whatsoever even on the designated official trails and asks if that is correct. Karen Cedar responds that they have not stated that cyclists are not allowed on the authorized trail – the issue is with the unauthorized trails.

Aaron Farough, Senior Legal Counsel states that what we have on the books addresses the circumstances that we're dealing with – i.e. the Parks Bylaw, restricting use of unauthorized areas and how it deals with designated multi-use trails versus non-designated trails. He states that the Parks By-law is currently being worked on as far as being able to prosecute under Part 1 under the Provincial Offences Act rather than Part 3 which means that tickets can be issued rather than issuing summons in order to prosecute violations. This process involves a set fine schedule that has to be approved by the court (waiting for judicial approval of this). The difficulties of enforcement remain that in order to properly ticket someone like when issuing a summons, one must be able to positively identify the person in order to issue the ticket. Obviously, the issue they run into is the nature of the use, i.e. people on bicycles so Park staff do not have the opportunity to properly address that. The Parks By-law covers the set fine schedule that is before the courts for approval. Administration could look into seeing what the maximum fine is for a ticket and upping that and raising public awareness regarding the possible issuance of a ticket. The history of the use and ongoing issues suggest how brazen some of these attempts are which may not discourage some people. He adds that changing prosecution from a Part 3 to Part 1 of the Provincial Offences Act should streamline the enforcement process. In certain cases could potentially apply to the court for an injunction. The issue is always that we do not know exactly who these individuals are and there is a different threshold for getting an injunction issued from the court against persons unknown.

Frank Butler advises that he visited Black Oak Heritage Park on two occasions over the past month and provides an overview of the areas of damage and unsafe conditions as follows:

- Significant moving of topsoil to build ramps and turning embankments
- Moving of rubble and logs to build turning embankments and jump ramps.
- Removal of warning signs and authorized trail signs for approved paths.
- Damage to trees to make trails using hand axes.
- Damage to trees by dumping soil against trunks which impact their health.
- Disturbed habitat areas.
- Chain link fences cut back in three locations to access across ETR rail tracks and into WUC property.
- Significant widening of paths using line trimers to keep trails clear (often two metres in width on average.
- Blind spots due to sharp turns in the trail path.
- Exposed roots which could lead to loss of control of bikes or tripping hazards.
- Narrow paths between two trees creating impact/striking hazards.
- Complex and overlapping paths could lead to hikers and dog walkers becoming disoriented and lost.
- The “non-profit” group is engaging in illegal activity which may put their non-profit status in jeopardy that can be identified.

In terms of the non-profit group engaging in illegal activity, Aaron Farough responds that this information will be provided to By-law Enforcement who would handle the actual claim to the extent we have one. The other difficulty that they run into as you identify either the non-profit organization or an unincorporated association of individuals is whether they are a proper party to a proceeding or whether we are best to identify the individuals and deal with them on an individual basis.

Kiemia Rezagian refers to dialogues held with the groups and asks if a different approach, i.e. speaking to one individual who may be able to communicate with the group would be more effective. Wadah Al-Yassiri responds that he is willing to sit with Karen Cedar and Aaron Farough to discuss ways to educate the violators.

Kiemia Rezagian concurs with developing a relationship building strategy. The Chair suggests that an education outreach strategy with Parks to improve some of the existing infrastructure may help to ameliorate the situation to some extent.

Councillor Angelo Marignani agrees that education and outreach is very important and proposes reaching out to the groups and have a dialogue on the importance of conserving the area, which may foster better support with that group. Secondly, he states that the placement and removal of the signage is an issue and asks if pile driving steel stakes into the ground with a sign in front of their trails saying “this is not a bike trail” is a possibility. Karen Cedar responds that the use of a pile driver has been done for the past thirty years; drove 12 stakes down 8 feet with signs that said “no entry”.

Councillor Angelo Marignani refers to switching the Part 3 violation to a Part 1 violation and asks if there is a timeline for this. Aaron Farough responds he does not have a definitive timeline as it is currently before the court for judicial approval. He adds that the Parks By-law is enforceable and states if prudent, a letter can be sent to the group noting that numerous reports have been received and to be advised that there are numerous fines under the Parks By-law and we intend to enforce these if we catch anyone in violation of them and ask that this be circulated to the members of your group to use the designated trails.

Councillor Angelo Marignani asks what are the risks involved with using social media to communicate with these groups. Aaron Farough responds that the risk is feeling targeted again not knowing how many people are in that particular group, how many people condone the use of those trails or go outside of the trails. Certainly in reading their media relations they frame themselves as people who are stewards of these parks who have taken credit for getting rid of off road vehicles within the park. The risk creates a more adversarial approach early on in the process that might foreclose the discussions that we are open to having with them.

Councillor Angelo Marignani asks Aaron Farough to provide recommendations from a legal perspective since enforcement seems to be the only thing that is working at this time. Aaron Farough responds it would be along the lines of what can we do to up that enforcement, consulting with Parks to see what resources they require and what type of engagement do we think would work well alongside that enforcement. He suggests an approach where we issue a letter notifying the group of the intended step up in enforcement and whatever powers we have to increase the level of enforcement between Parks and By-law Enforcement or Police based on past experience would probably be useful.

Mike Fisher refers to the violation of provincial laws in terms of the *Endangered Species Act* and asks how do we make that clear that this is Provincial and not just the City as removing that habitat is a violation of Provincial Law. He adds that with these lands are being earmarked to be Canada's second national urban park and suggests to extensively consult with the community, document and talk to people and explain why this area so special.

In response to a question asked by the Chair regarding the ability to quantify the damage to the Parks, Karen Cedar responds that they have the technology to map it to show the width of the trail and to quantify that with the city's Geomatics team.

Maria Boada proposes that the Public Education and Engagement Subcommittee begin engaging the community and the youth on this issue.

Jennifer Nantais asks if there any cycling networks or groups who would assist in sharing this messaging. The Chair expresses concern that there is an opportunity for deviousness to emerge from this.

Mike Fisher asks how much can we leverage the Black Oak Heritage Management Plan. Karen Cedar responds that the Management Plan was approved and the damage to the landscape was documented. She adds that they have not had a change in their position that the use and creation of unauthorized trails is prohibited in this area. As Aaron Farough indicated, there are now some other enforcement possibilities, so in the past they had to rely on the police to come in with authority and to advise they cannot be on an unauthorized trail.

Moved by Councillor Angelo Marignani, seconded by Maria Boada,
That the following direction and next steps **BE APPROVED:**

That an assessment **BE UNDERTAKEN** to determine the size and scope of the unauthorized trail impact on Black Oak Heritage Park and surrounding area; and,

That the Legal Department **BE DIRECTED** to bring back a report on the enforcement mechanisms available for Black Oak Heritage Park; and,

That the Black Oak Heritage Park matter **BE REFERRED** to the Public Education and Engagement Subcommittee for comment.

Carried.

5. Subcommittee Reports

5.1 City of Windsor Bird Team Subcommittee

Jennifer Nantais, Chair of the City of Windsor Bird Team Subcommittee provides an overview of the activities of the subcommittee as follows:

- The Bird Team has been meeting since Windsor was certified as a Bird Friendly City in 2022. Four meetings have been held in 2024.
- The Subcommittee is looking at the goals and deliverables to maintain and improve that bird friendly status with Nature Canada which requires annual reporting.
- Will continue to discuss bird friendly initiatives. Birds are important because they tell us about the health of our working landscapes, they are well studied, they provide connections to the natural world and resonate with people. Windsor is a hotspot for eco-tourism, is a great birding spot.
- Regularly connect on governance and processes, discussing roles and responsibilities of this Subcommittee and the relationship to the Advisory Committee and powers of the Subcommittee to inform and make recommendations.
- There is an interest in the public participating and joining this group so a discussion was held regarding if this should be opened up to the public, or to remain as a

small team, whether a Terms of Reference be established if guests are invited for public meetings.

- Will keep the closed group for now and may have a public meeting annually in the spring during migration activities around World Migratory Bird Day.
- Next steps include:
    - Reaching out to Birds Canada about potential outreach to inform and build relationships at chimney swift roost sites which have been added to the municipal database.
    - Ongoing research and review of Toronto standards and guidelines to compare progress with other cities.
    - Establishing baseline data collection on window collisions to inform future recommendations on potential window upgrades and the adoption of municipal standards.
    - Continuing discussions to bring awareness of the impact of outdoor cats on bird populations (cats kill billions of birds annually) and potential outreach and education through the Windsor Essex Humane Society and local rescues and T & R programs .
- Outcomes –Prepared a global bird rescue event from September 23 – 29, 2024 and a call to action for city staff and the public.
- A survey to be developed with a QR code that folks can submit and the possible involvement of the City's Wellness Committee.

Moved by Kiemia Rezagian, seconded by Mike Fisher,

That the update provided by Jennifer Nantais, Chair of the City of Windsor Bird Team Subcommittee **BE RECEIVED.**

Carried.

5.2 Planning and Environment Subcommittee

Councillor Angela Marignani, Chair of the Planning and Environment Subcommittee provides an overview of the activities of the subcommittee as follows:

Councillor Angelo Marignani, Chair advises that they have not met. He advises that the purpose of the Planning and Environment Subcommittee is to see how they can affect the City Council meetings moving forward. He refers to a recent meeting of the Development Charges Task Force and a question was asked about the environmental risks involved with those development charges. He adds that this is something that the Subcommittee will pursue. He alludes to the sustainable development in the city's Planning Department and with compliance and regulations that are being put forward both Provincially and Federally.

Barbara Lamoure remarks that this is a great Subcommittee for the Advisory Committee to partner with as they can assess which documents could use some modification or discussion.

Moved by Frank Butler, seconded by Maria Boada,

That the update provided by Councillor Angelo Marignani, Chair of the Planning and Environment Subcommittee **BE RECEIVED.**

Carried.

5.3 Public Education and Engagement Subcommittee

Maria Boada, Chair Public Education and Engagement Subcommittee provides an overview of the activities of the subcommittee as follows:

- Subcommittee to focus on three issues – Transit, Habitat and Waste Management and Recycling
- Discussion regarding how communities can be more involved, e.g. how a First Nations Community created QR codes to educate citizens about nesting turtles.
- Interested in doing a “mock Council” with high school students who will provide ideas to the Subcommittee on environmental issues that matter to them.
- Suggestion to partner with the Windsor International Film Festival (WIFF) to show movie(s) on environmental matters followed with a discussion. WIFF is eager to partner with the Subcommittee at a cost of $1,500.
- Hold a Speaker’s Corner where the public can speak to environmental matters in the city which would be posted on social media or another site.
- Suggestion to hold a contest whereby people create a short film on an environmental matter.
- Recruited three additional members to the Subcommittee.

Moved by Councillor Angelo Marignani, seconded by Kiemia Rezagian,

That the update provided by Maria Boada, Chair of the Public Education and Engagement Subcommittee **BE RECEIVED.**

Carried.

Moved by Mike Fisher, seconded by Frank Butler,

That **APPROVAL BE GIVEN** to an expenditure in the upset amount of $1,500 for the Windsor International Film Festival to show a movie on environmental issues.

Carried.

5.4 Youth Subcommittee

Kiemia Rezagian, Chair Youth Subcommittee provides an overview of the activities of the subcommittee as follows:

Discussed a plan to have a high school focused conference to provide awareness of municipal decision making, specifically as it relates to the environment; to receive their feedback; to encourage their engagement in municipal politics in the city and to show them avenues for environmental career paths.
Reached out to Art Windsor Essex to determine if they are interested in hosting the conference in February 2025.
Initial outreach for additional members has been undertaken.
Next steps – Will set up a meeting with the broader Youth Subcommittee.
Will be requesting a budget to bus students to the conference to be held in February 2025, for purchasing some food and perhaps some honoraria if Indigenous speakers are present.

Moved by Maria Boada, seconded by Councillor Angelo Marignani,
That the update provided by Kiemia Rezagian, Chair of the Youth Subcommittee **BE RECEIVED.**
Carried.

5.5 Budget Subcommittee

Frank Butler, Budget Subcommittee Chair provides an overview of the activities of the subcommittee as follows:

- On June 18, 2024 the Chair advises that he met with Barbara Lamoure, Karina Richters, Derek Coronado and Philippa von Ziegenweidt met to have a discussion on the budget review process and the cycle for input to City Council on budget items.
- The Budget Subcommittee will meet in August and September 2024 in order to report back to ECCAC and will then report to the Environment, Transportation and Public Safety Standing Committee and City Council.
- Two volunteers have joined the Subcommittee.

6. New Business

None.

7. Date of Next Meeting

The next meeting will be held on a date to be held on Tuesday, September 17, 2014 at 5:00 o’clock p.m. via Zoom video conference.

8. Adjournment

There being no further business, the meeting is adjourned at 7:00 o’clock p.m.

Item No. 7.2

Committee Matters: SCM 260/2024

Subject: Minutes of the Windsor Licensing Commission of its meeting held

August 28, 2024

Windsor Licensing Commission

Meeting held August 28, 2024

A meeting of the Windsor Licensing Commission is held this day commencing at 9:30 o'clock a.m. in Room 139, 350 City Hall Square West, there being present the following members:

Councillor Ed Sleiman, Chair
Councillor Renaldo Agostino, via Zoom video conference
Councillor Angelo Marignani

Regrets received from:

Harbinder Gill
Jayme Lesperance

Delegations in attendance:

Andom Gebrzgie, Assad Hurmuzlu, regarding ***Item 6(a)***
Golmar Karimi, and Kiemia Rezagian regarding ***Item 6(b)***
Jay Abdolrahmanpour, Walter Bezzina and Mohamad Kashash, regarding Item ***8(a)***

Also present are the following resource personnel:

Steve Vlachodimos, City Clerk and Licence Commissioner
Craig Robertson, Manager, Licensing & Enforcement, Deputy Licence Commissioner
Rory Sturdy, Supervisor of By-law Enforcement
Sandy Hansen, Senior Licence Issuer
Karen Kadour, Committee Coordinator

1. Call to Order

The Chair calls the meeting to order at 9:35 o'clock a.m. and the Windsor Licensing Commission considers the Agenda being Schedule A attached hereto, matters which are dealt with as follows:

2. Disclosure of Interest

None disclosed.

3. Adoption of the Minutes

Moved by Councillor Angelo Marignani, seconded by Councillor Renaldo Agostino,
That the misspelling of the Councillors' names (Councillor Angelo Marignani and Councillor Renaldo Agostino **BE CORRECTED.**
Carried.

4. Request for Deferrals, Referrals or Withdrawals

None.

5. Communications

None

6. Licence Transfers

6(a) Andom Gebrzgie, Transferor and Assad Hurmuzlu, Transferee appear before the Windsor Licensing Commission regarding the transfer of Plate #001.

Craig Robertson provides the following remarks regarding the transfer of Plate #001:

- An application was submitted to the Windsor Licensing Commission on May 13, 2024. The applicants have satisfied that application.
- Administration reviewed that application and is prepared to recommend transfer of the Taxicab plate #001.

Moved by Councillor Angelo Marignani, seconded by Councillor Renaldo Agostino,
That the transfer of Taxicab Plate #001 from Andom Gebrzgie to Assad Hurmuzlu **BE APPROVED** with the following conditions:

i. Assad Hurmuzlu be given thirty (30) days from the date of the approval to submit a vehicle for inspection that complies with Schedule 5 to By-law 150-2018, including a valid safety standards certificate.
ii. Assad Hurmuzlu be given thirty (30) days from the date of the approval to submit a Taxicab Plate Holder application and pay the associated fee.
iii. Assad Hurmuzlu be given thirty (30) days from the date of the approval to provide verification that full compensation has been made to Andom Gebrzgie in consideration of the transfer of Taxicab plate #001.
iv. Assad Hurmuzlu shall not lease Taxicab plate #001 for a one-year period as stated in Schedule 5, Section 21.3 of Licensing By-law 150-2018.
Carried.

6(b) Request to extend Estate Trustee as Plate Holder for Taxicab Plate #088

Golmar Karimi, Trustee for the Estate of the Late Fazlullah Rezagian and Kiemia Rezagian appear before the Windsor Licensing Commission regarding the request to extend the Estate Trustee as plate holder for Taxicab Plate #088.

Craig Robertson provides the following remarks regarding the request by the Estate Trustee to extend the plate holder terms of Plate #088 as a result of the plate holder's passing:

- On September 13, 2022, the Licensing Division was notified of Mr. Rezagian's passing.
- Received documentation confirming Golmar Karimi as the Estate Trustee. Per the Public Vehicle Licensing By-law, as the Estate Trustee, the plate will sit in the Estate. There is a two-year time period to decide what they want to do with the plate.
- Received a letter earlier this year from the Estate Trustee indicating some circumstances that they have been unable to transfer the plate in the past two years.
- The Estate Trustee had been relying on the income from this plate to support her family while still dealing with the passing of Mr. Rezagian.
- Administration is of the opinion that the request being put forward is not unreasonable and is prepared to recommend that the Windsor Licensing Commission approve a year extension; that Golnar Karimi maintain the plate, and if she does not, or if the Estate is not able to find a transferee of that plate, that the Plate be returned to the Windsor Licensing Commissioner.

Moved by Councillor Angelo Marignani, seconded by Councillor Renaldo Agostino,

That the Windsor Licensing Commission **RECOMMEND** that the request to permit Golnar Karimi, Estate Trustee, to hold City of Windsor Taxicab Plate #088 and any associated licenses **BE APPROVED** until September 10, 2025, and further, that Taxicab Plate #088 **BE REVOKED** and **RETURNED** to the Licence Commissioner should the taxicab plate not be transferred on or before September 10, 2025.

Carried.

8(a) Response to Request to Eliminate Age Limits for Wheelchair Accessible Taxicabs and Reduced Licence Fees – City Wide

Jay Abdolrahmanpour, Walter Bezzina and Mohamad Kashash, appear before the Windsor Licensing Commission regarding the request to eliminate age limits for wheelchair accessible taxicab and reduced licence fees – city wide.

Craig Robertson provides the following remarks regarding this Administrative Report as a result of the submission by the Owner of Canadian Checker Cab regarding wheelchair accessible taxicabs:

- Administration received a request from Jay Abdolrahmanpour, Owner, Canadian Checker Cab to eliminate the age limits for wheelchair accessible taxicabs as well asked for the associated licence fees to be reduced.
- Canadian Checker Cab has been the sole provider for wheelchair accessible taxicabs for a number of years. The request from Mr. Abdolrahmanpour was to eliminate age limits for the wheelchair accessible taxicabs as well as to reduce licence fees based on the requirements of the by-law to replace a vehicle after it reaches its age.
- Currently, all taxicabs must be removed from service once they reach ten (10) model years in age.
- Canadian Checker Cab is the only broker that has wheelchair accessible taxicabs in their fleet.
- Over fifty percent of the fleet must come off the road by the end of this month, with the remaining accessible cabs, due to their age, come off in 2025.
- There is a risk of losing wheelchair accessible service in our taxi industry if a solution is not found.
- There were approximately 9,000 taxicab fares that required wheelchair accessible services provided by Checker Cab last year.
- Traditionally, taxicab age limits ranged from six to eight years and then were required to be removed from service. Many municipalities shifted to increase these age limits and level the playing field when Transportation Network Companies like UBER and Lyft started providing transportation services in their municipality.
- A municipal scan was completed to determine how other municipalities were governing age limits for taxicabs.
- Some municipalities do not regulate age limits in their taxi industry, but they focus more on the physical inspection that is done by their by-law enforcement staff who are also certified mechanics. This is something that is not feasible for Windsor due to staff resources and qualifications.
- Most municipalities have similar regulations as Windsor and provide a maximum model year of ten years old for all taxicabs.
- Recent age limit reviews were conducted by the cities of Toronto, Ottawa and London. Those studies concluded that they would maintain a ten-year age limit for regular taxicabs but would increase the age limit for wheelchair accessible taxicabs to 12 years old due to the considerable difference in cost and increased expenses to replace a wheelchair accessible taxicab.
- Administration recommends that Windsor move to a 12-model year age limit for wheelchair accessible taxicabs and maintain the current 10-year age limit for regular taxicabs. The increase in age limit will assist Canadian Checker Cab and ensure that the industry is able to provide a crucial service to our accessible community.
- By providing an additional two years, it will allow for the owner of Checker Cab additional time to replace his existing fleet. Checker Cab will still be subject to

safety certificate submissions at the time of licence application as well as a secondary submission for those vehicles that are older. At any time, the vehicles will be subject to spot inspections by the City's By-law Enforcement Officers and/or the Ministry of Transportation (MTO) at any time or when a complaint is received.

- The 12-model year age limit will also provide an extra incentive for those taxicab drivers that are eligible under the by-law to obtain a wheelchair accessible plate and provide those services.
- There is a request for plate fees to be dropped from $425. which is not recommended by Administration at this time. Licence fees are based on cost recovery to administer and enforce the City's licensing program.

In response to a question asked by the Chair regarding if the city has been lobbied by the taxi industry to increase the age limit from ten years old to twelve years old, Craig Robertson responds that a letter was provided by Jay Abdolrahmanpour, Owner, Canadian Checker Cab that triggered this report. Craig Robertson remarks that Mr. Abdolrahmanpour is our sole provider for wheelchair accessible taxicab services in our city. He adds that Mr. Abdolrahmanour has come forward with financial constraints and concerns regarding the risk of the City losing wheelchair accessible taxicab services as early as next year.

Mr. Jay Abdolrahmanpour indicates that the licence fee is too much and asks that fees be waived for accessible taxicabs. Craig Robertson responds that the cost to renew each taxicab plate is $400 and that licence fees are based on cost recovery. Taxicab fees have not been raised since 2007. The $400 is to capture the cost to administrate and enforce the by-law and licensing program.

Walter Bezzina, representing Vets Cab remarks that they recognize the financial challenge that Mr. Abdolrahmanpour has with respect to keeping accessible taxicab vehicles on the road. He adds that if the owner of Checker Cab can get two more years out of each vehicle as opposed to having to put out a capital expenditure from anywhere from $45,000 to $65,000 (each vehicle), it would help tremendously. He adds he is in full support of the administrative report.

Councillor Sleiman asks if Checker Cab has considered increasing the fare. Jay Abdolrahmanpour responds that he is opposed to that as that would be discriminatory to people with disabilities.

Craig Robertson indicates as a result of the Windsor Licensing Commission making a decision today, this information will be forwarded to the Environment, Transportation and Public Safety Standing Committee and then onto City Council as there could be a potential change to the by-law based on the final decision of Council. He indicates that the Licensing Division will work with Mr. Abdolrahmanpour in the meantime to ensure that operations are not disrupted and will hold off from requesting any accessible taxicab vehicle replacements at this time. Craig Robertson suggests that it will take some time for this matter to be reviewed by Standing Committee and Council and

recommended that late fees for this year be waived due to the timing of the report and request from the licensee.

Councillor Angelo Marignani refers to the licensing fees for taxis and asks it is the same fee for medical transport operators. Craig Robertson responds that the city does not licence medical transport operators specifically. However, there are some vehicles that are licensed that provide livery services, meaning prearranged contracts that are made with individuals for transportation services. Craig Robertson indicates that licence fees for taxicab vehicles are higher than livery vehicle fees.

Moved by Councillor Angelo Marignani, seconded by Councillor Renaldo Agostino,

THAT the Windsor Licensing Commission **RECEIVE** the report of the Deputy Licence Commissioner entitled "Response to Request to Eliminate Age Limits for Wheelchair Accessible Taxicabs and Reduced Licence Fees; and,

THAT the Windsor Licensing Commission **RECOMMEND** to City Council, an increase of the current ten-year vehicle age limit to a twelve-year vehicle age limit for licensed Wheelchair Accessible Taxicabs; and,

THAT the Windsor Licensing Commission **RECOMMEND** to City Council, that Public Vehicle By-law 150-2018 **BE AMENDED** to reflect the changes made to the maximum age limit for licensed Wheelchair Accessible Taxicabs; and further,

THAT upon City Council's decision, all late fees incurred for this year would **BE WAIVED** upon registration of any remaining wheelchair accessible taxicabs that are owned and operated by Canadian Checker Cab.

Carried.

8(b) Expired Application(s) for Business Licence

Moved by Councillor Angelo Marignani, seconded by Councillor Renaldo Agostino,

That the report of the Deputy Licence Commissioner dated August 28, 2024, entitled "Expired Application(s) for Business Licence" **BE RECEIVED.**

Carried.

9. In Camera

No In Camera session is held.

10. Date of Next Meeting

The next meeting will be held at the call of the Chair.

11. Adjournment

There being no further business, the meeting is adjourned at 10:15 o'clock a.m.

Committee Matters: SCM 259/2024

Subject: Report No. 157 of the Windsor Licensing Commission - Request to eliminate age limits for wheelchair accessible taxicabs

September 25, 2024

REPORT NO. 157
of the
WINDSOR LICENSING COMMISSION
of its meeting held August 28, 2024

Present: Councillor Ed Sleiman, Chair
Councillor Renaldo Agostino
Councillor Angelo Marignani

The Windsor Licensing Commission submits the following recommendation:

Moved by Councillor Angelo Marignani, seconded by Councillor Renaldo Agostino,

THAT the Windsor Licensing Commission **RECEIVE** the report of the Deputy Licence Commissioner entitled "Response to Request to Eliminate Age Limits for Wheelchair Accessible Taxicabs and Reduced Licence Fees; and,

THAT the Windsor Licensing Commission **RECOMMEND** to City Council, an increase of the current ten-year vehicle age limit to a twelve-year vehicle age limit for licensed Wheelchair Accessible Taxicabs; and,

THAT the Windsor Licensing Commission **RECOMMEND** to City Council, that Public Vehicle By-law 150-2018 **BE AMENDED** to reflect the changes made to the maximum age limit for licensed Wheelchair Accessible Taxicabs; and further,

THAT upon City Council's decision, all late fees incurred for this year would **BE WAIVED** upon registration of any remaining wheelchair accessible taxicabs that are owned and operated by Canadian Checker Cab.

Carried.

NOTE: The Report of the Deputy Licence Commissioner dated August 28, 2024 entitled "Response to Request to Eliminate Age Limits for Wheelchair Accessible Taxicabs and Reduced Licence Fees – City Wide is ***attached.***

Notification :	
Windsor Licensing Commission	On file
Canadian Checker Cab	P5192547777@hotmail.com
Vets Cab Company	mkashash@vetscab.com wbezzina@vetscab.com
Unifor Local 195	pres@uniforlocal195.com

Subject: Response to Request to Eliminate Age Limits for Wheelchair Accessible Taxicabs and Reduced Licence Fees - City Wide

Reference:

Date to Commission: August 28, 2024
Author: Craig Robertson
Manager of Licensing and Enforcement & Deputy Licence Commissioner
519-255-6100 ext. 6869
crobertson@citywindsor.ca

Policy, Gaming, Licensing & By-Law Enforcement
Report Date July 22, 2023
Clerk's File #:

To: Windsor Licensing Commission

Recommendation:

THAT the Windsor Licensing Commission **RECEIVE** the report of the Deputy Licence Commissioner entitled *"Response to Request to Eliminate Age Limits for Wheelchair Accessible Taxicabs and Reduced Licence Fees"* and,

THAT the Windsor Licensing Commission **RECOMMEND** to City Council, an increase of the current ten-year vehicle age limit to a twelve-year vehicle age limit for licensed Wheelchair Accessible Taxicabs and further,

THAT the Windsor Licensing Commission **RECOMMEND** to City Council, that Public Vehicle Licensing By-law No. 150-2018 **BE AMENDED** to reflect the changes made to the maximum age limit for licensed Wheelchair Accessible Taxicabs.

Executive Summary:

N/A

Background:

On May 23, 2024, Licensing Administration received correspondence addressed to the Windsor Licensing Commission from Mr. Jay Abdolrahmanpour, owner of Canadian Checker Cab (attached as Appendix A). The content of the correspondence requested the elimination of age requirements and a reduction in licence fees specifically for

Wheelchair Accessible Taxicabs due to financial constraints his taxicab brokerage is currently faced with and the associated cost to replacing a wheelchair accessible taxicab.

The City of Windsor licences and regulates the municipality's taxicab brokers, drivers and vehicles through Schedule 5 of Public Vehicle Licensing By-law No. 150-2018. The Schedule itself prescribes the age limits for all licensed taxicabs including wheelchair accessible vehicles. In 2018, Windsor's maximum age limit for taxicabs was increased from eight (8) years old to the current age limit being a maximum of ten (10) model years in age. This became the industry standard across the province and country. The intent of the increase was to "level the playing field" when Transportation Network Companies like UBER and Lyft were introduced to the municipality as an alternative means of public transportation. Once a taxicab reaches the end of its lifecycle, the taxicab is required to be replaced at the expense of the taxicab plate holder. Failure to replace the taxicab requires the plate holder to surrender the taxicab plate back to the City and be made available to those in the industry that qualify.

Public vehicle licence fees, including those charged for Wheelchair Accessible Taxicabs, are governed under the City's Public Vehicle Licensing By-law and are established by the municipality to recover the cost to administer and enforce the licensing program.

Discussion:

The City of Windsor's cap limit on Wheelchair Accessible Plates is twenty-one (21). Canadian Checker Cab, which is owned and operated by Mr. Jay Abdolrahmanpour is the sole taxicab company that provides wheelchair accessible services to our community. Mr. Abdolrahmanpour is the holder of nine (9) Wheelchair Accessible Plates, the other twelve (12) remaining plates are in possession of the Licence Commissioner and available to licensees within the industry that qualify. Interest from current industry stakeholders to hold these types of plates is low due to the substantial cost difference to purchase, operate, maintain and replace a wheelchair accessible taxicab. In addition, Wheelchair Accessible Plates are non-transferable and hold no monetary value compared to "traditional" taxicab plates.

As previously mentioned, the maximum age limit for a taxicab to operate in Windsor is ten (10) model years old. Based on the age of Mr. Abdolrahmanpour's taxicab fleet, he is required to replace five (5) Wheelchair Accessible taxicabs by August 31st of this year and four (4) additional Wheelchair Accessible taxicabs in 2025. Mr Abdolrahmanpour has indicated that his brokerage is facing financial constraints and that the significant cost to replace his wheelchair accessible taxicabs (based on current age limits) could impact the continuity of providing essential accessible transportation services to the community.

Administration is empathetic to the situation that Mr. Abdolrahmanpour is challenged with and certainly recognizes the importance for accessible transportation services to continue in our community. Administration conducted a municipal scan with various

municipalities across the province of Ontario to identify best practices related to taxicab and wheelchair accessible taxicab age limits for the purpose of vehicle replacement. These results are discussed below.

No Regulated Age Limits

Although they are far and few between, there are some municipalities such as Niagara Region, Region of Waterloo and Guelph that do not regulate the age of taxicabs. The rational behind this, is that their City staff inspect the taxicabs annually or when a complaint is received. They utilize in-house by-law enforcement personnel (who are also certified mechanics) to determine the safe operation of the taxicab and make recommendations for replacement. This is not an option being considered or suggested by Administration due to current staff resources and qualifications.

Regulated Age Limits

A majority of the municipalities surveyed, had identical age limit requirements for taxicab and wheelchair accessible taxicab vehicle replacement as Windsor being ten-model years of age. As previously mentioned, this is the industry standard. It was discovered that traditional age limits were anywhere from six (6) to eight (8) years of age but shifted to an increase to ten (10), over the last few years, largely due to the implementation of Transportation Network Company licensing programs. Similar to Windsor, age limits were increased by these municipalities to coincide with vehicle replacement requirements mandated by companies like UBER and Lyft. Although a "level playing field" was created between taxicab and transportation network companies, this model provided little incentive for an industry stakeholder to invest in a Wheelchair Accessible Taxicab due to the significant difference in cost to replace the vehicle.

Tiered Age Limits

It was discovered that a few municipalities like Ottawa, Toronto and London had recently reviewed their taxicab vehicle replacement requirements based on contributing factors caused by the COVID-19 pandemic that impacted the cost of vehicle parts and supplies, along with the lack of availability to retrofit a wheelchair accessible vehicle. Within their licensing regulations, traditional taxicabs remain at a maximum ten (10) model year lifecycle while wheelchair accessible taxicabs were increased to a twelve (12) model year lifecycle. The increase in vehicle age requirements for this type of taxicab provides an incentive and relief for those plate holders that must pay significantly higher costs to replace their accessible vehicle.

As previously mentioned, the maximum vehicle age limit in Windsor, was increased in 2018. The vehicle age requirements established a reasonable standard for a service vehicle and reflected the full-time usage of taxicabs, often with more than one driver working the vehicle, as part of the public transportation network. However, the industry has changed significantly in recent years, and there are often vehicles with only one driver, with a lower mileage accumulation on the vehicles. The availability of newer vehicles and the retrofitting of them for accessible purposes, has become a challenge. In addition, there are significant additional costs associated with obtaining and operating a fully Wheelchair Accessible Taxicab. Administration is proposing an increase in the vehicle age limit for Wheelchair Accessible Taxicabs from ten (10) to twelve (12) model years to encourage continuity of this crucial service and as an incentive for eligible industry stakeholders to operate a Wheelchair Accessible Taxicab. Safety Standards

Certificates and annual inspections outlined under the City's Public Vehicle Licensing By-law would continue to be required.

Risk Analysis:

There is little risk to the Corporation by increasing the maximum age limit of Wheelchair Accessible Taxicabs from ten (10) to twelve (12) model years. Licensed fleet vehicles will still be required to submit annual mechanic checklists and provincial Safety Standard Certificates. The provincial certificate will continue to be mandated under the City's Public Vehicle Licensing By-law every six (6) months for older fleet vehicles and can also be requested at any time deemed necessary by the Licence Commissioner. In addition, all taxicab vehicles are subject to complaint-based and random inspections from City By-law Enforcement personnel and the Ministry of Transportation (MTO).

There is likely a substantial risk to the City and the community, should the availability of accessible transportation fall short within the taxicab industry. As noted previously, Canadian Checker Cab is the sole operator of accessible taxicab services within the municipality. Based on current age limits in the by-law, there is a risk of losing over 50% of the accessible fleet this year and then the remaining vehicles the following year. The loss of these vehicles would negatively impact the community that relies on wheelchair accessible services as approximately 9,000 passenger trips in 2023 were in relation to accessible transportation services provided by Canadian Checker Cab. Therefore, increasing the maximum age limit for wheelchair accessible vehicles by two (2) years provides extra time to save on the expenses associated with replacing the existing and aging fleet. It also provides an incentive for those eligible within the industry to obtain a plate from the City to operate a Wheelchair Accessible Taxicab.

Financial Matters:

As previously discussed, the fees charged under the City's Public Vehicle Licensing By-law are established based on the recovery of costs to administer and enforce the licensing program. Staff resources are required to review and process licence applications, respond to citizen complaints and conduct vehicle inspections. Windsor's taxicab licence fees are on par and in some cases lower in comparison to municipalities with similar fleet sizes.

Mr. Abdolrahmanpour has requested a reduction to the Wheelchair Accessible Taxicab Plate Holder fees from $400 to $25. Administration does not support or recommend any reduction to licence fees. Should the Windsor Licensing Commission recommend reduction to the fees as requested, Council would be required to find an alternative funding source to ensure administrative and enforcement costs are recovered. In addition, any reduction to licence fees would likely need to be vetted through the annual Budget process.

There are no financial implications to the Corporation resulting from the recommendations being made by Administration at this time.

Consultations:

Canadian Checker Cab Administration

Municipal scan across Ontario

Conclusion:

Administration's recommendation to increase the maximum age limit for Wheelchair Accessible Taxicabs from ten (10) to twelve (12) model years is designed to create equitable service for persons with disabilities by incentivizing Wheelchair Accessible Taxicab Plate Holders to invest in accessible vehicles.

If the Windsor Licensing Commission approves the recommendation to increase the age limit for Wheelchair Accessible Taxicabs, this report would then go to Standing Committee and ultimately to City Council for consideration. If approved by Council, amendments to the City's Public Vehicle Licensing By-law would then be prepared. Once the by-law is formally amended, the maximum age limit for Wheelchair Accessible Taxicabs would take effect immediately. It ought to be known that due to the timing of this report and the taxicab licensing deadline, being August 31st annually, Administration will not request the replacement of any licensed Wheelchair Accessible Taxicabs until Council makes a final decision on this matter.

Craig Robertson
Manager of Licensing & Enforcement and
Deputy Licence Commissioner

Notifications:

Name	Address	Email
Canadian Checker Cab	1235 Huron Church Rd. Windsor, ON N9C 2K6	P5192547777@hotmail.com
Vets Cab Company	350 Tuscarora St. Windsor, ON N9A 3L7	mkashash@vetscab.com wbezzina@vetscab.com
Unifor Local 195	3400 Somme Ave. Windsor, ON N8W 1V4	pres@uniforlocal195.com

Appendices:

Appendix "A"

CANADIAN CHECKER CAB

1235 Huron Church Rd. Windsor, Ontario. N9C 2K6. Phone: (519) 254-7777. Email: ph5192547777@hotmail.com

Date: Feb 20th 2024

To: Windsor Licensing Commission

Subject: Request to remove the age limit of wheelchair-accessible cabs

Dear Members of the Windsor Licensing Commission,

I am writing to bring a matter of great importance to your attention. It concerns the current regulations governing the age limit for wheelchair-accessible cabs in our city.
Specifically, I wish to address the challenges faced by Canadian Checker Cab—the sole cab company providing wheelchair-accessible services in Windsor.

Under the existing bylaws, all taxi cabs, including wheelchair-accessible ones, are subject to a maximum age limit of 10 years. I believe that this restriction presents a significant obstacle for our wheelchair-accessible services, primarily due to the substantial cost difference between purchasing a standard cab and an accessible van.

As you may be aware, the price of acquiring a wheelchair-accessible vehicle is approximately four times higher than that of a standard cab. Given the company's current financial constraints, procuring a new accessible van and using it to replace an older model is, unfortunately, a difficult proposition for Canadian Checker Cab.

To address this issue and ensure Canadian Checker Cab can continue to provide essential wheelchair-accessible transportation services within our community, I kindly request the Commission to consider the following amendments to the existing regulations:

1. **Remove Age Limit and Emphasize M.T.O. Certification:** I propose the removal of the age limit for wheelchair-accessible cabs, or alternatively, an extension from 10 years to 15 years. This modification is contingent upon maintaining rigorous M.T.O.

certification standards, requiring all wheelchair-accessible cabs to undergo standard certification twice a year. This approach ensures ongoing compliance with safety and regulatory standards while providing the necessary flexibility for maintaining our current fleet.

2. **License Fee Reduction:** Considering the unique financial challenges faced by Canadian Checker Cab, I request a reduction in the annual license fee from $400 to $25. This adjustment would align with the fees paid in 2005 and support the sustainability of our wheelchair-accessible cab services.

I believe that these proposed changes will not only ease the financial burden on the company, but also contribute to the continued availability of accessible transportation options for individuals with mobility challenges in Windsor.

I thank you for your attention to this matter, and I appreciate your dedication to enhancing the accessibility and inclusivity of our city's transportation services.

Sincerely,

Jay Abdolrahmanpour

Managing director of Checker Cab

THE CITY OF WINDSOR ONTARIO, CANADA

Council Report: C 112/2024

Subject: Fire Master Plan

Reference:

Date to Council: September 25, 2024
Author: Stephen Laforet
Fire Chief
Fire & Rescue Services
519-253-6573 x3753
slaforet@citywindsor.ca

Report Date: 9/6/2024
Clerk's File #: SF/14852

To: Mayor and Members of City Council

Recommendation:

THAT City Council **ADOPT** the **FIRE MASTER PLAN (Appendix A) including the Windsor Fire & Rescue Service (WFRS) suggestions for implementation (Appendix B);** and further

Whereas on February 2, 2024, the 2024 10-year capital budget was approved via Mayoral Decision MD05-2024 which included items suggested for implementation in the Fire Master Plan, be it further resolved:

THAT the City Treasurer **BE DIRECTED** to bring forward additional funding requests in future operating and capital budgets development processes for consideration over the 10 to 15-life cycle of the Fire Master Plan; and further

THAT the City Solicitor **BE DIRECTED** to amend and update the Fire Services Establishing and Regulating By-Law to reflect services provided by Windsor Fire & Rescue.

Executive Summary:

N/A

Background:

The Fire Master Plan (FMP) encompasses a comprehensive review of the Windsor Fire & Rescue Services' (WFRS) strengths, weaknesses, opportunities, and challenges. This FMP provides a set of strategies and goals for implementation that are aimed at assisting City Council in making decisions and serves as the guiding document for Administration. The last FMP was completed in 2006 by TL Powell and Associates. As

such, on Monday December 12, 2022, City Council approved RFP 150-22 for the new FMP (through CR 522/2022):

*That Council **APPROVE** RFP 150-22, Windsor Fire and Rescue Services (WFRS) Master Plan, to Emergency Management Group (EMG), for the provision of developing the 2023 Fire Master Plan and the Community Risk Assessment, to an upset limit of $169,945(excluding HST); and,*

*That the CAO and City Clerk **BE AUTHORIZED** to execute an agreement with Emergency Management Group (EMG) for the delivery of Fire Master Plans and the Community Risk Assessment, satisfactory in form to the City Solicitor, in financial content to the City Treasurer, and in technical content to the Fire Chief or designate.*

WFRS subsequently worked with EMG to develop the 2023 Fire Master Plan. If approved by Council, the new FMP will be the guiding document for WFRS for the next 10-15 years.

Discussion:

EMG initiated the FMP project in January of 2023. The project deliverables defined the scope of work undertaken as per the RFP. The Consulting Team worked collaboratively with WFRS services, including the Chief and Deputy Chiefs along with gathering input from the community and other City departments. EMG employed an evidence-based methodology built upon several inputs that combined the insights of the community and stakeholders with information provided by Administration and researched by the Consultants.

Results of the FMP include 49 recommendations for immediate/short (0 -3 years), medium (4-6 years) and long term (6-10+ years) implementation. Many of the recommendations are administrative in nature with six of the recommendations already completed and 14 of them in progress. However, after receiving the initial report, WFRS provided some updates to the recommendations as well as some suggestions for the proposed timelines that were originally laid out by EMG. That original plan Fire Master Plan with suggested timelines can be seen as Appendix A. The departmental response including updated timelines can be seen as Appendix B.

EMG has identified some recommendations that will impact future capital and operating budgets. Those recommendations include:

- Building of a new fire station and administration in the downtown area
- Options for consideration regarding combining training and apparatus facilities and a new station into a multi-purpose complex in the annexed lands should the growth projections warrant it.

It should be noted that these recommendations come from a variety of factors. There is currently increased pressure on the training division to meet O'Reg 343/22 Mandatory Certification. This results in increased demand on the current Training Division staff which will impact the division's ability to provide the other necessary training programs to the department.

In addition, as the City of Windsor continues to grow at unprecedented rates, there is a increase to staffing required in order to meet increased service demands.

Risk Analysis:

The City of Windsor was in need of a new FMP as the previous one had exceeded its lifecycle. As the City of Windsor continues to attract new businesses and residents, the population has and will continue to grow along with it. WFRS has experienced a 10% increase in call volume between 2019 and 2023. The FMP provides a clear vision of what future needs are to be implemented and when, a guide that includes options and budgetary estimates for implementation, prioritization of each project and the ability to communicate with staff, internal and external stakeholders about the future goals of the organization. The FMP will help guide the department for the next 10-15 years, if approved.

There is a financial risk involved with approving the FMP as there will be both operating and capital costs associated with the FMP. A phased in approach is proposed to help mitigate the financial risks associated with implementation of the FMP.

The FMP highlights some areas of the Fire Services Establishing and Regulating By-Law that require updating to better reflect the services provided by the department and the reporting structure. To mitigate this, Administration is requesting the City Solicitor work with the Fire Chief to update the By-Law in order to comply with the FMP.

Climate Change Risks

Climate Change Mitigation:

N/A

Climate Change Adaptation:

N/A

Financial Matters:

The Fire Master Plan provides a review of WFRS strengths, weaknesses, opportunities, and challenges, subsequently providing a set of strategies and goals for improvements to WFRS administration, and as such, there is no immediate financial impact in approving this report.

Administration will utilise a staged implementation approach for the FMP over its anticipated 10 to 15-year life cycle with all recommendations carefully considered and prioritised. The 2024 approved in principle 10-year Capital Budget includes funding that will be used towards the implementation of the FMP including the Replacement of Fire Station 1 and Headquarters in the amount of $14,072,517 (FRS-003-13), the New WFRS Training and Apparatus Complex in the amount of $14,260,000 (FRS-004-24) and partial funding for the Re-alignment of Fire & Rescue Apparatus and Training Facility in the amount of $400,000.

Should City Council adopt the FMP, Administration will submit funding requests for priority projects in future operating and capital budgets development processes for consideration over the life cycle of the Fire Master Plan.

Consultations:

N/A

Conclusion:

The Fire Master Plan will provide WFRS with direction to make decisions over the next 10-15 years to better the City of Windsor and its residents.

Planning Act Matters:

N/A

Approvals:

Name	Title
Stephen Laforet	Fire Chief
Emilie Dunnigan	Manager, Development Revenue and Financial Administration
Vincenza Mihalo	Executive Director, Human Resources
Wira Vendrasco	City Solicitor
Ray Mensour	Commissioner, Community Services
Janice Guthrie	Commissioner, Finance and City Treasurer
Joe Mancina	Chief Administrative Officer

Notifications:

Name	Address	Email

Appendices:

1 Appendix A – Fire Master Plan
2 Appendix B – Recommendations with Departmental Response

Appendix B - Recommendations with Department Response

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
4	The City of Windsor needs to develop a comprehensive Community Risk Reduction Plan that aligns with the CRA and FMP related recommendations.	Staff Time	Immediate (0-1 years)	The development and implementation of the CRRP will aid in prioritizing risks that will be lessened or mitigated. Answering the who, what, when, and how will assist in identifying risks.	Completed
6	That the WFRS initiate a Process Mapping study to identify redundancy and areas for improvement to optimize staffing in the Fire Prevention unit. Along with a study pertaining to the roles and responsibilities of the Deputy Chief of Support Services with a lens to evaluate workload.	Cost for a study can be as much as $30,000, unless resources are available internally or from the City of Windsor.	Immediate (0-1 years)	Process mapping may contribute to up to 20% performance improvement. Increasing staffing and process mapping would allow the WFRS Fire Prevention Unit to meet anticipated future growth.	Budget Issue: Resources are not available to accomplish this internally. Timeline: 2-3 years if approved by Council
9	WFRS conduct an audit to identify buildings requiring an inspection and to establish a frequency inspection schedule that would be manageable for WFRS, while optimizing community safety	Staff Time	Immediate (0-1 years)	Best practices for frequency inspection schedule arrange occupancy types by level of risk and prioritize level of risk commensurable with 1-yr, 2-yrs, or 3-yr inspection rotations.	Resources are not available to accomplish this internally. The department will utilize the recently completed Comprehensive Risk assessment to prioritize an interim inspection schedule. Presently, the Fire Prevention Division's staffing level hinders the department's ability to establish an inspection schedule beyond the statutory requirements of the FPPA. Additional staff may be required to achieve an increase in inspection type and frequency. Timeline: 1 to 2 yrs.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
10	WFRS revamp their proposed 2011 Fire Prevention policy through the lens of the NFPA 1730 and implement the updated policy with accompanying SOGs, detailing specific functions of fire inspection, fire investigation, and public fire and life safety education.	Staff Time	Immediate (0-1 years)	A policy would assist fiscal and operational monitoring of the section, as well as service delivery standard.	In Progress Timeline: 0-1 year.
11	Create a career path model for all specialized functions/positions within the WFRS.	Staff Time	Immediate (0-1 years)	Firefighting is a high-risk profession. Training is essential to enable firefighters to respond more efficiently to emergencies, reducing the property damage caused by fire, loss of life, and public hazards, as well as reducing personnel injuries. Although the WFRS has a career path model for recruit firefighters and officer promotion, there is limited documentation regarding career path modeling for other specialised positions, such as fire prevention officer, fire investigator, public educator, telecommunicator, or technical rescuer.	Discussions with WPFFA in progress Timeline: 0 to 1 yr.
12	WFRS consider a review of its organizational Chart with a training - centric lens to ensure equitable training support to all WFRS divisions.	Staff Time	Immediate (0-1 years)	The WFRS Training Division should not be under the tutelage of any specific Deputy Fire Chief but rather between the two Deputy Fire Chiefs linked with a dotted line to leverage training support to the entire WFRS.	The department agrees that the training division should be responsible for facilitating all departmental training needs. This will require the addition of 2 training officers. The department, however, disagrees with a dotted-line approach to accountability where the responsibility of the division lies somewhere between 2 deputies. Timeline: 0 to 2 years

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
14	WFRS Training Division ensures that any training props should be made to comply with NFPA 1402, Standard on Facilities for Fire Training and Associated Props.	Staff Time	Immediate (0-1 years)	NFPA 1402 provides guidance for the planning of fire service training centers, focusing on the main components necessary to accomplish general firefighter training effectively, efficiently, and safely.	
17	All in-house trainers supporting the annual suppression training program should be qualified to level 1 of the NFPA 1041: Standard for Fire and Emergency Services Instructor Professional Qualifications.	Staff Time	Immediate (0-1 years)	The benefits include improved teaching expertise and experience, improved delivery of program objectives, better- trained personnel, as well as benefiting the training resource capacity of the WFRS.	As part of the new legislation, all personnel responsible for training staff shall be certified to NFPA 1041. The deadline for compliance is July 2026
18	Suppression staff be trained to Fire and Life Safety Educator Level 1 and that the WFRS operations Division captains also be trained as Public Information Officer, under the NFPA 1035.	Staff Time	Immediate (0-1 years)	Suppression members contributes to public and life safety education through various WFRS initiatives. Suppression personnel and the WFRS in general would benefit from enhanced training in Public and Life Safety Education.	Starting in 2024 and ongoing new hires will be trained and certified to NFPA 1035 level 1

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
19	WFRS Fire Prevention policy addresses training requirements and that the training requirements for Fire Prevention which is set at Level 2 of NFPA 1031: Standard for Professional Qualifications for Fire Inspector and Plans Examiner be added to the program development and delivery of the WFRS Training Division. Or at the very least, WFRS Training Division should vet the curriculum and arrange testing and certification to NFPA 1031 and 1035 for fire prevention officers.	Staff Time	Immediate (0-1 years)	Fire inspection is a strong program within the WFRS. Training development and delivery are like public and life safety education concerning external training and coordination by the WFRS Training Officer. With the adoption of Ontario Regulation 343/22 and the certification requirements for fire prevention personnel, WFRS would benefit from the Training Division assuming a monitoring role and a curriculum design role to assure candidates' success from the provincial testing.	All Fire Prevention Officers are trained to NFPA standards. The deadline for legislative compliance is July 2026. Discussions on the promotional process and career pathways within the service are occurring which will inform the curriculum design. Timeline: On-going.
21	WFRS Training Division, at the very least, be responsible for record keeping and monitoring of EMS training requirements.	Staff Time	Immediate (0-1 years)	The benefits include improved teaching expertise and experience, improved delivery of program objectives, better trained personnel, as well as benefiting the overall in-house tracking of programs.	Agree. All training records will be kept in the RMS system. Timeline in-progress
22	WFRS update their Probationary to First Class Promotional Process SOP to include details (steps-by-steps) regarding the process.	Staff Time	Immediate (0-1 years)	With respect to the firefighter increment promotional process, it is based on a three-year period for completion and the SOP identifies clear and concise objectives and goals for each increment. However, written details of the promotional process are lacking compared to the actual process diligently followed by the Training Division responsible for the firefighter increment process.	Administrative issue. Timeline: Anticipated completion Q4 2025

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
23	EMG recommends that WFRS develops detailed SOP for each rank on the promotional process system, including Training Officer, Captain, and District Chief promotional processes.	Staff Time	Immediate (0-1 years)	With respect to the firefighter increment promotional process, it is based on a three-year period for completion and the SOP identifies clear and concise objectives and goals for each increment. However, written details of the promotional process are lacking compared to the actual process diligently followed by the Training Division responsible for the firefighter increment process. With respect to the officer promotional processes, EMG did not identify SOPs related to Training Officer, Captain, District Chief promotional processes, except for an SOP for firefighter increment process (GO 03.01- 2020). The current Human Resources promotional process SOP is lacking in detail and does not conform to the current process.	In Process The department and WPFFA are currently negotiating changes to the promotional process. Timeline: Anticipated completion Q4 2024

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
26	A full pre-incident planning program should be implemented for vulnerable occupancies (nursing homes etc.) high-risk industrial properties, multi-unit dwellings, commercial business districts, institutional occupancies (hospitals, universities), assembly occupancies, office-type structures, international crossings, and airports.	Staff Time	Immediate (0-1 years)	To afford fire crews the ability to gain foreknowledge (intelligence) of the water supplies and features threats of individual buildings that they may be called upon to operate in.	In addition to taking a tremendous amount of time to complete, the benefits of pre-incident planning are only realized if a reliable and accessible records management system is in place to store and retrieve the records. The department continues to transition to a single RMS system. Over 90% of all Fire Safety Plans are currently input into RMS. These plans will be available to responding personnel by Q4 2024. Where Fire Safety Plans do not exist and are not required for a property, pre-incident surveys and plans will be developed over the next few years. Timeline: 2 to 3 yrs.
44	Windsor update their emergency management training plan to ensure that existing and new staff are current with their required training as per their position within the plan.	Staff Time	Immediate (0-1 years)	Keeping this plan up to date is a requirement under the Act.	The Emergency Response Plan is kept up to date. Annual compliance with EMCPA, including mandatory training for the Municipal Emergency Control Group, is met annually. Timeline: Complete
27	The Department should establish annual training focusing on airport operations (including radio procedures), pre-incident planning, aircraft recognition and hazards, and aircraft rescue and firefighting operations for its crews.	Staff Time	Immediate to Short-Term (0 – 3 years)	Preparedness and safety issues for firefighters (who need to be intimately familiar with the risks and safety precautions to take).	Aircraft firefighting is distinct from municipal firefighting. Annual exercises and pre-planning to continue in 2025. Revised SOP to be developed. Timeline: Q4 2026

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
28	The Department should review its emergency response protocols for tunnel and bridge operations in concert with allied agencies on both sides of the border with a view to strengthening relationships and updating procedures respecting rescue, crash, firefighting, derailment, hazardous material, and terrorism/border security response tactics and procedures.	Staff Time	Immediate to Short-Term (0 – 3 years)	Preparedness and safety issues for firefighters (who need to be intimately familiar with the risks and safety precautions to take).	Exercises with the Tunnel occur annually. Response SOP to be updated. Completion date – 2025 – 2026 The new response protocol for the Gordie Howe International Bridge will be completed by 2026. Discussions with the Constructor and operator of the new bridge are ongoing. Timeline: In progress. Anticipated completion Q4 2026
29	The Department should undertake a comprehensive analysis of medical responses in respect of response times relative to EWEMS arrival, patient outcomes where WRES initiates life-saving measures, and other potential efficiencies that may be derived from such an analysis.	Staff Time	Immediate to Short-Term (0 – 3 years)	To establish and validate the business case for continuing involvement in this program and to assess the effectiveness of Departmental intervention efforts.	
30	The Department should explore the notion of program cost-recovery (training, consumables, response) from the County for providing first- response medical services as a means of securing at least partial program cost recovery.	Staff Time	Immediate to Short-Term (0 – 3 years)	Reduce the impact of operational costs by identifying a revenue source.	WFRS receives funding from Essex County for involvement in the Medical Tiered Response program. Funding increased in 2024 by 50%. The department will continue to monitor the cost of medical responses and negotiate funding levels accordingly. Timeline: Complete

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
31	The Department should establish the necessary budget and training programs to implement the rescue disciplines of Confined Space Rescue, High Angle (Rope) Rescue, and Trench Rescue OR These services be deleted from the Establishing and Regulating By-law.	Staff Time	Immediate to Short-Term (0 – 3 years)	The current Council policy (as expressed in the E&R Bylaw) is that the department is to carry out these functions, however, it is neither equipped nor trained to do so, thus presenting liability on several fronts.	The department will seek amendments to the by- laws that reflect the current service levels. Timeline – in progress
32	The Establishing and Regulating By-law should be updated to provide for the provision of Urban Search and Rescue (USAR) services as a Council-approved activity	Staff time only – but cost could be incurred if approved by Council .	Immediate to Short-Term (0 – 3 years)	To bring the By-law into concurrence with current departmental practices.	The department will seek amendments to the by-laws that reflect the current service levels. Timeline – in progress
34	The Post Incident Analysis Report (PIAR) process and SOP should be refreshed to reflect current practices and formal PIARs be conducted for incidents that meet a predetermined threshold. In addition, it's recommended that each PIAR be documented thoroughly and that an annual summary of all PIARS occurring in a calendar year be prepared with all operational staff, and the training division so that lessons learned can be incorporated into future training sessions.	Staff Time	Immediate to Short-Term (0 – 3 years)	To allow for broader organizational learning opportunities.	Timeline: Complete

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
35	The Department should undertake a review of the firefighting foam and other products used by the city to ensure that the products used are fluorinated chemical free and that they represent the best solution for current and future needs.	Staff Time	Immediate to Short-Term (0 – 3 years)	Firefighter safety and environmental protection.	Fluorinated foam or firefighting foam containing PFAS may pose a health hazard to responders, the public and the environment. WFRS has used PFAS-free Class A (ordinary combustibles) for several years. Notwithstanding the previous, the department is transitioning entirely from Class A foam for cost and environmental reasons. Class B (Flammable liquids and gases) foam is still required. The movement to newer, more environmentally favourable products depends on product availability. WFRS will continue to research the availability of newer PFAS-free products. Timeline- In Progress
36	A staff-driven team should be established with a broad mandate for the review and analysis of newer technologies available in the Canadian marketplace for potential applications locally and in addition to the cache of equipment.	Staff Time	Immediate to Short-Term (0 – 3 years)	To facilitate the introduction of new technologies intended to increase efficiency and safety.	Timeline- 0 to 3 yrs.
1	The Fire Administration brings forth a revised version of the E&R Bylaw for the Council's approval and ensures its annual review and updates.	Staff Time	Short-Term (1-3 years)	Maintaining an up-to-date E&R By-law will guide the WFRS' operations and identify response guidelines, fire prevention, and public education programs and levels of training.	Timeline- Immediate
2	The Fire Administration reviews By-laws that affect the daily operations of the fire department.	Staff Time	Short-Term (1-3 years)	Having current By-laws will reflect changing the circumstances of the City and meet Federal or Provincial Acts and Regulations.	Timeline - Immediate

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
3	Establish an SOP Committee representing all divisions of the WFRS that develops new SOPs and reviews current ones regularly.	Most costs will be about time spent by committee members.	Short-Term (1-3 years)	Establishing an SOP committee will aid in maintaining the information in the database to be current while allowing the participation of WFRS members to determine the fire department's operations.	Budget item: Due to increased costs associated with staff overtime participating in committees. Timeline 0 to 3 yrs.
5	The City of Windsor's Building Department and WFRS should promote the advantages of installing residential sprinklers, which include saving lives and property.	Staff Time	Short-Term (1-3 years)	Historically no persons have died in residential fires where residential sprinklers were installed and activated during a fire, and sprinklers may reduce the risk to homeowners.	Increased use of residential sprinklers will reduce fire-related injuries and dollar loss and decrease firefighter exposure to the products of combustion and mental trauma. Furthermore, when a fire occurs in a sprinklered area, the amount of damage is less, thus reducing the time required to repair and re-occupy the space. The OBC requires sprinklers in only some occupancy types but not all residential buildings. The City cannot establish any requirement beyond the OBC but could establish an incentive program. Investigating this initiative is recommended. Timeline: 2 to 4 yrs.
7	EMG recommends that WFRS re-evaluate the need for an additional Public and Life Safety Educator position within the Fire Prevention Division.	Costs associated with one FTE	Short-Term (1-3 years)	WFRS had two PFLSEs in the past. Previously, there may have been appropriate reasons to eliminate the position. However, given the renewed emphasis and demonstrated benefits of the first line of defense, re-instating the position within WFRS Fire Prevention would have added value to the WRFS and the City of Windsor.	There is an immediate need to increase the level of public education. Timeline: 1 to 3 yrs.
8	WFRS Public Education Program be reviewed annually to help identify any areas for improvements.	Staff Time	Short-Term (1-3 years)	WFRS Public Education Program be reviewed annually to help identify any areas for improvements.	Timeline: 1 to 3 yrs.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
13	Increase the WFRS Training Division staffing be increased by one Training Officer to meet anticipated growth and demands for training because of the Ontario Regulation 343/22 and introduction of an EV Battery plant within the municipality.	One Full-time Training Officer at a cost between $111,250 and $114,700	Short-Term (1-3 years)	Compounding factors contributing to inadequate staffing levels for the Training Division are the Ontario Regulation 343/22: Firefighter Certification, made under the Fire Protection and Prevention Act, 1997 and the building of an EV battery plant (Stellantis). These compounding factors are accruing workload to the Training Division and necessitate consideration for the increase staffing to the Training Division by one Training Officer.	Budget item. Training requirements for the fire service continue to increase annually. Timeline: 1 to 3 yrs.
15	EMG recommends a study to evaluate the benefit of relocating the Training Division as part of future expansion of the WFRS fire stations in view of including training facilities that would support revenue generation beneficial to sustain and support the WFRS training programs.	Study can be conducted in- house at limited costs. External consultant for such a study may cost upward of $50,000	Short-Term (1-3 years)	The current training facility is aging and has limited capacity to train to the current levels of service. Considering the Ontario Regulation 343/22 and the expansion of testing and certification to all level of service provided by WFRS, it would be beneficial to evaluate current capacity of the Training Division facility vis-à-vis relocating to a new facility that would account for the required expansion of the Training Division to meet growing needs.	Timeline: 1 to 3 yrs.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
16	All technical rescue training should be monitored through the WFRS Training Division in adherence to the NFPA 1006: Standard for Technical Rescue Personnel Professional Qualifications and in accordance with Ontario Regulation 343/22: Firefighter Certification. EMG also recommends that the WFRS aligns its technical operations and training to NFPA 2500: Standard for Operations and Training for Technical Search and Rescue Incidents and Life Safety Rope and Equipment for Emergency Services.	Staff time and possible cost associated with an updating of records management programs.	Short-Term (1 – 3 years) To align with O.Reg. 343/22 deadline of 1st of July 2026	With the adoption of Ontario Regulation 343/22: Firefighter Certification, made under the FPPA, 1997, as of July 1st, 2026, all fire departments will have to meet the certification requirements addressed in the regulation. The NFPA 2500 Standard is primarily used by emergency response agencies to guide their technical rescue training, equipment, and operations	Timeline: Complete
20	WFRS dedicated fire investigators be concurrently certified to NFPA 1033 and NFPA 921. In addition, EMG suggests that fire investigation operations and training adhere to NFPA 1231: Standard for Fire Investigation Units and that the WFRS Training Division be responsible for monitoring, record keeping, testing, and certification to the said NFPA standards	Staff time and costs for attending the NFPA courses	Short-Term (1 – 3 years) To align with O.Reg. 343/22 deadline of 1st of July 2026	NFPA 921 and NFPA 1321 documents complement NFPA 1033. Adherence to all three standards will assure best practices in training, equipment, and operations pertaining to fire investigation functions. training resource capacity of the WFRS	O.Reg. 343/22 requires NFPA 1033 certification. The department intends to ensure all staff members meet the legislative requirements (NFPA 1033) and then pursue certification to additional NFPA standards. Timeline: in progress and continuing.
33	The Department should re-establish a Marine Unit with a properly sized vessel that affords the ability to provide fire attack/control, rescue, and spill mitigation along the City's waterfront.	If approved, there would be costs associated with the level of equipment and training required.	Short-Term (1 – 3 years)	To establish a more complete fire rescue response and environmental protection capability to safeguard the recreational and commercial boating community and protect the waterfront.	This recommendation requires increases to the department's capital and operating budgets. Timeline: 5 to10 years

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
37	A permanent staff position should be created with a responsibility to develop and monitor quality assurance and related practices that will keep Windsor Fire and Emergency Services at the forefront of the delivery of fire protection services across the spectrum of services that meet the needs of the ratepayers of the City of Windsor.	Approximate cost of new position $50,000 to $70,000.	Short-Term (1 – 3 years)	A proactive measure that will allow for data monitoring and QA practice implementation at a greater rate/degree than is currently being conducted.	In 2024, the Department added an Assistant Deputy Chief Position responsible for Quality Assurance. Timeline: Complete
39	Train and certify the Windsor Fire Communicators to the OFM requirements.	Staff time and cost of training course.	Short-Term (1 – 3 years)	Staff time, which could incur overtime for course attendance off site.	O.Reg. 343/22 requires Emergency Communicator to be Certified to NFPA 1061 by July 01, 2026. The current training provided to all Emergency Communicators meets or exceeds NFPA 1061. Testing to commence after the division completed the transition to NG-911, including the move to the WPS building. Timeline: Q2 2026
45	Windsor develop and/or review essential Continuity of Operations Plans/Business Continuity Plans for the internal operations of the municipal administration.	Staff Time	Short-Term (1-3 years)	Review and updating of such a plan is a key resource for the City.	The department has a BCP for interruption of operations associated with the physical loss of equipment and loss of personnel due to pandemic, endemic, etc. The department is currently working with Corporate IT to develop a BCP to deal with the loss of technology. Timeline: 1 to 2 yrs.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
46	EMG recommends that all Automatic Aid, Mutual Aid and Fire Protection/Service Agreements be reviewed annually and revised if necessary. All parties involved should pay particular attention to adherence, and regularly defined review periods and or expiry dates identified. Also, a page listing the dates of review and areas revised should be an addendum to any of the revised agreements and associated By-laws.	Staff Time	Short-Term (1-3 years)	Having a current By-law and agreements in place better reflect enhanced service levels in providing fire protection services.	The Essex County Mutual Aid Plan is reviewed annually. Other protection agreements are reviewed and updated as needed. The department intends to undertake work to consolidate all agreements with their associated revision period in a single database. The by-law will be updated as required. Timeline: 1 to 2 yrs.
47	That all joint training opportunities be engaged in wherever possible.	Staff Time	Short-Term (1-3 years)	If a technical rescue call requires additional resources from outside the WFRS, a plan will already be in place ahead of time. It reduces the response time of these agencies if agreements are in place in advance, as pre-response approvals will not be required.	The department trains annually with its provincial counterparts in Haz Mat CBRN-E and USAR. The department also trains annually with each municipal fire department in Essex County for Hazardous Materials incidents. Since writing this plan, the department has trained with WPS and Essex Windsor EMS for active attacker emergencies. If the department expands its technical rescue capabilities future training opportunities will be explored. Timeline: in-progress and continuing
48	The Fire Chief annually review the building infrastructure replacement plan to ensure it meets municipal growth patterns and the current fire department locations remain relevant to community needs and emergency response	Staff time initially. Cost depending on needs.	Short-Term (1-3 years) ongoing	Review recommended to ensure services are meeting the needs of the department and community.	Timeline for analysis: 1 to 3 yrs. and ongoing.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
49	The Fire Chief annually review the fleet replacement schedule to update projected costs and currency.	Staff time initially. Cost depending on needs.	Short-Term (1-3 years) ongoing	Review recommended to ensure services are meeting the needs of the department response capabilities.	Timeline; inprogress and ongoing.
38	Consideration should be given to adding four Platoon Chief positions to the organizational structure of the department.	Approximate cost of a Platoon Chief would be $130,000, plus benefits	Short to Mid-Term (1-6 years)	As the population of the city increases and annual call volumes exceed 10,000 incidents, the Platoon Chief (one per shift) will allow for greater operational oversight while reducing the administrative workload on the District Chiefs. This position will increase command presence on the fireground, potentially reducing the span of control issues and increasing the efficiency of the Command Team.	The department agrees that adding four platoon chief positions would be very beneficial. The addition of FTEs is a budget item that will be brought forth for council consideration in future budget processes. Timeline: 1 to 6 yrs.
40	Station #1/HQ is running out of space and will no longer be able to effectively house all the department's vehicles, equipment, and staff quarters. As such, there is a real need for either a full upgrade/expansion of the present facility, or the building of a new fire station. Fire prevention and communications are to be part on the new facility.	For a facility the size of HQ, the cost would be approx. $10 to $20 million dollars or more depending on size and timing of project.	Short to Mid-Term (1 – 6 years)	An upgrading of the present facility would in most cases be a short-term fix and will most likely fail to meet the demands of the department. The cost of such upgrades could cost almost as much as the cost of a new headquarters. The building of a new headquarters should consider future growth expectations, along with incorporating new technologies to make the facility both energy efficient and safer for staff.	Several consolidation options exist that could bring one or more of the department's divisions under one roof. A location to replace Station 1 has been secured. The next step is to determine whether this location would serve as the new location for the administration divisions and Fire Prevention or whether these divisions would be moved to another location. Timeline: 3 to 10 yrs.
41	Station #4 should be relocated because of the construction of a new Canada Customs truck inspection plaza at the foot of the Ambassador Bridge.	Stations – approx. $4 to $6 million each.	Short to Mid-Term (1 – 6 years)	Station 4 is the oldest fire station. Relocation and a new building would be opportunistic, given the construction of the new Customs Plaza's impact on the current location of Fire Station #4	Project underway. Timeline: 2 to 3 yrs.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
42	To plan for the new fire station in District 7 or District 6 over the long term, the Fire Chief should work with the Planning Department to verify where the growth will occur and in what timeline.	Stations – approx. $4 to $6 million each. Fire trucks – approx. $800,000 to $1,000,000 each. Plus 20 staff for each new station.	Short to Mid-Term (1 – 6 years)	By doing this, a growth-based plan can be developed in relation to the station builds. This new construction and staff hiring for the new fire stations is a long-range plan that will most likely take place over the next ten years (or perhaps longer, depending on the City's growth).	As development continues to accelerate in those areas, an additional station will be required to service the lands in the south and east end of the city. Opportunities exist to consolidate a new station by relocating the training division, apparatus division, and possibly other divisions. Getting this project moving will require additional capital funds. The department will provide the council with proposals for consideration in future budget processes. Timeline: 1 to 10 yrs.
24	Twenty new firefighting positions should be hired in the short term, and twenty additional firefighters be hired in the medium term to address the current and future community risks that exist. One of these crews should be assigned to Station 7 in the City's east end; the other to Station 4.	Firefighter would initially start at 4th class, which is approximately $70,000 plus benefits. (Costing for one full-time first-class firefighters is approximately $105,000, plus benefits).	Short to Long-Term (1 – 10 years)	This will supplement existing staffing levels allowing greater depth of response and a greater ability to rotate firefighters into rehab at major incidents; provides for greater firefighter safety and potential for injury prevention, thus reducing WSIB and overtime costs.	Additional staff will be required to meet future needs. The department prioritizes all staff additions. An analysis and recommendations will be brought to the council for their consideration in future budget processes. Timeline: 2 to 10 years.

Rec #	Recommendation	Estimated Cost	Suggested Timeline for Implementation	Rationale	Department Response
43	The maintenance facility is outgrowing the demands of the Department. As such, a new maintenance facility should be built in the long term to meet future demands. This new maintenance facility could also be factored into the construction of the new headquarters.	Cost of a new facility or part of the new HQ could range from approx. $1 million as part of HQ, to $5 to $10 million (or more) as a stand-alone facility.	Mid to Long-Term (4 – 10 years)	The idea of a new HQ that would bring Training, Fire Prevention and Fleet Maintenance into one building would reduce the overall cost of building two separate facilities.	The current facility lacks sufficient space, particularly an additional bay with an inground hoist capable of lifting aerial apparatus. Several consolidation options exist that could bring one or more of the department's divisions under one roof. One option would be to collocate the Apparatus divisions with a new station in the City's south and east area. See recommendation #42. Timeline 1 to 10 yrs.
25	An update of the human resources element of this Fire Master Plan should be conducted in 2030 to evaluate the need to hire an additional 20 firefighters based on community growth and risk as they will have developed to that point in time.	Firefighter would initially start at 4th class, which is approximately $70,000 plus benefits. (Costing for one full-time first-class firefighters is approximately $105,000, plus benefits).	Long-Term (10 years)	To assess the impact of community growth on response times, response depth, WSIB, and overtime costs that develop over the medium to longer term.	A review of the Master Plan and analysis of its progress is necessary Timeline: 10 yrs.

THE CITY OF WINDSOR ONTARIO, CANADA

Council Report: S 114/2024

Subject: Update to Windsor/Essex Region Stormwater Manual & Response to CR195/2022 Flood Risk Monitoring and Mitigation Measures and Programs - City Wide

Reference:

Date to Council: September 25, 2024
Author: Ian Wilson
Water & Wastewater Engineer
(519) 255-6100 Ext. 6369
iwilson@citywindsor.ca
Development – Engineering
Report Date: September 5, 2024
Clerk's File #: SW2024 & SW/13822

To: Mayor and Members of City Council

Recommendation:

I. THAT City Council **RECEIVE** the Windsor/Essex Region Stormwater Manual update (v2, Amendment No. 1, dated: June 12, 2024) and **ADOPT** the Manual as part of the standards for the design and review of stormwater infrastructure within the City; and,

II. THAT City Council **RECEIVE** the response to CR 195/2022 for information.

Executive Summary:

N/A

Background:

On April 1, 2019, report C 35/2019 introduced the first publication of the Windsor/Essex Region Stormwater Manual (WERSM), version 1 to Council. The WERSM was prepared as a collaborative effort with nine municipal partners, including the City of Windsor, and led by the Essex Region Conservation Authority (ERCA) to standardize stormwater management best practices within the region (previously endorsed by Council per B 29/2019). The WERSM was to be reviewed and updated on a regular basis with technological advancements and engineering best practices. In June 2024, an updated Manual, version 2, was released.

At the July 5, 2021 meeting of City Council, Councillor Gill asked the following question, CQ 13-2021:

> *"Whereas in Ward 7 this is the third time that the same basements have been flooded spanning from 2008, 2016, 2017 and even last week in June 2021 from the inadequate storm water management. This is unacceptable for residents of this area as many of the damages are not covered by insurance and residents are left to pay out of pocket on many separate occasions; and whereas,*
>
> *In 2017, there was a resident meeting with administration to discuss the flooding issues. I would like to ask administration what the findings were from the 2018 meeting and what measures were put in place to resolve this issue; and,*
>
> *I would like to ask administration what the findings from their studies on the recent flooding issues in June 2021 were and what measures they will now be taking to rectify this problem. I request that administration report back to council in detail with viable action solutions, as soon as possible to mitigate the situation that is getting worse for many residents in Ward 7.*
>
> *I urge that we put a pause on other developments until we have remedied these urgent problems and set up a system to prevent future flooding."*

A response Council Report (C 1/2022) was provided for the above question as part of the May 9, 2022 Agenda package. Following the Report C 1/2022, Council Resolution CR 195/2022 directed administration as outlined below.

> *That the report of the Engineer II dated January 5, 2022 entitled "Response to CQ 13-2021 – Basement Flood Risk Reduction Update – Ward 7"* ***BE RECEIVED*** *for information; and further,*
>
> *That administration* ***BE DIRECTED*** *to report back to Council on what effective monitoring program can be put in place to give early warning in order to mitigate future flooding events and make proper adjustments to the system as needed.*

Discussion:

Update to Windsor/Essex Region Stormwater Manual (WERSM):

In February 2023 at the Windsor-Essex Regional Engineers and Planners Meeting, the value of updating the WERSM was identified including incorporating lessons learned from the manual's first years of implementation. ERCA, coordinating the WERSM update, retained Landmark Engineers Inc. (Landmark), as Landmark employs the original WERSMI's lead author. A scope of work proposal was circulated for review to municipal partners, including City of Windsor administration, prior to project initiation.

A finalized version of the updated WERSM was completed in June 2024 and a link is provided below. Key elements of this revision include clarification on the intent of the manual, providing consistent guidance to practitioners, while encouraging purposeful deviations using engineering judgement. A revision summary table is provided in the addendum cover pages of the updated manual.

https://www.essexregionconservation.ca/_files/ugd/24e1b4_578198d4bf7441248100c019c612df5c.pdf

The ERCA Board of Directors adopted the updated WERSM into policy for reviewing development applications and the other municipal partners are also anticipated to adopt the updated manual.

Adopting the updated WERSM will position the City to better address stormwater management as development increases throughout the City. The updated manual encourages, where appropriate, flexibility in designs with engineering judgement.

Response to CR195/2022 Flood Risk Monitoring and Mitigation Measures and Programs:

Provincial, Federal and local (City of Windsor) flood risk notification programs are all currently available to residents. Further, residents are encouraged to take advantage of existing notification and warning systems to better help prepare their homes and properties.

A technical memo has been attached as Appendix A, which provides a detailed response to CQ 13/2021 and the follow-up questions from CR 195/2022. The memo summarizes existing flood monitoring and notifications systems, programs available to residents aimed at reducing flood risk, and projects the City has undertaken to reduce flooding risk associated with sewer surcharge, overland flow, and coastal high-water levels.

In addition, the Sewer and Coastal Flood Protection Master Plan (SMP) was adopted in 2020 which recommends approximately $5B of short and long term solutions which serve to reduce the impact and risk of flooding. Administration has provided annual progress updates on the SMP to Council. The most recent update report provides figures and details of the 30+ projects being tracked under this file all with the objective to reduce flooding risks. A link to the Council Report (C 17/2024) summarizing the SMP implementation update and project tracking is provided below (see item No. 7.5).

https://www.citywindsor.ca/Documents/city-hall/City-Council-Meetings/Council%202024/03-18-2024/March%2018,%202024%20-%20City%20Council%20-%20Agenda%20-%20Item%20Numbers%20and%20Page%20Numbers.pdf

Risk Analysis:

The adoption of the updated WERSM will further reduce risks associated with flooding by adopting current standards and lessons learned that are focused on regional challenges and opportunities.

There are no significant or critical risks associated with the information provided to Council for information (per Directive CR 195/2022). The information provided in the memo outlines a variety of mitigation measures which seek to address contributing factors to flooding and provides an update on initiatives, programs and projects.

Climate Change Risks

Climate Change Mitigation:

The recommendations related to this Council Report do not facilitate Climate Change Mitigation in a material way.

Climate Change Adaptation:

The recommendations to adopt the updated WERSM will support efforts for climate change adaptation, specifically flooding risks. The updated WERSM continues to include a climate change "stress test" which will allow Administration to identify flooding risks that may result in unacceptable consequences and assist proponents to provide mitigating measures.

Financial Matters:

The City, as one of nine municipal partners, equally shared the total WERSM update project costs of $65,686.18, as outlined in the table below.

Component	Total Project Cost	Windsor's Contribution
Landmark Engineers Inc.	$59,931.39	$6,659.04
ERCA Project Management	$4,700.00	$522.22
Non-recoverable HST (1.76%)	$1,054.79	$117.20
Total	**$65,686.18**	**$7,298.46**

Windsor's contribution to the WERSM update is $7,298.46, which will be funded through the SMP Implementation account 7199004. The Financial Planning Administrator in Engineering confirms that there are sufficient funds available in project 7199004 to cover the City's portion of the costs described. It should be noted that any future costs to accommodate additional updates of the standards manual will be included in future capital budget requests for individual projects.

Consultations:

Kathy Buis – Financial Planning Administrator
Karina Richters – Supervisor of Environmental Sustainability and Climate Change
Emily Bertram – Emergency Planning Officer
Jason Moore – Senior Manager Communications & Customer Service
Ed Valdez – Manager Process Engineering & Maintenance

Jake Renaud – Executive Director, Pollution Control/Deputy City Engineer

Conclusion:

The adoption of the update to the Windsor Essex Region Stormwater Manual (WERSM) will position the City to better address stormwater management as development increases throughout the City.

The information is provided in response to directive CR 195/2022.

Planning Act Matters:

N/A

Approvals:

Name	Title
Mark Spizzirri	Manager, Performance Measurement & Business Case Development
Patrick Winters	Manager, Development
Stacey McGuire	Executive Director, Engineering / Deputy City Engineer
David Simpson	Commissioner, Infrastructure Services
Dan Seguin	On behalf of Commissioner, Finance & City Treasurer
Joe Mancina	Chief Administrative Officer

Notifications:

Name	Address	Email

Appendices:

1 Appendix A - Technical Memo - Flood Monitoring and Notification Programs: Improvements and System Adjustments Mitigating Impacts of Flooding

TECHNICAL MEMO

DATE: **July 19, 2024**

REVISED: **N/A**

TO: **File**

FROM: **Ian Wilson, P. Eng., M. A. Sc.**

SUBJECT: **Flood Monitoring and Notification Programs: Improvements and System Adjustments Mitigating Impacts of Flooding**

1.0 Introduction

This technical memo was drafted to respond to CQ 13/2021 and the follow-up questions from CR 195/2022. The memo summarizes existing flood monitoring and notifications systems, programs available to residents aimed at reducing flood risk, and projects the City has undertaken to reduce flooding risk associated with sewer surcharge, overland flow, and coastal highwater levels. This memo identifies how active systems would normally adjust during heavy rainfall events to mitigate flooding impacts.

2.0 Existing Notification Programs

In Ontario, flood forecasting is the responsibility of the Ministry of Natural Resources and Forestry (MNRF) and Conservation Authorities. Federally, Environment and Climate Change Canada also provides warnings for severe weather events including warnings for potential flooding.

The City of Windsor acts to amplify and support the notifications and alerts of potential emergencies (including flooding) that are provided by official agencies such as Windsor Fire and Rescue, the Windsor Port Authority, and Environment and Climate Change Canada.

During an emergency, the City of Windsor works with traditional news agencies to ensure notifications, updates and warnings are **broadcast** to residents. News releases and news conferences are two tools used to convey information via traditional media and each also triggers social media messages through the City of Windsor's social media accounts. Residents are encouraged to visit citywindsor.ca and follow city social media accounts.

Windsor Fire and Rescue operates a notification system called Windsor Alerts. This is a voluntary system that residents can opt-in to, to receive timely text and email notifications on emergencies. Residents or individuals interested in receiving messages during an emergency in Windsor are encouraged to sign up for Windsor Alerts at www.WindsorAlerts.ca.

Below is a summary of flood risk notification and warning programs. Residents are encouraged to take advantage of existing notification and warning systems to better help prepare their homes and properties. Further, and summarized in section 3.0, numerous tools and programs are provided to help make homes more flood resilient.

2.1 Provincial Notification Programs

Since the 1954 Hurricane Hazel event, flood forecasting has been the responsibility of the Ministry of Natural Resources and Forestry and the individual Conservation Authorities. Within the City's boundaries, the Essex Region Conservation Authority (ERCA) provides these services.

ERCA, like other Conservation Authorities, assists those within their region with flood risk management. ERCA monitors stream flow, lake and river water levels, and ice conditions within our watershed. They assess soil saturation levels and provide flood warnings to local municipalities and agencies when necessary, including assessing weather information at both the local and international levels to allow timely alerts to be issued. ERCA provides services at all stages of flood risk management including:

- Mitigation & Prevention – ERCA works to help limit and reduce exposure to risk by implementing ERCA's regulation and policies.
- Preparedness – ERCA's flood advisory plan and public education campaigns help prepare residents for flood events.
- Recovery – ERCA participates in flood event documentation and analysis and helps provide lessons-learned guidance to municipalities and the public.
- Before a potential flood event ERCA issues Flood Forecasts and Flood Warnings, communicates and advises on proper steps before and during an event, and maintains data records to assist in these efforts.

2.2 Federal Notification Programs

Federally, weather emergency warnings, including flood notifications are provided by Environment and Climate Change Canada. Environment and Climate Change Canada issues public weather alerts including warnings, watches and statements for extreme weather events. These alerts notify those in affected areas so that they can take steps to protect themselves and their property from harm. The type of alert used depends on the severity and timing of the event and are summarized as follows.

- **Special Weather Statements** are the least urgent type of alert and are issued to let people know that conditions are unusual and could cause concern.

- **Advisories** are issued for specific weather events (like blowing snow, fog, freezing drizzle and frost) that are less severe, but could still significantly impact Canadians.

- **Watches** alert you about weather conditions that are favorable for a storm or severe weather, which could cause safety concerns.

- As certainty increases about the path and strength of a storm system, a watch may be upgraded to a **Warning**, which is an urgent message that severe weather is either occurring or will occur. Warnings are usually issued six to 24 hours in advance, although some severe weather (such as thunderstorms and tornadoes) can occur rapidly, with less than a half hour's notice.

Environment Canada's notifications are also provided to residents via traditional media outlets (television, radio, etc.) and/or through a wireless public alerting (WPA) via a compatible device like a smartphone. A distinctive tone is included with WPA messages, which advises of warnings and actions that may be required. "Alert Ready" is the national public alerting system that distributes WPAs.

2.3 Windsor Alerts - Notification System

The Windsor Alerts service is an optional and opt-in program for the community, which provides local (City Level) notifications with updates, warnings and instructions before and during a major crisis, emergency or severe weather event. Notifications are provided by City Emergency Officials and are forwarded to a user's device(s) of choice (text, cellphone, email and landline).

In an emergency, Windsor Alerts subscribers will be sent information by the City, to inform residents of the situation and give instructions on how to react. Residents should then promptly follow instructions and continue to keep devices near them in the event that subsequent information is disseminated.

Windsor Alerts subscribers will be updated via electronic channels and further are recommended to monitor news outlets as well as the City of Windsor's website, Twitter and/or Facebook pages. Account holders receive tornado warnings and other critical emergency notifications.

Windsor Alerts is similar to the WPA that Environment and Climate Change Canada would use for extreme weather notifications. WPA is a public safety technology that allows public safety agencies to send critical notifications relating to dangerous weather, missing children or other dangerous situations. The WPA system is only used when absolutely necessary. A key difference is that Windsor Alerts is a voluntary, opt-in program specific to the City, whereas WPA is a technology that is embedded in all modern cell phones. Further, a major component of the Windsor Alerts system is the ability to deliver more targeted notifications during location specific emergencies such as gas leaks, hazardous materials events and flash floods.

2.4 Other Municipalities – Notification Programs

A limited comparison of flood risk emergency notification programs in other Ontario and Canadian municipalities was undertaken. This comparison review was completed in the first quarter of 2024 which considered programs and materials posted on the associated municipality's website. The municipalities investigated within Ontario include the City of London, City of Hamilton, City of Toronto, City of Ottawa, and the City of Guelph. Municipalities reviewed outside of Ontario include the City of Calgary, City of Edmonton, and the City of Winnipeg.

Only 2 of the 5 Ontario municipalities managed or implemented flood warning or notification programs. The City of London and City of Guelph implement the *Alert London Notification System* and the *Alert Guelph* system which in the event of an emergency provides critical public safety messages. These systems are designed to reach residents during a major crisis such as a large-scale flood, where the City officials will send warnings and instructions directly through text or call. These programs include more types of emergencies than just flood warnings. The City of London's and the City of Guelph's Alert systems function similar to Windsor's existing

Windsor Alerts. All 5 Ontario municipalities had emergency preparedness education materials posted on their website with similar content as the City of Windsor. Some of the Ontario municipalities had warning notifications for other similar, but non-flooding risks, including extreme hot and cold weather warnings.

Residents in the City of Calgary and the City of Edmonton can receive emergency warnings from Federal wireless alert (WPA) and provincial Alberta Emergency Alerts system. These systems provide numerous types of emergency notices including flood risk warnings.

The City of Winnipeg provides various flood risk education materials and bulletins on their website. The Province of Manitoba issues river flood risk predictions.

All seven of the other municipalities in Essex County provide a similar service to the Windsor Alerts system to their residents.

2.5 AI and Other Predictive Tools

With advances in artificial intelligence (AI) administration reviews potential tools, from time to time, that may predict future flood risk conditions. Real time controls (RTC) allow for adjustments of the system such as gates being lowered, or pumps being turned on. RTCs are currently used with the City's active sewage systems for example a stormwater pump would be off during a dry period and turn on during a rain event as the water level increases. Coupling RTC and AI may in the future improve system response; however, given Windsor's unique characteristics having flat topography and relatively small drainage areas, basement flooding risks are often associated with the immediate rain event and predictions of risk may be equally tied to accurate weather predictions.

One predictive AI tool is the Google Flood hub, link below. This tool includes estimates of flows within the Detroit River. As tools continue to advance, they will continue to be investigated and reviewed for application in Windsor.

https://sites.research.google/floods/

2.6 Private Services Available to Residents – Notification Programs

Multiple private services are available to residents for extreme weather and flood notifications. A partial list of these programs and services are outlined below. The listing of these private programs does not signify an endorsement from the City.

- Weather Underground
- AccuWeather
- Weather Network

3.0 Existing Drainage System Response

This section summarizes how the existing drainage system responds to flooding events including both the public (City) owned infrastructure drainage system and privately owned drainage infrastructure systems. In Windsor, like most municipalities, it is estimated that half or more of the total length of pipes servicing the drainage system are on private property. Modern and complete flood risk reduction programs need to be developed based on that fact.

3.1 Existing Public Infrastructure – Drainage System Response

The City's drainage systems are a complex network of underground sewers, pumping stations, control structures, roads providing overland flow and storage of rainwater, stormwater management facilities (ponds, underground storage, etc.), and open ditches and swales. **The majority of the City's sewage infrastructure is designed as a passive system with gravity being the driving force causing the water to flow through the system.** These passive systems do not have electrical or mechanical elements (i.e. pumps and controls) and as such cannot be adjusted or modified for storm events. The passive elements include storm, sanitary and combined sewers (nearly 1,800 km), roadside ditches and open drains (nearly 400 km), roadways (nearly 1,100 km), stormwater ponds (nearly 30) and over 22,000 catchbasins.

Beyond the many passive elements in the City's drainage system, there are fewer but key components of the sewage infrastructure that would be considered active with electrical and/or mechanical systems contributing to the operation. These active systems would include pumping stations (over 45), gates and other control structures. Treatment of sewage at the City's wastewater treatment plants would also be an active system.

Council Report C 5/2017 provided a debrief report following the major flooding event in August 2016, the below is an excerpt from that report, which summarizes steps taken under that extreme rainfall event.

> *During the storm, significant increases in flow rates to storm and sanitary pumping stations occurred in the impacted area. All stations responded appropriately, and additional pumps activated as required, in response to the increased flows. Additional staff came in during the initial hours of the rainfall event and continuously throughout the following days of the resulting increased flows to address any operational issues.*

The actions noted above would be typical for major storm events impacting the City's drainage and sewer systems. Pumping stations are generally controlled by automatic operation, which turn pumps on and off following increases or decreases in water level. Most pumping stations within the City can be monitored with real time telemetry.

Many stormwater management ponds and facilities in the City are dewatered by pumping stations. Under normal design conditions, where pumping stations are draining these systems, it may take several days (approximately 2

to 4 days) following the larger rainfall events to fully empty the runoff volume. This is a normal design condition which supports the function of the facility to provide stormwater runoff quantity and quality control. The stormwater ponds store the additional rainfall volumes during the storm and release them slowly into the sewers so as to not overwhelm the sewer system further in a storm event.

3.2 Private Infrastructure

As mentioned previously half or more of the drainage infrastructure within the City is on private property (e.g. private drain connections to homes, sewers and catchbasins in parking lots, stormwater retention facilities on a large non-residential site). The City is limited in its ability to manage and react to private drainage concerns. However, the City, the Ontario Building Code, the Essex Region Conservation Authority and the regional municipalities have established standards and best practices for these systems, including minimum standards for pipe sizes and through the adoption of the Windsor Essex Region Stormwater Manual (Windsor Essex Region Stormwater Manual v2 (essexregionconservation.ca). These are enforced through permit issuance and stormwater management approvals through the Site Plan Control process.

For residential properties, current standards require each new build to install a sump pump and backwater valve and where possible to construct all downspouts such that they splash on grade (rather than directly connecting to the storm sewer system).

3.2.1 City Offered Private Infrastructure Incentive Programs for Flood Mitigation

For existing properties, numerous private property flood risk reduction incentives are offered by the City of Windsor to improve the resiliency of residential properties. Key programs are listed below.

- Basement Flooding Protection Subsidy Program (BFPSP)
    - The City offers owners of residential dwellings (single family and duplex homes) a financial subsidy to install a sump pump with overflow and/or backwater valve(s) and/or disconnect foundation drains from the floor drain.
- Downspout (Eavestrough) Disconnection:
    - The City offers disconnection of your eavestrough downspout and is provided without charge to homeowners that qualify. Residents can call 311 to arrange for a home inspector visit.
- Eeling Program
    - The City offers eel service for blocked private drain connections (PDCs) free of charge three times over a 24-month period if tree roots are the source of the problem. If tree roots are not the source of the problem, a service fee applies.
- Private Sewer Replacement Program
    - The City offers a rebate for a total private drain connection replacement. Additionally financing options are offered by the City.
- Private Culvert Rehabilitation Subsidy Program

- The City offers owners of residential dwellings a financial subsidy to replace their existing failing culverts. For eligibility in the program, the existing culvert must be constructed under a driveway or lawn, providing private property access over a ditch or drain in the right-of-way.

- Home Flood Protection Program (HFPP)
  - The City offers a subsidized flood risk reduction education program for residents which provides a customized report of a home's flood risk. The reports provide residents information to help take actions and improvements to reduce risk and possible damage in the event of a flood. This program is currently a pilot project.

4.0 Programs and Measures to Reduce Flooding Risk

4.1 Citywide or Multi-Ward Flood Risk Reduction Projects

Numerous projects, programs and initiatives with the goal of reducing flood risk were recently completed or are currently ongoing. Below is a list of select citywide or multi-ward examples with this same goal.

Recently Completed Projects and Programs

- Sewer and Coastal Flood Protection Master Plan (SMP)
  - Summary: The SMP included collection of past flooding records, monitoring of actual flow conditions in sewers, computer modelling of flooding risks, public consultation, evaluation of flood risk reduction solutions, preliminary designs of solutions with cost estimates, and development of an implementation strategy.
  - Benefits: Provides a strategy to implement flood risk reduction measures based on recent and significant input including a balance of past flooding records, public input, Administration's experience, engineering design and sewer modelling software outputs. Council endorsed SMP recommendation strategy on July 27, 2020 per CR 379/2020.
  - Progress: Completed in 2020. Updates are required on a 5-10 year cycle to account for new information and upgrades in the system.
- Camera Inspections
  - Summary: Continued as part of the SMP, Administration began an exhaustive investigation into assessing existing sewer conditions in which video documentation of every sewer asset was recorded.
  - Benefits: The current inspections allow Administration to identify locations of breaks and look for significant sources of infiltration of groundwater into the sewers throughout the network.
  - Progress: Completed. However, ongoing updates are required to maintain currency in the information.
- Smoke and Dye
  - Summary: Smoke and dye testing programs were completed throughout the City to assess illegal and damaged connections to the sewer system. Smoke testing includes the placement of smoke in the sanitary sewer system and a subsequent observation identifying where the smoke escapes.

Dye testing includes placing a dye tablet in a home's yard drain to verify whether it is connected to a sanitary sewer.
    - Benefits: Smoke and dye testing are both useful tools to identify illegal connections or breaks, where unintended stormwater may enter the sanitary system leading to increased basement flooding risks.
    - Progress: From the smoke testing, nearly 200 instances of failure with the property owner's private drain connection clean-out were identified. Nearly 9,000 work orders were issued for smoke and dye testing between 2014 and 2017.
- Sanitary Sewer Lid Sealing SMP Priority Area Implementation – Phase 1 & 2
    - Summary: Installation of rain catchers (seals) under sanitary sewer maintenance hole covers which reduce surface water entering the sanitary system. The SMP identified a priority list of seals. Sanitary sewer lid seals were installed in nearly 1,300 priority manholes.
    - Benefits: The SMP identified that under heavy rainfall conditions the relatively inexpensive lid sealing could reduce the volume of rainwater entering the sanitary sewer system up to 5%.
    - Progress: Program implemented in 2 phases and completed in 2023.

On-Going Projects and Programs

- The City continues to subsidize several residential Private Infrastructure Incentive Programs, see section 3.2.1 for further details.
- Trunk Sewer Flow Monitoring Project (SMP)
    - Summary: This flow-monitoring program collects records of wet-weather and dry-weather flow conditions in sewer systems over a four-year period. Hydraulics in key trunk storm and sanitary sewer are being tracked.
    - Benefits: This flow monitoring data will support calibration and validation to improve the City's comprehensive sewer model. Additionally, this data will support an improved tracking of in-sewer hydraulics within the City with planned use in the upcoming Inflow & Infiltration workplan.
    - Progress: Data collection started in 2023 planned to end in 2027.
- Collaborative Low Impact Development (LID) Study (SMP)
    - Summary: The recently finalized Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) agreement between the Ministry of Environment, Conservation and Parks (MECP) and the City stipulates new stormwater design criteria for water balance control. To review constraints and options for more economical water balance controls in light of the City's predominantly clayey soils, Administration is initiating a study in partnership with the University of Windsor to evaluate the effectiveness of stormwater infiltration into soils locally.
    - Benefits: Improved understanding of potential limitations and constraints with meeting water balance control targets in the Windsor area which may result in a reduction in future stormwater infrastructure costs.
    - Progress: Project initiated in 2023. Planned completion in 2028.
- Development of Citywide Inflow and Infiltration (I&I) Reduction Workplan (SMP)
    - Summary: Develop an I&I workplan to assess the existing data, delineate areas of concern, define wastewater flow and private contribution I&I, and recommend future I&I reduction measures. A focus of the workplan will be to better understand the causes of I&I in neighbourhoods where foundation drains should not be connected to the sanitary sewer system.

  - Benefits: Consolidation of existing I&I programs and information. Better understanding of I&I in newer construction neighbourhoods. Action plan for next ten years to reduce I&I and associated basement flooding risk.
  - Progress: Project initiated in 2023. Planned completion in 2028.
- Windsor West RTB (DMAF-4)
  - Summary: As outlined in Windsor Riverfront West Combined Sewer Overflow (CSO) Control Schedule C Environmental Assessment the preferred solution for CSO control is the construction of a second Retention Treatment Basin (RTB) near the Lou Romano Water Reclamation Plant (LRWRP).
  - Benefits: A reduction in sewer surcharge basement flooding risk in nearly 1/3 of the City. In the event of an intense storm or in the event of a catastrophic plant failure, the RTB systems would provide emergency storm relief for approximately 140,000 people in Windsor. Enhance compliance with the Ministry of Environment, Conservation and Parks' regulatory requirements for combined sewage treatment (procedure F-5-5).
  - Progress: Council approval given on March 18, 2024, to proceed under the DMAF-4 program. Anticipated Completion by 2033.
- Stormwater Financing Project
  - Summary: Currently, sewer surcharge and grants fund operational, maintenance and capital costs for both sanitary and storm sewer systems. The City is undertaking a project to implement a dedicated funding model for the storm sewer budget by separating the existing sewer surcharge into a sanitary charge (based on water usage) and a storm charge (based on impervious area). The project also includes a credit program to encourage property owners to provide enhanced stormwater quantity and quality control in excess of regional requirements.
  - Benefits: The proposed stormwater financing approach is based on the amount of impervious surfaces a property has, which is proven a fairer and more equitable methodology than basing it on the current domestic water usage method. This will provide a dedicated and more equitable funding source for stormwater infrastructure.
  - Progress: Public communication and education about the program started in 2023 and is ongoing. Anticipated first bills will be in January of 2025.
- Pontiac Pumping Station Upgrades at the Little River Pollution Control Plant (LRPCP) (DMAF-1)
  - Summary: New pumping station increasing stormwater conveyance capacity including potential to bypass sewage upstream of the LRPCP. Works include a new dedicated pumping station which operates when the sewer and treatment plant systems are under high water level conditions derived from severe rainfall.
  - Benefits: Potential of lowering heavy rainfall condition sanitary sewer water levels, throughout the entire Pontiac Pumping Station and LRPCP service area.
  - Progress: Funding contribution of project secured through DMAF-1. Environmental assessment work completed in 2023. Detailed design started in 2024 with construction estimated to be completed by 2027
- St. Paul Pumping Station Improvements (DMAF-1)
  - Summary: Expand pumping capacity at existing St. Paul stormwater pumping station. Proposed improvements will nearly double existing capacity providing resiliency in the storm sewer and surface drainage systems under extreme rainfall conditions.

  - Benefits: This pumping station, primarily services Ward 6, but with numerous overflow connections to Ward 7, there is the potential to reduce surface flooding risk in both wards.
  - Progress: Funding of project secured through DMAF-1. Project currently in construction phase with planned completion in 2026.
- Downspout Disconnection Pilot Project (SMP)
  - Summary: Pilot project reviewing the benefits of a mandatory downspout disconnection in reducing total volume of water entering the storm sewer system. Note, an existing optional subsidized downspout disconnection service is currently provided to homeowners.
  - Benefits: The anticipated benefit for flood risk reduction may be modest (2 to 5% reduction in volume of water in the sewer), but relative to costs of more expensive capital infrastructure projects are expected to have an appropriate return on investment. This is being reviewed as part of the pilot project.
  - Progress: Pilot program started in 2021. Estimated completion in 2024. A report to Council will follow summarizing the results of the program.
- SMP Implementation
  - Summary: Following the completion of the SMP in 2020, numerous projects were identified to reduce basement, overland and coastal flooding risks. The scale and volume of the recommended projects were extensive and are expected to be implemented over many years. This project coordinates the implementation of the immediate and high-priority projects identified in the SMP, as approved by Council.
  - Benefits: Allows for monitoring and coordination of numerous related projects.
  - Progress: This program started in 2021 and is on-going.
- SMP Education Program
  - Summary: Development and Implementation of various Education and Outreach Initiatives related to SMP in order to encourage awareness and participation in stormwater reduction initiatives.
  - Benefits: Funds resident education programs related to flood risk reduction. Works included annual mailing of downspout disconnection pamphlets, republication of the Emergency Flooding Guide, and an individualized in-home flood assessment program for residents (Home Flood Protection Program (HFPP) pilot).
  - Progress: On-Going.

5.0 Conclusion

This memo outlines existing flood monitoring and notifications systems, programs available to residents aimed at reducing flood risk, and projects the City has undertaken to reduce flooding risk associated with sewer surcharge, overland flow, and coastal high-water levels as summarized below.

In Ontario, flood forecasting is the responsibility of MNRF and Conservation Authorities. Federally, Environment and Climate Change Canada also provides warnings for severe weather events including warnings including flood risk. The City provides residents with notifications and alerts of potential emergencies (including flooding) with the optional Windsor Alerts system. The City also normally provides notifications, updates and warnings to news outlets and via social media accounts.

The majority of the City's sewage infrastructure is designed as a passive system with gravity driven drainage. These passive systems do not have electrical or mechanical elements, which cannot be adjusted or modified for storm events. The passive elements include storm, sanitary and combined sewers (nearly 1,800 km), roadside ditches and open drains, roadways, stormwater ponds and over 22,000 catchbasins.

Beyond the many passive elements in the City's drainage system, there are fewer but key components of the sewage infrastructure considered active with electrical and/or mechanical systems contributing to the operation. These active systems would include pumping stations (over 40), gates and other control structures. Treatment of the sewage at the City's wastewater treatment plants would also be an active system.

When major storm events occur, it would be typical for additional staff to come in during the rainfall event and continuously throughout the following days of the resulting increased flows to address any operational issue. Pumping stations are generally controlled by automatic operation, which turn pumps on and off following increases or decreases in water level.

Numerous projects, programs and initiatives with the goal of reducing flood risk were recently completed or are currently ongoing. Select citywide and multi-ward were summarized in this memo.

The SMP has provided the City with critical tools necessary to react to, analyze and plan mitigation measures for increasingly intense and longer duration storm events experienced in recent years. Updates to the SMP model will allow it to remain current and better reflect the most immediate needs of the City.

THE CITY OF WINDSOR ONTARIO, CANADA

Council Report: S 115/2024

Subject: Matchett Road and Malden Road Ecopassage Review Study – Ward 1

Reference:

Date to Council: September 25, 2024
Author: Chris Gerardi
Policy Analyst, Transportation Planning
519-255-6100 x6830
cgerardi@citywindsor.ca
Public Works - Operations
Report Date: September 8, 2024
Clerk's File #: SR2024

To: Mayor and Members of City Council

Recommendation:

THAT report S 115/2024, "Matchett Road and Malden Road Ecopassage Review Study," **BE RECEIVED** for information.

Executive Summary:

N/A

Background:

At its January 27, 2020, meeting, Council passed the following resolution:

CR 202/2019 ETPS940

I. That the report regarding both the update on the Ojibway Eco-passage project and the capital project proposal for the Ojibway corridor (Matchette Road & Malden Road) **BE RECEIVED**.

II. That Council **PRE-COMMIT** $30,000 from project ENG-014-20 Eco-Passage, which represents a portion of the 2021 funding included in the recommended 2020 8-Year Capital Budget, for immediate use to conduct a study to identify passage/connectivity opportunities along the Malden Road corridor.

Ecopassage Review Study Purpose and Objectives

The City of Windsor retained Wood Environment and Infrastructure Solutions (Wood) to undertake a Review Study to determine the preferred location and to identify potential and alternative solutions (crossing type) as well as possible locations for ecopassages on Matchett Road and Malden Road in the City of Windsor. The goal of ecopassages

on Matchett Road and Malden Road is to ultimately re-establish an ecological connection between Ojibway Park and the Spring Garden Forest Life Science ANSI (commonly known as Spring Garden Natural Area (SGNA)).

There is a wide range of options that serve various purposes when considering the optimal ecopassage solution to connect these areas. The Review Study was recommended as a first step in considering ecopassages for both major north-south roads in the Ojibway Prairie Complex. The Review Study assessed the optimal locations to construct the ecopassages and recommend the preferred crossing design type.

Study Area

The Study Area considered for this project contains the Ojibway Prairie Complex ANSIs and Provincially Significant Wetlands (PSW) and Oakwood Park Wetland in the City of Windsor, and the LaSalle Woods and Turkey Creek Wetlands in the northern portion of the Town of La Salle (Figure 1-B). The Study Area contains the SGNA – Oakwood Park crossing (i.e., Rt. Hon. Herb Gray Parkway Tunnel Top 5) and the proposed crossing on Ojibway Parkway (between Ojibway Park and Black Oak Heritage Park). These crossings, along with the potential crossings on Matchett Road and Malden Road, would positively affect wildlife movement through natural areas.

Ecopassage Crossing Types and Options

Wildlife ecopassage crossings serve to connect habitats and populations as well as to reduce wildlife species road mortality. When facilitating connections, factors such as species-specific behaviours, cost of the structure, available material and expertise and physical limitations of the site are considered when deciding which crossing structure type is appropriate.

The ecopassage crossing objective is to create landscape permeability for a variety of species. In the City of Windsor, those solutions which maximize crossing by a variety of species are preferred due to the concentrated biodiversity within natural areas.

Description of Other Existing Local Ecopassages and Crossings

There are currently two constructed ecopassages within the City, both associated with the Rt. Hon. Herb Gray Parkway (Parkway). Tunnel Top T5, located northwest of Todd Lane and Cabana Road West, is 160 meters (m) long by 120 m wide (575 m2), spanning the below-grade portion of Highway 401. This tunnel is vegetated with native grasses, wildflowers and shrubs that provide suitable wildlife habitat on the structure and an effective ecological connection between the SGNA and Oakwood Park.

The T5 ecopassage is used by various wildlife, including deer, coyote, wild turkey and two species at risk (SAR) snakes. Ground-nesting birds and SAR plants have also been observed on the structure.

The other ecopassage is located at Matchett Road, just north of Chappus Street. This structure is a 16 m ACO Wildlife KT500 Slotted Tunnel. It fits flush to the roadway and has a slotted upper surface allows which airflow in and out of the tunnel. The ecopassage was installed to facilitate movement of SAR snakes from the protected

habitat within the Chappus Street Restoration Area (east side of Matchett Road) to the created habitat within the Parkway ecological landscape. To date, SAR snakes have approached the tunnel entrance on the east side of Matchett Road but have not yet travelled through the tunnel.

One future potential ecopassage is also being investigated to cross Ojibway Parkway, located between Broadway Street and Weaver Road. A Municipal Class Environmental Assessment (Class EA) study was recently completed for this proposed ecopassage, the report is titled Ojibway Parkway Wildlife Crossing Environmental Study. The proposed crossing would re-establish an ecological connection between the natural areas associated with Black Oak Heritage Park and Ojibway Park, facilitating safe passage for area wildlife and SAR between these two significant natural heritage areas.

Discussion:

The comprehensive findings of the Matchett Road and Malden Road Ecopassage Review Study are detailed in Appendix A.

Wildlife Issues

Reconnaissance fieldwork was completed in February and June 2021, and secondary sources were queried to inform existing conditions in the Study Area. Occurrences of SAR, provincially rare species, and information on ANSIs, Environmentally Significant Areas (ESA) and/or Provincially Significant Woodland (PSWs) were collected.

The aim of the fieldwork was to identify the species, natural areas, and natural processes affected by the barriers of Matchett Road and Malden Road. Many species of plants, birds, reptiles, amphibians, mammals and other species were found throughout the study area along with several rare and endangered species (refer to Section 3 of Appendix A).

Preferred Ecopassage Crossing Type and Width

Based on the biodiversity and significance of species in the Study Area, the ecopassage should be a crossing type that accommodates all wildlife species, as well as vegetation. Wildlife ecopassage crossings come in a variety of shapes and sizes, depending on their specific objective. As shown in Appendix A, Tables 6 and 7 considered different options of crossing type and their suitability for each species. Landscape bridge, wildlife overpass, and viaduct structures can accommodate all wildlife species, and a large underpass could generally accommodate the crossing of a variety of species.

However, after further analysis of Matchett Road and Malden Road characteristics, the topology of the area and review of the surrounding water courses; it was determined that a landscape bridge or viaduct may not be practical and a wildlife overpass structure as the most practical, but highest cost solution to accommodate the diversity of species in the study area.

The Review Study discusses different options for possible widths of the proposed ecopassages. While the Study did not provide a preferred width recommendation, it did afford the following width options:

- 50-metre-wide ecopassage that will accommodate a broader habitat linkages and plant dispersal. An ecopassage of this size larger structure may reduce the requirement for additional mammal dedicated crossings in the Secondary Crossing Area or elsewhere.

- Narrower wildlife overpasses are considered, recognizing that larger animals such as deer would be required to continue crossing the road. The report identifies deer collisions as a significant factor to determining if a narrower overpass is appropriate. If deer can be accommodated to safely cross Matchett Road or Malden Road, then a narrower wildlife overpass may suffice.

As road mitigation measures such as signage, lighting, and infrastructure adaptations (e.g., curbs, drainage grates, jersey barriers, the width of road median, etc.) can be effectively used to reduce deer collisions, smaller width ecopassages in combination with these types of road upgrades appear to be the best option.

The City of Windsor Transportation Planning division agrees with the approach to consider infrastructure accommodations to allow for large mammals, such as deer, to safely cross both Malden Road and Matchett Road which have posted speeds of 60 kph and 50 kph respectively. Both roads are rural cross section roads that can sometimes invite higher speeds. Suggested infrastructure adaptions, such as curbs and road medians, will not only create safer conditions for animals but also help achieve traffic calming goals.

Typically, crossings dedicated to small and meso-mammals require a crossing that is at least 3 m in width.

Proposed Ecopassage Locations

Matchett Road and Malden Road have been identified as a wildlife conflict zone. Wildlife conflict zones are road segments where animals are most likely to interact with the road. Therefore, mitigation efforts (e.g., wildlife crossings and ecopassages) should be considered in this area.

Accordingly, connectivity analysis was undertaken to assess the most optimal ecopassage location(s). The analysis used the least resistive (lowest impedance) wildlife movement corridor habitat patch GIS (global information system) modelling. The results of that modelling are show on Figure 5C MAP A located in Appendix A.

The results of the least resistive (lowest impedance) wildlife movement corridor habitat patch connectivity analysis was simplified to help illustrate generalized good potential wildlife corridors crossing Malden Road and Matchett Road. It is likely that multiple smaller overpasses would be warranted over both Matchett Road and Malden Road.

Also, segments of Malden Road and Matchett Road were identified as Primary Crossing Areas, Secondary Crossing Areas and Tertiary Crossing Areas based on the results from the analysis (refer to Figure 5-C – MAP B for information regarding the wildlife movement corridors and crossing locations/areas).

Risk Analysis:

There are no risks to receiving this report for information.

Climate Change Risks

Climate Change Mitigation:

There is no climate mitigation risk associated with this report.

Climate Change Adaptation:

Ecosystems are under threat due to climate change. Windsor's climate projections predict an increase in favourable conditions for the spread of invasive species, potential loss of species at risk and environmental damages due to increasing temperatures and extreme weather events. The City's Climate Change Adaptation Plan includes Objective 5: Protect Biodiversity and Enhance Ecosystem Functions that includes actions to reduce the threats to Windsor's biodiversity - Action 5.3: Enhance linkages between and among natural heritage features includes investigating increased land connectivity options including land acquisition and landscaped or below grade Eco passages to enhance natural area linkages.

Financial Matters:

There are no financial implications to receiving this report for information.

Consultations:

Marc DiDomenico – Project Administrator
Karen Cedar – Naturalist & Outreach Coordinator
Colleen Middaugh – Manager, Corporate Projects
Glolamreza (Ray) Sayyadi – Transportation Planning Senior Engineer

Conclusion:

The Matchett Road and Malden Road Ecopassage Review Study suggests possible ecopassage locations and crossing type (narrow overpass bridges) for consideration, which would need to likely be supported with additional road upgrade mitigations.

A follow-up report to study road mortality and current movement is required to further refine the preferred crossing location(s) and type(s), which has been commissioned as part of the Ojibway National Urban Park project.

This future report findings, along with the Matchett Road and Malden Road Ecopassage Review Study and the Ojibway Parkway Wildlife Crossing Class EA Study, will serve to provide a consolidated overview of ecopassage needs for the Ojibway National Urban Park. Ultimately, direction and funding by Parks Canada's will be required to determine and implement the preferred ecopassage solution concept associated with Parks Canada's policy driven process to create the Ojibway National Urban Park.

Planning Act Matters:

N/A

Approvals:

Name	Title
Cindy Becker	Financial Planning Administrator – Public Works
Karina Richters	Supervisor Environment Sustainability & Climate Change
Shawna Boakes	Executive Director of Operations/ Deputy City Engineer
David Simpson	Commissioner, Infrastructure Services/City Engineer
James Chacko	Executive Director, Parks & Facilities
Ray Mensour	Commissioner, Community & Corporate Services
Lorie Gregg	On behalf of Commissioner, Finance & City Treasurer
Joe Mancina	Chief Administrative Officer

Notifications:

Name	Address	Email

Appendices:

Appendix A – Matchett Road and Malden Road Ecopassage Location and Solution Study

Matchett Road and Malden Road Ecopassage Location and Solution Study

Preliminary Study of Siting Alternatives and Structure Design
City of Windsor
Project # ONS2103A

Final

Prepared for:

City of Windsor

310-350 City Hall Square West Windsor ON N9A 6S1

November 2023

Matchett Road and Malden Road Ecopassage Location and Solution Study

Preliminary Study of Siting Alternatives and Structure Design
City of Windsor
Project # ONS2103A

Final

Prepared for:

City of Windsor

310-350 City Hall Square West Windsor ON N9A 6S1

Prepared by:

WSP E&I Canada Limited (formerly Wood E&I)

2020 Winston Park Drive, Suite 600
Oakville, Ontario L6H 6X7
Canada
T: 905-568-2929

November 2023

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1.0 Introduction

1.1 Purpose and Objectives

The City of Windsor (the City) retained Wood Environment and Infrastructure Solutions (Wood) to undertake a study to determine the preferred location and to identify potential and alternative solutions (crossing type) as well as possible locations for ecopassages on Matchett Road and Malden Road in the City of Windsor. The goal of ecopassages on Matchett Road and Malden Road is to ultimately provide an ecological connection between Ojibway Park and the Springgarden Forest Life Science ANSI (commonly known as Spring Garden Natural Area; SGNA; Figure 1-A and Figure 1-B), in combination with other proposed efforts in the City (Section 1.3; Figure 1-A). In the City, Matchett Road lies between Ojibway Park and the Ojibway Prairie Provincial Nature Reserve, and Malden Road lies between Ojibway Prairie Provincial Nature Reserve and the SGNA, all of which are part of the Ojibway Prairie Complex Area of Natural and Scientific Interest (ANSI). As identified in the previous reports (LGL, 2015), there is a wide range of options that serve various purposes when considering the optimal ecopassage solution to connect these areas. A preferred location and solution study has been recommended as a first step in considering ecopassages for both major north-south roads in the Ojibway Praire Complex. This study will assess the optimal locations to construct the ecopassages and recommend the design type.

1.2 Study Area

The Study Area considered for this project contains the Ojibway Prairie Complex ANSIs and Provincially Significant Wetlands (PSW) and Oakwood Park Wetland in the City of Windsor, and the LaSalle Woods and Turkey Creek Wetlands in the northern portion of the Town of La Salle (Figure 1-B). The Study Area contains the SGNA – Oakwood Park crossing (i.e., Rt. Hon. Herb Gray Parkway Tunnel Top 5) and the proposed crossing on Ojibway Parkway (between Ojibway Park and Black Oak Heritage Park). These crossings, along with the potential crossings on Matchett Road and Malden Road, would positively affect wildlife movement through natural areas.

The Ojibway Prairie Complex is fragmented by residential and commercial land uses and a road network of local, collector, and arterial roads. The provincial Highway/E.C. Row Expressway is the northern limit of the Study Area, and the new Gordie Howe International Bridge will occur to the northwest. Other land uses within the Study Area include rail corridors and yards, utility corridors, the Ambassador Golf Club, and agriculture. The southern limit of the Study Area occurs at Laurier Drive/Parkway in the Town of LaSalle (Figure 1-A and Figure 1-B).

1.3 Description of Other Local Ecopassages and Crossings

There are currently two constructed ecopassages within the City, both associated with the Rt. Hon. Herb Gray Parkway (Parkway). Tunnel Top T5, located northwest of Todd Lane and Cabana Road West, is 160 meters (m) long by 120 m wide (575 m^2), spanning the below-grade portion of Highway 401. The outer edges of T5 are protected by parapet walls, fencing and dense vegetation to help safely guide wildlife across the structure. At the east end, a large concrete box culvert provides safe passage for wildlife under the Parkway's integrated multi-use trail.

Tunnel Top T5 is vegetated with native grasses, wildflowers and shrubs that provide suitable wildlife habitat on the structure and an effective ecological connection between the SGNA and Oakwood Park.

The T5 ecopassage is used by various wildlife, including deer, coyote, wild turkey and two species at risk (SAR) snakes. Ground-nesting birds and SAR plants have also been observed on the structure.

The other ecopassage is located at Matchett Road, just north of Chappus Street. This structure is a 16 m ACO Wildlife KT500 Slotted Tunnel. It fits flush to the roadway, and the slotted upper surface allows airflow in and out of the tunnel. The ecopassage was installed to facilitate movement of SAR snakes from protected habitat within the Chappus Street Restoration Area (east side of Matchett Road) to created habitat within the Parkway ecological landscape. To date, SAR snakes have approached the tunnel entrance on the east side of Matchett Road but have not yet travelled through the tunnel.

Lastly, one proposed ecopassage within the City of Windsor would cross Ojibway Parkway south of Broadway Street. This proposed ecopassage is subject to a Municipal Class Environmental Assessment (Class EA) study, which is currently ongoing. The proposed crossing would provide an ecological connection between Black Oak Heritage Park and Ojibway Park, facilitating safe passage for area wildlife and SAR between these two significant natural heritage areas. The proposed crossing is large enough to accommodate the movement of small to large-sized mammals, reptiles, and amphibians. It would be vegetated with native plant species to provide food and nectar sources for birds and pollinators.


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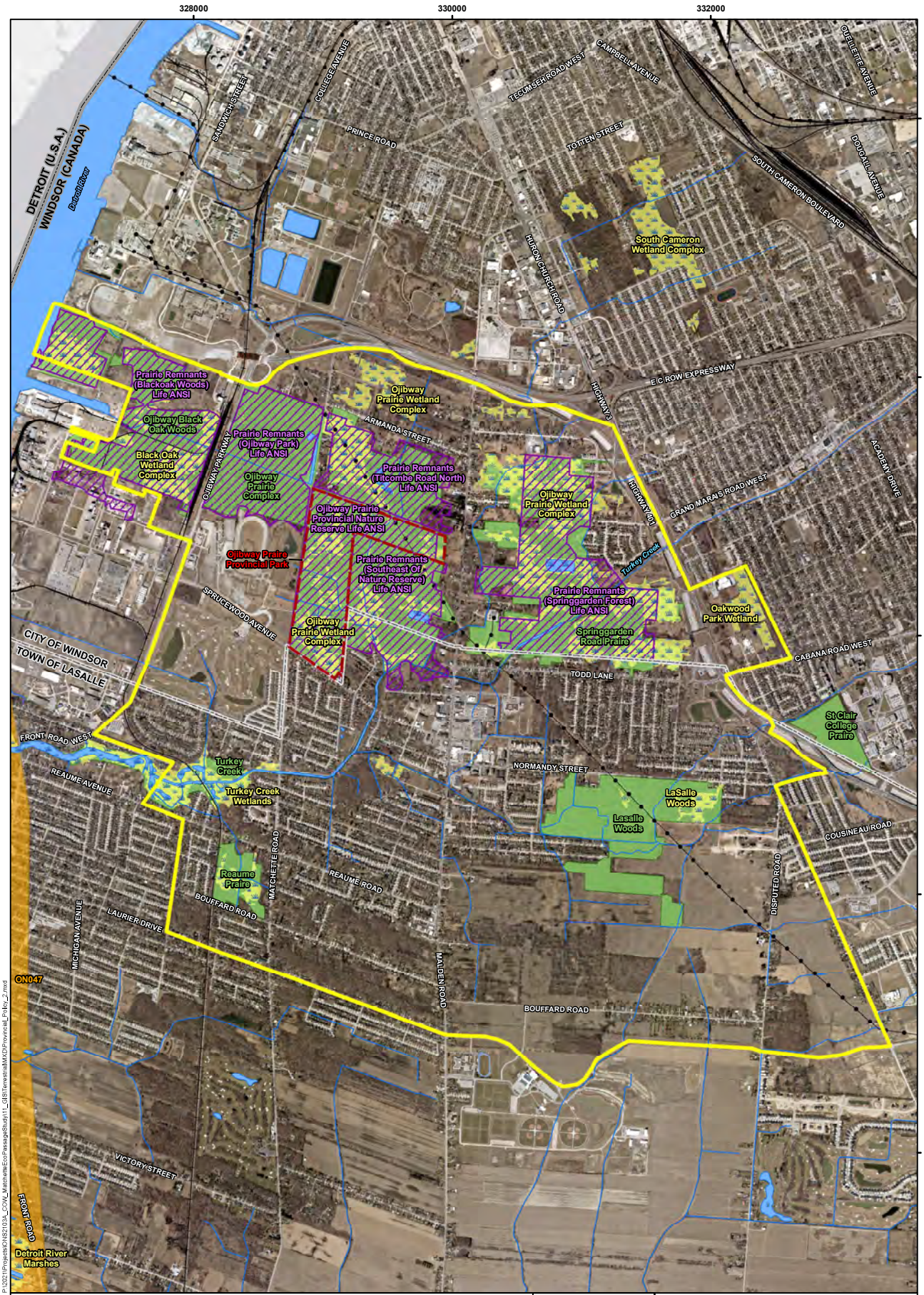
DETROIT (U.S.A.)
WINDSOR (CANADA)
North Tilston
South Tilston
Superior
Jackson
Matchette
Mic Mac
Maurice Belanger
Malden
South Cameron Woodlot
Virginia
Aboriginal
Partington
Bellewood
Black Oak Heritage
Ojibway Park
Tallgrass Prairie Heritage
Ojibway Parkway Trail
Spring Garden Natural Area
Fazio
Eury
Oakwood
CITY OF WINDSOR
TOWN OF LASALLE
Senator Paul Lucier Park
G. Craig Park
Ojibway Oaks Park
V. Marcotte Park
Turtle Club
Lasalle Conservation Lands
S. Budimir Park
Natalie Park
Brunet Park
Trillium Park
John Dupuis Park
Laferty Park
Kenwood Park
Paul Wilkinson Park
R. Carrick Memorial Track & Field Facility
Vollmer Culture And Recreation Complex
Essex Golf And Country Club
Victory Park
Brain Ringo Park
Seven Lakes Golf Course
Sandwich West Park
TODD LANE
CABANA ROAD WEST
NORMANDY STREET
README AVENUE
BOUFFARD ROAD
LAURIER DRIVE
MALDEN ROAD
DISPUTED ROAD
COUSINEAU ROAD
VICTORY STREET
LEGEND
Approximate Study Area
Watercourse
Waterbody
Railway
Hydro Line
Municipal Border (Lower and Single Tier)
National Border
Municipal Park and Golf Course (Boundaries Approximate)
Municipal Trails (City of Windsor)
Regulation Area (Essex Region Conservation Authority)
Significant Groundwater Recharge Area
NOTES:
- Aerial imagery extracted from Essex County Interactive map, 2019.
MALDEN AND MATCHETTE ECO PASSAGE STUDY
Municipal Policy Context
SCALE: 1:27,000
DATE: November 2023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DETROIT (U.S.A.)
WINDSOR (CANADA)
Detroit River
SANDWICH STREET
COLLEGE AVENUE
PRINCE ROAD
TECUMSEH ROAD WEST
CAMPBELL AVENUE
TOTTEN STREET
OUELLETTE AVENUE
DOUGALL AVENUE
SOUTH CAMERON BOULEVARD
HURON CHURCH ROAD
South Cameron Wetland Complex
E C ROW EXPRESSWAY
HIGHWAY 3
HIGHWAY 401
ACADEMY DRIVE
GRAND MARAIS ROAD WEST
Prairie Remnants (Blackoak Woods) Life ANSI
Ojibway Black Oak Woods
Black Oak Wetland Complex
OJIBWAY PARKWAY
Prairie Remnants (Ojibway Park) Life ANSI
Ojibway Prairie Complex
ARMANDA STREET
Ojibway Prairie Wetland Complex
Prairie Remnants (Titcombe Road North) Life ANSI
Ojibway Prairie Provincial Nature Reserve Life ANSI
Ojibway Praire Provincial Park
Prairie Remnants (Southeast Of Nature Reserve) Life ANSI
Ojibway Prairie Wetland Complex
Ojibway Prairie Wetland Complex
Turkey Creek
Prairie Remnants (Springgarden Forest) Life ANSI
Springgarden Road Praire
Oakwood Park Wetland
SPRUCEWOOD AVENUE
CITY OF WINDSOR
TOWN OF LASALLE
TODD LANE
CABANA ROAD WEST
St Clair College Praire
FRONT ROAD WEST
REAUME AVENUE
Turkey Creek
Turkey Creek Wetlands
NORMANDY STREET
LaSalle Woods
Lasalle Woods
COUSINEAU ROAD
MATCHETTE ROAD
Reaume Praire
REAUME ROAD
BOUFFARD ROAD
DISPUTED ROAD
MICHIGAN AVENUE
LAURIER DRIVE
ON047
MALDEN ROAD
BOUFFARD ROAD
VICTORY STREET
FRONT ROAD
Detroit River Marshes
P:\2021\Projects\DN82103A_CDW_MatchetteEcoPassageStudy\11_GIS\TerrestrialMXD\ProvincialPolicy_2.mxd
LEGEND
Approximate Study Area
Watercourse
Waterbody
Railway
Hydro Line
Municipal Border (Lower and Single Tier)
National Border
Name ANSI
Name Provincially Significant Wetland
Name Environmentally Significant Area
Name Important Bird Area of Canada
Name Provincial Park
0 0.25 0.5 1 1.5 2 Kilometres
NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.
Projection: UTM Zone 17N
MALDEN AND MATCHETTE ECO PASSAGE STUDY
Provincial Policy Context
PROJECT: DN82103A
FIGURE: 1-6
SCALE: 1:27,000
DATE: November 2021

2.0 Wildlife and Roads: Road Map

A variety of sources regarding road ecology were reviewed. Sources included journals, conference presentations and technical papers, articles, and previous studies in Ontario and beyond (Table 1). Information on preferred crossing types, crossing widths, ingress and egress locations and styles, fencing considerations, and crossing location preferences were noted and are included within this report.

Table 1 Road Ecology Sources Reviewed

ROAD ECOLOGY SOURCES REVIEWED
Barnum, S. (2003). Identifying the Best Locations to Provide Safe Highway Crossing Opportunities for Wildlife. International Conference on Ecology & Transportation, (p. 246). Lake Placid, New York.
Bissonette, J. A., & Adair, W. (2008). Restoring habitat permeability to roaded landscapes with isometrically-scaled wildlife crossings. Biological Conservation 141(2008) 482-488.
Center for Environmental Excellence by AASHTO. (2020). Chapter 3 Designing for Environmental Stewardship in Construction & Maintenance, 3.4. Designing to Accommodate Wildlife, Habitat Connectivity, and Safe Crossings. In Environmental Issue Construction and Maintenance Practices Compendium.
Eberhardt, E. (2008). Current and potential wildlife fatality hotspots along the Thousand Islands Parkway in eastern Ontario, Canada. Ottawa, ON: M. Sc. Thesis, Department of Geography and Environmental Studies, Carleton University.
Holder, S. (2018, July 31). Animals Need Infrastructure Too. Bloomberg.
Ministry of Transportation. (2016). Environmental Guide for Mitigating Road Impacts to Wildlife. St. Catharines, Ontario, 107 pages: Updated final report submitted by Eco-Kare International to the Ministry of Transportation, version March 2017.
Ontario Ministry of Natural Resources and Forestry. (2016). Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario. Queen's Printer for Ontario. 112 pp.
Ontario Road Ecology Group, Toronto Zoo. (2010). A Guide to Road Ecology in Ontario. Environment Canada Habitat Stewardship Program for Species at Risk.
Reed, D. F., & Ward, A. L. (1985). Efficacy of methods advocated to reduce deer-vehicle accidents: research and rationale in the USA. Routes et faune sauvage. Service d'Etudes Techniques de Routes et Autoroutes, Bagneaux, France. Pages 285-293.
Ruediger, B. (2003). A Rapid Assessment Process for Determining Potential Wildlife, Fish and Plant Linkages for Highways. International Conference on Ecology and Transportation. Ecology Program Leader for Road and Highways USDA Forest Service, 200 E. Broadway, MIssoula, MT.
Traffic Injury Research Foundation. (2012). Wildlife-vehicle Collisions in Canada: A Review of the Literature and a Compendium of Existing Data Sources.
U.S. Department of Transportation. (2011). Wildlife Crossing Structure Handbook Design and Evaluation in North America. Publication No. FHWA-CFL/TD-11-003.
Wildlife Collision Prevention Program. (2021). Collision Facts. Retrieved from https://www.wildlifecollisions.ca/collision/collision-facts.htm

Wildlife crossing structures are intended to increase habitat permeability and connectivity across roads and reduce the negative effects of roadways on wildlife and populations. Wildlife crossing structures can be above-grade (overpasses) or below-grade (underpasses) structures designed to facilitate the movement of animals and connections among populations. The following road map has been provided to document the objectives and guide selecting and locating the ecopassages (Figure 2-A; adapted from

Wildlife and Roads, 2007). The road map also provides a timeline of when monitoring and evaluation of crossing effectiveness, as well as maintenance, should occur after the final determinations are made.

Figure 2-A Decision Road Map

The initial step in evaluating ecopassages is determining if wildlife mitigation is needed (identify mitigation need Figure 2-A). The need for wildlife mitigation is well documented and understood by the City; however, a list of existing significant conditions is provided in Section 3.0. In the first part of an ecopassage project, it is important to determine the scope (planning and time constraints), the wildlife and natural processes that may be affected, and the possible goals and objectives of the ecopassage. The second step of the decision-making road map should provide the greatest detail on the ecopassage and how to proceed with determining configuration, maintenance, and how to begin a cost analysis. The third, fourth, and fifth steps of the road map help integrate the project into the larger planning, construction, implementation, and monitoring processes.

The following sections aim to identify and determine the wildlife issues, identify ecopassage solutions and options, and identify placement for the Matchett and Malden ecopassages, initiating steps one and two. Recommendations have been provided in Sections 6.0, 7.0, and 8.0 to assist in future steps and planning.

3.0 Wildlife Issues

Reconnaissance fieldwork was completed in February and June 2021, and secondary sources were queried to inform existing conditions in the Study Area. Occurrences of SAR, provincially rare species, and information on ANSIs, Environmentally Sensitive Areas (ESA), and/or PSWs were collected. Secondary sources reviewed are provided in Appendix A.

To understand the potential wildlife issues in the area, species occurrence is presented below. It is assumed, by the nature of the request, the City understands the need for permeability of roads for wildlife; therefore, this reporting scope does not aim to provide a literature review on the effects of roads

on wildlife. Rather this section aims to identify the species, natural areas, and natural processes affected by the barriers of Matchett Road and Malden Road.

3.1 Flora and Natural Areas

Species lists compiled for the Study Area (Appendix B) produced 704 vascular plant species. Of the plant species recorded, 168 (24%) are non-native to the region (ranked as SE 1-5 or H by NHIC) and 117 of the non-native plants are ranked as highly abundant or invasive (SE4 or SE5). There are 123 provincially rare species (S1, S2, S3) and 21 provincially listed on the Endangered Species Act, 2007 (Table 2). One hundred and forty-six (146) species are prairie and savannah indicator species present on the Southern Ontario Floral Inventory Analysis (SOFIA) list (SOFIA, 2020) and 235 are rare or uncommon on the List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E; Oldham, 2017).

Table 2 Flora Species listed on the Endangered Species Act, 2007

SCIENTIFIC NAME	ENGLISH NAME	S RANK (PROVINCIAL)	G RANK (GLOBAL)	ESA
Agalinis skinneriana	Skinner's False Foxglove	S1	G3G4	END
Aletris farinosa	White Colicroot	S2	G5	END
Ammannia robusta	Scarlet Ammannia	S1	G5	END
Arisaema dracontium	Green Dragon	S3	G5	SC
Castanea dentata	American Chestnut	S1S2	G4	END
Chimaphila maculata	Spotted Wintergreen	S2	G5	THR
Cornus florida	Eastern Flowering Dogwood	S2?	G5	END
Fraxinus quadrangulata	Blue Ash	S2?	G5	THR
Gymnocladus dioicus	Kentucky Coffee-tree	S2	G5	THR
Hibiscus moscheutos	Swamp Rose-mallow	S3	G5	SC
Juglans cinerea	Butternut	S2?	G3	END
Lespedeza virginica	Slender Bush-clover	S1	G5	END
Liatris spicata	Dense Blazing-star	S2	G5	THR
Liparis liliifolia	Purple Twayblade	S2S3	G5	THR
Morus rubra	Red Mulberry	S2	G5	END
Platanthera leucophaea	Eastern Prairie Fringed Orchid	S2	G2G3	END
Polygala incarnata	Pink Milkwort	S1	G5	END
Quercus shumardii	Shumard Oak	S3	G5	SC
Rosa setigera	Climbing Prairie Rose	S2S3	G5	SC
Solidago riddellii	Riddell's Goldenrod	S3	G5	SC
Symphyotrichum praealtum	Willow-leaved Aster	S2	G5	THR

Note(s)

1. S-Rank= Provincial (Sub-national) Rank, S1=Critically Imperiled, S2=Imperiled, S3=Vulnerable, S4=Apparently Secure, S5=Secure. S#S#=Range. Breeding Status Qualifiers: B – Breeding, N – Nonbreeding, M – Migrant. ? =Inexact or Uncertain.
2. ESA= Endangered Species Act,2007 (Ontario), END= Endangered, THR= Threatened, SC= Special Concern

Matchett Road occurs between the natural areas comprising the Ojibway Prairie Complex. The Ojibway Prairie Complex (Prairie Remnants Life ANSI) is a collection of five closely situated natural areas (Figure 1-B). From west to east, the areas are:

- Blackoak Woods (Ojibway Black Oak Woods; locally also known as Black Oak Heritage Park),
- Ojibway Park (Ojibway Prairie Complex; locally also known as Ojibway Tom Joy Woods Park),
- Southeast Of Nature Reserve,
- Titcombe Road North (locally also known as Tallgrass Prairie Heritage Park), and
- Springgarden Forest (Springgarden Road Prairie; locally also known as SGNA).

Essex Region Conservation Authority (ERCA) has also delineated these areas as Environmentally Significant Areas (ESA) (Figure 1-B) and when doing so also provided names, these names are also provided in brackets. Additionally, local names have developed which are indicated above and used to refer to areas throughout this report. Lastly, another ANSI occurs in the area called the Ojibway Prairie Provincial Nature Reserve Life Science ANSI (Figure 1-B) and this ANSI is also the Ojibway Praire Provincial Park (Figure 1-B).

The Ojibway Prairie Complex ANSI has also been identified as a Carolinian Canada site (Government of Ontario, 2002). The dominant feature in the Ojibway Prairie Provincial Nature Reserve is the tallgrass prairie plant community and related plant communities, such as oak savannah. Tallgrass prairie and oak savannah communities are designated as critically imperilled in Ontario (Rodger, 1998). Altogether 533 flowering plant species have been documented in and around the Ojibway Prairie Provincial Nature Reserve, of which more than 60 are of prairie affinity (Government of Ontario, 2002). Animal species representative of prairie habitats and found in the nature reserve include Butler's Gartersnake and Eastern Massasauga (Government of Ontario, 2002).

Malden Road occurs on the east side of the Ojibway Prairie Complex ANSI. Further east of Malden Road is the SGNA – Oakwood Park crossing (Tunnel Top 5) and the Oakwood Park Wetland in the City of Windsor. The LaSalle Woods and Turkey Creek Wetlands in the Town of La Salle (Figure 1-B) occur in the southern portion of the study area, near Matchett and Malden Roads.

At the northern extent of the study area, between Matchett and Malden Roads, is tallgrass habitat that has been protected and restored as part of the Parkway project. This area is called the Chappus Street Restoration Area and includes a variety of habitat types including tallgrass prairie, savannah, meadow marsh, PSW (thicket and deciduous swamp) and woodland. The area is home to five plant SAR and over 20 provincially rare plant species.

3.2 Avifauna

Species lists compiled for the Study Area (Appendix B) resulted in 171 bird species. Of the species recorded, three were recorded as oak savannah species (not restricted to these habitats) in SOFIA (SOFIA, 2020). The majority of species documented are associated with wooded and successional habitats or water and wetlands. Seven non-native species are documented, Rock Pigeon, Mute Swan, House Finch, House Sparrow, Ring-necked Pheasant, Eurasian Collared-Dove, and European Starling.

Fourteen provincially rare (S1, S2, S3) and 21 provincially listed on the Endangered Species Act, 2007 (Table 3) occur.

Table 3 Avian Species listed on the Endangered Species Act, 2007

SCIENTIFIC NAME	ENGLISH NAME	S RANK (PROVINCIAL)	G RANK (GLOBAL)	SARO
Antrostomus vociferus	Eastern Whip-poor-will	S4B	G5	THR
Cardellina canadensis	Canada Warbler	S4B	G5	SC
Chaetura pelagica	Chimney Swift	S4B,S4N	G4G5	THR
Chordeiles minor	Common Nighthawk	S4B	G5	SC
Contopus cooperi	Olive-sided Flycatcher	S4B	G4	SC
Contopus virens	Eastern Wood-pewee	S4B	G5	SC
Dolichonyx oryzivorus	Bobolink	S4B	G5	THR
Falco peregrinus	Peregrine Falcon	S3B	G4	SC
Haliaeetus leucocephalus	Bald Eagle	S2N,S4B	G5	SC
Hirundo rustica	Barn Swallow	S5B	G5	THR
Hylocichla mustelina	Wood Thrush	S4B	G4	SC
Icteria virens	Yellow-breasted Chat	S1B	G5	END
Ixobrychus exilis	Least Bittern	S4B	G4G5	THR
Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	G5	SC
Parkesia motacilla	Louisiana Waterthrush	S3B	G5	THR
Podiceps auritus	Horned Grebe	S1B,S4N	G5	SC
Protonotaria citrea	Prothonotary Warbler	S1B	G5	END
Rallus elegans	King Rail	S2B	G4	END
Riparia riparia	Bank Swallow	S4B	G5	THR
Setophaga cerulea	Cerulean Warbler	S3B	G4	THR
Sturnella magna	Eastern Meadowlark	S4B	G5	THR

Note(s)

1. S-Rank= Provincial (Sub-national) Rank, S1=Critically Imperiled, S2=Imperiled, S3=Vulnerable, S4=Apparently Secure, S5=Secure. S#S#=Range. Breeding Status Qualifiers: B – Breeding, N – Nonbreeding, M – Migrant. ? =Inexact or Uncertain.
2. ESA= Endangered Species Act,2007 (Ontario), END= Endangered, THR= Threatened, SC= Special Concern

Many of the bird species documented in the Study Area are area-sensitive and have other restrictive requirements for habitat. While all species documented in the Study Area are capable of sustained flight and very few are prone to nesting on road shoulders, there are several factors related to roads that may cause barriers to avifauna. Research in the past decade has suggested some bird guilds (e.g., forest-dependent) are less likely to be found next to roads and are hesitant to cross (Johnson, Evans, & Jones, 2017; Benítez-López, Alkemade, & Verweij, 2010). High levels of traffic noise (reducing song detection), visual disturbance from passing vehicles, and the risk of collision with vehicles are all potential risks. There is mounting evidence that migration and breeding of birds are also affected by roads.

3.3 Herptiles

Species lists compiled for the Study Area (Appendix B) resulted in 25 amphibian, reptile, and turtle (herptile) species. Of the species recorded, five were recorded as oak savannah or tallgrass prairie species

in SOFIA (SOFIA, 2020). The only exotic species documented was pond slider turtles, such as Red-eared Sliders. Ten provincially rare (S1, S2, S3) and 11 provincially listed on the Endangered Species Act, 2007 (Table 4) occur.

Table 4 Herptile Species listed on the Endangered Species Act, 2007

SCIENTIFIC NAME	ENGLISH NAME	S RANK (PROVINCIAL)	G RANK (GLOBAL)	SARO
Apalone spinifera	Spiny Softshell	S2	G5	END
Chelydra serpentina	Snapping Turtle	S4	G5	SC
Emydoidea blandingii	Blanding's Turtle	S3	G4	THR
Graptemys geographica	Northern Map Turtle	S3	G5	SC
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	G5	THR
Pantherophis gloydi pop. 2	Eastern Foxsnake (Carolinian population)	S2	G3TNR	END
Plestiodon fasciatus pop. 1	Common Five-lined Skink (Carolinian population)	S2	G5T2	END
Regina septemvittata	Queensnake	S2	G5	END
Sistrurus catenatus pop. 2	Massasauga (Carolinian population)	S1	G3TNR	END
Sternotherus odoratus	Eastern Musk Turtle	S3	G5	SC
Thamnophis butleri	Butler's Gartersnake	S2	G4	END

Note(s)

1. S-Rank= Provincial (Sub-national) Rank, S1=Critically Imperiled, S2=Imperiled, S3=Vulnerable, S4=Apparently Secure, S5=Secure. S#S#=Range. Breeding Status Qualifiers: B – Breeding, N – Nonbreeding, M – Migrant. ? =Inexact or Uncertain.
2. ESA= Endangered Species Act,2007 (Ontario), END= Endangered, THR= Threatened, SC= Special Concern

It is well known and well documented that amphibians and reptiles are the most negatively affected species groups regarding the barrier and threat of roads and traffic in Southern Ontario (Ontario Ministry of Natural Resources and Forestry, 2016). The City of Windsor and the surrounding region contain critical habitat for several of the SAR herptiles and some of the only remaining populations. A local study estimated that SAR reptiles were killed on roads across the Ojibway Prairie Complex at a minimum average of 19 individuals a month (Choquette & Valliant, 2016). Threats from roads include direct mortality of animals and habitat loss, degradation, and fragmentation (reducing gene flow and, in some cases, segregation of populations).

3.4 Mammals

Species lists compiled for the Study Area (Appendix B) produced 26 mammal species to genus. The only exotic species documented were Norway Rat and Black Rat. Two provincially rare (S1, S3) and listed species on the Endangered Species Act, 2007 (Table 5) were documented, Little Brown Myotis and Gray Fox.

Table 5 Mammal Species listed on the Endangered Species Act, 2007

SCIENTIFIC NAME	ENGLISH NAME	S RANK (PROVINCIAL)	G RANK (GLOBAL)	SARO
Myotis lucifugus	Little Brown Myotis	S3	G3	END
Urocyon cinereoargenteus	Gray Fox	S1	G5	THR

Note(s)

1. S-Rank= Provincial (Sub-national) Rank, S1=Critically Imperiled, S2=Imperiled, S3=Vulnerable, S4=Apparently Secure, S5=Secure. S#S#=Range. Breeding Status Qualifiers: B – Breeding, N – Nonbreeding, M – Migrant. ? =Inexact or Uncertain.
2. ESA= Endangered Species Act,2007 (Ontario), END= Endangered, THR= Threatened, SC= Special Concern

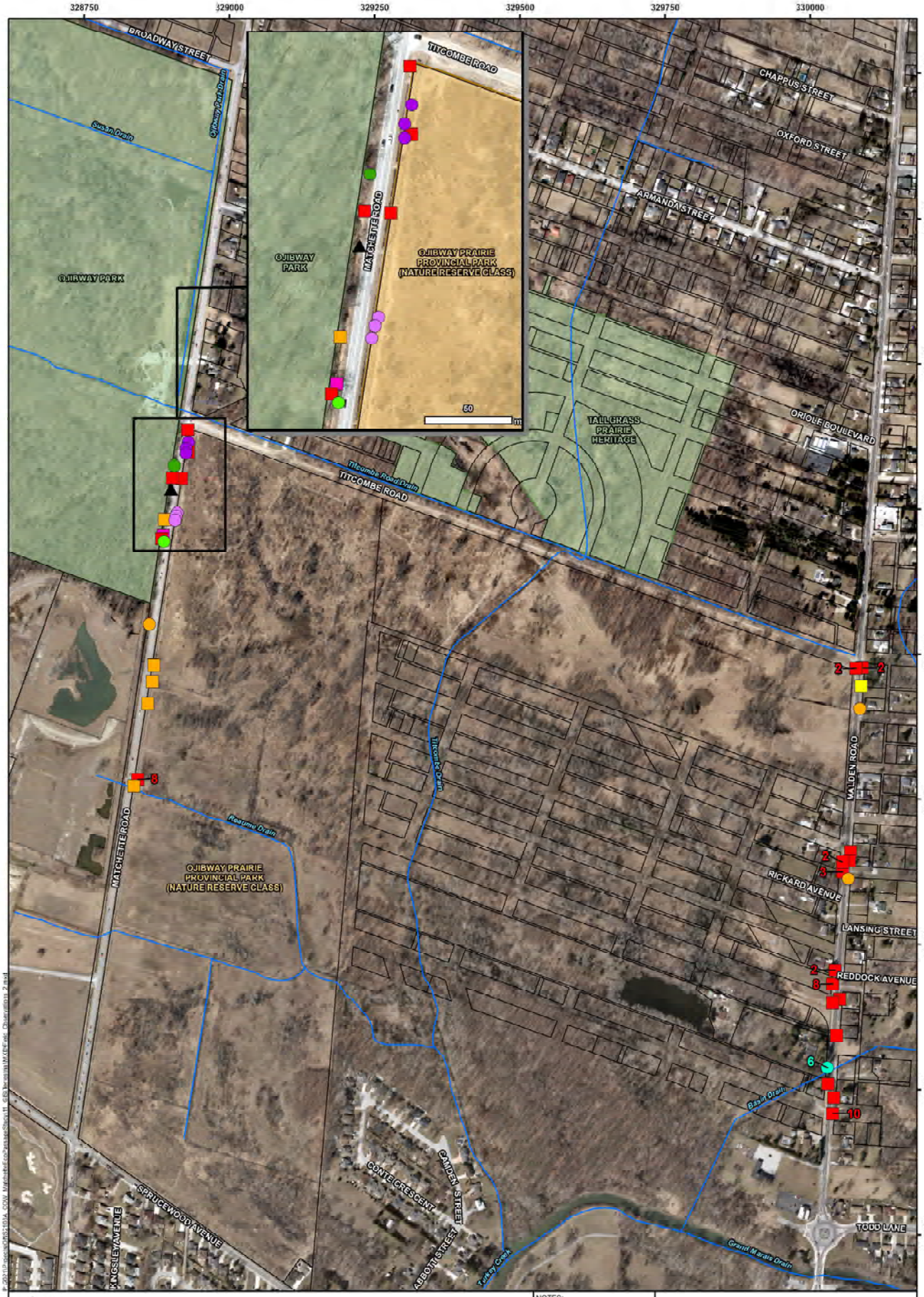
A reconnaissance survey was conducted in February 2021 to determine animal corridors on Matchett Road and Malden Road south of Titcombe Road for approximately 1 km (Figure 3-B). It is known that White-tail Deer are locally abundant in the Study Area, but their movement patterns within the Study Area are not documented. Most of the wildlife activity was White-tail Deer in the fire break along Matchett Road, next to the fence (Figure 3-A).

Fire Break along Matchett Rd., signs of frequent deer activity

Matchett Rd. gap in fencing with signs of frequent deer activity

Figure 3-A Fire Break White-tailed Deer Activity

Species such as White-tailed Deer, Coyote, Red Fox, Raccoon and other Meso-mammals (such as Striped Skunk, Groundhog, Opossum, and Eastern Gray Squirrel), Little Brown Bat, Eastern Red Bat, Silver-haired Bat, Big Brown Bat, and Hoary Bat have been confirmed in Ojibway Park by Wood (2021). The main response by mammals to roads in a meta-analysis was avoidance or reduced population density (Benítez-López, Alkemade, & Verweij, 2010). In the Ontario Road Safety Annual Report (Ministry of Transportation, 2018), Wildlife-vehicle Collisions (WVCs), which involved large animals (e.g., White-tailed Deer), resulted in four fatalities, 329 personal injuries, and 11,721 WVCs which caused property damage. Much like avifauna and herptiles, roads fragment habitats and reduce the permeability of movement for mammals.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BROADWAY STREET
Ojibway Park Drain
Sasaja Drain
OJIBWAY PARK
TITCOMBE ROAD
OJIBWAY PARK
MATCHETTE ROAD
OJIBWAY PRAIRIE PROVINCIAL PARK (NATURE RESERVE CLASS)
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CHAPPUS STREET
OXFORD STREET
ARMANDA STREET
TALLGRASS PRAIRIE HERITAGE
ORIOLE BOULEVARD
Titcombe Road Drain
TITCOMBE ROAD
Titcombe Creek
MALDEN ROAD
Regunu Drain
MATCHETTE ROAD
OJIBWAY PRAIRIE PROVINCIAL PARK (NATURE RESERVE CLASS)
RICKARD AVENUE
LANSING STREET
REDDOCK AVENUE
Basil Drain
CONTE CRESCENT
CAMDEN STREET
SPRUCEWOOD AVENUE
KINGSLEY AVENUE
ABBOTT STREET
Turkey Creek
Grand Marais Drain
TODD LANE
LEGEND
Municipal Parks
Provincial Park
Watercourse / Drain
Property Boundaries
Field Observations (Labelled with Count)
Dense Glazing Star
Willowleaf Aster
Large Oak Tree
Large Sycamore Tree
Small Mammal
Wild Turkey
Large Fallen Log
Coyote Trail
Deer Trail
Small Mammal Trail
Squirrel Trail
NOTES:
- Aerial imagery extracted from Essex County Interactive map, 2019
THE CITY OF WINDSOR
wsp
MATACHETTE ECO PASSAGE STUDY
Field Observations
SCALE: 1:6,000
DATE: November 2023

3.5 Other Species

Aquatic species such as Lampreys, fishes, and mussels were documented in secondary sources (Appendix B). However, these species are more likely to occur in the Detroit River. It is not known if Basin Drain and the roadside ditches are fish habitat. Four species are non-native, goldfish, Common Carp, White Perch, Round Goby. Eight are provincially rare (S1, S2, S3) and listed on the Endangered Species Act, 2007, Northern Sunfish, Spotted Sucker, Pugnose Shiner, Northern Madtom, Channel Darter, Northern Riffleshell, Eastern Pondmussel, and Kidneyshell.

Eight snails were documented in secondary sources (Appendix B). Five are non-native, Grovesnail, Chinese Mysterysnail, Gray Fieldslug, Giant Gardenslug, and Dark-bodied Glass-snail. The Striped Whitelip and Proud Globelet are provincially rare (S1, S2, S3), and the Proud Globelet is also an endangered species.

Hundreds of spiders and insects occurred in the iNaturalist search that NHIC does not recognize, and therefore information on native and rare status is unknown. However, 794 species recognized by NHIC were collected from all queried sources (Appendix B). Fifty-six (56) are provincially rare (S1, S2, S3) and three are provincially listed on the Endangered Species Act, 2007, Rusty-patched Bumble Bee, Monarch, and Mottled Duskywing. Lastly, three are prairie and savannah indicator species present on the SOFIA list (SOFIA, 2020), Wild Indigo Duskywing, Mottled Duskywing, and Regal Fritillary.

In line with the above, the City of Windsor contains ample biodiversity and Matchett and Malden Road may act as barriers to the safe movement and natural processes of invertebrate species.

4.0 Identify Ecopassage Solutions and Options

To address structure type, species-specific behaviours should be incorporated into the crossing structure design. However, sometimes these concerns are offset by other project constraints, including the cost of the structure, available material and expertise, and physical limitations of the site, e.g., soil, terrain, and hydrology (U.S. Department of Transportation, 2011). To the extent possible, the objective should be to create landscape permeability for a variety of species. In the City of Windsor, those solutions which maximize crossing by a variety of species are preferred due to the concentrated biodiversity within natural areas. Ultimately, wildlife crossings have two purposes: to 1) connect habitats and populations; and 2) reduce road mortality. When facilitating connections, overpasses and underpasses are discussed.

Wildlife crossings come in a variety of shapes and sizes, depending on their specific objective. Overpass designs are landscape bridges, wildlife overpasses, mixed-use overpasses (wildlife-human), and canopy crossings. Underpass designs are viaducts, large mammal underpasses, mixed-use underpasses, underpasses with waterflow, small and medium mammal underpasses, modified culverts, and herptile tunnels. Determining the type of wildlife crossing structure most suitable for a given location depends on several criteria (Table 6; Table 7). Selection begins by identifying a general wildlife crossing type that conforms to the habitat connectivity potential for the target species and topography of the site chosen (U.S. Department of Transportation, 2011). Additionally, landscape bridges and large wildlife overpasses have been the most effective structures for multiple species (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016).

The Study Area has large mammals-ungulates (deer); high-mobility medium-sized mammals-carnivores (coyote, fox); low mobility medium-sized mammals (raccoon, skunk, groundhog); small mammals (voles, mice); amphibians; and reptiles. To provide a mechanism of evaluation to determine which wildlife

crossing type is recommended for most species, a rank was provided in Table 6. Landscape bridge and viaduct can accommodate all species mostly due to their large size (width varies, however, 50+ m wide is typical). Wildlife overpass will also accommodate all species and may not be as wide as a landscape bridge, especially if the length is shorter. A large underpass will also largely accommodate the crossing of various species if it is not restrictive to White-tailed Deer. These options must include adaptations, such as microhabitat features, to be permeable to the wide variety of species.

Table 6 Suitability of Wildlife Crossing Design Type for Species and Groups

Species/Group	Landscape Bridge	Wildlife Overpass	Mixed-use Overpass	Canopy Crossing	Viaduct	Large Mammal Underpass	Mixed-use Underpass	Underpass with Waterflow	Small to Medium Mammal Underpass	Modified Culvert	Herptile Tunnel
Ungulates-Deer	✪	✪	⊗	N/A	✪	⊙	⊗	⊙	⊗	⊗	N/A
Carnivores – Coyote, Fox	✪	✪	✪	N/A	✪	✪	✪	✪	✪	⊙	N/A
Low Mobility Mammal-Raccoon, Skunk	✪	✪	✪	N/A	✪	✪	✪	✪	✪	✪	⊙
Semi-arboreal Mammals (Red Squirrel	⊙	⊙	⊙	✪	⊙	⊙	⊙	⊙	⊗	⊗	⊗
Semi-aquatic Mammals	⊙	⊙	⊙	N/A	⊙	⊙	⊙	✪	⊙	✪	⊙
Small Mammals - voles, mice	✪	✪	✪	⊙	✪	✪	✪	✪	✪	✪	⊙
Amphibians	⊙	⊙	⊙	N/A	⊙	⊙	⊙	⊙	⊙	✪	✪
Reptiles	✪	✪	✪	N/A	✪	✪	✪	⊙	✪	✪	⊙
Ranking[4]	**13**	**13**	**11**	**3**	**13**	**12**	**11**	**12**	**10**	**11**	**6**

Note(s)

1. ✪ [Recommended]
2. ⊙ [Possible if adapted]
3. ⊗ [Not Recommended]
4. To evaluate which design type accommodates the most species/group a ranking was provided where ✪=2 pts, ⊙=1pts, and ⊗=0pts.

Table 7 General Wildlife Crossing Design Criteria

Species	Openness Ratio	Tunnel-type (Minimum Dimensions)					Substrate Type	Additional Considerations
		Pipe Culvert (diameter)	Box Culvert	Open or Grated-top Culvert	Arch Tunnel	Large Underpass or Overpass		
Reptiles (Turtle)	>0.25 no less than 0.1	15m length: 1.5m 15-25m length: 1.8m	15m length: 1.5 x 1.0m 15-25m length: 1.8 x 1.0m	May increase crossing success	15m length: 1.8 x 0.9m 15-25m length: 2.0 x 1.0m	If longer than 25m span, Large Underpass (>3m) or Overpass preferred	Water for aquatic species, substrate may not be as important for terrestrial species	Crossings should be placed along migration corridors. Structures should not be separated more than 150-300m; several hundreds of metres (Carsignol et al. 2005).
Reptiles (Snake)	>0.1 no less than 0.07	15m length: 1.0m 15-25m length: 1.5m	15m length: 1.0 x 1.0m 15-25m length: 1.5 x 1.0m	May increase crossing success	15m length: 1.5 x 0.75m 15-25m length: 1.8 x 0.9m	If longer than 25m span, Large Underpass (>3m) or Overpass preferred	Water for aquatic species, open-bottom or natural substrate may enhance use. Cover objects at larger crossing structures are ideal.	Crossings should be placed along migration corridors. Structures should not be separated more than several hundreds of metres (Carsignol et al. 2005).
Amphibians (Frog, Toad)	>0.1 no less than 0.07	15m length: 1.0m 15-25m length: 1.5m	15m length: 1.0 x 1.0m 15-25m length: 1.5 x 1.0m	Both closed and open top tunnels have been used	15m length: 1.5 x 0.75m 15-25m length: 1.8 x 0.9m	If longer than 25m span, Large Underpass (>3m) or Overpass preferred	Terrestrial bottom tunnels should be used for anurans; high moisture content and even small pools of standing water may be beneficial but the tunnel should not be flooded with water.	Crossings should be placed along migration corridors (between overwintering and breeding habitat). Tunnels for amphibians should not be more than 50 m apart (Schmidt and Zumbach 2008; Ryser and Grossenbacher 1989).
Amphibians (Salamander)	>0.1 no less than 0.07	15m length: 1.0m 15-25m length: 1.5m	15m length: 1.0 x 1.0m 15-25m length: 1.5 x 1.0m	Both closed and open top tunnels have been used by mole salamanders	15m length: 1.5 x 0.75m 15-25m length: 1.8 x 0.9m	If longer than 25m span, Large Underpass (>3m) or Overpass preferred	Terrestrial bottom tunnels should be used for salamanders; high moisture content and even small pools of standing water may be beneficial but the tunnel should not be flooded with water.	Crossings should be placed along migration corridors (between overwintering and breeding habitat). Tunnels for amphibians should not be more than 50 m apart (Schmidt and Zumbach 2008; Ryser and Grossenbacher 1989) as salamanders will not follow a fence for long distances (e.g. Pagnucco et al. 2012).
Small Mammal (Rabbit, Mouse, Squirrel)	0.05	0.5-1m	<3.0m <2.0m		<3.0m	If longer than 25m span, Large Underpass (>3m) or Overpass preferred	Cover should be provided within larger tunnels to encourage crossing of smaller mammals.	Ledges for mammals can be added to drainage culverts to encourage crossing. More frequently placed culverts (150 to 300 m intervals) using a range of sizes (1 to 1.5 m for mid-size animals; 0.5 to 1 m size for small mammals) can improve connectivity across roads for small animals.
Meso-mammals (Fox, Raccoon)	0.4	1-1.5m	3.0m		>3.0m	If longer than 25m span, Large Underpass (>3m) or Overpass preferred	Terrestrial pathways should be 0.5 m for small and medium animals, and 2-3 m for large mammals (Clevenger and Huijser 2011).	Ledges for mammals can be added to drainage culverts to encourage crossing. Culverts should be spaced every 150-300 m.
Large Mammal (Coyote, Deer)	0.6 - 1.0 for Deer 0.2 Other	3.0m can be used but larger is preferred	3.0m can be used but larger is preferred		3.0m can be used but larger is preferred	Overpass preferred by Deer	Terrestrial pathways should be 0.5 m for small and medium animals, and 2-3 m for large mammals (Clevenger and Huijser 2011).	Minimizing human activity near the structure is considered important for wildlife use. Culverts should be spaced every 1.5 km.

Note(s)

1. Openness Ratios for Box Culvert = (Height X Width) / Length and for Corrugated Steel Pipe (CSP) = (πr^2) / Length
2. Ontario Ministry of Natural Resources and Forestry. April 2016. Best Management Practices for Mitigating the Effects of Roads on Amphibians and Reptile Species at Risk in Ontario. Queen's Printer for Ontario. 112 pp.
3. Ministry of Transportation. 2016. Environmental Guide for Mitigating Road Impacts to Wildlife. Updated final report submitted by Eco-Kare International to the Ministry of Transportation, St. Catharines, Ontario, 107 pages.
4. Credit Valley Conservation. 2017. Fish and Wildlife Crossing Guidelines. Version number 1.0. Last Updated March 20, 2017

5.0 Identify Placement for the Matchett and Malden Ecopassages

Location of ecopassages is important for less mobile species or animals with small home ranges or habitat specialists (Yanes, Velasco, & Suárez, 1995; Jackson & Griffin, 2000). Ecopassages should not lead to an ecological dead-end and should allow for dispersal and free movement to areas which wildlife requires for biological processes. Matchett Road and Malden Road have been identified as a wildlife conflict zone. Wildlife conflict zones are road segments where animals are most likely to interact with the road. Therefore, mitigation efforts (e.g., wildlife crossings and ecopassages) should be considered in wildlife conflict zones (Ministry of Transportation, 2016). A habitat connection on Matchett Road and Malden Road considers the larger landscape and projected land use.

Connectivity analysis at the landscape level can provide a general area where wildlife may be more likely to cross. Still, specific locations may need to be determined based on fieldwork and design considerations. Design considerations such as local conditions and engineering concerns determine the specific placement of wildlife crossings and are required at the project level (U.S. Department of Transportation, 2011). A connectivity analysis was completed herein for the Study Area. Road mortality studies for reptiles and spatial analysis studies completed by others (Choquette & Valliant, 2016)suggest that reptiles move in a southeast-northwest route along the utility right-of-way from LaSalle Woods ESA, through the Ojibway Prairie Complex, to the Parkway.

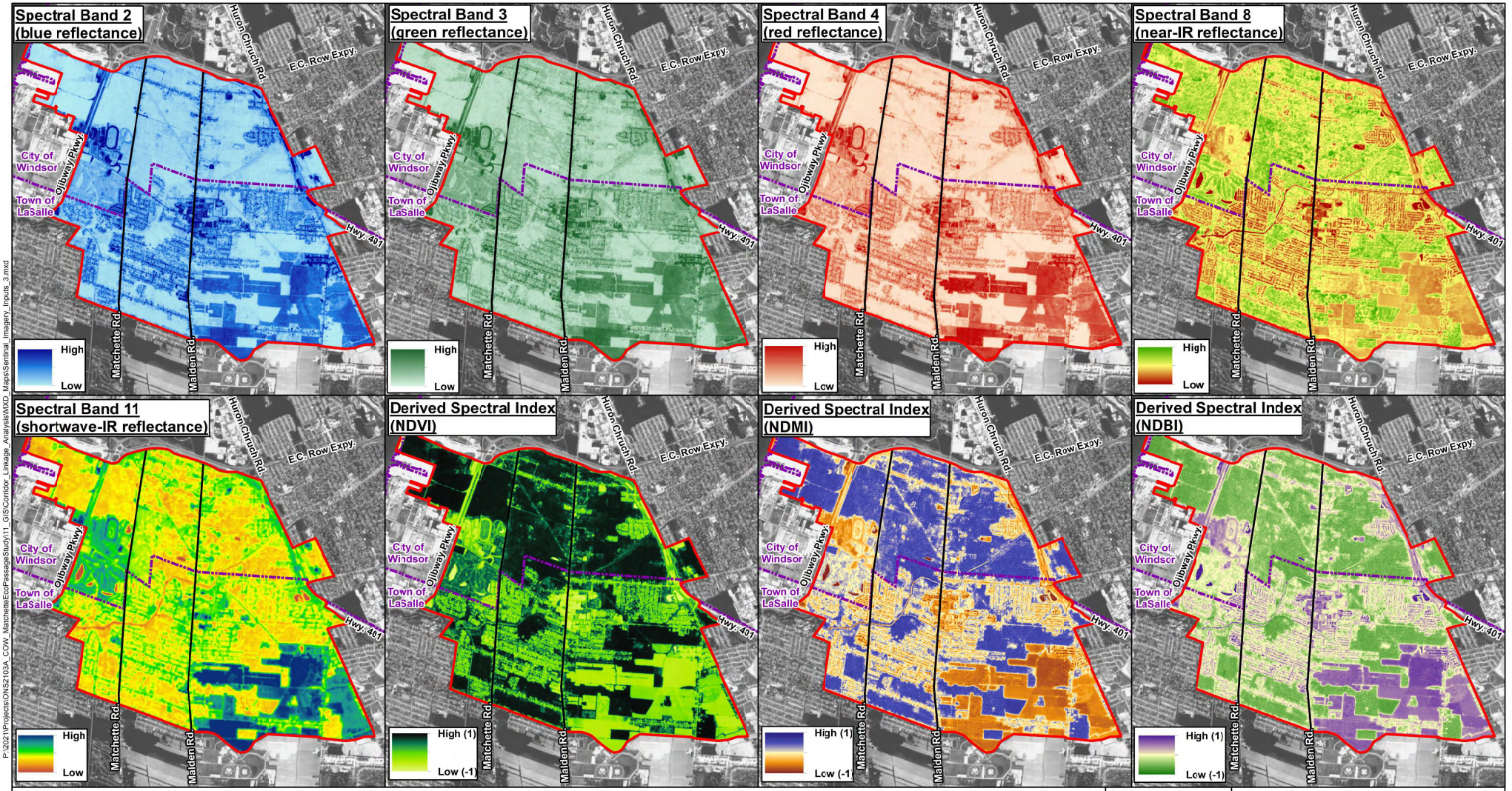
5.1 Connectivity Analysis

The connectivity analysis for the optimal ecopassage location used the least resistive (lowest impedance) wildlife movement corridor habitat patch GIS modelling. Sentinel 2A (European Space Agency) multi-spectral satellite imagery (10 m by 10 m spatial resolution), collected on June 18, 2020, was used as the raw data input for constructing the wildlife movement impedance surface. Various reflectance bands along with multi-spectral imagery derived index layers were combined into an eight-layer stacked data pool to be used in an unsupervised image classification procedure (Figure 5-A for information regarding multi-spectral imagery and indices used in this analysis).

The ISODATA (k-means) clustering algorithm was used on this data pool to categorize every 10 m by 10 m pixel into specific clusters based on overall similarities of reflectance characteristics from the layer stack. The resulting classified imagery was further aggregated into ordinal categories using visual inspection and known landscape features, such as golf courses, existing ecopassage locations (e.g., T5), and vegetation communities within the Study Area. The ordinal categories were ranked from 1, low wildlife movement impedance/resistivity (i.e., most suitable wildlife habitat), to 5, high wildlife movement impedance/resistivity (i.e., least suitable wildlife habitat). These categories were combined to generate the wildlife movement impedance surface. This surface functioned as the basis for habitat connectivity and corridor identification across the Study Area (Figure 5-B – MAP A for the wildlife movement impedance surface).

Patches of pixels categorized with the lowest impedance values from the wildlife movement impedance surface were isolated in areas west of Matchett Road (the western portion of the Study Area) and east of Malden Road (the eastern portion of the Study Area). These patches of land were considered "good" habitat fragments for general wildlife within the Study Area based on the image classification and category aggregation performed earlier. A cumulative landscape wildlife movement resistivity surface was generated extending outward from good habitat patches west of Matchett Road, and subsequently

extending outward from good habitat patches east of Malden Road (Figure 5-B – MAP B and C for information regarding the cumulative landscape wildlife movement resistivity surfaces).
The two cumulative landscape wildlife movement resistivity surfaces (one extending from good habitat west of Matchett Road, and one extending from good habitat east of Malden Road) were combined to identify the lowest cumulative impedance connective corridors crossing the Study Area, and therefore; crossing both Malden Road and Matchett Road. A density slicing technique was used on the combined cumulative landscape wildlife resistivity surface to highlight primary, secondary, and tertiary corridor areas connecting good habitat patches on one side of the Study Area to the other (Figure 5-C – MAP A for information regarding the combined cumulative landscape wildlife resistivity surface and corridor areas).
The results of the least resistive (lowest impedance) wildlife movement corridor habitat patch connectivity analysis was simplified to help illustrate generalized good wildlife corridors crossing Malden Road and Matchett Road. Also, segments of Malden Road and Matchett Road were identified as Primary Crossing Areas, Secondary Crossing Areas and Tertiary Crossing Areas based on the results from the analysis (Figure 5-C – MAP B for information regarding the wildlife movement corridors and crossing locations/areas).



LEGEND

- Approximate Study Area
- Malden and Matchette Road Location within Study Area
- City of Windsor Municipal Border

Sentinel 2A Imagery and Imagery Derived Input Information:

- Spectral Band 2: Blue reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 458-523 nm.
- Spectral Band 3: Green reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 543-578 nm.
- Spectral Band 4: Red reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 650-680 nm.
- Spectral Band 8: Near infrared reflectance values. Ten metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 785-899 nm.
- Spectral Band 11: Shortwave infrared reflectance values. Twenty metre resolution imagery with 16-bit scale reflectance ramp. Reflectance digital number values represent wavelength range 1565-1655 nm
- Derived Spectral Index (NDVI): Normalized Difference Vegetation Index (band 8 - band 4 / band 8 + band 4). Derived spectral index indicating variation in vegetation growth and productivity.
- Derived Spectral Index (NDMI): Normalized Difference Moisture Index (band 8 - band 11 / band 8 + band 11). Derived spectral index indicating variation in vegetation water content and plant biomass.
- Derived Spectral Index (NDBI): Normalized Difference Built-up Index (band 11 - band 8 / band 11 + band 8). Derived spectral index indicating variation in urbanized, built-up or anthropogenic developed areas.

NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020. L1C_T17TLG_AC26063_20200618 T162536

Datum: NAD83
Projection: UTM Zone 17N

0 2.5 5 10 15 Kilometres

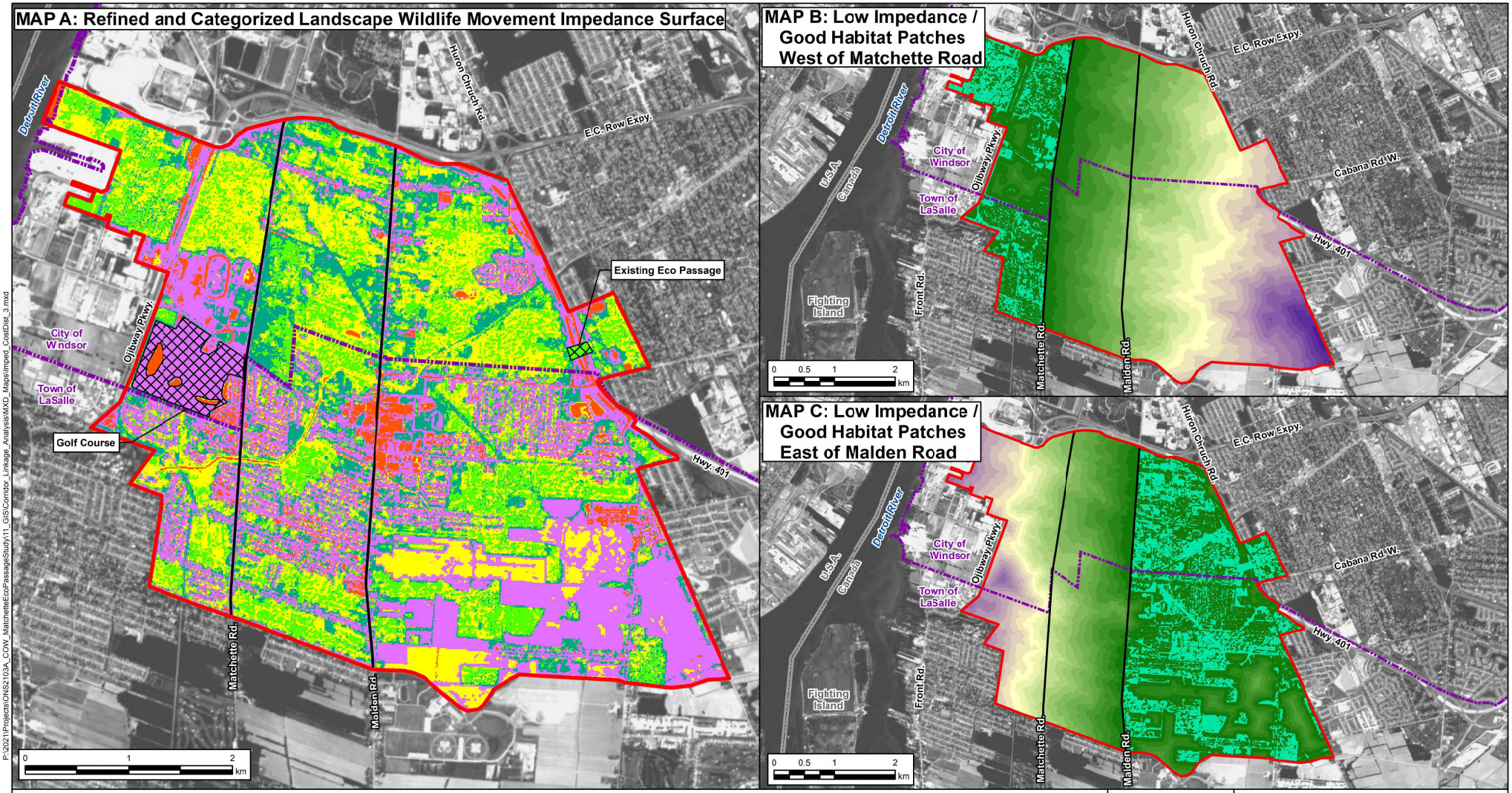
THE CITY OF WINDSOR ONTARIO, CANADA wood.

MALDEN AND MATCHETTE ECO PASSAGE STUDY

Sentinel 2A Satellite Platform Imagery and Imagery Derived Inputs for Inclusion in General Landscape Wildlife Movement Impedance Surface

PROJECT N°: ONS2103A | **FIGURE: 5A**

SCALE: 1:68,000 | DATE: October 2021



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LEGEND

- Approximate Study Area
- Malden and Matchette Road Location within Study Area
- City of Windsor Municipal Border
- National Border

MAP A:

- Areas where Categories were refined due to visual inspection of anthropogenic influence (labelled on map)

Categorized Landscape Wildlife Movement Impedance Surface

- Low Impedance Area for general Wildlife Movement across the Landscape (good habitat: prairie, meadow, moderately treed natural area, etc.)
- High Impedance Area for general Wildlife Movement across the Landscape (not good habitat: urban infrastructure, anthropogenic structures, unvegetated areas, open water, etc.)

MAP B and C:

- Low Impedance / Good Habitat Patches isolated to the west side of Matchette Road (Map B) and east side of Malden Road (Map C)

Cumulative Landscape Wildlife Movement Resistivity based on Wildlife Movement Impedance Surface Categories Extending outward from good habitat patches (west of Matchette Road on Map B, east of Malden Road on Map C)

- High accumulated Impedance moving across the landscape from good habitat patches
- Low accumulated Impedance moving across the landscape from good habitat patches

NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020. L1C_T17TLG_AC26063_20200618 T162536

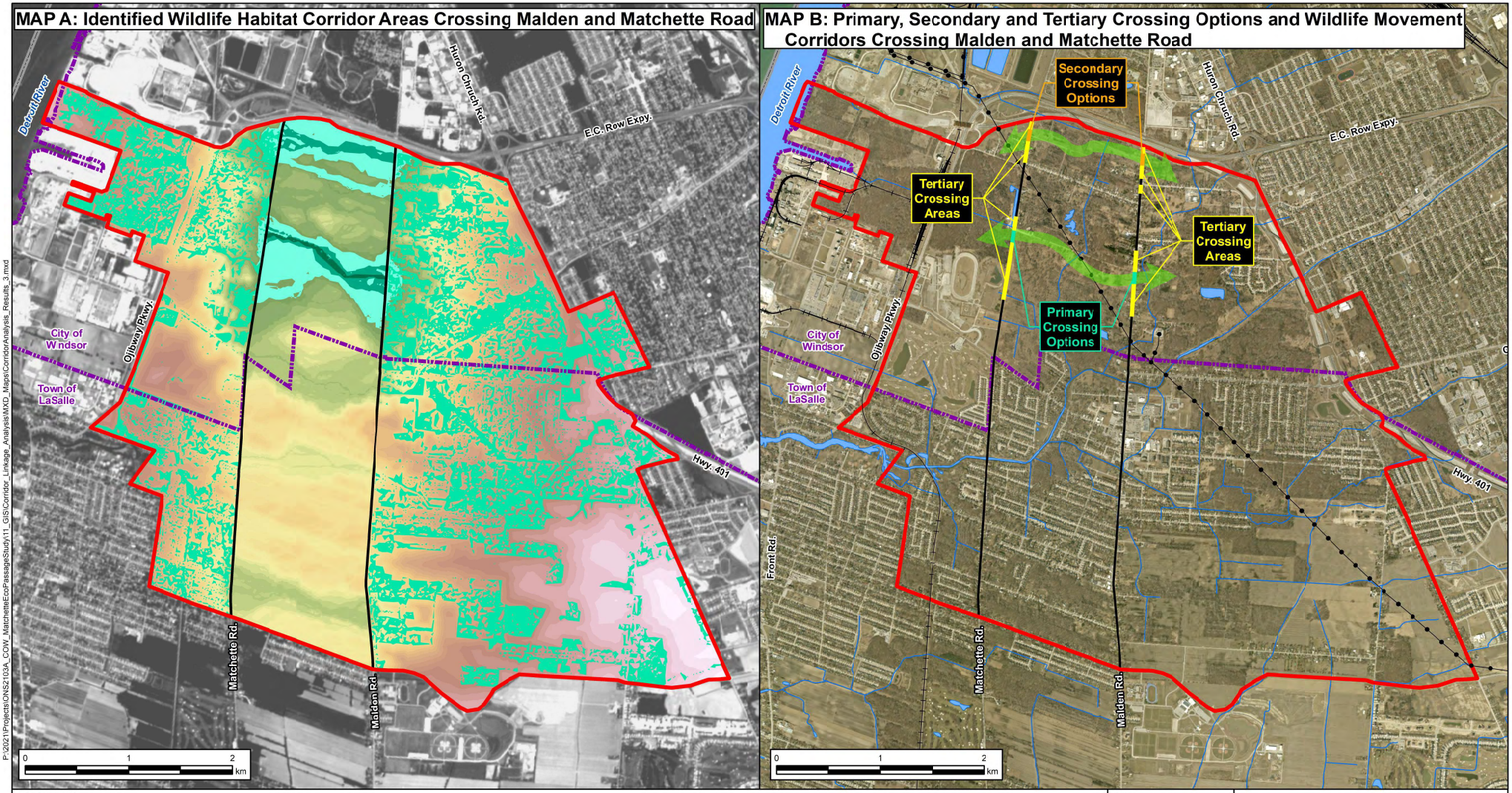
Datum: NAD83
Projection: UTM Zone 17N

THE CITY OF WINDSOR ONTARIO, CANADA | wood.

MALDEN AND MATCHETTE ECO PASSAGE STUDY

Resultant Categorized Landscape Wildlife Movement Impedance Surface and Cumulative Landscape Wildlife Movement Resistivity Analysis from Good Habitat West of Matchette Rd. and East of Malden Rd.

PROJECT N°: ONS2103A	**FIGURE: 5B**
SCALE: MAP A: 1:35,000 MAP B, C: 1:60,000	DATE: October 2021


MAP A: Identified Wildlife Habitat Corridor Areas Crossing Malden and Matchette Road
MAP B: Primary, Secondary and Tertiary Crossing Options and Wildlife Movement Corridors Crossing Malden and Matchette Road
Detroit River
Huron Church Rd.
E.C. Row Expy.
City of Windsor
Ojibway Pkwy.
Town of LaSalle
Hwy. 401
Matchette Rd.
Malden Rd.
Front Rd.
Secondary Crossing Options
Tertiary Crossing Areas
Primary Crossing Options
0 1 2 km
P:\2021\Projects\ONS2103A_COW_MatchetteEcoPassageStudy\11_GIS\Corridor_Linkage_Analysis\MXD_Maps\CorridorAnalysis_Results_3.mxd
LEGEND
Approximate Study Area
Malden and Matchette Road Location within Study Area
Railway
Hydro Line
City of Windsor Municipal Border
National Border
MAP A:
Low Impedance / Good Habitat Patches isolated to the west side of Matchette Road and east side of Malden Road
Identified corridor Areas Crossing Malden and Matchette Road
Primary Corridor Area (lowest wildlife movement resistivity from good habitat west of Matchette Rd. and east of Malden Rd.)
Secondary Corridor Area (lower wildlife movement resistivity from good habitat west of Matchette Rd. and east of Malden Rd.)
Tertiary Corridor Area (low wildlife movement resistivity from good habitat west of Matchette Rd. and east of Malden Rd.)
Combined Cumulative Landscape Wildlife Movement Resistivity Surface Indicating Overall Low/High Impedance Corridors from Good Habitat Patches West of Matchette Rd. and Good Habitat Patches East of Malden Rd.
High Combined Cumulative Impedance Area moving across the landscape from good habitat patches
Low Combined Cumulative Impedance Area moving across the landscape from good habitat patches
MAP B:
Primary and Secondary Wildlife Movement Corridors crossing Malden Rd. and Matchette Rd.
Primary Crossing Location
Secondary Crossing Location
Tertiary Crossing Area
NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020. L1C_T17TLG_AC26063_20200618 T162536
- Aerial imagery (Map B) extracted from Essex County interactive map, 2019.
Datum: NAD83
Projection: UTM Zone 17N
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THE CITY OF WINDSOR ONTARIO, CANADA
wood.
MALDEN AND MATCHETTE ECO PASSAGE STUDY
Resultant Wildlife Habitat Corridor Areas and Primary, Secondary and Tertiary Crossing Options and Wildlife Movement Corridors Crossing Malden and Matchette Road
PROJECT N°: ONS2103A
FIGURE: 5C
SCALE: 1:35,000
DATE: October 2021

6.0 Matchett Road Selection of Preferred Ecopassage Type and Location

Based on the biodiversity and significance of species in the Study Area, the ecopassage should be a type that accommodates all wildlife species, as well as vegetation. Landscape bridge, wildlife overpass, and viaduct can accommodate all wildlife species, and a large underpass could also generally accommodate the crossing of a variety of species. Landscape bridge and viaduct are larger structures and are typically implemented when the span of the road is over 25 m.

The Primary Crossing Area in Figure 5-C Map B Matchett Road is approximately 10 m shoulder to shoulder. The Primary Crossing Area occurs south of the Ojibway Nature Centre, and the crossing footings could occur on City land on the west side within Ojibway Park and provincially-owned land on the east side in Ojibway Prairie Provincial Nature Reserve (Figure 7-A). Field observations from winter 2021 (Section 3.4 and Figure 3-B) also suggest that the Primary Crossing Area is where many species approach the road naturally.

If current road widths are to remain long-term (i.e., Matchett Road will not be widened to accommodate increased traffic or transportation corridors), a landscape bridge or viaduct may not be practical from an engineering perspective, as the road is too narrow. Additionally, there is no large watercourse or valleyland to support a viaduct or a large underpass. A review of available aerial imagery and the City's open data for municipal drains/channelized watercourses indicates the presence of only roadside ditches within the Primary Crossing Area, which route the stormwater in the road right-of-way to one of the municipal drains. Additionally, there are no known wetlands or 100-year flood lines; however, the area does fall within 30 m of adjacent wetlands (to the east) and would be subject to ERCA regulations. The Primary Crossing Area is also within a significant groundwater recharge area. The available elevation data indicates that the Study Area and the surrounding region is very flat. Lastly, significant municipal and provincial protected natural areas occur on both sides of Matchett Road at the Primary Crossing Area.

A narrower wildlife overpass may also accommodate most species while adapting to the narrow road width. The width of the crossing must be evaluated in the context of the footprint on each side of the road. The wider the ecopassage, the larger the construction footprint. Then again, a larger structure may reduce the requirement for additional mammal dedicated crossings in the Secondary Crossing Area or elsewhere. Typically, crossings dedicated to small and meso-mammals require a crossing that is at least 3 m in width. Those ecopassages which accommodate broader habitat linkages and plant dispersal are 50 m wide.

Traffic numbers (provided by the City) for Matchett Road South of Broadway Street in 2021 are 8886 vehicles on average daily. However, if deer collisions are not an issue, fencing that does not impede deer or appropriate placement and incorporation of escape ramps may allow free movement of deer across Matchett Road. The crossing(s) may not have to accommodate deer if they are not restricted by fencing. Therefore, a narrower wildlife overpass in combination with road mitigation measures such as signage, lighting, and infrastructure adaptations (e.g., curbs, drainage grates, jersey barriers, the width of road median) can be effectively used by small and meso-mammals while also reducing deer collisions. A wildlife overpass which aims to connect several species and species groups must also include adaptations such as microhabitat features (such as stepping pools, brush piles, rock piles, etc.) to be permeable.

Lastly, narrow crossings and crossing structures for smaller animals (including amphibians, turtles, and snakes) should be spaced approximately 300 m apart (Ministry of Transportation, 2016 and Ontario

Ministry of Natural Resources and Forestry, 2016). For example, it is recommended that additional crossings dedicated to smaller animals be considered at the stormwater management pond adjacent to the former racetrack along Matchett Road, in the Tertiary Crossing Area to the south of the Primary Crossing Area. Field observations from winter 2021 (Section 3.4 and Figure 3-B) also suggest that this Tertiary Crossing Area is where many small species approach the road naturally. Note, this would only be feasible pending the long-term land use of the area. If the stormwater management pond adjacent to the racetrack is temporary and to be removed, a crossing would not be reasonable. Wildlife crossings are permanent structures within a changing landscape. The lifespan of wildlife crossing structures is around 70–80 years (U.S. Department of Transportation, 2011). Therefore, the location and design of the crossings need to accommodate the changing dynamics of habitat and climatic conditions and their wildlife populations over time (U.S. Department of Transportation, 2011).

A crossing dedicated to smaller animals may also be appropriate north of the Ojibway Nature Centre to capture migration away from the watercourse and pond within Ojibway Park (north of the residential land use). Likewise, previous local studies found that mortality "hotspots" occurred where roads intersected with the utility corridor (Choquette & Valliant, 2016). The utility corridor is in the same location as the suggested additional crossing north of the Ojibway Nature Centre near the pond; therefore, an additional small animal dedicated crossing is also supported by the local studies in this location. It is also notable, that the Secondary Crossing Area noted on Figure 5-C along Matchett Road contains an ACO Wildlife KT500 Slotted Tunnel (Section 1.3). The ACO tunnel was installed to facilitate movement of SAR snakes under Matchett Road. To date, SAR snakes have approached the tunnel entrance on the east side of Matchett Road but have not yet travelled through the tunnel. Adaptive management could also be considered at this tunnel to improve SAR snake connectivity.

It is recommended that detailed studies that inform road mortality and current movement corridors along Matchett Road between Sprucewood Avenue and the E C. Row Expressway/Rt. Hon. Herb Gray Parkway occur (that considers all species groups) to refine crossing locations and types. It is ideal to use both theoretical and empirical data to determine the site-specific location of wildlife crossings, when possible, as field-based assessments can help verify and refine where wildlife crossings are required. Field-based assessments are typically conducted during an Environmental Assessment (EA) at the project preliminary design stage (Ministry of Transportation, 2016). Additional preconstruction surveys and integration of that data (i.e., future land use, engineering constraints) can inform crossing placement, fencing, and escape ramp locations and feasibility.

7.0 Malden Road Selection of Preferred Ecopassage Type and Location

Based on the biodiversity and significance of species in the Study Area, the ecopassage should be a type that accommodates all wildlife species, as well as vegetation. Landscape bridge, wildlife overpass, and viaduct can accommodate all wildlife species and a large underpass could also largely accommodate crossing of a variety of species. Landscape bridge and viaduct are larger structures and are typically implemented when the span of the road is over 25 m. The Primary Crossing Area in Figure 5-C Map B Malden Road is approximately 10 m shoulder to shoulder. The Primary Crossing Area occurs south of the Ojibway Prairie Provincial Nature Reserve parking lot and trailhead (across from Elgin Street). The crossing footings could occur within Titcombe Park on the west side (which is not City owned) and would be in residential lots on the east side (Figure 7-A). Field observations from winter 2021 (Section 3.4 and Figure 3-B) suggest that the Primary Crossing Area is where species approach the road naturally.

Given the residential constraints along Malden Road, it is thought that the narrow road width and reduced road footprint would remain long-term. Similar to Matchett Road, a viaduct and large underpass may not be practical from an engineering perspective as there is no large watercourse or valleyland. Unlike Matchett Road, easements and land acquisition with individual residential owners must be considered when planning for a crossing and may reduce the potential width and characteristics of a crossing. The land use along Malden Road will also require strategic planning of fencing and escape ramps.

A review of available aerial imagery and the City's open data for municipal drains/channelized watercourses indicates the presence of roadside ditches within the Primary Crossing Area, which route the stormwater in the road right-of-way to one of the municipal drains. Additionally, there are no known wetlands, 100-year flood lines, municipal or provincially significant natural areas, or significant groundwater recharge areas at the Primary Crossing Area on Malden Road. However, the area does fall within 30 m of adjacent wetlands and would be subject to ERCA regulations. The available elevation data indicates that the Study Area and the surrounding region is very flat.

In terms of large (over 3 m in width) and singular crossings, a wildlife overpass or landscape bridge is more feasible than a viaduct or large underpass at the Primary Crossing Area on Malden Road. The width of the crossing must be evaluated in the context of the footprint on each side of the road. The wider the ecopassage, the larger the construction footprint and more land acquisition might be necessary. Similar to potential crossings along Matchett Road, ecopassages that function to accommodate habitat linkages, large animals, and plant dispersal are very wide. However, if large animal (deer) collisions are not an issue and/or mitigation measures to facilitate their safe passage across the roadway are also feasible to implement, then a smaller wildlife crossing dedicated to small and meso-mammals can be considered (these crossings are at least 3 m in width). Traffic numbers (provided by the City) for Malden Road South of Spring Garden Road in 2017 was 6363 vehicles on average daily.

Depending on the width of the crossing at the Primary Crossing Area, additional crossings may or may not be recommended. A larger structure at the Primary Crossing Area may reduce the requirement for additional mammal-dedicated crossings in the Secondary Location or elsewhere. According to the local study by Choquette & Valliant (2016), a connection between Tallgrass Prairie Heritage Park and SGNA on the north side of the Ojibway Prairie Provincial Nature Reserve parking lot and trailhead was recommended to mitigate potential mortality "hotspots" where Malden Road intersects the utility corridor. The Connectivity Analysis Primary Crossing Area and the local studies concur that this general area around the parking lot and trailhead is essential when considering ecopassage mitigation. Field observations from winter 2021 (Section 3.4 and Figure 3-B) suggest that deer cross in higher numbers at the utility corridor, approaching the road naturally; however, deer do not seem to be confined to any specific location. A wildlife overpass which aims to connect several species and species groups must also include adaptations such as microhabitat features to be permeable.

Narrow crossing structures for smaller animals, including amphibians, turtles, and snakes, should be spaced approximately 300 m apart (Ministry of Transportation, 2016 and Ontario Ministry of Natural Resources and Forestry, 2016). However, due to ownership constraints and the absence of municipally owned lands along Malden Road, additional crossings may not be feasible. Approximately 500 m south of the Primary Crossing Area, a watercourse crossing/municipal drain called Basin Drain occurs. Basin Drain crosses under Malden Road at the same location as the utility corridor. Existing culverts can be modified/retrofitted and used as a wildlife crossing. Moreover, land ownership might be less restrictive around a municipal drain. This culvert could be a suitable location for an additional crossing. Field observations from winter 2021 (Section 3.4 and Figure 3-B) note the occurrence of Wild Turkey at Basin Drain.

Similar to the recommendations for placement location along Matchett Road, it is also recommended that detailed studies that inform road mortality and current movement corridors along Malden Road between the bridge south of the Todd Lane roundabout and the E C. Row Expressway/Rt. Hon. Herb Gray Parkway and side streets occur. Combining the field-based assessments with results of the connectivity analysis or movement models will better support the understanding of wildlife movement and inform crossing placement, fencing, and escape ramp locations and feasibility. Implementing effective fencing along Malden Road to ensure the use of the crossing by wildlife will be constrained by property boundaries. Fencing will likely have to follow rear lot lines and watercourses. The City may have to consider the retrofit of existing culverts as additional wildlife crossings. An in-depth look at mortality on Malden Road and the ways to mitigate it should be conducted to refine crossing locations and types.

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LEGEND

- Properties Owned by The City of Windsor
- Municipal Park (Name)
- Natural Heritage Feature (ANSI, Provincially Significant Wetland, Environmentally Significant Area and Provincial Park)
- Watercourse / Drain
- Waterbody
- Railway
- Hydro Line
- Primary Crossing Location
- Secondary Crossing Location
- Tertiary Crossing Location
- Primary and Secondary Wildlife Movement Corridors crossing Malden Rd. and Matchette Rd.

0 0,25 0,5 1 1,5 2 Kilometres

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N

THE CITY OF WINDSOR ONTARIO, CANADA | wood.

MALDEN AND MATCHETTE ECO PASSAGE STUDY

Potential Wildlife Crossings and Land Ownership

PROJECT N°: ONS2103A | **FIGURE: 7-A**

SCALE: 1:10,000 | DATE: November 2021

8.0 General Limitations and Preliminary Recommendations

Based on the analysis, there are several potentially suitable crossing locations to be considered. Based on preliminary objectives an overpass structure is recommended at the Primary Crossing Areas. Additionally, considerations to include a combination of secondary crossings (small to medium mammal underpass, modified culvert, and herptile tunnel) along Matchett Road and Malden Road should be given. Below are several factors to consider when initiating the next steps to determine the feasibility of a wildlife crossing, including:

- Long-term maintenance agreements;
- Cost and Funding for implementation, long-term maintenance, and monitoring;
- Land ownership and long-term land use;
- Human interactions/disturbance; and
- Environmental constraints.

Crossing structures and fencing are effective measures in reducing WVCs and providing connections between fragmented habitats (Ministry of Transportation, 2016). When selecting wildlife crossing types where a roadway bisects habitat of high conservation value, mixed-use crossings should not be used (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). Preventing human use of large overpasses will be difficult, especially if overpasses are near nature centers and trailheads.

Engineering, geotechnical, and hydrological studies have not been completed, and these elements may refine or change ultimate crossing locations. Additionally, land ownership limitations will be a limiting factor in crossing and fencing placement, especially along Malden Road. Wildlife fencing is the most effective and preferred method to guide wildlife to the structure and prevent intrusions onto the roadway (Ontario Road Ecology Group, Toronto Zoo, 2010; U.S. Department of Transportation, 2011; and Ministry of Transportation, 2016). In general, both sides of the roadway must be fenced in equal lengths (symmetric) (U.S. Department of Transportation, 2011), and fencing must be designed for target species (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016). Fencing is a key part of a mitigation plan and needs to consider what happens for wildlife that becomes trapped on the road. Escape ramps, gates, or doors must be used to allow for one-way movement off the road (U.S. Department of Transportation, 2011 and Ministry of Transportation, 2016).

One of the most important factors in site selection for wildlife crossings is adjacent land use compatibility (current and future). When the property for the wildlife crossing and areas for elements such as fencing is not owned by the City, an agreement and understanding on long-term responsibilities and financial investments must be understood by all land and utility owners. Additionally, an adjacent landowner may have a long-term plan for their property that would negate the crossing, such as specific management of utility corridors that may impact wildlife concentrated at the crossings. Therefore, the planning of a wildlife crossing must consider adjacent owners and long-term land use.

Likewise, coordination between internal departments (e.g., operations, engineering, parks) must be forecasted to understand how to proactively integrate concerns around growing infrastructure and changing landscapes (U.S. Department of Transportation, 2011). Wildlife crossings can only be as effective as the management strategies developed and the funding and ability to implement them. For wildlife

corridors to fulfil their function as habitat connectors, impacts from development and human disturbance must be mitigated. Long-term planning and landscape connectivity must be understood to ensure that the local-scale connection is effective.

It is recommended the City collect road mortality observations and additional field sampling to establish a baseline study and to refine the location of the ecopassages and other mitigation measures (e.g., additional crossings, fencing). A baseline study would ideally be completed for multiple years to gather data that accounts for population cycles; however, funding may be limited, and baseline studies may be completed as part of an EA.

After the final determinations on type and location, configuration, and maintenance are made, the cost analysis and implementation plan can begin (the third, fourth, and fifth steps of the road map Figure 2-A). The subsequent steps help integrate the project into the larger planning, construction, implementation, and long-term monitoring processes. Post-construction monitoring commitments must also be considered to inform effectiveness and adaptive management.

9.0 Closure

Available data from local naturalists and researchers, agencies, and conservation authorities have been reviewed and integrated where appropriate for the scope of this report. Occurrence records were provided by Choquette (Choquette J. D., 2012; Choquette & Valliant, 2016) along with records collected as part of the Herb Gray Parkway project (Wood 2011- 2020), data from Ojibway Nature Centre, Natural Heritage Information Centre, satellite imagery, and field reconnaissance. This report identifies the preferred crossing types as wildlife overpasses and Primary Crossing Areas on both Matchett Road and Malden Road. Additional recommendations and considerations are provided to aid in a wholesome review of potential planning factors.

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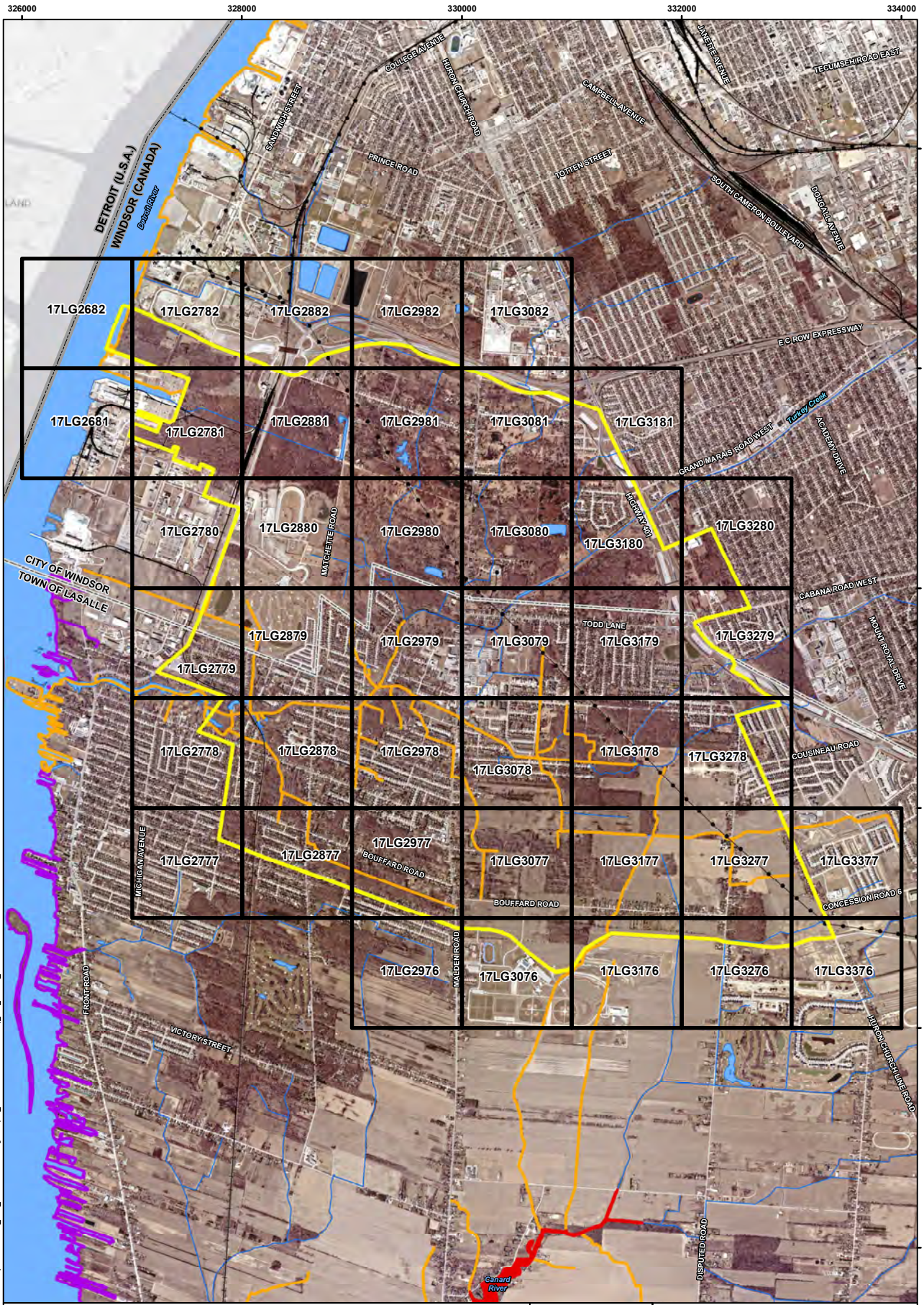
Appendix A

Secondary Sources

Secondary Sources queried are listed below and visually presented in the attached Figure.

- Essex Region Conservation Authority Mapping;
    - Natural Areas (the group of layers, specifically PSW, ANSI, ESA, Existing natural feature, restoration opportunities)
    - ERCA regulation (name from the group of layers, specifically the 1:100 yr flood line and limit of regulated area)
    - Drainage (all in the group of layers, municipal drains, constructed drains, and the sub watershed boundaries)
    - Source water protection (group of layers, specifically surface water intake and significant groundwater recharge area)
- Species at Risk in Ontario List (MNRF 2018);
- Species at Risk Public Registry database (ECCC 2018);
- MNRF Natural Heritage Information Centre (NHIC) database square (1 km x 1 km) encompassing the Project (17LG2676, 17LG2677,17LG2678, 17LG2679, 17LG2680, 17LG2681, 17LG2682, 17LG2776, 17LG2777, 17LG2778, 17LG2779, 17LG2780, 17LG2781, 17LG2782, 17LG2876, 17LG2877, 17LG2878, 17LG2879, 17LG2880, 17LG2881, 17LG2882, 17LG2976, 17LG2977, 17LG2978, 17LG2979, 17LG2980, 17LG2981, 17LG2982, 17LG3076, 17LG3077, 17LG3078, 17LG3079, 17LG3080, 17LG3081, 17LG3082, 17LG3176, 17LG3177, 17LG3178, 17LG3179, 17LG3180, 17LG3181, 17LG3182, 17LG3276, 17LG3277, 17LG3278, 17LG3279, 17LG3280, 17LG3281, 17LG3282) (MNRF 2021);
- Ontario Reptile and Amphibian Atlas (ORAA; square 17LG28, 17LG38, 17LG27, 17LG37);
- The Atlas (2001 to 2005) of the Breeding Birds of Ontario (ABBO) 10 x 10 km survey square 17NJ31 (Cadman et al. 2007);
- Ontario Butterfly Atlas by the Toronto Entomologists' Association (OBA) 10 x 10 km survey square 17NJ31;
- iNaturalist (Ojibway Prairie Complex, Windsor, ON, CA Point of Interest);
- Topographic data extracted from Land Information Ontario (MNRF 2018); and,
- Relevant technical reports provided by the City and others.



LEGEND

- Approximate Study Area
- Watercourse
- Waterbody
- Railway
- Hydro Line
- Municipal Border (Lower and Single Tier)
- National Border
- NHIC Squares (Labelled with ID)

Department of Fisheries and Oceans Species at Risk

- Critical Habitat
- Extirpated, Endangered, or Threatened
- Special Concern

NOTES:
- Aerial imagery extracted from Essex County interactive map, 2019.

Projection: UTM zone 17N

0 0.25 0.5 1 1.5 2 Kilometres

MALDEN AND MATACHETTE ECO PASSAGE STUDY

Secondary SAR Sources

PROJECT #: 0N82103A | FIGURE: Appendix A

SCALE: 1:32,000 | DATE: October 2021

P:\2021\Projects\0N82103A_COW_Matchette Eco Passage Study\1_GIS\Terrestrial\MXD\Secondary_SAR_Sources_1.mxd

Appendix B

Species Lists

Legend

*=Introduced Species
S rank (provincial)= NatureServe Subnational Conservation Status Definitions. The term "subnational" refers to state or province-level jurisdictions (e.g., California, Ontario).
G rank (global)= NatureServe Global Conservation Status Definitions

RANK	DEFINITION
GX **SX**	**Presumed Extirpated**—Species or ecosystem is believed to be extirpated from the jurisdiction (i.e., nation, or state/province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. [equivalent to "Regionally Extinct" in IUCN Red List terminology]
GH **SH**	**Possibly Extirpated** – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
G1 **S1**	**Critically Imperiled** At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
G2 **S2**	**Imperiled** — At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3 **S3**	**Vulnerable** — At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4 **S4**	**Apparently Secure** — At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
G5 **S5**	**Secure** — At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
G#G# **S#S#**	**Range Rank —** A numeric range rank (e.g., G2G3, G1G3) is used to indicate uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).
GU **SU**	**Unrankable —** Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
GNR **SNR**	**Unranked —** Global rank not yet assessed.
GNA **SNA**	**Not Applicable —** A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities. A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. For species, typically the species is a

	hybrid without conservation value, or of domestic origin. For ecosystems, the type is typically non-native (e.g, many ruderal vegetation types), agricultural (e.g. pasture, orchard) or developed (e.g. lawn, garden, golf course).
?	**Inexact Numeric Rank -** Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.
Q	**Questionable taxonomy that may reduce conservation priority -** Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.
C	**Captive or Cultivated Only -** Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to "Extinct in the Wild (EW) in IUCN's Red List terminology (IUCN 2001).

COSEWIC= The Committee on the Status of Endangered Wildlife in Canada

ESA= Endangered Species Act, 2007, S.O. 2007, c. 6

SARA Schedule 1= Species at Risk Act (SC 2002, c. 29)

EXT	**Extinct** - A species shall be classified as an extinct species if it no longer lives anywhere in the world.
EXP	**Extirpated** - A species shall be classified as an extirpated species if it lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END	**Endangered** - A species shall be classified as an endangered species if it lives in the wild in Ontario but is facing imminent extinction or extirpation.
THR	**Threatened** - A species shall be classified as a threatened species if it lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening to lead to its extinction or extirpation.
SC	**Special Concern** - A species shall be classified as a special concern species if it lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered because of a combination of biological characteristics and identified threats.

Coefficient of Wetness = indicates the plant's soil moisture tolerance
Coefficient of Conservatism = numeric values assigned to plant species to indicate their sensitivity to anthropogenic disturbance

Vegetation Table for Matchette and Malden (ONS2103A)

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA Schedule 1	Coefficient of Conservatism	Coefficient of Wetness	Essex County Status from Oldham Carolinian List	SOFIA Tallgrass Indicator Species	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28	Choquette& Valliant 2016
Juniperus communis	Common Juniper	S5	G5			4	3	Native, Rare				x	
Juniperus virginiana	Eastern Red Cedar	S5	G5			4	3	Native, Common		x			
* *Pinus nigra*	Austrian Pine	SNA	GNR				5			x			
Pinus strobus	Eastern White Pine	S5	G5			4	3	Native, Rare		x			
* *Pinus sylvestris*	Scots Pine	SNA	GNR				3	Introduced, Rare		x		x	
* *Abutilon theophrasti*	Velvetleaf	SNA	GNR				3	Introduced, Common		x			
Acalypha rhomboidea	Common Three-seeded	S5	G5			0	3	Native, Common		x			
Acer negundo	Manitoba Maple	S5	G5			0	0	Native, Common		x		x	
Acer rubrum	Red Maple	S5	G5			4	0	Native, Common		x		x	
Acer saccharinum	Silver Maple	S5	G5			5	-3	Native, Common		x		x	
Acer x freemanii	Freeman's Maple (Acer rubrum X Acer	SNA	GNA			6	-5	Hybrid		x		x	
* *Achillea millefolium*	Common Yarrow	SNA	G5				3			x		x	
Actaea racemosa	Black Snakeroot	S2	G4			10	3					x	
Actaea pachypoda	White Baneberry	S5	G5			6	5	Native, Common		x			
Agalinis purpurea var. purpurea	Large-flowered Purple False Foxglove	S1	GNRTNR			10	-3	Native, Rare	Yes		NHIC		
Agalinis skinneriana	Skinner's False Foxglove	S1	G3G4	END	END	10	3	Native, Rare	Yes		NHIC		
* *Aegopodium podagraria*	Goutweed	SNA	GNR				0			x			
Agalinis purpurea	Purple False Foxglove	S4S5	GNR			8	-3			x	NHIC	X	
Agalinis tenuifolia	Slender-leaved False	S4S5	G5			7	-3	Native, Rare		x		x	
Ageratina altissima	White Snakeroot	S5	G5			5	3	Native, Common		x			
Agrimonia pubescens	Soft Agrimony	S4	G5			7	5	Native, Common				x	
Agrimonia gryposepala	Hooked Agrimony	S5	G5			2	3	Native, Common		x		x	
Agrimonia parviflora	Swamp Agrimony	S4	G5			4	-3	Native, Common	Yes	x		x	
Agrimonia striata	Woodland Agrimony	S4	G5			3	3			x			
* *Ajuga reptans*	Creeping Bugleweed	SNA	GNR				5	Introduced, Rare				x	
* *Ailanthus altissima*	Tree-of-heaven	SNA	GNR				5	Introduced, Rare		x		x	
* *Alliaria petiolata*	Garlic Mustard	SNA	GNR				0	Introduced, Common		x		x	
Ammannia robusta	Scarlet Ammannia	S1	G5	END	END	9	-5	Native, Rare			NHIC		
Ambrosia artemisiifolia	Common Ragweed	S5	G5			0	3	Native, Common		x		x	
Ambrosia trifida	Great Ragweed	S5	G5			0	0	Native, Common		x		x	
Amelanchier arborea	Downy Serviceberry	S5	G5			5	3	Native, Uncommon		x			
Amphicarpaea bracteata	American Hog-peanut	S5	G5			4	0	Native, Common	Yes	x		x	
Anemone quinquefolia	Wood Anemone	S5	G5			7	0	Native, Common				x	
Angelica atropurpurea	Purple-stemmed Angelica	S5	G5			6	-5	Native, Rare				x	
Anemonastrum canadense	Canada Anemone	S5	G5			3	-3	Native, Common	Yes	x		x	
Anemone cylindrica	Long-headed Anemone	S4	G5			7	5	Native, Rare	Yes	x			
Anemone virginiana	Tall Anemone	S5	G5			4	3	Native, Common		x		x	
Antennaria neglecta	Field Pussytoes	S5	G5			3	5	Native, Rare				x	
Apios americana	American Groundnut	S5	G5			6	-3	Native, Common	Yes	x		x	
Apocynum	Spreading Dogbane	S5	G5			3	5	Native, Uncommon		x		x	

Vegetation Table for Matchette and Malden (ONS2103A)

Apocynum cannabinum	Hemp Dogbane	S5	GNR			3	0			x		x
Aquilegia canadensis	Red Columbine	S5	G5			5	3	Native, Common		x		
* *Aquilegia vulgaris*	European Columbine	SNA	GNR				3	Introduced, Rare		x		
Aralia nudicaulis	Wild Sarsaparilla	S5	G5			4	3	Native, Common		x		
* *Arctium lappa*	Great Burdock	SNA	GNR				3	Introduced, Rare		x		
* *Arctium minus*	Common Burdock	SNA	GNR				3	Introduced, Common		x		x
Aronia x prunifolia	(Aronia arbutifolia X Aronia melanocarpa)	SNA	GNA				-3					x
* *Armoracia rusticana*	Horseradish	SNA	GNR				0	Introduced, Rare		x		
Asclepias exaltata	Poke Milkweed	S4	G5			8	5	Native, Rare				x
Asclepias hirtella	Tall Green Milkweed	S1	G5			10	5	Native, Rare	Yes		NHIC	
Asclepias purpurascens	Purple Milkweed	S1	G5?			10	3	Native, Rare	Yes		NHIC	
Asclepias sullivantii	Prairie Milkweed	S2S3	G5			8	5	Native, Rare	Yes		NHIC	
Asarum canadense	Canada Wild-ginger	S5	G5			6	5	Native, Uncommon		x		
Asclepias viridiflora	Green Cornet Milkweed	S2	G5			10	5	Native, Rare	Yes		NHIC	
Asimina triloba	Pawpaw	S3	G5			10	0	Native, Rare			NHIC	
Asclepias incarnata	Swamp Milkweed	S5	G5			6	-5	Native, Common	Yes	x		x
Asclepias syriaca	Common Milkweed	S5	G5			0	5	Native, Common		x		x
Asclepias tuberosa	Butterfly Milkweed	S4	G5			8	5	Native, Uncommon	Yes	x		
Asclepias verticillata	Whorled Milkweed	S4	G5			6	5	Native, Rare	Yes	x		
Aureolaria flava	Smooth Yellow False	S2?	G5			10	5	Native, Rare	Yes		NHIC	
Aureolaria pedicularia	Fern-leaved Yellow False Foxglove	S2?	G5			10	5	Native, Rare	Yes		NHIC	x
Aureolaria virginica	Downy Yellow False	S1	G5			10	5					x
S *Baptisia australis*	Blue Wild Indigo	SNA	G5				3					x
Baptisia tinctoria	Yellow Wild Indigo	S1S2	G5			10	5	Native, Rare	Yes		NHIC	
* *Berberis vulgaris*	Common Barberry	SNA	GNR				3	Unconfirmed Report				x
* *Barbarea vulgaris*	Bitter Wintercress	SNA	GNR				0	Introduced, Common		x		x
Betula papyrifera	Paper Birch	S5	G5			2	3	Introduced, Rare				x
Bidens tripartita	Three-parted Beggarticks	S5?	G5			5	-3	Native, Common				x
* *Berberis thunbergii*	Japanese Barberry	SNA	GNR				3	Introduced, Uncommon		x		x
* *Berteroa incana*	Hoary Alyssum	SNA	GNR				5	Introduced, Uncommon		x		
Bidens frondosa	Devil's Beggarticks	S5	G5			3	-3	Native, Common		x		x
Boehmeria cylindrica	Small-spike False Nettle	S5	G5			4	-5	Native, Common		x		x
Calystegia sepium	Hedge False Bindweed	S5	G5			2	0	ve, status unknown or not spec		x		
* *Campanula rapunculoides*	Creeping Bellflower	SNA	GNR				5	Introduced, Uncommon		x		
Campsis radicans	Trumpet Creeper	S2?	G5			3	0	Native, Rare		x		
* *Capsella bursa-pastoris*	Common Shepherd's Purse	SNA	GNR				3	Introduced, Common		x		
Cardamine bulbosa	Bulbous Bittercress	S4	G5			8	-5	Native, Common		x		
Cardamine douglassii	Limestone Bittercress	S4	G5			7	-3	Native, Common		x		
* *Cardamine hirsuta*	Hairy Bittercress	SNA	GNR				3	Introduced, Rare		x		
Carya laciniosa	Shellbark Hickory	S3	G5			9	-3	Native, Common	Yes		NHIC	x
Carya cordiformis	Bitternut Hickory	S5	G5			6	0	Native, Common		x		
Carya glabra	Pignut Hickory	S3	G5			9	3	Native, Rare	Yes	x	NHIC	x
Carya ovata	Shagbark Hickory	S5	G5			6	3	Native, Common		x		x
Castanea dentata	American Chestnut	S1S2	G4	END	END	8	5	Native, Uncommon		x	NHIC	
* *Catalpa speciosa*	Northern Catalpa	SNA	G4?				3	Unconfirmed Report		x		

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Ceanothus americanus	New Jersey Tea	S4	G5			7	5	Native, Rare	Yes	x			
* *Celastrus orbiculatus*	Oriental Bittersweet	SNA	GNR				5	Introduced, Rare		x			
Celastrus scandens	Climbing Bittersweet	S5	G5			3	3	Native, Common		x			
Celtis occidentalis	Common Hackberry	S4	G5			8	0	Native, Common		x			
* *Centaurium erythraea*	European Centaury	SNA	GNR				0					x	
* *Centaurea stoebe*	Spotted Knapweed	SNA	GNR				5	Introduced, Uncommon		x			
* *Centaurium pulchellum*	Branching Centaury	SNA	GNR				0	Introduced, Uncommon		x			
Cephalanthus occidentalis	Eastern Buttonbush	S5	G5			7	-5	Native, Common		x		x	
Ceratophyllum demersum	Common Hornwort	S5	G5			4	-5	Native, Rare		x			
Cercis canadensis	Eastern Redbud	SX	G5			8	3	Native, Historical		x			
Chimaphila maculata	Spotted Wintergreen	S2	G5	THR	END	10	5	Native, Rare			NHIC		
Chelone glabra	White Turtlehead	S5	G5			7	-5	Native, Common		x			
* *Cichorium intybus*	Wild Chicory	SNA	GNR				5	Introduced, Common		x		x	
Cicuta maculata	Spotted Water-hemlock	S5	G5			6	-5			x		x	
Circaea canadensis	Broad-leaved Enchanter's Nightshade	S5	G5			2	3	Native, Common		x		x	
* *Cirsium arvense*	Canada Thistle	SNA	G5				3	Introduced, Common		x		x	
Cirsium discolor	Field Thistle	S3	G5			9	5	Native, Uncommon	Yes	x	NHIC	x	
Cirsium muticum	Swamp Thistle	S5	G5			8	-5	Native, Rare		x			
* *Cirsium vulgare*	Bull Thistle	SNA	GNR				3	Introduced, Common		x		x	
Claytonia virginica	Eastern Spring Beauty	S5	G5			5	3	Native, Common		x			
* *Clematis terniflora*	Sweet Autumn Clematis	SNA	GNR				5			x			
Clematis virginiana	Virginia Clematis	S5	G5			3	0	Native, Rare		x			
Collinsonia canadensis	Canada Horsebalm	S4	G5			8	0	Native, Common		x		x	
Comandra umbellata	Bastard Toadflax	S5	G5			6	3	Native, Common	Yes	x		x	
* *Convolvulus arvensis*	Field Bindweed	SNA	GNR				5	Introduced, Common		x		x	
Cornus florida	Eastern Flowering	S2?	G5	END	END	7	3	Native, Common			NHIC		
Coreopsis lanceolata	Lance-leaved Tickseed	S4	G5			5	3	Unconfirmed Report		x			
Coreopsis tripteris	Tall Tickseed	S1S2	G5			9	0	Native, Uncommon	Yes	x	NHIC	x	
Cornus sericea	Red-osier Dogwood	S5	G5			2	-3	Native, Common				x	
Cornus drummondii	Rough-leaved Dogwood	S4	G5			4	0	Native, Common		x		x	
Cornus obliqua	Silky Dogwood	S5	G5			2	-3	Native, Common		x	x	x	
Cornus racemosa	Grey Dogwood	S5	G5			2	0	Native, Common		x		x	
Corylus americana	American Hazelnut	S5	G5			5	3	Native, Common		x		x	
Corylus cornuta	Beaked Hazelnut	S5	G5			5	3			x		x	
Crataegus mollis	Downy Hawthorn	S4S5	G5			4	0					x	
Crataegus crus-galli	Cockspur Hawthorn	S4	G5			4	0	Native, Common		x		x	
Cryptotaenia canadensis	Canada Honewort	S5	G5			5	0	Native, Common		x			
Cuscuta campestris	Field Dodder	S2	G5			5	0	Native, Rare			NHIC		
Cuscuta cephalanthi	Buttonbush Dodder	S2	G5			8	5	Native, Rare			NHIC		
Cuscuta coryli	Hazel Dodder	S1	G5?			9	5	Native, Rare	Yes		NHIC		
* *Cynoglossum officinale*	Common Hound's-tongue	SNA	GNR				5	Introduced, Rare				x	
* *Datura stramonium*	Jimsonweed	SNA	GU				5	Introduced, Rare		x			
* *Daucus carota*	Wild Carrot	SNA	GNR				5	Introduced, Common		x		x	
Desmodium canadense	Canada Tick-trefoil	S4	G5			5	0	Native, Common	Yes	x		x	
Desmodium perplexum	Perplexed Tick-trefoil	S4	G5			6	5	Native, Uncommon	Yes	x			
* *Dianthus armeria*	Deptford Pink	SNA	GNR				5	Introduced, Common		x			

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* *Dipsacus fullonum*	Common Teasel	SNA	GNR				3	Introduced, Common		x		x
Dirca palustris	Eastern Leatherwood	S4	G4			7	0	Native, Rare		x		
Doellingeria umbellata	Flat-top White Aster	S5	G5			6	-3			x		x
* *Elaeagnus angustifolia*	Russian Olive	SNA	GNR				3	Introduced, Rare		x		x
* *Elaeagnus umbellata*	Autumn Olive	SNA	GNR				3	Introduced, Rare		x		x
Epilobium ciliatum	Northern Willowherb	S5	G5			3	-3					x
* *Eranthis hyemalis*	Winter Aconite	SNA	GNR				5			x		
Erechtites hieraciifolius	Eastern Burnweed	S5	G5			2	3	Native, Common		x		
Erigeron annuus	Annual Fleabane	S5	G5			0	3	Native, Common		x		x
Erigeron canadensis	Canada Horseweed	S5	G5			0	3	Native, Common	Yes	x		x
Erigeron philadelphicus	Philadelphia Fleabane	S5	G5			1	-3	Native, Common		x		x
Erigeron strigosus	Rough Fleabane	S5	G5			4	3	Native, Common	Yes	x		
Eupatorium altissimum	Tall Boneset	S1	G5			3	5	Native, Rare			NHIC	
* *Euonymus alatus*	Winged Euonymus	SNA	GNR				5	Introduced, Rare		x		
* *Euonymus europaeus*	European Euonymus	SNA	GNR				5	Introduced, Rare		x		
* *Euonymus fortunei*	Climbing Euonymus	SNA	GNR				5	Introduced, Rare		x		
Eupatorium perfoliatum	Common Boneset	S5	G5			2	-3	Native, Common		x		x
* *Eupatorium serotinum*	Late Boneset	SNA	G5				0	Introduced, Rare		x		
Euphorbia corollata	Flowering Spurge	S4	G5			7	5	Native, Rare	Yes	x		x
* *Euphorbia cyparissias*	Cypress Spurge	SNA	G5				5	Introduced, Rare		x		
* *Euphorbia maculata*	Spotted Spurge	SNA	G5?				3	Introduced, Common		x		
Euthamia caroliniana	Slender Fragrant	S1	G5			10	-3	Native, Rare	Yes		NHIC	x
Euthamia graminifolia	Grass-leaved Goldenrod	S5	G5			2	0	Native, Common		x		x
Eutrochium maculatum	Spotted Joe Pye Weed	S5	G5			3	-5			x		x
Eutrochium purpureum	Purple Joe Pye Weed	S4	G5			8	0	Native, Rare	Yes	x		x
S *Fallopia dumetorum*	Hedge Bindweed	SNA	GU									x
Fallopia scandens	Climbing False Buckwheat	S4S5	G5			3	0	Native, Common		x		
* *Filipendula ulmaria*	Queen-of-the-meadow	SNA	G5				0					x
* *Ficaria verna*	Fig-root Buttercup	SNA	GNR				-3	Introduced, Rare		x		
Fragaria vesca	Woodland Strawberry	S5	G5			4	3					x
* *Frangula alnus*	Glossy Buckthorn	SNA	GNR				0	Introduced, Rare				x
Fraxinus profunda	Pumpkin Ash	S2?	G4			9	-5	Native, Rare			NHIC	x
Fraxinus quadrangulata	Blue Ash	S2?	G5	THR	SC	9	3	Native, Rare			NHIC	
Fragaria virginiana	Wild Strawberry	S5	G5			2	3	Native, Common	Yes	x		x
Fraxinus americana	White Ash	S4	G5			4	3	Native, Common		x		
Fraxinus pennsylvanica	Red Ash	S4	G5			3	-3	Native, Common		x		x
Galium asprellum	Rough Bedstraw	S5	G5			6	-5	Native, Rare			x	
* *Galium odoratum*	Sweet-scented Bedstraw	SNA	GNR				5					x
Galium aparine	Common Bedstraw	S5	G5			4	3	Native, Common		x		x
Galium pilosum	Hairy Bedstraw	S3	G5			9	5	Native, Rare	Yes		NHIC	
Galium trifidum	Three-petalled Bedstraw	S5	GNR			5	-3					x
Galium circaezans	Licorice Bedstraw	S5	G5			7	3	Native, Common		x		
* *Galium mollugo*	Smooth Bedstraw	SNA	GNR				5			x		
Galium palustre	Common Marsh Bedstraw	S5	G5			5	-5	Native, Rare		x		x
Galium triflorum	Three-flowered Bedstraw	S5	G5			4	3	Native, Common		x		
Gaylussacia baccata	Black Huckleberry	S4	G5			8	3	Native, Uncommon		x		
Gentiana andrewsii	Andrews' Bottle Gentian	S4	G5?			6	-3	Native, Uncommon	Yes	x		x

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Gentianopsis crinita	Greater Fringed Gentian	S5	G5			8	-5	Native, Rare	Yes	x		x
Geum aleppicum	Yellow Avens	S5	G5			2	0	Native, Rare				x
Geranium maculatum	Spotted Geranium	S5	G5			6	3	Native, Common		x		x
Geum vernum	Spring Avens	S4	G5			7	3	Native, Common				x
Gillenia trifoliata	Bowman's-root	SX	G4G5			9	5	Unconfirmed Report			NHIC	
Geum canadense	Canada Avens	S5	G5			3	0	Native, Common		x		x
Geum laciniatum	Rough Avens	S4	G5			4	-3	Native, Common		x		
* *Glechoma hederacea*	Ground-ivy	SNA	GNR				3	Introduced, Common		x		x
Gleditsia triacanthos	Honey Locust	S2?	G5			8	0	Native, Uncommon	Yes	x		
Gymnocladus dioicus	Kentucky Coffee-tree	S2	G5	THR	THR	6	3	Native, Rare			NHIC	
Hackelia virginiana	Virginia Stickseed	S5	G5			5	3	Native, Common		x		x
Hamamelis virginiana	American Witch-hazel	S4S5	G5			6	3	Native, Common		x		x
* *Hedera helix*	English Ivy	SNA	GNR				3	Introduced, Rare		x		
Helenium autumnale	Common Sneezeweed	S4	G5			7	-3	Native, Uncommon	Yes	x		x
Helianthus divaricatus	Woodland Sunflower	S5	G5			7	5	Native, Common	Yes	x		
Helianthus giganteus	Giant Sunflower	S5	G5			6	-3	Native, Common	Yes	x		x
* *Helianthus maximiliani*	Maximilian Sunflower	SNA	G5				5	Introduced, Historical		x		
Helianthus tuberosus	Jerusalem Artichoke	SU	G5			1	0	ve, status unknown or not spec		x		x
Hepatica americana	Round-lobed Hepatica	S5	G5			6	5	Native, Rare		x		x
Heracleum maximum	American Cow Parsnip	S5	G5			3	-3	Native, Rare		x		
* *Hesperis matronalis*	Dame's Rocket	SNA	G4G5				3	Introduced, Uncommon		x		x
Heuchera americana	American Alumroot	S1	G5			9	3	Native, Uncommon			NHIC	
Hibiscus moscheutos	Swamp Rose-mallow	S3	G5	SC	SC	9	-5	Native, Common			NHIC	
* *Hibiscus trionum*	Flower-of-an-hour	SNA	GNR				5	Introduced, Uncommon		x		
Hylodesmum glutinosum	Large Tick-trefoil	S4	G5			6	5	Native, Uncommon		x		
Hypericum prolificum	Shrubby St. John's-wort	S2	G5			6	3	Native, Rare	Yes		NHIC	
Hypericum gentianoides	Gentian-leaved St. John's-	S1	G5			10	3	Native, Rare	Yes	x	NHIC	x
Hypericum mutilum	Dwarf St. John's-wort	S4	G5			6	-3	Native, Rare		x		
* *Hypericum perforatum*	Common St. John's-wort	SNA	GNR				5	Introduced, Common	Yes	x		x
Hypericum punctatum	Spotted St. John's-wort	S5	G5			5	0	Native, Common		x		
Ilex verticillata	Common Winterberry	S5	G5			5	-3	Native, Common		x		
Impatiens capensis	Spotted Jewelweed	S5	G5			4	-3	Native, Common		x		x
* *Jacobaea vulgaris*	Tansy Ragwort	SNA	GNR				5					x
Juglans cinerea	Butternut	S2?	G3	END	END	6	3	Native, Common			NHIC	
Juglans nigra	Black Walnut	S4?	G5			5	3	Native, Common		x		x
* *Juglans regia*	English Walnut	SNA	GNR				5			x		
Krigia biflora	Two-flowered Dwarf-	S2	G5			10	3	Native, Uncommon	Yes		NHIC	
Lactuca biennis	Tall Blue Lettuce	S5	G5			6	0	Native, Rare		x		
* *Lactuca serriola*	Prickly Lettuce	SNA	GNR				3	Introduced, Common		x		x
* *Lamium amplexicaule*	Common Dead-nettle	SNA	GNR				5	Introduced, Rare		x		x
* *Lamium purpureum*	Purple Dead-nettle	SNA	GNR				5	Introduced, Uncommon		x		
Lechea mucronata	Hairy Pinweed	S3	G5			9	5	Native, Rare	Yes		NHIC	
Lechea pulchella	Leggett's Pinweed	S1	G5			10	5	Native, Rare	Yes		NHIC	
Lathyrus palustris	Marsh Vetchling	S5	G5			6	-3	Native, Uncommon		x		
* *Lathyrus tuberosus*	Tuberous Vetchling	SNA	GNR				5	Introduced, Rare		x		
* *Leonurus cardiaca*	Common Motherwort	SNA	GNR				5	Introduced, Common		x		
Lespedeza virginica	Slender Bush-clover	S1	G5	END	END	10	5	Native, Rare	Yes		NHIC	

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Lespedeza capitata	Round-headed Bush-clover	S4	G5			7	3	Native, Rare	Yes	x		x
Lespedeza violacea	Wand Bush-clover	S4?	G5			8	5	Native, Rare	Yes	x		
* *Leucanthemum vulgare*	Oxeye Daisy	SNA	GNR				5	Introduced, Common		x		
Liatris aspera	Rough Blazing-star	S2	G4G5			10	5	Native, Rare	Yes		NHIC	x
Liatris spicata	Dense Blazing-star	S2	G5	THR	THR	9	0	Native, Rare	Yes		NHIC	x
* *Linaria vulgaris*	Butter-and-eggs	SNA	GNR				5	Introduced, Common		x		
Lindera benzoin	Northern Spicebush	S4	G5			6	-3	Native, Common		x		
Liriodendron tulipifera	Tulip Tree	S4	G5			8	3	Native, Uncommon		x		
Lithospermum canescens	Hoary Puccoon	S3	G5			10	5	Native, Rare	Yes		NHIC	
Lithospermum caroliniense	Golden Puccoon	S3	G4G5			8	5	Native, Rare	Yes			x
Lobelia cardinalis	Cardinal Flower	S5	G5			7	-5	Native, Uncommon		x		
Lobelia inflata	Indian-tobacco	S5	G5			3	3	Native, Uncommon		x		
Lobelia siphilitica	Great Blue Lobelia	S5	G5			6	-3	Native, Common		x		x
Lobelia spicata	Pale-spike Lobelia	S4	G5			8	0	Native, Rare	Yes	x		x
Lonicera canadensis	Canada Fly Honeysuckle	S5	G5			6	3	Native, Rare				x
Lonicera dioica	Limber Honeysuckle	S5	G5			5	3	Native, Common		x		
* *Lonicera japonica*	Japanese Honeysuckle	SNA	GNR				3	Introduced, Uncommon		x		
* *Lonicera maackii*	Maack's Honeysuckle	SNA	GNR				5	Introduced, Rare		x		x
* *Lonicera morrowii*	Morrow's Honeysuckle	SNA	GNR				3	Introduced, Rare		x		
* *Lonicera tatarica*	Tatarian Honeysuckle	SNA	GNR				3	Introduced, Uncommon		x		x
* *Lotus corniculatus*	Garden Bird's-foot Trefoil	SNA	GNR				3	Introduced, Common		x		
Ludwigia polycarpa	Many-fruit Seedbox	S2	G4			8	-5	Native, Uncommon	Yes		NHIC	x
Lupinus perennis	Sundial Lupine	S2S3	G5			10	5	Native, Rare	Yes		NHIC	
Ludwigia alternifolia	Bushy Seedbox	S1	G5			10	-5	Native, Rare	Yes	x	NHIC	x
Lycopus uniflorus	Northern Water-	S5	G5			5	-5	Native, Common				x
Lycopus americanus	American Water-	S5	G5			4	-5	Native, Common		x		x
* *Lysimachia arvensis*	Scarlet Pimpernel	SNA	GNR				3	Introduced, Rare		x		
Lysimachia ciliata	Fringed Yellow Loosestrife	S5	G5			4	-3	Native, Common	Yes	x		x
Lythrum alatum	Winged Loosestrife	S3	G5			5	-5	Native, Common	Yes		NHIC	x
Lysimachia quadriflora	Four-flowered Yellow	S4	G5?			10	-5	Native, Rare	Yes	x		x
Lysimachia quadrifolia	Whorled Yellow Loosestrife	S4	G5			8	3	Native, Rare	Yes	x		x
* *Lysimachia vulgaris*	Garden Yellow Loosestrife	SNA	GNR				-3			x		
* *Lythrum salicaria*	Purple Loosestrife	SNA	G5				-5	Introduced, Common		x		x
* *Malus baccata*	Siberian Crabapple	SNA	GNR				5					x
Malus coronaria	Sweet Crabapple	S4	G5			5	5	Native, Common		x		x
* *Malus pumila*	Common Apple	SNA	G5				5	Introduced, Rare		x		x
* *Medicago lupulina*	Black Medick	SNA	GNR				3	Introduced, Common		x		
* *Medicago sativa*	Alfalfa	SNA	GNR				5			x		
* *Melilotus albus*	White Sweet-clover	SNA	G5				3	Introduced, Common		x		x
* *Melilotus altissimus*	Tall Yellow Sweet-clover	SNA	GNR				5			x		
* *Melilotus officinalis*	Yellow Sweet-clover	SNA	GNR				3	Introduced, Common		x		
Menispermum canadense	Canada Moonseed	S4	G5			7	0	Native, Common		x		x
Mentha x dumetorum	(Mentha aquatica X Mentha spicata)	SNA	GNA									x
Mentha canadensis	Canada Mint	S5	G5			3	-3	Native, Common		x		x
* *Mentha spicata*	Spearmint	SNA	GNR				-3	Introduced, Rare		x		
Mimulus ringens	Square-stemmed	S5	G5			6	-5	Native, Common		x		x

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Monarda fistulosa	Wild Bergamot	S5	G5			6	3			x		x
Monotropa uniflora	Indian-pipe	S5	G5			6	3	Native, Uncommon		x		
Morus rubra	Red Mulberry	S2	G5	END	END	10	3	Native, Rare			NHIC	
* *Morus alba*	White Mulberry	SNA	GNR				0	Introduced, Common		x		x
Nabalus albus	White Rattlesnakeroot	S5	G5			6	3	Native, Common	Yes	x		x
Nabalus racemosus	Glaucous Rattlesnakeroot	S5	G5			10	-3	Native, Rare	Yes	x		
Nelumbo lutea	American Lotus	S2S3	G4			10	-5	Native, Uncommon		x	NHIC	x
* *Nepeta cataria*	Catnip	SNA	GNR				3	Introduced, Common		x		
Nuphar advena	Large Yellow Pond-lily	S3	GNR			8	-5	Native, Uncommon			NHIC	
Nyssa sylvatica	Black Gum	S3	G5			9	-3	Native, Uncommon			NHIC	x
Nymphaea odorata	Fragrant Water-lily	S5	G5			5	-5	Native, Rare		x		
Oenothera gaura	Biennial Gaura	S3	G5			4	3	Native, Uncommon	Yes		NHIC	x
Oenothera pilosella	Meadow Evening-primrose	S2	G5			8	0	Native, Rare			NHIC	
Oenothera biennis	Common Evening-primrose	S5	G5			0	3	Native, Common		x		x
* *Origanum vulgare*	Wild Marjoram	SNA	GNR				5			x		
Osmorhiza longistylis	Smooth Sweet Cicely	S5	G5			6	3	Native, Common		x		
Ostrya virginiana	Eastern Hop-hornbeam	S5	G5			4	3	Native, Common		x		
Oxalis stricta	Upright Yellow Wood-	S5	G5			0	3	Native, Common		x		x
Oxybasis glauca	Oak-leaved Goosefoot	S4?	G5				-3			x		
Oxypolis rigidior	Stiff Cowbane	S2	G5			9	-5	Native, Uncommon	Yes		NHIC	x
Packera pseudaurea var. semicordata	Heart-leaved Groundsel	S2	G5T3T5			8	-3	Native, Rare			NHIC	
Packera aurea	Golden Groundsel	S5	G5			7	-3	Native, Rare		x		x
Panax trifolius	Dwarf Ginseng	S4	G5			8	5	Native, Rare		x		
Parthenocissus vitacea	Thicket Creeper	S5	G5			4	3	Native, Common				x
Parthenocissus	Virginia Creeper	S4?	G5			6	3	Native, Common		x		x
* *Pastinaca sativa*	Wild Parsnip	SNA	GNR				5	Introduced, Uncommon		x		x
Pedicularis canadensis	Canada Lousewort	S5	G5			7	3	Native, Uncommon		x		
Pedicularis lanceolata	Swamp Lousewort	S4	G5			9	-3	Native, Rare		x		x
Penstemon digitalis	Foxglove Beardtongue	S4	G5			6	0	Native, Rare	Yes	x		x
Penstemon hirsutus	Hairy Beardtongue	S4	G4			7	5	Native, Common	Yes	x		
Penthorum sedoides	Ditch Stonecrop	S5	G5			4	-5	Native, Common		x		x
* *Persicaria hydropiper*	Marshpepper Smartweed	SNA	GNR				-5	Introduced, Common				x
Persicaria lapathifolia	Pale Smartweed	S5	G5			2	-3	Native, Common				x
Persicaria amphibia	Water Smartweed	S5	G5			5	-5	Native, Uncommon		x		
* *Persicaria maculosa*	Spotted Lady's-thumb	SNA	G3G5				-3	Introduced, Common		x		x
Persicaria pensylvanica	Pennsylvania Smartweed	S5	G5			3	-3	Native, Common		x		x
Persicaria virginiana	Virginia Smartweed	S4	G5			6	0	Native, Common		x		x
Phlox divaricata	Wild Blue Phlox	S4	G5			7	3	Native, Common		x		
Phryma leptostachya	Lopseed	S4S5	G5			6	3	Native, Common		x		x
Physocarpus opulifolius	Eastern Ninebark	S5	G5			5	-3	Native, Rare		x		
Phytolacca americana	Common Pokeweed	S4	G5			3	3	Native, Common		x		
Pilea pumila	Dwarf Clearweed	S5	G5			5	-3	Native, Common		x		
* *Pilosella caespitosa*	Meadow Hawkweed	SNA	GNR				5	Introduced, Uncommon		x		
* *Plantago lanceolata*	English Plantain	SNA	G5				3	Introduced, Common		x		x
* *Plantago major*	Common Plantain	SNA	G5				3	Introduced, Uncommon		x		x
Plantago rugelii	Rugel's Plantain	S5	G5			1	0	Native, Common		x		

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Platanus occidentalis	Sycamore	S4	G5			8	-3	Native, Common		x		x
* *Pluchea odorata*	Shrubby Camphorweed	SNA	G5				-5	Introduced, Rare				x
Podophyllum peltatum	May-apple	S5	G5			5	3	Native, Common		x		x
Polygala aquilonia	Northern Milkwort	SX	G4			9	-3	Native, Historical			NHIC	
Polygala incarnata	Pink Milkwort	S1	G5	END	END	10	3	Native, Rare	Yes		NHIC	
Polygala sanguinea	Blood Milkwort	S3	G5			9	3	Native, Rare	Yes		NHIC	x
Polygala verticillata	Whorled Milkwort	S3?	G5			7	5	Native, Rare	Yes		NHIC	x
Polygonum erectum	Erect Knotweed	SH	G5			2	3	Native, Historical			NHIC	
Polygonum tenue	Slender Knotweed	S2	G5			10	5	Native, Rare	Yes		NHIC	
* *Populus alba*	White Poplar	SNA	G5				5	Introduced, Rare		x		
Populus deltoides	Eastern Cottonwood	S5	G5			4	0			x		x
Populus grandidentata	Large-toothed Aspen	S5	G5			5	5	Native, Uncommon		x		x
Populus tremuloides	Trembling Aspen	S5	G5			2	0	Native, Common		x		x
Potentilla anserina	Silverweed	S5	G5			5	-3					x
* *Potentilla recta*	Sulphur Cinquefoil	SNA	GNR				5	Introduced, Common		x		x
Potentilla simplex	Old-field Cinquefoil	S5	G5			3	3	Native, Common		x		x
Proserpinaca palustris	Marsh Mermaidweed	S4	G5			7	-5	Native, Rare		x		
Prunella vulgaris	Common Self-heal	S5	G5			0	0			x		x
Prunus nigra	Canada Plum	S4	G4G5			4	3	Native, Uncommon		x		
Prunus serotina	Black Cherry	S5	G5			3	3	Native, Common		x		x
Prunus virginiana	Chokecherry	S5	G5			2	3	Native, Common		x		x
Pseudognaphalium obtusifolium	Fragrant Cudweed	S5	G5			4	5	Native, Rare		x		
Pycnanthemum	Slender Mountain-mint	S3	G5			8	0	Native, Rare	Yes		NHIC	
Pycnanthemum verticillatum var. pilosum	Hairy Mountain-mint	S1	G5T5			8	3	Native, Rare	Yes		NHIC	
Pycnanthemum	Virginia Mountain-mint	S4	G5			6	-3	Native, Common	Yes	x		x
Quercus alba	White Oak	S5	G5			6	3	Native, Common		x		x
Quercus bicolor	Swamp White Oak	S4	G5			8	-3	Native, Common		x		x
Quercus macrocarpa	Bur Oak	S5	G5			5	3	Native, Common		x		x
Quercus shumardii	Shumard Oak	S3	G5	SC		7	-3	Native, Uncommon			NHIC	x
Quercus palustris	Swamp Pin Oak	S4	G5			9	-3	Native, Common	Yes	x		x
* *Quercus robur*	English Oak	SNA	GNR				5			x		
Quercus rubra	Northern Red Oak	S5	G5			6	3	Native, Common		x		x
Quercus velutina	Black Oak	S4	G5			8	5	Native, Common	Yes	x		x
Ranunculus abortivus	Kidney-leaved Buttercup	S5	G5			2	0	Native, Common				x
* *Ranunculus acris*	Common Buttercup	SNA	G5				0	Introduced, Uncommon		x		x
Ranunculus hispidus	Bristly Buttercup	S3	G5			8	0	Native, Historical	Yes	x		x
Ratibida pinnata	Grey-headed Prairie	S3	G5			9	5	Native, Uncommon	Yes	x	NHIC	x
* *Reynoutria japonica*	Japanese Knotweed	SNA	GNR				3	Introduced, Rare		x		
Rhinanthus minor	Little Yellow Rattle	S4?	G5				0					x
* *Rhamnus cathartica*	European Buckthorn	SNA	GNR				0	Introduced, Uncommon		x		x
Rhus glabra	Smooth Sumac	S5	G5			7	5	Native, Uncommon		x		x
Rhus typhina	Staghorn Sumac	S5	G5			1	3	Native, Common		x		x
Ribes americanum	American Black Currant	S5	G5			4	-3	Native, Common				x
Ribes hirtellum	Swamp Gooseberry	S5	G5			6	-3	Native, Rare				x
* *Ricinus communis*	Castor-bean	SNA	GNR				3			x		

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Rosa arkansana	Prairie Rose	S1	G5			5	5					x
Rosa blanda	Smooth Rose	S5	G5			3	3	Native, Common				x
* *Robinia pseudoacacia*	Black Locust	SNA	G5				3	Introduced, Uncommon		x		
Rosa palustris	Swamp Rose	S5	G5			7	-5	Native, Common				x
Rosa setigera	Climbing Prairie Rose	S2S3	G5	SC	SC	5	3	Native, Common	Yes		NHIC	x
Rubus allegheniensis	Allegheny Blackberry	S5	G5			2	3	Native, Common				x
Rubus canadensis	Canada Blackberry	S5	G5			2	5	Native, Rare				x
* *Rosa multiflora*	Multiflora Rose	SNA	GNR				3	Introduced, Common		x		x
Rubus flagellaris	Northern Dewberry	S4	G5			4	3	Native, Common		x		
Rubus idaeus	Red Raspberry	S5	G5			2	3			x		x
Rubus parviflorus	Western Thimbleberry	S4	G5			7	3					x
Rubus occidentalis	Black Raspberry	S5	G5			2	5	Native, Common		x		
Rudbeckia fulgida	Orange Coneflower	S1	G5				-5	Native, Rare				x
Rubus pubescens	Dwarf Raspberry	S5	G5			4	-3	Native, Rare		x		
Rudbeckia hirta	Black-eyed Susan	S5	G5			0	3	Native, Common	Yes	x		x
* *Rumex acetosella*	Sheep Sorrel	SNA	GNR				3	Introduced, Common				x
Rudbeckia laciniata	Cut-leaved Coneflower	S5	G5			7	-3	Native, Rare		x		
* *Rumex crispus*	Curled Dock	SNA	GNR				0	Introduced, Common		x		x
Salix amygdaloides	Peach-leaved Willow	S5	G5			6	-3	Native, Common				x
Salix bebbiana	Bebb's Willow	S5	G5			4	-3	Native, Rare				x
Salix cordata	Heart-leaved Willow	S4	G4			9	0	Unconfirmed Report				x
Salix discolor	Pussy Willow	S5	G5			3	-3	Native, Common				x
Salix eriocephala	Cottony Willow	S5	G5			4	-3	Native, Common		x		x
Salix humilis	Prairie Willow	S5	G5			7	3	Native, Rare		x		
Salix nigra	Black Willow	S4	G5			6	-5	Native, Uncommon				x
Salix x pendulina	(Salix babylonica X Salix	SNA	GNA									x
Salix interior	Sandbar Willow	S5	G5			1	-3	Native, Common		x		x
S *Sambucus nigra*	Black Elderberry	SNA	G5				-3					x
Sambucus canadensis	Common Elderberry	S5	G5			5	-3	Native, Common		x		x
Sambucus racemosa	Red Elderberry	S5	G5			5	3	Native, Rare		x		x
Sanicula marilandica	Maryland Sanicle	S5	G5			5	3	Native, Common			x	
Sanguinaria canadensis	Bloodroot	S5	G5			5	3	Native, Uncommon		x		
Sanicula canadensis	Canada Sanicle	S4	G5			7	3			x		x
* *Saponaria officinalis*	Bouncing-bet	SNA	GNR				3	Introduced, Common		x		
Sassafras albidum	Sassafras	S4	G5			6	3	Native, Common		x		x
Scutellaria lateriflora	Mad-dog Skullcap	S5	G5			5	-5	Native, Common		x		x
* *Securigera varia*	Purple Crown-vetch	SNA	GNR				5	Introduced, Uncommon		x		
* *Senecio vulgaris*	Common Ragwort	SNA	GNR				5	Introduced, Rare		x		
Silphium laciniatum	Compass Plant	S1	G5			3	5	Introduced, Rare	Yes		NHIC	
Silphium terebinthinaceum	Prairie Rosinweed	S1	G4G5			10	0	Native, Rare	Yes		NHIC	x
* *Silene vulgaris*	Bladder Campion	SNA	GNR				5	Introduced, Uncommon		x		x
Silphium perfoliatum	Cup Plant	S2	G5			9	-3	Native, Historical		x	NHIC	
* *Sinapis arvensis*	Corn Mustard	SNA	GNR				5	Introduced, Rare		x		
* *Sisymbrium altissimum*	Tall Tumble Mustard	SNA	GNR				3	Introduced, Uncommon		x		
Sium suave	Common Water-parsnip	S5	G5			4	-5	Native, Common		x		x
* *Solanum carolinense*	Carolina Nightshade	SNA	G5				3	Introduced, Uncommon		x		
Solidago altissima	Tall Goldenrod	S5	G5			1	3				x	x

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* *Solanum dulcamara*	Bittersweet Nightshade	SNA	GNR				0	Introduced, Common		x		x
Solidago canadensis	Canada Goldenrod	S5	G5			1	3					x
Solanum emulans	Eastern Black Nightshade	S5	G5			1	3	Native, Common		x		
Solidago bicolor	White Goldenrod	S4?	G5			8	5	Native, Rare		x		
Solidago gigantea	Giant Goldenrod	S5	G5			4	-3	Native, Rare		x		x
Solidago riddellii	Riddell's Goldenrod	S3	G5	SC	SC	10	-5	Native, Rare	Yes		NHIC	x
Solidago juncea	Early Goldenrod	S5	G5			3	5	Native, Uncommon		x		x
Solidago rigida ssp. rigida	Eastern Stiff Goldenrod	S3	G5T5			7	3	Native, Uncommon	Yes		NHIC	
Solidago nemoralis	Grey-stemmed Goldenrod	S5	G5			2	5			x		
Solidago rigida	Stiff Goldenrod	S3	G5			7	3			x	NHIC	x
* *Sonchus arvensis*	Field Sow-thistle	SNA	GNR				3	Introduced, Common				x
* *Sorbus aucuparia*	European Mountain-ash	SNA	G5				5	Introduced, Rare				x
Solidago rugosa	Rough-stemmed	S5	G5			4	0	Native, Common		x		x
* *Solidago sempervirens*	Seaside Goldenrod	SNA	G5				-3	Introduced, Uncommon		x		x
Spergularia marina	Saltmarsh Sand-spurrey	S1	G5				-3	Introduced, Rare			NHIC	
Spiraea alba	White Meadowsweet	S5	G5			3	-3	Native, Common		x		x
Spiraea tomentosa	Steeplebush	S5	G5			5	-3	Native, Rare		x		x
* *Stachys palustris*	Marsh Hedge-nettle	SNA	G5				-5	uced, Status unknown or not sp				x
Stachys pilosa	Hairy Hedge-nettle	SU	G5			6	-3					x
Stachys hispida	Hispid Hedge-nettle	S4	G4Q			7	-3	Native, Common		x		
* *Stellaria media*	Common Chickweed	SNA	GNR				3	Introduced, Common		x		x
Strophostyles helvola	Trailing Wild Bean	S4	G5			8	0	Native, Common	Yes	x		x
Symphyotrichum	Heart-leaved Aster	S5	G5			5	5	Native, Uncommon				x
Symphyotrichum	Bushy Aster	S2	G5			10	0	Native, Rare	Yes		NHIC	
Symphyotrichum ericoides	White Heath Aster	S5	G5			4	3			x		x
Symphyotrichum laeve	Smooth Aster	S5	G5			7	3			x		x
Symphyotrichum	Panicled Aster	S5	G5			3	-3	Native, Common		x		
Symphyotrichum	Calico Aster	S5	G5			3	0	Native, Common		x		x
Symphyotrichum novae-angliae	New England Aster	S5	G5			2	-3	Native, Common	Yes	x		x
Symphyotrichum oolentangiense	Sky Blue Aster	S4	G5			9	5	Native, Rare	Yes	x		
Symphyotrichum pilosum	Old Field Aster	S5	G5				3			x		x
Symphyotrichum	Willow-leaved Aster	S2	G5	THR	THR	8	-3	Native, Rare	Yes		NHIC, x	x
Symphyotrichum shortii	Short's Aster	S4	G5			7	5	Native, Uncommon	Yes			x
Symphyotrichum	Arrow-leaved Aster	S4	G4G5			6	5	Native, Common	Yes	x		
* *Syringa vulgaris*	Common Lilac	SNA	GNR				5	Introduced, Rare		x		
Taenidia integerrima	Yellow Pimpernel	S4	G5			9	5	Native, Uncommon				x
* *Taraxacum officinale*	Common Dandelion	SNA	G5				3	Introduced, Common				x
Thalictrum amphibolum	Skunk Meadow-rue	S2S3	GNR			9	0	Native, Rare	Yes		NHIC	x
Teucrium canadense	Canada Germander	S4S5	G5			6	-3			x		
Thalictrum dasycarpum	Purple Meadow-rue	S4?	G5			5	-3	Native, Common	Yes	x		x
Thalictrum pubescens	Tall Meadow-rue	S5	G5			5	-3	Unconfirmed Report				x
Thalictrum dioicum	Early Meadow-rue	S5	G5			6	3	Native, Common		x		x
* *Thlaspi arvense*	Field Pennycress	SNA	GNR				5	Introduced, Common		x		
Tilia americana	Basswood	S5	G5			4	3	Native, Common		x		x

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Toxicodendron radicans var. rydbergii	Western Poison Ivy	S5	G--T5	2	0	Native, Common			x	
Toxicodendron radicans	Poison Ivy	S5	G5	2	0			x	x	
* *Tragopogon dubius*	Yellow Goatsbeard	SNA	GNR		5	Introduced, Common		x		
* *Tragopogon porrifolius*	Purple Goatsbeard	SNA	GNR		5	Introduced, Uncommon		x		
* *Tragopogon pratensis*	Meadow Goatsbeard	SNA	GNR		5	Introduced, Uncommon		x		
* *Trifolium campestre*	Low Hop Clover	SNA	GNR		5	Introduced, Uncommon		x		
* *Trifolium fragiferum*	Strawberry Clover	SNA	GNR		3	Introduced, Rare		x		
* *Trifolium pratense*	Red Clover	SNA	GNR		3	Introduced, Uncommon		x		
* *Trifolium repens*	White Clover	SNA	GNR		3	Introduced, Uncommon		x		
Triosteum perfoliatum	Perfoliate Horse-gentian	S1	G5	9	5	Native, Rare		NHIC		
Triodanis perfoliata	Clasping-leaved Venus' Looking-glass	S4	G5	6	3	Native, Uncommon		x		
* *Tussilago farfara*	Coltsfoot	SNA	GNR		3	Introduced, Uncommon		x		
Ulmus americana	White Elm	S5	G4	3	-3	Native, Common		x	x	
Ulmus rubra	Slippery Elm	S5	G5	6	0	Native, Common			x	
* *Ulmus pumila*	Siberian Elm	SNA	GNR		3	Introduced, Uncommon		x	x	
Urtica dioica	Stinging Nettle	S5	G5	2	0			x		
Vaccinium pallidum	Pale Blueberry	S4	G5	9	5	Native, Common		x		
* *Verbascum blattaria*	Moth Mullein	SNA	GNR		3	Introduced, Common		x	x	
* *Verbascum thapsus*	Common Mullein	SNA	GNR		5	Introduced, Common		x		
Verbena hastata	Blue Vervain	S5	G5	4	-3	Native, Common	Yes	x	x	
Verbena stricta	Hoary Vervain	S4	G5	7	5	Native, Rare	Yes	x		
Verbesina alternifolia	Wingstem	S3	G5	5	-3	Native, Rare		NHIC		
Verbena urticifolia	White Vervain	S5	G5	4	0	Native, Common		x	x	
Vernonia gigantea	Giant Ironweed	S1?	G5	4	0	ve, status unknown or not spec	Yes	NHIC	x	
Vernonia missurica	Missouri Ironweed	S3?	G4G5	4	0	ve, status unknown or not spec	Yes	x	NHIC	x
Veronicastrum virginicum	Culver's Root	S2	G4	10	0	Native, Rare	Yes	NHIC	x	
* *Veronica persica*	Bird's-eye Speedwell	SNA	GNR		5	uced, Status unknown or not sp		x		
Viburnum acerifolium	Maple-leaved Viburnum	S5	G5	6	5	Native, Common			x	
Viburnum lentago	Nannyberry	S5	G5	4	0	Native, Common		x	x	
Viburnum opulus	Guelder Rose	S5	G5	5	-3			x	x	Guelder Rose
Viburnum rafinesqueanum	Downy Arrowwood	S5	G5	7	5	Native, Common			x	
Vicia americana	American Vetch	S5	G5	5	3	Native, Rare		x		
* *Vicia cracca*	Tufted Vetch	SNA	GNR		5	Introduced, Rare		x		
* *Vicia sativa*	Common Vetch	SNA	GNR		3	Introduced, Rare		x		
* *Vicia villosa*	Hairy Vetch	SNA	G5		5	Introduced, Common		x		
* *Vinca minor*	Lesser Periwinkle	SNA	GNR		5	Introduced, Rare		x		
* *Vincetoxicum rossicum*	European Swallowwort	SNA	GNR		5			x		
Viola pubescens	Yellow Violet	S5	G5	5	3	Native, Common		x		
Viola sagittata	Arrow-leaved Violet	S4	G5	9	0			x	x	
Viola sororia	Woolly Blue Violet	S5	G5	4	0	Native, Common		x	x	
Vitis aestivalis	Summer Grape	S4	G5	7	3	Native, Uncommon		x		
Vitis labrusca	Northern Fox Grape	S1	G5	3	3	Native, Rare		NHIC	x	
Vitis riparia	Riverbank Grape	S5	G5	0	0	Native, Common		x	x	
Xanthium strumarium	Rough Cockleburr	S5	G5	2	0	Native, Common		x	x	
Zanthoxylum americanum	Common Prickly-ash	S5	G5	3	3	Native, Common		x		

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Zizia aurea	Golden Alexanders	S5	G5			7	0	Native, Rare		x			
* *Agrostis gigantea*	Redtop	SNA	G4G5				-3	Introduced, Common					x
Agrostis scabra	Rough Bentgrass	S5	G5			6	0	Native, Rare					x
Aletris farinosa	White Colicroot	S2	G5	END	THR	10	0	Native, Rare	Yes		NHIC		x
* *Agrostis capillaris*	Colonial Bentgrass	SNA	GNR				0			x			
Alisma subcordatum	Southern Water-plantain	S4?	G5			1	-5	ve, status unknown or not spec					x
Alisma triviale	Northern Water-plantain	S5	G5			1	-5	ve, status unknown or not spec		x			
Allium canadense	Canada Garlic	S5	G5			8	3	Native, Common		x			
Andropogon gerardi	Big Bluestem	S4	G5			7	3	Native, Uncommon	Yes	x			x
Andropogon virginicus	Broomsedge Bluestem	S4	G5			5	3	Native, Rare	Yes	x			x
Arisaema dracontium	Green Dragon	S3	G5	SC		9	-3	Native, Rare			NHIC		
Aristida longespica var. geniculata	Kearney's Threeawn Grass	S2	G5T5?			8	3	Native, Rare	Yes		NHIC		
Aristida longespica var. longespica	Slim-spike Threeawn Grass	S2	G5T5?			8	3	Native, Rare	Yes		NHIC		
Aristida purpurascens	Arrowfeather Threeawn	S1	G5			10	5	Native, Rare	Yes		NHIC		
Arisaema triphyllum	Jack-in-the-pulpit	S5	G5			5	-3	Native, Common		x			
* *Asparagus officinalis*	Garden Asparagus	SNA	G5?				3	Introduced, Common		x			x
Beckmannia syzigachne	American Sloughgrass	S4	G5			4	-5						x
* *Bromus inermis*	Smooth Brome	SNA	G5				5	Introduced, Common		x			x
Bromus kalmii	Kalm's Brome	S4	G5			8	0	Native, Rare	Yes	x			
* *Butomus umbellatus*	Flowering-rush	SNA	G5				-5	Introduced, Common		x			
Calamagrostis canadensis	Bluejoint Reedgrass	S5	G5			4	-5	Native, Common	Yes	x			x
Carex annectens	Yellow-fruited Sedge	S2	G5			6	-3	Native, Rare	Yes		NHIC		
Carex bicknellii	Bicknell's Sedge	S2	G5			10	0	Native, Rare	Yes		NHIC		
Carex blanda	Woodland Sedge	S5	G5			3	0	Native, Common					x
Carex brevior	Short-beaked Sedge	S4	G5			7	0	Native, Rare	Yes				x
Carex cephalophora	Oval-leaved Sedge	S5	G5			5	3	Native, Common					x
Carex conoidea	Field Sedge	S3	G5			9	-3	Native, Rare	Yes		NHIC		
Carex festucacea	Fescue Sedge	S1	G5			9	0	Native, Rare			NHIC		
Carex foenea	Bronze Sedge	S5	G5			3	5						x
Carex alopecoidea	Foxtail Sedge	S4	G5			6	-3	Native, Uncommon		x			
Carex lacustris	Lake Sedge	S5	G5			5	-5	Native, Common					x
Carex lasiocarpa	Woolly-fruit Sedge	S5	G5			8	-5	Native, Rare					x
Carex aurea	Golden Sedge	S5	G5			4	-3	Native, Rare		x			
Carex bebbii	Bebb's Sedge	S5	G5			3	-5	Native, Common		x			x
Carex cristatella	Crested Sedge	S5	G5			3	-3	Native, Common		x			
Carex granularis	Limestone Meadow Sedge	S5	G5			3	-3	Native, Common		x			
Carex muskingumensis	Muskingum Sedge	S3	G4			9	-5	Native, Common			NHIC		
Carex normalis	Larger Straw Sedge	S4	G5			6	-3	Native, Common					x
Carex hystericina	Porcupine Sedge	S5	G5			5	-5	Native, Rare		x			
Carex intumescens	Bladder Sedge	S5	G5			6	-3	Native, Uncommon		x			
Carex leptonervia	Finely-nerved Sedge	S5	G5			5	0			x			
Carex lupulina	Hop Sedge	S5	G5			6	-5	Native, Common		x			
Carex praticola	Northern Meadow Sedge	S2S3	G5			8	0	Introduced, Rare					x
Carex richardsonii	Richardson's Sedge	S4	G5			9	5	Native, Rare	Yes				x
Carex meadii	Mead's Sedge	S2	G4G5			9	0	Native, Rare	Yes	x	NHIC		x

Vegetation Table for Matchette and Malden (ONS2103A)

Carex muehlenbergii	Muhlenberg's Sedge	S4S5	G5	7	5			x		
Carex stricta	Tussock Sedge	S5	G5	4	-5	Native, Common				x
Carex suberecta	Prairie Straw Sedge	S2	G4	10	-5	Native, Rare	Yes		NHIC	
Carex pellita	Woolly Sedge	S5	G5	2	-5	Native, Common		x		
Carex tenera	Tender Sedge	S5	G5	4	0	Native, Common				x
Carex tetanica	Rigid Sedge	S3?	G4G5	8	-3	Native, Rare	Yes		NHIC	
carex trichocarpa	Hairy-fruited Sedge	S3	G4	8	-5					x
Carex pensylvanica	Pennsylvania Sedge	S5	G5	5	5	Native, Common		x		x
Carex prairea	Prairie Sedge	S5	G5	7	-3	Native, Rare		x		
Carex scoparia	Pointed Broom Sedge	S5	G5	5	-3	Native, Rare		x		x
Carex sparganioides	Burreed Sedge	S4S5	G5	5	3	Native, Common		x		
Carex swanii	Swan's Sedge	S4	G5	7	3	Native, Common	Yes	x		
Carex viridula	Greenish Sedge	S5	G5	5	-5	Native, Rare		x		x
Carex vulpinoidea	Fox Sedge	S5	G5	3	-5	Native, Common		x		x
Cenchrus longispinus	Long-spined Sandbur	S4	G5	3	5	Native, Uncommon		x		
* *Commelina communis*	Asiatic Dayflower	SNA	G5		0	Introduced, Rare		x		
* *Convallaria majalis*	European Lily-of-the-valley	SNA	G5		5	Introduced, Rare		x		
Corallorhiza odontorhiza	Autumn Coralroot	S2S3	G5	8	5			x		
Cyperus bipartitus	Shining Flatsedge	S5	G5	4	-3	Native, Uncommon		x		
Cyperus esculentus	Perennial Yellow Flatsedge	S5	G5	1	-3	Native, Common		x		
Cypripedium parviflorum	Yellow Lady's-slipper	S5	G5	5	0					x
Cyperus lupulinus	Hop Flatsedge	S4	G5	7	3			x		
Cyperus odoratus	Rusty Flatsedge	S4	GNR	4	-5	Native, Common		x		
Cyperus strigosus	Straw-coloured Flatsedge	S5	G5	5	-3	Native, Common		x		x
* *Dactylis glomerata*	Orchard Grass	SNA	GNR		3	Introduced, Common		x		x
Danthonia spicata	Poverty Oatgrass	S5	G5	5	5	Native, Common		x		
Dichanthelium	Commons' Panicgrass	SH	G5	6	3	Native, Historical	Yes		NHIC	
Dichanthelium latifolium	Broad-leaved Panicgrass	S4	G5	6	3	Native, Uncommon				x
Dichanthelium meridionale	Matted Panicgrass	S1	G5	10	5	Native, Rare	Yes		NHIC	
Dichanthelium praecocius	Early-branching Panicgrass	S3	G5?	8	5	Native, Rare	Yes		NHIC	x
Dichanthelium	Round-fruited Panicgrass	S3	G5	8	3	Native, Rare	Yes		NHIC	
Dichanthelium implicatum	Slender-stemmed	S5	G5	3	0	ve, status unknown or not spec		x		x
Dichanthelium	Few-flowered Panicgrass	S4	G5	7	3			x		
* *Digitaria ischaemum*	Smooth Crabgrass	SNA	GNR		3	Introduced, Uncommon				x
Digitaria cognata	Fall Crabgrass	S1?	G5	3	5	Native, Rare	Yes	x	NHIC	
Dioscorea villosa	Wild Yam	S4	G4G5	5	0	Native, Common		x		x
Echinochloa muricata var. microstachya	Western Barnyard Grass	S5	G5T5	4	-5	Native, Rare				x
* *Echinochloa crus-galli*	Large Barnyard Grass	SNA	GNR		-3	Introduced, Common		x		x
Eleocharis erythropoda	Red-stemmed Spikerush	S5	G5	4	-5	Native, Common				x
* *Eleusine indica*	India Goosegrass	SNA	GNR		3	Introduced, Uncommon		x		
Elodea canadensis	Canada Waterweed	S5	G5	4	-5	Native, Rare		x		
Elymus virginicus	Virginia Wildrye	S5	G5	5	-3					x
Elymus canadensis	Canada Wildrye	S5	G5	8	3	Native, Rare	Yes	x		x
Elymus hystrix	Bottlebrush Grass	S5	G5	5	5	Native, Common		x		
* *Elymus repens*	Quackgrass	SNA	GNR		3	Introduced, Common		x		
Eragrostis spectabilis	Purple Lovegrass	S4	G5	6	5	Native, Rare	Yes	x		

Vegetation Table for Matchette and Malden (ONS2103A)

Erythronium americanum	Yellow Trout-lily	S5	G5			5	5	Native, Common		x		x
Festuca rubra	Red Fescue	S5	G5				3			x		
Fimbristylis autumnalis	Slender Fimbristylis	S4	G5			9	-3	Native, Rare		x		
* *Galanthus nivalis*	Common Snowdrop	SNA	GNR				5			x		
Glyceria striata	Fowl Mannagrass	S5	G5			3	-5	Native, Common		x		x
* *Hemerocallis fulva*	Orange Daylily	SNA	GNA				5	Introduced, Uncommon		x		x
Hordeum jubatum	Foxtail Barley	S5?	G5			0	0			x		
Hypoxis hirsuta	Eastern Yellow Stargrass	S2S3	G5			10	0	Native, Rare	Yes		NHIC	x
Iris versicolor	Harlequin Blue Flag	S5	G5			5	-5			x		x
Iris virginica	Southern Blue Flag	S5	G5			5	-5	Native, Common		x		x
Juncus acuminatus	Sharp-fruited Rush	S3	G5			6	-5	Native, Rare	Yes		NHIC	x
Juncus anthelatus	Greater Poverty Rush	S1	GNR			3	-3	Native, Rare	Yes		NHIC	
Juncus biflorus	Two-flowered Rush	S1	G5			10	-3	Native, Rare	Yes		NHIC	x
Juncus brachycarpus	Short-fruited Rush	S1	G4G5			10	-3	Native, Rare	Yes		NHIC	x
Juncus bufonius	Toad Rush	S5	G5			1	-3	Native, Rare				x
Juncus effusus	Soft Rush	S5	G5			4	-5					x
Juncus greenei	Greene's Rush	S3	G5			9	0	Native, Rare	Yes		NHIC	x
Juncus marginatus	Grass-leaved Rush	S3	G5			9	-3	Native, Rare	Yes		NHIC	x
Juncus nodosus	Knotted Rush	S5	G5			5	-5	Native, Uncommon				x
Juncus articulatus	Jointed Rush	S5	G5			5	-5	Native, Rare		x		
Juncus dudleyi	Dudley's Rush	S5	G5			1	-3	Native, Common		x		x
Juncus tenuis	Path Rush	S5	G5			0	0	Native, Common		x		x
Juncus torreyi	Torrey's Rush	S5	G5			3	-3	Native, Common		x		x
Leersia oryzoides	Rice Cutgrass	S5	G5			3	-5	Native, Common		x		x
Leersia virginica	White Cutgrass	S4	G5			6	-3	Native, Common		x		x
Lemna minor	Small Duckweed	S5?	G5			5	-5	Native, Common		x		x
Lilium michiganense	Michigan Lily	S4	G5			7	-3	Native, Common	Yes	x		x
Liparis liliifolia	Purple Twayblade	S2S3	G5	THR	THR	8	3	Native, Rare	Yes		NHIC	
Liparis loeselii	Loesel's Twayblade	S4S5	G5			5	-3	Native, Rare		x		
* *Lolium pratense*	Meadow Ryegrass	SNA	G5				3	Introduced, Rare				x
* *Lolium arundinaceum*	Tall Ryegrass	SNA	GNR				3	Introduced, Common		x		x
* *Lolium perenne*	Perennial Ryegrass	SNA	GNR				3	Introduced, Uncommon		x		
Maianthemum racemosum	Large False Solomon's Seal	S5	G5			4	3	Native, Common		x		x
Maianthemum stellatum	Star-flowered False Solomon's Seal	S5	G5			6	0	Native, Common		x		x
Milium effusum	Wood Millet	S4S5	G5			8	3	Native, Rare				x
* *Miscanthus sacchariflorus*	Amur Silvergrass	SNA	GNR				5	Introduced, Rare		x		
* *Muscari botryoides*	Common Grape-hyacinth	SNA	GNR				5			x		
* *Ornithogalum umbellatum*	Common Star-of-	SNA	G3G5				3	Introduced, Rare		x		
Panicum capillare	Common Panicgrass	S5	G5			0	0	Native, Common				x
* *Panicum dichotomiflorum*	Fall Panicgrass	SNA	G5				-3	Introduced, Common		x		x
Panicum flexile	Wiry Panicgrass	S4	G5			8	-3	Native, Rare		x		
Panicum virgatum	Old Switch Panicgrass	S4	G5			6	0	Native, Uncommon	Yes	x		x
Paspalum setaceum	Slender Paspalum	S2	G5			8	3	Native, Rare	Yes		NHIC	x
Phalaris arundinacea	Reed Canarygrass	S5	G5			0	-3	Native, Common		x		
* *Phleum pratense*	Common Timothy	SNA	GNR				3	Introduced, Common		x		x
Phragmites australis	Common Reed	S4?	G5			0	-3			x		x

Vegetation Table for Matchette and Malden (ONS2103A)

Platanthera leucophaea	Eastern Prairie Fringed	S2	G2G3	END	END	10	-3	Native, Rare	Yes			x
Platanthera lacera	Ragged Fringed Orchid	S4	G5			6	-3	Native, Uncommon		x		
Poa alsodes	Grove Bluegrass	S4	G4G5			7	0			x		
Poa palustris	Fowl Bluegrass	S5	G5			5	-3	Native, Rare				x
Poa pratensis	Kentucky Bluegrass	S5	G5			0	3					x
* *Poa annua*	Annual Bluegrass	SNA	GNR				3	Introduced, Common		x		
* *Poa bulbosa*	Bulbous Bluegrass	SNA	GNR				3			x		
* *Poa compressa*	Canada Bluegrass	SNA	GNR				3	Native, Common		x		x
Potamogeton richardsonii	Richardson's Pondweed	S5	G5			5	-5	Native, Rare		x		
* *Puschkinia scilloides*	Striped Squill	SNA	GNR							x		
Rhynchospora capitellata	Small-headed Beakrush	S4	G5			10	-5	Native, Rare		x		
Schizachyrium scoparium	Little Bluestem	S4	G5			7	3	Native, Uncommon	Yes	x		x
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	S5	G5			5	-5	Native, Uncommon		x		x
* *Scilla siberica*	Siberian Squill	SNA	GNR				5			x		
Scirpus atrovirens	Dark-green Bulrush	S5	G5			3	-5	Native, Common		x		
Scirpus cyperinus	Common Woolly Bulrush	S5	G5			4	-5	Native, Rare		x		x
Scirpus hattorianus	Mosquito Bulrush	S4	G5			6	-3	Native, Rare		x		
Scleria pauciflora	Few-flowered Nutrush	S1	G5			10	3	Native, Rare	Yes		NHIC	
Scleria triglomerata	Whip Nutrush	S1	G5			10	0	Native, Rare	Yes		NHIC	x
Scirpus pendulus	Hanging Bulrush	S5	G5			3	-5	Native, Common		x		x
* *Setaria pumila*	Yellow Foxtail	SNA	GNR				0	Introduced, Common				x
* *Setaria faberi*	Giant Foxtail	SNA	GNR				3	Introduced, Common		x		
* *Setaria viridis*	Green Foxtail	SNA	GNR				5	Introduced, Common		x		
Sisyrinchium albidum	White Blue-eyed-grass	S1	G5?			9	3	Native, Rare	Yes		NHIC	
Sisyrinchium angustifolium	Narrow-leaved Blue-eyed-	S4	G5			6	0	Native, Common		x		x
Smilax ecirrata	Upright Carrionflower	S3?	G5			6	5	Native, Common	Yes		NHIC	
Smilax illinoensis	Illinois Carrionflower	S2?	G4?			5	5	Native, Uncommon	Yes		NHIC	
Smilax herbacea	Herbaceous Carrionflower	S4?	G5			5	0	Native, Rare		x		x
Smilax lasioneura	Hairy-nerved Carrionflower	S4S5	G5			5	5	Native, Common		x		x
Smilax tamnoides	Bristly Greenbriar	S5	G5			6	0	Native, Common		x		x
Sorghastrum nutans	Yellow Indiangrass	S4	G5			8	3	Native, Rare	Yes	x		x
Sphenopholis obtusata	Prairie Wedgegrass	S1	G5			10	0	Native, Rare	Yes		NHIC	
Spiranthes	Great Plains Ladies'-tresses	S3?	G3G4			8	-3	Native, Rare	Yes		NHIC	x
Spiranthes incurva	Sphinx Ladies'-tresses	S5	GNR			5	-3	Native, Rare		x		
Spiranthes lucida	Shining Ladies'-tresses	S4	G4			9	-3	Native, Rare		x		
Spirodela polyrhiza	Great Duckweed	S5	G5			4	-5	Native, Rare		x		
Sporobolus compositus	Rough Dropseed	S4	G5			2	5	Native, Uncommon	Yes	x		x
Sporobolus michauxianus	Prairie Cordgrass	S4	G5			7	-3	Native, Uncommon	Yes	x		x
Streptopus lanceolatus	Rose Twisted-stalk	S5	G5			7	3	Native, Historical				x
Symplocarpus foetidus	Eastern Skunk Cabbage	S5	G5			7	-5	Native, Rare		x		
Tradescantia ohiensis	Ohio Spiderwort	S2	G5			10	3	Native, Rare	Yes		NHIC	x
Trichophorum clintonii	Clinton's Clubrush	S2S3	G4			10	3	Native, Rare	Yes		NHIC	
* *Tridens flavus*	Purpletop Tridens	SNA	G5				5	Introduced, Rare		x		
Trillium grandiflorum	White Trillium	S5	G5			5	3	Native, Common		x		
* *Typha angustifolia*	Narrow-leaved Cattail	SNA	G5				-5	Native, Common				x

Vegetation Table for Matchette and Malden (ONS2103A)

Typha x glauca	(Typha angustifolia X Typha latifolia)	SNA	GNA		-5	Hybrid			x
Typha latifolia	Broad-leaved Cattail	S5	G5	1	-5	Native, Uncommon		x	x
Uvularia sessilifolia	Sessile-leaved Bellwort	S4	G5	7	3	Native, Rare		x	x
Vallisneria americana	American Eelgrass	S5	G5	6	-5	Native, Rare		x	
Ceratodon purpureus	Fire Moss	S5	G5					x	
Entodon cladorrhizans	Flat-stemmed Entodon	S4	G5					x	
Plagiomnium cuspidatum	Woodsy Leafy Moss	S5	G5					x	
Asplenium platyneuron	Ebony Spleenwort	S4	G5	6	3	Native, Rare		x	
Athyrium filix-femina	Common Lady Fern	S5	G5	4	0			x	x
Botrypus virginianus	Rattlesnake Fern	S5	G5	5	3	Native, Common		x	
Claytosmunda claytoniana	Interrupted Fern	S5	G5	7	0	Native, Uncommon			x
Dryopteris carthusiana	Spinulose Wood Fern	S5	G5	5	-3	Native, Common		x	
Equisetum fluviatile	Water Horsetail	S5	G5	7	-5	Native, Rare			x
Equisetum palustre	Marsh Horsetail	S5	G5	10	-3	Unconfirmed Report			x
Equisetum pratense	Meadow Horsetail	S5	G5	8	-3				x
Equisetum variegatum	Variegated Scouring-rush	S5	G5	5	-3	Native, Rare			x
Equisetum arvense	Field Horsetail	S5	G5	0	0	Native, Common		x	x
Equisetum hyemale	Common Scouring-rush	S5	G5	2	0	Native, Common		x	x
Equisetum laevigatum	Smooth Scouring-rush	S4	G5	7	-3	Native, Rare	Yes	x	
Matteuccia struthiopteris	Ostrich Fern	S5	G5	5	0	Native, Rare		x	x
Onoclea sensibilis	Sensitive Fern	S5	G5	4	-3	Native, Common		x	x
Osmunda regalis	Royal Fern	S5	G5	7	-5	Native, Uncommon		x	x
Osmundastrum	Cinnamon Fern	S5	G5	7	-3	Native, Uncommon		x	x
Pteridium aquilinum	Bracken Fern	S5	G5	2	3	Native, Uncommon		x	x
Pteridium aquilinum var. latiusculum	Eastern Bracken Fern	S5	G5T5	2	3	Native, Uncommon		x	x
Sceptridium dissectum	Cut-leaved Grapefern	S4S5	G5	6	0	Native, Common		x	
Thelypteris palustris	Marsh Fern	S5	G5	5	-3	Native, Common		x	x

Bird Table for Matchette and Malden (ONS2103A)

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA Schedule 1	Narrow Taxon Group	SOFIA Tallgrass Indicator Species	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28	Choquette& Valliant 2016
Botaurus lentiginosus	American Bittern	S4B	G5			birds		x			
Fulica americana	American Coot	S4B	G5	NAR		birds			OBBA		
Corvus brachyrhynchos	American Crow	S5B	G5			birds		x	OBBA		
Spinus tristis	American Goldfinch	S5B	G5			birds		x	OBBA	x	x
Falco sparverius	American Kestrel	S4	G5			birds		x			
Setophaga ruticilla	American Redstart	S5B	G5			birds		x	OBBA		
Turdus migratorius	American Robin	S5B	G5			birds		x	OBBA	x	x
Scolopax minor	American Woodcock	S4B	G5			birds		x	OBBA		
Haliaeetus leucocephalus	Bald Eagle	S2N,S4B	G5	SC		birds		x	OBBA, NHIC		
Icterus galbula	Baltimore Oriole	S4B	G5			birds		x	OBBA		x
Riparia riparia	Bank Swallow	S4B	G5	THR	THR	birds			NHIC		
Hirundo rustica	Barn Swallow	S5B	G5	THR	THR	birds		x	OBBA, NHIC	x	
Setophaga castanea	Bay-breasted Warbler	S5B	G5			birds		x			
Megaceryle alcyon	Belted Kingfisher	S4B	G5			birds		x	OBBA		
Mniotilta varia	Black-and-white Warbler	S5B	G5			birds		x			
Coccyzus erythropthalmus	Black-billed Cuckoo	S5B	G5			birds		x	OBBA		
Setophaga fusca	Blackburnian Warbler	S5B	G5			birds		x			
Poecile atricapillus	Black-capped Chickadee	S5	G5			birds		x	OBBA	x	x
Nycticorax nycticorax	Black-crowned Night-heron	S3B,S3N	G5			birds		x	OBBA		
Setophaga striata	Blackpoll Warbler	S4B	G5			birds		x			
Setophaga caerulescens	Black-throated Blue Warbler	S5B	G5			birds		x			
Setophaga virens	Black-throated Green Warbler	S5B	G5			birds		x			
Passerina caerulea	Blue Grosbeak	SNA	G5			birds		x			
Cyanocitta cristata	Blue Jay	S5	G5			birds		x	OBBA	x	
Polioptila caerulea	Blue-gray Gnatcatcher	S4B	G5			birds		x	OBBA		
Vireo solitarius	Blue-headed Vireo	S5B	G5			birds		x			
Anas discors	Blue-winged Teal	S4	G5			birds			OBBA		
Vermivora cyanoptera	Blue-winged Warbler	S4B	G5			birds		x			
Dolichonyx oryzivorus	Bobolink	S4B	G5	THR	THR	birds			NHIC, OBBA		
Chroicocephalus philadelphia	Bonaparte's Gull	S4B,S4N	G5			birds		x			
Buteo platypterus	Broad-winged Hawk	S5B	G5			birds		x			
Certhia americana	Brown Creeper	S5B	G5			birds		x			
Toxostoma rufum	Brown Thrasher	S4B	G5			birds		x	OBBA		
Molothrus ater	Brown-headed Cowbird	S4B	G5			birds		x	OBBA		
Bucephala albeola	Bufflehead	S4	G5			birds		x			
Branta hutchinsii	Cackling Goose	S4M	G5			birds		x			
Branta canadensis	Canada Goose	S5	G5			birds		x	OBBA		
Cardellina canadensis	Canada Warbler	S4B	G5	SC	THR	birds		x			
Setophaga tigrina	Cape May Warbler	S5B	G5			birds		x			
Thryothorus ludovicianus	Carolina Wren	S4	G5			birds		x	OBBA	x	x

	Hydroprogne caspia	Caspian Tern	S3B	G5	NAR		birds	x			
	Bombycilla cedrorum	Cedar Waxwing	S5B	G5			birds	x	OBBA		
	Setophaga cerulea	Cerulean Warbler	S3B	G4	THR	END	birds	x			
	Setophaga pensylvanica	Chestnut-sided Warbler	S5B	G5			birds	x			
	Chaetura pelagica	Chimney Swift	S4B,S4N	G4G5	THR	THR	birds		OBBA		
	Spizella passerina	Chipping Sparrow	S5B	G5			birds	x	OBBA		x
	Petrochelidon pyrrhonota	Cliff Swallow	S4B	G5			birds		OBBA		
	Gallinula galeata	Common Gallinule	S4B	G5			birds		OBBA		
	Bucephala clangula	Common Goldeneye	S5	G5			birds	x			
	Quiscalus quiscula	Common Grackle	S5B	G5			birds	x	OBBA	x	x
	Gavia immer	Common Loon	S5B,S5N	G5	NAR		birds	x			
	Mergus merganser	Common Merganser	S5B,S5N	G5			birds	x			
	Chordeiles minor	Common Nighthawk	S4B	G5	SC	THR	birds	x	OBBA		
	Acanthis flammea	Common Redpoll	S4B	G5			birds	x			
	Geothlypis trichas	Common Yellowthroat	S5B	G5			birds	x	OBBA		
	Oporornis agilis	Connecticut Warbler	S4B	G4G5			birds	x			
	Accipiter cooperii	Cooper's Hawk	S4	G5	NAR		birds	x	OBBA		
	Junco hyemalis	Dark-eyed Junco	S5B	G5			birds	x			
	Spiza americana	Dickcissel	SNA	G5			birds		OBBA		
	Phalacrocorax auritus	Double-crested Cormorant	S5B	G5	NAR		birds	x			
	Picoides pubescens	Downy Woodpecker	S5	G5			birds		OBBA	x	
	Sialia sialis	Eastern Bluebird	S5B	G5	NAR		birds	x	OBBA		x
	Tyrannus tyrannus	Eastern Kingbird	S4B	G5			birds	x	OBBA		
	Sturnella magna	Eastern Meadowlark	S4B	G5	THR	THR	birds		OBBA, NHIC		
	Sayornis phoebe	Eastern Phoebe	S5B	G5			birds	x	OBBA		
	Megascops asio	Eastern Screech-Owl	S4	G5	NAR		birds	x	OBBA		
	Pipilo erythrophthalmus	Eastern Towhee	S4B	G5			birds	x	OBBA	x	
	Antrostomus vociferus	Eastern Whip-poor-will	S4B	G5	THR	THR	birds		NHIC		
	Contopus virens	Eastern Wood-pewee	S4B	G5	SC	SC	birds	x	OBBA, NHIC	x	
*	*Streptopelia decaocto*	Eurasian Collared-Dove	SNA	G5			birds		OBBA		
*	*Sturnus vulgaris*	European Starling	SNA	G5			birds	x	OBBA	x	x
	Coccothraustes vespertinus	Evening Grosbeak	S4B	G5			birds	x			
	Spizella pusilla	Field Sparrow	S4B	G5			birds	x	OBBA		
	Passerella iliaca	Fox Sparrow	S4B	G5			birds	x			
	Regulus satrapa	Golden-crowned Kinglet	S5B	G5			birds	x			
	Dumetella carolinensis	Gray Catbird	S4B	G5			birds	x	OBBA	x	x
	Catharus minimus	Gray-cheeked Thrush	S4B	G5			birds	x			
	Ardea herodias	Great Blue Heron	S4	G5			birds	x			
	Myiarchus crinitus	Great Crested Flycatcher	S4B	G5			birds	x	OBBA	x	
	Ardea alba	Great Egret	S2B	G5			birds	x			
	Bubo virginianus	Great Horned Owl	S4	G5			birds	x	OBBA		
	Aythya marila	Greater Scaup	S4	G5			birds	x			
	Anser albifrons	Greater White-fronted Goose	SNA	G5			birds	x			
	Tringa melanoleuca	Greater Yellowlegs	S4B,S4N	G5			birds	x			
	Butorides virescens	Green Heron	S4B	G5			birds	x	OBBA		
	Picoides villosus	Hairy Woodpecker	S5	G5			birds		OBBA		
	Catharus guttatus	Hermit Thrush	S5B	G5			birds	x			

Bird Table for Matchette and Malden (ONS2103A)

	Larus argentatus	Herring Gull	S5B,S5N	G5			birds		x				
	Acanthis hornemanni	Hoary Redpoll	SNA	G5			birds		x				
	Lophodytes cucullatus	Hooded Merganser	S5B,S5N	G5			birds		x	OBBA			
	Podiceps auritus	Horned Grebe	S1B,S4N	G5	SC	SC	birds		x				
	Eremophila alpestris	Horned Lark	S5B	G5			birds		x	OBBA			
*	*Haemorhous mexicanus*	House Finch	SNA	G5			birds		x	OBBA	x		
*	*Passer domesticus*	House Sparrow	SNA	G5			birds			OBBA	x		x
	Troglodytes aedon	House Wren	S5B	G5			birds		x	OBBA	x		x
	Passerina cyanea	Indigo Bunting	S4B	G5			birds		x	OBBA	x		
	Charadrius vociferus	Killdeer	S5B,S5N	G5			birds		x	OBBA	x		
	Rallus elegans	King Rail	S2B	G4	END	END	birds			OBBA			
	Ixobrychus exilis	Least Bittern	S4B	G4G5	THR	THR	birds		x	OBBA			
	Empidonax minimus	Least Flycatcher	S4B	G5			birds		x	OBBA			
	Aythya affinis	Lesser Scaup	S4	G5			birds		x				
	Melospiza lincolnii	Lincoln's Sparrow	S5B	G5			birds		x				
	Parkesia motacilla	Louisiana Waterthrush	S3B	G5	THR	SC	birds		x				
	Setophaga magnolia	Magnolia Warbler	S5B	G5			birds		x				
	Anas platyrhynchos	Mallard	S5	G5			birds		x	OBBA			
	Cistothorus palustris	Marsh Wren	S4B	G5			birds			OBBA			
	Falco columbarius	Merlin	S5B	G5	NAR		birds		x				
	Anas fulvigula	Mottled Duck	SNA	G4			birds						x
	Zenaida macroura	Mourning Dove	S5	G5			birds		x	OBBA	x		
*	*Cygnus olor*	Mute Swan	SNA	G5			birds		x	OBBA			
	Cardinalis cardinalis	Northern Cardinal	S5	G5			birds		x	OBBA	x		x
	Colaptes auratus	Northern Flicker	S4B	G5			birds		x	OBBA			
	Circus hudsonius	Northern Harrier	S4B	G5	NAR		birds		x				
	Mimus polyglottos	Northern Mockingbird	S4	G5			birds		x	OBBA			
	Setophaga americana	Northern Parula	S4B	G5			birds		x				
	Anas acuta	Northern Pintail	S5	G5			birds		x				
	Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B	G5			birds		x	OBBA	x		
	Contopus cooperi	Olive-sided Flycatcher	S4B	G4	SC	THR	birds		x				
	Icterus spurius	Orchard Oriole	S4B	G5			birds		x	OBBA			
	Pandion haliaetus	Osprey	S5B	G5			birds			OBBA			
	Seiurus aurocapilla	Ovenbird	S4B	G5			birds		x				
	Falco peregrinus	Peregrine Falcon	S3B	G4	SC	SC	birds		x				
	Podilymbus podiceps	Pied-billed Grebe	S4B,S4N	G5			birds			OBBA			
	Spinus pinus	Pine Siskin	S4B	G5			birds		x				
	Setophaga pinus	Pine Warbler	S5B	G5			birds		x				
	Protonotaria citrea	Prothonotary Warbler	S1B	G5	END	END	birds			OBBA			
	Progne subis	Purple Martin	S3S4B	G5			birds			OBBA	x		
	Mergus serrator	Red-breasted Merganser	S4B,S5N	G5			birds		x				
	Sitta canadensis	Red-breasted Nuthatch	S5	G5			birds		x				
	Vireo olivaceus	Red-eyed Vireo	S5B	G5			birds		x	OBBA	x		
	Aythya americana	Redhead	S2B,S4N	G5			birds		x	OBBA			
	Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	G5	SC	THR	birds	Oak savannas. By no means restricted to this type.	x	NHIC OBBA			

Bird Table for Matchette and Malden (ONS2103A)

	Buteo lineatus	Red-shouldered Hawk	S4B	G5	NAR		birds		x			
	Buteo jamaicensis	Red-tailed Hawk	S5	G5	NAR		birds		x	OBBA		
	Agelaius phoeniceus	Red-winged Blackbird	S4	G5			birds		x	OBBA	X	X
	Larus delawarensis	Ring-billed Gull	S5B,S4N	G5			birds		x			
*	*Phasianus colchicus*	Ring-necked Pheasant	SNA	G5			birds		x			x
*	*Columba livia*	Rock Pigeon	SNA	G5			birds		x			x
	Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B	G5			birds		x	OBBA		x
	Regulus calendula	Ruby-crowned Kinglet	S4B	G5			birds		x			
	Archilochus colubris	Ruby-throated Hummingbird	S5B	G5			birds		x	OBBA		x
	Euphagus carolinus	Rusty Blackbird	S4B	G4	NAR	SC	birds		x			
	Grus canadensis	Sandhill Crane	S5B	G5			birds			OBBA		
	Passerculus sandwichensis	Savannah Sparrow	S4B	G5			birds		x	OBBA		
	Piranga olivacea	Scarlet Tanager	S4B	G5			birds		x	OBBA		
	Accipiter striatus	Sharp-shinned Hawk	S5	G5	NAR		birds		x			
	Plectrophenax nivalis	Snow Bunting	SNA	G5			birds		x			
	Tringa solitaria	Solitary Sandpiper	S4B	G5			birds		x			
	Melospiza melodia	Song Sparrow	S5B	G5			birds		x	OBBA	x	
	Actitis macularius	Spotted Sandpiper	S5	G5			birds		x	OBBA		
	Catharus ustulatus	Swainson's Thrush	S4B	G5			birds		x			
	Melospiza georgiana	Swamp Sparrow	S5B	G5			birds			OBBA		
	Tachycineta bicolor	Tree Swallow	S4B	G5			birds		x	OBBA	x	x
	Baeolophus bicolor	Tufted Titmouse	S4	G5			birds	Oak savannas. Not restricted to this type, as it also occurs in open woodland and swampland habitats.	x	OBBA		
	Cathartes aura	Turkey Vulture	S5B	G5			birds		x	OBBA		
	Catharus fuscescens	Veery	S4B	G5			birds		x			
	Pooecetes gramineus	Vesper Sparrow	S4B	G5			birds			OBBA		
	Rallus limicola	Virginia Rail	S5B	G5			birds			OBBA		
	Vireo gilvus	Warbling Vireo	S5B	G5			birds		x	OBBA	x	
	Sitta carolinensis	White-breasted Nuthatch	S5	G5			birds		x	OBBA		
	Zonotrichia leucophrys	White-crowned Sparrow	S4B	G5			birds		x			
	Vireo griseus	White-eyed Vireo	S2B	G5			birds			NHIC		
	Zonotrichia albicollis	White-throated Sparrow	S5B	G5			birds		x			
	Zenaida asiatica	White-winged Dove	SNA	G5			birds			OBBA		x
	Meleagris gallopavo	Wild Turkey	S5	G5			birds		x	OBBA		
	Empidonax traillii	Willow Flycatcher	S5B	G5			birds		x	OBBA	x	
	Cardellina pusilla	Wilson's Warbler	S4B	G5			birds		x			
	Troglodytes hiemalis	Winter Wren	S5B	G5			birds		x			
	Aix sponsa	Wood Duck	S5	G5			birds		x	OBBA		
	Hylocichla mustelina	Wood Thrush	S4B	G4	SC	THR	birds		x	OBBA, NHIC	x	
	Helmitheros vermivorum	Worm-eating Warbler	SNA	G5			birds		x			
	Setophaga petechia	Yellow Warbler	S5B	G5			birds		x	OBBA		
	Empidonax flaviventris	Yellow-bellied Flycatcher	S5B	G5			birds		x			
	Sphyrapicus varius	Yellow-bellied Sapsucker	S5B	G5			birds		x			
	Coccyzus americanus	Yellow-billed Cuckoo	S4B	G5			birds		x	OBBA		

Bird Table for Matchette and Malden (ONS2103A)

Icteria virens	Yellow-breasted Chat	S1B	G5	END	END	birds	Oak savannas. Not restricted to this type, as it also occurs in brushy old fields and open woodlands of all types.		NHIC
Setophaga coronata	Yellow-rumped Warbler	S5B	G5			birds		x	
Molothrus ater		S4B	G5			birds			OBBA

Herptile Table for Matchette and Malden (ONS2103A)

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA Schedule 1	Narrow Taxon Group	SOFIA Tallgrass Indicator Species	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28	Choquette& Valliant 2016
	Lithobates catesbeianus	American Bullfrog	S4	G5			amphibians		x	ORAA		x
	Anaxyrus americanus	American Toad	S5	G5			amphibians		x	x	x	x
	Lithobates clamitans	Green Frog	S5	G5			amphibians		x	ORAA		x
	Necturus maculosus	Mudpuppy	S4	G5	NAR		amphibians			ORAA		
	Lithobates pipiens	Northern Leopard Frog	S5	G5	NAR		amphibians		x	ORAA		x
	Pseudacris crucifer	Spring Peeper	S5	G5			amphibians			ORAA		
	Pseudacris triseriata pop. 2	Western Chorus Frog - Carolinian Population	S4	G5TNR	NAR		amphibians		x	x, ORAA		
	Thamnophis butleri	Butler's Gartersnake	S2	G4	END	END	reptiles	Tallgrass prairie. Primarily restricted to this type in Ontario. Some occurrences in other types.		ORAA, NHIC	x	x
	Plestiodon fasciatus pop. 1	Common Five-lined Skink (Carolinian population)	S2	G5T2	END	END	reptiles	Tallgrass prairie and oak savannas. Not entirely restricted to these types as it occurs extensively in Precambrian rock barrens along the southern edge of the shield.		ORAA, NHIC	x	
	Storeria dekayi	DeKay's Brownsnake	S5	G5	NAR		reptiles		x	ORAA		x
	Pantherophis gloydi pop. 2	Eastern Foxsnake (Carolinian population)	S2	G3TNR	END	END	reptiles	Oak savannas and tallgrass prairie. Not entirely restricted to these community types as it occurs commonly in SE Georgian Bay.		ORAA	x	x
	Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5	G5T5			reptiles		x	ORAA		x
	Heterodon platirhinos	Eastern Hog-nosed Snake	S3	G5	THR	THR	reptiles	Oak savannas and sand barrens. Not entirely restricted to these types by any means.		ORAA		
	Sistrurus catenatus pop. 2	Massasauga (Carolinian population)	S1	G3TNR	END	END	reptiles	Tallgrass prairie. Not restricted to this type as it occurs in alvar woodland and grassland, and Precambrian rock barren types.		ORAA, NHIC	x	x
	Nerodia sipedon sipedon	Northern Watersnake	S5	G5T5	NAR		reptiles			ORAA		
	Regina septemvittata	Queensnake	S2	G5	END	END	reptiles			ORAA		
	Storeria occipitomaculata	Red-bellied Snake	S5	G5			reptiles		x	ORAA		x
	Opheodrys vernalis	Smooth Greensnake	S4	G5			reptiles			ORAA		
	Emydoidea blandingii	Blanding's Turtle	S3	G4	THR	THR	turtles		x	ORAA, NHIC	x	x
	Sternotherus odoratus	Eastern Musk Turtle	S3	G5	SC	SC	turtles			ORAA, NHIC		x
	Chrysemys picta marginata	Midland Painted Turtle	S4	G5T5			turtles		x	ORAA, NHIC		x
	Graptemys geographica	Northern Map Turtle	S3	G5	SC	SC	turtles			ORAA, NHIC		x
*	*Trachemys scripta*	Pond Slider	SNA	G5			turtles		x	ORAA		x

Chelydra serpentina	Snapping Turtle	S4	G5	SC	SC	turtles	x	ORAA, NHIC	x	x
Apalone spinifera	Spiny Softshell	S2	G5	END	THR	turtles		NHIC		

Mammal Table for Matchette and Malden (ONS2103A)

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA Schedule 1	Narrow Taxon Group	SOFIA Tallgrass Indicator Species	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28	Choquette& Valliant 2016
	Neovison vison	American Mink	S4	G5			mammals		x			
	Castor canadensis	Beaver	S5	G5			mammals		x			
	Eptesicus fuscus	Big Brown Bat	S4	G5			mammals		x			
*	*Rattus rattus*	Black Rat	SNA	G5			mammals		x			
	Canis latrans	Coyote	S5	G5			mammals		x		x	
	Peromyscus maniculatus	Deer Mouse	S5	G5			mammals		x			
	Tamias striatus	Eastern Chipmunk	S5	G5			mammals		x		x	x
	Sylvilagus floridanus	Eastern Cottontail	S5	G5			mammals		x		x	x
	Sciurus carolinensis	Eastern Gray Squirrel	S5	G5			mammals		x			x
	Lasiurus borealis	Eastern Red Bat	S4	G3G4			mammals		x			
	mustela erminea	Ermine	S5	G5			mammals				x	
	Urocyon cinereoargenteus	Gray Fox	S1	G5	THR	THR	mammals				x	
	Lasiurus cinereus	Hoary Bat	S4	G3G4			mammals			x		
	Myotis lucifugus	Little Brown Myotis	S3	G3	END	END	mammals			x		
	Microtus pennsylvanicus	Meadow Vole	S5	G5			mammals		x		x	x
	Ondatra zibethicus	Muskrat	S5	G5			mammals		x			x
	Procyon lotor	Northern Raccoon	S5	G5			mammals		x		x	x
	Blarina brevicauda	Northern Short-tailed Shrew	S5	G5			mammals		x		x	x
*	*Rattus norvegicus*	Norway Rat	SNA	G5			mammals		x			
	vulpes vulpes	Red Fox	S5	G5			mammals				x	
	Lasionycteris noctivagans	Silver-haired Bat	S4	G3G4			mammals			x		
	Mephitis mephitis	Striped Skunk	S5	G5			mammals		x		x	x
	Didelphis virginiana	Virginia Opossum	S4	G5			mammals		x			x
	Peromyscus leucopus	White-footed Mouse	S5	G5			mammals		x		x	x
	Odocoileus virginianus	White-tailed Deer	S5	G5			mammals		x		x	
	Marmota monax	Woodchuck	S5	G5			mammals		x			x

Fish Table for Matchette and Malden (ONS2103A)

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA Schedule 1	Narrow Taxon Group	SOFIA Tallgrass Indicator Species	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28	Choquette& Valliant 2016
	Ichthyomyzon castaneus pop	Chestnut Lamprey - Great Lakes - Upper St. Lawrence populations	SU	G4TU	DD		Lampreys			NHIC		
	Lepomis macrochirus	Bluegill	S5	G5			ray-finned fishes		x			
	Amia calva	Bowfin	S4	G5			ray-finned fishes		x			
	Culaea inconstans	Brook Stickleback	S5	G5			ray-finned fishes		x			
	Ameiurus nebulosus	Brown Bullhead	S5	G5			ray-finned fishes		x			
	Umbra limi	Central Mudminnow	S5	G5			ray-finned fishes		x			
	Ictalurus punctatus	Channel Catfish	S4	G5			ray-finned fishes		x			
	Percina copelandi	Channel Darter	S2	G4	THR		ray-finned fishes			NHIC		
*	*Cyprinus carpio*	Common Carp	SNA	G5			ray-finned fishes		x			
	Semotilus atromaculatus	Creek Chub	S5	G5			ray-finned fishes		x			
	Pimephales promelas	Fathead Minnow	S5	G5			ray-finned fishes		x			
	Aplodinotus grunniens	Freshwater Drum	S5	G5			ray-finned fishes		x			
	Dorosoma cepedianum	Gizzard Shad	S4	G5			ray-finned fishes		x			
	Notemigonus crysoleucas	Golden Shiner	S5	G5			ray-finned fishes		x			
*	*Carassius auratus*	Goldfish	SNA	G5			ray-finned fishes		x			
	Lepomis cyanellus	Green Sunfish	S4	G5	NAR		ray-finned fishes		x			
	Nocomis biguttatus	Hornyhead Chub	S4	G5	NAR		ray-finned fishes		x			
	Micropterus salmoides	Largemouth Bass	S5	G5			ray-finned fishes		x			
	Percina caprodes	Logperch	S5	G5			ray-finned fishes		x			
	Lepisosteus osseus	Longnose Gar	S4	G5			ray-finned fishes		x			
	Noturus stigmosus	Northern Madtom	S1	G3	END	END	ray-finned fishes			NHIC		
	Esox lucius	Northern Pike	S5	G5			ray-finned fishes		x			
	Lepomis peltastes pop. 2	Northern Sunfish (Great Lakes - Upper St. Lawrence populations)	S3	G5TNR	SC		ray-finned fishes			NHIC		
	Notropis anogenus	Pugnose Shiner	S2	G3	THR	END	ray-finned fishes			NHIC		
	Lepomis gibbosus	Pumpkinseed	S5	G5			ray-finned fishes		x			
	Ambloplites rupestris	Rock Bass	S5	G5			ray-finned fishes		x			
*	*Neogobius melanostomus*	Round Goby	SNA	G5			ray-finned fishes		x			
	Moxostoma macrolepidotum	Shorthead Redhorse	S5	G5			ray-finned fishes		x			
	Micropterus dolomieu	Smallmouth Bass	S5	G5			ray-finned fishes		x			
	Minytrema melanops	Spotted Sucker	S2	G5	SC	SC	ray-finned fishes			NHIC		
	Morone chrysops	White Bass	S4	G5			ray-finned fishes		x			
*	*Morone americana*	White Perch	SNA	G5			ray-finned fishes		x			
	Catostomus commersonii	White Sucker	S5	G5			ray-finned fishes		x			
	Perca flavescens	Yellow Perch	S5	G5			ray-finned fishes		x			

Invertebrates arthropods Table for Matchette and Malden (ONS2103A)

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	SARO	SARA Schedule 1	Narrow Taxon Group	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28
Scutigera coleoptrata	A Centipede	SNA	GNR			centipedes	x		
Cambarus robustus	Big Water Crayfish	S4	G5			crustaceans	x		
Creaserinus fodiens	Digger Crayfish	S3	G5			crustaceans	x		
Faxonius immunis	Calico Crayfish	S4	G5			crustaceans	x		
Faxonius virilis	Virile Crayfish	S4	G5			crustaceans	x		
Lacunicambarus polychromatu	Paintedhand Mudbug	S1S2	G5			crustaceans	x	NHIC	
Acalymma vittatum	A Leaf Beetle	SNR	G5			insects	x		
Acanthocinus pusillus	A Longhorned Beetle	SNR	G5			insects	x		
Achalarus lyciades	Hoary Edge	S1	G5			insects		OBA	
Achyra rantalis	Garden Webworm Moth	SNR	GNR			insects	x		
Acleris forsskaleana		SNR	GNR			insects	x		
Acmaeodera pulchella	A Metallic Wood-boring Beetle	SNR	GNR			insects	x		
Acmaeodera tubulus	A Metallic Wood-boring Beetle	SNR	GNR			insects	x		
Acrobasis angusella		SNR	GNR			insects	x		
Acronicta afflicta	Afflicted Dagger Moth	S1?	G5			insects	x		
Acronicta americana	American Dagger Moth	S5	G5			insects	x		
Acronicta hasta		S4?	G5			insects	x		
Acronicta oblinita	Smeared Dagger Moth	S5	G5			insects	x		
Acronicta superans	Splendid Dagger Moth	S4?	G5			insects	x		
Actias luna	Luna Moth	S4	G5			insects	x		
Aeolus mellillus	A Click Beetle	SNR	GNR			insects	x		
Aeshna constricta	Lance-tipped Darner	S5	G5			insects	x		
Aeshna umbrosa	Shadow Darner	S5	G5			insects	x		
Aeshna verticalis	Green-striped Darner	S3	G5			insects	x		
Agallia quadripunctata	Four-spotted Clover Leafhopper	SNR	GNR			insects	x		
Agalliopsis ancistra		SNR	GNR			insects	x		
Agapostemon virescens	Bicoloured Sweat Bee	S5	G5			insects	x		
Aglais milberti	Milbert's Tortoiseshell	S5	G5			insects	x	OBA	
Aglossa caprealis		SNR	G5			insects	x		
Aglossa cuprina	Grease Moth	SNR	G4G5			insects	x		
Agnorisma badinodis	Pale-banded Dart	SNR	G5			insects	x		
Agonum cupripenne	Ground Beetle	SNR	G5			insects	x		
Agonum decorum	Ground Beetle	SNR	G5			insects	x		
* *Agrilus cyanescens*	A Metallic Wood-boring Beetle	SNA	GNR			insects	x		
Agriphila vulgivagellus	Vagabond Crambus	SNR	GNR			insects	x		
Agrotis ipsilon	Ipsilon Dart	S5	G5			insects	x		
Alaus oculatus	A Click Beetle	SNR	GNR			insects	x		
Albuna fraxini		SNR	GNR			insects	x		
Allograpta obliqua		S4	GNR			insects	x		
Allonemobius maculatus	Larger Spotted Ground Cricket	SU	G5			insects	x		
Alsophila pometaria	Fall Cankerworm Moth	SNR	G5			insects	x		
Alypia octomaculata	Eight-spotted Forester Moth	S5	G5			insects	x		

Invertebrates arthropods Table for Matchette and Malden (ONS2103A)

Amblycorypha oblongifolia	Oblong-winged Katydid	S4	GNR	insects	x			
Amblyscirtes hegon	Pepper and Salt Skipper	S4	G5	insects		OBA		
Amblysellus curtisii		SNR	GNR	insects	x			
Amorpha juglandis	Walnut Sphinx	S4?	G5	insects	x			
Amphasia interstitialis	Ground Beetle	SNR	G5	insects	x			
Amphion floridensis	Nessus Sphinx	S4	G5	insects	x			
Amphipoea americana		S5	G5	insects	x			
Amphipyra pyramidoides	Copper Underwing	SNR	G5	insects	x			
Anageshna primordialis		SNR	GNR	insects	x			
Anania funebris		SNR	GNR	insects	x			
Anatrytone logan	Delaware Skipper	S4	G5	insects	x	OBA		
Anavitrinella pampinaria	Common Gray Moth	S4S5	G5	insects	x			
Anax junius	Common Green Darner	S5	G5	insects	x			
Anaxipha exigua	Say's Winged Bush Cricket	S4	GNR	insects	x		x	
Ancistrocerus antilope		S5?	G5	insects	x	x		
Ancistrocerus gazella		SNA	GNR	insects	x	x		
Ancyloxypha numitor	Least Skipper	S5	G5	insects	x	x		
Andrena nubecula	Cloudy-winged Miner Bee	S3S4	GNR	insects	x	x		
Andrena vicina	Neighbouring Miner Bee	S5	G5	insects	x	x		
Antaeotricha leucillana		SNR	GNR	insects	x			
Antepione thisoaria	Variable Antepione	SNR	G5	insects	x			
Antheraea polyphemus	Polyphemus Moth	S5	G5	insects	x			
Anthidium manicatum	Wool Carder Bee	SNA	G5	insects	x			
Anthophora terminalis	Red-tipped Digger Bee	S5	G5	insects	x			
Anthrax argyropygus		SH	GNR	insects	x	NHIC		
Anthrax irroratus	Speckled Coal Bee Fly	S4S5	G5	insects	x			
Anthrax pluto	Wealthy Coal Bee Fly	SU	GNR	insects	x			
Anticarsia gemmatalis	Velvetbean Caterpillar Moth	SNA	G5	insects	x			
Apantesis phalerata	Harnessed Moth	S4?	G5	insects	x			
Apatelodes torrefacta	Spotted Apatelodes	SNR	G5	insects	x			
* *Aphrophora alni*	European Alder Spittlebug	SNA	GNR	insects	x			
Aphrophora quadrinotata	Four-spotted Spittlebug	S4	GNR	insects	x			
Apis mellifera	European Honey Bee	SNA	GNR	insects	x			
Apoda y-inversum		S5	G5	insects	x			
Archilestes grandis	Great Spreadwing	S1	G5	insects		NHIC		
Argia apicalis	Blue-fronted Dancer	S4	G5	insects	x			
Arigomphus villosipes	Unicorn Clubtail	S3	G5	insects	x			
Arphia sulphurea	Sulphur-winged Grasshopper	S4	G5	insects	x			
Ascalapha odorata	Black Witch Moth	SNA	G5	insects	x			
Asterocampa celtis	Hackberry Emperor	S3	G5	insects	x	OBA		
Asterocampa clyton	Tawny Emperor	S3	G5	insects		OBA		
Atalopedes campestris	Sachem	SNA	G5	insects	x	OBA		
Athetis tarda	The Slowpoke	SNR	G5	insects	x			
Athysanus argentarius		SNR	GNR	insects	x			
Atranus pubescens	Ground Beetle	SNR	GNR	insects	x			
Atteva aurea	Ailanthus Webworm Moth	SNR	G5	insects	x			
Augochlora pura	Pure Sweat Bee	S5	G5	insects	x			

	Autographa precationis	Common Looper Moth	S5	G5			insects	x	
	Automeris io	Io Moth	S5	G5			insects	x	
	Baliosus nervosus	A Leaf Beetle	SNR	G5			insects	x	
	Battus philenor	Pipevine Swallowtail	SNA	G5			insects		OBA
	Besma quercivoraria	Oak Besma	SNR	G5			insects	x	
*	*Bitoma crenata*	A Wedge-shaped Beetle	SNA	GNR			insects	x	
	Bittacus strigosus	Thin Hangingfly	SU	GNR			insects	x	
	Blastobasis glandulella	Acorn Moth	SNR	GNR			insects	x	
	Blepharida rhois	A Leaf Beetle	SNR	GNR			insects	x	
	Boloria bellona	Meadow Fritillary	S5	G5			insects		OBA
	Boloria selene	Silver-bordered Fritillary	S5	G5			insects		OBA
	Bombus affinis	Rusty-patched Bumble Bee	S1	G2	END	END	insects		NHIC
	Bombus bimaculatus	Two-spotted Bumble Bee	S5	G5			insects	x	
	Bombus citrinus	Lemon Cuckoo Bumble Bee	S3S4	G4			insects	x	
	Bombus fervidus	Golden Northern Bumble Bee	S3S4	G3G4			insects	x	
	Bombus griseocollis	Brown-belted Bumble Bee	S5	G5			insects	x	
	Bombus impatiens	Common Eastern Bumble Bee	S5	G5			insects	x	
	Bombylius major	Large Bee Fly	S5?	G5			insects	x	
	Brachiacantha ursina	A Ladybird Beetle	SNR	G5			insects	x	
	Brachyleptura rubrica	A Longhorned Beetle	SNR	G5			insects	x	
	Bruchomorpha oculata	A Piglet Bug	SNR	GNR			insects	x	
	Caenurgina erechtea	Forage Looper Moth	S4S5	G5			insects	x	
	Calleida punctata	Ground Beetle	SNR	G5			insects	x	
	Calligrapha bidenticola	A Leaf Beetle	SNR	G5			insects	x	
	Calligrapha multipunctata	A Leaf Beetle	SNR	G5			insects	x	
	Callopistria cordata	Silver-spotted Fern Moth	SNR	G5			insects	x	
	Callosamia promethea	Promethea Moth	S4	G5			insects	x	
	Calomycterus setarius	A Weevil	SNR	GNR			insects	x	
	Calopteron reticulatum	A Net-winged Beetle	SNR	GNR			insects	x	
	Calopteron terminale	A Net-winged Beetle	SNR	GNR			insects	x	
	Calopteryx maculata	Ebony Jewelwing	S5	G5			insects	x	
	Calyptra canadensis	Canadian Owlet	SNR	G5			insects	x	
	Campaea perlata	Pale Beauty Moth	S5	G5			insects	x	
	Camponotus pennsylvanicus	Eastern Black Carpenter Ant	S5	G5			insects	x	
	Camponotus subbarbatus	Lesser Bearded Carpenter Ant	SU	GNR			insects	x	
	Cantura jucunda		SNR	GNR			insects	x	
*	*Cassida rubiginosa*	Thistle Tortoise Beetle	SNA	GNR			insects	x	
	Catocala blandula	Charming Underwing	S5	G5			insects	x	
	Catocala cerogama	Yellow-banded Underwing	S5	G5			insects	x	
	Catocala grynea	Woody Underwing	S5	G5			insects	x	
	Catocala ilia	Ilia Underwing	S5	G5			insects	x	
	Catocala minuta	Little Underwing	SNR	G5			insects	x	
	Catocala palaeogama	Oldwife Underwing	SNR	G5			insects	x	
	Catocala parta	Mother Underwing	S5	G5			insects	x	
	Catocala piatrix	The Penitent	S4	G5			insects	x	
	Catocala relicta	White Underwing Moth	S5	G5			insects	x	
	Catocala retecta	Yellow-gray Underwing	SNR	G5			insects	x	

Invertebrates arthropods Table for Matchette and Malden (ONS2103A)

Catocala serena	Serene Underwing	SH	G5	insects	x	NHIC	
Catocala ultronia	Ultronia Underwing Moth	S5	G5	insects	x		
Catocala unijuga	Once-married Underwing	S5	G5	insects	x		
Celastrina lucia	Northern Spring Azure	S5	G5	insects		OBA	
Celastrina neglecta	Summer Azure	S5	G5	insects	x	OBA	
Celithemis elisa	Calico Pennant	S5	G5	insects	x		
Celithemis eponina	Halloween Pennant	S4	G5	insects	x		x
Celypha cespitana		SNR	GNR	insects	x		
Ceratomia catalpae	Catalpa Sphinx	SNA	G5	insects	x		
Cercyonis pegala	Common Wood-Nymph	S5	G5	insects	x	OBA	
Cerma cerintha	Tufted Bird-dropping Moth	SNR	G5	insects	x		
Chalcosyrphus nemorum		S4	GNR	insects	x		
Chauliognathus pensylvanicus	A Soldier Beetle	SNR	G5	insects	x		
Chelymorpha cassidea	A Leaf Beetle	SNR	GNR	insects	x		
Chilocorus stigma	A Ladybird Beetle	SNR	G5	insects	x		
Chionodes mediofuscella		SNR	GNR	insects	x		
Chlaenius tricolor	Ground Beetle	SNR	G5	insects	x		
Chloealtis conspersa	Sprinkled Grasshopper	S4	G5	insects	x		
Chlorochlamys chloroleucaria	Blackberry Looper Moth	SNR	G5	insects	x		
Chlosyne nycteis	Silvery Checkerspot	S5	G5	insects	x	OBA	
Choristoneura rosaceana	Oblique-banded Leafroller Moth	SNR	G5	insects	x		
Chortophaga viridifasciata	Green-striped Grasshopper	S4	G5	insects	x		
Chrysochus auratus	A Leaf Beetle	SNR	G5	insects	x		
Chrysopa nigricornis	Black-horned Green Lacewing	SU	GNR	insects	x		
Chrysopa oculata	Golden-eyed Green Lacewing	S5	G5	insects	x		
Chrysops pikei	Pike's Deer Fly	SU	GNR	insects	x		
Chrysoteuchia topiarius		SNR	GNR	insects	x		
Chrysotoxum pubescens		S4	GNR	insects	x		
Chytolita morbidalis	Morbid Owlet	SNR	G5	insects	x		
Cicindela duodecimguttata	A Tiger Beetle	S5	G5	insects	x		
Cicindela formosa	A Tiger Beetle	S4	G5	insects	x		
Cicindela punctulata	A Tiger Beetle	S5	G5	insects	x		
Cicindela sexguttata	A Tiger Beetle	S5	G5	insects	x		
Cisseps fulvicollis	Yellow-collared Scape Moth	SNR	G5	insects	x		
Clastoptera obtusa	Alder Spittle Bug	S5	G5	insects	x		
Clastoptera proteus	Dogwood Spittle Bug	S5	G5	insects	x		
Clepsis clemensiana		SNR	GNR	insects	x		
Climaciella brunnea	Wasp Mantidfly	S4	GNR	insects	x		
Clostera albosigma	Sigmoid Prominent Moth	S5	G5	insects	x		
Clytus ruricola	A Longhorned Beetle	SNR	G5	insects	x		
Cnaemidophorus rhododactyla		SNR	GNR	insects	x		
* *Coccinella septempunctata*	Seven-spotted Ladybird Beetle	SNA	GNR	insects	x		
Coenonympha tullia	Common Ringlet	S5	G5	insects	x	OBA	
Coleomegilla maculata	Spotted Ladybird Beetle	S5	G5	insects	x		
Colias eurytheme	Orange Sulphur	S5	G5	insects	x	OBA	
Colias philodice	Clouded Sulphur	S5	G5	insects	x	OBA	
Colladonus clitellarius	Sadleback Leafhopper	SNR	GNR	insects	x		

	Colletes inaequalis	Common Eastern Plasterer Bee	S5	G5			insects	x		
	Colliuris pensylvanica	Ground Beetle	SNR	GNR			insects	x		
	Conocephalus brevipennis	Short-winged Meadow Katydid	S4	G5			insects	x		
	Conocephalus nigropleurum	Black-sided Meadow Katydid	S3S4	GNR			insects	x		
	Conotrachelus nenuphar	A Weevil	SNR	G5			insects	x		
	Copris fricator	A Scarab Beetle	SNR	GNR			insects	x		
	Coquillettidia perturbans	Cattail Mosquito	S5	G5			insects	x		
	Coryphista meadii	Barberry Geometer	SNR	G5			insects	x		
	Cosmia calami	American Dun-bar	SNR	G5			insects	x		
	Cosmotettix delector		SNR	GNR			insects	x		
	Costaconvexa centrostrigaria	Bent-line Carpet	SNR	G5			insects	x		
	Crambidia pallida	Pale Lichen Moth	SNR	G5			insects	x		
	Crambus agitatellus		SNR	GNR			insects	x		
	Crambus laqueatellus		SNR	GNR			insects	x		
	Crambus praefectellus		SNR	GNR			insects	x		
	Crambus saltuellus		SNR	GNR			insects	x		
*	*Crioceris asparagi*	Common Asparagus Beetle	SNA	GNR			insects	x		
*	*Crioceris duodecimpunctata*	Spotted Asparagus Beetle	SNA	GNR			insects	x		
	Crocidophora tuberculalis		SNR	GNR			insects	x		
	Cryptocephalus venustus	A Leaf Beetle	SNR	G5			insects	x		
	Ctenicera pyrrhos	A Click Beetle	SNR	GNR			insects	x		
	Ctenucha virginica	Virginia Ctenucha Moth	S5	G5			insects	x		
	Cucujus clavipes	A Flat Bark Beetle	SNR	G5			insects	x		
	Cucullia asteroides	The Asteroid	S4	G5			insects	x		
	Cucullia convexipennis	Brown-bordered Cucullia	S4	G5			insects	x		
	Cupido comyntas	Eastern Tailed Blue	S5	G5			insects	x	OBA	
	Cycloneda munda	Immaculate Ladybird Beetle	SNR	G5			insects	x		
	Cycnia tenera	Delicate Cycnia	S4	G5			insects	x		
	Cydia latiferreana		SNR	GNR			insects	x		
	Cydia pomonella	Codling Moth	SNR	GNR			insects	x		
	Cymatodera undulata	A Checkered Beetle	SNR	GNR			insects	x		
	Cyrtepistomus castaneus	A Weevil	SNR	GNR			insects	x		
	Danaus plexippus	Monarch	S2N,S4B	G4	SC	SC	insects	x	OBA	
	Darapsa myron	Hog Sphinx	SU	G5			insects	x		
	Dargida diffusa	Wheat Head Armyworm Moth	S5	G5			insects	x		
	Datana integerrima	Walnut Caterpillar Moth	SNR	G5			insects	x		
	Datana perspicua	Spotted Datana	SNR	G5			insects	x		
	Deloyala guttata	A Leaf Beetle	SNR	G5			insects	x		
	Dendroides canadensis	A Fire-colored Beetle	SNR	G5			insects	x		
	Derospidea brevicollis	A Leaf Beetle	SNR	GNR			insects	x		
	Desmia funeralis	Grape Leaffolder Moth	SNR	G5			insects	x		
	Diabrotica cristata	A Leaf Beetle	SNR	GNR			insects	x		
	Diabrotica undecimpunctata	A Leaf Beetle	SNR	G5			insects	x		
	Diapheromera femorata	Northern Walkingstick	S4	G4G5			insects	x		
	Dichomeris bilobella		SNR	GNR			insects	x		
	Dichomeris ochripalpella		SNR	GNR			insects	x		
	Dichromorpha viridis	Short-winged Green Grasshopper	S2	G5			insects		NHIC	x

Dicromantispa sayi	Say's Mantidfly	SU	GNR	insects	x		
Dicymolomia julianalis		SNR	GNR	insects	x		
Dissosteira carolina	Carolina Grasshopper	S4S5	G5	insects	x		
Dolichovespula arenaria		S4	G5	insects	x		
Dolichovespula maculata		S4	G5	insects	x		
Dorcus parallelus	A Stag Beetle	SNR	GNR	insects	x		
Draeculacephala antica		SNR	GNR	insects	x		
Draeculacephala mollipes		SNR	GNR	insects	x		
Draeculacephala robinsoni		SNR	GNR	insects	x		
Dryocampa rubicunda	Rosy Maple Moth	S5	G5	insects	x		
Dypterygia rozmani	American Bird's-wing Moth	SNR	G5	insects	x		
Dyspteris abortivaria	The Bad-wing	SNR	G5	insects	x		
Dytiscus verticalis	A Predaceous Diving Beetle	SNR	GNR	insects	x		
Eburia quadrigeminata	A Longhorned Beetle	SNR	GNR	insects	x		
Ecdytolopha insiticiana	Locust Twig Borer Moth	SNR	GNR	insects	x		
Elater abruptus	A Click Beetle	SNR	GNR	insects	x		
Elophila icciusalis		SNR	GNR	insects	x		
Elophila obliteralis		SNR	GNR	insects	x		
Emmelina monodactyla		SNR	GNR	insects	x		
Empoasca fabae	Potatoe Leafhopper	SNR	GNR	insects	x		
Enallagma aspersum	Azure Bluet	S3	G5	insects	x	NHIC	x
Enallagma basidens	Double-striped Bluet	S3	G5	insects		NHIC	x
Enallagma carunculatum	Tule Bluet	S5	G5	insects	x		
Enallagma civile	Familiar Bluet	S5	G5	insects	x		
Enallagma exsulans	Stream Bluet	S5	G5	insects	x		
Enallagma geminatum	Skimming Bluet	S4	G5	insects	x		
Enallagma signatum	Orange Bluet	S4	G5	insects	x		
Enallagma vesperum	Vesper Bluet	S4	G5	insects	x		
Ennomos magnaria	Maple Spanworm Moth	S5	G5	insects	x		
Enoclerus nigripes	A Checkered Beetle	SNR	G5	insects	x		
Epargyreus clarus	Silver-spotted Skipper	S4	G5	insects	x	OBA	
Epiaeschna heros	Swamp Darner	S2S3	G5	insects	x	NHIC	x
Epiblema otiosana	Bidens Borer Moth	SNR	GNR	insects	x		
Epicallima argenticinctella		SNR	GNR	insects	x		
Epicauta cinerea	A Blister Beetle	SNR	GNR	insects	x		
Epicauta pensylvanica	A Blister Beetle	SNR	G5	insects	x		
Epicauta vittata	A Blister Beetle	SNR	GNR	insects	x		
Epimecis hortaria	Tulip-tree Beauty	SNR	G5	insects	x		
Epinotia lindana		SNR	GNR	insects	x		
Epitheca cynosura	Common Baskettail	S5	G5	insects	x		
Epitheca princeps	Prince Baskettail	S5	G5	insects	x		
Eristalis dimidiata		S5	G5	insects	x		
Eristalis flavipes		S5	G5	insects	x		
Eristalis tenax		SNA	GNR	insects	x		
Eristalis transversa		S5	G5	insects	x		
Erynnis baptisiae	Wild Indigo Duskywing	S4	G5	insects	x	OBA	
Erynnis brizo	Sleepy Duskywing	S1	G5	insects		NHIC, OBA	

Erynnis funeralis	Funereal Duskywing	SNA	G5		insects		OBA	
Erynnis horatius	Horace's Duskywing	SNA	G5		insects	x	OBA	
Erynnis icelus	Dreamy Duskywing	S5	G5		insects	x	OBA	
Erynnis juvenalis	Juvenal's Duskywing	S5	G5		insects	x	OBA	
Erynnis lucilius	Columbine Duskywing	S4	G5		insects	x	OBA	
Erynnis martialis	Mottled Duskywing	S2	G3	END	insects		OBA	
Erythemis simplicicollis	Eastern Pondhawk	S5	G5		insects	x		
Erythroneura calycula		SNR	GNR		insects	x		
Erythroneura elegans		SNR	GNR		insects	x		
Erythroneura rubra		SNR	GNR		insects	x		
Erythroneura rubrella		SNR	GNR		insects	x		
Erythroneura tricincta	Threebanded Grape Leafhopper	SNR	GNR		insects	x		
Estigmene acrea	Salt Marsh Moth	S5	G5		insects	x		
Euchaetes egle	Milkweed Tussock Moth	S4?	G5		insects	x		
Euchlaena serrata	The Saw-wing	SNR	G5		insects	x		
Euclea delphinii	Spiny Oak-slug Moth	SNR	G5		insects	x		
Euclidia cuspidea	Toothed Somberwing	S5	G5		insects	x		
Eucosma ochrocephala		SNR	GNR		insects	x		
Eucosma ornatula		SNR	GNR		insects	x		
Eucosma parmatana		SNR	GNR		insects	x		
Eucosma raracana		SNR	GNR		insects	x		
Eudeilinia herminiata	Northern Eudeilinea	S4?	G5		insects	x		
Euderces picipes	A Longhorned Beetle	SNR	G5		insects	x		
Eudryas grata	Beautiful Wood-nymph	SNR	G5		insects	x		
Eudryas unio	Pearly Wood-nymph	SNR	G5		insects	x		
Eugonobapta nivosaria	Snowy Geometer	SNR	G5		insects	x		
Eulogia ochrifrontella		SNR	GNR		insects	x		
Eumorpha pandorus	Pandorus Sphinx	S4	G5		insects	x		
Euodynerus foraminatus		S4	GNR		insects	x		
Euparthenos nubilis	Locust Underwing	S4?	G5		insects	x		
Euphoria inda	A Scarab Beetle	SNR	G5		insects	x		
Euphydryas phaeton	Baltimore Checkerspot	S4	G5		insects	x	OBA	
Euphyes bimacula	Two-spotted Skipper	S4	G4		insects		OBA	
Euphyes conspicua	Black Dash	S3	G4		insects		OBA	
Euphyes dion	Dion Skipper	S4	G4		insects		OBA	
Euphyes dukesi	Duke's Skipper	S2	G3		insects		OBA, NHIC	x
Euphyes vestris	Dun Skipper	S5	G5		insects	x	OBA	
Euphyia intermediata		SNR	G5		insects	x		
Eupithecia miserulata	Common Eupithecia	SNR	G5		insects	x		
Euptoieta claudia	Variegated Fritillary	SNA	G5		insects	x	OBA	
Eurytides marcellus	Zebra Swallowtail	SNA	G5		insects		OBA	
Eusarca confusaria	Confused Eusarca	SNR	G5		insects	x		
Evacanthus nigramericanus		SNR	GNR		insects	x		
Feltia herilis	Master's Dart Moth	S5	G5		insects	x		
Feltia jaculifera	Dingy Cutworm Moth	S5	G5		insects	x		
Feniseca tarquinius	Harvester	S4	G5		insects		OBA	
Formica exsectoides	Allegheny Mound Ant	S5	G5		insects	x		

Invertebrates arthropods Table for Matchette and Malden (ONS2103A)

	Formica subsericea	Slightly Silky Mound Ant	S5	G5	insects	x	
	Fumibotys fumalis		SNR	GNR	insects	x	
	Furcula cinerea	Gray Furcula	SNR	G5	insects	x	
	Galleria mellonella	Greater Wax Moth	SNA	G5	insects	x	
	Gaurotes cyanipennis	A Longhorned Beetle	SNR	G5	insects	x	
	Geron calvus	Bald Bee Fly	S3S4	GNR	insects	x	
	Glischrochilus fasciatus	A Sap Beetle	SNR	G5	insects	x	
	Gluphisia septentrionis	Common Gluphisia	SNR	G5	insects	x	
	Gomphurus vastus	Cobra Clubtail	S1	G5	insects		NHIC
	Graphisurus fasciatus	A Longhorned Beetle	SNR	G5	insects	x	
	Graphocephala coccinea		SNR	GNR	insects	x	
	Gryllus pennsylvanicus	Fall Field Cricket	S5	G5	insects	x	
	Gypona melanota		SNR	GNR	insects	x	
	Gyponana gladia		SNR	GNR	insects	x	
	Gyponana octolineata		SNR	GNR	insects	x	
	Haematopis grataria	Chickweed Geometer	SNR	G5	insects	x	
	Halictus ligatus	Ligated Gregarious Sweat Bee	S5	G5	insects	x	
	Halysidota harrisii		SNR	G5	insects	x	
	Halysidota tessellaris	Banded Tussock Moth	S5	G5	insects	x	
	Haploa clymene	Clymene Moth	SNR	G5	insects	x	
	Haploa confusa	Confused Haploa	S5	G5	insects	x	
	Haploa lecontei	LeConte's Haploa	S4?	G5	insects	x	
	Haploa reversa	Reversed Haploa	S1?	G5	insects		NHIC
	Harrisimemna trisignata	Harris's Three-spot	S4	G5	insects	x	
	Harrisina americana	Grapeleaf Skeletonizer Moth	SNR	G5	insects	x	
	Helicoverpa zea	Corn Earworm Moth	SNR	G5	insects	x	
	Heliomata cycladata	Common Spring Moth	SNR	G5	insects	x	
	Helophilus fasciatus		S5	G5	insects	x	
	Hemaris diffinis	Snowberry Clearwing Moth	S4S5	G5	insects	x	
	Hemaris thysbe	Hummingbird Clearwing	S5	G5	insects	x	
	Hemipenthes sinuosa	Sinuous Bee Fly	S3S5	G5	insects	x	
	Hemipenthes webberi	Webber''s Bee Fly	S5?	G5	insects	x	
	Herpetogramma abdominalis		SNR	GNR	insects	x	
	Herpetogramma aeglealis		SNR	GNR	insects	x	
	Herpetogramma pertextalis		SNR	GNR	insects	x	
	Hesperia leonardus	Leonard's Skipper	S4	G5	insects		OBA
	Hesperophanes pubescens	A Longhorned Beetle	SNR	GNR	insects	x	
	Heterocampa guttivitta	Saddled Prominent	SNR	G5	insects	x	
	Hippodamia parenthesis	A Ladybird Beetle	SNR	G5	insects	x	
*	*Hippodamia variegata*	A Ladybird Beetle	SNA	GNR	insects	x	
	Horisme intestinata	Brown Bark Carpet	SNR	G5	insects	x	
	Hyalophora cecropia	Cecropia Moth	S5	G5	insects	x	
	Hylaeus modestus	Modest Yellow-faced Bee	S5	G5	insects	x	
	Hylephila phyleus	Fiery Skipper	SNA	G5	insects	x	OBA
	Hymetta balteata		SNR	GNR	insects	x	
	Hyparpax aurora	Pink Prominent	SNR	G5	insects	x	
	Hypena abalienalis	White-lined Bomolocha	SNR	G5	insects	x	

Hypena baltimoralis	Baltimore Bomolocha	SNR	G5	insects	x		
Hypena bijugalis	Dimorphic Bomolocha	SNR	G5	insects	x		
Hypena manalis	Flowing-line Bomolocha	SNR	G5	insects	x		
Hypena scabra	Green Cloverworm Moth	SNR	G5	insects	x		
Hypenodes fractilinea	Broken-line Hypenodes	SNR	G4	insects	x		
Hyperaspis proba	A Ladybird Beetle	SNR	GNR	insects	x		
Hypercompe scribonia	Giant Leopard Moth	SNR	G5	insects	x		
Hyphantria cunea	Fall Webworm Moth	S5	G5	insects	x		
Hypoprepia fucosa	Painted Lichen Moth	S5	G5	insects	x		
Hyppa xylinoides	Common Hyppa	SNR	G5	insects	x		
Hypsopygia costalis	Clover Hayworm Moth	SNA	G5	insects	x		
Idaea dimidiata		SNR	G5	insects	x		
Idia aemula	Common Idia	SNR	G5	insects	x		
Idia americalis	American Idia	SNR	G5	insects	x		
Ischnura hastata	Citrine Forktail	SNA	G5	insects	x		
Ischnura posita	Fragile Forktail	S4	G5	insects	x		
Ischnura verticalis	Eastern Forktail	S5	G5	insects	x		
Japananus hyalinus		SNR	GNR	insects	x		
Junonia coenia	Common Buckeye	SNA	G5	insects	x	OBA	
Kuschelina gibbitarsa	A Leaf Beetle	SNR	GNR	insects	x		
Labidomera clivicollis	A Leaf Beetle	SNR	G5	insects	x		
Lacinipolia renigera	Bristly Cutworm Moth	S5	G5	insects	x		
Latalus sayii		SNR	GNR	insects	x		
Lebia viridis	Ground Beetle	SNR	G5	insects	x		
Ledaea perditalis	Lost Owlet	SNR	G5	insects	x		
Lema daturaphila	A Leaf Beetle	SNR	G5	insects	x		
Leptinotarsa decemlineata	A Leaf Beetle	SNR	G5	insects	x		
Leptomantispa pulchella	Beautiful Mantidfly	SU	GNR	insects	x		
Lepyronia quadrangularis	Diamond-backed Spittlebug	S5	G5	insects	x		
Lestes congener	Spotted Spreadwing	S5	G5	insects	x		
Lestes dryas	Emerald Spreadwing	S5	G5	insects	x		
Lestes forcipatus	Sweetflag Spreadwing	S4	G5	insects	x		
Lestes rectangularis	Slender Spreadwing	S5	G5	insects	x		
Lethe anthedon	Northern Pearly-Eye	S5	G5	insects	x	OBA	
Lethe appalachia	Appalachian Brown	S4	G4	insects	x	OBA	
Lethe eurydice	Eyed Brown	S5	G5	insects	x	OBA	
Leucania pseudargyria	False Wainscot	S5	G5	insects	x		
Leucania ursula	Ursula Wainscot	SNR	G5	insects	x		
Leucanthiza amphicarpeaefolie		SNR	GNR	insects	x		
Leuconycta diphteroides	Green Leuconycta	SNR	G5	insects	x		
Leuconycta lepidula		SNR	G5	insects	x		
Leucorrhinia intacta	Dot-tailed Whiteface	S5	G5	insects	x		
Libellula incesta	Slaty Skimmer	S4	G5	insects	x		
Libellula luctuosa	Widow Skimmer	S5	G5	insects	x		
Libellula pulchella	Twelve-spotted Skimmer	S5	G5	insects	x		
Libellula semifasciata	Painted Skimmer	S2	G5	insects	x	NHIC	
Libellula vibrans	Great Blue Skimmer	S1	G5	insects		NHIC	x

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	Libytheana carinenta	American Snout	SNA	G5	insects	x	OBA	
	Lichenophanes bicornis	A Bostrichid Powder-post Beetle	SNR	G5	insects	x		
*	*Lilioceris lilii*	A Leaf Beetle	SNA	GNR	insects	x		
	Limenitis archippus	Viceroy	S5	G5	insects	x	OBA	
	Limenitis arthemis arthemis	White Admiral	S5	G5T5	insects		OBA	
	Limenitis arthemis astyanax	Red-spotted Purple	S5	G5T5	insects	x	OBA	
	Limotettix uhleri		SNR	GNR	insects	x		
	Lintneria eremitus	Hermit Sphinx	S5	G4G5	insects	x		
	Lophocampa caryae	Hickory Tussock Moth	SNR	G5	insects	x		
	Loxocera ojibwayensis	a rust fly	SNR	GNR	insects	x		
	Lucanus capreolus	A Stag Beetle	SNR	GNR	insects	x		
	Lucidota atra	A Glowworm	SNR	G5	insects	x		
	Lycaena hyllus	Bronze Copper	S5	G5	insects	x	OBA	
	Lycaena phlaeas	American Copper	S5	G5	insects	x	OBA	
*	*Lymantria dispar*	Gypsy Moth	SNA	G5	insects	x		
	Lytrosis unitaria	Common Lytrosis	SNR	G5	insects	x		
	Maccaffertium luteum	Butter Flat-headed Mayfly	SU	G5	insects	x		
	Maccaffertium modestum	Modest Flat-headed Mayfly	SU	G5	insects	x		
	Maccaffertium pulchellum	Pretty Flat-headed Mayfly	SU	G5	insects	x		
	Machimia tentoriferella	Golden-striped Leaftier Moth	SNR	GNR	insects	x		
	Macrochilo litophora		SNR	GNR	insects	x		
	Macrodactylus subspinosus	A Scarab Beetle	SNR	G5	insects	x		
	Macropsis cinerea		SNR	GNR	insects	x		
	Macropsis osborni		SNR	GNR	insects	x		
	Macrostemum zebratum	Striped Net-spinning Caddisfly	S4S5	G5	insects	x		
	Madarellus undulatus	A Weevil	SNR	GNR	insects	x		
	Malacosoma americana	Eastern Tent Caterpillar Moth	S5	G5	insects	x		
	Maliattha synochitis	Black-dotted Lithacodia	S4?	G5	insects	x		
	Mallota posticata		S4	GNR	insects	x		
	Mantis religiosa	Praying Mantis	SNA	GNR	insects	x		x
	Marimatha nigrofimbria	Black-bordered Lemon Moth	SNR	G5	insects	x		
	Meconema thalassinum	Drumming Katydid	SNA	GNR	insects	x		
	Megachile sculpturalis	Giant Leafcutter Bee	SNA	G5	insects	x		
	Megacyllene robiniae	A Longhorned Beetle	SNR	G5	insects	x		
	Megalodacne fasciata	A Pleasing Fungus Beetle	SNR	GNR	insects	x		
	Megisto cymela	Little Wood-Satyr	S5	G5	insects	x	OBA	
	Melanchra picta	Zebra Caterpillar Moth	SNR	G5	insects	x		
	Melanoplus bivittatus	Two-striped Grasshopper	S5	G5	insects	x		
	Melanoplus confusus	Pasture Grasshopper	S3S4	G5	insects	x		
	Melanoplus differentialis	Differential Grasshopper	S3	G5	insects		NHIC	x
	Melanoplus punctulatus	Grizzly Grasshopper	S4	G5	insects	x		
	Melanoplus scudderi	Scudder's Short-winged Grasshop	S1	G5	insects		NHIC	x
	Melanoplus walshii	Walsh's Grasshopper	S2	G4G5	insects			x
	Melittia cucurbitae	Squash Vine Borer Moth	SNR	GNR	insects	x		
	Merodon equestris		SNA	GNR	insects	x		
	Meropleon ambifusca		SNR	G3G4	insects	x		
	Mesamia nigridorsum		SNR	GNR	insects	x		

Metzneria lappella		SNR	GNR	insects	x			
Microcentrum rhombifolium	Greater Angle-wing Katydid	S4	GNR	insects	x			x
Microcrambus biguttellus		SNR	GNR	insects	x			
Microcrambus elegans		SNR	GNR	insects	x			
Microdon globosus		S4	GNR	insects	x			
Micromus posticus	Posterior Brown Lacewing	SU	GNR	insects	x			
Mocis texana	Texas Mocis	SNA	G5	insects	x			
Molorchus bimaculatus	A Longhorned Beetle	SNR	G5	insects	x			
Monobia quadridens		S2?	GNR	insects	x	NHIC		
Mononychus vulpeculus	A Weevil	SNR	GNR	insects	x			
Mythimna unipuncta	Armyworm Moth	S4	G5	insects	x			
Nadata gibbosa	White-spotted Prominent Moth	S5	G5	insects	x			
Nathalis iole	Dainty Sulphur	SNA	G5	insects		OBA		
Necrophila americana	A Carrion Beetle	S5	G5	insects	x			
Nectopsyche exquisita	Exquisite Long-horned Caddisfly	S4S5	G5	insects	x			
Nematocampa resistaria	Horned Spanworm Moth	SNR	G5	insects	x			
Neoconocephalus ensiger	Sword-bearing Conehead Katydid	S4	G5	insects	x			
Neocurtilla hexadactyla	Northern Mole Cricket	S2S3	GNR	insects		NHIC		
Neoxabea bipunctata	Two-spotted Tree Cricket	S4	GNR	insects	x			x
Nicrophorus orbicollis	A Carrion Beetle	S5	G5	insects	x			
Nicrophorus tomentosus	A Carrion Beetle	S5	G5	insects	x			
* *Noctua pronuba*	Large Yellow Underwing Moth	SNA	GNR	insects	x			
Nomophila nearctica		SNR	G5	insects	x			
Norvellina novica		SNR	GNR	insects	x			
Norvellina seminuda		SNR	GNR	insects	x			
Nymphalis antiopa	Mourning Cloak	S5	G5	insects	x	OBA		
Nymphalis l-album	Compton Tortoiseshell	S5	G5	insects		OBA		
Ocyptamus fuscipennis		S4	GNR	insects	x			
Odontota scapularis	A Leaf Beetle	SNR	G5	insects	x			
Oecanthus nigricornis	Black-horned Tree Cricket	S4	G5	insects	x			
Oecanthus niveus	Narrow-winged Tree Cricket	S3S4	GNR	insects	x			x
Oecanthus quadripunctatus	Four-spotted Tree Cricket	S4	G5	insects	x			
Oiceoptoma inaequale	A Carrion Beetle	SNR	GNR	insects	x			
Oligia modica	Black-banded Brocade	SNR	G5	insects	x			
Onthophagus hecate	A Scarab Beetle	SNR	G5	insects	x			
Orchelimum nigripes	Black-legged Meadow Katydid	S4	GNR	insects	x			
Orgyia definita	Definite Tussock Moth	SNR	G5	insects	x			
Orgyia leucostigma	White-marked Tussock Moth	S5	G5	insects	x			
Orthonama obstipata	The Gem	SNR	G5	insects	x			
Orthosia hibisci	Speckled Green Fruitworm Moth	S5	G5	insects	x			
Ostrinia penitalis		SNR	GNR	insects	x			
Otiorhynchus sulcatus	A Weevil	SNR	GNR	insects	x			
Pachydiplax longipennis	Blue Dasher	S5	G5	insects	x			
Pachyschelus purpureus	A Metallic Wood-boring Beetle	SNR	GNR	insects	x			
Pachysphinx modesta	Big Poplar Sphinx	S5	G5	insects	x			
Palpita magniferalis		SNR	GNR	insects	x			
Palthis angulalis	Dark-spotted Palthis	SNR	G5	insects	x			

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Palthis asopialis	Faint-spotted Palthis	SNR	G5	insects	x		
Pandemis limitata	Three-lined Leafroller Moth	SNR	GNR	insects	x		
Panopoda rufimargo	Red-lined Panopoda	SNR	G5	insects	x		
Pantala flavescens	Wandering Glider	S4	G5	insects	x		
Pantala hymenaea	Spot-winged Glider	S4	G5	insects	x		
Pantographa limata	Basswood Leafroller Moth	SNR	GNR	insects	x		
Paonias excaecata	Blinded Sphinx	S5	G5	insects	x		
Paonias myops	Small-eyed Sphinx	S5	G5	insects	x		
Papaipema arctivorens		SNR	G5	insects	x		
Papaipema inquaesita		SNR	G5	insects	x		
Papaipema insulidens		SNR	GU	insects	x		
Papaipema nebris	Stalk Borer Moth	SNR	G5	insects	x		
Papaipema necopina	Sunflower Borer Moth	SNR	G4?	insects	x		
Papaipema pterisii		SNR	G5	insects	x		
Papaipema rigida	Rigid Sunflower Borer Moth	SNR	G4G5	insects	x		
Papaipema unimoda		SNR	G5	insects	x		
Papilio cresphontes	Giant Swallowtail	S4	G5	insects	x	OBA	
Papilio glaucus	Eastern Tiger Swallowtail	S5	G5	insects	x	OBA	
Papilio polyxenes	Black Swallowtail	S5	G5	insects	x	OBA	
Papilio troilus	Spicebush Swallowtail	S4	G4?	insects	x	OBA	
Parallelia bistriaris	Maple Looper Moth	SNR	G5	insects	x		
Parancistrocerus perennis		S2	GNR	insects		NHIC	
Parapoynx allionealis		SNR	GNR	insects	x		
Parapoynx badiusalis		SNR	GNR	insects	x		
Parapoynx obscuralis		SNR	GNR	insects	x		
Paraulacizes irrorata		SNR	GNR	insects	x		
Parrhasius m-album	White-M Hairstreak	SNA	G5	insects	x	OBA	
Pelidnota punctata	A Scarab Beetle	SNR	G5	insects	x		
Penthimia americana		SNR	GNR	insects	x		
Peridea angulosa	Angulose Prominent	SNR	G5	insects	x		
Peridroma saucia	Variegated Cutworm Moth	S5	G5	insects	x		
Perigea xanthioides	Red Groundling	SNR	G5	insects	x		
Perithemis tenera	Eastern Amberwing	S4	G5	insects	x		x
Pero honestaria	Honest Pero	SNR	G5	insects	x		
Petrophila canadensis		SNR	GNR	insects	x		
Petrophora subaequaria	Northern Petrophora	SNR	G5	insects	x		
Phaeoura quernaria	Oak Beauty	SNR	G5	insects	x		
Phalaenophana pyramusalis	Dark-banded Owlet	SNR	G5	insects	x		
Phalaenostola larentioides	Black-banded Owlet	SNR	G5	insects	x		
Phanogomphus graslinellus	Pronghorn Clubtail	S3	G5	insects		NHIC	x
Pheosia rimosa	Black-rimmed Prominent	SNR	G5	insects	x		
* *Philaenus spumarius*	Meadow Spittlebug	SNA	GNR	insects	x		
Phoebis philea	Orange-barred Sulphur	SNA	G5	insects		OBA	
Phoebis sennae	Cloudless Sulphur	SNA	G5	insects		OBA	
Pholisora catullus	Common Sootywing	S4	G5	insects	x	OBA	
Phyciodes cocyta	Northern Crescent	S5	G5	insects	x	OBA	
Phyciodes tharos	Pearl Crescent	S4	G5	insects	x	OBA	

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	Phyllobius oblongus	A Weevil	SNR	GNR	insects	x	
	Phyllodesma americana	Lappet Moth	S5	G5	insects	x	
*	*Pieris rapae*	Cabbage White	SNA	G5	insects	x	OBA
	Pilocrocis ramentalis		SNR	GNR	insects	x	
	Plathemis lydia	Common Whitetail	S5	G5	insects	x	
	Platylomalus aequalis	A Hister Beetle	SNR	G5	insects	x	
	Platynota idaeusalis	Tufted Apple-bud Moth	SNR	GNR	insects	x	
	Platyptilia carduidactylus		SNR	G5	insects	x	
	Pleuroprucha insulsaria	Common Tan Wave	SNR	G5	insects	x	
	Plusiodonta compressipalpis	Moonseed Moth	SNR	G4	insects	x	
	Poanes hobomok	Hobomok Skipper	S5	G5	insects		OBA
	Poanes massasoit	Mulberry Wing	S4	G4	insects		OBA
	Poanes viator	Broad-winged Skipper	S4	G5	insects	x	OBA
	Poanes zabulon	Zabulon Skipper	S1	G5	insects		OBA
	Pococera asperatella		SNR	GNR	insects	x	
	Podabrus brevicollis	A Soldier Beetle	SNR	GNR	insects	x	
	Podabrus flavicollis	A Soldier Beetle	SNR	GNR	insects	x	
	Podabrus rugosulus	A Soldier Beetle	SNR	G5	insects	x	
	Podabrus tomentosus	A Soldier Beetle	SNR	GNR	insects	x	
	Polemius laticornis	A Soldier Beetle	SNR	GNR	insects	x	
	Polistes dominula		SNA	GNR	insects	x	
	Polistes fuscatus		S4	G5	insects	x	
	Polites mystic	Long Dash Skipper	S5	G5	insects	x	OBA
	Polites origenes	Crossline Skipper	S4	G4G5	insects	x	OBA
	Polites peckius	Peck's Skipper	S5	G5	insects	x	OBA
	Polites themistocles	Tawny-edged Skipper	S5	G5	insects	x	OBA
	Polyamia caperata		SNR	GNR	insects	x	
	Polygonia comma	Eastern Comma	S5	G5	insects	x	OBA
	Polygonia interrogationis	Question Mark	S5	G5	insects	x	OBA
	Polygrammodes flavidalis		SNR	GNR	insects	x	
	Pompeius verna	Little Glassywing	S4	G5	insects	x	OBA
	Ponana rubida		SNR	GNR	insects	x	
	Ponometia candefacta	Olive-shaded Bird-dropping Moth	S4?	G5	insects	x	
	Ponometia erastrioides	Small Bird-dropping Moth	SNR	G5	insects	x	
	Pontia protodice	Checkered White	SNA	G5	insects		OBA
*	*Popillia japonica*	A Scarab Beetle	SNA	GNR	insects	x	
	Prenolepis imparis	Winter Ant	S4	G5	insects	x	
	Prescottia lobata		SNR	GNR	insects	x	
	Prochoerodes lineola	Large Maple Spanworm Moth	S5	G5	insects	x	
	Progomphus obscurus	Common Sanddragon	S1	G5	insects		NHIC
	Prolimacodes badia	Skiff Moth	SNR	G5	insects	x	
	Protoboarmia porcelaria	Porcelain Gray	SNR	G5	insects	x	
	Protodeltote muscosula	Large Mossy Lithacodia	SNR	G5	insects	x	
	Psenocerus supernotatus	A Longhorned Beetle	SNR	G5	insects	x	
	Pseudeustrotia carneola	Pink-barred Lithacodia	S4	G5	insects	x	
	Pseudeva purpurigera	Straight-lined Looper Moth	SNR	G5	insects	x	
	Pseudogaurotina abdominalis	A Longhorned Beetle	SNR	GNR	insects	x	

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Pseudohermonassa bicarnea	Pink-spotted Dart	S4	G5	insects	x	
Pseudothyatira cymatophoroia	Tufted Thyatirid	S4S5	G5	insects	x	
Psorophora ciliata	Large Gold-striped Mosquito	SU	GNR	insects	x	
* *Psyche casta*	Common Bagworm Moth	SNA	GNR	insects	x	
Psychomorpha epimenis	Grapevine Epimenis Moth	S4	G5	insects	x	
Psyllobora vigintimaculata	A Ladybird Beetle	SNR	G5	insects	x	
Psyrassa unicolor	A Longhorned Beetle	SNR	GNR	insects	x	
Pterostichus mutus	Ground Beetle	SNR	G5	insects	x	
Pyralis farinalis	Meal Moth	SNR	GNR	insects	x	
Pyrausta acrionalis		SNR	G5	insects	x	
Pyrausta bicoloralis		SNR	GNR	insects	x	
Pyrausta orphisalis		SNR	GNR	insects	x	
Pyrausta signatalis		SNR	G5	insects	x	
Pyrgus communis	Common Checkered Skipper	SNA	G5	insects		OBA
Pyrisitia lisa	Little Yellow	SNA	G5	insects		OBA
Pyropyga decipiens	A Glowworm	SNR	G5	insects	x	
Pyrrharctia isabella	Isabella Tiger Moth	S5	G5	insects	x	
Pyrrhia aurantiago	False Foxglove Sun Moth	S1	G3G4	insects		NHIC
Pyrrhia cilisca	Bordered Sallow	SNR	G5	insects	x	
Pyrrhia exprimens	Purple-lined Sallow	SNR	G5	insects	x	
Raphia frater	The Brother	S4S5	G5	insects	x	
Rhingia nasica		S5	G5	insects	x	
Rhyssomatus lineaticollis	A Weevil	SNR	GNR	insects	x	
Ripiphorus fasciatus	A Wedge-shaped Beetle	SNR	GNR	insects	x	
Rivula propinqualis	Spotted Grass Moth	SNR	G5	insects	x	
Roeseliana roeselii	Roesel¿s Shield-backed Katydid	SNA	GNR	insects	x	
Satyrium acadica	Acadian Hairstreak	S4	G5	insects	x	OBA
Satyrium calanus	Banded Hairstreak	S4	G5	insects	x	OBA
Satyrium caryaevorus	Hickory Hairstreak	S4	G4	insects	x	OBA
Satyrium edwardsii	Edwards' Hairstreak	S4	G5	insects	x	OBA
Satyrium favonius	Oak Hairstreak	S1	G4G5	insects		OBA, NHIC
Satyrium liparops	Striped Hairstreak	S5	G5	insects	x	OBA
Satyrium titus	Coral Hairstreak	S5	G5	insects	x	OBA
Saucrobotys futilalis		SNR	GNR	insects	x	
Scaphytopius frontalis	Yellowfaced Leafhopper	SNR	GNR	insects	x	
Scarites subterraneus	A Ground Beetle	SNR	GNR	insects	x	
Schinia arcigera	Arcigera Flower Moth	SNR	G5	insects	x	
Schinia florida	Primrose Moth	SNR	G5	insects	x	
Schinia rivulosa	Ragweed Flower Moth	SNR	G5	insects	x	
Schinia trifascia	Three-lined Flower Moth	SNR	G5	insects	x	
Schizura leptinoides	Black-blotched Schizura	SNR	G5	insects	x	
Schizura unicornis	Unicorn Caterpillar Moth	SNR	G5	insects	x	
Scoliopteryx libatrix	Herald Moth	S5	G5	insects	x	
Scoparia biplagialis		SNR	GNR	insects	x	
Scopula limboundata	Large Lace-border	SNR	G5	insects	x	
Scudderia furcata	Fork-tailed Bush Katydid	S4	G5	insects	x	
Scudderia septentrionalis	Northern Bush Katydid	S3?	G3?	insects	x	

	Sitona hispidulus	A Weevil	SNR	GNR	insects	x	
	Smodicum cucujiforme	A Longhorned Beetle	SNR	GNR	insects	x	
	Spargaloma sexpunctata	Six-spotted Gray	SNR	G5	insects	x	
	Sparganothis sulfureana	Sparganothis Fruitworm Moth	SNR	GNR	insects	x	
	Sparnopolius confusus	Aster Bee Fly	S3S4	GNR	insects	x	
	Speyeria aphrodite	Aphrodite Fritillary	S5	G5	insects		OBA
	Speyeria cybele	Great Spangled Fritillary	S5	G5	insects	x	OBA
	Speyeria idalia	Regal Fritillary	SNA	G3?	insects		OBA
	Sphaerophoria contigua		S5	G5	insects	x	
	Sphecius speciosus	Cicada Killer	S1S2	GNR	insects		NHIC
	Sphecodina abbottii	Abbott's Sphinx	S4	G5	insects	x	
	Sphinx kalmiae	Laurel Sphinx	S5	G5	insects	x	
	Spilomyia longicornis		S4	GNR	insects	x	
	Spilosoma virginica	Virginian Tiger Moth	S5	G5	insects	x	
	Spiramater lutra		S5	G5	insects	x	
	Spodoptera frugiperda	Fall Armyworm Moth	SNR	G5	insects	x	
	Spodoptera ornithogalli	Yellow-striped Armyworm Moth	SNR	G5	insects	x	
	Spragueia leo	Common Spragueia	SNR	G5	insects	x	
	Stenolophus lineola	Ground Beetle	SNR	GNR	insects	x	
	Stenolophus ochropezus	Ground Beetle	SNR	G5	insects	x	
	Strangalia luteicornis	A Longhorned Beetle	SNR	GNR	insects	x	
	Strymon melinus	Gray Hairstreak	S4	G5	insects		OBA
	Stylurus notatus	Elusive Clubtail	S2	G3	insects		NHIC
	Sumitrosis inaequalis	A Leaf Beetle	SNR	G5	insects	x	
	Sunira bicolorago	Bicolored Sallow Moth	S5	G5	insects	x	
	Symmerista canicosta		SNR	G5	insects	x	
	Sympetrum obtrusum	White-faced Meadowhawk	S5	G5	insects	x	
	Sympetrum rubicundulum	Ruby Meadowhawk	S5	G5	insects	x	
	Sympetrum semicinctum	Band-winged Meadowhawk	S4	G5	insects	x	
	Sympetrum vicinum	Autumn Meadowhawk	S5	G5	insects	x	
	Synchlora aerata	Wavy-lined Emerald	SNR	G5	insects	x	
	Systena marginalis	A Leaf Beetle	SNR	GNR	insects	x	
	Tabanus atratus	Mourning Horse Fly	S4	GNR	insects	x	
	Tabanus trimaculatus	Three-spotted Horse Fly	SU	GNR	insects	x	
	Tenodera sinensis	Chinese Mantis	SNA	GNR	insects	x	
	Tetraopes quinquemaculatus	A Longhorned Beetle	SNR	GNR	insects	x	
	Tetraopes tetrophthalmus	A Longhorned Beetle	SNR	G5	insects	x	
	Tettigidea lateralis	Black-sided Pygmy Grasshopper	S4?	G5	insects	x	
	Thorybes bathyllus	Southern Cloudywing	S3	G5	insects		OBA
	Thorybes pylades	Northern Cloudywing	S5	G5	insects	x	OBA
*	*Thymelicus lineola*	European Skipper	SNA	G5	insects	x	OBA
	Thyris maculata	Spotted Thyris	SNR	GNR	insects	x	
	Tolype velleda	Large Tolype	SNR	G5	insects	x	
	Toxomerus geminatus		S5	G5	insects	x	
	Toxomerus marginatus		S5	G5	insects	x	
	Toxomerus politus		S4	GNR	insects	x	
	Toxophora amphitea	Symmetric Hunchback Bee Fly	S1	GNR	insects		NHIC

Invertebrates arthropods Table for Matchette and Malden (ONS2103A)

Tramea carolina	Carolina Saddlebags	SNA	G5	insects	x	
Tramea lacerata	Black Saddlebags	S4	G5	insects	x	
Trichiotinus affinis	A Scarab Beetle	SNR	G5	insects	x	
Trichodezia albovittata	White-striped Black	SNR	G5	insects	x	
Tricholita signata	Signate Quaker	SNR	G5	insects	x	
Trichordestra legitima	Striped Garden Caterpillar Moth	S5	G5	insects	x	
Trirhabda canadensis	A Leaf Beetle	SNR	G5	insects	x	
Tritoma sanguinipennis	A Pleasing Fungus Beetle	SNR	G4G5	insects	x	
Tylonotus bimaculatus	A Longhorned Beetle	SNR	GNR	insects	x	
Tylozygus bifidus		SNR	GNR	insects	x	
Typocerus velutinus	A Longhorned Beetle	SNR	G5	insects	x	
Udea rubigalis	Celery Leaftier Moth	SNR	G5	insects	x	
Ululodes quadripunctatus	Four-spotted Owlfly	SU	GNR	insects	x	
Urbanus proteus	Long-tailed Skipper	SNA	G5	insects		OBA
Urola nivalis		SNR	G5	insects	x	
Vanessa atalanta	Red Admiral	S5	G5	insects	x	OBA
Vanessa cardui	Painted Lady	S5	G5	insects	x	OBA
Vanessa virginiensis	American Lady	S5	G5	insects	x	OBA
Vespula flavopilosa		S3S4	GNR	insects	x	
Vespula maculifrons		S4	G5	insects	x	
Vespula vidua		S3	GNR	insects		NHIC
Wallengrenia egeremet	Northern Broken-Dash	S5	G5	insects	x	OBA
Xanthogramma flavipes		S4	GNR	insects	x	
Xenotemna pallorana		SNR	GNR	insects	x	
Xenox tigrinus	Tiger Bee Fly	S3S4	GNR	insects	x	
Xestia dolosa	Greater Black-lettered Dart	S5	G5	insects	x	
Xylocopa virginica	Virginia Carpenter Bee	S4S5	G5	insects	x	
Yponomeuta cagnagella	Spindle Ermine Moth	SNA	GNR	insects	x	
Ypsolopha dentella		SNR	GNR	insects	x	
Zale lunata	Lunate Zale	S5	G5	insects	x	
Zanclognatha cruralis	Early Zanclognatha	SNR	G5	insects	x	
Zanclognatha pedipilalis	Grayish Zanclognatha	SNR	G5	insects	x	
Zerene cesonia	Southern Dogface	SNA	G5	insects		OBA
Oxidus gracilis	A Millipede	SNR	G5	millipedes	x	
Acanthepeira stellata	Star-bellied Orbweaver	S4	GNR	spiders	x	
Amaurobius ferox	Black Laceweaver	SNA	GNR	spiders	x	
Araneus bicentenarius	Lichen-marked Orbweaver	SU	GNR	spiders	x	
Araneus diadematus	Cross Orbweaver	SNA	GNR	spiders	x	
Araneus marmoreus	Marbled Orbweaver	S5	G5	spiders	x	
Araneus thaddeus	Lattice Orbweaver	S3S4	GNR	spiders	x	
Araneus trifolium	Shamrock Orbweaver	S5	G5	spiders	x	
Araniella displicata	Six-spotted Yellow Orbweaver	S5	G5	spiders	x	
Argiope aurantia	Yellow Garden Orbweaver	S5	G5	spiders	x	
Argiope trifasciata	Banded Garden Orbweaver	S5	G5	spiders	x	
Cheiracanthium mildei	Milde's Prowling Spider	SNA	GNR	spiders	x	
Dolomedes tenebrosus	Terrestrial Fishing Spider	S5	G5	spiders	x	
Dolomedes triton	Six-spotted Fishing Spider	S5	G5	spiders	x	

Invertebrates arthropods Table for Matchette and Malden (ONS2103A)

Dysdera crocata	Woodlouse Hunter Spider	SNA	GNR	spiders	x	
Enoplognatha ovata	Polymorphic Long-jawed Cobwea	SNA	GNR	spiders	x	
Eris militaris	Bronze Jumping Spider	S5	G5	spiders	x	
Eustala anastera	Hump-backed Orbweaver	S5	G5	spiders	x	
Evarcha hoyi	Hoy's Knobbed Jumping Spider	S4	G5	spiders	x	
Habronattus borealis	Boreal Ornamented Jumping Spid	S4	GNR	spiders	x	
Hentzia mitrata	Golden Long-jawed Jumping Spid	S4	GNR	spiders	x	
Hentzia palmarum	Dark-legged Long-jawed Jumping	SU	GNR	spiders	x	
Herpyllus ecclesiasticus	Parson Ground Spider	S4S5	G5	spiders	x	
Hibana gracilis	Garden Ghost Spider	SU	GNR	spiders	x	
Larinioides cornutus	Furrow Orbweaver	S5	G5	spiders	x	
Leucauge venusta	Orchard Long-jawed Spider	S4S5	GNR	spiders	x	
Maevia inclemens	Dimorphic Jumping Spider	SU	GNR	spiders	x	
Mangora gibberosa	Lined Orbweaver	S4	GNR	spiders	x	
Mangora placida	Tuft-legged Orbweaver	S4	GNR	spiders	x	
Marpissa formosa	Short-bellied Slender Jumping Spi	SU	GNR	spiders	x	
Marpissa lineata	Four-lined Slender Jumping Spide	SU	GNR	spiders	x	
Marpissa pikei	Pike's Slender Jumping Spider	SU	GNR	spiders	x	
Micrathena gracilis	Spined Orbweaver	S3S4	GNR	spiders	x	
Micrathena sagittata	Arrow-shaped Orbweaver	S3S4	GNR	spiders	x	
Mimetus notius	Reticulated Pirate Spider	SU	GNR	spiders	x	
Misumena vatia	Goldenrod Crab Spider	S5	G5	spiders	x	
Misumessus oblongus	Pale Crab Spider	S4	GNR	spiders	x	
Neoscona arabesca	Arabesque Orbweaver	S5	G5	spiders	x	
Neoscona crucifera	Hentz's Orbweaver	S3S4	GNR	spiders	x	
Oxyopes scalaris	Western Lynx Spider	S4S5	G5	spiders	x	
Pachygnatha autumnalis	Big-eyed Thick Long-jawed Spider	S4S5	GNR	spiders	x	
Pelegrina galathea	Peppered White-cheeked Jumpin	S4	GNR	spiders	x	
Pelegrina proterva	Common White-cheeked Jumping	S5	G5	spiders	x	
Phidippus audax	Bold Tufted Jumping Spider	SU	GNR	spiders	x	
Phidippus clarus	Striped Tufted Jumping Spider	S5	G5	spiders	x	
Phidippus princeps	Sinuous Tufted Jumping Spider	S4	GNR	spiders	x	
Pirata piraticus	Common Pirate Wolf Spider	S5	G5	spiders	x	
Piratula minuta	Small Pirate Wolf Spider	S5	G5	spiders	x	
Pisaurina brevipes	Straight-banded Nurseryweb Spid	S4S5	GNR	spiders	x	
Pisaurina mira	Common Nurseryweb Spider	S5	G5	spiders	x	
Platycryptus undatus	Ondulated Flattened Jumping Spi	SU	GNR	spiders	x	
Salticus scenicus	Zebra Jumping Spider	SNA	GNR	spiders	x	
Sphodros niger	Black Purseweb Tarantula	S3	G4G5	spiders		NHIC
Steatoda triangulosa	Checkered False Black Widow Spi	SNA	GNR	spiders	x	
Synemosyna formica	Slender Antmimic Jumping Spider	SU	GNR	spiders	x	
Tetragnatha elongata	Elongated Long-jawed Spider	S4S5	G5	spiders	x	
Tigrosa helluo	Wetland Giant Wolf Spider	S5	G5	spiders	x	
Tmarus angulatus	Tuberculated Crab Spider	S4	GNR	spiders	x	
Trachelas tranquillus	Large Contrasting Corinne Spider	S4S5	GNR	spiders	x	
Varacosa avara	Spurred Secretive Wolf Spider	SU	GNR	spiders	x	
Zygoballus rufipes	Red Hammer-jawed Jumping Spid	SU	GNR	spiders	x	

Invertebrates non-arthropods Table for Matchette and Malden (ONS2103A)

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	SARO	SARA Schedule 1	Narrow Taxon Group	iNat	Atlas/City Data (Ojibway EA unique records and fieldwork)	Ojibway Prairie Wetland Complex ER28
*	*Cepaea nemoralis*	Grovesnail	SNA	G5			gastropods	x		
*	*Cipangopaludina chinensis*	Chinese Mysterysnail	SNA	G5			gastropods	x		
	Cochlicopa lubrica	Glossy Pillar Snail	S5	G5			gastropods	x		
*	*Deroceras reticulatum*	Gray Fieldslug	SNA	G5			gastropods	x		
	Epioblasma rangiana	Northern Riffleshell	S1	G1	END	END	bivalves		NHIC	
	Ligumia nasuta	Eastern Pondmussel	S1	G4	END	END	bivalves		NHIC	
*	*Limax maximus*	Giant Gardenslug	SNA	G5			gastropods	x		
*	*Oxychilus draparnaudi*	Dark-bodied Glass-snail	SNA	G5			gastropods	x		
	Patera pennsylvanica	Proud Globelet	S1	G4	END		gastropods		NHIC	
	Ptychobranchus fasciolaris	Kidneyshell	S1	G4G5	END	END	bivalves		NHIC	
	Webbhelix multilineata	Striped Whitelip	S2S3	G5			gastropods		NHIC	

THE CITY OF WINDSOR ONTARIO, CANADA

Committee Matters: SCM 327/2023

Subject: CQ 13-2023 - Front Yard Parking Best Practice 2.2.2

Moved by: Councillor Mark McKenzie
Seconded by: Councillor Renaldo Agostino

THAT the report of the Technologist II, dated November 9, 2023, entitled "CQ 13-2023 - Front Yard Parking Best Practice 2.2.2" BE RECEIVED for information; and,

THAT the City of Windsor Bylaw 9023 which regulates vehicular parking within the limits of the City of Windsor on municipal streets, municipal parking lots, and private property BE AMENDED to allow for residents to apply for a minor variance to permit front yard parking in a residential district.

The motion is **put** and **lost**.

Aye votes: Councillors Renaldo Agostino and Mark McKenzie.
Nay votes: Councillors Kieran McKenzie, Fabio Costante, and Gary Kaschak.
Absent: None.
Abstain: None.

Moved by: Councillor Kieran McKenzie
Seconded by: Councillor Gary Kashack

Decision Number: **ETPS 972**
THAT the report of the Technologist II, dated November 9, 2023, entitled "CQ 13-2023 - Front Yard Parking Best Practice 2.2.2" **BE RECEIVED** for information.
Carried.
Councillors Mark McKenzie and Renaldo Agostino voting nay.

Report Number: S 150/2023
Clerk's File: ST2023

Clerk's Note:

1. The recommendation of the Environment, Transportation & Public Safety Standing Committee and Administration are the same.

2. Please refer to Item 8.2 from the Environment, Transportation & Public Safety Standing Committee held on November 29, 2023.

3. To view the stream of this Standing Committee meeting, please refer to: https://csg001-harmony.sliq.net/00310/Harmony/en/PowerBrowser/PowerBrowserV2/20231129/-1/9448

Subject: Response to CQ 13-2023 - Front Yard Parking Best Practice 2.2.2

Reference:

Date to Council: November 29, 2023
Author: Amy Kurek
Technologist II
(519) 255-6257 Ext. 6216
akurek@citywindsor.ca
Right-of-Way – Engineering
Report Date: November 9, 2023
Clerk's File #: ST2023

To: Mayor and Members of City Council

Recommendation:

THAT the response to CQ 13-2023 **BE RECEIVED** for information.

Background:

On May 29, 2023, Councillor Mark McKenzie asked the following Council Question:

CQ 13-2023, "**Asks Administration re-examine the Driveway Requirement Policy regarding BP2.2.2 which deals with not allowing front parking, as well as the Official Plan to allow front driveways with report back to Council."**

This report is in response to CQ 13-2023.

Discussion:

By-law 9023

City of Windsor Bylaw 9023 regulates vehicular parking within the limits of the City of Windsor on municipal streets, municipal parking lots and private property. Front yard parking is governed through Part V – Private Property, item 42 (3);

> Notwithstanding Section 42(1) no personal shall park, stand or stop a motor vehicle on a front yard in a residential district except on a driveway or as authorized by statute, regulation, by law or otherwise by the Corporation. (ADDED B/L 182-2016 DEC 12/16)

Further policy support for restrictions on front yard parking is included later in this report.

Comparison to other Municipalities:

Administration investigated policies in place in municipalities of similar size to Windsor and the responses received to date are provided below:

City of London: Currently does not permit front yard parking. If a property owner would like to seek permission for front yard parking, they are required to apply for a minor variance.

City of Hamilton: Currently does not have any restrictions in place for front yard parking.

City of Oshawa: Currently does not permit front yard parking.

City of Richmond Hill: Currently does not permit front yard parking.

City of Kitchener: Does not have a specific restriction for front yard parking however ensures that the addition of a driveway does not result in the loss of on street parking.

Impacts of Front Yard Parking on the Neighbourhood:

1. On street parking:

   The majority of properties where front yard parking would be permitted are in areas where lot sizes would only allow for the addition of one (1) parking space to the front yard to avoid exceeding the maximum hard surface coverage of 50% of the required front yard. With the addition of the one (1) space to the front yard, up to three (3) spaces may be eliminated from the road depending on where the driveway can be located and the distance between the new driveway and the driveways of adjacent properties. This results in a sole benefit to the property owner and a loss to the neighbourhood.

2. Urban Tree Canopy:

   A substantial amount of the 70,000 city trees exist in locations where individuals might request driveways. As such, limiting the number of driveways, especially in those areas where trees are mature, will provide a benefit for the Urban Canopy Cover.

   The Urban Tree Canopy Assessment Report 2020 indicates that the City needs to continue to plant, at a minimum, 2200 trees per year. This planting requires substantial planting spaces, part of which is attained by planting on City rights-of-way. One of the objectives of the City is to improve our Canopy Cover which is currently at 19%. This requires optimising the use of available potential planting areas (PPAs). Any act that will further fragment and/or reduce our PPAs should be avoided.

3. City's Capital and Maintenance projects:

The cost to replace a driveway approach can be as much as seven (7) times the cost of reinstating seed or sod. This could have a measurable financial impact on budgeting for City Capital and maintenance projects such as road and sewer rehabilitation and local improvement projects in areas where front yard parking is not currently permitted.

4. Public safety:

   Multiple driveways in close proximity result in added safety concerns for pedestrians and bicycles, especially where vehicles are parked between the front face of the building and the road/sidewalk; more conflict points related to backing out of driveways results in a higher risk.

   A vehicle parked between the road and the front face of a home, especially where the homes are close to the road such as in the downtown core, may cause sight line issues for pedestrians or other motorized vehicles using the right-of-way. As a result, accidents, near misses and security concerns may increase; making the use of streets for active transportation less appealing.

   Maintaining the current practice of not allowing front yard parking when there is suitable paved alley access available for the property owner supports two key crime prevention through environmental design (CPTED) principles:

   - Sustained, random, *positive activity generation* within the less observable and less travelled (compared to a roadway access) alley space by lawful users
   - Enhanced *natural surveillance* of the alley because there are more property users regularly using the alley space, thus adding more regular periods of "eyes-on-the-alley"

   Vehicles parked in a home's front yard when a designated driveway is in place, versus the rear yard space off a paved alley, are more openly visible at all times, due to the frequency of the travelled (and thus observed) roadway environment. As a result, criminal activity such as vandalism and vehicle theft, as well as theft from vehicle is reduced. This benefit would not apply to allowing vehicles to park on grass/landscaped areas of a property's front yard however, as that could result in cluttering the area, blocking sight lines, etc.

   On-street parking provides a natural traffic calming impact. By reducing the number of cars parked on the road, there is a possibility that speeds will increase, as the perceived width of the road increases in the gaps.

5. Neighbourhood Characteristics

   The introduction of front yard parking is counterintuitive to the neighbourhood design, which favours front porches, open sight lines, traditional front door approaches and access through the alleys. Additionally, the benefit of front yard parking is limited to individual property owners and not to the community and City as a whole.

Impact on Additional Dwelling Units (ADUs)

Section 5.99.80 of Zoning By-law 8600 permits Additional Dwelling Units (ADUs) throughout the City where a *single unit dwelling*, *semi-detached dwelling*, or *townhome dwelling* is permitted. The City is seeing an increase in construction of ADU's with a resulting increase in requests for front yard parking.

Currently, there are various areas within the City (Appendix C – Secondary Residential Units: Exempt Areas) that are exempt from requiring a parking space when adding an ADU. Some of these areas also have paved alleys available for access to parking at the rear.

If the restriction of front yard parking is removed from properties having paved alleys access, they would now qualify for parking off the front and rear yard, which would substantially increase hard surface and decrease greenspace. It should be noted, that the 50% minimum greenspace requirement for residentially zoned properties only applies to front yards. There is currently no obligation for greenspace within rear yards.

Encouraging parking in the rear yard from the alley (where available) for ADUs limits the impact to the boulevard/landscape area and helps reduce the conflict between vehicular and pedestrian movement.

Stormwater Financing Project

Council received the most recent update on the Stormwater Financing Project on June 12, 2023, which estimates that the new stormwater finance program would be underway by January 1, 2025. This program confirms the amount of hard surface located within individual private properties and charges a fee based on that percentage. There will be no fees associated with privately owned objects within the city right-of-way, such as the driveways, landscaping, or lead walkways.

A vast majority of front yard parking spaces are located within the municipal rights-of-way, as these properties do not have sufficient side yard widths or a garage to park within, which minimizes the amount of driveway (hard surface) on private property. For this reason, many of these driveways would not be accounted for in the program and the respective properties would not be responsible for paying for that impermeable surface causing added stormwater runoff to the municipal sewer. Conversely, properties with side yard parking, would be assessed at a higher stormwater financing fee, as their driveways must extend eighteen feet (18'-0") past the home's front wall as per the current standards and would increase their impermeable percentage on private property.

The City of Windsor Official Plan

The following sections of the Official Plan speak to front yard parking restrictions:

Chapter 8, Volume 1 - Urban Design, Section 8.11.2.22: Council will limit the construction of parking spaces in the required front yards of dwellings, in order to protect the aesthetic character of older residential neighbourhoods, ensure the

availability of on-street public parking, ensure unhampered pedestrian movement within the public right-of-way and prevent harm to boulevard trees.

Chapter 7, Volume 1 - Infrastructure: identifies protecting roadways from driveway proliferation as an objective of a safe, sustainable, effective and efficient transportation system;

> Section 7.2; A safe, sustainable, effective and efficient transportation system is one which meets the needs of all users in a manner consistent with a healthy environment and vibrant economy. In order to achieve this balance, Council will manage Windsor's transportation system to enhance physical mobility and ensure that the economic, social and environmental needs of the community are met.
>
> Section 7.2.1.12; To restrict driveway access based on road classification and minimize the number of driveway access points.

Chapter 2, Volume II: also identifies not permitting parking in the Prado Place and Sandwich Heritage Conservation Districts and within the vicinity of Traditional Commercial Streets;

> Sections 1.22.17 & 1.26.18; No front yard parking as defined in the City's zoning by-law shall be permitted.
>
> Section 1.39: Prohibits parking areas abutting the street including encroaching within the public right-of-way.

On-Street Accessible Parking Spaces-Residential Policy

Section 4.3.2 Eligibility Requirements – Applicants for on-street accessible parking permits must meet the following criteria:

> 4.3.2.1 No off-street parking is provided for the property including:
>
> 4.3.2.1.1 A front yard, side yard, or rear yard parking area, including parking accessible by a paved alley.

Zoning Bylaw 8600

Zoning Bylaw 8600 also restricts front yard parking in the following designations:

- Heritage Conservation Districts (Sandwich Town and Prado Place) and Areas (Walkerville)
- Sandwich Town, Target Area 3
- Within the Vicinity of Traditional Commercial Streets

The intent of the traditional commercial street-off-street parking provisions was also to discourage demolition of buildings for front yard parking areas and to preserve a building edge along the streets.

Urban Design Guidelines associated with Community Improvements Plans (CIPs) such as Sandwich, Ford City, Main Streets, and the recently adopted City of Windsor Intensification Guidelines for Mixed-Use, Corridors, Centres, nodes, and Mature Neighbourhoods encourage parking at the rear or side yard of dwellings. Front yard parking is restricted or discouraged given the impact to the neighbourhood.

Engineering Best Practices 2.2.1 & 2.2.2

Further to the above mentioned Bylaws, sections of the City's Official Plan, and Design Guidelines, Administration adopted and follows the Engineering Best Practices to ensure consistency in applying policies for work in the City right-of-way. Additionally, Best Practices BP2.2.1 (Appendix A) & BP2.2.2 (Appendix B) provide standards, such as size and material specifications for front yard parking; which govern the issuance of permits. Per section 4.6 of BP2.2.2, front yard parking is permitted where no other parking is or may be made available on site (for example from a paved alley).

Risk Analysis:

Waiving of the requirements of Engineering Best Practice BP2.2.2 to allow the construction of front yard parking access where other parking options exist will require the By-Laws and City Official Plan sections noted in the Discussion Section to be amended accordingly.

Additionally, allowing front yard driveways in these limited areas would also negatively impact:

- neighbourhood character/appearance, by interrupting the continuity established by the boulevard;
- the safety of residents/pedestrians by creating increased conflict with vehicles and restricting pedestrian movement along municipal sidewalks;
- the City's Tree Canopy initiative by reducing greenspace, the opportunity to plant trees and by encouraging the removal of existing trees;
- the availability of on-street parking spaces;
- the costs related to the City's capital and maintenance projects;
- increased risk of claims;
- the City's Climate Change Adaptation Plan; and,
- the Windsor Environment Master Plan.

Climate Change Risks:

Climate Change Mitigation Risks:

N/A

Climate Change Adaptation Risks:

The addition of front yard parking would increase the amount of impermeable surfaces, in some cases pushing the impermeable area to close to 50%, as mentioned above. This would increase storm water run off volumes that could increase the risk of flooding depending on the number of front yard parking spaces permitted in a neighbourhood.

In addition, a reduction in front yard green space will directly affect the viability of tree plantings. Urban trees provide many climate change adaptation benefits including storm water retention, reduction of the urban heat island and biodiversity enhancements.

Financial Matters:

N/A

Consultations:

Planning – Neil Robertson

Operations (Right of Way & Field Services) – Andrew Lewis, Marc Ladouceur

Operations (Transportation Planning) – Shawna Boakes

Heritage Planner – Kristina Tang

Forestry – Yemi Adeyeye

Operations (Maintenance) – Roberta Harrison

Manager of Right-of-Way – Adam Pillon

Windsor Police Service – Barry Horrobin

Manager Design Engineering – Fahd Mikhael

Planner lll Special Projects – Kevin Alexander

Supervisor of Sustainability and Climate Change – Karina Richters

Manager Purchasing – Alex Vucinic

Conclusion:

The above report provided information regarding the CQ 13-2023 for information.

It is Administration's belief that the existing restriction of Front Yard Parking in areas with paved alleys available for access and areas with preservation initiatives should be maintained.

Planning Act Matters:

N/A

Approvals:

Name	Title
Adam Pillon	Manager of Right-of-Way
Fahd Mikhael	Acting Executive Director of Engineering / Deputy City Engineer
Shawna Boakes	Executive Director of Operations/Deputy City Engineer
Mark Nazarewich	For City Solicitor
Joe Mancina	Chief Administrative Officer

Notifications: N/A

Name	Address	Email

Appendices:

1 Appendix A - Engineering Best Practice BP2.2.1
2 Appendix B - Engineering Best Practice BP2.2.2
3 Appendix C - Secondary Residential Units: Exempt Areas

1. SUBJECT DRIVEWAY REQUIREMENT POLICIES – RESIDENTIAL

2. DEFINITIONS

Driveway – Paved area that provides access from a roadway to private property.

Frontage – Exterior lot line abutting a public right-of-way, not including an alley.

Single Car Garage– A garage having a front exterior door width of less than 5m (16ft). For this best practice, a one and a half garage is considered a single car garage.

Two Car Garage – A garage having a front exterior door width of 5m (16ft) or greater.

Shared Driveway – A single driveway constructed on or near a common property line between two or more properties which provides access to all such properties.

3. DRAWINGS

AS-542-A – Maximum Curb Cut for Residential Driveways with No Garage, Single & Double or More Car Garages
AS-542-B – Maximum Curb Cut for Residential Driveways on Corner Lots
AS-542-D – Maximum Curb Cut for Residential Driveways - Exceptions

4. BEST PRACTICE

One driveway approach will be permitted per lot frontage. A property may be accessed from an open, paved municipal alley.

The following residential driveway permit options are available:

4.1. Proposed Residential Driveway with an Existing or Proposed Single Car Garage or Carport

4.1.1 A driveway to a residence with a single car garage or carport shall not exceed a maximum curb cut or edge of pavement width of 4.5m (15ft) but no greater than 50% of the frontage width (AS-542-A).

4.1.2 A driveway to a residence on a cul-de-sac shall not protrude beyond the projected side yard property lines to said cul-de-sac.

4.2. Proposed Residential Driveway with an Attached Garage or Carport (two car or greater)

4.2.1 A driveway to a residence with a two car garage shall not exceed a maximum curb cut or edge of pavement width of 7.0m (23ft) but no greater than 50% of the frontage width (AS-542-A).

4.2.2 A driveway to a residence with a 3 or more car garage shall not exceed a maximum curb cut or edge of pavement width of 9.0m (30ft) but no greater than 50% of the frontage

4.2.3 A driveway to a residence on a cul-de-sac shall not protrude beyond the projected side yard property lines to a said cul-de-sac.

4.3. Proposed Residential Driveway on Corner Lot, see drawing AS-542-B

4.3.1 New driveways for homes on corner lots shall be constructed on the side of the house furthest from or opposite the intersection (AS-542-B). The new driveway shall be a minimum 11m (36ft) from the face of curb or edge of pavement of the intersecting street and be located on the lowest classified road.

4.3.2 A second driveway approach from a side street may be permitted only at the rear of the house and where a 5.5m (18ft) minimum clearance from property line on to private property is available, subject

to the approval of the City Engineer (AS-542). Driveway curb cut widths shall be determined as follows:

4.3.2.1 No Garage – maximum 4.5m (15ft)
4.3.2.2 One Car Garage – maximum 4.5m (15ft)
4.3.2.3 Two or Greater Car Garage – maximum 7m (23ft)

4.4. Proposed Residential Driveway with an Existing or Proposed Shared Driveway

4.4.1 Proposed New Shared Driveway – Construction of a new shared driveway for adjoining residential properties will not be permitted subject to reciprocal access agreement in form satisfactory to City Engineer/City Solicitor.

4.4.2 Reconstruction of an Existing Shared Driveway – An existing shared driveway serving two or more properties may be reconstructed as per its current dimensions provided a permit is issued for each property individually. The permit shall correspond to each property owner's portion of the common approach. If the driveway is reconstructed in concrete, a saw-cut is required along the extension of the property line, from back of curb or edge of pavement to property line.

4.4.3 Proposed New Driveway Location for Properties with an Existing Shared Driveway – A property with an existing shared driveway is permitted to construct a new driveway approach, in an alternative location, provided the following is satisfied:

a) Sufficient proof is provided indicating adjoining properties do not have access rights over the portion of the existing shared driveway fronting the subject property.
b) The new driveway shall comply with the current requirements of this Best Practice [BP2.2.1].
c) Their portion of the existing shared driveway must be removed as only one driveway approach is permitted per property frontage.

4.5. Existing Driveways to be Re-Constructed

4.5.1 An existing driveway to be re-constructed requires a permit and shall comply with the current driveway requirement policy BP 2.2.1. An existing curb cut width may be maintained where the existing curb cut is deemed to be proper, at the discretion of the City Engineer. A proper curb cut may include, but is not limited to, one of the following situations:

- there is a permit for the existing driveway;
- the driveway approach or curb cut was constructed by the City of Windsor; or
- the curb cut is existing and there is no evidence, based on the review of the City's 2010 aerial map records that the curb cut has been altered in any way without the permission of the City.

4.6. Leadwalks Adjacent to Driveways

4.6.1 A maximum 1.2m (4ft) wide concrete leadwalk may be permitted in addition to, and may be constructed adjacent to a driveway, provided a curb cut is not provided for the leadwalk and the total width of the driveway and leadwalk does not exceed 50% of the frontage width.

4.6.2 Addition of concrete leadwalk adjacent to existing driveway to be permitted provided the following is satisfied:

- Leadwalk to be installed integral from the curb/edge of pavement or from back of sidewalk to the front face of the house, porch, or gate to rear yard.
- Existing driveway approach to be cut and full-depth isolation joint to be completed as per S-6 section 6.04.07.
- If an existing flare is present the flare must be removed to allow for the leadwalk.
- Leadwalk is not to be constructed for the intent of parking
- Width of leadwalk to be consistent from back of curb/sidewalk to a porch or side yard.`

4.7. Exceptions, see drawing AS-542-D

4.7.1 Subject to the approval of the City Engineer, where unique circumstances require, a variance in these standards may be provided.

4.7.2 Where a driveway leads to a front yard parking space Best Practice BP2.2.2 shall apply.

4.7.3 Where a two car garage consists of two independent doors a driveway curb cut may be permitted equal to the width of the garage doors (including the door separation) plus 0.3m (1ft) on either side but no greater that 50% of the frontage width. (AS-542-D)

4.7.4 Where an alley is not maintained and the applicant does not wish to pave the alley at their own expense, access to the property for the use of parking will not be permitted from the alley.

4.7.5 On arterial roads, at the discretion of the City Engineer, flares may be added to an approach to a maximum of 1m per side as per AS-221 and AS-222. Driveway width cannot be widened in the future to match the curb cut size.

5. RELATED BEST PRACTICES

Front Yard Parking – BP2.2.2.

6. RELATED CITY SPECIFICATIONS

S-4 – Selected Granular Base Courses

S-6 – Concrete Sidewalk and Driveway Approaches

S-9 – Concrete

S-10 – Hot Mix, Hot Laid Asphaltic Concrete

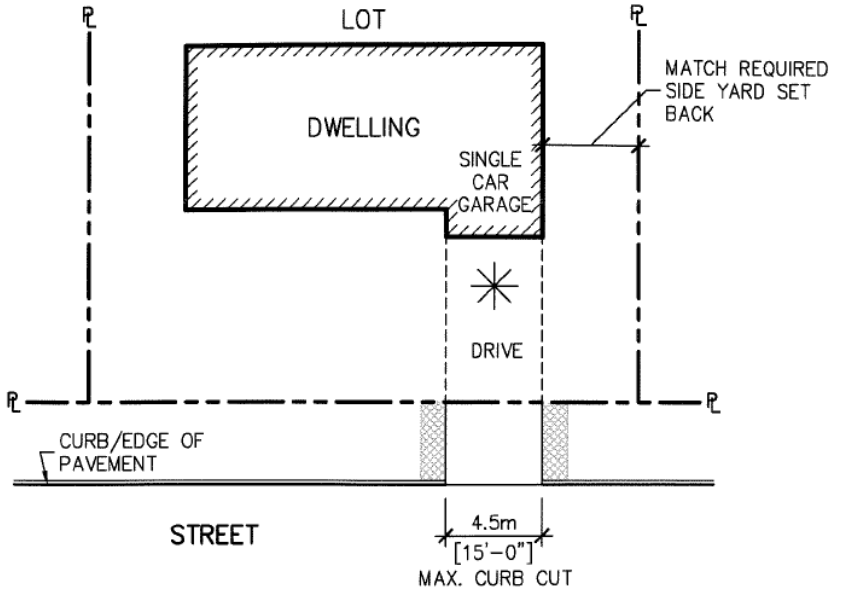
S-14 – Sodding and Topsoil

S-15 – Seeding Roadway Areas by Hydraulic Seeding and Mulch Cover Method

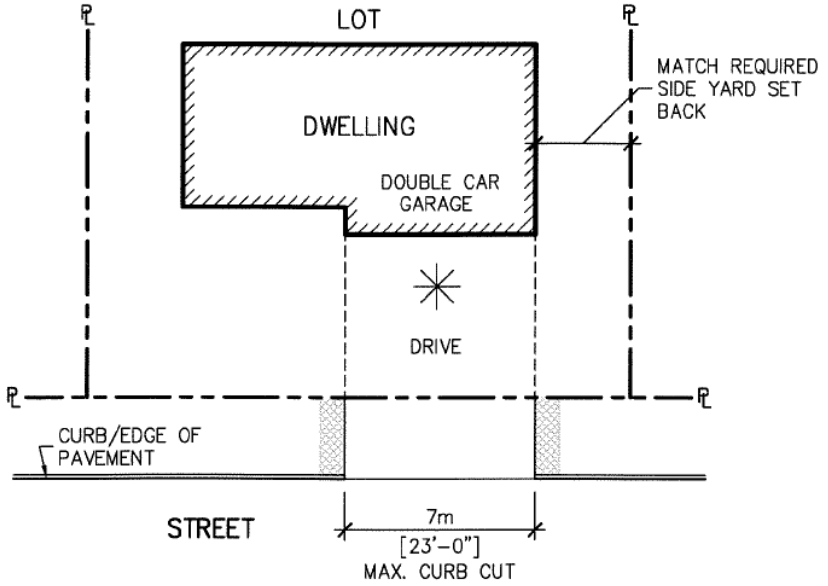
City Engineer or Designate

September 9/2022
Date

Attachments – AS-542-A; AS-542-B; AS-542-D



PROPOSED RESIDENTIAL DRIVEWAY WITH SINGLE CAR GARAGE OR CARPORT



PROPOSED RESIDENTIAL DRIVEWAY WITH GARAGE (TWO CARS OR GREATER)

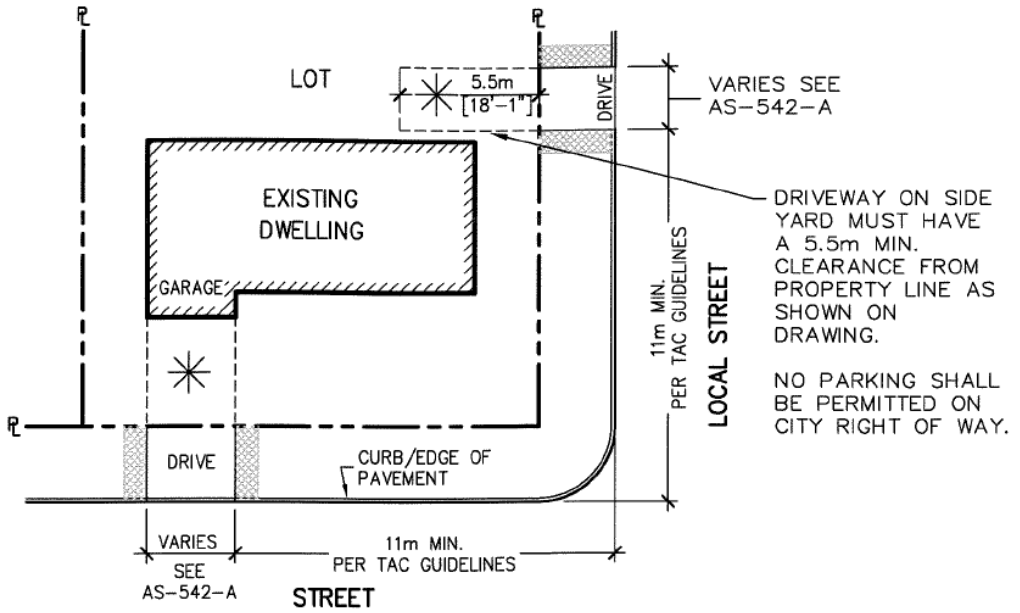
NOTES:

1. NO RADIUS OR RAISED CURBS ON CITY RIGHT OF WAY. STRAIGHT FLARES ONLY.
2. NOTWITHSTANDING THIS DRAWING CURB CUT WIDTH SHALL NOT EXCEED 50% OF FRONTAGE WIDTH.

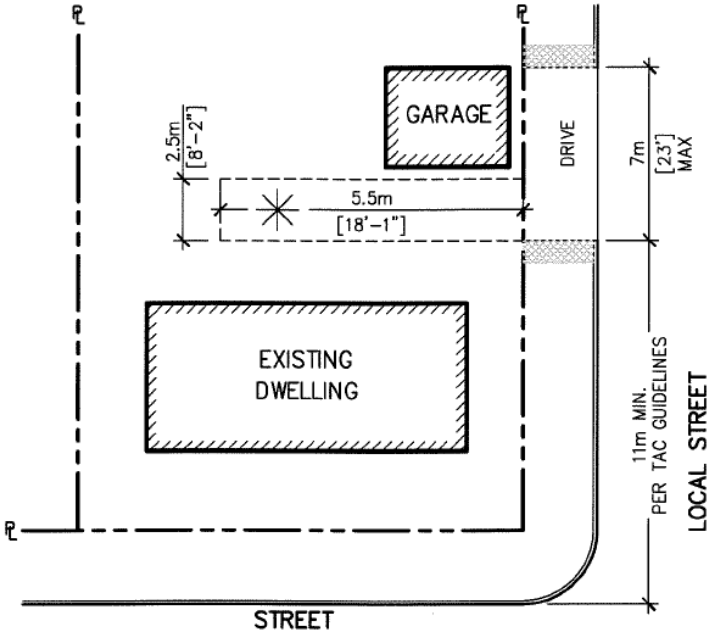
DRIVEWAY PORTION ON PRIVATE PROPERTY IS TO COMPLY WITH AND BE APPROVED BY THE BUILDING DEPARTMENT AT THE CITY OF WINDSOR.

DRIVEWAY MUST HAVE A MINIMUM SEPARATION OF 0.9m (3') OF ANY VERTICAL OBSTRUCTION. ie. HYDRO POLE, FIRE HYDRANT, CABLE BOX, TREE, ETC.

CITY OF WINDSOR ENGINEERING DEPARTMENT	
Maximum Curb Cut For Residential Driveways with a Garage	
DR'N BY: AJC, JL	DATE: JANUARY, 2011
REVISION: NOV, 2013	CH'KD BY: P. UBENE
CH'KD BY: SS	PASSED BY:
CITY ENGINEER	AS–542–A



PROPOSED RESIDENTIAL DRIVEWAY ON CORNER LOT WITH SIDE YARD



PROPOSED RESIDENTIAL DRIVEWAY ON CORNER LOT WITH SIDE YARD GARAGE

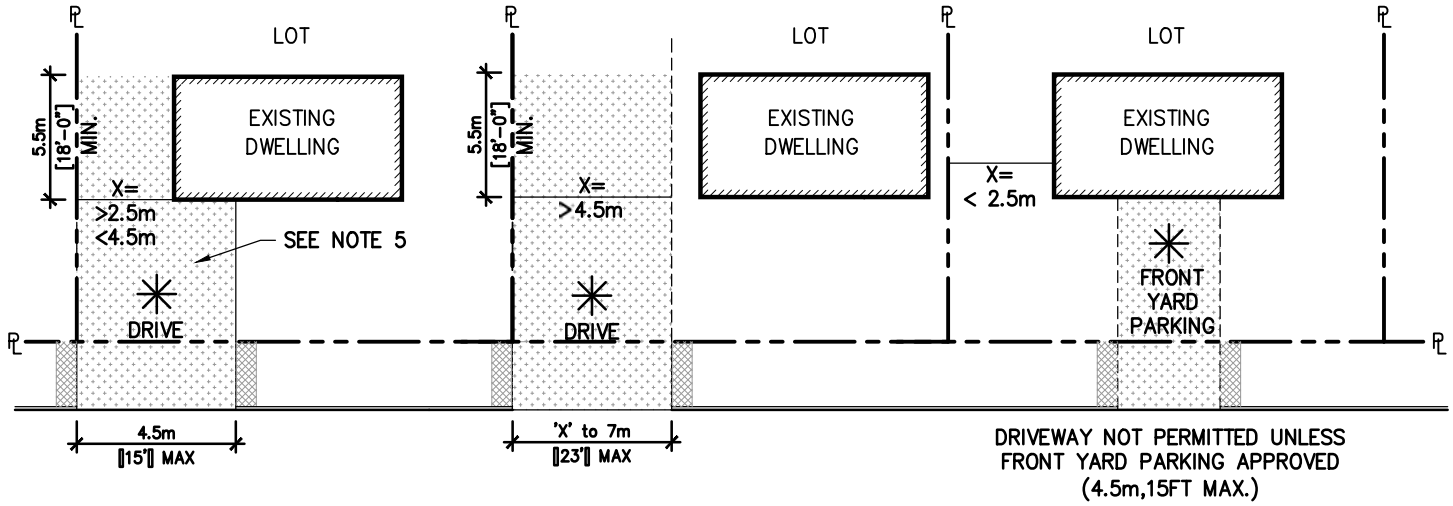
NOTES:

1. NO RADIUS OR RAISED CURBS ON CITY RIGHT OF WAY. STRAIGHT FLARES ONLY.
2. NOTWITHSTANDING THIS DRAWING, CURB CUT WIDTH SHALL NOT EXCEED 50% OF FRONTAGE WIDTH.
3. NEW DRIVEWAYS FOR HOMES ON CORNER LOTS SHALL BE CONSTRUCTED ON THE SIDE OF THE HOUSE OPPOSITE OF THE INTERSECTION.

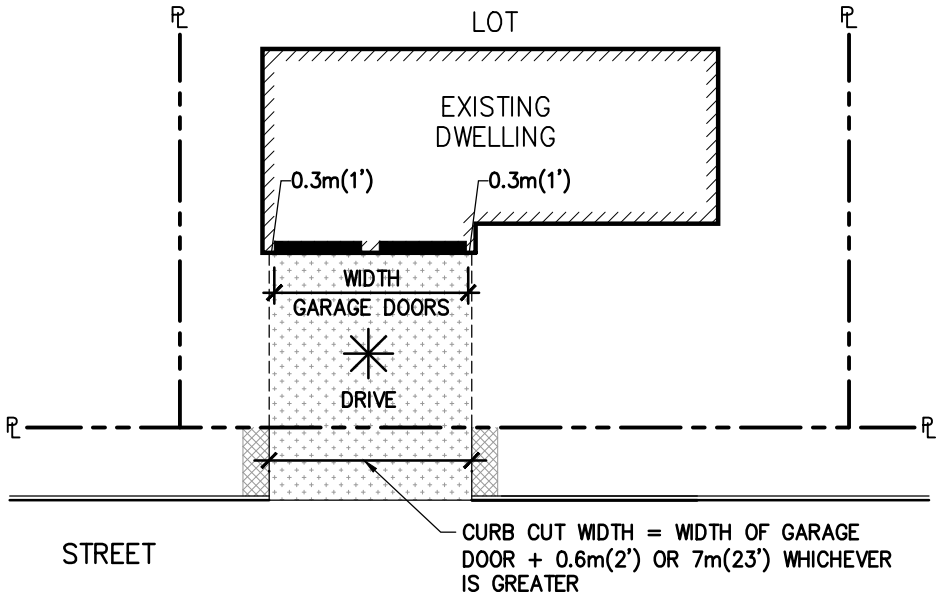
DRIVEWAY PORTION ON PRIVATE PROPERTY IS TO COMPLY WITH AND BE APPROVED BY THE BUILDING DEPARTMENT AT THE CITY OF WINDSOR.

DRIVEWAY MUST HAVE A MINIMUM SEPARATION OF 0.9m (3') OF ANY VERTICAL OBSTRUCTION. ie. HYDRO POLE, FIRE HYDRANT, CABLE BOX, TREE, ETC.

CITY OF WINDSOR ENGINEERING DEPARTMENT	
Maximum Curb Cut For Residential Driveways on Corner Lots	
DR'N BY: AJC,JL	DATE: JANUARY, 2011
REVISION: NOV, 2013	CH'KD BY: P. UBENE
CH'KD BY: SS	PASSED BY:
CITY ENGINEER	AS-542-B



DRIVEWAY TO SIDE YARD / GARAGE IN REAR



SEPARATE GARAGE DOORS

NOTES:

1. NO RADIUS OR RAISED CURBS ON CITY RIGHT OF WAY. STRAIGHT FLARES ONLY.
2. NOTWITHSTANDING THIS DRAWING, CURB CUT WIDTH SHALL NOT EXCEED 50% OF FRONTAGE WIDTH.
3. ONE ACCESS IS PERMITTED PER LOT FRONTAGE. A PROPERTY MAY BE ACCESSED FROM AN OPEN, PAVED MUNICIPAL ALLEY.
4. NEW DRIVEWAYS FOR HOMES ON CORNER LOTS SHALL BE CONSTRUCTED ON THE SIDE OF THE HOUSE OPPOSITE OF THE INTERSECTION.
5. ANY PORTION OF DRIVEWAY THAT DOES NOT EXTEND 18FT INTO SIDE YARD IS TO COMPLY WITH FRONT YARD PARKING REQUIREMENTS.

✳ DRIVEWAY PORTION ON PRIVATE PROPERTY IS TO COMPLY WITH AND BE APPROVED BY THE BUILDING DEPARTMENT AT THE CITY OF WINDSOR.

DRIVEWAY MUST HAVE A MINIMUM SEPARATION OF 0.9m (3') OF ANY VERTICAL OBSTRUCTION. ie. HYDRO POLE, FIRE HYDRANT, CABLE BOX,TREE, ETC.

CITY OF WINDSOR	
ENGINEERING DEPARTMENT	
EXCEPTIONS	
DR'N BY: AJC,JL,BC,AC,SS	DATE: JANUARY, 2011
REVISION: AUG, 2022	CH'KD BY: P. UBENE
CH'KD BY: AK	PASSED BY:
CITY ENGINEER	AS-542-D

1. SUBJECT FRONT YARD PARKING

2. DEFINITIONS

Front yard parking – Paved area that provides a single parking space located in the front yard of an existing dwelling.

3. DRAWINGS

AS-542-C – Front Yard Parking
AS-542-A – Maximum Curb Cut for Residential Driveways with No Garage, Single & Double or More Car Garages
AS-542-B – Maximum Curb Cut for Residential Driveways on Corner Lots
AS-221 – Residential Drive – Asphalt
AS-222 – Residential Drive – Concrete

4. BEST PRACTICE

The following residential driveway options are available:

1. A driveway for a front yard parking space shall not exceed a maximum curb cut or edge of pavement width of 4.5m (15') (in accordance with AS-542-C).
2. A front yard parking space and driveway is required to be hard surfaced within twelve (12) months from the issuance of a driveway permit.
3. A minimum distance of 5.5m (18') in length and 2.5m (8') in width is required to create one parking space. Where insufficient area is available for the parking space to be entirely on private property, this space may extend into the right-of-way, however, shall commence at the front face of dwelling without any obstruction of the sidewalk.
4. Approval by the Building Department and compliance with the zoning by-law are required for front yard parking to be permitted.
5. Front yard parking is permitted where existing side yard widths are less than 2.5m (8').
6. Front yard parking is permitted where no other parking is or may be made available on site. (for example from a paved alley)

5. RELATED BEST PRACTICES

Driveway Requirement Policies – BP2.2.1
Alley Access – BP2.3.2

6. RELATED CITY SPECIFICATIONS

S-4 - Selected Granular Base Courses
S-6 – Concrete Sidewalk and Driveway Approaches
S-9 – Concrete
S-10 – Hot Mix, Hot Laid Asphaltic Concrete
S-14 – Sodding and Topsoil
S-15 – Seeding Roadway Areas by Hydraulic Seeding and Mulch Cover Method

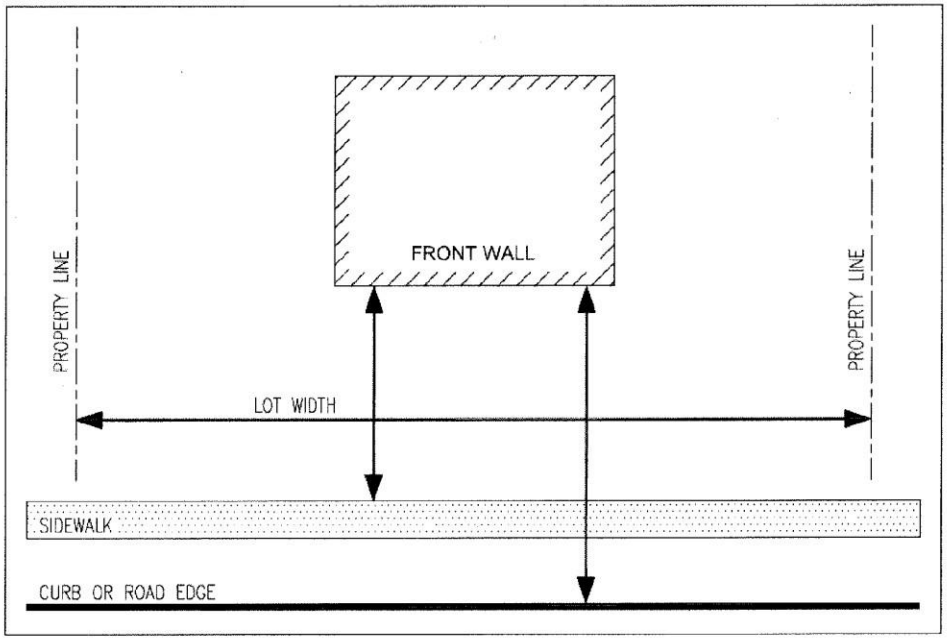
Mario Sonego January 2, 2014
City Engineer or Designate Date

Attachments – By-law 92-2003 information, AS-542-C

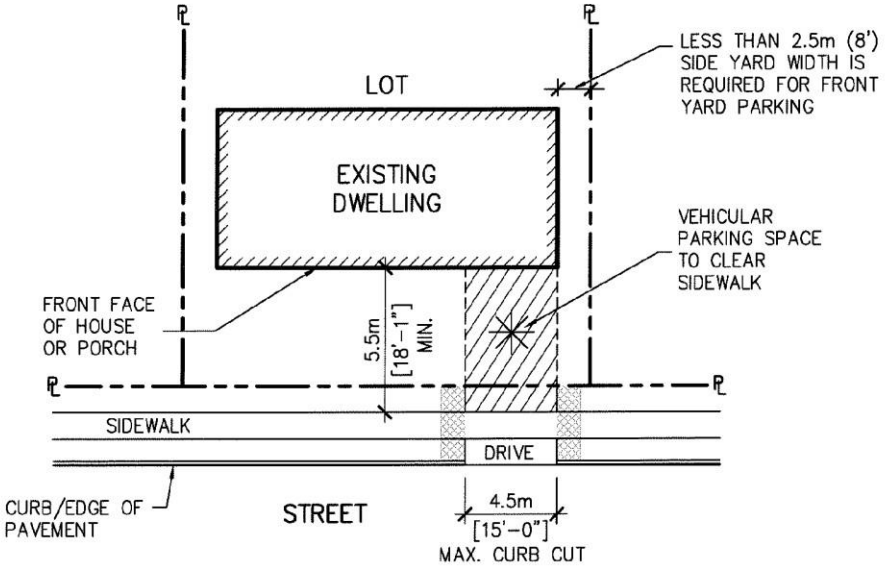
THE CORPORATION OF THE CITY OF WINDSOR
ENGINEERING – DEVELOPMENT & GEOMATICS
DRIVEWAY APPROACHES – FRONT YARD PAVING

According to By-law 92-2003, the following conditions will apply to front yard paving where the purpose is other than the standard side yard driveway and garage access:

- The pavement must be one (1) metre from any above ground utilities structure (i.e. fire hydrants, pedestals, light poles, etc)
- Must pave your driveway AND approach within 12 months – extensions to be considered separately
- Interlocking brick must have a 12" (30.5 cm) base of stone
- Full depth black expansion joints apply at the curb/sidewalk
- Corner lot properties cannot be paved at radius of curb on road
- If pavement is within one (1) metre of the base of a tree, you must contact Parks and Forestry at 253-2300 for approval
- Any deviation from the permit requirements must be made with an approved dimensioned site plan and brought to the Building Department (4th Floor). See diagram below for example of site plan information
- Inspection required – 255-6257
  - Must call for base inspection **BEFORE** pouring or paving
  - Please allow one (1) day notice for inspection
  - Call for final inspection when complete – forms removed, saw-cuts complete, backfill levelled.
- All concrete within the right-of-way must have a broomed or non-slip finish
- When cleanout is located in driveway, City recommends a cast iron cleanout cap be used
- Subject to re-inspection fee
- 45 days after final inspection is approved, indemnity deposit refunded by mail



Updated November 25, 2013



PROPOSED FRONT YARD PARKING FOR RESIDENTIAL DRIVEWAY

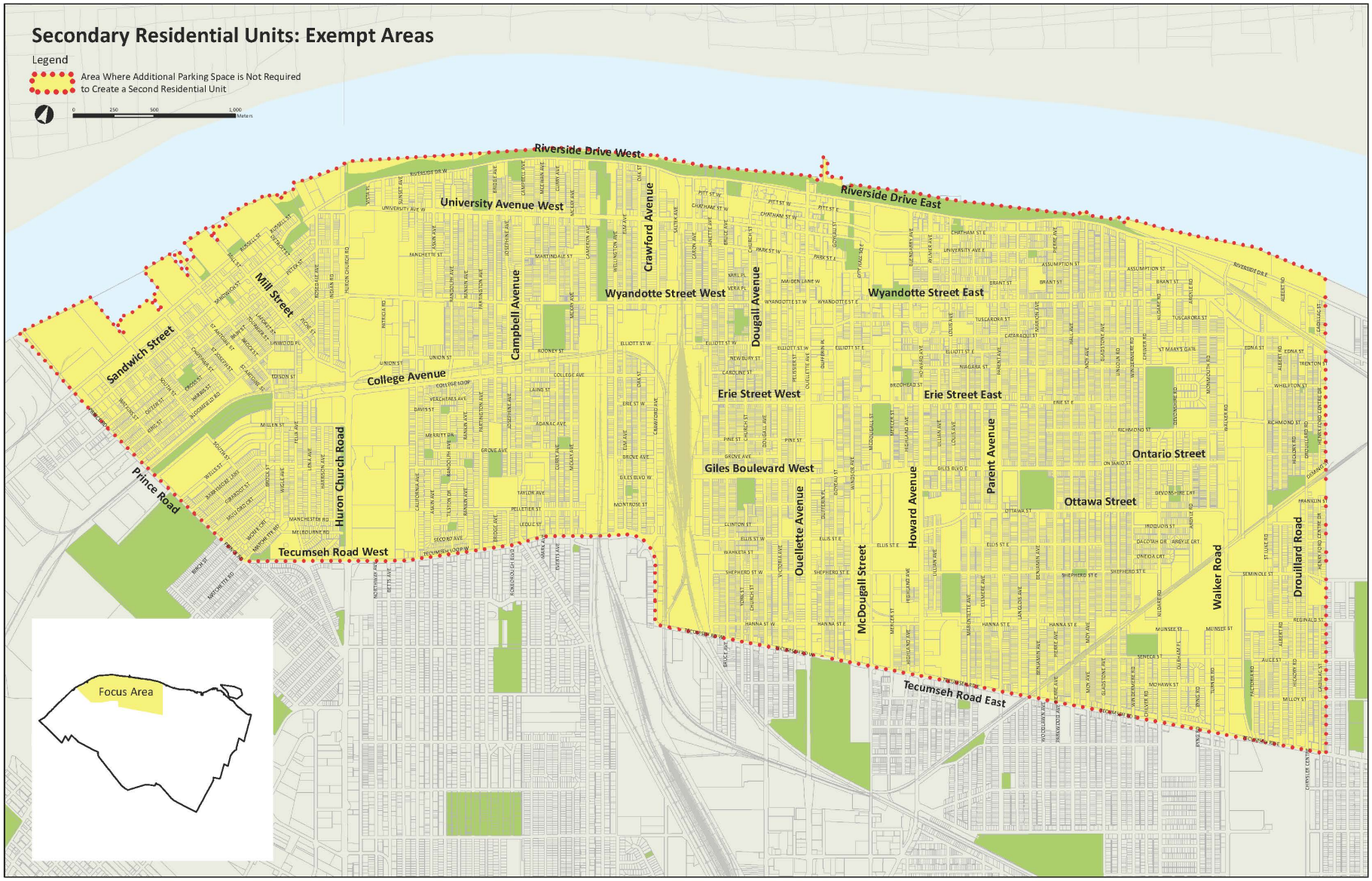
NOTES:

1. NO RADIUS OR RAISED CURBS ON CITY RIGHT OF WAY. STRAIGHT FLARES ONLY.
2. NOTWITHSTANDING THIS DRAWING CURB CUT WIDTH SHALL NOT EXCEED 50% OF FRONTAGE WIDTH.

✱ DRIVEWAY PORTION ON PRIVATE PROPERTY IS TO COMPLY WITH AND BE APPROVED BY THE BUILDING DEPARTMENT AT THE CITY OF WINDSOR.

DRIVEWAY MUST HAVE A MINIMUM SEPARATION OF 0.9m (3') OF ANY VERTICAL OBSTRUCTION. ie. HYDRO POLE, FIRE HYDRANT, CABLE BOX, TREE, ETC.

CITY OF WINDSOR ENGINEERING DEPARTMENT	
Front Yard Parking For Residental Driveways	
DR'N BY: AJC, JL	DATE: JANUARY, 2011
REVISION: DEC, 2013	CH'KD BY: P. UBENE
CH'KD BY: SS	PASSED BY:
CITY ENGINEER	AS–542–C


Secondary Residential Units: Exempt Areas
Legend
Area Where Additional Parking Space is Not Required to Create a Second Residential Unit
0 250 500 1,000 Meters
Focus Area
Riverside Drive West
Riverside Drive East
University Avenue West
Crawford Avenue
Wyandotte Street West
Wyandotte Street East
Dougall Avenue
Campbell Avenue
Mill Street
Sandwich Street
College Avenue
Erie Street West
Erie Street East
Giles Boulevard West
Parent Avenue
Ontario Street
Ottawa Street
Howard Avenue
Ouellette Avenue
McDougall Street
Walker Road
Drouillard Road
Huron Church Road
Prince Road
Tecumseh Road West
Tecumseh Road East

Subject: Additional Information Memo to Report # S 150/2023 – CQ-13-2023 – Front Yard Parking Best Practice 2.2.2. – City Wide

Reference:

Date to Council: July 31, 2024
Author: Adam Pillon
Manager of Right-of-Way
(519) 255-6257 Ext. 6612
apillon@citywindsor.ca
Right-of-Way - Engineering
Report Date: July 12, 2024
Clerk's File #: ST2024

To: Environmental, Transportation & Public Safety Standing Committee

Additional Information:

This memo provides additional information as requested by Councillor Mark McKenzie under CR11/2024, "to provide more options to amend the by-law regarding front yard parking within residential districts near business districts".

Subsequent to the meeting of Council, Administration met with internal departments and peer municipalities to discuss the request and potential options to address residential districts near business districts and below are the resulting recommendations:

Option 1: Residential On-Street Parking Passes

Residential neighbourhoods looking to obtain access to parking over and above their existing rear accessed alley parking space(s), can submit a "Request for Residential On-Street Parking Passes". Through this process, a comprehensive review of the surrounding neighbourhood will be completed to ensure parking issues would not be shifted to an adjacent street as a result. If approved, this would provide exclusive on-street parking to residents living in the area, thus eliminating concerns of visitors utilizing this parking to access neighbouring business districts. The following information is available online in further detail and should be reviewed prior to initiating the process:

1. 95% community support is required.
2. Annual permit renewals and the associated fees are applicable.

3. Quantity limitations - two (2) residential vehicle permits per property and one (1) additional visitor permit

Option 2: Referral to the Ad Hoc Alley Standards Committee

On May 27th, Council approved CR236-2024, which established the need for an internal team to identify all paved alleys and classify them in an effort to help guide the prioritization of future actions, including maintenance and enforcement. Based on the priority level identified for alley maintenance, a set of enhanced enforcement standards are currently being developed by the resulting Ad Hoc Alley Standards Committee.

Administration recommends that where there is a concern with the specific condition and/or maintenance of a paved alley, that the newly created Ad Hoc Alley Standards Committee review and provide recommendations based on criteria such as usage, condition, and other relevant characteristics.

The options identified above align with existing Community Improvement Plans such as Sandwich, Ford City and Downtown, which support the maintenance of alleys as alternative pedestrian and bike routes.

Section 8.7.2 (d) - Policies of the Official Plan "Encourages the creation of attractive residential streetscapes through architectural design that reduces the visual dominance of front drive garages, consideration of rear lanes where appropriate, planting of street trees and incorporation of pedestrian scale amenities. (added by OPA #60–05/07/07-B/L85-2007 – OMB Decision/Order No.2667, 10/05/2007)". This would all be compromised if front yard parking were to be permitted in these areas.

The recently implemented additional dwelling unit (ADU) policies do not require additional parking for second and third units (1st and 2nd ADUs). Despite this, from a practical perspective, the increased presence of ADUs in residential neighbourhoods with alleys is likely to result in requests for additional parking spaces both off the alley and in the front yard (if permitted) to accommodate the residents in the additional units. In addition to the concerns raised in report S150/2023, this would increase the impervious surface for such properties, resulting in additional stormwater runoff to the adjacent sewers. While the impact of one property on the sewer system may be negligible, the cumulative impact of ADU's and additional parking spaces throughout a large area may affect the capacity of the existing sewer network.

Administration has reached out to several Ontario municipalities to discuss specific front yard parking restrictions for residential properties with paved rear alleys, adjacent to Business Districts. While the feedback was limited, no responding Municipalities have exceptions listed in their Driveway Standards or Best Practices for residential properties near Business Districts.

Municipality	Notes
Aurora	• Permits front yard parking where parking at the rear is not permitted or available. • Does not have residential street parking passes in areas close to business districts. • If on street parking is available, residents are to utilize it.
Brant	• Residential properties are only permitted one entrance per property. • If there is alley access to the rear, front yard parking is not permitted.
Whitby	• If there is a paved alley, front yard driveways are not permitted.

Amending City by-laws or Best Practices to accommodate front yard parking, where paved alleys already provide access to these properties, is in conflict with the intent of the Ad Hoc Alley Standards Committee. Administration does not recommend taking such action, as the concerns raised in report S 150/2023 are not addressed through such amendments.

Consultations:

Andrew Lewis - Field Services Coordinator, Operations

Marc Ladouceur - Enforcement Administrator, Operations

Shawna Boakes - Executive Director, Operations

Roberta Harrison - Maintenance Coordinator, Operations

Kevin Alexander - Planner III Special Projects, Planning

Approvals:

Name	Title
Adam Pillon	Manager of Right-of-Way
Stacey McGuire	Executive Director Engineering/Deputy City Engineer

Name	Title
Mark Winterton	Commissioner, Infrastructure Services/City Engineer
Joe Mancina	Chief Administrative Officer

Notifications:

Name	Address	Email

Appendices: