CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF DECEMBER 15, 2020

Item 2, Report No. 59, of the Committee of the Whole (Working Session), which was adopted, as amended, by the Council of the City of Vaughan on December 15, 2020, 2020, as follows:

By receiving communication C5, from the City Clerk/Returning Officer, dated December 11, 2020.

2.   CONSIDERATION OF INTERNET VOTING FOR THE 2022 MUNICIPAL ELECTION

The Committee of the Whole (Working Session) recommends

1)   That the recommendations contained in the following report of the Deputy City Manager, Administrative Services and City Solicitor, dated December 2, 2020, be approved; subject to amending Recommendation 1, by adding "in principal" after the word Election, to read as follows:

   1.   That internet voting be authorized for the Advance Vote period for the 2022 Municipal Election, in principal, subject to the successful completion of testing and remediation of the City's internet voting solution;

   2.   That the City Clerk / Returning Officer report back in 2021 on the outcome of the testing and remediation of the internet voting solution; and

2)   That correspondence is sent to the Government of Ontario to advise of the urgency of providing a more accurate Voters' List for the 2022 Election.

Recommendations

1.   That internet voting be authorized for the Advance Vote period for the 2022 Municipal Election, subject to the successful completion of testing and remediation of the City's internet voting solution.

2.   That the City Clerk / Returning Officer report back in 2021 on the outcome of the testing and remediation of the internet voting solution.

Committee of the Whole (Working Session) Report

DATE: Wednesday, December 02, 2020   **WARD(S):** ALL

TITLE: CONSIDERATION OF INTERNET VOTING FOR THE 2022 MUNICIPAL ELECTION

FROM:
Wendy Law, Deputy City Manager, Administrative Services and City Solicitor

ACTION: DECISION

Purpose

To provide Council with recommendations on the introduction and implementation of internet voting for the Advance Vote period of the 2022 Municipal Election.

Report Highlights

- As reported by AMCTO, 49% of Ontario municipalities used internet voting for Advance Vote and/or Voting Day in 2018.
- In York Region, Markham, Newmarket and Aurora utilized internet voting in the 2018 Municipal Election and Richmond Hill conducted a school board by-election by internet in 2020.
- The City Clerk engaged MNP to conduct a gap analysis to determine what ~~... ... ...~~

Recommendations

1. That internet voting be authorized for the Advance Vote period for the 2022 Municipal Election, subject to the successful completion of testing and remediation of the City's internet voting solution.
2. That the City Clerk / Returning Officer report back in 2021 on the outcome of the testing and remediation of the internet voting solution.

Background

Role of City Clerk

The *Municipal Elections Act*, 1996 (MEA), in Section 11(1), identifies that the clerk of the municipality is responsible for conducting elections within the municipality. The MEA further identifies the powers of the clerk in Section 12, including the authority to provide for any matter or procedure not already provided for in the MEA, or in their opinion, is necessary for conducting the election. This authority must be carried out in an independent manner that reflects the principles of the MEA.

Background Reports

At its meeting of April 19, 2017, Council adopted recommendations from the City Clerk not to implement internet voting for the 2018 Municipal Election and for the City Clerk to report back no later than 2020 on security and other implementation measures specific to internet voting that may support consideration of this option for the 2022 Municipal Election. As part of its recommendations, Council confirmed the award of election services for leasing optical-vote tabulators in both 2018 and 2022 Municipal Elections to Dominion Voting Systems along with the option for internet voting in 2022.

As reported by the Association of Municipal Managers, Clerks and Treasurers of Ontario (AMCTO) in their 2018 Post-Election Survey, 49% of municipalities responded indicating that they made use of internet voting for either Voting Day only, or Advance Vote and Voting Day. Locally, the City of Markham and the Town of Newmarket conducted remote internet voting for Advance Vote and Voting Day, while the Town of Aurora conducted Advance Vote using remote internet voting. The City of Richmond Hill used internet voting for the YRDSB Trustee by-election in October 2020.

In 2020, the City Clerk / Returning Officer engaged consultants from MNP to consider implementation measures for internet voting in Vaughan, including analyzing measures taken by municipalities which have already adopted internet voting. Consultants from iSecurity were engaged to consider the security of internet voting and to make recommendations on the City's internet voting solution and measures necessary for risk mitigation in implementing the internet voting method. The cumulative outcome of these assessments is contained in Attachment 1.

Previous Reports/Authority

Technologies for the 2018 and 2022 Municipal Elections

Analysis and Options

Based on the analysis and recommendations of the consultant teams engaged by the

Election Services Division, the City Clerk / Returning Officer recommends implementing internet voting during the Advance Vote period for the 2022 Municipal Election, subject to the completion of testing of Dominion Voting Systems' (DVS) internet voting solution and the remediation of any critical issues identified during testing.

Internet voting provides additional accessibility options to electors, including the ability to vote away from home for students studying outside the geographic area, and for electors working or vacationing away from home. Internet voting also provides a more convenient voting option for electors that are caught up in the increasingly busy balancing work and family life – negating the need to attend a physical voting place. The internet voting option also negates ballot waste and the potential for an elector to incorrectly mark a ballot, with a virtual ballot and defined fields to mark the ballot, including ensuring electors cannot place an incorrect mark on the ballot or unintentionally overvoting a ballot.

The realities of the COVID-19 environment add an additional benefit and consideration to the adoption of internet voting. The remote nature of voting by internet offers an alternative option to the large in-person gatherings that are associated with an in-person election and negates concerns about having to make contact with people outside of the household in order to participate in an election. An internet vote also avoids the need for election officials to handle physical ballots which would need to be quarantined for a period of time before being counted, in the case of a mail-in ballot option.

As identified in Attachment 1, there are risks to the adoption of internet voting, including the costs associated with initial adoption, cyber risks, and the need for technical assistance not normally required to complete a paper ballot. Experiences in jurisdictions which have adopted internet voting have found that potential concerns about digital literacy impacting one's ability to engage with an internet voting platform have not been realized. Challenges related to accessing internet and requirements for assistance are negated through the implementation of Voter Assistance Centres which provide computers and support staff to help guide electors through the process. Additional opportunities to leverage internet connectivity at community centres and library facilities ensure that no elector is unable to engage with the internet voting platform in the City.

The alternative to internet voting adoption is to maintain the status quo – paper ballots counted and recorded by optical-scan vote tabulators during Advance Vote and Voting Day. Long-term considerations related to the rising costs to employ temporary election workers, increasing difficulty recruiting and retaining election workers through Voting Day, and the conduct of an election in a pandemic make maintaining the status quo a

growing risk for the success of municipal elections in the City of Vaughan.

Financial Impact

Under the City's existing contract with Dominion Voting Systems, internet voting for Advance Vote-only would cost an additional $126,000 plus HST. The cost to conduct the necessary testing of the internet voting solution in advance of the 2022 Municipal Election is estimated at approximately $200,000.00 plus HST. There are opportunities for future cost sharing to complete testing of the solution alongside other Ontario municipalities using the same internet voting solution in future municipal elections. All costs associated with the conduct of elections, including the necessary testing are funded by the City's Election Reserve.

Broader Regional Impacts/Considerations

There are no regional impacts associated with this report. The Regional Municipality of York is not involved in the determination of voting methods for the Mayor and Local and Regional Councillors who also sit on York Regional Council.

Conclusion

Internet voting has seen increasing adoption as a voting method for Ontario municipalities, during both Advance Vote and Voting Day. In York Region, three municipalities have used internet voting technologies during a regular election, with Richmond Hill recently using internet voting to conduct a school board trustee by-election. An assessment of internet voting technology was conducted by consultants from iSecurity, which have deemed the City's internet voting solution to be safe and secure, subject to recommendations further detailed in Attachment 1. The most critical of these recommendations, is to complete testing of the solution to identify areas of weakness for remediation by the vendor prior to implementation.

The adoption of internet voting for the 2022 Municipal Election will provide an easy-to-use voting method that recognizes the increasingly fast-paced life of many Vaughan voters, extending voting to electors who are studying away, out on vacation or business, and provide a new avenue of accessible voting in the comfort of one's own home. The realities of the present COVID-19 pandemic add an additional dimension to the consideration of internet voting, as the risks associated with traditional in-person voting are negated when electors are able to vote from the safety of home via computer or cellphone.

For more information, please contact: Evan Read, Manager, Elections and Special Projects, x8241

Attachments

1. Alternative Voting Methods for the 2022 Municipal Election: Remote Internet Voting, Office of the City Clerk, December 2, 2020

Prepared by

Evan Read, Manager, Elections and Special Projects, x8241
Jenny Sun, Election Project Coordinator, x8495
Todd Coles, City Clerk, x8281

Approved By

Wendy Law
Deputy City Manager,
Administrative Services
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Reviewed By

Jim Harnum
City Manager

CITY OF VAUGHAN

Alternative Voting Methods for the 2022 Municipal Election:
Remote Internet Voting

VAUGHAN
VOTES

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Summary

The Election Services Division retained two consulting firms to complete comprehensive assessments of internet voting to assist with the report back to Council on the security and other implementation measures for consideration of this option for the 2022 Municipal Election.

The assessments were guided by election principles - accessibility, equity, privacy, accuracy and auditability. The scope of the assessment was limited to remote online voting, which is the method that allows voters to cast their ballot online through any device connected to the Internet. In 2018, over 40% of Ontario municipalities offered remote internet voting and over 91% would recommend it again.

In a remote internet voting session, a verified voter is generally mailed credentials (username and/or PIN) along with instructions on how to vote online. The credential requirements could be single or two factor authentications. Once the voter correctly enters their credentials, they're presented with an online ballot to complete. Upon submitting their ballot, a confirmation page is loaded indicating that the vote was successfully received.

Each vote is encrypted and anonymized for additional security prior to processing. That is, the information contained in the ballot is turned into code to prevent unauthorized access and any identifiers linking a voter to a ballot are also removed. When ready, each ballot is decrypted, the votes counted and integrated into the overall totals. Votes are archived for recounts and audits (no authentication information is stored).

There are numerous advantages to online voting such as increased voter satisfaction, improved accessibility, reduced wait times and an increasingly important option of contactless service. All of these elements make online voting more efficient and in return, offer better value for money to taxpayers. However, this option could increase the potential for voter coercion due to the unsupervised nature of remote online voting. It also requires significant financial investment in procuring and testing a solution. Lastly, it introduces cyber risks which do not exist in a paper-ballot model.

Seven risks were identified as part of the City's assessment. No high risks (high likelihood and high impact) were identified. The risks identified can be mitigated to varying degrees. Extensive testing of the internet voting solution is a key recommendation to address the technical risks identified. A large number of business risks can be addressed with changes to the City's policies and procedures to account for this new technology. Voter education is a key component of risk mitigation.

Based on the findings of the consulting engagements, the Election Services Division conditionally recommends a hybrid model for the 2022 Municipal Election. The proposed hybrid model would offer remote internet voting during the Advance Vote period only and paper-ballots on Voting Day. This model is aligned with the delivery of election services by jurisdictions across the province, Canada and internationally. It offers voting options without relying solely on one system.

The conditional recommendation is contingent on the completion of testing by a third-party vendor on the City's internet voting solution and the vendor's proof of satisfactory remediation no later than December 2021.

1. Background

The City of Vaughan entered into a multiyear contract with Dominion Voting Systems in 2016 to provide vote count tabulators for 2018 and 2022, with an optional extension for the 2026 Municipal Election. As part of the RFP requirement, Internet voting was included as a provisional item in the contract. Provisional items are optional, and the City reserves the right to procure these items only if required.

At the Council meeting of April 19, 2017, Item 3, Report No. 15 of the Committee of the Whole (Working Session), was adopted without amendment. Council directed staff to report back no later than December 2020 on security and other implementation measures related to internet voting for consideration of this option for the 2022 Municipal Election.

To assist the Election Services Division in preparing an informed and factual recommendation to Council, the City, through a competitive bidding process, retained two consulting firms to complete comprehensive assessments on internet voting. Two separate RFPs were issued between May and June 2020 with different scopes. The first RFP was a business review and analysis of internet voting, while the second RFP was focused on the technical and security aspects of internet voting. Both engagements were conducted independent of one another to maintain the integrity of their independent assessments.

MNP was retained to conduct the business review and analysis for the City. It focused on understanding the City's current election practices, analyze the experience of jurisdictions who have implemented internet voting and develop a transition plan for the City based on its recommendations. This work will help guide the City in continuing its transformation to deliver more efficient election services.

iSecurity was retained to conduct the technical and security analysis of the current internet voting landscape from jurisdictions to vendors. It was also tasked with identifying risks, gaps and opportunities in internet voting solutions and develop assessment criteria to evaluate an internet voting provider and internet voting solution. As neither Ontario or Canada have standards for internet voting, this work was crucial for the City to gain perspective on best practices and security requirements.

In preparing this report, the Election Services Division considered findings from both engagements and any recommendations put forward within the context of the voting demographics for the City of Vaughan.

2. Objective and Scope

The objective of this report is to provide Council with a recommendation on alternative voting methods ahead of the 2022 Municipal Election.

The scope of this analysis is limited to Remote Internet Voting. Both consulting firms conducted their analysis between July 2020 and November 2020. Given the rapid advancements in technology, it is important to note that systems, standards, workflows and its resulting analyses are reflective of this period and do not consider potential future enhancements.

Both consulting firms reviewed an extensive list of resources and conducted numerous interviews as part of their analysis:

1. Lessons learned reports

2. Workflow documentation

3. White papers

4. Peer-reviewed publications

5. Vendor interviews

6. Jurisdiction interviews

7. Stakeholder interviews

A few notes on the assumptions, limitations and quality of data:

1. The jurisdictions selected for interviews reflect different stages and experiences of Internet voting. Some of the selection criteria included number of election cycles with Internet Voting, vendor, jurisdiction size and demographics and continuity of Council and public support.

2. Internal interviews were limited to 15 stakeholders from the City of Vaughan. Best efforts were made to provide access to a diverse roster of election staff in varying positions and levels of experience.

3. The vendor provided limited live support due to pre-existing commitments. As such, consultants primarily relied on documentation supplied by the vendor and publicly available information.

4. Consultants were tasked with conducting their analysis and subsequent recommendations independent of one another to minimize any potential of influencing their respective work.

3. Election Principles

There are five fundamental principles and requirements for a fair democratic election (POLYAS, 2020).
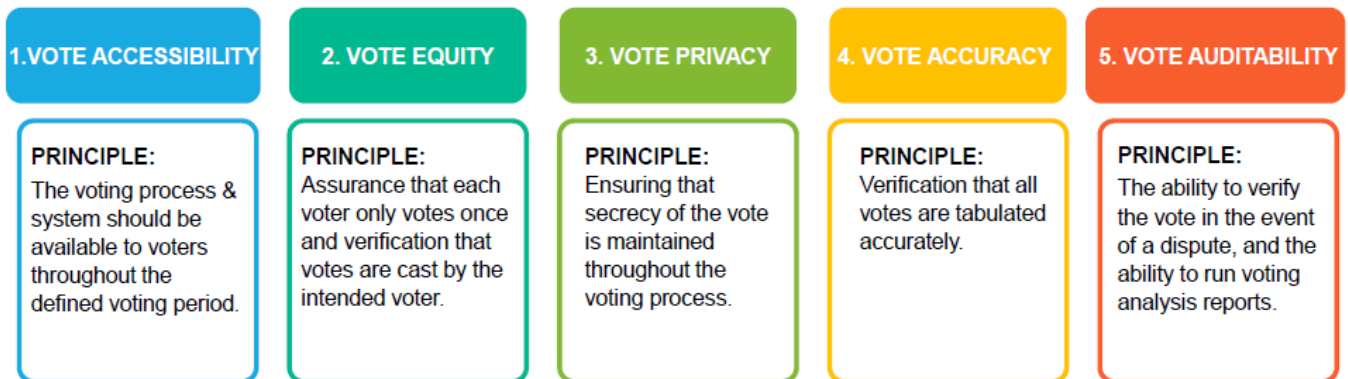

1. VOTE ACCESSIBILITY	2. VOTE EQUITY	3. VOTE PRIVACY	4. VOTE ACCURACY	5. VOTE AUDITABILITY
PRINCIPLE: The voting process & system should be available to voters throughout the defined voting period.	**PRINCIPLE:** Assurance that each voter only votes once and verification that votes are cast by the intended voter.	**PRINCIPLE:** Ensuring that secrecy of the vote is maintained throughout the voting process.	**PRINCIPLE:** Verification that all votes are tabulated accurately.	**PRINCIPLE:** The ability to verify the vote in the event of a dispute, and the ability to run voting analysis reports.

Figure 1: Election Principles

4. Internet Voting

4.1. Electronic Voting Solutions

Electronic voting solutions have been used in several countries since the late 1970s. These solutions leverage technology to obtain ballots, cast votes and/or count votes in political elections. Initially created to improve the efficiency and accuracy of vote counting, the increase in personal devices with access to the Internet have changed the expectations of what these solutions should do.

Currently, there are four main types of electronic voting systems in use:

o **Electronic Voting Machines (EVM):** EVMs use special paper ballots cast at designated polling locations, which are then scanned for tabulation. This system can be complimented by an electronic Voters' List. This is the most common form of electronic voting and the system currently used by the City of Vaughan.

o **Remote Internet Voting (Online Voting):** This method allows voters to cast their ballot using any computer or mobile device connected to the Internet. This method was used by over 40% of municipalities in Ontario during the 2018 election cycle.

- o **Direct Recording Electronic (DRE):** DREs are purpose-built computers with locked interfaces which allow voters to cast their votes directly through a touchscreen (similar to an ATM or a self-service check-in kiosk at the airport). DREs are typically only available at designated voting places and referred to as "vote terminals". The popularity of DREs are growing particularly in the United States in states such as California and Florida. There are no known examples of DRE use in Canada.
- o **Telephone Voting:** In this method, voting is done through an automated attendant phone process. This method is typically used in combination with another voting system.

The scope of this report is limited to Remote Internet Voting (Online Voting).

4.2. Remote Internet Voting (Online Voting)

Internet voting or online voting is a method that allows voters to cast their ballots through any device that is connected to the Internet. This section provides a general model of an internet voting system.

4.2.1. Model of an Internet Voting System

4.2.1.1. Voter Information Package

Registered voters are mailed a Voter Information Package a few weeks before the start of the Advance Vote period (the first opportunity to vote). The packages have general election information, a unique credential and instructions on how to vote online. These packages are comparable to the existing voter information cards mailed out by the City of Vaughan, with additional information for online voting.

4.2.1.2. Casting a Ballot

Using any device (computer, tablet, phone, etc.) with a secure Internet connection, voters can access the internet voting system as follows:

1. Enter the link provided in the Voter Information Package into any standard browser. This will open the secure voting website to access the appropriate ballot. Voters will need to correctly enter their unique credentials (in the form of a username/voter ID and password/and or pin combination) for authentication.

2. After a voter is authenticated, the voter is presented with the ballot.

3. Voters are then be able to mark their ballots and review prior to submission.

4. Once the voter is satisfied that the ballot is marked correctly, the ballot is submitted.

5. A confirmation page is provided confirming that the ballot was successfully submitted, and the voting process is now complete.

User credentials are deactivated only when voters submit or cast their final ballot. This means, voters can access their electronic ballot as many times as needed during the voting period to complete their vote.

4.2.1.3. Processing a Ballot

Each ballot that is submitted is encrypted and anonymized for additional security. Encryption is the process in which information is converted into cipher or code to prevent unauthorized access. Only authorized parties can decipher a code. Data anonymization is the process that removes identifiable information. The combination of these two processes, ensures the confidentiality and secrecy of all ballots cast. Under no circumstances would a voter's ballot be associated to them and vice versa, a ballot cannot be traced back to specific voter.

At the ballot processing stage, all authentication information has been stripped. When ready, each ballot is decrypted, the votes counted and integrated into the overall totals. Votes are archived for recounts and audits (no authentication information is stored).

4.2.2. Authentication

There are two forms of voter authentication commonly used in online voting systems, Single-Factor Authentication (SFA) and Two-Factor Authentication (2FA).

SFA is the simplest form of authentication requiring one credential to identify the user. A correct password (credential) to a username is the most common form. Forty-three percent of Ontario municipalities that used online voting in 2018 used SFA (AMCTO, 2019).

2FA is an additional layer of security that requires users to input two out of three types of credentials correctly, these types are:

- Something you know, such as a date or answer to a question
- Something you have, such as a PIN or password
- Something you are, such as a biometric identifier (fingerprint recognition, facial recognition, voice recognition)

Fifty-four percent of Ontario municipalities that used online voting in 2018 used 2FA (AMCTO, 2019). No municipality used biometric identifiers, instead, opting for a combination of "something you know" and "something you have".

4.3.   Risks and Mitigation of Remote Internet Voting

4.3.1.   General Risks

Remote electronic voting, both over the Internet and telephone are the only methods of voting in which physical presence of the voter or proxy is not required at a polling station. This enables voters to easily cast their vote from anywhere and at a time convenient to them. This convenience comes with risks. The most commonly cited risks associated with remote voting are listed in Table 1. It is important to note that risks exist in every voting method, including paper-ballots.

Table 1: General Risks and Mitigation Associated with Remote Online Voting

Risk	Threat	Details	Potential Mitigation
1. CYBER RISK	Registration email interception (phishing)	Attempting to send voters false registration emails to gain access to vote on their behalf.	• Educate voters on the legitimate registration methods and channels. • Avoid or minimize use of email for communication with voters.
	Unprotected / infected endpoint computers	Personal computers may already be infected with malware and voting could be stolen.	• Encourage voters who do not feel comfortable voting with their personal devices to attend a Voter Assist Centre. • Devices in these locations should be scanned for malware and anti-malware software installed.
	Fake websites posing as election pages	Carefully constructed sites created to steal voter information	• Educate voters on the legitimate registration methods and channels. • Educate voters to only use the information provided in their Voter Information

			Packages, including voting website URL.
	Vulnerability in voting application/infrastructure	Flaws in the design and construction of voting application.	• Extensive testing of voting application prior to implementation and rollout.
2. SYSTEM OVERLOAD	Unexpectedly high voter turnout	Higher than expected load on the system leading to voting application performance issues (e.g. unresponsive application etc.).	• Load test voting application at max capacity. • Mitigate performance issues flagged during testing. • Monitoring of voting application throughout day (at different peaks). • Have vendor and vendor resources on standby ready to triage.
	High system utilization for vote encryption	Strong encryption algorithm impacting system performance.	
	Improperly designed infrastructure	Outages or performance issues with online system resulting from incorrectly sized, load balance or resilient system.	
3. DIGITAL MARGINALIZATION	Voters with limited access to digital services	Alienation of voters without access to high-speed digital services or the latest computing or mobile devices, making it difficult for them to vote.	• Offer Voter Assist Centres with devices connected to the Internet free of charge. • Offer non-electronic voting alternatives.
	Voters not technically inclined and required to vote online	Overly complicated process to vote may be difficult for less technology savvy voters.	
4. VOTE FRAUD	Coercion or vote buying	Since voting is held outside of controlled polling station, there is a chance of pressuring a voter to vote a certain way.	• Educate voters on their rights. • Encourage voters who do not feel comfortable voting with their personal devices to attend a Voter Assist Centre. • Monitor voting application for suspicious activities such as high number of failed login

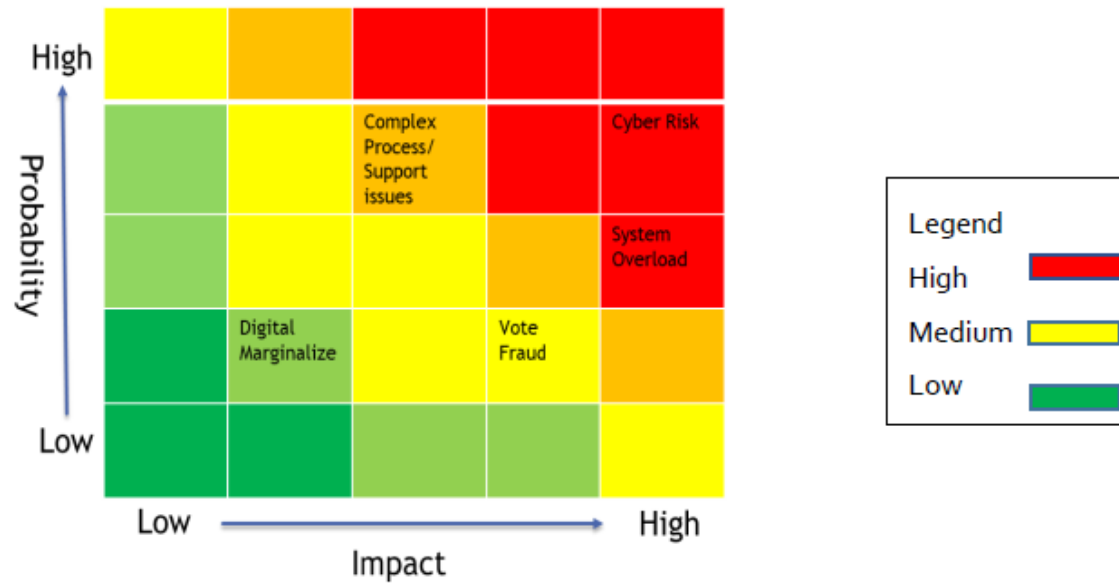|			
			attempts, high activity from single URL.
5. COMPLEX VOTING / SUPPORT ISSUES	Online support issues	Ensuring that online system has enough support teams available to answer questions without lengthy delays.	• Expand support services to include more trained staff. • Secure vendor resources to provide live support.

Online Voting Risks Heat Map

Figure 2: Online Voting Risks Heat Map

Based on the heat map depicted in Figure 2, cyber risk regarding voter confidentiality and system capacity are the most cited concerns with online voting. However, it should be noted that despite the highly cited concerns over cyber risk, no evidence has been found on any unauthorized attempted hacking or direct attacks on online voting applications to date. The other examples of cyber risks listed in Table 1, are inherent risks to Internet usage and not necessarily unique to voting systems (they can target any business or organization).

4.3.2.   Vaughan Risk Assessment and Mitigation

The following section identifies specific risks and mitigation strategies for the City. The assessment compares risks against the Election Principles in Figure 1 and are based on the likelihood of materializing and potential impact on the 2022 Municipal Election. No high risks (high likelihood and high impact) were identified.

The ISO31000 standard risk management was the analysis approach leveraged. The National Institute of Standards and Technology (NIST) Cyber Framework was also used. These are best practice guidelines.

4.3.2.1. Denial of Service

Risk: Denial of Service		Potential Impact: Voter Accessibility
Description: The Internet voting system can be a target of a sophisticated distributed denial of service attack that may render the system inaccessible to voters. There are examples of activist or load related denial of service attacks, most recently in the 2018 Ontario provincial election when over 50 municipalities experienced online voting delays*.	**Existing Controls:** • Impacted vendor has adjusted architecture to sustain distributed denial of service attacks. • Separate advance voting period, reducing risk of single day voting. • Physical voting is available.	**Current Risk Level:**
Recommendations: Technical: • Vendor to provide evidence of stress and load testing performed, including the measurement of max capacity of the system and how the system is throttled. Business: • Develop contingency plan to address potential unavailability of online voting systems scenarios. • Establish more than one voting method to reduce risk system unavailability.		**Risk Level After Recommendations:**

To date, there is only one system overload incident reported in Ontario. In 2018, the voting application for one vendor experienced higher traffic than expected. This resulted in the voting application denying access to voters for a brief period to balance the load. The vendor has since upgraded its architecture to sustain distributed issues like this. This incident was unique to a single vendor and not reflective of the remote internet voting landscape.

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4.3.2.2. Voting Platform Malfunction

Risk: Voting Platform Malfunction		Potential Impact: Voter Accessibility
Description: The Internet voting system may be unavailable or unreachable due to software or network issues. Software modifications to the system or widespread Internet failure to voters could impact online voting system availability. Also, some areas of the City may not have access to reliable Internet access to vote online.	**Existing Controls:** • Separate advance voting period, reducing risk of single day voting. • Physical voting is available. • Logical access to systems is restricted. • Modifications to each system are logged.	**Current Risk Level:**
Recommendations: Technical: • Vendor to provide evidence of stress and load testing performed, including the measurement of max capacity of the system and how the system is throttled. Business: • Develop contingency plan to address potential unavailability of online voting systems scenarios. • In conjunction with vendor, develop change management procedures to ensure sufficient testing is performed prior to any software updates. • Establish more than one voting method to reduce risk system unavailability.		**Risk Level After Recommendations:**

4.3.2.3. Individual Voting Multiple Times

Risk: Individual Voting Multiple Times		Potential Impact: Vote Equity
Description: The deliberate act of a registered voter casting ballot more than once.	**Existing Controls:** • Existing electronic Voters' List can be synchronized to online voting system. • Separate advance voting period allows for refresh of election day Voters' List.	**Current Risk Level:**
Recommendations: Technical: • Document system architecture, data flows and conduct time analysis and identification of controls and testing required to prevent voter from voting more than once. Business: • Develop procedures to ensure election day Voters' Lists are refreshed to capture all advance voting period votes. • Limit online voting to Advance Vote period to further restrict potential synchronization problems.		**Risk Level After Recommendations:**

4.3.2.4. Missing/Lost/Theft of Voting Card or PIN

Risk: Missing/ Lost/ Theft of Voting Card or PIN		Potential Impact: Vote Equity
Description: Interception of the voting registration card information by someone other than the intended recipient. This could allow the vote to be cast by another individual.	**Existing Controls:** • Voter registration information includes last mailing address on file	**Current Risk Level:** MEDIUM
Recommendations: Technical: • Establish 2FA to reduce risk of unauthorized access to ballot should voter card or PIN be intercepted. Business: • The voter registration card should only include the ID. Consider delivering PIN separately via phone or online (after an additional verification method). • Update or negotiate third party agreements specifying requirements and obligations in accessing and distributing confidential information. • Define procedures to investigate reported issues of missing or stolen voter information packages. • Define audit requirements that provide traceability and investigation into reported issues.		**Risk Level After Recommendations:** LOW

4.3.2.5.Exposure of Vote Selection

Risk: Exposure of Vote Selection		Potential Impact: Vote Privacy
Description: A technical or process flaw within the system or a voter's personal computer which could expose vote selections by voters. No guarantee that the device used by voter is free of malware.	**Existing Controls:** • Fully encrypted and secure communication between voter and online system.	**Current Risk Level:**
Recommendations: Technical: • Test and verify that all access Internet Voting system is logged, and access is only used when needed. Business: • Educate voters on how to protect the systems used to cast their vote (e.g. using anti-virus, personal firewall, patching). • Encourage voters who do not feel comfortable voting with their personal devices to attend a Voter Assist Centre where secure devices are available. • Educate voters to only use the information provided in their Voter Information Packages, including voting website URL.		**Risk Level After Recommendations:**

4.3.2.6. Unauthorized Access and Modification of Election System

Risk: Unauthorized Access and Modification of Election System		Potential Impact: Vote Accuracy
Description: This scenario encompasses unauthorized access to the Internet voting system by an external party, by exploiting the available interfaces or underlying service provider infrastructure.	**Existing Controls:** • Vendors may leverage cloud computing service providers which have security features such as antivirus protection and "automatic" patching. These are open architectures that can be verified and tested. • Reputable cloud service providers such as Azure and Cloud Fare have tier 1 data center certified in SOC 2 Type II among other security certifications.	**Current Risk Level:**
Recommendations: Technical: • At a minimum, perform penetration testing and a configuration audit. • Document system architecture, data flows and conduct time analysis and identification of controls and testing required to prevent unauthorized access to the system. Business: • Define an access policy for computers used to manage the administrative portal. • Define logging, auditing and monitoring system requirements for Internet Voting. • Define Internet Voting monitoring and incident response procedures.		**Risk Level After Recommendations:**

4.3.2.7. Incomplete Information Required for Audit and Verification

Risk: Incomplete Information Required for Audit and Verification		Potential Impact: Vote Auditability
Description: Sufficient logs and a full audit trail are required should an investigation of the Internet voting system be required.	**Existing Controls:** • Each vote is logged and timestamped. • Component level auditing and alerting exist.	**Current Risk Level:**
Recommendations: Business: • Define logging, auditing and monitoring system requirements for Internet Voting. • Define Internet Voting monitoring and incident response procedures. • Define post-election auditing policy and procedures to evaluate potential issue and threats.		**Risk Level After Recommendations:**

4.4. Advantages & Disadvantages of Remote Internet Voting

The online voting industry is expected to grow at an annual compound rate of 11%. This is driven by the advantages and disadvantages offered by remote voting solutions and their impact on voters and administrators. The following section was compiled from both research and firsthand interviews of jurisdictions with experience in implementing remote internet voting.

4.4.1. Advantages

Table 2: Advantages of Remote Internet Voting

Metric	Details
1. INCREASED VOTER SATISFACTION	Voters report a higher rate of satisfaction when remote internet voting is offered as an alternative voting method. This is driven by the convenience of voting where they want, when they want.
2. IMPROVED ACCESSIBILITY	Remote internet voting allows voters who are unable to physically attend a polling location to vote independently (without relying on a proxy). It also helps to better address accessibility issues for persons with disabilities, those suffering from illness or those away on personal or work travel or school.
3. EASIER VOTING PROCESS	Most online voting systems are very intuitive and offer audio-visual tutorials for first time users. This is particularly beneficial for first time voters.
4. REDUCED WAIT TIMES	The added convenience of remote internet voting reduces the number of voters who physically line-up at polling locations (where available). This in return reduces wait times at polls.
5. REDUCTION IN BALLOT WASTE	Online voting applications help reduce ballot waste by eliminating spoiled ballots, which are caused by: • Inappropriate markings (outside of box, too light, incorrect marking pen) • Overvoting • Physically damaging a ballot

6. LESS HUMAN ERRORS	Online voting reduces the possibility of human errors in tabulating results.
7. COST SAVINGS	There is generally a reduction in physical voting locations and therefore staff required to support these locations when online voting is available. These savings can be significant for jurisdictions with large populations or geographic area. Savings are most evident in jurisdictions that offer online voting as their only voting method. Jurisdictions with hybrid models may actually spend more to support multiple voting methods.
8. VALUE FOR MONEY	An online voting system is a one-time fixed cost per election cycle. That is, it does not fluctuate or depend on disposable items such as ballots, secrecy folders, pens, etc. therefore delivering better value for money and potentially lowering the cost per voter.
9. IMPROVED EFFICIENCY	Operational and administrative efficiencies from elimination of complex logistics, recruiting, training and vendor management.
10. CONTACTLESS	Demand for contactless services is growing due to COVID-19 and the anticipated changes in the post pandemic world. Internet voting eliminates the need for large crowds to gather in a confined indoor space to vote, sharing equipment and supplies.
11. LANGUAGE	Online voting can reduce language barriers to casting a ballot by providing instructions in multiple languages. This is generally offered on a vendor by vendor basis.

4.4.2. Disadvantages

Table 3: Disadvantages of Remote Internet Voting

Metric	Details
1. SIGNIFICANT UPFRONT INVESTMENT	The first election cycle with internet voting is the most expensive to implement. There are significant costs associated with workflow changes, procuring and testing a voting solution and conducting voter education.

	For jurisdictions that implement a hybrid model, this cost can double as resources are required to support two or more voting methods. Jurisdictions that do not reduce the number of physical voting locations during their transition phase (from paper to online), are more likely to incur additional costs from supporting a hybrid model. As the adoption of online voting increases, jurisdictions are able to scale back on the number of physical voting locations and thereby reducing costs.
2. CYBER RISKS	Risks covered in Table 1 are generally minimized or do not exist in a paper-based environment.
3. VOTER MARGINALIZATION	Certain demographic of voters may feel disenfranchised due to their limited access or knowledge of the Internet to participate in remote internet voting.
4. TURNKEY SOLUTION	Due to the nature of online voting, most vendors that offer internet voting do so as a turnkey solution. This could lead to negative implications if jurisdiction does not have proper oversight of vendor relationship.
5. INCREASED OPPORTUNITY FOR COERCION	The lack of physical oversight in a controlled environment such as a polling location, can lead to higher opportunities to coerce voters.
6. INCREASED RELIANCE ON THE VOTERS' LIST	The accuracy of the Voters' List is an ongoing problem for most of jurisdictions in Ontario. With internet voting, where voters would receive credentials in the mail based on the Voters' List, inaccuracies and gaps would be magnified. This may result in some voters not receiving a card or voters receiving a card intended for someone else in the address.
7. NEED FOR TECHNICAL SUPPORT STAFF	Internet voting requires a large number of staff to be technically inclined or additional funding to contract vendor support. Inadvertently this creates a dependency on IT departments and limits the existing resources in other areas of an organization that can be leveraged, such as contact centres (i.e. Access Vaughan).
8. CHANGES IN CIVIC LIFE	Some believe that altering the nature of electoral participation through internet voting may erode civic life and local social networks.

4.5.   Summary of Findings

The City's retained security consultants found the landscape of internet voting to be safe. That is, in their professional opinion, internet voting as a practice has existing controls that minimize risks. Technical risks can also be effectively mitigated with testing, policies, procedures and voter education. It is important to note that the most commonly cited risks associated to internet voting are inherent to all online transactions – regardless of nature (i.e. online shopping, banking, reservations, etc.). Individuals who engage in these daily online transactions have accepted some of these risks.

From a business perspective, the City's retained management consultants found the advantages of internet voting far outweigh the disadvantages for both constituents and administrators. The improved accessibility, ease of use, cost savings and efficiency all contribute to higher voter satisfaction.

5.   Case Study

5.1.   Ontario

Over 40% of Ontario municipalities used online voting in the 2018 municipal election cycle. Of the surveyed municipalities, 91% (107) would recommend using internet voting again (AMCTO, 2019). Table 4 provides a summary of selected municipalities.

5.1.1.   City of Markham

The City of Markham was the first municipality in Canada to introduce online voting in 2003 (Elections Canada, 2018). They implemented a hybrid model, where online voting was used in addition to paper-based voting places. This model continues to be used by Markham, as recently as the 2018 Municipal Election. In a hybrid model, two types of elections are planned and executed concurrently – paper and online. The paper-based election operates similarly to the current model used by the City of Vaughan. Paper ballots are provided for voters to mark in secrecy which are then fed to a tabulator for counting. The online election model is a vendor turnkey solution similar to the one described in Section 4.

In 2018, the City of Markham offered 11 continuous days of voting. Voters were able to cast their ballot online 24 hours a day throughout the voting period. Paper ballots were available at select voting places during the first eight days of voting. The final three days, including election day, were online-only (but physical assistance centres were opened). A 91% of all votes in 2018 were cast online. Their total voter turnout was 38.26%, the highest in Markham's history since implementing online voting.

There are two notable areas in the City of Markham's implementation of a hybrid model. First, the overall reduction in physical voting locations meant that all their staffing needs were met with internal staff only. This resulted in significant reduction in time and costs associated with

recruitment and training of external staff – which remains as one of the biggest challenges for election administrators. The second area is the investment in their communication strategy. Messaging leading up to the voting period was educational and informative, often addressing misinformation and providing tips on safe online voting. The online voter turnout is reflective of their investment and success in this area.

5.1.2.   Town of Newmarket

Newmarket overhauled their election process in 2018. It introduced online voting and vote by phone (using an automated attendant). Unlike the City of Markham, Newmarket eliminated the use of all paper ballots, opting for a full electronic election. 10 days of continuous voting was offered with limited physical voting places. In these voting places, mobile devices (tablets) were setup and connected to a secure Internet session where voters could be assisted through the process.

Data from Newmarket's post-election analysis shows the following:

- Voter turnout was not impacted by the removal of paper ballots. It remained at 35%, in line with previous paper-based elections.
- 91% of votes cast were done online
- 9% of votes cast were through the phone
- Overall reduction in costs associated with staffing, equipment and logistics management

5.1.3.   Town of Aurora

The Town of Aurora introduced online voting as an additional voting method in 2018. They deployed a hybrid model similar to that of the City of Markham, where online voting was supplemented with paper-ballots. Aurora opted for a split voting period, one that is not continuous and distinguishes between Advance Voting and Voting Day. A total of 10 Advance Voting days were offered in addition to the legislated Voting Day.

During the Advance Voting period, the Town of Aurora offered 24-hour access to their online voting platform. It also offered voter assist centres with connected devices and in-person help. Paper ballots were also available during the Advance Vote period on day three and four at special polls (senior and long-term care homes). Approximately one third of votes cast during the Advance Vote period were done online.

Voting Day was conducted using paper ballots only, that is, there was no reduction in voting locations on this date relative to previous years. As such, the Town of Aurora did not realize the cost and resource savings seen in other municipalities that offered online voting on Voting Day, however, they did note that efficiencies and savings are likely at a higher adoption rate of online voting. These savings will derive from a reduction in physical voting locations and its associated costs, as more voters choose to cast their ballot online.

5.1.4. Summary & Other Notable Examples

Table 4: Summary of Ontario Municipalities

Municipality	Year Online Voting was Introduced	Model	Voting Type	Percentage of Votes Cast Online (latest election)
CITY OF MARKHAM	2003	Hybrid	First 8 Days Voting: • Paper-Based Continuous Voting: • Remote Internet • Voter Assist Centres	91%
CITY OF GUELPH	2014	Hybrid	Advance Vote: • Remote Internet • Paper-Based Voting Day: • Paper-Based	33%
CITY OF PETERBOROUGH	2018	Hybrid	Advance Vote: • Remote Internet • Paper-Based Voting Day: • Paper-Based	41%
TOWN OF AURORA	2018	Hybrid	Advance Vote: • Remote Internet • Voter Assist Centres • Paper-Based (day 3 and 4) Voting Day: • Paper-Based	22%
TOWN OF NEWMARKET	2018	Electronic (Remote Internet & Telephone)	Continuous Voting: • Remote Internet • Voter Assist Centres • Telephone Voting	91%
CITY OF RICHMOND HILL	2020 (by-election)	Full Internet	Continuous Voting: • Remote Internet • Voter Assist Centres	100%

5.2.   Canada

The Halifax Regional Municipality has been delivering municipal and school board elections through a hybrid model since 2008. Halifax offers in-person paper-ballots, telephone voting (through an automated attendant) and remote internet voting. The electronic voting options have been well received. Table 5 outlines Halifax's experience.

Table 5: Halifax Internet Voting Summary

Election	Model	Voting Type	Percentage of Votes Cast Online
2008 MUNICIPAL & SCHOOL BOARD	Hybrid	4 days prior to Advance Vote: • Remote Internet • Telephone Advance Vote: • Paper-Based Voting Day: • Paper-Based	28.40%
2012 MUNICIPAL & SCHOOL BOARD	Hybrid	Advance Vote: • Remote Internet • Telephone Voting Day: • Paper-Based	60.18%
2016 MUNICIPAL & SCHOOL BOARD	Hybrid	Advance Vote: • Remote Internet • Telephone • Paper-Based Voting Day: • Paper-Based	61.00%
2019 BY-ELECTION	Electronic (Remote Internet & Telephone)	Continuous Voting: • Remote Internet • Telephone • Voter Assist Centres	100.00%

*Note: Halifax continued to use their hybrid model for the 2020 Halifax Regional Municipality election. However, data on voting percentages by method was not released in time for this report.

5.3.   International

5.3.1.   Estonia

Estonia is perhaps the most commonly studied example of remote internet voting. It was the first country in the world to hold binding national elections using remote internet voting technology in 2005. In its first year of adoption, only 1.5% of votes cast were done online. However, in the 2019 parliamentary election, the adoption rate increased to 43%. It is estimated that by 2023, votes cast online will surpass paper-ballots. Adoption of remote internet voting at the local (municipal) elections have also steadily increased across the country.

In preparation for the introduction of remote internet voting, Estonia issued National ID cards to all citizens in 2002. This ID is used not only for voting but also for online taxes, passport applications and accessing e-government services. As of 2019, 85% of the electoral has been issued an ID card. Each ID card has a unique personal PIN (which is associated to their ID card) and used as part of their 2FA process.

The voting process is simple. Voters visit the voting website and authenticate themselves using their ID card and PIN. Once their vote is cast, a digital receipt is issued with a QR code which can be used to confirm that the vote was successfully received. Online voting is available in the last four days prior to Voting Day.
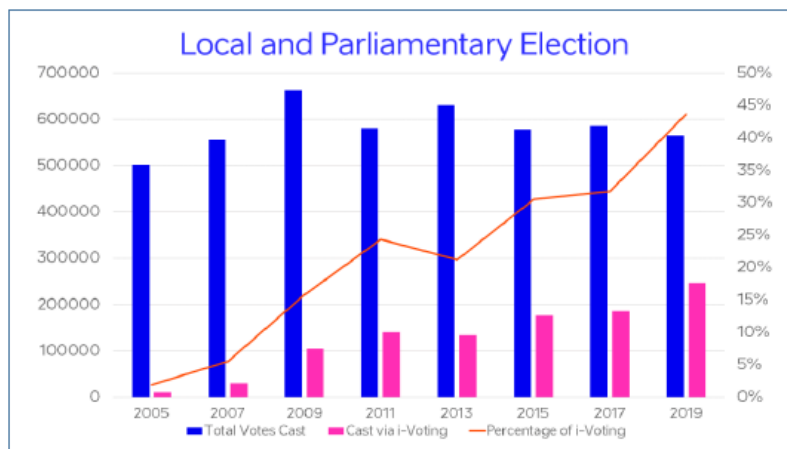

Figure 3: Estonia Adoption

5.3.2.   Norway

Norway introduced remote internet voting in 2011 for its local elections, making it the second country in the world to do so. By 2013, it had allowed 12 different municipalities across the country to vote online for the Storting (parliamentary) elections. It adopted a similar model to Estonia, leveraging their national ID cards. However, Norway's approach to 2FA is slightly different. Instead of using the personal PIN associated with each ID card, voters receive a PIN

by registered mail for that election or can opt to receive it by SMS to a registered phone number.

The feedback received in 2011 and 2013 from voters in Norway was very positive. Most voters liked the practicality of the solution and the ease of use. However, the Norwegian government voted against further online voting beyond 2014 due to voter coercion concerns.

6. Vaughan Voters

According to the most recent census (2016), the median age of a Vaughan resident is 40.2 years, slightly lower than the national 40.7. As seen in Figure 4, Vaughan's population is primarily made up of individuals under 50.
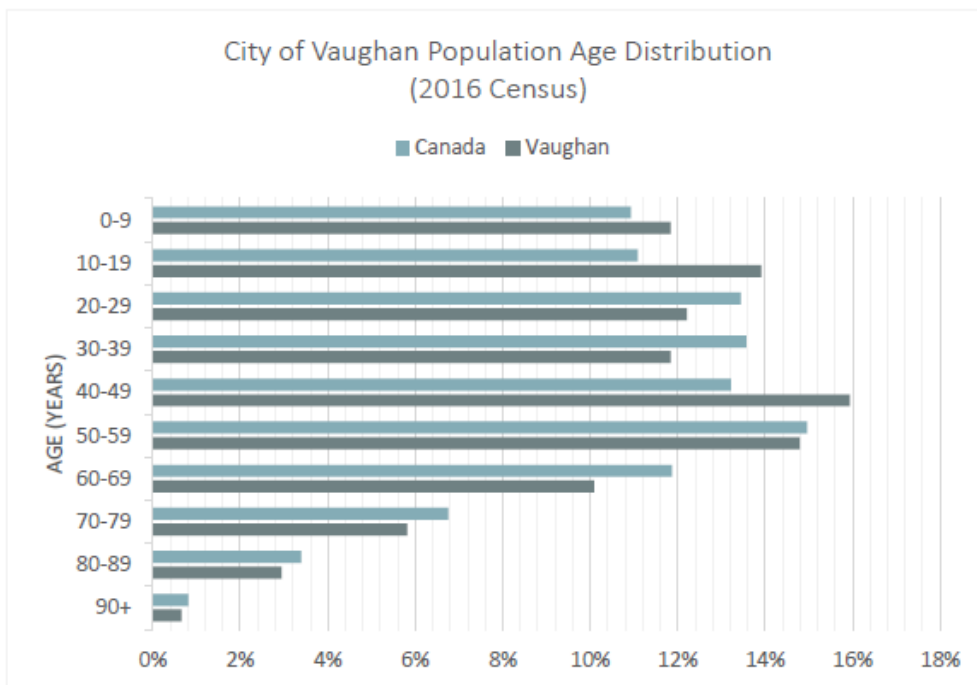

Figure 4: City of Vaughan Population Age Distribution
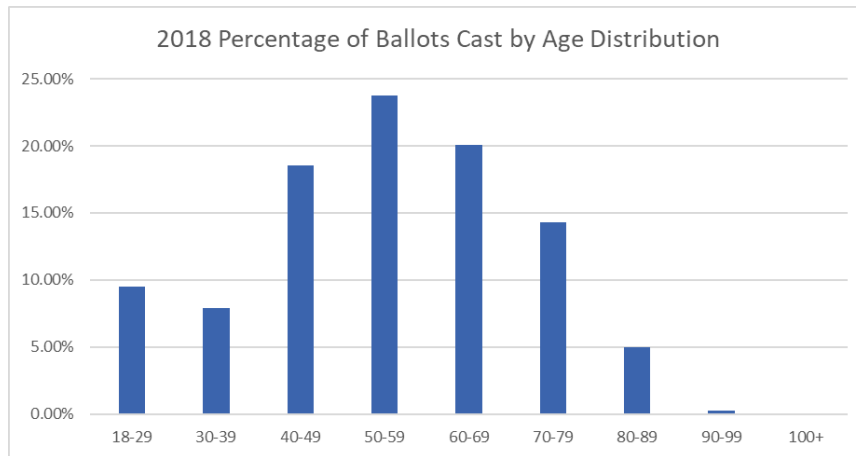
6.1.   Who Voted in 2018?

Figure 5: 2018 Percentage of Ballots Cast by Age Distribution

Figure 5 shows the 2018 City of Vaughan ballots cast by age distribution. This data was taken from the City's Voters' List management software. It is clear that despite seniors (those over the age of 60) making up approximately 20% of Vaughan's population as per Figure 4, they actually represent approximately 40% of ballots cast in the last municipal election.

6.2.   Seniors & Internet Use

Statistics Canada, on their most recent (2018) Canadian Internet Use Survey, reports that 71% of seniors are frequent Internet users (Statistics Canada, 2019). This is significant increase from the previous survey (2012) where only 48% of seniors used the Internet.

Although it is frequently assumed that seniors are not technology savvy, there is no data to support this claim. In fact, none of the municipalities that were interviewed by the consultants reported complaints or criticism from senior voters claiming to be disenfranchised by online voting. Some municipalities were proactive in bridging any potential gaps by organizing 'Lunch and Learns' in senior homes, which were very well received.

6.3.   Very/Somewhat Likely to use Online Voting

Although no voter specific survey has been conducted in Vaughan, a question regarding the likelihood of using online voting services was included in the 2016 Citizen Satisfaction Survey. Note, respondents who identified as not having regular Internet access (dk/na and no Internet access) were excluded in the results of this section as per the footnote on page 13 of the Survey. 745 citizens responded to the online voting question.

Figure 6: 2016 Citizen Satisfaction Survey
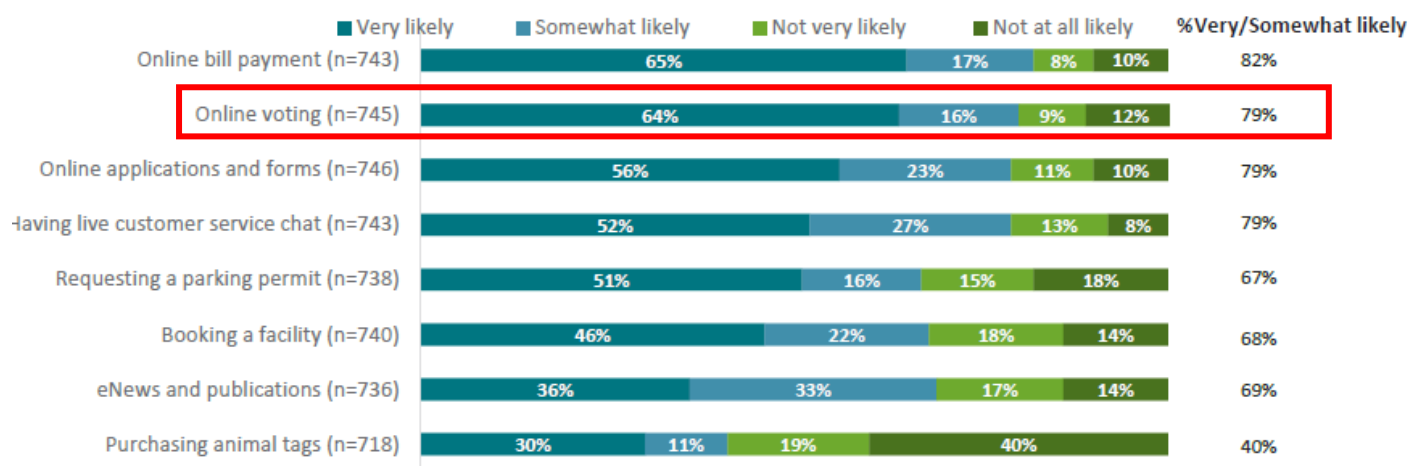
Based on Figure 6, 79% of respondents are very or somewhat likely to use online voting. That is, more respondents are willing to cast a ballot online than to purchase an animal tag (40%) or book a facility (68%) online. This survey shows the openness and willingness of Vaughan residents to engage in remote internet voting if offered.

6.4.   Increase in Online Voting Inquiries

During the 2018 Vaughan Municipal Election, 23 calls were received on Voting Day inquiring about online voting. Some callers were under the impression that the City was offering internet voting, while others called to express their disappointment in the lack of alternative options to physical polls. The Election Services Division has begun to receive inquiries from the community regarding the availability of online voting for 2022. It is expected that interest in alternative voting methods, especially given the current COVID-19 pandemic, will only increase leading up to the next election.

7.   Proposed Model for 2022

This section details the proposed model for the 2022 Municipal Election noting additional considerations and assumptions. The included implementation model is a high-level view of key activities.

7.1.   COVID-19 Considerations

COVID-19 has impacted every aspect of life and it is, for the foreseeable future, a factor that must be considered when planning for the 2022 election. Many jurisdictions across Canada and internationally have held elections during COVID-19 with additional safety measures in place for voters, candidates and election workers. Some of the safety practices implemented include:

- Election officials wearing personal protective equipment (such as masks and face-visors)
- Physical distancing
- Capacity limits
- Protective barriers
- Hand sanitizer stations
- Frequent cleaning of high contact surfaces
- Safety training and pandemic protocol

These safety practices have significantly increased the complexity and cost of administering elections. Many items such as marking pens and secrecy folders become single use to minimize the potential of spreading the virus. The procurement of protective equipment, hand sanitizer and cleaning products has also come at a premium due to demand. Longer voting periods to accommodate physical distancing and capacity limits in voting locations have also contributed to higher costs.

Most impacted jurisdictions have provided alternative voting methods to make sure voters don't have to choose between safeguarding their health and exercising their right to vote. The most common alternatives leverage electronic voting solutions such as telephone voting and online voting. Vote by mail has also become popular*.

Vote by mail considerations are out of scope of this report. However, when considering COVID-19 safety practices for an election, it should be noted that vote by mail is the only voting method alternative that requires a physical exchange of information. That is, the ballot must be mailed to the voter and physically returned to the administrator. Additional protocols need to be in place to ensure the safe handling of mail.

7.2.   Availability of EO Sharing Program

One of the key assumptions for the proposed 2022 model is the continuation of Elections Ontario's Sharing Program. This program was leveraged by the City during the 2018 and 2019

municipal and YRDSB by-election respectively to procure ePoll notebooks and peripherals such as modems. It was a convenient and cost-effective way to secure large quantities of equipment that met the City's requirements.

7.3.   Hybrid Model

After careful consideration of the findings and experiences from other jurisdictions, the Election Services Division recommends the conditional use of a hybrid model for the 2022 Municipal Election. The proposed hybrid model will leverage the existing use of paper-based ballots for Voting Day and introduce remote online voting for Advance Vote only. This model will allow the City to deliver more efficient election services by giving constituents a choice on how to cast their votes. In addition, it will align the City with neighboring municipalities and a growing number of jurisdictions across Ontario that use remote internet voting in some capacity. Hybrid models also reduce the risk associated with relying on a single voting method (whether paper-based or electronic) and are the preferred adoption model for jurisdictions introducing new voting methods for the first time.

7.3.1.   Advance Vote

These are the recommended measures (and the rationale) for Advance Vote in a hybrid model:

1. **Remote online voting be limited to Advance Vote period only.**
   - Allows the City to deliver a clear and consistent message about voting options, methods and dates.
   - Eliminates risk of denial of service on Voting Day.
   - Reduces the impact of a potential denial of service as Advance Vote stretches over several days.

2. **Remote online voting be the only voting method during the Advance Vote period.**
   - Allows the City to deliver a clear and consistent message about voting options, methods and dates.
   - Reduces the risk of voters deliberately attempting to vote twice through multiple voting methods.
   - Improve customer service by only having one voting method to focus on.

3. **Implement split voting period instead of continuous (break between Advance Vote and Voting Day).**
   - Mitigation strategy to address any potential synchronization issues between the online voting system and the Voters' List on Voting Day.

4. **Setup Voter Assist Centres to help voters with remote online voting.**
   - Minimum of one in each Ward (similar to the existing Advance Vote model).

- Equip each Centre with City issued or approved devices (tablet or laptop) that have been scanned for malware, viruses and configured with the latest security updates.
- Voter Assist Centres must have a secure and stable Internet connection, either through a modem or a facility provided connection.
- Staff each location with election workers with knowledge in the election process, online voting system and general technical knowledge.

7.3.2.   Voting Day

These are the recommended measures (and the rationale) for Voting Day in a hybrid model:

1. **Paper-based voting on Voting Day only.**
    - Eliminates risk of denial of service.
    - Simpler to manage one voting methodology on Voting Day given the scale of implementation.
    - Provides a comfortable voting method for constituents that do not want to vote online.

2. **Leverage ePoll notebooks and peripherals to improve processing.**
    - Implemented with great success in 2018, allowing for more efficient processing of voters.
    - Provides a live Voters' List.

7.3.3.   Addressing Risks

Outlined in Section 4 of this report are the risks identified for remote internet voting as a general solution as well as specific risks for the City. Majority of the risks identified can be effectively remediated or the probability of occurrence reduced to an acceptable threshold. Table 6 shows a summary of the proposed strategies to mitigate the identified risks.

Table 6: Summary of Mitigation

STRATEGY	RISKS MITIGATED
EXTENSIVE TESTING	- Denial of Service - Voting Platform Malfunction - Individual Voting Multiple Times - Unauthorized Access and Modification of Election System - Incomplete Information Required for Audit and Verification
DEVELOP POLICIES AND PROCEDURES	- Denial of Service - Voting Platform Malfunction - Individual Voting Multiple Times

	• Exposure of Vote Selection
	• Unauthorized Access and Modification of Election System
	• Incomplete Information Required for Audit and Verification
VOTER EDUCATION	• Missing/ Lost/ Theft of Voting Card or PIN
	• Exposure of Vote Selection

7.3.3.1. Extensive Testing

Independent testing of any remote internet voting solution is highly recommended by security consultants and City security experts. The conditional recommendation to proceed with remote internet voting in a hybrid model is contingent on the completion of testing and remediation. The following set of tests are recommended:

- Penetration Testing
- Vulnerability Scan
- Configuration Testing
- Proof of Concept Testing

Remediation of the findings can be addressed in numerous ways including vendor patches, policies and procedures. However, it is important to note that remediation is an ongoing and complex process. A level of residual risk will remain (this is true of any type of testing) that the City should be willing to accept. The goal of remediation is to lower the level of risk to an acceptable threshold.
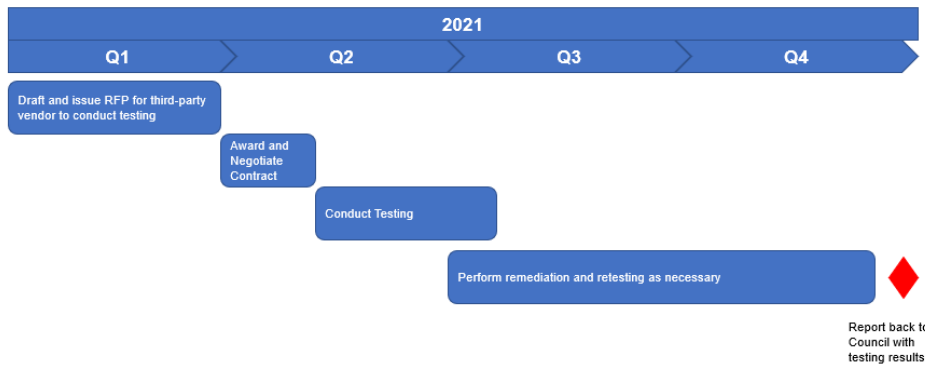

Figure 7: Estimated Testing Timeline

7.3.3.2. Voter Education

Voter education was one of the key recommendations from the 2018 Comprehensive Election Report and supported by the findings of both consulting firms. Investments in delivering and educating voters with clear, consistent and factual information will be one the major mitigation

strategies the City must undertake in transitioning from paper only elections to a hybrid model with online voting. This initiative should start no later than Q4 2021.

7.4. Costs

The implementation costs of a hybrid model are expected to be greater than an election offering only one voting method – particularly in its introductory year. This is largely driven by the fixed costs in acquiring licenses (for online voting), testing and equipment (including ballots) for paper-based elections. Staffing costs are also significantly higher in models that offer physical voting locations. Figure 8 outlines the estimated costs for a hybrid 2022 election model.

Estimated Hybrid Model Cost		
Item	**Estimated Cost**	**Notes**
Online Voting License & Solution	$ 126,000.00	Price of current contract option
Testing[1]	$ 200,000.00	Includes: third-party vendor for testing internet solution
Tabulators[2]	$ 142,902.00	125 tabulators and 2 accessible units
Paper Ballots	$ 40,000.00	120,000 ballots (assumes uptake in online voting)
ePoll Equipment[3]	$ 55,000.00	Includes: tablets, scanners, printers and modems from Elections Ontario's Sharing Program for Voting Day
Supplies	$ 75,000.00	Includes: marking pens, secrecy folders, memory cards, tabulator stands, ballot transfer boxes, etc.)
Personal Protective Equipment	$ 30,000.00	Includes: masks, face shields, gloves, sanitizer, disinfectant, etc.
Printing Services	$ 80,000.00	Includes: voter information packages, pamphlets, etc.
Mail and Postage	$ 80,000.00	Includes: mailing of voter information packages
External Advertising	$ 40,000.00	Includes: social media, print media
Voter Education	$ 50,000.00	Includes: social media, print media, events
Staffing Costs	$ 200,000.00	Assumes 400 election workers
Contract Staff	$ 175,000.00	Based on proposed staffing model
Contingency	$ 75,000.00	
Estimated Total	**$ 1,368,902.00**	*exclusive of taxes*

1: Cost of conducting independent third-party testing could potentially decrease should other jurisdictions be interested in cost sharing.
2: Tabulator costs could potentially decrease pending availability through Election Ontario's Sharing Program.
3: Assumed to be provided through Election Ontario's Sharing Program.

Figure 8: Estimated Cost of 2022 Hybrid Election

For reference, the budgeted costs for the 2014 Municipal Election was $1.02M and $1.10M for the 2018 Municipal Election.

8. Recommendation for 2022 and Next Steps

1. The Election Services Division conditionally recommends the use of remote internet voting (for Advance Vote only) and paper-ballots (for Voting Day) for the 2022 Municipal Election.

2. The Election Services Division further recommends issuing an RFP in Q1 of 2021 to secure a third-party vendor to conduct independent testing of the City's internet voting solution.

3. The Election Services Division will collaborate with the City's vendor to remediate findings. A remediation plan will be drafted with the City's vendor by end of Q2 or early Q3 at the latest. Proof of satisfactory remediation needs to be provided to the City no later than December 2021.

4. The Election Services Division will report back to Council no later than December 2021 with the results of testing, for final approval to proceed with exercising the contract option for remote internet voting for the 2022 Municipal Election.