Date: 2022-05-02

Subject: **RM 14/2022: 2022 Municipal Election – Testing and Certification of Voting Technology**

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Report Number: Legislative Services-2022-553

Recommendations:

That the report titled: **RM 14/2022: 2022 Municipal Election – Testing and Certification of Voting Technology**, to the Committee of Council meeting of June 22, 2022, be received.

Overview:

- **The next municipal election for the City of Brampton will be held on Monday, October 24, 2022.**

- **By-law 265-2021 authorizes the use of voting and vote counting equipment for City of Brampton Municipal Elections, in accordance with Section 42 of the *Municipal Elections Act, 1996,* as amended**

- **Through Resolution CW146-2022, Council has requested the City Clerk to report on the vote tabulation equipment to be used in the 2022 Municipal Election, and to provide information on certification processes and options available for audit purposes.**

- **This information report fulfills Council's request for information pertaining to the vote tabulation equipment, and options for auditing the equipment.**

Background:

The City of Brampton conducts municipal elections in accordance with the *Municipal Elections Act, 1996*, as amended (MEA). The next regular municipal election will take place on October 24, 2022.

Section 42(1) of the MEA permits municipalities to pass a by-law authorizing the use of voting and vote counting equipment such as voting machines, voting recorders or optical scanning vote tabulators. Such by-laws must be passed by May 1 in the year of the election.

For more than 15 years, the City of Brampton has used optical scan units (vote tabulators) and touch screen units for accurate and efficient vote tabulation and results reporting.

At its Committee meeting of November 18, 2020, Council passed Resolution CW289-2020 to confirm the 2022 Municipal Election voting model of in-person voting with paper ballots, and vote tabulation equipment and accessible voting units. By-law 265-2021 was passed in this regard.

At its Committee meeting of March 30, 2022, Council passed the following resolution pertaining to vote tabulators, which has been added to the Referred Matters List as item RM 14/2022:

> CW146-2022
>
> That the City Clerk be requested to report on tabulation machines used and the certification processes applied thereto; and
>
> That potential additional options available for audit purposes, externally or from within, be detailed.

The City's supplier of election equipment for the past several elections has been Election Systems & Software (ES&S). The City is leasing equipment for the 2022 Municipal Election from ES&S. Prior to the 2018 election, the City owned ES&S vote tabulation equipment.

Current Situation:

Voting Technology

Based on Council's approval of an in-person voting method with paper ballots and vote tabulators, the City has leased 200 units of the DS200 vote tabulator from ES&S. In addition, in order to fulfill the Clerk's obligations under the MEA towards accessibility for all voters, the City has leased 15 ExpressVote accessible voting units.

For the 2018 Municipal Election, the City leased DS200 vote tabulators, and a legacy version of the accessible voting unit (AutoMARK).

For the 2022 Municipal Election, one vote tabulator will be placed at every Advance Voting location and every Voting Day location in the city. Based on the voter turnout in the 2018 Municipal Election, certain locations have been identified that will require an additional vote tabulator in order to facilitate an efficient voting process for voters.

In addition, one accessible voting unit will also be placed at every Advance Voting location. On Voting Day, one accessible voting unit will be available at a designated voting location in each ward, to provide greater accessibility to voting. Voters will be informed which location in their ward will have an accessible voting unit.

The City has received its shipment of equipment and testing is underway.

Election Technology Overview

All election technology falls under the responsibility of the City Clerk, who is responsible for the administration of the election. The Election team is comprised of administrative and technical resources who are seconded to the City Clerk's Office for the duration of the election project. While the Election team maintains a strong partnership with the Digital Interactions and Information Technology (DiIT) department, the core technical resources assigned to the Election project report into and receive direction from the Clerk.

In addition, the vote tabulation and accessible voting unit technology used for the Election project does not connect to the corporate network at any time:

- A separate and unique internet connection is used when programming the software for vote tabulators and accessible voting units

- A separate and unique internet connection is used for the transmission of results to the Election Office after the close of voting

Pre-Election Testing and Certification of Equipment

Testing of the vote tabulation equipment begins early on in the election project. A rigorous testing plan is developed in consultation with the vendor, and is based on municipal best practices.

It is important to note that currently, there are no approved or endorsed technical standards for the use of voting technology in Ontario elections. The Chief Electoral Officer of Ontario made a recommendation to establish common evaluative standards and a certification process for election technology, in the 2018 Provincial Election Report. Until provincial standards are established, municipalities continue to work with

vendors to create comprehensive testing procedures to validate and certify the equipment, based on established best practices.

The City's testing procedures for vote tabulators and accessible voting units are documented in the Procedures for the use of Vote Tabulators & Accessible Voting Units (E2208) attached as Appendix 1. These procedures are required under the MEA and must be established by June 1 of the election year, and made available to candidates.

The testing procedures followed are summarized below for ease of reference:

Testing Vote Tabulators

- Prior to the first voting day (advance voting), each vote tabulator is tested to ensure it will accurately count the votes cast for all candidates

- While testing, adequate safeguards are taken to ensure the software system, or any part of it, that is used for processing and tabulating votes is isolated from all other applications or programs and that no remote devices are capable of gaining access to the vote tabulator

- Testing phases include:
    - Diagnostic testing (clock, display, hardware configuration, printer, ballot reader, battery and modem)
    - USB flash drive testing
    - Voting location testing
    - Ballot testing of all ballot faces, including marked, blank, over voted and under voted ballots
    - Results testing – verification of printed results with transmitted results

- A complete record of all testing phases will be retained in accordance with the records retention requirements of the MEA and the City's Retention By-law

- In the event that a vote tabulator requires repairs or a USB flash drive requires replacement, the vote tabulator or USB flash drive will be retested before it is put into operation

Testing Accessible Voting Units

- Prior to the first voting day (advance voting), each accessible voting unit is tested to ensure it will accurately produce a paper record for votes cast for all candidates

- While testing, adequate safeguards are taken to ensure the software system, or any part of it, that is used for voting is isolated from all other applications or programs and that no remote devices are capable of gaining access to the accessible voting unit

- Testing phases include:
    - Diagnostic testing (clock, display, hardware configuration, touch screen area, accessibility tools and battery)
    - USB flash drive testing
    - ExpressVote printer testing
    - Ballot testing of all ballot faces
    - Candidate selection testing – verification of selected candidates with ballot print-out
- A complete record of all testing phases will be retained in accordance with the records retention requirements of the MEA and the City's Retention By-law
- In the event that an accessible voting unit requires repairs or a USB flash drive requires replacement, the accessible voting unit or USB flash drive will be retested before it is put into operation

Candidates and third party advertisers will be invited to attend a demonstration of the voting equipment at an information session to be held in September 2022.

Testing and Review Completed by Vendor

In addition to the above testing completed by staff, the vendor participates in review and testing of the election management system set-up at various stages of the election period:

- Participates in onsite installation of software and firewalls ahead of system set-up
- Completes a detailed review and sign-off of the election set-up in the election management system
- Completes onsite logic and accuracy testing of every vote tabulator and accessible voting unit prior to advance voting in order to certify each machine.

    The vendor's Logic & Accuracy Checklist for the City of Brampton is attached as Appendix 2

Mock Elections and Other Testing Opportunities

Staff also schedule multiple mock elections ahead of advance voting, in order to test the vote tabulators and accessible voting units. Testing conducted during mock elections includes:

- Hardware and software functionality and accuracy
- Ballot printer review

- Results transmission review

One mock election has been completed to date using 12 vote tabulators. Other mock elections are scheduled to take place over the coming months, with the next mock election in July 2022.

The City also serves as returning office for the Association of Municipalities of Ontario (AMO) Board of Directors Election, which takes place in August 2022. Staff will be conducting this election using paper ballots and vote tabulators, and will use this opportunity as a real-time mock election test of the voting technology and ballot printer ahead of the municipal election.

Post-Election Testing and Certification of Equipment

Following the unofficial results transmission on Election night, staff receive all vote tabulators, accessible voting units and marked and unmarked ballots at the Election Office for a post-election review and audit of results. The results tape from each vote tabulator is re-printed and cross-referenced with the results that were transmitted on Election night in order to identify any discrepancies in results and address any errors. For each voting location, the results for each candidate are reviewed, line-by-line to ensure the transmitted results are correct.

This process is completed each election, and must occur before the Clerk can certify the results. In the City's history using vote tabulators, a discrepancy has never occurred between transmitted results on Election night and the post-election certification review.

Options for Audits of Equipment

Upon Council's request for information regarding possible options for audits of the vote tabulators, staff surveyed a number of Ontario municipalities to inquire if any municipalities conduct such audits. A small number of responses were received indicating that either the municipality did not conduct an audit, conducted an audit via internal departments, or used an external auditor to conduct an audit.

Option 1: Continue with Existing Testing and Certification Processes

With this option, staff would continue with the use of existing testing plans and processes to validate and certify vote tabulators in partnership with the vendor, as outlined in Appendix 1.

Although no technical standards exist either provincially or federally, the US Election Assistance Commission (EAC) provides various resources related to testing voting equipment. Vendor systems must be certified for use by the EAC; the systems used by ES&S, the City's current vendor, are certified for use by the EAC.

There would be no additional audits of the voting technology with this option.

The Cities of Toronto and Mississauga do not conduct audits of their voting technology outside of their defined testing plans and vendor logic and accuracy certification.

Option 2: Engage internal departments to conduct an independent review of the vote tabulators

This option would require engaging internal departments to observe and participate in a review of the testing activities and certification process. Internal departments would be engaged at various stages of testing to ensure test plans are followed accurately and all machines are behaving as expected. This model has been followed in other municipalities, leveraging both Internal Audit and Information Technology departments.

The City of Edmonton Office of the City Clerk engages the Office of the City Auditor, which is accountable to City Council, to review the overall operation of the election project, including a review of the testing of the voting technology. The audit process used by the Office of the City Auditor (Auditors) for voting technology is summarized below:

Election staff develops a logic and accuracy (L&A) script and checklist to ensure that all tabulators, voter assist terminals and ballot on demand printers are programmed correctly for their respective assigned locations. In partnership with the vendor, every machine is tested and the checklist is completed before being sealed and deployed. The Auditors then validate each checklist to ensure they have been completed correctly, comparing the test results tapes to expected results, and cross-referencing serial numbers, seal numbers and assigned locations. Any detected anomalies would be addressed by reprogramming or replacing a machine, and retesting.

The Auditors conduct random site visits during the voting period, to observe processes in the voting locations. This includes verifying that the expected vote tabulators are located in the correct stations, and still include the seals validated during pre-election review. On Election Night, an Auditor is situated in the Results Centre, observing the process as aggregated totals are received from the voting stations and unofficial results are posted on the City's website. Post-election, the Auditors are again involved with the review of the results and ballot accounting. The results audit ensures that the totals reported on the tapes, transmitted data files and posted on the website are consistent, while the ballot accounting ensures all ballots (marked, unmarked and spoiled or rejected) are accounted for. Election staff also conducts a post-L&A test on a random sample of voting tabulators as one final confirmation that the tabulators are functioning properly. The results of the audit are summarized in a post-election report to Council.

The City of North Bay is another municipality that engages internal departments to conduct an audit. The City's Information Systems department conducts an audit of vote tabulators in partnership with vendor.

Possible options for the City include engaging the Internal Audit department or the DiIT department to observe the testing and certification process.

A potential engagement with Internal Audit could include the following:

- Observation of future mock elections
- Observation of hardware and software testing of AMO Election
- Observation of logic and accuracy testing conducted by vendor

Option 3: Engage an external third-party to conduct an audit of the vote tabulators

This option would require an external third-party organization to conduct an audit of the voting technology.

The City of Ottawa engages an external auditor to conduct an assessment of the multiple election processes based on agreed-upon procedures prepared in line with Section 9110 of the CPA Canada Handbook. The assessment covers multiple processes including the use of vote tabulators. The cost of the engagement for the 2022 Municipal Election is expected to be up to $85,000.

For the 2018 Municipal Election, the City of London engaged an external auditor to certify the tabulation equipment for the ranked choice voting election. The City had requested the province to certify the voting equipment, but the request was not fulfilled. In the absence of provincial certification of ranked ballot voting equipment, the Auditor provided verified processes, procedures, and tested the algorithm to provincial regulation. London was the only municipality in Canada to implement ranked choice voting. The cost of the engagement for the Auditor was over $147,000. As ranked choice voting is no longer an option under the MEA, the City of London will return to the traditional First-Past-The-Post voting method for 2022. As a result, the City does not require the use of an external auditor, and so no external or internal audits are planned for this election.

The City of Wasaga Beach, like many municipalities that conduct internet voting, engages an independent auditor for the internet voting audit function; this election, the City is also planning to have the auditor present to observe the logic and accuracy testing for vote tabulators.

If Council chooses Option 3, an appropriate budget will need to be determined, as well as project scoping and timelines.

Corporate Implications:

Financial Implications:

There are no financial implications resulting from this report. If Council wishes to exercise Option 3 as indicated in this report, adequate budget will be required and corresponding funding source identified.

Other Implications:

None

Term of Council Priorities:

This report fulfills the Council Priority of a Well-run City by demonstrating the comprehensive testing plan of vote tabulation equipment.

Conclusion:

Authored by: Reviewed by:

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Approved by:

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Commissioner, Legislative Services

Attachments:

Appendix 1: Procedures for the Use of Vote Tabulators & Accessible Voting Units (E2208)

Appendix 2: Election Systems & Software DS200 Logic & Accuracy Checklist for the City of Brampton