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To Whom It May Concern:

I understand that you are considering adoption of e-voting for upcoming elections in the City of Guelph. As a resident of Guelph and a lecturer at the Centre for Society, Technology, and Values at the University of Waterloo, the topic of e-voting is one of interest to me and my students. In that capacity, I have some observations in the matter that you may find informative in your deliberations.

No doubt you are aware of reports relating to previous occasions in which e-voting was considered and studied. I include links here for your convenience, including the report that I submitted to Guelph City Council in 2017. (As the situation with e-voting remains the same in many respects since 2017, that report is still applicable in 2024.)

- Staff report: "[2026 Municipal Election Alternative Voting Methods and Accessible Voting Service Enhancements](#)"
- Cardillo, A., Akinyokun, N., & Essex, A. (2019). [Online voting in Ontario municipal elections: a conflict of legal principles and technology?](#). In *Electronic Voting: 4th International Joint Conference, E-Vote-ID 2019, Bregenz, Austria, October 1–4, 2019, Proceedings 4* (pp. 67–82). Springer International Publishing.
- Essex, A., & Goodman, N. (2022). [A Cyber-Threat Analysis of Online Voting in Canada](#). In Garnett, H.A. (2022). *Cyber-Threats to Canadian Democracy* (Vol. 6) McGill-Queen's Press, 87–115.
- Shelley, C. (2017). [E-voting in Guelph 2017](#). [Online document]

Obviously, this material is extensive, so I will just comment briefly on some salient matters rather than rehearse every point raised in these sources. I do wish to call particular attention to relevance of **artificial intelligence** to e-voting, which is one aspect of the situation that has changed in significant ways in recent years.

Accessibility

There is no question that e-voting is superior in accessibility for some voters than other voting methods. Also, accessibility is an important component of election integrity. If accessibility were the only consideration, then there could be no objection to adoption of e-voting.

Security: Accuracy and small potatoes

Another component of election integrity is accuracy. In brief, vote counts from ballot tallies should accurately represent the intentions of voters. With paper voting, this consideration implies that ballots and vote counts must be kept secure from manipulations that would cause misrepresentations. With e-voting, this consideration implies keeping ballots and vote counts secure from what is broadly called “hacking.”

One argument sometimes made to support the claim that e-voting in municipal elections (like Guelph’s) is secure from hacking is that no one who with the ability to hack a municipal election would care to do so. Guelph is small potatoes, the argument goes, so a lack of motivation to interfere in its affairs will serve to keep e-voting secure.

Regrettably, this argument is not convincing. It invites us to imagine that hacking of elections is something done at the state level by computer experts, such as hoodie-wearing computer whizzes in the basement of the Kremlin. It is true that, according to the ongoing investigation by [the Foreign Interference Commission](#), such people seem mostly interested in manipulating federal elections, though that is not hugely reassuring.

More likely, the sort of person with an interest in hacking Guelph’s next election is Guelph’s next [Michael Sona](#). Recall that Sona was a local Conservative partisan who used robocall equipment, along with other electronic resources, to target Guelph voters with misinformation about the 2011 federal election. He was convicted of crimes under the Elections Act for his efforts.

It is true that Sona acted in a federal election and not a municipal one. What is important here, however, is that Sona was a local partisan and not a cool hacker-for-hire in an exotic locale. The problem with the small-potatoes argument in this respect is that it invites us to view local elections through the lens of international affairs. It may be indeed that foreign partisans do not care about who is elected in Guelph, but this does not mean there are no local partisans prepared to intervene.

Security: Voter manipulation

Another respect in which election integrity is misrepresented in notions like the small-potatoes argument is that manipulating election results requires expertise beyond the grasp of most mortals. Even if a local partisan had the motivation to hack a local election, according to this view, they wouldn’t likely have the hacking chops to pull it off.

Certainly, several of the many security vulnerabilities of e-voting systems on offer in Ontario today require specialized expertise. Those curious about technical aspects of e-voting security (“cybersecurity”) are invited to read the materials co-authored by Professor Alex Essex of Western University, listed above, who is an expert in these matters.

However, many “hacks” that apply to e-voting require very little technical expertise.

Returning to the Michael Sona case, Sona had only to program a robocalling system to deliver a pre-recorded message to numbers in a list that he acquired from a Conservative Party database that he was granted ready access to. Sona attacked the integrity of the election not through any unusual feats of stealth, technical wizardry, etc., but simply by manipulating voters with readily available and easy-to-use means.

E-voting presents many similar opportunities. For example, Essex and Goodman (2022) discuss *voter-targeted phishing*. In this scenario, targeted voters would receive an email or text message reminding them to vote and providing a link to an official-looking website. The bogus website invites victims to enter their credentials and then cast their ballots. The site can then either simply discard voters' information, thus simply disenfranchising its victims, or it can use information voters were tricked into providing to impersonate the victims and cast ballots in their stead, possibility against their intentions.

Clearly, this attack is quite similar to the one mounted by Sona, substituting phishing texts or emails for robocalls. Unfortunately, such attacks are increasingly common and effective in Canada. A recent report by the Canadian Anti-Fraud Centre reported that \$24m was lost to fraudsters using phishing text messages in 2023. Spokesman Jeff Horncastle noted that this figure substantially underestimates the actual loss since only 5–10% of fraud victims report incidents. “Honestly, from what we’re seeing, it’s everybody that’s a target and a lot of it has to do with automation,” he remarked for [a recent news report](#).

Experience with phishing scams suggests that voter-targeted phishing would be effective and could be deployed at a large scale with modest resources.

It has also become much easier technically to carry out than previously. As Mr. Horncastle pointed out, automation has made phishing scams cheaper and more effective. In particular, artificial intelligence (AI) facilitates the process in a number of ways.

To see some of the implications for e-voting, you can simply visit [ChatGPT](#), OpenAI’s freely-available AI chatbot, and ask it about the vulnerabilities of online voting. It readily lists numerous options and can elaborate on how each one may be carried out. (Prompt: “I am concerned about online voting. In what ways is it vulnerable?”) It can also help to frame phishing emails and texts. (Prompt: “What message can I send people to vote at my election website?”) It can also generate code for election websites themselves. (Prompt: “I need to hold an election. Make a website that voters can access to cast their votes.”)

The results may be easily tweaked to imitate the website of any given municipal election, such as Guelph’s. More sophisticated AIs can produce more detailed information, instructions, and results.

Don’t take my word for it. Try these prompts for yourself along with any more that come to mind.

As noted above, people often take the view that security concerns with e-voting involve arcane knowledge and difficult-to-obtain means or expertise. For some security concerns, this is true. For others, it is not, and these latter concerns have only grown in recent years.

Authenticity: Voter coercion and vote taking

Security issues like voter manipulation can affect elections at a large scale. Other issues tend to affect individuals or small groups. For example, Essex and Goodman (2022) discuss the matters of voter coercion and vote taking.

Voter coercion involves voters being coerced into voting in a particular way by a hostile individual or organization. Anecdotal evidence in Ontario points to cases of parents casting ballots on behalf of their children, or spouses casting their partner’s ballots, often without permission. Vote taking involves third parties obtaining a voter’s authentication

information, such as PIN number and birthdate, and casting their ballots in their place. On some occasions, voter authentication information was stolen; in other cases, the information was gifted by voters to third parties. (There is also the issue of vote selling, where voters exchange their voting credentials for other considerations, which Essex and Goodman do not discuss.)

These issues are known challenges for any absentee-ballot system, including mail-in ballots. The problems that they pose are clear: They expose some voters to risks of coercion, in the presence of negative family or household power dynamics, thus depriving them of their right to vote on their own behalf. Of course, all of these issues undermine election integrity by skewing election results from the actual intentions of voters.

There are a number of ways these issues might be addressed. For example, some e-voting systems are set up to allow voters to cast ballots multiple times, with the last ballot being the one that counts. The idea is that if a voter is coerced into casting a ballot online at a given time, they can override that with a later vote outside the influence of the coercer. Some e-voting systems provide this function. This response is notably weak since a coercer with a voter's authentication information can also override previous votes.

Another possibility is the principle of the supremacy of paper. This is a principle adopted in the Estonian e-voting system, which developed at a national level with substantial resources. The idea is that if a voter is coerced into casting a ballot online, they can resort to a conventional polling station to cast their authentic ballot in a situation where their privacy and personal security is guaranteed. It is not clear to me that any e-voting system on offer in Ontario provides this function. In any event, this method also has its limitations, as it places the onus on victims of coercion to take extra steps to correct their votes.

The most obvious way to address the issue of vote taking is to have robust user identification. Systems on offer in Ontario have very weak authentication measures, usually consisting of a PIN code and birthdate. These are weak because people's birthdates are often publicly available and PIN codes can be intercepted or observed. Voter coercion and vote taking are considered small-scale issues (and have not been well studied), which it is tempting to take lightly as a result, but I would caution against this response. Firstly, issues that affect small groups are still significant. People for whom conventional voting presents an accessibility barrier in elections may be a small group numerically but their right to civic participation remains significant also. Secondly, voters deprived of their votes through coercion are unlikely to complain to authorities about their situation. They may refrain out of concern for the coercer or of themselves, or simply feel too embarrassed to make a report. As a result, this issue does not enjoy much of a profile and people whose votes are coerced due to e-voting adoption are not likely to appear at public consultations. Nevertheless, their interests deserve consideration.

Consistency: Oversight and standards

Ontario municipalities that adopt e-voting as a voting method are in an awkward situation: the Municipal Elections Act places many requirements on the conduct of elections where paper ballots are concerned. However, the Act also allows municipalities to adopt e-voting as a voting method—without establishing any standards or requirements at all. The

Province of Ontario appears to be singularly unconcerned with the integrity of municipal elections that adopt e-voting. How did this remarkable state of affairs come about? In 2010, the province's Chief Electoral Officer undertook a study to investigate the possibility of using alternative voting methods, particularly e-voting. As part of this effort, Elections Ontario announced that it would use e-voting in a pilot project in a byelection in 2012, provided it could acquire use of a system that met its requirements. By the spring of that year, Elections Ontario had determined that no available system would suffice and cancelled its plans, as explained in [their report](#):

By evaluating the implementation against our criteria, we determined that it would introduce more complexity and security issues, operational challenges and risk than originally anticipated. It would take time to determine whether these identified risks could be adequately resolved. As such, we did not proceed to the next stage of pilot development.

Instead, the province decided to monitor developments in the field waiting for evidence of e-voting software that measures up to its expectations. It is still waiting.

In the meantime, in its wisdom, the province permitted municipalities to adopt e-voting systems of whatever nature, laying down no standards and adopting no oversight role.

It is surely remarkable that the Province of Ontario would determine that no e-voting system meets its criteria for integrity of provincial elections or byelections yet hold that e-voting is perfectly acceptable for municipal elections! One cannot help the impression that municipal elections are just small potatoes when viewed from Queen's Park.

This posture has some unfortunate consequences for municipalities. The most obvious is that they must shoulder the burden of determining what criteria e-voting systems should meet. This sort of responsibility requires the resources of state or national-level governments, as seen in countries such as Estonia or Switzerland where e-voting has been pursued in a serious way. Through no fault of their own, Ontario municipalities simply do not have the kind of resources that the job requires.

So, Ontario municipalities must make ad hoc decisions about e-voting adoption. As a result, each municipality does things differently, resulting in a situation where the integrity of municipal elections varies considerably from one place to another. Ontario voters deserve consistency and high standards in their local elections but the current situation makes that impossible. This situation is both unfair to voters and may serve to undermine their acceptance of municipal election results *in toto*.

In their discussion of the current state of affairs regarding e-voting in Canada, Essex and Goodman (2022) conclude that senior governments must step in "to develop some type of regulatory framework for digital voting in Canada. Such a framework is essential for preserving democratic health in an era of digital voting and elections."

Rather than contribute to the risks and inconsistency of e-voting in Ontario, the City of Guelph should advocate for the development of such standards, which is what Essex and Goodman have themselves set out to initiate.

Transparency: Paper vs online ballots

The lack of oversight and standards in e-voting in Ontario has important implications for the transparency of municipal elections. On this point, it is instructive to consider some salient differences between voting on paper and voting online.

For example, the Ontario Municipal Elections Act allows candidates for municipal election to appoint scrutineers to ensure the accuracy of ballot counting:

Scrutineers at election of candidate

16. (1) A candidate may appoint scrutineers to represent him or her during voting and at the counting of votes, including a recount.

...

Objections

[54.] (3) A scrutineer or certified candidate may object to a ballot, or to the counting of some or all votes in a ballot, on the ground that the ballot or votes do not comply with the prescribed rules.

Scrutineers help to ensure that ballots are interpreted appropriately and that vote tallies are accurate. It also provides candidates with assurances that the winners and losers identified through the counting process are the actual winners and losers of the election. Of course, e-voting eliminates such scrutiny. Since ballot interpretation and vote counting occur in a black box somewhere on the internet, using a proprietary process that neither candidates nor the public are allowed to inspect, no scrutiny can take place and no objections can be lodged.

Note that the Act mentions not only vote counting but also recounts. Unfortunately, e-voting eliminates recounts as well. With paper ballots, a recount involves retrieving ballots from locked storage, interpreting them again as votes, and tallying the results. With e-voting (as currently on offer), this sort of recount is not possible because e-voting systems do not store ballots. Note that a ballot is a list of the names of candidates for office, represented on paper, screen, etc., that voters interact with in order to indicate their intended choices. In an e-voting system, ballots on voters' screens simply disappear after voters indicate their choices. While e-voting systems transmit their interpretations of the actions that voters took, the actual ballots that voters interact with are neither stored nor transmitted. That being the case, those vanished ballots cannot be recounted.

Of course, e-voting systems do allow a process that providers call "recounts." Roughly speaking, what happens in these cases is that the votes that resulted from the system's initial interpretation of ballots are reloaded into it and tallying is repeated. With luck, the results in each case will be the same.

Clearly, this e-voting process is not a recount, as no ballots are involved. This fact is important because the purpose of recounts is to bolster the integrity of elections by ensuring that the intentions of voters—as reflected in their manipulations of their ballots—are interpreted and honoured correctly.

Actual recounts can play an important part in municipal elections. When contests are very close, recounts are used to assure candidates and voters that the declared winners and losers are the actual ones. The bogus recounts offered by e-voting (as currently on offer) cannot play this role.

Adoption of e-voting significantly degrades the transparency of municipal elections in comparison with paper ballots. Transparency is an important aspect of the voting process that Ontarians have long relied on to ensure the integrity of their elections. Reducing transparency can only reduce the assurance that voters have that their intentions are properly reflected in election results.

Conclusions

Like any form of technological change, adoption of e-voting presents us with trade-offs. The main benefit of e-voting would be the accessibility that it can provide for voters versus conventional voting methods. This point is an important consideration in upholding the integrity of municipal elections.

However, adoption of e-voting introduces many risks to election integrity. Some of these risks, such as voter manipulation, undermine the integrity of elections in a broad way. Unfortunately, this risk and similar ones have only become easier due to technological changes such as the easy and widespread availability of artificial intelligence.

Some of these risks are narrower in scope, such as risks of voter coercion and vote taking. For this reason, it is easy to overlook this sort of risk, especially as the victims tend to remain hidden from official view. Nonetheless, their situation must be weighed also. Another way in which risks posed by e-voting to election integrity remain hidden is the assumption that e-voting is essentially the same as voting with paper ballots, only on screens instead. In some respects, the two are similar but in significant respects they are not. Voting interpretation and counting via paper ballots provides kinds of scrutiny, enshrined in the Ontario Elections Act, that assures candidates and voters of the integrity of election results. Unfortunately, e-voting does not allow for this kind of transparency. If candidates or voters are concerned that something went wrong in the vote interpretation and tallying process, they are either out of luck or must be content with a bogus form of recount.

In the end, the breadth of the risks that e-voting poses to election integrity precludes its adoption. Though it would grant voters access to voting that they deserve, it would also undermine the integrity of elections comprehensively. It is no service to any voter to adopt a voting method that facilitates participation in an election whose result it undermines. In effect, it is giving with one hand and taking with the other.

To be clear, this situation is no fault of advocates for voting accessibility nor of the City of Guelph. It is the creation of the province of Ontario.

Because the government of Ontario has made no effort to identify and lay down standards or requirements to ensure the integrity of municipal elections—while itself opting out of the technology—each municipality has gone its own way in light of its own resources (or lack thereof). The result is an ad hoc mosaic of election processes that fails to provide the consistency and high standards that Ontarians deserve.

Rather than adding to this mess, the City of Guelph should join Professors Essex and Goodman and their colleagues, who are advocating for the province to live up to its responsibilities. Let the Premier, the province's Chief Electoral Officer, and our MPP Mike Schreiner know that this is your vision for future elections in the City of Guelph.