

0 Connecticut Citizen Election Audit

15 Years and Little Improvement: Citizen Post-Election Audit Report

Independent Observation and Analysis
of Connecticut's Audit of the 2021 General Election
February 22, 2022

We conclude, based on citizen observations and analysis of official municipal post-election vote audit of the November 2022 election, that it failed to meet basic audit standards. Again, the Secretary of the State's Office failed to require local officials to conduct the audit according to law and published procedures. As a result, voters cannot have confidence in the accuracy of election results.

We are pleased that officials made progress in the following area:

- ▲ The UConn Audit Station made progress in counting creased, folded, and colored ballots. In that regard the technology is quite mature.

Yet long-standing problems continue:

- ▼ 38% of official audit reports from registrars were incomplete. Several were insufficient to determine the results of the audit.
- ▼ Weaknesses in ballot chain-of-custody and security procedures remain. Ballot security is necessary for confidence that ballots were not tampered with between the election and the municipal audit counting sessions.
- ▼ 9 districts attributed differences in vote and ballot counts to Human Error. A large increase from the 2 we reported in 2019.
- ▼ Despite progress in 2019 and 2020 in verifiability of the electronic audits, in 2021 those audits eliminated comparing samples of paper ballots to Cast Vote Records.

We emphasize that this report does not question any election official's integrity. Most election officials are well-motivated and of high integrity. However, unquestioned trust and lack of knowledge can lead to a lack of vigilance that allows errors to be overlooked and opportunity for the occasional bad actor to manipulate elections and audits

After 15 years with disappointing, locally performed, hand-count audits, we recommend replacement of all local hand-count audits with sufficient and efficient *electronically assisted manual audits* utilizing the UConn Audit Station.

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Executive Summary

Introduction

Connecticut statutes require the Secretary of the State and local registrars of voters to conduct audits after every election and primary.

After the November 2021 Election, Connecticut conducted its 23rdst large-scale post-election audit.¹ This was also the 22nd large-scale audit observation² for the Connecticut Citizen Election Audit (“Citizen Audit”).

The purposes of our observations are to *create election integrity*, demonstrate citizen interest in the process, increase citizen involvement in elections, provide feedback for improvement to the Secretary of the State and the Connecticut General Assembly on the audit process, and provide the public with the information necessary to determine confidence in Connecticut's elections.

Citizen Audit volunteer observers invested 19 days observing 24 audit counting sessions. Without the service of these volunteers, Connecticut’s post-election audits would take place without public observation, and the insights in this report would not be possible.

¹ In this document we will frequently use the term “audit” when we mean “post-election audit,” “post-election audit counting session,” or other parts of the process, from the random selection of districts to be audited to the official report of each post-election audit produced by the University of Connecticut Voter Center (UConn).

² For the 2020 post-election audit because of COVID we did not solicit citizen observers. We did observe about one-half of the counting sessions (most of those observed were electronic audits). We did not collect sufficient data to make a full report.

Findings

We conclude, based on citizen observations and analysis of the official municipal post-election vote audit of the November 2021 election, that it **failed to meet basic audit standards**. Again, the Secretary of the State's Office failed to require local officials to conduct the audit according to law and published procedures. As a result, voters cannot have confidence in the accuracy of election results.

We are pleased that officials made strides in the following areas:

- ▲ The UConn Audit Station made progress in counting creased, folded, and colored ballots. In that regard the technology is quite mature.

Yet, long-standing problems continue:

- ▼ 38% of official audit reports from registrars were incomplete. Several were insufficient to determine the results of the audit.
- ▼ Weaknesses in ballot chain-of-custody and security procedures remain. Ballot security is necessary for confidence that ballots were not tampered with between the election and the municipal audit counting sessions.
- ▼ 9 districts attributed differences in vote and ballot counts to Human Error. A large increase from the 2 we reported in 2019.
- ▼ Despite progress in 2019 and 2020 in verifiability of the electronic audits, in 2021 those audits eliminated comparing samples of paper ballots to Cast Vote Records.

The public and candidates expect, and the Secretary of the State should require, that local election officials organize audits and produce accurate, complete audit reports. The public should expect the Secretary of the State's Office to take the lead in ensuring that each audit report is complete.

We emphasize that this report does not question any election official's integrity. Most election officials are well-motivated and of high integrity. However, unquestioned trust and lack of knowledge can lead to a lack of vigilance that allows errors to be overlooked and opportunity for the occasional bad actor to manipulate elections and audits.

After 15 years with disappointing, locally performed, hand-count audits, we recommend replacement of all local hand-count audits with sufficient and efficient *electronically assisted manual audits* utilizing the UConn Audit Station.

Audit Background

After the November 2021 Election, Connecticut conducted its 23rdst large-scale post-election audit.³ This was also the 22nd large-scale audit observation⁴ for the Connecticut Citizen Election Audit (“Citizen Audit”).

The purposes of our observations are to *create election integrity*, to demonstrate citizen interest in the process, increase citizen involvement in elections, provide feedback to the Secretary of the State (SOTS), UConn, and the Connecticut General Assembly on the audit process, and provide the public with the information necessary to determine its confidence in Connecticut's elections.

By law, the Secretary of the State is required, after each election, to select at random 5%⁵ of districts for audit from the full list of Connecticut's voting districts. In the random drawing 33 voting districts and 2 central count absentee locations⁶ were selected. The audited districts observed were located in 27 municipalities. The audit counting sessions were required to be conducted between November 17, 2021 and December 22, 2021.

In spite of Covid 19, Citizen Audit volunteer observers invested 19 days observing 24 of 27 counting sessions during this period. Observers frequently attended audits on short notice, observed multiple audits, and accommodated last minute changes to the audit schedule. **Without the service of these volunteers, Connecticut’s post-election audits would take place without public observation, and the insights in this report would not be possible.**

³ In this document we will frequently use the term “audit” when we mean “post-election audit,” “post-election audit counting session,” or other parts of the process, from the random selection of districts to be audited to the official report of each post-election audit produced by the University of Connecticut Voter Center (UConn).

⁴ For the 2020 post-election audit, because of COVID, we did not solicit citizen observers. We did observe about one-half of the counting sessions (most of those observed were electronic audits). We did not collect sufficient data to make a full report.

⁵ Effective July 1, 2016 the post-election audits were reduced by the General Assembly from 10% to 5% of districts.

⁶ Unfortunately, one of those central count locations, subject to a recanvass, was replaced by an alternate, while the other was not in in fact a central count location.

Purpose of Connecticut's Random, Post-Election Audits

As stated in the Office of the Secretary of the State's Post-Election Audit Procedures:⁷

The primary purpose of the hand count⁸ audit is to assess how well the optical scan voting machines functioned in an actual election and to ensure that votes cast using these machines are counted properly and accurately.

Good government groups support the "Principles and Best Practices for Post-Election Audits,"⁹ which includes the following definition and benefits:

Well-designed and properly performed post-election audits can significantly mitigate the threat of error, and should be considered integral to any vote counting system. A post-election audit in this document refers to hand counting votes on paper records and comparing those counts to the corresponding vote counts originally reported, as a check on the accuracy of election results, and resolving discrepancies using accurate hand counts of the paper records as the benchmark. Such audits are arguably the most economical component of a quality voting system, adding a very small cost for a large set of benefits.

The benefits of such audits include:

- *Revealing when recounts are necessary to verify election outcomes*
- *Finding error whether accidental or intentional*
- *Deterring fraud*
- *Providing for continuous improvement in the conduct of elections*
- *Promoting public confidence*

Citizen Observation: Challenges and Limitations

We recognize that there may be occasional errors in our raw data derived from observations. However, when taken as a whole, the observations tell a collective story that is quite consistent and provides valuable feedback to the public and for the continuing education of elections officials.

Without our volunteer observers willing to invest a day of their time, being available for short-notice scheduling, and observing to the best of their ability, no one except local election officials would know how post-election audits are conducted in Connecticut. Our observers care about democracy and ensuring that measures are in place to protect the integrity of our elections.¹⁰

⁷ Official Procedures: <http://ctelectionaudit.org/2016/AuditProcedure201605.pdf>

⁸ Hand count means the manual counting of ballots and votes without relying on voting machines such as optical scanners.

⁹ https://electionaudits.org/files/bestpracticesfinal_0-2008.pdf

¹⁰ Upon request of any registrar of voters participating in the audit, we would be pleased to discuss volunteer observation reports and provide feedback applicable to their municipality.

Analysis

We Do Not Question Any Election Official's Integrity

This report does not question any election official's integrity. Most elections officials are well-motivated and of high integrity. However, unquestioned trust and lack of knowledge can lead to a lack of vigilance that allows errors to be overlooked and the opportunity for the occasional bad actor to manipulate elections and audits.

At a minimum, lack of attention to detail and opportunities for error and fraud leave voters without justified confidence in our election system and election officials.

Citizen Observation Analysis

Volunteer citizen observers observed local counting sessions and reported their observations on Observation Report Forms.¹¹ Analysis in this section is based on those reports. Appendix A is a table showing the percentage of "yes" responses on all yes/no questions on Observation Report Forms for this audit. Appendix C describes in detail our methodology of observation and analysis.

Even-Year Elections vs. Odd-Year Elections vs. Primary Elections

In several aspects, it is more appropriate to compare even-year elections with even-year elections, odd-year elections with odd-year elections, and primary elections with primary elections. Even-year elections include statewide races and involve more ballots, yet generally are easier to count manually than municipal elections. Odd-year elections are municipal elections. They involve fewer ballots due to lower turnout, yet present more challenging counts of vote-for-multiple races (for example, "Vote for 6 of the 12 candidates"). Primary election audits require counting only a single race, have far fewer ballots, do not involve cross-endorsements or write-ins, and seldom have vote-for-multiple contests.

A. Procedures Are Unenforceable, Current Laws Are Insufficient

As noted in previous reports, discussions with representatives of the Secretary of the State's Office and the State Elections Enforcement Commission (SEEC) indicated that many, if not all, of the post-election audit procedures, including those covering chain-of-custody, are unenforceable. There has been disagreement between past SEEC Directors and some members of the General Assembly regarding the enforceability of regulations, but there is agreement that current post-election audit procedures are not enforceable.¹²

¹¹ Our latest forms used for this observation is available at: <http://ctelectionaudit.org/Forms/ObservationReportM.pdf> and <http://ctelectionaudit.org/Forms/ObservationReportE.pdf> for the manual and electronic audits, respectively.

¹² In 2015, Public Act 15-224 authorized the Secretary of the State to designate enforceable procedures, yet the audit procedures have not been so designated.

A.1 Ballot Security Laws Are Insufficient for Credible Audits

Laws that govern the post-election sealing of ballots, memory cards, and tabulators are unclear and insufficient. After over a decade of optical scanner use, the laws have not been updated to recognize that polling place voting with optical scanners involves paper ballots. Most officials interpret the law to imply that polling place ballots are required only to be sealed only until the 14th day after the election. Yet the audits do not start until the 15th day after the election. We note that the adherence to prescribed chain-of-custody and ballot security procedures varies widely among audited districts.

Ballots are not uniformly maintained in secure facilities, and access to these storage facilities is not reliably logged or recorded, even though the law requires two individuals to be present when these facilities are accessed. In the majority of towns, each registrar could have undetected lone access to the sealed ballots¹³ for extended periods. In many towns, several other individuals also have such access. The lack of uniform security of the ballots diminishes confidence in the integrity of the ballots. This diminishes confidence in the integrity of election results.

Ballots are the basis for the data reported in audits and the foundation for the integrity of elections. Secure, credible chain-of-custody procedures should preclude the opportunity for a single individual to have any unobserved extended access to ballots, which provides the opportunity for an individual to substitute or modify ballots.

B. Laws and Procedures Are Not Followed or Understood

Problems uncovered in this year's observation include: incorrectly completed forms, chain-of-custody concerns, inconsistent counting methods, error-prone, confusing totaling processes, and problems with totaling results.

The Official Audit Procedures¹⁴ were frequently not followed, were not enforced, and, as noted previously, may not be enforceable. Also, the procedures still lack detailed guidance in efficient counting methods that would provide accurate and observable results. See Section C below.

Our observations indicate that some towns do a good job of using the procedures in the audit, following each step, in order, and enhancing them with effective detailed counting methods. However, in other towns it was clear that election officials were not referencing or following the procedures. Some who attempt to follow the steps do not seem to understand them or their purpose and appear to be reading the procedures for the first time at the start of the counting session. Frequently, effective counting procedures are coupled with *ad-hoc*, disorganized totaling procedures. This causes inaccuracies and

¹³ While useful, ballot bag seals, which are small plastic or plastic and metal numbered devices, are not supposed to be reusable, offer little protection, especially when used to protect ballots from those who are responsible for applying and checking seal integrity: *Security Theater: Scary! Expert Outlines Physical Security Limitations* <http://ctvoterscount.org/security-theater-expert-outlines-physical-security-limitations/>. See a video demonstration of how to compromise such seals here: https://www.youtube.com/watch?time_continue=2&v=ZtzLlfULnbl

¹⁴ The latest SOTS procedures: <http://ctelectionaudit.org/2016/AuditProcedure201605.pdf>

frustration for officials and makes it difficult to observe the accumulating vote totals from teams and their batches to reach the final totals.

B.1 Official Audit Reports Were Not Sent to or Tracked by the SOTS Office

We have no reason to believe this has changed. After several years of disappointing results asking the Secretary of the State’s office for all results and delays in getting those results, we no longer rely on obtaining them that way. Instead we are using the completed, signed forms collected by observers or obtained by Citizen Audit Freedom of Information requests to individual registrars.

B.2 Thirteen Incorrectly Completed Forms, and Incomplete Audit Counting

Several registrars' reports were incomplete due to insufficient data to determine the actual results of the audits, and if and how they were performed. As in the past, for some reports we can make assumptions and fill in missing data. In this audit some reports are so incomplete that we cannot make reasonable assumptions. This includes eight of the reports from the electronic audits completed under the supervision or lack thereof by the Secretary of the State’s staff.

Voters should expect that the SOTS reviews such reports and returns them to local officials to be completed and, where necessary, require the audit be repeated. We are equally concerned that such reports in the past were accepted by the Secretary of the State’s Office and UConn as representing the actual results of the audit.

Without complete reports we cannot analyze or verify the results of the audit. So, we nor the audits can provide any level of confidence in the optical scanners in those districts, nor in the officials charged with supervising and performing the audits. This, after all, is the statutory purpose of the audits.

Audit Report

Town Name: _____ Voting District (and polling place name): _____
 District Numbers:(Cong _____) (State Senate _____) (Assembly _____)
 Ballot Carrying Case Seal Number: _____ Audit Date: _____
 Total of tabulator-counted ballots - hand counted at the audit:
 Totals ballots counted by tabulator as shown on tabulator tape produced on election night:
 Ballot Carrying Case Seal Number (When Resealed After Audit): _____

A	B	C	D	E	F
Office	Candidate	Machine Totals (Tape)	Undisputed Vote Totals	Questionable Vote Totals	Overall Hand Count Totals (D + E)

Explanation of Differences:

Submit completed forms within 48 hours by fax to 1-866-392-4023

Registrar of Voters: _____ (Signed) _____ (Printed)
 Registrar of Voters: _____ (Signed) _____ (Printed)

Official Audit Report Form - Figure 1

	2021	2019	2017	2015 ¹⁵
Number of ballots counted by hand or machine not filled in or filled in incorrectly	3	2	2	1
Some columns not completed and/or incorrectly completed	8	8	5	6
Minor arithmetic/transcription errors	1	1	5	3
Reports with negative counts of questionable ballots	0	1	0	1
Fewer races or candidates counted than required by law	1	2	0	1
Missing reports from SOTS	N/A	N/A	2	2
Differences attributed to questionable votes, but not reported in Col. E	0	2	3	0
Cross-endorsed candidates not counted as such	5	0	0	3
Differences attributed to questionable votes, but not enough reported	2	0	0	0
Total incorrect or missing reports ¹⁶	13	14	14	15
Districts selected	35	34	34	68
Rate of incomplete reports	37%	41%	41%	22%

Errors in Official Report Forms - Table 1

Incomplete data should be taken seriously. The Secretary of the State (SOTS) should not accept incomplete forms. She should insist that forms be filled out correctly and that enough races are counted. Where necessary, the SOTS should perform investigations, including recounting ballots or votes. These investigations should be announced publicly in advance to allow public observation. Every significant difference is an opportunity for an election error or malfeasance to remain undetected. Images of the actual official Audit Report Forms and our data compiled from those reports can be viewed at: <http://www.CTElectionAudit.org>.

Overall, we see little progress in this area in recent years.

¹⁵ We present several tables in this report from the 2021, 2019, 2017, and 2015 audits. Odd-year elections are similar municipal elections and are more directly comparable than State and Federal even-year elections.

¹⁶ Some district reports had more than one error, counted only once in this total.

B.5 “Human Error” Should Not Be Accepted as an Explanation of Differences

	2021	2019	2017	2015
Reports attributing differences in counts to “Human Error”	9	2	6 ¹⁷	19
Rate of “Human Error” excuse in official reports	26%	5%	22%	28%

Official Forms Listing “Human Error” as Cause of Differences - Table 2

Officials routinely attribute differences in counts to “Human Error.” Accepting that as the reason or excuse completely negates the purpose of the audit. Without reliable, accurate counting in the audit it is impossible to attribute errors to either machines or humans. Hand counts which are inaccurate do not imply that machine counts were accurate.

Registrars submitting and the SOTS Office accepting reports with “Human Error” as explanations are also contradictory to the published procedures, which state:

Small differences of one or two unexplained votes can often occur, but such differences should be verified by at least two counts. It is your responsibility to be thorough and comfortable that your counts of the ballots are accurate. If you are not confident in your counts then you should continue counting and recounting until you are satisfied that your hand count result is accurate.

Differences excused by “Human Error” should not be accepted by the SOTS Office nor by the University of Connecticut in their reporting of scanner accuracy. They should be investigated, analyzed, and reported accurately.

This year’s results represent a regression and increase in the “Human Error” as an explanation.

¹⁷ Counts are significantly reduced, because the audit was reduced to 5% of districts from 10% of districts prior to 2016. Also, “Human Error” is not a reasonable explanation for electronic audits.

B.6 Multiple Chain-of-Custody Concerns

In several municipalities,¹⁸ observers expressed concerns with chain-of-custody and ballot security.

% Yes:	2021	2019	2017	2015
Do you have any concerns with the chain of custody?	25%	60%	29%	32%
A single individual can access ballot containers in storage.	77%	60% ¹⁹	48%	42%

Municipalities Where Observers Noted Chain of Custody Concerns - Table 3

Single officials delivered ballots, single individuals were left with ballots, and ballots were left alone with observers. Numbered seals were improperly applied, were left open, or were not used. Some registrars did not bring seals to the electronic audits for resealing and none were supplied by the SOTS Office.

A larger concern is that, in many towns, single individuals may access the ballots undetected for extended periods of time. In 77% of towns surveyed in this audit, a single individual can access the ballot storage. In other towns, even though policies require more than one person to access ballots, there are few or no protections in place to prevent a single person from accessing the ballots.²⁰ In some towns this is not considered a violation. This is a serious problem, since single individuals could change the ballots and be undetected. **At minimum it destroys the credibility of audits and elections.**

From observers:

The ballots were delivered to the audit room by two registrars; however, they left the room under the care of one election official.

Had no seals to reseal after electronic audit.

Audit was disorganized and left up to the counters.

Ballots unsealed before stated start time. Electronic Audit.

¹⁸ We did not observe every characteristic of every audit counting session that we attended. Some questions did not apply; in some audits observers could not fully observe audits that continued beyond one day, etc.

¹⁹ Rates cannot be compared year to year, as the question was changed in 2018 to more accurately reflect physical security. Previous questions accepted two-person security based only upon an *honor system*.

²⁰ Numbered tamper-evident seals are a useful protection, but without extensive procedures for their verification and other strong ballot protections, at best they provide a few seconds of protection from possible compromise. For examples, see: <http://www.cs.princeton.edu/~appel/voting/SealsOnVotingMachines.pdf> and <http://www.cs.princeton.edu/~appel/voting/Johnston-AnalysisOfNJSeals.pdf>

C. Training and Attention to Counting Procedures Are Inadequate and Inconsistently Followed

C.1 Audit Organization and Counting Procedures:

Observers expressed concerns that many of the audits were not well-organized. Observers noted the following concerns, which frequently occurred within the same municipalities:

Question	%Yes:	2021	2019	2017	2015
MA ²¹ : Do you have any concerns that the auditing was not well-organized?		33%	9%	29%	36%
MA: Do you have any concerns that the manual count was inaccurate?		33%	36%	33%	21%
Do you have any concerns that the officially reported information is inaccurate?		0%	10%	5%	16%
Do you have any concerns with the transparency/observability of the process?		0%	0%	6%	3%

Municipalities Where Observers Noted Procedural Concerns - Table 4

We note that over time, observers’ concerns with the manual audit have been decreasing.

From observers:

Excellent team... Still confusion, of course, but excellent team and teamwork. But NEVER TALLIED THE NUMBER OF BALLOTS COUNTED!

One oblong rounded conference table. Too crowded for calling and for keeping ballot piles well organized.

"Decide if they went through machine" rather than the machine may or may not have read bubbles.

They sought to resolve discrepancies only if they were over 20.

Registrar is a quality control expert, understands auditing.

²¹ “MA” indicates observations applicable only to manual audits.

C. 2 Need for Dual Verification

Official audit counting procedures require “two eyes,” i.e., dual verification of the count of each individual ballot, but this was frequently ignored. When ballots are counted by a single individual, miscounts can require tiring recounts and unnecessary investigation. When single individuals count hundreds of ballots or votes, errors are almost inevitable.

Question	% Yes:	2021	2019	2017	2015
Were the ballots counted by each team such that a second election official verified each count?		58%	80%	62%	66%
IF HASH MARKING USED: Did a second official observe that each vote was read accurately?		36%	30%	50%	36%
IF HASH MARKING USED: Did a second official make duplicate hashx marks observe that each hash mark was recorded accurately?		36%	20%	62%	28%
IF STACKING/PILES USED: Was the vote counting process such that two election officials verified that each vote was stacked as marked?		33%	50%	67%	82%
IF STACKING/PILES USED: Were the stacks of ballots counted such that two election officials verified that each stack was counted accurately?		33%	75%	67%	62%

Municipalities Audited Manually Where Observers Noted Dual Verification Concerns - Table 5

Comparing only the manual count statistics over time, the use of double checking continues to vary and trended down in 2021.

From observers:

Good training but no supervision. Four at a head table never checked or said anything that teams were not double checking.

Not much training. First audit for them. Never referred to procedures that I could see.

Question	Electronic Audit	%Yes:	2021	2019	2017
While you were observing, in your judgment, did two local election officials focus their attention on each ballot?			17%	42%	88%
While you were observing, in your judgment, did local officials have enough time to confirm that the Audit Station correctly classified each bubble on a ballot for 90% of the ballots?			100%	43%	13%
While you were observing, in your judgment, did local officials have enough time to confirm that the Audit Station correctly counted each vote on each ballot, in the columns on the right for 90% of the ballots?			0%	43%	0%

Electronic Audit Concerns - Table 6

Electronic Audit: The system prevented the observation of actual ballots being counted. Observers judged that in all the audits, most ballot images displayed were observed by two officials. Yet where two individuals observed ballot images, they could not actually have verified the counts on the right. This is because the officials chose to view ballots for only two to three seconds as ballot images were displayed. In addition, this would be impossible, since in most municipal elections with large ballots, all count results were not displayed on the screen because of Audit Station limitations and the large number of candidates and races.

C.3 The Importance of Blind Counting

Blind counting is a method of counting without preconceived knowledge of the expected outcome. When counting teams know the machine totals or know the differences between their counts and the machine totals, there is a natural human tendency to make the hand count match the machine count. This risks taking shortcuts and seeking unjustified explanations for discrepancies which, in turn, lower the credibility of the process and undermine confidence in the audit results.

Question	% Yes:	2021	2019	2017	2015
Were counters kept unaware of the election totals for the ballots or races they were counting until counting and recounting each race was finally complete?		67%	82%	87%	75%
If initial counts were off, were counters kept unaware of the exact and approximate level of difference?		27%	60%	62%	50%

Municipalities Where Observers Noted Blind Counting Concerns - Table 7

In November 2021 when manual counts were off, 63% of the time counters were informed of the exact or approximate number of discrepancies. 33% of the time the scanner counts were available to the counters. This wide-spread lack of blind counting greatly reduces the credibility of the audit. The trend is unfortunately in the wrong direction.

Electronic Audit: One advantage of the Electronic Audit is that knowledge of results by local election officials cannot change the machine results. Yet we note that without a manual audit of actual ballots against the Audit Station results, there is no way to confirm that the reported electronic audit results accurately reflect the cast ballot and vote totals.

C.4 Lack of Written Electronic Auditing Procedures

Electronic Audit: There were no written procedures for the Electronic Audit. There was some training by University of Connecticut staff, who also assisted the election officials and answered their questions.

The law passed in 2015 authorized Electronic Audits:

...provided (1) the Secretary of the State prescribes specifications for (A) the testing, set-up and operation of such equipment, and (B) the training of election officials in the use of such equipment...

Without written procedures, it is difficult to determine if the Secretary of the State in fact authorized the procedures employed and impossible to assess if authorized procedures, if any, were uniformly followed.

Official Audit Report Data Analysis

After the counting sessions, registrars complete and submit the Official Audit Report Forms to the SOTS. Where possible, observers collect copies of the forms after the counting session. The Citizen Audit obtained the rest of the official forms by Freedom of Information Act requests of registrars.

The statistics in this section were produced from the official forms. The images of those forms and our detailed data compiled from those forms are available at <http://CTElectionAudit.org>.

As stated earlier: Without complete reports we cannot analyze and verify the results of the audit, or provide any level of confidence in the optical scanners in those districts, nor in the officials charged with supervising and performing the audits.

Ballot Count Accuracy

Any unexplained difference greater than or approaching the automatic recanvass trigger of 0.5% should be a concern.²²

Unlike vote counts (discussed later) there can be no “questionable” ballot counts. Any difference in ballot counts must be due to optical scanner or human error, or both. Human errors²³ are not limited to audit hand counts. Scanners or ballots could have been mishandled and incorrectly counted on Election Day, read through the scanner twice, misplaced on Election Day, or subsequently misplaced.

²² In state-wide contests the margin is much less. The recanvass trigger is 2000 votes, which in a presidential election is approximately 0.12%.

²³ Ultimately, almost all errors are human errors in counting, software programming, election setup, or failing to follow procedures. Exceptions would include hardware errors or fraud.

Machine Totals (Tape)	Audit Count	Difference	Percent Difference
459	485	-26	-5.7 %
1803	1801	2	0.1 %
1401	1403	-2	-0.1 %
1000	999	1	0.1 %
949	948	1	0.1 %

All Ballot Count Differences in the Audit - Table 8

This table does not include three districts:

- Two where ballots counted in the audit were not reported.
- One where ballots counted on the tabulator were not reported.

Most likely some of those incomplete reports are due to lack of attention to detail and a lack of motivation by officials, yet we have no basis to conclude that some of them do not hide errors or intentional fraud. The integrity and value of the audit depends on complete, accurate work and oversight.

Without reasonable explanations or investigations, we have no basis to blame scanners or humans for these differences.

CONCLUSION: We conclude that the audits leave us with no basis for confidence in scanners or in officials.

Vote Count Accuracy

Col C Machine Totals (Tape)	Col D Undisputed Vote Totals	Col E Questionable	Col F Total Hand Count (D + E)	Difference (F - D or E - D)	Percent Difference
284	304	0	304	-20	-7.0 %
281	300	0	300	-19	-6.8 %
469	433	22	455	14	3.0 %
804	791	0	791	13	1.6 %
693	682	0	682	11	1.6 %
567	553	3	556	11	1.9 %
589	535	44	579	10	1.7 %
431	421	0	421	10	2.3 %
162	172	0	172	-10	-6.2 %
529	520	0	520	9	1.7 %
501	493	0	493	8	1.6 %
501	493	0	493	8	1.6 %
536	544	0	544	-8	-1.5 %
621	629	0	629	-8	-1.3 %
530	520	2	522	8	1.5 %
51	44	0	44	7	13.7 %
134	141	0	141	-7	-5.2 %
15	8	0	8	7	46.7 %
490	484	0	484	6	1.2 %
636	642	0	642	-6	-0.9 %

Col C Machine Totals (Tape)	Col D Undisputed Vote Totals	Col E Questionable	Col F Total Hand Count (D + E)	Difference (F -D or E - D)	Percent Difference
9	3	0	3	6	66.7 %
170	176	0	176	-6	-3.5 %
397	372	20	392	5	1.3 %
694	699	0	699	-5	-0.7 %
14	10	0	10	4	28.6 %
234	229	1	230	4	1.7 %
761	755	2	757	4	0.5 %
648	639	5	644	4	0.6 %
1851	1838	10	1848	3	0.2 %
14	11	0	11	3	21.4 %
502	497	2	499	3	0.6 %
584	581	0	581	3	0.5 %
239	235	1	236	3	1.3 %
574	570	1	571	3	0.5 %
160	163	0	163	-3	-1.9 %

Candidate Count Differences Greater than 2 in the Audit- Table 9

The table above presents, by number and percentage, vote differences greater than two between hand-counted votes and machine-counted votes, after all ballots with questionable votes are considered and all votes for cross-endorsed candidates are totaled.

It does not include contests where tabulator counts were not reported.

Any difference over 0.5% should call into question that recanvasses set at 0.5% are sufficient to detect errors, tabulator or voter, that could change the result of close contests.

Based on observer reports, we do not believe that all of the hand counts of votes are accurate. Yet there is no way to judge the accuracy of the optical scanners in these districts, leaving little to

provide trust in the election results, scanner accuracy, or confidence in officials’ abilities to perform their duties.

The following tables show the number of candidate counts, with varying count differences between the optical scanners and the hand counts, after considering that so called questionable votes may or may not have been counted by the scanners:²⁴

Candidate Vote Count Difference Range	Number of Differences in Range	% of All Candidate Counts in range 2021	2019	2017	2015
0	182	50.6	80.1%	62.5%	67.6%
1-3	72	25.7	16.9%	22.5%	26.4%
4-6	10	3.6%	7.2%	7.2%	4.2%
7-9	9	3.2%	2.1%	2.6%	0.9%
>9	9 ²⁵	3.2%	0.6%	2.6%	0.9%
Average Difference in Votes:		1.29	0.45	1.3	0.80

Summary of Vote Count Differences-Table 10

Once again, without credible audit reports, the data in this table are of little use in evaluating accuracy of the scanners or comparing results to earlier elections and primaries.

Range of % of Count Difference	Number of Candidate Counts	% of All Candidate Counts in range 2021	2019	2017	2015
0	182	64.5%	80.1%	62.5%	67.6%
> 0 and < 0.5 %	41	14.5%	10.3%	28.7%	13.7
0.5 % and < 1.0 %	20	7.1%	5.4%	6.4%	6.1%
1.0 % and < 2.0 %	21	7.4%	2.1%	4.1%	5.6%
2.0 % and < 5.0 %	7	2.5%	1.2%	5.1%	3.7%
5.0 % and < 10.0 %	4	1.4%	0.6%	0.5%	0.4%
10.0 % and greater	7	2.8%	0	0	0.9%
Average Difference %		0.28%	0.08%	0.24%	0.22%

Trend of Vote Count Differences by Percent -Table 11

²⁴ The maximum benefit of any doubt is given to the scanners, recognizing a difference only when a scanner counted more votes than the sum of questionable votes and undisputed votes, or when a scanner counted less than the number of undisputed votes.

²⁵ Does not include reports that does not include enough information to determine differences.

Confusion about “Questionable” Votes

Observations and comments from election officials indicate confusion about classifying “undisputed ballots” and about counting “questionable votes.” An undisputed ballot is a ballot with no apparent problem or questionable votes on it. A questionable vote is a mark on a ballot that may not have been read properly by the optical scanner. Based on observations, counting teams and registrars demonstrated a variety of interpretations of what constitutes “undisputed” and “ballots with questionable votes.” Audit statistics confirm these observations.

Col C Machine Totals (Tape)	Col D Undisputed Vote Totals	Col E Questionable	Col F Total Hand Count (D + E)	Difference (F-D or E-D)	Percent Questionable
616	570	47	617	0	7.6 %
593	549	46	595	0	7.8 %
590	542	46	588	2	7.8 %
589	546	45	591	0	7.6 %
589	535	44	579	10	7.5 %
587	542	43	585	2	7.3 %
423	396	24	420	3	5.7 %
469	433	22	455	14	4.7 %
397	372	20	392	5	5.0 %
416	394	19	413	3	4.6 %
417	397	18	415	2	4.3 %
435	421	17	438	0	3.9 %
423	406	15	421	2	3.5 %
399	387	14	401	0	3.5 %
381	371	14	385	0	3.7 %
395	384	12	396	0	3.0 %

Col C Machine Totals (Tape)	Col D Undisputed Vote Totals	Col E Questionable	Col F Total Hand Count (D + E)	Difference (F-D or E-D)	Percent Questionable
202	189	12	201	1	5.9 %
225	212	12	224	1	5.3 %
1072	1059	11	1070	2	1.0 %
421	408	11	419	2	2.6 %
1851	1838	10	1848	3	0.5 %
168	158	10	168	0	6.0 %
199	188	10	198	1	5.0 %
1783	1775	10	1785	0	0.6 %
1374	1368	9	1377	0	0.7 %
1076	1068	8	1076	0	0.7 %
948	940	7	947	1	0.7 %
847	841	6	847	0	0.7 %
652	646	6	652	0	0.9 %
1092	1086	6	1092	0	0.5 %
685	682	5	687	0	0.7 %
648	639	5	644	4	0.8 %
558	554	4	558	0	0.7 %
765	760	4	764	1	0.5 %
867	863	4	867	0	0.5 %
1038	1034	4	1038	0	0.4 %

Questionable Votes Over 3 - Table 12

We note that all the questionable counts of 19 and higher are from a single town and district. And the rest over 12 are from another town and district.

	2021	2019	2017	2015
Overall % Questionables	.55%	0.23%	0.26%	0.73%
Counts over 12 Questionables	15	7	8 ²⁶	23

Questionable Votes -Table 13

²⁶ 2017 and after were a 5% audits, so compared to 10% audits in previous years.

Electronic Audit Review and Recommendations

Electronic audits in Connecticut are the more credible alternative to the poor methods and inaccurate reporting used for state hand-count audit. For more details see our report in Appendix B of our report for the November 2019 audit:

<http://ctelectionaudit.org/2020/ObservationReport2019Nov.pdf>

Here we report on developments since that time.

Laudable Progress in 2019 and 2020, Dropped in 2021

In 2019 we said:

“In the 2019 electronic audits officials from the Secretary of the State’s Office and UConn demonstrated and prototyped capabilities to perform electronically-assisted post-election audits. After results were produced by the audit station one out of each 250 ballots was randomly selected to compare to the associated CVR for that ballot. In each case officials found an exact match.

The Citizen Audit applauds this work, but it does not go far enough toward public verifiability. We have provided detailed suggestions to solve this problem to the Secretary of the State, her Office, and UConn. These suggestions can be implemented with a moderate amount of work and expenditure.”

In 2020 UConn went beyond the demonstration and randomly selected a number of ballots from each audit for comparison to CVRs. It was great progress. Yet it needed more work to provide the needed transparency and public verifiability that would provide justified confidence in the audits and in turn our voting machines and elections.

Yet in 2021 UConn completely left any type of verification out of the electronic audits.

Progress and a New Concern in Reading All Ballots

The Audit Station had no problems reading creased, folded, or colored ballots. Progress in that regard has been continuous over the years as the Audit Station has matured.

We were also pleased that UConn is considering adding space and boxes on the Audit Station report so that it can be manually completed to provide all the information necessary and serve as the Official Audit Report form. If UConn follows through on that it would go a long way in creating full and accurate official audit reports for those districts audited electronically.

A new issue surfaces. When there are marks outside the timing marks on a ballot the Audit Station rejects the ballot. Such marks are normal mistakes or pen rests by voters. UConn indicated that scanner specifications say no marks should be made in those margins. Yet, apparently in every case the tabulator read each of these ballots and read them correctly.

So that the Audit Station can be used efficiently in future audits and possibly in Risk Limiting Audits this should be fixed. It would seem to be a simple fix.

A Recommendation for Vastly Improved Audits

After 15 years with disappointing, locally performed, hand-count audits, we recommend replacement of all local hand-count audits with sufficient and efficient *electronically assisted manual audits* utilizing the UConn Audit Station.

With the following recommended changes to the electronic counting:

- **Performing manual checks as demonstrated in 2020** as part of the electronic audit.
- **Refining the manual check such that it is transparent and publicly verifiable**, leaving no doubt that the process is secure from being electronically or manually compromised. Including public electronic access to CVRs prior to random selection for the manual checks.
- **Creating partially printed Official Report Forms by the Audit Station** that can be manually completed to serve as alternatives to the manual forms required today - forms that would have all the same required fields and provide for the need to manually interpret and report the ballots and votes that cannot be read by the Audit Station.
- **Creating sufficient and enforceable written procedures** for the audit including security, so that management of the process can be expanded with less day-to-day involvement from UConn experts and with trained officials supervising the audit. With formal, enforceable procedures the public can evaluate the design, and observers can verify the execution of the process. And procedures requiring that the SOTS Office be responsible for reasonable advance public notice of all audit activities, reviewing and accepting all audit report forms, along with deadlines for UConn to report on the results of the audit.

About the Citizen Audit

The Connecticut Citizen Election Audit ("Citizen Audit")

Our purpose is to increase integrity and confidence in elections, for the benefit of the voters of Connecticut. We provide independent audit observations, independent audits, and independent reports focusing on the integrity of elections and election administration. We are non-partisan and strive for objectivity and integrity in our work. The Citizen Audit has observed and reported on every general primary and election since the statewide implementation of optical scan voting in Connecticut in 2007.

Executive Director/Board

Significant decisions and reports are approved by majority vote of the Board. Members of the Board are experienced volunteer observers, with diverse skills, political affiliation, and geographic representation. Current members of the Board are:

- Luther Weeks, Executive Director
- Kathleen Burgweger, Jean de Smet, Aaron Goode, Julie Lewin, Tessa Marquis, Mary Rydingsward, Jan-Maya Schold, Douglas Sutherland, and Victoria Usher

Citizen-Powered

The Citizen Audit is an entirely volunteer, citizen-powered organization. We appreciate every Citizen Audit volunteer. Without dozens of volunteers spending days and hours on each election objectively observing, auditing, and reporting, the promise of publicly verifiable elections could not be pursued and will never be attained.

Acknowledgments

Coordination for this project by Luther Weeks with editing of this report by Julie Lewin.

We appreciate the responsive and cordial replies to our requests for information from registrars of voters across Connecticut.

Contact/Additional Information

Luther Weeks, Executive Director, [Luther 'at' CTElectionAudit.org](mailto:Luther@CTElectionAudit.org), 860-918-2115. All reports and additional supporting data are available at <http://www.CTElectionAudit.org>.

Appendix A. Observation Report Statistics

"E" Electronic Only. "M" Manual Only	Percentage Answer Yes:	Nov 2021
E	Did the supervisor review the audit procedures with the counting team?	83%
M	Did the supervisor clarify procedures for everyone before beginning to count ballots?	58%
M	Did the supervisor review the official audit procedures with the counting team?	25%
E	Did the supervisor review that two individuals should verify the counts on the right of the screen match the bubbles on each ballot?	58%
E	Did the supervisor review that two individuals should observe each ballot on the screen and verify that bubbles are correctly classified by the Audit Station?	0%
M	Did the supervisor review the ballot and vote counting procedues in detail with the counting teams?	50%
	Were the ballots delivered to the site by at least two individuals?	93%
	Were you permitted to observe that the ballot seals were not tampered with?	100%
	Were the ballot seals intact?	100%
	Was there a separate envelope for hand counted ballots in the ballot container?	46%
	Was there a separate envelope for write-in ballots in the ballot container?	40%
M	Was the total number of ballots counted before the votes were counted for races?	83%

“E” Electronic Only. “M” Manual Only	Percentage Answer Yes:	Nov 2021
M	Were the ballots counted by each team such that a 2nd official verified each count?	58%
M	If multiple teams ballots, was the totaling independently verified by a 2nd official?	73%
E	If you concentrated could you confirm that the Audit Station correctly classified each bubble on each ballot?	100%
E	If you concentrated could you confirm that the Audit Station correctly counted each vote on each ballot, in the columns on the right of the screen?	0%
E	While you were observing, in your judgment, did two local election officials focus their attention on each ballot?	17%
E	While you were observing, did one of the officials ask to slow down or to go back to review previous ballots?	100%
E	While you were observing, in your judgment, did local officials have enough time to confirm that the Audit Station correctly classified each bubble on a ballot for 90% of the ballots?	100%
E	While you were observing, in your judgment, did local officials have enough time to confirm that the Audit Station correctly counted each vote on each ballot, in the columns on the right for 90% of the ballots?	0%
M	If hash marking was used: Did a 2nd official observe that each vote was read accurately?	36%
M	If hash marking was used: Did a 2nd official make duplicate hashmarks OR observe that each hash mark was recorded accurately	36%
M	If sorting and stacking was used: Was the vote counting such that a 2nd official verified that each vote was stacked as marked?	33%
M	If sorting and stacking was used: Were the stacks of ballots counted such that a 2nd official verified that each stack was counted accurately	33%

"E" Electronic Only. "M" Manual Only	Percentage Answer Yes:	Nov 2021
E	Did the Audit Station have problems reading ballots on colored/tinted stock?	0%
E	Did the Audit Station have problems reading folded or creased ballots?	20%
E	Did the Audit Station have problems reading absentee or Election Day Registration ballots?	0%
E	Did the Audit Station have equipment/hardware problems with the scanner, computer, or projector?	20%
E	Did the Audit Station have problems that required reprogramming/relearning the Audit Station district ballot format?	20%
E	Did the Audit Station have other software problems with the scanner or computer?	17%
M	If hash marking was used: Were you permitted to observe that each vote was read Accurately?	100%
M	If hash marking was used: Were you permitted to observe that each hash mark was recorded accurately?	100%
M	If sorting and stacking was used: Were you permitted to observe that each vote was placed in the correct stack?	75%
M	If sorting and stacking was used: Were you permitted to see that the count of ballots in piles for each race was accurate?	75%
M	Were counters kept unaware of the tabulator totals for the ballots or races they were counting until counting and recounting each race was finally complete?	67%
M	If initial counts were off, were counters kept unaware of the exact and approximate level of differences? I.e. No indication was given of the amount a count was off.	27%

"E" Electronic Only. "M" Manual Only	Percentage Answer Yes:	Nov 2021
M	Were questionable votes on ballots ruled upon separately, vote by vote, rather than all votes on such ballots all classified as questionable, when some were not questionable?	75%
M	Were questionable votes ruled on prior to the tallying of votes for each race AND counts not adjusted based on knowledge of the results of the differences in counts for each race?	75%
M	Did officials find a match between machine counts and manual counts at the end of the initial count of each race?	38%
M	Did officials try to resolve mismatched counts by counting again?	75%
M	Did officials try to resolve mismatched counts by changing counting teams ?	44%
M	Did officials resolve mismatched counts by the end of the audit?	70%
M	Were you able to observe that hash marks and totals of batches for each team were tallied accurately?	100%
M	Were you able to observe that the number of ballots from multiple teams and batches were totaled accurately?	100%
M	Were you able to observe that the number of votes from multiple teams and batches were totaled accurately?	92%
	Did elections officials record counts, including unresolved discrepancies, if any, on the Official Audit Report Form by the end of the audit?	100%
	Were you given an opportunity to have/make a copy of the Audit Report Form?	94%
	Did the ballot counts on the optical scanner tape(s) printed on election-night match the tabulator tape ballot count transcribed on the official audit report form(s)?	93%

"E" Electronic Only. "M" Manual Only	Percentage Answer Yes:	Nov 2021
	Did the race counts on the optical scanner tape(s) printed on election-night match the tabulator tape counts transcribed to Column 'C' on the official audit report form(s)?	88%
	Were the ballots under the observation of at least two officials at all times?	78%
	Could you confirm that the ballots were returned to their proper containers?	94%
	Were the ballot containers resealed?	83%
	Were seal numbers recorded correctly on the official report forms?	82%
M	Do you have any concerns with the way the room was laid out?	8%
E	Do you have any concerns that the counts were inaccurate?	0%
E	Do you have any concerns with the way the room was laid out?	33%
M	Do you have any concerns that the officially reported information is inaccurate?	0%
M	Do you have any concerns that the audit was not well-organized?	33%
E	Do you have any concerns that the officially reported information is inaccurate?	0%
E	Do you have any concerns that the audit was not well-organized?	25%
M	Do you have any concerns with the transparency/observability of the process	0%
M	Do you have any concerns with the counting and totaling process?	20%
E	Do you have any concerns with the transparency/observability of the process	0%
E	Do you have any concerns with the counting and totaling process?	17%

"E" Electronic Only. "M" Manual Only	Percentage Answer Yes:	Nov 2021
M	Do you have any concerns with the chain-of-custody?	x0%
M	Do you have any concerns that the counts were inaccurate?	33%
E	Do you have any concerns with the chain-of-custody?	60%
	How many people are required to access ballot storage? One	77%
	Were there any memory card problems in pre-election testing or on election day?	18%
	Were there any problems with the IVS voting system?	6%
	Were there any other significant events, such as ballot problems, scanner problems, or occurrences before, during, or after election day?	12%

Observation Report Statistics -Table 14

Appendix B. Methodology

The following activities were performed in the course of the project to organize observers and collect and analyze data for the report. They are in approximate time sequence.

- Just prior to the election, we emailed past observers an invitation to sign up on the web to observe local counting sessions specifying the dates they were available to observe and the distance they were willing to travel. Observers were encouraged to provide at least three availability dates and volunteer to travel at least 35 miles. Observers were also instructed to sign up for a conference call training session and were emailed training materials that included access to video training.
- Our observers attended and participated in the random drawing of districts to be audited. After the drawing, the SOTS Office released a list of selected districts and selected alternate districts.
- Municipalities and districts in the drawing were recorded in our Audit Database. To learn the dates and times of their local audit counting sessions, we sent emails, made calls, and left voicemails with registrars of voters of the selected municipalities. Observers participated in conference call and web video training in the days prior to the start date of the local audit counting sessions, which began 15 days after the election.
- Starting shortly after the drawing and extending through the audit period, while audit dates were obtained from local officials, observers were matched and tentatively scheduled for upcoming local audit counting sessions. Often schedule changes were made when observers were unable to observe a tentatively scheduled audit. Some observers signed up for additional dates. Others volunteered to observe additional audits.
- Observers attended audits, completed our paper Observation Report Forms, and, where possible, collected draft or final copies of the official SOTS Audit Report. Copies of Audit Report Forms were mailed or scanned by observers to us for early data entry. Observers submitted most of our Observation Report Forms, using the LimeSurvey tool, while some mailed or emailed paper forms for Citizen Audit data entry.
- Citizen Audit volunteers observed and reported on the electronic audits which were held in the Secretary's offices at 165 Capitol Avenue, Hartford.
- Observation Report Forms for counting sessions not observed or those not obtained by observers, the Citizen Audit obtained the forms through FOI requests to registrars.
- We completed data entry of all Official Audit Report Forms based on the official data.
- Data and Observation Reports were analyzed and compared with past results, and this report was created.