



★ VIRGINIA ★
DEPARTMENT *of* ELECTIONS

Risk Limiting Audit Manual

VIRGINIA DEPARTMENT OF ELECTIONS

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1. Introduction

1.1 Background on Risk Limiting Audits (RLA) in Virginia

1.1.1 Definition of an RLA

A Risk Limiting Audit (RLA) is a type of post-election audit that utilizes statistical methods and a manual review of paper ballots to confirm that the electronic voting system accurately reported the correct outcome of an election. RLAs analyze a random sample of hand-counted ballots to confirm election results. If the margin of an election is wide, fewer votes are audited; if the margin is narrow, more votes are audited until enough evidence can confirm the results of the contest.¹

1.1.2 History of RLAs in Virginia

RLAs provide strong statistical evidence that the declared winner of a contest received the most votes. In 2017, the Virginia General Assembly passed legislation that amended the Code of Virginia to include RLAs of ballot scanner machines in use in the Commonwealth and the changes went into effect on July 1, 2018. During the 2022 General Assembly Session, §24.2-671.1 was repealed and replaced with §24.2-671.2, which took effect on July 1, 2022. With these changes, the Code now requires that RLAs be performed by the local electoral boards (EB) and general registrars (GR) under the supervision of ELECT following the procedures prescribed by the State Board of Elections (SBE).

This document outlines the SBE procedures and includes guidance on the following:

- Randomly selecting contested races and determining the risk limit.
- Preparing for an RLA, including guidelines for organizing ballots, selecting venues, and securing appropriate materials by EBs and GRs.
- Ballot custody, accounting, security, and written record retention procedures that ensure a complete and accurate collection of cast ballots from which samples are drawn.
- Hand counting of the audited ballots.
- Methods for conducting the RLA.
- Ensuring transparency and understanding of the process by participants and the public, including guidelines for direct observation by members of the public, representatives of the candidates involved in the RLA, and representatives of the political parties.

¹ See [National Conference of State Legislatures, Risk-Limiting Audits](#)

2. RLA Basics

2.1 Methods

There are two RLA methods approved for use in the Commonwealth of Virginia: *ballot-polling* and *batch-comparison methods*. Ballot-polling audits manually review a randomly selected, sufficiently large sample of ballots to determine if the overall outcome of an election contest was correctly reported. Batch-comparison audits manually review randomly selected physical batches of ballots, such as those cast in one precinct, and compare those results with corresponding machine counts.²

Although the ballot polling and batch comparison methods differ in their sampling methodology, both methods achieve the same purpose. Pursuant to §24.2-671.2(B), the SBE is required to set the processes and procedures for each RLA performed.³ The SBE will vote on the method for statutorily required RLAs and RLAs requested by the SBE by two-thirds majority vote by no-later than September for the November General Election.

Since 2022, local electoral boards (EB) have the option to apply for RLAs of contested races that are wholly contained within their jurisdiction. Local electoral boards may choose to utilize either the *ballot-polling* or *batch-comparison* methods for conducting their RLA, subject to the approval of the SBE.

2.2 RLA Selection and Notification Process

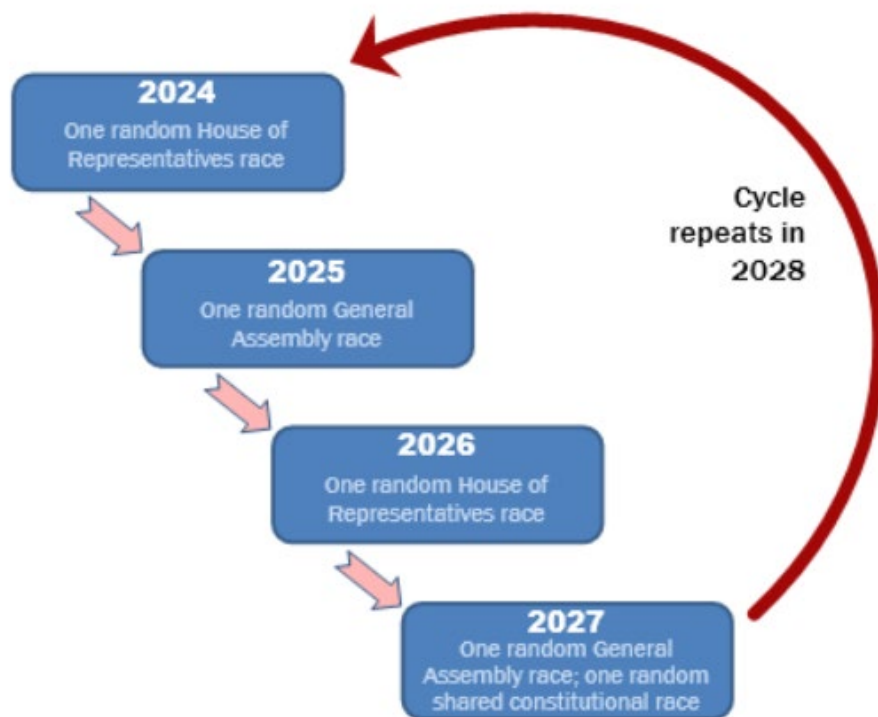
Pursuant to § 24.2-671.2, RLAs must be conducted **before** a race has been certified.⁴ ELECT must ensure that an RLA is conducted for at least one randomly selected contest each year. The Code of Virginia provides the contests eligible for selection for an RLA depending on the election cycle, as outlined in §24.2-671.2(C) and illustrated below.⁵

² *Id.*

³ See Code of Virginia [§24.2-671.2\(B\)](#).

⁴ See [Code of Virginia, § 24.2-671.2](#).

⁵ *Id.*



The SBE may also choose to audit a race in any other year that ensure that each locality participates in a risk-limiting audit of an office within its jurisdiction at least once every five years or that the State Board finds appropriate. The SBE defines participation in an RLA by the uploading of a ballot manifest. Every locality in the Commonwealth participated in RLA of the 2020 Presidential and 2020 U.S. Senate races, which is explained in greater detail in the March 31, 2021, Risk-Limiting Audit Report found on ELECT’s website.⁶

Additionally, §24.2-671.2(D) allows local electoral boards to *request* a risk-limiting audit of a contested race within the EB’s jurisdiction. Using *SBE-671.2(D) Form: Request for Risk Limiting Audit*, a locality may submit their request to the SBE for approval.⁷ Examples of races wholly contained within a locality’s jurisdiction *may* include but are not limited to: mayoral, school board, city council, clerk of court, treasurer, or sheriff. Localities that have portions of House of Delegate, State Senate, U.S. Senate, or U.S. House of Representative races located within their localities are not able to request to audit just their jurisdiction in those races. Section 2.2.3 of this manual details how to apply for an RLA.



Applying for an RLA and the Yearly Random Selection of Races

If a locality opts for an RLA of a race wholly contained within its jurisdiction, it is not exempted from the required yearly, randomly selected RLA.

⁶ See [ELECT, Risk-Limiting Audit Report, March 31, 2021](#)

⁷ See [ELECT, SBE-671.2\(D\) Form](#)

2.2.1 Selecting a Contest for Statutorily Mandated RLAs

For those contests eligible for an RLA as designated by the year in §24.2-671.2(C), the SBE will only consider races with margins greater than 1%.⁸ All races that meet that threshold will be placed in the selection pool and will be drawn at the SBE meeting held on the third Monday in November. There is no statutory requirement to audit a primary election, although the SBE may vote to do so (see 2.2.2 of this Manual).

DRAWING

For those contests eligible for an RLA each year under 24.2-671.2(C), the SBE Chair or designated representative will randomly draw one race(s) to audit from this pool. Before the random selection takes place, a member of ELECT staff will explain the selection method. Examples of random selection methods may include drawing a contest from a bowl or rolling dice to determine the audited contest. The selection will be held and recorded during a public meeting held on third Monday in November to ensure that the chosen race is completely random.

2.2.2 SBE Requested RLAs

Under §24.2-671.2(C)(4) of the Code of Virginia, the SBE has the right to require an RLA of any race to ensure that each locality participates in an RLA at least once every five years *or* that the SBE otherwise deems appropriate.⁹ If the SBE decides to audit a race pursuant to §24.2-671.2(C)(4) of the Code of Virginia, the SBE must approve such audit by two-thirds majority vote. The approval of this contest will take place at a SBE meeting held two months prior to the June primary, and no-later than September prior to the November General Election. This will allow localities time to plan for the audit ahead of the start of early voting. The approval of such races will be contingent on the outcome of the race, as no race may be audited that has a margin of less than 1%. The SBE will request ELECT to add this item to the Board agenda prior to the SBE meeting where the vote will take place.

2.2.3 Applying for an RLA of a Local Contest

An EB may request SBE approval for an RLA of a contested local race wholly contained within the EB's jurisdiction. The SBE has promulgated both a regulation to guide EBs in selecting a race for an RLA as well as the *SBE-671.2(D) Form* that localities must use to request a race for an RLA. As of March 2022, EBs may choose between utilizing the *ballot- polling* or *batch-comparison* method of conducting a Risk-Limiting Audit upon approval of the SBE.

An electoral board must cast a majority vote at a public meeting to request an RLA for a particular contested local race, wholly contained within the jurisdiction of the electoral board. Further, an electoral board must sign and complete the current *SBE-671.2(D) Form* and identify the local race(s) subject to the requested RLA. All board members should sign and date the

⁸ See Va. Admin. Code, 1VAC20-60-80.

⁹ See [Code of Virginia §24.2-641.2](#).

form. Once completed, the secretary of the electoral board must send the form to ELECT via the locality's Elections and Registration Specialist. An ideal time for electoral board members to select a race for audit is during the canvass. These forms must be submitted to ELECT no later than close of business the day prior to the publicly noticed RLA SBE meeting (the date will vary depending on the election cycle.)

The SBE will grant an RLA request if the form is properly completed, all statutory requirements are met, and the request is submitted on time. Finally, the regulation specifies that, as needed, the SBE will grant a two-week extension to an electoral board's certification deadline under § 24.2-671 to accommodate the completion of the RLA.¹⁰

KEY FACTORS

When considering applying for an RLA of a race wholly contained within the jurisdiction of the electoral board, ELECT recommends considering several aspects:

METHOD CHOICE

The SBE gives EBs the option to choose between the use of two RLA methods for applications submitted pursuant to §24.2-671.2(D): ballot-polling and batch-comparison.

Ballot-polling typically requires the smallest number of ballots to produce strong evidence that a reported outcome was correct. This method has been used by the Commonwealth since RLAs were first required by statute. It is the easiest method for the public to observe the interpretation of ballots. A ballot-polling audit is like an exit poll, where a statistically significant number voters are sampled to make inferences about the outcome of a race. In the case of ballot-polling RLAs, a statistically significant number of ballots are sampled to test the accuracy of the voting system's counts in the election.

Batch-comparison is an audit where batches of ballots (e.g., all ballots cast in a precinct) are randomly selected, counted, and compared to test the accuracy of the voting system's count in the election. This method tends to use the most ballots of either method, causing a greater workload than ballot-polling and the need for more resources. Additionally, when Arlo, the RLA software, is set up for a batch-comparison audit it tends to select, although random, the precincts with more ballots. Therefore, localities should expect to review over a thousand ballots.

¹⁰ See [Code of Virginia, §24.2-671](#).

**Tip**

You can use the Arlo Planner Tool to create an *estimate* of the number of ballots or batches that may be required to conduct an RLA for your race. The Arlo Planner Tool can be found here: [Arlo Planner Tool, by VotingWorks](#). This tool is available to the public and does not require a login to access.

AN EXAMPLE OF SAMPLE SIZES FOR BOTH METHODS

ELECT estimated the number of ballots that may have needed to be sampled for the 2022 General Election RLA, U.S. Congressional District 9, using both the ballot-polling method and the batch-comparison method, with the risk limit set to 10%, to provide a real-world example of the amount of work required for each method. This race had 248,792 ballots cast with a margin of 47% between the candidate with the most votes and the candidate with the second most votes.

Batch-comparison Estimate for District 9	Ballot-Polling Estimate for District 9
7 Batches or ~5,600 total ballots*	60 ballots

**Note about Performing Both a Ballot-polling RLA and a Batch-comparison RLA**

If your locality must perform both a ballot-polling RLA and a batch-comparison RLA, can you use the same ballot manifest for both? Yes, the ballot manifest for one may be used for the other. *However*, in this event, the batches listed in the ballot manifest ***must*** be the same as your precincts. For example, if 100 ballots were cast in Precinct 1, then Batch 1 would have 100 ballots. The candidate by batch file must match with the ballot manifest for a batch-comparison method RLA. This is discussed in greater detail in 5.2.2 Creating a Candidate Total by Batch File. You may also choose to create two separate ballot manifests for greater ease in locating ballots.

**Reminder**

ELECT reminds localities that should an EB choose to apply for an RLA the batches or ballots used to perform the RLA will be randomly chosen by Arlo, no matter which RLA method is chosen, and will not be chosen by the applying EB.

TIME

Pursuant to the Code of Virginia §24.2-671.2, ELECT is required to ensure that certain RLAs are conducted. The SBE announces those races, approved applications from localities requesting an RLA, and any other RLAs ordered by the SBE during a meeting held on the third Monday in November. This creates a very tight timeline for the RLAs, which must be completed before certification, that overlaps with the Thanksgiving holiday. This means localities will have approximately 8 business days to complete the RLA process during a general election, i.e., 6 days in 2024, 6 days in 2025, 11 days in 2026, 11 days in 2027, and 6 days in 2028.

This timeline may be further compounded during a November general election by choosing a

different method than the SBE for an RLA of a local contest. For example, the SBE may choose to conduct an RLA using the ballot-polling method in a jurisdiction. If an EB chooses to utilize a batch-comparison method for a local race, then the EB would be running two different types of RLAs at the same time, which may take additional time to complete.

If an EB applies for an RLA of a primary, the timeline is even more compressed. For a June primary, an electoral board will have 3 business days from the time of approval of the RLA to the date for the SBE to declare a nominee. This timeline may also include the 4th of July, depending on the year. Given these time constraints, an RLA of a primary, while not prohibited by statute, is not recommended.

STAFFING

As part of the RLA, EBs must recruit audit review boards (see section 3.4 for more information about audit review boards). An audit review board is a two-person team assigned to review ballots and record a hand tally of the results. The required number of audit review boards is based on the number of batches that are needed for an RLA. However, when a single batch contains a large number of ballots, additional audit review boards may be assigned to the batch to tally the ballots more effectively and efficiently. For example, a batch-comparison method RLAs must have batches that are the size of your precincts. Your locality may have only a few batches, but those batches may be large based on the number of ballots cast in a precinct.

Thus, more audit review boards may be needed to tally those ballots effectively and efficiently.

- On average, an audit review board can pull 20-25 ballots per hour utilizing the ballot-polling method. If many ballot containers must be retrieved, this average decreases to about 15-20 ballots per hour. It may take longer to locate a specific ballot within a stack of ballots utilizing the ballot-polling method, which accounts for the additional time.
- On average, an audit review board utilizing the batch-comparison method could approximately audit about 220 ballots per hour. Batch-comparison audit review boards can work more quickly because they are not searching for specific, random ballots but instead working through all ballots in a “batch”. That being said, the review board or boards have substantially more ballots to review. This may be further complicated when the Central Absentee Precinct (CAP) is chosen for audit as not every ballot will contain the chosen race.

COST

As noted above, audit review boards will need to be recruited to process the ballots or batches that will be hand counted. Each audit review board consists of two individuals; if more ballots or batches are sampled, more people will need to be compensated to complete the RLA process on time.

2.3 SBE Administrative Tasks

In addition to the SBE's role in selecting and approving races for audit, the SBE plays a role in setting the risk-limit, choosing the method of conducting the RLA, and generating the random seed number. These tasks are outlined below and performed at one of two SBE meetings held prior to the RLA.

2.2.2 Setting the Risk Limit

A *risk limit* is the maximum chance that the RLA will fail to correct an incorrectly reported outcome. For example, a 10% risk-limit means that there is a 90% chance that the RLA will correct an incorrect outcome. To date, every RLA in Virginia has used a 10% risk-limit. A 5% risk limit has been used in other states, such as Georgia, although has yet to be tested in Virginia. The lower the risk limit the more batches or ballots that are likely to be pulled.

The SBE will set the *risk limit* of any RLA following industry best practices and will announce the risk limit of each RLA at a public meeting held prior to the RLA. The approval of the risk limit will take place at a SBE meeting held no-later than the September prior to the November General Election.

2.2.3 Choosing the RLA Method

The approval of the method for the RLA of a statutorily mandated contest will take place at a SBE meeting held no-later than the September prior to the November General Election.

2.2.4 Generating the Random Seed Number

For each audited race, the RLA software uses a 20-digit random seed number to select ballots for retrieval. A random seed number specifies the starting point of a computer-generated random sequence of numbers. The 20-digit random seed number is generated during a SBE meeting.

To create this random number, the SBE Chair or designated representative(s) rolls twenty, ten-sided dice (numbered zero through nine), one time each. As each dice is rolled, the resulting number is recorded on a whiteboard. Any person may be designated by the SBE Chair to roll the dice; it may be done by one person or multiple people. Alternatively, the 20-digit random seed number may also be generated using an electronic random number generator.

If there are applications approved by the SBE from electoral boards pursuant to Title 24.2-671.2(D), a new, additional 20-digit seed number will be generated via the process explained above.

The 20-digit number generated by this activity will be inputted into the RLA software by the RLA *Administrator* on ELECT's staff. Once this number is inputted, the auditing software will randomly select and generate a list of ballots to be retrieved based on the sample size. For an

illustrated example of this process, please review the *Random Seed Number Generation* video on ELECT's YouTube channel.¹¹

3. RLA Preparation

3.1 Overview

Due to the compressed timeline for RLAs, localities can take actions before Election Day to set themselves up for a successful RLA should they be chosen or approved by the SBE, including:¹²

- Determining RLA location;
- Scheduling the public meeting;
- Recruiting Audit Review Boards;
- Reviewing ballot accounting and storage practices; and,
- Logging ballot manifest quantities produced from early voting and pre-processing.

3.2 Determining the Location of the RLA

A locality must consider a space for the RLA that can accommodate the public and that is ADA-compliant. The facility where an RLA takes place must also have an internet connection to download and print retrieval lists, placeholder pages, RLA board credentials, and labels.

If only a few ballots are required for an RLA, it may be possible to conduct the RLA at the courthouse. If more space is needed or if no workspace is available, the RLA may take place in another suitable location, such as: the GR's office, a library, a firehouse, a school, etc. Localities should work with their Clerks of Court to consult on the physical space of the RLA.

3.3 Scheduling the Public Meeting

Pursuant to § 2.2-3707¹³ and §24.2-671.2(G), an RLA must be conducted as a public meeting. An EB and the GR shall conduct an RLA within their jurisdiction. Once the electoral board has selected a location for the RLA, it must provide the location to ELECT; ELECT will select the date and time for the RLA to begin. ELECT will publish the list of contested races along with the date, time, and location of the RLA as soon as practical. Local party chairpersons and the candidates involved in the race being audited must also be notified of the RLA public meeting by the general registrar.

Authorized representatives may be sent by parties and candidates to observe the RLA. As the RLA is a public meeting, authorized representatives are allowed to attend. Authorized representatives should be provided the same level of observance as they would during the

¹¹ See [ELECT YouTube Channel, Random Seed Number Generation](#).

¹² See the Appendix for an example of the timeline for the November General Election

¹³ See [Code of Virginia, § 2.2-3707](#).

Canvass. Local electoral boards should set up the location of the RLA to allow the public and authorized representatives the ability to observe the RLA.

Additionally, at least one member of the electoral board representing each party must participate in, and be present for the duration of, the RLA.¹⁴ In addition to electoral board members and the GR, meeting attendees may include:

- Clerk of Court
- Audit Board members;
- General public;
- Representatives from political parties;
- Candidates;
- Campaign staff; *and*,
- Local party chairs.

Localities should plan for at least one full day to conduct the RLA. As a best practice, it is recommended that the public meeting begins in the morning so the afternoon may be free if a second round of ballot retrieval is required. Since the sample is random, there is no way to predetermine the number of ballots a locality must retrieve.

3.4 Recruiting RLA Audit Review Boards

An *Audit Review Board* is a two-person team that retrieves specified ballots, records the results of the ballot, and inputs the results into the ballot software. GRs and/or the electoral board determine the audit board(s). Audit board members can be: staff, officers of election, electoral board members, GRs, or representatives from each party and/or candidates. Audit boards do not have to declare a party affiliation. As a best practice, it is recommended the audit board consist of one Democrat and one Republican to ensure balanced representation.

The number of *Audit Review Boards* is based on the number of ballot storage containers that must be opened and not on the number of ballots to be retrieved. The average numbers for both the ballot-polling and the batch-comparison method are provided below.

- Ballot-polling: On average, an audit board can pull 20-25 ballots per hour. If many ballot containers must be retrieved, this average decreases to about 15-20 ballots per hour.
- Batch-comparison: On average, an audit board could audit about 220 ballots per hour.

Since localities retrieve random ballots when utilizing the ballot-polling method, it can take

¹⁴ See [Code of Virginia §24.2-641.2](#).

audit boards longer to locate the appropriate ballot in a stack of ballots, which results in fewer ballots being retrieved per hour. Whereas in the batch-comparison method, every ballot in a stack is counted in a precinct. While this may be quicker than locating random ballots, more ballots need to be reviewed using the batch-comparison method.

3.5 Reviewing Ballot Accounting and Storage Practices

When preparing for an RLA, it is a good time to review ballot accounting practices, which include ballot tracking, ballot reconciliation, and chain of custody forms and procedures. Ballot accounting forms the basis of a ballot manifest by providing the number of ballots in an envelope/box/container (ballot manifests are explained in greater detail for *ballot-polling* in section 4.3 Creating a Ballot Manifest and for *batch-comparison* in section 5.2.1 Creating a Ballot Manifest.) It is imperative that the ballots remain organized and clearly marked within the contents of the box. It is important to consider both methods when storing your ballots, having a strategic plan for organizing ballots can save a lot of time when conducting an RLA.

ELECT has designed a sample chain of custody form to document the control, transfer, and disposition of ballots during an RLA. Localities may choose to utilize this form or design their own to suit their specific needs. This sample form can be found in Forms Warehouse under the RLA section.

3.6 Suggested Supplies

While not required, the following is a list of helpful supplies for a successful RLA:

- Table and chairs for each audit board;
- Bright colored paper;
- Bright-colored removable labels;
- Tally sheets;
- Pens;
- Rubber fingers;
- Device to open containers;
- Materials to reseal containers, if necessary;
- Device with Wi-Fi/cellular to enter ballot tallies (laptop, smartphone, etc.); *and*,
- Printer.

4. The Ballot-Polling Method of the Risk-Limiting Audit

4.1 Overview

Once a locality is selected for an RLA or the electoral board has requested an RLA, it must do the following:

- Notify the public and participants identified in section 3.2 and 3.4 of this manual;
- Submit an ELECT 659-Request to Inspect Sealed Election Material form;
- Create and upload the ballot manifest; *and*,
- Gather supplies.

For the purpose of this manual, a batch is a documented set of ballots created by a voting system, an officer of election, or other election official.

4.2 Submitting an ELECT 659-Request to Inspect Sealed Election Material Form

Pursuant to Va. Code § 24.2-659, a locality must receive permission from the ELECT to unseal ballots cast on Election Day for a post-election audit. Localities are required to submit an *ELECT 659-Request to Inspect Sealed Election Material* form to obtain permission. The form is submitted to ELECT for signature authorization and then presented to the Clerk of the Circuit Court to access ballots from the election. This form may be found in Forms Warehouse under the RLA section.

4.3 Creating a Ballot Manifest

A *ballot manifest* is a two-column Excel spreadsheet created by localities that includes a list of the “Batch Name” (Column A) and the “Number of Ballots” (Column B).

	A	B
1	Batch Name	Number of Ballots
2	Precinct 1	301
3	Precinct 2	302

The ballot manifest creates an inventory of every ballot cast in a locality. Depending on the size of the locality, a ballot manifest should take one hour or less to complete. As a best practice, localities are encouraged to build their ballot manifest as they go. To select random ballots or batches, *all* participating localities must upload a ballot manifest before the audit can begin.



Note about Performing Both a Ballot-polling RLA and a Batch-comparison RLA

In the event that your locality has to perform *both* a ballot-polling RLA and a batch-comparison RLA, pay attention to the design of your ballot manifest for each method. While the ballot manifest for one may be used for the other, the batches listed in the ballot manifest ***must*** be the same as your precincts. For example, if 100 ballots were cast in Precinct 1, then Batch 1 would have 100 ballots. This is not only for consistency but also so that the candidate by batch file matches with the ballot manifest for a batch-comparison method RLA, discussed in 5.2.2 Creating a Candidate Total by Batch File. You may also choose to create two separate ballot manifests for each separate method for greater ease in locating ballots.

Batch information can be found on Ballot Record Reports or on Label #3. ELECT encourages localities to have discussions with their Clerk of Court prior to the election. During these conversations, localities should work with their Clerk of Court to discuss storage limitations, the location of the RLA, and chain of custody concerns.¹⁵

The number of ballots in each batch should be verified independent of the tabulator. The information to create a ballot manifest may be found in the following places:

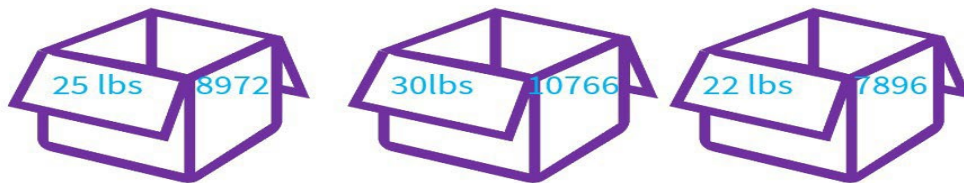
- Ballot Record Reports from precincts
- Inventory the ballot boxes at the Clerk of Court. Label #3 should contain the information needed.

- Electronic Pollbook Data
 - **Reminder:** Check Incident Reports or Officer of Election notes for occurrences of failing to check-in voters. This will allow the EPB number to be increased to the correct number.)
- VERIS data from the Final Absentee Report
- Calculating the Number of Ballots in a container by weight.

¹⁵ See Democracy Fund, Knowing It's Right, Part Three, Planning and Conducting a Risk-Limiting Audit Pilot, Jennifer Morrell, June 2020.

- If the number of ballots in a specific container is unknown, a locality can perform a simple equation to approximate the number of ballots in each box. To do this, each container box must be weighed. The weight of each box is added together. The total of this sum is then divided by the total number of ballots cast. The result of this equation is then multiplied by the weight of the corresponding box to get the number of ballots (see graphic.)

Calculating Ballots by Weight



Total Weight = 77lbs

Total ballots from vote history/credit = 27,634

$27634 / 77 = 358.88$

Box 1 = 25lb * 358.88 = 8972

Box 2 = 30lb * 358.88 = 10766

Box 3 = 22lb * 358.88 = 7895


Helpful Tips and Reminders:

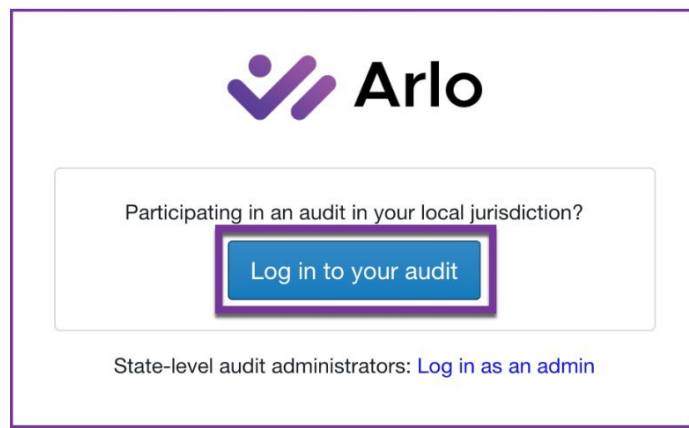
- All types of ballots are included (in-person, mail-in, provisional, etc.) in the manifest.
- Localities may label the "Batch Name" in any way that helps keep them organized (example: Precinct 101, Box 26, Container 8, etc.). Batch names are unique to each locality.
- Boxes/Containers/Envelopes that contain large amounts of ballots may be grouped into smaller units to ease the physical challenges of conducting the RLA, if it is reflected in the batch name (example of "batch names": Precinct 101 Unit 1; Box 26 Unit 2; Container 8 Unit 3 etc.).
- Keep the spreadsheet simple; avoid color coding and bold, so the ballot auditing software can read it.
- Run a quick equation in Excel to check that all ballots have been accounted for in a locality. After performing this check, make sure to **delete** this sum before uploading the manifest into the RLA software.
- Build a ballot manifest as the ballots are being stored after an election in preparation for future RLAs.
- ELECT staff is available to troubleshoot specific challenges and provide support.

4.4 Uploading a Ballot Manifest

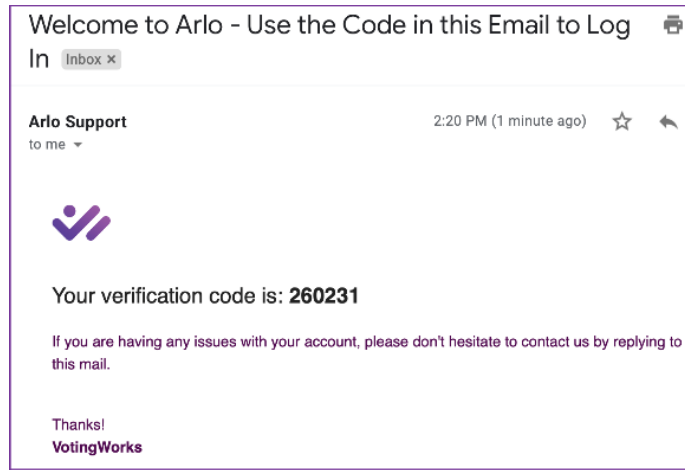
Once the ballot manifest is created, it is saved as a **.csv file** (CSV UTF-8, CSV (Macintosh) and CSV (MS-DOS) are all acceptable) and uploaded into the auditing software. The RLA software lets participants know if a mistake has been made when creating or uploading the manifest by generating an error message. Mistakes may include: empty rows, incorrect file formats (the manifest must be saved as a .csv file), or ballot totals in any rows or columns. All ballot manifests must be submitted by all participating localities to start the RLA.

Once the software receives all the ballot manifests, it will compile them into one large ballot list. This master list will be used to select random ballots across participating localities. Ballot manifests must be uploaded no later than the Thursday after the SBE's random draw. Once all ballot manifests are uploaded the RLA can begin. Detailed instructions, on how to upload a ballot manifest into the current auditing software, are listed below:

1. Using Google Chrome  or Safari as your browser, go to this link: <https://arlo.voting.works>
2. Click Log in to your audit.



3. Enter your email address. Check your email for a new email with the subject.
4. "Welcome to Arlo - Use the Code in this Email to Log In" - enter the verification code.



5. Click on the button with the locality name.



6. Click the Browse button and navigate to the ballot manifest .csv file that was created. Once selected, click Upload File.



The audit has not started.
Ballot manifest not uploaded.

Audit Source Data

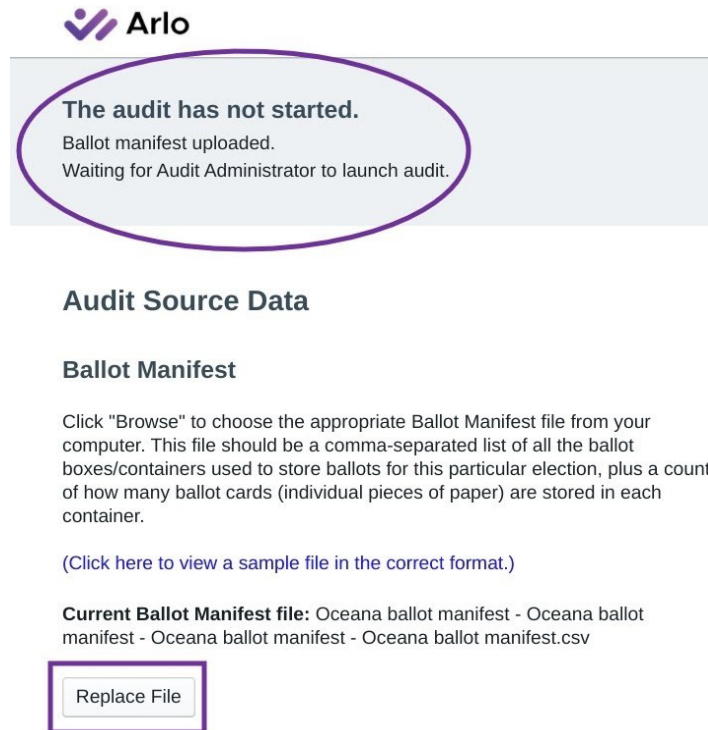
Ballot Manifest

Click "Browse" to choose the appropriate Ballot Manifest file from your computer. This file should be a comma-separated list of all the ballot boxes/containers used to store ballots for this particular election, plus a count of how many ballot cards (individual pieces of paper) are stored in each container.

[\(Click here to view a sample file in the correct format.\)](#)

A file upload interface. It features a text input field with the placeholder 'Select a CSV...', a 'Browse' button to its right, and an 'Upload File' button below the input field. A purple rectangular box highlights the entire upload section.

7. When the upload is successful, a message will appear at the top of the screen that says, "Ballot manifest uploaded." If a mistake is found after a ballot manifest has been uploaded, participants have the option to log back in and use the **Replace File** button to update the file.




8. Once the steps for uploading your ballot manifest have been completed, log out before exiting the screen.

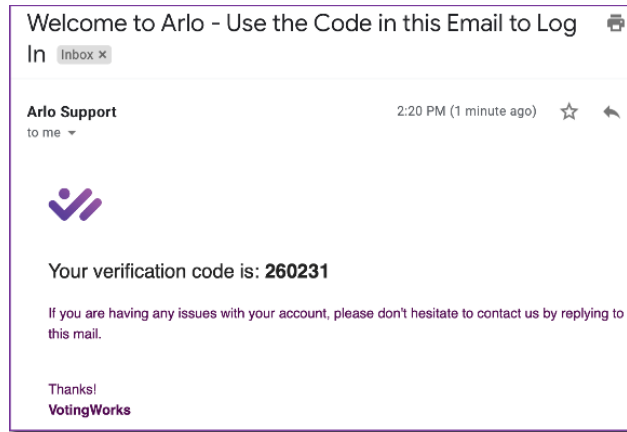
4.6 The Public Meeting

4.6.1 Ballot Retrieval Process

4.6.1.1 Log In to RLA Software

Once the list of ballots to be audited has been generated by the RLA software, participants will log into the RLA software to review the list of ballots they must retrieve to complete the RLA.

1. Using Google Chrome  or Safari as your browser, go to this link: <https://arlo.voting.works>
2. Click Log in to your RLA.
3. Enter email address.
4. Check your email for a new email with the subject "Welcome to Arlo - Use the Code in this Email to Log In" - enter the verification code.

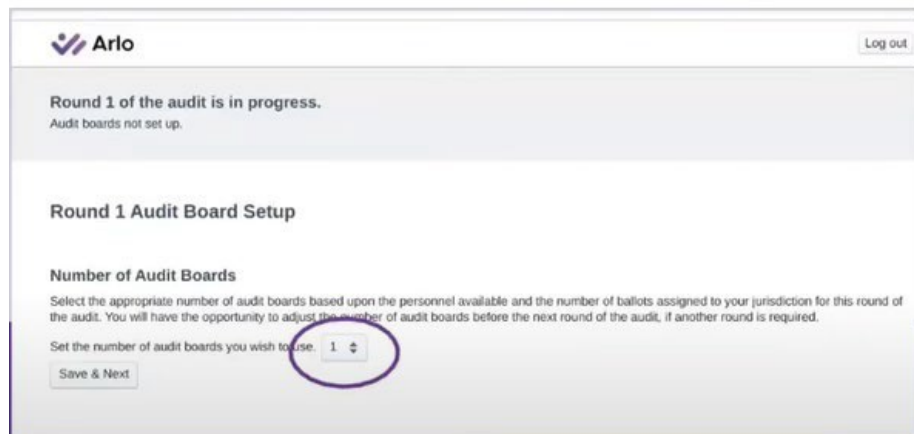


5. Click on the button with the locality name.



4.6.1.2 Audit Boards

The RLA software will ask how many audit boards will be participating in the RLA.



4.6.1.3 Download and Print

The RLA software will sort ballot retrieval lists, placeholder sheets, ballot labels, and audit board credentials for every audit board. Print each item for each audit board.

TEST RLA ELECTION - April 8, 2021





Round 1 of the audit is in progress.

1 of 1 audit boards complete.

Waiting for all jurisdictions to complete Round 1.

Round 1 Data Entry

0 ballots to audit in Round 1

 Download Aggregated Ballot Retrieval List
 Download Placeholder Sheets
 Download Ballot Labels
 Download Audit Board Credentials

Audit Board Progress

0 of 0 ballots audited



Audit Board #1: no ballots to audit

- **Ballot Retrieval List:** A ballot retrieval list is a list of ballots to be retrieved by a locality. The “Batch Name” will be the naming convention used in the ballot manifest. Since the selection is random, precincts may have multiple ballots to be retrieved and some precincts may have none.

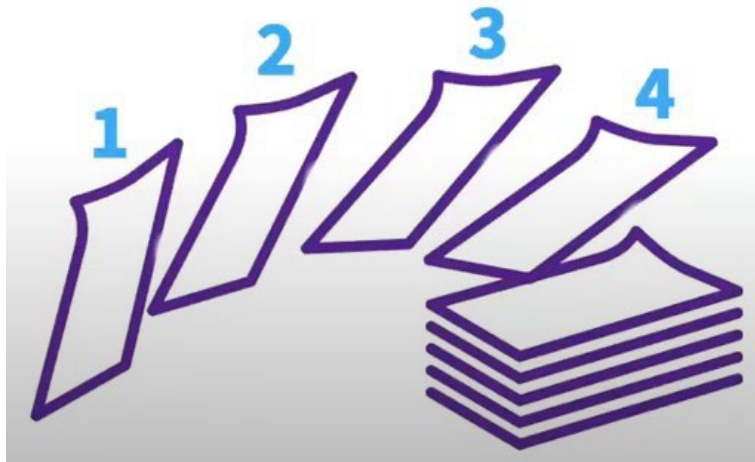
	A	B
1	Batch Name	Ballot Number
2	Precinct 1	90
3	Precinct 2	2
4	Precinct 2	197
5	Precinct 4	27
6	Precinct 5	313
7	Precinct 5	578
8	Precinct 5	587

- The ballot number reflects the numerical order of a specific ballot. To audit ballot number 90 in Precinct 1, for example, a member of the audit board must count from the top, each stored ballot until they reach the 90th ballot in the batch.
- **Placeholder sheets:** Placeholder sheets are individual sheets that contain each batch name and number (ex. Precinct 1, Ballot Number 90). They come in the form of a pdf and are printed on brightly colored paper. These sheets will be used to mark the place of the ballot that is being retrieved in the stack of ballots.

- **Ballot Labels:** Ballot Labels should be placed on ballots when retrieved. A bright-colored removable label is recommended but not required.
- **Audit Board Credentials for Data:** The RLA software will create a username and password for the audit board members. The link at the bottom of the audit board credentials or QR code will direct audit board members to the site to enter in the ballot totals.

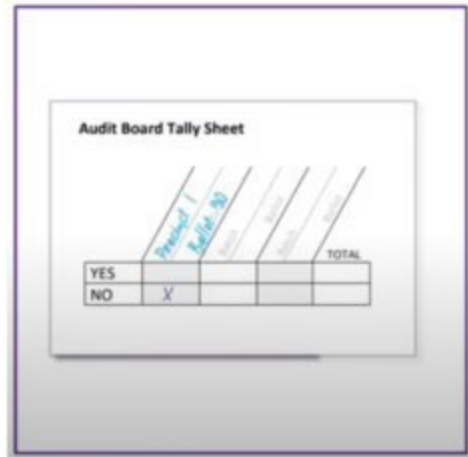
4.6.2 Retrieving and Tallying Ballots

1. Review the list of ballots and retrieve the necessary containers.
2. Perform any change of custody that may be required by the Clerk of Court. The chain of custody needs to be documented. ELECT has a sample form that may be used to document the chain of custody, or a locality may design their own form.
3. Remove ballots from the box and place them in a neat stack.
4. Review the *Ballot Retrieval List* to determine what ballot to select.
5. Starting at the top of the stack, count ballots until the desired ballot is reached.



6. Once the ballot needed to be retrieved is reached, pull it out of the stack and insert the placeholder sheet in the stack to mark its position. Place the removable label on the ballot. The placeholder sheets and ballot labels are generated by the RLA software.
7. Once all ballots have been pulled from the containers, the audit board will use the procedures established by ELECT for conducting hand counts of ballots.¹⁶ These procedures are outlined in Forms Warehouse under Election Management, Election Day Instruction and Forms, *Hand Counting-Ballots-Examples*. Include the batch name, ballot number, and the vote on the tally sheet. ELECT has sample tally sheets available for use during an RLA, but a locality may choose to create their own.

¹⁶ See [ELECT, Commonwealth of Virginia, Hand Counting Guide](#).



8. Localities may return ballot(s) to the appropriate container(s) or keep all the ballots from the RLA in a designated envelope/container.
9. The containers should be resealed and returned to the Clerk of the Circuit Courts following the Chain of Custody procedures.

4.6.2.1 Alternative Methods to “Counting Down the Stack”

If a locality has a batch that is too large to locate a single ballot efficiently by counting down the stack of ballots, the locality may perform the **K-Cut Method** to locate the ballot or utilize a **Commercial Scale**. The methods are explained in more detail below:

K-Cut Method

To make a k-cut of a given stack of ballots:

- Cut the stack into two parts at *random*, designated a “top” part and a “bottom” part.
- Switch the order of the parts by moving the “bottom” part to the top and the “top” part to the bottom.
- The two parts are placed together.
- Cut the stack at least five times.
- The ballot at the top of the new stack is selected.¹⁷

A locality must perform a k-cut five times before selecting the top ballot. A random number must be used to dictate the percentage of the cut. One way to randomize the percentage of the cut is to utilize a random number generator set to 1-100.¹⁸ The number generated then becomes the percentage of the cut (*example* 23=23% of the stack is moved to the bottom.) After performing the cut five times the top ballot becomes the retrieved ballot. The k-cut method is repeated for each random ballot that must be extracted from the stack of ballots.

¹⁷ See [k-Cut: A Simple Approximately-Uniform Method for Sampling Ballots in Post-Election Audits, Mayuri Sridhar and Ronald L. Rivest, Massachusetts Institute of Technology](#)

¹⁸ See [Sample Random Number Generator](#)

The Department's k-cut method demonstration video is available on Forms Warehouse.¹⁹

Commercial Scale

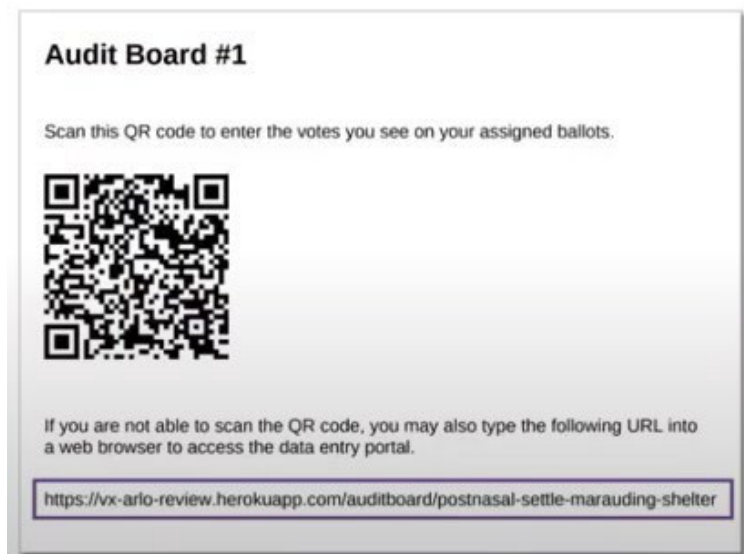
Localities may utilize a commercial scale to locate a ballot. Using a ballot scale is highly accurate, saves time, and places less stress on a locality's audit board. By calculating the average weight of the ballots, a scale can easily identify the corresponding ballot in a ballot retrieval list.²⁰ The Department's scale method demonstration video is available on Forms Warehouse > Risk Limiting Audit.

Helpful Tips and Reminders:

- ELECT has a limited number of counting scales to loan. Localities may send an email to their Elections and Registration Specialist to request the use of a scale.
- ELECT has sample Chain of Custody forms and Tally Sheets available for use in Forms Warehouse.

4.7 Ballot Entry into the RLA Software

The link and/or QR code found at the bottom of the audit board credentials will take audit board members to the data entry portal to input the results of the RLA. A device with a Wi-Fi connection is needed to record the paper tally sheet. This may include a laptop or a smartphone. If using a smartphone, scan the QR code or type in the URL into the web browser.



1. The audit board members will be prompted to sign in. The audit board will see the list of ballots. Audit board members will "key in" results from the list of ballots. If a

¹⁹ See Formwarehouse, [Virginia Dept. of Elections: Risk Limiting Audit](#).

²⁰ See [Weight, Weight, Don't Tell Me: Using Scales to Select Ballots for Auditing](#), Cynthia Sturton, Eric Recorla, and David Wanger, University California Berkeley

locality has 22 ballots to retrieve, there will be 22 separate fields to record each ballot. ELECT recommends both audit board members participate with one audit board member reading the results and one audit board member entering the results. Audit board members must **both** agree on the results of each ballot.

2. Click the **Start Auditing** button to begin.

Audit Board #1: Ballot Cards to Audit

The following ballots have been assigned to your audit board for this round of the audit. Once these ballots have been located and retrieved from storage, click "Start Auditing" to begin recording the votes you see marked on the paper ballots. When you are finished auditing these ballots, click "Auditing Complete - Submit Results" to submit the results. **Note that you will not be able to make changes after results are submitted.**

Start Auditing **Auditing Complete - Submit Results**

Batch	Ballot Position	Tabulator	Status
Av/CB City of Lansing, Ward 1, Precinct ...	7	N/A	Not Audited
Av/CB City of Lansing, Ward 1, Precinct ...	32	N/A	Not Audited
Av/CB City of Lansing, Ward 2, Precinct ...	38	N/A	Not Audited
Av/CB City of Lansing, Ward 2, Precinct ...	24	N/A	Not Audited
Av/CB City of Lansing, Ward 4, Precinct ...	36	N/A	Not Audited
Av/CB City of Lansing, Ward 4, Precinct ...	49	N/A	Not Audited
City of Lansing, Ward 1, Precinct 3	113	N/A	Not Audited
City of Lansing, Ward 1, Precinct 5 & 45	3	N/A	Not Audited
City of Lansing, Ward 3, Precinct 22 & 26	46	N/A	Not Audited
City of Lansing, Ward 4, Precinct 41	4	N/A	Not Audited
City of Lansing, Ward 4, Precinct 42	25	N/A	Not Audited

3. Go through the ballots in order.
4. Select the candidate marked on the ballot, both audit board members need to agree with the results. Click Review. Verify accuracy before clicking Submit & Next Ballot button.

Audit Board #1: Ballot Card Data Entry

Enter Ballot Information

Auditing ballot 1 of 11

Current ballot:
Tabulator: ...
Batch: Av/CB City of Lansing, Ward 1, Precinct 3 Batch 147
Record/Position: 7

Are you looking at the correct ballot?
Before continuing, check the "Current ballot" information to make sure you are entering data for the correct ballot. If the ballot could not be found, click "Ballot not found" below and move on to the next ballot.

Submit & Next Ballot **Submit as audit member**

Instructions
Select all the candidates/ballots below that you see marked on the paper ballot.
If the voter did not vote in the contest, select "Blank voting mark."
If the audit board cannot agree, select "Audit board can't agree." You may add a comment for additional information about the disagreement.

POTUS (DEM)

Bennet	Biden
Bloomberg	Booker
Buitrago	Castro
Delaney	Goldman
Kirchmeyer	Sanders
Stress	Shyrer
Uncommitted	Warren
Williamson	Yang
Audit board can't agree	Blank voting mark

Presidential Primary (DEM)

Presidential Primary (REP)

Submit & Next Ballot

5. When all ballots have been inputted, audit boards should return to the audit overview screen to verify every ballot has been entered into the audit software. Once everything has been verified, click the **"Auditing Complete-Submit Results"** button.

Audit Board #1: Ballot Cards to Audit

The following ballots have been assigned to your audit board for this round of the audit. Once these ballots have been located and retrieved from storage, click "Start Auditing" to begin recording the votes you see marked on the paper ballots. When you are finished auditing these ballots, click "Auditing Complete - Submit Results" to submit the results. **Note that you will not be able to make changes after results are submitted.**

Start Auditing Auditing Complete - Submit Results

Batch	Ballot Position	Tabulator	Status	
AvCB City of Lansing, Ward 1, Precinct ...	7	N/A	Audited	Re-audit
AvCB City of Lansing, Ward 1, Precinct ...	32	N/A	Audited	Re-audit
AvCB City of Lansing, Ward 2, Precinct ...	18	N/A	Audited	Re-audit
AvCB City of Lansing, Ward 2, Precinct ...	24	N/A	Audited	Re-audit
AvCB City of Lansing, Ward 4, Precinct ...	36	N/A	Audited	Re-audit
AvCB City of Lansing, Ward 4, Precincts ...	49	N/A	Audited	Re-audit
City of Lansing, Ward 1, Precinct 3	113	N/A	Audited	Re-audit
City of Lansing, Ward 1, Precinct 5 & 45	3	N/A	Audited	Re-audit
City of Lansing, Ward 2, Precinct 22 & 26	40	N/A	Audited	Re-audit
City of Lansing, Ward 4, Precinct 41	4	N/A	Audited	Re-audit
City of Lansing, Ward 4, Precinct 42	35	N/A	Audited	Re-audit

- Audit board members will sign off. Names must be keyed in exactly how the audit board member signed in. For example, if the caps lock was on when the audit board member signed in, then the caps lock must be on when the audit board member signs out.

Audit Board #1: Board Member Sign-off

Thank you for completing the ballots assigned to your Audit Board. Please sign your name below to confirm that all ballots were audited to the best of your ability and in accordance with the appropriate state statutes and guidelines.

If another round of auditing is needed, you will be notified by election officials.

Audit Board Member: RACHEL LAWLESS

Full Name
RACHEL LAWLESS

Audit Board Member: rachel lawless

Full Name
rachel lawless

Sign Off

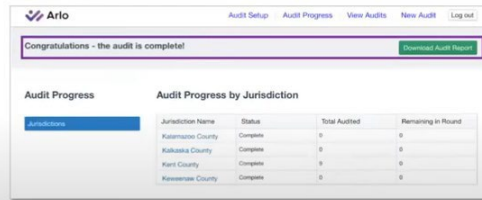
4.8 Completion of the Ballot-Polling RLA

When all audit boards have completed their ballot entry and the risk limit has been met, the *Audit Progress* screen will display the message "Congratulations - the audit is complete!"

If the risk limit was not met after all the ballots have been audited for the contest, the audit software will initiate another round of sampling. A new ballot retrieval list, placeholders, labels, and audit board credentials will be generated for an additional round of ballot retrieval. If more than one locality is auditing for the same office, both localities must complete before the software will determine the need for the second round and subsequently generate the new retrieval list(s)

Audit Completion

Completed



Arlo Audit Setup Audit Progress View Audits New Audit Log out

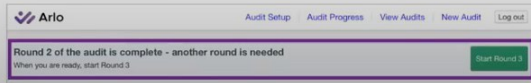
Congratulations - the audit is complete! [Download Audit Report](#)

Audit Progress

Audit Progress by Jurisdiction

Jurisdictions	Jurisdiction Name	Status	Total Audited	Remaining in Round
	Kalamazoo County	Complete	0	0
	Kalamazoo County	Complete	0	0
	Kalamazoo County	Complete	0	0
	Kalamazoo County	Complete	0	0

Additional Sampling



Arlo Audit Setup Audit Progress View Audits New Audit Log out

Round 2 of the audit is complete - another round is needed
When you are ready, start Round 3

[Start Round 3](#)

Pursuant to § 24.2-671.2 (I), if an RLA of a contested race escalates to a full hand count, the results of the hand count shall be used to certify the election in lieu of the tabulation of the unofficial results obtained prior to the conduct of the RLA.²¹²⁰ After a certain number of rounds of RLA and the risk limit has yet to be met, Arlo will indicate that a full hand count is required if it finds the sample size needed is the same as the actual amount of ballots.

²¹ See [Code of Virginia, §24.2-671.2.](#)

5. The Batch-comparison Method of the Risk-Limiting Audit

Once a locality has been approved for a batch-comparison RLA, it must do the following:

- Notify the public and participants identified in section 3.2 and 3.4 of this manual;
- Submit an ELECT 659-Request to Inspect Sealed Election Material form;
- Create and upload the ballot manifest as described in section 5.2.1;
- Create and upload the candidate totals by batch file as described 5.2.2; and,
- Gather Supplies for the RLA

5.1 Submitting an ELECT 659-Request to Inspect Sealed Election Material Form

Pursuant to Va. Code § 24.2-659, a locality must receive permission from the ELECT to unseal ballots cast on Election Day for a post-election audit. Localities are required to submit an *ELECT 659-Request to Inspect Sealed Election Material* form to obtain permission. Once submitted, the form is sent to ELECT for signature authorization and then presented to the Clerk of the Circuit Court to access ballots from the election. This form may be found in Forms Warehouse under the RLA section.

5.2 Create the RLA Documents

For a batch-comparison RLA, Arlo requires two documents, a *Ballot Manifest* and a *Candidate Totals by Batch* file. Both documents are discussed below. For the purpose of this manual, a batch is a documented set of ballots created by a voting system, an officer of election, or other election official. In Virginia, a batch is the equivalent of a precinct when utilizing the batch-comparison RLA Method.

5.2.1 Creating a Ballot Manifest

The ballot manifest is an inventory of every ballot cast in a locality for a particular race. A ballot manifest is a two-column Excel spreadsheet created by localities that includes a list of the “Batch Name” (Column A) and the “Number of Ballots” (Column B). Unlike in a ballot-polling ballot manifest, the batches listed in the ballot manifest for a batch comparison audit must be the size of your precincts. For example, if precinct 1 had 100 ballots cast then precinct 1 would be entered under Column A and 100 would be entered under Column B (*see below*).

	A	B
1	Batch Name	Number of Ballots
2	Precinct 1	301
3	Precinct 2	302



Note about Performing Both a Ballot-polling RLA and a Batch-comparison RLA

In the event that your locality has to perform both a ballot-polling RLA and a batch-comparison RLA, the ballot manifest for one may be used for the other. However, in this event, the batches listed in the ballot manifest ***must*** be the same as your precincts. For example, if 100 ballots were cast in Precinct 1, then Batch 1 would have 100 ballots. This is not only for consistency but also so that the candidate by batch file matches with the ballot manifest for a batch-comparison method RLA, discussed in 5.2.2 Creating a Candidate Totals by Batch File. You may also choose to create two separate ballot manifests for each separate method for greater ease in locating ballots.

5.2.2 Creating a Candidate Totals by Batch File

Unlike a ballot-polling method RLA, a batch-comparison RLA needs the number of ballots cast for each candidate from each batch. Due to various voting systems capabilities and for the purposes of uniformity across the Commonwealth, the size of a batch must be the size of a precinct as that is the only way to get the total number of ballots cast for any candidate. The total number of ballots cast for any candidate must, then, be placed into a spreadsheet called the *Candidate Totals by Batch File*, which outlines each batch of ballots and how many ballots were cast for each candidate in a particular batch.

To create a *Candidate Totals by Batch File*, open a spreadsheet program to create a simple spreadsheet.

- Column A labeled “Batch Name” is for your batch name. The batch names in column A must match the batch names in your ballot manifest.
- Additional columns should be labeled with the names of the candidates. You should use the names on the ballot. Write-ins may be lumped together unless they have reached the threshold for a write-in certification.


	A	B	C	D
1	Batch Name	John Doe	Jane Smith	Write-in
2	Precinct 1	100	200	1
3	Precinct 2	200	100	2

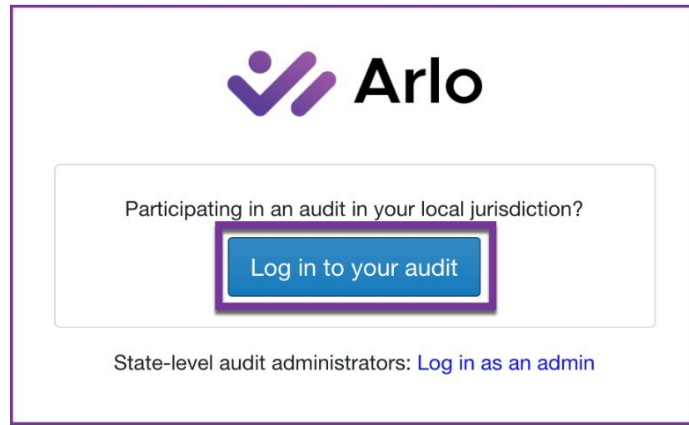
Enter the data for your locality from your statements of results. When you're finished, review the spreadsheet to ensure the total number of batches matches the number of batches in your ballot manifest and that the candidate totals are correct. Then, save the file as a .csv file.

5.3 Uploading the Ballot Manifest and Candidate Totals by Batch files

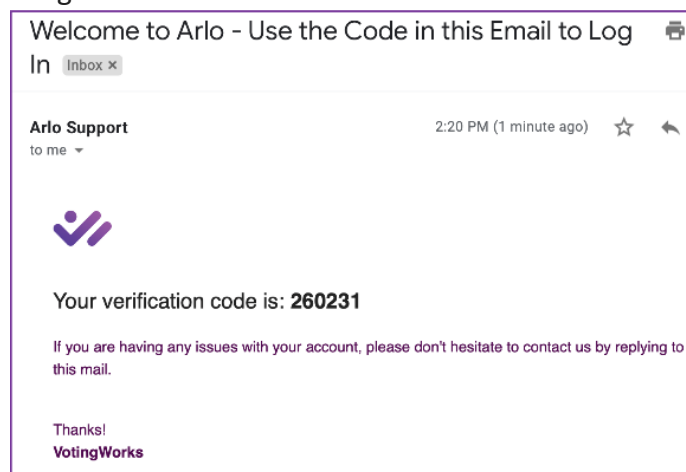
Once the ballot manifest and the candidate totals by batch files are created, participants will save the ballot manifest and candidate totals by batch files as **.csv files** (CSV UTF-8, CSV (Macintosh) or CSV (MS-DOS) are all acceptable) and upload the spreadsheets into the auditing software. The RLA software will let participants know if a mistake has been made when creating or uploading the files by generating an error message. Mistakes can include: empty rows, incorrect file formats (the manifest must be saved as a .csv file), or ballot totals in any rows or

columns. The ballot manifest and the candidate total by batch files must be uploaded no later than the Thursday after the SBE's random draw. Once the files are uploaded the RLA can begin. Detailed instructions, on how to upload a ballot manifest and the candidate totals by batch into the current auditing software, are listed below:

1. Using Google Chrome  or Safari as your browser, go to this link:
<https://arlo.voting.works>
2. Click Log in to your audit.



3. Enter email address.
4. Check your email for a new email with the subject "Welcome to Arlo - Use the Code in this Email to Log In" - enter the verification code.



5. Click on the button with the locality name.



6. Click the Browse button and navigate to the ballot manifest .csv file that was created.

Once selected, click Upload File.



The audit has not started.

Ballot manifest not uploaded.

Audit Source Data

Ballot Manifest

Click "Browse" to choose the appropriate Ballot Manifest file from your computer. This file should be a comma-separated list of all the ballot boxes/containers used to store ballots for this particular election, plus a count of how many ballot cards (individual pieces of paper) are stored in each container.

[\(Click here to view a sample file in the correct format.\)](#)

- When the upload is successful, a message will appear at the top of the screen that says, "Ballot manifest uploaded." If a mistake is found after a ballot manifest has been uploaded, participants have the option to log back in and use the **Replace File** button to update the file.



The audit has not started.

Ballot manifest uploaded.

Waiting for Audit Administrator to launch audit.

Audit Source Data

Ballot Manifest

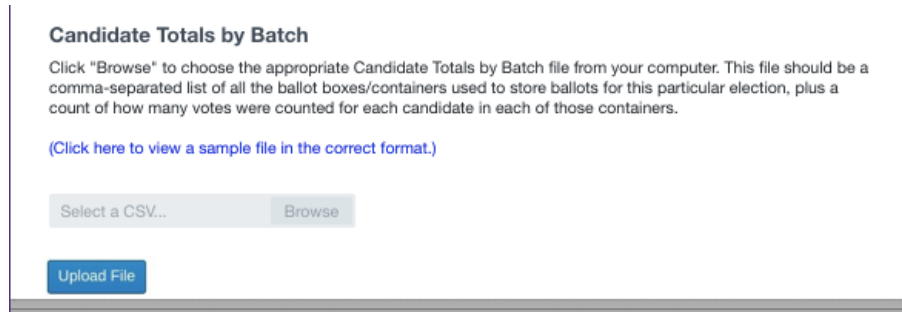
Click "Browse" to choose the appropriate Ballot Manifest file from your computer. This file should be a comma-separated list of all the ballot boxes/containers used to store ballots for this particular election, plus a count of how many ballot cards (individual pieces of paper) are stored in each container.

[\(Click here to view a sample file in the correct format.\)](#)

Current Ballot Manifest file: Oceana ballot manifest - Oceana ballot manifest - Oceana ballot manifest - Oceana ballot manifest.csv

- Next, a prompt will appear below the Ballot Manifest section to upload the Candidate

Totals by Batch. click the Browse button to navigate to the candidate totals by batch .csv file. Once selected, click the Upload File button. Remember, the batch names in the Candidate Totals by Batch file must match the batch names in the ballot manifest and the totals listed in the Candidate Totals by Batch match your statements of results.

A screenshot of a web interface titled "Candidate Totals by Batch". The text explains that the user should click "Browse" to choose a CSV file from their computer, which should be a comma-separated list of ballot boxes/containers used to store ballots, plus a count of votes for each candidate. A link "(Click here to view a sample file in the correct format.)" is provided. Below the text are two buttons: "Select a CSV..." and "Browse". At the bottom is a blue "Upload File" button.

5.4 Retrieving and Tallying

After the audit begins, the locality will receive a batch retrieval list. To retrieve batches, refer to your batch retrieval list to determine what batches are needed.



Best Practice

Unlike in the ballot polling method, Arlo does not assign the audit review boards to specific batches on the batch retrieval list. ELECT recommends assigning more experienced officers of election or staff to audit review boards who will review the larger batches on the batch retrieval list.

- Retrieve the correct container(s) using the required chain of custody verification steps.
- Pull the entire batch of ballots out of the storage container and organize it into a neat stack of ballots. If the container contains more than 1000 ballots, ballots should be removed from the container and sorted in manageable stacks, leaving the rest of the ballots in the container until the previous stack is tallied.²²

5.4.1 Methods for Retrieving Ballots

There are two methods for retrieving and tallying during a batch-comparison RLA. For larger batches, multiple audit review boards may be assigned. Audit review boards should be encouraged to prioritize accuracy over speed; it is better to have the correct count the first time and it take more time than to have to redo the count.

²² See [VotingWorks, Batch Retrieval & Tally](#)

The Sort-and-Stack Method²³

- a. For each ballot: one audit board member picks up a single ballot from the stack and reads the vote for the contest being audited aloud, then hands the ballot to the second audit board member.
 - i. The second audit board member verifies the vote that is on the ballot is indeed what the first audit board member read, then places the ballot in the “stack” that corresponds to the vote.
 - ii. The first audit board member should watch to make sure the ballot is placed in the correct stack.
 - iii. A stack should be created for each contest choice (including write-in), overvoted/blank/undervoted ballots, duplicated ballots, and ballots where the audit board cannot agree on the voter’s intent.
- b. Count the ballots in each stack by having one member of the audit board verbally count the ballot while handing it to the other member for verification.
 - i. Count the ballots in groups of 10, stacking the groups at right angles to each other, so you can easily count the complete groups when you are done. For instance, if you have seven groups of 10 ballots each plus an extra 3 ballots, the total tally would be 73.
 - ii. Record the total tally for each candidate on the Audit Board Batch Tally Sheet.

The Hashmarking Method²⁴

- a. Prepare a Tally Sheet
 - i. For this method, a tally sheet should be prepared. The tally sheet should:
 1. be organized in the same order as the ballot.
 2. list each contest and associated choices (including write-ins when applicable) to be audited.
 3. include a space for overvotes and blank/undervotes for each contest.
 4. have space for tally marks after each choice.
- b. Tally the Votes: One audit board member reads the choice for the first contest being audited to the second audit board member who makes a tally mark on the tally sheet. Repeat for all contests being audited. Ideally, a third audit board member should observe the ballot marks and tally sheet tallies.
 - i. Completing this process in groups of 20, 50, 100, or some other set number allows for verification checks throughout the process. Once the set number is completed, add up the tally marks to ensure the same number was tallied for each contest.
- c. Complete Audit Board Batch Tally Sheet: When all ballots are tallied, total the tally marks and complete the Audit Board Batch Tally Sheet.

²³ *Id*

²⁴ *Id.*

5.5 Batch Tally Entry into Arlo

All tallies from the batches selected must be uploaded into Arlo; the audit will remain open until all tallies have been uploaded. Tallies can be entered by audit boards, a specified member of the staff, an electoral board member, or the GR.

To create tally entry accounts for audit boards or for a specified individual, select Set Up Tally Entry Accounts on the Set Up Tally Entry Accounts screen. If only one designated participant will be entering tallies, select Skip.²⁵

The image displays two screenshots of the Arlo web application interface, specifically the 'Set Up Tally Entry Accounts' screen during a 'General Election' in 'Test County', 'Round 1'. The top screenshot shows the 'Prepare Batches' step (1) with a 'Download Batch Retrieval List' button and instructions for retrieving batches from storage. The bottom screenshot shows the 'Set Up Tally Entry Accounts' step (2) with a 'Do you want to set up additional tally entry accounts?' prompt and buttons for 'Set Up Tally Entry Accounts' and 'Skip'. Both screenshots show a progress bar at the top indicating '0/4 batches audited' and a 'Continue' button at the bottom right.

Arlo jonah+ja.losangeles@...

Test County — General Election Round 1 0/4 batches audited

1 Prepare Batches 2 Set Up Tally Entry Accounts 3 Enter Tallies

1 Retrieve Batches from Storage

Download Batch Retrieval List

For each batch in the retrieval list:

- Find the container in storage
- Perform the required chain of custody verification steps
- Take the batch of ballots out of the container and stack them

2 Print Batch Tally Sheets

Download Batch Tally Sheets

There will be one tally sheet for each batch. Use these tally sheets when recording the audited votes in each batch.

Continue >

Arlo jonah+ja.losangeles@...

Test County — General Election Round 1 0/4 batches audited

✓ Prepare Batches 2 Set Up Tally Entry Accounts 3 Enter Tallies

Do you want to set up additional tally entry accounts?

If you want to have multiple people entering tallies at the same time, set up tally entry accounts for them. Otherwise, use your account to enter the tally for each batch you audit.

Set Up Tally Entry Accounts Skip

< Back Continue >

²⁵ See [VotingWorks, Batch Tally Entry into Arlo, Voting Works](#)

A designated participant should provide the audit boards or the specified individual with the login link displayed on the screen (each link is unique). Then, the audit board or specified individual should Log In by entering their name(s) and party affiliation, if provided. A login code will be provided, the participants enter that code to authenticate the Tally Entry User(s) by selecting Enter Login Code, entering the code, and selecting Confirm to complete the login process.²⁶

The screenshot shows the Arlo Tally Entry interface. At the top, it says 'Sample County — Batch inventory test Round 1' and '0/4 batches audited'. The main navigation bar has three steps: '1 Prepare Batches', '2 Set Up Tally Entry Accounts' (current step), and '3 Enter Tallies'. The 'Set Up Tally Entry Accounts' section is divided into two parts. On the left, 'Share Tally Entry Login Link' displays a unique URL: 'https://arlo.voting.works/tallyentry/anyhow-childcare-ruttin'. Below the URL are 'Copy Link' and 'Download Printout' buttons. On the right, 'Confirm Tally Entry Accounts' shows a table with two rows: 'Hank Aaron' and 'Bob Jane'. The 'Hank Aaron' row has a '3' in a purple circle next to it, and a '4' in a purple circle next to the 'Enter Login Code' button. Below the table, it says 'Logged In'. A modal window titled 'Confirm Login: Hank, Aaron' is open, showing 'Enter the login code shown on their screen:' and a 4-digit code '340' in large blue digits. Below the code are 'Cancel' and 'Confirm' buttons.

Jurisdiction Manager

The screenshot shows the Jurisdiction Manager Tally Entry Login screen. It has a header 'Sample County — Batch inventory test' and a title 'Tally Entry Login'. Below the title are two rows of input fields: 'Name' and 'Party Affiliation (if required)'. The first row has 'Hank' in the Name field and a dropdown menu for Party Affiliation. The second row has 'Aaron' in the Name field and a dropdown menu for Party Affiliation. Below the input fields is a 'Log In' button. A modal window titled 'Sample County — Batch inventory test Login Code' is open, showing a 3-digit code '340' in large blue digits. Below the code is the text 'Tell your login code to the person running your audit.'

Tally Entry User

To enter the candidate totals for a batch, select the batch from the list on the left-hand side of the Enter Tallies screen or use the search batches function, and, then, click Edit Tallies, enter

²⁶ *Id.*

the vote totals from the Batch Tally Sheet, and select Save Results.²⁷ Once all batches have been entered and reviewed, a designated participant can select Finalize Tallies.²⁷

The screenshot displays the Arlo software interface for entering tally results. At the top, the user is logged in as 'jonah+ja.losangeles@...'. The interface shows a progress bar with three steps: 'Prepare Batches', 'Set Up Tally Entry Accounts', and '3 Enter Tallies'. Below the progress bar, there is a search bar for batches and a list of batches for 'Tabulator A'. The main area is titled 'Tabulator A - Batch 1' and contains a 'Vote Totals' table. The table has two columns: 'Choice' and 'Votes'. The rows are: Alice Adams (12 votes), Bob Bates (8 votes), and Carol Copeland (empty field). There is an 'Edit Tallies' button with a dropdown arrow. At the bottom, there is a 'Back' button and a 'Finalize Tallies' button.

Choice	Votes
Alice Adams	12
Bob Bates	8
Carol Copeland	

If multiple Audit Board Batch Tally Sheets were used to tally a batch, select the drop-down next to Edit Tallies and select Use Multiple Tally Sheets to enter more than one tally sheet. The individual who enters the tally sheet should edit the name at the top to identify who completed the entry of the Batch Tally Sheet; this helps keep a chain of custody for the data entered. Next, enter the votes, and select Save Sheet (the Edit Tallies button changes to Save Sheet after selection).²⁸ Select Sheet 2 to add another Batch Tally Sheet, and Select +Add Sheet to add another Tally Sheet as needed.²⁹ The Vote Totals tab is the sum of votes for all sheets entered.³⁰

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.*

5.6 Completion of a Batch-comparison RLA

When all audit boards have completed their tally entry and the risk limit has been met, the *Audit Progress* screen will display the message “Congratulations - the audit is complete!”

If the risk limit was not met after all the batches have been audited for the contest, the audit software will initiate another round of sampling. A new batch retrieval list, placeholders, labels, and audit board credentials will be generated for an additional round of batch retrieval.

Audit Completion

Completed

Additional Sampling

Pursuant to § 24.2-671.2 (I), if an RLA of a contested race escalates to a full hand count, the results of the hand count shall be used to certify the election in lieu of the tabulation of the unofficial results obtained prior to the conduct of the RLA.³¹ After a certain number of rounds of RLA and the risk limit has yet to be met, Arlo will indicate that a full hand count is required if it finds the sample size needed is the same as the actual amount of ballots.

³¹ See [Code of Virginia, §24.2-671.2 Risk-Limiting Audits](#)

6. Results

At the conclusion of the RLA, ELECT will submit a report to the SBE on the findings of the RLA. If your locality is participating in an RLA and would like to provide feedback to be included in the report, contact your RLA Administrator from ELECT with your findings. The report will include the results of the RLA as well as an analysis of any detected discrepancies. ELECT has also created a sample press release template that localities may utilize. This press release is found in the RLA section in Forms Warehouse.

7. APPENDIX

7.1 Glossary

Administrator: a member of ELECT staff that adds elections to be audited, sets the risk-limit, adds participants, inputs the random seed number, and reviews the progress of the RLA.

Arlo: the RLA software supported by VotingWorks and leased by ELECT to administer the RLA

Audit Review Boards: a two-person team that retrieves specific ballots, records the results on a tally sheet, and uploads the results into the auditing software.

Ballot Manifest: a two-column Excel spreadsheet that creates an inventory of every ballot cast in a locality during a contest.

Ballot-Polling: one of two methods for conducting an RLA that relies on manually reviewing a random sample of ballots across localities to determine if the overall outcome of an election was correctly reported.

Batch: a documented set of ballots created by a voting system, an officer of election, or other election official.

Batch-comparison: one of two methods for conducting an RLA that relies on manually counting all ballots in a random selection of precinct batches to determine if the overall outcome of an election was correctly reported. This method is only available to those RLAs applied for pursuant to §24.2-671.2(D).

Candidate Totals by Batch: a file that outlines each batch of ballots and how many votes were cast for each candidate in a particular batch.

Participants: a GR or appointed person that will be responsible for coordinating the audit in their locality. Participants are responsible for uploading a ballot manifest, entering audit review boards, and downloading ballot retrieval lists from the audit software.

Random Seed Number: a 20-digit number randomly generated during an SBE Meeting. This number is used to generate the ballot or batch retrieval list by Arlo.

Risk Limit: the maximum chance that the audit will fail to correct an incorrectly reported outcome. For example, a 10% risk limit means there is a 90% chance that the audit will correct an incorrectly reported outcome.

Risk Limiting Audit: a type of post-election audit that utilizes statistical methods and a manual review of paper ballots to check that the voting equipment accurately reported the correct outcome of an election.

7.2 General Timeline for a Risk-Limiting Audit after a General Election

