

# Risk-Limiting Audits: Batch-Comparison Method

## Lesson 1: Background on Risk Limiting Audits (RLAs) in Virginia

### Introduction to RLAs

In 2024, every locality in Virginia will be participating in the Risk Limiting Audit (RLA) for the General Election in November. The RLA takes place after all election results have been received and following a State Board of Elections meeting.

This course will guide you through all aspects of the RLA process, from set-up to submitting results, in order to help you prepare for the upcoming RLA this November.

### 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.

### RLA Methods

There are two RLA methods used in the Commonwealth of Virginia: **ballot-polling** and **batch-comparison**.

- **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.

In Virginia, the Virginia Department of Elections (ELECT), in accordance with the procedures prescribed by the State Board of Elections (SBE), has traditionally utilized the **ballot-polling** method to conduct statutorily required RLAs.

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

### **History of RLAs in Virginia**

RLAs are one type of post-election audit used to verify the accuracy of voting systems (voting machines, counting machines, etc.). In addition to comprehensive Voting System Certification Standards and Logic and Accuracy Testing, RLAs can provide an additional check in ensuring the integrity of voting equipment. As a type of post-election audit, RLAs have been gaining in popularity with election administrators nationwide. California, Colorado, Georgia, Indiana, Kentucky, Maine, Michigan, Nevada, New Jersey, New Mexico, Ohio, Oregon, Pennsylvania, Rhode Island, Texas, Virginia, and Washington have all passed legislation requiring or allowing for RLAs following elections or have administration pilot programs in process (source: [risklimitingaudits.org](http://risklimitingaudits.org)).

View more on the history of RLAs in Virginia below.

- **2017-** 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.
- **2018-** The City of Fairfax conducted Virginia's first pilot of RLAs in August 2018.
- **2019-** Eight localities in Virginia conducted RLAs: Lancaster County, Franklin City, Bristol City, Loudoun County, Manassas City, Louisa County, Stafford County, and Rockingham County.
- **2020-** The Department of Elections conducted a statewide risk-limiting audit of the November 2020 General Election.
- **2022-** 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 EBs and general registrars (GR) under the supervision of ELECT and in accordance with the procedures prescribed by the SBE.

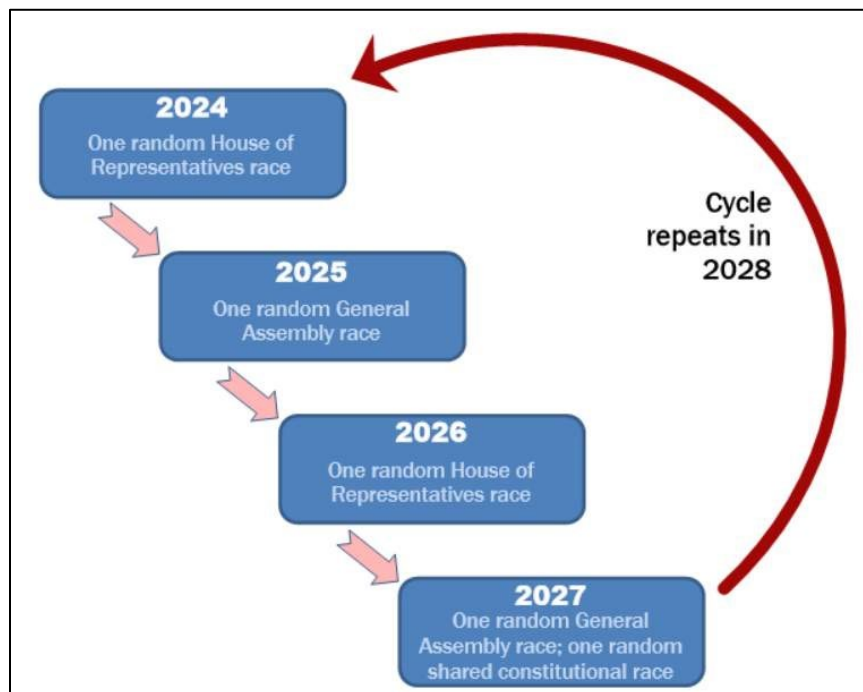
**This course outlines the SBE procedures and includes guidance on the following:**

- 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

## **Lesson 2: RLA Basics**

### **RLA Basics**

Pursuant to [§ 24.2-671.2](#), RLAs must be conducted before a race has been certified. 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 in the graphic from 2024 below:



Additionally, [§24.2-671.2\(D\)](#) allows EBs to request a risk-limiting audit of a contested race within the EB's jurisdiction. Using an SBE-671.2(D) Form: Request for Risk Limiting Audit, a locality may submit their request to the SBE for approval.

Examples of races wholly contained within a locality's jurisdiction may include but are not limited to: mayoral, school board, clerk of court, treasurer, sheriff, or city council.

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 portions of those races.

At least once every five years, every jurisdiction must participate in at least one RLA of a contest in its jurisdiction, either by random selection by the SBE or by opting into their own contest. As of 2022, the SBE may, by two-thirds majority vote, direct that a locality conduct an RLA of a contest within its jurisdiction. The SBE defines participation in an RLA by the uploading of a ballot manifest.

Every locality in the Commonwealth participated in a ballot-polling RLA of the 2020 Presidential and 2021 U.S. Senate races, which is explained in greater detail in the March 31, 2021 Risk-Limiting Audit Report linked [here](#). It can also be found on ELECT's website.


### **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 an RLA.**

### **To request an RLA, board members must take the following steps:**

1. The electoral board casts 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.
2. The electoral board completes the current SBE-671.2(D) Form and identifies local race(s) subject to the requested RLA.
3. All board members sign and date the form.
4. The electoral board's secretary sends the form to ELECT via the locality's Elections and Registration Specialist 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 (pictured below) is properly completed, all statutory requirements are met, and the request is submitted in time. 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.

	<p>★ VIRGINIA ★ DEPARTMENT of ELECTIONS</p>	<p><b>REQUEST FOR RISK-LIMITING AUDIT</b></p>
<p><b>PURPOSE OF THIS FORM</b></p> <p>Under Code of Virginia § 24.2-671.2(D), "A local electoral board may request that the State Board approve the conduct of a risk-limiting audit [RLA] for a contested race within the local electoral board's jurisdiction." The local electoral board may request an audit of such a race wholly contained within the jurisdiction of the local electoral board by completing and submitting this form to their Election Services Registrar Liaison prior to the State Board of Elections (SBE) meeting to choose races to audit. <i>If a request is made of a race that is not wholly contained within a locality's jurisdiction, this request will be denied. Please review 1VAC20-60-80 for details on qualifying for a risk-limiting audit request.</i></p> <p><b>COMPLETE THE FOLLOWING:</b></p> <p>Locality: _____</p> <p>Date of Public Meeting: _____</p> <p>Contested Race: _____</p> <p>Town Name/District Number: _____</p> <p>Date of RLA: _____</p> <p>Location of RLA: _____</p> <p>Was Ranked-Choice Voting Used? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>RLA Method Requested: <input type="checkbox"/> Ballot Polling <input type="checkbox"/> Batch Comparison</p> <p>Preliminary Vote Totals: _____</p> <p>Candidate A: _____</p> <p>Candidate B: _____</p> <p>Candidate C (if applicable): _____</p> <p>Candidate D (if applicable): _____</p> <p>On the lines below, please include any other relevant information:</p> <p>_____</p> <p>_____</p>		
SBE 671.2(D)		3/2023



*\*ELECT reserves the right to ask additional questions on behalf of the SBE, if necessary.*

*\*\*Please submit a form for each contested race your locality is requesting to have audited.*

*\*\*\* If multiple races are being submitted, the RLA method requested must be the same for all races requested.*

We, the members of the electoral board, request an audit of the above contested race(s), being wholly contained within our jurisdiction:

Printed name of Chairperson	Signature	Date	Vote (Yay or Nay)
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Printed name of Vice-Chairperson	Signature	Date	Vote (Yay or Nay)
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Printed name of Secretary	Signature	Date	Vote (Yay or Nay)
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*If your audit request is approved by the State Board of Elections, then the Board may grant an extension of up-to two weeks to your certification deadline under §24.2-671.2 of the Code of Virginia for the audited race.*

The second page of the SBE 671.2(D) form is pictured above. It requires the printed name, signature, date, and yay or nay vote of all three members of the electoral board.

## Key Factors

When a locality considers applying for an RLA, ELECT recommends a review of the following aspects: method choice, time, staffing, cost, and stakeholders.

### 1. Method Choice

The SBE gives EBs the option to choose between the use of two RLA methods for applications submitted: ballot-polling or 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. In the case of ballot-polling RLAs, a statistically significant number of ballots are sampled to infer the accuracy of the machines used in the election.

Batch-comparison is an audit where batches (such as precincts) are randomly selected, counted, and compared to the voting system's count. This method tends to use the most ballots of either method, causing a greater workload and the need for more manpower and resources. Additionally, when the RLA software (Arlo) is set up for a batch comparison audit, it tends to randomly select the precincts with more ballots. Localities should expect to review over a thousand ballots.

#### Example of Sample Sizes:

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 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 around 5,600 total ballots	60 ballots

### 2. Time

Pursuant to the Code of Virginia §24.2-671.2, ELECT is required to oversee that certain RLAs are done after the general election but before certification. The SBE announces those races, as well as approved applications requesting a local RLA, during an SBE meeting, typically held the second Wednesday following the November General Election. This creates a very tight timeline for the RLA, which must be completed before certification. This means localities will have 9.5 business days to complete the RLA process following a general election.

This timeline may be further compounded during a November general election if an EB chooses the batch-comparison method for a local race. Historically, the SBE has conducted RLAs using the ballot-polling method, and utilizing the batch-comparison method locally would mean running both types of RLAs simultaneously. This will take additional time and staff to complete.

If an EB applies for an RLA of a 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. Given these time constraints, an RLA of a primary, while not prohibited by statute, is not recommended.

### **3. Staffing**

As part of the RLA, EBs must recruit 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.

Ballot-polling method: On average, an audit review 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. It may take longer to locate a specific ballot within a stack of ballots utilizing the ballot-polling method, which accounts for additional time.

Batch-comparison method: On average, an audit review board could audit about 510 ballots per hour. Auditing 100,000 ballots for one contest would take approximately 195 hours. 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, they have substantially more ballots to review.

### **4. 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.

### **5. Stakeholders**

Administering and performing any RLA requires a great deal of coordination amongst both state and local stakeholders. Each group relies on the other to perform their duties to the best of their ability for the RLA process to be successful. The process includes:

- ELECT staff
- GRs and their staff
- Local EBs



- Officers of Election
- Clerks of Court and their staff
- Circuit Judges
- Authorized representatives
- The public

GRs need to be available to coordinate the EB members, audit board members, and their staff; typically, GRs also fill the role of local manager of the RLA, an important role in ensuring that data is properly uploaded into Arlo.

EB members from both major parties need to be available to observe the RLA as is required under §24.2-671.2(G).

Clerks of Court need to be available to help maintain the chain of custody of the ballots either by being present for the RLA or are available to transfer custody of the ballots to the GR or EB for the RLA.

If an EB member of a major party is unavailable for the RLA, Circuit Court Judges should be available to allow for the temporary appointment of an EB member for the purpose set out in §24.2-671.2(G).

RLAs are open to the public and other authorized representatives as they are conducted during public meetings of the local electoral board.

### **Arlo Planner**

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:

<https://arlo.voting.works/planner>

This tool is available to the public and does not require a login to access.

### **REMINDER:**

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.

### **RLA SBE Meeting**

The SBE will meet the next business day following the end of a general election's canvass to select contests, set the “risk limit”, and determine the random seed number for the RLA.

- **Selected Contests**

Eligibility:

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%. All races that meet that threshold will be placed in the selection pool.

An EB may apply for an RLA pursuant to §24.2-671.2(D). The EB must fill out an SBE-671.2(D) Form, and the contested race must qualify pursuant to the criteria under 1VAC20-60-80.9. If the SBE-671.2(D) Form is properly filled out and the contested race qualifies under 1VAC20-60-80, then the SBE will approve the application. These contests will not be placed in a selection pool.

Drawing:

For those contests eligible for an RLA in a given 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 to ensure that the chosen race is completely random.

- **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 is also common in other jurisdictions, though it has yet to be tested in Virginia. The SBE will set the risk limit of the RLA following industry best practices and will announce the risk limit of each RLA at the SBE RLA meeting.

- **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.

To create this random number, the 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 to roll the dice; it may be done by one person or multiple people.

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.

## **Lesson 3: RLA Preparation**

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:

- Determining RLA location
- Scheduling the public meeting
- Recruiting Audit Review Boards
- Reviewing ballot accounting and storage practices

As a best practice, ELECT recommends coordinating with local partners (such as the Clerk of Court) throughout all steps of the preparation process.

### **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, the RLA may take place in another suitable location, such as:

- The GR's office
- A library
- A firehouse
- A school

Localities should work with their Clerks of Court to consult on the physical space of the RLA.

### **Scheduling the Public Meeting**

Pursuant to [§2.2-370712](#) 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 must also be notified of the RLA public meeting.

Additionally, at least one member of the electoral board representing each party must participate in and be present for the duration of the RLA. 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
- Local party chairs

**Note:** While the RLA statute does not specifically address authorized representatives, the RLA is a public meeting of the electoral board. A best practice would be to apply the same rules of authorized representatives used during canvass to authorized representatives that attend an RLA. Meaning, authorized representatives would be allowed to observe the process but are not allowed to interfere with the process.

Localities should plan for at least one full day to conduct the RLA. 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.

### **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
- General Registrars
- 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.

### **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. It is imperative that the ballots remain organized and clearly marked within the contents of the box. 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. A sample form can be found in FormsWarehouse under the RLA section.

### **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.)
- Printer

## Lesson 4: Overview of the Batch-Comparison Method

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. The Department of Elections in Virginia has traditionally used the ballot-polling method to conduct statutorily required RLAs. However, local boards have the option to utilize either the ballot-polling or batch-comparison method for conducting their RLA, with approval from the SBE.

### Overview

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

- Notify the public and participants in the RLA Preparation section of this course
- Submit an ELECT 659-Request to Inspect Sealed Election Material form
- Create and upload the ballot manifest
- Create and upload the candidate totals by batch file
- Gather supplies for the RLA

**Note:** *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.*

### Submit a "Request to Inspect Sealed Election Materials for a Post-Election Audit" Form

Pursuant to [Va. Code § 24.2-659](#), a locality must receive permission from 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 can be found in FormsWarehouse under the RLA section.

## Lesson 5: Creating RLA Documents: Ballot Manifest and Candidate Totals File

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 course, 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.

### Creating a Ballot Manifest

The ballot manifest is an inventory of every ballot cast in a locality for a particular race. It 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. This is shown in the example below.

	A	B
1	Batch Name	Number of Ballots
2	107 - LITTLE RIVER	1086
3	114 - DULLES SOUTH	674
4	123 - CARDINAL RIDGE	634
5	209 - POTOMAC FALLS	1222
6	210 - CASCADES	1120
7	214 - SUGARLAND NORTH	984
8	215 - SUGARLAND SOUTH	1070
9	216 - LOWES ISLAND	1068
10	217 - SOUTH BANK	1180
11	220 - MIRROR RIDGE	922
12	221 - SENECA	841
13	701 - SULLY	748
14	702 - PARK VIEW	746
15	703 - ROLLING RIDGE	881
16	705 - FOREST GROVE	880
17	710 - STERLING	515
18	711 - GUILFORD	362
19	713 - CARTER	233
20	715 - OAK GROVE	352

Note: The ballot manifest includes ***all*** ballots cast: provisional, early voting, absentee, Election Day, and post-election.

**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. 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.

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

### **Creating a Candidate Totals by Batch File**

Unlike a ballot-polling method RLA, a batch-comparison RLA needs the amount 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.



	A	B	C	D
1	Batch Name	Chris K. Harnisch	Atoosa R. Reaser	Write-In
2	107 - LITTLE RIVER	526	537	7
3	114 - DULLES SOUTH	319	335	10
4	123 - CARDINAL RIDGE	311	317	0
5	209 - POTOMAC FALLS	521	682	10
6	210 - CASCADES	462	643	6
7	214 - SUGARLAND NORTH	414	557	7
8	215 - SUGARLAND SOUTH	442	614	1
9	216 - LOWES ISLAND	509	547	3
10	217 - SOUTH BANK	539	614	15
11	220 - MIRROR RIDGE	380	508	14
12	221 - SENECA	384	441	3
13	701 - SULLY	341	392	5
14	702 - PARK VIEW	333	388	10
15	703 - ROLLING RIDGE	305	546	22
16	705 - FOREST GROVE	386	476	6
17	710 - STERLING	271	230	2
18	711 - GUILFORD	127	233	0
19	713 - CARTER	92	132	4
20	715 - OAK GROVE	113	231	2

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. This is shown in the example above.

**To create a "Candidate Totals by Batch File" spreadsheet:**

- 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.
- Enter the data for your locality from your statements of results.
- When you're finished entering the data, 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.
- Finally, save the file as a .csv file.

## Lesson 6: Uploading the RLA Documents

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)**
- 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 your 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.
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. 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.

## Lesson 7: Methods for Retrieving and Tallying Ballots

### Preparation for Ballot 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. The locality has the option to assign batches to different audit boards. A best practice would be to assign more experienced staff to the larger batches.

To prepare for tallying ballots:

- 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.

### Retrieving and Tallying Ballots

There are two methods for retrieving and tallying during a batch-comparison RLA: the Sort-and-Stack Method and the Hashmarking Method. 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.

#### **The Sort-And-Stack Method**

The "Sort-And-Stack Method" requires audit boards to create stacks based on the vote on the ballot, then count the votes once stacks are complete. This method is described further below.

- **Part One: Sorting the Ballots**

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.

1. 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.
2. The first audit board member should watch to make sure the ballot is placed in the correct stack.

3. A stack should be created for each contest choice (including write-in), over-voted/blank/under-voted ballots, duplicated ballots, and ballots where the audit board cannot agree on the voter's intent.
- **Part Two: Tallying the Ballots**

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.

    1. 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.
    2. Record the total tally for each candidate on the Audit Board Batch Tally Sheet.

### **The Hashmarking Method**

The "Hashmarking Method" varies from the "Sort-And-Stack Method" in that a tally sheet is primarily used to sort the votes instead of stacks. This method is described in detail below.

- **Step One: Prepare a Tally Sheet**

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.
- **Step Two: 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.

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.
- **Step Three: Complete Audit Board Batch Tally Sheet**

When all ballots are tallied, total the tally marks and complete the Audit Board Batch Tally Sheet.

## Lesson 8: Entering Batch Tallies into Arlo

Once the proper ballots have been retrieved and tallied, the data will need to be entered 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.

1. **Set up Tally Entry Accounts-** 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.
2. **Log In-** 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.
3. **Enter Candidate Totals-** To enter the candidate totals for a batch:
  - i. Select the batch from the list on the left-hand side of the Enter Tallies screen or use the search batches function
  - ii. Click Edit Tallies
  - iii. Enter the vote totals from the Batch Tally Sheet
  - iv. Select Save Results.Once all batches have been entered and reviewed, a designated participant can select Finalize Tallies.
4. **Add Multiple Tally Sheets-** If multiple Audit Board Batch Tally Sheets were used to tally a batch:
  - i. Select the drop-down next to Edit Tallies
  - ii. Select Use Multiple Tally Sheets to enter more than one tally sheet.
  - iii. 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.
  - iv. Enter the votes.
  - v. Select Save Sheet (the Edit Tallies button changes to Save Sheet after selection).
  - vi. Select Sheet 2 to add another Batch Tally Sheet.
  - vii. Select +Add Sheet to add another Tally Sheet as needed.
  - viii. The Vote Totals tab is the sum of votes for all sheets entered.

## Lesson 9: Completion of the RLA and Results

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.

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.

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.

### 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 template (pictured right) is found in the RLA section in Forms Warehouse.

## Lesson 10: Toolbox

### Form Request for Risk-Limiting Audit Link:

[https://www.elections.virginia.gov/media/formswarehouse/risk-limiting-audit/SBE-671.2\(D\)-Form-Request-for-Risk-Limiting-Audit\\_March-2023\\_FINAL.pdf](https://www.elections.virginia.gov/media/formswarehouse/risk-limiting-audit/SBE-671.2(D)-Form-Request-for-Risk-Limiting-Audit_March-2023_FINAL.pdf)

### Request to Inspect Sealed Election Materials for a Post-Election Audit Form Link:

<https://fs28.formsite.com/vaelect/6adxuvmm6n/index.html>