From: **MOA Elections Team**

Subject: **Risk Limiting Audit for the April 2, 2024 Regular Municipal Election**

I.   Executive Summary

The MOA Elections Team conducted a post-election audit that contained three areas of focus.

1. ***Hand-Count.*** A pre-determined number of ballots in randomly specified contests was selected and the actual random ballots for those specified races were hand counted.
2. ***Machine Review.*** Cast Vote Records were produced from the tabulation system and tallied for the ballots selected.
3. ***Comparison of Hand-Count and Machine Review.*** The totals from the hand-count, detailed in paragraph 1, and the totals from the machine count, detailed in paragraph 2, were compared.

The results of the MOA post-election Risk Limiting Audit are that the scanning, adjudication, and tabulation system performed as expected and the results reflect the will of the voters. All ballots were adjudicated and tabulated as expected. The results of the hand-count and the machine tabulation were identical.[1]

II.   WHAT IS A POST-ELECTION RISK LIMITING AUDIT?

A.   Research. Research defines a post-election audit as a check to confirm that the voting equipment and procedures used to count votes worked properly. Post-election audits are recommended by election security experts as one method of protecting the integrity of elections.

There are many types of "post-election audits" used to validate election results or outcomes. As a term of art, it refers to checking paper ballots (or records) against the results produced by the vote tallying equipment to ensure accuracy.

Risk limiting audits (RLA) use statistically developed audit techniques that allow selection of a number of ballots to be audited that provide statistical confidence that the tabulation system performed as expected. A RLA is an incremental audit system: If the percentage of risk selected in advance of the audit failed to demonstrate the tabulation system was

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[1]   For more detailed information on the results of the audit, see Item G. Comparison of the Hand-Count to the Machine Count, Results of the Risk Limiting Audit, and Exhibit A – RLA Worksheet

performing as expected, election officials would review further ballots or conduct a full manual tally of the election.

The MOA Election Team conducts "Batch-Level Comparison Audits," which is a type of RLA that most resembles a "traditional" audit. In a batch-level comparison audit, the voting system must export identifiable physical batches of ballots. In the MOA RLA, Election Officials selected random batches from the entire election to audit. In "Batch-Level Comparison Audits" and in the MOA RLA, Election Officials add up the selected batch-level results by hand to verify that they produce the reported contest outcomes. The votes in each selected batch were examined manually and hand-counted, and the audit counts were compared to the tabulation system's report and subtotals. Depending on the number and type of discrepancies the audit finds in the sample, the audit either stops or examines more batches manually.

B.   *Implementation of the Risk Limiting Audit at the MOA*

Successful implementation of any new election process requires careful thought and a considerable amount of planning. The MOA Elections Team began looking at post-election audits in 2020. One important step in preparing for the post-election audit, was obtaining the imprinters on the ballot scanners in 2020; the imprinters put a unique number – the scanner, batch, and ballot number – on each ballot, allowing elections officials the ability to pull the actual ballot to confirm the votes.

The MOA Elections Team conducted a practice audit after the 2021 Regular Municipal election in preparation for implementation of post-election audit in 2022. The practice was worthwhile: The Elections Team determined it tested too many ballots in one race and too few in another; the Elections Team pulled individual ballots which was incredibly time consuming. To address this shortcoming, the 2022 audits tested "batches" of ballots, which was more efficient to select and re-file rather than randomly selecting individual ballots and having to refile those.

Now, the Elections Team is happy to provide the results of the Risk Limiting Audit at certification.

III.   <u>PROCEDURES FOR THE RISK LIMITING AUDIT</u>

A.   *Selection of Races and Measure to be audited.*

1. ***Selection of Race and Measure.*** The MOA Risk Limiting Audit Procedures requires the Elections Team to identify the races and measures to be audited by rolling a 6-sided die. In years where there is a Mayor's race, the MOA Elections Team automatically audits the Mayor's race, and then randomly select one proposition to audit. For the random selection of the proposition, the Elections Team rolled the 6-sided die, and the result was a 1, therefore proposition 1 was randomly selected to be audited. All propositions on the April 2, 2024 Regular Election ballot were area-wide.

2. ***Target Number of Ballots.*** The target number of ballots per race and measure was calculated. 5% of the total ballots cast in the mayoral race and for proposition 1, or 3,600, were selected for the audit.

The exact calculations for target number of ballots are as follows:

- Calculate 5% of ballots cast, regardless of the number of votes cast or spread. Round down to nearest 1,000. E.g., change 72,250 to 72,000 for ease of count:
  - In 2024, total ballots cast = 72,000 x .05 = 3,600

The audit reviewed 3,701 ballots in both the areawide Mayoral race and Proposition 1 ballot measure.

3. ***Random Selection of Batches.*** To reach the 3,600 ballots targeted for review, the MOA Elections Team estimated a minimum of 36 batches would be required to be audited since during the processing of the election, approximately 100 ballots were scanned per batch. However, the Team selected 44 batches for this audit – in the event that some of the batches contained less than the 100 ballots typically scanned per batch.

Then, staff calculated the percentage of total ballots processed in the election on ICC 1 (scanner 1), ICC 2 (scanner 2), and ICC 3 (scanner 3). The result is that 21 batches from ICC 1, 16 batches from ICC 2 and 7 batches from ICC 3 were pulled for audit.

The exact calculations for the number of batches selected from each scanner are as follows:

1. Determine the total number of batches scanned by each selected ICC:
   - ICC 1= 414 batches
   - ICC 2 = 336 batches
   - ICC 3 = 155 batches
   - 905 total batches to possibly be verified
2. Determine the percentage of total batches each ICC scanned:
   - ICC 1 = 414/905 = 46%
   - ICC 2 = 336/905 = 37%
   - ICC 3 = 155/905 = 17%
3. For each ICC selected, use the percentage of total batches each ICC scanned to determine the random number of batches needed from each ICC, and then to determine which batch numbers for each ICC to

pull. Since 44 batches were selected for verification, <u>the total number of batches for verification from each ICC is as follows:</u>

- <u>ICC 1 = 46% of total batches x 44 batches for verification = 21</u>
- <u>ICC 2 = 37% of total batches x 44 batches for verification = 16</u>
- <u>ICC 3 = 17% of total batches x 44 batches for verification = 7</u>

B.   *Use Pseudo-Random Number Generator for Random Selection of Batches.*

The staff used the Pseudo-Random Number generator located at https://www.stat.berkeley.edu/~stark/Java/Html/sha256Rand.htm to randomly select the batches of ballots from each ICC. Following the instructions on the Pseudo-Random Number Generator, the batches were selected as follows:

(1)   Staff rolled ten, ten-sided dice one time, and then a second time and entered all twenty numbers into the "Seed". "Seed," is the starting point of a random number generator.
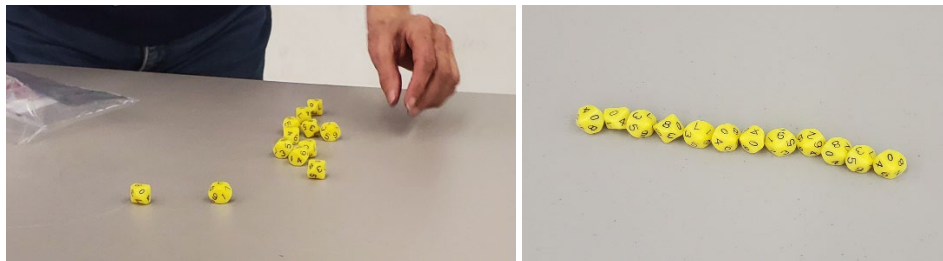
(2) The "Seed" and other information was entered into the random number generator and "Draw Sample" was pressed. The result is the list of randomly selected items, or batches. This process was done for ICC 1, ICC 2, ICC 3 to audit all three scanners.

The batches identified were pulled and delivered to counting teams.

C.   *Hand-Count Results*

Mayoral Race – Only the top two candidates in the batches were hand-counted. The ballots were sorted by Candidate A, Candidate B, and other. The results of the hand-count are as follows:

Category	Hand-Count
Candidate 1	1,288
Candidate 2	1,374
Total	**2,662**

*Note: 3701 ballots were reviewed and the difference between the total of candidate 1 and candidate 2 and 3701 was the other candidates, or undervotes.

Proposition 1 – The ballots were sorted by Yes, No, and other. The results of the hand-count are as follows:

Category	Hand-Count
Yes	1,828
No	1,873
Total	3,701

Machine Count Verification

After the batches of ballots were hand-counted, the Cast Vote Records for the selected batches of ballots were produced and tallied. The batch totals were transferred to the RLA Worksheet[2] and are as follows:

Mayoral Race -

Category	Machine-Count Total
Candidate 1	1,828
Candidate 2	1,873
Total	2,662

Proposition 1 -

Category	Machine-Count Total
Yes	1,828
No	1,873
Total	3,701

Comparison of the Hand-Count to the Machine Count

The third and final step in the post-election audit was to compare the hand-count to the machine count. The comparison is as follows:

Mayoral Race -

Category	Hand-Count	Machine-Count Total
Candidate 1	1,828	1,828
Candidate 2	1,873	1,873
Total	2,662	2,662

*Note: 3701 ballots were reviewed and the difference between the total of candidate 1 and candidate 2 and 3701 was the other candidates, or undervotes.

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[2] See Exhibit A – RLA Worksheet

Proposition 1 –

Category	Hand-Count	Machine-Count Total
Yes	1,828	1,828
No	1,873	1,873
Total	3,701	3,701

The result of the post-election audit are that of 3,701 randomly selected ballots, the hand count and machine count of those ballots was identical. The conclusion is that the scanning, adjudication, and tabulation system performed as expected and the results of the election demonstrated the will of the voters.

Respectfully Submitted:
MOA Elections Team
William Northrop, Acting Election Administrator
Jamie Heinz, Municipal Clerk

Exhibit A

Scanner & Batch #	Handcount Column A Yes	Handcount Column B No	N=3600	Machine Batch Level Results Prop Yes	Machine Batch Level Results Prop No	Total Proposition	Handcount Column D Candidate 1	Handcount Column E Candidate 2	n=36002	Machine Batch Level Results Candidate 1	Machine Batch Level Results Candidate 2	Total Race
1-135	44	39		44	39		22	36		22	36	
1-94	32	52		32	52		24	45		24	45	
1-371	43	30		43	30		33	20		33	20	
1-374	46	54		46	54		26	47		26	47	
1-16	39	22		39	22		29	17		29	17	
1-220	29	31		29	31		19	25		19	25	
1-256	51	41		51	41		34	25		34	25	
1-97	29	37		29	37		24	30		24	30	
1-141	46	55		46	55		23	43		23	43	
1-342	20	25		20	25		11	22		11	22	
1-315	33	46		33	46		17	44		17	44	
1-365	34	57		34	57		20	46		20	46	
1-53	55	27		55	27		34	19		34	19	
1-50	37	49		37	49		33	23		33	23	
1-353	46	54		46	54		23	41		23	41	
1-133	41	34		41	34		30	20		30	20	
1-204	46	42		46	42		24	37		24	37	
1-402	28	38		28	38		20	35		20	35	
1-111	33	21		33	21		31	10		31	10	
1-124	40	30		40	30		24	16		24	16	
1-119	41	46		41	46		42	30		42	30	
2-73	46	56		46	56		35	47		35	47	
2-5	42	46		42	46		38	29		38	29	
2-64	44	53		44	53		32	36		32	36	
2-51	49	38		49	38		49	21		49	21	
2-101	29	46		29	46		25	24		25	24	
2-202	37	58		37	58		33	40		33	40	
2-219	31	49		31	49		23	39		23	39	
2-125	47	48		47	48		27	37		27	37	
2-300	26	74		26	74		12	62		12	62	
2-39	63	50		63	50		38	39		38	39	
2-260	53	34		53	34		28	27		28	27	
2-55	32	36		32	36		24	22		24	22	
2-95	11	13		11	13		7	9		7	9	
2-85	96	32		96	32		70	26		70	26	
2-277	52	38		52	38		51	24		51	24	
2-257	44	41		44	41		28	41		28	41	
3-51	55	45		55	45		45	21		45	21	
3-96	50	56		50	56		36	40		36	40	
3-10	61	50		61	50		40	34		40	34	
3-29	22	29		22	29		13	24		13	24	
3-62	51	49		51	49		36	33		36	33	
3-22	45	53		45	53		35	36		35	36	
3-98	29	49		29	49		20	32		20	32	
Totals	1828	1873	3701	1828	1873	3701	1288	1374	2662	1288	1374	2662

NOTE: The number of ballot counted for both Propostion 1 and for the mayoral race were 3,701. However, when auditing the mayoral race, the Election Team only audits the two candidates who receive to most votes. This is why the total for both the hand count and machine count are below the total counts on Proposition 1. If the number of "other" votes that were not part of the count were inlcuded, the total number of ballots counted both by hand and machine would equal 3,701.