



MARICOPA COUNTY ELECTION DAY VOTE CENTER CAPACITY

Flawed Assumptions in the Election Plan Could
Negatively Impact Election Day Voters

October 21, 2024

Maricopa County Election Day In-Person Voting 2024 Vote Center Capacity

For the first time in nearly 20 years, Maricopa County will have a 2-page, 4-sided ballot. Ballots will have an average of 79 contests¹ including numerous complex ballot initiatives. Maricopa County's 2024 Election Plan² (the Election Plan) includes forecast models to minimize voting location wait-times.”

The Election Plan, released and approved last Spring, may not adequately account for these long *time-to-vote* ballots and high projected turnout. Election Plan adjustments are needed to mitigate potential voter impact.

The Election Plan is based on informed predictions, historical information, and other variables. The key variables in forecasting wait time are turnout, number of voting booths, and the amount of time it takes for voters to vote. However, other variables like peak voting time congestion also contribute to overall wait times throughout the day. Underestimating any of the key variables could lead to flawed wait time mitigation strategies.

Turnout: Maricopa's model for the November 2024 General Election anticipates voter turnout over 80%. Turnout in the 2022 General Election in Maricopa County was just over 64% but printer issues led to hours-long lines.

Booths Per Vote Center: The maximum number of booths per vote center (BPVC) mentioned in the Election Plan is 40 booths.

Average Time to Complete the Ballot: The 2024 Election Plan includes a 10.4 to 12.4 minutes average ballot time-to-vote. In their more conservative simulation model, Maricopa used an average projected time-to-vote of 13.1 minutes.

Under these projected conditions, there is insufficient time for even a perfectly uniform 2022-sized turnout to flow through some vote centers. The much larger turnout expected for 2024 will likely result in longer wait times and could lead to voters abandoning the lines. Long wait times are known to discourage up to 30% of voters from participating in the election.³

Calculating Estimated Time-to-Vote: To determine the time-to-vote a 2024 Maricopa 2-page ballot, 51 voters were given a printed sample ballot and timed as they completed all

¹ <https://elections.maricopa.gov/news-and-information/elections-news/two-page-ballot2024-general-election.html>

² https://maricopa.hylandcloud.com/198AgendaOnline/Documents/ViewDocument/2024%20PRIMARY%20ND%20GENERAL%20ELECTIONS%20PLAN_FINAL.PDF.pdf?meetingId=4352&documentType=Agenda&itemId=243754&publishId=117558&isSection=false

³ See Appendix A – AMP Research Lab

votes on the 4 sides of the ballot. The average time-to-vote for the sample set was 15.055 minutes. More significant was the distribution of times.

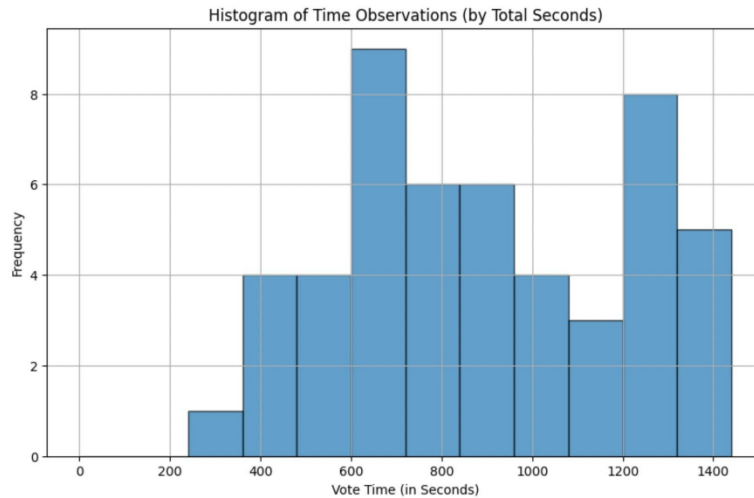


Figure 1: Table of Time-to-Vote in Seconds Showing Bimodal Distribution

The large number of propositions on the 4-sided 2024 ballot are likely to increase the time necessary for voters to complete the ballot. Long-tail time-to-vote incidents greatly exceed the expected average time to vote as evidenced by the bimodal distribution of time-to-vote.

As early voting began in Maricopa, voters went to social media to remark about the length of time it took them to complete a ballot. Barrett Marson, a prominent Arizona resident and CEO of Marson Media posted on X, *PSA: It took me, a generally informed voter who knew most of the issues and candidates, 16 minutes to fill out my ballot.*

The SiteBook check-in process is not expected to cause congestion and long lines. Rather, excessive wait times will likely be a result of voters waiting for a voting booth to become available. In addition, traffic through the vote centers will not flow evenly, instead spikes in turnout will likely occur in the morning and evening hours, making lines worse than expected at those times. Long wait times could cause voters to abandon the line and reports of long lines could discourage Election Day voters from going out to vote at all.

Maricopa s Turnout Projections vs Turnout Simulation: For the November 2024 General Election, Maricopa s model anticipates an historic 80% turnout with a high end estimate of 421,187 Election Day voters.

However, when producing the election simulation, the turnout used was a much lower 365,470, or 55,717 fewer voters than the County’s Election Day projected highest turnout.

They estimated only 225 vote centers and an average of 30 booths per vote center as inputs for a more constrained projection.

November Election Estimated Wait-Times (Based on Most Likely Projections)		
Time of Day	Average Wait-Time	Longest Wait-Time
6AM - 6:30AM	5 Minutes	15 Minutes
4:30PM	14 Minutes	27 Minutes
6:30PM	28 Minutes	45 Minutes
7:00PM	22 Minutes	40 Minutes

Wait-Time Simulation Inputs are based on the highest estimated Election Day turnout. For planning purposes, we base our planning efforts on meeting the highest turnout.

November Election Simulation Inputs: In-Person Voters: 365,470 (includes 17,557 provisional voters) / Vote Centers: 225/ Check-in Stations: 8 / Voting Booths: 30 / Time to Vote Ballot 13.1 Minutes / Time to Check-in: 2.5 Minutes. Even though vote center cancellations are rare, the simulation included 225 vote centers instead of the anticipated 235 vote centers. For wait-time estimates, we used 225 to account for smaller precincts (e.g., Kaka Village, Aguila, San Lucy) and last-minute voting location cancellations. This smaller number prepares Maricopa County election if we experience an unforeseen cancellation or closure of 5% of our planned vote centers.

Figure 2: Maricopa County Election Plan Simulation Using Highest Turnout Estimates

*For the General Election, we estimate that the average ballot will have 80 contests on the ballot. Using this data, we anticipate that it will take between **10.4 – 12.4 minutes** on average for each voter to complete their ballot. Based on these time estimates and the amount of time we have calculated to check-in, we can determine how many check-in stations and voting booths are needed to eliminate bottlenecks in our vote centers.”⁴*

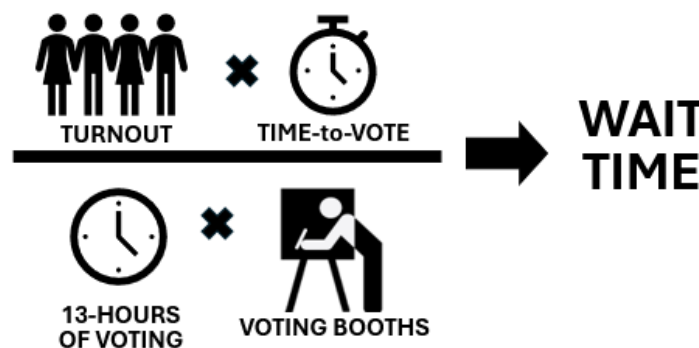


Figure 3: Factors Contributing to Wait Time at Vote Centers

The primary concern with Maricopa’s forecast model is the average time for the voter to complete their ballot. Maricopa’s 10.4 to 13.1 minutes time-to-vote estimate is optimistic compared to independent testing completed using the 2024 printed sample ballots. The testing indicates that Maricopa’s Election Plan assumptions grossly underestimate the time necessary to complete the ballot. Using Maricopa’s high end turnout projections, the

⁴ Page 15, Maricopa County 2024 Election Plan

Election Plan fails to provide enough vote centers and/or enough voting booths to accommodate the number of voters projected to vote on Election Day.

2024 Election Model	MC Estimated Election Day Voters	Time-to-Vote in Minutes	Voting Booth Occupied Minutes
		421,187	15.055
Vote Centers	Average Voting Booths	Minutes Polls Open	Total Available Voting Booth Minutes
246	30.0	780	5,756,400
Voting Booth Minute Shortage with Perfect Flow and No Booth Transition Time and No Technology Disruptions			-584,570

Figure 4: Forecast for All Vote Centers En Masse Using Maricopa County's High End Projections, Plan Can Not Accommodate Voters at the 15.055 Minute Time to Vote

Maricopa established guidelines based on the room size of a voting location to determine the number of booths per vote center (BPVC). Due to the 15.055 minute estimated ballot time-to-vote, 40 BPVC would not be sufficient even for the 64% turnout from the 2022 General Election. Maricopa officials announced that they have increased the number of voting booths from the simulation model of 7,380 to just over 8,000 booths” for November 2024⁵.

Vote Center Square Footage	Voting Booths
800-2,000	20-35
2,000-3,000	35-40

Figure 5: Election Plan Booths Per Vote Center Based on Square Footage

2024 Election Model	MC Estimated Election Day Voters	Time-to-Vote in Minutes	Voting Booth Occupied Minutes
		421,187	15.055
Vote Centers	Average Voting Booths	Minutes Polls Open	Total Available Voting Booth Minutes
246	32.6	780	6,255,288
Voting Booth Minute Shortage with Perfect Flow and No Booth Transition Time and No Technology Disruptions			-85,682

Figure 6: Booth Shortage with Maricopa's estimated increase to 8000 voting booths county-wide

Time-to-vote for ballot selections include choices between candidate names is significantly lower than ballot selections for paragraph-long propositions that require

⁵ <https://x.com/maricopacounty/status/1846315137239507255>

careful reading and often rereading to ensure comprehension. See sample below of a portion of one side of one page of the Maricopa County ballot.

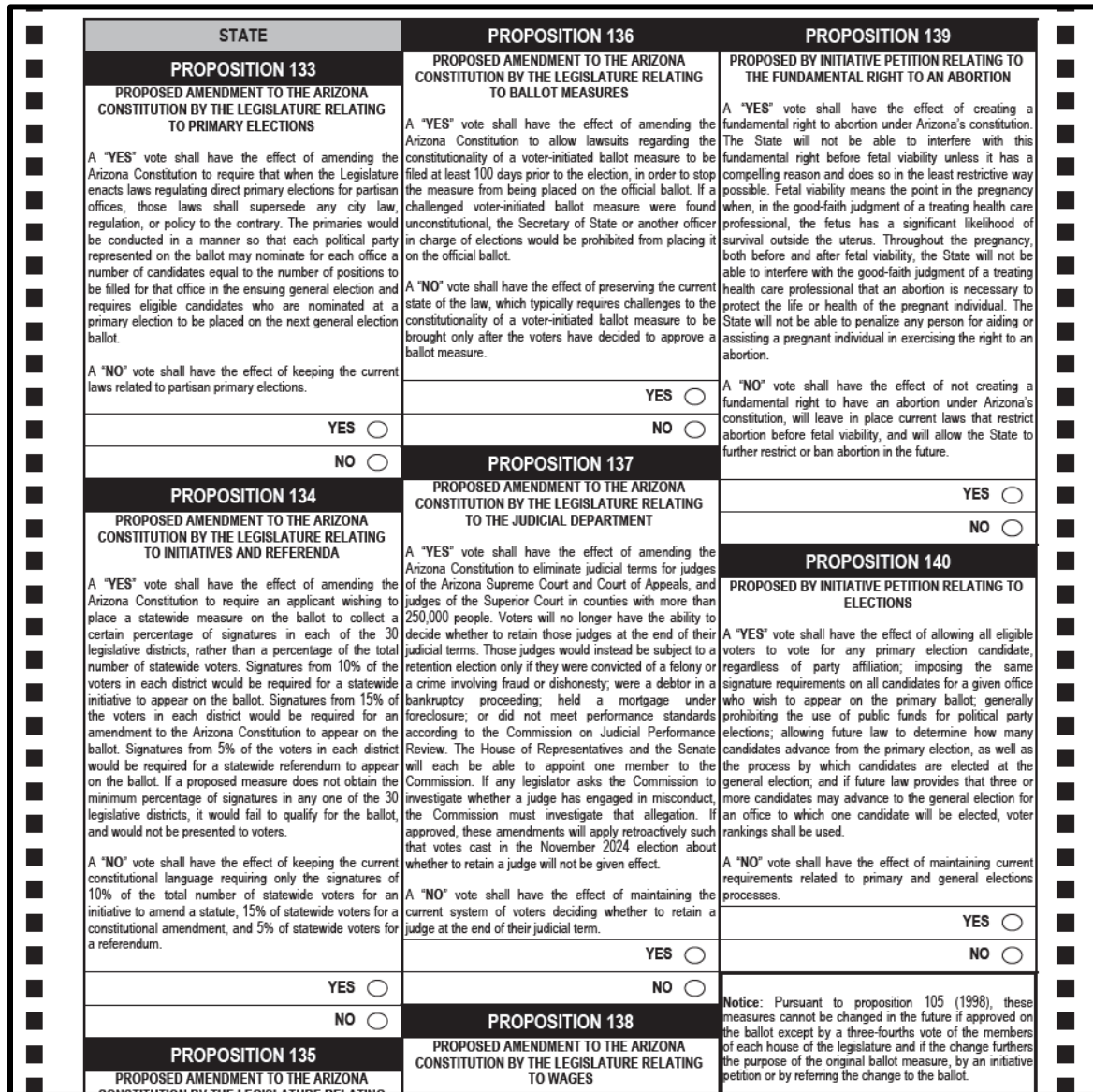


Figure 7: Image of Partial Page of Sample Ballot Showing Paragraph-Long Propositions Contributing to Long Time-to-Vote

Prior Election Vote Center Traffic: The 2022 vote centers with the greatest number of SiteBook voter check-ins included:

- Horizon Community Center
- Queen Creek Library
- Paradise Valley Comm College
- GCC North Chinle Building
- Communiversity QC
- SE Regional Library Gilbert
- Gateway Fellowship Church
- Happy Trails Resort
- ASU Polytechnic Campus
- Chandler Nature Center
- Surprise City Hall
- Living Word Bible Church

Each of these vote centers processed more than 1850 voters on Election Day 2022. Using the modest 64% turnout from the 2022 midterm to calculate the anticipated number of booths required for an average time-to-vote of 15.055 minutes – 40 booths would not be sufficient on Election Day.

The 13 hours of Election Day voting is equivalent to 780 minutes. To calculate the projected number of booths required per vote center, the average 15.055 minute time-to-vote was multiplied by the actual 2022 vote center turnout for the 12 highest turnout vote centers. Without adding booth turnover time and assuming a perfectly controlled uniform flow of voters (which is not feasible), even the 64% turnout of the midterm would require more than 40 booths per vote center.

Vote Center Description	2022 ED Check-ins	Hours / 15.055 m/v	Min. Booths Controlled Flow 100%
Horizon Community Center	2,599	652.13	50.16
Queen Creek Library	2,259	566.82	43.60
Paradise Valley Comm College	2,205	553.27	42.56
GCC North Chinle Bldg	2,087	523.66	40.28
Communiversity QC	1,959	491.55	37.81
SE Regional Library Gilbert	1,953	490.04	37.70
Gateway Fellowship Church	1,928	483.77	37.21
Happy Trails Resort	1,900	476.74	36.67
ASU Polytechnic Campus	1,886	473.23	36.40
Chandler Nature Center	1,870	469.21	36.09
Surprise City Hall	1,850	464.20	35.71
Living Word Bible Church Ahw	1,832	459.68	35.36
Copper Hills Church/ Westwing	1,811	454.41	34.95

Figure 8: 2022 Vote Center Turnout Long Time-to-Vote Average

The calculations above are merely used to demonstrate that if the 2-page double-sided ballot had been used in the lower turnout midterm – 40 booths would not have been nearly enough to allow all voters to vote. Since 2022, additional vote centers have been added in some locations for 2024, but a number of vote centers have been removed⁶. Some removals

⁶ <https://elections.maricopa.gov/asset/jcr:ebb3da9c-5409-440a-a5c6-7fe1a7f3b4cb/Voting%20Sites%20Schedule%2010182024.xlsx>

have been in areas of high Election Day turnout. Below is one example of the changes in vote center locations.

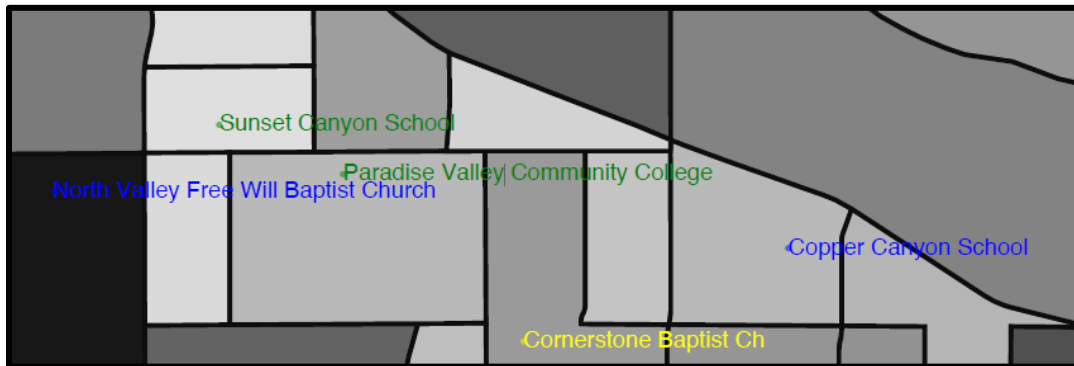


Figure 9: Vote Center Location Changes (Green = 2024 and 2022, Yellow = New 2024, Blue=Removed/2022 Only)

The Vote Center at Paradise Valley Community College had 2,259 voters in the 2022 General Election. Two of the 2022 nearby vote centers have been removed and only one new vote center, at Cornerstone Baptist Church, has been added in proximity. If the 1,556 midterm voters from Copper Canyon School and the 871 midterm voters from North Valley Free Will choose to vote at the Paradise Valley CC, that could create significant and potentially unmanageable voter backlogs.

In the presentation of the Election Plan to the MC Board of Supervisors, Scott Jarrett described their process for calculating wait times as the length of time from when a voter enters the line until they complete the SiteBook check-in process⁷. As acknowledged in the meeting, the projected bottleneck will be voters waiting for an open booth. The County should make plans to adjust wait time reporting to include the wait time to enter a voting booth, so voters are properly informed of actual wait times to vote vs. wait times to check-in.

Conclusion: It is vital for Maricopa County to update the assumptions on which the current Maricopa Election Plan is based (all three of the primary variables). Absent such changes, there is insufficient time in the Election Plan for even a perfectly controlled 2022-sized turnout to flow through some of the vote centers. The high turnout expected for 2024, combined with the expanded time to complete the unprecedented 2-page, 4-sided ballot, requires an increased number of locations and secrecy voting booths at existing voting locations. Absent such revisions, long wait times could discourage voters into abandoning the lines altogether, thus suppressing the votes of eligible Maricopa County voters.

⁷ <https://maricopa.hylandcloud.com/198AgendaOnline/Meetings/ViewMeeting?id=4352&doctype=3#>

Recommendations

- Increase the number of voting booths per vote center to the maximum number that safely fit in the space.
- Increase the number of vote centers in geographic areas that have had historically high Election Day vote center turnout.
- Invest in significant voter education efforts to increase awareness of the 2-page 4-sided ballot and encourage Election Day voters to prepare for their time in the voting booth by printing and marking their choices on their sample ballots. Voters should bring their completed sample ballots to the vote center to expedite vote selection and reduce the time-to-vote in the voting booths.
- Maricopa County could take advantage of recent legislation authorizing on-site early ballot tabulation on Election Day⁸. This voting method could appeal to voters who tend to wait until Election Day to return their early ballots and to voters who want to vote in-person and tabulate their own ballot. However, on-site early ballot tabulation is a new process so it should be deployed in separate locations selected only for Election Day early ballot tabulation. The law requires a separate, designated space for this alternative early ballot tabulation process. All existing vote center space will be needed for voting booths; there will be no room to accommodate the addition of a physically separate area for early ballot tabulation at Election Day Vote Centers. There are additional obvious hurdles to establishing on-site early ballot tabulation at this point in the election cycle, including:
 1. Creating procedures and training for poll workers on this new process.
 2. Identifying and acquiring separate designated locations for use on ED. The early ballot tabulation procedure should not be offered as an option in regular ED Vote Centers. The opportunity for errors and voter confusion would be too great to deploy and manage both processes at a single location with the few short weeks before the election.
 3. Allocating SiteBooks and ICP Tabulators programmed to accept early ballots. A secure receptacle for the signed affidavit envelopes would also be required.
 4. Reprogramming ICP Tabulators to accept early ballots and the SiteBooks to not print ballots would trigger additional equipment testing prior to Election Day.
 5. Deploying voter education to inform voters that they have this option and inform them of the designated locations for on-site early ballot tabulation.

⁸ <https://www.azleg.gov/ars/16/00579-01.htm>

6. Directing traditional Election Day voters away from these early ballot tabulation centers toward appropriate in-person designated Vote Centers.

Strategic planning involves an analysis of (and a lot of speculation about) multiple threats to election operations including equipment malfunctions, weather and other natural disasters, power outages, cyber-attacks, terror attacks, and other unforeseen disruptions or vote center closures. Now is the time to make adjustments to Maricopa County's General Election plan. Proactive and preventative strategies will protect the voters of Maricopa from unnecessary Election Day disruption. Further, the recent history of election issues in Maricopa has eroded public confidence in the election system. A clear communication of Maricopa's intent to increase capacity for Election Day voters will go a long way to restoring confidence.