Report on Analysis of Districts Petition

We estimate that there are 22,435 valid signatures on the Districts petition. Using a random sample of a size required by law, the City is 95% confident that the true number of valid signatures on the entire petition exceeds 22,330 and is 95% confident that the true number of valid signatures on the entire petition is less than 22,540. Furthermore, the City is virtually certain that the true number exceeds 20,000.

A total of 23,007 lines of names were submitted on the petition. A random sample of 5,752 of these lines was checked. 113 of the sample lines were disqualified on account of bearing signatures of persons not on the voter list (91) or of being duplicate signatures of registered voters who signed more than once (10), or for other reasons (12). The remaining 5,639 sample lines were validated as bearing signatures of qualified voters.

Using these figures, we estimate that there are 22,435 valid signatures on the Districts petition. The method used for calculating this estimate is based on Goodman's method (*The Annals of Mathematical Statistics*, 1949, pp. 572-579), supplemented with variance estimate based on Haas and Stokes (*Journal of the American Statistical Association*, 1998, pp. 1475-1487.) The estimate of 22,435 valid signatures adjusts properly for the effect of multiple signatures. In principle, it is incorrect to extrapolate the 5,639 valid signatures that were found in the sample by simply multiplying 5,639 by the petition-to-sample-size ratio 23,007 ÷ 5,752 (essentially 4). The presence of multiple signatures in the sample substantially increases the margin of error for the estimate even when the multiplicities are relatively few, as in this petition. The method used correctly calculates the margin of error; the simple extrapolation does not. The effect of increased margin of error is to reduce confidence that a required minimum number of signatures were submitted. However, the correct margin of error is still small relative to the difference between the estimate of 22,435 and the benchmark minimum figure of 20,000. Therefore, the confidence is nearly 100% that the petition contains at least 20,000 valid signatures. Details on proper ways to adjust for multiple signatures are given in the cited references.

Random number generation for the sample and all programming were done with SAS® (Statistical Analysis System).

Number of Valid Signatures on Districts Petition is Estimated to be 22,435

The City of Austin has determined that the District petition meets the requirement for the minimum number of signatures of valid voters if the required minimum is 20,000. 23,007 lines of names were submitted on the petition. A random sample of 5,752 of the submitted lines was checked. 113 of the sample lines were disqualified on account of bearing signatures of persons not on the voter list (91) or of being duplicate signatures of registered voters who signed more than once (10), or for other reasons (12). The remaining 5,639 sample lines were validated as bearing signatures of qualified voters.

Furthermore, using the random sample, the City estimates that there are 22,435 valid signatures on the Districts petition. The City is 95% confident that the true number of valid signatures on the entire petition exceeds 22,330 and is also 95% confident that the true number is less than 22,540. Furthermore, the City is virtually certain that the true number of valid signatures exceeds 22,000.