Report on Analysis of Code Next Petition

We estimate that there are 25,790 valid signatures on the Code Next 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 25,541 and is 95% confident that the true number of valid signatures on the entire petition is less than 26,039. Furthermore, the City is virtually certain that the true number exceeds 20,000.

A total of 31,062 lines of names were submitted on the petition. A random sample of 7,766 of these lines was checked. 1,222 of the sample lines were disqualified on account of being duplicate signatures of registered voters who signed more than once (32), or for other reasons (1,190). The remaining 6,544 sample lines were validated as bearing signatures of qualified voters.

Using these figures, we estimate that there are 25,790 valid signatures on the Code Next 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 25,790 valid signatures adjusts properly for the effect of multiple signatures. In principle, it is incorrect to extrapolate the 6,544 valid signatures that were found in the sample by simply multiplying 6,544 by the petition-to-sample-size ratio $31,062 \div 7,766 = 4$ (approximately). Also, 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 both the estimate and 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 was submitted. However, the correct margin of error is still small relative to the difference between the estimate of 25,790 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) software.

Number of Valid Signatures on Code Next Petition is Estimated to be 25,790

The City of Austin has determined that the Code Next petition meets the requirement for the minimum number of signatures of valid voters if the required minimum is 20,000. 31,062 lines of names were submitted on the petition. A random sample of 7,766 of the submitted lines was checked. 1,222 of the sample lines were disqualified on account of being duplicate signatures of registered voters who signed more than once (32), or for other reasons (1,190). The remaining 6,544 sample lines were validated as bearing signatures of qualified voters.

Furthermore, using the random sample, the City estimates that there are 25,790 valid signatures on the Code Next petition. The City is 95% confident that the true number of valid signatures on the entire petition exceeds 25,541 and is also 95% confident that the true number is less than 26,039. Furthermore, the City is virtually certain that the true number of valid signatures exceeds 20,000.