Application for relief from default for failure to submit application to file an amicus curiae brief on time regarding
PICO NEIGHBORHOOD ASSOCIATION et al., Plaintiffs and Respondents, v. CITY OF SANTA MONICA (No. B295935; S263972)
from

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March 30, 2022

Chief Justice Tani Cantil-Sakauye and Associate Justices
350 McAllister Street
Room 1295
San Francisco, CA 94102-4797

Re: PICO NEIGHBORHOOD ASSOCIATION et al., Plaintiffs and Respondents, v.
CITY OF SANTA MONICA (No. B295935; S263972)

Dear Chief Justice Cantil-Sakauye and Associate Justices:

We are seeking relief from default for our failure to submit our application for permission of the presiding justice to file an amicus curiae brief on time. I first learned about this case on the Internet and submitted my first application for permission of the presiding justice to file an amicus curia brief on August 30, 2021. A copy of that stamped letter is attached. When I did not receive a letter granting or denying this permission, I sent a version of this application again on March 2, 2022. Two days later, I received an email from Florentino Jimenez. I was also pleased to receive a phone call from your office confirming this letter's invitation to submit these three items as soon as possible (415-865-700 at 11:46, 3/28/2022).

We do very much want to make our contribution to the arguments, important principles, and proposals surrounding this case. Consequently, in the hope that we may be granted relief from default for our failure to submit our application to file an amicus curiae brief,

we are now ready again electronically to submit a version of our application to file an amicus curiae brief, as well as submitting the amicus curiae brief itself.

I declare under penalty of perjury that the above is true and correct.

Kind regards,

Stephen Bosworth (Ph.D.)

Amicus Letter from Stephen Bosworth (Ph.D)
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August 30, 2021

Chief Justice Tani Cantil-Sakauye and Associate Justices
350 McAllister Street
Room 1295
San Francisco, CA 94102-4797

Re: PICO NEIGHBORHOOD ASSOCIATION et al., Plaintiffs and Respondents, v. CITY OF SANTA MONICA (No. B295935)

Dear Chief Justice Cantil-Sakauye and Associate Justices:

My co-authors (Anders Corr (Ph.D.) and L. Stevan Leonard (M.S. in Computer Science) and I are suggesting a remedy to the existing vote dilution in Santa Monica that should satisfy both parties to the above dispute.

The California Supreme Court requested the parties to answer the following question: "What must a plaintiff prove in order to establish vote dilution under the California Voting Rights Act?" Our answer is: To show that the relevant electoral process "dilutes" or "abridges" the votes of many members of a "protected class". The plaintiff must also outline a realistic electoral plan to remove this dilution: "Dilution requires a showing, not of a merely marginal percentage increase in a proposed [jurisdiction], but evidence the [proposed] change is likely to make a difference in what counts in a democracy: electoral results" (Appeal Court's Opinion, II(b)2). This judgment follows Justice Frankfurter's principle that "plaintiffs must postulate an alternative voting practice to serve as the benchmark undiluted voting practice, because the concept of vote dilution necessitates the existence of an undiluted practice against which the fact of dilution may be measured" ("Opinion", II Section D).

This practical definition seems exactly to describe the new voting method called evaluative proportional representation (EPR) that we published January 2020 (https://www.jpolrisk.com/legislatures-elected-by-evaluative-proportional-representation-epr-an-algorithm-v3/ – also see below **Attachment 1: EPR Count**). Accordingly, we "postulate" that electing the City Council at-large by EPR should satisfy both parties, as well as matching the democratic benefits sought by the overriding aim both of the federal VRA (FVRA) and CVRA as we understand them: to eliminate the "dilution" of votes from members of "protected classes" to the fullest extent possible – to assure each citizen that they have an equal opportunity to help elect a candidate of their choice. We see this understanding as following from:

"(a) Purpose.-The purpose of this Act ... is to ensure that the right of all citizens to vote ... is preserved and protected as guaranteed by the Constitution" ("Congressional Purpose and Findings [Pub. L. 109–246, §2, July 27, 2006, *120 Stat. 577]*). [We see this as most completely "guaranteed" by EPR at-large elections.]

"(a) No voting ... standard, practice, or procedure shall be applied ... in a manner which results in a denial or abridgment of the right of any citizen of the United States to vote, ... or in contravention of the guarantees set forth in section 10303(f)(2) of this title, as provided in subsection (b). [We see such "abridgment" in Santa Monica as already proven by the briefs served.]

"(b) A violation of subsection (a) is established if, based on the totality of circumstances, it is shown that the political processes ... are not equally open to participation by members of a class of citizens protected by subsection (a) in that its members have less opportunity than other members of the electorate to … elect representatives of their choice" (52 USC 10301). [Plurality voting is the key element of " the totality of circumstances"that increases the number votes diluted (see below **Attachment 2: Plurality's Structural Flaw**.]

(e) This law is addressed to where there is "a difference ... in the choice of candidates or other electoral choices that are preferred by voters in a protected class, and in the choice of candidates and electoral choices that are preferred by voters in the rest of the electorate" (CHAPTER 1.5. Rights of Voters (CVAR 14026(e)). [We see this "difference" in Santa Monica as shown to be highly probable by the briefs already served].

"An at-large method of election may not be imposed or applied in a manner that impairs the ability of a protected class to elect candidates of its choice or its ability to influence the outcome of an election, as a result of the dilution or the abridgment of the rights of voters who are members of a protected class" (CVAR 14027). [We see Santa Monica's use of at-large *plurality* voting as structurally making it almost impossible not to dilute many votes – the votes of large and small minorities, and sometimes even of a majority are diluted – see below **Attachment 2: Plurality's Structural Flaw**.]

"Proof of an intent on the part of the voters or elected officials to discriminate against a protected class is not required" (CVRA:14028(d)). [While such "intent" need not be proven in this case, it is hard to avoid its presence given that all the City Councils in Santa Monica seem effectively to have ignored the 1992 Commission's majority recommendation that STV at-large elections be adopted.]

Argument

FairVote's Amicus Curiae Brief (5/27/2021) correctly reports that "objective factors demonstrate that [Latinos'] voting power and ability to, at minimum, influence elections would be improved under a modified at-large voting system" (pp. 15-17). Santa Monica's current at-large elections of its Councils dilute many citizens' votes, sometimes a majority of all votes cast, because they use *plurality* voting (see **Attachment 2: Plurality's Structural Flaw)** . Many of these diluted votes are most probably from its Latino citizens. Unfortunately, all the remedies proposed so far still needlessly dilute some votes. We say "needlessly" because EPR *makes all such dilution impossible*. If the current at-large elections are modified so EPR voting is used instead of plurality voting, 0% of all votes cast would be diluted. Therefore , we see the most satisfactory remedy for the current dilutions is to elect the Council at-large using EPR. At the same time, the adoption of EPR in Santa Monica could provide a model for removing such needless democratic deficits wherever plurality voting is used and some of its citizens are members of a protected class.

Before 2020, we would have instead said that the current at-large elections should be modified by using single transferable voting (STV), what Santa Monica's 1992 Commission's majority recommended (pp.("Commission", pp. 8, 10,11, 24-27, 31, 32). However, since STV typically dilutes about 12% of all citizens' votes while EPR dilutes none, the EPR remedy is democratically superior.

EPR described

EPR invites voters to grade the candidates' suitability for office as either Excellent, Very Good, Good, Acceptable, Poor or Reject. This also helps make EPR superior to STV because EPR allows citizens to express their judgments about the candidates more meaningfully – grades express more qualitative information than do rankings. As a result, every EPR citizen's clearer evaluative vote is added to the *weighted vote* in the council of the elected candidate who receives their "highest possible grade" (see

Attachment 1: EPR Count). This means that each citizen's EPR vote will not be diluted qualitatively or quantitatively. It also makes it as likely as possible that each elected candidate and the council as a whole will be of the highest available quality in the eyes of the electorate. Moreover, in contrast to the information provided by any official post-election report of any alternative voting method, EPR's would most complete data to inform each citizen about the intensity and number of voters who support the different agendas being pursued in their city. Thus, EPR gives 100% of the voters every appropriate reason to be satisfied with the results of the election.

Finally, we note that the main admirable reason some people support the existing at-large elections is that it helps candidates to be elected who mainly care about the "common welfare" of the city. Equally, those supporting by-district elections want to elect a councilmember who will represent their local concerns. If so, both groups should be happy to adopt EPR because it makes it equally possible for both types of candidate to run and win. Every citizen's vote will count equally to give a winner a weighted vote in the council exactly equal to the number of citizens' votes exclusively counted for them. This is why we see this letter and our proposed brief as supporting both parties.

To fully explain how EPR offers the above democratic benefits, we hope you will give us leave to send you the necessary brief.

Summary of Argument

 Justice Frankfurter's principle guided us to define diluted votes by describing a practical alternative voting method that makes it impossible for any citizens' vote to be diluted. EPR both provides this "benchmark" to measure dilution, and a complete remedy for it. Therefore, we advise Pico to request the court to require future elections of the seven members of the City Council to be elected at-large every four years using EPR.

Conclusion
The court should require Santa Monica to elect its seven member City Council at-large every four years using EPR. (see Attachments below)

Attachment 1: EPR Count -(pp. 13-16 of our paper expanding upon our 2020 article).

Treating you, the reader, as a voter, you may give the same grade to more than one candidate. Any candidates who you do not explicitly grade will be counted as if you marked them as a Reject. You are assured that your one vote of Acceptable or better for a candidate will increase the voting power in the council or legislature of the winner you helped to elect directly, or indirectly by your proxy vote. The target number of candidates who finally receive the largest numbers of grades (votes) of at least Acceptable are elected. For example, assume you completed your EPR ballot as shown in Table 1.

Table 1. EPR sample ballot

Sample Secret Ballot Paper for EPR						
City Number 30						
Directions: If you want to grade at least one candidate's suitability for office yourself, put an X in either the Excellent, Very Good, Good, or Acceptable box to the right of each of the candidates you want to grade. You may give the same grade to more than one candidate. Use Poor or Reject to grade candidates you do not find acceptable to hold office. Any candidates who you do not explicitly grade will be counted as if you marked them as 'Reject'.						
Identity Code of the candidate	**Candidate**	*Note*: Give only one grade to each candidate by placing an X in the relevant box. Grade as many or as few candidates as you would like. You may give the same grade to multiple candidates.					
		EXCELLENT	**VERY GOOD**	**GOOD**	**ACCEPTABLE**	**POOR**	**REJECT**
A	Stephen Collins	X					
B	Candice Crosby		X				
C	Robin Levy	X					
D	Martin Newman			X			
E	June Glover				X		
F	Frank Field						
		\					

If you think all of the candidates are unacceptable, in the above empty row you may instead grade any citizen registered as a potential WRITE-IN candidate. Write the pre-published Code Number of that citizen in this space:

If your WRITE-IN candidate, or any candidates you graded are not elected, the one you graded most highly gives your *proxy vote* to the winning candidate they judge most suitable for office. If you do not want your *proxy vote* to be used in this way, circle NO at the end of this sentence:

YES --- N0

If you have not graded any candidate, you may give your PROXY VOTE to a REGISTERED ELECTOR to grade the candidates for you. WRITE IN the Code Number of that Elector in this space:

The first rounds of Stage 1 of the EPR count determine to which of the candidates' running total of votes your Excellent is exclusively but provisionally added, either Collins's or Levy's. It goes to the candidate who has the largest number of votes at that point in the count. This is justified by the democratic assumption that the candidate who has more votes is probably better. Say your Excellent goes to Levy. If Levy has accrued enough grades (votes) by the beginning of Stage 3 to be elected, your vote remains part of her weighted vote in the council (legislature). The target number of candidates are elected who have accrued one of the largest numbers of votes by the beginning of Stage 3.

In Stage 1, your Excellent is added only provisionally to Levy because your vote may have to be transferred in a later stage to another candidate if Levy has not received a large enough number of grades of at least Acceptable to be elected by the beginning of Stage 3. In this event, your vote is instead transferred to the candidate your ballot gives its remaining highest grade. If Collins, Cosby, and Newman have not been elected, then your vote goes to Glover. If Glover is also not elected, your proxy vote is finally added in Stage 4 to the weighted vote of the winner publicly judged by Levy to be most fit for office, unless you prohibit this use of your proxy vote by circling NO in the relevant box near the end of the ballot.

Also, to avoid the remote but anti-democratic possibility of a candidate being able to dictate to the legislative body by retaining more than 50% of all the weighted votes in the assembly, our EPR algorithm does not allow a member to retain more than 20% of these votes. This requires at least three members to agree before any majority decision can be made in the assembly. Consequently, if Levy had received more than 20% in Stage 1, her surplus votes received in Stage 1 are automatically transferred in Stage 2 to the running total of the candidate that each relevant ballot awards its remaining highest grade. The ballots that are transferred are selected by lot.

For a full description of the EPR count, see Appendix A of our expanded paper. For our algorithm, and the report of the output for the EPR count of a simulated EPR election, see the Supplemental Materials.

Attachment 2: Plurality's Structural Flaw
Plurality voting is "an electoral device" that is currently a key part of the "totality of circumstances" (52 USC 10301) in Santa Monica that helps "enhance the dilutive effects of at-large elections" (CVAR 14028(e)). Each plurality voter is allowed only to vote for a number of candidates equal to the number of positions available. When four of the seven council members are being elected, each citizen has four votes. The seven candidates with the largest number of votes win. While Santa Monica's plurality elections allow every citizen (including each member of a protected class) to "participate" in the sense that all are free to fill out an official ballot that will be officially counted, the problem is that all these ballots are counted in a way that does not provide all voters with an equal "opportunity … to elect representatives of their choice" (52 USC 10301). For many, this participation cannot in practice have the effect of helping to elect a candidate of their "choice" (CVRA,14027). Plurality voting does this by allowing a majority of voters, intentionally or not, to prevent any minority group from being represented at all in the city council.

This needless dilution is fundamentally caused by a structural flaw in plurality voting as illustrated by the following election of candidate C if candidates A, B, and C respectively receive 33%, 33%, and C 34% of all the votes cast. In this example, 34% of citizens' votes make 66% of the citizens feel dissatisfied, ignored, disenfranchised and without a voice in the council -- their votes are diluted by not helping to elect a candidate of their choice. Therefore, even if Santa Monica chose instead to use plurality to elect its seven council members by seven districts, something like the same dilution would take place in each district.

Accordingly, some such dilution most probably occurred in Santa Monica ever since 1946. This is illustrated by its three most recent post-election reports in 2016, 2018, and 2020:

In 2016, the four winning candidates were supported by a combined total of 62.46% of all the votes cast. All the loosing candidate received a combined total of 37.36%. This is to illustrate that 62.46% could prevented up to 37.36% of the voting citizens from being represented in the Council.

Santa Monica: total combined percentage of votes received by:

	All Winners	All Losers
2016	62.46%	37.36%
2018	62.84%	37.15%
2020	44.04%	55.96%

Plurality needlessly allows the dilution of large percentages of citizens' votes. Given that about 30% of Santa Monica's population are members of a "protected classes" ("Opinion", I(C)3), this makes it highly probable that many of their votes were among these dilutions. We say "probably" because the secrecy of ballots makes "certainty" impossible. In contrast, EPR makes it certain that no vote is diluted.

Of course, Santa Monica is not alone in this regard. Most of the elections conducted in the USA do the same thing. This is apart from the many other ways that votes can be diluted, but these are not relevant to this case. Unfortunately, most of the discussants of this case also seem to be victims of a "plurality-mind-set" that naively take it for granted that plurality voting is the only or best way to elect candidates.

Again ,the above large percentages of "losing" or diluted votes would only be about 12% if STV were use, or 0% if EPR were used.

Please note that in one sense, it can be equally simple for a citizen to record their vote either on a plurality, STV, or EPR ballot. For a citizen's one vote to be officially counted to help elect a candidate, a plurality voter must only mark their most favored candidate(s). An STV voter must at least prefer one of the candidates, and an EPR voter must grade at least one candidate as at least Acceptable. See **Attachment 1: EPR count** to see how your vote as an EPR citizen would be counted and added to the *weighted vote* in the council of the winner to whom you awarded your "highest possible grade".

Application to file an amicus curiae brief from Stephen Bosworth (Ph.D. in Political Philosophy, University of London, 1984)

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March 28, 2022

Chief Justice Tani Cantil-Sakauye and Associate Justices
350 McAllister Street
Room 1295
San Francisco, CA 94102-4797

Re: PICO NEIGHBORHOOD ASSOCIATION et al., Plaintiffs and Respondents, v. CITY OF SANTA MONICA (No. B295935; S263972)

Dear Chief Justice Cantil-Sakauye and Associate Justices:

We are supporting both parties to the current dispute because we see our proposed remedy for the votes currently diluted in Santa Monica has having the potential to satisfy both. Our remedy guarantees that every citizens' vote will continue equally to count in the council through the voice of the elected candidate they are likely to see as representing their hopes and concerns most accurately. This should satisfy both parties because candidates mainly focused on serving the needs of their local community, and candidates focused mainly on serving the common good of the whole city as they see it, have an equal opportunity to be proportionally elected to the council.

Concisely put, my co-authors and I argue that electing the seven members of Santa Monica's Council by at-large evaluative proportional representation (EPR) provides the most democratic remedy. EPR does not dilute any citizen's vote. That fact makes it certain that no vote by a member of any protected class will be diluted.

The Court invites us to answer the following question: "What must a plaintiff prove in order to establish vote dilution under the California Voting Rights Act?" We answer that the plaintiff must prove that votes cast by members of a "protected class" are being

needlessly "diluted" by the existing electoral system in question. That such dilution exists in Santa Monica hinges on our acceptance of Justice Wiley's Opinion following Justice Frankfurter's principle: "plaintiffs must postulate an alternative voting practice to serve as the benchmark undiluted voting practice, because the concept of vote dilution necessitates the existence of an undiluted practice against which the fact of dilution may be measured" ("Opinion", II Section D). An alternative benchmark practice must enable a larger percentage of such citizens' votes to help elect representatives of their choice.

Accordingly, in the postscript to this letter, we detail how the election of the current Council of Santa Monica needlessly diluted an average of about 47% of all the votes cast when electing the council in 2018 and 2020. In contrast, either of two alternative voting methods would clearly dilute many fewer citizens' votes. In the first method, when seven members are elected at-large by "proportional ranked-choice voting (PRCV)," only about 12% of all the votes cast would be diluted. This method is described and supported by Fair Vote's current Brief to the Court (pp. 15-43). Expressed positively, in contrast to the 53% of all the votes cast in the existing 2018 and 2020 at-large plurality elections not diluted, seven-seat PRCV would enable about 88% of all the votes cast to help elect a favored council member.

However, we prefer evaluative proportional representation (EPR) because it is an improved version of multi-seat PRCV. It dilutes no citizen's vote (0%). It guarantees that every citizen's vote will add to the voting power in the council of the member they are likely to see as representing their scale of values most faithfully. EPR provides Justice Wiley's above "alternative voting practice to serve as the benchmark undiluted voting practice."

Stated positively, a Council of Santa Monica elected by at-large EPR would be supported by 100% of all the votes cast, and by 88% if elected by at-large seven-seat PRCV. This contrasts with the 53% support received by the existing council. This is why we see the adoption of at-large EPR as the optimal remedy for the current needless dilution of many citizens' votes. The fact that EPR does not dilute any citizen's vote makes it certain that no vote by a member of any protected class will be diluted. Only EPR is entirely skin-color bind.

Because the explanations and arguments offered by our brief would help the Court test the validity of this letter's claims for EPR, we hope the Court will accept its current submission.

Kind regards,

Stephen Bosworth

P.S. Documentation of Votes Diluted in Santa Monica

Unfortunately, many people are blind to the fact that plurality voting is the great vote-wasting elephant in the room. Yet, this elephant is central to "the totality of circumstances" (52 USC 10301) that needlessly dilute many votes. Structurally, plurality voting enables a majority of voters, intentionally or not, to prevent everyone else from being represented in a legislative body. This truth is exemplified Santa Monica's elections.

In 2018, the 3 winning candidates were elected by a combined total of 62.84% of all the votes cast. In 2020, the 4 winning candidates were elected by a combined total of 44.04%.

Santa Monica: total combined percentage of votes received by:

	All Winner	**All Losers**
2018	62.84%	37.15%
2020	44.04%	55.96%

This means that all seven members of the council were elected by an average of 53%. – needlessly diluting 47%, given EPR as the availability alternative. The above 2020 example also shows that plurality voting can sometimes even allow a minority to exclude a majority from being represented.

Kind Regards,

Stephen Bosworth

Amicus Curiae Brief from Stephen Bosworth (Ph.D. in Political Philosophy, University of London, 1984)

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ARGUMENT

I.   SANTA MONICA V. PICO: RELEVANT DETAILS

We are supporting both parties to the current dispute because we see our proposed remedy for the votes currently diluted in Santa Monica has having the potential to satisfy both. Our remedy guarantees that every citizens' vote will continue equally to count in the council through the voice of the elected candidate they are likely to see as representing their hopes and concerns most accurately. This should satisfy both parties because candidates mainly focused on serving the needs of their local community, and candidates focused mainly on serving the common good of the whole city as they see it, have an equal opportunity to be proportionally elected to the council.

Concisely put, my co-authors and I argue that electing the seven members of Santa Monica's Council by at-large evaluative proportional representation (EPR) provides the most democratic remedy. EPR does not dilute any citizen's vote. That fact makes it certain that no vote by a member of any protected class will be diluted.

The Court invites us to answer the following question: "What must a plaintiff prove in order to establish vote dilution under the California Voting Rights Act?" We answer that the plaintiff must prove that votes cast by members of a "protected class" are being needlessly "diluted" by the existing electoral system in question. That such dilution exists in Santa Monica hinges on our acceptance of Justice Wiley's Opinion following Justice Frankfurter's principle: "plaintiffs must postulate an alternative voting practice to serve as the benchmark undiluted voting practice, because the concept of vote dilution necessitates the existence of an undiluted practice against which the fact of dilution may be measured" ("Opinion", II Section D). An alternative benchmark practice must enable a larger percentage of such citizens' votes to help elect representatives of their choice.

4

We detail how the election of the current Council of Santa Monica needlessly diluted an average of about 47% of all the votes cast when electing the council in 2018 and 2020. In contrast, we assert that either of two alternative voting methods would clearly dilute many fewer citizens' votes. In the first method, when seven members are elected at-large by "proportional ranked-choice voting" (PRCV), only about 12% of all the votes cast would be diluted. This method is described and supported by FairVote's current Brief to the Court (pp. 15-43).

Expressed positively, in contrast to the 53% of all the votes cast in the existing 2018 and 2020 at-large plurality elections not diluted, seven-seat PRCV would enable about 88% of all the votes cast to help elect a favored council member [also see pages 10-12 below].

However, we prefer evaluative proportional representation (EPR) because it is an improved version of multi-seat PRCV. It dilutes no citizen's vote (0%) [see pages 8-10 below and Appendix A]. It guarantees that every citizen's vote will add to the voting power in the council of the member they are likely to see as representing their scale of values most faithfully. EPR provides Justice Wiley's above "alternative voting practice to serve as the benchmark undiluted voting practice."

Against this benchmark, a Council elected by at-large EPR would be supported by 100% of all the votes cast, and by 88% if elected by at-large seven-seat PRCV. This contrasts with the 53% support received by the existing council. This is why we see the adoption of at-large EPR as the optimal remedy for the current needless dilution of many citizens' votes. The fact that EPR does not dilute any citizen's vote makes it certain that no vote by a member of any protected class will be diluted. Only EPR is entirely skin-color bind.

Explanation of the above percentages:

Unfortunately, many people are blind to the fact that plurality voting is the great vote-wasting elephant in the room. Yet, this elephant is central to the current "totality of circumstances" (52 USC 10301) that needlessly dilute many votes.

Structurally, plurality voting enables a majority of voters, intentionally or not, to prevent everyone else from being represented in a legislative body. This truth is exemplified by Santa Monica's elections.

In 2018, the 3 winning candidates were elected by a combined total of 62.84% of all the votes cast. In 2020, the 4 winning candidates were elected by a combined total of 44.04%.

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When compared with EPR as the availability alternative, this means that all seven members of the council were elected by an average of 53%. – needlessly diluting 47%. The above 2020 example also shows that plurality voting can sometimes even allow a minority to exclude a majority from being represented.

In the context of the above facts and our assertions, the next part of this brief explains exactly how using EPR guarantees the removal of all vote dilution.

II. REPRESENTATIVE DEMOCRACIES CAN BE IMPROVED BY VOTERS GRADING CANDIDATES: AN ALGORITHM BY STEPHEN BOSWORTH, ANDERS CORR AND STEVAN LEONARD

Our Assertions Summarized

Needlessly, many city and state legislative bodies in the US and elsewhere have been elected by less than half of the votes cast by citizens – resulting in more than half the votes being wasted ("diluted") – leaving citizens feeling unrepresented and disenfranchised. Such waste is needless because a new voting method called evaluative proportional representation (EPR)

guarantees what each citizen presumably wants: their vote equally to increase the voting power of the elected candidate they see as likely to represent their hopes and concerns most faithfully. EPR also helps to elect a higher quality council – a council seeking the common good by making decisions after discussions and debates between all the many perspectives represented.

How these democratic benefits are provided by EPR is explained below, but first we describe how plurality voting, the most commonly used and least democratic voting method, needlessly wastes citizens' votes. Most of the legislative bodies in the US are chosen in plurality elections.

Plurality Voting

Currently, many legislative bodies are elected by fewer than half of all the citizens' votes cast. This is most likely to happen when traditional simple-plurality voting is used, where each citizen can vote only for as many candidates as the number of positions to fill. The candidates who receive the largest numbers of votes are elected. Each vote that did not help elect a candidate is diluted or wasted in the sense that it is not represented in the legislative body.

As anothe example of plurality voting, in 2018 and 2020, the current seven-member city council of Santa Cruz, California was elected by an average of 46% of all the votes cast. This means that about 54% of the votes cast by citizens can be said to be diluted because they are not represented in the council. Like many other cities, this council is elected at-large by plurality voting.

Also, many cities use plurality voting to elect their councils from districts. However, these elections can waste even more citizens' votes. This is illustrated by candidate C being elected from a district when candidates A, B, and C received the following percentages of all the votes cast in that district: 33%, 33%, and 34%. Therefore, 66% of the votes are wasted – these citizens can rightly feel disenfranchised.

This means that in a council elected by simple plurality by the above mentioned 47%, either at-large or from seven districts, a 4-to-3 "majority" in this council is supported by only 26% of all the votes cast (four sevenths of 47%). This is not "majority rule."

EVALUATIVE PROPORTIONAL REPRESENTATION

EPR invites you to vote most expressively by grading at least one candidate's suitability for office as either Excellent, Very Good, Good, or Acceptable. You can grade Poor or Reject for any candidates you find unacceptable to hold office. You can award the same grade to more than one candidate. You are guaranteed that your one EPR vote of at least Acceptable will quantitatively increase the voting power (weighted vote) in the council of the elected candidate who you awarded your "highest possible grade". This candidate is discovered by following the rules of the count.

HOW EPR COUNTS GRADES

For an EPR at-large election of a seven-member council, each of the seven elected candidates must have received one of the seven largest numbers of grades of at least Acceptable from all the ballots cast. Your vote and every other citizen's vote is added to one of the different weighted votes that will be held by one of the elected members

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of the council. The council represents 100% of the votes cast – no vote is wasted or "diluted."

Except in two circumstances, your one vote adds to the weighted vote in the council of the highest-graded candidate on your ballot. If you awarded this highest grade to more than one candidate, it is exclusively added to the candidate who will have the largest number of these grades as a result. This is justified by the democratic assumption that, other things being equal, the candidate with a larger number of votes is probably better.

The first exception is when that candidate has received too few grades of at least Acceptable from all the ballots cast to be elected. In this event, your ballot is automatically transferred to the candidate on your ballot to whom you awarded your remaining highest grade. If no such eligible candidate is graded on your ballot, your ballot automatically becomes your proxy vote. This proxy vote is finally added to the weighted vote of the elected candidate publicly judged by your highest-graded candidate to be most fit for office. You can prohibit this use of your proxy vote by specifying this on your ballot.

The second exception can result from your highest-graded candidate having received too many highest grades from all the ballots cast. To avoid the remote but anti-democratic possibility of an elected candidate being able to dictate to the council by retaining more than 50% of all the weighted votes in the council, our EPR algorithm does not allow a member to retain more than 20% of all the votes cast. This requires at least three members to agree before any majority decision can be made in the council. If the candidate to whom you gave your highest grade received more than 20% of the votes, your ballot could be selected by lot as one of the surplus ballots to be automatically transferred to the remaining highest-graded candidate on your ballot. If no such eligible candidate is graded on your ballot, your ballot

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automatically becomes your proxy vote and is transferred to the weighted vote of one of the eligible winners as described earlier. As a result, your EPR vote equally adds to the weighted vote of the winner who finally receives your highest grade, remaining highest grade, or proxy vote – the winner you see as likely to represent your hopes and concerns most faithfully. As a result, each EPR council member has a different weighted vote in the council, exactly equal to the total number of ballots counted for them. [See the Supplemental Materials: Appendix A for a full description of the EPR count; the EPR algorithm, and the report of the output for the count of the simulated EPR election.]

> Every member of an EPR city council is elected proportionally. Each winner has a different weighted vote in the council exactly equal to the number of citizens' votes counted for them. The council is supported by 100% of the votes cast so that no citizen's vote can be wasted.

EPR IS DEMOCRATICALLY ALSO SUPERIOR TO PROPORTIONAL RANKED-CHOICE VOTING (PRCV)

Thankfully, electing city councils by plurality voting has been replaced in some cities by at-large elections using proportional ranked-choice voting (PRCV – https://www.fairvote.org/). This method is used in in Cambridge, Massachusetts (http://vote.cambridgecivic.com/), and planned to be used in November 2022 in California in Albany, Eureka, and Palm Desert. Also, PRCV (called single transferable voting (STV) has been used in the Republic of Ireland, Australia, and Malta for many years (Types of Voting System (2019) . PRCV invites citizens to vote by ranking the candidates, 1st preference, 2nd preference, 3rd preference, etc.

While PRCV is not as good as EPR, it is much better than plurality for electing a city council. EPR is best because PRCV sill wastes some citizens' votes both

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quantitatively and qualitatively. Its qualitative wasting results from the fact that grades are more meaningfully and informatively expressive of each voter's judgments about the candidates which produced their PRCV rankings of the candidates. For example, a first preference does not reveal whether the voting citizen judged that candidate to be excellent or least bad (a plurality vote is even less informative in this regard). At the same time, some quantitative loss stems from PRCV's assumption that each elected member of the council must have the same voting power in the council: one-member one-vote. To help justify this practice, PRCV tries to count all the ballots so each winner receives the same total number.

PRCV starts its count by calculating the smallest total number that each of the target number of winners must receive both to be elected and to exclude the possibility of any additional candidate being elected by the votes that have not yet been counted for any of the winners. This number is called the quota. The Droop Quota is equal to one vote more than the quotient resulting from dividing the total number of ballots cast (the dividend) by one more than the target number of winners. Therefore, when electing a seven-member council, the divisor is 8. This also means that not all the votes cast are used in order to elect the seven winners. These left-over ballots are said to be "exhausted" – wasted in the sense that they are not represented in the council. Any ballot that happens not to rank any of the winners are also said to be exhausted. This is why about 12% of all the PRCV ballots cast to elect a seven-member election are wasted quantitatively.

Note that if all PRCV's preferences were instead counted like EPR counts its grades (and also including EPR's way of distributing proxy votes to winners), this modified PRCV would not waste any votes quantitatively. However, every citizen's qualitative judgments when completing such a modified PRCV ballot are partly wasted, not as fully revealed as when an EPR citizen grades the candidates.

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Readers may also want to consider the needless democratic deficits that would be caused by modifying EPR's algorithm so that each of the elected candidates would have only one vote in the council. We accept that such an arrangement is a practical possibility, but it is not as democratic. To make each winner instead receive the same number of grades of at least Acceptable, many more ballots would have to be needlessly transferred according the same principles outlined in our earlier description of EPR's count. The same total number of proxy votes would need to be publicly distributed to the winners, but only to ensure that each winner receives the same final total number.

All the democratic deficits resulting from this modified EPR would follow from all the different degrees of qualitative waste of any of the ballots having to be transferred from higher to lower graded winners. For example, a ballot grading one winner to be Excellent might have to be transferred to a winner judged by that ballot to be only Acceptable (three ordinal grades below Excellent), or as a Reject (five ordinal grades below Excellent). This is still better than the greater quantitative and qualitative waste already shown to be inherent both in plurality and standard PRCV elections.

The extra democratic benefits offered by our unmodified EPR proposal are also enhanced by the additional information provide by EPR's post-election reports. Each such report should report all the grades anonymously awarded to each candidate by every voter. This enables analysts to help educate the public most comprehensively and reliably by informing every citizen about the ordinal intensity and number of citizens who are pursuing each of the many different agendas in their society. The more candidates an EPR voter grades, the more fully complete and exact will be the qualitative information communicated to others anonymously by such post-election reports. Of course, some understanding of the guiding sets of political

values held by each plurality or PRCV voter can also be extracted from their similar post-election reports. However, the understandings that could be gained from these reports cannot have the same clarity and depth as those revealed from EPR reports.

Finally, we want to stress that the way a citizen marks their EPR ballot can be similarly as simple as voting by plurality or PRCV. Completing a plurality ballot requires you to vote for no more candidates than the number that must be elected. At the same time, no plurality vote guarantees to help elect a candidate. PRCV only requires you to prefer at least one candidate, although the more you rank, the more likely it is that one of your preferred candidates will be elected. Only EPR assures you that your one vote will strengthen the weighted vote in the council of the winner you see as likely to represent your aims and worries most faithfully and skillfully.

CONCLUSION

Unfortunately, all multi-winner voting systems in use today structurally and needlessly ignore or waste some citizens' votes. Everyone in a representative democracy is upset when they see their elected representatives fail to give voice to their concerns—and rightfully so. As a corrective measure, we have shown how every citizen's graded EPR ballot equally adds to the voting power of the city council member they see as likely to give voice and more weight to their hopes and concerns. Grading candidates from Excellent to Reject rather than voting by simple plurality or PRCV allows citizens to express more discerning, meaningful, and informative choices.

EPR improves representative democracy and optimally promotes the common good by making it as likely as possible that the highest quality legislative bodies and candidates will be elected. It does this by helping to educate all citizens by enabling its most informative post-election reports to be analyzed; by satisfying any citizen's

desire honestly and clearly to express their own judgments about issues and candidates; and by enabling each citizen to be confident that their one vote will equally add to the voting power of the elected candidate they see as likely to represent their hopes and concerns most faithfully.

SUPPLEMENTAL MATERIALS

Appendix A: A Full Explanation of the EPR Count (see below)

EPRv3.r (available upon request)

Simulated Election Output from EPRv3.r (available upon request)

APPENDIX A. EVALUATIVE PROPORTIONAL REPRESENTATION DETAILED COUNT

SUMMARY OF STAGES IN THE EVALUATIVE PROPORTIONAL REPRESENTATION COUNT

The four stages in the evaluative proportional representation (EPR) count are summarized as follows.

Stage 1 performs the same steps repeatedly that examine all remaining unassigned ballots to determine the candidates with the most votes at the current grade level, starting with Excellent and continuing with Very Good, Good, and finally Acceptable. At the end of Stage 1, all ballots have been examined. One vote, called an affirmed evaluation, from each valid ballot is assigned to one of the candidates who received the highest grade on that ballot.

Stage 2 applies a limit on the percentage of total votes that a candidate can retain. This limit avoids the otherwise anti-democratic possibility of one elected

candidate being able to dictate to the legislative body by retaining at least 50% plus 1 of all the votes in the assembly. We suggest a limit of 20% so as to require at least three members of the assembly to agree before a majority decision can be made. The excess number of ballots counted for such a super-popular candidate in Stage 1 are selected randomly to transfer to the remaining highest graded (Acceptable or higher) candidate marked on each ballot who does not exceed the vote limit. Any ballot that cannot be transferred is marked as a proxy vote that will be handled in Stage 4 by the candidate that currently holds it.

Stage 3 determines the elected candidates to fill the number of open positions. These are the candidates that have the largest number of affirmed evaluations (votes). The losing candidates will have their ballots transferred to the highest graded elected candidate marked on each ballot who also must not exceed the vote limit. Any ballots that cannot be transferred are marked as proxy votes that will be handled in Stage 4 by the candidate (trustee) that held this ballot in Stage 1. Stage 3 concludes the programmatic vote count by printing a table that reports for which candidate each citizen's ballot was finally counted, or which candidate is the trustee for its proxy vote to be handled in Stage 4.

Stage 4 is a public event where the proxy votes held by both elected and losing candidates are transferred to elected candidates who must not exceed the vote limit. Each candidate that holds one or more proxy votes transfers them to the elected candidates they judge most fit for office. The final total of votes each elected candidate receives defines the weighted vote they will have in the legislative body.

The details of each stage in the EPR count are described below.

STAGE 1 OF THE EPR COUNT

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The Single Round Algorithm is used repeatedly at each grade level in the steps for Stage 1 of the EPR count.

SINGLE ROUND ALGORITHM

(1) For the first round at this grade level, make all candidates eligible.

(2) Set the single round vote counts to 0 for each eligible candidate.

(3) For each uncounted ballot, add one to the single round vote count for each eligible candidate that is marked with the current grade.

(4) Select the candidate with the most single round votes as the winner of this round. If there is a tie, randomly select the winning candidate.

(5) Add the single round vote count to the count of affirmed evaluations for the winning candidate.

(6) Mark the ballots assigned to the winning candidate as counted.

(7) Mark the winning candidate as ineligible for the remainder of rounds at this grade level.

STEPS FOR STAGE 1 OF THE EPR COUNT

(1) Mark all ballots uncounted and set the count of affirmed evaluations for each candidate to 0.

(2) While uncounted ballots remain at the Excellent grade level, repeat the Single Round Algorithm.

(3) While uncounted ballots remain at the Very Good grade level, repeat the Single Round Algorithm.

(4) While uncounted ballots remain at the Good grade level, repeat the Single Round Algorithm.

(5) While uncounted ballots remain at the Acceptable grade level, repeat the Single Round Algorithm.

(1) Determine the candidates that exceed a chosen percentage of the votes cast, referred to as the vote limit. For this paper, we decided that no elected candidate is allowed to retain more than 20% of all the votes in the legislative body. This limit requires a minimum of three candidates to pass legislation.

(2) For each candidate whose votes exceed the vote limit, and handling candidates in order of who holds the most votes (ties broken randomly), perform these steps:

    (a) Randomly select a number of ballots to transfer that brings this candidate's count of affirmed evaluations to the vote limit.

    (b) If possible, transfer each of these ballots and their associated affirmed evaluation to one of the highest graded (Acceptable or higher) candidates marked on the ballot (ties broken randomly), but only for a candidate that does not exceed the vote limit.

    (c) For each ballot that cannot be transferred, mark this ballot as a proxy vote that will be handled in Stage 4 by this candidate as its trustee.

STAGE 3 OF THE EPR COUNT

(1) Determine the target number of candidates to elect as follows:

    (a) Sort the list of all candidates starting with the candidate with the largest number of affirmed evaluations (votes).

    (b) Provisionally select the number of candidates to elect who have the largest number of votes. If the selected candidate with the smallest number of votes is not tied with any candidates not selected, elect all the candidates selected.

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(c) For the candidates that are tied with the candidate who has the smallest number of votes, compute the sum of ordinal values on each of their ballots. These ordinal values correspond to the grades as follows: Excellent (6) down to Acceptable (4).

(d) Sort these initially tied candidates in order of their respective cardinally summed votes. If there are no ties between any of these candidates, elect those with the larger cardinal sums. If there remains a tie between a number of candidates in this list that is larger than the remaining number of candidates to be elected, select that remaining number of candidates randomly.

(2) Starting with the unelected candidate who holds the most votes (ties broken randomly), perform these steps:

(a) If possible, transfer the highest remaining grade (Acceptable or higher) on each of the ballots currently counted for this unelected candidate to the relevant elected candidate (ties broken randomly), but only to a candidate who does not exceed the vote limit.

(b) For each ballot that could not be transferred, mark this ballot as a proxy vote that will be handled in Stage 4 by its trustee: the candidate who received the highest grade on this ballot in Stage 1.

(3) Print a table that reports for which candidate each citizen's ballot was finally counted, or which candidate is the trustee for its proxy vote (the candidate who received this vote in Stage 1).

STAGE 4 OF THE EPR COUNT

(1) Print a summary of the ballots that will be transferred by the proxy vote holders at a public event. This concludes the programmatic vote count.

(2) Though not carried out by the algorithm, the weighted votes of each elected candidate are finalized as follows: Each candidate that is a trustee of proxy votes, starting with the candidate with the largest number of affirmed evaluations (ties resolved by lot), publicly transfers their proxy votes to any of the eligible winners they judge most suitable for office.