AEC
Australian Electoral Commission

Mr Daryl Melham MP
Chair
Joint Standing Committee on Electoral Matters
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Parliament House
CANBERRA ACT 2600

Dear Mr Melham

I am writing in response to your letter dated 24 September 2008 relating to an alternative counting system for Senate elections put to the Committee by Mr Anthony van der Craats. Your letter draws attention to his main submission (No. 51) and several supplementary submissions, two of which have "included a count of Senate votes for the 2007 federal election based on the counting system advocated by him." You state that the Committee "would be interested in the AEC's view on the counting system advocated by Mr van der Craats and an analysis of the results of his recount", and that the Committee "would be pleased to receive any views that the AEC has about the relative merits of the current system compared to the system advocated by Mr van der Craats."

Transfer values applied in surplus distributions

Under the current Senate scrutiny system set out in the *Commonwealth Electoral Act 1918*, when a candidate is elected with surplus votes, they are distributed by attributing a common transfer value to all of the ballot papers received by the candidate up to that point, regardless of the transfer value at which they were received. Mr van der Craats proposes, among other things, that the system be changed so that the ballot papers of an elected candidate would be transferred at a range of transfer values, reflecting the transfer values at which they had been received. These two alternative approaches have come to be known respectively in the academic literature as the "Inclusive Gregory method" and the "Weighted Inclusive Gregory method" (see D M Farrell and Ian McAllister, "The 1983 Change in Surplus Vote Transfer Procedures for the Australian Senate and its Consequences for the Single Transferable Vote", *Australian Journal of Political Science*, Vol. 38, No. 3, November 2003, pp. 479-91).

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The proposal that the Weighted Inclusive Gregory method should be used in lieu of the Inclusive Gregory method is not a new one. It was one of a number of issues raised in a paper put to the Joint Select Committee on Electoral Reform in 1985 by Mr E Haber on behalf of the Australian Democrats (NSW). At the Committee's request, the AEC provided detailed comments on the paper, which are set out at **Annex 1**.

That Committee, at paragraphs 7.61 to 7.66 of its December 1986 Report on *The Operation during the 1984 General Election of the 1983/84 Amendments to Commonwealth Electoral Legislation*, endorsed the AEC's view of the issue. Key elements of the AEC's view were set out at paragraph 7.64 of the Committee's Report, in the following quote from the AEC's detailed comments:

> "(2)   The preliminary point should be made that proportional representation systems of scrutiny can be no more than devices to provide, first, for the representation within a legislature of a reasonable cross-section of views and, second, for the representation of political groups in approximate proportion to their support within the electorate. Provided that two or more systems satisfy these broad criteria, there is very little basis for arguing that one is better than another, and the choice between any two must rest on the criterion of ease of practical implementation. No process whereby the complex preferences of millions of voters are agglomerated into an election result in which six candidates are successful and the rest are not can be said to be definitively 'correct' or 'accurate'.
>
> (3)   In addition, the Commission would reject as fallacious the proposition that there exist real but unobservable entities called 'vote values' which it is the duty of the system to reflect in the formula laid down for the calculation of 'transfer values'. To base ... [prescriptions] for legislative change on such a proposition would be to give overriding normative significance to what is merely a metaphor which has been used in the past to describe the mathematics of proportional representation systems.
>
> (4)   Furthermore, it should be noted that the changes proposed to the current system by Mr Haber, though minor, would, if implemented either together or individually, give rise to the possibility of a result different from that which the current system would produce. However, in the Commission's view, the current system and the system which would be produced by the adoption of Mr Haber's proposals both satisfy the broad criteria laid down in paragraph (2) above. For that reason, it cannot be seriously asserted that the result produced by one would be any more legitimate than the different result which the other would produce in certain restricted circumstances.".

It was stated explicitly at paragraph 7.66 of the Report that "The Committee agrees with the AEC's assessment and does not support Mr Haber's proposals".

In the AEC's view, the points of principle stated by the AEC in 1985 and endorsed in the Joint Select Committee's 1986 Report still stand. In particular, the AEC does not accept the validity of the fundamental premise of Mr van der Craats's argument: that there exists, in surplus transfers, a "correct proportional value of the vote". While it can easily be demonstrated that different electoral systems or formulae have different properties and therefore are capable of producing different results, it does not follow that there must, among a number of such formulae, be a "correct" one.

The choice between the Inclusive Gregory method and the Weighted Inclusive Gregory method gave rise to discussion in Western Australia following the 2001 Upper House election, and this led the WA Electoral Commission to produce a discussion paper on the issue entitled *Determining the Result: Transferring Surplus Votes in the Western Australian Legislative Council* (ed. N. Miragliotta, Western Australian Electoral Commission, 2002). The Weighted Inclusive Gregory System was subsequently adopted for Legislative Council elections in Western Australia.

The Weighted Inclusive Gregory method would be somewhat easier to implement for Senate elections now than in 1986, as at that time it would have required the computerisation of what was then a manual counting system, whereas now it would require the existing computerised system to be amended and thoroughly tested. Against that, it should be noted that the Inclusive Gregory method has been in use for some 24 years, and therefore has the virtue of being reasonably understood by a range of stakeholders, most of whom do not appear to have shared Mr van der Craats's concerns.

For these reasons, the AEC does not accept that there is a demonstrated need for the Inclusive Gregory method to be replaced by the Weighted Inclusive Gregory method.

"Re-iterative" counting processes

Mr van der Craats's second main proposal is that "re-iterative" counting processes should be used. He asserts that as a matter of principle "If a candidate is excluded, all ballots are treated as if that candidate had never stood." He argues that this principle, among others, is expressed in what he calls the "Wright system", which he advocates. As far as the AEC can determine, it is a system which not been previously used at legislative

elections anywhere in the world. Its adoption would therefore represent a radical departure from past practice.

In the AEC's view, the basic principle asserted by Mr van der Craats is by no means self-evidently valid. The current process, under which candidates are excluded successively (or in bulk if their ultimate exclusion is demonstrably inevitable), is one which in its broad outline has been advocated by supporters of proportional representation for over a century.

It is important to emphasise that there are quite a number of variants of single transferable vote proportional representation (including, for example, the Hare-Clark system used in Tasmania, the "random sampling" system used at Senate elections up to 1980, the "Newland-Britten" system, and other more exotic variants such as Meek's method and Warren's method.) Every such variant is typically stated by its proponents to have outstanding qualities. A shift to the use of the "Wright system" would be of little benefit to Australia if the immediate or proximate effect was merely to generate arguments that the wrong system had been chosen, and that some other advocate's preferred scheme should have been adopted.

Finally, in the AEC's view a number of considerations need to be borne in mind when considering choice of electoral systems.

- It needs to be recognised clearly that there is no such thing as a perfect system: they all have their advantages and disadvantages, and they are all capable, given an unfortunate combination of circumstances, of producing individual results which might be seen as paradoxical, counter-intuitive, or undesirable when judged against reasonable criteria.

- The key test of the legitimacy of an electoral system is whether it is generally accepted within a society; its mathematical properties are of secondary importance at best. While legitimacy can spring from a number of sources, two that are typically overlooked are relative simplicity and coherence. Very often, electoral systems are well accepted because they embody clear, coherent principles about who should be elected. In systems of rising complexity, where counting can only be done by computer, it is very often difficult to explain in any clear way why the winners won and losers lost, and this does not assist in building a system's legitimacy.

- Coherent systems have another virtue, which is that their effects tend to be relatively predictable and well-understood. Partly this is because

they have been extensively used and studied, but it is also the case that their simplicity makes them easier to analyse. Brand new, complex systems have a history of surprising their designers, and manifesting paradoxes which had either not been predicted, or had been thought to be unlikely.

In the light of these points, the AEC would see no benefit in the replacement of the current Senate system by the complex, untested system advocated by Mr van der Craats.

Results of Mr van der Craats's recounts

The AEC is not in a position to provide an independent check of the figures given to the Committee by Mr van der Craats, since that would require the independent development of software to implement the "Wright" and "Meek" counting methods.

The AEC notes that if Mr van der Craats's figures are taken at face value, a different result would have been produced by the "Wright" and "Meek" methods at last year's Senate election in Queensland. About that there is little that can be said: different counting methods, by definition, will in some cases produce different results. The mere fact of difference does not establish that the "Wright" and "Meek" methods have any greater legitimacy than the current system.

Finally, as the AEC understands it, Mr van der Craats has not provided any simulation of the effect at last year's Senate election of using a non-iterative Weighted Inclusive Gregory method, as is done at Upper House elections in Western Australia.

Yours sincerely

Paul Dacey
Acting Electoral Commissioner

30 September 2008

DOCUMENT SUPPLIED BY MR E. HABER ON
BEHALF OF AUSTRALIAN DEMOCRATS (NSW)
- AEC COMMENTS

Introduction

Mr Haber's document embodies three distinct proposals for changes to the current Senate scrutiny system:

- that the procedure for transferring surplus votes be altered so as to ensure that ballot-papers which are set aside as exhausted during a surplus distribution are given a transfer value of zero and therefore are not "carried over" to Table II of the standard Senate Scrutiny Sheet as "exhausted votes";

- that another aspect of the same procedure be modified so as to eliminate so-called "loss by fraction" at surplus distributions; and

- that in distributing the surplus votes of a candidate elected at a later count than the first, the various ballot-papers of the elected candidate should not all be distributed to the continuing candidates at the same transfer value, but should be distributed at a transfer value related to that at which the elected candidate received them.

These proposals will be dealt with separately in this paper.

2. The preliminary point should be made that proportional representation systems of scrutiny can be no more than devices to provide, first, for the representation within a legislature of a reasonable cross-section of views and, second, for the representation of political groups in approximate proportion to their support within the electorate. Provided that two or more systems satisfy these broad criteria, there is very little basis for arguing that one is better than another, and the choice between any two must rest on the criterion of ease of practical implementation. No process whereby the complex preferences of millions of voters are agglomerated into an election result in which six candidates are successful and the rest are not can be said to be definitively "correct" or "accurate".

3. In addition, the Commission would reject as fallacious the proposition that there exist real but unobservable entities called "vote values" which it is the duty of the system to reflect in the formulae laid down for the calculation of "transfer values". To base prescriptions for legislative change on such a proposition would be to give overriding normative significance to what is merely a metaphor which has been used in the past to describe the mathematics of proportional representation systems.

4. Furthermore, it should be noted that the changes proposed to the current system by Mr Haber, though minor, would, if implemented either together or individually, give rise to the possibility of a result different from that which the current system would produce. However, in the Commission's view, the current system and the system which would be produced by the adoption of Mr Haber's proposals both satisfy the broad criteria laid down in paragraph 2 above. For that reason it cannot be seriously asserted that the result produced by one would be any more legitimate than the different result which the other would produce in certain restricted circumstances.

Exhausted ballot-papers

5.   In a "fractional transfer" proportional representation system, the "transfer value" of a ballot-paper is simply a figure indicating the fraction of a vote which that ballot-paper represents. Under current procedures a transfer value at a surplus distribution is calculated by dividing the number of surplus votes of the elected candidate by the total number of ballot-papers received during the scrutiny by that candidate. A distribution of preferences takes place to determine how many of those ballot-papers show a next preference for each continuing candidate, and how many must be set aside as exhausted because they show no preference for any continuing candidate. The numbers so determined are each multiplied by the transfer value, and the resulting figures are credited to the continuing candidates as votes, or are added to the running tally of "exhausted votes".

6.   Under Mr Haber's proposal, only transferable ballot-papers (i.e. those showing a preference for a continuing candidate) would be included in the divisor used in calculating the transfer value, and only the numbers of transferable ballot-papers would be multiplied by that transfer value to determine the numbers of votes to be credited to continuing candidates. In effect, ballot-papers which were set aside as exhausted at a count would be "buried in the quota" with a transfer value of zero.

7.   As drafted, the proposal would enable the ballot-papers of a candidate elected on first preferences to be given a transfer value greater, indeed much greater, than one. This would appear to be a drafting error, since Mr Haber's proposed paragraph 273(10)(c) would impose on the first preferences of a candidate elected at a later count than the first a maximum transfer value of one.

8.   The adoption of the proposal would not on the face of it lead to the elimination of all "exhausted votes" entries on Table II of the Scrutiny Sheet, since the possibility would still exist of votes being exhausted at preference distributions associated with exclusions of candidates. At the 1984 Senate election in New South Wales, for example, 47.6% of the "exhausted votes" tally at the count at which the final vacancy was filled had arisen during exclusions rather than surplus distributions. The "exhausted votes" tally could only be reduced to zero by replacing the general principle that excluded candidates' ballot-papers are transferred from them at the value at which they were received, by a more complex formula under which ballot-papers could have a new transfer value attached to them every time they were transferred from an excluded candidate. This would be cumbersome and time-consuming, to say the least.

9.   Such an attempt to eliminate the "exhausted votes" tally during exclusions would also nullify the benefits of adopting the "combined transfer value" option for modifying the exclusion process, as discussed in paragraphs 9 to 13 of the Commission's submission to the Committee on Senate Scrutiny Procedures. The efficacy of that option depends essentially on there being an upper limit (equal to the number of vacancies being filled) on the number of transfer values for ballot-papers which can arise during a scrutiny. Any scheme which would give rise to a multitude of different transfer values for ballot-papers would defeat the purpose of adopting the option.

10.   The procedure which would be superseded under Mr Haber's proposal is based on one which has operated at Tasmanian House of Assembly elections for many years; vote exhaustion at those elections has typically been of the order of 3% of the total formal vote. There do not appear to have been any major expressions of dissatisfaction with the operation of the Tasmanian provisions.

11.   No argument in support of this proposal was put to the Committee by Mr Haber, by Ms Kirkby in her written submission on behalf of the Australian Democrats (NSW), or by Ms Kirkby in her oral evidence.

12.   The Commission is of the view that the proposal is directed towards a phenomenon of quite minor significance; at the 1984 Senate election in New South Wales, the "exhausted votes" tally at the count at which the last vacancy was filled amounted to only 0.06% of the total formal vote. While the arguments advanced in paragraph 2 above imply that there is no particular theoretical objection to the proposal, neither is there any theoretical justification for it. There would seem to be no point in eliminating by mathematical contrivance only a part of the already-miniscule "exhausted votes" tally. On the other hand, any attempt so to eliminate fully the "exhausted votes" tally would involve introducing quite disproportionate complications into an already complex system of scrutiny, and would also render nugatory an otherwise useful technique which the Commission has proposed to simplify the current scrutiny system. The Commission is therefore opposed to the proposal.

Loss-by-fraction

13.   Under the current provisions of the Act, whenever, following a count of preferences during a surplus distribution, the numbers of ballot-papers distributed to the various continuing candidates are multiplied by the transfer value to determine the numbers of votes to be credited to those candidates, fractional remainders arising in the numbers of votes so determined are ignored. This results in the crediting to the continuing candidates of a total number of votes less than the number of votes in the original surplus. The shortfall is known as the "loss-by-fraction".

14.   Mr Haber proposes that this approach be replaced by a system under which this loss-by-fraction would be eliminated by rounding upwards the largest fractional remainder in cases where the loss by fraction would have been equal to one, the two largest fractional remainders in cases where the loss by fraction would have been equal to two, and so on. Such a system was used under the old random-sampling Senate scrutiny system during the distribution of surplus votes, and attracted criticism from time to time on the basis that it was indeterminate in cases where there were ties in fractional remainders. Such a criticism is not merely a theoretical one - the same problem in fact would have arisen during the distribution of Childs's surplus at the 1984 Senate election in New South Wales.

15.   Again, Mr Haber's draft does not seem to envisage an extension of this proposal to cases where the distribution of preferences follows the exclusion of a candidate. Returning again to the example of the New South Wales Senate election of 1984, it was the case then that only 20.4% of the loss-by-fraction which had arisen by the time the final vacancy was filled had resulted from distributions of surpluses. Accordingly, it would seem pointless to adopt the proposal in the restricted form in which it is put forward.

16.   The procedure which would be superseded under this proposal is again based on one which has operated in a thoroughly effective and uncontroversial way at Tasmanian State elections for many years. The proposal, like the first, was not supported at the Committee hearing by any arguments from those putting it forward.

17.   Again, the phenomenon to which it is directed is of little significance; "loss-by-fraction" at the 1984 Senate election in New South Wales amounted at the time the final vacancy was filled to only 0.01% of the total formal vote.

18.   The Commission would oppose the proposal's adoption, on the basis that it would introduce additional unnecessary complications to the scrutiny with no corresponding practical benefits.

Surplus distributions

19.   Where a candidate is elected at the first count, the distribution of his or her surplus votes is conceptually straight-forward, since the only ballot-papers to be dealt with are his or her full-value first preferences. In the case of a candidate elected at a later count than the first, the picture is complicated by the fact that he or she will generally have received by that stage not only first preferences but also ballot-papers with a fractional value. It is necessary in such a case to specify whether all or only some of the elected candidate's ballot-papers are to be regarded as eligible for transfer as part of the surplus, and also to determine the transfer value to be applied.

20.   Prior to the 1983 amendments to the Act, the approach taken was to regard as eligible for distribution as part of the surplus only the parcel of ballot-papers received by the elected candidate at the count at which he or she achieved a quota. A similar approach has also been used for many years at Tasmanian State elections, where it has, even in the aftermath of close elections, attracted no significant criticism. The transfer value of the ballot-papers in this "Tasmanian scheme" is determined by dividing the candidate's surplus votes by the number of ballot-papers in the parcel in question.

21.   As a result of a recommendation made in paragraph 3.34 of the Committee's First Report, this approach was altered for Senate elections, the Commonwealth Electoral Act being amended so as to provide that all the ballot-papers received by an elected candidate, rather than only those he or she received at the count at which he or she achieved a quota, should be eligible for transfer as part of the surplus. No recommendation was made concerning the transfer value which should be applied during the surplus distribution. The view was taken, in the drafting of the amendments, that the simplest possible mechanism, under which all the ballot-papers had attributed to them the same transfer value, should be pursued.

22.   Although the amended provisions gave clear authority for the ballot-papers of an elected candidate to be physically amalgamated and counted as a single unit, the view was taken that it would be prudent, at any rate on the first occasion on which the amended provisions operated, to deal individually with the separate parcels of ballot-papers which had at different stages of the scrutiny been transferred to such a candidate. Accordingly, it was laid down in the Commission's Senate Scrutiny Procedures Handbook that the surplus distribution in such a case should be conducted over a series of physically separate "sub-counts", the results of which would be summed up to give a final breakup of preferences to which the single transfer value could be applied.

23.   On reflection this appears to have been an unnecessarily cautious approach. No serious difficulties were encountered in managing the large numbers of ballot-papers involved in the surplus distributions conducted at the 1984 Senate scrutinies, and the Commission would be proposing, in the event that the current system of distributing surpluses is unaltered, to abandon the time-consuming conduct of separate sub-counts within surplus distributions.

24.   Mr Haber, on the other hand, advocates an approach under which a separate transfer value would be calculated for each parcel of votes which had been received by the elected candidate, and each parcel would be separately transferred at that value. The prospect would thus exist of a candidate being elected during, rather than only at the conclusion of, the transfer of a surplus.

25.   Set out at Attachment A is a worksheet illustrating how these various mechanisms would have operated at the hypothetical distribution of surplus required at Count 19 of the sample scrutiny set out at Appendix J of the Commission's Senate Scrutiny Procedures Handbook. It can be seen from the worksheet that the approach advocated by Mr Haber would be vastly more complicated than that currently used, and would exceed the Tasmanian approach in complexity to an even greater extent. There are three factors which would contribute to this increased complexity.

26.   First, there would be an additional arithmetical burden resulting from the method used to determine transfer values. While the calculation of transfer values under the current approach and under the Tasmanian scheme is trivially easy, extensive calculations would be needed under the Haber scheme - and the extent of the calculations required would increase under the Haber scheme with the number of parcels involved. The hypothetical example given involves only nine parcels of ballot-papers. In practice, surplus distributions involving hundreds of parcels would often be encountered. In such cases, even the rounding of fractional remainders needed to move from column (D) to column (E) of the worksheet would have to be done by computer.

27.   Second, however, there would be a burden associated with the prospect, contemplated by Mr Haber's draft, of a candidate or candidates being elected at the conclusion of a sub-count within a surplus distribution, rather than only at the end of the distribution. Under such an arrangement, it would not always be possible, as it is at the moment, for the various sub-counts in a surplus distribution to be conducted separately but simultaneously by different counters. Rather, it would be necessary for an estimate to be made of the number of sub-counts which could feasibly be proceeded with simultaneously, of much the same type as is required in respect of the counts in a multiple-count exclusion.

28.   Third, the generation of a multiplicity of transfer values for ballot-papers at a given surplus distribution would induce an increase in the number of counts required to conduct subsequent exclusions. Taken together, these three factors would greatly increase the time required to conclude the scrutiny, and thus to obtain a final result.

29.   The generation of different transfer values at each sub-count would also have a deleterious effect on the operation of the Commission's "combined transfer value" option - and these new transfer values would be generated quite independently from those produced by the operation of Mr Haber's first proposal. To give a concrete example, there were, after the seventh count at the 1984 Tasmanian Senate election, seven different transfer values attached to the ballot-papers in the scrutiny. If Mr Haber's proposal had been in operation, there would have been 17. Under "combined transfer values", approximately twice as many counts would have been required in the scrutiny, had Mr Haber's proposal been in operation, as would have been required if his proposal had not operated. Mr Haber's assertion that his proposal would "fit in excellently" with combined transfer values is therefore incorrect.

30.   The reasoning behind Mr Haber's objection to the method currently used to distribute surpluses is by no means clear. From the statements in his oral evidence, it would appear that he attributes to the transfer values of ballot-papers a normative significance of the kind explicitly rejected in paragraph 3 above, though such a view is never directly spelt out.

31.   There is also a contradiction inherent in Mr Haber's views, since he is prepared to countenance, as an alternative to his proposed approach, a return to the Tasmanian scheme of counting only ballot-papers received in the last parcel. That scheme involves implicitly giving the ballot-papers in all but that parcel a transfer value of zero, and cannot on the face of it be reconciled with any underlying view that ballot-papers should be passed on at a transfer value related to that at which they were received.

32.   As a consequence of the principles outlined in paragraphs 2 and 3 above, the Commission is of the view that there is no fundamental defect in the method currently used to distribute surpluses of candidates elected at a later count than the first. Mr Haber's proposal would lead to practical complications in the scrutiny, and would increase the time required to complete it, without any corresponding benefits. The Commission is therefore strongly opposed to the proposal.

33.   On the other hand, the Commission would support a reversion to the Tasmanian scheme for distributing surpluses if the Committee is minded to seek changes to the current approach. Such a reversion would simplify, rather than complicate, the scrutiny process, and would lead to quicker, rather than slower, scrutinies.

Conclusion

34.   The whole thrust of the Commission's approach to the review of section 273 has been to seek amendments which will expedite, simplify and render more robust the scrutiny of Senate votes, while maintaining consistency with the broad criteria laid down in paragraph 2 above. Mr Haber's proposals all lead in the opposite direction, and would tend to complicate and lengthen Senate scrutinies, with no attendant benefits.

35.   Finally, the Commission would point out that there are overall benefits to be gained from having an electoral system which is simple for all participants in the political process (including parties and candidates, the media, and the voters themselves) to understand. On this basis, again, the modifications of the current system proposed by the Commission are preferable to those put forward by Mr Haber.

OPTIONS FOR THE CALCULATION OF TRANSFER VALUES IN SURPLUS DISTRIBUTIONS

Sub-count	Ballot-papers counted at sub-count (A)	No. of votes represented by A (B)	Proportion that B represents of Jones's total vote (i.e. B/35,631) (C)	C x surplus (i.e. C x 201) (D)	Rounded value of D (E)	Transferable papers at sub-count (F)	Transfer value = E/F (G)
19(1)	12,390	12,390	.3477	69.8877	70	12,390	.00564971
19(2)	50,110	20,686	.5806	116.7006	117	50,110	.00233486
19(3)	145	145	.0041	0.8241	1	145	.00689655
19(4)	290	290	.0081	1.6281	2	290	.00689655
19(5)	312	312	.0087	1.7487	2	312	.00641025
19(6)	5	5	.0001	0.0201	0	5	0
19(7)	640	640	.0180	3.6180	3	640	.00468750
19(8)	630	630	.0180	3.6180	3	630	.00476191
19(9)	533	533	.0150	3.0150	3	533	.00562852
	65,055	35,631			201		

Tasmanian approach : 533 ballot-papers received in last parcel are transferred at a value of 201/533 = 0.37711069

Current Commonwealth approach : All 65,055 ballot-papers are transferred at a value of 201/65,055 = 0.00308969

Haber approach : Ballot-papers are transferred parcel by parcel, at the values given at (G)