EXHIBIT 3
TO COMMON CAUSE OBJECTIONS
(Second Ketchie Affidavit)

STATE OF NORTH CAROLINA COUNTY OF WAKE	IN THE GENERAL COURT OF JUSTICE SUPERIOR COURT DIVISION 21 CVS 015426
NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, INC., et al., REBECCA HARPER, et al., COMMON CAUSE, *Plaintiffs,* v. REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al. *Defendants.*	**SECOND AFFIDAVIT OF CHRISTOPHER DALTON KETCHIE**

NOW COMES Christopher Dalton Ketchie.

I, Christopher Dalton Ketchie, declare as follows:

1. I am over 18 years of age, legally competent to give this Affidavit, and have personal knowledge of the facts set forth in this Affidavit.

2. I am a graduate of North Carolina State University with a master's degree in Forestry and Environmental Resources with a concentration in Geographic Information Systems (GIS). Additionally, I have over 11 years of professional GIS and data analysis experience.

3. I am employed by the Southern Coalition for Social Justice in Durham, North Carolina as a Senior Data Analyst and Quantitative Researcher, which includes the frequent use of GIS.

4. In support of Plaintiff Common Cause's objections to the remedial maps enacted by the North Carolina General Assembly in February 2022, I calculated the scores for several metrics of

these maps evaluating partisan performance using publicly available data and analytical tools. These metrics include the mean-median difference, efficiency gap, partisan symmetry / partisan bias, the plausible number of representatives elected across different electoral conditions, and the relative chances of electing a majority or (for state legislative maps) supermajority by a given political party.

5. I used the publicly available platform PlanScore to calculate the mean-median, efficiency gap, partisan symmetry / partisan bias, plausible number of representatives elected, and one of the six scenarios I used to determine the relative chances of electing majority or supermajorities. PlanScore is a project of the nonpartisan Campaign Legal Center, and is considered a reliable platform for calculating partisan metrics. *See* https://planscore.campaignlegal.org/#!2020-ushouse.

6. I used the publicly available platform Dave's Redistricting App (DRA) to calculate the plausible number of representatives elected and four of the six scenarios I used to determine the relative chances of electing a majority or supermajority, as described in more detail below. DRA is also considered a reliable platform for evaluating legislative maps and calculating partisan metrics. *See* https://davesredistricting.org/maps#home.

7. Both PlanScore and DRA draw their election data from the Voting and Election Science Team (VEST), based out of the University of Florida and Wichita State University. This data is available at https://dataverse.harvard.edu/dataverse/electionscience. PlanScore's election data and methodology can be found here: https://planscore.campaignlegal.org/models/data/2021D/. DRA's election data and methodology can be found here: https://davesredistricting.org/maps#aboutdata.

8. For the metrics that were calculated using PlanScore, I downloaded the shapefile for the proposed remedial Senate plan from the General Assembly website, then uploaded the shapefile

to PlanScore's "Score A Plan" page, which can be found at https://planscore.campaignlegal.org/upload.html. Once the shapefile was successfully uploaded, I selected the new prediction method to calculate the comparators below.

9. For the metrics that were calculated using DRA, I downloaded the block assignment file for the proposed remedial Senate plan from the General Assembly website, then imported the block assignment file to DRA using the import tool which can be found at https://davesredistricting.org/maps#. Once the block assignment file was successfully imported, I selected the "Statistics" tab at the top right of the screen and downloaded the demographics (including election data) as a .csv file and used this to calculate the comparators below.

10. For the metrics that were not calculated directly with either PlanScore or DRA, I downloaded North Carolina VEST data from the VEST Github page, which can be found at https://github.com/alarm-redist/census-2020/tree/main/vest-2020/nc. I imported 2020 VEST data into Maptitude, imported the block assignment file for the remedial Senate plan into Maptitude, and selected the relevant election (2020 North Carolina Chief Justice) as my summary field. I then exported the tabular data to a .csv file to calculate the performance of the plan using that election.

11. The results for the Legislative Defendants' remedial Senate Map S.L. 2022-2 are shown in the following table:

Metric	**Score**
Mean-Median	2.2% R
Efficiency Gap	4.8% R
Partisan Symmetry (Partisan Bias)	4.8% R
Plausible Number of Representatives Elected Comparison	22D-28R / 21D-29R (DRA / PlanScore)

Relative Chances of Electing Majority (26) or Supermajority (30)	R Majority: 4/6 Scenarios D Majority: 0/6 Scenarios R Supermajority: 1/6 Scenarios D Supermajority: 0/6 Scenarios

12. The percentages in the median-mean difference, efficiency gap, and partisan symmetry scores in the chart above indicate a bias towards Republican candidates.

13. The mean-median difference measures a party's median vote share minus its mean vote share, across all of a plan's districts. The greater the difference between a plan's median vote share and a plan's mean vote share, the greater the bias that plan exhibits against one party. PlanScore provides a detailed explanation of mean-median difference here: https://planscore.campaignlegal.org/metrics/meanmedian/.

14. The efficiency gap compares each party's number of unnecessary votes across all of a plan's districts. Unnecessary votes are defined as every vote that it is not necessary for victory in a given electoral district, including every vote above the 50% plus one threshold cast for the winning party/candidate in a given district, and every vote cast for the losing candidate in a given district. The efficiency gap is then calculated by subtracting all of one party's total unnecessary votes from the other party's total unnecessary votes, and dividing that difference by the total number of votes cast. The more unequal the numbers of unnecessary votes cast for each party, the further away from zero the efficiency gap will be. PlanScore provides a detailed explanation of efficiency gap here: https://planscore.campaignlegal.org/metrics/efficiencygap/. I calculated efficiency gap using PlanScore, as detailed above.

15. Partisan symmetry/partisan bias is the difference between 50% of the seats in a plan and the share of seats a party would expect to win on a given plan in a perfectly tied election (where each party received exactly 50% of the total votes cast). To calculate partisan symmetry/partisan

bias, the observed vote share in each district is shifted by the amount necessary to simulate a tied statewide election. The greater the difference between seat share in a hypothetical perfectly tied election and 50%, the greater level of partisan bias in the plan. PlanScore provides a detailed explanation of partisan symmetry/partisan bias here: https://planscore.campaignlegal.org/metrics/partisanbias/. I calculated partisan symmetry/partisan bias using PlanScore, as detailed above.

16. The plausible number of representatives elected comparison was derived by evaluating the plan according to the partisan lean calculated for each district by the PlanScore and DRA election composites. I counted each district as a performing district for whichever party was favored by the composite, and then added up the total number of performing districts for each party to come to the final totals. I calculated the plausible number of representatives elected comparison using both PlanScore and DRA, as detailed above.

17. The relative chances of electing a majority or supermajority was derived by evaluating the plan's performance under six different election scenarios and evaluating how many of these scenarios would elect a Republican or Democratic majority, or a Republican or Democratic supermajority, using the proposed Senate plan. I calculated these metrics using PlanScore, DRA, and Maptitude, as detailed above. The only scenario that was not calculated directly with PlanScore or DRA was the 2020 Chief Justice of the North Carolina Supreme Court race. The six scenarios are:

a. PlanScore composite

b. DRA composite

c. 2020 Presidential

d. 2020 Governor

e. 2016 Lieutenant Governor

f. 2020 Chief Justice of North Carolina Supreme Court

18. For the remedial enacted House Map, S.L. 2022-4, I followed the process outlined above to calculate additional metrics to aid in the Court's review of the proposed House plan.

Metric	**Score**
Mean-Median	1.4% R
Efficiency Gap	3.0% R
Partisan Symmetry (Partisan Bias)	2.9% R
Plausible Number of Representatives Elected Comparison	57D-63R / 58D-62R (DRA / PlanScore)
Relative Chances of Electing Majority (61) or Supermajority (72)	R Majority: 4/6 Scenarios D Majority: 1/6 Scenarios R Supermajority: 1/6 Scenarios D Supermajority: 0/6 Scenarios

19. For the remedial enacted Congressional Map, S.L. 2022-3, I followed the process outlined above in Paragraphs 4–14 to calculate additional metrics to aid in the Court's review of the proposed Congressional plan.

Metric	**Score**
Mean-Median	1.1% R
Efficiency Gap	6.4% R
Partisan Symmetry (Partisan Bias)	4.9% R
Plausible Number of Representatives Elected Comparison	6D-8R / 4D-10R (DRA / PlanScore)
Relative Chances of Electing Majority (8)	R Majority: 5/6 Scenarios

	D Majority: 1/6 Scenarios

Senate Alternative Map Metrics

20. Using the same methods described above, I generated the metrics for an alternative Senate plan that starts with S.L. 2022-2 as a base plan but incorporates districts from the following amendments that were tabled from the legislative process, which are available on the General Assembly website at https://www.ncleg.gov/BillLookUp/2021/S744:

a. Common Cause remedial Senate District 4 (submitted on February 18, 2022)

b. New Hanover (A2)[1]

c. Wake (A3)[2]

d. Mecklenburg (as reflected in A9)[3]

e. Cumberland (A4)[4]

f. Guilford (A5)[5]

g. Forsyth (A8)[6]

h. Buncombe (A7)[7]

21. Using the same process outlined above, I determined this map would have mean-median difference of 0.2% R, efficiency gap of 1.0% R, and partisan symmetry of 0.7% R.

House Alternative Map Metrics

22. Using the same process outlined above, I generated the metrics for an alternative House plan that starts with S.L. 2022-4 as a base plan and incorporated the Common Cause remedial

[1] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53740/0/S744-A-NBC-9432.
[2] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53738/0/S744-A-NBC-9430.
[3] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53720/0/S744-A-NBC-9411.
[4] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53718/0/S744-A-NBC-9410.
[5] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53726/0/S744-A-NBC-9417.
[6] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53743/0/S744-A-NBC-9435.
[7] Available at https://webservices.ncleg.gov/ViewBillDocument/2021/53723/0/S744-A-NBC-9414.

House District 10 (submitted on February 18, 2022). I determined this map would have mean-median difference of 1.2% R, efficiency gap of 2.6% R, and partisan symmetry of 2.5% R.

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

Executed this the 21st day of February, 2022.

Christopher Ketchie

Sworn and subscribed before me this the 21st day of February, 2022.

Talia Ray

Notary Public

Name: Talia Ray

My commission expires: 11/6/2024

TALIA RAY
My Commission Expires
NOTARY PUBLIC
November 6, 2024
MOORE COUNTY, NC