

COMPACTNESS REPORTS

Explanation of Senate Maps Comparison

The charts below provide compactness scores on two standard measurements: the Reock metric and the Area/Convex Hull metric. The Reock metric is a dispersion-based measure of compactness. The Reock score provides a way of evaluating the extent to which a district's shape is spread out from a central point. In other words, the Reock score measures the relationship between the area of a district and the area of the smallest circumscribing circle. For example, under this metric, a district that is a perfect circle would be very compact, while a district in the shape of a star would be less compact. Reock scores always fall between 0 and 1, with 1 being the most compact. For these reports, the Reock scores were obtained using the Maptitude software described at Tab B.¹

The Area/Convex Hull metric measures the ratio between the area of the district and the area of the minimum convex bounding polygon that can enclose the district. The measure ranges from 0 to 1, with a score of 1 representing the highest level of compactness. A circle, square, or any other shape with only convex angles has a score of 1. These Area/Convex Hull scores were obtained using ESRI software.

These charts evaluate each district's score on both of these measurements, and also provide overall map scores. The "Lowest Score" category shows the scores for the least compact district in each map; the "Highest Score" category shows the scores for the most compact district in each map; the "Mean" category contains the average score for the entire map.

¹ When this Court issued its March 9th opinion, the Coalition noticed some slight discrepancies between the Reock scores in the Court's opinion, which were derived from ESRI, and the Reock scores in the Coalition's filing, which were derived from Maptitude. The Coalition contacted both vendors about this issue. A technical staffer from ESRI Redistricting Online confirmed that ESRI was using an incorrect formula to calculate the Reock scores and stated that ESRI would contact this Court about this issue.

**Compactness of Legislature and Coalition
Senate Plans Summary**

	Coalition's SPUBS0178 Plan		Legislature's S9030 Plan	
	Reock	Convex Hull	Reock	Convex Hull
Lowest Score	0.20	0.43	0.23	0.43
Highest Score	0.63	0.94	0.60	0.92
Mean	0.43	0.76	0.41	0.76

Legislature's S9030 and Coalition's SPUBS0178 Senate Plans District-By-District Compactness Analysis					
District	Coalition's SPUBS0178 Plan			Legislature's S9030 Plan	
	Reock	Convex Hull		Reock	Convex Hull
1	0.45	0.79		0.46	0.79
2	0.44	0.80		0.43	0.80
3	0.34	0.76		0.34	0.76
4	0.49	0.70		0.49	0.69
5	0.47	0.75		0.47	0.75
6	0.37	0.71		0.47	0.78
7	0.54	0.74		0.45	0.78
8	0.43	0.76		0.24	0.73
9	0.42	0.69		0.41	0.64
10	0.41	0.75		0.57	0.92
11	0.46	0.74		0.40	0.65
12	0.45	0.71		0.41	0.74
13	0.30	0.75		0.42	0.79
14	0.33	0.71		0.27	0.64
15	0.49	0.84		0.41	0.75
16	0.43	0.69		0.44	0.84
17	0.42	0.75		0.38	0.71
18	0.44	0.73		0.37	0.69
19	0.20	0.46		0.23	0.45
20	0.55	0.85		0.55	0.83
21	0.51	0.78		0.38	0.71
22	0.53	0.82		0.39	0.66
23	0.34	0.66		0.33	0.67
24	0.44	0.74		0.53	0.84
25	0.36	0.82		0.56	0.89
26	0.48	0.78		0.32	0.77
27	0.58	0.94		0.54	0.89
28	0.39	0.80		0.40	0.89
29	0.63	0.94		0.44	0.90
30	0.56	0.85		0.58	0.87
31	0.34	0.69		0.34	0.70

Legislature's S9030 and Coalition's SPUBS0178 Senate Plans District-By-District Compactness Analysis					
District	Coalition's SPUBS0178 Plan			Legislature's S9030 Plan	
	Reock	Convex Hull		Reock	Convex Hull
32	0.41	0.80		0.23	0.83
33	0.34	0.83		0.30	0.64
34	0.28	0.67		0.29	0.83
35	0.34	0.77		0.28	0.72
36	0.55	0.78		0.60	0.83
37	0.35	0.84		0.41	0.90
38	0.57	0.91		0.60	0.87
39	0.24	0.43		0.23	0.43
40	0.33	0.67		0.29	0.69