

An Analysis of the 11/06/2012 Richland County General Election For the Legislative Delegation of Richland County

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Main Findings

About 90 of the 124 non-absentee precincts had fewer terminals for 2012 than for 2010. A total of 813 terminals appear in the data for 2010, but only 628 terminals appear in the data for 2012. (See Appendix A)

In 2010 there were 132 of 813 non-absentee terminals that closed after 7:30pm, but only nine of these were closed after 8:30pm and the latest was 9:26pm.

In 2012 there were 384 of 628 non-absentee terminals closed after 7:30pm, with 291 of these closing after 8:30pm and 62 closing after 11pm. The last of these was closed at 1:30am the morning of November 7.

In all, the data show 14784 of the 121206 non-absentee votes, more than 12% of the total, cast after 7pm. The detailed breakdown of votes by hour after 7pm is shown in Appendix D, with comparisons to 2010.

The election could only have been conducted in 12 hours under an absolutely perfect distribution of voter arrivals and terminal allocations.

Finally, we note that the average “last vote time” for a terminal still being used at 7:30pm was 9:45pm. The average voter in line at 7:30pm would still have had an additional wait of an hour and eight minutes before voting.

Summary

It has been widely reported that the election process on 11/06/2012 in Richland County did not go well and that extremely long lines, broken voting machines, etc., were more prevalent than in previous elections. The purpose of this analysis is to provide *quantitative* statements rather than anecdotal evidence regarding the election process and to compare the 2012 election with the 2010 general election.

I have obtained from the South Carolina State Election Commission the “audit data” for the general election of 11/6/2012. Following the 2010 election I wrote computer programs for analyzing the data from our ES&S election system, and I have upgraded the programs and run them on both the 2012 and 2010 election data. Because the current controversy surrounds the election *process*, I have

concentrated this report on what can be said about the process, especially such things as numbers of iVotronic terminals, numbers of votes per terminal, frequency of votes during the day, and numbers of votes cast after closing time.

Acknowledgment

I am grateful to the State Election Commission for being able to provide the data quickly so that this analysis can be done in time for the delegation's hearing.

Disclaimer

I have to announce up front that I make no claims that this report will be 100% correct. There isn't time to make sure that every detail is correct. Also, the crucial issue involves long lines and allocation of terminal resources, but the timestamps in the terminals can be incorrect. There may be a few terminals that look as if they are anomalous but in fact it is just that the time set in the terminal is wrong. There was one terminal set to 11/06/2014 and one to 11/06/2015, for example. I believe the number of such terminals whose data is thus misleading is no more than half a dozen, but this can't be determined without looking individually at the data rather than relying on the output of a computer program.

Personal

I am a computer science professor at the University of South Carolina, and I have lectured and published on the analysis of election data as part of my professional work. I have since 2004 been a member of the League of Women Voters of South Carolina and serving the League as a consultant regarding election technology. This work comes at no charge and my software is freely available to all. I have often assigned parts of this data processing as student assignments in my classes.

Introduction

The files used in my analysis are the following standard output files from the ES&S election system.

- EL30A – this is a “results” file that I use to get precinct names, number of registered voters, and number of ballots cast. Although I could extend the processing to compare my own vote counts in detail against the 30A results, I don't do this.
- EL68A – this is the “system” log. This file shows the time and serial numbers of the PEBs whose data is uploaded to the county master files, as well as the time and serial numbers of the memory cards when their data is uploaded. This file provides much of the verification that the hardware used during the election has all been accounted for after the election is over.
- EL155 – this is the actual cast vote record. Each vote cast in an iVotronic is recorded in detail (in a somewhat randomized order). This is the file I use to count votes.
- EL152 – this is the “event log” for each of the iVotronic terminals. This records the existence of votes cast, the opening and closing of the terminal,

collection of the totals, calibrations and re-calibrations, errors, and other events. Each event comes with a timestamp.

Timestamps:

On the one hand, one would like event timestamps to be reliable pieces of information. On the other hand, it would probably be disastrous for a fielded terminal not to be able to collect votes on election day simply because its internal timer was set to the wrong day. One would surmise it is for this reason that the timestamps do not affect the operation of the terminal. There was one terminal in Richland set to 11/06/2014, and one set to 11/06/2015. There was at least one terminal that was off by an hour at the beginning of election day (probably this was a Daylight Savings Time issue) and had its time reset to the correct time during the day. For this reason, timestamp processing is not perfect. I have attempted to check timestamp anomalies, but this is a manual process and I probably have not found all the exceptions. I do not think that the small number of anomalies has a significant effect on the analysis I provide here.

Analysis

The primary output of my software is an exceptions file, which in this case is named `richland_20121106_EXCEPTIONS.txt`. (The corresponding file for the 2010 data is named `richland2010_20101102_EXCEPTIONS.txt`, and this naming convention occurs throughout.) This file contains a list of the various exceptions to what would be “correct” data.

The first thing to note is that the 152 and the 155 files corroborate each other in terms of the vote count. There are 145861 votes in the 155 cast vote record, and there are the same number of “vote cast” events in the 152 file. This indicates that all the data has been collected from at least the terminals from which some data was collected.

The second grouping in the exceptions file concerns PEBs used for opening and closing terminals. The SCSEC protocol is that a single PEB is to be used for opening all terminals in a precinct and then used to close the terminals and collect vote totals at the end of the day. It was the failure to observe this protocol that led to some votes not being counted in the 2010 election.

In this case, although there are a few instances of a violation of the protocol, other records show that this error did not lead to the failure to count votes. One would assume that the election officials would look at these violations of protocol and either educate or replace, prior to the next election, the poll managers who were responsible.

At the end of the exceptions file I look at the time when the memory card data was collected into the county master file and the existence of any missing memory cards. In this case, all the cards were collected, as one would have expected given the scrutiny under which the votes were counted.

Summary Counts of Votes and Terminals by Precinct

The primary file that I produce that indicates the totals of numbers of votes is the richland_20111106_IvosAndPcts.txt file. This lists precincts, terminals in that precinct by serial number, and votes per terminal. I also have produced a line of output showing the number of terminals for each precinct with the number of votes. A comparison of 2010 against 2012 is Appendix A of this report.

What Appendix A shows is that about 90 of the 124 non-absentee precincts had fewer terminals for 2012 than for 2010. A total of 813 terminals appear in the data for 2010, but only 628 terminals appear in the data for 2012.

I say “about” because raw numbers can fail to tell the whole story. One could argue that Ward 8, for example, had more terminals than it needed in 2010 (based on the number of votes per terminal being very much lower than the county average) and that Sandlapper, although it shows 10 terminals in 2012, didn’t actually have 10 terminals most of the day for most of the day (see below where four terminals were opened at about 8pm in that precinct).

Opening, Closing, and Timing of Votes

Most important for the current discussion is the timing during the day of the opening and closing of terminals and the votes collected.

My software specifically excludes the 750+ and 850+ precincts (absentee, failsafe, provisional, etc.). This is because the absentee terminals are opened and closed all the time during absentee voting, and their collection of votes is not an election day event. I could have looked at the provisional/failsafe terminals, given that long lines were reported at county headquarters on election day, but I did not do that.

I show four terminals opened prior to 5:30am on 11/06/2012, in four different precincts. Three of these obviously were one hour off (again, daylight time?) and had their timers set forward an hour prior to being closed. The fourth terminal shows being opened at 13:25:24 on 11/05/2012 and then having its timer set immediately to 6:58am on 11/06/2012 before collecting votes as one would expect for the rest of the day.

There were twelve terminals that opened late. Four of these show being opened just before 8pm on 11/06/2012 in precinct 390 (Sandlapper), and one more was similarly opened after closing time in precinct 125 (Ward 25). Five of the twelve had timestamps set to 2014 when they opened, but the time of day (between 6 and 7am) would be correct.

It is the late closing times that tell the real story of this election. In 2010 there were 132 of 813 non-absentee terminals that closed after 7:30pm, but only nine of these were closed after 8:30pm and the latest was 9:26pm. In 2012 there were 384 of 628 terminals closed after 7:30pm, with 291 of these closing

after 8:30pm and 62 closing after 11pm. The last of these was closed at 1:30am the morning of November 7.

In all, the data show 14784 of the 121206 non-absentee votes, more than 12% of the total, cast after 7pm. The detailed breakdown of votes by hour after 7pm is shown in Appendix D, with comparisons to 2010.

The counts in the paragraph above do not include the fact that an additional 16 terminals were not closed until the middle of the day on November 7, one not until November 8, and three more not until November 9. These represent a different process problem from that of long lines at the polls.

I present in Appendix B a spreadsheet of the votes cast after closing time in 2010 and in 2012. Of all the numerical data that could be presented, this perhaps illustrates best what happened on November 6. For each precinct, the table has

- the number of votes cast in 2010
- the percent of votes cast in 2010 that were cast after 7pm
- the number of votes cast in 2012,
- the quotient of 2012 votes divided by 2010 votes in the precinct
- the percent of votes cast in 2012 that were cast after 7pm

I have put in bold face all percentages of late votes larger than 10% and have put those larger than 30% in red.

Disclaimer: The totals in Appendix B and Appendix D for late votes differ by six votes. I attribute this to my having computed the numbers in slightly different ways and not accounting properly for a timestamp anomaly in some terminal.

Votes per Terminal

Finally, we present the data of votes per terminal for 2010 for the counties for which electronic data is available. There are two counties with votes per terminal in the high 150 range. Richland was somewhat above average with 129 votes per terminal in 2010. But in Richland in the 2012 election just conducted, the average number of votes per terminal was 193, about 50% more votes per terminal than in 2010 and 25% larger than the high water marks anywhere in the state in 2010.

Duration of Voting Events

I am given to understand that one of the harder things to predict is the length of time needed for each voter. We do not have event log messages for the time when a terminal is opened for voting by an individual, so we cannot separate a voter's duration in the actual voting process from possible slack time with no one in line.

After closing, however, we ought to be able to assume that voting is a steady state activity, and thus the times between "vote cast" events on the terminals is a good

measure of the actual time spent for a voter to be voting, including the time spent by the poll manager opening the terminal, etc.

Appendix E is a very crude histogram of the time between “vote cast” events after closing time in Richland County, with times rounded to the nearest five second intervals. The 14,000 plus voters who cast votes after 7pm spent an average of just over three minutes and thirty seconds in walking to the voting booth, having the terminal opened for them, and casting their ballots. If we extrapolate from the late voter durations, we would have needed just over 600 terminals in steady state to have enough “vote minutes” in a 12-hour period of election day. When one discounts from the 628 total in the data for terminals with only a very small number of votes collected, the 600 terminal count is about right.

What this means in round numbers is that the allocation of terminals to the election could have been completed in the 12 hours of election day if voters had arrived at precincts exactly five voters per precinct every 3-1/2 minutes nonstop throughout the day. Any bursty arrivals (the morning, noon, and evening rush, for example) would necessarily have caused lines to form. Any underallocation of terminals to precincts would have caused lines to form. **The election could only have been conducted in 12 hours under an absolutely perfect distribution of voter arrivals and terminal allocations.**

Finally, we note that the average “last vote time” for a terminal still being used at 7:30pm was 9:45pm. The average voter in line at 7:30pm would still have had an additional wait of an hour and eight minutes before voting.

Appendix A -- Votes by terminal by precinct, 2010 and 2012

2010	6	WARD_#1 0101	546:	87	95	91	84	86	103		
2012	4	WARD_1 0101	659:	199	114	187	159				
2010	3	WARD_#2 0102	227:	70	85	72					
2012	4	WARD_2 0102	342:	75	89	111	67				
2010	4	WARD_#3 0103	612:	154	154	157	147				
2012	4	WARD_3 0103	841:	87	253	256	245				
2010	5	WARD_#4 0104	652:	135	127	124	132	134			
2012	4	WARD_4 0104	704:	249	88	119	248				
2010	4	WARD_#5 0105	325:	80	79	96	70				
2012	3	WARD_5 0105	582:	185	192	205					
2010	5	WARD_#6 0106	655:	132	121	127	138	137			
2012	4	WARD_6 0106	718:	186	178	168	186				
2010	6	WARD_#7 0107	472:	86	86	67	52	93	88		
2012	4	WARD_7 0107	611:	195	29	200	187				
2010	10	WARD_#8 0108	432:	50	23	19	72	34	37	57	28
59	53										
2012	5	WARD_8 0108	1143:	226	231	231	235	220			
2010	5	WARD_#9 0109	440:	108	101	53	101	77			
2012	5	WARD_9 0109	660:	151	92	166	134	117			
2010	5	WARD_#10 0110	731:	146	140	149	142	154			
2012	3	WARD_10 0110	781:	237	269	275					
2010	5	WARD_#11 0111	530:	107	113	93	110	107			
2012	3	WARD_11 0111	690:	244	248	198					
2010	6	WARD_#12 0112	715:	121	122	118	118	124	112		
2012	4	WARD_12 0112	808:	211	219	222	156				
2010	7	WARD_#13 0113	937:	134	120	126	141	145	132	139	
2012	4	WARD_13 0113	1068:	277	262	274	255				
2010	6	WARD_#14 0114	855:	143	140	146	136	152	138		
2012	5	WARD_14 0114	873:	247	150	118	119	239			
2010	3	WARD_#15 0115	587:	204	189	194					
2012	3	WARD_15 0115	595:	202	212	181					
2010	5	WARD_#16 0116	769:	148	163	144	149	165			
2012	3	WARD_16 0116	763:	261	253	249					
2010	6	WARD_#17 0117	830:	156	87	153	143	141	150		
2012	3	WARD_17 0117	894:	308	285	301					

2010	5	WARD_#18	0118	500:	111	97	110	82	100			
2012	3	WARD_18	0118	663:	209	218	236					
2010	5	WARD_#19	0119	492:	116	111	54	102	109			
2012	3	WARD_19	0119	674:	218	230	226					
2010	5	WARD_#20	0120	740:	158	153	134	144	151			
2012	6	WARD_20	0120	864:	170	151	102	85	183	173		
2010	6	WARD_#21	0121	694:	121	101	130	104	112	126		
2012	5	WARD_21	0121	826:	232	68	148	157	221			
2010	6	WARD_#22	0122	638:	113	83	112	119	108	103		
2012	4	WARD_22	0122	832:	224	209	188	211				
2010	4	WARD_#23	0123	478:	109	138	89	142				
2012	3	WARD_23	0123	569:	198	187	184					
2010	4	WARD_#24	0124	539:	130	135	140	134				
2012	3	WARD_24	0124	583:	192	199	192					
2010	5	WARD_#25	0125	905:	187	185	180	174	179			
2012	5	WARD_25	0125	875:	327	319	189	20	20			
2010	5	WARD_#26	0126	360:	76	53	69	83	79			
2012	4	WARD_26	0126	607:	153	163	127	164				
2010	5	WARD_#29	0129	588:	122	119	109	112	126			
2012	3	WARD_29	0129	719:	255	255	209					
2010	2	WARD_#30	0130	287:	134	153						
2012	3	WARD_30	0130	386:	140	132	114					
2010	3	WARD_#31	0131	392:	141	129	122					
2012	4	WARD_31	0131	545:	178	154	198	15				
2010	3	WARD_#32	0132	410:	159	166	85					
2012	3	WARD_32	0132	442:	147	141	154					
2010	4	WARD_#33	0133	424:	127	124	125	48				
2012	3	WARD_33	0133	516:	168	182	166					
2010	4	WARD_#34	0134	555:	150	144	124	137				
2012	4	WARD_34	0134	577:	216	158	179	24				
2010	6	ARCADIA	0301	774:	127	141	127	130	124	125		
2012	4	ARCADIA	0301	853:	141	226	236	250				
2010	2	ARDINCAPLE	0302	195:	97	98						
2012	3	ARCINCAPLE	0302	247:	86	98	63					
2010	9	BALLENTINE	0303	1436:	171	168	85	177	165	163	165	168
174												
2012	8	BALLENTINE	0303	1806:	217	237	222	239	232	222	201	236

2010	4	FAIRWOLD	0320	462:	108	120	118	116				
2012	3	FAIRWOLD	0320	484:	171	161	152					
2010	5	E_FOREST_ACRES	0321	622:	125	120	125	130	122			
2012	3	E_FOREST_ACRES	0321	680:	234	231	215					
2010	5	N_FOREST_ACRES	0322	646:	136	136	128	128	118			
2012	5	N_FOREST_ACRES	0322	737:	210	169	158	191	9			
2010	5	S_FOREST_ACRES	0323	770:	152	147	165	152	154			
2012	4	S_FOREST_ACRES	0323	836:	220	206	196	214				
2010	7	FRIARSGATE_#1	0324	927:	139	139	126	127	132	135	129	
2012	3	FRIARSGATE_1	0324	944:	274	354	316					
2010	6	FRIARSGATE_#2	0325	753:	132	122	124	128	119	128		
2012	4	FRIARSGATE_2	0325	918:	226	246	229	217				
2010	5	OLD_FRIARSGATE	0326	654:	131	134	126	122	141			
2012	3	OLD_FRIARSGATE	0326	661:	276	120	265					
2010	7	GADSDEN	0327	1049:	164	175	175	152	160	145	78	
2012	4	GADSDEN	0327	1113:	303	291	217	302				
2010	3	GARNERS	0328	447:	157	139	151					
2012	3	GARNERS	0328	518:	170	161	187					
2010	7	GREENVIEW	0329	970:	138	124	148	125	149	146	140	
2012	7	GREENVIEW	0329	978:	172	164	82	163	149	153	95	
2010	7	GREGG_PARK	0330	739:	126	43	109	109	118	121	113	
2012	4	GREGG_PARK	0330	900:	230	228	224	218				
2010	7	HAMPTON	0331	710:	102	108	98	93	96	112	101	
2012	4	HAMPTON	0331	858:	248	228	262	120				
2010	8	HARBISON_#1	0332	878:	107	114	116	113	97	116	116	99
2012	6	HARBISON_1	0332	1126:	207	236	222	20	225	216		
2010	9	HOPKINS	0333	1332:	153	141	146	151	158	151	141	148
143												
2012	5	HOPKINS	0333	1224:	273	261	233	232	225			
2010	8	HORRELL_HILL	0334	1007:	131	115	134	145	147	136	70	129
2012	6	HORRELL_HILL	0334	1215:	168	217	199	206	211	214		
2010	2	HUNTING_CREEK	0335	283:	141	142						
2012	3	HUNTING_CREEK	0335	298:	107	27	164					
2010	10	KEELS	0336	1144:	134	128	129	144	119	119	3	127
114	127											
2012	6	KEELS	0336	1213:	223	181	200	217	174	218		

2010	7	KEENAN	0337	848:	117	139	130	117	113	117	115	
2012	4	KEENAN	0337	842:	201	203	210	228				
2010	4	KILLIAN	0338	604:	146	155	150	153				
2012	3	KILLIAN	0338	752:	265	263	224					
2010	9	KINGSWOOD	0339	1221:	144	138	130	138	126	132	141	127
145												
2012	6	KINGSWOOD	0339	1424:	257	250	248	168	243	258		
2010	8	LINCOLNSHIRE	0340	997:	125	132	103	118	131	133	128	127
2012	5	LINCOLNSHIRE	0340	1195:	259	228	235	251	222			
2010	10	LONGCREEK	0341	1683:	171	173	176	162	163	165	166	166
162	179											
2012	10	LONGCREEK	0341	1864:	4	216	152	242	238	239	244	47
239	243											
2010	8	LYKESLAND	0342	1189:	151	140	143	147	158	159	145	146
2012	6	LYKESLAND	0342	1274:	256	256	232	75	207	248		
2010	3	MCENTIRE	0343	403:	139	141	123					
2012	3	MCENTIRE	0343	485:	161	154	170					
2010	7	MEADOWFIELD	0344	957:	142	137	145	112	132	142	147	
2012	7	MEADOWFIELD	0344	940:	77	62	13	245	226	61	256	
2010	8	MEADOWLAKE	0345	1098:	140	129	141	112	148	150	141	137
2012	6	MEADOWLAKE	0345	1147:	219	217	86	207	234	184		
2010	9	MIDWAY	0346	1113:	139	131	109	94	144	85	139	135
137												
2012	7	MIDWAY	0346	1283:	209	201	20	226	201	200	226	
2010	6	MILL_CREEK	0347	739:	135	134	68	142	123	137		
2012	6	MILL_CREEK	0347	978:	56	201	223	215	49	234		
2010	7	MONTICELLO	0348	995:	141	142	116	144	145	149	158	
2012	7	MONTICELLO	0348	1142:	211	217	4	184	249	257	20	
2010	10	NORTH_SPRINGS_#1	0349	1523:	151	150	140	152	159	157	152	161
159	142											
2012	8	NORTH_SPRINGS_1	0349	1554:	224	223	148	233	201	117	209	199
2010	10	NORTH_SPRINGS_#2	0350	1340:	142	119	134	149	113	140	128	142
134	139											
2012	8	NORTH_SPRINGS_2	0350	1377:	175	200	192	204	28	191	181	206
2010	4	OAKWOOD	0351	506:	124	128	119	135				
2012	3	OAKWOOD	0351	591:	188	200	203					
2010	6	OLYMPIA	0352	654:	101	108	106	115	121	103		
2012	6	OLYMPIA	0352	997:	134	117	214	192	141	199		

2010	16					PARKWAY_#1	0353	2395:	168	144	145	137	158	151	158	149
141	146	152	145	154	149	148	150									
2012	12					PARKWAY_1	0353	2408:	222	41	234	185	208	218	203	199
221	233	231	213													
2010	7					PENNINGTON	0354	1254:	173	185	177	186	159	190	184	
2012	6					PENNINGTON	0354	1250:	275	247	268	142	41	277		
2010	9					PINE_LAKES	0355	1124:	132	117	121	140	121	119	119	124
131																
2012	8					PINE_LAKES	0355	1228:	177	14	58	222	207	194	144	212
2010	5					PINEWOOD	0356	708:	142	143	143	135	145			
2012	4					PINEWOOD	0356	855:	78	271	287	219				
2010	15					POLO_ROAD	0357	1817:	125	102	121	128	124	131	127	134
133	117	121	129	114	124	87										
2012	10					POLO_ROAD	0357	2254:	231	240	217	229	246	202	225	213
215	236															
2010	8					PONTIAC	0358	1186:	154	150	148	141	146	149	144	154
2012	8					PONTIAC	0358	1304:	251	156	203	122	127	52	129	264
2010	14					RICE_CREEK	0359	1828:	134	134	132	139	139	133	129	126
127	106	137	123	131	138											
2012	7					RICE_CREEK	0359	1928:	288	266	287	273	272	290	252	
2010	3					RIDGEWOOD	0360	331:	118	97	116					
2012	3					RIDGEWOOD	0360	403:	129	160	114					
2010	12					RIVER_SPRINGS	0361	1770:	162	147	153	145	145	152	136	145
138	156	139	152													
2012	10					RIVER_SPRINGS	0361	1951:	223	219	175	208	183	163	198	184
209	189															
2010	5					RIVERSIDE	0362	405:	93	78	75	87	72			
2012	4					RIVERSIDE	0362	562:	165	153	98	146				
2010	10					RIVERWALK	0363	1373:	142	134	140	139	149	92	144	143
138	152															
2012	7					RIVERWALK	0363	1358:	73	272	264	249	159	102	239	
2010	5					SATCHELFORD	0364	724:	145	149	143	141	146			
2012	4					SATCHELFORD	0364	816:	199	205	204	208				
2010	4					SKYLAND	0365	367:	104	92	68	103				
2012	2					SKYLAND	0365	554:	285	269						
2010	6					SOUTH_BELTLINE	0366	554:	105	107	87	96	60	99		
2012	3					SOUTH_BELTLINE	0366	720:	235	252	233					
2010	8					SPRING_VALLEY	0367	1154:	142	142	143	143	150	148	138	148
2012	6					SPRING_VALLEY	0367	1229:	202	207	196	217	200	207		

2010	12		SPRINGVILLE 0368	1791:	149	154	142	127	161	134	149	164
156	141	159	155									
2012	10		SPRINGVILLE 0368	2186:	209	226	234	230	224	210	228	207
209	209											
2010	5		ST_ANDREWS 0369	489:	107	103	79	100	100			
2012	3		ST_ANDREWS 0369	639:	211	216	212					
2010	4		TRENHOLM_ROAD 0370	521:	130	130	127	134				
2012	3		TRENHOLM_ROAD 0370	586:	201	192	193					
2010	8		VALHALLA 0371	1089:	137	134	145	143	140	101	148	141
2012	6		VALHALLA 0371	1249:	204	224	210	166	220	225		
2010	7		VALLEY_STATE_PARK 0372	861:	120	130	118	127	124	122	120	
2012	6		VALLEY_STATE_PARK 0372	1155:	183	193	206	196	194	183		
2010	4		WALDEN 0373	335:	72	76	99	88				
2012	3		WALDEN 0373	455:	156	139	160					
2010	6		WESTMINSTER 0374	647:	102	113	113	111	104	104		
2012	4		WESTMINISTER 0374	835:	223	207	220	185				
2010	6		WHITEWELL 0375	547:	105	91	72	80	96	103		
2012	4		WHITEWELL 0375	835:	212	224	198	201				
2010	9		WILDEWOOD 0376	1297:	155	142	139	147	159	138	133	141
143												
2012	5		WILDEWOOD 0376	1237:	264	270	264	168	271			
2010	9		WOODFIELD 0377	1063:	126	114	126	122	114	119	115	114
113												
2012	9		WOODFIELD 0377	1370:	161	72	170	187	187	15	197	192
189												
2010	8		WOODLANDS 0378	1289:	165	149	157	149	166	169	164	170
2012	6		WOODLANDS 0378	1288:	73	294	175	288	193	265		
2010	5		BLYTHEWOOD_#3 0379	639:	134	117	128	132	128			
2012	4		BLYTHEWOOD_3 0379	873:	213	220	219	221				
2010	10		DUTCH_FORK_#2 0380	1466:	146	141	160	144	156	83	170	150
150	166											
2012	7		DUTCH_FORK_#2 0380	1446:	299	131	117	306	127	145	321	
2010	5		HARBISON_#2 0381	584:	118	127	119	107	113			
2012	3		HARBISON_2 0381	638:	218	201	219					
2010	3		KELLY_MILL 0382	416:	131	152	133					
2012	3		KELLY_MILL 0382	618:	200	197	221					
2010	8		LAKE_CAROLINA 0383	1059:	128	138	122	131	133	136	136	135
2012	5		LAKE_CAROLINA 0383	1288:	242	263	256	255	272			

1615 1444 2064

2012 11

1615 1444 2064

FAILSAFE_3 0852

110: 496 2036 1377 1806 1466 1604 1624 1610

Appendix B -- Late votes, 2010 and 2012

	2010 Votes	2010 Late	2012 Votes	2012/2010	2012 Late
WARD_#1 0101	546	0.366	659	1.21	0.152
WARD_#2 0102	227	1.322	342	1.51	0.000
WARD_#3 0103	612	2.124	841	1.37	0.595
WARD_#4 0104	652	0.153	704	1.08	2.841
WARD_#5 0105	325	0.923	582	1.79	2.921
WARD_#6 0106	655	1.221	718	1.10	0.000
WARD_#7 0107	472	1.483	611	1.29	13.748
WARD_#8 0108	432	0.694	1143	2.65	20.385
WARD_#9 0109	440	0.682	660	1.50	0.303
WARD_#10 0110	731	0.410	781	1.07	1.536
WARD_#11 0111	530	0.755	690	1.30	11.739
WARD_#12 0112	715	0.140	808	1.13	0.371
WARD_#13 0113	937	0.854	1068	1.14	8.333
WARD_#14 0114	855	0.702	873	1.02	3.322
WARD_#15 0115	587	0.852	595	1.01	0.000
WARD_#16 0116	769	0.260	763	0.99	0.131
WARD_#17 0117	830	0.361	894	1.08	6.935
WARD_#18 0118	500	0.400	663	1.33	15.385
WARD_#19 0119	492	0.203	674	1.37	0.000
WARD_#20 0120	740	0.946	864	1.17	0.000
WARD_#21 0121	694	0.576	826	1.19	20.702
WARD_#22 0122	638	0.470	832	1.30	11.058
WARD_#23 0123	478	0.418	569	1.19	0.000
WARD_#24 0124	539	0.186	583	1.08	0.172
WARD_#25 0125	905	0.331	875	0.97	17.600
WARD_#26 0126	360	1.111	607	1.69	0.000
WARD_#29 0129	588	0.000	719	1.22	13.491
WARD_#30 0130	287	0.697	386	1.34	0.259
WARD_#31 0131	392	1.276	545	1.39	0.000
WARD_#32 0132	410	0.244	442	1.08	0.000
WARD_#33 0133	424	1.179	516	1.22	0.000
WARD_#34 0134	555	0.000	577	1.04	8.319
ARCADIA 0301	774	0.000	853	1.10	0.000
ARDINCAPLE 0302	195	0.000	247	1.27	0.000
BALLENTINE 0303	1436	1.671	1806	1.26	0.055
BEATTY_ROAD 0304	293	2.048	509	1.74	0.000
BLUFF 0305	1026	0.000	1154	1.12	0.000
BLYTHEWOOD_#1 0306	545	0.734	678	1.24	0.590
BLYTHEWOOD_#2 0307	819	6.227	1060	1.29	0.000
BRANDON 0308	1235	3.077	1577	1.28	9.258
BRIARWOOD 0309	1083	4.247	1306	1.21	0.000
CAUGHMAN_ROAD 0310	852	11.854	937	1.10	0.000
COLLEGE_PLACE 0311	713	1.543	891	1.25	3.928
COOPER 0312	673	0.149	697	1.04	1.291
DENNYSIDE 0313	390	0.256	479	1.23	0.000
DENTSVILLE 0314	1079	3.892	1080	1.00	19.444

Appendix B -- Late votes, 2010 and 2012

DUTCH_FORK_#1 0315	1111	0.270	1395	1.26	9.677
EASTOVER 0316	1172	0.597	1421	1.21	14.638
EDGEWOOD 0317	761	3.285	967	1.27	20.786
ESTATES 0318	1928	4.149	2229	1.16	21.714
FAIRLAWN 0319	1284	2.960	1402	1.09	17.475
FAIRWOLD 0320	462	1.948	484	1.05	0.207
E_FOREST_ACRES 0321	622	0.161	680	1.09	0.000
N_FOREST_ACRES 0322	646	0.619	737	1.14	3.392
S_FOREST_ACRES 0323	770	2.727	836	1.09	0.000
FRIARSGATE_#1 0324	927	6.472	944	1.02	32.733
FRIARSGATE_#2 0325	753	1.594	918	1.22	7.190
OLD_FRIARSGATE 0326	654	0.917	661	1.01	21.180
GADSDEN 0327	1049	1.144	1113	1.06	31.806
GARNERS 0328	447	2.013	518	1.16	1.351
GREENVIEW 0329	970	0.309	978	1.01	0.102
GREGG_PARK 0330	739	0.135	900	1.22	2.778
HAMPTON 0331	710	0.282	858	1.21	9.907
HARBISON_#1 0332	878	0.683	1126	1.28	6.661
HOPKINS 0333	1332	0.976	1224	0.92	23.284
HORRELL_HILL 0334	1007	0.497	1215	1.21	1.070
HUNTING_CREEK 0335	283	0.353	298	1.05	0.336
KEELS 0336	1144	4.108	1213	1.06	35.779
KEENAN 0337	848	0.825	842	0.99	20.546
KILLIAN 0338	604	0.662	752	1.25	10.771
KINGSWOOD 0339	1221	1.884	1424	1.17	18.961
LINCOLNSHIRE 0340	997	2.307	1195	1.20	11.548
LONGCREEK 0341	1683	2.258	1864	1.11	14.539
LYKESLAND 0342	1189	2.523	1274	1.07	17.661
MCENTIRE 0343	403	0.248	485	1.20	0.000
MEADOWFIELD 0344	957	0.418	940	0.98	13.617
MEADOWLAKE 0345	1098	1.730	1147	1.04	8.806
MIDWAY 0346	1113	2.965	1283	1.15	17.927
MILL_CREEK 0347	739	0.000	978	1.32	17.996
MONTICELLO 0348	995	2.412	1142	1.15	19.352
NORTH_SPRINGS_#1 0349	1523	5.384	1554	1.02	14.221
NORTH_SPRINGS_#2 0350	1340	0.000	1377	1.03	14.379
OAKWOOD 0351	506	0.000	591	1.17	0.000
OLYMPIA 0352	654	0.000	997	1.52	7.121
PARKWAY_#1 0353	2395	5.219	2408	1.01	29.651
PENNINGTON 0354	1254	8.373	1250	1.00	18.800
PINE_LAKES 0355	1124	2.936	1228	1.09	26.059
PINEWOOD 0356	708	3.672	855	1.21	26.082
POLO_ROAD 0357	1817	1.211	2254	1.24	11.934
PONTIAC 0358	1186	0.759	1304	1.10	31.825
RICE_CREEK 0359	1828	3.665	1928	1.05	28.164
RIDGEWOOD 0360	331	0.906	403	1.22	0.248
RIVER_SPRINGS 0361	1770	1.582	1951	1.10	12.096

Appendix B -- Late votes, 2010 and 2012

RIVERSIDE 0362	405	0.247	562	1.39	0.178
RIVERWALK 0363	1373	2.185	1358	0.99	27.614
SATCHELFORD 0364	724	0.276	816	1.13	0.000
SKYLAND 0365	367	0.000	554	1.51	10.469
SOUTH_BELTLINE 0366	554	0.361	720	1.30	15.139
SPRING_VALLEY 0367	1154	0.173	1229	1.06	7.079
SPRINGVILLE 0368	1791	1.117	2186	1.22	0.046
ST_ANDREWS 0369	489	0.204	639	1.31	1.408
TRENHOLM_ROAD 0370	521	0.000	586	1.12	0.000
VALHALLA 0371	1089	0.643	1249	1.15	1.121
VALLEY_STATE_PARK 0372	861	5.923	1155	1.34	5.714
WALDEN 0373	335	1.493	455	1.36	9.011
WESTMINSTER 0374	647	1.855	835	1.29	7.665
WHITEWELL 0375	547	0.914	835	1.53	6.707
WILDEWOOD 0376	1297	0.000	1237	0.95	25.061
WOODFIELD 0377	1063	0.847	1370	1.29	5.036
WOODLANDS 0378	1289	0.155	1288	1.00	14.053
BLYTHEWOOD_#3 0379	639	0.782	873	1.37	1.604
DUTCH_FORK_#2 0380	1466	3.411	1446	0.99	31.743
HARBISON_#2 0381	584	0.514	638	1.09	9.091
KELLY_MILL 0382	416	0.962	618	1.49	4.854
LAKE_CAROLINA 0383	1059	0.755	1288	1.22	17.624
OAK_POINTE 0384	1447	1.866	1612	1.11	17.308
PARKRIDGE 0385	291	1.718	467	1.60	0.214
PARKWAY_#2 0386	1222	3.764	1351	1.11	25.167
PINE_GROVE 0387	737	3.121	814	1.10	27.027
RIDGE_VIEW 0388	1843	3.690	1932	1.05	29.037
ROUND_TOP 0389	320	0.313	392	1.23	0.255
SANDLAPPER 0390	1166	0.000	1578	1.35	32.953
SPRING_HILL 0391	669	3.587	813	1.22	0.000
SPRING_VALLEY_WEST 0392	1177	1.274	1083	0.92	25.023
	104904		121206	1.16	

Appendix C

Votes per Terminal, 2010 General Election, by County

Hampton	83.774
Marlboro	85.085
Greenwood	96.709
Marion	97.000
Allendale	97.261
Colleton	98.891
Dillon	99.704
Cherokee	100.869
Union	101.233
Barnwell	102.155
Chester	102.238
Laurens	110.836
Aiken	111.259
Bamberg	111.650
Darlington	114.817
Horry	115.754
Abbeville	116.268
Pickens	117.371
Edgefield	117.582
McCormick	118.167
Lee	119.140
Saluda	120.224
Chesterfield	123.417
Newberry	123.787
Greenville	123.813
Sumter	125.169
Calhoun	125.220
Florence	125.232
York	126.185
Anderson	126.388
Lexington	126.731
Richland	129.225
Fairfield	130.270
Kershaw	133.319
Beaufort	134.657
Georgetown	135.234
Oconee	136.103
Dorchester	138.458
Clarendon	140.164
Jasper	140.564

Spartanburg	156.351
Berkeley	157.496

Appendix D
Late Votes by Hour after 7pm

	2010	2012
7pm - 8pm	1888	6297
8pm - 9pm	43	4544
9pm - 10pm		2520
10pm - 11pm		1145
11pm - 12M		255
12M - 1am		29

Appendix E
 CRUDE HISTOGRAM OF VOTING TIMES AFTER 7PM
 COUNT MINS SECS

COUNT	MINS	SECS	
0	0	50	:
0	0	55	:
1	1	0	: *
1	1	5	: *
2	1	10	: **
3	1	15	: ***
3	1	20	: ***
5	1	25	: *****
6	1	30	: *****
10	1	35	: *****
13	1	40	: *****
15	1	45	: *****
20	1	50	: *****
22	1	55	: *****
23	2	0	: *****
31	2	5	: *****
32	2	10	: *****
42	2	15	: *****
42	2	20	: *****
45	2	25	: *****
50	2	30	: *****
52	2	35	: *****
45	2	40	: *****
50	2	45	: *****
46	2	50	: *****
45	2	55	: *****
44	3	0	: *****
44	3	5	: *****
46	3	10	: *****
41	3	15	: *****
37	3	20	: *****
41	3	25	: *****
36	3	30	: *****
34	3	35	: *****
33	3	40	: *****
29	3	45	: *****
27	3	50	: *****
29	3	55	: *****
24	4	0	: *****
26	4	5	: *****
21	4	10	: *****
22	4	15	: *****
17	4	20	: *****
19	4	25	: *****
17	4	30	: *****
15	4	35	: *****
14	4	40	: *****
15	4	45	: *****
12	4	50	: *****
11	4	55	: *****
11	5	0	: *****

9 5 5 : *****
9 5 10 : *****
8 5 15 : *****
8 5 20 : *****
9 5 25 : *****
7 5 30 : *****
7 5 35 : *****
5 5 40 : *****
5 5 45 : *****
6 5 50 : *****
5 5 55 : *****
5 6 0 : *****
5 6 5 : *****
4 6 10 : *****
4 6 15 : *****
3 6 20 : *****
4 6 25 : *****
3 6 30 : *****
3 6 35 : *****
3 6 40 : *****
2 6 45 : *****
2 6 50 : *****
2 6 55 : *****
2 7 0 : *****
1 7 5 : *****
2 7 10 : *****
1 7 15 : *****
2 7 20 : *****
1 7 25 : *****
1 7 30 : *****
1 7 35 : *****
1 7 40 : *****
1 7 45 : *****
0 7 50 : *****
1 7 55 : *****
1 8 0 : *****
1 8 5 : *****
1 8 10 : *****
1 8 15 : *****
1 8 20 : *****
0 8 25 : *****
1 8 30 : *****
1 8 35 : *****
0 8 40 : *****
1 8 45 : *****
0 8 50 : *****
1 8 55 : *****
0 9 0 : *****
0 9 5 : *****
0 9 10 : *****
1 9 15 : *****
0 9 20 : *****
1 9 25 : *****
1 9 30 : *****

1 9 35 : *
1 9 40 : *
1 9 45 : *
0 9 55 :
22 10 0 : *****