

ACORN (CSL) Research Project

An Analysis on the Locations of Polling Stations in Municipal Elections in Ottawa

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Topic:

Through correspondence with the City of Ottawa, it was suggested to ACORN--by the individual responsible for administering polling station locations--that the city uses voter turnout rates as the primary criterion for where to locate polling stations. This is extremely problematic, for it goes against democratic principles for voting to be made more convenient to those who more regularly exercise that democratic right; instead, the more democratic criterion for the location of polling stations would, of course, be based on population density.

Therefore, we have decided to discover whether this rationality is, in fact, operating in the decisions of where to locate polling stations during elections. That is to say, that we will attempt to discover whether there is a relationship between polling station locations and voter turnout. Aside from it being undemocratic to base the location of polling stations on voter turnout rates, it is also likely to asymmetrically affect particular groups of people within an electorate. For example, low-income individuals, who are known to be less likely to vote (Coulson 1999). Furthermore, it is likely that closing polling stations where there is lower voter turnout will either reinforce low voter turnout, or worse, exacerbate it. Ultimately, if the stated criterion of voter turnout is indeed determining the locations of polling stations, the City of Ottawa would, in effect, be making it harder for those already disenchanted by politics to vote.

Statistically uncovering whether this rationale is truly at play will determine whether actions need to be undertaken to remedy this undemocratic situation; moreover, if this rationale is at play, and it can further be shown that it is negatively affecting voter turnout, then this makes the case even stronger for action to be taken. At present, there is no bylaw in Ottawa that regulates how the locations of polling stations are determined. However, if it is shown that voter turnout rates are the criterion that the City of Ottawa is using to determine the locations of polling stations, then this makes a strong case

for an amendment to be made to the bylaws of the city. Ideally, the law would dictate that population density shall determine the location of polling stations, for this would be in keeping with basic democratic principles.

Research Hypothesis:

Voter turnout is a criterion that the City of Ottawa is using to determine where to locate polling stations in municipal elections. Decreased voter turnout will result in a decrease in polling stations in each ward.

Literature Review:

Distance, Turnout, and the Convenience of Voting

This article examines how physical distance from polling stations affects political participation. The research calculates distances between the permanent residence of voters and their respective precinct in Clark County, NV for the 2002 midterm election. The research uses cost-benefit analyses of voting to investigate if the costs of voting (including costs associated with travelling and distance) are worth the benefits. The results demonstrate that there is a positive correlation between the distance voters have to travel and voter turnout. This article reinforces our hypothesis that there will be a positive correlation between the distance of polling stations from voters and voter turnout.

Canada Elections Act

The Canada Elections Act is the primary piece of legislature that is of interest to the research project. The elements of the act that are of importance are: “Establishment of Polling Stations” as an Elections Officer randomly chooses the location for polling stations; “Multiple Polling Stations” as it mentions the possibility of adding polling stations where there are voters; “Level Access” as this is subject to discretion whether a polling station is accessible and that an Election Officer has the authority to move polling station to an inaccessible location. This act provides our research with the logic of how polling

stations are assigned in Ottawa.

Location, Location, Location: Precinct Placement and the Costs of Voting

The research conducted in this article calculates the distance between resident density and polling stations. The study found that slight movements in distance of the polling stations can have a negative effect on voter turnout and that moving a polling station can impact a voter's decision on whether or not to vote. This reinforces the hypothesis that there will be a decrease in voter turnout with the movement of polling stations to further distances.

Voter Turnout: A Case Study of Scarborough–Rouge River

This article investigates the reason for the drop in national voter turnout in the 40th general election. Particularly voter turnout in the riding of Scarborough–Rouge River dropped to an unprecedented low of 47.5%, the lowest in Toronto and seventeenth lowest in the country.

This article found that the further away a polling station is located, the less likely a voter will participate. Also, distance from polling stations affects the urban population more than the rural population because of a greater reliance on public transportation. Furthermore, new migrants are resistant to vote if the polling station is located outside their community. This directly relates to our research because the majority of the variables discussed are related to the six low income neighbourhoods located in Ottawa. These neighbourhoods being located in an urban setting and the demographic of these areas.

2012's Newest Voter Suppression Trend: Close Polling Places, Don't Tell Voters

This article discusses cutbacks on polling stations in American states which are particularly affecting low income and minority neighbourhoods. One study shows a county which was 1.4 to 3.2 percentage points below the state average in 1998, 2002 and 2006 elections, but in 2010, after the polling station

closures, voting in the same county was 7.4 percentage points below the average. This reinforces the notion that closing polling stations and relocating them will affect voter turnout rate in those areas.

Political Participation and the Accessibility of the Ballot Box

The article examines how the geography and placement of polling stations affect voter turnout. Gimpel and Schuknecht find that precincts where polling stations are not as accessible to their underlying populations will exhibit lower voter turnout. This is due to the fact that commuting to and from precinct locations can be burdensome on potential voters. Given these findings, the article is crucial to our research as it provides a central premise implicit in our thesis which is that voter turnout is impacted by the number of polling stations in a neighbourhood. Consequently, we must empirically determine whether or not polling stations in lower income neighbourhoods have decreased. Once this is determined, we can validate the research hypothesis (or the null hypothesis).

The Effects of Density and Urban Residence on Voter Turnout

The hypothesis in question in the article is whether high population density and urbaneness have a decreasing effect on the likelihood of voting by persons living under such conditions. Preuss concludes that there is some degree of unwillingness or inability to vote in urban areas and in other areas of high population density. These are relevant for our study, as one of our premises is that there are lower voter turnouts in lower-income areas when compared to suburban and rural areas, which is what this article concedes.

Quantitative Method:

This report will use aggregate data collected from the City of Ottawa. The data details the voter turnout in five municipal wards in which there are low-income communities--communities where low voter turnout is likely--for the years 2003, 2006, and 2010. The five wards are as follows: Ward 7 (Bay), Ward 12 (Rideau-Vanier), Ward 15 (Kitchissippi), Ward 16 (River), and Ward 18 (Alta Vista).

This report will also use population data of the different wards to determine whether the number of polling station locations in a ward is proportionate to the population of that ward. Finally, a case study will be done of Ward 12 (Rideau-Vanier) due to its uniqueness, namely the ward is an amalgamation of three distinct neighbourhoods for which population data is available. An analysis of this data will illustrate if municipal polling station locations are, in fact, determined by voter population, or if voter turnout is a criterion affecting the placement of polling stations.

Quantitative Analysis:

First, it is necessary to define and explain exactly the data that is being described by the different terms used in this report. This report looks at data on polling stations and voter turnout from three municipal elections, and due to the fact that not all polling stations were static over these three elections, the term *stable polling stations* will be used to describe polling stations that were, in fact, static, and were thus present in all three elections. More generally, this report does not distinguish between polling stations on election day, and advance polling stations on either of the two days selected for advance voting. Thus *polling stations* refers to all polling stations. That said, a cursory look at the data excluding advance polling stations suggests that there is a similar pattern regardless. With that said, we can now look to our first level of analysis

Analysis 1:

This first level of analysis compares two types of variables over two different time frames. The two types of variables are the “VoterTurnoutAgainstAvg” variables, and the “StationsChange” variables. The former indicate the difference between a ward’s voter turnout, and the overall voter turnout in the City of Ottawa, in a given year, as measured by a percentage and input as data in decimal form. Thus, a number less than 1 indicates that voter turnout in the ward was below the overall city turnout; conversely, a number greater than one indicates that voter turnout in the ward was

above the overall city average. The purpose of measuring this difference is to control for the fluctuations of overall voter turnout in Ottawa, and thus to identify the *relative* voter turnout of a given ward. The two time frames for these variables will be 2003 and 2006. The latter variables, i.e. the “StationsChange” variables, indicate the net change in polling stations from one election year to the next within a given ward, namely from 2003 to 2006 and from 2006 to 2010. This difference is, once again, measured as a percentage converted into decimal form. Thus, a number less than 1 indicates an overall decrease in polling stations; conversely, a number greater than one indicates an increase.

The “StationsChange” variable for 2003-2006 and the “VoterTurnoutAgainstAvg” for 2003 will be analyzed together, and the remaining two variables will also be paired and analyzed together. The idea here is to see whether the relative voter turnout of a ward in any way determines whether there will be a net gain or loss of polling stations for the next election. In order to analyze the data, we undertook a bivariate regression analysis. This allows us to see how much a variation in our “StationsChange” variables can be explained by our “VoterTurnoutAgainstAvg” variables.

Interestingly, a bivariate regression analysis of the independent variable “VoterTurnoutAgainstAvg” variable for 2003 has a negative effect on the “StationsChange” variable for 2003-2006. Indeed, the unstandardized regression coefficient is: -0.196. This means that a unit change in the 2003 “VoterTurnoutAgainstAvg” variable can explain a corresponding change of -0.196 in the 2003-2006 “StationsChange” variable. Therefore, an increase in voter turnout resulted in a decrease in polling stations in the following election. That said, however, the coefficient was found to be statistically insignificant, even given the small N size (see Table 1 below).

As for our bivariate regression analysis of the independent variable “VoterTurnoutAgainstAvg” for 2006 on “StationsChange” variable for 2006-2010, too, reveals that the latter has a negative effect on the former. This time the unstandardized regression coefficient is more significant: -0.864.

Table 1

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.179	.090		13.074	.001
	% Voter TO Against Avg 2003	-.196	.090	-.782	-2.177	.118

a. Dependent Variable: % of Polling Stations Changed 2006

Therefore, an increase in voter turnout in 2006 resulted in a decrease in polling stations in 2010. Once again, however, the coefficient was found to be statistically insignificant, even given the small N size (see Table 2 below). However by running a multiple regression of two independent variables “% Voter turnout against average 2003” and “% Voter turnout against average 2006” with the dependent variable “% change in poll stations 2010”, the adjusted R Square is 0.436, which indicates a relatively strong positive association between the independent variables and the dependent variable (see Table 3 below).

Table 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.833	.405		4.530	.020
	% Voter TO Against Avg 2006	-.864	.411	-.772	-2.103	.126

a. Dependent Variable: % of Polling Stations Changed 2010

Table 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.847 ^a	.718	.436	.0732909

a. Predictors: (Constant), % Voter TO Against Avg 2003, % Voter TO Against Avg 2006

Analysis 2:

Our second attempt to analyze the data involved using the same variables, i.e. the “VoterTurnoutAgainstAvg” and “StationsChange” variables, but this time percentages were not used. Instead, we used positive and negative numbers. More specifically, we used the “VoterTurnoutAgainstAvg” variables to simply indicate the number of percentage points that a ward’s voter turnout was either above or below the city’s turnout; a positive number indicates an above average voter turnout, a negative number indicates a below average turnout, and a zero indicates that a ward had the same voter turnout rate as the city. There was a similar change for the “StationsChange” variables. Here, instead of using a percentage, we simply used the variable to indicate the number of polling stations added or removed. Thus a positive number indicates a net gain in polling stations, a negative number indicates a net loss, and zero indicates that there was no change in polling stations.

Interestingly, a bivariate regression analysis once again revealed that the “VoterTurnoutAgainstAvg” variables have a negative effect on the “StationsChange” variables. Indeed, the unstandardized regression coefficient is: -0.172. This means that a unit change in the 2003 “VoterTurnoutAgainstAvg” variable can explain a corresponding change of -0.172 in the 2003-2006 “StationsChange” variable. Therefore, an increase in voter turnout in 2003 resulted in a decrease in polling stations in 2006. This time around, however, the coefficient was found to be statistically significant, given the small N size (see Table 4 below). As for our bivariate regression analysis of the

“StationsChange” variable for 2006-2010, and the “VoterTurnoutAgainstAvg” variable for 2006, it, too, reveals that the latter has a negative effect on the former. Once again, the unstandardized regression coefficient is more significant for the latter time period: -0.318. This time, however, the results are statistically significant regardless of N size (see Table 5 below)

Table 4

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.469	.331		-1.417	.252
	% Voter TO Against Avg 2003	-.172	.067	-.829	-2.563	.083

a. Dependent Variable: % of Polling Stations Changed 2006

By running a multiple regression of two independent variables “Number of percentage point change in Voter Turnout 2003” and “Number of percentage point change in Voter Turnout 2006” against the dependent variable “Number of stations change 2010”, the Adjusted R-Square has a significance of 0.946, which indicates a strong positive association between the independent and dependent variable. (see Table 6 below)

Table 5

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.118	.365		-.324	.767
	% Voter TO Against Avg 2006	-.318	.085	-.908	-3.760	.033

a. Dependent Variable: % of Polling Stations Changed 2010

Table 6

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986 ^a	.973	.946	.3812464

From this we can conclude that voter turnout does, in fact, seem to play a role in the City of Ottawa's determination of where to locate polling stations. That said, however, it appears that the relationship is the opposite of what we initially expected; which is to say that we found an increase in voter turnout leads to a decrease in polling stations, but we were expecting it to lead to an increase. Indeed, one of the concerns that was the motivation for this research was that low-income neighbourhoods, as a result of being less likely to vote, were being punished through polling stations becoming less accessible. The analysis thus far; however, seems to suggest that the opposite is true, namely that lower voter turnout in a ward results in that ward receiving more polling stations.

Nevertheless, there is still cause for concern. Indeed, the case study of Ward 12 below helps to illustrate why this is. Furthermore, using voter turnout as a criterion for the allocation of polling station locations is problematic for a simple reason that was stated at the outset of this report: voting should be equally accessible to all citizens; choosing whether or not to exercise one's right to vote should not result in voting becoming more or less accessible. In fact, it was suggested earlier that population density ought to be the sole criterion for the allocation of polling stations. Thus it will also be valuable for us to next analyze whether population has a discernable effect on the allocation of polling stations. Moreover, it could be the case that the relationship discovered above is incidental, and that an exogenous factor such as change in population is actually influencing the allocation of polling stations. Therefore, it is essential that we explore this possibility.

Analysis 3:

This third level of analysis is, perhaps, the most straightforward. We took the population of each ward, and the number of polling stations in each ward, and determined whether the latter corresponded to the former. Interestingly, the population of each ward is roughly equal (see Figure 3 below). The amount of polling stations per ward, however, varies greatly (see Figure 4 below). Moreover, we took the number of polling stations for each ward, and divided by the population of each ward, in order to determine the approximate number of people for each polling station in each ward (see Figure 5 below).

From this we can conclude that polling stations do not correspond to population density. That said, however, the varying geographic sizes of the wards could explain this variation in polling station numbers insofar as larger geographic spaces with a more dispersed population may require more polling stations, and smaller geographic spaces with a dense population may require less. By mapping out the data, however, we discovered that this alone cannot, in fact, explain the discrepancies (see Appendix 1.1). This conclusion is, perhaps, made most clear by the case study below.

Figure 3

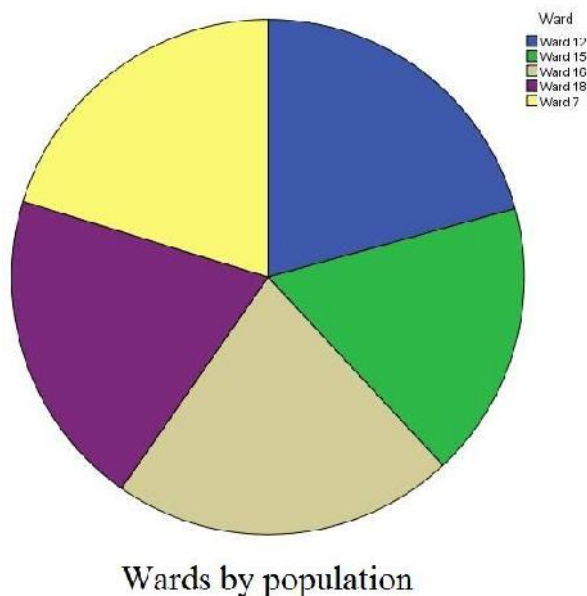
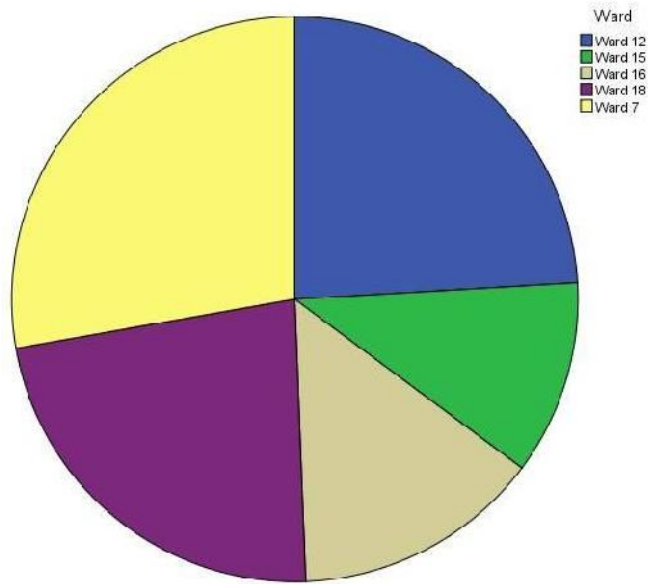
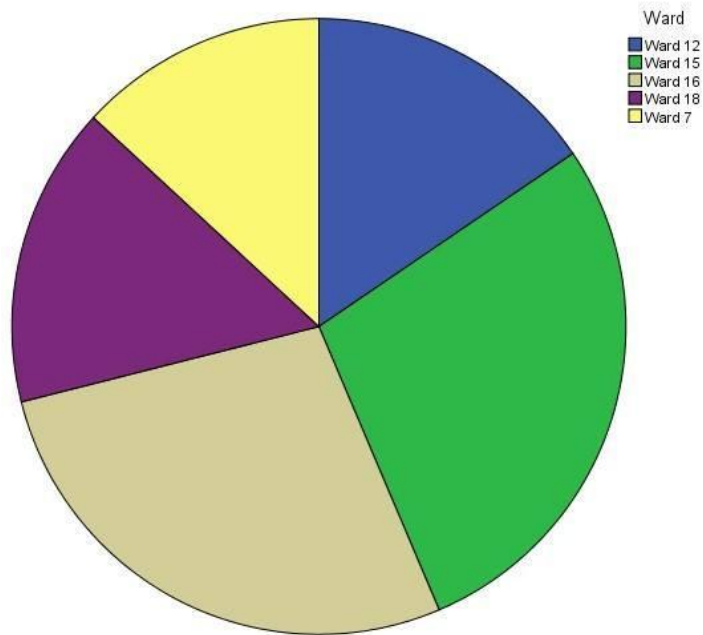


Figure 4



Number of Polling Stations by Ward

Figure 5



Wards by Approximate Number of People Per Polling Station

Case Study Analysis: Ward 12 (Rideau-Vanier)

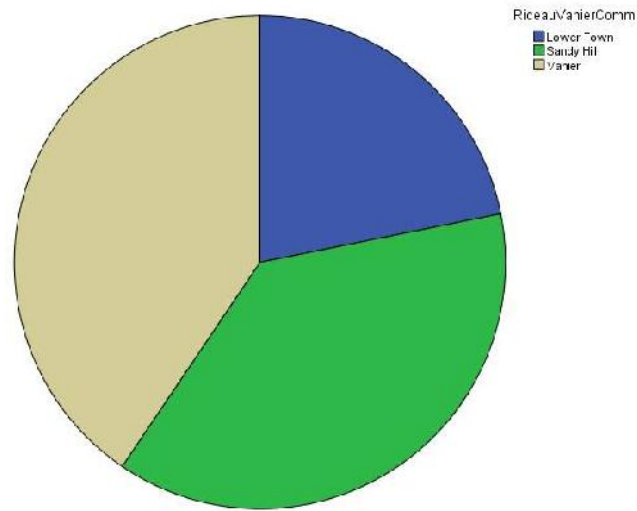
Ward 12 is unique for a couple of reasons: (1) it can be separated into three distinct communities for which population data is available; (2) it has the lowest voter turnout in comparison to the other five wards analyzed in this report. The former allows us to identify whether the amount of polling stations within the different communities that make up a ward corresponds to the population of these communities. Ward 12 consists of three distinct communities: Vanier, Sandy Hill, and Lower Town. The population of each community is as follows: 16,258 in Vanier (2011 Census), 12,078 for Sandy Hill (2006 Census), and 12,274 for Lower Town (2011 Census). Given this information, one would expect Vanier to have the most polling stations, and for Sandy Hill and Lower Town to have roughly the same amount. Yet, Lower Town had the most polling stations in 2010 (see Table 7 below), and has the most stable polling locations (see Table 8 below). The picture becomes even more problematic when looking at the approximate number of people per stable polling station in each community (see Table 9, and Figure 6, below), and the approximate number of people per polling station in 2010 (see Table 10, and Figure 7, below).

Table 7	Lower Town	Sandy Hill	Vanier
# of polls 2010	15.00	8.00	13.00

Table 8	Lower Town	Sandy Hill	Vanier
# of stable polling locations	14.00	8.00	10.00

Table 9	Lower Town	Sandy Hill	Vanier
Appx # of people per stable poll	877.00	1510.00	1626.00

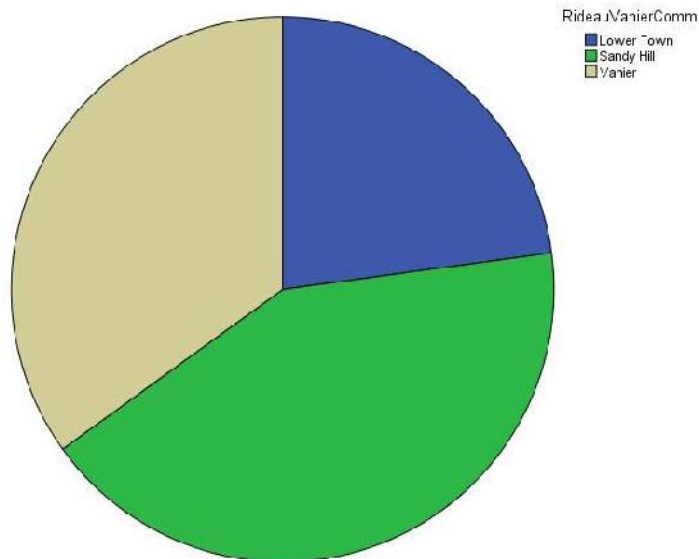
Figure 6



Approximate number of people per stable polling station

Table 10	Lower Town	Sandy Hill	Vanier
Appx # of people per poll 2010	818.00	1510.00	1251.00

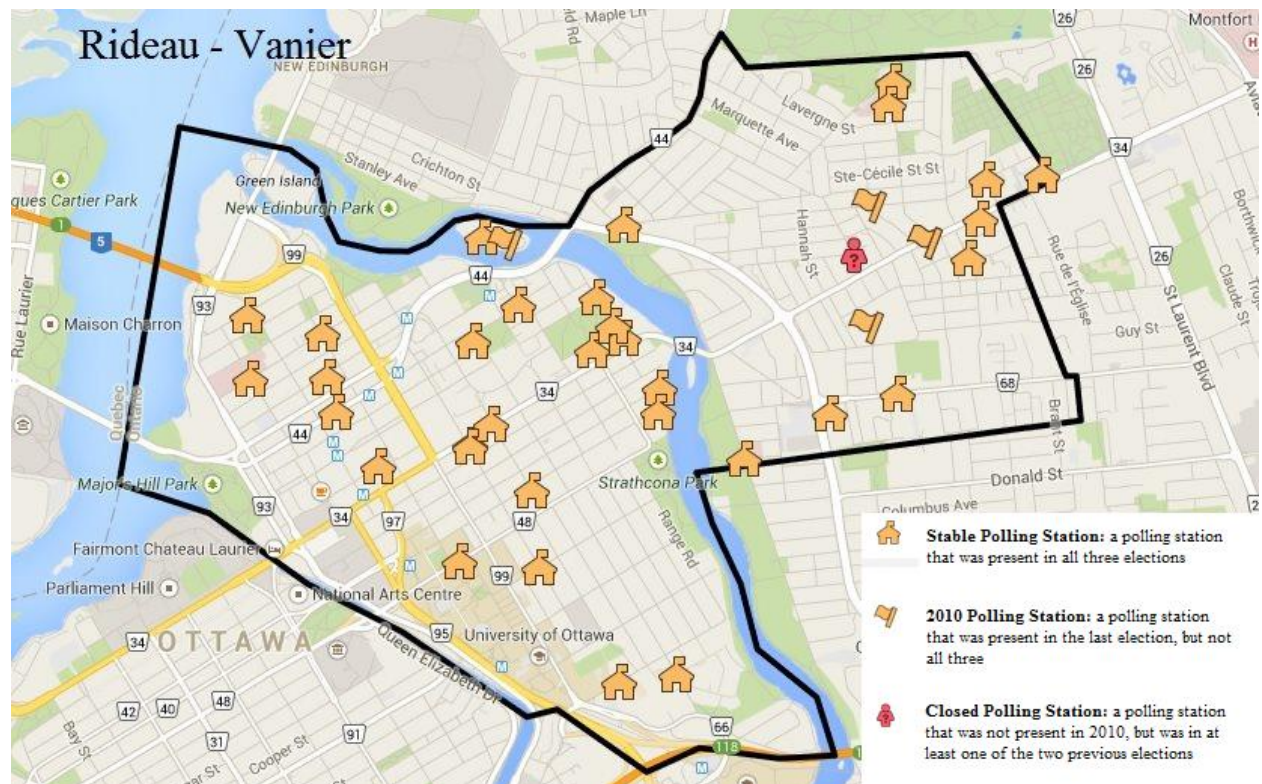
Figure 7



Approximate number of people per polling station 2010

Furthermore, this discrepancy cannot be explained by differences in the geographic size of each community. Indeed, looking at the map of Rideau-Vanier (see Figure 8 below) reveals that Vanier not only has the largest population, but also takes up the most space geographically; yet, Lower Town has the highest number of both stable polls, and polls in 2010. Furthermore, both the population and the geographic size of Lower Town and Sandy Hill are roughly comparable; yet, they differ dramatically when it comes to the number of polling stations. Interestingly, based on the group’s collective anecdotal knowledge of the ward, we can say that Vanier is a community known for being a low-income area. We can also say that Sandy Hill is known for being a “student ghetto”, and is thus also characterised as low-income (as well as having a transient student population). Lower Town, on the other hand, is largely commercial, and appears to have less residential areas than the other two communities.

Figure 8



Analysis 2 Revisited:

It is with the findings of our case study in mind, that we can add a potential caveat to the findings of the second analysis. A look at Figure 8 (above) shows that there are blank spots in low-income residential areas. Blank spots on the map--that is to say areas with no polling stations--indicates that there were no polling stations in that area during any of the last three elections; however, a look at data from earlier elections could potentially reveal that there were, in fact, polling stations located in these areas during previous elections. Thus, although analysis two showed that an increase in voter turnout may cause a decrease in polling stations, the reverse may have been true in a previous decade. This speaks to a larger problem, namely that there appears to be no clear rule, or criterion, in place which determines the allocation of polling stations in Ottawa. Therefore, the allocation of polling stations is left, at least in part, to the caprice of whomever it is that has that prerogative.

Recommendations:

As mentioned throughout this report certain recommendations are made in order to further investigate into the locations of polling stations. Our data was confined to the election years of 2003, 2006 and 2010. If we had greater access to polling station data from later election years a more comprehensive pattern may have been illustrated. As seen in Ward 12, large swaths of area are without a polling station from 2003, 2006, and 2010 election years. There is the potential that polling stations were once located in this area but are not captured in the years we studied. If they were captured in earlier years, data may be able to demonstrate the movement of polling stations out of that area, as it stands right now, data cannot be collected on polling stations if they do not exist in that area anymore.

Another recommendation is to gather city information on population density as well as socio-economic status of each neighbourhood to fully gather data on socio-economic status and its effect on where polling stations are located. In this report, low income neighbourhoods are identified with

anecdotal evidence from our ACORN advisor. More specific data on socio-economic status in relation to voter turnout and polling station accessibility would provide the research with more detailed data.

Conclusion:

In researching whether voter turnout is a criterion that the City of Ottawa is using to determine where to locate polling stations in municipal elections and if a decrease in voter turnout resulted in a decrease in polling stations, we analyzed aggregate data through SPSS as well as a case study focusing on one ward in particular.

Our first analysis compared the variables of “VoterTurnoutAgainstAvg” and “StationsChange.” Through running a bivariate regression analysis between the two variables it was determined that “VoterTurnoutAgainstAvg” had a negative effect on “StationsChange.” Therefore, an increase in voter turnout led to a decrease in polling stations in the following election; however, the analysis from the data shows that the coefficient for both years was statistically insignificant.

The second analysis used the same variables of “VoterTurnoutAgainstAvg” and “StationsChange” during the same years as the first analysis. In this analysis, instead of using a percentage, we used the variable to indicate the number of polling stations added or removed. Once again, through running the bivariate regression analysis we discovered that “VoterTurnoutAgainstAverage” variables have a negative effect on the “StationsChange” variables. Additionally, in this analysis the results showed the coefficient to be statistically significant. This analysis revealed a relationship in which an increase in voter turnout leads to a decrease in polling stations, contradicting what we expected of a high voter turnout leading to an increase in polling stations.

In Analysis 3 the supposed relation between the number of polling stations in a ward and the population of the ward was further examined. The findings of this work were interesting as the

population across wards were comparably equal, while the number of polling stations were not. By taking an in-depth look at these numbers, it was demonstrated that polling stations do not correspond to population numbers. It was then hypothesized that perhaps the geographical mapping of the wards had an influence on the findings. An attempt was made to further investigate the findings of the non-relation between the number of polling stations and total population within a ward.

Ward 12 was selected due to its possibility to be separated into three distinct communities (Vanier, Sandy Hill, Lower Town), and also due to the fact that it had the lowest voter turnout results compared to the other wards included in the report. While Lower Town and Sandy Hill were found to have the lowest populations; Lower Town contained the most polling stations and the most stable polling stations even though Vanier's population was larger.

Overall, our conclusion is that polling stations are not moving because of decreased voter turnout in an area. This project found a negative relationship between voter turnout and polling stations; as voter turnout increases so does polling stations. Therefore, our hypothesis is a null hypothesis as polling stations did not decrease when voter turnout decreased. Even though this is a null hypothesis it is still argued that the lack of criteria for the location of polling stations is unequal to voters. Our report does illustrate that there lacks an apparent pattern for where polling stations are located in the City of Ottawa.

The members of this group would also like to thank CSL and ACORN Canada for the opportunity to take on this project. A special mention is also directed towards Jill O'Reilly who oversaw the direction and aim of the research.

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Data entry, literature review, drafting conclusion

Kyle Bedford

Data entry, preparing PowerPoint presentation

Mark Seeley

Data entry, running analysis in SPSS and analysing data

James McLaughlin

Literature review, drafting conclusion

Taylor Jamison

Compiling and editing final documents, literature review, drafted research proposal

Martel Mikhail




Creating shared documents for team, preparing PowerPoint presentation

Miles Krauter

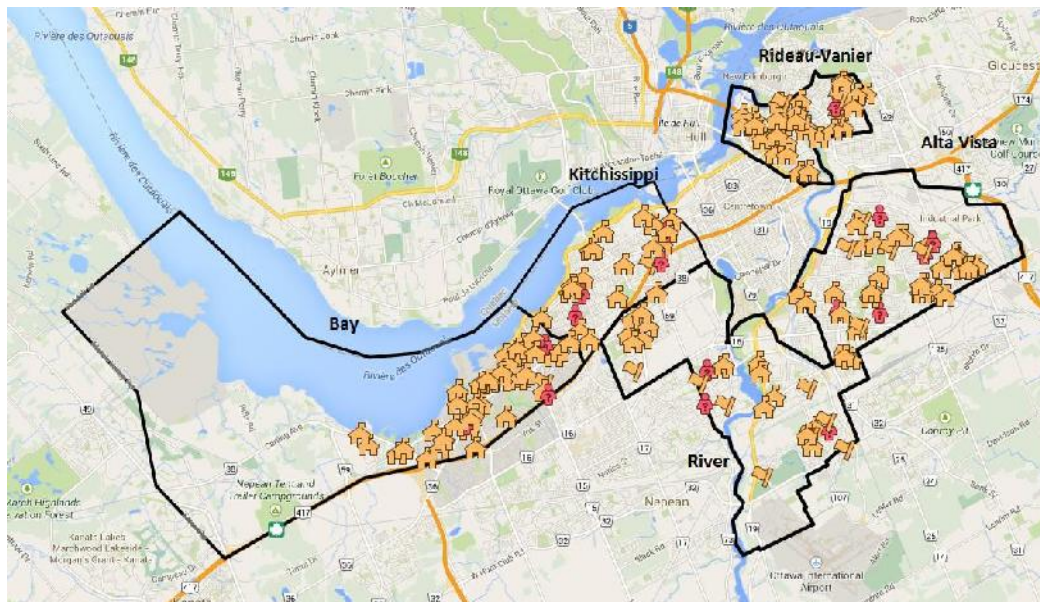
Data entry, running analysis in SPSS and analysing data, drafting text, explaining analysis results

APPENDIX

1.0 Legend for all maps

-  **Stable Polling Station:** a polling station that was present in all three elections
-  **2010 Polling Station:** a polling station that was present in the last election, but not all three
-  **Closed Polling Station:** a polling station that was not present in 2010, but was in at least one of the two previous elections

1.1 All Wards



1.2 Each Ward Individually

