

Getting Priorities Straight **Municipal Sign Replacement Strategies**

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Abstract: The abuse evidence on 2581 publically-owned stop signs in seven Montreal Island municipalities was recorded. The results were collated into data interpretable on a municipal level. The results were compared with one another to determine whether there is a dominant strategy that dictates how each municipality replaces and maintains its stop signs. The results indicated that the municipalities do replace their stop signs in unique ways, particularly Hampstead which stood out significantly as the "cleanliest" municipality.

Introduction

Montreal is anything but a unified city. Many different socioeconomic lines divide it: linguistic, economic, and religious, to name but a few. Aside from socioeconomic lines, however, the island is divided by explicitly political lines, those that divide municipalities from one another. Though the island has at times attempted to unite all its municipalities under the city of Montreal, it is clear that the municipalities do not always wish to be coagulated under a single dominant name. As unlikely as it may seem, the differences between municipalities manifest themselves even in the ways they replace their abused stop signs.

Replacement and maintenance are important processes in the development of a city. The layout of an excavated city can reveal such important processes as the refurbishing of an urban area or the superseding of a new urban centre over an older traditional centre. Excavations at the ancient Roman city of Ostia, for example, have revealed that the Roman-style forum had an earlier indigenous road running straight through it (Gates 2003). This feature has been interpreted as demonstrating that when founding a colony, the Romans did not simply erect a Forum wherever they pleased, but rather attempted to integrate the Forum with existing urban structures. The replacement and superseding of stop signs in Montreal may be able to reveal similar aspects of its municipalities' functioning.

The methods which a municipality employs in replacing and maintaining its abused stop signs can indicate a number of things about its governance. A municipality with that has more highly abused stop signs may be one that places less value on its overall appearance, or perhaps that is characterized by more general "mischief" and is therefore unable to maintain its stop signs at a high level. On the other hand, a municipality that has fewer highly-abused signs and more less-abused signs may indicate one that prizes itself on order and hygiene, or a populace less inclined to abuse stop signs: an older average age, perhaps? Several papers in this volume discuss stop sign abuse in relation to a number of other socioeconomic factors, including languages spoken, economic prosperity, and others. With this paper, I attempt to place these in a more general context, demonstrating to the extent possible the attitude that each municipality takes towards its stop signs.

Methods

Data on 2816 stop signs in seven Montreal municipalities were collected by teams of three surveyors over a period of approximately three weeks. The relevant data for this study (damage, wear,

and vandalism on both front and back) were rated on a scale of one to three based on loose guidelines for each.

Following initial data collection a new rating, "abuse," was created by adding together the ratings for each of the four relevant categories. This rating is measured out of twelve. As well, a total of 235 individual stop signs were omitted from the sample. These included signs that were missing a value for any of the four original categories, the many "hinged" or "folded" signs present in Westmount and Hampstead, signs whose backs were obscured, and signs thought to be privately owned as municipalities presumably do not have jurisdiction over these. This left a total sample size of 2581 stop signs.

Each municipality was then given an "abuse index," calculated with the following formula:

$$A_i = A_t / (12 \times N)$$

where A_i is total abuse in a given municipality and N is total stop signs in that municipality. $(12 \times N)$ is the potential total abuse if every stop sign in that municipality had received a rating of three in each of the four abuse categories. The abuse index is then the amount of abuse that the average sign from a single municipality has, and can therefore be considered a measure of a municipality's "tolerance" for stop sign abuse.

Following this, a bar graph was made for each municipality showing the number of stop signs that were given each abuse rating. Finally, the Wilcoxon two-sample test was used a total of 21 times to compare the stop signs of each municipality to those of each other municipality (see Appendix 1, "Wilcoxon two-sample test data".)

Results

The findings for the abuse index indicate that Ville-Marie tolerates stop sign abuse the least, followed in order by NDG, Westmount, Côte Saint-Luc, the Plateau, Hampstead, and Côte-des-Neiges (see Table 1, "Abuse index data"). Of course, these averages are to an extent merely arbitrary as there is no direct scale for the difference between, for example, a damage rating of one versus a damage rating of two, and even less for a damage rating of one versus a vandalism rating of two. Thus, the abuse index is not useful in itself, and must be coupled with the Wilcoxon two-sample tests in order to determine which differences are significant.

Table 1: Abuse Index Data

Municipality	Total Signs	Total Damage	Total Wear	Total Van (F)	Total Van (B)	Total Abuse	Abuse Index
Ville-Marie	273	183	102	134	101	520	0.158730159
NDG	601	236	397	206	112	951	0.131863561
Westmount	397	236	156	184	64	640	0.13434089
Côte Saint-Luc	344	115	252	50	45	462	0.111918605
Plateau	216	91	113	94	149	447	0.172453704
Hampstead	329	111	179	24	6	320	0.081053698
Côte-des-Neiges	421	223	269	61	34	587	0.116191607

Of the 21 Wilcoxon two-sample tests used, 14 indicated statistically significant differences while the remaining 7 did not, although the relationship between Côte-des-Neiges and NDG was less than 0.01 away from significance. Côte-des-Neiges, NDG, and Ville-Marie were each found to be significant in relation to three other municipalities. Côte Saint-Luc, Ville-Marie, and the Plateau were each found to be significant in relation to five other municipalities. Hampstead was found to be significant in relation to all

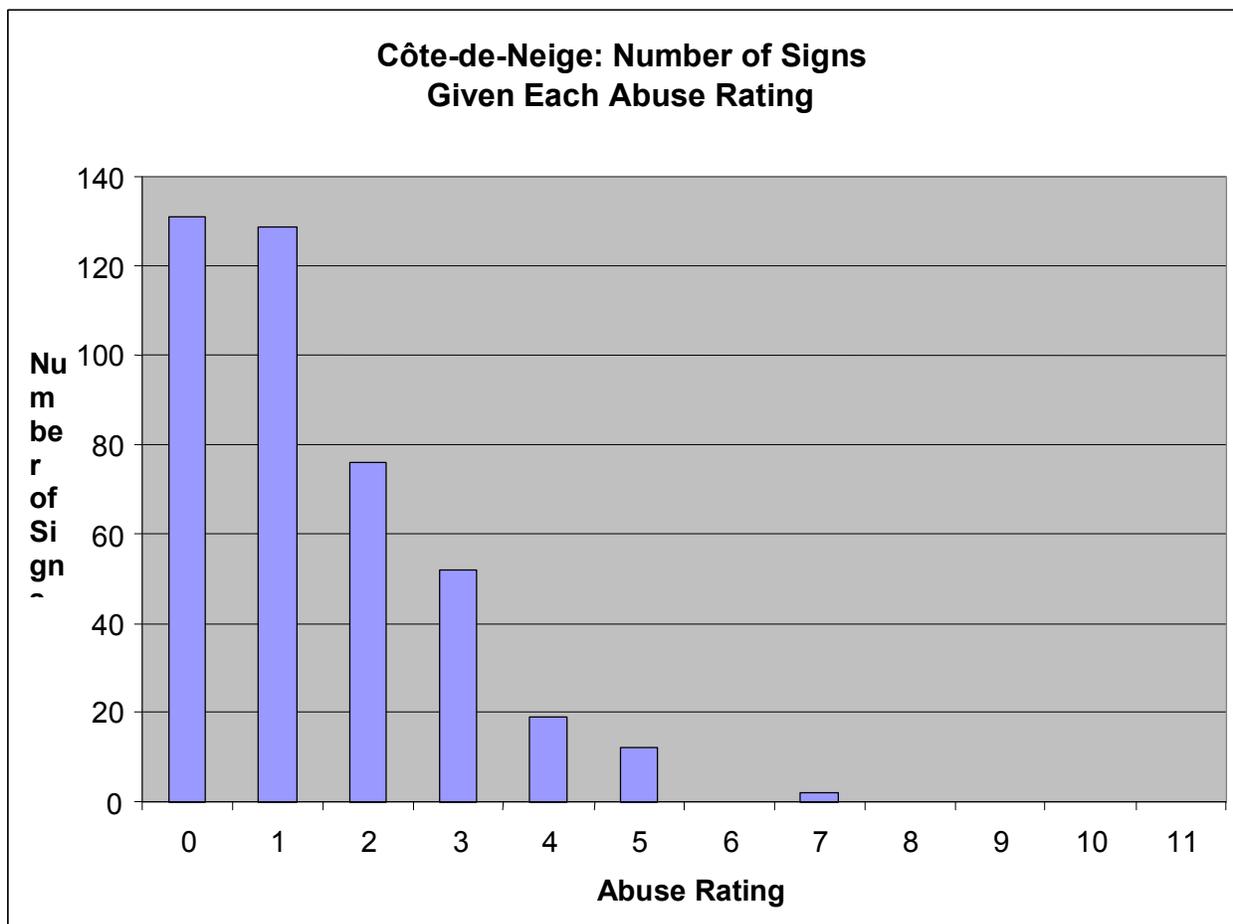
other municipalities (see Table 2, "P-values for Wilcoxon two-sample tests"). No municipality was found to have a majority of insignificant relationships, implying that there is in fact a relationship between municipality and rate of replacement of stop signs.

The basic shape of all seven bar graphs was basically the same; as was expected, there tends to be a large number of low-abused signs (in the 0-2 rating range), after which the number of signs drop off dramatically either the 2 or 3 level, varying between municipalities (see graphs 1-7 and Appendix A, "Data for Municipal Graphs"). There are only few signs rated 4 or higher in any municipality, and as the rating increases the number of signs decreases.

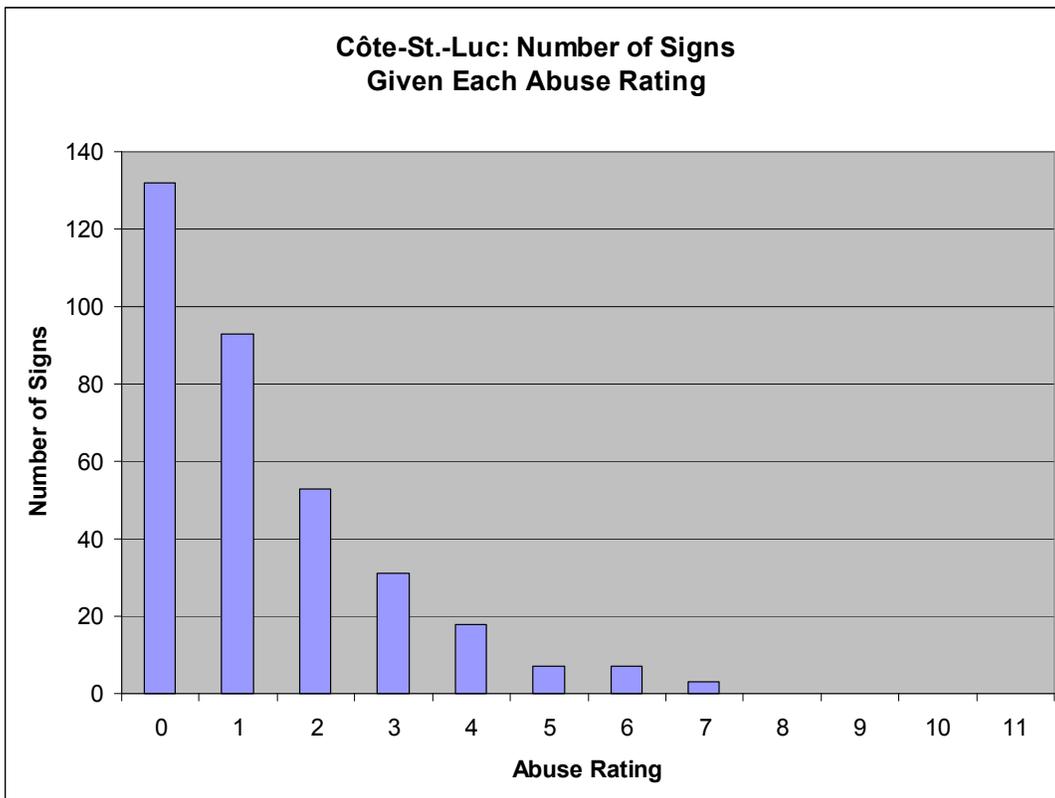
A number of interesting features on the graphs deserve discussion, however. Both NDG and Westmount have fewer signs with a 0 rating than with a 1 rating, in sharp contrast with the other five municipalities. The oddity of NDG's graph is much more pronounced than that of Westmount's, NDG having 30 fewer 0-rated signs than 1-rated signs while Westmount has only one fewer. Though NDG also has approximately 50% more total signs included in this study, the difference is still significant, and Westmount's oddity may even be considered a moot point with a difference of only one out of 231 total 0- and 1-rated signs.

The second interesting feature of the graphs is in the Plateau's. While the Plateau shows more 0-rated signs than 1-rated signs, there are significantly more 2-rated than 1-rated signs, a feature present only in the Plateau. There are 11 more 2-rated signs (55-44) in a municipality with only 216 included signs, quite a significant number. Plateau's graph is the only one with a polymodal distribution.

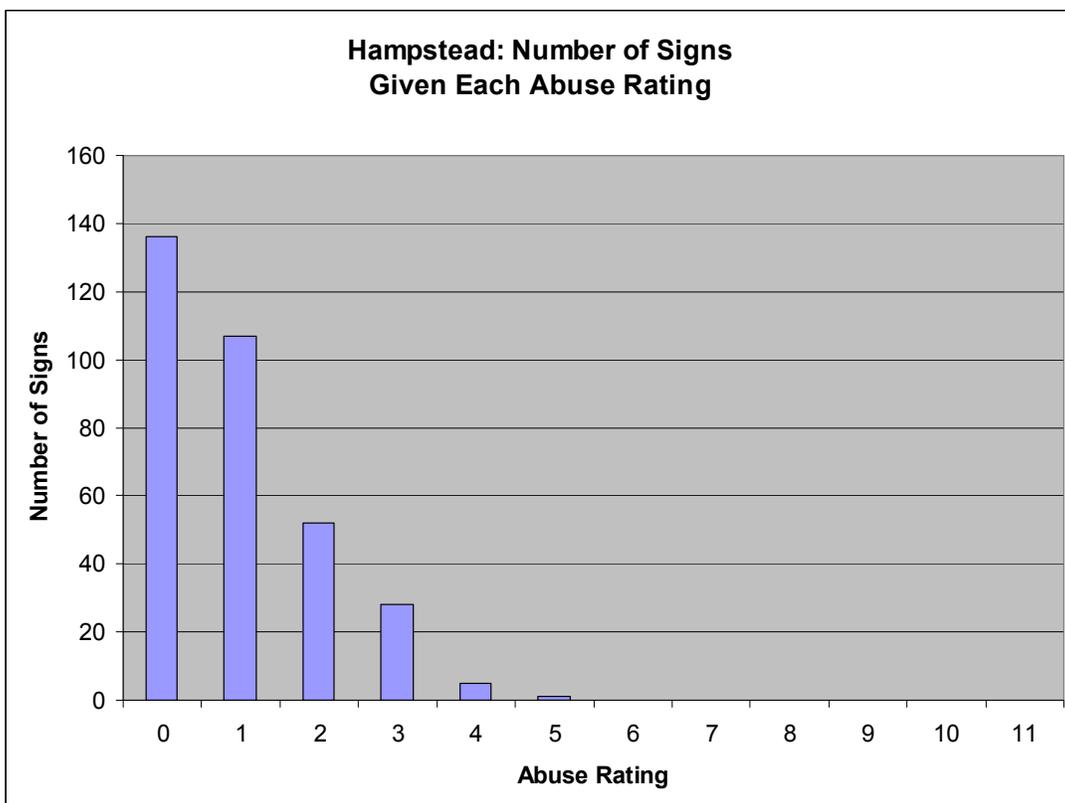
Finally, Hampstead's graph demonstrates a replacement strategy at odds with that of every other municipality. This will be discussed in detail in the "Discussion" section below.



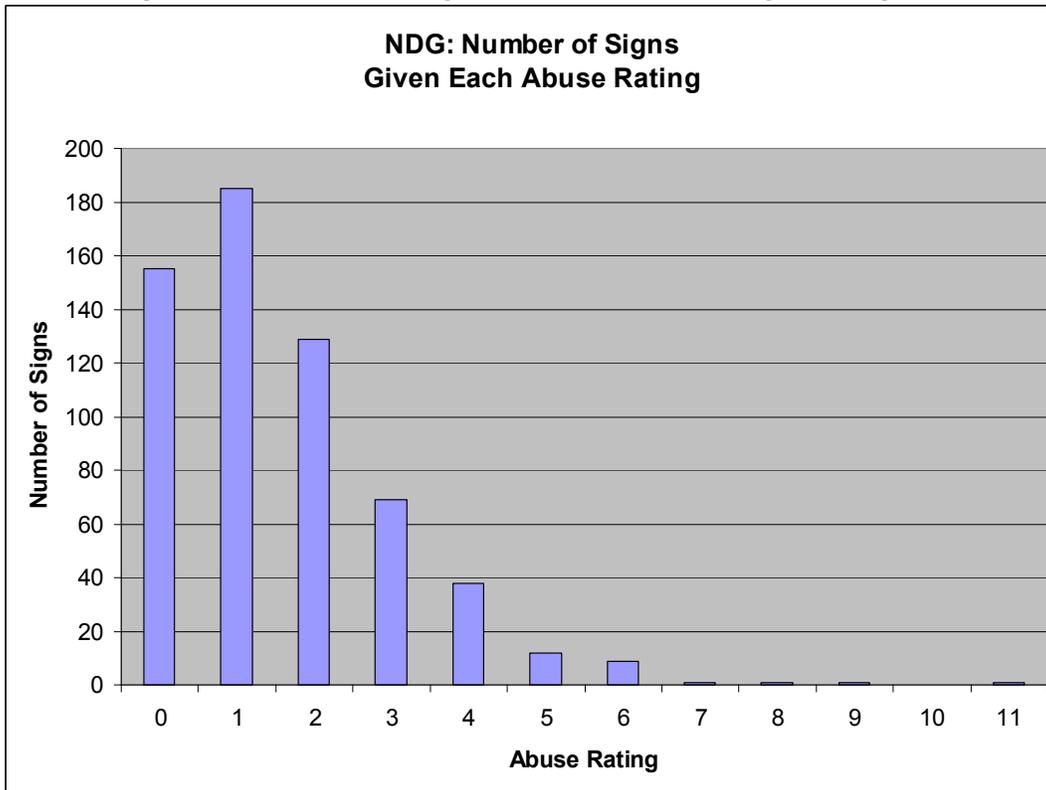
Graph 1: Distribution of signs for each abuse rating in Côte-des-Neiges



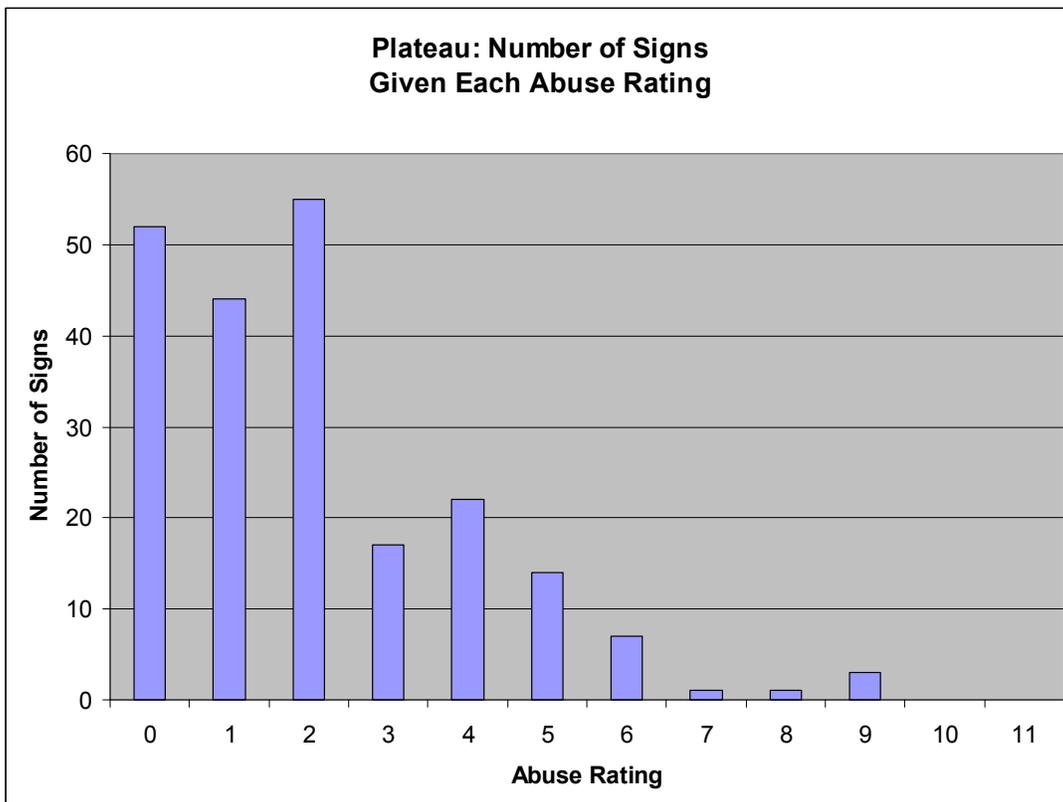
Graph 2: Distribution of signs for each abuse rating in Côte Saint-Luc



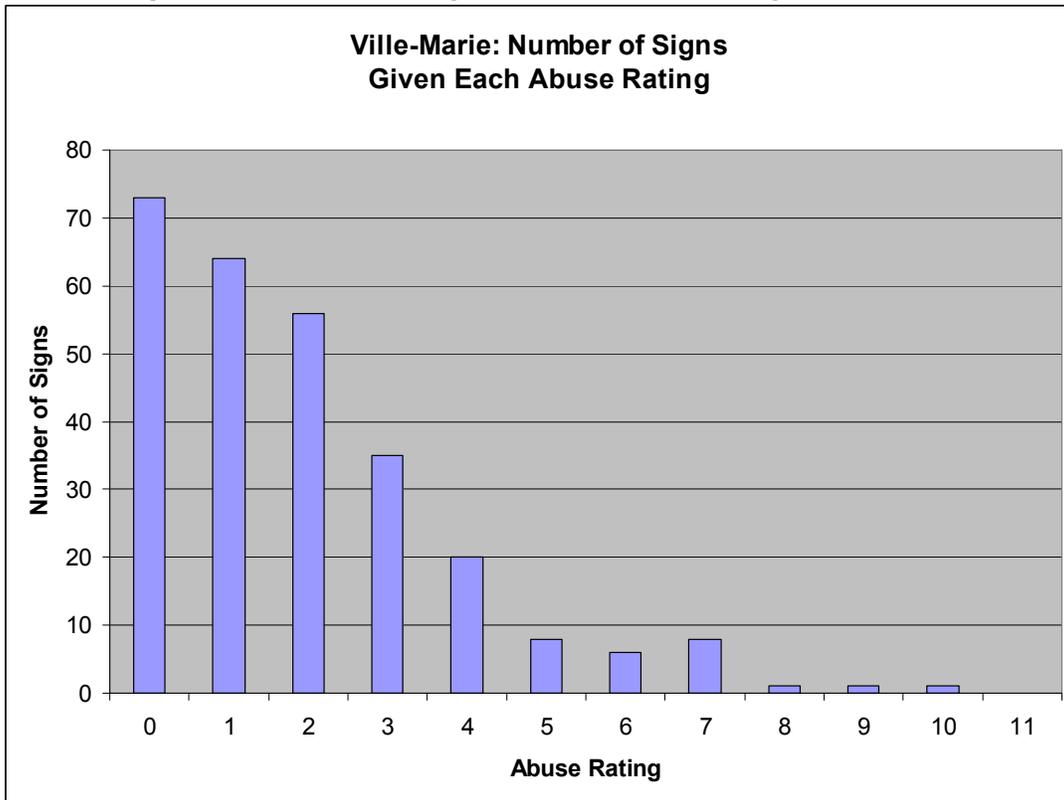
Graph 3: Distribution of signs for each abuse rating in Hampstead



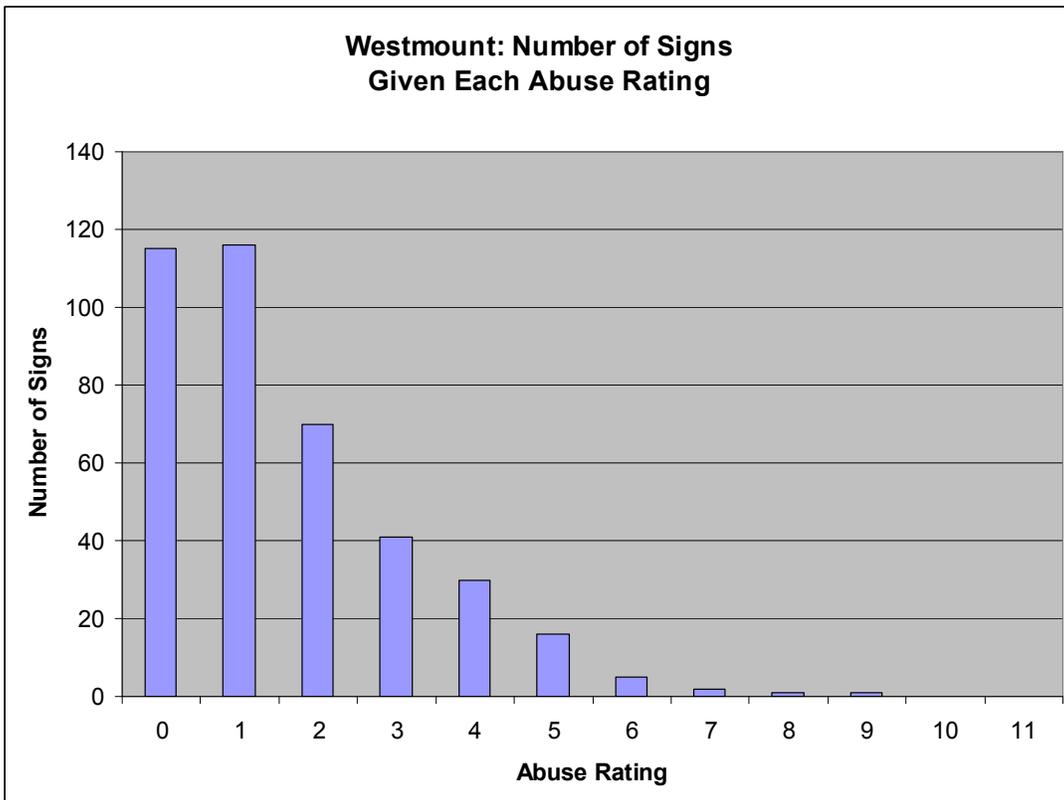
Graph 4: Distribution of signs for each abuse rating in NDG



Graph 5: Distribution of signs for each abuse rating in the Plateau



Graph 6: Distribution of signs for each abuse rating in Ville-Marie



Graph 7: Distribution of signs for each abuse rating in Westmount

Table 2: P-values for Wilcoxon two-sample tests							
Municipality	Westmount (0.119565217)	Ville-Marie (0.080287929)	Plateau (0.129969419)	NDG (0.115002684)	Hampstead (0.143627451)	Côte Saint-Luc (0.129452055)	Côte-des-Neiges (0.165758896)
Côte-des-Neiges (0.165758896)	0.1682	0.003318	8.38E-05	0.05974	0.000109	0.1545	-
Côte Saint-Luc (0.129452055)	0.009482	0.000123	3.38E-06	0.001241	0.0357	-	
Hampstead (0.143627451)	6.76E-07	1.73E-09	1.73E-11	2.54E-09	-		
NDG (0.115002684)	0.7638	0.1015	4.93E-03	-	The value below each municipality's name is its abuse index.		
Plateau (0.129969419)	0.006425	0.2977	-	Green squares denote statistically significant relationships while red squares denote insignificant relationships. Note that Côte-des-Neiges : NDG is very nearly significant.			
Ville-Marie (0.080287929)	0.09647	-					
Westmount (0.119565217)	-						

Discussion

The most significant finding of this study is that it is not possible to deconstruct replacement rates to be sufficiently simple that any sort of “tolerance rank” can be assigned to a municipality. Instead, it is necessary to look at each municipality as it relates to each other one in order to determine the differences that exist between them. Replacement strategies do not boil down to a simple statement of purpose such as “when a sign reaches an abuse rating of x, it must be replaced.” If this were true we would expect to find far fewer signs rated in the 3 or even 4 and above range. Instead, each municipality tolerates abuse in its own way, replacing signs when it sees fit. I will offer a number of explanations for why each municipality behaves this way, but it must be remembered that these are conjectures at best and can not be conclusively proven by the data in this study.

The municipalities of Westmount and Côte-des-Neiges display similar abuse patterns in their graphs. Both municipalities have a very high number of signs rated 0 and 1 in relation to any other rating. As well, both municipalities have almost equal numbers of 0- and 1-rated signs. Westmount has only one more 1-rated sign than 0-rated signs, approximately a quarter of a percent of the total included signs in the municipality. Côte-des-Neiges has only two more 0-rated signs than 1-rated signs, less than half a percent of the total signs in the municipality. This replacement strategy is also characterized by a sharp drop from the near-equal 0-1 ratings to the 2+ ratings. Though this characteristic is present in other municipalities’ replacement strategies as well, it differs in Westmount and Côte-des-Neiges because there is no gradual drop from 0 to 2, only a sudden drop from 1 to 2. As well, the Wilcoxon two-sample test shows that the abuse ratings for the two municipalities are not significantly different.

NDG’s graph reveals what could be a similar replacement pattern as Westmount and Côte-des-Neiges. NDG has significantly more 1-rated signs than 0-rated signs (185-155=30 more 1-rated signs). While this is odd, it is still a pattern that could be created by a replacement strategy that does not differentiate between 0- and 1-rated signs. A factor that could account for this oddity is that NDG appears to wait later to replace a single sign than do Westmount or Côte-des-Neiges. NDG has signs with much higher abuse ratings than Côte-des-Neiges. Compared to Westmount, it has a somewhat similar distribution of highly-abused signs (NDG has slightly fewer 5-rated signs and slightly more 6-rated signs than Westmount). However, NDG has the only 11-rated sign found in the survey. No other municipality

has such an abused sign, and the only 10-rated sign is found in Ville-Marie and will be discussed below. Thus, it appears that NDG is willing to let an individual sign deteriorate further than Westmount or Côte-des-Neiges before they replace it. This would, assuming that time corresponds roughly with an increase in abuse, result in a graph showing more 1-rated signs than 0-rated signs because before a "new" 0-rated sign is created a large number of them would have already deteriorated to a 1-rating.

It seems that Westmount and Côte-des-Neiges do not strongly differentiate between "non-abused" signs and "slightly abused" signs, that is, between what our surveyors have deemed 0 and 1. It is true that, from my survey experience, a damage rating of 1 is difficult to spot without close inspection of the sign. It may be for this reason that these municipalities do not make replacing 1-rated signs a priority; certainly while driving and perhaps only glancing at signs it is not necessary to worry about what may be a single sticker or graffito or a slight bend.

Côte Saint-Luc, Ville-Marie, and Hampstead also demonstrate a similar replacement pattern, though not as strikingly similar as that shared by Westmount and Côte-des-Neiges. Côte Saint-Luc, Ville-Marie, and Hampstead both display a gradual decrease in numbers of signs as abuse rating increases, from approximately 0-5. This is an unsurprising abuse pattern in all respects; simply the more abused a sign is the more likely it is to be replaced. However, Ville-Marie has one sign each for the ratings of 7, 8, and 9, while Côte Saint-Luc and Hampstead have none for these ratings. This is even more striking as Ville-Marie has only 79.3% of the total signs that Côte Saint-Luc has, meaning that these highly-rated signs are not merely the result of increased sample size.

It is possible that these three highly-rated signs are relics of the surveying process. Often privately-owned signs endure a large amount of abuse, and though signs noted as privately owned were excluded from this study it is possible that the surveyors neglected to note or could not determine if they were public or private signs. This may be a problem particularly in Ville-Marie which, as the downtown core of Montreal, has many parking garages and small alleys that may have their own stop signs. However without resurveying these signs, for which I have neither the time nor the inclination, this hypothesis cannot be further investigated. Otherwise, it may be possible that these signs have merely been severely damaged quite recently and the municipality has not yet had a chance to replace them. This would suggest that Ville-Marie does not replace signs on an individual basis, though again this hinges on a number of assumptions that cannot be proven.

The Plateau's graph reveals that it in fact has more 2-rated signs than either 1- or 0-rated signs. As well, the difference between the Plateau's total 2-rated signs and its total 3-rated signs is greater even than that between any other municipality's 1- and 2-rated signs, where the most significant drop is usually found. It seems, therefore, that the Plateau's replacement strategy is even more lenient than that of Westmount and Côte-des-Neiges. Even 2-rated signs do not seem to be a priority; only signs rated 3+ appear to require any sort of attention at all, let alone urgent attention. Even then, 4-rated signs outnumber 3-rated signs in the Plateau. The signs only really begin to taper off in the manner that we see in most other municipalities at the 3 rating in the Plateau when it hits 5, and even then there are more 9-rated signs than 7- or 8-rated signs (three 9-rated to one each of 7- and 8-rated signs). Sign replacement certainly does not appear to be a priority in this municipality. Patterns that could possibly lead to this sort of replacement strategy could be one that replaces a sign only when it becomes harder than usual to actually identify what the sign says or one that replaces signs only when someone complains. Of these the first seems more likely as 3-rated signs are still quite unlikely to have their writing obscured. Being a much less urbanized municipality than Ville-Marie, it is unlikely that the highly-abused signs in the Plateau represent unidentified privately-owned ones.

The final municipality that requires discussion is Hampstead. The Wilcoxon two-sample test demonstrated that Hampstead's abuse ratings were significantly different from *every* other municipality, indicating immediately that Hampstead does something different from all the others. It should be pointed out that Hampstead has had a history of distancing itself when possible with the rest of the city of Montreal. At the beginning of 2002 the city joined with Côte Saint-Luc and Montreal West in becoming a single borough of the city of Montreal. Four years later, at the beginning of 2006, the municipality voted to again become independent from Montreal. In fact, our surveyors reported that they were confronted by Hampstead's private security forces; the municipality is obviously uncomfortable with strangers and eager to keep itself clean, well-maintained, and quiet.

This characterization is supported well by the municipality's graph. The municipality has no signs with a rating higher than 5 (and only a single sign with a 5-rating), while every other municipality has at least one sign with a rating of at least 7. As well, the municipality has the second highest percentage difference between 1- and 0-rated signs: 107 1-rated/136 0-rated = only 78.7%. Finally, Hampstead also has by far the steepest reduction from 107 1-rated signs to zero 6- and above-rated signs. The total for no abuse rating is more than 50% that of its preceding total with the exception of 1- versus 0-rated signs, a distinction unique to the municipality.

It is clear from the graph, then, that Hampstead makes replacing its stop signs – and most likely all other signs in its area – a high priority. This is most likely only one aspect of an intense programme of maintaining the utmost cleanliness of their extremely well-to-do municipality. This is a replacement strategy certainly unique to Hampstead. The closest replacement strategies of other municipalities to Hampstead's are Côte Saint-Luc, Ville-Marie, and Westmount, but the presence of signs rated higher than 5 indicate that stop sign replacement is not as important a priority in these municipalities as in Westmount.

One more point that must be made regarding Hampstead's signs is that it contained the only zone surveyed by Team Valiant!, the survey team made up of this volume's editor and his three research assistants. This bias in survey may account for some of the differences between Hampstead and other municipalities. From my own survey experience, I can state that after several hours of survey one can easily become quite tired and frustrated. Though all surveyors, I am sure, did their utmost to minimize this, it is only natural that this frustration may manifest itself somehow in data collection, for instance by recording less-abused signs as more abused than they "objectively" were. Though I am still confident that my findings demonstrate a distinct difference between Hampstead's sign replacement strategies and those of the six other municipalities, the factor just described should nonetheless be kept in mind as a potentially drastic factor in these results.

It is clear, then, that Montreal's municipalities do employ different stop sign replacement strategies. In more specific contexts, these strategies most likely correspond to other socioeconomic characteristics of each municipality. These are not clear from the data used in this study, but in combination with other information, especially those from census data, these factors could be identified (and have been by a number of other scholars in this volume.) Though stop signs may not be the top priority of every municipality on the Island, it is clear that they are not considered equally between them as well.

References

Gates, Charles

2003 *Ancient Cities: The Archaeology of Urban Life in the Ancient Near East and Egypt, Greece, and Rome*. Routledge, Abingdon.

Appendix A: Data for Municipal Graphs

Côte-des-Neiges	
Rating	Total Signs
0	131
1	129
2	76
3	52
4	19
5	12
6	0
7	2
8	0
9	0
10	0
11	0
Total	421

Hampstead	
Rating	Total Signs
0	136
1	107
2	52
3	28
4	5
5	1
6	0
7	0
8	0
9	0
10	0
11	0
Total	329

Plateau	
Rating	Total Signs
0	52
1	44
2	55
3	17
4	22
5	14
6	7
7	1
8	1
9	3
10	0
11	0
Total	216

Westmount	
Rating	Total Signs
0	115
1	116
2	70
3	41
4	30
5	16
6	5
7	2
8	1
9	1
10	0
11	0
Total	397

Côte Saint-Luc	
Rating	Total Signs
0	132
1	93
2	53
3	31
4	18
5	7
6	7
7	3
8	0
9	0
10	0
11	0
Total	344

NDG	
Rating	Total Signs
0	155
1	185
2	129
3	69
4	38
5	12
6	9
7	1
8	1
9	1
10	0
11	1
Total	601

Ville-Marie	
Rating	Total Signs
0	73
1	64
2	56
3	35
4	20
5	8
6	6
7	8
8	1
9	1
10	1
11	0
Total	273