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Does Brampton Have Enough Parks?

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1. Introduction

1.1 Background

Brampton is experiencing large population growth, leading to an urban sprawl to house the incoming citizens. This presents the need for more community parks and open spaces as tools for better mental health and physical activity opportunities.

1.2 The Demand

Evidence is abundant that obesity and living in the suburbs are linked (Oregon State University, 2005). Further, rates of being overweight and obese in the Peel Region are higher than in the rest of the Greater Toronto Area. Another interesting fact is that In the Peel Region, the majority of neighborhoods with high rates of diabetes are located in Brampton. (Glazier, et al., 2014)

Parks seem to also be important for mental health. And, “Mental health is significantly related to residential distance from parks”. (Sturm & Cohen, 2014)

1.3 Interest

This project can be used to inform City of Brampton planners, more specifically the Planning & Development team of city hall. The goal is to inform these planners about the need for more parks for the people of the city and where specifically the need is the greatest.

Taking all the above into consideration, building many parks and building them in targeted locations can have a tremendous positive impact.

2. Data acquisition and cleaning

There were two main datasets used in the analysis of this project.

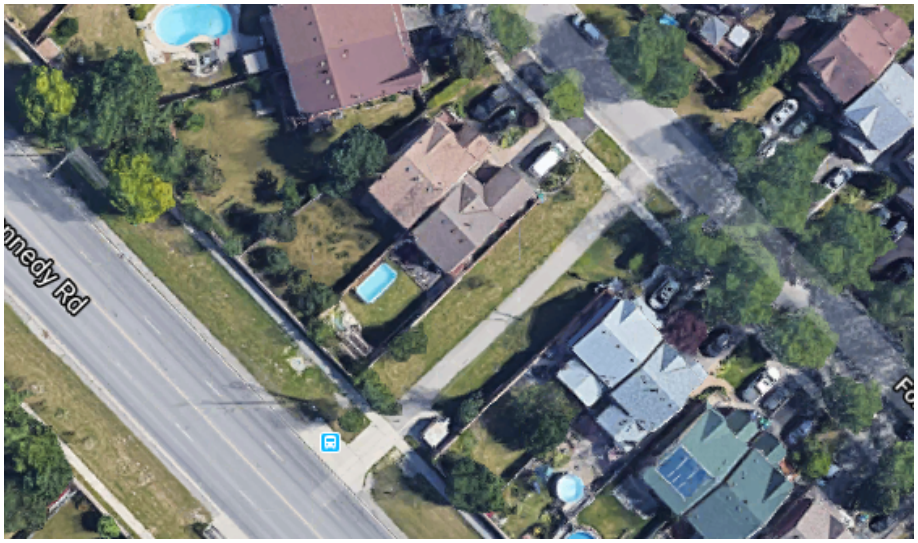
2.1 Parks

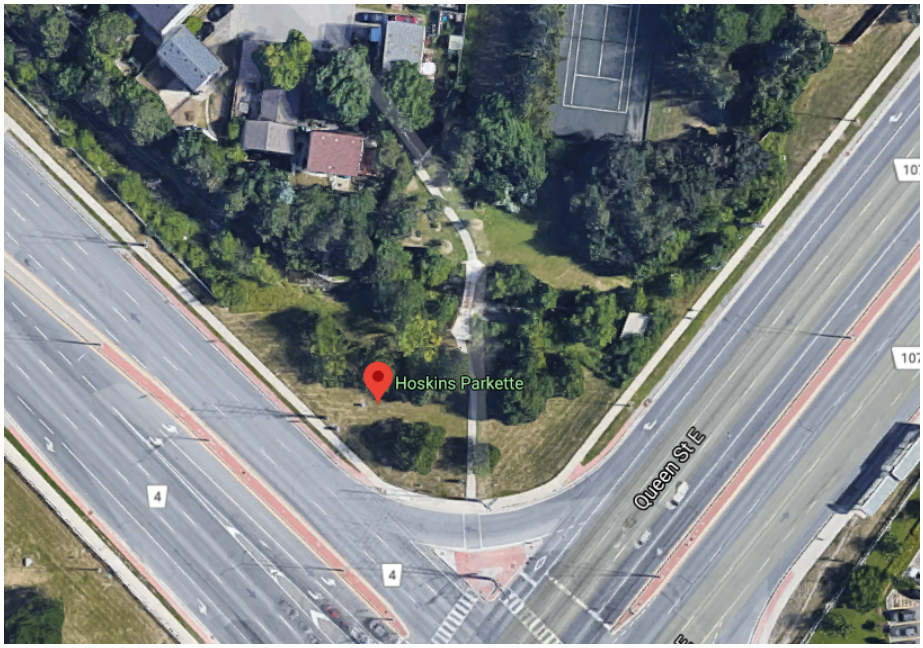
The Parks dataset was retrieved from Brampton’s Open Data on Geohub. It contained a list of 839 of Brampton’s parks.

	PARK_NAME	PARK_STATUS	PARK_TYPE	SUB_TYPE	AREA_HECT
0	THATCHER PARKETTE	ACTIVE	NEIGHBOURHOOD PARKS	VEST POCKET	
1	KINDLE PARKETTE	ACTIVE	NEIGHBOURHOOD PARKS	VEST POCKET	
2	SUNCREST PARKETTE	ACTIVE	NEIGHBOURHOOD PARKS	VEST POCKET	
3	JORGEN JENSEN PARKETTE	ACTIVE	NEIGHBOURHOOD PARKS	VEST POCKET	
4	CONESTOGA PARKETTE	ACTIVE	NEIGHBOURHOOD PARKS	PARKETTE	

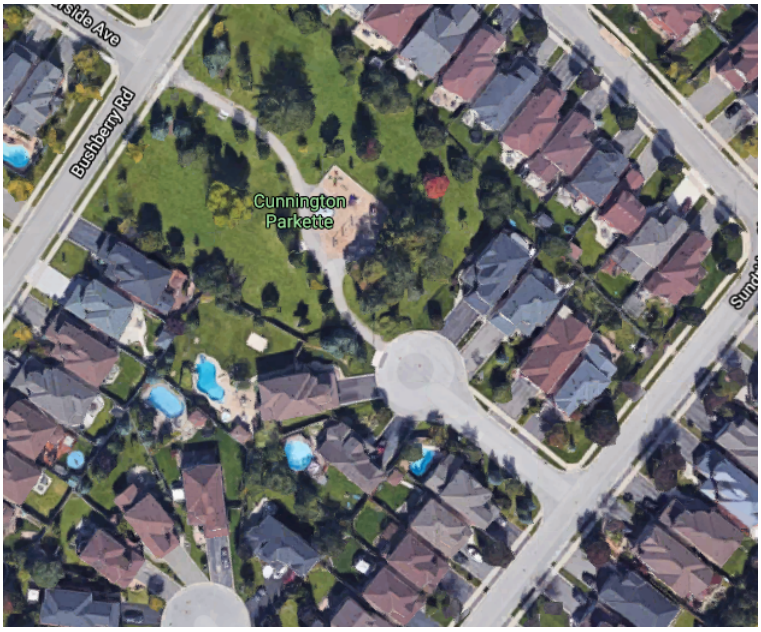
I needed to know the location of each park for the analysis in this project. I had to manually go through each park and determine the coordinates using Google Maps. This was done to filter out parks that I thought should not be included in the analysis (there were many). I found that it was difficult to find the coordinates of each park using Google's geocoding API due to the fact that the park names were not consistently registered in Google Maps. In addition, I found Brampton's GeoHub platform very difficult to work with. In general, I first used the ACCESS_POINTS column to find the parks with Google Maps satellite view and then determined if a park was present there. If in the end a park was not found then that park was removed from consideration. Sometimes I found that the "park" that I was looking for was just a small patch of grass or a very small path connecting a smaller street to a road that shouldn't qualify as a park. I removed these as well. The PARK_TYPE classifications were inconsistent and usually did not aid in determining whether or not a given park fits the mandate of this project.

Of the 839 parks I went through, I could either not find or discounted 123 "parks". There were many examples of so-called "parks" that I found should not qualify for my list, even if some of them may have fit the definition of a park. Here are two examples of parks that I removed from my list. The first example is a small pathway connecting a minor road to Kennedy. The second example connects a minor road to a major intersection. I felt that these did not fit the mandate of the project.





Here is a good example of a park.



Note that it isn't a park just because of the swing set and sandbox, these aren't necessary, but this example also includes free green space for any general recreation usage.

	PARK_NAME	AREA_HECTARES	Latitude	Longitude
0	SUNCREST PARKETTE	0.370	43.693096	-79.790422
1	JORGEN JENSEN PARKETTE	0.091	43.727332	-79.791506
2	RC CHARLTON PARK	0.791	43.647689	-79.760273
3	PICKARD PARK	1.344	43.681801	-79.797636
4	GARBUTT PARKETTE	0.178	43.669562	-79.781612

Finally, I was able to get a list of 716 parks and their coordinates.

2.2 Address Points

The Address Points dataset was also retrieved from Brampton's Open Data on Geohub. It contained a list of 220,000 or so of Brampton's address points. From these, I was able to remove the address points that were not labeled as residential. Unfortunately, many of the addresses, about 118,000, lacked a label and so were not removed. This introduced a source of error because many of the address points used were not houses even though that was the goal.

I was able to convert the coordinates for each address point to latitude and longitude for ease of use.

	FULL_ADDRESS	POSTAL_CODE	PERMIT_TYPE	WARD	Latitude	Longitude
0	4 ANSBURY DR	L7A3S8	Repeat Residential	6.0	43.711492	-79.823719
1	6 ANSBURY DR	L7A3S8	NaN	6.0	43.711533	-79.823863
2	8 ANSBURY DR	L7A3S8	Repeat Residential	6.0	43.711575	-79.824015
3	142 BONISTEL CRES	L7A3H1	Repeat Residential	6.0	43.696703	-79.812413
4	21 LEAGATE ST	L7A1Z7	Repeat Residential	6.0	43.681749	-79.822541

2.3 Key Calculations

For this project, I decided a key metric would be the distance to the closest park for each house. So I proceeded to calculate in kilometers the shortest distance to one of the 700 or so parks for the 200,000 or so address points.

	FULL_ADDRESS	POSTAL_CODE	PERMIT_TYPE	WARD	Latitude	Longitude	nearest_park_distance
0	4 ANSBURY DR	L7A3S8	Repeat Residential	6.0	43.711492	-79.823719	0.177782
1	6 ANSBURY DR	L7A3S8	NaN	6.0	43.711533	-79.823863	0.169235
2	8 ANSBURY DR	L7A3S8	Repeat Residential	6.0	43.711575	-79.824015	0.160937
3	142 BONISTEL CRES	L7A3H1	Repeat Residential	6.0	43.696703	-79.812413	0.262320
4	21 LEAGATE ST	L7A1Z7	Repeat Residential	6.0	43.681749	-79.822541	0.232539

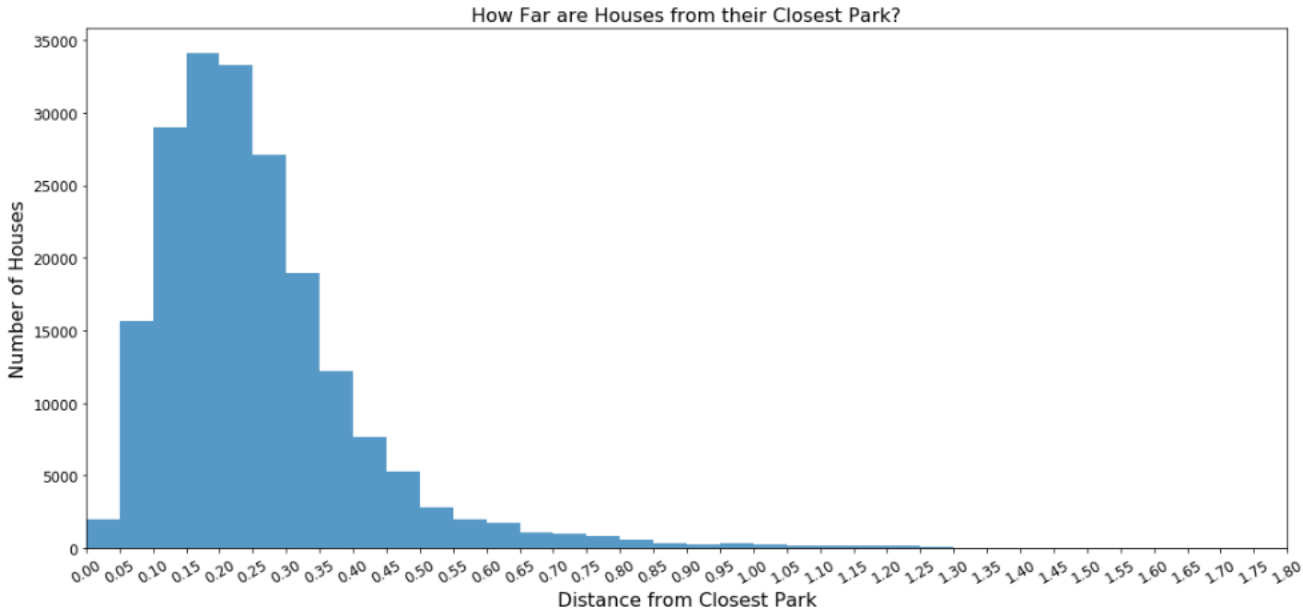
3. Analysis

There are of course 3 major sources of error.

- Using coordinates means that both parks and houses are treated as single points, rather than large areas.
- Distance numbers are misleading to citizens because although a park might be some distance away, this is a point-to-point distance and does not represent the distance that a citizen would have to walk to get to a park from their house (sidewalks do not exist as straight paths from house to park).
- As mentioned earlier, many of the address points used are not necessarily residential address points, but they nonetheless are assumed to represent houses.

On average, I found the address points considered are about 261 meters away from a park. And 75% of address points considered are less than 318 meters away from a park. Of course, the

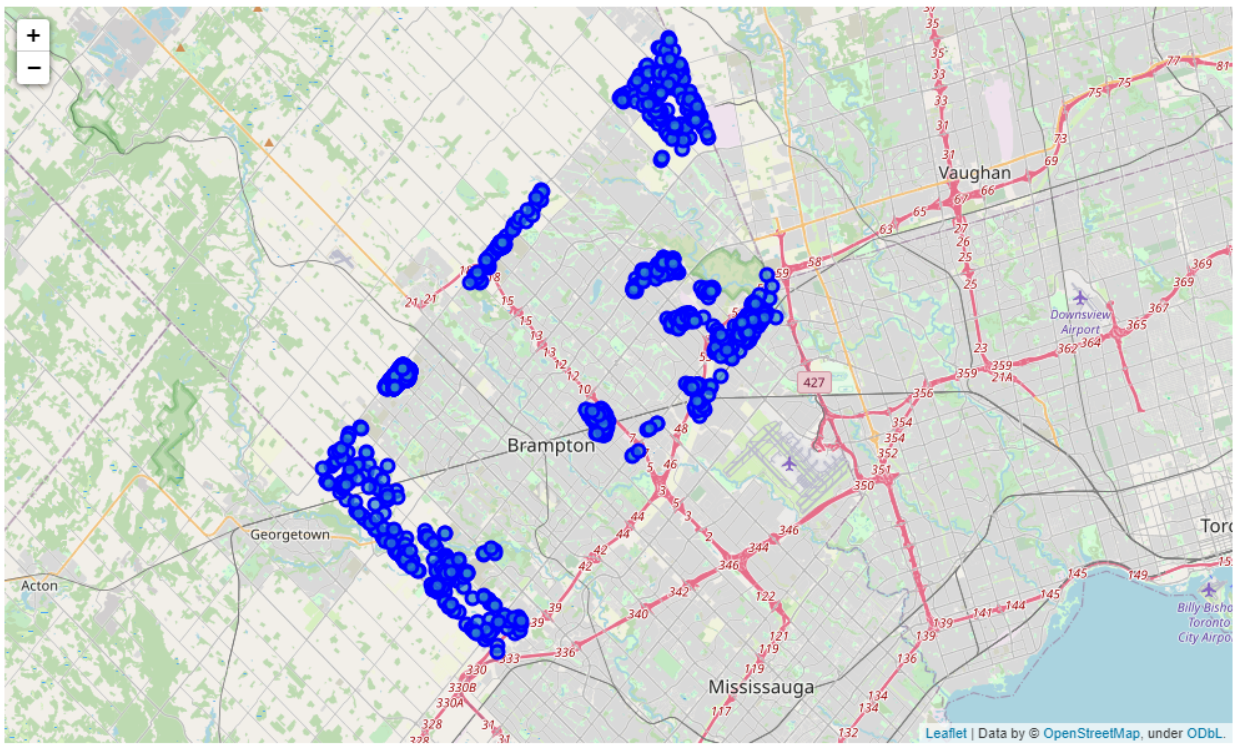
smaller the numbers the better, but these numbers seem reasonable. Taking a look at a histogram of how far the address points considered are from their closest park:



There seem to be many address points that are a sufficiently small distance away from a park (again though, the smaller the better). However, one thing to note in the histogram is the steady decline in frequency after the peak. There are many address points in the analysis that are disproportionately far from a park and this needs to be further looked into.

I decided to use K Means clustering to group the address points by how far away they are from the nearest park. I used 4 clusters to group the address points. I then took a closer look at the cluster with address points furthest away from the nearest park. I would like to point out that it is also fruitful to look at the second cluster with address points furthest away from the nearest park. I carefully looked at one to show how the data can be used to inform decisions.

I then plotted the address points of this cluster on a map of Brampton.

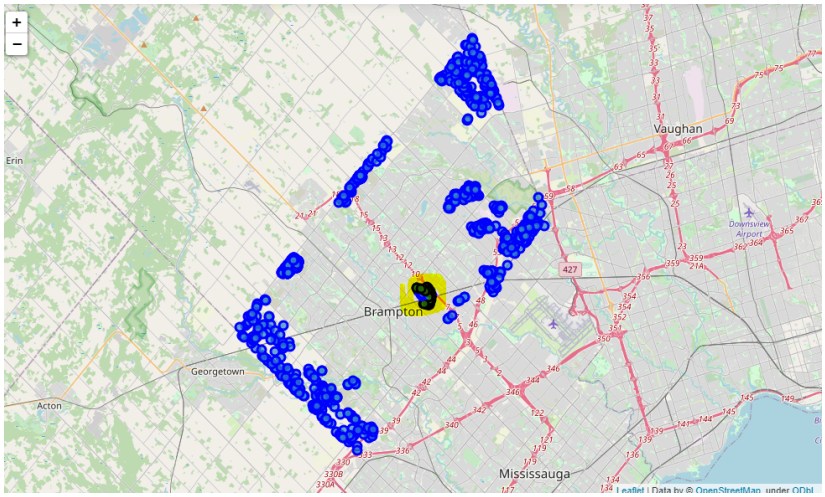


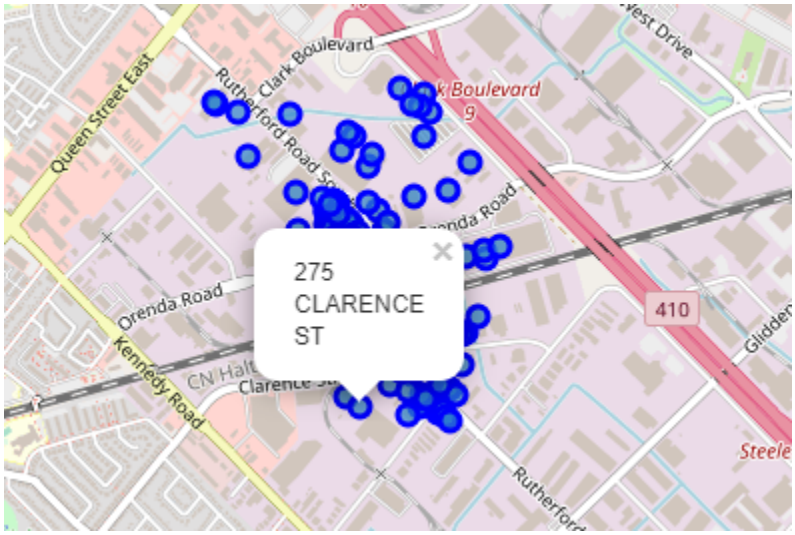
4. Results and Discussion

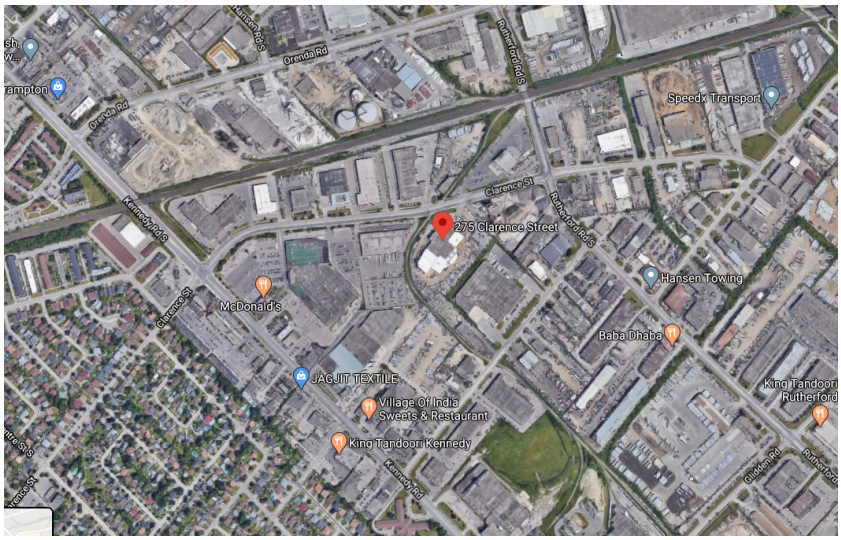
The cluster with address points furthest away from a park had address points an average of 1.18 kilometers away from the nearest park. Keep in mind that even if a park is 1.18 kilometers away, it will inevitably be a significantly longer walk to get there because paths rarely run in a straight line from an arbitrary point A to an arbitrary point B.

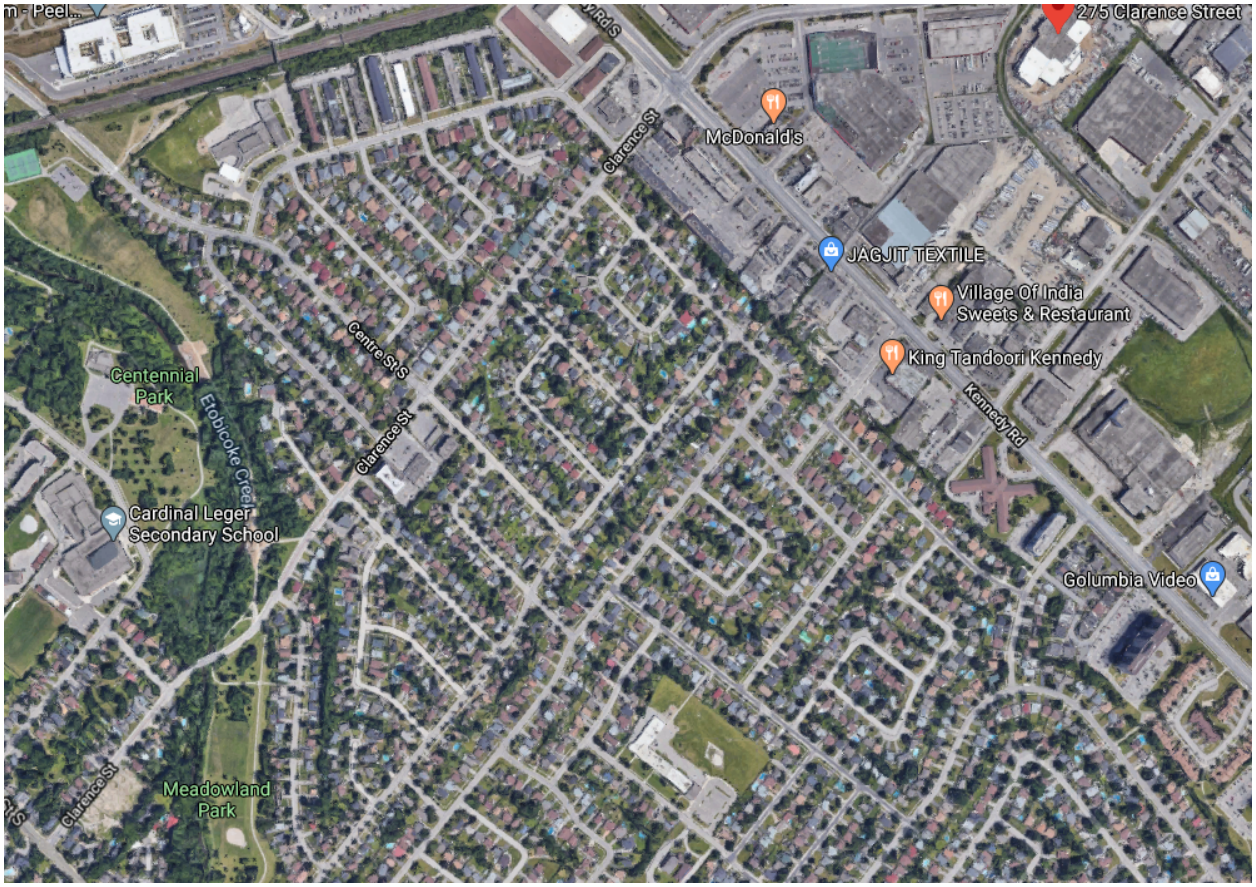
Taking a look at the map above, we can pick up on a few things. The first thing to note is that most of the address points far away from parks are on the outskirts of Brampton. This can be explained away by the fact that since the data is looking at Brampton's parks only, the outskirts of Brampton will be affected the most.

What else can be gained from the map are the handful of dense groupings within the city. These are the points of interest in this project. Taking a look at the highlighted groups of address points.


Vaughan
Brampton
Georgetown
Acton
Mississauga
427


Queen Street East
Rutherford Road South
Clark Boulevard
Orenda Road
Kennedy Road
275
CLARENCE
ST
410
Steele


275 Clarence Street
Speedx Transport
Hansen Towing
McDonald's
Baba Bhaba
JAGJIT TEXTILE
Village Of India
Sweets & Restaurant
King Tandoori Kennedy
Clarence St
Orenda Rd
Kennedy Rd



It seems that the actual points of the cluster are not all houses. Regardless, the area is a problem area because of a lack of parks. It is important to recognize these areas and provide solutions for their residents. The nearby houses live in an ugly area looking through the lens of proximity to parks. I recognize that there is the Etobicoke Creek trail nearby with its parks, but many of the residents here face an almost 2km walk through endless houses to get to any sort of real greenery. It seems to be difficult to add any parks because of the densely built houses and buildings. City planners should look to add greenery to what looks like a grey mess from the satellite view. Repurposing some of the space for recreation, a targeted gardening program, or having initiatives for better lawns for the people who live here could be fruitful endeavours.

5. Conclusion

I hope that through this sort of analysis, citizens of Brampton can be better provided with essential outdoor recreation space. Parks are great faucets for mental health and physical well-being. The analysis in this project is helpful in identifying problem areas and citizens who are in need of more greenery. I hope that the growing Flower City can work to better provide its citizens with essential parks.

Citations

City of Brampton. (2020). *Address Points*. Retrieved May 15, 2020 from https://geohub.brampton.ca/datasets/address-points

City of Brampton. (2020). *Parks*. Retrieved May 10, 2020 from https://geohub.brampton.ca/datasets/parks

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Oregon State University. (2005). Study Links Obesity, Urban Sprawl. *ScienceDaily.* Retrieved May 7, 2020 from www.sciencedaily.com/releases/2005/09/050909220354.htm

Sturm, R., & Cohen, D. (2014). Proximity to urban parks and mental health. *The journal of mental health policy and economics*, 17(1), 19–24.