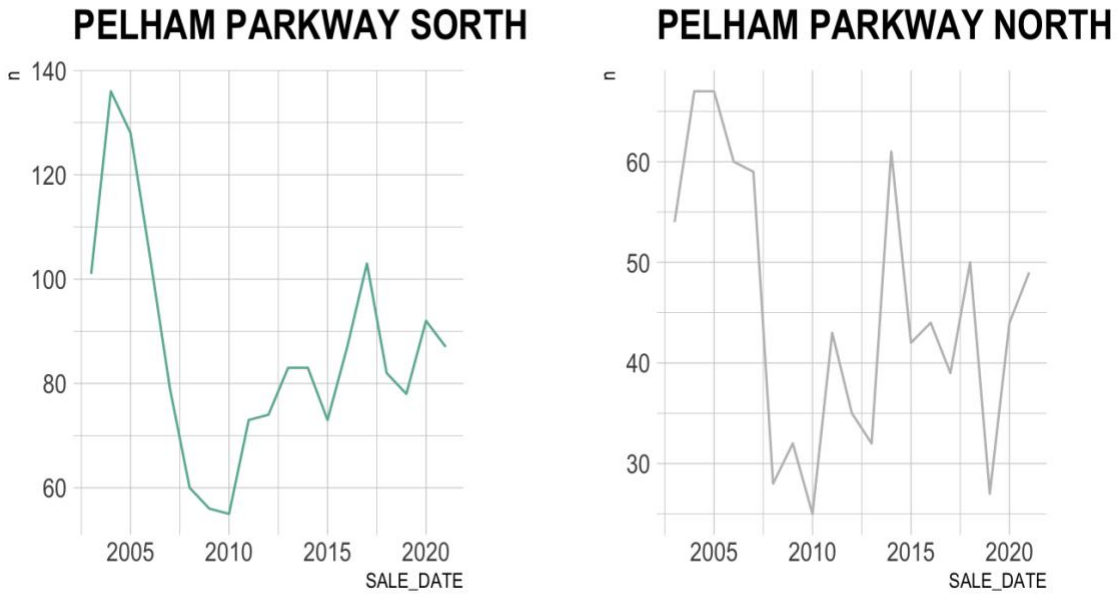
NYC Real Estate Analytics Project- Data Manipulation

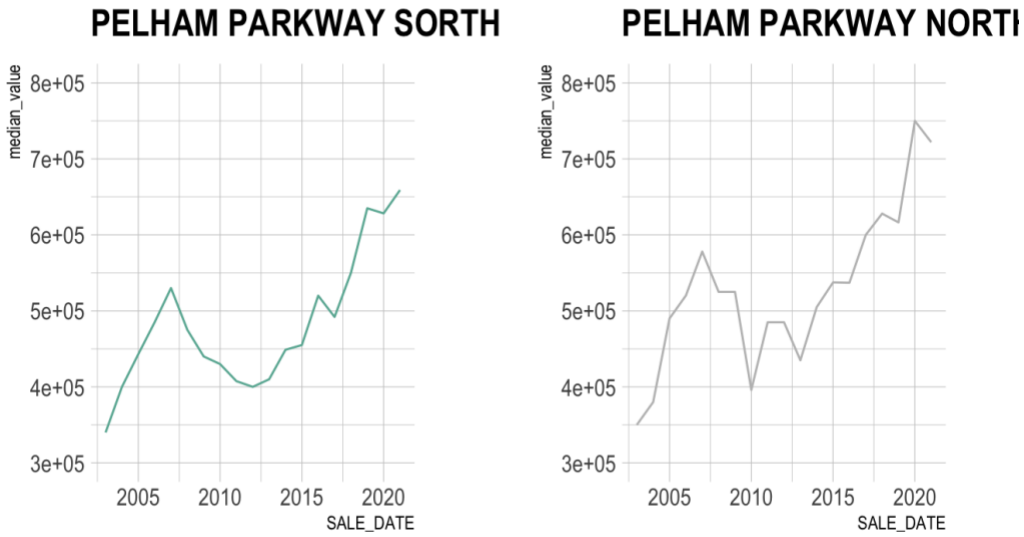
KPI analysis

KPI 1: Annual Sales Count of residential properties.



In terms of Annual Sales Count of residential properties, Pelham parkway south and Pelham parkway north have almost shown the same trend in these years. Reaching the highest value in 2005, then declining to reach the lowest value in 2010, followed by a gradual upward trend

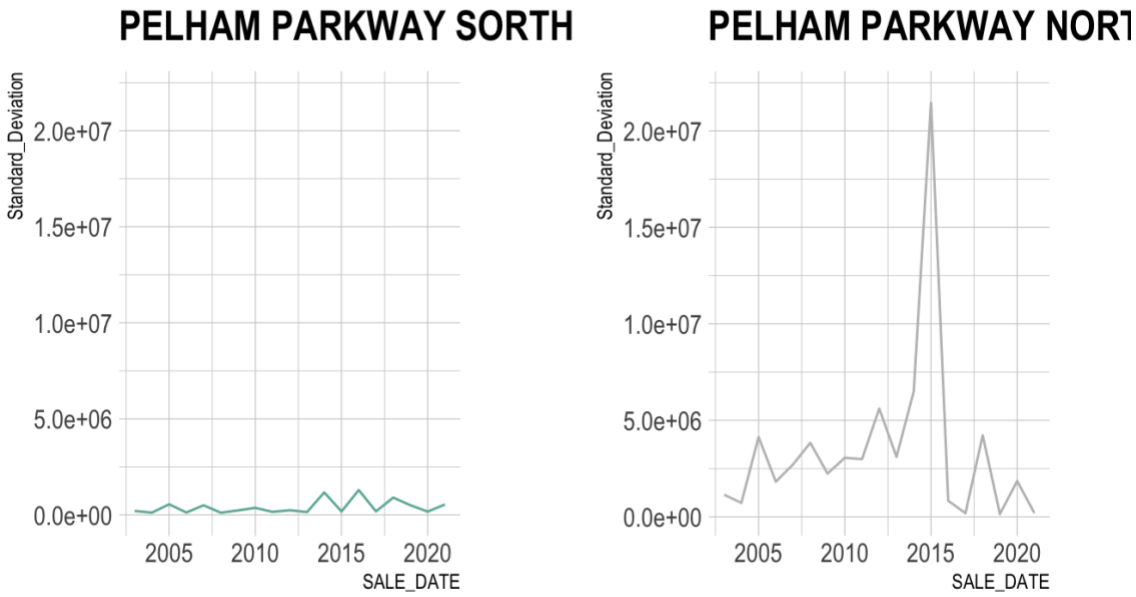
KPI 2: Annual Median Sale Price of residential properties.



In Annual Median Sale Price of residential properties
above,South and North also showed almost the same trend. In 2005, they started to rise first, then dropped, and finally showed an upward trend.

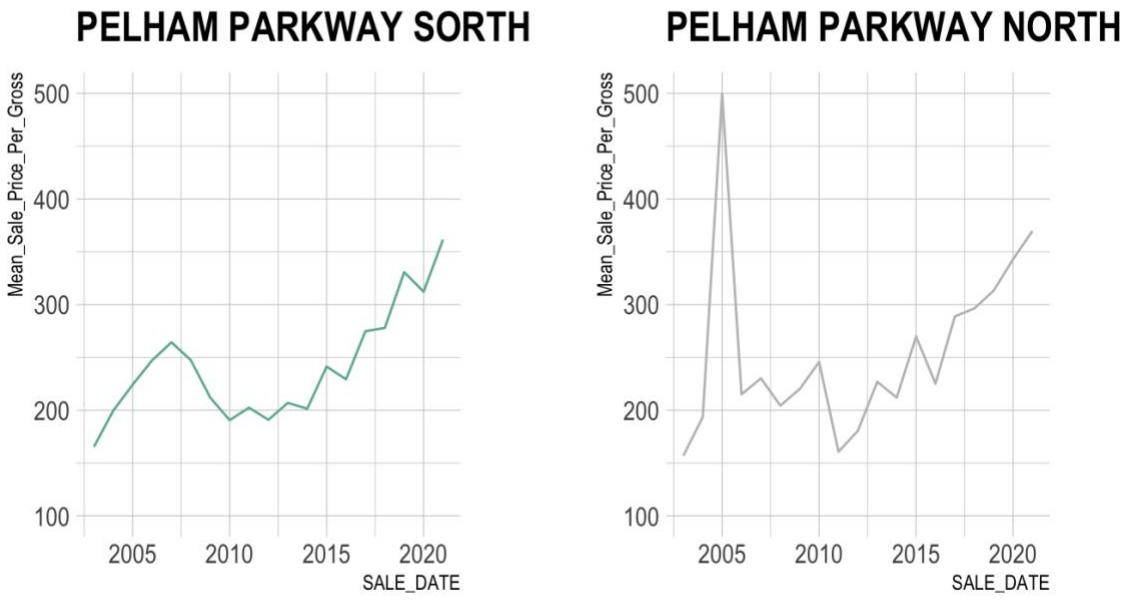
KPI 3: Annual Standard Deviation of Sales Prices of residential properties.

However, in the Annual Standard Deviation of Sales Prices of residential properties, the trends of South and North are completely different. The change of South is very small, which means that the difference in house prices in the area is very small, while the change of North is larger, reaching 2015 peak.



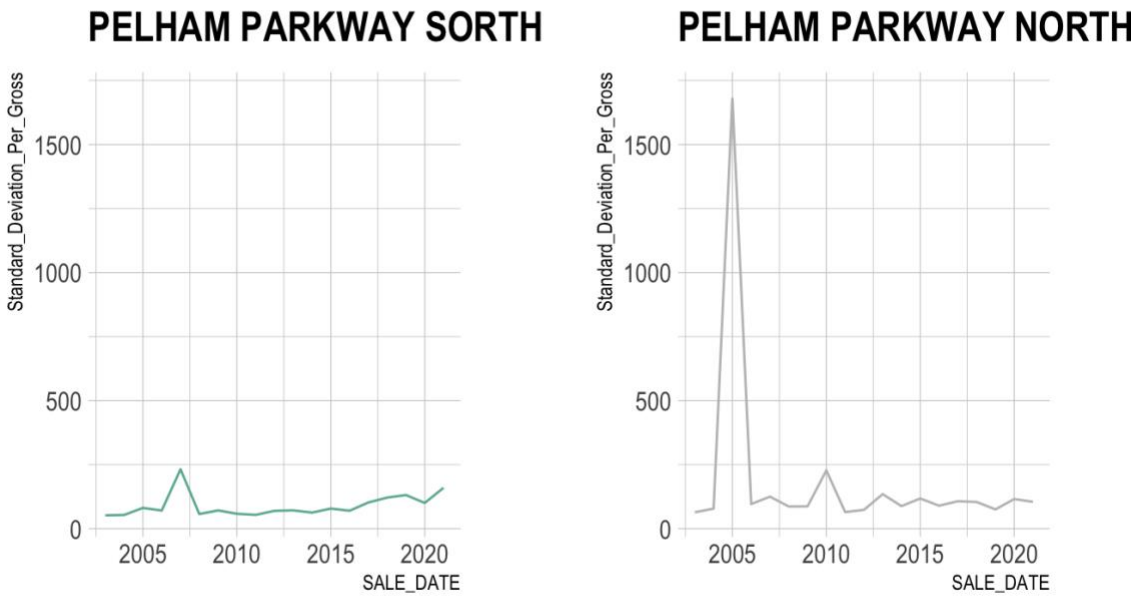
KPI 4: Annual Mean Sale Price Per Gross Square Foot of residential properties.

The Annual Mean Sale Price Per Gross Square Foot of residential properties shows almost the same trend as the Annual Median Sale Price of residential properties.



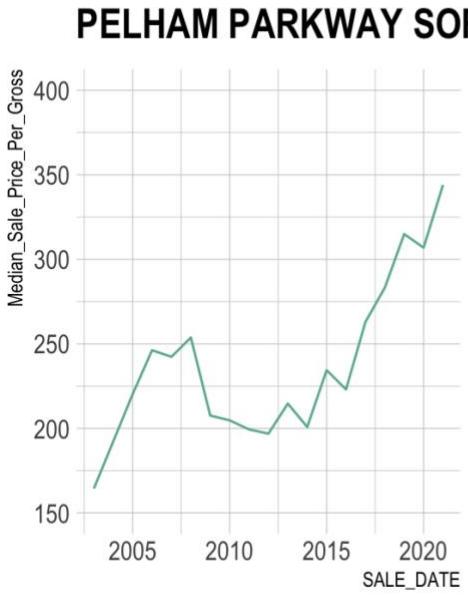
KPI 5: Annual Standard Deviation of Sale Price Per Gross Square Foot of residential properties.

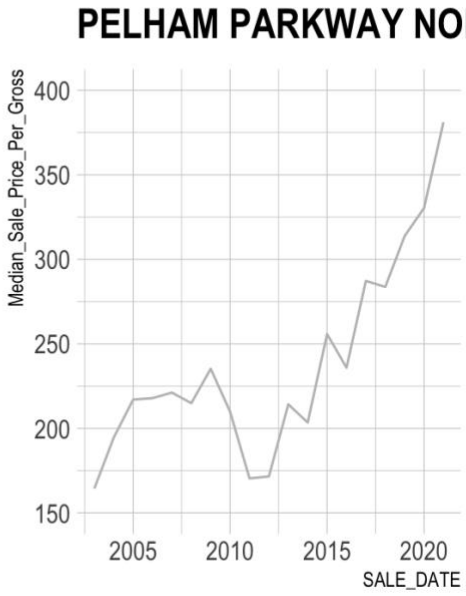
In the Annual Standard Deviation of Sale Price Per Gross Square Foot of residential properties, south tends to be stable, while north has relatively large changes around 2005.



KPI 6: Annual Median Sale Price Per Gross Square Foot of residential properties

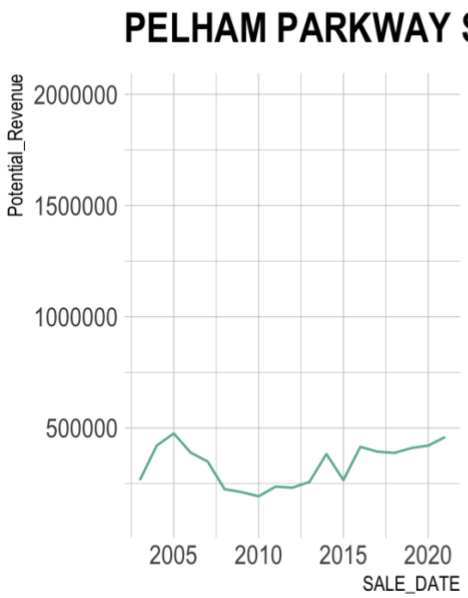
In terms of Annual Median Sale Price Per Gross Square Foot of residential properties, the trends of the two are basically the same as Annual Mean Sale Price Per Gross Square Foot of residential properties.

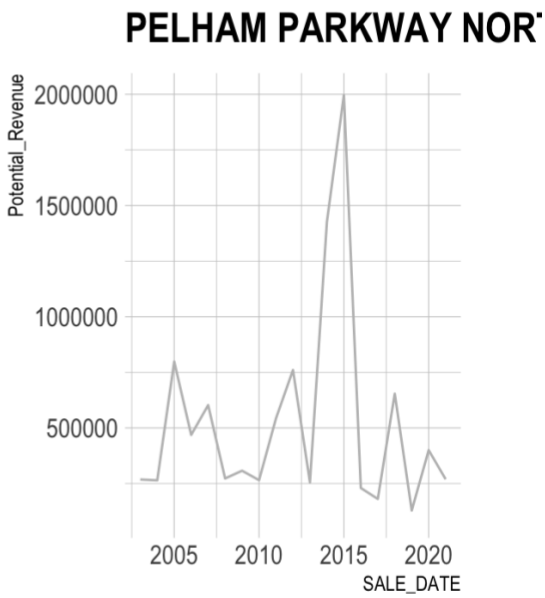




Potential Revenue

In terms of Potential Revenue, overall north is obviously higher than south, and the range of changes is also larger, reaching a peak in 2015.

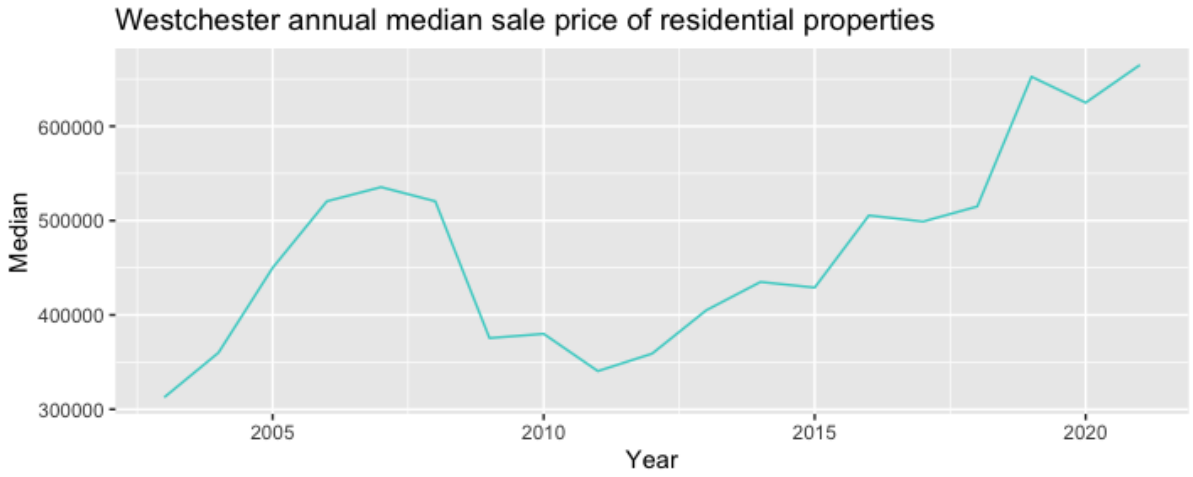


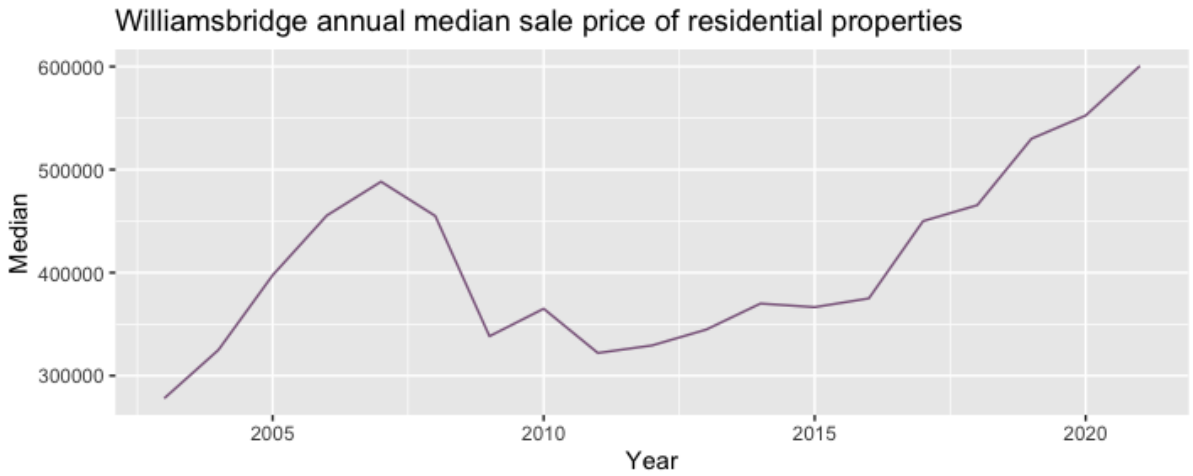


KPI 1: Annual Sales Count of residential properties

In terms of Annual Sales Count of residential properties, Westchester and Williamsbridge show relatively the same trend of growth over years, except from 2015 to 2020. Williamsbridge's annual sales count increased from 2015 to 2018 and decreased from 2018 to 2020, but Westchester's growth was more turbulent.

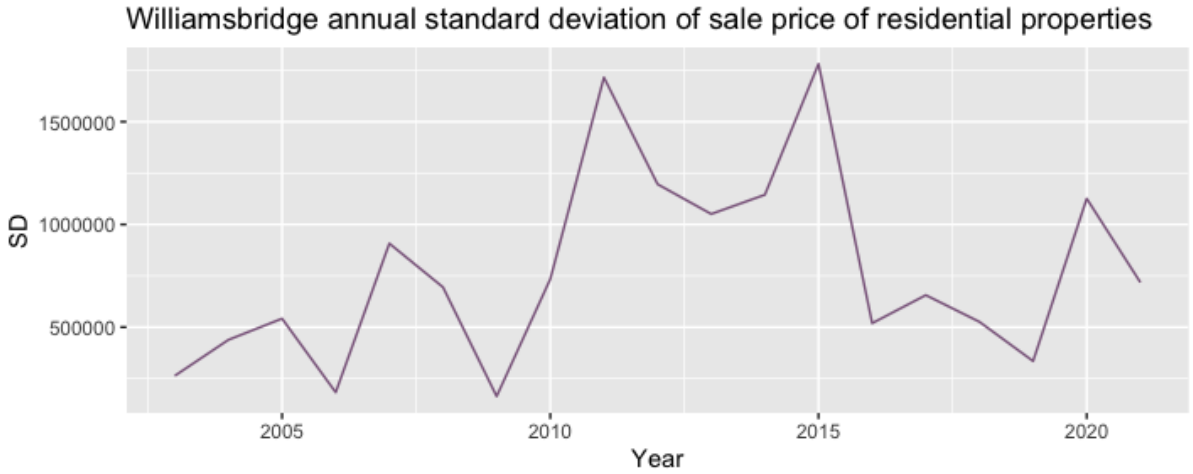
KPI 2: Annual Median Sale Price of residential properties





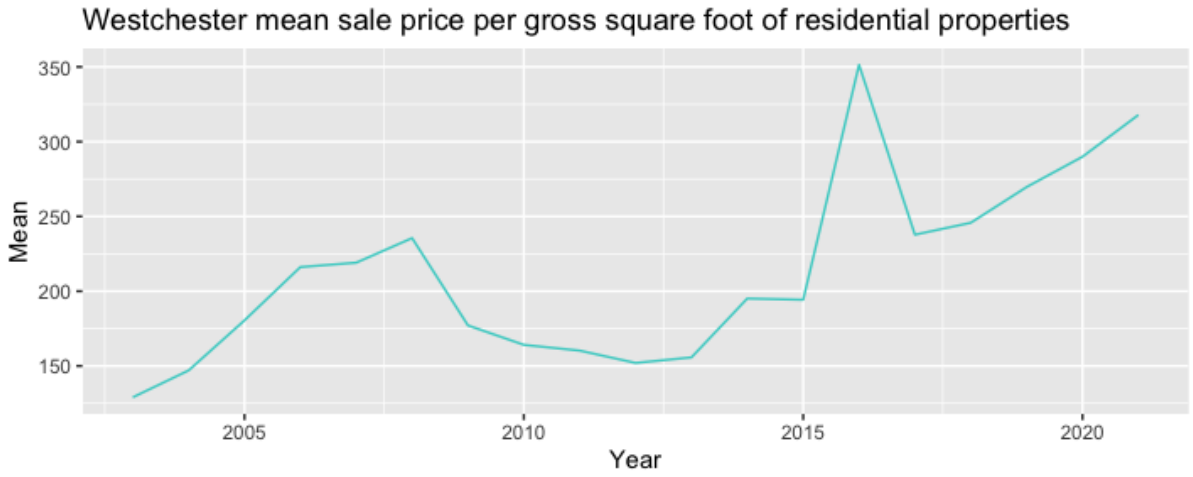
In terms of annual median sale, Westchester and Williamsbridge were almost the same. Westchester's figure revealed that there was a steeper increase from 2018 to 2019, and also a steeper decline from 2019 to 2020.

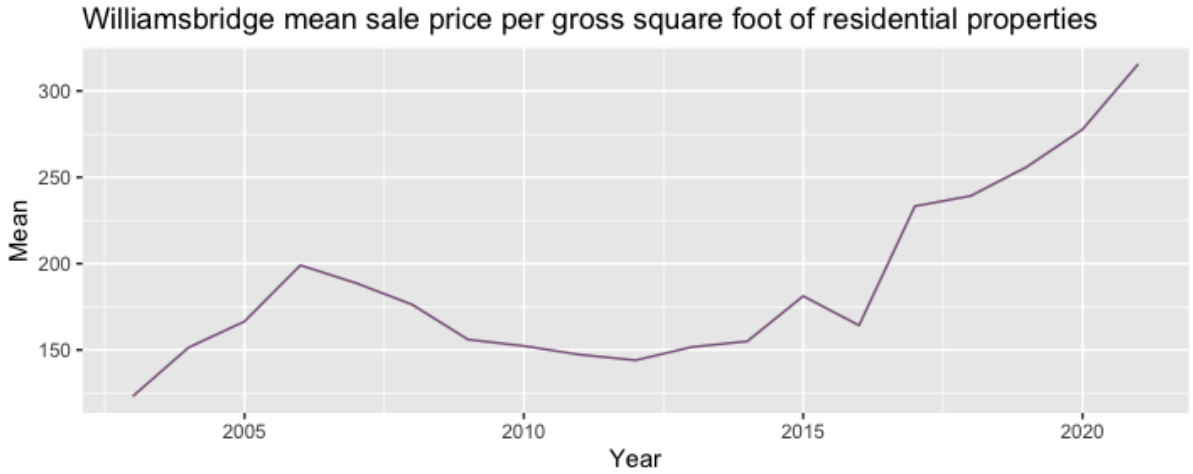
KPI 3: Annual Standard Deviation of Sales Prices of residential properties



We can observe that annual standard deviation of sale price of residential properties in Williamsbridge from 2009 to 2011 experienced a marked increase, while Westchester experienced a marked increase from 2013 to 2014.

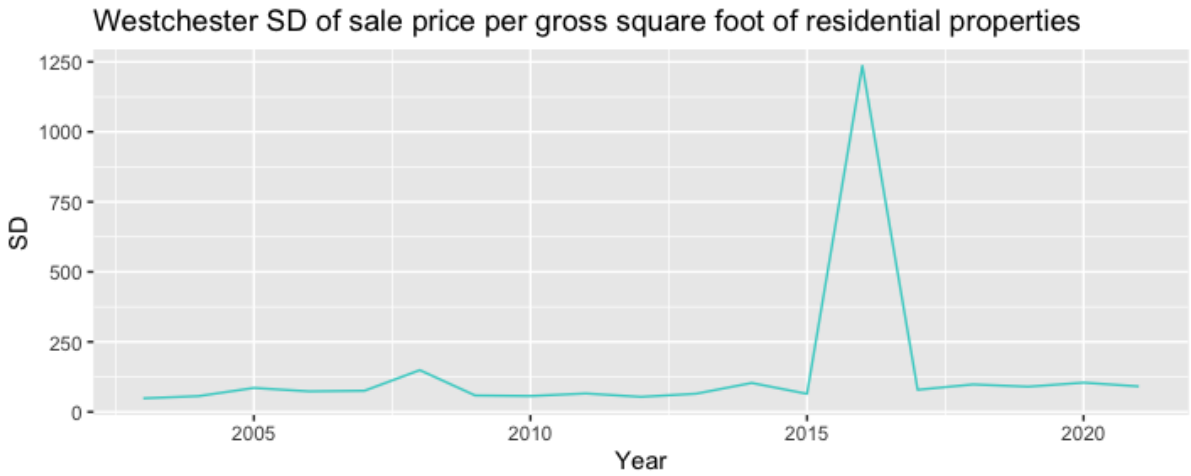
KPI 4: Annual Mean Sale Price Per Gross Square Foot of residential properties

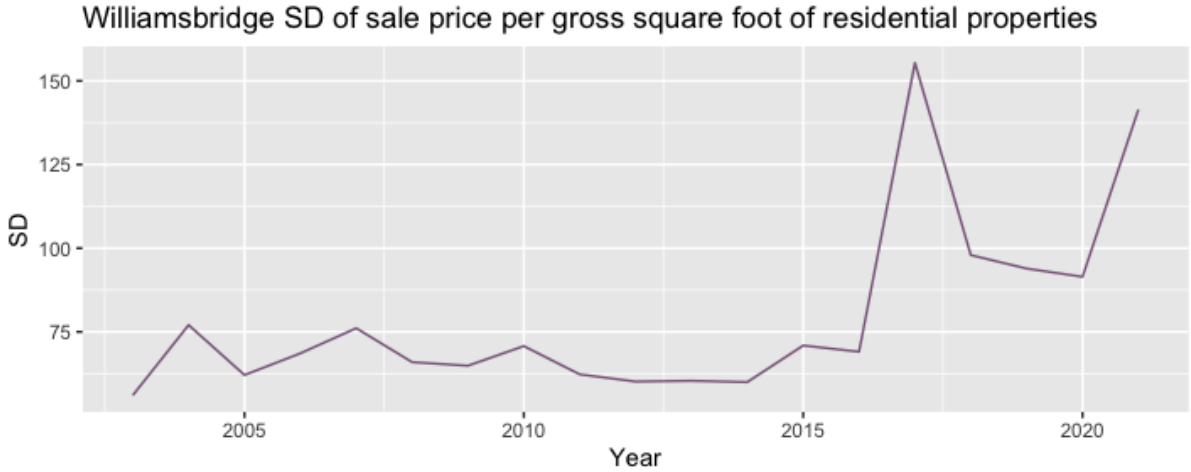




In the year of 2015, Westchester and Williamsbridge showed quite different trends. In Westchester, the mean sale price increased sharply from 2015 to 2016, and declined from 2016 to 2017. However, in Williamsbridge, we observed a decline from 2015 to 2016, and a rise from 2016 to 2017. Both of them had increased from 2017.

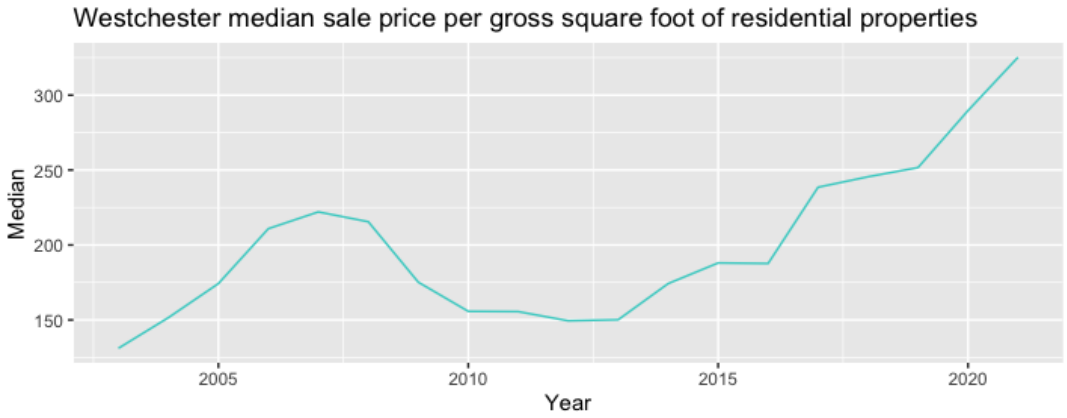
KPI 5: Annual Standard Deviation of Sale Price Per Gross Square Foot of residential properties

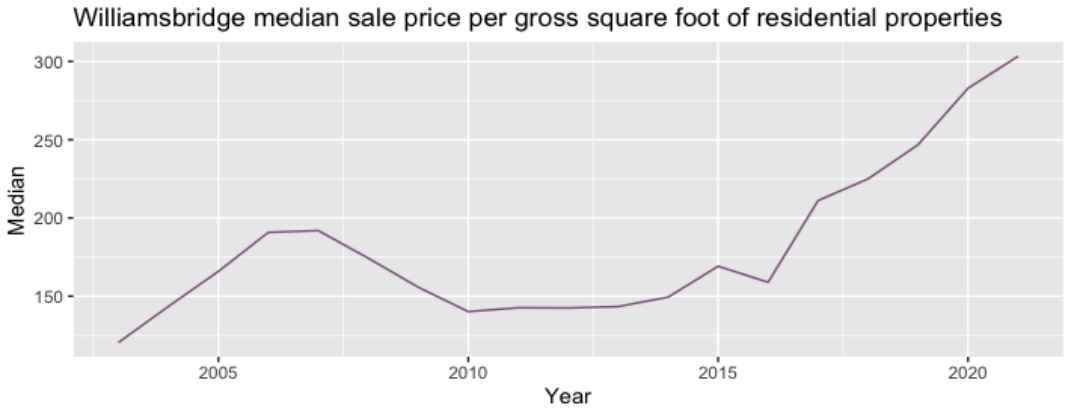




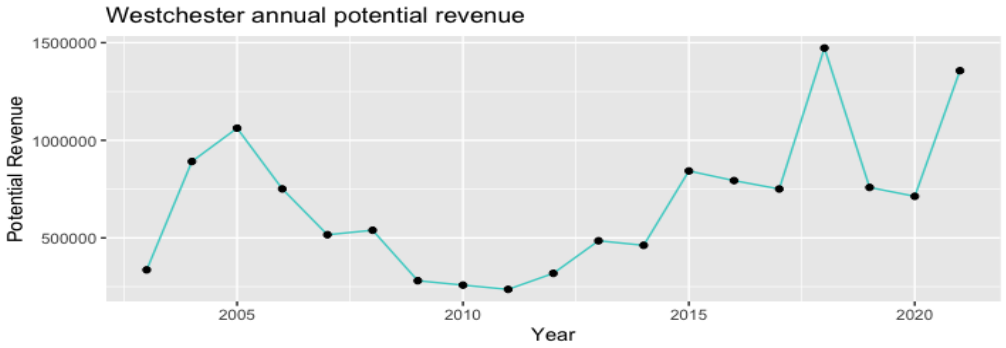
The graph showed that there has been a steep rise in the standard deviation of sale price per gross square foot of residential properties from 2015 to 2016 in Westchester. Unlike Williamsbridge, the trend is relatively flat from 2017 in Westchester.

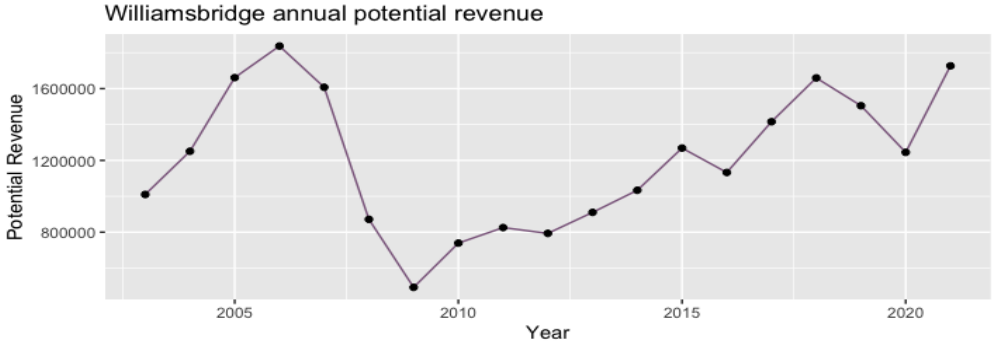
KPI 6: Annual Median Sale Price Per Gross Square Foot of residential properties



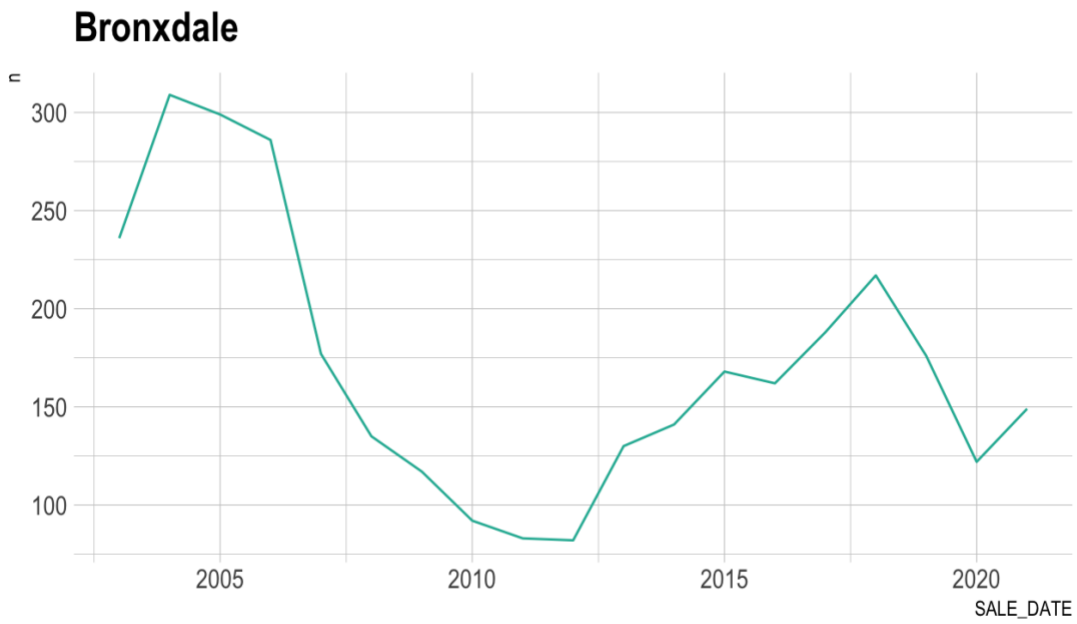


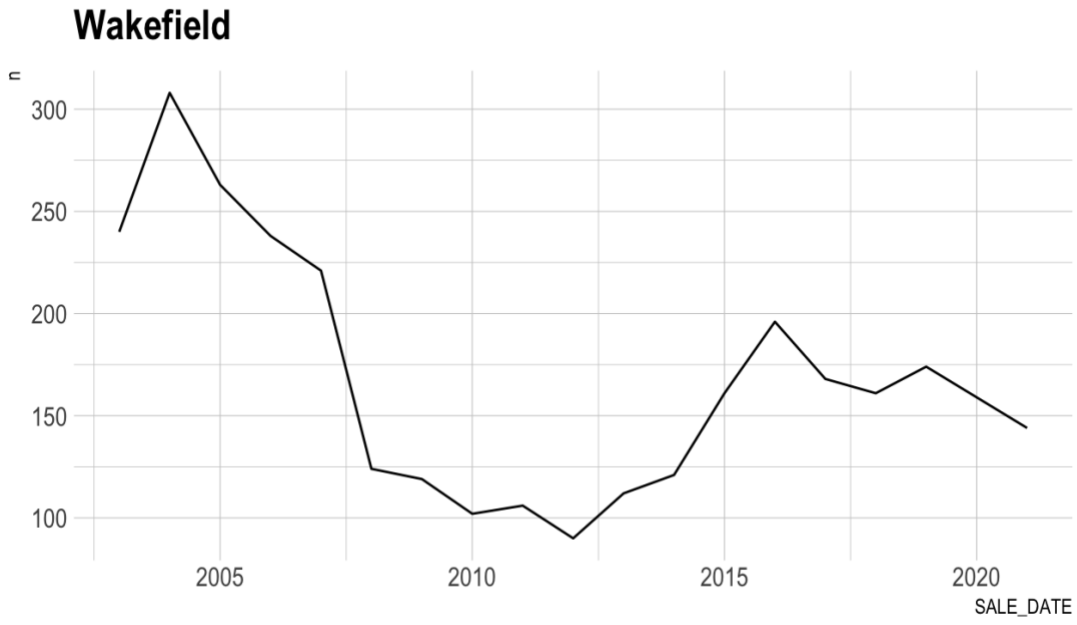
Potential Revenue



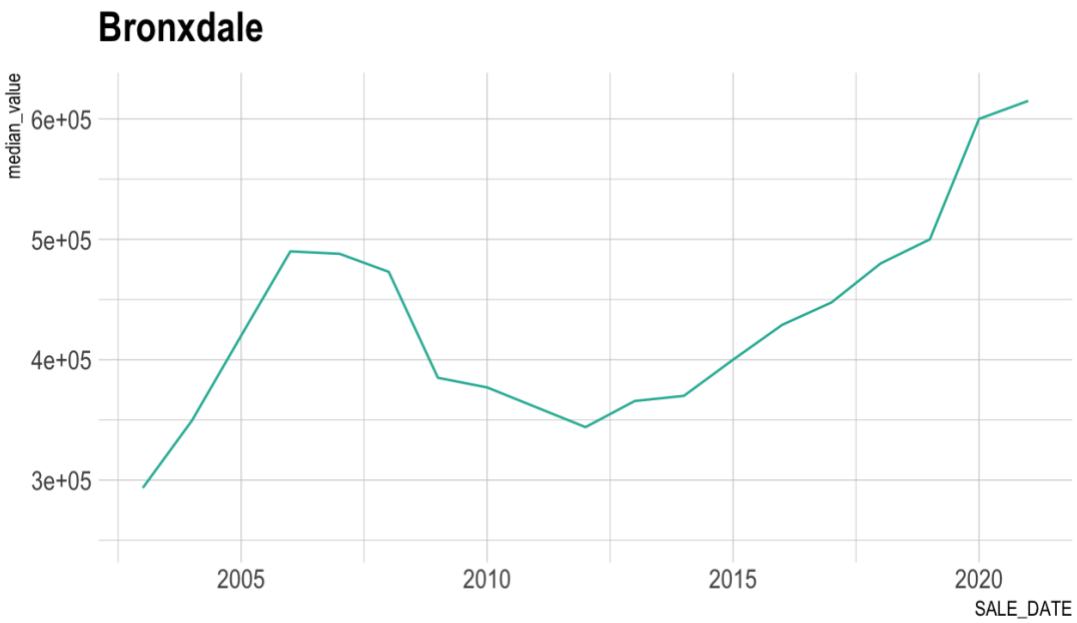


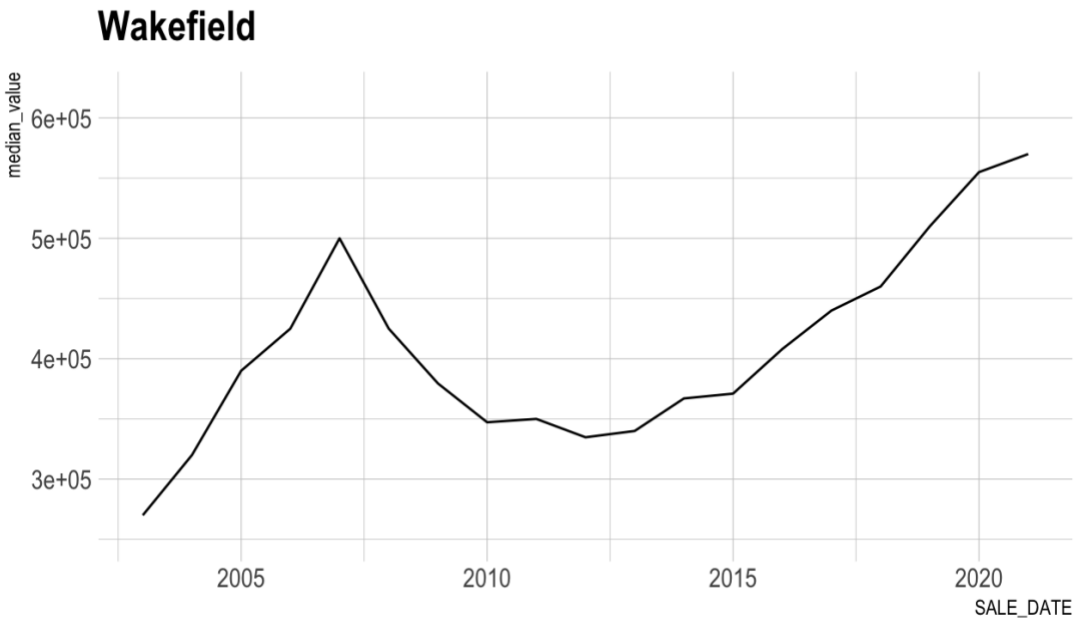
KPI 1: Annual Sales Count of residential properties.



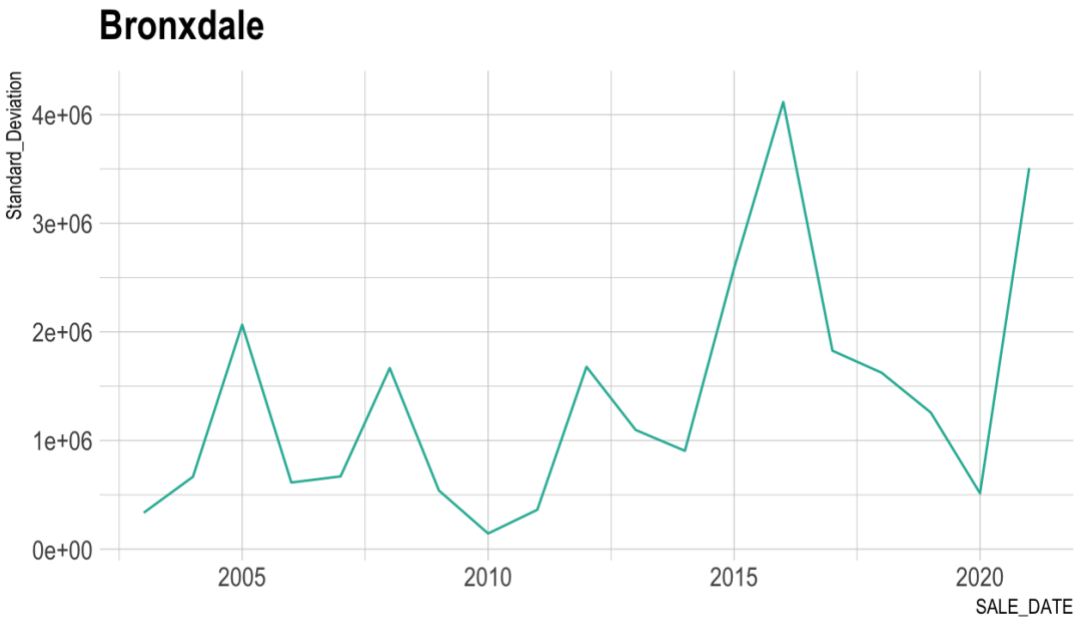


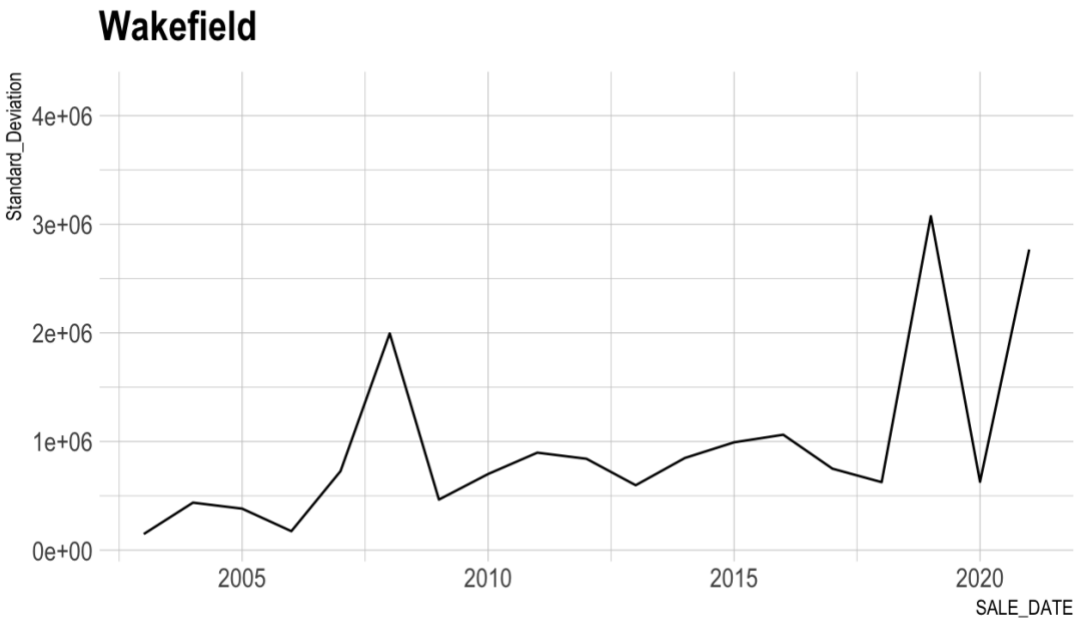
KPI 2: Annual Median Sale Price of residential properties.



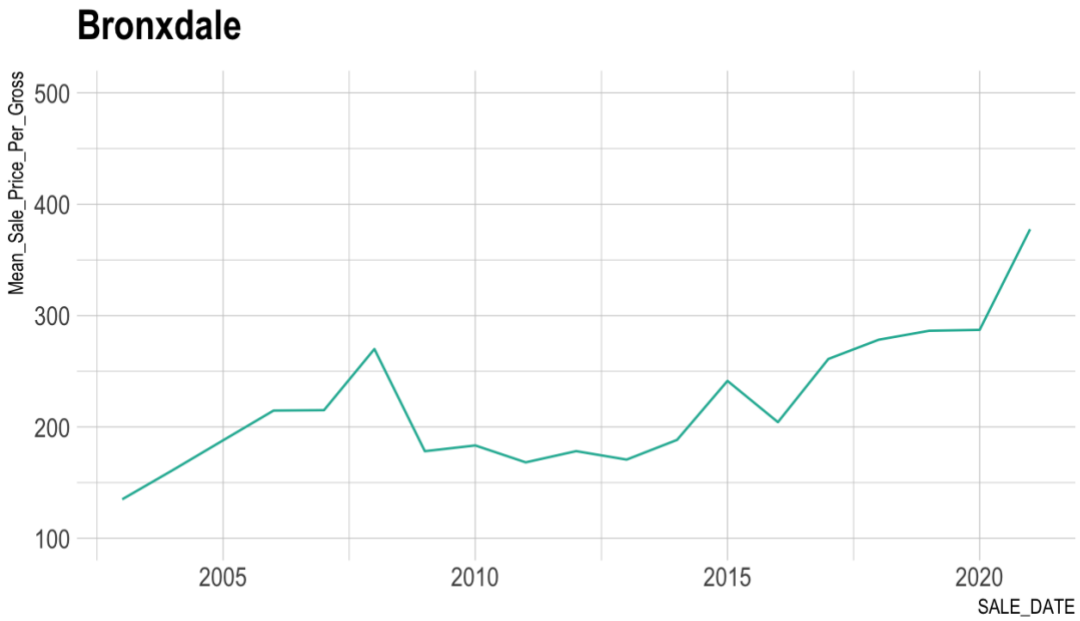


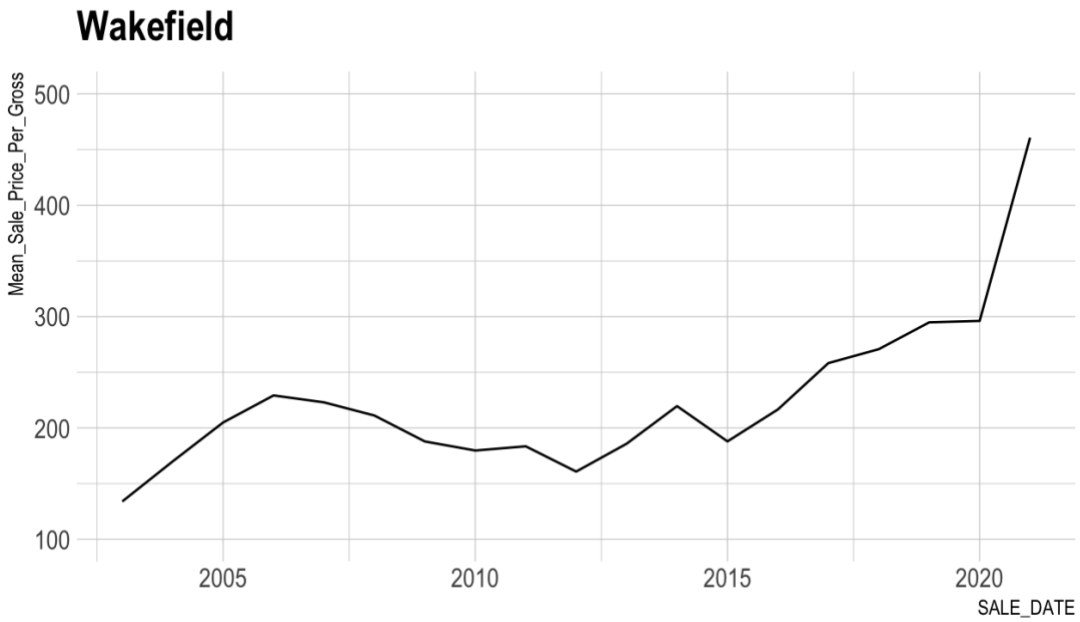
KPI 3: Annual Standard Deviation of Sales Prices of residential properties.



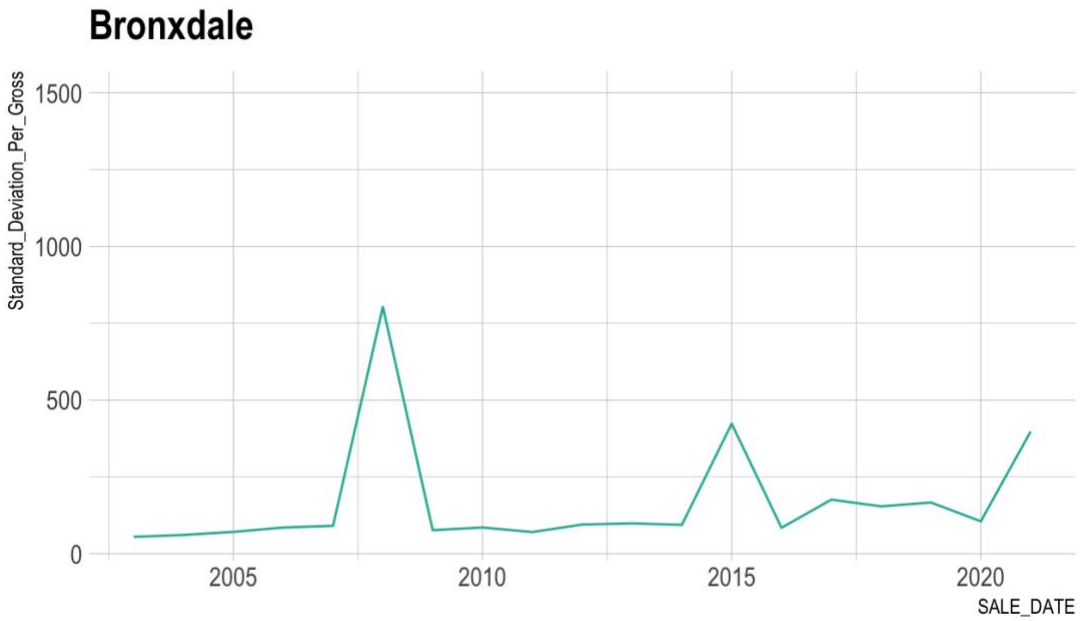


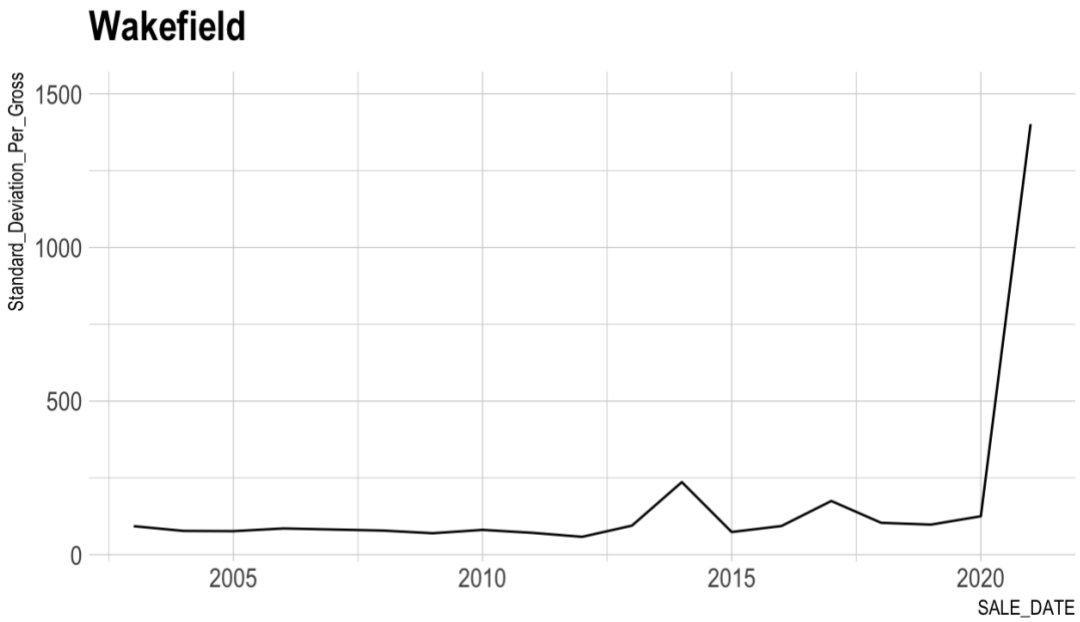
KPI 4: Annual Mean Sale Price Per Gross Square Foot of residential properties.



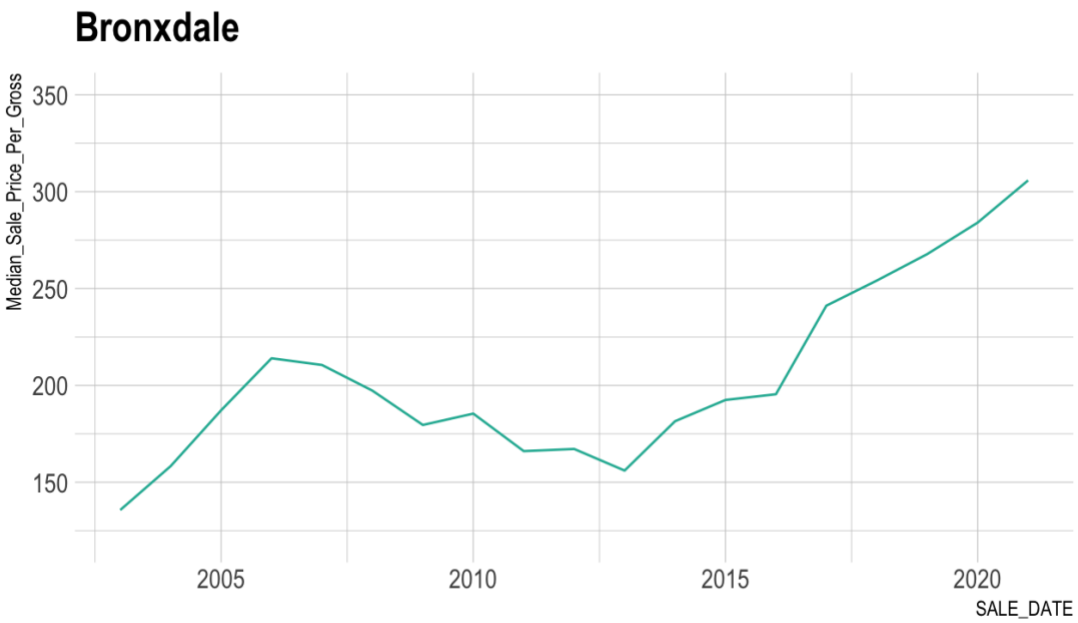


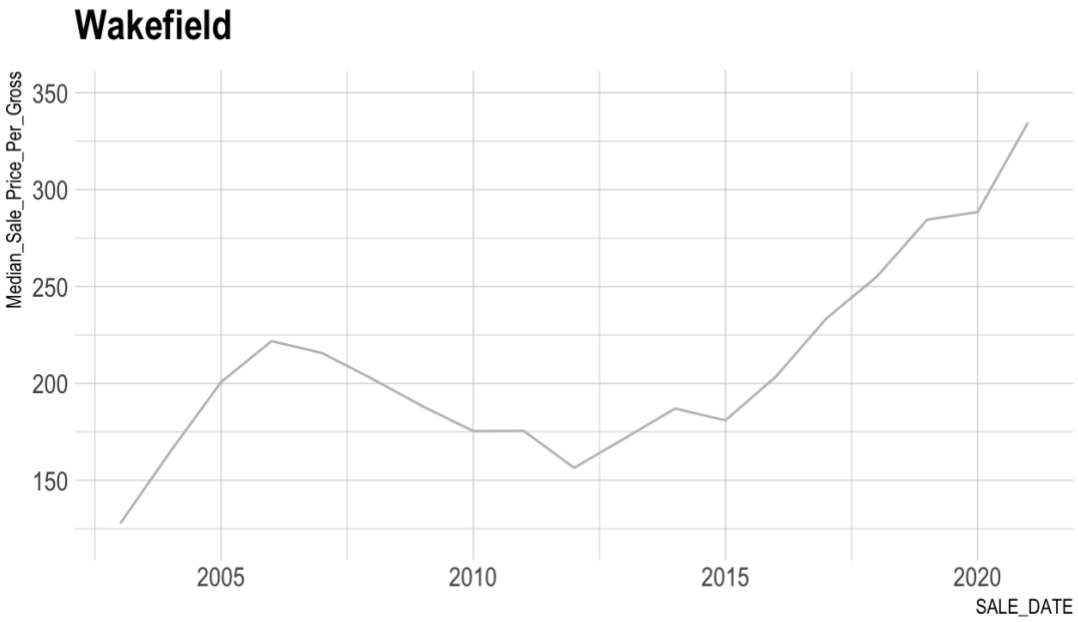
KPI 5: Annual Standard Deviation of Sale Price Per Gross Square Foot of residential properties.



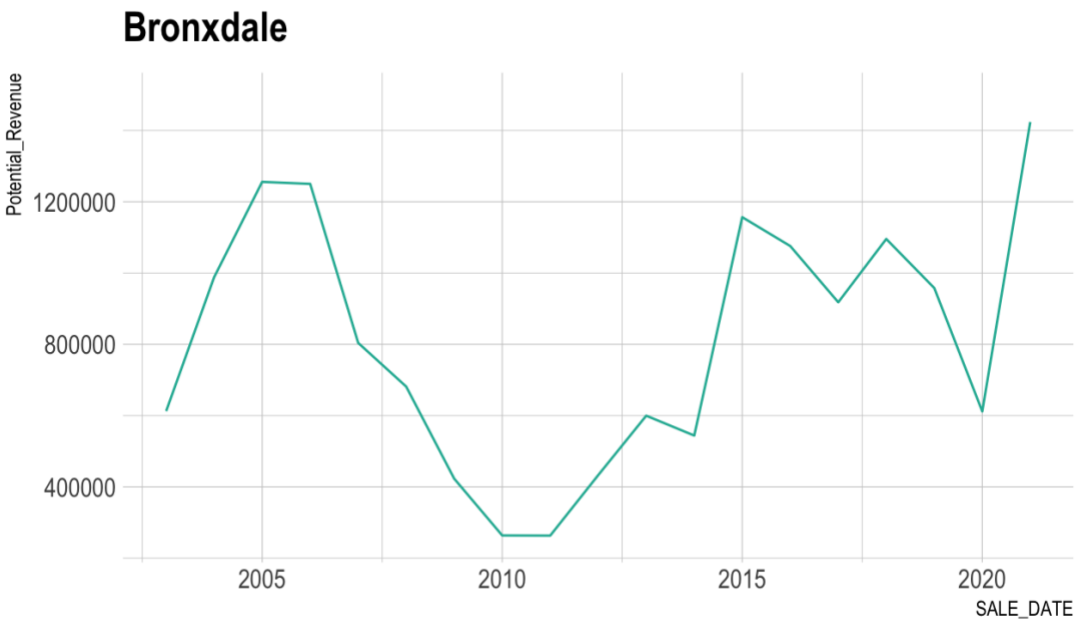


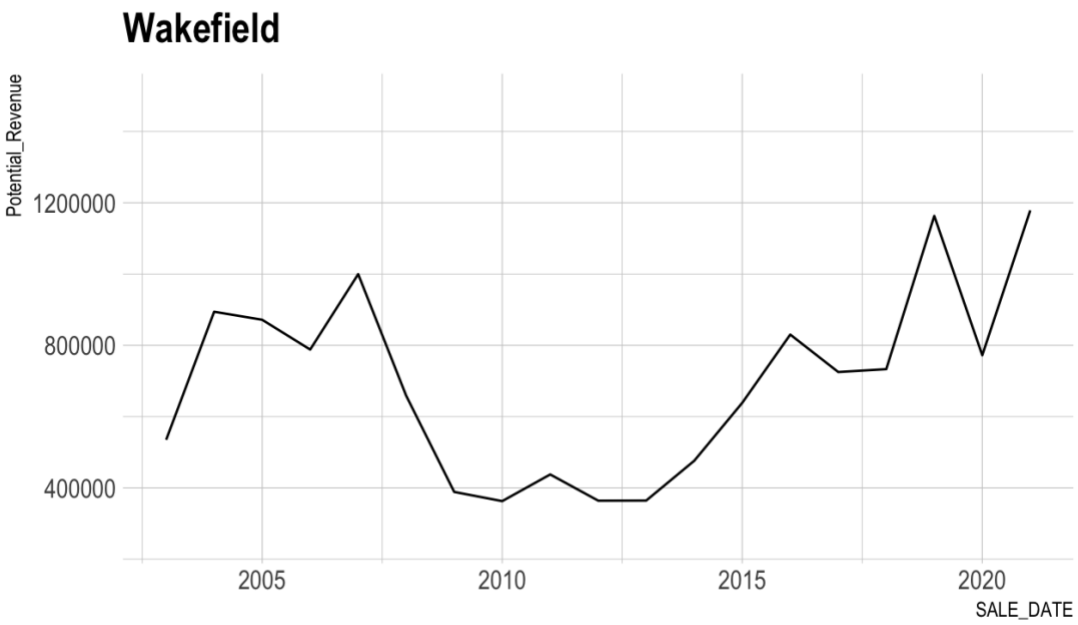
KPI 6: Annual Median Sale Price Per Gross Square Foot of residential properties





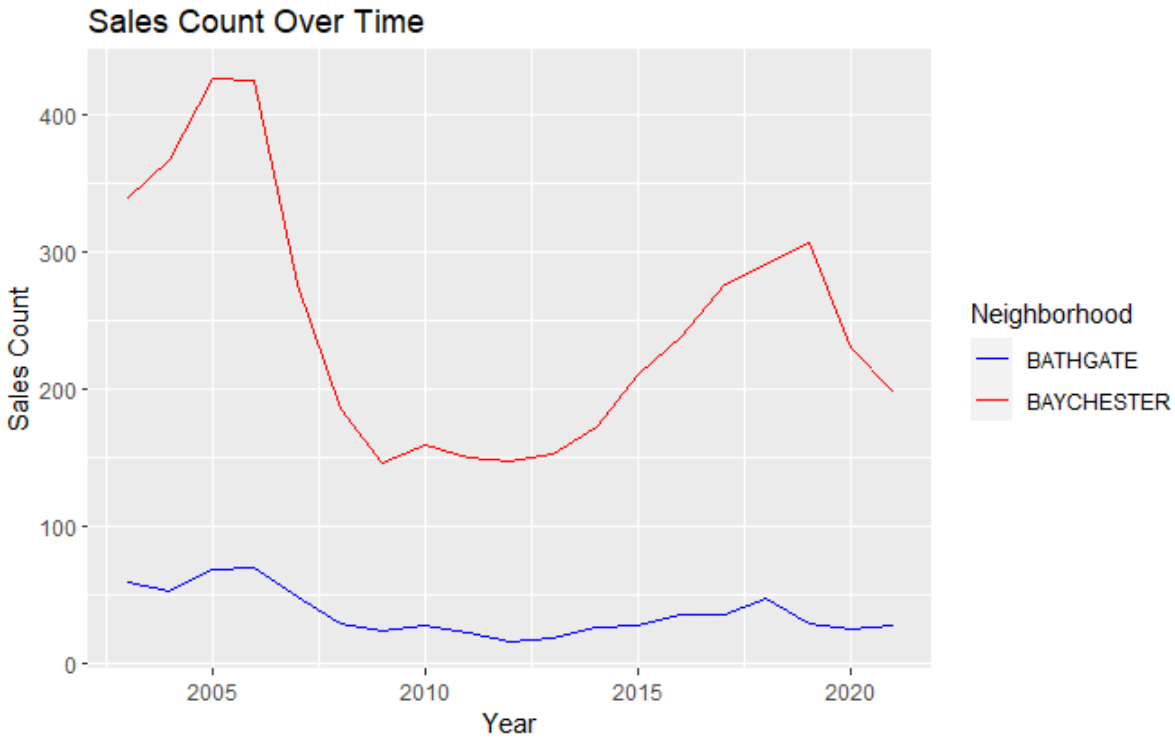
Potential Revenue


Bronxdale
Potential_Revenue
1200000
800000
400000
2005
2010
2015
2020
SALE_DATE


Wakefield
Potential_Revenue
1200000
800000
400000
2005
2010
2015
2020
SALE_DATE

NEIGBORHOOD COMPARISON:
(BATHGATE & BAYCHESTER)

K1: Sales Count
Appendix 1.1 Table

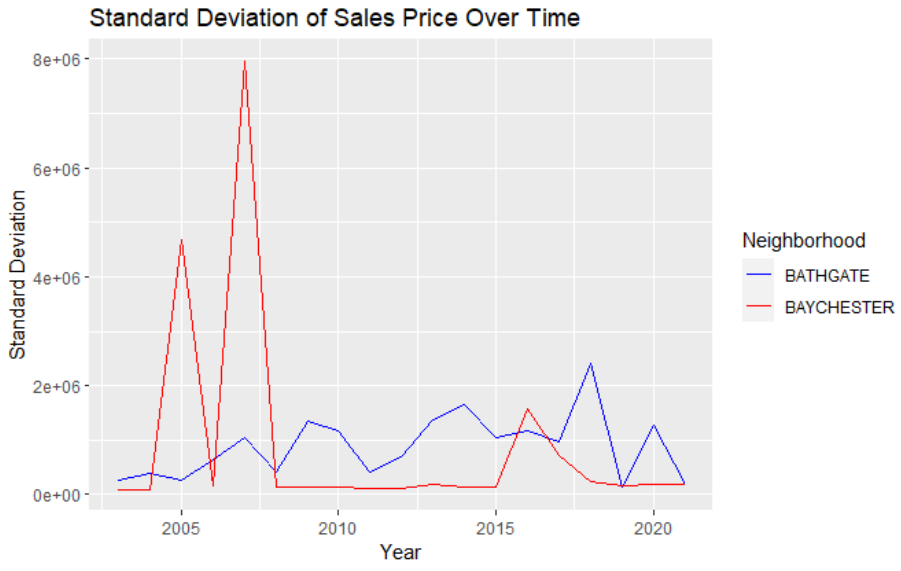


The reason for the big difference in residential property sales between Bathgate and Baychester is that Baychester has a more attractive neighborhood. It has a mix of city and suburban vibes, with most people owning their homes. There are many restaurants, coffee shops, and parks in Baychester. It's also popular among young professionals who tend to have liberal views, and the public schools are better in Baychester. All of these factors make Baychester a more desirable place to live, which reflects in the higher property sales.
Although the sales count in Bathgate has remained steady, while in Baychester, it has been inconsistent or irregular.

K2: Median Sale Price
Appendix 1.2

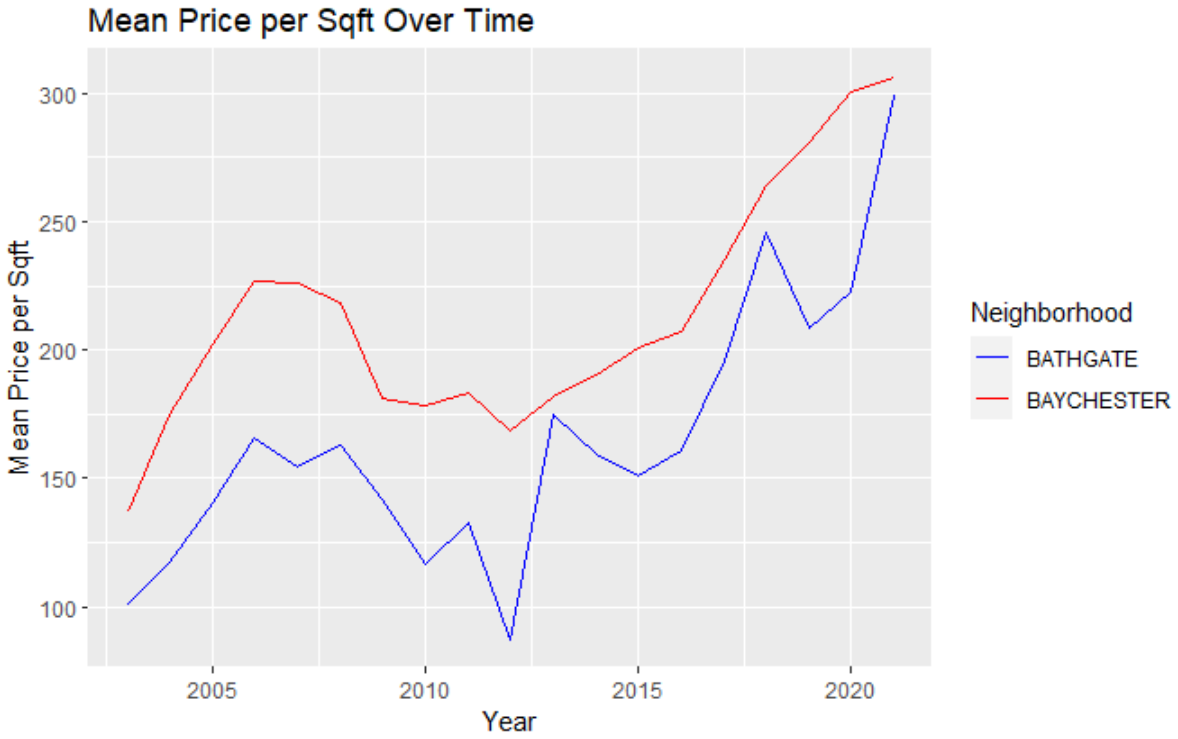
The middle or median sales prices in both Bathgate and Baychester went down between 2007 and 2010 because of a crisis in the housing market. It happened when a lot of people couldn't pay their mortgages. But after that difficult time, both Bathgate and Baychester saw their prices start to go up, and this positive trend continued until 2021.

K3: Standard Deviation of Sales Price Over Time
Appendix 1.3



In Baychester, the standard deviation, which tells us how much property prices vary, sometimes went up a lot and other times was not as extreme. On the other hand, in Bathgate, it had its unique pattern of going through short periods of both low and high variation, as we talked about earlier. This shows that property prices in these neighbourhoods had different levels of ups and downs, making them more or less stable at various times.

K4: Mean Price Per Square feet
Appendix 1.4

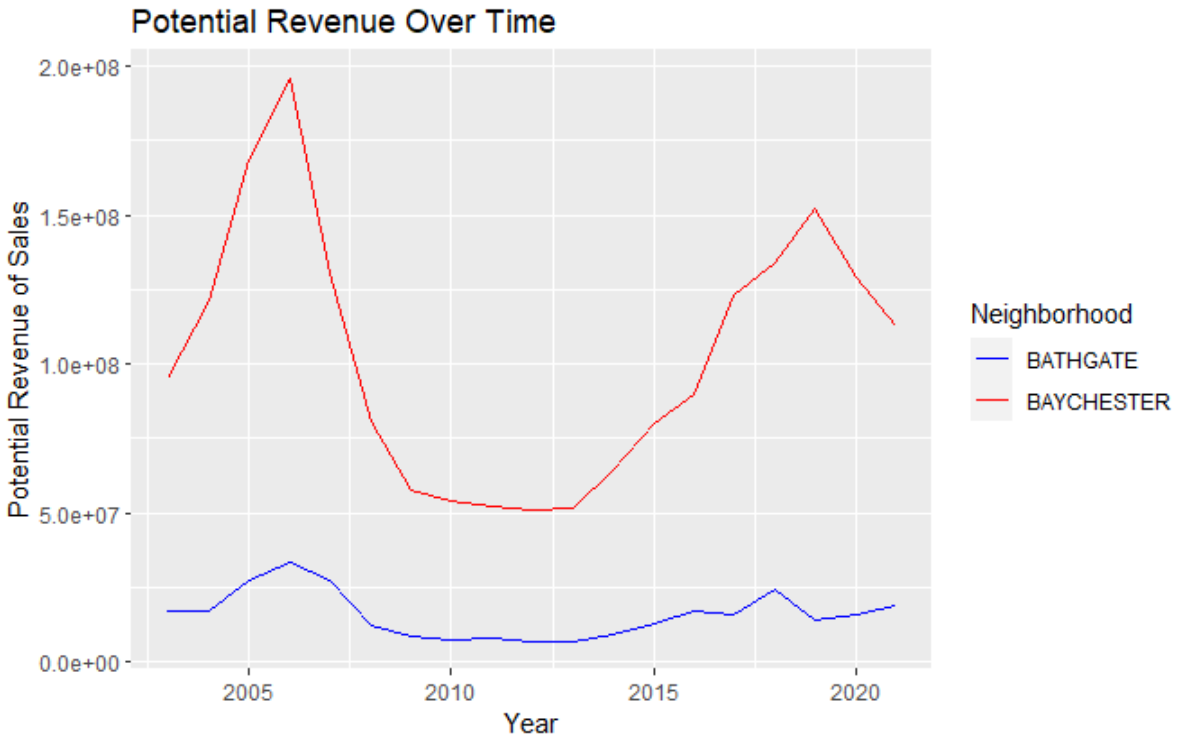


The average price for each square foot of space in both Bathgate and Baychester went through periods of going down and then going up. These shifts happened because of the things we discussed earlier when looking at the median prices of houses.

K5: Standard Deviation of Sales price per square feet
Appendix 1.5

The ups and downs in the standard deviation of the price per square foot match the trends in the average price per square foot. In other words, when the average price goes up or down, the standard deviation also follows a similar pattern. This suggests that as property prices per square foot change, so does the degree of variability or consistency in those prices.

K6: Potential Revenue of Residential properties
Appendix 1.6



The potential revenue in Bathgate and Baychester is significantly different. Baychester, on one hand, has a more unpredictable pattern, with ups and downs. In contrast, Bathgate shows a consistent and increasing trend over time. This means that, while the potential revenue in Bathgate is steadily growing, in Baychester, it goes through more ups and downs.

Conclusion and Branch Office Recommendation:
Based on our analysis, we recommend opening a branch office in Bathgate. Here's why:

Bathgate has a steady number of property sales, meaning there's consistent demand for real estate in the area, making it a reliable place for business. The median sales price in Bathgate, while having some ups and downs, generally goes up, suggesting a positive trend in property values. This makes it a good place for long-term investments and growth. Bathgate also has a consistent level of price variation, which is important for assessing risks and planning business strategies. Additionally, the potential revenue in Bathgate is on a consistent rise, offering the promise of profit and business expansion. All these factors make Bathgate a solid choice for your branch office.

Reasoning:
Now, let's delve into the reasoning behind this choice. While Baychester has its merits, such as a blend of urban and suburban atmospheres and the presence of restaurants, coffee shops, and parks, its real estate market tends to be less predictable. Sales counts, median prices, and standard deviation in Baychester show fluctuations that might make it more challenging to establish a consistently profitable branch office.

On the other hand, Bathgate stands out with its steady sales count, a general trend of increasing median sales prices, and stable standard deviation. These qualities create a more dependable and promising environment for conducting real estate business operations. Furthermore, the consistent rise in potential revenue in Bathgate implies greater potential for profit and growth. All of these factors combined make Bathgate the superior choice for locating your branch office.

APPENDIX:

1.1 Sales count of Bathgate & Baychester

	SALE_YEAR	Sales_count_BATH	Sales_count_BAY
1	2003	59	340
2	2004	52	368
3	2005	68	427
4	2006	70	425
5	2007	48	277
6	2008	29	186
7	2009	24	146
8	2010	27	159
9	2011	22	150
10	2012	16	148
11	2013	18	153
12	2014	26	173
13	2015	28	211
14	2016	35	238
15	2017	36	277
16	2018	47	291
17	2019	29	307
18	2020	25	231
19	2021	28	198

1.2 Median Sales Price Of Bathgate & Baychester

	SALE_YEAR	Median_sale_price_BATH	Median_sale_price_BAY
1	2003	290000.0	280000
2	2004	328127.5	330000
3	2005	400000.0	395380
4	2006	475000.0	461100
5	2007	564300.0	470000
6	2008	419000.0	434496
7	2009	352395.0	393500
8	2010	272231.0	340000
9	2011	370000.0	347150
10	2012	426888.0	345625
11	2013	385000.0	337000
12	2014	360000.0	371000
13	2015	450500.0	379000
14	2016	493000.0	377500
15	2017	434500.0	445000
16	2018	515000.0	460000
17	2019	477134.0	495000
18	2020	625000.0	560000
19	2021	672500.0	570000

1.3 Standard Deviation of Sales Price

	SALE_YEAR	std_dev_sale_price_BATH	std_dev_sale_price_BAY
1	2003	251342.2	89874.17
2	2004	381594.4	90174.41
3	2005	266879.6	4678592.92
4	2006	628195.5	166507.23
5	2007	1046558.4	7964444.09
6	2008	423156.6	135748.43
7	2009	1345386.4	137478.51
8	2010	1170056.2	134980.28
9	2011	418817.6	114043.82
10	2012	697908.5	114907.19
11	2013	1374829.3	172980.04
12	2014	1656721.3	139241.46
13	2015	1043582.8	140816.32
14	2016	1168247.5	1576303.66
15	2017	958968.5	716262.17
16	2018	2410433.0	228395.13
17	2019	146077.4	168554.80
18	2020	1276830.9	179730.07
19	2021	183326.1	190059.85

1.4 Mean Sale Price Per Gross Square Foot

	SALE_YEAR	Mean_sales_Price_per_sqft_BATH	Mean_sales_Price_per_sqft_BAY
1	2003	101.15139	136.8414
2	2004	117.13720	175.1391
3	2005	140.29729	202.2317
4	2006	165.94092	226.8562
5	2007	154.51600	226.4002
6	2008	163.12100	218.3643
7	2009	142.01640	181.2149
8	2010	116.43784	178.6499
9	2011	132.87843	183.1961
10	2012	87.37357	168.5929
11	2013	174.76121	181.6546
12	2014	159.46251	190.4242
13	2015	151.36313	201.1210
14	2016	160.79432	206.8818
15	2017	195.79285	235.1057
16	2018	245.53265	263.7791
17	2019	208.66821	280.8938
18	2020	222.54973	300.5182
19	2021	299.37381	306.1513

1.5 Standard Deviation of Sale Price Per Gross Foot

	SALE_YEAR	Std_dev_Sales_Price_per_sqft_BATH	Std_dev_Sales_Price_per_sqft_BAY
1	2003	54.99584	47.28191
2	2004	59.09476	76.94778
3	2005	63.03182	89.95445
4	2006	84.06185	78.95088
5	2007	100.94774	84.56623
6	2008	78.63958	71.88473
7	2009	80.03738	63.57492
8	2010	72.09369	60.45849
9	2011	56.73607	95.02050
10	2012	55.83536	59.22323
11	2013	87.11302	74.49007
12	2014	171.70735	77.17198
13	2015	51.55974	84.47944
14	2016	74.21195	94.32892
15	2017	78.04105	96.91209
16	2018	140.96446	109.83785
17	2019	56.71072	100.77539
18	2020	103.56215	97.34004
19	2021	93.86665	105.30530

1.6 Potential Revenue Of Bathgate and Baychester

	SALE_YEAR	POTENTIAL_REVENUE_BATH	POTENTIAL_REVENUE_BAY
1	2003	17110000	95200000
2	2004	17062630	121440000
3	2005	27200000	168827260
4	2006	33250000	195967500
5	2007	27086400	130190000
6	2008	12151000	80816256
7	2009	8457480	57451000
8	2010	7350237	54060000
9	2011	8140000	52072500
10	2012	6830208	51152500
11	2013	6930000	51561000
12	2014	9360000	64183000
13	2015	12614000	79969000
14	2016	17255000	89845000
15	2017	15642000	123265000
16	2018	24205000	133860000
17	2019	13836886	151965000
18	2020	15625000	129360000
19	2021	18830000	112860000