

Evaluating the Neighborhoods in Fairfax County of Virginia, USA

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1. INTRODUCTION

1.1 The Background

The Fairfax County is a county of the Virginia State of the United States located in the suburban of the capital city Washington, D.C. The county is one of the well-developed city clusters that has a promising future to continue to flourish, in terms of population, demographics, income level, location, and employment opportunities.

The Fairfax County is the 3rd highest-income county in US, accounts for 13% of Virginia's population and 20% of the DC-VA-MD Metropolitan Area population, and is home to seven Fortune 500 companies. Also, Amazon's second headquarter offices has been selected to locate right next to the Fairfax County.

1.2 The Problem

The county has a total area of 406 square miles (1,050 km²), and there are a number of allegedly good residential zones in this small area including 58 neighborhoods or 80 zip codes. With the rapid development and also as a resident living in the area myself, it is helpful to know which neighborhoods have the higher potential or in other words more attractive to live in.

This project is designed to evaluate all the 58 neighborhoods in Fairfax County and identify those with higher parameters indicating better places to live in. Coding will use data in areas of population, housing market, income level, crime, and school quality, Foursquare location data will also be used to explore and segment these neighborhoods.

1.3 Target Audience

The result of this project might be of interest to the current and future residents of the Fairfax County, as well as to property investors.

2. DATA COLLECTION

Neighborhood values are typically determined by the following factors: real estate market trends, demographic trends, income level and job access, crime and safety, school quality, and nearby features. The following datasets were collected accordingly (Table 1):

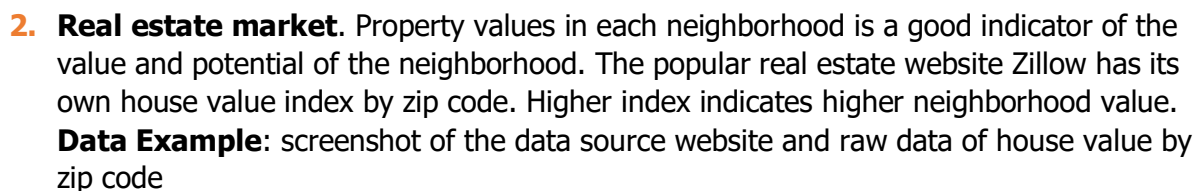
- 1. Fairfax County neighborhood list and zip code list.** This is the foundation of this project and other indicator data will be organized by this neighborhood and/or zip code list. Official lists gained from the Fairfax County Government was selected for this data needs.

Data Example: screenshot of the data portal page

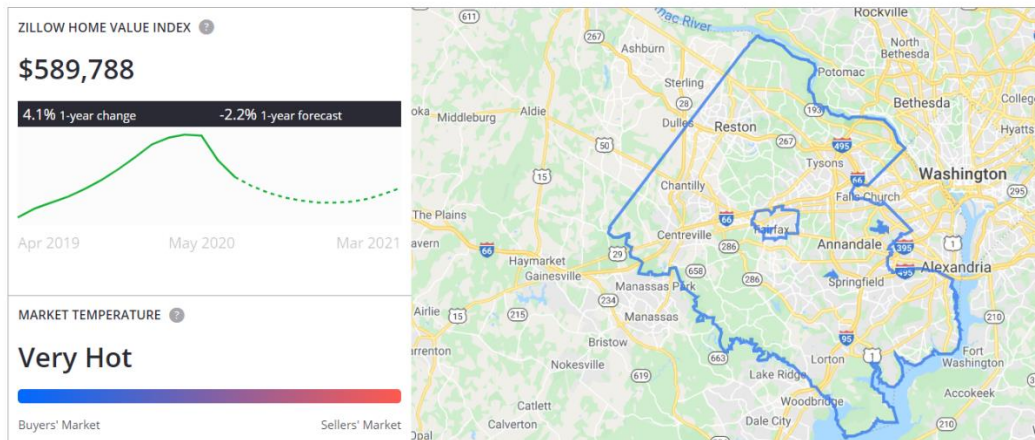
349

Census Explorer →

To search: Click next to the magnifying glass in the top right corner of the window. Type in an address, place, or ZIP Code and hit enter.



Fairfax County Home Prices & Values



	Metros	Counties	Cities	Zip Codes	Neighborhoods
Region					Value
20105					\$661,141
20109					\$309,583
20110					\$348,495
20111					\$354,128
20112					\$498,343
20120					\$506,854
20121					\$417,424
20136					\$489,959
20147					\$547,144
20148					\$651,057
20151					\$582,431
20152					\$595,783
20155					\$503,664
20164					\$428,953
20165					\$539,341
20169					\$560,017
20170					\$518,025
20171					\$643,871
20175					\$558,236

- Demographics.** Population is a good indicator for a neighborhood. The better a neighborhood is, the more residents it has. Official 2019 population data from the Fairfax County Government was selected, the higher population the more positive for a neighborhood assessment.

Data Example: screenshot of the data source website and raw data of Fairfax County neighborhood population by zip code

How to Use the Map

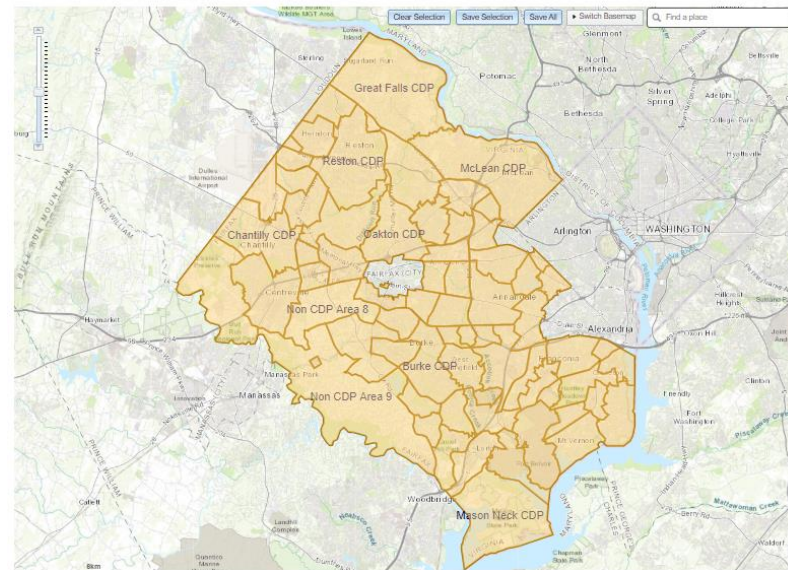
To pan: Click left mouse button and hold. Move the mouse to pan across the map.

To zoom: Use the scroll bar to zoom in and out, or double click to zoom in to a particular location.

To get information: Click the left mouse button once to select a feature. Additional features can be selected. Click again to unselect feature, or click "Clear Selection" button to clear all feature selections. Data will appear in table below map.

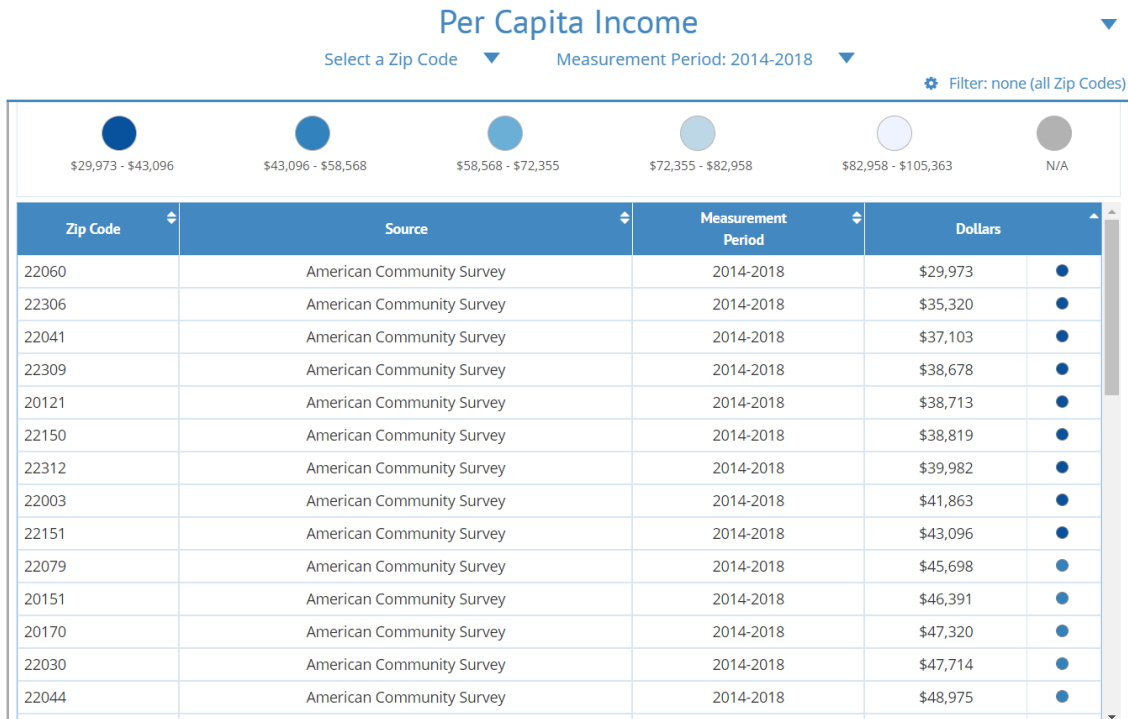
To download information: After selecting features, click "Save Selection" button to export data for selected features. To export data for all features, click "Save All" button.

To search: Click next to the magnifying glass in the top right corner of the window. Type in an address, place, or ZIP Code and hit enter.



ZIPCODE																													
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U									
ZIPCODE	YEAR	POPULATION	POP_5YEA	LAND_TOTAL	HL_SFD	SFA	MF_LOW	MF_MID	MF_HIGH	HOUSEHO	HU_30UP	HU_LT30	VALUE_LC	VALUE_MI	VALUE_HI	TOTAL_GF	OFFICE_GF	RETAIL_GF	INDUST_GF										
22067	2019	166	166	240.191	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
22203	2019	322	322	2.751	150	0	100	50	0	147	100	50	0	0	0	0	0	0	0										
20153	2019	0	0	0.571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
22124	2019	18983	19005	6627.592	6656	4194	1445	1017	0	6588	5035	1617	1564	3555	1396	1124879	759785	365094	0										
22180	2019	27859	28059	3663.452	10110	6068	1165	1550	1068	259	9906	6685	3422	974	5609	1343	5404450	2645195	2386729	372526									
20191	2019	30278	31689	4873.39	12199	3695	4906	2704	520	374	12038	11151	1048	6191	4131	114	9974860	8282011	1336119	356730									
22182	2019	28952	31534	7938.045	9847	6843	1480	850	274	400	9791	5996	3844	136	6150	2110	14562269	8461579	5312063	788627									
20194	2019	14517	14520	1847.783	5859	1900	2563	1396	0	5791	2804	3053	1864	2537	292	529426	4171	525034	221										
22044	2019	11008	11095	1434.165	4610	1626	221	1502	310	951	4485	4456	153	1730	1513	198	3343894	367618	2843283	132993									
22181	2019	15832	15846	3628.105	5523	3290	1440	793	0	5464	3920	1598	1059	3396	745	33629	29521	4108	0										
22042	2019	33453	33586	4047.645	12490	6708	1521	3820	441	0	12263	10747	1738	4671	4638	86	9736122	5352216	3834846	549060									
20120	2019	43440	44304	10576.25	14165	6335	5744	2086	0	14134	7412	6752	7301	5102	193	1342336	578836	763020	480										
22009	2019	0	0	0.581	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
22046	2019	5333	5373	1810.063	2084	1418	2	664	0	2052	1852	232	545	1142	218	167555	9098	132605	25852										
22043	2019	25580	25741	3042.224	9651	4301	1940	1839	340	1231	9462	7934	1712	1913	4433	935	2250971	1281871	813595	155505									
22066	2019	19431	19874	16270.88	5814	5726	0	88	0	5797	3688	2113	9	2460	3090	635393	146495	466938	21960										
22106	2019	0	0	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
20122	2019	0	0	0.295	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
22003	2019	57381	58207	8099.306	19759	10716	2955	5072	545	471	19579	18748	1001	7106	8852	308	4609991	1965897	2525382	118712									
22153	2019	33323	33357	5505.475	10857	6393	4364	100	0	10815	9606	1247	4810	5689	102	6318521	2710616	792359	2815546										
22079	2019	36203	37053	18823.08	12028	4838	4861	2329	0	11881	5024	6994	5500	4088	253	9248705	662740	1379096	7206869										
22102	2019	28921	34757	7846.437	13615	3372	885	4109	880	4369	13126	7238	6370	4053	1293	2788	28361808	20691137	7107062	563609									
22031	2019	34074	35946	4585.286	12679	3077	3378	3652	1691	881	12420	7687	4985	2774	4306	197	9546313	4412398	2776157	2357758									
22041	2019	27717	27765	1859.447	10738	2044	963	2884	449	4398	10512	9815	920	4490	1768	221	8314647	3639051	4162747	512849									
22150	2019	28626	28737	4948.904	9379	4961	1219	1800	1399	0	9204	5566	3808	4455	1774	17	13309293	1415614	7986596	3907083									
22152	2019	28867	28875	3880.872	10350	4852	4341	1157	0	10281	9782	564	5587	4488	20	1455053	302897	674255	477901										

4. **Income level.** Good neighborhoods tend to have more high-income residents. The per capita income from 2014-2018 by zip code/neighborhood of Fairfax County from the popular income statistics source American Community Survey was selected for this assessment indicator. The higher per capita income, the more positive for a neighborhood.
- Data Example:** screenshot of the per capita income dataset by zip code



5. Crime and safety. Crime rate is another common indicator for neighborhood evaluation. The Weekly Crime Data from the Fairfax County Police Department will be used, and it is a real time database that's always updated for the most recent 7 days. The more total crime number for a selected neighborhood, the lower value of this neighborhood.

Data Example: screenshot of the crime dataset with dates and by zip code

A	B	C	D	E	F	G	H	I
1	1	FRAUD-26 FRAUD - IN	6/22/2020	912	5100 PORT FAIRFAX	VA		22032
2	1	FRAUD-26 FRAUD - IN	6/22/2020	1458	14400 LAK CHANTILL	VA		20151
3	1	FRAUD-26 FRAUD - IN	6/22/2020	1539	2200 CENT VIENNA	VA		22182
4	1	FRAUD-26 FRAUD - IN	6/22/2020		1900 HOPE FALLS CHU	VA		22043
5	1	SERV-8 SERVICE -	6/22/2020	13	6000 OXPE ALEXANDR	VA		22315
6	1	ASLT-13B ASSAULT -	6/22/2020	6	11600 FAIR FAIRFAX	VA		22030
7	1	DEST-290- DESTRUCT	6/22/2020	22	7600 BROOK FALLS CHU	VA		22043
8	1	SUSP-3 SUSPICIOUS	6/22/2020	32	6200 DAN SPRINGFIE	VA		22150
9	1	SERV-1 SERVICE -	6/22/2020	5	1600 BELL ALEXANDR	VA		22307
10	2	TRES-90J- TRESPASS	6/22/2020	152	6300 WAT FALLS CHU	VA		22044
11	1	DRUG-35A DRUGS - M	6/22/2020	152	6300 WAT FALLS CHU	VA		22044
12	1	SERV-29 SERVICE -	6/22/2020	49	11000 BEC RESTON	VA		20190
13	1	SUSP-2 SUSPICIOUS	6/22/2020	156	11000 BEC RESTON	VA		20190
14	1	DRUG-35A DRUGS - C	6/22/2020	216	6300 COTT ALEXANDR	VA		22310
15	1	DEST-290- DESTRUCT	6/22/2020	208	5800 FRAN ALEXANDR	VA		22310
16	2	ROB-120-4 ROBBERY	6/22/2020	204	10400 FAIR FAIRFAX	VA		22030
17	1	ABDCT-10I ABDUCTIO	6/22/2020	204	10400 FAIR FAIRFAX	VA		22030
18	2	DRUG-35A DRUGS - M	6/22/2020	304	8400 RICH ALEXANDR	VA		22309
19	1	ASLT-13B ASSAULT -	6/22/2020	304	8400 RICH ALEXANDR	VA		22309
20	1	ASLT-13B ASSAULT -	6/22/2020	402	8000 CHAI FALLS CHU	VA		22042
21	2	DEST-290- DESTRUCT	6/22/2020	402	8000 CHAI FALLS CHU	VA		22042
22	2	SERV-999 POLICE PH	6/22/2020	407	7500 REPL ALEXANDR	VA		22306
23	1	SERV-29 SERVICE -	6/22/2020	351	10000 CHE BURKE	VA		22015
24	1	ASLT-13B ASSAULT -	6/22/2020	407	12100 SUN RESTON	VA		20190
25	1	SERV-1 SERVICE -	6/22/2020	426	5500 SEMI FALLS CHU	VA		22041
26	1	SERV-1 SERVICE -	6/22/2020	403	6900 BRAC ANNANDA	VA		22003
27	1	LARC-23-9 LARCENY -	6/22/2020	213	3300 WILL FAIRFAX	VA		22030

- 6. School quality.** School quality is another common and important indicator. School scores of the public elementary schools of Fairfax County for 2019 from the popular school rating website SchoolDigger was selected for this indicator. School scores will be aggregated by zip code/neighborhood, the higher score the better neighborhood.

Data Example: screenshot of school rating for zip code 22033 on SchoolDigger

Best Public Schools in Zip Code 22033

Schools: All Public + My Schools 24

List / Map Table

Choose columns to see: Summary School Students/Teachers Ranking Test Scores

Search:

School	Ranking (2019)				Ranking (2018)			
	Average Standard Score (2019)	Statewide Rank (2019)	State Percentile (2019)	SchoolDigger Rating (2019)	Average Standard Score (2018)	Statewide Rank (2018)	State Percentile (2018)	Rank Change from Previous Year
Greenbriar East Elementary	47.6	667 th of 1102 public elementary schools	39.5%	☆☆☆☆☆	51.1	607 th of 1097 public elementary schools	44.7%	▼ 60
Greenbriar West Elementary	82.6	121 st of 1102 public elementary schools	89.0%	☆☆☆☆☆	79.4	165 th of 1097 public elementary schools	85.0%	▲ 44
Lees Corner Elementary	72	286 th of 1102 public elementary schools	74.0%	☆☆☆☆☆	74.5	231 st of 1097 public elementary schools	78.9%	▼ 55
Navy Elementary	89.1	26 th of 1102 public elementary schools	97.6%	☆☆☆☆☆	87.2	57 th of 1097 public elementary schools	94.8%	▲ 31

Show 10 schools

- 7. Nearby features.** Location is everything for a neighborhood. It makes a neighborhood more valuable and attractive if, for example, it's close to shopping centers, entertainment businesses, food and beverage amenities, city centers, recreational centers, sought-after tourist areas, and office buildings. Foursquare data will be used to explore and evaluate the nearby features for a given neighborhood, neighborhoods with similar characteristics may be segmented and grouped in this analysis.

Data Example: find the latitude and longitude for all neighborhood/zip code in Fairfax County, then identify the top 10 most common venue for each neighborhood/zip code. This information will help with segmenting and grouping Fairfax County neighborhoods that have similar nearby features for further evaluation analysis.

Table 1: Data Collection Summary

#	Data	Source	Method
1	Fairfax County neighborhood and zip code list	Fairfax County Government, Open Geospatial Data https://opendata.arcgis.com/datasets/3111976184004077_b836f535f31eadf1_21.csv	Import from a downloadable csv file from the source
2	Property Value	Zillow, home value index (by zip code and by city), current https://www.zillow.com/fairfax-county-va/home-values/	Import from a downloadable csv file from the source
3	Population	Fairfax County Government, Economic, Demographic and Statistical Research (EDSR) unit, demographics data 2019 https://www.fairfaxcounty.gov/gisapps/iplsmap/IPLSExport.ashx?Type=Z&Year=2019&Param=ALL	Import from a downloadable csv file from the source
4	Income	American Community Survey, per capita income, 2014-2018 http://www.livehealthyfairfax.org/indicators/index/view?indicatorId=15&localeTypeId=3&periodId=1581	Import from a downloadable csv file from the source
5	Crime	Fairfax County Police Department, Weekly Crime Data, current https://www.fairfaxcounty.gov/apps/pfsu/api/file/crimereportsfromsp	Import from a downloadable csv file from the source
6	School quality	SchoolDigger, Fairfax County elementary public school scores, 2019 https://www.schooldigger.com/go/VA/zip/22033/search.aspx	Make an excel spreadsheet
7	Nearby features	Foursquare	API