# Assignment #1 – DQR of NY Property Data

**High-Level Description:**

This report consists of a preliminary quantitative analysis of the Property Valuation and Assessment Data derived from NYC OpenData. It primarily covers data from November 2010.

- There are a total 1,070,994 rows and 32 columns.
- There is a mix of numerical and categorical variables.

Following table summarizes characteristics of different variables, 31 columns, present in the NY Property Data (‘Record’ variable has been discarded as it is just a unique identifier).

**Table of Summary Characteristics of Variables**

- **Numerical Variables**

| Field Name | Field Type | # Records that have a value | % Populated | # Unique values | # Records with value 0 | Min | Max | Mean | Standard deviation |
|---|---|---|---|---|---|---|---|---|---|
| **LTFRONT** | Numerical | 1070994 | 100 | 1297 | 169108 | 0 | 9999 | 36.6 | 74 |
| **LTDEPTH** | Numerical | 1070994 | 100 | 1370 | 170128 | 0 | 9999 | 8.88 | 76.3 |
| **STORIES** | Numerical | 1014730 | 94.74 | 112 | 0 | 1 | 119 | 5 | 8.36 |
| **FULLVAL** | Numerical | 1070994 | 100 | 109324 | 13007 | 0 | 6.15e+09 | 8.7e+05 | 1.15 e+07 |
| **AVLAND** | Numerical | 1070994 | 100 | 70921 | 13009 | 0 | 2.6e+09 | 8.5e+04 | 4.0e+06 |
| **AVTOT** | Numerical | 1070994 | 100 | 112914 | 13007 | 0 | 4.66e+09 | 2.27e+05 | 6.87e+06 |
| **EXLAND** | Numerical | 1070994 | 100 | 33419 | 491699 | 0 | 2.6e+09 | 3.6e+04 | 3.9e+04 |
| **EXTOT** | Numerical | 1070994 | 100 | 64255 | 432572 | 0 | 4.6e+09 | 9.1e+04 | 6.5e+06 |
| **BLDFRONT** | Numerical | 1070994 | 100 | 612 | 228815 | 0 | 7575 | 23.04 | 35.57 |
| **BLDDEPTH** | Numerical | 1070994 | 100 | 621 | 228853 | 0 | 9393 | 39.92 | 42.70 |
| **AVLAND2** | Numerical | 282726 | 26.4 | 58592 | 0 | 3 | 2.37e+09 | 2.46e+05 | 6.17e+06 |
| **AVTOT2** | Numerical | 282732 | 26.4 | 111361 | 0 | 3 | 4.5e+09 | 7.13e+05 | 1.16e+07 |
| **EXLAND2** | Numerical | 87449 | 8.17 | 22196 | 0 | 1 | 2.37e+09 | 3.51e+05 | 1.08e+07 |
| **EXTOT2** | Numerical | 130828 | 12.2 | 48349 | 0 | 7 | 4.5e+09 | 6.56+05 | 1.60e+07 |

- **Categorical Variables**

| **Field Name** | **Field Type** | **# records that have value** | **% Populated** | **# unique values** | **#records with zero value** | **Most common value (MCV)** | **Freq. of MCV** |
|---|---|---|---|---|---|---|---|
| **BBLE** | Categorical | 1070994 | 100 | 1070994 | 0 | NA | NA |
| **B** | Categorical | 1070994 | 100 | 5 | 0 | 4 | 358046 |
| **BLOCK** | Categorical | 1070994 | 100 | 13984 | 0 | 3944 | 3888 |
| **LOT** | Categorical | 1070994 | 100 | 6366 | 0 | 1 | 24367 |
| **EASEMENT** | Categorical | 4636 | 0.43 | 13 | 0 | E | 4148 |
| **OWNER** | Text | 1039249 | 97 | 863346 | 0 | PARKCHESTER PRESERVAT | 6020 |
| **BLDGCL** | Categorical | 1070994 | 100 | 200 | 0 | R4 | 139879 |
| **TAXCLASS** | Categorical | 1070994 | 100 | 11 | 0 | 1 | 660721 |
| **EXT** | Categorical | 354305 | 33.08 | 4 | 0 | G | 266970 |
| **EXCD1** | Categorical | 638488 | 59.62 | 130 |  | 1017 | 425348 |
| **STADDR** | Categorical | 1070318 | 99.93 | 839280 | 0 | 501 Surf Avenue | 902 |
| **ZIP** | Categorical | 1041104 | 97.21 | 197 | 0 | 10314 | 24606 |
| **EXMPTCL** | Categorical | 15579 | 1.45 | 15 | 0 | X1 | 6912 |
| **EXCD2** | Categorical | 92948 | 8.68 | 61 | 0 | 1017 | 65777 |
| **PERIOD** | Categorical | 1070994 | 100 | 1 | 0 | FINAL | 1070994 |
| **YEAR** | DateTime | 1070994 | 100 | 1 | 0 | 2010/11 | 1070994 |
| **VALTYPE** | Categorical | 1070994 | 100 | 1 | 0 | AC-TR | 1070994 |

Now, we will explore in detail, the characteristics of each variable by plotting various graphs based on the category of the variable.

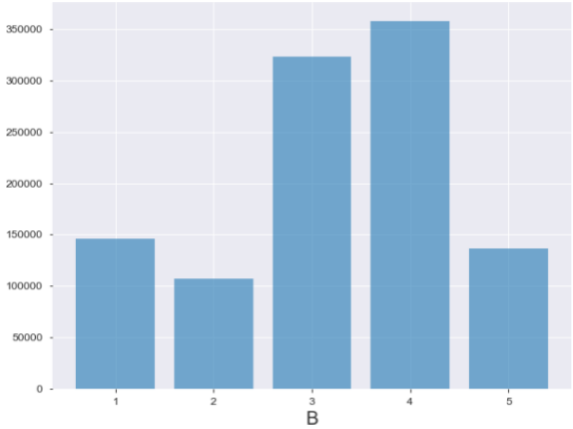
**BBLE:**

- Each of the column values under the ‘BBLE’ column has a unique value (Similar to ‘RECORD’).
- It is concatenation of AV_BORO, AV_BLOCK, AV_LOT and AV_EASEMENT. It is used to uniquely identify the area of each property

**B:**

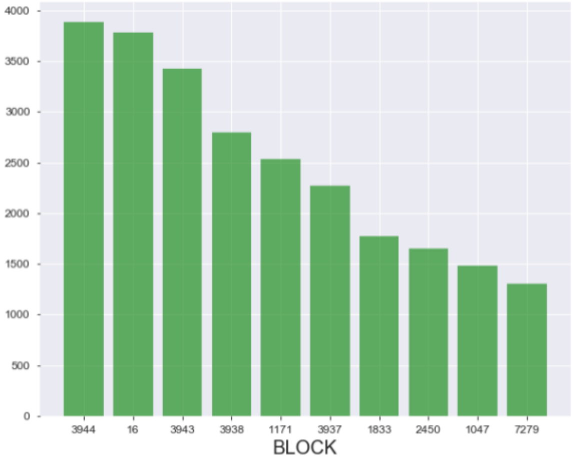
- B here means BORO Codes of the property.
- The following list denotes the meaning of each value under this variable:
    - 1: Manhattan

    - 2: Bronx
    - 3: Brooklyn
    - 4: Queen’s
    - 5: Staten Island



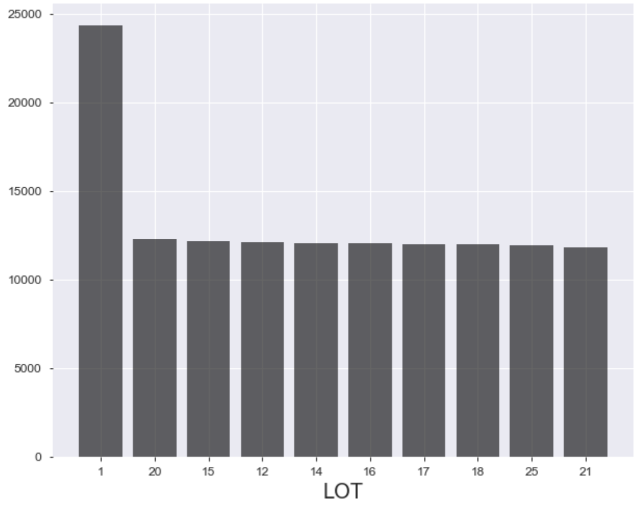
**BLOCK:**

- BLOCK denotes the block number (different for each BORO) of the property.
- The following is a valid range of BLOCK variables:
    - MANHATTAN - 1 TO 2,255
    - BRONX - 2,260 TO 5,958
    - BROOKLYN - 1 TO 8,955
    - QUEENS - 1 TO 16,350
    - STATEN ISLAND - 1 TO 8,050
- The following graph shows the top 10 BLOCKs:

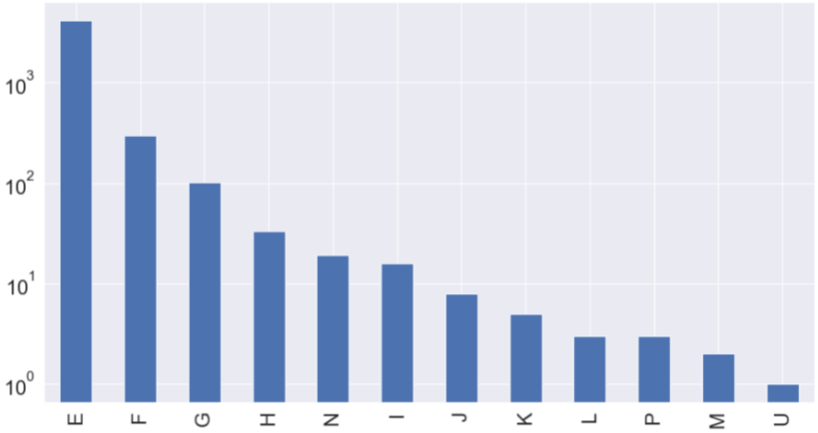


**LOT:**

- It is a unique area number within a BLOCK/BORO
- The following graph shows the top 10 LOTs:

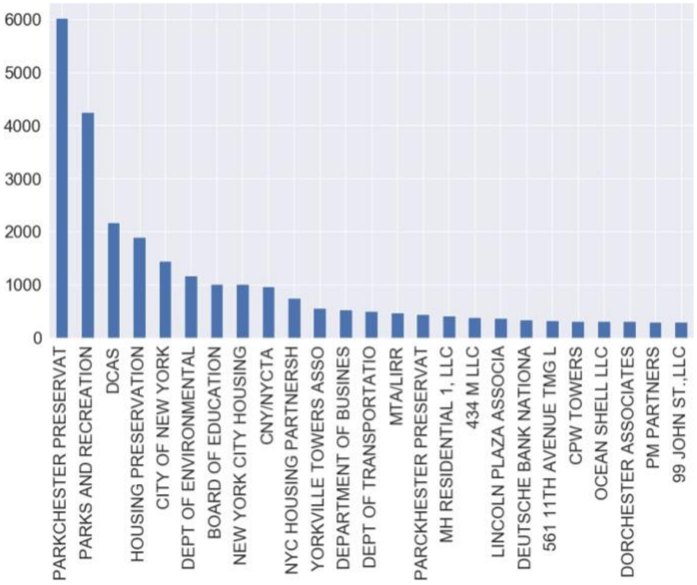


**EASEMENT:** It's a categorical variable. Following bar graph shows the spread of NY properties across different classes of 'EASEMENT' variable



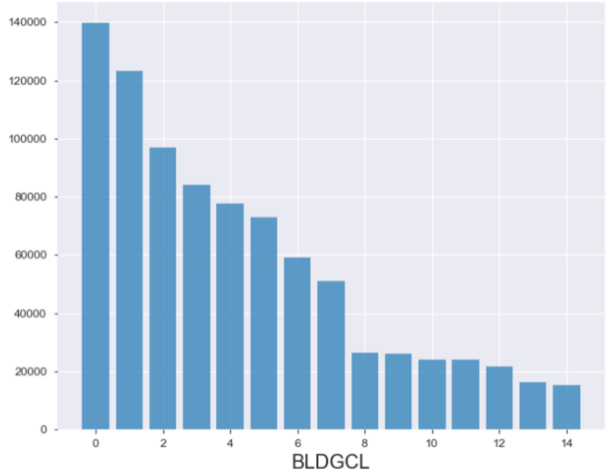
**OWNER:**

- This field has the name of the owner of the property.



**BLDGCL:**

- It’s a categorical variable that shows the class of the building
- The following are the top 15 classes in the New York data:

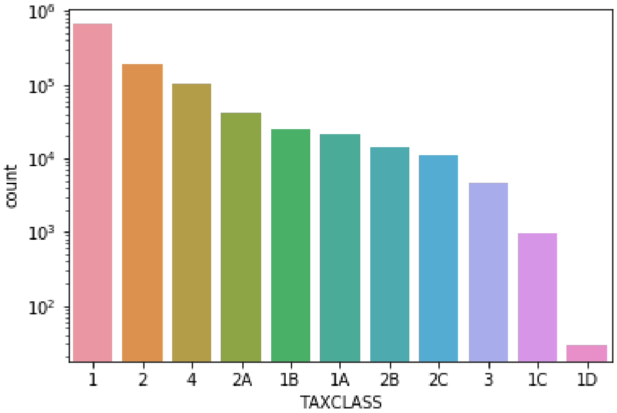


**TAXCLASS**:

- It corresponds to the Current Property Tax Class Code (NYS Classification). The following are valid values for this column:
  - 1 = 1-3 unit residences
  - 1a = 1-3 story condominiums originally a condo
  - 1b = residential vacant land
  - 1c = 1-3 unit condominiums originally tax class 1
  - 1d = select bungalow colonies
  - 2 = apartments

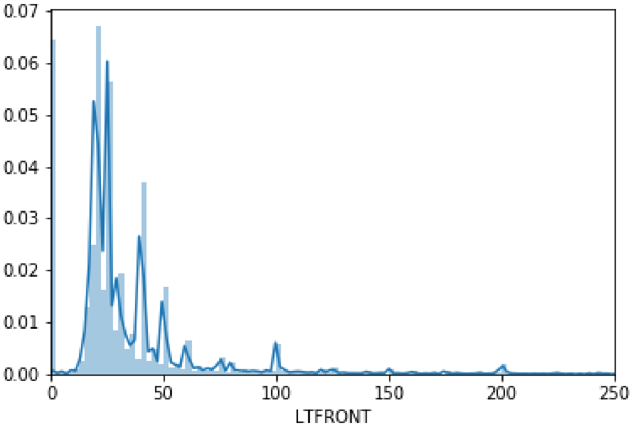
- 2a = apartments with 4-6 units
- 2b = apartments with 7-10 units
- 2c = coops/condos with 2-10 units
- 3 = utilities (except ceiling RR)
- 4a = utilities - ceiling railroads
- 4 = all others

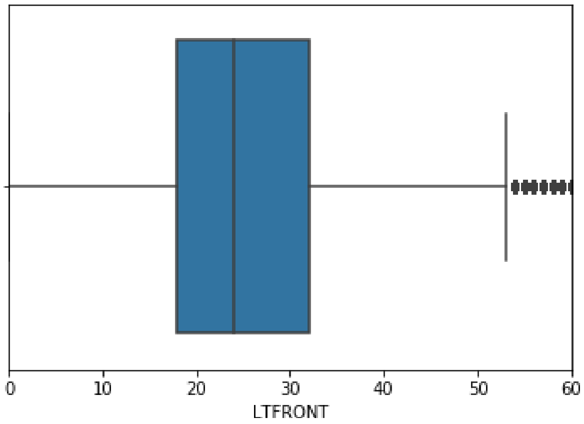
- The bar graph below shows the spread of NY properties across different classes of 'TAXCLASS' variable:



**LTFRONT:**

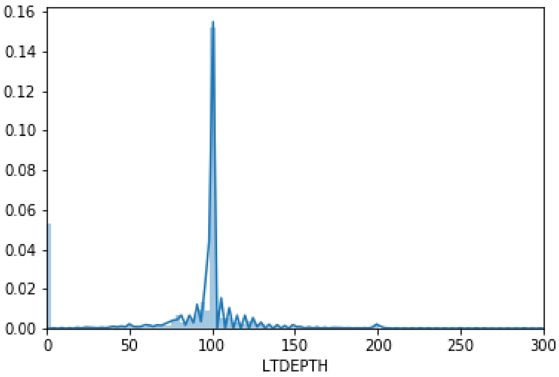
- It stands for Lot Frontage in feet.
- The Density plot and Boxplot below show the spread of values of 'LTFRONT' variable:

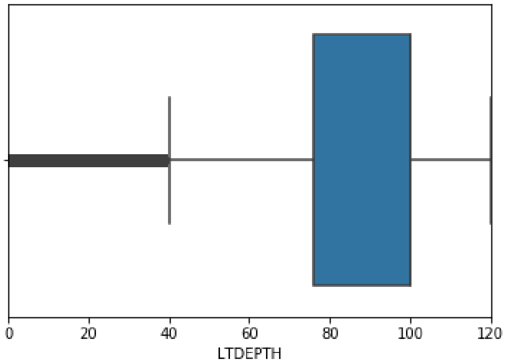




**LTDEPTH:**

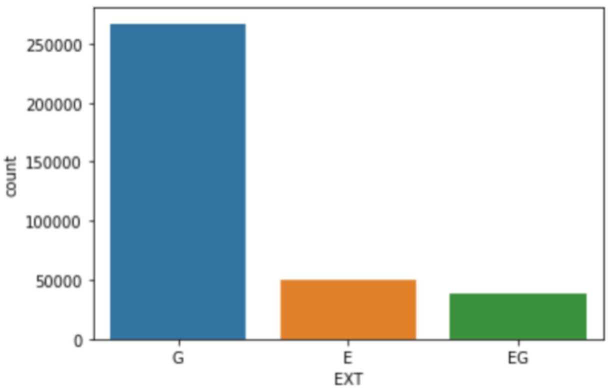
- It stands for Lot Depth in feet.
- The Density plot and Boxplot below show the spread of values of ‘LTDEPTH’ variable:





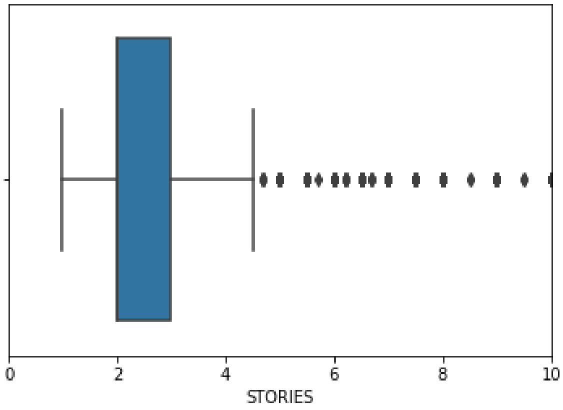
**EXT:**

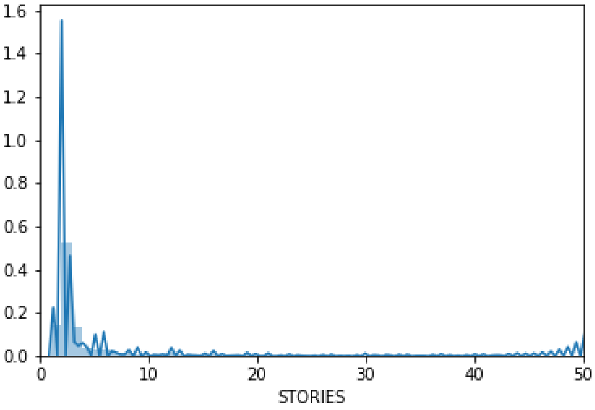
- It’s a categorical variable, meaning extension.
- Following bar graph shows the spread of properties across different classes of ‘EXT’ variable.



**STORIES:**

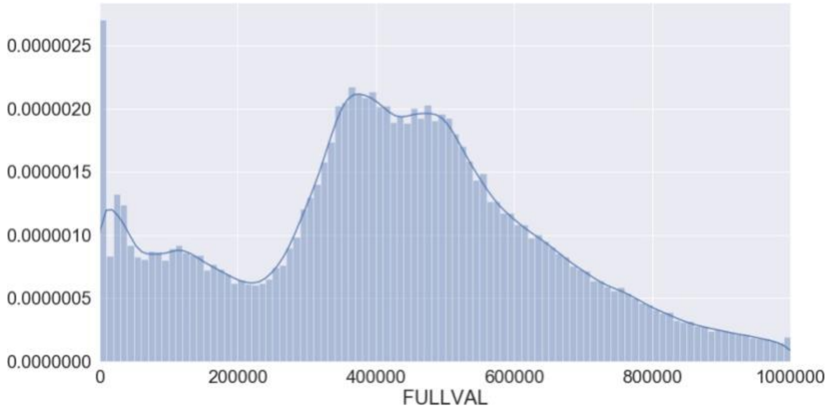
- It's a numerical variable showing the number of stories.
- Following Density plot and Boxplot show the spread of values of 'STORIES' variable





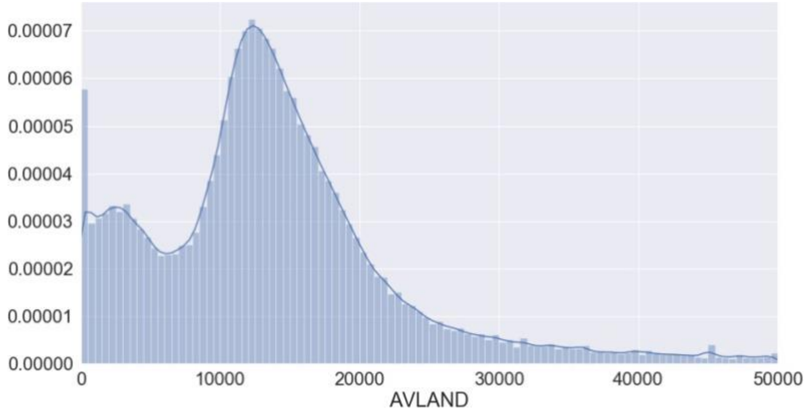
**FULLVAL**:

- It's a numerical variable showing the total value of the property.
- Following Density plot shows the distribution of values of 'FULLVAL' variable



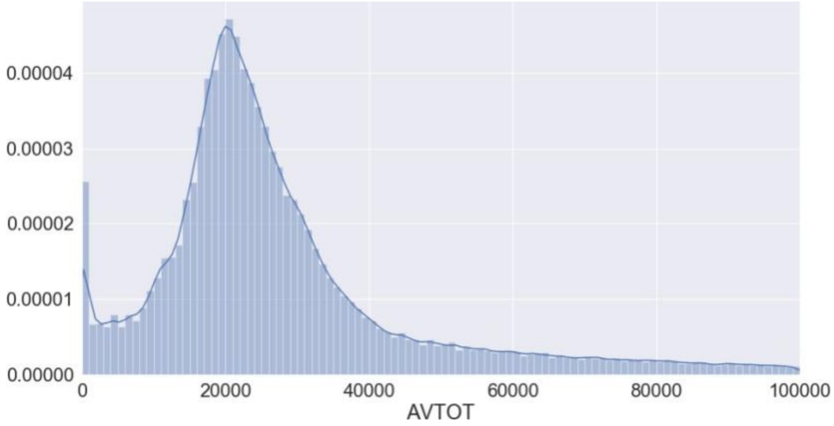
**AVLAND**:

- It’s a numerical variable.
- Following Density plot shows the spread of values of ‘AVLAND’ variable



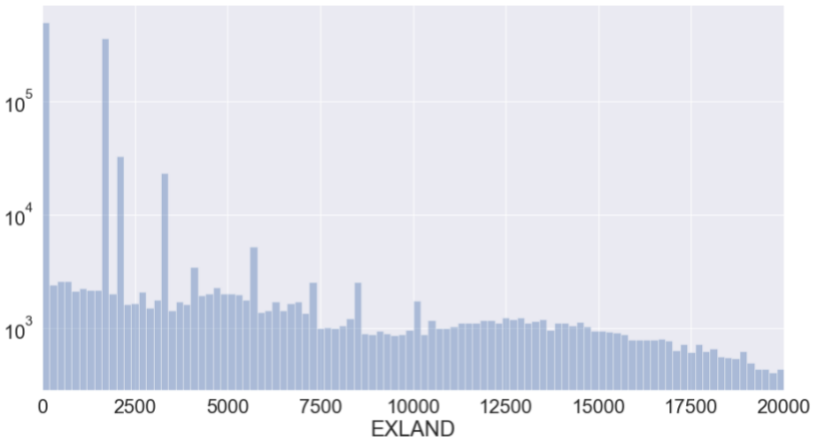
**AVTOT:**

- It’s a numerical variable.
- Following density plot shows the spread of values of the ‘AVTOT’ variable



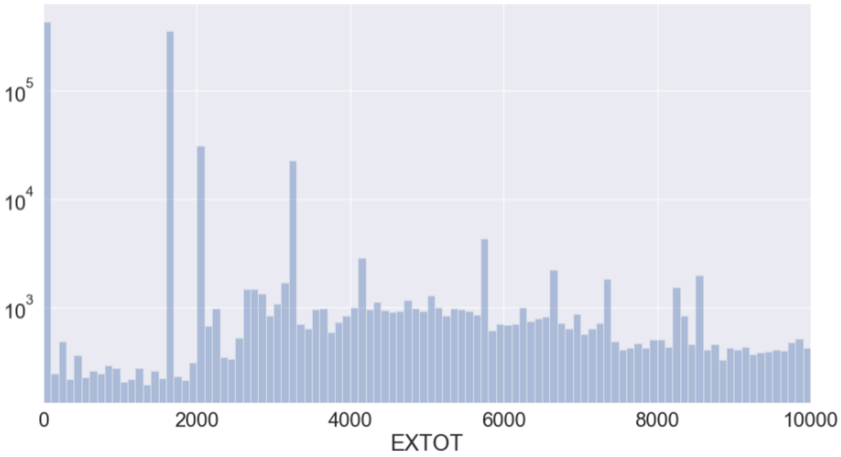
**EXLAND**:

- It’s a numerical variable. Following density plot shows the spread of values of the ‘EXLAND’ variable



**EXTOT:**

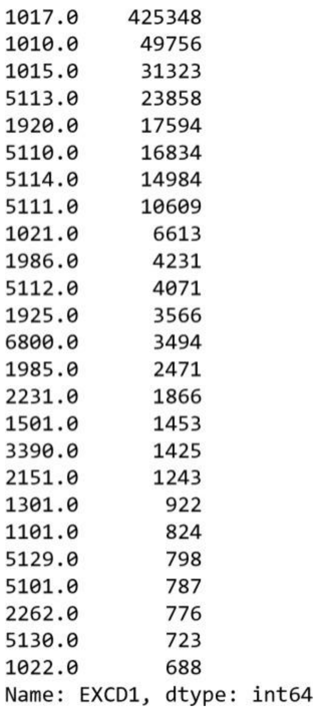
- It’s a numerical variable.
- Following histogram shows the spread of values of the ‘EXTOT’ variable



**EXCD1:**

- t’s a categorical variable. Following table shows the spread of NY properties across different values of ‘EXCD1’ variable

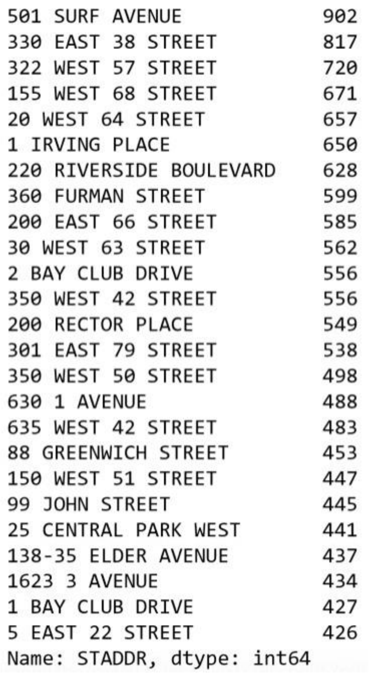
**Value Count**



```
1017.0    425348
1010.0     49756
1015.0     31323
5113.0     23858
1920.0     17594
5110.0     16834
5114.0     14984
5111.0     10609
1021.0      6613
1986.0      4231
5112.0      4071
1925.0      3566
6800.0      3494
1985.0      2471
2231.0      1866
1501.0      1453
3390.0      1425
2151.0      1243
1301.0       922
1101.0       824
5129.0       798
5101.0       787
2262.0       776
5130.0       723
1022.0       688
Name: EXCD1, dtype: int64
```

**STADDR**:

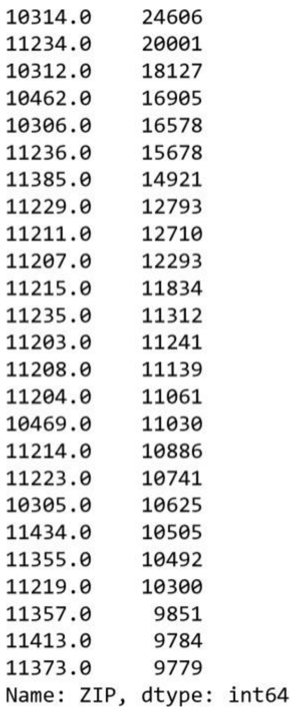
- It's a categorical variable.
- The following table shows the spread of NY properties across some of the top occurring addresses present in 'STADDR' variable



```
501 SURF AVENUE           902
330 EAST 38 STREET        817
322 WEST 57 STREET        720
155 WEST 68 STREET        671
20 WEST 64 STREET         657
1 IRVING PLACE            650
220 RIVERSIDE BOULEVARD   628
360 FURMAN STREET         599
200 EAST 66 STREET        585
30 WEST 63 STREET         562
2 BAY CLUB DRIVE          556
350 WEST 42 STREET        556
200 RECTOR PLACE          549
301 EAST 79 STREET        538
350 WEST 50 STREET        498
630 1 AVENUE              488
635 WEST 42 STREET        483
88 GREENWICH STREET       453
150 WEST 51 STREET        447
99 JOHN STREET            445
25 CENTRAL PARK WEST      441
138-35 ELDER AVENUE       437
1623 3 AVENUE             434
1 BAY CLUB DRIVE          427
5 EAST 22 STREET          426
Name: STADDR, dtype: int64
```

**ZIP:**

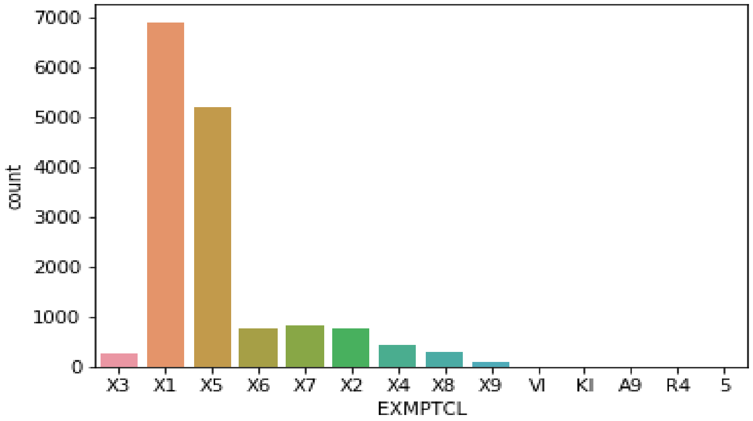
- It’s a categorical variable, denoting the zip-code of the property.
- The following table shows the spread of NY properties across top 20 Zip codes



```
10314.0    24606
11234.0    20001
10312.0    18127
10462.0    16905
10306.0    16578
11236.0    15678
11385.0    14921
11229.0    12793
11211.0    12710
11207.0    12293
11215.0    11834
11235.0    11312
11203.0    11241
11208.0    11139
11204.0    11061
10469.0    11030
11214.0    10886
11223.0    10741
10305.0    10625
11434.0    10505
11355.0    10492
11219.0    10300
11357.0     9851
11413.0     9784
11373.0     9779
Name: ZIP, dtype: int64
```

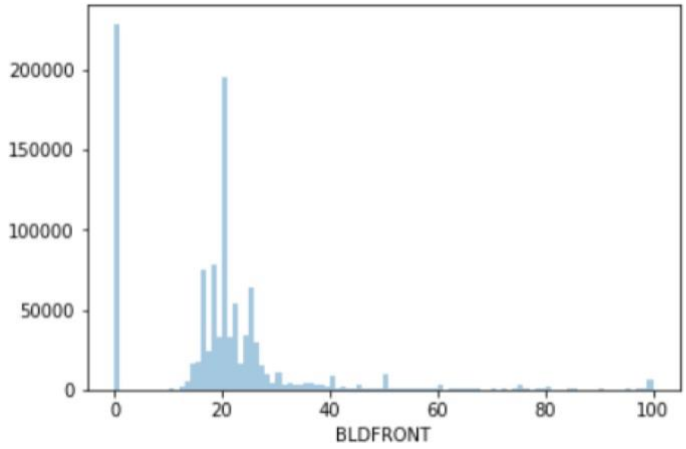
**EXMPTCL**:

- It’s a categorical variable used for fully exempt properties.
- Following bar graph shows the spread of properties across different classes of ‘EXMPTCL’ variable



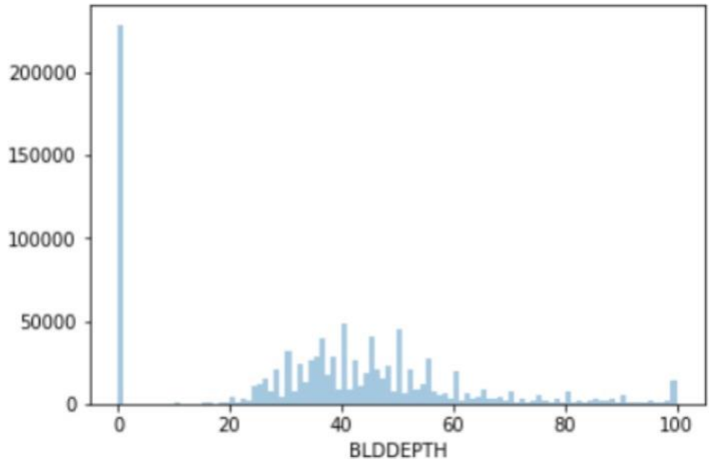
**BLDFRONT:**

- It’s a numerical variable.
- Following histogram shows the spread of values of the ‘BLDFRONT’ variable



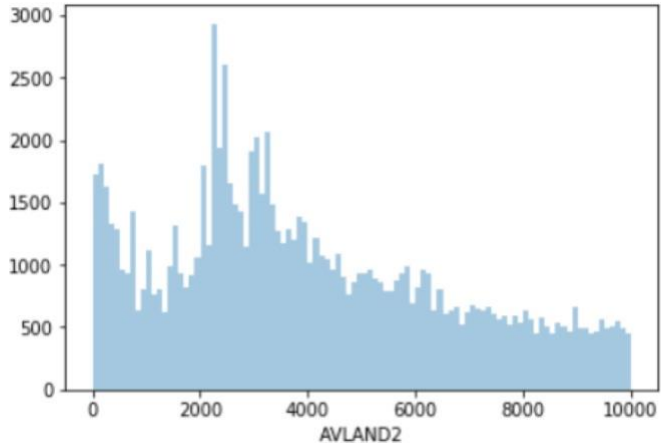
**BLDDEPTH:**

- It’s a numerical variable, stands for depth of the building in feet.
- Following histogram shows the spread of values of the ‘BLDDEPTH’ variable
-



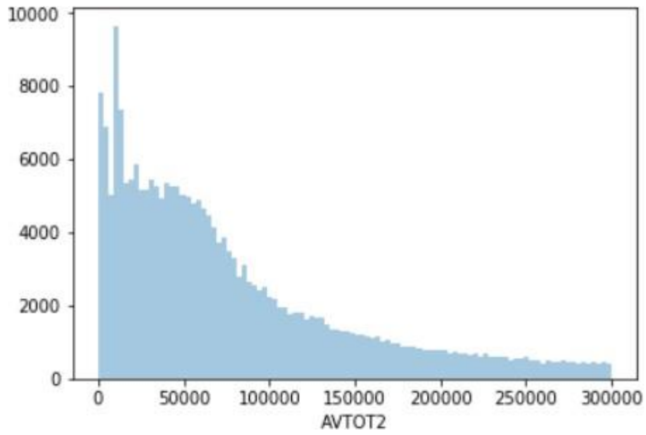
**AVLAND2:**

- It’s a numerical variable.
- Following histogram shows the spread of values of the ‘AVLAND2’ variable



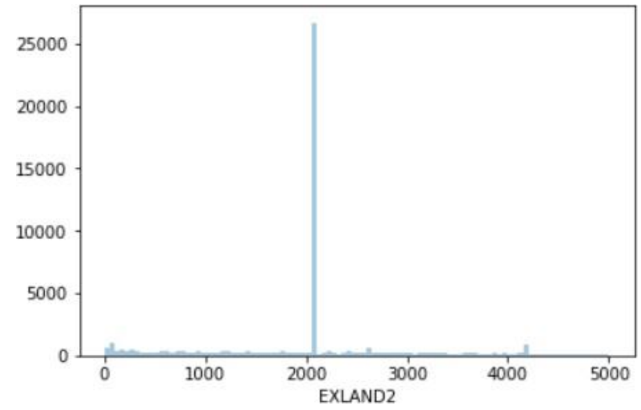
**AVTOT2:**

- It’s a numerical variable.
- - Following histogram shows the spread of values of the ‘AVTOT2’ variable



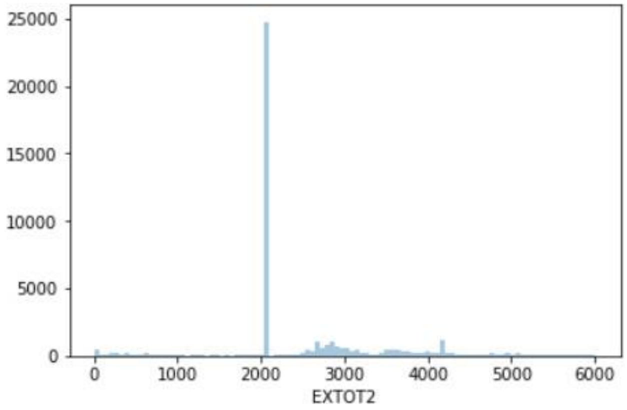
**EXLAND2:**

- It’s a numerical variable.
- Following histogram shows the spread of values of the ‘EXLAND2’ variable



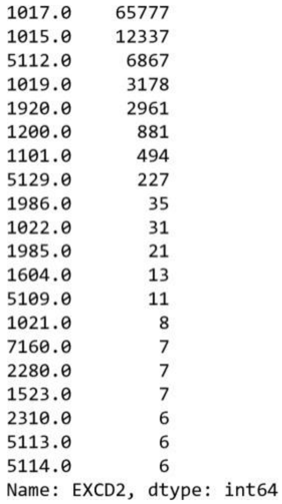
**EXTOT2:**

- It’s a numerical variable.
- Following histogram shows the spread of values of the ‘EXTOT2’ variable



**EXCD2:**

- It’s a categorical variable.
- Following table shows the spread of NY properties across different values of ‘EXCD2’ variable



```
1017.0    65777
1015.0    12337
5112.0     6867
1019.0     3178
1920.0     2961
1200.0      881
1101.0      494
5129.0      227
1986.0       35
1022.0       31
1985.0       21
1604.0       13
5109.0       11
1021.0        8
7160.0        7
2280.0        7
1523.0        7
2310.0        6
5113.0        6
5114.0        6
Name: EXCD2, dtype: int64
```

**PERIOD:**

- PERIOD variable has only 1 value across all the NY properties, which is ‘FINAL’.

**YEAR:**

- YEAR variable has only 1 value across all the NY properties, which is ‘2010/11’.

**VALTYPE:**

- VALTYPE variable has only 1 value across all the NY properties, which is ‘AC-TR’.