Real Estate

Understanding the Influences upon
Property Prices in Melbourne

Project 1

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Project Description & Outline
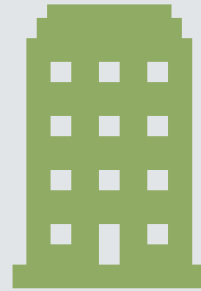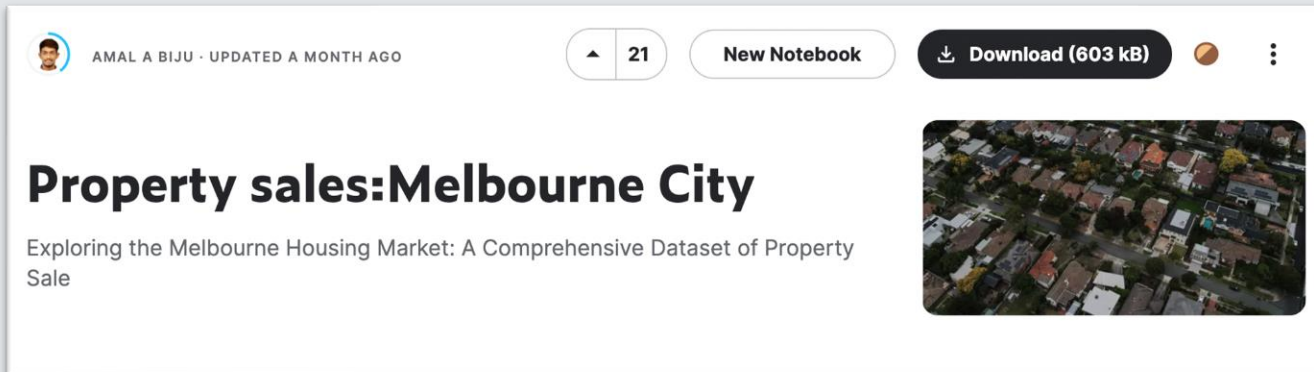
Melbourne Property Price Insights

For Buyers:

➢ Key attributes influencing Property Prices
➢ Insights per Living Demographic

For Sellers:

➢ Refined pricing estimates
➢ Evaluate the performance of Melbourne's top real estate agencies.

Dataset & Initial Data Cleaning

Source: Data generated by Biju, A.A. (2023). Property sales:Melbourne City.
Accessed on 4 April 2023. URL: https://www.kaggle.com/datasets/amalab182/property-salesmelbourne-city

Cleaned Dataset
➢21 Columns
➢18,396 Rows

```
Data columns (total 21 columns):
 #   Column        Non-Null Count   Dtype
---  ------        --------------   -----
 0   Suburb        18396 non-null   object
 1   Address       18396 non-null   object
 2   Rooms         18396 non-null   int64
 3   Type          18396 non-null   object
 4   Price         18396 non-null   int64
 5   Method        18396 non-null   object
 6   SellerG       18396 non-null   object
 7   Date          18396 non-null   datetime64[ns]
 8   Distance      18395 non-null   float64
 9   Postcode      18395 non-null   object
 10  Bedroom2      14927 non-null   float64
 11  Bathroom      14925 non-null   float64
 12  Car           14820 non-null   float64
 13  Landsize      13603 non-null   float64
 14  BuildingArea  7762 non-null    float64
 15  YearBuilt     8958 non-null    float64
 16  CouncilArea   12233 non-null   object
 17  Lattitude     15064 non-null   float64
 18  Longtitude    15064 non-null   float64
 19  Regionname    18395 non-null   object
 20  Propertycount 18395 non-null   float64
dtypes: datetime64[ns](1), float64(10), int64(2), object(8)
```

QUESTION 1.

What are the main influences on Property Prices in Melbourne?

QUESTION 1. | Data Exploration & Cleaning

Dependent Variable	➤ Price

Independent Variables	
➤ Property Type	➤ Number of Bedrooms
➤ Land Size	➤ Number of Bathrooms
➤ Building Size	➤ Parking Spots
➤ Rooms	➤ Year Built
	➤ Date of Sale

|	Price	Type	Landsize	BuildingArea	Rooms	Bedroom2	Bathroom	Car	YearBuilt	Date
0	1480000	h	202.0	NaN	2	2.0	1.0	1.0	NaN	2016-03-12
1	1035000	h	156.0	79.0	2	2.0	1.0	0.0	1900.0	2016-04-02
2	1465000	h	134.0	150.0	3	3.0	2.0	0.0	1900.0	2017-04-03
3	850000	h	94.0	NaN	3	3.0	2.0	1.0	NaN	2017-04-03
4	1600000	h	120.0	142.0	4	3.0	1.0	2.0	2014.0	2016-04-06

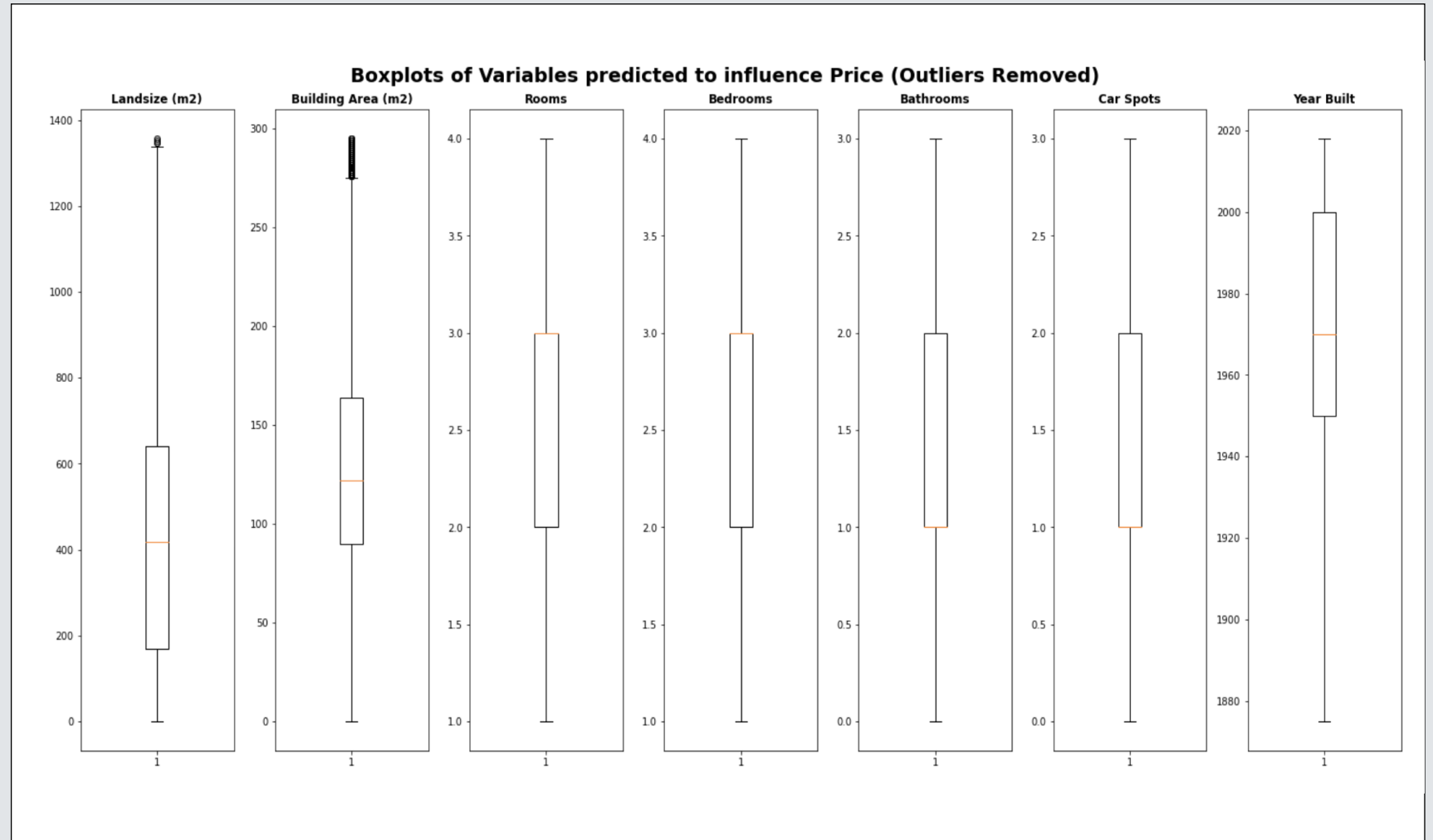# QUESTION 1.

Data Analysis: Property Type

Welch's T-Test

Pair	P-value
House – Townhouse	~0.0
House – Unit	~0.0
Townhouse - Unit	~0.0

P-value < 0.05 = significantly different means
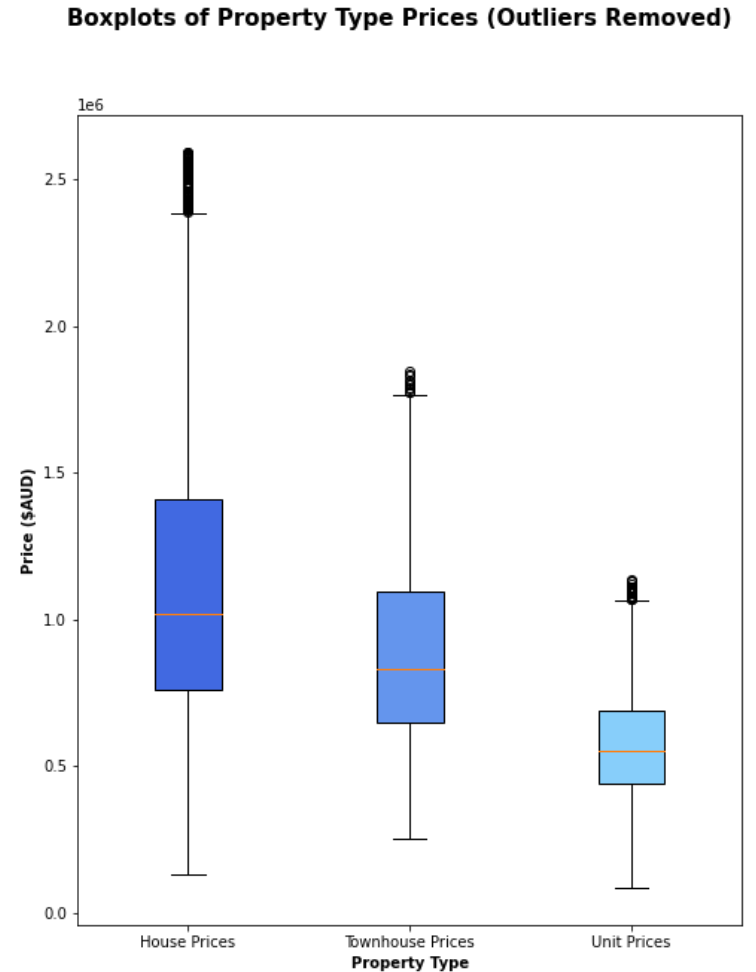
Boxplots of Property Type Prices (Outliers Removed)

QUESTION 1. | Data Analysis: Dependent Nominal Variables

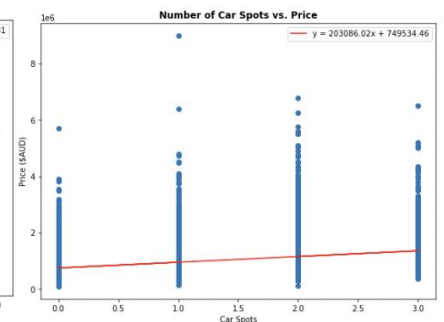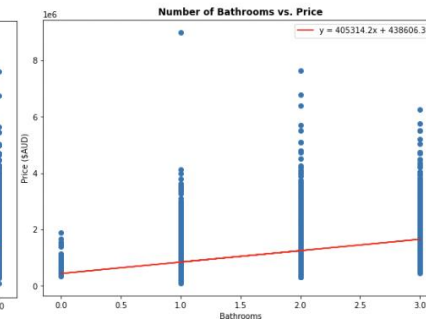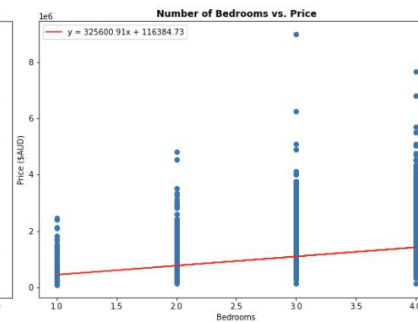**Boxplots of Variables predicted to influence Price (Outliers Removed)**

QUESTION 1.

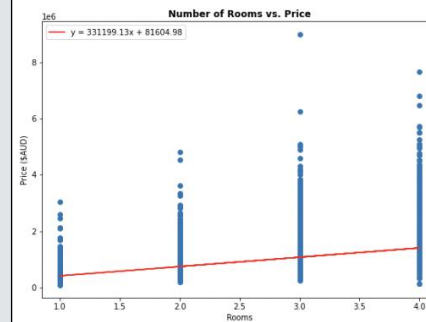## Data Analysis: Dependent Nominal Variables

Scatter Plots with Linear Regression Equations for Variables predicted to influence Price (Outliers Removed)
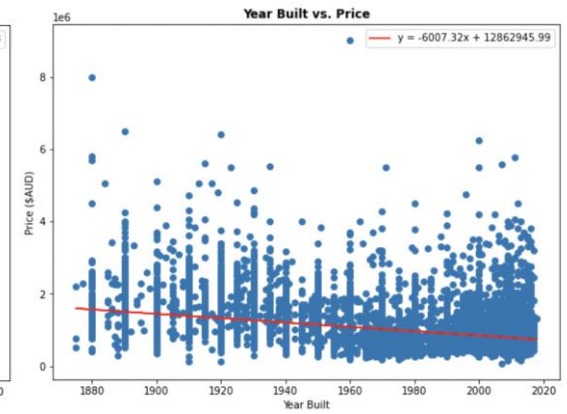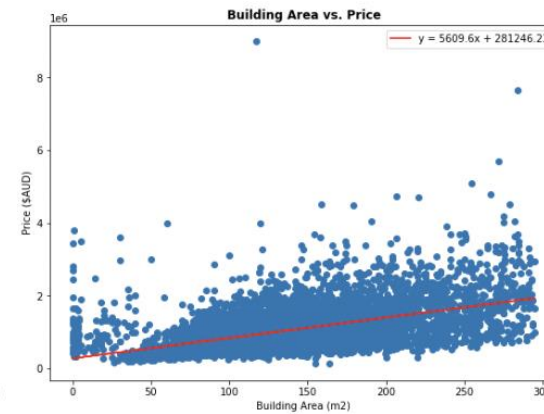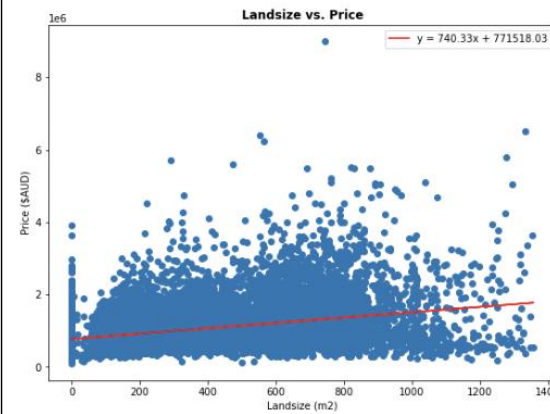
QUESTION 1.

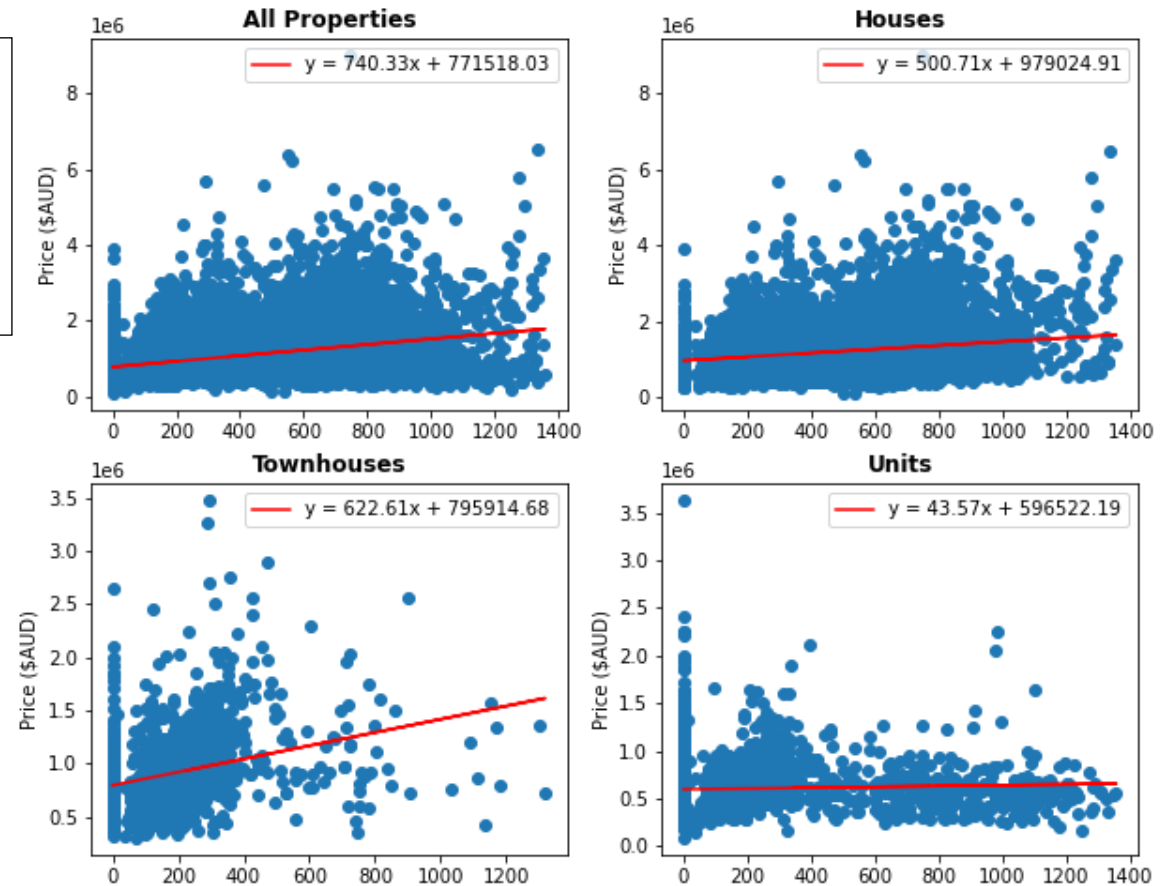## Data Analysis: Dependent Nominal Variables

Landsize vs. Price per Property Type (Outliers Removed)

Correlation Values	
All	0.339
House	0181
Townhouse	0.280
Unit	0.048

QUESTION 1.

Data Analysis: Date of Sale

Average Property Price per Month
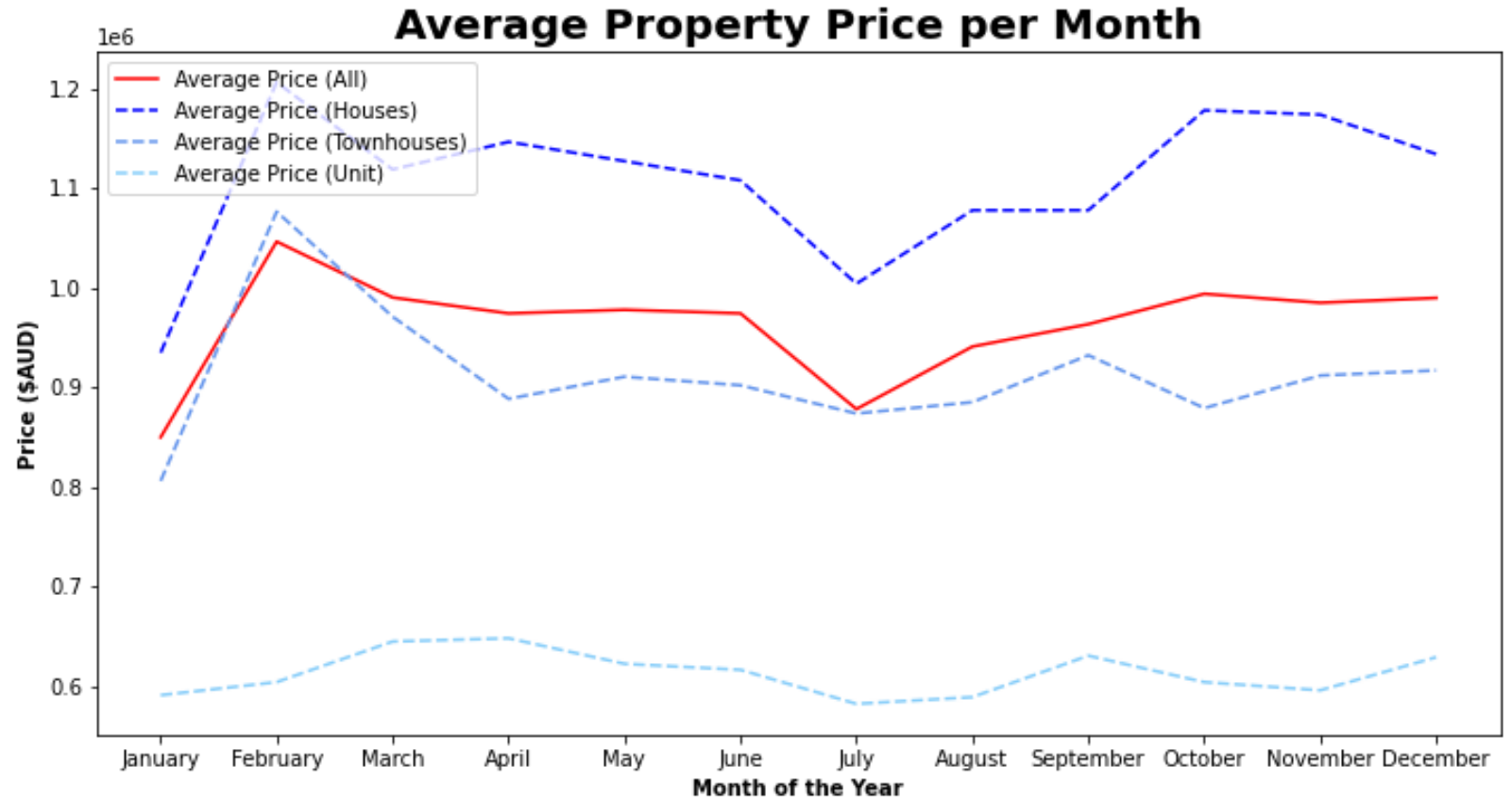
QUESTION 2.

Looking to buy in Melbourne? What location is best for your living demographic & your budget?

QUESTION 2.

Data Exploration & Cleaning

Dependent Variable	➢ Price

Independent Variables	➢ Distance from CBD ➢ Living Demographic
	     ➢ Longitude ➢ Property Type
	     ➢ Latitude ➢ Number of Bedrooms
	     ➢ Suburb

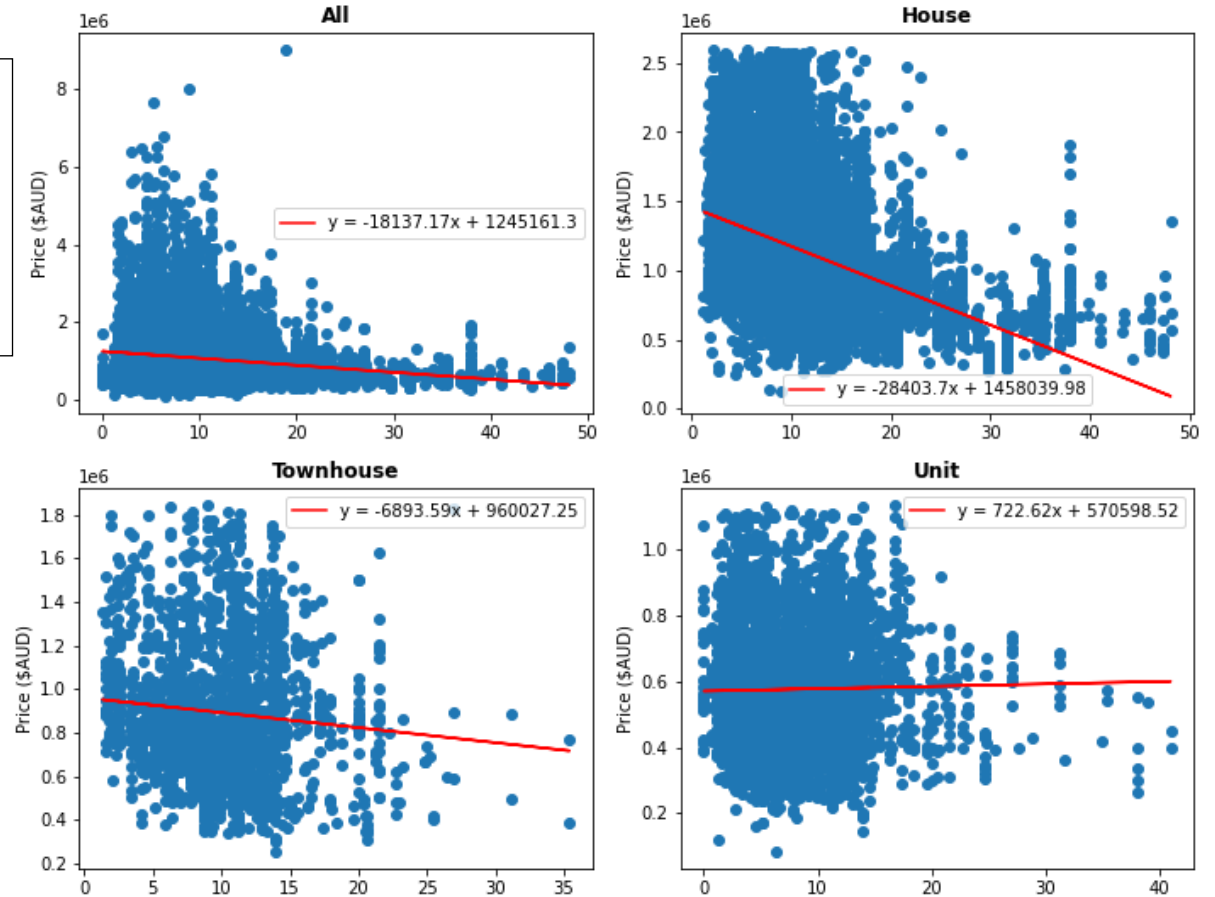|	Price	Type	Distance	Longtitude	Lattitude	Suburb	Bedroom2
0	1480000	h	2.5	144.9984	-37.7996	Abbotsford	2.0
1	1035000	h	2.5	144.9934	-37.8079	Abbotsford	2.0
2	1465000	h	2.5	144.9944	-37.8093	Abbotsford	3.0
3	850000	h	2.5	144.9969	-37.7969	Abbotsford	3.0
4	1600000	h	2.5	144.9941	-37.8072	Abbotsford	3.0

QUESTION 2.

Data Analysis: Linear Regression & Correlation

Distance vs. Price per Property Type (Outliers Removed)

Correlation Values
All	-0.170
House	-0.380
Townhouse	-0.095
Unit	0.019

All — y = -18137.17x + 1245161.3

House — y = -28403.7x + 1458039.98

Townhouse — y = -6893.59x + 960027.25

Unit — y = 722.62x + 570598.52

QUESTION 2. | Data Exploration: Living Demographics

Single

➤ Property Type

✓ Unit, Townhouse

➤ Number of Bedrooms

✓ <=2

Couple

➤ Property Type

✓ Unit, Townhouse, House

➤ Number of Bedrooms

✓ =2

Small Family

➤ Property Type
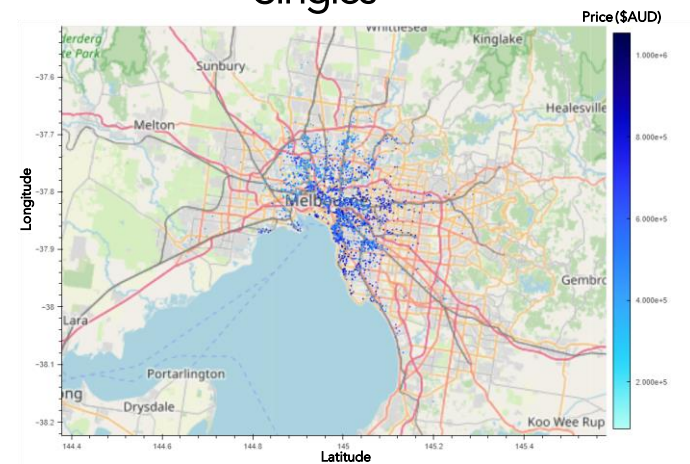
✓ Unit, Townhouse, House

➤ Number of Bedrooms

✓ 2-3

Large Family
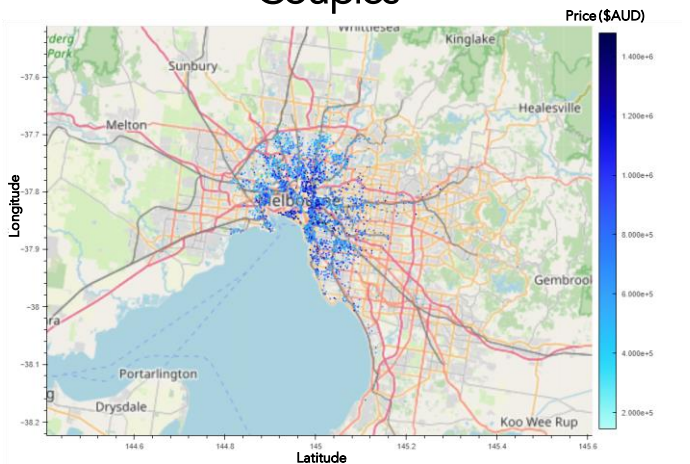
➤ Property Type

✓ House

➤ Number of Bedrooms
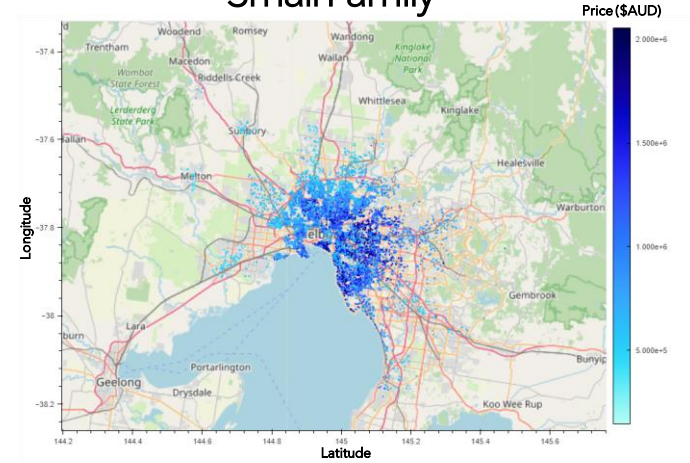
✓ >=3

QUESTION 2.

Data Analysis: Property Maps

QUESTION 3.

Looking to sell in Melbourne? Which real estate agency will get you the best value for your property?

QUESTION 3.

Data Exploration & Cleaning

Dependent Variable	➢ Price

Independent Variables	➢ Seller	➢ Location
	➢ Living Demographic	➢ Longitude
	➢ Property Type	➢ Latitude
	➢ Number of Bedrooms	➢ Suburb
		➢ Distance from CBD

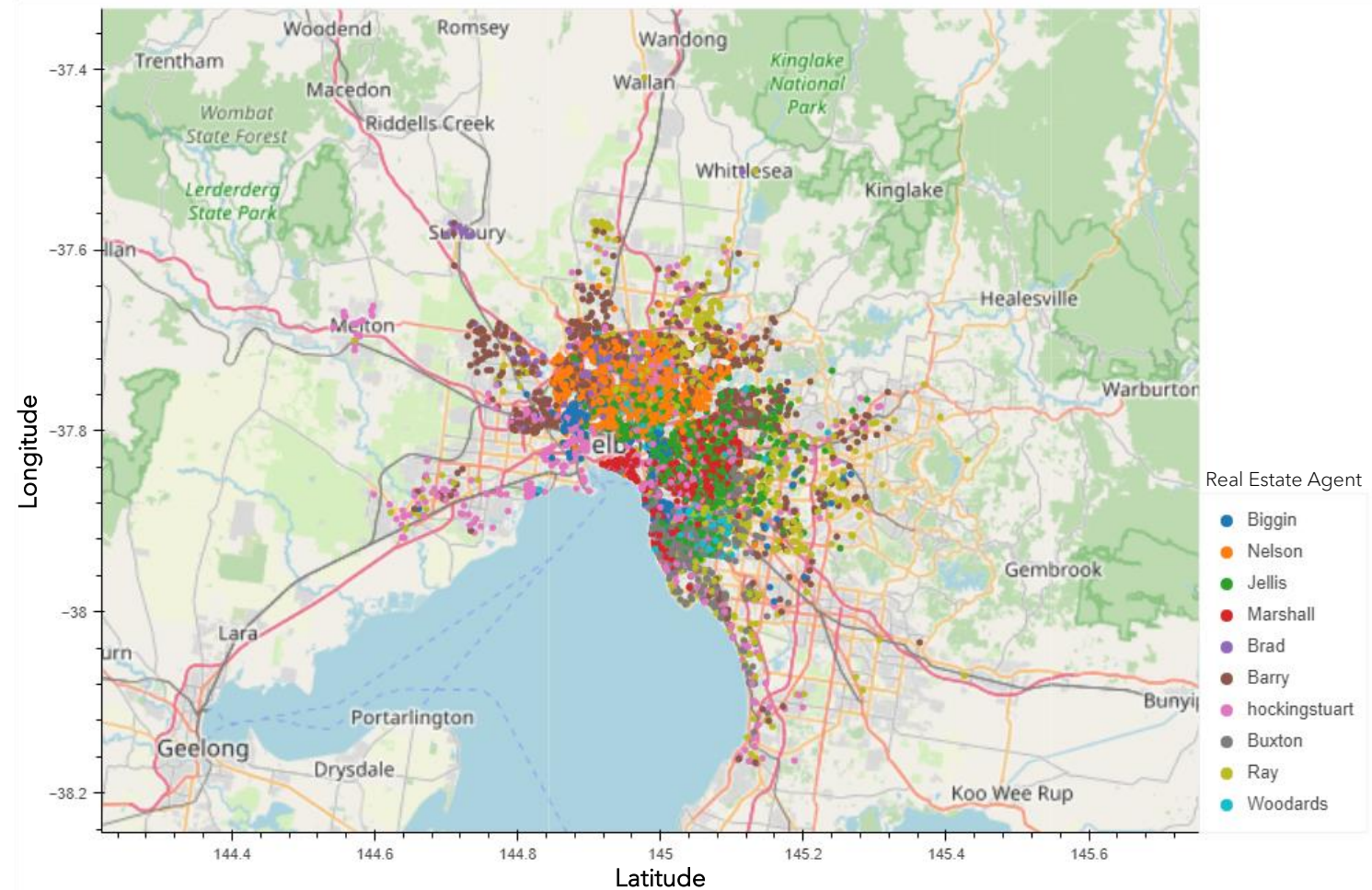|	SellerG	Price	Type	Bedroom2	Longtitude	Lattitude	Suburb	Distance
0	Biggin	1480000	h	2.0	144.9984	-37.7996	Abbotsford	2.5
1	Biggin	1035000	h	2.0	144.9934	-37.8079	Abbotsford	2.5
2	Biggin	1465000	h	3.0	144.9944	-37.8093	Abbotsford	2.5
3	Biggin	850000	h	3.0	144.9969	-37.7969	Abbotsford	2.5
4	Nelson	1600000	h	3.0	144.9941	-37.8072	Abbotsford	2.5

QUESTION 3.

Data Analysis: Top 10 Agencies

Number of Properties sold by the Top 10 Agencies in Melbourne
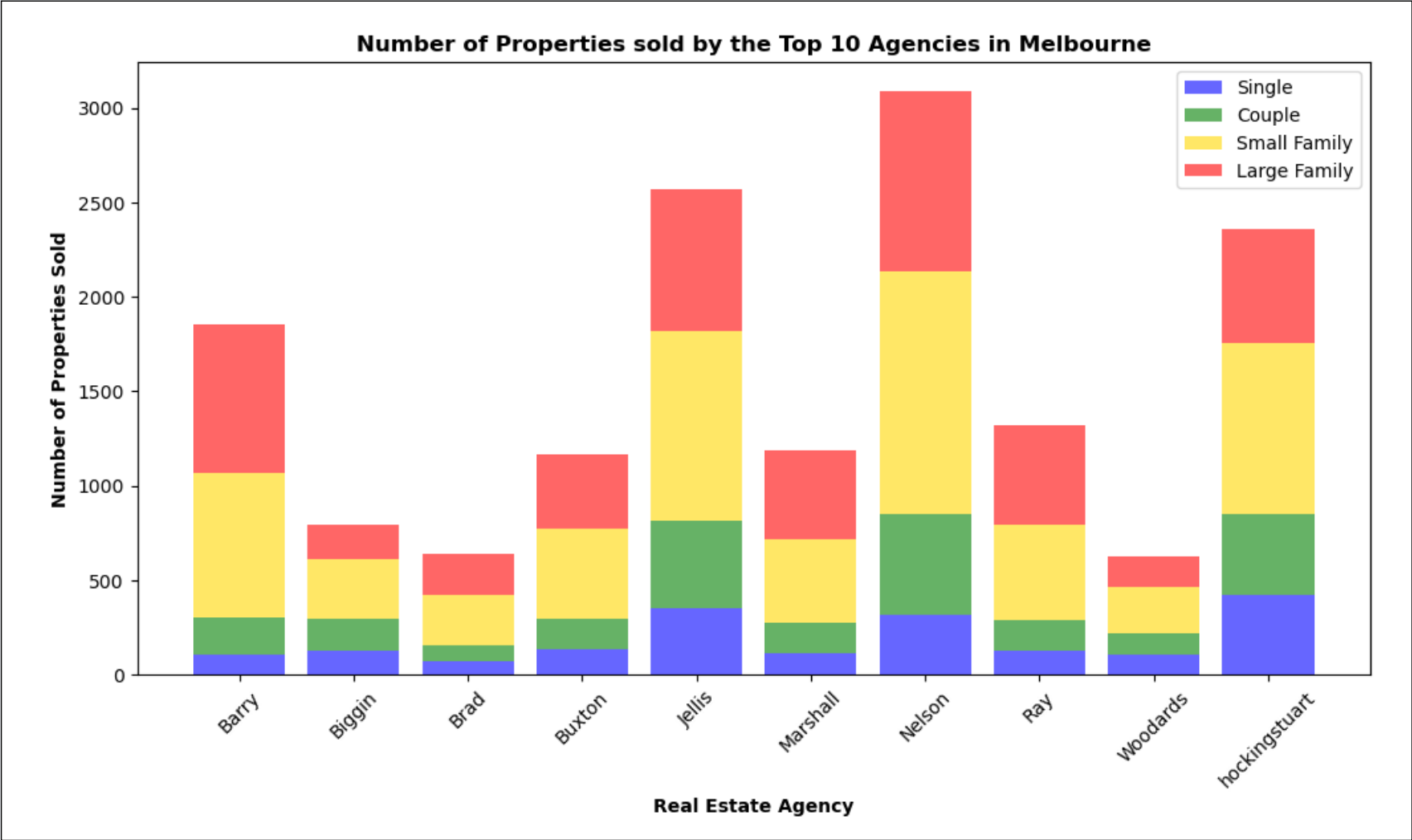
QUESTION 3.

Data Analysis: Map of Sales per Agent

QUESTION 3.   Data Analysis: Performance above Average

Boxplots of Property Prices grouped by Living Demographic (Outliers Removed)

Mean Sale Price per Agent

SellerG	Single	Couple	Small Family	Large Family
Barry	488744.392523	634963.927461	7.760736e+05	9.456324e+05
Biggin	534503.906250	799911.949686	9.451786e+05	1.236176e+06
Brad	446402.777778	666789.156627	7.849801e+05	9.591402e+05
Buxton	628545.801527	740343.537415	1.068719e+06	1.402903e+06
Jellis	601089.894260	825987.215457	1.105216e+06	1.594070e+06
Marshall	659795.470588	892251.029851	1.278638e+06	1.907037e+06
Nelson	544070.388350	763266.441006	9.371377e+05	1.179235e+06
Ray	498309.523810	628057.324841	7.880643e+05	9.822373e+05
Woodards	569485.281553	738895.309091	9.871616e+05	1.314482e+06
hockingstuart	565608.521845	718148.717340	8.759566e+05	1.143379e+06

Overlaid as Scatterplot Values

SUMMARY

In-depth analysis of Property Prices for sellers & buyers in Melbourne