

The background of the slide is a deep blue night sky filled with numerous small, bright white stars of varying sizes, creating a sense of depth and vastness.

IBM Applied Data Science Capstone Project The Battle of the Neighborhoods

A solid, vibrant pink horizontal bar spans the width of the slide, positioned at the bottom, providing a strong visual contrast to the dark blue background.



Introduction

We have been approached by our client to research possible locations in London for their new organic coffee and juice café. They currently have one café located near **Hackney Central** station which has proved very successful, so they are looking to open a second café located in or near a London station where the new location matches their current cafés location in relation to the amount of people who pass through the station each day and the makeup of the neighborhood surrounding the station.

Data

- List of London stations from Wikipedia page **List of London railway stations** to get the geographic location, Fare Zone and Station Category.
- **Foursquare API** – For neighborhood information.

Methodology - Location requirements

- Located in or near a London railway station.
- Station must be in a neighbourhood near central London.
- Station must have high through put of passengers.
- New location must have a similar “feel” to current café location of Hackney Central Station.

Methodology Part 1 - Station shortlist

- The customer wants to locate their new cafe in the suburbs that are nearest to central London, they don't want premises in central London due to the high cost of rent. To meet this requirement we only looked at stations that fell into **Fare Zone 2**.
- The station must still have high through put of passengers even if it's not located in Central London. To meet this requirement we only looked at stations that fell into **Category B, C or D**. The categories are based on the following **Trips Per Annum values**:

Category **B** = **Over 2 million** trips per annum.

Category **C** = **0.5 to 2 million** trips per annum.

Category **D** = **0.25 to 0.5 million** trips per annum

Methodology Part 1 - Station shortlist

Applying the criteria in the previous slide we ended up with a shortlist of stations listed in the table on left.

	Station	FareZone	Category	lat	lng
13	Battersea Park	2	D	51.477900	-0.147700
33	Brockley	2	D	51.464500	-0.036900
44	Camden Road	2	D	51.544400	-0.140100
72	Clapham Junction	2	B	51.464400	-0.170300
85	Dalston Kingsland	2	D	51.548200	-0.076300
87	Denmark Hill	2	D	51.468300	-0.089400
117	Finsbury Park	2	C	51.564653	-0.106366
125	Gospel Oak	2	D	51.555200	-0.151400
133	Hackney Central	2	D	51.547000	-0.055900
134	Hackney Downs	2	C	51.548300	-0.060100
138	Hampstead Heath	2	D	51.555300	-0.165400
173	Kensington (Olympia)	2	C	51.498500	-0.211000
214	New Cross	2	C	51.476000	-0.032500
215	New Cross Gate	2	C	51.475200	-0.040600
234	Peckham Rye	2	D	51.470100	-0.069100
244	Queen's Park	2	C	51.534100	-0.205300
269	Shepherd's Bush	2	D	51.505100	-0.217500
331	Wandsworth Town	2	C	51.461000	-0.187900
348	West Hampstead	2	D	51.547300	-0.191300

Methodology Part 2 - Station neighborhood

- Using the Foursquare API got a list of the venues within 500m of each shortlisted station including a category type for each venue.
- Got a mean value for each venue category at each station then calculated the Top 10 venue categories for each station.

Methodology Part 2 - Station neighborhood

The table below lists the Top 10 venues for the shortlisted station locations.

	Station	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Battersea Park	Bar	Pub	Hotel	Train Station	Spanish Restaurant	Chinese Restaurant	Furniture / Home Store	Italian Restaurant	Café	Wine Shop
1	Brockley	Chinese Restaurant	Beer Store	Coffee Shop	Gastropub	Grocery Store	Fish & Chips Shop	Restaurant	Brewery	Pub	Convenience Store
2	Camden Road	Pub	Coffee Shop	Café	Italian Restaurant	Grocery Store	Caribbean Restaurant	Supermarket	Pharmacy	Paper / Office Supplies Store	Sandwich Place
3	Clapham Junction	Pub	Coffee Shop	Pharmacy	Grocery Store	Bar	Supermarket	Bakery	Cocktail Bar	Sandwich Place	Korean Restaurant
4	Dalston Kingsland	Café	Grocery Store	Coffee Shop	Pub	Pizza Place	Restaurant	Cocktail Bar	Convenience Store	Caribbean Restaurant	Yoga Studio
5	Denmark Hill	Coffee Shop	Pub	Café	Deli / Bodega	Portuguese Restaurant	Bar	Train Station	Grocery Store	Vietnamese Restaurant	Chinese Restaurant
6	Finsbury Park	Pub	Café	Hotel	Italian Restaurant	Pizza Place	Sandwich Place	Bus Stop	Coffee Shop	Bakery	Grocery Store
7	Gospel Oak	Café	Coffee Shop	Pub	Gastropub	Convenience Store	Farm	Pool	Farmers Market	Track Stadium	Trail
8	Hackney Central	Café	Pub	Grocery Store	Cocktail Bar	Coffee Shop	Platform	Brewery	Turkish Restaurant	Restaurant	Vegetarian / Vegan Restaurant
9	Hackney Downs	Café	Pub	Grocery Store	Coffee Shop	Cocktail Bar	Breakfast Spot	Clothing Store	Sandwich Place	Vegetarian / Vegan Restaurant	Hotel
10	Hampstead Heath	Café	Pub	Bakery	Coffee Shop	Indian Restaurant	Italian Restaurant	Lake	Museum	Hotel	Event Space
11	Kensington (Olympia)	Hotel	Pub	Grocery Store	Sandwich Place	Persian Restaurant	Coffee Shop	Convention Center	Indian Restaurant	Gastropub	Italian Restaurant
12	New Cross	Coffee Shop	Café	Grocery Store	Pub	Gastropub	Indie Movie Theater	Restaurant	Chinese Restaurant	Cocktail Bar	Sandwich Place
13	New Cross Gate	Café	Pub	Grocery Store	Coffee Shop	Chinese Restaurant	Gastropub	Supermarket	Lebanese Restaurant	Bus Stop	Sandwich Place
14	Peckham Rye	Pub	Grocery Store	Italian Restaurant	Café	Coffee Shop	Supermarket	Cocktail Bar	Bar	Indie Movie Theater	Indian Restaurant
15	Queen's Park	Coffee Shop	Yoga Studio	Café	Gym / Fitness Center	Gym	Pub	Italian Restaurant	Bar	French Restaurant	Restaurant
16	Shepherd's Bush	Clothing Store	Hotel	Chinese Restaurant	Grocery Store	Sushi Restaurant	Cosmetics Shop	Supermarket	Bar	Burger Joint	Pizza Place
17	Wandsworth Town	Pub	Grocery Store	Bus Stop	Gym / Fitness Center	Hotel	Indian Restaurant	Coffee Shop	Breakfast Spot	Thai Restaurant	Deli / Bodega
18	West Hampstead	Coffee Shop	Grocery Store	Pizza Place	Pub	Café	Indian Restaurant	Vietnamese Restaurant	Bakery	Platform	Thai Restaurant

Methodology Part 3 - Clustering

- Using K-means clustering to cluster the neighborhoods surrounding each station, grouping them where they have a similar make up of shops and businesses.

Methodology Part 3 - Clustering

The table below shows the results of the clustering - we can see that Hackney Central (current café location) falls into Cluster Label 3.

	Station	FareZone	Category	lat	lng	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
13	Battersea Park	2	D	51.477900	-0.147700	2	Bar	Pub	Hotel	Train Station	Spanish Restaurant	Chinese Restaurant	Furniture / Home Store	Italian Restaurant	Café	Wine Shop
33	Brockley	2	D	51.464500	-0.036900	3	Chinese Restaurant	Beer Store	Coffee Shop	Gastropub	Grocery Store	Fish & Chips Shop	Restaurant	Brewery	Pub	Convenience Store
44	Camden Road	2	D	51.544400	-0.140100	3	Pub	Coffee Shop	Café	Italian Restaurant	Grocery Store	Caribbean Restaurant	Supermarket	Pharmacy	Paper / Office Supplies Store	Sandwich Place
72	Clapham Junction	2	B	51.464400	-0.170300	3	Pub	Coffee Shop	Pharmacy	Grocery Store	Bar	Supermarket	Bakery	Cocktail Bar	Sandwich Place	Korean Restaurant
85	Dalston Kingsland	2	D	51.548200	-0.076300	3	Café	Grocery Store	Coffee Shop	Pub	Pizza Place	Restaurant	Cocktail Bar	Convenience Store	Caribbean Restaurant	Yoga Studio
87	Denmark Hill	2	D	51.468300	-0.089400	1	Coffee Shop	Pub	Café	Deli / Bodega	Portuguese Restaurant	Bar	Train Station	Grocery Store	Vietnamese Restaurant	Chinese Restaurant
117	Finsbury Park	2	C	51.564653	-0.106366	3	Pub	Café	Hotel	Italian Restaurant	Pizza Place	Sandwich Place	Bus Stop	Coffee Shop	Bakery	Grocery Store
125	Gospel Oak	2	D	51.555200	-0.151400	4	Café	Coffee Shop	Pub	Gastropub	Convenience Store	Farm	Pool	Farmers Market	Track Stadium	Trail
133	Hackney Central	2	D	51.547000	-0.055900	3	Café	Pub	Grocery Store	Cocktail Bar	Coffee Shop	Platform	Brewery	Turkish Restaurant	Restaurant	Vegetarian / Vegan Restaurant
134	Hackney Downs	2	C	51.548300	-0.060100	3	Café	Pub	Grocery Store	Coffee Shop	Cocktail Bar	Breakfast Spot	Clothing Store	Sandwich Place	Vegetarian / Vegan Restaurant	Hotel
138	Hampstead Heath	2	D	51.555300	-0.165400	3	Café	Pub	Bakery	Coffee Shop	Indian Restaurant	Italian Restaurant	Lake	Museum	Hotel	Event Space
173	Kensington (Olympia)	2	C	51.498500	-0.211000	3	Hotel	Pub	Grocery Store	Sandwich Place	Persian Restaurant	Coffee Shop	Convention Center	Indian Restaurant	Gastropub	Italian Restaurant
214	New Cross	2	C	51.476000	-0.032500	1	Coffee Shop	Café	Grocery Store	Pub	Gastropub	Indie Movie Theater	Restaurant	Chinese Restaurant	Cocktail Bar	Sandwich Place
215	New Cross Gate	2	C	51.475200	-0.040600	1	Café	Pub	Grocery Store	Coffee Shop	Chinese Restaurant	Gastropub	Supermarket	Lebanese Restaurant	Bus Stop	Sandwich Place
234	Peckham Rye	2	D	51.470100	-0.069100	3	Pub	Grocery Store	Italian Restaurant	Café	Coffee Shop	Supermarket	Cocktail Bar	Bar	Indie Movie Theater	Indian Restaurant
244	Queen's Park	2	C	51.534100	-0.205300	3	Coffee Shop	Yoga Studio	Café	Gym / Fitness Center	Gym	Pub	Italian Restaurant	Bar	French Restaurant	Restaurant
269	Shepherd's Bush	2	D	51.505100	-0.217500	3	Clothing Store	Hotel	Chinese Restaurant	Grocery Store	Sushi Restaurant	Cosmetics Shop	Supermarket	Bar	Burger Joint	Pizza Place
331	Wandsworth Town	2	C	51.461000	-0.187900	0	Pub	Grocery Store	Bus Stop	Gym / Fitness Center	Hotel	Indian Restaurant	Coffee Shop	Breakfast Spot	Thai Restaurant	Deli / Bodega
348	West Hampstead	2	D	51.547300	-0.191300	3	Coffee Shop	Grocery Store	Pizza Place	Pub	Café	Indian Restaurant	Vietnamese Restaurant	Bakery	Platform	Thai Restaurant

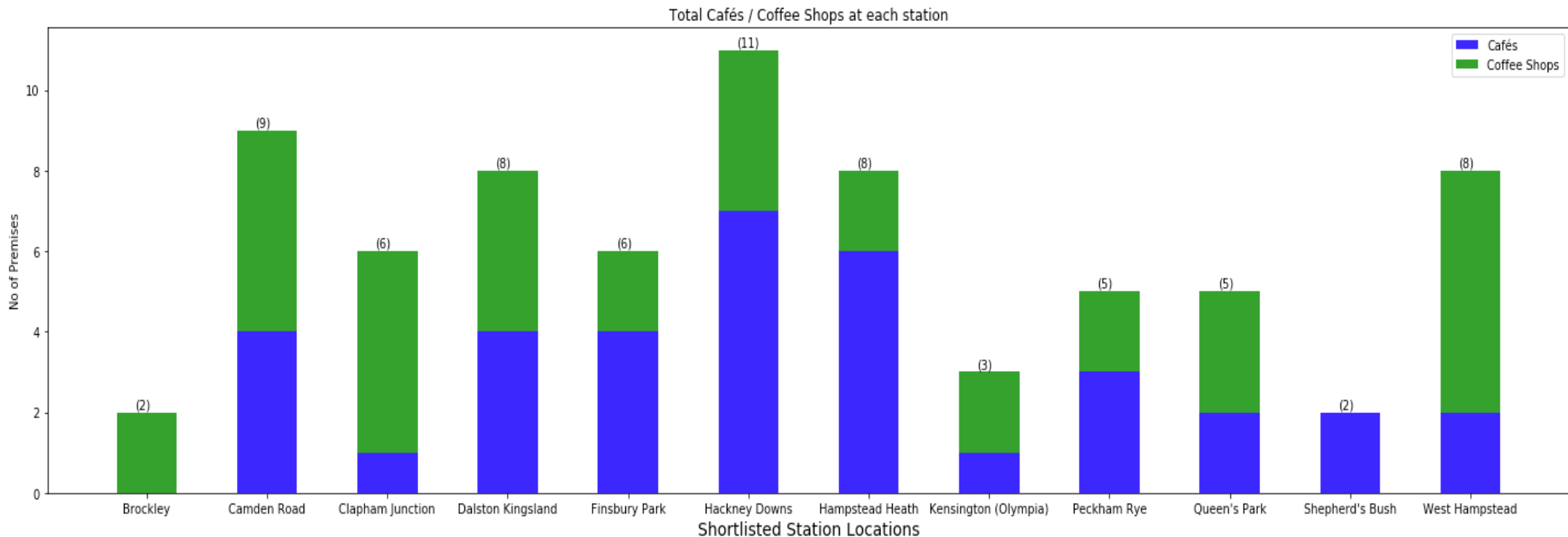
Methodology Part 3 - Clustering

Below is the list of stations that fall into the same cluster (cluster label 3) as the current café at Hackney Central.

	Station	FareZone	Category	lat	lng	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
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85	Dalston Kingsland	2	D	51.548200	-0.076300	3	Café	Grocery Store	Coffee Shop	Pub	Pizza Place	Restaurant	Cocktail Bar	Convenience Store	Caribbean Restaurant	Yoga Studio
117	Finsbury Park	2	C	51.564653	-0.106366	3	Pub	Café	Hotel	Italian Restaurant	Pizza Place	Sandwich Place	Bus Stop	Coffee Shop	Bakery	Grocery Store
134	Hackney Downs	2	C	51.548300	-0.060100	3	Café	Pub	Grocery Store	Coffee Shop	Cocktail Bar	Breakfast Spot	Clothing Store	Sandwich Place	Vegetarian / Vegan Restaurant	Hotel
138	Hampstead Heath	2	D	51.555300	-0.165400	3	Café	Pub	Bakery	Coffee Shop	Indian Restaurant	Italian Restaurant	Lake	Museum	Hotel	Event Space
173	Kensington (Olympia)	2	C	51.498500	-0.211000	3	Hotel	Pub	Grocery Store	Sandwich Place	Persian Restaurant	Coffee Shop	Convention Center	Indian Restaurant	Gastropub	Italian Restaurant
234	Peckham Rye	2	D	51.470100	-0.069100	3	Pub	Grocery Store	Italian Restaurant	Café	Coffee Shop	Supermarket	Cocktail Bar	Bar	Indie Movie Theater	Indian Restaurant
244	Queen's Park	2	C	51.534100	-0.205300	3	Coffee Shop	Yoga Studio	Café	Gym / Fitness Center	Gym	Pub	Italian Restaurant	Bar	French Restaurant	Restaurant
269	Shepherd's Bush	2	D	51.505100	-0.217500	3	Clothing Store	Hotel	Chinese Restaurant	Grocery Store	Sushi Restaurant	Cosmetics Shop	Supermarket	Bar	Burger Joint	Pizza Place
348	West Hampstead	2	D	51.547300	-0.191300	3	Coffee Shop	Grocery Store	Pizza Place	Pub	Café	Indian Restaurant	Vietnamese Restaurant	Bakery	Platform	Thai Restaurant

Methodology Part 3 - Location Analysis

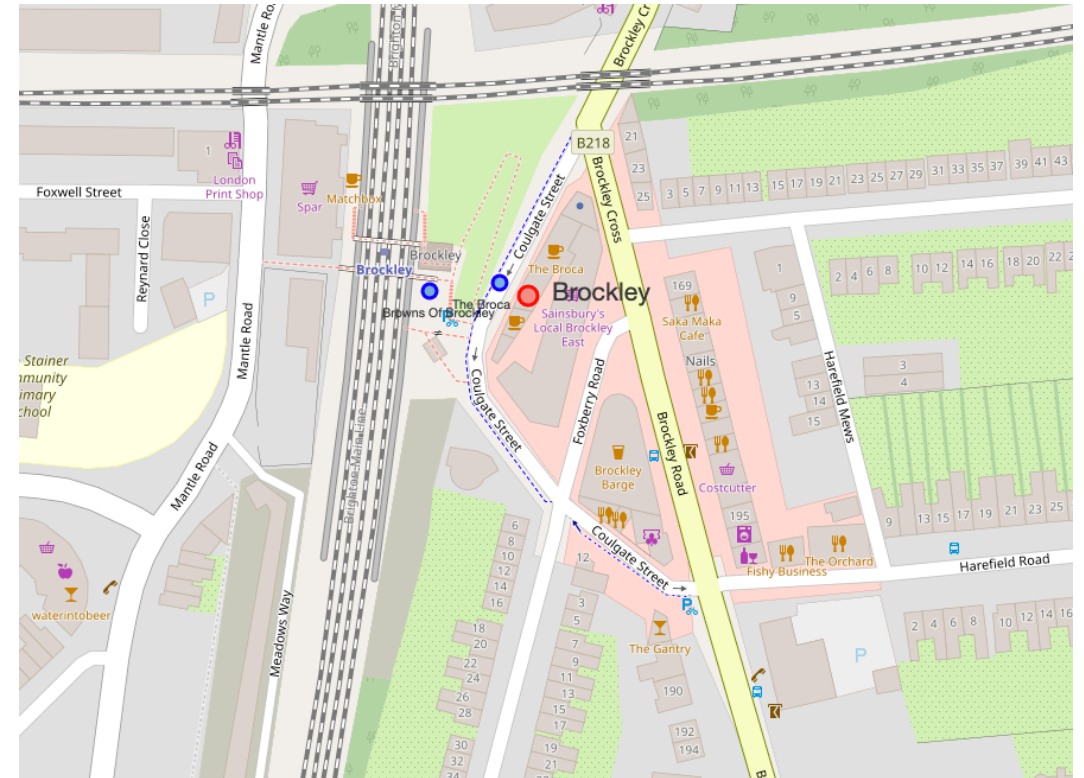
Next we got a count of cafes and coffee shops at each of the stations to determine what the level of competition is at each location. From the bar chart below the stations **Brockley**, **Kensington (Olympia)** and **Shepherd's Bush** have least amount of competition.



Methodology Part 3 - Location Analysis Brockley

There are 2 coffee shops located around the station.

Venue	Distance to Station (meters)
Browns of Brockley	30
The Broca	9

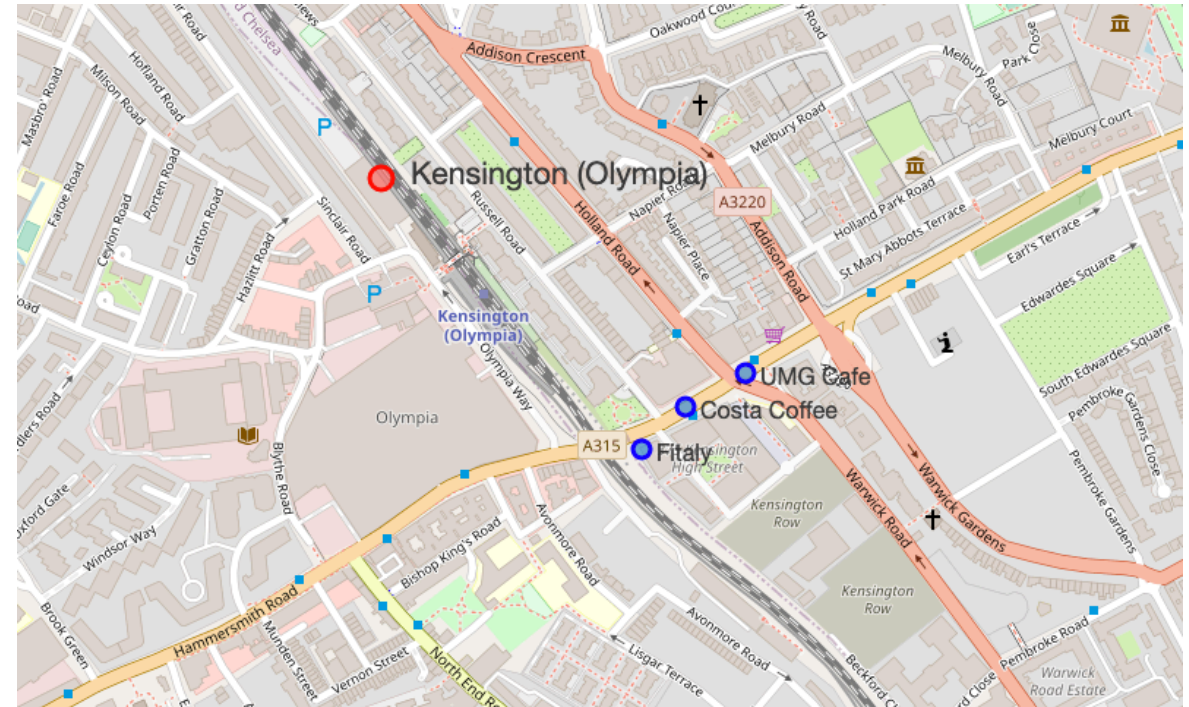


Methodology Part 3 - Location Analysis

Kensington (Olympia)

There are 2 coffee shops and 1 café located around the station.

Venue	Distance to Station (meters)
Fitaly	381
Costa Coffee	386
UMG Cafe	420

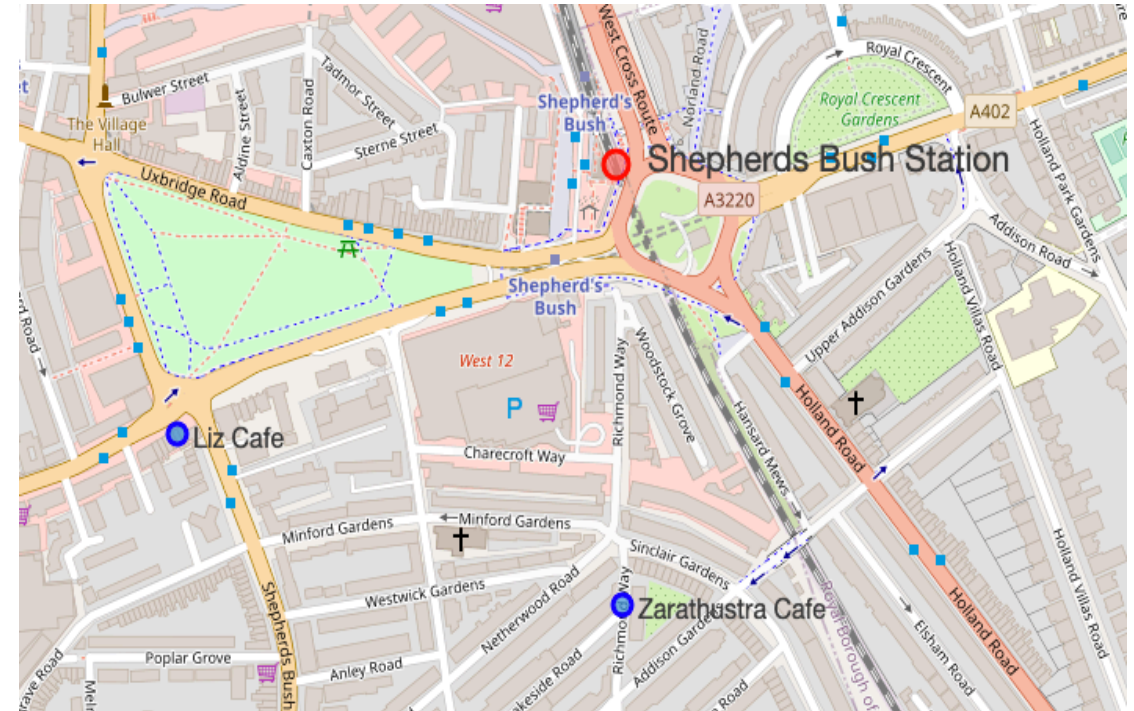


Methodology Part 3 - Location Analysis

Shepherd's Bush

There are 2 cafes located around the station.

Venue	Distance to Station (meters)
Liz Cafe	476
Zarathustra Cafe	379



Conclusion

- We have put forward to the client **Brockley, Kensington (Olympia)** and **Shepherd's Bush** stations as possible locations for their new organic coffee and juice cafe.
- All the locations match their current location (**Hackney Central**) in relation to the make up the neighborhood surrounding the stations, which was one of their requirements.
- In terms of through put of passengers, **Kensington (Olympia)** is classed as a category C station whereas **Brockley** and **Shepherd's Bush** are classified as category D (see **Methodology Part 1** section above for station category definitions), so **Kensington (Olympia)** will see more passengers pass through, so potentially more customers, however it does have a Costa Coffee within 500m of the station so the clients new cafe will have stronger competition for those potential customers. **Brockley** has 2 smaller coffee shops but both are very close to the station. **Shepherd's Bush** has only 2 smaller cafes within 500m of the station so there will be less competition for the potential customers passing through the station.