

Queen Elizabeth Olympic Park

ANALYZING CAMERA DATA

FYMA's GDPR-compliant data, extracted from CCTV cameras in and around London's Queen Elizabeth Olympic Park, was read through the lens of a number of urban metrics. In the following pages, these urban metrics are defined and accompanied by relevant graphs, maps, and interpretation.

Tallinn, Helsinki | August 2021

CONTENTS

1. Project summary
2. Synthesis
3. Mobility indexes + Figures
4. Suggestions

1/4 PROJECT SUMMARY



Process

Developing mobility indexes

Our team developed a series of urban mobility metrics and indexes that could be computed utilising the data captured by Fyma AI technology.

- Benchmarking mobility indexes
- Assessing socially relevant mobility indexes
- Studying Fyma computer vision data
- Compiling a list of mobility indexes based on Fyma

July - August

Analysis

For each camera, all the selected mobility indexes and metrics were computed. For each analysis, we provided cartographies and graphs, which were also used to validate our analysis.

- Developing a universal parser for spatial analysis and GIS
- Spatial data analysis
- Output cartographies
- Output graphs
- Validation

August

Synthesis

A comparative analysis of the most relevant indexes was carried out to compile this report and provide suggestions to implement a greater number of socially relevant mobility indexes.

- Comparative analysis
- Suggestions
- Report

August 31st

List of Selected Indexes

Average Traffic Density

Measuring the road traffic at a given location in relation to the visible road area, weighed by the number of minutes for which the camera recorded data.

Average Traffic Density (%)

Measuring how much space vehicles and people occupy in a minute, compared to the camera’s ground area, expressed as a percentage.

Pedestrian Traffic Intensity

The ratio between the number of pedestrians and the number of pedestrian lanes.

Road Traffic Intensity

The ratio between the number of vehicles and the number of road lanes.

Modal Share

The share of traffic of a certain transport mode in relation to other transport modes - expressed as a percentage.

Modal Consistency

The share of time intervals in which a particular mode was consistently predominant over others - expressed as a percentage.

Available mobility services

The number of mobility services available in a 250 meter radius.

Available amenities

The number of optional and necessary amenities available within a 250 meter radius.

Diversity (mix) of amenities

The diversity of optional and necessary amenities available in a 250 meter radius.

Popularity

The popularity of the amenities available within a 250 meter radius.

Definitions

DAY vs NIGHT

Night hours are defined as any hour between 6pm and 6am, matching the Greater London Authority (GLA) Economics’ definition in their 2018 “London at night: An evidence base for a 24-hour city.” Day hours are, it follows, all of the other hours in a day.

PEAK vs NON-PEAK

Peak hours are defined dynamically by camera, using Fyma’s data, as the three hours in a day in which observed traffic is at its greatest. Non-peak hours, it follows, are every other hour in a day.

WEEKDAY vs WEEKEND

Weekdays are defined as days 0 through 4, Monday through Friday. Weekends are defined as days 5 through 6, Saturday through Sunday.

TRANSPORT MODES

For the purposes of this report, transport modes consist of the following: trucks, cars, buses, vans, bicycles, motorbikes, and walking / pedestrians.

MOBILITY OPTIONS

Mobility options, referred to in the *Availability of Mobility Options* metric, are defined using SPIN’s system for categorising Foursquare observations. These include bus stops and bike rental / Santander stations.

OBJECT AREAS

To calculate the *Average Traffic Density (%)* metric, we used rough estimates for the average square meterage of each transport mode’s footprint.

OPTIONAL ACTIVITIES

Optional amenities are those activities which can be categorised, primarily, as being social, consumptive, leisurely, or civic, [per the SPIN Wheel](#).

NECESSARY AMENITIES

Necessary amenities are those activities which can be categorised, primarily, as revolving around or being in service of income, education, mobility, and nutrition, [per the SPIN Wheel](#).

PROJECT SUMMARY

Area analysed

Grouping Cameras.
The cameras highlighted in the map to the right are those that were analyzed for this report. For the synthesis section, these cameras are occasionally grouped into 5 study areas:

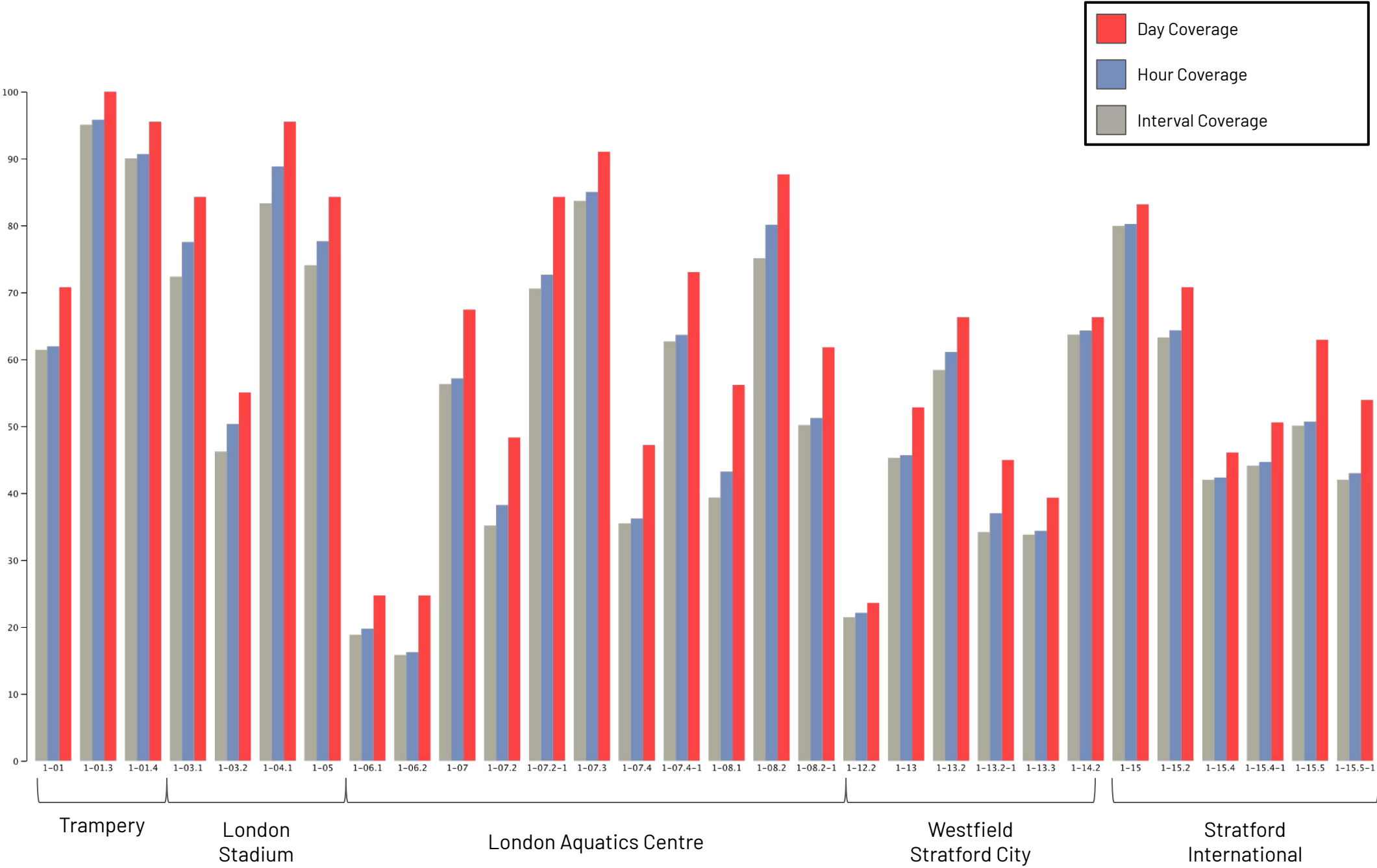
- 1) the Trampery area
- 2) the Stratford International area
- 3) the Westfield Stratford City area
- 4) the London Aquatics Centre area
- 5) the London Stadium area.



PROJECT SUMMARY

Camera Coverage

The graph (*right*) highlights the coverage of each camera, taking the earliest day as the starting-point and the last one as the end-point. For the period of evaluation, only one camera – 1.01-3 – covers all of the inscribed days. On average, cameras cover 54.78% of the intervals, 56.52% of the hours, and 63.74% of the days in the period. Although the metrics account for this, using averages where possible, this is important to keep in mind, especially when metrics are compared across time characteristics – there will be more data for certain time characteristics than others.



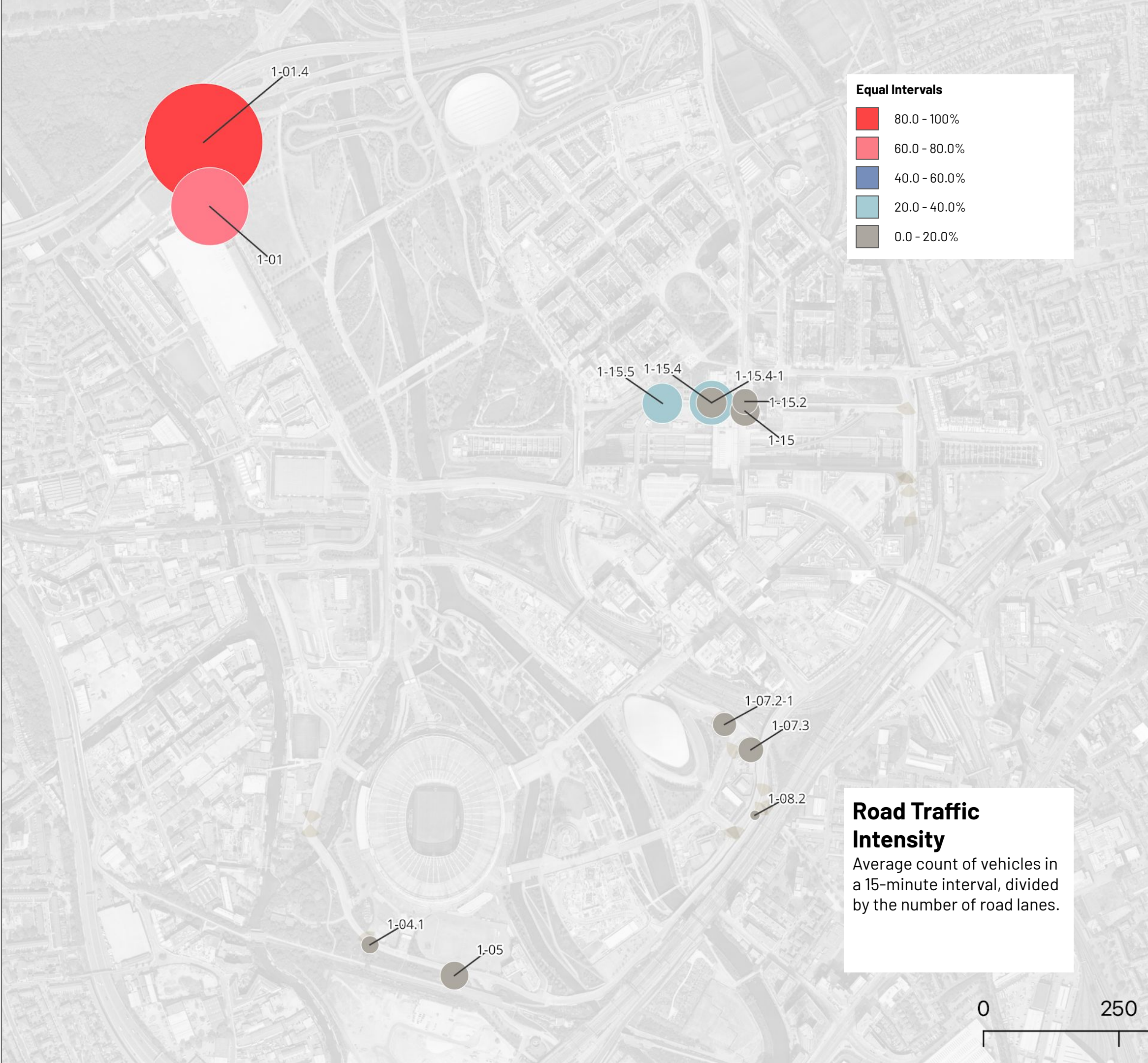
2/4 SYNTHESIS



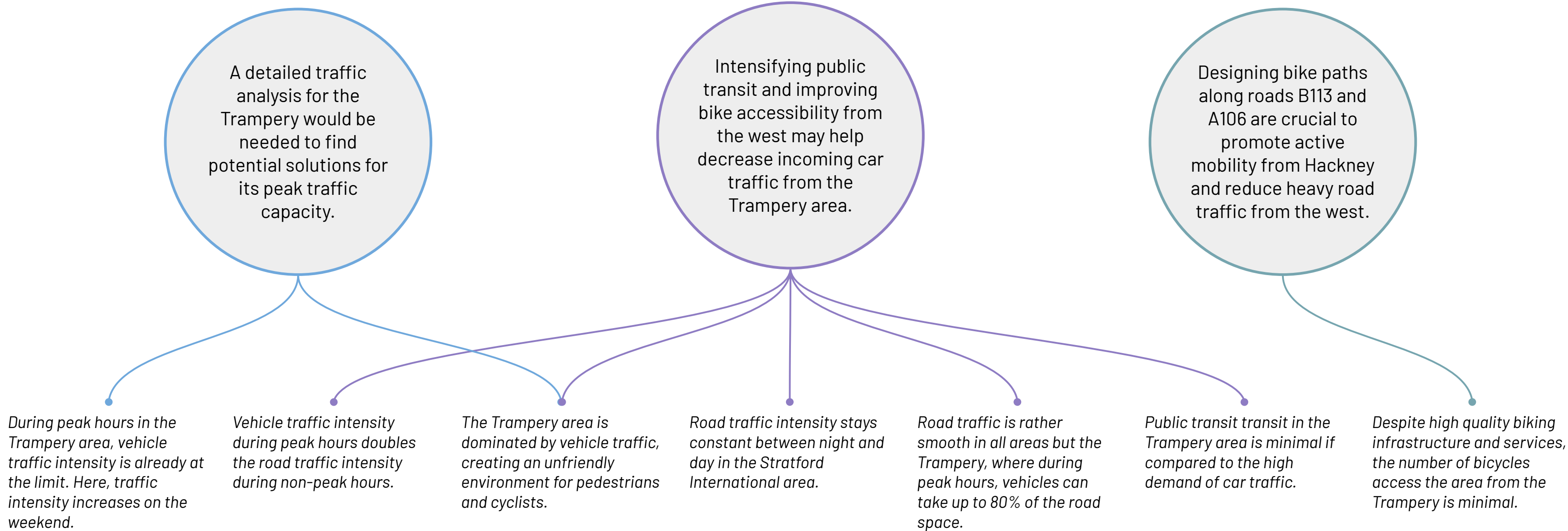
SYNTHESIS

CAR TRAFFIC

“The Tramperry area appears to be at peak traffic capacity, with cars dominating the urban landscape. This can potentially deter pedestrians and cyclists from using the crossing.”

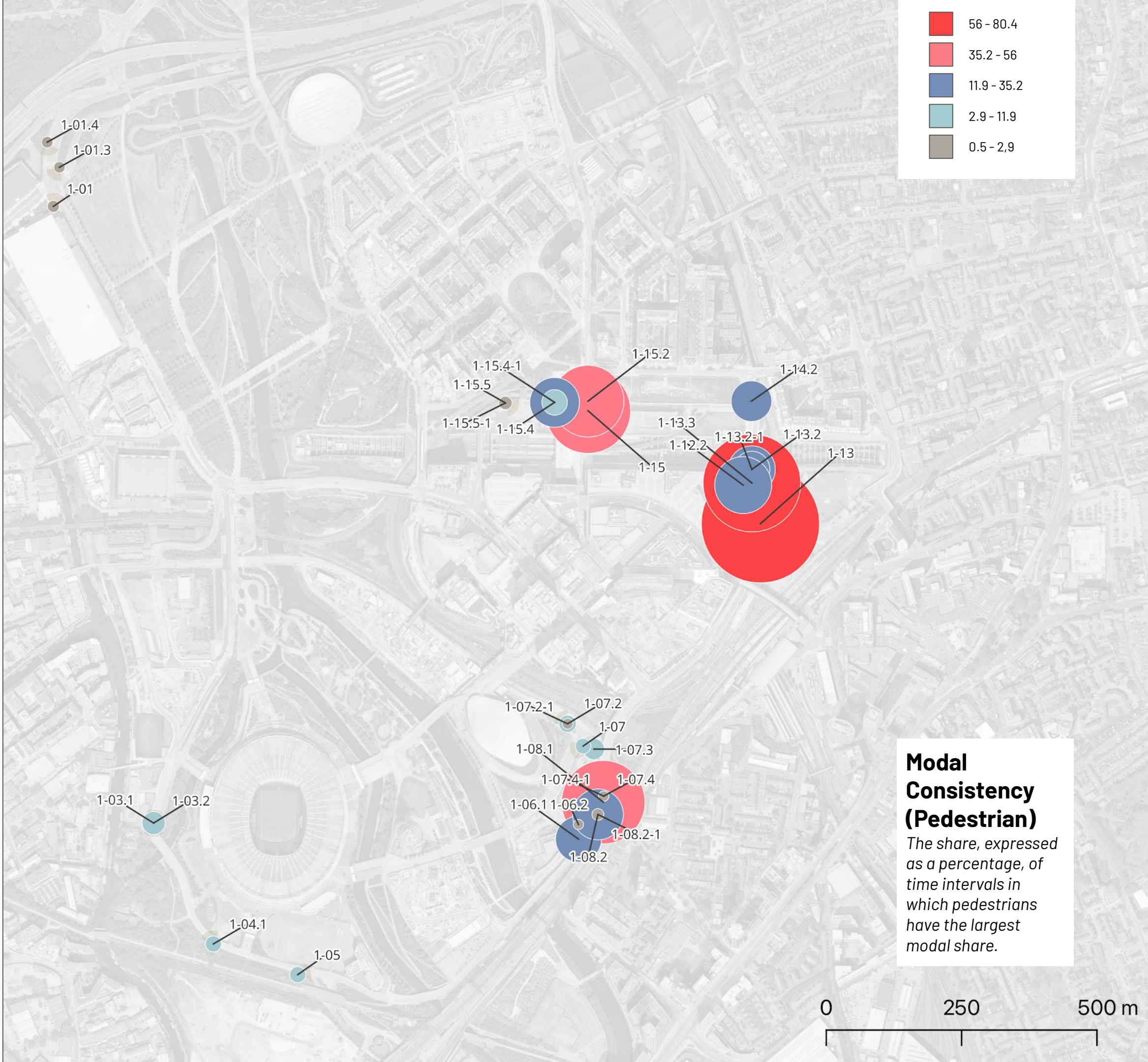


REDUCING THE SHARE OF VEHICLES ON THE STREET

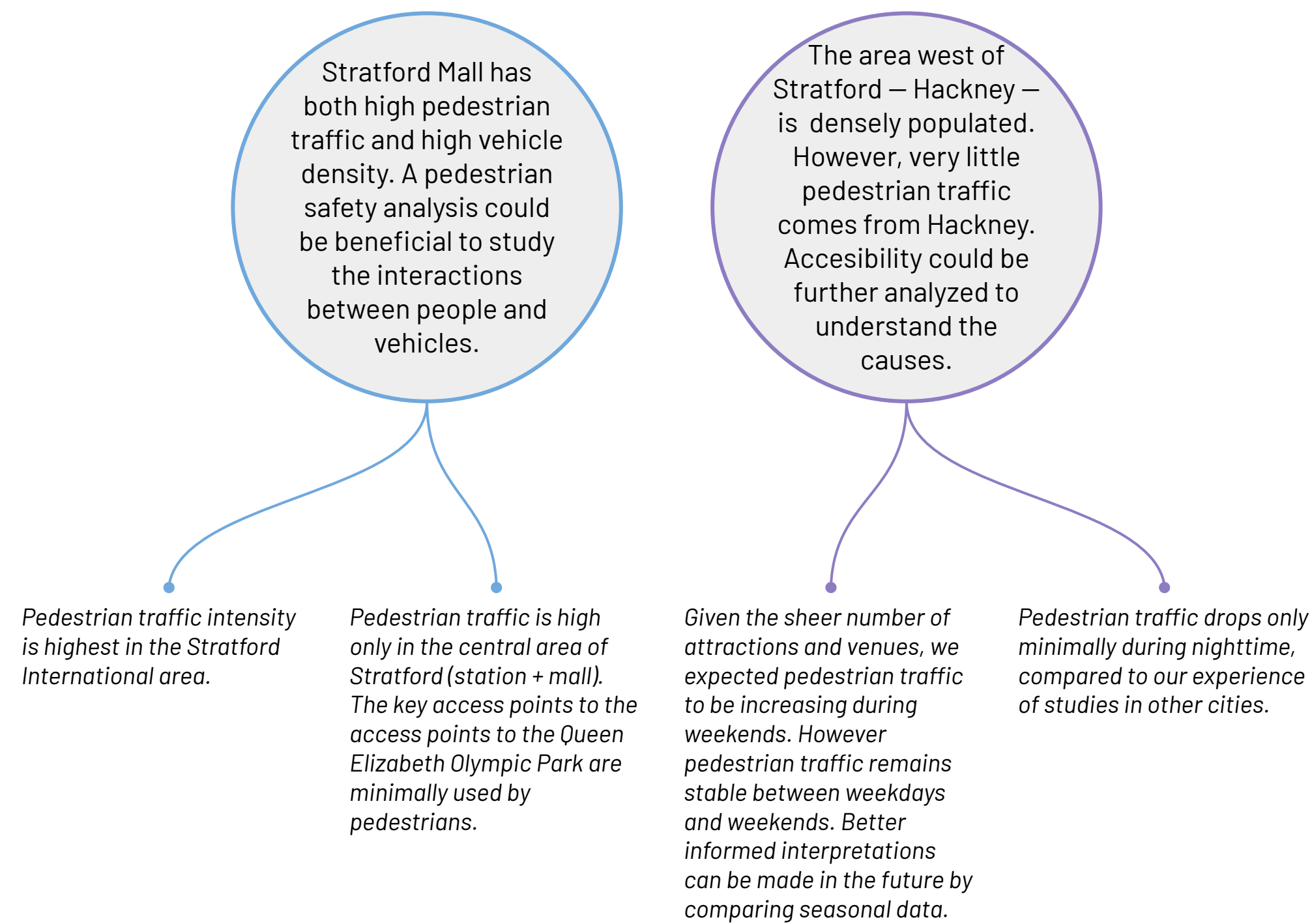


PEDESTRIAN TRAFFIC

“The shopping centre, with its high diversity of activities, is the only area that attracts more pedestrians than cars consistently over time”



IMPROVING PEDESTRIAN TRAFFIC

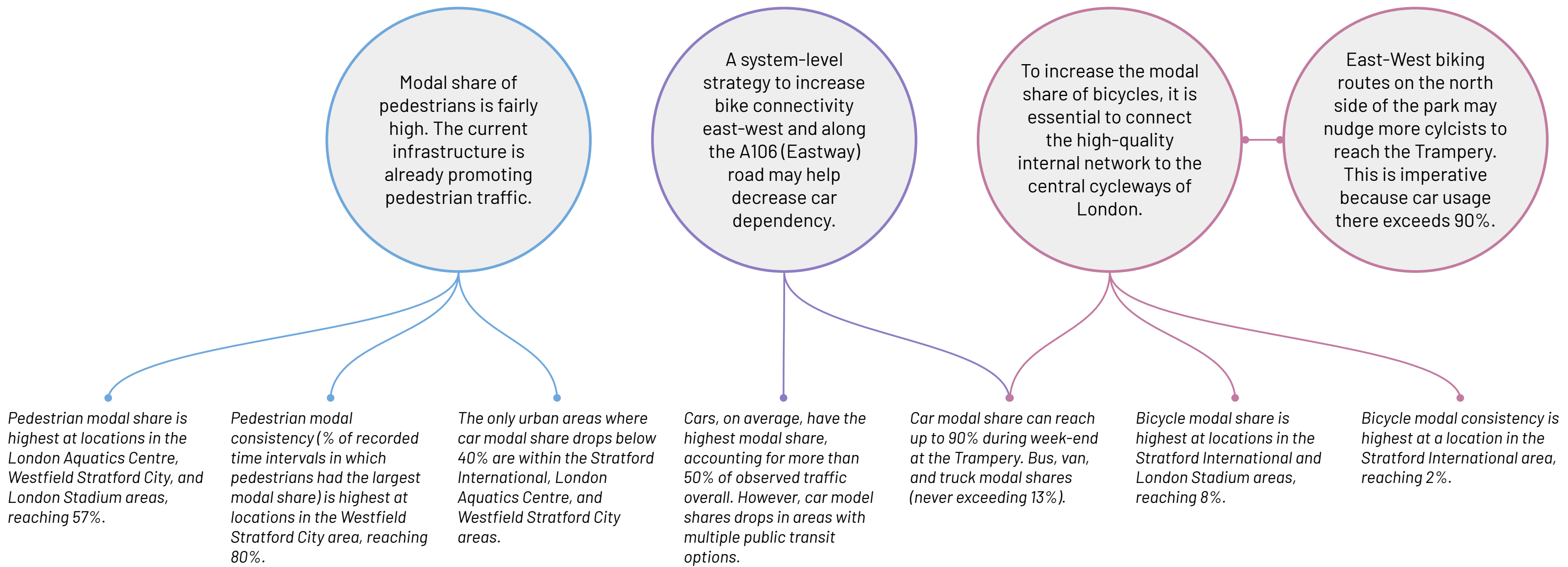


MODAL SHARE

“Car modal share can reach peaks of 90% during week-ends. However, at Westfield Stratford City, walking is the most dominant mobility mode.”



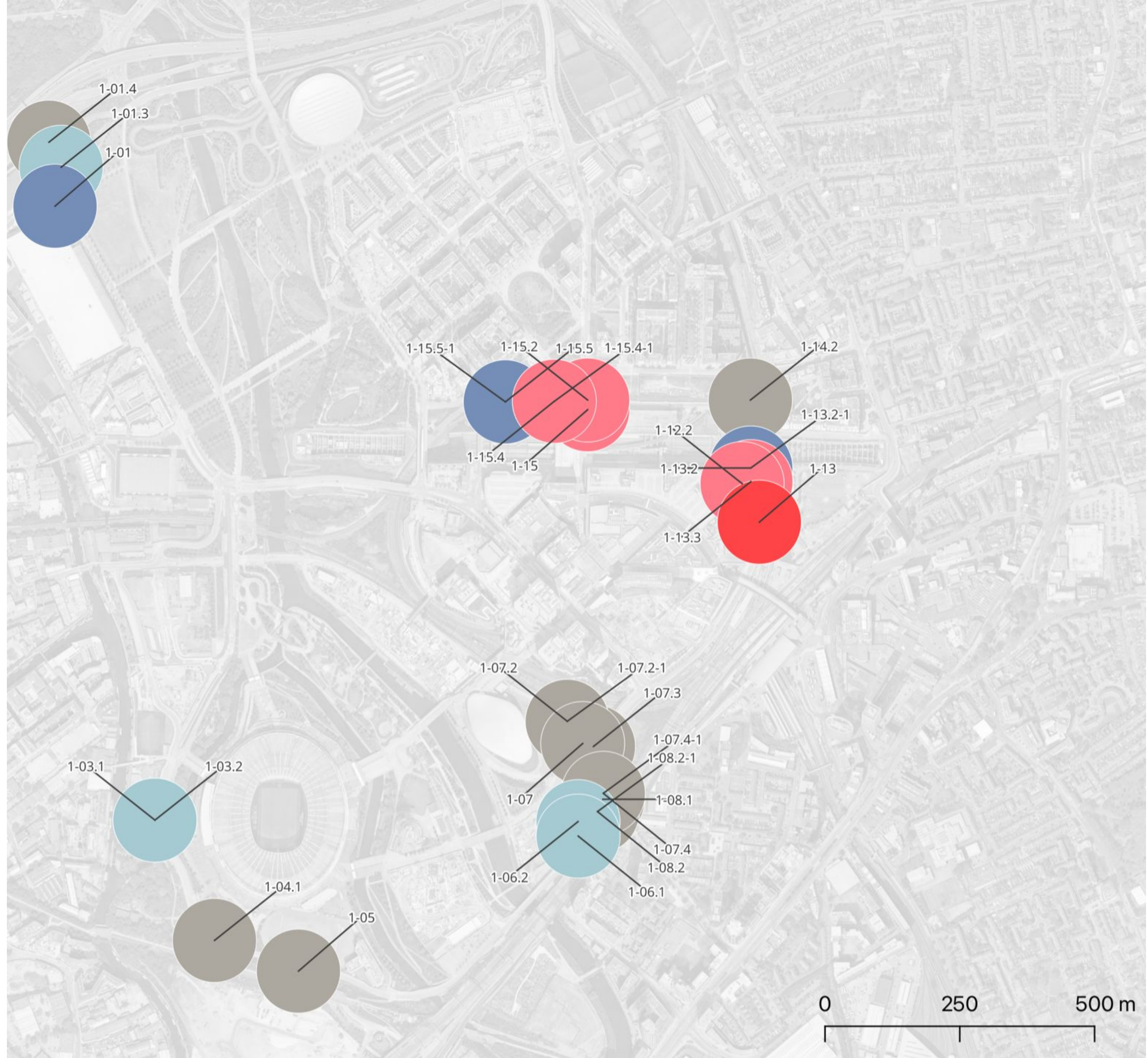
PROMOTING A MODAL SHIFT FROM CARS TO ACTIVE MOBILITY



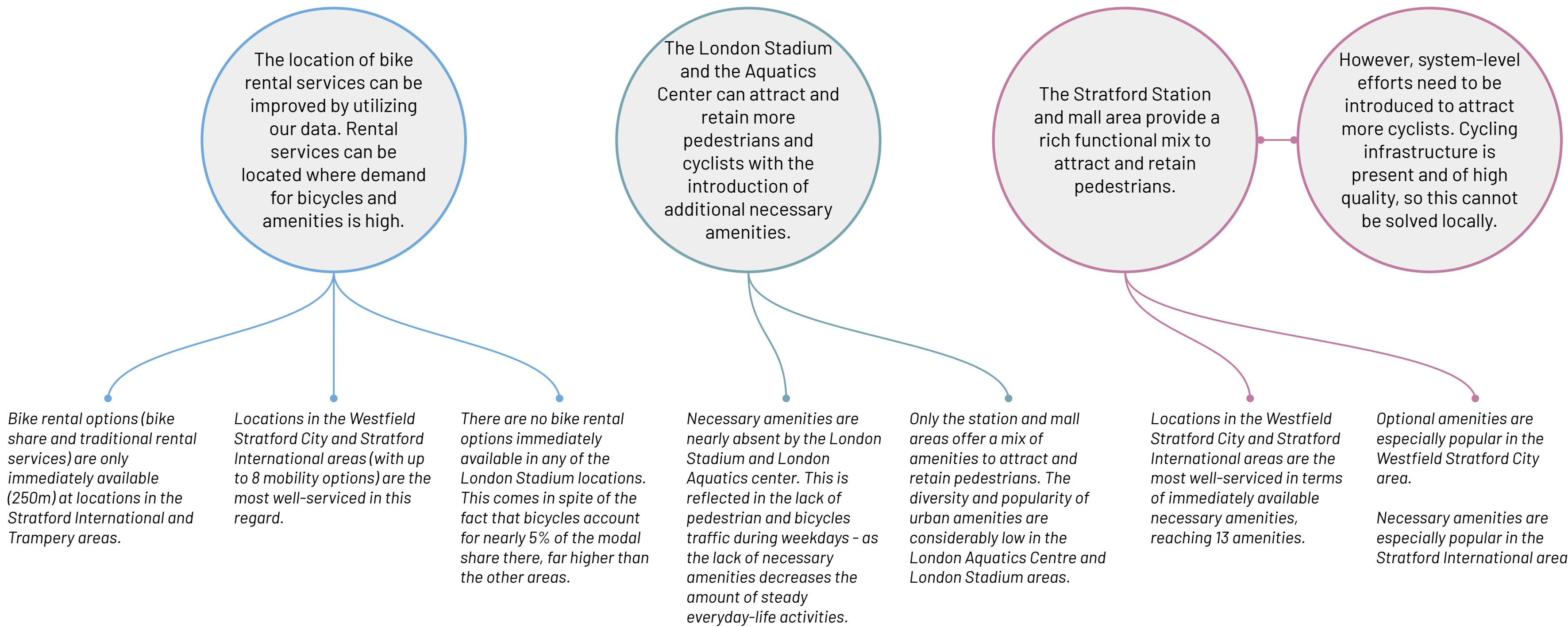
URBAN MIX

"The higher the mix between optional and necessary amenities, the more pedestrians are present."

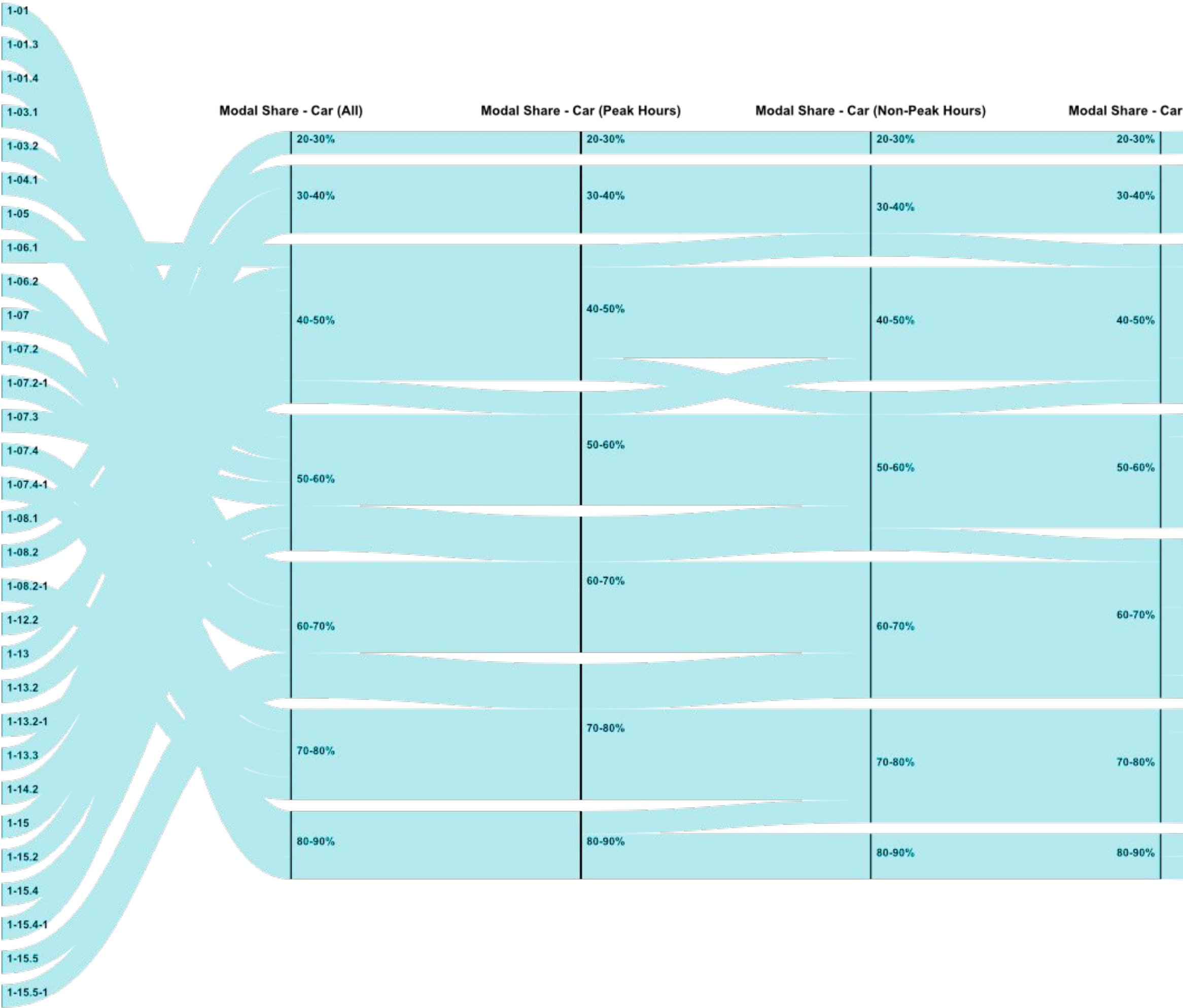
"The area with highest mix of amenities is also the only area where walking prevails over driving."



INTEGRATING SERVICES WITH ACTIVE MOBILITY



3/4 Mobility indexes + Figures



ANALYSIS OVERVIEW

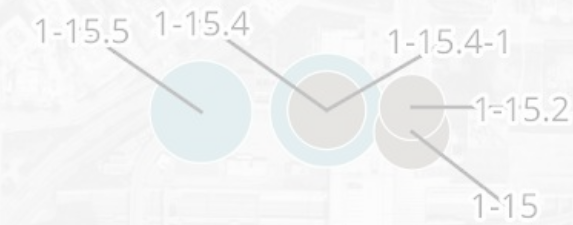
Road Traffic Intensity

The ratio between the number of vehicles and the number of road lanes.

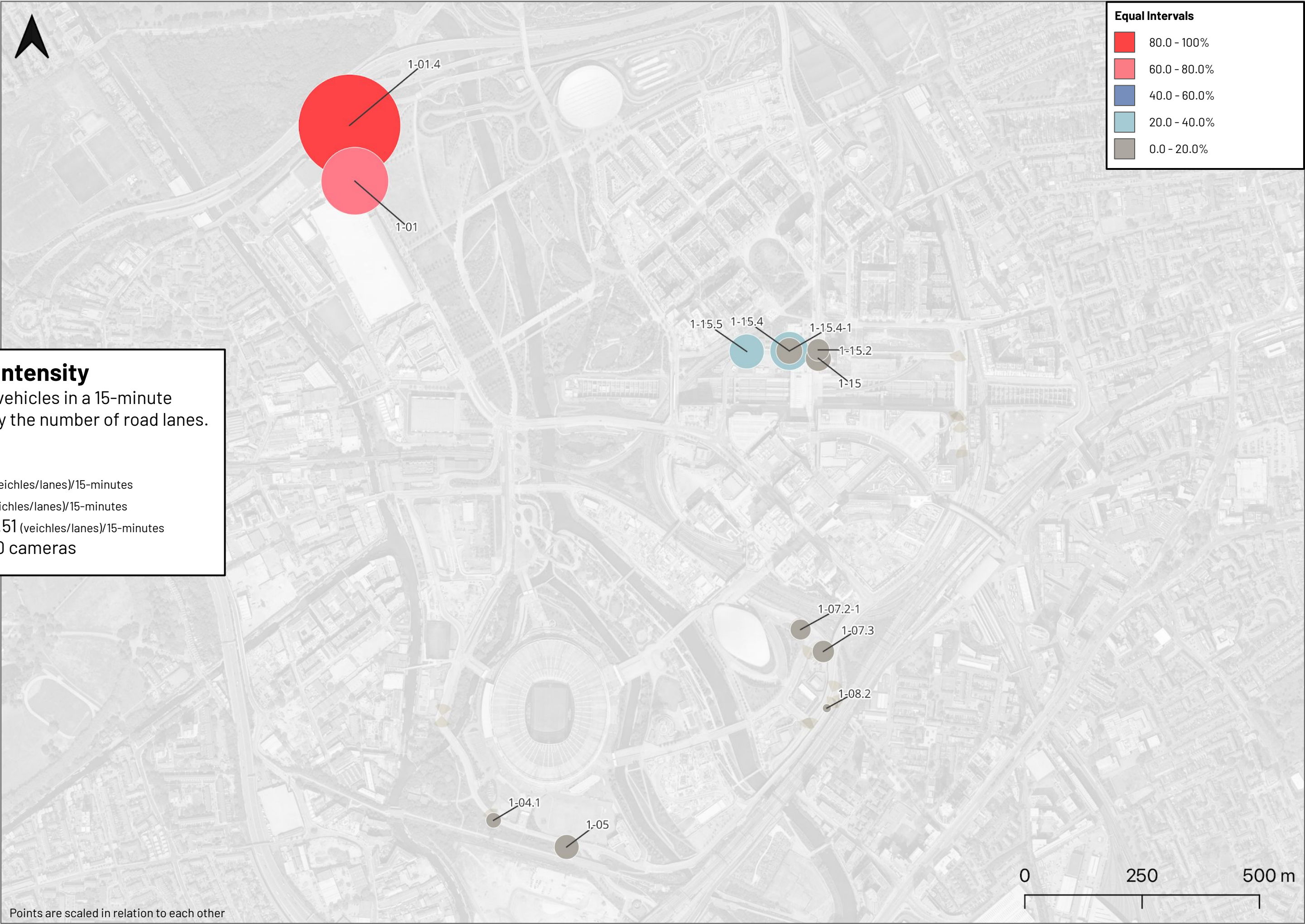
Purpose: This metric is a way of comparing road infrastructure use between different cameras. It points to the relationship between road traffic infrastructure / lanes and road traffic flow through those lanes.

Input: Total number of vehicles identified as crossing a road gate at a given site /camera; the total number of road lanes at a camera (gates often contain more than one lane); total number of 15-minute intervals in which the camera was recording.

Output: Average count of vehicles in a 15-minute interval, divided by the number of road lanes.



Graph reproduced and edited from "Urbanism at a Turning Point. Modern, Postmodern, Now,"
Lehtovuori, P. & Varna, S. (2017)



Road Traffic Intensity

Average count of vehicles in a 15-minute interval, divided by the number of road lanes.

Max Value: 85.51 (veichles/lanes)/15-minutes

Min Value: 5.88 (veichles/lanes)/15-minutes

Average Value: 27.51 (veichles/lanes)/15-minutes

Count: 12 of the 30 cameras

Road Traffic Intensity (Day)

Average count of vehicles in a 15-minute interval during the day (6am to 6pm), divided by the number of road lanes.

Max Value: 96.47 (veichles/lanes)/15-minutes

Min Value: 6.87 (veichles/lanes)/15-minutes

Average Value: 30.11 (veichles/lanes)/15-minutes

Count: 12 of the 30 cameras

Road Traffic Intensity (Night)

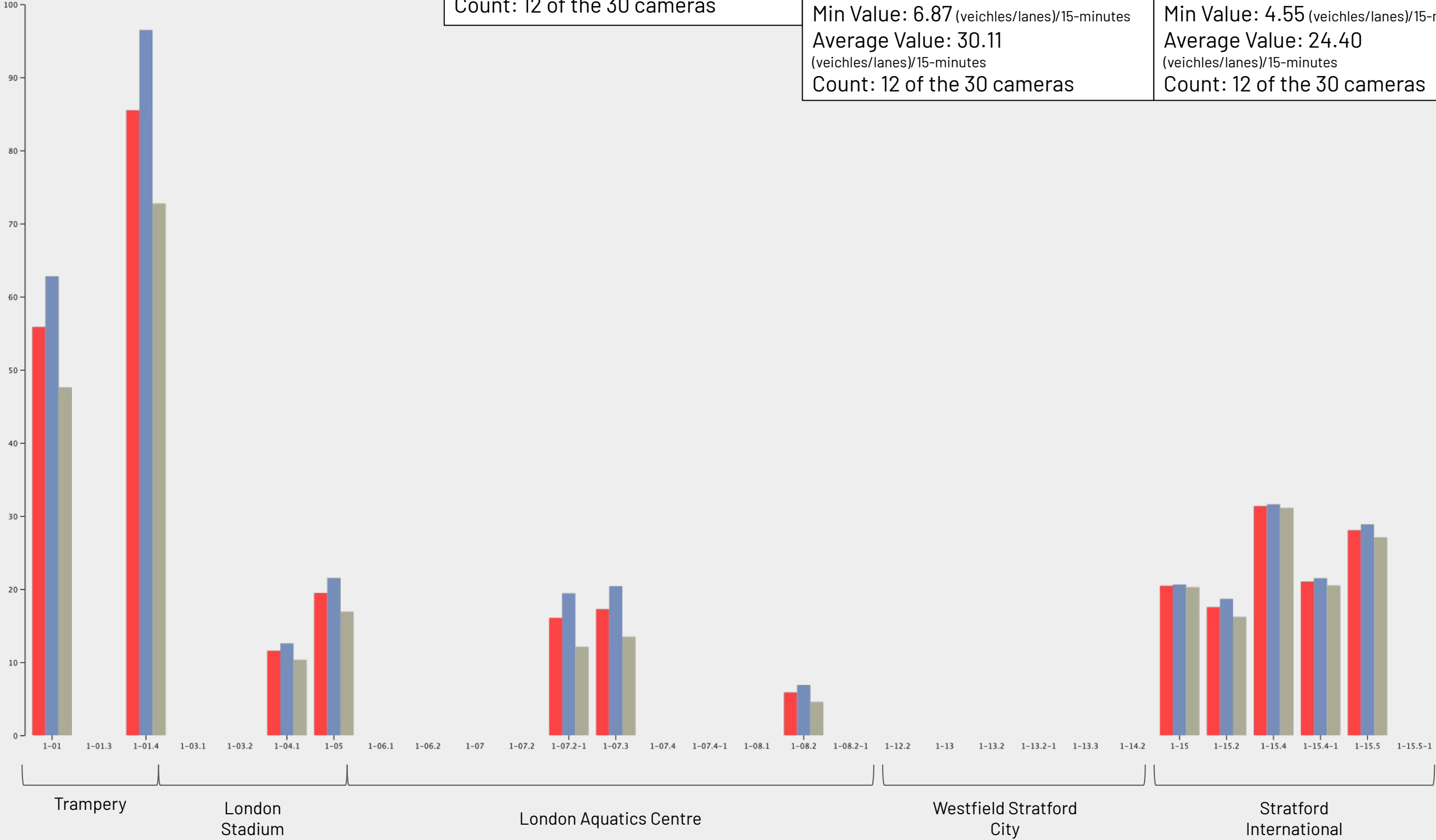
Average count of vehicles in a 15-minute interval during the night (6pm to 6am), divided by the number of road lanes.

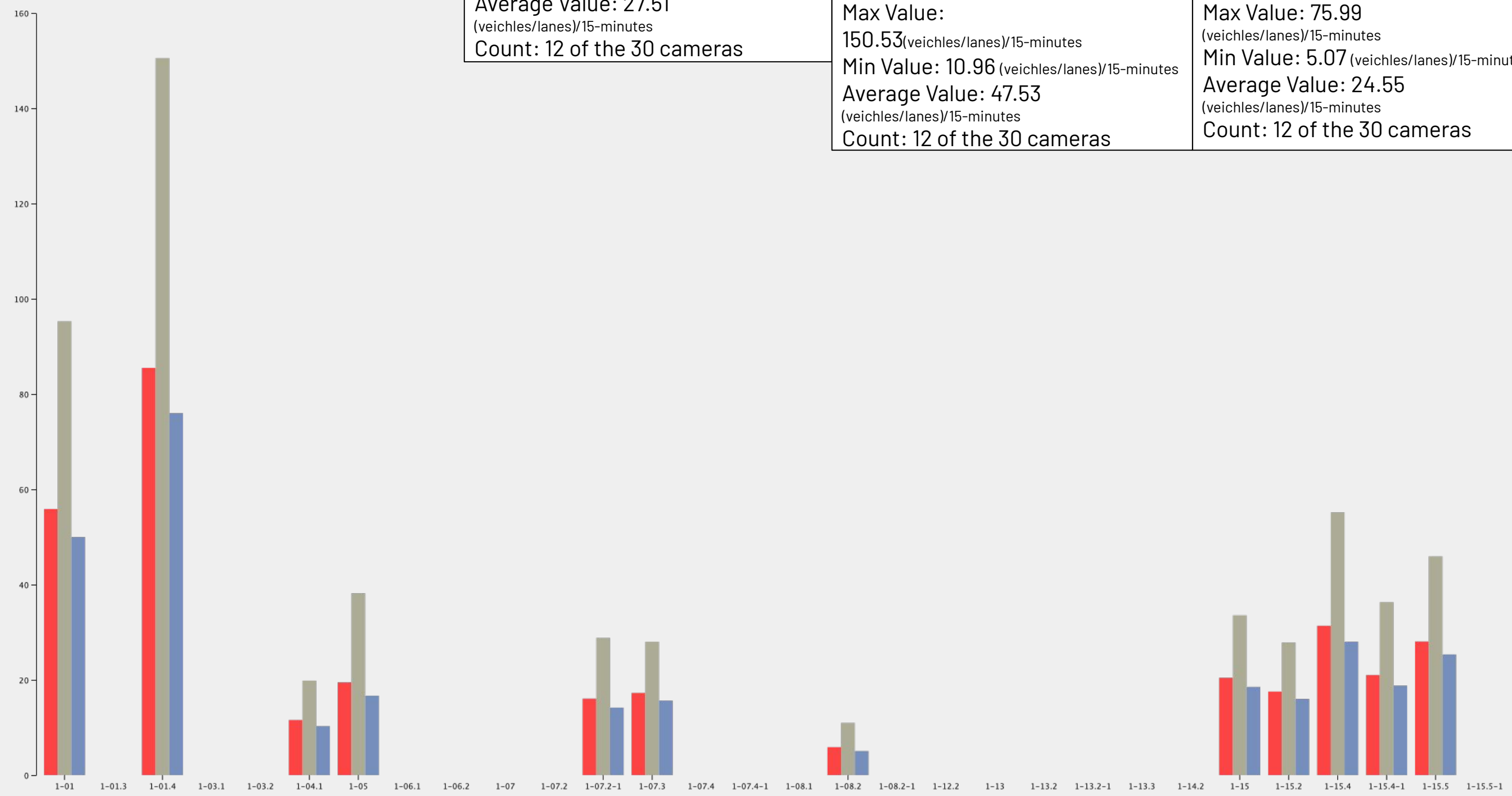
Max Value: 72.73 (veichles/lanes)/15-minutes

Min Value: 4.55 (veichles/lanes)/15-minutes

Average Value: 24.40 (veichles/lanes)/15-minutes

Count: 12 of the 30 cameras





Road Traffic Intensity

Average count of vehicles in a 15-minute interval, divided by the number of road lanes.

Max Value: 85.51 (veichles/lanes)/15-minutes
Min Value: 5.88 (veichles/lanes)/15-minutes
Average Value: 27.51 (veichles/lanes)/15-minutes
Count: 12 of the 30 cameras

Road Traffic Intensity (Peak)

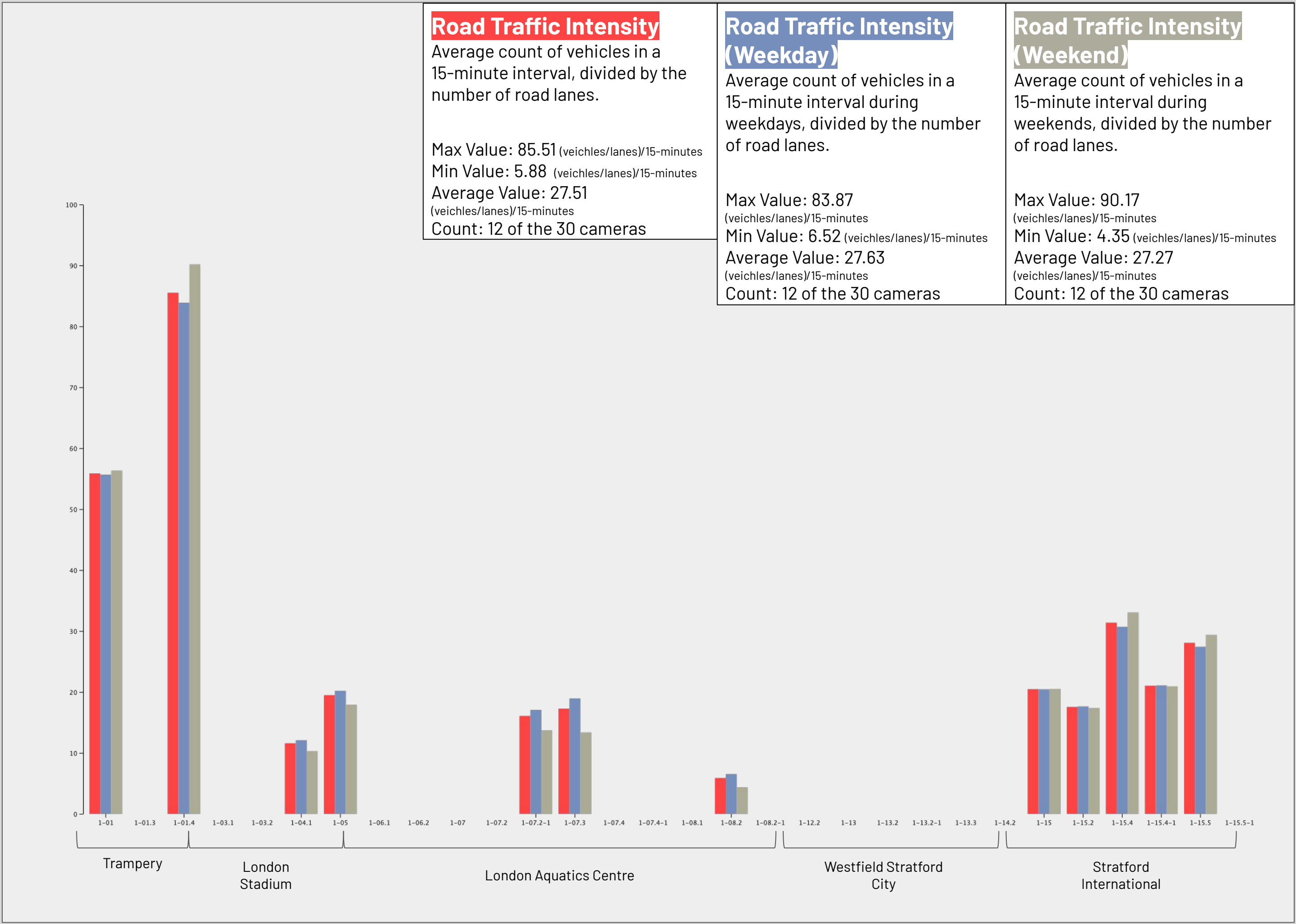
Average count of vehicles in a 15-minute interval during peak hours, divided by the number of road lanes.

Max Value: 150.53(veichles/lanes)/15-minutes
Min Value: 10.96 (veichles/lanes)/15-minutes
Average Value: 47.53 (veichles/lanes)/15-minutes
Count: 12 of the 30 cameras

Road Traffic Intensity (Non-Peak)

Average count of vehicles in a 15-minute interval during non-peak hours, divided by the number of road lanes.

Max Value: 75.99 (veichles/lanes)/15-minutes
Min Value: 5.07 (veichles/lanes)/15-minutes
Average Value: 24.55 (veichles/lanes)/15-minutes
Count: 12 of the 30 cameras



ANALYSIS OVERVIEW

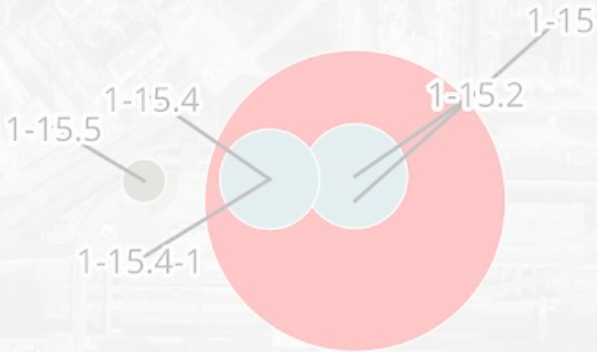
Pedestrian Traffic Intensity

The ratio between the number of pedestrians and the number of pedestrian lanes.

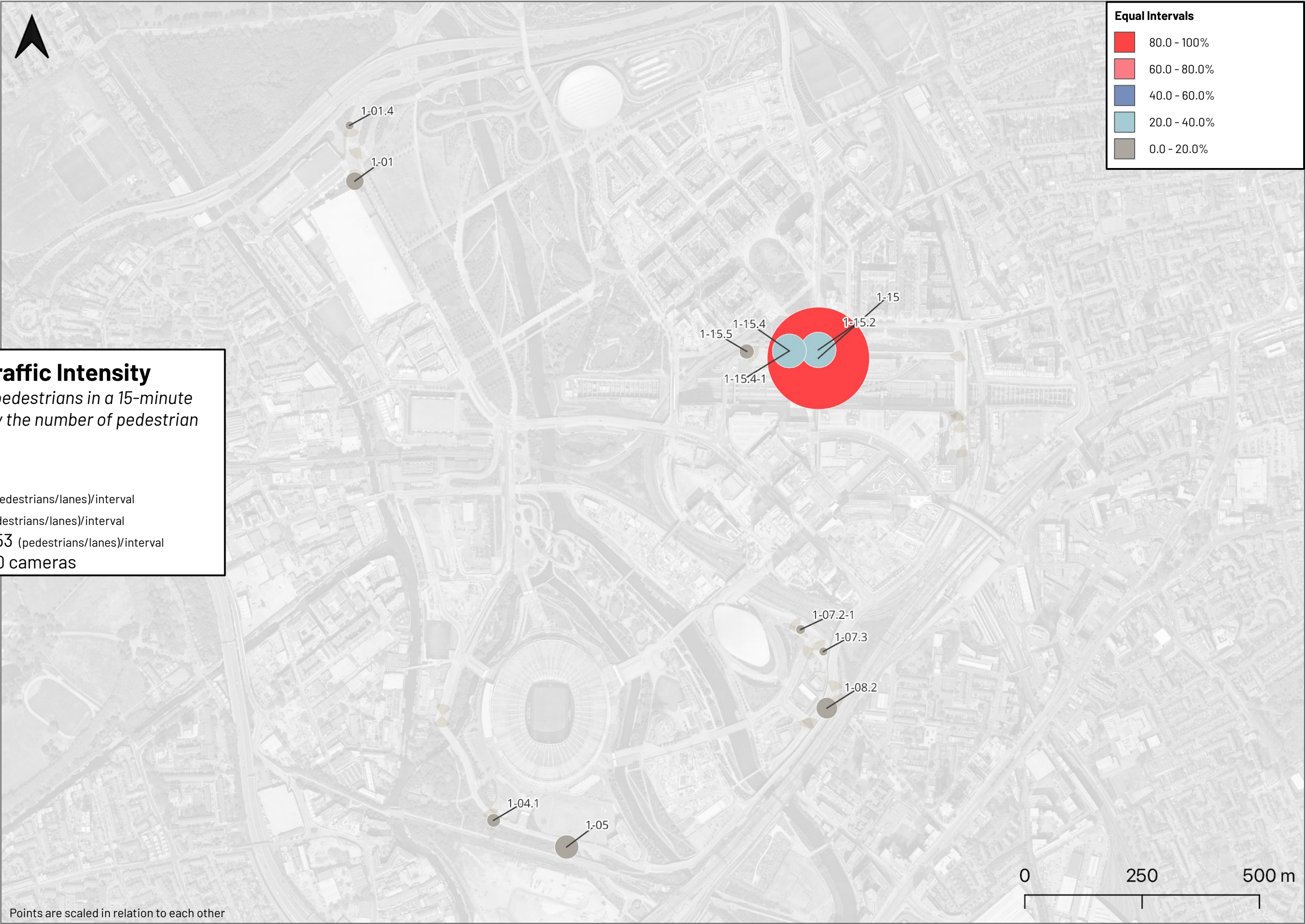
Purpose: This metric is a way of comparing the use of pedestrian infrastructure. It points to the relationship between pedestrian traffic infrastructure / lanes and the movement of people.

Input: Total number of pedestrians identified by the camera as crossing the late; the total number of pedestrian lanes at a given camera site (gates often contain more than one lane); total number of 15-minute intervals in which the camera was recording.

Output: Average count of pedestrians in a 15-minute interval, divided by the number of pedestrian lanes.



Graph reproduced and edited from "Urbanism at a Turning Point. Modern, Postmodern, Now,"
Lehtovuori, P. & Varna, S. (2017)



Pedestrian Traffic Intensity

Average count of pedestrians in a 15-minute interval, divided by the number of pedestrian lanes.

Max Value: 21.74 (pedestrians/lanes)/interval

Min Value: 0.39 (pedestrians/lanes)/interval

Average Value: 4.53 (pedestrians/lanes)/interval

Count: 12 of the 30 cameras

Equal Intervals

- 80.0 - 100.0%
- 60.0 - 80.0%
- 40.0 - 60.0%
- 20.0 - 40.0%
- 0.0 - 20.0%

Points are scaled in relation to each other

Pedestrian Traffic Intensity

Average count of pedestrians in a 15-minute interval, divided by the number of pedestrian lanes.

Max Value: 21.74 (pedestrians/lanes)/interval
Min Value: 0.39 (pedestrians/lanes)/interval
Average Value: 4.53 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras

Pedestrian Traffic Intensity (Day)

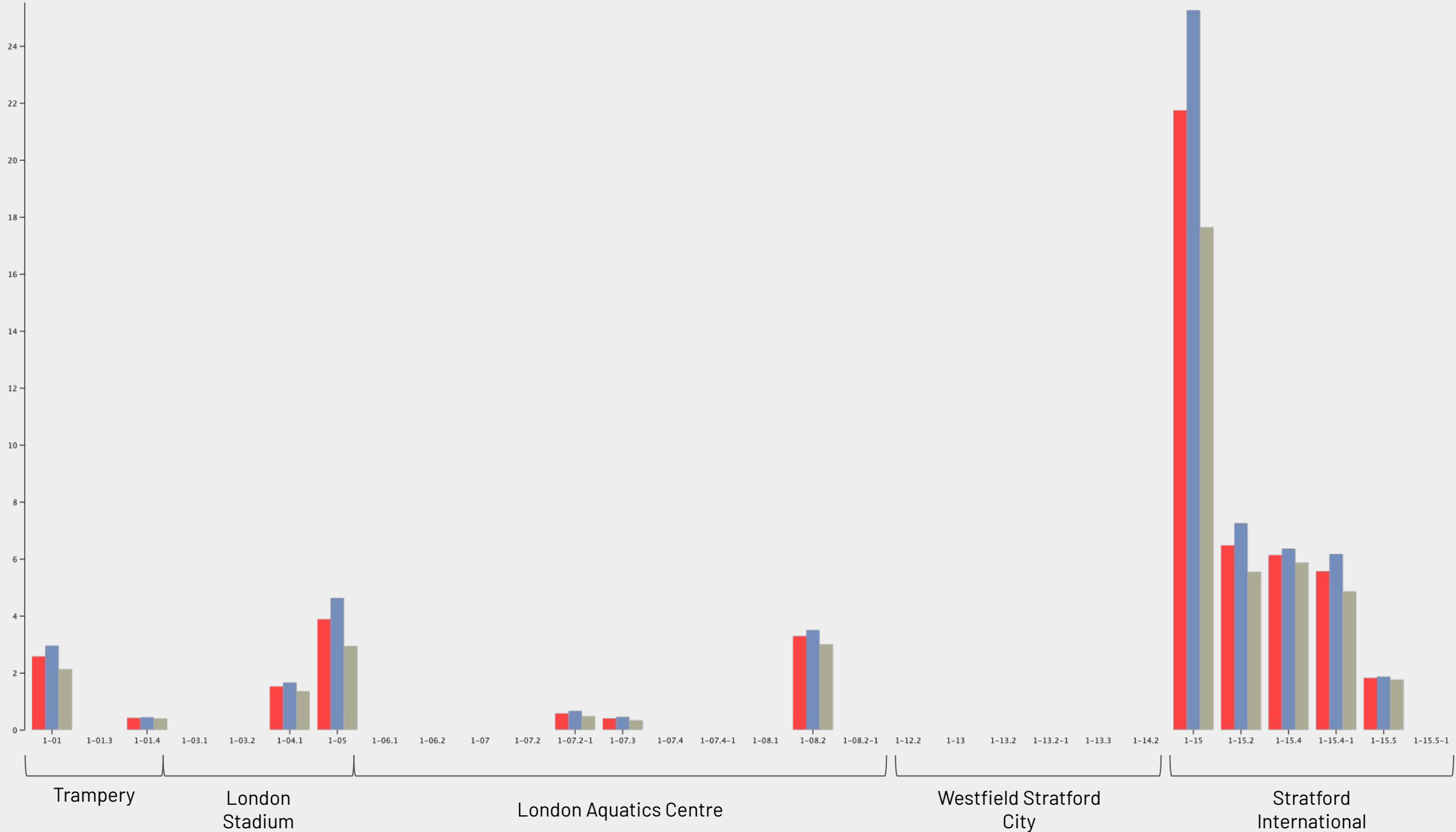
Average count of pedestrians in a 15-minute interval during the day (6am to 6pm), divided by the number of pedestrian lanes.

Max Value: 25.25 (pedestrians/lanes)/interval
Min Value: 0.44 (pedestrians/lanes)/interval
Average Value: 5.10 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras

Pedestrian Traffic Intensity (Night)

Average count of pedestrians in a 15-minute interval at night (6pm to 6am), divided by the number of pedestrian lanes.

Max Value: 17.63 (pedestrians/lanes)/interval
Min Value: 0.33 (pedestrians/lanes)/interval
Average Value: 3.85 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras



Pedestrian Traffic Intensity

Average count of pedestrians in a 15-minute interval, divided by the number of pedestrian lanes.

Max Value: 21.74 (pedestrians/lanes)/interval
Min Value: 0.39 (pedestrians/lanes)/interval
Average Value: 4.53 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras

Pedestrian Traffic Intensity (Peak)

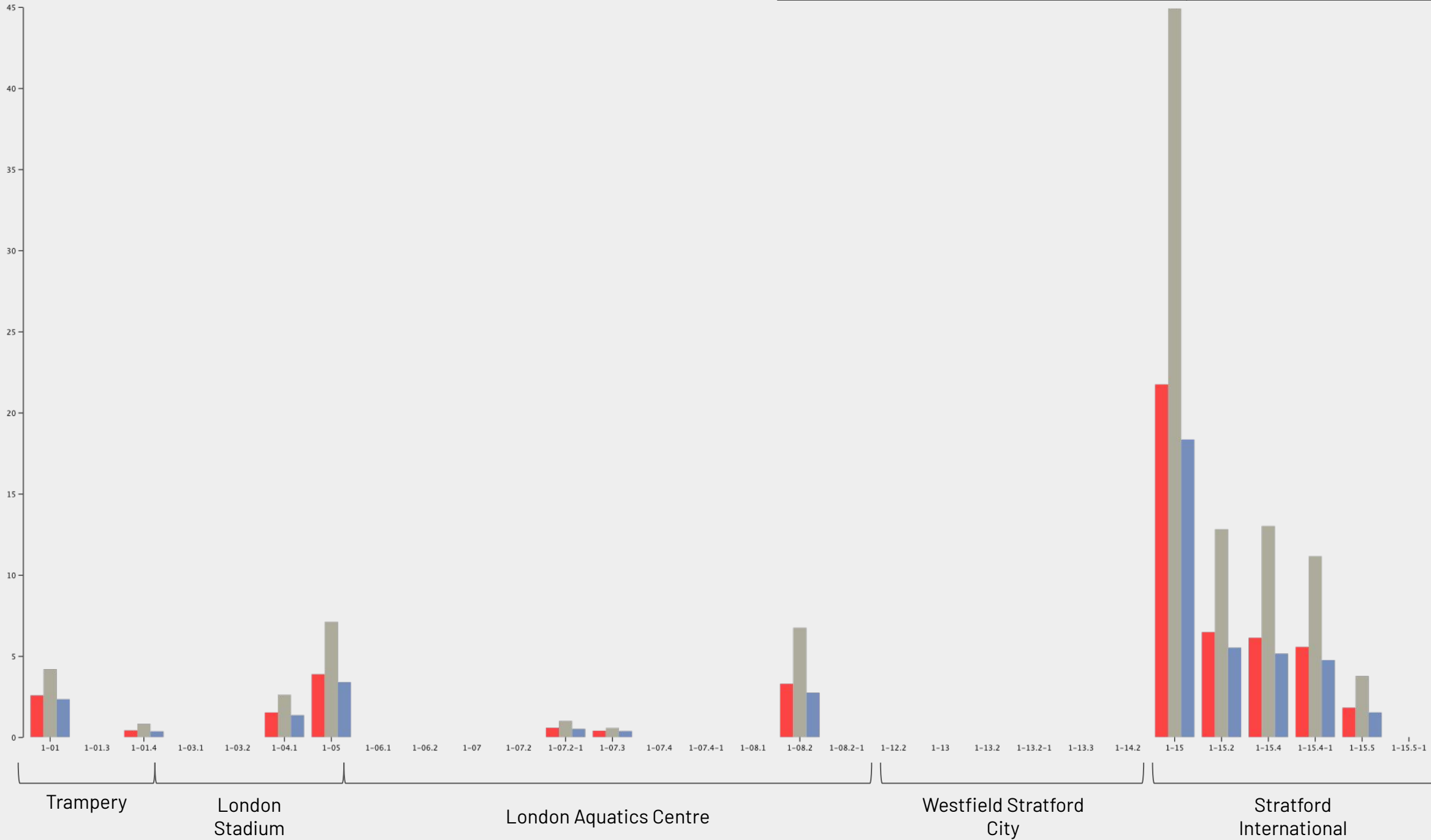
Average count of pedestrians in a 15-minute interval during peak hours, divided by the number of pedestrian lanes.

Max Value: 44.91 (pedestrians/lanes)/interval
Min Value: 0.56 (pedestrians/lanes)/interval
Average Value: 9.05 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras

Pedestrian Traffic Intensity (Non-Peak)

Average count of pedestrians in a 15-minute interval during non-peak hours, divided by the number of pedestrian lanes.

Max Value: 18.34 (pedestrians/lanes)/interval
Min Value: 0.36 (pedestrians/lanes)/interval
Average Value: 3.86 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras



Pedestrian Traffic Intensity

Average count of pedestrians in a 15-minute interval, divided by the number of pedestrian lanes.

Max Value: 21.74 (pedestrians/lanes)/interval
Min Value: 0.39 (pedestrians/lanes)/interval
Average Value: 4.53 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras

Pedestrian Traffic Intensity (Weekday)

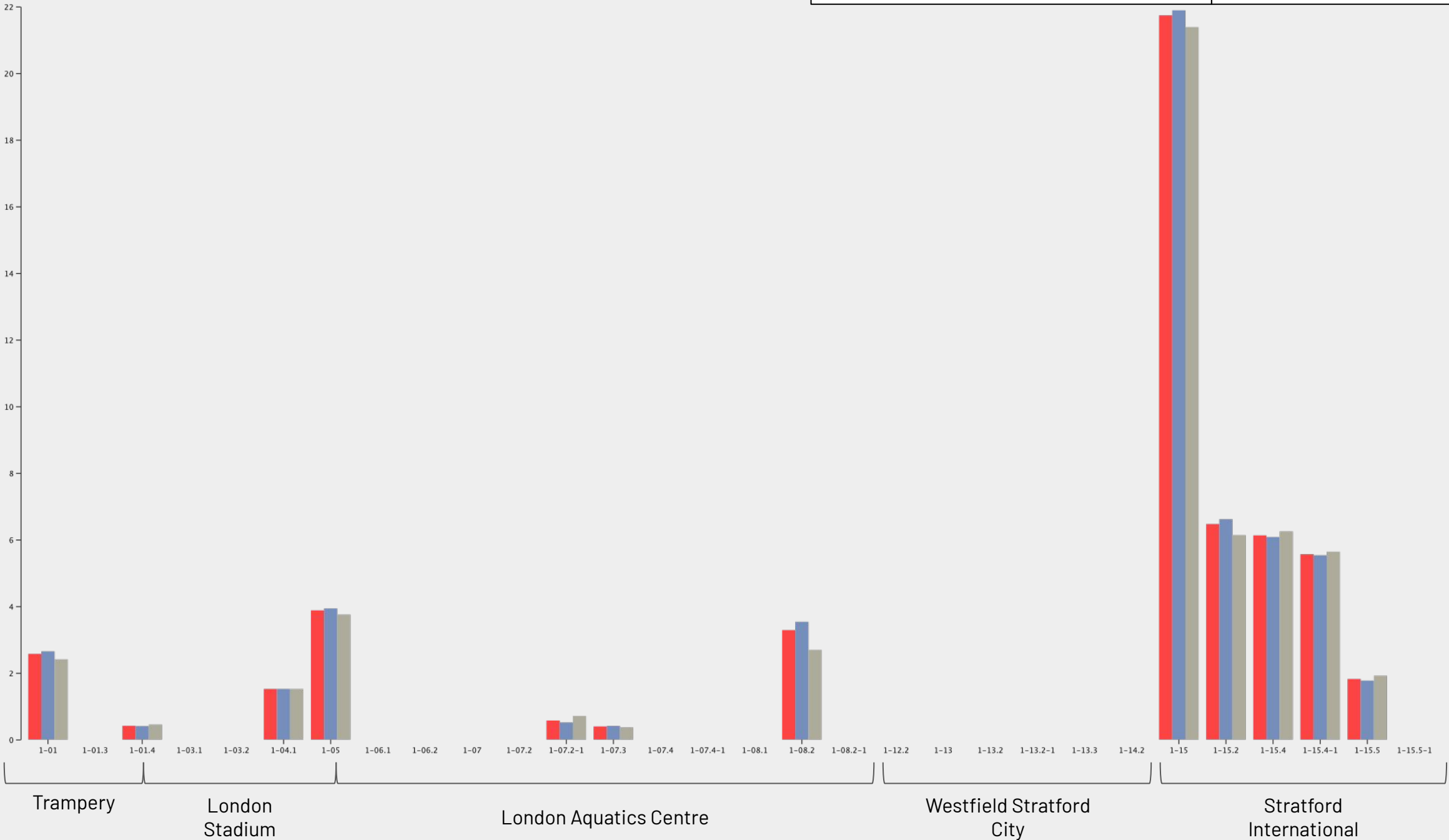
Average count of pedestrians in a 15-minute interval during the weekday, divided by the number of pedestrian lanes.

Max Value: 21.89 (pedestrians/lanes)/interval
Min Value: 0.40 (pedestrians/lanes)/interval
Average Value: 4.57 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras

Pedestrian Traffic Intensity (Weekend)

Average count of pedestrians in a 15-minute interval during the weekend, divided by the number of pedestrian lanes.

Max Value: 21.38 (pedestrians/lanes)/interval
Min Value: 0.36 (pedestrians/lanes)/interval
Average Value: 4.43 (pedestrians/lanes)/interval
Count: 12 of the 30 cameras



ANALYSIS OVERVIEW

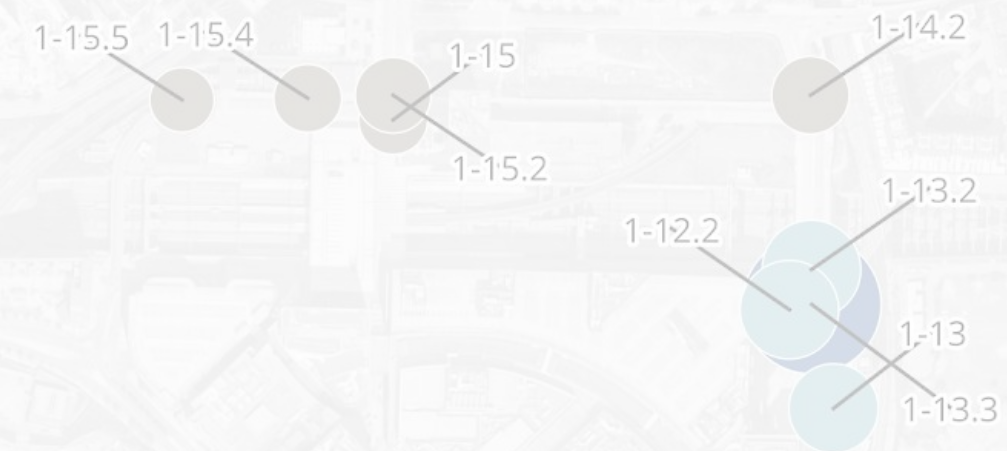
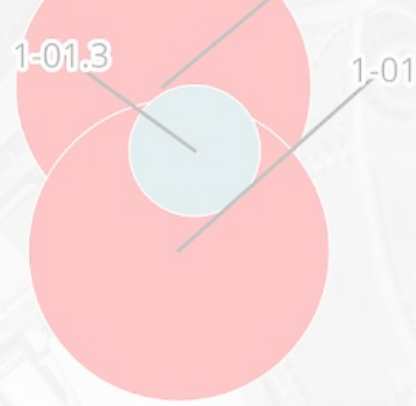
Average Traffic Density

Measuring the number of vehicle objects at a camera in relationship to the surface area of the road.

Purpose: The metric shows how packed a thoroughfare or selected path of road is.

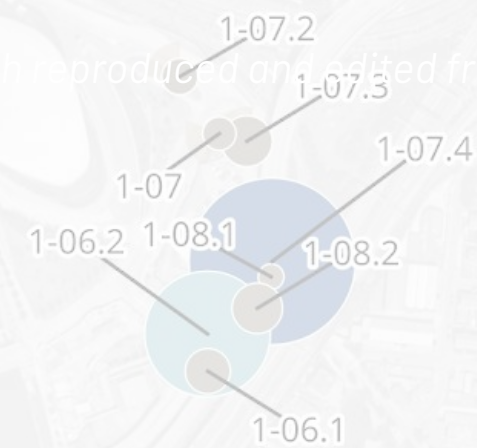
Input: Total number of vehicles identified by a given camera; the visible road area (intersection of a view cone from a camera, a 25m buffer, and road polygons); total minutes in which the camera was recording.

Output: the number of vehicle objects at a camera in relationship to the surface area of the road over the course of a minute.



1-03.1 1-03.2

Graph reproduced and edited from "Urbanism at a Turning Point. Modern, Postmodern, Now,"
Lehtovuori, P. & Varna, C. (2017)

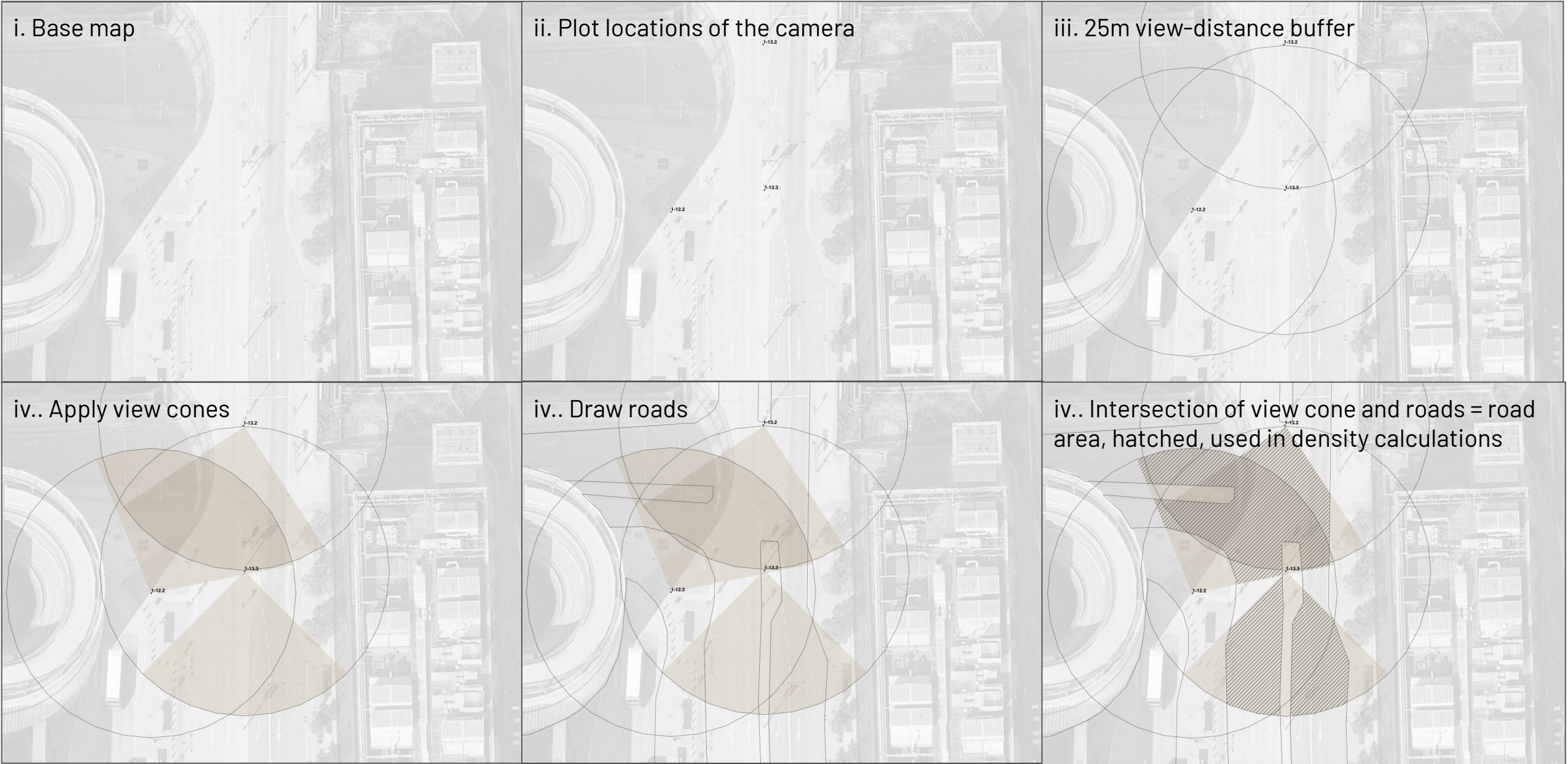


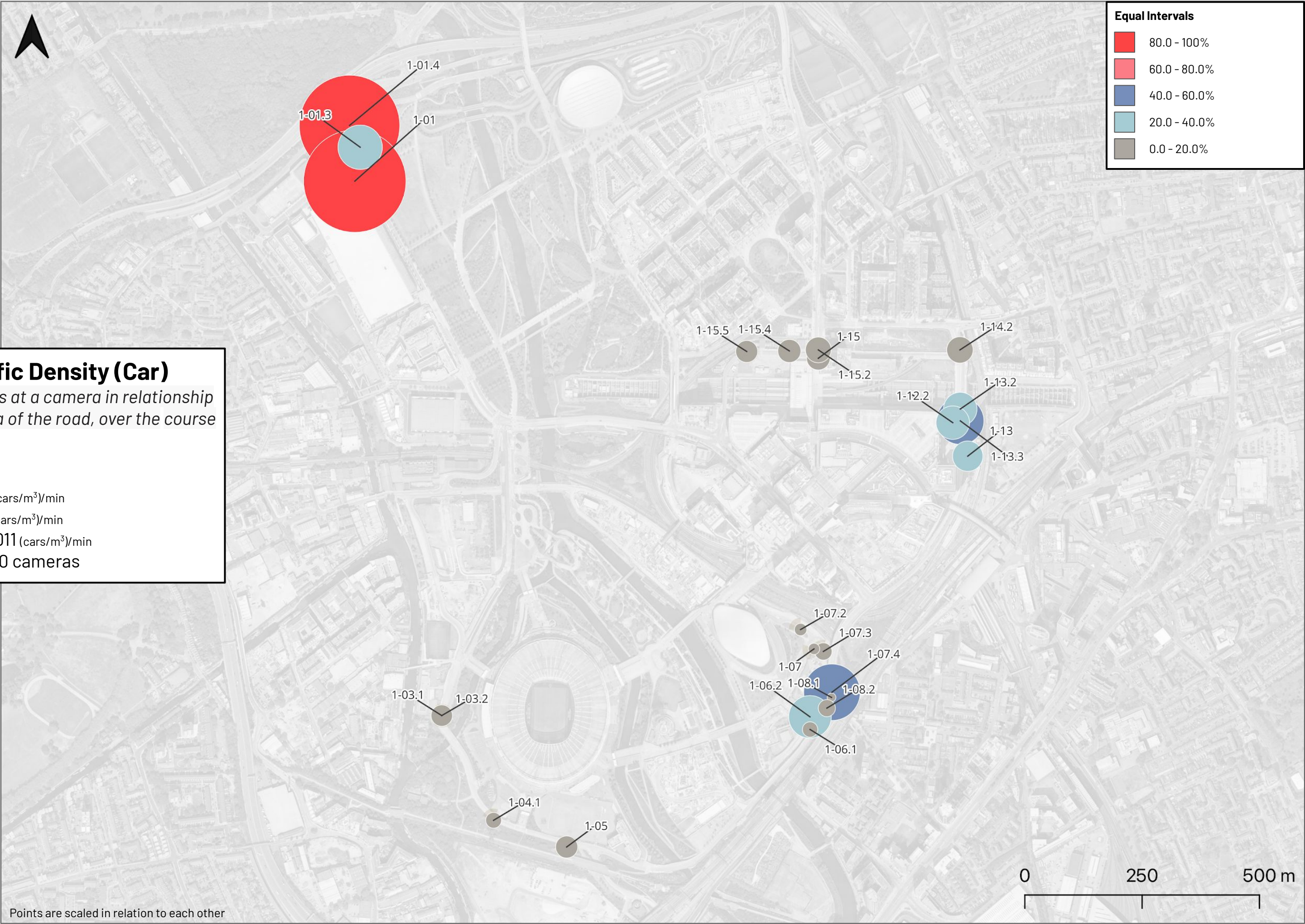
Calculating Road Area

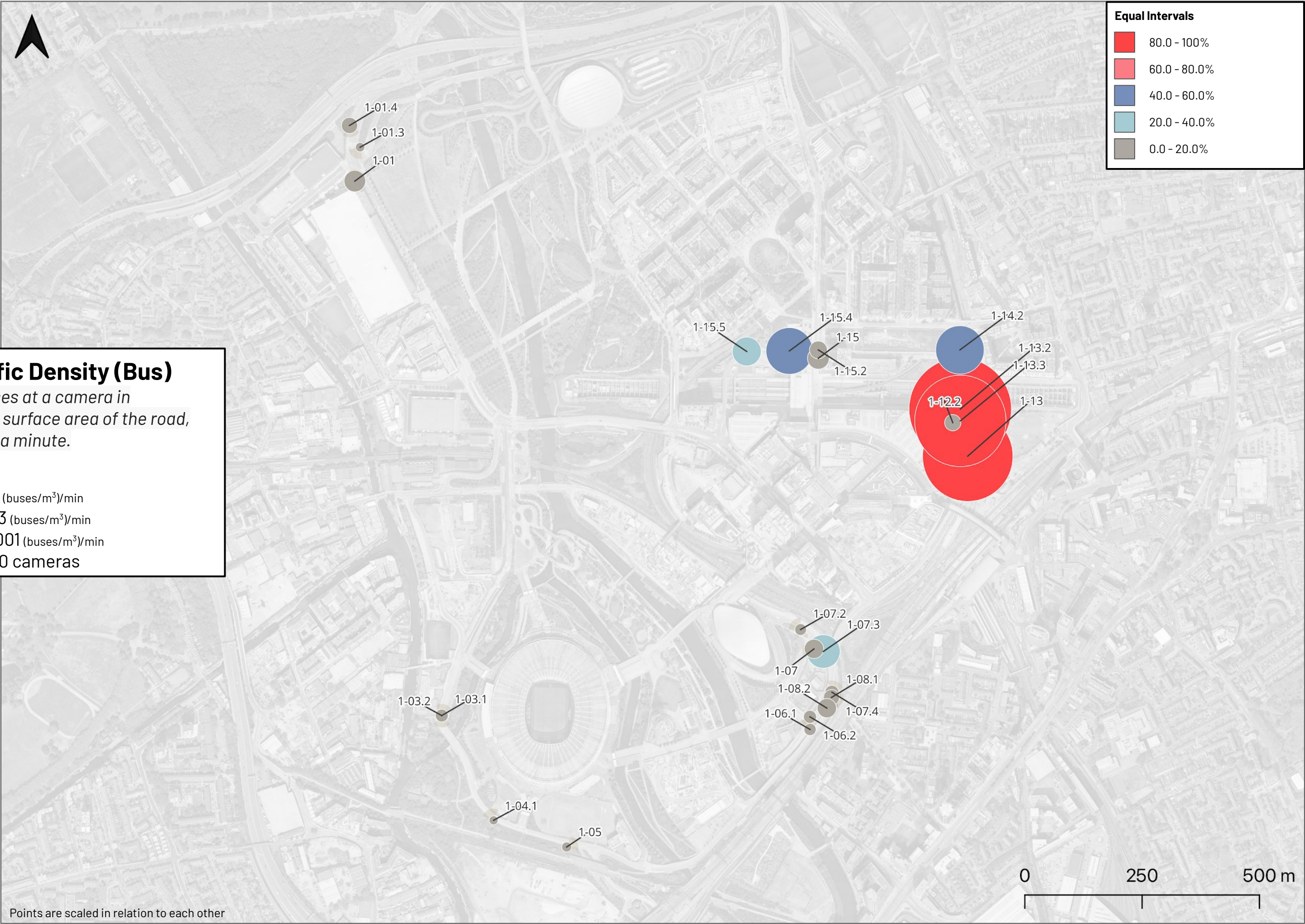
View Cone Method

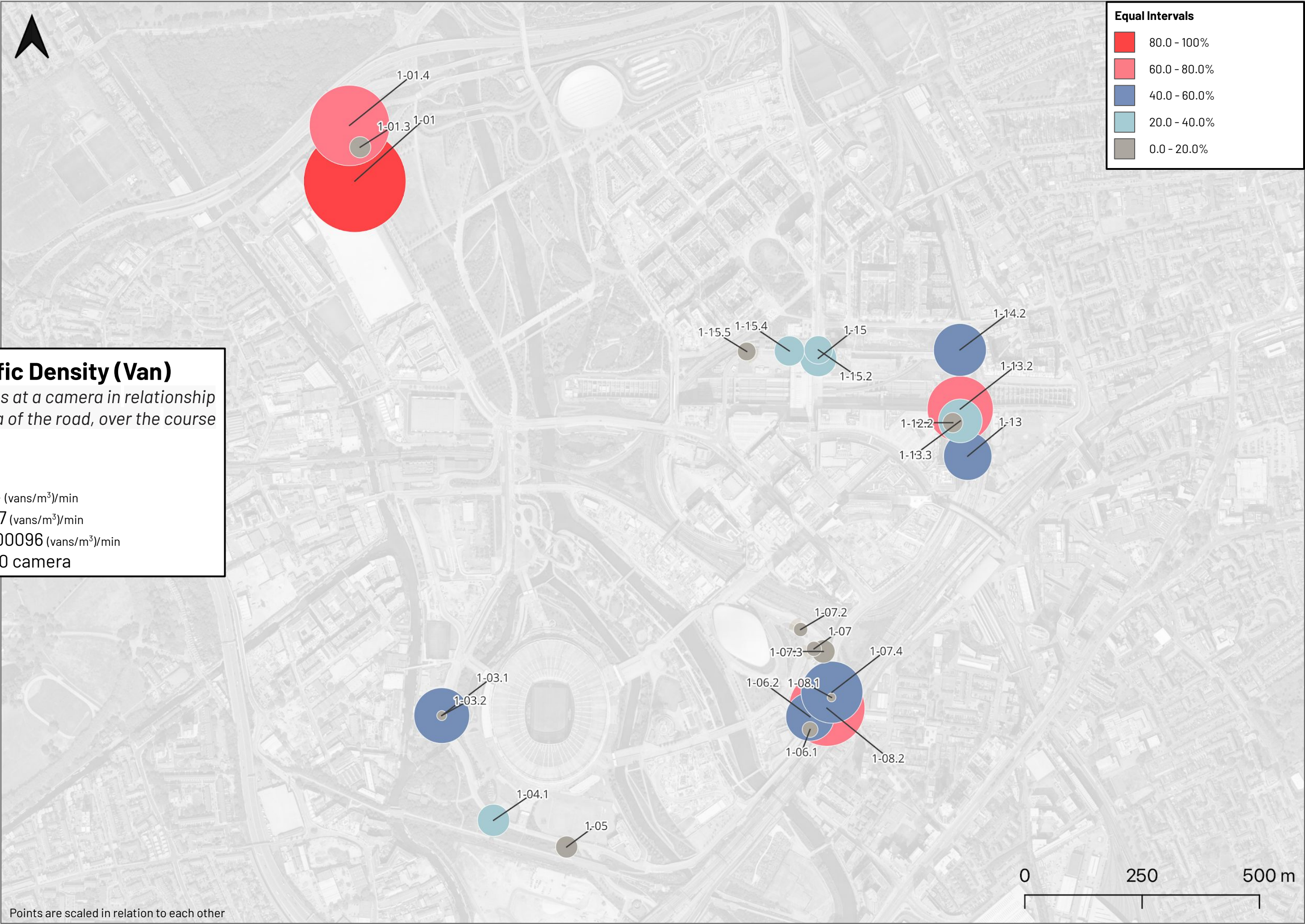
The road area, which is used to calculate a number of the metrics (Average Traffic Density, Average Traffic Density expressed as a percentage), is calculated according to the method described in the schematic (*right*).

In the future, it will be possible to calculate this more precisely.









ANALYSIS OVERVIEW

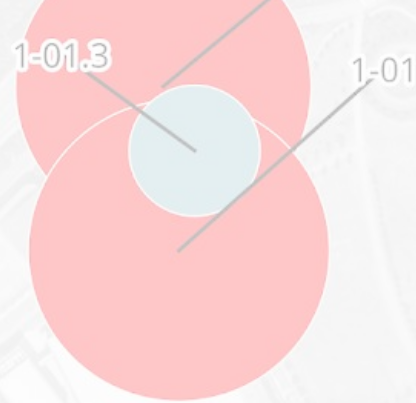
Average Traffic Density (%)

Measuring how much space vehicles and people occupy in a minute, compared to the camera's ground area, expressed as a percentage.

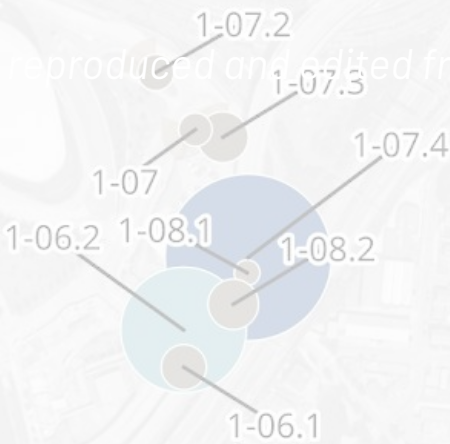
Purpose: To learn how densely occupied an urban space is.

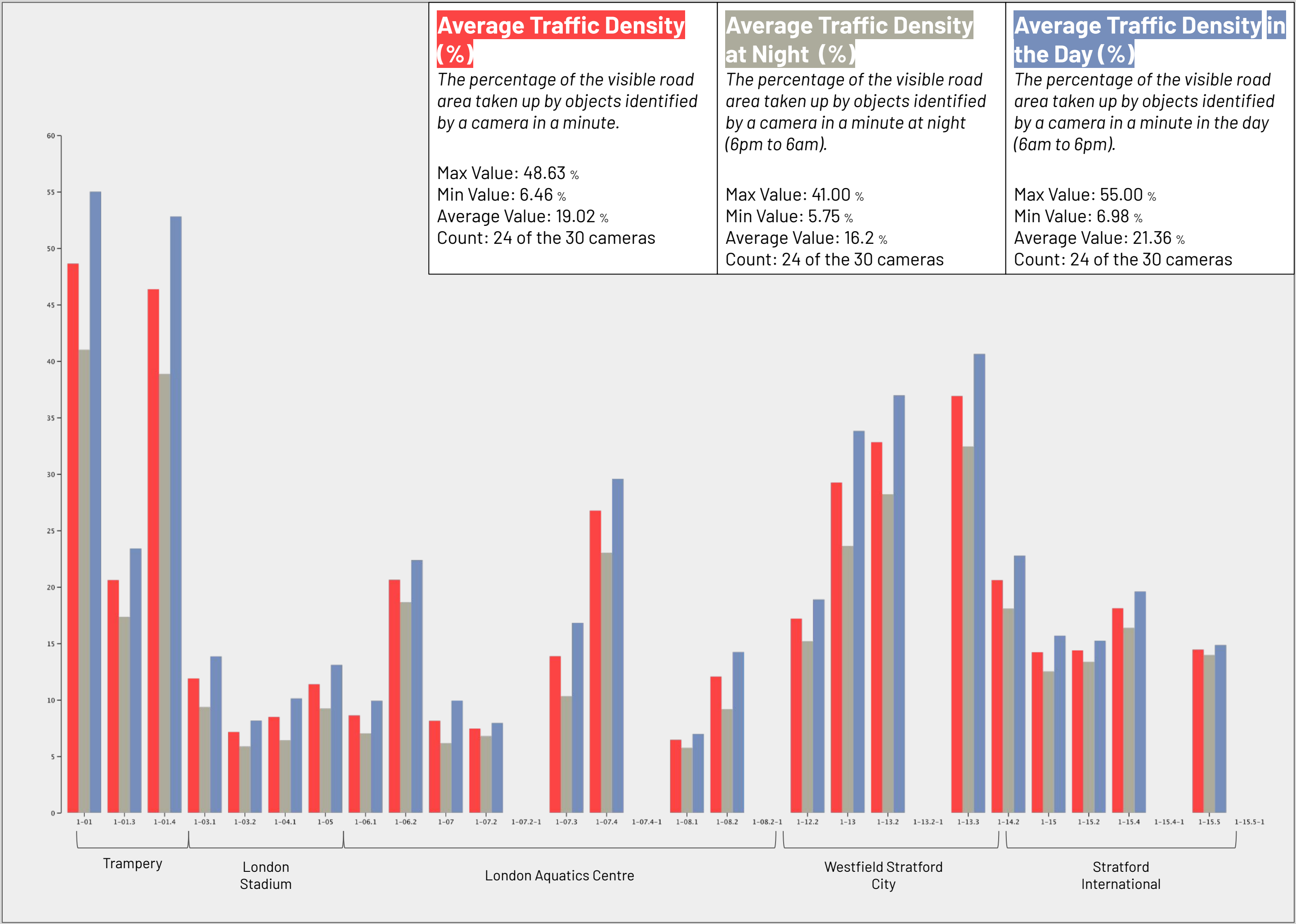
Input: Total number of vehicles identified by a given camera; the visible road area (intersection of a view cone from a camera, a 25m buffer, and road polygons); estimate for average footprint of a labeled object; total minutes in which the camera was recording.

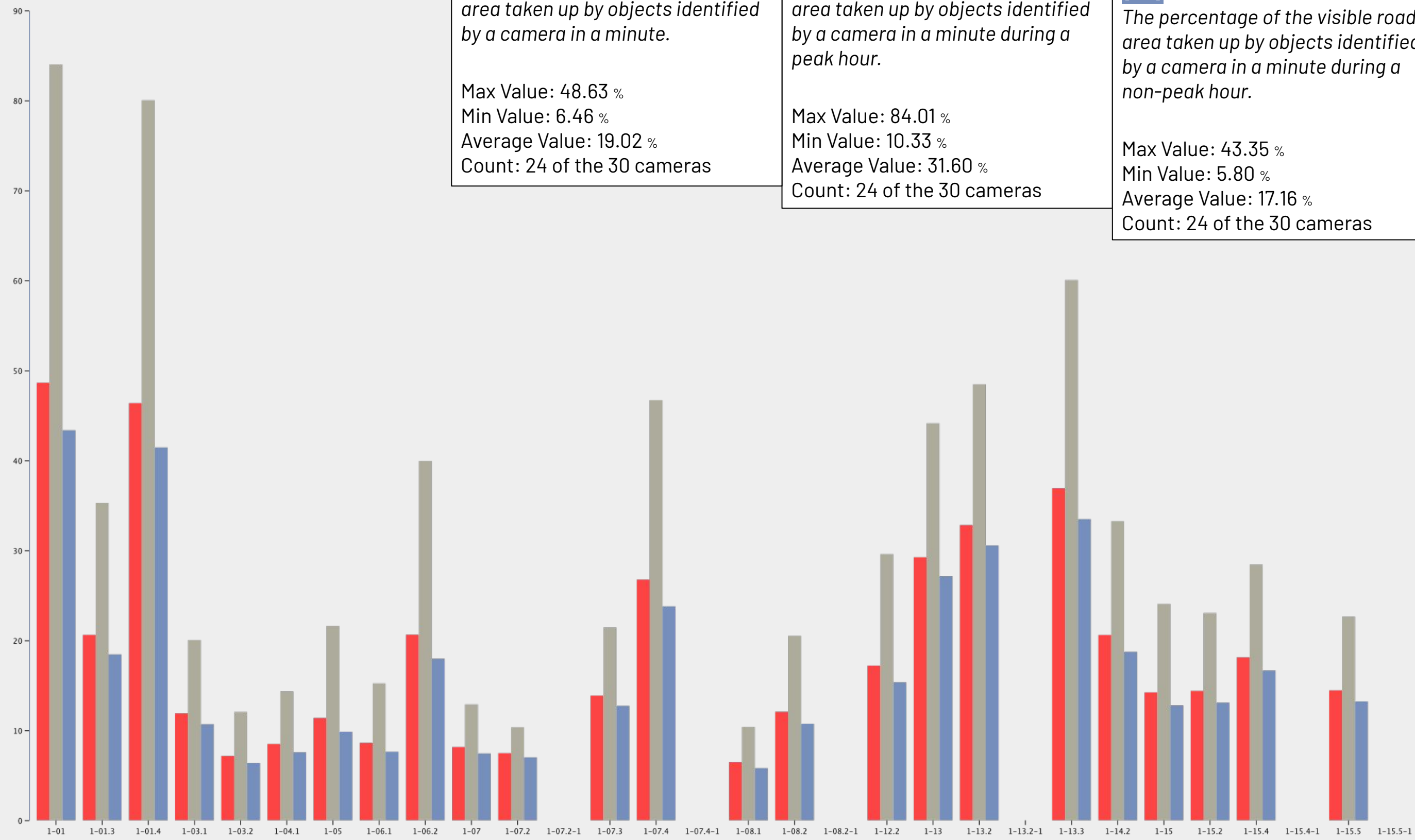
Output: The percentage of the visible road area taken up by objects recorded by a camera over the course of a minute.



Graph reproduced and edited from "Urbanism at a Turning Point. Modern, Postmodern, Now,"
Lehtovuori, P. & Varna, S. (2017)







Average Traffic Density (%)

The percentage of the visible road area taken up by objects identified by a camera in a minute.

Max Value: 48.63 %
Min Value: 6.46 %
Average Value: 19.02 %
Count: 24 of the 30 cameras

Average Traffic Density During Peak Hours (%)

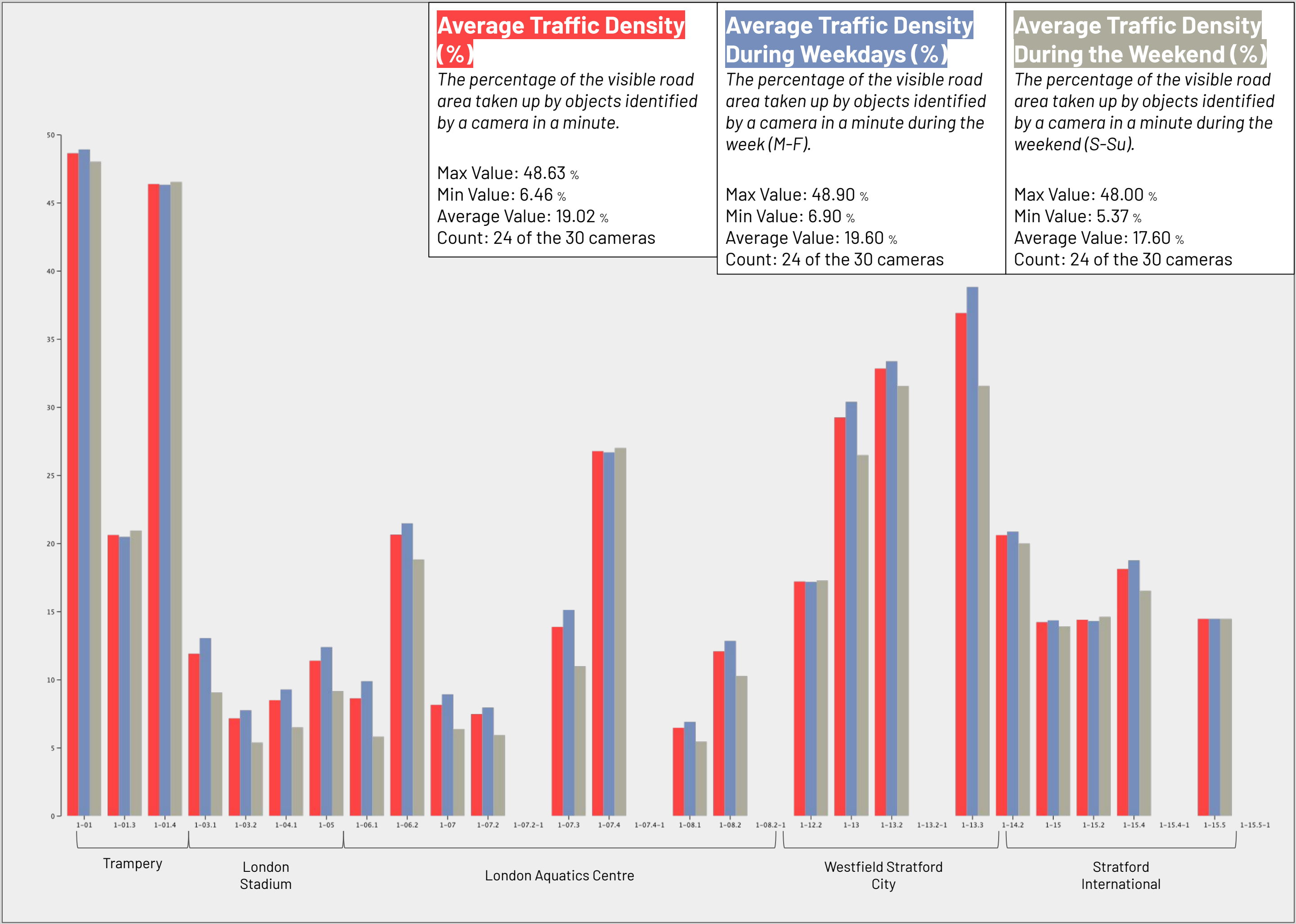
The percentage of the visible road area taken up by objects identified by a camera in a minute during a peak hour.

Max Value: 84.01 %
Min Value: 10.33 %
Average Value: 31.60 %
Count: 24 of the 30 cameras

Average Traffic Density During Non-Peak Hours (%)

The percentage of the visible road area taken up by objects identified by a camera in a minute during a non-peak hour.

Max Value: 43.35 %
Min Value: 5.80 %
Average Value: 17.16 %
Count: 24 of the 30 cameras



ANALYSIS OVERVIEW

Modal Share

The share of traffic of a certain transport mode in relation to the other transport modes - expressed as a percentage.

Purpose: This metric is a way of understanding the distribution of transit modes for a given time characteristic.

Input: Total number of transport mode objects, disaggregated by type, identified by a camera for a time characteristic.

Output: Share of traffic by mode during a time period.

Car Modal Share

Car share of traffic.

Max Value: 86.71 %
Min Value: 29.41 %
Average Value: 57.69 %
Count: 30 of the 30 cameras

Pedestrian Modal Share

Pedestrian share of traffic.

Max Value: 57.01 %
Min Value: 5.06 %
Average Value: 26.36 %
Count: 30 out the 30 cameras

Bus Modal Share

Bus share of traffic.

Max Value: 13.42 %
Min Value: 1.41 %
Average Value: 5.57 %
Count: 30 of the 30 cameras

Van Modal Share

Van share of traffic.

Max Value: 12.53 %
Min Value: 2.09 %
Average Value: 5.23 %
Count: 30 of the 30 cameras

Truck Modal Share

Truck share of traffic.

Max Value: 8.14 %
Min Value: 0.58 %
Average Value: 2.70 %
Count: 30 of the 30 cameras

Bicycle Modal Share

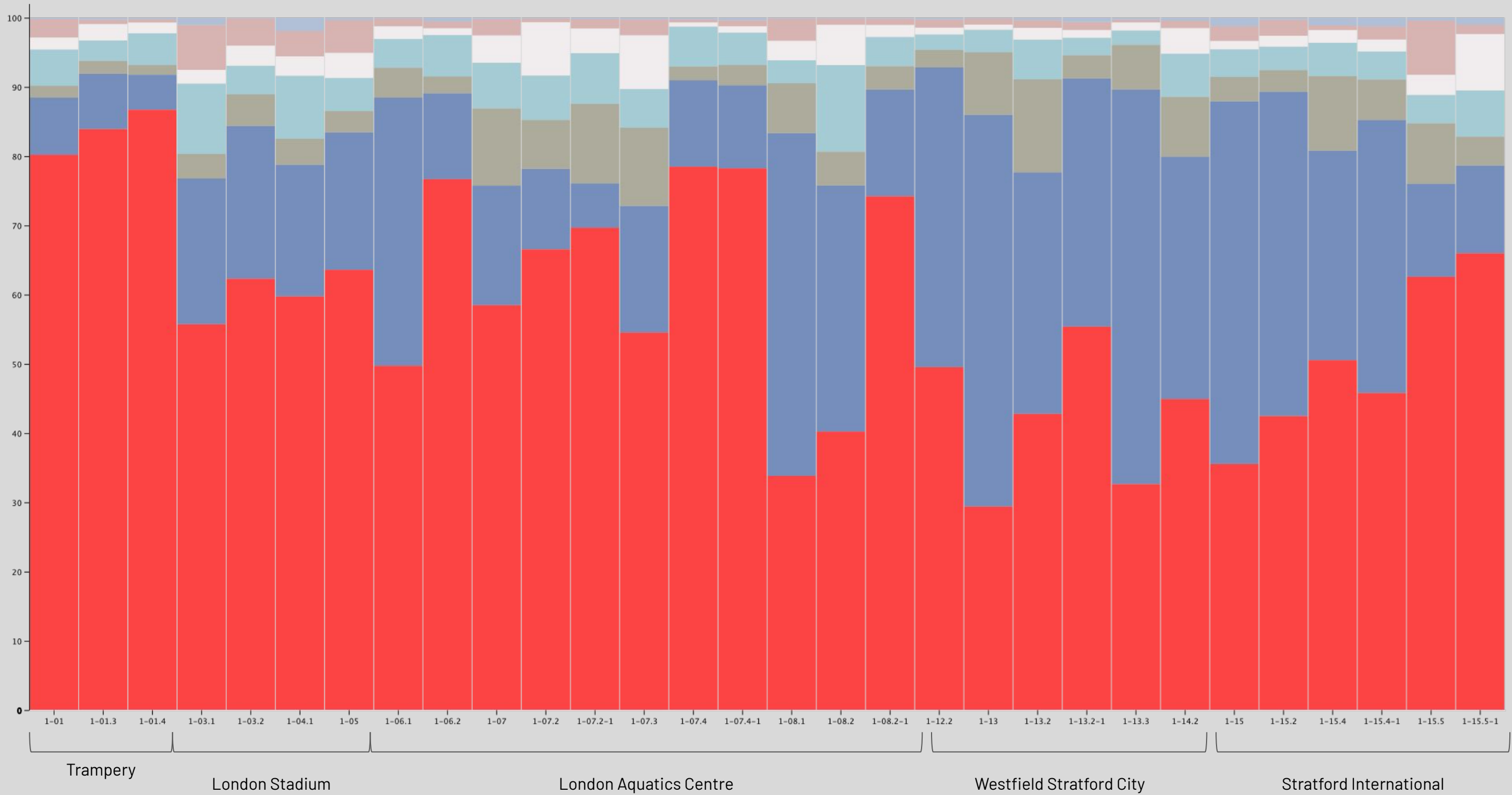
Bicycle share of traffic.

Max Value: 7.84 %
Min Value: 0.41 %
Average Value: 2.01 %
Count: 30 out the 30 cameras

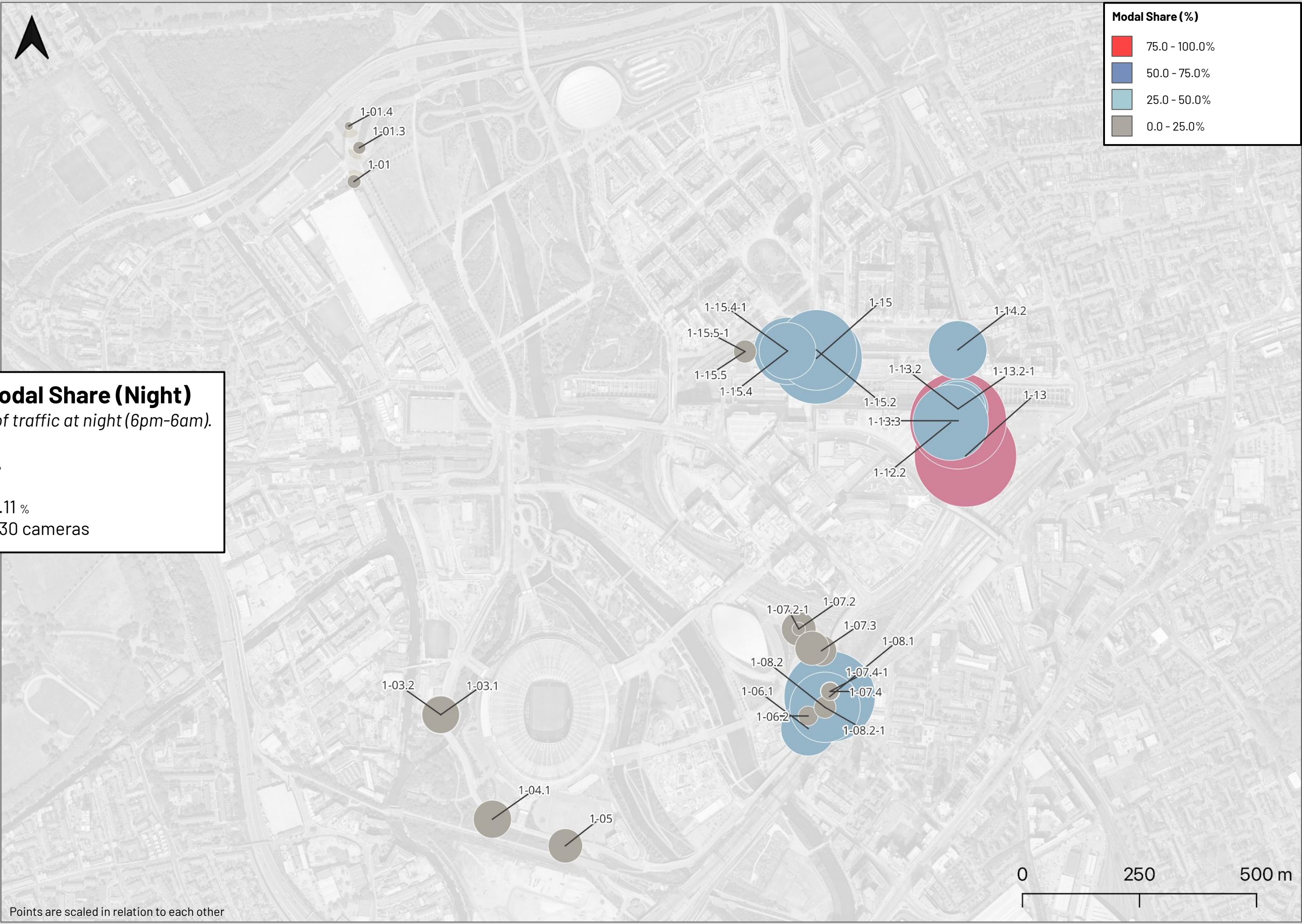
Motorbike Modal Share

Motorbike share of traffic.

Max Value: 1.91 %
Min Value: 0.06 %
Average Value: 0.45 %
Count: 30 of the 30 cameras



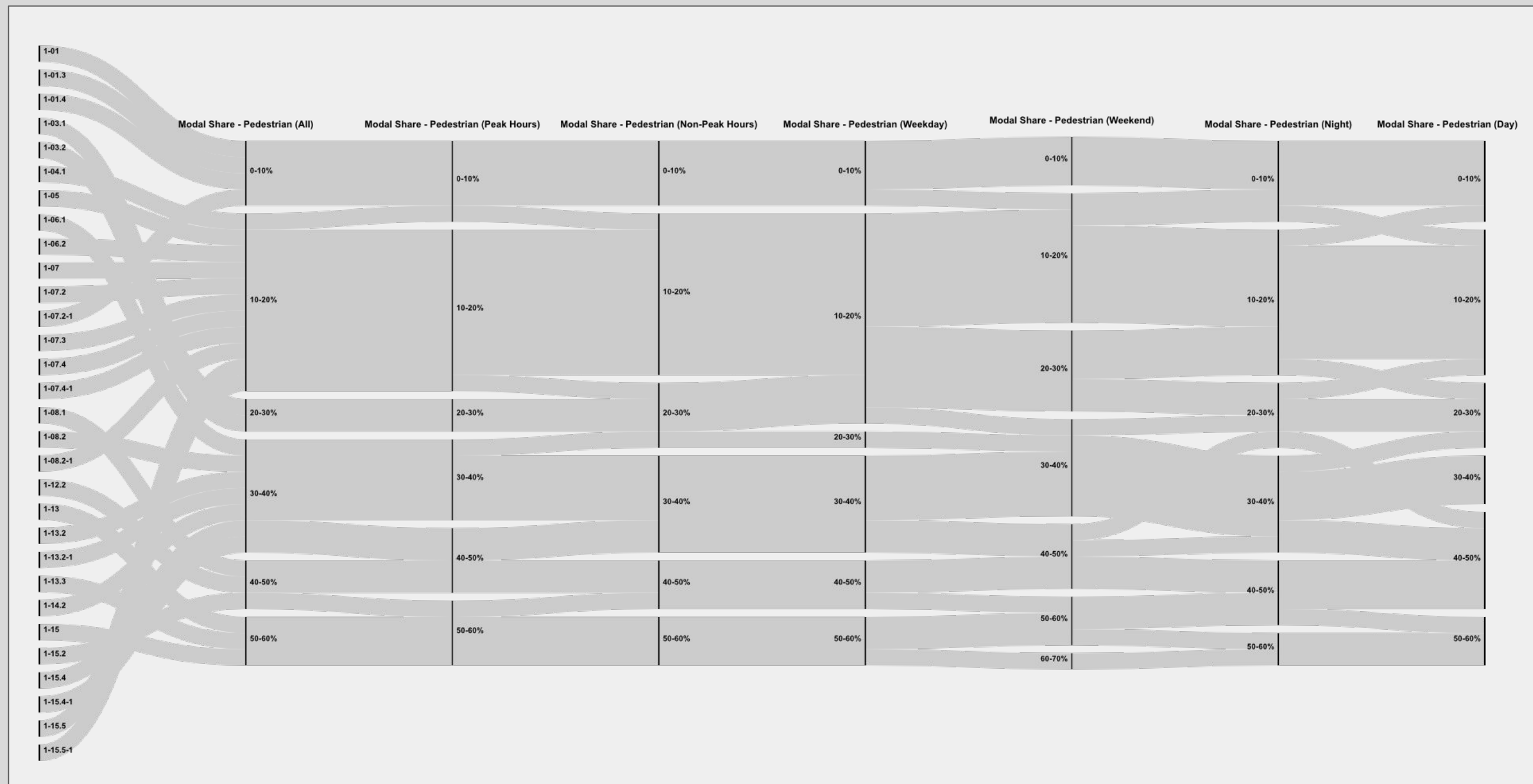


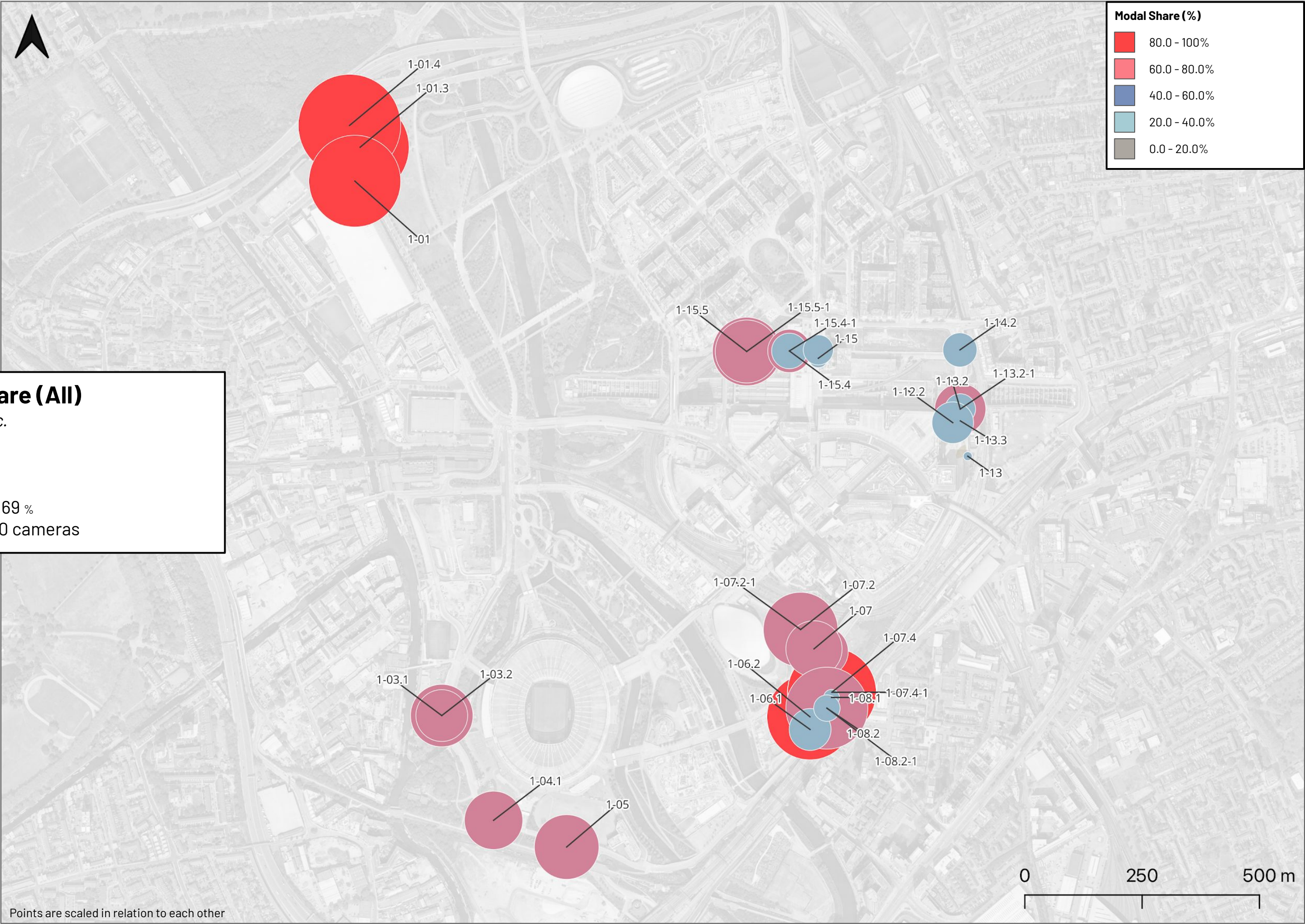


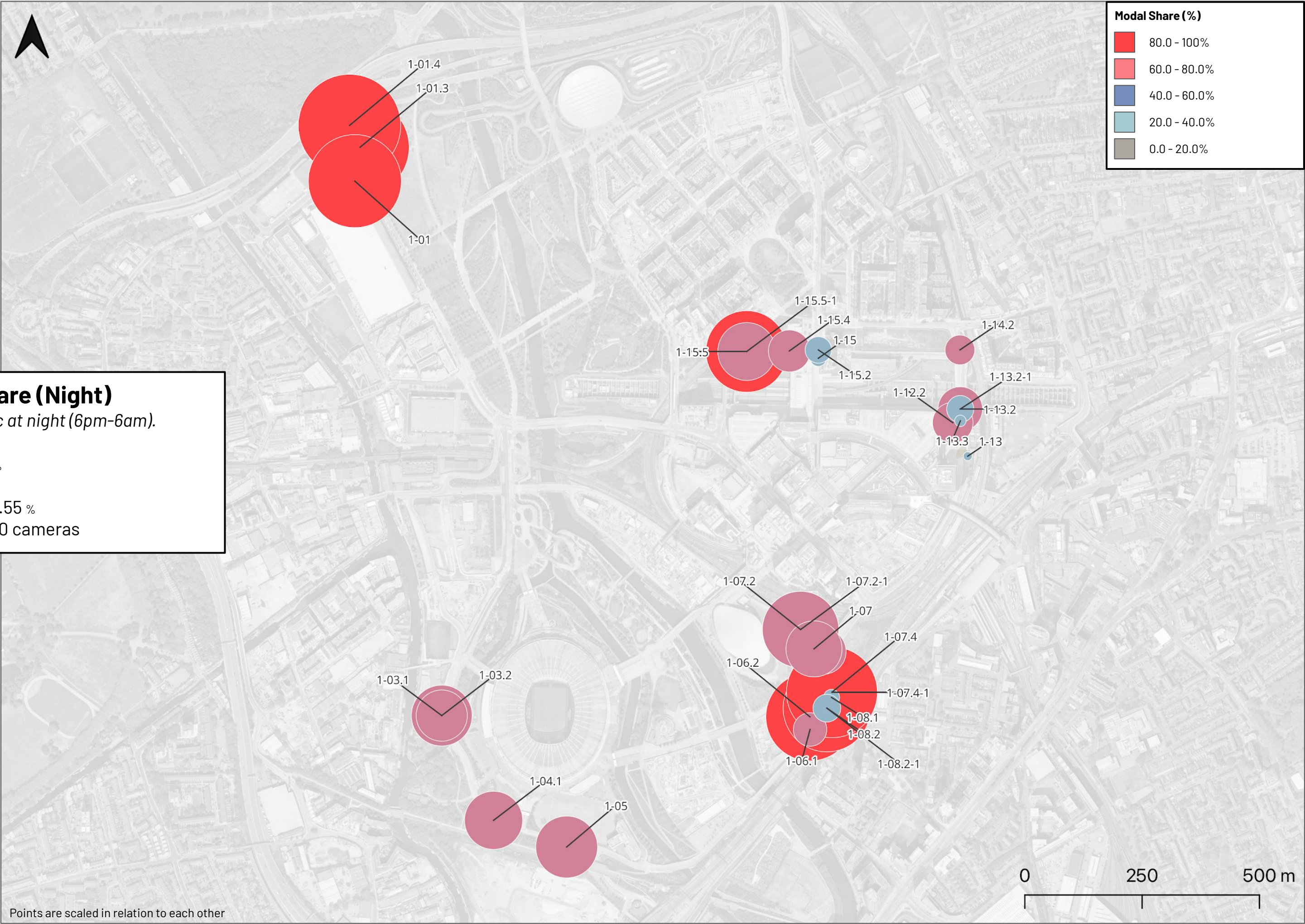


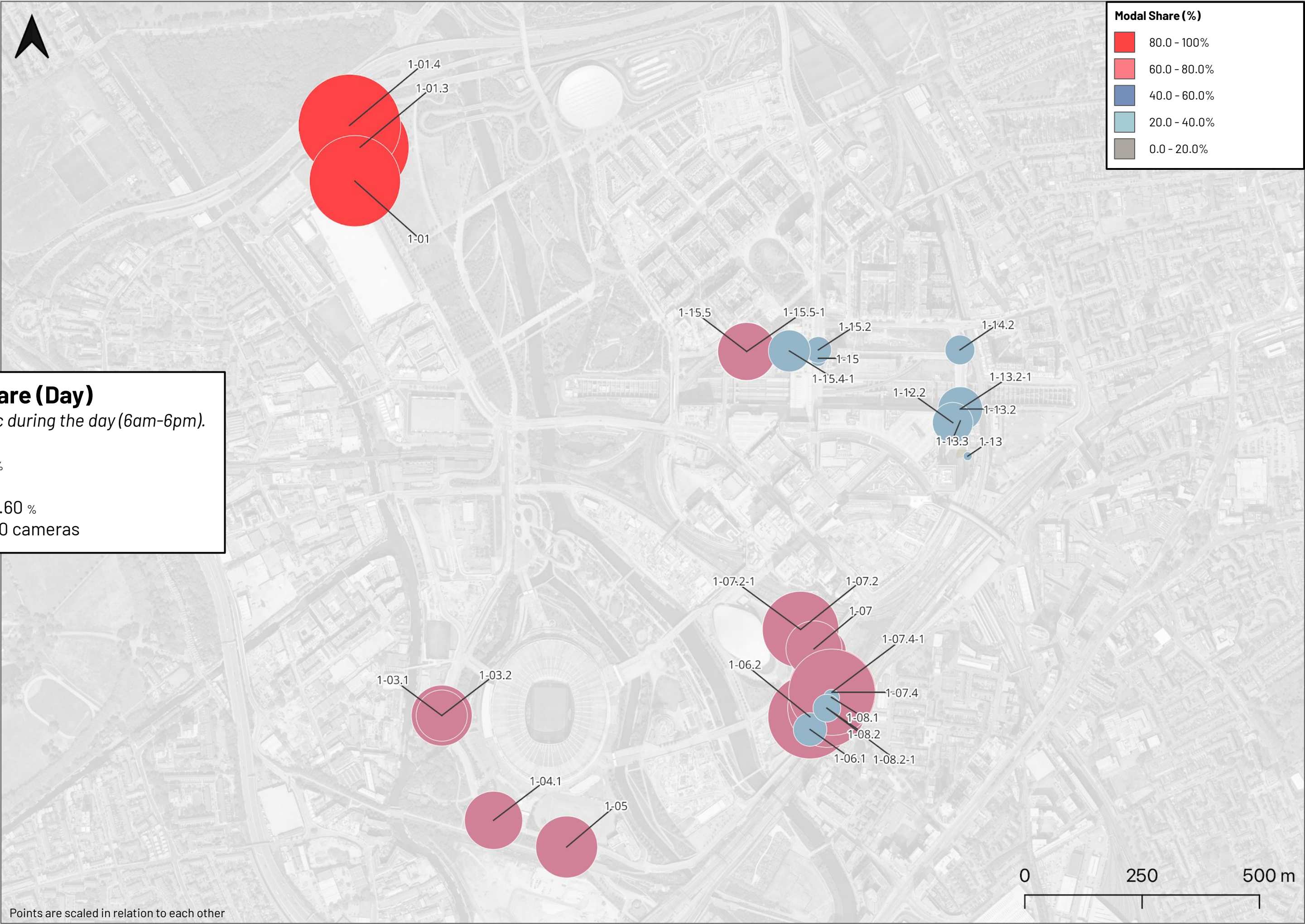
Pedestrian share of traffic.

1. *Journal of the American Medical Association*, 1997; 277: 1039-1043.









Car share of traffic.

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

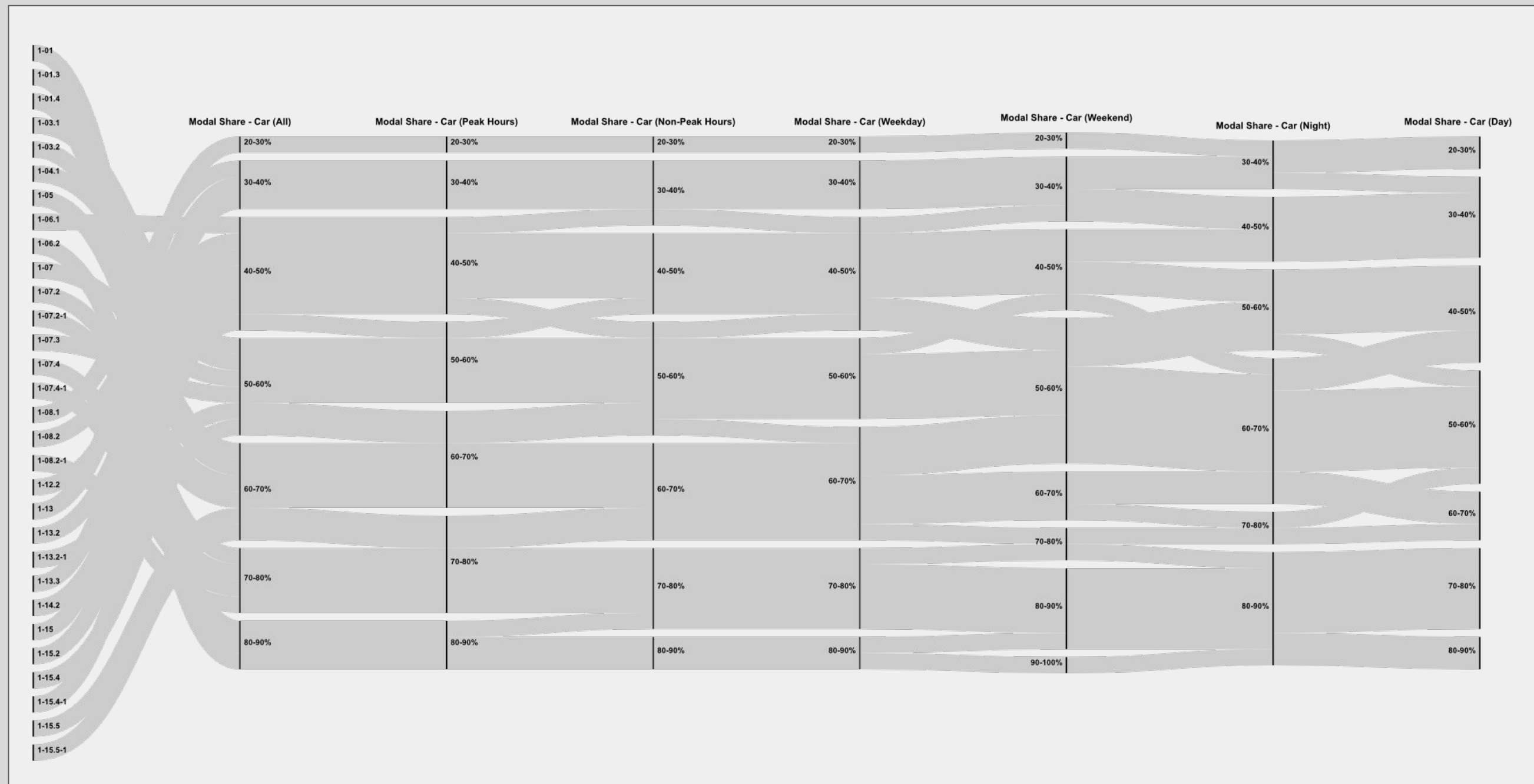
10

Page 10 of 10

11

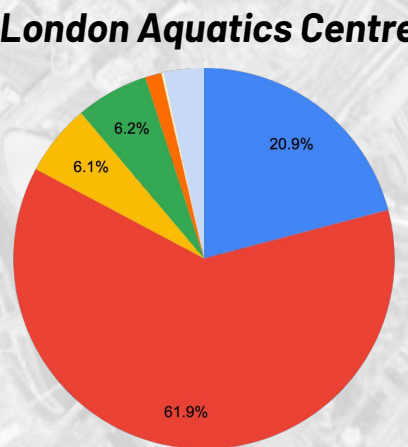
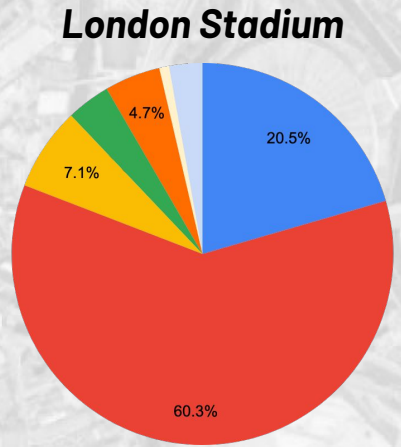
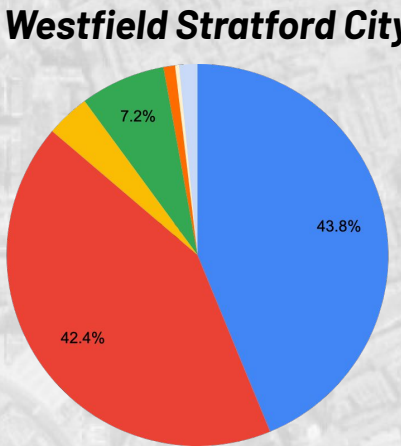
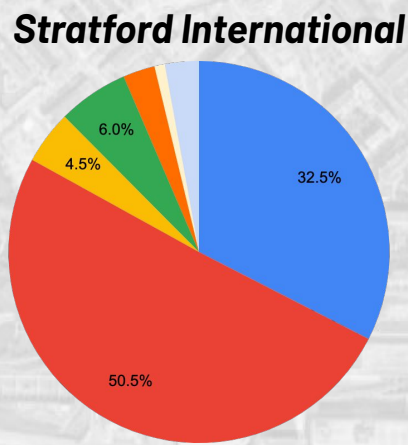
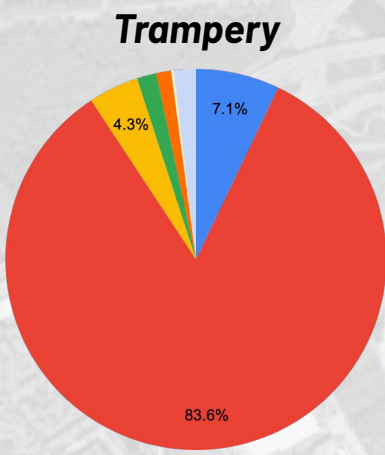
114

114



Modal Share by Area

- PEDESTRIAN
- CAR
- VAN
- BUS
- BICYCLE
- MOTORBIKE
- TRUCK



ANALYSIS OVERVIEW

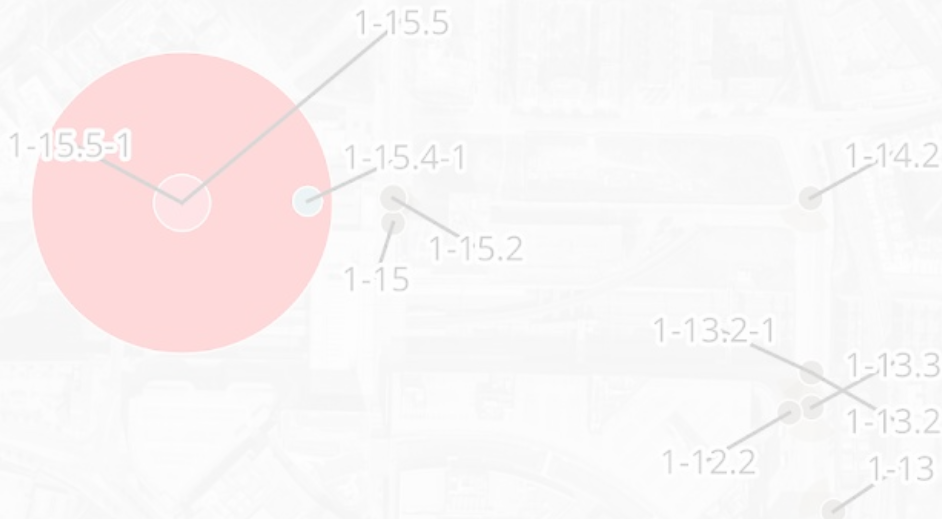
Modal Consistency

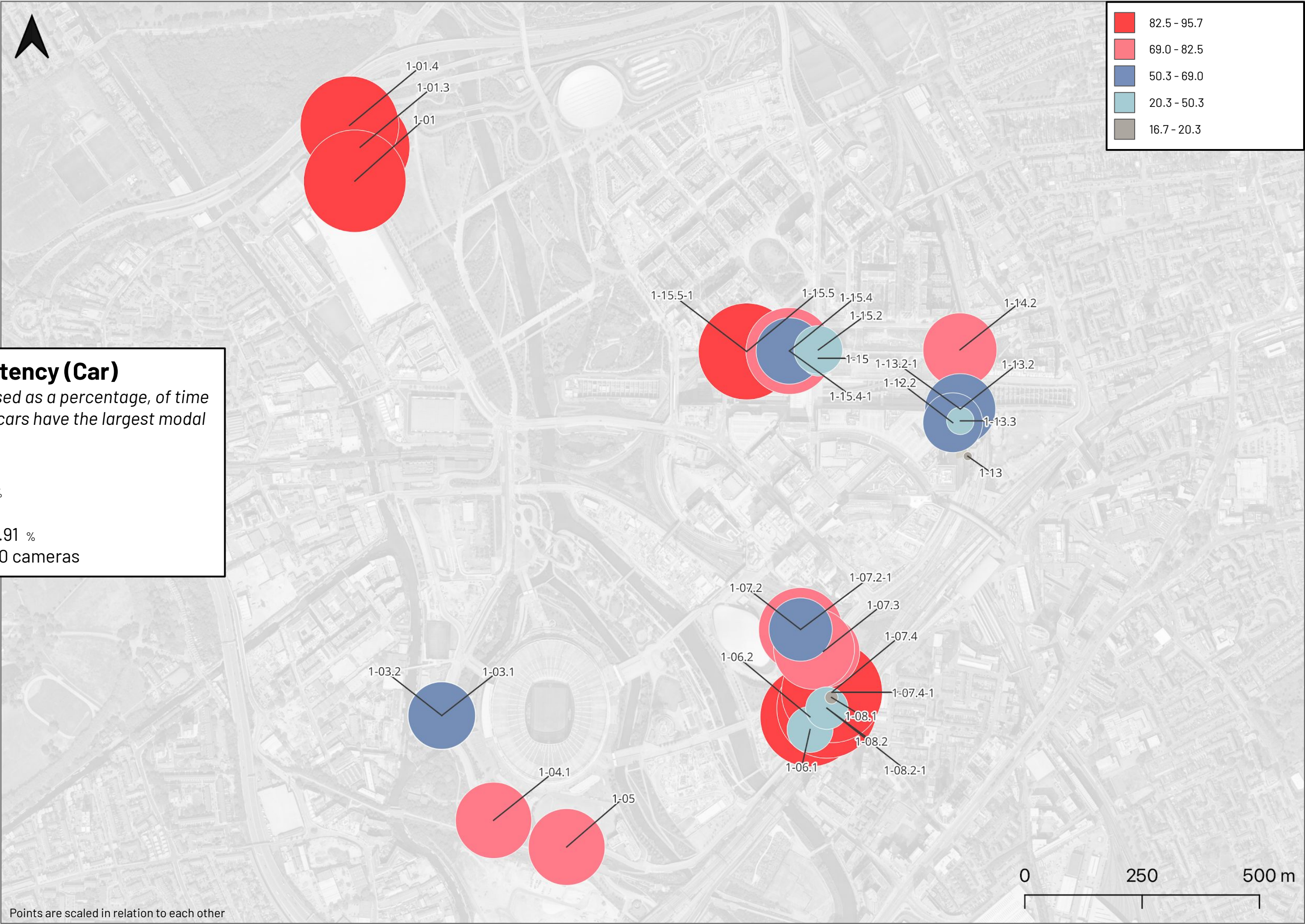
The share of time intervals in which a particular mode was predominant over others - expressed as a percentage.

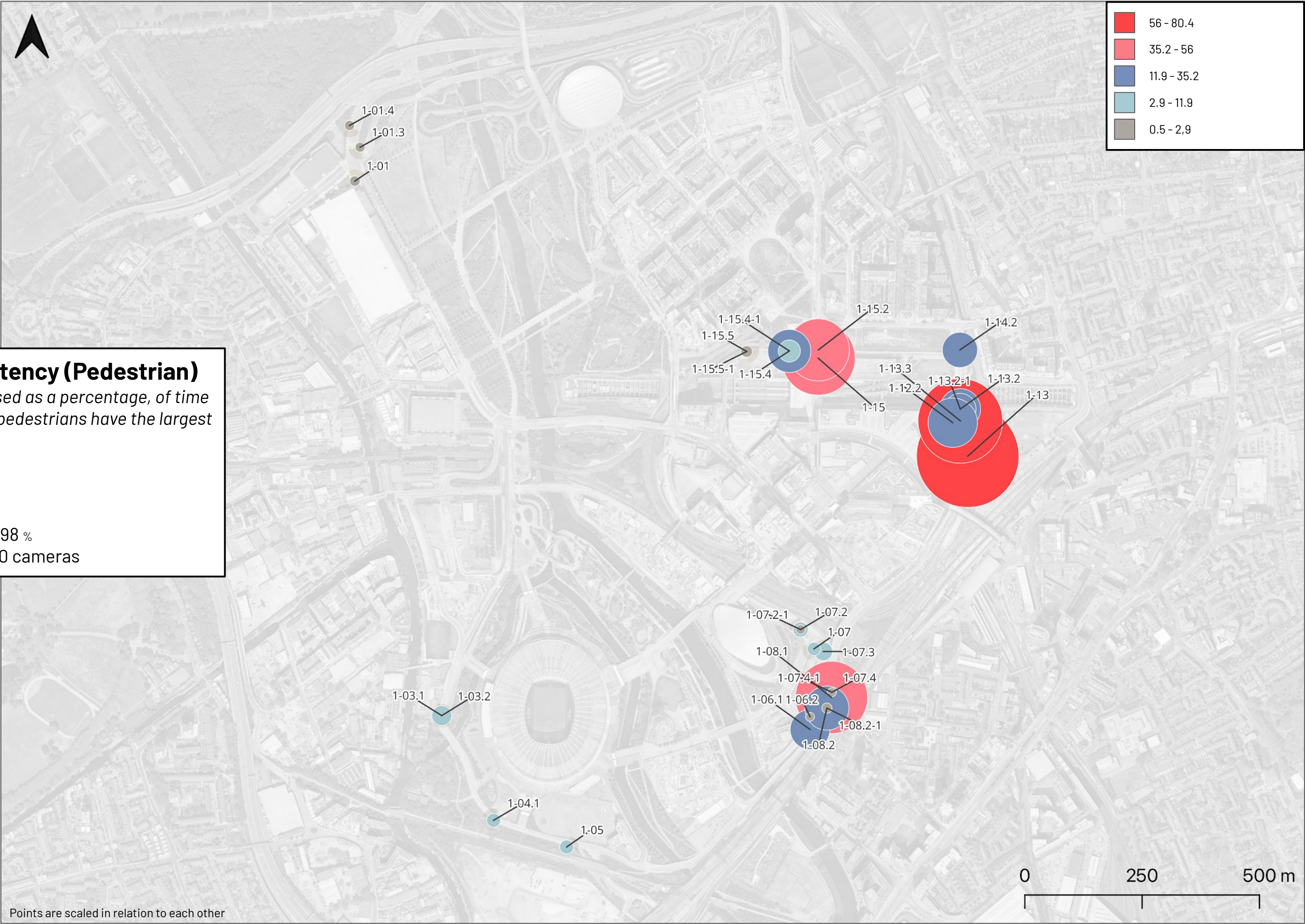
Purpose: This metric is a way of seeing the frequency with which a particular mode is predominant over time.

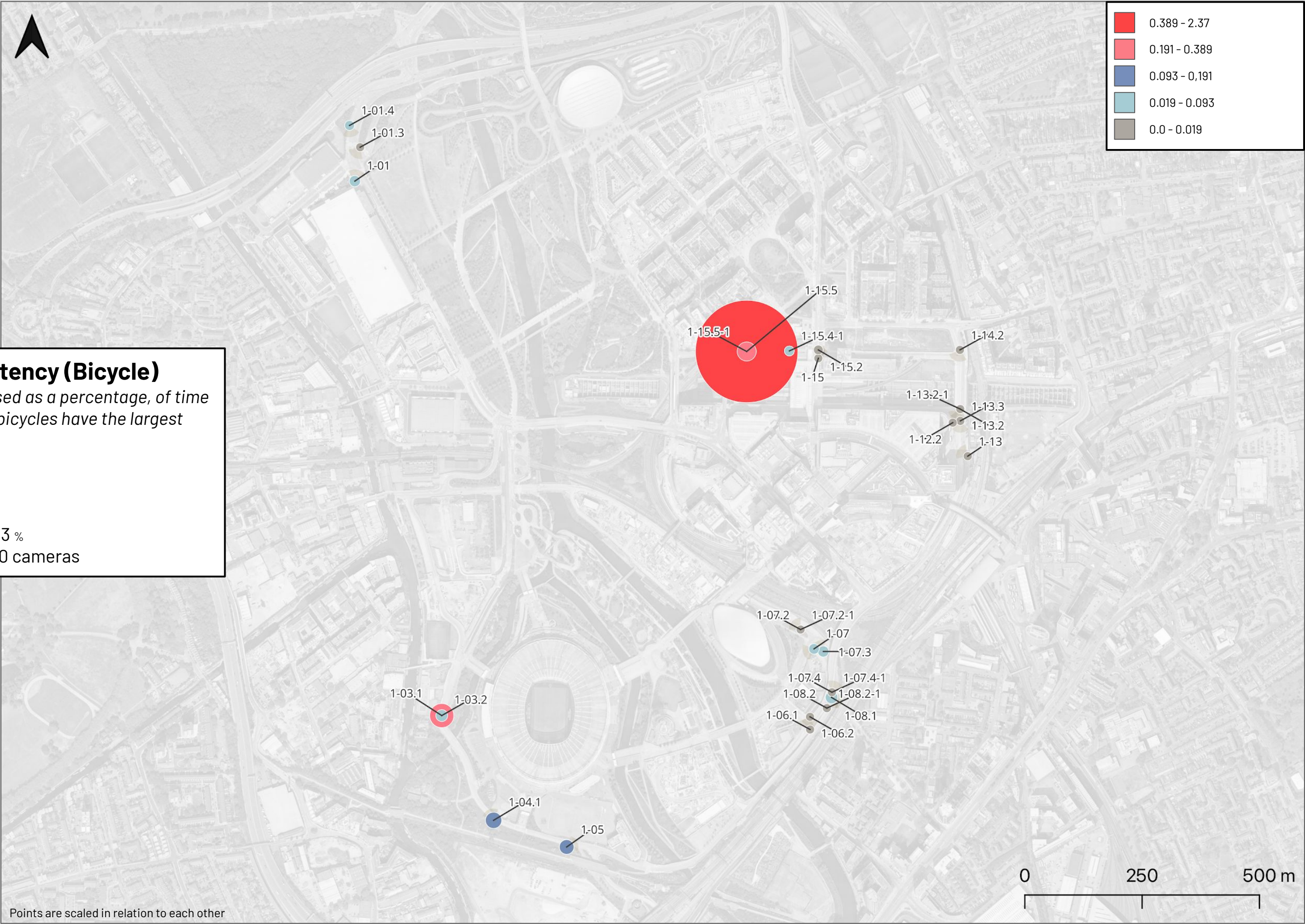
Input: Total number of transport mode objects, disaggregated by type, identified by a camera for each time interval; total number of recorded time intervals.

Output: The share, expressed as a percentage, of time intervals in which a mode has the largest modal share.





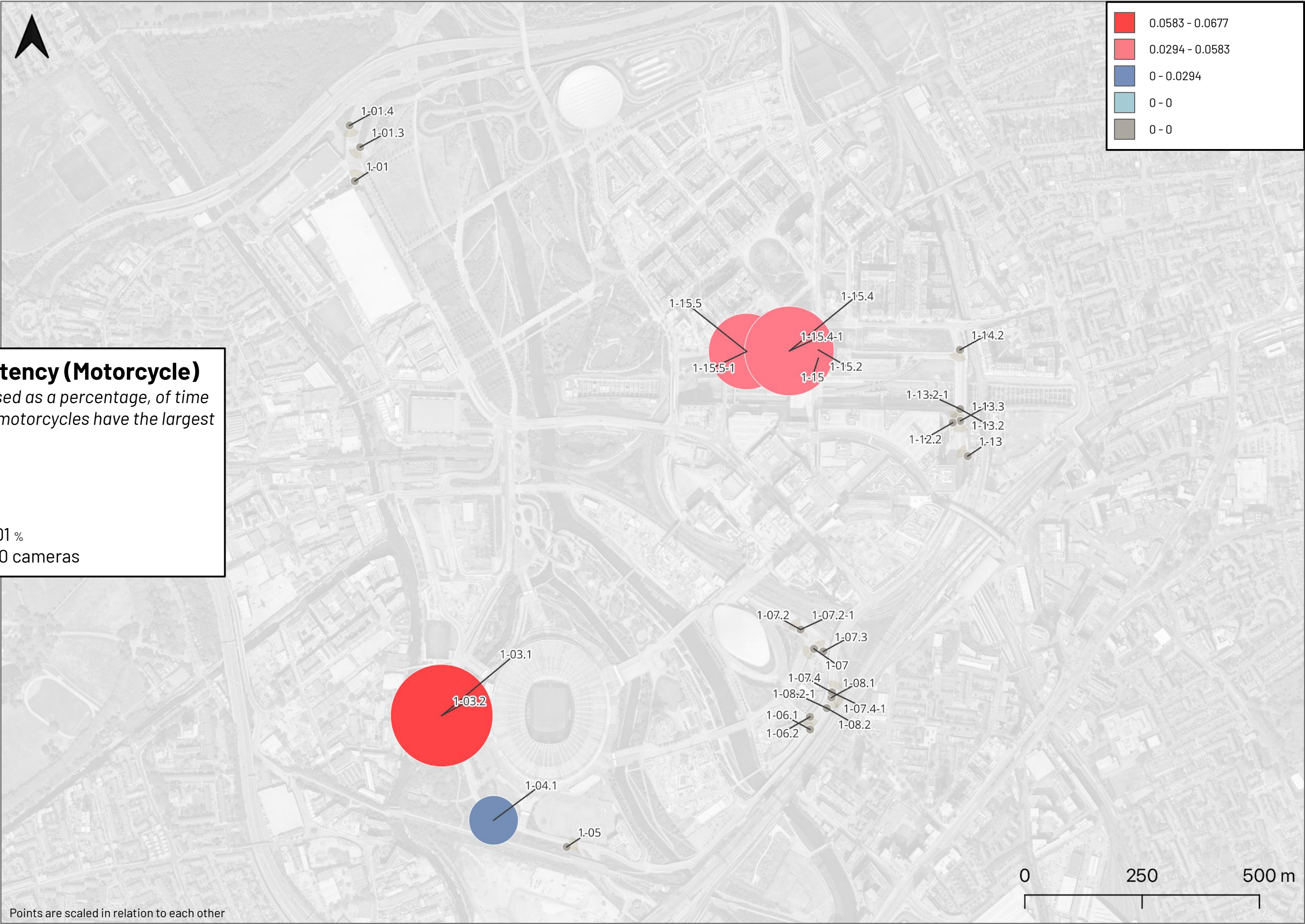


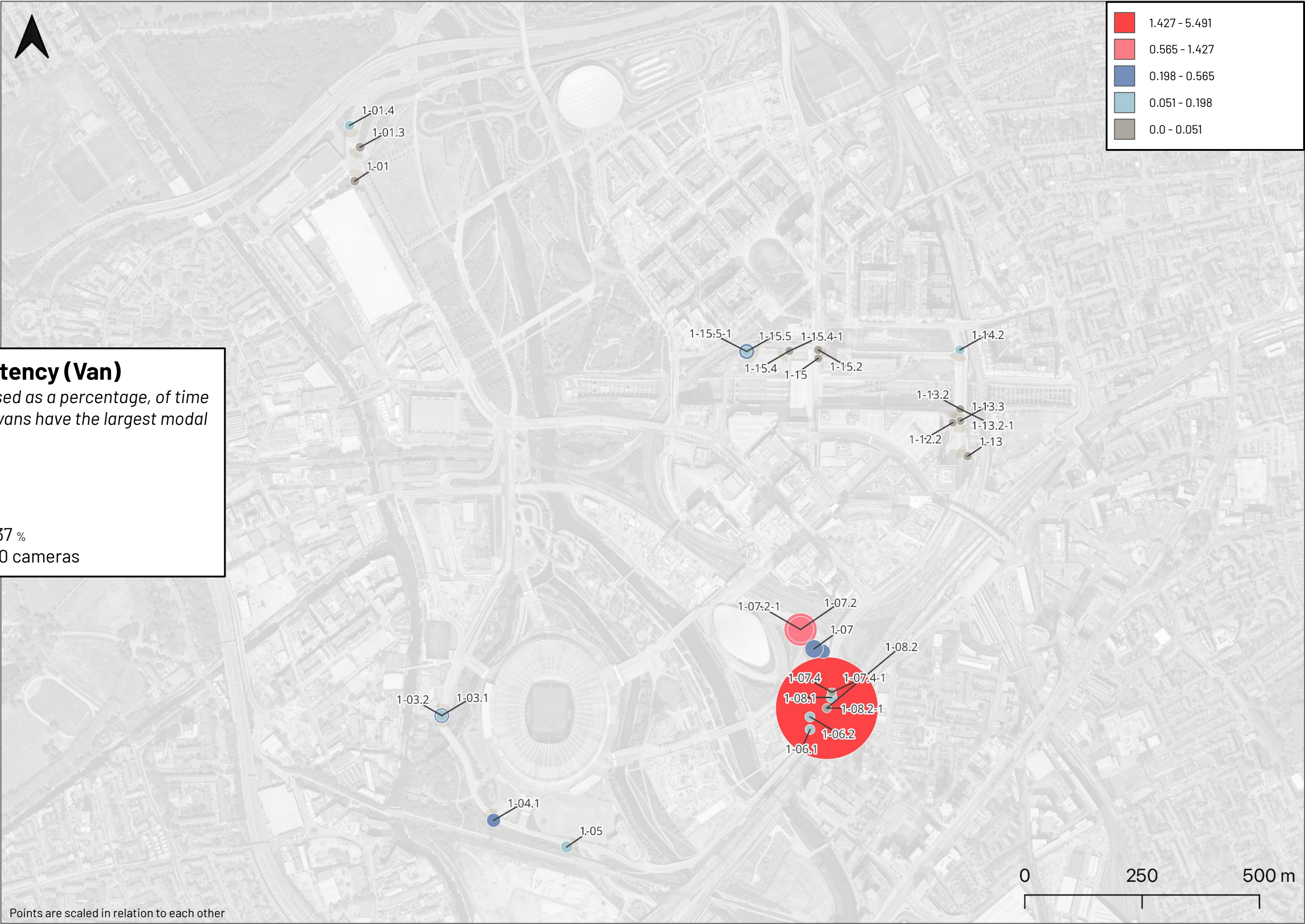


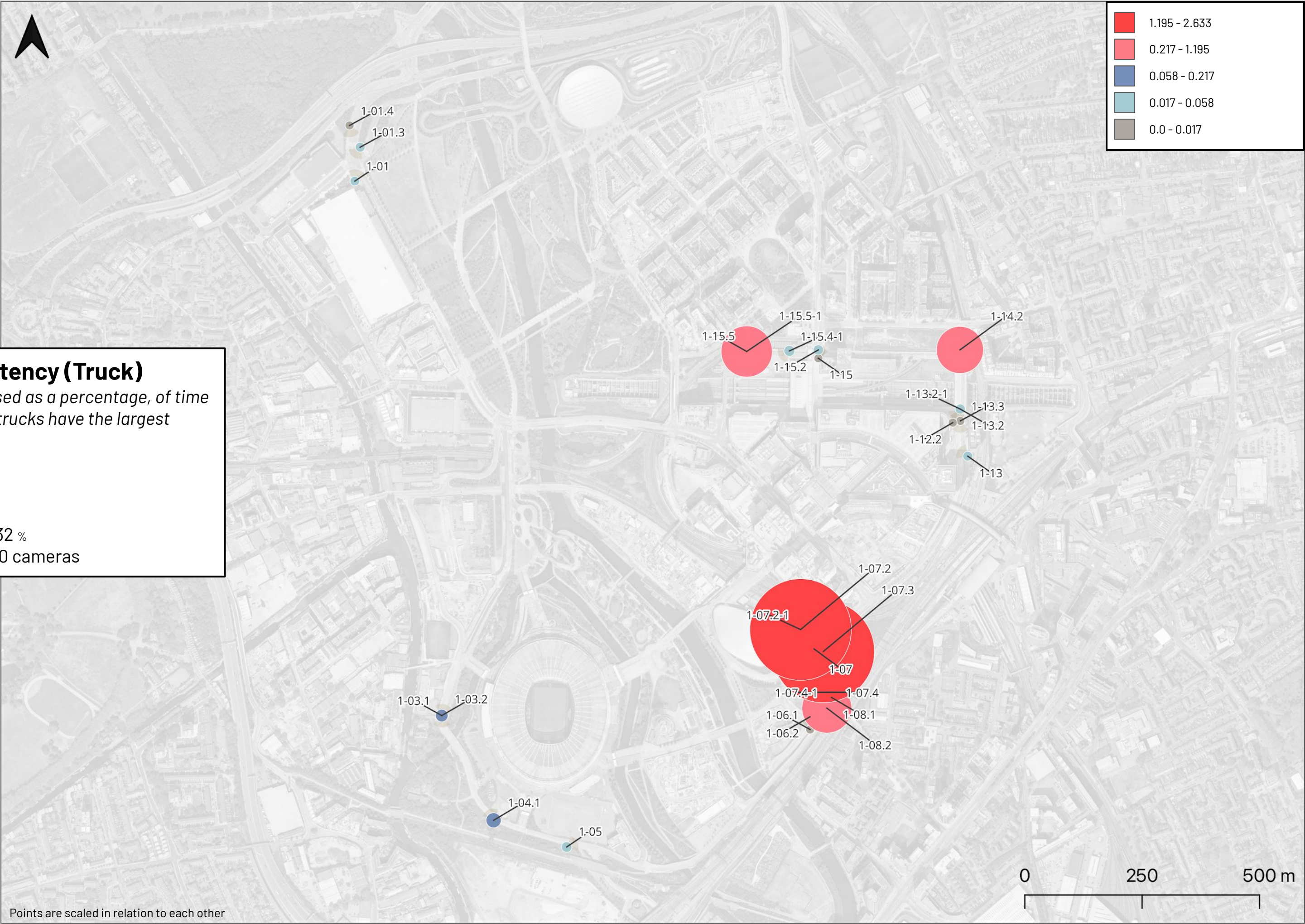
Modal Consistency (Bicycle)

The share, expressed as a percentage, of time intervals in which bicycles have the largest modal share.

Max Value: 2.37 %
Min Value: 0.00 %
Average Value: 0.13 %
Count: 30 of the 30 cameras







ANALYSIS OVERVIEW

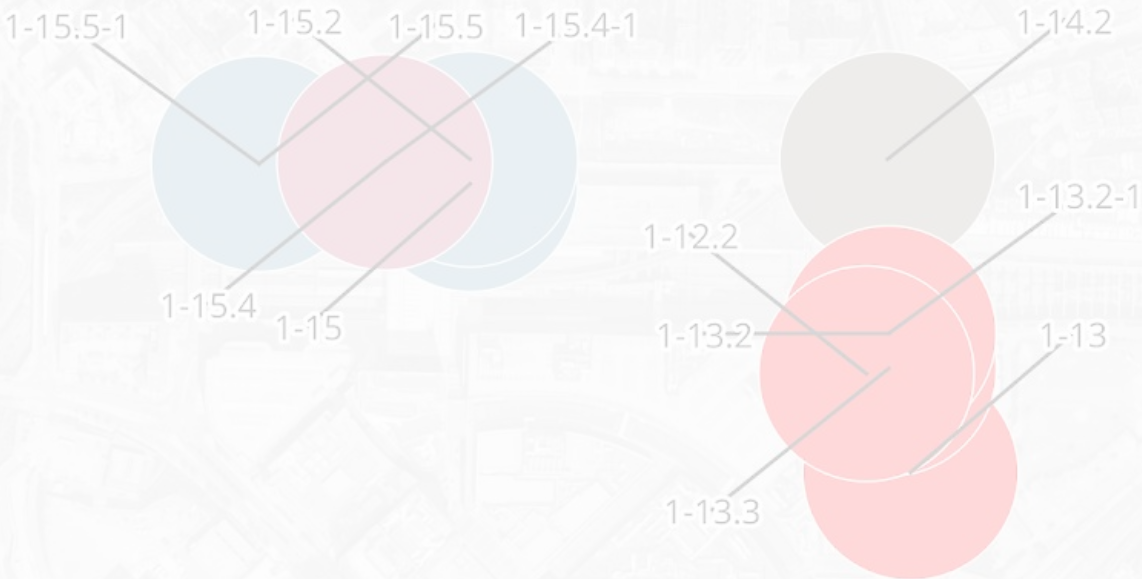
Available Mobility Services

The number of mobility services available in a 250 meter radius.

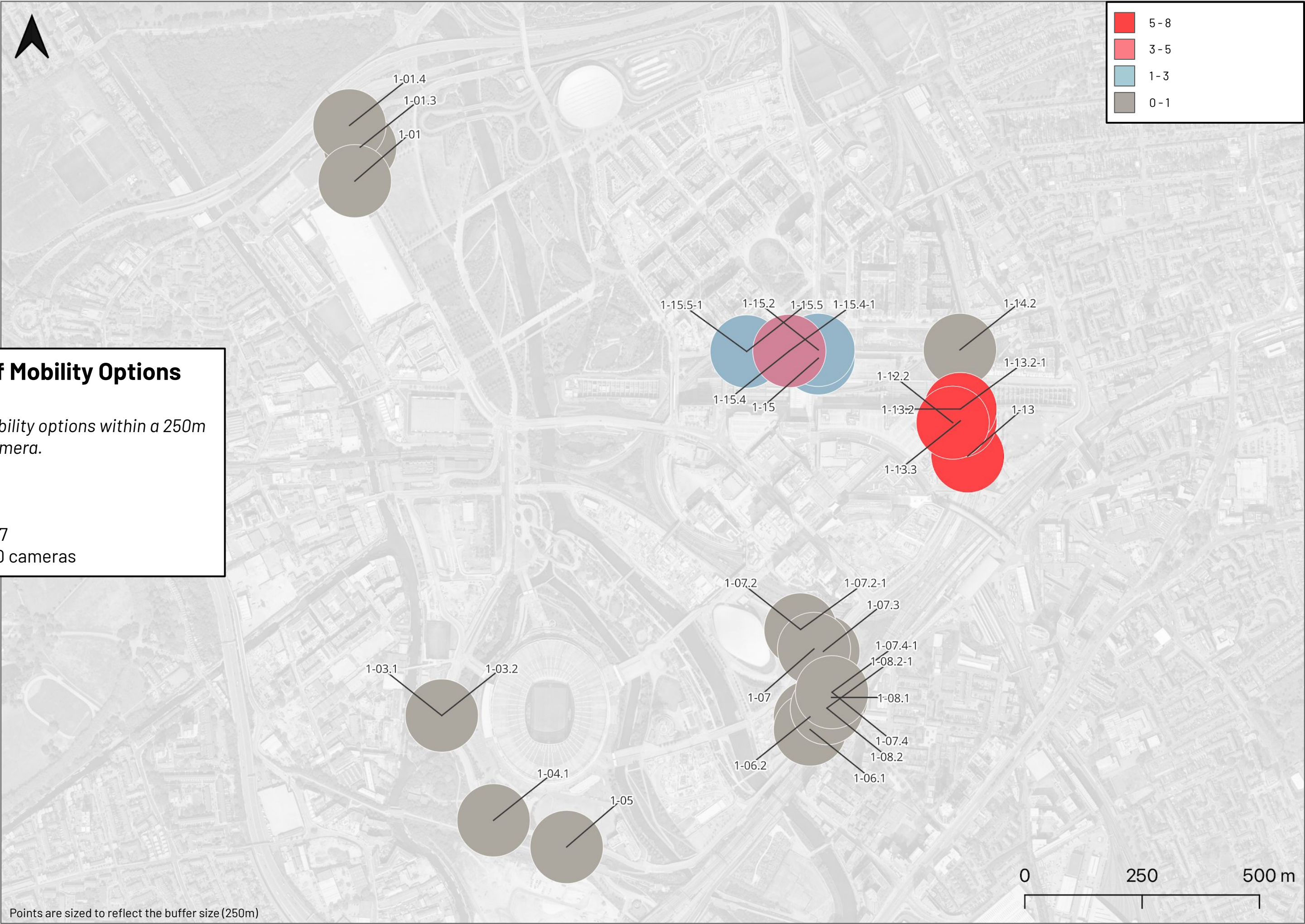
Purpose: This metric allows Fyma to compare cameras by the availability of mobility services within a certain radius from them, pointing to the accessibility of transportation alternatives.

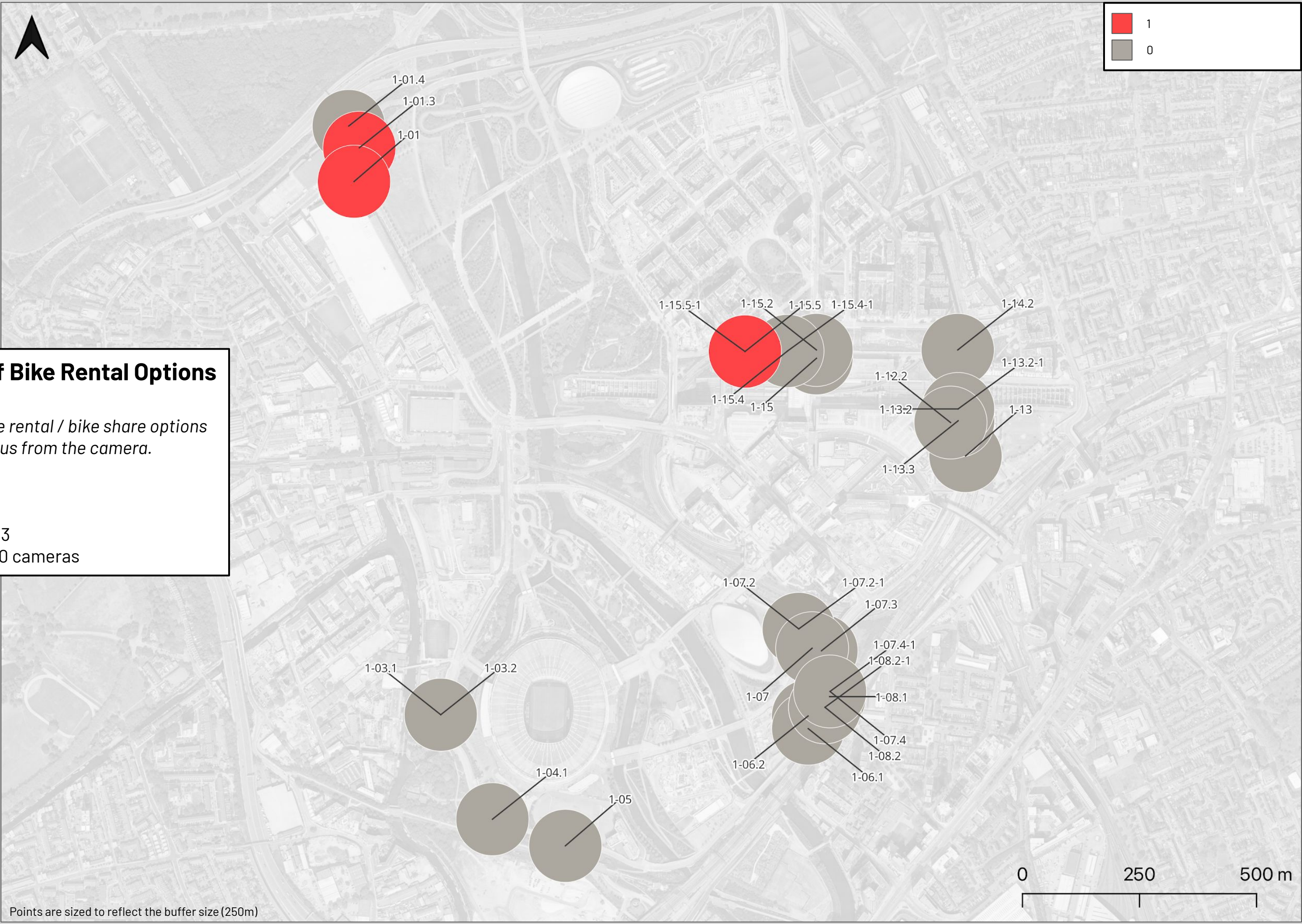
Input: Quantitative observations of mobility options based on Foursquare 2020.

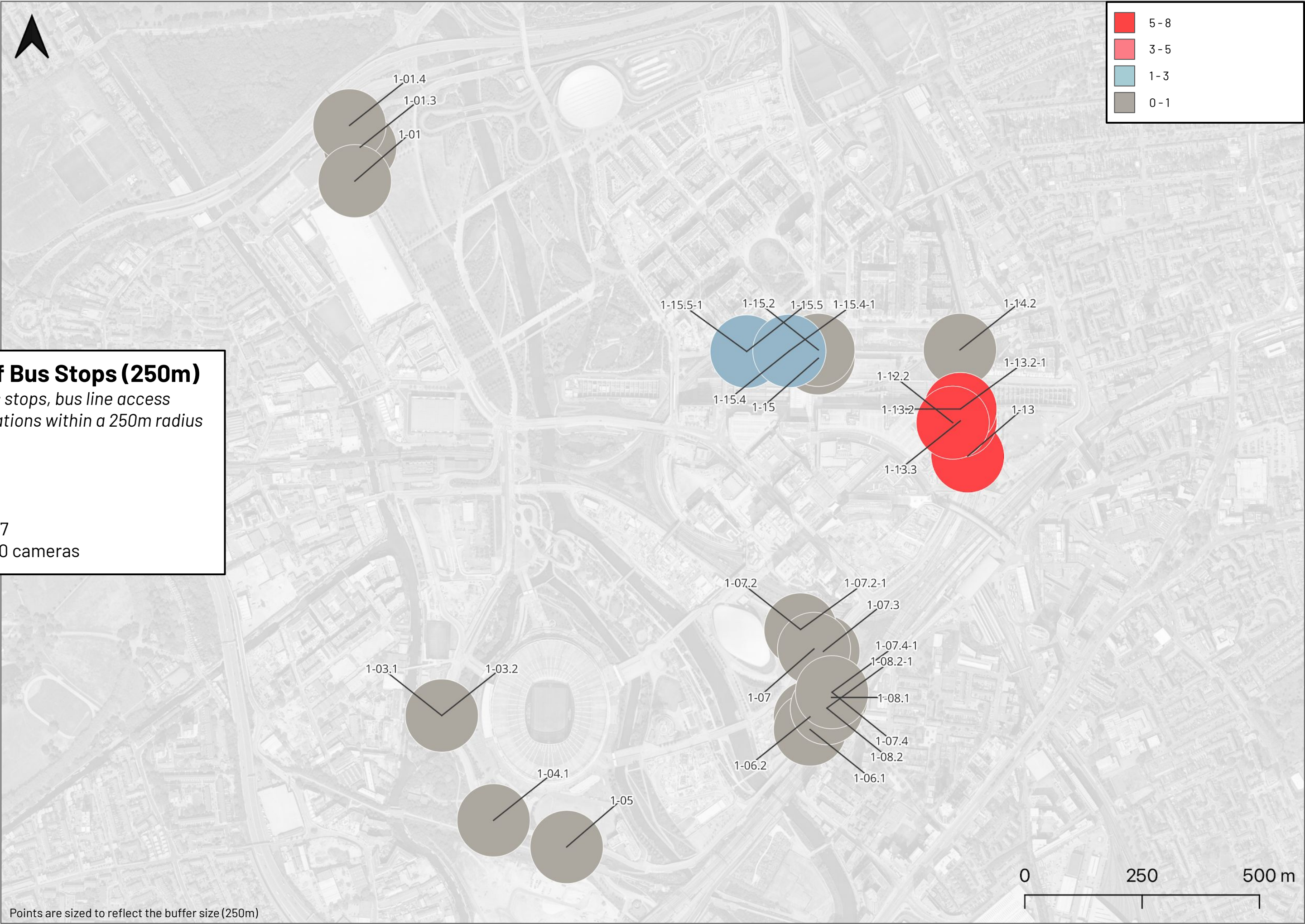
Output: The number of mobility options or types of mobility options within a certain radius from the camera.



Graphic produced and edited from "Urbanism at a Turning Point. Modern. Postmodern. Now." by Lehtovuori, P. & Varna, S. (2017)







ANALYSIS OVERVIEW

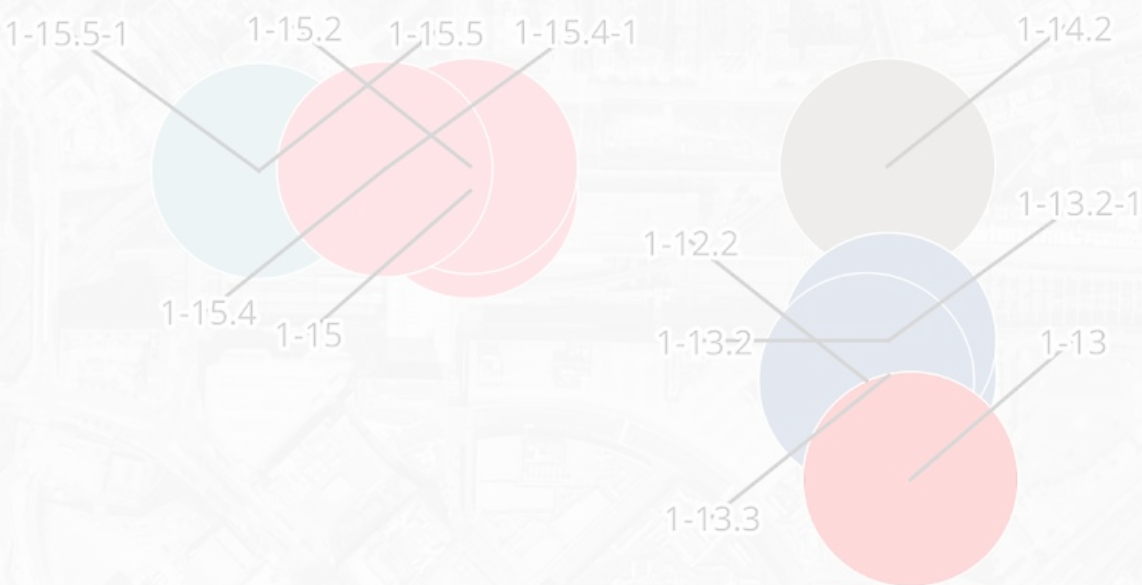
Available Amenities

The number of **optional and necessary amenities** available within a 250 meter radius.

Purpose: This metric allows for the comparison of the diversity of urban amenities within a 250m radius between cameras.

Input: Quantitative observations of urban activities based on Foursquare

Output: The number of urban activity options – both optional and necessary – within a certain radius from the camera.



Graphic produced and edited from "Urbanism at a Turning Point. Modern. Postmodern. Now." by Lehtovuori, P. & Varna, S. (2017)

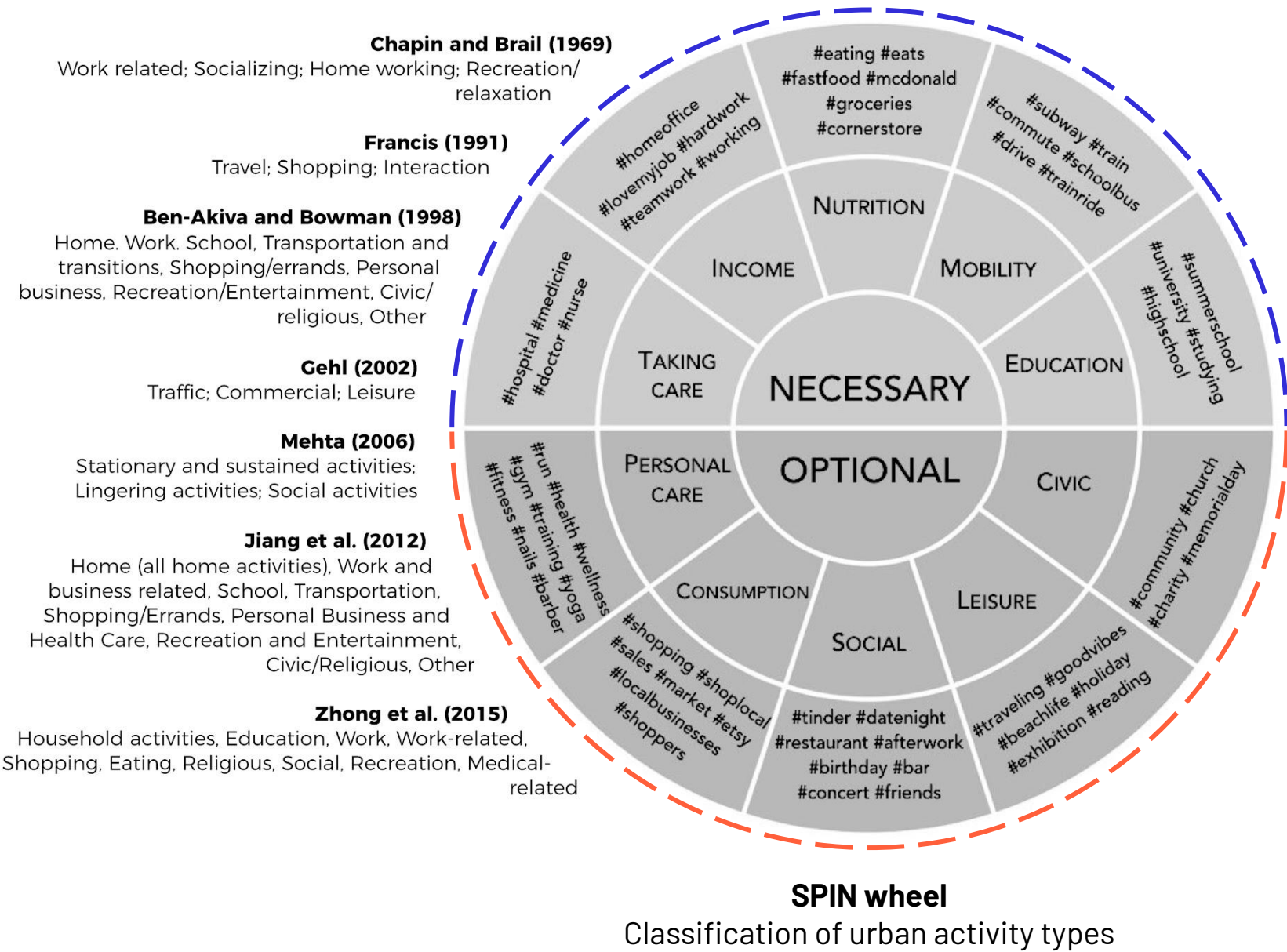
Classification of Urban Activities

The mixity of optional and necessary human activities, is a key driver for attracting and retaining pedestrians.

Jan Gehl’s classic division of Optional and Necessary activities was further expanded by our team to utilise urban amenities as proxy to map and analysis the diversity of human activities.

The SPIN wheel (*right*) is utilised to categorise urban amenities according to the type of human activity they can foster.

In this analysis, we mapped the location of urban amenities in a 250m radius from each camera and , classified them using the SPIN wheel. This allowed us to calculate the diversity of amenities present in the area (often referred to as mixity) and assessed their popularity by qualitative observation from Foursquare.



Classification of Urban Activities

More information about the methodology can be found in the article Baeza, Jesús López, Damiano Cerrone, and Kristjan Männigo. "Comparing two methods for urban complexity calculation using the Shannon-Wiener Index. Following, the list of the 10 sub categories.

NECESSARY

Taking care: to maintain or improve the condition of health (i.e. hospital, doctor, dentist, health centre)

Income: to receive a payment for a good or service (i.e. office spaces, or any other working activity)

Nutrition: to consume food with no other purpose (i.e. food that is ready to be eaten)

Mobility: horizontal physical displacement by a mean of transport (i.e. transportation nodes or stations, commuting, travelling)

Education: to learn by being taught (i.e. schools, kindergarten, university, people studying)

OPTIONAL

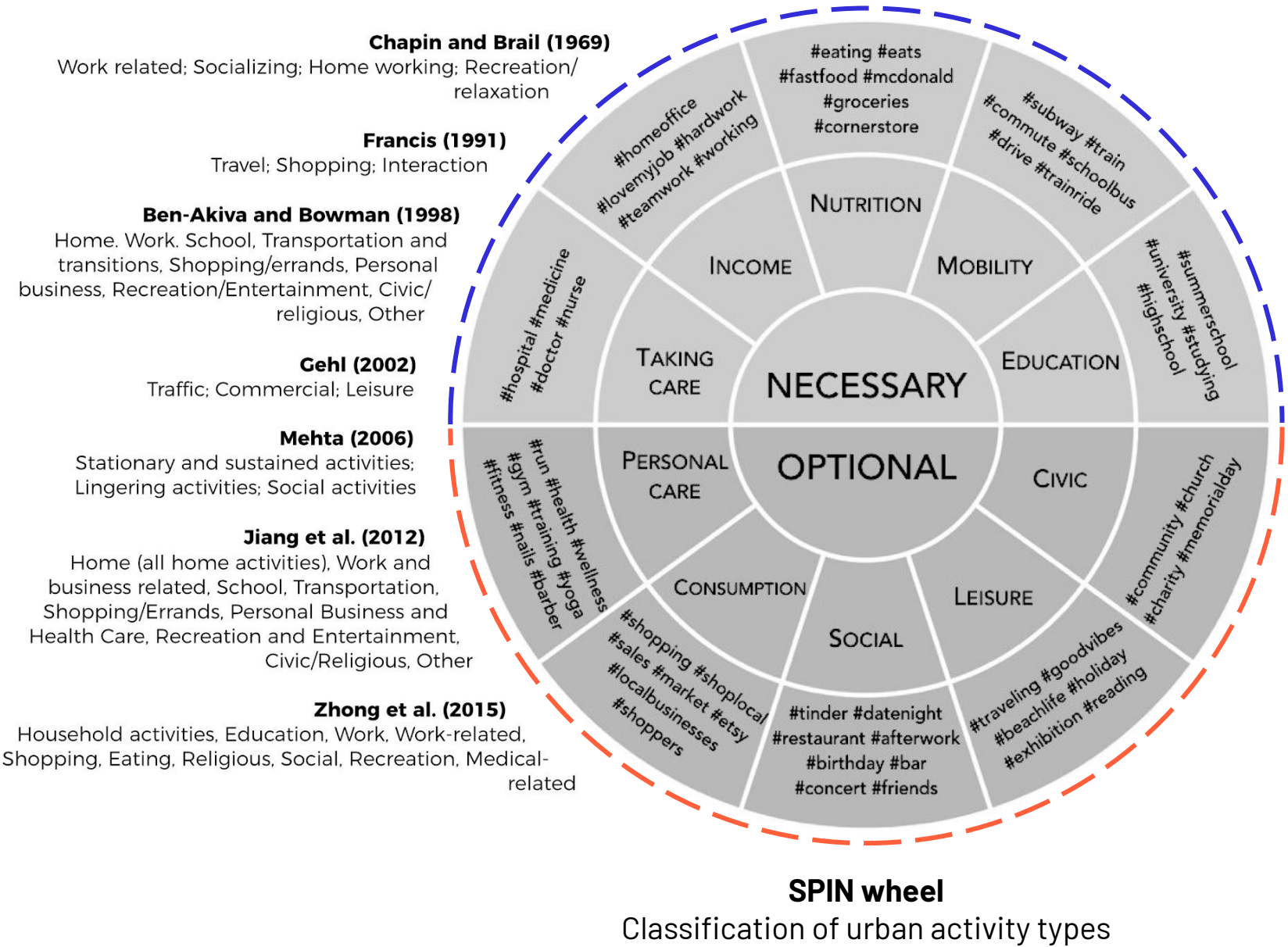
Civic: to pertain to citizenship (i.e. rallies, parades, public events and commemorations, volunteering, going to church, all activities that are part of the civic life of one community)

Leisure: to recreate by making use of the freedom from demands of work or duty (i.e. picnic, playing, reading, exhibition, sunbathing, walking the dog)

Social: to be in companionship with others (i.e. bar, nightclub, café, home party, dinner)

Consumption: to make use of a good or service (i.e. stores, boutiques, retail, supermarket)

Personal care: to maintain or improve the condition of comfort, wellbeing, fitness (i.e. sports, spa, nail care, make up)





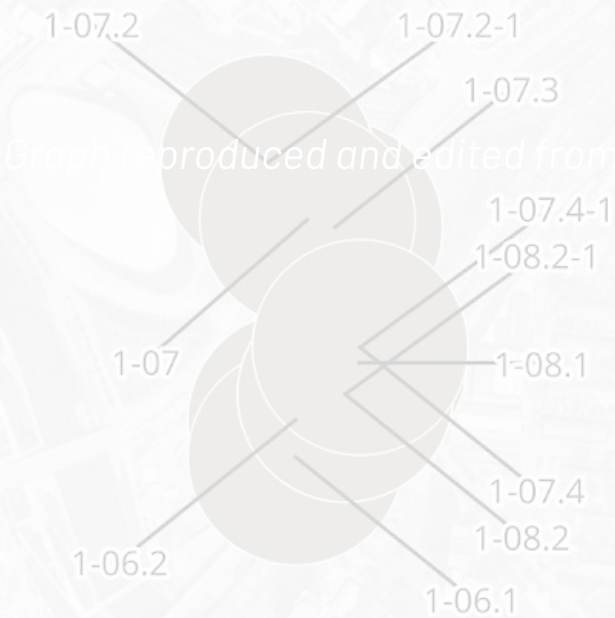
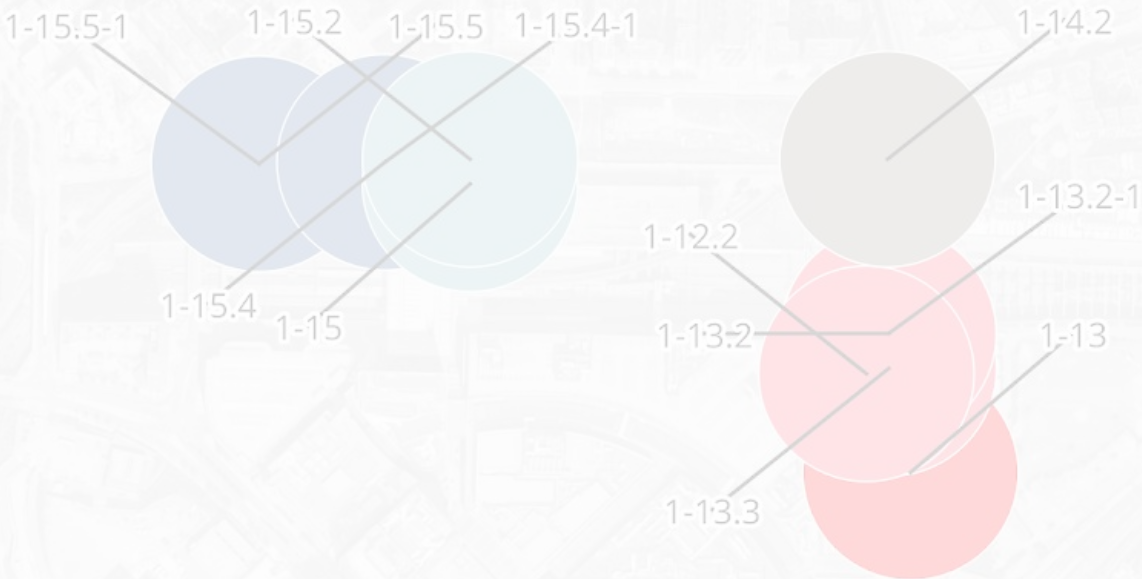


ANALYSIS OVERVIEW

Diversity (mix) of Amenities

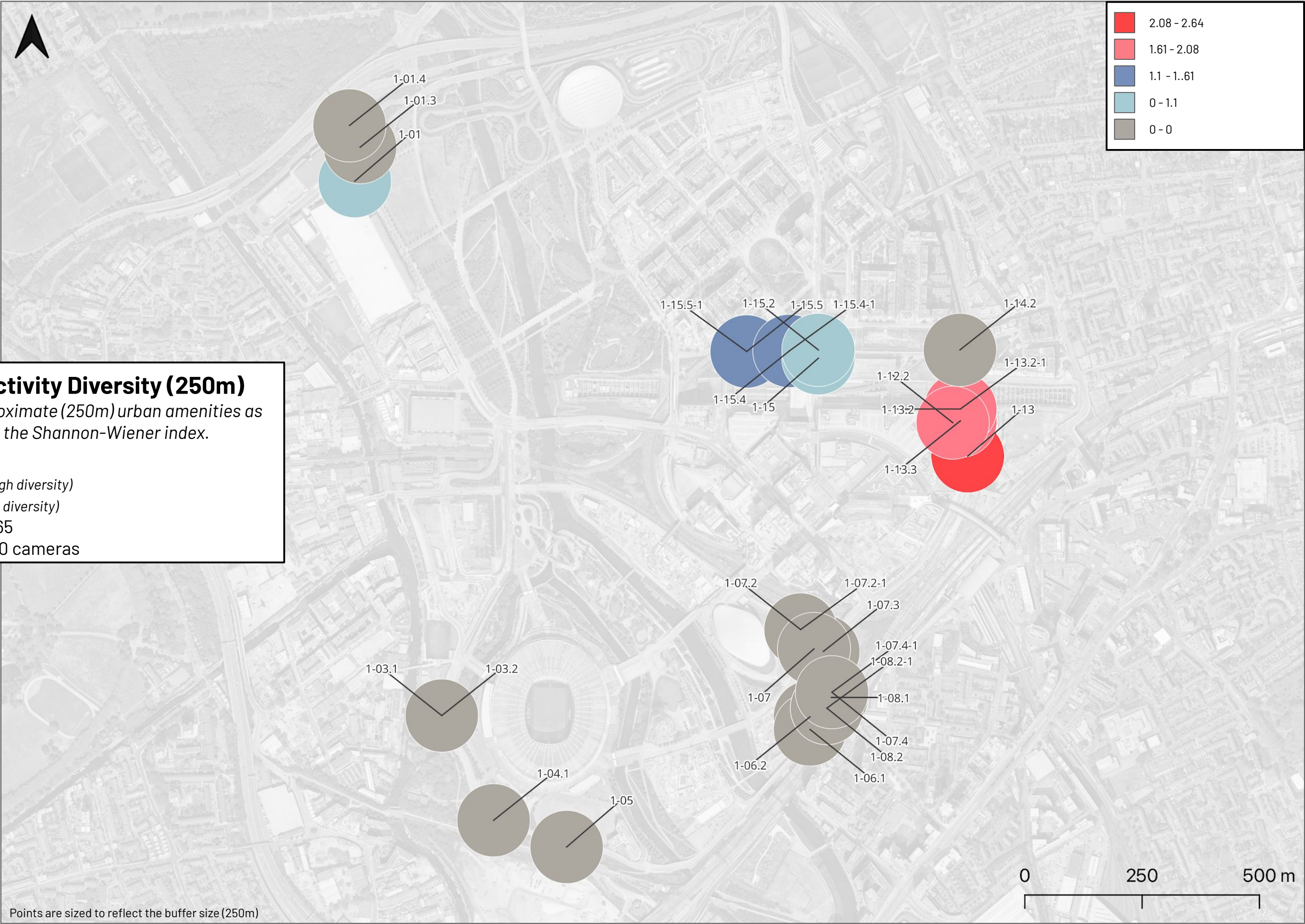
*The diversity of **optional and necessary amenities** available in a 250 meter radius.*

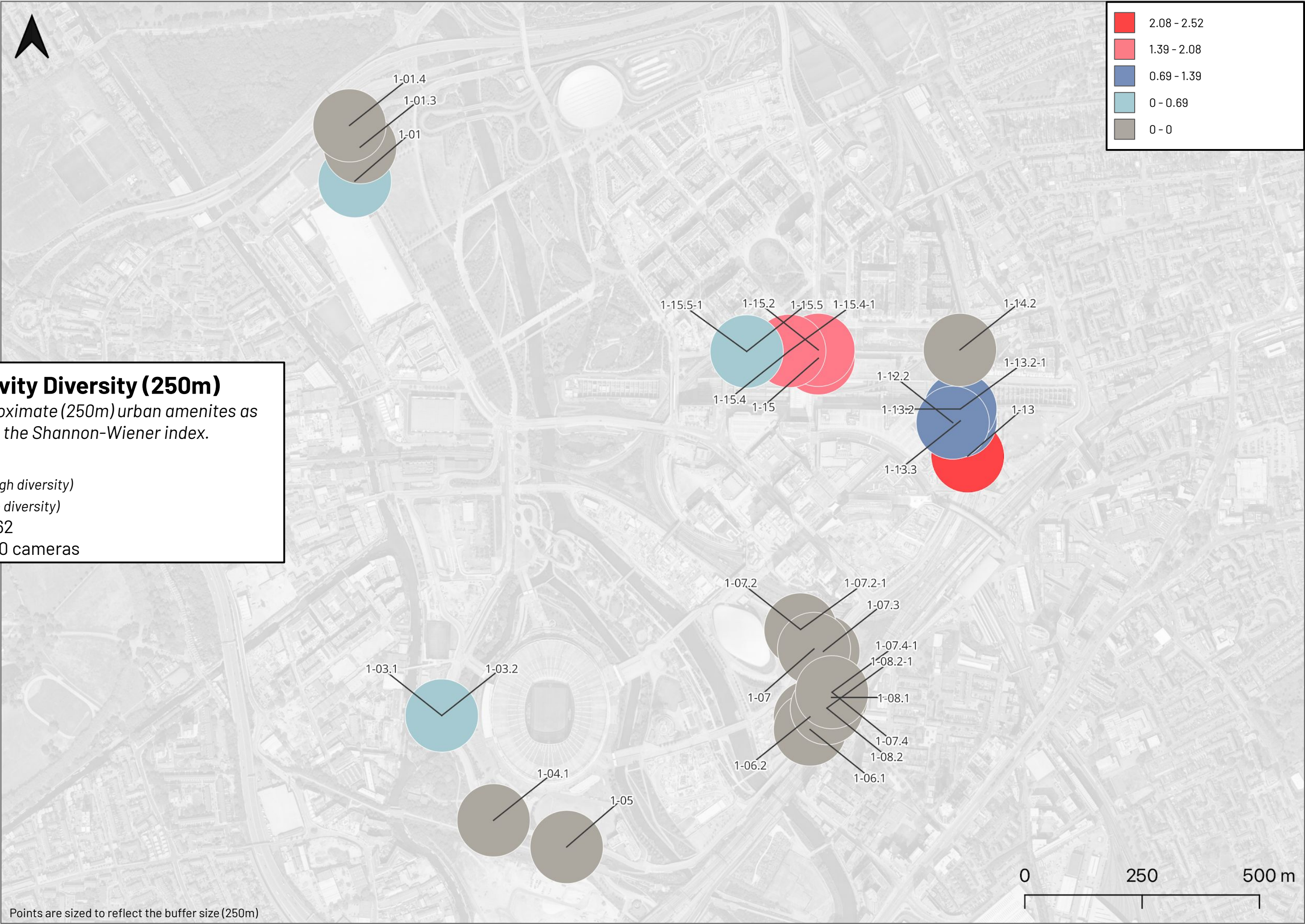
- Purpose:** This metric measures the diversity of urban amenities within a 250m radius from the camera.
- Input:** Quantitative observations of urban activities based on Foursquare
- Output:** Diversity of proximate (certain radius) urban activities as measured through the Shannon-Wiener index.



Graphic produced and edited from "Urbanism at a Turning Point. Modern. Postmodern. Now." by Lehtovuori, P. & Varna, S. (2017)







ANALYSIS OVERVIEW

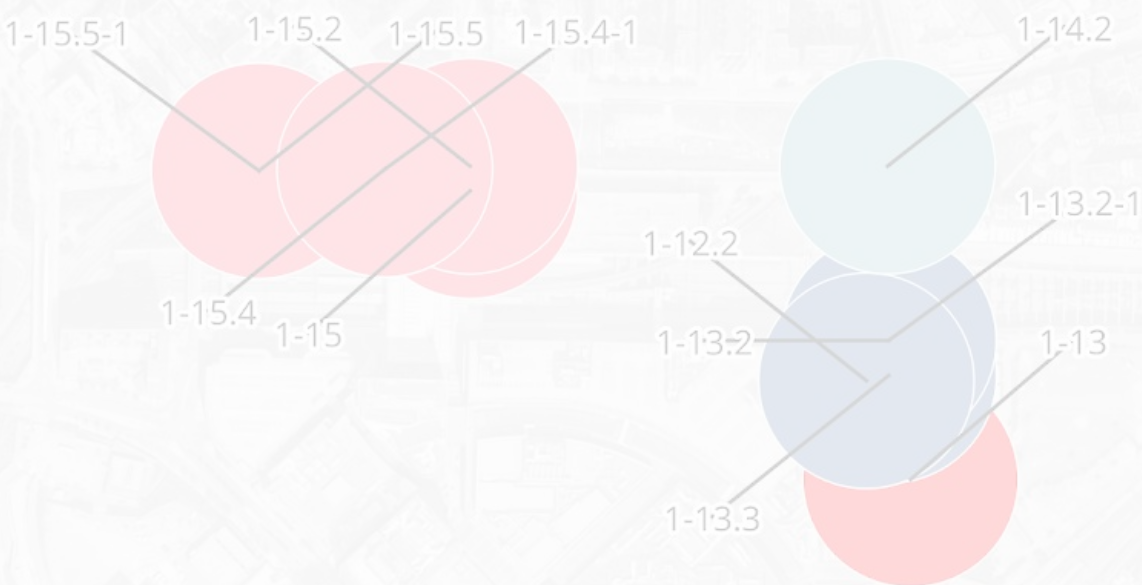
Popularity of Amenities

The popularity of the **optional and necessary amenities** available within a 250 meter radius.

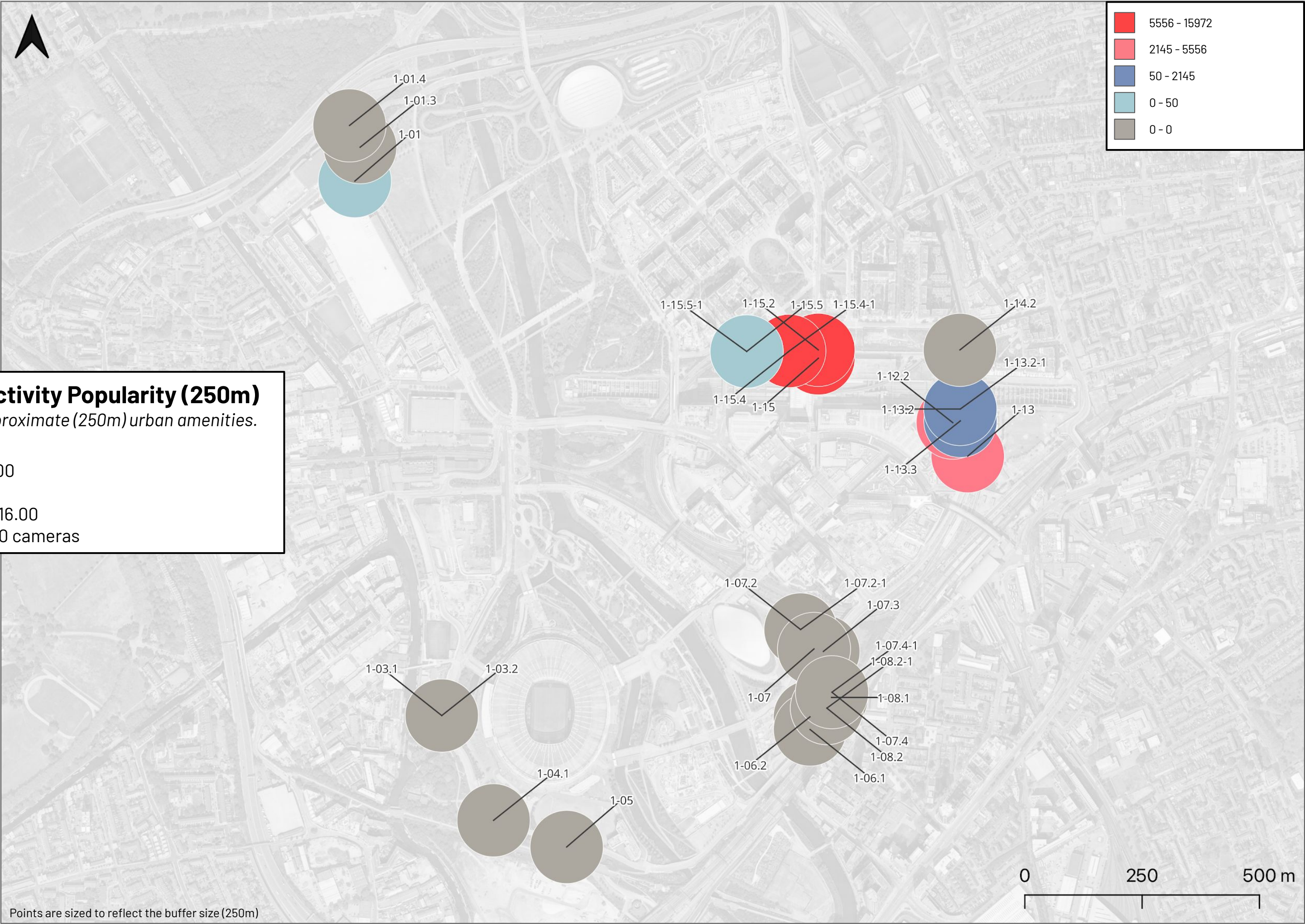
Purpose: This metric measures the popularity of urban amenities within a 250m radius from the camera.

Input: Quantitative observations of urban activities based on Foursquare

Output: Popularity of proximate (250m radius) urban activities.



Graphic produced and edited from "Urbanism at a Turning Point. Modern. Postmodern. Now." by Lehtovuori, P. & Varna, S. (2017)



Necessary Activity Popularity (250m)

The popularity of proximate (250m) urban amenities.

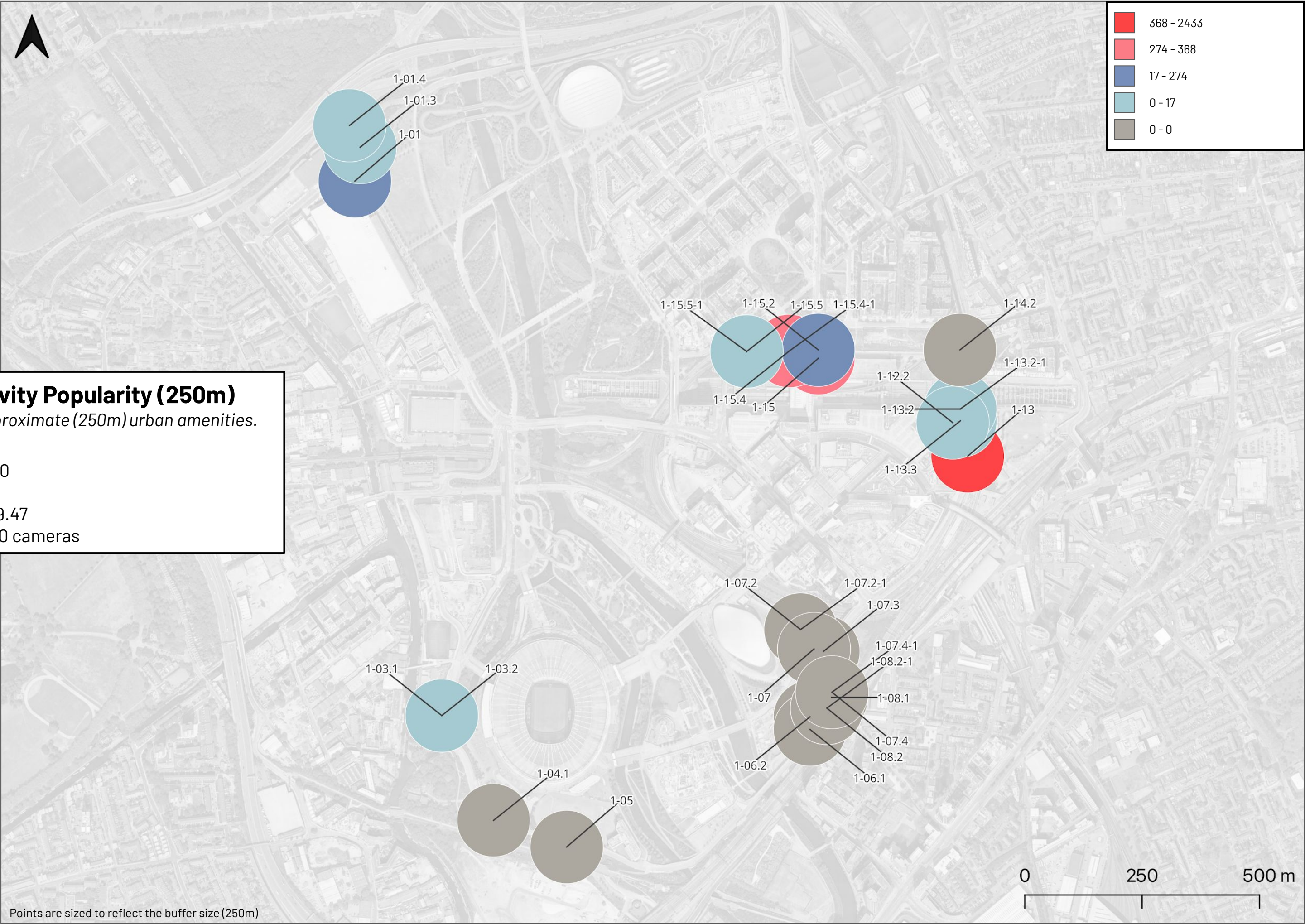
Max Value: 15972.00

Min Value: 0.00

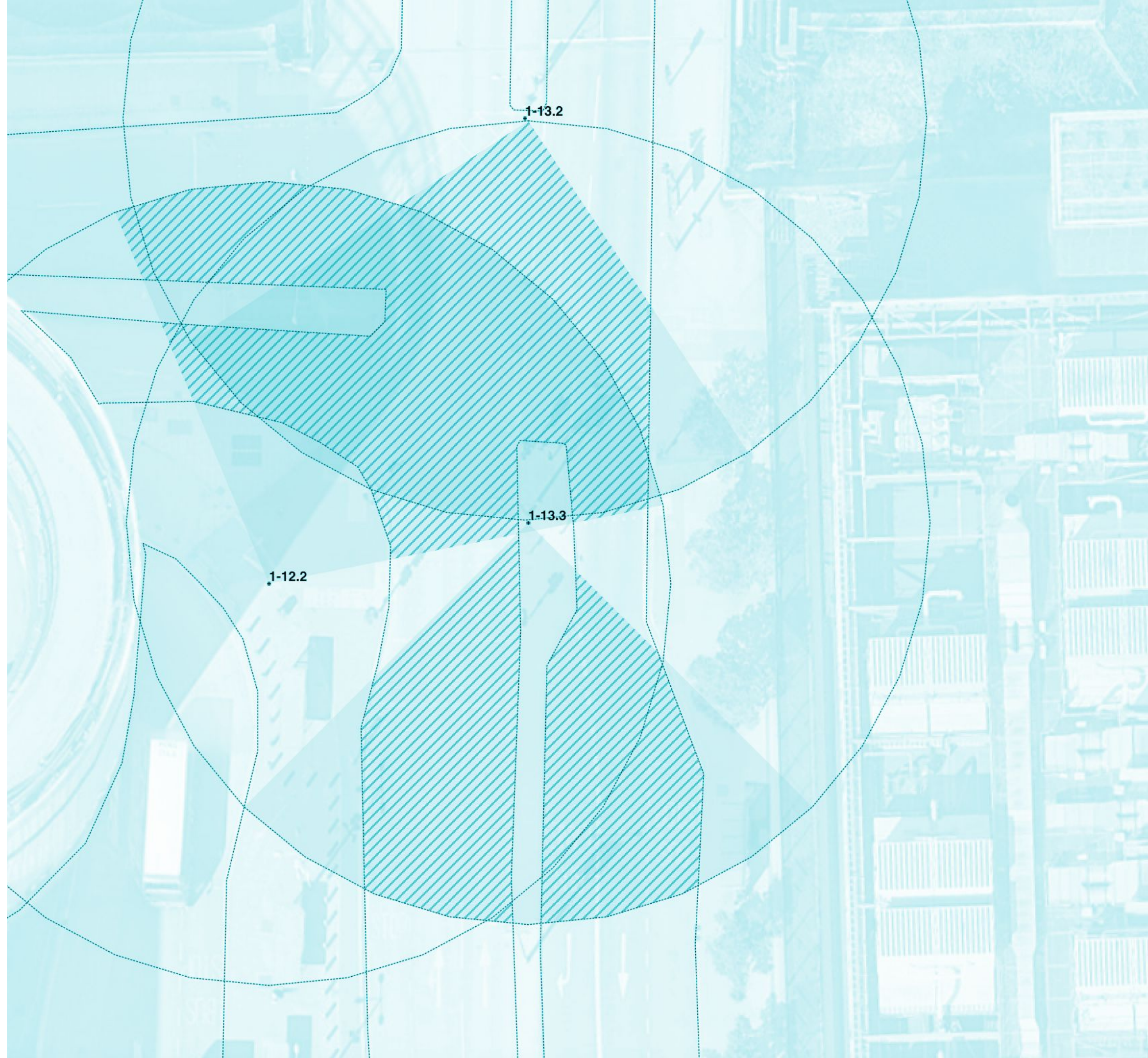
Average Value: 2616.00

Count: 30 of the 30 cameras

Points are sized to reflect the buffer size (250m)



4/4 SUGGESTIONS

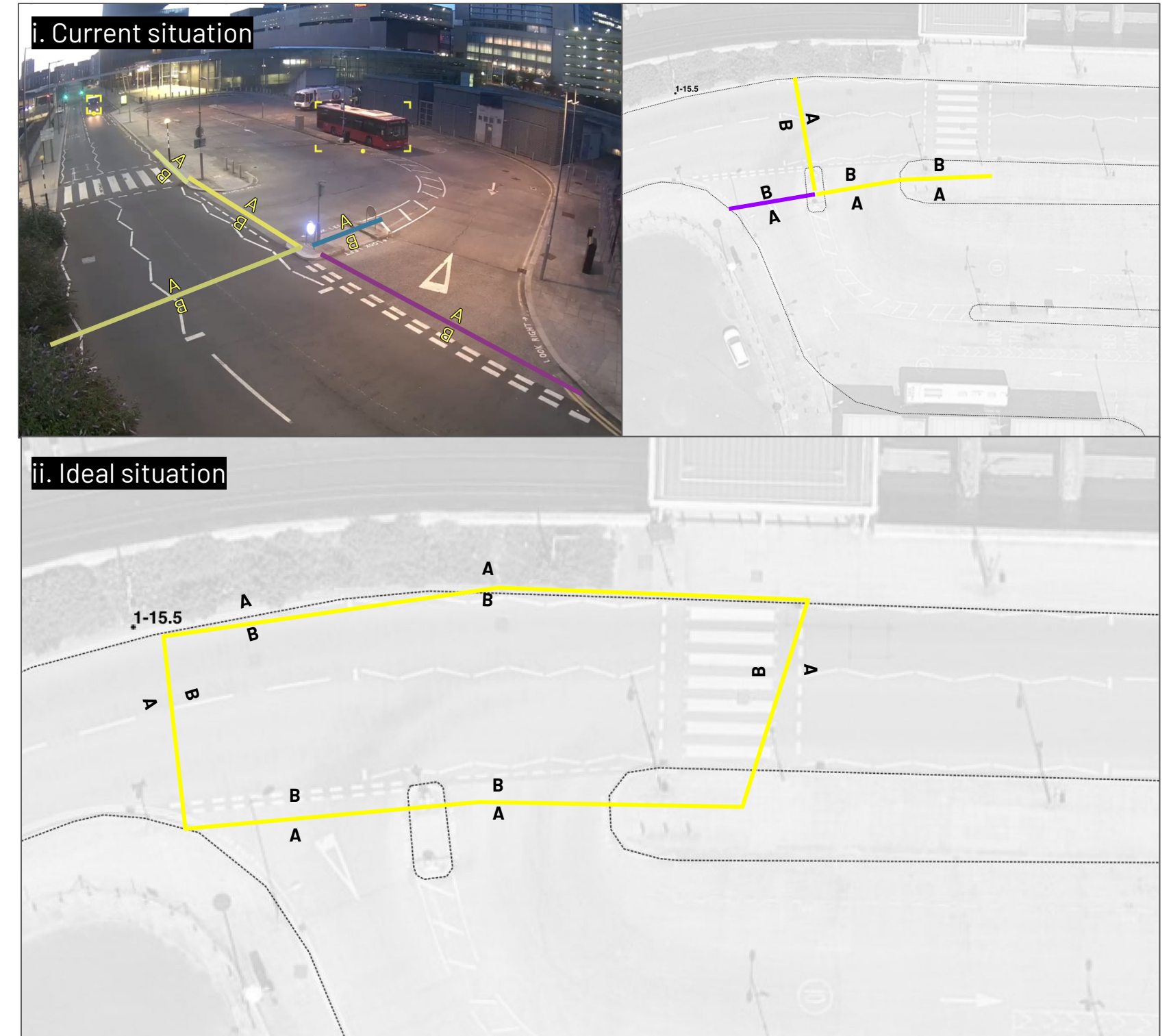


CROSSING BOUNDING BOXES

A key piece of information for mobility planners and urban designers is how packed a crossing is over time.

If it were possible to draw a polygon where each edge, automatically, functioned as a gate, with one key always pointing inwards, then it would be possible to treat these polygons / crossings as urban spaces on their own. Importantly, if it were possible to detect not just the presence of objects within these polygons but also their speed and length-of-stay, we could understand these crossings even more richly, developing metrics like modal permanence, as outlined in the preliminary evaluation.

Indeed, if this mode of data collection were possible, metrics could be developed “per crossing” instead of just “per camera.” Fyma would be capable of focusing on crossings and analysing them as complex urban spaces through dynamic and static mobility indexes.



HIERARCHICAL GATES – NUMBER OF LANES, DIRECTION, ILLEGALITY

It would be useful if gates could nest additional information. For example, for the purple gate, it would be useful if, within Fyma's system, it was possible to tag which direction – towards B, in this case – is not permitted, the hours for which that rule holds, and the objects permitted to be moving through the gate. Likewise, it would be useful if you could define 'sub-gates' in cases where a gate spans more than one lane, with it being possible to tag direction and rules for each 'sub-gate' / lane too.

Doing this would allow Fyma to understand the traffic intensity of individual lanes, instead of just the average traffic intensity for lanes in a camera. It would also allow Fyma to calculate additional metrics – the incidence of bicycles illegally riding in pedestrian lanes, for example.

