

APPENDICES

APPENDIX A: Walkability attribute table.

APPENDIX B: Neighborhood selection stage analyses maps.

APPENDIX C: Convex and Solid-Void attribute maps.

APPENDIX D: Building attribute maps.

APPENDIX E: Aggregated Space Syntax attribute maps.

APPENDIX F: Aggregated street view attribute maps.

APPENDIX G: Street view point attribute maps.

APPENDIX H: Activity attribute maps

APPENDIX A

Table A.1 : Walkability related characteristics and attributes.

Characteristic	Attribute	How is it measured traditionally?	Method proposed
Density		Number of residential units, number of non-dwelling units, residential floor area, total floor area, building footprint area or population is divided by unit area of analysis.	
	Building area density	Total building footprint area is divided by unit area or length of analysis.	Convex and Solid-Void models, based on building footprint area per unit length and area of street space.
	Floor area density	Total of building floor areas is divided by unit area or length of analysis.	Convex and Solid-Void models, based on building footprint areas and number of floors per unit length and area of street space.
	Density of amenities per unit area	Number of varying or specific types of amenities, amenities per network distance, travel time distance, or buffer area.	Google maps places and Convex and Solid-Void model units
Diversity		Number or floor area of various amenities, their proportions to residential unit numbers or total floor areas, number of shops, recreational and other amenities within unit area of study. Network, point distance or travel time distance to closest amenities. Measure also commonly referred as land-use or entropy measure.	

Characteristic	Attribute	How is it measured traditionally?	Method proposed
	Number of building or wall facades per unit length	Number of building facades per 100m have been used for measuring complexity (Ewing & Handy, 2009) and perceived safety of the built environment (Harvey et al., 2015)	Convex and Solid-Void models, based on number of building and urban limit faces per unit length of street space.
	Variation in building heights	Not a previously utilized measure of diversity	Convex and Solid-Void models, based on number of floors for each building
	Variation in building footprint areas surrounding a unit area	Not a previously utilized measure of diversity	Convex and Solid-Void models
	Variation in building floor areas surrounding a unit area	Not a previously utilized measure of diversity	Convex and Solid-Void models
	Variation in street widths	Not a previously utilized measure of diversity	Convex and Solid-Void models
	Variation in footprint shapes of unit street spaces.	Not a previously utilized measure of diversity	Convex and Solid-Void models, using squareness and compactness (see Table 4.2)
	Variation in elevation within a unit street space.	Not a previously utilized measure of diversity	Convex and Solid-Void models
	Variation in percentage of visible sky within a unit street space.	Not a previously utilized measure of diversity	Convex and Solid-Void models

Characteristic	Attribute	How is it measured traditionally?	Method proposed
Connectedness	Density of amenities per unit area	Number of varying or specific types of amenities, amenities within a network distance, travel time distance, or buffer area.	Google maps places and Convex and Solid-Void model units
	Diversity of land-use and amenities	Number of varying or specific types of amenities, amenities within a network distance, travel time distance, or buffer area.	Number of types of amenities per unit area (This measure was omitted in the method due to insufficient variation across neighborhoods.)
		Several different indicators are utilized to account for connectedness (connectivity) of street network in walkability studies (Ewing & Cervero, 2010). It is sometimes referred to with different terminology (Pikora et al., 2002).	
	Density of walkable paths per street space	Street density is a commonly used measure, including in wider scope studies (UN Habitat, 2013). Total segment length is divided by total area analyzed.	Convex and Solid-Void models, by total segment length divided by street space area
	Node count	The number of all street segments passed through in the routes from a street segment to all others in the network, measured using Space Syntax methods/software.	Space syntax measures aggregated within Convex Solid-Void units
	Connectivity (Space Syntax indicator)	Number of street segments immediately connected to a street segment, measured using Space Syntax methods/software	Space Syntax software results aggregated within Convex Solid-Void units

Characteristic	Attribute	How is it measured traditionally?	Method proposed
(Human) Scale	Angular Connectivity	Cumulative angle of all segments connecting to a street segment, measured using Space Syntax methods/software	Space Syntax software results aggregated within Convex Solid-Void units
	Total depth	The total of all topological depths from any street segment to all other street segments, measured using Space Syntax methods/software	Space Syntax software results aggregated within Convex Solid-Void units
	Choice	How likely a street segment is to be used within all the shortest routes connecting all street segments to all street segments, within the given radius, measured using Space Syntax methods/software	Space Syntax software results aggregated within Convex Solid-Void units
	Integration	The normalized distance from any street segment to all other street segments in the network; how close each segment is to all the other segments, measured using Space Syntax methods/software.	Space syntax software results aggregated within Convex Solid-Void units
		Human scale is used as a walkability measure to account for the sizes of street features and weather elements like street furniture that relate to the body's scale exist (Ewing & Handy, 2009)	
	Street space footprint area	Not a common measure of human scale	Convex and Solid-Void models
	Street segment length	Commonly used as part of Space Syntax measures, corresponds to block length also used in walkability studies.	Convex and Solid-Void models and street network
	Average street space width throughout the street segment	Although not commonly used for human scale measures, utilized in walkability studies.	Convex and Solid-Void models

Characteristic	Attribute	How is it measured traditionally?	Method proposed
Complexity	Average height of buildings and walls throughout a street segment	Building heights are used in walkability measures, as part of human scale measures (Ewing & Handy, 2009)	Convex and Solid-Void models
	Number of building and wall facades per unit length	Not a common measure of human scale	Convex and Solid-Void models, based on number of building and urban limit faces per unit length of street space.
	Average width of building and wall façades surrounding a street segment	Not a common measure of human scale	Convex and Solid-Void models
	Average number of floors of buildings surrounding a street segment	Not a common measure of human scale	Convex and Solid-Void models
	Average footprint area of buildings surrounding a street segment	Not a common measure of human scale	Convex and Solid-Void models
	Average floor area of buildings surrounding a street segment	Not a common measure of human scale	Convex and Solid-Void models
	Average number of street sides where street furniture was identified throughout a street segment length	Number of instances where street furniture (Ewing & Handy, 2009; Park, Choi, & Lee, 2017) or outdoor dining (Ewing & Handy, 2009) was identified per street length have been used as a measure. On-site surveys were utilized to collect data.	Google Street View images analyzed with Clarifai prediction API, general model
Complexity		Complexity is used as a walkability measure concerning building and other streetscape elements that improve how interesting and attractive a street is, accounting for frequency of building facades, variations in color and shape as well as streetscape elements. (Ewing & Handy, 2009)	

Characteristic	Attribute	How is it measured traditionally?	Method proposed
	Number of building or wall facades per unit length	Number of building facades per 100m have been used for measuring complexity (Ewing & Handy, 2009) and perceived safety of the built environment (Harvey et al., 2015)	Convex and Solid-Void models, based on number of building and urban limit faces per unit length of street space.
	Building density	Total number of buildings is divided by the length of street unit area of analysis.	Convex and Solid-Void models, based on number of neighboring buildings per unit length of street space.
	Density of walkable paths per street space	Street density is a commonly used measure, including in wider scope studies (UN Habitat, 2013). Total segment length is divided by total area analyzed.	Convex and Solid-Void models, by total segment length divided by street space area
	Average façade areas of buildings and walls surrounding a street segment	Not a common measure of human scale	Convex and Solid-Void models
	Average width of building and wall façades surrounding a street segment	Not a common measure of human scale	Convex and Solid-Void models
	Average number of street sides where greenery was identified throughout a street segment length	Number of instances where landscape elements were identified per street length was used as a measure of imageability (Ewing & Handy, 2009). Trees and their canopy sizes are accounted for as positive contributors to walkability in many studies (Harvey et al., 2015; Pikora et al., 2002) On-site surveys were utilized to collect data.	Google Street View images analyzed with Clarifai prediction API, general model
	Average number of street sides where street furniture was identified throughout a street segment length	Number of instances where street furniture (Ewing & Handy, 2009; Park et al., 2017) or outdoor dining (Ewing & Handy, 2009) was identified per street length have been used as a measure. On-site surveys were utilized to collect data.	Google Street View images analyzed with Clarifai prediction API, general model

Characteristic	Attribute	How is it measured traditionally?	Method proposed
Enclosure	Average number of street sides where commercial activity was identified throughout a street segment length	Not a common measure of human scale	Google Street View images analyzed with Clarifai prediction API, general model
	Average number of street sides where motor transit vehicles were identified throughout a street segment length, as a negative contributor.	Not a common measure of human scale	Google Street View images analyzed with Clarifai prediction API, general model
	Number of amenities per street segment length	Number of instances where buildings with identifiers and active uses were identified is used as part of imageability and transparency measures respectively (Ewing & Handy, 2009). On-site surveys were utilized to collect data.	Google Maps API
	Proportion of average building, wall or other urban limit height to average street width.	Harvey et al. (2015) as well as several other studies utilize this measure as part of enclosure measures for walkability.	Convex and Solid-Void models
	Percentage of visible sky	This indicator have been used as part of enclosure measures. (Ewing & Clemente, 2013; Ewing & Handy, 2009) On-site surveys were utilized to collect data.	Convex and Solid-Void models
	Average of height to width ratio of building and wall facades surrounding a street segment space.	Not a common measure in walkability studies.	Convex and Solid-Void models
	Proportion of total façade widths of buildings and walls to perimeter of unit street space.	Proportion of street wall have been used as part of enclosure measures (Ewing & Handy, 2009). On-site surveys were utilized to collect data.	Convex and Solid-Void models

Characteristic	Attribute	How is it measured traditionally?	Method proposed
Shape	Footprint shape of a unit street space, distinguishing between wider spaces such as plazas and narrower spaces such as streets and passageways. Also, the level of articulation of facades constituting the street boundaries are identified.	Not a common measure in walkability studies.	
	Compactness of unit street space: the ratio between perimeter of the street space unit and perimeter of a circle of the same area	Not a common measure in walkability studies.	Convex and Solid-Void models.
	Squareness of unit street space: the ratio between area of the unit street space and area of its smallest bounding square	Not a common measure in walkability studies.	Convex and Solid-Void models.
	Perimeter of street space divided by the footprint area of it.	Not a common measure in walkability studies.	Convex and Solid-Void models.
Inclination	Average slope of all walkable paths within a street segment space	Used by Özbil et al. (2015) as part of walkability analysis and Vale et al. (2016) refer to studies that take into account slope for walkability and bikeability.	Convex and Solid-Void models.
	Maximum change in elevation throughout the street segment space, divided by street segment length. Differs from slope accounting for the whole footprint of street space rather than walkable paths. May indicate view/scenery.	Not a common measure in walkability studies.	Convex and Solid-Void models.

Characteristic	Attribute	How is it measured traditionally?	Method proposed
Permeability/ Transparency		Based on the “Eyes on the Street” theory of Jacobs (1963), and the idea that more entrances mean more street activity, this indicator is sometimes used in walkability studies.	
	Average number of street sides where doors or windows were identified throughout a street segment length	Number of windows have been used as part of transparency measure (Ewing & Handy, 2009), building entrances were linked to street liveliness by Beirão & Koltsova (2015). On-site surveys are commonly utilized to collect data.	Google Street View images analyzed with Clarifai prediction API, general model
Infrastructure quality (and Maintenance)		Several indicators are utilized in walkability studies that are referred to or can be referred to as infrastructure quality. Sidewalks, street furniture, transit stops, lighting, traffic calming measures, street trees are some of the elements accounting for this indicator.	
	Sidewalks: Average number of street sides where a sidewalk was identified throughout a street segment length	Existence of sidewalks and sidewalk quality have been utilized as a measure in several walkability studies. Data is commonly collected on-site but many attempts to automate the process are underway (Frackelton et al., 2013).	Google Street View images analyzed with Clarifai prediction API, general model
	Green: Average number of street sides where trees, landscape, a park or environment were identified throughout a street segment length	Visibility of landscape elements have been utilized in studies (Ewing & Handy, 2009) as well as number (Neckerman et al., 2009), canopy size (Harvey et al., 2015) and shading capacities of trees. Data was gathered on-site or through already available census-tract data sets.	Google Street View images analyzed with Clarifai prediction API, general model
	Commerce: Average number of street sides where shopping, commerce or businesses were identified throughout a street segment length	Numbers and square meters of commercial amenities have been utilized in walkability measures, commonly as part of land use mix or “entropy” indicators based on proportions with square meters of residential and other uses.	Google Street View images analyzed with Clarifai prediction API, general model

Characteristic	Attribute	How is it measured traditionally?	Method proposed
	Street Furniture: Average number of street sides where chairs, benches or other furniture were identified throughout a street segment length	Number of instances where street furniture (Ewing & Handy, 2009; Park et al., 2017) or outdoor dining (Ewing & Handy, 2009) was identified per street length have been used as a measure. On-site surveys were utilized to collect data.	Google Street View images analyzed with Clarifai prediction API, general model
	Motor Transit: Average number of street sides where cars, vehicles or traffic were identified throughout a street segment length	Traffic volume and noise as well as safety from traffic is used by studies as a negative indicator for walkability (Ewing & Cervero, 2001; Vale et al., 2016).	Google Street View images analyzed with Clarifai prediction API, general model
	Negative: Average number of street sides where abandonment, demolition or calamity were identified throughout a street segment length	Abandoned buildings (Blečić, Cecchini, Congiu, Fancello, & Trunfio, 2015; S. Lee & Talen, 2014) or inversely the buildings in active use (Ewing & Handy, 2009), as well as other street disorders (Kelly, Schootman, Baker, Barnidge, & Lemes, 2007) are accounted for in Walkability measures. Data was collected by on-site audits or manually assessing Google Street View images.	Google Street View images analyzed with Clarifai prediction API, general model

APPENDIX B



Figure B.1 : Istanbul neighborhood and case study limits.

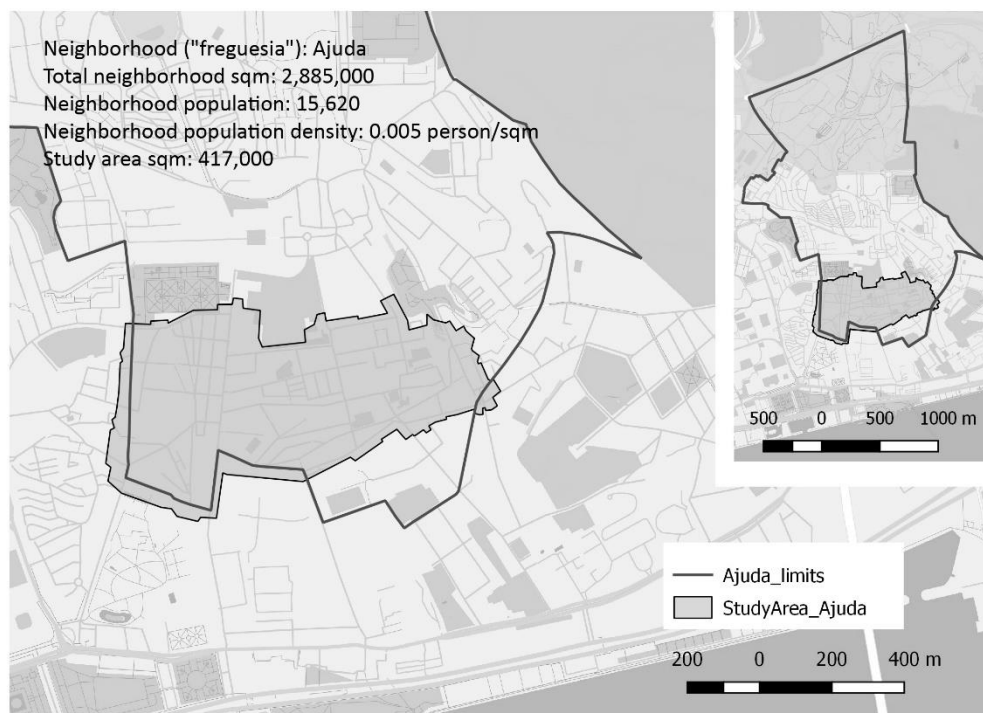
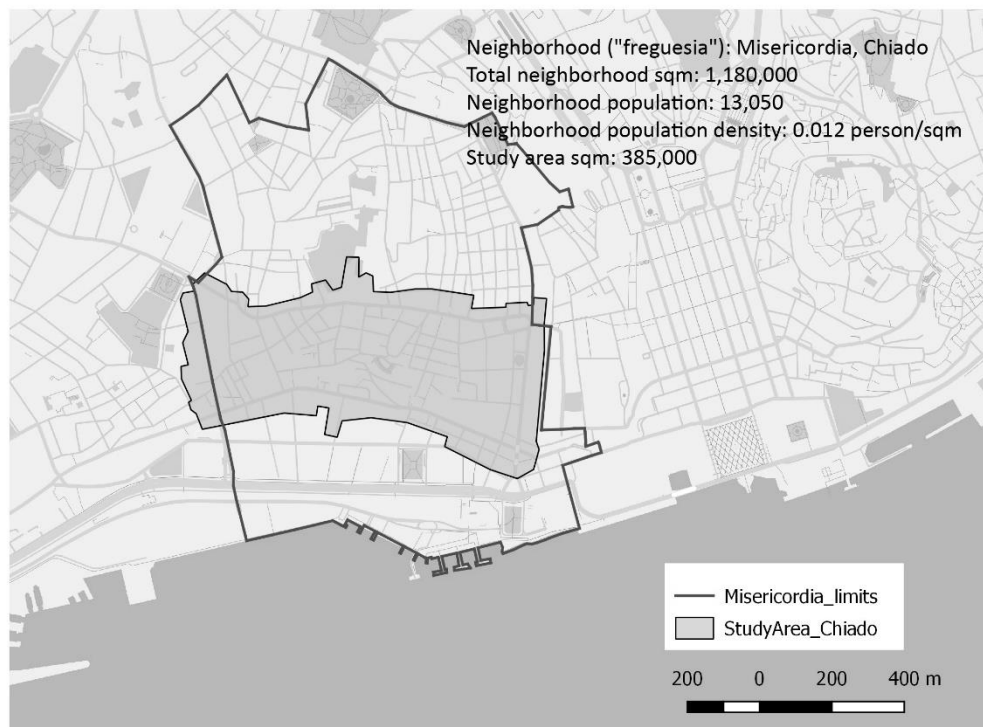


Figure B.2 : Lisbon neighborhood and case study limits.

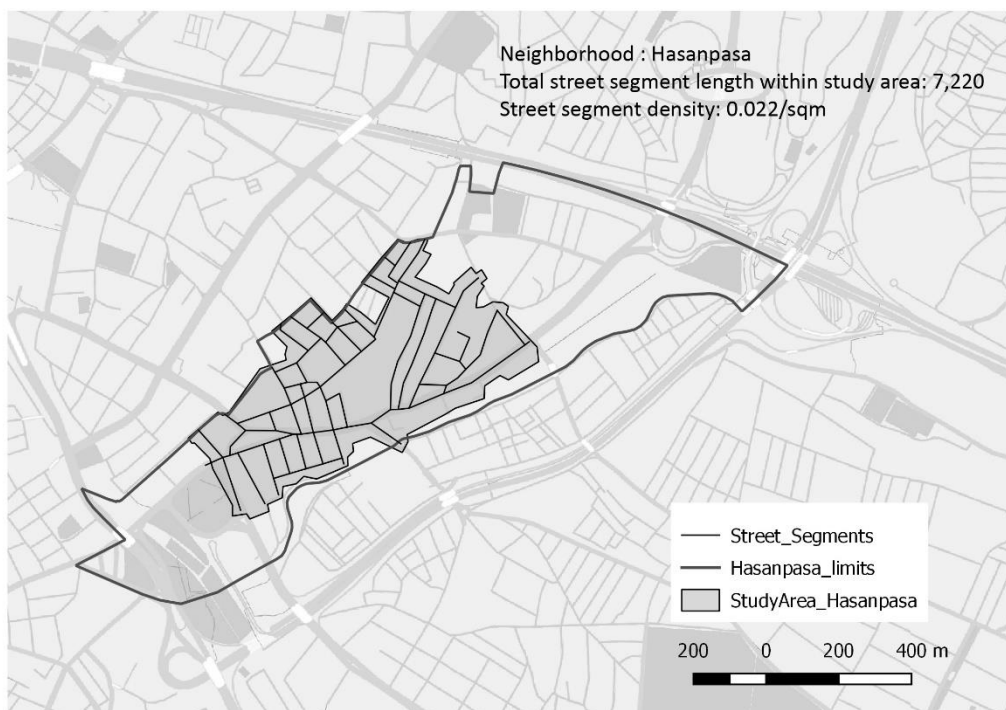
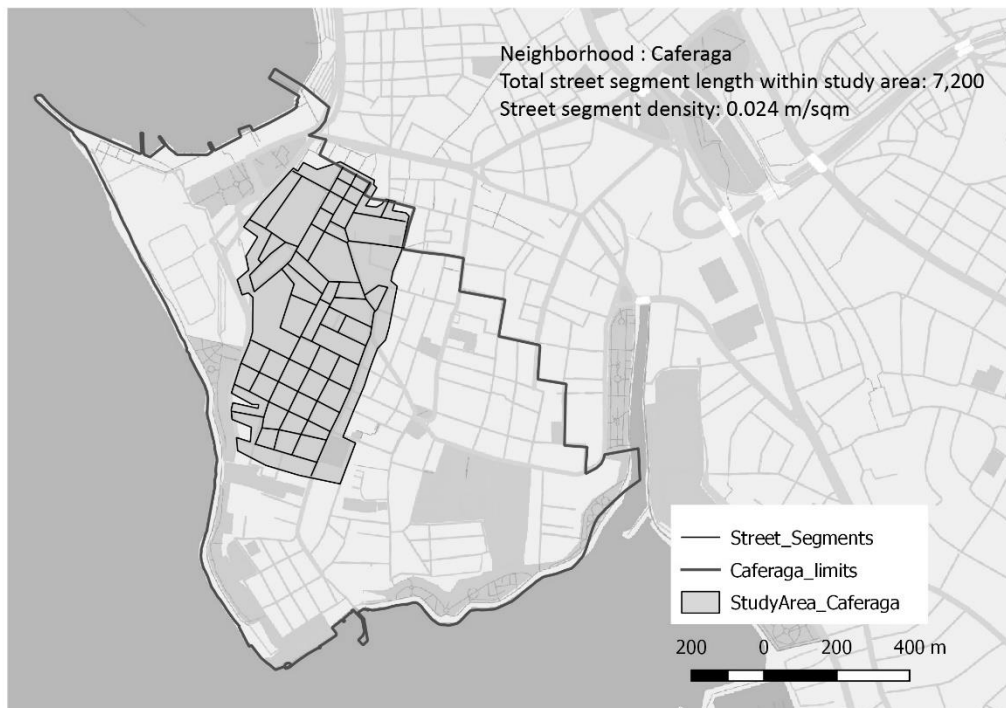


Figure B.3 : Istanbul street segments.

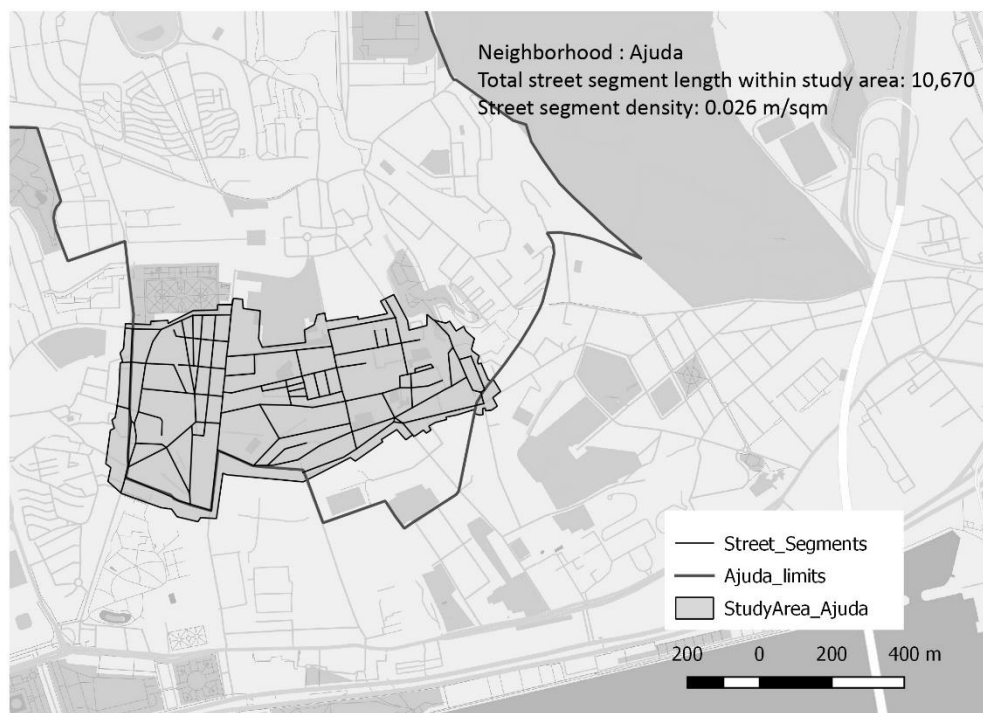
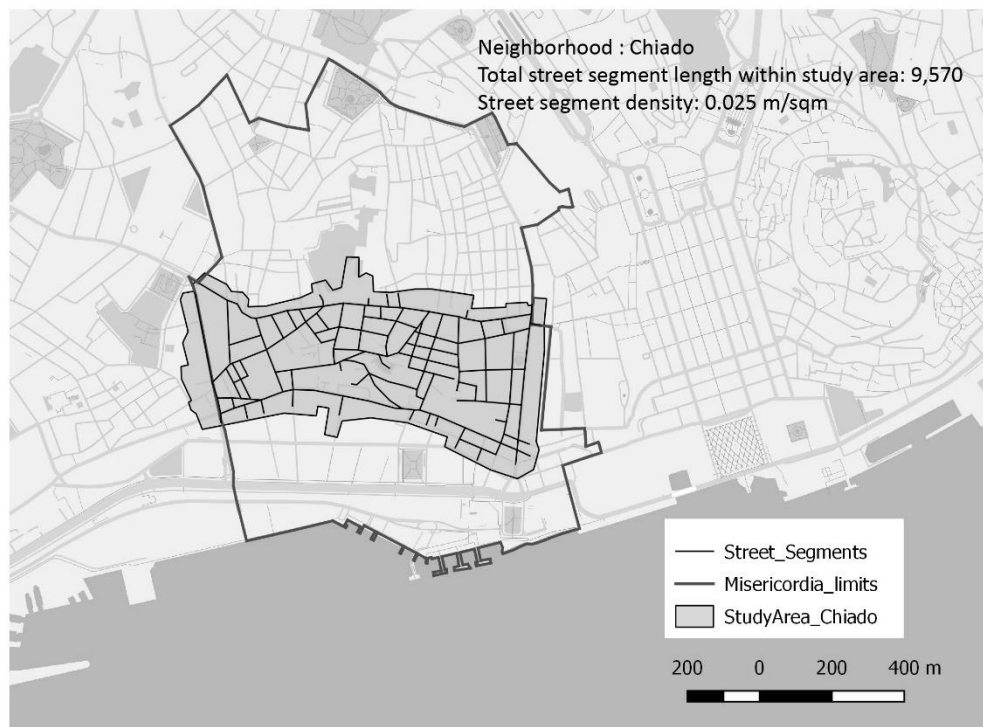


Figure B.4 : Lisbon street segments.

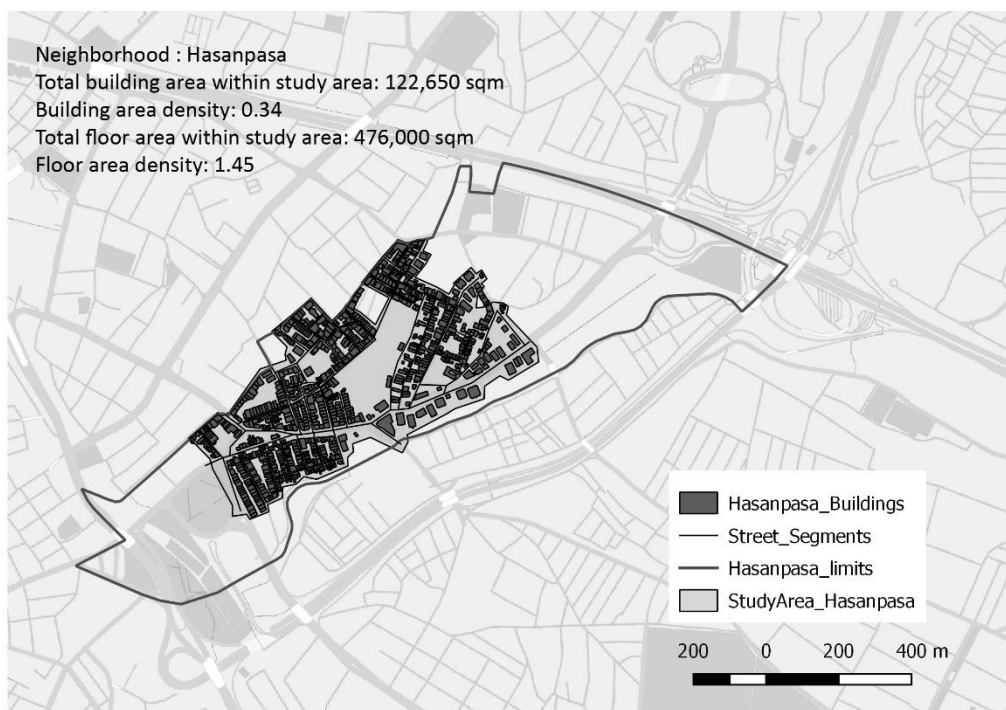
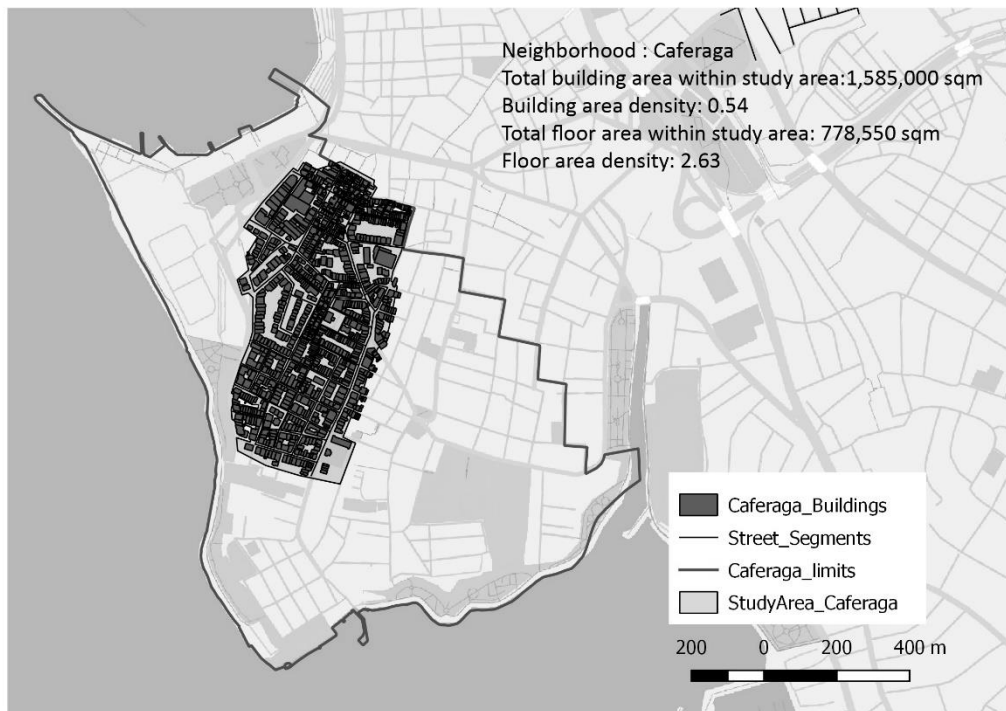


Figure B.5 : Istanbul buildings.

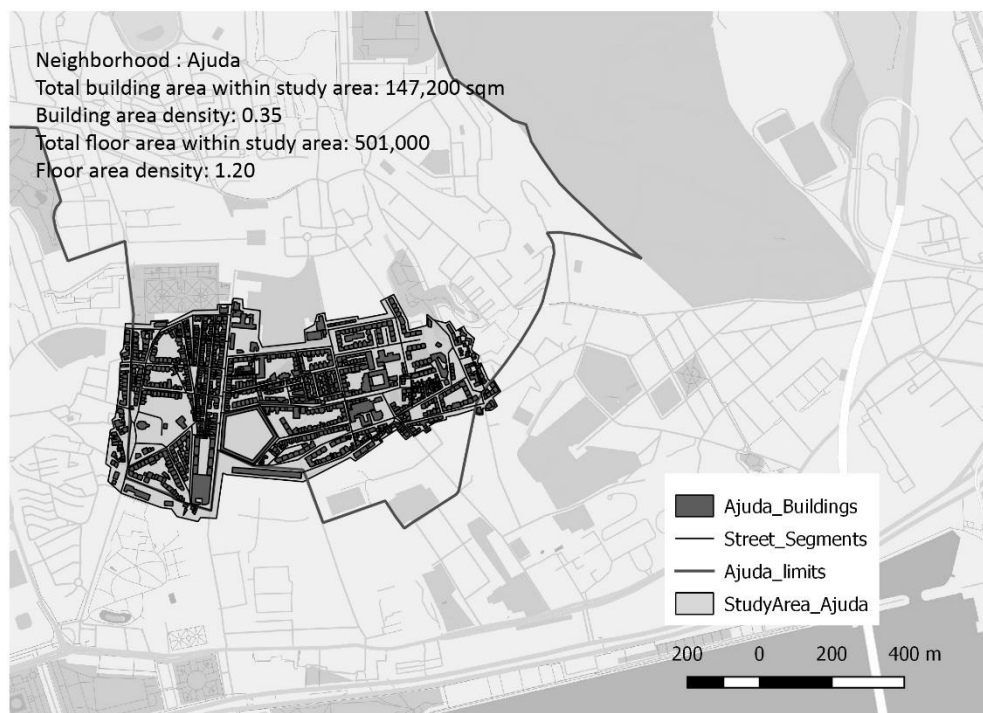
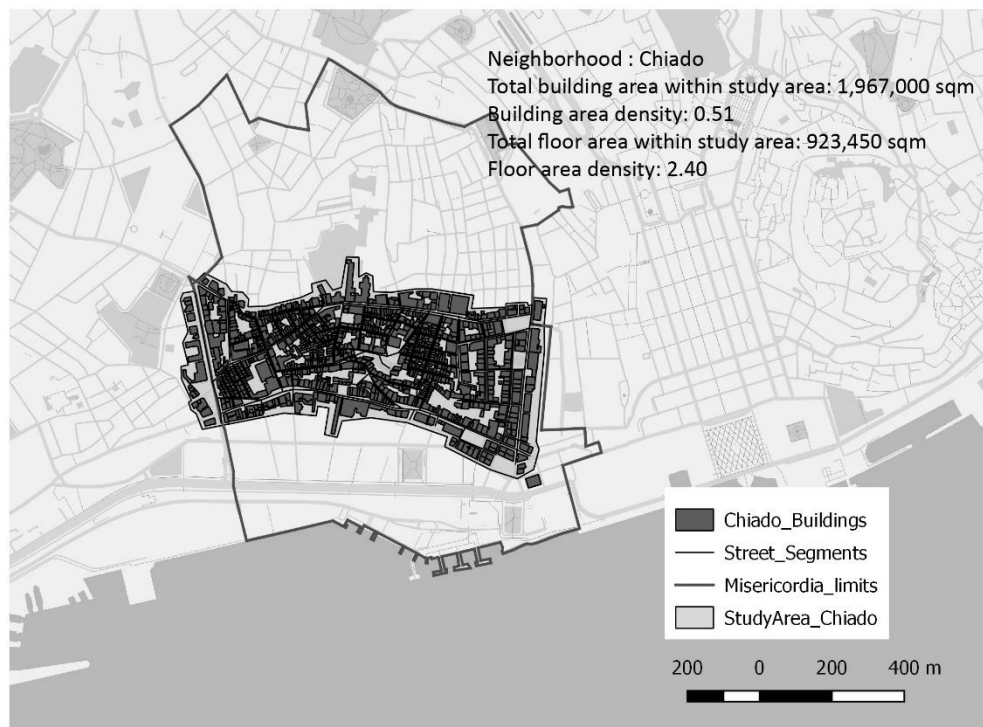
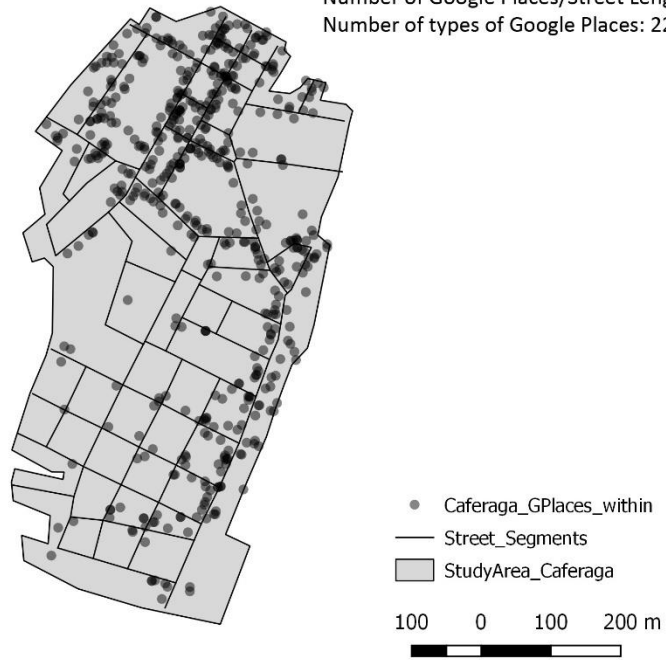


Figure B.6 : Lisbon buildings.

Neighborhood: Caferaga
 Total number of Google Places : 539
 Number of Google Places/Street Length: 0.075
 Number of types of Google Places: 22



Neighborhood: Hasanpasa
 Total number of Google Places : 277
 Number of Google Places/Street Length: 0.038
 Number of types of Google Places: 21

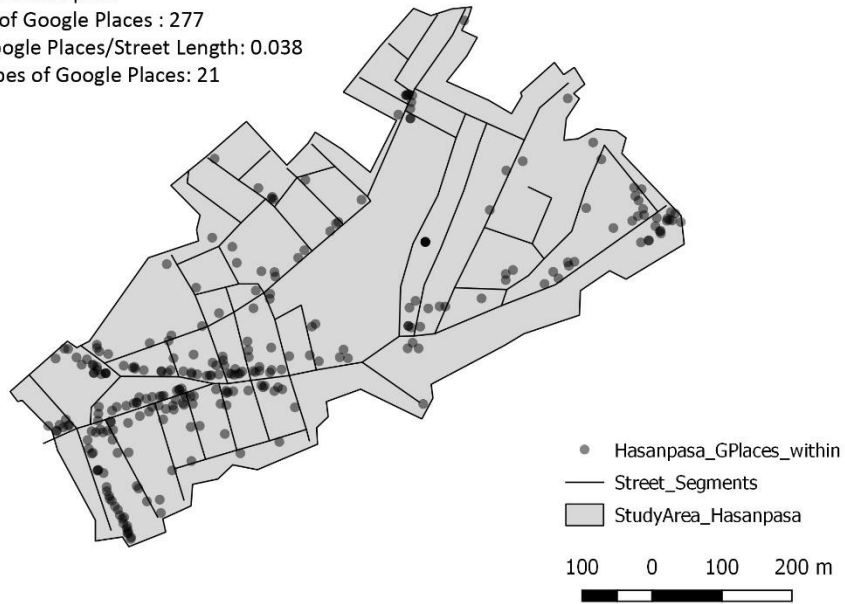


Figure B.7 : Istanbul Google Place locations.

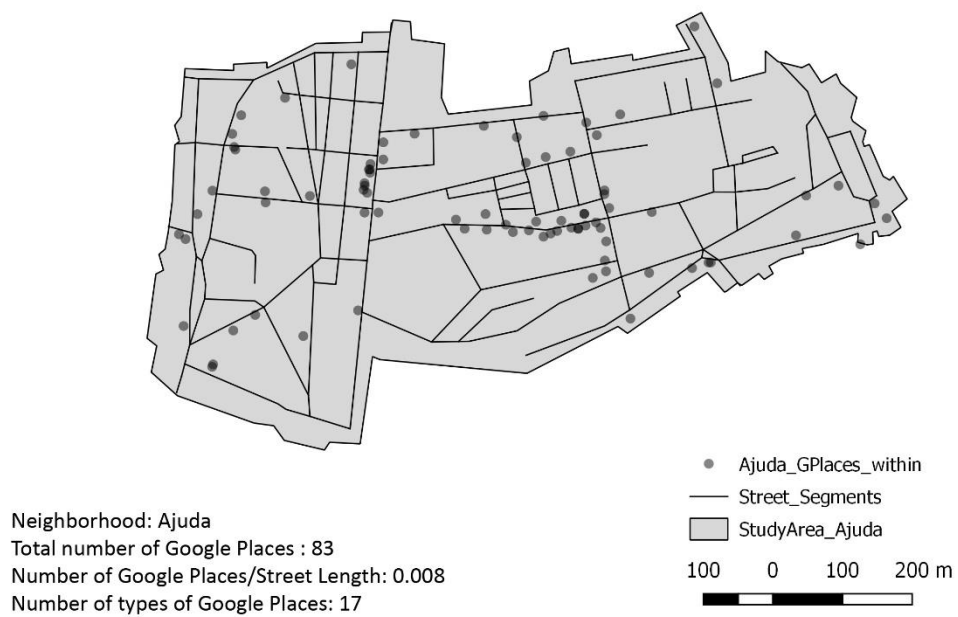
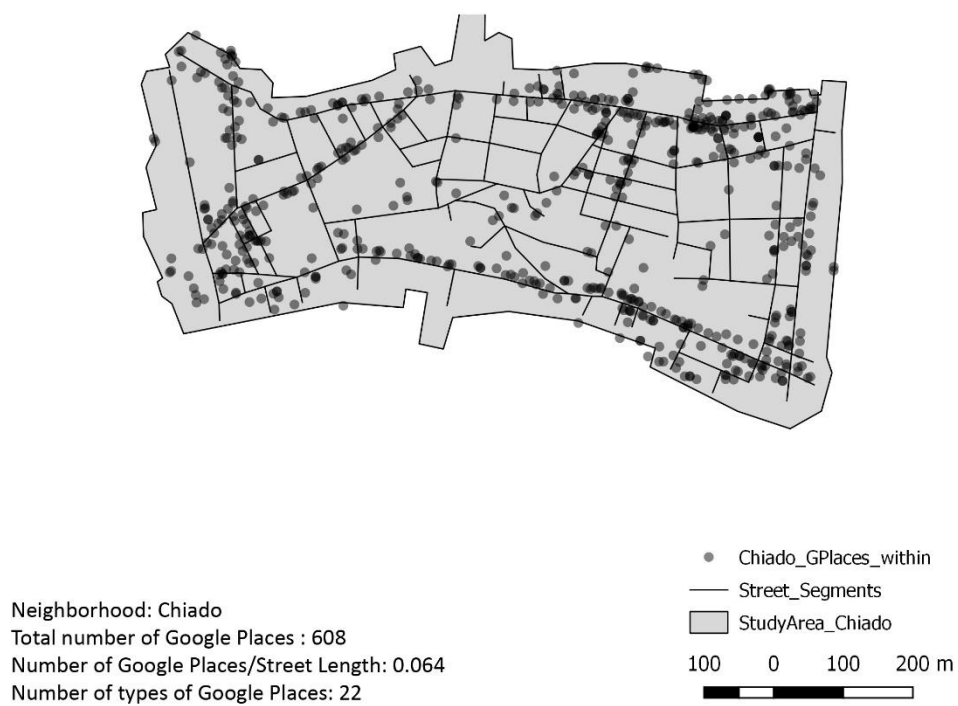
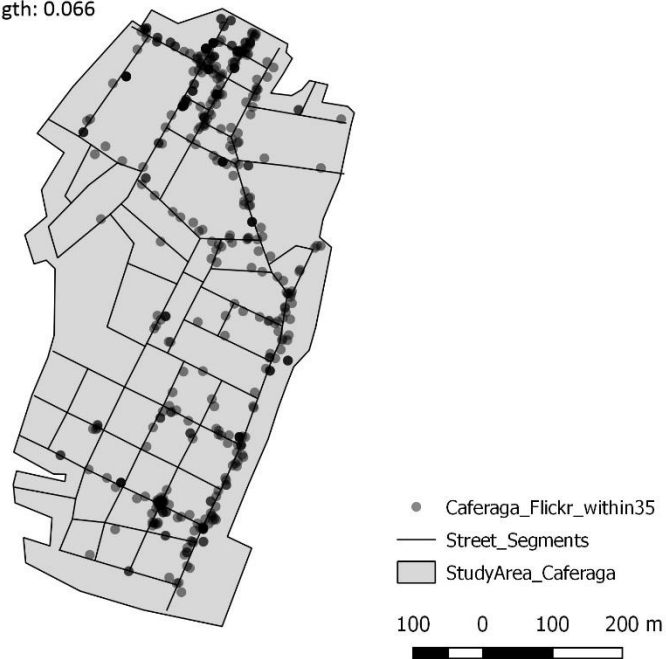


Figure B.8 : Lisbon Google Place locations.

Neighborhood: Caferaga

Total number of Flickr posts within 3.5 m of streets : 477

Number of Flickr posts/street length: 0.066



Neighborhood: Hasanpasa

Total number of Flickr posts within 3.5 m of streets : 28

Number of Flickr posts/street length: 0.004

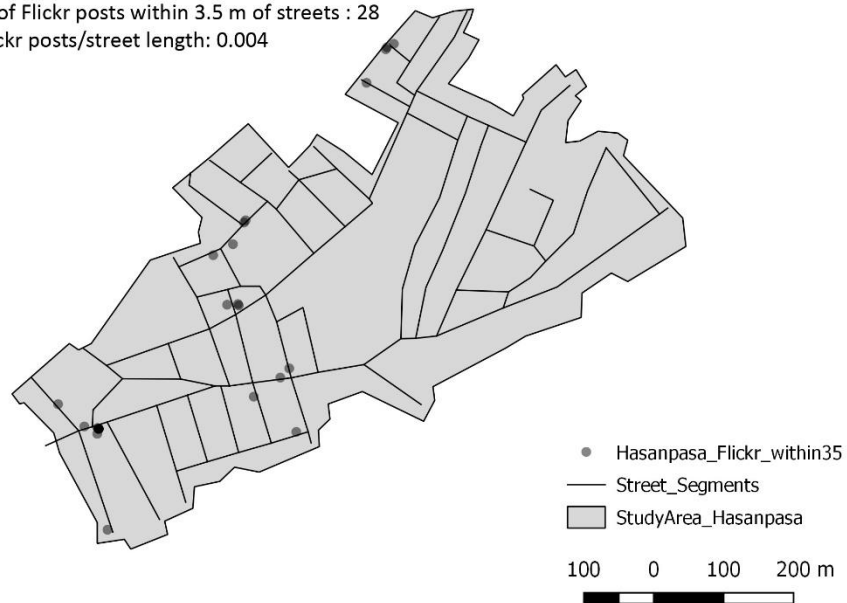


Figure B.9 : Istanbul Flickr posts.

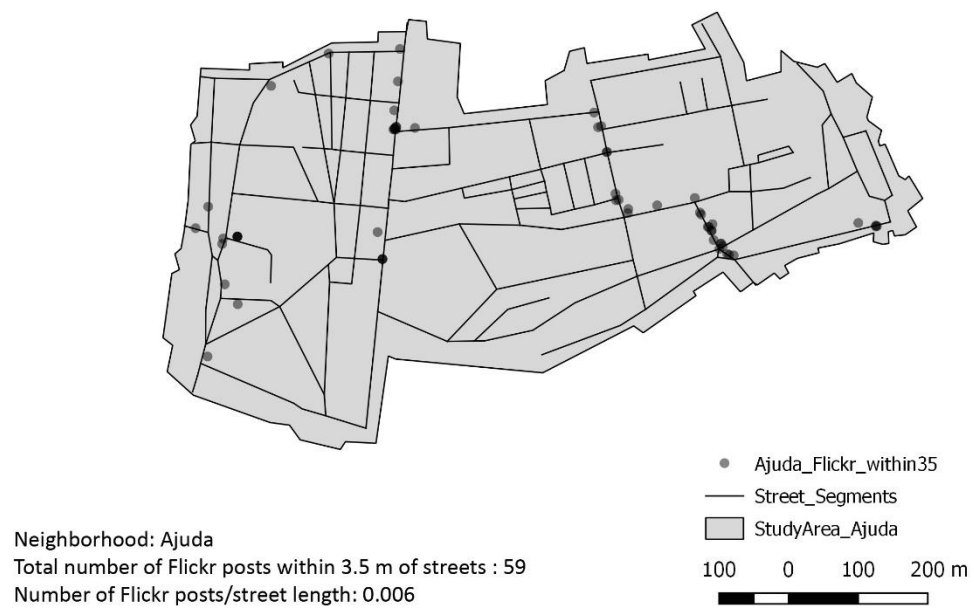
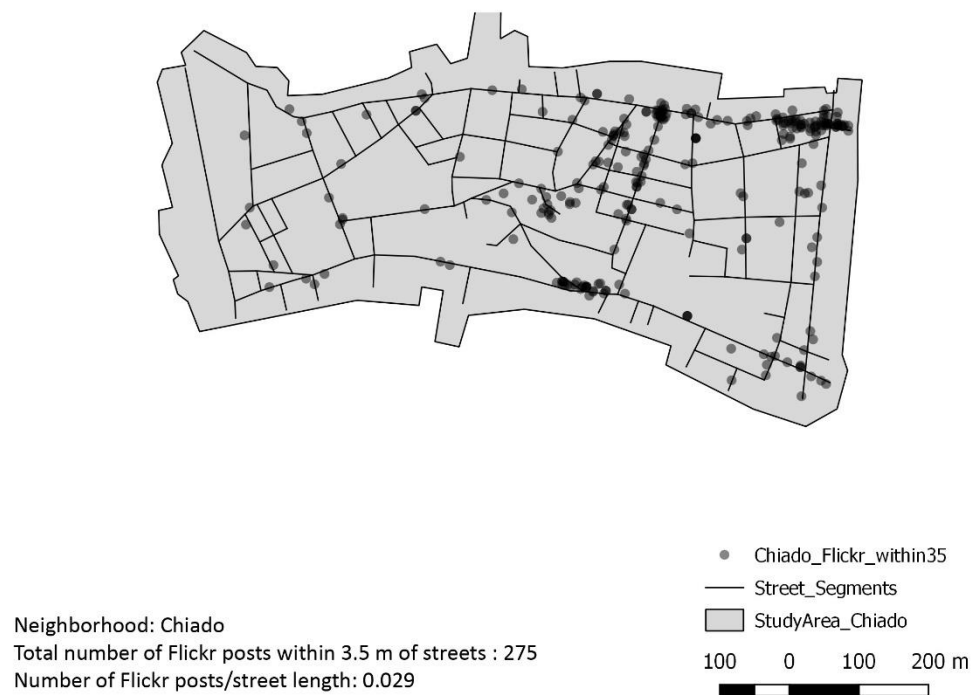


Figure B.10 : Lisbon Flickr posts.

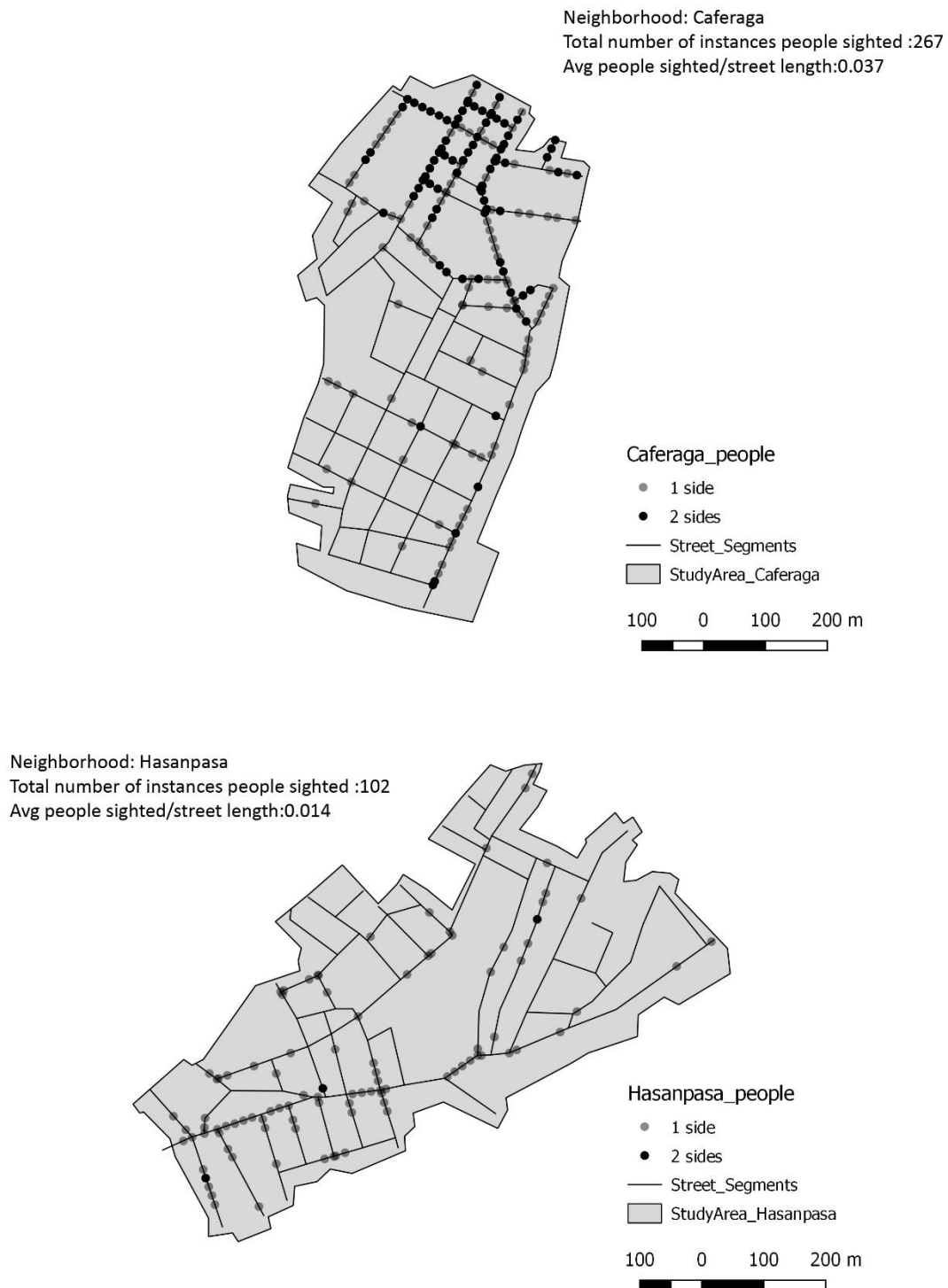


Figure B.11 : Istanbul street sides with people.

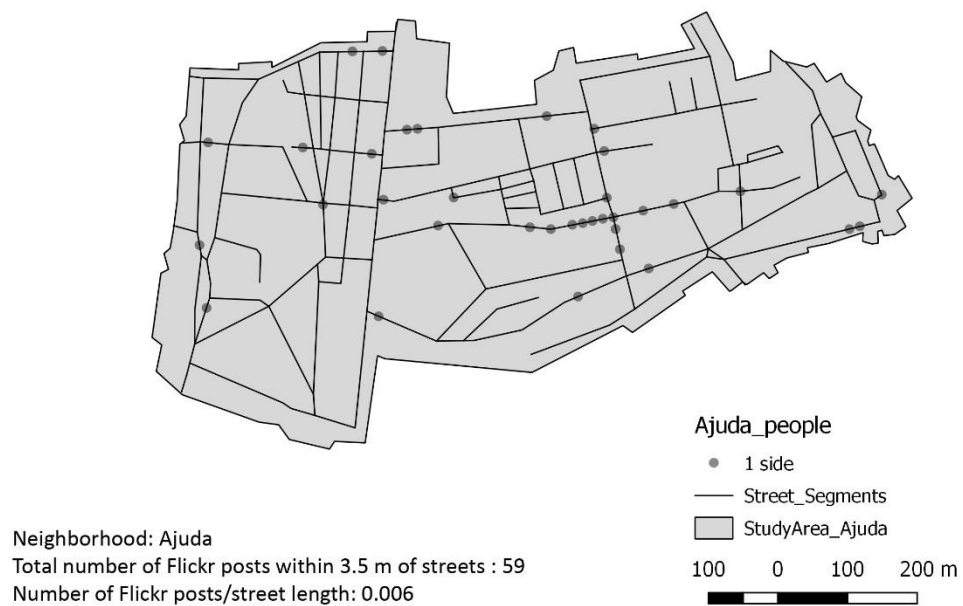
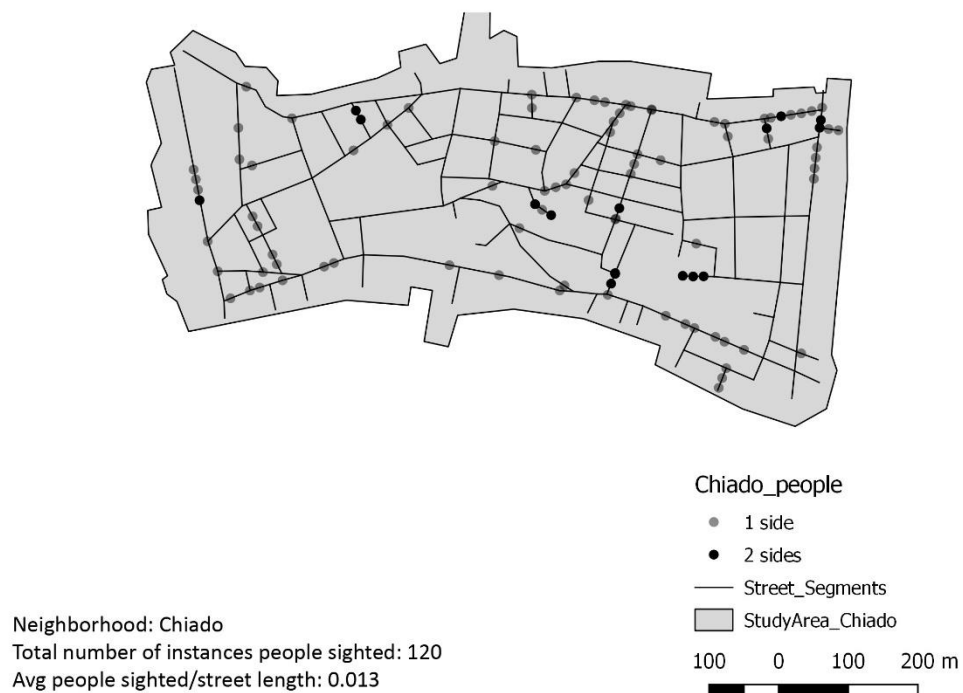


Figure B.12 : Lisbon street sides with people.

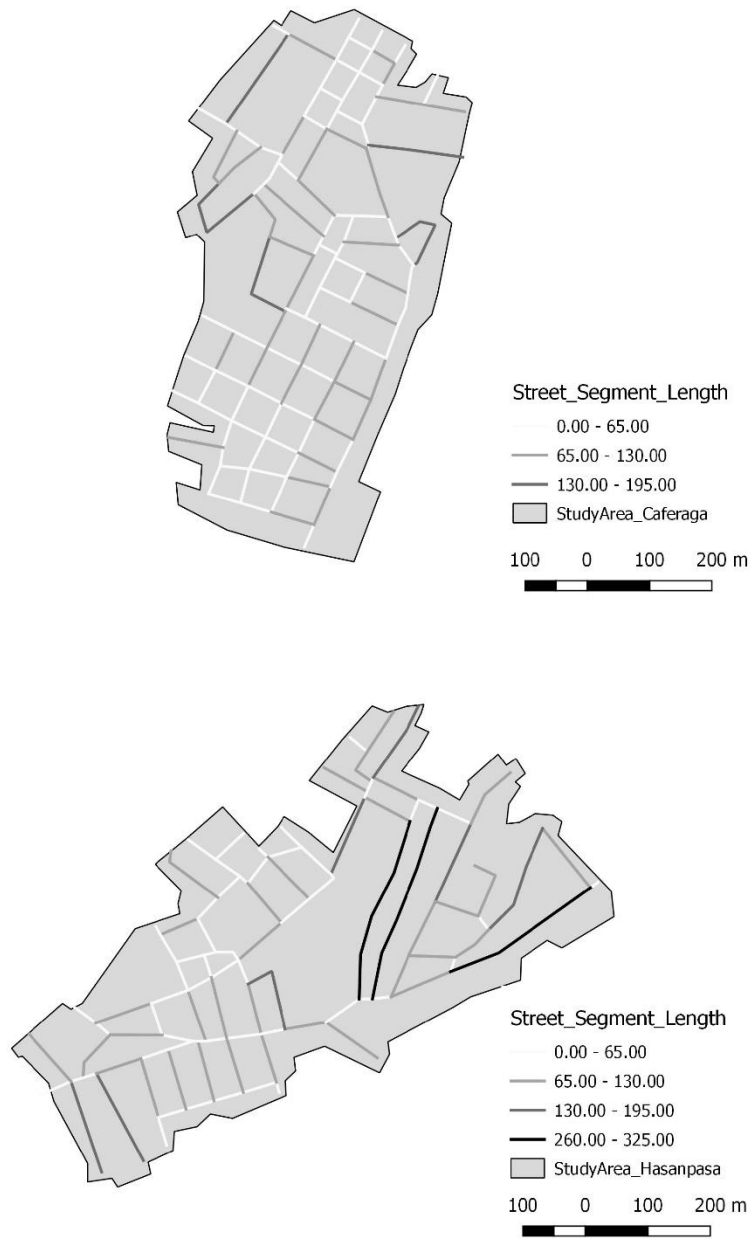


Figure B.13 : Istanbul street segment length.

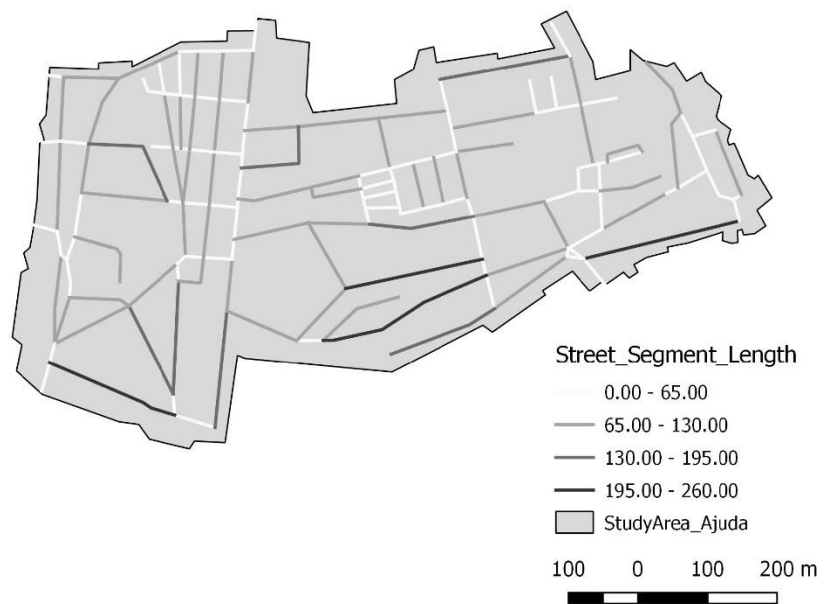
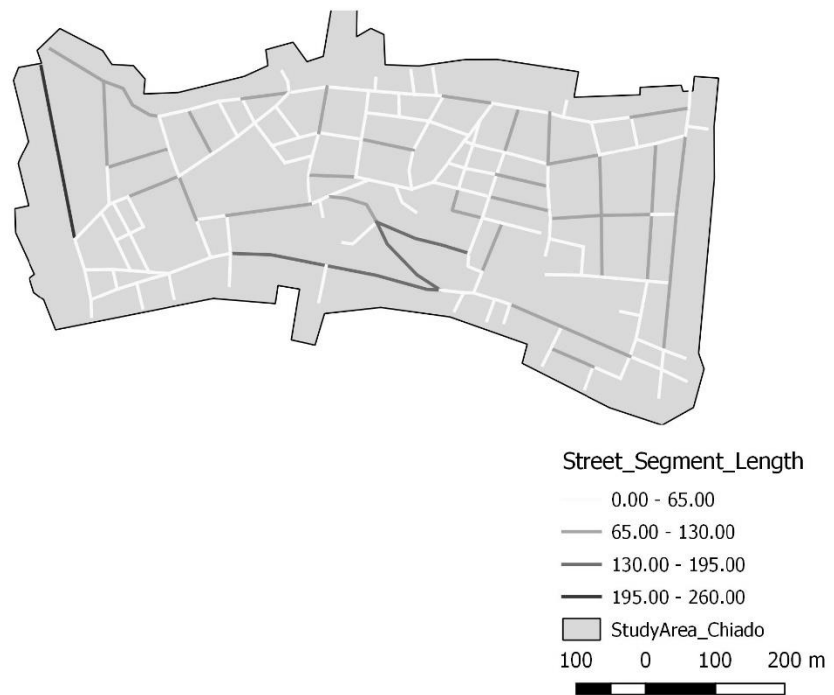


Figure B.14 : Lisbon street segment length.

APPENDIX C

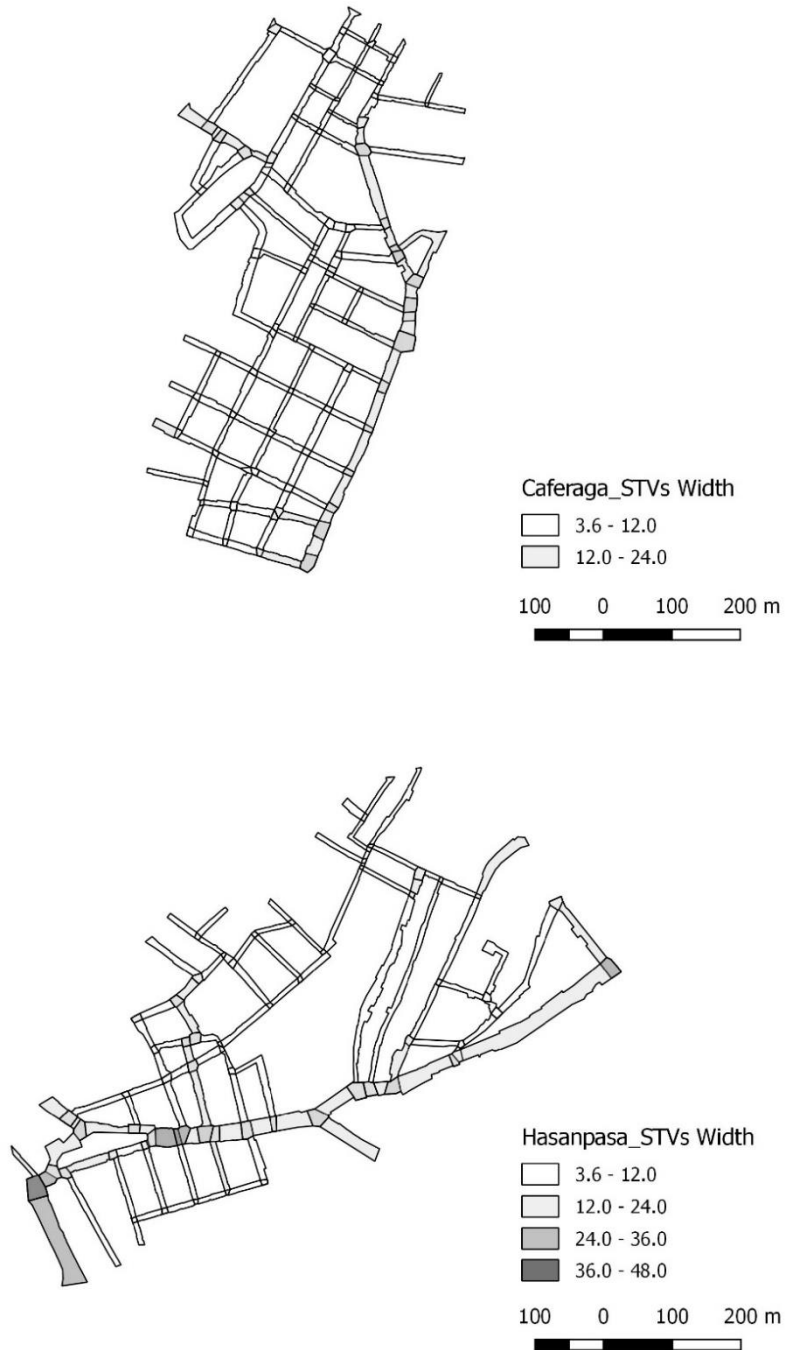


Figure C.1 : Istanbul STV widths.

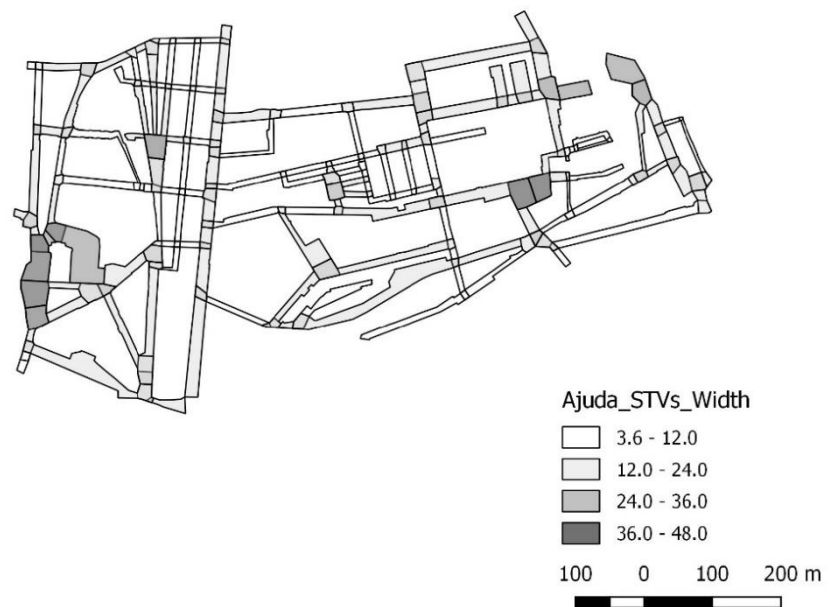
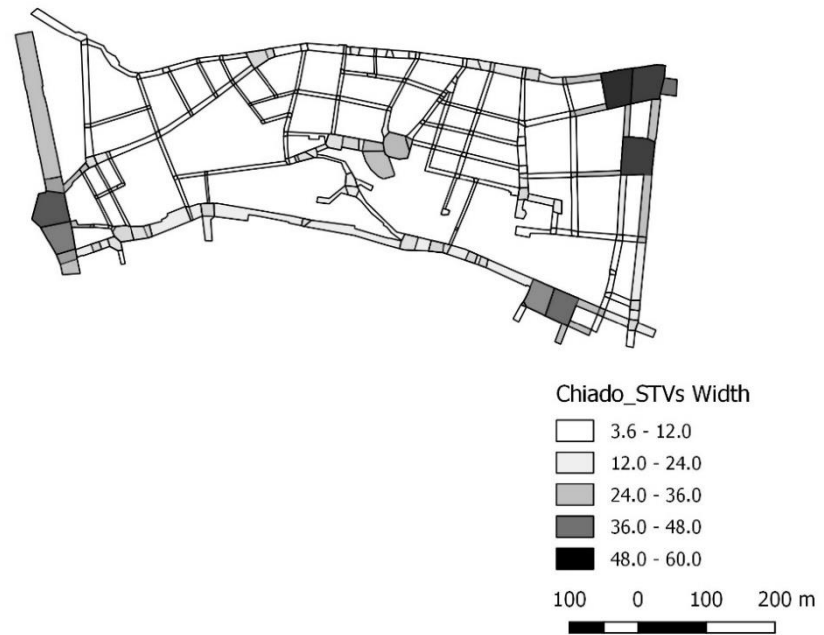


Figure C.2 : Lisbon STV widths.

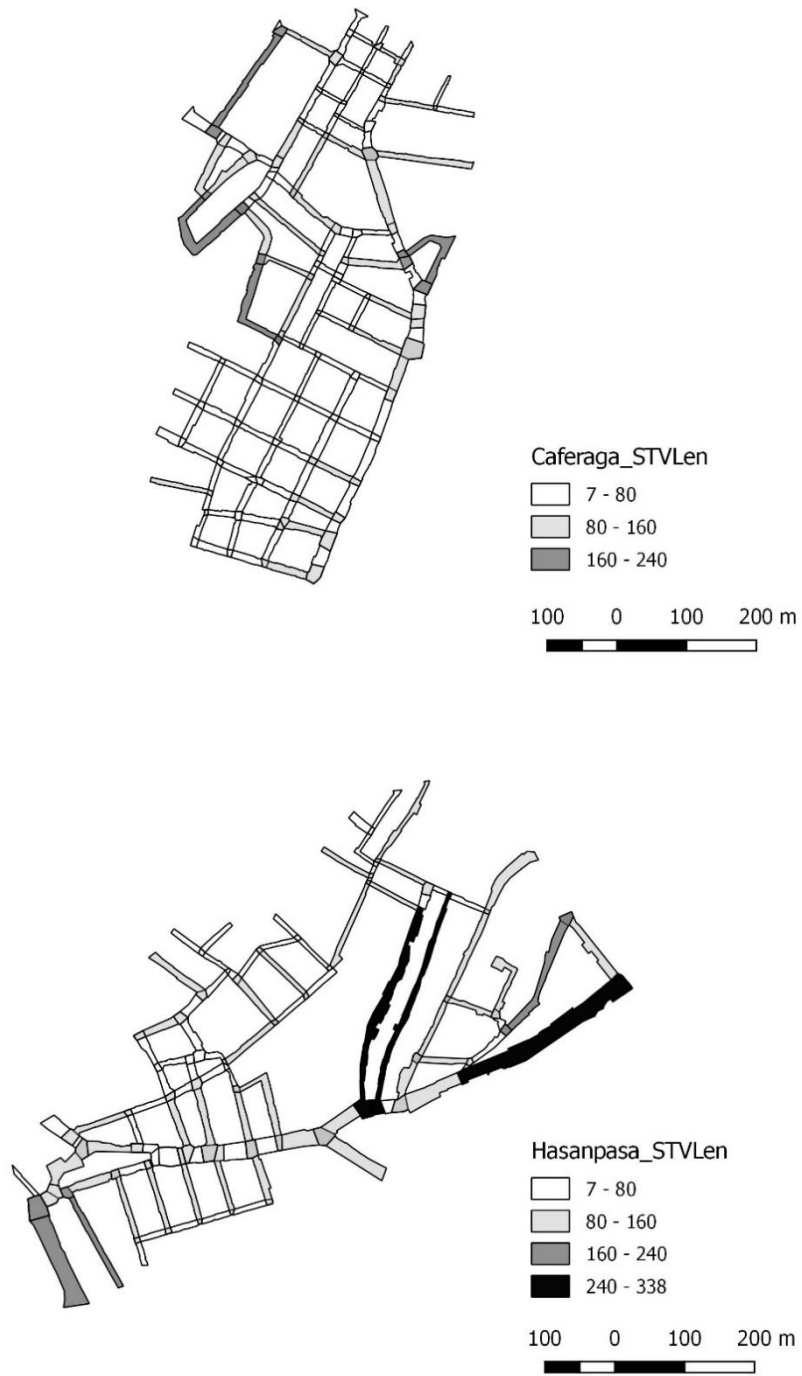


Figure C.3 : Istanbul STV lengths.

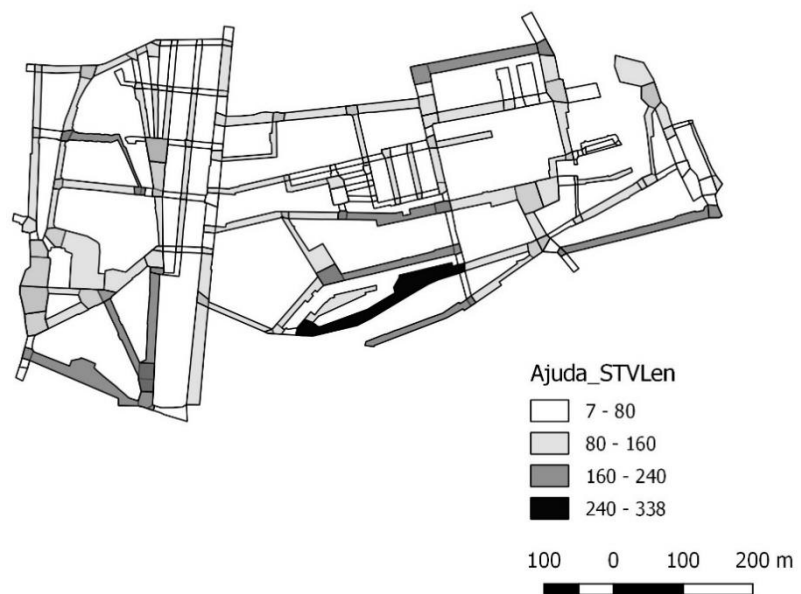
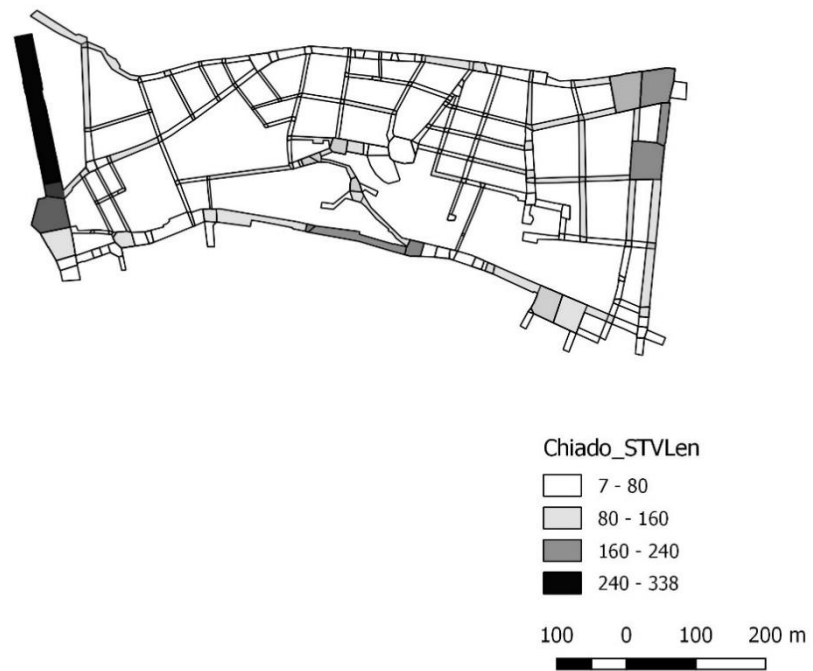


Figure C.4 : Lisbon STV lengths.



Figure C.5 : Istanbul STV areas.

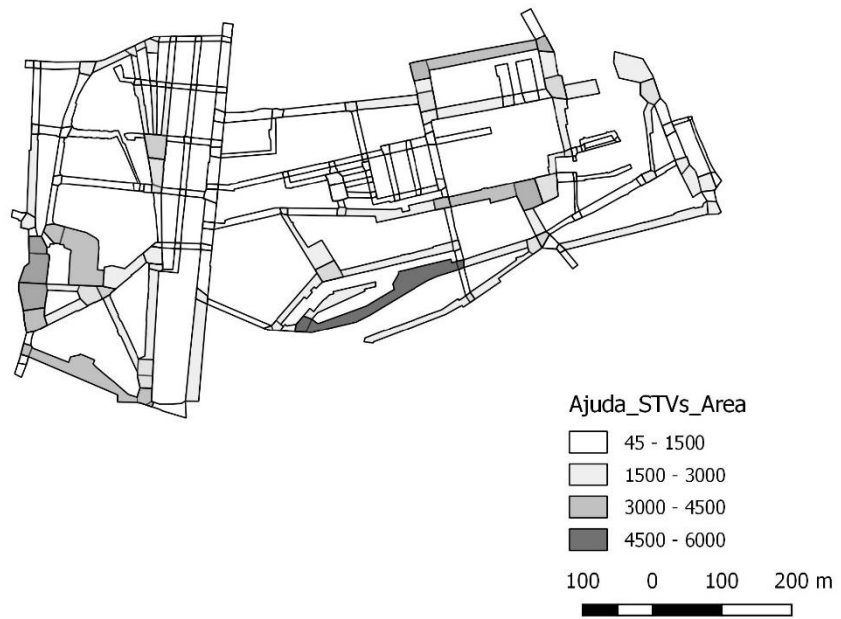
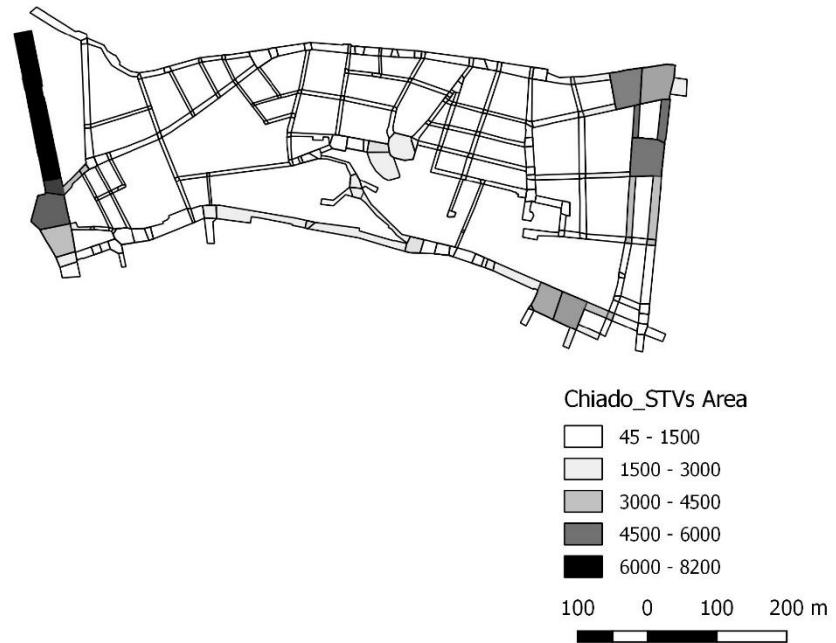


Figure C.6 : Lisbon STV areas.

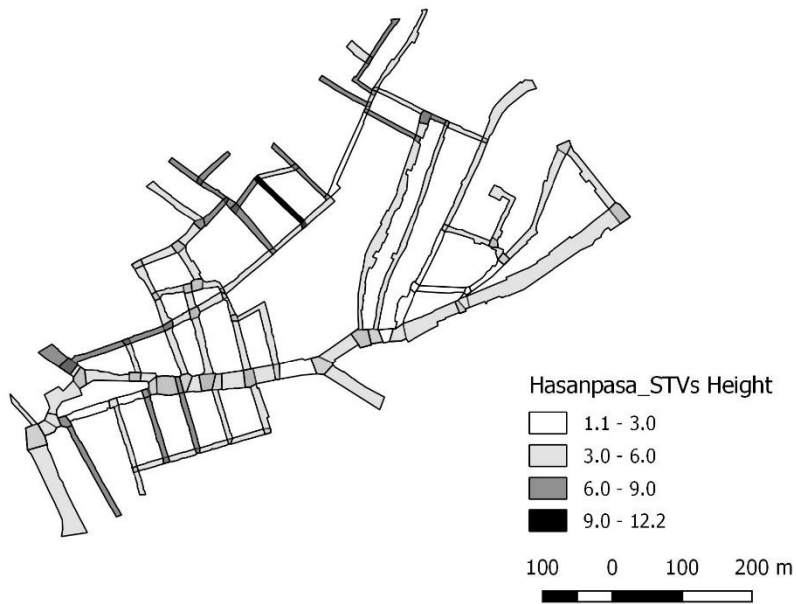
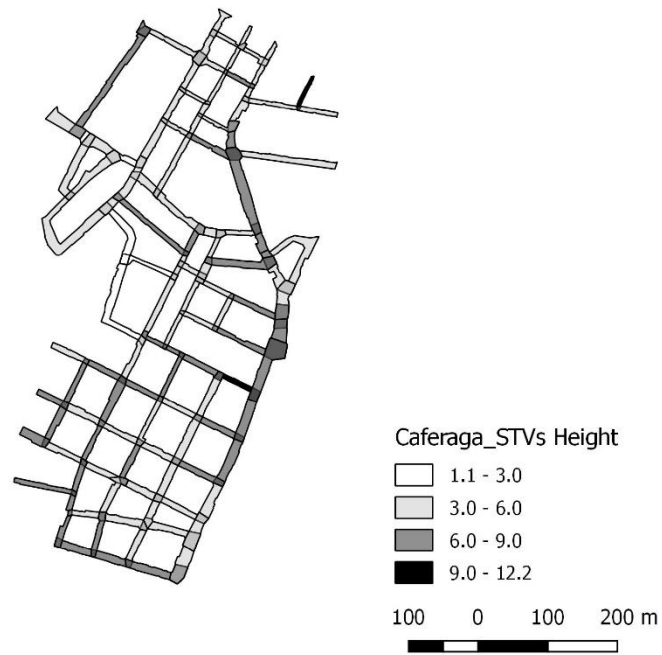


Figure C.7 : Istanbul STV heights.

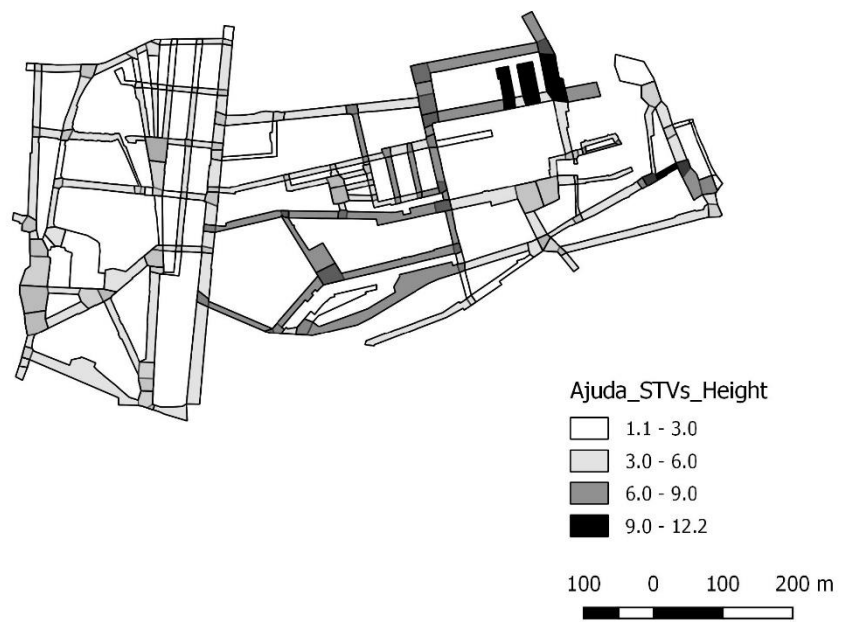
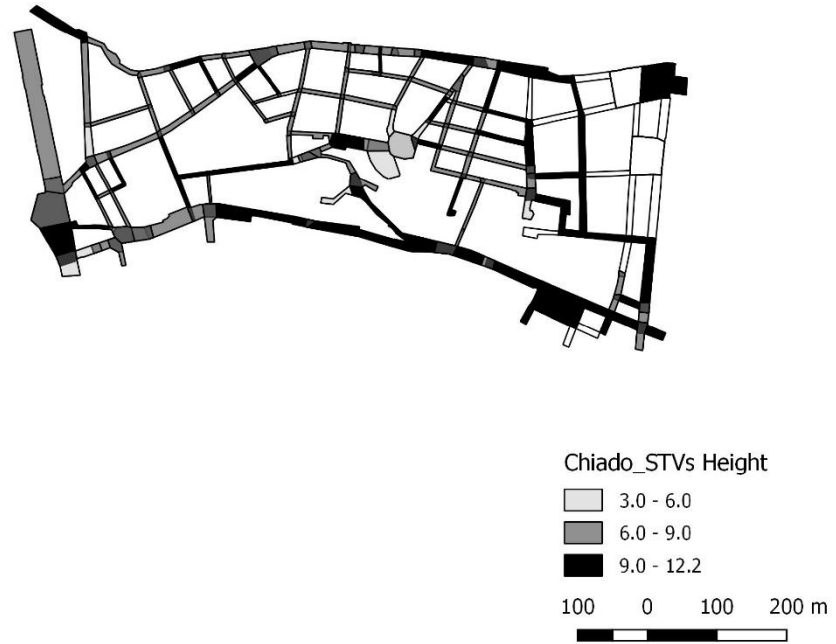


Figure C.8 : Lisbon STV heights.

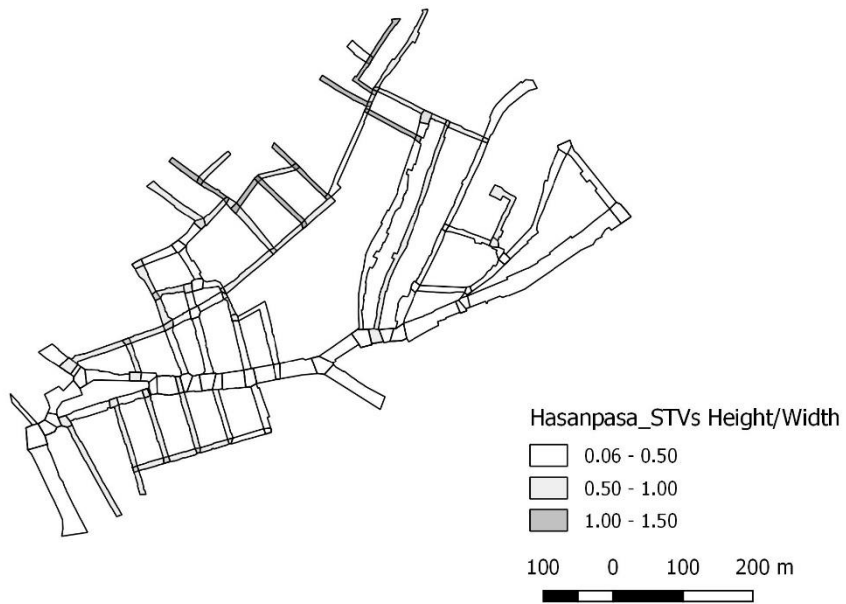
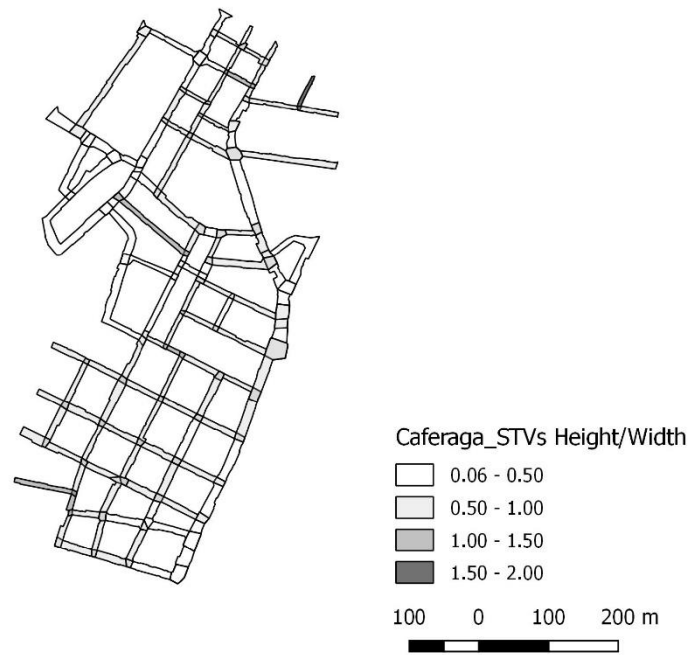


Figure C.9 : Istanbul STV height to width ratios.

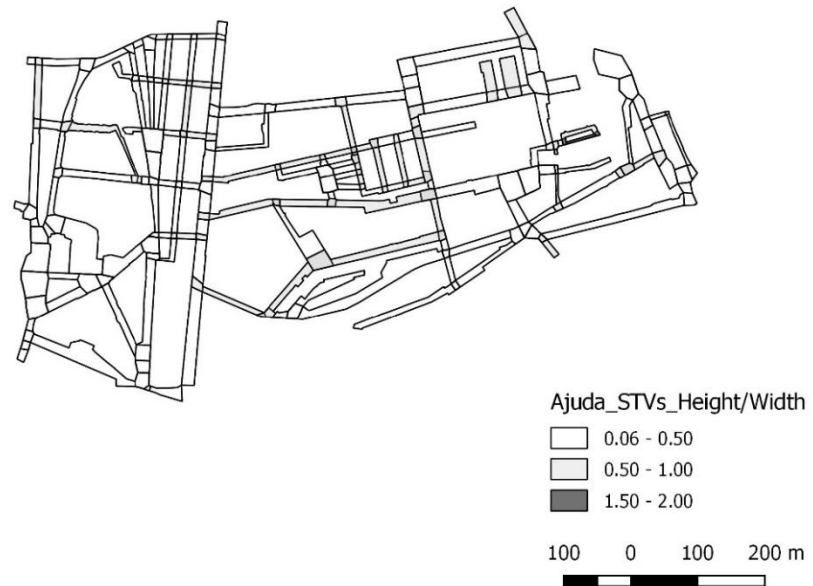
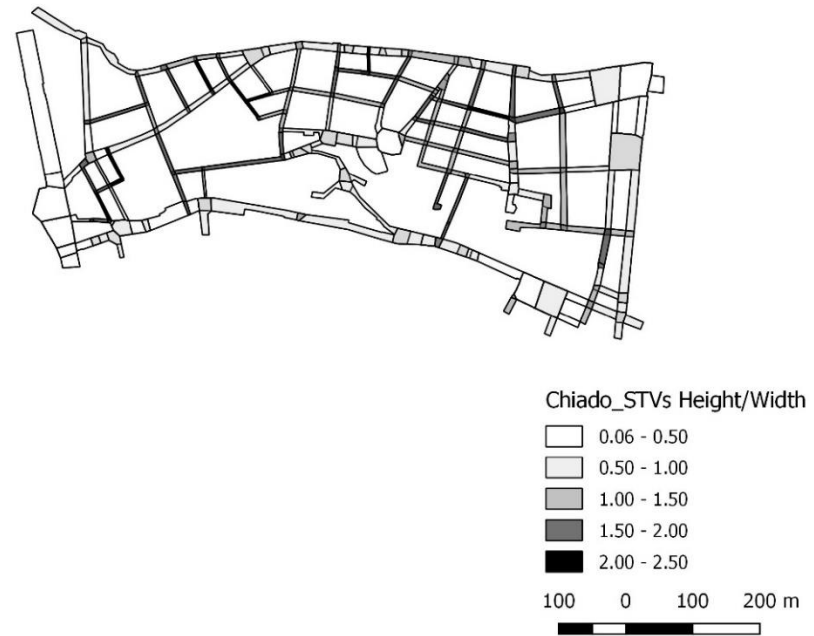


Figure C.10 : Lisbon STV height to width ratios.

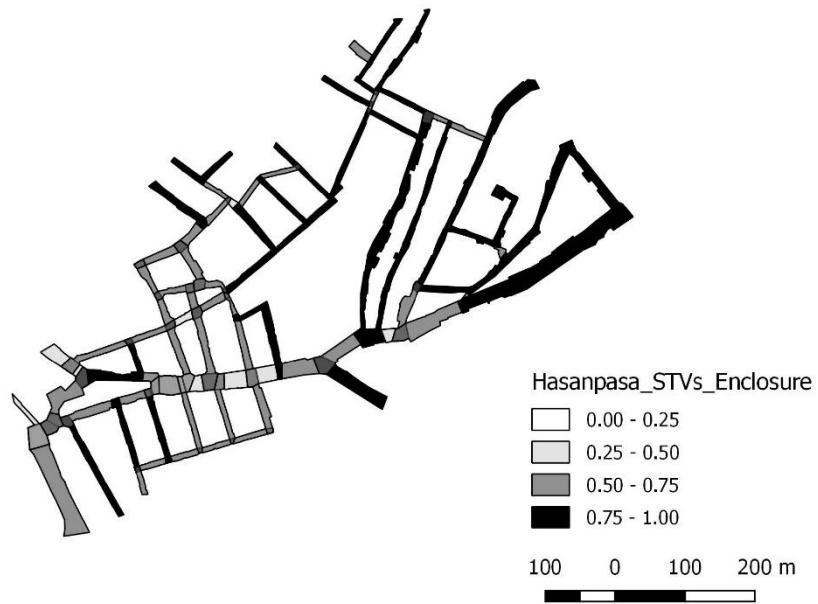
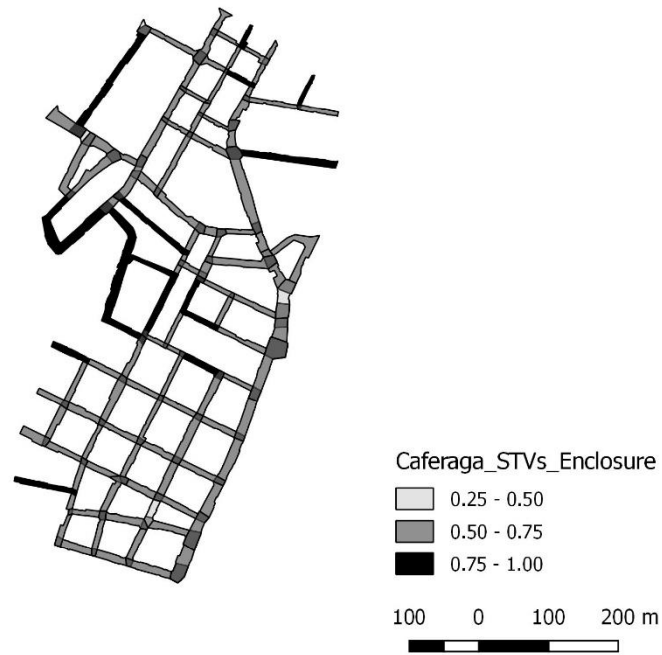


Figure C.11 : Istanbul STV enclosure values.

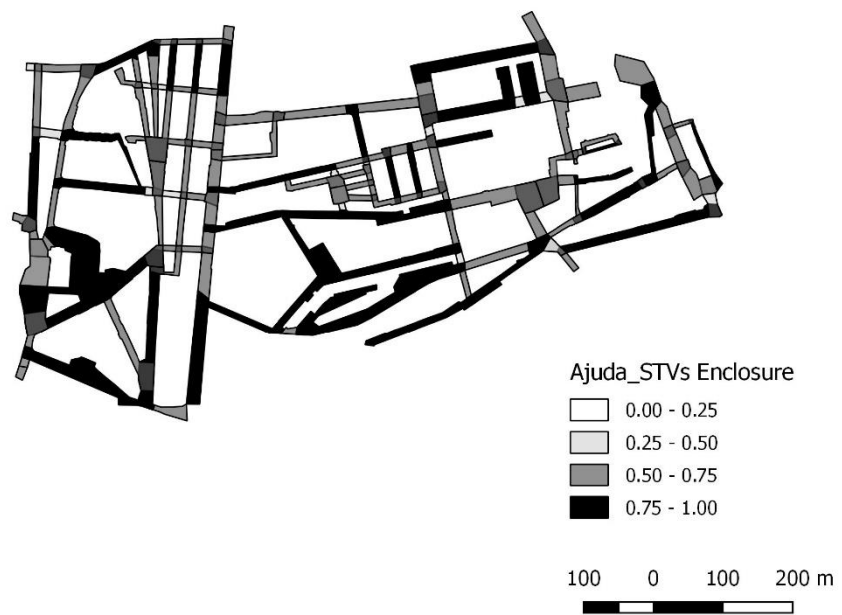
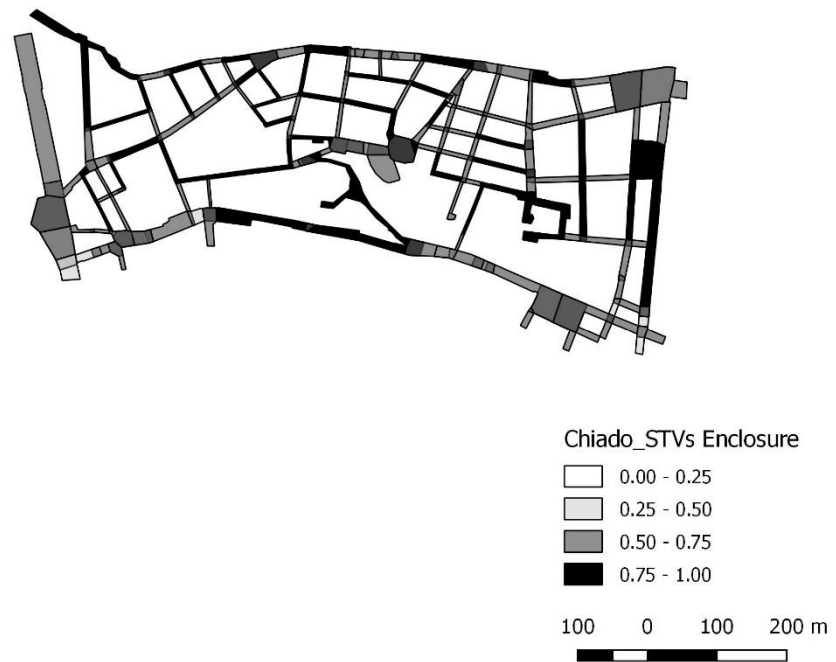


Figure C.12 : Lisbon STV enclosure values.

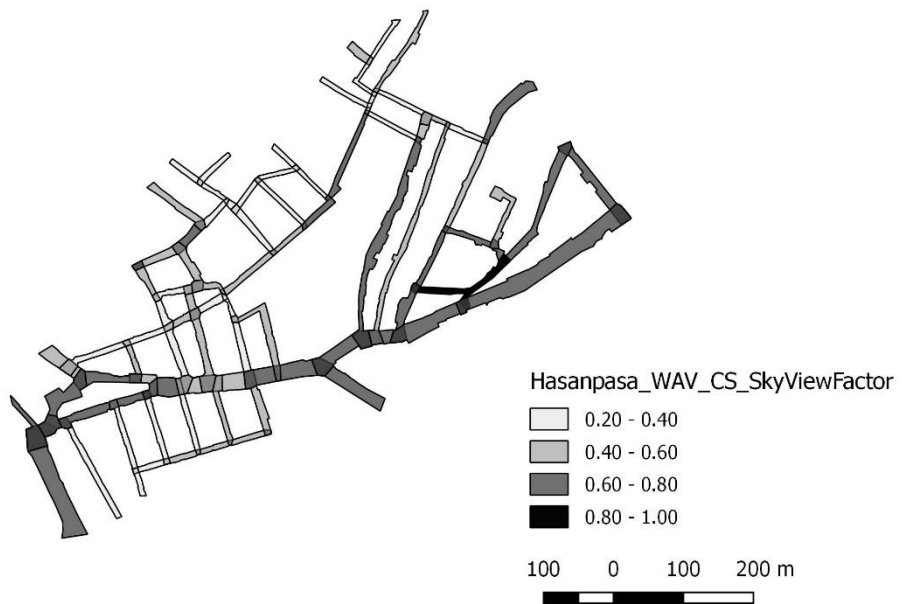
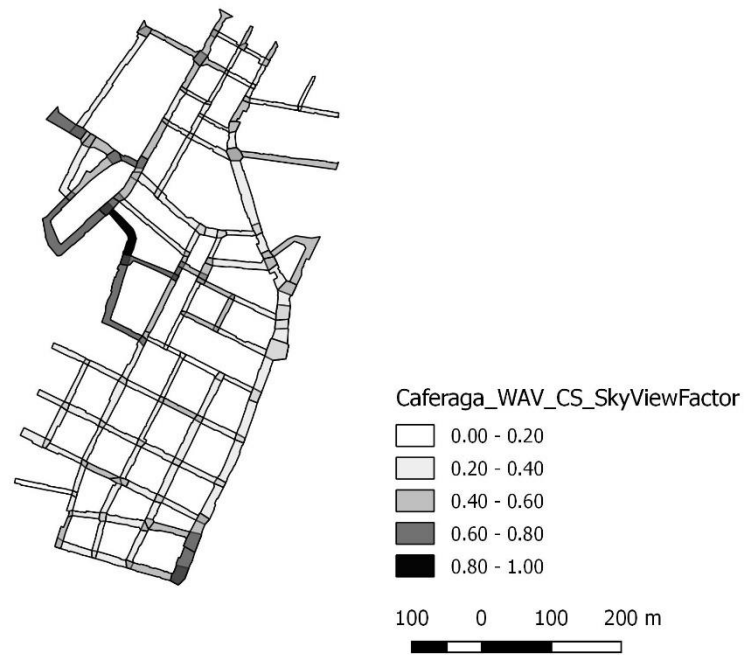


Figure C.13 : Istanbul average sky view factors of Convex-Voids.

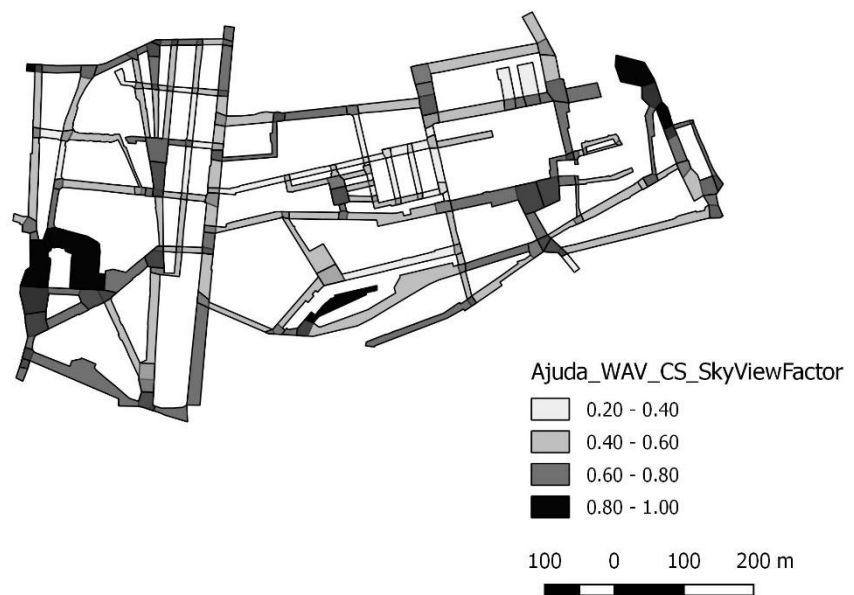
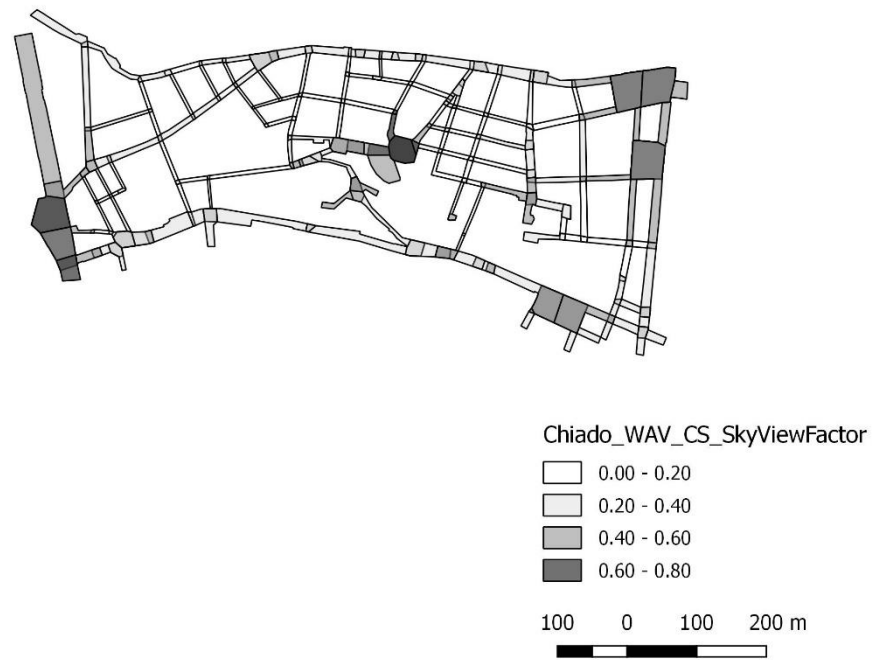


Figure C.14 : Lisbon average sky view factors of Convex-Voids.

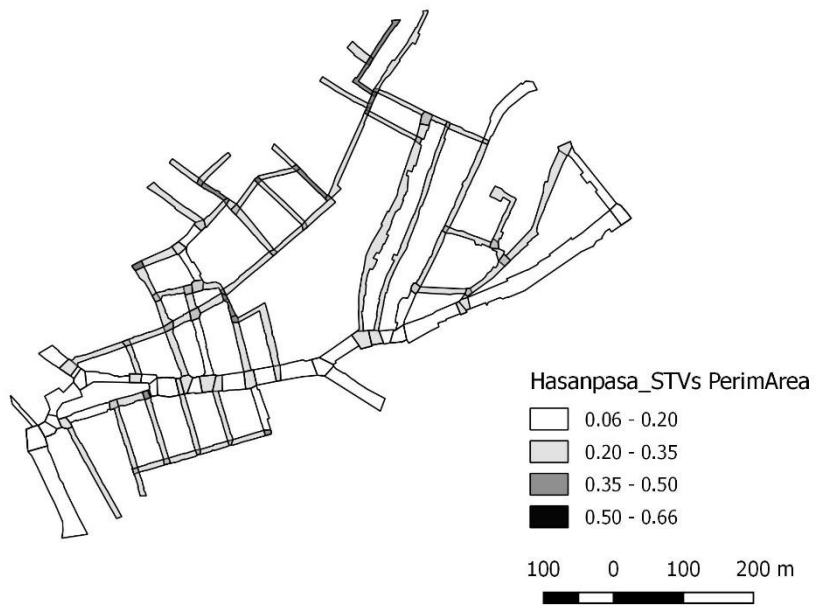
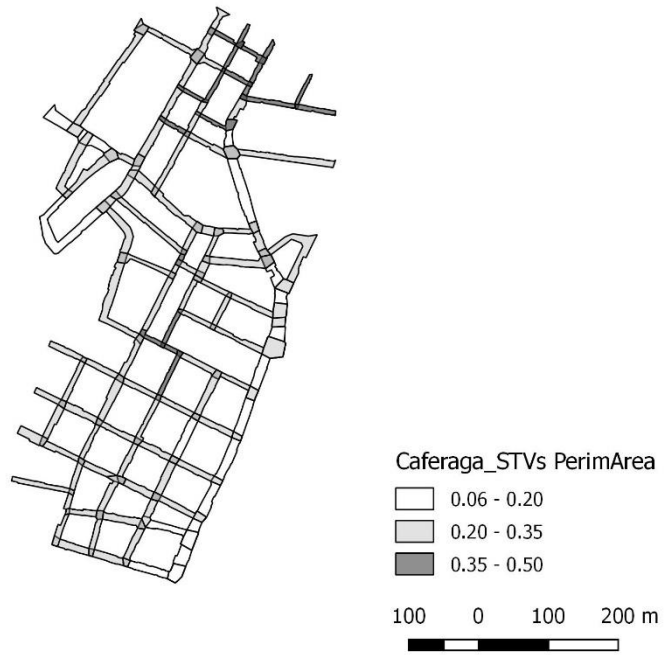


Figure C.15 : Istanbul STV perimeter/area ratios.

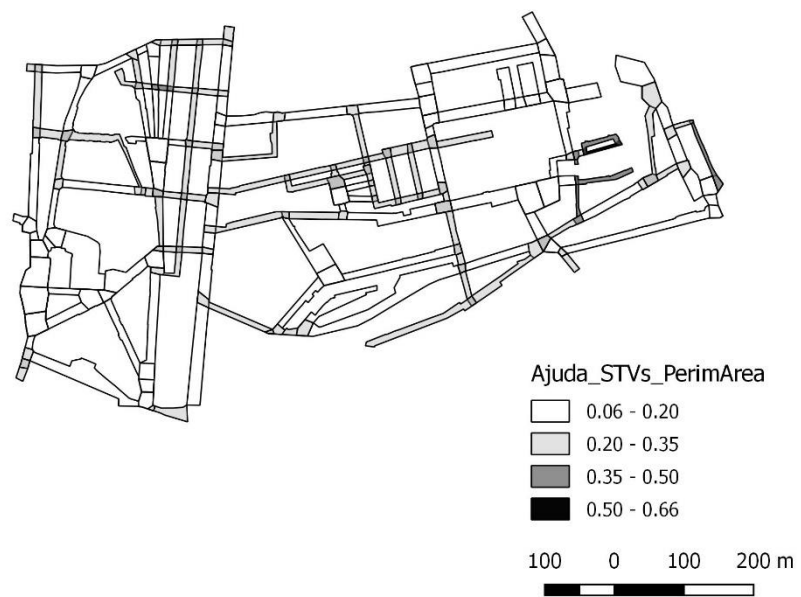
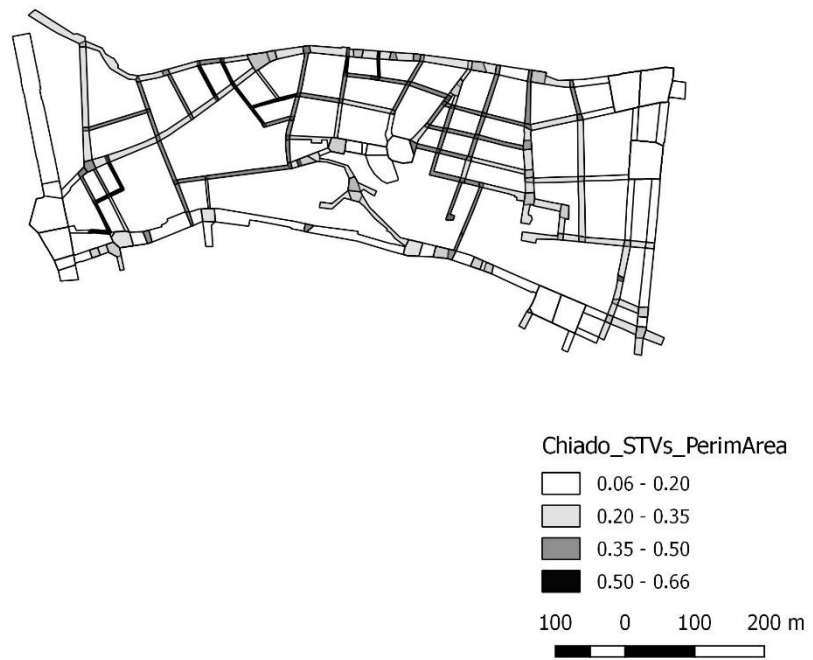


Figure C.16 : Lisbon STV perimeter/area ratios.

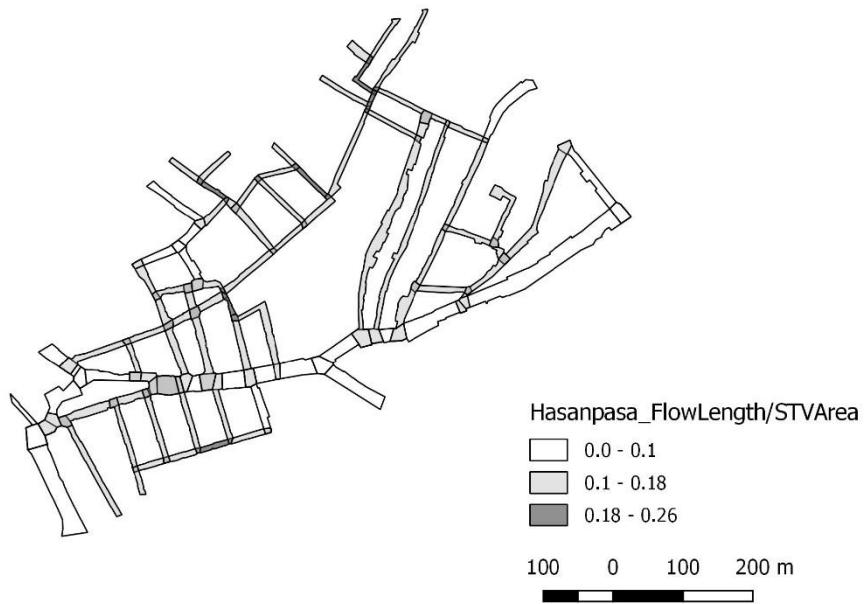
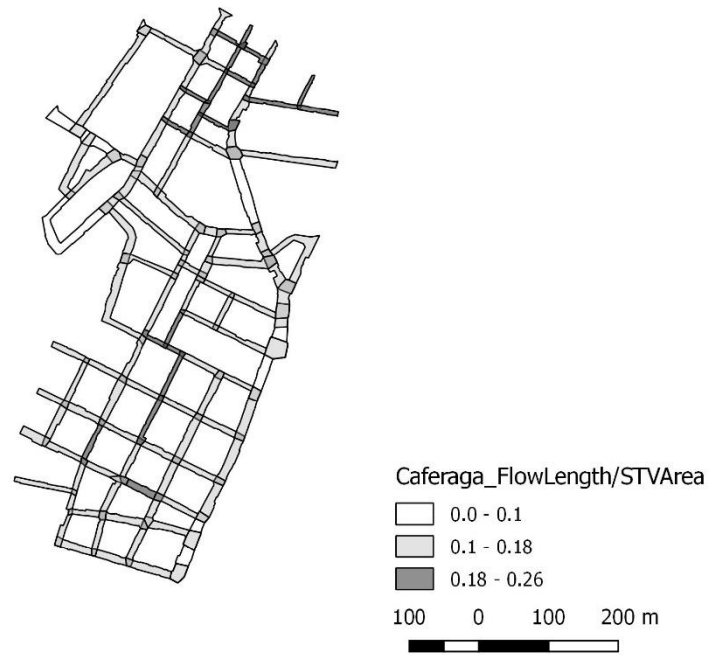


Figure C.17 : Istanbul total flow length per STV area.

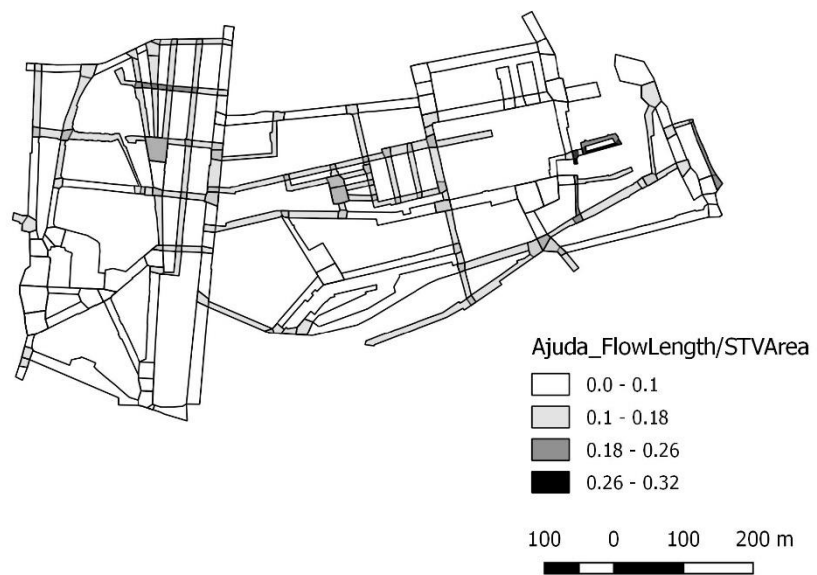


Figure C.18 : Lisbon total flow length per STV area.

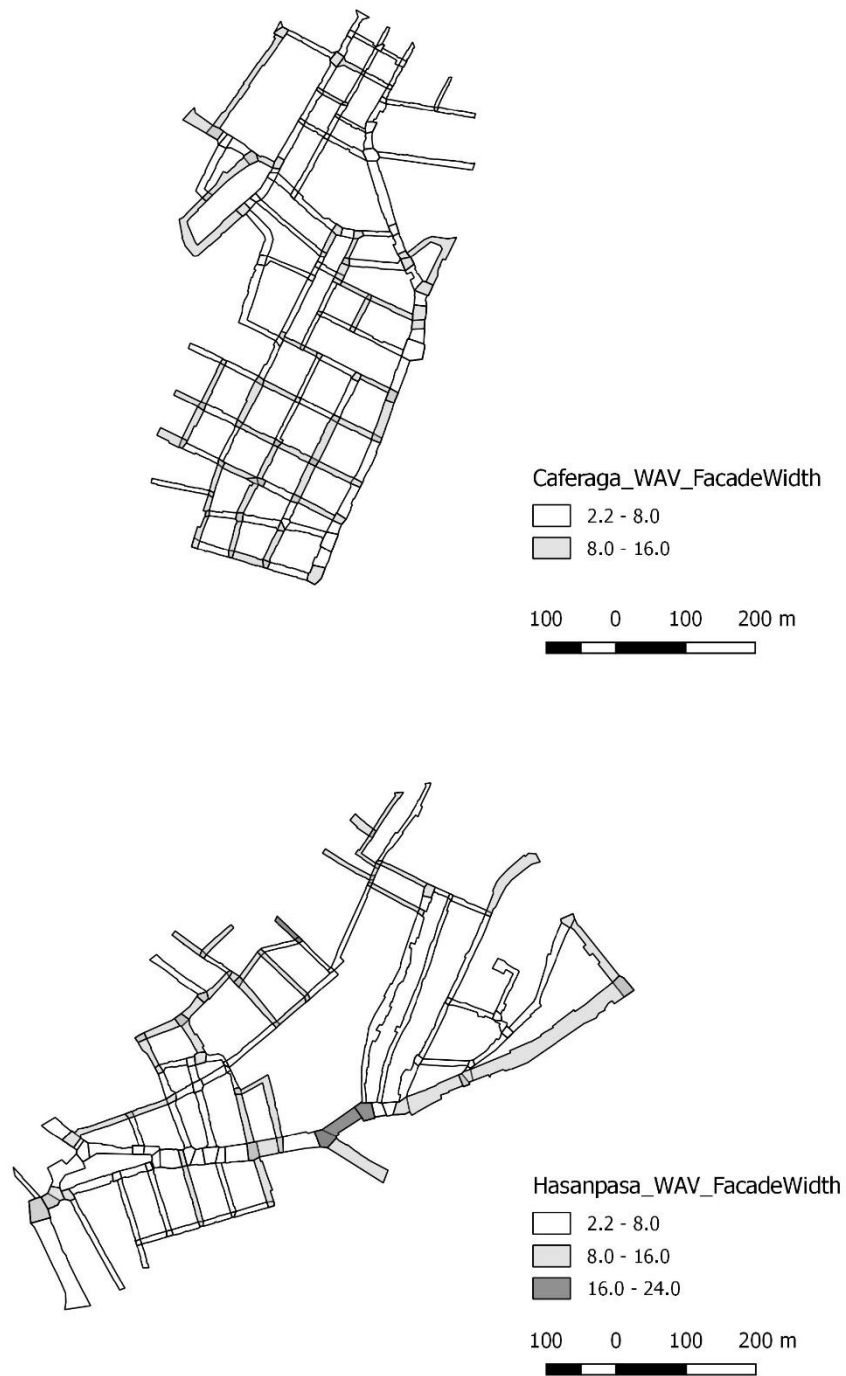


Figure C.19 : Istanbul WAV of façade widths.

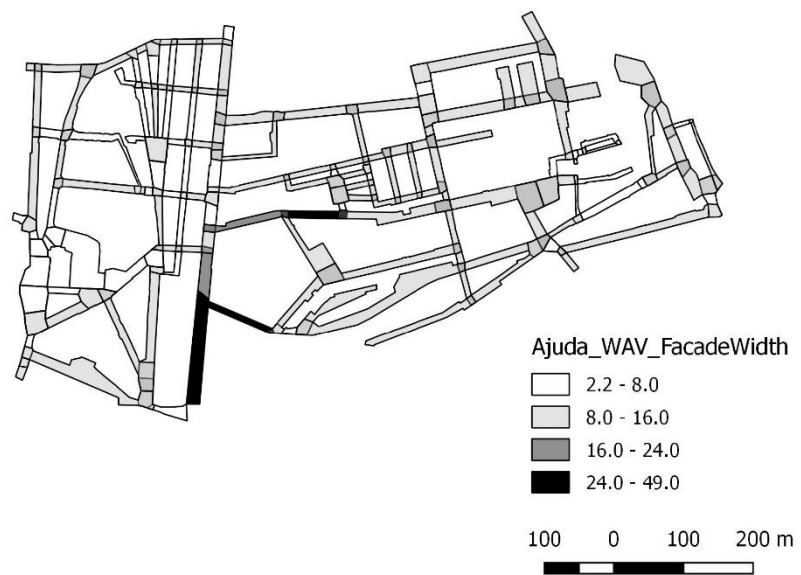
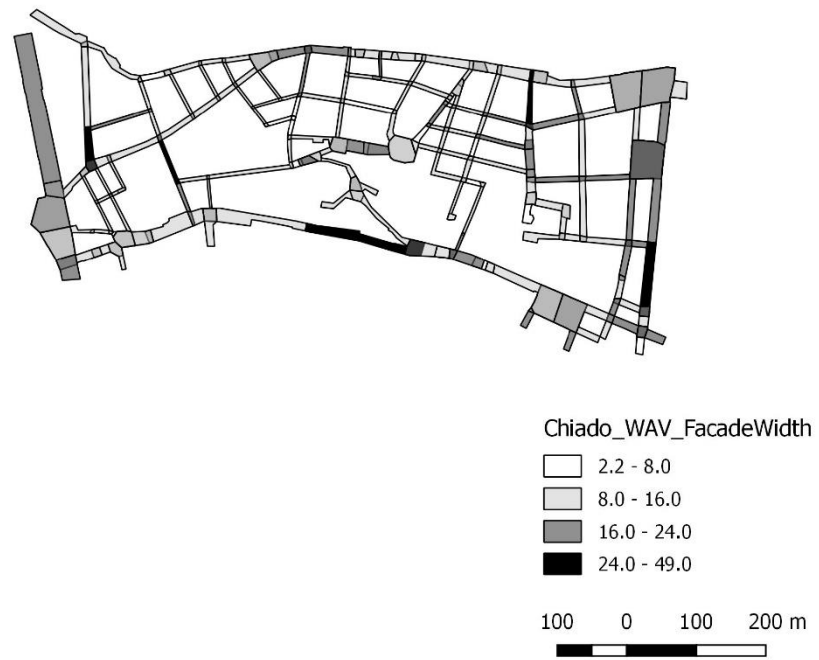


Figure C.20 : Lisbon WAV of façade widths.

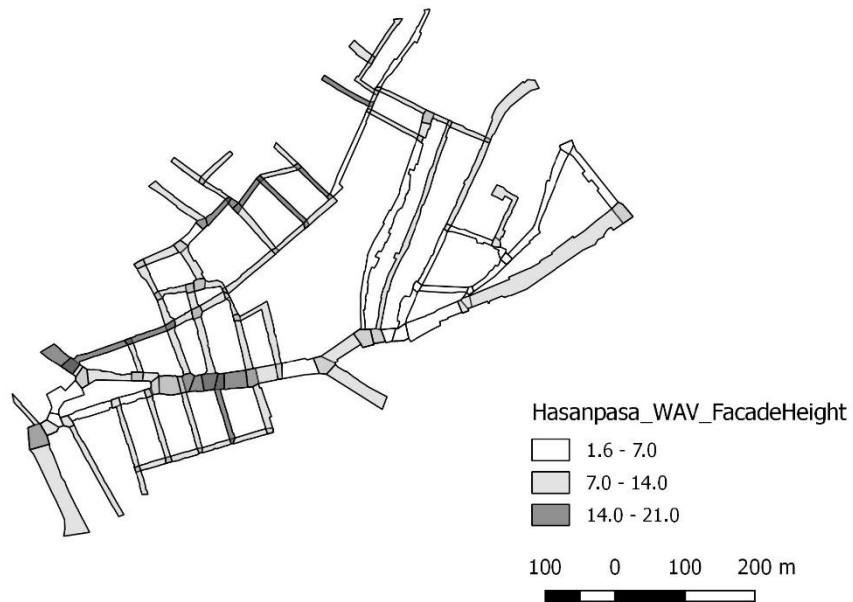
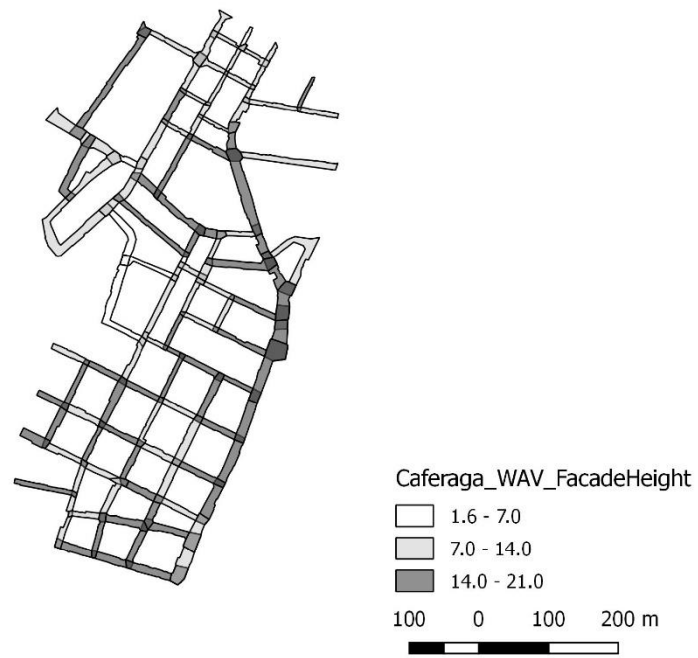


Figure C.21 : Istanbul WAV of façade heights.

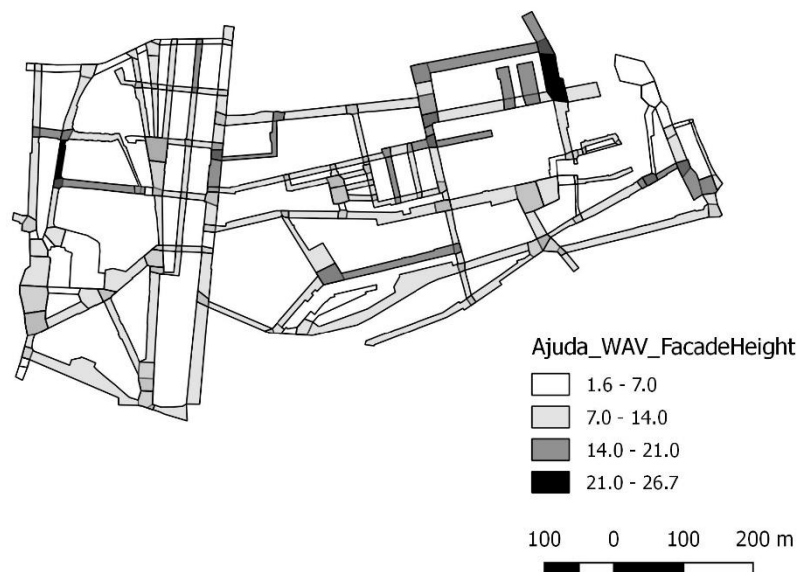
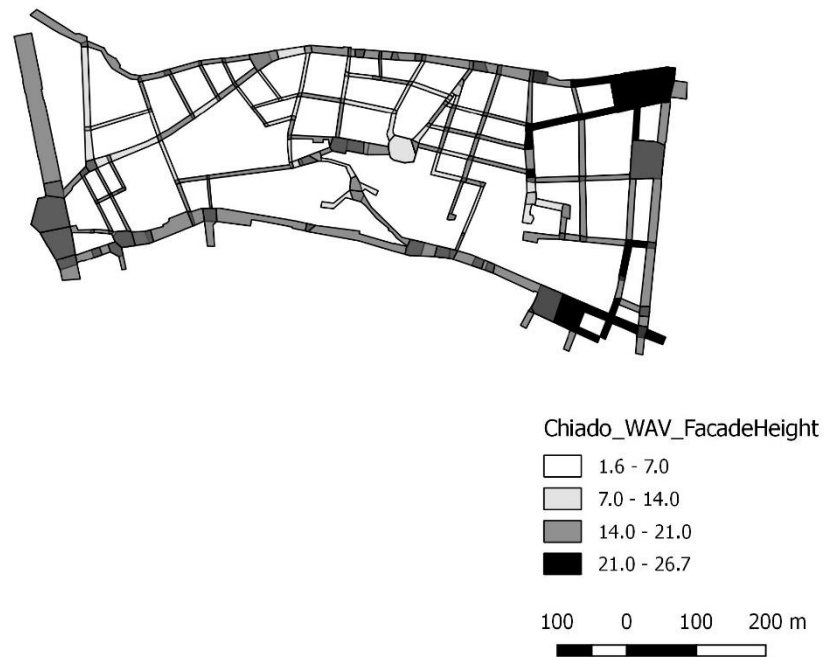


Figure C.22 : Lisbon WAv of façade heights.

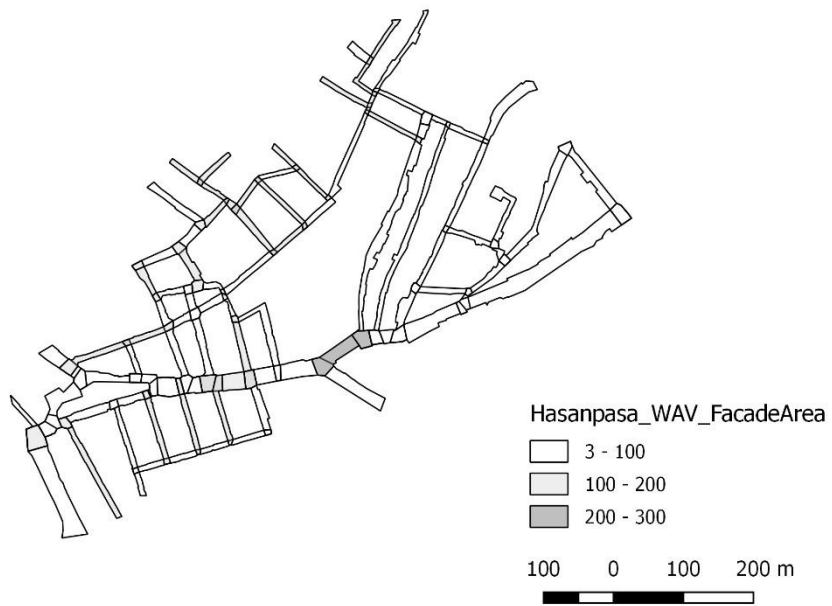
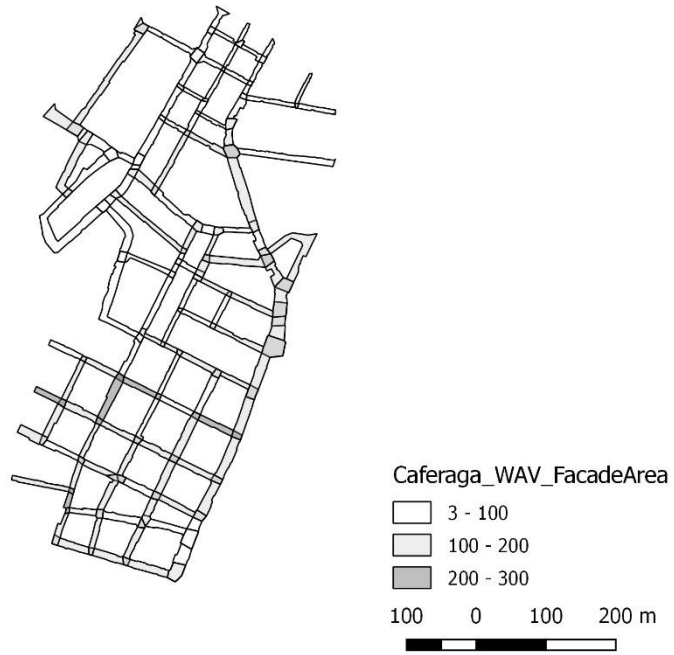


Figure C.23 : Istanbul WAv of façade areas.

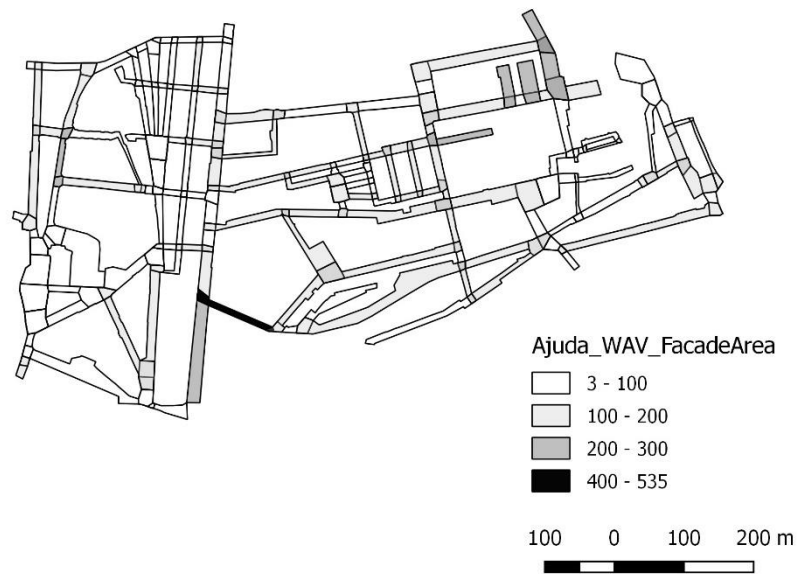
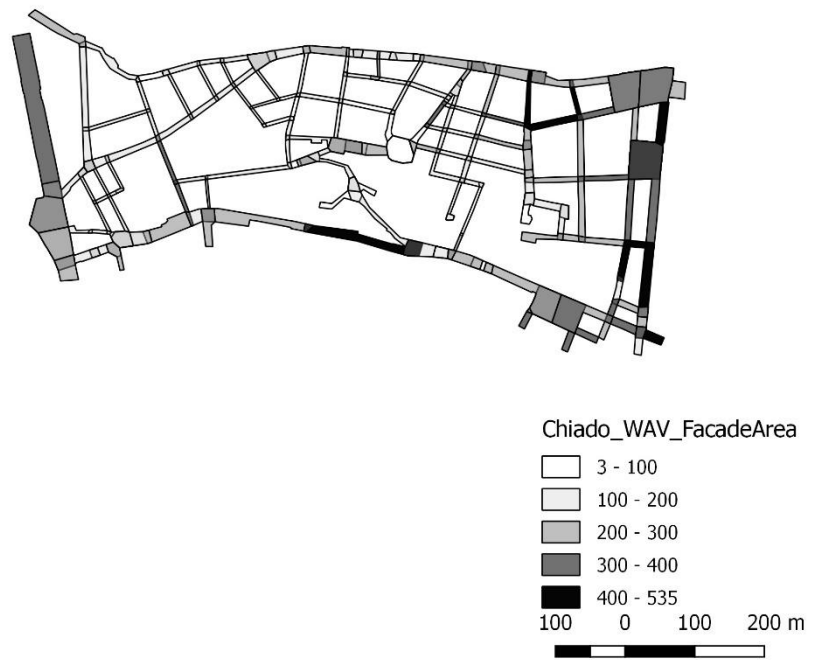


Figure C.24 : Lisbon WAV of façade areas.

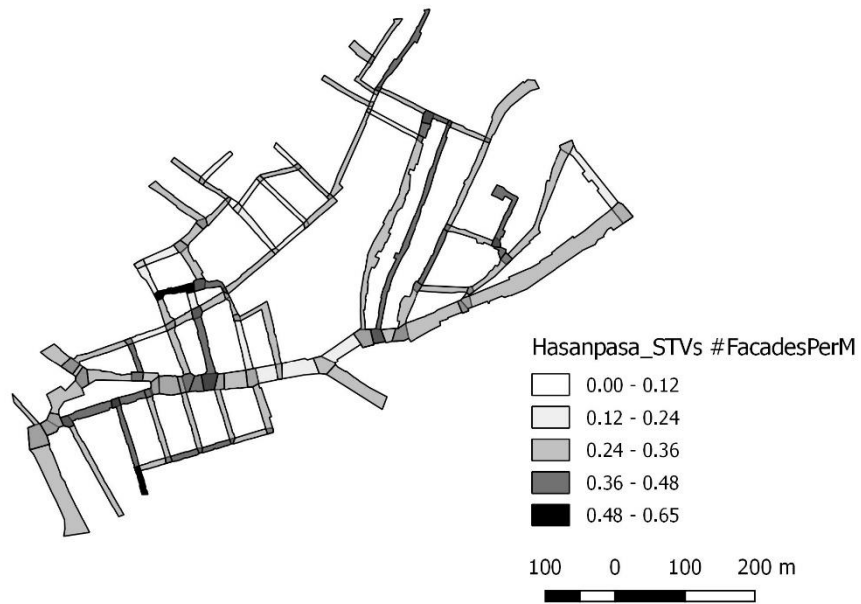
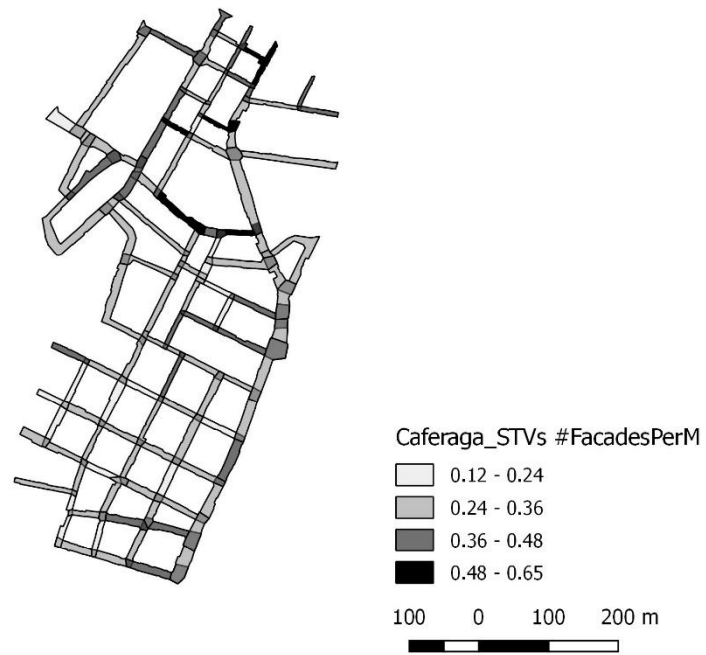


Figure C.25 : Istanbul number of facades per STV length.

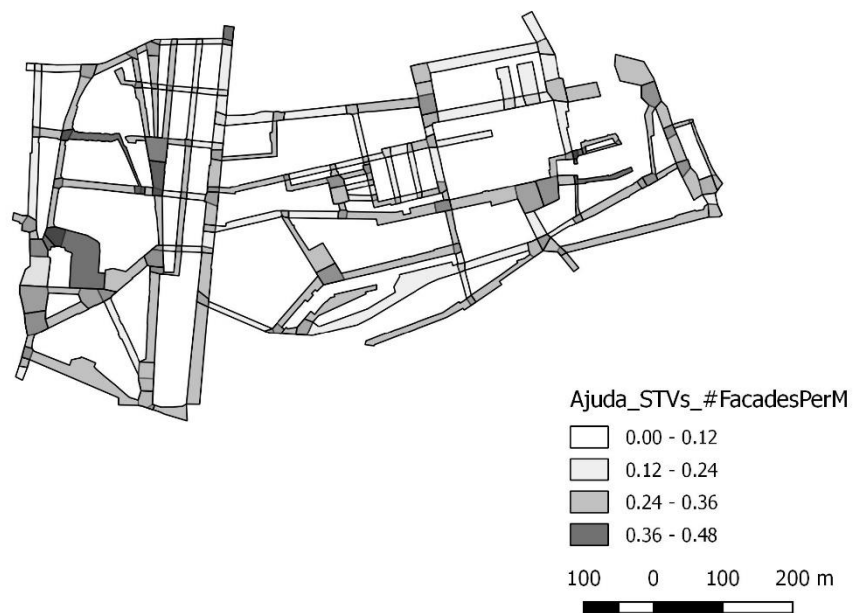
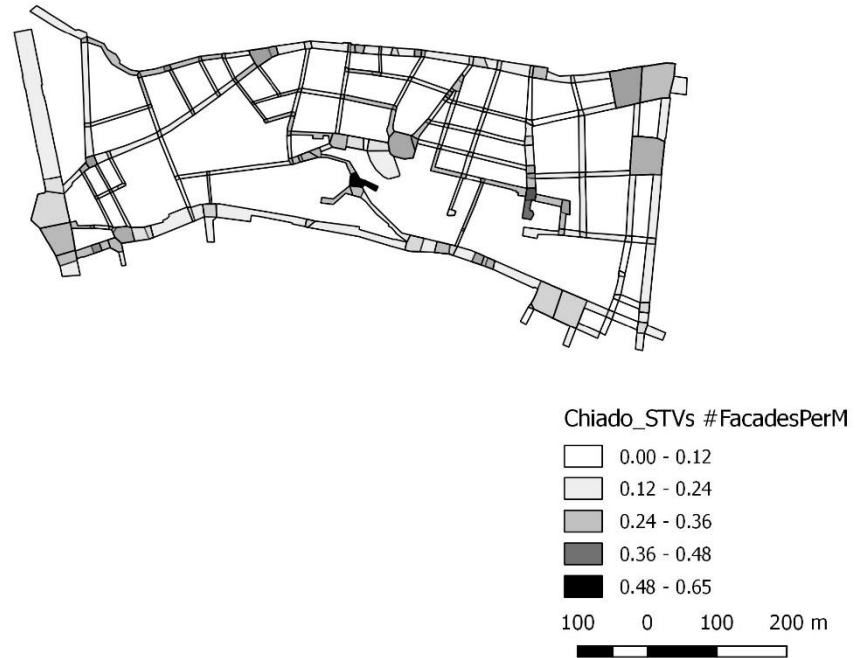


Figure C.26 : Lisbon number of facades per STV length.

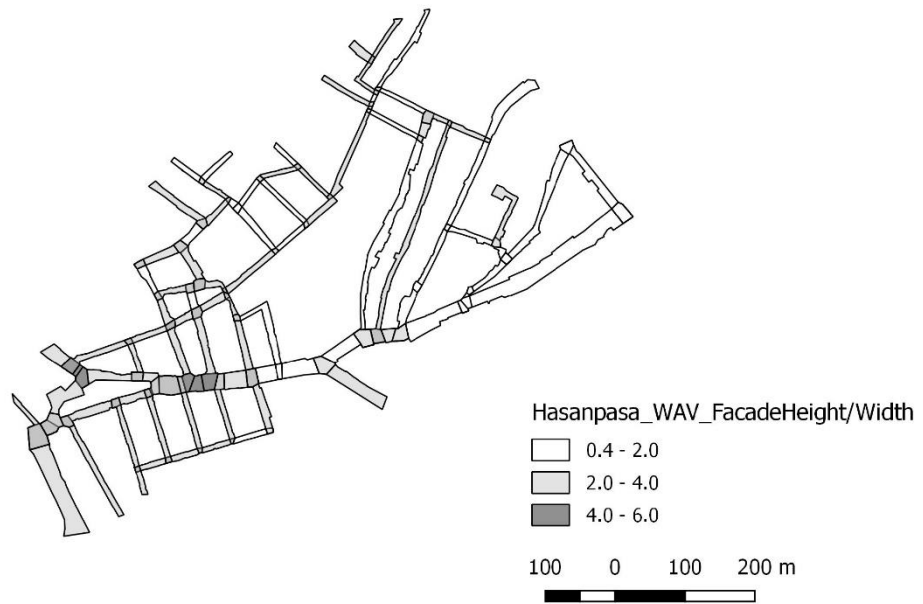
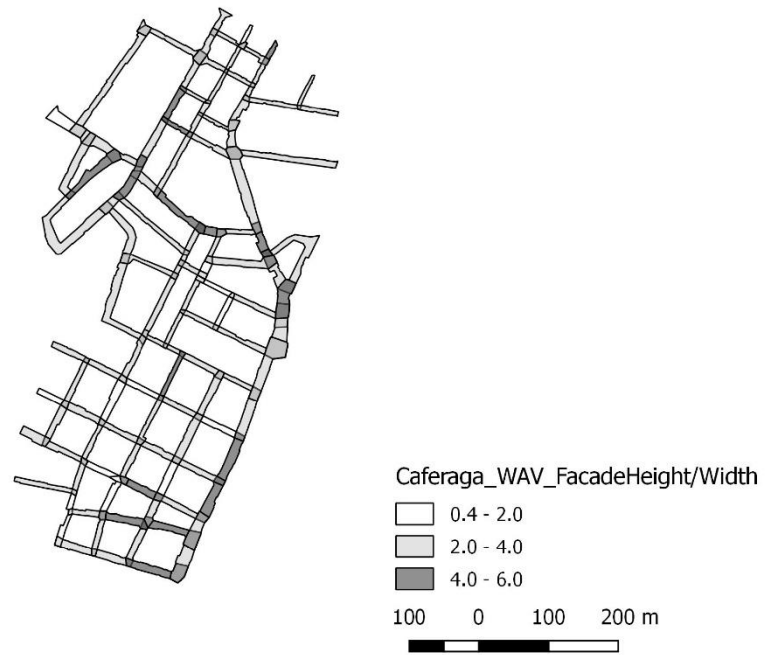


Figure C.27 : Istanbul WAV of facades height to width ratio.

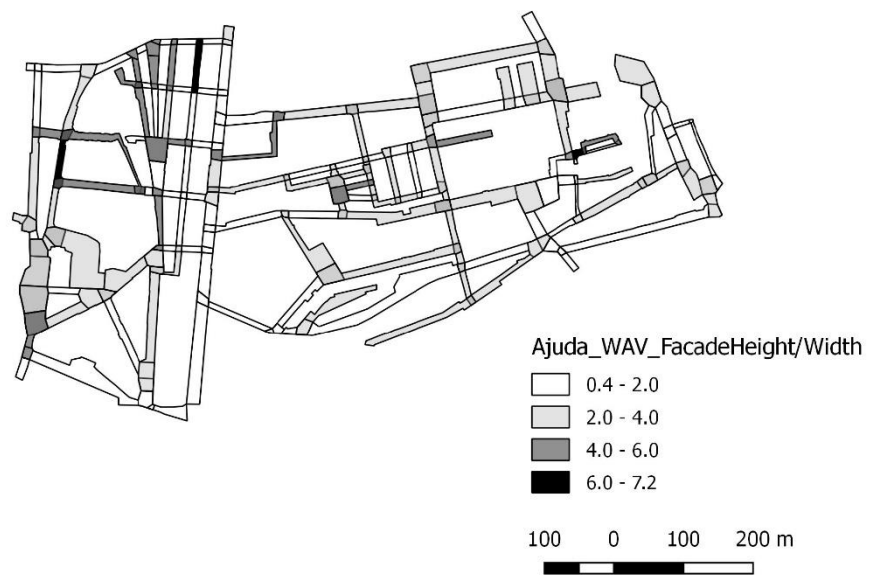
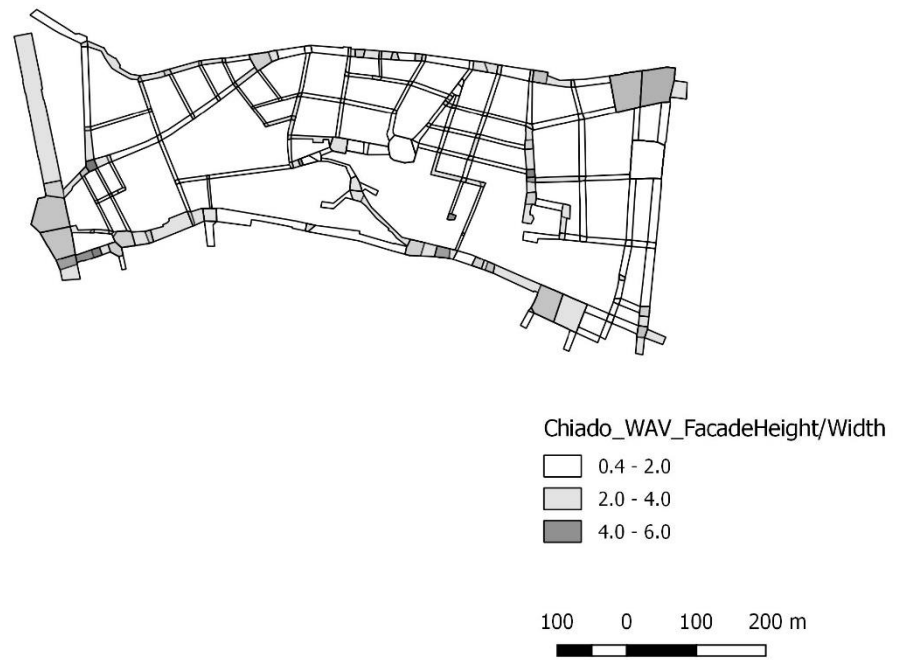


Figure C.28 : Lisbon WAV of facades height to width ratio.

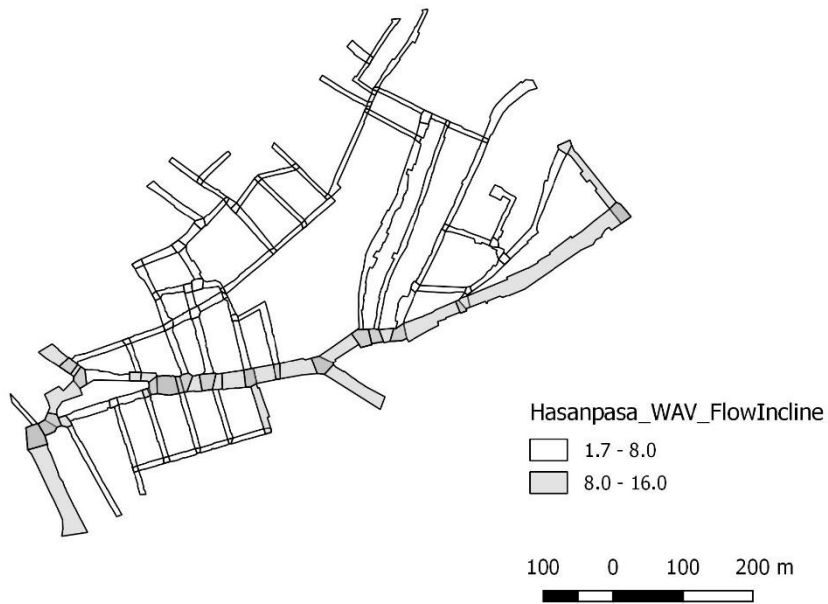
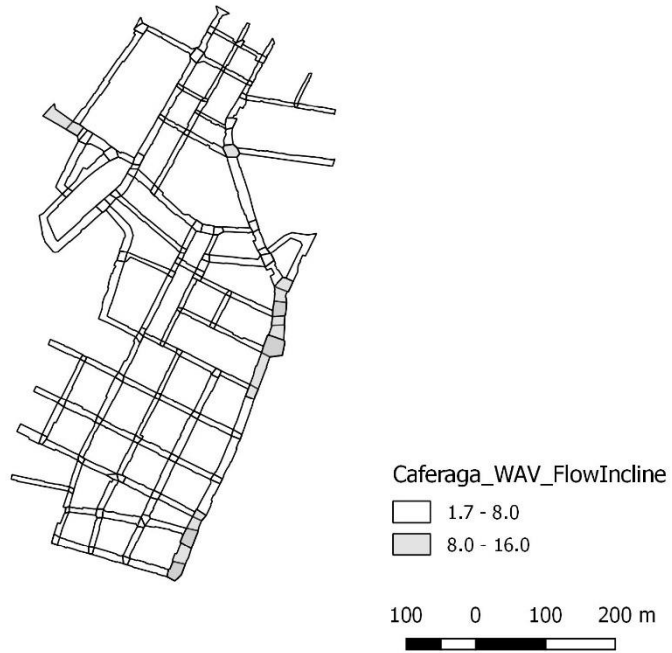


Figure C.29 : Istanbul WAV of flow inclines.

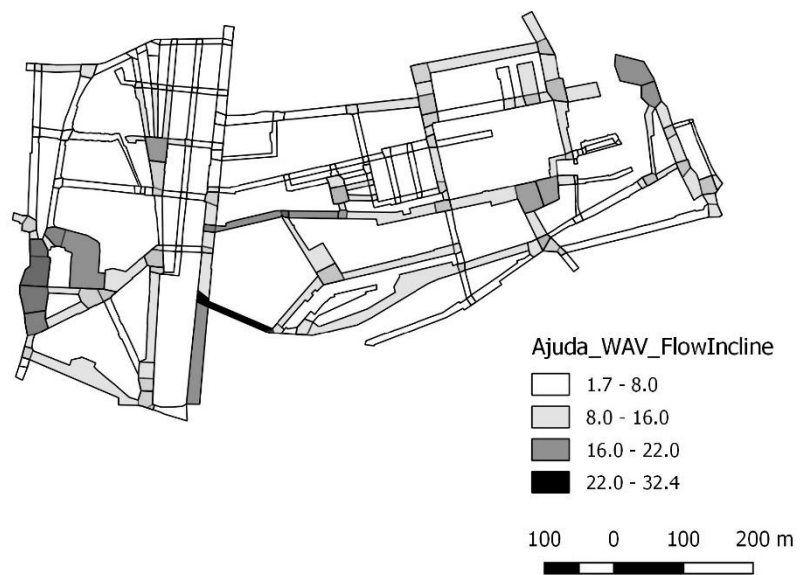
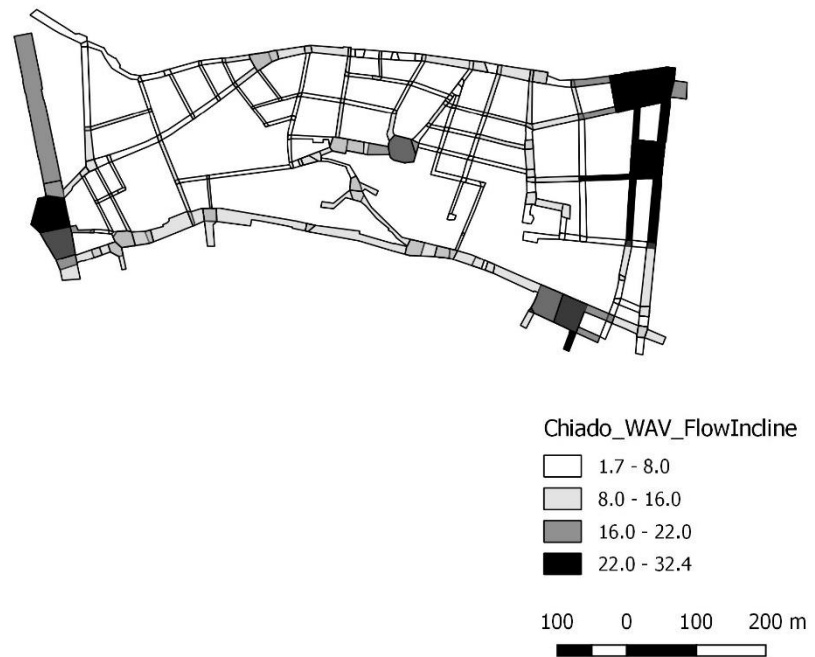


Figure C.30 : Lisbon WAV of flow inclines.

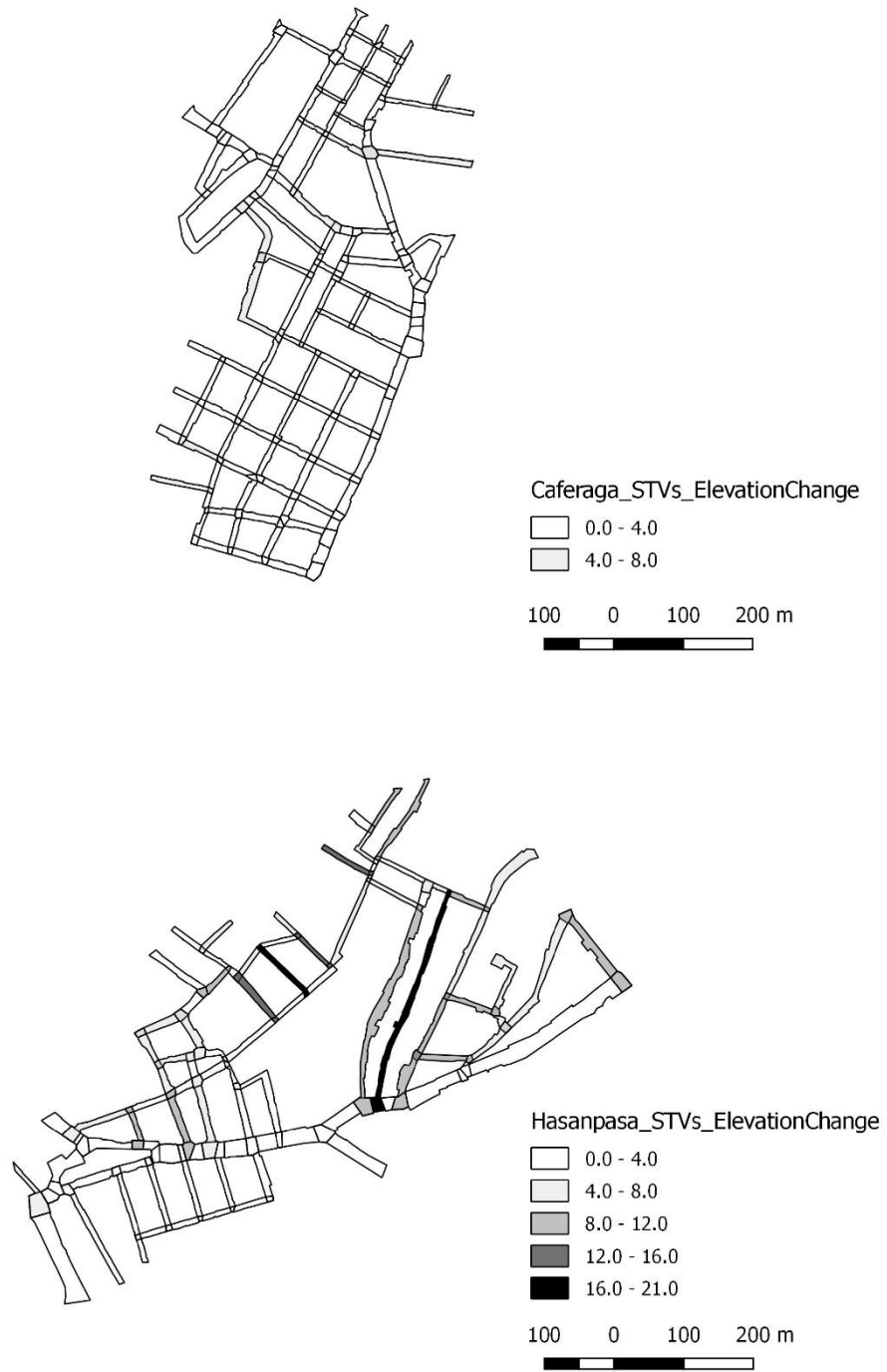


Figure C.31 : Istanbul max elevation change per STV.

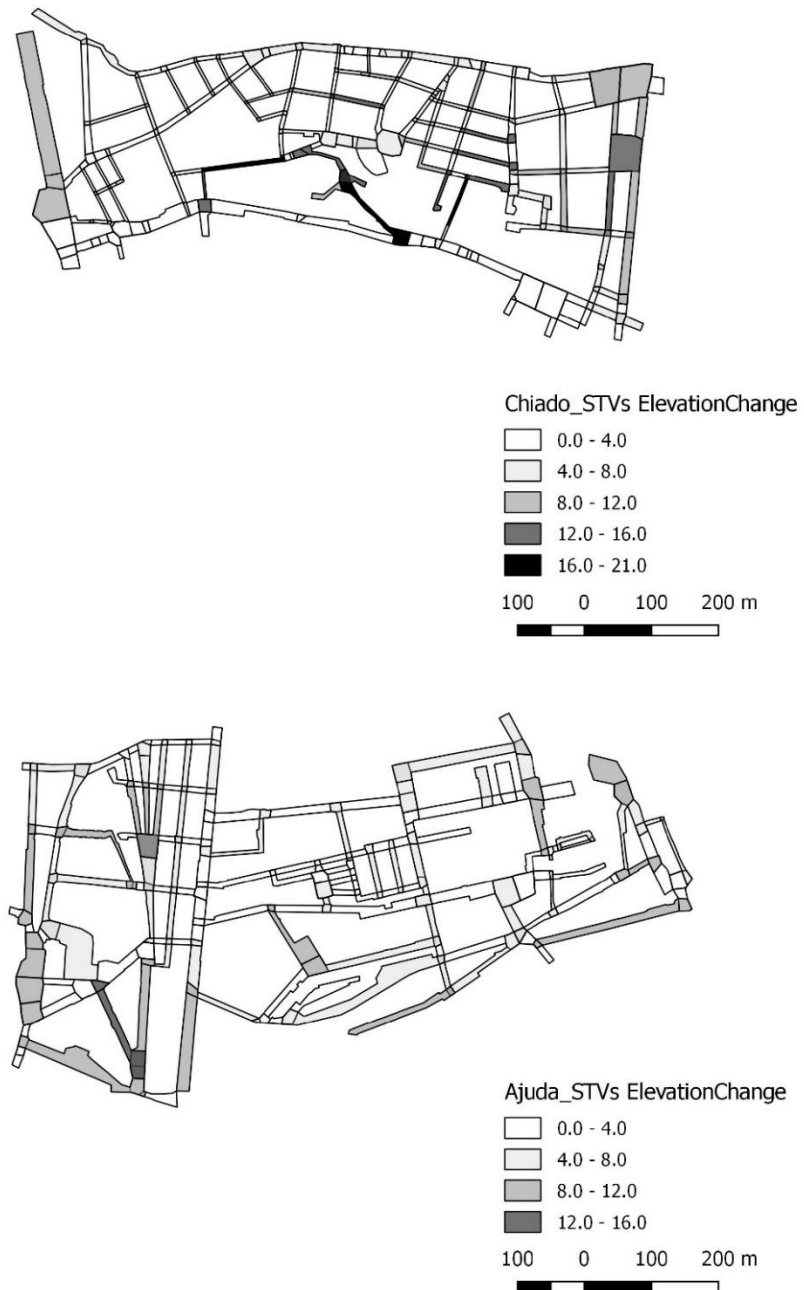


Figure C.32 : Lisbon max elevation change per STV.

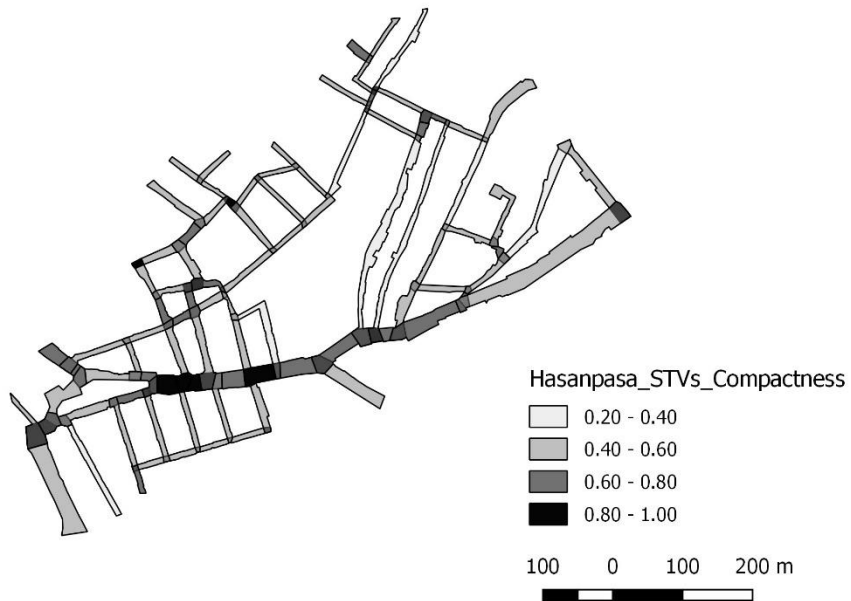
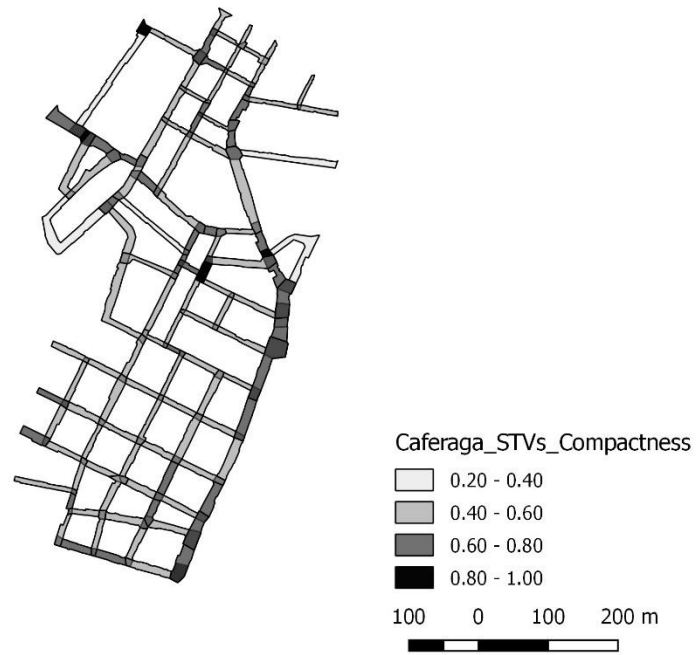


Figure C.33 : Istanbul STV Compactness.

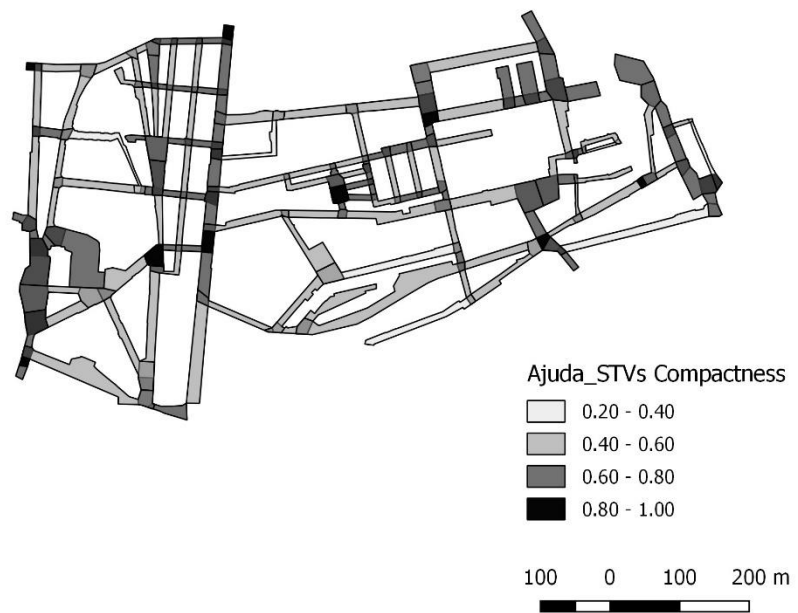


Figure C.34 : Lisbon STV Compactness.

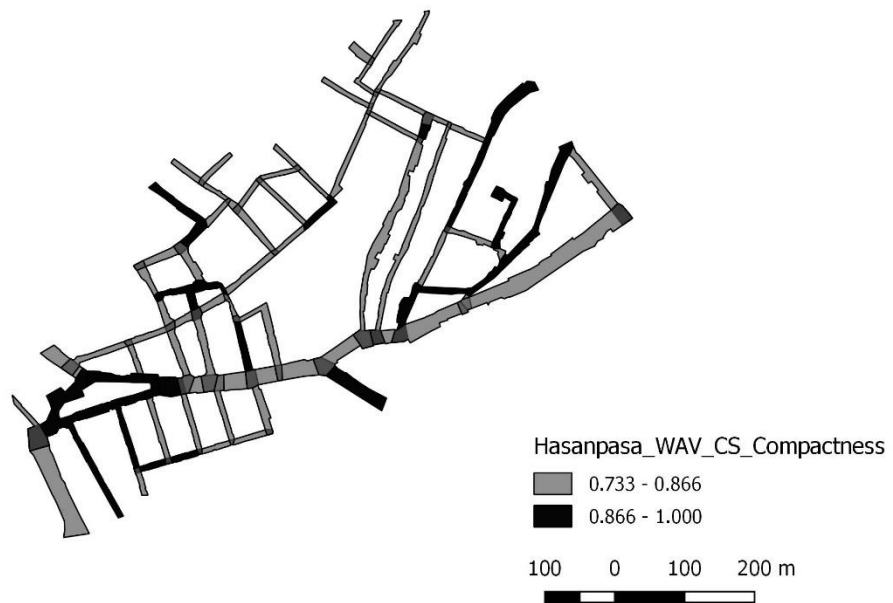
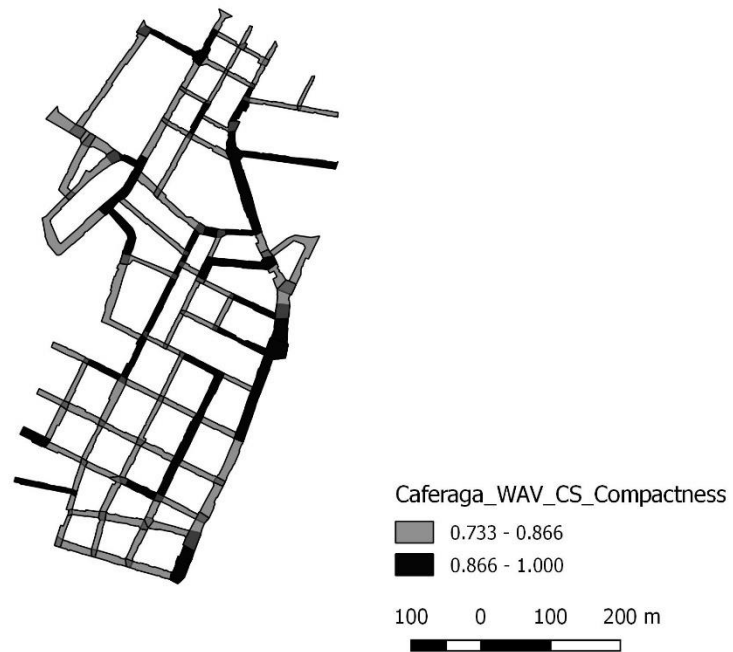


Figure C.35 : Istanbul WAv of Convex-Void Compactness values.

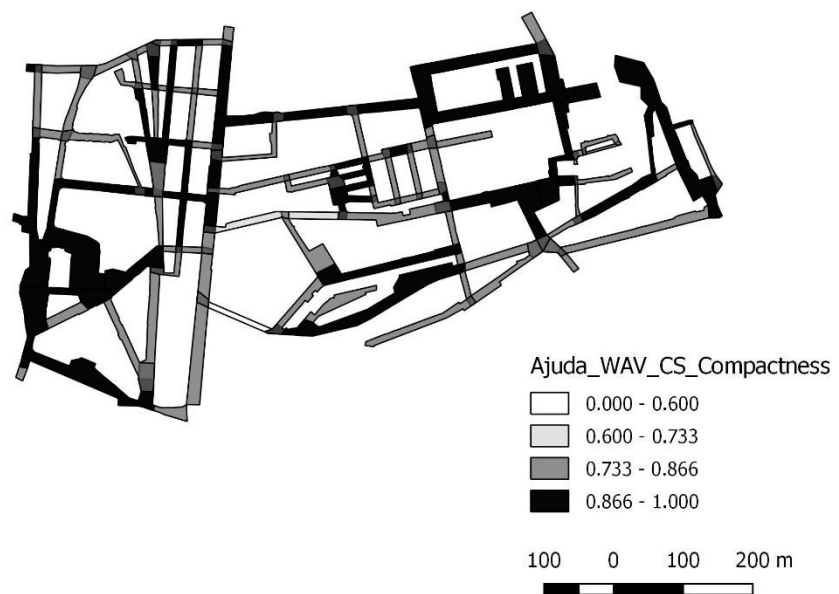
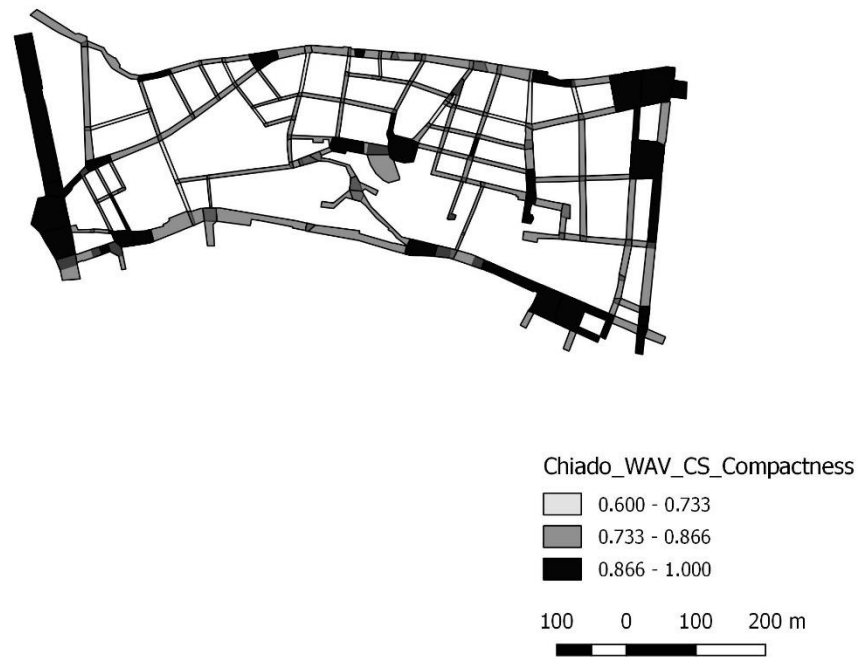


Figure C.36 : Lisbon WAv of Convex-Void Compactness values.

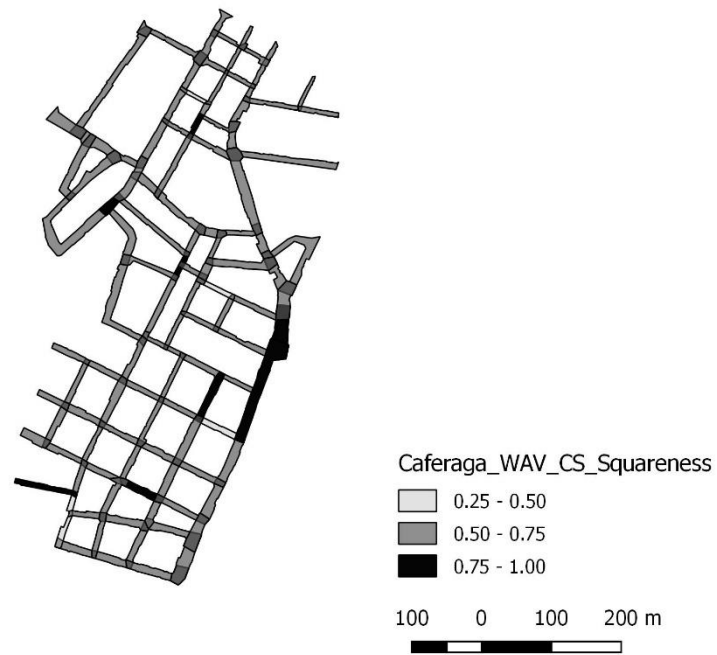


Figure C.37 : Istanbul WAV of Convex Space Squareness values.

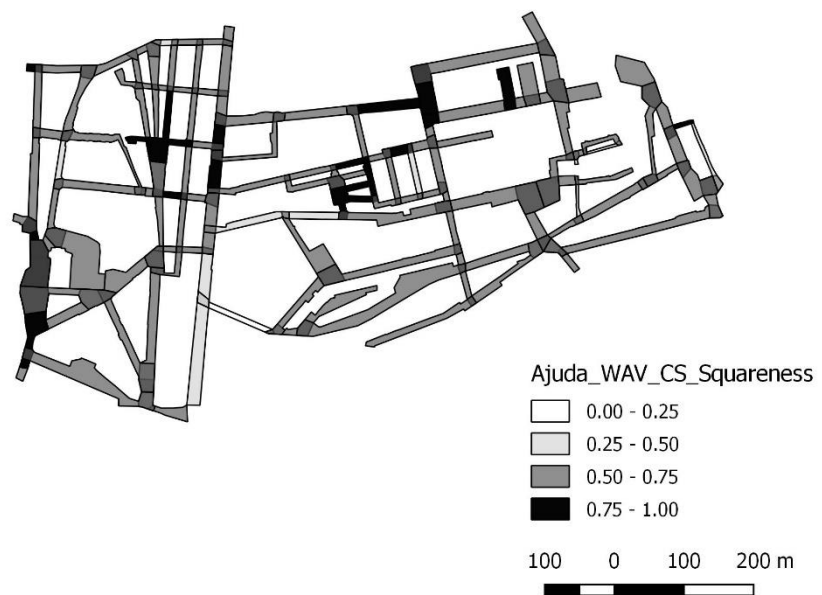


Figure C.38 : Lisbon WAV of Convex Space Squareness values.

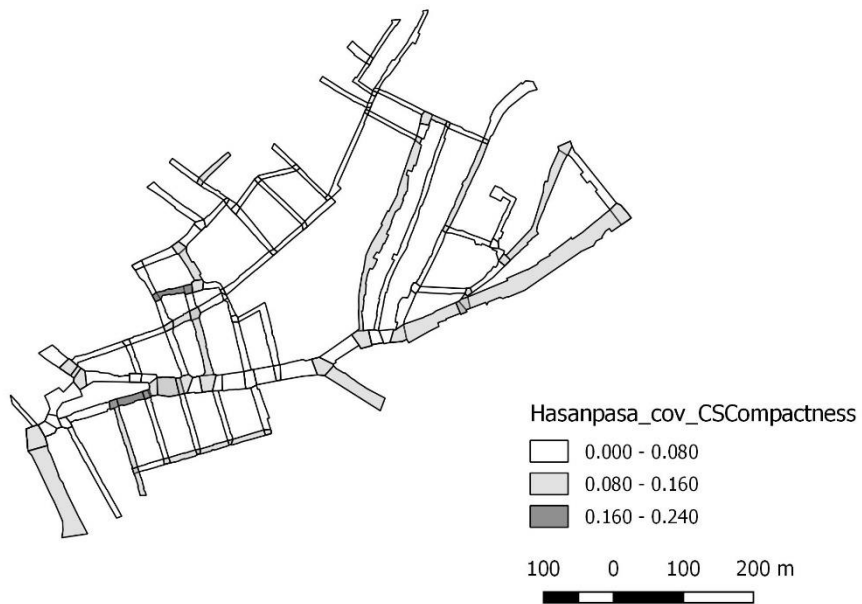
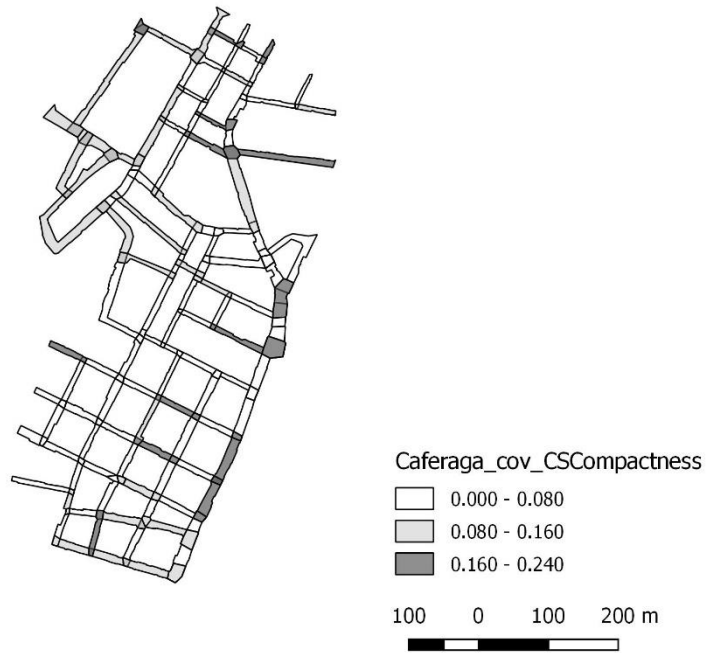


Figure C.39 : Istanbul Cov of Convex Space Compactness values.

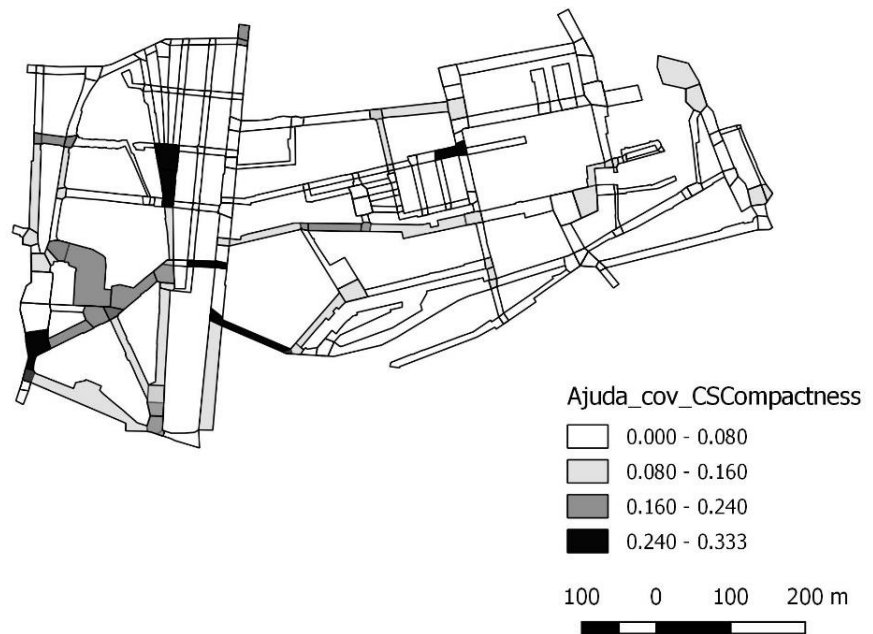


Figure C.40 : Lisbon Cov of Convex Space Compactness values.

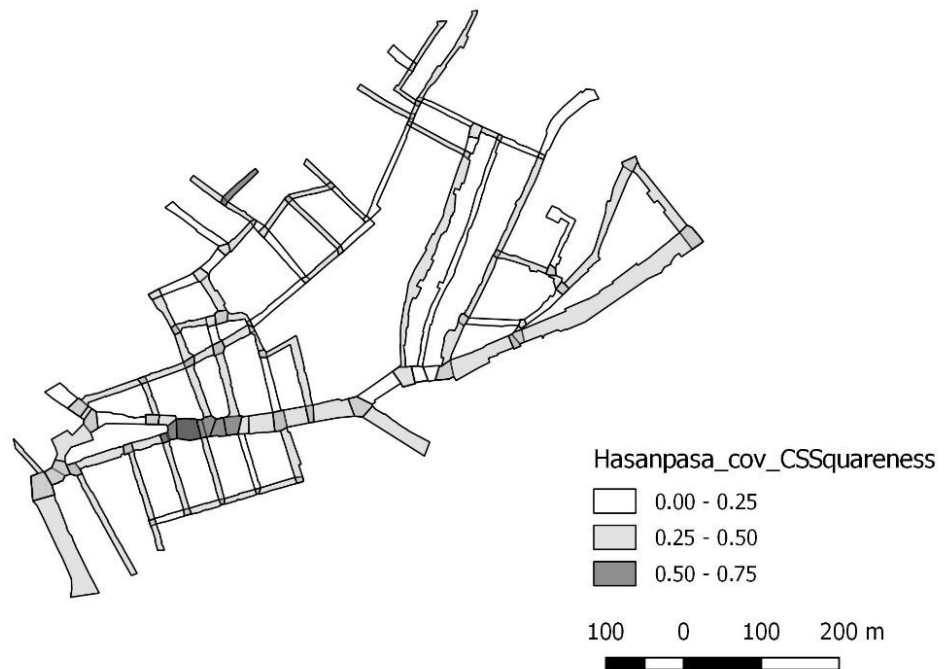
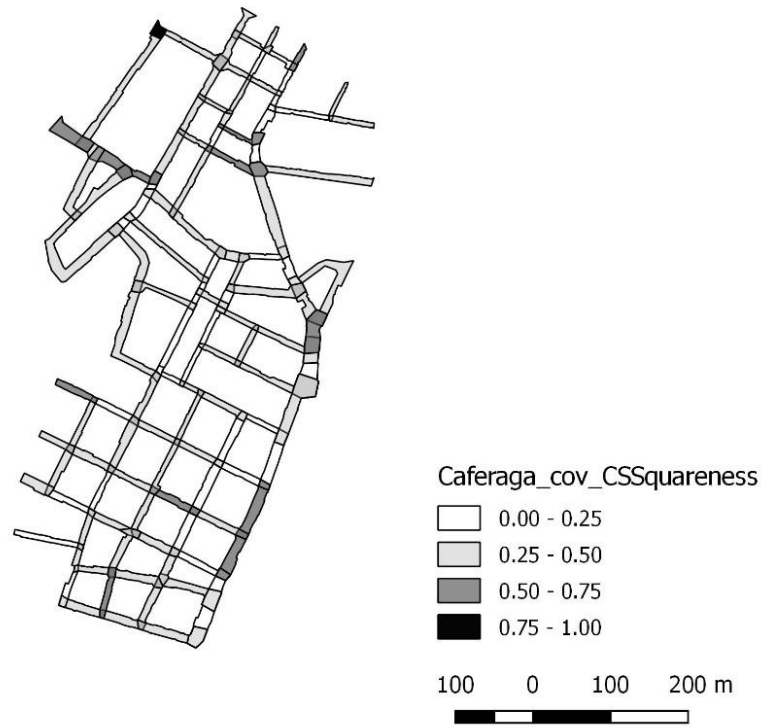


Figure C.41 : Istanbul Cov of Convex Space Squareness values.

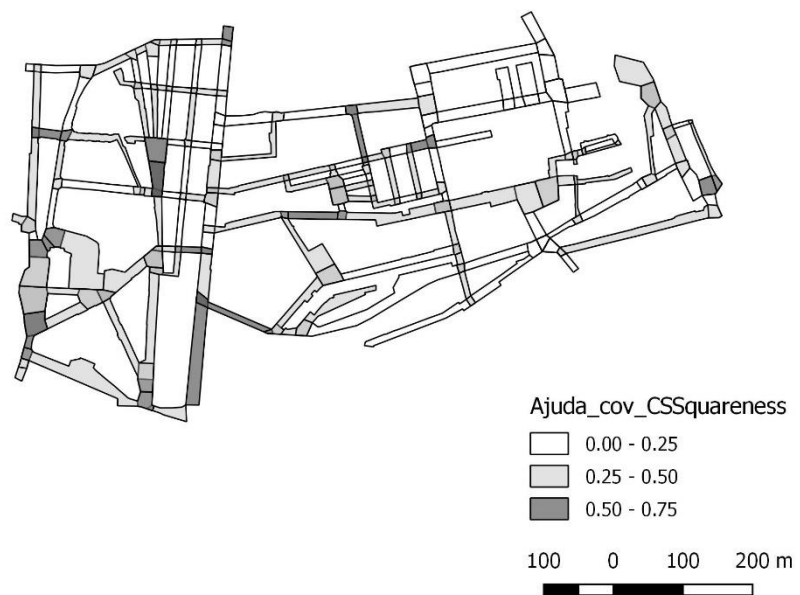
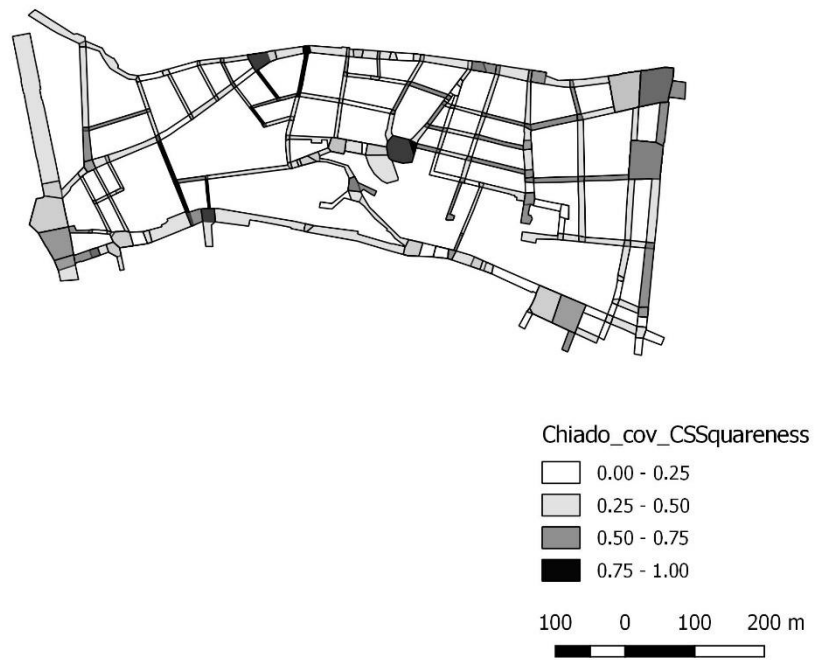


Figure C.42 : Lisbon Cov of Convex Space Squareness values.

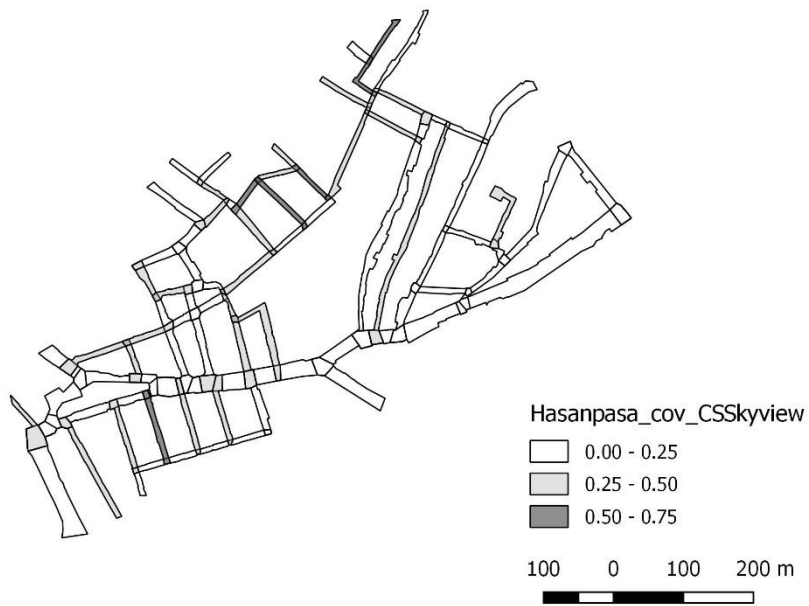
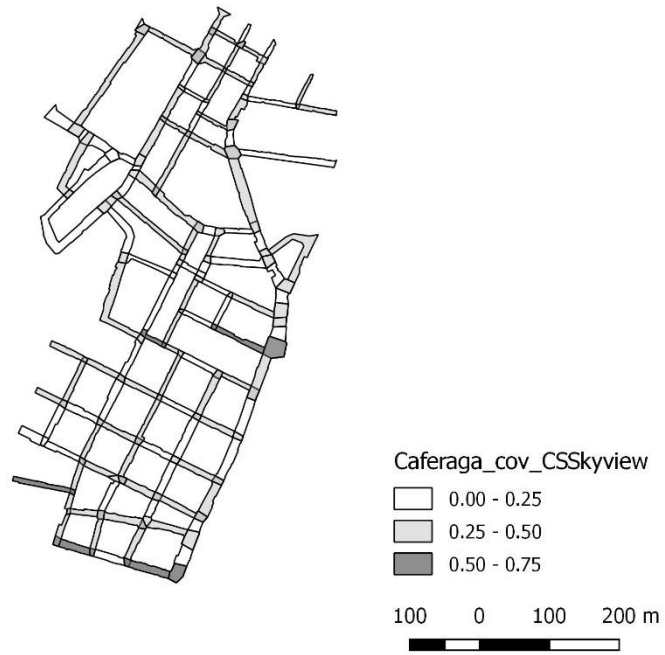


Figure C.43 : Istanbul Cov of Convex Space sky view factor values.

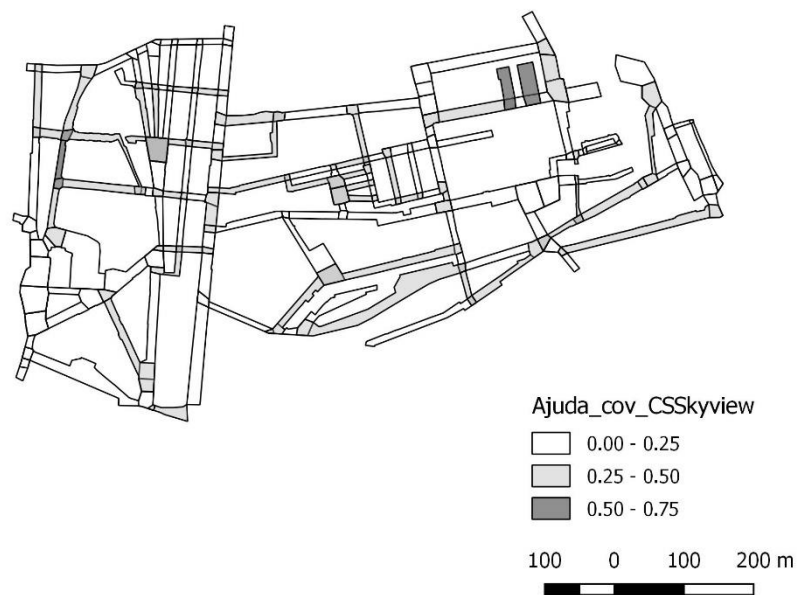
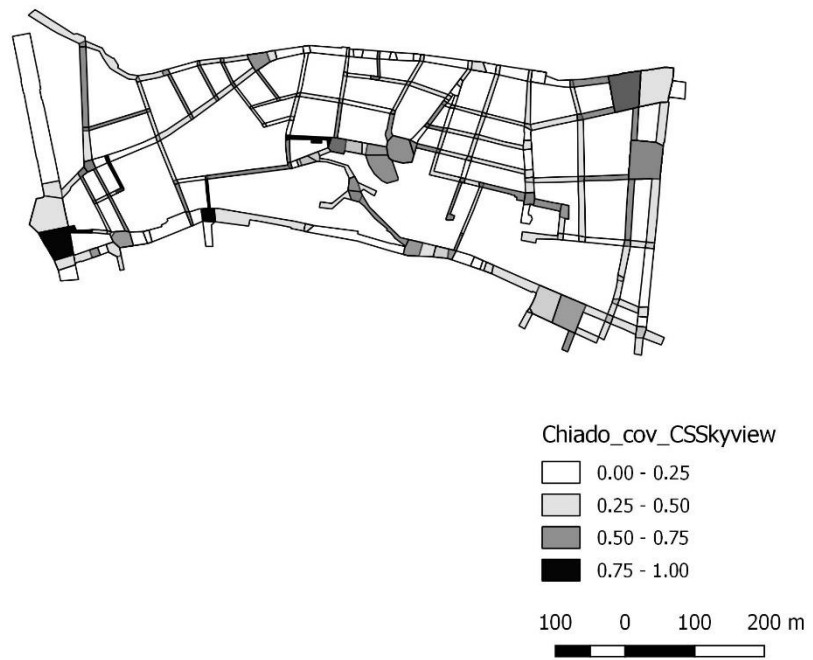


Figure C.44 : Lisbon Cov of Convex Space sky view factor values.

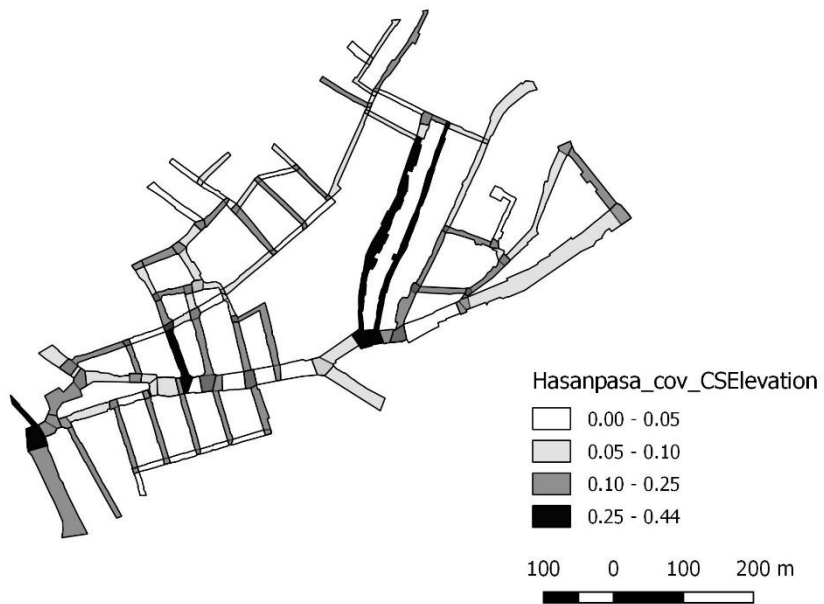
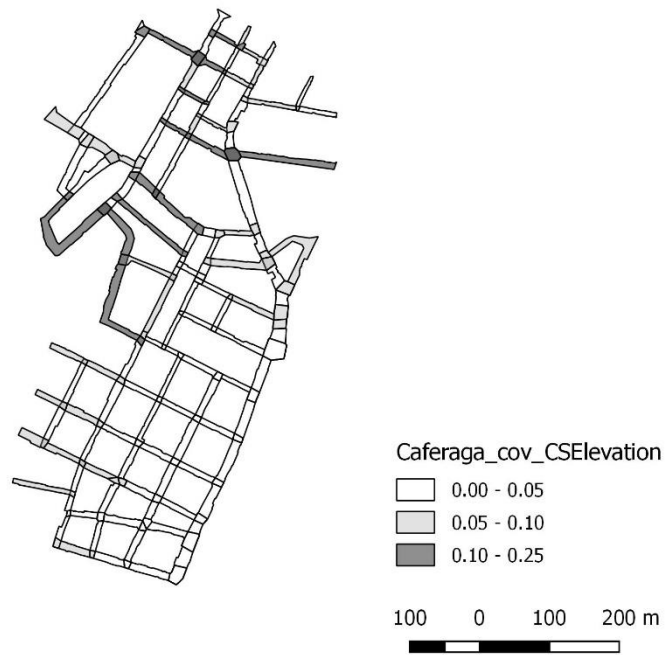


Figure C.45 : Istanbul Cov of Convex Space elevation values.

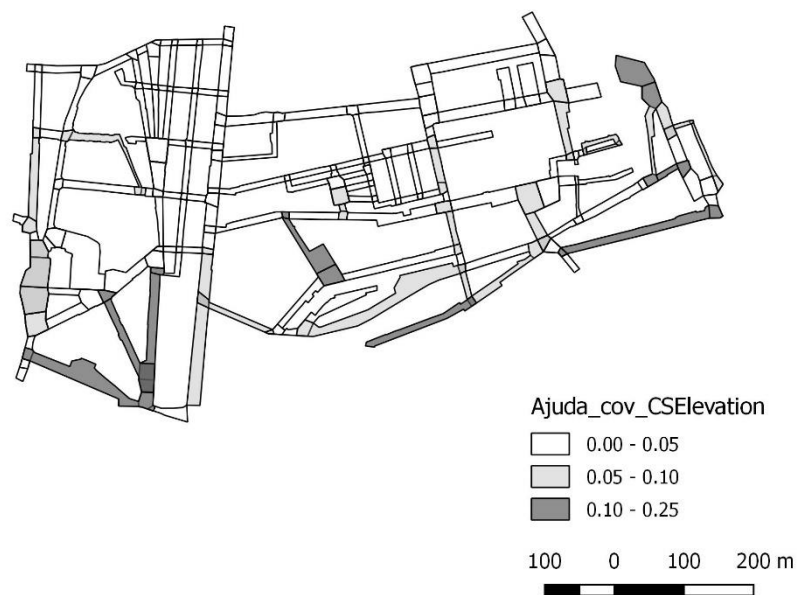
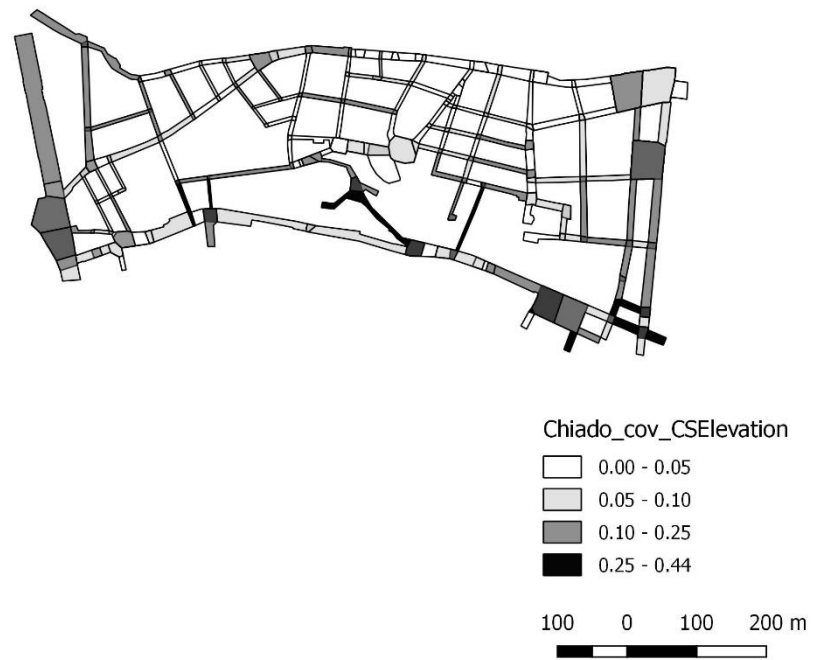


Figure C.46 : Lisbon Cov of Convex Space elevation values.

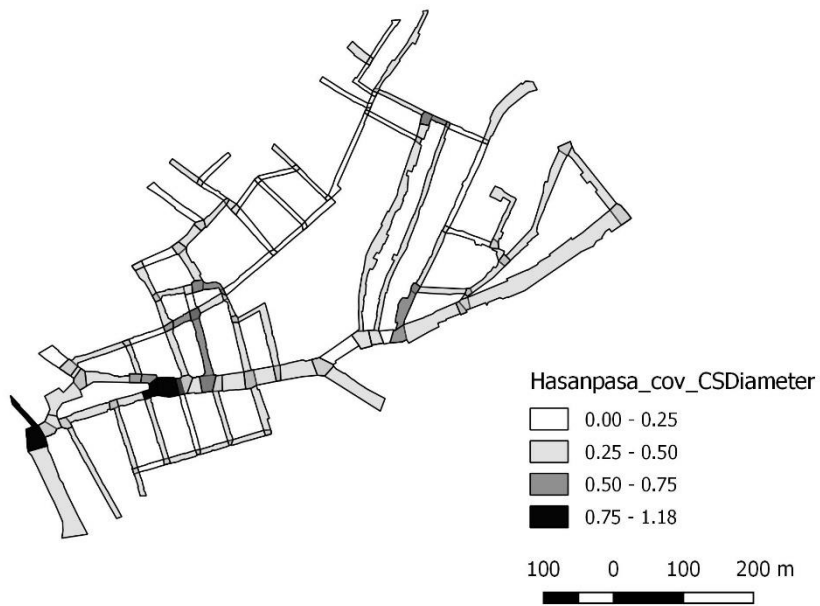
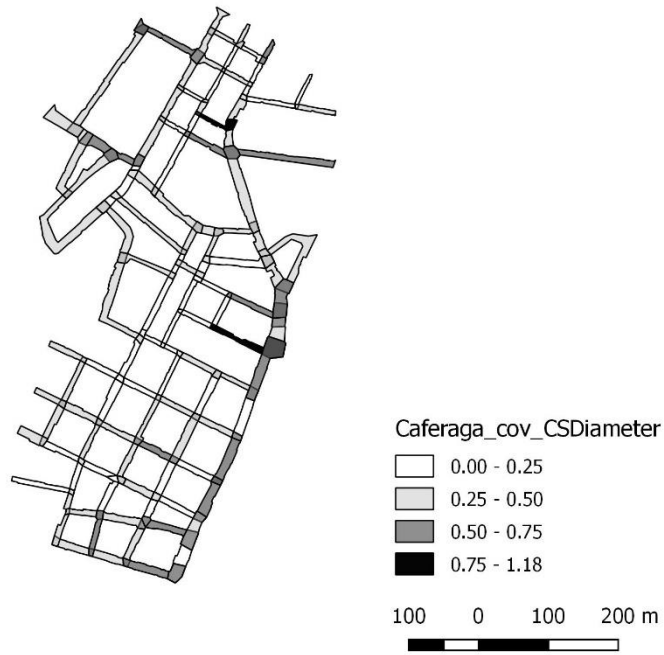


Figure C.47 : Istanbul Cov of Convex Space diameter values.

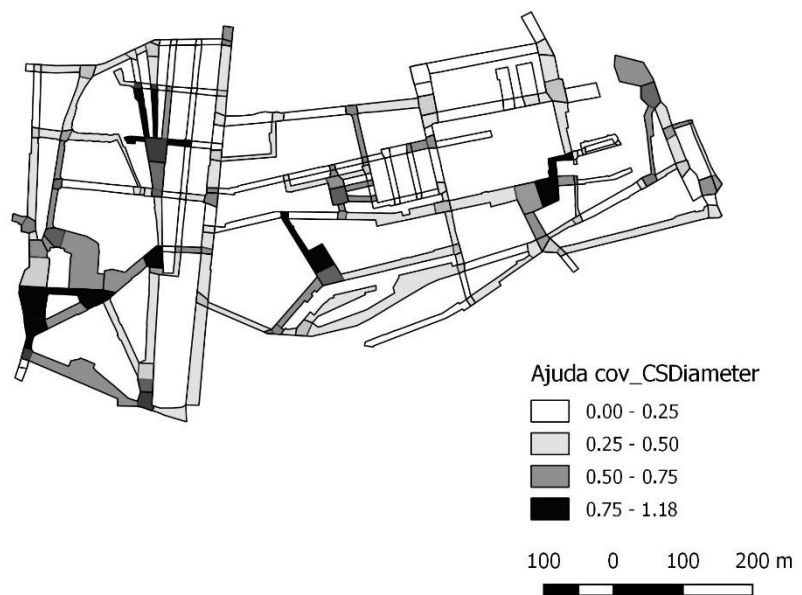
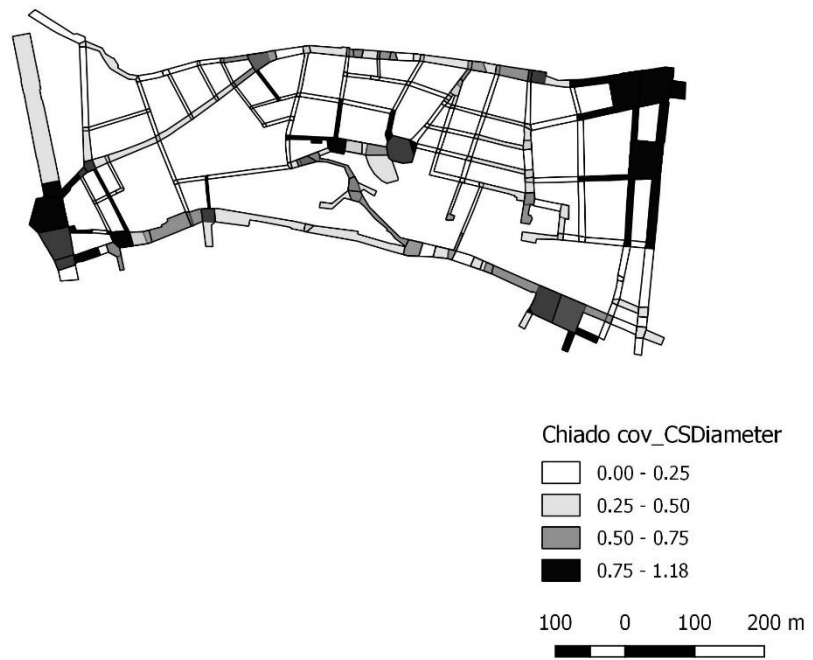


Figure C.48 : Lisbon Cov of Convex Space diameter values.

APPENDIX D

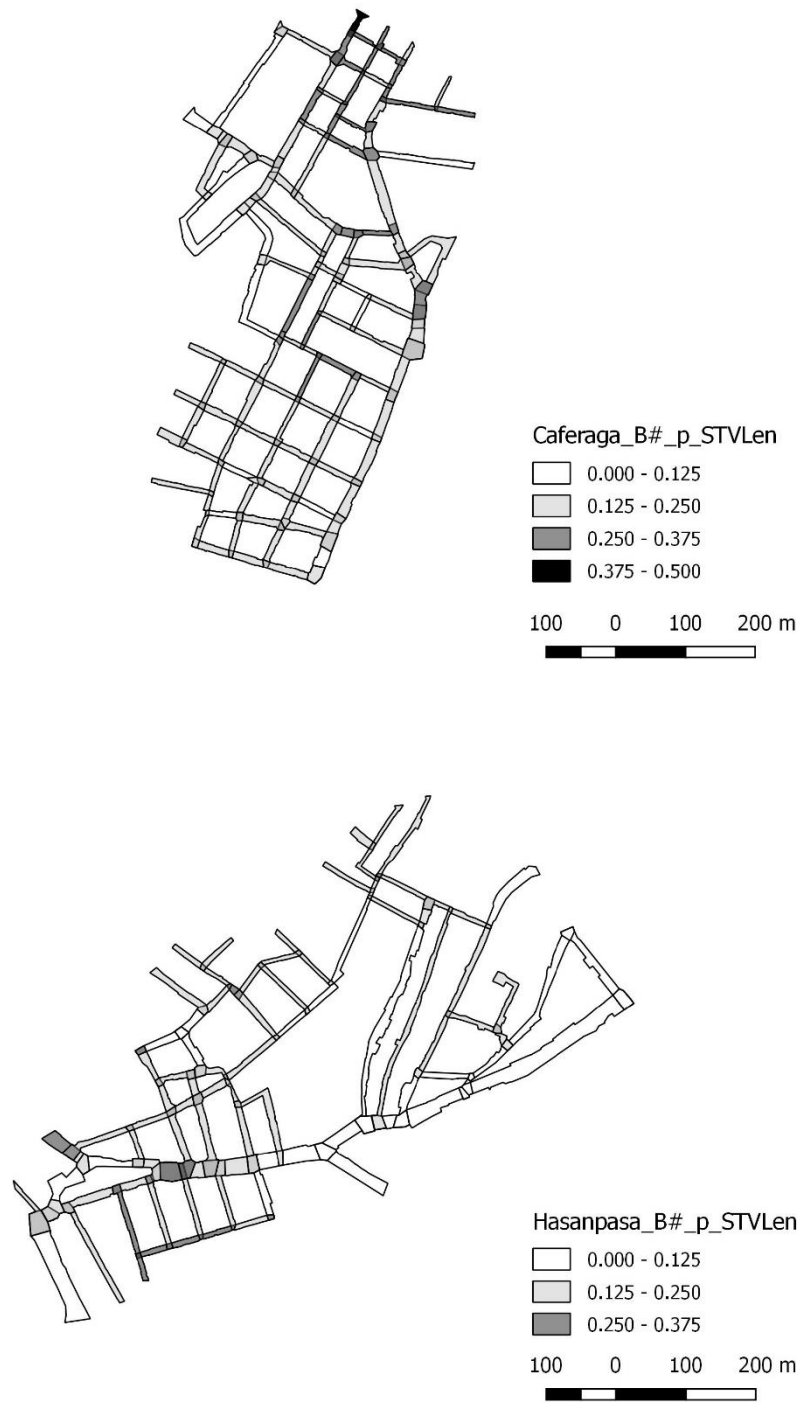


Figure D.1 : Istanbul number of buildings per STV length.

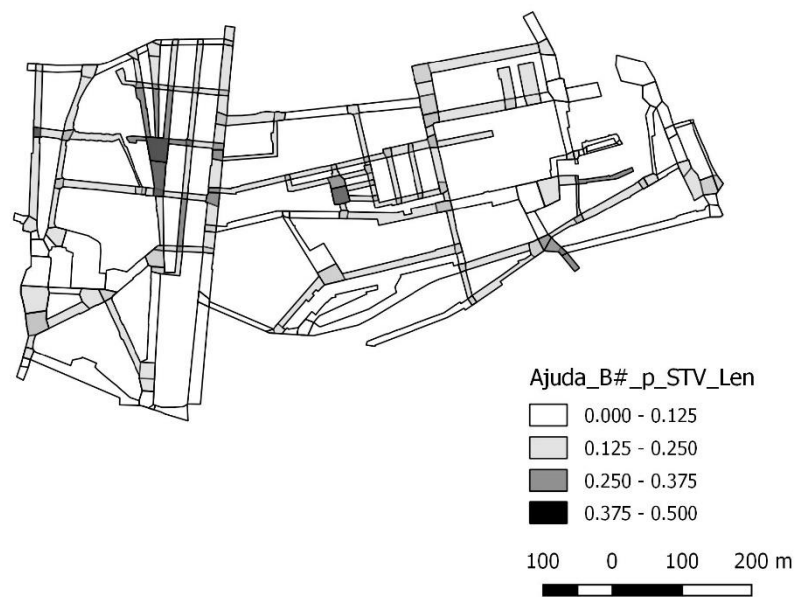
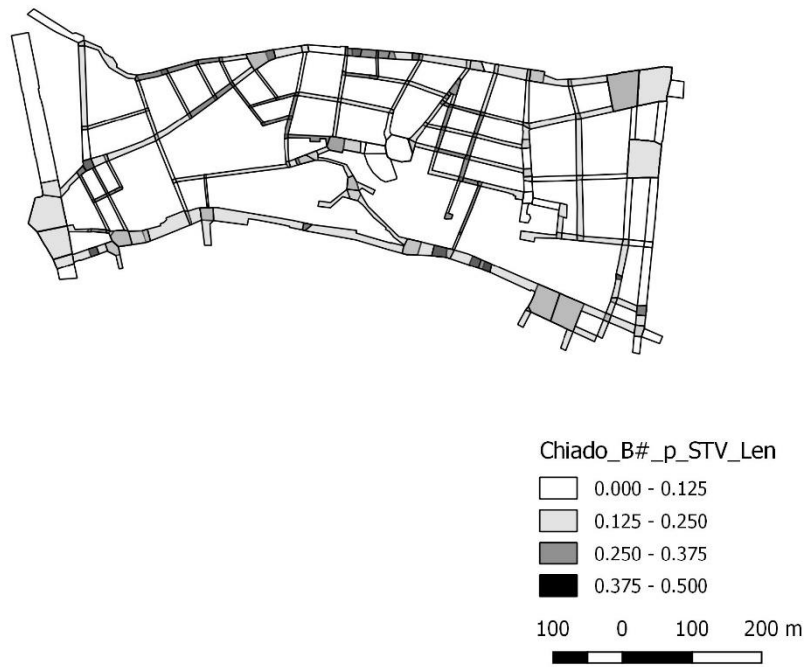


Figure D.2 : Lisbon number of buildings per STV length.

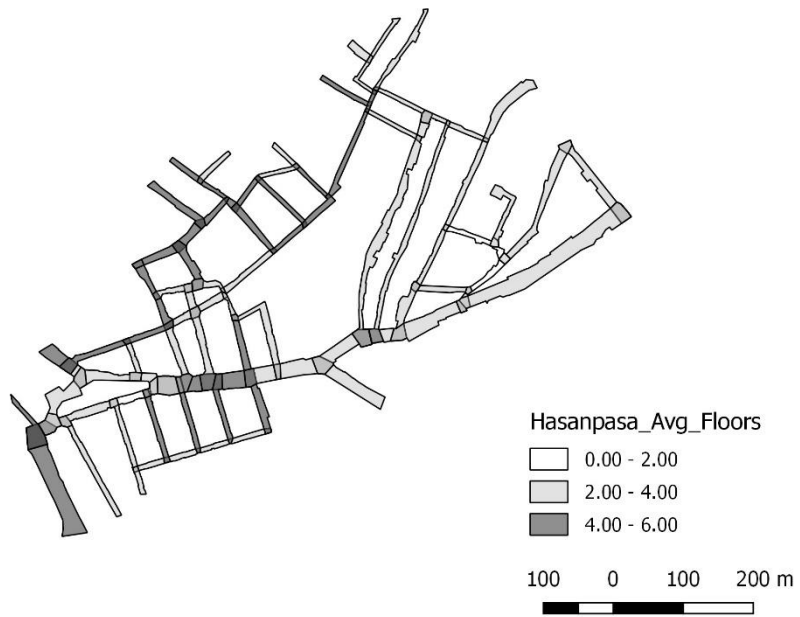
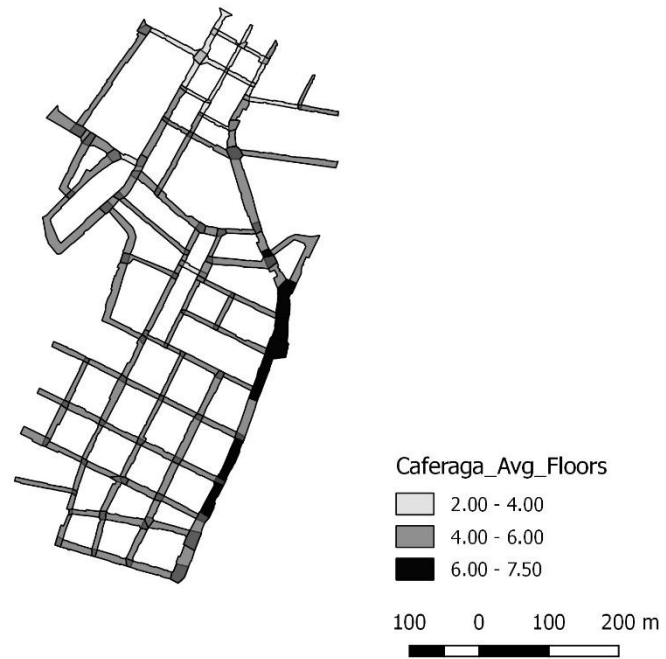


Figure D.3 : Istanbul average number of floors per building per STV.

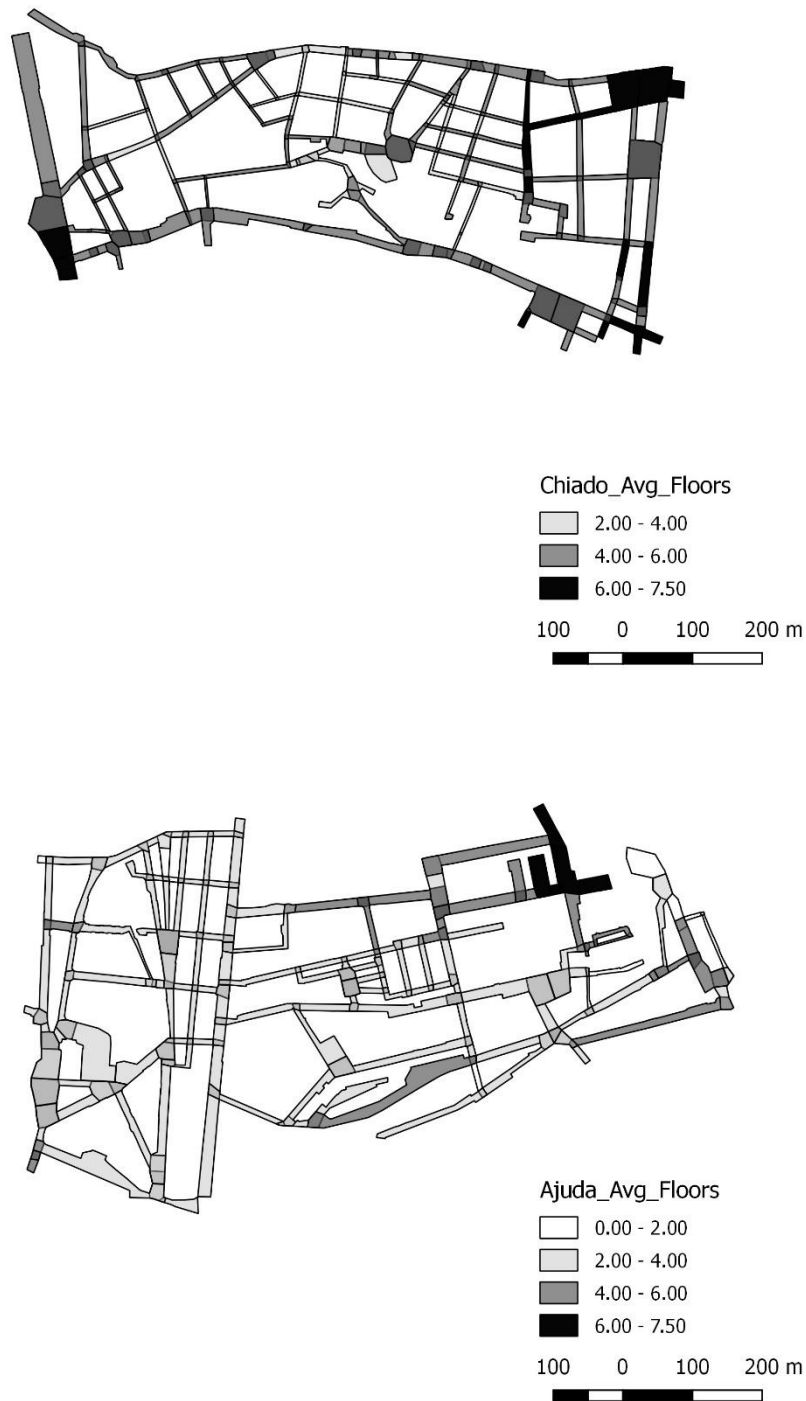


Figure D.4 : Lisbon average number of floors per building per STV.

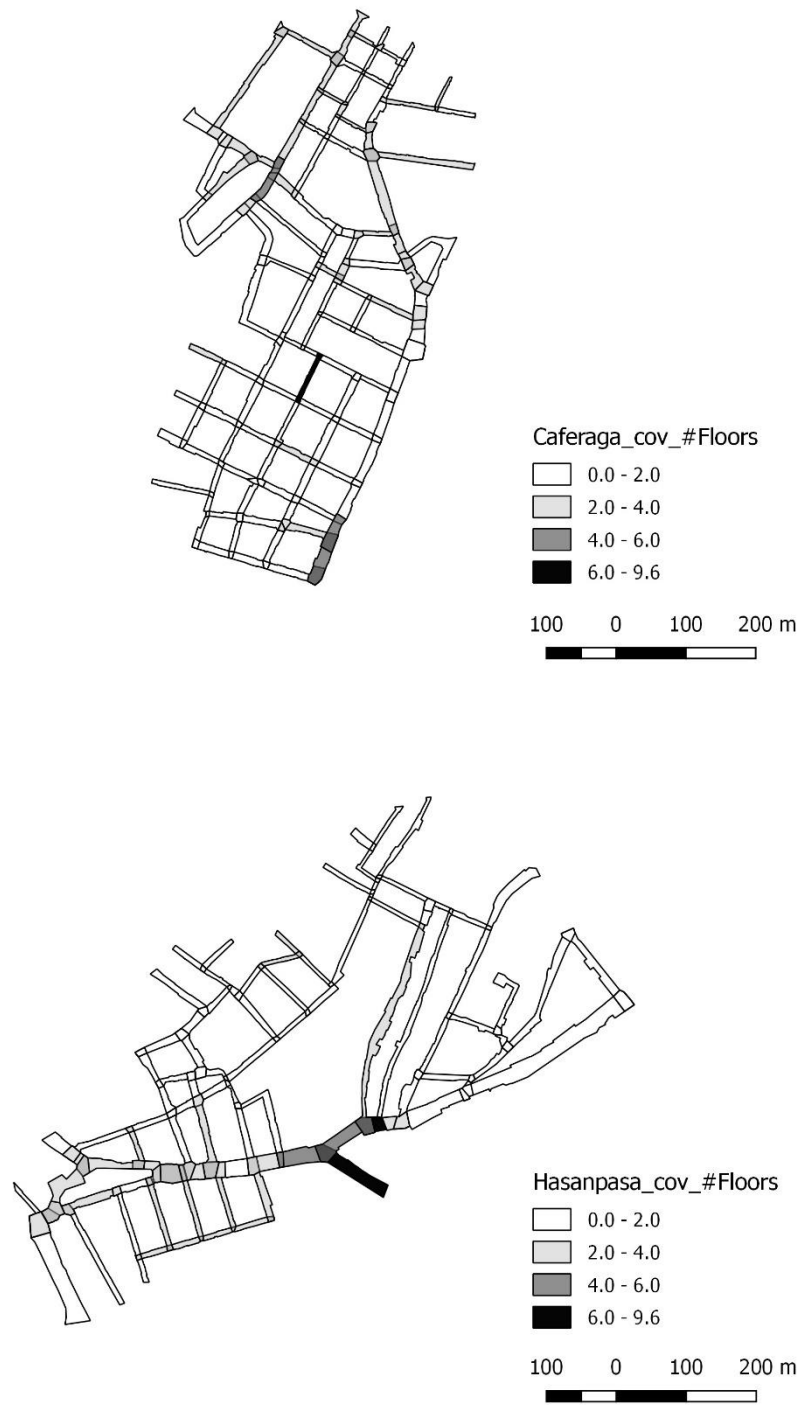


Figure D.5 : Istanbul Cov of number of floors per building per STV.

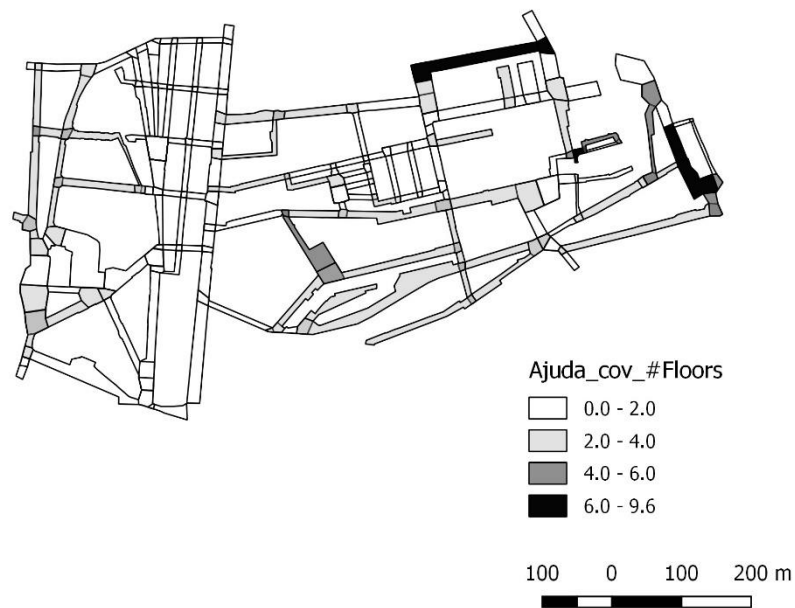
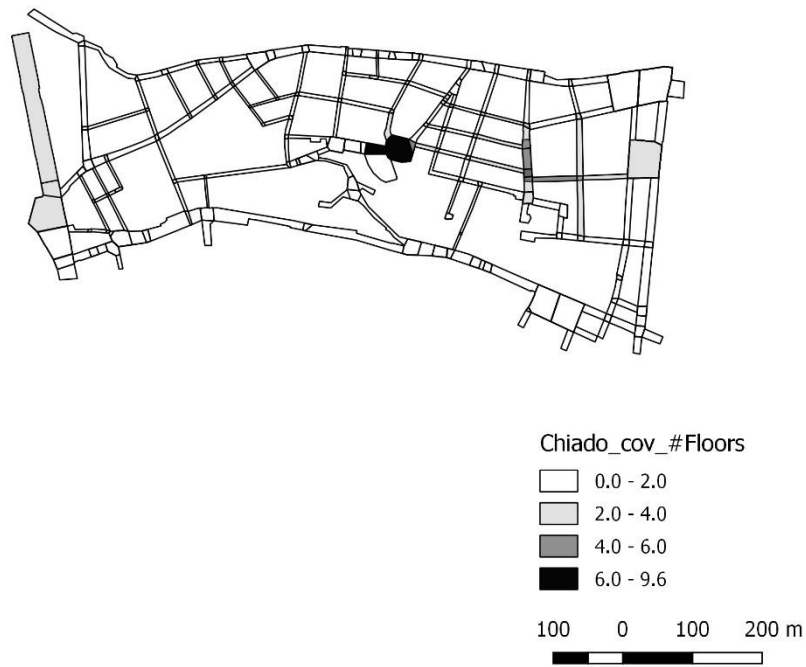


Figure D.6 : Lisbon Cov of number of floors per building per STV.

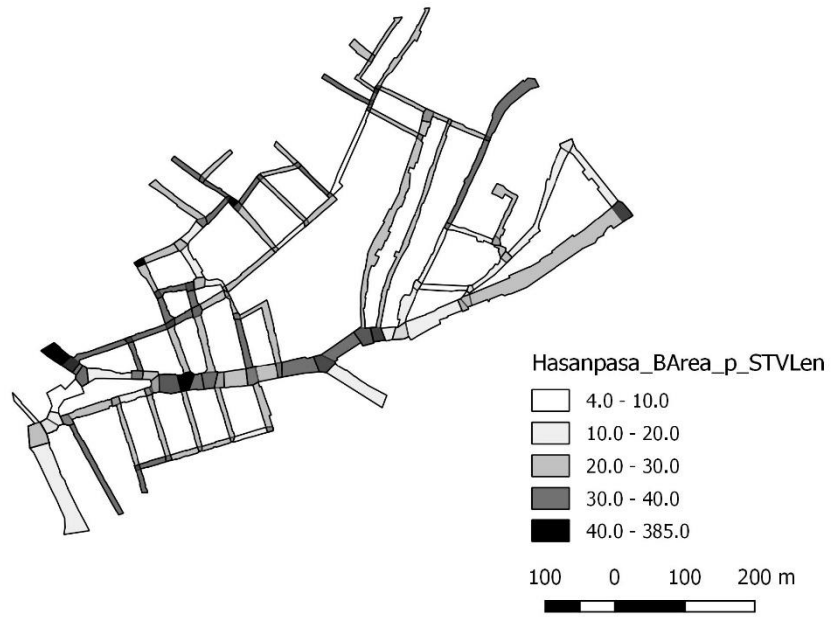
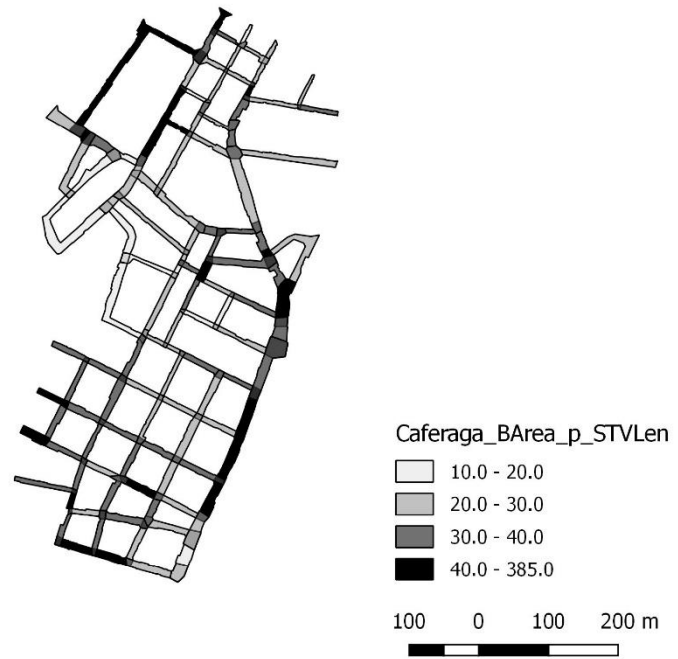


Figure D.7 : Istanbul total building footprint area per STV length.

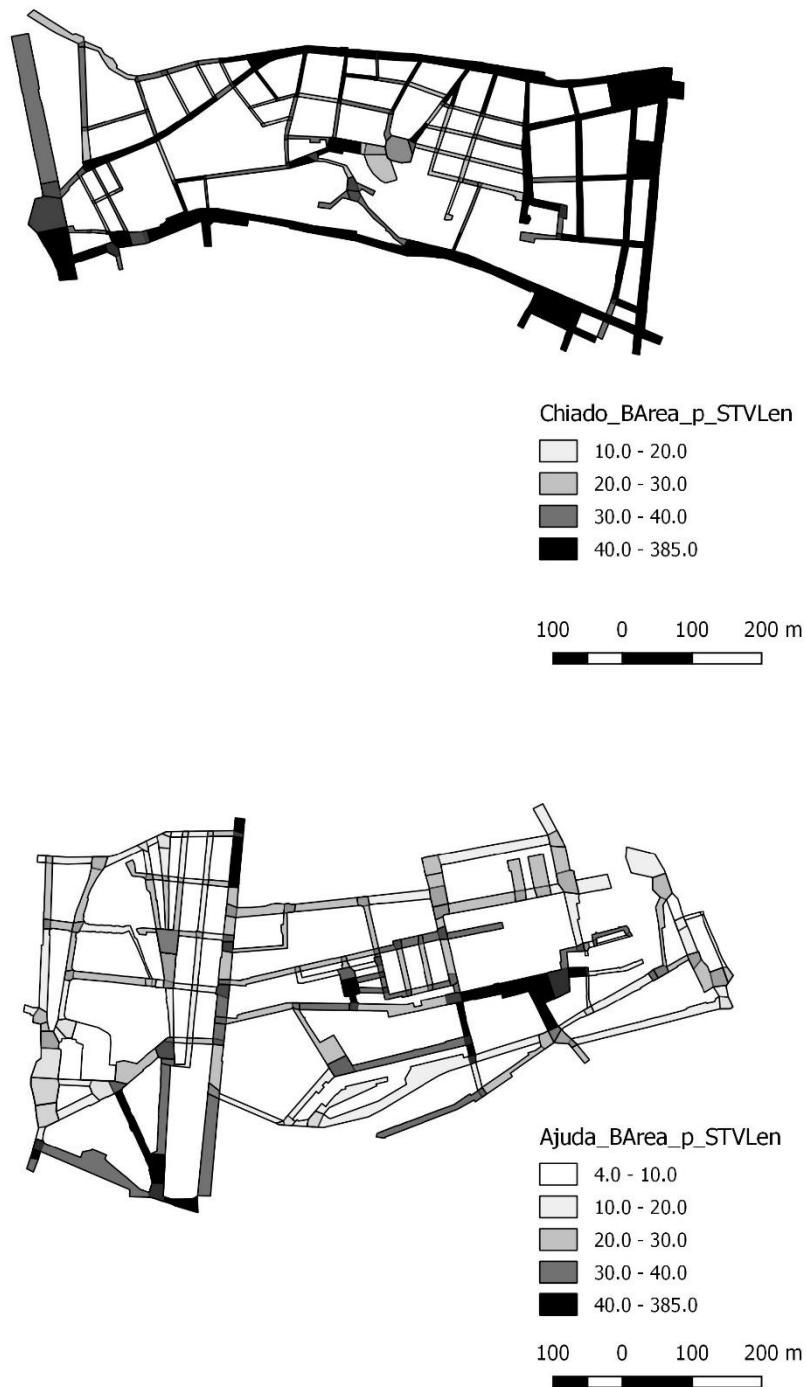


Figure D.8 : Lisbon total building footprint area per STV length.

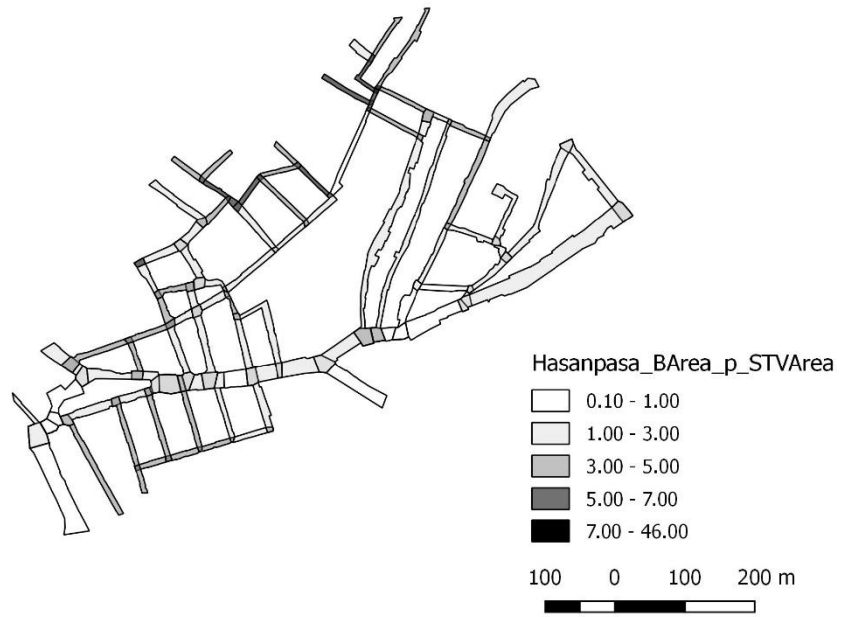
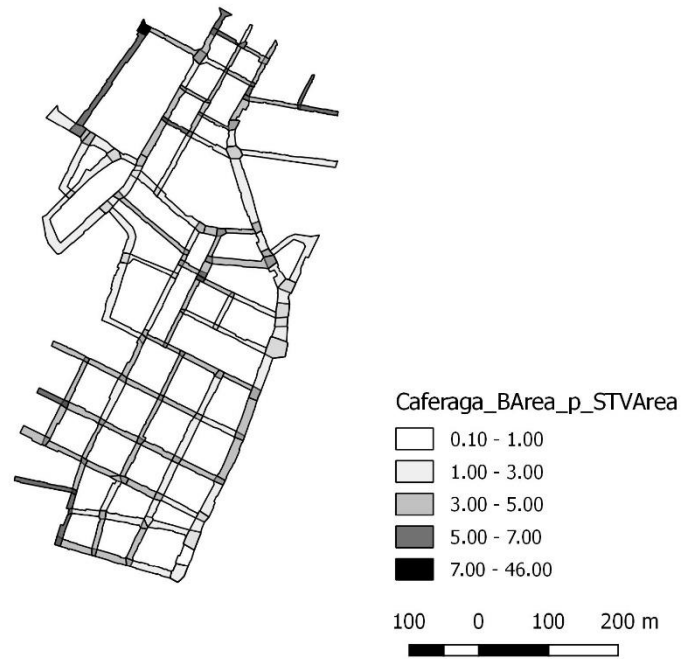


Figure D.9 : Istanbul total building footprint area per STV area.

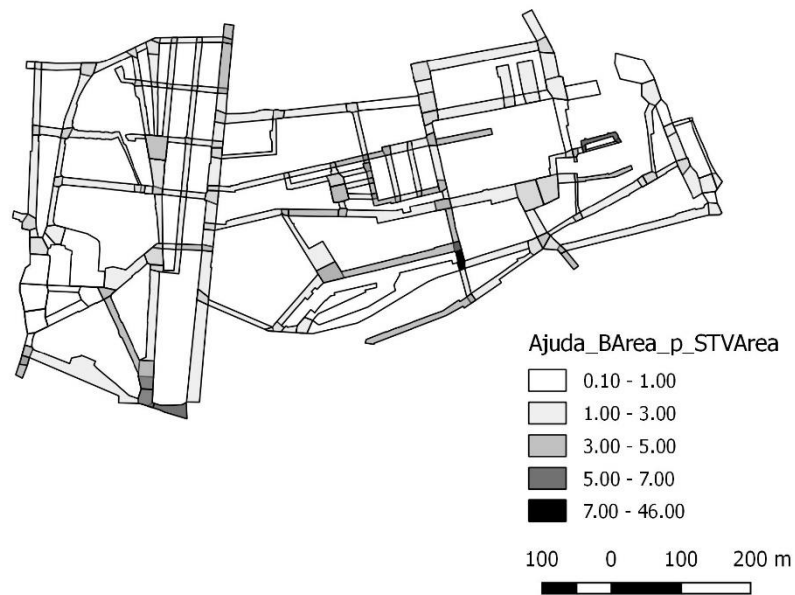


Figure D.10 : Lisbon total building footprint area per STV area.

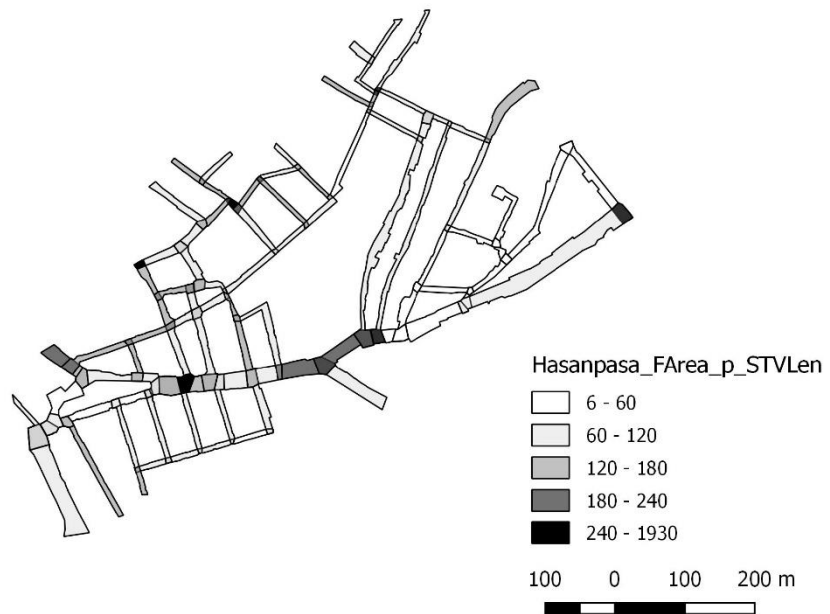
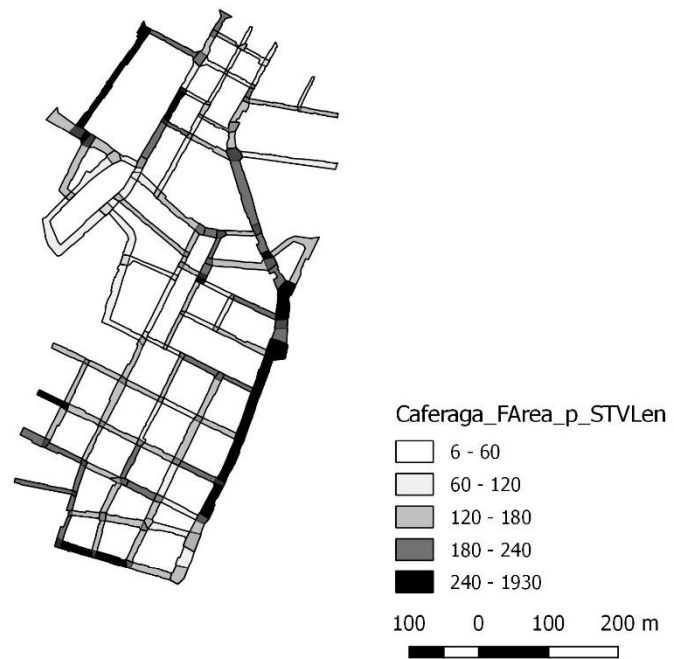


Figure D.11 : Istanbul total building floor area per STV length.

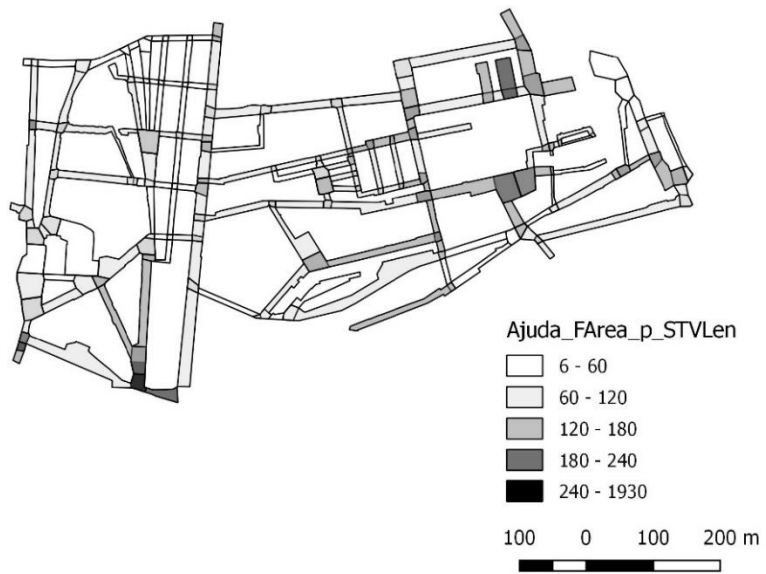


Figure D.12 : Lisbon total building floor area per STV length.

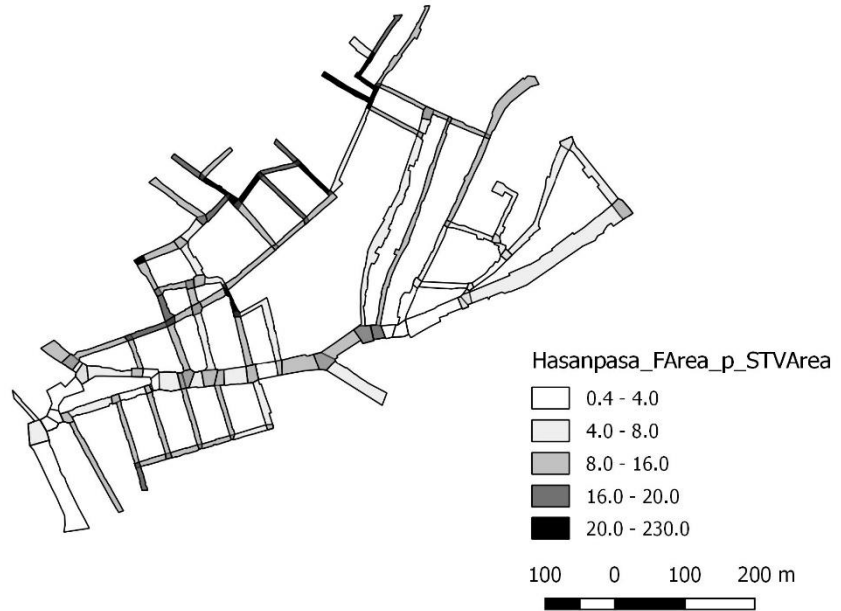
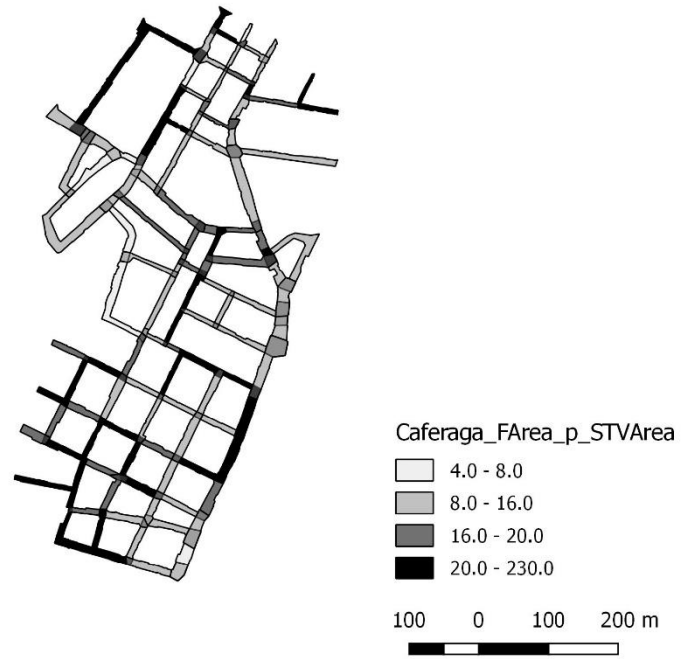


Figure D.13 : Istanbul total building floor area per STV area.

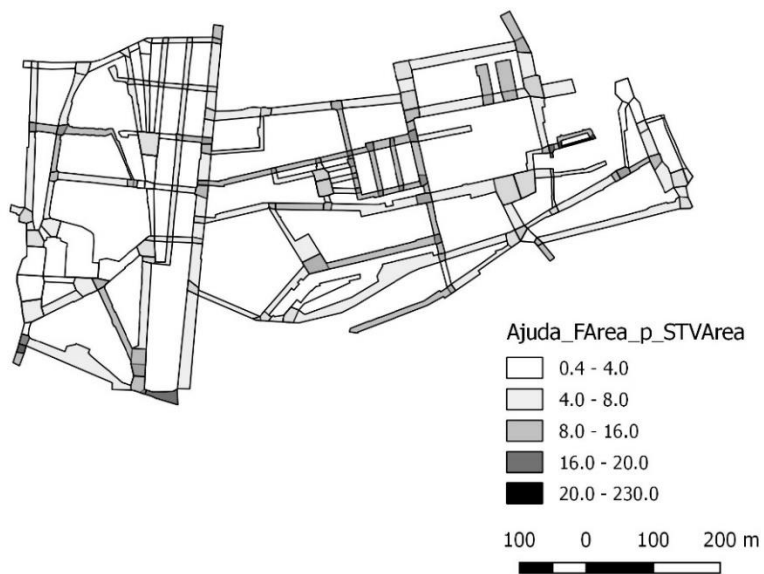
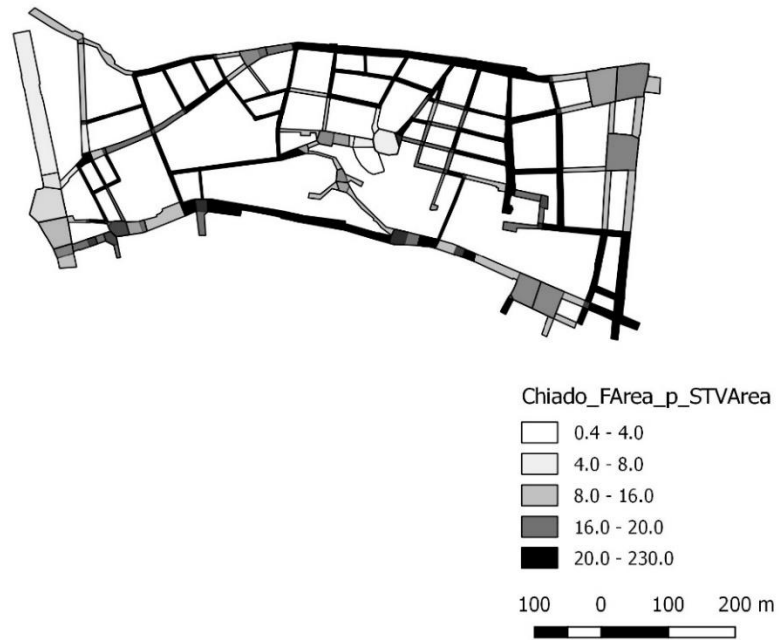


Figure D.14 : Lisbon total building floor area per STV area.

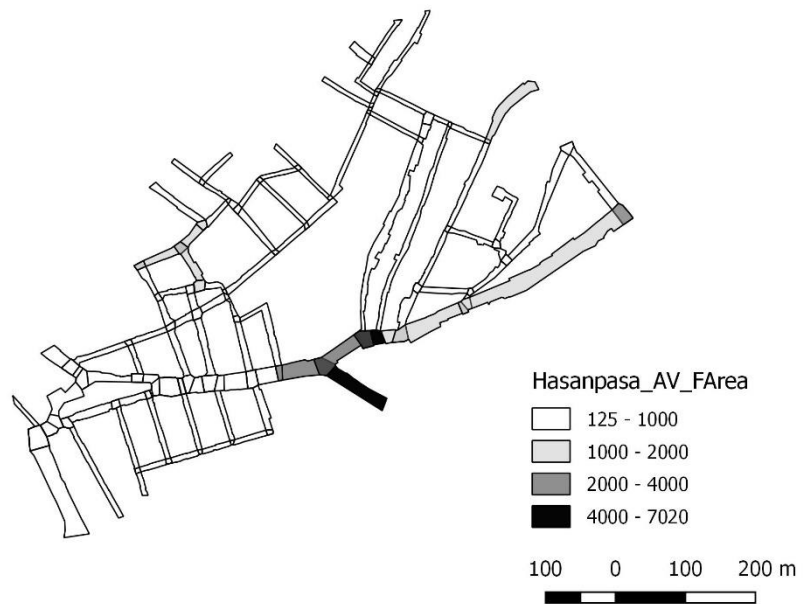
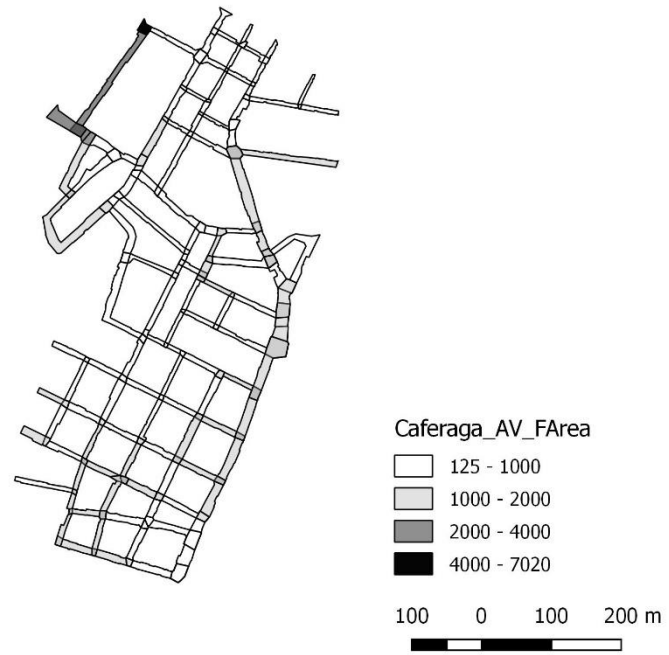


Figure D.15 : Istanbul average floor area per building per STV.

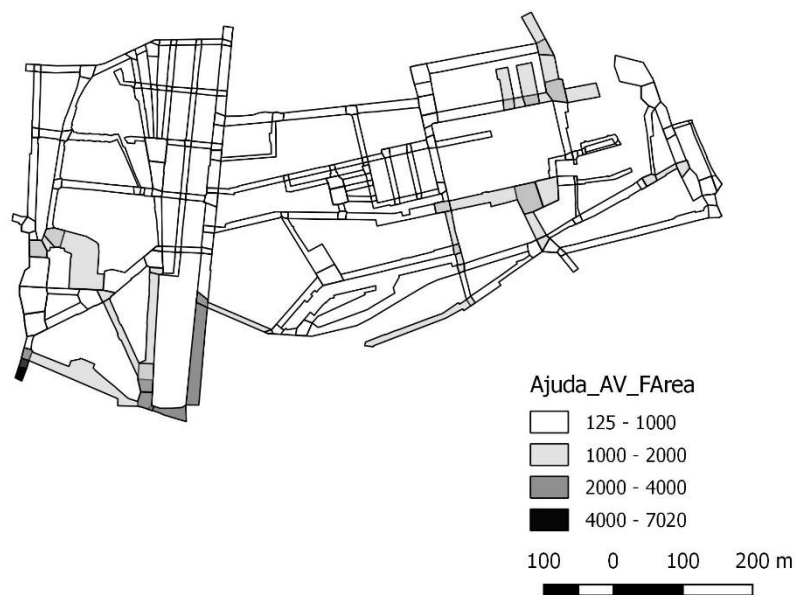
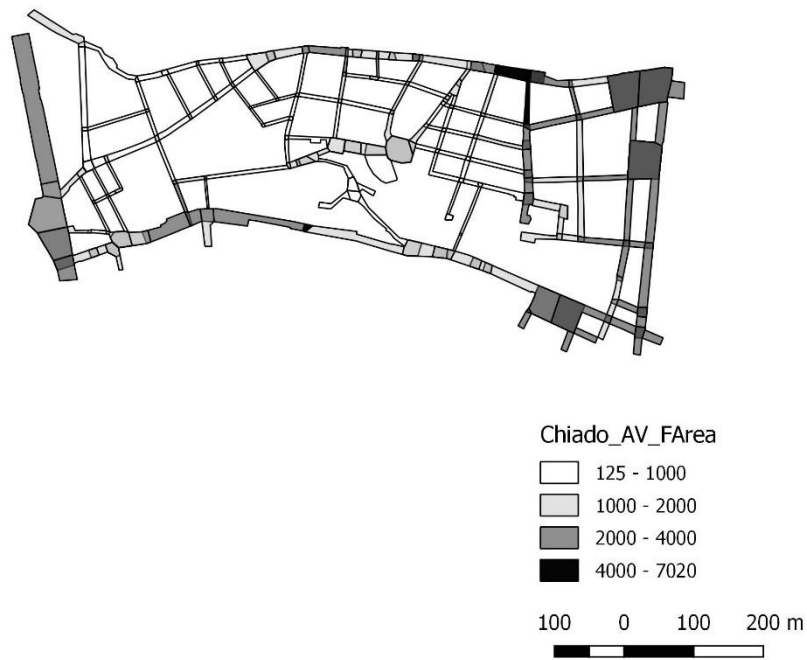


Figure D.16 : Lisbon average floor area per building per STV.

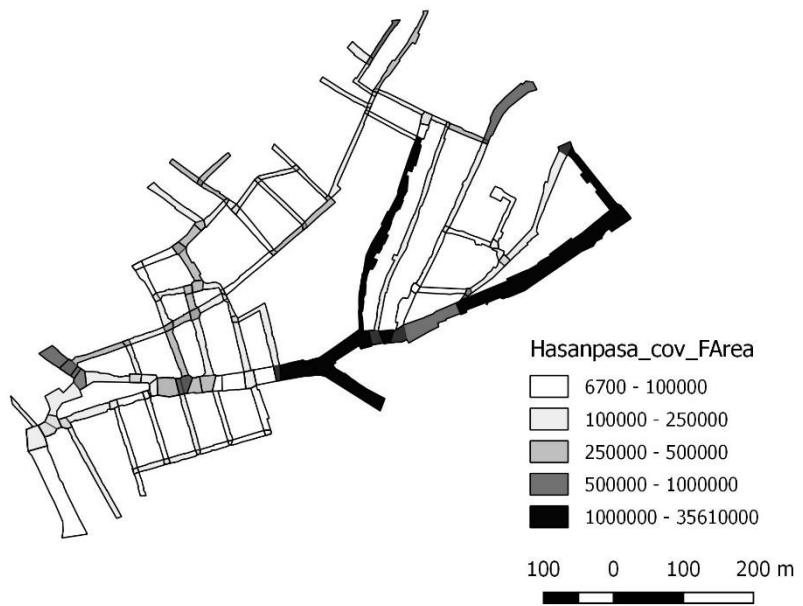
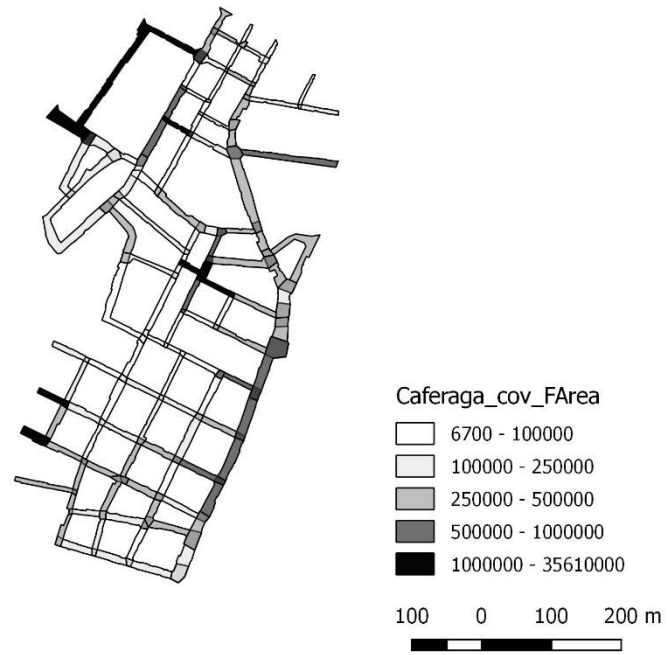


Figure D.17 : Istanbul Cov of floor area per building per STV.

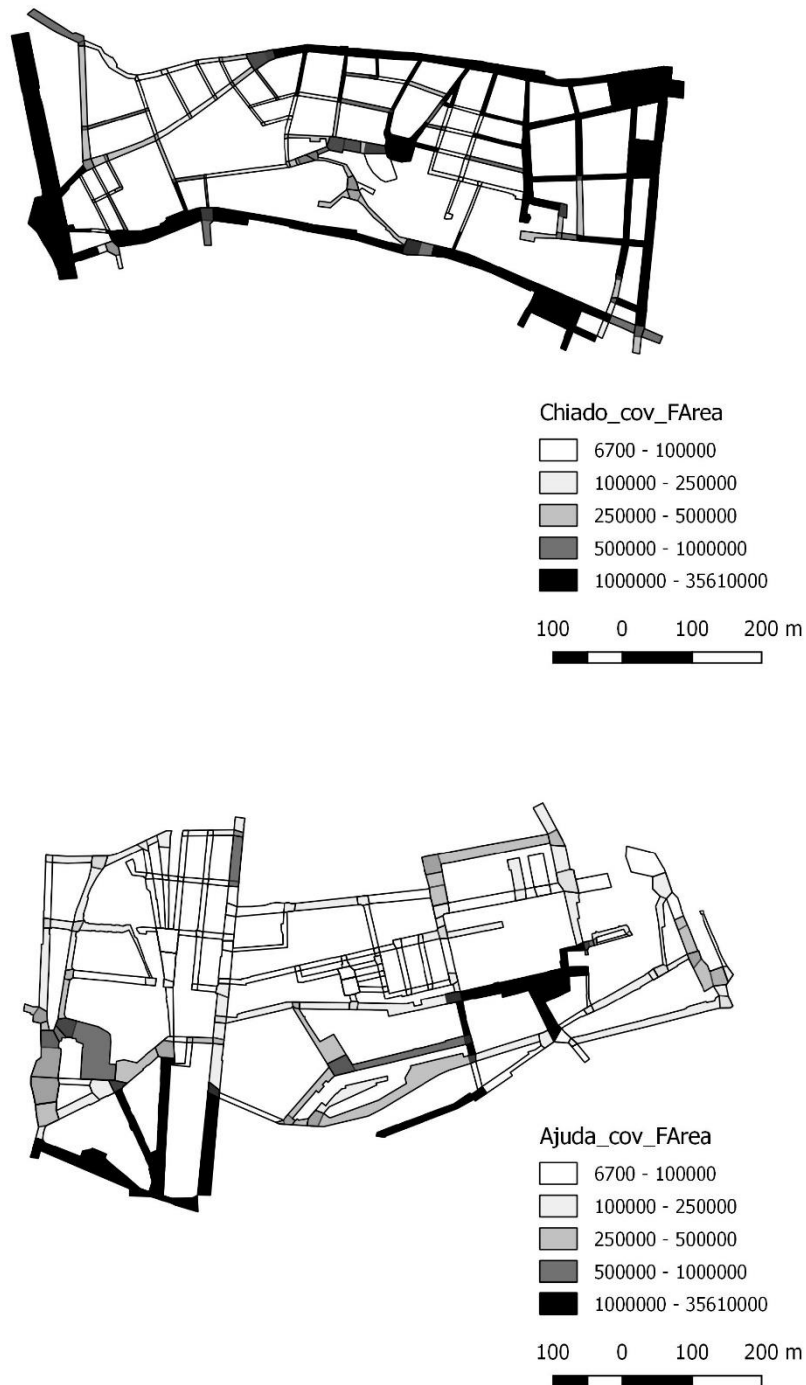


Figure D.18 : Lisbon Cov of floor area per building per STV.

APPENDIX E

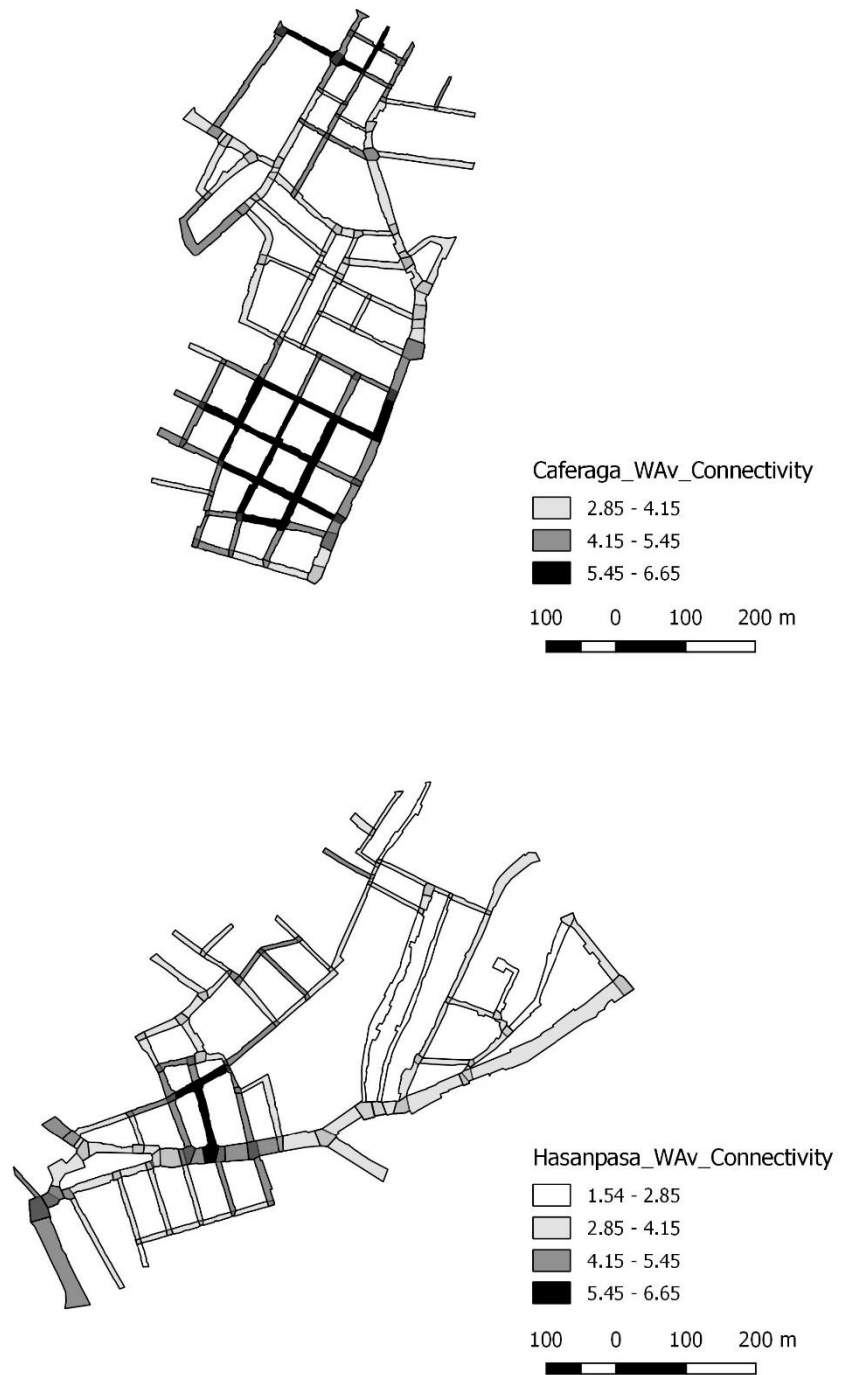


Figure E.1 : Istanbul WAv of Connectivity per street segment per STV.

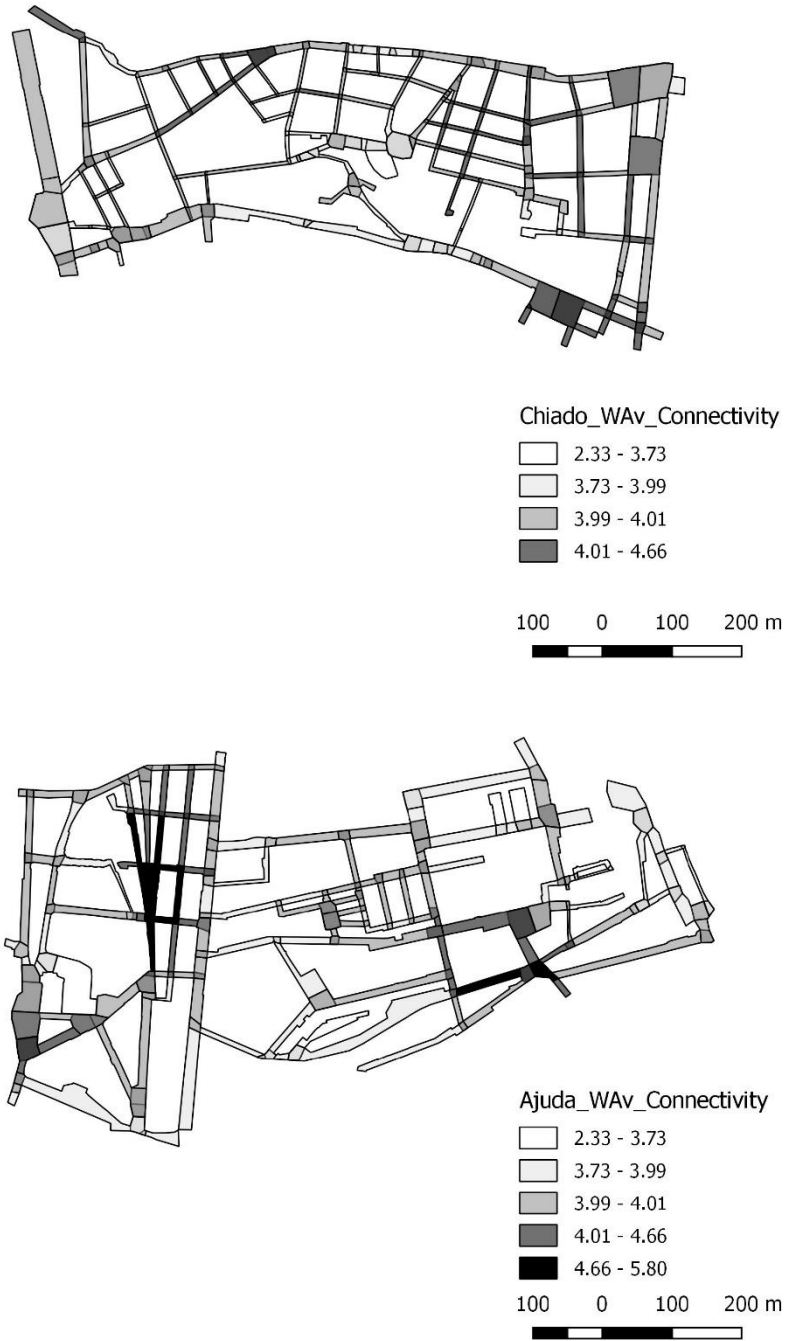


Figure E.2 : Lisbon WAv of Connectivity per street segment per STV.

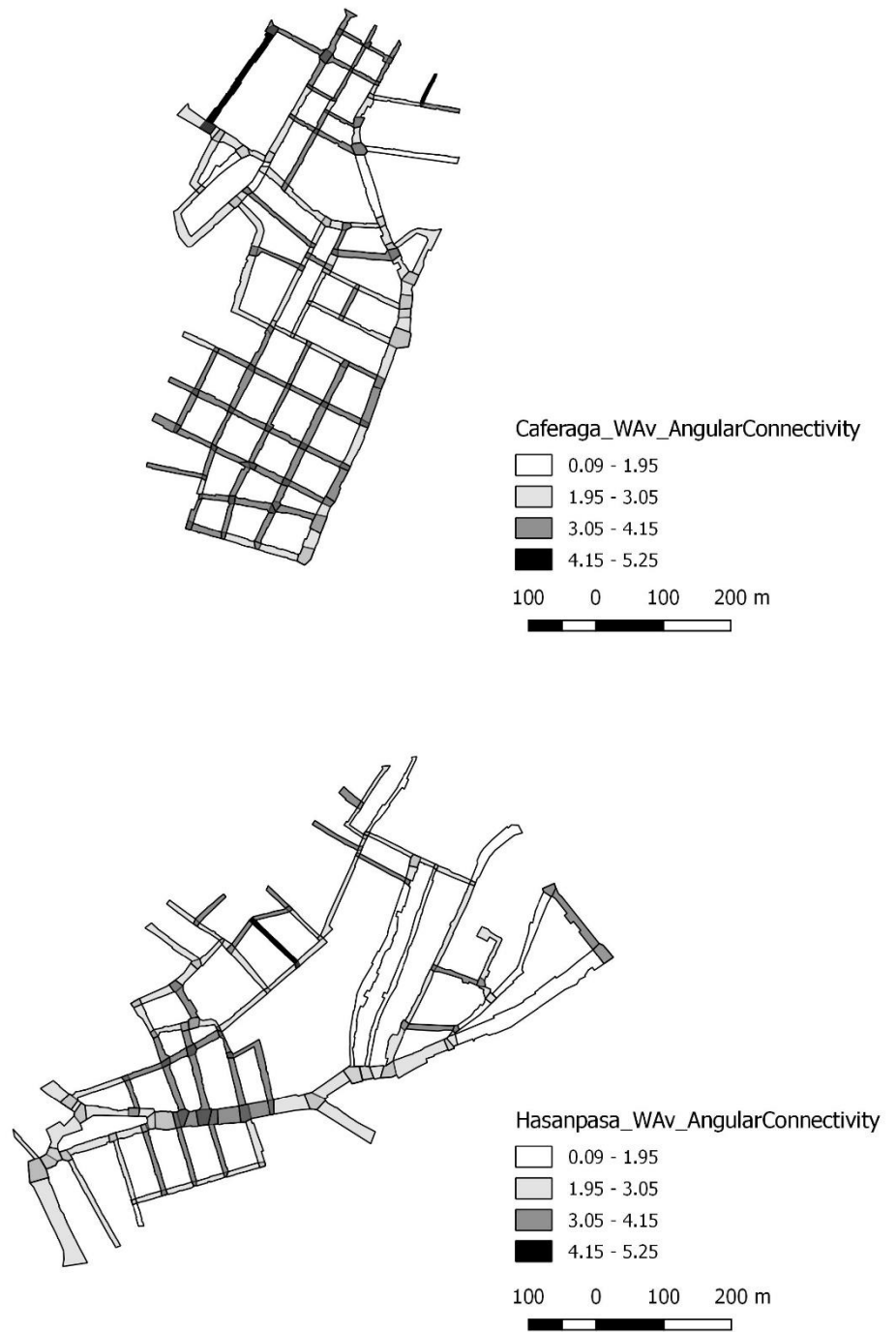


Figure E.3 : Istanbul WAv of Angular Connectivity per street segment per STV.

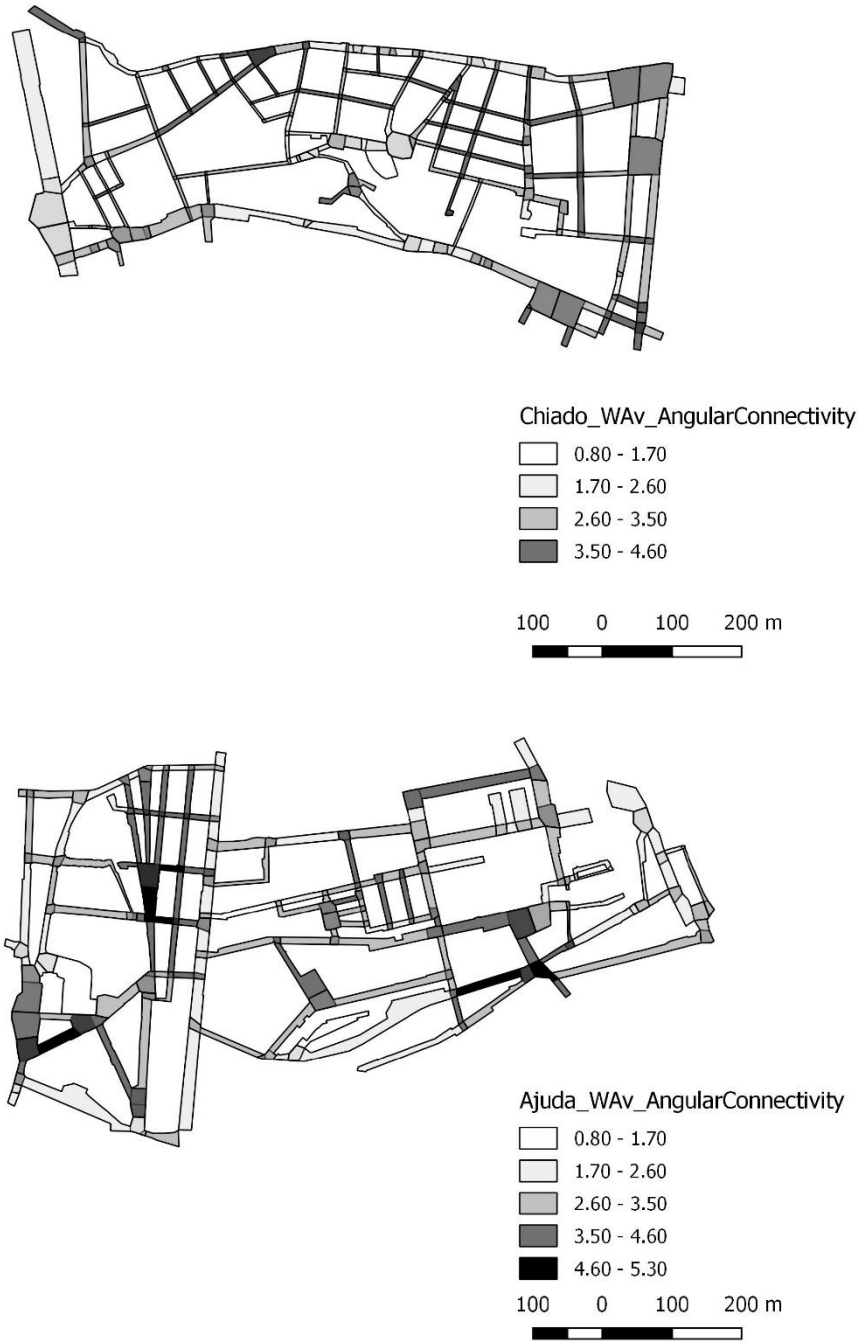


Figure E.4 : Lisbon WAv of Angular Connectivity per street segment per STV.

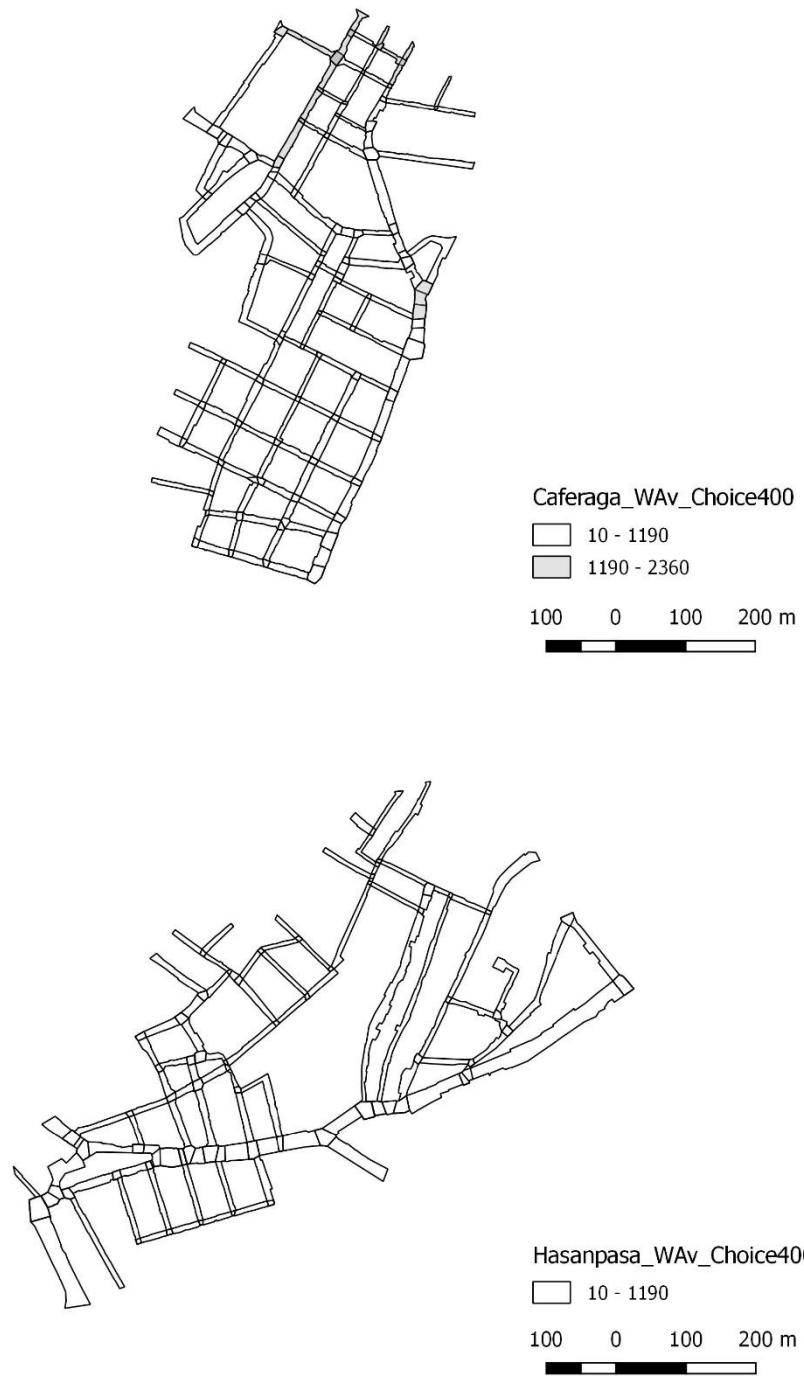


Figure E.5 : Istanbul WAv of Choice for 400m per street segment per STV.

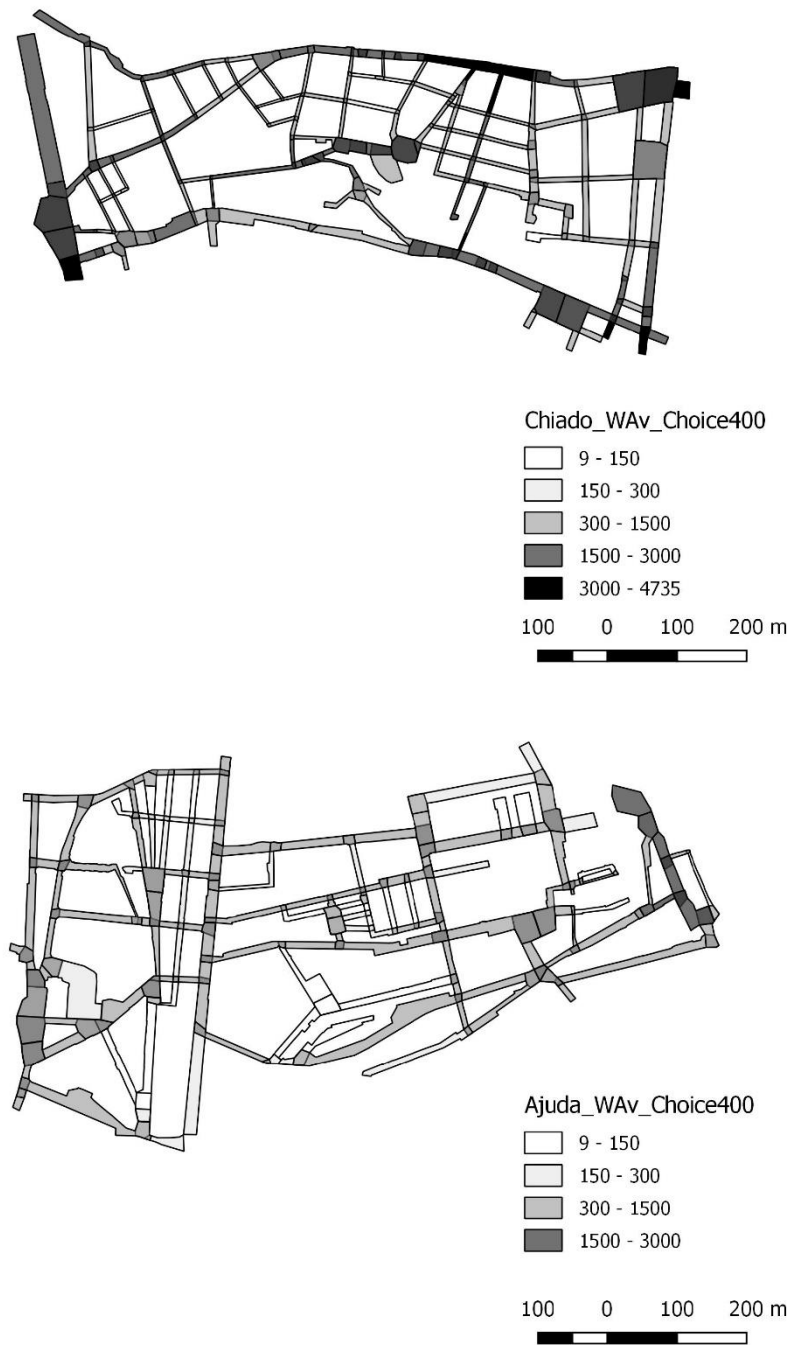


Figure E.6 : Lisbon WAv of Choice for 400m per street segment per STV.

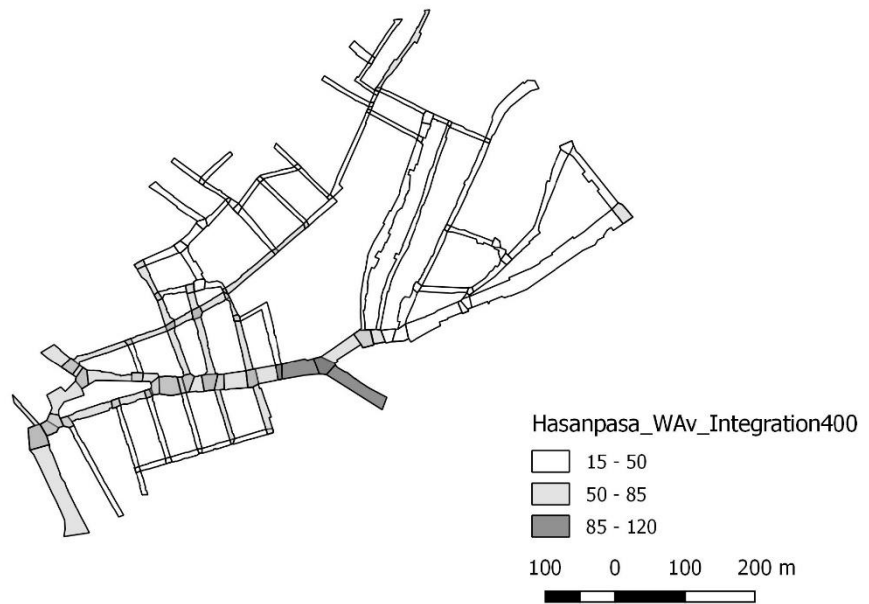
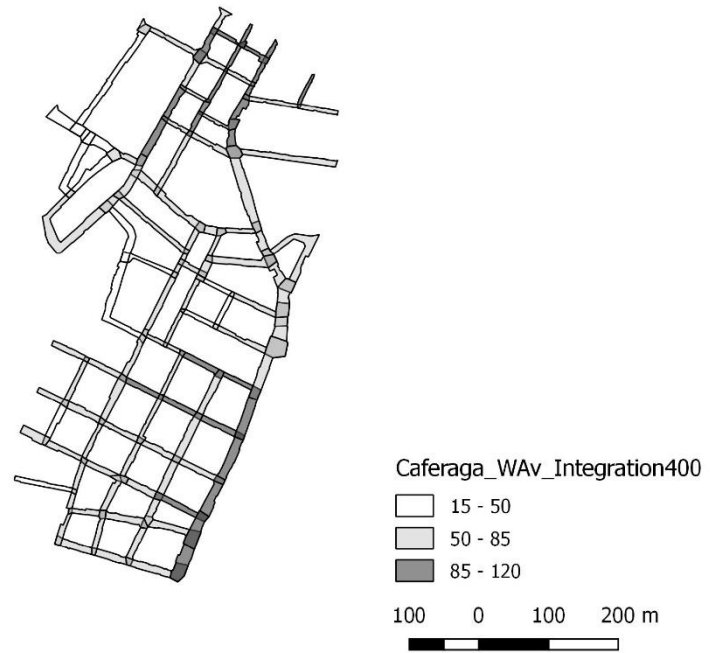


Figure E.7 : Istanbul WAv of Integration for 400m per street segment per STV.

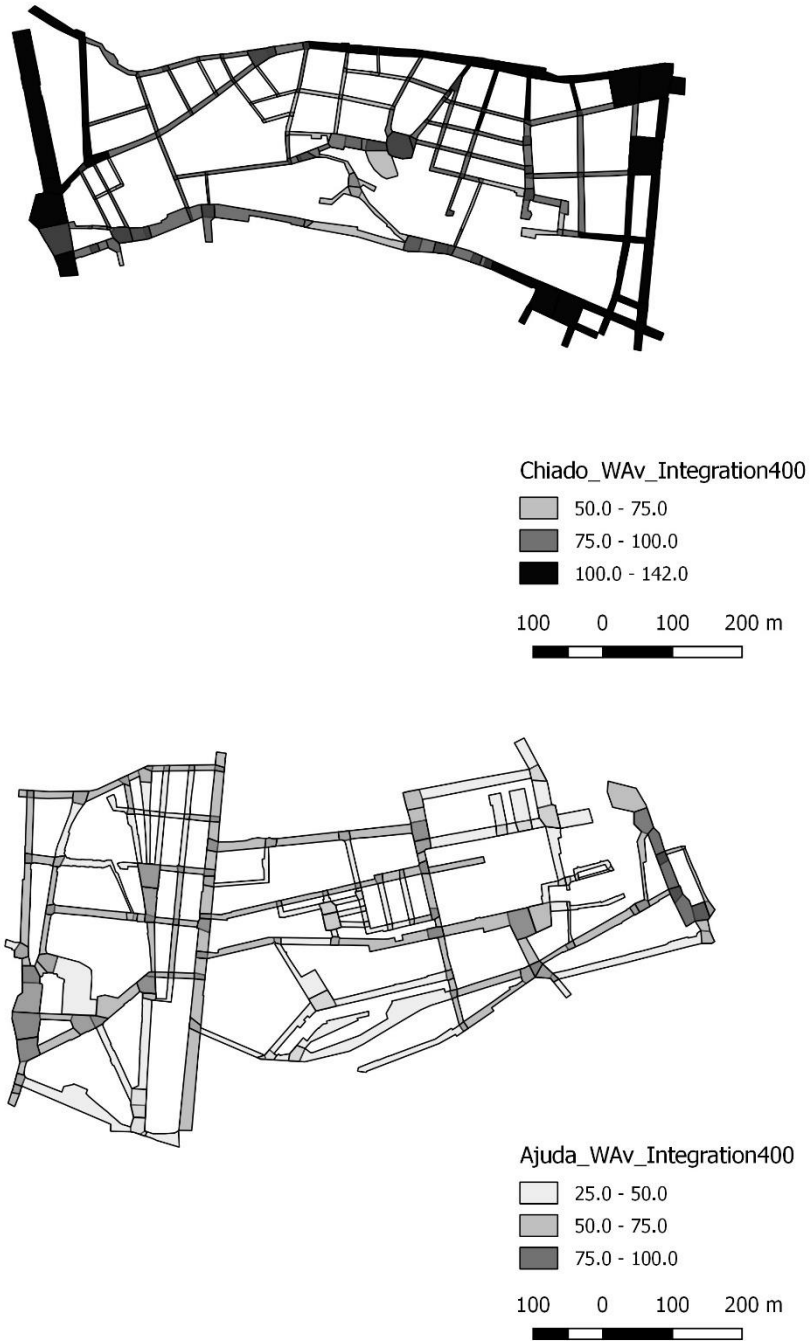


Figure E.8 : Lisbon WAv of Integration values for 400m per street segment per STV.

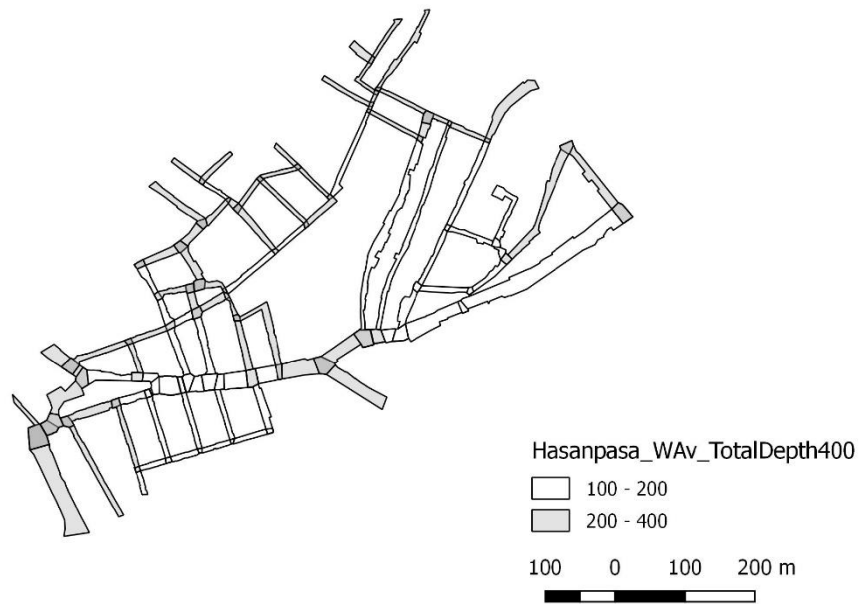
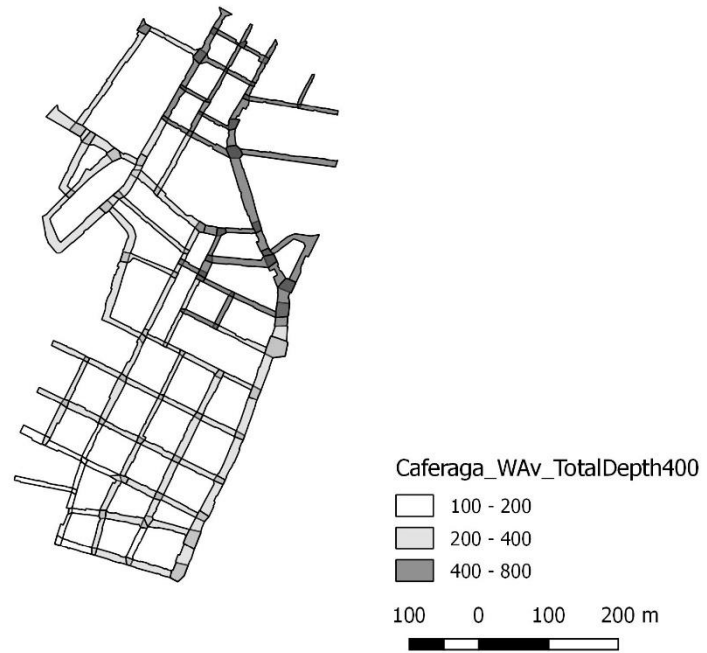


Figure E.9 : Istanbul WAv of Total Depth values for 400m per street segment per STV.

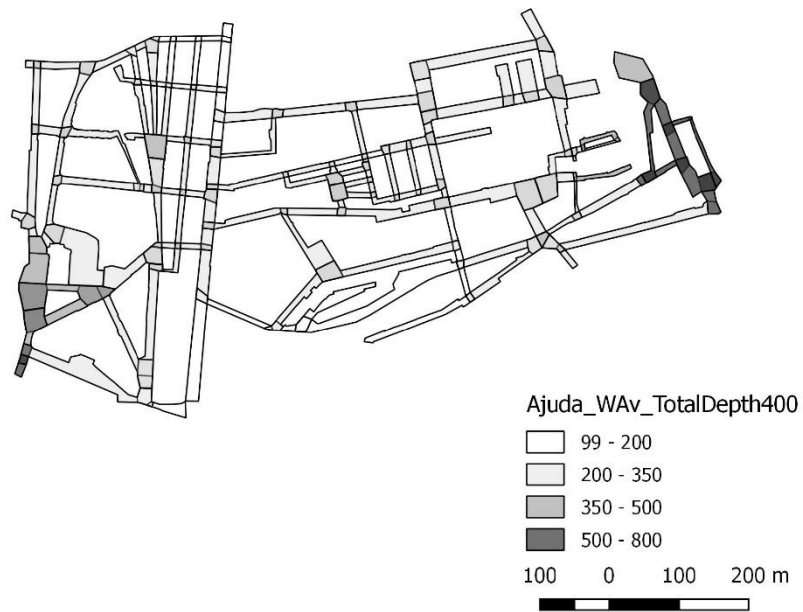
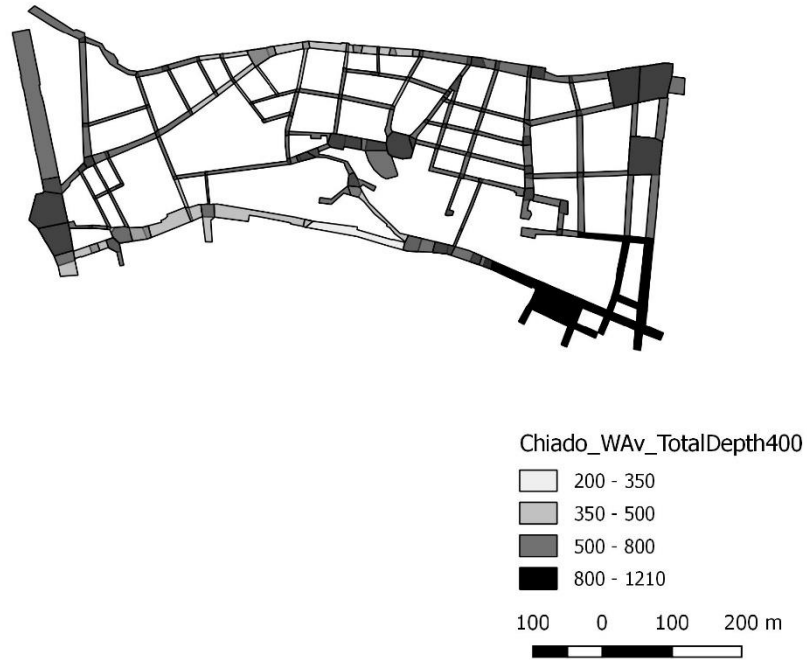


Figure E.10 : Lisbon WAv of Total Depth values for 400m per street segment per STV.

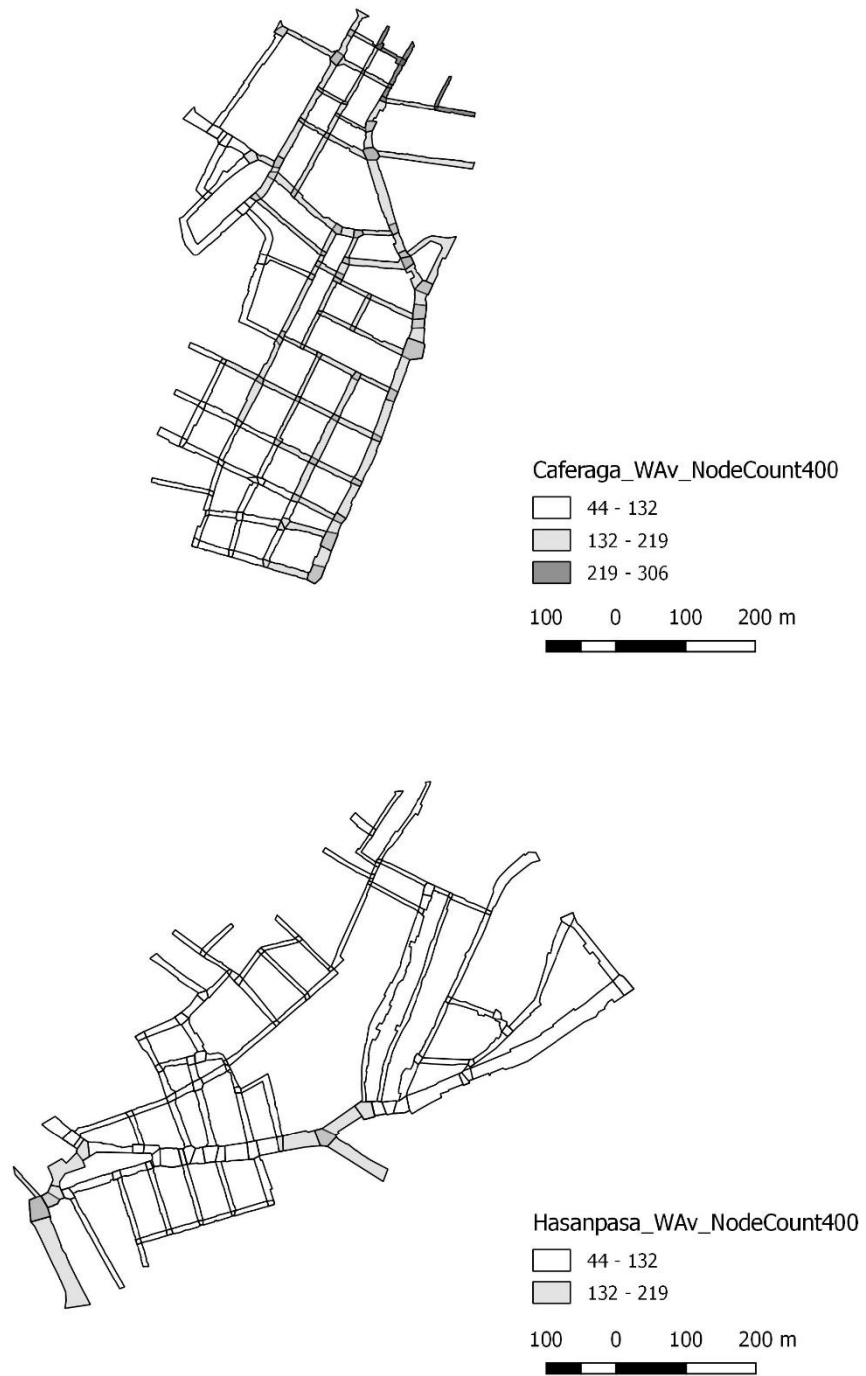


Figure E.11 : Istanbul WAv of Node Count values for 400m per street segment per STV.

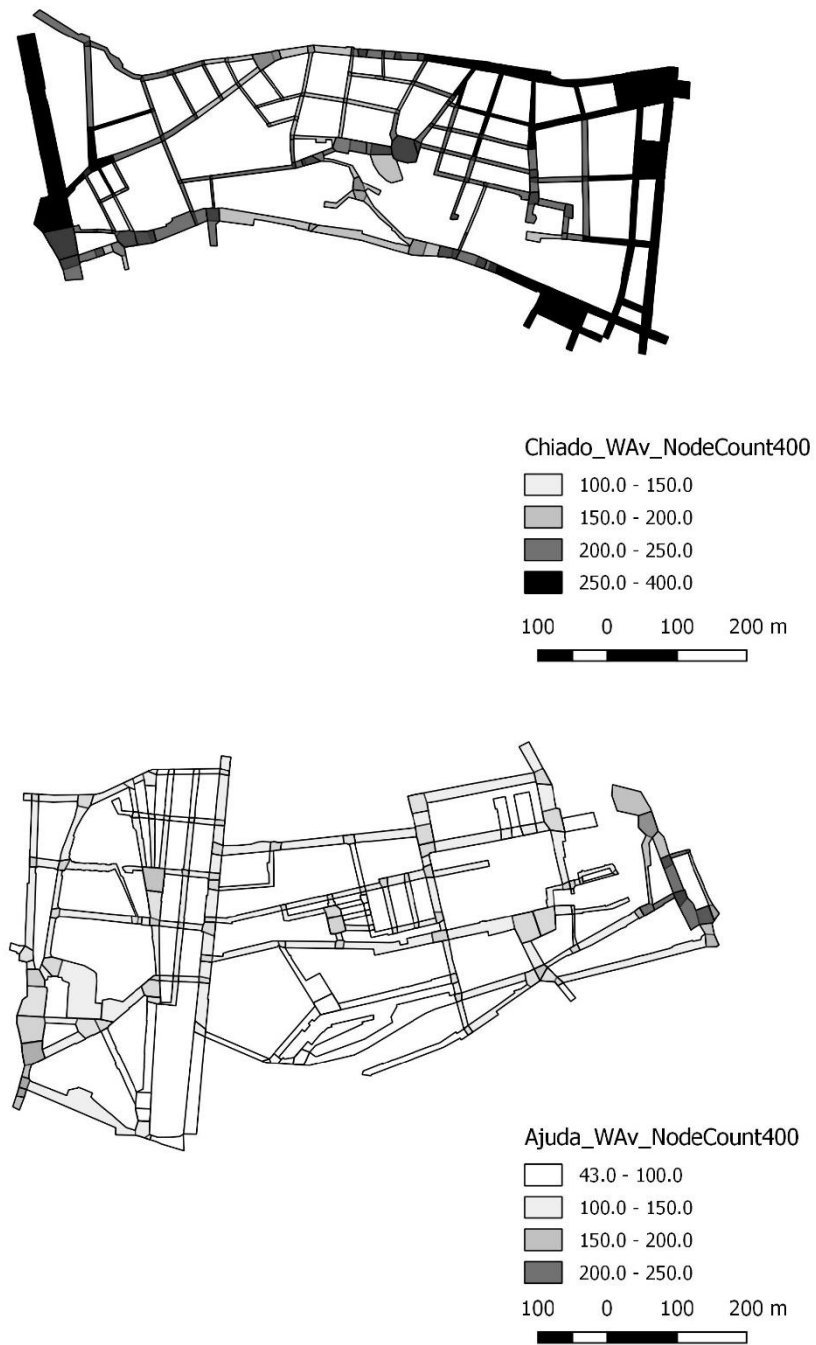


Figure E.12 : Lisbon WAv of Node Count values for 400m per street segment per STV

APPENDIX F

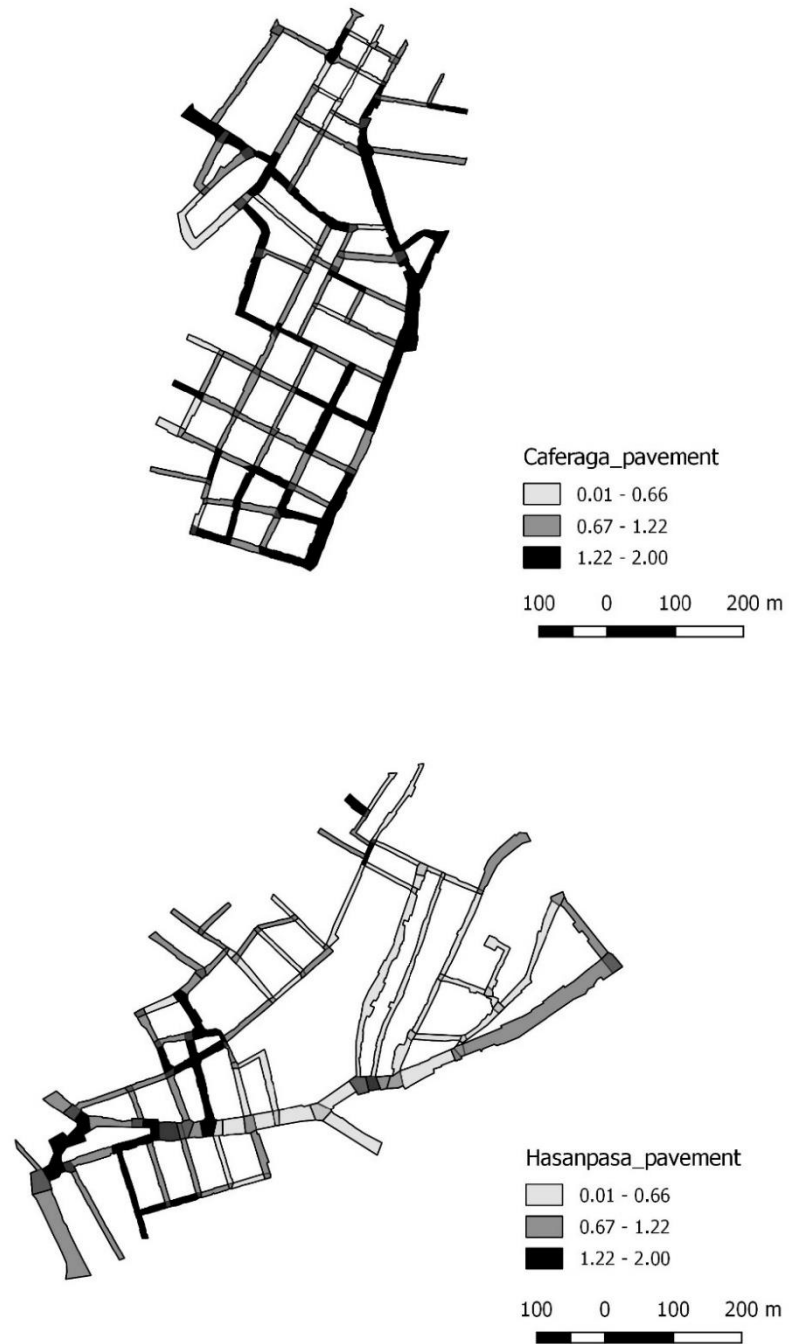


Figure F.1 : Istanbul ANSS where a sidewalk is identified.

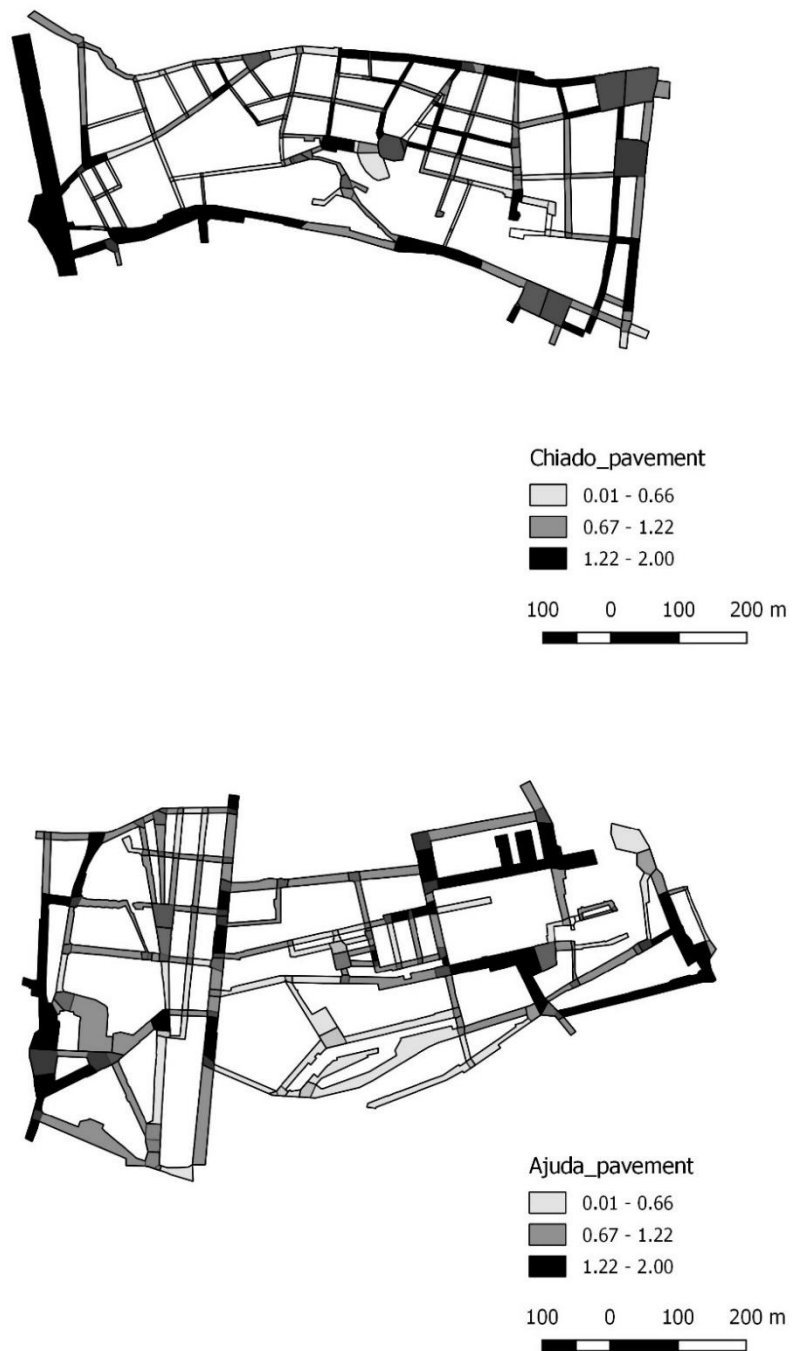


Figure F.2 : Lisbon ANSS where a sidewalk is identified.

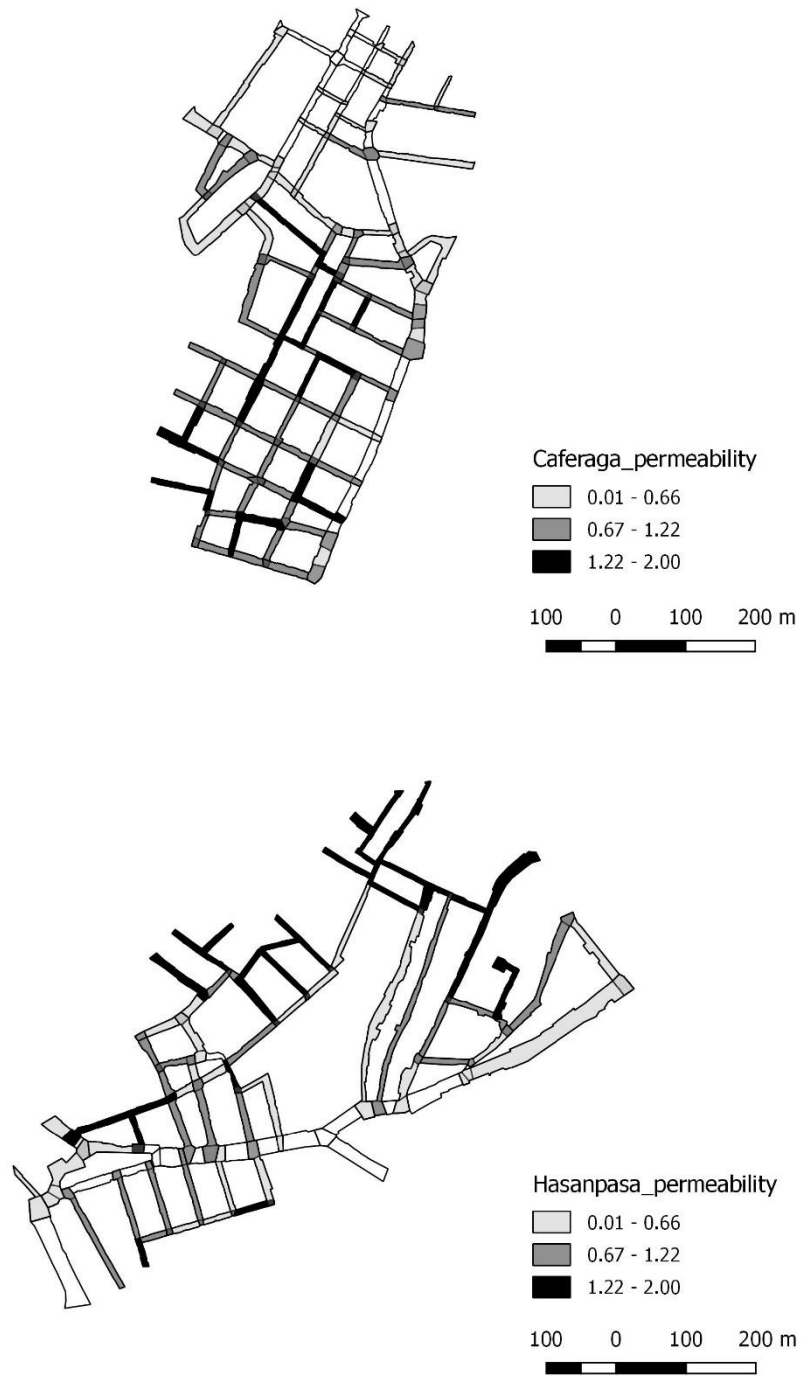


Figure F.3 : Istanbul ANSS where doors or windows are identified.

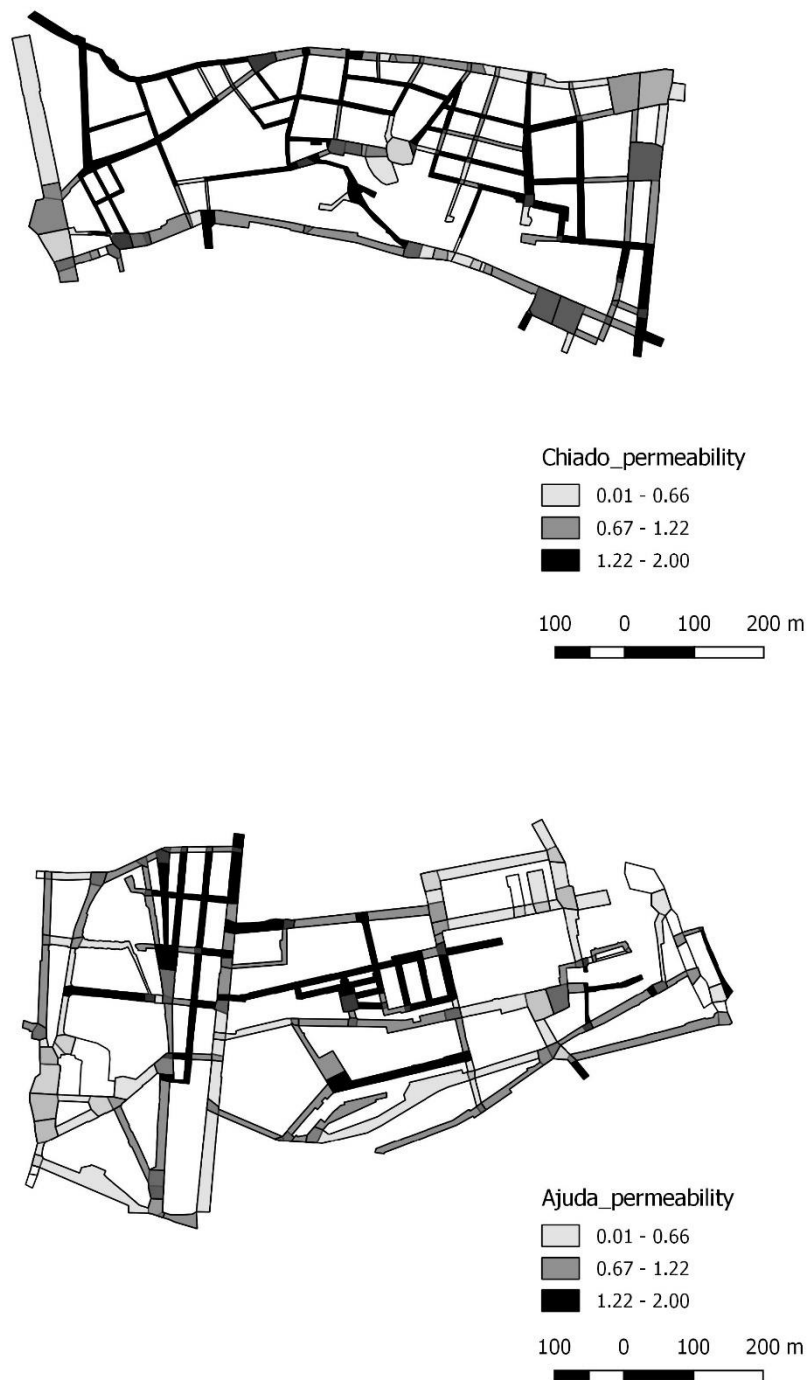


Figure F.4 : Lisbon ANSS where doors or windows are identified.



Figure F.5 : Istanbul ANSS where “trees”, “landscape”, ”parks” or “environment” tags are identified.

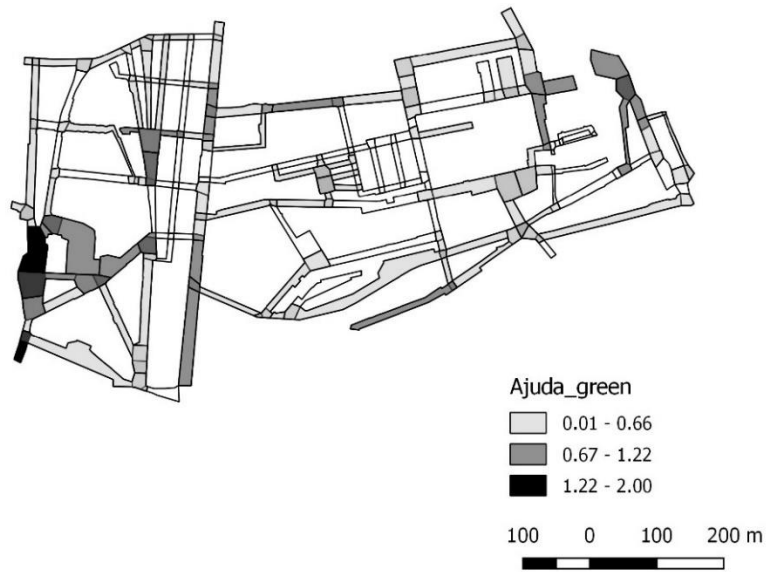
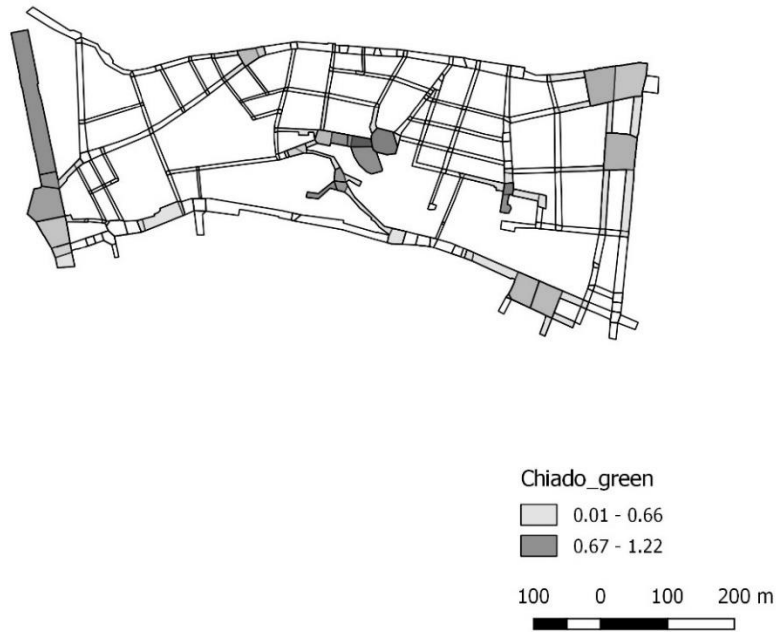


Figure F.6 : Lisbon ANSS where “trees”, “landscape”, ”parks” or “environment” tags are identified.

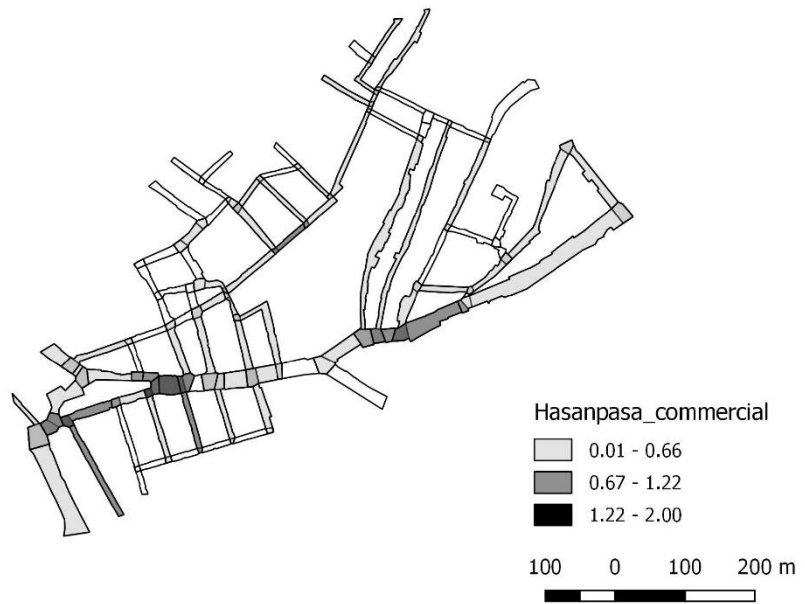
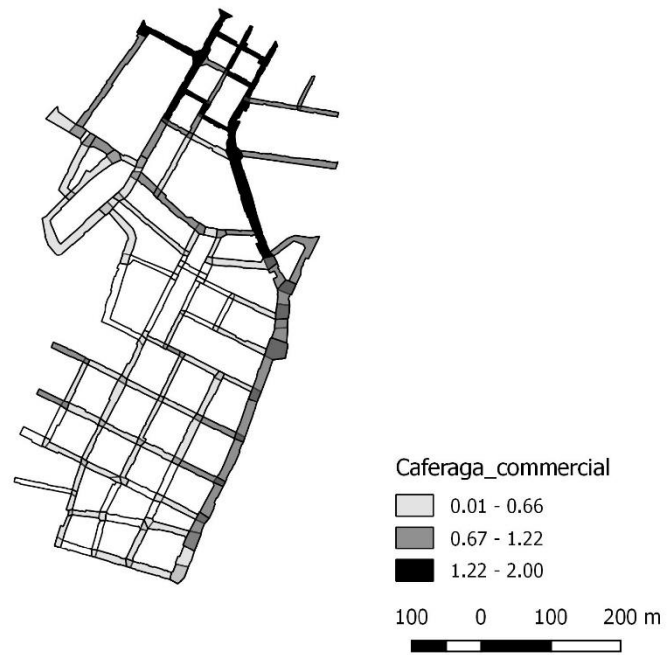


Figure F.7 : Istanbul ANSS where “commercial”, “shopping” or “business” tags are identified.

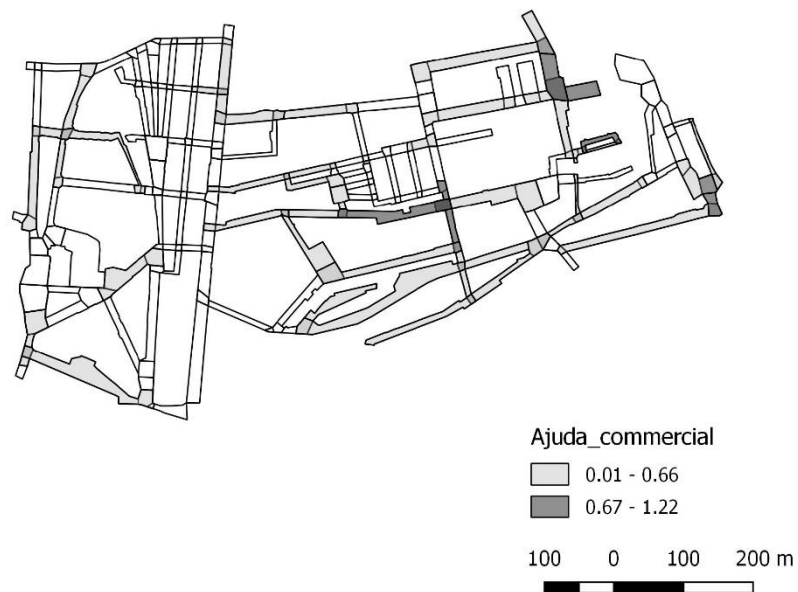
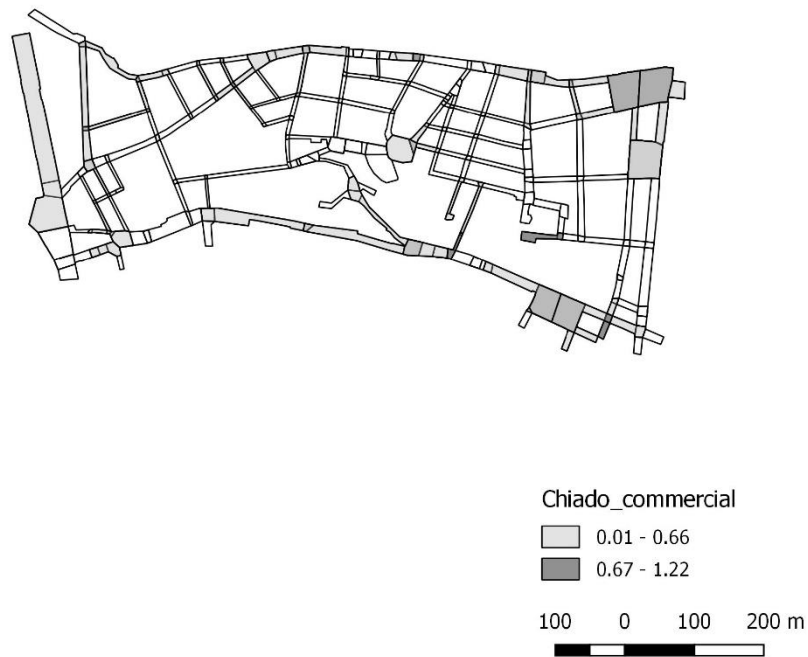


Figure F.8 : Lisbon ANSS where “commercial”, “shopping” or “business” tags are identified.



Figure F.9 : Istanbul ANSS where “benches”, “chairs” or “street furniture” tags are identified.

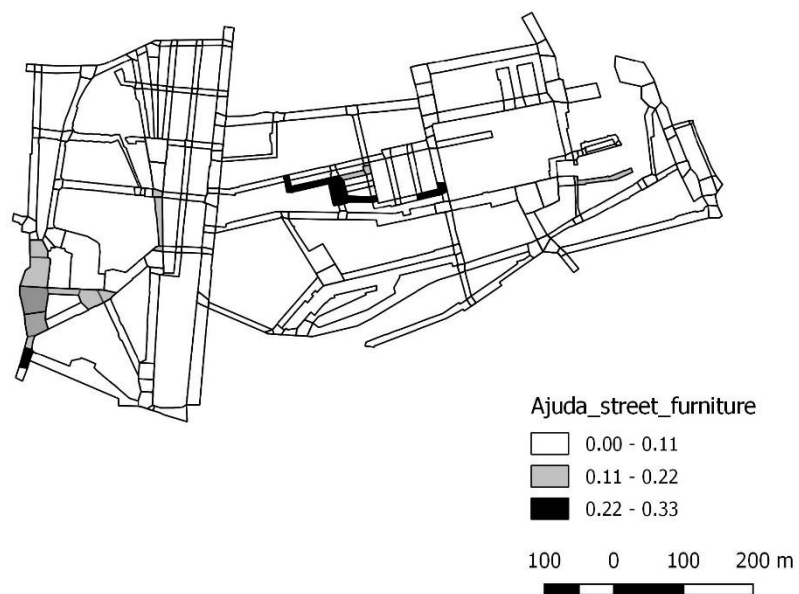
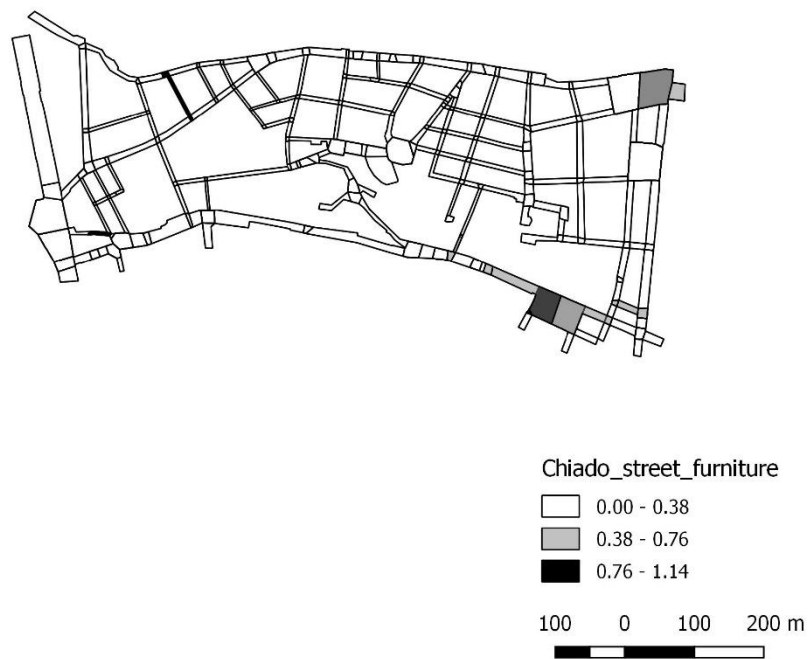


Figure F.10 : Lisbon ANSS where “benches”, “chairs” or “street furniture” tags are identified.



Figure F.11 : Istanbul ANSS where “cars”, “vehicles” or “traffic” tags are identified.

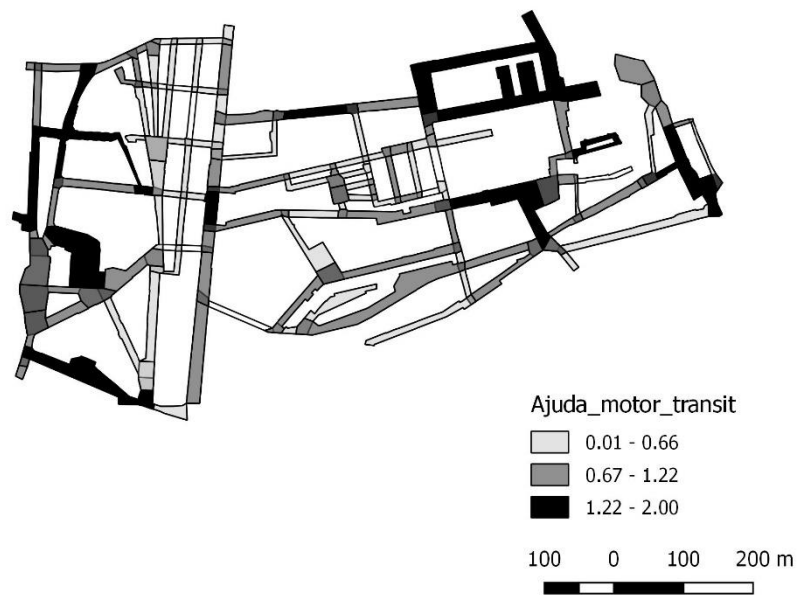


Figure F.12 : Lisbon ANSS where “cars”, “vehicles” or “traffic” tags are identified.

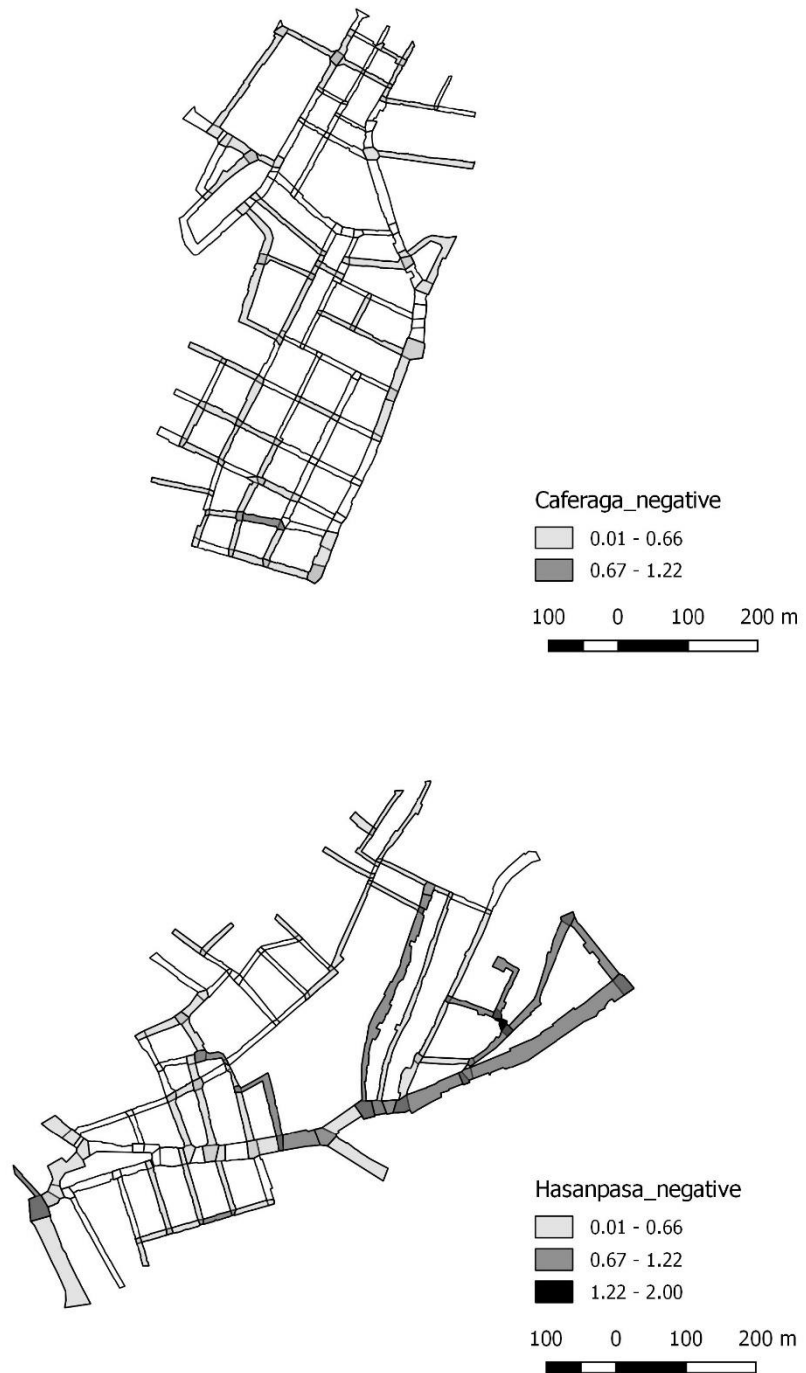


Figure F.13 : Istanbul ANSS where “abandoned”, “calamity” or “demolished” tags are identified.

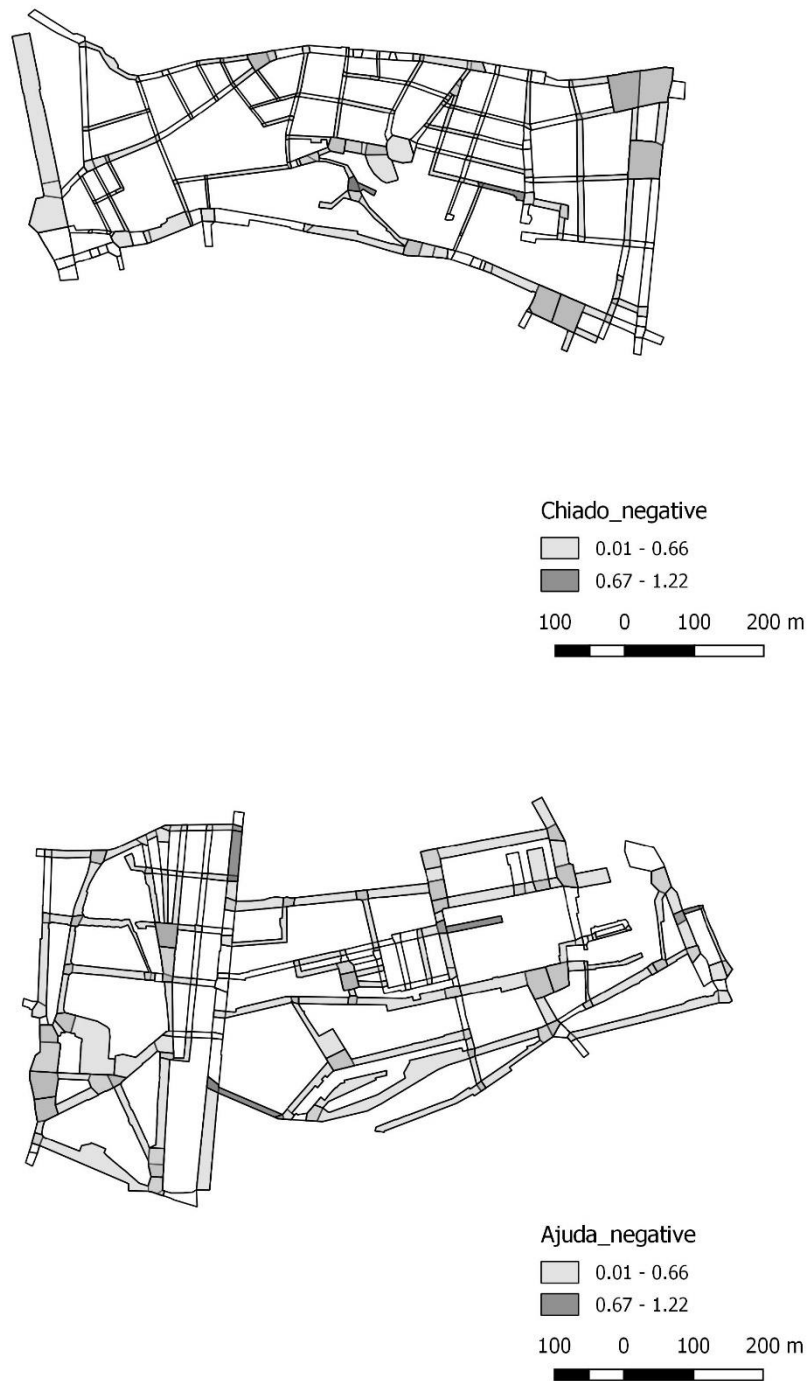


Figure F.14 : Lisbon ANSS where “abandoned”, “calamity” or “demolished” tags are identified.

APPENDIX G

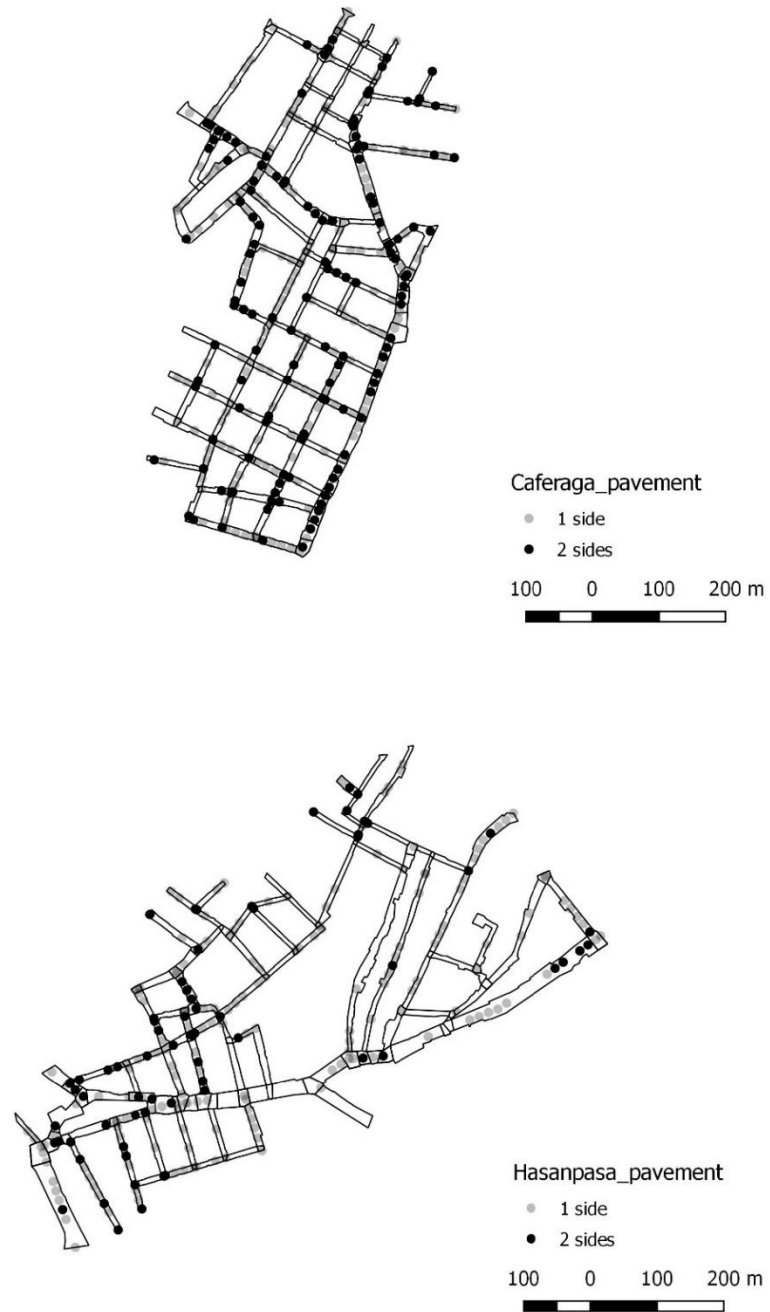


Figure G.1 : Istanbul NSS where a sidewalk is identified.

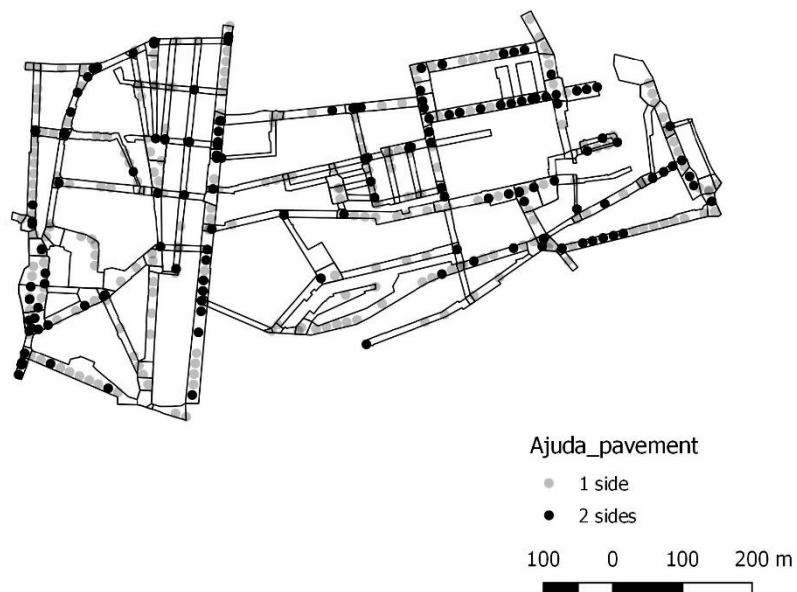
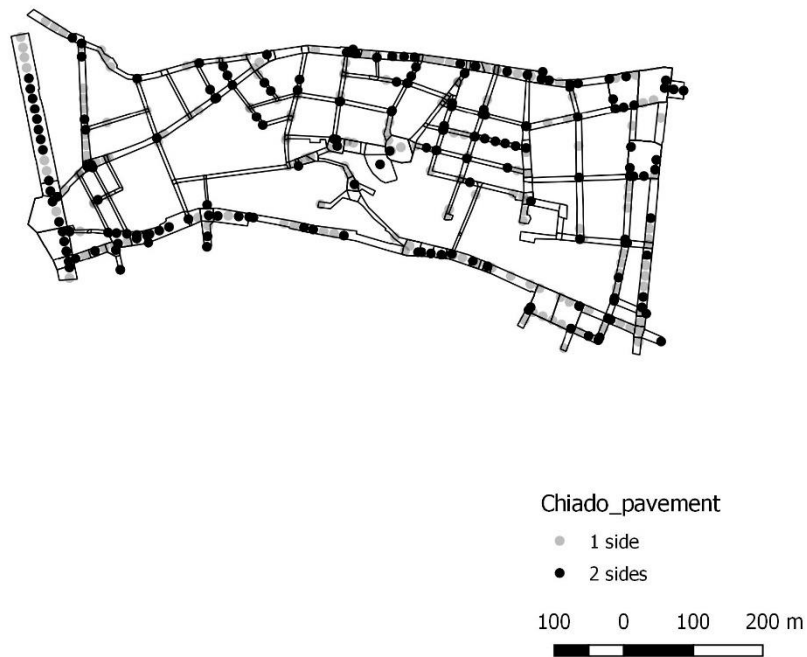


Figure G.2 : Lisbon NSS where a sidewalk is identified.

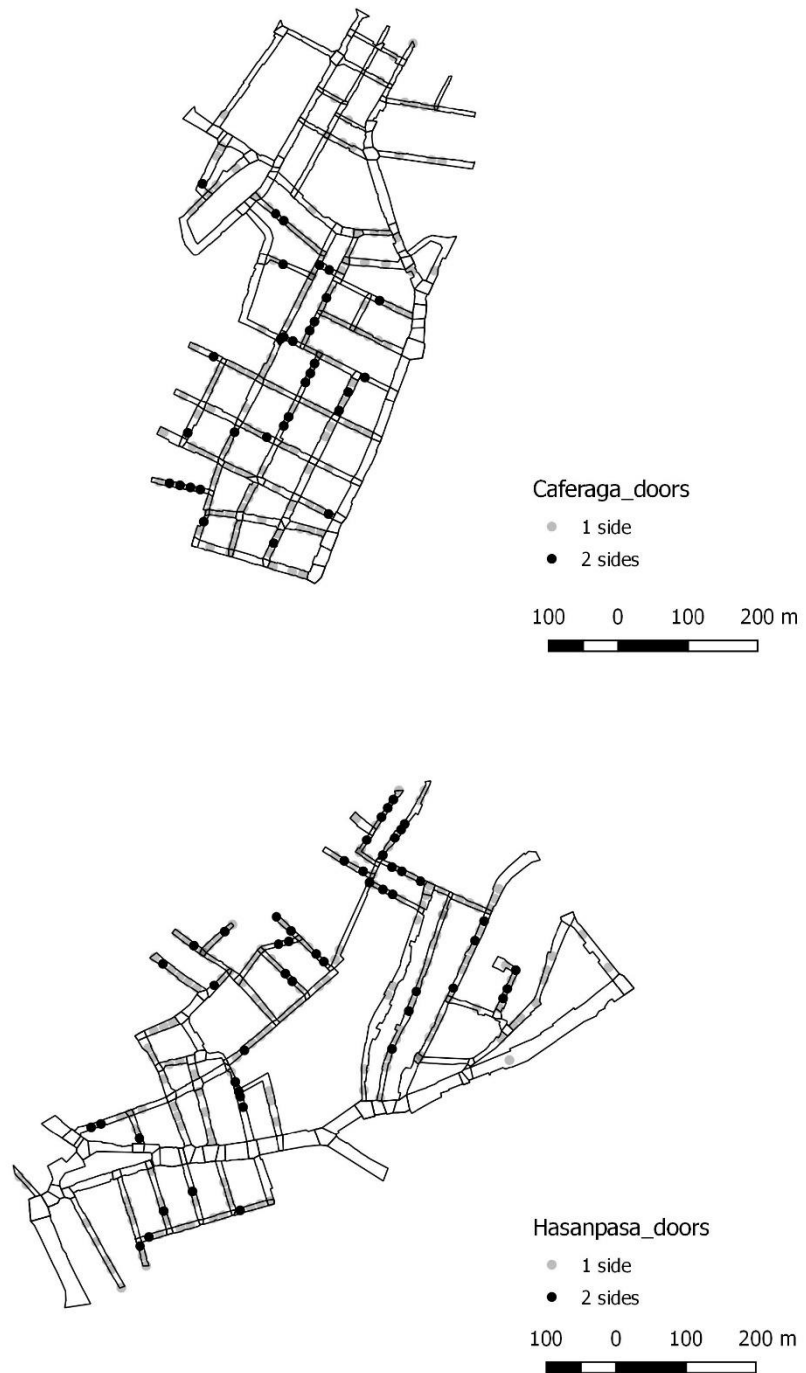


Figure G.3 : Istanbul NSS where doors are identified.

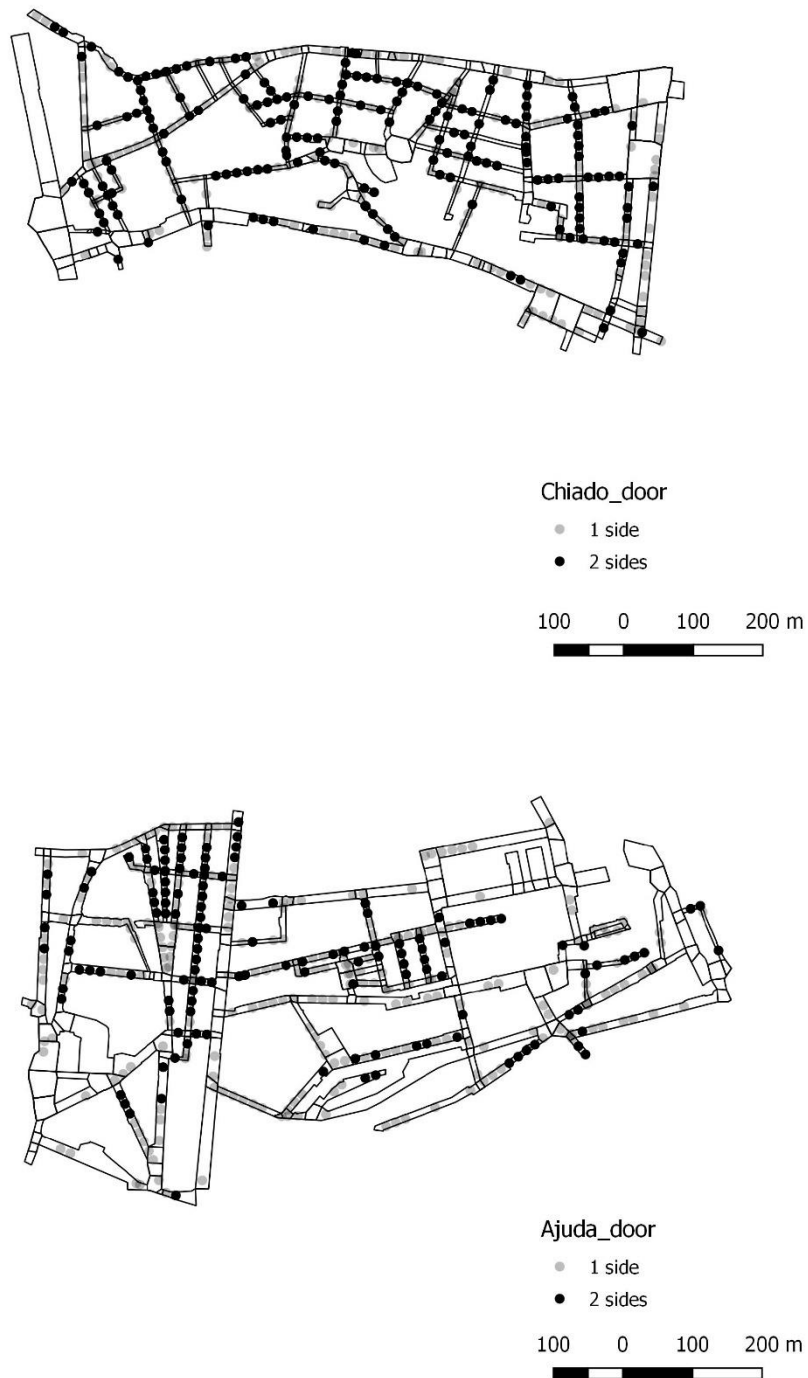


Figure G.4 : Lisbon NSS where doors are identified.

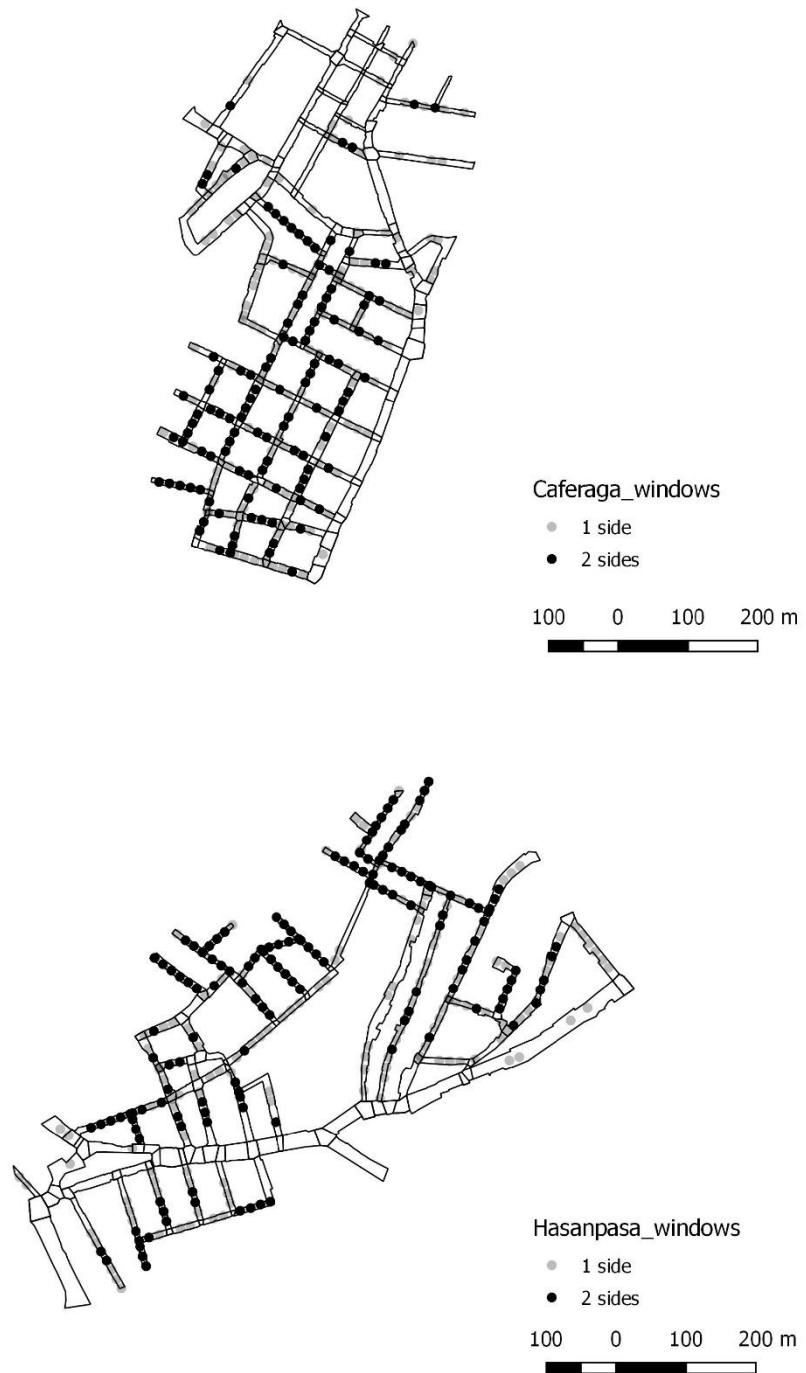


Figure G.5 : Istanbul NSS where windows are identified.

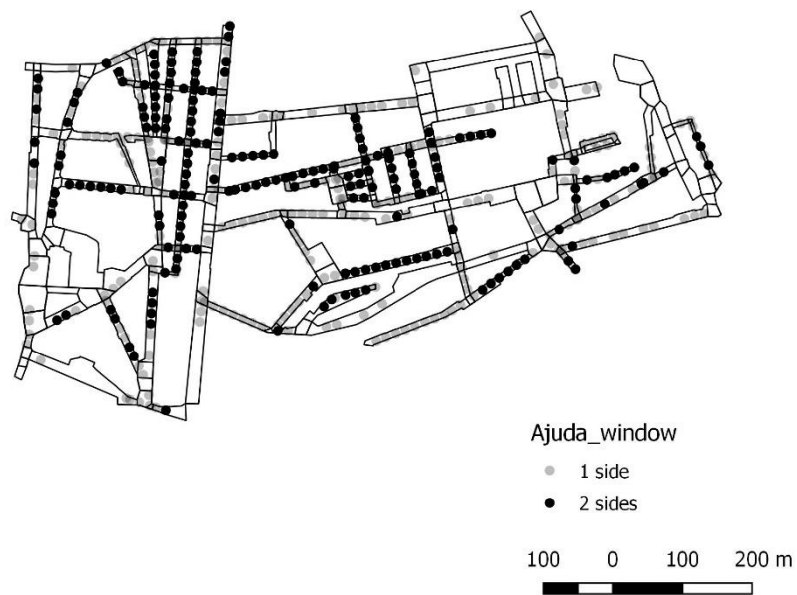
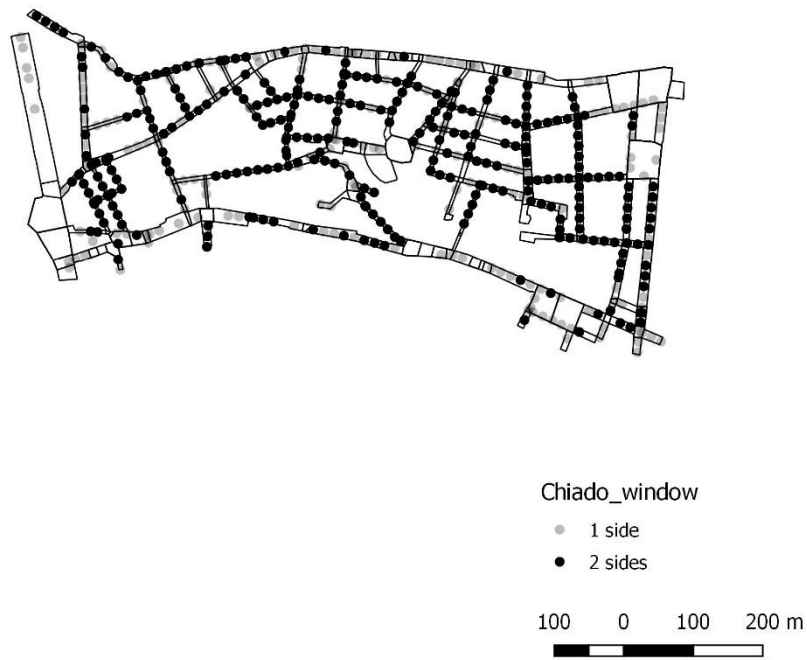


Figure G.6 : Lisbon NSS where windows are identified.

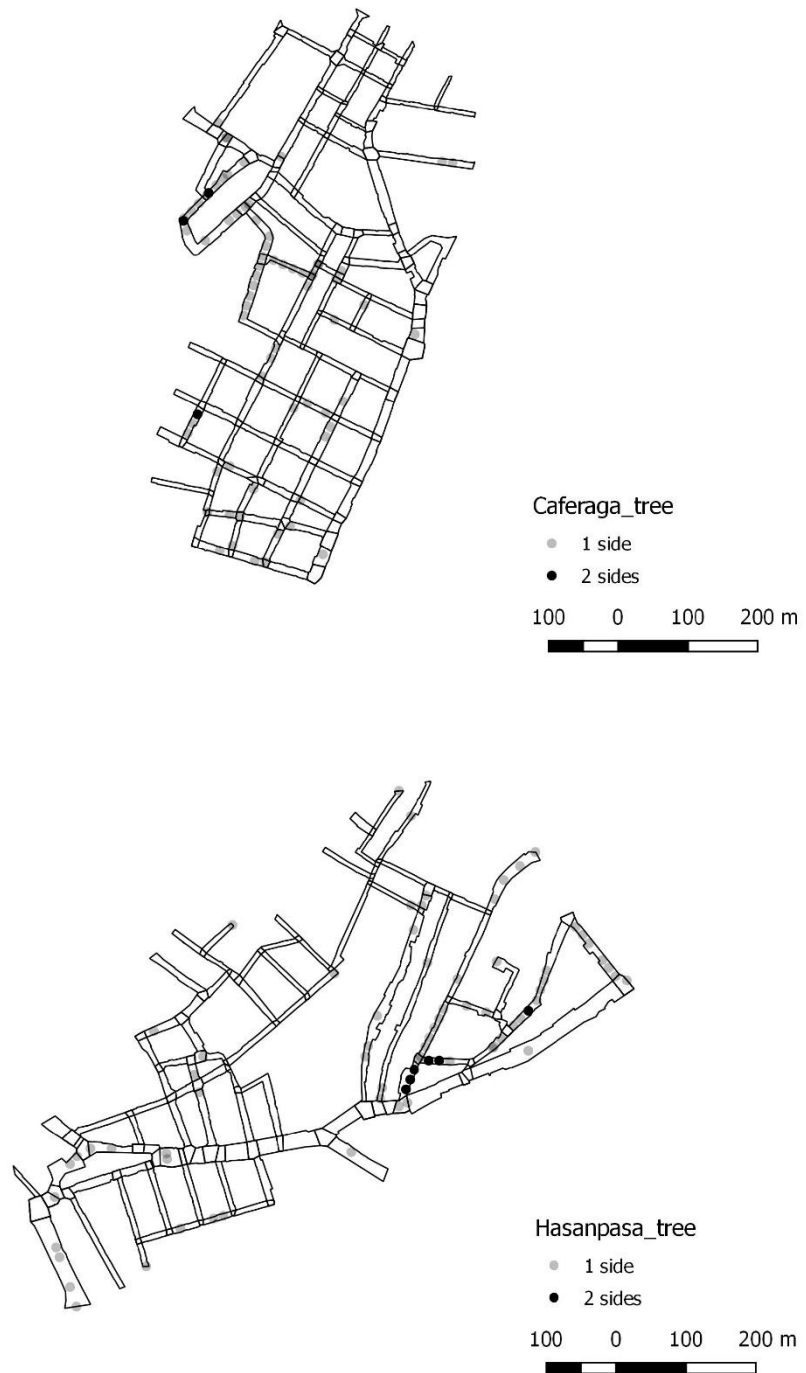


Figure G.7 : Istanbul NSS where trees are identified.

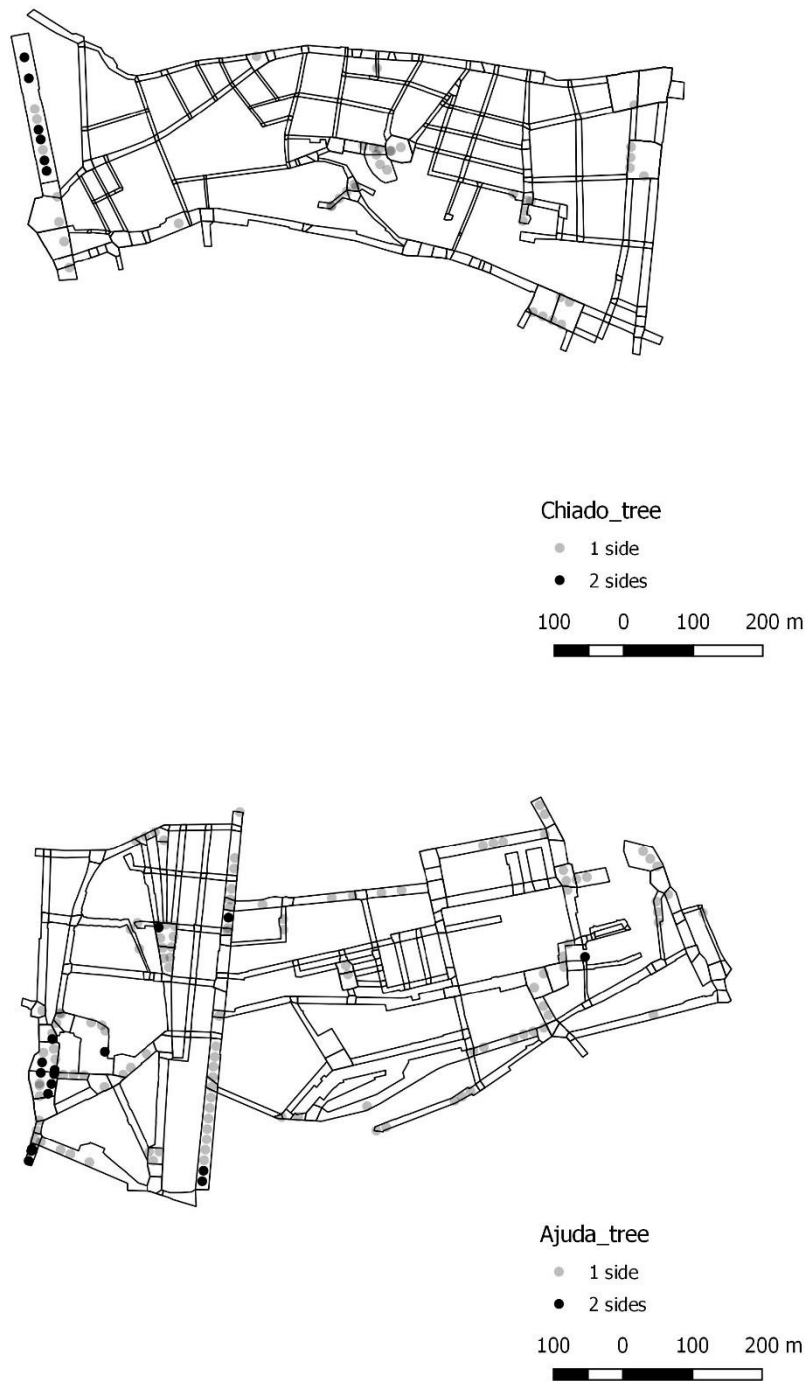


Figure G.8 : Lisbon NSS where trees are identified.

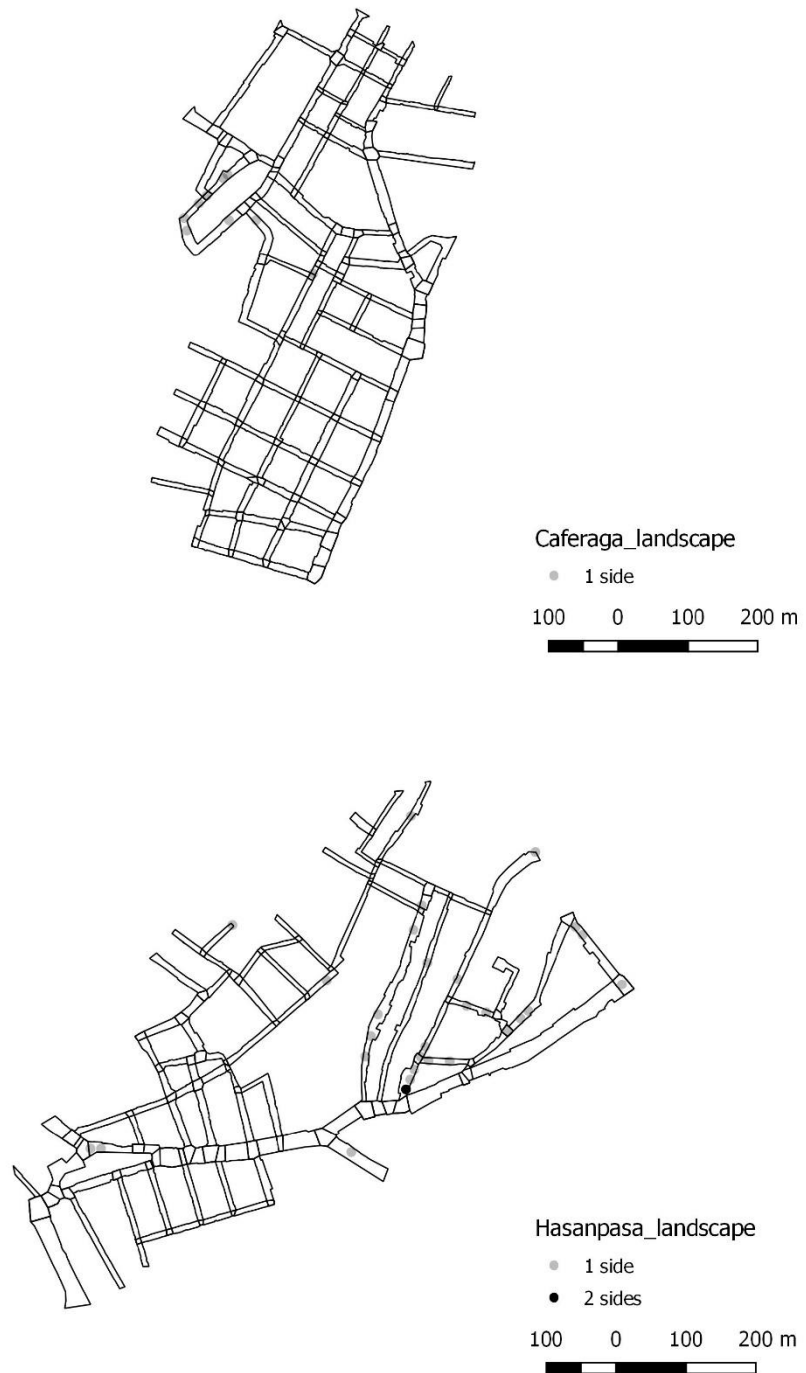


Figure G.9 : Istanbul NSS where landscape is identified.

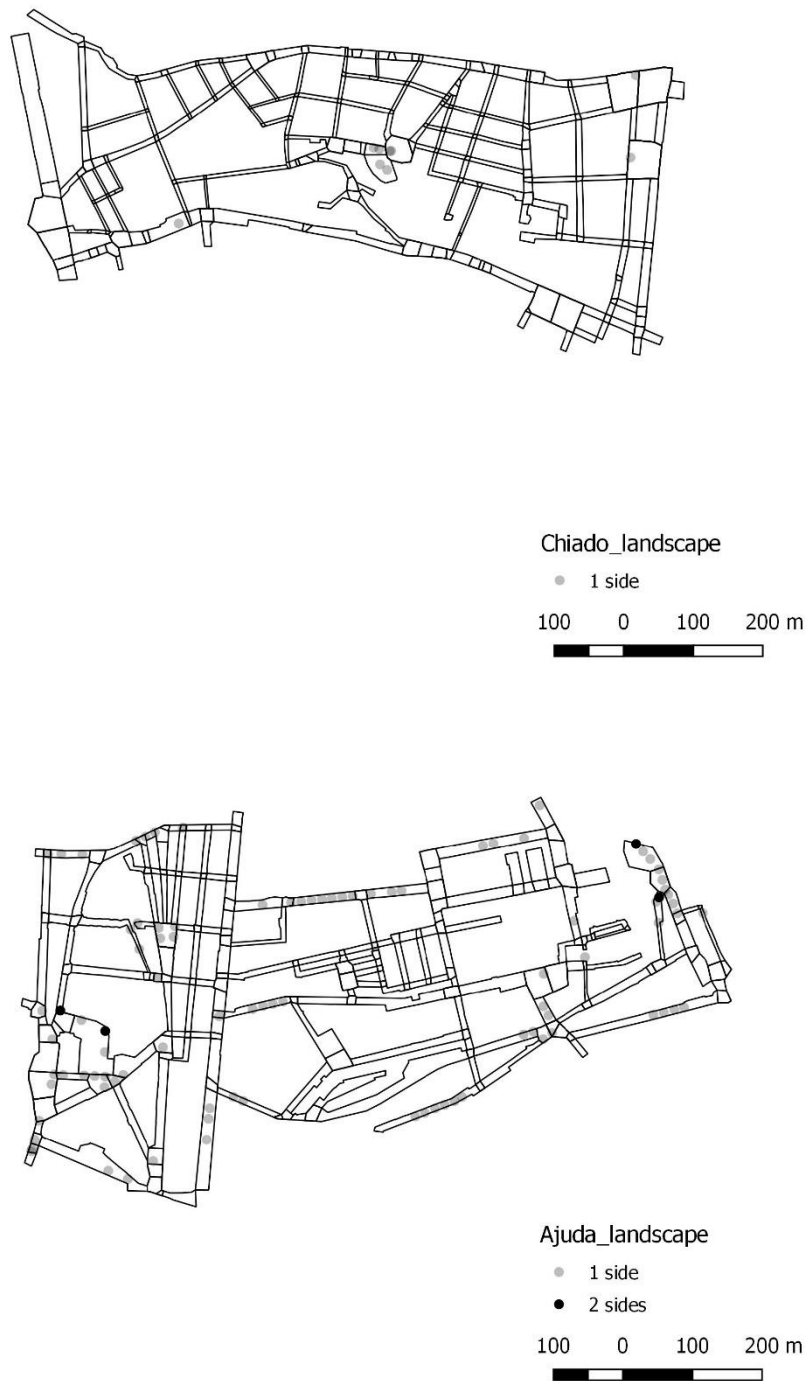


Figure G.10 : Lisbon NSS where landscape is identified.

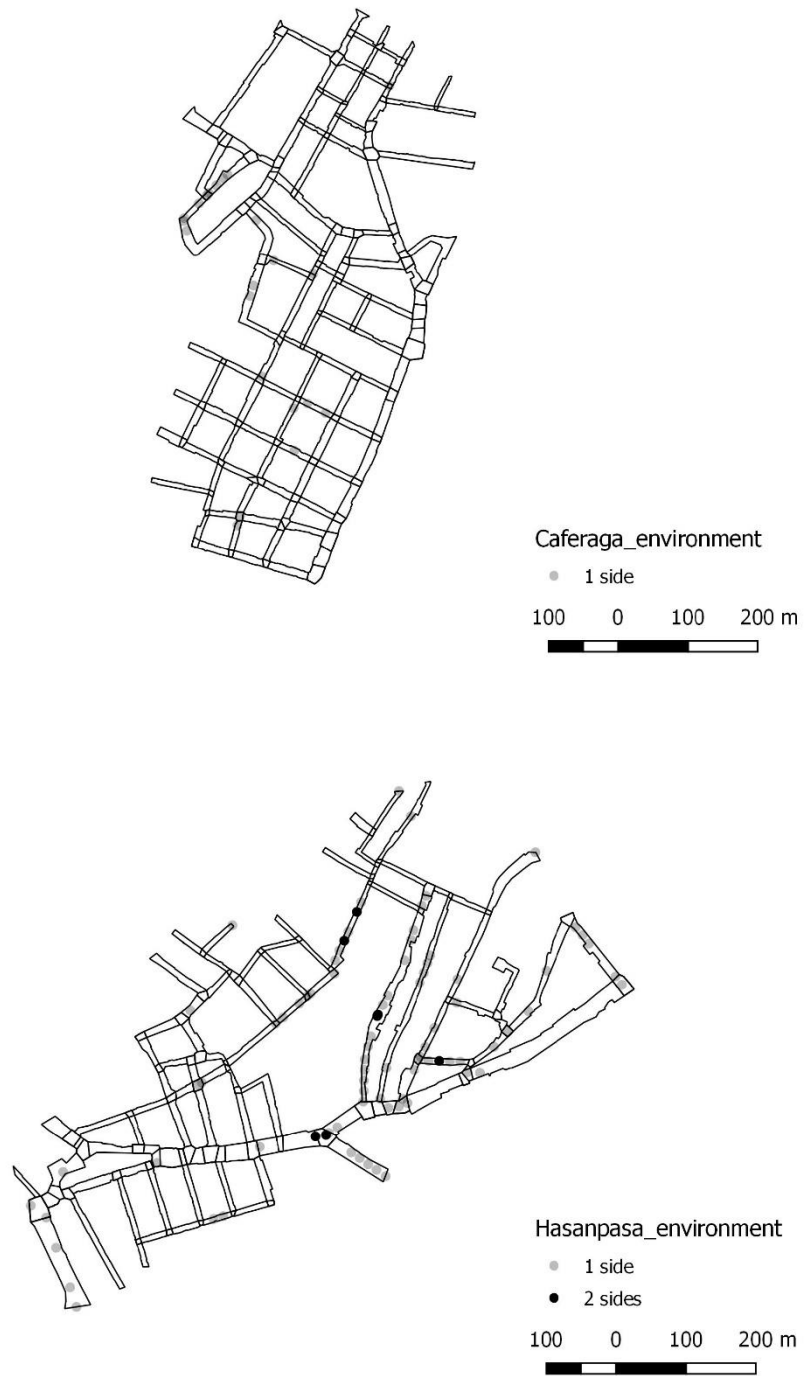


Figure G.11 : Istanbul NSS where “environment” tag is identified.

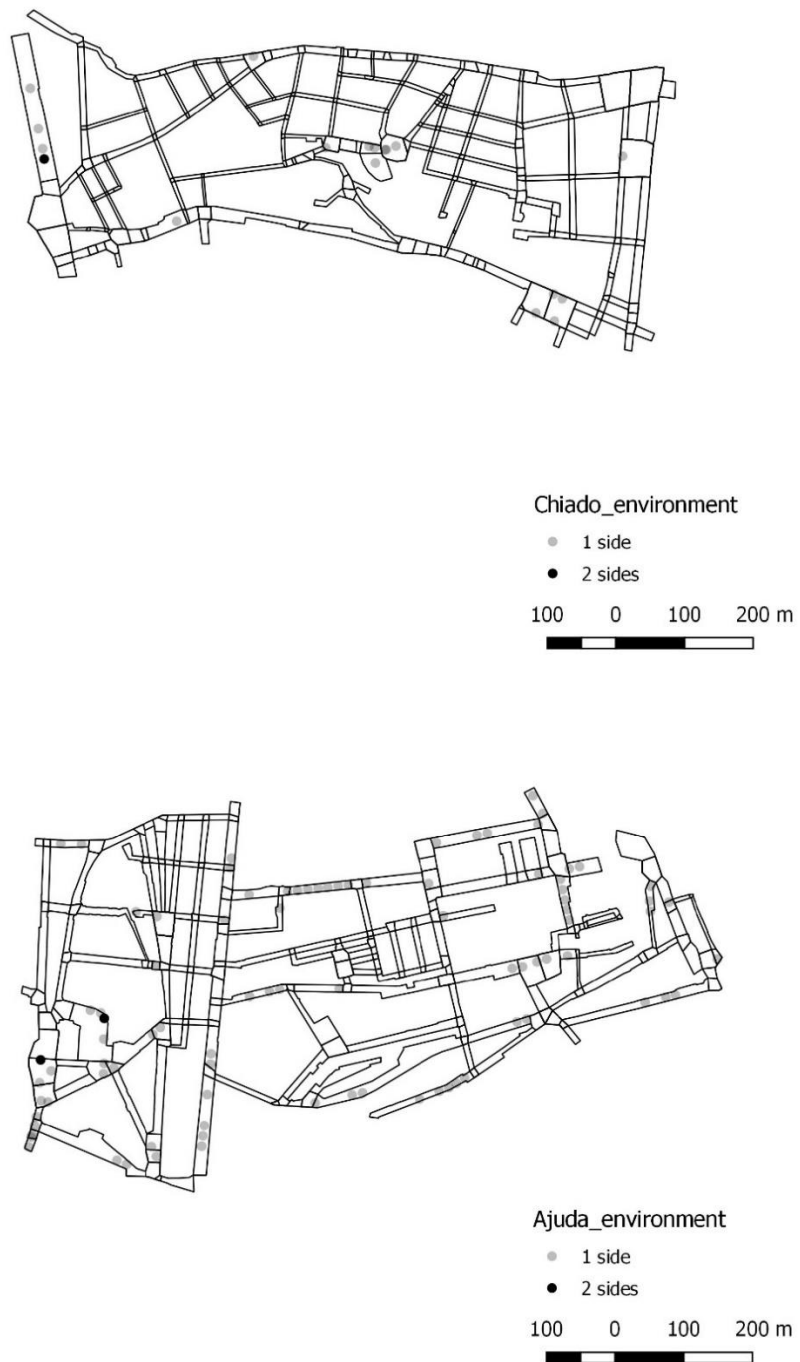


Figure G.12 : Lisbon NSS where “environment” tag is identified.

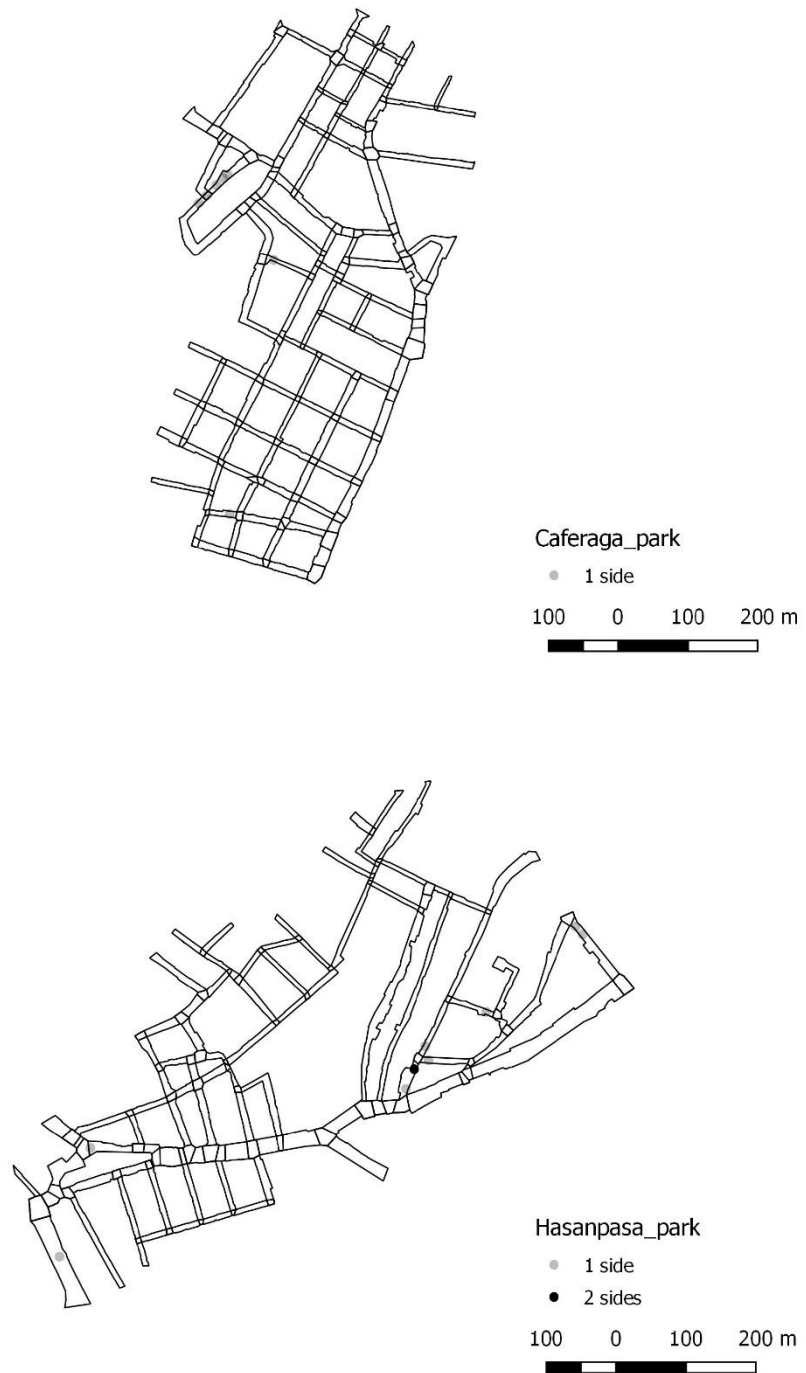


Figure G.13 : Istanbul NSS where a park is identified.

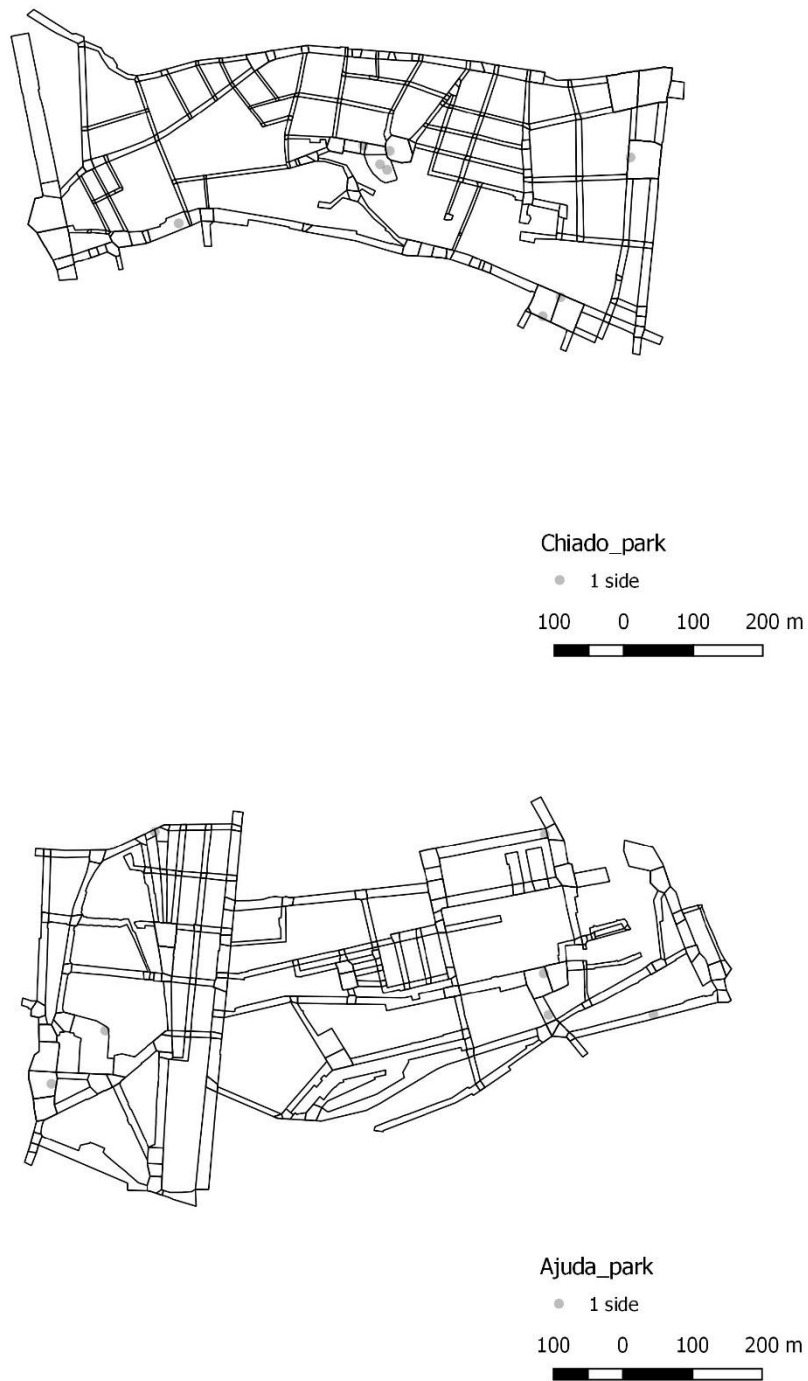


Figure G.14 : Istanbul NSS where a park is identified.

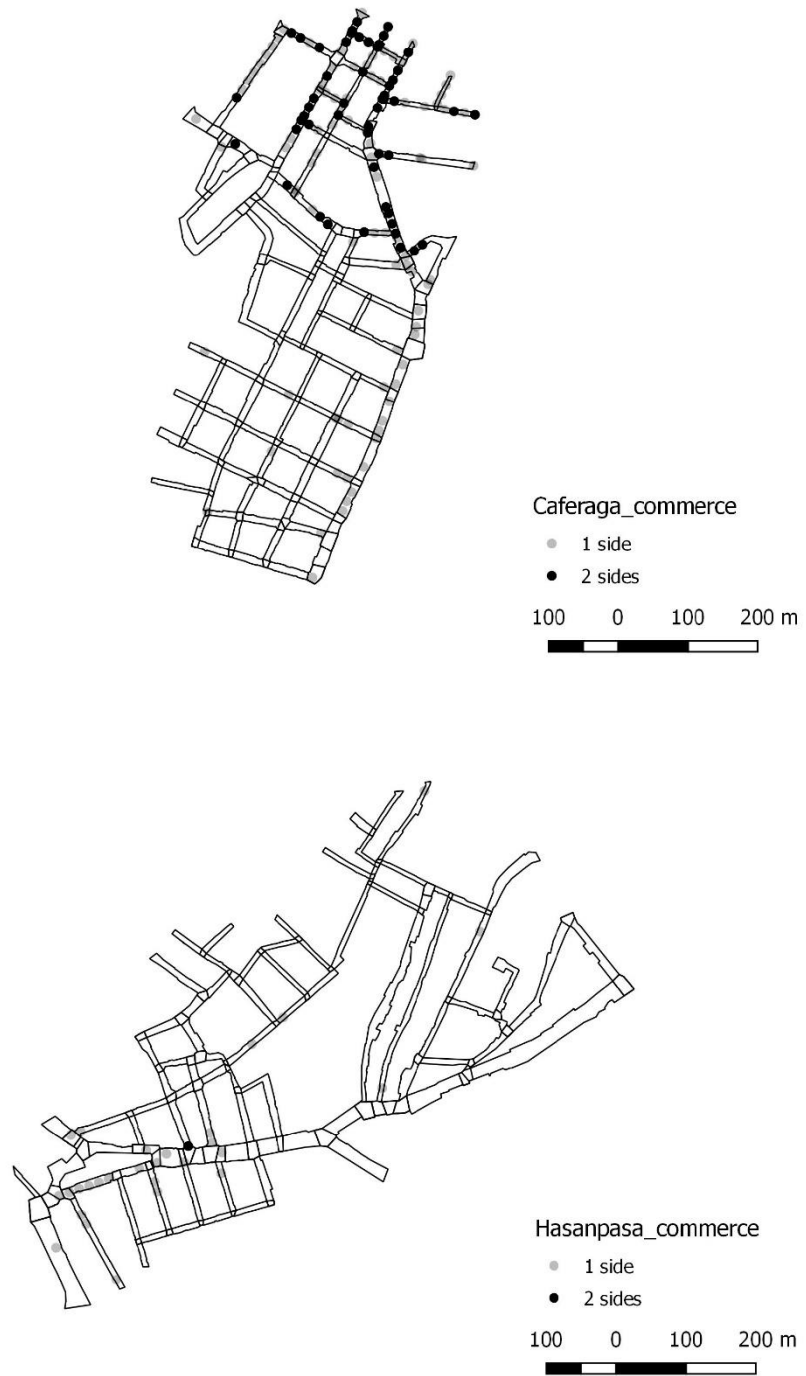


Figure G.15 : Istanbul NSS where commercial activity is identified.

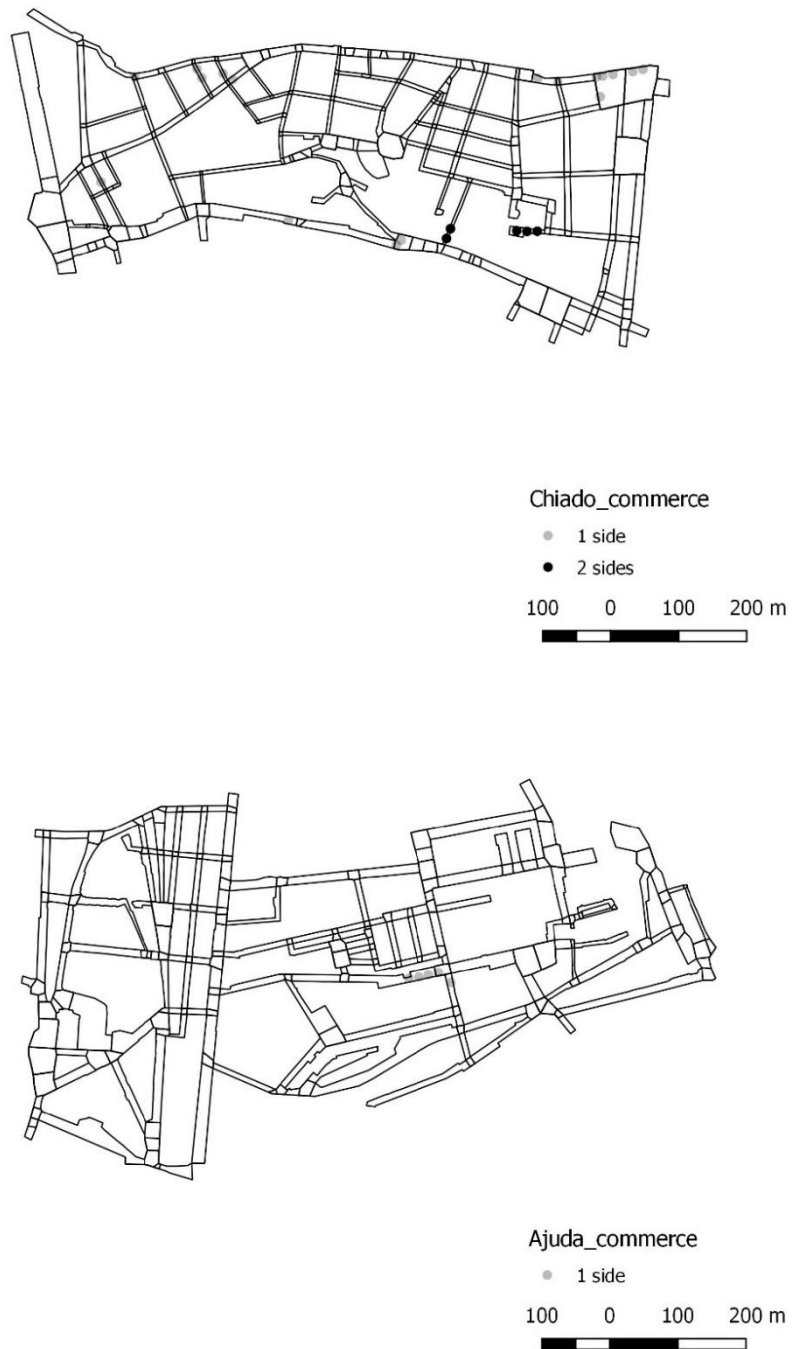


Figure G.16 : Lisbon NSS where commercial activity is identified.

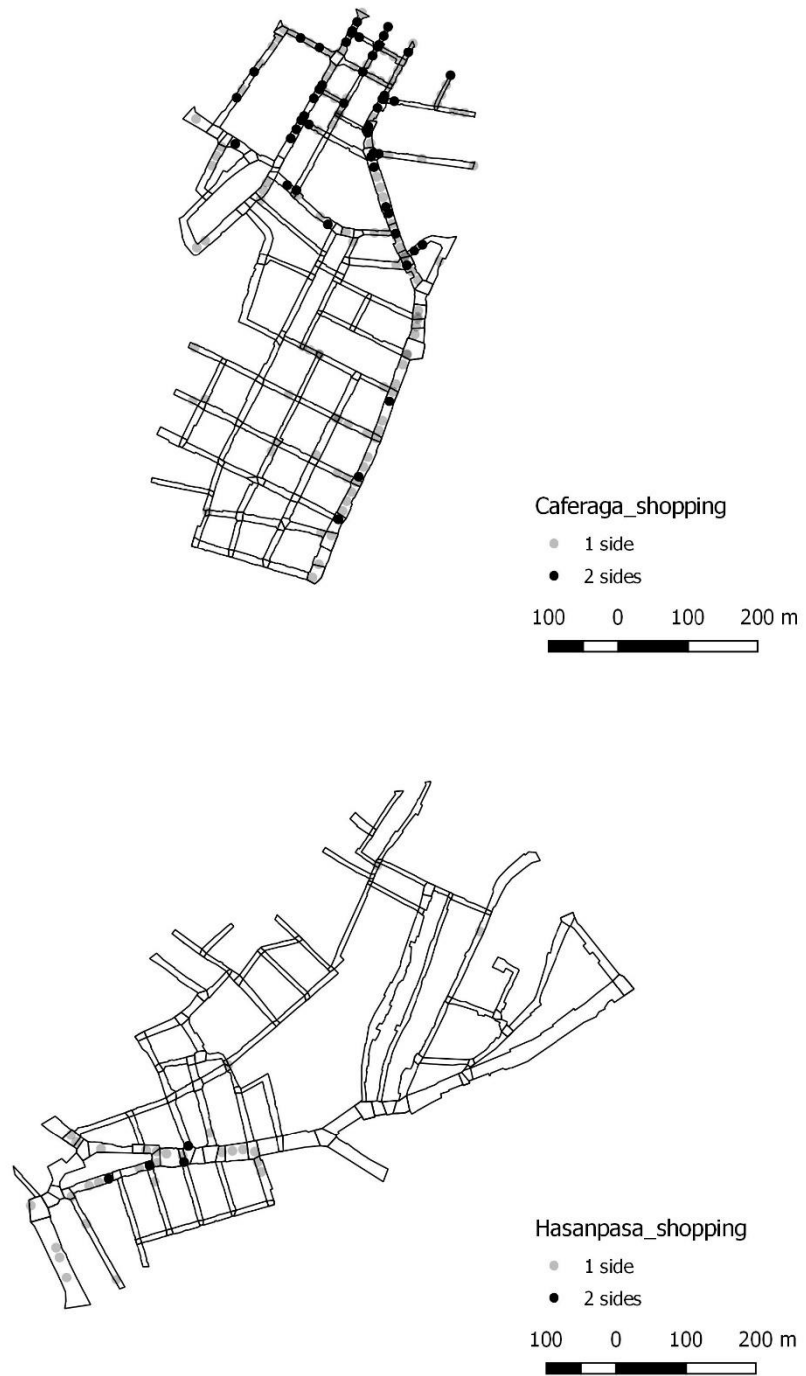


Figure G.17 : Istanbul NSS where shopping activity is identified.

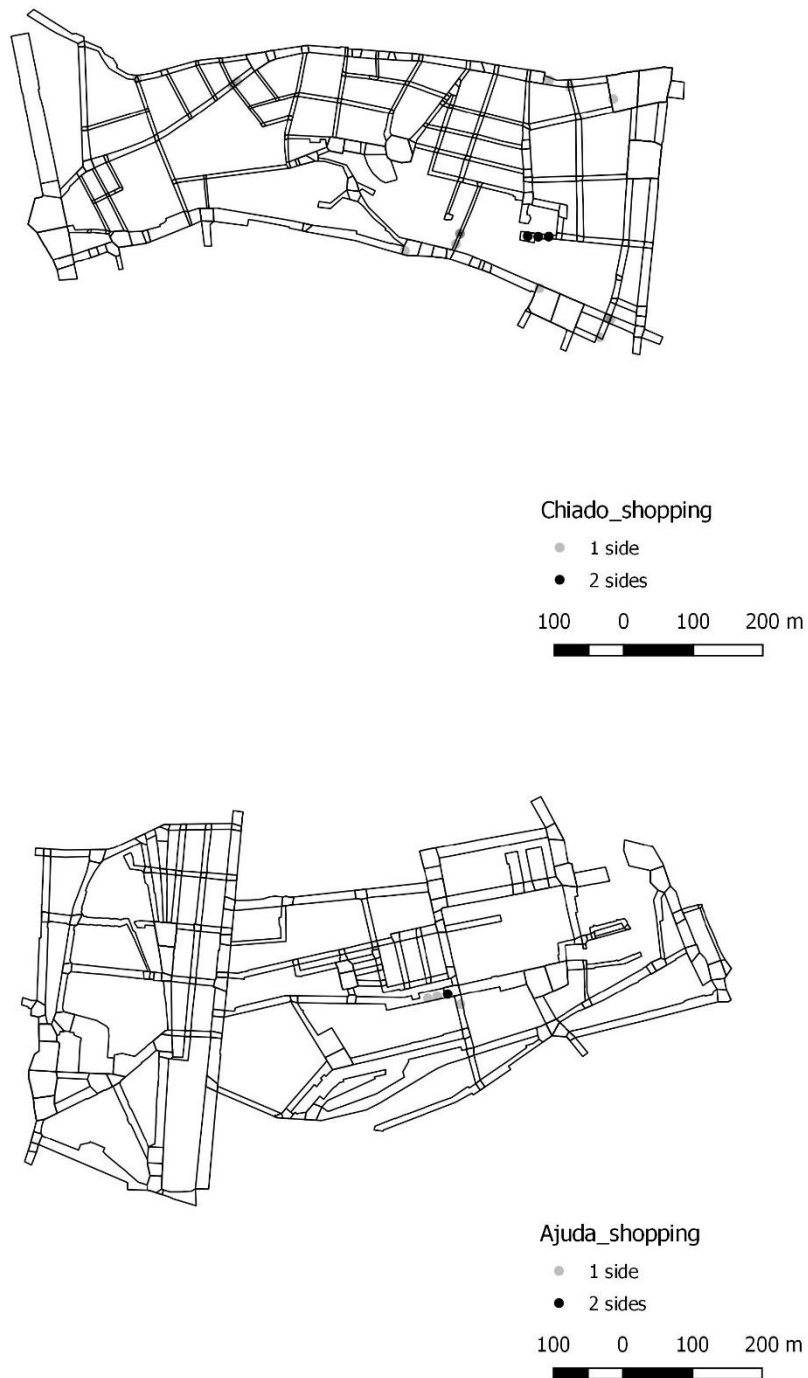


Figure G.18 : Lisbon NSS where shopping activity is identified.

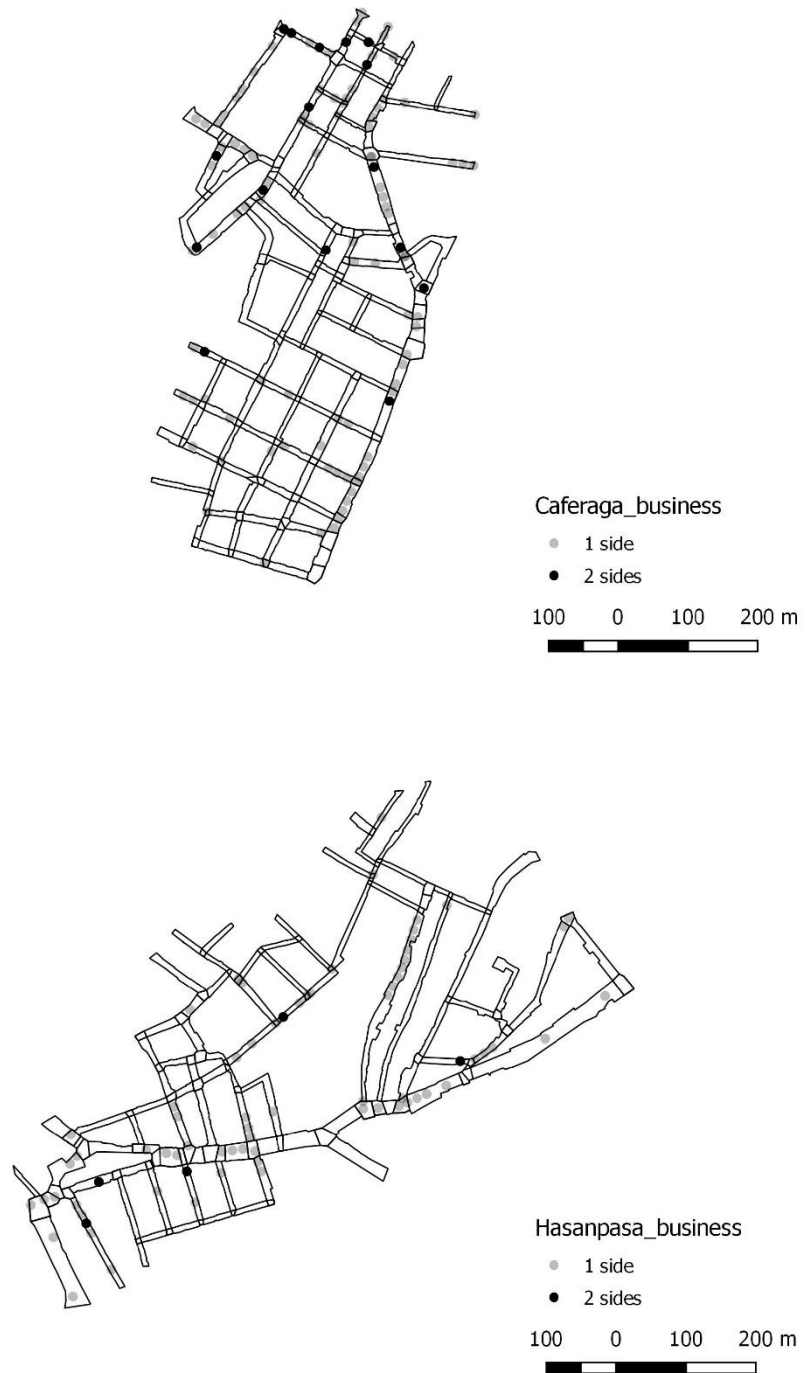


Figure G.19 : Istanbul NSS where businesses are identified.

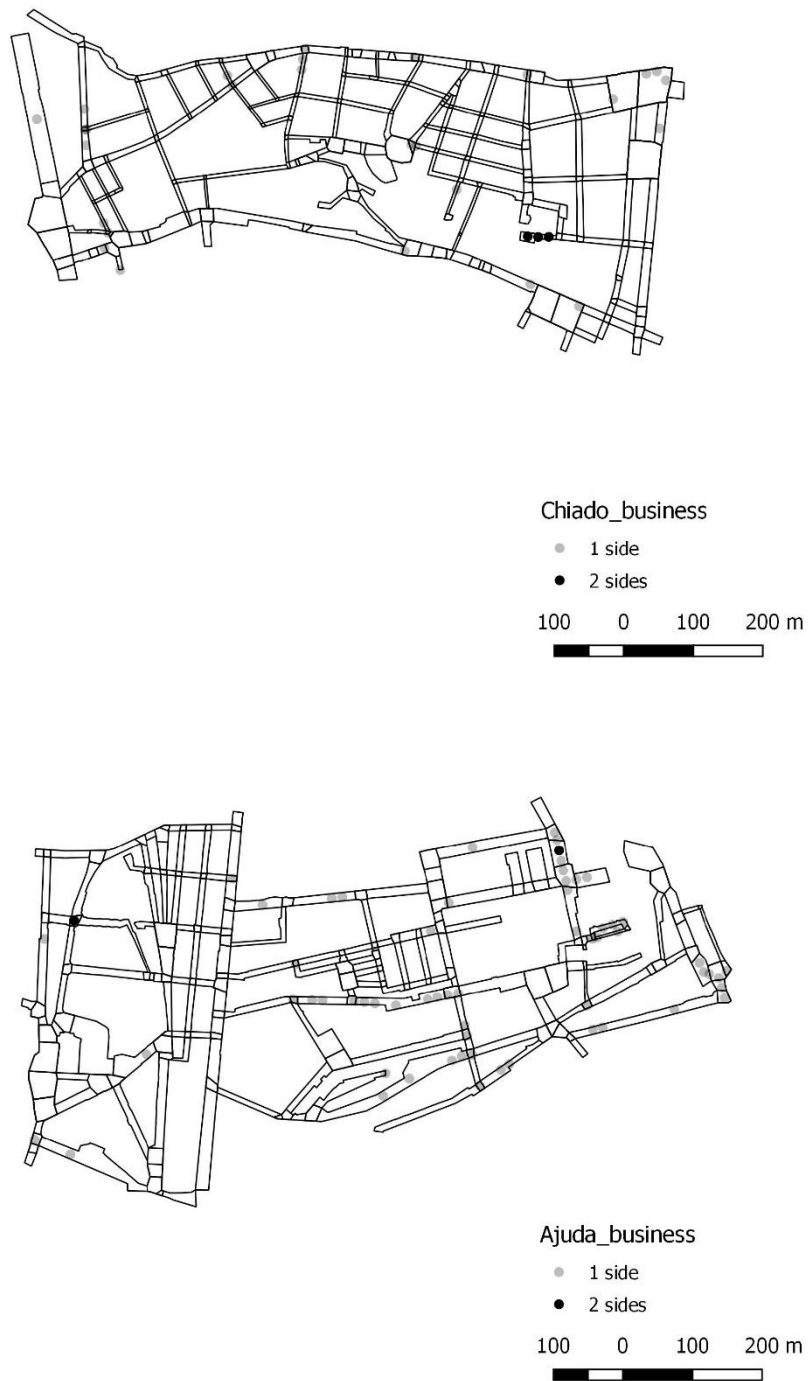


Figure G.20 : Lisbon NSS where businesses are identified.

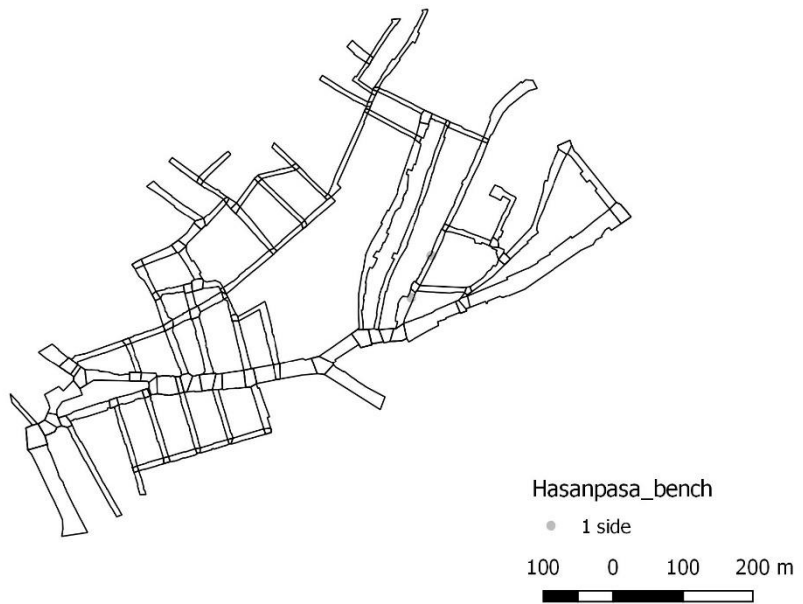
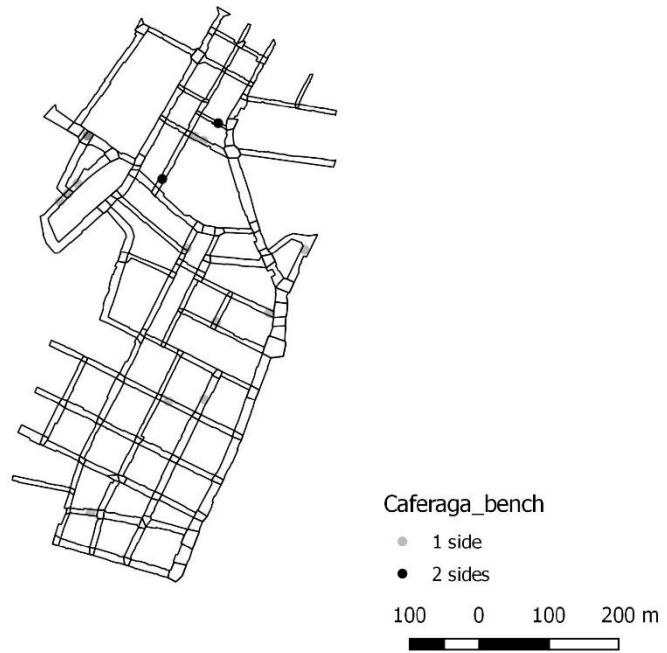


Figure G.21 : Istanbul NSS where benches are identified.

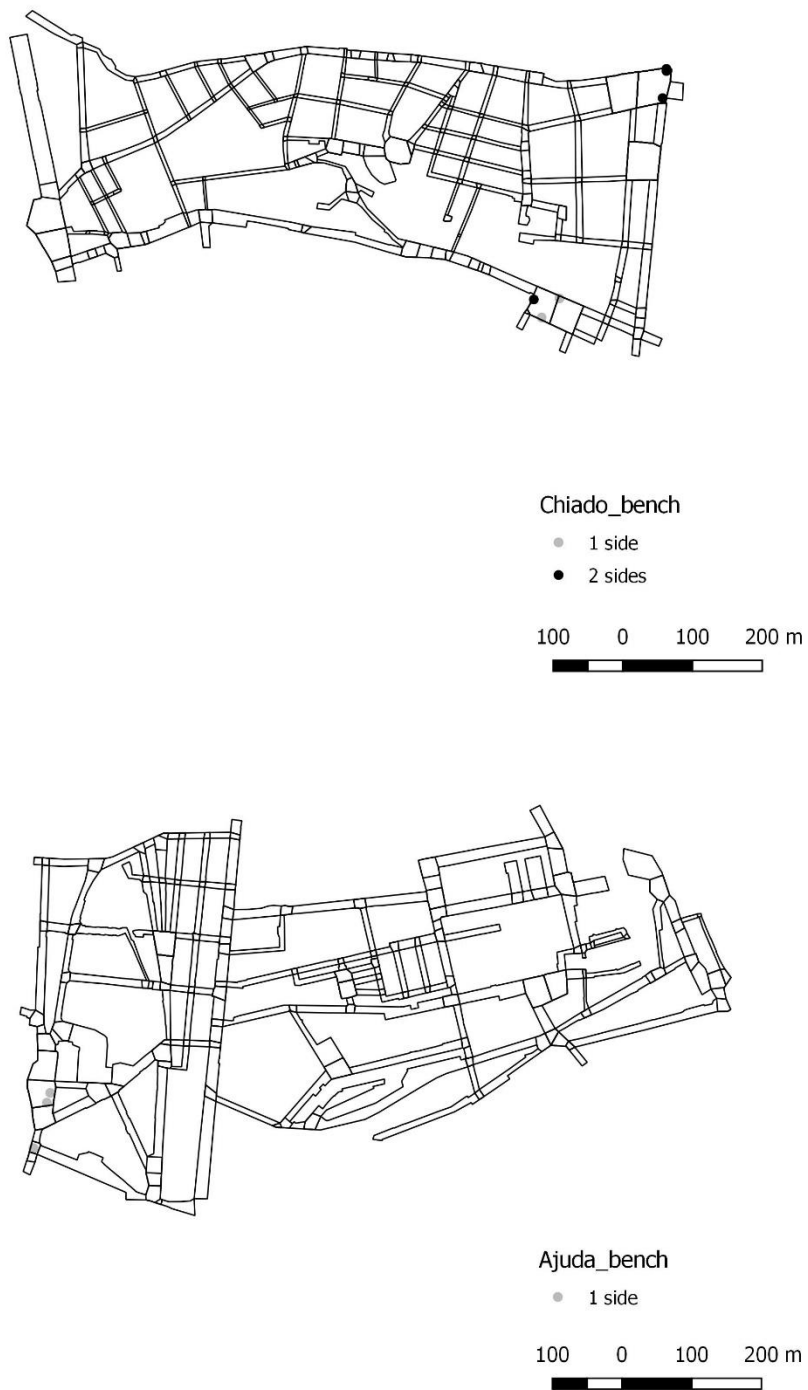


Figure G.22 : Lisbon NSS where benches are identified.

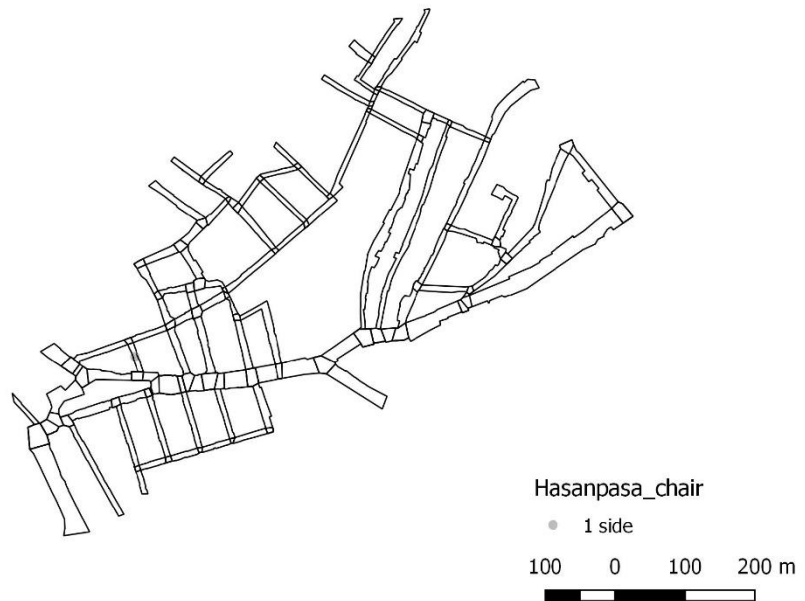
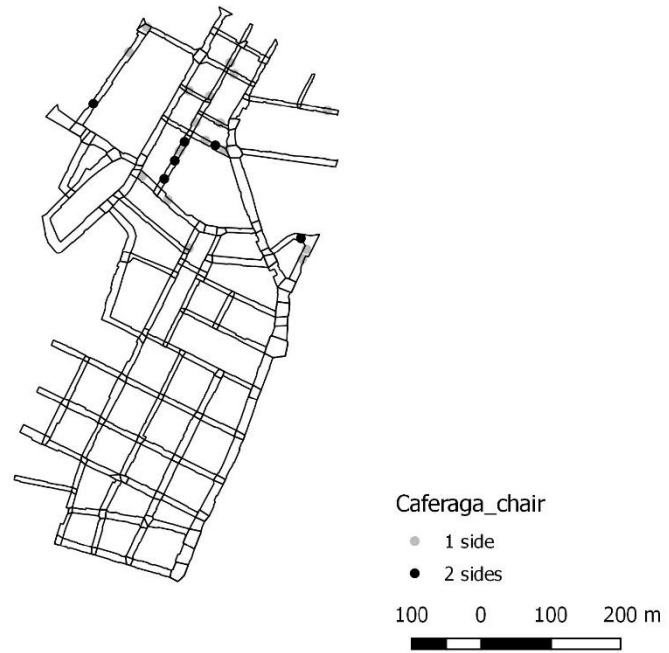


Figure G.23 : Istanbul NSS where chairs are identified.

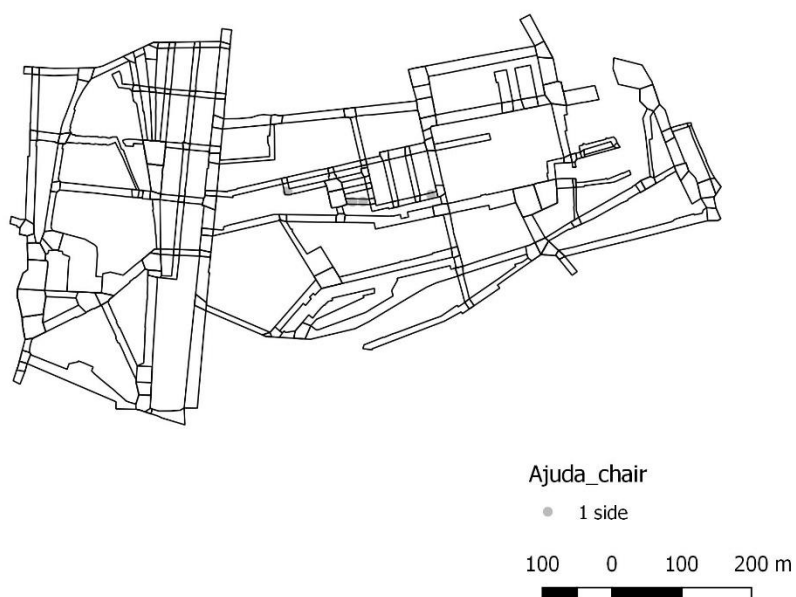
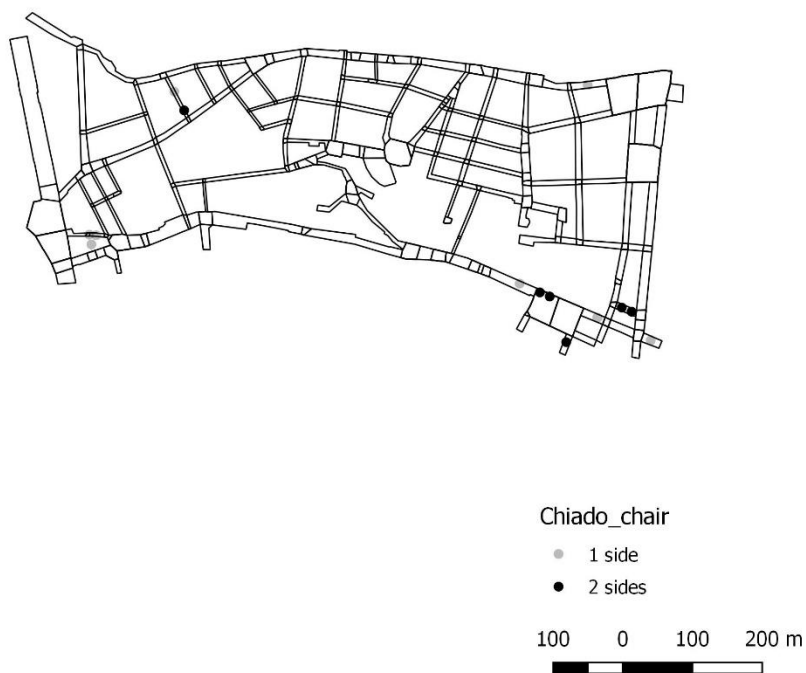


Figure G.24 : Lisbon NSS where chairs are identified.

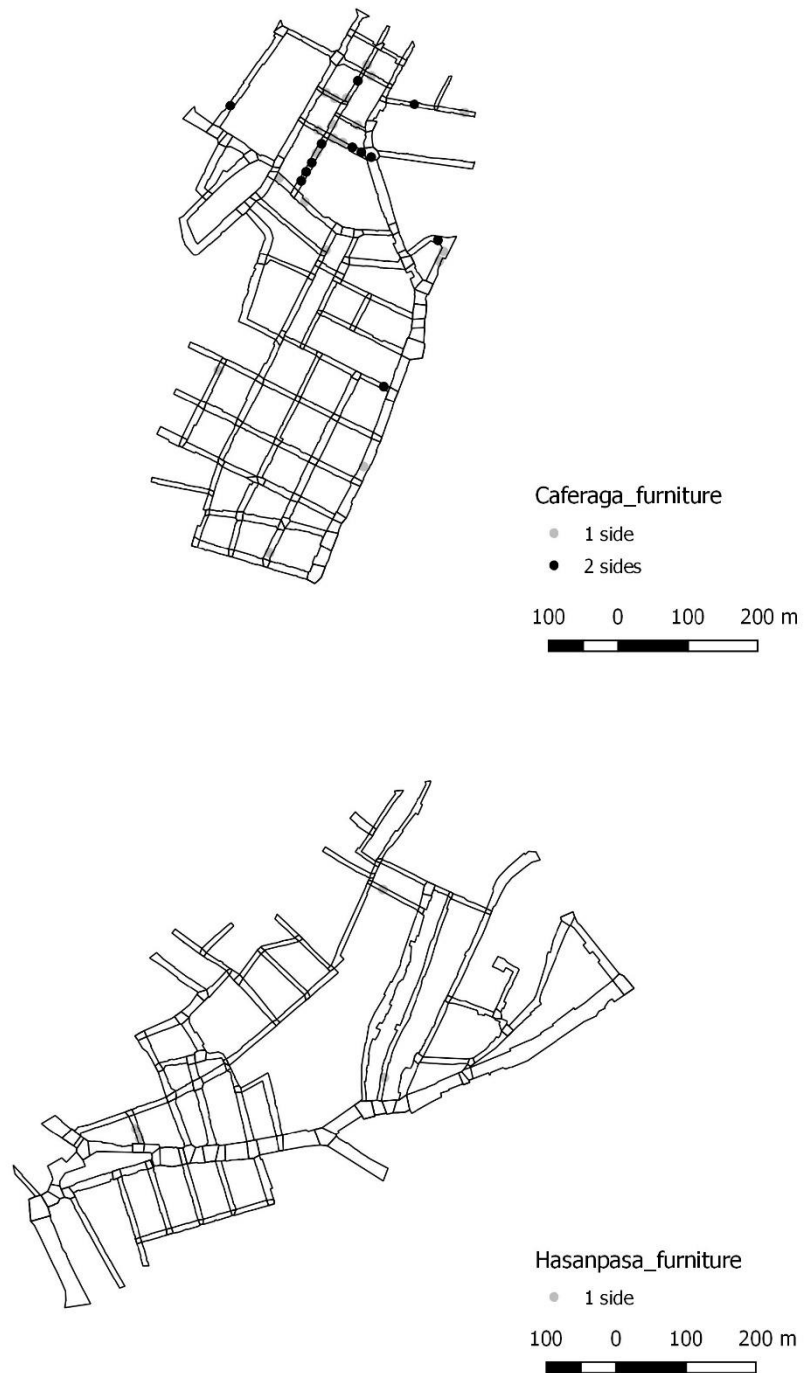


Figure G.25 : Istanbul NSS where street furniture is identified.

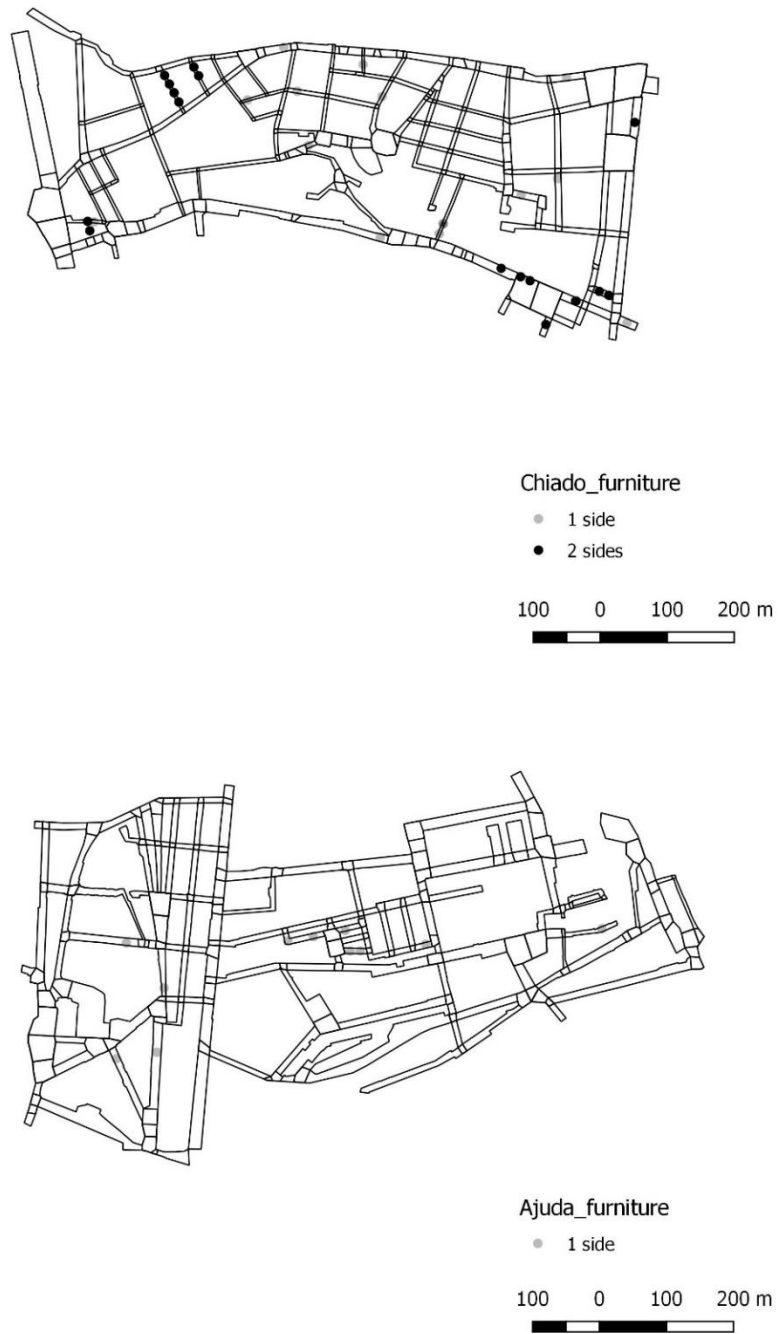


Figure G.26 : Lisbon NSS where street furniture is identified.

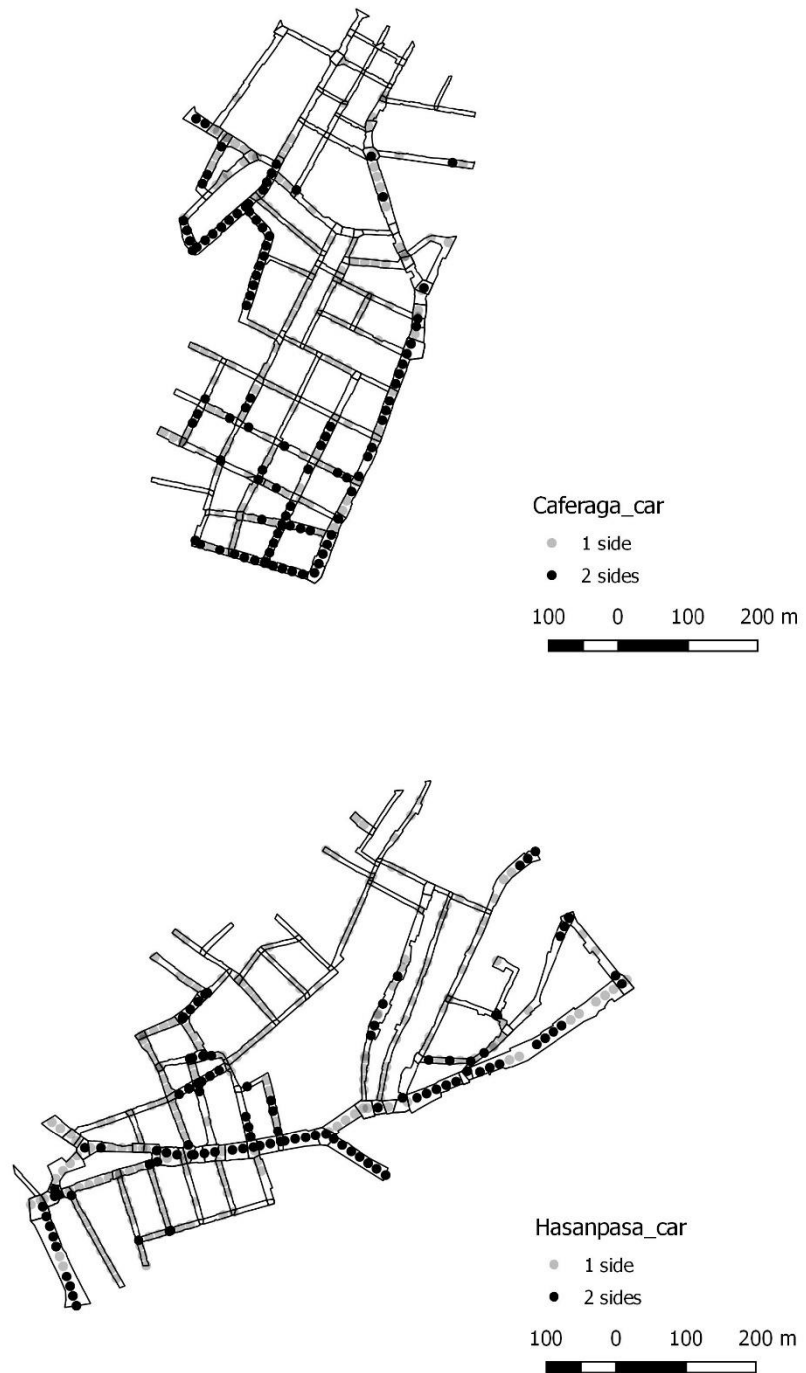


Figure G.27 : Istanbul NSS where cars are identified.

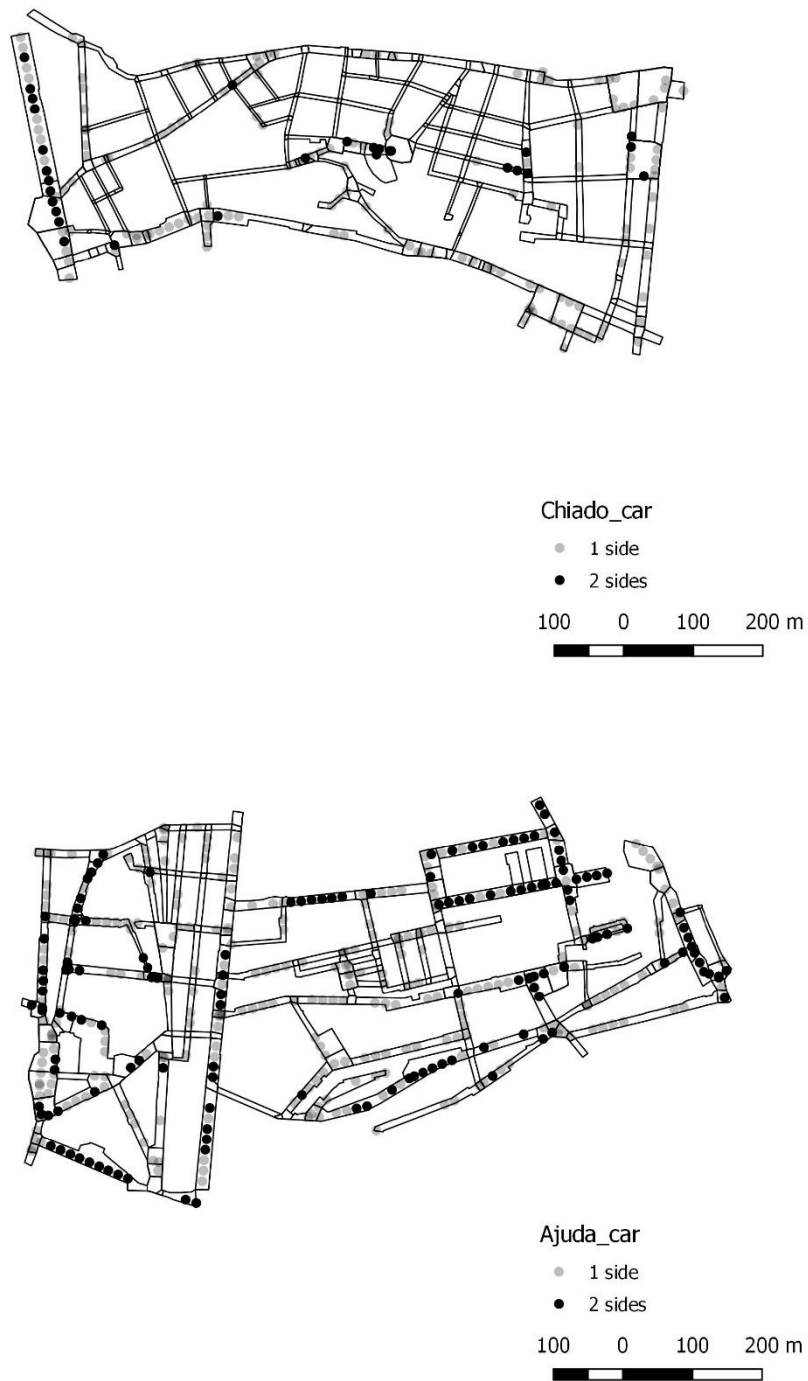


Figure G.28 : Lisbon NSS where cars are identified.

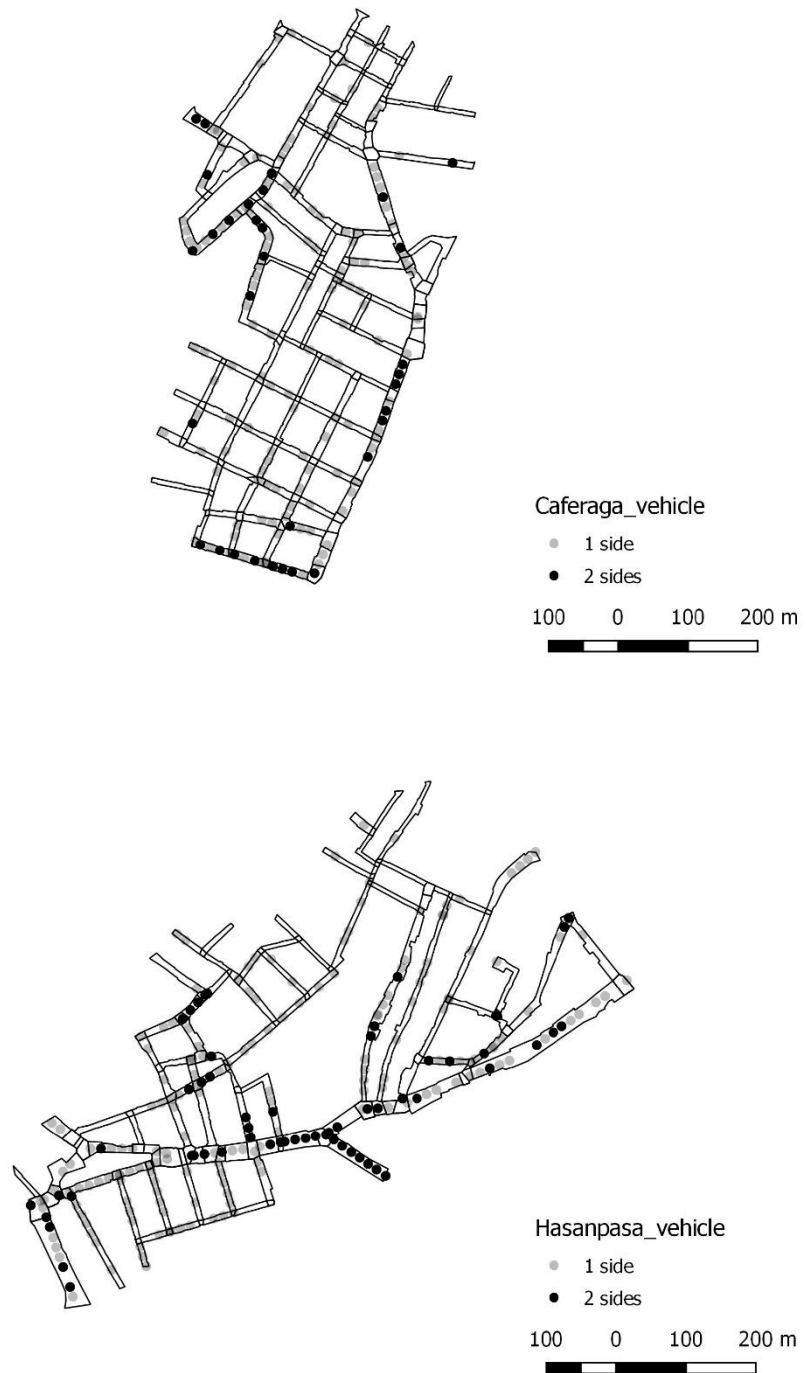


Figure G.29 : Istanbul NSS where vehicles are identified.

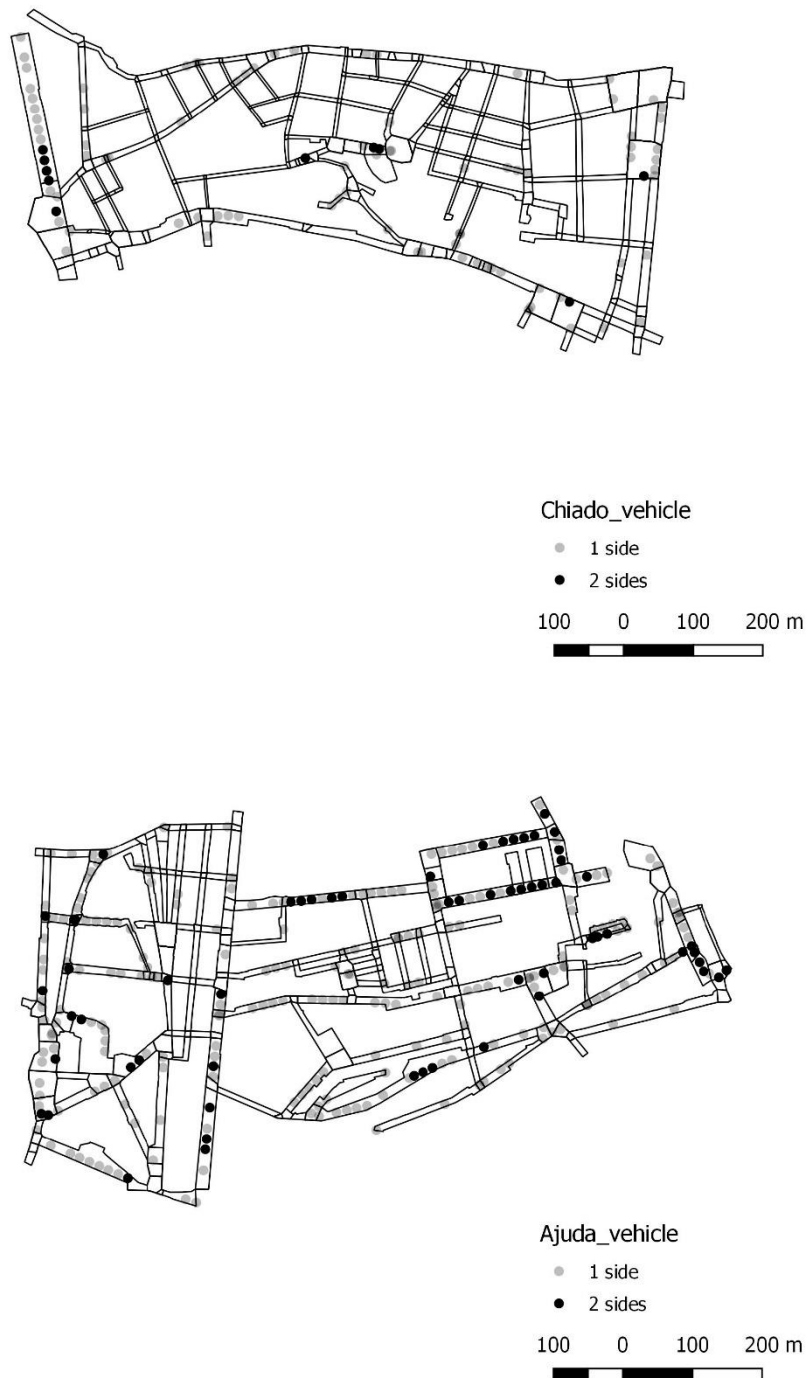


Figure G.30 : Lisbon NSS where vehicles are identified.

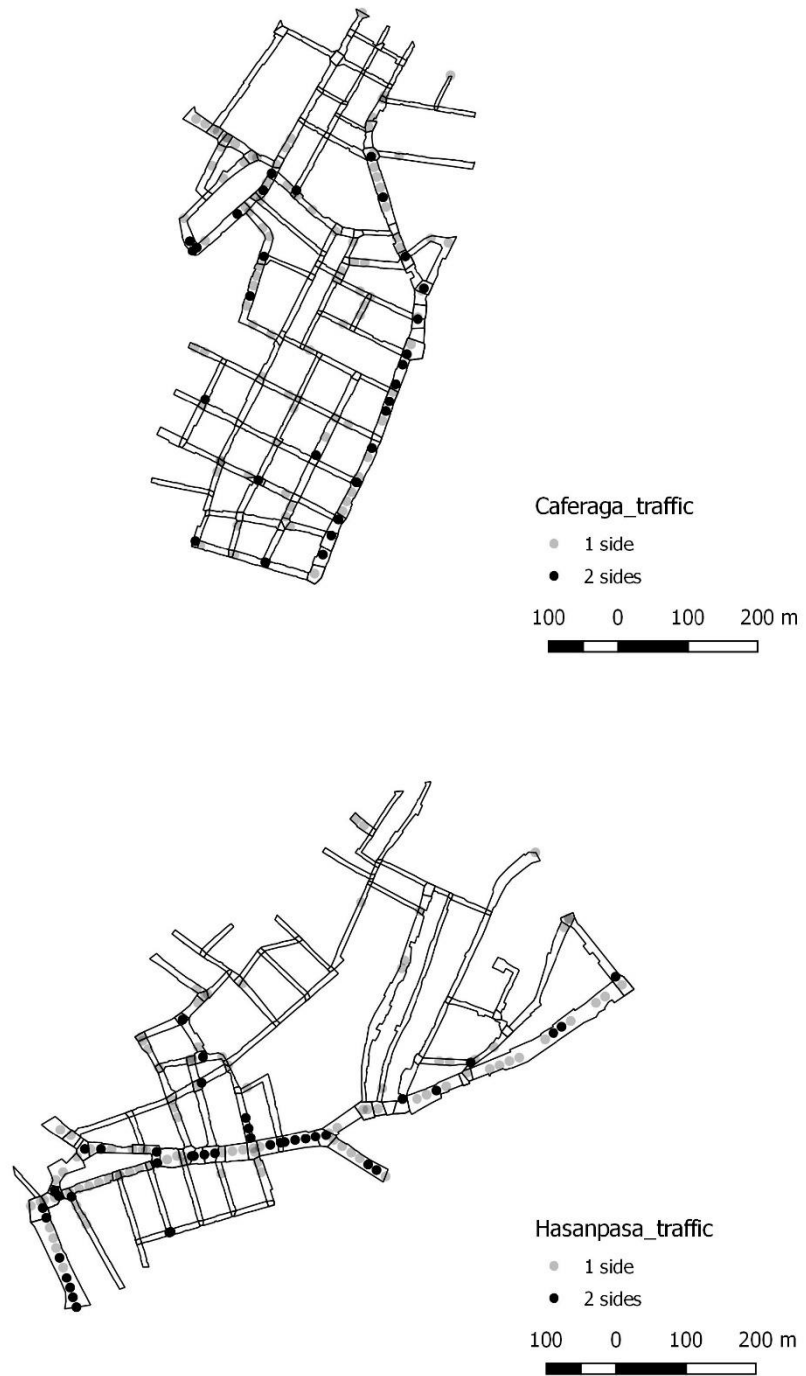


Figure G.31 : Istanbul NSS where traffic is identified.

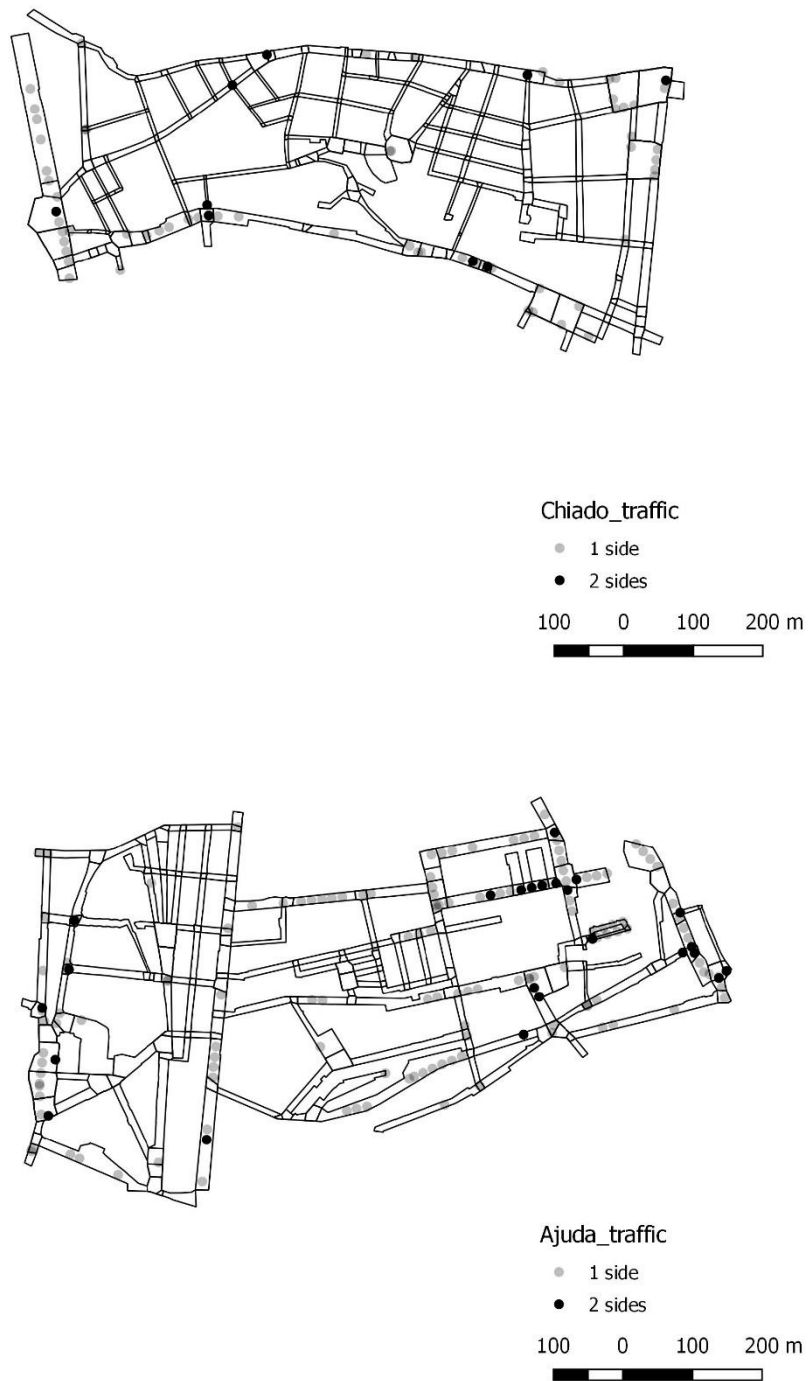


Figure G.32 : Lisbon NSS where traffic is identified.

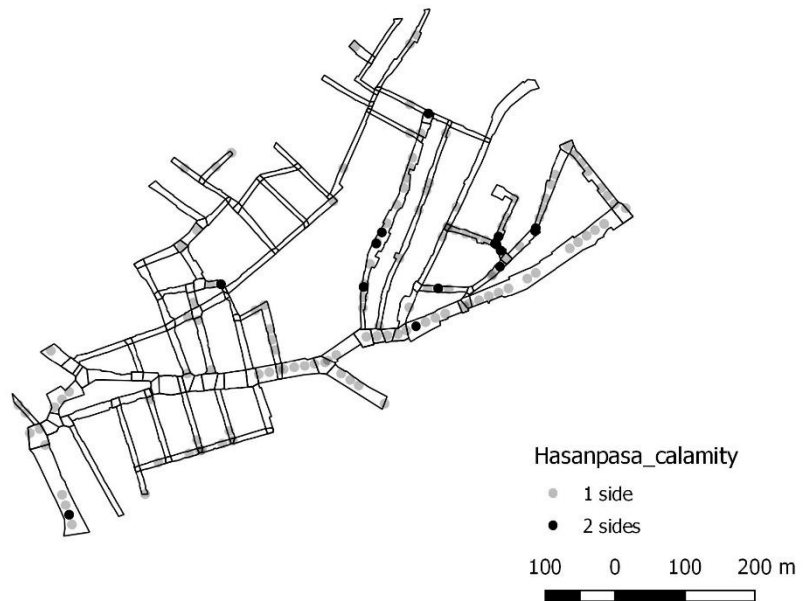
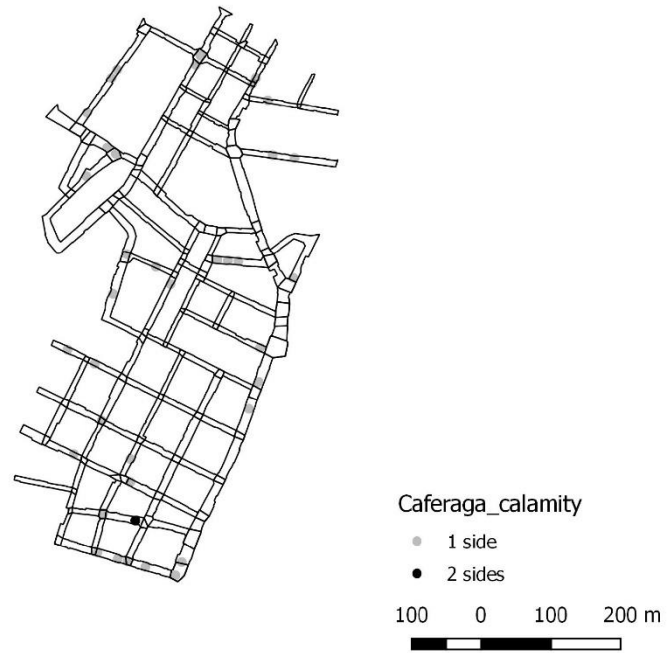


Figure G.33 : Istanbul NSS where “calamity” is identified.

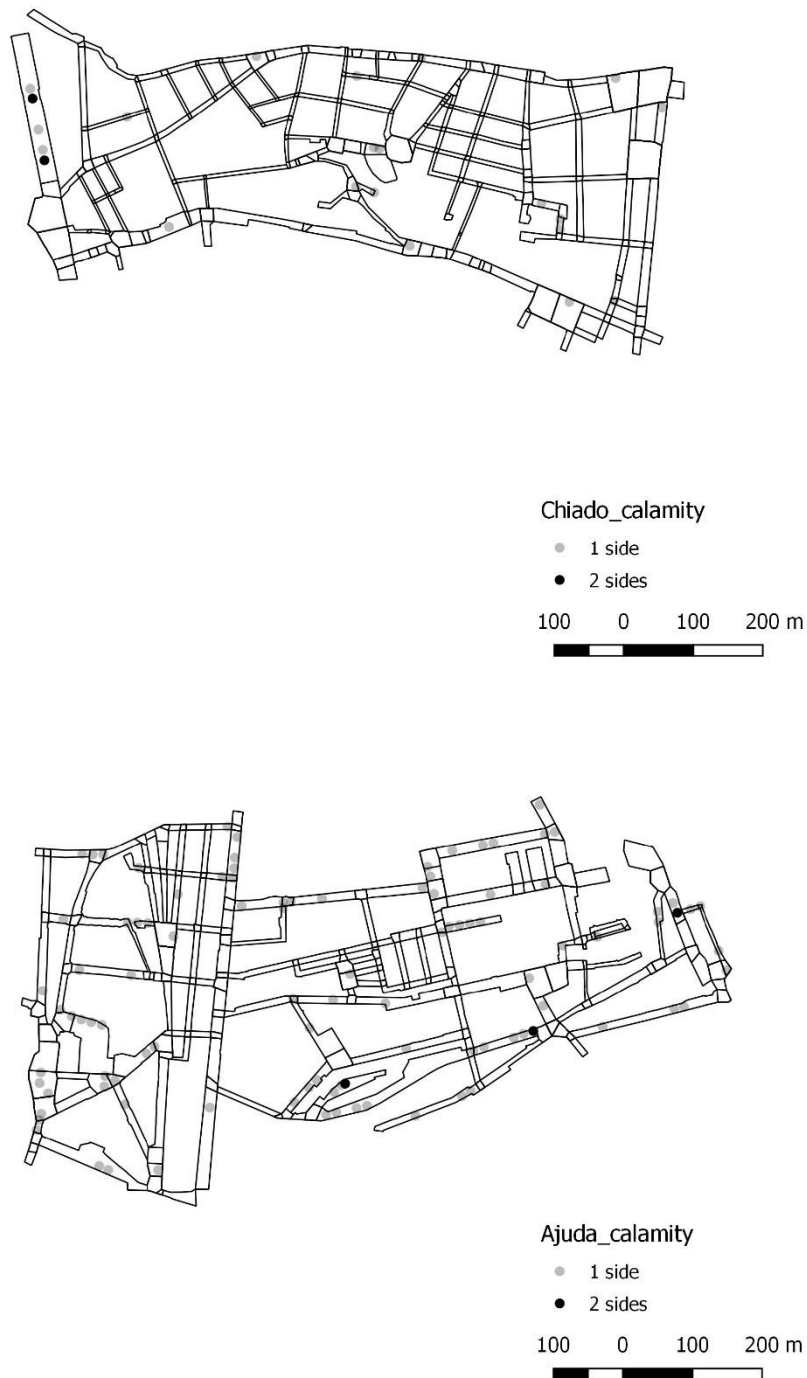


Figure G.34 : Lisbon NSS where “calamity” is identified.

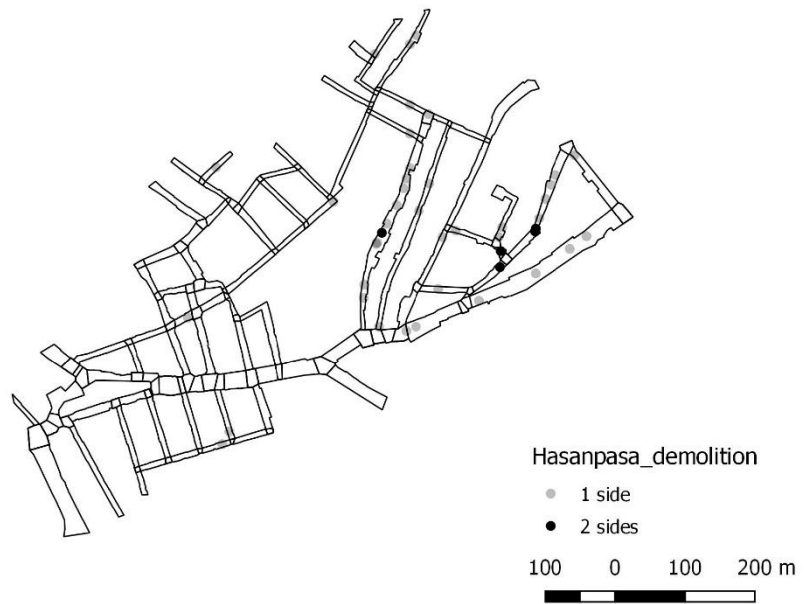
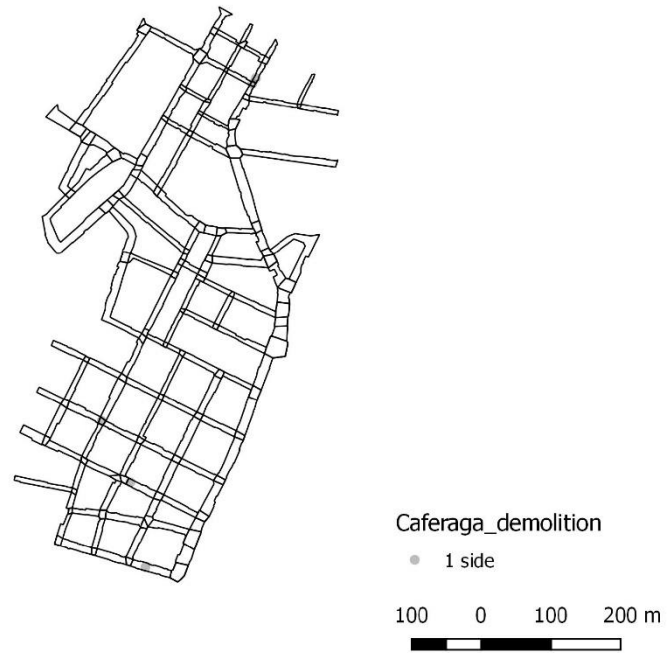


Figure G.35 : Istanbul NSS where “demolition” is identified.

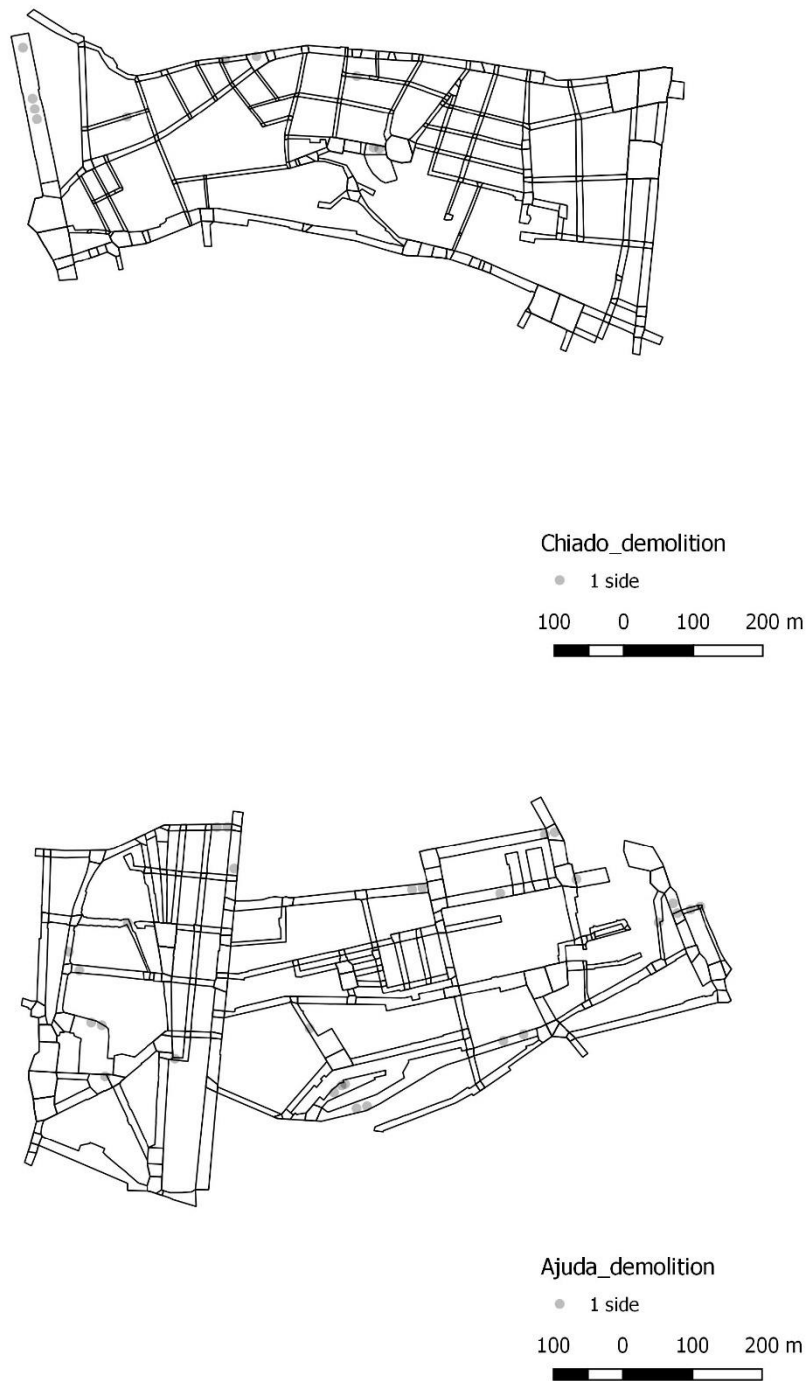


Figure G.36 : Lisbon NSS where “demolition” is identified.

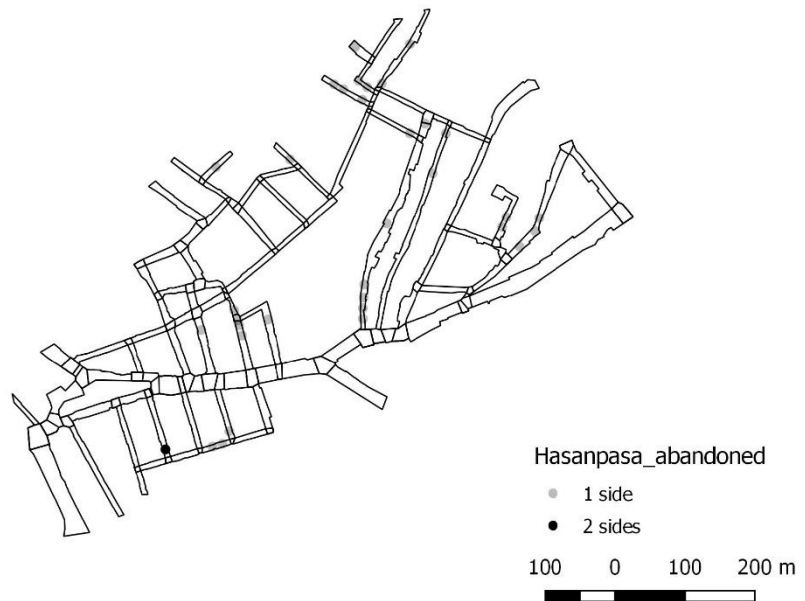
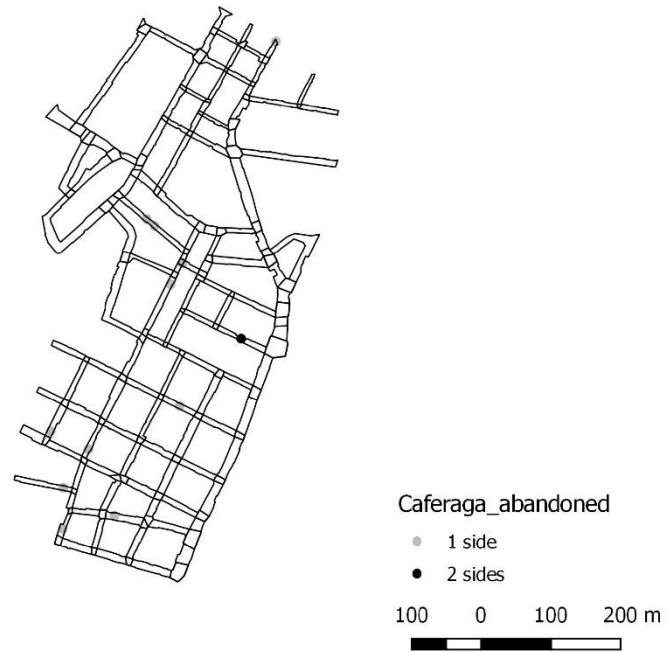


Figure G.37 : Istanbul NSS where “abandoned” tag is identified.

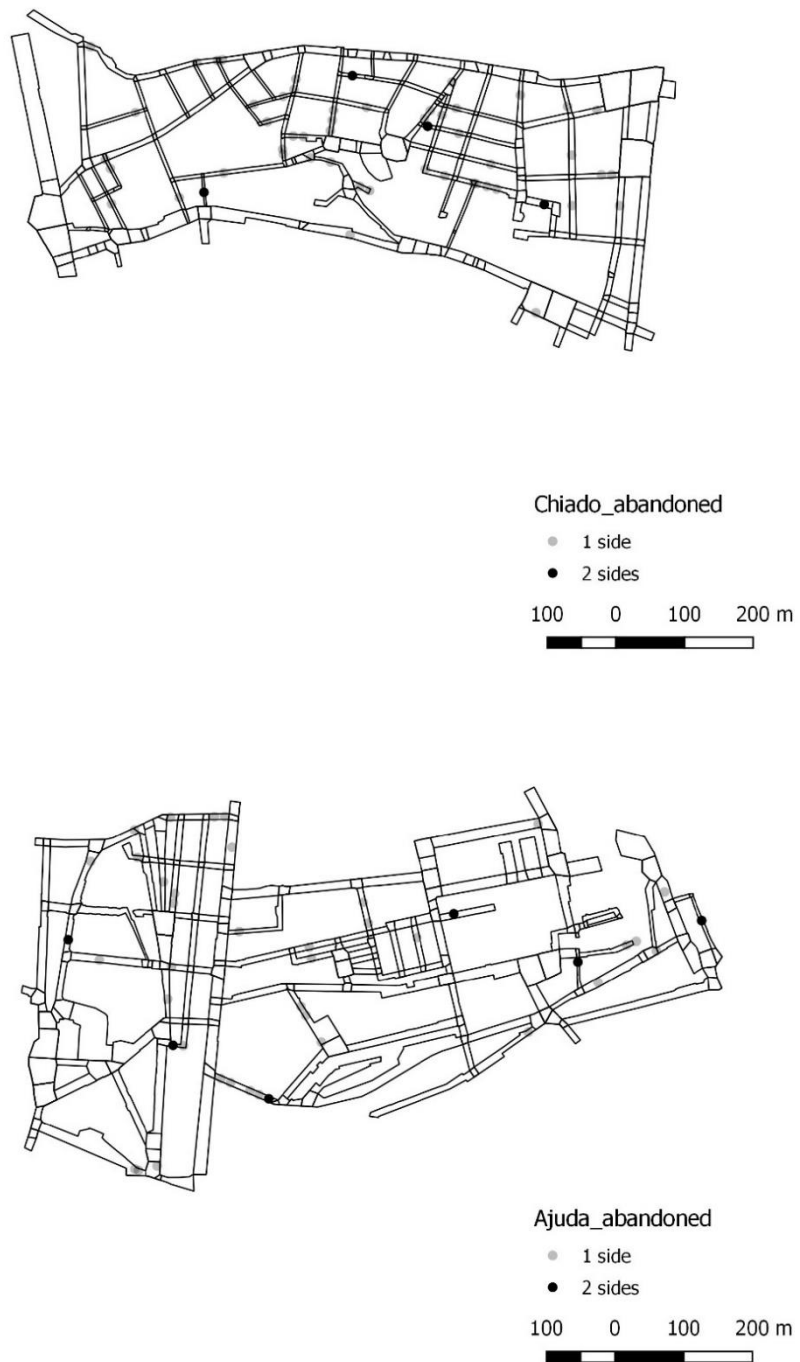


Figure G.38 : Lisbon NSS where “abandoned” tag is identified.

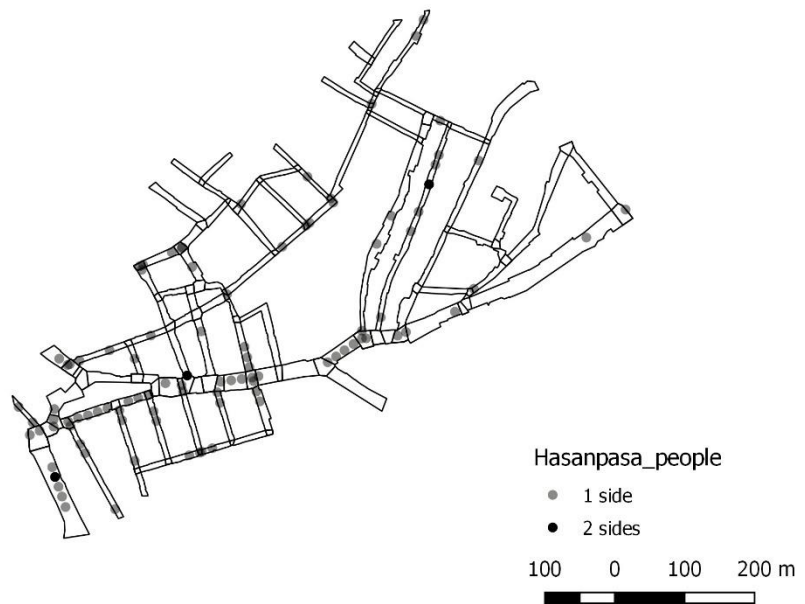
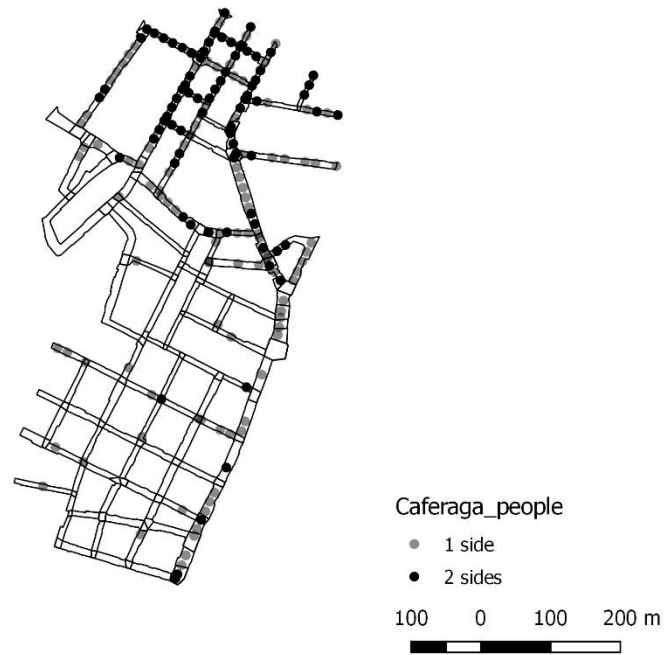


Figure G.39 : Istanbul NSS where people are identified.

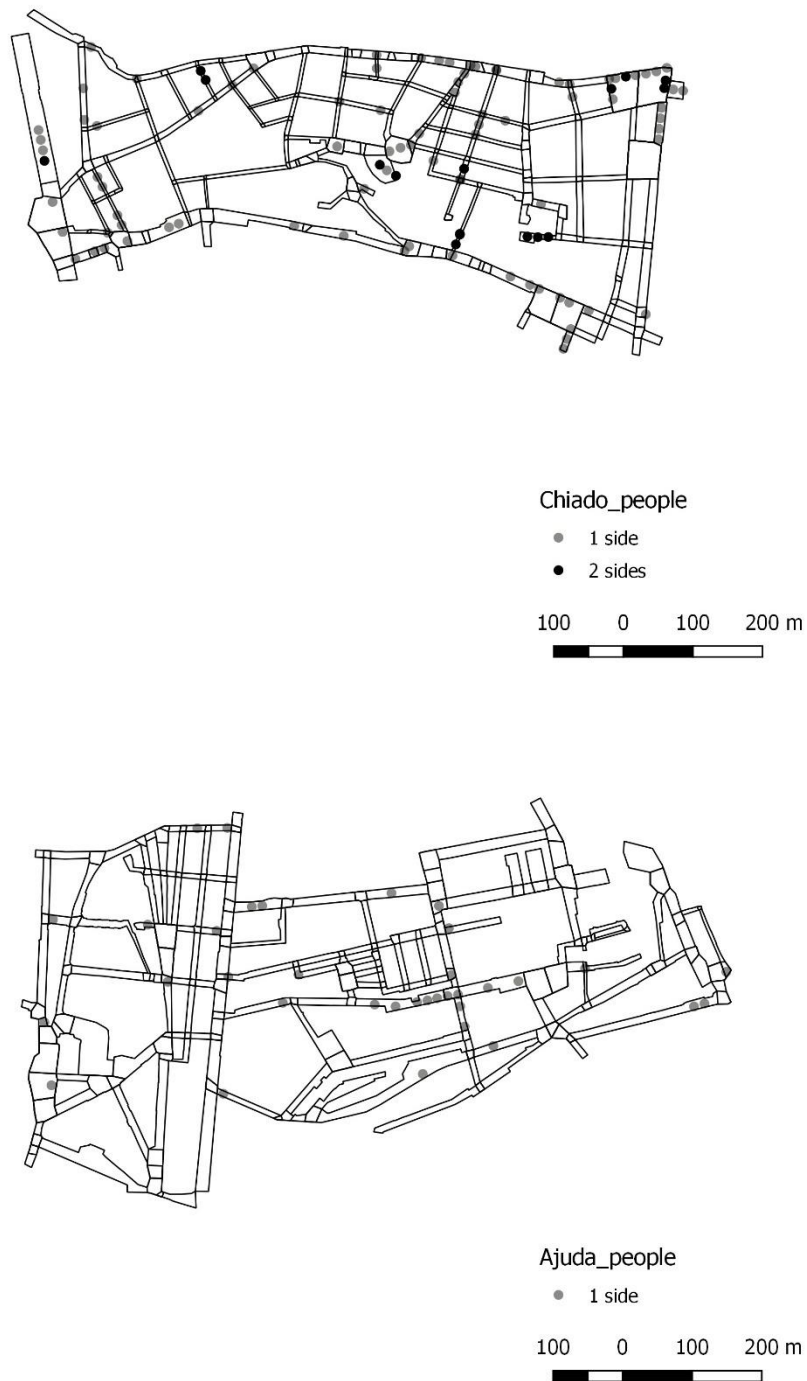


Figure G.40 : Lisbon NSS where people are identified.

APPENDIX H

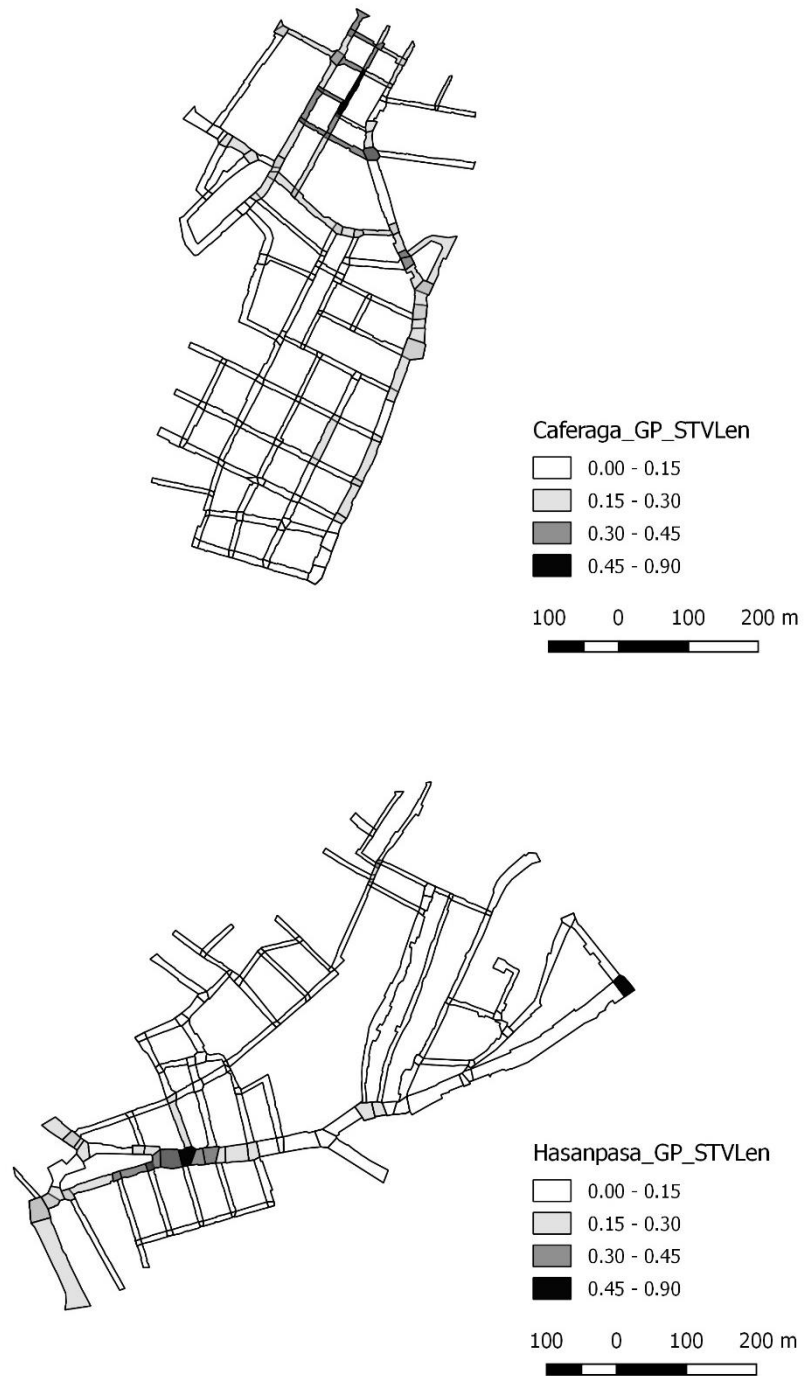


Figure H.1 : Istanbul number of Google Place locations per STV length.

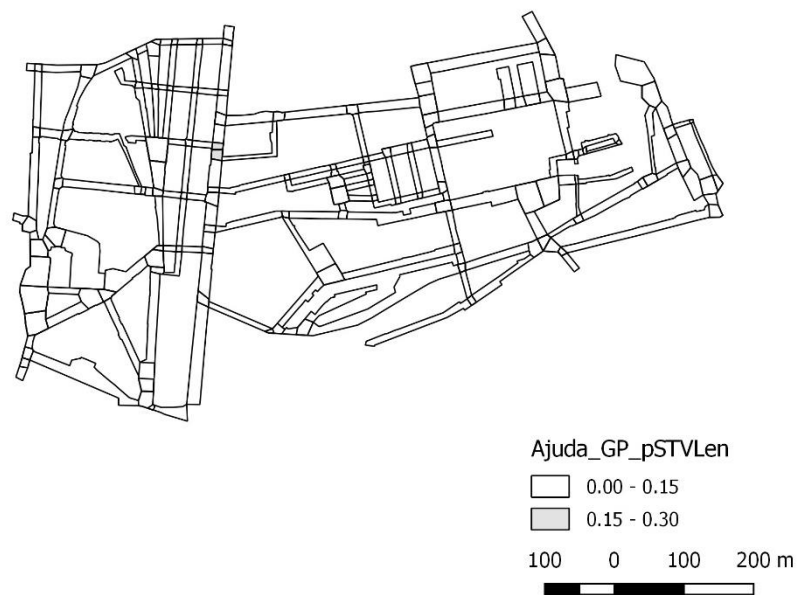


Figure H.2 : Lisbon number of Google Place locations per STV length.

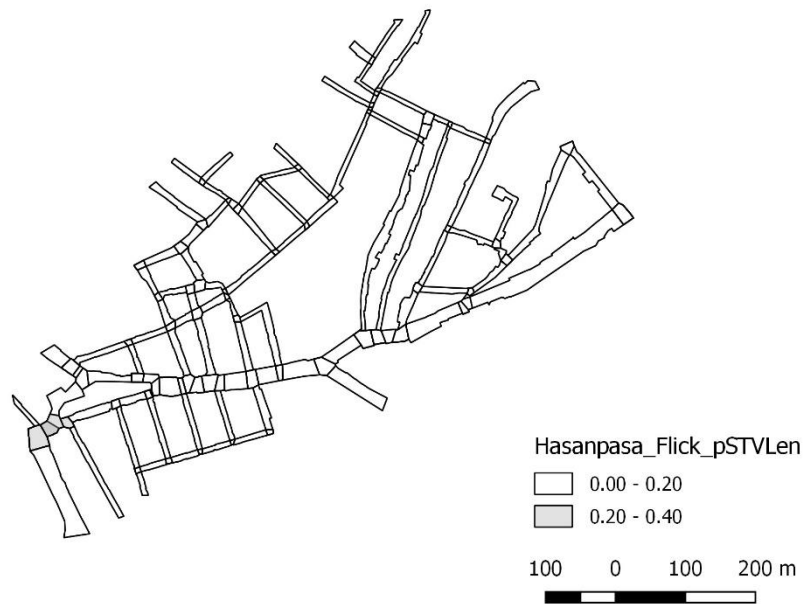
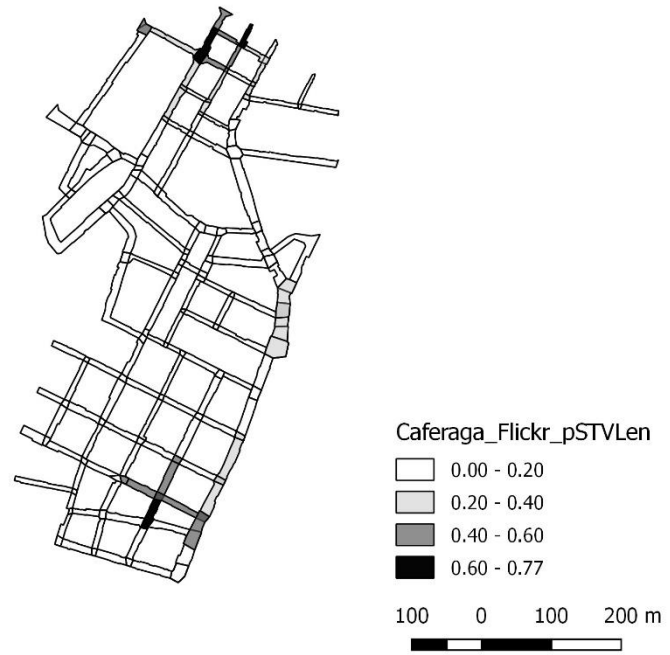


Figure H.3 : Istanbul number of Flickr posts per STV length.

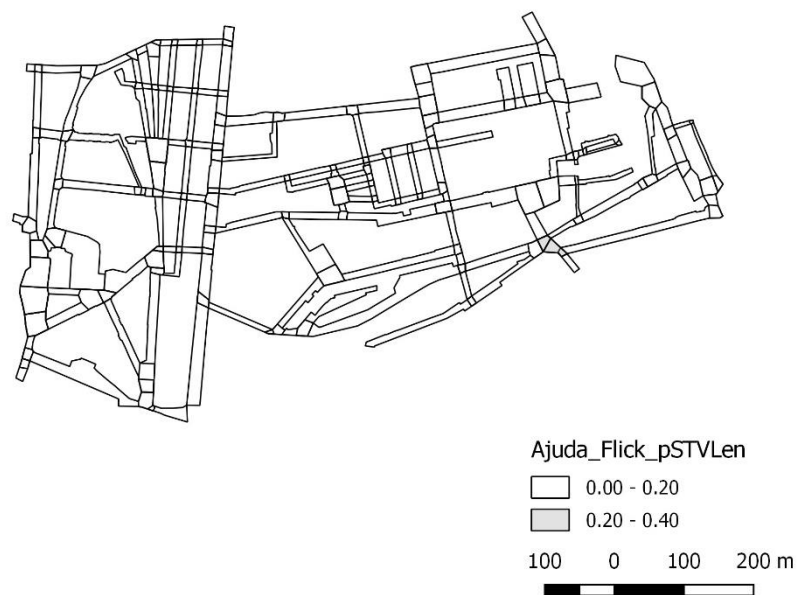


Figure H.4 : Lisbon number of Flickr posts per STV length.

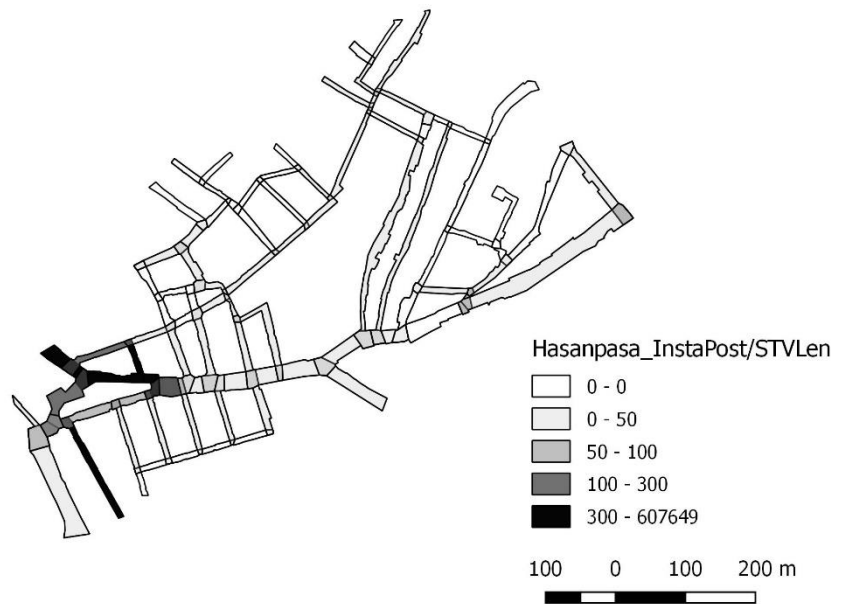
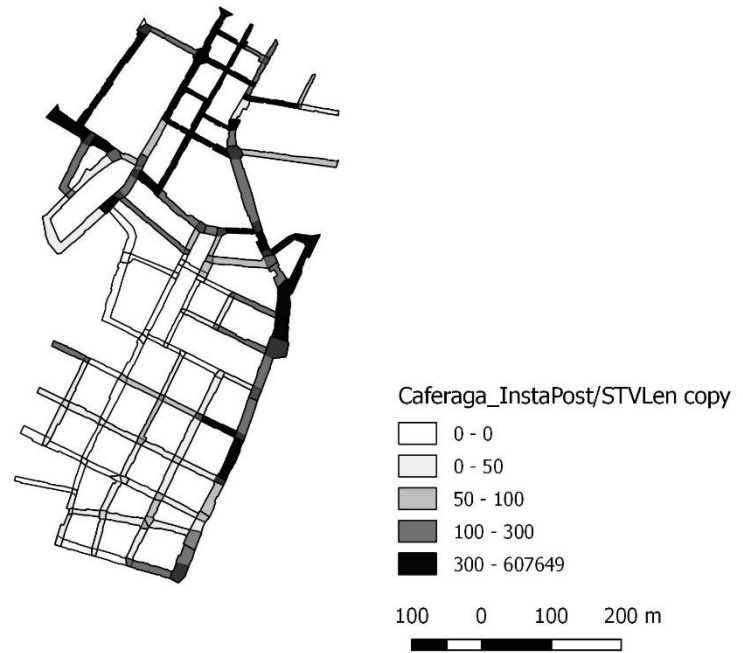


Figure H.5 : Istanbul number of Instagram posts per STV length.

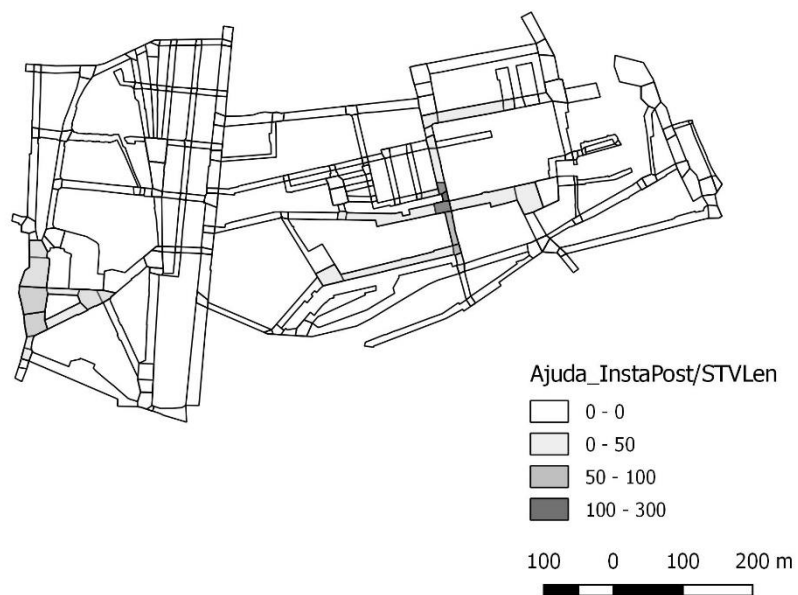


Figure H.6 : Lisbon number of Instagram posts per STV length.

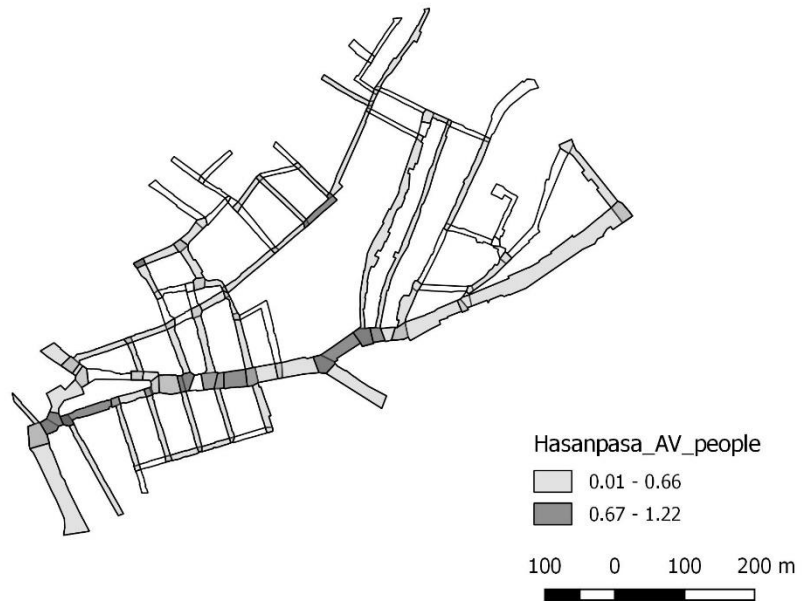
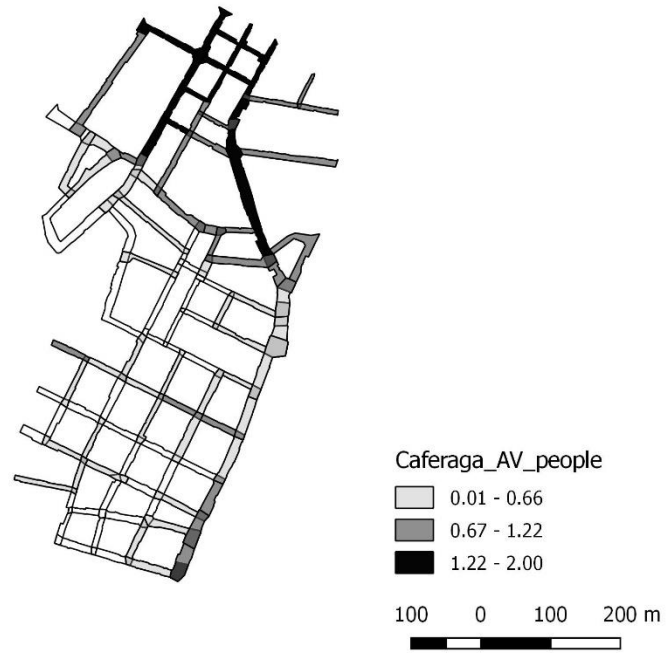


Figure H.7 : Istanbul ANSS where people are identified.

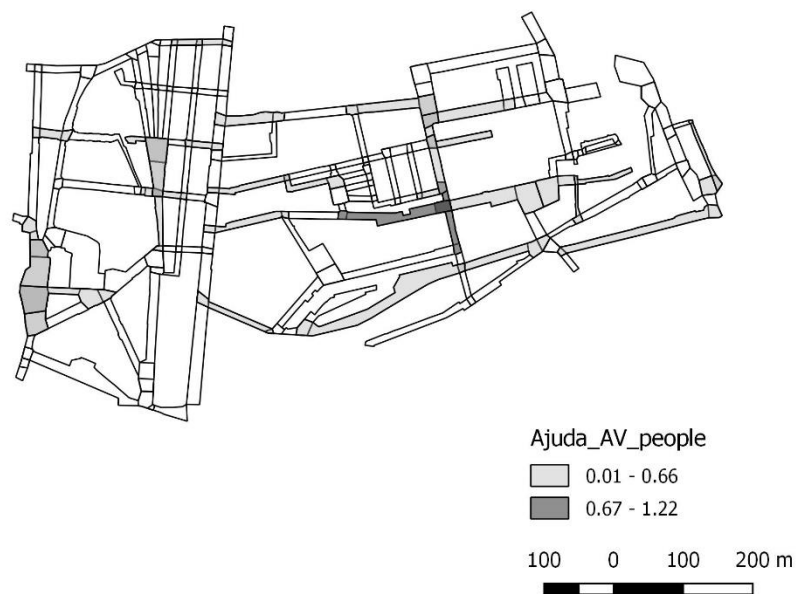
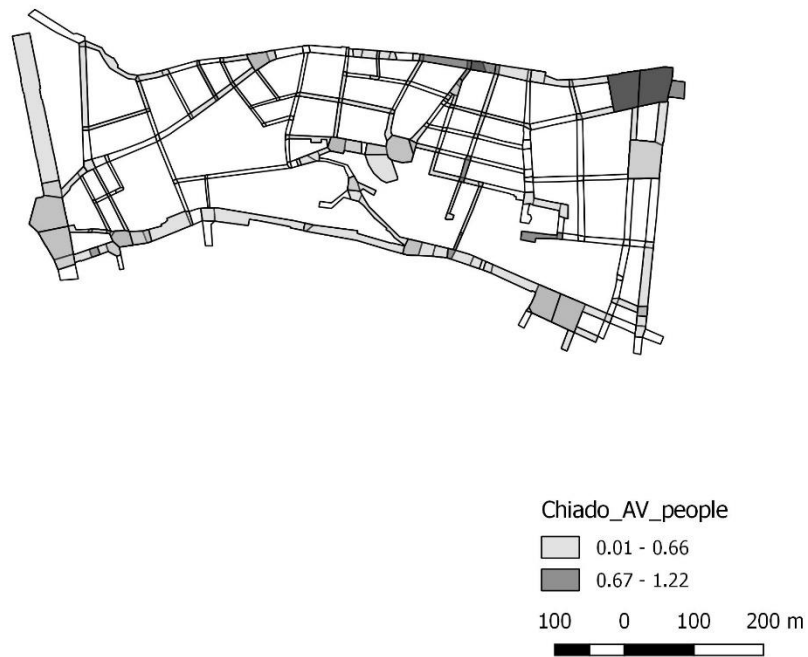


Figure H.8 : Lisbon ANSS where people are identified.