Florence

Mobility On Demand Urban Implementation Case Study

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Historic Florence

North Bank

South Bank

The historic city of Florence is well-known and well-loved. This is evident through the millions of tourists that come to visit it's preserved renaissance form each year. However, although over the last 20 years there has been a steady increase in tourism, there has been an equally steady decline in the number of full-time local residents living in the historic center. Rising housing and rent prices and a lack of access to services that can cater for residents as well as tourists, has reinforced this decline.

The question then becomes, how do we provide more for residents so that quality of life is possible in an historic centre whose form has been physically locked since its declaration as a UNESCO world heritage site in 1982

This case study looks at Mobility on Demand as a way to alleviate some of the negative aspects of the historic centre of Florence, namely the pollution, noise and congestion caused by existing forms of transportation.

It takes the perhaps rather radical view that private mobility should be banned completely from the historic centre and explores how mobility on demand can act as a complement to existing public transport.

This will be done through examining the city on three different scales: the historic centre, the neighborhood of Oltrarno and the traditional city gate of Porta Romana. Although this case study does not examine the twentieth century sprawl outside the historic centre, it is believed that mobility on demand could do much to alleviate the first-mile/last-mile issues that are encountered here.
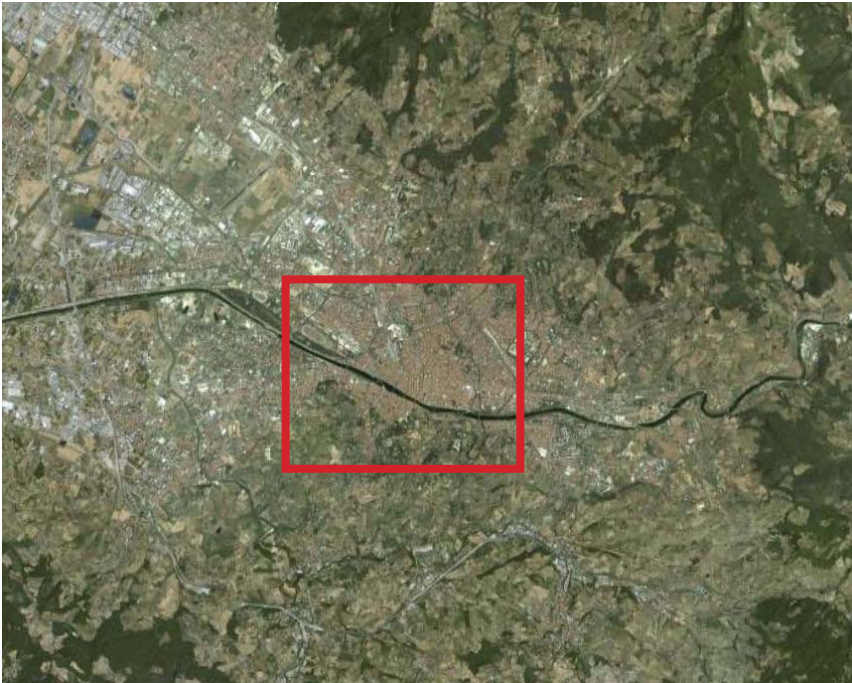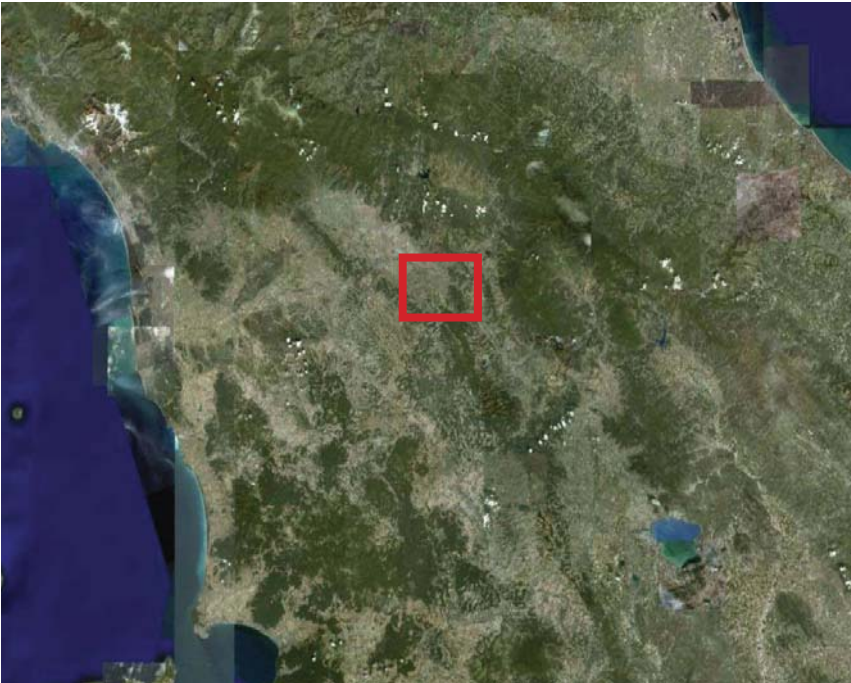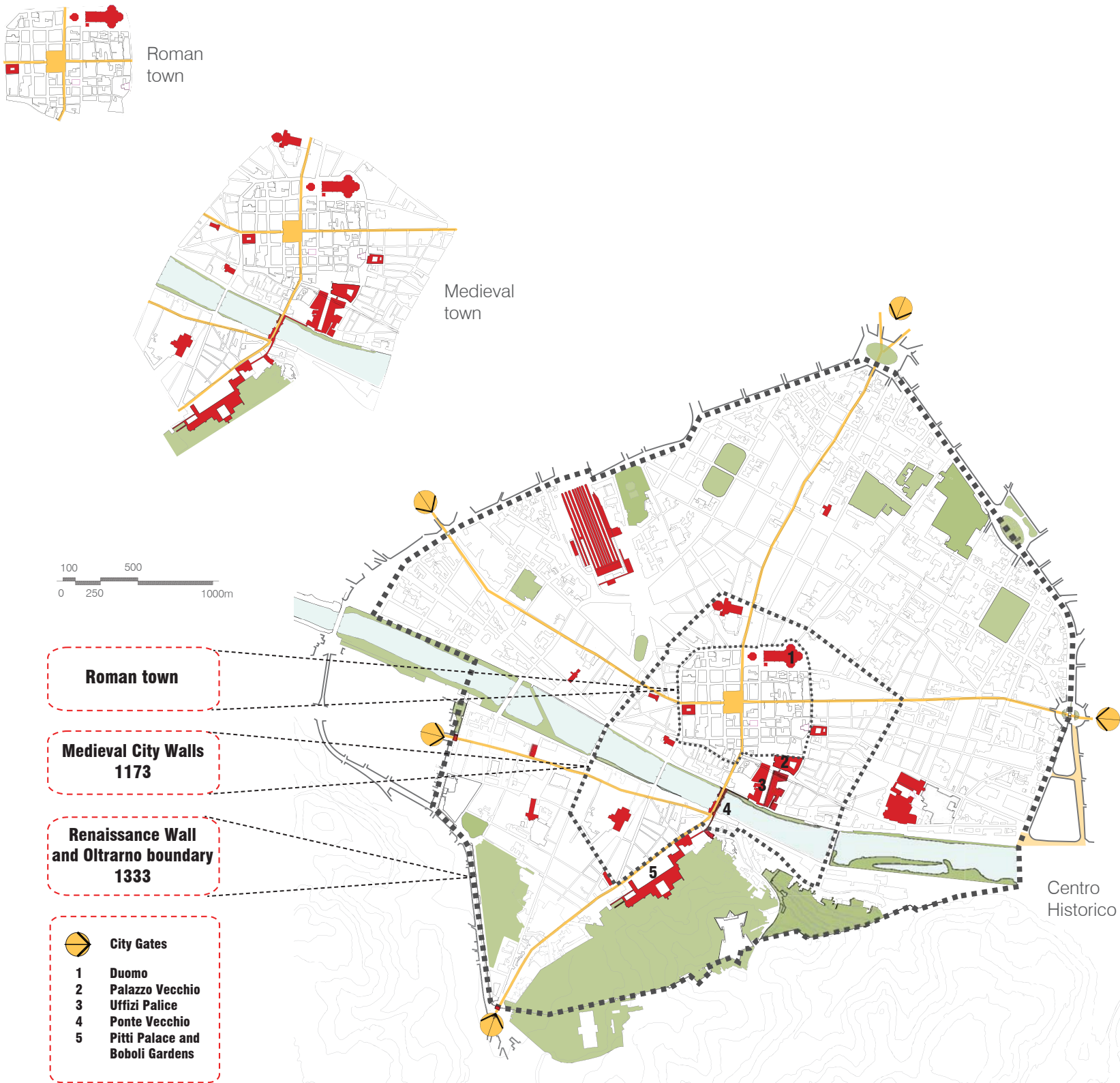
The Historic Centre of
Florence became a UNESCO
world heritage site in 1982

Outside the historic centre, the
city sprawls along the valley lines.
Topography impedes walking and the
transport issue becomes that of the
first and last mile

Florence is a reasonably
small city with an area
of 102km^2

As of 2006, the population of
Florence was 366,488 people

Roman
town

Medieval
town

100   500

0   250   1000m

Roman town

Medieval City Walls
1173

Renaissance Wall
and Oltrarno boundary
1333

City Gates
1   Duomo
2   Palazzo Vecchio
3   Uffizi Palice
4   Ponte Vecchio
5   Pitti Palace and
    Boboli Gardens

Centro
Historico

Lying in a valley on the banks of the River Arno, Florence is in many ways, typical of what can be called a 'traditional city'. It has a distinct dense urban core that is a combination of a traditional Roman town and successive medieval and renaissance expansions.

During the 19th century, however, the urban fabric built outside the traditional renaissance walls changed. The typology of boulevards and larger more regular blocks sets up a distinct departure from what is now called the Centro Historico.
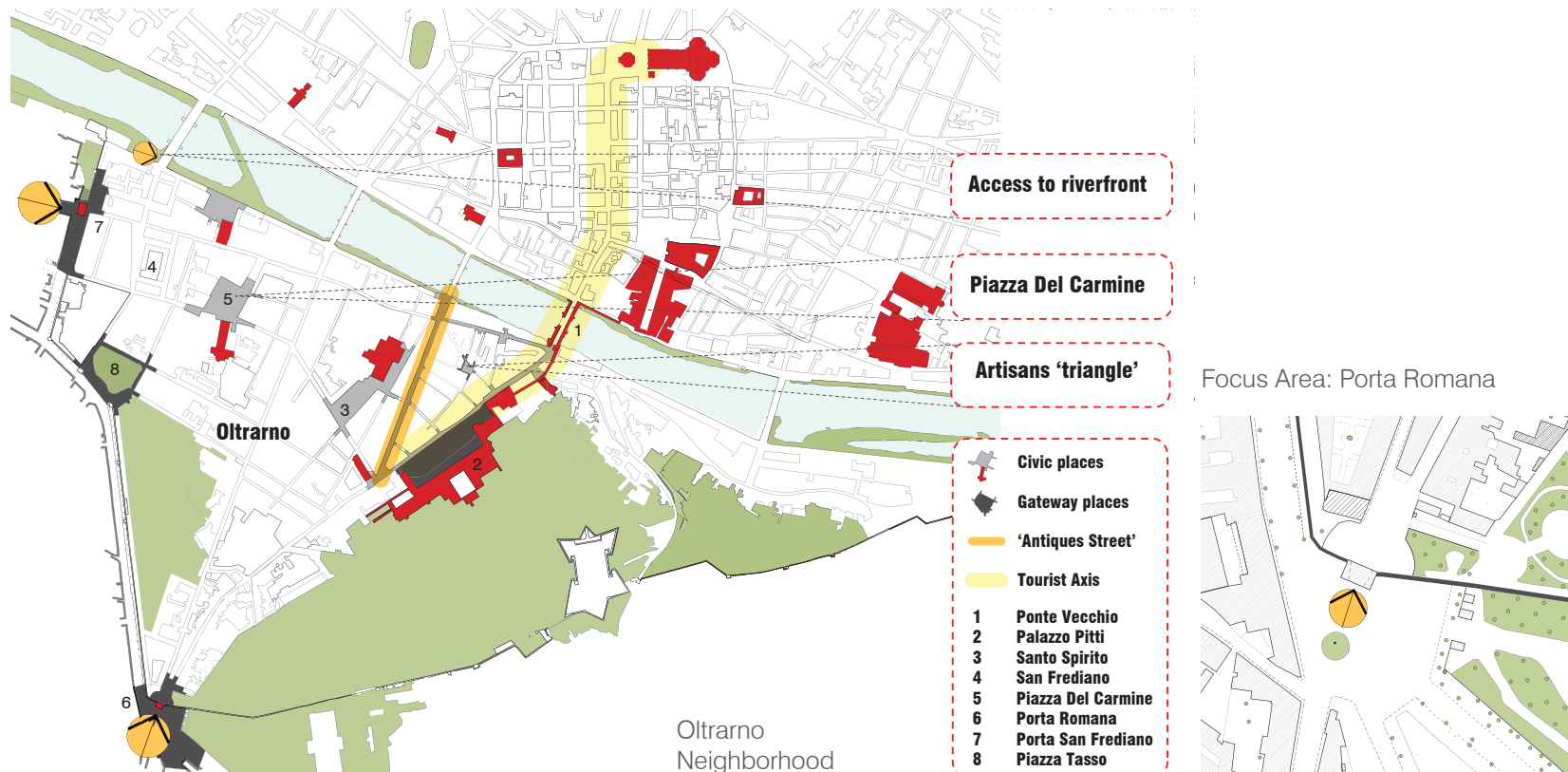
The twentieth century saw the urban fabric explode further and Florence now covers an area of 102km². This twentieth century growth runs along the valley lines that spread from the historic centre. As the topography gets steeper walking is impeded and the use of both private and public transportation is more common than the city's centre.

Although not covered in this case study, it is felt that the mobility on demand system would additionally complement existing transportation modes in the outer areas of Florence where the 'first and last mile' of movement is often a problem. This is particularly true of the areas of the city that lie on the southern side of the River Arno where there is less public transport.

This case study looks at three scales of the inner city of Florence.

° The Centro Historico;

° The neighborhood of Oltrarno on the southern banks of the River Arno; and

° The traditional gate of Porta Romana.

The first two scales look at the existing transportation systems in inner city Florence and propose new mobility on demand nodes in relation to these existing networks. Meanwhile, the scale of Porta Romana explores how a more permanent mobility on demand point could be implemented and integrated into the existing urban fabric and morphology of Florence.

Access to riverfront

Piazza Del Carmine

Artisans 'triangle'

Oltrarno

	Civic places
	Gateway places
	'Antiques Street'
	Tourist Axis
1	Ponte Vecchio
2	Palazzo Pitti
3	Santo Spirito
4	San Frediano
5	Piazza Del Carmine
6	Porta Romana
7	Porta San Frediano
8	Piazza Tasso

Oltrarno
Neighborhood

Focus Area: Porta Romana

The challenge for inner Florence is that it is not designed for the current mobility system – cars squeeze down narrow streets and park on sidewalks, car and scooter parking exists in the many public piazzas (degrading the urban realm) and pollution levels are high. Beyond the city center, there is a heavy reliance on the automobile, even if it is just to drive to the parking stations that coincide with the regional train lines.

Specific traffic problems in Florence include:

° The width of streets in the historic centre does not support a desired traffic flow.

° Existing car and scooter parking encroaches on usable public space (sidewalks and piazzas)

° Pollution becomes a major problem for residential dwellings (often on the second, third and fourth floors of the historic center) that have windows facing to the street

° The 'first and last mile' for those that live outside of the historic center is problematic.

° Restrictions have been made so that fewer people can enter the historic center by car or scooter however this system is easily circumnavigated through alternative routes or bribes.

° The preserved historic fabric of the city prevents many larger scale infrastructure changes that could alleviate transport issues.
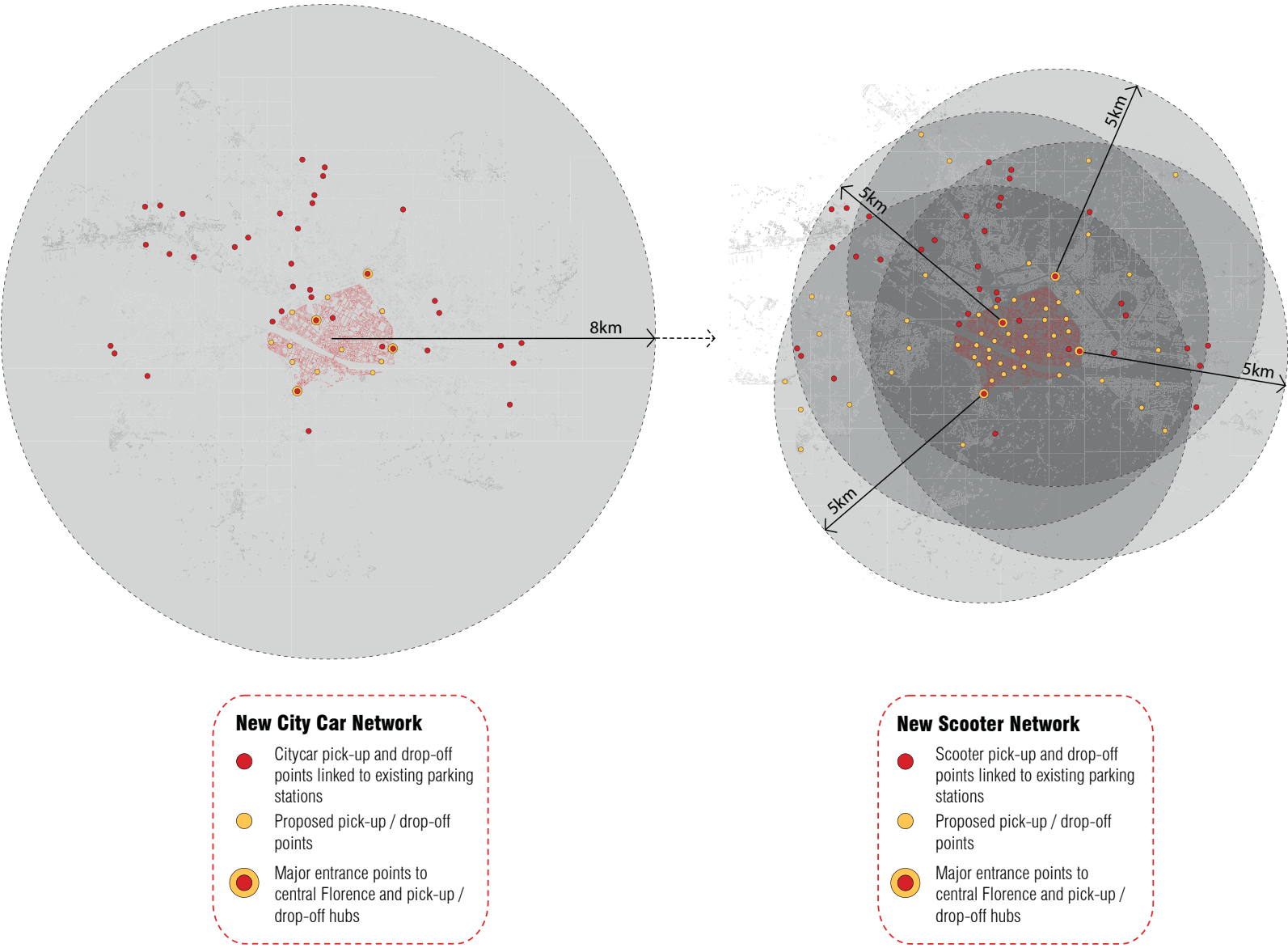

<< Pedestrians have to negotiate with cars to use the sidewalk

^ The public plaza, Piazza del Carmine is currently a parking lot and home for garbage dumpsters

< Scooters and motorcycles line the streets in the historic center

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Mobility on Demand: range by mode of transport

> Potentiality of different vehicle
modes to provide sufficient
transportation in the city of
Florence

8km

5km

5km

5km

5km

New City Car Network

● Citycar pick-up and drop-off
points linked to existing parking
stations

● Proposed pick-up / drop-off
points

◉ Major entrance points to
central Florence and pick-up /
drop-off hubs

New Scooter Network

● Scooter pick-up and drop-off
points linked to existing parking
stations

● Proposed pick-up / drop-off
points

◉ Major entrance points to
central Florence and pick-up /
drop-off hubs

2km
2km
2km
2km

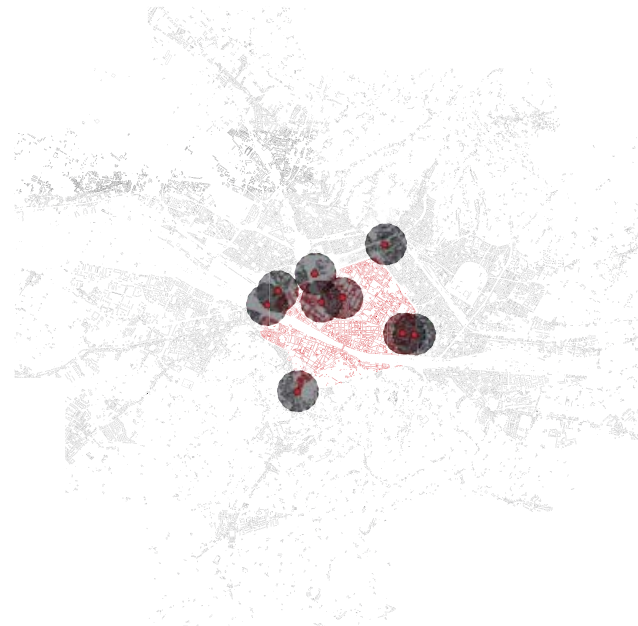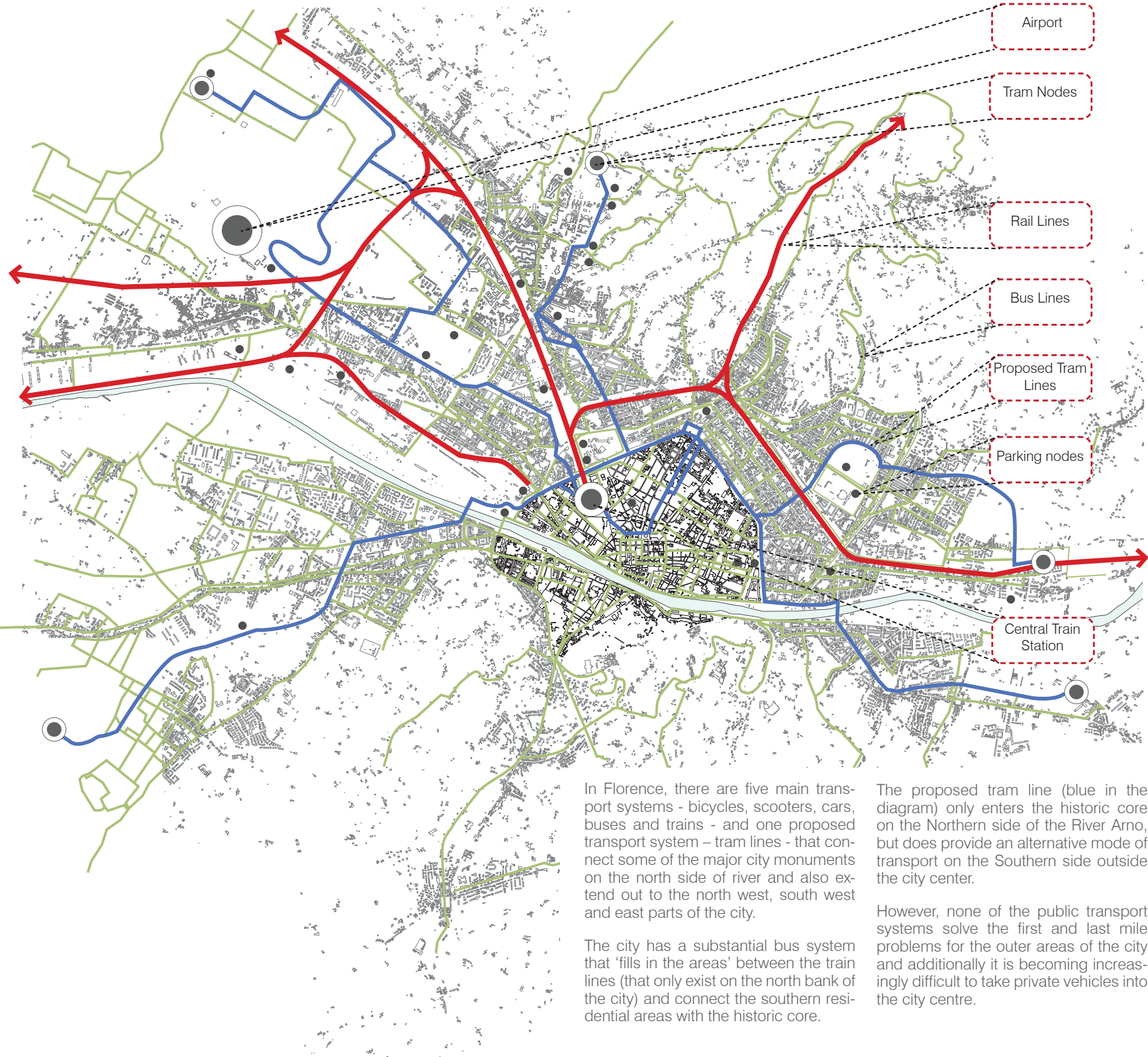**New Bicycle Network**

- Bicycle pick-up and drop-off points linked to existing parking stations
- Proposed pick-up / drop-off points
- Major entrance points to central Florence and pick-up / drop-off hubs

Walking from existing parking stations

- 5 minutes walk / 400m
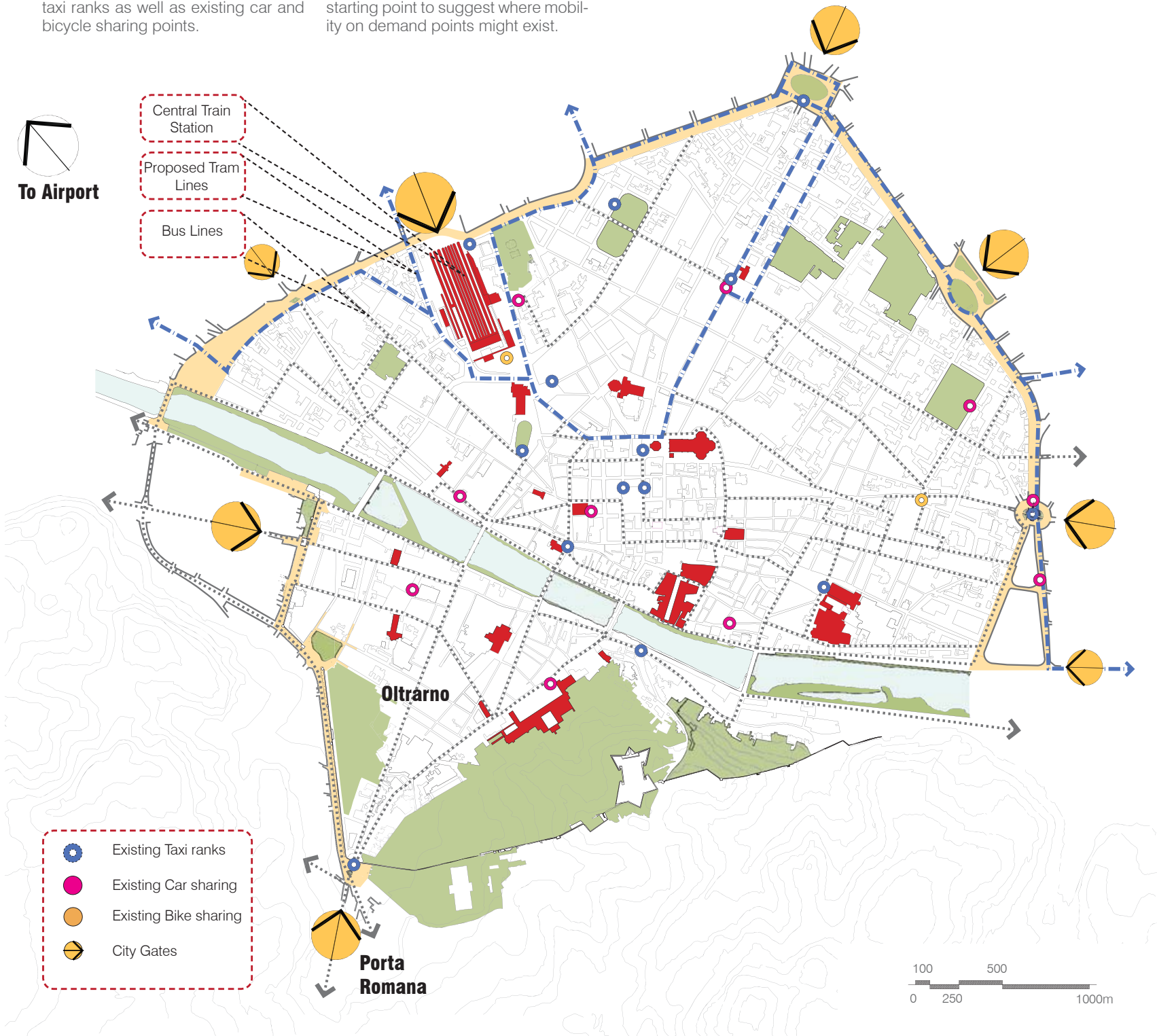- Existing parking station

Airport

Tram Nodes

Rail Lines

Bus Lines

Proposed Tram Lines

Parking nodes

Central Train Station

In Florence, there are five main transport systems - bicycles, scooters, cars, buses and trains - and one proposed transport system – tram lines - that connect some of the major city monuments on the north side of river and also extend out to the north west, south west and east parts of the city.

The city has a substantial bus system that 'fills in the areas' between the train lines (that only exist on the north bank of the city) and connect the southern residential areas with the historic core.

The proposed tram line (blue in the diagram) only enters the historic core on the Northern side of the River Arno, but does provide an alternative mode of transport on the Southern side outside the city center.

However, none of the public transport systems solve the first and last mile problems for the outer areas of the city and additionally it is becoming increasingly difficult to take private vehicles into the city centre.

Zooming into the Centro Historico, we see that the city centre has a number of other mobility systems, including taxi ranks as well as existing car and bicycle sharing points.

If we are to carry through with the elimination of private mobility in the city centre, we can use these as a starting point to suggest where mobility on demand points might exist.

To Airport

Central Train Station

Proposed Tram Lines

Bus Lines

Oltrarno

Porta Romana

Existing Taxi ranks

Existing Car sharing

Existing Bike sharing

City Gates

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100   500

0   250   1000m

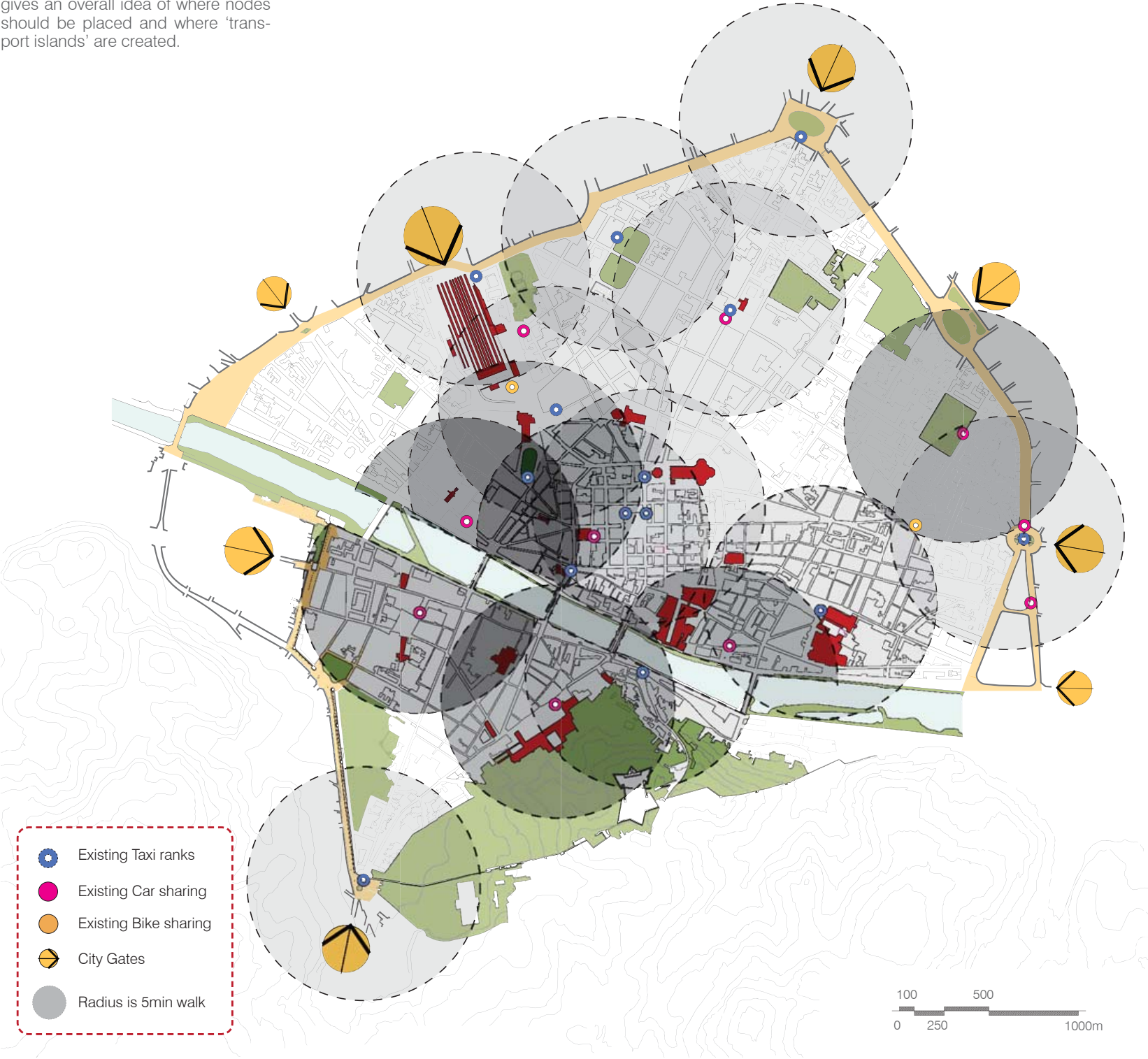5 minute walking circles from existing taxi and transportation points

A five minute walk is nominated as the time and distance that pedestrians are willing to travel before they can pick up a vehicle from a stack or walk to their destination after dropping off a vehicle.

Once private mobility is removed from the city centre, it is logical to assume that pick up and drop off points can coincide with existing transportation points. Therefore as an initial exploration, circles with a 5 minute walk as their radius are placed around the existing taxi pick up points in the city to get an idea of base coverage.

Existing Taxi ranks

Existing Bike sharing

City Gates

Radius is 5min walk
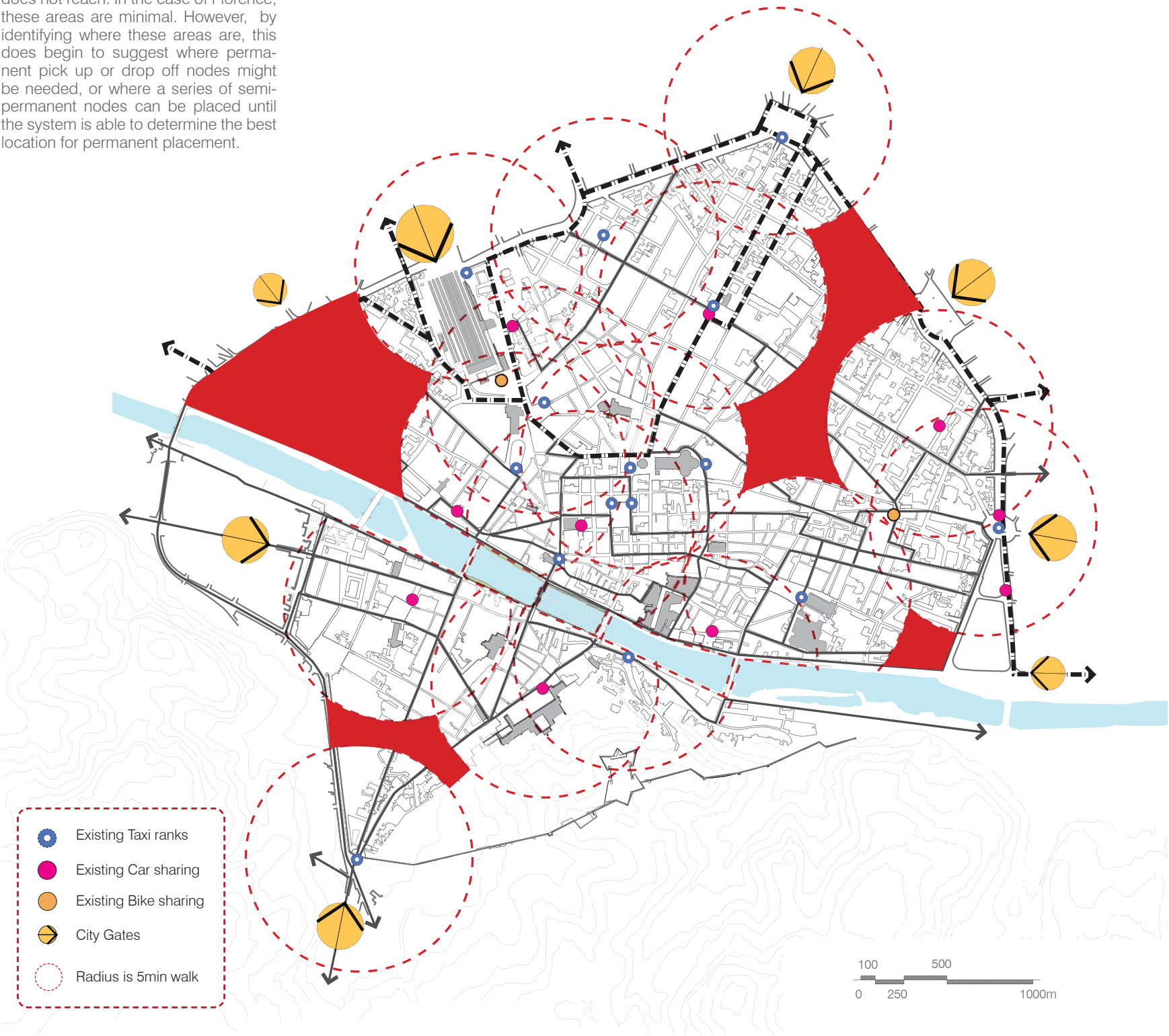
100   500

0   250   1000m
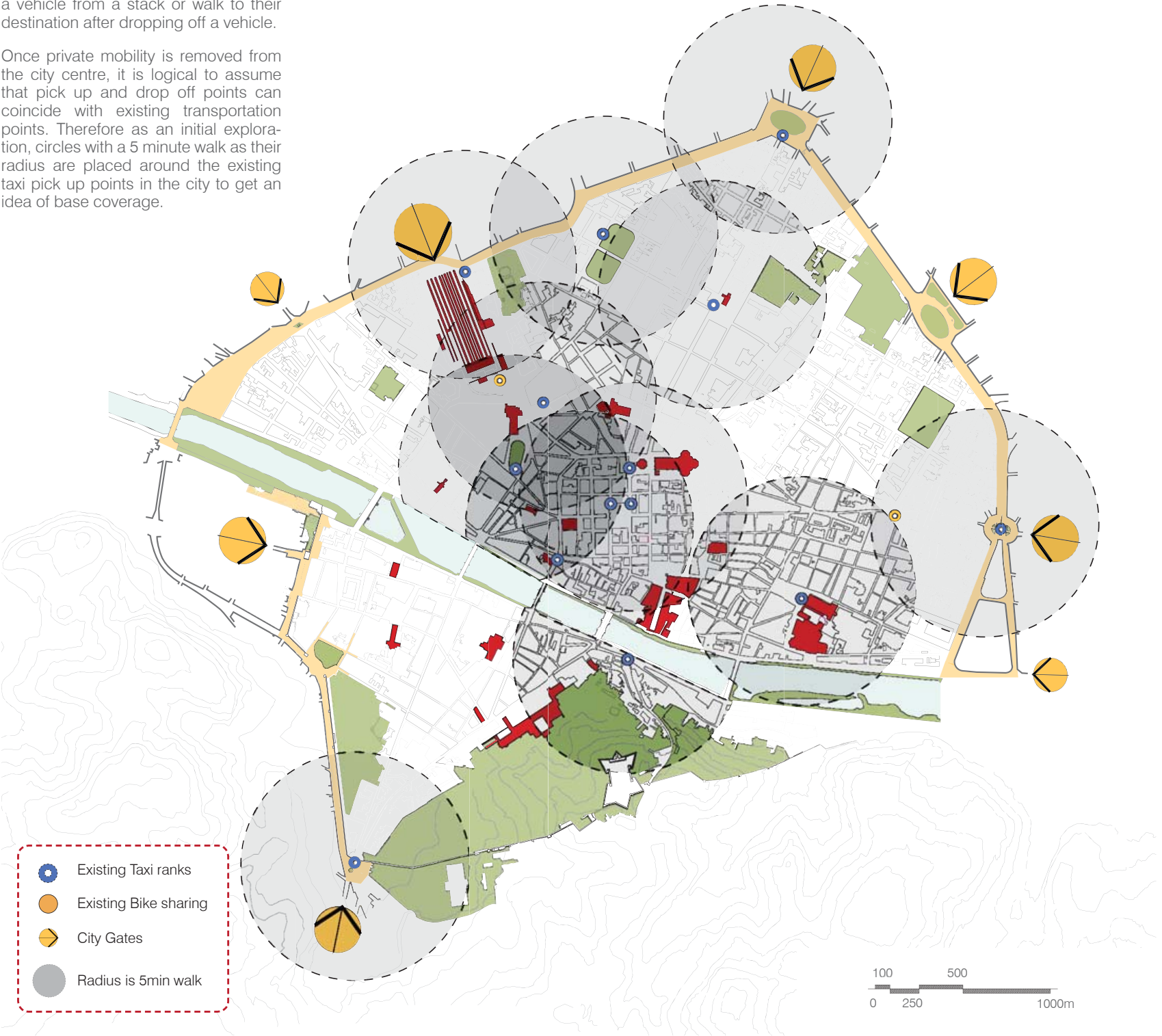
In this diagram, additional 5 minute walking circles are added at points where car sharing already exists. This gives an overall idea of where nodes should be placed and where 'transport islands' are created.

Existing Taxi ranks

Existing Car sharing

Existing Bike sharing

City Gates

Radius is 5min walk
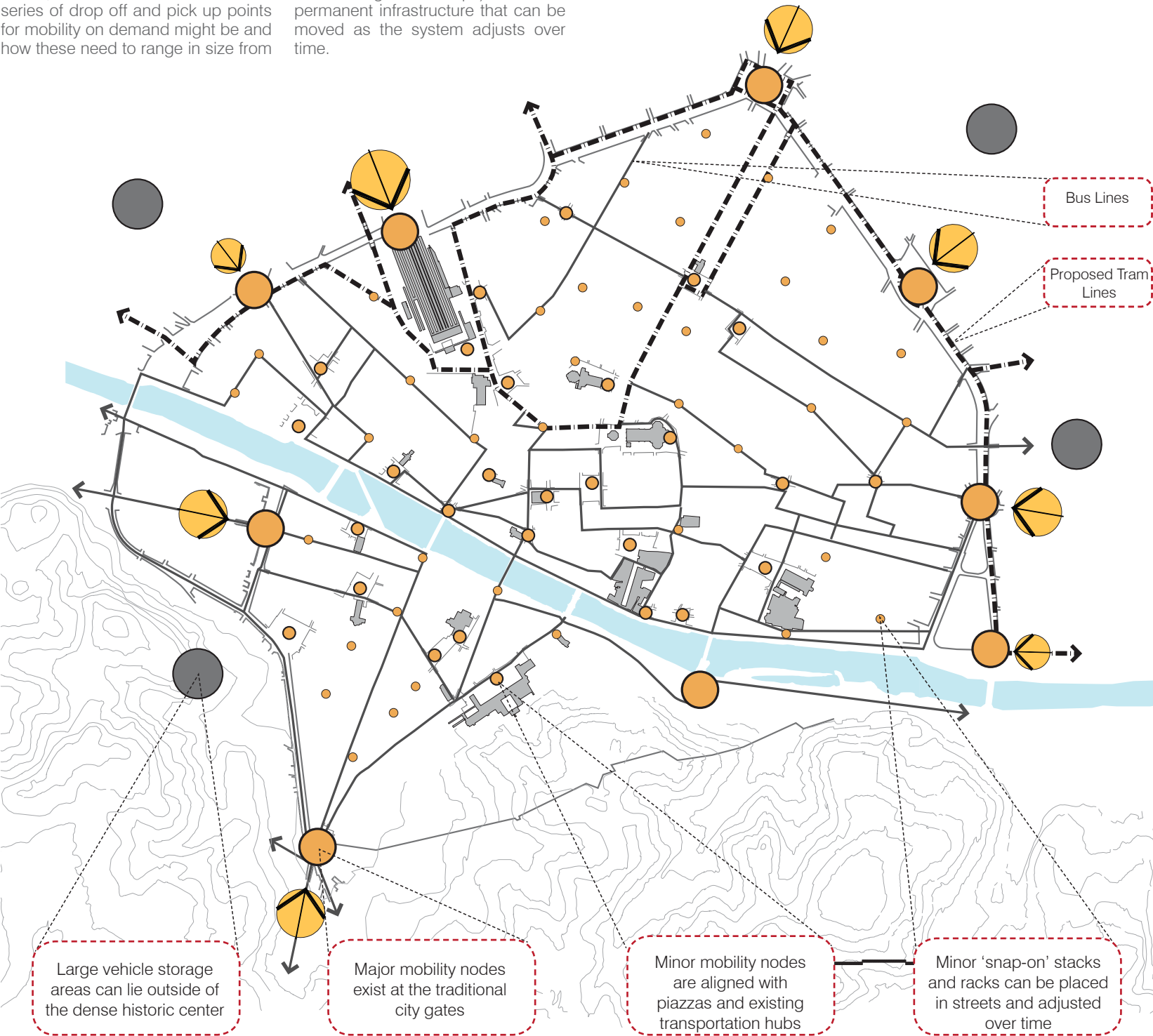
43

100   500

0   250   1000m

Transport islands are described as areas where existing public transportation does not reach. In the case of Florence, these areas are minimal. However, by identifying where these areas are, this does begin to suggest where permanent pick up or drop off nodes might be needed, or where a series of semi-permanent nodes can be placed until the system is able to determine the best location for permanent placement.

Existing Taxi ranks

Existing Car sharing

Existing Bike sharing

City Gates

Radius is 5min walk
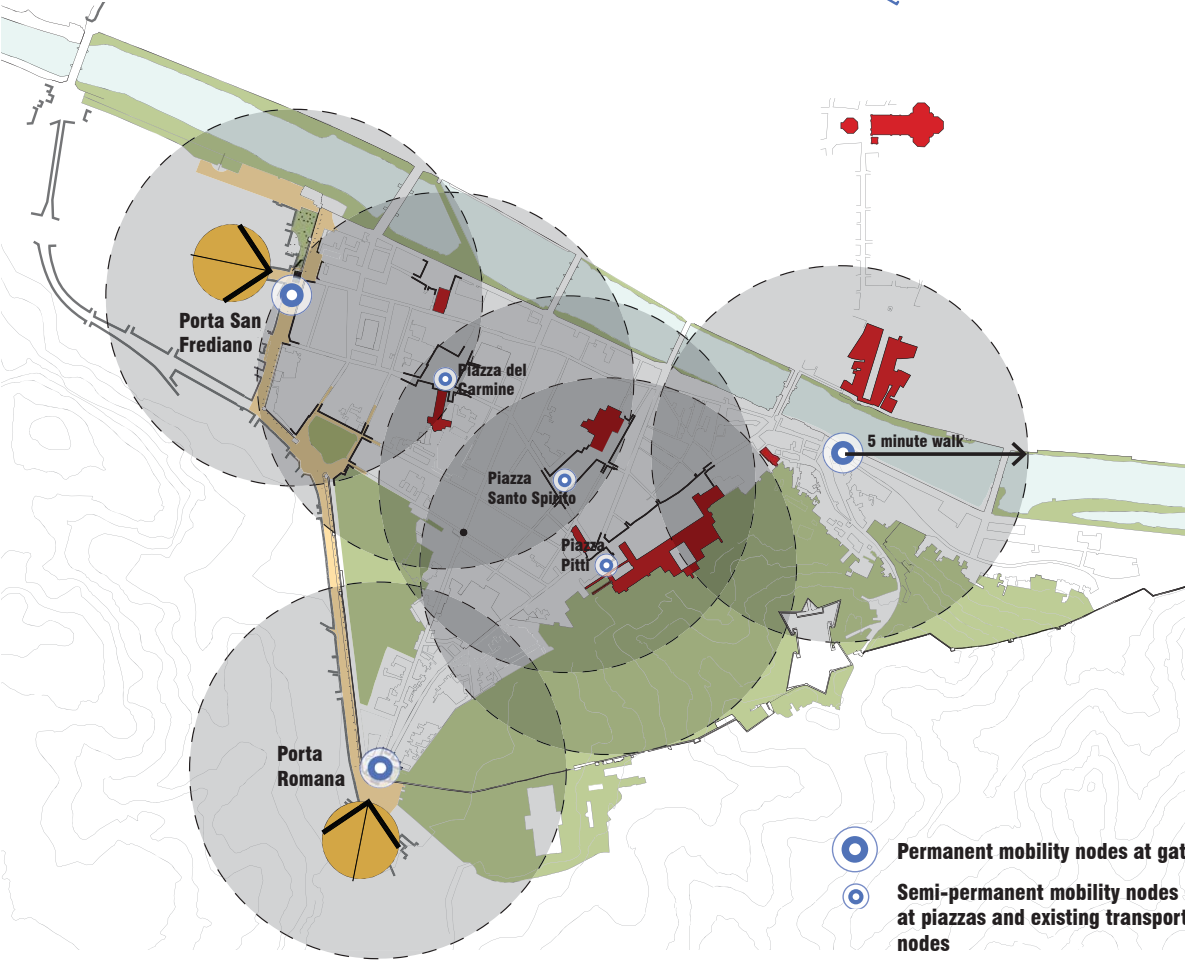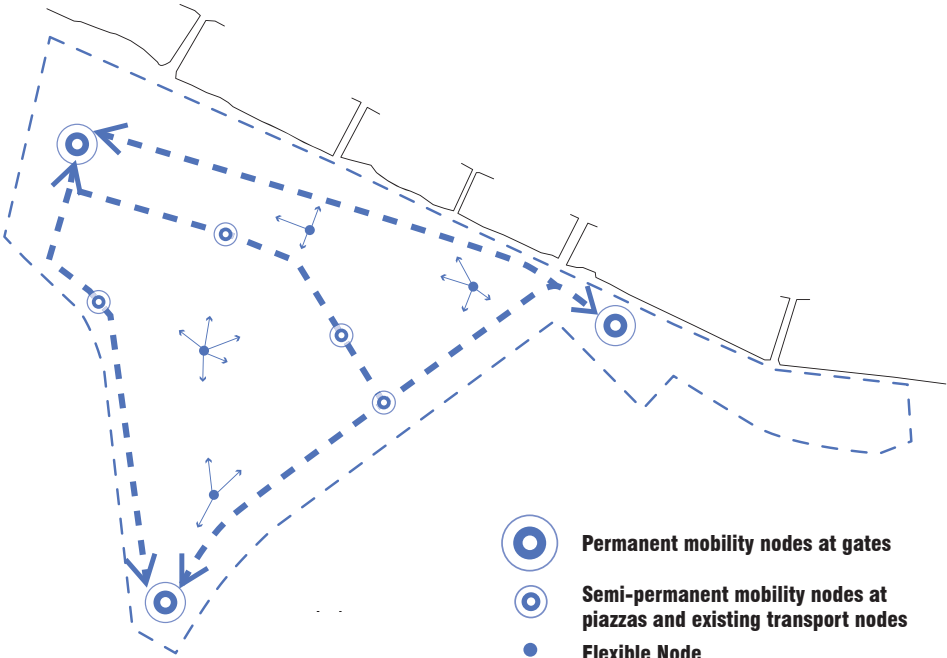
100   500

0   250   1000m

Based on the existing public transport nodes, taxi ranks, car and bicycle sharing points and the points of entry (traditional gates) into the historic centre, we can determine where a series of drop off and pick up points for mobility on demand might be and how these need to range in size from storage areas (most likely outside the historic centre), permanent large mobility points (at the city gates), permanent minor points (at the piazzas and existing transit stops) and semi-permanent infrastructure that can be moved as the system adjusts over time.

Bus Lines

Proposed Tram Lines

Large vehicle storage areas can lie outside of the dense historic center

Major mobility nodes exist at the traditional city gates

Minor mobility nodes are aligned with piazzas and existing transportation hubs

Minor 'snap-on' stacks and racks can be placed in streets and adjusted over time

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Permanent mobility nodes at gates

Semi-permanent mobility nodes at piazzas and existing transport nodes

Flexible Node

Porta San Frediano

Piazza del Carmine

Piazza Santo Spirito

Piazza Pitti

5 minute walk

Porta Romana

Permanent mobility nodes at gates

Semi-permanent mobility nodes at piazzas and existing transport nodes

The Oltrarno neighbourhood on the southern banks of the River Arno is known as the last remaining 'authentic' part of central Florence and is where a larger number of local residents and crafts people live. However, the locals to this area have little access to the public spaces of the traditional city. Although piazzas on the northern banks of the city are celebrated tourist spots, the public squares in the south are essentially parking lots. Additionally, the two main arteries leading to the north are congested and polluted, while in contrast, the smaller streets, particularly within the artisans area are difficult to access with conventional vehicles

The mobility on demand system proposes different types of pick up and drop off nodes to fit into the existing urban fabric. Three large permanent nodes are placed at the neighbourhood entrance points to cater for the vast number of commuters switching modes before entering the new 'private-mobility free' city. It is suggested that these nodes be tri-modal. That is, that they contain CityCars, RoboScooters and regular bicycles. It is particularly important that these permanent nodes cater for a large number of parked cars, as in the southern part of the city it can be assumed that private mobility is used more than public (as evident through the lack of train and proposed tram lines).

Complementing these permanent nodes are smaller nodes at the existing transit and car-sharing points. These coincide with the three major piazzas in the neighbourhood: Piazza Pitti, Piazza Santo Spirito, and Piazza del Carmine and are most likely bi-modal car and scooter points.

Smaller semi-permanent nodes of bicycles and scooters, can then be placed in the small streets where stacks and racks of cars will not fit. The small amount of space that the RoboScooter takes up when folded, ensures that the use of valuable pedestrian space in these smaller streets is kept to a minimum. As the mobility on demand system is self-aware. These semi-permanent nodes can be adjusted if their initial placement does not meet demand.

Florence is a city defined by its historic walls and gates. The gates are still visible in parts of the city today and exert a strong influence on its urban form. These historic gates and city walls are most evident in the neighborhood of Oltrarno. Today, as in the past, the two main gates in Oltrarno -- the Porta Romana and Porta San Frediano -- mark the thresholds into the neighborhood. Historically, the gates and walls were built for security and protection, but today the gates do not perform that function and have become artifacts of a previously fortified city. As access points and critical nodes of transport and connection, the gates are integral to the fabric of the neighborhood and deserve particular attention. These important nodes should be more than historic artifacts of fortification; the gates provide unique opportunities for collection and distribution.

Florence officials estimate that 200,000 people commute into the city in a day, and a fair number of these pass through Porta Romana. It is therefore the right location to intervene upon this unintelligent and non-responsive system of transportation and traffic management and to reclaim and re-purpose urban space and resources devoted to the automobile. Ubiquitous real time information and a new ability to intelligently and efficiently distribute commuters through multiple modes of transportation allow unparalleled customization and efficient distribution in this '21st Century Gate'. As a result, a place that was inhospitable to pedestrians becomes a community gathering place, a veritable village well around which to gather. An underground parking garage would allow much of the surface of Porta Romana to be re-purposed for park and pedestrian use creating a social hub and network for transportation exchange.

(text by Joshua Fiala)

Piazza Della Calza

New pick-up and drop-off point for mixed modality transportation

New Media
Digital Tower at intersection of pedestrian axes into the gardens

Cafe
Cafe and gathering point for entrance into the old city

Underground Parking
Entrance point for underground parking

Piazza
Della
Calza