Walkable Streets

Analyzing Pedestrian-Friendly Street Design Strategies of Europe and Adapting them into Market Street, San Francisco, CA

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Landscape Architecture
Senior Project 2010

Signatures

Walkable Streets:

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Abstract

The purpose of this senior project is to examine the broad range of ingredients, from the physical design strategies and other influences, behind Europe's invention of successful, walkable streets and to explore the possibility of adapting those techniques in America. Due to the growing success of pedestrian-friendly streets in Europe, I have chosen to focus on five major cities that are both diverse and similar: Paris, France; Copenhagen, Denmark; Stockholm, Sweden; Freiburg, Germany; and Barcelona, Spain. Each of these cities respectfully have diverse methods for their own success in pedestrian-friendly streets, as well as similar ones, and my goal is to discover ways to adapt and implement their strategies half-way across the world, despite the lengthy list of differences between America and Europe. The site to demonstrate this ambition is located in the heart of San Francisco – Market Street, from 1st to 8th Streets.

Dedications

THIS SENIOR PROJECT IS DEDICATED
TO

My mom

My dad

My twin sister

whose love and support have guided me in
becoming who I am today

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Definition of Terms

BOULEVARD

Boulevards are broad streets with emphasis on size, formality, and, most importantly, grandeur. They function as the structure and comprehension of the rest of the city, marking boundaries and linking important destinations. Public and intentionally for people, boulevards "are most intimately experienced in small segments, as part of daily urban life or as special destinations." (Jacobs, 1993)

STREET

The literal meaning of a street is "a public thoroughfare, usually paved, in a village, town, or city, including sidewalks" (Dictionary.com). Allan B. Jacobs expands this definition by describing streets as a place to see and to be seen, a generator for movement, a place for people to be outside, for social and commercial encounters and exchange, and always public. Great streets are "markedly superior in character or quality" and they include street examples such as, Paseo de Gracia in Barcelona, Spain and Avenue Montaigne in Paris, France. The criteria for great streets are the following: physically comfortable and safe, accessible, facilitates social interaction, encourages participation, allow observation of others, and memorable. (Jacobs, 1993)

PEDESTRIAN-FRIENDLY STREET

Based on the definition from the American Planning Association, pedestrian-friendly streets "are designed to be more accommodating to pedestrian traffic than are conventionally designed streets." Pedestrian-friendly streets are inclusive to a wide range of users: bicyclists, the physically handicapped, transit users, and all ages travelling by foot (American Planning Association, 2006). Narrow streets, wider roads, human-scaled proportions, and consistent tree vegetation are typical elements in pedestrian-friendly streets, but it varies and depends on the context of the location.

Definition of Terms

WALKABLE STREET/WALKABILITY

Walkable street is the sister term to pedestrian-friendly streets, since both exist to serve pedestrians. Yet, they are distinct in that walkable streets specifically involve pedestrian activity and use, while pedestrian-friendly streets have more general measures and consider a wide range of factors, including physical design and contextual influences. Because walkabe streets are closely linked to the term, "walkability," these terms will be used interchangeably. A proposed definition for walkability is "the extent to which the built environment is friendly to the presence of people living, shopping, visiting, enjoying or spending time in an area" (Abbey, 2005).

FLÀNEUR

This comes from a French masculine noun meaning that of "a person who walks the city in order to experience it," that represents an idler, stroller, or lounger (Wikipedia.org).

SUCCESSFUL STREET

For the purposes of this paper, I personally define a successful street that is continuously active from day to night, user-friendly, a place people want to go through, unique and aesthetically pleasing, and comfortable and safe for pedestrians.

TRAFFIC CALMING

Traffic calming is "the art of setting the needs of walkers and transit users as the priority while still permitting car use. Derived in Europe, this term sought to illustrate the full range of methods to slow cars down as they pass through commercial and residential spaces. (Gratz & Mintz, 1998)

"The **paradox** of the late 20th century is that while it became possible to travel to the moon, it also became impossible, in many cases, to **walk** across the **street**,"

- Joell Vanderwagen

Introduction

I. WHERE ARE WE?

The unfortunate irony and reality in today's society is our detached mentality to the simplest means of travel: walking. Nowadays, walking a few blocks or crossing a street seems like an inconvenience. Yet, most areas have adequate sidewalks and crosswalks placed all over for this type of movement, so where does the problem lie?

It's not that we have no desire to walk, it is more like we can't. In America, even with numerous sidewalks and crosswalks located in every direction, roads and streets are designed for vehicular transportation and pedestrian pathways tightly outline their borders, making pedestrians secondary to automobiles. Pedestrians are not in the center, or even along the sidelines, when new streets are born because most planning prioritizes vehicular circulation as the primary focus. Thus, roads can be too wide, too uncomfortable, and too dangerous for pedestrians, but appropriately accommodate the needs of vehicle traffic. This creates a dangerous setting for pedestrians because drivers sometimes forget pedestrians can be present, even in the most unlikely places.

Not all streets are like this. Europe, on the other hand, is receiving international applause for creating pedestrian-friendly streets, and, more importantly, these streets work. Popular cities such as Copenhagen and Barcelona are famous for designing streets for pedestrians, as well as bicyclists, rather than individual cars. European streets are a world-wide inspiration and America has the potential to utilize and adapt Europe's street design strategies in their urban street development, despite diversity in cultures, politics, history, and economics. We can learn a little from Europe and still develop streets that embrace our American identity and uniqueness.

II. WHY EUROPE IS AHEAD OF THE GAME

Why are pedestrian-friendly, walkable streets successful in many parts of Europe and not anywhere else? Simply put, Europe has one of the best recipes for street design – they are well-defined, human-scaled, and visually complex with incredibly detailed facades, enriched diversity of uses, focal points and significant destinations, as well as, places to sit and stand (Jacobs, 1994). Typical physical design elements include a variety of small shops with entrances in close proximity, narrow streets, convenient back and forth movement between facing stores, and short sight distances. And the list does not stop there. Major European cities strive for a good public transportation system (Mckeever, 1969) and "none have sold off their train networks to private interests or dismembered their delicate mass transit systems to the degree Americans have since World War II" (Gratz & Mintz, 1998). Early on, Europe became consciously aware of the positive impact in constructing public means of travel, and, rather than submitting to the automobile trend, they redirected their focus on alternate options for movement and transport.

Figure 1.1 Example of pedestrian-friendly street in Las Ramblas, Barcelona, Spain.

Incentives such as increasing gas prices help motivate citizens in Europe to take other available modes of transportation, like public transit or biking (Gratz & Mintz, 1998). Further, revitalization of European downtowns into hundreds of inner-city pedestrian areas has helped restrict automobile traffic, eradicating a major source of visual and atmospheric pollution (Pressman, 1987).

However, the United States is not as pedestrian-orientated as Europe when it comes to urban street development. Looking back at history, daily necessities were formerly within walking distances in traditional villages and neighborhoods; a few minutes could get an individual to a grocery, cleaners, café, pharmacy, bakery, park, day care center, schools or other social amenities (Walljasper, 2003). This small circle of mixed use development "guided the building of towns and cities for all human history," but after World War II, Americans seem to forget this simple wisdom (Walljasper, 2003). As a result, planners narrowly concentrated on mass producing houses on an assembly-line scale, rather than putting the spotlight on features that make a neighborhood a pleasant place to live (Walljasper, 2003). While modern houses were successfully built for millions of upper class Americans (Walljasper, 2003), the ultimate consequences of this expansion did not reveal itself until later where reversal surpassed repair.

Currently, there is a concern that people are denied from basic rights of street access, use, and enjoyment when American streets are becoming more private and less open to the public (Francis, 1987). Further, many public works departments in the United States are reluctant to turn control of the street back to people, which explains the limited application of pedestrian-friendly street techniques (Francis, 1987). But there is hope. Even though street designs remain to lack major emphasis on pedestrians, development towards regeneration, revitalization, and sustainability is becoming the new trend of the century, shifting focus on reducing negative environmental impacts through effective strategies while promoting healthy living for people simultaneously. For instance, American planners are gradually revitalizing declining downtown areas through the closure or restriction of main streets to traffic and development of extravagant and high-class pedestrian malls (Francis, 1987).

Changes to traditional methods of urban development may be slow, but it is happening in America. Removal of existing roads and complete ban on vehicular traffic would be impractical measures

to defeat sprawl and other environmental problems, but small, gradual modifications and an open-mind are possible key components for a thriving future. Streets, for one, are an opportunity to not only function as an ordinary pathway, but for multi-purpose use. Europe, with an impressive streak of successful streets, is a great inspiration and American planners can utilize design strategies from abroad and recreate a similar atmosphere at home.

The next question is, what are the general techniques that make pedestrian-friendly streets successful in Europe? Physical street elements and effective transportation are sometimes not enough, so adding other essential mechanisms can significantly enhance pedestrian street life.

III. TAME THE TRAFFIC AND ACTIVATE THE PEOPLE

TRAFFIC CALMING ENFORCEMENT

Aside from having appropriate street design programs and a good transportation system, other strategies, such as traffic calming, are necessary to create the perfect concoction of pedestrian-friendly streets. Traffic calming is the "art of setting the needs of walker and transit users as the priority while still permitting car use" and attempts to establish a good balance among all users of the street- cars, trucks, public transit, bikes, and pedestrians (Gratz & Mintz, 1998). Developed in the Netherlands during the 1960s, traffic calming entered urban innovation from a minor, yet influential incident: a few neighborhood residents became irritated with cars roaring in front of their homes, so they took the brave initiative to place furniture and other large objects at strategic spots on the street, forcing motorists to slow down (Walljasper, 2003). Designed to slow cars down as they pass through commercial and residential areas, this idea of traffic calming became a useful method

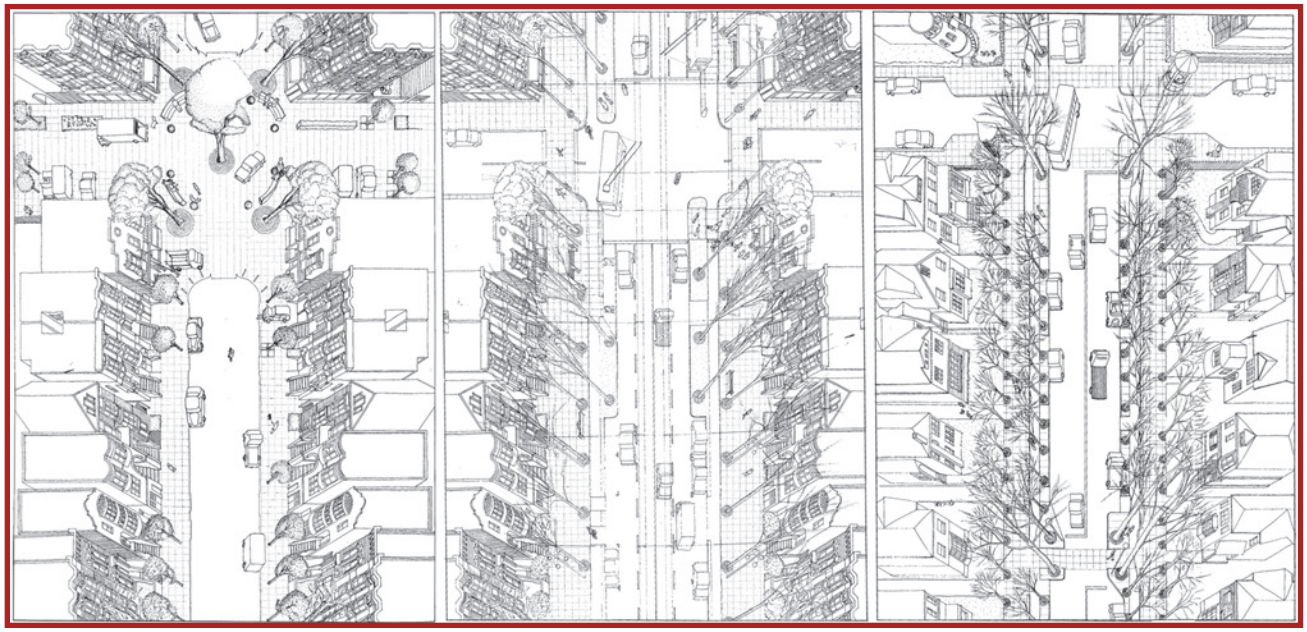


Figure 1.2 Traffic calming suggestions – for a low (far left), medium (center), and high (far right) traffic volume street. The far left image is a redesign of an inner-city street in a preautomobile neighborhood that effectuate cautious driving where pedestrians and automobiles share the street space, even on streets with low traffic volumes. The center image includes measures that mitigate heavy traffic flow. The far right image displays the benefits of attractive speed bumps that could serve as pedestrian rest areas, and from amenities, such as bus shelters, that would enhance residents' use of public transit.

to prevent drivers from speeding, considering how it is enforced 24 hours a day (Gratz & Mintz, 1998; Walljasper, 2003). Additionally, they encompass "a whole set of street designs that increase safety and aesthetic satisfaction for pedestrians," making them appealing and not an intrusion to existing street conditions (Walljasper, 2003). Overall, the goal of traffic calming is to present drivers visual gestures to decrease traffic speed and to share the street with people (Walljasper, 2003). They are not meant to ban car use or inhibit the freedom to drive, but to advocate efficient transportation and

life-style alternatives (Gratz & Mintz, 1998).

Simple measures of traffic calming include "narrowed streets, four-way stops signs, brightly painted crosswalks, on-street parking, median strips down the middle of streets, bans on right turn at red lights, crosswalks raised a few inches above roadway, and curbs that extend a ways into intersections," which all assist in making streets safe and comfortable for pedestrians (Walljasper, 2003). Low-cost techniques, such as, tree plantings and installation of tree-lined medians or traffic circles, can be established on an experimental basis and are easily changed and modified (Gratz & Mintz, 1998). The new, effective device of speed humps, not speed bumps, is preferred for streets in towns since they are not as exaggerated and less bumpy on impact. Moreover, they are inexpensive, valuing at $3000, compared to traffic signals which may take years to build and costing at least $50,000. Against sprawl development, traffic calming can provide an alternative, cheaper source for street renovation rather than building more bypasses that bring short-lived congestion relief (Gratz and Mintz, 1998).

Some disagree with the effectiveness of traffic calming. Opponents declare traffic calming strategies pressures speeding traffic onto someone else's street; however, copious studies proven otherwise and they "actually decrease traffic in general so people make fewer auto trips, either by handling a number of errands on one outing or by sometimes switching to biking, walking, or taking public transit" (Walljasper, 2003). Further, traffic-calmed streets illustrate "a decrease [in] injuries, deaths, and air pollution, little or no decrease in volume, and no significant time added to the drive" (Gratz & Mintz, 1998). Studies in Denmark and elsewhere in Europe illustrate that calming traffic through towns decreases speed, not the amount, of vehicles and only one to three minutes are added to most vehicular trips (Gratz & Mintz, 1998).

Thus, traffic calming works: it is a compromise for all users and an assisting movement to create pedestrian-friendly streets. Davis Engwicht

claims that traffic calming involves “a fundamental rethinking of metropolitan planning and organization – and a revised emphasis on quality rather than quantity of life. Some may see the ultimate goal is the calming of society itself.” The significance of Engwicht’s statement is the beneficial impacts of traffic calming not just for streets, but for humanity as well. European cities practice traffic calming for many advantages, from lowering traffic volumes to increasing pedestrian activity on streets, in the light of returning street life back to pedestrians and a calmer atmosphere within communities.

SLOWER SPEED, SAFER STREETS

Pedestrian-friendly streets not only incorporate traffic calming strategies, but also the technique of lowering speed limits. Studies have shown that speed of traffic, rather than volume, is the major threat to pedestrians. In the 1990s, the British government conducted a study and discovered that cars travelling 40 mph, which is a common speed on streets in many American communities, killed pedestrians 85% of the time compared to only 5% of the time when vehicles were travelling at 20 mph. Street and highway expansions impose a greater risk for pedestrians and bicyclists, particularly children and those who struggle to cross wider streets with fast traffic. Slow traffic should mirror pedestrian walking pace, so the slower the better. (Walljasper, 2003; Gratz & Mintz, 1998).

Enforcing stricter speed limits is a practical response for pedestrianizing streets, considering how wide, open streets encourage motorists to zoom ahead (Buchwald, 2003).To expand, wide streets provide the chance for angled parking, where streets appear narrower, instead of typically designing par-

allel parking spaces and slowing passing traffic. Streets with great widths also open the opportunity for producing creative landscaped median strips with trees, benches, and gathering places (Gratz & Mintz, 1998).

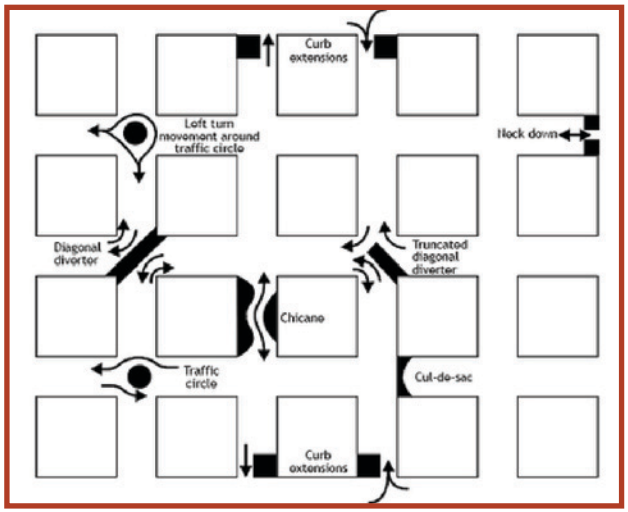


Figure 1.3 Examples of traffic calming measures on an illustrative sketch.

PEOPLE ONLY

Europe is known for designing traffic-free zones where vehicular traffic is prohibited in pedestrian areas so people are capable of wandering freely without the stress of car traffic. According to Norman E.P. Pressman, this segregation between pedestrian areas and traffic zones occurs in Europe for a variety of good reasons:

1.) A more efficient management of traffic to ameliorate mobility in the core
2.) Conservation of architectural tissue
3.) Improvement of residential conditions
4.) The beautification of the environment
5.) The desire to achieve meaningful social spaces with a strong sense of identity
6.) Shaping of environments that bring people together and stimulate spontaneous discourse and human contact.

Traffic-free zones are almost non-existent in America because most people depend on the automobile for short or long distances. Thus, it is important to realize it would be impractical to ban cars from

areas with high pedestrian density or completely cut vehicular traffic from streets.

Street traffic should not be completely eliminated and, rather, consider balancing car traffic with pedestrian use. These examples include regulations that restrict vehicular penetration at certain times of the day or design alternatives that make streets safe and pleasing for pedestrians. Administering specific hours for car use, slowing traffic to pedestrian pace, placing parking lots behind stores instead of the front, implementing angled and parallel street parking instead of prohibiting on-street parking, and inflicting great value on sidewalk amenities can strengthen the downtown core for pedestrians and make streets more walkable and pedestrian-friendly (Gratz & Mintz, 1998). American planners do not have to perform the dirty task of eliminating car traffic, but can seek measures that regulate car traffic for a more vibrant pedestrian street life.

These basic European strategies are the building blocks for pedestrianization of streets. A deeper examination of specific streets in major European cities can present a better explanation of how some streets are more successful and walkable than others. Every noteworthy, pedestrian-friendly street has their own reasons and techniques for their success. Exploring individual streets throughout Europe provides a greater understanding of how they apply general street design techniques, as well as features that make them special and distinct from other famous streets.

The next collection of writing is devoted to the research on internationally popular streets that are known to be pedestrian-friendly. The later portion analyzes all the streets together and determines what strategies can be adapted into streets in America. The last section presents a master design plan on Market Street, which attempts to adapt European concepts, ideas, and designs that help produce a pedestrian-friendly, walkable environment in one of the most challenging streets in San Francisco.

"A **good city** is like a good party. People **don't** want to leave early."

- Jan Gehl

Case Studies

IV. COPENHAGEN, DENMARK

CITY FOR THE PEOPLE

A rival to Paris and Amsterdam, Copenhagen is internationally famous for its unique creation of lively pedestrian streets, its laid back outdoor cafes, and its rich cosmopolitan culture. Ever wonder why? Like the old, familiar saying, “Rome wasn’t built in a day,” Copenhagen did not randomly sprout buildings, roads, and streets in a rushed manner. Instead, Copenhagen embraced the impressive skill of calmly and consciously watching development occur before making decisions and plans when changes of their city center were needed to correlate with the demanding modernization at the time (Bosselmann, 2008). City developers also deliberately left some decisions for later, so not too many decisions were made in one sitting (Bosselmann, 2008). Despite carrying out some bad decisions, the most common planning disasters, such as large-scale urban renewal or modernizing city centers through the lining buildings of office towers in the middle, have been avoided (Bosselmann, 2008). They understood it was almost impossible to fix

Figure 2.1 Conscious decision making and prioritizing pedestrians above private cars and automabiles led Copenhagen to be one of the most pedestrian-friendly cities in the world.

large mishaps when new street configurations were built, so major design considerations required a long thinking process when it came to combining new expansion with old development (Bosselmann, 2008). Further, throughout history, the people of Copenhagen were not scared of changing decisions when an obviously better one arrived and this became one of the foundations for city planning development, which led to the presence of lively, pedestrianized streets

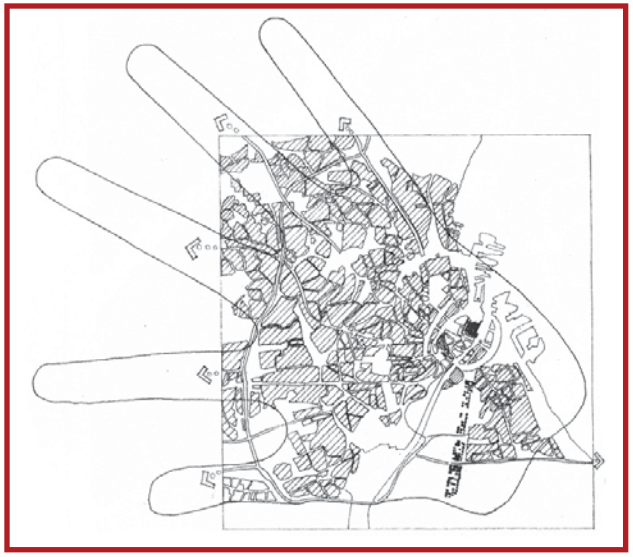


Figure 2.2 Copenhagen's famous Five Finger Plan in the 1940s, showing conscious urban expansions.

today (Bosselmann, 2008). Copenhagen is the happy effect of sensible urban planning and continues to place strong emphasis on making attractive towns for pedestrians (Walljasper, 2003). Thanks to aggressive minds and dedicated efforts against real-world urban conditions, Copenhagen is considered a wonderful, livable, walkable place, appealing and attracting many visitors and tourists to see for themselves the reasons for the city's inspiring reputation.

THE FIRST MOVE

Copenhagen is equally as old as most East Coast American cities, considering how the city had to be completely rebuilt after the British navy demolished and burned it to the ground in 1807 (Walljasper, 2003). Official planning started in 1947 and plan amendments in 1962 called for a new center designed accordingly to the elements of transportation, including rail, highway, and land use (Mckeever, 1969). The year 1962 was a significant one since traffic was first closed off a main street, known as Stroget, in order to make room for pedestrian spaces (Walljasper, 2003). Ever since then, blocks are added each year to the lively pedestrian zone, parking spots are eliminated, and traffic lanes have been transformed into bike lanes (Walljasper, 2003). The number of pedestrian spaces and squares tripled within 18 years (Gehl, 2006). The production of pedestrian zones in Copenhagen was met with just as much doubt and disapproval as Americans with similar plans today, but Copenhagen surpassed the bitterness and is now famous for taking the first, bold risk

(Walljasper, 2003). If Copenhagen could do it, even in the scope of many disbelieving and glaring eyes, then there is no reason America can't do the same.

Figure 2.3 A road in Copenhagen showing a personalized bike lane and a public advertisement of the city's appreciation for biking.

SMALL STEPS TO A BIG PRESTIGE: STROGET

Stroget is a city located at the nucleus of Copenhagen and consists of a linear collection of four medieval streets that reaches 3,500 feet long (Jacobs, 1993). Winding, relatively narrow streets with old, long streets define this area, producing a mysterious sensation from the tightness, towering buildings, and blurred ability to distinguish the start from the end (Jacobs, 1993). 1962 was a big year for Stroget since its main shopping streets began to convert into a pedestrian promenade (Bosselmann, 2008). About 96,000 square meters were designated for pedestrian spaces, where cars were permitted to pass through, only at low speeds (Beatley, 2000).

Many unique qualities allow Stroget to be a pedestrianized center. What makes the street unique to the human eye are the open, stopping squares for formal and informal entertainments and restaurants or coffee shops that are always nearby, along with food stalls and attractions (Jacobs, 1993). As one walks along the street, each experience is different from the next, creating an ongoing curiosity as each

step is taken (Jacobs, 1993). The street also physically provides comfort and protection since the natural anatomy and configuration of buildings act as wind barriers (Jacobs, 1993). One of the best things about Stroget is that the street is made for everyone and is for all types of crowds, bringing people from diverse backgrounds, cultures, and ethnicities together on the same street (Jacobs, 1993). Apparently, people physically blend in with one another and, even though social interactions among groups are uncommon, they cannot help observing each other and being in their presence (Jacobs, 1993). The presence of people and activity, along with its relaxing, carefree environment and the presence of various older historical architecture, are the factors that make people enjoy walking down Stroget so much (Beatley, 2000).

Stroget contains many important features: narrow streets, verticality of buildings, abundance of doors and windows, and a general "richness in visual stimulation" (Beatley, 2000). There are no curbs to segregate cars and pedestrians (Jacobs, 1993). Because shopwners are prohibited from covering or closing up their display windows, Stroget is a place to be at night for evening strolls (Beatley, 2000). Streets are just as lively when stores are closed in the evenings and on Sundays (Walljasper, 2003).

Figure 2.4 Illustration of vibrant pedestrian uses and activities on Stroget.

Interestingly, the statistics of people walking along Stroget can be record-breaking: a summer day can amount to about 55,000 people, which is about 145 pedestrians per minute, and, even in winter months, approximately 25,000 people come outside and walk on Stroget. The amount of bicyclists is just

as impressive. Half of all people who work in central Copenhagen arrive by bicycle in the summer time. About 70% of those normally bicycling also bike to work during the winter months, despite the chilly, rainy and sometimes icy weather. The average commute ride for bicyclists is about 20 minutes, making it obvious that many people are ready to travel beyond short distances. Moreover, there is no apparent discrimination of bike riders, since everyone rides bikes in Copenhagen; from business executives and fashionable women in high heels to old people, students,

Figure 2.5 Large parking lot designated for bikes near shopping area of Stroget.

Figure 2.6 Pedestrian shopping area along Stroget, Copenhagen.

and parents with toddlers. Riding a bike in Copenhagen is as common as driving in America. (Beatley, 2000; Walljasper 2003)

POLICIES TOWARDS WALKABLE STREETS

While much emphasis was placed on pedestrians during modern development, Copenhagen understood the importance of public transit and valued the efficiency of travel. For 30 years and more, transit is systematically upgraded (Gratz & Mintz, 1998). Regulations on parking are enforced as well: in some Danish communities, the price for parking is raised when parking spaces become scarce (Gratz & Mintz, 1998). All schools have no parking lots, so students must bike or walk (Gratz & Mintz, 1998). All of these strict incentives contribute to the development of pedestrian-friendly streets and, as a whole, a very walkable city.

For the past 30 years, the city has abided to the policy of removing 2% of its city-center parking, reducing 600 spaces in the last ten years, and converting them into pedestrian spaces (Beatley, 2000). This hasn't affected car traffic since flow continues to run smoothly through the city and has increased more people to come (Gratz & Mintz, 1998). Biking is essential to the city's culture, so Copenhagen continuously takes initiative to increase bike lanes, about 300 km

Figure 2.6 Road on Stroget with no vehicle signs.

(about 186 miles) of bike lanes and recently instituted the policy of installing bike lanes along all major streets (Beatley, 2000).

Nearly all new stores are required to be built within existing commercial centers of cities, towns, or villages as a national effort to contain sprawl (Walljasper, 2003). New commercial buildings also must be within a short walk of a transit stop; offices and factories must accommodate bicyclists and pedestrians as well (Walljasper 2003). That way, land is then conserved and, more impor-

tantly, people are capable of going to grocery stores, markets, and shopping areas within walking or biking distances.

Figure 2.7 Busy and crowded near the entrance of Stroget.

A MOMENT OF REFLECTION

Not placing one over the other, pedestrians, bicyclists, and transit riders all reside on an equal level of value with motorists and, in effect, the environment is improved, aesthetics are enhanced, and social and economic sectors are reinvigorated (Walljasper, 2003). The lively pedestrian-friendly climate of central Copenhagen has brought many suburbanites to move back into town, revitalizing the city as a whole (Walljasper, 2003).

Copenhagen continues to possess the same mindset, as it did four decades ago; they heed and carefully review every addition, improvement, and revitalization in the city before finalizing any actions, big or small. For example, each quality improvement in Copenhagen depends on the monitoring of the use in existing public spaces beforehand (Gehl, 2006). Thus, a major lesson to learn from Copenhagen is the importance of gradualism and gradual change (Beatley, 2000). People tend to not notice change that has occurred gradually, so small removal of traffic spaces every year does not appear a lot at first, but forty

years later, the effects are indeed dramatic.

It does not take a rocket scientist to figure out why Copenhagen has numerous pedestrian-friendly streets. There is no secret ingredient for Copenhagen's success in their movement of a walkable, sustainable future. Their main objective is to build the city for people, accommodating other types of users and new development as a secondary responsibility. In this case, it's not primarily about the street's physical appearance and attractions. The combination of careful, conscious planning, gradual changes, and strict measures pushed Copenhagen to have one of the most successful, pedestrian-friendly streets in the world. And they won't stop doing so.

V. BARCELONA, SPAIN

A CITY OF STREETS

It has been claimed that Barcelona is an outstanding example of improving cities in a certain way for the past 10 to 15 years (Marshall, 2004). Since the late 1960s, Barcelona has undergone a radical metamorphosis, changing its economic base, social structure, population's habits, and physical structure (Marshall, 2004). And transformation is accelerating. The key agents involved with Barcelona's outstanding development are numerous, but the most essential component is their forte to plan (Marshall, 2004).

Barcelona was formally a fortress and the high walls served to protect the people residing inside, but expansion for urban growth and the nearing 20th century made it clear that destruction of the constraining walls had to be made. No longer serving security purposes, the medieval walls were authorized for destruction by the Madrid government in 1854, opening new, ambitious plans for feasible extension.

This led to the design development of 900 octangular blocks of development, called manzanas, exposing street corners and giving a more spacious outlook. The purpose of this configuration was to open the space in intersecting streets, so drivers, pedestrians, and other users gained a clearer view of all sides and directions. The manzanas also allowed angled vehicular parking, which intentionally slowed

Figure 3.1 Anglular blocks create angled parking in between intersections; parking spaces are mean to slow traffic.

car traffic for a safer, more comfortable street experience.

It also forced all structural development to follow the angled side corners of the streets, opening the door to create unique architectural designs and forms.

In terms of street orientation and development, a plan in 1860 called for North to South and East to West orientation of streets, which were about 15 or 30 meters (50 to 100 feet) wide, to avoid acting as wind tunnels (Wynn, 1984). This arrangement of grid-like network of streets dominates most of the metropolitan city today, surrounding a large concentric center with major street arterials radiating outwards. By the early 1900s, Barcelona expanded in a radiocentric form from the old city, which became the landmark in the conceptual development of urban planning in Spain (Wynn, 1984).

Barcelona is a city of streets. Today, Barcelona is known as having a huge diversity of streets (Marshall, 2004). Some streets are lined with trees, while other streets have equal space between pedestrians and vehicles, but together they make Barcelona a place for walking (Marshall 2004). In 1987, Barcelona proclaimed a new goal and policy: "the city is the people," literally meaning developing for people (Marshall, 2004).

Some street block designs are different from the next, while complementing each other in color, detail, and form, respectively. Artistic and architectural influence, most notably Antoni Gaudi, was the leading pillar in sustaining the city's tourist pedestrian areas, as well as, constructing Barcelona's image and personality (Marshall, 2004). Pedestrian streets and tourist spaces in Barcelona are almost always occupied with exquisite detail, beauty, and extravagance, indicating Barcelona's high and serious value on aesthetics and attractions.

Figure 3.2 Aerial photo of one of Barcelona's most favorite pedestrianized streets: Las Ramblas.

THE RAMBLAS: SMALL AND SIMPLE

Allan B. Jacobs considers The Ramblas the best street in the world. And who wouldn't? As one strolls along the street, the strong presence of strange street entertainment, many tourist vendors, and miniature shops invites and amuses people to stop almost every ten feet and see what the craze is all about. The placement in the city and in the Gothic Quarter, the natural welcoming sensation of the street, the quality of the buildings, all make The Ramblas a wonderful place to be for people to walk, meet, and talk (Jacobs, 1993). Wide, central, and canopied, The Ramblas is a focus for walking, ushering automobiles to the sides and making space for a central, pedestrianized median (Jacobs, 1993).

Characteristics of this street are endless. With a distinct beginning and end, the street has recognizable start and stopping points. Similar height of buildings, around five to seven stories high, envelope the street and closely-spaced, interweaving canopies of London Plane trees protect from the one-way automobile traffic on either side. Almost every 13 feet is an entrance to a shop, with transparent windows so one could see the specialties inside. Buildings embrace complex surfaces and striking details, and although they are not the same, they complement each other extremely well. There are just as many buildings as entrances and windows, considering how some buildings only reach 15 feet wide. Major destinations are spread throughout the street, including a major theater and public market. Both the sidewalk and central medians have many stalls that sell birds and flow-

ers and larger stalls for magazines. Restaurants and tables are separated by the automobile road or cartway: waiters and waitresses constantly serve food and drinks back and forth across the narrow roadway. The tables are located on the edges of the median, allowing crowded strollers to observe the sitting, eat-

Figure 3.3 View of the narrow vehicular road and large pedestrian median on The Ramblas.

Figure 3.4 (upper right corner) Numerous pedestrians easily crossing the narrow vehicular road, as if it were part of the path.

Figure 3.5 (lower right corner) Many people walking through the large median.

ing, and delivery of tasty food. Many outdoor seating areas are placed in the central median and are typically used and occupied. Because the median is the center of pedestrian activity, it is only natural to walk in the center, not on the narrow sidewalks with stores. This implies the constant street crossing over the roadways, which promotes a "humanizing" effect and a pause for motorists. (Jacobs, 1993)

Pedestrians are given the right-of-way power on this street, setting the entire pace and tone for the whole environment. Short distances make the street walkable and pedestrian-friendly, so those on the center can recognize people on the sidewalks and can distinguish storefronts even if the goods inside are not visible. The prominent location significantly helps the street stand out. An important concept of The Ramblas is that the people and place are confined to a dense space, but it works. Like Stroget, the tight, narrow streets create a sense of mystery since the winding streets may be less than 10 feet wide with buildings up to six stories tall. (Jacobs, 1993)

To sum up the design of the street, it is uncomplicated, yet effective. A visitor can use The Ramblas as a reference point if he is lost. The presence of The Ramblas is always felt. (Jacobs, 1993)

Figure 3.6 A pedestrianized shopping area that leads to The Ramblas.

Some argue that The Ramblas is not as good as it sounds because buildings are not maintained as well as they should be and the striped concrete paving has faded away. But the overall strong design is no match for these small blemishes. The comfortable and informal vibe on the street gives pedestrians the relaxation they desire. The Ramb-

las is truly a wonderful place to be and is not short of being pedestrian-friendly. (Jacobs, 1993)

Specific design elements, such as the median located at the center, narrow streets, things in close proximity, are what makes The Ramblas an incredibly walkable street. Its dimensions of buildings, roads, sidewalks, and tree spacing produce the perfect mixture for its worldwide success. Emphasis on pedestrian use, rather than vehicular mobility, also allow group massing throughout the street, so people of all ages and cultures are seen everywhere. The Ramblas is a product of strategic and genius design; its simplicity works to bring pedestrians together on a daily basis and, more importantly, make them want to come back for more.

Figure 3.7 Night view of Paseo de Gracia, where evening is just as lively as night.

PASEO DE GRACIA: WALKABLE STREET WITH STYLE

To reiterate, not all streets in Barcelona are the same and while Paseo de Gracia has some similar components to The Ramblas, the former has distinct features from the latter. Extending about 1-mile long, the design of Paseo de Gracia reflects and promotes public stroll, particularly during evenings, like The Ramblas. It connects to the older city, surrounding the Gothic Quarter, and is centrally

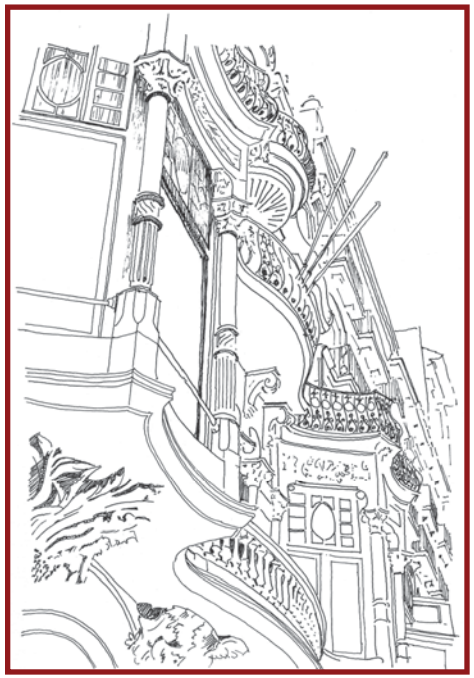


Figure 3.8 (upper left) and Figure 3.9 Both images shows the exquisite details of almost every element of the street, from buildings to floor tiles and furniture to tree plantings.

located. Unlike The Ramblas, the beginning and end points are not as conspicuous. Six traffic lanes occupy the main road, five in one direction and the sixth for buses facing the opposite direction. Approximately 350 feet long, block lengths are short due to the 19th century development of manzanas.

Paseo de Gracia is considered a walkable street because of the side access roads that act as one with the median, providing a slow zone for autos and people. A myriad of strategies and plans respond to changing needs and opportunities of that area, such as, implementing subway entrances, diagonal or parallel parking, lighting, and seating possibilities. The flexibility in street alterations is beneficial for accommodating new pedestrian development, so removal and additions take place easily, with the exception of tree placement or spacing, location of lights, and sidewalk curbs. (Jacobs, 1993)

Exquisite detail makes Paseo de Gracia an attractive and aesthetically pleasing place for pedestrians, appealing both visitors and locals to

travel through the entire street and more. First off, there are four different types of lighting, from traditional lighting to new, creative ones. Contemporary and typical, the first type is a high universal "cobra head" on a thin pole painted olive green to help them recede from sight. The second type is an older, classic fixture that varies in spacing and is usually located on the sidewalk side of the trees, offering low light during the dark hours. Standing on every corner and intersection, the third is ornately designed and is grander with five-lamp fixtures, making it stand out the most and illuminates the way. Distinct from the first three, the fourth type is playful, swirling and is intricately designed by Gaudi, which is placed along the street at the center curb. Its high light pretends to shine light on autos, while the low light serves to guide a path for pedestrians. (Jacobs, 1993)

Placed to face the walk and the promenade, many circular Gaudi-designed benches have trees and flowers planted in the center. Buildings, often in the art nouveau style, are also rich in detail and

Figure 3.9 This shows at least three different lamp fixtures on an intersection in Paseo de Gracia.

diverse from one another, but have no problem fitting in the same street. Other characteristics, such as, large windows, medium-sized stores, and paving, are accessorized with great embellishments, complementing with the rest of the stylish elements on the street. (Jacobs, 1993)

Paseo de Gracia is not just a place for people to sit and stroll; a spectacle in its own right, the street is filled with artistic beauty and extravagance, fascinating many who visit this magnificent place. Even with

the many traffic lanes, the street is pedestrian-friendly because of its medians on the side of the main roads that permit safe pedestrian crossings at large intersections. Elaborately designed outdoor furniture and building facades act as captivating features, not only functioning as typical street components. When walking along Paseo de Gracia, even the smallest features are exotic to the tourist eye. It is important to note that the detailed development of Paseo de Gracia was an expensive investment, but the choice to do so is what created the fame it embraces today.

The smart combination of aesthetics works effectively in this street and thought, imagination, and creativity are necessary for this result. This street type is also the prime model to cure current traffic issues (Bosselmann, 2008). As a residential boulevard, Paseo de Gracia can carry a shocking amount of traffic while also being an attractive place to live (Bosselmann, 2008). Not all streets can achieve the same accomplishment Paseo de Gracia has, but can attempt to imitate its similar route of incorporating innovative, inventive minds with street design.

REASONS FOR SUCCESS

Representing symbols of strong cultural characteristics of Barcelona's life, The Ramblas and Paseo de Gracia, along with many streets in the city, emphasize the plurality uses of public spaces, from daily rituals of meeting and strolling to gathering in groups (Rowe, 2006). Architects and public officials understood how public spaces embrace a broad range of functions, while acknowledging the diversity of uses and people, building pedestrian spaces to enhance the surrounding architecture (Rowe, 2006).

First off, Barcelona is spatially apparent; the orderly arrangement of streets and individual street designs express the sensitive awareness of appropriate design differences when establishing road network links. There are significant differences among streets for traffic and avenues for both traffic and pedestrian strollers and passers, which also manage to abide Barcelona's high civic role to be a gathering space. No one street is exactly the same and it is rare to get streets of Barcelona confused, even though they appear like ordinary streets from

an aerial perspective. (Rowe, 2006)

Barcelona also recognized the importance of the uncertainty of future modifications so invention and innovation were the main options for design in order to suit contemporary spatial conditions. One innovation is the extensive use of hard pave and masonry surfaces. The decision was made to place these surfaces in public open spaces because materials were available, immediate, practical and represented tradition, which obviously increased cost and socio-economic benefits. Durable and low maintenance, these hard surfaces symbolically gave an immediate look of project completion. Dynamic abstractions of bollards, benches, and light fixtures bring order in space at little expense. The effects are functional: trees provide shade and open spaces leave room for pause. (Rowe, 2006)

Careful planning and decisions guided the creativity and development of walkable streets in Barcelona. The lesson here is to plan wisely and cautiously, while also maintaining the city's unique characteristics. It requires much struggle and hard work, but Barcelona took the time to make its pedestrian-friendly streets thrive today.

VI. PARIS, FRANCE

CITY OF THE FUTURE

While Copenhagen is a city for people and Barcelona is a city of streets, the primary theme for the development of Paris is also expressed in brief terms: it aims to be the city of the future. From 1853 to 1869, Baron Georges-Eugene Haussmann, a French civic planner, ambitiously envisioned Paris as the city of the future that ultimately represented light and progress, using Napoleon as a guidance. Positively convinced their plans would dramatically improve the lives of their contemporaries and future generations, both men ambitiously planned for a total transformation from jumbled, unpaved streets into broad boulevards and grand views. Problems of congestion, narrow streets, and transportation enlightened Haussmann to increase street lighting, link sewer systems and water supply, open new roads, and improve transportation. (Soderstrom, 2008)

Haussmann's drastic urban changes and development was a major influence on other European countries, including Spain and Copenhagen, where architects and engineers utilized Haussmann's approach and extended his ideas and concepts in a form of their own. Past planners borrowed ideas from their contemporaries, so Americans can also learn current strategies that promote pedestrian-friendly streets from Europeans.

Figure 4.1 A common, narrow street in Paris, France. Roads are narrow for pedestrian traffic.

Figure 4.2 (upper left) The one-way street between high-class store brands on Avenue Montaigne. Figure 4.3 (lower left) A wide path is dedicated for pedestrian movement. Trees and other minor details enhance the feeling of comfort and safety.

AVENUE MONTAIGNE: A CLASSY STREET

The first noticeable aspects of Avenue Montaigne are its wealth and power: buildings, like expensive hotels, famous designer brands, and foreign government offices dominate the space, indirectly implying that the street is not meant for everyone (Jacobs, 1993). High fashion and elegance of the street divert some groups away from this street, but that does not mean the street cannot be walkable.

About half the total width of Paseo de Gracia, the street has two lanes on narrow access roads, where one is for car movement and the other is for parking, so fast movement is impossible, forcing automobiles and pedestrians to mix and maintain a pedestrian pace. With the narrow access road, the street becomes a tight, intimate boulevard, defined with symmetrical balance, grace, and elegance of buildings.

The close placement of chestnut trees, where branches meet on top, creates an imaginary picket fence that segregates the pedestrian side-

Figure 4.4 Uniformity of stores, hedges, and fence detail are apparent throughout the street.

walks from the vehicular roadway. Four lanes of traffic run through Avenue Montaigne: three lanes go in one direction, while buses and taxis go the other way. (Jacobs, 1993)

It helps to know that this street was built before the automobile or when only a few of them existed (Jacobs, 1993). Outlining street connections and points of interests first before transportation is an advantageous move for reducing sprawl and creating more pedestrian spaces. A repeated street design strategy is making car traffic go in a dominate direction, while other modes of transportation, such as cabs and buses, go in the opposite direction, so fewer movements are possible (Jacobs, 1993). An important feature of this street is the behavior of users, where drivers and pedestrians adapt to each other and accordingly to common street regulations.

Avenue Montaigne may not be as detailed as Paseo de Gracia or as bicycle-friendly as Stroget, but it is no doubt a walkable street. Pedestrians have their own space on the sidewalks and walking across intersections and blocks are just as comfortable and safe on a sidewalk. Street vegetation on the side produces a barrier between cars people, making people have a sense of private space and sense of distance from vehicular movement and traffic. These strategies are simple measures to balance pedestrians and drivers in a tight space and these techniques could be applied anywhere.

BOULEVARD SAINT-MICHEL: THE TRIO

Being Paris, it is obvious that the city does not only have one successful, pedestrian-friendly street. Boulevard Saint-Michel stretches 2,500 feet long and is particularly special because of its unusual mixture of light, stores, and cafes. The natural light passing through the trees mixed with the transparent, welcoming windows of commercial uses on the ground-floor invites spectators to observe goods hanging on racks or tables on the sidewalks. During daylight hours, outdoor

Figure 4.5 Illustrative sketch of street along Boulevard Saint-Michel.

electric and neon shop signs are turned on, creating a mixed feeling of day and night. The sunlight and sharp, moving patterns of light and shade work to produce a brilliant effect of lighting. With these contrasts, a bland façade can come to life.

Buildings are uniformly light-colored and five floors high, letting the reflection of London plane trees create patches of sharp contrast on these facades. The sidewalks are crowded, most likely due to the combined presence of the following obstacles: kiosks, benches, bus shelters, clothes racks and book tables, tables and chairs at cafes, light poles, trees, and metal fences. And don't forget the many people that walk through this space. At any pace, pedestrians typically need to walk around other people, moveable furniture, and outdoor stores and cafes. This slow pace gives more time for people to look, browse, and notice objects around the street, making it difficult to walk fast on this street. (Jacobs, 1993)

Despite the restraint on pace, Boulevard Saint-Michel is a pedestrian-friendly street. The

Figure 4.6 Example of outdoor cafes in Paris.

numerous outdoor objects and crowds of people create much pedestrian activity on the sidewalks, which, ironically, makes other people want to walk on the same path. The effect of lighting also helps produce a compelling scene for both drivers and pedestrians passing by. Light and stores are a rare combination, but these two components work effectively to deliver a complex setting that enhances pedestrian use, making the street walkable, especially during the day.

CURRENT AMBITIONS

Streets in France have shown their ways of being pedestrian-friendly and, gradually, the country is planning towards sustainable development. France has policies and goals that cut down automobile use. Within ten years, the city plans to diminish automobile traffic by 40%, considering how automobile traffic successfully declined by 15% between 2000 and 2005. The concept is to add car restrictions systematically while making other modes of transportation easier to use, including the Metro, bus, bicycle, or foot.

New, sustainable standards are applied to new and existing streets, while still making them walkable. What to learn from Paris is its ability to combine environmentally-friendly methods into urban plans, while implementing pedestrian-friendly strategies on streets.

VII. STOCKHOLM, SWEDEN

CITY ON WATER

A neighbor to Copenhagen, Stockholm is a central area made up of 14 islands with 45 bridge connections. Over 700 years old, the city is 55% forested and rugged. Beautiful, clean, and colorful, the city resides above a sea of water. (Mckeever, 1969)

Rather than building a road network serving private cars, planners strategically constructed a supportive public transportation network first so one could easily travel within the islands without depending on individual automobiles. Formerly, new roads were built to accommodate the increasing use of private cars, but the negative effects of cars on the urban environment pushed planners to prioritize transportation needs. This prior planning became the setting stone for later infrastructures and establishments. (Botta, 1987)

In 1952, Stockholm realized the necessary separation between pedestrian and vehicular traffic and, thus, proposed a citywide network of separate routes for vehicles, bicycles and pedestrians. Pedestrian movement policies established an evaluation of public transit, covering all aspects of the environment, including noise, pollution, and safety. Recognizing the importance of bicycling and walking, many proposed construction of new roads in the 1960s were cancelled and traffic was relocated with the existing network.

Figure 5.1 Aerial view of the many islands that make up Stockholm.

Figure 5.2 (left) A designated bike path is created in between a pedestrian area.

Figure 5.3 (right) The streetcar rails are located in the middle of the street, with trees and grass bordering the center.

In an effort for a strategic urban revitalization, the concept of "traffic reorganization," where cars were parked under houses and towns transformed into pedestrian spaces, took place. This process educated citizens to realize the preferred roads, optimal driving speeds, and the best places for walking or bicycling. By 1977, concerns for social and ecological impact of traffic on the environment initiated policies that reduce dautomobile traffic by 20%. (Botta, 1987)

Streets were thus redesigned into public open space that accommodated needs of pedestrians, children's play, and adult recreation. Sidewalks take most of the roadway, considering how many streets in neighborhoods were dead ends, and, thus, decorated with paving, plantings, and street furniture with the aid of residents' participation. (Botta, 1987)

The ambition of taming automobile traffic with ideas such as traffic calming, changed resident's attitudes towards car use, developing a sense of responsibility for maintenance and care (Botta, 1987).

Stockholm's instruments of planning are constrained with land-use restrictions and transportation control, benefitting the environment and the future in the long run (Botta, 1987). A strong set of decisions that promote good environmental health became a powerful planning method for the rest of city development. Early on, the city recognized the environmental effects of vehicular transportation, so the city was built in an environmentally-conscious and wise manner, with planners meticulously analyzing places before planning and construction was done. Today, pedestrians feel the positive effects of it: cleaner air and smaller roads calls for a brighter future.

Pedestrian-friendly streets in Stockholm flourish everywhere because of city developers' ambition to reduce automobile use and increase use of other modes of transportation, which can be equally as convenient, safe, and affordable. Out of the four major cities observed, Stockholm seems to be the most aware of urban effects on the fragile environment. A good strategy for street design is to lay out a network of public transportation, putting automobiles second, in an attempt to create walkable spaces for pedestrians.

Figure 5.4 The cobblestone surface of pedestrian spaces.

Figure 5.5 The main pedestrian street, Drottninggatan in Stockholm, Sweden.

VIII. FREIBURG, GERMANY

CITY OF FORESTS

Situated in the Black Forest region, Freiburg is an influential example for many European cities with its early efforts to promote environmental and quality-of-life policies into transportation planning (Walljasper, 2003). The radical move in 1973 to keep streetcars intact and create the first pedestrian-only precinct in an entire location became the basis for later urban development not only in Germany, but for other countries as well (Beatley, 2000).

Figure 6.1 An example of a colored bike lane in Freiburg, Germany.

Figure 6.2 Grass paved railroads that circles around neighborhoods in Freiburg, making it convenient for residents to travel with the light rail.

ALTSTADT: THE FIRST BUT NOT THE LAST

Altstadt was the place for this 1973 experiment. It was divided into three different pedestrian zones: one prohibits motor traffic at all times and the other two allow only delivery traffic during certain times of the day. Specifically, in one zone, day and night deliveries were allowed, while another allowed only daytime deliveries. This measure regulated traffic flow and defined pedestrian spaces as the dominate entity of this space. The cobblestones throughout Altstadt limit heavy vehicles from travelling through

the roads, decreasing possible disruption to neighboring areas. However, this created a spillover of cars on nearby streets, so the city is mitigating these effects by narrowing and greening some streets, as well as restricting parking. Nonetheless, Altstadt remains pedestrian-friendly and walkable, with many people strolling between department stores, an open-air market, and numerous side walk cafes. (Beatley, 2000).

NEW GOALS, BRIGHTER FUTURE

Like Stockholm, Freiburg built a network of bicycle lanes and pushed streetcars into a modern light rail system. The effects of establishing a good transportation system are dramatic: when private vehicle trips were made 60% of the time back in the 1970s, the number of motor vehicle trips account for less than half of those trips today. Bikes

Figure 6.3 (lower left) and Figure 6.4 (lower right) These images reveal Freiburg's unique integration of open pedestrian spaces, such as outdoor cafes and stores between corridors of buildings, creating intimacy and a human-scaled experience.

Figure 6.5 and Figure 6.6 (upper Images) Both photos show the narrow, pedestrianized corridors filled with creative embellishments.

Figure 6.7 The image above illustrates an open water flow that runs throughout the entire city. The night lights reflect the spirited, energetic atmosphere within this area.

are increasing from 18 to 27% of all trips and light rail from 22 to 26%. Currently, there is bike lanes run about 410 km (254 miles), which is a number that is a little more than the bike lanes in Copenhagen. These statistics imply the effectiveness of Freiburg's policies in transportation planning. (Beatley, 2000; Walljasper, 2003)

All of Freiburg's historic centers are pedestrian-only, converting into car-free districts and limited only to tams, pedestrians, and bicycles. Utilizing traffic calming strategies, most of the rest of Freiburg are 30 km per hr zones, setting a comfortable and safe mood for pedestrians and bicyclists throughout the city. Gradually, the city is converting its auto parking spaces into bike-rack areas; the city increased the number of bike spaces from 2,200 to 4,000 within nine years. (Beatley, 2000)

The success of Freiburg's walkable spaces is due to the availability of good public transit service, a sufficient density of housing, multi-purposes use, and the design of highly attractive places (Beatley, 2000). Their promotion of environmental initiatives also

Figure 6.8 An area is completely pedestrianized for shopping and an open space for people to gather and move.

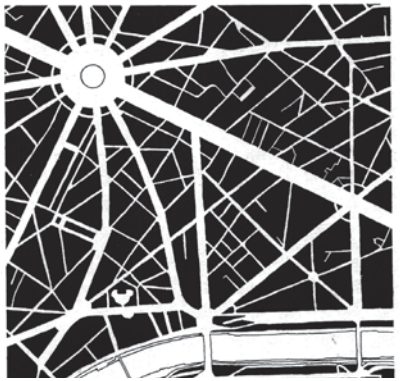
Figure 6.9 Outdoor cafes and pedestrian movement activate the space.

allows them to be a leading city in creating successful sustainability methods. More importantly, Freiburg's success is the solution to change Americans' current mentality: people who would never leave their cars and how spread-out metropolitan cities in America would end up like the densely populated Old World cities decades before, making application of European methods almost impossible in the United States (Walljasper, 2003). But it can be applicable. Americans just need to make a move.

IX. COMPARATIVE ANALYSIS OF STREETS

Copenhagen, Denmark

Barcelona, Spain



Paris, France

Stockholm, Sweden

Freiburg, Germany

Market Street, San Francisco

SUMMARY OF STRATEGIES

As shown in the previous research, each pedestrian-friendly street is a one of a kind and no two are the same. Every one of them has reasons for its own success, which shows the rich variety of possibilities planners could do to produce pedestrian-friendly streets. Like body types, pedestrian-friendly streets vary in size, shape, and form; more specifically, they embrace distinct street dimensions, details, and concepts, which all are combined to create an explosion of interests on a single street.

To briefly summarize the research on the five European case studies, none of them are alike, not even streets in the same city. For instance, in Barcelona, both Paseo de Gracia and The Ramblas are walkable, constantly in motion, and are frequently inhabited by pedestrians, but for completely different reasons. While Paseo de Gracia serves to allure users of its striking, sophisticated details and aesthetic functions, The Ramblas offers multi-purpose uses, involving outdoor cafes and restaurants, street entertainment, vendors, and shops in a variety of large and confined spaces. The wonderful, careful mixture of street elements, like trees, architectural features, building uses, and street activity, did not fall short of expressing Barcelona's impressive creativity and talent. These two streets in Barcelona are creative physically and conceptually, with conscious planning behind every move.

On the other hand, Stroget in Copenhagen, Denmark, is nothing like the streets in Barcelona, considering how emphasis is on pedestrians and bicyclists, not detail or the street itself in particular. Thus, development revolved around planning a good, effective transportation system for people walking or biking, where implementations of policies, such as, reduction of private cars and addition of pedestrian spaces, added to the process. The success of pedestrian-friendly streets in Copenhagen is fairly simple due to the ambitious policies that promote gradual change and produce efficient transportation.

Unlike streets in Barcelona and Spain, streets in Paris have specific qualities and strate-

(a)

(b)

(c)

(d)

(e)

Figure 7.1 Photos of streets: (a) Avenue Montaigne, Paris, France (b) Barcelona, spain (c) Freiburg, Germany (d) Stroget, Copenhagen, Denmark (e) Drottninggatan, Stockholm, Sweden

gies that make them pedestrian-friendly. For one, Avenue Montaigne is a street with expensive brand names for high-class shoppers and Boulevard Saint-Michel is a crowded one with numerous outdoor cafes, street furniture, and bus shelters competing for the sidewalk space and slowing pedestrian movement. The former is symmetrical, uniformed, and classy, while the latter is busy, chaotic, and colorful. These specific combinations of texture, style, and color work for each street and enhance the vibe of friendliness, comfort, and safety for pedestrians.

Stockholm placed pedestrian needs above the automobile like Copenhagen, but they went even further in making this idea practical and long-lived. Stockholm made sure transportation throughout the islands was accessible for travel while also incorporating strict measures to decrease urban environmental impacts. Fresher and cleaner, streets in Stockholm are easy to move through and are circulated with better air quality for all users in the space. Traffic calming techniques were additional

strategies in making pedestrian-friendly streets.

Because of good transit, traffic calming, and the environmentally-conscious mindset, pedestrian-friendly streets are made and continue to thrive for many generations and beyond.

Lastly, Freiburg seems to embrace the strategies from all the cities, where good public transit, highly embellished streets, mixed use spaces, traffic calming techniques, sustainability methods, and gradual change of policies generate streets that are not only pedestrian-friendly, but ones that can adapt a variety of approaches from different cities and also be original and unique.

While the streets differ, they all aspire for a similar goal: they desire for people to visit, stroll, and use the space. These streets were not developed for a one-time purpose and, rather, cities want both locals and foreigners to come back to the street throughout their life and have a different experience each time. Even ten or fifteen years later, successful pedestrian-friendly streets continue to attract and please, captivating local regulars and people from all backgrounds, age, and class. The street may remain the same, but a second visit can generate the same initial reaction like the first one, producing sensational feelings of awe and wonder over again. And it only takes one visit. These pedestrian-friendly streets are meant to impress and are to be remembered beyond our generation and the next. This is what constitutes successful pedestrian-friendly streets. It is not an easy process, but these five cities, among many other ones, did it and the rest of the world can too.

SUCCESSFUL V.S UNSUCCESSFUL

There are two types of streets: those that are pedestrian-friendly, those that are not. Pedestrian-friendly streets have variety, in terms of uses, people, design, layout, and context. They are customized to the city's taste, so there is no exact duplicate of a pedestrian-friendly street, when even implementing the same general methods, such as traffic calming and a good transportation system. But, there are common design characteristics among these streets that are noteworthy for creating a walkable atmosphere.

Narrow pathways adjacent to major arterial streets allow streets be both intimate and spacious, creating a constant feeling of surprise and suspense. Pedestrians moving through the street are confronted with irregular changes in the street pathway, so a street is not always in perfect symmetry and straight. Both Stroget and The Ramblas slightly curves, preventing users from seeing the distant view and motivating them to travel down further to discover the unknown features up ahead.

Figure 7.2 Example of narrow roads in Barcelona, Spain.

Medians are common denominators in pedestrian-friendly streets throughout Europe. The Ramblas, Paseo de Gracia, Boulevard Saint-Michel, and Avenue Montaigne have medians for dividing the roads, which allows the street to appear smaller and narrower so pedestrians can cross safely and comfortably. Tree plantings or wide pedestrian spaces are typical on medians, but The Ramblas is especially known for its 36 feet wide median, where outdoor restaurants, vendors, kiosks, street entertainment, and news stand reside in the same

space, along with pedestrian traffic moving back and forth. Barcelona creatively pushed vehicular traffic on either side of the street, deliberately leaving the center room for people. Pedestrians then feel dominate in the space, crossing the car roads casually and comfortably, considering how cars must go at a slow pace or stop at a mini crossroad.

Most European streets have lanes in two directions, with a couple lanes going one way, and a singular, side lane in the opposite direction. That one lane is usually for buses and taxis, while the rest of the lanes are for regular car traffic. This unique setup of traffic separates private automobiles from public transit so pedestrians can easily hop onto buses or cabs without the stress of other cars impatiently passing by.

Figure 7.3 Large median and consistent planting on The Ramblas, Barcelona, Spain.

Every pedestrian-friendly street must have trees proportional to the building size and close proximity, approximately 20 to 25 feet apart, which helps create foliage density and shade, as well as, intimacy and a touch of nature in urban spaces. Tree planting dimensions should coordinate with the overall measurements of the street and buildings, so the overall street elements balances and work with one another. Most streets apply London Plane species throughout the sidewalks since these species are durable in urban environments, fast-growing, and deciduous.

Widths of the sidewalk and traffic vary from one street to another, but the main idea is to keep the dimensions appropriate for pedestrians.

If possible, human-scaled proportions are the most preferable, where everything fits for pedestrians: nothing is too high or wide, so people can feel equal to small stores and short crosswalks.

An important note is that there is variety. The diversity of uses and activities bring diverse groups of people. Mixed-use spaces allow everyone to be in the same places, despite differences in destinations, bringing the population together and allowing them to interact, even if they don't actually communicate with each other.

A good balance of all modes of transport - walking, driving, and biking- along with the physical features of the street, also goes hand in hand with one another. Without one or the other, a pedestrian-friendly street cannot exist.

The research demonstrated many types of successful pedestrian-friendly streets, but there are also unsuccessful ones, even in Europe. For instance, Avenue des Champs-Elysees in Paris has similar features as the successful pedestrian-friendly streets, such as, medians, visually interesting buildings, out-door cafes, and four rows of London Plane trees, but other factors make this street unappealing and unwalkable. Many structures on the street are wide, including the sidewalks, the narrow access roads, and the center traffic lanes; there are a total of ten vehicular lanes on this street and sidewalks are about 35 wide. This makes the street friendly for cars, where lanes are spacious enough for speeding and accommodate heavy

Figure 7.4 Wide sidewalks and traffic lanes along Avenue des Champs-Elysees. Four rows of London Plane Trees (two on each side) are also displayed.

traffic throughout the day. The sidewalk is too wide, even in an attempt to balance the wide traffic lanes, because it does not become human-scaled anymore. Further, outdoor cafes and furniture take up about 16 feet of space and sticks out like a sore thumb since they bulge out into the sidewalk and create “dead spots,” forcing pedestrians away from shops and into wide-paved areas (Jacobs, 1993). The London Plane trees are appropriately spaced, but the foliage is oddly pruned in a box-hedge like shape that offers little shaded or protection. Everything on the street seems too large or out of proportion for pedestrians to feel comfortable and safe in, which is a problematic experience for most people walking on streets in America.

Figure 7.5 Trees pruned in a box-hedged manner and the center road is accommodating ten lanes of vehicular traffic.

It is beneficial to determine what makes pedestrian-friendly streets successful or unsuccessful so planners can understand what mistakes to avoid in the future. Experimenting with street design in an effort to make walkable streets may sometimes bring unwanted consequences but it is a step. Trials and errors are essential to see what works and what does not, despite the costly investment. Europeans already passed this stage and Americans can learn from their streets to make their own streets pedestrian-friendly. America has no right to copy, but borrowing design ideas and strategies from successful, pedestrian-friendly streets in Europe can lead to the development of an innovative, walkable street.

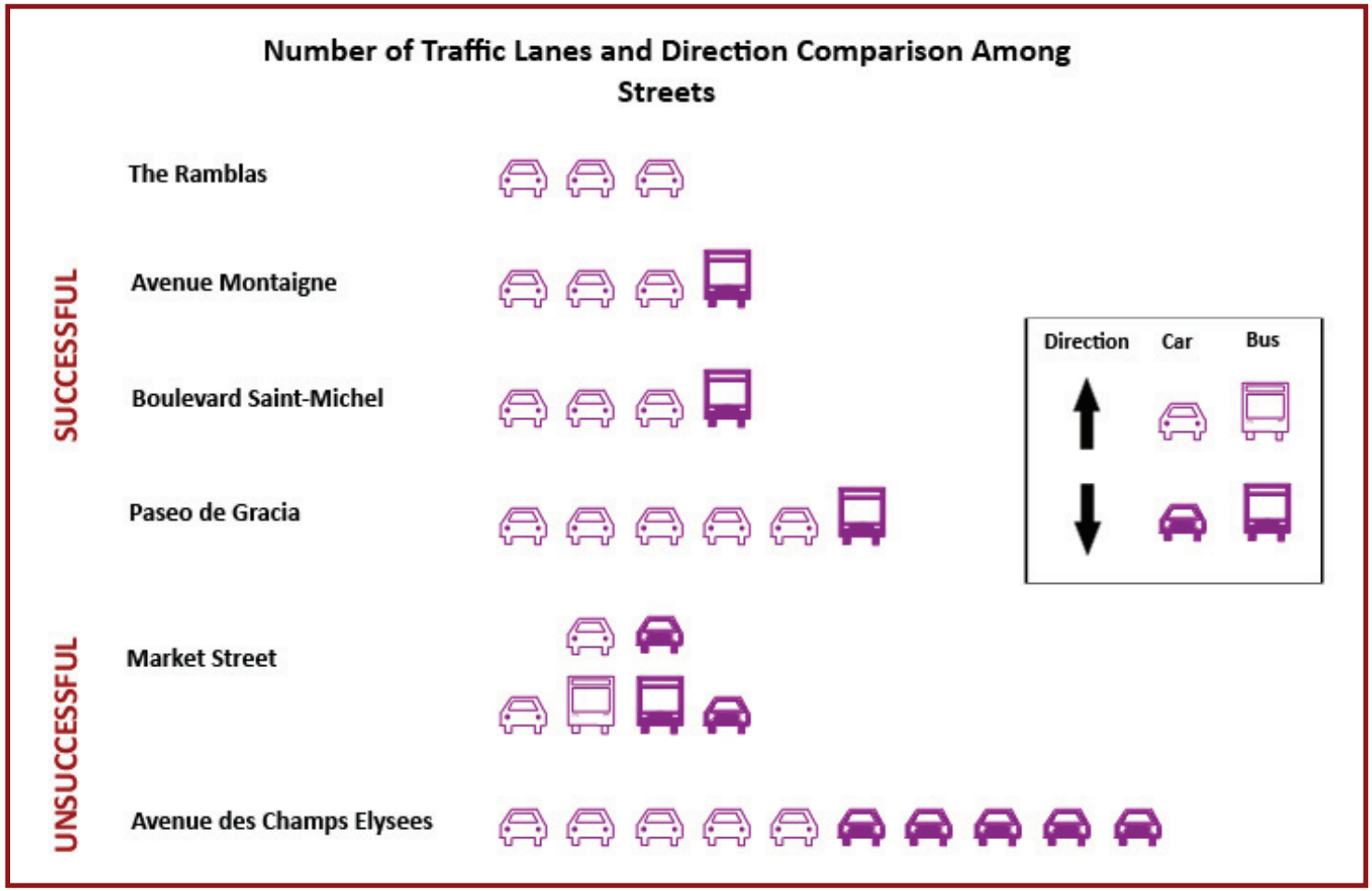


Figure 7.6 The graphic illustrates the number of traffic lanes and directions of streets previously mentioned and Market Street.

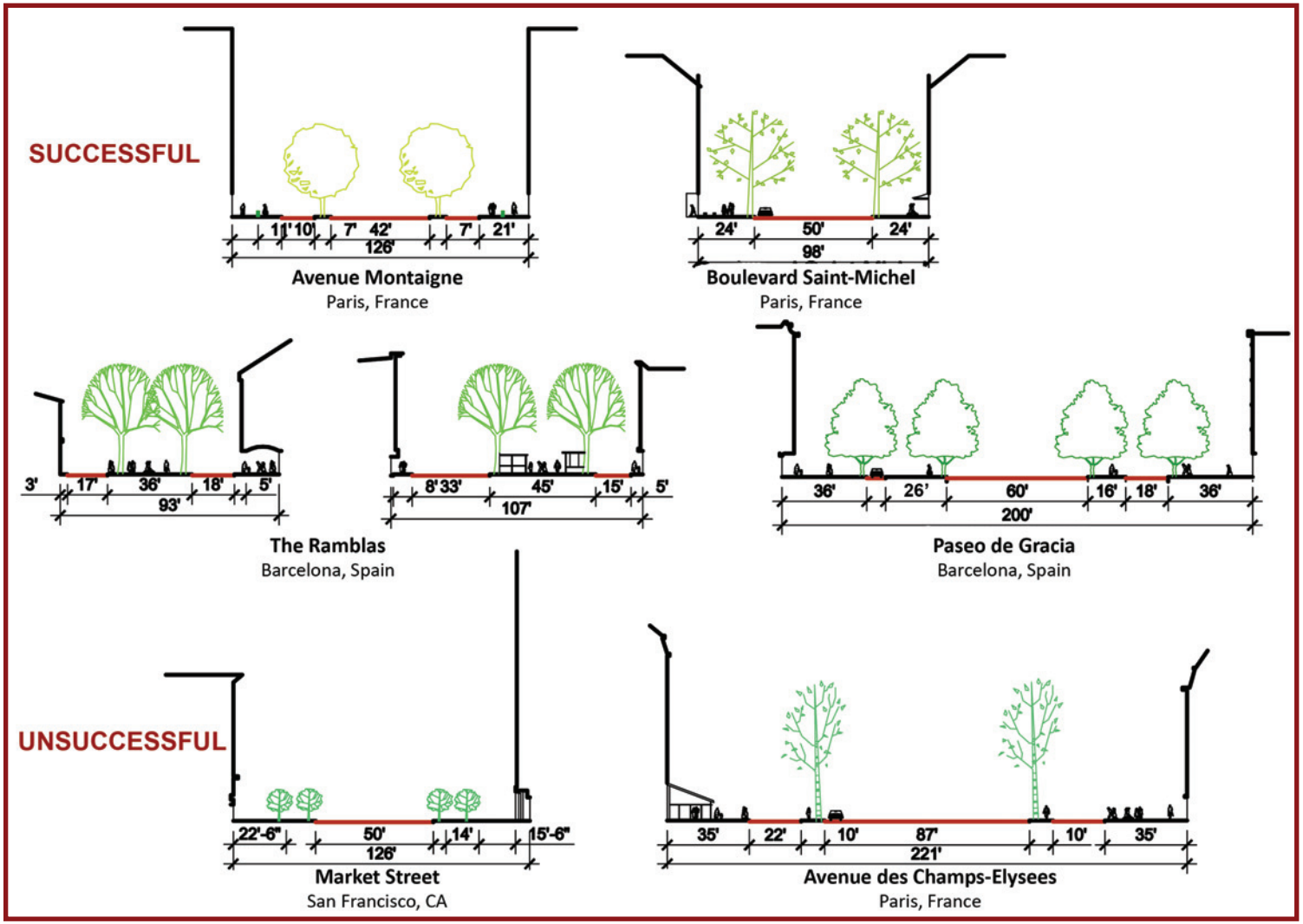


Figure 7.7 Street Dimension Comparisons between European streets and Market Street.

LESSONS TO LEARN

The biggest question is how can America adapt European street design strategies, when streets in America are completely different from streets in Europe? The context, as well as, social, economical, and political factors, is incredibly distinct; in addition, people in America rely heavily on motor transportation, particularly private not public ones, and, thus, streets are designed for vehicular traffic, not for people. Even with much dissimilarities, America can adapt European methods and adjust them into streets.

Moving buildings and taking cars off the streets are impractical methods to make streets in America pedestrian-friendly, but it is possible to restrict automobile traffic to certain areas or specific hours of the day. For instance, delivery trucks can only be present within a three or four hour time frame, so it would not be too much of an intrusion to pedestrian movement. Traffic calming techniques, such as narrow roads, slow speeds, raised or brightly painted crosswalks, make streets safer and appealing for people. Traffic calming does not ban cars from roads, but is meant to reduce speeding and promote a walkable atmosphere. Regulations, including banning right turns on lanes and gradually increasing pedestrian spaces, work to motivate cars to drive slower and also allow drivers to observe pedestrian spaces as they are driving.

Good public transit can establish street vitality, but it is important to recognize that transit does not automatically bring people. Streets must have good variety of uses to accommodate diverse needs, so different types of people can be in the same space at the same time. Small shops, outdoor cafes, vendors, consistent tree plantings, also add to pedestrian street life. Door entrances should be close to each other and windows should be transparent. Open spaces surrounded by buildings are common throughout Europe and can be applied in America.

If budget is not an issue, original designs of street furniture, architecture, and tree plantings gives the street a unique flavor. Different materi-

als spice up the surface of buildings and the ground, so they should be in good quality and durable for long-term use. The addition of special features, such as the four different types of lighting on Paseo de Gracia, adds to street aesthetic and interest. Methods to reduce environmental impacts also allow the street to not just only be pedestrian-friendly, but environmentally-friendly too.

It would be awesome to walk down a street in America that looks like Stroget or The Ramblas, but American streets don't work that way. Fortunately, streets in America can be designed similarly to streets in Europe; learning to adapt strategies from Europe is one way to make streets more pedestrian-friendly, enjoyable, and comfortable. The initiative to do so exists in America, despite the challenges and objections against it.

Market Street in San Francisco, was formerly a good, walkable street and many are attempting to bring the street back to life. This site has potential to be pedestrian-friendly and, rather than utilizing traditional methods, why not implement European street design strategies? Market Street can be the ideal prototype for pedestrian-friendly streets in America and one of the firsts to incorporate street ideas from Europe. It does not have to be the next Stroget, but it can be better as long as we try.

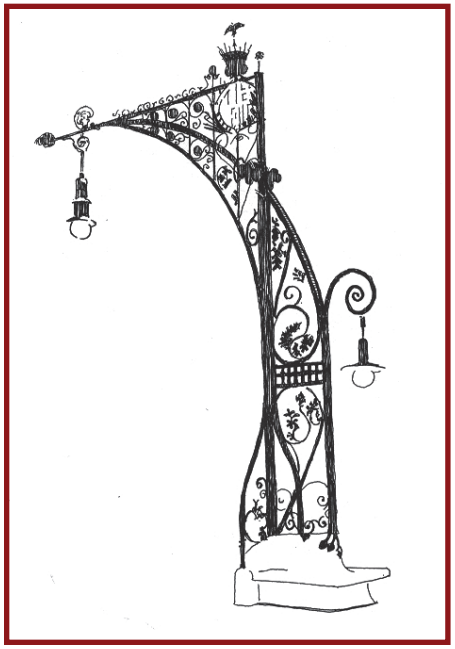


Figure 7.7 Sketch of lamp detail on Paseo de Gracia in Barcelona, Spain.

"Many people, it seems have **returned from Barcelona,** Sydney, Buenos Aires, or Savannah **fired up** by what they've seen and wanting to do something like it at home. Historic preservation and sidewalk cafes, tapas bars and Irish pubs, bicycle lanes and farmers' makrets all owe some of their popularity to **inspiration from abroad**."

- Jay Walljasper

Adapt Strategies to Site

X. SITE ANALYSIS OF MARKET STREET

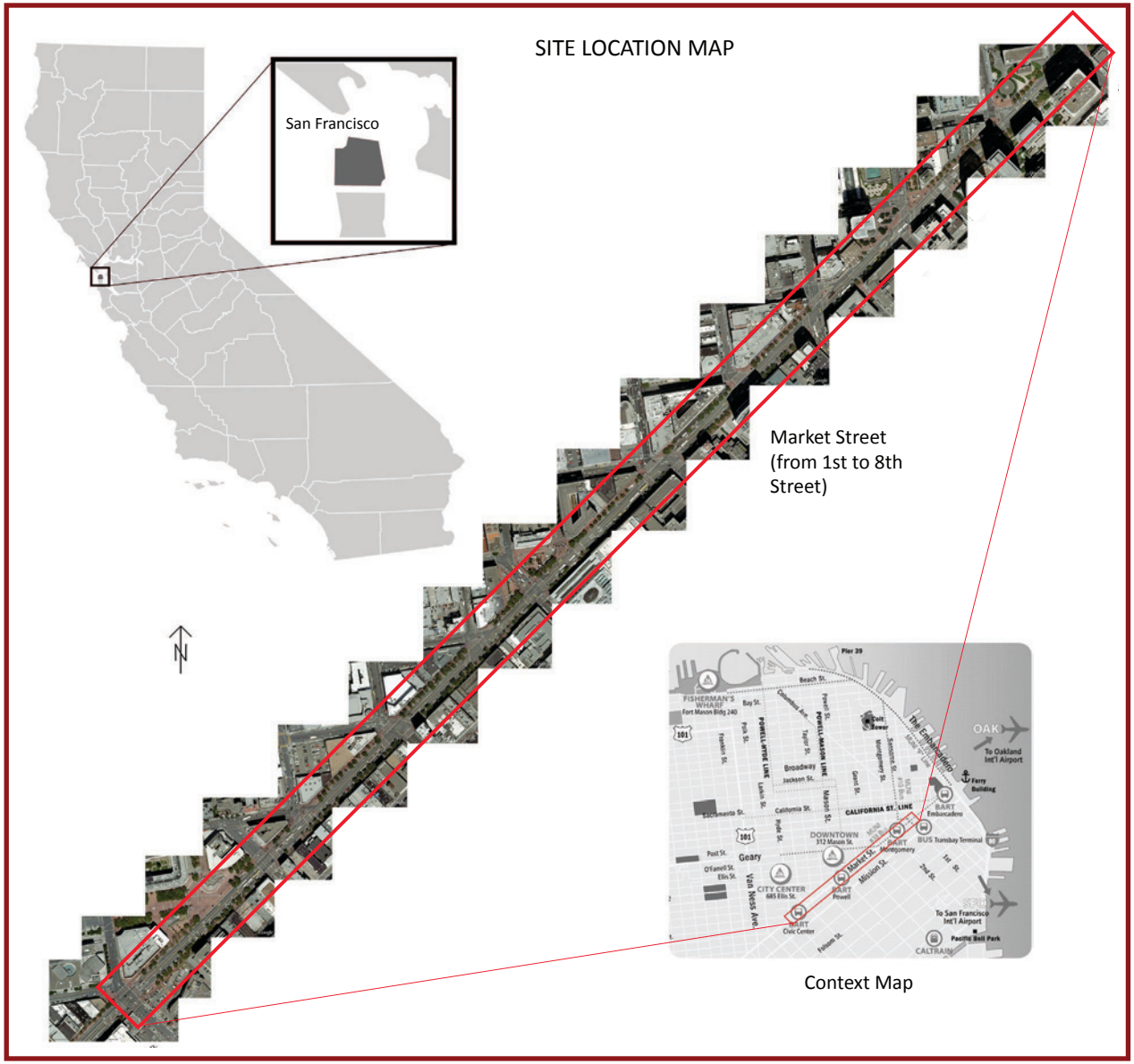


Figure 8.1 Location and context map of Market Street.

LOOKING BACK IN TIME

Similar to most major cities, Market Street is located in the heart of San Francisco, signifying the city's self-image and functionality since the 1850s. It formerly symbolized the liveliness, friendless, and America's hope for the future. But change was inevitable. Ripped apart and reconstructed over and over, the sections or the entire street was repeatedly perished and resurrected throughout the 20th century due to natural disasters and other various causes. (Jacobs, 1993; Carlsson, 2009)

The big construction of the Bay Area Rapid Transit (BART) system in 1967 dug up the entire length of Market in order for people to use and enjoy the tunnels and underground stations today. Trenches reaching several floors below ground was required for this establishment, so in the 1970s, it was typical to see blocks of Market Street filled with bulldozers, welders, cranes, cement mixers, dump trucks, fences, piles of dirt, gravel, steel rails, railroad ties, tractors, and workers with hard hats. The BART system opened by 1972, but the MUNI subway tunnel took longer,

Figure 8.2 A 1945 historic photo of Market Street and 3rd Street.

needing 8 more years of construction before its grand opening. During construction, the sight was messy and chaotic, which literally drove people away, weakening Market Street's status as an important place for working-class shopping. The two projects of producing public transportation were unappealing to the people of San Francisco. The sad irony is that while planners hoped to bring more accessible transit for long-distant travelers on Market

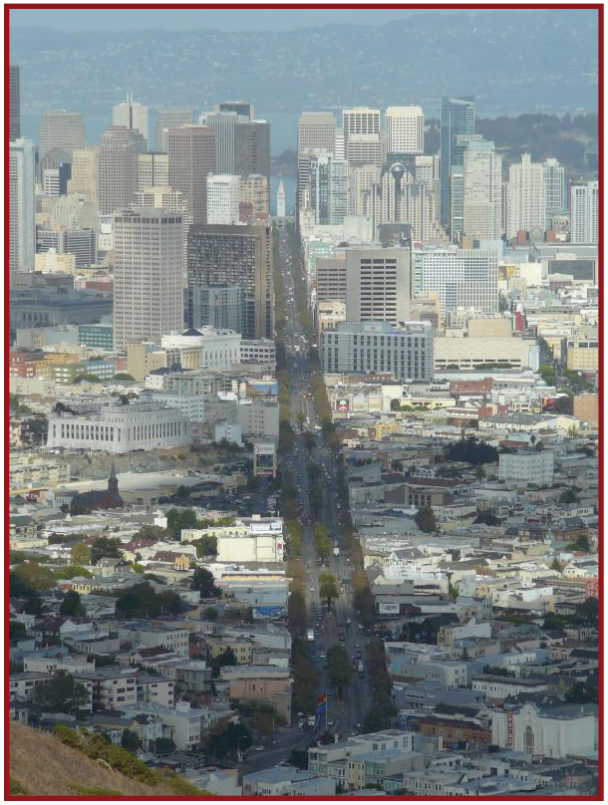
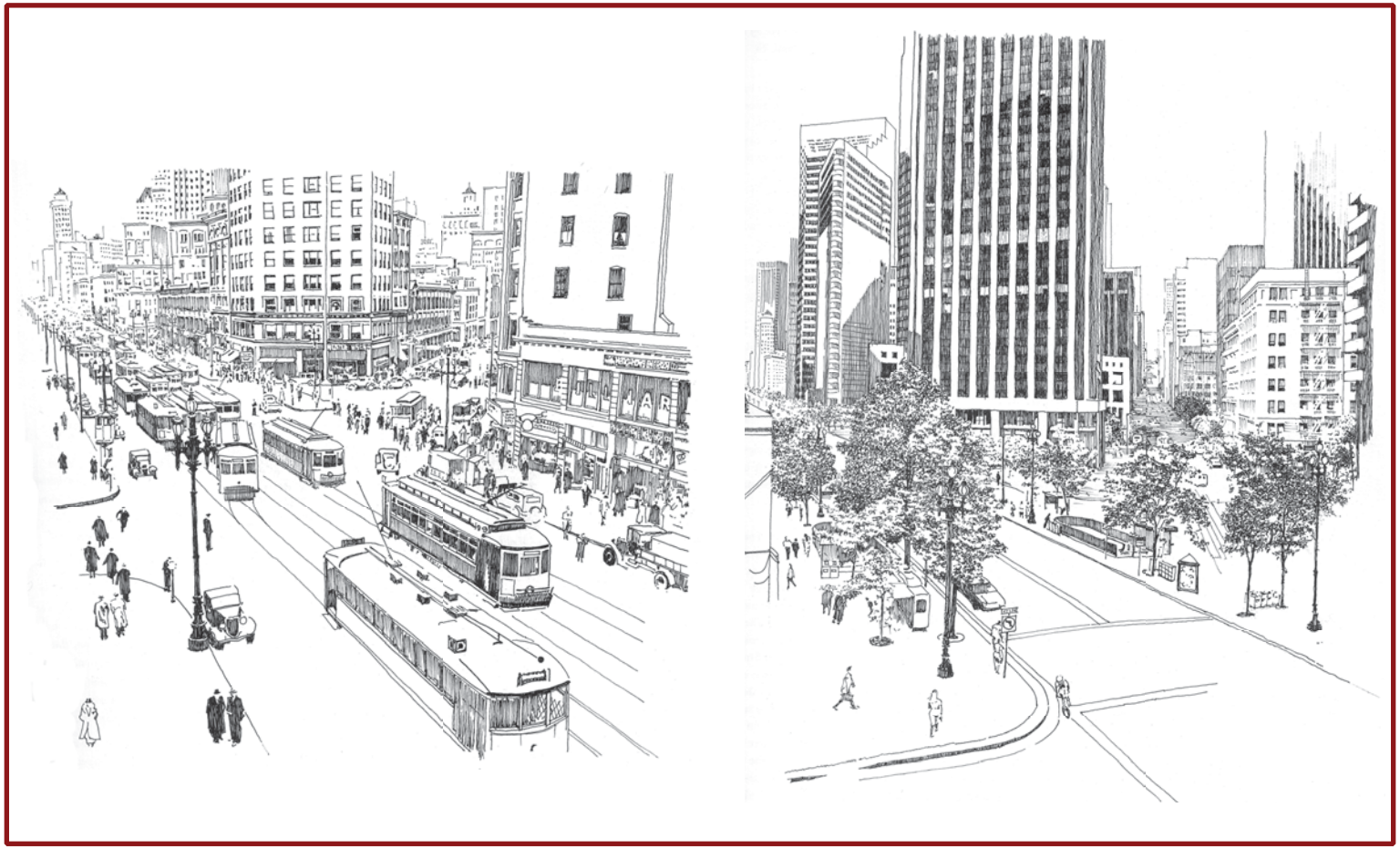


Figure 8.3 Market Street shown from a bird's eye perspective.

Street, they discouraged people who work, visit, and walk there daily from appreciating the street. No longer a significant retail district, Market Street currently struggles to achieve the fame it once had. (Carlsson, 2009)

The current administration originally had glorious plans for a pedestrian-friendly boulevard full of plazas and parks, but convinced of the MUNI system's success, they rededicated the plan to public transit instead. This decision weakened the significance Market Street previously embraced, motivating planners of San Francisco to reevaluate the reasons for its downfall. (Carlsson, 2009)

In 1979, Mayor Dianne Feinstein officially declared to revitalize Market Street. The underground light rail system faced new problems: it was unable to handle the crush of riders, since the number of workers increased in the larger financial district. By 1988, Market Street was transformed again. Streetcar stops in mid-street were implemented and sidewalks and crosswalks were given a facelift. Streetcars strengthened the major existing destinations, such as major stores and movie houses. A dedicated bike lane was squeezed in the plan, but the city's installation of the "historic" F-line streetcars and desire to make Market Street a prominent arterial for many bus routes overrode that suggestion. (Jacobs, 1993, Carlsson, 2009)



1937 **1992**

Figure 8.4 Sketches of Market Street showing the street in different angles.

Figure 8.5 Stores along the sidewalk are appealing, but only in certain blocks.

There are just as many bicyclists as private automobiles travelling down Market Street. Bicyclists strive to be an equal, valuable member within the realm of San Francisco's transportation systems and many aspire to change the current inconsistency of bike lanes on the street. (Carlsson, 2009) But bike lanes are just one of the various issues with Market Street.

PROBLEMS WITH MARKET

Market Street is filled with public spaces, but pedestrians don't use them. Social politics and the uncertainty of the current economy leave little room to take a casual, leisure stroll down the street. (Carlsson, 2009)

The street itself has many problems. It is congested, hazardous, and poorly maintained. The sidewalks are too wide and tree-lined for people who don't have time to enjoy the space. Further the "homeless, hungry, and discarded population" often occupies these public spaces, diverting present-day visitors from using them. In its past state, Market Street welcomed all types of visitors, from rich to poor and residents to tourists. Yet, a lot has changed since then. (Jacobs, 1993; Carlsson, 2009)

Because of its spaciousness, Market Street is used for marches, parades, protests, and other large social events. But daily use of the street is minimal, with the exception of those who work and live nearby.

The pace of the automobile used to match the pedestrian, with regular stops, drop offs, and

Figure 8.6 (top) The photo shoes the wide brick paved sidewalks with high canopies of London Plane trees. Figure 8.7 (bottom) Traffic lanes on Market Street are wide and worn out.

pickup of people. However, the double set of transit lines and streetcars became the dominant, physical features, which currently set the pace and scale on the street. The succession of stores, windows, doors, and signs were the pedestrian experience on Market; they were busy and eye-catching, but now commercial office buildings with large entrance lobbies and private spaces replaced this former atmosphere with less interesting features. (Jacobs, 1993)

Views were an interesting characteristic of the street. Stone, stucco, or tiled buildings formerly sat on the edges individual windows and individual blinds. Today, anonymous patterns, usually in vertical or horizontal bands, make it difficult to perceive individual floors. (Jacobs, 1993)

Market Street lacks interest and individuality. It is not a place to talk, sit, or gather. More importantly, it is not a walkable or a pedestrian-friendly street.

SUBJECTIVE OBSERVATIONS

I drove to Market Street the first time in late February of this year and had great difficulty knowing where to go. And I am sure many drivers would agree as well. Market Street diagonally slices a grid of streets, creating awkward triangular blocks with sharp edges and making it difficult to navigate the one-way streets adjacent to Market. Because of the strange orientation of angles, I noticed some drivers at intersections were confused at which stoplights or next roadways were theirs, so lots of impatient honking added to the background noise. The no right-turn signs were also frustrating and their presence with various other lettered signs created an overwhelming scene for me; how can a driver be expected to read the tiny words without the need to slow down traffic? Parking is everywhere, but a driver would need to circle around to find the precise location of the underground lots.

Even though the layout of Market Street is consistent in all blocks, there is no consistency of pedestrian users in each block. From 1st to 8th Streets,

Figure 8.8 (right) Blocks between 4th and 5th streets are the busiest. Figure 8.9 (left) Blocks between 6th to 8th streets are run-down and empty.

the busiest block would have to be between 4th and 5th streets. In this block, a Forever 21 store, a free trolley terminal, the Powell BART station, and an open space for entertainment and vendors directly faces the San Francisco Westfield mall. This is the place where the liveliness and crowdedness occurs.

In contrast, the blocks between 6th and 8th streets are barely inhabited with pedestrians. And there is good reason for it. Many of the stores are run-down, old, closed, or out of business. Further, the stores themselves are not welcoming to visitors or visually appealing. This abrupt transition in this half of Market can be significantly improved with a few European touches here and there.

Existing Land Use Map on Market Street, San Francisco

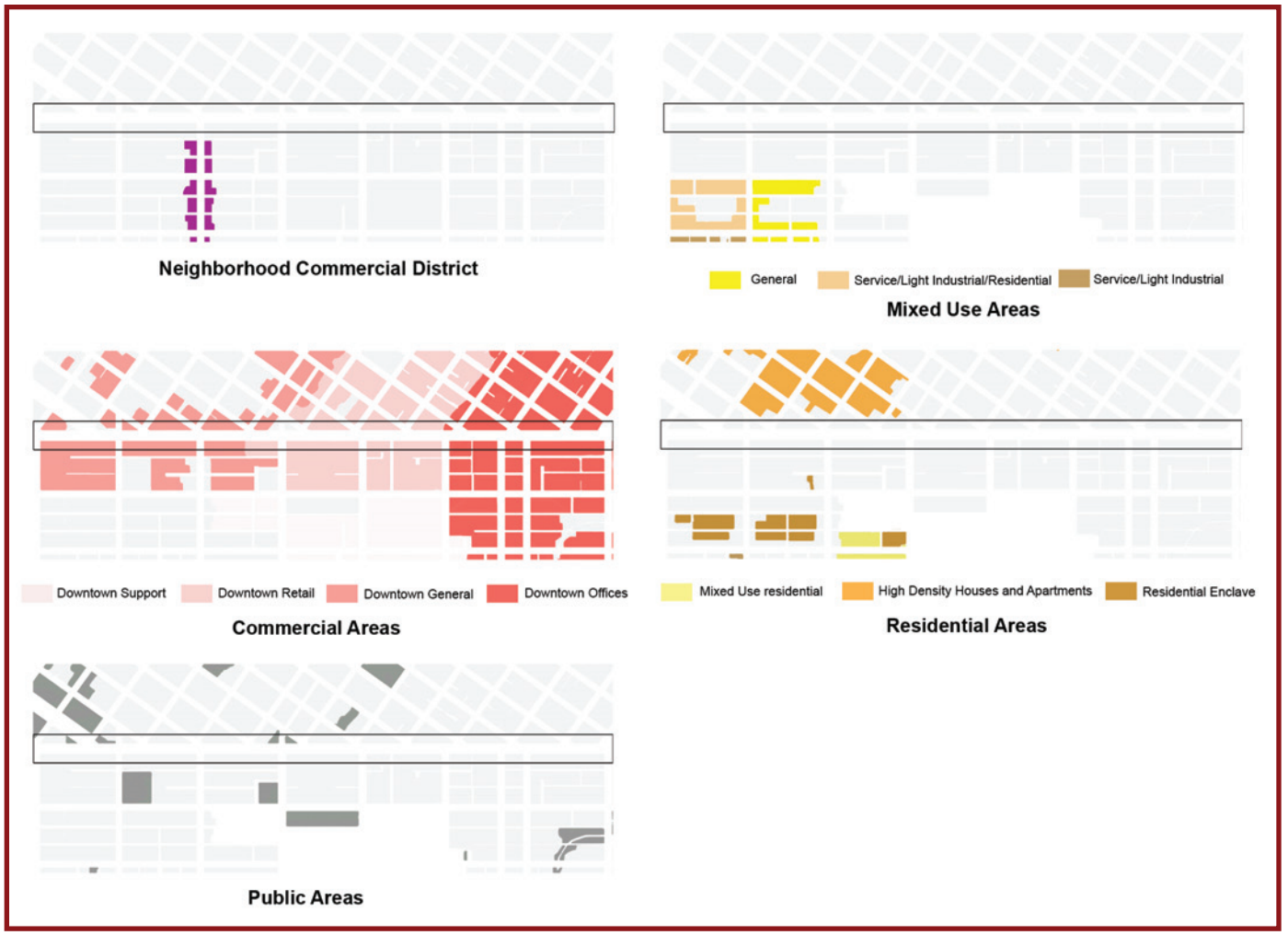
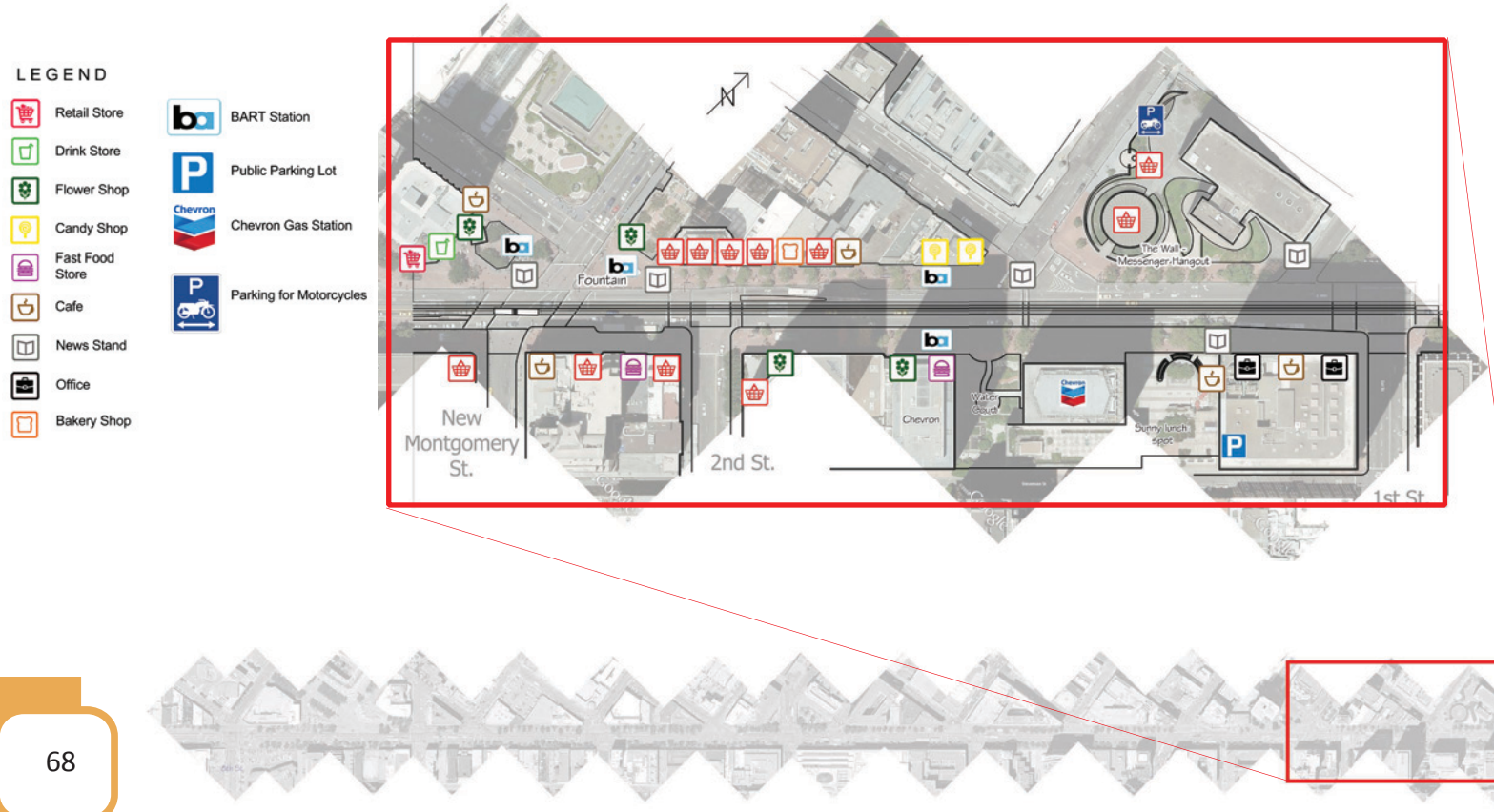


Figure 8.10
This land use map shows there is a dominant-number of retail stores from 1st to 8th street, followed by residential areas. Market Street has a variety of mixed uses, but people do not take advantage of the space.

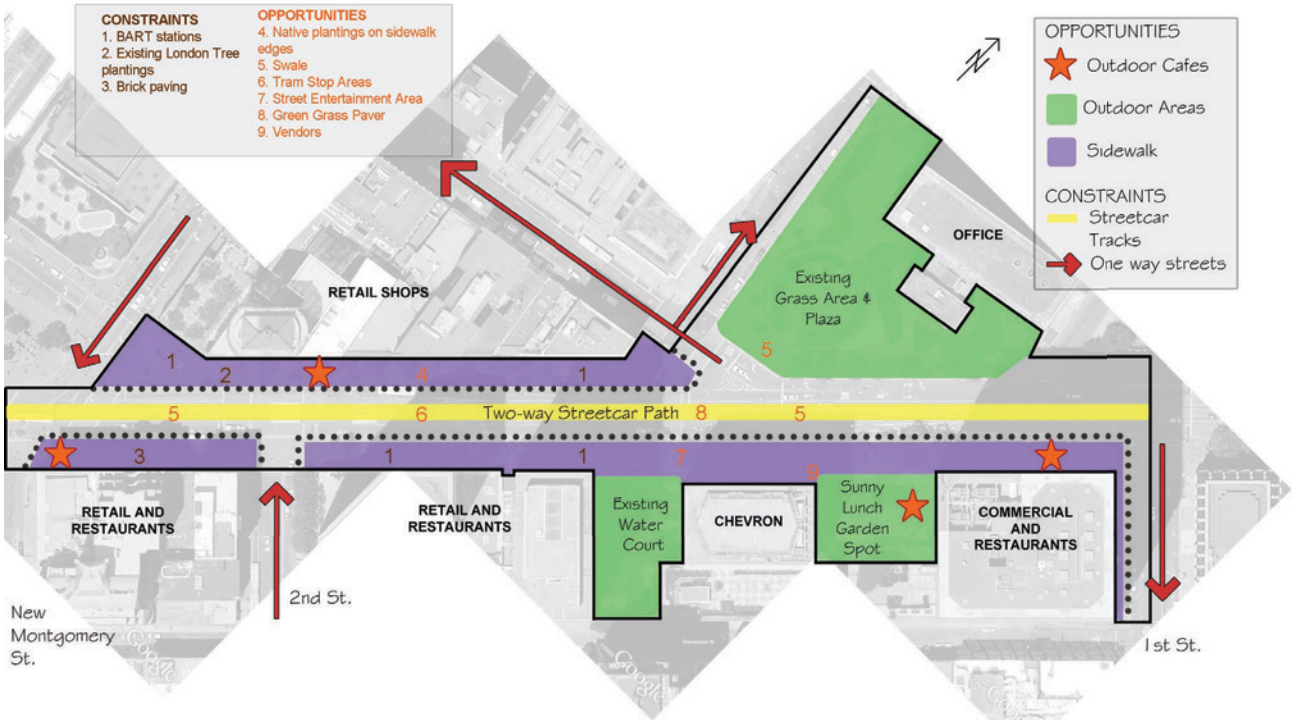
Many retail shops dominate this space, including clothing stores, flower boutiques, news stands, pharmacy, and candy shops. Fast food restaurants and numerous outdoor cafes are almost in every block.

A large plaza, water court, and garden area make this area friendly for outdoor gathering during lunch breaks. This section of Market Street embraces the diversity of activities one could possibly do here: sitting, observing, walking, talking, and shopping.

Specific Site Inventory Map (From 1st to New Montgomery)



Opportunities and Constraints Map



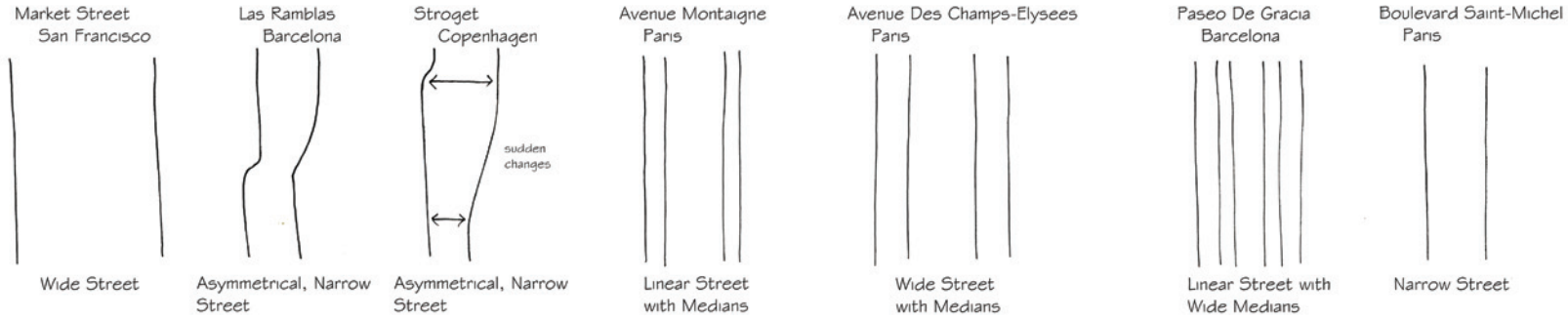
The streetcar railroads and one-way traffic roads adjacent to Market are considered constraints because this layout has existed for many years and it would be impractical to move or change them, considering the cost would be enormous.

Even with several constraints, there are potential opportunities through this section of Market. Sidewalks can be given a new facelift, cafes could be outdoors, and existing outdoor spaces can be enhaced. Even the surface about railroad tracks do not have to be gray and concrete.

XI. DESIGN

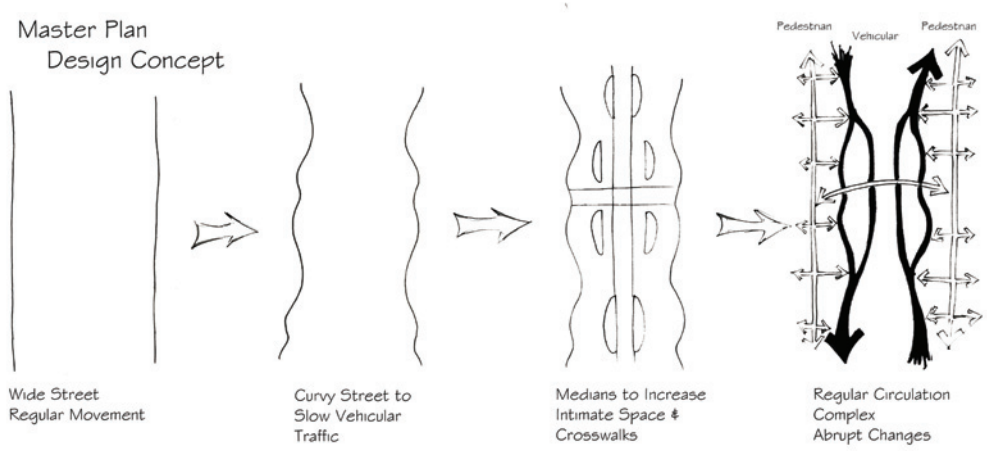
DESIGN DEVELOPMENT

Widths and Shape Comparisons of Streets

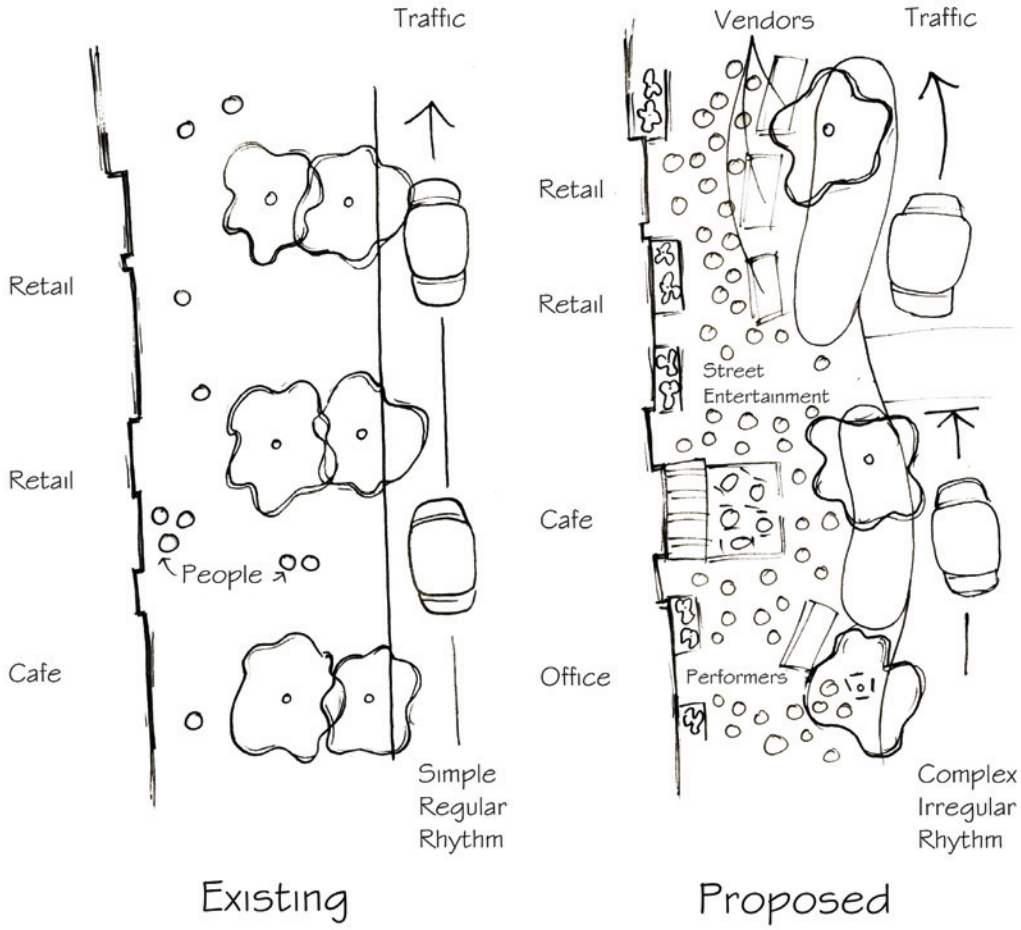


The hand-drawn sketches of street widths reveal what street shapes work and what does not: Market Street in San Francisco and Avenue Des Champs-Elysess in Paris have streets too wide for pedestrians to feel comfortable and safe in. On the other hand, The Ramblas, Stroget, and the rest are narrower, which can either be symmetrical or asymmetrical (curved).

The sketch on the right shows the developmental process of design. From a wide street to a curved one, this forces cars to slow down, but not cut traffic lanes at the same. As a result, the same number of cars can get through and pedestrians can fee safe crossing the street. Medians in the center can have plantings or other aesthetic features.

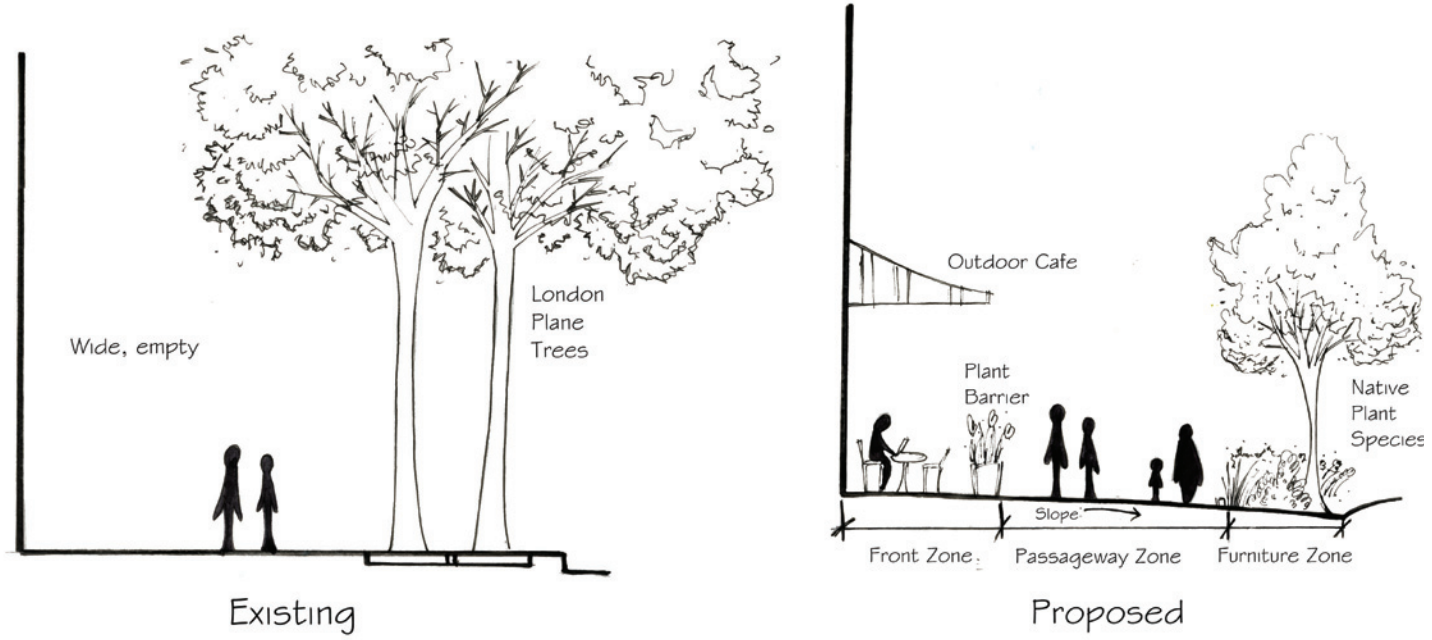


Existing and Proposed Sidewalk (Plan)



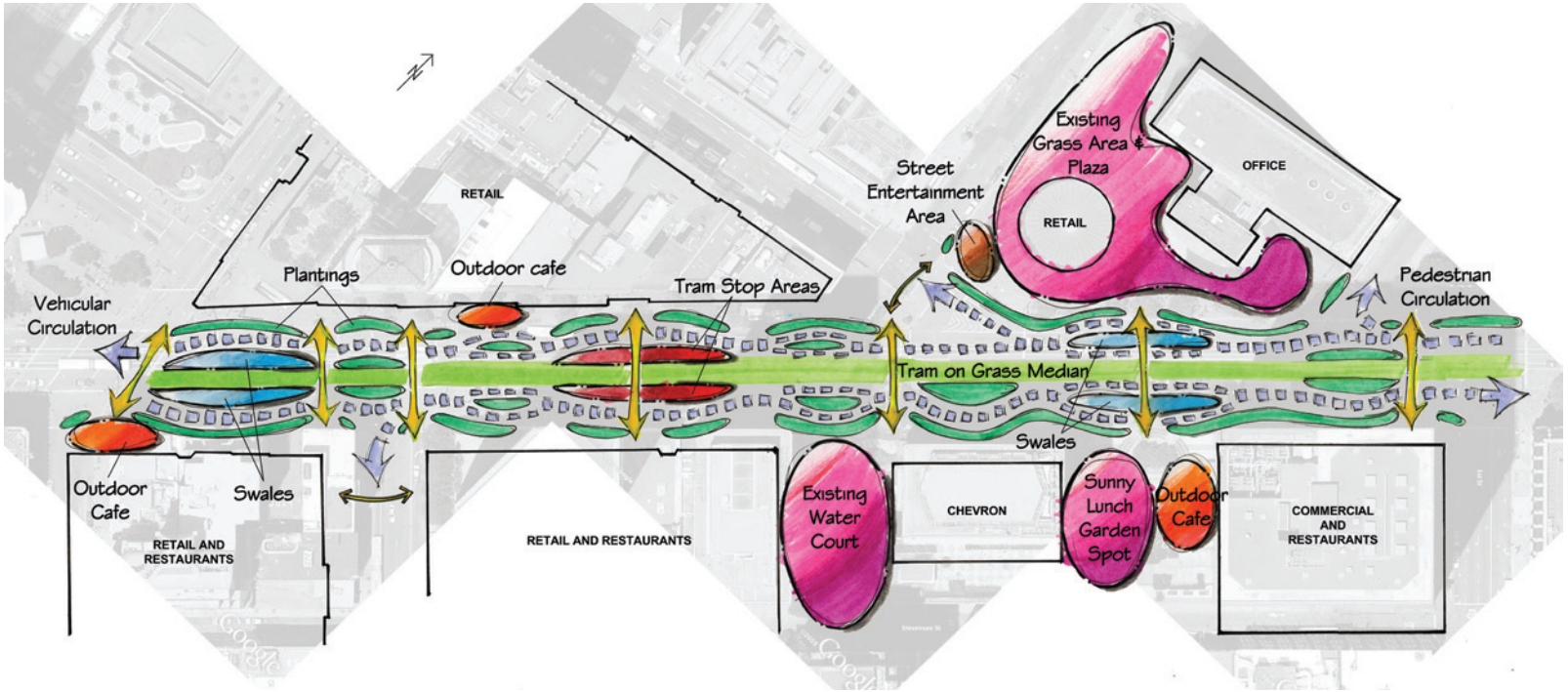
This graphic is meant to conceptually display the current activity on Market Street and the proposed activity that would be in the final design. In the existing sketch, sidewalks are wide, people are scarce, and car traffic is smooth and regular. The proposed sketch incorporates European design strategies, where sidewalks are narrower and street elements, such as vendors, outdoor cafes, vegetated communities and aesthetic decorations, are added. Further, the sidewalk is curvy, making traffic go at a irregular and slow pace. There are pedestrian crosswalks in the middle of the road every so often, so traffic must yield and stop for people to cross.

Existing and Proposed Sidewalk (Section)



These sections are an extension from the previous graphic plans above. The left image illustrates the existing layout of the sidewalk, revealing the spacious, roomy atmosphere even with two tall London Plane trees. The right image shows a proposed sidewalk: there would be a zone in front of cafes dedicated for outdoor seating, a zone for pedestrian movement, and, if there is space left, a zone for native vegetation plantings. This setup is typical in European streets, where outdoor cafes are placed outside of the building and plantings are on the edge of the sidewalk, leaving room for pedestrian movement in the center. Overall, a vibrant, more walkable environment is created with added street elements.

CONCEPTUAL DESIGN (Between 1st and New Montgomery)

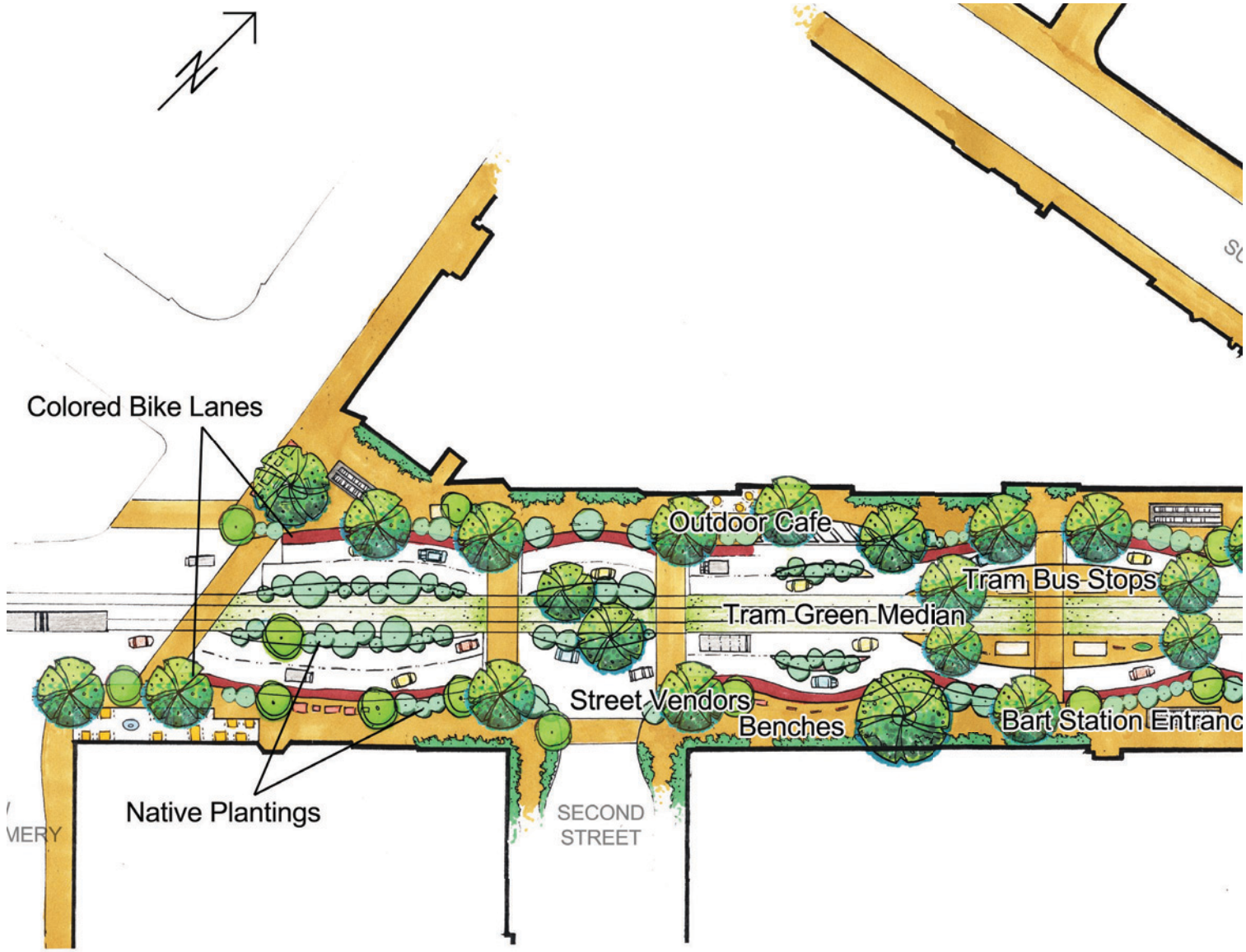


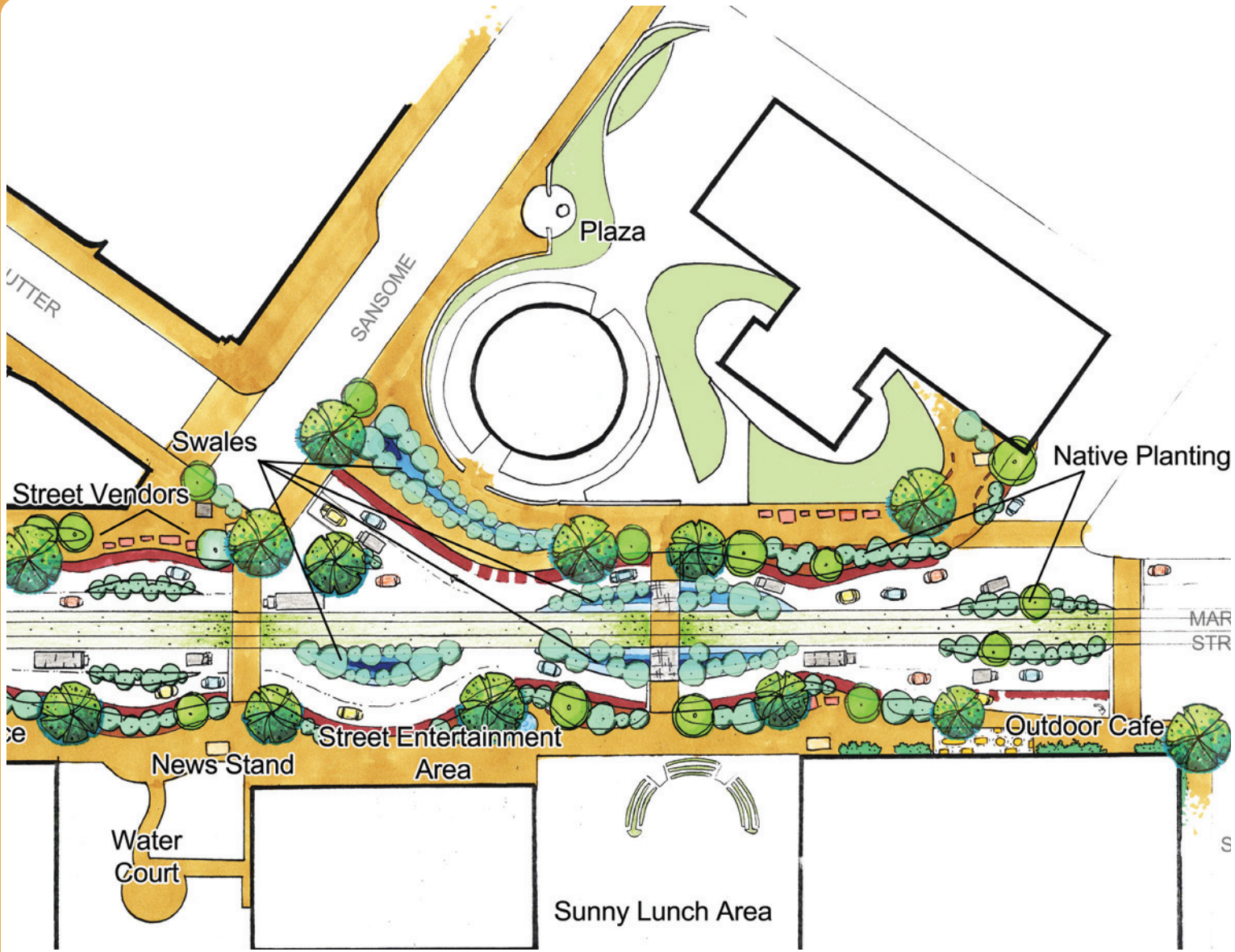
The image above displays a conceptual sketch of the final design. To slow down cars, the sidewalk continuously curves in and out, creating a wave-like movement for both cars and pedestrians. This strategy is not exactly European, but it is derived from irregular, asymmetrical form of streets. Overall, both sidewalks are symmetrical, which keeps the same momentum for both sides.

Cars are constantly in stop-and-go speed, considering how many crosswalks (as shown in yellow arrows) are present to accommodate people crossing. At least one outdoor cafes in every block allows a consistent flow of street elements on Market Street.

Native plantings and a green grass median in between the streetcar tracks are possible.

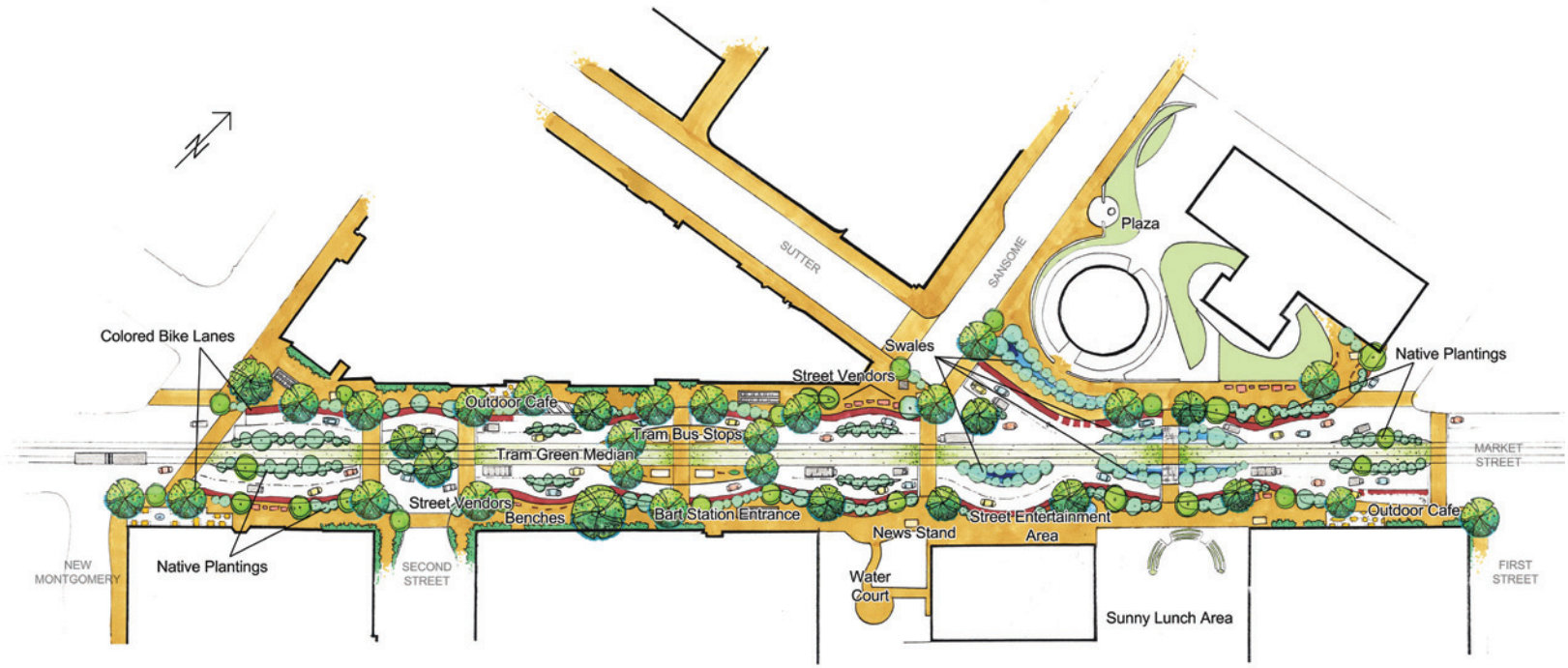
PROPOSED DESIGN OF MARKET STREET (Enlarged View)




Plaza
SANSOME
Swales
Native Planting
Street Vendors
Street Entertainment Area
News Stand
Outdoor Cafe
Water Court
Sunny Lunch Area

Proposed Goals

NOT TO SCALE



1. SAFE

- Wave-like sidewalk and lowered speed limit motivate cars to slow down
- Crosswalks, with lane setbacks, at almost every twenty feet allow comfortable access to the other side
- Colored bike lanes are visible for cars

2. INTIMATE EXPERIENCE

- Sidewalk is narrow and filled with various street activity
- Dense vegetation creates shade and appeal
- Medians along the center road allow drivers to feel surrounded

3. ACTIVE

- Street entertainment, vendors, news stands, outdoor cafes all combine to produce street vitality
- Bike lanes are consistent throughout all blocks
- Transit stops are easily accessible with designated areas

4. DECREASE ENVIRONMENTAL EFFECTS

- Swale demonstrations work to collect stormwater drainage on Market Street
- Choice of native plant species for plantings
- Use of recycled materials for street furniture and other materials

Explanation of Proposed Design

While this design is meant to show how European street design strategies are adapted, Market Street continues to display creativity and originality of street design. Four goals are established in the final plan: the creation of a safe atmosphere (for pedestrians), the experience of an intimate sensation, the production of pedestrian activity, and the reduction of urban environmental effects. In some way or form, these goals reflect the general ideas of European street design techniques.

To be more specific, the travel of private cars becomes a new issue, considering how the newly installed green grass pavers on the streetcar tracks block some vehicular passage from crossing. Thus, cars desiring to go from South to North between 1st and New Montgomery cannot do so until the next block. Once a large intersection opens up, where streets on all four sides are opened, cars are welcomed to cross over to the other side. If possible, an alternative design would be to split the green grass pavers in certain areas of the street so cars could get from South to North. The fact that streets adjacent to Market Street are one way makes travelling a struggle because one mistake of turning could lead to at least an additional minute of car time to get to the actual destination. This is the original layout of Market Street and should not be altered, despite how bothersome it can be. Though, it is less difficult for drivers who want to travel from North to South since they can either turn right or go straight on New Montgomery or the next block through Market Street.

New streetcar stops for both directions are located on the outer edge of the tracks. They reside in central median spaces, where it is easy for people to cross through since the two traffic lanes merge into one lane for safe pedestrian crossing. Cars are slowed down and people feel much comfortable crossing to the other side in a short distance than a long one. Further, this might allow other people to consider taking the streetcar transit because stops no longer sit in odd places of the street; there were some issues that former stops would get crowded, so the median is wide enough to accommodate crowds and a great number of people. The

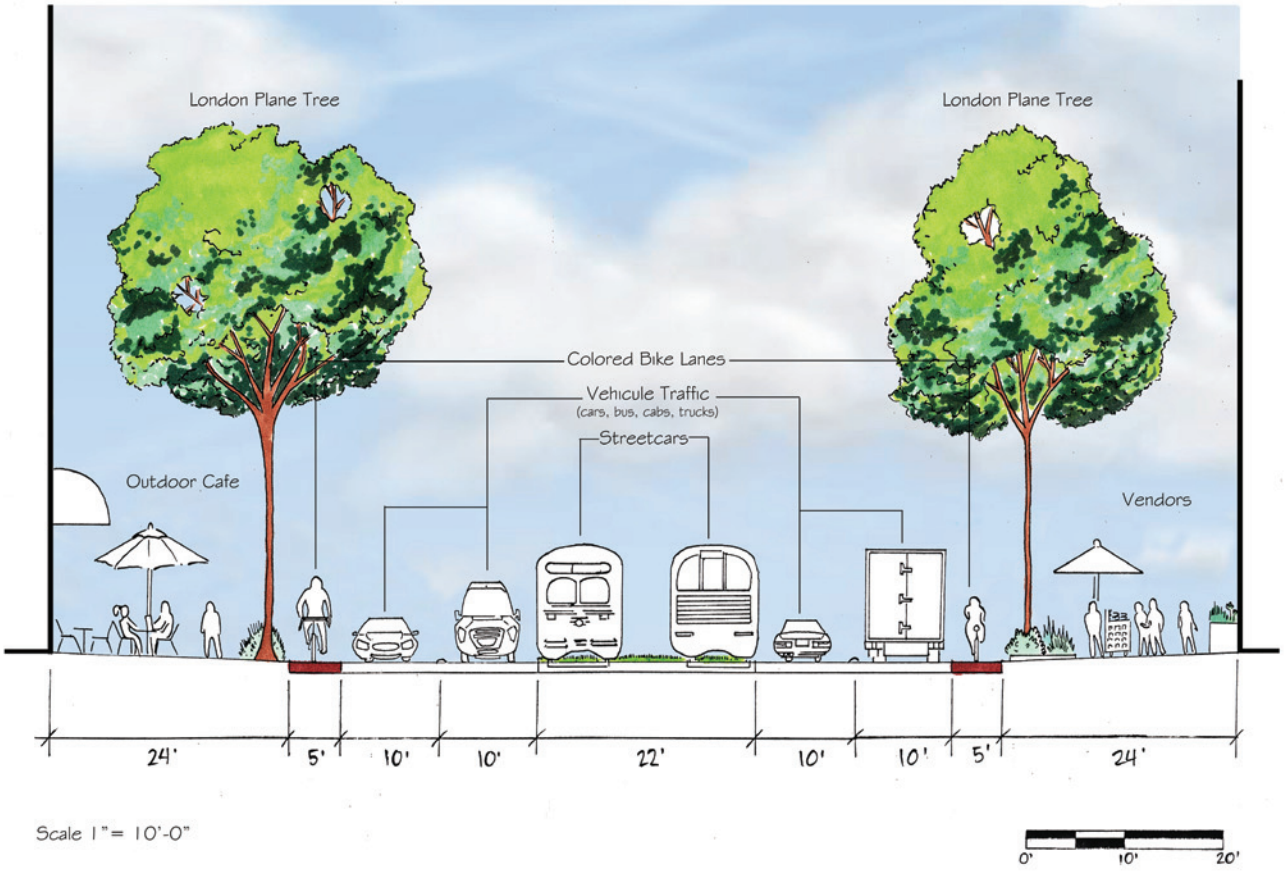
streetcar medians are not boring either, because each is shaped like a half-elliptical form and native plantings and benches fill in some empty spaces. Without considering budget, incorporating intricate details throughout street paving, furniture, and other specific elements would definitely enlighten the place, creating much interest and wonderment for both visitors and locals.

On either side, there are zones that accommodate at least two or three buses, which take up some sidewalk space, for people to get on or get out. The zones do not interrupt traffic flow, but they attempt to slow traffic down when buses want to get into the space or merge out of it. Further, delivery trucks can only come at loading zone spots during specific times of the day, such as 3 am to 6 am, so they would not obstruct traffic flow during rush hour or the rest of the day. Vehicles constantly merge into one lane for pedestrian crosswalks, which does affect traffic flow, but this strategy gives pedestrians a safer experience of crossing from one side to the other, watching one car instead of four all at once.

The entire street is flat, with no distinguishing curbs on sidewalks or medians. People would feel comfortable crossing or walking through the street because it seems like a continuous path all around. Bike lanes are colored with a mahogany red color in an effort to prevent cars from driving over bike lanes and actually designate consistent spaces for bicyclists throughout Market Street. This also creates an improved visibility for drivers to see bike lanes are restricted spaces designed only for bicyclists. Bike lanes then become bicyclists' personal space, just like how center roads are for motor transportation and sidewalks are for pedestrian travel. Every user has their own space and does not conflict with one another, creating balance among all members.

London Plane tree plantings would still exist on Market Street, with the addition of grouping native plantings together. They can be demonstration sites for educational purposes or be an attraction. Hedges are added to store fronts to balance the native plantings

PROPOSED SECTION IN OTHER PARTS OF MARKET STREET

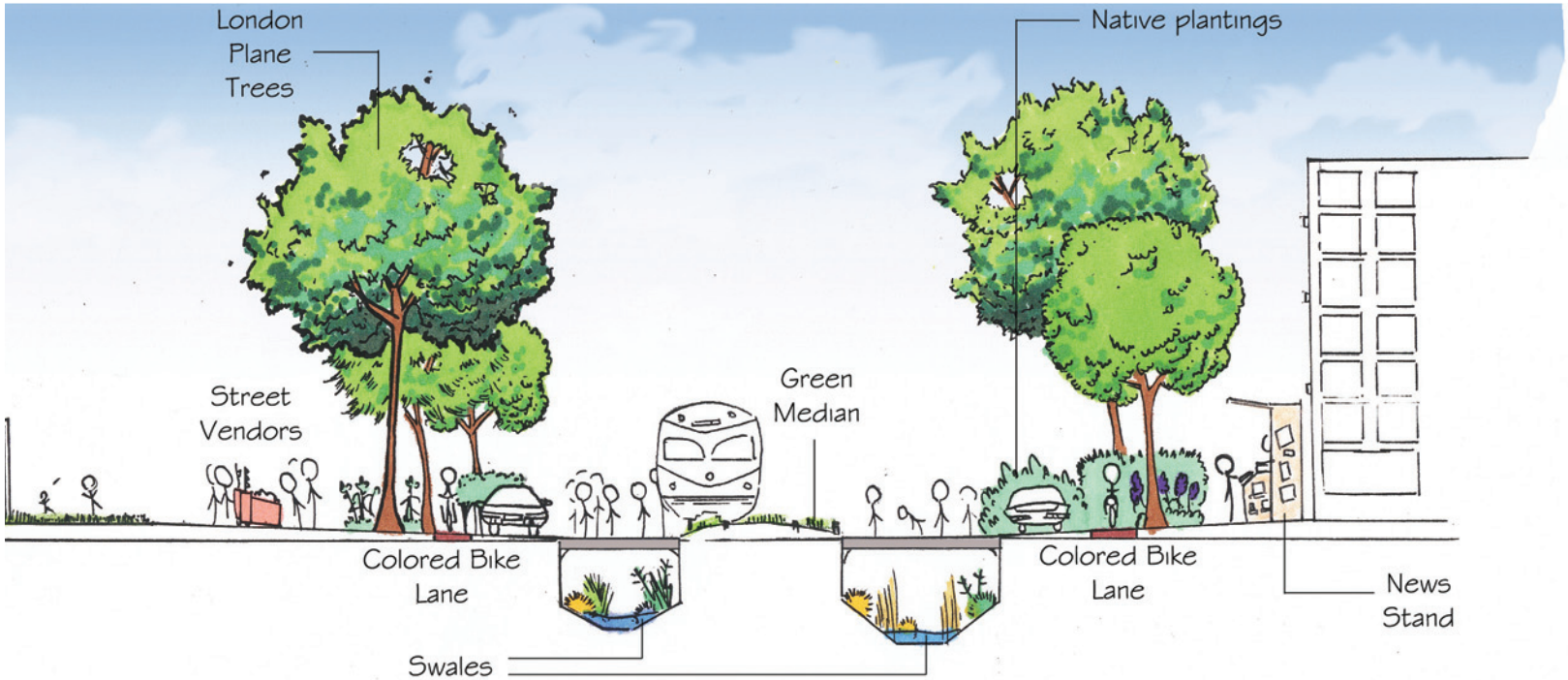


The image on the left illustrates proposed measurements of the new road on Market Street, where streetcars remain located at the center, two vehicular traffic lanes are narrower, bike lanes are established, and sidewalks are smalller.

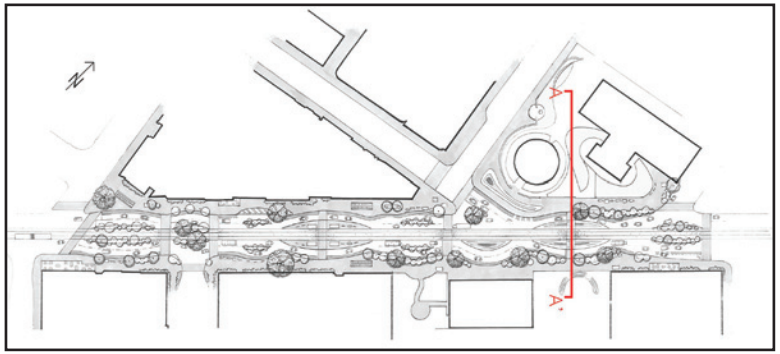
on the other side of the sidewalk. Swales are created in several places on this site to capture storm water drainage, with a culvert that leads to the main San Francisco water system, and be demonstration sites as well. The green grass pavers along the streetcar tracks are permeable and create a grassy surface, which is rare to see on regular, concrete streets.

SECTION A-A'

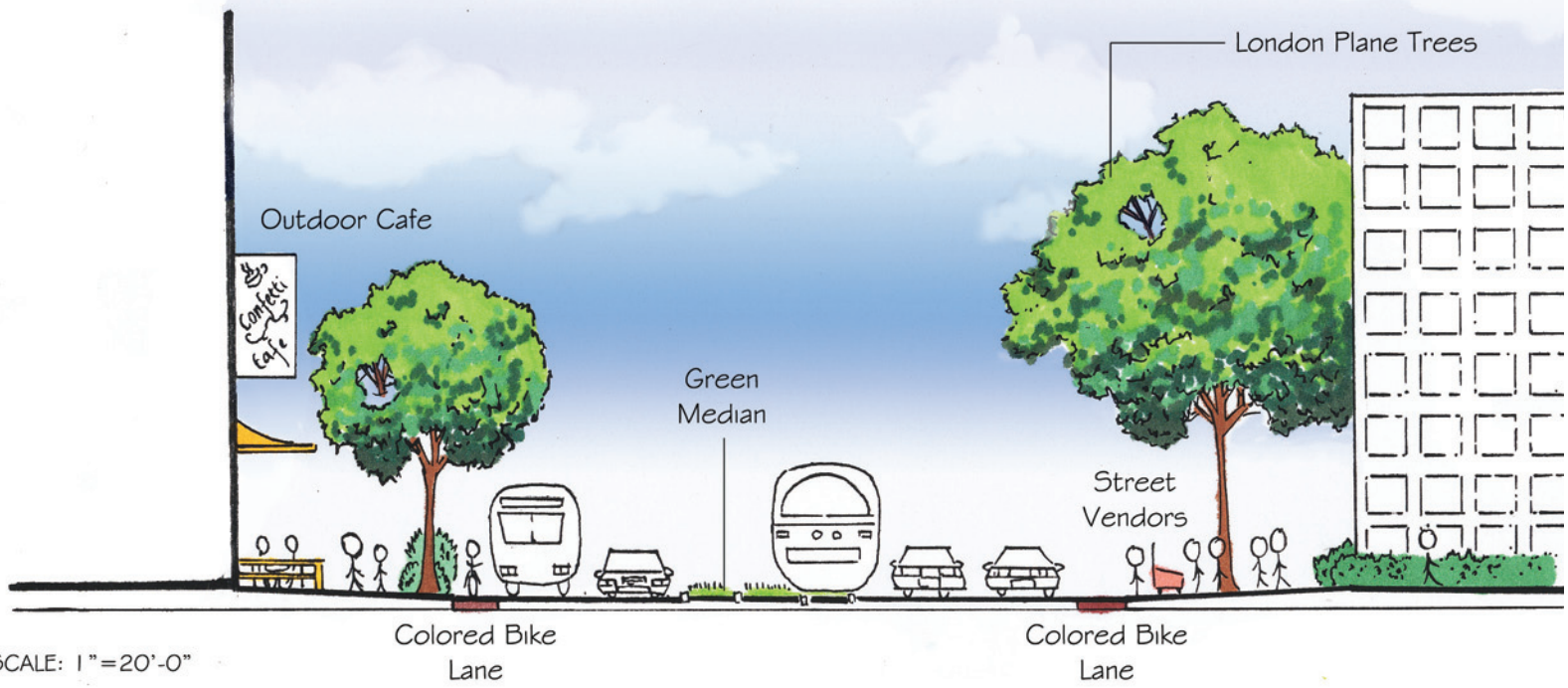
SCALE: 1" =20'-0'



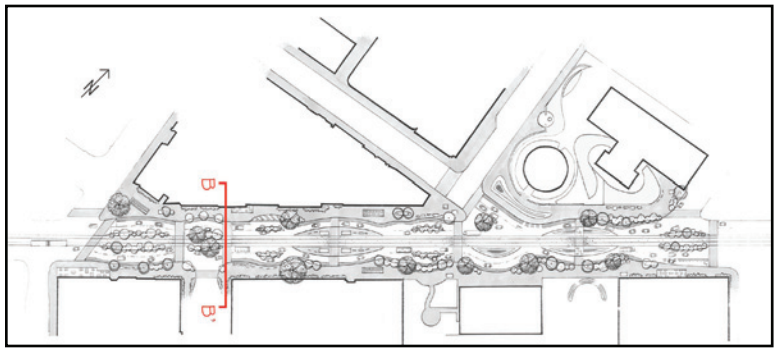
The A-A' section illustrates how the swale would appear like below the pedestrian crosswalk. Street vendors and a couple of news stand occupy the sidewalk, increasing street life and constant pedestrian movement on both sides of the street.



SECTION B-B'



SCALE: 1"=20'-0"



Section B-B' shows a newly designed street with street vendors and outdoor cafes that enhances pedestrian activity. London Plane trees are planted asymmetrically, fitting into spaces with other native plantings.

Perspective looking East from 2nd Street: this illustrates new design ideas on Market Street, including colored bike lanes, a green grass median, native species plantings, and outdoor cafes.

This second perspective shows a view of the sidewalk with native species demonstration area on the sidewalk and road medain, outdoor cafes, and street vendors.

Conclusion

The proposed design of Market Street in San Francisco conceptually turns an idea into reality: it is possible to adapt European design strategies that make successful pedestrian-friendly streets to produce an original version of street design that constructs walkable streets as well. The purpose of this project was to explore why European streets are an inspiration to all and to discover ways to adapt their strategies into America. It also opens the mindset to incorporate design strategies from other countries, even with distinct backgrounds, and combine them in our American landscape. All these European cities started somewhere and are progressing towards a future of streets for people, and America is making small efforts, which is a start.

It is true that many famous cities love to embrace their own identity and uniqueness and to create different landscape attractions, but it is never a disadvantage to borrow ideas from other cities and recreate something bigger and even greater than the original.

Bibliography

Beatley, Timothy. “Green Urbanism: Learning from European Cities.” Washington: Island Press, 2000.

Bosselmann, Peter. “Urban Transforming: Understanding City Design and Form.” Washington: Island Press, 2008.

Carlsson, Chris. “Will We Ever Get Market Street Right?” 23 Mar 2009. SF.STREETBLOGS.ORG. 25 Mar 2010. <http://sf.streetsblog.org/2009/03/23/will-we-ever-get-market-street-right/>

Francis, Mark. “The Making of Democratic Streets.” Public Streets for Public Use. Ed. Anne Vernez Moudon. New York: Van Nostrand Reinhold, 1987.

Gratz, Roberta & Mintz, Norman. “Cities Back from the Edge: New life for Downtown.” New York: John Wiley & Sons, 1998.

Jacobs, Allan B. “Great Streets.” Cambridge: MIT Press, 1993.

Jacobs, Jane. “The Death and Life of Great American Cities.” New York: Penguin Books, 1994.

Marshall, Tim ed. “Transforming Barcelona.” New York: Routledge, 2004.

Mckeever, J. Ross. “What’s New in Urban Development.” Washington: Urban Land Institute, 1969

Pressman, Norman E.P. “The European Experience.” Public Streets for Public Use. Ed. Anne Vernez Moudon. New York: Van Nostrand Reinhold, 1987.

Soderstrom, Mary. “The Walkable City: From Haussmann’s Boulevards to Jane Jacobs’ Streets and Beyond.” Quebec: Vehicule Press, 2008

Walljasper, Jay. “How to Fall in Love with Your Hometown.” Toward the Livable City. Ed. Emilie Buchwald. New York: Milkweed, 2003.