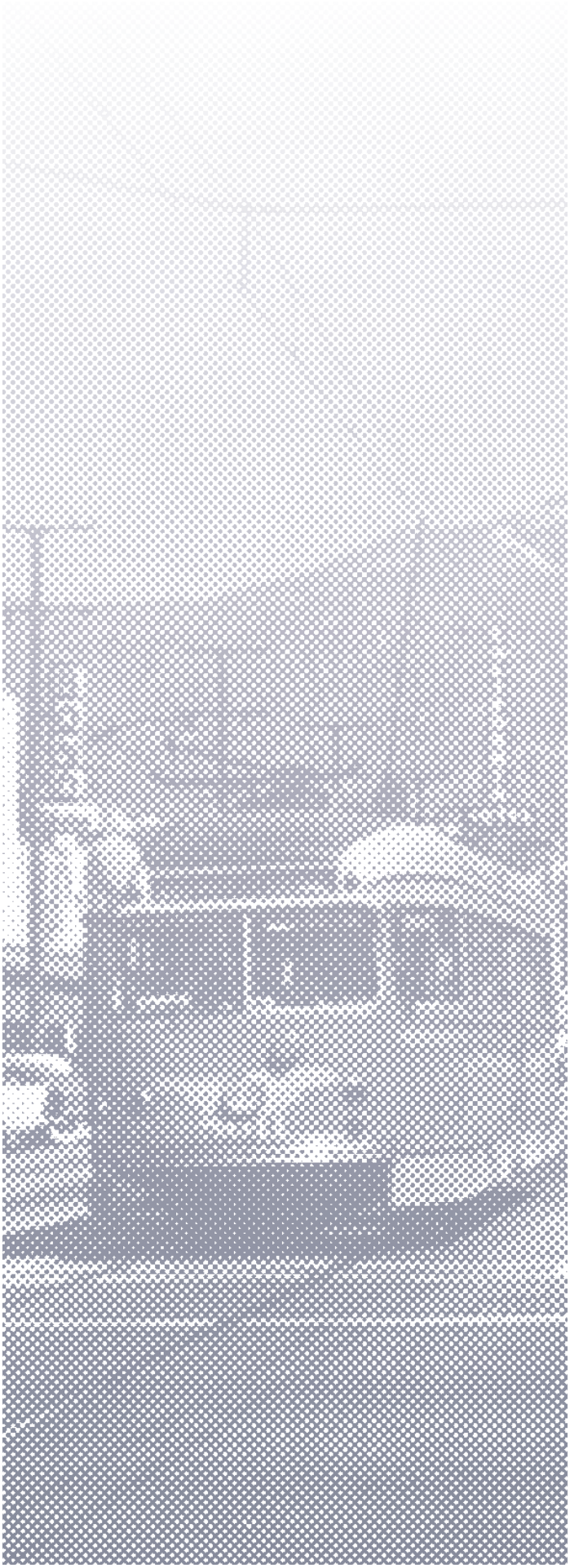

GLENDALE DOWNTOWN MOBILITY STUDY

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Glendale Transportation Performance Measures and Street Typology Report

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DRAFT **June 2006**

Downtown Glendale Mobility Plan

Transportation Performance Measures and Street Typology

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CHAPTER 1. INTRODUCTION AND OVERVIEW

The City of Glendale faces a fundamental challenge, and a remarkable opportunity. Continued reinvestment is required for the ongoing vitality of downtown, the private sector appears more than ready to invest in new residences, office, retail and entertainment venues, and this new investment has the potential to improve Glendale's already high quality of life. However, several major Glendale intersections are already congested with automobile traffic; the freeways that ring downtown already often slow to a crawl; and new development, if it follows the same patterns and same transportation policies as previous development, would seem certain to worsen all of this traffic congestion.

Can Glendale build its way out of traffic congestion? The Circulation Element of Glendale's General Plan, adopted in 1998, answered the question in this way:

The more traditional capital-intensive road-widening projects are becoming less feasible as many crucial arterials have already been widened. Further widening greatly increases both construction and ancillary costs, which generally renders such proposals infeasible within the time frame of this element.

Today, in 2006, the prospects for building our way out of traffic congestion are no better. If Glendale wishes to accommodate major investment in downtown, with no increase in traffic congestion, a new approach will be needed.

The Downtown Mobility Plan aims to meet this challenge. This working paper is intended to open the discussion on what we believe will be three key components of a successful mobility plan for Glendale:

- Performance measures for streets and transit services;
- A new street typology for Glendale
- A rational, practical method for balancing the needs of different modes of transportation, as they compete for limited space on Glendale streets.

It is important to note that this document is the first draft of a working paper, and it has not yet been reviewed with any city agency, Los Angeles MTA Metro or other key stakeholders. Its largest purpose is to start discussion about what performance measures, street types and transportation policies will be needed to allow downtown Glendale to grow, with no increase in traffic congestion. If the overall concepts are met with favorable review, both the overall framework and especially the individual performance measures will need to be adjusted before any standards are finally adopted.

Additionally, this working paper is about evolution, not revolution. It assumes the overall policy goals adopted by the City in the General Plan as a given, with particular attention given to the transportation goals and policies of the Circulation Element. The intention of this paper is to provide tools for implementing those policies, and to suggest practical, financially feasible and incremental steps toward their realization.

CHAPTER 2. EXAMPLES OF SUCCESS

Is it really feasible for Glendale to grow without increasing traffic? A good deal can be learned from the successes – and the failures – of other cities facing a similar predicament. In 2002, one city began their downtown transportation plan with the following description:

> The transportation challenge facing the downtown is to accommodate more people traveling in the future without adding traffic lanes to the existing bridges and roads leading to the downtown. At the same time, there is an expectation to minimize congestion. At first glance the challenge appears enormous. However, this plan presents a strategy that meets the challenge.
>
> In 1997, [our city] recognized that road capacity is finite and that even if more roads were to be built they would soon be congested with more cars. The solution is to decrease the demand for auto trips by providing additional transportation choices, particularly transit. Although the transportation solution may seem simple, the transportation issues are much more complex within the downtown...

For Glendale, the problem is the same. Historically in Glendale, additional development meant increasing congestion, prompting a response of increased capacity, which quickly induced additional traffic and became congested with more cars. Now, the strategy of widening roads has essentially reached its end in Glendale. At rush hour, Caltrans uses metering lights to restrict the flow of traffic from Glendale onto the freeways to *less than the physical capacity* of Glendale's on ramps, because the finite capacity of the freeway to accept additional rush-hour trips has been filled, and further widening of the freeways is infeasible.

Within the greater downtown, there are still places where additional capacity can be added, mostly by removing on street parking and narrowing sidewalks, but this strategy has two drawbacks. For commuters heading home, adding capacity at downtown intersections leading up to the freeway ramps may result in no net improvement in travel time from work to home: widening an upstream bottleneck may simply result in a longer line of cars waiting at the fundamental downtown bottlenecks created by the on-ramp metering lights. Second, attempting to satisfy all demands for road space by removing parking and narrowing sidewalks conflicts seriously with Glendale's goal of creating a more livable downtown, where both existing and new residents can enjoy living, strolling and shopping on foot.

Vancouver's response to downtown growth

In 1991, the City of Vancouver, Canada – whose downtown transportation plan is quoted above – responded to the same problems of downtown growth and congestion with their Central Area Plan. As a deliberate transportation strategy, the plan tremendously increased housing capacity in the downtown area to reduce commuting times and congestion, in what became known as the "living-first strategy". Calling for streets to be the "focal point of public life," the plan called for public realm improvements – wider sidewalks, bike lanes, maintaining curb parking as a buffer – to foster movement on foot. Given Vancouver's cold, wet and windy winters – hardly Southern

California's balmy climate – it was a remarkable ambition.

Other key points of the transportation strategy were summarized in the 1997 Vancouver Transportation Plan as follows:

- The increase in peak period trips to downtown should be accommodated by a major expansion in transit;
- Overall road capacity to the downtown will not be increased above the present level;
- Bicycle access both to and within downtown will be improved by providing...a safe and effective network of routes throughout downtown;…
- Short-term parking will be managed to ensure there is sufficient parking to meet normal demand;...
- The fundamental principle of the plan is to create a sustainable transportation system that will meet the needs of the present without compromising the future.[1]

For the past fifteen years, Vancouver has achieved remarkable success with this strategy. From 1991 to 2002, the number of residents living downtown increased by 62%, to 76,000. The increase in downtown population indeed resulted in reducing the burden on the city's transportation network, as downtown residents live closer to work and within a "complete community, placing residents within walking distance of most destinations". Vancouver officials found this confirmed by the walking and cycling and auto traffic trends: "In 1994, walking and cycling trips made up 20 percent of all daily trips into the downtown and together made up the third-highest used mode behind auto and transit trips. In 1999, walking and cycling trips made up 35 percent of all daily trips and are now the most frequently used mode, followed closely by car and transit trips. At the same time, car trips into downtown remained relatively constant."[2]

Setting maximum parking requirements, combined with improving transit, has resulted in transit carrying the largest share (about 40%) of *commuters* to downtown. Finally, overall, downtown Vancouver is economically successful, and Vancouver has been ranked as the most livable city in the world.

As downtown Vancouver continues to grow rapidly, following the same fundamental transportation strategy, their downtown transportation model[3] finds that with the full implementation of their 2002 Downtown Transportation Plan, congestion will decline while transit ridership continues to increase. Average vehicle speeds will *increase* by 3% from 1996 to 2021, while average transit speeds will increase by 14%. The model result is significant considering that "while the number of trips made into the downtown increases, there is no increase in road capacity and additional facilities are provided for pedestrians and cyclists."

Vancouver is notable for both its downtown residential growth – a deliberate transportation strategy of placing residents near jobs – and the success of its overall transportation strategy. But it is not necessary to look north of the border for other examples of downtown growth with no increase in traffic.

1 City of Vancouver 2002 Downtown Transportation Plan, page 2. Available at: http://www.city.vancouver.bc.ca/dtp/.

2 Ibid.

3 Vancouver uses a regional EMME/2 transportation model, based on the same software as Glendale's EMME/2 software-based traffic model.

Downtown San Francisco

In a rapidly growing San Francisco, downtown transportation policy centered on the realization that together with improving transit, *controlling parking* was the City's most powerful tool for managing congestion – and unlike gas taxes or transit funds, it was a key tool that lay entirely under the City's control.

According to the San Francisco Planning Department, employment in downtown San Francisco doubled between 1968 and 1984, while the number of cars traveling into the downtown stayed the same. City planners recognized that constrained capacity in the regional highway system – and particularly the Bay Bridge – made it impossible to develop a downtown that promoted access by car. Completion of BART and Muni Metro subways and a Downtown Plan that encouraged a compact, walkable, highly dense pattern influence downtown's 500,000 employees to use alternatives to driving.

Parking was carefully controlled. New buildings were built atop existing surface parking lots and most were required to build little or no parking. Instead, the City developed ten public garages arranged in a ring around the far edges of the Financial District and Union Square area, totaling over 11,000 spaces. Parking prices at each of the garages are set to discourage long term commuter parking and to support shorter-term shopping, business and errand trips.

An important part of the strategy is the creation of Transit Preferential Streets. Market Street, the spine of downtown, is the classic example. Bus-only lanes (though imperfectly enforced) give priority to transit. Curb cuts and garage entries are prohibited virtually everywhere along it, reducing the number of auto drivers with a reason to use it; the sidewalks are wide and the adjoining buildings are now required by design standards to provide pedestrian friendly façades.

The lesson here is that cities can change from car-dominated to transit-dominated as they urbanize. The shift can be accomplished by investing in alternative transportation strategies that support a long-term vision. These lessons do not apply only to the biggest cities like Vancouver and San Francisco. Smaller cities have also experienced similar success with similar policies.

Boulder, Colorado: Just Buses

Set in a region dominated by auto commuting, with a population of only 100,000 people, no rail transit in the city, and no control over its main transit provider, Boulder, Colorado, is in many ways similar to Glendale. In 1990, before Boulder changed their transportation policies, transit mode split was the same as Glendale city-wide: 4% of work trips were made by transit and only 1.6% of all trips were on the bus (Glendale has 4% transit mode split city-wide and 6% in the DSP area). By the same token, car ownership in Boulder is virtually identical to that of Glendale city-wide and higher than in the DSP: 50% of Boulder households have 1 car or less, 85% have 2 cars or less (in the DSP area 65% of households have one car or fewer) .

Given its circumstances, Boulder may seem an unlikely candidate for successful traffic reduction. However, due to concerted efforts to invest in alternative mobility strategies, downtown Boulder has grown with little increase in traffic congestion.

The Parking and Transportation Demand Management Toolkit, a companion paper to this document, describes Boulder's initiatives in greater detail. Here, we simply note some key factors that enabled them to succeed, despite the lack of rail transit and despite lacking control over the Denver Regional Transportation District (RTD), the major transit agency in the region. Boulder's rapid downtown growth was offset by major investments in alternative modes of transportation, including:

- **Transportation Demand Management:** Free transit passes for every single downtown employee, paid for by savings on parking construction. This program alone has reduced commuter parking demand by 850 spaces, more than paying for itself, while simultaneously reducing traffic.
- **Parking Policy Reforms:** Removal of minimum parking requirements for all nonresidential uses in the downtown, with only one parking space per unit required for residences (a standard which developers often voluntarily exceed). This policy is necessarily combined with sophisticated management of on-street parking, in both commercial and residential areas, to prevent spillover parking.
- **Local Transit:** A major investment in additional local transit services (the "Hop", "Skip" and "Jump" shuttles, among others), based upon the principle of investing in the most cost-effective mix of transit, demand management measures and increases in parking supply.

As a result, downtown has grown with little increase in traffic congestion. For example, City of Boulder figures find that for the downtown, use of alternative modes increased from 35% in 1993 to 47% in 1997, as a result of the sustained investment. At the same time, sales tax receipts in downtown Boulder during this period have increased by more than 100%.

Los Angeles Metro Rapid Program

As a local example of quickly deployed investment in transit, it is worth noting the success of the Metro Rapid Program. This partnership between the Los Angeles County Metropolitan Transportation Authority (MTA) and the city of Los Angeles Department of Transportation (LADOT) is a marriage of major improvements in street design, to protect the speed and reliability of transit, with investment in frequent service, better buses and less frequent stops.

In basic terms, on the transit provider side (primarily under the MTA's control), the key attributes are: frequent service, headway-based schedules, simple route layouts, less frequent stops, level boarding and alighting, and carefully branded, color-coded buses. On the street design side (primarily under the LADOT's control), the key attributes are: bus signal priority and improved stops (designed to emulate light rail transit stations, with amenities such as bus bulb-outs, better shelters, and real-time arrival displays).

The program is a primary example of how close cooperation between city traffic engineers (the professionals who design streets, set street standards and set measures for the performance of streets) and transit planners (who route and schedule buses) can result in a major increase in the performance of transit service – even when relatively little funding is available, and the prospects for rail transit funding appear distant.

According to the Federal Transit Administration, the result is an express arterial bus service that has reduced passenger travel times by as much as 29%, with ridership increases of nearly 40%. According to the FTA, approximately one third of

the reduction in travel time results from the bus signal priority system, with the majority of the balance attributed to fewer stops and headway-based schedules.[4]

Congestion Pricing

For actually solving or seriously reducing traffic congestion, perhaps the most radical approach is the use of congestion pricing to add a toll to anyone entering downtown by car during the peak. This option is beyond the scope of this working paper. **Congestion pricing** uses prices to balance the limited supply of roadway space with demand. In a wide variety of circumstances, in both the United States and abroad, congestion pricing has proven its ability to quickly reduce or eliminate traffic congestion. Cities abroad that are successfully using congestion pricing include London; Stockholm; Oslo, Bergen and Trondheim in Norway; and Singapore, among others. In the United States, congestion pricing has been implemented more commonly on individual roads rather than an entire downtown.

Such a strategy can not be recommended for downtown Glendale in the foreseeable future. However as technology continues to improve congestion pricing should be considered as a long term "fix" for growing congestion.

Some Conclusions

This short review of some rather disparate examples was designed to explore several points. First, numerous cities, including too many to review here, have demonstrated that even without new rail service, it is possible to control traffic, improve transit ridership and improve quality of life during a period of growth. Notably, some cities, like Vancouver, view downtown housing as a specific transportation strategy that reduces traffic congestion, and have proven that they can add thousands of units of downtown housing with no increase in traffic. Even in places like Boulder, a fairly small city in a region dominated by autos, with low transit ridership initially and a lack of control over regional transit service, growth without increasing traffic can be achieved. Glendale, too, can make big gains by implementing a comprehensive package of mobility strategies.

Second, in most places, key aspects of success usually include reform of parking policies (switching from *minimum* to *maximum* requirements, usually), and providing additional transportation choices, particularly transit. Third, the design and classification of streets often changes, to devote new attention to providing transit priority on at least some key transit streets, and new attention to cyclists and pedestrians. Often, this requires new partnerships between transit planners and traffic engineers. Finally, measurements of the performance of streets often are revised, to acknowledge the reality that since lanes can no longer be added, performance measures need to focus on optimizing the *person-carrying capacity* of streets, rather than vehicle carrying capacity. This does not suggest that auto travel is eliminated or relegated to a "second class" mode. There will always be cars in downtown Glendale. The goal of the mobility plan is to increase the tools available to move people.

As Glendale moves forward, there are two important facts to keep in mind. First, small shifts in mode choice have large impacts on traffic congestion. Second, regardless of existing conditions, people respond to financial incentives.

4 Los Angeles County Metro Rapid Program Description. Accessed at: http://www.fta.dot.gov/2396_7279_ENG_HTML.htm.

Changing prices affects people's choices. For example, in Boulder, offering free transit passes to all downtown employees was one of the central factors in their success. Glendale must improve circumstances for transit, bicycling and walking, and then make it pay for people to leave their cars at home.

This working paper focuses primarily on: (a) measuring the performance of streets and transit services; (b) classifying streets; and (c) balancing the needs of competing users. Overall, the goal of this paper is to begin building consensus on a set of quantifiable policies for transportation in Glendale, with a particular focus on the role that transit should, or should not, play in the future of the city.

CHAPTER 3. ESTABLISHED POLICY FRAMEWORK

The City of Glendale *General Plan* forms the policy basis for this working paper. To succinctly describe the policy framework, we include below some key points from two primary elements that guide Glendale's land use and transportation future: the *Housing Element* of the *General Plan* (adopted May 2000) and the *Circulation Element* of the *General Plan* (adopted August 1998). Key policies of the *Housing Element* that are particularly relevant to this paper include:

- **Provide higher density residential development in close proximity to public transportation, services and recreation.**
- **Encourage the development of residential units in the downtown area and along appropriate commercial corridors.**

As the overall vision statement for the future of Glendale, the *Circulation Element* declares:

> **A circulation system which preserves and enhances the quality of life in the city by allowing for commerce to thrive, protecting the character of residential neighborhoods, and minimizing adverse environmental impacts.**

Based on that vision, the *Circulation Element* identifies the following primary transportation goals (particularly relevant Objectives are noted as well):

Goal 1. Preservation and enhancement of the quality of life in Glendale's unique communities.

Goal 2. Minimization of congestion, air pollution, and noise associated with motor vehicles.

- **Increase/support public and high occupancy vehicle transportation system improvements through mitigation of traffic impacts from development.**

Goal 3. Reasonable access to services and goods in Glendale by a variety of transportation modes.

- **Encourage growth in areas and in patterns which are or can be well served by public transportation.**

Goal 4. Functional and safe streetscapes that are aesthetically pleasing for both pedestrians and vehicular travel.

Goal 5. Land use which can be supported within the capacity constraints of existing and realistic future infrastructure.

Existing Street Classifications

Glendale has one of the most sophisticated street classification systems in California, improving upon the often oversimplified "arterial, collector, local" system so common in late 20th century suburban cities. The basic list of street classifications (aka 'street types'), which are described in detail in the Circulation Element of the General Plan, is as follows:

- Freeways
- Major Arterials
- Minor Arterials
- Urban Collectors
- Community Collectors
- Neighborhood Collectors
- Local Streets
- 'Signature Street' Overlays

Essentially, this hierarchical system classifies streets by the volume of automobile traffic that they are intended to carry, from highest traffic volumes (freeways) to lowest (local streets).

While Glendale's existing street classification system is useful for many purposes, it also has some important limitations.

- The major existing street types do little to distinguish between a street that is extremely important for transit (a Primary Transit Street) and one that has no transit service at all. As defined, a major arterial street may carry thousands of bus passengers per day (like Brand Boulevard and Broadway) or none at all.
- The Signature Street Overlays which indicate the goal of a highly pedestrian friendly atomsphere help somewhat to overcome this, but the definition of this overlay, and the way in which it should affect the underlying basic street designation, is not entirely clear.
- The existing classifications specify that auto-oriented land uses (e.g. car washes, parking garages, body shops) should be encouraged to locate along major arterials. This makes sense for arterials with little transit and therefore few pedestrians, but is this desired along major transit corridors, since transit ridership generally benefits from high-density mixed-use land uses?
- In general, the existing street type definitions mix land use and transportation functions in somewhat inconsistent ways.
- The transportation and land use classifications are not consistently linked to one another.
- Tools that take into account all modes of transportation are not consistently provided to inform key design or street management decisions in a given corridor. If an arterial has thousands of transit passengers, does it need more frequent pedestrian crossings than an arterial with no one crossing to the bus stop?
- Tools are not provided to help balance modes that compete against one another, or transportation goals that compete with land use goals. If a street is very important to both transit and autos, how can one decide which mode takes priority in matters such as signal timing, lane designations (e.g., bus 'queue jumps' at signals) or streetscape design?

This paper attempts to build upon Glendale's existing efforts in order address these gaps.

Existing Performance Measures

The Glendale General Plan adopts automobile Level of Service a (LOS) as the primary quantitative measure with which to judge the performance of the street system. As the Circulation Element describes it, "Level of Service is a measurement of the ability of the street or intersection to accommodate its traffic. In order that a street provide an acceptable level of service to the driver, it is necessary that arterial or collector street service volume be considerably lower than the capacity of the street."

Since about the 1950s, most American cities have, like Glendale, adopted Automobile Level of Service as the primary measure of performance for their transportation system. Auto LOS is useful since it is easy to measure, and it can effectively estimate auto congestion, a factor of great concern to most citizens. At intersections, Auto LOS estimates the average seconds of delay a motor vehicle will experience. Most cities use a letter scale from A (less than 10 seconds of delay) to F (more than 80 seconds of delay), but other cities add additional letters (G, H) to denote further delay. Auto LOS at intersections is often also based explicitly upon volume-to-capacity V/C ratios, which take the total number of vehicles at a given intersection

and divide by the capacity of that intersection to handle cars. Similar LOS measures are available for street segments in between intersections. V/C ratios for street segments take the total number of vehicles on a given stretch of roadway and divide by the capacity of that road to handle cars. A V/C ratio of 0.80 or lower represents free-flow conditions, while a ratio of 1.20 represents very congested conditions.

Glendale's *Circulation Element* establishes the following performance target: "A minimum desired level of service is 'D' during afternoon peak hours, except at intersections along major arterials, where a minimum desired level of service is 'E'."

While useful for estimating the effects of congestion on motorists, Auto LOS and V/C ratios do not offer the full picture of a transportation network in a place as complex as Glendale. Relying on this measure alone to measure transportation performance results in several shortcomings:

- **Auto LOS and V/C ratios do little to measure progress toward Glendale's five primary Circulation Element goals**, on themes such as preserving and enhancing quality of life, protecting the character of residential neighborhoods, and minimizing adverse environmental impacts.
- **By focusing on spot locations, Auto LOS and V/C ratios say nothing about the ability of the overall transportation network to carry traffic.** For example, they do not allow planners to estimate actual average travel time among various destinations. This constitutes a significant gap in the planning process, as travel time (along with travel costs) is the factor that travelers care most about.
- **More importantly, these measures estimate delay only to vehicles, not people.** A bus with 50 passengers on board is counted the same as an automobile with one passenger. In order to improve Auto LOS at a given intersection, for example, traffic engineers may feel obliged to remove transit priorities in order to give more accommodation for cars. The result may be that the intersection can handle more *vehicles* but fewer *people*. In the long-term, moreover, as the city grows, managing the transportation system with an exclusive focus on auto congestion paradoxically results in more auto congestion than an approach that considers all modes.
- **A street system that is optimized for cars is never optimized for transit.** Due to their fundamental need to stop to board passengers, buses and streetcars travel a certain fraction slower than other vehicles under free-flow conditions in a given street. Synchronization of traffic lights, which may significantly speed up auto flow, may actually worsen transit speeds, as buses and streetcars fall behind "platoons" of cars and hit every light red.

As auto speeds improve and transit speeds worsen, two effects take hold: induced demand toward driving and mode shift away from transit. Since travel time is the primary factor by which individuals decide to make trips and choose their travel mode, projects that reduce congestion by expanding capacity are often filled to capacity the day they open – as a result of new travelers being "induced" into using the new capacity. Similarly, as auto travel time improves relative to transit travel time, many individuals give up on transit and shift to driving. If cities respond to these shifts by continuing to expand auto capacity while allowing transit to deteriorate, the result is a spiral of ever-increasing congestion and steady reductions in the ability of the overall system to move people.

This paper attempts to create a framework to break this inefficient cycle by looking to manage the transportation system as a whole, not just as a collection of unrelated modes.

Glendale's Transit Performance Measures

Glendale's Beeline transit service performance measures include at least four route-level performance indicators:

- **Riders per revenue hour**
- **Farebox recovery (ratio of operations revenue to operations cost)**
- **Passenger miles per revenue seat mile**
- **Passenger miles per revenue hour**

All these indicators are important efficiency measures from the operator's perspective, but they do not take into account factors that **transit passengers most care about:**

- **frequency**
- **reliability**
- **travel time**
- **hours of operation**
- **crowding**

Later sections of this document detail a proposed new performance indicator – Transit Quality and Level of Service – that will complement these transit performance indicators. Using only Auto Level of Service to measure the performance of the streets where transit runs, while simple to do, results in measuring just one extremely limited aspect of transit service, namely if buses are caught in congestion.

CHAPTER 4. STREET TYPOLOGY REDEFINED

In most cities that have succeeded in growing with no increase in traffic congestion, a fundamental part of that success has been improved transit. A key element is protecting transit vehicles from rising traffic congestion, which will otherwise cause steadily declining transit speeds, decreasing reliability, higher operating costs and eventually deterioration of the entire transit network.

In addition, key corridors – typically the primary retail and/or transit corridors – should ideally give the highest possible level of comfort and safety for pedestrians. Still, these goals do not mean that the needs of automobile drivers can be abandoned, not only because it is a political reality, but since auto access will continue to be a key part of the economic health of the downtown.

The solution is to clearly designate priorities for different types of streets:

Primary Auto Streets give first priority to moving automobile traffic. In terms of measuring their performance, and their design, they should essentially follow the existing definition of a primary arterial street in Glendale. On the streets, first priority is given (e.g., in signal prioritization) to meeting automobile level of service standards. Other modes, while not entirely ignored, take second priority. Clear candidates for the streets are the arterial streets that do not also carry high frequency transit: for example, Colorado Street and Central Avenue north of Broadway.

Primary Transit Streets need to give first priority to moving transit. These are the streets where, for example, signal prioritization should give first priority to speeding up buses, even at the expense of some loss of performance or automobile level of service, where queue jumps or exclusive bus lanes should be installed when needed, and where first priority is given for investments in transit amenities, such as better shelters. These are also the streets where high priority must be given to creating excellent conditions for pedestrians, in the design of both streets and buildings.

Examining the map of the frequencies of the existing transit services on Glendale streets there are some obvious candidates for transit priority (see Figure 4-1, Fixed Route Bus Transit Service Frequency (Beeline and MTA). The existing high frequency transit corridors are the clear candidates, while streets with less frequent transit service, such as Colorado St., are not. In downtown, the likely primary transit streets include Brand Boulevard, and the corridor defined by the MTA Metro Rapid 780 buses: Broadway, Central Avenue from Broadway to Los Feliz Boulevard, and Los Feliz to city limits. Realigning transit services (for example, consolidating transit service from Central to Brand) would of course change these priorities, the frequency map indicates only the most likely candidates.

This raises a major question. If, for example, Central Avenue were designated both a primary auto street and a primary transit street, at least in some blocks, which mode would take priority? Answering that question is a focus of much of the later chapters of this paper, which describe a system of performance measures and a proposed method for balancing between modes.

Primary Pedestrian Streets give first priority to creating excellent conditions for pedestrians. This designation is usually most important on primary retail and transit corridors, but also desirable on many residential streets. Typically, this means wide sidewalks, fine streetscapes, curb parking to buffer pedestrians from passing traffic, and frequent safe crossings. All primary transit streets should be considered primary pedestrian streets as well. However, there are some streets that are primary pedestrian streets only. Candidate streets include Orange Street, where new housing development will create the opportunity for new pedestrian treatments, as well as some of the "offset" blocks and East-West streets, such as Lexington and Milford, that offer limited opportunity for auto or transit travel but could offer a quiet pleasant pedestrian alternative.

Primary Bicycle Streets are the key streets in the bicycle network. Key bicycle streets, including Louise, were described in the City's bicycle plan. Bicycle streets do not necessarily require eliminating auto or parking lanes to create a separated bicycle lane, but may be designated as a bicycle route because of their topography and minimal auto/transit conflicts.

Summary

Again, in many places, there will be conflicts and trade-offs will be required. A highly constrained right-of-way – for example, Broadway at Brand – may be designated as both a primary transit street and a primary pedestrian street, while still needing to serve some automobile traffic. Something has to give. In the case of Broadway at Brand, four lanes were created by removing parking – providing enough street capacity to keep autos and transit moving – and pedestrians, while they still get a finely detailed streetscape, lose the buffer they once had. This design, probably necessarily, resolves the conflict by giving first priority to transit over pedestrians.

Figure 4-1 Fixed Route Bus Transit Service Frequency (Beeline and MTA)

A Proposed New Street Typology

A new street typology for Glendale should include primary auto streets, primary transit streets, primary pedestrian streets and primary bicycle streets. It should closely link together land use and transportation. Most importantly, it should provide a comprehensive classification system, which can help to sort out and intelligently prioritize the needs of different modes of transportation, street by street and block by block throughout Glendale, and especially on the major downtown corridors.

The following proposed classification system would create a new comprehensive street typology for Glendale. It includes three key elements:

- **Function**, the relative importance of the street for each mode of transportation. Glendale has already defined many functional priorities and has included these in its Geographic Information System database. Function is the starting point for system-wide transportation performance measures and is the focus of this report.
- **Context**, the adjacent buildings and land uses. This is particularly important for Main Street retail patterns and downtowns, which have special needs regarding traffic speed, pedestrian accommodation and on-street parking. Context informs system-wide transportation performance measures and is addressed in this report. It is also a key factor in street design standards.
- **Form**, the physical shape of the right of way. Form is the starting point for street design standards, which are not thoroughly considered here. Designations such as "Alley" or "Boulevard," are primarily related to form.

These elements are combined in different ways to inform decisions about street design and management. Specifically:

- When measuring the performance of a given corridor as part of the overall transportation network, the functional role of the corridor is paramount, followed by its adjacent land use context. The physical form of the street is less important.
- When considering the design standards for a corridor, the physical form is typically paramount. Context informs critical elements such as the provision of on-street parking, and function determines important details such as bicycle lanes, bus bulbouts and intersection design.

The focus of this paper is on performance measures, so transportation function and building context are considered here. Form can be addressed later in order to link this document to the city's design standards approach.

This chapter attempts to take Glendale's existing transportation and land use classification framework and modify it for greater consistency and usefulness. It begins by more clearly defining the functional context of streets and follows with the physical context. The following chapter then begins to apply these new classifications to the measurement of transportation systems.

Transportation Function: Classification by Mode

Glendale has already completed a basic framework of functional classification, noting the relative importance of each street primarily by the volume of automobile traffic that it carries. We suggest elaborating on this basic framework to consider all modes of transportation, as follows:

Figure 4-2 Proposed New Functional Classifications

Classification	Existing Sub-Categories	Proposed Performance Classifications
Transit		
	None	Primary Transit Network Secondary Transit Route Tertiary Transit Route
Automobiles		
Freeways Major Arterials		Any changes to these classifications will need to be addressed in more detail in later working papers. It may be that few if any changes are needed. For purposes of comparing transit performance against auto performance in this paper, we have grouped these categories into three groups: • Primary Auto: Major Arterials • Secondary Auto: – Minor Arterials – Urban Collectors – Community Collectors – Neighborhood Collectors • Tertiary Auto: Local Streets
Minor arterials		
Collectors	Urban Collectors Community Collectors Neighborhood Collectors	
Local streets		
Bicycle		
	Bicycle Path Bicycle Lane Bicycle Route	As with autos, the bicycle system may need further development in later working papers. For comparison against transit performance in Chapter 6, we have simplified bicycle classifications into two categories: • Primary Bicycle Street • Secondary Bicycle Street
Pedestrian		
	Signature Street	Key Pedestrian Street
Truck		
	Truck Route Truck Restricted Street	Trucks will also need further development in later working papers. For the time being, we have included two key categories: • Primary Truck Route • Secondary Truck Route
Other		
	Other existing designations?	Others needed?

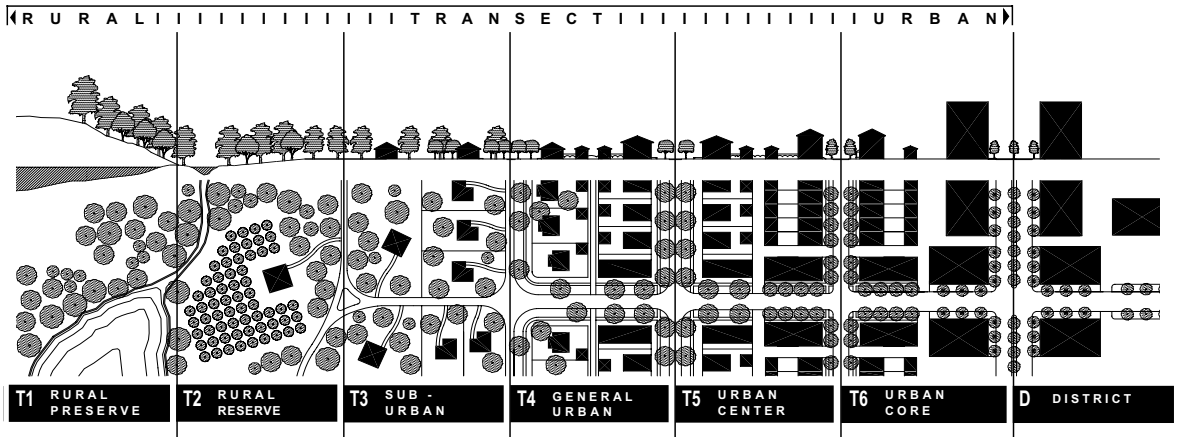
Transportation Context: Classification by Adjacent Land Use

Over the last decade, architects, urban designers and traffic engineers have increasingly come to agree upon a basic principle: that context determines all of the design details that shape our cities, including their roads, buildings and landscape. New Urbanist architects and city planners often describe context using a framework called the "Transect," borrowed from early 20th century urban design techniques and a tool of biologists, see Figure 4-3. The concept is simple. In all great places around the world, one can draw an imaginary line from rural to urban, from the wilderness to the urban downtown. This line passes through a series of places of increasing urbanity each with its own set of characteristics.

In rural areas, for example, buildings are small and spaced far apart. Streets have no curb, no sidewalk and little if any lighting. Plantings are informal. In neighborhood commercial centers, shop fronts line the street, formal plantings and street lighting are in place, and sidewalks, curbs and on-street parking define the street. Putting "main street" light fixtures in a rural area looks and feels out of place, just like letting blackberries grow rampant along a main street.

While simple, the Transect is a very useful tool for crafting design standards and other details about streets in a city like Glendale.

Figure 4-3 The Duany Plater-Zyberk "Transect"



Many cities, including Glendale, use some form of the Transect in their zoning rules. Rather than using zoning to separate uses, such as stores from houses, mixed use zoning often separates areas according to an urbanity gradient. In Figure 4-4 below we examine how zoning categories can incorporate the ideas of the Transect, defining the city from its most dense urban core to its single-family residential areas. We also begin to explore how key design and management characteristics of streets relate to their urban context.

We assume main commercial streets in a neighborhood center (for example, Honolulu Avenue in the Montrose neighborhood center) have different characteristics than the secondary or primarily residential streets in those areas. These categorizations may need refinement, but it allows us to group streets with common characteristics into five clear categories.

While the physical form of the adjacent buildings sets the primary design guidelines for a road, the actual uses inside the adjacent buildings have bearing on several key details, including:

- Parking management
- Sidewalk design
- Speed limit
- Other design details, including signage and lighting

In Figure 4-4, some preliminary criteria for these areas are provided in a cursory fashion to demonstrate how the city's street design guidelines can relate directly to the same criteria that define performance measures for the different modes of transportation using the street. Signage and lighting standards, and numerous other areas of street design, are also related strongly to context, and can be established using the concept of the transect. Several New Urbanist codes do just that, sorting various design elements from most rural to most urban.

Figure 4-4 Glendale Context Zones and Their Influence on Streets

New Urbanist Context Zone	Typical Glendale Application	Potential Parking Management Criteria	Potential Sidewalk and Landscape Criteria	Suggested Speed Limit and Design Speed
T6: Urban Core	Glendale's most urban places, including the Downtown Core.	All on-street parking paid and short term On-street parking may be restricted or removed to accommodate increased person capacity of street, according to City guidelines	Attached Landscape buffer: none Tree spacing: 20'- 40' Minimum, preferred and maximum usable sidewalk widths or clear zones to be established.	25 mph maximum Typical speed should be 20 mph, regardless of functional classification.
T5: Urban Village Center	Other mixed-use commercial streets in the Downtown, and in neighborhood centers (e.g., Montrose), typically with lower vehicular traffic demands	All on-street parking short-term, and metered/paid where appropriate. On-street parking generally required and may only be removed under special circumstances, as per City guidelines.	Attached Landscape buffer: none Tree spacing: 20'- 40' Minimum, preferred and maximum usable sidewalk widths or clear zones to be established	30 mph maximum Typical speed should be 25 mph, regardless of functional classification.
T4: General Urban	The non-commercial streets in Glendale's denser neighborhoods.	On-street parking generally required and may only be removed under special circumstances, as per City guidelines. Residential parking permit zones considered as appropriate.	Unattached Landscape buffer: minimum 5' Tree spacing: Min 40' Minimum, preferred and maximum usable sidewalk widths or clear zones to be established.	Speed limit may vary depending upon functional classification, but typically speed limit will be 30 mph or under, with typical speeds at 25 mph.
T3: Sub-Urban	Single-Family Residential Neighborhood: Low density residential areas throughout Glendale.	Network functionality is primary consideration, and on-street parking may be removed to accommodate additional person movement.	Unattached Landscape buffer: minimum 5' Tree spacing: Min 40' Minimum, preferred and maximum usable sidewalk widths or clear zones to be established.	Speed limit dependent upon functional classification and design speed.
D: District	Manufacturing/ Industrial Centers. Single-use manufacturing districts.	Truck loading is primary consideration and may preclude other on-street parking. Remaining parking generally metered. Short term where needed for customer access; long term where used primarily by employees	Where truck bays present, none required No landscape buffer or tree requirement Where no truck bays, minimum sidewalk width required.	Speed limit dependent upon functional classification and design speed.

Transportation Form

Finally, in addition to function and context, the physical form of the street right of way influences many decisions about street design and management. Form has little influence on performance measures, so it is not addressed in detail in this report.

Pulling it Together: Classification Mapping

Figure 4-5 below begins to show how all the proposed classifications, including their most complex combinations, could be shown simultaneously on a single map. Using the city's existing GIS database, a "Classification Map" could be produced with characteristics as shown in Figure 4-5.

Figure 4-5 Proposed Functional and Land Use Classifications

FUNCTIONAL CLASSIFICATIONS			
Mode	Source Mapping	Line	Comments
TRANSIT		Widest, bottom	
Primary Transit Network (Primary Transit)	To be defined. Existing high frequency principal transit routes are shown as place-holder	Dark Red	This layer is not yet mapped. Instead, we would use existing high frequency routes as a starting point.
Secondary Transit	To be defined. All other transit routes are shown as placeholder	Mid-red	See above
Tertiary Transit	To be defined. Least frequent transit routes.	Pink	For clarity, this layer should not be mapped, but is available in the GIS. Tertiary transit does not feature prominently in the proposed performance measure system.
AUTO		Medium, in middle	
Primary Auto	"Major Arterials"	Dark Blue	
Secondary Auto	"Minor Arterials" plus "Collectors"	Light blue	
Tertiary Auto	Other streets		For clarity, these should not be mapped.
BICYCLE		Narrow	
Primary Bicycle	Lanes, routes and paths from City of Glendale. These equate to General Plan clas-sifications	Dark green	
Secondary Bicycle	Not yet defined	Light Green	Not mapped
PEDESTRIAN		Narrowest, top	
Primary Pedes-trian	Not clearly defined	Orange	These categories will be more clearly defined in a future work task.
Secondary Pedes-trian	Not defined	Yellow	
TRUCK			
Primary Truck	City truck routes	Gray	For clarity, these should not be mapped.
LAND USE CONTEXT CLASSIFICATIONS			
Context Zone	Source Mapping	Map Color	Comments
Urban Core	Land Use Plan	Pale Orange	Translations from existing city zoning catego-ries to these context zones will need to be defined, before they can be mapped.
Urban Center	Land Use Plan	Not colored	See above
General Urban	Land Use Plan	Pale Orange	See above
Sub-Urban	Land Use Plan	Pale Yellow	See above
Districts (e.g. Industrial)	Land Use Plan	Not mapped	See above

In addition to being displayed graphically, this proposed classification system can also use a shorthand notation that notes Context Zone plus functional transportation priorities for each mode. The abbreviations are outlined in Figure 4-6.

For example, a street such as Brand in the heart of downtown might be currently defined as:

CucT1A1P1

That is, Context Zone "Urban Core," Primary Transit route, Primary Auto route and Primary Pedestrian.

Parts of Central Avenue in downtown, by contrast, have only enough transit service to be classified as Secondary transit:

CucT2A1P2

That is, Context Zone, "Urban Core", Secondary Transit route, Primary Auto route, Secondary Pedestrian.

Similarly, Honolulu Avenue in Montrose could be:

CuvcT2A2

That is, Context Zone "Urban Village Center," Secondary Transit route, Secondary Auto route. Figure 4-7 shows a sample street classification map for the downtown where the classifications described in Figure 4-5 are mapped on the downtown street grid.

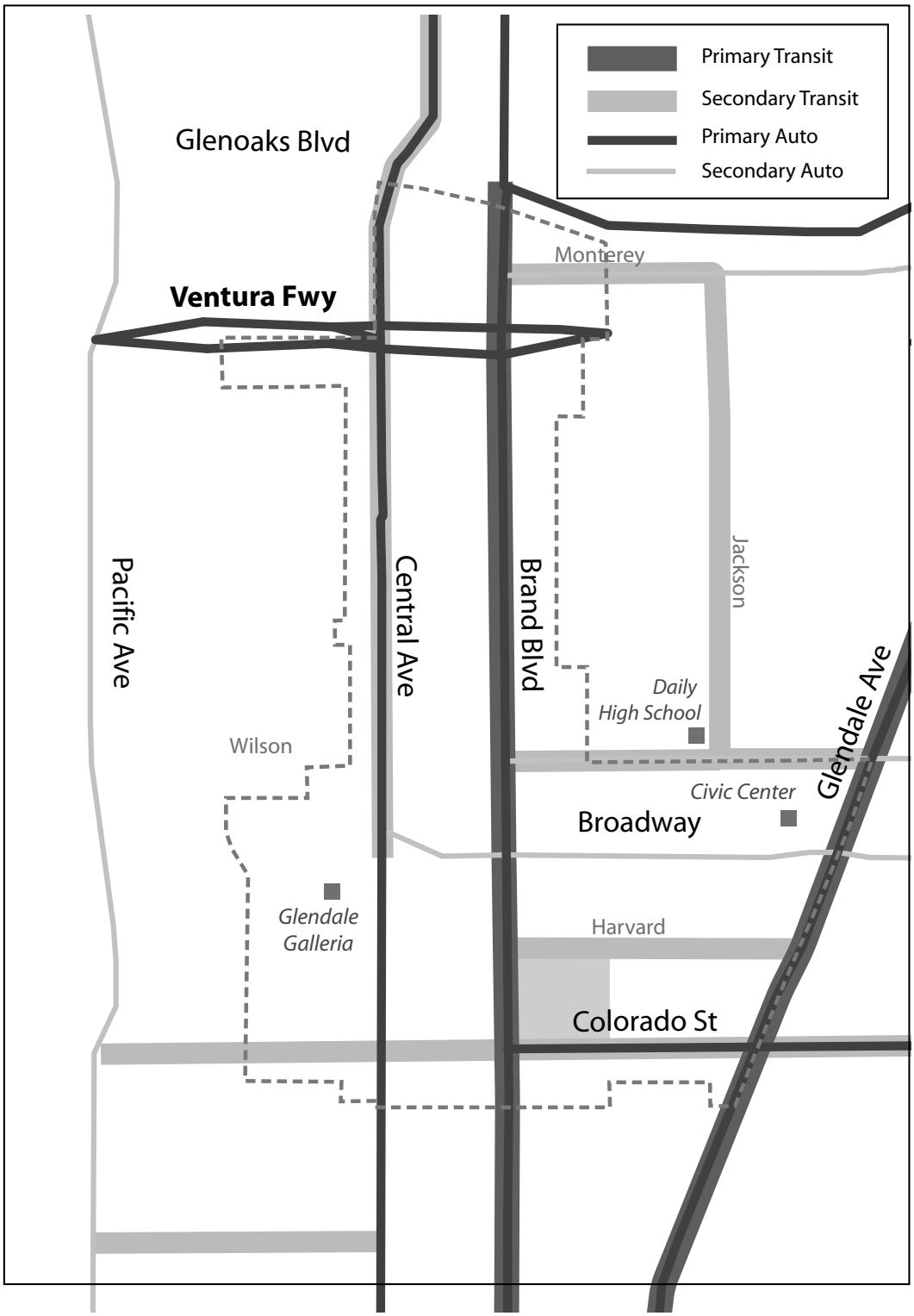
In this map Primary Transit streets were designated based on existing transit frequencies on existing transit routes. All corridors with buses running at least every 15 minutes were designated Primary Transit streets. All other streets with existing transit routes were designated Secondary Transit routes. Auto streets were designated by applying Glendale's existing street classifications to the map. All major arterials were designated Primary Auto and all minor arterials and collector streets were designated Secondary Auto.

The map reveals the conflict described earlier—some blocks are currently attempting to be both Primary Transit and Primary Auto streets. The following Chapters explain how this conflict may be resolved.

Figure 4-6 Shorthand for Proposed Functional Classifications

Route description	Shorthand
CONTEXT	
Urban Core	C_{UC}
Urban Village Center	C_{UVC}
General urban	C_{GY}
Single family residential areas	C_{SF}
Manufacturing/ Industrial Centers	C_{MI}
TRANSIT ROLE	
Primary Transit Network (Primary Transit)	T_1
Secondary Transit	T_2
Tertiary Transit	T_3
AUTO	
Primary Auto	A_1
Secondary Auto	A_2
Tertiary Auto	A_3
BICYCLE	
Primary Bicycle	B_1
Secondary Bicycle	B_2
PEDESTRIAN	
Primary Pedestrian	P_1
Secondary Pedestrian	P_2
TRUCK	
Primary Truck ('Heavy Vehicle')	H_1

Figure 4-7 Potential Street Classification – Based on Existing Transit Frequencies and Street Classifications



CHAPTER 5. DEFINING A PRIMARY TRANSIT NETWORK

Better transit can play a powerful role in reducing congestion. However, future investments in transit need to be focused, rather than scattershot, and supported by street designs that work well with transit. Dense, transit-oriented development is proposed for downtown, and General Plan policies recommend additional housing along commercial corridors where it can be linked with transit. To serve all of this new development, to make it genuinely transit oriented, a fast, frequent and reliable transit network is needed. This paper proposes the concept of a Primary Transit Network, that will be the backbone of the City's transit system and carry its highest concentrations of transit trips, and suggests that the city then dedicate itself to steadily improving this primary network.

The Primary Transit Network consists of all transit lines – regardless of mode or operating agency – that operate every 15 minutes or better all day for at least 18 hours every day. A 15-minute headway represents the point at which a transit rider no longer needs to consult a schedule to use the service. It also permits transfers to be made rapidly even without timing of connections. For these reasons, the threshold frequency of 15 minutes is the point at which the benefits of transit tend to grow exponentially.

Figure 4-1, Fixed Route Bus Transit Service Frequency (Beeline and MTA) illustrates existing bus service lines that do, and do not, meet this frequency standard already. Portions of a Primary Transit Network exist today, in the form of streets (such as Brand and Broadway) that already carry transit routes with combined frequencies meeting this standard.

Not every street with transit service can be in the primary transit network. Investments in the network would be concentrated on those corridors that serve the most riders and provide the highest quality of service. Transit will operate on other streets, but defining a primary network provides the basis for making investments in transit and pedestrian infrastructure. The Primary Transit Network has performance criteria for the four key dimensions of transit quality:[1]

- **Frequency**. The Primary Transit Network runs at least every 15 minutes considering all services on that corridor in combination.
- **Span**. The Primary Transit Network runs at the above frequency for at least 18 hours a day, 7 days a week.
- **Speed**. Primary Transit Network services have an average operating speed, including stops, of no less than 35% of the speed limit. (For example, if the speed limit on the street is 30 miles per hour, transit services must operate at least 10.5 miles per hour including all stops.
- **Reliability**.[2] Buses should arrive at reliable intervals and avoid bunching.
- **Loading**. Standing loads but no crush loads are acceptable. Peak hour loads do not exceed 85% of total crush capacity averaged across all buses operating on the corridor.[3]

1 See Chapter 6 for more detail on these performance measures.

2 Actual headways between consecutive buses will exceed scheduled headways by a coefficient of variation not to exceed 0.30.

3 "Standing loads" means the number of standing passengers does not exceed the bus manufacturer's rated capacity for comfortable travel. "Crush loads" means the vehicle is uncomfortably full, loaded to the point where it is unrealistic for more passengers to board, and passenger circulation, alighting and boarding is affected.

Defining a primary transit network does not require implementing rail service or other non-bus technologies, although any future streetcar or other rail service in Glendale would almost certainly meet the criteria for the primary transit network. However, primary transit corridors have been most successful in organizing and promoting development when the primary mode is fixed, such as rail. Creating a Primary Transit Network serves to reinforce, on the level of policy, that certain bus service corridors are permanent, and supported with a high level of investment. This allows bus corridors to be the foundations of dense, transit-reliant communities.

Whether formed by light rail, streetcars or bus service, the Primary Transit Network is a foundational element of the City's infrastructure. For the high-density portions of the city, it will become as essential as power lines. Because it is designed to serve a large share of the city's population with a minimum of line miles, it can offer not just the best frequencies and spans of service, but also many other premium features, including:

- Priority for low-floor, high-capacity coaches and any new coach technologies that expedite comfort or operations.
- Premium shelters with many of the amenities associated with rail stations.
- Information features, including real-time information in shelters (the number of minutes until the next bus comes) and informational displays within buses (such as the time and the next stop.)
- A distinct image that sets the Primary Transit Network apart from the less-frequent supporting services.
- Reinforced street pavement for smooth travel and fewer maintenance interruptions.

The Primary Transit Network consists of **transit lines that will have all-day headways of 15 minutes or better over a span of at least 18 hours** (equivalent to 5 AM to 11 PM; typically Primary Transit Network routes should also run all night at lesser headways). Routes with this level of service differ profoundly from the rest of the network in a number of respects:

- **Ridership and Productivity Potential**. The threshold of 15 minutes marks the point at which transit begins to attract a large number of riders with a choice of modes, rather than just transit dependent individuals. If transit runs every 15 minutes or better, wait times are short enough that the system can be used spontaneously throughout the day and evening for a variety of trips. Passengers can simply wait at a stop without having to consult the schedule.
- **Connectivity**. The ability to catch a bus soon without worrying about the schedule also means that Primary Transit Network lines interconnect as a network. Passengers can make connections at any intersection of Primary Transit Network lines without worrying about whether timed transfers are provided or the bus is on time.
- **Magnified Effect of Small Changes**. The Primary Transit Network represents an extremely concentrated investment of service hours. It will also carry the majority of the system's riders. Any changes that affect transit operations or attractiveness – for better or worse – will therefore have a magnified impact on both ridership and service cost. Investments in bus stop amenities on the Primary Transit Network will be used by more people and will therefore have a greater positive impact than similar investments elsewhere. Measures to improve speed and reliability have the potential to save the greatest number of service hours, and reduce travel times and schedule variability for the greatest number of riders. Conversely, anything that happens to undermine transit performance, such as a loss of speed or reliability due to congestion or street design changes, will have a magnified negative impact on both ridership and service costs.
- **Synergy with Land Use**. The level of service offered by the Primary Transit Network makes it possible, even convenient, to live without a car,

or to have fewer cars than adults in a household, or for a business to require fewer parking spaces. It provides a two-way synergy with land use – the Primary Transit Network requires density, and it also encourages livable densification by reducing parking needs, generating pedestrian activity in village cores, etc.

Relationship to downtown and neighborhood centers

The location of the Primary Transit Network is based primarily on the residential and employment density of surrounding land uses, since this is by far the most important factor determining ridership. The fundamental definition, however, is based on frequency and span of service, because these are the essential features of transit systems that effectively compete with the private automobile for all kinds of trips.

Land Use Integration Principles

The Primary Transit Network has a two-fold connection with land use. Firstly, the Primary Transit Network serves areas with the highest transit ridership, densities and mix of uses. In this way, higher ridership is rewarded with increased service. The success of land use policies to promote transit and reduce auto dependency in downtown and elsewhere will depend in good part on the ability of the Primary Transit Network to deliver the speed, frequency, reliability and amenity improvements necessary to attract riders.

Secondly, the Primary Transit Network should be an important factor determining land use policies and zoning in the City of Glendale. New ridership on the Primary Transit Network is much easier to accommodate than new demands for service in low-density areas. The following policies are recommended:

- **Transit-supportive land uses should be encouraged *primarily* on Primary Transit Network corridors**. Increased densities and other transit-oriented land use policies should be encouraged primarily where there will be a high level of transit service. In many cases, this has already been planned, through the city's planning documents for downtown. However, there may be significant opportunities for infill on lower density segments along commercial corridors. This approach will also help balance ridership over the length of a route.
- **All new transit-dependent land uses should be on the Primary Transit Network**. Examples include social service agencies, which frequently locate on the cheapest available land, which usually has poor access. While this may optimize costs for the agency in question, it forces the transit agency to run an inefficient service to reach a poorly sited facility. In effect, one agency is simply transferring its costs to another. Other examples of developments that should be on the Primary Transit Network include affordable and senior housing developments, community colleges and high schools.
- **Auto-dependent land uses should *not* be encouraged on the Primary Transit Network**. Big box retail development, auto malls, low-density industrial uses and similar developments should be directed elsewhere, to the extent that the City wishes to accommodate them at all.

It should be noted that much research has found employment density to be more important than residential density in determining transit ridership. However, both are important, as is a mix of uses. As well as reducing overall travel demand by internalizing trips, mixed-use development helps

to balance loadings in both directions over the course of the day.

The Primary Transit Network as Infrastructure

The Permanence of Fixed-Infrastructure Transit

In the Los Angeles region, station area plans are already promoting transit-oriented development around future light rail stations. However, it is impossible to build rail to all the places that will need transit-oriented intensification. In the next few decades at least, most of Glendale and the region will rely on bus services for their transit access.

One of the main features hindering the success of bus-based Transit Oriented Development has been the perceived lack of permanence compared to rail infrastructure. In reality, many of the City's bus corridors are as permanent as light rail and streetcars, particularly in denser areas. However, their permanence is not visually obvious, as it needs to be. Nor is there a defined process by which future densification will be rewarded with increased service. Developers, lenders and tenants are therefore understandably reluctant to commit to real transit oriented land use design – and reduced parking provision in particular – in the absence of guarantees that a high level of transit service will continue for the life of the development.

The feature of permanence is therefore critical if the Primary Transit Network is to guide land use investments. In other words, significant capital investments by the City and Los Angeles MTA Metro will give developers and land use planners the certainty that a high level of service will continue to be provided, and that the Primary Transit Network will be as permanent a feature of the City's transportation infrastructure as future light rail and streetcar services. These capital investments fall into two broad categories: speed and reliability improvements, and passenger amenities. They have the twin goals of improving service, while demonstrating the commitment of the City (via both street design and the Beeline service) and Los Angeles MTA Metro to making that service permanent.

Primary Transit Network Legibility

To ensure that the Primary Transit Network is easily recognizable and understandable as the key transit system, services should have a different "look and feel" to the rest of the transit system. At least within the bus system, the different elements and modes should be unified with a common identity.

In addition, many physical features of the stops can help make the Primary Transit Network stand out and advertise its exceptional usefulness. These can include the stop improvements planned along the best of the Los Angeles MTA Metro Rapid bus rapid transit lines, such as pedestrian and bicycle access; shelters and benches; lighting; and signage and customer information. Real-time information, telephones and news racks are also important to provide. Bus stops on the Primary Transit Network should be given the look and feel of light rail stations.

Rather than making provision at each stop dependent on ridership, the aim should be to achieve a minimum level of consistency and realize the

benefits of uniform branding. While high-ridership stops may warrant additional investments above this minimum, the overall "look and feel" should remain the same.

There is a link between stop consolidation and improved amenities. A higher level of amenities is financially feasible if they need to be installed at fewer stops, and they represent the tangible enhancements that can make stop consolidation politically viable.

The Primary Transit Network will carry the heaviest passenger loads at the greatest level of convenience. This convenience should be marketed and emphasized. For example, transit system maps should distinguish the Primary Transit Network from the Secondary Transit Network – for example, through marking it in a different color. (Transit maps that make no effort to distinguish frequent services from infrequent ones are no more useful than a road map that doesn't distinguish a freeway and a dirt road.)

Technology

The Primary Transit Network is defined by level of service, not by mode. For long-range planning purposes, it makes little difference if a transit connection is provided by light rail, streetcar, trolley, bus or some different technology entirely. The attributes of a service – legibility, permanence, amenity, frequency, speed and reliability – should not be confused with the technologies that are often associated with these attributes.

Operating Agency

Just as it is not defined by mode, the Primary Transit Network is not defined by operating agency. It includes all services in city that meet the Primary Transit Network definition regardless of whether these are operated by Los Angeles MTA Metro, the Beeline, and/or some other administrative unit yet to be conceived.

Street Design and the Primary Transit Network

Provide the Necessary Levels of Priority to Protect and Enhance Transit Speed and Reliability

The City needs to make a strong commitment to provide the necessary levels of priority to ensure transit speed and reliability. Among the factors within this City's control, this one is by far the most important.

Despite many efforts by the City and Los Angeles MTA Metro, transit service in Glendale can be slow. On key downtown streets, average transit operating speeds rarely top 10 mph. This is often due to a combination of crowded buses (which increases boarding times), and increased traffic congestion. This is not a factor unique to the Los Angeles region – many agencies across the country are losing 1% or more per year in average operating speed.

Improved speeds are important for two reasons. Firstly, the discretionary transit rider is very sensitive to speed. The faster the operating speed, the greater the ability of transit to capture new riders. Secondly, time is money – the longer it takes to complete the cycle of a line, the more it will cost to operate a given frequency. To the extent that speed and reliability improvements reduce the time needed to run the length of a route, the service hours can be reinvested in enhanced frequencies, yielding a larger and more robust

Primary Transit Network.

Policy speeds and reliability measures for the Primary Transit Network are considered in later chapters, which will address the City's street classifications and performance standards. They should almost certainly vary by context – policy speeds will be significantly lower in a neighborhood commercial district, for example.

Typical improvements the City can implement include:

- **Curb Lane Improvements**. These might include bus bulbs, parking restrictions or extended bus stops to reduce delays encountered when entering and leaving bus stops.
- **Transit Signal Priority**. These measures can consist of corridor-wide transit signal priority or preemption, or more limited treatments at specific intersections.
- **Right-of-Way Reallocation**. These treatments allow buses to bypass congestion, by providing dedicated or semi-dedicated right of way. Specific measures include transit-only, high occupancy vehicle (HOV) or business access and transit (BAT) lanes, and queue jumps at intersections.
- **Pedestrian Improvements.** These include safe crossings, wider sidewalks, and better landscaping.

Some of these improvements are already underway on Brand Blvd. such as bus bulbs and crosswalk improvements.

Pedestrian and cyclist access

The amenity and safety of access to transit lines has a strong influence on mode choice. By providing pedestrian- and cyclist-friendly urban environments, the City will better achieve their transportation goals.

Summary of Primary Transit Network Features

The Primary Transit Network, then, will have the following features:

- **Policy Frequency and Span**. The Primary Transit Network by definition operates at least every 15 minutes for at least 18 hours a day every day.
- **Wide Route Spacing**. Parallel Primary Transit Network lines are no less than 1/2 mile apart, except (a) where physical or topographical barriers reduce the catchment area of a given line (b) in the downtown or other areas of comparable density.
- **Easy Connections between Lines**. Transferring in a transit network is an unavoidable as turning a corner when driving. The convenience of transfers will be maximized on the Primary Transit Network, through the high frequency of service and also through special attention to the physical facilities at transfer points.
- **Good legibility and Usability**. The Primary Transit Network system will be easy to comprehend (at a macro / system level) and easy to navigate (at a micro / user level).

CHAPTER 6. PERFORMANCE MEASURES FOR A NEW STREET TYPOLOGY

Glendale's existing primary transportation performance measure, automobile Level of Service, is an important performance measure, and we do not propose in this paper that it should be abandoned. Measuring auto performance remains key, and should remain the primary measure of performance on the primary auto streets. However, Glendale needs additional performance measures, to be able to measure how well other modes of transportation are doing, and in particular, how well transit is performing on a few key primary transit corridors: that is, on the primary transit streets.

The City of Glendale is most interested in allowing its transportation system to accommodate planned growth in a sustainable manner, with a strong focus on quality of life. For Glendale, achieving this will require a new focus, including performance measures, that concentrates on moving people rather than automobiles, particularly on the streets of the Primary Transit Network. Performance levels include:

- Level of Service should reflect person delay rather than vehicle delay.
- Volume to Capacity ratios should examine person capacity rather than vehicle capacity.

This focus, if adopted, should also be adopted in the General Plan, environmental compliance guidelines, congestion management program, and elsewhere as appropriate.

To implement this overall approach, the rest of this chapter examines the following specific level of service measures, which cover each of the various modes in turn:

- Vehicle Level of Service (adopted)
- Transit Quality and Level of Service
- Pedestrian Level of Service
- Bicycle Level of Service
- Freight Level of Service

Since this document focuses on performance indicators necessary for Glendale to accommodate its growth plans and make its primary transit system and primary auto streets work, it does not yet consider other goals such as environmental quality or freight movement; these could be addressed later and incorporated into a more comprehensive set of indicators.

Quality of Service Measures for Transit

Introduction to Quality of Service

This chapter uses the classification system outlined in the previous chapters to define performance measures for transit. Compatible performance measures for other modes of transportation are considered briefly in a later chapter. Tools for balancing the performance of modes against one another are considered in final chapter.

We are focused specifically on *Quality of Service* (QOS), defined as the overall measured or perceived performance of transit service from the passenger's point of view. The Beeline and MTA Metro will need to maintain their own efficiency measures from the operator's point of view. It is not realistic to attempt to measure every aspect of

a transit network's quality of service. However, it is necessary to select a few indicators that suitably represent the quality of service of the transit network and how attractive it will be to passengers. These indicators can be aggregated to provide a single indicator that can be used to compare transit QOS with measures of other modes. This comparison can then be used to help balance the needs of transit with the needs of other modes and the urban context in which they operate.

This section:

- recommends quality of service measures
- describes a framework for applying these measures
- describes in more detail the measures proposed.

Unit to be assessed - *Transit Route Segment*

The process developed in this working paper aims to avoid the intersection-by-intersection or block-by-block focus of the Highway Capacity Manual approach. In addition to this, it aims to consider the transportation network from the perspective of transit rather than traffic. For this reason, we propose transit service measures that incorporate aspects of network and route performance (such as frequency and reliability) as well as more localized indicators such as travel speed. The term *Transit Route Segment* refers to the portion of a route or road corridor to be assessed.

Proposed Measures for Assessing Quality of Service

We researched a broad variety of approaches to measuring Transit Quality of Service to identify a methodology that would meet certain key criteria including:

- Measures factors of most importance to allow transit to achieve Glendale's economic development, quality of life and land use goals
- Requires modest investment in data collection, using the city's existing resources
- Understandable to engineers, planner and policymakers

The most suitable methodology we found is described in great detail in the Transportation Cooperative Research Program's *Transit Capacity and Quality of Service Manual*, prepared by Kittleson & Associates. The first edition (TCRP, 1999) outlined a large group of factors affecting quality of service. To develop a few key measures of Quality of Service for Glendale's potential Primary Transit Network, Nelson\Nygaard examined all of the measures recommended in the TCRP report. We then selected five key measures that, in aggregate, best define the service characteristics most important in Glendale. These are:

- Frequency
- Span of Service
- Reliability
- Loading
- Travel Speed

These selected measures are described below. The proposed "System of Measurement" charts are especially important. For each measure, specific targets are set that correspond to numerical Quality of Service "scores." These scores are equivalent to the A-F letter scale in traditional Level of Service measures, but they have two key advantages:

- The letter ranking cannot be confused with elementary school grades, where 'F' stands for "Fail." Rather, it lets us define what "fail" means and adjust it given the context.
- More importantly, they allow us to combine different factors into an aggregate scale, weighting some factors more strongly than others.

In this chapter, we focus exclusively on the desired

performance of the Primary Transit Network. Specific thresholds are set for good performance and poor performance. In each case, we also set a "failure" threshold for each factor. *A score in this category would automatically mean that remedial action is necessary, even if a Primary Transit Network segment scores very well in all other measures.*

In the final section of this chapter, we provide tools for weighting the individual measures against one another for an aggregate Quality of Service score. This aggregate score is then used in the concluding chapter to balance transit performance against the performance of other modes.

Each of the five key transit measures is addressed below.

Frequency

Justification of the measure's selection

The Primary Transit Network has been defined as a system of high frequency transit services running at least every 15 minutes or better. The 15-minute headway represents the point at which the passenger no longer needs to consult a schedule to use the service. It also permits transfers to be made rapidly even without timing of connections. As a result, a frequency of at least every 15 minutes is a point at which the benefits of transit tend to grow exponentially.

From the user's perspective, frequency determines the number of times an hour a user has access to the transit mode, assuming that transit service is provided within acceptable walking distance (measured by service coverage) and at the times the user wishes to travel (measured by hours of service). Service frequency also measures the convenience of transit service to choice riders and is one component of overall transit trip time (helping to determine how long one waits for a transit vehicle).

System of measurement

Although the measure of *frequency* strictly refers to the number of services per hour, the measure of *headway* is often more useful and easier to use. The unit of headway also measures frequency, but measures it in terms of minutes between services. The assessment of frequency should be based on the longest headways on the daily schedule, excluding Owl (late night) service. In general, segments should be selected so that frequencies are consistent along the whole segment. Where this is not the case, an average should be used, based on the relative lengths of the partial segments with a particular frequency.

Proposed Primary Transit Network Transit Frequency Measurement			
	QOS	Headway (minutes)	Comments
Pass	+3	< 7	Passengers don't need schedules, headway based
	+2	7 – 10	Passengers don't need schedules, headway based
	+1	11 - 15	Frequent service, passengers start consulting schedules
Fail	-3	16 - 20	Undesirable time to wait if bus/train missed
	-6	21 – 30	Service unattractive to choice riders
	-9	> 31	Service unattractive to all riders

Span of Service

Justification of the measure's selection

While it is often feasible to run high frequency transit services during a limited peak period, a truly useful and attractive transit system needs to maintain this level of service throughout the day. This is important for a number of reasons, including:

- As mixed land uses cluster in downtown and along transit lines, the purpose and timing of trips will become more diverse and the transit network will need to respond to this demand.
- Analysis of national travel data shows that non-commuter travel demand is growing significantly faster than commuter trips. To achieve the City's environmental and travel demand management aims, it is important that this high-growth travel can be captured by transit.
- Unit costs of peak-only services are usually higher than for all-day services, because of the inefficiency of partial shifts.

System of measurement

Span of service (also known as hours of service) is relatively easy to measure. It is the number of hours in the day that a service runs at Primary Transit Network frequencies.

Proposed Primary Transit Network Span of Service Measurement			
	QOS	Service Span (hours)	Comments
Pass	+3	20 – 24	Night service provided (e.g. 4:30 am – 12:30 am or better)
	+2	18 – 20	Late evening service provided (e.g. 5:00 am – 1 am)
	+1	16 – 18	Late evening service provided (e.g. 6:00 am – 10:00 pm)
Fail	-3	14 – 16	Early evening service provided (e.g. 6:00 am – 8:00 pm)
	-6	12 – 14	Minimal span not useful to many riders. (e.g. 6:00 am – 6:00 pm)
	-9	< 12	Service useful only for regular riders making rigidly scheduled commutes. (e.g. peak-only service)

For consideration when applying the measure

If a route has sufficient ridership to justify Primary Transit Network-level frequencies levels for over 16 hours a day, it will generally have sufficient ridership to justify (or require) a night (or owl) service running at reduced frequencies.

Reliability

Justification of the measure's selection

A high-frequency 'headway-scheduled' system such as the Primary Transit Network reduces some of the challenges involved with a lower-frequency 'timetable-scheduled' system. Nevertheless, passenger confidence in the system, and its ability to capture patronage is still is heavily dependent on the reliability of the Primary Transit Network services.

This dependence goes much deeper than pure waiting time, as every interface, whether between two Primary Transit Network services or between the Primary Transit Network and a local service, will be affected by service reliability (or lack thereof).

System of measurement

We propose a system of measurement that focuses on achieving scheduled headways or better. The *headway adherence* approach outlined in the TCRP report (TCRP, 2003) assesses reliability based on both late-running and early-running services. Since the Primary Transit Network will be running to a headway schedule, we modified this approach in such a way that it was based on the assumption that when transit is running to a headway schedule rather than a timetable, it is acceptable for services to run early, so long as that does not cause an increase in the waiting time for the following service(s).

We therefore propose the concept of measuring the *gap* between buses to determine the percentage of transit vehicle arrivals where the actual headway *exceeded* the scheduled headway by more than a certain time.

The easiest way to illustrate this approach is through an example. The table below describes 10 services along a route where the scheduled headway is 5 minutes:

A	B	C	D = C - B	E
Service No.	Scheduled Headway	Actual Headway	Actual – Scheduled ('gap')	Only Count Delays ('gaps' > headway)
1	5	5	0	0
2	5	8	3	3
3	5	2	-3	0
4	5	3	-2	0
5	5	2	-3	0
6	5	10	5	5
7	5	5	0	0
8	5	5	0	0
9	5	2	-3	0
10	5	3	-2	0
Standard Deviation		2.72	2.72	1.75
Coefficient of variation		0.54	0.54	0.35

Notes:

Coefficient of Variation = Std Deviation of Headway / Scheduled headway

Column E can be calculated using the Excel IF function: IF (Logical test, value if true, value if false).

Proposed Primary Transit Network Reliability Measurement				
	QOS	**Coefficient of** Variation	Probability of delay of > 0.5 headway	Comments
Pass	+2	0.00 - 0.21	≤1%	Service is provided like clockwork, with very regular headways.
	+1	0.22 - 0.30	≤10%	Most vehicles are off the scheduled headway by a few minutes, but the likelihood of being off-headway by more than one-half the scheduled headway amount is low (e.g., 5 minutes off a 10 minute scheduled headway).
Fail	-3	0.31 - 0.39	≤20%	Vehicles are often off-headway, with a few headways much longer or shorter than scheduled.
	-6	0.40 - 0.52	≤33%	Headways are quite irregular, with up to one in three vehicles one-half a headway or more off-headway.
	-9	0.53 - 0.74	≤50%	Bunching occurs frequently.
	-9	> 0.50	>50%	Most vehicles are bunched.

Note: these coefficients of variation were taken directly from the TCRP report (TCRP, 2003) and have not been independently verified for the purpose of this study. It appears that these coefficients were based on gaps that were both shorter and longer than the scheduled headway. These figures will therefore need to be re-visited should this overall approach be adopted. For the purposes of this report, however, the pass-fail ratings have been slightly modified to take account of the TCRP outputs.

The measure of *coefficient of variation* is a coefficient of standard deviation, thus in itself means very little from a perceptual perspective. The column titled *Probability of delay of > 0.5 headway* provides a more understandable measure of reliability, corresponding to the probability that a given transit vehicle's headway will be off-headway by more than one half of the scheduled headway. From the explanation given in the TCRP report (TCRP, 2003), it is understood that this probability was only measured for services arriving after a wait *(gap) greater than* the scheduled headway.

If this system of measurement is adopted, the values in the columns titled *Coefficient of variation* and *Probability of delay of > 0.5 headway* will need to be verified and refined to meet the needs of Glendale.

Loading

Justification of the measure's selection

Loading constitutes a potent measure as it provides a useful indication of a range of issues affecting transit. This was articulated well in the TCRP (2003) report[1]:

> *From the passenger's perspective, passenger loads reflect the comfort level of the on-board vehicle portion of a transit trip—both in terms of being able to find a seat and in overall crowding levels within the vehicle.*
>
> *From a transit operator's perspective, a poor LOS may indicate the need to increase service frequency or vehicle size in order to reduce crowding and to provide a more comfortable ride for passengers.*

1 Transit Cooperative Research Program, *TCRP Report 100 Transit Capacity and Quality of Service Manual 2nd Edition*. Submitted by Kittleson Associates, 2003. Page 3-43.

A poor passenger load LOS indicates that dwell times will be longer for a given passenger boarding and alighting demand at a transit stop and, as a result, travel times and service reliability will be negatively affected.

System of measurement

Care was taken to adopt a system of measurement that encourages tailoring vehicle specification to the passenger and system needs. The level of service measures proposed by TCRP note that to achieve a LOS of A, there should be more than two seats for each carried passenger. This risks inadvertently promoting inefficiency, with transit services running at under half their capacity.

In addition, the TCRP approach assesses passenger load using the measures of square meter per passenger or passengers per seat. These measures could risk confusion if, for example, low floor buses with a metro-style side-bench seating replaced coach-style buses. The metro-style configuration could feasibly transport higher number of passengers over crowded, short-haul sections more comfortably and efficiently than coach-style configurations.

For this reason, we have chosen the measure of *percentage of transit vehicle capacity* (% Capacity). This measure will provide a more 'level' means of comparison between different vehicles serving different needs. It will also encourage the use of vehicles better-suited to different roles in the transit network.

Loading			
	QOS	% Capacity	Comments
Pass	+3	55 – 70%	For low capacity vehicle configurations (i.e. high proportion of seats), most or all passengers would have seats. For high capacity vehicle configurations (i.e. low proportion of seats), limited availability of seating (depending on the precise configuration of the vehicle).
	+2	71 – 85% or <50%	Generally standing room only, but free passage for boarding and alighting.
	+1	86 – 100%	Approaching maximum capacity, density of passengers risks slowing boarding and alighting. Generally still comfortable for passengers, albeit standing.
Fail	-3	101 – 110%	Some level of overcrowding. Density of passengers causes some delays in boarding and alighting, potentially uncomfortable for passengers.
	-6	110 – 120%	Overcrowded, density of passengers causing some delays in boarding and alighting. Uncomfortable for passengers,
	-9	> 120%	Severe overcrowding. Approaching crush capacity, density of passengers causing significant delays in boarding and alighting. Uncomfortable for passengers, starting to bring safety risks.

The capacity of a transit vehicle is generally determined by the manufacturers. It describes the number of passengers (seated and standing) that can safely and comfortably travel on the vehicle. It generally also reflects the operational needs of the vehicle such as passenger circulation (within the vehicle and boarding and alighting).

In periods of peak demand, vehicles are sometimes loaded to levels above their capacity. Once a vehicle is loaded to a point where it becomes unrealistic for any more passengers to board it is said to be at crush capacity. As loadings increase from capacity to crush capacity, the passenger circulation (within the vehicle and boarding and alighting) becomes less efficient, increasing the required dwell times at stops.

Travel Speed

Justification of the measure's selection

Travel speed of services provided by most urban transit agencies are gradually slowing, typically at rates of 1-3% per year. This is just gradual enough that it rarely becomes a political issue, and yet it represents a profound decay over just a few years. Overall transit travel speed, including stops, may be one of the most powerful transit performance measures, for the simple reason that speed affects the transit operation in two independent ways:

- Falling speeds mean rising operating cost (slower service › longer running times › more buses needed to maintain a given headway › more cost). This comes at the expense of additional needed service to which this money could be devoted.
- Falling speeds discourage ridership, because the service is less attractive relative to the automobile.

The TCRP document recommends the use of Transit/Auto Travel Time difference as the preferred measure of travel speed. This recommendation has at least one serious problem. In the face of increasing levels of auto congestion, it would seem counter-productive to assess transit speeds relative to auto speeds. If this measure were used, there would be a risk that as auto travel time increased, so would transit travel time, meaning that over time, the speed and efficiency of the transport network would gradually reduce.

Based on the recognition of these issues, Nelson\Nygaard developed an alternative measure of *Percentage of Posted Speed Limit*.

This was selected on the basis that it constitutes a readily available and simple term of reference. Importantly, posted speed limit is a reasonably consistent term of reference because it is less prone to "creep" than measures such as auto or network speeds. By using it as an assessment measure, it is therefore possible to promote improved transit travel speeds and avoid the risk of declining speeds on the overall network.

Proposed Primary Transit Network Loading Measurements			
	QOS	% Posted Speed Limit (SL)	Comments
Pass	+3	> 20% of services running > 0.7SL > 90% of services running > 0.5SL (or 10 MPH, whichever is greater) 100% of services running > 0.3SL (or 10 MPH, whichever is greater)	A very high proportion of transit services running at speeds that would make it attractive compared to driving.
	+2	> 10% of services running > 0.7SL > 80% of services running > 0.5SL (or 10 MPH, whichever is greater) 100% of services running > 0.3SL (or 10 MPH, whichever is greater)	A high proportion of transit services running at speeds that would make it attractive compared to driving.
	+1	> 5% of services running > 0.7SL > 70% of services running > 0.5SL (or 8 MPH, whichever is greater) 100% of services running > 0.3SL (or 8 MPH, whichever is greater)	An acceptable proportion of transit services running at speeds that would make it attractive compared to driving.
Fail	-3	< 70% of services running > 0.5SL > 5% of services running < 0.3SL (or 8 MPH, whichever is greater)	An unacceptable proportion of transit services running at speeds that would make it attractive compared to driving.
	-6	< 50% of services running > 0.5SL > 10% of services running < 0.3SL (or 8 MPH, whichever is greater)	An unacceptable proportion of transit services running at speeds that would make it attractive compared to driving.
	-9	< 30% of services running > 0.5SL > 20% of services running < 0.3SL (or 8 MPH, whichever is greater)	An unacceptable proportion of transit services running at speeds that would make it attractive compared to driving.

Framework for Assessing Transit Quality of Service

This subsection describes the process by which the individual QOS measures can be brought together to provide an overall assessment of the QOS of a particular transit route or network segment. While the individual performance criteria help determine the actions necessary to optimize the transit system itself, aggregation of the criteria helps to provide a more complete picture of the quality of service that different elements of the transit network offer. It also assists in determining how to balance the needs of transit with those of other modes. These weighted scores are used in the "balancing process" described in the concluding chapter.

Process

The process for measuring Transit Quality of Service is summarized as follows:

- Select Transit Route Segment to be measured.
- Undertake the measurements of individual QOS indicators (Frequency, Hours of Service, Reliability, Loading and Travel Time).
- Incorporate into the Transit Service Measures Report Card (as described in the following subsection).

Transit Service Measures Report Card

As outlined earlier, *Transit Service Measures* can be an effective and appropriate way of assessing the quality of service offered by a transit network. We see an advantage to maintaining the transparency of the measurement process and recommend the production of a "Report Card" for each transit route segment assessed. This will ensure that the relative performance of the route segment in all of the component service measures is taken into account in the planning process.

A sample report card is provided in the figure below. Sample scores are inserted in gray.

The features of the report card are summarized below.

Service Measure

The service measure is shown in the left hand column. Details of these service measures, and how they are calculated or applied are provided in previous sections.

Weighting

Some service measures are considered more important than others. In this case, we assumed that frequency and travel time are the most important factors that determine transit ridership, the key concern of the city. To recognize these differences, therefore, a simple weighting has been applied. For the frequency and travel time measures, each point is multiplied by two.

QOS scores ("Fail / Pass" columns)

This portion of the "Report Card" brings together the scores from the individual QOS assessment processes. For an overall assessment to be considered a "pass", all measures must be +1 or greater; that is, if any individual measure appears in the red-shaded portion of the table, it causes an instant 'fail' in the overall assessment. The scores for the individual assessments are entered in the body of the table.

QOS scores ("Total" column)

The individual scores are then multiplied by the weighting of their row to calculate the number

in the "Total" column. The numbers in this column are then summed to calculate the Total Aggregated Quality of Service. This final sum can be divided to get an average weighted score. In the sample below, the total score of 11 points produces a weighted average of 1.6, Acceptable to Good overall.

QOS descriptions

The meaning of the different QOS scores will vary depending on the individual measure. This said, the global meaning of the different scores are provided at the bottom of the report card.

Location: _____								Date of assessment:	
Service Measure	Weighting	FAIL			PASS			Total	Comment
		-9	-6	-3	+1	+2	+3		
Frequency	2					2		4	
Hours of Service	1						3	3	
Reliability	1				1			1	
Loading	1				1			1	
Travel Speed	2				1			2	
Total	7							11	Aggregated Quality of Service
								1.6	Average Score
QOS Descriptions		Fail – Very Poor	Fail - Poor	Fail	Acceptable	Good	Excellent		

Limitations associated with the aggregation of individual transit service measures

The aggregation of a range of individual transit service measures into a single measure is a necessary part of the overall process we have developed to balancing the needs of different modes of transport while improving transit quality of service. This said, the process of aggregation should be considered with caution for a number of reasons, as outlined below.

- Particularly poor performance on one segment or in one measurement may produce an overall poor score for a route that otherwise performs well.
- Route segments scoring higher on such measures as Frequency could benefit the most from high performance in other service measures. For example, if travel speeds are improved on high frequency routes, there will be greater saving in operating costs and travel time.

There are a number of methods that could be applied to address these potential issues, including:

- Reduce the effect of aggregation by classifying the route segment by the poorest performing transit service measure.
- Select critical transit service measure(s) (eg: frequency) and require better performance overall performance for route segments that score well in the critical measure(s).

Quality of Service Measures for Non-Transit Modes

To be useful to traffic engineers, planners and road designers, the transit Quality of Service measures must be paired with comparable measures for other modes. Planners must know the extent to which one mode can be inconvenienced in order to benefit another mode. They must understand how the competing needs of each mode are best balanced against the others.

This chapter begins to explore how Quality of Service measures may be developed for automobiles, bicycles, pedestrians, freight and parking. The measures are designed to be directly compatible with those proposed for transit, so that straightforward balancing tools can be developed, as shown in Chapter 7.

This section is intentionally cursory, and provides 'placeholders' rather than final recommended performance measures. Before implementing, more detail will need to be developed for each of these modes below.

Automobile

Existing LOS Standards

As discussed earlier, an Auto Level of Service (LOS) standard, based on volume to capacity (V/C) ratios is the currently adopted Level of Service measure in the Glendale General Plan. Once a jurisdiction sets a standard, it is used to assess environmental impacts, i.e. if the impacts of new development can be met through existing capacity, and/or to determine the required mitigations.

V/C ratios typically take the total number of vehicles on a given stretch of roadway or intersection and divide by the capacity of that road or intersection to handle cars. A v/c ratio of 0.80 or lower represents free-flow conditions, while a ratio of 1.20 represents severely congested conditions.

Possible Performance Measures

There is a range of different methods of measuring performance for automobiles. These include:

- Volume/capacity (v/c) ratio
- Intersection delay
- Graded A-F level of service (which can be sed on v/c ratio or intersection delay, accounting for roadway type and free-flow speed)
- Average travel times between destinations

Each method has a range of advantages and disadvantages. It would be helpful for any new methodology to be consistent with standards in the General Plan, and other applications. For these reasons, the v/c methodology is used as a placeholder in this working paper, prior to the possible augmentation of performance standards for automobiles.

Bicycle

Recent research has resulted in two emerging national standards for bicycle level of service:

- Bicycle Compatibility Index, developed for the Federal Highway Administration[2]
- Bicycle Level of Service, developed for the Florida Department of Transportation[3]

2 The Bicycle Compatibility Index: A Level of Service Concept. Implementation Manual. FHWA-RD-98-095. Available at: www.hsrc.unc.edu/research/pedbike/98095/index.html.

3 Landis, Bruce, et. al. (1997), "Real Time Human Perceptions: Toward a Bicycle Level of Service," Transportation Research Record 1578. Available at: www11.myflorida.com/planning/systems/sm/los/pdfs/BLOS%20TRB%20Scanned.pdf.

Both are similar, in that they employ a formula to take into account various roadway design features and traffic characteristics, and express results on a scale of A through F. Grade "A" represents the best conditions for bicycles. The Bicycle Compatibility Index (BCI) is the best established of the two measures, and is recommended as the interim measure for the City of Glendale. The BCI requires the following inputs:

- Geometric and roadside data:
  - Number of through lanes
  - Curb lane width
  - Bicycle lane or paved shoulder presence and width
  - Area character (residential or non-residential)
- Traffic operations data
  - Posted speed limit
  - 85th percentile speed of motor vehicles
  - Average Annual Daily Traffic volume
  - Percentage of traffic constituted by trucks
  - Percentage of vehicles turning right into driveways or minor intersections
- Parking data
  - Presence of on-street parking
  - On-street parking occupancy
  - Parking time limit

Note that both of these methodologies apply to mid-block segments only. Intersection level of service methodologies for bicycles are currently under development by the Florida Department of Transportation.[4] They also apply only to on-street facilities.

4 Landis, Bruce et. al. (2003), "Intersection Level Of Service For The Bicycle Through Movement," Transportation Research Record No. 1828. Available at: www11.myflorida.com/planning/systems/sm/los/pdfs/TM%20IntBLOS4.pdf.

Pedestrian

Establishing a performance indicator for pedestrians is fraught with several problems. Not only is there a lack of a nationally recognized standard measure, but – as with bicycles – there are also numerous, interwoven factors affecting the quality of the pedestrian environment. The Pedestrian Level of Service measure described in the *Highway Capacity Manual* primarily focuses on the capacity of sidewalks and other facilities; in other words, an empty, hostile suburban sidewalk can score better than a busy, vital, urban commercial street. While this may be appropriate in limited instances in Glendale where capacity is a real concern (for example, around busy bus stops), a more generally applicable measure of the quality of the pedestrian environment is necessary.

A number of cities, such as Fort Collins, CO, have developed their own measures for pedestrian quality. The Fort Collins methodology takes into account five criteria: directness of routes; continuity of routes; street crossings; visual interest; and amenity and security. Another promising standard results from Florida Department of Transportation research.[5] Similar to the Bicycle Compatibility Index, the Pedestrian Level of Service methodology uses a formula to take into account various relevant characteristics, and expresses results on a scale of A through F. It requires the following inputs:

5 Landis, Bruce et. al. (2001), "Modeling the Roadside Walking Environment: Pedestrian Level of Service," Transportation Research Record No. 1773. Available at: www11.myflorida.com/planning/systems/sm/los/pdfs/pedlos.pdf. Software available at: www.dot.state.fl.us/planning/systems/sm/los/los_sw2.htm.

- Sidewalks
  - Presence and width of sidewalk
- Lateral separation of pedestrians and motor vehicles
  - Widths of outside lane and any shoulder or bike lane
  - Presence of on-street parking
  - Presence and width of buffers between sidewalk and travel lane (e.g. trees)
- Motor vehicle volume and speed
  - Motor vehicle traffic volume
  - Number of through traffic lanes
  - Average motor vehicle speed

Pedestrian Level of Service may be considered in detail in a future working paper. Ideally, the indicator will consider ease of pedestrian crossings, as well as travel along the street.

Freight

There is no nationally accepted or locally adopted performance standard for freight. Given the importance of freight traffic to the regional economy, however, it is essential that one be developed, in order to balance the needs of trucks with other modes.

The primary concern of freight traffic is congestion and travel speed. For this reason, we recommend that the key performance indicator for freight be the same as that for automobile traffic. This is currently volume/capacity ratio, but could be amended if an alternative automobile level of service indicator is developed. The standards for freight traffic should perhaps be higher than those for general vehicle traffic, in view of the higher economic cost of delays.

In addition, Primary Truck streets would need to meet certain minimum design standards, including:

- Clearances at bridges and other structures
- Turning radii
- Lane widths
- Absence of weight limits or other restrictions

Parking

While it is not technically a travel mode, on-street parking is important to consider in the same framework as the needs of transit, automobiles, bicycles, pedestrians and freight. This is largely because it represents a competing demand for right-of-way, which has to be balanced against the demands of other modes. The less reliant the adjacent land use on curb parking, the greater the scope to introduce bus bulbs, turn lanes, peak-period only lanes and turn lanes, or to remove parking altogether. This paper therefore indicates a preliminary scope to remove on-street parking, based on the land use context and the competing demands on the limited right-of-way.

The City is currently developing detailed policies on where to install parking meters, or similar payment technologies for on-street parking such as pay stations, and updating a more comprehensive policy on parking management, as part of another section of the Mobility Plan.

CHAPTER 7. APPLICATION OF THE PERFORMANCE MEASURES

A key aim of this working paper is to show how Transit Performance Measures can be used to inform the planning and implementation of the Primary Transit Network.

Based on this recognition, we have developed a process that focuses on bringing the different modes together in consideration of the context in which the route segment is located. By considering the modes together with the context it provides the opportunity to:

- *balance* the often competing needs of the different modes within different contexts
- *inform* a process of compromise whereby the net gain for the community can be maximized while the net impact on different modes and context can be minimized.

How the 'Balancing Process' Works

The following summarizes the different actions that make up the 'balancing process'.

1. Locate the route segment in question. This can be as short as a single block or as long as a citywide corridor. It can also apply to an entire network.
2. Determine the context for the route segment in question according to the "Street Classifications" in Chapter 4.
3. Determine the different roles that the route segment in question is serving, as shown by the "Street Classifications" in Chapter 4. This will determine which modes / rows on the selected 'Balance Table' should be considered in the Balancing process.
4. Determine the necessary service measures. (See Chapter 6 for transit service measures and 'placeholder' service measures for other modes.)
5. Assess site constraints to determine the level of competition between modes within the physical dimensions of the route segment. This will determine which QOS / column on the selected 'Balance Table' should be considered in the Balancing process.
6. Adjustments to the physical roadway or its management may then be made to bring each mode into balance with the others. That is, to raise Bicycle LOS from "Minimum" to "Desired," Auto LOS may be reduced from "Preferred" to "Desired."

Because on-street parking can be used as an important tool both for increasing traffic capacity (by removing it) as well as promoting the health of commercial streets (by retaining it), we have also included parking in the table. Throughout, we have added more detailed notes that planners and engineers should consider while proposing adjustments to street design and management. Other design guidelines, such as standards for sidewalks, landscaping, lighting and signage, could also be considered as part of this overall balancing table, but they are beyond the scope of this working paper.

Figure 7-1 Balancing Quality of Service for Competing Modes

MODE / FUNCTION	CONTEXT ZONE	Minimum Quality of Service (Very high competition within corridor)	Desirable Quality of Service (High competition within corridor)	Preferred Quality of Service (Low competition within corridor)	BALANCING TOOLS
ROADWAY OPERATIONS STANDARDS					
Transit		Transit QOS	Transit QOS	Transit QOS	
Primary Transit Network	All	≥+1	≥+1.5	≥+2	Minimum Primary Transit Network standards must be met regardless of context or competition from other modes. Where conflict or substandard QOS results from delay, person delay rather than vehicle delay will determine remedial action.
Secondary transit	Urban Core	≥-1	≥-0.5	≥+1	For secondary transit routes, person delay or person capacity will be considered when there is a conflict that results from delay or capacity concerns. Automobile, Bicycle and Pedestrian QOS may all be adjusted so they come into balance.
	Urban Village Center	≥-1	≥-0.5	≥+1	
	General Urban	≥+0.5	≥+1	≥+1	
	Single family residential areas	≥+0.5	≥+1	≥+1	
Other transit	All	-	≥-1	≥-0.5	Person capacity and person delay may be considered, but are not crucial.
Auto		Vehicular V:C	Vehicular V:C	Vehicular V:C	
Primary Auto	Urban Core	<1.2	<0.8	>0.6	Person delay and person capacity must also be considered when reducing other modes' QOS level to raise auto QOS to the same level.
	Urban Village Center	<1.2	<1.0	>0.6	
	General Urban	<1.0	<0.8	>0.6	
	Single family residential areas	<1.0	<0.6	<0.4	
Secondary Auto	Urban Core	<1.2	<0.8	>0.6	
	Urban Village Center	<1.2	<1.0	>0.6	
	General Urban	<1.2	<0.8	>0.6	
	Single family residential areas	<1.2	<0.6	<0.4	
Tertiary Auto	All	-	<0.9	<0.8	
Bicycle		Bicycle QOS	Bicycle QOS	Bicycle QOS	
Primary Bicycle	Urban Core	D	B	A	In neighborhood commercial districts, transit and pedestrian QOS should generally take precedence over the provision of dedicated bicycle facilities. Where possible, primary bike routes should also avoid the Primary Transit Network. Where grades and other obstructions prevent relocating a key bicycle network street to a parallel street, secondary transit (not Primary Transit Network), primary auto and primary pedestrian QOS may be degraded to provide balance with Bicycle QOS.
	Urban Village Center	D	C	A	
	General Urban	C	B	A	
	Single family residential areas	B	A	A	
Secondary Bicycle	Urban Core	D	B	A	
	Urban Village Center	D	D	A	
	General Urban	D	B	A	
	Single family residential areas	D	B	A	

Figure 7-1 Balancing Quality of Service for Competing Modes (continued)

MODE / FUNCTION	CONTEXT ZONE	Minimum Quality of Service (Very high competition within corridor)	Desirable Quality of Service (High competition within corridor)	Preferred Quality of Service (Low competition within corridor)	BALANCING TOOLS
Pedestrian		Pedestrian QOS	Pedestrian QOS	Pedestrian QOS	
Primary Pedestrian	Urban Core	B	A	A	The success of all modes relies upon an excellent and complete pedestrian network. In general, degradation of pedestrian QOS should be avoided at all costs.
	Urban Village Center	B	A	A	
	General Urban	C	A	A	
	Single family residential areas	D	B	A	
Secondary Pedestrian	Urban Core	D	B	A	
	Urban Village Center	D	D	A	
	General Urban	D	B	A	
	Single family residential areas	D	B	A	
Truck		Vehicular V:C	Vehicular V:C	Vehicular V:C	
Urban Core	Primary Truck	<0.8	>0.6	<0.4	Freight movements have a much greater economic value to the city than the movement of other vehicles. Where vehicular volume to capacity ratios cannot be improved due to competition with other modes, special truck bypasses or other tools should be considered.
	Urban Village Center	<1.0	>0.6	<0.4	
	General Urban	<0.8	>0.6	<0.4	
	Single family residential areas	<0.6	<0.4	<0.4	
ROADWAY DESIGN and MANAGEMENT STANDARDS					
Parking	Urban Core	Compete removal of parking is acceptable in order to achieve "Desirable" QOS for all other modes	Compete removal of parking is acceptable in order to achieve "Desirable" QOS for other modes	Maintain on-street parking, at least during off-peak. In general, parking will be paid/metered.	Parking management and remediation plan required for any parking removal.
	Urban Village Center	Significant on-street parking reduction is acceptable in order to achieve "Desirable" QOS for transit and pedestrians.	Limited parking removal at spot locations acceptable in order to achieve "Desirable" QOS for transit and pedestrians.	Maintain all on-street parking. In general, parking will be paid/metered.	
	General Urban	Compete removal of parking is acceptable in order to achieve "Minimum" QOS for other modes	Limited parking removal at spot locations to achieve "Desirable" QOS for all modes.	Maintain all on-street parking. All parking must be managed.	
	Single family residential areas	Compete removal of parking is acceptable in order to achieve "Minimum" QOS for other modes	Limited parking removal at spot locations to achieve "Desirable" QOS for all modes.	Maintain all on-street parking.	
Sidewalk Design					These design elements may also be included in this table format, but they are not within the scope of this paper.
Landscape Requirements					
Lighting Requirements					

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Glendale Streetcar Alignment Review

Appendix
4A

GLENDALE DOWNTOWN MOBILITY PLAN

Review Of The BUZZ Alignment As A Future Streetcar Alignment

The following is a review of the feasibility of a future conversion of the alignment identified for the Glendale downtown bus circulator (The BUZZ) to a fixed rail streetcar system. The review is based on a visual reconnaissance of the proposed alignment and is intended to address the following questions:

- Are there fatal flaws or potential fatal flaws that would make a conversion from bus operations to a streetcar operation infeasible?
- Are there locations on The BUZZ alignment that would require changes to improve the functioning of a streetcar operation?
- Are there locations that would require special design attention if a decision is made to pursue implementation of a streetcar operation?

The following sections provide a description of the considerations associated with the implementation of a streetcar operation on the proposed alignment for The BUZZ. The text proceeds in a north to south direction.

Stocker - Glenwood/North Terminus

Two alignment options would be appropriate for a more detailed assessment in this section of the alignment. The first would be a loop as illustrated for the proposed bus circulator. The second option would be a two-way operation on Stoker.

From the intersection of Pacific and Stocker, the loop option would proceed north on Pacific, west on Glenwood, south on Concord and east on Stocker. Each of the streets are of two-lane configuration with parallel parking and frequent curb cuts for a combination of residential driveways and business accesses. Pacific Avenue functions as an arterial with left-turn lanes at both the Stocker and Glenwood intersections. The turn from Stocker westbound onto Pacific northbound is likely to require a modification of the traffic lane configuration, including the likelihood of removing some parking on the west side of Pacific north of the Stocker interchange. The turn from northbound Pacific to westbound Glenwood could occur within the current lane configurations but would likely require the addition of a traffic signal at this location. Glenwood currently accommodates bus service and has a character that would work well with a streetcar operation. Station locations

between Pacific and Concord on Glenwood would require curb extensions at station locations, improvements that are not currently utilized on the Beeline routes. Each station would require removal of two or three parking spaces and would have to be carefully located to avoid driveways. A new traffic signal would be required at Concord to accommodate streetcars turning from Glenwood to southbound Concord (Concord is a two-lane southbound one-way street with parking on the south side). The west side of Concord could serve as a block long exclusive streetcar alignment that could serve the dual purpose of a terminal station and layover. Another signal or a "train turning warning device" would be required to accommodate the streetcar turning from the right lane of Concord, across two travel lanes to the eastbound lane of Stocker. Although the section of Stocker between Concord and Pacific currently houses a bus line, this section of the street has much more of a residential street character. One requirement that could be an issue is a number of the trees that provide a canopy for the street would have to be trimmed in order to accommodate the overhead contact wire system.

Stocker Street (east of Concord)

A second streetcar alignment in this segment would consist of a two-way operation on Stocker between Pacific and Concord. This alignment would be less complex and likely less expensive to build, eliminating three turning movements and the addition and modification of signals and the traffic impact of accommodating the streetcar turning movements. The alignment would require more extensive trimming of the street trees on Stocker, as mentioned in the previous paragraph. The terminal station could be located either north or south of Stocker on the west side of Concord (Figures__ and __). In either case some level of signalization would be required at the intersection of Concord and Stocker to protect the streetcar operations through the intersection. In either terminal location, the streetcar track would have to be segregated from the auto traffic. The west side of Concord does not currently have parking, so no loss of parking would be associated with these locations for a station and terminal layover.

Concord Street (south of Stocker)

Stocker - Pacific to Brand

This section of Stocker functions as a minor arterial with two travel lanes and parallel parking on the south side of the street. The streetcar would utilize the two travel lanes by operating as a two-way system in this segment. Stations would require curb extensions, approximately the length of two parking spaces. There are numerous curb cuts in this section that would require careful consideration in locating any stations. The character of this street is consistent with streetcar operations. Stocker currently has bus service.

The train turning movement to and from Brand Blvd. to Stocker will require special design attention, including modifications to the functioning of the traffic signal system at the Brand and Stocker intersection. How the intersection functions will be impacted by the location of the track within Brand Blvd. Of particular concern would be the Stocker east bound to Brand south-bound turn if the track alignment on Brand is in the outside lane.

Brand at Stocker

Brand Blvd. - Stocker to Ventura Freeway

This segment includes two travel lanes in each direction with left-turn refuges at a number of intersections. On-street parking is a combination of diagonal and parallel parking. The traffic volume on this segment of Brand is lighter than south of the Ventura Freeway. The preferred alignment within the street for the streetcar tracks to be in the outside travel lanes with stations provided by use of curb extensions.

There are two significant considerations in utilization of the outside lanes for the streetcar operations in the segment of Brand between Stocker and Glenoaks. The first are potential conflicts with numerous business accesses throughout this segment. Each will require special attention in the location of stops to avoid conflicts. The second consideration is the difficulty introduced by streetcar operations adjacent to the diagonal parking located between Stoker and Glenoaks Blvd. Autos accessing and departing from the parking spaces can impact the streetcar operations and could present safety problems.

Brand at Stocker (looking south)

If operations of the streetcar were to occur in the center lanes the primary difficulty is providing stations that can be safely accessed by pedestrians in the street median. In addition, it appears the diagonal parking acts to moderate the use of the outside lanes, resulting in the center lanes function as a “through-lane”. Locating the streetcar in the center lanes would appear to have greater impact on the traffic carrying capacity of section of Brand Blvd.

Either street alignment will require an review of the structure over the Ventura Freeway to assess its ability to accommodate a streetcar operation.

Brand Blvd. - Ventura Freeway to Broadway

As with the section east of the Ventura Freeway, this segment of Brand Blvd. has two travel lanes in each direction with left-turn lanes at key intersections. The majority of this segment is also characterized by a landscaped median and some mid-block pedestrian crossings. On-street parking is a combination of parallel and diagonal parking, with some areas having no on-street parking. This segment is also characterized as having few direct accesses onto Brand.

The preferred track alignment in this section would be in the outside travel lanes in order to simplify the creation of station through use of curb extensions. As with other sections, each stop would require removal of two or three parallel parking spaces and four to six diagonal parking spaces. The stops should be more frequent in this segment given the density of adjacent development. Given there are no streetcar turning movements in this segment, the operation of the streetcar would not require significant modifications to either the street geometry or the signal system.

Brand at Wilson (looking south)

Brand to Central Transition

The transition of the alignment for The bus circulator from Brand to Central Avenue is shown as occurring on Broadway. For a streetcar operation, other options for making the transition should be investigated for the following reasons:

- Introducing streetcar turning movements at the Brand/Broadway and Broadway/Central intersections would likely require a separate signal phase, complicating the operation of two of the most critical intersections in the City's core.
- The nature of Broadway between Brand and Central, coupled with the necessity of using the inside lanes to accommodate turning movements, would exclude introduction of a streetcar stop in this segment.
- Assuming that a streetcar alignment on Central would utilize the outside travel lanes, the northbound Central alignment turning onto eastbound Broadway could not be made without reconfiguring Broadway to include possible elimination of the left-turn lane from Broadway to Central.

Broadway at Brand (looking west)

Broadway at Orange (looking west at the intersection of Broadway and Central)

Options for making the transition could include use of Wilson or Colorado Streets, or a combination of the southbound Brand/Broadway/Central alignment with an alternative northbound alignment (see Figure __). A more detailed investigation of alternative locations to make the transition from Brand to Central would be required including a detailed assessment of the impact on the traffic operations.

Central Avenue

South of Broadway Central Avenue is a fairly wide 5-lane arterial with parallel parking on both sides. The street has a combination of commercial and residential uses between Broadway and the Glendale MetroLink Station. The street functions as a major traffic corridor serving major destinations such as the Glendale Galleria, the Glendale Memorial Hospital complex and the MetroLink Station. Bus service currently operates the length of Central. Given the configuration of the street, the preferred location of the streetcar tracks would be in the outside lanes, providing station stops via use of curb extensions that could double as bus stops. The location of stops would need to be carefully evaluated to avoid impacting business accesses. This will be particularly important in finding suitable locations at key intersections such as Chevy Chase Drive and Los Feliz Blvd.

The character of the street and traffic operations is fairly consistent between Broadway and San Fernando Road. Within this segment, it is not anticipated the introduction of a streetcar operation would require significant modification of the traffic operations or the current signal system.

South of San Fernando, the character of Central Avenue changes substantially. The street in this section is a two-lane, two-way street with parallel parking on both sides. The street is lined with a combination of commercial/industrial and residential land uses. The street has a heavy volume of bus service, a result of being a primary access route to the MetroLink Station. Given the narrow character of the street and the numerous driveways, the operation of a streetcar on this short section would necessitate a low speed.

The intersection of Central and San Fernando would require special design considerations. In particular, the northbound tracks through the intersection would require either a substantial modification or complete removal of the existing traffic island that houses a portion of the traffic signal system that controls movements through the intersection.

Glendale MetroLink Station

The southern terminus of the streetcar line is proposed to be at the Glendale Metrolink Station. This location would facilitate convenient transfers to Amtrak and Metrolink rail services and regional and Beeline bus services. An initial review indicates the potential exists to modify the current bus circulation area to accommodate a streetcar operation through the station area and

provide direct transfers between the various services. However, such modifications could be relatively expensive and could place some constraints on the bus operations or conversely impact some of the auto parking area.

Central at entrance to the Glendale Transportation Center. Potential single-track terminal station site.

An alternative that could be implemented at less cost as well as less impact on the current functioning of the Metrolink Station would be to terminate the streetcar line at the north end the station parking lot on the east side of Central. This area is currently occupied by a landscaping strip, a sidewalk and utility accesses. Although not as convenient as a direct cross-platform transfer, with good signage this location could function as an effective transfer point (see Figure __). Another option would be for the streetcar alignment to turn from Central onto Gardena Avenue and terminate with a stop utilizing the current on-street parking area on the south side of the street as a single-track station (see Figure __). As with the other terminal option, this option would offer the advantage of being relatively low cost but again would provide a less direct transfer compared to being "on-site".

SUMMARY

A review of the proposed alignment for The BUZZ does not indicate there exists a fatal flaw in a future conversion to a streetcar operation. Some existing portions of the alignment would benefit from exploring and possibly modifying the alignment to better accommodate a streetcar operation and, in some cases, to reduce impacts on traffic or adjacent development. The following is a listing of some of the elements associated with the implementation of a streetcar operation that will require additional study:

- A second option at the north end of the alignment would be to extend the two-track option on Stocker west to Concord, avoiding the streetcar turning movements at the Pacific/Stocker, Pacific/Glenwood and Glenwood/Concord intersections.
- The design of the transition from Stocker to Brand would require special attention.
- Diagonal parking on Brand could pose a potential conflict.
- The northbound track alignment through the Central/Broadway/Brand intersections is complicated and would likely result in added traffic delays.
- Alternative locations to make the Brand to Central transition should be explored
- Some modifications would be required at the San Fernando-Central intersection.
- The termination at the Glendale Metrolink Station would require a special design assessment; however, there are a good range of options available for a streetcar terminal station at this location.
- A critical consideration in the development of a streetcar operation is the need for a maintenance facility that has direct access to the selected alignment.

- It does not appear that Glenoaks Blvd. is a candidate for a streetcar operation given the higher operating speeds of the traffic that would lead to possible safety issues at streetcar stops.

Appendix

5A

Peak Occupancy Calculation for Entire Downtown Public Parking Supply

WEEKDAY PEAK PARKING OCCUPANCY FOR ENTIRE PUBLIC PARKING SUPPLY (1-2PM)											
	On-Street Non-Brand[1]	Brand (2)	Lots 1, 3, 4, 6, 12, 15, 17[3]	Lot 10[4]	Lot 11[4]	Orange[5]	Ex-change[6]	Market-place[7]	Total[8]	Occu-pancy	Empty Spaces
Total Spaces Available	2079	251	498	62	66	625	694	1124	5399		
Spaces Occupied at Weekday Peak (1-2 PM)	1339	220	321	12	3	97	507	358	2857	53%	2542

SOURCES

1 DSP Occupancy Survey, sum of all streets surveyed in that survey, weekday=Thursday 1-2p, weekend=Saturday 8-9pm
2 Brand Blvd Downtown Parking Survey, 2004 (We do not have hour-by-hour parking occupancy data for Brand, 220 is the average occupancy
3 Downtown Parking Lot Survey 2004-Tuesday 1-2pm (see sheet 2 of this spreadsheet titled "Lot Occup.")
4 Off-Street Parking Meter Revenue (2004) (This is AVERAGE occupancy based on revenue which is the only occupancy data we have for these 2 lots)
5 Orange Street Parking Structure Occupancy Survey, Average of 1-2 pm weekday occupancy from Jan/Feb/March 2005
6 Exchange Parking Structure Occupancy Survey, Average of 1-2 pm weekday occupancy from Jan/Feb/March 2005
7 Marketplace Parking Structure Occupancy Survey, Average of 1-2 pm weekday occupancy from Jan/Feb/March 2005
8 It should be noted that according to Tommy Chow and Jano at the City there are 3104 off-street spaces, this chart shows only 3069

Redwood City Parking Ordinance

Appendix
5B

REPORT

To the Honorable Mayor and City Council
From the City Manager

July 25, 2005

Subject
Downtown Parking Management Plan

Recommendations

1. Introduce the attached Ordinance, which establishes meter rates based on the fair market rate, eliminates time limits, allows for the installation of computerized pay-by-space meters, utilizes Downtown meter revenue for parking and traffic related improvements pursuant to Section 20.121, and provides for modifications to the parking permit program.
2. By motion, authorize staff to allow all Downtown retail, restaurant, and entertainment businesses who purchase validation equipment to issue validations to their customers, in compliance with the Parking Facilities Agreement, without the payment of a per-validation fee to the City.

Executive Summary
On June 6, 2005 staff presented a Parking Management Plan ("The Plan") to the City Council to ensure convenient, efficient, and orderly use of Downtown parking as the magnitude and pattern of Downtown parking demand changes.

The Plan proposed changes to the current Downtown parking system that are summarized as follows:

Recommendation #1: Establish parking prices on the fair market rate.

Recommendation #2: Eliminate time limits.

Recommendation #3: Switch meters in the core area to computerized pay-by-space models.

Recommendation #4: Utilizes Downtown meter revenue for parking and traffic related improvements pursuant to Section 20.121.

Recommendation #5: Modify the parking permit program.

In order to implement these changes, an ordinance must be adopted which changes certain parking regulations. Once this is done, physical changes can be made, such as the installation of new meters and signage. The creation of an educational and promotional campaign to introduce the new program to the public can also commence upon the adoption of the ordinance currently under consideration.

Background

With the upcoming opening of the "On Broadway" retail/cinema project, parking patterns in Downtown Redwood City will change dramatically. The number of cars competing for parking spaces will increase significantly, and the hours of activity will shift from a daytime-oriented pattern to an 18 hour/7 days a week pattern. Staff appeared before the Council on April 11 and gave a presentation about these anticipated changes.

The current parking management system was not designed to handle these new patterns of use. Parking meter fees are not in effect during evenings and weekends, which currently aren't busy periods, but will be in the near future. Current prices are too low in the most active areas to ensure adequate turnover of prime spaces (resulting in a perception of a lack of parking), and use of conventional meters in these areas will be very inconvenient because they only take coins for payment.

Staff has been researching various parking strategies and working with Downtown stakeholders for more than a year, and the Parking Management Plan is the result of this effort. Staff strongly believes that this plan is the best way to accomplish these goals:

- Keep convenient curbside spaces available for customers at all times.
- Create parking opportunities for as many different people as possible.
- Don't make customers leave early or move their cars to avoid tickets.
- Create reasonable parking options for employees—don't make them "shuffle" every hour.
- Avoid traffic congestion from "cruising."
- Create a customer-friendly system.
- Rely more on incentives than penalties.
- Keep the parking system financially self-sufficient.
- Utilizes Downtown meter revenue for parking and traffic related improvements pursuant to Section 20.121.

Adoption of the attached ordinance would implement the various components of The Plan in order to achieve these goals. Attachment 1 includes a brief description of each part of the ordinance and its role in carrying out the Parking Management Plan.

Changes to the Parking Management Plan per the Meeting of June 6

Based on Council and public feedback from June 6, as well as further staff analysis, some improvements have been made to the Parking Management Plan since it was initially presented. These improvements have already been incorporated into the ordinance currently under consideration.

Permits: There was concern that the suggested permit program did not meet the needs of many current permit holders in light of the extended hours of operation of City lots and garages. In particular, there was major concern that many Marshall Garage permit holders who work late and on the weekends would have to pay the $5 per hour rate after office hours and that this would present a significant inconvenience. This would also represent a change from the current system, in which Marshall Garage permit holders do not have to pay to park in that facility at any time and no specific limitations for the validity of these permits is described in the current code language which governs them. Therefore, to meet the diverse needs of Downtown workers, staff now recommends a more diverse permit program than initially discussed. This program is

described in detail in Attachment 2. Three types of permits would be available: Bronze (valid weekdays until 7pm), Silver (valid all day on weekdays), and Gold (valid at all times). This system should accommodate many different needs.

Free Night and Weekend Parking: Staff has concluded that it would be best to alter the area which will be free on nights and weekends slightly from the area shown in the Parking Management Plan. It is recommended that the area with nighttime and weekend prices match the area with the new computerized "pay-by-space" meters. This is the area with the greatest anticipated nighttime/weekend parking demand and it is very logical for it to coincide with the nighttime/weekend pricing more closely. The new boundaries of free night and weekend parking are shown in Attachment 3. This change results in a greater amount of free parking.

Validations: Another concern from the public had to do with validations. Per the Parking Facilities Agreement with the retail/cinema developer, a validation program will be established for the Jefferson Garage, Marshall Garage, and Middlefield Lot. As of the June 6 presentation to the Council it was undecided whether merchants outside of the retail/cinema project would be required to pay a fee for each validation that they issued to their customers. Some felt that requiring payment from other Downtown merchants while *not* requiring it of the project businesses was inequitable. After analysis, staff has concluded that not charging a fee for validations would not result in a major loss of revenue to the parking fund and would not cause significant parking problems because validations will only give customers one to two hours of free parking and they will not be allowed to accrue multiple validations. Therefore, staff recommends that validations be free to all Downtown retail and restaurant businesses that purchase validation equipment.

Library Area Parking Congestion: The area around the Library is very congested, and competition for this parking will probably remain intense. In the initial plan, this was addressed by a slightly higher meter rate near the Library than in the Main Street Parking Lot, which would discourage retail and restaurant employees from parking near the Library. Another measure in the original plan was to meter the City Hall Employee Lot and allow the public to park in spaces not occupied by permit holders (currently this lot is "permit only" until 4:00pm on weekdays). This will add some spaces to the supply available to Library users. Since the June 6 presentation, staff has attempted to decongest the City Hall Employee Lot further with three added measures.

- City fleet vehicles would be moved to the area behind the library, adjacent to the Caltrain tracks.
- City employee permits would only be valid in the City Hall Employee Parking Lot until 6:00pm. Employees working later than that would need to park in the area behind the Library, which is much less desirable for customer parking.
- A limited number of permits would be made available to employees of restaurants and shops for use in the area behind the Library to lure them out of the customer parking areas.

These three added measures, coupled with the originally recommended measures, ought to substantially improve parking availability near the Library. Community Development staff has spoken to Library Director Dave Genesy and he is supportive of these changes.

Remaining Issue

Free Parking for Library Patrons: Some people, including some on the Council, voiced support for exploration of ways to offer the Library clientele free parking opportunities. There are two possible ways of doing this. One would be to install a validation machine in the Library which would allow people who use Library services to receive free validated parking in the Middlefield Lot, the Jefferson Garage, and the Marshall Garage in the same manner as other Downtown businesses will be permitted to do. This would give Library patrons up to two hours of free parking within a few blocks. The other option would be to equip the Library Parking Lot with the same pay-on-foot equipment that is being installed in the Marshall Street Garage. This would allow the Library to have its own validated lot close-by. This equipment is relatively costly, though, and preliminary staff estimates show that equipping this lot in this way may cost up to $100,000. However, no action is needed on this issue at this time. If the Council wishes, staff will get bids for such equipment when it gets bid for the new "pay-by-space" meters and the Council may decide at that point.

Dan Zack
Downtown Development Coordinator

Joel Patterson
Community Development Director

Susan Moeller
Redevelopment Manager

Ed Everett
City Manager

Attachments

1. Ordinance Summary
2. Proposed Parking Permit Fee Schedule
3. Night and Weekend Meter Rates
4. Map of Off-Street Parking Facilities
5. Ordinance _____

Attachment 1

A Summary of the Ordinance under Consideration on July 25

The ordinance under consideration implements the Parking Management Plan that was discussed at the City Council meeting of June 6, 2005. The five recommendations of that plan were as follows:

Recommendation #1: Establish parking prices on the fair market rate.

Recommendation #2: Eliminate time limits.

Recommendation #3: Switch meters in the core area to computerized pay-by-space models.

Recommendation #4: Utilizes Downtown meter revenue for parking and traffic related improvements pursuant to Section 20.121

Recommendation #5: Modify the parking permit program.

The ordinance includes four parts. Part 1 of the ordinance removes time limits from the Downtown area, per Recommendation #2 of the Parking Management Plan. Time limits outside of the Downtown area—where there are not meters to ensure adequate turnover—have not been changed. The table in Part 1 of the ordinance merely re-states existing time limits outside of the Downtown area, reordered to reflect the removal of Downtown time limits and placed in a table for improved accessibility.

Part 2 of the ordinance implements Recommendations #1 (establish prices based on the fair market rate) and #4 (utilizes Downtown meter revenue for parking and traffic related improvements pursuant to Section 20.121) of the Parking Management Plan. It sets the base rates that were shown in the Plan and also puts into place a mechanism for incremental adjustments, up or down, of those rates in order to maintain the use of parking areas close as possible to the 85% "target occupancy rate" that is ideal for ensuring easy ingress and egress, reducing cruising traffic, and offering parking opportunities to as many different people as possible. A maximum meter rate of $1.50 is also established.

Part 2 of the ordinance also amends appropriate language in order to allow for the installation of computerized pay-by-space parking meters per Recommendation #3 of the Parking Management Plan. The rest of Part 2 of the ordinance contains other parking meter regulations that are unaffected by the Parking Management Plan and have simply been reordered to fit into this new version of Division 4 of the code.

Part 3 of the ordinance creates a new parking permit program for Downtown, establishing new types of permits, the periods for which they are valid, and the costs of these permits. This implements Recommendation #5 of the Parking Management Plan.

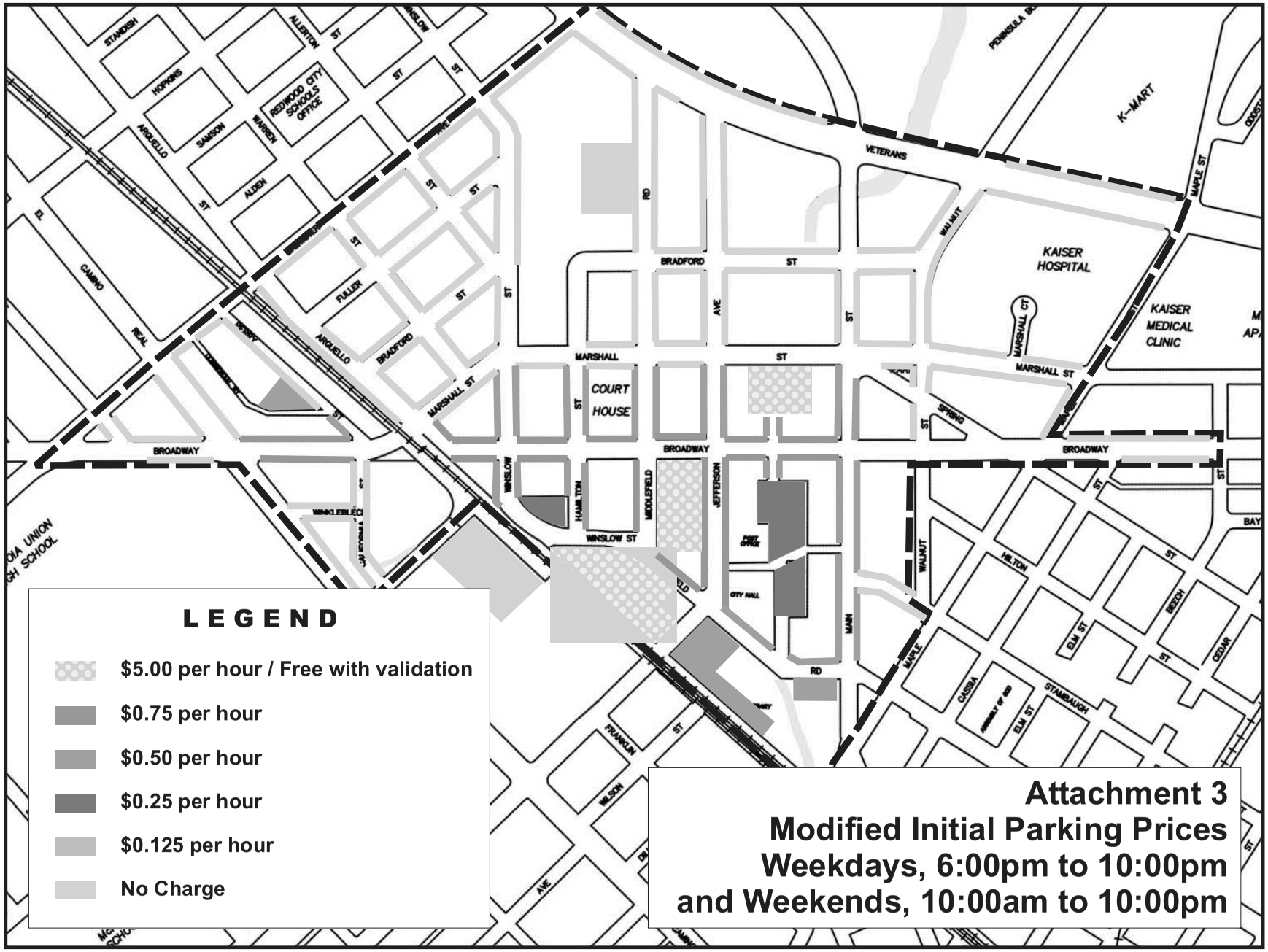
Part 4 of the ordinance also implements Recommendation #5 of the Parking Management Plan. Division 9 regulated ***un***metered parking lots, so the primary change pertains to the parking area behind the Library, which would become a permit-only zone for use by City Hall and Library employees and City fleet vehicles.

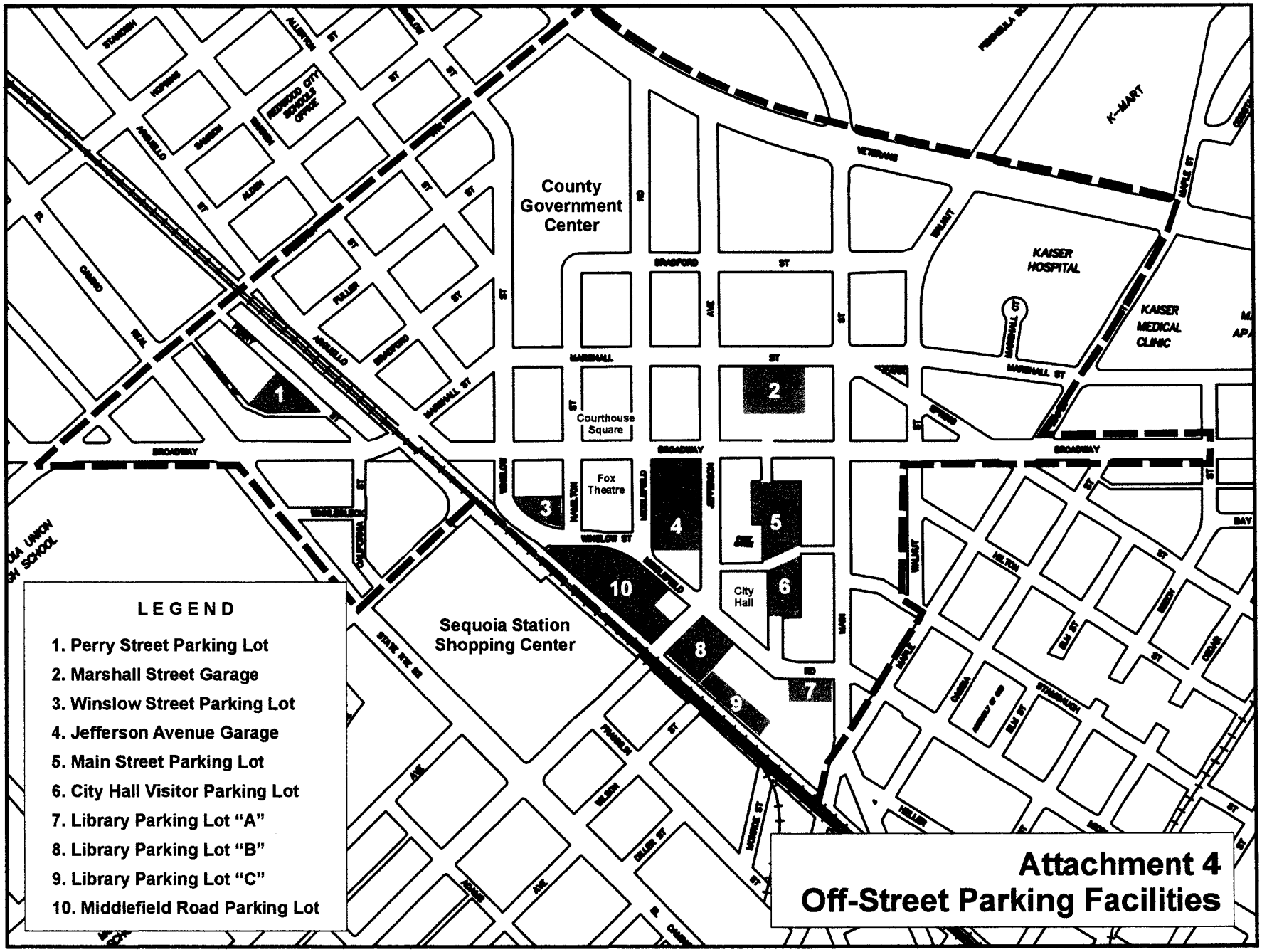
Part 5 of the ordinance establishes the effective date of these changes, which would be February 1, 2006.

Attachment 2

Proposed Downtown Permit Program

Permit Type	Valid Area	Valid Times	Monthly Cost	Yearly Cost
Marshall/Middlefield Bronze Permit	Marshall Street Garage and Middlefield Parking Lot	Valid in Middlefield Parking Lot Monday through Friday, from the time at which meters begin operation until 7:00pm; valid in Marshall Street Garage Monday through Friday, from the time at which meters begin operation until 7:00pm	$30.00	$330.00
Marshall/Middlefield Silver Permit	Marshall Street Garage and Middlefield Parking Lot	Valid in Middlefield Parking Lot Monday through Friday, from the time at which meters begin operation until 7:00pm; valid in Marshall Street Garage Monday through Friday, all hours	$35.00	$385.00
Marshall/Middlefield Gold Permit	Marshall Street Garage and Middlefield Parking Lot	Valid in Middlefield Parking Lot Monday through Friday, from the time at which meters begin operation until 7:00pm; valid in Marshall Street Garage at all times	$40.00	$440.00
Perry/Winslow/Main Bronze Permit	Perry Street Parking Lot, Winslow Street Parking Lot, and Main Street Parking Lot	Monday through Friday, from the time at which meters begin operation until 7:00pm	$40.00	$440.00
Perry/Winslow/Main Silver Permit	Perry Street Parking Lot, Winslow Street Parking Lot, and Main Street Parking Lot	Monday through Friday, all hours	$50.00	$550.00
Perry/Winslow/Main Gold Permit	Perry Street Parking Lot, Winslow Street Parking Lot, and Main Street Parking Lot	All times	$60.00	$660.00
Library Parking Lot "C" Gold Permit	Library Parking Lot "C"	All times	$20.00	$220.00


LEGEND
$5.00 per hour / Free with validation
$0.75 per hour
$0.50 per hour
$0.25 per hour
$0.125 per hour
No Charge
Attachment 3
Modified Initial Parking Prices
Weekdays, 6:00pm to 10:00pm
and Weekends, 10:00am to 10:00pm
COURT HOUSE
KAISER HOSPITAL
KAISER MEDICAL CLINIC
K-MART
REDWOOD CITY SCHOOLS OFFICE
BROADWAY
MARSHALL ST
BRADFORD ST
VETERANS
WINSLOW ST
MAIN
JEFFERSON
MIDDLEFIELD
HAMILTON
WALNUT
MAPLE ST
ELM ST
STAMBAUGH
FRANKLIN
WILSON
CAMINO REAL
ARGUELLO
ALDEN
FULLER
WARREN
SAMSON
HOPKINS
STANDISH
ALLERTON
WINKLEBLECK
SPRING
CITY HALL
POST OFFICE


County Government Center
Courthouse Square
Fox Theatre
Sequoia Station Shopping Center
City Hall
KAISER HOSPITAL
KAISER MEDICAL CLINIC
K-MART
REDWOOD CITY SCHOOLS OFFICE
LEGEND
1. Perry Street Parking Lot
2. Marshall Street Garage
3. Winslow Street Parking Lot
4. Jefferson Avenue Garage
5. Main Street Parking Lot
6. City Hall Visitor Parking Lot
7. Library Parking Lot "A"
8. Library Parking Lot "B"
9. Library Parking Lot "C"
10. Middlefield Road Parking Lot
Attachment 4
Off-Street Parking Facilities

ORDINANCE NO._____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF REDWOOD CITY AMENDING CHAPTER 20, ARTICLE VII OF THE REDWOOD CITY MUNICIPAL CODE BY AMENDING SECTIONS 20.96 THROUGH 20.96.21 IN THEIR ENTIRETY AND DIVISIONS 4, 5 AND 9 IN THEIR ENTIRETY.

RECITALS

WHEREAS, planned new development in Downtown Redwood City is likely to increase traffic and parking demand. *(Downtown Mixed Use Retail/Cinema Project Environmental Report, 2000)*; and

WHEREAS, the City has conducted a substantive review of the literature and the practices of other cities to determine the most effective ways of managing the traffic and parking demand; and

WHEREAS, based on that review the City has determined that the most effective tool for managing on-street parking is a program of pricing the on-street public parking at a rate so as to achieve a fifteen percent (15%) vacancy rate in the parking spaces on each block. (*See Shoup, Donald. The High Cost of Free Parking, American Planning Association Planners Press. 2005);* and

WHEREAS, underpriced on-street parking causes "cruising," which adds to traffic congestion. *Shoup, page 291*; and

WHEREAS, a vacancy rate of about 15% is necessary to avoid cruising-induced traffic, to facilitate easy ingress and egress, and to offer parking opportunities to as many different people as possible. *Shoup, page 297* ; and

WHEREAS, California Vehicle Code Section 22508 authorizes cities to establish parking meter zones and to fix the rate of fees for such zones; and

WHEREAS, parking meter rate ordinances "may ... justify a fee system intended and calculated to hasten the departure of parked vehicles in congested areas, as well as to defray the cost of installation and supervision." *DeAryan v. City of San Diego*, 75 CA2d 292, 296 (1946); and

WHEREAS, such parking meter rate ordinances are for the purpose of regulating traffic and the parking of vehicles in the public streets, not a tax for revenue purposes. *Id* at 293; and

WHEREAS, receipts from such parking meter rate ordinances "may be used not only in defraying the expenses of installation, operation and control of such parking space and parking meters, but also those incurred in the control of traffic which may affect or be affected by the parking of vehicles in the parking meter zones thus created, including those incurred in connection with painting lines and signs, maintaining mechanical traffic signals and other expenses of regulating traffic and enforcing traffic regulations with respect to all traffic which may affect or be affected by the parking of vehicles in parking meter zones." Id at 296; and

WHEREAS, using parking meter rates to achieve a vacancy rate of about 15% negates the necessity for time restrictions on the use of parking spaces; and

WHEREAS, certain formerly unmetered off-street parking facilities must be metered in order to meet the demands of changing patterns of use of Downtown parking; and

WHEREAS, the parking permit program requires modifications in order to meet the demands of changing patterns of use of Downtown parking.

NOW THEREFORE BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF REDWOOD CITY THAT:

1. Sections 20.96 through 20.96.21 of Chapter 20, Article VII, Division 1, are hereby amended in their entirety to read as follows:

Sec. 20.96. PARKING TIME LIMITED ON CERTAIN DESIGNATED STREETS DURING CERTAIN DESIGNATED PERIODS: When signs are erected giving notice thereof, parking shall be limited as specified in the table below. Such limitations on parking shall be effective daily except on Sundays and holidays.

Street	Side	Limits	Maximum Parking Period	Applicable Hours
Arch Street	Easterly	Brewster Avenue to a point one hundred twenty-five feet (125') northerly of Brewster Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Arguello Street	Both	Brewster Avenue to Alden Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Arguello Street	Westerly	Alden Street to Hopkins Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Arguello Street	Westerly	Whipple Avenue to a point one hundred feet (100') southerly of Whipple Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Birch Street	Both	Broadway to a point one hundred ninety five feet (195') northerly of Broadway	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Brewster Avenue	Both	Warren to Arguello	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Brewster Avenue	Northwesterly	From a point sixty feet (60') northeasterly of northeasterly line of Arch Street to Broadway	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Brewster Avenue	Southeasterly	Broadway to Arch Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Broadway	Both	Brewster Avenue to Duane Street	One (1) hour	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Broadway	Southerly	From Douglas Avenue to a point two hundred twenty four feet (224') easterly of Douglas Avenue	One (1) hour	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Cedar Street	Southerly	Main Street to El Camino Real	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Charter Street	Northerly	Hancock to El Camino Real	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Clinton Street	Both	Brewster to Broadway	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Clinton Street	Easterly	Seventy five feet (75') northerly of Broadway	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.

Edgewood Road	Both	El Camino Real to Wellesley Crescent	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Southwesterly	James Avenue to a point eighty feet (80') northwesterly from the center line of Harrison Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Southwesterly	From a point one hundred forty feet (140') southeasterly from the center line of Jefferson Avenue to Hazel Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Northeasterly	James Avenue to a point one hundred seventy five feet (175') northwesterly from the center line of Jefferson Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Northeasterly	From a point one hundred seventy five feet (175') southeasterly from the center line of Wilson Street to Charter Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Southwesterly	Brewster Avenue to Whipple Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Southwesterly	From a point one hundred forty three feet (143') southeasterly of Whipple Avenue to Brewster Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
El Camino Real	Southwesterly	Whipple Avenue to a point one hundred forty three feet (143') southeasterly of Whipple Avenue	One (1) hour	between the hours of nine o'clock (9:00) A.M. to twelve o'clock (12:00) A.M. midnight.
El Camino Real	Southwesterly	Edgewood Road to Claremont Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Euclid Avenue	Westerly	From Upton Street to a point two hundred ten feet (210') southerly of Upton Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Harrison Avenue	Northerly	El Camino Real to Adams	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Heller Street	Westerly	From Laurel Street to one hundred twenty five feet (125') southerly of Laurel Street	One (1) hour	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Hess Road	Both	From Woodside Road to one hundred fifty feet (150') northwesterly of Woodside Road	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Hopkins Avenue	Both	El Camino to Arch Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Jefferson Avenue	Northwesterly	From a point two hundred ten feet (210') northeasterly from the center line of El Camino Real to Franklin Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Jefferson Avenue	Southeasterly	From a point one hundred forty five feet (145') southwesterly from the center line of El Camino Real to Adams Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Lathrop Street	Both	Chestnut Street to El Camino Real	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Madison Avenue	Southerly	Seventy five feet (75') westerly of El Camino Real	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Main Street	Both	Maple to Beech	One (1) hour	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Main Street	Both	Chestnut Street to El Camino Real	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Veterans Boulevard	Southwesterly	Brewster Avenue to Convention Way	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Veterans Boulevard	Easterly	From Convention Way to Brewster Avenue	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M

Whipple Avenue	Northerly	Stafford Street to Arguello Street, except on which parking is prohibited during all or any specific hours	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Whipple Avenue	Both	El Camino Real to Arch Street, except on which parking is prohibited during all or any specific hours	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Whipple Avenue	Northerly	From Upland Road two hundred thirty feet (230') easterly thereof	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.
Wilson Street	Southerly	El Camino Real to Franklin Street	Two (2) hours	Between the hours of nine o'clock (9:00) A.M. to six o'clock (6:00) P.M.

2. Division 4 of Chapter 20, Article VII is hereby amended in its entirety to read as follows:

DIVISION 4. PARKING METER ZONES

Sec. 20.115. MANNER OF ESTABLISHING PARKING METER ZONES: Parking meter zones in streets, public rights-of-way, and publicly controlled off-street parking facilities rates and regulations for use therein shall be as established in this Division.

Sec. 20.116. ESTABLISHMENT OF DOWNTOWN METER ZONE: The Downtown Meter Zone is hereby established and is described as follows:

That certain area of the City of Redwood City, County of San Mateo, State of California, bounded by the following described line:

Commencing at the point where the centerline of Brewster Avenue intersects with the northeasterly edge of the Veterans Boulevard right-of-way, extending along the centerline of Brewster Avenue to the southerly edge of the Broadway right-of-way; extending along the southerly edge of the Broadway right-of-way to the centerline of El Camino Real; extending along the centerline of the El Camino Real to the centerline of James Avenue; extending along the centerline of James Avenue to the centerline of the Southern Pacific Railroad; extending along the centerline of the Southern Pacific Railroad to the westerly edge of the Maple Street right-of-way; extending along the westerly edge of the Maple Street right-of-way to the centerline of Stambaugh Street; extending along the centerline of Stambuagh Street to the westerly edge of the Walnut Street right-of-way, extending along the westerly edge of the Walnut Street right-of-way to the southerly edge of the Broadway right-of-way; extending along the southerly edge of the Broadway right-of-way to the centerline of Beech Street; extending along the centerline of Beech Street to the northerly edge of the Broadway right-of-way; extending along the northerly edge of the Broadway right-of-way to the centerline of Maple Street; extending along the centerline of Maple Street to the northerly edge of the Veterans

Boulevard right-of-way; extending along the northerly edge of the Veterans Boulevard right-of-way to the point of commencement.

Sec. 20.117. ESTABLISHMENT OF DOWNTOWN METER ZONE BASE METER RATES FOR ON-STREET PARKING AREAS: Under the authority of California Vehicle Code section 22508, the City Council hereby establishes the following Base Meter Rates for the following on-street parking areas within the Downtown Meter Zone:

			Base Meter Rate (Per Hour)	
Street	Side	Limits	Monday through Friday, 10:00am to 6:00pm	Monday through Friday, 6:00pm to 10pm; and Saturday through Sunday, 10:00am until 10:00pm
Allerton Street	Southwesterly	Brewster Avenue to Fuller Street	$0.25	Free
Allerton Street	Northeasterly	Brewster Avenue to Fuller Street	$0.25	Free
Allerton Street	Southwesterly	Fuller Street to Bradford Street	$0.25	Free
Allerton Street	Northeasterly	Fuller Street to Bradford Street	$0.25	Free
Arch Street	Southwesterly	Brewster Avenue to Broadway	$0.25	Free
Arch Street	Northeasterly	Brewster Avenue to Broadway	$0.25	Free
Arguello Street	Southwesterly	Brewster Avenue to Marshall Street	$0.25	Free
Arguello Street	Northeasterly	Fuller Street to Bradford Street	$0.25	Free
Arguello Street	Northeasterly	Bradford Street to Marshall Street	$0.25	Free
Arguello Street	Northeasterly	Marshall Street to Broadway	$0.50	$0.75
Bradford Street	Northwesterly	Arguello Street to Warren Street	$0.25	Free
Bradford Street	Southeasterly	Arguello Street to Warren Street	$0.25	Free
Bradford Street	Northwesterly	Warren Street to Allerton Street	$0.25	Free
Bradford Street	Southeasterly	Warren Street to Allerton Street	$0.25	Free
Bradford Street	Northerly	Middlefield Road to Jefferson Avenue	$0.25	Free
Bradford Street	Southerly	Middlefield Road to Jefferson Avenue	$0.25	Free
Bradford Street	Northerly	Jefferson Avenue to Main Street	$0.25	Free
Bradford Street	Southerly	Jefferson Avenue to Main Street	$0.25	Free
Bradford Street	Northerly	Main Street to Walnut Street	$0.50	Free
Bradford Street	Southerly	Main Street to Walnut Street	$0.50	Free
Broadway	Northerly	Arch Street to El Camino Real	$0.25	Free
Broadway	Southerly	Arch Street to El Camino Real	$0.25	Free
Broadway	Northerly	El Camino Real to Perry Street	$0.50	$0.75
Broadway	Southerly	El Camino Real to California Street	$0.50	$0.75
Broadway	Northerly	Arguello Street to Winslow Street	$0.50	$0.75
Broadway	Southerly	Arguello Street to Winslow Street	$0.50	$0.75
Broadway	Northerly	Winslow Street to Hamilton Street	$0.50	$0.75
Broadway	Southerly	Winslow Street to Hamilton Street	$0.50	$0.75
Broadway	Northerly	Hamilton Street to Middlefield Road	$0.50	Free
Broadway	Northerly	Middlefield Road to Jefferson Avenue	$0.50	$0.75
Broadway	Southerly	Middlefield Road to Jefferson Avenue	$0.50	Free
Broadway	Northerly	Jefferson Avenue to Main Street	$0.50	$0.75
Broadway	Southerly	Jefferson Avenue to Main Street	$0.50	$0.75

Broadway	Northerly	Maple Street to Beech Street	$0.25	Free
Broadway	Southerly	Cassia Street to Beech Street	$0.25	Free
California Street	Westerly	Broadway to Winklebleck Street	$0.50	Free
California Street	Easterly	Broadway to Winklebleck Street	$0.50	Free
California Street	Westerly	Winklebleck Street to James Street	$0.25	Free
California Street	Easterly	Winklebleck Street to James Street	$0.25	Free
El Camino Real	Northeasterly	Brewster Avenue to Broadway	$0.25	Free
El Camino Real	Southwesterly	Brewster Avenue to Broadway	$0.25	Free
El Camino Real	Northeasterly	Winklebleck Street to James Street	$0.25	Free
Fuller Street	Northwesterly	Warren Street to Allerton Street	$0.25	Free
Fuller Street	Southeasterly	Warren Street to Allerton Street	$0.25	Free
Fuller Street	Northwesterly	Allerton Street to Winslow Street	$0.25	Free
Fuller Street	Southeasterly	Allerton Street to Winslow Street	$0.25	Free
Hamilton Street	Westerly	Marshall Street to Broadway	$0.50	$0.50
Hamilton Street	Easterly	Marshall Street to Broadway	$0.50	$0.50
Hamilton Street	Westerly	Broadway to Winslow Street	$0.50	$0.50
Hamilton Street	Easterly	Broadway to Winslow Street	$0.50	$0.50
Jefferson Avenue	Easterly	Veterans Boulevard to Bradford Street	$0.25	Free
Jefferson Avenue	Westerly	Veterans Boulevard to Bradford Street	$0.25	Free
Jefferson Avenue	Easterly	Bradford Street to Marshall Street	$0.25	Free
Jefferson Avenue	Westerly	Bradford Street to Marshall Street	$0.25	Free
Jefferson Avenue	Easterly	Marshall Street to Broadway	$0.50	$0.50
Jefferson Avenue	Westerly	Marshall Street to Broadway	$0.50	$0.50
Jefferson Avenue	Easterly	Broadway to Middlefield Road	$0.50	$0.75
Jefferson Avenue	Westerly	Broadway to Middlefield Road	$0.50	$0.75
Main Street	Easterly	Bradford Street to Marshall Street	$0.25	Free
Main Street	Westerly	Bradford Street to Marshall Street	$0.25	Free
Main Street	Easterly	Marshall Street to Broadway	$0.50	$0.50
Main Street	Westerly	Marshall Street to Broadway	$0.50	$0.50
Main Street	Easterly	Stambaugh Street to Middlefield Road	$0.50	$0.50
Main Street	Easterly	Broadway to Stambaugh Street	$0.50	$0.50
Main Street	Westerly	Broadway to Middlefield Road	$0.50	$0.50
Maple Street	Northwesterly	Marshall Street to Broadway	Free	Free
Marshall Street	Northwesterly	Arguello Street to Warren Street	$0.25	Free
Marshall Street	Northwesterly	Warren Street to Winslow Street	$0.25	Free
Marshall Street	Southeasterly	Arguello Street to Winslow Street	$0.25	Free
Marshall Street	Southerly	Winslow Street to Hamilton Street	$0.25	Free
Marshall Street	Northerly	Hamilton Street to Middlefield Road	$0.25	Free
Marshall Street	Southerly	Hamilton Street to Middlefield Road	$0.25	Free
Marshall Street	Northerly	Middlefield Road to Jefferson Avenue	$0.25	Free
Marshall Street	Southerly	Middlefield Road to Jefferson Avenue	$0.25	Free
Marshall Street	Northerly	Main Street to Walnut Street	$0.25	Free
Marshall Street	Southerly	Spring to Walnut Street	$0.25	Free
Marshall Street	Southerly	Walnut Street to Maple Street	$0.25	Free
Marshall Street	Northerly	Walnut Street to Marshall Court	$0.25	Free

Marshall Street	Northerly	Marshall Court to Maple Street	$0.25	Free
Middlefield Road	Easterly	Veterans Boulevard to Bradford Street	$0.25	Free
Middlefield Road	Westerly	Veterans Boulevard to Bradford Street	$0.25	Free
Middlefield Road	Easterly	Bradford Street to Marshall Street	$0.25	Free
Middlefield Road	Westerly	Bradford Street to Marshall Street	$0.25	Free
Middlefield Road	Easterly	Marshall Street to Broadway	$0.50	$0.50
Middlefield Road	Westerly	Marshall Street to Broadway	$0.50	$0.50
Middlefield Road	Westerly	Broadway to Winslow Street	$0.50	$0.75
Middlefield Road	Northeasterly	Winslow Street to Jefferson Avenue	$0.50	$0.75
Middlefield Road	Northeasterly	Jefferson Avenue to Main Street	$0.50	$0.50
Perry Street	Southwesterly	Brewster Avenue to Commercial Way	$0.25	Free
Perry Street	Southwesterly	Commercial Way to Broadway	$0.50	$0.50
Stambaugh Street	Northeasterly	Main Street to Maple Street	$0.25	Free
Stambaugh Street	Southwesterly	Main Street to Maple Street	$0.25	Free
Veterans Boulevard	Northeasterly	Brewster Street to Main Street	Free	Free
Veterans Boulevard	Southwesterly	Brewster Street to Middlefield Road	Free	Free
Veterans Boulevard	Southwesterly	Middlefield Road to Jefferson Avenue	Free	Free
Veterans Boulevard	Southerly	Walnut Street to Maple Street	$0.25	Free
Veterans Boulevard	Northerly	Walnut Street to Maple Street	Free	Free
Walnut Street	Westerly	Veterans Boulevard to Bradford Street	$0.50	Free
Walnut Street	Westerly	Bradford Street to Marshall Street	$0.50	Free
Walnut Street	Easterly	Veterans Boulevard to Marshall Street	$0.50	Free
Walnut Street	Easterly	Marshall Street to Spring Street	$0.25	Free
Walnut Street	Westerly	Marshall Street to Spring Street	$0.25	Free
Walnut Street	Westerly	Broadway to Spring	$0.25	Free
Warren Street	Northeasterly	Brewster Avenue to Fuller Street	$0.25	Free
Warren Street	Southwesterly	Brewster Avenue to Fuller Street	$0.25	Free
Warren Street	Northeasterly	Fuller Street to Bradford Street	$0.25	Free
Warren Street	Southwesterly	Fuller Street to Bradford Street	$0.25	Free
Warren Street	Northeasterly	Bradford Street to Marshall Street	$0.25	Free
Warren Street	Southwesterly	Bradford Street to Marshall Street	$0.25	Free
Winklebleck Street	Southerly	El Camino Real to California Street	$0.50	Free
Winklebleck Street	Northerly	El Camino Real to California Street	$0.50	Free
Winslow Street	Easterly	Brewster Avenue to Bradford Street	$0.25	Free
Winslow Street	Westerly	Brewster Avenue to Fuller Street	$0.25	Free
Winslow Street	Westerly	Fuller Street to Bradford Street	$0.25	Free
Winslow Street	Westerly	Bradford Street to Marshall Street	$0.25	Free
Winslow Street	Easterly	Marshall Street to Broadway	$0.50	$0.50
Winslow Street	Westerly	Marshall Street to Broadway	$0.50	$0.50
Winslow Street	Easterly	Broadway to Hamilton Street	$0.50	$0.50
Winslow Street	Westerly	Broadway to Hamilton Street	$0.50	$0.50

Sec. 20.118. ESTABLISHMENT OF DOWNTOWN METER ZONE BASE METER RATES FOR SPECIFIED OFF-STREET PARKING AREAS: The following base meter rates are hereby established for certain off-street parking areas:

		Base Meter Rate	
Parking Facility	**Description of Location**	**Monday through Friday, 10:00am to 6:00pm**	**Monday through Friday, 6:00pm to 10pm; and Saturday through Sunday, 10:00am until 10:00pm**
Library Parking Lot "A"	Located southwesterly of the intersection of Main Street with Middlefield Road	$0.50	$0.50
Library Parking Lot "B"	Located southeasterly of the intersection of Jefferson Avenue with Middlefield Road	$0.50	$0.50
City Hall Parking Lot	Located at the east side of City Hall, near the rear entry thereof, 1017 Middlefield Road	$0.75	$0.75
Winslow Street Parking Lot	Located northwesterly of the intersection of Winslow Street with Hamilton Street	$0.25	$0.25
Perry Street Parking Lot	Located northwesterly of the intersection of Perry Street with Commercial Way	$0.50	$0.50
Main Street Parking Lot	Located at the southerly of Broadway, between Main Street and Jefferson Avenue, and northeasterly of City Hall, 1017 Middlefield Road	$0.25	$0.25

Sec. 20.119. ESTABLISHMENT OF DOWNTOWN METER ZONE BASE METER RATES FOR SPECIFIED OFF-STREET PARKING AREAS: The following base meter rates are hereby established for certain off-street parking areas:

Parking Facility	**Description of Location**	**Peak Hours**	**Hourly Rate For Peak Hours**	**Base Hourly Rate For Non-Peak Hours**
Jefferson Avenue Garage	Located southwesterly of the intersection of Broadway with Jefferson Avenue	Monday through Thursday, 5:00pm until closing, but no later than 3:00am; Friday, from 12:00pm until closing, but no later than 3:00am; and Saturdays, Sundays, and holidays from opening until closing, but no later than 3:00am.	$5.00	$0.25
Middlefield Road Parking Lot	Located westerly of the intersection of Middlefield Road and Jefferson Avenue	Monday through Thursday, 5:00pm until closing, but no later than 3:00am; Friday, from 2:00pm until closing, but no later than 3:00am; and Saturdays, Sundays, and holidays, from opening until closing, but no later than 3:00am.	$5.00	$0.25
Marshall Street Garage	Located southerly of Marshall Street, between Jefferson Avenue and Main Street	Monday through Friday, 5:00pm until closing, but no later than 3:00am; and Sundays, and holidays from opening until closing, but no later than 3:00am	$5.00	$0.25

Sec. 20.120. PERIODIC ADJUSTMENT OF DOWNTOWN METER ZONE METER RATES: Under the authority of California Vehicle Code section 22508, the City Council hereby adopts the following process for adjusting Downtown Meter Zone meter rates from time to time to manage the use and occupancy of the parking spaces for the public benefit in all parking areas within the Downtown Meter Zone.

A. To accomplish the goal of managing the supply of parking and to make it reasonably available when and where needed, a target occupancy rate of eighty-five percent (85%) is hereby established.

B. At least annually and not more frequently than quarterly, the Parking Manager shall survey the average occupancy for each parking area in the Downtown Meter Zone that has parking meters. Based on the survey results, the Parking Manager shall adjust the rates up or down in twenty-five cent ($0.25) intervals to seek to achieve the target occupancy rate. The base parking meter rate, and any adjustments to that rate made pursuant to this ordinance, shall become effective upon the programming of the parking meter for that rate. A current schedule of meter rates shall be available at the City Clerk's office.

C. The hourly meter rate shall not exceed one dollar and fifty cents ($1.50) without the express approval of the City Council.

D. This Section does not apply to the parking facilities described in Section 20.119 of this Division during the "peak hours."

Sec. 20.121. USE OF DOWNTOWN METER ZONE PARKING METER REVENUES: Revenues generated from on-street and off-street parking within the Downtown Meter Zone boundaries shall be accounted for separately from other City funds and may be used only for the following purposes:

A. All expenses of administration of the parking program

B. All expenses of installation, operation and control of parking equipment and facilities within or designed to serve the Downtown Meter Zone

C. All expenses for the control of traffic (including pedestrian and vehicle safety, comfort and convenience) which may affect or be affected by the parking of vehicles in the Downtown Meter Zone, including the enforcement of traffic regulations as to such traffic.

D. Such other expenditures within or for the benefit of the Downtown Meter Zone as the City Council may, by resolution, determine to be legal and appropriate.

Sec. 20.122. ACQUISITION, INSTALLATION, MAINTENANCE, REGULATION, OF METERS; ROLE OF CITY MANAGER: The City Manager is hereby directed to provide for the purchase, acquiring, installation, operation, maintenance, supervision, regulation and use of the parking meters provided for in this Division and to maintain the meters in good workable condition.

Sec. 20.123. LOCATION AND OPERATION OF METERS:
A. Conventional parking meters installed in a parking meter zone shall be placed immediately adjacent to individual parking places described in the following section and shall be placed on the curb or sidewalk if the parking place is adjacent to a curb or sidewalk. Each conventional parking meter shall be arranged so that upon the expiration of the time period for which payment was deposited it will indicate by a proper visible signal that the lawful parking period for the adjacent parking meter space has expired and in such cases the right of such a vehicle to occupy the space shall cease.

B. Each pay-by-space machine, pay-and-display machine, or pay-on-foot machine shall conspicuously display the applicable parking rates and instructions for use of the machine. Each pay-by-space or pay-and-display machine shall, upon the deposit of the appropriate United States coins, currency, credit card, or city prepaid parking card with respect to a parking meter space controlled thereby, dispense a receipt showing the amount of time purchased and when the lawful parking period will expire for that space. Upon expiration of the lawful parking period, the right of a vehicle to occupy the space shall cease.

Sec. 20.124. MARKING OF INDIVIDUAL PARKING SPACES; VEHICLES TO BE PARKED WITHIN MARKED LINES: The City Manager shall have lines or markings painted or placed upon the curb, right of way or parking lot adjacent to each parking meter for the purpose of designating the parking space for which the parking meter is to be used. Spaces regulated by pay-by-space machines shall be assigned numbers, which shall be clearly painted onto the curb next to each such space. It shall be unlawful and a violation of this Division to park any vehicle across any such line or marking or to park the vehicle in such position that the same shall not be entirely within the area so designated by such lines or markings.

Sec. 20.125. MANNER OF PARKING IN SPACES PARALLEL TO CURB: When a parking space in any parking meter zone is parallel with the adjacent curb or sidewalk and is regulated by a conventional parking meter, any vehicle parked in such parking space shall be parked with the foremost part of such vehicle nearest to such meter.

Sec. 20.126. USE OF METER REQUIRED:

A. When a vehicle is parked in any space controlled by a conventional parking meter or a pay-by-space machine and payment is required pursuant to Sections 20.117, 20.118, or 20.119, the operator of the vehicle shall upon entering the parking space, immediately purchase time by depositing coins indicated on such meter or by depositing other forms of payment which may be accepted at pay-by-space and pay-and-display machines such as dollar bills, credit cards, or prepaid city parking card as specified on such machines. Failure to put the meter in operation by purchasing time, and (if applicable) failure to place the receipt on the vehicle dashboard as prescribed, shall constitute a violation of this Division.

B. When a vehicle is parked in any space controlled by a pay-and-display machine and payment is required pursuant to Sections 20.117, 20.118, or 20.119, the operator of the vehicle shall upon entering the parking space, immediately purchase time by depositing coins indicated on such meter or by depositing other forms of payment which may be accepted at pay-by-space and pay-and-display machines such as dollar bills, credit cards, credit cards, or prepaid city parking card as specified on such machines. The operator of the vehicle shall immediately cause the parking receipt provided by the machine to be placed face up on the driver's side dashboard of the vehicle. Failure to put the meter in operation by purchasing time, and (if applicable) failure to place the receipt on the vehicle dashboard as prescribed, shall constitute a violation of this Division. Upon the deposit of payment and placing such meter in operation, the parking space may be lawfully occupied by such vehicle for the time indicated by the meter.

C. When a vehicle is parked in any space controlled by a pay-on-foot machine and payment is required pursuant to Sections 20.117, 20.118, or 20.119, the operator of the vehicle shall upon entering the parking facility, press the specified button at the gate to receive a voucher. Prior to departure from the facility, the operator of the vehicle shall deposit the voucher into the pay-on-foot machine and shall pay for the time used by depositing the amount of money specified by the machine in a form of payment which may be accepted at the machine such as coins, dollar bills, credit cards, or prepaid city parking card as specified on such machines. Failure to remove vehicle from the parking facility within fifteen

(15) minutes of payment shall constitute a violation of this Division. Failure to pay for time used shall constitute a violation of this Division.

Sec. 20.127. INJURING OR TAMPERING WITH METERS: It shall be unlawful and a violation of the provisions of this Division for any person to deface, injure, tamper with, open or willfully break, destroy or impair the usefulness of any parking meter installed under the provisions of this Division or post supporting such parking meter.

Sec. 20.128. USE OF SLUGS AND SIMILAR DEVICES PROHIBITED: It shall be unlawful and a violation of the provisions of this Division to deposit or cause to be deposited in any parking meter any slugs, device or metallic substance, or any other substitute for any of the coins or other payment types specified in Section 20.123.

Sec. 20.129. OVERTIME PARKING: If the vehicle shall remain parked in any such parking space beyond the time for which payment has been made, the parking meter shall indicate such illegal parking and in that event, such vehicle shall be considered as parked overtime and beyond the period of legal parking time and the parking of a vehicle overtime or beyond the period of legal parking time in any such part of a street where any such meter is located shall be a violation of this Division.

It shall be unlawful and a violation of the provisions of this Division for any person to cause, allow, permit or suffer any vehicle registered in the name of, or operated by such person to be parked overtime or beyond the period of legal parking time established for any parking meter zone.

Sec. 20.130. PARKING OR REMAINING ADJACENT TO EXPIRED METER: It shall be unlawful and a violation of the provision of this Division for any person to permit any vehicle to remain or be placed in any parking space adjacent to any parking meter while the meter is displaying a signal indicating that the vehicle occupying such parking space has already been parked beyond the period of time prescribed for such parking space.

Sec. 20.131. DUTY OF POLICE WHERE VEHICLE PARKED OVERTIME; ISSUANCE OF CITATION: It shall be the duty of each police officer or parking enforcement deputy to take the number of any meter at which any vehicle is over-parked, as provided in Section 20.124; the state vehicle license of such vehicle; the time and date of such over-parking, and make of such vehicle; and issue, in writing, a citation for illegal parking in the same form and subject to the same procedure provided for by the laws of the State applicable to the traffic violations within the City.

Sec. 20.132. PAYMENT OF FINE TO AVOID PROSECUTION: Any operator or owner of a vehicle to whom a citation has been issued in accordance with the preceding section may, within fifteen (15) days of the time of the issuance of such citation, pay to the appropriate court, as a penalty for and full consideration of such violation, the sum of twenty-five dollars ($25.00). The mailing, in a sealed envelope properly addressed through the United States mail, of a check, money order, or postal order, within fifteen (15) days from the time of issuance of the citation, or notice of such violation, or the deposit at the City Hall of the sum of twenty-five dollars ($25.00) within fifteen (15) days constitutes a compliance with this provision. Delivery of such envelope shall be the responsibility of such owner or operator. The failure of such owner or operator to make such payment within the fifteen (15) days shall render such owner or operator subject to the penalties provided for violation of the provisions of this Division.

Sec. 20.133. PROVISIONS FOR TEMPORARY SUSPENSION OF METER RATES: The provisions of Division may be suspended from time to time by motion of the City Council in any case where the Council finds that strict compliance would not serve the public interest, including but not limited to the use of public streets and sidewalks for celebrations, special public events, celebration of holiday seasons and any other such activity or purpose as the City Council in its sole discretion shall determine.

Sec. 20.134. DEFINITIONS: For the purposes of this Division the following words and phrases shall have the meanings respectively ascribed to them by this Section:

OPERATOR: Every individual who shall operate a vehicle as the owner thereof or as the agent, employee or permittee of the owner.

PARKING MANAGER: The person so designated by the City Manager to, among other responsibilities, monitor the occupancy of parking areas and adjust meter rates according to the provisions of Division 4.

PARKING METER: Any mechanical device which accepts payment for the use of parking spaces as described in this Division. Such mechanical devises shall include but not be limited to conventional parking meters, pay-by-space machines, pay-and-display machines, and pay-on-foot machines.

STREET: Any public street, avenue, road, boulevard, highway or other public place located in the City and established for the use of vehicles.

VEHICLE: Any device in, upon or by which any person or property is, or may be transported upon a street or highway, except a device which is operated upon rails or tracks.

Sec. 20.135--20.149. RESERVED

3. Division 5 of Chapter 20, Article VII is hereby amended in its entirety to read as follows:

DIVISION 5. PARKING PERMITS

Sec. 20.150. ISSUANCE; FEE:

A. The City Manager is hereby authorized to issue parking permits to the public in accordance with the following schedule and subject to the payment of the following fees:

Permit Type	Valid Area	Valid Times	Monthly Cost	Yearly Cost
Marshall/Middlefield Bronze Permit	Marshall Street Garage and Middlefield Parking Lot	Valid in Middlefield Parking Lot Monday through Friday, from the time at which meters begin operation until 7:00pm; valid in Marshall Street Garage Monday through Friday, from the time at which meters begin operation until 7:00pm	$30.00	$330.00
Marshall/Middlefield Silver Permit	Marshall Street Garage and Middlefield Parking Lot	Valid in Middlefield Parking Lot Monday through Friday, from the time at which meters begin operation until 7:00pm; valid in Marshall Street Garage Monday through Friday, all hours	$35.00	$385.00
Marshall/Middlefield Gold Permit	Marshall Street Garage and Middlefield Parking Lot	Valid in Middlefield Parking Lot Monday through Friday, from the time at which meters begin operation until 7:00pm; valid in Marshall Street Garage at all times	$40.00	$440.00
Perry/Winslow/Main Bronze Permit	Perry Street Parking Lot, Winslow Street Parking Lot, and Main Street Parking Lot	Monday through Friday, from the time at which meters begin operation until 7:00pm	$40.00	$440.00
Perry/Winslow/Main Silver Permit	Perry Street Parking Lot, Winslow Street Parking Lot, and Main Street Parking Lot	Monday through Friday, all hours	$50.00	$550.00
Perry/Winslow/Main Gold Permit	Perry Street Parking Lot, Winslow Street Parking Lot, and Main Street Parking Lot	All times	$60.00	$660.00
Library Parking Lot "C" Gold Permit	Library Parking Lot "C"	All times	$20.00	$220.00

B. The City Manager is hereby authorized to issue parking permits, without charge, to City employees, officers, volunteers, and visitors as follows:

Permit Type	Valid Area	Valid Times
"C.E." Permit	Library Parking Lot "B" and Library Parking Lot "C"	Valid in Library Parking Lot "B" on Mondays through Fridays, from the time which meters begin operation until 6:00pm; valid in Library Parking Lot "C" at all times
"C.O." Permit	Main Street Parking Lot	All times
City Hall Visitor Permit	City Hall Parking Lot	All times, with the exception that such permits shall be of a temporary nature and shall only be valid on they day during which they were issued.

C. In order to ensure orderly and efficient use of the parking supply, the City Manager is authorized to limit the number of permits which may be issued, in which case priority shall be based on the order in which requests for such permits are received.

D. The City Manager is authorized to collect deposits, require the submission of application forms, and to establish other administrative procedures for the parking permit program as may be necessary from time to time.

Sec. 20.151. FORM: The parking permit may consist of a windshield card or may be in such other form as the City Manager may prescribe.

Sec. 20.152. PAYMENT OF FEE IN ADVANCE; PRORATION; REFUNDS: Payment shall be made to the City in advance on an annual calendar year basis for an annual permit, or on a calendar month basis for a monthly permit. The fee payable for a monthly permit purchased after the sixteenth of the month shall be one-half (1/2) the monthly fee established by resolution of the City Council. The fee payable for an annual permit shall be the fee established by resolution of the City Council, which amount shall be prorated on a monthly basis for issuance thereof after January 1 of any year; provided, however, during the last two (2) months of each calendar year monthly permits only may be purchased.

Sec. 20.153. DISPLAY WHERE VISIBLE; RELIEF FROM PAYMENT OF METER FEES: When a windshield card parking permit is placed so as to be clearly legible through the windshield of a vehicle, the operator thereof shall be relieved of the obligation of putting the meter, pay-by-space machine, or pay-and-display machine in operation by the deposit of money therein during the time periods for which such permit is valid. If the permit is not so visible, the vehicle and operator shall be subject to the provisions of Division 4 of this Article. If the permit is visible but is used during periods for which it is not valid or in a manner for which it is not valid as established by this Division, the vehicle and operator shall be subject to the provisions of Division 4 of this Article.

Secs. 20.154 -20.159. RESERVED:

4. Division 9 of Chapter 20, Article VII is hereby amended in its entirety to read as follows:

DIVISION 9. REGULATED, UNMETERED OFF-STREET PARKING FACILITIES

Sec. 20.184. REGULATED, UNMETERED OFF-STREET PARKING FACILITIES DESIGNATED: The following off-street parking facilities, owned or operated by the City, are hereby designated as regulated, unmetered off-street parking facilities:

A. Police Department Parking Lot, located at the front, unenclosed area, of the Police Department building, 1301 Maple Street.

B. Municipal Services Center Parking Lot, 1300 Broadway.

C. Library Parking Lot "C," located directly behind and southerly of the Main Library branch, 1044 Middlefield Road.

The City Manager shall cause parking spaces to be designated and shall cause appropriate signs to be posted, and markings to be made, in all regulated, unmetered off-street parking facilities designated in this Section.

Sec. 20.185. PERMITS ISSUED: The City Manager is hereby authorized to issue parking permits for use in regulated unmetered off-street parking facilities in accordance with such rates and regulations as shall be established by resolution of the City Council.

The parking facility permit may consist of a windshield card or may be in such other form as the City Manager may prescribe.

Sec. 20.186. PERMIT OR CITY IDENTIFICATION REQUIRED:
A. It shall be unlawful for any person to permit any vehicle to occupy or remain in any space in the Police Department Parking Lot for more than one hour, except on Sundays and holidays, when signs are erected giving notice thereof, unless such vehicle displays a valid parking permit or said vehicle bears distinctive markings, or logo, or sign (collectively, "City identification") identifying said vehicle as City-owned or as an otherwise duly designated City vehicle.

B. It shall be unlawful for any person to permit any vehicle to occupy or remain in any space in the Municipal Services Center parking lot for more than one hour, except on Sundays and holidays, when signs are erected giving notice thereof, unless such vehicle displays a valid parking permit or said vehicle bears distinctive markings, or logo, or sign (collectively, "City identification") identifying said vehicle as City-owned or as an otherwise duly designated City vehicle.

C. It shall be unlawful for any person to permit any vehicle to occupy or remain in any space in the Library Parking Lot "C" unless such vehicle displays a valid parking permit or said vehicle bears distinctive markings, or logo, or sign (collectively, "City identification") identifying said vehicle as City-owned or as an otherwise duly designated City vehicle.

Sec. 20.187. DISPLAY OF PERMIT: Windshield card permits shall be placed so as to be clearly legible through the windshield of a vehicle parked in a regulated unmetered parking facility.

Sec. 20.188. NO PARKING AREAS: It shall be unlawful for any person to permit any vehicle to occupy or remain in, or adjacent to, any area marked or posted by signs for no parking, or parking prohibited, or adjacent to any curb painted red, as so designated by the City Manager in any off-street parking facility described in Section 20.184, or in any turnaround circle or other traffic circulation portion of said facility so designated

Sec. 20.189. VEHICLES TO BE PARKED WITHIN LINES: It shall be unlawful and a violation of this Division to park any vehicle across lines designated parking spaces or to park a vehicle in such position that the same shall not be entirely within the area so designated by such lines.

Sec. 20.190. ISSUANCE OF CITATION: It shall be the duty of each police officer or parking enforcement deputy to take the designated name or description of the regulated unmetered parking facility at which any vehicle is parked in violation of Sections 20.186 through 20.189 of this Division; the state vehicle license of such vehicle; the time and date of such parking; and the make of such vehicle; and issue, in writing, a notice to appear (citation) for illegal parking in the same form and subject to the same procedures provided by the laws of the State applicable to traffic violations within the City.

Sec. 20.191. PAYMENT OF FINE TO AVOID PROSECUTION: Any operator or owner of a vehicle to whom a citation has been issued in accordance with the preceding section may, within fifteen (15) days of the time of the issuance of such citation, pay to the appropriate court, as a penalty for and full consideration of such violation, the sum of twenty-five dollars ($25.00) plus applicable surcharges established by resolution. The

mailing, in a sealed envelope properly addressed through the United States mail, of a check, money order or postal order, within fifteen (15) days from the time of issuance of the citation, or notice of such violation, or the deposit with the court of the sum of twenty-five dollars ($25.00), plus applicable surcharges, within fifteen (15) days constitutes compliance with this provision. Delivery of such envelope shall be the responsibility of such owner or operator. The failure of such owner or operator to make such payment within the fifteen (15) days shall render such owner or operator subject to the penalties provided for violation of the provisions of this Division

Sec. 20.192--20.199. RESERVED

5. This ordinance shall take effect on February 1, 2006.

Appendix
5C

Cost to Construct New Parking Spaces in Glendale

Downtown Glendale Mobility Study

Cost per New Structured Parking Space Added

Assumptions

Variables	Input value	Comments/Notes/Sources
Average assessed land value in downtown Glendale	$250	per sf. Source: $200-$300/sf per Alex Hamilton, City of Glendale Department of Development Services.
National median construction cost per structured space	$12,617	2005 dollars. Source: Carl Walker, Inc. Parking Structure Construction Cost Outlook for 2005.
LA region escalation index compared to national average	1.068	Source: Carl Walker, Inc. Parking Structure Construction Cost Outlook for 2005.
LA region median construction cost per structured space	$13,475	Source: Carl Walker, Inc. Parking Structure Construction Cost Outlook for 2005.
Expected useful life of structure	35	years (industry standard)
Projected soft costs	27%	Based on Carl Walker Inc. research.
Long-term interest rate (i.e., discount rate)	5.00%	Based on Carl Walker Inc. research.
Operations & maintenance costs	$350	per space per year. Source: Jano Bagdhanian, City of Glendale Traffic and Transportation Administrator.
Insurance cost	0.20%	of original construction cost per year (industry standard)
Enforcement costs	$54	per space per year. Based on current Cal Poly enforcement expenditures.
Workdays per month	22.4	
Parking space size	340	sf per space (or 128.1 spaces per acre)
"Capacity loss" factor for structured parking	20%	loss of spaces per parking level due to additional vehicle circulation, columns, stairwells/elevators needed for structures.

Definitions

"Direct Cost" means direct construction costs, for bricks and mortar.

"Project Cost" equals direct costs plus land costs and soft costs (such as architectural and engineering fees).

"Debt Service" equals payments needed to repay project costs over the lifetime of the structure.

Hypothetical new parking garage in downtown Glendale

* Assumes a 5-story parking garage with 6 parking levels (with parking on roof level) and 80 spaces on each parking level for a total of 480 spaces.
* Assumes the structured garage displaces a 100-space surface parking lot on a 34,000 sf (0.78 acre) site.
* Considers two scenarios, one in which land costs nothing (or has no value) and one in which land costs $250 per sf.
* Doesn't include value of land regained by consolidating existing surface lots into one structure, and redeveloping those lots. Assuming the new garage allows 380 spaces of existing surface parking to be redeveloped, the land value is $32.3 million (380 spaces at 340 square feet per space, valued at $250 per square foot).
* All costs are in 2005 dollars for the Los Angeles region.
* Costs can easily be escalated to a future construction date (escalated for inflation), but this is not done here.

Capital Costs

	Structured Spaces Built	Surface Spaces Displaced	Net Spaces Gained	Year Completed	Land Cost/ Value Current $	Direct Cost Current $	Project Cost (Land + Soft) Current $	Construction Cost Inflation Adjusted $	Project Cost Inflation Adjusted $	Gross Cost Per Space Current $		Cost Per Space Gained Current $	
										Direct	Project	Direct	Project
New downtown garage ($0/sf land costs)	480	100	380	n/a	$0	$6,467,979	$8,214,333	n/a	n/a	$13,475	$17,113	$17,021	$21,617
New downtown garage ($250/sf land costs)	480	100	380	n/a	$8,500,000	$6,467,979	$16,714,333	n/a	n/a	$13,475	$34,822	$17,021	$43,985

Resulting Costs Per Space Per Year

	Project Cost Per Space Gained	ANNUAL COSTS PER SPACE GAINED				TOTAL COST PER SPACE GAINED		
		Debt Service	Operation & Maintenance	Insurance	Enforcement	Per Year	Per Month	Per Workday
New downtown garage ($0/sf land costs)	$21,617	$1,320	$350	$43	$54	$1,767	$147	$6.58
New downtown garage ($250/sf land costs)	$43,985	$2,686	$350	$88	$54	$3,178	$265	$11.82

Parking Wayfinding and Technology

Appendix
5D

APPENDIX 5D

Parking Technology Vendors & Wayfinding Signage Design Firms

Parking Wayfinding and Occupancy Systems Manufacturers

MobileParking LLC
Use your cell phone to find the nearest parking in major US cities (based on parking garages cooperating with MobileParking).
6911 Laurel Bowie Rd
Bowie, MD 20715
1-800-PARK
www.mobileparking.com/index.html

Misco – Parkman Products
RM #1004, Kayang-Techno Town, 1487, Kayang 3-Dong
Kangso-Ku, Seoul 157-810, South Korea
82-02 3663-6161
www.misco21.com

Walter P. Moore
Parking design engineers.
11900 West Olympic Boulevard, Suite 750
Los Angeles, CA 90064
310-254-1900
www.walterpmoore.com/index.cfm

Spark Parking
Space counting and parking guidance systems, in addition to other services.
2588 Mission St, Suite 203
San Francisco, CA 94110
415-920-1880
www.sparkparking.com/index.html

Streetline Networks
Parking occupancy systems and user interfaces (web, cell phone, etc).
995 Market Street, 16th Floor
San Francisco, CA 94103
415-869-8639
www.streetlinenetworks.com

TCS International
Directional signage and amount of spaces in addition to parking meters.
55 Union Avenue
Sudbury, MA 01776
978-443-2527
www.tcsintl.com

Multi-Space Digital Meters Manufacturers

Cale Parking Systems USA, Inc.
Headquarters-Main Office
21925 Highway 19N
Clearwater, FL 33765
Phone: 727-724-1800
www.caleparkingusa.com

Cale- Oakland Facility
414 Lesser Street
Oakland, CA 94601

Cale-Portland Facility
1515 SE 9TH Street
Portland, OR 97214
Phone: 503-720-6049

Cubic Parking Systems Inc.
Cubic Transportation Systems, Inc.
5650 Kearny Mesa Road
San Diego, CA 92111
858-268-3100
www.cubic.com/cts
CubicInfo@cubic.com

Sales Quotations – Spares, Equipment, Consumables
Customer Service Representative: Bernie Bowling
(800) 251-1171 Ext. 455
Parking.Quote@cubic.com

Digital Payment Technologies
4105 Grandview Highway
Burnaby, BC V5C 6B4, Canada
888-687-6822
info@digitalpaytech.com
www.digitalpaytech.com

Duncan Parking Technologies
340 Industrial Park Road
Harrison, AR 72601
800-338-6226
Duncan@DuncanIndustries.com
www.duncanindustries.com

Lexis Systems Inc.
Parking division acquired by Cubic Parking Systems (see Cubic contact info above).

Parkeon International
40 Twosome Drive
08057 Moorestown, NJ
856-234-8000
www.parkeon.com

Photo Violation Technologies, Corp.
Suite 670-999 West Broadway Street
Vancouver, BC V5Z 1K5
Canada
604-628-8694
www.photoviolation.com

Reino Parking Systems
Australia (International Head Office)
Reino International Pty Ltd.
15/39 Herbert Street
St Leonards NSW 2065, Australia
61-2-9432-0500
goreino@reino.com.au
www.reino.com.au

USA (USA Head Office)
Reino Enforcement Technology
28 Hammond, Suite C
Irvine, CA, 92618
949-707-3832
www.reinosolutions.com

In-Car Parking Meter Manufacturers

Ganis Smart Park Systems Ltd
53, Hairusim St., Kenoter Center
Nes-Ziona, 74066, Israel
972-8-938-9990
ganismar@netvision.net.il
www.ganis-smartpark.com

Ganis Subsidiary/Affiliates:

- **International Systems Ltd Parking** (New Zealand)
  Model(s): Smart Park
- **Parkcom AB** (Sweden)
  Model(s): various

OTI America Inc.
2 Executive Drive, Suite 740
Fort Lee, NJ 07024
201-944-5200
info@otiamerica.com
www.otiamerica.com

Other Parking Meter Firms

Intellipark
4733 Bethesda Avenue, Suite 400
Bethesda, MD 20814
301-347-4653
http://intellipark.com/

Wayfinding and Signage Design Firms
(Overlaps with Environmental Graphic Design)

Apple Designs, Inc.
Contact: John Erhart
1146 Celebration Blvd
Kissimmee, FL
407-566-1416 (for John Erhart in North Carolina)
Main office: 919-838-4928
johnerhart@appledesigns.net
www.appledesigns.net

CHK USA (known as *Cook Hammond & Kell* in the UK)
Contact: Ed Easton and Rick Wood
115 S. La Cumbre Lane
Santa Barbara, CA 93105
805-682-8900
ed.easton@mapsusa.com
www.mapsusa.com

Cook Hammond & Kell (CHK)
Whittington House
764-768 Holloway Road, London N19 3JQ
44-020-7281-2161
www.chk.co.uk

Forcade Associates
Contact: Mark Levine
1626 Payne Street
Evanston, Illinois 60201
847-424-1010
mlevine@forcade.net
www.forcade.net

Gensler
2 Harrison Street, Suite 400
San Francisco, CA 94105
415-433-3700
www.gensler.com

Hunt Design
Contact: Barry Marshall, President
25 N. Mentor Ave.
Pasadena, CA 91106
626-793-7847
info@huntdesign.com
www.huntdesign.com

Karo
Contact: Barry Marshall, President
308-611 Alexander St.
Vancouver, BC V6A 1E1
604-255-6100
barry@karo.com
www.karo.com

Newsom Design
7906 West 4th St.
Los Angeles, CA 90048
323-658-7955
info@newsomdesign.com
www.newsomdesign.com

RTKL Associates Inc.
333 South Hope Street
Suite C200
Los Angeles, CA 90071
213-633-6000
LA-Info@rtkl.com
www.rtkl.com

Selbert Perkins Design Collaborative
200 Culver Blvd.
Playa Del Rey, CA 90293
Contact: Nancy Martinez, Director of Marketing
310-822-5223
info@spdweston.com
http://selbertperkins.com

Sussman/Prejza & Company, Inc.
3525 Eastham Drive
Culver City, CA 90232
310-836-3939
business@sussmanprejza.com
http://sussmanprejza.com/

Mechanically-Retractable Bollards – Vendors

All-in-One Security
www.all-in-one.co.uk/html/retractable_bollards___posts.html

ATG Access
www.atgaccess.com/products/automatic-rising-bollards.htm

Automatic Bollard Systems
www.automaticbollard.com/

Autopa
www.autopa.co.uk/steel_castiron_bollards.php?page=gfc_fixed

Barriers & Bollards
www.barriersandbollards.com/Automatic_Retractable_Bollards.htm

Cal Pipe Security Bollards
calpipebollards.com/retrac.htm

Delta Scientific Corp.
www.deltascientific.com/hs_bollards.htm

Image Bollard
www.imagebollards.com.au/retractableBollards.aspx

Master Halco
www.masterhalcosecurity.com/secureMaster/products/retractablebollards.php

California Parking Cash-Out Law

Appendix
6A

California Environmental Protection Agency

Air Resources Board

P.O. Box 2815, Sacramento 95812

California's Parking Cash-Out Program

An Informational Guide For Employers

State law requires certain employers who provide subsidized parking for their employees to offer a cash allowance in lieu of a parking space. This law is called the *parking cash-out program* (Assembly Bill 2109, Katz; Chapter 554, Statutes of 1992). It was enacted after studies showed cash allowances in lieu of parking encourage employees to find alternate means of commuting to work, such as public transit, carpooling, vanpooling, bicycling, or walking. Parking cash-out offers the opportunity to improve air quality and reduce traffic congestion by reducing vehicle trips and emissions. For years, negative tax implications limited the implementation of the law. But in 1998, the federal Transportation Equity Act for the 21st Century (TEA-21) included amendments to the Internal Revenue Code that fixed this problem.

The Air Resources Board is the agency authorized by the Legislature to interpret and administer the parking cash-out law. Board staff has developed this informational guide to help employers determine whether they are subject to the requirements of the law and to answer questions about implementing a parking cash-out program.

The law does not apply to all employers or all employees. Employers with over 50 employees in an air basin designated nonattainment for any state air quality standard must offer a parking cash-out program to those employees who have the availability of subsidized parking that meets certain criteria.

The main provision of the parking cash-out law is less than a page long. But employer parking circumstances are often very complicated, which can make the law complicated to implement. Recognizing this, the goal of this guide is to provide a foundation for employers to carry out the law as it relates to them.

This guide includes: Page

March 2002

Text of Parking Cash-Out Law

§ 43845. Parking cash-out program. California Health and Safety Code.
(a) In any air basin designated as a nonattainment area pursuant to Section 39608, each employer of 50 persons or more who provides a parking subsidy to employees, shall offer a parking cash-out program. "Parking cash-out program" means an employer-funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space.
(b) A parking cash-out program may include a requirement that employee participants certify that they will comply with guidelines established by the employer designed to avoid neighborhood parking problems, with a provision that employees not complying with the guidelines will no longer be eligible for the parking cash-out program.
(c) As used in this section, the following terms have the following meanings:
(1) "Employee" means an employee of an employer subject to this section.
(2) "Parking subsidy" means the difference between the out-of-pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space.
(d) Subdivision (a) does not apply to any employer who, on or before January 1, 1993, has leased employee parking, until the expiration of that lease or unless the lease permits the employer to reduce, without penalty, the number of parking spaces subject to the lease.
(e) It is the intent of the Legislature, in enacting this section, that the cash-out requirements apply only to employers who can reduce, without penalty, the number of paid parking spaces they maintain for the use of their employees and instead provide their employees the cash-out option described in this section.

Related Provisions

Sections 17202 and 24343.5, California Revenue & Taxation Code. Specifies that costs related to a parking cash-out program may be deducted as business expenses for employers.

Section 17090, California Revenue & Taxation Code. States that the cash allowance given to employees must be included in gross income subject to state income and payroll taxes (except any portion used for ridesharing purposes).

Sections 65088.1, 65089, and 65089.3, California Government Code. Requires (1) congestion management agencies to consider parking cash-out when developing and updating the trip reduction and travel demand elements of their congestion management plans, and (2) requires cities or counties to grant appropriate reductions in parking requirements to new and existing commercial developments if they offer parking cash-out programs.

Uncodified language:

The Legislature hereby finds and declares all of the following:
(a) Existing local, state, and federal policies tend to encourage the provision of subsidized parking by employers.
(b) Subsidized parking creates a strong incentive for employees to commute to work in a single occupancy vehicle.
(c) Commuting in a single occupancy vehicle contributes to traffic congestion and air pollution.
(d) In Los Angeles and Orange Counties, more than 90 percent of the commuters receive free worksite parking, but less than 10 percent of employers provide an employee ridesharing or transit benefit.

Information on the Parking Cash-Out Law

Implementation

- *How do I determine whether I am subject to the parking cash-out law?*

  The law applies to employers (public or private) that:
  - employ at least 50 persons (regardless of how many worksites);
  - have worksites in an air basin designated nonattainment for any state air quality standard;
  - subsidize employee parking that they don't own;
  - can calculate the out-of-pocket expense of the parking subsidies they provide; and
  - can reduce the number of parking spaces without penalty in any lease agreements.

  (See page 10 for a questionnaire designed to help you determine whether you are subject to the parking cash-out law and that explains the above parameters of the law in more detail.)

- *When must I implement parking cash-out? When does the program end?*

  The law went into effect January 1, 1993, and includes no sunset provision specifying an ending date to the program. So the law requires all affected employers to offer a parking cash-out program until and unless the law is changed.

- *Where do I start?*

  1. Determine which employee parking is subject to cash-out. (See *Employee Parking* below.)
  2. Determine which specific employees are eligible. (See *Employee Eligibility*, page 4.)
  3. Calculate the appropriate cash allowance for each eligible employee. (See *Cash Allowance,* page 5.)
  4. Inform eligible employees. (See *Informing Employees*, page 7.)

Employee Parking

- *Which employee parking is subject to cash-out?*

  Employee parking is subject to cash-out if all the following apply: (1) you subsidize it, (2) you don't own it, (3) you can calculate the out-of-pocket amount you pay for it, (4) it is not a vanpool or carpool space, and (5) if it is leased parking, the lease allows you to reduce the number of parking spaces without penalty.

- *Is parking that is included ("bundled") in the building lease subject to parking cash-out?*

  If you cannot determine the out-of-pocket expenses of the parking you provide, and you do not make a discreet payment solely for parking occupied by an employee, which is almost always the case with bundled parking, the parking is not subject to parking cash-out.

- *I am the sole tenant of a leased parking garage. The lease agreement stipulates that I am subject to paying for all spaces in the garage. Is the parking subject to cash-out?*

  Since you cannot reduce the number of parking spaces without penalty, the parking is not subject to cash-out.

Employee Eligibility

- *Which employees are eligible for the cash-out option?*

  Employees must be offered the cash-out allowance if they are using, or could use, a subsidized parking space subject to cash-out. Examples include: any employee who is currently using a subsidized space; is offered a subsidized space (now or in the future); or was previously offered a subsidized space but declined, if a subsidized space is still available to him/her.

  (See page 9 for an eligibility checklist.)

- *What about current carpoolers, vanpoolers, transit users, telecommuters and those who walk or bike to work?*

  These individuals are eligible for parking cash-out if a qualifying subsidized parking space for a single-occupancy vehicle is currently available to them.

  NOTE: Carpool and vanpool spaces are not subject to cash-out. This means you *don't* have to offer six members of a vanpool an additional pro-rated $15 cash allowance for a $90/month vanpool space.

- *Can employee eligibility change over time?*

  Yes. An employee is eligible for cash-out based on the parking space he/she is offered. So, an employee's eligibility can change if the employee's parking circumstances change. Example:

  - If an employee changes work sites and goes from a subsidized leased parking space to one that is not eligible (e.g., a space that you own), you are no longer required to offer the employee a cash allowance. And vice versa, if an employee changes from parking in an owned space to a subsidized leased space subject to cash-out, you are required to offer the employee a cash allowance.

- *I don't lease parking, but I reimburse my employees for their commute-related parking costs. Does this trigger cash-out requirements?*

  Yes, if the parking costs are reimbursed on a regular basis. If not, then no. Examples:

  - You have employees who park regularly in a private garage at a cost of $60/month. You reimburse each one the full $60/month. These employees are eligible for a $60/month cash-out allowance in lieu of being reimbursed for their parking.

  - You reimburse employees only for commute-related parking on a sporadic basis related to special circumstances such as having to work overtime. The employees are not eligible for a cash-out allowance because you are not providing a parking subsidy on a regular basis.

I provide limited subsidized parking to my employees on a daily first-come, first-served basis. Is this parking subject to parking cash-out?

To be eligible for parking cash-out, an employee must have the expectation of having a subsidized parking space, whether assigned or unassigned, in which to park.

If you lease 100 spaces that are available daily to 400 employees on a first-come, first-served basis, the employees cannot expect to have a parking space in which to park, and would not be eligible for parking cash-out.

NOTE: Some employers confronted with a similar situation have changed their parking policies, assigning one employee to each parking space and offering a cash allowance equal to the actual cost per space. Others have chosen to begin charging for the parking.

- *How much participation in parking cash-out can I expect?*

Studies indicate that approximately 12 percent of eligible employees, on the average, will take the cash-out offer, based on an average parking subsidy of $80 (Shoup 1992, 1997). Actual participation at each work site may vary.

- *What if employees who accept the cash allowance ask for their subsidized spaces back? Can employees who don't take cash-out when initially offered take it later?*

The law simply requires you to give employees the parking cash-out option. Employers may establish reasonable policies for administering this benefit such as quarterly or semiannual review. It is suggested that you make cash-out readily available to employees. Policies that require employees to make irrevocable decisions or respond in an unduly short time period are not compatible with the spirit of the law.

- *How do employee bargaining agreements fit into the parking cash-out picture?*

The cash-out program changes employee benefits and working conditions. Therefore, most bargaining agreements will require employers to "meet and confer" regarding cash-out implementation. While negotiations with unions may affect parking policies and how employers go about implementing parking cash-out, a bargaining agreement cannot keep an employer from implementing the law and must not result in any policies that are contrary to the law.

Cash Allowance

- *How much cash allowance must be offered?*

The law requires the cash allowance to equal the parking subsidy -- what you pay for the parking space minus any contribution by the employee. Commute-related subsidies

(e.g., transit pass, ridesharing allowance) may be deducted from the cost of the parking in determining the amount of the cash allowance. Some examples:

- Cost of parking space - $75/mo. Employee pays nothing to park. *Cash allowance = $75/mo.*
- Cost of parking space - $100/mo. Employee pays $20/mo. to park. *Cash allowance = $80/mo.*
- Cost of parking space - $65/mo. Employee does not use space and receives $50 transit pass (subsidy) from employer every month. *Cash allowance = $15/mo. (if transit pass still provided).* If the transit pass were increased to $65/mo., the cash allowance would be $0/mo.

- *Can the amount of the cash allowance change over time?*

  Yes. Since the law requires the cash allowance to equal the parking subsidy, if the subsidy increases or decreases, the cash allowance adjusts to coincide. Some examples:

  - Cost per parking space increases $10/month. You charge your employees an additional $5/month parking fee. The parking subsidy has increased $5/month, so the cash allowance also increases $5/month.
  - You increase the amount your employees pay for parking by $25/month. Your cost per parking space does not change. The parking subsidy has decreased $25/month, so the cash allowance may also be decreased $25/month.

- *How often must I provide the cash allowance?*

  The law requires that you simply provide a cash allowance that is equal to the parking subsidy. The law does not specify how often. However, providing the cash allowance monthly is the norm, since most parking and commute-related subsidies and/or charges are on a month-to-month basis.

- *I have many work sites with different leased parking rates. Can I average the cost per space?*

  Yes. The law would not prohibit you from averaging the cost of subsidized parking and providing one uniform cash-out payment. If you use this method, the cash allowance could also change over time based on the change in the average cost of subsidized parking.

Informing Employees

- *How do I inform employees?*

  Some employees are aware of this law. Others will be learning of it for the first time. All need to know your particular strategies for implementing the cash-out program. Many employers have designated an employee, such as their employee transportation coordinator, to be available to discuss with employees what cash-out means to them. It is also important to inform employees in a positive way, such as giving them an example of how parking cash-out can benefit them and their community -- by adding to their pay check while reducing congestion and air pollution.

- *Can I offer cash-out to employees even if the parking is not subject to the law?*

  Yes. You may implement cash-out voluntarily. And this may make sense when: (1) you own your parking, provide a travel allowance to all employees, and charge a fee for parking at an

equal or greater rate than the allowance, thus keeping costs to a minimum; (2) unoccupied spaces can be used by your patrons; or (3) you lease some parking spaces and thus must offer cash-out to some, but not all, employees.

Tax Consequences

- *Is the cash allowance considered taxable income?*

  Yes. The cash allowance is considered gross income subject to state and federal income and payroll taxes. However, ridesharing subsidies are exempt from state income taxes (Section 17149, Revenue & Taxation Code), and transit or vanpool subsidies up to $100 per month are exempt from federal income taxes (Section 132(f)(2)(A), Internal Revenue Code).

- *Can my costs related to cash-out be deducted as an employer business expense?* Yes.

- *Is the tax-free status of transit, vanpool, and parking subsidies at risk by offering them along with a cash-out allowance?*

  No. Federal legislation was enacted in 1998 allowing employers to offer a combination of cash and tax-free transportation fringe benefits (parking, vanpool and transit subsidies) without losing any of the tax-free benefits. (Note: The cash is still considered taxable income.) This new provision in the tax code is often called the Commuter Choice Program or Commute Benefit Program. For more information on how to use the new federal tax code provisions to your advantage, visit the web sites of the Association for Commuter Transportation at *http://tmi.cob.fsu.edu/act/act.htm* or the web site of the U.S. Environmental Protection Agency's Office of Mobile Sources at *http://www.epa.gov/oms/transp/comchoic/ccweb.htm*.

Federal and state tax laws are constantly changing. For current and reliable information, please contact your tax consultant, the U.S. Internal Revenue Service, or the California Franchise Tax Board.

Enforcement

- *Who administers this program?*

  The cash-out mandate is located in Division 26, Part 5, of the California Health & Safety Code, which the Air Resources Board is authorized to administer. However, the parking cash-out mandate is imposed directly on the employer who must meet the criteria of the statute. This type of statute is often described as "self-implementing."

- *Are there any penalties for noncompliance?*

  Violations of provisions in Division 26, Part 5, of the Health & Safety Code, which includes the parking cash-out law, are subject to civil penalties not to exceed $500 per vehicle per civil action. (See Section 43016, Health & Safety Code.) The Air Resources Board would apply the civil penalty per vehicle in a parking space subject to the cash-out program. The focus of ARB administration of the parking cash-out law would be to facilitate compliance before seeking civil penalties.

Neighborhood Parking Problems

- *What about the potential of spillover parking into nearby neighborhoods?*

  The law provides that employers may develop guidelines to avoid neighborhood parking problems. Employees must comply with these to be eligible for the cash allowance. Such guidelines might prohibit cash-out recipients from parking on specific streets or in specific neighborhoods, or require the recipient to not drive alone to work (e.g., take the bus, carpool, walk, etc.).

- *My cashed-out employees need to drive to work occasionally. To avoid having them park on neighboring streets, can I set aside a few spaces and reduce the cash allowance proportionately?*

  This would be a reasonable policy for accommodating employees and avoiding neighborhood parking problems. Since you would be subsidizing some parking for their use, you could reduce the cash allowance proportionately. (One space set aside for every ten cashed-out employees would equate to a ten percent reduction in the cash allowance.)

Relationship of Cash-Out to Other Transportation Demand Measures

- *How is cash-out related to other ridesharing and transportation demand measures?*

  It is suggested that parking cash-out be incorporated into other trip reduction and ridesharing incentives. If alternate means of commuting are made available and affordable through incentives, employees are more likely to take the cash allowance and not drive solo to work. Studies indicate that the most successful trip reduction programs tend to combine parking management and pricing with subsidies for transit, carpooling, and other alternate modes of commuting.

- *Can I make commuting by an alternate mode other than driving alone a condition of accepting the cash allowance?*

  The law allows for employers to establish guidelines to avoid neighborhood parking problems (see above). Requiring employees to participate in some form of verifiable trip reduction activity would be a reasonable employer policy to avoid such problems. In fact, many employers have implemented the parking cash-out program as a commute benefits program and avoided using the terms "parking cash-out" or "cash allowance," since the law does not require use of these designations.

- *How can cash-out work for employees who commute by an alternate mode on a part-time basis?*

  Many employers have developed successful transportation demand management programs by rewarding part-time, as well as full-time, use of alternate commute modes. One of the ways parking cash-out can compliment this type of program is by providing for "shared" parking spaces. Just as two employees can team up to carpool and cash-out one parking space, two employees who use alternate modes on a part time basis can coordinate that use, share one parking space and cash-out the other. (Example: One employee telecommutes on Monday and Friday, another employee commutes by bus on Tuesday through Thursday. They share one parking space and cash-out the other.)

- *I have multiple work sites, with some parking subject to cash-out and some exempt. I wish to implement a uniform commute cash reward program for all employees based on the amount of alternate mode use. How do I ensure compliance with the cash-out law?*

  You can ensure compliance if your monthly cash reward for full-time use of an alternate commute mode is at least equal to the average monthly subsidy of your parking spaces subject to cash-out.

Eliminating Subsidized Parking

- *What if I discontinue parking subsidies? Is this a way to comply with the law?*

  Yes. The law was enacted to help balance existing local, state, and federal policies that tend to encourage subsidized parking. So if you stop subsidizing parking, you are no longer subject to the law. Studies show that paid parking has about the same impact on reducing solo driving as providing a cash allowance.

  Some employers have balanced employee compensation by replacing subsidized parking with travel allowances, providing all employees with a choice of how to use their commute subsidy. Other employers have reduced parking subsidies slightly to help defray the costs of the parking cash-out program.

Contacts

- *Who can I call with questions about the parking cash-out program?*

  You may call the Air Resources Board at (916) 327-2980. A Board staff person will return your call within one working day to help you with your questions and concerns. Written inquiries should be sent to Air Resources Board, Parking Cash-Out, Transportation Strategies Group, P.O. Box 2815, Sacramento, California 95812. Your local air district, ridesharing organization, or transportation management agency may also be able to answer your questions.

Eligibility Checklist

Determine what parking is subject to cash-out. Employees are eligible for the parking cash-out offer if they are currently using the parking or it is available to them.

Parking
(subject to cash-out if all items checked)

- O Subsidized
- O Not owned
- O Can calculate how much it costs
- O Not a vanpool or carpool space
- O If leased, lease allows the reduction of parking spaces without penalty

Employee
(eligible if one item checked)

- O Is using the parking
- O Is offered the parking (now or in the future)
- O Previously offered the parking but declined, but parking is still available

Parking Cash-Out Program
Employer Questionnaire

Employers answering "yes" to all of the following questions are subject to the parking cash-out law. Employers answering "no" to one or more questions are currently exempt.

	Yes	No
1. Do you employ over 50 persons (regardless of how many work sites)? - Persons are considered "employees" for purposes of parking cash-out if they are considered employees for unemployment insurance, state or federal tax purposes. (For a legal reference, see the definition of "employee" in Sections 621 and 621.5 of the Calif. Unemployment Insurance Code.)	☐	☐
2. Are any of your work sites located in an air basin designated nonattainment for any state air quality standard? - The answer is "yes" if any of your work sites are in a county other than Lake County.	☐	☐
3. Do you subsidize employee parking? - A "yes" means you pay all or part of the cost of parking for any employee.	☐	☐
4. Do you subsidize any employee parking on property that you do not own? - Parking spaces owned by employers are exempt from parking cash-out. - In most cases a "yes" answer means you subsidize employee parking that you lease. But reimbursing an employee on a regular basis for his/her commute-related parking costs in a lot that you neither own nor lease is also a parking subsidy subject to cash-out.	☐	☐
5. Can you calculate the out-of-pocket expense of the parking subsidies you provide? - A "yes" answer for leased parking means your parking costs are separated in your lease agreement, and/or you claimed parking as a separate itemized business expense on your state or federal tax returns.	☐	☐
6. Can you reduce the number of parking spaces in any of your leases without penalty? - If reducing the number of parking spaces would cause you to (1) continue to pay for unused spaces, (2) violate local planning regulations, or (3) break the lease, then the answer is "no." If not, then the answer is "yes."	☐	☐

Appendix 6B

Santa Monica Parking Cash-Out Law

Santa Monica Parking Cash Out Law

Santa Monica is the only city in California to enforce the state parking cash-out law. California's mandatory parking cash-out law, AB 2109 (passed in 1992) requires certain employers who provide subsidized parking for their employees to offer a cash allowance in lieu of a parking space. The law applies to employers (public or private) of 50 or more employees who lease their parking and who are able to reduce the number of spaces they lease without penalty.

An employer can comply with the cash-out program by offering an employee any of the following:

- No parking subsidy
- A parking subsidy only for carpools
- The choice between a parking subsidy or its cash value
- The choice between a parking subsidy or more than its cash value
- A commuting allowance that can be spent on any form of commuting

In 1995 Santa Monica integrated enforcement of the state law into its existing *Transportation Management Ordinance* (TMO). This ordinance, passed in 1993, requires new and existing non-residential development employing 50 or more employees to reduce employee drive-alone trips. Every employer has a goal of 1.5 AVR (Average Vehicle Ridership).

To comply, employers must administer an annual employee commute survey, develop and submit to the City an Emission Reduction Plan, and pay a Transportation Impact Fee. These plans include marketing strategies and concrete tools and incentives to reduce emissions from employee commuting and meet worksite specific emission reduction targets. Those employers in Santa Monica who fall under the purview of the State law must implement a parking cash-out program as part of their Emission Reduction Plan (ERP). Failure to do so will result in the disapproval of the employer's ERP.

Santa Monica offers both penalties and incentives to ensure compliance of employers with the TMO. If an employer does not comply with the Transportation Management Ordinance (including the parking cash-out provision), the first violation they receive a warning notice, every subsequent violation results in a $5.00 fine per employee per day and possible revocation of the Santa Monica business license. On the other hand, if employers maintain or exceed their goal of a 1.5 Average Vehicle Ridership (AVR), they get a reduction in their annual transportation impact fee: a 40% reduction for meeting the goal for one year, and up to a 60% reduction for meeting the goal for 3 consecutive years.

Though comprehensive statistics were not available, overall, the Transportation Management Ordinance (TMO) has been successful. For the Transportation Management Program as a whole, 75% of employers have met their goal of 1.5 AVR in both the morning and evening commute windows (6am-10am and 3pm to 7pm) and the city as a whole met the goal of 1.5 AVR in 2006.

There are 125 companies that are subject to the TMO (they employ over 50 employees). 20 of these are subject to the parking cash-out provision (they lease their parking and

are able to reduce the number of spaces they lease without penalty). The majority of these employ between 50-200 employees.

According to city staff, on average 15% of employees have opted for the parking cash-out option when offered. These employees have primarily used the alternatives of carpool and bus. The parking cash-out provision has worked best for the two major business parks and other dense areas where parking is at a premium. In many of these places, where previously there was no incentive to choose alternatives to driving alone (or a mere $1/day), employees are now offered $85-100/month. This significant financial incentive has resulted in much higher ridesharing. City staff also reports that most employers do not give up their parking spaces if employees opt for parking cash-out, but rather they save the spaces for future employees or for customers.

According to city staff, employers have not found compliance with the parking cash-out provision difficult, mainly because it was simple to integrate into their existing Emission Reduction Plans. The City also provided information seminars and made themselves available to speak to management to ease the understanding and integration of the new requirement. Only once has the city had to fine an employer. When a warning has been issued, for the most part employers have complied in the 30-day window or have contacted the city to arrange for special circumstances.

For now, Santa Monica is maintaining their goal of 1.5 AVR in line with the Los Angeles Air Basin goal. If that goes up, they would likely increase their goal as well.

For more information on this program, visit Santa Monica's Transportation Management Office:

http://santa-monica.org/planning/transportation/abouttransmanagementtmo.html

For the full text of the law and all relevant forms see:

http://santa-monica.org/planning/transportation/tmoformsandinformation.html

Other References:

State of California Air Resources Board**,**
http://www.arb.ca.gov/planning/tsaq/cashout/cashout.htm

Evaluating The Effects Of Parking Cash Out: Eight Case Studies, Principal Investigator: Donald C. Shoup, University of California, Los Angeles, 9/1/1997.
http://www.arb.ca.gov/research/abstracts/93-308.htm

TMA Peer Review

Appendix
6C

Appendix 6C: TMA Peer Review

TMA	Lloyd District TMA	Gresham Regional Center TMA	Westside TMA	Emeryville TMA	Moffett Park Business and Transportation Association	Hacienda Business Park	South Natomas TMA	Burbank TMO
Organization/ Administration								
Mission	The Lloyd District TMA is an action-oriented association working with businesses and public agencies in the Lloyd District to enhance the economic vitality of the district through improved access and mobility for those who work, reside, shop and commute in and to the Lloyd District.	To bring together a coalition of local businesses, public agencies and citizens dedicated to improving access options for employees and customers of the Gresham Regional Center (GRC) and enhancing the GRC as the economic engine of East Multnomah County.	To serve as a unified business voice in partnership with the public sector advocating for and creating balanced transportation choices in Washington County, and supporting sustainable economic growth in the region.	To increase access and mobility to, from, and within Emeryville while alleviating congestion through operation of a shuttle program.	The MPBTA is committed to improving and promoting the environmental and economic health of the Moffett Park community through the development and promotion of transportation programs; and through mutual cooperation and advocacy for initiatives of common interest.	Provide a premiere environment for Hacienda's owners and tenants To provide a location that fosters creativity, productivity and growth To provide resources that facilitate business To provide premium service To provide programs that add value and distinction to the development	The South Natomas Transportation Management Association is a non-profit, mutual benefit corporation comprised of employers and developers in South Natomas. The TMA works cooperatively with the greater South Natomas community on transportation management and air quality issues to develop and operate successful trip reduction programs that help reduce traffic and improve air quality in Sacramento.	The Mission of the Burbank TMO is to develop, implement and coordinate cost effective transportation programs which reflect our committment to relieving traffic congestion and improving air quality. We are dedicated to increasing mobility and access to and within Burbank for employees, customers, vendors, visitors, and residents.
Legal Structure	The LDTMA is a 501-(c)(6) non-profit business association. The organization is free standing (i.e. not affiliated with another non-profit or organization)	The GRC-TMA is affiliated with the Gresham Downtown Development Association (GDDA) a 501-(c)(6) non-profit business association. GDDA focuses on the revitalization of the downtown through programs and strategies for safety, crime prevention, new development and producing promotional events.	The WTA is a 501-(c)(6) non-profit business association. The organization is free standing (i.e. not affiliated with another non-profit or organization)	Non-profit organization.	MPBTA is a 501(c)4 nonprofit organization comprised of developers and employers located in the Moffett Park area of Sunnyvale, California.	Hacienda Business Park is a non profit, mutual benefit corporation. This is not a stand-alone TMA, but they do operate TDM programs that support the mission statement.	The South Natomas TMA was incorporated in 1989.	The Burbank TMO is a private non-profit corporation.
Membership	The LDTMA has 60 member businesses representing approximately 9,000 employees	GDDA serves 50 member businesses in the downtown. A breakout of those that are GRC-TMA members was not available.	The WTA has 30 members (public and private) that represent nearly 32,000 employees.	Approximately 200 property owners.	9 businesses, included: Yahoo, Juniper Networks, Ariba, City of Sunnyvale, Labcyte, Lockheed Martin, Menlo Equities, Network Appliance, and Marvell.	Owners of all properties within the development must be members (approximately 100 owners/members).	120 members with 7,500 employees.	120 members.
Board Structure	The LDTMA has a 19 member Board of Directors. The goal of the Board is to find Directors who are senior managers or higher in their respective organizations. The Board serves primarily as the policy making and advocacy arm of the organization. The Board has specific positions that are filled. These include: Voting positions (16) Building Owners (3) Large employers (3) Small & Medium sized employers (3) Public sector employers with offices in the Lloyd District (3) Neighborhood Associations (2) At-Large (2) Ex-Officio (non-voting) (3) Portland Department of Transportation (1) Portland Development Commission (1) TriMet (1) The public sector agencies on the Board determined that they were more comfortable as ex-officio members, which reduced conflicts between having to vote on decisions that are specific to the LDTMA mission and having to represent public interests that are larger than just the Lloyd District. Board membership gives ex-officio Directors all rights of discussion, persuasion and fiduciary responsibility in the oversight of the organization.	The GRC-TMA maintains an Advisory Committee, charged by the GDDA Board to carry out the transportation priorities of GDDA. The TMA Advisory Committee takes direct responsibility in developing the transportation priority plan for the GDDA Board to review and adopt. The GRC-TMA Advisory Committee is comprised primarily of business/employer representatives from within the GRC-TMA's service boundary. The size and number of Advisory Committee members fluctuates. At least two GDDA Board members sit on the GRC-TMA Advisory Committee (to provide direct report back to the GDDA Board) as does one representative each of the Gresham City Council, the Gresham Community Development Department and TriMet. In general, once the annual work plan is adopted, the Advisory Committee works fairly independently of the GDDA Board (operating within a set budget and work plan). All Advisory Committee members are allowed to vote on issues, programs and direction. Major policy questions are generally formulated and evaluated at the Advisory Committee level, with recommendations forwarded to GDDA for lobby and advocacy efforts.	The WTA has an 8 member Board of Directors. The goal of the Board is to find senior level senior managers or higher in their respective organizations. The Board serves primarily as the policy making and advocacy arm of the organization. The Board has specific positions that are filled. The goal of the WTA is to balance public and private sector participation on the Board of Directors. Board positions include: Voting positions (8) Private sector employers (4) City of Beaverton, Oregon (1) City of Tigard (1) Washington County, Oregon (1) TriMet (1)	The TMA Board of Directors, which also serves as the official representative of property owners for the Business Improvement District, determines tax assessment rates as well as the level of shuttle service on an annual basis.	2004-2005 Board of Directors Chair: Dan Hoffman, Network Appliance Vice Chair: Roger van Overbeek, Yahoo! Secretary/Treasurer: Julie Ford-Tempesta, Ariba Directors at Large: Allana Bindi, Juniper Networks Brice McQueen, City of Sunnyvale Susan Dietz, Lockheed Martin Space Systems Company. Jane Vaughan, Menlo Equities Scott Haywood, Santa Clara VTA (Ex-officio) Suzi Blackman, Sunnyvale Chamber of Commerce (Ex-officio) Executive Director: Open	5 members elected in an annual general election. Once elected, they elect the board positions (President, Vice-President, Treasurer/Secretary, 2 At Large members)	The South Natomas TMA is governed by a Board of Directors which elects a President, Vice-President, Secretary and Treasurer.	Private.
Staff	The LDTMA Executive Director is a contracted position at 0.50 FTE. As such, the Executive Director is not an employee of the LDTMA. An additional 3.0 FTE (Program Director, Program Manager and Office Manager) are on staff and employees of the LDTMA.	The GRC-TMA shares its Executive Director with GDDA (Gresham Downtown Development Agency). As such, TMA staffing is at 0.50 FTE.	The WTA funds a full time Executive Director and (through a regional grant) a part-time events coordinator.	1 independent contractor	One-Executive Director	The Park has 4 staff members: 2 full time, 2 part time. Transportation occupies approximately 1/7 of total staff time.	The TMA is administered by a full-time Executive Director and a part-time Membership Services Manager.	One Executive Director.

Appendix 6C: TMA Peer Review

TMA	Lloyd District TMA	Gresham Regional Center TMA	Westside TMA	Emeryville TMA	Moffett Park Business and Transportation Association	Hacienda Business Park	South Natomas TMA	Burbank TMO
Committees	Besides the Board, the LDTMA has 5 standing committees charged with carrying out adopted strategic plan programs and strategies of the Board of Directors. The LDTMA Committees incorporate approximately 100 participating members. It is the LDTMA Board's goal that each committee is chaired by a Board member, with committee representatives comprised of mid-level managers of the LDTMA's member businesses. Standing committees include: • Transportation • Marketing/Communications • Bikes • Pedestrian Environment • Transportation Coordinators Forum The LDTMA also assembles Ad Hoc committees and Task Forces as necessary.	At this point in the GRC-TMA's evolution, all work (program and policy) is done at the Advisory Committee level. As such, the marketing and service delivery efforts of the organization have all occurred within the Advisory Committee. The Advisory Committee has broken out into Ad Hoc work groups when work loads and timing have necessitated this approach.	The WTA doesn't carry standing committees at this time. Most policy work is carried out by the Board and programs and service delivery are developed by staff (with Board input and approval)	None.	Executive Committee comprised of Board members meets every other month.	Personnel Committee (for personnel reviews) and Nominating Committee (for annual elections).	No existing committees, but in the process of forming Financial Policy Committee and Strategic Planning Committee.	Private.
By-Laws	Public.			Private.	Private.	Public.		
Major Obstacles/ Hurdles in Forming the TMA?	Early funding was an obstacle. The major stakeholders met early on with no funding (being facilitated by a City staff person). The strength of the TMA at it inception was the clear realization by stakeholders of the future impact of congestion on their ability to achieve their goal for new job growth. This was an impetus to seek funding resources and formalize the stakeholders into a TMA.	Finding consensus on the issue of transportation as an impediment to future commercial job growth. The Gresham TMA was provided a three year funding grant by the regional government to cover formation expenses. By the third year, a private source of funding needed to be established. Because Gresham is a suburban downtown, it was initially difficult to get stakeholders to agree that reducing parking demand, commute trip reduction and transit planning/support were key economic development goals.	The WTA boundaries include an entire county (i.e. Washington County) and, therefore, it was difficult for the WTA to find consensus among businesses on a focused transportation program that would have general benefits for businesses. As a result, the WTA is primarily focused on regional and state wide transportation advocacy more than specific program delivery services (i.e., bike, walk and transit pass programs).	Formed in the late 90's when CALTRANS was financially supporting the formation of TMA's, no major hurdles were presented.	1. Funding. 2. Getting people on-board with original concept. Both of these hurdles were successfully addressed.	Part of Business Park, so no TMA issues in forming.	New Executive Director has limited institutional knowledge about starting of TMA.	
Regulatory Requirements								
Voluntary or Required Membership	Voluntary	Voluntary	Voluntary	City requires property developers to join the TMA as part of development agreements.	Voluntary.	Mandatory	City of Sacramento has designated the TMA as the delivery mechanism for mitigation measures for developers' approvals. For any of these developers, membership is mandatory.	Mandatory membership of select employers
Who is Required to Join TMA?	No requirements. Open to building owners, employers and developers as well as public agencies.	No requirements. Open to building owners, employers and developers as well as public agencies.	No requirements. Open to building owners, employers and developers as well as public agencies.	Developers are required to join, however, additional members volunteer to participate in the benefits.	N/A	All property owners (not necessarily business owners).	Building owners and tenants must join in support of the mitigation measures for project approval. Additional members may volunteer to join.	All employers with more than 25 employees in the Media District or downtown areas.
Is There a Target Trip Reduction Goal?	Trip targets are set for 2015. The goals are set as mode split goals. 2015 targets are: 42% transit, 10% bike, 5% walk, 10% rideshare and 33% drive alone.	No formal trip reduction targets have been adopted.	The WTA focuses on the State of Oregon's Employee Commute Options (ECO) Rule that establishes a 10% commute trip reduction goal for all businesses in the Portland Metropolitan Area with more than 50 employees.	No.	Up to 2 years ago, each company had a trip reduction goal set by the city, then the City increased the goal for each new project. Now there is a specific goal for the complete park with a trip reduction goal of 20% trip reduction for new projects.	Drive Alone Target = less than 70%. Congestion Target = Reduce peak hour vehicle trips by 45%.	City ordinance encourages a 35% trip reduction goal.	38% below base rates (determined by ITE trip generation rates) by 2010.
How is Progress Monitored?	An annual commute trip survey of district employees. The survey covers approximately 6,000 of the districts 20,000 employees.	Annual reporting to both the Board of Directors and to the regional government.	Annual reporting to both the Board of Directors and to the regional government.	N/A	Annual surveys and reports.	Drive Alone Target is measures through City of Pleasanton random surveys and US Census. Congestion target is not measured.	Not monitored.	Annual survey.
Penalties if not Achieved?	None	None	None	N/A	Penalties are assessed on a case by case basis, and are higher than the cost of creating a trip reduction program.	These targets are not mandatory, so no penalty if not achieved. The Park believes in the goals and wants to maintain good faith with the City, plus the programs are popular with tenants	No penalties.	If goals are not met, employers are required by City to work with TMO to develop a TDM and trip reduction plan.

Appendix 6C: TMA Peer Review

TMA	Lloyd District TMA	Gresham Regional Center TMA	Westside TMA	Emeryville TMA	Moffett Park Business and Transportation Association	Hacienda Business Park	South Natomas TMA	Burbank TMO
Financial Information								
Fee Structure/ Basis	No fee.	No fee.	Membership dues range from $5 to $10 per employee (based on the package of services a business desires to receive). Membership dues are capped at $15,000 for any member. The City of Beaverton, City of Tigard and Washington County pay dues at the same rate as private sector members.	Funded through property-based improvement system based on the square footage of commercial property.	Fees start at $10 per employee for new members, but fees are flexible to accommodate new members. Founding members pay at a sponsorship level (approx. $25,000 per year) which gives them a seat on the Board.	Annual membership dues are assessed in levies per acre.	Membership dues. For developers, dues based on unleased square feet. For tenants, dues based on rentable square feet (higher rate).	Membership dues: $18/employee.
Other Funding Sources	The LDTMA derives its funding from the following sources: • Business Improvement District (private sector contribution of $90,000) • Parking Meter Revenue from the District (City of Portland contribution of $75,000) • A commission from the sale of transit passes (TriMet contribution of $40,000) • Regional grant (Metro regional government contribution of $25,000)	**Business Improvement District:** A portion of the larger GDDA BID is directly allocated to the TMA. During the last renewal of the BID, the BID formula was specifically calculated to show funders the percentage breakout of their assessment going to the TMA and that going to GDDA for more general economic development purposes. **Annual city of Gresham Contribution:** The City of Gresham makes an annual contribution to both the TMA and to GDDA as a matching contribution for the private sector's BID investment. Regional Grant Funding	The organization also receives CMAQ grant funding through METRO, the regional government	None.	City of Sunnydale originally funded the organization's feasibility study and provided a startup contribution. Now, the City pays a membership rate as they have offices in the Park.	No.	CMAQ funds through SACOG.	None.
In-Kind Services?	The LDTMA receives free office rent from a local development company.			No.	Free overhead/rent. Office of the Board chair hosts the Executive Director's office for that 2 year period.	No.	No.	No.
Annual Operating Budget	The LDTMA maintains an annual operating budget of approximately $230,000.	The annual operating budget of the GRC-TMA is approximately $75,000.	The WTA's annual operating budget is approximately $150,000.	$1.5M	$125,000 per year.	Total Park budget = $2M annually. Transportation program = $140,000 annually to subsidize the shuttle and maintain shelters, signage, etc. Additional cost of staff time not included in these costs.	Private.	Private.
TMA Programs/Strategies								
Major Programs	• LDTMA PASSport annual transit pass program. • Commuter Connection Transportation Store • District bike locker program • District pedestrian infrastructure fund • Policy & Advocacy • 14 annual district outreach and educational events	• Advocacy for downtown transportation issues. • Assisting businesses to comply with State ECO Rule	• Transportation Policy and Advocacy • Annual Carefree/Carfree event • ECO employer assistance	Shuttle bus service, information and referral services.	Guaranteed Emergency Ride Home; Transportation Consulting; Advocacy for local and regional transportation projects and commute services that affect companies and employees; Employee Commute Survey; Network of Commute Coordinators	Free shuttle connecting the Park to regional rail (BART and ACE), plus circulator, and interregional bus services. Connections and/or coordination include: Dublin/Pleasanton station, Tri-Delta Transit, San Joachin Regional Transit, Modesto Express, and Contra Costa County Connections. Additional services include Guaranteed Ride Home; Regional Rideshare; Bicycle Coordination Currently working on a TOD program to add more residential units within the park.	Subsidized regional transit passes; Amtrak subsidy; Emergency Ride Home Program; Network and monthly programs for Employee Transportation Coordinators; Bike Users Group (benefits include: bi-monthly lunches with informative programs; bike forums and safety training; Bike to Work Day breakfast and activities; and bike subsidies, when available); Rideshare Express (regional carpool database); advocacy, and communication.	• Free shuttle service for all members • Demand responsive shuttle for in-city employees • Employee education and training • Ridematching Services • Commuter discount coupon book • Guaranteed ride home • One-fare taxi program • Home-to-work taxi program • Marketing and Promotional Materials • Membership Resource Center • Inform, educate and involve member companies in regional policy issues
Which are most successful and why?	Each program has been very successful and supported by results from the annual district survey. The transit program is successful because businesses purchasing the program for their employees receive (a) a business tax credit for the purchase and (b) a discount on the price of the pass. The Bike program is successful because of the coordination of the program through the Bike Committee, the availability of secure bike lockers and the ability to manage all the services through the Commuter Connection Transportation Store.	The GRC-TMA has been most successful in advocating with developers to better plan and coordinate their developments to support reduced auto trips. The tie between the GRC-TMA and the Gresham Downtown Development Association allows for close coordination of transportation priorities at the front end of development.	The WTA's annual Carefree/Carfree event is now being expanded to become a regional event, focusing on challenging businesses and employees to try alternative modes during September of each year. Competitions and prizes are awarded. The event has grown in scale and popularity largely because of the partnership the WTA has established with the regional government to expand marketing, communication and outreach for the event.	Shuttle bus service provided 973,000 rides last years. This is successful because it's a good service, free to users, and dependable.	1) Network of Commute Coordinators and 2) Advocacy/lobbying to maintaining transit services to the Park. Coordination of many companies provides a greater impact than the sum of the parts.	Bus services are most successful, especially by employees who live nearby and use the routes to go to more than work locations.	Subsidized transit pass, because their progressive workforce desires transit.	Private.

Appendix 6C: TMA Peer Review

TMA	Lloyd District TMA	Gresham Regional Center TMA	Westside TMA	Emeryville TMA	Moffett Park Business and Transportation Association	Hacienda Business Park	South Natomas TMA	Burbank TMO
Benefits to TMA	• Free-standing organization - autonomous • Very clear mission and organization is mission driven • Clear standards/guidelines for operating, policy development and program delivery • Safe forum for participation of Board Directors • Legal standing • Clear lines of authority between Board, committees and program delivery services	• Shared use of staff and office space, therefore maximizing resources (which benefits both GRC-TMA and GDDA) • Can be a format that is used as a transition from TMA formation to formal free-standing TMA organization • Quick means to get programs and services up and going. • Regular forum for private and public sectors to convene	• Free-standing organization – autonomous • Very clear mission and organization is mission driven • Clear standards/guidelines for operating, policy development and program delivery • Safe forum for participation of Board Directors • Legal standing • Clear lines of authority between Board, committees and program delivery services	The TMA provides an easy way to pool resources and make more efficient use of collective funds.	Excellent support by original members.	Support from owners, residents, tenants, and City.	SNTMA is an innovative organization willing to try new things and be creative in their approach.	Very cooperative relationship with partners:support from larger employers and City staff. Productive 3-way partnership.
Limitations to TMA	Decision-making may take time because of process, but this can be mitigated through Executive Committee, if necessary.	There is not a clear delineation of final authority between Advisory Board and GDDA Board. • Less focused on policy, emphasizing programs and services • May limit fundraising capabilities because of competing needs of parent organization • The lines of authority between Board, committees and program delivery services is less clear than in LDTMA or WTA model	• Decision-making may take time because of process, but this can be mitigated through Executive Committee, if necessary. • Equal representation of public and private sector (at Board level) may limit ability to recruit private sector Board members.	People outside of the user group frequently want the service to expand to do more than shuttle's mission. If it has to be all things to all people, it will not be enough for it's core responsibility.	1) Funding. 2) Membership because it's voluntary. New businesses tend to join (especially smaller ones that don't have staff to fill these functions), but older companies tend not to see a compelling reason to join.	More funding would allow them to provide more routes, services, and frequency. More front door service is hoped for, after the TOD plan is implemented, provided it includes a financial entitlement.	Social Marketing: How to tailor programs to individuals.	It is sometimes difficult to leverage the compliance of smaller employers.
Contact & Website	www.lloydtma.com. Rick Williams, (503) 236-6441.	www.gdda.org/transit.htm. Kathy Everett, Executive Director,	www.wta-tma.org. (503) 617-4844	www.emerygoround.com. Wendi Silvani (510) 465-0724.	http://www.mpbta.org. Jennifer Pedon 408-742-2148	www.hacienda.org and www.tod.hacienda.org. James Paxson, 925-734-6510	http://www.southnatomastma.org. Ken Loman, Executive Director, 916-646-0928	http://www.btmo.org, JJ Weston, Executive Director, (818) 953-7788

Case Study- Boulder, CO

Appendix
6D

CASE STUDY – BOULDER, COLORADO

Boulder's public garage wrapped in retail and office

Introduction

Boulder's downtown business district, having recovered from near-death in the 1970's, today comprises some 700 businesses and more than 7,500 employees. Faced with a shortage of parking for customers, the city developed a program that combines restrictions on downtown parking with aggressive demand management. These initiatives have been introduced through a special district – the Central Area General Improvement District (CAGID), which was established in the 1970s. The Board of CAGID, which makes the final decisions on issues such as new parking construction, is comprised of the City Council. However, considerable power over decisions such as parking charges is held by the Downtown Management Commission (DMC), which is made up of local businesses and property owners, although its actions are subject to City Council review.[1]

The program was set up in conjunction with the design of the Pearl Street pedestrian mall. The intention was to provide parking on a district-wide basis on the periphery of the mall, avoiding the need to provide on-site parking for each business. It was seen as a tool for economic revitalization and promoting a good pedestrian environment, with the two going hand in hand.

Key characteristics include a desire to create a walkable, vibrant community, with a focus on a high quality of life. In addition, Boulder (at least at present) is dependent on bus transit to meet its public transportation needs. **It should be noted that Boulder had very little transit at the time that CAGID was established; bus service improvements have arrived subsequently. The City of Boulder has a population of around 96,000 people.**

Parking Tools

Boulder is most notable for its integrated approach that allows CAGID to invest in the optimum mix of transit, demand management and parking supply to improve downtown access. The following specific parking strategies have been employed in Boulder:

- **No parking requirements.** The City has no parking requirements for non-residential uses within the CAGID area. Developers are allowed to build as much or as little parking as they choose, subject to design standards in the zoning code, and to manage it as they see fit. If they choose to build less parking, they can purchase permits for public lots and garages from the DMC for resale to their employees. This is usually a much cheaper strategy than building parking on-site. Public garage permits cost $213 per quarter ($852 per year), and surface lot permits (for which there is a waiting list) cost $134 per quarter ($536 per year). Residential minimum parking requirements are set at one space per unit, although these have had little impact since developers have

1 For more details, see Boulder Municipal Code, Title 2, Chapter 3-5.

tended to provide two spaces per unit given market demands.

- **Funding of public parking.** Shared public parking facilities are constructed and operated by CAGID, and funded through CAGID's general obligation bonds. This debt is supported primarily by revenue from parking charges (including meters), and secondarily by property and other taxes paid by property owners (providing 16% of revenue). The DMC currently manages 202 spaces in non-metered surface lots, 2,209 spaces in five structures, and 871 metered spaces, 61 of which are in a surface lot (2004 figures).

- **Demand management.** On-street meter revenue is used to provide all employees with benefits such as a free universal transit pass (called an Eco-Pass); Guaranteed Ride Home; ride-matching services; bicycle parking; and a number of other benefits. In 2002, these programs cost just under $325,000 (Figure 4-1).2 This focus was prompted by the reality of limited street capacity to handle more traffic, and simple economics. "CAGID realized that the economics of parking garages are dismal," according to James Bailey, a former planner who helped establish the system. The DMC determined that demand management was a cheaper strategy than building new parking alone. These TDM programs are not directly managed by CAGID, but through the City's Downtown and University Hill Management Division.

- **Curb parking.** All downtown parking meter revenue – more than $1 million per year – is transferred to CAGID from the City's General Fund. This responsibility, together with the fact that local businesses and property owners comprise the DMC, gives it a strong incentive to create new curb parking. One of its first moves was to create more curbside, metered parking through converting parallel spaces to diagonal.

- **Parking garage design.** Boulder's original concept, which has largely been implemented, was to begin with surface lots, and transition to structured parking as downtown grew. All DMC-run garages are mixed-use. For example, the new garage at 15th and Pearl Streets is wrapped in street-level retail and second-floor offices on two sides. The garage has received several design awards from architectural, planning and parking institutes, including a Charter Award from the Congress for the New Urbanism. The Zoning Code also has specific design requirements for downtown parking, which must be wrapped in retail, restaurant or other pedestrian-oriented uses for a depth of 20-30 feet on the first floor. Parking must also be wrapped on the second floor, although this may be with any permitted use and the required depth is lower.3

- **Reduced parking requirements.** Outside of the CAGID area, the City has also experimented with lower, more flexible parking requirements in mixed-use districts. A single parking requirement for all non-residential uses allows the use to change freely. For example, an office use can be converted into a restaurant, without the barrier of having to add new parking. There are also low parking requirements for residential uses in many parts of the city.

- **Residential Permit Parking (RPP).** Neighborhood Permit Parking initiatives have been introduced to prevent overspill parking from commuters trying to avoid parking restrictions and charges downtown. Commuters are eligible, however, to buy on-street parking permits for $60 per quarter – another example of the integration of on-street and off-street management. Commuter permits are limited to four per block face, on blocks where average occupancy is lower than 75%. This RPP program is designed to be revenue neutral, and so commuter fees cross-subsidize low annual resident fees of $12 per year (Figure 4-2).

2 Eco-Pass costs were projected to rise significantly from $257,550 in FY2002 to $320,000 in FY 2003 and 2004.

3 See Boulder Municipal Code, Title 9, Chapter 3.4-21.

Sophisticated enforcement is used, with license plates entered into a handheld device, meaning that motorists cannot evade the restrictions by simply moving their cars every few hours.

- **Discounted validated parking.** Downtown businesses can bulk-purchase meter tokens or validated stamps, in order to offer free parking to their customers. A common practice in many downtowns with parking charges, it avoids the risk of customers turning to other retail destinations in order to avoid parking charges.

Figure 4-1 CAGID Revenue and Expenditure, 2002

Revenue	
Taxation (inc. property/owner/TIF tax)	$775,293
Short Term Fees	$925,757
Long Term Fees	$1,302,507
Meter Revenue*	$1,026,820
Meterhood and Tokens†	$106,777
Interest	$70,751
Rental Income	$380,766
Mobility Center Grant	$84,969
Miscellaneous	$25,779
Total Revenue	**$4,699,419**
Expenditures	
Parking Operations	$737,928
Major Parking Maintenance	$50,569
Downtown & University Hill Management Division**	$924,565
Eco-Pass Program	$257,550
Major Maintenance to Pearl Street Mall	$942,158
Debt Service	$1,964,028
Other Expenditure	$159,560
Total Expenditure	**$5,036,358**

* Meter revenue is transferred from the City's General Fund.

† Meterhoods are paid for by contractors, special events, utility companies, etc. to use a curb parking space. Tokens are purchased by businesses to provide parking validation for their customers, or others who prefer tokens to quarters.

** Includes all costs that are not directly related to parking facility and meter maintenance and revenue collection. Includes $392,000 for personnel, $65,000 for Transportation Demand Management, and $62,000 for planning for a new structure.

Source: City of Boulder.

Figure 4-2 Boulder Neighborhood Permit Parking Program Revenue and Expenditure, 2002

Residential Permit Sales	$26,395
Commuter Permit Sales	$69,936
Citation Revenue	$239,231
Administrative Costs (excluding enforcement)	$70,027

Source: City of Boulder. Staff estimate that Neighborhood Parking Program enforcement accounts for 60% of the City's enforcement resources (11 officers) while generating 13% of citation revenue

Impacts of Parking Policies

Development Feasibility

Initially, developers and property owners were skeptical of the proposals to create CAGID, but according to local planners and developers, they have been convinced by its success in catalyzing economic development. According to James Bailey, a former planner who helped establish the system: "In the 1970s, downtown was dying. They had to do something. This was a pretty pragmatic approach."

Already, rapid growth has brought Boulder close to the population and employment levels that in 1996 were projected for 2020. The downtown pedestrian-oriented "Pearl Street Mall" has tripled in length in the past decade, as automobile-oriented parcels at either end have been redeveloped. There are numerous examples of new developments that have taken place in recent years, such as the 300,000 square foot One Boulder Plaza. Pearl Street is one of the best examples of a successful pedestrian mall in the United States.

According to local planners, a small mixed-use zone on East Pearl Street, close to the city's downtown, was established in the 1980s but barely used for more than a decade, at least partly due to high parking requirements. A reduction in requirements adopted in 1997 to one space per 400 square feet of non-residential development (one space per 500 square feet if commercial makes up less than 50% of the development) has been a key to encouraging recent development.

Traffic and Parking

According to the Downtown Management Commission, there has been an increase in available parking, partly due to the construction of new garages, but also due to more employees taking transit.

Any decision to build new parking is based on feasibility studies demonstrating the need for additional supply, highlighting the importance of adopting guidelines that can be used to determine when new parking is needed.

Commuting in multiple occupancy vehicles increased from 35% in 1993 to 47% in 1997. According to the DMC, the Eco Pass program alone has reduced commuter parking demand by 850 spaces, the DMC states.

While new development is not required to incorporate on-site parking, some projects have done so due to market demands – but only to the point where it is economic. At the 400,000 square foot One Boulder Plaza, for example, two stories of underground parking are provided, equivalent to 1.2 spaces per 1,000 square feet. However, site constraints meant that about half the parking for employees is provided off-site through CAGID. The cost to the individual of these off-site permits is about $50 per month cheaper per employee.

According to City staff, the Neighborhood Permit Parking program has also had success in preventing spillover and ensuring space is available for residents. At the same time, the sale of commuter permits has contributed to the efficient use of curb space.

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Boulder, CO

Appendix

7A

Downtown Parking Revenue Projections

Projected Downtown Parking Revenues

Assumptions
See individual revenue calculation worksheets for assumptions

PUBLIC GARAGES

		Annual Revenues - Existing (2004)				Annual Revenues - Projected			
	% of Transient Revenue from stays of < 90 minutes	Monthly	Other	Transient	Total	Monthly	Other	Transient	Total
Exchange	11%	$323,323	$35,292	$349,055	$707,670	$323,323	$35,292	$207,118	$565,733
Marketplace	20%	$207,088	$7,540	$325,889	$540,517	$207,088	$7,540	$173,227	$387,855
Orange	13%	$155,960	$8,061	$84,434	$248,455	$155,960	$8,061	$49,225	$213,246
Total	**20%**	**$686,370**	**$50,893**	**$759,379**	**$1,496,642**	**$686,370**	**$50,893**	**$429,570**	**$1,166,833**

OFF-STREET METERS

				Existing Hours of Operation		Additional Hours of Operation		
Lot No.	Annual Revenues - Existing (2004)	# of Meters	Proposed Hourly Rate	Projected Occupancy	Projected Annual Revenue	Projected Occupancy	Projected Annual Revenue	Projected Total Annual Revenue
1	$ 11,138	58	$ 0.75	18%	$ 20,884	6%	$ 6,040	**$26,924**
2	$ 44,775	57	$ 0.75	57%	$ 67,162	19%	$ 19,425	**$86,587**
3	$ 49,359	65	$ 0.75	56%	$ 74,038	19%	$ 21,414	**$95,452**
4	$ 39,968	81	$ 0.75	45%	$ 74,940	15%	$ 21,675	**$96,615**
6	$ 137,181	117	$ 0.75	86%	$ 205,771	29%	$ 59,515	**$265,286**
10	$ 16,191	62	$ 0.75	19%	$ 24,286	6%	$ 7,024	**$31,310**
11	$ 3,349	66	$ 0.75	5%	$ 6,278	2%	$ 1,816	**$8,094**
12	$ 5,051	33	$ 0.75	14%	$ 9,470	5%	$ 2,739	**$12,209**
15	$ 12,951	25	$ 0.75	38%	$ 19,427	13%	$ 5,619	**$25,046**
17	$ 45,728	45	$ 0.75	74%	$ 68,593	25%	$ 19,839	**$88,432**
TOTAL	**$ 365,690**	**609**			**$ 570,849**		**$ 165,107**	**$735,955**

ON-STREET METERS

				Existing Hours of Operation		Additional Hours of Operation		
Location	Annual Revenues - Existing (2004)	# of Meters	Proposed Hourly Rate	Projected Occupancy	Projected Annual Revenue	Projected Occupancy	Projected Annual Revenue	Projected Total Annual Revenue
Existing meters	$ 232,051	499	$ 0.75	28%	$ 290,063	9%	$ 83,056	**$373,119**
Brand Boulevard - new meters	$ -	251	$ 1.00	75%	$ 515,052	25%	$ 147,479	**$662,531**
New meters on other streets	$ -	156	$ 0.75	28%	$ 90,681	9%	$ 25,965	**$116,647**
TOTAL	**$ 232,051**	**906**			**$ 895,796**		**$ 256,500**	**$1,152,297**

	Total Annual Revenues		
	Existing	Projected	Increment
GRAND TOTAL	**$2,094,382**	**$3,055,085**	**$960,703**

Projected Revenues for Public Garages

Assumptions

Inputs

$	1.50	Existing hourly price
$	1.00	Proposed hourly price
		Proposed policy: 1st 90 minutes free

		Annual Revenues - Existing (2004)				Annual Revenues - Projected			
	% of Transient Revenue from stays of < 90 minutes	Monthly	Other	Transient	Total	Monthly	Other	Transient	Total
Exchange	11%	$323,323	$35,292	$349,055	$707,670	$323,323	$35,292	$207,118	$565,733
Marketplace	20%	$207,088	$7,540	$325,889	$540,517	$207,088	$7,540	$173,227	$387,855
Orange	13%	$155,960	$8,061	$84,434	$248,455	$155,960	$8,061	$49,225	$213,246
Total	**20%**	**$686,370**	**$50,893**	**$759,379**	**$1,496,642**	**$686,370**	**$50,893**	**$429,570**	**$1,166,833**

Projected Revenues for Off-Street Parking Meters

Assumptions

Inputs		Notes
2736	Existing revenue hours/year	Current hours of operation are 9 am - 6 pm, 304 days per year (meters are not in effect on Sundays & Holidays
2374	Additional revenue hours/year	Proposed: extend hours to 9 am - 11 pm, 365 days per year (=304 days @ 5 addtnl hours/day + 61 days @ 14 addtnl hours/day
		"Projected Occupancy" on this spreadsheet is defined as equal to actual annual revenue divided by maximum possible revenue at 100% occupancy, using 2004 data provided by the Cit
33%		Occupancy during the additional revenue hours (i.e., on Sundays, holidays and from 6-11 pm Mon-Sat) is one-third of occupancy during current hours of operatio

Lot No.	Annual Revenues - Existing (2004)	# of Meters	Proposed Hourly Rate	Existing Hours of Operation		Additional Hours of Operation		Projected Total Annual Revenue
				Projected Occupancy	Projected Annual Revenue	Projected Occupancy	Projected Annual Revenue	
1	$11,137.90	58	$ 0.75	18%	$20,883.56	6%	$6,040.15	$26,923.72
2	$44,774.55	57	$ 0.75	57%	$67,161.83	19%	$19,425.22	$86,587.04
3	$49,358.75	65	$ 0.75	56%	$74,038.13	19%	$21,414.05	$95,452.17
4	$39,968.00	81	$ 0.75	45%	$74,940.00	15%	$21,674.90	$96,614.90
6	$137,180.80	117	$ 0.75	86%	$205,771.20	29%	$59,515.21	$265,286.41
10	*$16,190.55*	*62*	$ 0.75	*19%*	$24,285.83	6%	$7,024.19	$31,310.01
11	$3,348.50	66	$ 0.75	5%	$6,278.44	2%	$1,815.91	$8,094.35
12	$5,050.80	33	$ 0.75	14%	$9,470.25	5%	$2,739.08	$12,209.33
15	$12,951.35	25	$ 0.75	38%	$19,427.03	13%	$5,618.88	$25,045.90
17	$45,728.35	45	$ 0.75	74%	$68,592.53	25%	$19,839.02	$88,431.54
TOTAL	**$365,689.55**	**609**			**$570,848.78**		**$165,106.60**	**$735,955.38**

Projected Revenues for On-Street Parking Meters

Assumptions

Inputs		Notes
2736	Existing revenue hours/year	Current hours of operation are 9 am - 6 pm, 304 days per year (meters are not in effect on Sundays & Holidays)
2374	Additional revenue hours/year	Proposed: extend hours to 9 am - 11 pm, 365 days per year (=304 days @ 5 addtnl hours/day + 61 days @ 14 addtnl hours/day)
		"Projected Occupancy" on this spreadsheet is defined as equal to actual annual revenue divided by maximum possible revenue at 100% occupancy, using 2004 data provided by the City
33%		Occupancy during the additional revenue hours (i.e., on Sundays, holidays and from 6-11 pm Mon-Sat) is one-third of occupancy during current hours of operation
		Occupancy for Brand Boulevard's new meters is assumed to be 75%.
		Occupancy for new meters on other streets is assumed to be equal to occupancy for the existing meters (i.e., 28%).
		156 new meters on other streets: 657 spaces total on affected blocks, less 442 existing meters on those blocks, less 59 loading, disabled & other spaces that cannot be metered, equals 156

Location	Annual Revenues - Existing (2004)	# of Meters	Proposed Hourly Rate	Existing Hours of Operation		Additional Hours of Operation		Projected Total Annual Revenue
				Projected Occupancy	Projected Annual Revenue	Projected Occupancy	Projected Annual Revenue	
Existing meters	$232,051	499	$ 0.75	28%	$290,063.23	9%	$83,056.04	$373,119.27
Brand Boulevard - new meters	$0	251	$ 1.00	75%	$515,052.00	25%	$147,478.82	$662,530.82
New meters on other streets	$0	156	$ 0.75	28%	$90,681.09	9%	$25,965.42	$116,646.50
TOTAL	**$232,050.58**	**906**			**$895,796.31**		**$256,500.27**	**$1,152,296.59**

Off-Street Parking Meter Revenue (2004)

LOT NO	NO. METERS	RATE	ANNUAL REVENUE	OCCUPANCY	Revenue if meters were 100% occupied*
1	58	0.4	$11,137.90	18%	$63,475.20
2	57	0.5	$44,774.55	57%	$77,976.00
3	65	0.5	$49,358.75	56%	$88,920.00
4	81	0.4	$39,968.00	45%	$88,646.40
6	117	0.5	$137,180.80	86%	$160,056.00
10	***62***	***0.5***	***$16,190.55***	19%	$84,816.00
11	***66***	***0.4***	***$3,348.50***	***5%***	$72,230.40
12	33	0.4	$5,050.80	14%	$36,115.20
15	25	0.5	$12,951.35	38%	$34,200.00
17	45	0.5	$45,728.35	74%	$61,560.00
		TOTAL	**$365,689.55**		

Lot 10 and 11: Adult Recreation Center ("ARC") visitors with "SR" parking permits do not have to feed the parking meters while visiting the ARC.

**** Used Only to Calculate Occupancy Rate***

(Projected Revenue with Meter Rate Increases - City Staff Estimate)

LOT NO	NO. METERS	RATE	ANNUAL $$	OCCUPANCY	Revenue if meters were 100% occupied*
1	58	0.5	$14,281.92	18%	$79,344.00
2	57	0.6	$53,335.58	57%	$93,571.20
3	65	0.6	$59,754.24	56%	$106,704.00
4	81	0.5	$49,863.60	45%	$110,808.00
6	117	0.6	$165,177.79	86%	$192,067.20
10	*62*	*0.6*	$19,338.05	***19%***	$101,779.20
11	66	0.5	$4,514.40	5%	$90,288.00
12	33	0.5	$6,320.16	14%	$45,144.00
15	25	0.6	$15,595.20	38%	$41,040.00
17	45	0.6	$54,665.28	74%	$73,872.00
		TOTAL	**$442,846.22**		

Projected Annual Revenue Increase with Proposed Meter Rate Change ***$77,156.67***

**** Used Only to Calculate Occupancy Rate***

LOT NO	NO. METERS	RATE	ANNUAL $$	OCCUPANCY	100% REVENUE*
1	58	0.5	$14,281.92	18%	$79,344.00
2	57	0.75	$66,669.48	57%	$116,964.00
3	65	0.75	$74,692.80	56%	$133,380.00
4	81	0.75	$74,795.40	45%	$166,212.00
6	117	0.75	$206,472.24	86%	$240,084.00
10	*62*	*0.75*	$24,172.56	*19%*	$127,224.00
11	66	0.5	$4,514.40	5%	$90,288.00
12	33	0.5	$6,320.16	14%	$45,144.00
15	25	0.75	$19,494.00	38%	$51,300.00
17	45	0.75	$68,331.60	74%	$92,340.00
		TOTAL	**$559,744.56**		

Projected Annual Revenue Increase with Proposed Meter Rate Change ***$194,055.01***

**** Used Only to Calculate Occupancy Rate***

Glendale Parking Figures January-December 2004

SPECIFIC PLAN AREA METERED STREETS (Including Glendale Avenue)

Area	Address	Parking Meters	Meter Rate	Annual Revenue	Annual Revenue per Meter	Annual per Meter Revenue if Meters Were 100% Occupied	Estimated Occupancy
A55	Central Ave (North of Broadway)	75	$0.60	$32,822.27	$438	$1,641.60	27%
A56	Central (South of Broadway)	5	$0.60	$1,278.90	$256	$1,641.60	16%
A57	Orange Street (North of Broadway)	94	$0.60	$46,234.00	$492	$1,641.60	30%
A58	Orange Street (South of Broadway)	35	$0.60	$13,149.70	$376	$1,641.60	23%
A60	Lexington (East of Broadway)	8	$0.60	$7,566.60	$946	$1,641.60	58%
A61	Lexington (West of Brand)	24	$0.60	$4,170.40	$174	$1,641.60	11%
A63	Louise (North of Brand)	21	$0.60	$14,935.20	$711	$1,641.60	43%
A66	California (East of Brand)	7	$0.60	$4,536.65	$648	$1,641.60	39%
A67	California (West of Brand)	3	$0.60	$2,377.10	$792	$1,641.60	48%
A74	Colorado	8	$0.60	$2,945.85	$368	$1,641.60	22%
A77	Wilson (East of Brand)	9	$0.60	$2,754.15	$306	$1,641.60	19%
A78	Wilson (West of Brand)	8	$0.60	$4,233.70	$529	$1,641.60	32%
A79	Broadway	87	$0.60	$41,228.66	$474	$1,641.60	29%
A80	Harvard (West to Brand)	25	$0.60	$6,298.55	$252	$1,641.60	15%
A81	Harvard (East to Brand)	13	$0.60	$5,020.35	$386	$1,641.60	24%
A82	Maryland (North of Broadway)	20	$0.60	$14,333.35	$717	$1,641.60	44%
A83	Glendale (WS Broadway to Wilson)	15	$0.60	$7,339.00	$489	$1,641.60	30%
A84	Glendale (ES Broadway to Wilson)	14	$0.60	$5,990.10	$428	$1,641.60	26%
A85	Glendale (South of Broadway)	28	$0.60	$14,836.05	$530	$1,641.60	32%
Total		**499**	**$0.60**	**$232,050.58**	**$465**	**$1,641.60**	**28%**

NON-DOWNTOWN METERED STREETS (Except Glendale Avenue)

A54	Mountain-Canada-Towne	103	$0.60	$43,575.40	$423	$1,641.60	26%
A86	Montrose	142	$0.50	$77,618.70	$547	$1,368.00	40%
Total		245		**$121,194.10**	$495		
Combine Total		744		**$353,244.68**	$475		

Pasadena Impact Fee

Appendix
7B

Case Study: Pasadena's Development Impact Fee

Pasadena's *Transportation Impact Review: Current Practice & Guidelines* (2005) begins, "The following guidelines support Pasadena's vision of creating 'a community where people can circulate without cars'." The vision relies upon an integrated and multimodal transportation system that provides choices and accessibility for everyone living and working in the City. Key strategies to achieve this vision promote non-auto travel including public transit services, parking strategies, bicycle facilities, and pedestrian components that are well coordinated and connected with a larger regional transportation system."

As part of an overall strategy to reduce traffic, the City of Pasadena considered a wide range of mitigation measures, including regulatory reforms. One of these was to institute a Transportation Impact fee, similar to those already adopted in Palo Alto, Santa Cruz, and Redwood City.

Development Impact Fees

Developers must mitigate the increase in traffic caused by their development. Mitigation measures are required when level of service at any study intersection or on any street segment exceeds thresholds contained in the guidelines. If mitigation reflects trip reductions predicted as a result of implementing required Transportation Demand Management (TDM) measures, an approved report must be submitted substantiating such mitigation.

Trip and parking generation for any new development are two critical inputs in a traffic impact analysis. According to the guidelines, trip generation for new development should primarily be determined by the Institute of Transportation Engineers (ITE) *Trip Generation*, current edition. Other trip production rates can be used if approved by the Department of Transportation. In addition, trip credits can be given to certain uses located on major corridors and/or within the Transit Oriented District (TOD). These trip discounts are determined on a case by case basis and must be consistent with the City's current practice. Any adjustments to standard rates, such as for special uses, mixed uses, high transit use, or pass-by trips must be approved by the City Traffic Engineer.

City of Pasadena's City Council adopted in July 2006 the Traffic Reduction and Transportation Improvement Fee, a new development fee that will fairly and accurately charge for new transportation infrastructure and facilities required to accommodate new development. The Fee has been structured to implement the Four Major Mobility Element Objectives:

- Promote a livable and economically strong community
- Encourage non-auto travel
- Protect neighborhoods
- Manage multimodal corridors

About half of the revenues from the Fee will be used to fund seven key intersection improvements and two street extensions identified in the Mobility Element as well as improvements to manage traffic on designated multimodal corridors as specified in the Mobility Element. The remaining half of the funds collected through the Fee will be used to improve the local transit service, ARTS, thereby further encouraging non-auto travel throughout the City. The

funds will be distributed between higher annual operating costs over the coming 9 years, 10 new buses, 5 new Dial-A-Ride vans, bus stop improvements, transit ITS, and the construction of a new transit maintenance facility/bus yard. See Figure 1 below.

Figure 1 Pasadena Transportation Improvement and Traffic Reduction Fee

Transportation Improvements Included in the Fee Calculation

Local Transit Improvements	**Units**	**Cost Per Unit**	**Tot. Project Costs [1]**
Net Increase in Annual Operating Cost - 9 years [2]	9	$1,000,000	$9,000,000
Additional Buses	10	$325,000	$3,250,000
Misc. Bus Stop Improvements (Poles, Signs, etc)	150	$6,250	$937,500
Dial-A-Ride Vans (CNG)	5	$60,000	$300,000
Transit Maintenance Facility/Bus yard	1	$12,500,000	$12,500,000
Transit ITS		$1,000,000	$1,000,000
		Sub-Total Transit Costs:	***$26,987,500***
Mobility Corridor Improvements			
Corridor Safety/Mobility Enhancements		$3,125,000	$3,125,000
ITS Phase Master Plan II		$8,500,000	$8,500,000
		Sub-Total Mobility Corridor Costs:	**$11,625,000**
Intersection Improvements/Street Extensions	**Right of Way Cost**	**Construction Cost**	**Tot. Project Costs [1]**
Arroyo Pkwy & Del Mar Blvd	$2,645,000	$500,000	$3,145,000
Arroyo Pkwy & California Blvd.	$3,105,000	$1,000,000	$4,105,000
Del Mar Blvd. & Hill Ave.	$2,875,000	$456,250	$3,331,250
Foothill Blvd. & Rosemead Blvd.	$1,610,000	$750,000	$2,360,000
Foothill Blvd. & Sierra Madre Villa Ave.	$517,500	$712,500	$1,230,000
Lake Ave. & Maple St.	$0	$1,125,000	$1,125,000
Lake Ave. & Walnut St.	$8,510,000	$875,000	$9,385,000
		Sub-Total Intersection Costs:	**$24,681,250**
		Unfunded Amount	
Kinneloa St. Ext - Colorado Blvd. To Foothill Blvd.		$672,350	$672,350
Walnut St. Ext - Sunnyslope To Kinneloa St.		$2,050,000	$2,050,000
		Sub-Total Street Costs:	**$2,722,350**
		Total Transportation Improvement Project Costs:	**$66,016,100**

Notes: 1 All costs are in 2006 Dollars
2 Seven ARTS Routes - Increased Peak Frequency

The Fee replaces the existing New Development Impact Fee, which was a single fee of $3.22 per square foot of net new industrial, office and retail development. These have been adjusted to better reflect the traffic impacts from various uses, and are now:

- $3.10 per net new square foot of industrial use
- $3.72 per net new square foot of office use
- $8.62 per net new square foot of retail use
- $2,480 per net new residential unit

There is also an incentive for developers to construct for sale or for rent affordable housing units by offering a 50% discount on the Fee. Affordable housing units built on-site, per Title 17.42 of the Municipal Code, will receive a 75% discount on the Fee. Workforce housing units are offered a 50% Fee discount when at least 15% of the development is within the price range of 121-150% of the Average Median income for Los Angeles County; and 35% Fee discount when

at least 15% of the development is within 151-180% of the Average Median income for Los Angeles County.

According to the Agenda Report provided to the City Council on the topic, the residential Fee is fixed rather than variable depending on size of the unit or the number of bedrooms.[1] The reason for this is that it is calculated based upon the PM Peak Hour trips generated by growth within the city forecast through 2015 as adopted in the Mobility Element. That forecast includes a mix of sizes of new residential units, and new multi-family projects usually include a mix of unit sizes. Another argument is that the PM Peak Hour trip generation rate does not vary significantly based on the number of bedrooms per unit.

Analysis of Fee Structure

The following analysis explores a majority of the transportation-related expenses a developer typically bears, both using the existing developer fee and the recently approved fee (Figure 2). The transportation categories used are:

- Intelligent Transportation System (ITS) improvements
- Roadway improvements (and existing Commercial Development Fee)
- Traffic calming, bicycle/pedestrian improvements and monitoring – all beneficiary to pedestrians and bicyclists
- Transit improvements
- Parking costs, which are calculated based on the cost to comply with the minimum parking requirements in a Pasadena Central or Transit-Oriented District[2]

As Figure 3 and Figure 4 (charts on the left) illustrate, parking accounts on average for more than 95% of the costs under current practice and of 93% of the costs in the recently adopted fee schedule. Consequently, this is a significant cost to any commercial or multi-family development.

Ignoring parking for a moment and looking only at the fee-related costs (in Figure 3 and Figure 4, in the charts on the right), current practice allocates more than 50% to roadway improvements (assuming the existing commercial development fee falls under this category). Another 20% is allocated to ITS and the remaining 30% to transit and walking/biking.

With the recently approved fee, roadway improvements will become a less significant part, and a much larger share will be invested in transit. ITS improvements will increase mobility throughout the entire street network, and will thus have a positive impact on transit speed and reliability as well.

Figure 5 shows a comparison of cities which charge developer mitigation fees.

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[1] City of Pasadena (2006) *Public Hearing: Amendment to the Schedule of Taxes, Fees and Charges to Revise the New Development Impact Fee and to Establish the Traffic Reduction and Transportation Improvement Fee*. Agenda Report from City Manager to City Council on July 17, 2006.

[2] All projects are assumed to have sub-terranean parking (with an average capital cost of $25,914 per space) but the Medical office, which is assumed to have a parking structure (with an average capital cost of $21,883 per space).

Figure 2 Estimated Costs for Transportation-Related Mitigation Measures for Recently Approved Pasadena Projects, Comparing Previous and New Practice & Fee Schedule

Type	Project Scope	Current Practice & Fee Schedule				Under the Proposed Transportation Impact Fee Schedule							
		Est'd Cost for Required Traffic Mitigations		Applicable Commercial Development Fee ($3.22/s.f. net new)	Total	Alt. 1 Fee Schedules				Alt. 2 Fee Schedules			
		With System-wide Improvements	Project-Specific / Site-Specific Improvements			Transportation Impact Fee	Note	Possible Project-Specific Improvements	Total	Proposed Alt. 2 Rates	Note	Possible Project-Specific Improvements	Total
Mixed Use	54 Single-family Condominium & 7,000 s.f. commercial (demolishing 6,876 s.f. commercial)	ITS Improvements: $30,000	Signal Modification: $46,000	$399	**$76,399**	$134,989	(1)	Signal Modification: $46,000	**$ 180,989**	$112,128	(1)	Signal Modification: $46,000	**$ 158,128**
Medical Office	130,000 s.f. medical office	Bus Purchase: $25,000 CCTV: $25,000 Wireless Cameras: $75,000 ITS Fiber: $120,000	Monitoring: $20,000 Speed Sign: $10,000	$419,900	**$694,900**	$483,600		NTMP: $30,000	**$ 513,600**	$401,700		NTMP: $30,000	**$ 431,700**
Residential	17 condos (net new 16)	Signal Upgrade: $10,000	Monitoring: $5,000	$0	**$15,000**	$39,680		NTMP: $5,000	**$ 44,680**	$32,960		NTMP: $5,000	**$ 37,960**
Retail	76,482 s.f. supermarket	ITS Fiber: $80,000 New Transit Stop: $6,000	New Signal: $140,000	$0 (No net new sq added)	**$226,000**	$420,651	(2)	New Signal: $140,000	**$ 560,651**	$350,288	(3)	New Signal: $140,000	**$ 490,288**
Mixed Use	Retain existing retail and construct 16 condos	Bus Purchase: $25,000 Bus stop upgrade: $4,000	Monitoring: $5,000	$0 (No net new sq added)	**$34,000**	$39,680		NTMP: $5,000	**$ 44,680**	$32,960		NTMP: $5,000	**$ 37,960**

Notes:

(1) Net new 124 s.f. retail is subject to the transportation impact fee

(2) Change of use from industrial to retail is credited in fee calculation, i.e. every net new square foot is assessed at ($8.62-$3.10= **$5.52**)

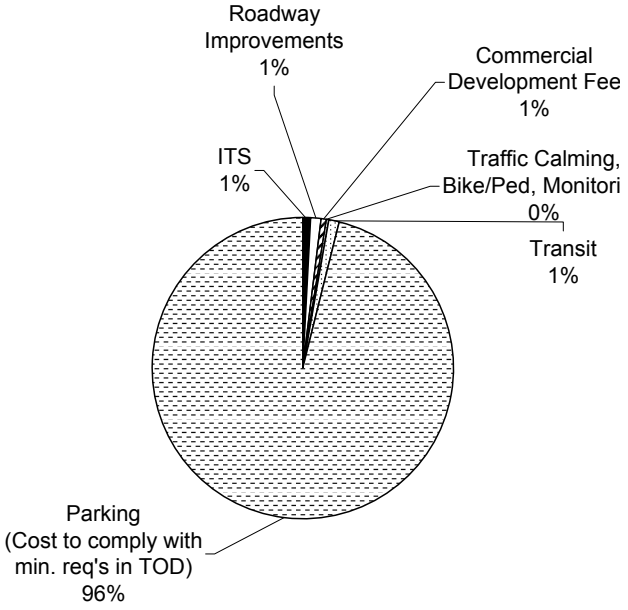
(3) Change of use from industrial to retail is credited in fee calculation, i.e. every net new square foot is assessed at ($7.16-$2.58= **$4.58**)

Source: Pasadena DOT (2006) Estimated Costs for Transportation-Related Mitigation Measures Based on Recently Approved Projects/Development in Pasadena (Working Draft)

Note: The list does not necessarily represent 100% of the transportation-related costs for a developer. For instance, a developer may also need to construct a new sidewalk or plant street trees in front of a project as part of CC&Rs2. Impact fee distribution between the following categories: 13% ITS; 42% Roadway Capacity; 5% Traffic Calming; 41% Transit. Based on assumptions from Pasadena Transportation Improvement and Traffic Reduction Fee - Transportation Improvement Included in the Fee Calculation (Pasadena DOT, 2006).

Figure 3 Estimated Costs in Current Practice, Incl. Parking Expenses (Left) and Excl. Parking Expenses (Right)

Current Practice & Fee Schedule, Incl. Parking Expenses



Current Practice & Fee Schedule, Excl. Parking Expenses

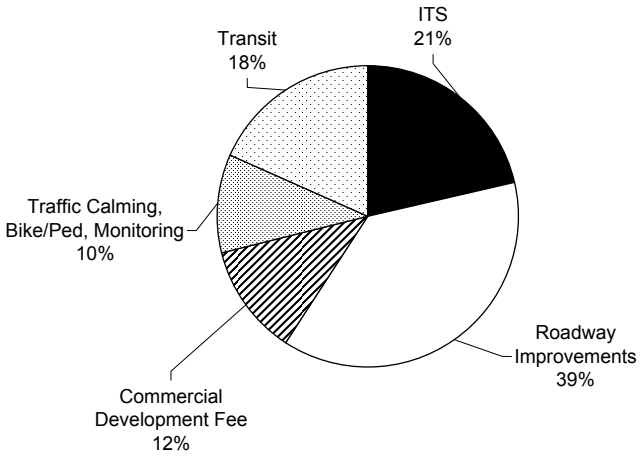
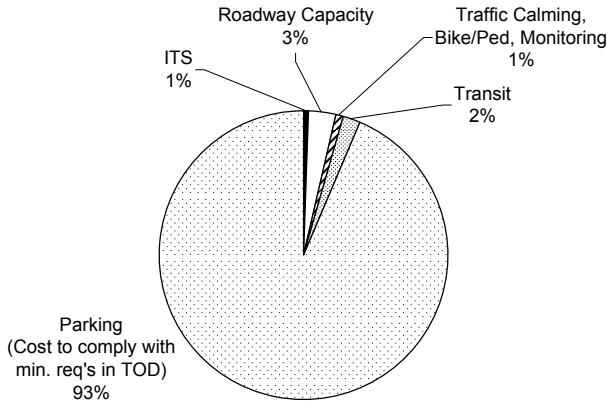
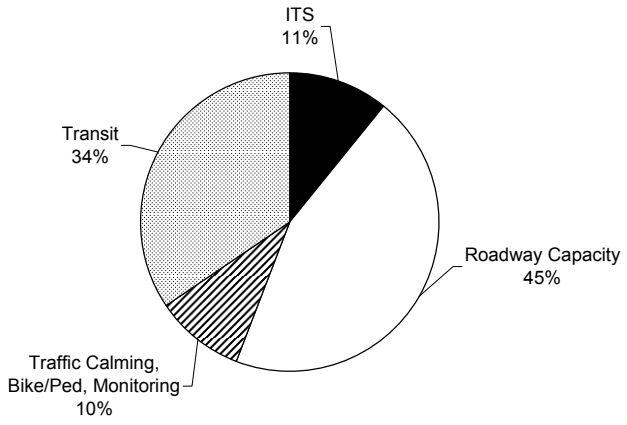


Figure 4 Estimated Costs with Adopted Fee Schedule, Incl. Parking Expenses (Left) and Excl. Parking Expenses (Right)

Under New Impact Fee Schedule, Incl. Parking Expenses



Under New Impact Fee Schedule, Excl.. Parking Expenses



Source: LADOT's Commuter Express System Map (www.ladottransit.com/map/cemap.htm)

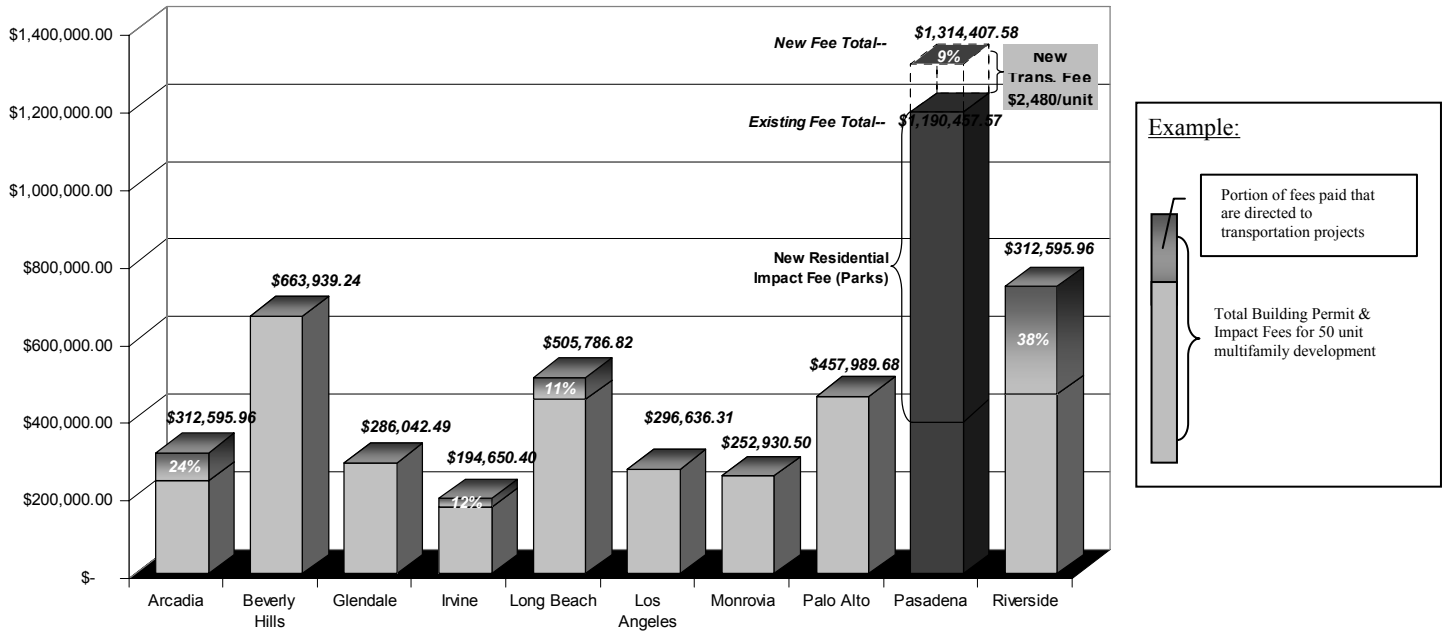
Figure 5 Comparison of Fees Among Cities

FEE COMPARISONS

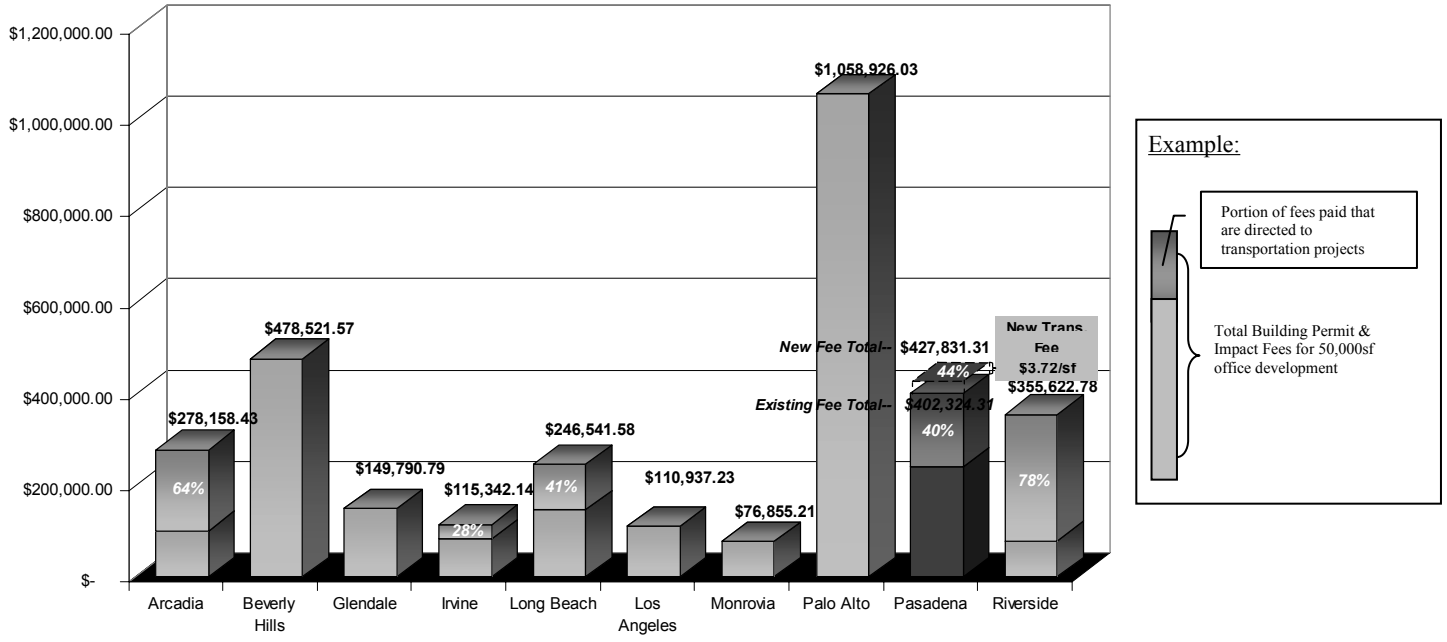
Pasadena city staff compared select cities' building permit charges and impact fees based on the following sample project assumptions:

Residential Assumptions		Commercial Assumptions	
Use:	Apartments	Use:	Office
Building Size:	58,000sf	Building Size:	50,000sf
Est. Construction Cost (City of Pasadena calculation)	$4,934,800	Est. Construction Cost (City of Pasadena calculation)	$4,560,000

Residential (Multifamily)



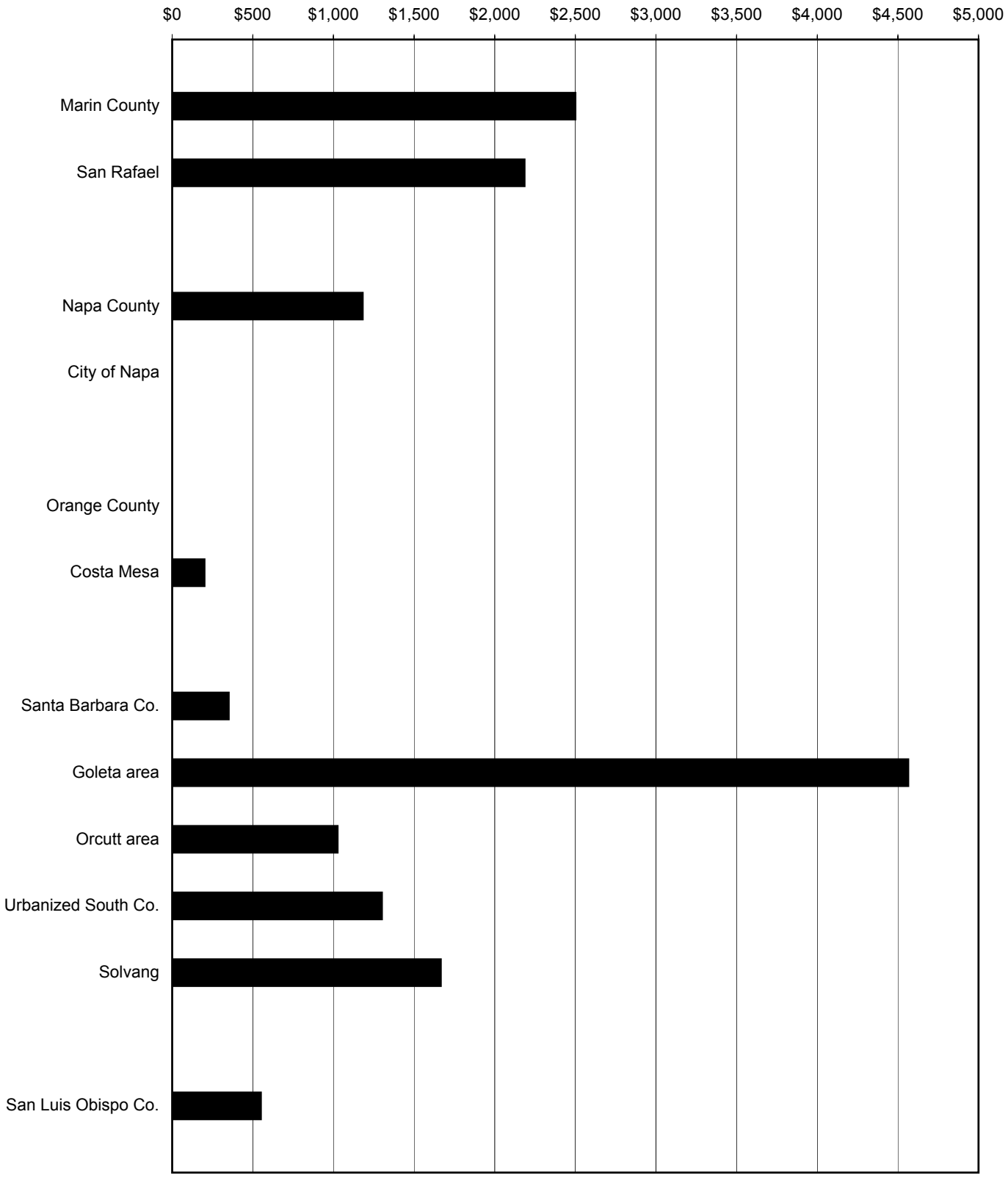
Commercial (Office)



Appendix
7C

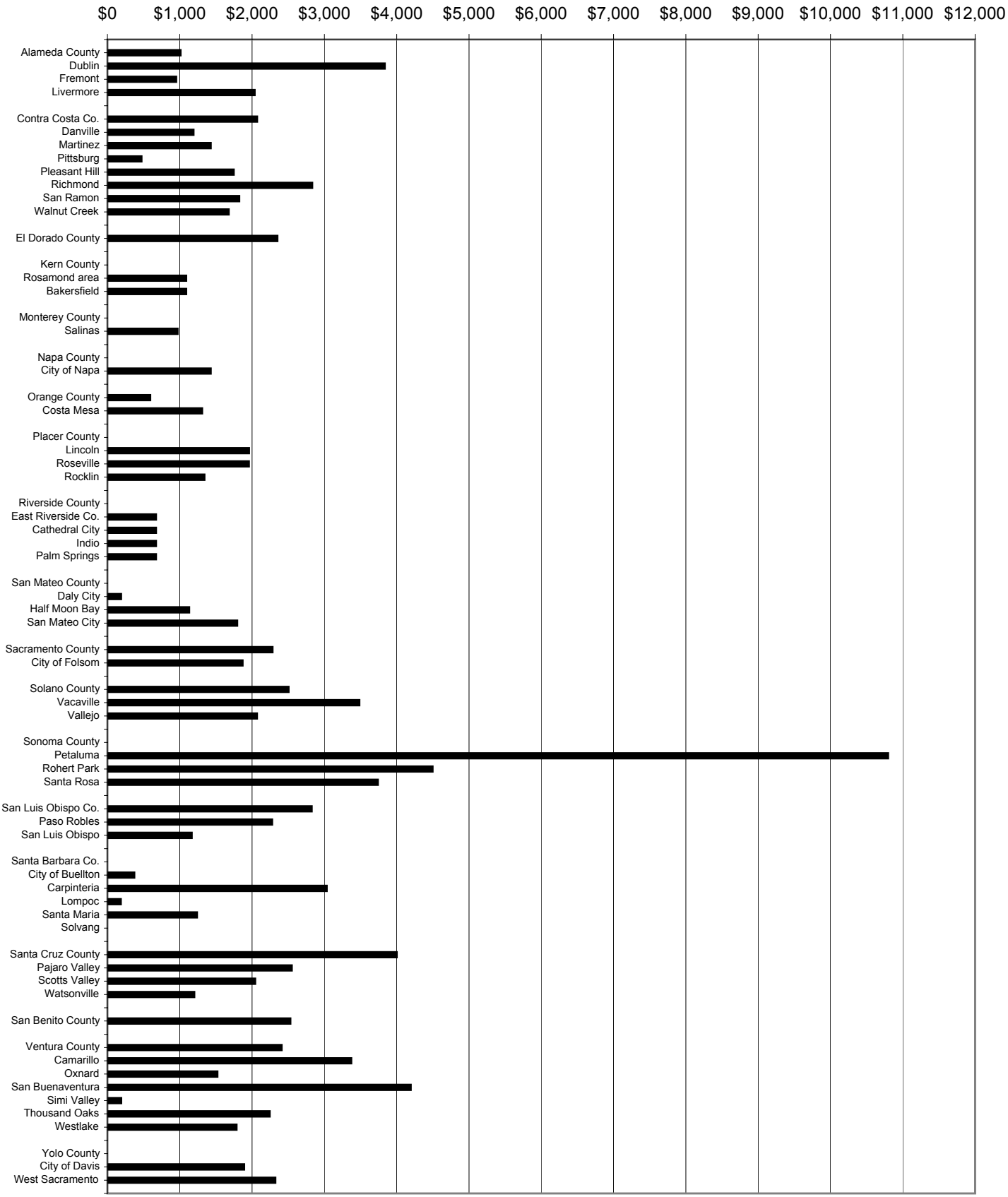
Survey of California Transportation-Related Impact Fees

Traffic Impact Fees (per Vehicle Trip)



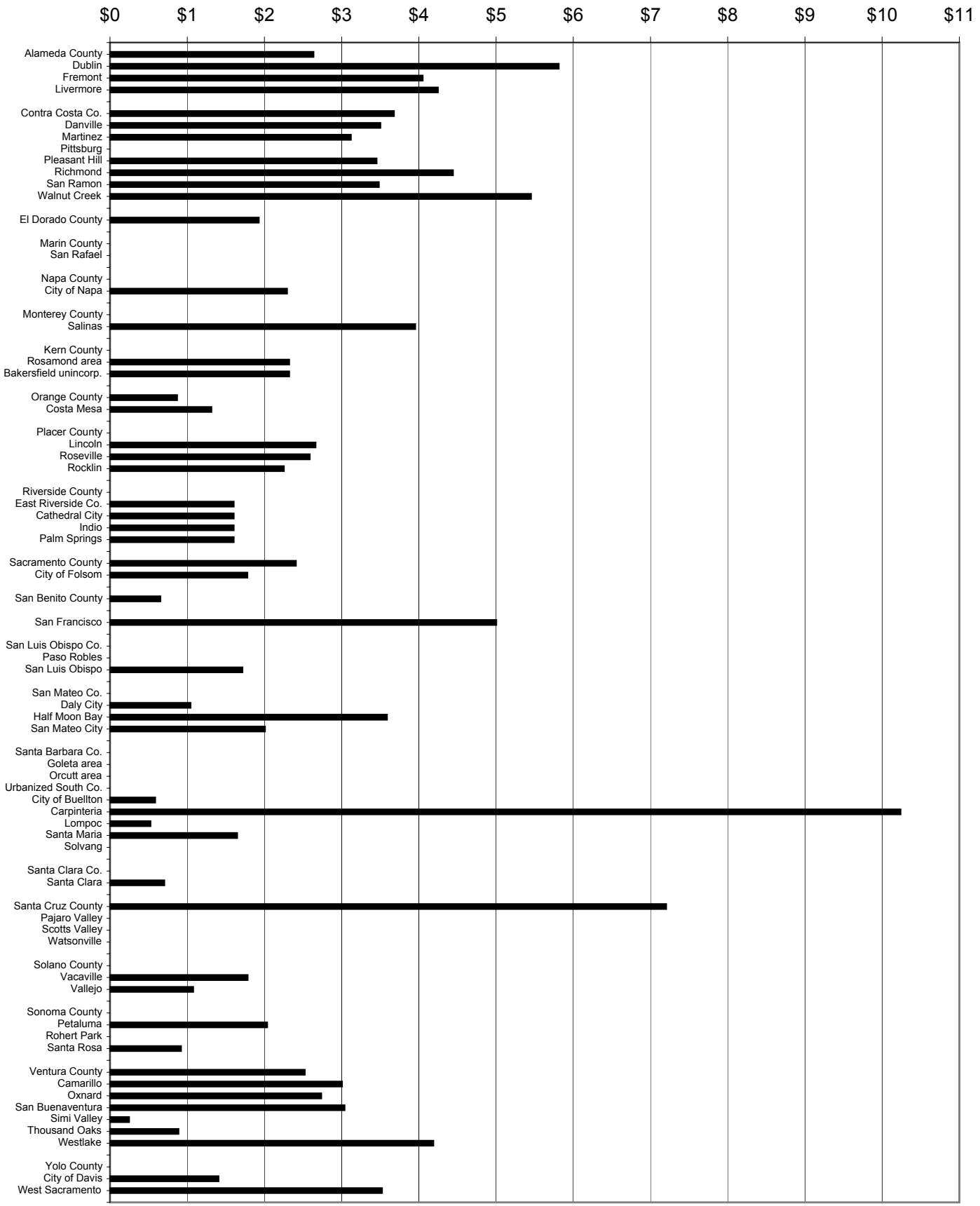
Data Source: "Traffic Impact Fee Survey," Santa Barbara Association of Governments (May 1997).
Note: In some areas, survey did not distinguish between areas which did not have fees and areas for which data was not available.

Traffic Impact Fees (Residential Land Uses, per dwelling unit)



Data Source: "Traffic Impact Fee Survey," Santa Barbara Association of Governments (May 1997).
Note: In some areas, survey did not distinguish between areas which did not have fees and areas for which data was not available.

Traffic Impact Fees (non-Residential Land Uses, per square foot)



Data Source: "Traffic Impact Fee Survey," Santa Barbara Association of Governments (May 1997).
Note: In some areas, survey did not distinguish between areas which did not have fees and areas for which data was not available.