Palmdale Transit-Oriented Development Overlay Zone Transportation Report

Palmdale TOD Overlay Zone Project

August 2016

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Primary Funding from

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Table of Contents

List of Figures

List of Tables

1 Introduction

This Transportation Report works together with the Palmdale TOD Overlay Zone Land Use Framework Plan (Land Use Plan) to provide a Transit-Oriented Development (TOD) framework to guide future development in the area surrounding the Palmdale Transportation Center and the future Palmdale Multimodal Station. The Land Use Framework Plan envisions a vibrant urban core and walkable mixed-use neighborhoods that enable healthy, sustainable lifestyles. This Report provides transportation recommendations to support that vision. As described in the Land Use Plan, a transitional TOD land use and transportation network is feasible in the project area, given the area's growing population, development potential and its existing and future transportation network: no major constraints or fatal flaws exist that would negatively impact TOD planning principles within the project area.

1.1 Purpose of the Transportation Report

The Transportation Report for the Palmdale TOD Overlay Zone project is a companion document to the Palmdale TOD Overlay Zone Land Use Framework Plan. The Land Use Plan will serve as the land use regulatory document to guide development of the Study Area. It provides policy direction and identifies General Plan, Zoning Ordinance, Palmdale Transit Village Specific Plan (PTVSP) and Palmdale Trade and Commerce Center Specific Plan (PTCCSP) amendments needed to carry out the TOD Overlay Zone vision. This Report supplements the Land Use Plan by providing additional transportation policy direction. It is perhaps best thought of as an Appendix to the Land Use Plan.

The Report makes policy recommendations regarding all modes of transportation, in order to guide public improvements and private development in the Study Area. Like the Land Use Plan, this Report identifies General Plan and Zoning Ordinance amendments needed to carry out the TOD Overlay Zone vision. To avoid redundancy and the potential for confusion, the recommendations in this Report are limited (insofar as is possible) to transportation policies which have not already been addressed in the Land Use Plan. The recommendations address the following elements:

- The thoroughfare network, including standards for thoroughfares (i.e., streets, passages and trails) that result in the creation of "complete streets", which meet the needs of all users, including pedestrians, bicyclists, transit users, and motorists.
- An integrated transit network, encompassing high-capacity transit corridors, bus and shuttle service (e.g. Antelope Valley Transit Authority routes), Metrolink commuter rail, and high-speed rail (California High-Speed Rail and Xpress West).
- Recommendations for transit access to Palmdale Regional Airport.

- Parking, including curb parking management, proposed public parking facilities, and policies for regulating private parking.
- Transportation demand management strategies.

REPORT OBJECTIVES

This Transportation Report aims to support the Land Use Plan in accomplishing the following key objectives:

- Create Transit-Oriented Development (TOD) and supportive streets and public spaces along the Avenue Q Corridor, connecting people with the Palmdale Transportation Center (PTC) and the city's future High Speed Rail station.
- Increase development within walking and biking distance of transit, jobs, and shopping to support affordable, healthy and sustainable lifestyles.
- Remove regulatory constraints to TOD by identifying necessary amendments to the General Plan, Zoning Ordinance, and relevant Specific Plans (PTVSP and PTCCSP).

1.2 Guiding Policies, Planning Process, Relationship to Other Plans, & Implementation

The Palmdale TOD Overlay Zone Land Use Framework Plan provides essential background reading for this Report, and should be reviewed before reading this document. The Land Use Plan includes the following useful sections. **Chapter 1, Introduction,** includes:

- **Section 1.1, Purpose**, establishes the purpose and objectives of both the Land Use Plan and this Report, and describes the Study Area in text and maps.
- **Section 1.2, Summary of Recommendations**, presents the Guiding Policies that guide both the Land Use Plan and the recommendations of this Transportation Report.
- **Section 1.3, Planning Process**, describes the background research, development of the TOD Circulation Plan document, and community workshops that have informed both the Land Use Plan and this Report.
- **Section 1.4, Plan Organization, and Section 1.5, Relationship to Other Plans**, describe the Land Use Plan's chapters, relationship to other planning documents, and relationship to important related transportation projects, such as the High Desert Corridor, California High-Speed Rail, and Xpress West High-Speed Rail.
- **Section 1.6, Environmental Review, and Section 1.7, Implementation**, describe the plans and process for completing the environmental review of, and implementing, both the Land Use Plan and the recommendations in this Report.

Chapter 2, Background, describes the existing land uses and community character; the key aspects of the General Plan, Specific Plans and Zoning Ordinance that regulate the Study Area; the community priorities expressed during the public outreach process for both plans; and the opportunities and constraints for transit-oriented development.

Chapter 3, Land Use Framework, provides an overview of the plan; explains the essential land use structure; and sets forth policies for guiding development and setting land use standards.

1.3 Summary of Recommendations & Phasing

Section 1.2 of the Palmdale TOD Overlay Zone Land Use Framework Plan presents the key recommendations (i.e., the Guiding Policies) that guide both the Land Use Plan and the recommendations contained in this Transportation Report. The Land Use Plan also contains many Implementation Policies that address transportation topics (e.g., parking, street design and streetscape character). For brevity's sake, they are not repeated here.

This section summarizes the key transportation recommendations contained in this Report. They are primarily Implementation Policies, which supplement and further articulate the policies presented in the Land Use Plan. These recommendations will support the implementation of a land use, transportation and public realm plan that will support the future Multimodal Station and enhance sustainability and quality of life in Palmdale. These recommendations are repeated as Guiding and/or Implementation Policies in later chapters.

Plan Implementation and Phasing

The Land Use Plan and the recommendations in this report will be implemented over many years (20+ years). For each Guiding Policy and Implementation Policy listed in the table below, a suggested time frame for implementation is shown. These suggested dates are only approximate, and should be reviewed and updated on a regular basis to reflect changing economic conditions, changing timelines for major infrastructure investments (i.e., high-speed rail), the completion of tasks, and changes to funding and City priorities.

Implementation Time Frame	Estimated Date of Completion
Short	1 – 5 years
Medium	5 – 10 years
Long	10+ years (After inauguration of High-Speed Rail service to Palmdale)
Ongoing	Recurring or continuous action

Many of the policies recommended in this report may only require implementation in the medium (5 – 10 years) or long-term (10 or more years from today). In the long-term, high-speed rail trains will begin service to Palmdale Station. The California High-Speed Rail Authority has made it clear that they will be charging for parking at the station and not subsidizing it. To pay for the full cost of the parking – ultimately, structured parking – that will serve thousands of rail passengers, daily parking fees of $8 to $12 or more can be expected to be needed.[1] Additionally, properties in the station area will, most likely, have

[1] Note that parking fees for XpressWest parking have yet to be determined.

begun to redevelop with the high-density mixed-use buildings envisioned in the Land Use Plan.

To address these changes, some form of curb parking management will be essential. If there is no parking pricing or residential parking permit districts on City streets in and around the station area, these streets can be expected to overflow with hundreds of all-day commuters' cars. That is, if parking on the street remains free and unregulated, while the rail station's parking lots are unsubsidized, large numbers of riders can be expected to fill up the nearby curb parking. Additionally, once all of the free, unmanaged curb parking within an easy walk of the station fills, some commuters can be expected to park on the street near local transit stops (e.g., along the future Avenue Q transit corridor), and then take a short ride to avoid the station area's parking fees.

If curb parking is left free and unregulated, and allowed to overflow, a number of harmful secondary effects can be expected. When free or underpriced curb parking fills up, motorists frequently circle in search of underpriced curb parking, even as available (but not free) off-street parking facilities remain underused. Circling drivers create excess congestion and pollution, as well as additional traffic safety risks. And when curb parking – which is usually the most visible, most easily accessible and often perceived as the safest parking option – is allowed to fill, the widespread *perception* of an overall parking shortage typically results, even when many off-street parking spaces are readily available nearby.

Additionally, even without the advent of high-speed rail, active curb parking management is likely to be essential to the success of any walkable, high-density mixed-use developments. Experience from many similar urban districts has shown that if curb parking in high-density areas is left unmanaged, it tends to fill up (even when nearby, but slightly less convenient and less visible off-street parking is available). Depending on real estate market conditions, a significant number of the higher-density buildings allowed under the Land Use Plan may be completed in the medium-term (in the next 5-10 years) or in the long-term (10+ years).

Therefore, in the medium-term, actively managing curb parking in the vicinity of the station (i.e., within a 10 minute walk), as well as in areas of high-density mixed-use development, may become necessary. In the long-term, it will be essential. Managing curb parking will require a mix of parking pricing and residential permit parking, in order to ensure that on-street parking is well used, but readily available. These parking policy recommendations for helping the plan area thrive and succeed in the mid- to long-term are described in more detail below, and in later sections of this report.

The Land Use Plan and this report should also be thought of as living documents, which will need to be regularly updated and refined. Over the coming years, long-range planning efforts will continue. For example, the plans and schedule for implementing California High-Speed Rail, the Xpress West High-Speed Rail, and other major infrastructure can be expected to change and evolve: the Land Use Plan and this report will then likely need to be amended in order to keep pace.

THOROUGHFARE POLICIES

Policy		Time Frame
TR-G-1	**Build complete, attractive and multimodal streets that provide for the needs of diverse members of the community, safely provide for users of all modes of transportation, promote physical activity, and support environmental sustainability.**	Ongoing
TR-I-1	**Accommodating all modes.** Plan, design and construct transportation projects to safely accommodate the needs of pedestrians, bicyclists, transit riders, motorists, people with disabilities, and persons of all ages and abilities.	Ongoing
TR-I-2	**Thoroughfare types.** Use the system of thoroughfare types established in this chapter to inform the design of (a) new streets and (b) improvements to existing streets.	Ongoing
TR-I-3	**Make use of NACTO Design Guides.** Make use of the NACTO (National Association of City Transportation Officials) Urban Street Design Guide and Urban Bikeway Design Guide as reference documents to help further define and establish standards for the thoroughfare types set forth in this Report.	Ongoing
TR-I-4	**Transit priority.** Ensure transit vehicles have priority over other vehicles along Avenue Q and Palmdale Boulevard, which are proposed Transit Corridor streets, prioritizing transit speed and schedule reliability.	Medium to Long
TR-I-5	**Design standards for street connectivity.** Establish standards requiring streets to interconnect within a development and with adjoining development, in order to disperse traffic, provide direct routes for cyclists and pedestrians, and allow for pedestrian-scale streets. Establish a basic maximum block perimeter standard of 1600 linear feet. Discourage cul-de-sacs or dead-end streets except where topographic conditions or barriers such as railroad quarters offer no practical alternatives. Require the provision of street stubs in developments on properties adjacent to open land and/or redevelopment sites to provide for future connections.	Short
TR-I-6	**Pedestrian network.** Create a safe, comfortable, and convenient pedestrian network that focuses on (a) safe travel; (b) improving connections between neighborhoods and commercial areas, and across existing barriers; (c) providing places to sit or gather, pedestrian-scaled street lighting, and buffers from moving vehicle traffic; and d) includes amenities that attract people of all ages and abilities.	Ongoing
TR-I-7	**Bicycle network.** Improve facilities and eliminate gaps along the bicycle network to connect destinations across the Study Area and create a network of bicycle facilities of multiple types, including protected bicycle lanes on streets, and off-street trails	Ongoing

	and passages. The network should facilitate bicycling for commuting, school, shopping, and recreational trips by riders of all ages and levels of experience.	
TR-I-8	**Traffic calming.** Implement traffic calming measures on streets and at intersections, focusing on those with (a) high levels of pedestrian and bicycle activity; or (b) high levels of injury and/or fatality collisions.	Ongoing
TR-I-9	**Wayfinding.** Increase the convenience of walking, bicycling and driving by supporting the phased implementation of a comprehensive, consistent vehicular, bicycle and pedestrian wayfinding system connecting major destinations throughout the Study Area.	Medium to Long
TR-I-10	**Minimize roadway widening.** When feasible, avoid widening roadways to increase automobile capacity, and instead focus first on operational improvements such as signal timing optimization, modern roundabouts and other Transportation Systems Management (TSM) strategies that improve traffic conditions by maximizing the efficiency of existing vehicle infrastructure.	Ongoing
TR-I-11	**Multimodal transportation impact fee.** Adopt a transportation impact fee for new development that raises funds for improving all modes of transportation.	Short

PARKING & TRANSPORTATION DEMAND MANAGEMENT POLICIES

Policy		Time Frame
TR-G-2	**Manage, price, and set zoning code requirements for parking to achieve the following goals: maximizing transit, cycling and walking trips; minimizing motor vehicle trips; increasing social equity and housing affordability (by charging separately for parking, rather than hiding its cost in the cost of other goods and services); and minimizing paved surfaces, with their associated environmental costs (e.g., heat island effects, air and water pollution, and storm water runoff).**	Ongoing
Policies for Managing On-Street Parking		
TR-I-12	**Priorities for use of curb space.** Adopt a clear hierarchy for the use of scarce curb space, prioritizing (in order from highest to lowest priority): i. public safety measures, such as pedestrian safety measures and fire hydrant access; ii. pedestrian movement; iii. public transit;	Medium

	iv. bicycle facilities; v. active freight and passenger loading, including taxi stands; vi. short-term parking for people with disabilities; vii. short-term parking for all others; viii. long-term parking for shared vehicles, such as car share vehicles; ix. long-term parking for people with disabilities; x. long-term parking for existing residents; xi. long-term parking for all others.	
TR-I-13	**Curb parking occupancy goal.** Adopt a goal of setting parking prices to ensure that curb parking is well used, but readily available. Set prices at the lowest rate required to ensure that at least one or two spaces per block are available most of the time (approximately an 85% occupancy rate).	Medium to Long
TR-I-14	**Parking pricing when warranted by demand.** On each block, charge for parking whenever necessary – including evenings and weekends, if needed – to achieve the City's occupancy goal (approximately 85% maximum occupancy per block).	Medium to Long
TR-I-15	**Performance-based parking pricing.** Implement performance-based parking pricing with rates that vary by time of day, day of week and by block.	Medium to Long
TR-I-16	**Pricing rather than time limits.** Use prices rather than time limits to achieve curb parking availability.	Medium to Long
TR-I-17	**Curb parking privileges for existing residents.** Grandfather in existing residents by providing them with parking permits allowing them to continue to park at the curb for free (or a nominal price) in their neighborhood. Charge non-residents and future residents for parking at rates that achieve the City's occupancy goals.	Medium to Long
TR-I-18	**Use of curb parking revenues.** Dedicate all curb parking revenues to improve public facilities and services in the blocks where the parking revenue is generated, in order to sustain local support for parking pricing.	Medium to Long
TR-I-19	**Establish commercial and residential parking benefit districts.** Establish multiple parking benefit districts for the commercial and residential areas of the Study Area, in order to provide an institutional structure for returning curb parking revenue to the blocks where it was collected to fund neighborhood improvements.	Medium to Long
TR-I-20	**Revenue return to parking benefit districts.** Return curb parking revenues to the parking benefit district where the revenue is	Medium to

	collected, to fund improved public infrastructure and services.	Long
TR-I-21	**Advisory role for local organizations.** Give existing merchant and neighborhood organizations, such as Business Improvement Districts, a significant advisory role in deciding how to spend their local parking benefit district's revenues.	Medium to Long
TR-I-22	**Technology deployment for managing curb and off-street parking.** Improve parking monitoring and enforcement with integrated "smart" meters that accept credit cards and coins, pay-by-phone technologies, off-street Parking Access and Revenue Control Systems, and license plate recognition (LPR) systems.	Medium to Long
TR-I-23	**Parking occupancy sensors.** Evaluate emerging parking occupancy sensor technologies (in-ground and/or on-meter) and consider deploying them if and when current reliability, accuracy and cost problems are overcome.	Long
Policies for Managing Publicly-Owned Off-street Parking		
TR-I-24	**Palmdale Multimodal Station parking.** Manage station parking in a manner similar to parking at most airports, where parking rates generate sufficient revenue to cover the full cost of building, operating and maintaining parking facilities, including land value, in order to minimize automobile trips, and maximize the public's return on its major investments in High Speed Rail.	Long
TR-I-25	**Public parking district.** Establish a public parking district to create public parking facilities, and thereby ensure the efficient sharing of parking between land uses with different times of peak parking demand. Designate the entire study area as a parking district (in legal terms), in order to allow the flexibility to establish public parking facilities anywhere they become needed. Finalize precise locations for public parking over time, as development proceeds, in order to provide parking when and where it is needed, in a process that is closely coordinated with land-use development.	Medium to Long
TR-I-26	**Off-street Parking Enterprise Operation.** Refrain from subsidizing automobile storage and use: require that City-owned lots and garages in downtown be operated as an Enterprise Operation, which pays for itself through user fees. As necessary, establish programs to allow retailers to reimburse the Enterprise Operation for valet parking for customers.	Medium to Long
TR-I-27	**Off-street Parking Enterprise Operation Funding.** Require that the Off-Street Parking Enterprise Operation support itself solely through lot and garage user fees, without additional support from other taxpayer dollars or curb parking revenues. Plan and budget for the long-term financial sustainability of this Enterprise Operation, including setting parking rates which are sufficient to provide for long-term facility maintenance,	Medium to Long

	renovation, reconstruction, and staffing.	
TR-I-28	**Parking wayfinding.** Develop an integrated wayfinding system for parking facilities, including both static and dynamic (changeable electronic display) signage to provide guidance and real-time parking availability information.	Medium to Long
Policies for Regulating Privately-Owned Parking To manage future growth in ways that minimize traffic congestion and pollution, while improving economic vitality and social equity, establish the following policies for regulating privately-owned parking:		
TR-I-29	**Removal of minimum parking regulations.** Amend the Zoning Ordinance to remove all minimum parking regulations in the Study Area, in order to allow the emergence of a more normal market for parking, where spaces are bought and sold, rented and leased, much like any other commodity.	Medium to Long
TR-I-30	**Establish maximum parking requirements.** Amend the Zoning Ordinance to establish maximum parking requirements for all land uses in the Study Area.	Medium to Long
TR-I-31	**Unbundling of parking costs, carshare parking and provision of transit passes.** Require new developments to: (a) unbundle the cost of parking from the cost of other goods and services; (b) offer carsharing agencies the right of first refusal for a limited number of parking spaces and require that those spaces be provided to the carsharing agencies free of charge; and (c) provide free deep-discount group transit passes for local bus service to the project's residents and/or employees.	Medium to Long
Additional Transportation Demand Management Policies To improve transportation choices, while minimizing congestion and pollution:		
TR-I-32	**Cost-effective transportation demand management (TDM).** Assess the most cost-effective mix of investments in pedestrian, bicycle, transit, ridesharing and parking infrastructure and services for meeting Palmdale's economic, environmental and social equity goals.	Medium to Long
TR-I-33	**Development of TDM programs.** Develop transportation demand management programs with clear, quantifiable goals for reducing parking capital and operating costs, vehicle trips, and pollution.	Medium to Long
TR-I-34	**Planning, funding and staffing TDM programs.** Plan, fund, and staff TDM programs with the same clarity of purpose, level of expertise and seriousness normally accorded to a major parking garage construction project.	Medium to Long

TR-I-35	**Funding TDM programs with parking revenue.** Use a portion of parking revenues to fund TDM programs, focusing particularly on helping commuters leave their cars at home, in order to free up more space in future City-owned garages for high-priority, high-revenue hourly customer parking.	Medium to Long
TR-I-36	**Deep-discount group transit pass programs.** Establish deep-discount group transit pass programs to provide free local bus transit access for existing and future residents and employees. Consider using a portion of curb parking revenues to fund these passes.	Medium to Long
TR-I-37	**Enforcement of parking cash-out law.** Encourage and enforce compliance with California's parking cash-out law.	Medium to Long
TR-I-38	**Transportation Management Association.** Establish a Transportation Management Association for the Study Area, to improve traveler information about, marketing of, and employer participation in programs and services regarding walking, bicycling, ridesharing and transit.	Medium to Long

2 Thoroughfares

Thoroughfares form the bones of a city, serving as the foundation for its economy, culture, recreation, and the day-to-day lives of its citizens. This Report establishes a thoroughfare network for the Study Area and a system of thoroughfare types. The thoroughfare types described in this chapter include a broad range of pedestrian-friendly street types, ranging from major boulevards to minor alleys and lanes. This chapter also defines thoroughfare types that are reserved for bicycle and pedestrian use, such as trails.[2]

2.1 Thoroughfare Policies

TR-G-1 **Build complete, attractive and multimodal streets that provide for the needs of diverse members of the community, safely provide for users of all modes of transportation, promote physical activity, and support environmental sustainability.**

TR-I-1 **Accommodating all modes.** Plan, design and construct transportation projects to safely accommodate the needs of pedestrians, bicyclists, transit riders, motorists, people with disabilities, and persons of all ages and abilities.

TR-I-2 **Thoroughfare types.** Use the system of thoroughfare types established in this chapter to inform the design of (a) new streets and (b) improvements to existing streets.

TR-I-3 **Make use of NACTO Design Guides.** Make use of the NACTO (National Association of City Transportation Officials) Urban Street Design Guide and Urban Bikeway Design Guide as reference documents to help further define and establish standards for the thoroughfare types set forth in this Report.

Additional useful references for bicycle and pedestrian-friendly street design include the Institute of Transportation Engineers' Designing Walkable Urban Thoroughfares: A Context Sensitive Approach; and Residential Streets: Third Edition, developed by the Institute of Transportation Engineers, the American Society of Civil Engineers, the National Association of Home Builders, and the Urban Land Institute.

TR-I-4 **Transit priority.** Ensure transit vehicles have priority over other vehicles along Avenue Q and Palmdale Boulevard, which are proposed Transit Corridor streets, prioritizing transit speed and schedule reliability.

Providing transit priority does not necessarily imply or require exclusive transit lanes, but normally includes establishing traffic signal prioritization for transit vehicles.

[2] This plan uses the term thoroughfare in its broadest sense, defining a thoroughfare as a road or path or corridor forming a route between two places.

TR-I-5 **Design standards for street connectivity.** Establish standards requiring streets to interconnect within a development and with adjoining development, in order to disperse traffic, provide direct routes for cyclists and pedestrians, and allow for pedestrian-scale streets. Establish a basic maximum block perimeter standard of 1600 linear feet. Discourage cul-de-sacs or dead-end streets except where topographic conditions or barriers such as railroad quarters offer no practical alternatives. Require the provision of street stubs in developments on properties adjacent to open land and/or redevelopment sites to provide for future connections.

For further guidance on establishing street connectivity standards, refer to Planning for Street Connectivity: Getting from Here to There (American Planning Association Planning Advisory Service Report No. 515), which provides both useful examples and explanation of the advantages of a more connected network. Note that in compact mixed-use districts with a more highly connected street network, residents do typically experience higher levels of traffic on their street than if they lived in a low-density detached single-family neighborhood with cul-de-sac streets. Most people who choose to rent or lease on a through street in a mixed-use neighborhood expect this, as one of the trade-offs that comes with living within easy walking distance of restaurants, cafés, shops, transit and other services. However, as described below, establishing a more highly-connected street network should be paired with the implementation of traffic calming measures on local and collector streets to control speeds and improve safety. On new streets, traffic calming measures can be built into the design; on existing streets, retrofits may be required.

TR-I-6 **Pedestrian network.** Create a safe, comfortable, and convenient pedestrian network that focuses on (a) safe travel; (b) improving connections between neighborhoods and commercial areas, and across existing barriers; (c) providing places to sit or gather, pedestrian-scaled street lighting, and buffers from moving vehicle traffic; and d) includes amenities that attract people of all ages and abilities.

TR-I-7 **Bicycle network.** Improve facilities and eliminate gaps along the bicycle network to connect destinations across the Study Area and create a network of bicycle facilities of multiple types, including protected bicycle lanes on streets, and off-street trails and passages. The network should facilitate bicycling for commuting, school, shopping, and recreational trips by riders of all ages and levels of experience.

TR-I-8 **Traffic calming.** Implement traffic calming measures on streets and at intersections, focusing on those with (a) high levels of pedestrian and bicycle activity; or (b) high levels of injury and/or fatality collisions.

Manuals such as the Institute of Transportation Engineers' Traffic Calming: State of the Practice and Residential Streets: Third Edition provide further guidance the selection, design and implementation of appropriate traffic calming measures for both retrofitting existing streets, and building traffic calming into the design of new streets. Generally, collector streets should make use of measures which control speeds while still accommodating expected traffic volumes, such as modern roundabouts, curb extensions, medians and pedestrian refuge islands. On local streets, where intended traffic volumes are lower, a wider range of measures may be used.

TR-I-9 **Wayfinding.** Increase the convenience of walking, bicycling and driving by supporting the phased implementation of a comprehensive, consistent vehicular, bicycle and pedestrian wayfinding system connecting major destinations throughout the Study Area.

TR-I-10 **Minimize roadway widening.** When feasible, avoid widening roadways to increase automobile capacity, and instead focus first on operational improvements such as signal timing optimization, modern roundabouts and other Transportation Systems Management (TSM) strategies that improve traffic conditions by maximizing the efficiency of existing vehicle infrastructure.

Because intersections are often the bottlenecks in the roadway system, installing measures such as modern roundabouts can sometimes resolve congestion problems without requiring widening the entire length of a corridor. Future planning and detailed design efforts (e.g., for new development projects) should take this into consideration. Note, however, that the intent of this policy is not to eliminate or reduce the responsibility of new developments to fund needed transportation improvements. As under current policy, new developments will remain responsible for building out the streets within and adjacent to the development to their ultimate improved standard. Additionally, as described below, new developments will remain responsible for paying fair-share transportation impact fees to fund necessary off-site improvements.

TR-I-11 **Multimodal transportation impact fee.** Adopt a transportation impact fee for new development within the plan area, in order to raise funds for improving all modes of transportation.

When zoning ordinance provisions (e.g., height limits, floor-to-area ratios, and minimum parking requirements) limit development intensity, it may be adequate to simply have new developments fund any necessary widening of the immediately adjacent street frontages. However, the Land Use Plan allows substantially taller buildings and additional development rights on most parcels within the plan area. To help fund the substantial off-site transportation infrastructure needed to help offset the impacts of these more intense developments, a new impact fee, applicable within the project area, will be needed. This fee will help to fund key transportation improvements such as the proposed Avenue Q transit corridor, with its frequent bus rapid transit service, bicycle and pedestrian improvements, and motor vehicle capacity increases at key intersections. A nexus study will be required to help determine the appropriate fee level, and to establish the legally-required "nexus" (i.e., a reasonable relationship) between the fee levied on new development and the fair-share cost of the improvements needed to offset the development's transportation impacts.

2.2 Thoroughfare Network & Types

THOROUGHFARE NETWORK

This chapter establishes a thoroughfare network for the Study Area, and defines a system of thoroughfare types. The Circulation Plan (Figure 2.3) applies these thoroughfare types to the Study Area, in a manner that considers the context of the surrounding land uses. The

Circulation Plan provides a coherent and effective network, consisting of streets, transit corridors, and bicycle and pedestrian trails. The Circulation Plan also envisions transforming the existing street grid, which is currently comprised largely of long blocks with few through streets, into a highly connected and pedestrian-friendly street network.

Street Network

The current street network in the project area has approximately 1,000' long north-south blocks. This sparse street network funnels all trips onto the very limited number of through streets. To prevent such a network from becoming excessively congested as additional development occurs, the limited number of through streets would have to be designed as wide, six to eight-lane arterials, which by their nature would be generally unpleasant and uncomfortable for walking, cycling and transit access. To avoid this problem, the Thoroughfare Policies in this chapter will result in the addition of more streets to the network over time, to form a fine-grained street grid with short, pedestrian-friendly urban blocks. As shown in the Circulation Plan, numerous additional streets would eventually be added, particularly in the vicinity of the future Palmdale Multimodal Station. ***The dotted lines indicating the location of future streets are conceptual, and do not necessarily not indicate precise locations for future streets.***

Providing a flexible street and block network in the station area is particularly important. The Circulation Plan provides a highly connected street grid with short urban blocks in the station area. This pattern, which is similar to the pattern seen in many traditional downtowns, has proven itself to be both flexible and adaptable to many possible station designs, and highly supportive of transit-oriented development. Future streets will be created over time using both of the following methods:

- Key access streets (e.g. crucial access routes to the future rail station) will be developed through a combination of land purchases and/or easements obtained as a condition of future development.
- Additional connections will be created over time by establishing maximum block perimeter standards for new development. Typically, block perimeter standards are applied only to larger parcels (e.g. to developments of four acres or more).

The maximum block perimeter standard should be designed to facilitate the creation of a connected street pattern that relates to Palmdale's existing street and lot pattern, while providing more connections and shorter blocks. The recommended basic maximum block perimeter standard of 1600 linear feet allows, for example, for blocks of up to 300 feet in width by 500 feet in length, a scale which is at the upper end of the range typically observed in America's traditional walkable cities and streetcar suburbs.[3]

On parcels that may initially be developed with auto-oriented uses, such as big-box retail stores, maximum block perimeter standards should be applied to the development's "streets" in a manner that facilitates future redevelopment. For example, requiring that a big-box center's buildings and parking lots be laid out as blocks with streets, following the

[3] For further guidance on developing a specific standard, refer to *Planning for Street Connectivity: Getting from Here to There (American Planning Association Planning Advisory Service Report No. 515)*.

block perimeter standards (with the streets initially serving as parking lot aisles, and all significant utility lines placed under them) allows easy conversion of these uses to denser, higher value, walkable mixed-used districts when land values rise. The recent redevelopment of the big-box retail district in the Kentlands (Gaithersburg, MD) is a notable example of the successful use of this approach.[4]

It is worth noting that because new developments must already provide fire lanes and parking lot aisles, introducing block perimeter standards for large new developments typically requires little or no additional land: instead, asphalt and concrete which would be required in any event to provide necessary fire and parking access is reconfigured in the form of a complete street network.

Bicycle and Pedestrian Network

All of the streets in the project area would be designed to be safe and welcoming for cyclists and pedestrians of all ages, from an eight year-old child to an 80 year-old grandmother. Major streets would be provided with cycle tracks (a.k.a. protected bicycle lanes), as shown in Figures 2-1 and 2-2. All streets would be provided with ample, shaded sidewalks, or designed as shared streets. Additionally, bicycle and pedestrian trails would be provided throughout the open space corridors, creating a safe and pleasant network. These off-street trails would supplement the extensive network of on-street bicycle facilities.

Funding Maintenance of the Public Realm

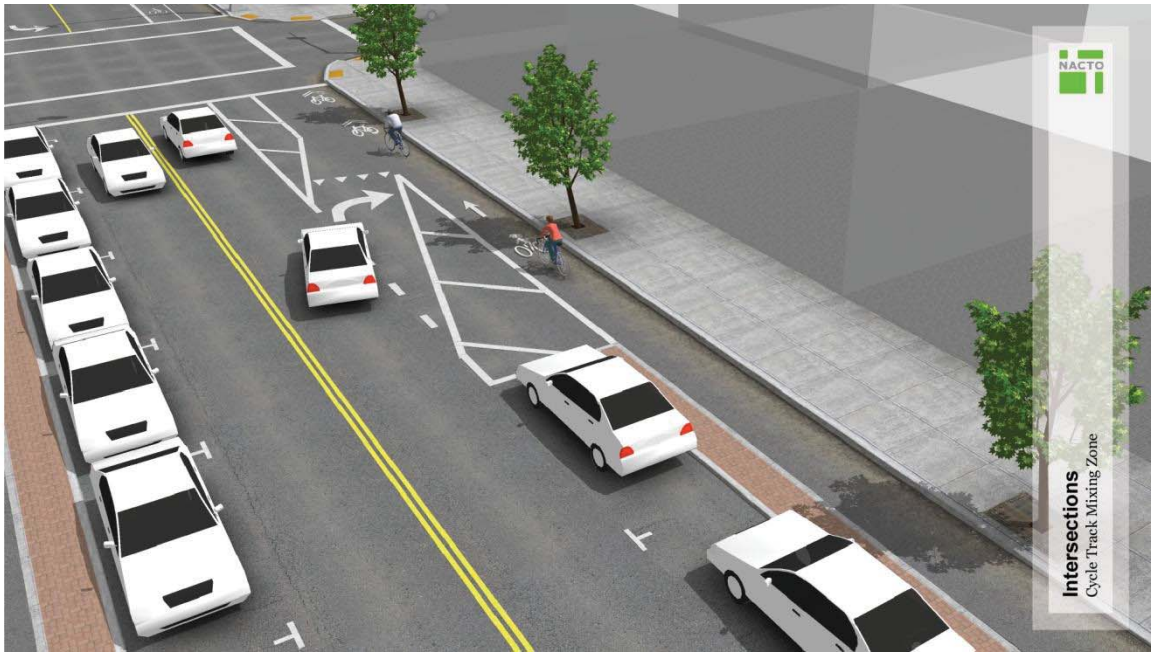
Providing a better public realm, with more street trees, wider sidewalks, pedestrian-scale lighting, cycle tracks, open space corridors, and welcoming public spaces, requires not just building these spaces, but also maintaining them. To raise the ongoing funding required, one or more funding mechanisms (such as a Lighting and Landscape Maintenance District, a Property-based Business Improvement District, and/or a Community Facilities District) will need to be established for the plan area. It is worth noting that while this will mean an additional expense for property owners (e.g., future condominium residents), it also provides value. Residents in mixed-use districts generally spend more time in and rely more on public spaces, such as neighborhood parks, which are owned and maintained in common; and rely less and spend less on private amenities, such as building and maintaining private yards.

[4] For further information, see: https://www.cnu.org/publicsquare/light-rail-and-real-downtown-kentlands .

Figure 2-1: Cycle Track

Source: National Association of City Transportation Officials Urban Bikeway Design Guide

Figure 2-2: Cycle Track Treatment at Intersection

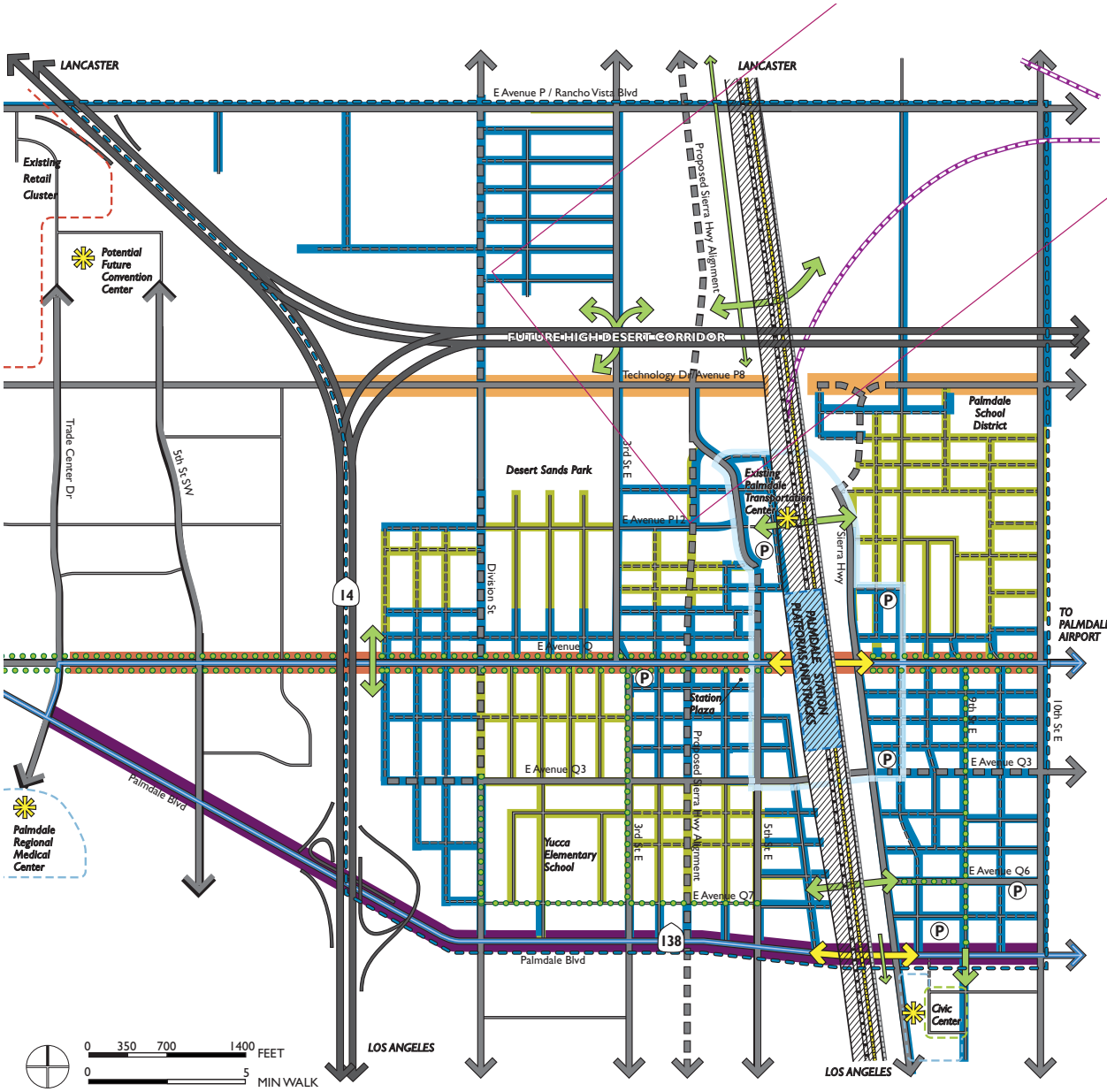


Source: National Association of City Transportation Officials Urban Bikeway Design Guide

Figure 2-3

TOD Circulation Plan

2/11/2016



- Avenue P8
- Avenue Q Transit Corridor
- Palmdale Boulevard
- Commercial Street
- Residential Street
- Existing/Future *(Conceptual)* Major Street
- Existing/Future *(Conceptual)* Minor Street
- California High Speed Rail *(Conceptual)*
- XpressWest High Speed Rail *(Conceptual)*
- Metrolink Rail
- Union Pacific Railroad
- Potential Future High Capacity Transit
- Palmdale Multimodal Station Platforms and Tracks *(location subject to change)*
- Palmdale Multimodal Station Overlay Zone
- High Speed Rail Right of Way *(subject to change)*
- Landmark
- Potential Parking Garage
- Green Connection
- New or Enhanced Street Crossings
- New or Enhanced Pedestrian/Bike Connection
- Air Installations Compatible Use Zones: Accident Potential Zone II
- Study Area

NELSON NYGAARD

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ROADWAY EXPANSIONS

To accommodate the full build-out of the land use development permitted under the Land Use Plan, this chapter provides for widening a number of roadways and modifying intersections (e.g., signalization). The *Palmdale TOD Overlay Zone Transportation Impact Analysis (TIA)* projects that the following roadway and intersection expansions will eventually be needed to accommodate the full build-out of the Land Use Plan. The TIA, however, makes conservatively high assumptions about the number of motor vehicle trips that may be generated in the future, and may overstate future traffic volumes. Because such expansions are both costly, and may or may not (depending upon the effectiveness of the transit network, the effectiveness of the transportation demand management measures proposed in this Report, technological advances, and other possible future developments) ever be needed, such expansions should be constructed only when warranted. The proposed roadway network changes in the vicinity of the Study Area are summarized below and in Table 2-1:

- Palmdale Boulevard
  - Increase to eight lanes, with turn pockets as needed at selected intersections.
  - Increase the number of through lanes westbound at Division Street to five lanes to the freeway ramps.
- **SR-14 Ramps at the Palmdale Boulevard/SR 14 Interchange:** Restripe existing paved roadway to assign two lanes to the northbound and southbound ramps. This may require construction of additional pavement width on Palmdale Boulevard to install an additional turn pocket.
- **Sierra Highway, realigned to the 4th Street East alignment:** Sierra Highway will be realigned to the 4th Street East alignment, and widened to six lanes with left turn pockets at intersections. This realignment will allow the City to provide economic opportunities, improved circulation and create better transit-oriented development zones. It will provide important arterial access to the station from the freeway, reduce pressure on other nearby North-South roadways, and provide more direct connections.
- **Division Street:** Increase to four lanes with left turn pockets at intersections.
- **Trade Center Drive:** Can be reduced to two lanes with left turn pockets at intersections; consider a three lane road with two way left turn lanes.
- **Technology Drive/Avenue P-8**: The intersection at the realigned Sierra Highway will have two left turn pockets and one right turn pocket.
- **5th Street West:** Maintain four lanes and left turn pockets at intersections.
- **Avenue Q:** Reconstruction of Avenue Q into a high-capacity transit corridor will require a two lane roadway with left turn pockets and protected left turn phasing to accommodate a center running transit-only lane.

For a full description of the proposed roadway and intersection modifications (including maps and diagrams of proposed lane configurations at each study intersection), refer to the TIA report. The TIA report also provides detailed analysis of traffic volumes, levels of automobile delay at significant intersections, and analysis of potential bicycle, pedestrian and transit impacts of the Land Use Plan.

TABLE 2-1 PROPOSED ROADWAY NETWORK CHANGES

Street/Interchange Name	Limits (To/From)	Scenario	Roadway Classification (Existing vs. Proposed)	Planned Right-of-Way at Build-out (Existing vs. Proposed)	# of Lanes (Existing vs. Proposed)	Intersection Changes Proposed
Palmdale Boulevard	Medical Center Drive to 10th Street East	Existing	Regional Arterial/Major Arterial	126'/104'	6 with turn pockets	
		Proposed	*Downtown Thoroughfare*	*114'*	*8 with turn pockets*	*5 lanes westbound at Division Street*
Palmdale Boulevard/SR 14 Interchange	Within limits of the interchange	Existing	Regional Arterial	126'	6 with ramps	
		Proposed	*Downtown Thoroughfare*	*126'*	*8 with ramps*	*2 lane on & off-ramps*
Sierra Highway	Rancho Vista Boulevard to Palmdale Boulevard	Existing	Major Arterial	104'	4 with turn pockets	
		Proposed	*Downtown Thoroughfare*	*104'*	*6 with turn pockets*	
Division Street	Rancho Vista Boulevard to Palmdale Boulevard	Existing	Major Arterial	104'	2	
		Proposed	*Downtown Thoroughfare*	*104'*	*4 with turn pockets*	
Trade Center Drive	Auto Center Drive to Palmdale Boulevard	Existing	Secondary Arterial	84'	4 with turn pockets	
		Proposed	*Downtown Thoroughfare*	*84'*	*2 with turn pockets*	
Technology Drive/Avenue P-8	SR 14 to 10th Street East	Existing	Major Arterial	104'	4 with turn pockets	1 LT + 1 RT pocket at Sierra Highway
		Proposed	*Downtown Thoroughfare*	*128'*	*4 with turn pockets*	*2 LT + 1 RT pocket at Sierra Highway*
5th Street West	Technology Drive/Avenue P-8 to Palmdale Boulevard	Existing	Major Arterial	100'	4 with turn pockets	
		Proposed	*Downtown Thoroughfare*	*104'*	*4 with turn pockets*	
Avenue Q	10th Street West to 10th Street East	Existing	Major Arterial/Secondary Arterial	104'/84'	2 with turn pockets	
		Proposed	*Transit Corridor*	*142'*	*2 with turn pockets with 2 lane transit way*	*Protected only LT phasing (for transit)*

UPDATING CITY STREET STANDARDS

In recent years, many agencies, ranging from the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) to local municipalities, have modernized their street standards to reflect the findings of recent traffic safety research.

For example, the FHWA recently issued new guidance updating the controlling criteria for the design of streets on the National Highway System (NHS).[5] The NHS includes both freeways and many city streets which receive federal funding. In 1985, the FHWA established 13 controlling criteria for the design of projects on these streets, and required extensive documentation for projects seeking exceptions from any of these criteria. These 13 design criteria included factors such as lane width, shoulder width, and lateral offset to obstructions.

According to the agency, "Recent research, culminating in publications of the most recent Highway Capacity Manual (2010, Transportation Research Board) and the Highway Safety Manual (2010, AASHTO), developed much greater knowledge of the traffic operational and safety effects of the controlling criteria than was available when they were established. The NCHRP Report 783 "Evaluation of the 13 Controlling Criteria for Geometric Design" (2014) specifically examined the safety and operational effects of the existing controlling criteria."[6]

The result of this recent research was significant change in the agency's criteria for designing city streets. For roadways with a design speed of less than 50 mph, the FHWA's new guidance reduces the controlling criteria to just two: design loading structural capacity and design speed.

According to the FHWA, "The shift in FHWA's approach was prompted by current research in the field of geometric design showing that the majority of the 13 design criteria yielded significant benefits only on higher speed roadways."[7] "Higher speed" NHS roadways are defined as freeways and other roadways with a design speed greater than or equal to 50 mph. Regarding city streets with design speeds of less than 50 mph, the FHWA reports, "NCHRP Report 783 found that the 13 controlling criteria had minimal influence on the safety or operations on urban streets."

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[5] Mooney, Robert B. "Revisions to the Controlling Criteria for Design and Documentation for Design Exceptions." Federal Highway Administration, May 5, 2016. Accessed June 21, 2016. file:///C:/Users/psiegman.NN/AppData/Local/Temp/Revisions_to_the_Controlling_Criteria_for_Design_and_Documentation_for_Design_Exceptions.pdf.

[6] Federal Highway Administration. "Federal Register | Revision of Thirteen Controlling Criteria for Design; Notice and Request for Comment," October 7, 2015. Accessed June 21, 2016. https://federalregister.gov/a/2015-25526.

[7] Federal Highway Administration. "Press Release: FHWA Move to Encourage Highway Design Flexibilities Kicks Off with Changes for Lower Speed Roads, 10/7/2015 | Federal Highway Administration," October 7, 2015. http://www.fhwa.dot.gov/pressroom/fhwa1566.cfm?utm_source=twitterfeed&utm_medium=twitter.

Regarding lane widths on urban and suburban arterial streets, for example, National Cooperative Highway Research Program (NCHRP) Report 783 arrived at the following conclusions:[8]

- "Chapter 12 (Urban and Suburban Arterials) of the HSM [2010 AASHTO Highway Safety Manual] does not include a CMF [Crash Modification Factor] for lane width on urban and suburban arterials."
- "Recent research by Potts et al. (23, 24) under NCHRP Project 03-72 found no difference in safety performance for urban and suburban arterials in lane widths ranging from 10 to 12 ft., with only limited exceptions that could represent random effects."
- "On roadways with speeds of 45 mph or less, there are often good reasons for using narrow lanes as a flexibility measure to obtain other benefits: shorter pedestrian crossing distances, inclusion of turn lanes, medians, bicycle lanes, etc."
- In summary, the report concludes, on urban and suburban arterial streets, "Lane width does not appear to affect crash frequency or severity."

This transportation report recommends updated street designs for the plan area, which draw upon the conclusions of NCHRP Report 783's safety research, the FHWA's updated design guidance, and other recent safety research. One critical issue is the selection of appropriate design speeds. In the complex environment of city streets – particularly in walkable, transit-oriented districts where a high level of pedestrian activity is both expected and encouraged – adopting a proactive design approach that explicitly focuses on the goal of reducing speeds "may be the single most consequential intervention in reducing pedestrian injury and fatality."[9] Design speeds for all streets within the plan area, with the exception of limited access freeways, should be selected using the concept of *target speed. Target speed* is the speed that the designer intends for drivers to go, rather than operating speed. The maximum target speed for urban arterial streets is 35 mph, while the maximum target speed for urban collector or local streets is 30 mph.[10]

Regarding lane widths, for example, 10 foot wide travel lanes are recommended for several street types, since: (a) the most recent traffic safety research finds no improvement in safety performance on urban streets for wider lane widths; (b) on existing streets (e.g., Palmdale Boulevard), using 10 foot lanes allows room for benefits such as bicycle lanes; and (c) on new streets, using 10 foot lanes reduces capital and maintenance costs, while providing benefits such as shorter pedestrian crossing distances and reduced heat island effects.

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[8] Harwood, Douglas W. Evaluation of the 13 Controlling Criteria for Geometric Design. NCHRP National Cooperative Highway Research Program Report 783. Washington, DC: Transportation Research Board of the National Academies, 2014. Accessed June 21, 2016. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_783.pdf.

[9] Dumbaugh, Eric, and Li, Wenhao. "Designing for the Safety of Pedestrians, Cyclists and Motorists in Urban Environments." *Journal of the American Planning Association.* 77:1 (2011): 69-88.

[10] Institute of Transportation Engineers. *Designing Walkable Urban Thoroughfares: a Context-Sensitive Approach*. Washington, DC: Institute of Transportation Engineers, 2010. Chapter 7.

Similarly, this report recommends relatively new geometric design features, such as separated bicycle lanes, which have only recently been endorsed by FHWA, Caltrans and many local jurisdictions. Note that some streets within the project area are currently under the control of Caltrans: adopting some features recommended in this report on those streets, such as 10 foot lane widths, may require either going through the Caltrans design exception process; waiting for Caltrans to update its standards to reflect recent research (as recently occurred for separated bicycle lanes); or having Caltrans relinquish ownership of these streets to the City (an approach which several municipalities have adopted, but which has the disadvantage of requiring the City to take on ongoing maintenance costs for the street).

THOROUGHFARE TYPES

The Transportation Report establishes the following street types for use in the Study Area. The following seven street types are intended for use in downtown and primarily commercial areas:

- Transit Corridor
- Downtown Thoroughfare
- Downtown One-Way Street
- Downtown Two-Way Street
- Neighborhood Main Street
- Commercial Shared Street
- Commercial Alley

An additional five street types are provided for use in areas which are primarily residential:

- Residential Boulevard
- Neighborhood Street
- Yield Street
- Residential Shared Street
- Green Alley

Finally, an additional thoroughfare type is provided for off-street trails and paths:

- Trail

The following pages provide illustrations and brief descriptions of each type. All are Complete Streets, whose design is supportive of motorists, cyclists, pedestrians, and transit riders. Additional definition and design details for each of these street types are provided in the National Association of City Transportation Officials (NACTO) *Urban Street Design Guide* (USDG) and the NACTO *Urban Bikeway Design Guide* (UBDG).[11] The NACTO guides

[11] For further information, see: http://nacto.org/usdg/ and http://nacto.org/cities-for-cycling/design-guide/ . Both design guides have been endorsed by the Federal Highway Administration (FHWA) and Caltrans, as well as numerous other cities, counties, states and professional organizations. For further information on FHWA and Caltrans support for these manuals, see:
http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/design_flexibility.pdf
http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/design_flexibility.cfm
http://www.dot.ca.gov/hq/oppd/design/2014-4-2-Flexibility-in-Design.pdf

classify urban streets according to their form and function, and provide detailed guidance for developing Complete Streets that are fully supportive of transit-oriented development.

Additionally, the Institute of Transportation Engineers' *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*; and *Residential Streets: Third Edition*, developed by the Institute of Transportation Engineers, the American Society of Civil Engineers, the National Association of Home Builders, and the Urban Land Institute, are useful design references. The pages below provide more specific descriptions of the concepts proposed for several key streets in the study area, such as Avenue Q.

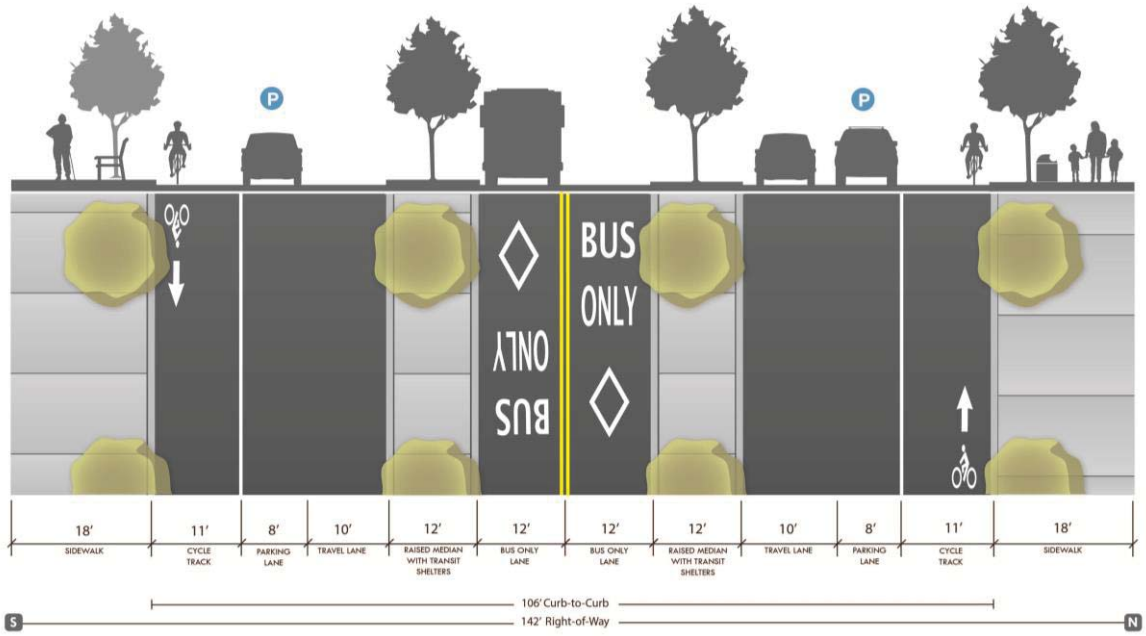
The Transit Corridor Street Type

The Transit Corridor street type is designed to support high-capacity and high-quality transit service. Figure 2-4 illustrates an example of the Transit Corridor street type.

Figure 2-4: Transit Corridor

Transit corridors that support bus, bus rapid transit, light rail, and streetcars should feature design that ensures high quality transit service that integrates with bicycle and pedestrian connections. Pedestrian improvements, such as high quality shelters, curb extensions and high visibility crossings, are key in corridors with multiple surface stops. (Source: NACTO Urban Street Design Guide)

Figure 2-5: Avenue Q Transit Corridor, Conceptual Cross-Section



The Circulation Plan designates Avenue Q as a Transit Corridor street type. Figure 2-5 provides a conceptual cross-section for the Avenue Q Transit Corridor. This Report proposes that initially, the Avenue Q Transit Corridor would be developed as a Bus Rapid Transit (BRT) Line with exclusive transit lanes running in a center median (as shown in the illustration above). Features such as exclusive bus lanes, transit signal priority, level boarding, typical minimum distances of one-half mile to one mile between stops, high-quality 'stations' at each stop for waiting passengers, and minimum headways of 15 minutes would provide fast, frequent and reliable service. In the future, if demand warranted, rail transit could be introduced on the corridor to provide additional passenger capacity.

As described in the Land Use Plan, the goal for Avenue Q is to facilitate the development of mixed-use buildings with active, sidewalk oriented uses on the ground floor and apartments and condominiums above. To achieve this, the Land Use Plan generally prohibits the introduction of new driveways along Avenue Q, and requires that parking structures and lots be located behind buildings, so as not to detract from the pedestrian-oriented streetscape. Access to parking will be provided from the side streets, rear alleys, and additional east-west streets running parallel to Avenue Q, on both the north and south sides of the corridor. This will allow Avenue Q to develop into a traditional American Main Street form, with wide sidewalks, continuous shopfronts and an unbroken pedestrian strolling experience in the mixed-use portions of the corridor.

At most intersections, left turns from Avenue Q onto side streets will be prohibited, in order to reduce congestion and maintain transit running speeds. However, left turn access will be provided at intervals of at least every one-half mile, and through movements on north-south cross streets will remain permitted.[12]

What is Bus Rapid Transit (BRT)?

Bus Rapid Transit (BRT) is an innovative, flexible, and high performance transit mode that uses buses or specialized vehicles on roadways or dedicated lanes to quickly and efficiently transport passengers to their destination. BRT systems can equal or exceed the performance of most rail systems but at a fraction of the cost due to reduced construction, infrastructure, and maintenance needs. Common features of a bus rapid transit system that are different from most conventional bus systems include:

- High-capacity vehicles
- Exclusive bus lanes separated from other roadways
- Rail-like station amenities with level boarding platforms
- Rail-like spacing between stations for fewer stops and express travel times
- More frequent service
- Traffic signal priority

[12] Note that in urban areas with a grid street pattern, limiting left turns from major streets onto side streets is a common practice. Examples include Pasadena's Colorado Boulevard; and Divisadero, Market, Masonic and Van Ness Avenues in San Francisco. In a traditional connected grid, motorists on a major street who wish to access a side street, where a left turn from the major street is not permitted, typically either: (a) turn left before or after the side street, or (b) go around the block, by making three right turns. It is worth noting that in a conventional suburban cul-de-sac pattern, the question of turning left onto many side streets never arises, because most side streets do not directly connect through to the major street.

- Real-time passenger location and schedule information
- Off-vehicle fare collection

An example: Los Angeles County's Orange line

The Metro Orange Line is one of the first full-featured BRT systems anywhere in the United States. In 1991, Metro used $44.8 million in Proposition 108 funds (the Passenger Rail and Clean Air Bond Act of 1990) to purchase an abandoned railroad line parallel to the Ventura Freeway (U.S. 101). Initially, Metro considered building rail in the corridor, but this was deemed infeasible both politically and as a result of Metro's decline in revenue at the time.

After a successful Metro Rapid Demonstration Program of street-running rapid bus services, Metro proposed building a BRT line, which was highly contested by some neighborhood groups who fought against its development. With a $324 million construction cost, the Metro Orange Line opened in October 2005 as a fourteen mile route primarily consisting of a two-lane dedicated busway, operating sixty-foot articulated vehicles powered by compressed natural gas. The route crosses thirty-four streets and five midblock pedestrian crosswalks. At signalized intersections, it has loop detectors installed to give Orange Line vehicles traffic signal priority. In order to mitigate noise impacts on adjacent neighborhoods, it operates on rubberized asphalt with sound walls on portions of the busway. Adjacent to the busway, Metro has built eight miles of bicycle and pedestrian paths, with designated on-street bike lanes for the remaining six miles. There is extensive landscaping along the corridor.

On June 30, 2012, a four-mile spur was opened off of the main line, toward the north from a point near its western end. This extension utilizes a continuation of the same former rail right-of-way used by the original segment.

The Orange Line Today

The Orange Line has proven to be one of Metro's most successful routes, outperforming other Metro rapid transit lines. As of December 2014, ridership on the Orange line averaged 25,000 per weekday. The Orange Line has exceeded ridership projections, reduced travel times, and eased congestion within the San Fernando Valley. It has also provided greater access to destinations in the Valley and attracted new riders. Metro's Orange Line serves as an example of what transit agencies can do to feasibly implement sustainable rapid transit through the cost-effective option of BRT.

The Orange Line operates seven days a week, twenty-two hours per day. Vehicles depart every four minutes during the morning and evening peaks. During off-peak hours and on weekends, headways range from ten to twenty minutes. The Orange Line also accommodates a series of transit connections. The busway connects to the Metro Rail Red Line subway terminus at North Hollywood. When developing the Orange Line, Metro rerouted several bus lines in the area and added buses to several north-south lines in order to ease transit connections with the Orange Line. Orange Line schedules are coordinated with the Red Line to facilitate transfers.

The fourteen original Orange Line stations are spaced approximately one mile apart, and they are located near residential areas, commercial activity centers, and major north/south arterials. Each station provides bicycle racks and/or lockers, covered seating, telephones,

lighting, and security cameras. Stations also feature variable message signs and real-time bus arrival information. Overall, the Orange Line provides a level of service and performance that is often associated with much more expensive rail systems.

For more information about the Orange line:
William Vincent and Lisa Callaghan, A Preliminary Evaluation of the Metro Orange Line Bus Rapid Transit Project, April 2, 2007.
http://www.gobrt.org/Orange_Line_Preliminary_Evaluation_by_BTI.pdf.

Los Angeles County Metropolitan Transportation Authority (Metro) Ridership Statistics, December 2014.
http://www.metro.net/news/ridership-statistics/. Accessed January 19, 2015.

Palmdale Boulevard: a Boulevard Street Type *and* a Future High-Capacity Transit Corridor

Palmdale Boulevard is currently designated in the City's General Plan as a Major Arterial, and will in the future carry a significant share of the motor vehicle traffic traveling to and from the Study Area. To accommodate the eventual full buildout of the Land Use Plan, this Report proposes to expand motor vehicle capacity by widening the street to eight through lanes. The Land Use Plan and this Report also envision Palmdale Boulevard being redeveloped over time into a high-capacity transit corridor with a new Bus Rapid Transit line, as proposed in the Antelope Valley Transit Authority's recently completed *Comprehensive Operational Analysis & Ten-Year Plan*.[13] The new line, however, is envisioned to generally operate in mixed-flow traffic with signal prioritization, rather than in exclusive transit lanes.

Figure 2-6 provides a conceptual typical cross-section of the proposed Palmdale Boulevard. In order to maintain compliance with the City's current automobile Level of Service standards, the street would be ultimately widened to eight lanes, with turn pockets as needed at selected intersections. Additionally, the number of through lanes westbound would increase at Division Street to five lanes, and continue at this width up to the SR-14 freeway ramps.

As Figure 2-6 shows, the typical cross-section would provide eight through lanes, a central median/turn lanes, bicycle lanes and sidewalks, all fit within a 114 foot right-of-way. This is the City's standard right-of-way width for a Major Arterial with bicycle lanes. In order to achieve this number of lanes within just 114 feet, 10 foot wide travel lanes are used, as is frequently done in constrained urban areas. However, at present, Palmdale Boulevard's existing right-of-way ranges between approximately 100 feet wide (in the most constrained sections) and 140 feet wide (in sections where the street includes a frontage road). Therefore, achieving this right-of-way width throughout the corridor will require some right-of-way acquisition by the City (either through purchase, or via dedications of land as

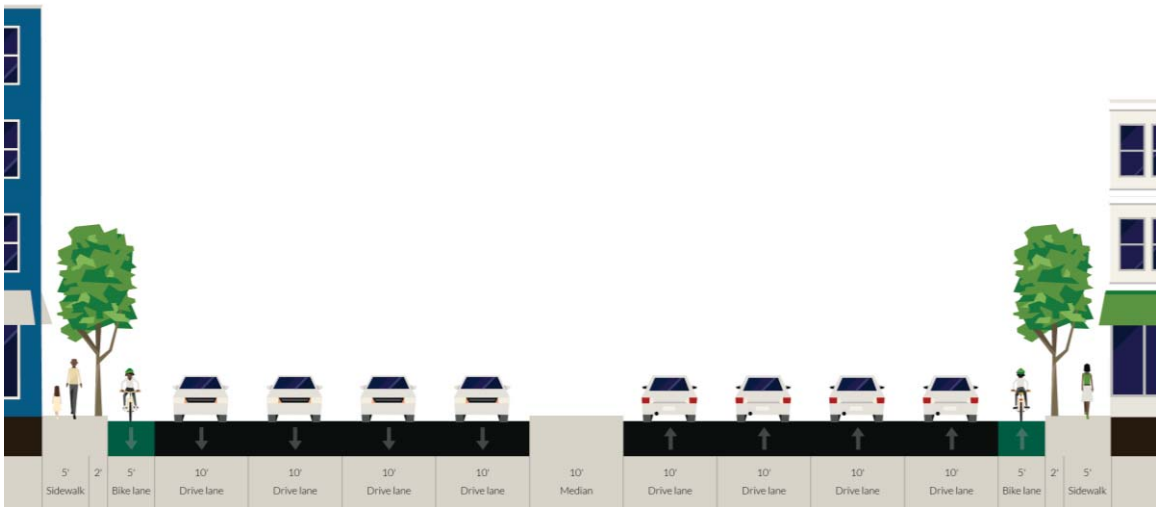
[13] Antelope Valley Transit Authority. *Route to Success: Antelope Valley Transit Authority Comprehensive Operational Analysis & Ten-Year Plan.* Antelope Valley Transit Authority, November 2014. http://www.avta.com/modules/showdocument.aspx?documentid=946. Accessed January 15, 2015.

redevelopment of properties along Palmdale Boulevard takes place. Alternately, the City retains discretion to approve narrower, less land-consumptive street and right-of-way widths, particularly in constrained segments with existing buildings.

Additionally, because the street is a Caltrans roadway, specific design dimensions will need to be negotiated and agreed upon with Caltrans during future design phases. Ordinarily, Caltrans standards call for wider travel lane widths (e.g., 11 feet or more). However, in constrained situations on existing urban roadways, Caltrans has previously agreed to more slender lane widths.

One example is the redesign of Van Ness Avenue (US 101) in San Francisco, where Caltrans has agreed to lane widths of less than 11 feet in order to make room for exclusive bus lanes and landscaped, tree-lined medians. Caltrans has been increasingly amenable to such changes, because agency priorities have shifted to emphasize increasing bicycle, pedestrian and transit use on Caltrans roadways; and because in recent decades, traffic safety research has demonstrated that on urban streets with design speeds of 50 miles per hour or less, travel lane widths of 11 or 12 feet generally offer no safety advantage over 10 foot lanes.

Figure 2-6: Palmdale Boulevard, Conceptual Cross-Section



The conceptual cross-section shown above illustrates a typical section of Palmdale Boulevard at full build-out, with eight through travel lanes, central median/turn lane, bicycle lanes and sidewalks.

The Downtown Thoroughfare Street Type

The Downtown Thoroughfare street type is used to connect neighborhood centers and other major destinations.[14] The type (illustrated conceptually in Figure 2-7) is designed to provide significant motor vehicle capacity, while also comfortably accommodating street-facing buildings, pedestrians, cyclists and transit riders with parking (to buffer cyclists and pedestrians from traffic), cycle tracks, landscaped medians, and shaded sidewalks. Parking may be omitted in areas with little or no parking demand.

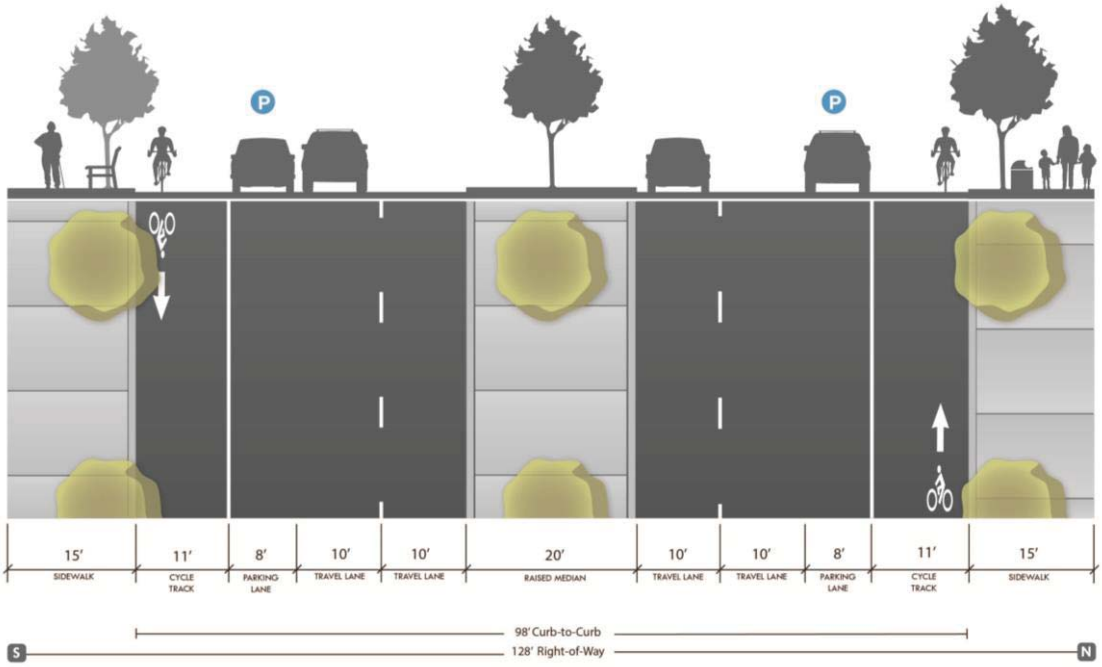
Technology Drive/Avenue P-8 would be redeveloped as a Downtown Thoroughfare street type, as shown conceptually in Figure 2-8. In blocks of the avenue with little demand for parking, such as industrial areas, on-street parking would be omitted.

Figure 2-7: Downtown Thoroughfare

Major downtown streets serve as arteries connecting to both local and neighboring destinations, with busy multimodal activity throughout the day. Pedestrians can benefit from shorter, higher visibility, and more frequent crossing opportunities across these multiple lanes. Landscaped medians contribute to downtown aesthetics while reducing vehicle turning and parking access conflicts. Dedicated bicycle facilities provide a safer space for cyclists while calming traffic throughout the active corridor. (Source: NACTO Urban Street Design Guide)

[14] While the NACTO *Urban Street Design Guide* refers to this type as the "Downtown Thoroughfare" street type, it is useful and applicable for a broad range of urban applications, and is therefore recommended for use in some parts of the Study Area which are outside of the area designated in the Land Use Plan as Palmdale's Downtown.

Figure 2-8: Technology Drive / Avenue P-8



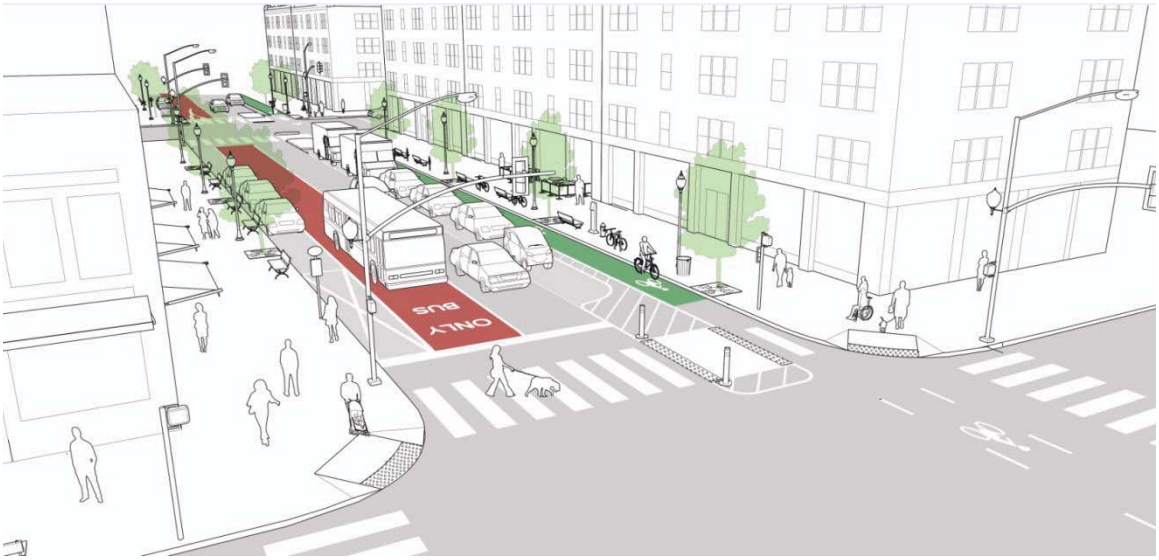
Additional Street Types for Commercial Areas

Five additional street types, described below and shown in Figures 2-9 to 2-13, are established for use in the downtown and primarily commercial areas of the project area.

- Downtown One-Way Street
- Downtown Two-Way Street
- Neighborhood Main Street
- Commercial Shared Street
- Commercial Alley

Together with the three commercial street types (the Transit Corridor, the Boulevard, and the Downtown Thoroughfare) designated earlier in this chapter, these additional types provide a wide palette of choices (eight types) for downtown and commercial blocks. The eight commercial street types may be applied on any of the streets designated on the Circulation Plan (Figure 2-3) as a Commercial Street. This level of flexibility is provided to allow for better matching of street type to land use context in the coming years, as adjacent land uses and the transit systems serving the area change and evolve. Additional details on these street types may be found in the NACTO Urban Street Design Guide.

Figure 2-9: Downtown One-Way Street



The roadway space of downtown one-way streets can be optimized for multimodal travel and public use by establishing slender automobile lanes and accommodating wide sidewalks, bicycle lanes, cycle tracks, transit-only lanes, and parklets. (Source: NACTO Urban Street Design Guide)

Figure 2-10: Downtown Two-Way Street

Downtown streets that operate in both directions can have the most limited design flexibility due to heavy multimodal volumes, parking needs, and constrained right-of-way. Safety and flow improvements should be the priority, in the form of high visibility pedestrian crossings, dedicated or upgraded bicycle facilities, and bus bulbs. (Source: NACTO Urban Street Design Guide)

Figure 2-11: Neighborhood Main Street

Main streets are a central focus of activity in neighborhoods. Road diets (reducing 4 travel lanes to 2 with a center turning lane or median) can free road space for other uses, often with negligible impact on automobile delay. These other uses can range from new dedicated bicycle facilities to better on-street parking facilities to recreational green spaces. (Source: NACTO Urban Street Design Guide)

Figure 2-12: Commercial Shared Street

Commercial shared streets are ideal for urbanized, narrow commercial corridors with high pedestrian traffic and low or discouraged automobile traffic. These shared streets address many of the failures of old pedestrian malls by maintaining access for vehicles (especially freight) while intentionally slowing traffic with shared use elements. These elements include street furniture, bicycle parking, trees, and movable planters that allow street closures to traffic according to the time of day (for example, during the lunch rush in a street with many restaurants). (Source: NACTO Urban Street Design Guide)

Figure 2-13: Commercial Alley

Commercial alleys are frequently underutilized spaces that can instead be designed to improve freight access (thereby reducing parking demand on-street) and/or enable pedestrians and cyclists to make shorter trips between destinations. (Source: NACTO Urban Street Design Guide)

Additional Street Types for Residential Areas

Five additional street types, described below and shown in Figures 2-14 to 2-18, are established for use in areas which are primarily residential.

- Residential Boulevard
- Neighborhood Street
- Yield Street
- Residential Shared Street
- Green Alley

These additional types provide a wide range of choices for residential blocks. The five residential street types may be applied on any of the streets designated on the Circulation Plan (Figure 2-3) as a Residential Street. This level of flexibility is provided to allow for better matching of street type to land use context in the coming years, as adjacent land uses and the transit systems serving the area change and evolve. Additional details on these street types may be found in the NACTO Urban Street Design Guide.

Figure 2-14: Residential Boulevard

Boulevards in neighborhoods can lend themselves to high speed traffic despite their typically residential nature. On these streets, it is important to limit the road width available to vehicles, as wider lanes make it easier to travel at high automobile speeds. Design should also focus on activating the median as a public activity space for recreation, including linear parks, trails, and multi-use path connections to bicycle routes and community destinations. (Source: NACTO Urban Street Design Guide)

Figure 2-15: Neighborhood Street

Neighborhood streets feature lower traffic volumes while hosting social, recreational and playing activities for residents. These streets should therefore have elements that prioritize the safety of these activities, slowing automobiles through slender lanes, vertical deflections, and high visibility pedestrian crossings. (Source: NACTO Urban Street Design Guide)

Figure 2-16: Yield Street

Two-way yield streets promote slow vehicle speeds and higher driver awareness of surroundings in residential areas. Effective design means that drivers should be able to intuitively navigate the street without risking head-on collisions. These streets should be implemented in places with limited on-street parking utilization to reduce potential conflicts. (Source: NACTO Urban Street Design Guide)

Figure 2-17: Green Alley

Residential alleys can be upgraded to primarily support people walking, biking, playing, and socializing. Given low automobile traffic, green alleys can use modern and sustainable design elements, including pervious pavement and native plants. (Source: NACTO Urban Street Design Guide)

Figure 2-18: Residential Shared Street

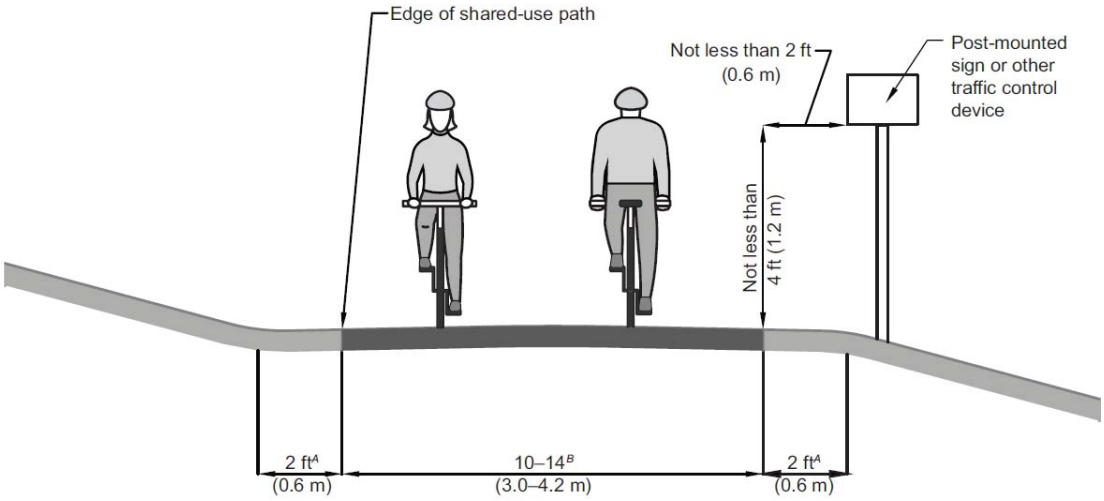
Residential streets with low automobile volumes can be designed to better support their existing functions as truly shared spaces for all users, prioritizing social and recreational activity. Residential shared streets typically enable two-way traffic, though one-way functionality is possible and should be intuitive in design. Design elements to distinguish these streets include colored pavement, flush curbs, staggered parking spaces, bollards, and street furniture. (Source: NACTO Urban Street Design Guide)

Finally, this Report establishes an additional thoroughfare type for off-street trails and paths which are reserved for bicycle and pedestrian use:

- Trail

Bicycle and pedestrian trails similar to the one illustrated in Figure 2-19 would be provided throughout the park and open space corridors shown on the Circulation Plan. In parks and along greenways, shared use paths can provide both commuter and recreational routes for pedestrians and cyclists. Off-street trails also provide elegant shortcuts that connect important destinations, making more trips possible for walking and biking. The image below illustrates minimum dimensions for such trails.

Figure 2-19: Trail



Notes:
[A] (1V:6H) Maximum slope (typ.)
[B] More if necessary to meet anticipated volumes and mix of users, per the *Shared Use Path Level of Service Calculator* (9)

Source: AASHTO Guide for the Development of Bicycle Facilities, 4th Edition 2012.

2.3 Transit Facilities and Access

This Report establishes both Palmdale Boulevard and Avenue Q as important transit corridors. On both of these corridors, the following key features should be provided to ensure fast, frequent and reliable service:

- intersection queue jumps and/or exclusive transit lanes, where necessary to minimize traffic congestion-related delays
- transit signal priority
- level boarding
- limited stops (one-half mile to one mile between stops)
- high-quality 'stations' at each stop
- minimum headways of 15 minutes

Palmdale Boulevard is already proposed as a new Bus Rapid Transit line in the Antelope Valley Transit Authority's recently completed *Comprehensive Operational Analysis & Ten-Year Plan*.[15] This new line is envisioned to generally operate in mixed-flow traffic with signal prioritization, rather than in exclusive transit lanes. This Report carries forward this concept. Additionally, the Report proposes updating the AVTA plan's proposals by adding Avenue Q as a new high-capacity transit corridor to serve the new, high intensity uses envisioned for the corridor. Avenue Q would be developed in anticipation of a Bus Rapid Transit line with exclusive transit lanes running in a center median (as shown in the Thoroughfare Standards section, above). In the future, if demand warranted, rail transit could be introduced on either or both corridors to provide additional capacity.

The Avenue Q Bus Rapid Transit Line is envisioned as beginning its route in Lancaster; continuing down 10th street West past the Antelope Valley Mall; turning onto Palmdale Boulevard; stopping at Palmdale Boulevard and Trade Center Drive (adjacent to the Palmdale Regional Medical Center, an important regional destination); and then turning north on Trade Center Drive to reach Avenue Q. The BRT Line would then traverse the length of Avenue Q, with a major stop at the new Palmdale Multimodal Station.

The Palmdale Multimodal Station, described in more detail in the Land Use Plan, will become the region's premier transit hub, serving as a meeting place and transfer center for high-speed rail, commuter rail, local and intercity buses, as well as providing automobile parking and rentals, carshare pods, and bicycle storage and rental facilities.

Airport Access

From the Palmdale Multimodal Station, the Avenue Q BRT line would continue east along Avenue Q to 20th Street East. The line would then turn north on 20th Street East to reach the Palmdale Airport Passenger Terminal located at the northern terminus of 20th Street East. The entire length of the BRT line between Trade Center Drive and Avenue Q on the west, and the airport passenger terminal on the east, would be provided with exclusive

[15] Antelope Valley Transit Authority. *Route to Success: Antelope Valley Transit Authority Comprehensive Operational Analysis & Ten-Year Plan.* Antelope Valley Transit Authority, November 2014. http://www.avta.com/modules/showdocument.aspx?documentid=946. Accessed January 15, 2015.

transit lanes. At key locations, passing lanes would be provided within the exclusive transit lanes to allow express buses to run nonstop between key destinations such as the Palmdale Multimodal Station and the Airport. This new high-capacity transit corridor would provide fast, frequent and reliable transit service to both land uses east of the station, and the airport itself.

Figure 2-20: San Jose's Proposed California High Speed Rail and Caltrain Station

San Jose's proposed California High Speed Rail Station and the planned high-density mixed-use development surrounding it, shown in the rendering above, is already becoming a lively destination for entertainment, events, living, working and playing, as well as a hub where commuters transfer daily between commuter rail, bus, private autos and taxis. The existing San Jose Arena (now known as the SAP Center) serves as an anchor for the district's restaurants and hotels. San Jose exempts all downtown intersections from automobile Level of Service (LOS) standards, a policy which has helped the City establish and maintain pedestrian and bicycle-friendly streets in the station area. (Image courtesy of the California High-Speed Rail Authority)

Providing this connection between the Multimodal Station, Palmdale Airport, and the land uses in between the two will be important, because the Southern California Association of Government's projections show that growing travel demand will generate sufficient new demand for air travel to support restarting commercial air service to Palmdale Airport. Land between the high speed rail station and the airport can then be expected to become valuable development parcels, which will require good transit service.

HIGH SPEED RAIL STATION ACCESS

According to the most current available information from the California High Speed Rail Authority (CHSRA), the CHSRA has not yet determined its preferred alignment for the Palmdale to Burbank segment of the line. However, all of the alternatives currently under study by the CHSRA continue to show the California High Speed Rail line running at surface level through Palmdale, with the line running directly to the west of and parallel to the existing Metrolink/Union Pacific railroad right-of-way. The CHSRA also proposes to grade-separate all existing railroad crossings within Palmdale, by building overpasses or underpasses. All of the alternatives propose a new Palmdale Multimodal Station for joint high-speed rail, commuter rail, and bus transit service located approximately 1250 feet south of the existing Palmdale Transportation Center. Additionally, the XpressWest Las Vegas – Palmdale high speed rail line will meet the California High-Speed Rail line at the Palmdale Multimodal Station. This proposed HSR alignment and approximate station location are illustrated on the Circulation Plan (Figure 2-3).

The proposed surface alignment through Palmdale will reinforce the existing barrier created by the Metrolink/Union Pacific rail tracks. To help overcome this barrier, the Circulation Plan envisions providing grade-separated railroad track crossings serving motor vehicle, bicycle and pedestrian traffic at Rancho Vista Boulevard, Avenue Q, and Palmdale Boulevard. Additionally, this Report proposes the eventual creation of three new grade-separated bicycle/pedestrian crossings, with potential new crossings at a point just north of the High Desert Corridor, at East Avenue P-12, and at East Avenue Q-6.

Finally, this Report recommends maintaining, whenever feasible, all existing public rights of way that currently cross and/or terminate at the railroad corridor and at freeway corridors. In the long term (measured in decades, rather than years), these rights-of-way may be highly useful for constructing future undercrossings or overcrossings of these major barriers to travel. The cost of maintaining these rights-of-way in public hands can be minimal. Once lost, such rights-of-way frequently can only be reestablished at significant cost, if it all, and are therefore worth preserving.

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3 Parking & Transportation Demand Management

To avoid excessive traffic congestion from the high-intensity development envisioned for the project area, and to pay for the substantial parking supply that will be required to support the Palmdale Multimodal Station and associated development, this Report proposes that parking be carefully managed, and priced at rates that cover the full cost of building, operating, and maintaining the parking supply. The Report recommends a holistic parking management strategy which integrates all aspects of parking: pricing, regulations, enforcement, and policy for both on-and off-street facilities.

3.1 Parking Policies

To achieve these goals, this Report proposes the following parking policies. All of these are commonly used in urban areas and transit-oriented districts, and at major regional transit hubs. A common thread in these parking principles is the idea of ensuring that parking is treated more as an ordinary commodity, where spaces are bought and sold, or rented and leased, and where parking is paid for by the driver who uses it.

As described previously in Section 1.3, Summary of Recommendations and Phasing, many of the parking and transportation demand management policies in this chapter will likely require implementation only in the medium (5 – 10 years) or long-term (10 or more years from today, once high-speed rail trains have begun serving Palmdale Station). The California High-Speed Rail Authority intends to charge for parking at the station, at rates that cover the full cost of the parking facilities. To pay for the full cost of the parking – ultimately, structured parking – that will serve thousands of rail passengers, daily parking fees of $8 to $12 or more can be expected to be needed. If there is no parking pricing or residential parking permit districts on City streets in and around the station area, these streets can be expected to overflow with hundreds of all-day commuters' cars.

Additionally, properties in the station area will, most likely, have begun to redevelop with the high-density mixed-use buildings envisioned in the Land Use Plan. Experience from many similar urban districts has shown that if curb parking in high-density districts is left unmanaged, it tends to fill up (even when nearby, but slightly less convenient and less visible off-street parking is available).

To address these changes, in the medium-term, actively managing curb parking in the vicinity of the station (i.e., within a 10 minute walk), as well as in areas of high-density mixed-use development, may become necessary. In the long-term, it will be essential.

Managing curb parking will require a mix of parking pricing and residential permit parking, in order to ensure that on-street parking is well used, but readily available. These parking policy recommendations, along with others useful for helping the plan area thrive and succeed in over the long-term, are described below.

This Report's recommended parking policies are as follows:

TR-G-2 **Manage, price, and set zoning code requirements for parking to achieve the following goals: maximizing transit, cycling and walking trips; minimizing motor vehicle trips; increasing social equity and housing affordability (by charging separately for parking, rather than hiding its cost in the cost of other goods and services); and minimizing paved surfaces, with their associated environmental costs (e.g., heat island effects, air and water pollution, and storm water runoff).**

Policies for Managing On-Street Parking

TR-I-12 **Priorities for use of curb space.** Adopt a clear hierarchy for the use of scarce curb space, prioritizing (in order from highest to lowest priority):

i. public safety measures, such as pedestrian safety measures and fire hydrant access;
ii. pedestrian movement;
iii. public transit;
iv. bicycle facilities;
v. active freight and passenger loading, including taxi stands;
vi. short-term parking for people with disabilities;
vii. short-term parking for all others;
viii. long-term parking for shared vehicles, such as car share vehicles;
ix. long-term parking for people with disabilities;
x. long-term parking for existing residents;
xi. long-term parking for all others.

TR-I-13 **Curb parking occupancy goal.** Adopt a goal of setting parking prices to ensure that curb parking is well used, but readily available. Set prices at the lowest rate required to ensure that at least one or two spaces per block are available most of the time (approximately an 85% occupancy rate).

TR-I-14 **Parking pricing when warranted by demand.** On each block, charge for parking whenever necessary – including evenings and weekends, if needed – to achieve the City's occupancy goal (approximately 85% maximum occupancy per block).

TR-I-15 **Performance-based parking pricing.** Implement performance-based parking pricing with rates that vary by time of day, day of week and by block.

TR-I-16 **Pricing rather than time limits.** Use prices rather than time limits to achieve curb parking availability.

TR-I-17 **Curb parking privileges for existing residents.** Accommodate existing residents by providing them with parking permits allowing them to continue to park at the curb for free (or a nominal price) in their neighborhood. Charge non-residents and future residents for parking at rates that achieve the City's occupancy goals.

TR-I-18 **Use of curb parking revenues.** Dedicate all curb parking revenues to improve public facilities and services in the blocks where the parking revenue is generated, in order to sustain local support for parking pricing.

TR-I-19 **Establish commercial and residential parking benefit districts.** Establish multiple parking benefit districts for the commercial and residential areas of the Study Area, in order to provide an institutional structure for returning curb parking revenue to the blocks where it was collected to fund neighborhood improvements.

TR-I-20 **Revenue return to parking benefit districts.** Return curb parking revenues to the parking benefit district where the revenue is collected, to fund improved public infrastructure and services.

TR-I-21 **Advisory role for local organizations.** Give existing merchant and neighborhood organizations, such as Business Improvement Districts, a significant advisory role in deciding how to spend their local parking benefit district's revenues.

TR-I-22 **Technology deployment for managing curb and off-street parking.** Improve parking monitoring and enforcement with integrated "smart" meters that accept credit cards and coins, pay-by-phone technologies, off-street Parking Access and Revenue Control Systems, and license plate recognition (LPR) systems.

TR-I-23 **Parking occupancy sensors.** Evaluate emerging parking occupancy sensor technologies (in-ground and/or on-meter) and consider deploying them if and when current reliability, accuracy and cost problems are overcome.

In recent years, numerous California municipalities, including Los Angeles, Oakland, Redwood City, San Francisco, Ventura, Walnut Creek, and others around the nation have adopted on-street parking management policies similar to those set forth above.

Additional information on these city's policies, and their experiences in implementing them, is available in handbooks such as San Francisco's "SFpark: Putting Theory into Practice"[16], and on the websites of Los Angeles' LA Express Park performance-based parking pricing program[17], and Ventura's downtown parking management program[18]. Additional information on the benefits of and theoretical foundation for these policies may be found in UCLA Professor Donald Shoup's The High Cost of Free Parking.[19]

Benefits cited by cities which have adopted performance-based parking pricing policies similar to those above include:

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[16] *SFpark: Putting Theory into Practice.* San Francisco Municipal Transportation Agency, June 2014. Accessed June 20, 2016. http://sfpark.org/wp-content/uploads/2014/06/SFpark_Pilot_Overview.pdf.

[17] "LA Express Park | Save Time, Park Smarter." Accessed June 20, 2016. http://www.laexpresspark.org/. Accessed June 20, 2016.

[18] "Parking | City Of Ventura." Accessed June 20, 2016. http://www.cityofventura.net/pw/transportation/parking.

[19] Shoup, Donald C. *The High Cost of Free Parking.* American Planning Association (Planners Press), 2005.

- Making it easier to park through improved parking availability, easier ways to pay, and enhanced information and wayfinding.
- Decreasing congestion and pollution, and speeding up public transit, by decreasing the number of drivers circling and double-parking.
- Making streets safer for motorists, bicyclists and pedestrians by decreasing the number of drivers circling and double-parking.
- Improving economic vitality and quality of neighborhoods by making it easier to enjoy their city's commercial areas, through improved parking availability, cleaner air, less congested streets, and safer conditions for motorists, pedestrians and bicyclists.
- Making it possible to remove and/or reduce minimum parking requirements for new development without experiencing spillover parking problems on nearby streets. In turn, removing or reducing minimum parking requirements has made it financially feasible to build desired types of compact, mixed-use infill development, bringing new economic development and revitalization, more affordable housing, and increased property values to aging neighborhoods.

The effects of San Francisco's performance-based parking pricing programs have been particularly well-documented, with its benefits summarized in the FHWA-funded SFpark Pilot Project Evaluation Summary report.[20]

Implementation of these kinds of parking policies has also been eased by the falling costs, improved performance and widespread availability of technologies such as wirelessly-networked and credit-card accepting "smart" meters, license plate recognition systems and pay-by-phone technology. Wirelessly-networked meters, for example, have made it relatively easy to track parking revenues, estimate parking occupancy, and remotely adjust parking prices on a block-by-block basis. Many cities now do so on a regular (e.g., annual, quarterly or monthly) basis.

Similarly, pay-by-phone systems, which typically use a vehicle's license plate as its "virtual parking permit", have made it possible for cities to implement curb parking pricing without installing physical parking meters or any other new physical infrastructure, other than regulatory and informational signage. Enforcement and monitoring of parking occupancy and parking payment has also been eased by the widespread adoption of license plate recognition systems.

Policies for Managing Publicly-Owned Off-street Parking

TR-I-24 **Palmdale Multimodal Station parking.** Manage station parking in a manner similar to parking at most airports, where parking rates generate sufficient revenue to cover the full cost of building, operating, and maintaining parking facilities, including land value, in order to minimize automobile trips, and maximize the public's return on its major investments in High Speed Rail.

TR-I-25 **Public parking district.** Establish a public parking district to create public parking facilities, and thereby ensure the efficient sharing of parking between land uses

[20] *SFpark Pilot Project Evaluation Summary.* San Francisco Municipal Transportation Agency, June 2014. Accessed June 20, 2016. http://sfpark.org/wp-content/uploads/2014/06/SFpark_Eval_Summary_2014.pdf.

with different times of peak parking demand. Designate the entire study area as a parking district (in legal terms), in order to allow the flexibility to establish public parking facilities anywhere they become needed. Finalize precise locations for public parking over time, as development proceeds, in order to provide parking when and where it is needed, in a process that is closely coordinated with land-use development.

TR-I-26 **Off-street Parking Enterprise Operation.** Refrain from subsidizing automobile storage and use: require that City-owned lots and garages in downtown be operated as an enterprise operation, which pays for itself through user fees. As necessary, establish programs to allow retailers to reimburse the Enterprise Operation for valet parking for customers.

TR-I-27 **Off-street Parking Enterprise Operation Funding.** Require that the Off-Street Parking Enterprise Operation support itself solely through lot and garage user fees, without additional support from other taxpayer dollars or curb parking revenues. Plan and budget for the long-term financial sustainability of this Enterprise Operation, including setting parking rates which are sufficient to provide for long-term facility maintenance, renovation, reconstruction, and staffing.

TR-I-28 **Parking wayfinding.** Develop an integrated wayfinding system for parking facilities, including both static and dynamic (changeable electronic display) signage to provide guidance and real-time parking availability information.

Since at least the 1920s, downtowns, rail station areas, and neighborhood business districts in cities throughout California have established public parking districts in order to allow businesses and other land uses to efficiently share parking. Laws such as California's Parking District Laws of 1943 and 1951 were established to ease this process.

Establishing efficiently shared parking, which is available to the general public, is important for the financial viability of downtowns and walkable districts. Ensuring this kind of "Park Once" environment is fundamental to the creation of thriving, compact mixed-use districts. The typical suburban pattern of isolated, single-use buildings, each surrounded by parking lots, requires two vehicular movements and a parking space to be dedicated for each visit to a shop, office, or civic institution. To accomplish three errands in this type of environment requires six movements in three parking spaces for three tasks. With virtually all parking held in private hands, spaces are not efficiently shared between uses, and each building's private lots are therefore typically sized to meet a worst-case parking load. If a proposed transit-oriented district attempts to provide typical suburban quantities of parking, with little or no sharing, the result will be a system that is costly and inefficient, and a land use pattern that is anything but transit-oriented. Applying conventional suburban parking ratios will generate freestanding office and retail boxes surrounded by cars, or pedestrian-hostile buildings that hover above parking lots; and the resulting low density fabric generates too few pedestrians to let the place reach critical mass.

When the suburban practice of building individual private lots for each building is introduced into a mixed-use district, the result is also a lack of welcome for customers: at each parking lot, the visitor is informed that his vehicle will be towed if he or she peruses any place besides the adjacent building. When this occurs, nearby shopping malls gain a distinct advantage over the district with fragmented parking. Mall owners understand that

they should not divide their mall's parking supply into small fiefdoms: they operate their parking supply as a single pool for all of the shops and other uses, so that customers are welcomed wherever they park.

The compactness and mixed-use nature of the proposed district's mixed-use areas lend themselves to a "Park Once" strategy. Operating most of the parking supply in the mixed-use areas as one or more shared pools will result in significant savings in daily vehicle trips and required parking spaces, for three reasons:

- Park Once: those arriving by car can easily follow a "Park Once" pattern: drivers can park their cars just once and complete multiple daily tasks on foot before returning.
- Shared parking among uses with differing peak times: spaces can be efficiently shared between uses with differing peak hours, peak days, and peak seasons of parking demand (such as office, restaurant, retail and entertainment uses).
- Shared parking to spread peak loads: the parking supply can be sized to meet average parking loads (instead of the worst-case parking ratios needed for isolated suburban buildings), since the common supply allows shops and offices with above-average demand to be balanced by shops and offices that have below-average demand or are temporarily vacant. It is important to realize that even within a single land use category (e.g., offices), parking demand per square foot of built space can vary by a factor of 10 or more.

When parking is efficiently shared, all of these factors result in less need for costly parking lots and garages, resulting in lower capital and operations costs, better urban design and greater development opportunities. Finally, and perhaps most importantly, by transforming motorists into pedestrians, who walk instead of drive to different district destinations, a "Park Once" strategy is an immediate generator of pedestrian life, creating crowds of people who animate public life on the street and generate the patrons of street-friendly retail businesses.

To implement a "Park Once" strategy, most parking in the district should be managed as a shared utility, just like streets and sewers, with available-to-the-public parking provided in strategically placed lots and garages. Completing the work of establishing a public parking district is beyond the scope of this study. This task can and should be completed over the medium (5 – 10 years) or long-term (10+ years), as development proceeds, in order to allow shared parking facilities to be developed and funded in close coordination with the private sector, civic and rail station developments that will make use of them.

Policies for Regulating Privately-Owned Parking

To manage future growth in ways that minimize traffic congestion and pollution, while improving economic vitality and social equity, establish the following policies for regulating privately-owned parking:

TR-I-29 **Removal of minimum parking regulations.** Amend the Zoning Ordinance to remove all minimum parking regulations in the Study Area, in order to allow the emergence of a more normal market for parking, where spaces are bought and sold, rented and leased, much like any other commodity.

TR-I-30 **Establish maximum parking requirements.** Amend the Zoning Ordinance to establish maximum parking requirements for all land uses in the Study Area.

TR-I-31 **Unbundling of parking costs, carshare parking and provision of transit passes.** Require new developments to: (a) unbundle the cost of parking from the cost of other goods and services; (b) offer carsharing agencies the right of first refusal for a limited number of parking spaces and require that those spaces be provided to the carsharing agencies free of charge; and (c) provide free deep-discount group transit passes for local bus service to the project's residents and/or employees.

In order for the City to realize its goals for the development of the plan area as a walkable, transit-oriented district, particularly over the long-term, it will be helpful for the plan's zoning to fully support those goals. The experience from similar mixed-use districts throughout California and the United States indicates that existing citywide minimum parking requirements pose a substantial obstacle to the physical and financial feasibility of developing the types of compact, high-density and mixed-use development envisioned for the area.

In particular, walkable and transit-oriented districts which follow the strategy of developing shared public parking facilities generally remove minimum parking requirements, since requiring new developments to build parking on-site discourages the use of the shared public lots.

The table below lists some of the many places, such as the entire nation of Great Britain, that have removed minimum parking requirements from various neighborhoods.

Communities That Have Eliminated Minimum Parking Requirements Examples of communities that have partially (in particular neighborhoods and districts) or entirely eliminated minimum parking requirements include:	
Austin, TX	Muskegon, MI
Boulder, CO	Nashville, TN
Coral Gables, FL	Oakland, CA
Eugene, OR	Olympia, WA
Fort Collins, CO	Portland, OR
Fort Myers, FL	Sacramento, CA
Fort Pierce, FL	San Francisco, CA
Greenfield, MA	Sandpoint, ID
Great Britain (entire nation)	Seattle, WA
Hayward, CA	Spokane, WA
Los Angeles, CA	St. Paul, MN
Miami, FL	Stuart, FL
Milwaukee, WI	Whittier, CA

Minimum parking requirements, even relatively low ones, also frequently deter investment and reinvestment in mature transit-oriented districts, particularly by developers who serve the niche markets of tenants (both residential and commercial) who rely heavily on transit, bicycling and walking, and have little or no need for on-site parking. In the long-term, therefore, as this area develops, redevelops and intensifies in use, current code

requirements are likely to work against the City's overall goals for this station area. By their very nature, minimum parking requirements are designed to ensure that districts have more parking than would exist if the matter was left up to the market, and over the long-term, they therefore distort transportation choices toward automobile travel, while increasing housing costs and the cost of other goods and services.

The one useful purpose that minimum parking requirements do serve is to prevent spillover parking issues – provided that they are strict enough, and provided that no fees are charged at off-street lots. However, if the other strategies suggested in this report are adopted, pricing of curb parking, combined with residential parking permits, will ensure that ample vacancies exist on the street. Where good curb parking management has been implemented, minimum parking requirements become superfluous, and only their unfortunate side effects remain.

Note that when a city (a) manages curb parking properly, to prevent spillover parking, and (b) removes minimum parking requirements, the result is that market forces determine how many parking spaces new developments need to provide. In the modern world, real estate developers generally cannot obtain financing to construct a new development unless they can satisfy lenders that they have a plan for providing adequate parking; and cannot attract buyers or tenants unless they can assure them that the development has access to adequate parking. As a result, when curb parking is properly managed to prevent spillover parking, developers must either provide private on-site parking, or else make it possible to rent or lease parking spaces from an area's public parking supply.

Numerous California precedents demonstrate that removing minimum parking requirements, combined with active curb parking management, can help redeveloping neighborhoods attract new investment and flourish. For example, San Francisco's Mission Bay Plan, a plan to redevelop the City's rail yards and surrounding areas as a transit-oriented district, removed all minimum parking requirements from the area in 1998. Today, the neighborhood is home to the new San Francisco Giants ballpark, a new UC San Francisco campus, biotech and high technology offices, hundreds of new condominiums, and parking (at levels primarily determined by market demand) to serve these uses. Mission Bay's success helped spur city leaders to remove minimum parking requirements from numerous other established San Francisco neighborhoods.

Similarly, in the East Bay suburb of Hayward, California, the South Hayward BART/Mission Boulevard Corridor Specific Plan eliminated minimum parking requirements and replaced them with maximum parking requirements. These new standards generally allowed the developers of infill projects in this zone to provide the amount of parking which they found appropriate to meet the demands of their particular target market. (The relatively loose maximum parking requirements, however were designed to discourage highly auto-oriented businesses to locate elsewhere in the city, rather than in what is intended to become a compact, walkable neighborhood.) For example, the Wittek/Montana mixed-use development, which is transforming former rail station parking lots into a $120 million housing and retail development, proposed to build approximately 898 parking spaces for 788 market-rate and affordable multi-family residential units, although no parking spaces at all are required by current zoning.

Additional Transportation Demand Management Policies

To improve transportation choices, while minimizing congestion and pollution:

TR-I-32 **Cost-effective transportation demand management (TDM).** Assess the most cost-effective mix of investments in pedestrian, bicycle, transit, ridesharing and parking infrastructure and services for meeting Palmdale's economic, environmental and social equity goals.

TR-I-33 **Development of TDM programs.** Develop transportation demand management programs with clear, quantifiable goals for reducing parking capital and operating costs, vehicle trips and pollution.

TR-I-34 **Planning, funding and staffing TDM programs.** Plan, fund and staff TDM programs with the same clarity of purpose, level of expertise and seriousness normally accorded to a major parking garage construction project.

TR-I-35 **Funding TDM programs with parking revenue.** Use a portion of parking revenues to fund TDM programs, focusing particularly on helping commuters leave their cars at home, in order to free up more space in future City-owned garages for high-priority, high-revenue hourly customer parking.

TR-I-36 **Deep-discount group transit pass programs.** Establish deep-discount group transit pass programs to provide free local bus transit access for existing and future residents and employees. Consider using a portion of curb parking revenues to fund these passes.

TR-I-37 **Enforcement of parking cash-out law.** Encourage and enforce compliance with California's parking cash-out law.[21]

TR-I-38 **Transportation Management Association.** Establish a Transportation Management Association for the Study Area, to improve traveler information about, marketing of, and employer participation in programs and services regarding walking, bicycling, ridesharing and transit.

Fully implementing these parking and transportation demand management policies can help Palmdale make real progress towards its economic, environmental, and social equity goals. Performance-based parking pricing has been shown to be one of the single most effective ways to improve parking availability for customers, reduce double parking and circling in search of underpriced curb parking, and to thereby reduce unnecessary frustration, vehicle miles traveled, wasted gasoline, and pollution. Better parking management – in particular, ending below-market rate parking pricing, and the judicious use of a portion of parking revenues to fund better transportation choices – can also significantly increase walking, bicycling and transit trips, which translates directly to reductions in vehicle use and the improved vitality and livability of commercial districts and adjacent neighborhoods.

[21] For further information on California's parking cash-out law, refer to "Senate Bill 728 (SB 728), Lowenthal. Air Pollution: Parking Cash-out Program. - CHAPTERED." Accessed February 21, 2013. http://www.leginfo.ca.gov/pub/09-10/bill/sen/sb_0701-0750/sb_728_bill_20091011_chaptered.html. Additionally, the following report describes the benefits of cashing-out employer-paid parking benefits: Shoup, Donald C. "Evaluating the Effects of Parking Cash Out: Eight Case Studies." University of California Transportation Center, Working Paper. University of California Transportation Center, September 1, 1997. http://econpapers.repec.org/paper/cdluctcwp/qt5nc6w2dj.htm.

Managing parking with social equity goals in mind can also reduce inequality. On average, low-income families own fewer cars and drive less than the average family. They rely more heavily on walking, bicycling and transit. Wealthy families own more cars, drive more, and park more often. Parking management policies that remove public subsidies for automobile parking can therefore increase social equity. For example, removing minimum parking requirements increases housing affordability. Similarly, using a share of curb parking revenues to fund free transit passes can help low income families, who often cannot afford an automobile, meet their daily needs. Finally, but not least, effective parking management make convenient parking readily available on every block, resulting in positive economic impacts for local businesses, as employees, residents, and visitors can all better utilize the parking supply to shop, dine, or recreate.

STATION PARKING

Providing properly managed, priced and located parking for the Palmdale Multimodal Station is an important issue. The High Desert Corridor Environmental Impact Report estimates that the Palmdale Multimodal Station will need 6,200 parking spaces when both the California and Las Vegas-Palmdale high speed rail lines are complete. To put this in perspective, the main parking garages and lots serving Burbank Airport, shown in Figure 3-1, provides approximately 3000 spaces. To accommodate this predicted future need, the Circulation Plan (Figure 2-3) designates potential sites for garages and/or lots with this combined capacity immediately to the northwest, northeast, and southeast of the future Palmdale Multimodal Station. Initially, the sites could be developed as surface parking, with garage capacity added only when warranted by demand. As established in the parking policies listed above, Multimodal Station parking should be priced to ensure that users of the parking pay for its full cost, as is done at a typical airport. This will avoid creating a costly automobile subsidy program that discourages access to the station by other alternatives, such as transit, cycling, walking, shuttles, taxis, and rideshare services.

Figure 3-1: Burbank Airport Parking