Planning & Transportation Commission

Staff Report (ID # 9217)

Report Type: Study Session **Meeting Date:** 5/30/2018

Summary Title: Multifamily Residential Parking Requirements

Title: Council Housing Work Plan Referral: Discussion of Potential Revisions to Parking Requirements in the 2018 Housing Ordinance Implementing the Comprehensive Plan and Housing Work Plan

From: Jonathan Lait

Recommendation

Staff recommends the Planning and Transportation Commission (PTC):

1. Review key issues related to residential parking requirements to be addressed in the zoning code to encourage production of a diversity of housing types in appropriate locations, as specified by the Council referral of 2018 Housing Work Plan items.
2. Provide input to staff regarding possible housing-related parking standard changes.

Report Summary

This report focuses on parking requirements for multifamily residential projects. The Background section reviews parking's relationship to the Housing Work Plan and describes existing parking regulations. The Analysis section examines five key issues related to the effects of parking on housing production and affordability:

1. Changing Trends in Car Ownership and Commuting to Work: U.S. Census data reveals declining rates of Palo Alto residents driving alone to work and much higher rates of alternative transportation modes (e.g., transit, bikes) among Downtown residents in particular.
2. Parking Demand in Multifamily Apartments Lower than Supply: An empirical analysis of parking occupancy demonstrates that parking supply exceeds demand in all nine Palo Alto apartment developments surveyed (see Attachment A).
3. State Density Bonus Law (SDBL) Parking Requirements: Developers pursuing projects under SDBL are eligible for much lower parking requirements than City standards

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require. This is notable since projects providing inclusionary units on site may elect to use State standards instead of following the City's higher standards.

4. Form Follows Parking: Based on discussions with developers and architects, and review of recently approved projects, parking has emerged as the key driver of site planning—as opposed to architectural design, open space, pedestrian-orientation, or other design factors.
5. Parking for Ground-Floor Retail: Based on discussions with developers and architects, and review of recently approved projects, the parking requirements for required ground-floor retail may likewise constrain site planning and potentially the viability of a project.

At the end of the Analysis section, the report identifies strategies to alleviate parking as a constraint based on better alignment between parking supply and demand.

Background

Housing Work Plan. On February 12, 2018, the City Council approved a Housing Work Plan, which outlines steps to implement the City's vision and adopted policies and programs for housing production, affordability, and preservation. The Work Plan synthesizes policies and programs from the adopted Comprehensive Plan, adopted Housing Element, and a City Council colleagues' memo.

The Work Plan describes the City's progress towards the housing production goals at various income levels (i.e. RHNA) in its Housing Element, and the City's progress towards the housing projections developed during preparation of the updated Comprehensive Plan. In both cases, the City is behind where it should be to meet its goals. The approved Housing Work Plan indicates that action is needed to spur the production of housing.

For more detailed information about the Work Plan, see the materials below:

> February 5, 2018 City Council Staff Report and Draft Housing Work Plan:
> https://www.cityofpaloalto.org/civicax/filebank/documents/63054
>
> February 12, 2018 City Council Action Minutes:
> https://www.cityofpaloalto.org/civicax/filebank/documents/63659

Council Referral to PTC. The Council referred specific Work Plan items to the PTC related to a 2018 zoning amendment ordinance. At its April 25th meeting, the PTC discussed key issues in the zoning ordinance as they related to the Council referral, including issues regarding development standards and the entitlement process. Parking topics were set aside until tonight's meeting to allow time for a focused discussion. The Council referral included the following specific parking items, which will be the subject of tonight's meeting:

- 2.4 Provide incentives and remove constraints for multifamily housing in the Downtown (CD-C), Cal Ave. (CC(2)/PTOD) and El Camino Real (CN and CS) districts

  - 2.4.5 Allow parking reductions based on TDM plans and on payment of parking in-lieu fees for housing (Downtown and Cal Ave.). Review and update as necessary the TDM Ordinance to include additional metrics, goals, and enforcement
- 2.6. Provide incentives and remove constraints in all zoning districts:
  - 2.6.1. Adjust parking requirements to reduce costs (based on parking study); identify the appropriate amount of parking for various housing types and locations, taking into account parking mitigations

For a detailed discussion of the PTC's role and the full Council referral, see the materials below:

April 25, 2018 Planning & Transportation Commission Staff Report:
https://www.cityofpaloalto.org/civicax/filebank/documents/64680

Short History of Parking Requirements. In 2003, the City updated its Zoning Code to implement the goals established by the 1998 Comprehensive Plan. The update established parking standards for new land use classifications and evaluated standards for all types of development, including the number of spaces required, the size of spaces and the design of parking lots. The update also consolidated parking requirements located in different sections of the code into one subsection (Chapter 18.52). Currently, off-street parking, loading, and bicycle parking are required for any new building constructed, use established, addition, or increase in occupancy.

How the Current Zoning Code Addresses Parking Requirements. Current development standards for market-rate multi-family residential developments in the City are as follows:

- 1.25 spaces per studio unit
- 1.5 spaces per 1-bedroom unit
- 2 spaces per 2-bedroom or larger unit
- 1 guest parking spaces per project plus 10% of total number of units.

Additionally, specific project types are eligible for reductions:

- Senior Housing: up to 50% reduction, subject to approval of a parking analysis
- Affordable Housing: 20 to 40% reduction depending on level of affordability and proximity to transit, support services and traffic demand management (TDM) measures
- Housing Near Transit: up to 20% reduction with approval of a TDM program
- Mixed Use Projects: up to 20% reduction with approval of shared parking
- These reductions may be combined as long as in total no more than a 30% reduction of the total parking demand otherwise required occurs, or no less than a 40% reduction for affordable housing projects, or no less than 50% reduction for senior housing projects.

Transportation Demand Management (TDM) Plans. TDM plans are required to reduce and manage single-occupant vehicle trips of an applicant in the following circumstances:

- Projects that generate 50+ net new weekday or weekend peak hour trips;

- Projects claiming a reduction in net new trips due to proximity to public transit or the implementation of a TDM plan; and
- Projects requesting a parking reduction, including for affordable housing and housing near transit.

Findings from Stakeholder Interviews

Consultants conducted 16 meetings with 22 individuals (primarily architects and developers who regularly use the City's Zoning Ordinance) in April and May 2018. The list of stakeholder organizations is provided below:

1. Architarian Design
2. Bentall Kennedy
3. Eden Housing
4. Explore Real Estate (Golden Gate Homes)
5. FGY (Fergus, Garber, Young) Architecture
6. Hayes Group
7. Lighthouse Public Affairs
8. Mid Pen Housing
9. Palo Alto Housing
10. Resident
11. Sand Hill
12. Sobrato Organization
13. SV@Home
14. Thoits Brothers
15. TOPOS Architecture
16. Windy Hill

Key comments related to parking were as follows:

- Required parking ratios do not reflect demand
- Parking requirements are high compared to nearby communities and tend to drive site planning, commercial floor area, and unit yield
- Parking ratios should account for proximity to Caltrain stations and reductions for bike parking and shared parking
- Parking requirements should be more flexible in Downtown and Cal Ave. where there is less demand and higher costs; stakeholder ideas include: shared parking, tandem configurations, off-site locations, allowing projects to pay into the assessment districts and encouraging use of parking lifts
- In addition to the number of stalls required, drive aisle requirements, back-up distances, stall sizes that can make site planning challenging
- Parking becomes a major expense when it's required to go underground
- Many people living in multifamily housing use alternate travel modes—Caltrain, Uber, Marguerite shuttle, etc.; they don't need parking spaces

The TDM plan is reviewed and approved by the Planning Director and must include the following standards and processes:

- Performance targets for parking and/or trip reduction, including the basis for such estimates
- Identification of a single entity to implement the proposed measures
- Monitoring reports must be submitted to the Director annually, evaluating implementation outcomes against performance targets and implementing modifications, as necessary
- The Director may require program modifications where performance measures are not being met and may impose administrative penalties if identified deficiencies are not addressed within 6 months

Transportation Division staff are currently updating guidelines for administering, monitoring and enforcing TDM programs in line with the Council referral.

Analysis

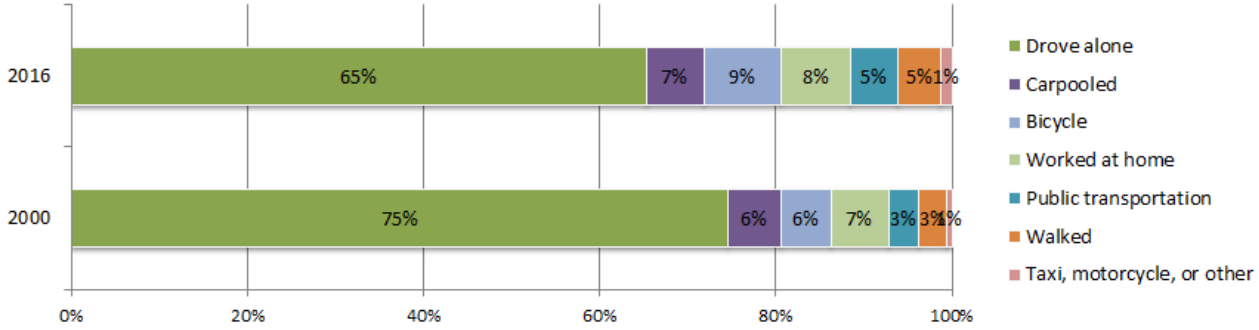
This section includes a discussion of key issues related to the direct and indirect effects of parking on housing production and affordability. Parking is an important issue for community members and business owners, to support the convenience of getting to destinations, to facilitate shopping activities, and to prevent concerns over potential spillover into residential neighborhoods. However, it is typically not leasable area and takes up space that could be used for other purposes. To align incentives for residential development this section concludes with strategies to better match supply with estimated demand.

KEY ISSUES

1. Trends in Car Ownership and Commuting to Work

The City as a whole is trending toward more diverse methods of getting around town—from bikes and walking, to transit and likely transportation network companies. Chart 1 demonstrates a trend toward the use of alternative modes of travel to work over the last 15 years, citywide, according to U.S. Census data. Rates of people driving alone dropped by 10 percentage points during this period.

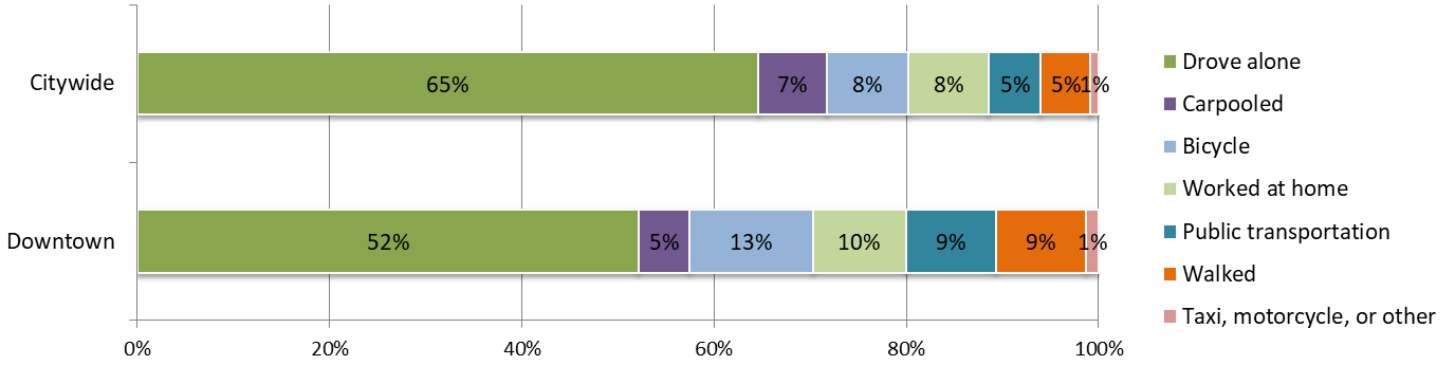
Chart 1: Commuting to Work, by Mode in Palo Alto (2000 vs. 2016)



Source: U.S. Census, American Community Survey: 2000 Summary File 3 (Means of Transportation

For residents living Downtown, rates of driving alone are even lower. Chart 2 compares how Downtown residents are getting to work versus Palo Alto residents as a whole. Downtown residents report higher rates of walking, biking, and transit use, and lower rates of driving alone compared to citywide figures (52% vs. 65%).

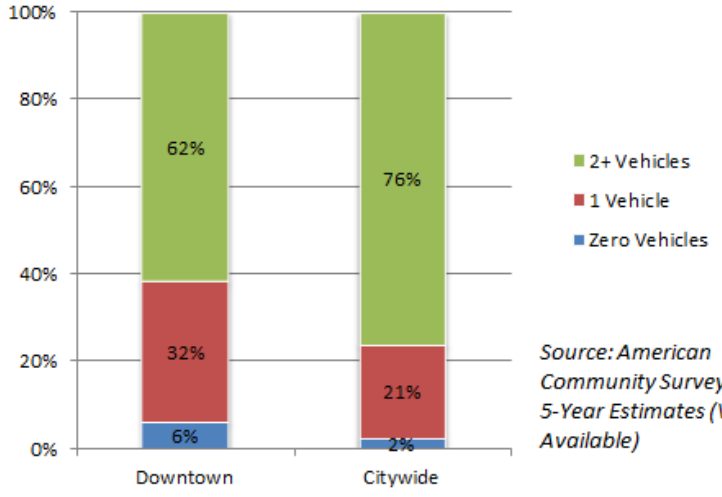
Chart 2: Commuting to Work, Downtown vs. Citywide (2012)



Source: U.S. Census, American Community Survey: 2012 5-Year Estimates (Means of Transportation to Work) Palo Alto and Downtown (Census Tracts 5113.02 and 5113.01)

Compared to the city as a whole, the Downtown area enjoys better transit access, pedestrian and bike facilities, and more retail and community amenities. Downtown also may be attracting residents who prefer not to drive and therefore choose to live Downtown. Transportation planners refer to this as "self selection."

Chart 3: Vehicles Available, Downtown vs. Citywide



Source: American Community Survey: 2016 5-Year Estimates (Vehicles Available)

As shown in Charts 2 and 3, many residents of Palo Alto, particularly in the City's established low-density communities, own cars, drive to work

and other destinations, and will continue to do so in the future. However, nationally, rates of driver's license issuance is down, as young people are choosing not to obtain driver's licenses, as evidenced by research by the University of Michigan Transportation Research Institute.[1,2] A change in costs, preferences and availability of alternative transportation options (e.g., transportation network companies) have reduced the necessity of car ownership for some populations. Boomers retiring from both their jobs and their current driving habits and higher vehicle operating costs could also reduce vehicle ownership rates. Transportation planners expect these trends to continue with the introduction of autonomous vehicles over the next few years, the increase in residents working remotely, and other innovations. (See Attachment B, which describes trends in vehicle use).

If new multifamily housing gets built near transit in Palo Alto, it may attract people who "self select" to live in more walkable, transit-accessible locations. As shown in Chart 3, similar to the findings for commuting to work, Downtown residents behave differently than residents citywide in terms of their vehicle ownership. While 38% of households Downtown have access to 0 or 1 vehicle, citywide only 23% of households report these low vehicle rates. While existing and future Downtown residents may still own cars, the trend suggests they are likely to own fewer cars. The local implications of this national trend are reflected in the parking demand section below.

801 Alma, located 0.3 miles from the Downtown Caltrain station. The project provides 1.2 parking spaces per unit, but has peak demand of 1.0 spaces per unit, suggesting that the project has 20% more parking supply than demand.

[1] Michael Sivak & Brandon Schoettle (2016) "Recent Decreases in the Proportion of Persons with a Driver's License across All Age Groups." The University of Michigan Transportation Research Institute. Report No. UMTRI-2016-4. http://www.umich.edu/~umtriswt/PDF/UMTRI-2016-4.pdf. About 87% of 19-year-olds in 1983 had their licenses, but more than 30 years later, that percentage had dropped to 69%. Drivers in their 20s, 30s and 40s also saw their ranks fall as a percentage of their age group population since 1983—down about 13 percentage points for those in their 20s, more than 8 percentage points for people in their 30s and nearly 3 percentage points for those in their 40s. For 45- through 69-year-olds, there was an increase in the percentage of persons with a driver's license from 1983 to 2008, followed by a continuous decrease from 2008 to 2014.

[2] National trends may not reveal local variations and the PCE Department does not have driver's license data specific to Palo Alto or the surrounding region.

2. An Empirical Analysis: Parking Demand in Multifamily Apartments in Palo Alto

The City engaged Fehr & Peers, a transportation consulting firm, to conduct a study of parking demand in multi-family developments in Palo Alto. These developments included market rate, affordable, and senior housing projects at sites located at varying distances to transit. The report is included as Attachment A.

The study observes the following trends (see pages 13 - 18 for details):

- The lowest parking demand rates were observed at the Senior Housing complexes and the highest at a Market Rate complex.
- The parking demand rates seem to be correlated with proximity to transit for both Affordable and Market Rate apartments. (Results are inconclusive for Senior Housing.)
- Parking requirements exceed actual parking demand in the developments surveyed.

Table 1 compares the City's existing parking requirements with observed parking demand in the occupancy studies. The third column (Surveyed Parking Demand Rate) identifies an average observed parking demand rate for the housing type, while the fourth column suggests a further reduction for projects within proximity to transit (generally within ½ mile of a Caltrain station).

Table 1: Palo Alto Parking Requirements vs. Actual Parking Demand Rates

Multi-Family Housing Type	***Current Requirement***	***Surveyed Parking Demand Rate***	***Reduction for Proximity to Transit (1)***
Market Rate	1.25 spaces per studio, 1.5 spaces per 1-bedroom unit 2 spaces per 2+ bedroom unit	0.75 spaces per bedroom	25%
Affordable Housing	See market-rate, plus 20-40% reduction depending on affordability	0.55 spaces per bedroom	25%
Senior housing	See market-rate, plus up to 50% reduction	0.34 to 0.69 spaces per bedroom	none

Note: (1) The study classified sites close to transit as within ½ mile of a Caltrain station.

For example, for market rate units, the current parking requirements range from 1.25 spaces per studio unit to 2 spaces per 2-bedroom unit. The surveyed parking demand rate suggests that 0.75 spaces per studio and 1.5 spaces per 2-bedroom unit would be appropriate to meet demand. However, if such a project were located within ½-mile of a Caltrain station, the parking supply needs could be reduced by up to 25%--to 0.6 spaces per studio and 1.1 spaces per 2-bedroom unit.

Housing developments that have more parking than is needed add unnecessary construction costs and therefore contribute to the cost of housing. Efforts to better align parking to housing type, proximity to transit and geography, could reduce these costs and increase housing opportunities without impacting surrounding neighborhoods from spillover parking.

3. State Density Bonus Law Parking Requirements

State Density Bonus Law (SDBL) (Government Code Section 65915 – 65918) represents an opportunity for developers and property owners to obtain additional residential density/dwelling units in exchange for providing on-site below-market rate units. Additionally, developers are eligible for waivers from development standards and incentives or concessions to make the provision of below-market rate units feasible.

Specifically, State law includes specific parking standards, which an applicant can request—and which the City cannot refuse—for an eligible density bonus project. These standards are shown in Table 2, along with how they compare to the City's requirements.

Notably, the State parking standards apply to the entire project—both the affordable and market rate units—while the City's parking reductions for affordable units only apply to the BMR units. In other words, regardless of what the City sets as its standard, an applicant for a project that is eligible as a State Density Bonus Law project can choose to utilize a lower parking requirement for a project. Moreover, compliance with the City's below market rate housing program when the affordable housing units are provided onsite, automatically qualify a developer under the SDBL to take advantage of the reduced parking standards.

Table 2: State Density Bonus Law Parking Standards Compared to City Standards for Multifamily Housing

	Basic Requirement (spaces/unit type)		*Near Transit (spaces/unit type)*	
Unit Type	***State Density Bonus Law***	***City of Palo Alto***	***State Density Bonus Law (1)***	***City of Palo Alto (2)***
Studio	1	1.25	.5	1
1-Bedroom	1	1.5	.5	1.2
2-Bedroom	2	2	1	1.6
3-Bedroom	2	2	1.5	1.6
4-Bedroom	2.5	2	2	1.6
Rental Projects (per unit)	See Table 1	See Table 1	0.5	See Table 1
Senior Rental Projects (per unit)	See Table 1	See Table 1	0.5	See Table 1
Example SDBL Project (Maximum Total Spaces Required)				
50-units with 6 Very-Low Income (11%) and 44 Market Rate: • 10 studios • 20 1-bedrooms • 15 2-bedrooms • 5 3-bedrooms	**70**	**83**	**38**	**66**

Notes: (1) Defined as within ½-mile of transit; (2) Assumes maximum 20% reduction

The last row of Table 2 includes a hypothetical 50-unit project with 11% Very-Low Income units that would qualify as an eligible project under State Density Bonus Law. If such a project were developed within ½ mile of transit, it need only provide 38 parking spaces vs. the City requirements which would otherwise require at least 66 spaces. This issue is notable since projects providing their 15% inclusionary units on site may elect to use State standards instead of following the City's higher standards. Based on feedback from the stakeholder interviews, developers tend to want to propose projects that are completely consistent with the City's Zoning Ordinance in an effort to navigate the entitlement process more easily. As a result, they are currently not taking advantage of either the bonus density allowances or the relief from parking requirements.

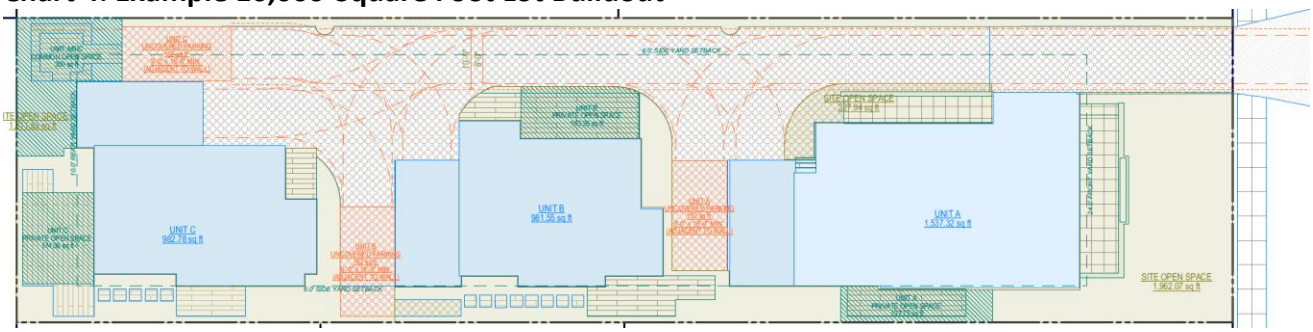
4. Form Follows Parking

Like in many communities in the Bay Area, much of the site planning and massing decisions on a project site in Palo Alto are driven by parking and access requirement. This issue was cited again and again by developers and architects during stakeholder meetings. Specifically, the requirements for driveway widths, backup distances, and the number of parking stalls can inhibit the ability to build out a sufficient number of units on a site to make a project viable. Moreover, in Downtown and Cal Ave. in particular—unlike with office developers—residential developers do not have the option to pay a fee in lieu of providing parking on-site. This is

another example of the code biasing office over residential development, as was discussed in the April 25th report.

The example below in Chart 4 shows a recent example of a housing project in Palo Alto on a lot that measures 50 feet by 200 feet (10,000 square foot total). The project just meets the development standard requirements for FAR, lot coverage, open space, building height and setbacks. With 3 units proposed, the resulting density is 13 units/acre.

Chart 4: Example 10,000-Square Foot Lot Buildout



In terms of parking, each unit requires 2 spaces (1 covered and 1 uncovered), for 6 total spaces. The orange dotted lines show the required backup areas and highlight one key exception necessary to make the project physically feasible: reducing the driveway width from 16 to 10 feet. The resulting project represents three 1,700-square foot condos that may sell for $3 million per condo.

There are two key levers that could be modified to create a more affordable project: residential density and parking. As described in the April 25th report, maximum residential density may be constraining the number of units that can be achieved on a site, resulting in larger units that rent or sell at higher rates. An architect and developer have two basic massing choices when approaching the site plan for the lot shown in Chart 4: detached single-family homes or a small apartment complex. These two prototypes have very different price points; the latter may be affordable for moderate income earners, while the former will not be.

If a fourth unit were added to this site, assuming another 2+ bedroom unit, another 2 parking spaces to serve the unit would be required. Additionally, this fourth unit would trigger the requirement for guest parking, which would necessitate another 2 parking spaces, bringing the site total to 10 spaces for 4 units. These spaces and their requisite drive aisle requirements cannot fit in a surface parking configuration so the parking would need to be in a ground-floor podium, accommodated in lifts, or placed underground. Based on conversations with developers and architects, none of these scenarios would be financially feasible for such a small project.

5. <u>Parking for Ground-Floor Retail</u>

The stakeholder interviews revealed key insights regarding the provision of parking for the commercial portion of mixed use residential buildings. As discussed in the April 25th staff report, most residential uses are required to be a part of mixed use developments in the CD-C, CC(2), CS, and CN districts. Typically, this commercial component is retail given the Retail Protection Ordinance and retail requirements of the GF Overlay.

The parking requirements for ground-floor retail are as follows for citywide locations and Downtown/Cal Ave., respectively:

- Retail (Intensive): 1/200 sq. ft.
- Retail (Extensive): 1/350 sq. ft.
- Eating and Drinking Services (with drive-in or take-out facilities): 3 per 100 sq. ft. of gross floor area
- Eating and Drinking Services: 1 space for each 60 gross sq. ft. of public service area, plus 1 space for each 200 gross sq. ft. for all other areas.
- California Avenue Assessment District: 1/240 to 1/350 spaces/sq. ft. for retail and 3/100 to 1/155 spaces/sq. ft. for Eating and Drinking Services
- Downtown Assessment District only: blended rate of 1/250 sq. ft. for all non-residential uses

Assuming a typical moderately-sized 2,000-square foot tenant space, these parking requirements would necessitate 6 to 10 spaces for a retail tenant and 28 spaces for a sit-down restaurant tenant (assuming ¾ of the tenant space is used for public service). Given parking dimension requirements in Section 18.54.070 of the City's code, a 2,000 tenant space could necessitate an additional 1,000 to 7,000 square feet of area to accommodate these parking needs depending on the use and parking configuration—potentially more than three times the size of the tenant space itself. Moreover, a parking lot needs to add in space for drive aisles and backing out of spaces, resulting in an even larger area consumed by parking.

As the city balances its interests in preserving and promoting retail and encouraging housing, there may be areas of the city along the commercial streets where allowing housing without ground floor commercial may be appropriate. Additionally, the PTC could explore exempting parking for smaller retail spaces.

STRATEGIES

Based on the information above and consistent with the Council referral, staff recommends that the Commission consider the following strategies to regulate parking more efficiently to better align parking supply with actual demand:

1. Explore possible adjustments to reduce the base parking requirement for the following housing types (without the need for a parking analysis and/or implementation of TDM measures):
    - multi-family housing near transit

- affordable housing
- senior housing

2. Maintain parking requirements for single- and two-family residential uses
3. Consider exempting a portion of ground-floor retail from parking requirements to relieve physical and financial constraints
4. For the Downtown Parking Assessment districts consider allowing housing development to participate in the in-lieu parking program and explore the possibility of establishing a program for California Avenue[3].

Environmental Review

The City Council certified a Final EIR on November 13, 2017 to analyze potential impacts associated with the updated Comprehensive Plan. The 2018 Ordinance will be evaluated pursuant to the California Environmental Quality Act (CEQA) once a draft ordinance is prepared. It is anticipated that the Ordinance will be consistent with the Comprehensive Plan and its Final EIR. At this time, no substantially greater or more severe impacts are anticipated and no development is proposed, beyond what is allowed by the Comprehensive Plan.

Next Steps

Staff will consolidate feedback received from April 25th and tonight's meeting to inform the ordinance framework. An anticipated timeline for development of the ordinance is provided in the table below.

Table 3: Anticipated Timeline

Meeting Type	*Topic*	*Date*
PTC Study Session	Review objectives for housing work plan and city council direction	March 14 (completed)
PTC Study Session	Overview of issues, including key findings from an analysis of residential capacity in Downtown	April 25 (completed)
PTC Study Session	Parking, including key findings from an analysis of residential parking demand	May 30 (Tonight's Meeting)
Community Meeting	Present and receive feedback on ordinance framework	Week of June 25th
PTC Study Session	Framework for ordinance	July
PTC Hearing	Review Draft Ordinance	August 8
PTC Hearing (continued, if needed)	Recommendation on Draft Ordinance (as revised)	August 29

Report Author & Contact Information
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PTC[4] Liaison & Contact Information
Jonathan Lait, AICP, Assistant Director

[3] This consideration is intended to stimulate discussion and may not be actionable as part of the 2018 Housing Ordinance; additional staff research and public comment is needed.
[4] Emails may be sent directly to the PTC using the following address: planning.commission@cityofpaloalto.org

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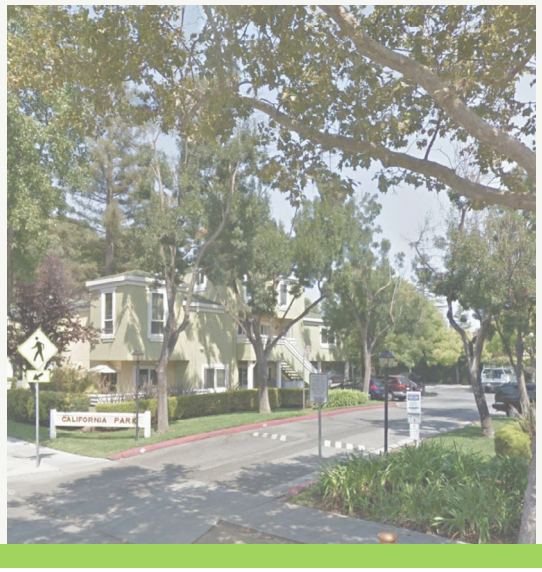
jean@lexingtonplanning.com

(650) 329-2679
jonathan.lait@cityofpaloalto.org

Attachments:

- Attachment A: Fehr & Peers Multi-Family Parking Study - Palo Alto and Statewide (PDF)
- Attachment B: Factors Affecting Parking Demand of Multi-Family Residential Developments (PDF)



Source: Google Earth

City of Palo Alto
Multi-Family Parking Demand Rates

Prepared for

CITY OF PALO ALTO

Prepared by

FEHR & PEERS

April 2018

City of Palo Alto

Multi-Family Parking Demand Rates

Prepared for:
City of Palo Alto

April 2018

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FEHR PEERS

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Executive Summary

Fehr & Peers conducted this study to provide the City of Palo Alto with parking demand rate data for multi-family developments including market rate, affordable, and senior housing projects at sites located at varying distances to fixed rail transit stations and major bus routes. The following parking rate trends were observed from the results of the parking surveys conducted at nine sites in Palo Alto:

- The Affordable complexes have a higher proportion of two and three-bedroom units, the Market Rate complexes have more one-bedroom then two+ bedroom units, and the Senior Housing complexes are comprise primarily one-bedroom units. These unit mix differences are not taken into consideration in the parking demand per unit results, but are in the rate per bedroom results.
- The lowest parking demand rates were observed at the Senior Housing complexes and the highest at a Market Rate complex.
- The parking demand rates seem to be correlated to proximity to transit for both Affordable and Market Rate apartments. (Results are inconclusive for Senior Housing.)

Using the survey results, and the results of other parking studies and available surveys, Fehr & Peers reached several conclusions. For Affordable Housing, the surveyed parking demand rate is approximately 0.55 spaces per bedroom. For Market Rate units, the surveyed parking demand rate is approximately 0.75 spaces per bedroom. Proximity to transit can reduce the parking demand by approximately 25 percent for both Affordable Housing and Market Rate units. Senior Housing has the lowest rates which ranged from 0.34 to 0.69 spaces per bedroom. Other available surveys had rates ranging from 0.39 to 0.49 spaces per bedroom. The variation in parking demand rates may indicate some self-selection occurring and residents with vehicles choosing complexes with higher supplies.

1. Introduction

This study was conducted to provide the City of Palo Alto with parking demand rate data for multi-family developments including market rate, affordable, and senior housing projects at sites located at varying distances to fixed rail transit stations and major bus routes. This study includes information from available reports, documents, studies, and the results of surveys conducted as part of this study. Fehr & Peers was also able to obtain the results of previous surveys conducted at various apartment complexes in the South Bay, and included them in this report.

2. Available Reports and Studies

Fehr & Peers reviewed several reports and studies that included parking demand rates for multi-family market rate, affordable, and senior residential developments in the Bay Area near rail stations (Caltrain, Bay Area Rapid Transit (BART), and light rail transit (LRT)). Industry standard parking generation sources and studies from Los Angeles and San Diego that include parking data for affordable housing were also reviewed. These reports and studies are:

- Santa Clara Valley Transportation Authority's (VTA's) A Parking Utilization Survey of Transit-Oriented Development Residential Properties in Santa Clara County
- Metropolitan Transportation Commission's (MTC's) Reforming Parking Policies to Support Smart Growth
- Transform's GreenTRIP Parking Database
- Robert Cervero, et al, University of California Transportation Center, UCTC Research Paper No. 882 Are TODs Over-Parked?
- Los Angeles Department of City Planning's Local Trip Generation Study
- City of San Diego's San Diego Affordable Housing Parking Study
- Institute of Transportation Engineers, Parking Generation, 4th edition

These reports and the general results that are applicable to parking demand rates for the City of Palo Alto are summarized in the following sections.

A Parking Utilization Survey of Transit-Oriented Development Residential Properties in Santa Clara County

This research project was completed by Santa Clara Valley Transportation Authority (VTA) and San Jose State University in 2010. Twelve TOD residential properties near light rail and Caltrain stations in Santa Clara County were surveyed as part of the study. (A table from this report summarizing the results included in **Appendix A**.) The study does not specify whether the surveyed properties are market rate, affordable, or senior housing; it is likely that they are market rate properties. The parking supply rates ranged from 1.31 to 2.31 spaces per unit with an average of 1.68 spaces per unit, whereas the peak parking demand rates ranged from 0.84 to 1.54 spaces per unit with an average of 1.31 spaces per unit. The study found that the parking supply exceeded the parking demand at every site surveyed indicating that the code requirements for the city they are located in may be too high. This research project shows overall that parking demand at residences near a transit station is less than current zoning code requirements.

Reforming Parking Policies to Support Smart Growth

The Metropolitan Transportation Commission (MTC) developed this handbook to help city officials, politicians, and planners with the planning and implementation of parking policies and programs that will support transit–oriented development (TOD). The document is intended to allow users to explore potential parking strategies that have been shown to work in different types of communities, identify best practices about policies and programs, and establish implementation guidelines to best gain the support of the public. It includes representative parking requirements for four types of land uses in five different location types. The rates for residential units in suburban centers/town centers range from 1.00 to 1.50 spaces per unit. Although the report does not differentiate among market rate, affordable, or senior housing, it is likely that these rates are for market rate properties.

TransForm's GreenTRIP Parking Database

TransForm's GreenTRIP Parking Database (http://database.greentrip.org/) is a compilation of data gathered at approximately 80 multi-family residential sites in the San Francisco Bay Area. It includes the building location, place type (e.g. transit town center or city center), type of residence (family, senior, diverse abilities, condominium), percent of units below market rate, number of units, number of parking spaces, parking utilization, parking supply rate, parking demand rate, and traffic reduction strategies in place. The database can provide insight into why parking use fluctuates based on location, transit access, and TDM strategies.

The GreenTRIP Parking Database allows data filtering for the study site parameters listed above. For the all-residential, senior housing study sites in Santa Clara County, parking demand rates range from 0.27 to 0.71 spaces per unit. For the all-residential, non-senior housing study sites that are 50 to 100% below market rate (affordable housing) in Santa Clara County, parking demand rates range from 0.96 to 1.34 spaces per unit.

Some other relevant example results are:

- 801 Alma in Palo Alto (0.3 miles from a Caltrain station) with 50 units, 60 parking spaces (1.20 spaces per unit), and a peak parking demand of 1.02 spaces per unit,
- Madera Apartments in Mountain View (0.1 miles from a Caltrain station) with 203 units, 279 parking spaces (1.37 spaces per unit), and a peak parking demand of 0.88 spaces per unit, and
- Arbor Terrace Apartments in Sunnyvale (0.2 miles froma VTA Rapid 522 stop) with 175 units, 359 parking spaces (2.05 spaces per unit), and a peak parking demand of 1.37 spaces per unit

Are TODs Over-Parked

Robert Cervero at the University of California Transportation Center (UCTC) led this study with the University of California, Berkeley. The study finds that parking demand rates for residential units at transit-oriented developments (TODs) in the San Francisco Bay Area ranged from 0.74 to 1.69 spaces per unit, averaging 1.20 spaces per unit. For all surveyed sites, the average parking supply was 1.59 spaces per dwelling unit. (A table from this report summarizing the results is included in **Appendix A**.) The study does not specify whether the surveyed properties are market rate, affordable, or senior housing; based on a review of the survey locations, most, if not all, are market rate properties. Varying development contexts explains the range in peak parking demand rates. Well-established sites with complementary land uses (such as office, restaurant, health club, hotel, and retail uses) had lower parking demand rates, while less dense and less diverse sites had higher parking demand rates.

Los Angeles Trip Generation Study

In 2015 Fehr & Peers conducted a parking study in conjunction with a trip generation study for the Los Angeles Department of City Planning. The study surveyed 42 affordable housing sites inside and outside Transit Priority Areas (TPAs) in Los Angeles (20 inside a TPA, 22 outside a TPA). The study compared the observed parking demand rates to the Los Angeles Municipal Code (LAMC) parking requirements. All observed parking demand rates were lower than LAMC requirements. (A table from this report summarizing the results is attached.) Some relevant parking rates and results are:

- Affordable family housing within a TPA (8 surveyed) have a parking supply rate of 1.15 spaces per unit and a peak parking demand rate of 0.85 spaces per unit
- Affordable family housing outside a TPA (6 surveyed) have a parking supply rate of 1.17 spaces per unit and a peak parking demand rate of 0.82 spaces per unit
- Affordable senior housing within a TPA (5 surveyed) have a parking supply rate of 0.60 spaces per unit and a peak parking demand rate of 0.44 spaces per unit
- Affordable senior housing outside a TPA (8 surveyed) have a parking supply rate of 0.70 spaces per unit and a peak parking demand rate of 0.48 spaces per unit

San Diego Affordable Housing Parking Study

In 2011 the City of San Diego conducted a parking study for affordable housing in various contexts throughout the city. The study documented parking rates for 21 housing developments to develop a citywide parking demand model. Variables considered includes walkability, access to transit, and housing type (e.g. single-family, senior, etc.). The parking study concluded that parking demand for affordable projects is about one half of typical rental units in San Diego, with almost half of all units surveyed having

no vehicle. Parking demand was generally associated with larger unit size and higher income for affordable housing developments. (A table from this report summarizing the results is attached.) In all projects surveyed, the amount of peak parking used was less than the amount supplied. Some relevant parking rates are:

- Villa Harvey Mandel Affordable Rentals located 1,500 feet from the 12th & Imperial Transit Center in San Diego with 90 units, 26 parking spaces (0.29 spaces per unit), and a peak parking demand of 0.28 spaces per unit
- Windwood Village Apartments in San Diego (not located near major transit service) with 92 units, 195 parking spaces (2.10 spaces per unit), and a peak parking demand of 1.56 spaces per unit
- Renaissance Senior Apartments in San Diego with 96 units, 103 parking spaces (1.07 spaces per unit), and a peak parking demand of 0.39 spaces per unit

Parking Generation, 4th Edition

The Institute of Transportation Engineers published Parking Generation, 4th edition in 2004 to provide parking demand rates for various land uses based on survey data collected in primarily suburban, low-density areas. While the report does not provide authoritative findings, recommendations, or standards on parking demand, it is often referenced by planners and designers in making parking supply estimations and decisions. Some relevant results are:

- Low/Mid-Rise Apartment (Land Use 221) has an average weekday peak parking demand of 1.23 spaces per dwelling unit in suburban context and 0.42 spaces per dwelling unit in urban context
- Residential Condominium/Townhouse (Land Use 230) has an average peak parking demand of 1.38 spaces per dwelling unit in suburban context
- Senior Adult Housing – Attached (Land Use 252) has an average peak period parking demand of 0.59 spaces per dwelling unit

City of Palo Alto Municipal Code

The City of Palo Alto Municipal Code, Chapter 18.52 *Parking and Loading Requirements* outlines the current parking supply requirements for multi-family residential units. Based on Table 1 in Section 18.52.040 *Off-Street Parking, Loading and Bicycle Facility Requirements*, market-rate multi-family residential complexes should have:

- 1.25 parking spaces per studio unit,
- 1.5 parking spaces per 1-bedroom unit,
- 2 parking spaces per 2-bedroom or larger unit, and
- 1 guest parking spaces per project plus 10% of total number of units.

Additionally, the following parking supply reductions may be taken:

- Housing for seniors may be reduced by up to 50% of the total spaces required for the site, subject to submittal and approval of a parking analysis justifying the reduction.
- Affordable housing may be reduced by up to 20% for low income units, up to 30% for very low income units, and 40% for extremely low income and single room occupancy units. The reduction shall consider proximity to transit and support services and traffic demand management measures may be required.
- Up to 20% reduction for housing near transit facilities and approval of a Transportation Demand Management (TDM) program.

3. Parking Surveys

Fehr & Peers gathered the results of previous parking surveys for multi-family residential developments within and near Palo Alto and conducted new parking surveys. This section presents the survey methodology and results.

Previous Parking Surveys

The results of previous parking surveys conducted for market rate multi-family developments in the South Bay from other Fehr & Peers studies, TransForm, and studies conducted by other consultants were compiled. Available information about each site, such as the number of units, walking distance to the nearest rail station, type of rail service, peak parking demand, parking supply and demand rates, is presented in **Table 1**. **Figure 1** shows the locations of each development. All developments are market-rate, except for Madera Apartments in Mountain View which has seven affordable-housing units and 196 market-rate units. Some of the developments may not be directly applicable to Palo Alto but the information can be used for comparison purposes. The parking supply rates ranged from 1.20 to 1.97 spaces per unit and the parking demand rates ranged from 0.88 to 1.41 spaces per unit, which indicates that the developments generally had enough parking to meet demand. The highest parking demand rate is from a complex that is not near a rail station or major bus route, suggesting that complexes far from transit require more parking than those close to transit.

Table 1: Available Multi-Family Residential Parking Survey Results

Name of Complex	Address	Distance to Rail Station	Type of Rail	Number of Units				No. of Occupied Units	Supply			Demand				Over-supply[1]
				1 BR	2 BR	3+ BR	Total Units (Bedrooms)		No. of Spaces	Rate Per Unit	Rate Per Bedroom	Peak Parking Demand	Rate Per Unit	Rate Per Occupied Unit	Rate Per Bedroom	
801 Alma	801 Alma St., Palo Alto	0.3 miles	Caltrain (PA)	10	24	16	50 (106)	50	60	1.20	0.57	51	1.02	1.02	0.48	18%
Park Place Apartments	851 Church St., Mountain View	0.7 miles	Caltrain/ LRT (MV)	181	186	6	373 (571)	n/a	511	1.37	0.89	339	0.91	n/a	0.59	51%
Avalon Mountain View	1600 Villa St., Mountain View	0.8 miles	Caltrain/ LRT (MV)	117	75	56	248 (435)	n/a	426	1.72	0.98	301	1.21	n/a	0.69	42%
AvalonBay Creekside	151 Calderon Ave., Mountain View	0.4 miles	Caltrain/ LRT (MV)	n/a	n/a	n/a	294 (n/a)	288	436	1.48	n/a	365	1.24	1.27	n/a	19%
Avalon Towers (on the Peninsula, ATOP)	2400 West El Camino Real, Mountain View	0.8 miles	Caltrain/ LRT (MV)	90	115	6	211 (338)	203	262	1.24	0.78	258	1.22	1.27	0.76	2%
Madera Apartments	455 W. Evelyn Ave, Mountain View	0.2 miles	Caltrain/ LRT (MV)	n/a	n/a	n/a	203[2] (n/a)	n/a	279	1.37	n/a	179	0.88	n/a	n/a	56%

Table 1: Available Multi-Family Residential Parking Survey Results

Name of Complex	Address	Distance to Rail Station	Type of Rail	Number of Units				No. of Occupied Units	Supply			Demand				Over-supply[1]
				1 BR	2 BR	3+ BR	Total Units (Bedrooms)		No. of Spaces	Rate Per Unit	Rate Per Bedroom	Peak Parking Demand	Rate Per Unit	Rate Per Occupied Unit	Rate Per Bedroom	
Central Park Apartments	100 N. Whisman Rd., Mountain View	0.3 miles	LRT (Whisman)	68	204	82	354 (722)	n/a	696	1.97	0.96	490	1.38	n/a	0.68	42%
Kensington Apartments	1220 N. Fair Oaks Ave., Sunnyvale	0.2 miles	LRT (Fair Oaks)	n/a	n/a	n/a	186 (n/a)	182	317	1.70	n/a	262	1.41	1.44	n/a	21%

Source: Fehr & Peers, TransForm, and Hexagon Transportation Consultants.

1. Oversupply = (Supply – Demand) / Demand
2. Madera Apartments has seven affordable-housing units and 196 market-rate units.

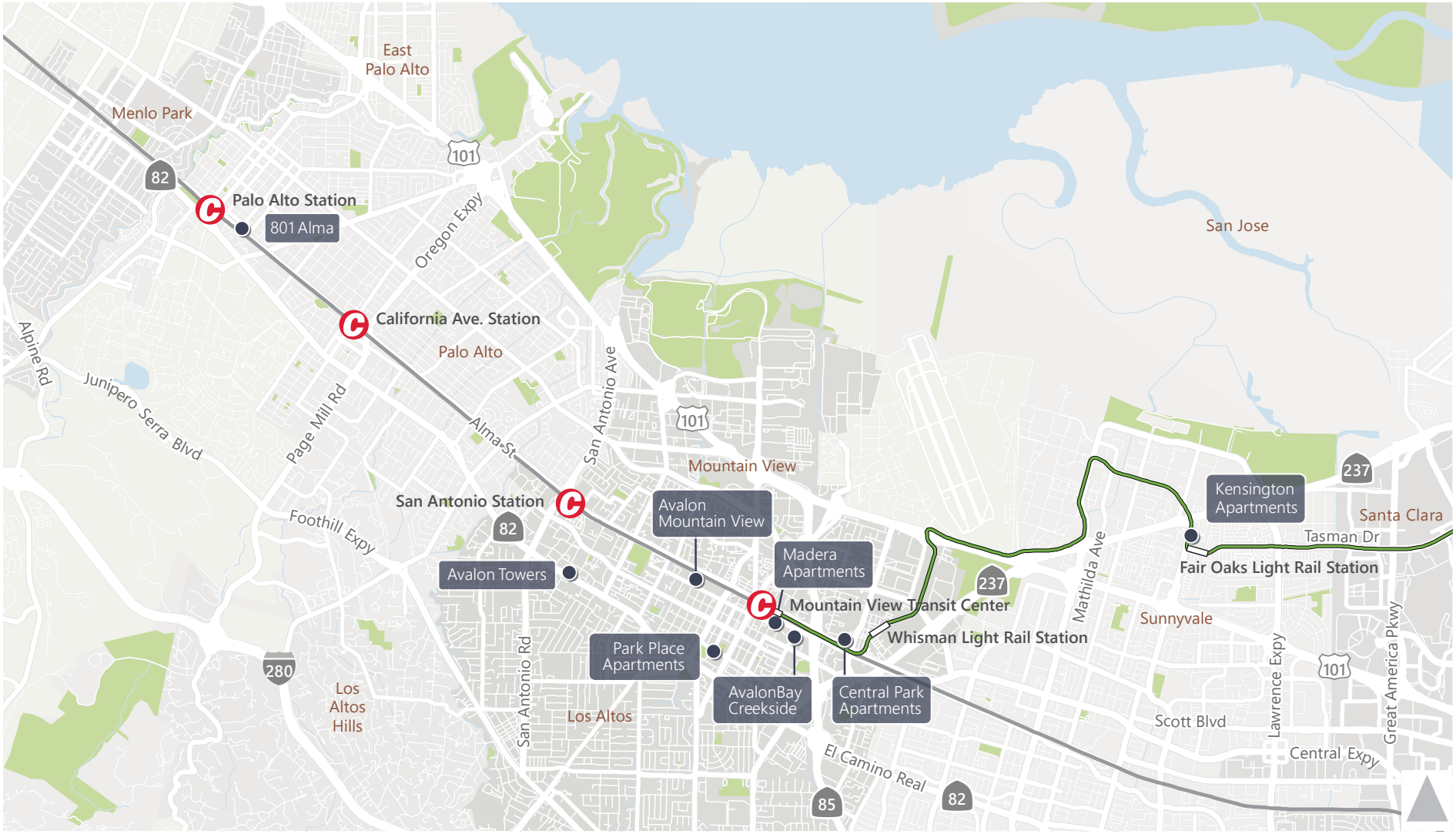

Figure 1

Previous Parking Survey Locations

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New Parking Surveys

During November and December, 2017, surveys were conducted at nine apartment complexes in Palo Alto to measure their parking demand during various days of the week and times of day.

Selected Survey Sites

The nine multi-family complexes were selected in concert with City staff based on development type (i.e. Market Rate, Affordable Housing, or Senior Community) and distance from transit, where transit is defined as fixed rail stations (primarily Caltrain stations) and/or major bus routes (primarily El Camino Real) so that the effects of transit proximity can be discerned. **Table 2** lists the locations of the properties along with their types and distance-to-transit categories. **Figure 2** shows their locations in relation to nearby Caltrain stations (Palo Alto, California, and San Antonio).

Table 2: Selected Multi-Family Complexes

Type	Near Transit (<0.5 miles)	Mid-Distance to Transit (0.75 to 1.25 miles)	Far from Transit (>1.5 miles)
Affordable Housing	California Park Apartments *(2301 Park Boulevard)*	Oak Court Apartments *(845 Ramona Street)*	Colorado Park Apartments *(1141 Colorado Avenue)*
Market Rate Housing	The Marc *(501 Forest Avenue)*	Midtown Court Apartments *(2721 Midtown Court)*	Tan Plaza Apartments *(580 Arastradero Road)*
Senior Housing	Sheridan Apartments[1] *(360 Sheridan Avenue)*	Lytton Gardens *(330 Everett Avenue)*	Stevenson House *(455 E. Charleston Road)*

Source: Fehr & Peers, 2017.

1. Sheridan Apartments is an affordable housing complex for senior & disabled residents. For the purposes of this analysis, Sheridan Apartments was considered as a Senior Housing complex.

All observed sites have dedicated parking facilities for residents, visitors, and staff where the number of parked vehicles could be counted (no private one and two-car garages). No observed sites offer unbundled parking. The number of units by bedroom count, number of parking spaces, and parking supply rates per unit and per bedroom are presented in **Table 4.** The properties also have at least 45 units, with unit occupancy at or above 95%.

Methodology & Results

A parking inventory was conducted at each selected survey site to verify the parking supply. The inventory included counts of the numbers of spaces and how they were identified, e.g., reserved, visitor, staff, office,

Americans with disabilities Act (ADA)-compliant, etc. Spaces that had no identification were designated as "general". The parking inventories are presented in **Table 3**.

Table 3: Parking Inventories at Survey Sites

Name of Complex	Number of Parking Stalls							
	General	Reserved	ADA-Compliant	Visitor	Office/ Staff/ Vendor	Future Neighbor	EV	Total
Affordable Housing								
California Park Apartments	67	-	3	-	-	-	-	**70**
Oak Court Apartments	-	85	2	20	-	-	-	**107**
Colorado Park Apartments	-	86	2	-	2	-	-	**90**
Market Rate Housing								
The Marc	-	153	2	-	-	-	2	**157**
Midtown Court Apartments	58	10	-	-	1	-	-	**69**
Tan Plaza Apartments	65	10	2	-	2	5	-	**84**
Senior Housing								
Sheridan Apartments	-	20	1	-	-	-	-	**21**
Lytton Gardens	3	38	5	5	-	-	-	**51**
Stevenson House	35	2	3	6	4	-	-	**50**

Source: Fehr & Peers, 2018.

Parking occupancy surveys were conducted to count the numbers of parked vehicles by space type on a weekday (Tuesday, Wednesday, or Thursday) at three time periods (midday, evening, and late night - after midnight) and on a weekend day at two time periods (midday and late night).

The summarized results of the parking surveys showing the numbers of parked vehicles, space occupancy (percent of spaces occupied by a parked vehicle), and parking demand rates per unit, per occupied unit, and per bedroom are summarized in **Table 4**. (More detailed survey results are included in **Appendix B**.)

Most of the complexes achieved their peak parking demand on weekdays during the late night period. Two had identical peak parking demands during the late night period on weekdays and on weekends (California Park Apartments and Tan Plaza). One of the senior housing complexes reached its peak parking demand during the late night weekend period (Stevenson House).

Only three of the complexes, Oak Court Apartments, Lytton Courtyard, and Stevenson House, have designated visitor spaces. Oak Court Apartment has 20 visitor spaces and the number of vehicles parked in those spaces remained at 6 or 7 throughout the survey period. Lytton Courtyard has 5 visitor spaces with 1 or 2 parked vehicles. The number of vehicle in the six visitor spaces at Stevenson House ranged from 2 to 5.

Trends

The following trends from the surveys are noted:

- The Affordable complexes have a higher proportion of two and three-bedroom units, the Market Rate complexes have more one-bedroom then two+ bedroom units, and the Senior Housing complexes are comprised of primarily one-bedroom units. These unit mix differences are not taken into consideration in the parking demand per unit results, but are in the rate per bedroom results.
- The lowest parking demand rates were observed at the Senior Housing complexes and the highest at a Market Rate complex.
- The parking demand rates seem to be correlated to proximity to transit for both Affordable and Market Rate apartments. (Results are inconclusive for Senior Housing.)

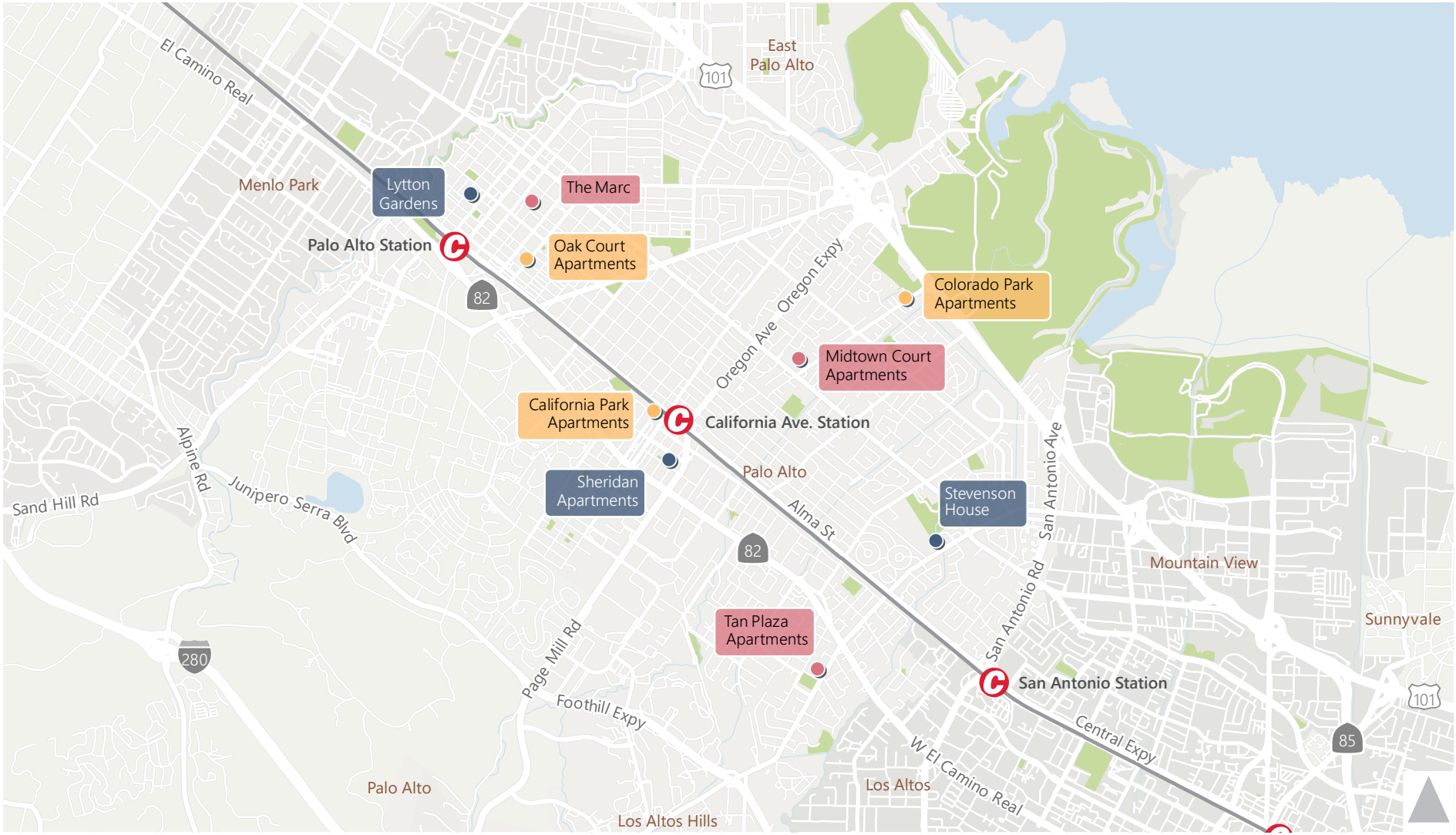
Table 4: New Multi-Family Residential Parking Survey Results

Name of Complex	Distance to Rail Station	Type of Rail	Number of Units				No. of Occupied Units	Supply			Demand				Over-Supply[2]
			1 BR	2 BR	3+ BR	Total Units (Total Bedrooms)		No. of Spaces	Supply Rate per Unit	Supply Rate per Bedroom	Peak Parking Demand (*Time*[1])	Rate Per Unit	Rate Per Occupied Unit	Rate Per Bedroom	
Affordable Housing															
California Park Apts.	0.1 miles	Caltrain (CA)	1	31	13	45 (102)	45	70	1.56	0.69	41 (*WD,L*)	0.91	0.91	0.40	71%
Oak Court Apts.	0.8 miles	Caltrain (PA)	9	18	26	53 (123)	53	107	2.02	0.87	66 (*WD,L*)	1.25	1.25	0.54	62%
Colorado Park Apts.	2.4 miles	Caltrain (CA)	8	24	28	60 (140)	60	90	1.50	0.64	78 (*WD,L*)	1.30	1.30	0.56	15%
Market Rate Housing															
The Marc	0.5 miles	Caltrain (PA)	70	44	4	118 (170)	114	157	1.33	0.92	90 (*WD,L*)	0.79	0.79	0.53	74%
Midtown Court Apts.	1.2 miles	Caltrain (CA)	31	15	0	46 (61)	44	69	1.50	1.13	46 (*WD,L*)	1.00	1.05	0.75	50%
Tan Plaza Apts.	1.6 miles	Caltrain (SA)	6	50	5	61 (121)	60	84	1.38	0.69	70 (*WD,L*)	1.15	1.17	0.58	20%
Senior Housing															
Sheridan Apts.	0.3 miles	Caltrain (CA)	57	0	0	57 (57)	57	21	0.37	0.37	20 (*WD,L*)	0.35	0.35	0.35	5%
Lytton Gardens	0.8 miles	Caltrain (PA)	51	0	0	51 (51)	51	51	1.00	1.00	35 (*WE,L*)	0.69	0.69	0.69	46%
Stevenson House	1.9 miles	Caltrain (SA)	120	0	0	120 (120)	120	50	0.42	0.42	41 (*WD,L*)	0.34	0.34	0.34	22%

Notes: Complexes are color coded by distance to transit, with darker colors indicating higher distance to transit.

1. WD,L=Weekday, Late Night; WE,L=Weekend, Late Night
2. Oversupply = (Supply – Demand) / Demand

Sources: City of Palo Alto, Fehr & Peers.



New Parking Survey Locations

- Affordable Housing
- Market Rate Housing
- Senior Housing

- Caltrain Station
- Caltrain Route

Figure 2

New Parking Survey Locations

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4. Conclusions

Conclusions were drawn from the survey results and other reports regarding the parking demand rates for multi-family residential developments and the effect of proximity to transit:

- For Affordable Housing, the surveyed parking demand rate is approximately 0.55 spaces per bedroom. Proximity to transit can reduce the rate by approximately 25 percent.
- For Market Rate units, the surveyed parking demand rate is approximately 0.75 spaces per bedroom. Proximity to transit can reduce the rate by approximately 25 percent.
    - These rates are supported by other studies conducted for sites near South Bay Caltrain stations.
- Senior housing has the lowest rates which ranged from 0.34 to 0.69 spaces per bedroom. Other available surveys had rates ranging from 0.39 to 0.49 spaces per bedroom.
    - Many of these complexes also had low parking supply rates. The variation in parking demand rates may indicate some self-selection occurring and residents with vehicles choosing complexes with higher supplies.
- Surveys conducted at additional locations would provide more information to refine results. They could be focused on the weekday late night period when the majority of the peak demands occurred.

Appendix A:
Summary Tables from Previous Parking Studies

Summary Table from "A Parking Utilization Survey of Transit-Oriented Development Residential Properties in Santa Clara County"

TABLE 6.1 Survey Data

Site	Housing		Parking			Parking Utilization Ratio	Parking Demand Rate	Parking Supply Rate	Over Supply (%)	Distance to Nearest Station
	Total Units	Occupied Units	Total Spaces	Utilized Spaces	Unused Spaces	(Utilized Spaces / Total Spaces)	(Utilized Spaces / Occupied Units)	(Total Spaces / Total Units)	(Supply - Demand) / Supply	(Feet)
1	294	288	438	365	73	0.83	1.27	1.49	15	2,500
2	306	294	568	439	129	0.77	1.49	1.86	19	3,060
4+	924	832	1,654	1,282	372	0.78	1.54	1.79	14	5,560
5	2,760	2,622	4,605	3,409	1,196	0.74	1.30	1.67	22	2,400
6	186	182	317	262	55	0.83	1.44	1.70	16	1,040
11*	93	93	122	99	23	0.81	1.06	1.31	19	1,060
13	210	200	373	271	102	0.73	1.36	1.78	24	1,330
14	104	100	240	148	92	0.62	1.48	2.31	36	1,500
16	115	113	186	132	54	0.71	1.17	1.62	28	130
18	176	174	338	241	97	0.71	1.38	1.92	28	690
20	250	242	387	287	100	0.74	1.19	1.55	23	730
21	383	383	523	320	203	0.61	0.84	1.37	39	3,930
Total	5,801	5,522	9,751	7,255	2,496					
Average	483	460	813	605	208	0.74	1.31	1.68	22	
Std. Dev.	751	709	1,258	936	324	0.07				

Notes

* Site 11 has an occupancy rate of 75% (it was the only survey site with an occupancy rate less than 90%).
  The total number of housing units and parking spaces were adjusted for Site 11 to reflect an occupancy rate of 100%.
  Total dwelling units: Calculation: 124 total units x 0.75 = 93
  Total parking spaces: Calculation: 163 total parking spaces x 0.75 = 122

+ The actual distance is shorter than the 5,560 feet shown here.
  See Section 5.5.2 and Figure 5.5 for more detail.

Summary Table from
“Are TODs Over-Parked?”

Site	Supply per Unit	Peak Demand per Unit	Demand: % diff. from Supply	Demand: % diff. from ITE Rate
Walnut Creek: Pleasant Hill BART Station				
Diablo Oaks	1.05	0.74	-29.5%	-38.3%
Iron Horse Park	1.42	0.80	-43.7%	-33.3%
Archstone Walnut Creek	1.12	0.92	-17.9%	-23.3%
Park Regency	1.47	1.06	-27.9%	-11.7%
Archstone Walnut Creek Stat.	1.29	1.09	-15.5%	-9.2%
Villa Montanaro	2.05	1.23	-40.0%	2.5%
San Leandro: Bayfair BART Station				
The Hamlet	1.28	1.07	-16.4%	-10.8%
Union City BART Station				
Verandas	1.50	1.11	-26.0%	-7.5%
Parkside	1.46	1.13	-22.6%	-5.8%
Fremont BART Station				
Presidio	1.82	1.23	-32.4%	2.5%
Watermark Place	1.84	1.27	-31.0%	5.8%
Mission Peaks	1.75	1.35	-22.9%	12.5%
Archstone Fremont	1.98	1.45	-26.8%	20.8%
Sun Pointe Village	1.98	1.47	-25.8%	22.5%
Park Vista Apartments	1.97	1.48	-24.9%	23.3%
Alborada	1.78	1.69	-5.1%	40.8%
ALL 16 EAST BAY STATIONS				
Weighted Average	1.59	1.20	-24.7%	0.0%

Figure 2. East Bay Results: Peak Parking Generation Rates (Parked Vehicles per Dwelling Unit) Relative to Supply Levels and ITE Standard

Summary Table from
“Los Angeles Trip Generation Study”

TABLE 3

Summary Table of Parking Analysis for Affordable Housing Sites in Los Angeles

(By Transit Priority Area and Affordable Housing Type)

Counts conducted May, June, and November 2016

TPA Area	Affordable Housing Type	Sample Size	Parking Demand Per Dwelling Unit	Parking Utilization
Inside	-	20	0.53	64%
Outside	-	22	0.56	63%
-	Family	14	0.84	72%
-	Seniors	13	0.46	71%
-	Special Needs	8	0.32	43%
-	Permanent Supportive	7	0.37	56%
Inside	Family	8	0.85	74%
Inside	Seniors	5	0.44	73%
Inside	Special Needs	4	0.20	34%
Inside	Permanent Supportive	3	0.29	64%
Outside	Family	6	0.82	70%
Outside	Seniors	8	0.48	69%
Outside	Special Needs	4	0.44	52%
Outside	Permanent Supportive	4	0.43	50%

LAMC for Comparison

	Parking Requirement per Unit
Apartments (LAMC 12.21A.4(a))	
<3 habitable rooms	1
3 habitable rooms	1.5
>3 habitable rooms	2
Projects with Affordable Housing Density Bonus - Option 1 (applies to all units, not just restricted units) (LAMC 12.22A.25(d)(1))	
0-1 bedroom	1
2-3 bedrooms	2
4 or more bedrooms	2.5
Projects with Affordable Housing Density Bonus - Option 2 (applies to restricted units only) (LAMC 12.22A.25(d)(2))	
restricted affordable units	1
restricted to low or very low income senior citizen or disabled	0.5
restricted affordable units in residential hotel	0.25

Summary Table from
“San Diego Affordable Housing Study”

Table 2. Comparison of Spaces Required Under Different Standards

A. Type	B. Project, # of units, special district (if any)	C. Spaces required under current code with no reductions for increases, or Centre City Planned District (if applicable)	D. Spaces required if reduction for "very low income" or "transit area adjustment" is applied	E. Spaces w/ all density bonus 143.0790 adjustments (transit area + very-low income)	F. Spaces required under Chapter 6 parking model, including visitor, staff and vacancy factor	G. Actual spaces supplied	H. Peak overnight parking occupancy (surveyed projects)
Studio	Via Harvey Mandel, 90 units, CCPD	22[2]	N/A	N/A	33	26	20
Family (large)	Beyer Courtyard, 60 units	153	136	108	114	118	19
	Windwood Village, 92 units	223	196	151	149	195	144
	Seabreeze Farms, 38 units	96	85	68	65	73	N/A
	Gateway Family, 42 units	108	96	76	62	92	N/A
Family (small)	Regency Center, 100 units	198	168	97	142	100	N/A
SRO	Island Inn, 197 units, CCPD	87[3]	N/A	N/A	43	86	52
	Studio 15, 275 units, CCPD	85[4]	N/A	N/A	61	55	N/A
Senior	Renaissance Seniors, 96 units	178	149	68	87	103	37
	San Diego Apartments, 16 units	28	23	10	13	4	N/A
	Horton House, 153	Conditional use	N/A	N/A	48	17	14

[1] The model assumed that the desired vacancy rate is 10%.
[2] Assuming classified as living unit, 50% AMI, or 0.2 spaces per unit; requirement for less or equal to 40% AMI is zero spaces.
[3] Assuming classified as living unit, 50% AMI or 0.2 spaces per unit; requirement for less or equal to 40% AMI is zero spaces.
[4] Assuming classified as living unit, 50% AMI or 0.2 spaces per unit; requirement for less or equal to 40% AMI is zero spaces.

Appendix B:

New Parking Survey Results

Palo Alto Parking Survey Results (By Housing Type)

						Weekday									*Weekend*					
						Midday			Evening			Late			Midday			Late		
Site	Total units	Occupied units	Capacity (Spaces)	Supply Rate	Maximum Demand	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate
California Park	45	45	70	1.56	0.91	19	0.27	0.42	28	0.40	0.62	41	0.59	0.91	27	0.39	0.60	41	0.59	0.91
Oak Court	53	53	107	2.02	1.25	36	0.34	0.68	43	0.40	0.81	66	0.62	1.25	46	0.43	0.87	59	0.55	1.11
Colorado Park	60	60	90	1.50	1.30	36	0.40	0.60	56	0.62	0.93	78	0.87	1.30	44	0.49	0.73	70	0.78	1.17
		Affordable Average:		**1.69**	**1.15**	--	**0.34**	**0.57**	--	**0.47**	**0.79**	--	**0.69**	**1.15**	--	**0.43**	**0.73**	--	**0.64**	**1.06**
The Marc	118	114	157	1.33	0.79	59	0.38	0.52	64	0.41	0.56	90	0.57	0.79	59	0.38	0.52	79	0.50	0.69
Midtown Court	46	44	69	1.50	1.05	22	0.32	0.50	27	0.39	0.61	46	0.67	1.05	28	0.41	0.64	42	0.61	0.95
Tan Plaza	61	60	84	1.38	1.17	38	0.45	0.63	39	0.46	0.65	70	0.83	1.17	49	0.58	0.82	70	0.83	1.17
		Market Rate Average:		**1.40**	**1.00**	--	**0.38**	**0.55**	--	**0.42**	**0.61**	--	**0.69**	**1.00**	--	**0.45**	**0.66**	--	**0.65**	**0.94**
Sheridan	57	57	21	0.37	0.35	17	0.81	0.30	19	0.90	0.33	20	0.95	0.35	16	0.76	0.28	18	0.86	0.32
Lytton	51	51	51	1.00	0.69	31	0.61	0.61	26	0.51	0.51	25	0.49	0.49	23	0.45	0.45	35	0.69	0.69
Stevenson	120	120	50	0.42	0.34	33	0.66	0.28	39	0.78	0.33	41	0.82	0.34	35	0.70	0.29	36	0.72	0.30
		Senior Average:		**0.60**	**0.46**	--	**0.69**	**0.39**	--	**0.73**	**0.39**	--	**0.75**	**0.39**	--	**0.64**	**0.34**	--	**0.75**	**0.43**

Palo Alto Parking Survey Results (By Location Type)

						Weekday									*Weekend*					
						Midday			Evening			Late			Midday			Late		
Site	Total units	Occupied units	Capacity (Spaces)	Supply Rate	Maximum Demand	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate	Stalls Occupied	Parking Occupancy	Demand Rate
California Park	45	45	70	1.56	0.91	19	0.27	0.42	28	0.40	0.62	41	0.59	0.91	27	0.39	0.60	41	0.59	0.91
The Marc	118	114	157	1.33	0.79	59	0.38	0.52	64	0.41	0.56	90	0.57	0.79	59	0.38	0.52	79	0.50	0.69
Sheridan	57	57	21	0.37	0.35	17	0.81	0.30	19	0.90	0.33	20	0.95	0.35	16	0.76	0.28	18	0.86	0.32
		Near to Transit Average:		**1.08**	**0.68**	--	**0.49**	**0.41**	--	**0.57**	**0.51**	--	**0.70**	**0.68**	--	**0.51**	**0.47**	--	**0.65**	**0.64**
Oak Court	53	53	107	2.02	1.25	36	0.34	0.68	43	0.40	0.81	66	0.62	1.25	46	0.43	0.87	59	0.55	1.11
Midtown Court	46	44	69	1.50	1.05	22	0.32	0.50	27	0.39	0.61	46	0.67	1.05	28	0.41	0.64	42	0.61	0.95
Lytton	51	51	51	1.00	0.69	31	0.61	0.61	26	0.51	0.51	25	0.49	0.49	23	0.45	0.45	35	0.69	0.69
		Medium to Transit Average:		**1.51**	**0.99**	--	**0.42**	**0.60**	--	**0.43**	**0.64**	--	**0.59**	**0.93**	--	**0.43**	**0.65**	--	**0.62**	**0.92**
Colorado Park	60	60	90	1.50	1.30	36	0.40	0.60	56	0.62	0.93	78	0.87	1.30	44	0.49	0.73	70	0.78	1.17
Tan Plaza	61	60	84	1.38	1.17	38	0.45	0.63	39	0.46	0.65	70	0.83	1.17	49	0.58	0.82	70	0.83	1.17
Stevenson	120	120	50	0.42	0.34	33	0.66	0.28	39	0.78	0.33	41	0.82	0.34	35	0.70	0.29	36	0.72	0.30
		Far from Transit Average:		**1.10**	**0.94**	--	**0.50**	**0.50**	--	**0.62**	**0.64**	--	**0.84**	**0.94**	--	**0.59**	**0.61**	--	**0.78**	**0.88**

FEHR PEERS

MEMORANDUM

Date: May 11, 2018

To: Jean Eisberg, Lexington Planning

From: Jane Bierstedt and Ryan Caldera, Fehr & Peers

Subject: Factors Affecting Parking Demand of Multi-Family Residential Developments

SJ16-1668.12

There are several factors that affect the parking demand of multi-family residential developments. However, there is limited data on many of the factors, especially regarding emerging technologies and societal changes. This memorandum presents historic data regarding two of the factors: transit ridership and vehicle ownership. It also describes other factors that may reduce the parking demand in the future.

Transit Ridership and Vehicle Ownership

Estimates from the American Community Survey were used to assess how transit ridership and vehicle ownership in Palo Alto have changed over time. The estimates are presented as 5-year rolling estimates: the 2016 estimate includes data from 2012-2016, 2015 is 2011-2015, etc. Despite the overlap of years they tend to provide better information because the sample size is more robust than 1-year or 3-year estimates. The results are presented in **Table 1.**

Table 1: Data on Transit Ridership and Vehicle Ownership Trends in Palo Alto

ACS Year	Years Covered	Percent Transit Commuters	Percent of Households with Zero Vehicles	Percent of Households with One Vehicle and 2+ persons
2009	2005-2009	4.1%	n/a	n/a
2010	2006-2010	4.6%	6.3%	12%
2011	2007-2011	5.3%	6.0%	13%
2012	2008-2012	5.4%	6.7%	13%
2013	2009-2013	5.3%	6.5%	14%
2014	2010-2014	5.6%	6.1%	15%
2015	2011-2015	5.8%	6.9%	15%
2016	2012-2016	5.3%	6.9%	15%

Source: American Community Survey

The general trend is towards slightly higher transit usage and slightly lower rates of vehicle ownership, but all of the trends are small. Higher transit ridership and lower ownership would tend to reduce parking demand.

Other Factors

There are other factors that may reduce residential parking demand and corresponding parking supply in the future. Many would lead to reduced vehicle ownership rates. Since many of these are new and/or still emerging, there is little empirical data to illustrate their effect. Therefore they are provided for informational purposes only.

Reduced Vehicle Ownership Rates

Vehicle ownership rates could reduce for a variety of reasons. Millennials may focus on urban living and forego car ownership in lieu of other modes of transportation including car sharing, Transportation Network Companies (TNCs), and biking. Millennials are putting off receiving their driver's license and stricter teen licensure laws could further reduce the number of new drivers and their need to have access to a vehicle. Boomers retiring from both their jobs and their current driving habits and higher vehicle operating costs could also reduce vehicle ownership rates.

First/Last Mile Strategies

Improvements to pedestrian and bicycle connections, transit passenger amenities, and access to trip-end mobility services would increase the geographic reach of transit travel, and increase trips made by transit, walking, and biking making car-free life an easier option for more people.

Shared Mobility Services

Transportation Network Companies (TNCs) like Uber and Lyft provide on-demand services and use smartphone apps to connect drivers with passengers. They meet the demand for faster point-to-point travel than transit and avoid inconveniences of driving and parking. TNCs enable a car-free or car-light lifestyle.

Telecommuting and Social Networking

Working remotely would reduce the need to have a vehicle available every day. Virtual forums for social encounters and entertainment can also reduce in-person encounters that depend on driving and vehicle ownership.

Automated Vehicles

Next-generation vehicles that operate with or without a driver aboard will be available in the next few years. They will likely be provided as a subscription service and would not need a residential parking space.