



788 San Antonio Road

Transportation Demand Management Plan

FINAL DRAFT

October 2020

INTRODUCTION

The following Transportation Demand Management (TDM) Plan has been prepared for 788SAPA Land LLC (developer) to meet City of Palo Alto TDM requirements for a proposed new mixed-use housing development project. This project is required to include a TDM plan to meet trip reduction requirements.¹ The developer is not seeking a waiver of, nor reduction to, the project's parking requirement. The Draft Environmental Impact Report (DEIR) for the project requires a TDM as a mitigation measure for Green House Gas Emissions. The Transportation Element of the Palo Alto Comprehensive Plan mandates a 20% reduction in trips generated, which the proposed TDM exceeds. This document outlines a TDM Plan designed to meet those requirements for the development project described below.

PROJECT AND SITE DESCRIPTION

On-Site Land Uses

The proposed development site is located along the southern side of San Antonio Road, between Leghorn Street and Charleston Road. The development will include 102 residential units, comprised of 32 studio units, 66 one-bedroom units, and 4 two-bedroom units. 16 units will be rented at below-market rates for qualified households -- satisfying the City's 15% requirement for affordable housing units. The retail space is approximately 1,800 square feet to be located on grade at the corner of San Antonio Road and Leghorn Street.

On-Site Parking

A two-level garage is proposed to include 126 parking stalls (20 for retail use and 106 for residential use), with no tandem stalls nor any mechanical stackers. Parking will be offered to residents as a fee-based, optional amenity that is completely separate from their housing lease and rent rates. The project will include bike parking in excess of the City's minimum requirements, to consist of at-grade long-term bike parking rooms with capacity for 102 bikes, and short-term bike parking for 18 bikes near the main entry.²

According to the California Air Pollution Control Officers Association (CAPCOA), the effectiveness of implementing secure parking facilities for bicycles depends on being grouped with a suite of other TDM programs to incentivize biking, walking, and riding transit³. Subsequent surveys of people who ride bicycles in California have identified a need for upgraded bicycle parking in developments; the presence and availability of a secure bicycle parking facility motivates people to ride bicycles more often.⁴ Sources also note the importance of reducing obstacles to accessible parking; The City of West Hollywood requires the placement of such facilities on the ground floor, for example.⁵

¹ Palo Alto Municipal Code 18.52.030

² Palo Alto Municipal Code 18.52, Table 1

³ <http://capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>

⁴ <https://www.weho.org/home/showdocument?id=41795> and https://www.sfmta.com/sites/default/files/reports-and-documents/2018/06/1_sfmta_bicycle_parking_guidelines-updated-05-15-2018.pdf

⁵ Ibid. and <https://www.toronto.ca/wp-content/uploads/2017/12/8c1a-Cycling-Guidelines-for-the-Design-and-Management-of-Bicycle-Parking-Facilities.pdf>

Area Access and Mobility Context

Transit Service

The site of the proposed project is accessible to several bus services and is a 20-minute walk or 10-minute bike ride to Caltrain's San Antonio Station.

Figure 1 Transit Service within 1 Mile of Site (as of Fall 2020)

Transit Agency	Route Number	Destinations	Service Hours	Bus Frequency Range	Walking Distance to nearest stop
VTA	Local 21	Stanford Shopping Center & Santa Clara Transit Center	Weekdays (5:38 am to 7:38 pm)	52 to 60 minutes (Weekdays)	0.7 miles (Charleston Rd.)
			Saturday (9:20 am to 6:11 pm)		
			Sunday/Holiday (9:24 am to 6:11 pm)	60 minutes (Weekends/Holidays)	
VTA	Local 40	La Avenida & Inigo to Foothill College	Weekdays (6:30 am – 8:30 pm)	11 to 30 minutes (Weekdays)	0.5 miles (Rengstorff Ave.)
			Saturday (9:00 am – 6:30 pm)		
			Sunday/Holiday (9:20 am – 6:00 pm)	14 to 30 minutes (Weekends/Holidays)	
VTA	Local 104	Penitencia Creek Transit Center to Palo Alto	Weekdays (6:09 am – 5:55 pm)	Commuter 2 Round Trips	0.25 miles (Charleston Rd.)
VTA	ACE Orange	Great America ACE Station to Mountain View	Weekdays (6:16 am – 5:43 pm)	Commuter 2 Round Trips	0.9 miles (Meadow Dr.)

Bicycle/Pedestrian Facilities

There are multiple bicycle facilities within a 1/2 mile of the site. The site is also a 10 -minute bike ride from the Charleston Road entrance to Google Headquarters in Mountain View. The site has good access to the Permanente Creek Trail, which connects to Mountain View's North Bayshore Office Park and the Regional Trail system.

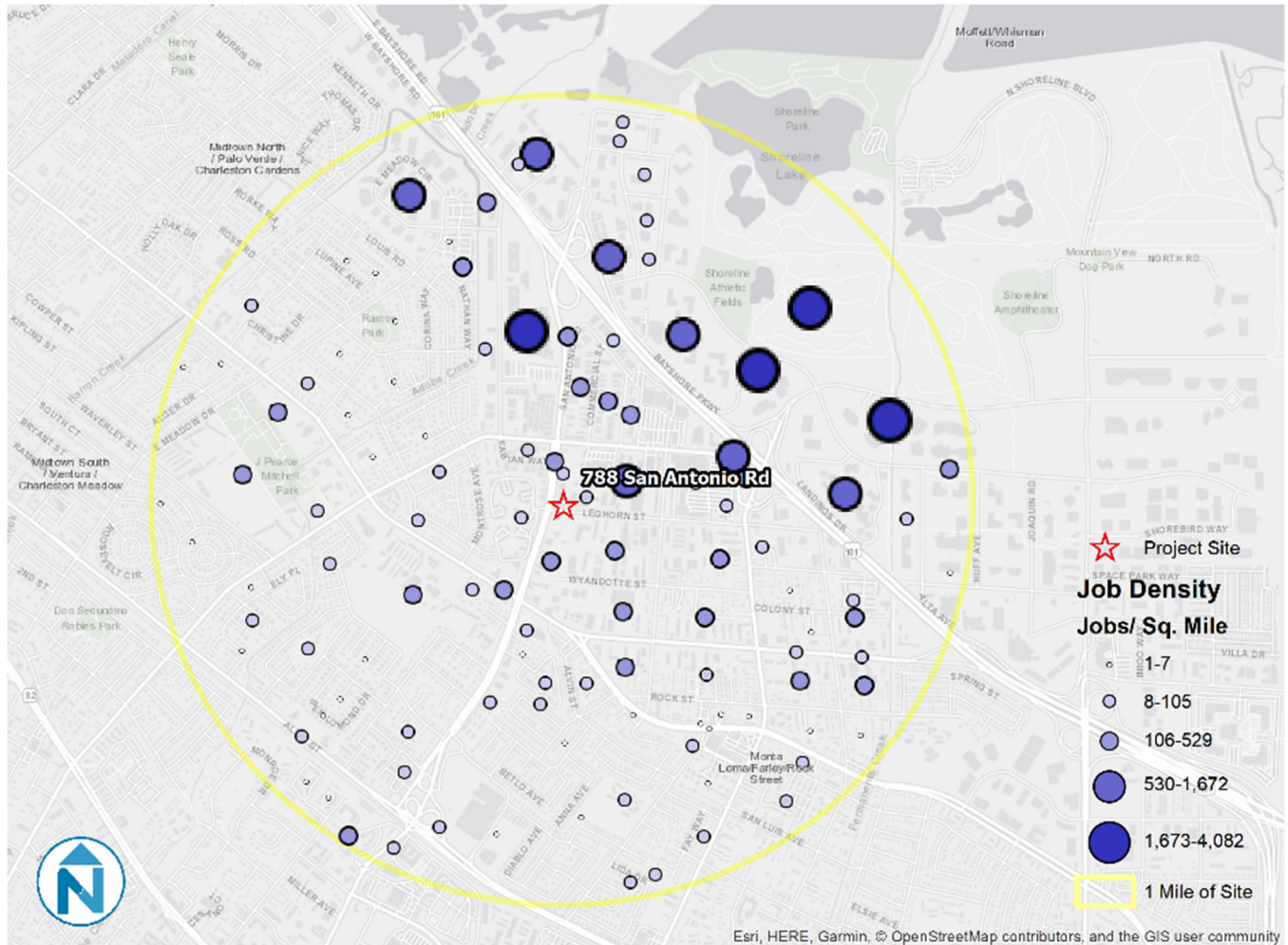
Figure 2 Bike Facilities within 1/2 Mile of Site

Class of Bike Facility	Facility Name	Description of Corridor	Destinations	Distance from Site
Class III	Leghorn St.	Shared Lane Markers	Independence Ave. to Sierra Vista Ave.	0.25 Miles
Class III	Independence Ave.	Shared Lane Markers	Leghorn St. to Charleston Rd.	0.25 Miles
Class II	Fabian Way	Unbuffered Bike Lanes	Charleston Rd. to Amarillo Ave.	0.25 Miles
Class II	Charleston Rd.	Unbuffered Bike Lanes	N. Rengstorff Ave. to El Camino Real	0.25 Miles
Class II	San Antonio Rd.	Shared Lane Markers	Charleston Rd. to W. Middlefield Rd.	0.01 Miles

Proximity to Major Employers

The site of the proposed project is located within a ½ mile of over 8,800 jobs. Within a mile of the site, there are over 25,700 jobs, with 42% of those jobs with technology firms such as Google whose campus is in nearby the North Bayshore Office Park in Mountain View.⁶

Figure 3 Job Density within One Mile of Proposed Project Site



Proximity to Amenities

The site of the proposed project is located on San Antonio Rd., with restaurants and coffee shops in close walking proximity. Additionally, the site is an approximate 4-minute walk to a Costco and shopping plaza on Leghorn Street. However, there are other major amenities and shopping centers less than 10-minute transit trip away, including San Antonio Center.

In addition to shopping, the area is home to major cultural institution including the 8.5-acre Taube Koret Campus for Jewish Life, The Cubberley Community Center, and The Abundant Life Christian Fellowship Center; all located within a 10-Minute walk or 5-Minute bike ride from the site.

⁶ U.S. Census Bureau, OnTheMap Application, <https://onthemap.ces.census.gov>, (2017)

Figure 4 Shopping Areas within Three Miles of Site

Shopping Area	Distance from Proposed Site (Miles)	Travel Time by Mode (Mins.)			Major Amenities
		Bike	Walking	Transit	
Charleston Plaza	0.4	4	10	N/A	Bed Bath & Beyond, Best Buy, REI, PetSmart, Chipotle
Rengstoff Center	0.4	4	10	N/A	Krispy Kreme, Royal Beauty Salon, Ross Dress for Less, Costco,
Charleston Center	0.7	4	12	N/A	Piazza's Fine Foods, Peets Coffee, Mountain Mike's Pizza, Green Elephant Gourmet, Rojoz Gourmet Wraps, Charleston Cleaners and Alterations, Pet Food Express
The Village at San Antonio Center	1.3	10	25	10	Trader Joe's, Walmart, Safeway, Target, CVS, Sprouts Farmers Market

BASELINE FOR TDM IMPACT ASSESSMENT

A baseline impact-assessment measure was based derived from the project Traffic Impact Study (TIS) drafted by TJKM (as of July 30, 2020). This TIS, using the Institute of Transportation Engineers (ITE) *Trip Generation (10th Edition)* report, identifies an average rate of 5.56 total weekday trips per dwelling unit for mid-rise apartments⁷ and an average rate of 754.55 weekday trips per 1,000 square feet of gross floor area for a coffee shop without a drive-through⁸ (identified in the report as the retail use). While the TIS also incorporates reductions in trip generation due to pass-by trips and internal capture trips (by as many as 574 weekday trips), they are not included in this TDM Plan's baseline due to the expectation from the Palo Alto Comprehensive Plan that a reduction is based on the stated ITE manual rates. To that end, the baseline number of trips used for assessing the impact of the proposed TDM program is a total of 1,915 trips per weekday, 219 trips for the AM peak hour, and 110 trips for PM peak hour.

Figure 5 Baseline Vehicle Trip Generation Estimates

Proposed Land Use	Size	Total Weekday Rate	Total Weekday Trips	AM Peak Rate	AM Peak Hour Trips	PM Peak Rate	PM Peak Hour Trips
Multi-Family Housing (Code #221)	102 units	5.44	555	0.36	37	0.44	45
Coffee Shop (Code #936)	1,803 square feet	754.55 per 1,000 square feet	1,360	101.14 per 1,000 square feet	182	36.31 per 1,000 square feet	65
Total Baseline Estimate			1,915		219		110

Source: Project Trip Generation Estimates by Hexagon, using Rates from ITE Trip Generation, 10th Edition, 2017, using land use codes from project TIS report.

Note: Above numbers may not add up due to rounding

⁷ ITE Code 221, Note: ITE does not consider variations in dwelling unit size (e.g. number of rooms) in its definition and trip generation calculation for mid-rise apartments.

⁸ ITE Code 936, Note: Only one observation contributes to the average weekday rate.

TDM PLAN

Following is an overview of a TDM Plan, recommended to leverage key aspects of the proposed development and its site characteristics to meet the City's TDM Plan requirement and to minimize the project's travel and parking-generation impacts.

Core Plan Strategies

The table below outlines several TDM strategies that are designed to work together to affect site users' travel habits. These strategies will strengthen the benefits of proposed investments in bicycle and pedestrian infrastructure as well as the site's proximity to major transit nodes, in part by reinforcing awareness of these options, breaking down barriers to incorporating them in travel routines, and incentivizing habitual use.

Figure 6 Core TDM Strategies Summary

TDM Strategy	Description	Cost
On-site Transportation Coordinator	On-site property management staff will provide a welcome package for new tenants, distribute Go Passes and other memberships, and additional information.	Minimal: This should be the property manager, ideally one offering skills in maintaining and promoting the benefits of a TDM Plan.
Monitoring program	By annually monitoring the TDM and parking program, the owner/management can adjust the strategies etc. in order to meet requirements, parking ratio, mode split, etc.	TDM plan will be monitored by a licensed traffic engineer and submitted to the City of Palo Alto.
Caltrain Go Pass provision	Provide unlimited Caltrain rides for all residents.	Annual cost of \$342 per resident over 5 years old.
VTA SmartPass provision	Provide unlimited VTA local and express bus rides for all residents.	Annual cost of \$90 per resident ⁹ .
Information Boards/Kiosks	TDM information boards, kiosk, and hotline/online access to transportation information and coordinators.	Included in construction costs.
Bicycle Parking	The project is proposing a total of 120 bicycle parking spaces for residential and community use, including 102 long-term (Class I) and 18 short-term (Class II) bicycle parking spaces, which significantly exceeds the City's requirement. Hardware for bicycle parking is currently in the procurement stage.	Estimate: \$800 - \$1,000 per one unit of 8-bike double-decker bike racks.
Unbundling Parking	Pricing separately for all parking makes the rent more affordable to those who do not want a car while placing a premium on those who want guaranteed parking in a dense and transit-oriented environment. Based on a monthly fee within the range of \$100 - \$300 (depending on the number of parking spaces requested by a household and/or ease of access to the parking space).	Cost-neutral.

⁹ <https://www.vta.org/sites/default/files/2019-10/2020%20SmartPass%20Fares.pdf>

Additional TDM Strategies

Supplemental optional TDM strategies are provided in Figure 7 and would be considered supplemental to the mandatory TDM program.

Figure 7 Supplemental TDM Strategy Summary

TDM Strategy	Description	Cost
Carpool Ride-Matching Services	Tenant ride-matching services allows residents to easily be paired with potential carpool partners.	Waze carpool matching is a free service is available to residents, Other services are available for a fee.
Commuter Shuttle	Commuter shuttle from the site to the San Antonio Caltrain Station	Funding of Local TMA shuttle program in coordination with local businesses.
Promotional Programs	Promotion and organization of events for the following programs: new tenant orientation packets on transportation alternatives; flyers, posters, brochures, and emails on commute alternatives; transportation fairs; Bike to Work Day, Spare the Air; Rideshare Week; Palo Alto TMA Programs ¹⁰ (e.g. Clipper or Lyft benefits for employees working in commercial areas); trip planning assistance routes and maps.	Responsibility of the site wide TDM coordinator to administer programming.

Impact of Local Context, Parking Management, and TDM Programs

Trip Generation (URBEMIS)

URBEMIS (urban emissions model) is used in this analysis to estimate an appropriate and conservative potential trip percentage reduction impact from the stated baseline.

The California Air Resources Board initially developed URBEMIS to quantify and evaluate emissions from development projects in California, and Nelson\Nygaard has used URBEMIS to calculate the trip reduction effects of not just the project's proposed parking and TDM program, but also the project's location. A project in an urban area, for example, will generate fewer trips than the same project located close to a freeway interchange and surrounded by low-density subdivisions or office parks. Therefore, inputs for the URBEMIS model included figures specific to the location of the project within Palo Alto.

Based on the proposed site's existing context in the urban environment and regional transportation network, along with the TDM program as described in Figure 8, the model estimates a 27.4% reduction in daily trips, a 21.0% reduction in AM peak hour trips, and a 33.6% reduction in PM peak hour trips. This estimate **exceeds the minimum 20% reduction** for new projects within the City of Palo Alto as set by the Transportation Element of the Palo Alto Comprehensive Plan.¹¹

¹⁰ Palo Alto TMA has three programs for Downtown and California Avenue employees. Employees earning less than \$70,000 are eligible for a free, monthly transit pass as well as subsidized Lyft shared ride trips.

¹¹ p. 78

Figure 8 URBEMIS Model Outputs for Total Project

Category	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Baseline Trip Estimate (ITE from TIS)	1,915	219	110
<i>Reduction due to Local Context¹²</i>	-224 (-11.7%)	--	--
<i>Reduction due to Transportation System¹³</i>	-135 (-7.0%)	--	--
<i>Reduction due to Parking Controls¹⁴</i>	-163 (-8.5%)	--	--
<i>Reduction due to Other TDM Measures¹⁵</i>	-3 (-0.2%)	--	--
Total Reduction in Trips	-524	-46	-37
Modelled Trips (URBEMIS)	1,391	173	74
Percentage Change from Baseline in Trips	-27.4%	-21.0%	-33.6%

Note: Above numbers may not add up due to rounding. AM and PM Peak Hour Trip reductions were not broken down by the model, due to the complementary nature of each TDM program component (e.g., the reductions due to the existing transit network are affected by the provision of transit passes, and vice versa).

Annual Vehicle-Miles Travelled (GreenTRIP Connect)

A GreenTRIP Connect model was run for the project site with regards to its planned residential use. The GreenTRIP Connect Parking Model was developed by the Center for Neighborhood Technology (CNT), a national nonprofit organization focused on developing research and modeling tools for city planning. The model's equations were developed and calibrated using parking demand data from 71 transit-oriented developments throughout the Bay Area¹⁶. The model is similar to those produced by CNT for King County, Washington state (RightSizeParking.org) and Washington, D.C. (ParkRightDC.org). The model's calculations are based on local data and include several variables such as parking supply, parking price, average bedrooms per unit, presence of transit passes or car share memberships, availability of affordable units, and neighborhood variables (walkability, job density and frequency of transit). Due to the local variables used in it, the GreenTRIP model only applies in the San Francisco Bay Area.

Figure 9 GreenTRIP Connect Model Outputs for Project

Project	Annual VMT	% Reduction in VMT from Baseline	Annual Metric Tons of Carbon Dioxide	Predicted Parking Demand
If Built in an Average Location in Santa Clara County (Baseline)	974,276	--	491.99	108
If Built on Site Parcels	771,000	20.9%	389.35	108
If Built on Site Parcels with TDM Program and Affordable Housing (Final Total)	621,955	36.2%	314.07	89

¹² Includes residential density, the balance of jobs and housing, and affordable housing.

¹³ Includes site proximity to buses by frequency, bicycle and pedestrian network coverage, and intersection density.

¹⁴ Includes parking measures (such as unbundling the cost of parking spaces from residential rent).

¹⁵ Includes provisions of dedicated transportation marketing and incentives for people who do not commute using a single-occupancy vehicle.

¹⁶ <http://www.transformca.org/GreenTRIP-Connect/Methodology> and <https://www.transformca.org/sites/default/files/Parking%20Model%20July%202016.pdf>

The annual vehicle-miles travelled (VMT) which would be generated by the project is lower than if the same project size were to be in an average location in the Santa Clara County and Palo Alto. When adding in the core TDM strategies and a provision of affordable housing, the draft model outputs generated an approximately 36% reduction in the project's contributions to VMT compared to the average development in Santa Clara County (see Figure 9).

IMPLEMENTATION AND MONITORING

Per the Transportation Element of the Palo Alto Comprehensive Plan, new developments are expected to regularly monitor the success of their TDM measures. Success in TDM programs comes with meeting or surpassing measurable benchmarks that relate directly to the implementing entity's overarching goals. With regular and rigorous monitoring, the developer can ensure its investments in TDM programs are as cost-effective as possible, and staff may be enabled to adjust the proposed TDM framework over time in response to changing resident, employee, and patron needs.

The number of vehicle trips associated with the project will be tracked using an annual hose count in perpetuity. The trip count will be managed and overseen by a licensed Traffic Engineer. The purpose of the hose count is to determine how many vehicles are entering and exiting the site during the peak hour and ensure the number of trips generated are at least 20% less than the baseline counts shown in Figure 5. Because of a majority of the estimated trips generated is contingent on the occupancy and operation of an 1,803 square foot retail space, the site will be held to varying standards of compliance:

- If the retail space is in operation during the day and/or time of counts, the site is out of compliance if it exceeds a count of 175 vehicular trips in the morning peak hour, 88 in the afternoon peak hour, *or* 1,532 in a single weekday.
- If the retail space is *not* in operation during the day and/or time of counts, the site is out of compliance if it exceeds 29 vehicular trips in the morning peak hour, 36 in the afternoon peak hour, *or* 444 in a single weekday.

The hose count will be conducted over a 3-day period; Tuesday, Wednesday, and Thursday during a normal business week. Data on vehicle entries and exits will be collected at all entry and exit points to the site continuously over the 3-day period. An average of the peak hour data for the three days will be taken to determine the number of peak hour vehicle trips. The count will be conducted during the same month each year and the initial count should commence within a year of the certificate of occupancy.

As this site continues its commitment to proactively reduce the vehicular impacts onto the area's transportation network, annual site reports are required to be submitted to the City. Reports will be submitted within seven business days of the completion of the counts. If the project does not achieve targets, the site must include a plan to come into compliance, which may include:

- Increased incentive amounts
- Implementation of any, or all, supplemental TDM
- Additional transit services (which can be scaled up with proximate properties)

The plan for compliance must be reviewed and approved by the City.

If, after multiple years of full occupancy under the same owner, the site remains in compliance, the site should be able to consider the following (contingent on City approval):

- Manual counts
- Limited timeframes for counts
- Scaling of annual counts and reports with adjacent properties