Appendix TRA

Access and Circulation Memo

FEHR PEERS

MEMORANDUM

Date: June 26, 2019

To: Colum Regan, Aralon Properties

From: Jarrett Mullen and Daniel Jacobson, Fehr & Peers

Subject: 499 Forbes Boulevard Access & Circulation Assessment

SF19-1041

This memorandum presents an access and circulation assessment for a proposed life science office building at 499 Forbes Boulevard in the City of South San Francisco (herein referred to as "Project"). This assessment includes trip generation and distribution estimates and an evaluation of multimodal site access and circulation. The findings of this assessment may help inform the Project team's site planning efforts and potential future analyses related to the environmental review process.

Our key findings include the following:

- **Trip Generation and Distribution:** The project would generate approximately 881 daily, 96 AM peak hour, and 94 PM peak hour new motor vehicle trips. These volumes include a 35% trip reduction from the baseline trip generation forecast for consistency with City of South San Francisco's transportation demand management (TDM) ordinance. Outputs from the City of South San Francisco travel demand model indicate approximately three quarters of vehicle trips are anticipated to approach and depart the Project site from the west, via Forbes Boulevard. The remainder would approach from the south and east.
- **Peak Hour Traffic Signal Warrant Not Met** Based on the trip generation and distribution estimates, project trips were assigned to the Forbes Boulevard / Allerton Avenue intersection approaches to determine if a traffic signal was warranted with the addition of project trips. The traffic signal warrant was not met under project conditions in the AM or PM peak hour.
- **Off-Site Improvements** The existing center landscape median on Forbes Boulevard should be modified to permit direct left turns into the Project driveway from westbound Forbes

Boulevard. Pedestrian facilities along the Project frontage should be enhanced to support the Project TDM plan, including a landscaped buffer along the sidewalk and a new marked crosswalk on the western approach of the Forbes Boulevard / Allerton Avenue intersection.

- **Off-Street Auto Parking Supply** The Project is required to provide2.83 parking spaces per 1,000 square feet of office space. The City may consider reducing off-street parking requirements to support the Project's trip reduction goals

Please contact Jarrett Mullen at (415) 426-2517 with questions.

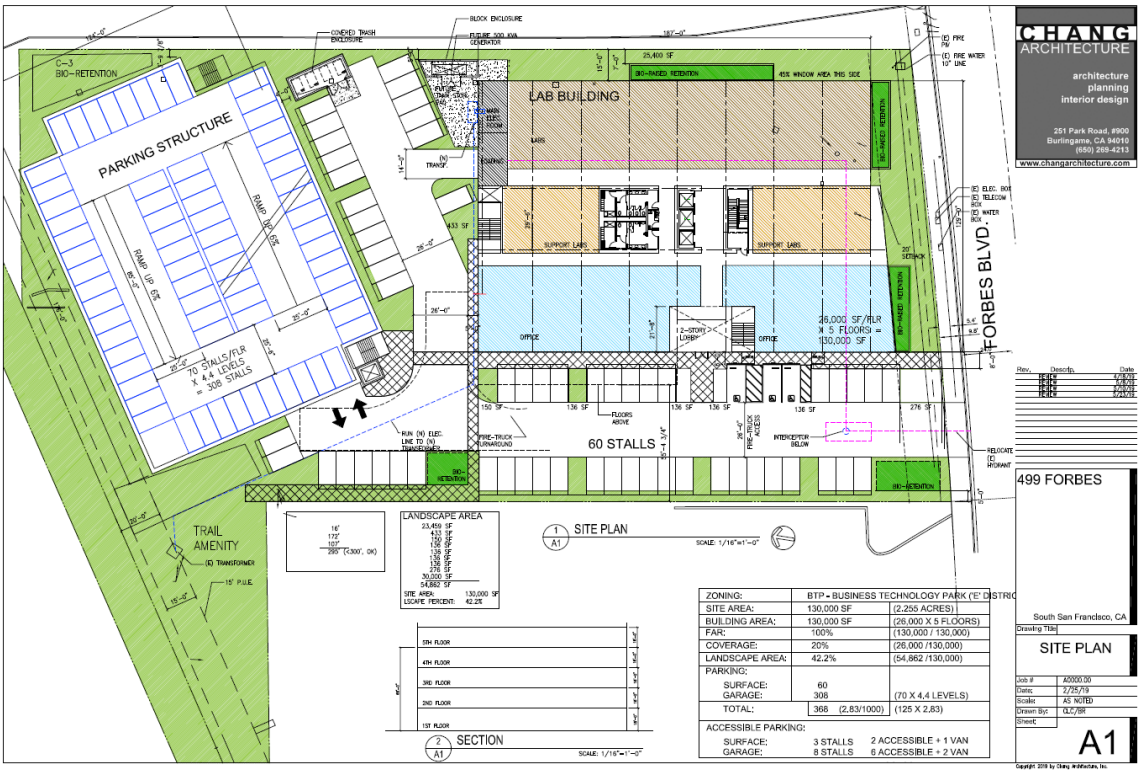
Project Understanding & Setting

The Project site is located near the intersection of Forbes Boulevard and Allerton Avenue in the City of South San Francisco's East of 101 Area. Previously, the site was home to the Columbus Salame factory, but it is currently vacant. It is our understanding the Project encompasses demolition of the existing, approximately 54,000 square foot vacant salame factory and construction of a new 128,799 square foot life science office building. Motor vehicle and bicycle access is provided via a two-way two-lane driveway that connects to Forbes Boulevard. Pedestrian access is provided via a walkway that parallels the driveway.

Forbes Boulevard is a designated major arterial in The City of South San Francisco General Plan. Along the Project frontage and south of The Allerton Avenue intersection, the roadway has two vehicle lanes in each direction and a center median that alternates between a raised landscaped median and a two-way left turn lane. The vehicular travelway, inclusive of the center median area, is approximately 60-feet wide.

Continuous sidewalks are present along the north side of the roadway only and no dedicated bicycle facilities are provided. East of the Allerton Avenue intersection, Forbes Boulevard includes a wider landscaped center median, continuous sidewalks on both sides of the roadway, Class II buffered bicycle lanes, and one travel lane in each direction. The City's 2011 Bicycle Master Plan and recent planning efforts considers reducing the number of travel lanes west of Allerton from four to two lanes and extending bike lanes. The roadway connects to East Grand Avenue which provides motor vehicle access to northbound U.S. Highway 101 and destinations to the west via the local street network. Southbound access to U.S. Highway 101 is provided from Oyster Point Boulevard via Gull Drive.

Figure 1 – Site Plan



Commute.org provides three weekday peak-period public shuttle lines that travel along Forbes Boulevard and connect to regional transit stations, including: the South San Francisco BART station (10 daily roundtrips); the South San Francisco Caltrain station (seven daily roundtrips); and, the South San Francisco Ferry Terminal (three daily round trips). The shuttle stop closest to the Project site is at the intersection of Forbes Boulevard and Carlton Court, which is approximately 1,200 feet west of the Project site.

Three of Genentech's *DNA Shuttle* routes provide stops within 300 feet of the Project site (Blue, Green, and Orange Lines). The *DNA Shuttle* connects to the Genentech campus as well as express buses connecting to the greater Bay Area. While express bus services are intended for Genentech employees only, the *DNA Shuttle* and buses to the Millbrae BART/Caltrain Station and Glen Park BART Station are open to the public.

Project Trip Generation & Distribution

Trip generation estimates were prepared for weekday daily, AM and PM peak hours using the Institute of Transportation Engineers' (ITE) *Trip Generation Manual 10th Edition.*, which contain motor vehicle trip generation data for a variety of land uses in North America. *Trip Generation* does not contain specific data on life sciences and biotechnology uses, which can vary widely in their employee densities and tend to be lower trip generators than typical office uses. Consequently, estimating Project trip generation as an office may slightly overestimate its actual trip generation.

Project Trip Generation estimates are presented in **Table 1.** ITE estimates the Project would generate 148 trips during the AM peak hour and 145 trips during the PM peak hour. However, in accordance with the City of South San Francisco's transportation demand management (TDM) ordinance and C/CAG's Congestion Management program, the Project would be required to implement a TDM program. The City's ordinance requires a 35 percent trip reduction for an FAR of 1.0. With this trip reduction, Project is estimated to generate 96 trips during the AM peak hour and 94 trips during the PM peak hour.

Although the site is not presently active, if an industrial tenant were to instead move into the site similar to Columbus Salame, the site would generate approximately 28 AM peak hour trips and 24 PM peak hour trips.

Table 1: Weekday Project Trip Generation

Land Use	Size	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Office[1]	128.8 KSF	1356	127	21	148	23	122	145
35% TDM Trip Reduction		(475)	(44)	(7)	(52)	(8)	(43)	(51)
Total		**881**	**83**	**14**	**96**	**15**	**79**	**94**
Previous Light Industrial[2]	*54 KSF*	*263*	*25*	*3*	*28*	*3*	*21*	*24*

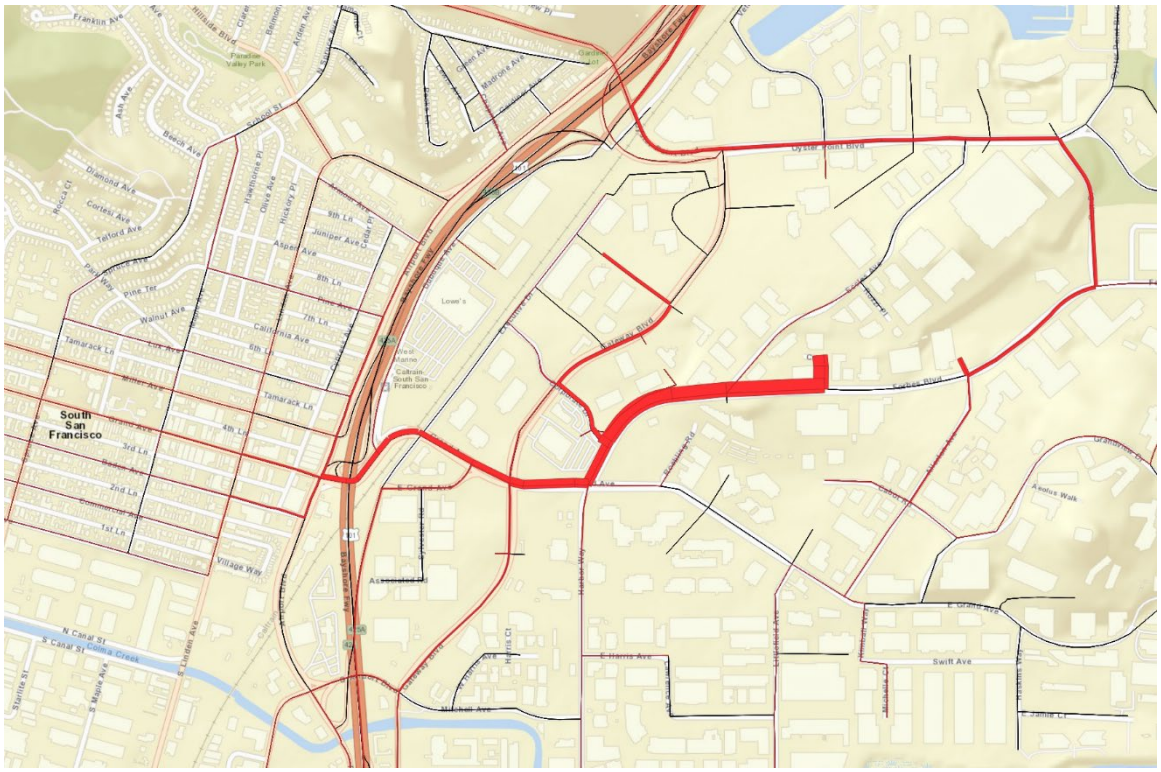
Notes:
1. Rates based on ITE *Trip Generation 10th Ed., 2017* fitted curve equation for Office (ITE 710)
2. Rates based on ITE *Trip Generation 10th Ed., 2017* fitted curve equation for General Light Industrial (110). These volumes are shown to compare Project trip generation characteristics with a scenario where the existing building was reoccupied with a similar industrial use.

The distribution of Project trips along the roadway network is based on a review of outputs from the City of South San Francisco Model TAZ 40023. The results are shown in **Table 2** and **Figure 2**

Table 2: Project Trip Distribution – City of South San Francisco Model

Street	Percent of Project Trips
Forbes Boulevard – West of Project Site	76%
Forbes Boulevard – East of Allerton Avenue	18%
Allerton Avenue	6%

Figure 2 – Output from City of South San Francisco Traffic Model depicting most trips from TAZ 40023 occurring via Forbes Boulevard and East Grand Avenue



A traffic operations analysis was not performed at this time, although additional analysis may be requested at the City's discretion during the environmental review process. . A peak hour traffic signal warrant analysis was performed at the Forbes Boulevard / Allerton Avenue intersection to understand if the Project would require off-site traffic control improvements beyond what is covered in the East of 101 Traffic Impact Fee program. The intersection currently operates with all-way stop control. Using the 2014 California Manual on Uniform Traffic Control Devices (CAMUTCD) methodology, existing weekday AM and PM peak hour turning movement counts collected in 2016, and the trip generation and distribution estimates shown above, the signal warrant thresholds were

not met in the existing plus project condition. The Peak Hour traffic signal warrant results are shown in **Attachment 1**.

Multimodal Site Access & Circulation

Multimodal site access and circulation was qualitatively assessed based on Project site plans. The Project driveway is situated at the western side of the site, which maximizes horizontal separation from the Forbes Boulevard / Allerton Avenue intersection, lessening potential conflicts between vehicle movements at the driveway and intersection. The driveway is 26-feet wide, which permits entry and exit for automobiles and small single-unit trucks with minimal potential for conflicts with opposing vehicles. Sight lines are not impeded for drivers exiting the Project site, but City staff or other qualified professionals should verify adequate sight lines are maintained as the site design progresses.

As noted previously, Forbes Boulevard features a center median which alternates between a two-way left turn lane and landscaped islands. An existing landscape island impedes inbound motor vehicle access to the Project site for motorists approaching from the west. Since most inbound trips are anticipated to approach the site from this direction, the median could be modified to permit left turns from Forbes Boulevard into the Project site.

> **Recommendation #1:** Modify the existing landscape island within the Forbes Boulevard center median to permit left turns for motorists approaching the site on Forbes Boulevard from the west. The extent of the potential modification is depicted in **Figure 3**. If desired by City officials or the Project Team, an existing gap within the landscape median to the west of the site driveway could be replaced with landscaping to lessen, equal, or exceed the net landscape area removed.

The parking lot drive aisles and parking stall dimensions appear to meet City design standards for parking facilities and general engineering design principles. The alignment of drive aisle approaching the proposed parking garage structure could be shifted to minimize sharp turns and reduce turning friction.

> **Recommendation #2**: Consider modifying the lane geometry or alignment of the drive aisle approaching the parking garage. The angle and adjacent parking stalls could introduce conflicts between drivers accessing the surface parking stalls and drivers accessing the garage. At minimum, stripe the drive aisle centerline to guide drivers through the corner.

We assessed commercial motor vehicle access using AutoTURN, a swept-path vehicle simulation tool that shows maneuvering space required for various design vehicles. We tested access for an SU-30 design vehicle per the specifications of the Project sponsor. The results are shown on **Figure 4** The SU-30 can back into the proposed loading dock (albeit with some challenging maneuvering), and can turn around on site, avoiding backing maneuvers into Forbes Boulevard. Drive aisles and driveways provide adequate maneuvering space for the trucks to enter and depart the site.

Pedestrian access is provided via a proposed walkway adjacent to the driveway that connects to an existing sidewalk along Forbes Boulevard. As part of the project, the existing driveway along the eastern edge of the Project site is to be removed, providing an opportunity to enhance pedestrian connectivity at the intersection of Forbes Boulevard and Allerton Avenue with a new marked pedestrian crosswalk on the western leg of the intersection. This location would be suitable for a shuttle stop for Commute.org or another operator as appropriate.

> **Recommendation #3:** With removal of the existing driveway at the eastern edge of the Project site, install a new marked, high-visibility crosswalk on the western leg of the Forbes Boulevard / Allerton Avenue intersection. Install a curb ramp and accessibility improvements as required to formalize pedestrian crossing at this location. If a shuttle stop is desired, the sidewalk should be widened to at least 8-feet to meet bus stop accessibility standards at the boarding location. A shelter and bench could further enhance the quality of the shuttle stop. The approximate extents of these enhancements are shown in **Figure 3.**

Bicycle access would be either shared with the Project driveway or via the adjacent walkway. Based on the City of South San Francisco's *Bicycle Master Plan*, a Class I bicycle and pedestrian shared-used trail is envisioned along the former railroad spur that fronts the rear edge of the project site. The Project would also not preclude a future extension of Class II buffered bicycle lanes on Forbes Boulevard, which may be funded by the Project's Bicycle and Pedestrian Impact Fees and other sources.

Off-Street Parking Supply

Based on the City of South San Francisco's zoning code, off-street automobile and bicycle parking minimums apply to the Project. At least one automobile parking stall is required per 350 square feet of gross floor area for research and development or professional office uses over 100,000 square feet. Based on plans dated February 25, 2019, 368 parking stalls are proposed as part of the

Project, and 371 are required. Additional parking stalls may be required. However, the project's required TDM trip reduction of 35 percent may support a reduction in parking supply at the discretion of City officials.

Long-term bicycle parking spaces, such as lockers or other secure facilities are also required. Based on the zoning code, long-term bicycle parking, such as lockers or other secure bicycle parking facilities, shall be provided at a ratio of one space per 25 vehicle spaces. At least 15 long-term bicycle parking spaces are required as part of the Project.

> **Recommendation #4:** Verify off-street auto parking requirements with City staff as exemptions and adjustments may apply for the Project's TDM requirements. Provide at least 15 long term bicycle parking spaces that meet design and performance standards in the City's Municipal Code, Chapter 20.330.008.

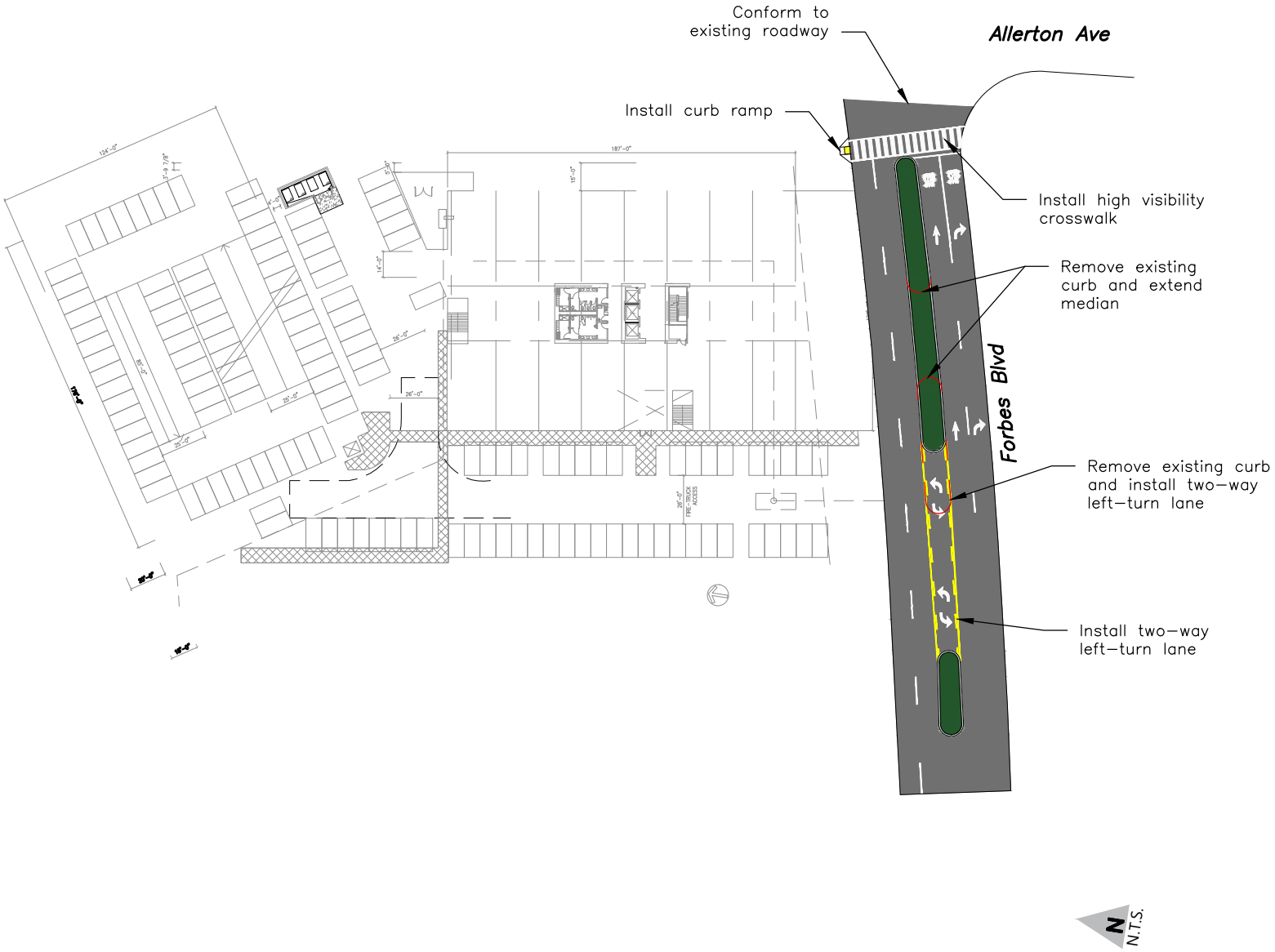


Figure 3

493 Forbes Boulevard
Off-Site Roadway Improvements

CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

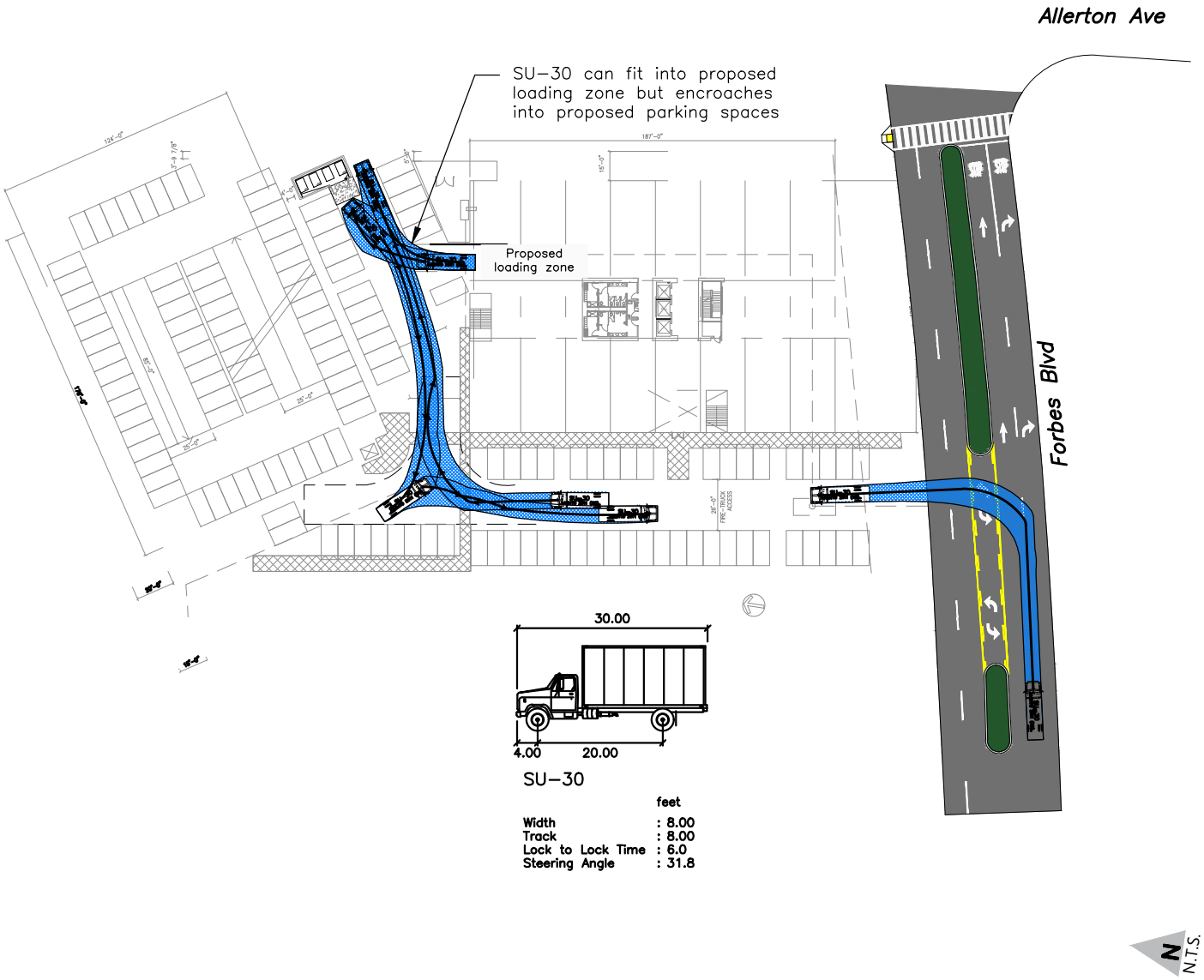


Figure 4

493 Forbes Boulevard

Off-Site Roadway Improvements

SU-30 Truck Turning Movements

Attachment 1

FEHR PEERS

Major Street	Forbes Boulevard
Minor Street	Allerton Avenue

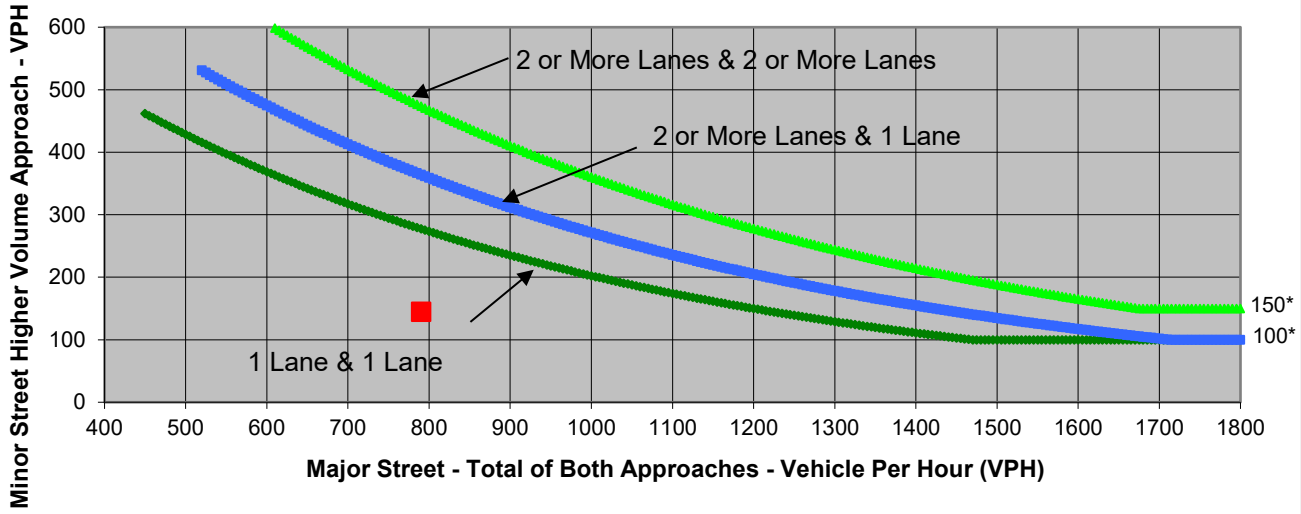
Project	493 Forbes Boulevard
Scenario	Existing
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	62	6	22	109
Through	5	7	430	138
Right	78	11	86	5
Total	145	24	538	252

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Forbes Boulevard	Allerton Avenue	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**790**	**145**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

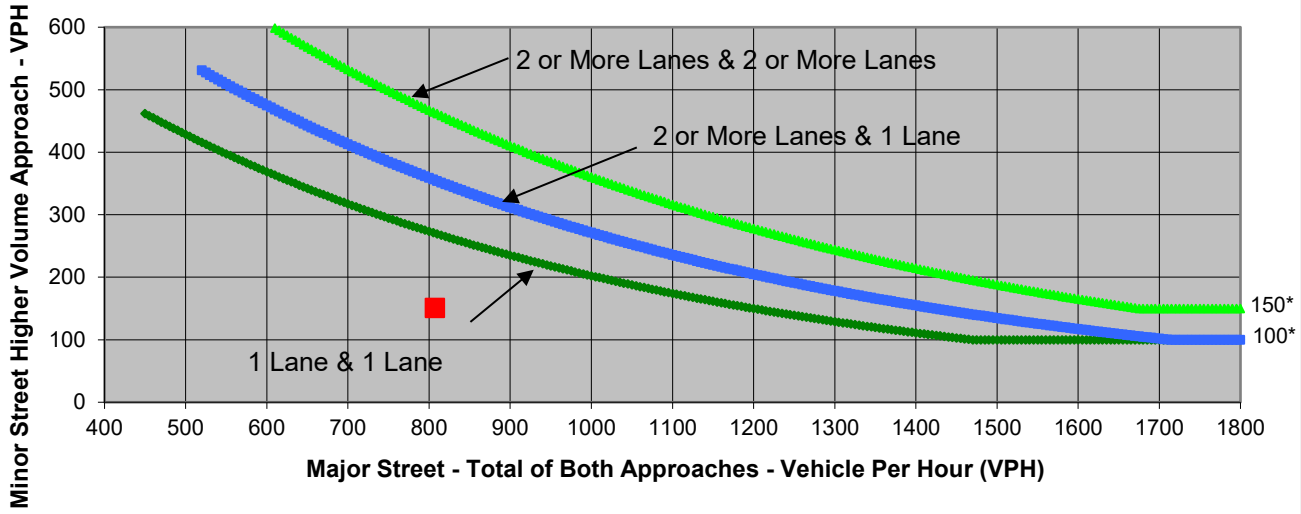
Major Street	Forbes Boulevard	Project	493 Forbes Boulevard
Minor Street	Allerton Avenue	Scenario	Existing + Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	68	6	22	109
Through	5	7	432	152
Right	78	11	87	5
Total	151	24	541	266

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Forbes Boulevard	Allerton Avenue	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**807**	**151**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Forbes Boulevard
Minor Street	Allerton Avenue

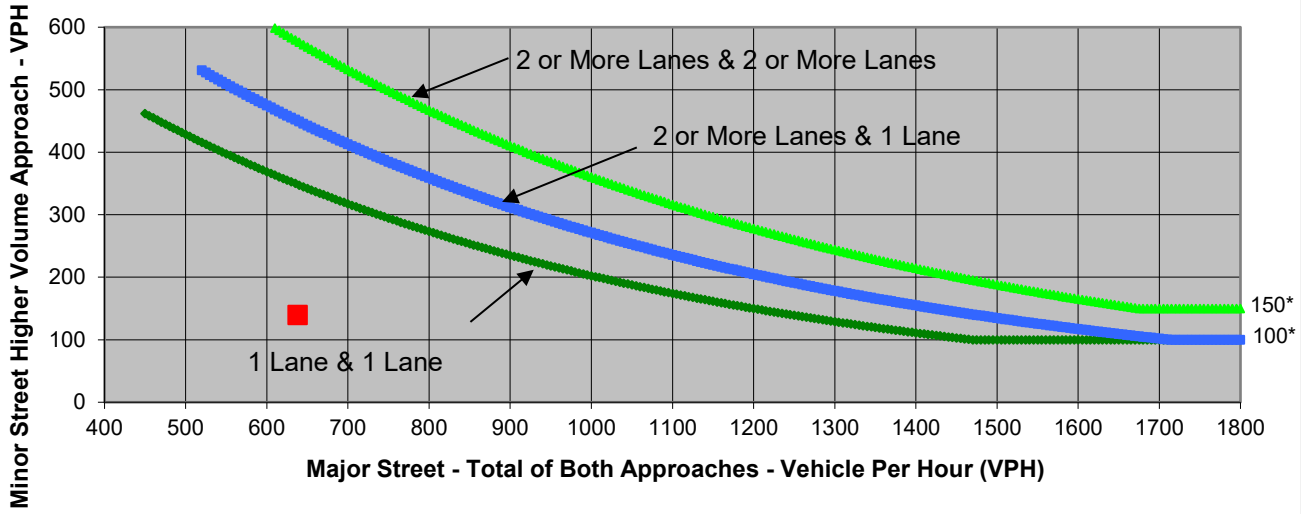
Project	493 Forbes Boulevard
Scenario	Existing
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	67	5	13	59
Through	8	13	120	413
Right	65	27	28	5
Total	140	45	161	477

Major Street Direction

	North/South
x	East/West



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Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Forbes Boulevard	Allerton Avenue	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**638**	**140**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Forbes Boulevard
Minor Street	Allerton Avenue

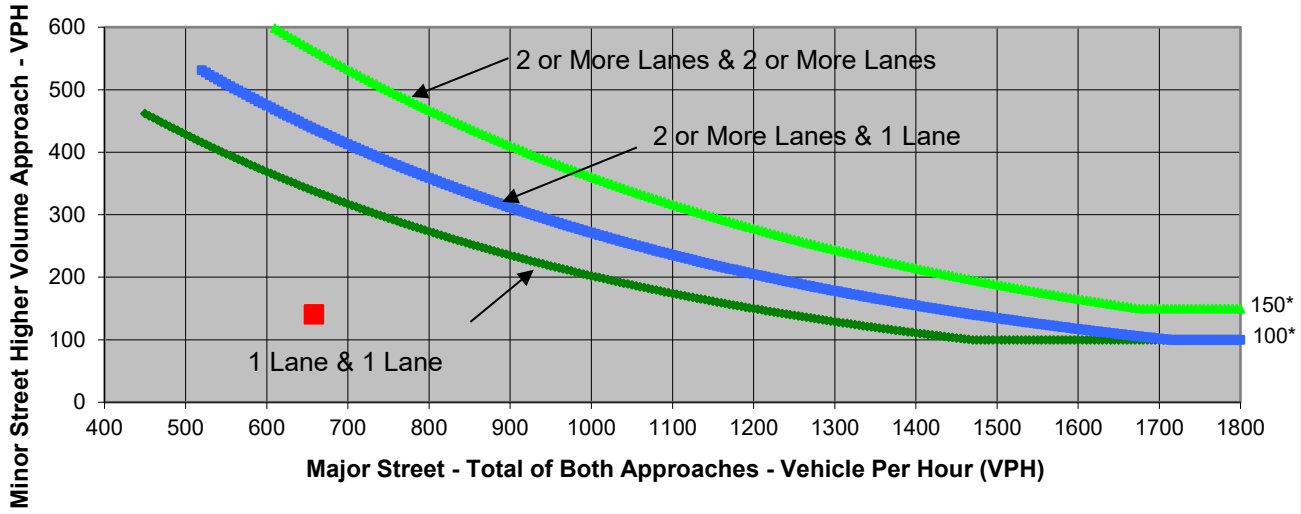
Project	493 Forbes Boulevard
Scenario	Existing + Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	68	5	13	59
Through	8	13	133	415
Right	65	27	33	5
Total	141	45	179	479

Major Street Direction

	North/South
x	East/West



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Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Forbes Boulevard	Allerton Avenue	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**658**	**141**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.