

Memo

Date: November 3, 2025

To: Jack Varozza, City of Roseville

From: Raina Joby and John Gard, Fehr & Peers

Subject: Evaluation of Access and On-Site Circulation for the Proposed Hayden Commercial Center

RS25- 4401.00

This memo presents the analysis and conclusions of the site access and on-site circulation study for Hayden Commercial Center (here after referred to as “project”), which is proposed to be located in the southwest quadrant of Blue Oaks Boulevard/Hayden Parkway intersection in Roseville, CA.

The analysis focuses on morning (AM), and evening (PM) peak hour project traffic conditions. The project site is located in the western area of the city, in which significant residential growth is expected in the future. This will influence travel patterns and consequently the usage of the project driveways will change over time. Therefore, although atypical, the study examines conditions under both existing and cumulative conditions.

The study evaluates site access and on-site circulation elements against requirements prescribed in the *City of Roseville Design Standards* (City of Roseville, 2025) based on the latest project site plan (*Hayden CSP- Concept 10, Milestone Imagineering, Inc., Sep 24, 2025*).

All recommendations are summarized in the final section of the memo. It should be noted that this site access review is the second such study prepared for the proposed project. The initial study findings (completed in early 2025) were shared with the applicant, with many of the recommendations having been incorporated into the updated site plan.

Existing Conditions

The project site is located on a 5-acre parcel in the southwest quadrant of the Blue Oaks Boulevard/Hayden Parkway intersection in Roseville, CA. **Figure 1** shows the project location and the surrounding roadway network and transportation facilities.

Blue Oaks Boulevard is an east-west arterial with a posted speed limit of 45 mph in the project vicinity. Adjacent to the project site, this roadway features three lanes in each direction separated by a raised median.

Hayden Parkway is north-south collector with a posted speed limit of 35 mph. Adjacent to the project site, this roadway features one lane in each direction and a landscaped median. In addition to the proposed project, this roadway also serves West Park High School, Roseville Fire Station 9, and several residential communities.

The adjacent intersection, Blue Oaks Boulevard/ Hayden Parkway shown in **Image 1**, was signalized in early 2025. The striping along Hayden Parkway remains unchanged with a single through lane, left-turn pocket, and right-turn pocket. Notably, u-turn movements are allowed on Blue Oaks Boulevard but are prohibited on northbound Hayden Parkway at this intersection.

This intersection now includes crosswalks at all approaches. Class II bike lanes (on-street with appropriate signing and pavement markings) are present in both directions along Blue Oaks Boulevard, and Hayden Parkway in the project vicinity. Sidewalks are present along developed frontages on Blue Oaks Boulevard and Hayden Parkway.



Image 1. View of the recently signalized Blue Oaks Boulevard / Hayden Parkway intersection from the southwest corner.

Project Travel Characteristics

Figure 2 shows the project site plan. As shown, the project site would consist of the following land uses:

- Gas station (12 fueling positions) with 4,650 sq. ft. Convenience Store and Carwash
- 2,000 sq. ft. Coffee Shop with Drive-Through Lane
- 10,000 sq. ft. Food Court Building
- 14,000 sq. ft. of retail

Access to the project would be provided by the following two driveways:

- **Driveway 1** would be located on Hayden Parkway near the southerly edge of the project, about 475 feet south of Blue Oaks Boulevard¹. All movements would be permitted at this driveway. The project site plan shows a 125-foot northbound left-turn lane on Hayden Parkway at this driveway.
- **Driveway 2** would be located on Blue Oaks Boulevard near the westerly edge of the project, about 305 feet west of Hayden Parkway. This driveway would allow right turns only.

¹ Referenced from driveway centerline to near curb return of adjacent street.

Image 2 shows the segment of Blue Oaks Boulevard adjacent to the project site. It was captured from approximately 100 feet east of Driveway 2. **Image 3** presents a motorist's view while driving southbound on Hayden parkway along the project frontage. This image shows the bus turnout situated on Hayden Parkway immediately south of Blue Oaks Boulevard.



Image 2. View of Blue Oaks Boulevard / Hayden Parkway intersection from east of Driveway 2 with project site to the right



Image 3. Motorist's view of Hayden Parkway driving southbound with project site to the right



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Project Site

FIGURE 1
Project Location



Traffic Signal



Stop Sign

FIGURE 2

Project Site Plan

Trip Generation

Table 1 summarizes the vehicular trip generation estimated for the proposed project. These estimates were derived using trip rates from *the ITE Trip Generation Manual (TGM), 12th Edition* (Institute of Transportation Engineers, 2025) and pass-by rates² from *ITE Trip Generation Manual Appendices* (Institute of Transportation Engineers, 2025). Table 1 indicates that the project driveways would accommodate a total of 530 inbound/outbound vehicles during the AM peak hour and 540 inbound/outbound vehicles during the PM peak hour.

In addition to the published trip rates, the study makes additional considerations to arrive at the trip generation estimate. They are listed below.

- The on-site car wash would wrap around the convenience market, similar to numerous other gas station / convenience markets built elsewhere in Roseville. It is not proposed as a standalone car wash and was therefore not analyzed as such.
- Due to concerns that the TGM would underestimate the coffee shop's AM peak hour trips, this study uses the results of a trip generation survey conducted by Fehr & Peers at a Starbucks Store located at 709 Cirby Way in Roseville, CA. That store is also about 2,000 square feet and has a drive-through window. That survey showed about 50 more AM peak hour trips generated than would have been estimated using TGM data.
- The TGM does not provide trip rates for Food Courts. Therefore, we used trip rates associated with "Fast Casual Restaurants (ITE code 930)"³ in its place. By definition, this land use type is functionally similar to the proposed use.

Table 1. Project Trip Generation Estimate

Project Land Use	ITE LU Code	Units	Qty	Trip Estimates					
				AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
Gas Station w/ Convenience Store and Carwash	945	Fuel positions	12	239	122	117	230	115	115
Coffee Shop w/ drive-thru	937	ksf	2	219	112	107	78	39	39
Food Court	930	ksf	10	16	10	6	144	76	68
Retail	822	ksf	14	55	30	25	88	44	44
Gross Trips				529	274	255	540	274	266
Total Pass-by Trips				-298	-149	-149	-312	-156	-156
Net New Project Trips				231	125	106	228	118	110

Notes: ksf = thousand square feet. LU = Land use

Source: ITE Trip Generation Manual (Institute of Transportation Engineers, 2025); Fehr & Peers, 2025.

² A pass-by trip is made to a retail use, restaurant or gas station by a motorist while en route to a different primary destination. Pass-by trips add trips to driveways but not to the surrounding roadway network.

³ Fast Casual Restaurants (ITE LU Code- 930) is defined as "A sit-down restaurant with no (or very limited) wait staff or table service. A customer typically orders off a menu board, pays for food before it is prepared, and seats themselves. The menu generally contains higher-quality, made-to-order food items with fewer frozen or processed ingredients than at a fast-food restaurant.... The typical duration of stay for an eat-in customer is 40 minutes or less".

Note that total pass-by trips presented in Table 1 is the sum of pass-by trips associated with each individual land use type. As shown, more than half of the project trips are expected to be pass-by. However, this estimate only applies under a longer-term, cumulative-type condition in which there is more traffic on Blue Oaks Boulevard, from which pass-by could come from. Under existing conditions, total pass by trips is capped at 15% (per standard industry practice) of the total existing traffic volume at Blue Oaks Boulevard / Hayden Parkway. This implies that the existing plus project analysis will reflect a greater number of new trips generated than under cumulative conditions. However, the total volume of traffic entering/exiting the project is the same.

Trip Distribution and Assignment

As discussed earlier, additional residential growth and street connections are expected to the west of the project site in the future. This will influence location of trip origins and destinations, thereby resulting in different travel patterns to the site under cumulative versus near-term conditions. Therefore, we utilized both the City’s updated 2024 Base Year Roseville Travel Demand Model 2035 Cumulative Year Travel Demand Model to develop peak hour project trip distribution patterns under existing, and cumulative conditions, respectively.

Table 2 summarizes the share of new project trips by origin or destination under existing and cumulative conditions. The share of peak hour project trips, heading to or from west of the project site on Blue Oaks Boulevard increases by 20% under cumulative conditions due to the additional residential uses and street connections featured in the cumulative travel demand model.

Table 2. Project Trip Distribution

#	Direction of Trips	Project Trip Distribution ¹	
		Existing Conditions	Cumulative Conditions
1	To/From West on Blue Oaks Boulevard	20%	40%
2	To/From East on Blue Oaks Boulevard	35%	25%
3	To/From North on Hayden Parkway	20%	15%
4	To/From South on Hayden Parkway	25%	20%
Total		100%	100%

Note:
1. The trip distribution percentages remain same for both inbound and outbound trips for both AM and PM peak hours and apply to the net new project trips.
Source: Fehr & Peers, 2025.

Figure 3 illustrates weekday AM and PM peak hour trips at the project driveways and the adjacent intersection under existing plus project conditions. **Figure 4** illustrates the same under cumulative plus project conditions.

The figures exhibit a clear difference in usage of the project driveways between existing and cumulative conditions. Under existing conditions, 62% of total trips use Driveway 1 on Hayden Parkway to access the project site. However, under cumulative conditions some trips shift to Driveway 2. Consequently, the share of total trips using Driveway 1 drops to 50% under cumulative conditions. This shift can be attributed to the increase in the number of trips heading to or from west of the project site.

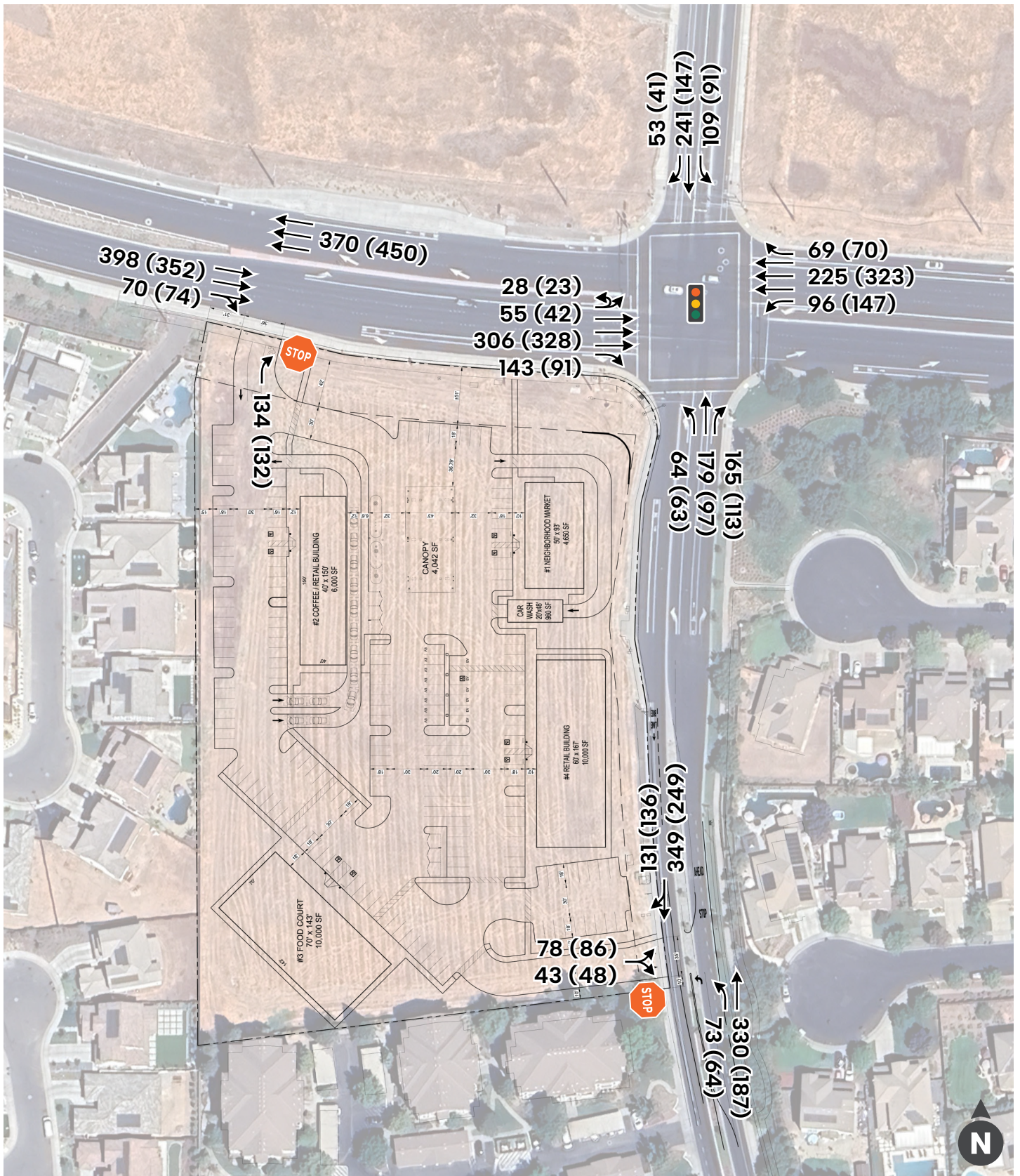


FIGURE 3

Existing Plus Project Traffic Volumes, Lane Configurations, and Traffic Controls

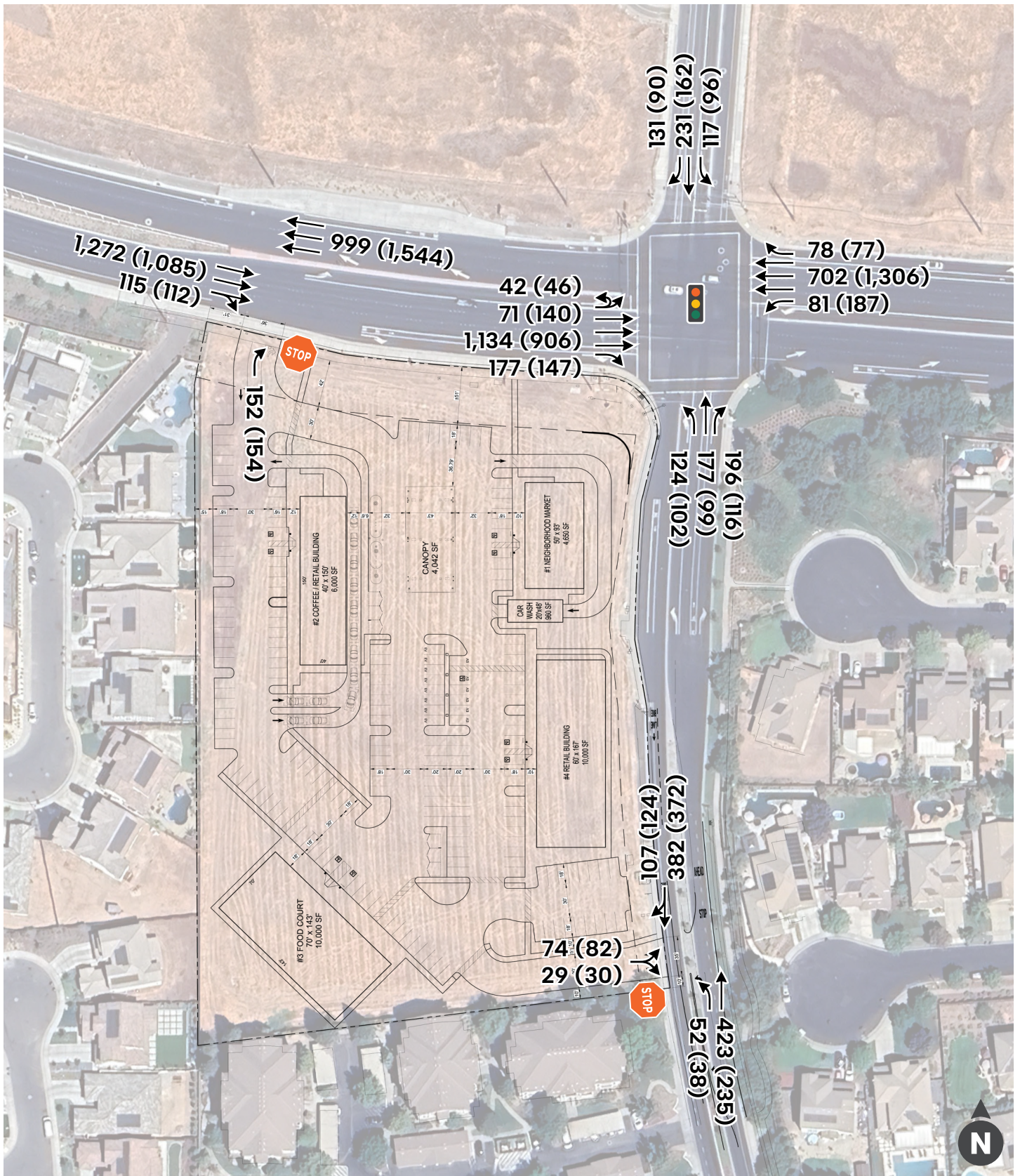


FIGURE 4

Cumulative Plus Project Traffic Volumes, Lane Configurations, and Traffic Controls

Review of Site Access

This section analyzes project site access including adequacy of sight distance at project driveways, required vehicle storage for left-turn ingress lane at Driveway 1, need for deceleration lanes at project driveways, driveway widths/spacing, and weaving across Blue Oaks Boulevard. The study applies the *City of Roseville Design Standards* (City of Roseville, 2025) as necessary to review project site access. Recommendations are highlighted at the end of each topic and illustrated in **Figure 6**.

Sight Distance Evaluation

Hayden Parkway features a gradual horizontal curve near the project site. Fortunately, Driveway 1 is situated on the outside of this curve, meaning sight distance is typically not an issue. But because full movements are being considered at this driveway, available sight distance for the following movements were analyzed:

- Northbound left-turn ingress into Driveway 1 from Hayden Parkway
- Eastbound left-turn egress from Driveway 1 onto northbound Hayden Parkway.

Figure 5a illustrates left-turn sight distance required for motorists on northbound Hayden Parkway waiting to turn left into Driveway 1. These calculations are based on the methodology recommended in chapter 9 of the *AASHTO Geometric Design of Highways and Streets* (American Association of State Highways and Transportation Officials, 2018). Note that a design speed of 35 mph was applied for this analysis based on an April 2025 off-peak speed survey of this segment, which showed its 85th percentile vehicle speed was 35 mph. Key findings from this figure are:

- The line of sight for motorists performing this left-turn does not overlap with the northbound left turn pocket at the Blue Oaks Boulevard/Hayden parkway intersection. This confirms that left turn queuing at this intersection will not obstruct the line of sight.
- The line of sight will pass through the landscaped median area immediately north of the left-turn pocket, which leads to Recommendation #1 below.

Recommendation 1: Limit any vertical elements in shaded area of Figure 5a to either 0.5-foot high or less landscaping or hardscaping to ensure an adequate line of sight for motorists turning left into Driveway 1.

Figure 5b illustrates the sight distance available for a motorist about to exit Driveway 1 onto Hayden Parkway while looking to the left and right. As shown, adequate sight distance is available in each direction. As is described later, the majority of the landscaped median south of Driveway 1 would be removed to provide for the left-turn pocket and bay taper, meaning existing trees and shrubs that could otherwise block the line of sight will not be present.

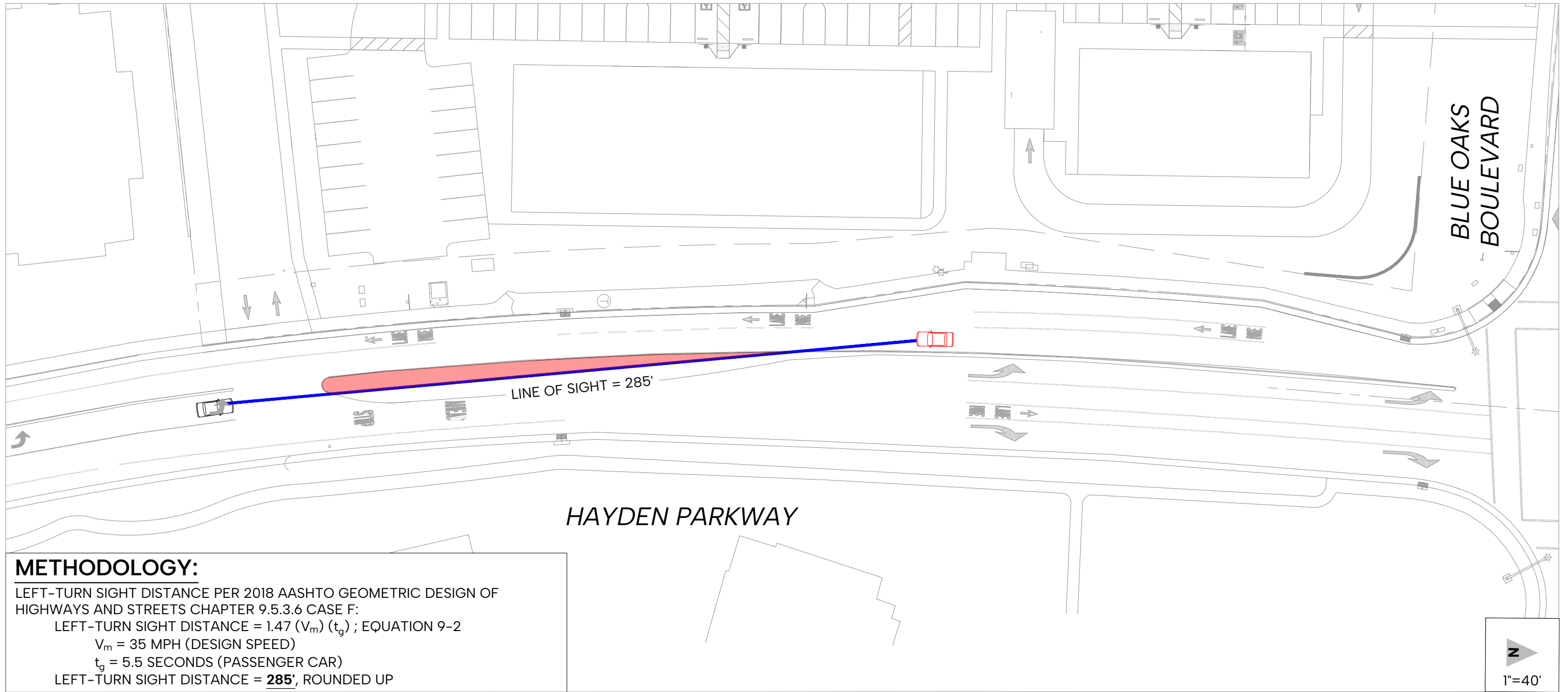


Figure 5 (a)

LEFT-TURN INTO HAYDEN PARKWAY DRIVEWAY SIGHT DISTANCE
BLUE OAKS BOULEVARD AND HAYDEN PARKWAY
ROSEVILLE, CA

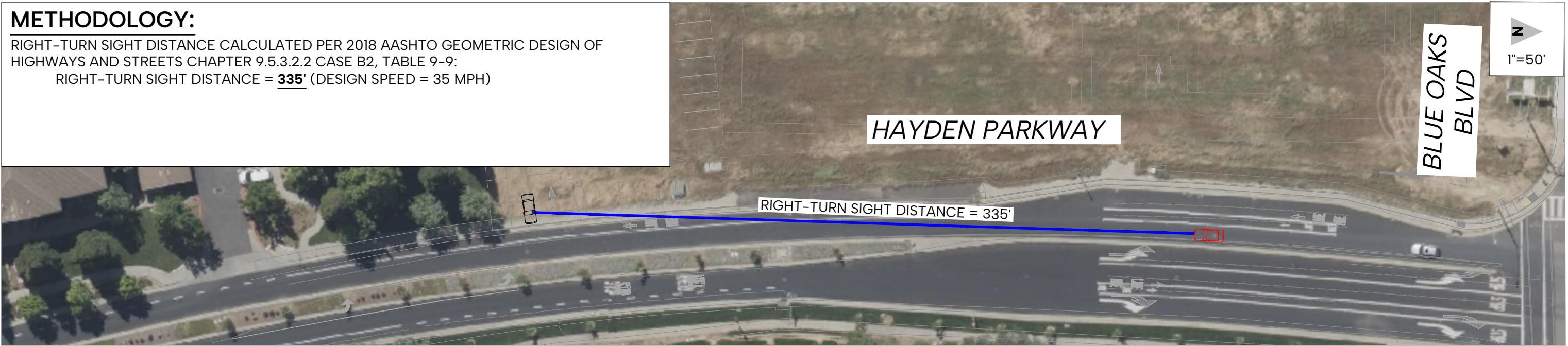
METHODOLOGY:

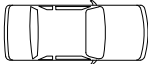
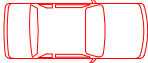
LEFT-TURN SIGHT DISTANCE CALCULATED PER 2018 AASHTO GEOMETRIC DESIGN OF HIGHWAYS AND STREETS CHAPTER 9.5.3.2.1 CASE B1, EQUATION 9-1:
LEFT-TURN SIGHT DISTANCE = $1.47 (V_m) (t_g)$;
 V_m = 35 MPH (DESIGN SPEED)
 t_g = 7.5 SECONDS + 0.5 SECONDS = 8.0 SECONDS
(PASSENGER VEHICLE + MEDIAN CONVERSION DISTANCE)
LEFT-TURN SIGHT DISTANCE = **415'** (DESIGN SPEED = 35 MPH), ROUNDED UP



METHODOLOGY:

RIGHT-TURN SIGHT DISTANCE CALCULATED PER 2018 AASHTO GEOMETRIC DESIGN OF HIGHWAYS AND STREETS CHAPTER 9.5.3.2.2 CASE B2, TABLE 9-9:
RIGHT-TURN SIGHT DISTANCE = **335'** (DESIGN SPEED = 35 MPH)



-  SIGHT DISTANCE LINE
-  DESIGN VEHICLE - PASSENGER CAR
-  SIGHT DISTANCE OBJECT OF INTEREST (APPROACHING VEHICLE)

DESIGN SPEED:

DESIGN SPEED: 35 MPH

Figure 5 (b)
SIGHT DISTANCES TURNING OUT OF HAYDEN PARKWAY DRIVEWAY
BLUE OAKS BOULEVARD AND HAYDEN PARKWAY
ROSEVILLE, CA

Left-Turn Ingress Storage

The maximum queue in the northbound left-turn ingress lane at Driveway 1 was estimated using the methodology contained in *Estimation of Maximum Queue Lengths at Unsignalized Intersections* (ITE Journal, 2001). This methodology is recommended for use in the *City of Roseville Design Standards*. As shown in Appendix A, the maximum queue would be 100 feet (4 vehicles)⁴.

There is an approximate 280-foot distance along Hayden Parkway between the center of the median opening at Driveway 1 and the southerly end of the landscaped 12-foot wide median (at Summerland Way).

Section 5 of the *City of Roseville Design Standards* indicates that left-turn ingress lanes are not required on collector streets. On arterial streets, they should be a minimum of 200 feet long plus a 120 foot bay taper. However, given the volume of traffic expected on this segment of Hayden Parkway and the amount of left-turn traffic that would utilize this driveway, a left-turn lane is a desirable feature to include. Accordingly, Recommendation #2 is offered.

Recommendation 2: Construct a 175-foot left turn ingress lane plus a 60-foot bay taper on northbound Hayden Parkway at Driveway 1.

The recommended design would leave the most southerly 50 feet (or so) of the landscaped median unchanged. This is considered desirable as it effectively means that there would be no change in how turning movements would occur at the Hayden Parkway/Summerland Way/Siena Apartments intersection. The recommendation also results in the removal of trees and shrubs that could otherwise pose sight distance constraints for outbound left-turns from Driveway 1.

Right-Turn Deceleration Lanes

According to Section 5-5 of the *City of Roseville Design Standards* (City of Roseville, 2025), a right-turn deceleration lane shall be provided at a driveway if all of the following conditions are met:

- The driveway is located on an arterial or expressway.
- Right turn ingress volume is expected to exceed 50 vehicles during peak hour flows on the roadway.
- There is ample room and frontage to fit a deceleration lane as determined by the City Engineer.
- The travel speed of the roadway, as determined by the City Engineer, equals or exceeds 45 mph.

Driveway 2 is situated on an arterial with a posted speed limit of 45 mph and would serve more than 50 right-turning vehicles per hour. However, it is unclear whether there is ample room to accommodate a deceleration lane in light of the following:

1. Driveway 2 would be situated 30 feet from the edge of the project's property, meaning that part of a deceleration lane would need to be situated off-site.

⁴ The maximum left-turn queue at the inbound left turn pocket on Hayden Parkway was estimated under existing and cumulative conditions for both peak hours. A maximum queue of 4 vehicles (100 feet) was the longest among all scenarios.

2. An overhead power line, utility box, and an emergency vehicle access (to the adjacent residential area) is present immediately to the west of the project along Blue Oaks Boulevard. These elements are mostly visible in **Image 4** below.

Driveway 1 is situated on a collector street, so provision of a deceleration lane is not applicable.



Image 4. View from eastbound Blue Oaks Boulevard approaching project site

Recommendation 3: City staff and the project applicant should coordinate to evaluate the feasibility of constructing either a right-turn deceleration lane or curb flare at Driveway 2 on Blue Oaks Boulevard. If deemed feasible, construction should be a project condition of approval.

Driveway Widths and Spacing

The project driveways meet all applicable driveway widths and spacing requirements pertaining to driveways on arterials and collectors mentioned in Sections 5-3 and 7-14 of *City of Roseville Design Standards* (City of Roseville, 2025).

Both project driveways meet or exceed the minimum throat width requirements for driveways on commercial properties. Driveway 1 exceeds the requirement of being located at least 150 feet from the nearest intersection. Driveway 2 exceeds the requirement of being located at least 240 feet away from the nearest intersection.

Weaving Across Blue Oaks Boulevard

It is apparent from Figure 4 that approximately 75 vehicles during the PM peak hour would depart Driveway 2, weave across three lanes of Blue Oaks Boulevard and access the left/u-turn at the signalized intersection at Hayden Parkway. Motorists would have about 300 feet in which to perform this maneuver, which will be complicated by the heavy volume and high speeds of traffic on eastbound Blue Oaks Boulevard. Gaps in traffic will be created when a traffic signal is eventually installed at the Blue Oaks Boulevard/Westpark Drive intersection (situated about one-half mile to the west).

Review of crash data⁵ at comparable driveway locations elsewhere in Roseville is insightful to understand expected outcomes at this intersection. The following three locations were analyzed:

1. Nugget Plaza onto Fairway Drive – Right-turn only driveway is situated 230 feet upstream of Fairway Drive/Pleasant Grove Boulevard intersection. No injury collisions were reported between 2017 and 2024 inclusive.
2. Eureka Ridge Plaza onto Eureka Road– Right-turn only driveway is situated 180 feet upstream of Eureka Road/Rocky Ridge Drive intersection. One injury collision (in 2017, broadside) was reported between 2017 and 2024 inclusive.
3. Foothill Junction Shopping Center onto Foothills Boulevard – Right-turn only driveway is situated 320 feet upstream of Foothills Boulevard/Junction Boulevard intersection. No injury collisions were reported between 2017 and 2024 inclusive.

Thus, while there are no guaranteed safety outcomes regarding this weaving movement based on the above data, review of historic collision data at three comparable locations did not identify this is a recurring hot spot collision pattern.

Review of On-site Circulation

This section consists of a review of on-site circulation including adequacy of drive-through lane vehicle storage at the planned coffee shop, adequacy of driveway throat depth, and other circulation issues (e.g., drive aisle alignment, parking aisle location and dimensions, and pedestrian circulation). Recommendations are highlighted at the end of each topic and visually illustrated in **Figure 6**.

Drive-Through Lane Vehicle Storage for Coffee Shop

The site plan shows approximately 275 feet of total available storage in the coffee shop drive-thru lane, with the first 50 feet of storage split between two ordering lanes. In 2022, Fehr & Peers collected a variety of queuing information at two Starbucks drive-through stores (one being at the aforementioned location on Cirby Way and the other being in unincorporated Sacramento County).

The two stores exhibited an average distance occupied of about 23 feet per vehicle. If the proposed store has the same type of vehicle fleet and driver behaviors, the drive-thru lane would have storage for about 12 vehicles.

⁵ Data was obtained from the Transportation Injury Mapping System (TIMS), *Safe Transportation Research and Education Center, University of California, Berkeley*. 2025. Found at: [TIMS – Transportation Injury Mapping System](#)

The data showed that both Starbucks locations had comparable drive-thru operations. Both locations had an AM peak hour maximum queue of 9 drive-thru vehicles. Since the proposed project would provide storage for 12 vehicles, queuing beyond the storage area is not expected. However, if service rate at the proposed coffee shop are considerably slower and/or drive-through demand is much greater, than a different outcome could occur. But since the entry to the drive-through lane is in the far interior of the site, it is highly unlikely that the queue would ever spill back onto a public street.

Project Driveway Throat Depth

The *City of Roseville Design and Construction Standards* (City of Roseville, 2025) require the driveway throat depth to accommodate maximum outbound vehicle queue at the project driveways. **Table 3** summarizes maximum estimated outbound queues at the project driveways using the methodology contained in *Estimation of Maximum Queue Lengths at Unsignalized Intersections* (ITE Journal, 2001). Refer to Appendix A for detailed calculations.

Table 3. Maximum Outbound Queue on Project Driveways

Location	Movement	Available Storage (feet)	Maximum Queue (feet)			
			Existing Plus Project Conditions		Cumulative Plus Project Conditions	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Driveway 1	Eastbound Shared Left/Right Lane	175	75	50	75	75
Driveway 2	Northbound Right-Turn Lane	65	100	100	125	125

Note:
Numbers in **bold** indicate queue lengths that exceed the storage provided.
The maximum queue is calculated assuming 25 feet spacing per vehicle.
Available storage measured from project site plan.
Source: Fehr & Peers, 2025

As shown in Table 3, the available storage at Driveway 1 is more than adequate to accommodate the maximum expected queue of three vehicles. However, the maximum queue at Driveway 1 would exceed the available storage. However, the site plan incorporates an innovative lane striping treatment to accommodate this peak queuing condition.

As shown in **Image 5**, the ingress would be striped with a through lane and a left-turn lane (that would provide access to gas station). Should outbound traffic block entry to the gas station drive aisle, motorists desiring to enter that area could wait in the left-turn lane. This design is in place at a gas station / retail center in the southeast corner of the Pleasant Grove Boulevard/Fairway Drive intersection and has shown to function well. This is a more desirable treatment than the alternative concept of adding “Keep Intersection Clear” signing and striping (which motorists do not always follow).

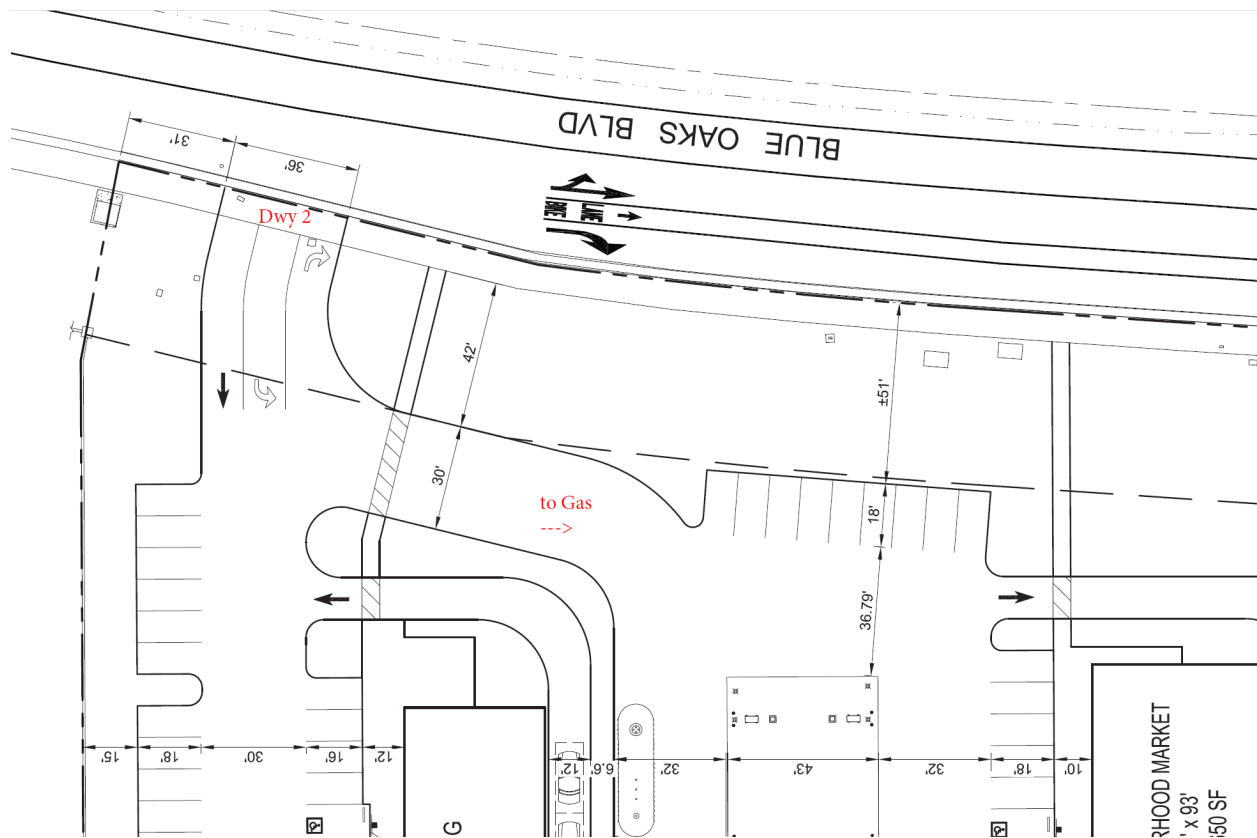


Image 5: Project site plan showing striping at Driveway 2

Drive Aisles

Overall, the arrangement of the land use pads, parking spaces and alignment of drive aisles is intuitive. The site plan shows 30 to 32 foot wide parking aisles (exceeding the minimum width requirement of 24 feet) and generally 18 foot deep parking spaces. A few notable concerns are discussed below:

- A row of 18 parking spaces adjacent to the coffee shop/retail building are 16 feet deep. They might cause parked vehicles to partly obstruct the driving aisle.
- The northbound drive aisle approaching Driveway 2 (just beyond coffee shop drive-through lane exit) is not aligned with the driveway exit lane (see Image 5).

Recommendation 4: Alter the parking layout in front of the coffee shop/retail parking aisle such that parking spaces immediately adjacent to the building are 18 feet deep and the drive aisle width is 28 feet.

Recommendation 5: Slightly alter the layout of the first intersection south of Driveway 2 to reduce the northbound travel offset.

With regard to Recommendation 4, this would only be a reallocation of pavement space and not require any changes in building pad locations.

With regard to Recommendation 5, perfect alignment is not necessary given the slow speed nature of travel in this area (and given this intersection is on private property).

Recommendation 6: At the first two internal intersections within the site, install stop signs on the side-street approaches (see Figure 6).

Pedestrian Circulation

The site plan provides three pedestrian pathways to access the project site from the sidewalks along Blue Oaks Boulevard and Hayden Parkway. These pedestrian pathways are located adjacent to the project driveways and close to the crosswalks on the west and south legs of Blue Oaks Boulevard / Hayden Parkway. However, a connection is not provided between the gas station and retail building to where the bus stop shelter pad would be located.

Recommendation 7: Add a pedestrian connection between the gas station and retail building to connect the site to the sidewalk adjacent to the bus stop on Hayden Parkway (see Figure 6).

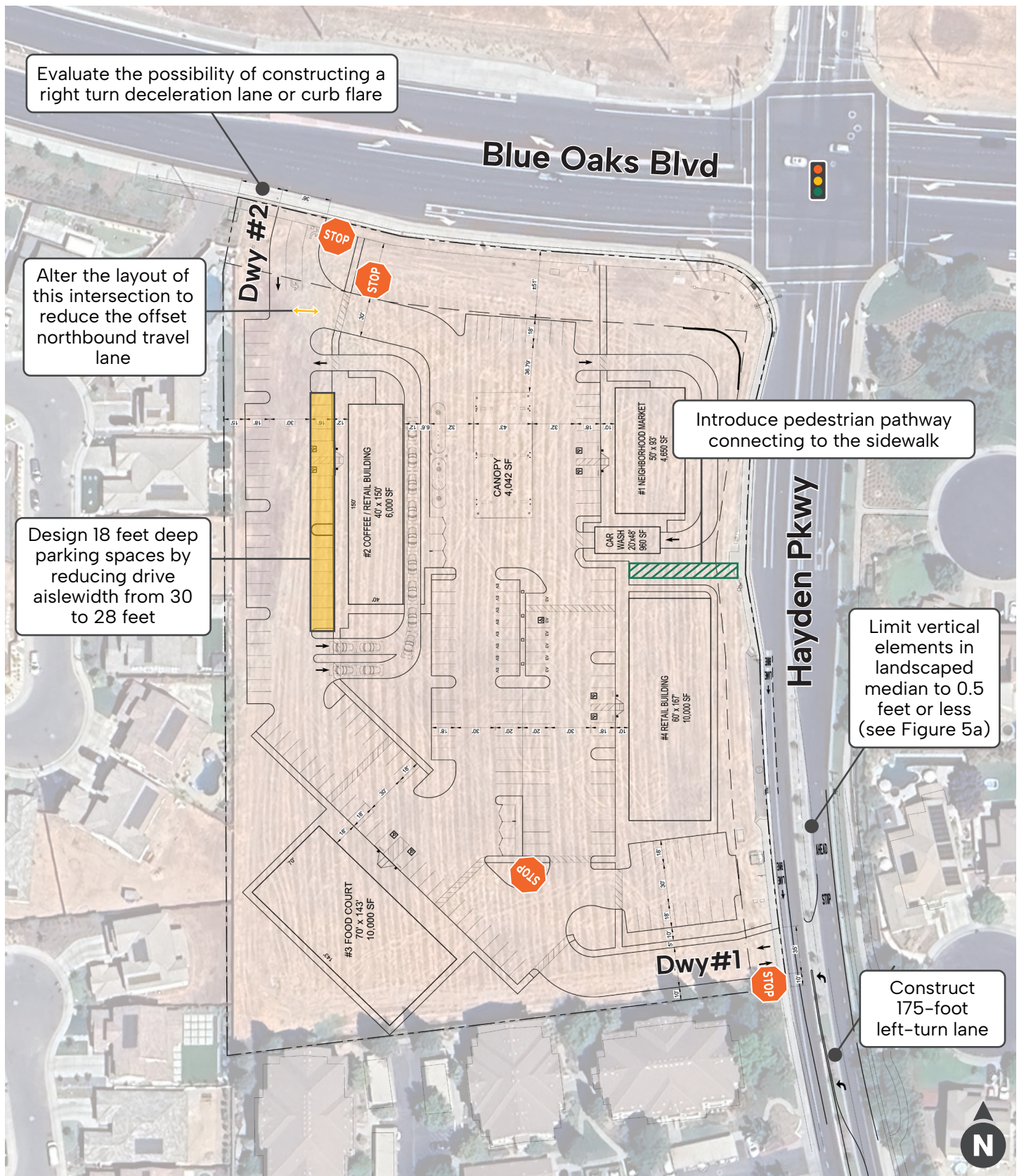


FIGURE 6

Appendix A

Maximum Queue Estimation for: Major Street Left-Turn

Scenario:	Existing Plus Project
Peak Hour:	AM

Input Data

Subject Approach		
Traffic Volume	73	vph
Peak Hour Factor (PHF)	1	

Major Street		
Conflicting Traffic Volume	558	vph
Peak Hour Factor (PHF)	1	
Conflicting Number of Through Lanes	1	lanes
Posted Speed Limit	35	mph

Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1
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Output

Estimated Maximum Queue	4	vehicles
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Maximum Queue Estimation for:
Major Street Left-Turn

Scenario:	Existing Plus Project
Peak Hour:	PM

Input Data

Subject Approach		
Traffic Volume	64	vph
Peak Hour Factor (PHF)	1	

Major Street		
Conflicting Traffic Volume	471	vph
Peak Hour Factor (PHF)	1	
Conflicting Number of Through Lanes	1	lanes
Posted Speed Limit	35	mph

Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1
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Output

Estimated Maximum Queue	4	vehicles
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Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).

Maximum Queue Estimation for: Minor Street Left/Through/Right-Turn

Scenario:	Existing Plus Project
Peak Hour:	AM

Input Data

Subject Approach		
Total Approach Volume	121	vph
Peak Hour Factor (PHF)	1	
% RT's	0.35	%
Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1	

Major Street		
Conflicting Traffic Volume for Left/Through Movements	752	vph
Peak Hour Factor (PHF)	1	
Conflicting Traffic Volume for Right-Turn Movements	349	vph
Peak Hour Factor (PHF)	1	

Output

Estimated Maximum Queue	3	vehicles
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Maximum Queue Estimation for: Minor Street Left/Through/Right-Turn

Scenario:	Existing Plus Project
Peak Hour:	PM

Input Data

Subject Approach		
Total Approach Volume	134	vph
Peak Hour Factor (PHF)	1	
% RT's	0.55	%
Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1	

Major Street		
Conflicting Traffic Volume for Left/Through Movements	500	vph
Peak Hour Factor (PHF)	1	
Conflicting Traffic Volume for Right-Turn Movements	372	vph
Peak Hour Factor (PHF)	1	

Output

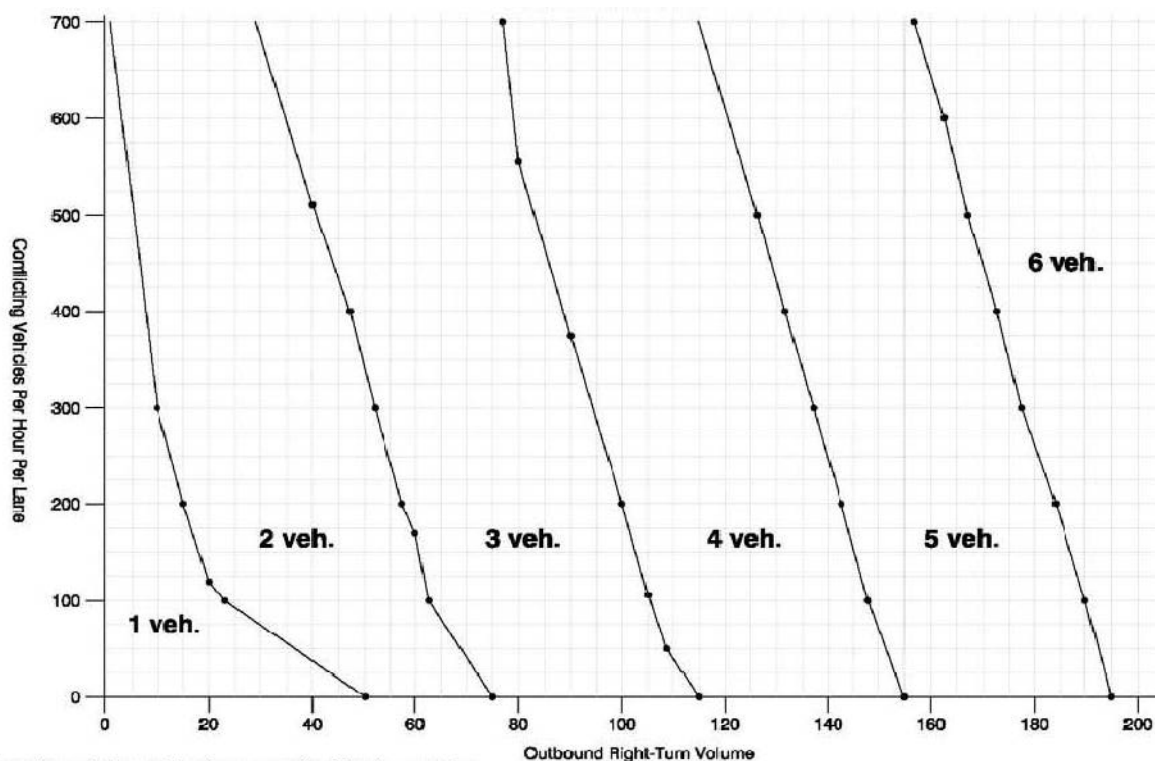
Estimated Maximum Queue	2	vehicles
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Maximum Queue Estimation for: Minor Street Right-Turn

Scenario: Existing Plus Project

Peak Hour: AM

Minimum Required Throat Depth Calculations



If the data point is outside of range, use the following:

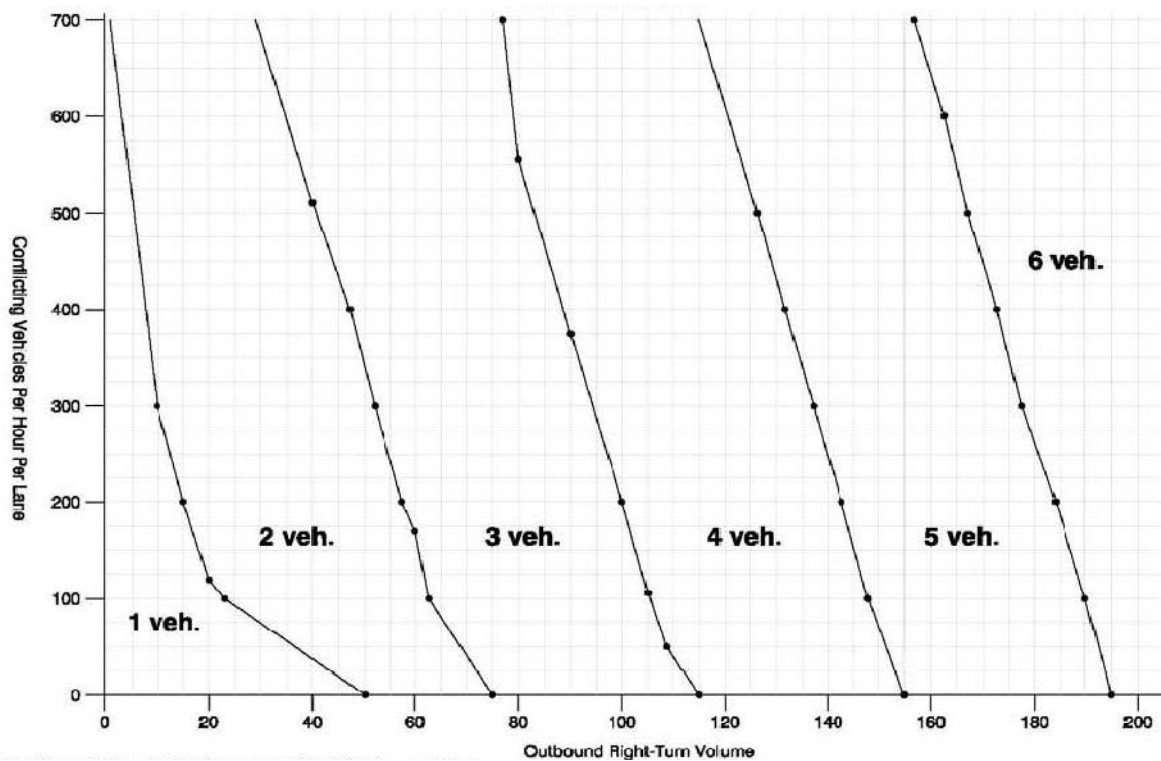
Input Data		
Approach Volume	134	vph
Conflicting Vehicles Per Lane	132	vphpl
Output		
Estimated Maximum Queue	4	vehicles

Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).

Maximum Queue Estimation for: Minor Street Right-Turn

Scenario: Existing Plus Project
Peak Hour: PM

Minimum Required Throat Depth Calculations



If the data point is outside of range, use the following:

Input Data		
Approach Volume	132	vph
Conflicting Vehicles Per Lane	117	vphpl
Output		
Estimated Maximum Queue	4	vehicles

Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).

Maximum Queue Estimation for: Major Street Left-Turn

Scenario:	Cumulative Plus Project
Peak Hour:	AM

Input Data

Subject Approach		
Traffic Volume	52	vph
Peak Hour Factor (PHF)	1	

Major Street		
Conflicting Traffic Volume	489	vph
Peak Hour Factor (PHF)	1	
Conflicting Number of Through Lanes	1	lanes
Posted Speed Limit	35	mph

Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1
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Output

Estimated Maximum Queue	4	vehicles
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Maximum Queue Estimation for: Major Street Left-Turn

Scenario:	Cumulative Plus Project
Peak Hour:	PM

Input Data

Subject Approach		
Traffic Volume	38	vph
Peak Hour Factor (PHF)	1	

Major Street		
Conflicting Traffic Volume	496	vph
Peak Hour Factor (PHF)	1	
Conflicting Number of Through Lanes	1	lanes
Posted Speed Limit	35	mph

Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1
--	---

Output

Estimated Maximum Queue	3	vehicles
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Maximum Queue Estimation for: Minor Street Left/Through/Right-Turn

Scenario:	Cumulative Plus Project
Peak Hour:	AM

Input Data

Subject Approach		
Total Approach Volume	103	vph
Peak Hour Factor (PHF)	1	
% RT's	0.28	%
Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1	

Major Street		
Conflicting Traffic Volume for Left/Through Movements	857	vph
Peak Hour Factor (PHF)	1	
Conflicting Traffic Volume for Right-Turn Movements	382	vph
Peak Hour Factor (PHF)	1	

Output

Estimated Maximum Queue	3	vehicles
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Maximum Queue Estimation for: Minor Street Left/Through/Right-Turn

Scenario:	Cumulative Plus Project
Peak Hour:	PM

Input Data

Subject Approach		
Total Approach Volume	112	vph
Peak Hour Factor (PHF)	1	
% RT's	0.26	%
Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1	

Major Street		
Conflicting Traffic Volume for Left/Through Movements	735	vph
Peak Hour Factor (PHF)	1	
Conflicting Traffic Volume for Right-Turn Movements	372	vph
Peak Hour Factor (PHF)	1	

Output

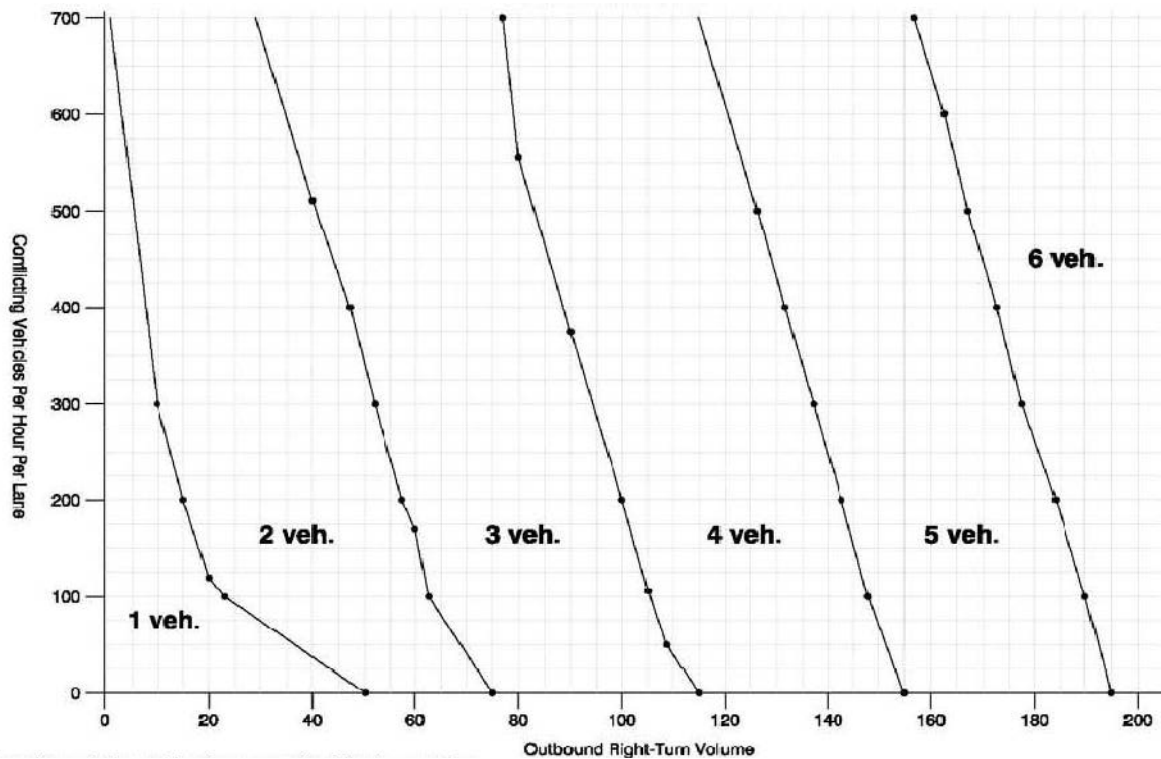
Estimated Maximum Queue	3	vehicles
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Maximum Queue Estimation for: Minor Street Right-Turn

Scenario: Cumulative Plus Project

Peak Hour: AM

Minimum Required Throat Depth Calculations



If the data point is outside of range, use the following:

Input Data		
Approach Volume	152	vph
Conflicting Vehicles Per Lane	424	vphpl
Output		
Estimated Maximum Queue	5	vehicles

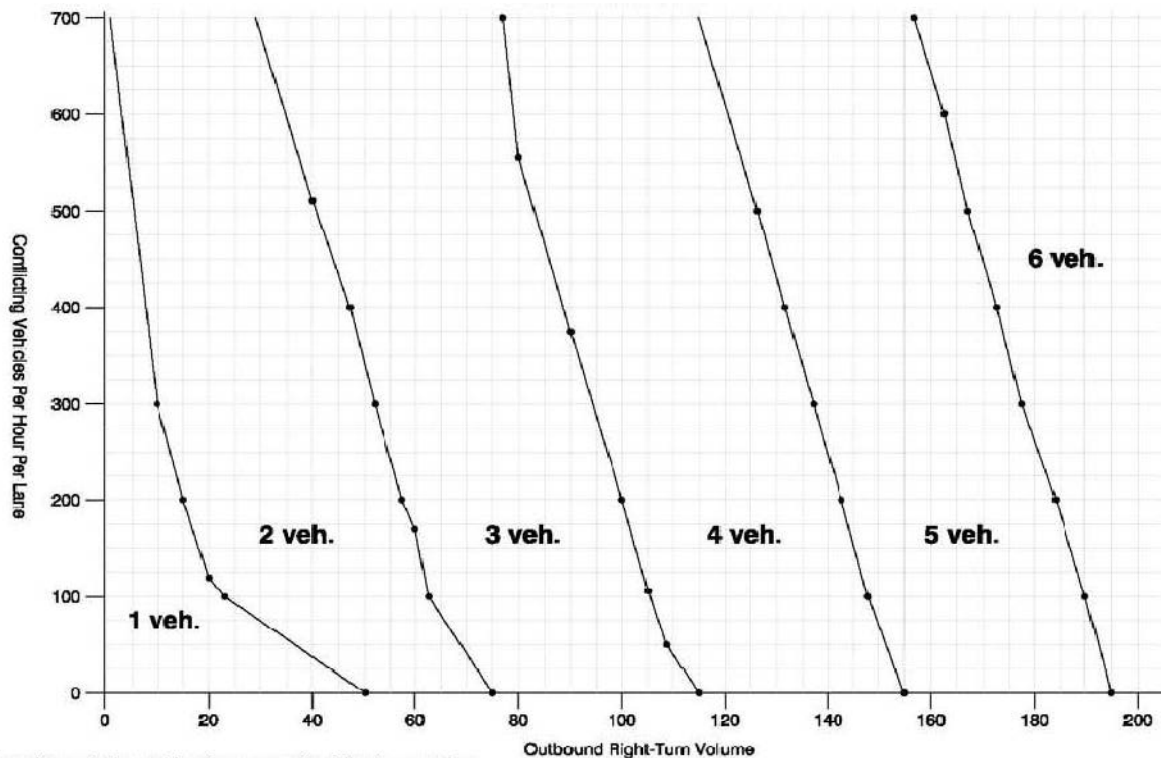
Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).

Maximum Queue Estimation for: Minor Street Right-Turn

Scenario: Cumulative Plus Project

Peak Hour: PM

Minimum Required Throat Depth Calculations



If the data point is outside of range, use the following:

Input Data		
Approach Volume	154	vph
Conflicting Vehicles Per Lane	362	vphpl
Output		
Estimated Maximum Queue	5	vehicles

Source: Estimation of Maximum Queue Lengths at Unsignalized Intersections (ITE Journal, November 2001).