

Memorandum

Date: April 1, 2024
To: Jack Varozza, PE, City of Roseville
From: Mary Ramones and John Gard, TE, Fehr & Peers
Subject: **Access Study for Rocky Ridge Apartments**

RS24-4340

This memorandum presents the data collection, analysis, and recommendations of our access study of the Rocky Ridge Apartments project, which would be situated at 1995 Rocky Ridge Drive in the City of Roseville.

Project Site Setting

According to the project site plan (*Rocky Ridge Apartments*, Peabody Tsumura Engineering, September 2023), the site would consist of an approximately 17,600 square foot apartment complex with 18 multi-family dwelling units and 27 parking spaces. Refer to **Figure 1** for the project site plan.

Access would be provided by the following driveways (see Figure 1):

- Driveway 1 on Rocky Ridge Drive would be 35 feet wide and located directly opposite Condor Court. It is assumed (for analysis purposes) that it would permit all turning movements.
- Driveway 2 on Cirby Way would be 25 feet wide and restricted to right-turns in and right-turns out only. The driveway would be located about 125 feet east of Rocky Ridge Drive.¹

¹ Driveway distance is measured from the driveway center line to the near curb return.



Existing Conditions

Roadway Network

The project site is located on an undeveloped parcel in the northeast corner of the Cirby Way/Rocky Ridge Drive intersection. The project site is located at the junction of two roadways featuring horizontal curvature. Cirby Way is an east-west minor arterial roadway within the study area. It begins at Roseville Road in the west and extends to Old Auburn Road in the east. Along the project frontage, Cirby Way has two lanes in each direction, which are separated by narrow centerline striping. The posted speed limit on Cirby Way is 40 miles per hour (MPH) in the project vicinity, however, an advisory 30 MPH sign is located in the westbound direction of Cirby Way east of Rocky Ridge Drive to alert motorists to an upcoming horizontal curve (along the project frontage). Similarly, an advisory 25 MPH speed sign is situated in advance of the curve for eastbound vehicles approaching Rocky Ridge Drive. There is a road providing gated utility access at the horizontal curve on Cirby Way, adjacent to the proposed project driveway location.

Rocky Ridge Drive is a north-south minor arterial roadway within the study area. The roadway begins at Cirby Way and extends northerly, terminating at Roseville Parkway. Along the project frontage, Rocky Ridge Drive has two lanes in each direction, which are separated by a center median turn lane. The posted speed limit is 40 MPH. The following advisory speed signs are present on Rocky Ridge Drive to advise motorists of horizontal curves:

- Northbound 30 MPH sign situated immediately south of Condor Court
- Northbound 30 MPH sign situated immediately south of Mallard Lane
- Southbound 30 MPH sign situated immediately south of McLaren Lane

Figure 2 shows the horizontal curves and advisory speed limit signs in the project vicinity.

Bicycle Network

Westbound on Cirby Way, a Class II bike lane begins at Old Auburn Road and extends 0.8 mile to Rocky Ridge Drive. It then becomes a Class III bike route west of Rocky Ridge Drive. Eastbound on Cirby Way, a Class II bike lane begins 240 feet east of Rocky Ridge Drive and extends 0.8 mile to Old Auburn Road.

Northbound on Rocky Ridge Drive, a Class II bike lane begins at Cirby Way and extends 0.8 mile to Hackamore Drive. There are no designated bikeway facilities north of Hackamore Drive to Douglas Boulevard. Southbound on Rocky Ridge Drive, a Class II bike lane begins at Professional Drive and extends 0.9 mile to Condor Court. There are no designated bikeway facilities between Condor Court and Cirby Way.



Pedestrian Network

A sidewalk begins on the east side of Rocky Ridge Drive at Cirby Way and is continuous across the project frontage and over the adjacent Linda Creek Bridge. There is an approximate 150-foot gap in the sidewalk along the project's Cirby Way frontage, as shown in Image 1. Just east of the project site, a sidewalk is continuous on the north side of Cirby Way for 0.75 mile to Old Auburn Road.



Image 1: Sidewalk gap and advisory chevron alignment signs on Cirby Way.

The signalized Cirby Way/Rocky Ridge Drive intersection features crosswalks with push-button pedestrian actuation on the west and north legs. A crosswalk is not provided on the east leg.



Project Travel Characteristics

Trip Generation

The trip generation of the Rocky Ridge Apartments was estimated using the *Trip Generation Manual, 11th Edition* (Institute of Transportation Engineers, 2021). **Table 1** shows the estimated daily, weekday AM peak hour, and PM peak hour trip generation. As shown, the project would generate 121 new daily trips, 7 new AM peak hour vehicle trips, and 9 new PM peak hour vehicle trips.

Table 1: Project Trip Generation

Land Use	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise)	220 ¹	18	121	2	5	7	6	3	9

Notes:

¹ITE Trip Generation land use category (220) Multifamily Housing (Low-Rise) Not Close to Rail Transit (Adj Streets, 7-9A, 4-6P)

Daily: T=6.74(X)

AM Peak Hour: T = 0.40(X) (20% in, 80% out)

PM Peak Hour: T = 0.51(X) (65% in, 35% out)

Sources: *Trip Generation Manual, 11th Edition* (Institute of Transportation Engineers, 2021); Fehr & Peers, 2024.

Trip Distribution

Table 2 displays the project's estimated distribution of new trips. The trip distribution percentages were estimated by adding the project to the City's base year (2020) travel demand model and performing a select zone traffic assignment to track the directions of travel of project trips.

Table 2: Project Trip Distribution

Trip Distribution	Percentage
Cirby Way to/from I-80 (West)	40%
Cirby Way to/from Old Auburn Road (East)	10%
Rocky Ridge Drive to/from Douglas Boulevard (North)	50%
Total	100%

Source: City of Roseville Travel Demand Model; Fehr & Peers, 2024.



Trip Assignment

Trips generated by the proposed apartments were assigned to the two project driveways assuming the Rocky Ridge Drive driveway permits all movements and the Cirby Way driveway permits right-turns only. As shown in Table 1, total peak hour trips generated by the project are modest, indicating that no movement into and out of either project driveway would exceed five vehicles per hour. Project trips would not have a significant effect on existing roadway operations or volumes.

Project Access Review

The project access review focuses on the access and design of both project driveways relative to standards established in the *City of Roseville Design and Construction Standards (2023)*. Additionally, this review addresses potential modifications to the Cirby Way project frontage.

Recommendations resulting from the project access review are summarized in **Figure 3**.

Rocky Ridge Drive Driveway

Driveway Location & Permitted Turning Movements

The Rocky Ridge Drive Driveway (Driveway 1) would be situated directly opposite Condor Court. The City requires that driveways on arterials meet the minimum offset requirements of 600 feet for right hand offsets and 400 feet for left hand offsets (refer to Section 5-7 and ST-47). Therefore, Driveway 1 would meet the City's minimum offset requirements.

Driveway 1 would be located approximately 250 feet north of the Cirby Way/Rocky Ridge Drive intersection, as measured from the intersection near curb return to the driveway centerline. The driveway would be full access and allow all turning movements. The City establishes the following standards for the location of driveways relative to adjacent upstream arterial-arterial intersections and their associated permitted turning movements (refer to Section 5-3, Section 5-8, and ST-46)

- Zone 1 (0 to 240 feet) – No driveways allowed
- Zone 2 (240 to 370 feet) – Driveways allowed but outbound left turns prohibited
- Zone 3 (Over 370 feet) – Driveways allowed and all turning movement permitted

While the location of Driveway 1 would be allowed within Zone 2, the accommodation of all turning movements would not meet the City's driveway permitted turning movement requirements. It would not be possible to relocate Driveway 1 further to the north (i.e., within Zone 3) as it would not connect to the project site. The concept of prohibiting outbound left turns was also explored, but dismissed because it would cause severe challenges for project access and potentially result in other undesired movements (e.g., u-turns within the Rocky Ridge Drive S Curve). Thus, while Driveway 1 would not meet this standard, it is noted that its necessary



placement opposite full-access Condor Court is the primary issue resulting in this conclusion. Refer to the corner sight distance analysis below for additional information regarding potential line of sight implications associated with accommodating outbound left turns at Driveway 1 at the proposed location.

Fehr & Peers conducted field observations at the proposed Driveway 1 location to verify that motorists simultaneously turning left from Rocky Ridge Drive into the project site and into Condor Court would have an adequate light of sight of oncoming traffic. Image 2 shows the view of a southbound vehicle turning left into Driveway 1 from near the edge of the recommended southbound left turn lane. Given the slight lane offset resulting from the horizontal curve on Rocky Ridge Drive, vehicles making simultaneous left turns would have an unobstructed view of oncoming traffic.



Image 2: View from southbound left turn into the proposed Driveway 1 on Rocky Ridge Drive.



Need for Deceleration Lanes/Tapers at Driveway (5-5 and 5-6)

The City requires that a right turn deceleration lane be provided for a driveway if all of the following conditions are met (refer to Section 5-5):

- A. The driveway is located on an arterial or expressway.
- B. Right turn ingress volume is expected to exceed fifty (50) during peak hour flows on the roadway. For right turn ingress volumes between ten (10) and fifty (50) a right turn curb taper shall be constructed in conformance with the Standard Drawings.
- C. There is ample room and frontage to fit a deceleration lane as determined by the City Engineer.
- D. The travel speed of the roadway, as determined by the City Engineer, equals or exceeds 45 mph.

While Driveway 1 is located on an arterial, it does not meet the remaining criteria to warrant a right turn deceleration lane. Therefore, no right turn deceleration lane is recommended at Driveway 1. However, based on conversations with City of Roseville staff, a right-turn deceleration taper has been recommended given the volume of traffic on Rocky Ridge Drive and the presence of the S Curve immediately beyond the driveway.

The City requires that left turn deceleration lanes be provided for driveways on arterials where left turns in are permitted. The City allows for this to be provided in the form of a continuous two-way left-turn lane (TWLTL) on a four-lane road. Inbound left-turn vehicles would use the existing open median on Rocky Ridge Drive. To achieve consistency with City standards, Fehr & Peers recommends that the project install a 200-foot southbound left turn lane into Driveway 1. Alternatively, the City could consider the installation of a TWLTL on Rocky Ridge Drive to accommodate two-stage left turn movements at Driveway 1 and Condor Court (note that this modification would affect existing northbound left-turn movements into Condor Court by introducing southbound vehicles exiting the project site, as these vehicles would physically mix in the TWLTL).

Corner Sight Distance

Fehr & Peers analyzed corner sight distance for outbound left turns from Driveway 1 onto Rocky Ridge Drive. To determine an appropriate design speed for sight distance analysis of approaching vehicles coming around the horizontal curves, Fehr & Peers retained NDS to conduct a speed survey of southbound traffic on Rocky Ridge Drive at a location just south of Mallard Lane. The advisory speed limit around the curves is 30 MPH. The speed survey, which was conducted during non-peak hours with dry road conditions during daylight hours, revealed an 85th percentile speed for southbound traffic of 38 MPH. A design speed of 40 MPH was therefore selected for analysis of corner sight distance at Driveway 1.



Figure 4 shows the sight distance analysis results. As shown, from an aerial imagery perspective, there are several trees that appear to block the line of sight of southbound vehicles on Rocky Ridge Drive.

Fehr & Peers visited the project site on Tuesday, February 27, 2024, to conduct field observations and evaluate sight distance and corner time gap at the project driveway. Image 3 shows the view from a driver's eye level (exiting Driveway 1) looking towards the right at Rocky Ridge Drive. As shown, while there are tree branches that temporarily block part of the view of an approaching motorist, it was apparent to the engineers present at the site that oncoming traffic traveling southbound on Rocky Ridge Drive was detected well in advance of reaching Driveway 1. In fact, Fehr & Peers measured the elapsed time that a southbound vehicle on Rocky Ridge Drive is visible before passing the proposed Driveway 1 location. Oncoming traffic was visible, on average, for 13 seconds before reaching the driveway.

Table 405.1A in the *Highway Design Manual* (HDM), Caltrans, 2020, indicates that the unsignalized intersection passenger car corner sight distance time gap for vehicles making a left turn from stop is 7.5 seconds. This value should be adjusted for vehicles making a left turn onto a two-way major road with more than two lanes, adding 0.5 s for passenger cars for each additional lane to be crossed. Vehicles making the outbound left turn at Driveway 1 would have to cross 3 lanes, resulting in a corner sight distance time gap of 9 seconds. The 13 second time gap measured in the field exceeds the 9 seconds corner sight distance time gap specified by the HDM. Therefore, vehicles making the outbound left turn at Driveway 1 have ample time to complete the turn. Using the corner sight distance time gap of 9 seconds and a design speed of 40 MPH, the minimum corner sight distance was calculated to be 530 feet. Therefore, Driveway 1 would have adequate corner sight distance for outbound left turning vehicles.

Given that this photo was taken at a time when there were no leaves on the trees, it is possible that the line of sight may be impacted when the trees begin to bloom. Therefore, the pruning of trees located north of the project site adjacent to the sidewalk is recommended to ensure that a motorist exiting the driveway would have an adequate line of sight of oncoming traffic.²

² Sight distance adequacy determined using a 40 MPH design speed and applying the methodology related to corner sight distance outlined in 405.1 of the Highway Design Manual, Caltrans, 2020. See Figure 4.



Image 3: View of southbound Rocky Ridge Drive from the proposed Driveway 1 location.



Fehr & Peers visited the project site during the evening due to concerns of potential headlight visibility restrictions given the curvature on Rocky Ridge Drive. As shown in Image 4, vehicle headlights are clearly visible at the Driveway 1 location and adequate corner sight distance would be maintained during nighttime conditions.



Image 4: View of southbound Rocky Ridge Drive from the proposed Driveway 1 location under evening conditions.



Cirby Way Driveway

Driveway Location & Permitted Turning Movements

The Cirby Way Driveway (Driveway 2) would be located approximately 125 east of Rocky Ridge Drive, as measured from the intersection near curb return to the driveway centerline. The driveway would accommodate right-in/right-out access only. Under existing conditions, there is no median or barrier separating vehicles traveling on Cirby Way. The site plan does not show pavement markings, signage, or physical improvements at Driveway 2 that would prevent left turn movements. The site plan also does not show any proposed physical changes to Cirby Way to prevent eastbound left turns into Driveway 2 or southbound left turns out of Driveway 2.

Accordingly, Fehr & Peers recommends that the project construct a raised, triangular median at Driveway 2 to limit vehicular movements to right-in/right-out access only. This would maintain access for the residential driveways on the south side of Cirby Way and meets the City's turning movement restriction standard. The low travel demand generated at Driveway 2 suggests that many of the vehicles using the driveway would be users familiar with the project and the driveway restrictions. Additionally, the project's address of 1995 Rocky Ridge Drive indicates that any delivery drivers would be directed to enter the project site at Driveway 1, further limiting the number of vehicles that are unfamiliar with the project site and driveway restrictions. Given that Driveway 2 is proposed to be 25 ft wide, the driveway may need to be widened to accommodate the raised, triangular median. City Engineering staff will work with the applicant on a design that works to prohibit left ingress/egress while not conflicting with the existing bike lane.

Need for Deceleration Lanes/Tapers at Driveway

According to the project trip generation estimates, westbound right turns at Driveway 2 would be modest (less than 10 vehicles per hour). Thus, no additional deceleration or right turn curb taper is required per City standards at Driveway 2. However, in conjunction with the construction of the raised, triangular median, driveway widening would be necessary which could provide opportunities for partial deceleration (i.e., a short taper) approaching the driveway on westbound Cirby Way.



Modifications to Cirby Way Project Frontage

Chevron Alignment Signs

There are five existing chevron alignment signs (W1-8) located along project frontage on the westbound Cirby Way approach to the Rocky Ridge Drive intersection. Image 5 shows these signs and their location on the edge of the roadway.

If the signs were to remain in their current location, they would likely either be situated in the Class II bike lane or be co-located with the new sidewalk. Fehr & Peers spoke to City of Roseville staff about the placement of these signs, which were posted in 2020 as a result of an engineering and traffic study that assessed and considered a curve warning for Cirby Way at Rocky Ridge Drive. City staff indicated that the signs were installed due to vehicle collisions with the signal controller, which has been hit at least three times over the last 10 years. The City requests that the signal controller be relocated with the project to beyond the back of sidewalk. Additionally, City staff recommends the applicant work with City staff in determining the final location of the chevron alignment signs.

Gated Utility Access Road

Aerial imagery shows an existing gate connection that appears to provide vehicle access to the utility towers located east of the project site on Cirby Way. The site plan does not indicate that this connection would remain once Driveway 2 is constructed. Fehr & Peers recommends that the project site be modified to maintain the connection to the utility towers and that this connection restricts access via a gate.



Image 5: Existing gate on Cirby Way at the proposed location of Driveway 2.

Cirby Way/Rocky Ridge Drive Intersection Signage

With the right-in/right-out restriction at Driveway 2, vehicles exiting the project site at Driveway 2 could be encouraged to u-turn at the intersection to continue eastbound on Cirby Way. Fehr & Peers recommends that the project install a no U-turn regulatory sign (R3-4) at the westbound approach of the Cirby Way/Rocky Ridge Drive intersection to restrict this movement and reduce potential conflicts.






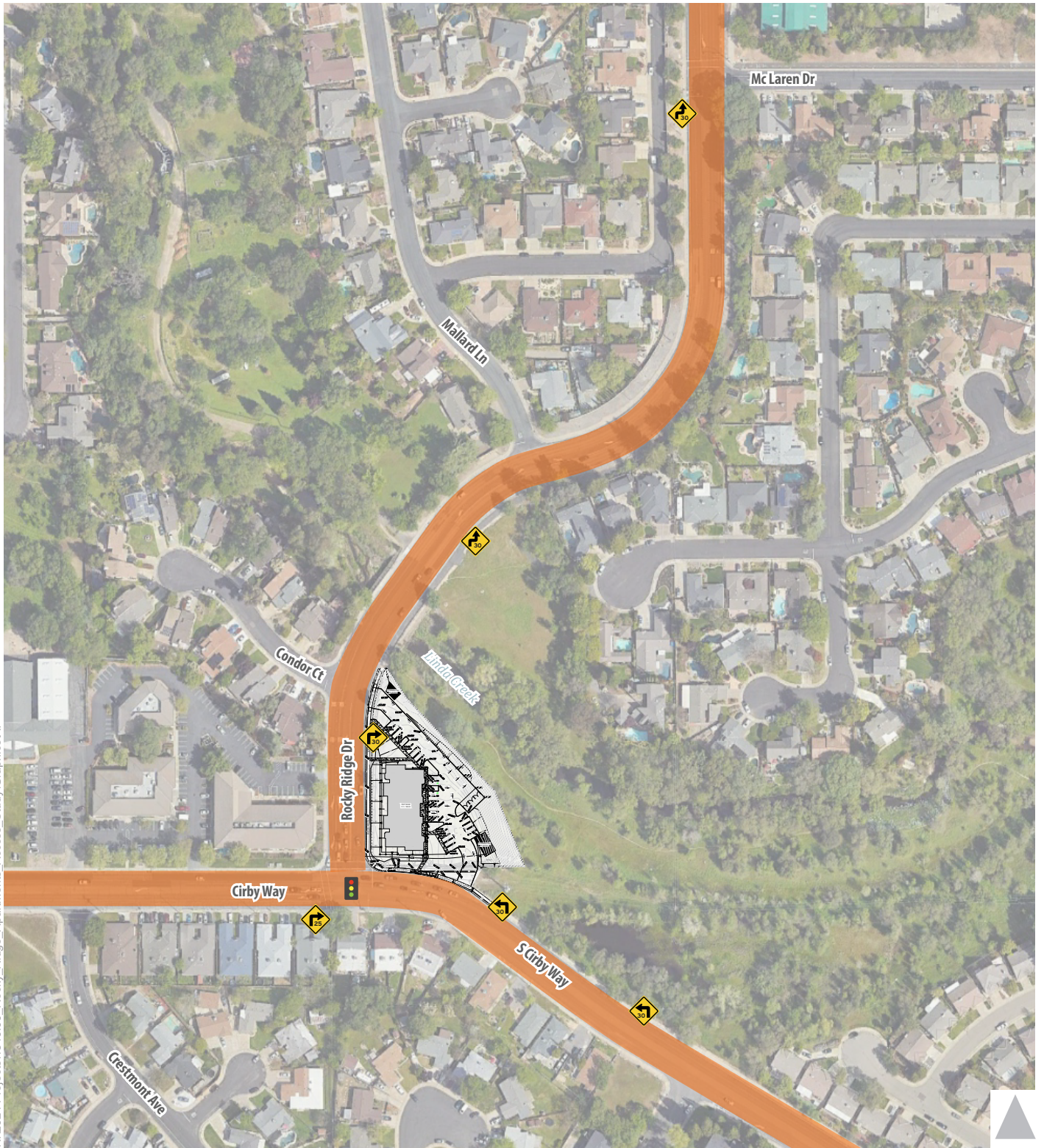
-  Permitted Driveway Turning Movement
-  Stop Sign
-  Traffic Signal



Figure 1
Project Site Plan






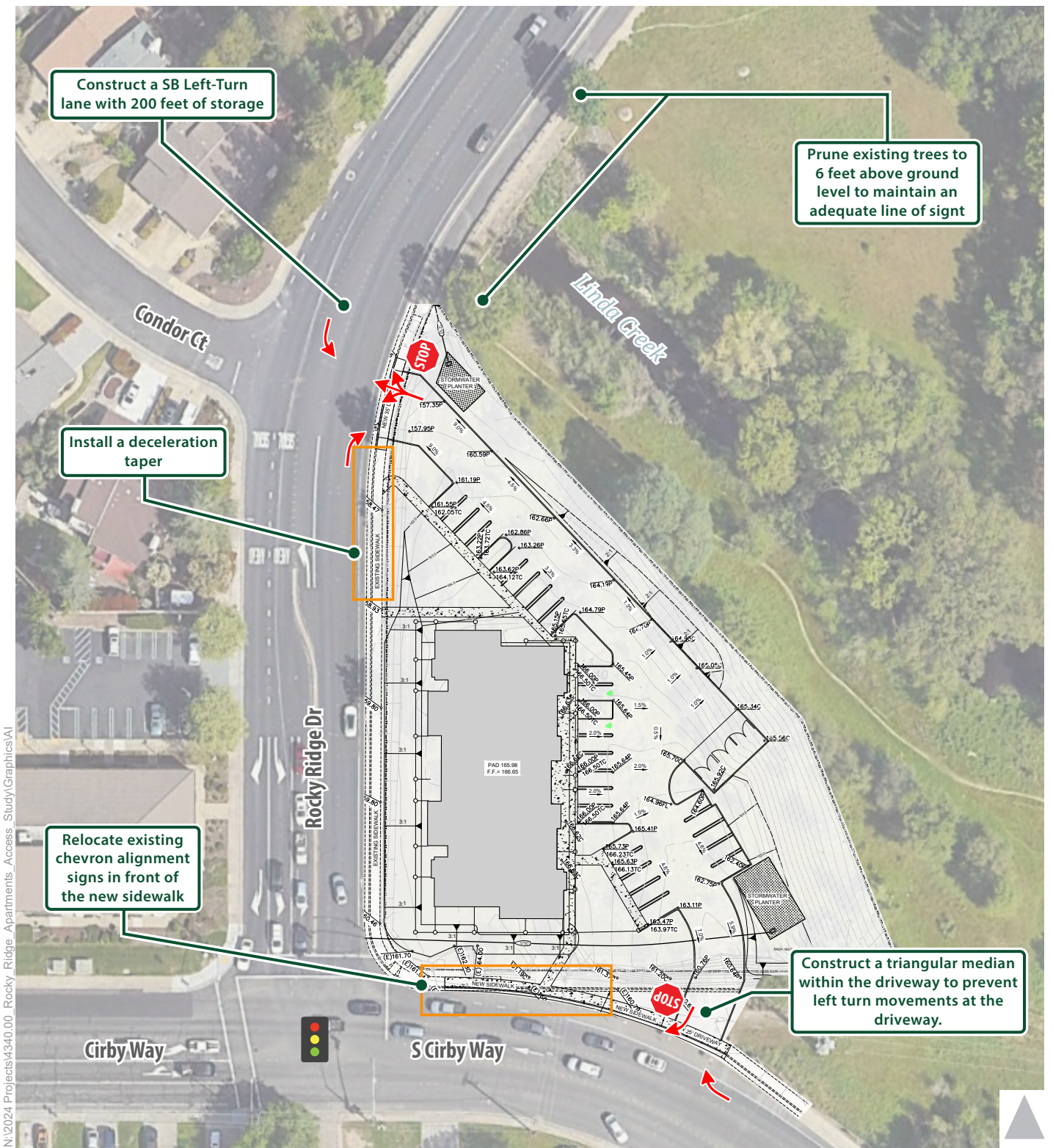
-  Signalized Intersection
-  Advisory Speed Limit
-  40 MPH Posted Speed Limit



Figure 2
Project Location



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-  Permitted Driveway Turning Movement
-  Stop Sign
-  Traffic Signal



Figure 3
Recommendations



LEGEND:

DESIGN SPEED:

ROCKY RIDGE DRIVE - 40 MPH
 (BASED ON SPEED SURVEY PERFORMED BY NDS ON 2/22/2024)

CORNER SIGHT DISTANCE:

CORNER SIGHT DISTANCE = 530' CALCULATED PER
 HIGHWAY DESIGN MANUAL TOPIC 405.1(2)



Figure 4
 Sight Distance Analysis
 Project Driveway at Rocky Ridge Drive

Spot Speed Study

Prepared by: National Data & Surveying Services

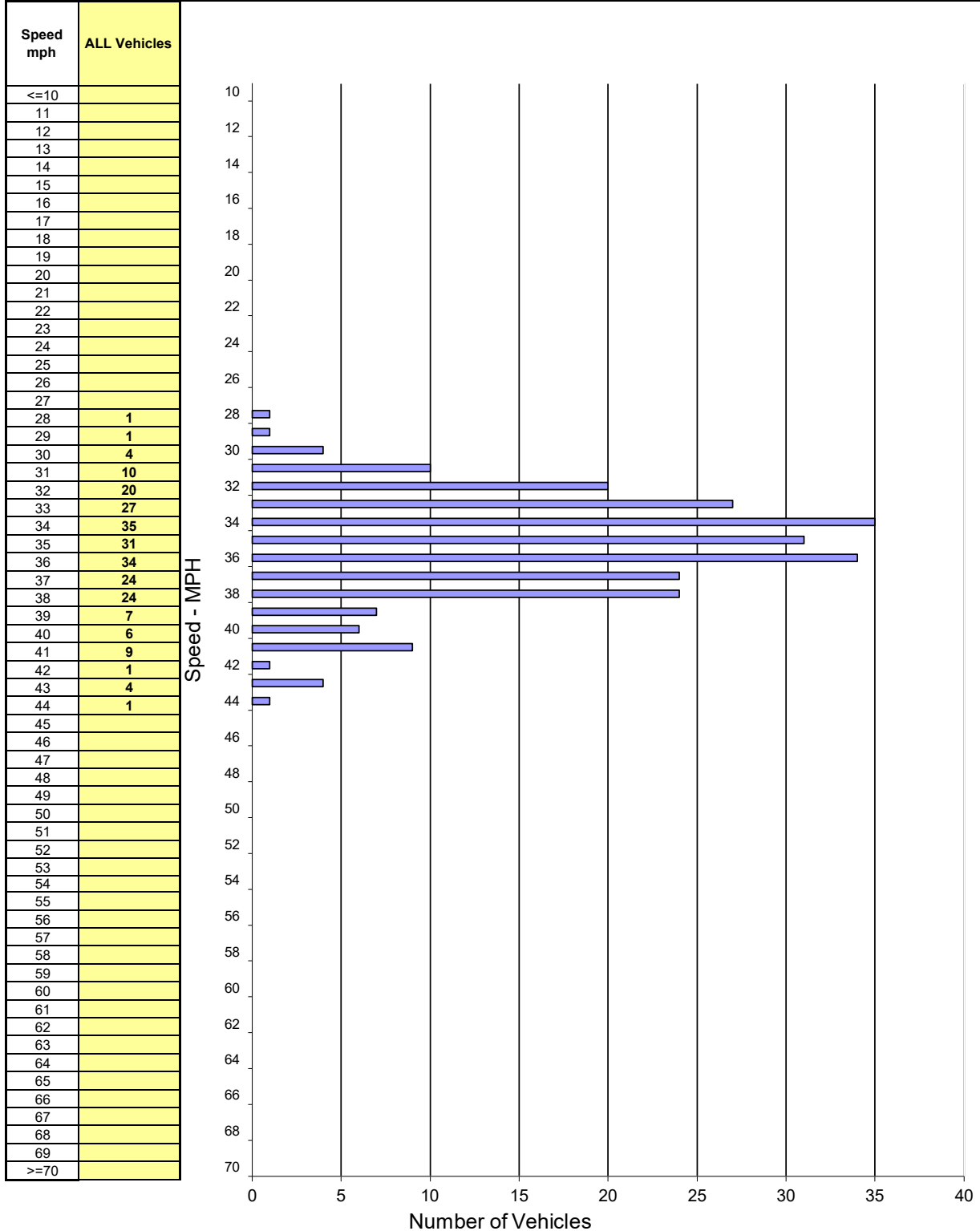
City of Roseville

DATE: 2/22/2024
TIME: 13:20-15:20

Location: Rocky Ridge Dr N/O Cirby Way
Posted Speed: 30 MPH Clear/Dry

Project #: 24-070038-001

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	239	28 - 44	35 mph	38 mph	31 - 40	218	91%	2% / 6	7% / 15