CITY OF CORONA

Riverside County, California

Public Works Department

2019

ENGINEERING AND TRAFFIC SURVEY

FOR SPEED LIMITS

TECHNICAL REPORT

PREPARED BY:

CITY OF CORONA
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CERTIFICATION

I, Rosalva N. Ureno, do hereby certify that this Engineering and Traffic Survey for the City of Corona was performed under my supervision. I certify that I am experienced in performing surveys of this type and duly registered in the State of California as a Professional Civil Engineer.

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Rosalva N. Ureno, P.E. No. 77433
Senior Engineer

2019 ENGINEERING AND TRAFFIC SURVEY FOR SPEED LIMITS

(SEE SECTION 3.3 FOR PROPOSED SPEED LIMITS)

1. INTRODUCTION

In accordance with procedures established by the State of California, this Engineering and Traffic Survey has been developed for the City of Corona as the basis for the establishment and enforcement of speed limits for selected streets within the City. The work herein was performed by the City to evaluate established speed limit sections to determine whether changes in pre-existing conditions have occurred which would require a modification to the speed limit.

The Traffic Engineering Division performs Engineering and Traffic Surveys for speed limits in accordance with the California Vehicle Code (CVC). Section 40802 of the CVC specifies the time periods within which speed surveys must be performed if the use of radar is to be employed to enforce speed limits. If such a survey is not performed within the required time frame, the new data and its use will constitute a speed trap. Hence, evidence using such data would not be admissible in court. CVC Section 40802(c)(2) defines a “speed trap” is either of the following:

(A) A section of a highway measured as to distance and with boundaries marked, designated or otherwise determined in order that the speed of a vehicle may be calculated by securing the time it takes the vehicle to travel the know distance.

(B) (i) A particular section of a highway with a prima facie speed limit that is provided by this code or by local ordinance under paragraph (1) of subdivision (b) of Section 22352, or established under Section 22354, 22357, 22358, or 22358.3, if that prima facie speed limit is not justified by an Engineering and Traffic Survey conducted within one of the following periods, prior to the date of the alleged violation, and enforcement of the speed limit involves the use of radar or other electronic devices that measure the speed of moving objects:

(I) Except as specified in subclause (II), seven years.

(II) If an Engineering and Traffic Surveys was conducted more than seven years prior to the date of the alleged violation, and a registered engineer evaluates the selection of the highway and determines that no significant changes in roadway or traffic conditions have occurred, including, but not limited to, changes in adjoin property or land use, roadway width, or traffic volume, 10 years.

(ii) This subparagraph does not apply to a local street, road, or school zone.

2. PROCEDURES

2.1 ESTABLISHMENT OF SPEED ZONES

The reason that speed limit areas, and their required postings, are established is to guard reasonable drivers from the unreasonable behavior of reckless, unreliable, or otherwise dangerous drivers. As with other similar laws, the identified speed limits are based on the consensus of the majority of those who drive the highway as to what speed is reasonable and safe. It is this type of information that is reflected in the analysis section of this report. Namely, posted speed limits reflect the speed that most people deem to be safe, as opposed to a minority of drivers who do not drive in a reasonable manner.

Speed zones are also established to advise of road conditions or hazards which may not be readily apparent to a reasonable driver. For this reason, a field review of related road/traffic variables is included, which considers the analytical and accident history of a roadway segment to help determine a safe and reasonable speed limit.

2.2 DATA COLLECTION PROCEDURES

Speed evaluation data was collected at 41 different roadway segments in the City of Corona. These streets, and the number of segments on each street are described as follows:

- Border Avenue (3)
- Griffin Way (2)
- Hidden Valley Parkway (2)
- Mountain Gate Drive (1)
- Oakridge Drive (1)
- Olive Street (2)
- Ontario Avenue (7)
- Parkridge Avenue (5)
- Pomona Road (3)
- Railroad Street (4)
- Rincon Street (2)
- Sampson Avenue (3)
- Sherman Street (2)
- Tenth Street (4)

As described in various traffic engineering documents, including information provided by the State of California, the selection of data collection locations for roadway segments on which radar data collection procedures were used involved considerations for the following:

1. Stop signs or traffic signal locations;
2. Visibility problems;
3. Traffic flow opportunities at or near intersections, major driveways, crosswalks, railroad crossings and unusual turning movements; and

4. Minimum influence from parked vehicles, bumps, dips, curves, or poor roadway conditions.

2.3 RADAR COLLECTION TIME-FRAMES

The hours of radar operations were restricted to off-peak periods (when possible) for heavily traveled streets, and to peak periods on lightly traveled streets. All speed surveys were conducted in fair weather.

The radar unit was mounted at the top of the front dash of an unmarked vehicle, with the meter-reading unit sustained inside the vehicle. The radar's unit calibration was checked periodically using a tuning fork.

The radar operator recorded the radar speed meter readings for each location on Radar Speed Survey Field Sheets, included in the Appendix Sections of this Report. In order for the sample to be representative of the actual traffic flow, a sample of at least 100 vehicles was taken in each survey. On low volume roads, where a total sample of 100 vehicles would result in an excessive time period, sampling was continued until a representative bell-shaped curve was attained. In no case did the sample contain less than 50 vehicles.

2.4 PREVAILING SPEEDS

The prevailing speeds are determined by speed zone surveys. The analysis of the prevailing speeds will provide important information about the existing traffic conditions. These are described in detail below.

- The **CRITICAL SPEED**, or 85th percentile speed, is defined as the speed at or below which 85 percent of the traffic is moving. From experience, traffic engineers have found that this is one of the most reliable factors in determining appropriate speed limits. Hence, the accepted practice, and one which has been used in this case, is to set the speed limit at the nearest 5 MPH increment to the critical speed. When this procedure is used, it not only conforms to that required by Federal and State regulations, but also provides a strong base for law enforcement personnel to properly enforce speed limits.

- The **10 MPH PACE** is the 10 MPH increment of speed where the largest number of recorded vehicles is contained. It is a measure of the dispersion of speeds within the sample surveyed. For this element, the accepted practice is to keep the recommended speed limit within the 10 MPH pace to the greatest extent possible, after considering the critical speed and any factors requiring a speed lower than the critical speed.

- The **MEDIAN SPEED**, or 50th percentile speed, represents the mid-point value within the range of recorded speeds for a particular roadway section. In other words, 50 percent of the vehicles travel faster than, and 50 percent travel slower than the median speed. This value is another measure of the central tendency of the vehicle speed distribution.

- The **15th PERCENTILE SPEED** is the speed at or below which 15 percent of the vehicles are traveling. This value is important in determining the minimum allowable speed limit, given that the vehicles traveling below this speed tend to obstruct the flow of traffic, thereby increasing the accident potential.

The numerical values of the above factors are derived from the cumulative speed distribution curves which are calculated for each survey location. These distribution curves represent a method of graphical analysis which compares the cumulative percentage of vehicles to the speed at which the vehicles are traveling.

2.5 FIELD REVIEW

In addition to the availability of the statistical data discussed above, a significant aspect of speed limit recommendations is based on the field review. This is important, in that existing conditions may warrant a lower speed than what is actually indicated by the application of the survey data. Examples of the field data collected for the purposes of analyzing related roadway characteristics as they pertain to the determination of appropriate speed limits are listed below:

1. Segment length, width, and alignment;
2. Level of pedestrian activity;
3. Traffic flow characteristics;
4. Number of lanes and other channelization/striping factors;
5. Frequency of intersections, driveways and on-street parking;
6. Location of stop signs, traffic signals, and other regulatory traffic control devices;
7. Roadway condition, bumps, and dips;
8. Obstructions to drive/pedestrian visibility;
9. Land use and proximity of schools;
10. Uniformity with existing speed zones to/with adjacent jurisdictions; and
11. Any other unusual conditions or hazards not readily apparent to the driver.

The results of the field review of related road/traffic variables are summarized on the Engineering and Traffic Survey forms found in the Appendix of this report.

2.6 ACCIDENT HISTORY

The Engineering and Traffic Survey forms summarize the available accident information for the subject streets. The accident information includes the total number of accidents within each street segment, and of those accidents, the number which are speed-related. This information is obtained from the City of Corona computerized accident database. The annual accident rate figures represent the number of speed-related accidents divided by two years of accident records.

The equation for calculating roadway segment accident rates is as follows:

Accident Rate per HMVM (100 Million Vehicle Miles) =

$$\frac{\text{(No. of accidents in one year) x (100,000,000}}{\text{(Average Daily Traffic) x (365) x (Distance of Segment in Miles)}}$$

Source: Institute of Transportation Engineers, Traffic Engineering Handbook 6th ed., Washington D.C.: ITE, 2010

3. RESULTS AND RECOMMENDATIONS

Several factors are considered when determining recommendations for speed limits. These important factors include the prevailing speeds, as determined by the radar speed surveys; the accident history; and the existing traffic and roadside conditions not readily apparent to the driver. Per the California Manual on Uniform Traffic Control Devices (CA MUTCD) Section 2B.13, the posted speed is established at the nearest 5 MPH increment of the 85th percentile speed of free-flow traffic, except as shown in the two options below.

> **Option 1:** Whenever engineering study indicates the need for a reduction in speed to match existing conditions with the traffic safety needs of the community, the posted speed may be reduced by 5 MPH from the nearest 5 MPH increment of the 85th percentile speed, provided that the conditions and justification for the lower speed limit is documented in writing in the E&TS and approved by a registered Civil or Traffic Engineer. The conditions and justifications for those street segments with lower speed limits are provided in Section 3.2 herein.
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> **Option 2:** For cases in which the nearest 5 MPH increment of the 85th percentile speed would require a rounding up, then the speed limit may be rounded down to the nearest 5 MPH increment below the 85th percentile speed, if no further reduction is used.

Section 3.3 summarizes the results and recommendations of the radar speed survey for the selected locations. As shown, the table presents the necessary analysis elements that, in addition to the field review of a registered Civil Engineer, led to the recommendations indicated.

3.1 NO CHANGES TO EXISTING SPEED LIMITS

Section 3.3 indicates that 41 of 41 street segments are recommended for no change in posted speed limits. The reason centers mostly on the fact that newly measured values of the 85th percentile and the 10 MPH pace are still within the parameters of the existing speed limits. Hence, the current postings should remain as is. Those locations are listed below:

- Border Avenue
  - Condor for Ontario
  - Ontario to Via Del Rio
  - Via Del Rio to Tenth
- Griffin Way
  - McKinley to Mondale
  - Mondale to Brittany[1]
- Hidden Valley Parkway
  - Parkview to Parkridge[1]
  - Parkridge to City Limits
- Mountain Gate Drive
  - Main to Lincoln
- Oakridge Drive
  - San Ramon to Canyon Crest[1]
- Olive Street
  - Lincoln to Taylor
  - Taylor to Garretson
- Ontario Avenue
  - Paseo Grande to Border
  - Border to Via Pacifica
  - Via Pacifica to Lincoln
  - Lincoln to Main
  - Main to Kellogg[1]
  - Kellogg to Rimpau
  - Rimpau to State
- Parkridge Avenue
  - City Limits to Lincoln
  - Cota to Main
  - Main to Joy
  - Joy to Cresta
  - Cresta to Hidden Valley
- Pomona Road
  - Auto Center to Maple[1]
  - Maple to Smith[1]
  - Smith to Lincoln[1]
- Railroad Street
  - Auto Center to Smith[1]
  - Smith to Lincoln
  - Lincoln to Buena Vista[1]
  - Buena Vista to W. Grand
- Rincon Street
  - Smith to Lincoln
  - Cota to Joy
- Sampson Avenue
  - Radio to Delilah
  - Delilah to McKinley
  - McKinley to City Limits[1]
- Sherman Street
  - Tenth to D
  - Pomona to Railroad
- Tenth Street
  - Border to Lincoln
  - Lincoln to W. Grand
  - W. Grand to Main
  - Main to E. Grand

[1]Speed limit reduction with justifications per CA MUTCD Section 2B.13 (see Section 3.2 herein for justifications)

3.2 NO CHANGE TO EXISTING SPEED LIMITS WITH JUSTIFICATIONS

This Section presents the conditions and justifications for those street segments that are to remain unchanged after the 5 MPH reduction per the California MUTCD standards Section 2B.13. The speed reduction is necessary to facilitate the orderly movement of traffic, and the reasons for the lower speed limit compliant with CVC Sections 627 and 22358.5.

Griffin Way from Mondale to Brittany (30 MPH)
Griffin Way is a two-lane undivided local street is 0.52 miles in length and carries 4,900 vehicles per day. The street serves mainly residential uses and via side streets and is adjacent to vacant land on some portion of the segment. There are multiple horizontal and vertical curves along the entire segment of the road which raises concern for safe stopping distance that is not readily apparent to the motorist. To maintain safe stopping sight distance and to ensure adequate egress opportunities for residents on Griffin Way, it is recommended that the current speed limit of 30 MPH be maintained.

Hidden Valley Parkway from Parkview to Parkridge (45 MPH)
This segment of Hidden Valley Parkway is a four-lane divided secondary arterial with Class II bike lanes and is 0.80 miles in length. The segment serves residential uses via side streets and carries an average of 20,600 vehicles per day. The roadway is characterized by horizontal and vertical curves along its entire length causing line of sight distance concerns not readily apparent to the motorist. To maintain safe conditions for pedestrians and motorists, and ensure adequate egress opportunities onto Hidden Valley Parkway, it is recommended that the current 45 MPH limit be maintained.

Oakridge Drive from San Ramon to Canyon Crest (35 MPH)
Oakridge Drive is a two-lane undivided collector that is 0.56 miles in length and carries 900 vehicles per day. The street serves mainly residential uses via side streets and is adjacent to vacant land on some portion of the segment. There are multiple horizontal and vertical curves along the entire segment of the road which raises concern for safe stopping distance that is not readily apparent to the motorist. To maintain safe stopping sight distance and to ensure adequate egress opportunities for residents on Oakridge Drive, it is recommended that the current speed limit of 35 MPH be maintained.

Ontario Avenue from Main to Kellogg (45 MPH)
This segment of Ontario Avenue is a six-lane divided major arterial that is 0.78 miles in length and carries 24,500 vehicles per day. The street serves commercial to the south and residential to the north via side streets. There have been 46 accidents in the past two years, 16 of them being speed related collisions, resulting in an accident rate of 115 accidents per HMVM. To maintain safe conditions, avoid an increase in speed-related accidents, and ensure adequate egress opportunities onto Ontario Avenue, it is recommended that the current 45 MPH limit be maintained.

Pomona Road from Auto Center to Maple (35 MPH)
This segment of Pomona Road is a two-lane undivided collector that is 0.57 miles in length and carries 4,700 vehicles per day. This street segment supports light industrial use with numerous frontloading driveways and has large slow-moving trucks which access the multitude of driveways all along the segment. In addition, this segment has multiple horizontal curves which limit lateral visibility of the street, creating a line of sight concern. The ensure adequate egress opportunities onto Pomona Road without increasing the risk of broadside accidents, is recommended that the current speed limit of 35 MPH be maintained.

Pomona Road from Maple to Smith (35 MPH)
This segment of Pomona Road is a two-lane undivided collector that is 0.67 miles in length and carries 4,500 vehicles per day. This street segment supports light industrial use with numerous frontloading driveways and has large slow-moving trucks which access the multitude of driveways all along the segment. In addition, this segment has multiple horizontal curves which limit lateral visibility of the street, creating a line of sight concern. The ensure adequate egress opportunities onto Pomona Road without increasing the risk of broadside accidents, is recommended that the current speed limit of 35 MPH be maintained.

Pomona Road from Smith to Lincoln (35 MPH)
This segment of Pomona Road is a two-lane undivided collector that is 0.73 miles in length and carries 4,600 vehicles per day. This street segment supports light industrial use with numerous frontloading driveways and has large slow-moving trucks which access the multitude of driveways all along the segment. In addition, this segment has multiple horizontal curves which limit lateral visibility of the street, creating a line of sight concern. The ensure adequate egress opportunities onto Pomona Road without increasing the risk of broadside accidents, is recommended that the current speed limit of 35 MPH be maintained.

Railroad Street from Auto Center to Smith (40 MPH)
This segment of Railroad Street is a four-lane undivided secondary arterial that is 1.5 miles in length and carries 14,400 vehicles per day. This street segment supports industrial use with numerous frontloading driveways and side streets and has large slow-moving trucks which access the multitude of driveways and streets all along the segment. In addition, this segment has multiple horizontal curves which limit lateral visibility of the street, creating a line of sight concern. The ensure adequate egress opportunities onto Railroad Street without increasing the risk of broadside accidents, is recommended that the current speed limit of 40 MPH be maintained.

Railroad Street from Lincoln to Buena Vista (40 MPH)
This segment of Railroad Street is a four-lane undivided secondary arterial that is 0.33 miles in length and carries 11,100 vehicles per day. This short street segment supports industrial use and residential use with numerous frontloading driveways and has large slow-moving trucks which access the multitude of driveways along the segment. The ensure adequate egress opportunities onto Railroad Street

without increasing the risk of broadside accidents, is recommended that the current speed limit of 40 MPH be maintained.

Sampson Avenue from McKinley to City Limits (45 MPH)
This segment of Sampson Avenue is a two-lane undivided collector that is 1.13 miles in length and carries 9,900 vehicles per day. This street segment supports light industrial and office use with numerous frontloading driveways. The ensure adequate egress opportunities onto Sampson Avenue without increasing the risk of broadside accidents, is recommended that the current speed limit of 45 MPH be maintained.

3.3 PROPOSED SPEED LIMITS

STREET	LIMITS	SPEED EXISTING	SPEED CRITICAL[1] (85%-TILE)	SPEED PROPOSED
Border Avenue	Condor to Ontario	35	31.8	35
	Ontario to Via Del Rio	35	39.9	35
	Via Del Rio to Tenth	35	32.7	35
Griffin Way	McKinley to Mondale	35	37.5	35
	Mondale to Brittany	30	37.3	30
Hidden Valley Parkway	Parkview to Parkridge	45	51.4	45
	Parkridge to City Limits	45	47.6	45
Mountain Gate Drive	Main to Lincoln	40	42.6	40
Oakridge Drive	San Ramon to Canyon Crest	35	41.0	35
Olive Street	Lincoln to Taylor	35	38.3	35
	Taylor to Garretson	35	38.7	35
Ontario Avenue	Paseo Grande to Border	35	39.0	35
	Border to Via Pacifica	35	37.4	35
	Via Pacifica to Lincoln	45	49.3	45
	Lincoln to Main	45	49.8	45
	Main to Kellogg	45	51.3	45
	Kellogg to Rimpau	45	47.2	45
	Rimpau to State	45	46.1	45
Parkridge Avenue	W. City Limits to Lincoln	40	35.7	40
	Cota to Main	40	31.7	40
	Main to Joy	45	43.8	45
	Joy to Cresta	45	44.9	45
	Cresta to Hidden Valley	45	44.9	45
Pomona Road	Auto Center to Maple	35	42.0	35
	Maple to Smith	35	41.8	35
	Smith to Lincoln	35	42.0	35
Railroad Street	Auto Center to Smith	40	47.3	40
	Smith to Lincoln	40	44.6	40
	Lincoln to Buena Vista	40	46.6	40
	Buena Vista to W. Grand	40	43.1	40
Rincon Street	Smith to Lincoln	45	44.3	45
	Cota to Joy	35	33.0	35

3.3 PROPOSED SPEED LIMITS (CONTINUED)

Sampson Avenue	Radio to Delilah	45	48.3	45
	Delilah to McKinley	45	46.7	45
	McKinley to City Limits	45	51.8	45
Sherman Street	Tenth to D	35	35.7	35
	Pomona to Railroad	35	37.6	35
Tenth Street	Border to Lincoln	35	39.8	35
	Lincoln to W. Grand	30	33.8	30
	W. Grand to Main	25	23.8	25
	Main to E. Grand	25	27.4	25

NOTE:

1. The CRITICAL SPEED, or 85th percentile speed, is defined as that speed at or below which 85 percent of the traffic is moving. From experience, traffic engineers have found that this is one of the most reliable factors in determining appropriate speed limits. Hence, the accepted practice, and one which has been used in this case, is to set the speed limit at the nearest 5 mph increment to the critical speed. When this procedure is used, it not only conforms to that required by the State but is also provides a strong base for law enforcement personnel to properly enforce speed limits.