TECHNICAL MEMORANDUM

DATE: March 13, 2020

TO: Mr. MD M. Hossain

FROM: R. Jake Gutekunst, P.E.

JOB NUMBER: 064405305

RE: Killeen On-Call
Work Order 5
Speed Zone Study – Rosewood Drive from E Central Texas Expressway to Stagecoach Road

Background

This report documents the results of a speed zone study conducted for Rosewood Drive, a roadway owned and maintained by the City of Killeen, Texas. This report contains recommendations related to speed limits on Rosewood Drive between E Central Texas Expressway and Stagecoach Road, based on engineering analysis performed per applicable provisions of the Texas Transportation Code and guidelines set forth by the Texas Department of Transportation (TxDOT).

BASIC SPEED LAW

Transportation Code, Chapter 545, Subchapter H, "Speed Restrictions," contains the statutes governing speeds on roadways in the state of Texas. The following sections pertain to speed zoning by municipalities:

- Section 545.351, Maximum Speed Requirements
- Section 545.356, Authority of Municipality to Alter Speed Limits

The basic speed law is founded on the belief that the majority of motorists are willing to modify their driving behavior properly, as long as they are aware of the conditions around them. Speed zone regulations are based on Section 545.351, which states: "An operator may not drive at a speed greater than is reasonable or prudent under the circumstances … then existing."

The part of the Texas Transportation Code that relates directly to Municipality authority is Section 545.356, which is provided below:

Chapter 545, Operation and Movement of Vehicles

Sec. 545.356. AUTHORITY OF MUNICIPALITY TO ALTER SPEED LIMITS. (a) The governing body of a municipality, for a highway or part of a highway in the municipality, including a highway of the state highway system, has the same authority to alter by ordinance prima facie speed limits from the results of an engineering and traffic investigation as the Texas Transportation Commission on an officially designated or marked highway of the state highway system. The governing body of a municipality may not modify the rule established by Section 545.351(a) or establish a speed limit of more than 75 miles per hour.

(b) The governing body of a municipality, for a highway or part of a highway in the municipality, including a highway of the state highway system, has the same authority to alter prima facie speed limits from the results of an engineering and traffic investigation as the commission for an officially designated or marked highway of the state highway system, when the highway or part of the highway is under repair, construction, or maintenance. A municipality may not modify the rule established by Section 545.351(a) or establish a speed limit of more than 75 miles per hour.

(b-1) Except as provided by Subsection (b-3), the governing body of a municipality, for a highway or a part of a highway in the municipality that is not an officially designated or marked highway or road of the state highway system, may declare a lower speed limit of not less than 25 miles per hour, if the governing body determines that the prima facie speed limit on the highway is unreasonable or unsafe.

(b-2) Subsection (b-1) applies only to a two-lane, undivided highway or part of a highway.

(b-3) The governing body of a municipality with a population of 2,000 or less, for a highway or a part of a highway in the municipality that is a one-lane highway used for two-way access and that is not an officially designated or marked highway or road of the state highway system, may declare a lower speed limit of not less than 10 miles per hour, if the governing body determines that the prima facie speed limit on the highway is unreasonable

or unsafe.

(c) A prima facie speed limit that is altered by the governing body of a municipality under Subsection (b), (b-1), or (b-3) is effective when the governing body erects signs giving notice of the new limit and at all times or at other times as determined.

(d) The governing body of a municipality that declares a lower speed limit on a highway or part of a highway under Subsection (b-1) or (b-3), not later than February 1 of each year, shall publish on its Internet website and submit to the department a report that compares for each of the two previous calendar years:

(1) the number of traffic citations issued by peace officers of the municipality and the alleged speed of the vehicles, for speed limit violations on the highway or part of the highway;

(2) the number of warning citations issued by peace officers of the municipality on the highway or part of the highway; and

(3) the number of vehicular accidents that resulted in injury or death and were attributable to speed limit violations on the highway or part of the highway.

LOCAL AUTHORITY

The altering of the general statewide maximum speed limits to fit existing traffic and physical conditions of the highway constitutes the basic principle of speed zoning. Cities have the authority to establish a prima facie maximum speed limit of 75 miles per hour.

County commissioner courts and governing bodies of incorporated cities, towns, and villages may alter maximum *prima facie* speed limits on roadways under their jurisdiction in accordance with the provision of the Transportation Code, Chapter 545, Subchapter H, Sections 545.355 and 545.356 respectively.

A city that increases the *prima facie* speed limit on a city road or highway is required to conduct an engineering and traffic investigation. However, for a highway or a part of a highway in the municipality that is not an officially designated or marked highway or road of the state highway system, the municipality may declare a lower speed limit of not less than 25 miles per hour, if the governing body determines that the *prima facie* speed limit on the road or highway is unreasonable or unsafe.

PRIMA FACIE CONCEPT

In Texas, all speed limits are considered "*prima facie*" limits. *Prima facie* limits are those limits that, "on the face of it," are reasonable and prudent under normal conditions. To exceed a *prima facie* speed limit does not automatically constitute an infraction of the law, as reasonable and prudent driving behavior is, at times, possible at speeds in excess of the posted limit. However, the burden of proof of reasonable and prudent conduct under the existing conditions rests with the driver. To afford a driver this opportunity to exceed a *prima facie* speed limit recognizes the fact that any posted speed limit cannot adequately reflect the many different road conditions confronting the driver on the same highways at different times.

VALUE OF SPEED ZONING

Although comparative "before-and-after" studies indicate that speed limit signs actually have very little influence on the driver's choice of speed, speed zoning is necessary and does serve a worthwhile purpose. Realistic speed zoning will serve to protect the public and to regulate the unreasonable behavior of an individual. Having recognized that normally careful and competent actions of a reasonable person should be considered legal, the Texas Legislature has passed legislation concerning speed zoning in order to assure this protection.

If a speed zone is determined by the actions of the majority of drivers on a highway, then it is hoped that speed zoning will facilitate the orderly movement of traffic by increasing driver awareness of a reasonable and prudent speed. Properly applied speed zoning can:

- help drivers adjust their speed to the conditions
- make enforcement easier by furnishing police officers with a reasonable indication of what is excessive speed
- result in more motorists driving within the same speed range at each of the locations along the highway
- reduce the frequency and severity of crashes when accompanied by enforcement.

GUIDELINES FOR SELECTING SPEED LIMITS

TxDOT recommends in its Procedures for Establishing Speed Zones manual that all authorized entities using these procedures should observe the following guidelines when selecting speed limits:

- Speed limits on all roadways should be set based on spot speed studies and the 85th percentile operating speed. Legal minimum and maximum speeds should establish the boundaries of the speed limits. If an existing roadway section's posted speed limit is to be raised, the roadway's roadside features should be examined to determine if modifications may be necessary to maintain roadside safety.

- It is appropriate for posted speed limits to be based on the 85th percentile speed, even for those sections of roadway that have an inferred design speed lower than the 85th percentile speed. Posting a roadway's speed limit based on its 85th percentile speed is considered good and typical engineering practice. This practice remains valid, even where the inferred design speed is lower than the resulting posted speed limit. In such situations, the posted speed limit would not be considered excessive or unsafe.
- Arbitrarily setting lower speed limits at point locations due to a perceived shorter than desirable stopping sight distance is neither effective nor good engineering practice.

- If a section of roadway has (or is expected to have) a posted speed in excess of the roadway's inferred design speed and a safety concern exists at the location, then appropriate warning or informational signs should be installed to warn or inform drivers of the condition. Slightly shorter than desirable stopping sight distances do not present an unsafe operating condition, because of the conservative assumptions made in establishing desirable stopping sight distances. It is important to remember that any sign is a roadside object and that it should be installed only when its need is clearly demonstrated.

- New or reconstructed roadways (and roadway sections) should be designed to accommodate operating speeds consistent with the roadway's highest anticipated posted speed limit based on the roadway's initial or ultimate function.

DESIGN AND PHYSICAL FACTORS OF THE ROADWAY

Because so many variables affect the safe operating speed of vehicles, it is not practical to consider each individually. These factors should be considered as a whole and weighed accordingly. They include:

- horizontal and vertical curves
- hidden driveways and other roadside developments
- high driveway density

- rural residential or developed areas
- lack of striped, improved shoulders.

Speed restrictions (if any) imposed by some curves can be calculated easily and checked by the use of the ball bank indicator; likewise, the restriction imposed by obstructions to sight distance can be calculated.

The effects of such factors as lane width, condition of surface, type and width of shoulders, frequency of intersections, and roadside development are not so easily measured. As a general rule, especially on tangents, these factors will be measured on the basis of prevailing speeds as determined by speed checks.

Regulatory and Advisory Speeds

When an engineering and traffic investigation shows that the statutory speed limits are no longer applicable for the existing conditions, the *prima facie* maximum speed limits should be altered accordingly with a speed zone. The types of speed zones are as follows:

- regulatory
- construction
- school
- private road.

This study does not address construction, school, or private road speed limits. During field observations on March 5, 2020, it was noted that chevron alignment signs (TMUTCD W1-8 signs) were installed on a curve in Rosewood Drive just south of Aspen Drive, but no advisory speed signs accompanied these signs. If implementation occurs of an increased speed limit as a result of this study, it is recommended that additional analysis be performed to assess the need for advisory speeds around the curve south of Aspen Drive and north of Glennwood Drive per the applicable provisions of the TMUTCD Section 2C.08 for advisory speed plaques.

REGULATORY SPEEDS

Regulatory speed zones should be applied only to those locations and sections of highways which are not dealt with adequately by the general statewide speed limits, and they should be indicators of the speed limitations imposed by physical and traffic conditions at such locations. Speed limits are determined by specific roadway and traffic conditions. Speed limits should not be lowered to the extent necessary for a driver to avoid a collision with a

pedestrian or other motorist who is entering or crossing the highway in violation of an existing traffic regulation.

Roadway safety is an important consideration in establishing speed limits. The following factors affect roadway safety and, therefore, should be considered when establishing speed limits:

- horizontal and vertical curves
- hidden driveways and other roadside developments
- high driveway density
- crash history along the location
- rural residential or developed areas
- lack of striped, improved shoulders.

Regulatory Speed Zones

A regulatory speed zone is the application, by city ordinance, of posted legal speed limits to sections of roadway where the numerical values of these special speed limits have been determined through engineering investigations of traffic and physical conditions.

Speed Zone Studies

This section includes a description of how to conduct an engineering and traffic investigation as the basis for establishing a regulatory speed zone along a roadway. This investigation is commonly called a “speed zone study.”

Sound and generally accepted engineering practices are an integral part of such speed zone studies

DETERMINING THE 85TH PERCENTILE SPEED

The maximum speed limits posted as the result of a study should be based primarily on the 85th percentile speed, when adequate speed samples can be secured. The 85th percentile speed is a value that is used by many states and cities for establishing regulatory speed zones.

THEORY

Use of the 85th percentile speed concept is based on the theory that:

- the large majority of drivers:

  - are reasonable and prudent
  - do not want to have a crash
  - desire to reach their destination in the shortest possible time
- a speed at or below which 85 percent of people drive at any given location under good weather and visibility conditions may be considered as the maximum safe speed for that location.

STATISTICAL RATIONALE

The results of numerous and extensive "before-and-after" studies substantiate the general propriety and value of the 85th percentile criterion.

Statistical techniques show that a normal probability distribution will occur when a random sample of traffic is measured. From the resulting frequency distribution curves, one finds that a certain percentage of drivers drive too fast for the existing conditions and a certain percentage of drivers travel at an unreasonably slow speed compared to the trend of traffic.

Most cumulative speed distribution curves "break" at approximately 15 percent and 85 percent of the total number of observations. Consequently, the motorists observed in the lower 15 percent are considered to be traveling unreasonably slow and those observed above the 85th percentile value are assumed to be exceeding a safe and reasonable speed. Because of the steep slope of the distribution curve below the 85th percentile value, it can readily be seen that posting a speed below the critical value would penalize a large percentage of reasonable drivers.

Experience proves these findings valid and shows that the 85th percentile speed is the one characteristic of traffic speeds that most closely conforms to a speed limit which is considered safe and reasonable.

SPEED CHECKS FOR EXISTING HIGHWAYS

Speed measurements were collected using tube counters to collect speed and volume data at three locations, as shown on the map. The speed data collected is provided in the *Appendix*. Analysis of this data provides the 85th percentile speeds and 10 mile per hour pace. Speed checks are of prime importance, because they:

- represent the consensus of drivers as to the safe speed at a given location
- provide the basic data on which the regulatory speed zone is based.

In Figure 1, the three segment count locations for Rosewood Drive between E Central Texas Expressway to Stagecoach Road are provided for the extents of the study.

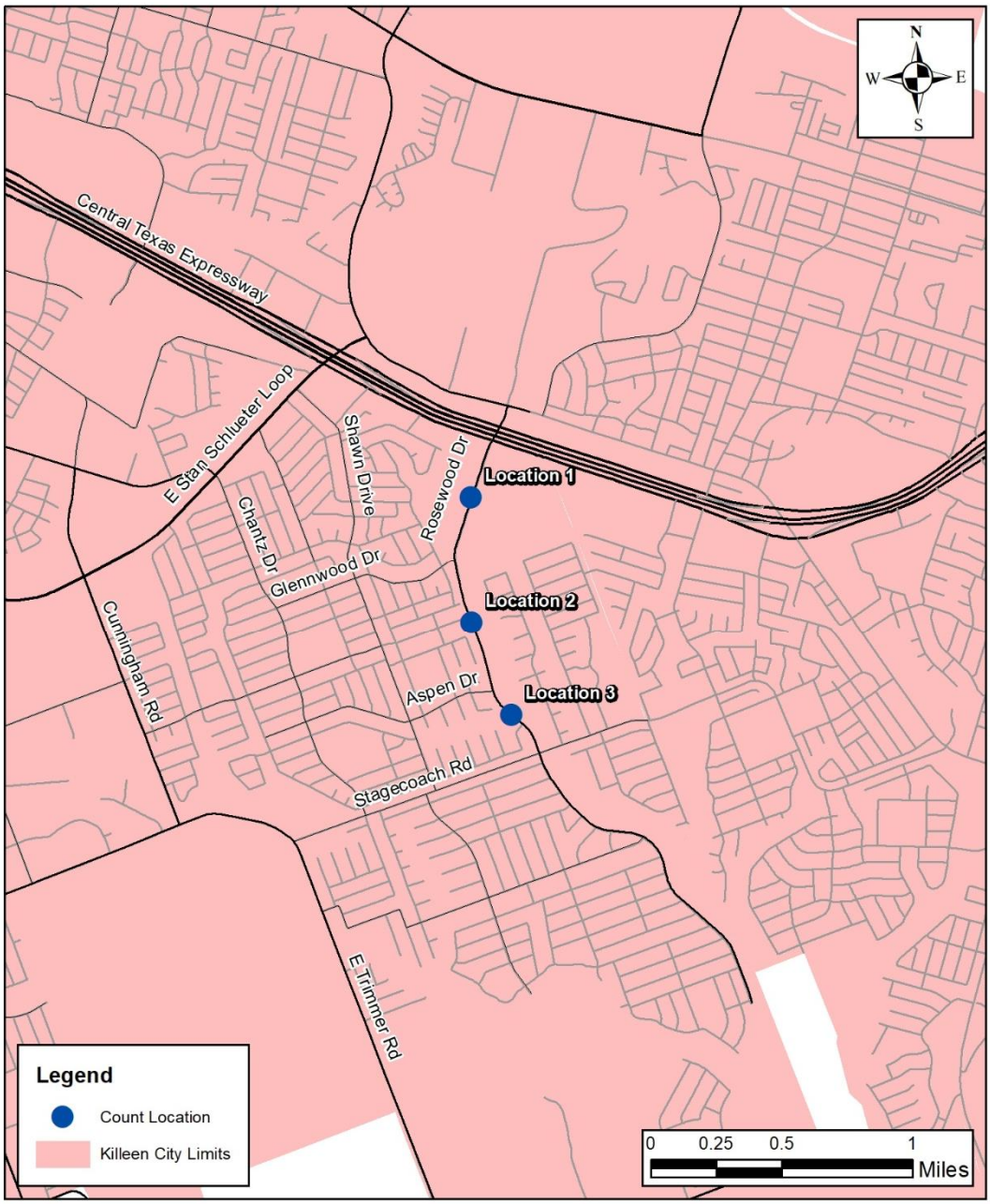

Figure 1: Rosewood Drive Count Locations

VARIATION FROM 85TH PERCENTILE

The posted speed selected is the nearest value ending in 5 or 0. The final speed limit may be lowered or raised by as much as 5 miles per hour from the 85th percentile speed determined by the study, based on the professional judgement of the supervising engineer. Only under special conditions would the zone speed vary further from the 85th percentile.

Additional Roadway Factors. The posted speed limit may be reduced below the 85th percentile speed, based on sound and generally accepted engineering judgement that includes consideration of the following factors:

- narrow roadway pavement widths (20 feet or less, for example)
- horizontal and vertical curves (possible limited sight distance)
- hidden driveways and other developments (possible limited sight distance)
- high driveway density (the higher the number of driveways, the higher the potential for encountering entering and turning vehicles)
- crash history along the location
- rural residential or developed areas (higher potential for pedestrian and bicycle traffic)
- lack of striped, improved shoulders (constricted lateral movement).

The final decision on the amount of variation from the 85th percentile speed for a specific roadway should be based on the engineering judgement of the supervising engineer.

Recommendations

In order to be consistent in weighing additional roadway factors, mile per hour (mph) reduction values to the 85th percentile speed were assigned to each condition. For alignments with curves or alignment changes along a segment, a reduction of 1 mph was assigned, and an additional 2 mph reduction was assigned in scenarios with severe and frequent alignment changes. Hidden driveways and high driveway densities were given a reduction of 1 mph. From this value, engineering judgment was exercised to determine a recommended speed in 5 mph increments. In cases where speed changes would be too frequent between segments of the same road, a uniform speed limit was assigned for safe operation of a vehicle.

The speed study results, additional factors regarding the roadway, and recommended speed limits are provided in the table below:

Roadway	Location	85 Percentile Speed (mph)	10 mph Pace	Roadway Characteristics			Recommended Speed (mph)
				Alignment	Hidden Driveways	High Driveway Density	
Rosewood Drive	1: E Central Texas to Glennwood	47	36-45				45
Rosewood Drive	2: Glennwood to Aspen	49	36-45				45
Rosewood Drive	3: Aspen to Stagecoach	43	31-40	X			45

The existing posted speed limit on Rosewood Drive is 35 mph along the entire length of the studied section. This report recommends changing the speed limit for the entire length of the studied section of Rosewood Drive. The recommended speed for Segment 1 of Rosewood Lane (from E Central Texas Expressway to Glennwood Drive) is 45 mph. This segment has no features which should be considered for speed reduction; it has mostly vacant land on both sides, is a mostly straight segment with a 4-lane divided roadway and low driveway density, including no driveways on the east side due to the presence of a creek. Thus, a recommended speed of 45 mph, which is within 5 mph of the 85th percentile speed, is sufficient. Segment 2 (from Glennwood Drive to Aspen Drive) has many features in common with Segment 1, including few, gradual curves, well-developed 5-lane roadway, and few driveways, with none on the east side. As such, reduction in speed limit is not necessary on Segment 2, and a recommended speed of 45 mph, which is within 5 mph of the 85th percentile speed, is sufficient. Segment 3 (from

Aspen Drive to Stagecoach Road) has two horizontal curves within its boundaries. It otherwise is in good condition as a speed zone, with a well-developed 5-lane roadway and no eastern driveways. A reduction of 1 mph should be applied to its 85th percentile speed to accommodate the horizontal curvature. However, by use of engineering judgement and to maintain consistent speeds on this relatively short study area, 45 mph is again the recommended speed for this segment, which is within 5 mph of the 85th percentile speed. It is recommended to add advisory speed limit signs along the curve marked with directional chevron signs south of Aspen Drive, which should be posted at 40 mph advisory speed to represent closer to the observed 85th percentile speed and noticeable drop in speeds by drivers in this section.

In addition to the recommendations related to speed limits, it is recommended that evaluation of pedestrian volumes using the crosswalk to the north of the intersection of Rosewood Drive and Glennwood Drive be evaluated for adequate gaps in traffic for the pedestrian demand at this location. If an increase in posted speed is implemented, additional measures may need to be installed to enhance pedestrian safety at this location. Potential measures for improved safety include extension of the existing median for a pedestrian refuge island, addition of Rectangular Rapid Flashing Beacons, a Pedestrian Hybrid Beacon, or other measures to increase the visibility of this pedestrian crossing to motorists.

Appendix

Kimley»Horn

Site Code:
Station ID:
Rosewood Drive
Location 1

Direction
Northbound & Southbound

Date	Speed Ranges (MPH)														
3/3/2020-3/6/2020	1	16	21	26	31	36	41	46	51	56	61	66	71	76	
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total
8:00	2	1	1	0	63	265	244	72	9	2	1	1	0	0	661
9:00	2	1	0	2	44	235	252	112	24	4	1	0	0	0	677
10:00	0	1	1	2	34	235	261	121	31	3	3	0	0	0	692
11:00	0	0	0	3	62	224	253	126	39	11	1	0	1	0	720
12:00	2	0	0	1	51	271	296	131	30	7	1	1	0	0	791
13:00	0	3	0	1	73	282	264	116	28	4	1	0	0	0	772
14:00	0	0	0	2	73	306	317	118	24	5	0	0	0	0	845
15:00	1	0	0	0	81	328	418	179	47	11	2	1	0	0	1068
16:00	0	0	0	0	79	418	566	253	60	7	3	0	0	0	1386
17:00	0	1	1	6	85	492	569	263	61	9	0	1	1	0	1489
18:00	0	0	0	2	50	404	453	190	48	5	0	0	0	0	1152
19:00	0	0	0	6	63	279	277	129	32	3	1	0	0	0	790
20:00	0	0	0	2	39	186	228	120	27	7	0	0	0	0	609
21:00	0	0	0	0	27	166	140	76	27	6	1	0	0	0	443
22:00	0	0	0	1	13	75	71	34	6	3	1	0	0	0	204
23:00	0	0	0	1	16	57	65	29	9	0	1	0	3	0	181
0:00	0	0	0	0	12	32	32	14	7	2	0	0	0	0	99
1:00	0	0	1	1	4	24	21	7	4	0	0	0	0	0	62
2:00	0	0	0	1	3	12	8	3	3	4	0	0	0	0	34
3:00	0	0	0	1	7	19	12	1	2	0	0	0	0	0	42
4:00	0	0	0	0	21	48	40	15	3	1	1	0	0	0	129
5:00	0	0	0	2	38	164	120	32	5	0	0	0	0	0	361
6:00	0	3	19	51	151	312	224	52	5	3	0	0	0	0	820
7:00	3	14	23	73	247	605	292	86	10	2	0	0	0	0	1355
8:00	0	0	0	19	141	478	349	96	11	3	3	0	0	0	1100
9:00	0	0	0	2	69	224	264	80	16	3	1	0	0	0	659
10:00	0	1	0	1	47	218	240	99	21	1	1	0	0	0	629
11:00	0	3	3	0	44	258	282	106	26	6	0	0	0	0	728
12:00	0	2	2	1	44	259	314	124	39	2	1	0	0	0	788
13:00	1	1	0	2	36	252	334	114	37	2	1	0	0	0	780
14:00	2	4	0	2	55	305	334	139	28	4	0	1	0	0	874
15:00	0	0	0	4	69	381	455	174	46	4	0	0	0	0	1133
16:00	2	2	0	19	149	552	483	147	25	4	0	1	0	0	1384
17:00	0	0	0	8	132	574	574	200	26	7	1	0	0	0	1522
18:00	0	0	0	6	89	444	383	122	23	3	1	0	0	0	1071
19:00	0	0	0	4	77	297	273	100	18	3	0	0	0	0	772
20:00	0	0	0	4	82	240	187	68	17	4	0	0	0	0	602
21:00	0	0	0	4	45	152	133	49	12	4	1	0	0	0	400
22:00	0	0	0	3	26	90	87	30	9	0	1	0	0	0	246
23:00	0	0	0	0	19	34	66	25	13	1	0	0	0	0	158
0:00	0	0	0	0	10	35	24	16	1	1	0	0	0	0	87
1:00	0	0	0	0	5	20	19	10	2	1	0	1	0	0	58
2:00	0	0	0	0	5	10	18	5	1	0	0	0	0	0	39
3:00	0	0	0	0	5	25	21	9	4	3	0	0	0	0	67
4:00	0	0	0	0	9	36	35	22	7	1	0	0	0	0	110
5:00	0	0	0	0	29	151	160	59	14	0	0	0	0	0	413
6:00	0	0	0	2	63	311	393	120	33	8	3	1	0	0	934
7:00	0	0	0	0	68	494	583	215	48	11	2	0	1	0	1422
8:00	2	0	0	2	63	375	399	138	29	5	1	1	0	0	1015
9:00	1	0	0	0	36	237	234	106	23	8	0	0	1	0	646
10:00	0	0	0	0	40	220	208	106	29	2	0	0	2	0	607
11:00	0	0	0	2	63	230	268	118	32	3	1	1	0	0	718
12:00	2	1	1	4	51	252	306	124	38	7	1	0	0	0	787
13:00	0	0	0	3	56	265	316	135	27	6	2	0	0	0	810
14:00	2	3	9	8	71	267	354	131	31	4	0	1	0	0	881
15:00	1	1	3	2	71	351	427	194	39	6	1	0	0	0	1096
16:00	0	0	0	3	59	424	562	250	57	22	0	1	1	0	1379
17:00	0	0	0	2	53	390	582	296	80	14	2	1	0	0	1420
18:00	1	0	1	1	70	410	479	207	62	10	0	0	0	0	1241
19:00	0	0	3	5	64	333	348	155	27	4	2	1	0	0	942
20:00	0	0	0	2	36	219	290	101	37	7	0	0	1	0	693
21:00	0	2	0	2	43	142	153	86	20	7	0	0	0	0	455
22:00	0	0	0	0	32	85	103	51	13	5	1	0	0	0	290
23:00	0	0	0	0	15	77	83	40	18	3	0	0	0	0	236
0:00	0	0	0	0	14	36	38	20	7	1	0	1	0	0	117
1:00	0	0	0	0	8	15	37	17	2	0	0	0	1	0	80
2:00	0	0	0	3	4	17	21	12	6	2	0	0	1	0	66
3:00	0	0	0	0	4	14	33	9	2	1	0	0	0	0	63
4:00	0	0	0	1	13	33	41	26	10	2	0	0	0	0	126
5:00	0	0	0	1	16	138	154	56	15	4	1	0	0	0	385
6:00	0	0	0	2	53	279	364	136	43	9	1	1	1	0	889
7:00	0	0	0	3	78	431	588	239	66	8	3	0	1	0	1417
8:00	0	0	1	4	88	336	378	135	40	2	1	2	0	0	987
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	24	44	69	289	3755	16855	18200	7296	1771	317	51	18	15	0	48704
Percent	0.0%	0.1%	0.1%	0.6%	7.7%	34.6%	37.4%	15.0%	3.6%	0.7%	0.1%	0.0%	0.0%	0.0%	

15th Percentile:	36 MPH
50th Percentile:	41 MPH
85th Percentile:	47 MPH
95th Percentile:	50 MPH

10 MPH Pace Speed:	36 - 45 MPH
Number in Pace:	35055
Percent in Pace:	72.0%
Number of Vehicles > 45 MPH	9468
Percent of Vehicles > 45 MPH	19.4%
Mean Speed (Average):	42 MPH

Kimley»Horn

Site Code:
Station ID:
Rosewood Drive
Location 1

Direction
Northbound & Southbound

Date	Speed Ranges (MPH)														
3/3/2020-3/6/2020	1	16	21	26	31	36	41	46	51	56	61	66	71	76	
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total
8:00	1	0	0	3	33	189	226	136	24	4	0	1	1	0	618
9:00	1	0	0	1	29	184	302	147	34	8	2	0	0	0	708
10:00	0	0	0	1	27	176	283	162	46	8	2	0	0	0	705
11:00	0	0	0	1	32	200	286	175	44	14	1	0	1	0	754
12:00	0	0	0	1	28	238	339	173	48	14	2	1	1	0	845
13:00	0	0	0	0	38	238	341	147	47	8	2	0	0	0	821
14:00	0	0	0	0	40	257	356	174	47	6	0	0	0	0	880
15:00	1	0	1	0	48	265	440	263	58	15	0	0	1	0	1092
16:00	0	0	0	0	36	346	603	333	104	17	5	0	0	0	1444
17:00	7	9	3	4	33	349	636	346	78	14	1	0	0	0	1480
18:00	0	0	0	1	31	300	523	243	52	11	1	0	0	0	1162
19:00	0	0	0	1	42	236	291	158	41	5	1	0	0	0	775
20:00	0	0	0	0	21	155	238	114	41	6	1	1	0	0	577
21:00	0	0	0	1	21	117	167	84	19	10	0	0	1	0	420
22:00	0	0	0	0	5	43	81	43	11	3	0	0	2	0	188
23:00	0	0	0	2	14	32	82	28	8	1	0	0	2	0	169
0:00	0	0	0	0	9	33	33	13	7	0	0	0	0	0	95
1:00	0	0	0	1	5	12	18	9	3	0	0	0	0	0	48
2:00	0	0	1	0	2	12	9	0	6	2	1	1	0	0	34
3:00	0	0	0	0	2	24	11	2	1	1	0	0	0	0	41
4:00	0	0	0	0	4	54	43	21	7	1	0	0	0	0	130
5:00	0	0	0	1	10	119	152	50	13	1	0	0	0	0	346
6:00	0	0	0	21	109	284	272	76	13	1	0	0	0	0	776
7:00	0	0	1	7	108	515	497	161	23	8	0	0	0	0	1320
8:00	1	0	1	2	42	301	452	206	49	5	0	1	0	0	1060
9:00	0	0	0	4	37	196	301	113	19	1	0	0	0	0	671
10:00	0	0	0	2	31	195	257	112	24	10	1	0	0	0	632
11:00	0	0	2	1	35	208	299	139	31	9	0	0	0	0	724
12:00	0	0	0	3	35	222	324	158	46	6	3	2	0	0	799
13:00	0	0	0	6	31	207	324	155	38	10	3	1	0	0	775
14:00	0	0	0	2	36	226	343	164	60	6	0	0	0	0	837
15:00	0	0	0	0	40	334	431	215	60	11	1	0	0	0	1092
16:00	0	0	0	1	74	474	530	183	29	6	0	0	0	0	1297
17:00	0	0	0	1	60	411	622	248	50	8	2	0	0	0	1402
18:00	0	0	0	3	43	289	450	181	39	8	3	0	0	0	1016
19:00	0	0	0	2	33	211	276	140	28	3	0	0	0	0	693
20:00	0	0	0	6	36	184	217	88	18	2	1	0	0	0	552
21:00	0	0	0	1	25	126	131	56	11	7	1	0	0	0	358
22:00	0	0	0	1	23	74	75	40	8	1	0	0	0	0	222
23:00	0	0	0	1	11	46	57	22	5	2	0	0	0	0	144
0:00	0	0	0	0	7	26	26	13	2	2	0	0	0	0	76
1:00	0	0	0	1	3	14	20	7	6	0	0	0	0	0	51
2:00	0	0	0	1	1	13	16	7	0	1	1	0	0	0	40
3:00	0	0	0	0	4	23	21	6	3	2	1	0	0	0	60
4:00	0	0	0	2	3	28	34	20	6	0	1	0	0	0	94
5:00	0	0	0	0	10	98	195	72	16	2	1	0	0	0	394
6:00	0	1	0	0	23	225	373	189	51	11	3	3	0	0	879
7:00	0	0	0	1	24	284	611	360	83	21	1	0	1	0	1386
8:00	1	0	0	4	27	258	509	234	62	9	3	0	0	0	1107
9:00	0	0	0	2	22	191	297	178	48	10	2	0	0	0	750
10:00	0	0	0	1	27	213	248	150	44	8	4	0	1	0	696
11:00	0	0	0	1	18	211	293	202	42	12	1	1	0	0	781
12:00	0	1	1	3	29	201	366	200	59	15	1	0	1	0	877
13:00	0	0	0	0	38	199	369	206	60	21	2	0	0	0	895
14:00	1	0	0	4	38	219	363	223	54	12	2	1	0	0	917
15:00	0	0	0	1	26	261	469	325	78	12	0	0	0	0	1172
16:00	0	0	0	0	22	321	592	403	110	21	0	0	0	0	1469
17:00	0	0	1	2	22	319	616	362	119	21	3	0	1	0	1466
18:00	0	0	0	2	28	280	536	280	81	22	3	0	1	0	1233
19:00	0	0	1	4	31	230	390	199	30	8	3	1	0	0	897
20:00	0	0	0	2	22	163	271	143	36	7	2	0	1	0	647
21:00	0	0	0	1	18	124	165	88	36	3	1	0	1	0	437
22:00	0	0	0	0	22	78	97	50	14	5	1	0	0	0	267
23:00	0	0	0	1	7	53	85	49	14	3	0	0	0	0	212
0:00	0	0	0	0	7	37	48	17	9	1	0	2	0	0	121
1:00	0	0	0	0	1	18	26	16	2	1	1	0	0	0	65
2:00	0	0	0	1	4	12	16	17	3	3	0	0	0	0	56
3:00	0	0	0	0	4	10	20	12	4	2	0	0	0	0	52
4:00	0	0	0	0	8	38	38	16	6	2	0	0	0	0	108
5:00	0	0	0	0	10	89	152	77	25	4	1	0	0	0	358
6:00	3	2	1	0	21	203	387	157	40	13	2	0	1	0	830
7:00	0	0	0	2	32	310	609	322	100	22	3	2	0	0	1402
8:00	0	1	0	3	31	244	405	253	83	10	2	0	0	0	1032
9:00	0	0	0	1	4	1	0	0	0	0	0	0	0	0	6
Total	16	14	13	122	1913	13076	19981	10131	2616	539	79	18	17	0	48535
Percent	0.0%	0.0%	0.0%	0.3%	3.9%	26.9%	41.2%	20.9%	5.4%	1.1%	0.2%	0.0%	0.0%	0.0%	

15th Percentile:	37 MPH
50th Percentile:	43 MPH
85th Percentile:	49 MPH
95th Percentile:	52 MPH

10 MPH Pace Speed:	36 - 45 MPH
Number in Pace:	33057
Percent in Pace:	68.1%
Number of Vehicles > 45 MPH	13400
Percent of Vehicles > 45 MPH	27.6%
Mean Speed (Average):	43 MPH

Kimley»Horn

Site Code:
Station ID:
Rosewood Drive
Location 1

Direction
Northbound & Southbound

Date	Speed Ranges (MPH)														
3/3/2020-3/6/2020	1	16	21	26	31	36	41	46	51	56	61	66	71	76	
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total
8:00	5	5	11	29	106	163	51	8	2	0	0	0	0	0	380
9:00	1	0	0	15	154	293	115	19	3	0	0	0	0	0	600
10:00	0	0	1	9	125	311	140	14	1	1	0	0	0	0	602
11:00	0	0	0	15	124	324	135	23	3	0	0	0	0	0	624
12:00	0	0	0	9	164	348	163	16	0	1	0	0	0	0	701
13:00	0	0	1	14	182	342	128	10	6	2	0	0	0	0	685
14:00	0	1	1	17	215	332	137	13	0	0	0	0	0	0	716
15:00	0	1	0	38	229	448	189	28	2	0	0	0	0	0	935
16:00	0	0	1	25	261	649	277	51	2	0	0	0	0	0	1266
17:00	0	0	3	24	262	677	260	46	3	0	0	0	0	0	1275
18:00	1	0	1	18	181	532	209	29	4	0	0	0	0	0	975
19:00	0	0	2	17	170	298	136	16	1	0	0	0	0	0	640
20:00	1	0	0	13	135	237	93	13	1	0	0	0	0	0	493
21:00	0	0	0	11	84	185	58	10	0	0	0	0	0	0	348
22:00	0	0	0	3	34	69	42	4	1	0	1	1	0	0	155
23:00	0	0	0	6	30	68	21	4	0	0	1	1	0	0	131
0:00	0	0	0	4	17	28	16	2	0	0	0	0	0	0	67
1:00	0	0	1	2	9	23	6	2	0	0	0	0	0	0	43
2:00	0	0	0	1	8	9	7	2	1	0	0	0	0	0	28
3:00	0	0	0	3	10	18	3	1	0	0	0	0	0	0	35
4:00	0	0	0	2	38	59	13	1	0	0	0	0	0	0	113
5:00	0	0	0	5	97	163	41	4	0	0	0	0	0	0	310
6:00	0	1	15	67	213	262	57	4	1	0	0	0	0	0	620
7:00	0	2	14	120	422	445	140	19	2	0	0	0	0	0	1164
8:00	0	0	2	15	218	475	192	29	3	0	0	0	0	0	934
9:00	0	0	0	16	159	275	91	7	1	0	0	0	0	0	549
10:00	0	0	1	12	138	285	96	11	1	0	0	0	0	0	544
11:00	0	0	6	7	155	312	136	23	1	2	0	0	0	0	642
12:00	0	0	2	9	158	337	140	18	3	1	0	0	0	0	668
13:00	0	0	1	11	144	330	137	15	3	0	0	0	0	0	641
14:00	0	0	0	22	173	336	143	24	2	0	0	0	0	0	700
15:00	0	0	2	26	245	453	164	24	5	0	0	0	0	0	919
16:00	2	0	0	35	299	556	204	15	1	0	0	0	0	0	1112
17:00	0	0	2	35	299	588	231	37	1	0	1	0	0	0	1194
18:00	0	0	0	19	199	431	171	33	2	1	0	0	0	0	856
19:00	0	0	0	14	152	286	115	11	1	0	0	0	0	0	579
20:00	0	0	2	25	150	183	84	13	2	0	0	0	0	0	459
21:00	0	0	1	16	80	139	46	12	0	0	0	0	0	0	294
22:00	0	0	1	10	42	82	32	10	0	0	0	0	0	0	177
23:00	0	0	1	5	26	54	26	7	0	0	0	0	0	0	119
0:00	0	0	0	4	15	14	14	2	0	0	0	0	0	0	49
1:00	0	0	0	2	13	15	9	4	0	0	0	0	0	0	43
2:00	0	0	0	0	9	17	5	0	1	0	0	0	0	0	32
3:00	0	0	0	0	12	26	6	3	1	0	0	0	0	0	48
4:00	0	0	0	1	15	44	19	5	0	0	0	0	0	0	84
5:00	0	0	0	2	63	187	69	11	0	1	0	0	0	0	333
6:00	0	0	0	10	138	351	169	32	5	1	0	0	0	0	706
7:00	0	0	0	37	261	579	309	46	6	0	0	0	0	0	1238
8:00	0	0	0	6	158	524	244	31	1	0	0	0	0	0	964
9:00	0	0	0	16	153	323	153	21	3	0	0	0	0	0	669
10:00	1	0	1	24	163	294	101	9	0	0	0	0	0	0	593
11:00	0	0	0	12	154	361	114	16	2	0	0	0	0	0	659
12:00	0	0	1	10	176	355	158	31	1	0	1	0	0	0	733
13:00	0	0	2	17	159	371	167	26	3	0	0	0	0	0	745
14:00	3	2	7	29	157	351	190	20	2	0	0	0	0	0	761
15:00	0	0	0	28	213	520	194	22	7	0	0	0	0	0	984
16:00	0	0	0	20	198	583	378	65	3	2	0	0	0	0	1249
17:00	0	1	1	12	169	691	359	59	5	0	0	0	0	0	1297
18:00	0	0	1	17	182	516	271	41	4	1	0	0	0	0	1033
19:00	1	0	2	15	177	406	138	29	3	0	0	0	0	0	771
20:00	0	0	0	15	119	273	122	12	4	0	1	0	0	0	546
21:00	0	0	2	11	94	159	74	12	2	0	0	0	0	0	354
22:00	0	0	0	7	50	101	38	9	1	0	0	0	0	0	206
23:00	0	0	0	5	37	65	40	11	2	0	1	0	0	0	161
0:00	0	0	0	4	22	42	19	3	1	0	0	0	0	0	91
1:00	0	0	0	2	6	21	19	4	0	0	0	0	0	0	52
2:00	0	0	1	2	12	21	12	1	1	0	0	0	0	0	50
3:00	0	0	0	0	8	22	11	1	1	0	0	0	0	0	43
4:00	0	0	2	5	17	46	21	0	1	0	0	0	0	0	92
5:00	0	0	1	2	59	168	77	6	0	0	0	0	0	0	313
6:00	0	1	1	19	142	318	158	18	6	1	0	0	0	0	664
7:00	0	0	1	47	280	570	271	48	8	0	1	0	0	0	1226
8:00	1	0	2	14	169	426	213	40	0	0	0	0	0	0	865
9:00	0	0	0	1	4	1	0	0	0	0	0	0	0	0	6
Total	16	14	97	1140	9511	20166	8587	1266	133	14	7	2	0	0	40953
Percent	0.0%	0.0%	0.2%	2.8%	23.2%	49.2%	21.0%	3.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	

15th Percentile:	32 MPH
50th Percentile:	38 MPH
85th Percentile:	43 MPH
95th Percentile:	45 MPH

10 MPH Pace Speed:	31 - 40 MPH
Number in Pace:	28753
Percent in Pace:	72.5%
Number of Vehicles > 40 MPH	10009
Percent of Vehicles > 40 MPH	24.4%
Mean Speed (Average):	38 MPH