



**County of Kings
Department of Public Works**



**Traffic Control
Policies and Warrants**

2021



COUNTY OF KINGS BOARD OF SUPERVISORS

GOVERNMENT CENTER HANFORD, CALIFORNIA 93230 (559) 852-2362
Catherine Venturella, Clerk of the Board of Supervisors

AGENDA ITEM

May 4, 2021

SUBMITTED BY: Public Works Department – Dominic Tyburski/Christopher Kelly

SUBJECT: TRAFFIC CONTROL POLICIES AND WARRANTS MANUAL

SUMMARY:

Overview:

On April 30, 1991, the Kings County Board of Supervisors voted to adopt the Traffic Control Policies and Warrants Manual 1991, for the Public Works Department. The Department hired Peters Engineering Group to update the manual, and after extensive development and review, the updated 2021 Traffic Control Policies and Warrants Manual is ready for adoption.

Recommendation:

Adopt the 2021 Traffic Control Policies and Warrants Manual for the Department of Public Works.

Fiscal Impact:

Adoption of the 2021 Traffic Control Policies and Warrants Manual will not create a fiscal impact.

BACKGROUND:

The purpose of the Traffic Control Policies and Warrants Manual is to provide the County with policies to ensure the consistent and uniform application of traffic control devices throughout the County while also aligning the County's policies with national and state policies. The Manual also provides the County's policies in a written form to ease the transition between personnel. A hard copy of both documents are on file with the Clerk of the Board.

BOARD ACTION:

APPROVED AS RECOMMENDED: OTHER:

ROLL CALL: VERBOON, FAGUNDES, NEVES, VALLE, PEDERSEN – AYE

I hereby certify that the above order was passed
and adopted on May 4, 2021.

CATHERINE VENTURELLA, Clerk to the Board

By Catherine Venturella, Deputy.

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1.00 PURPOSE OF TRAFFIC CONTROL POLICY

1.10 Uniformity of Application

Uniformity of application of all types of traffic control devices is advantageous in that the motorist will interpret the meaning of the sign in the same manner throughout this County and other agencies. Thus, there will be a minimum of confusion when traveling. An attempt has been made to present policies that are consistent with national and state policies.

1.20 Consistency in Application

It is inequitable to sign one way for one group of citizens and another for others. To be fair, there should be consistency in the way control devices are used throughout the County. An adopted written policy enables this feature.

1.30 Continuity of Application

Throughout the years, in any Agency, there is a turnover of personnel. New personnel should be aware of previous policies in order to rapidly adapt to the job. A clear understanding of previous County policies is better conveyed when in written form.

1.40 Exception to Policies

No set of rules or policies can be expected to cover all circumstances. This is impossible and undesirable. There should always be provisions for flexibility. These policies, therefore, should be used with practical judgment and, when a special condition arises, the problems should be evaluated on the basis of current "traffic engineering practices."

It is not intended that these policies become immutable. As new findings arise in the field of traffic engineering, and at the discretion of the Board of Supervisors, the policies herein presented should be reviewed and revised accordingly.

2.00 DEFINITIONS

2.10 Publications Referenced

- 2.11 California Vehicle Code (CVC).
- 2.12 "California Manual on Uniform Traffic Control Devices, 2014 Edition, Revision 5" (March 27, 2020), State of California, California State Transportation Agency, Department of Transportation (CMUTCD).
- 2.13 "Traffic Manual," (Sections 9-06 through 9-13), State of California Business, Transportation and Housing Agency, Department of Transportation, November, 2002.

2.20 Terminology

2.21 ADT

Represents average daily traffic. It is actually the total two-way daily vehicular volume averaged over a one-year period. Short counts are usually made and the ADT is estimated on the basis of prior experience. The length of traffic counts will vary from one day to seven days, and counts may be conducted during different periods of the year depending on the accuracy desired.

2.22 Rural

Refers to any area adjoining a road which is not a “residence district” or “business district” per Sections 515 and 235 of the CVC.

2.23 Traffic Engineering Practices

Those procedures and methods recommended for use by various professional traffic organizations: Institute of Transportation Engineers, Transportation Research Board, American Automobile Association, etc.

2.24 Engineering and Traffic Survey

Used as defined in Section 627 of the CVC.

2.25 Through Road

Defined in Section 23-14 of the Kings County Code of Ordinances. Also refer to Section 3.14 of this manual.

3.00 SIGNING

3.10 Regulatory Signing

3.11 YIELD Sign Warrants

If any of the following conditions exist, installation of a yield sign may be warranted. YIELD signs should not be used when warrants for STOP signs are met. (See Section 3.12):

1. An intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;
2. A street entering a designated through highway or street; and/or
3. An unsignalized intersection in a signalized area.

4. In addition, the use of YIELD signs should be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:
 - a) The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;
 - b) The ability to see conflicting traffic on an approach is not sufficient to allow a road user to yield in compliance with the normal right-of-way rule if such yielding is necessary; and/or
 - c) Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.
5. On the approaches to a through street or highway where conditions are such that a full stop is not always required.
6. At the second crossroad of a divided highway, where the median width at the intersection is 30 feet or greater. In this case, a STOP or YIELD sign may be installed at the entrance to the first roadway of a divided highway, and a YIELD sign may be installed at the entrance to the second roadway.
7. For a channelized turn lane that is separated from the adjacent travel lanes by an island, even if the adjacent lanes at the intersection are controlled by a highway traffic control signal or by a STOP sign.
8. At an intersection where a special problem exists and where engineering judgment indicates the problem to be susceptible to correction by the use of the YIELD sign.
9. Facing the entering roadway for a merge-type movement if engineering judgment indicates that control is needed because acceleration geometry and/or sight distance is not adequate for merging traffic operation.

A YIELD sign shall be used to assign right-of-way at the entrance to a roundabout. YIELD signs at roundabouts shall be used to control the approach roadways and shall not be used to control the circulatory roadway.

Other than for all of the approaches to a roundabout, YIELD signs shall not be placed on all of the approaches to an intersection.

Refer to the CMUTCD for additional information, guidance, and standards for the use of YIELD signs.

3.12 Warrants for Two-Way STOP Control

At intersections where a full stop is not necessary at all times, consideration should first be given to using less restrictive measures such as YIELD signs. If any of the following conditions exist, two-way STOP sign control may be warranted:

1. Any rural intersection with four legs.
2. An approach to a "Through Road."
3. An intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law.
4. At the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:
 - a) The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;
 - b) The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop in compliance with the normal right-of-way rule if such stopping is necessary; and/or
 - c) Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.
5. The use of STOP signs on the minor-street approaches should be considered if engineering judgment indicates that a stop is always required because of one or more of the following conditions:
 - a) The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles per day;
 - b) A restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through street or highway; and/or
 - c) Crash records indicate that three or more crashes that are susceptible to correction by the installation of a STOP sign have been reported within a 12-month period, or that five or more such crashes have been reported within a 2-year period. Such crashes include right-angle collisions involving road users on the minor-street approach failing to yield the right-of-way to traffic on the through street or highway.

Refer to the CMUTCD for additional information, guidance, and standards for the use of STOP signs.

3.13 Warrants for All-Way (Multi-Way) STOP Control

Consideration should first be given to using less restrictive measures such as YIELD signs or two-way STOP sign control (see Sections 3.11 and 3.12). If any of the following conditions exist, all-way STOP sign control may be warranted:

1. The following criteria should be considered in the engineering study for a multi-way STOP sign installation:
 - a) Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
 - b) Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
 - c) Minimum volumes:
 - i. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
 - ii. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
 - iii. If the 85th-percentile approach speed of the major-street traffic exceeds 40 miles per hour (mph), the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.
 - d) Where no single criterion is satisfied, but where Criteria b, c.i, and c.ii are all satisfied to 80 percent of the minimum values. Criterion c.iii is excluded from this condition.
2. Other criteria that may be considered in an engineering study include:
 - a) The need to control left-turn conflicts;
 - b) The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
 - c) Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and
 - d) An intersection of two residential neighborhood collectors (through) streets of similar design and operating characteristics where multi-way

stop control would improve traffic operational characteristics of the intersection.

Refer to the CMUTCD for additional information, guidance, and standards for the use of STOP signs.

3.14 Through Road Warrants

A road, or section of road, may be designated a “through road” if the following warrants are met:

1. The route must be at least three miles long in rural areas or six blocks in urban areas;
2. The route must begin and end on other “through roads”;
3. The route must have:
 - a) At least 22 feet of pavement width;
 - b) Fair or better pavement condition;
 - c) Safe travel speed in excess of 60 mph in rural areas or 30 mph in urban areas;
4. The route must have one or more of the following conditions:
 - a) At least 500 ADT;
 - b) Designated as an arterial or collector in the County General Plan;
 - c) At least 75 percent of the intersections on the route have traffic signals, stop signs, yield signs, or meet the warrants for same.

3.15 Speed Zones

The establishment of speed zones shall be in conformance with the CVC.

1. Those prima facie speed limits prescribed by Section 22352 of the CVC will not, in general, be posted. An exception will be made as follows: The County will post the speed limit, upon request, at main entrances to subdivisions or concentrated residential areas when those entrances have an ADT greater than 500.
2. The reduction or increase of prima facie speed limits established under Sections 22349 and 22350 is provided for by Sections 22357 and 22358 of the CVC. The change in speed limit shall be made only after an “engineering and traffic survey.” This survey shall be conducted as defined in Section 627 of the CVC and described in Part 2 of the CMUTCD. In general, the speed limit shall be set at the 5 mph increment closest to the 85th-percentile speed.
3. When physical conditions along a roadway are “readily apparent” to a driver, then there is not a need for special downward zoning (Section 22358.5 of the CVC).

4. The smallest practical length of a speed zone is approximately 0.5 mile.
5. Speed zones will generally be restricted to arterial and collector roads having traffic volumes in excess of 500 ADT.

3.16 Parking Regulations

Any request for parking restrictions shall be investigated and studied in accordance with current “traffic engineering practices.” The regulations shall be established as allowed under Division 11, Chapter 9 of the CVC and under Chapter 23, Article II of the Kings County Code of Ordinances.

1. The Public Works Director, or his designated representative, may prohibit parking along a road or street in the unincorporated area of the County at the vehicular approach to, and departure from, a marked pedestrian crosswalk by establishing a “No Parking” zone when the following conditions are found to exist:
 - a) The road or street is a two-lane, two-way road or street; and
 - b) The road or street is in a residential area as defined in Section 515 of the CVC, or the crosswalk has been established in the vicinity of a school in accordance with the provisions of Section 21368 of the CVC, or the road or street is adjacent to facilities operated by the County of Kings; and
 - c) The crosswalk is in an area where evidence indicates a greater-than-normal crosswalk usage by pedestrians less than 10 years of age.
2. If it is determined by the Public Works Director, or his designated representative, that a “No Parking” zone is necessary adjacent to a marked crosswalk, the “No Parking” zone shall extend along the vehicular approach lane for a distance “D” from the crosswalk, measured along the road or street in accordance with the values in Table 1 (distance “D” being based on the approach land width, indicated as “W” in the table, and measured between the road center line and the parking curb or edge of the road or street delineation).

A “No Parking” zone may be extended a maximum of 10 feet from the nearest marked crosswalk along the departing vehicular lane.

Table 1
No Parking Zone Adjacent to Crosswalks

Half-Street Width W (feet)	Length of No Parking Zone On Approach to Crosswalk D (feet)
15	67
16	63
17	60
18	56
19	52
20	48
21	44
22	41
23	37
24	33
25	29
26	25
27	22
28	18
29	14
30	10
Greater than 30	10 minimum

3.20 Warning Signs

3.21 General

Warning signs should be installed as prescribed in the CMUTCD.

3.22 Advisory Speed Signs

Horizontal alignment warning signs shall be placed when shown to be warranted in accordance with the CMUTCD.

Advisory speed signs shall be used with horizontal alignment warning signs and with any other warning sign where the condition is such that the difference between the safe speed and the prevailing approach speed is 10 mph or more.

The speed posted will be determined from methods described in Section 2C.08 of the CMUTCD and shall be to the nearest 5 mph increment.

3.23 Stop Ahead or Yield Ahead

Stop ahead (yield ahead) warning signs should be installed at all approaches to arterials and collectors in advance of STOP signs (YIELD signs).

3.24 Warning Signs for Dead-End / T Intersections

Type 4 object markers and T-Symbol warning signs will be allowed at all “T” intersections. The “Stop Ahead” sign should be used in advance of STOP signs instead of the T-Symbol warning sign.

3.30 Street Name Signs

Street name signs shall be installed at the intersection of all County-maintained roads or public roads that have residences for which there is a mailing address.

3.40 Guide Signs

Guide signs are essential to direct road users along streets and highways, to inform them of intersecting routes, to direct them to cities, towns, villages, or other important destinations, to identify nearby rivers and streams, parks, forests, and historical sites, and generally to give such information as will help them along their way in the most simple, direct manner possible. Guide signs are not intended to replace maps or substitute for adequate trip planning by road users.

Guide signs, if used, shall conform to the CMUTCD. Chapter 2A of the CMUTCD addresses placement, location, and other general criteria for signs.

3.50 Roads Not Maintained by the County

Special signs may be placed, upon request and if approved by the Director of Public Works, at the entrance to a privately owned and maintained road when enforcement of vehicle provisions applies, as provided in CVC 21107.7. The alternate message PRIVATE PROPERTY shall be used at each entrance to a privately owned and maintained off-street parking facility when enforcement of vehicle code provisions applies, as provided in CVC 21107.8.

4.00 SIGNAL INSTALLATION

4.10 Traffic Signals

Part 4 of the CMUTCD provides a comprehensive discussion of traffic signals. The decision to install traffic signals shall be based on an engineering study that includes consideration of warrants presented in the CMUTCD. The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal. The warrants are briefly described below.

Warrant 1: Eight-Hour Vehicular Volume. Warrant 1 is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal, and at locations where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. The need for a traffic control signal shall be considered if an engineering study finds that certain minimum volumes occur for each of any eight hours of an average day. The volumes are dependent upon the

number of lanes on each roadway and the setting (urban or rural), which includes consideration of the approach speeds.

Warrant 2: Four-Hour Vehicular Volume. Warrant 2 is intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The need for a traffic control signal shall be considered if an engineering study finds that, for each of any four hours of an average day, certain minimum volumes occur. The volumes are dependent upon the number of lanes on each roadway and the setting (urban or rural), which includes consideration of the approach speeds.

Warrant 3: Peak Hour. Warrant 3 is intended for use at a location where traffic conditions are such that, for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of two categories are met. The first category includes calculation of the total delay experienced on the minor street and certain minimum volume requirements. The second category involves plotting the traffic volumes on a curve provided in the CMUTCD to determine whether the plotted point falls within the area of the curve where signalization is warranted.

Warrant 4: Pedestrian Volume. Warrant 4 is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Warrant 5: School Crossing. Warrant 5 is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word “schoolchildren” includes elementary through high school students.

Warrant 6: Coordinated Signal System. Warrant 6 is intended for application where progressive movement in a coordinated signal system necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

Warrant 7: Crash Experience. Warrant 7 is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Warrant 8: Roadway Network. Warrant 8 is intended for application where installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Warrant 9: Intersection Near a Grade Crossing. Warrant 9 is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

4.20 Type and Placement of Traffic Signals

The type of signals, the location, and the installation shall be as described in the CMUTCD.

5.00 PAVEMENT MARKINGS

5.10 General

Pavement markings shall be installed at locations and in a manner prescribed by the CMUTCD.

5.20 Centerline Striping

Centerline striping should be installed on all "rural" County roads having a pavement width of 18 feet or greater with a pavement of adequate surface condition, and on residential streets serving as a collector with substantial traffic volumes.

5.30 Edge Line Striping

Edge lines shall conform to the CMUTCD and may be painted along a road that has the following characteristics:

1. The road has a minimum ADT of 800 cars per day; and
 2. The road has a minimum pavement width of 24 feet. However, if the pavement width in general is at least 24 feet, the road should not be edge lined if a significant length of pavement edge is broken out, thereby reducing the effective width below 24 feet.
- or
3. Along roads where the shoulder presents a potential for accidents due to a hazardous condition that cannot be corrected without a major construction effort.

Edge lines may also be painted at corners and intersections where it is expected that the lines will reduce the potential for accidents.

5.40 Crosswalks

5.41 School Crosswalks

School crosswalks shall be located only as allowed by Section 21368 of the CVC:

1. When the nearest point of the crosswalk is not more than 600 feet from a school building or grounds thereof, or
2. When the nearest point of the crosswalk is not more than 2,800 feet from a school building or grounds thereof and there are no intervening crosswalks other than those contiguous to the school grounds, and it appears that the facts and circumstances require special painting or markings of the crosswalks for the protection and safety of persons attending the school.

5.42 Painted Crosswalk Warrants

Crosswalk lines should not be used indiscriminately. An engineering study should be performed in accordance with the CMUTCD before a marked crosswalk is installed at a location away from a traffic control signal or an approach controlled by a STOP or YIELD sign.

1. **Crosswalks at Intersections** - Crosswalks may be painted at intersections and represent the extension of sidewalk lines. In rural areas, they are used to guide pedestrians and help alert road users that such crossing may be anticipated.
2. **Mid-Block Crosswalks** - Mid-block crosswalks are discouraged. Motorists may encounter them unexpectedly, potentially resulting in nonobservance of pedestrian right-of-way. Mid-block crosswalks must be established by ordinance or resolution (CVC Section 21106) and only:
 - a) If the distance between adjacent intersections is 800 feet or more and pedestrian volumes are judged to be high; or
 - b) In rural areas adjacent to schools where pedestrian traffic volume is high and needs to be channelized; or
 - c) At other locations only if a traffic engineering study indicates a mid-block crosswalk should be installed.

5.50 Stop Bar and Stop Ahead

A stop bar should be painted on the pavement on any approach where a STOP sign is installed. The stop bar shall be white, 12 inches wide, at least 10 feet long, and shall contain reflective glass beads.

“STOP AHEAD” should be painted on the pavement in advance of the STOP sign if needed (as determined by engineering judgment) to supplement a Stop Ahead sign and/or to provide additional emphasis for a Stop Ahead sign.

5.60 Reflective Markers

White reflective markers may be used to help motorists locate intersections at night or in the fog. They should be used only:

1. On County-maintained roads that meet edge lining requirements, and
2. At the intersection of two County-maintained roads.

Yellow reflective markers may be used in addition to a painted centerline and installed as required by the CMUTCD. They should be used only on:

1. Rural Arterials with:
 - a) Prevailing speed over 50 mph.
 - b) ADT over 500.
 - c) Pavement that will hold markers.
2. Rural Collectors with:
 - a) Prevailing speed over 50 mph.
 - b) ADT over 1000.
 - c) Pavement that will hold markers.

5.70 No Passing Zone Markings

No passing zone markings shall conform to Section 3B.02, "No-Passing Zone Pavement Markings and Warrants," of the CMUTCD.

6.00 TRAFFIC CONTROL FOR SCHOOL AREAS

Traffic control for school areas shall comply with Part 7 of the CMUTCD.

7.00 TRAFFIC SAFETY LIGHTING

7.10 Warrants for Installation

By Resolution No. 67-87, approved by the Board of Supervisors, certain minimums are required before lights may be installed.

1. Approximately 1,000 ADT on the major road and approximately 400 ADT on the minor road, or
2. Accident history at such intersection shows three or more accidents in any one year, which might have been avoided by street lighting.

Special locations may exist, such as on newly-constructed roadways, where there is no accident history, but there is ample evidence of hazard. At such potential problems spots, Section 2 above will be interpreted as follows: if experience indicates that a given geometric arrangement of a roadway is conducive to the above-described accident rate, then lighting will be warranted.

7.20 Lighting Type and Location

7.21 Type of Lighting

The type of lights used will be light-emitting diode (LED), or the most modern and efficient light available through the utility companies. The illuminance provided by street lighting should be per the Traffic Manual as follows:

1. In urban areas, 1.6 horizontal lux (0.15 foot-candles) on the area normally bounded by the crosswalks and 6.5 horizontal lux (0.6 foot-candles) at the intersection of centerlines of the entering streets.
2. In rural areas, 1.1 horizontal lux (0.1 foot-candles) on the area normally bounded by the crosswalks and 3.2 horizontal lux (0.3 foot-candles) at the intersection of centerlines of the entering streets.

7.22 Light Placement

Street lights at intersections should be located as shown in Figures 9-27 and 9-28 of the Traffic Manual. In general, street lights are placed on the right side of the roadway and on the far side of the intersection from the perspective of an approaching vehicle. Four-way intersections will have a minimum of two street lights over the major street (through road), with two additional lights (when required) over the minor street as shown in Figure 9-27. "T" intersections shall have a minimum of one street light placed on the "dead-end" side of the intersection, with additional lights as necessary to maintain the minimum required lighting levels.

To determine the position and number of luminaires needed to provide a desired lighting level or to determine the lighting level achieved by a given pattern of luminaires, the isolux diagram for the luminaire may be used. The lighting level at any point may be approximated by adding the values shown by the isolux curve passing through the point from each contributing luminaire.

7.23 Urban and Residential Lights

In urban and residential areas, the type of light and light placement may be varied with the approval of the Director of Public Works. This may be done in order to coordinate the lighting with existing city or district lighting patterns or to avoid light shining into residences. Within the sphere of influence of a city, the lighting shall be installed per that city's standards, if feasible.