

SUDAS Revision Submittal Form

Status Date: As of 5/20/2020 **Topic:** Lane width and capacity
Manual: Design **Manual Location:** Section 5C-2, A

Requested Revision:

From Section 5C-2 - Geometric Design Elements

A. Level of Service

Level of service (LOS) is a measure of the operating conditions of a roadway facility. LOS is based upon traffic performance related to speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The LOS ranges from A (least congested) to F (most congested). Refer to the Highway Capacity Manual for a more thorough discussion of the LOS concept.

Based upon the traffic capacity analysis, the number of lanes, turn lanes, and intersection controls should be selected to provide a design with the desired LOS for the design year traffic. Design year traffic is based upon a 20 year traffic projection. The current Highway Capacity Manual and the current AASHTO “Green Book” should be used for traffic projections and to determine the number of lanes and intersection configuration at the desired LOS.

The LOS for the roadway overall is based upon Average Daily Traffic (ADT), while the LOS at signalized intersections is based upon the peak hourly volume (PHV).

As a planning tool, refer to the generalized service volume tables in FHWA’s *Simplified Highway Capacity Calculation Method for the Highway Performance Monitoring System* (https://www.fhwa.dot.gov/policyinformation/pubs/pl18003/hpms_cap.pdf).

The 2010 Highway Capacity Manual, issued in 2013, indicates there is no reduction in lane capacity until the lane width is less than 10 feet. For lanes less than 10 feet wide, the adjustment factor is 0.96.

As a planning tool, the following tables are provided to indicate approximate capacities for two lane and four lane streets and highways and intersection capacity for four way stop and signalized intersections. These tables do not consider site specific details and should not be utilized for final design purposes.

Table 5C-2.01: Maximum ADT vs. LOS and Type of Terrain for Two Lane Highways

Terrain	LOS		
	B	C	D
Level	3,200–4,800	5,300–7,900	9,000–13,500
Rolling	1,800–2,800	3,500–5,200	5,300–8,000
Hilly	900–1,300	1,600–2,400	2,500–3,700

Table 5C-2.02: Reduced Capacity of Narrow Lanes with Restricted Lateral Clearance

Usable Shoulder Width or Clearance to Obstruction (feet)	Two Lane Roadway (percent of capacity of 12-foot lane)		
	12-foot lanes	11-foot lanes	10-foot lanes
6	100	93	84
4	92	85	77
2	81	75	68
0	70	65	58

Table 5C-2.03: Planning Capacity at LOS C⁺, D, and E²
Two Way Arterial Streets (Non-intersection)

Number of Lanes	Turn Lanes	Capacity, VPD at LOS D			
		<i>Minimal Side Friction</i>	<i>Light (Residential) Side Friction</i>	<i>Moderate (Mixed Zoning) Side Friction</i>	<i>Heavy Side Friction</i>
Two Lanes Undivided	Without turn lanes	42,100	41,600	41,200	40,400
	With turn lanes	46,000	45,300	44,000	43,900
Four Lanes Undivided	Without turn lanes	24,300	23,400	23,400	21,900
	With left turn lanes or 5 lane with center TWLTL	32,100	30,900	30,900	29,100
Four Lanes Divided	Without turn lanes	27,100	26,200	26,100	23,300
	With left turn lanes	35,400	34,200	34,100	32,500
	With left and right turn lanes	37,500	36,200	34,400	34,400

-LOS- Level of Service

-TWLTL- Two Way Left Turn Lane

-VPD- Vehicles per Day

¹ Capacity at LOS C may be determined by multiplying LOS D values above by 0.8.

² Capacity at LOS E may be determined by multiplying LOS D values above by 1.2.

Source: Adapted from "2000 Des Moines Area Daily Directional Capacities At Level of Service D" - Des Moines Area MPO

Table 5C-2.04: Approximate LOS C Service Volumes (VPH) for Four Way Stop-controlled Intersections (Sum of all Four Legs)

Demand Split	Two Lanes on Each Street	Street 1: Two Lanes Street 2: Four Lanes	Four Lanes on Each Street
50/50	1,200	1,800	2,200
55/45	1,140	1,720	2,070
60/40	1,080	1,660	1,970
65/35	1,010	1,630	1,880
70/30	960	1,610	1,820

Reason for Revision: Updated to reflect new lane width and capacity relationships.

Comments: None.

District: 1 2 3 4 5 6 **2/27/2020 Webinar**

Comments: None.

District: 1 2 3 4 5 6 **4/2020 Webinars**

Comments: None.

Action: Deferred Not Approved Approved

Final District Action Summary: All 6 districts approved.

Board of Directors Action: Approved.