Chapter 2 - The Manhattan Roundabout

The roundabout built in Manhattan was the first modern roundabout to be built in the state of Kansas (see Figure 1). The roundabout is located at the intersection of two collector roads: Candlewood Drive/ Gary Avenue. The roundabout is adjacent to a residential area. The roundabout was completed in the fall of 1997.

Figure 1 - Roundabout in Manhattan, Kansas

Section 2.1 – Roundabout Geometry

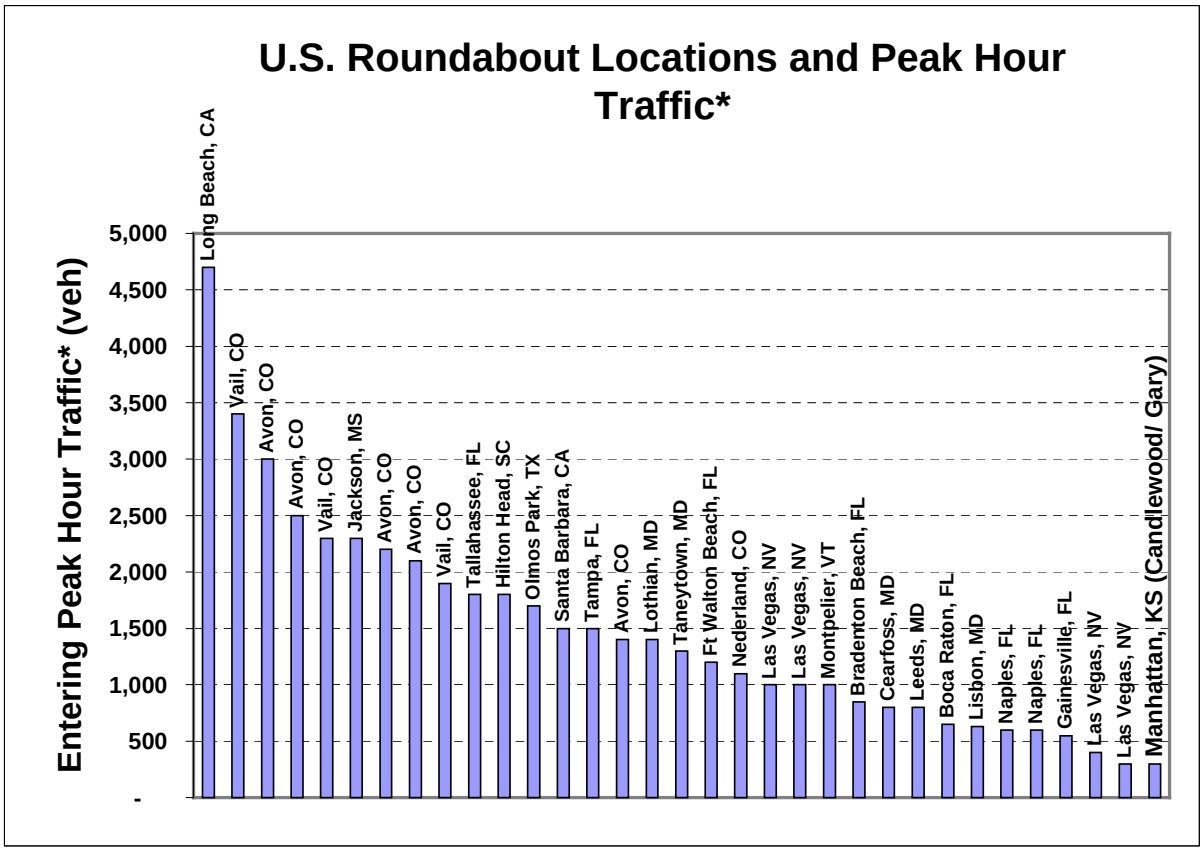
The Manhattan roundabout controls a four-leg intersection. All approach legs are two lane roadways (one entering and one exiting) and parking is allowed on both sides of all approach roads (see Figure 1). There is one circulating lane. All approaches are controlled with a YIELD sign. Each approach has a raised splitter island and all approaches have marked crosswalks. The central island is approximately 9.1 meters (30 feet) in diameter with a 3.7 meter (12 feet) wide truck apron. The approach lane widths are generally 4.6 meters (15 feet) wide.

The roundabout is controlled by 'yield to circulating traffic' rule and has deflection creating a low speed curve around the central island, thereby fitting the definition of a roundabout of modern design.

Section 2.2 – Hourly Traffic Volumes

The Manhattan roundabout carried traffic at what can be considered to be the bottom end of the range for existing roundabouts in the United States. A National Cooperative Highway

Research Program report (1998) *(5)* presented the hourly traffic levels at existing roundabouts from across the United States (see Figure 2). The hourly approach volumes ranged from a low of 300 vph in Las Vegas, Nevada to a high of 4,700 vph in Long Beach, California.



Source *(5)*, modified to also show the Manhattan roundabout
* peak hour traffic not defined in source

Figure 2 - United States Roundabouts and Entering Traffic Volumes

The daily traffic volumes at the Manhattan roundabout ranged from 738 to 1,680 vpd on each of the four approaches. The average hourly entering volume ranged from 224 to 402 vehicles with an average of 310 vehicles (see Table 2).

Typical daily distribution at the roundabout intersection is shown in Table 3. These traffic counts were collected on Thursday, January 28, 1999. These hourly traffic counts are shown graphed in Figure 3.

Table 2 - Count Data - Candlewood Drive/ Gary Avenue

Date:	Day of Week:	Count:	Peak Hour Factor:	Max Peak Hour:
2/26/99	Friday	224	0.78	287
2/27/99	Saturday	230	0.80	288
1/19/99	Tuesday	272	0.52	523
1/22/99	Friday	277	0.83	334
2/27/99	Saturday	280	0.79	354
2/18/99	Thursday	285	0.63	452
1/20/99	Wednesday	289	0.83	348
2/19/99	Friday	293	0.85	345
1/20/99	Wednesday	296	0.74	400
2/27/99	Saturday	311	0.93	334
2/27/99	Saturday	315	0.83	380
1/22/99	Friday	320	0.79	405
1/19/99	Tuesday	321	0.89	361
1/19/99	Tuesday	324	0.86	377
2/27/99	Saturday	330	0.93	355
2/18/99	Thursday	333	0.67	497
2/27/99	Saturday	344	0.96	358
2/27/99	Saturday	348	0.77	452
1/21/99	Friday	354	0.66	536
2/17/99	Wednesday	364	0.82	444
1/19/99	Tuesday	364	0.94	387
2/27/99	Saturday	402	0.97	414
		310	**0.80**	**387**
Summary:				
	Max:	402	Range:	178
	Min:	224		

Table 3 - Candlewood Drive/ Gary Avenue Approach Counts

	Direction From Intersection				
End Time	N	S	E	W	Hour Total
0100	18	5	14	2	39
0200	15	4	13	1	33
0300	13	6	6	1	26
0400	6	2	5	1	14
0500	5	4	1	2	12
0600	4	4	2	4	14
0700	17	15	10	13	55
0800	**89**	**50**	**80**	**115**	**334**
0900	74	41	77	96	288
1000	68	30	45	27	170
1100	58	25	45	31	159
1200	68	42	86	33	229
1300	95	49	124	61	329
1400	100	53	86	29	268
1500	84	40	89	29	242
1600	85	67	176	81	409
1700	82	55	137	52	326
1800	**114**	**63**	**202**	**54**	**433**
1900	123	63	137	35	358
2000	103	41	105	24	273
2100	63	33	80	22	198
2200	75	28	73	17	193
2300	58	15	62	7	142
2400	40	7	25	1	73
Day Total:	1,457	742	1,680	738	**4,617**

Vehicle approach speed data was collected at the roundabout intersection. The 85 percentile speeds for approaching vehicles ranged from 43 to 48 kph (27 to 30 mph). The variation of these speeds by approach is shown in Table 4.

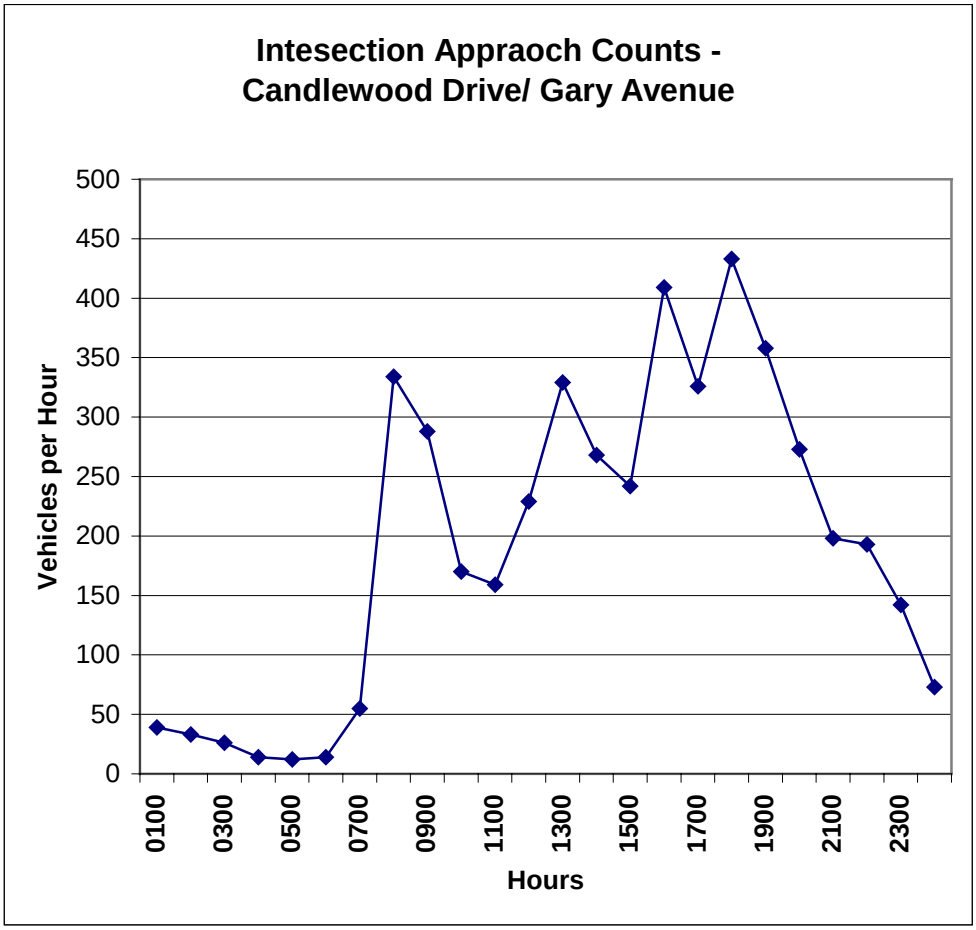


Figure 3 - Candlewood Drive/ Gary Avenue - Approach Traffic Counts

Table 4 - Candlewood Drive/ Gary Avenue 85 Perceitile Approach Speeds

Approach	North	South	East	West
85% Speeds (kph)	49	44	47	44
(mph)	30	27	29	27

First, an initial statistical analysis was conducted to determine if the raw traffic counts were normally distributed. An initial review of normality was performed by examining the study hour data points using a cumulative frequency histogram. The traffic counts were grouped into twelve count intervals. The resulting cumulative frequency histogram is shown in Figure 4. This figure shows that the raw traffic count data for the Candlewood Drive/ Gary Avenue intersection does exhibit the standard normal curve shape.

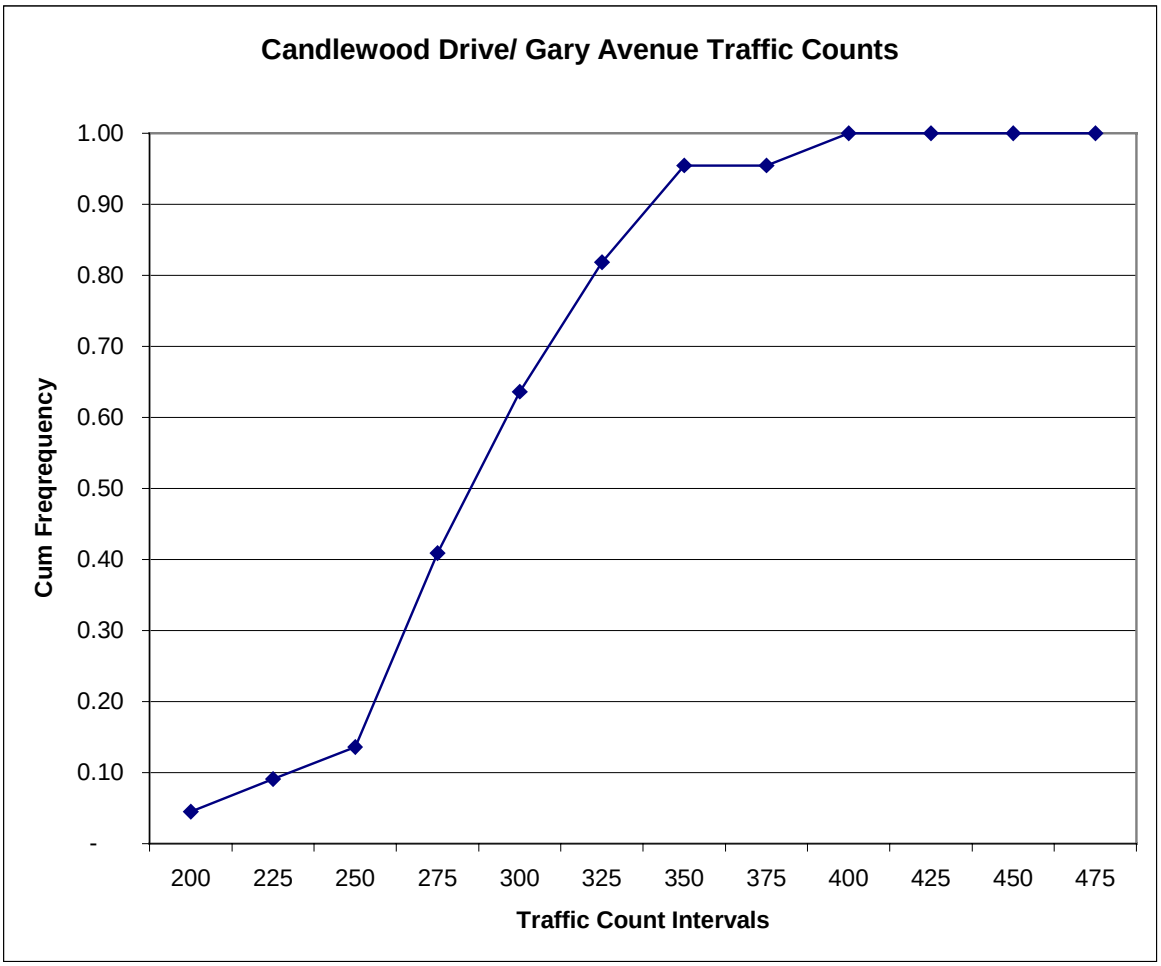


Figure 4 - Cumulative Frequency Distribution of Traffic Counts - Candlewood Drive/ Gary Avenue

Section 2.3 – Mini Traffic Circles in Manhattan, Kansas

During 1997 the City of Manhattan constructed a number of mini traffic circles in the central parts of town (see example shown in Figure 5). These traffic circles were installed at local residential intersections only and were installed as a means of controlling vehicle speeds on the residential streets. The local news media reported on the many issues surrounding the mini traffic circle installations (see Section on Local Media), including one severe motorcycle crash. Based on testimony given at City Commission meetings, cut-through drivers disliked the mini traffic circles, while with one exception the residents in the neighborhoods where they were installed favored them.

While the mini traffic circles have been a continuing source of local controversy, there has been no negative press on the Manhattan roundabout. The City engineer who oversaw the construction of the roundabout stated that it operated without any problems from the first day of operation.

Figure 5 - Manhattan, Kansas Mini Traffic Circle

Section 2.4 - Local Print Media Coverage

One of the tasks of the research team was to determine how the citizens of Manhattan had adapted to the installation of a roundabout. This was done through a review of the print media.

Section 2.4.1 - Focus of Local Print Media

There are two primary local newspapers in the Manhattan, Kansas area: The Manhattan Mercury and the Kansas State Collegian. These two papers have covered the City's actions in considering and installing both mini traffic circles and roundabouts. Appendix 6 includes copies of all identified news articles from these two sources for the period 1997 to 1999. This period includes the period when the Candlewood Drive/ Gary Avenue roundabout was constructed.

Section 2.4.3 – Article Summaries – Roundabouts

This section contains article summaries related to the City's consideration and construction of roundabouts. Note that none of the articles found shed negative light on the one existing roundabout in Manhattan. Rather, the articles deal with the fears of the drivers either unfamiliar with the Candlewood Drive/ Gary Avenue roundabout or confusing them with a mini traffic circle.

September 8, 1997 – 'Busy intersection to get 'roundabout' rerouting' - This article discussed the proposed roundabout installation at the intersection of Claflin Road and North Manhattan Avenue. This intersection is one of the City high accident locations where the plan is to replace the existing traffic signal with a roundabout at an estimated cost of $250,000. The quotes provide information on the benefits of a roundabout: "safer than conventional intersections" (Public Works Director), "less delay" (City Manager), "designed to move traffic"

(City Engineer). The City officials also bring to light that roundabouts are not traffic circles.

September 10, 1997 – 'Straight ahead for a roundabout' - This article is about the proposed installation of a roundabout at the intersection of Claflin Road and North Manhattan Avenue. Citizen concerns have been raised concerning the safety to pedestrians at this intersection under roundabout control. Kansas DOT officials state that "roundabouts don't cause more accidents than normal intersections. In fact . . . roundabouts lower the number of accidents at intersections. . . . The existing intersection has 32 'points of conflict' or places where cars (and pedestrians) could collide; roundabouts have only eight points of conflict."

The City engineer stated that there are differences in the design, function and use of mini traffic circles and roundabouts and that roundabouts are designed to carry traffic through the intersection at about 15 to 20 mph.

March 10, 1998 – 'Kimball roundabout? City favors one, but fears you won't' - This report discusses the City consideration of a roundabout to be installed at the intersection of Kimball Avenue and North Manhattan Avenue. The intersection carries 18,500 vehicles per day. Original plans had been to install a traffic signal at the location at a cost of $103,000. The Public Works Director states that the roundabout could be installed for the same cost. He goes on to state that he can "prove statistically that a roundabout there would be safer". While the public's initial reaction to the idea is 'that's hard to believe."

April 2, 1998 – 'Roundabouts: City likes them, police don't' - This article reports on the attitudes following a roundabout design training seminar sponsored by Kansas State University's Department of Civil Engineering. The seminar convinced the mayor and two commissioners that roundabouts are good ideas. Police department personnel attended the seminar and reported the information to the Captain responsible for the patrol division. The police department remains concerned that the roundabout would not function adequately "seven or eight times a year."

The most important thing to be gained by a review of the local print media is not in what was reported, but in what was not reported. Not one article was uncovered that headlined the roundabout built at Candlewood Drive and Gary Avenue. Very little is even said about it in any article beyond its construction cost and scheduled opening date. If the roundabout didn't work, the print media would be covering the failure of the city in its construction endeavor. It is this lack of print media coverage that can lead to a conclusion that the roundabout works.