5. Existing and 2030 Baseline Transportation System Performance

This section summarizes the procedures used to evaluate performance of the transportation system and also the performance evaluation findings. Evaluation procedures were structured to provide insights into the quality of transportation system performance and performance gaps for each element of the surface transportation system in the study area: roadways, rail transit, bus transit, freight rail, and bicycle and pedestrian facilities. Analyses considered both existing performance characteristics on the current transportation system, as well as predicted performance in 2030 for the baseline transportation system defined in Section 4. Together these analyses provide an understanding of how continuing growth in travel demand will affect travel mobility and efficiency in the study area.

5.1 Roadway Transportation System Performance

This section describes the performance of the existing roadway system and the projected performance of the baseline roadway system in 2030. The roadway system performance analysis was structured to evaluate systemwide performance characteristics, and to identify the nature and location of performance gaps. The following subsections present performance measures considered, analysis results, and conclusions.

5.1.1 Performance Measures

Performance measures were established to assess existing roadway conditions and those of the baseline roadway system for 2030. Four categories of measures were used to analyze performance:

- Traffic service
- Congestion
- Traffic safety
- Accessibility

The basic tool used in calculating performance measurements for the existing and future transportation roadway networks is the travel demand model. For further detail regarding the development and use of the model, refer to *Travel Demand Modeling and Travel Forecasting Technical Memorandum.*

5.1.1.1 Traffic Service Measures

Traffic service commonly is measured in terms of level of service (LOS). For roadway segments, average delay and speed along with other factors enter into the LOS determination. For freeways, LOS is directly related to the volume to capacity ratio. LOS measures the quality of traffic service and may be determined for each roadway segment on the basis of delay, congested speed, volume to capacity ratio, or vehicle density by functional roadway class. LOS for roadway segments is defined as follows:[2]

- **LOS A** describes free-flow operation at average travel speeds, usually about 90 percent of the free-flow speed for the arterial classification.
- **LOS B** represents reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the arterial classification.
- **LOS C** represents stable operations. Ability to maneuver and change lanes in mid-block locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both, may contribute to average travel speeds that are about 50 percent of the average free-flow speed for the arterial classification.
- **LOS D** borders on a range in which small increases in flow may cause substantial increases in delay, and hence decreases in arterial speed. Average travel speeds are about 40 percent of free-flow speeds. LOS D is often used as a limiting design criterion.
- **LOS E** is characterized by significant delays and average travel speeds of one-third of the free-flow speed or less. LOS E sometimes is accepted as a limiting design criterion when restricted conditions make it impractical to consider a higher LOS.
- **LOS F** is characterized by arterial flow at extremely low speeds, below one-third to one-fourth of the free-flow speed. Intersection congestion is likely at critical signalized locations with high delays and extensive queuing. LOS F is never used as a design standard. It represents a condition that is intolerable to most motorists.

As noted, LOS on roadway segments is described by operating speed and delay by motorists. Table 5-1 presents the average travel speeds under various LOS conditions for urban streets (arterials and collector roadways). For freeways, the LOS is determined by the ratio of volume to capacity on each segment of the freeway, as shown in Table 5-2. In describing traffic service, LOS F is considered to be extreme congestion, LOS E severe congestion, and LOS D moderate congestion.

5.1.1.2 Congestion Measures

Congestion measures match a calculated performance value, such as speed or travel time, to a corresponding level of congestion. Two measures are often used to quantify congestion levels on a roadway system: actual versus desirable travel speeds, and travel delay caused by congested traffic conditions.

Average operating speed represents the modeled speed at which traffic travels during various periods of the day. Operating speeds vary significantly between facility types and by time of day. Desirable speed represents the maximum speed for the roadway class under uncongested conditions. In the traffic assignment process, this is the initial speed assigned to each link when establishing the network. Travel time and, hence, congested speed is obtained from the output of each model assignment.

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[2] *Highway Capacity Manual.*

TABLE 5-1
LOS Criteria for Urban Streets (Arterials and Collectors)

Urban Street Class	**I**	**II**	**III**	**IV**
Range of free-flow speeds	**55–45 mph**	**45–35 mph**	**35–30 mph**	**35–25 mph**
Typical FFS	**50 mph**	**40 mph**	**35 mph**	**30 mph**
LOS	**Average Travel Speed (mph)**			
A	> 42	> 35	> 30	> 25
B	> 32–42	> 28–35	> 24–30	> 19–25
C	> 27–34	> 22–28	> 18–24	> 13–19
D	> 21–27	> 17–22	> 14–18	> 9–13
E	> 16–21	> 13–17	> 10–14	> 7–9
F	≤ 16	≤ 13	≤ 10	≤ 7

Source: Transportation Research Board, National Research Council. 2000. *Highway Capacity Manual,* Exhibit 15-2, LOS Criteria for Urban Street Level of Service by Class of Roadway.

Another important measure of congestion is delay. The results from this measure generally are consistent with those obtained from a speed analysis, and may be more descriptive of traffic operating conditions. Delay can be calculated for each link. Systemwide delay can be calculated by summing the delays for all links. Separate summaries may also be produced by functional class or by individual route.

TABLE 5-2
Freeway Level of Service

	Maximum Volume to Capacity Ratio by Free Flow Speed			
LOS	**70 mph**	**65 mph**	**60 mph**	**55 mph**
A	0.32	0.30	0.29	0.27
B	0.53	0.50	0.47	0.44
C	0.74	0.71	0.68	0.64
D	0.90	0.89	0.88	0.85
E	1.00	1.00	1.00	1.00
F	var	var	var	var

Source: Transportation Research Board, National Research Council. 2000. *Highway Capacity Manual,* Chapter 23, Basic Freeway Segments; Exhibit 23-2, LOS Criteria for Basic Freeway Segments, pp. 23–4.

Performance measures used to evaluate travel performance include:

- Vehicle miles of travel (VMT) = volume × distance traveled
- Vehicle hours of travel (VHT)= volume × travel time
- Vehicle hours of delay (VHD) = volume × (congested travel time – free flow travel time)
- Average speed = VMT/VHT

5.1.1.3 Traffic Safety Measures

Among transportation performance criteria, traffic safety is most universally accepted. A quantitative index or measure of safety performance is therefore appropriate as one of the basic performance measures for the transportation system.

Safety often is discussed only in general or qualitative terms. To include safety as a useful performance measure, it is desirable to quantify safety in readily understandable terms. Of course, any effort to quantify safety must be fully supportable. Highway safety can best be characterized by number of highway crashes and resulting injuries and fatalities that might occur or be expected to occur over a given period. Developing a highway safety performance measure thus becomes an exercise in relating basic transportation system features and attributes to an expected number of highway crashes. There are several basic, well-established principles relating highway safety to elements of the highway. These include the relationship of vehicular traffic volume to crash frequency, and differences in the safety performance of different highway types.

5.1.1.4 Accessibility

Accessibility pertains to the ability of the roadway system to provide safe, convenient routes for motorists both within the study area and between the study area and locations outside it. The usual measure of accessibility is travel time. This considers both the availability of a convenient route and travel speed on the available path.

5.1.2 Existing and Baseline Roadway System Performance Analysis Results

5.1.2.1 Traffic Service Performance

As noted, LOS is the best indicator of traffic service performance. For the purpose of this study, LOS was calculated at a segment level for both existing and 2030 baseline conditions using P.M. peak period travel demand model outputs. Travel model network links between major cross roads constituted a defined segment along a particular roadway within the study area. Segment level LOS was computed using link-based weighted averages of volume/capacity ratio and average speeds using High Capacity Manual procedures. LOS calculations based on travel demand model outputs therefore represent general congestion characteristics for a particular segment of the roadway but do not account for location-specific operations associated with intersection design features and local access points. The intent of this analysis was to assess changes in travel conditions between the existing (2007) conditions and forecast year (2030) baseline conditions across the roadway system. It should be noted that detailed location-specific traffic service performance would be analyzed with future detailed studies of individual roadways.

LOS was calculated for each roadway segment for the critical (most heavily traveled) time period: P.M. peak (4 P.M. to 6 P.M.). Exhibit 5-1 indicates congested locations on the network, labeled “moderate congestion,” “severe congestion,” and “extreme congestion.” Exhibit 5-2 identifies network segments expected to operate at a congested level in the 2030 P.M. peak period for the baseline network. A review of 2007 and 2030 congested locations and levels demonstrates widespread and growing intensity of congestion on major roadways. Roughly 94 percent of freeways /tollways and principal arterials will operate under congested conditions in the 2030 P.M. peak period, as compared to 91 percent in 2007. By comparison, 87 percent of the roads will operate at “severe” or “extreme” congestion levels by 2030, as compared to 77 percent in 2007. The increase in congestion severity will result in growing travel delays on study area roadways.

TABLE 5-3
Change in VMT and VHT between 2007 Existing and 2030 Baseline by Time Periods

	A.M. Peak Period (7 A.M.–9 A.M.)				**P.M. Peak Period (4 P.M.–6 P.M.)**				**Daily**			
Functional Class	Δ VMT	% growth	Δ VHT	% growth	Δ VMT	% growth	Δ VHT	% growth	Δ VMT	% growth	Δ VHT	% growth
Freeway[a]	332,000	22	6,300	23	370,000	25	6,900	25	2,673,000	25	52,600	28
Principal arterial	(6,000)	(2)	1,800	11	7,000	2	2,500	14	33,000	1	17,700	15
Minor arterial	9,000	3	2,400	15	14,000	4	3,100	16	103,000	5	22,100	17
Collector	12,000	14	1,300	25	18,000	17	1,900	30	114,000	16	11,900	29
Total	**347,000**	**16**	**11,800**	**18**	**409,000**	**18**	**14,400**	**20**	**2,923,000**	**18**	**104,300**	**22**

[a] Includes ramps

Table 5-3 summarizes change in VMT and VHT as a measure of growth in travel characteristics in the study area between 2007 existing and 2030 baseline conditions. For the P.M. peak period, VMT is projected to increase at the greatest level (25 percent) on area freeways / tollways, with a comparable increase in VHT of 25 percent. Interestingly, the projected growth in VHT on other roadway classifications (principal arterials, minor arterials, collectors), as compared to the corresponding growth in VMT, is much greater. As an example, VMT on major arterials is projected to increase by a nominal 2 percent, while the corresponding increase in VHT is 14 percent. This trend underscores the expanding and intensifying congestion levels on the overall roadway network.

Within the study area, 92 percent of freeways VMT, 76 percent of principal and minor arterial VMT, and 39 percent of collector VMT occur at a congested level in the P.M. peak period. By 2030, congestion will grow to 94 percent of VMT on freeways, 81 percent of VMT on principal and minor arterials, and 43 percent of VMT on collectors. Clearly, planned roadway capacity improvements contained in the 2030 baseline network will neither address current travel performance problems nor accommodate growing travel demand.

5.1.2.2 Congestion Performance

The effects of congestion on roadway system performance were evaluated in terms of delay, expressed as VHD. Table 5-4 summarizes existing and projected 2030 VMT, VHT, and VHD during the P.M. peak period on study area roadways stratified by functional classification. Freeways, which account for only 30 percent of the lane-miles within the study area, carry roughly 70 percent of congested VMT and 13 percent of VHD in 2007 existing conditions during the P.M. peak period. Table 5-4 also lists the change in congested VMT, VHT, and VHD between 2007 and 2030 in the P.M. peak period, stratified by functional classification. For all roads, total VMT and total VHT will increase by 18 percent and 22 percent respectively between 2007 and 2030. In addition, VHD will increase by 35 percent due to increased congestion. This dramatic deterioration of traffic performance indicates that the existing and committed facilities alone would not adequately handle future travel demand.

As noted, congestion will continue to cause significant travel delays in the P.M. peak period. An associated effect of these conditions is that the duration of peak travel periods will increase over time to accommodate growing travel demand. Exhibit 5-3 compares the congested (LOS D, E, and F) peak period travel conditions between the existing and baseline transportation systems. Future growth in travel demand will result in an increase in the duration of congestion in the peak period along with higher proportions of congestion during the shoulder periods (pre- and post-peak periods) resulting in longer peak conditions between 2007 and 2030.

5.1.2.3 Safety Performance

Safety performance analysis procedures for the EO-WB Bypass project is structured to identify project transportation needs and to allow comparison of safety performance among the various transportation system alternatives.

The safety performance methodology relies on basic principles of safety as established through research (Appendix H, Travel Modeling and Traffic Forecasting Technical Report), and data for the study area including both crashes and traffic volumes. The methodology is intended to address potential or expected differences in system level safety performance

TABLE 5-4
Traffic Performance—2007 and 2030 P.M. Peak Period

Functional Class	P.M. Peak Period VMT					
	2007 Existing VMT			2030 Baseline VMT		
	Total	Congested	% Congested	Total	Congested	% Congested
Freeway[a]	1,501,000	1,377,000	92	1,871,000	1,751,000	94
Principal arterial	352,000	312,000	87	359,000	336,000	94
Minor arterial	342,000	217,000	63	356,000	247,000	69
Collector	107,000	42,000	39	125,000	54,000	43
Total	**2,302,000**	**1,948,000**	**85**	**2,711,000**	**2,388,000**	**88**

	P.M. Peak Period VHT			
	2007 Existing VHT	2030 Baseline VHT	Δ VHT	% Increase
Freeway[a]	27,300	34,200	6,900	25
Principal arterial	17,800	20,300	2,500	14
Minor arterial	19,700	22,800	3,100	16
Collector	6,400	8,300	1,900	30
Total	**71,200**	**85,600**	**14,400**	**20**

	P.M. Peak Period VHD			
	2007 Existing VHD	2030 Baseline VHD	Δ VHD	% Increase
Freeway[a]	2,400	3,100	600	25
Principal arterial	7,000	9,400	2,400	34
Minor arterial	7,600	10,100	2,600	34
Collector	2,100	3,200	1,100	52
Total	**19,100**	**25,800**	**6,700**	**35**

[a] Includes ramps.

between the current roadway system (with existing travel demand), the baseline roadway system (with projected 2030 travel demand), and the range of system build alternatives that will be considered (with projected 2030 travel demand) with this study.

The safety performance analysis for this study focuses on evaluating the relationship of vehicular traffic volume to crash frequency, and on evaluating potential differences in safety performance along different highway types. Traffic volumes, crash data, and facility type descriptions were obtained from data maintained by IDOT and CMAP, including IDOT crash data records for the years 2004 to 2006. Because only about 50 percent of the total crashes in the 2004 crash data were geographically referenced, only years 2005 and 2006 were included as part of the safety analysis. A total of 31,000 crashes, including roughly 6,000 crashes on the secondary system, were reported and identified in the GIS database for 2005–2006 within the 100-square mile study area. Of those crashes, 5,245 were injury crashes and 50 fatal crashes. See Table 5-5 and Exhibit 5-4.

TABLE 5-5
Crash Severity by Functional Class within Study Area (2005 and 2006 Crash Data)

Functional Class	Fatal Crashes	A-Injury Crashes	B-Injury Crashes	C-Injury Crashes	Total Fatal Plus All Injury Crashes
Freeway[a]	12	176	636	439	1,263
Principal arterial	16	209	600	783	1,608
Minor arterial	18	229	578	660	1,485
Collector	0	47	120	179	346
Other/unknown	4	81	261	247	593
Total	**50**	**742**	**2,195**	**2,308**	**5,295**

[a] Includes ramps

Of the 792 fatal and A-injury (serious injury) crashes, 31 percent occurred on minor arterials, 28 percent on primary arterials, and 23 percent on freeways/tollways. Also, more than 20 percent of the fatal and A-injury crashes occurred between 5:00 P.M. and 8:00 P.M. and about 10 percent involved an impaired driver.

The number of crashes in the study area is comparable to other urbanized areas of similar size in the Chicago metropolitan region. Exhibit 5-4A represents crash rate comparisons between the study area and IDOT District One by functional class. Comparison of crash rates suggests that total crashes in the study area is less than or equal to those in other urbanized areas in IDOT District 1; thus, crashes within the study area based on amount of traffic exposure is not unique to the study area.

A key component of the safety analysis is a comparison of the relationship between crash characteristics and traffic demand along various roadway types. For the existing transportation system with current traffic, VMT was calculated from the travel demand model. A time of day analysis was then conducted to provide an understanding of the effect of congestion on crash frequency and severity. Crashes and modeled traffic volume data were plotted for the 24-hour period, expressed as a proportion of the daily total. Exhibit 5-5 shows the traffic flow-crash profile results for freeways/tollways and for principal arterials. As indicated on the traffic flow-crash profiles, the proportion of daily crashes occurring during peak periods is greater than the proportion of traffic volume during the same periods. This suggests that congestion levels contribute to increased crash frequencies.

Crash rates and severity were also determined for the different roadway functional classifications under both congested and uncongested conditions. For the purpose of this safety analysis, LOS E and F were considered “congested conditions” since traffic flow characteristics are appreciably constrained at these levels. Crash data were aggregated for roadway segments and times of day when congestion occurs, and for segments and time periods deemed relatively uncongested (LOS A through D). Table 5-6 summarizes existing crash rates, VMT, and crash severity under congested and uncongested conditions.

TABLE 5-6
Crash Rate, VMT and Crash Severity Distribution: Congested and Uncongested Conditions (2007 Existing)

	2007 Modeled Annual MVMT		Annual Crash Rate (Crashes/MVMT)		Annual Congested Crashes				Annual Uncongested Crashes			
Functional Class	Congested	Uncongested	Congested	Uncongested	Fatal plus A-Injury	B-Injury plus C-Injury	PDO	Total Crashes	Fatal plus A-Injury	B-Injury plus C-Injury	PDO	Total Crashes
Freeway[a]	2,460	1,390	1.16	0.99	52	345	2,451	2,847	42	193	1,143	1,378
Principal arterial	300	590	5.85	4.11	38	280	1,459	1,777	75	412	1,934	2,420
Minor arterial	175	655	6.34	4.09	29	182	899	1,109	95	438	2,144	2,676
Collector	40	220	5.62	3.47	5	33	169	207	19	117	623	759
Total	**2,975**	**2,855**			**124**	**839**	**4,977**	**5,940**	**230**	**1159**	**5,843**	**7,232**

[a] Includes ramps

Existing crash rates and severity distribution were used as the basis for predicting future crashes. Subsequently, projected growth in traffic demand and the corresponding growth in congested conditions by 2030 were calculated with aid of the travel demand model. Thus, the analysis allows a full understanding of shifts in traffic to different facility types, travel efficiencies, and operational quality by time of day. The annual total predicted crashes (N) for the 2030 baseline roadway network was computed as follows:

$$N = \sum \left[\left(Annual\ MVMT\ uncongested * Crash\ \ Rate\ uncongested \right) + \left(Annual\ MVMT\ congested * Crash\ \ Rate\ congested \right) \right]$$

Where:

N = annual total predicted crashes
Annual MVMT uncongested = annual million VMT on uncongested roadways
Crash Rate uncongested = crash rate for uncongested roadways
Annual MVMT congested = annual million VMT on congested roadways
Crash Rate congested = crash rate for congested roadways

Table 5-7 summarizes the annual total predicted crashes for the study area and estimated crash severity distribution based on 2030 forecasted VMT.

In the study area, the increase of crashes is linked to more vehicles traveling more miles than before, and to congestion on roadways. The study area is a regional transportation hub connecting the various urbanized locations throughout the Chicago metropolitan region. Strategies for improving travel safety in this area include providing improvements that increase roadway capacity and shift traffic to the appropriate types of roadway facilities that suit the travel. Most notably, strategies which accommodate the significant percentage of longer distance regional travel on interstate facilities—which by design minimize travel conflicts and efficiently carry heavy traffic demand—would aid in reducing overall congestion and hence reduce overall crashes.

Based on the foregoing discussion, key findings of the existing and predicted 2030 safety performance of the roadway system are as follows:

- Controlled access facilities (freeways/tollways) have lower crash rates than lower functional class facilities.
- Crash rates are consistently greater for all roadway types during congested conditions, as compared to during uncongested conditions.
- The severity of crashes (proportion resulting in an injury or a fatality) is greater during uncongested time periods, with the greatest difference in severity occurring on the higher speed controlled access facilities. For example, for controlled access facilities, about 17 percent of reported crashes were injury or fatality producing in uncongested time periods but only 14 percent during congested periods. The increase in traffic for the 2030 baseline scenario results in extended congested periods, thereby a higher proportion of crashes in the congested periods as compared to the existing condition.
- Crash rates in the study area are consistent with those in other urbanized areas of similar size in the Chicago metropolitan region.

TABLE 5-7
Predicted Crashes and Crash Severity Distribution: Congested and Uncongested Conditions (2030 Baseline)

	2030 Forecast Annual MVMT		Annual Crash Rate (Crashes/MVMT)		Predicted Annual Congested Crashes				Predicted Annual Uncongested Crashes			
Functional Class	Congested	Uncongested	Congested	Uncongested	Fatal plus A-Injury	B-Injury plus C-Injury	PDO	Total Crashes	Fatal plus A-Injury	B-Injury plus C-Injury	PDO	Total Crashes
Freeway[a]	3,620	1,205	1.16	0.99	77	507	3,606	4,190	36	167	991	1,195
Principal arterial	435	470	5.85	4.11	55	402	2,094	2,550	59	328	1,540	1,927
Minor arterial	210	660	6.34	4.09	35	217	1,073	1,325	95	440	2,156	2,691
Collector	70	230	5.62	3.47	8	62	316	387	20	122	650	792
Total	**4,335**	**2,565**			**174**	**1,187**	**7,090**	**8,451**	**211**	**1,057**	**5,337**	**6,604**

[a] Includes ramps

5.1.2.4 Accessibility Performance

Ability to gain access to and from the interstate system was ranked as one of the top issues by stakeholders in the study area. Efficient access to locations throughout the remainder of the metropolitan region is highly reliant on availability of a freeway connection. As described in Section 3.1.3.3, 48 percent of traffic traveling in the study area has trip origins or destinations outside the study area. Those trips generally rely on convenient access to major regional roadway facilities.

A tool commonly used to measure accessibility is the isochronal map, on which travel time is calculated between a location within the study area and locations throughout the region. Exhibit 5-6 illustrates 2030 travel times from the west side of O'Hare Airport to locations both within and outside the study area. As shown, travel times to the nearest interstate facility are considerably longer for travel to the west and northwest. A detailed examination of modeled travel times to five interstate locations on the surrounding freeway system supports this observation (Table 5-8). Travel times vary for the five locations, with travel times today ranging from roughly 10 to 17 minutes. By 2030, modeled travel times will increase between 10 and 25 percent to the various interstate locations. The longer trips are to the west and northwest.

TABLE 5-8
Travel Time (minutes) from O'Hare West Area to Study Area Locations (P.M. peak period)

	Thorndale/I-290		Arlington Heights/I-90		Elmhurst Rd/ I-90		Irving Park/I-294		IL 83/I-290	
From/To	**2007**	**2030**	**2007**	**2030**	**2007**	**2030**	**2007**	**2030**	**2007**	**2030**
ORD / West	18.5	22.6	17.2	19.3	11.2	12.5	9.8	12.2	11.2	13.3

Another analysis determined travel times from within the study area to freeway interchanges within the study area. Exhibit 5-7 shows travel time contours for existing interchanges. Forty percent of the study area is 10 or more minutes distant (based on estimated travel times during P.M. peak period conditions) from the nearest freeway access. The part of the study area (40 percent) farthest from a freeway connection is also the location of the greatest concentration of industrial and commercial land use and the proposed O'Hare west entrance, which relies on freeway access to attract employees and move people and goods. The economic vitality and the development of commercial/retail enterprises are linked to accessibility and adequate transportation facilities that support efficient movement of people and goods within and outside the study area.

One clear barrier to convenient interstate access in the study area is the lack of adequate service interchanges along existing facilities. There are 22 interchanges with local roads along the interstates in the study area. Ten are partial interchanges, contributing to out-of-direction travel, impaired access, and travel inefficiency.

The combination of service interchange short falls, and lengthy travel times to the nearest interstate connection demonstrates that more efficient travel solutions are needed to provide convenient access between the study area and the region.

5.1.3 Findings and Conclusions

The area roadway system has and will continue to have widespread congestion, causing travel delays, constrained operations, and increasing safety concerns. Key findings and conclusions of the roadway transportation system performance analyses are as follows:

- More than 92 percent of travel on freeways/tollways and 87 percent of travel on principal arterials are congested in the P.M. peak period. By 2030, the proportion of congested travel during the P.M. peak period will increase to 94 percent on both freeways/tollways and principal arterials.
- Widespread congestion results in significant travel delays in the study area, and decreasing travel reliability. Congestion causes 127,800 vehicle hours of delay daily, which will grow to 176,000 vehicle hours of delay in 2030 with the baseline transportation system.
- Widespread congestion will result in extended durations of congested conditions on area roadways, as peak traffic demand spills over into the pre and post peak periods.
- Widespread congestion will result in increasing traffic demand on secondary collector roadways, resulting in decreasing travel efficiency and mobility. Specifically, by 2030 P.M. peak period vehicle hours of delay will increase by 34 percent on minor arterials and 52 percent on collector systems. The increase in delay on the minor arterials and collectors (secondary roadways) is equal to or greater than that for freeway and principal arterials (primary roadways).
- Based on analysis of existing crash data, congestion levels affect the safety performance of the existing roadway system, with all roadway classifications experiencing a higher crash rate during congested travel conditions. With the projected growth in traffic demand on the 2030 baseline system, crash occurrences are expected to increase over 40 percent during periods of congested operations.
- Much of the study area (40 percent of the geographic area) lacks convenient access to major regional roadways. Availability of convenient access to interstate corridors is particular important in light of the fact that 48 percent of all highway traffic in the study area has a trip origin or destination outside the study area.

5.2 Transit System Performance

This section describes the performance of the existing and 2030 baseline transit system, with particular focus on issues related to transit ridership trends and the potential for increasing future transit use to improve the overall efficiency of the transportation system in the study area.

5.2.1 Discussion of Performance Considerations

A variety of factors and measures are commonly used to evaluate the effectiveness and the deficiencies of an existing transit system. Identifying measurable deficiencies permits the development of strategies and plans to improve the system's performance.

Ridership on the current system, and projected ridership on an improved system are the most important and identifiable measures of transit performance. One important objective is to increase the proportion of residents and jobs within transit's immediate service area, thus increasing transit's mode share and potential future ridership. The immediate service area is considered to be within ¼ mile of a Pace route, or within ½ mile of a Metra station. The ¼ mile measure for bus service conforms both to the measure Pace uses in evaluating customer satisfaction and to traditional CTA policy as to the maximum distance Chicagoans should have to walk to reach a bus route. The ½ mile measure for Metra stations relates to the fact that the preponderance of people who access the stations on foot walk ½ mile or less; thus, these individuals are not accessing by a mode that increases traffic volumes on the roadway system. A series of exhibits developed with these guidelines assesses both Pace and Metra coverage for the existing system in 2007 and the Baseline system in 2030, as follows:

- Exhibit 5-8 shows that, in 2007, 23 percent of the area's population lives within ½ mile of a Metra station, a proportion projected to increase to 35 percent in 2030. Exhibit 5-9 displays similar information for employment served by Metra, with 15 percent of jobs within ½ mile, or walkable distance of a Metra station in 2007, increasing to 36 percent in 2030, with the implementation of the STAR line corridor. This projection may be refined as actual STAR line station locations are confirmed.
- Exhibit 5-10 shows that 44 percent of the area's population is within ¼ mile of Pace service in 2007, a proportion that decreases slightly to 43 percent in 2030. Exhibit 5-11 displays similar information for employment, with 65 percent of the study areas jobs within ¼ mile of a Pace route, projected to diminish somewhat to 59 percent in 2030. Although the proportions of population and employment in the area covered by Pace is quite high, they do not correlate with actual use of the system, which may be affected by the measures enumerated below. It is important to note that, although the alternatives analysis phase of this study is expected to address major improvements to Pace's system, the baseline does not include changes, a fact that affects the output of the 2030 analysis displayed in the exhibits.

Additional measures commonly used to assess transit performance relate to transit's efficiency, capacity, accessibility and socioeconomic considerations, which affect the overall transportation system in the study area and are elaborated below:

- As noted, accessibility to jobs, community centers, shopping services, and housing is critical. Accessibility can be measured by proximity to bus and rail service, quality of the access routes, station parking, capacity, and effectiveness of intermodal connections such as collector and distributor systems.
- Capacity for both rail and bus transit systems. For rail transit, capacity is most commonly measured by seat availability during peak periods and the rail infrastructure's ability to accommodate additional trains. For bus transit, capacity is a function of roadway LOS and seat availability. In this regard, congestion on area roadways affects transit travel times, with LOS D or worse causing degradation of travel times and schedule adherence on the bus system.
- Travel time as measured by the length of time to travel from origin to destination, as compared to auto. In the Chicago metropolitan region as a whole, the proportion of work commutes via transit that are under 60 minutes ranges from 80 to 88 percent, compared to 98 to 99 percent for highway work commutes. Similarly, the proportion of jobs that can be reached within 60 minutes by transit ranges from 27 to 33 percent, compared to 49 to 56 percent by highway. These facts illustrate an important obstacle to increased transit mode share in the region.
- Socioeconomic considerations such as households, population, and employment within a 3-mile radius of transit facilities, proportion of low income population served by transit, and accessibility of transit-dependant populations to transit facilities. (CMAP has applied the 3-mile radius in developing the conformity analysis for the 2030 RTP. Although it is more liberal than the guidelines used to display the immediate service areas covered by transit, discussed above, it does provide yet another measure of effectiveness.)

5.2.2 Performance Issues

This section includes an overview of the performance characteristics, and a discussion of potential service or ridership expansion strategies for the CTA, Metra, and Pace transit systems in the study area based on identified performance gaps.

5.2.2.1 CTA System Characteristics and Deficiencies

As noted in Section 3.2, the Blue Line is the only CTA facility that serves the study area. The only CTA rail service improvement in the 2030 baseline transit network consists of connecting CTA's Blue Line service to O'Hare International Airport from Block 37 in downtown Chicago. This connection, now under construction, will facilitate transferring to the Red and Orange lines, potentially reducing travel time for airport bound passengers.

An additional improvement, which is not part of the EO-WB 2030 transit baseline, is CTA's proposed Express Airport Service. This service would operate on a dedicated track from the new station at Block 37 in downtown Chicago-a multi-use retail office complex. This investment represents one approach to capturing more of the air traveler market. The service would feature higher fares than existing Blue Line train service and would provide limited, if any, stops beyond the CBD. However, it would provide increased flexibility and faster, more reliable travel for residents and visitors.

It should be noted that currently, extensive signal system and track repairs are under way on the O'Hare Branch. While travel times during the repair period are substantially increased, they are expected to improve considerably when the work is complete, enhancing Blue Line service.

5.2.2.1.1 **Rider Trends.** Ridership along the Blue Line in the study area increased throughout the period 1999–2006. Most notably, the O'Hare Airport Station saw a 19 percent increase. In 2007, however, perhaps because of increased travel times on the line, ridership is off 6 percent on the branch and 2 percent at the O'Hare Station. The principal markets this line serves are: those who work at or near the airport, those who are traveling to and from the Chicago CBD, and airport travelers. Opportunities to capture additional airport-related trips would benefit the CTA in the form of new revenue.

5.2.2.1.2 **Accessibility.** When evaluating opportunities to increase rail transit ridership, it is necessary to evaluate ease of access and availability of connections at CTA stations. It is also recognized that lack of adequate parking can adversely affect ridership. Part of the transit ridership equation is convenience. If one element of the commute proves problematic, then alternative travel modes are sought. CTA monitors the balance between parking and commuter demand, and makes adjustments when possible. An inventory of available parking at CTA stations in the study area is presented in Table 3-5. Excluding the O'Hare Terminal Station, three stations provide convenient parking, but the fourth provides more restricted parking. Parking facilities at all these stations are heavily used. Thus, increasing the number of spaces may help to increase ridership.

More significant than parking availability, though, is the fact that the CTA system is designed so that the bus system, generally structured on a grid, connects routes to each other and to the transit stations. The efficiency and effectiveness of these connections is a most important element in maximizing ridership. For many years, CTA's policy has been to assure that no person must walk more than ¼ mile to a bus route and that policy continues to be observed. There are some exceptions to the rule, including residential areas with lower than typical city densities, interruptions in the grid street system, or changes in municipal boundaries. Some of these conditions surround the Blue Line in the study area. However, all stations in the study area have connecting bus services that are not analyzed as part of this assessment because, by themselves, they do not serve the study area. Their passengers who travel into the study area or to O'Hare International Airport would transfer to the Blue Line.

The availability of connections for pedestrians and bicyclists from the stations to work or home is also important. Continuous sidewalks exist throughout the City of Chicago, as do safe signalized intersections or pedestrian crossings at the end of short blocks. The City has committed to defining bicycle trails or roadways suitable for bicycle use, throughout, with designated, striped lanes in evidence throughout.

5.2.2.1.3 **Capacity.** One constraint to handling more passengers on the Blue Line is availability of cars, which is a capital investment. Another is the track and signal systems, which together with the current repair work, constrain train capacity on the O'Hare Branch. When this work is complete at the end of 2008, as demand warrants, CTA can reduce the headways on the line to operate additional trains. Currently, trains operate every 5 to 8 minutes throughout most of the day, with lower levels of service in the middle of the night. Between 2:00 A.M. and 3:43 A.M., service frequency is about 30 minutes.

CTA indicates that the heaviest peak hour passenger load is about 8,000 passengers and the heaviest quarter-hour load about 2,500. When the line is operating optimally, headways can be reduced to operate trains more frequently; every 3 or 4 minutes, for example.

5.2.2.1.4 Travel Time. In recent years, the condition of the CTA infrastructure has resulted in operational constraints on the system, including along the Blue Line. Deteriorating track conditions have reduced train speeds significantly, lengthening the trip between downtown Chicago and O'Hare International Airport by as much as 15 minutes. As noted, track repairs are under way.

5.2.2.2 Metra System Characteristics and Deficiencies

Four Metra lines serve the study area, including the North Central Service (NCS), which recently was improved by the addition of a second mainline track and, in the study area, three new stations. This increased capacity on the NCS permitted the addition of 17 trains (total of 22 daily) to the weekday schedule.

Metra service expansions and improvements contained in the 2030 baseline transit network should also correct operational problems, improve schedule reliability, increase train speeds, increase ridership, and increase the number of trains. They consist of capacity upgrades along the UP-W line, capacity upgrades and extension of the UP-NW line, and construction of the proposed STAR Line with service extending from O'Hare International Airport to Joliet. The STAR line is designed to provide unique suburb-to-suburb connection service to the growing number of residents and employers in the area. Running 55 miles in length, the proposed STAR line route will make use of 38 miles of EJ&E railroad running from Hoffman Estates south to Joliet. The rest of the STAR line alignment, and the part that lies within the study area, will run from O'Hare along the I-90 corridor, with stations at Elmhurst Road, Busse Road, Arlington Heights Road, Golf Road, and the Ikea store at Woodfield Mall. Diesel multiple unit vehicles would be used on the STAR line, providing service flexibility similar to a light rail system.

Metra has completed alternatives analysis studies for the UP-NW and UP-W lines. The alternatives analysis for the STAR line is still under way.

5.2.2.2.1 Rider Trends. Recent ridership trends and projections are discussed extensively in Sections 3.2 and 4.6. In the A.M. peak period the number of riders boarding at Metra stations in the study area has decreased about 12.5 percent since 1999, whereas the number of riders alighting at the same stations has increased 2.4 percent. These changing Metra ridership characteristics appear to be related to changing regional residential locations and employment commuting patterns. Alighting increases can be attributed to Chicago residents commuting to suburban jobs and to more suburban residents commuting to suburban jobs.

When fully implemented, the planned improvements and expansions discussed above (as reflected in the 2030 baseline transit network) should result in substantial ridership increases. In fact, ridership at stations that are in or near the study area is projected to increase 17 percent on the UP-NW and 32 percent on the UP-W (see Table 4-6).

5.2.2.2.2 Accessibility. Important factors to consider when evaluating these ridership trends are the availability of connections to work centers, the need for improved transit travel times, the need for ample parking at stations, and system upgrades and schedule adjustments to accommodate the reverse commute. Ease of access to Metra stations and the ability to make "last mile" connections from stations to final destinations in areas surrounding the outlying stations presents another important opportunity for increasing transit's market share. To the extent that door-to-door connections by transit compete effectively or more favorably with the auto, the system's ability to serve the demand requirements of the corridor will increase even more.

The latest customer satisfaction survey, the *2005 Metra Rider Survey,* provides important information on accessibility issues. Tables 5-9 through 5-11 array the related survey results for the lines serving the study area and for the system as a whole.

TABLE 5-9
Mode of Access to Boarding Station

	NCS	**UP-NW**	**MDW**	**UP-W**	**Total All Lines**
Drive alone/park	62%	54%	61%	49%	52%
Carpool driver/parked	2%	3%	3%	3%	3%
Carpool passenger	3%	3%	3%	3%	3%
Dropped off	21%	15%	14%	16%	14%
Walked	9%	19%	11%	21%	21%
CTA or Pace	< 0.5%	3%	5%	4%	4%
Bicycle	2%	2%	1%	3%	1%
Other (shuttle, taxi, etc.)	< 0.5%	1%	1%	1%	2%

TABLE 5-10
Mode of Egress from Destination Station

	NCS	**UPNW**	**MDW**	**UPW**	**Total All Lines**
Walked	74%	72%	70%	74%	73%
CTA or Pace	12%	12%	13%	13%	13%
Shuttle/van	9%	5%	4%	4%	4%
Drove alone	1%	2%	3%	2%	3%
Picked up	2%	2%	4%	2%	2%
Taxi, other	2%	4%	6%	5%	5%

The fact that 55 percent of Metra's riders carpool or drive to the commuter station and park reinforces the importance of parking availability at stations. In the study area, the percentages increase to 64 percent on the NCS and 64 percent on the Milwaukee West Line. Except for the newest stations on the NCS, available capacity is heavily used throughout the area, with use exceeding 90 percent at some stations, particularly at UP-W and UP-NW stations, where more than 90 percent of spaces are used on a typical weekday (see Table 3-12).

TABLE 5-11
Customer Satisfaction with Parking Availability

	1999	2005
NCS	85%	88%
MDW	76%	73%
System Average	57%	59%
UP-NW	52%	57%
UP-W	57%	53%

Customers are less satisfied with parking availability on these two lines than they are on average, systemwide. They are quite satisfied with parking availability on the new NCS line (Table 5-11). Capacity increases will occur with implementation of the 2030 baseline projects. For example, the alternatives analysis study for the UP-NW line proposes the addition of about 77 spaces at Palatine, whereas the UP-W study proposes the addition of 351 spaces in the Maywood to Lombard segment. When the STAR line alternatives analysis is complete, it, too, will quantify the parking capacity to be provided in the study area.

Although part of the remedy is more parking, another consideration is alternative forms of access to the rail stations. These alternatives include bicycle and pedestrian facilities, and connecting bus services. Table 5-9 shows that walking is the second most frequent means of access to a station, 21 percent overall. Including trips to the Chicago CBD, 73 percent of the riders walk from their destination stations, so walking is the greatest mode of egress (Table 5-10). Walking continues to be the most significant mode of egress for riders traveling on outbound trains during the A.M. peak period, 44 percent of whom walk to their final destination. For outbound riders, connecting shuttle or van services represent the second most frequently used egress mode—15 percent—while 12 percent take Pace. Making connections from suburban stations to the suburban employment sites is incorporated into the locally preferred alternative for the UP-NW, which includes employer shuttles projected to serve 2,120 daily Metra riders. The UP-W study found that major activity centers are already served, so it does not provide for new connections to employment sites.

Since the 2005 survey was conducted from start of service until 2:00 P.M., it is safe to conclude that most riders were accessing suburban stations, where high-quality transit connections may not exist, and exiting at CBD stations, where connecting transit services are abundant. The bicycle and pedestrian systems at study area stations are addressed separately in Section 5.4, and the suburban bus system is addressed in Section 5.2.2.3.

5.2.2.2.3 Capacity. Capacity is stressed on two of the four Metra lines serving the study area: UP-W and UP-NW. Some trains on both lines have more passengers than seats (Table 5-12). Implementation of the preferred alternatives for those services will relieve the capacity problems. Although STAR line projections are not yet available, implementation of this service may relieve pressure on the UP-NW line by diverting some of its passengers. As demand warrants, additional trains can also be added to the NCS. In fact, Metra planned for up to 52 trains per day at full buildout of the line (e.g., a second mainline all the way to

Antioch), compared to the current 22 daily trains. By 2030, capacity problems on the system should be resolved.

5.2.2.2.4 Travel Time. In evaluating travel time by rail as compared to travel time by auto, it is important to note a couple of points. One is that total travel time by rail involves travel from trip origin to the station and from the station to final destination, at least three links. A trip made wholly by auto on the other hand may be directly from door to door. There are several important factors that appear to attract transit riders. Again, citing the *2005 Metra Rider Survey*, factors that influence people to ride are travel time (79 percent), ability to better predict travel (74 percent), and ability to read/work while commuting (66 percent). Getting to one's destination on time is consistently important for passengers.

Table 5-13 illustrates the recent performance record for study area lines. Only the UP-NW performs consistently better than the system average, likely because of its third mainline track. Also to be noted are the improvements on the NCS since additional mainline track has been installed, and a trend toward erosion on the UP-W, reinforcing the need for improvements on that line. The alternatives analysis studies project a 7-minute decrease in minimum travel time for the UP-W between Elburn and downtown Chicago, and an average savings ranging from 9 to 22 minutes as compared to auto for representative trips.

TABLE 5-12
Capacity Utilization on Metra Trains in the Study Area, February 2006

	Weekday Revenue Trains											
	Inbound		Outbound		Inbound Seats			Outbound Seats				
Line	Total	A.M. Peak	Total	P.M. Peak	Total	Avg Total Occupancy	Trains with 85% or more Occupancy	Total	Avg Total Occupancy	Trains with 85% or more Occupancy	First Inbound Train	Last Outbound Train
NCS[a]	10	5	10	4	6,013	33.2%	0	5,539	33.3%	0	5:20 A.M.	8:30 P.M.
UP-NW[b]	32	17	33	16	27,117	75.7%	11	27,418	71.7%	8	4:47 A.M.	12:30 A.M.
MDW	29	14	29	13	18,336	58.4%	5	18,256	56.6%	4	4:17 A.M.	12:40 A.M.
UP-W[c]	29	14	30	13	23,200	66.8%	8	22,235	65.0%	6	4:48 A.M.	12:40 A.M.

[a] Since 2006, 1 weekday train in each direction has been added to the NCS schedule.

[b] Occupancy on 2 weekday inbound trains exceeds 100% of available seats; on 5 others it exceeds 90%. On outbound trains, occupancy on 7 trains exceeds 100% of available seats, with occupancy on 1 train at 136%.

[c] Occupancy on 4 weekday inbound trains exceeds 90% of available seats. Outbound, occupancy on 1 train exceeds 100% of available seats; it exceeds 90% on 4 others.

Source: Metra.

Beyond the system performance issues and enhancement strategies addressed above, it should be noted that Metra is uniquely positioned to upgrade the region's commuter rail system to complement changing regional commuting patterns. Transit systems traditionally have been designed and operated to accommodate the suburban to central business district commute. With changing work patterns, however, Metra and other transit agencies are addressing the shift in work locations. Transit providers have begun to address the needs of the reverse commuter. The planned Metra service improvements contained in the 2030 baseline begin to address these needs.

TABLE 5-13
Metra On-time Performance

Line	2004	2005	2006	Jan to Sept 2007[a]
UP-NW	97.7%	96.9%	97.7%	95.9%
UP-W	95.2%	94.7%	94.7%	94.0%
NCS	90.6%	90.2%	94.5%	94.1%
MD-W	95.2%	94.8%	96.0%	95.5%
System[b]	96.9%	96.3%	96.3%	95.6%

[a] 4th quarter numbers not yet released
[b] without South Shore

5.2.2.3 Pace Bus Service Performance and Deficiencies

As described in Section 3, Pace operates 34 bus routes in the study area. Although the 2030 baseline transit network does not incorporate any major capital initiatives for the suburban bus system, Pace has identified as a priority technology improvements such as signal priorities to improve bus travel times, express bus services and bus rapid transit (BRT) initiatives.

For example, the DuPage J Line, a BRT proposal that could increase travel options in the study corridor, is a priority for both Pace and DuPage County. This project and others will be addressed in the alternatives analysis phase of this study.

5.2.2.3.1 **Rider Trends.** Pace ridership in the study area has declined 7 percent since 1999. A sluggish economy, employment drops, and fare hikes likely play a role in the trend. The trend is similar to that on the commuter rail system in that the drop (16 percent) was most severe between 1999 and 2002. Between 2002 and 2006, Pace ridership improved with a 10 percent increase for the period, but there are still fewer riders than in 1999 (Table 3-13).Individual ridership projections for the Pace system have not been isolated for the 2030 horizon, although assumptions regarding the system would have been factored into the regional mode split models. Projections discussed in Section 4.6 indicate that transit's 2030 share for all transit modes ranges from 8 to 11 percent for all trips, and from 13 to 21 percent for work trips. In all scenarios modeled, these proportions represent increases in the actual numbers of riders.

Some routes in the study area are among the most productive in Pace's system. For example, Route 250 Dempster is among the top 10 in the system in riders served. In 2007's third quarter, that route recovered 35 percent of its operating cost in passenger revenue; another, Route 318 West North Avenue, recovered 42 percent. As performance measures for suburban bus systems, these ratios are very good, comparing to Pace's average of just over 27 percent.

Another indicator of ridership potential is customer satisfaction. *Pace's 2007 Customer Satisfaction Survey Report* for its Northwest Division shows that 79 percent of the riders expressed overall satisfaction, compared to 75 percent for the system as a whole. This compares to Metra's rating of 77 percent. Also for this division, 78 percent of the riders are likely to recommend this service to others (vs. 76 percent systemwide), and 85 percent are likely to continue using the service (vs. 82 percent systemwide). However, only 25 percent of the riders in this division are so-called "choice" riders: those who have alternatives but prefer to use Pace service.

5.2.2.3.2 Accessibility. Accessibility of the bus system is a concern throughout the corridor, both for residents and employees. Another problem is the constant budget pressure that affects the agency. Nevertheless, Pace's *2007 Customer Satisfaction Survey* provides insights into the issue. Only 36 percent of the Northwest Division's riders have a bus stop within ¼ mile from home. In addition, only 50 percent of the riders indicated that bus stop shelters are available. As Table 5-14 shows, many of the routes that do serve the corridor offer reasonable levels of service in terms of frequency, early morning start times and service into the evening.

TABLE 5-14
Pace Service Levels Selected Routes

Route	Name	Frequency Range	First Bus	Last Bus
208	Golf Road	35 min all day; hourly after 7:45 P.M.	5:50 A.M.	10:24 P.M.
209	Busse Highway	20–30 min all day; hourly evenings	5:11 A.M.	9:45 P.M.
221	Wolf Road	20–35 min	5:13 A.M.	7:05 P.M.
223	Elk Grove–Rosemont Station	5–10 minutes peak, up to 1 hr 20 min off-peak	4:59 A.M.	12:30 A.M.
226	Oakton	10–15 min, peak; hourly off-peak	5:01 A.M.	6:20 P.M.
230	South Des Plaines	20–30 min, peak; hourly off-peak	5:35 A.M.	7:10 P.M.
240	Dee Road	25 min, peak; hourly off-peak	5:35 A.M.	6:50 P.M.
250	Dempster	25–45 minutes	5:20 A.M.	11:25 P.M.
309	Lake Street	24–30 min, peak, hourly off-peak	5:02 A.M.	10:30 P.M.
318	West North Avenue	10–30 min, peak, 30 min off-peak	4:52 A.M.	9:59 P.M.
319	Grand Avenue	4–20 min, peak; approx. hourly off-peak	5:30 A.M.	7:00 P.M.
330	Mannheim–LaGrange Road	20–35 min peak, approx. hourly off-peak	5:16 A.M.	10:12 P.M.
332	River and York Roads	45–55 min peak; hourly off-peak; no service from 9:25 to12:25 and 18:33 to 21:25	5:35 A.M.	11:15 P.M.
392	Little Village UPS	4 buses daily; scheduled to conform to shift changes	2:45 A.M.	9:45 P.M.
606	Northwest Ltd.	10–20 min peak; 30 min off-peak	5:10 A.M.	10:30 P.M.
643	Northwest Elmhurst	scheduled to meet A.M. and P.M. peak Metra trains	6:18 A.M.	6:06 P.M.
696	Woodfield-Arlington Heights-Randhurst	15–45 min peak; hourly off-peak	5:45 A.M.	7:30 P.M.
699	Palatine-Woodfield-Elk Grove	25–35 min peak; hourly off-peak	5:35 A.M.	5:49 P.M.

With few exceptions, the system does not adequately serve suburban employment sites in the study area. As noted, there are more than 532,000 jobs in the study area, but many of the employment sites are not served by connecting bus services. When connecting bus services are available, they may not offer the service quality that would make them attractive options to people who have alternative modes available. Examples of study area routes that do connect to Metra stations (or to CTA) are Route 616, the Chanceloory Connection, classified as a CTA connector but also serving the Itasca Metra Station on the MDW line, and Route 645 Elmhurst Industrial, a Metra feeder.

Most characteristics of Route 645 appear to conform to those that have made the successful Lake-Cook Shuttle services a national model. These include short trips (up to 5 miles) from rail station to the final destination; maximum one-way trip times of 15 minutes on the bus route, and a short wait time to transfer. Although ridership on the Lake-Cook shuttles increased 52 percent between 2002 and 2006, it decreased 46 percent on Route 645. On Route 616, ridership was down substantially (30 percent) between 1999 and 2002, but between 2002 and 2006 it increased 20 percent. Some characteristics of this route conform to the Lake-Cook model, but some do not. One-way trip times to employment centers from the Rosemont CTA station are lengthy, up to 47 minutes. In yet another example of how Pace's "last mile" connections from Metra stations compare to the Lake-Cook model, transfer times from UP-NW stations to Pace were examined. While the average wait time to transfer to the Lake-Cook Shuttle is 2.7 minutes, it is 18 minutes for UP-NW passengers transferring to Pace. This last issue relates to the travel time discussion below.

As a practical matter, improved and flexible bus service is part of the remedy to many of the issues with overall ridership on the region's transit system. Flexible and reliable bus service can link rail stations to major job centers, or provide the trip from home to major area destinations. Expanded bus service can address many mobility needs in the study area, and provide an interim solution that may be implemented in advance of more costly rail transit. The right type of bus transit combined with other complementary transportation system improvements can be an effective combination.

For example, Pace's Shuttle Bug service, providing last-mile connections from the Lake-Cook and Deerfield stations on Metra's Milwaukee District North line to employment sites along Lake Cook Road has been very successful. Working with area employers, each route is specifically designed to capture the reverse commute and work-trip travel markets. There is great potential for this service model to be used in the study area, especially along the Metra lines where employment is particularly dense such as the UP-NW line.

5.2.2.3.3 Capacity. Of 18 routes for which Pace provided data, boarding passengers exceed seating capacity on six routes in both the A.M. and P.M. peak periods (Table 5-15). During the morning peak, only three routes had boarding passengers equivalent to fewer than 70 percent of seats. On routes where people are required to stand consistently, this could be a deterrent to ridership, particularly if the trip exceeds 10 or 15 minutes.

As noted, transit travel time is increased by the time it takes to get to the stop and the time it takes to get to a final destination. The accessibility discussion states that the wait to transfer between Metra and Pace averages 18 minutes. Pace's *2007 Customer Satisfaction Survey* for the Northwest Division indicates that the average typical trip length is about 35 minutes, so for average Pace passengers who are transferring from Metra, the trip is 53 minutes long without the access, egress and rail links. Improving transit travel times should lead to the system's achieving greater mode share and relieving some of the pressure in the corridor.

TABLE 5-15
Pace Peak Period Capacity Utilization: Selected Routes

		Peak Vehicle Capacity: 6:00 A.M. to 9:00 A.M.			Peak Vehicle Capacity 3:00 P.M. to 6:00 P.M.		
Route Number	**Name**	Top Load	Seating Capacity	% Capacity	Top Load	Seating Capacity	% Capacity
208	Golf Road	93	76	122.4	77	108	71.3
209	Busse Highway	67	72	93.1	87	72	120.8
221	Wolf Road	87	72	120.8	146	184	79.3
223	Elk Grove–Rosemont Station	134	112	119.6	56	40	140.0
226	Oakton	71	72	98.6	50	112	44.6
230	South Des Plaines	147	148	99.3	80	112	71.4
240	Dee Road	122	152	80.3	91	116	78.4
250	Dempster	119	148	80.4	94	148	63.5
309	Lake Street	80	72	111.1	90	70	128.6
318	West North Avenue	91	111	82.0	263	212	124.1
319	Grand Avenue	49	70	70.0	59	68	86.8
330	Mannheim–LaGrange Road	132	174	75.9	264	181	145.9
332	River and York Roads	42	70	60.0	42	70	60.0
392	Little Village UPS	23	34	67.6	19	34	55.9
606	Northwest Ltd.	49	27	181.5	20	27	74.1
643	Northwest Elmhurst	21	27	77.8	17	27	63.0
696	Woodfield-Arlington Heights-Randhurst	29	54	53.7	65	108	60.2
699	Palatine-Woodfield-Elk Grove	64	54	118.5	n.a.	n.a.	

5.2.3 Findings and Conclusions

With few exceptions, the efficiency and effectiveness of the area’s transit system will continue to be affected by capacity constraints, LOS, inadequate reinvestment in infrastructure for some system elements, roadway conditions, and accessibility issues. Based on the foregoing discussion, key findings and conclusions of the transit system performance analyses are as follows:

- Capacity is constrained on selected elements of both Metra and Pace systems. In the peak periods, ridership on several UP-NW and UP-W trains exceeds 100 percent of the seating capacity, and on the Pace system, the maximum passenger load exceeds seating capacity on several bus routes. Without major investments in the system, the capacity problems will persist and worsen by 2030, perhaps even adversely affecting transit’s mode share.
- The widespread roadway congestion in the study area adversely affects schedule adherence on the Pace system. Of 24 routes analyzed, only two were on-time more than 80 percent of the time. Fifteen of the 24 routes adhered to schedule less than 70 percent of the time, including some “express” or “limited” routes. Roadway system performance

findings indicate that the congestion will persist through 2030, continuing to adversely affect bus system performance.

- Deteriorating infrastructure affects performance on the CTA Blue Line. Existing conditions and operating constraints are causing substantially increased travel times, potentially eroding ridership.
- Accessibility is a problem that is reflected in several measures:
  - Only 36 percent of Pace's riders are within ¼ mile of Pace service.
  - Fifty-five percent of Metra's riders drive to the station and park. However, parking capacity is stressed at both Metra and CTA stations. In the study area, capacity is over 90 percent utilized at seven Metra stations. At CTA's Harlem station, kiss-and-ride facilities have been converted to commuter parking to address demand.
  - Bus services to and from Metra stations could be enhanced. Only 4 percent of Metra's riders access the system by connecting transit service, affecting volumes of short local trips.
  - Employment sites could be better served by the Pace system. Analysis completed for Metra's UP-NW alternatives analysis study shows that there are an abundance of employers in the study area with 500,000 jobs near commuter rail, but service to those sites either does not exist or is of poor quality in terms of wait time to transfer, travel time to final destination, or length of the trip in miles. In the study area, where there are over 530,000 jobs, there are similar gaps in connections between suburban rail stations on the UP-W, MDW, and NCS lines and area's employment sites.
  - The existence and quality of access and egress connections are also important. Before 2 P.M., 21 percent of passengers accessing the Metra system and 73 percent exiting walk to their destinations. Therefore, attractive, direct, safe pathways are important. These conditions, sometimes lacking near suburban station locations, are addressed in Section 5.4.
- Finally, system connectivity appears to be affected by the barriers presented by large tracts of land including O'Hare International Airport and the forest preserves.

5.3 Freight Rail Transportation System Performance

This section describes the performance of the freight rail transportation system, focusing on major conflicts with area roadway (at-grade railroad crossings) and transit systems.

5.3.1 Performance Considerations

Numerous national freight rail corridors traverse the study area. Some share tracks with the Metra commuter rail system; all of them cross area highways at-grade at numerous locations throughout the study area. These conditions cause delays in moving freight rail traffic through the area and on area roadways adjacent to at-grade crossings, and constrain the movement of commuter rail traffic along shared corridors. For the purpose of this study, performance issues of concern include the following:

- At-grade crossings conflict with auto traffic. The conflicts are particularly problematic on major arterials that have high volumes of daily traffic.
- Train speed is a measure used by the freight rail operators for both scheduled and unscheduled trains. It is an indicator of the system's operating efficiency, directly affecting the economics of freight operations.
- Terminal dwell time—how long a train sits in a designated terminal while waiting to be rerouted to its next destination—measures conditions in the rail yards and the time to transfer to connecting railroads, a particular issue related to the economies of freight rail operations in the Chicago region.
- Intermodal access focuses on the efficiencies of truck to rail connections where traffic volumes are high and projected to increase by 2030.

5.3.2 Performance and Deficiencies

At-grade rail crossings, particularly in areas with high traffic volumes, adversely affect the freight rail system's capacity. In the study area, 80 grade crossings are associated with rail facilities, some of which cross major arterial streets, and many of which serve local industrial parks with lesser impacts on roadways. At-grade crossings along major roadways significantly impede the movement of traffic within and through the study area. Table 5-16 lists the crossings in the study area that have been identified by the communities they serve as having the most adverse impacts.

The at-grade crossing adjacent to the Illinois Route 19 (Irving Park Road) and York Road intersection exemplifies the systemwide impacts. Here, 25 trains traveling at a speed of 10 mph cross the location on an average day. The trains vary in length from 7,500 to 10,000 feet. In 2005, the average delay for each of the 6,400 vehicles that crossed the track during an 8-hour period was 14 minutes, or a combined total daily vehicle delay of 1,500 hours. Delays and resulting roadway congestion affect schedule performance of both Pace and school buses and hinder emergency services. Considering the number of at-grade crossings along arterials in the study area, the cumulative effects are serious impediments to both the efficiency and capacity of the study area's transportation system. Table 5-17 lists all locations within the study area where an at-grade crossing occurs on major or minor arterial roads, as well as one road classified as a collector. At-grade crossings on smaller local streets exist but are not included in the table because their impacts are less significant. Engineering for grade separating projects to improve the CP and MD-W crossings identified in Table 5-16 has commenced, and should result in significant efficiency improvements by eliminating the need for autos to yield to oncoming trains.

TABLE 5-16
Major Grade Crossing Conflicts

Railroad	Crossing Street Location	Functional Classification	AADT	Lanes of Roadway	Daily Scheduled Trains	
					Passenger	Freight
MDW	25th Ave. south of Belmont Ave.	Minor arterial (urban)	13,300	4 lane	72	18
	York Rd. north of Green St.	Minor arterial (urban)	23,700	4 lane	72	18
	Church Rd. west of Green St.	Collector (urban)	6,000	2 lane	72	18
	Irving Park Rd. (IL 19) east of Wood Dale Rd.	Minor arterial (urban)	31,200	4 lane	72	18
	Wood Dale Rd. north of Irving Park Rd.	Minor arterial (urban)	15,400	4 lane	72	18
	IL 53 north of Irving Park Rd.	Minor arterial (urban)	18,200	4 lane	72	18
	Medinah Rd. north of Irving Park Rd.	Minor arterial (urban)	11,600	4 lane	72	18
UP-W	York Rd. between 1st Ave. and Park Ave.	Minor arterial (urban)	18,400	4 lane	70	80
UP Milwaukee Subdivision	Touhy (IL 72) West of Mt. Prospect Rd.	Other principal arterial	13,600	6 lane	0	38
	Howard Ave. East of Mt. Prospect Rd.	Minor arterial (urban)	2,200	4 lane		
	Oakton Ave. Between Wolf Rd. and Mt. Prospect Rd.	Minor arterial (urban)	9,500	4 lane	0	38
	Algonquin Rd (IL 62) Between Wolf Rd. and Mt. Prospect Rd.	Minor arterial (urban)	11,100	4 lane	0	38
Canadian National (CN) / NCS	Belmont Ave. East of 25th Ave.	Minor arterial (urban)	9,900	4 lane	22	26
CP	Irving Park Rd. (IL 19) East of York Rd.	Minor arterial (urban)	41,100	4 lane	0	20
	York Rd. Between Thorndale Ave and Foster Ave	Minor arterial (urban)	30,800	4 lane		

An important performance measure in the freight rail industry is on-time performance. The freight rail systems have both scheduled and unscheduled trains, and freight system operators monitor and measure performance in terms of schedule adherence or on-time arrival for scheduled service. Scheduled trains are those that travel through the system at regular, prearranged intervals on daily, weekly, or other bases. Unscheduled trains use the system as needed; they are demand-driven, with delivery requirements that are not time-sensitive. The volume of unscheduled trains changes depending on seasonal or market variations. Generally, a rail carrier waits to accumulate enough carloads destined for the same location before making up a train.

TABLE 5-17
Pace Average On-Time Performance, Selected Routes
(based on November 2007 Pace data)

Route #	On Time %
208	73.6
209	78.8
221	74.5
223	81.9
226	72.5
230	81.4
240	73.6
250	75.5
309	58.7
318	68.9
319	69.2
330	78.0
332	65.3
392	52.7
393	66.2
394	62.5
600	49.9
606	67.2
610	47.9
616	60.5
637	65.8
696	63.7
699	64.7
757	53.3

Each freight rail company has its own approach to schedule performance, as exemplified by two of the major carriers in the study area. CP classifies trains by categories or series ranging from 100 to 400, with the 100 series being the highest priority and the 400 series being the fourth level of priority, and monitors schedule adherence by series. Canadian National, on the other hand, achieves 95 percent on-time performance systemwide, using the following color codes for its long-haul trains:

- Green for trains operating within 15 minutes of schedule (considered to be on time)
- Yellow for trains operating within 60 minutes of schedule time
- Red for trains that are more than 60 minutes late
- Purple for trains that are so late as to be unable to recover their schedules

Note that these measures do not apply to train movements within the freight yards, nor do they apply to nonscheduled service. For unscheduled service, comparable performance cannot be evaluated. The railroads have not provided data on schedule adherence.

Another freight rail system performance measure is average train speed. Canadian National and UP both monitor average train speed as an additional measure of freight rail system performance and apply it to all trains operating through the system. Because the measure includes both scheduled and unscheduled trains, it is a better measure of overall system performance and, therefore, is monitored by operating division or subdivision, Table 5-18 summarizes selected performance metrics for two of the freight railroads operating in the study area.

TABLE 5-18
Freight Rail Performance Metrics Selected Carriers, January 2008

	Cars on Line		Train Speed (mph)		Terminal Dwell Time (hr)	
Carrier	**Intermodal**	**Total**	**Intermodal**	**All Trains**	**Chicago**[a]	**Avg. Entire Railroad**
Canadian Pacific	8,761	82,546	29.0	24.0	27.6	24.0
Union Pacific	13,066	305,175	27.7	22.7	30.6	25.3

[a] Proviso Yard on the Union Pacific
Source: www.railroadpm.org

Finally, the measure that has been important in promoting the CREATE initiative is terminal dwell time, also displayed in Table 5-16. For the CP, the terminal dwell time in Chicago is 15 percent greater than average at other railroad terminals, and at UP's Proviso Yard, it is 21 percent greater. Considering the volume of freight that moves through Chicago (see Exhibit 3-15), these delays are costly.

Before 2030, the CREATE projects enumerated and described in Section 3.3 are expected to be complete. All of the projects, those in the study area and those near it, will improve the system's operation. The grade crossing projects will reduce roadway congestion and improve safety, while others will add capacity or make other improvements to the system.

5.3.2.1 Intermodal Access Performance and Deficiencies

Intermodal traffic on both the CP and the UP is not the greatest proportion of their business, about 11 percent of total cars on the CP and about 4 percent on the UP (Table 5-15). At this time, projected 2030 volumes of intermodal traffic for the railroads serving the study area are unknown. However, a document published by US GAO, *Freight Transportation: National Policy and Strategies Can Help Freight Mobility,* indicates that, by 2035, truck volume will increase 98 percent and railroad volume will increase 88 percent. The report further suggests that natural barriers, conflicting development patterns, and inefficiencies in the use of infrastructure are contributing to the "widening gap between volumes of goods and available system capacity." Of course, increased congestion is the result. Future phases of this study will evaluate strategies for increasing capacity such as truck-only lanes and ramps that connect directly from major roadways to rail yards.

5.3.3 Findings and Conclusions

The freight rail system is important to the region's economy, and when it is inefficient, it is costly to the freight rail companies. Where the system conflicts with other traffic, it also causes costly delays for the affected motorists. Key conclusions of the analysis are as follows:

- Grade crossing improvements and grade separations at key locations would make the operations of freight rail, commuter rail and roadway systems more efficient, both now and in 2030. Engineering to improve two of the crossings that have been identified as most problematic by the area's communities is in progress. The third problematic crossing, IL 19 and Wood Dale Road, should be addressed by 2030. While correcting these conditions should result in significant improvements, additional crossing improvements are needed to handle existing and projected growth in traffic volumes.

- Capacity and other improvements, such as grade separation projects that are proposed with CREATE will improve freight operations and safety conditions; they will also diminish roadway congestion. However, the project's funding limitations means that only a few desirable projects are currently programmed. These address the most critical problems, but more investment is needed to alleviate 2030 conditions.
- Both freight and truck traffic volumes are projected to essentially double nationally by 2030. These increases will stress the existing system.

5.4 Bicycle and Pedestrian Transportation System Performance

This section describes the performance of the bicycle and pedestrian system, focusing on whether the system provides effective transportation connections and where service gaps are present.

5.4.1 Performance Considerations

The existing pedestrian and bikeway systems and facilities in the study area consist of marked and unmarked bicycle routes along roadways, nonmotorized bicycle and pedestrian shared-use trails, sidewalks, pedestrian crossings and signalized intersections, and bicycle parking facilities. Because bicyclists and pedestrians often use a common system, they are both addressed in this section.

Performance of the area bicycle and pedestrian system is most commonly evaluated on the basis of the following measures:

- Safety addresses the quality of the system in terms of safe routing.
- Accessibility and proximity to safe bicycle routes and paths relates to the areas within ½ mile of a bicycle facility that IDOT rates as reasonably safe. It also includes off-road bicycle paths.
- Consistency in the safety level of a given travel route addresses the fact that, while segments of safe bicycle and pedestrian ways are scattered throughout the study area, the value of such facilities depends on how well they are linked to provide a safe trip from origin to destination.
- Bicycle and pedestrian access to transit stations and the quality of facilities at the station areas impacts bicycle, pedestrian and transit connectivity. Quality of facilities relates to conditions such as availability of bicycle parking and the proximity of stations to safe pedestrian crossings.
- Sidewalk coverage and pedestrian LOS is the largest factor specifically affecting pedestrian travel. It relates to the availability and quality of sidewalks, which for these purposes, is measured in terms of sidewalk coverage as a part of roadways that have adjacent sidewalks.

5.4.2 Performance and Deficiencies

5.4.2.1 Safety

Bicycle and pedestrian trips comprise 7 percent of all trips in the U.S., a dramatically lower mode share than occurs in many other countries (see Table 5-19 below). However, the U.S. has higher levels of pedestrian and bicycle fatalities. In the study

TABLE 5-19
Bicycle and Pedestrian Mode Share and Fatalities 2002

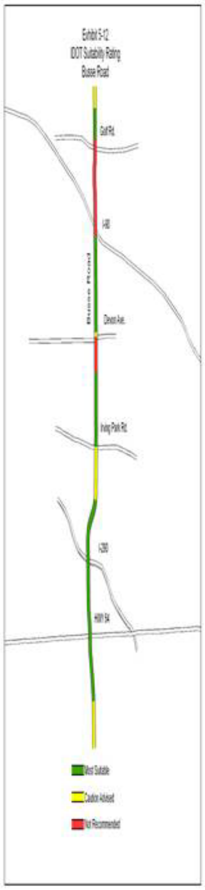
Country	Bicycle and Pedestrian Trips	Bicycle and Pedestrian Fatalities per 100,000 Population	Total Traffic Fatalities per 100,000 Population
United States	7%	1.9	14.9
Australia	20%	1.4	8.8
Norway	27%	0.9	6.9
United Kingdom	30%	1.6	6.1
Switzerland	32%	1.7	9.4
Germany	40%	1.8	8.3
Netherlands	48%	1.6	6.1

Source: Soles and Spokes Report. Chicago Area Transportation Study, 2004.

area, pedestrian and bicycle fatalities are 14 percent of the total fatalities (7 of 50) area from 2005 to 2006 (see Exhibit 5-4). Almost all traffic related bicycle and pedestrian fatalities are caused by automobiles. With more vehicles on the road, the incidence of bicycle and pedestrian injuries and fatalities increases. In this sense, improving conditions for bicycle and pedestrian travel is a matter of public safety. According to CATS' 2004 *Soles and Spokes: Task Two Report*, there were 7,190 nonoccupant injury and fatality crashes in Cook County and 330 in DuPage County in 2000.

The safety of a route depends on many factors, such as average vehicle speed, lane width, the roadway shoulder (availability, size, and surface), and existence of segregated bicycle lanes. Using these measurements, IDOT has ranked roadways in terms of their suitability for bicycle travel (see Figure 3-18). While there are roughly 310 total miles of safe bicycle routes and bicycle paths within the study area, there are also 242 miles of roadway that IDOT has classified "not recommended." These segments are interspersed throughout the study area and often create gaps in the travel path. There are numerous instances where a cyclist traveling on a given bicycle route will encounter segments of that route not recommended for biking, according to the IDOT rating system. An example of the fragmentation caused by inconsistencies in route safety is shown in Exhibit 5-12, where a 12-mile stretch of roadway incorporates segments rated unsuitable for biking, as well as numerous changes in suitability ratings along the route.

EXHIBIT 5-12
IDOT Suitability Rating, Busse Road



5.4.2.2 Accessibility

In addition to considering the consistency of safe route segments, it is important to examine proximity of any point within the study area to these facilities. Exhibit 5-13 shows locations that are more than ½ mile away from safe bicycle routes or bicycle paths. Safe bicycle routes those classified as "acceptable" or "caution advised" on the *Illinois Official* Bicycle *Map, Chicago/Northeastern Illinois Map 1* (IDOT Bike Map) (see Exhibit 3-19). Routes "not suitable for biking" are not considered to be adequate. Since a single bicycle route can exhibit different safety ratings within a single municipality, the inconsistence may be related to lack of funding for system improvements; alternatively, they may be due to absence of policies or planning that support bicycle safety. In some areas, local conditions such as heavy industrial traffic may be incompatible with safe bicycle ways.

There are bicycle system safety gaps in several parts of the study area, some of which are sizable (see Exhibit 5-13). One is in the southwest corner near the intersection of US 20 and IL 53 in Itasca, an area of primarily residential and commercial development. A larger gap exists just north of I-90 between Arlington Heights Road and York Road. This area is largely residential with some commercial and industrial land uses. A third gap exists in the northeastern corner of the study area northwest of O'Hare International Airport and I-294 and I-90 crossing in Des Plaines. This area is also of largely residential concentration. Smaller gaps include the following:

- Near the UP-W line's Berkeley and Elmhurst stations
- In southern Schiller Park just south of the NCS Schiller Park station
- Just west of Busse Woods between Schaumburg Road and Nerge Road
- In an area directly southeast of Busse Woods

5.4.2.3 Access to Transit

Assuring adequate connections to transit for pedestrians and bicyclists is essential. As described in Section 3.4, CTA, Metra, and Pace have all made efforts to increase the connectivity for bicyclists to transit through bicycle storage at stations, bicycle racks on vehicles, and aggressive education campaigns to encourage the integration of bicycle and transit travel. However, barriers still remain that limit the ease and safety with which bicycling and transit interact. The most frequently encountered factor in the study area concerns the availability of safe routes to and from rail stations. While a survey of study area rail stations confirms that most stations are equipped with convenient bicycle storage, enhanced by well lighted and maintained paths within the station area, the availability of safe paths and routes once a bicyclist or pedestrian leaves the station area is much less consistent (Table 5-20).

Table 5-20

Metra Station Pedestrian and Bicycle LOS

Line	Station	Sidewalk Condition in Station Area	Pedestrian Connectivity to Surrounding Area	Availability of Pedestrian Crossings	Bicycle Connectivity to Routes/Paths
NCS	O'Hare Transfer	+	+	–	0
	Rosemont	+	0	0	0
	Schiller Park	+	0	0	–
	Belmont Ave/Franklin Park	+	0	0	+
UPNW	Palatine	+	+	+	+
	Arlington Park	+	+	+	+
	Arlington Heights	+	+	+	+
	Mount Prospect	+	+	+	+
	Cumberland	0	0	–	+
	Des Plaines	0	+	+	+
	Dee Road	+	+	+	+
	Park Ridge	+	+	+	+
	Edison Park	+	+	n.a.	+
	Norwood Park	+	+	n.a.	+
	Gladstone Park	–	0	–	0
	Jefferson Park	0	+	+	0
MDW	Roselle	+	+	+	0
	Medinah	+	+	0	0
	Itasca	+	+	+	–
	Wood Dale	0	+	+	0

Table 5-20

Metra Station Pedestrian and Bicycle LOS

Line	Station	Sidewalk Condition in Station Area	Pedestrian Connectivity to Surrounding Area	Availability of Pedestrian Crossings	Bicycle Connectivity to Routes/Paths
	Bensenville	+	+	+	0
	Mannheim	–	0	0	+
	Franklin Park	+	+	+	+
	River Grove	+	+	+	+
UPW	Villa Park	+	+	+	0
	Elmhurst	+	+	+	+
	Berkeley	–	–	0	–
	Bellwood	0	–	+	0
CTA Blue Line					
	Jefferson Park	0	+	+	-
	Harlem	0	0	+	+
	Cumberland	+	0	-	-
	Rosemont	0	0	0	0
	O'Hare[a]	n.a	n.a	n.a	n.a

“+” = good, generally satisfactory; “0” = fair with room for improvement;” –“ = poor, no adequate facilities.
Data gathered January 2008

[a] The station is inside the O’Hare terminal and is, therefore, not rated.

Land use patterns, municipal codes regarding the integration of pedestrian and bicycle facilities in new construction, and historical development patterns surrounding the station sites affect pedestrian or bicycle accessibility. Two exhibits are presented to compare poor and good conditions:

- Metra’s Rosemont station on the North Central Service Line (Exhibit 5-14) is an example of a station with poor pedestrian and bicycle access. In this case, a pedestrian must walk about ½ mile east to the nearest signalized intersection to cross Balmoral Road safely in order reach destinations to the north. Although sidewalks are available along Balmoral Road, they abut the roadway without a parkway or safety barrier separating the walks and the road. Further, the nature of land use and development there is not welcoming to a pedestrian. No bicycle storage is available at the station.
- A Metra rail station that has a high level of pedestrian and bicycle connectivity is the Franklin Park station on the Milwaukee West line (Exhibit 5-15). Pedestrian access to the station is enhanced by the prevalence of sidewalks leading to it from surrounding areas. A signalized intersection is located just northeast of the station area at Belmont and 25th avenues, less than 0.1 mile away. Unlike at Rosemont, bicycle parking facilities are provided at Franklin Park. Several bicycle routes along Pacific, 25th, and Franklin Avenues that provide convenient travel options to the north, south, east, and west of the station.

5.4.2.4 Pedestrian Level of Service

Many factors that determine pedestrian LOS are similar to those for bicycles. For example, a pedestrian's comfort and safety are related to vehicle speed, and offset of pedestrians from the roadway. Other factors that influence pedestrian LOS include availability and width of sidewalks; existence and use of on-street parking; existence and spacing of trees and other fixed barriers; and other pedestrian amenities such as benches, lighting, and curb cuts.

In 2004, the Chicago Area Transportation Study (now part of CMAP) performed a bicycle and pedestrian LOS analysis for the 6-county Northeastern Illinois region, focusing on 25 communities throughout the region. Two of the selected communities within the study area—Franklin Park and Schaumburg—were assigned pedestrian LOS scores of D and C, respectively, on a scale of A to F. Generally, the analysis showed that pedestrian LOS scores were higher in areas with denser development patterns, as well as in areas developed before the 1970s. Older and denser development is more likely to have street patterns on a grid system, shorter block lengths, and sidewalks. Many suburban developments built since the 1970s abandoned the more traditional grid pattern in favor of more isolated, auto-oriented developments that rely on larger arterials and collectors for travel. Such areas may have omitted sidewalks all together. These factors add up to a very low pedestrian LOS.

The CATS *Soles and Spokes* report includes measurements of sidewalk density, expressed in terms of the percent of existing roadway that had adjacent sidewalks. Twenty-two of the 25 study area municipalities that completed a self-administered survey, most reported having a sidewalk density of at least 75 percent in their communities. Wood Dale reported having the least sidewalk density, less than 50 percent. Arlington Heights, Lombard, and Mt. Prospect reported the next lowest densities, ranging from 50 to 75 percent. The highest densities were reported by Elk Grove Village, Norridge, River Grove, Schaumburg, and the City of Chicago, all with sidewalk densities higher than 95 percent.

Based on these findings, much of the area appears to have adequate sidewalk coverage, although the alternatives phase of the study should focus on filling the gaps in the system, and making safe crossings at rail stations and other locations where there are opportunities for intermodal connections. A Metra brochure published in 1998 addressed strategies for improving connections to rail stations. It addresses the importance of providing a pleasant walking environment with good sidewalks, attractive landscaping, and shops, and a sense of activity to make the walk interesting and engaging.

5.4.3 Findings and Conclusions

The area's nonmotorized routes and trails are being improved continually. However, gaps in the systems and safety considerations may be impediments to the optimum effectiveness of the systems. Key findings and conclusions of the bicycle and pedestrian system performance analysis are as follows:

- The availability of more than 300 miles of safe bicycle routes and trails within the study area is overshadowed by the amount of fragmentation and lack of connectivity among these facilities.
- Gaps in access, defined as any point more than ½ mile away from a safe route or path, occur, especially in the southwest and northern parts of the study area.

- Gaps in intermodal connectivity between bicycle and pedestrian routes and transit facilities are also apparent and could be improved by ensuring that safe routes, including signalized intersections, connect directly to the transit stations.
- Pedestrians face inconsistencies in sidewalk availability throughout the study area. Even when sidewalks are available, psychological or physical barriers may diminish a pedestrian's perceived level of safety and comfort, thereby discouraging foot travel.

Pedestrian and bicycle travel are potential mitigators of roadway congestion. They increase travel mode options, and support transit services. Maintaining and improving pedestrian and bicycle accommodations is an important consideration for this study. Because of the area's wide scale of problems, realistic solutions should focus on major gaps in corridors where roadways are being improved.