I-290

Preliminary Engineering

and Environmental (Phase I) Study

West of Mannheim Road to East of Cicero Avenue

Existing Transportation System Performance Report

August 2010

Full Draft

This document is a revised draft of the I-290 Phase I Study Existing Transportation System Performance Report. It provides to the I-290 Phase I Corridor Advisory Group (CAG)/Task Force (TF) members the subject information presented at the February 17th, 2010, April 29th, 2010 and July 22nd, 2010 Corridor Advisory Group meetings.

1.0 Table of Contents

List of Tables

List of Figures

Appendices

1.0 Introduction

1.1 Background and History

The Eisenhower Expressway (I-290) transportation corridor was one of the first multi-modal facilities constructed in the United States. First open to traffic in the mid to late 1950's, this facility was designed and constructed according to early standards that were newly created for the interstate highway system and transit facilities.

The Eisenhower Expressway provides the primary east-west roadway access to the Chicago central business district. It also serves northwest Cook County, connects to the Reagan Memorial Tollway (I-88) and the Tri-State Tollway (I-294) on the west, and I-90/94 (Kennedy and Dan Ryan Expressways) on the east.

During the original construction of I-290, the Chicago Transit Authority (CTA) Garfield Park rapid transit branch was removed and replaced with what is now known as the "Blue Line" Forest Park branch. This rail rapid transit line was constructed parallel to I-290 on the south side of the roadway and in the median. The freight rail lines owned by Baltimore & Ohio Chicago Terminal Railroad (now CSX) were also relocated adjacent to the CTA tracks from east of Des Plaines Avenue to Central Avenue, which is referred to by the railroad as the Altenheim Subdivision.

1.2 Other Related Transportation Studies

- In 1998, the Illinois Department of Transportation (IDOT) High Occupancy Vehicle, or HOV, Feasibility study was completed and evaluated the feasibility of a dedicated carpool lane.
- Between 1999 and 2001, the IDOT Hillside Interchange Reconstruction project was initiated and completed, which eliminated the single lane bottleneck at I-88's connection with I-290 and improved connections to Mannheim Road.
- In 2001, IDOT began the I-290 Phase I Study to identify ways to improve the I-290 corridor between Mannheim Road and Cicero Avenue, but this study was put on hold pending the results of the Regional Transportation Authority (RTA) Cook-DuPage Corridor Study.
- From 2003 thru 2009, the Regional Transportation Authority (RTA) Cook-DuPage Corridor Study focused on a broader region and conducted a Travel Market Analysis and an Options Feasibility Study, and established a framework for future planning.
- From 2003 to 2005, the Village of Oak Park studied the feasibility of "capping" or "covering" the expressway through Oak Park, and is continuing this effort with the 2009 Cap Concept Analysis Study.

- In February 2006, the CTA Board approved the recommendations of the West Side Corridor Study that evaluated the West Side and suburban CTA transit services and identified bus and rail service enhancements.

- In February of 2007, the RTA released the Regional Transportation Strategic Plan, *Moving Beyond Congestion* that identified 30-year transit needs as part of an 'Invest to Expand' scenario for the six county area.

IDOT will consider these past efforts and work with stakeholders regarding ongoing efforts.

1.3 Study Area

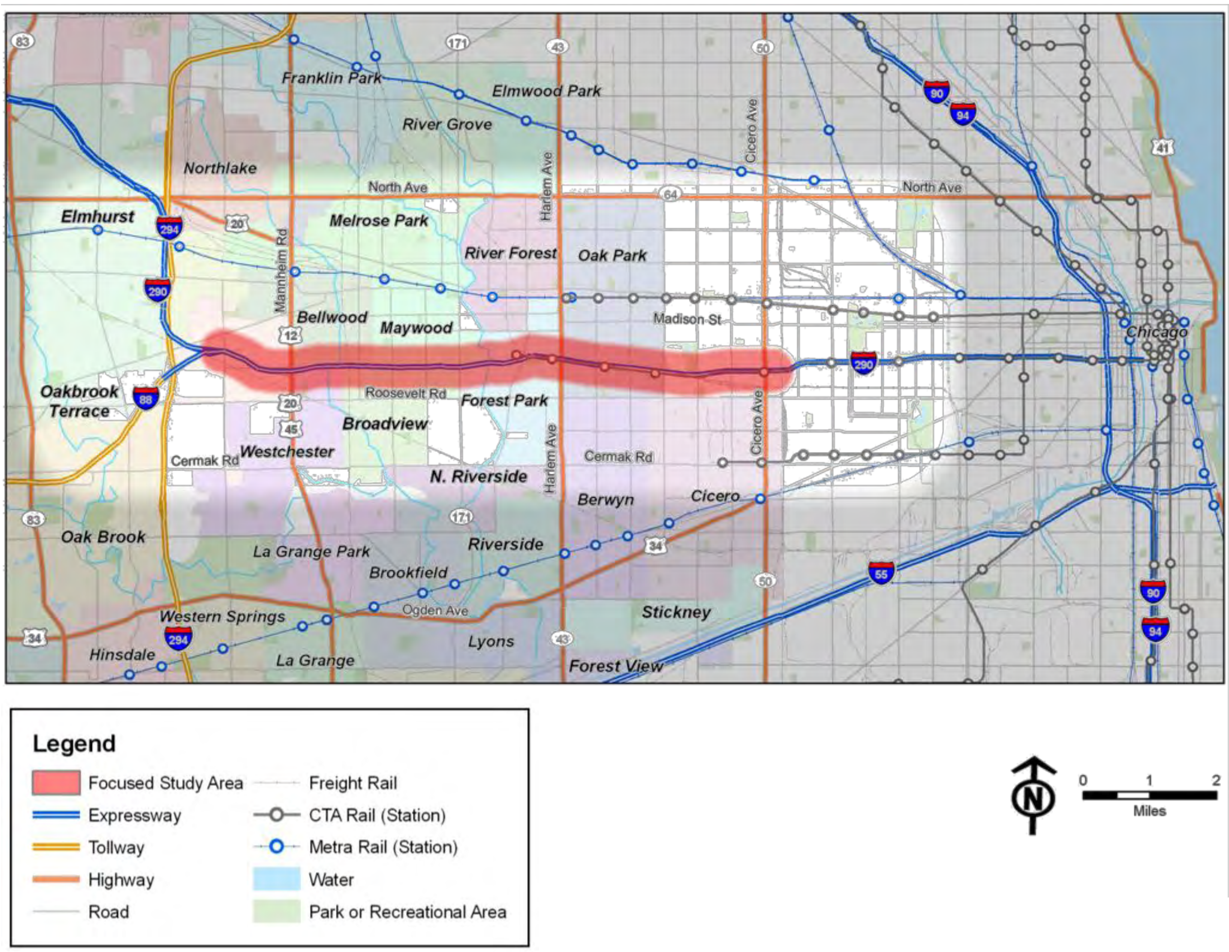
The I-290 Preliminary Engineering and Environmental (Phase I) Study will seek to identify improvements to transportation facilities along the Eisenhower Expressway corridor within the context of the broader transportation network.

The I-290 Phase I corridor focused study area (Figure 1-1) is centered along I-290 in Cook County extending approximately 7.5 miles from west of US 12/20/45 (Mannheim Road) to east of IL Route 50 (Cicero Avenue). The focused study area limits were established to facilitate a detailed study of the condition, operation and inter-relationship of the transportation systems in close proximity to I-290. The focused study area includes adjacent transit and freight railroads, interchanges, cross streets and other parallel and crossing features that are within or in close proximity to I-290. The geometric design and physical condition of I-290, the CTA Blue Line and other transit facilities, and adjacent parallel and crossing roads were evaluated in greater detail within the focused study area.

The broader I-290 transportation study area is generally centered along I-290 from approximately two miles west of Mannheim Road to approximately two miles east of Cicero Avenue, and also extends from North Avenue to the north to the Metra Burlington Northern Santa Fe (BNSF) commuter rail line to the south. The broader study area limits were established to capture how the I-290 transportation corridor relates within the wider sub-regional transportation network. It should be noted that this study is working in close coordination with the Chicago Metropolitan Agency for Planning (CMAP) and its travel demand model, which considers the interrelationship of population, employment and travel demand for the entire Chicago metropolitan region, including the transportation network elements within and outside the 1-290 study area.

By understanding the existing condition and performance of the broader transportation network, solutions can be developed that will enhance the overall transportation performance in this region.

Figure 1-1 Study Area Map



2.0 Existing Conditions

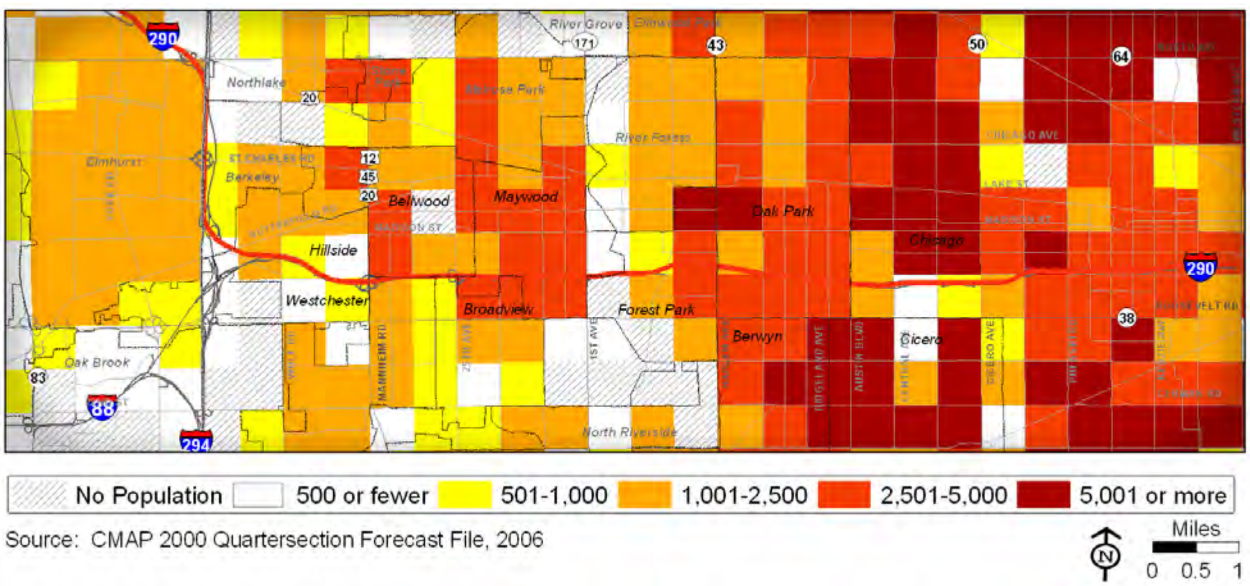
2.1 Socioeconomic and Land Use

This subsection presents a description of existing socio-economic and land use characteristics. These socio-economic characteristics, including population, minority population, zero-car households, employment, and land use, are important factors in determining the need for transportation improvements.

2.1.1 Socioeconomic

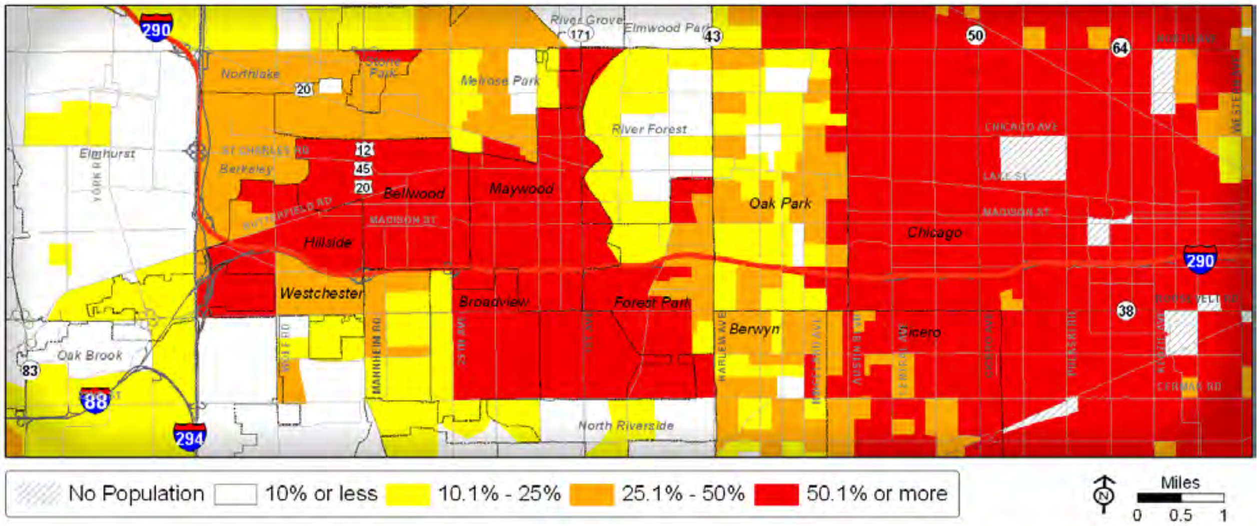
Within the broader I-290 study area, population levels are highest in the eastern and central portions of the broader study area and declines as the study area extends west. The highest population concentrations are in Chicago and Cicero, with additional highly populated areas in Berwyn, Forest Park and Oak Park. Bellwood, Berwyn, Broadview, Forest Park, Maywood and Oak Park are also well populated, although the population is more dispersed within the communities. Figure 2-1 shows 2000 population by quarter section (½-mile by ½-mile area).

Figure 2-1 2000 Population (Quarter section)



The broader study area has a relatively high minority population in a number of communities. The area of Chicago adjacent to I-290, Bellwood, Maywood, and portions of Broadview, Cicero, Forest Park, Hillside and Oak Park are more than 50 percent minority. Remaining areas have between 10 and 50 percent of the population identified as minority. See Figure 2-2 for 2000 minority population percentages by quarter section.

Figure 2-2 2000 Minority Population

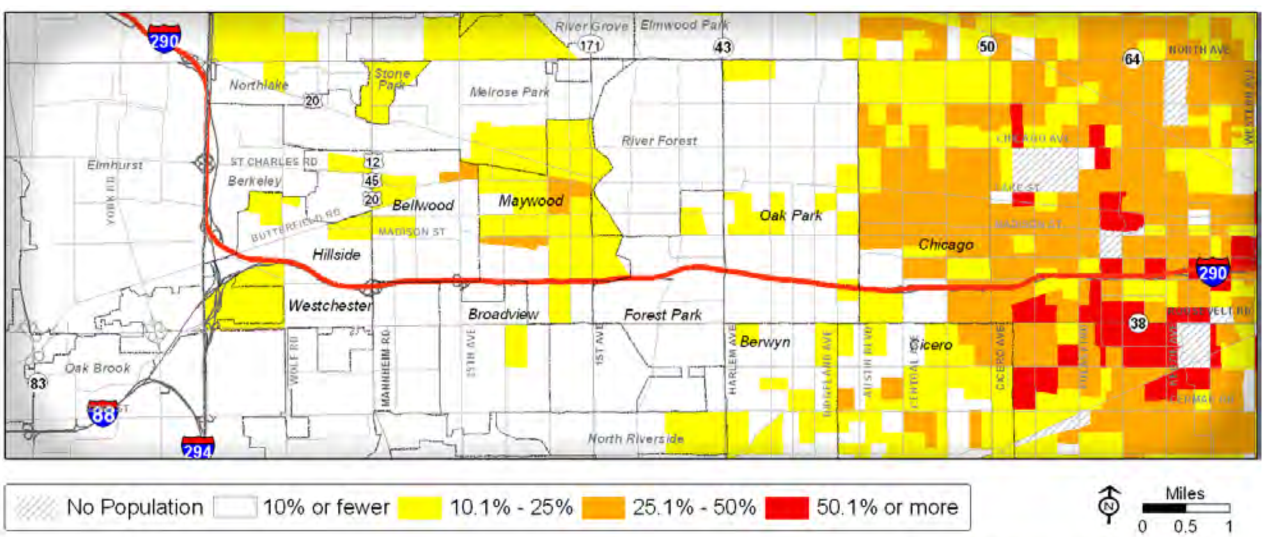


Source: US Census 2000 Summary File 3

The U.S. Census defines low income households by a sliding scale dependent on the number of people in a household, their age and relationship. For example, for a family of four with two related children under 18, the 2000 low income threshold was $17,463 a year (Source: Poverty in the United States 2000, U.S. Census, September 2001).

Most of the low income population is located in the Chicago portion of the broader study area. There are scattered concentrations (25 to 50 percent of the population) of low-income persons in Cicero and Maywood, and one area of Bellwood. Berwyn, Cicero, Maywood and Hillside have other areas where low-income residents comprise 10 to 25 percent of the population. See Figure 2.3 for low income population percentages by census geography.

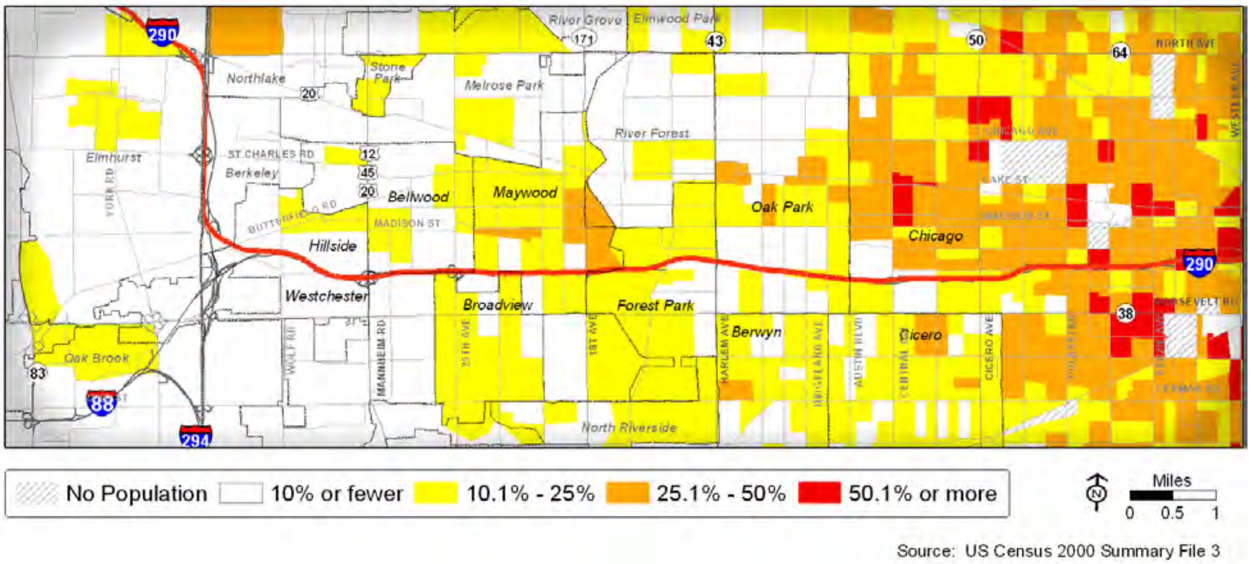
Figure 2-3 2000 Low Income Population



Source: US Census 2000 Summary File 3

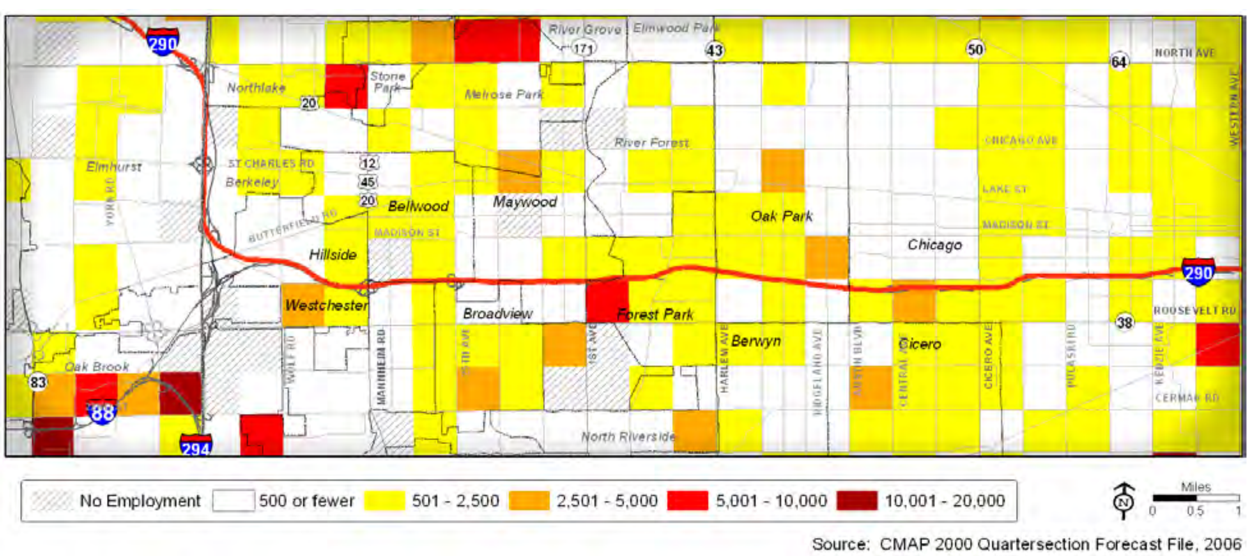
The highest concentrations (25 percent or more) of households in 2000 that reported not owning an automobile are located in Chicago. The communities of Bellwood, Berwyn, Broadview, Cicero, Forest Park, Maywood, North Riverside and Oak Park also have areas where 10 to 50 percent of households reported not owning an automobile. Several factors can contribute to zero car households, including low income and the availability of multimodal options. See Figure 2-4 for Zero Car Household percentages by census geography.

Figure 2-4 2000 Zero Car Households



Year 2000 employment in the broader corridor is dispersed, with most quarter sections having 500 or fewer jobs. Employment centers in Chicago, Cicero, Oak Park, Forest Park, Broadview, Hillside, Maywood, Westchester and the Loyola Medical Center in unincorporated Cook County had between 2,500 to 10,000 jobs. See Figure 2-5 for employment by quarter section.

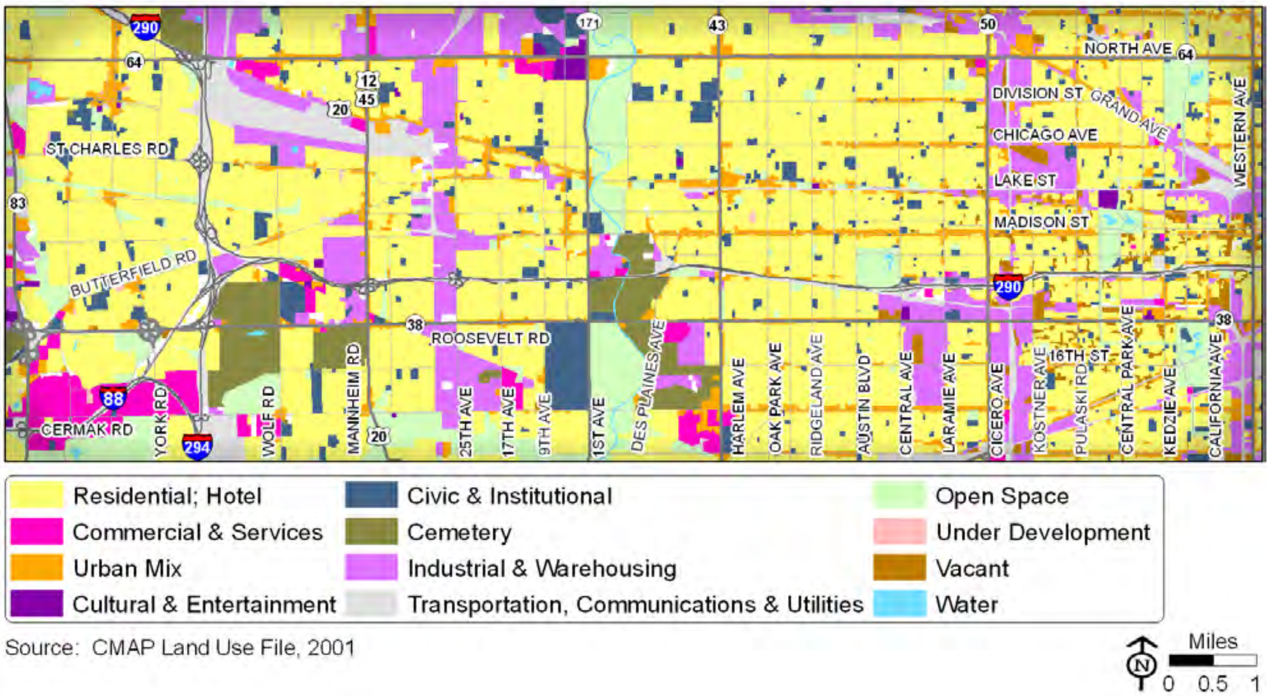
Figure 2-5 2000 Employment (Quarter section)



2.1.2 Land Use

Land use in the communities immediately adjacent to I-290 is primarily residential, but also has several areas of industrial and institutional land (which included cemeteries) and open space. See Figure 2-6 for a map depicting existing land uses.

Figure 2-6 2000 Existing Land Use



Source: CMAP Land Use File, 2001

2.2 Corridor Travel Patterns

A "traditional" commuting pattern consists primarily of inbound trips from the suburbs and outer areas of Chicago to the Chicago Central Business District (CBD) in the morning and return trips in the opposite direction in the afternoon/evening. The highway and transit components in the broader and focused study areas serve this market with concentrated operations eastbound in the morning commute period and westbound in the afternoon/evening commute period, especially along I-290, the Metra commuter rail lines, CTA rail and CTA and Pace bus services. The "traditional" pattern has been a dominant work trip pattern in the Chicago region for many decades and continues to be the dominant pattern in the I-290 study area. However, the emergence of employment centers in DuPage County and other areas has led to important, but smaller "reverse commute" patterns primarily from workers in Chicago to employment centers to the west and northwest. There are other commuting patterns, such as from the suburbs of south Cook County to employment centers in DuPage County, that often replicate some of the same routes as the reverse commute. North-south work trips also represent a market segment on the major arterials including Mannheim Road and Cicero Avenue. Non-work trips also follow many of these identified patterns, though the timing and frequency of the trips is more dispersed than the predominant trends of the work trips.

These and other travel patterns were documented and analyzed in the RTA Cook-DuPage Corridor Travel Market Analysis (TMA) [December 2005], which presented a comprehensive examination of travel patterns and mobility trends in DuPage and Cook Counties centered on the Eisenhower Expressway (I-290) and the East-West Tollway (I-88). Nine predominant travel markets were identified in the TMA (See Figure 2-7). Of the nine travel markets identified in the TMA, five have direct involvement within the broader study area (Traditional, Reverse, North Central Cook, South Central Cook, and West Central Cook). Some of the findings of the TMA are shown in Table 2-1 below.

Table 2-1 Travel Market Trip Overview

	Travel Market				
	Traditional (E-W)	**Reverse (E-W)**	**North Central Cook (E-W)**	**South Central Cook (E-W)**	**West Central Cook (N-S)**
Trips are daily estimated; base year 2000					
Work Trips:					
Total Trips	213,964	123,265	6,493	13,395	23,931
Auto Trips	143,099	105,148	6,062	12,957	22,105
Bus Transit Trips	12,544	11,125	374	366	1,443
Rail Transit Trips	58,321	6,992	57	72	383
Transit Mkt Share	33%	15%	6%	3%	8%
Non Work Trips:					
Total Non-Work	70,540	134,290	41,841	41,534	69,336
Non Work Trips as a % of all trips	25%	52%	87%	76%	74%

In the RTA study, the five travel markets are defined as follows:

<u>Traditional:</u> consists of travel that originates in the western suburbs of Cook, DuPage and Kane counties, and is destined for the City of Chicago. It also includes a substantial amount of travel that occurs entirely within Chicago – from origins on the far west and northwest sides to destinations elsewhere in the city.

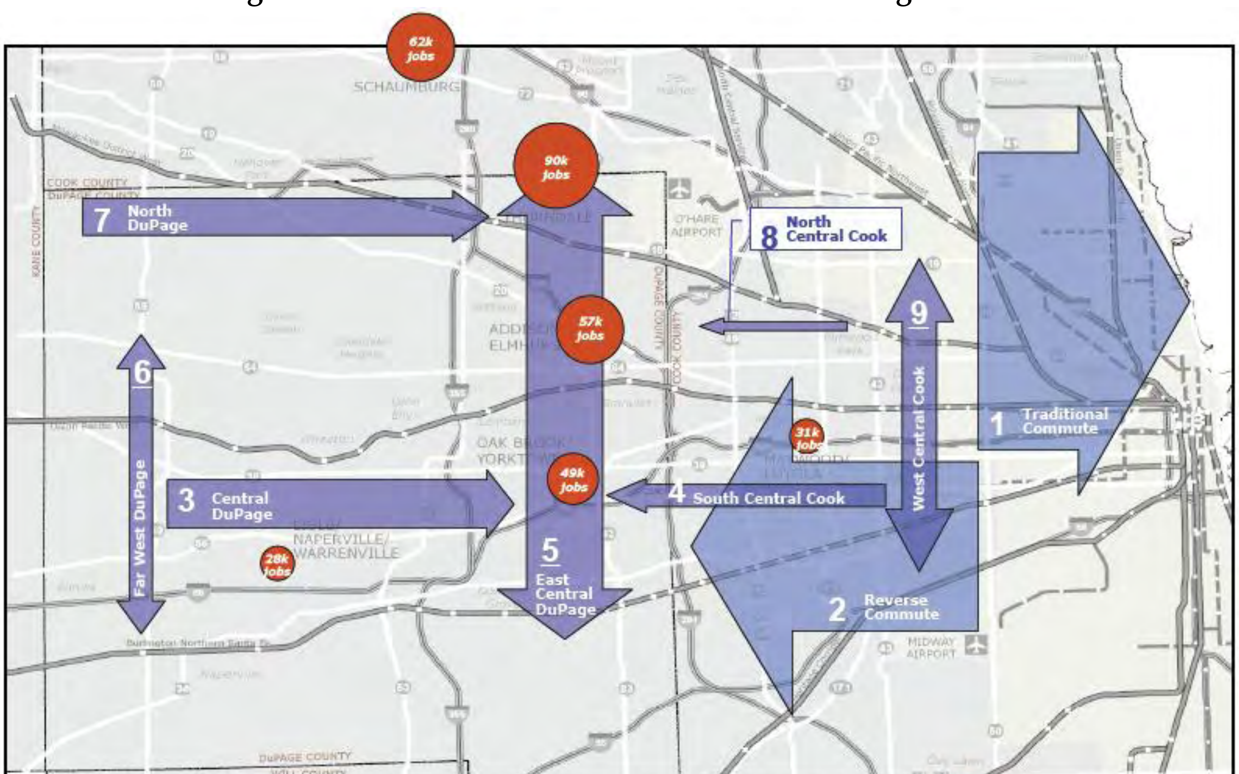
<u>Reverse:</u> consists of travel that originates east of Cicero Avenue (IL 50) in the City of Chicago and is destined for the west suburbs of Cook, DuPage and Kane counties (Travel Market 2 in Figure 4.5). It also includes travel that occurs entirely within the City of Chicago from origins east of Cicero Avenue to destinations in the northwest, far west, and far southwest sides of the city.

<u>North Central Cook:</u> consists primarily of travel that originates in several near-west suburbs located east of Harlem Avenue as well as portions of the northwest and far west side of Chicago and is destined to an area spanning nine west suburban communities located south/southeast of O'Hare International Airport.

South Central Cook: consists of travel that originates in Cook County east of the Tri-State Tollway (I-294) and south of the Metra Union Pacific-West (UP-W) Line and is destined for an area including Oak Brook, Oakbrook Terrace, and portions of Lombard, Villa Park, Elmhurst, Downers Grove, Westmont, Clarendon Hills and Hinsdale.

West Central Cook: consists of a bi-directional north-south travel market in Cook County between Mannheim Road and Cicero Avenue. This market extends as far north as Devon Avenue and as far south as 95th Street. The northbound flow in the West Central Cook travel market includes travel that originates south of the Metra UP-West line and is destined to communities located north of the UP-West Line while the southbound flow reflects travel in the opposite direction.

Figure 2-7 Nine Travel Markets of the Cook-DuPage TMA



Employment Centers	2000 Employment	2030 (Projected)	Antic. Change/30-Yr Growth
Thorndale	90,700	98,700	8,000
Schaumburg	62,400	91,100	28,700
Addison/Elmhurst	56,900	62,900	6,000
Oak Brook/Yorktown	48,900	57,700	8,800
Maywood/Loyola	31,100	31,800	700
Lisle/Naperville/Warrenville	27,600	38,700	11,100

It should be noted that these five markets do not define the total travel within the project's broader or focused study area, but represent predominant travel markets and their associated movements. It should also be noted that the RTA study contained more detailed information related to commuting or work trips (derived from 2000 U.S. Census Journey-to-Work surveys) in comparison to non-work trips (which are not available from the U.S. Census and were largely based on a 1990 CATS regional household travel survey, which was the most recent data source for that purpose)[1]. In general, non-work trips use a lower percentage of public transit modes than work trips; however, this information was not detailed in the RTA study.

In the Cook-DuPage Corridor Travel Market Analysis, it was shown that there is a predominant east-west travel market movement in the broader study area; however, there is also substantial north-south travel to access jobs and for other travel purposes. Public transportation has its largest market share in the "traditional commute" market, and it is not as widely used in other markets, but does get some use in the "reverse commute" market.

2.3 Public Transportation

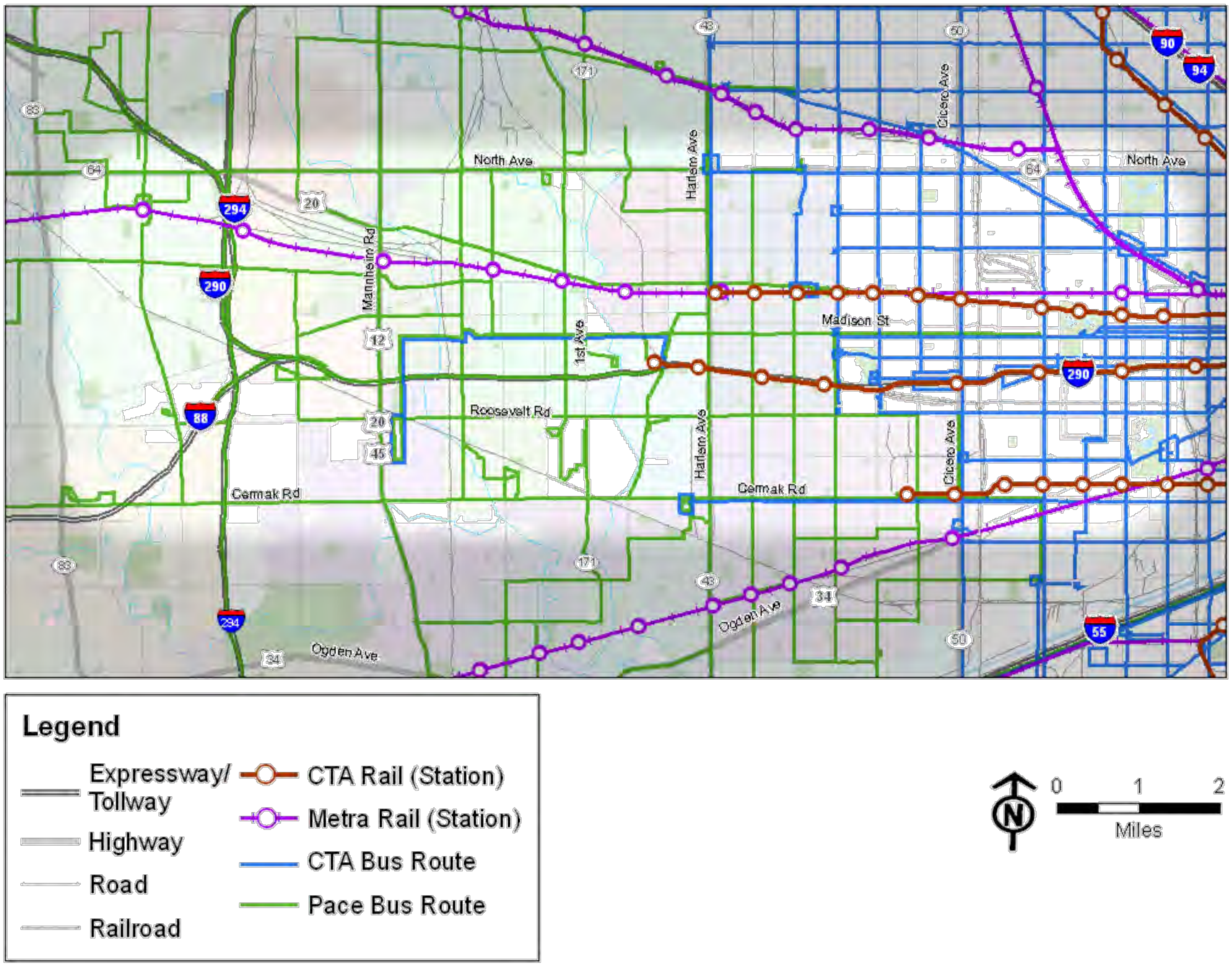
This section provides an overview of the existing public transportation system within the I-290 broader study area. More detail is available in the *I-290 Phase I Study – Public Transit Existing Conditions Technical Memorandum*.

Transit services currently operating in the broader study area include Metra commuter rail, CTA rapid transit service and fixed route bus service, and Pace bus service as shown in Figure 2-8. Metra operates the commuter rail system, which provides commuter service from the suburbs to the downtown Chicago central business district. Metra operates two commuter rail lines through the study area. CTA's rapid transit system provides rail rapid transit service in the eastern portion of the study area. CTA operates three rapid transit lines including the Blue, Green and Pink Lines. The CTA bus routes tend to be in the eastern portion of the study area, while the Pace bus routes are distributed throughout the study area.

[1] *Cook-DuPage Corridor Travel Market Analysis, p. 4-1.*

[2] From IDOT 2006, 2007 & 2008 ADT maps

Figure 2-8 Study Area Transit Network



The frequency of service, travel times, differences in service by time of day, service coverage, and the accessibility characteristics for each transit service were examined. Paratransit services in the study area are also identified. The existing transit network statistics are summarized below and in Table 2-2.

Table 2-2 Study Area Existing Transit Network Statistics

Transit Operator	Service Objective	Service Area	Stations/ Stops/ Routes (east to west)	2009 Weekday Ridership	Frequency of Service
Amtrak	Commuter and Intercity Rail	Amtrak's Service to the west coast	1 Station	38 (La Grange station only)	4 trains per day stop at LaGrange Road
Metra Commuter Rail	UP West Line	Between Elburn and Downtown Chicago (Ogilvie Transportation Center)	5 Stations	1,804* (5 stations) **30,800 (UP-W Line total**	59 trains per day
	BNSF Line	Between Aurora and Downtown Chicago (Union Station)	7 Stations	2,806* (7 stations) **63,500 (BNSF Line total)**	94 trains per day
CTA Rail	Green Line	Between Harlem/Lake and Downtown and 63rd Street terminals	7 Stations	14,514 (7 stations) **27,284 (Harlem/Lake Branch total)**	4:00a – 1:00a weekdays
	Blue Line	Between Forest Park and Downtown (and O'Hare Airport)	5 Stations	9,901 (5 stations) **29,531 (Forest Park Branch total)**	24 Hours every day
	Pink Line	Between 54th/Cermak and Downtown	2 Stations	3,493 (2 stations) **15,620 (Pink Line total)**	4:00a – 1:00a weekdays
CTA Bus	Public Bus System	Chicago and Suburbs	16 Routes	136,107 (16 routes total)	Morning, midday, evening and late night service on most routes
Pace	Public Bus System	Suburban	23 Routes	21,401 (23 routes total)	Morning and Evening Peak

Amtrak station boardings are based on an annual LaGrange Station boarding for 2009 of 13,813 divided by 365. Source: Amtrak Illinois factsheet 2009; *Metra 5 and 7 station totals from 2006 (latest available). Source: RTAMS

Metra monthly ridership figures are based on ticket sales. This table gives total monthly values for the total line rather than average daily values for Metra in the study area. CTA and Pace bus route weekday ridership includes the total route which may originate, pass through or terminate within the study area. CTA and Pace statistics are from October 2009. Source: CTA and RTAMS

2.3.1 Existing Network

- Metra's commuter rail operations serving the study area include the (BNSF) and the Union Pacific – West (UP-W) Line. Current scheduling primarily serves the Chicago CBD-bound market of suburban workers during peak hours. The BNSF and UP-W have 7 and 5 stations in the study area, respectively. The BNSF line linking Aurora to Chicago provides the most frequent Metra service between the suburbs and downtown Chicago during peak periods.
- Amtrak's Chicago-Galesburg-Quincy trains share the BNSF tracks with BNSF and Metra trains, making one of their suburban Chicago stops at LaGrange Road. Amtrak also operates two pairs of daily long-distance trains between Chicago and the west coast via the BNSF line, though these trains do not stop within the limits of the study area.
- The CTA rapid transit services in the I-290 study area include the Blue Line, Green Line and Pink Line. These routes begin in the eastern portion of the study area and head toward downtown Chicago with a total of 14 rapid transit stations. Park-and-ride facilities at Harlem/Lake, Forest Park, and 54th/Cermak and transfer options at Harlem/Lake and Forest Park enhance the accessibility of transit services in this portion of the study area.
- Bus service in the study area is provided both by CTA and Pace. CTA's bus service primarily serves the easternmost portion of the study area, operating 16 bus routes within the study area. Most of the CTA bus routes in the study area offer transfer service to one or more CTA rail facilities in the study area, and operate in off-peak as well as peak periods. Pace operates 23 bus routes that provide extensive geographic coverage and transfer opportunities during the peak periods. However, Pace bus service greatly diminishes during off-peak periods. During peak periods, Pace provides considerable feeder service to Metra and CTA stations in the study area.
- Paratransit service is provided by Pace and Dial-a-Ride services are available in most areas of the study area and are provided through many different agencies and private contractors. Unlike paratransit, Dial-a-Ride services provide point-to-point transportation for senior citizens and handicapped persons. Pace also manages a vanpool program where vans are supplied to volunteer drivers, who pick up and drop off additional passengers who participate in the program.

CTA Blue Line

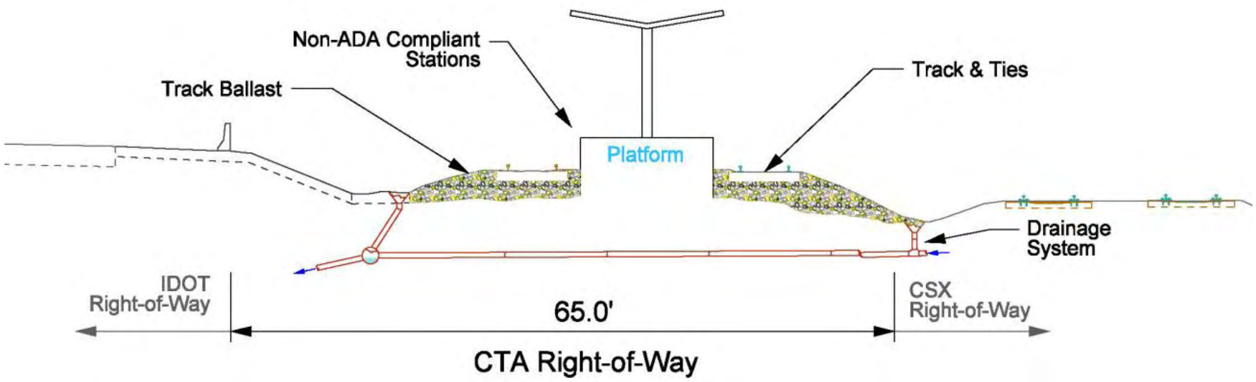
The CTA Blue Line extends through Chicago's Loop from O'Hare International Airport at the far northwest side of the city, through downtown via the Milwaukee-Dearborn-Congress subway, and across the West Side to its southwest end at Forest Park (Congress). It is the CTA's second busiest rail line, with an average weekday ridership of 154,012 as of October 2009 (of which 9,901 were riders boarding at stations between Forest Park and Cicero).

Within the study area, the Blue Line runs along I-290 from Forest Park to the Chicago. From its western terminus in Forest Park, the line crosses I-290, traveling east through Oak Park between I-290 and the CSX railroad. East of Central Avenue, the Blue Line crosses under eastbound I-290 emerging from a tunnel into the median of the expressway. From that location it continues east towards Chicago inside the expressway median.

Within the focused study area, between the Forest Park terminus and Cicero Avenue, CTA maintains 5 stations: Forest Park, Harlem, Oak Park, Austin, and Cicero. The stations were constructed in the 1950's and are still of original design. Each station (except Forest Park) consists of a 15' wide covered center loading eight car platform with access ramps descending from street level head stations. CTA has expressed the desire to upgrade and widen these platforms to meet current ADA requirements.

The Blue Line operates on two tracks, one eastbound and one westbound. When originally constructed, land was set aside for the addition of a third CTA track; since its construction the Blue Line has operated with only two tracks. The available land for CTA improvements is limited. Current ADA standards and minimum track spacing requirements present a challenge to accommodating both a third track and ADA compliant stations within the existing right of way. Figure 2-9 represents the typical Blue Line cross-section at a station in Oak Park.

Figure 2-9 CTA Blue Line Focused Study Area Typical Section



2.4 Roadways

2.4.1 Eisenhower Expressway (I-290)

Within the focused study area, the Eisenhower Expressway has remained almost entirely unchanged since its construction over 50 years ago. Interchanges, access ramps, and lane configurations of I-290 east of the I-290 Hillside Interchange Improvement Project are still in their original design. The number of I-290 mainline lanes varies within the focused study area. Starting in Hillside and traveling east along I-290, there are three mainline lanes until just east of Mannheim Road where an auxiliary lane is added by the collector-distributor (C-D) road which connects the Mannheim Road interchange to I-290. The auxiliary lane ends where the lane terminates as the off ramp for 25th Avenue. I-290 continues east with three lanes for approximately 5.5 miles to a point just east of Austin Avenue. Here the eastbound I-290 on-ramp from Austin Avenue enters I-290 on the left and forms a fourth lane. I-290 continues east as four lanes for approximately 6 miles to its eastern terminus in downtown Chicago.

The westbound direction of I-290 has a similar configuration, except that where the on-ramp from Harrison Street merges with the expressway to form a short auxiliary lane connecting the Harrison Street on-ramp to the Mannheim Road off-ramp. A fourth mainline lane is added by the Mannheim Road westbound on-ramp. The four mainline lanes continue west past Mannheim Road for a mile to the I-88 & I-290 split; here two lanes continue as I-290 and two as I-88.

Mainline lane configurations are illustrated in an existing lane diagram in Appendix A. Mainline typical sections can also help illustrate where lane changes occur. A set of mainline aerial maps and corresponding typical roadway cross-sections can be found in Appendix B.

This discussion of the existing roadway network is related to I-290 and roadways parallel to or crossing I-290 within the focused study area (see Figure 1-1 Study Area Map). For a more detailed analysis of the existing roadway network, please refer to the I-290 Phase I Study - Roadway Existing Conditions Technical Memorandum.

2.4.2 I-290 Pavement

The original 1950's pavement constructed on I-290 consisted of 10" thick Portland cement concrete (PCC) pavement with stabilized shoulders. The subsequent widening and resurfacing improvements include the following:

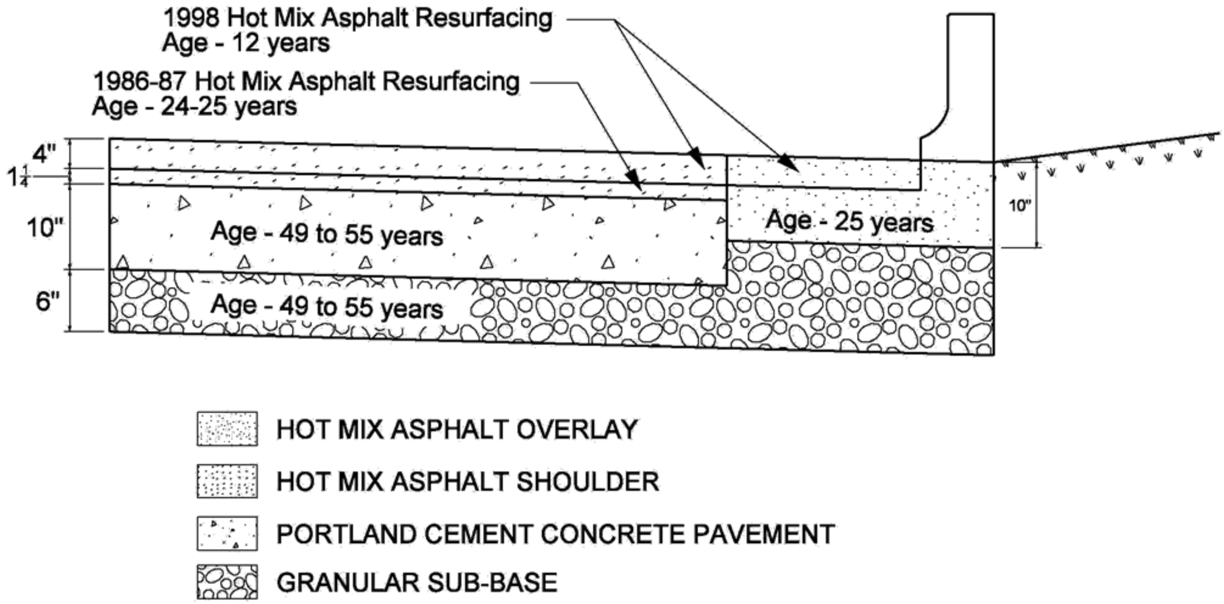
In 1969, the mainline lanes received 3" of hot mix asphalt resurfacing with guardrail modernization throughout. The existing shoulders also received a hot mix asphalt overlay.

In 1986 to 1987, there was a major rehabilitation project on the mainline pavement, shoulders, ramps and frontage roads. The mainline pavement received a 4 ¼" to 5 ¼" hot mix asphalt overlay. Complete pavement removal and replacement was done on a 700' section of westbound I-290 east of Oak Park Avenue. In addition, the existing pavement was completely removed and replaced with continuously reinforced concrete pavement (CRCP) from approximately Kostner Avenue to east of Central Park Avenue in Chicago. The existing outside shoulders were removed and replaced with hot mix asphalt shoulders, the inside shoulders were replaced with PCC shoulders, and a concrete barrier wall constructed.

In 1998, the mainline pavement, ramps and shoulders were resurfaced with Hot Mix Asphalt. On the mainline pavement, 4" of existing bituminous surface was removed and replaced. On the ramps, 3" of existing bituminous surface was removed and replaced. On the mainline and ramp shoulders, 1 ¾" depth of bituminous shoulder material was removed and replaced. Since the surface removal and replacement was in-kind, no vertical profile adjustments were necessary to maintain the clearances at bridges.

Figure 2-10 I-290 Existing Pavement Cross Section illustrates the composition of the existing pavement structure as of 2009. In 2010, I-290 was resurfaced for a fourth time to address severe wear to the riding surface. This resurfacing will replace only the top layer of asphalt and will not address the aged pavement sub-structure it will rest on.

Figure 2-10 I-290 Existing Pavement Cross Section



2.4.3 Interchanges

Within the seven mile section between Mannheim Road and Cicero Avenue there are 11 interchanges providing access to I-290: Mannheim Road (US 112/20/45), 25th Avenue, 17th Avenue, 9th Avenue, 1st Avenue (IL 171), Des Plaines Avenue, Harlem Avenue (IL 43), Austin Boulevard, Central Avenue, Laramie Avenue, and Cicero Avenue (IL 50). This represents an interchange every two thirds of a mile on average. All interchanges, with the exception of Mannheim Road, maintain their original design from the 1950s. Lane configuration diagrams for each crossroad can be found in Appendix C and drawings that illustrate the typical cross-section for each cross-street can be found in Appendix D.

2.4.3.1 U.S. Route 12/45 (Mannheim Road) (full access partial cloverleaf interchange)

Mannheim Road is a full interchange in Hillside that provides full access between I-290 and this north-south U.S. marked route. It was completely reconstructed in 2001 as part of the Hillside Interchange Project and was designed to improve weaving conditions and interchange capacity.

2.4.3.2 25th Avenue (full access partial cloverleaf interchange)

The 25th Avenue interchange is situated at the intersection of the communities of Bellwood, Broadview and Maywood. This connection is considered a partial cloverleaf interchange and has full access to I-290. Direct access ramps provide immediate connections to and from the east, but not from or to the west. Both the eastbound off ramp and westbound on ramp to I-290 are located west of the Indiana Harbor Belt (IHB) railroad bridge and are connected to 25th Avenue via frontage roads. Eastbound I-290 traffic must exit west of the IHB railroad bridge and travel 1/3 of a mile along frontage roads to a signal at Lexington Street and 25th Avenue.

Traffic desiring to enter west bound I-290 from 25th Avenue must take a 1/3 mile route via Congress Street and Harrison Street.

2.4.3.3 *17th Avenue (full access frontage road slip-ramp interchange)*

Full access to I-290 is provided at 17th Avenue. This full interchange is located within a residential setting of Maywood. Connection of I-290 and 17th Avenue is via slip ramps between I-290 and the one-way frontage streets of Harrison Street and Bataan Drive.

2.4.3.4 *9th Avenue (partial access frontage road slip-ramp interchange)*

Partial access to I-290 is supplied by this slip ramp interchange at 9th Avenue. Two slip ramps provide access to and from the east only via connections with the Harrison Street and Bataan Drive frontage roads. This ½ interchange is located in a residential setting of Maywood.

2.4.3.1 *Il Rte 171 (1st Avenue) (full access frontage road slip-ramp interchange)*

1st Avenue is considered a full access slip-ramp interchange that provides access to and from each direction of travel with I-290. It lies on the east side of Maywood and shares a border with Forest Park to the south of I-290. 1st Avenue is the eastern limit of the one-way frontage roads of Harrison Street and Bataan Drive in Maywood. The I-290 connections to and from the west, and the west I-290 bound off ramp, are provided via slip ramps to the Harrison Street and Bataan Drive frontage roads. A dedicated ramp provides access to east-bound I-290

2.4.3.2 *Des Plaines Avenue (partial access 1/2 diamond interchange)*

Access to and from I-290 is provided only to the west at Des Plaines Avenue on dedicated ramps. CTA's Forest Park Blue Line Terminal and maintenance facility lie adjacent to the east bound on-ramp to I-290. Des Plaines Avenue's profile is tightly constrained: it first climbs over I-290, and then quickly descends under both the CTA Blue Line and the CSX railroad before climbing back up to connect with Jackson Boulevard.

2.4.3.1 *Il Rte 43 (Harlem Avenue) (full access single point inside ramp interchange)*

The Harlem Avenue interchange was constructed with left-hand exiting and entering ramps as a means of minimizing the ROW needs in this constrained area. This interchange type is referred to here as a modified single point urban interchange (SPUI), but the I-290 interchange design predates the development of the modern SPUI. Modern SPUIs typically feature much wider turning radii and conventional right-hand ramps. The ramps intersect Harlem Avenue similar to that of a standard four-way intersection, and it is controlled by a single traffic signal. Access to the CTA Blue Line Harlem Station is provided on the west side of Harlem, just south of the ramp intersection by a CTA bus stop and sidewalks. No bus pull out exists and buses must stop in the through traffic lane.

2.4.3.2 *Austin Boulevard (full access single point – inside ramp interchange)*

The Austin Boulevard interchange was constructed with left-hand exiting and entering ramps as a means of minimizing the ROW needs in this constrained area. This interchange type is a modified SPUI design similar to the Harlem Avenue interchange. The ramps intersect Austin Boulevard similar to that of a standard four-way intersection, and it is controlled by a single traffic signal. Access to the CTA Blue Line Austin Station is provided on the west side of Austin Boulevard, just south of the ramp intersection by a CTA bus stop and raised sidewalks. No bus pull out exists, and buses must stop in the through traffic lane.

2.4.3.3 Central Avenue (full access diamond interchange)

The Central Avenue interchange is a conventional diamond interchange that provides access to the expressway in all directions. Central Avenue is the only cross road interchange in the focused study area that crosses under I-290. All ramps directly connect with Central Avenue except for the west bound off ramp. This ramp connects traffic to Flournoy Street, which is a one-way street that soon connects with Central Avenue. Just north of the interchange is the Harrison and Central CTA bus terminal.

2.4.3.4 Laramie Avenue (partial access frontage road slip-ramp interchange)

The interchange with Laramie Avenue is considered a partial interchange because only two travel directions are served, the west bound exit to Laramie Avenue and the east bound on ramp from Laramie Avenue. These two slip ramps connect to one-way frontage roads rather than to Laramie Avenue itself. The west bound off ramp connects to Flournoy Street, and the east bound on ramp is accessed from Lexington Street. This interchange is complimentary to the Cicero Avenue interchange in providing full access between the two cross streets.

2.4.3.5 Il Rte. 50 (Cicero Avenue) (partial access frontage road slip-ramp interchange)

The interchange with Cicero Avenue is considered a partial interchange because only two travel directions are served: the east bound I-290 exit to Cicero Avenue and to west bound I-290 from Cicero Avenue. These two slip ramps connect to one-way frontage roads rather than to Cicero Avenue itself. The east bound off ramp connects to Lexington Street, and the west bound on ramp is accessed from Flournoy Street. Access to the CTA Blue Line Cicero Station is provided on the west side of Cicero Avenue in the middle of the overpass. Pedestrian access is provided by a raised sidewalk along west side of Cicero Avenue, as well as a bus stop in from the station. This interchange is complimentary to Cicero Avenue in providing full access between the two. This interchange is complimentary to the Laramie Avenue interchange in providing full access between the two cross streets.

2.4.4 Cross Roads

In addition to the north-south roads that interchange with I-290, there are nine non-interchanging north-south roads that cross I-290 within the focused study limits. These crossings are located at Wolf Road, Frontage Road Connection, Westchester Boulevard, 5th Avenue, Circle Avenue, Oak Park Avenue, East Avenue, Ridgeland Avenue, and Lombard Avenue. Most of the these crossings are bridges which carry the cross street over I-290; the only exceptions to this are Wolf Road and Frontage Road Connection, where mainline bridges carry the expressway over the cross road. In addition to the 9 road crossings, there are two overhead pedestrian bridge crossings near Home Avenue and Lavergne Avenue. The Home Avenue bridge serves to connect the residential areas between Harlem Avenue and Oak Park Avenue, and the Lavergne Avenue bridge connects the mixed use areas between Laramie Avenue and Cicero Avenue and also provides access to the CTA Blue Line station west of Cicero Avenue.

2.4.5 Frontage Roads

Frontage roads exist on both sides of the Eisenhower Expressway throughout most of the study area, although they are not continuous. The largest gap is between 1st Avenue and Des Plaines Avenue, where the Forest Home and Concordia cemeteries abut I-290 and frontage traffic must divert several blocks to other routes. There are several other locations where frontage road traffic is required to divert along circuitous routes prior to rejoining the frontage road system. The frontage roads vary from two way streets to one-way one-lane streets with parking. These routes include Harrison Street, Lehmer Street and Flournoy Street on the north side of I-290, and Harrison Street, Wedgwood Drive, Lexington Street, Bataan Drive, Garfield Street, and Railroad Avenue on the south side of I-290.

2.4.6 Other Arterial Roads

The primary parallel arterial roads adjacent to I-290 in the study area are Roosevelt Road, approximately ½ mile to the south of I-290, and Madison Street ½ mile to the north of I-290, with Lake Street just over a ½ mile further to the north.

Roosevelt Road features several different configurations over its length, including one and two lanes in each direction, a variety of median types, and parking allowed or prohibited in various locations. In the I-290 broader study area, traffic on Roosevelt Road varies from about 17,000 to 29,000 vehicles per day, east of I-294 to over 54,000 vehicles per day west of I-294[2].

Madison Street also features several different configurations as it travels east and west, including one and two lanes in each direction, a variety of median types, but with parking permitted at most locations. Traffic on Madison Street varies from about 11,000 to 26,000 vehicles per day in the I-290 study area[2].

These arterial roads are limited in their capacity to carry traffic by the number of through lanes, the number and operation of signalized intersections along their routes, and a variety of other factors.

The primary north-south cross roads are described above in section 2.4.3. The principal arterial north-south routes are US 12/20/45 (Mannheim Road), IL 171 (1st Avenue), IL 43 (Harlem Avenue), and IL 50 (Cicero Avenue). Traffic on these north-south arterial routes varies from 27,000 to 41,000 vehicles per day in the vicinity of I-290[3].

2.4.7 Drainage

This section provides a general overview of existing drainage conditions along the I-290 corridor. A Location Drainage Study, which includes a detailed existing drainage inventory

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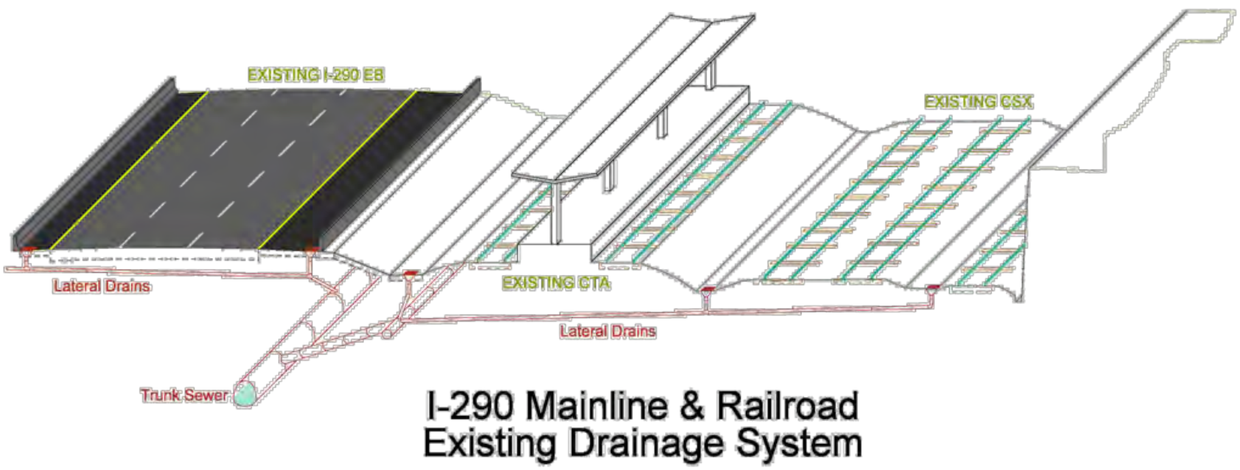
[2] From IDOT 2006, 2007 & 2008 ADT maps

[3] From IDOT 2006, 2007 & 2008 ADT maps

and evaluation, existing and proposed outfall evaluation, and proposed drainage plan, will be prepared as part of the overall Phase I study for this project.

I-290 is currently drained from Hillside Drive eastward to Pump Station No. 4 (located at the Des Plaines River) by a trunk storm sewer, and a separate trunk sewer from Central Avenue westward to Pump Station No. 4. The portion of the study area that drains to the existing trunk storm sewer system varies by location, but includes all of the I-290 Expressway and cut-slopes up to the access control fencing. West of the Des Plaines River, some of the frontage roads are drained to the trunk storm sewer system. Both the CSX and the CTA facilities adjacent to I-290 between Des Plaines Avenue and Central Avenue also drain to the I-290 trunk storm sewer system that was originally installed in the 1950s (see Figure 2-11). The main trunk sewer is a reinforced concrete arch pipe, ranging from 4'x4.5' to 6.3' x 6.8' in size.

Figure 2-11 I-290 Mainline & Railroad Existing Drainage System



Hydraulic analysis shows that the I-290 trunk storm sewer system is adequate for the 50-year storm event; however the analysis indicates that flows from the 100-year event exceed the full-flow capacity of the trunk storm sewer system. This occurs at one location, a sag near Bellwood Avenue.

Pump Station 4 is located southwest of the I-290 Bridge at the Des Plaines River and pumps flow from the existing trunk storm sewers to the Des Plaines River. The pump station currently has a rated pumping capacity of approximately 200 cubic feet per second (cfs). This pump station was originally constructed in the 1950s and was last rehabilitated in 1972. It is currently programmed for replacement in IDOT's 2011-2016 Proposed Highway Improvement Program due to its age and condition.

There are two waterway crossings within the focused study area, Addison Creek and the Des Plaines River. Addison Creek flows south under I-290 between Mannheim Road and 25th Avenue. North of I-290, the creek flows within a paved trapezoidal channel, and though a steep-sided earthen channel to the south. The Des Plaines River also flows south and crosses with a skew under I-290 between 1st Avenue and Des Plaines Avenue. Adjacent to the expressway, this river is bounded primarily by two cemeteries, and the Cook County Circuit Court House. A section of unused railroad piers partially blocks the channel on the north side of the expressway.

2.4.8 Structures

Within the study limits there are 32 bridge structures. Of these, 17 carry cross streets over I-290, 4 carry the I-290 mainline over cross streets, 2 carry the eastbound C-D road over cross streets, 2 carry I-290 mainline lanes over waterways, 2 carry multi-use paths over I-290, 3 carry railroads or CTA tracks over I-290, and 1 carries eastbound I-290 over CTA tracks, and 1 carries CTA tracks over Des Plaines Avenue. The CTA crosses under the I-290 eastbound lanes via a short tunnel, east of Central Avenue. All structures were originally built in the 1950s. Eleven of the original highway structures have been rehabilitated since their original construction. The bridges at Mannheim Road and Westchester Boulevard were completely replaced as part of the Hillside Bottleneck reconstruction in 2001.

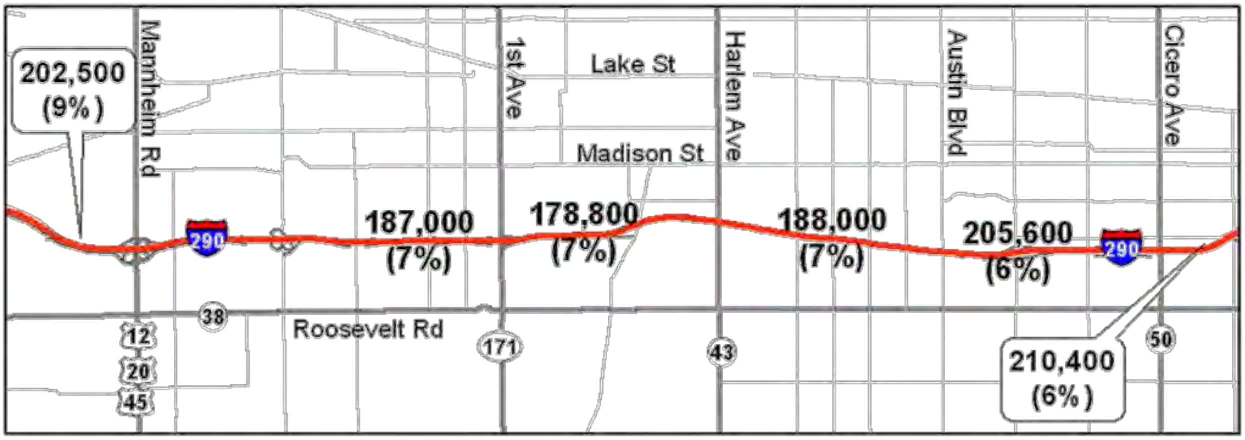
2.4.9 I-290 Traffic and Operations

Traffic operation analyses were performed to evaluate and document the existing traffic operations of the Eisenhower Expressway (I-290) and connecting streets from west of Mannheim Road to east of Cicero Avenue in Cook County, Illinois. The detailed analysis is documented in the I-290 Phase I Study, Existing Roadway Operations Technical Memorandum.

The existing lane diagram in Appendix A illustrates the existing mainline, crossroads, frontage road, and ramp lane configurations in the focused study area.

Traffic volumes are heavy along I-290, ranging from 178,000 to 210, 400 vehicles per day (Figure 2-12). Volumes are higher on the east and west ends where four lanes of capacity are available, lower volumes are associated with the six lane section between 25th Avenue and Austin Boulevard.

Figure 2-12 I-290 Study Area ADT (% Trucks)[4]

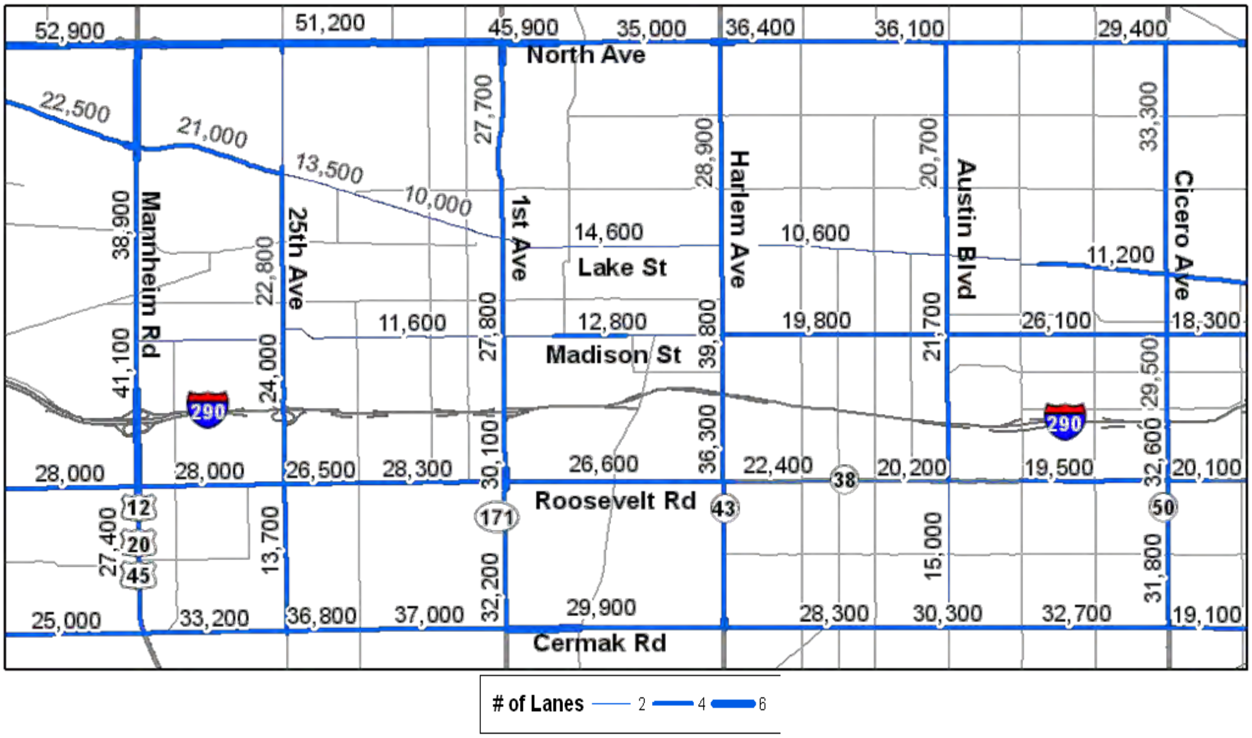


The primary parallel arterial roads near I-290 are Roosevelt Road to the south and Madison Street to the north. Traffic on Roosevelt Road ranges from about 19,500 to 28,300 vehicles per day. Traffic on Madison Street varies from about 11,600 to 26,000 vpd. These arterial roads are limited in their capacity to carry additional traffic by the number of through lanes and the operation of signalized intersections along their routes.

Other parallel arterial roads to the north and south of I-290 include Lake Street (approximately 1 mile to the north), North Avenue (approximately 2.4 miles to the north), and Cermak Road (approximately 1.6 miles to the south). The ADT on Lake Street varies from 10,000 to 22,000 vpd. Along North Avenue, the ADT varies between 29,400 and 52,900 vpd. The ADT on Cermak Road varies between 19,100 and 37,000 vpd.

[4] 2007 IDOT ADT data

Figure 2-13 Study Area Arterial ADTs[5]



Average hourly volumes were calculated to determine the A.M. and P.M. peak traffic periods which are between 6 A.M. and 10 A.M. in the morning, and between 4 P.M. and 7 P.M in the evening.

Level of Service (LOS). LOS is a transportation congestion measure that represents the collective factors of speed, travel time, traffic interruption, freedom to maneuver, safety, driver comfort and convenience, and operating volume. LOS procedures from the Transportation Research Board's Highway Capacity Manual (HCM), 2000 were used to evaluate I-290 corridor traffic operations during the morning (A.M.) and evening (P.M.) peak hours. The HCM defines six levels-of-service, ranging from A to F. LOS A represents the best operating conditions and LOS F the worst.

Table 2-3, and the companion Mainline Crashes and Operations exhibit in Appendix E, provide a comprehensive overview of the existing A.M. and P.M. peak hour mainline operations for all mainline elements analyzed (basic freeway segments, ramp junctions, and weaving segments) for east and westbound I-290 within the focused study area. As seen in the table, almost the entire I-290 mainline in the study area is operating at LOS E and F during the A.M. and P.M. peak hours. This means that the facility is operating at capacity or in breakdown flow, with low travel speeds and periods of stop and go flow.

[5] 2007 IDOT ADT data

Table 2-3 Overall I-290 Mainline LOS Summary

Mainline Segments								
LOS	EASTBOUND				WESTBOUND			
	AM		PM		AM		PM	
	Length	%	Length	%	Length	%	Length	%
F	32,102	60%	34,650	65%	34,739	75%	32,621	71%
E	14,693	28%	6,073	11%	6,481	14%	5,118	11%
D	3,126	6%	6,072	11%	4,868	11%	8,349	18%
C	3,298	6%	6,424	12%	0	0%	0	0%
B	0	0%	0	0%	0	0%	0	0%
A	0	0%	0	0%	0	0%	0	0%
Total	53,219	100%	53,219	100%	46,088	100%	46,088	100%

Traffic data indicates that the I-290 Eisenhower Expressway experiences congested conditions (LOS D or worse) for up to seventeen hours each weekday for both eastbound and westbound lanes. Average peak period speeds are consistently low along I-290. Figure 2-14 and Figure 2-15 illustrate the existing speeds along I-290 as calculated by the 2010 regional travel model. For the traditional commute pattern eastbound travel speeds range between 24mph and 36mph in the AM period and between 24pmh & 39mph in the westbound direction during the PM peak. Reverse commute speeds are slightly higher with westbound average speeds ranging between 30mph and 48mph in the AM period, and eastbound average speeds ranging between 29mph and 47mph in the PM period.

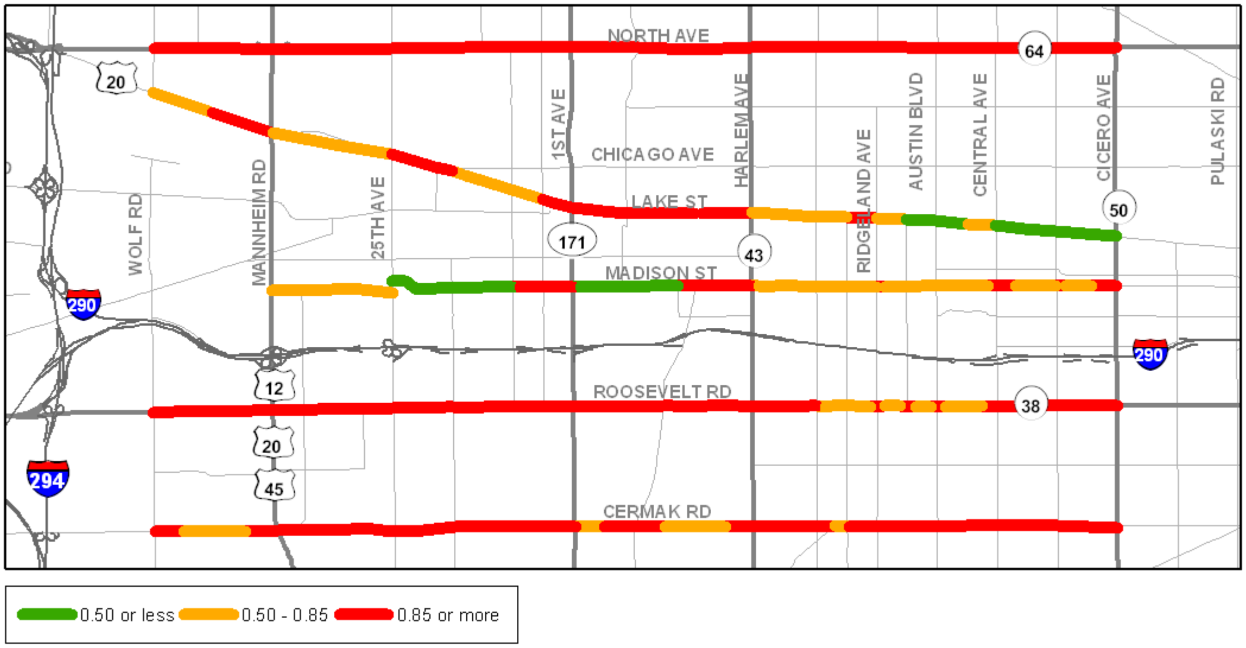
Figure 2-14 I-290 Mainline 2010 Average Travel Model Speeds – A.M. Peak

Figure 2-15 I-290 Mainline 2010 Average Travel Model Speeds – P.M. Peak

There are ten cross roads that interchange with I-290 between 25th Avenue and Cicero Avenue; all but one (9th Avenue) have signalized intersections that control the flow of traffic. Of these, the intersections at the 1st Avenue, Harlem Avenue, Austin Boulevard, and Cicero Avenue interchanges experience congested operations (LOS D or worse) in both the A.M and P.M. peak periods, with numerous movement failures. 17th Avenue, Des Plaines Avenue, and 9th Avenue also exhibit congested conditions for some movements, primarily in the P.M peak period. Intersection operations are represented in the Mainline Crashes and Operations Exhibit in Appendix E, and are discussed in more detail in the Existing Roadway Operations Technical Memorandum.

Parallel arterial operations were examined using the travel demand model for the PM peak period to estimate the levels of congestion based on volume to capacity ratios (v/c). In this analysis, uncongested conditions are assumed to occur when v/c is less than 0.5, congested conditions are assumed between 0.5 to 0.85, and very congested conditions are assumed over 0.85. Figure 2-16 illustrates where parallel arterial congestion is occurring in the study area. Overall, 69% of the arterials are operating under very congested conditions and 23% as congested, while only 9% with no congestion.

Figure 2-16 2010 Arterial PM Peak Period Volume to Capacity



2.4.10 Crash Analysis

A crash analysis was performed for the I-290 mainline, ramps, crossroads and frontage roads using the latest available crash data from 2006 through 2008. This crash analysis is the first activity in determining existing roadway safety problems and providing a framework for determining contributing causes and developing effective countermeasures for build alternatives in later parts of the study. The crash analysis examines all crashes, regardless of potential cause, and examines the details of when, where, what happened, and under what conditions the crashes occurred.

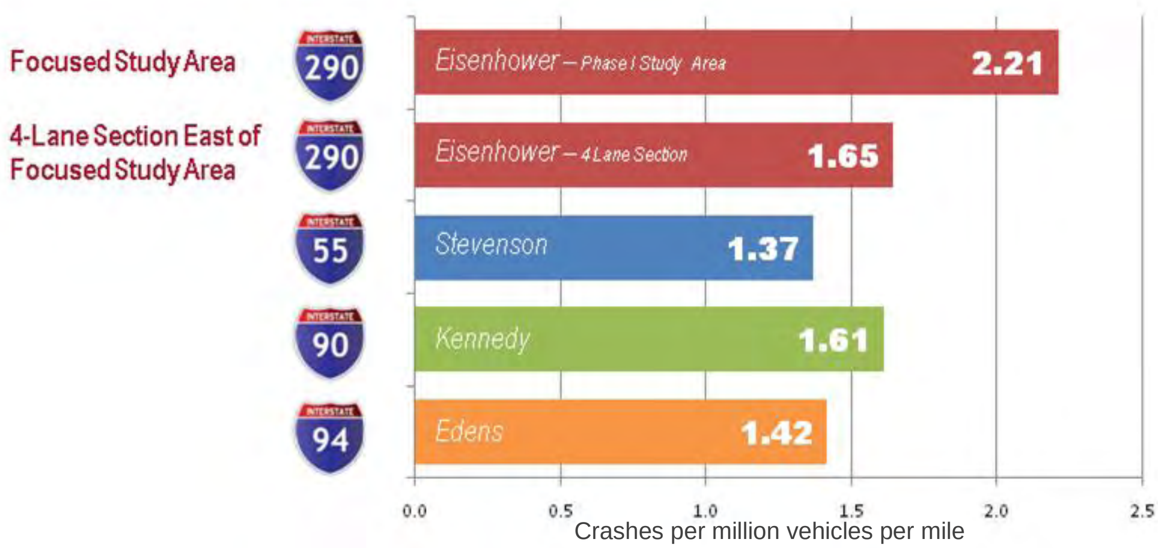
Table 2-4 summarizes the three year crash totals and within the study area by each facility type analyzed. The Mainline Operations & Crashes exhibit in Appendix E summarizes the crash locations with respect to mainline operations, as well as the location of the severe, K & A type injury crashes.

Table 2-4 Corridor Crash and Injury Totals (2006-2008)

Study Area Facility	Total Crashes	Injuries	
		Total	Fatal
Mainline	4,559	410	9
Ramps	310	82	0
I-290 Crossroads	913	187	0
Frontage Roads	284	46	0
Total	**6,066**	**725**	**9**

To determine how crash rates in the I-290 focused study area compare against other facilities in the Chicago area, the crash rates of several similar freeways in the region were calculated for the same three-year period from 2006 through 2008. Figure 2-17 presents the crash rates for these similar sections of I-94, I-90 and I-55, as well as the four lane section of I-290 east of the focused study area.

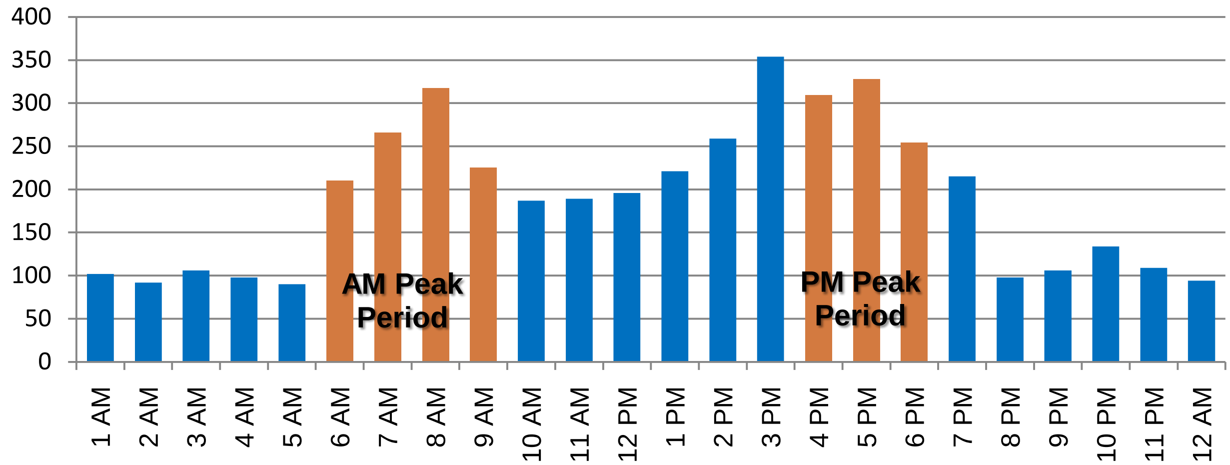
Figure 2-17 Comparative Freeway Crash Rates



By comparing the crash rates in 'crashes per million vehicles per mile', the analysis indicates that I-290 between I-294 and Kostner Avenue experiences a crash rate between 34% and 61% higher than similar facilities in the Chicago region.

For the mainline, the three year crashes were totaled by time of day and charted in one-hour time increments identify any trends in crashes by time of day. Figure 2-18 presents this chart and superimposes the peak AM and PM travel periods for reference. The hours in which the highest number of crashes occur correlate very closely to the peak congestion periods, indicating that the higher crash rate is related to an increase in congestion.

Figure 2-18 Mainline Crashes by Time of Day (2006-2008)



Overall, 85% of the recorded crashes for the three year reporting period occurred during congested conditions. Rear end crashes account for well over half of the recorded crash types with a very high majority occurring on dry pavement. Rear end crashes on urban freeways are typically associated with congested, stop and go traffic.

Mainline crashes for the east and westbound travel were totaled in 1/10th mile increments and plotted by milepost. The following two figures show the number of crashes every 1/10th mile.

In the eastbound direction, the highest spike in crashes occurs in the vicinity of Mannheim Road. Because there are no mainline connections to or from Mannheim Road in the eastbound direction, these crashes are attributed to congestion related traffic backups due to the CD road merge east of Mannheim Road and the lane drop prior to 25th Avenue (this is further explained in section 2.4.3). A second high crash spike occurs in relationship to 25th Avenue. Here a short auxiliary lane connection two closely spaced loop is introducing a complicated traffic weaving condition that increases the likelihood of an incident. The remainder of the crash spikes correlate to interchange ramp exit and entrance locations.

In the westbound direction, the highest crash spike occurs over Central Avenue, just east of the Austin Boulevard left hand exit and mainline lane drop. Here, traffic experiences severe congestion for extended periods of time each day due to four lanes of heavy traffic merging into three, as well as weaving traffic to exit at Harlem Avenue. Two prominent crash spikes also occur just west of the first, related to Austin Boulevard and Harlem Avenue left hand ramps. The remainder of the crash spikes in the westbound direction correlates to interchange ramp exit and entrance locations.

Figure 2-19 Mainline Crashes per 1/10th Mile - Eastbound

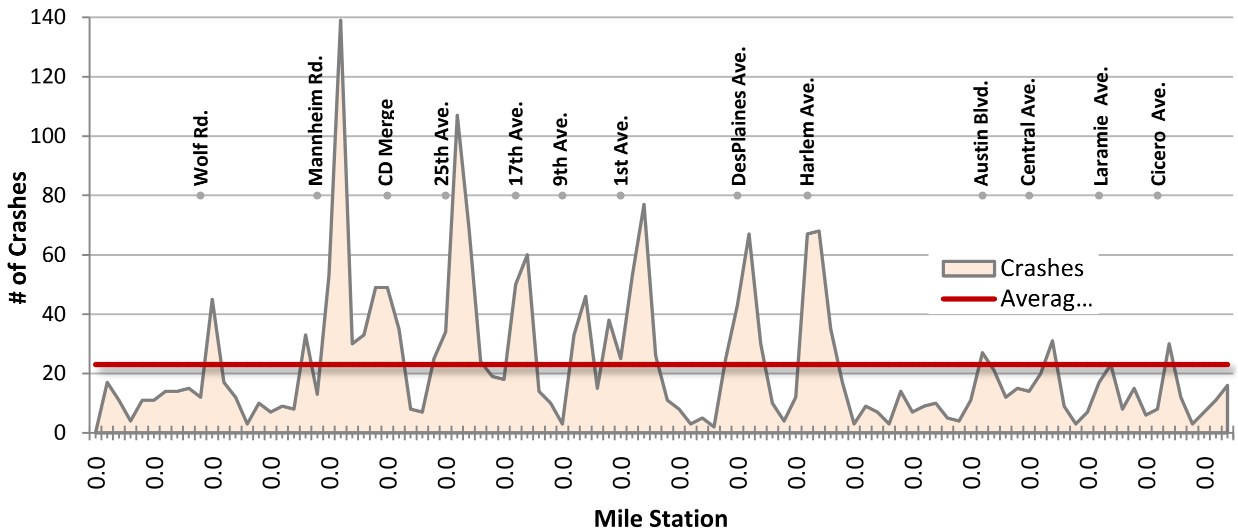
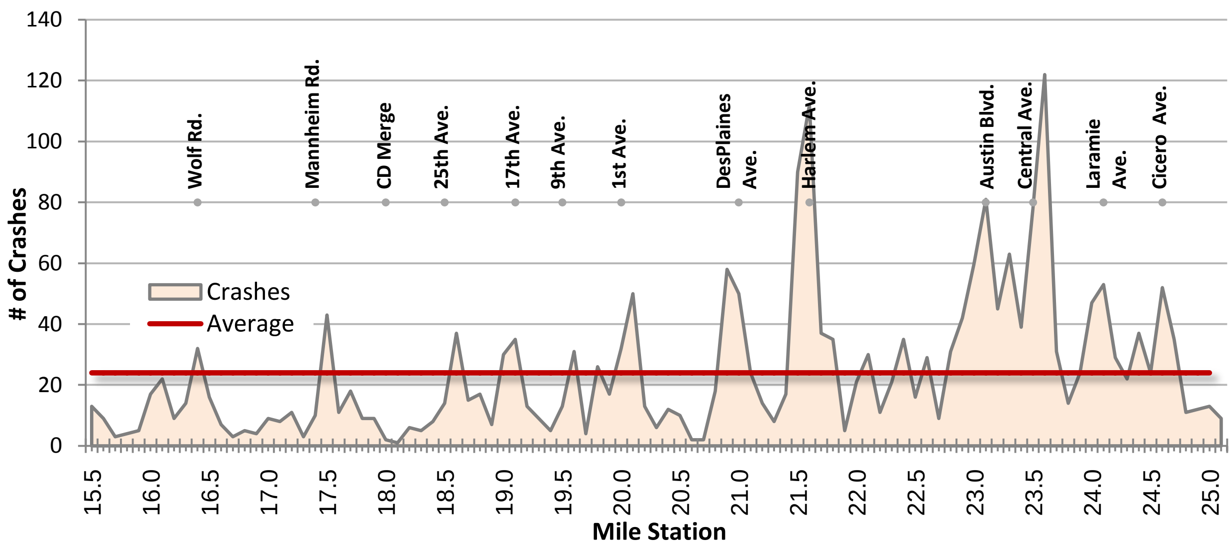


Figure 2-20 Mainline Crashes per 1/10th Mile - Westbound



For comparison to the segments, Table 2-5 presents an overall summary of east and westbound mainline crashes by predominant type and conditions.

Table 2-5 Predominant Mainline Crash Types

Predominant Crash Type	# of Crashes	% of All Crashes	AM Peak 6a to 11a	Midday 11a to 4p	PM Peak 4p to 7p	Congested Period 6a to 11p	Dry	Wet	Ice Snow Slush
Eastbound									
Rear end	1407	63%	34%	28%	22%	95%	82%	13%	3%
Sideswipe same direction	463	21%	26%	25%	19%	83%	79%	15%	6%
Fixed object	264	12%	13%	14%	7%	52%	59%	22%	18%
Westbound									
Rear end	1533	66%	27%	32%	24%	93%	85%	10%	3%
Sideswipe same direction	454	19%	19%	26%	17%	76%	79%	14%	5%
Fixed object	250	11%	16%	12%	3%	46%	62%	23%	15%
Mainline Total									
Rear end	2940	64%	30%	30%	23%	94%	84%	12%	3%
Sideswipe same direction	917	20%	22%	25%	18%	80%	79%	15%	5%
Fixed object	514	11%	15%	13%	5%	49%	60%	22%	16%

The following conclusions regarding the mainline as a whole can be drawn from this table:

- The predominant crashes (rear end & sideswipe) occur during periods of congestion
- Road condition is not a primary crash factor
- Fixed object crashes occur primarily during off-peak, uncongested conditions

Severe Injury Crashes. The Federal Highway Administration classifies "severe injury" crashes as Type K (fatal) and Type A (where a vehicle occupant is incapacitated by the injury).

There were 9 Type K crashes, containing a total of 9 fatalities, and 58 Type A crashes, containing a total of 68 Type A injuries, in the 2006-2008 reporting period along the I-290 mainline within the focused study area. These crashes were evenly distributed throughout the study area with little apparent overall pattern or clustering. There were 22 fixed object crashes, 18 rear end crashes, 8 same-direction sideswipes, 5 collisions with parked vehicles, and 14 crashes of other types.

A majority of severe injury crashes occurred in non-congested conditions between dusk and dawn. Driving Under the Influence (DUI) was a reported factor in 21% of the I-290 mainline severe injury crashes.

Ramps, Crossroads and Frontage Roads. Ramp, Crossroad and Frontage Road crashes are examined in detail in the Crash Analysis Technical Memorandum. There were 310 crashes on entrance and exit ramps, 913 crashes on crossroads, and 284 crashes on frontage roads in the I-290 study area during the 2006-2008 reporting period. There were no fatal (Type K) crashes on these facilities; there were 31 incapacitating (Type A) crashes on facilities including 8 on ramps, 19 on crossroads, and 4 on frontage roads.

2.5 Freight Railroads

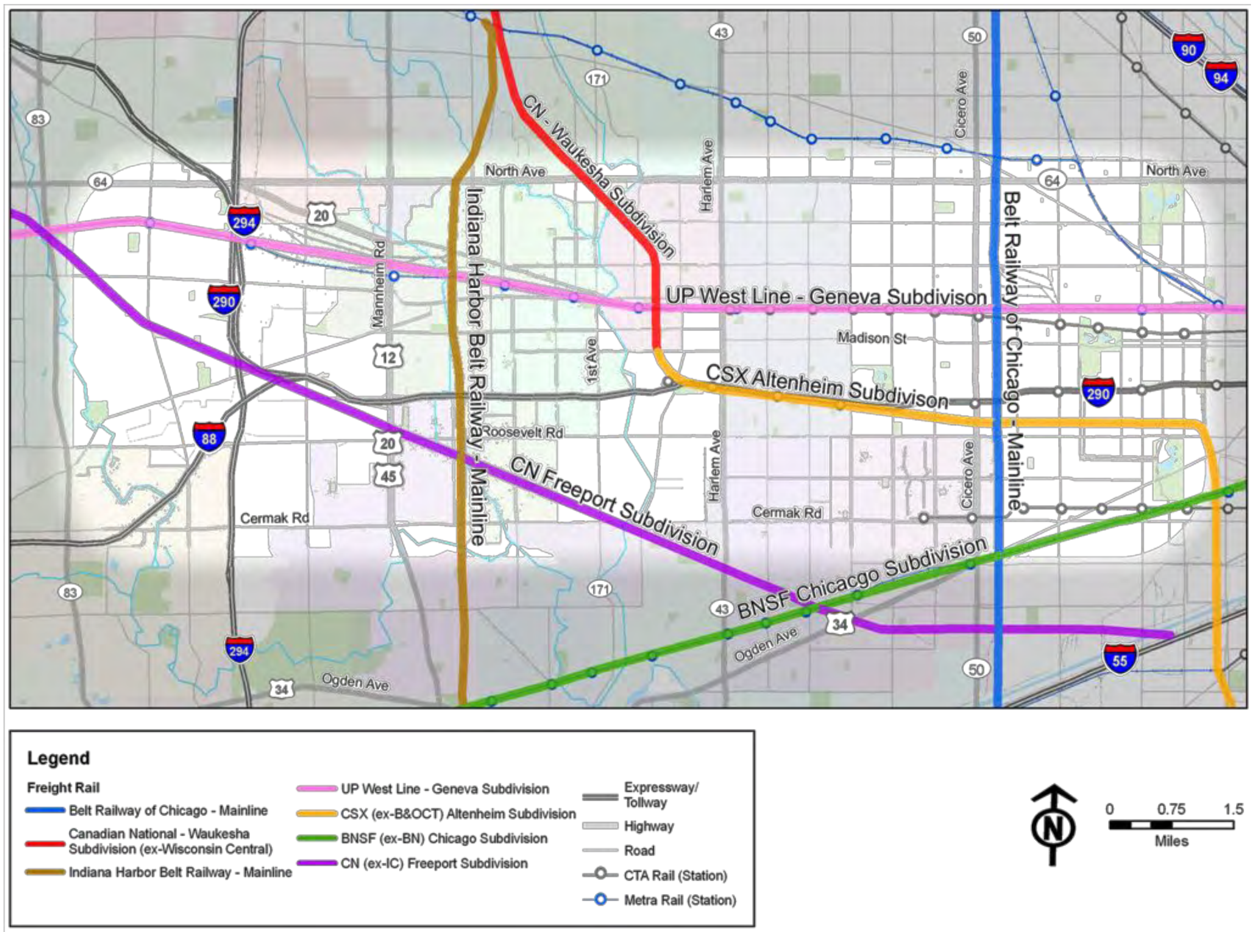
The freight rail and heavy commercial vehicle operations in the study area reflect the status of Chicago as one of the largest intermodal freight hubs in the world. The freight train traffic primarily moves east and west on the BNSF and the UP-W lines in the study area. Other east-west freight railroads include CSX and Canadian National CN (former IC). North-south routes include Belt Railway of Chicago (BRC), CN and Indiana Harbor Belt (IHB) (See Figure 2-21).

The CSX Altenheim Subdivision runs adjacent to the CTA Blue Line and the Eisenhower Expressway through Oak Park, crossing I-290 west of Harlem Avenue then traveling northwest through Forest Park. Within this parallel section, CSX maintains right of way for three tracks, including two continuous tracks and a third intermittent track. CSX operates only a few trains per week through this section. Until recently, Canadian National (CN) was CSX's primary operator through this corridor. In early 2009 CN purchased the Elgin, Joliet & Eastern (EJ&E) Railway line allowing CN to route traffic around Chicago, significantly reducing CN's dependence on the CSX line.

The CREATE program (Chicago Region Environmental and Transportation Enhancement) is a cooperative effort between the federal government, the state of Illinois, the city of Chicago, Metra, Amtrak and the Class I freight railroads, to reduce rail congestion and conflicts at rail-highway grade crossings in the Chicago area. Several projects to improve freight rail operations and provide rail/highway grade separations are planned within and near the study area. The Altenheim Subdivision was once planned for a major upgrade through the CREATE program, but was dropped with CN's purchase of the EJ&E.

North of Madison Street, ownership of the rail line changes from CSX (Altenheim Subdivision) to CN (Waukesha Subdivision).

Figure 2-21 Study Area Freight Railroads



2.6 Non-Motorized Transportation

2.6.1 Bicycle Network

There are three off-road multi-use facilities in the study area: the Prairie Path, the Des Plaines River Trail and a path through Columbus Park. There is one bike lane in the study area that lies within the city of Chicago. The striped bike lane is along Washington Boulevard beginning at Laramie Avenue and continuing east to the Loop. See Figure 2-22 for a map of the existing bike network in the study area. Bike parking (sheltered and indoor) is only available at the Forest Park Station, off of Van Buren Street and Des Plaines Avenue. Bike parking is available at the Metra Oak Park station.

Figure 2-22 Existing Bicycle Network

Sources: CMAP Bicycle Information System Database, 2009; PB

Within the focused study area, cyclists can cross the Eisenhower Expressway via 19 existing roadway crossings and two exclusive bicycle and pedestrian crossings. The expressway may be crossed using the existing roadway overpasses by riding with traffic in the outside most lane (right side, in the direction of travel), or walking the bicycle on the provided sidewalks. Table 2-6 lists the travel widths of the existing outside lane of each available bicycle crossing of I-290, as well as the lane widths for the continuing roadways immediately to the south and north of the crossing.

Table 2-6 Existing I-290 Bicycle Crossing Accommodations

Crossing Location	Outside Roadway Lane on S. Roadway		Outside Roadway Lane on Bridge		Outside Roadway Lane on N. Roadway	
	NB	SB	NB	SB	NB	SB
Wolf Road	12′	12′	--	--	12′	12′
Mannheim Rd. (x)	12′	12′	12′	12′	12′	12′
Westchester	12′ (P-8′)	12′ (P-8′)	15′	15′	15′	15′
25th Ave.	12′	12′	12′	12′	11′	11′
17th Ave.	15′	15′	25′*	25′*	12′ (P-8′)	12′ (P-8′)
9th Ave.	12′ (P-8′)	12′ (P-8′)	25′*	25′*	12′ (P-8′)	12′ (P-8′)
5th Ave.	12′ (P-8′)	12′ (P-8′)	25′*	25′*	12′ (P-8′)	12′ (P-8′)
1st Ave. (x)	12′	12′	13.5′	13.5′	11′	11′
Des Plaines Ave (x)	11′	11′	10′	10′	12′	12′
Circle Ave.	13′	13′	13′	13′	18′	18′
Harlem Ave (x)	11′	11′	10′ to 15′	10′ to 15′	11′	11′
Home Ave.	Bike/Pedestrian Crossing only – 9.5′ width					
Oak Park Ave.	12′ (P-10′)	12′ (P-10′)	11′	11′	12′ (P-10′)	12′ (P-10′)
East Ave.	17′	17′	11′	11′	15′	15′
Ridgeland Ave. (x)	18′	18′	11′	11′	12′	12′
Lombard Ave.	14′	14′	15′	15′	14′	14′
Austin Ave.	11′	11′	10′ to 12′	10′ to 12′	11′	11′
Central Ave.	12′	12′	--	--	12′	12′
Laramie Ave.	11′	11′	11′	11′	11′	11′
Lavergne Ave.	Bike/Pedestrian Crossing only – 9.5′ width					
Cicero Ave. (x)	11′	11′	11′ to 18′	11′ to 18′	11′	11′

(x) Listed as "Not recommended for bike travel" or "Caution Advised" on IDOT Bicycle Map
* Traffic lanes not marked – apparent use as a double lane by local traffic
(P-#) Indicates apparent parking lanes are present, with width in feet. Some have prohibited or restricted parking

2.6.2 Pedestrian Network

Pedestrians rely on sidewalks to reach nearby destinations, including transit stations. Although there is no formal inventory of existing sidewalks, the street network is well developed in all the communities in the study area. The street network in Chicago, Oak Park, Forest Park, Maywood and Broadview is primarily a grid based system with many connections to major roads. This type of network helps pedestrians navigate easily, and often provides more direct connections to destinations, compared to developments that have curved streets or cul-de-sacs. The suburbs of Westchester, Hillside and Bellwood also have some grid streets, but are less connected than the other communities in the study area.

North-south bicycle and pedestrian connections across I-290 occur approximately every 0.5 mile on average. There are a total of 21 pedestrian-accessible crossings between Wolf Road and Cicero Avenue inclusive; all are overpasses except for Central Avenue which crosses underneath I-290. Two of the crossings (near Home Avenue and Lavergne Avenue) are limited to pedestrians and bicyclists only. Of the remaining crossings of I-290, all feature sidewalks on both sides of the crossing bridge or roadway except for Mannheim Road and 25th Avenue, which feature a sidewalk on one side only.

Table 2-7 Existing I-290 Pedestrian Crossing Accommodations

Crossing Location	Sidewalk Width of. South Approach Street (ft)		Sidewalk Width Across Bridge (ft)		Sidewalk Width of. North Approach Street (ft)	
	East	West	East	West	East	West
Wolf Road	5′	5′	5′	5′	5′	5′
Mannheim Rd.	5′	--	5′	5′	5′	--
Westchester	5′	5′	7′	7′	5′	5′
25th Ave.	5′	--	6′	6′	5′	5′
17th Ave.	5′	5′	5′	5′	5′	5′
9th Ave.	5′	5′	5′	5′	5′	5′
5th Ave.	5′	5′	5′	5′	5′	5′
1st Ave.	--	5′	5′	5′	5′	5′
Des Plaines Ave	5′	7′	5′	5′	5′	5′
Circle Ave.	5′	5′	6′ Δ	6′	5′	5′
Harlem Ave	5′	5′	6′	6′ Δ	5′	5′
Home Ave.	Bike/Pedestrian Crossing only – 9.5′ width					
Oak Park Ave.	9′	9′	6′ Δ	6′	9′	9′
East Ave.	5′	5′	6′	6′ Δ	5′	5′
Ridgeland Ave.	5′	5′	6′	6′	5′	5′
Lombard Ave.	5′	5′	7′ Δ	7′	5′	5′
Austin Ave.	5′	5′	7.25′	7.25′ Δ	9′	8′
Central Ave.	7′	7′	--	--	7′	7′
Laramie Ave.	5′	5′	7.5′	7.5′	17′	6′
Lavergne Ave.	Bike/Pedestrian Crossing only – 10′ width					
Cicero Ave.	7′	7′	7′	7′ Δ	7′	7′

Δ Adjacent to CTA Rapid Transit Station

3.0 Findings

The following section identifies known deficiencies in the study area. Throughout the I-290 Phase 1 Study there will be coordination with stakeholders and agencies, which may result in identifying additional deficiencies.

3.1 Public Transportation

3.1.1 Facility Deficiencies

The 8.9-mile Forest Park Branch of the CTA-Blue Line extends from the subway portal located just east of Halsted Street in the median of the Eisenhower Expressway to the Forest Park station which lies to the west of Des Plaines Avenue in Forest Park. The terminal facility is located on the north side of the expressway right-of-way. A 122-car yard with shop building and car washer is located adjacent to the terminal station. The Des Plaines light maintenance shop and yard was built over 50 years ago and its capacity has historically been inadequate for the Blue Line. In particular, the yard site is constrained and cannot be expanded without extensive modification. According to the CTA, the shop and yard facility is nearing the end of its useful life.

The Forest Park Branch has 10 intermediate stations plus the terminal station at Des Plaines Avenue/Forest Park. All stations are of the island platform configuration, with long ramps connecting them to station head houses at street level. Long pedestrian ramps from street to platform level are not entirely desirable as the island platform station location results in a long walk for transit riders and personal safety concerns. The stations were constructed before the American with Disabilities Act (ADA) and do not meet the current ADA standards. Designed as a low cost / low maintenance solution, the CTA is shifting access philosophies towards providing elevators and stairways at head houses to address ADA compliance. In addition, one head station is now more favorable than two on opposite sides of the same cross street – two head stations mean doubling the staff, operations and maintenance coverage.

There are also three closed stations on the branch which are still largely intact, but are no longer active passenger stops. These are located at California, Kostner and Central Avenues. The long ramps (typically at either end of a long station platform) on the Forest Park Branch were added as the line replaced an older elevated line which had closely spaced stations. In this way, one new station was able to replace two-to-three of the older stations, thereby reducing the number of stops and improving service.

Most of the track on the line consists of older running rail (about 30-35 years old) with plastic ties having replaced the wood ties over the last five years. Signals have been recently replaced as part of a major capital improvement on the Blue Line. Track ballast and sub-ballast on the branch and the related drainage have been major problems on the line for several years and improvements to these conditions need to be programmed in the short-term according to the

CTA. Six power substations supply power to the Forest Park Branch, and the equipment in these substations is in need of renewal or replacement.

3.1.2 Service Deficiencies

The existing CTA rail transit facilities at their current operation levels have available capacity to add trains with reduced headway between trains if desired.[6] However, this is based on the current operating mode where all station stops are made and trains are spaced accordingly. With the existing double track configuration of the Blue Line (and also of the parallel Pink and Green lines), it would be difficult to operate an express-type service in peak demand periods without encountering "local train" interference if a mixture of local and express peak service were desired.

For Metra service, commuter service must operate in an environment where freight trains and switching movements share the track infrastructure, unlike the passenger-only CTA. Capacity and scheduling problems are less an issue on the BNSF line than the UP-West line because of BNSF's more efficient triple-track arrangement. Metra is proposing UP-West line major improvements including signal system upgrades that would enhance safety, additional tracks and crossovers to improve travel times and restructuring the bottleneck that occurs at the A-2 Crossing, located near Western Avenue in Chicago.

Pace bus service provides 23 (18 regular routes and 5 subscriber routes) in the broader study area. May 2009 Pace bus system wide on-time performance was 70.6%, study area on-time performance averaged 68.1%. Fourteen Pace routes performed below 70% in on-time service. On-time performance varies due to traffic congestion and road construction. There is also delay associated with accessing the Forest Park terminal.

3.1.3 Multi-Modal and Regional Access Deficiencies

The Forest Park Blue Line station is a major transit hub with connections to 13 CTA and Pace bus routes. According to Pace, Pace bus transit operations using I-290 and the CTA transit Park & Ride facilities at the Forest Park terminal of the CTA Blue Line rail transit line are adversely affected by the traffic congestion on the Eisenhower Expressway and adjacent local arterials. The Forest Park station Park & Ride has capacity of 1,051 spaces, 85% utilized in 2000. Multiple surface lots with separate entrances, some of which are isolated, and long walking distances to the station discourage use. Automobile access to the CTA and Village of Forest Park parking areas is constricted by the congested traffic patterns at the I-290 Des Plaines Avenue interchange, with observed backups caused by traffic waiting to enter the westbound I-290 ramp.

The closely-spaced traffic signals on Des Plaines Avenue and unprotected left turns required for egress/ingress for both Pace and CTA bus operations at the north side of the Forest Park Transit

[6] Based on load factor calculations for January 2009 CTA ridership on the Forest Park Branch and peak hour car operations. Refer to the *I-290 Phase I Study – Public Transit Existing Conditions Technical Memorandum* for more information.

Center also results in extensive delays to transit operations during AM and PM peak periods. Pace Route 747 buses east of York Road frequently divert to Roosevelt Road to avoid stop-and-go traffic conditions on I-290.

Commuter, pedestrian and bicycle access to transit stations, as well as within the corridor communities, is currently a major deficiency in the I-290 study corridor. Three of the existing CTA Blue Line stations in the study area, Harlem, Austin and Cicero, are located in the intersections of heavily congested interchanges. Pedestrian and bicycle access to the study area transit stations is provided below:

- The Harlem Station has access from the Harlem Avenue bridge, with auxiliary access from Circle Avenue.
- Austin Station has access from the Austin Boulevard bridge, with auxiliary access from Lombard Avenue.
- Cicero Station has access from the Cicero Avenue bridge. A pedestrian bridge at Lavergne Avenue connects to the station's auxiliary exit.
- Oak Park Station has access from the Oak Park Avenue bridge, with auxiliary access from East Avenue.
- Harlem Avenue and Cicero Avenue are neighborhood activity centers both north and south of I-290.

The high volume of pedestrian and vehicle movement through these heavily congested intersections creates a need for improved safety and accessibility for pedestrians, bicycle riders, CTA riders, and bus transfer pedestrians.

The pedestrian and bicycle bridge over the Des Plaines River, opened in 2007, provides a connection to Maywood along the Illinois Prairie Path. However, the link to the Forest Park Station is incomplete and lacks signage and pavement marking to define a route to the station.

Cook DuPage Study Corridor Mobility Assessment: A "Corridor Mobility Assessment" was performed in December 2005 as part of the Cook Du Page Corridor Study's Travel Market Analysis. The mobility of each of the nine travel markets was assessed in the context of access and service quality. The information for the four travel markets covered by the I-290 study area is presented in Table 3-1. While based on a careful examination of travel patterns and transportation options that are available to each of the travel markets, this assessment was considered to be subjective by its nature; therefore, a relative rating scale of "High," "Medium" and" Low" was used. Bus, rail, arterial and expressway options were assessed independently; however, to simplify the presentation and to take into account available intermodal transit options, the results are shown in two broad categories for Transit and Highway.

The assessment related to access was determined by examining the following questions for each market:

- Connectivity: Do the existing transit services and highways ***connect*** areas originating over 250 work trips/square mile with destination zones attracting over 250 work trips/square mile; and
- Availability: What is the ***availability*** of existing transportation facilities and transit services during the AM peak in the direction of the travel flow of each respective market?

All destinations were considered accessible by automobile given the extensive network of roadways in the Corridor. Ideally, such a measure would reflect the availability of a full-fledged multimodal network of highway and transit to serve all potential combinations of movements in a region, but clearly transit is not equally available to all Corridor travel.

While the connectivity and availability assessments bring focus to the availability of transportation options and the connectivity they provide between key origins and destinations, service quality focuses on how much or how well the options provide mobility and "serve" each travel market.

Table 3-1 Corridor Mobility Summary

Service Characteristics	Traditional		Reverse		North Central Cook		South Central Cook		West Central Cook	
Mode ->	T	H	T	H	T	H	T	H	T	H
Access Connectivity	Green	Green	Green	Green	Green	Green	Yellow	Green	Green	Green
Access Availability	Green	Green	Green	Green	Green	Green	Yellow	Green	Green	Green
Service Efficiency	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Service Frequency	Green	Green	Yellow	Green	Green	Green	Yellow	Green	Green	Green
Service Convenience	Green	Green	Red	Green	Red	Green	Green	Green	Red	Green
Mobility Ratings	14	13	8	13	12	14	11	14	12	14
Total Mobility (0-30)	27		21		26		25		26	
Transit Share	33%		15%		6%		3%		8%	
Work Trips	213,964		123,265		6,493		13,395		23,931	
Proj. Growth 2030	18%		18%		26%		-5%		41% NB/3% SB	

T = Transit options (rail/bus/intermodal combinations)

H = Highway options (arterials/expressways)

Green: Level = High (rating = 3 pt.)
Yellow: Level = Medium (rating = 2 pt.)
Red: Level = Low (rating = 1 pt.)

- Efficiency: in a multimodal environment, service quality depends on the ***efficiency*** of available transportation options in connecting origins and desired destinations. In this context, the Cook DuPage study considered how circuitous or direct the available options are, wait or transfer times, posted speed limits, and actual travel speeds and observed congestion by time of day (where available).

- Frequency: The assessment of ***frequency***, or how often an option is available to make a desired trip, only varies among the transit modes and is based on published transit service schedules.
- Convenience: The rating of ***convenience*** reflects the ease which the trip can be made, based on the number of required transit transfers and how proximate the service or facility access points are to trip origins and destinations.

To get a sense of how the travel markets compared in terms of mobility, a basic numeric score was applied to the rating scale (High = 3, Medium = 2, Low = 1). For each market, a mobility rating was tallied for Transit (T) and Highway (H) options independently, and then totaled. Because "Efficiency" was the only mobility factor that varied in the assessment of highway options available to each market, the extent and service quality of transit options available to each travel market had the determining role in this mobility assessment.

Further discussion of the multi-modal transportation characteristics and deficiencies in the four travel markets of the Cook DuPage Corridor Study is presented below:

Traditional: The Traditional Commute (Travel Market 1 in the Cook DuPage Study) has the greatest mobility of the nine travel markets. Nearly all origins in the DuPage portion of the Corridor have a commuter rail transit option, complemented with feeder bus service. The west Cook portion of the Corridor has both commuter rail and, to some extent, bus options (although bus travel requires at least one transfer from Pace to CTA). Areas east of Harlem Avenue have greater access to bus, rapid transit and to some extent, commuter rail.

While Metra's BNSF is zoned for express service and the UP-West and MD-W provide some semi-express service, most of the available transit service is local, especially in Cook County. Transit travel time is considerably higher when only local service is offered. The efficiency of transit therefore received a "Medium" rating for the Traditional market as a whole.

Reverse: The Reverse Commute travel market (Travel Market 2 in the Cook DuPage Study) has many problematic mobility issues. The overall poor rating of the Reverse Commute travel market is largely due to:

- A lack of transit options to reach key concentrations of destinations (particularly those in DuPage),
- The long travel time it takes to make a transit trip relative to travel distance,
- The inconvenience of same direction and/or multiple transfers among bus, rail and intermodal options, and
- The circuity of rail transit travel through downtown Chicago.

The routine congestion on I-290 and the inefficiency of arterials for longer distance trips as an alternative to I-290, result in a "Low" rating for Efficiency among highway options.

North Central Cook: North Central Cook (Travel Market 8 in the Cook portion of the Corridor) fares relatively well from a market mobility standpoint, largely due to the greater connectivity, availability and frequency of bus transit. The North Central Cook travel market is most inconvenienced by same-direction Pace/CTA transfers necessitated by service boundaries and CTA route segmentation that also require a transfer in the same direction of travel. This market received a "Low" rating for convenience of transit service primarily due to connection difficulties but was otherwise considered a fairly well served market.

South Central Cook: South Central Cook (Travel Market 4 in the Cook portion of the Corridor) fares relatively well from a market mobility standpoint, largely due to the greater connectivity, availability and frequency of bus transit. The South Central Cook travel market has a DuPage district as a destination that lacks the CTA's more extensive grid bus network and multimodal bus/rail options. Three bus services provided by Pace – routes #322 (Cermak Road), #313 (St. Charles Road) and #747 (DuPage Connection) – are convenient to major origins and destinations of this travel market but the service hours and frequency of these services are limited. All transit measures except for convenience were rated as "Medium", indicating some room for improvement but a fairly well served market.

West Central Cook: West Central Cook (Travel Market 9 in the Cook portion of the Corridor) fares relatively well from a market mobility standpoint, largely due to the greater connectivity, availability and frequency of bus transit. The West Central Cook travel market is most inconvenienced by same-direction Pace/CTA transfers necessitated by service boundaries and CTA route segmentation (e.g., service on Cicero Avenue is broken into three route segments) that also require a transfer in the same direction of travel. This market received a "Low" rating for convenience of transit service primarily due to connection difficulties but was otherwise considered a fairly well served market.

3.2 Roadways

3.2.1 Design Deficiencies

IDOT and FHWA require that specific design criteria be achieved for all new or reconstructed facilities. Variances from established design criteria may be justified in terms of reduced costs, minimized impacts, and to achieve certain community needs, without compromising safety. Existing geometric deficiencies were identified by comparing the roadway design against the accepted "level 1 controlling criteria" (as established by the IDOT and the FHWA). This includes design elements such as: design speed, lane width, shoulder width, horizontal curvature, superelevation, stopping sight distance, structural capacity of bridges, vertical clearances, and maximum grades.

Numerous design deficiencies were identified for the I-290 mainline and along cross roads and interchanges in the study area. Shoulder widths are inconsistent along I-290, varying from 2.5

feet to 12 feet in width, with approximately 82% of the mainline shoulders not meeting the minimum required widths of 10′ for left and right shoulders. It should be noted that 12 foot width shoulders would be considered for reconstruction of I-290 according to IDOT policy, based on the existing truck traffic volumes on I-290. One in every three exit ramp departure angles are too abrupt (exceeding current design requirements), and 29 of the 33 ramp gores lengths are too short. A majority of the existing cross roads have vertical curve geometry that does not meet the current stopping sight distance (K-value) requirements. There are a total of 22 bridges over I-290 in the study area, 18 of which do not meet the 15′ minimum (16′ desirable) clearance requirement for reconstructed structures inside of I-294.

By the end of 2010, the Eisenhower Expressway within the focused study area will have been resurfaced four times since its original construction in the 1950′s. However, these rehabilitation projects only addressed the surface of the multi-layered pavement structure. The underlying concrete and granular sub-base are still original and are now approaching 55 years of age, well over 30 years past the typical 20 year service life of this type of pavement.

The study area roadways have experienced flooding during major storm events and this is due in part to the current design and age of the existing drainage system and pump station. The only pump station in place to drain the expressway in the focused study area is over 50 years old and is obsolete with ever increasing maintenance costs; failure of this pump station would result in the flooding of the expressway in almost any rain event. The existing highway trunk sewer system drained by the pump station was also constructed in the 1950s and is under sized for existing conditions, and there is evidence that suggests the trunk sewer system has overflowed into the adjacent CTA and CSX right of way in the past.

3.2.2 Structure Deficiencies

There are three components to the sufficiency rating system for evaluating bridges: structural adequacy, serviceability and functional obsolescence, and essentiality for public use. Structural adequacy is essentially based on the ability of the various structural elements of the bridge to support the loads for which the bridge is rated (designed to carry) and adequacy of the railing system to protect vehicle from breaking through the barrier and leaving the deck. Serviceability and functional obsolescence are based on the adequacy of the existing deck width to carry the number of lanes needed for traffic volumes, the corresponding approach roadway width, deck geometry and condition, and vertical clearances. Essentiality for public use is basically a determination of the need for the crossing.

To develop the overall sufficiency rating, the three rating components are given a score between 0 and 100 based on a bridge inspection and other physical data. To arrive at the overall rating, the three components are weighted according to the following percentages and combined:

- Structural Adequacy and Safety (55%)
- Serviceability and Functional Obsolescence (30%)
- Essentiality for Public Use (15%)

Structures given an overall sufficiency rating of 50 to 80 are eligible for federal bridge rehabilitation funds, and structures rated less than 50 are eligible for federal bridge replacement funds. A bridge is considered structurally deficient if significant load-carrying elements are found to be in poor condition or the waterway opening adequacy is insufficient. This does not imply the bridge is unsafe; rather that it is in need of repair. If a bridge is unsafe, it is closed until repairs can be made.

Table 3-2 provides the breakdown of the individual sufficiency rating components for each roadway structure.

Table 3-2 Roadway Structure Sufficiency Ratings Table

Bridge Location (Structure Number)	Year of Original Construction	Year of Most recent Rehabilitation[7]	Min. Vertical Clearance	Overall Sufficiency Rating	Structural Adequacy and Safety	Serviceability and Functional Obsolescence	Essentiality for Public Use
I-290 EB C-D Road over Wolf Road (016-2758)	2001	***	NA	**96%**	100%	87%	100%
I-290 over Wolf Road (016-0086) ⊕	1952	1984	NA	**91%***	100%	70%	100%
I-290 EB C-D Road over Hillside Drive (016-2759)	2002	***	NA	**100%**	100%	100%	100%
I-290 over Hillside Drive (016-0986) ⊕	1952	1998	NA	**96%***	100%	87%	100%
Mannheim Road over I-290 (016-2760)	2000	***	14′-1″	**91%**	100%	70%	100%
Westchester Boulevard over I-290 (016-2761)	2002	***	14′-5″	**90%***	100%	67%	100%
I-290 over Addison Creek (016-0088) ⊕	1952	2000	NA	**98%**	100%	100%	87%**
25th Ave. over I-290 (016-0686)	1951	2003	14′-2″	**95%**	100%	82%	100 %
17th Ave. over I-290 (016-0694)	1951	1984	14′-2″	**65%**	82%	17%	100%
9th Ave. over I-290 (016-2058)	1951	1985	14′-2″	**77%**	100%	23%	100%
5th Ave. over I-290 (016-0692)	1951	***	14′-3″	**78%**	100%	26%	100%
IL 171 (1st Ave.) over I-290 (016-0699)	1951	1984	14′-5″	**66%**	82%	20%	100%
I-290 over Des Plaines River (016-0090) ⊕	1958	1987	NA	**98%**	100%	100%	87%**
Des Plaines Ave. over I-290 (016-0706)	1957	1984	14′-11″	**77%**	100%	23%	100%
Circle Ave. over I-290, CSX RR and CTA (016-0995)	1958	1984	14′-2″	**77%**	100%	23%	100%
IL 43 (Harlem Ave.) over I-290, CSX RR and CTA (016-0311)	1957	1998	17′-0″	**96%**	100%	87%	100%
Oak Park Ave. over I-290, CSX RR and CTA (016-2123)	1958	***	14′-4″	**77%**	100%	23%	100%
East Ave. over I-290, CSX RR and CTA (016-2061)	1957	1984	14′-4″	**77%**	100%	23%	100%
Ridgeland Ave. over I-290, CSX RR and CTA (016-	1957	1991	14′-7″	**77%**	100%	23%	100%

[7] Most recent year of rehabilitation as documented in the District 1 Bridge Microfilm List.

Bridge Location (Structure Number)	Year of Original Construction	Year of Most recent Rehabilitation[7]	Min. Vertical Clearance	Overall Sufficiency Rating	Structural Adequacy and Safety	Serviceability and Functional Obsolescence	Essentiality for Public Use
0710)							
Lombard Ave. over I-290, CSX RR and CTA (016-2062)	1957	1990	14'-4"	**79%**	100%	30%	100%
Austin Blvd. over I-290, CSX RR and CTA (016-2063)	1957	1990	14'-4"	**77%**	100%	23%	100%
I-290 EB over Central Avenue (016-0094) ⊕	1957	1984	14'-0"	**94%***	100%	87%	87%**
I-290 WB over Central Avenue (016-0095) ⊕	1957	1984	14'-0"	**94%***	100%	87%	87%**
I-290 EB over CTA (016-0999)	1954	***	NA	**100%***	100%	100%	87%**
Laramie Ave. over I-290 and CTA (016-2064)	1954	1987	14'-3"	**77%**	100%	23%	100%
Cicero Ave. over I-290 and CTA (016-0406)	1954	1986	14'-6"	**94%**	100%	80%	100%

* The calculated overall sufficiency rating in the table varies from that shown in the IDOT Structure Master Report. This is attributed to how subtle differences in how the rating information is entered in to the system vs. what is calculated here. The differences are small (2%) and considered negligible for the purposes of this analysis.

** I-290 has been designated as a Department of Defense Strategic Highway Network facility (STRAHNET). To indicate this higher maintenance priority, any structure serving facility with this designation is assigned a lower rating.

*** Information to be verified and provided in subsequent draft of this report

⊕ Bridge Maintenance included as part of the 2010 resurfacing Project. Includes bridge deck repairs, approach slab repairs, joint repairs, and concrete sealer application.

The percentages shown for the three sufficiency components were calculated by dividing the rating calculated for the particular structure by the total allowed for that category. Of the 26 I-290 roadway bridge structures within the study limits, 12 are considered to be functionally obsolete. All 26 roadway bridge structures are considered to be structurally adequate and essential for public use, as of the most recent bridge inspections.

Six structures that carry I-290 traffic will receive maintenance repairs as part of the 2010 resurfacing project (see Table 3-2). These short term repairs are unlikely to materially affect the serviceability rating due to their limited scope.

3.2.3 Operational Deficiencies

The results of the existing traffic operations analysis indicate that the majority of roadway elements within the I-290 corridor are operating under extended periods of congested conditions and deteriorated levels of service. Each of the various operational elements analyzed have different factors that affect their performance under traffic. Documentation of the detailed existing operations analysis is provided in the Existing Roadway Operations technical memorandum, below is a summary of the primary deficiencies identified by that report:

Basic Freeway Segments. A majority of the three and four lane basic freeway segments along east and westbound I-290 operate at LOS E or worse during both A.M. and P.M. peak hours. This deteriorated LOS may be attributed to the following factors:

- Inadequate capacity for travel demand
- Existing geometric design deficiencies
- Violation of the Basic Number of Lanes principle (westbound)
- Violation of the Lane Balance principle (eastbound)

Ramp Junctions. The majority of the ramp junctions within the 3 lane sections of eastbound and westbound I-290, and each of the identified weaving sections operate at deteriorated LOS. This low performance can be attributed to several factors:

- High mainline and ramp volumes
- Complex maneuvers between closely spaced interchanges and ramp
- Non-uniform exit and entrance ramp patterns
- Short or non-existent ramp acceleration and deceleration lanes

Interchanges. Seven out of ten interchanges in the study area have failing movements that reduce overall operations at the intersections. Factors that impact traffic operations at interchange intersections are:

- Demand exceeding available capacity
- Sub-optimal existing signal timing and phasing
- Substandard & inadequate intersection geometry
- Insufficient turn lane storage

Parallel Arterials. Parallel arterials in the study area are operating primarily under congested to very congested conditions:

- 91% of the study area arterials are operating under congested to very congested conditions.
- Traffic volume: Breakdown conditions occur when demand exceeds capacity resulting in extremely congested conditions characterized by lower speeds, longer trip times, and longer queues.
- Number of lanes and cross-sections: The lack of adequate number of through and turn lanes results in the deterioration in service levels and congestion.
- Traffic signals: Higher number of traffic signals per mile on arterials result in lower travel speeds, increase in delay, queuing at intersections, congestion, and opportunity for crashes.
- North Avenue, Roosevelt Road, Cermak Road, and to a lesser extent Lake Street, are serving trips similar in pattern to those served by I-290. These longer distance trips would normally be served by I-290, however with the heavy congestion on I-290, these parallel arterial routes attract more trips.

3.2.4 Safety Deficiencies

The following observations were made from a review of the overall crash data, individual crash reports, and the existing roadway environment:

- The dominant crash type along I-290 is rear end (64% overall). National studies, as well as the I-290 Crash Analysis Report, correlates this high frequency and percentage of rear-end crashes with congestion.
- In the uncongested period between 11 PM and 6 AM, travel speeds tend to be higher and the crash type mix changes from being primarily rear-end, to a mixture of fixed object, sideswipe and rear-end crashes.
- Most severe injury crashes occurred during the uncongested period between 11 PM and 6 AM. Also, the occurrence of a majority of severe crashes during darkness appears to be a contributing factor. All Type K and A pedestrian collisions occurred between dusk and dawn.
- Most of the serious injuries and fatalities (Type K and A crashes) were not associated with the rear end crash type. Seven of the nine Type K (fatal) crashes involved a vehicle leaving the roadway or striking a pedestrian.
- Narrow mainline shoulder widths may be a contributing factor to several of the Type K crashes; also, the presence of fixed objects within the roadway clear zone, barriers not in accordance with current standards or non-breakaway sign posts, or the lack of barriers to shield objects are likely contributing factors to fixed object crashes, including the more severe Type K and A crashes where leaving the roadway occurs in a large percentage of the crashes.
- Driving Under the Influence (DUI) was an identified factor in 21% of severe crashes on the I-290 mainline, which is similar to but somewhat lower than national and Illinois rates for these type crashes.
- Crash rates were higher at ramp entrances and exits, particularly eastbound I-290 near Harlem Avenue , and westbound I-290 near Austin Boulevard and Harlem Avenue. A Federal Highway Administration study indicated a crash rate associated with left hand off (exit) ramps of 1.74 crashes per million vehicles, over twice the rate as the next highest type. The same study indicated crash rates associated with left hand on (entrance) ramps at 0.74 crashes per million vehicles, among the highest of the various types studied.
- No clear pattern of roadway surface or weather conditions contributing to severe crashes.
- At intersections, the most common types of crashes were rear end, turning and angle. These types of crashes are typical of signalized intersections, which are present on most of the cross roads. Signalization introduces stop and go conditions, and combined with congestion, increase the potential for rear end crashes. Turning and angle crashes often occur due to driver error including impatience or inattentiveness during congestion. Roadway environment factors for turning and angle crashes at intersections can include less than optimal timing of traffic signals, poor or worn lane marking, traffic signal layout, and other factors.

- Parked vehicle and sideswipe crashes occurred along the frontage roads. Narrow parking lanes and narrow overall roadway width may have contributed to the incidence of these types of crashes.

3.3 Freight Railroads

Deficiencies of freight railroads other than the CSX Altenheim Subdivision are discussed in detail in the I-290 Phase I Engineering Study Mannheim Road to Cicero Avenue Freight Rail Existing Conditions Technical Memorandum (February 2010).

Vertical clearances along CSX's Altenheim Subdivision (measured from top of rail to low beam of overhead structure) are substandard in most locations in the I-290 corridor, according to the current 23 feet minimum requirement. These substandard clearances inhibit the railroad's ability to run "double-stack" container trains or other high clearance loads typical of modern mainline rail traffic. Table 3-3 lists the existing vertical clearances over the CSX railroad in the study area.

Table 3-3 Existing Vertical Clearances over CSX Railroad

Bridge over CSX Railroad	Clearance over railroad	Additional clearance needed to obtain 23 foot clearance
Circle	19.5′	3.5′
Harlem	19.8′	3.2′
Home (pedestrian bridge)	21.8′	1.2′
Oak Park	19.6′	3.4′
East	19.7′	3.3′
Ridgeland	19.2′	3.8′
Lombard	19.3′	3.7′
Austin Ave	19.4′	3.6′

The CSX railroad existing track grades are entering and exiting the depressed section through Oak Park are at the design maximum, which is undesirable for freight rail operations. In some cases, tracks can be lowered to increase existing under clearances; however lowering the tracks in this section would further increase existing grades. Maintaining adequate drainage is also an important consideration when lowering existing tracks. This section of existing roadbed of the CSX Altenheim Subdivision is poorly drained because of fouled ballast, although it is served by the I-290 storm sewer system.

3.4 Non-Motorized Transportation

The spacing of pedestrian/bicycle crossings within the I-290 study area is fairly dense at 0.25 to 0.75 miles. However, with the exception of bicycle/pedestrian-only overpasses near Home

Avenue and Lavergne Avenue, there are no shoulders or dedicated bicycle lanes to provide a safer, more comfortable operating zone for bicyclists. Most of the major north-south bicycle routes including Wolf Road, Mannheim Road, 1st Avenue, Des Plaines Avenue, and Cicero Avenue, are marked "Not Recommended for Bicycle Travel" on IDOT's District 1 Bicycle Map; Ridgeland Avenue is marked "Caution Advised". Of the parallel east-west bicycle routes near I-290, Roosevelt Road west of Mannheim Road and east of Harlem Avenue, Washington Boulevard between 25th and 1st Avenues, and Washington Boulevard between Des Plaines and Harlem Avenues are marked "Not Recommended for Bicycle Travel", with the remainder of the routes along Roosevelt and Washington marked "Caution Advised".

In March of 2007, a 195 foot pedestrian bridge was constructed over the Des Plaines River, providing a direct connection for pedestrians and bicyclists traveling between the Forest Park Blue Line station and Maywood, and the Maywood Circuit Court complex located on the west side of the Des Plaines River.

The high utilization of the transit, pedestrian, and highway facilities has led to increased pedestrian/vehicle conflicts at rail transit station access points, and the bus-to-rail transfer points.

The pedestrian network is well-developed with a grid network of sidewalks in the eastern part of the study area. However, the network is not as well connected in Westchester, Hillside and Bellwood. There are some sidewalks that are not in compliance with current ADA standards that make pedestrian access more difficult for persons with disabilities. AASHTO also recommends 8 foot wide sidewalks for heaver pedestrian volumes; the existing sidewalks in the study area providing access to the CTA Blue line stations are below this recommendation. Although the sidewalks in the focused study area meet the 5' minimum requirements, the placement of signs, vending machines, benches and other obstacles may reduce their effective widths.

Commuter, pedestrian and bicycle access to transit stations, as well as within the study area communities, is currently a major deficiency in the I-290 study area. Three of the existing CTA stations in the study area, Harlem, Austin and Cicero, are located in the intersections of heavily congested interchanges. Harlem Avenue and Cicero Avenue are also neighborhood activity centers. The high volume of pedestrian movement through the heavily congested intersections negatively affects safety and accessibility for pedestrians, bicycle riders, CTA riders, and bus transfer pedestrians. Bicycle access to commuter rail and to the CTA Blue and Green lines is hampered by a lack of designated bike routes along existing streets. Many of the major routes are too narrow and congested.

4.0 Conclusions

The performance characteristics and identified deficiencies of the transportation system within the I-290 study area are summarized as follows:

- The transportation system within the I-290 study area is a critical component of the overall Chicago area transportation network. The highway and public transportation system carries hundreds of thousands of people per day through the study area, providing a vital east-west link between the Chicago Central Business District, western Cook County, Du Page County and other areas of Illinois, as well as providing local transportation within the study area.

- All modes of transportation were found to have deficiencies that negatively affected performance. "Condition" deficiencies were found in all modes, as well as "operational" or "service" deficiencies. "Safety" deficiencies were identified for roadways, as well as for pedestrians and cyclists.

- The study area has a well developed and utilized public transportation system, particularly east of Harlem Avenue. This system has grown to most efficiently serve the "traditional commute" pattern from the western suburbs into the Chicago Central Business District. However the strong "reverse commute" pattern to the more dispersed employment centers of the western counties is not well served. Lack of coordination and inconvenience of transfers between different systems and modes, speed of service, and lack of usable connections to employment centers hamper the ability of public transportation to effectively serve the reverse commute market. Other travel markets in western Cook County exhibit the same types of service problems as the reverse commute, but to a lesser degree.

- Number of crashes and crash rates along I-290 through the study area are higher overall in comparison to similar freeway facilities in the Chicago area. The primary crash types were rear end and sideswipe types, which can be correlated to congestion on I-290. In contrast, the majority of severe injury crashes involved a vehicle leaving the roadway and occurred during non-congested conditions where higher speeds were obtainable; nighttime lighting conditions and DUI were identified as potential contributing factors to severe crashes. Crash "hot spot" locations were identified, most notably occurring where a lane drop/capacity reduction exists eastbound near Mannheim Road and westbound prior to Austin.

- Congestion and poor levels of service along the I-290 mainline and its associated frontage roads, ramps, crossroads, and parallel arterial roads within the I-290 study area occur for extended periods of time. Contributing factors include insufficient capacity for the existing demand and geometric deficiencies such as abrupt ramp exit and entrances, lane reductions and imbalances, undersized turn lane capacity, complex mainline/ramp weaving maneuvers, inconsistent successive exit and entrance ramps, and non-optimal traffic signal operation.

- The age and condition of existing transportation facilities is of concern, especially with I-290 pavement and structures that have been in place beyond their expected service life without a major rehabilitation. There are also deficiencies in adjacent CTA facilities which were built at approximately the same time. Drainage facilities are also inadequate, especially for major storm events.

- The CSX Altenheim Subdivision is a freight rail line that parallels I-290 through much of the study area; it is a lightly used line that has deficiencies relating to vertical clearances, grades and drainage where it co-exists next to I-290 and the CTA Blue Line.

- Although existing bicycle and pedestrian facilities are plentiful in the study area, many are substandard and inadequate for safe and efficient use, including numerous conflict areas with motorized transportation.

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