Final Report

Access Justification Report

I-290 and Elgin O'Hare Expressway/Thorndale Avenue Interchange

Prepared for

Illinois Department of Transportation and Illinois Tollway

October 2012

Contents

Tables

Figures

Exhibits

Appendixes

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AJR	access justification report
BDE	Bureau of Design and Environment
BRT	bus rapid transit
CAAT	Corridor Aesthetic Advisory Team
CER	cost estimate review
CFR	Code of Federal Regulations
CMAP	Chicago Metropolitan Agency for Planning
CPG	Corridor Planning Group
CTA	Chicago Transit Authority
DHV	design hour volume
EB	eastbound
EIS	environmental impact statement
EO-WB	Elgin O'Hare West Bypass
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FY	fiscal year
GWG	Geometric Working Group
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HOT	high-occupancy tolled
HOV	high-occupancy vehicle
HSM	Highway Safety Manual
I	Interstate
ICP	Initial Construction Plan
IDOT	Illinois Department of Transportation
IDS	interchange/intersection design study

IL	Illinois Route
ITS	Intelligent Transportation Systems
LOS	level of service
MDW	Milwaukee District–West
mph	mile(s) per hour
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
NB	northbound
O/D	origin/destination
OMP	O'Hare Modernization Program
pc/mi/lane	passenger car(s) per mile per hour
PHF	peak hour factor
PSI	potential of safety improvement
RTA	Regional Transportation Authority
RTP	*Regional Transportation Plan*
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SB	southbound
SPF	safety performance function
TDM	travel demand management
TIP	*Transportation Improvement Program*
TSM	transportation system management
UIUC	University of Illinois at Urbana-Champaign
US	U.S. Route
VMT	vehicle miles traveled
WB	westbound
YOE	year of expenditure

SECTION 1

Introduction

The Illinois Department of Transportation (IDOT) requests a change in access along Interstate (I)-290 (I-290) in Cook County, Illinois, for the purpose of enabling construction of a new access-controlled facility by the Illinois Tollway, referred to as the Elgin O'Hare corridor.[1] The new facility, in combination with the construction of the new access-controlled West Bypass corridor, is proposed as part of the Illinois Tollway's *Move Illinois* Program.

The change in access is associated with the required reconstruction of the existing interchange of I-290 and Thorndale Avenue. In accordance with Federal Highway Administration (FHWA) policies regarding interstate access approvals, the request is made by IDOT.

1.1 Description of Proposed Access Modification

The Illinois Tollway intends to construct and operate a long-planned extension of the Elgin O'Hare Expressway as an access-controlled facility from west of I-290 in Cook County to the western border of O'Hare Airport in DuPage County. Construction of the Elgin O'Hare corridor requires conversion of an existing full-movement partial cloverleaf service interchange between Thorndale Avenue and I-290 to a full free-flowing system interchange for all system movements.

The existing service interchange is a four-quadrant partial cloverleaf (Parclo-A) with loop ramps off Thorndale Avenue (in the northwest and southeast quadrants) to both westbound (WB) and eastbound (EB) I-290 (see Figure 1-1 and, for detailed view, see Exhibit 3-5 on Sheet 2 of 6). Directional ramp connections are provided in the northeast and southwest quadrants from Thorndale Avenue to WB and EB I-290. Thus, all existing movements from Thorndale to I-290 are free flowing, with varied design speeds. The existing movements from I-290 to Thorndale Avenue, on the other hand, terminate at signalized intersections (except for EB I-290 to WB Thorndale Avenue, which acts as a free-flow right-turn/directional ramp).

I-290 is a federal-aid interstate facility under the jurisdiction of IDOT. In the study area, I-290 travels north (signed WB I-290) and south (signed EB I-290), forming a segment of the second circumferential interstate around the Chicago metropolitan area. Other routes carrying the second "ring road" around Chicago consist of Illinois Route (IL) 53 (an access-controlled freeway) north of I-90 and I-355 (an access-controlled freeway/tollway) south of I-290. Interchanges proximate to the location of proposed access modification include a service interchange between I-290 and Biesterfield Road (IL 53) to the north and a system interchange between I-290 and I-355 to the south.

[1] The Elgin O'Hare corridor refers to the entirety of the east-west corridor of the Elgin O'Hare West Bypass Project. The Elgin O'Hare corridor includes both the existing Elgin O'Hare Expressway from US 20 to its terminus at Rohlwing Road (IL 53) and the proposed extension of the expressway from IL 53 to the O'Hare Airport in place of what is now Thorndale Avenue.

FIGURE 1-1
Existing I-290 Interchange Area

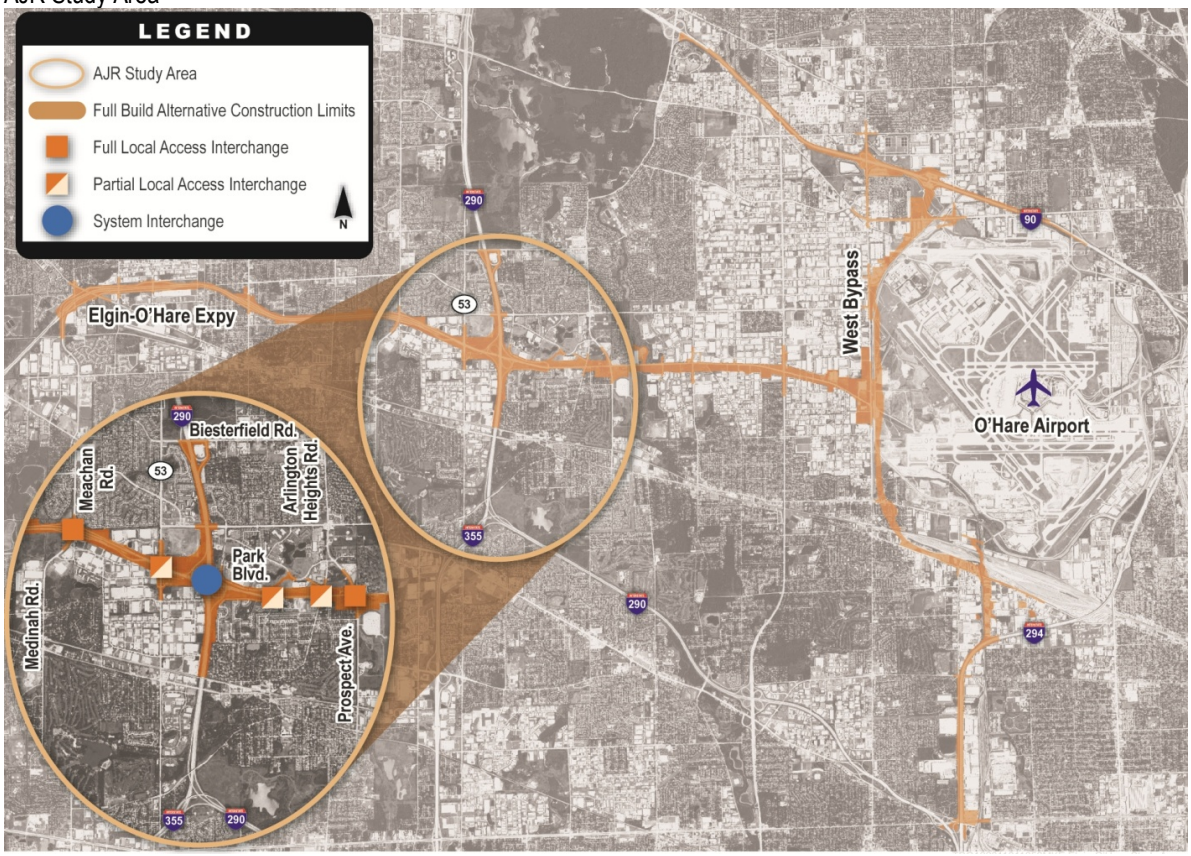
The existing Elgin O'Hare Expressway is an access-controlled freeway from approximately 1 mile west of I-290 to its western terminus at U.S. Route (US) 20, a distance of about 6 miles. It currently transitions from an access-controlled freeway to a lower-speed arterial (Thorndale Avenue) with an at-grade intersection at IL 53 (Rohlwing Road). The Elgin O'Hare Expressway is a federal-aid freeway presently under the jurisdiction of IDOT, and Thorndale Avenue is an arterial highway under the jurisdiction of IDOT (west of Park Boulevard) and DuPage County (from west of Park Boulevard to York Road).

The system interchange of I-290 and the Elgin O'Hare corridor is central to other improvements that are being implemented by the Illinois Tollway and IDOT. As part of the Elgin O'Hare West Bypass (EO-WB) Project, the Illinois Tollway intends to construct and operate the following access-controlled toll facilities: widening and converting the existing Elgin O'Hare Expressway to a toll facility, constructing the easterly extension of the Elgin O'Hare Expressway, and constructing a new West Bypass connecting I-294 (toll road) south of O'Hare Airport with I-90 (toll road) north and west of O'Hare Airport (see Figure 1-2). The long-planned eastern extension of the Elgin O'Hare Expressway from its current terminus at IL 53 will connect with the new West Bypass, and eventually to the proposed Western Terminal at O'Hare Airport. With the improvements along the Elgin O'Hare

corridor, the entirety of the facility from its current terminus at US 20 to the western edge of O'Hare Airport will be owned and operated as a tolled facility by the Illinois Tollway.

The Access Justification Report (AJR) study area includes the I-290 and Elgin O'Hare Expressway/Thorndale Avenue interchange and surrounding local access interchange connections (see Figure 1-2). Just west of I-290 will be local access interchanges at Meacham Road/Medinah Road (full) and IL 53 (partial). To the east will be local access interchanges at Park Boulevard (partial), Arlington Heights Road (partial), and Prospect Avenue (full). The interchanges will be constructed concurrently with reconstruction of the I-290 interchange.

FIGURE 1-2
AJR Study Area



1.2 Scope of Access Modification Study and Request

Through consultation with the FHWA Division Office in Springfield, IDOT, and the Illinois Tollway, it was agreed that FHWA access approval would be limited to the system interchange at the Elgin O'Hare corridor and I-290, which is under the jurisdiction of IDOT and FHWA. Aside from the system interchange, all other proposed system and local access interchanges (outside of the AJR study area) associated with the overall EO-WB Project are under the jurisdiction of the Illinois Tollway and are not subject to FHWA access review and approval.

This report documents technical analyses associated only with the I-290 interchange and other adjacent roadways and interchanges necessary to fulfill FHWA's access approval requirements. This report is intended to address FHWA's eight policy requirements for

access to the interstate system. The IDOT Bureau of Design and Environment (BDE) Manual requires review and consideration of additional items, included herein, in support of a proposed interstate access change.

The cost of the Tier Two Preferred Alternative is estimated at between $5.8 billion to $6.2 billion (estimated year of expenditure costs). The Illinois Tollway plans to implement the project in phases. The first phase consists of construction of the Initial Construction Plan (ICP), with an estimated cost of $3.46 billion (estimated year of expenditure costs). The ICP represents a scaled-down version of the overall project. Construction of the ICP is planned to begin in 2013 and extend through 2025. Remaining improvements would be considered for construction with future project phase(s), with implementation anticipated post-2035. The ICP was determined by FHWA to represent an operationally independent project, as detailed in the *Initial Construction Plan Operational Independence Memorandum* (June 2012). As part of the initial phase, the Elgin O'Hare corridor in the vicinity of I-290 will be constructed as follows: a toll road with three basic lanes in each direction (plus auxiliary lanes and frontage roads); local access interchanges at Meacham Road/Medinah Road, IL 53, Park Boulevard, and Arlington Heights Road/Prospect Avenue; and the full system interchange at I-290. The I-290 full system interchange will be constructed in phases. All proposed access modifications along I-290 will be constructed as part of the ICP, with the initial construction providing full build conditions along some ramps and mainline sections of I-290. Future phase improvements near the system interchange will consist of additional mainline and capacity improvements only. Additional interchange improvements from Park Boulevard to EB I-290 and WB Elgin O'Hare will be provided in future phases.

At the request of FHWA, this report includes design and operational analyses associated with both the ICP and future phase improvements at the I-290 interchange. See Section 2.5 for more details regarding both improvement plans.

1.3 Access Modification Study Area

FHWA requires that operation and design analyses to support access approval include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 *Code of Federal Regulations* [CFR] 625.2[a], 655.603[d] and 771.111[f]). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, are also to be included in the analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2[a] and 655.603[d]). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute, and accommodate traffic on the interstate facility, ramps, intersection of ramps with crossroads, and local street network (23 CFR 625.2[a] and 655.603[d]). As such, the AJR study area, as depicted in Figure 1-2 in Section 1.1, includes the proposed Elgin O'Hare corridor from the proposed Meacham Road/Medinah Road interchange from approximately 1.3 miles west of the I-290 system interchange to the proposed Prospect Avenue interchange approximately 1.2 miles to the east. Also included in the study area is I-290 between I-355 approximately 1.6 miles to the south of I-290 and Biesterfield Road approximately 1.25 miles to the north.

SECTION 2

Project Background

Section 2 provides background information on the complete EO-WB Project to enable understanding of the scope and technical inputs to the proposed I-290 interchange reconstruction.

2.1 Existing Transportation Network

The existing transportation network along the Elgin O'Hare and Thorndale Avenue corridor consists of a local access interchange at the Elgin O'Hare Expressway and Meacham Road/Medinah Road, and signalized intersections along Thorndale Avenue at IL 53 at the EB I-290 exit ramps, the WB I-290 exit ramps, Park Boulevard, Arlington Heights Road, and Prospect Avenue. Along I-290, a service interchange exists at I-290 and Biesterfield Road (approximately 1.25 miles to the north) and at I-290 and I-355 (approximately 1.6 miles to the south). Other existing roadway characteristics are summarized as follows:

- **Elgin O'Hare Expressway—** The mainline freeway section from US 20 to IL 53 consists of two basic lanes in each direction with an open median. The posted speed limit is 55 miles per hour (mph).
- **Thorndale Avenue—** Thorndale Avenue is classified as an Other Principal Arterial. The posted speed limit is 40 mph. The Elgin O'Hare Expressway terminates between Meacham/Medinah Road and a signalized intersection with IL 53 and transitions into Thorndale Avenue. Thorndale Avenue has two lanes in each direction with a flush median and exclusive turn lanes at intersections, except through the I-290 interchange where three lanes are provided.
- **I-290 Interchange—** The local access (service) interchange between Thorndale Avenue and I-290 is a partial cloverleaf "A" with loops in the northwest and southeast quadrants. Directional ramp connections are provided in the northeast and southwest quadrants from Thorndale Avenue to WB and EB I-290. Thus, all existing movements from Thorndale Avenue to I-290 are free flowing, with varied design speeds. The existing movements from I-290 to Thorndale Avenue end at intersections with traffic signal control (except for EB I-290 to WB Thorndale Avenue, which acts as a free-flow right-turn/directional ramp). Thorndale Avenue crosses over I-290 and has three lanes in each direction with a median barrier through the interchange. I-290 has four lanes in each direction and segments of an auxiliary lane (see existing corridor information on Exhibit 3-2) with a continuous concrete median barrier. The posted speed limit is 55 mph on I-290 and 40 mph on Thorndale Avenue.
- **Meacham Road/Medinah Road—** Meacham Road/Medinah Road is classified as a Minor Arterial (Urban). The posted speed limit is 40 mph. The local access (service) interchange between Meacham Road/Medinah Road and the Elgin O'Hare Expressway is a conventional diamond, which includes a WB to EB "Texas" turnaround. There are

two lanes in each direction on Meacham Road/Medinah Road with a flush median and turn-lane channelization provided through the interchange.

- **Rohlwing Road (IL 53)—** This section of IL 53 is classified as a Minor Arterial (Urban). The posted speed limit is 40 mph. There are two lanes in each direction with a raised median through the intersection with Thorndale Avenue. Left turns from Thorndale Avenue to IL 53 are prohibited. The WB Thorndale to southbound (SB) IL 53 left turns can use the Texas turnaround at the Meacham Road intersection to complete their movements, which minimizes impacts on existing traffic. The cross-section of the south leg of IL 53 is currently being expanded south to Army Trail Road as part of an IDOT project that will be completed in 2013.
- **Park Boulevard—** Park Boulevard is classified as an Other Local Street. South of the intersection with Thorndale Avenue, Park Boulevard is a two-lane facility with a posted speed limit of 25 mph. North of Thorndale Avenue, Park Boulevard is a four-lane facility with a barrier median at the intersection and a posted speed limit of 35 mph.
- **Arlington Heights Road—** This section of Arlington Heights Road is classified as a Collector. At the intersection with Thorndale Avenue, Arlington Heights Road is a two-lane facility with a posted speed limit of 45 mph north of Thorndale Avenue and 35 mph south of Thorndale Avenue. Thorndale Avenue is a four-lane roadway with a painted median at the intersection with Arlington Heights Road.
- **Prospect Avenue—** This section of Prospect Avenue is classified as a Minor Arterial (Urban). The posted speed limit is 40 mph south of Thorndale Avenue and 35 mph north of Thorndale Avenue. Prospect Avenue is a four-lane facility. Thorndale Avenue is a four-lane facility with a painted median at the intersection with Prospect Avenue.

2.2 Existing Regional and Local Travel

Congestion has overwhelmed the existing roadway system in the study area (see Exhibit 2-1). In 2010, 86 percent of freeways and 88 percent of primary arterials operated at level of service (LOS) D, E, or F, which are generally defined as moderate, severe, and extreme congestion, respectively. Currently, the Elgin O'Hare Expressway, Thorndale Avenue, and I-290 all experience severe to extreme congestion. By 2040, congestion will worsen with an increase in travel by over 9 percent in the p.m. peak period, with LOS F becoming typical for most freeways and arterials (see Exhibit 2-2). Extreme congestion on the Elgin O'Hare Expressway, Thorndale Avenue, and I-290 will force traffic to use local collectors and minor arterials, causing severe congestion on those facilities, as well. By 2040, 91 percent of the minor arterials and 78 percent of collectors in the study area are anticipated to be congested during the p.m. peak travel period under the No-Build Alternative.

2.3 Access to O'Hare Airport from the West

The O'Hare Airport is the second-busiest airport in the world. The airport has only one major access road, which is oriented toward downtown Chicago, or east on I-190. Discussions have been ongoing for many years with the City of Chicago Department of Aviation about how improved access to O'Hare Airport would reduce the roadway operational problems that occur with primary access only on I-190.

In 2001, the City of Chicago announced a modernization plan for O'Hare Airport (the O'Hare Modernization Program [OMP]), and began preparation of an environmental impact statement (EIS). In 2005, the Federal Aviation Administration (FAA) published the *O'Hare Modernization Final Environmental Impact Statement* and issued the *O'Hare Modernization Record of Decision* for the OMP (FAA, 2005). The approved plan includes a western terminal and a western airport entrance near the current intersection of Thorndale Avenue and York Road. Construction on the OMP began in 2005, and by 2015, three new runways, an extension of one runway, and numerous enabling projects will have been completed. In 2010, an agreement was made with airline partners and the City of Chicago stating that the construction of the proposed Western Terminal complex would occur when air travel demand demonstrates the need. The conduct of the EO-WB Project was guided by the Chicago Metropolitan Agency for Planning's (CMAP's) *GO TO 2040 Comprehensive Regional Plan* determination that air traffic demand would result in the need for and construction of the proposed Western Terminal by 2040. The addition would clearly produce significant shifts and increases in vehicular traffic demands for the communities and region west of O'Hare Airport.

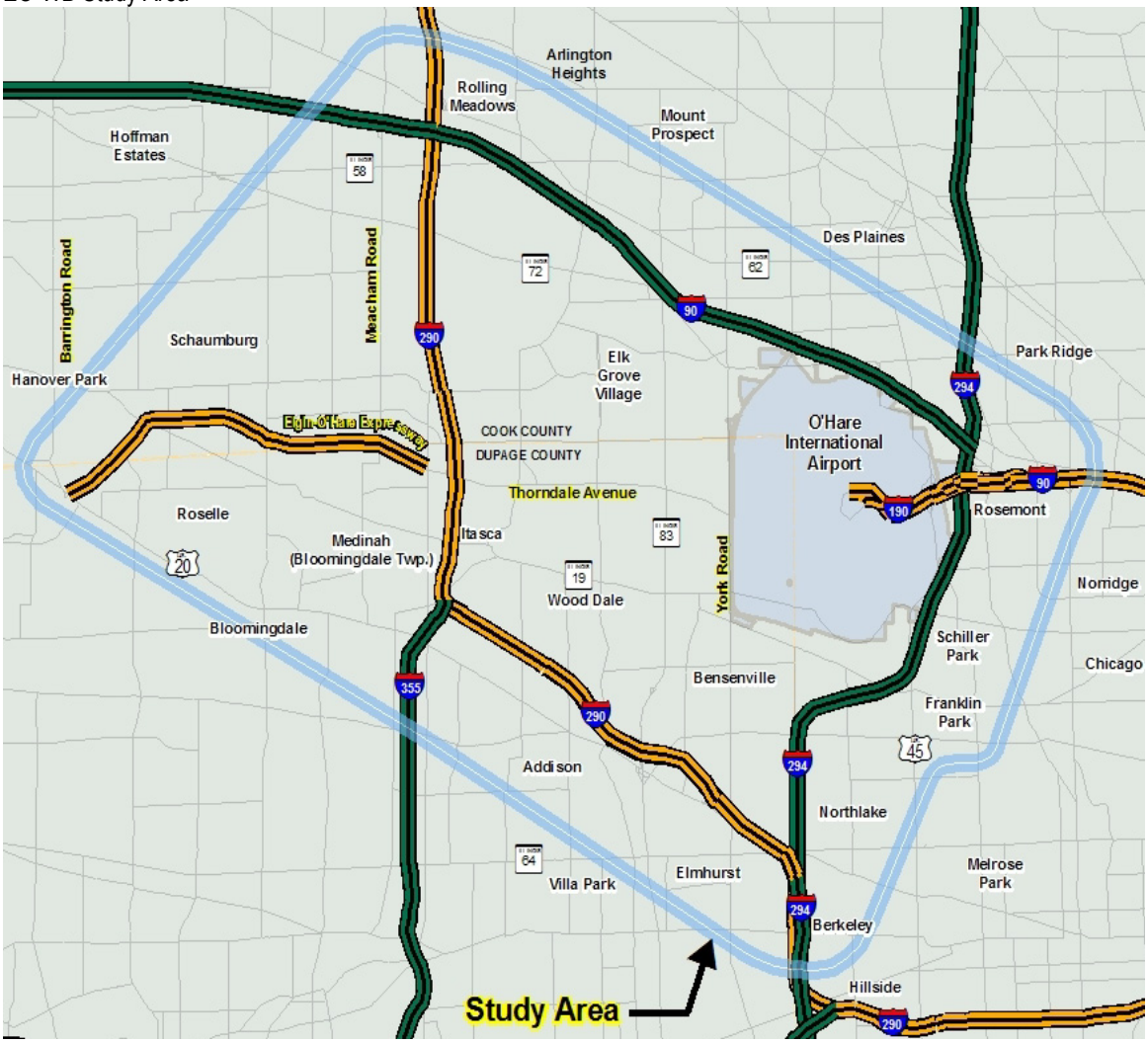
2.4 EO-WB Purpose and Need

In 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) identified the EO-WB Project as one of national and regional significance, resulting in a planning process that has advanced in two parts, or tiers. Tier One focused on a comprehensive approach to identifying a preferred transportation system alternative for the study area. It was completed in June 2010 with the issuance of the *Tier One Final Environmental Impact Statement* and *Elgin O'Hare–West Bypass Project Tier One Record of Decision* (FHWA and IDOT, 2010). Tier Two studies focus on traditional Phase I engineering and environmental studies, including further defining elements of the Tier One Preferred Alternative (full build) and developing a financially feasible implementation plan.

The EO-WB study area is bounded roughly by I-90 on the north, I-294 on the east, I-290 on the south, and the Elgin O'Hare Expressway on the west (see Figure 2-1). The area is characterized as a transportation crossroads that includes O'Hare Airport, a network of freeways and toll roads, transit facilities (including Metra rail lines and Pace bus service), freight rail service, and multimodal transfer facilities. It also contains the second-largest employment base in the Chicago metropolitan area. The major components of the large study area were considered comprehensively in the development of the project Purpose and Need.

The EO-WB Purpose and Need was established in Tier One and refined in Tier Two of the process. The Tier Two Purpose and Need was updated by extending the planning period from 2030 to the year 2040 to be consistent with CMAP's Regional Transportation Plan for 2040, *GO TO 2040 Comprehensive Regional Plan* (adopted in October 2010 and developed by the Metropolitan Planning Organization [MPO] for the area, CMAP). The update included development of the 2040 No-Build Alternative travel forecasts, an analysis of system travel performance using the 2040 No-Build forecasts, and a revision to the scope of the improvements in the No-Build Alternative to be representative of typical agency program investment levels.

FIGURE 2-1
EO-WB Study Area



Based on the updated analysis, the Tier Two Purpose and Need preserves the purpose and need statements presented in Tier One, and is defined as follows:

- Improve regional and local travel by reducing congestion
- Improve travel efficiency
- Improve access to O'Hare Airport from the west
- Improve modal opportunities and connections

2.5 Improvement Features

Implementation of the EO-WB requires a substantial financial investment, and as such will be constructed in phases. The Tier Two Environmental Impact Statement defines a "full build-out condition" for the Tier Two Preferred Alternative that accommodates area travel demand through the current regional long-range planning period (year 2040). An ICP is a

scaled-down version of the Tier Two Preferred Alternative (full build-out condition) that provides fewer travel lanes, fewer interchanges, and, in some cases, interim layouts for new interchanges. All proposed access modifications along I-290 will be constructed as part of the ICP, with remaining future phase improvements near the system interchange consisting of mainline and capacity improvements only.

The Tier Two Preferred Alternative and the ICP are described and compared in the following subsections.

2.5.1 Tier Two Preferred Alternative (Full Build-Out Condition)

The EO-WB Project is planned as a toll road with approximately 25 miles of mainline improvements, including 11 miles of new mainline construction, about 14 miles of improvements to existing access-controlled roads (adjacent interstates and the existing Elgin O'Hare Expressway), and about 16 miles of supporting arterial improvements (see Exhibit 2-3). Improvements along the Elgin O'Hare corridor extend from Gary Avenue on the west to the western edge of the O'Hare Airport as a tolled facility and would have three basic lanes in each direction with added auxiliary lanes. The West Bypass corridor would be a tolled facility with two basic lanes in each direction with added auxiliary lanes, extending from I-90 near the Elmhurst Road interchange on the north to I-294 on the south. Required arterial improvements in the immediate vicinity of the mainline typically include added travel lanes, turning lanes, and traffic signal modernization. In addition, along the Elgin O'Hare corridor, there would be 7 miles of new frontage roads configured mostly as two-lane, one-way roads.

Accompanying the mainline improvements are interchange improvements, drainage considerations, and multimodal accommodations. Also, new bridges are required in numerous locations to accommodate stream crossings, railroad crossings, and crossing roadways. There are interchange improvements at 4 system interchanges and 17 local access/service interchanges (Exhibit 2-3). Stormwater detention facilities, compensatory floodplain storage, and other best management practices are to be constructed to compensate for the increased impervious surface and floodplain fill. The plan includes transit and bicycle/pedestrian multimodal accommodations (to be implemented by others), including provisions for transit in the median of the Elgin O'Hare corridor and space preservation for bike/pedestrian facilities adjacent or crossing the planned roadway improvements.

2.5.2 Initial Construction Plan

The Illinois Tollway Board of Directors recently approved a new capital improvement program *Move Illinois: The Illinois Tollway Driving the Future* (Illinois Tollway, 2011). The program includes the EO-WB Project, for which the Illinois Tollway will be the principal implementing agency. The Illinois Tollway intends to implement a phased construction program that reflects logical segments and sequences and is affordable given the Illinois Tollway's available resources. For the EO-WB, an ICP was developed with the goal of being more financially attainable for the first phase of the project while also maintaining the integrity of the full project. Exhibit 2-4 shows the improvements included in the ICP, as compared to those Tier Two Preferred Alternative improvements that will be deferred to future phase(s).

The ICP was developed to accommodate traffic for an interim 2030 design year and to fully adhere to the requirements for an operationally independent project with logical termini. The ICP was determined by FHWA to represent an operationally independent project, as detailed in the *Initial Construction Plan Operational Independence Memorandum* (June 2012). The ICP represents a fiscally responsible approach to addressing the area's diverse travel needs. Both the Tier Two Preferred Alternative "full-build" plan and the ICP are presented and discussed in this report.

2.5.3 I-290 Interchange Improvement Schedule

The conceptual sequence of construction for the Elgin O'Hare at I-290 interchange improvements along with a plan for maintaining traffic flow on mainline, ramp, and arterial/local roadway segments has been identified (see Exhibit 2-5). Staging studies were conducted to develop a construction sequence that will function properly, considering existing traffic movements, and to identify a chronological order for critical construction elements that maintains access where practical. The conceptual construction staging sequence specific to I-290 traffic movements is as follows:

- **Stage 1:**
  - Construction of parts of the ramps from WB I-290 to EB Elgin O'Hare and Park Boulevard West
- **Stage 2:**
  - Construction of the WB I-290 to WB Elgin O'Hare flyover ramp
  - Construction of ramps in the northwestern quadrant of the I-290/Elgin O'Hare interchange and ramps west of IL 53
  - Construction of WB Elgin O'Hare from I-290 to west of IL 53
- **Stage 3:**
  - Construction of parts of the ramps in the southeastern quadrant of the I-290/Elgin O'Hare interchange
  - Construction of the loop ramp from EB Elgin O'Hare to WB I-290
- **Stage 4:**
  - Construction of the EB I-290 to EB Elgin O'Hare flyover ramp
  - Completion of construction of the WB Elgin O'Hare to EB I-290 loop ramp
  - Construction of the WB Elgin O'Hare to WB I-290 ramp and of a section of WB Elgin O'Hare
- **Stage 5:**
  - Construction of remaining ramp sections at the I-290 interchange
  - Construction of EB Elgin O'Hare

SECTION 3

FHWA Eight-Point Access Approval Process

The AJR addresses the 20 conditions required by Chapter 37 of the BDE Manual (see *37-1.03(e) Access Justification Report Contents*). The remainder of this report is organized around FHWA's Eight-Point Process for approval of interstate access modifications.

3.1 Policy Point 1—Need for Access or Access Modification

FHWA Policy Point 1 states the following:

> *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2[a]).*

The existing interchange at I-290 and Thorndale Avenue is a service interchange. The configuration and operations reflect existing conditions (that is, the termination of the Elgin O'Hare Expressway west of IL 53 and continuation of Thorndale Avenue as an arterial to the east). Construction of the entire EO-WB Project necessitates converting the service interchange to a system interchange. The latter requires special design requirements, including the provision for free-flow ramp movements and application of more-rigorous design criteria.

The current interchange was constructed in the early 1970s. The EO-WB Project is planned to accommodate travel demand through 2040. With the proposed extension of the Elgin O'Hare Expressway through the existing service interchange area and associated changes in traffic demand, complete reconstruction of the I-290 interchange is necessary.

Policy Point 1 primarily relates to requests for new ramps/interchanges along freeways. The policy reflects FHWA's objectives of maintaining the operational integrity of the interstate system and minimizing the addition of new ramps to interstates unless they are absolutely necessary. In the case here, there is no change in the number of ramps entering and exiting I-290. The existing interchange of I-290 and Thorndale Avenue is a Parclo-A with single exits and two entrance ramps serving all directions of traffic. In replacing the service interchange with a system interchange, the location, function, and traffic demand expected on both entrances and exits have changed, but the number of ramps has not. There are single exits for both WB and EB traffic off I-290 and separate entrances for the loop and directional ramps. No additions to service interchanging are proposed or being requested on I-290 in the study area.

3.2 Policy Point 2—Transportation System Alternatives to Access Modification

FHWA Policy Point 2 states the following:

> *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV [high-occupancy vehicle] facilities), geometric design, and alternate improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2[a]).*

The purpose of Policy Point 2 is to address FHWA concerns that reasonable less-costly and less-impacting alternatives to new access points have been studied and implemented appropriately, rather than relying solely on construction of new interchanges or access points. As noted previously, the fundamental purpose of the requested change relates to design needs associated with conversion of the service interchange to a system interchange.

A comprehensive evaluation of transportation conditions and problems in the overall project study area was performed as part of Tier One studies. This evaluation served as the basis for development of the project Purpose and Need (see Section 2.4). Findings of the evaluation are presented in the *Final Transportation System Performance Report* (July 2009) and include the following:

- Roadways in the study area experience severe congestion on peak periods, imposing significant delays and impairing mobility.
- Lack of access to and from the interstate roadway system impairs mobility to destinations inside and outside the study area.
- Reduced travel efficiency on the roadway system is affected by several factors, including out-of-direction travel caused by partial interchanges along the interstate system, at-grade railroad crossings, and the lack of options for major travel movements.
- Inadequate transit infrastructure and connectivity impairs the opportunity to increase transit mode share and thus to reduce congestion on roadways.

In the case of the I-290 interchange and EO-WB Project, both transportation system management (TSM) solutions and accommodation of transit are integral elements of the overall plan, and as such have positively influenced the vehicular demands at the I-290 interchange. However, TSM improvements alone cannot incorporate the existing or future traffic demand along the EO-WB corridor. Public transit ridership in the study area is presently about 4 percent, which is typical of the suburbs in large metropolitan areas. Although the design of the proposed improvements reflects accommodation of long-range transit improvements to be implemented by others, by the year 2040, the projected transit ridership will increase to only 4.5 percent of all trips in the study area, even with the completion of several new proposed transit projects.[2] Transit ridership is not projected to change substantially from 2010 to 2040. However, given the magnitude of congestion on the roadway system, the need remains to improve the number and percentage of trips made by transit.

[2] Percentages derived from Elgin O'Hare – West Bypass Travel Demand Model with input data from CMAP.

The *Tier One Final Environmental Impact Statement* (FHWA and IDOT, 2010) established the need to provide for high-capacity, reliable transit service within the Elgin O'Hare corridor. Such service could include bus rapid transit (BRT) service, with stations along the corridor, or express bus/high-occupancy tolled (HOT) service. Travel demand forecasts used to size and design all elements of the EO-WB Project, including the I-290 interchange, assumed some meaningful level of transit service in the corridor for the year 2040. During Tier Two studies, engineering details have been developed to incorporate transportation system management and multimodal features along the Elgin O'Hare and West Bypass corridors.

3.2.1 Transit Facilities

In Tier Two, transit analyses focused on feasible service routes that would be collocated in the Elgin O'Hare and West Bypass corridors. The centerpiece of the transit plan identified in Tier One was a new east-west dedicated transit corridor collocated in the Elgin O'Hare corridor right-of-way. The transit reservation was sized to accommodate either BRT or rail transit. In addition to the added right-of-way, roadway features such as bridges would be sized to accommodate the future development of transit.

As shown in Exhibit 3-1, the ultimate cross-section for the Elgin O'Hare corridor provides a 100-foot median through the I-290 interchange area. The dimension is sufficient to allow construction of rail transit facilities (requiring the greatest width of any transit alternative) with a station located in the vicinity of Park Boulevard, just east of I-290. Pier locations and designs for the flyover bridges in the interchange will accommodate potential transit service. Should the ultimate solution in the median be BRT, HOVs, or both, the 100-foot dimension will be more than adequate. The development of the transit service would be the responsibility of others.

3.2.2 Bicycle and Pedestrian Facilities

Bicycle and pedestrian elements are located in the project corridor consistent with IDOT's Complete Street Policy, and input from numerous stakeholders including communities, bicycle associations, DuPage County, etc. Bicycle and pedestrian improvements focus on filling gaps in bicycle trail and pedestrian paths to provide better nonmotorized connections to transit stations, park-and-ride facilities, community activity centers, existing trail systems, and employment areas. Nearly 18 miles of planned bicycle and pedestrian facilities have been accommodated within the project corridor or as logical linkages between planned facilities in the project corridor. Space has also been reserved in the project corridor for over 3.5 miles of planned sidewalks.

The main feature of the Tier Two Preferred Alternative bicycle and pedestrian facilities is a bicycle and pedestrian side path along the Elgin O'Hare frontage road system, extending easterly from Hanover Park to the western edge of O'Hare Airport. North-south connectivity would be developed along York Road and Elmhurst Road. Whereas the overall improvement plan includes bicycle and pedestrian facilities, their implementation is subject to agreement to cost, maintenance, and jurisdictional responsibilities for the facilities. The proposed improvements will accommodate space for bicycle and pedestrian facilities crossing the Elgin O'Hare and West Bypass corridors. Existing trails crossing the proposed improvements will be reinstated in at least as good of condition as they were prior to

construction. It should be noted that no bicycle and pedestrian accommodations are planned for the I-290 corridor itself.

3.2.3 Congestion Management Strategies

The proposed project would include strategies designed to add efficiencies to travel and reduce single-occupancy vehicles. The strategies that aid travel efficiency can be added to the system without causing the need for additional right-of-way. Two types of strategies are proposed—TSM and travel demand management (TDM) strategies. The TSM strategies are aimed at improving the operating efficiency of the system and include variable message signage, traffic incident management, signal pre-emption for emergency vehicle or buses, interconnected traffic signals on arterial streets, etc. The TDM strategies are aimed at changing driver behavior to reduce traffic and congestion and to improve air quality. The strategies include toll pricing strategies, HOV lanes, more transit opportunities, better connectivity to all transit modes, and parking facilities that serve transit users as well as carpools and vanpools.

The timeframe for implementing TSM and TDM would vary; some strategies may be more appropriate in the short term because they are proven, whereas others may be deferred to the future given that they are still developing as proven practices. The Illinois Tollway and IDOT currently use many of the TSM technologies, including variable message signs, automated license plate recognition, photo enforcement, ramp metering, signal preemption, etc. The techniques for TDM are less widespread by IDOT and the Illinois Tollway, but discussions have commenced on several practices including congestion pricing and managed lanes. At this time, the approach to implementing TDM and TSM practices is conceptual, but further details will be advanced.

3.3 Policy Point 3—Operational and Safety Acceptability

FHWA Policy Point 3 states the following:

> *An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroads) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2[a], 655.603[d], and 771.111[f]). The crossroads and other roads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2[a] and 655.603[d]). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersections of ramps with crossroads, and local street network (23 CFR 625.2[a] and 655.603[d]). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109[d] and 23 CFR 655.603[d]).*

3.3.1 Traffic Operations

Traffic operational analyses were performed for the following conditions:

- The existing facility with existing (year 2010) traffic conditions
- The ICP with projected (interim design year 2030 build) traffic conditions
- The Tier Two No-Build Alternative with projected (year 2040 no-build) traffic conditions
- The Tier Two Preferred Alternative with projected (year 2040 build) traffic conditions

Travel demand forecasts for the project were generated through a robust travel demand model. The travel forecasting process for the 2030 ICP design year used the travel demand modeling procedures employed in the development of the EO-WB travel demand model. The system-wide model follows the 2040 planning period to be consistent with CMAP's *GO TO 2040 Comprehensive Regional Plan* (CMAP, 2010) and associated long-range planning and forecasting processes. Alternative-specific socioeconomic forecasts of land use, population, and employment implications within the project study were developed for both the Tier Two Preferred Alternative and the No-Build Alternative. The socioeconomic forecasts were used as input to the travel demand modeling process to generate the design year vehicle trip tables and traffic forecasts. All socioeconomic forecasting and travel demand modeling procedures were developed in consultation and subsequently endorsed by CMAP. The 2040 No-Build travel demand model run was performed by CMAP and the generated data was assigned to the No-Build scenario to generate the traffic forecasts to develop system-wide travel performance and evaluations. Similar to the 2040 No-Build network development, a 2040 Tier Two Preferred Alternative travel demand network was developed based on the design features of the Tier Two Preferred Alternative. System-wide travel performance and evaluation measures were generated to evaluate Tier Two Preferred Alternative performance. The 2030 forecasts were generated on the basis of both the 2010 existing year and the 2040 Tier Two Preferred Alternative design year forecasts.

LOS D was established as the travel performance goal, with LOS E acceptable on a case-by-case basis. See Section 3.4.1, "Sizing and Planning Criteria," for details. Design year traffic forecasts—year 2030 for the ICP and year 2040 for the Tier Two Preferred Alternative—were used in combination with the selected performance criteria to size all elements of the project, such as numbers of lanes for mainline, ramps, and intersections and interchange configurations, as well as traffic control at intersections. In conjunction with development of design alternatives, operational analyses were performed to confirm the intended operational quality and refine ramp and lane arrangements as needed.

The traffic operations review was completed in accordance with the 2010 *Highway Capacity Manual* (HCM) procedures and is summarized in the following subsections for each condition. The analysis includes assessment of the freeway mainline (I-290 and Elgin O'Hare corridor), ramp junctions and weaving sections for existing, 2030 ICP, 2040 No-Build, and 2040 Tier Two Preferred Alternative conditions. Additionally, intersection operations at ramp terminal intersections and other adjacent facilities have been assessed. While the Elgin O'Hare corridor will be a tolled facility, it will operate comparably to a freeway facility because tolling will be through an All Electronic Tolling system. All Electronic Tolling technology will allow for vehicles to be tolled at prevailing highway or ramp speeds, eliminating the decision making, weaving, acceleration, and deceleration commonly found at conventional toll plazas.

Traffic operational analysis findings for the existing and the 2030 ICP condition, 2040 No-Build, and 2040 Tier Two Preferred Alternative are presented in the following section. The analyses were performed using a combination of Highway Capacity Software (HCS) and VISSIM microsimulation software. Traffic operations for both the 2030 ICP and 2040 Tier Two Preferred Alternative were found to be acceptable (LOS D or better for mainline segments along I-290) for both facilities (I-290 and Elgin O'Hare corridor) within the system interchange. Peak hour traffic volumes, lane configurations and resultant performance measures including volume-to-capacity ratios, average speed, and LOS conditions are provided with the operational analysis summaries. Detailed operational reports are provided in Appendix A.

For I-290, it should be noted that the remainder of this section describes operational analysis findings in relation to the cardinal east-west interstate route orientation. The portion of I-290 within this study area has a north (westbound)/south (eastbound) layout corresponding with the cardinal route orientation.

3.3.1.1 HCS Analysis

2010 Existing Condition Traffic Operations. Exhibits 3-2A and 3-2B are schematic corridor diagrams showing the existing number of basic and auxiliary lanes together with lane arrangement at interchanges for the 2010 condition. Traffic data reflects current peak hour volumes and resultant LOS conditions for roadways and ramps. Interchanging traffic volumes at the I-290 and Thorndale Avenue interchange are illustrated in Exhibit 3-3.

Field observations identified the following existing traffic problems at the interchange of I-290 at Thorndale Avenue:

- SB I-355 congestion builds progressively north toward the interchange during the peak hours affecting the weaving operations just south of the I-290 at Thorndale Avenue interchange (p.m. peak period).
- WB I-290 exit ramp traffic backs to the auxiliary mainline lane during both a.m. and p.m. peak hours. The ramp detection clears the ramp traffic in one to two cycle lengths, preventing backups on the mainline. However, the longer green time induced by the detection for the WB exit ramp traffic causes queues along WB Thorndale Avenue that reach Arlington Heights Road or farther during the p.m. peak hour.
- During the a.m. peak period, the EB Thorndale Avenue to WB I-290 on-ramp (loop ramp) traffic backs up and reaches the adjacent intersection of Thorndale Avenue and Rohlwing Road (IL 53).
- The existing interchange operates at unacceptable conditions. Traffic along EB I-290 experiences failing operations and capacity issues from the WB Thorndale Ave entrance ramp to the I-355 mainline plaza at Army Trail Road. The traffic flow is forced, with frequent slowing required, and travel times cannot be predicted. The facility has more traffic demand than capacity. WB I-290 and the EB Thorndale Avenue to WB I-290 on-ramp (loop ramp) experience congestion.

2040 No-Build Alternative Traffic Operations. Exhibits 3-4A and 3-4B are schematic corridor diagrams showing the existing number of basic and auxiliary lanes together with lane

arrangement at interchanges for the 2040 No-Build condition. Traffic data shown in the exhibits reflects forecast peak hour volumes and resultant LOS conditions for roadways and ramps. Interchanging traffic volumes at the I-290 and Thorndale Avenue interchange are illustrated in Exhibit 3-5.

Traffic operational problems at the I-290 interchange would continue to worsen with the No-Build Alternative. Traffic along EB I-290 and most ramps would experience failing operations and capacity issues. The facility would have more traffic demand than capacity. Detailed traffic operations are discussed in Section 3.3.1.2.

2040 Tier Two Preferred Alternative Corridor Sizing and LOS. Year 2040 traffic was used as the basis of design for the project. FHWA, IDOT, and Illinois Tollway chose LOS D for weekday peak period traffic as the basis for sizing of mainline and ramps. Exhibits 3-6A and 3-6B are schematic corridor sizing diagrams showing the number of basic and auxiliary lanes together with lane arrangement at interchanges for the 2040 Tier Two Preferred Alternative. They present forecasts of 2040 design hour traffic and LOS in accordance with HCM procedures for roadways and ramps. It is noted that some 2040 design hour volumes (DHVs) are less than existing DHVs along I-290. This is reasonable, however, because the 2040 network includes major new highway facilities (Elgin O'Hare Extension and West Bypass), which would be expected to divert traffic from existing routes such as I-290.

Interchanging 2040 traffic volumes with the Tier Two Preferred Alternative for the I-290 and Elgin O'Hare corridor system interchange are illustrated in Exhibit 3-7. A comparison of projected 2040 No-Build Alternative versus 2040 Tier Two Preferred Alternative DHVs along I-290 is presented in Table 3-1.

Within the I-290/Elgin O'Hare system interchange the proposed Elgin O'Hare corridor would consist of three basic lanes in either direction, with a continuous auxiliary lane in each direction east and west of the I-290 system interchange to facilitate entering and exiting traffic. Both to the east and west of the I-290 system interchange, LOS D or better would be achieved (weaving analysis based on the 2000 HCM[4] and LOS from VISSIM consistent with 2010 HCM methodology) for all mainline segments, with the exception of the EB weaving section between the I-290 eastbound entrance ramp and Prospect Avenue exit ramp, which would perform at LOS E (A.M. peak). One ramp junction would operate at LOS E, which is considered acceptable due to the urban nature of the study area and the existing operational characteristics.

The section of WB I-290 in the study area would remain at four basic lanes from the I-290/I-355 split to Biesterfield Road. An auxiliary lane would be added between the I-290/I-355 split and the ramp to EB Elgin O'Hare corridor, and between the ramp from the WB Elgin O'Hare corridor to the Biesterfield Road exit. LOS D or better operations would prevail (weaving analysis based on the 2000 HCM[4] and LOS from VISSIM consistent with 2010 HCM methodology) for all WB mainline segments and ramps, with the exception of the ramp diverge to EB Elgin O'Hare Expressway, which would perform at LOS E (a.m.

[4] The weaving analysis conducted with the 2010 HCM does not represent field conditions and is therefore not calibrated. Existing conditions weaving analysis conducted with the HCM 2000 were better calibrated and consistent with the VISSIM simulation. Therefore, the combination of the 2000 HCM procedures and simulation were judged to be better than the 2010 HCM weaving methodology for I-290 and Elgin O'Hare.

peak). LOS E was considered acceptable due to the urban nature of the study area and the existing operational characteristics.

The section of EB I-290 in the study area would remain at four basic lanes from Biesterfield Road to the I-290/I-355 split. Two auxiliary lanes would be provided EB from Biesterfield Road to the Elgin O'Hare corridor, while a single auxiliary lane would be provided from WB Elgin O'Hare corridor/Park Boulevard to the I-290/I-355 split. LOS D or better conditions would result (weaving analysis based on the 2000 HCM) except for the ramp diverge to WB I-290, which would operate at LOS E (p.m. peak). Although LOS D was chosen as the desirable LOS for the determination of lane requirements, LOS E was considered acceptable in this case due to the urban nature of the study area and the existing operational characteristics.

All ramp terminal intersections in the study area would be expected to operate at LOS D or better in both a.m. and p.m. peak periods.

TABLE 3-1

I-290 DHV: 2040 No-Build and 2040 Tier Two Preferred Alternative

	Location	Segment Type	2040 No-Build		2040 Tier Two Preferred Alternative	
			AM	PM	AM	PM
Westbound I-290	South of I-290 WB Entrance	Mainline	5,120	3,900	5,770	4,990
	I-290 WB Entrance	Ramp	3,710	3,510	3,140	3,180
	I-290 WB Entrance to Elgin O'Hare Exit	Mainline	8,830	7,410	8,910	8,080
	Elgin O'Hare Exit	Ramp	2,200	1,980	3,640	3,080
	Elgin O'Hare Exit to Elgin O'Hare EB Entrance	Ramp	6,630	5,430	5,270	5,000
	Elgin O'Hare EB Entrance	Ramp	1180	760	1,400	960
	Elgin O'Hare EB Entrance to Elgin O'Hare WB Entrance	Mainline	7,810 7,610	6,190	6,670	5,960
	Elgin O'Hare WB Entrance	Ramp	680	990	1,400	1,500
	Elgin O'Hare WB Entrance to Biesterfield Road Exit	Mainline	8,490	7,180	8,070	7,460
	Biesterfield Road Exit	Ramp	840	680	980	1,040
	Biesterfield Road Exit to Biesterfield Rd Entrance	Mainline	7,650	6,500	7,090	6,420
	Biesterfield Road Entrance	Ramp	780	950	620	720
	At Biesterfield Road	Mainline	8,430	8,450	7,710	7,140
Eastbound I-290	At Biesterfield Road	Mainline	6,830	6,960	6,360	7,290
	Entrance from Biesterfield	Ramp	930	1,300	1,330	1,520
	Biesterfield Entrance to Elgin O'Hare Exit	Mainline	7,760	8,260	7,690	8,810
	Exit to Elgin O'Hare	Ramp	1,730	1,590	2,510	3,080
	Exit to Elgin O'Hare to Entrance from Elgin O'Hare WB	Mainline	6,030	6,670	5,180	5,730

TABLE 3-1

I-290 DHV: 2040 No-Build and 2040 Tier Two Preferred Alternative

Location	Segment Type	2040 No-Build		2040 Tier Two Preferred Alternative	
		AM	PM	AM	PM
Entrance from Elgin O'Hare WB	Ramp	580	1,100	1,420	1,750
Entrance from Elgin O'Hare WB to Entrance from Elgin O'Hare EB	Mainline	6,610	7,700	6,600	7,480
Entrance from Elgin O'Hare EB	Ramp	1,740	1,590	1,640	1,700
Entrance from Elgin O'Hare EB to Exit to I-290 EB	Mainline	8,350	9,360	8,240	9,180
Exit to I-290 EB	Ramp	3,670	3,190	3,500	2,980
South of Exit to I-290 EB	Mainline	4,610	6,170	4,740	6,200

Note:
The portion of I-290 within this study area has a north-south layout. However, operational analysis results are presented in relation to the cardinal east (southbound)/west (northbound) interstate route orientation.

2030 ICP Corridor Sizing and LOS. The ICP represents an operationally independent initial phase of the Tier Two Preferred Alternative. The ICP includes all design features contained in the Tier Two Preferred Alternative, with the exception of the following deferred elements (see Exhibit 2-4):

Conversion of the EB I-290 entrance from Biesterfield Road from one lane in the ICP to two lanes in the Tier Two Preferred Alternative

- Conversion of the single auxiliary lane for EB I-290 (between Biesterfield Road entrance ramp to Elgin O'Hare Expressway exit) in the ICP to two auxiliary lanes in the Tier Two Preferred Alternative
- Improvement of the two-lane exit to Elgin O'Hare Expressway in the ICP to a three-lane exit to Elgin O'Hare Expressway in the Tier Two Preferred Alternative
- Conversion of the WB Elgin O'Hare Expressway to EB I-290 one-lane loop ramp in the ICP to a two-lane loop ramp in the Tier Two Preferred Alternative
- An additional mainline or auxiliary lane in the Tier Two Preferred Alternative along the Elgin O'Hare Expressway
- Addition of Park Boulevard to WB Elgin O'Hare Expressway and EB I-290 ramps in the Tier Two Preferred Alternative
- Addition of WB Elgin O'Hare Expressway to Park Boulevard ramp connection in the Tier Two Preferred Alternative
- EB I-290 entrance from Elgin O'Hare Expressway WB is improved from one lane in existing to two lanes in the 2040 Tier Two Preferred Alternative

- EB I-290 between Elgin O'Hare Expressway WB to Elgin O'Hare Expressway EB is improved from four lanes existing to five lanes in the 2040 Tier Two Preferred Alternative

Exhibits 3-8A and 3-8B illustrate schematic corridor sizing diagrams representing the number of basic and auxiliary lanes together with lane arrangement at interchanges for the 2030 ICP. They present 2030 design hour traffic forecasts and projected HCS LOS for roadways and ramps. Interchanging traffic volumes at the I-290 and Elgin O'Hare 2030 ICP corridor system interchange are illustrated in Exhibit 3-9.

There would be a continuous auxiliary lane in each direction east and west of the I-290 system interchange. West of the I-290 system interchange, LOS D or better is achieved for both Elgin O' Hare Expressway mainline segments and ramps. East of I-290, LOS D or better prevails except for the EB exit to Prospect Avenue (a.m. peak), WB mainline between Prospect Avenue and Park Boulevard (a.m. peak), WB ramp diverge at Prospect Avenue (p.m. peak), WB entrance ramp from Arlington Heights Road (p.m. peak), and to WB I-290 (p.m. peak), which would operate at LOS E.

The section of WB I-290 in the study area would consist of four basic lanes from the I-290/I-355 split to Biesterfield Road. An auxiliary lane would be provided between the I-290/I-355 split and the ramps to the Elgin O'Hare corridor and Meacham Road/Medinah Road, and between the Elgin O'Hare corridor entrance ramp from EB and the Biesterfield Road exit ramp. LOS D or better operations prevail (weaving analysis based on the 2000 HCM) for all WB mainline segments and ramps.

The section of EB I-290 in the study area would be a four basic lane facility from Biesterfield Road to the I-290/I-355 split. An auxiliary lane would be provided EB from Biesterfield Road to the Elgin O'Hare corridor, Meacham Road/Medinah Road, and Park Boulevard exit and from the Elgin O'Hare corridor EB entrance to the I-290/I-355 split. LOS D or better conditions result (weaving analysis based on 2000 HCM) except for the merge from the eastbound Elgin O'Hare corridor and Meacham Road/Medinah Road (p.m. peak), which results in LOS E.

Table 3-2 shows the I-290 HCS LOS Analysis for the Existing 2010, 2030 ICP, 2040 No-Build, and 2040 Tier Two Preferred Alternatives.

TABLE 3-2
I-290 Mainline LOS Analysis: Existing 2010, 2040 No-Build, 2040 Tier Two Preferred Alternative* and 2030 ICP

	Segment	HCM 2010	Existing (2010)		2040 No-Build		2040 Tier Two Preferred Alternative		2030 ICP	
		Analysis Type	AM	PM	AM	PM	AM	PM	AM	PM
Westbound I-290	South of I-290 WB Entrance	Mainline	D	C	D	C	D	D	D	D
	I-290 WB Entrance	Merge	E	E	E	E	D	D	D	D
	I-290 WB Entrance to Elgin O'Hare Exit	Mainline	D	C	D	C	D	D	D	D
	Elgin O'Hare Exit	Diverge	D	C	D	D	E	D	D	D
	Elgin O'Hare Exit to Elgin O'Hare EB Entrance	Mainline	D	C	D	C	C	C	C	C
	Elgin O'Hare EB Entrance	Merge	D	B	D	B	C	C	C	C
	Elgin O'Hare WB Entrance	Merge	C	B	C	C	D	D	C	C
	Elgin O'Hare WB Entrance to Biesterfield Road Exit	Mainline	C	C	D	C	D	C	C	C
	Biesterfield Road Exit	Diverge	B	B	C	B	C	C	C	C
	Biesterfield Road Entrance	Merge	B	B	B	C	B	B	B	C
	At Biesterfield Road	Mainline	C	C	D	C	C	C	C	C
Eastbound I-290	At Biesterfield Road	Mainline	D	D	D	D	D	D	C	D
	Entrance from Biesterfield	Merge	B	C	C	D	B	B	C	D
	Biesterfield Entrance to Elgin O'Hare Exit	Mainline	C	D	C	D	C	C	C	D
	Exit to Elgin O'Hare	Diverge	D	D	E	D	C	D	D	D
	Exit to Elgin O'Hare to Entrance from Elgin O'Hare WB	Mainline	C	D	C	D	C	C	C	C
	Entrance from Elgin O'Hare WB	Merge	C	C	C	D	C	C	C	D
	Entrance from Elgin O'Hare WB to Entrance from Elgin O'Hare EB	Mainline	C	D	D	E	C	C	D	D
	Entrance from Elgin O'Hare EB	Merge	E	D	E	D	D	D	D	E
	Entrance from Elgin O'Hare EB to Exit to I-290 EB	Mainline	D	D	D	D	D	D	D	D
	Exit to I-290 EB	Diverge	E	D	E	E	D	E	D	D
	South of Exit to I-290 EB	Mainline	B	C	C	C	C	C	C	C

Notes:
*Weaving analysis was performed using VISSIM for 2040 Tier Two Preferred Alternative scenario and is not included in this comparison.
The LOS computed by HCS (macroscopic) does not take into account the impact of upstream and downstream traffic operations.
The microscopic VISSIM results shown in Table 3-3 and Table 3-4 show the traffic operations more accurately.
The portion of I-290 within this study area has a north-south layout. However, operational analysis results are presented in relation to the cardinal east (southbound)/west (northbound) interstate route orientation.

3.3.1.2 Microsimulation Analyses (VISSIM)

In addition to the HCS analysis, a network model of the Elgin O'Hare corridor from Meacham Road/Medinah Road to Prospect Avenue and I-290 from Biesterfield Road to Lake Street was developed using VISSIM software. VISSIM software was used due to the complexity of traffic operations at the system interchange of the Elgin O'Hare corridor and I-290. VISSIM is a microscopic traffic simulation tool better suited than the HCS for evaluating the buildup, dissipation, and duration of traffic congestion. The modeling was used to determine the average travel times, speeds and densities of vehicles travelling through the Elgin O'Hare corridor from Meacham Road/Medinah Road on the west to Prospect Avenue on the east, and I-290 from Biesterfield Road on the north to Lake Street on the south, including the cross streets of Meacham Road/Medinah Road, IL 53, the I-290 interchange, Park Boulevard, Arlington Heights Road, and Prospect Avenue.

The VISSIM microsimulation tool was used to evaluate and compare operational performance characteristics between the existing network (2010 traffic), the ICP (2030 traffic), the No-Build network (2040 traffic), and the Tier Two Preferred Alternative (2040 traffic). The following methodology was developed using the guidance of Chapter 7, "Interpreting HCM and Alternative Tool Results," from the 2010 HCM.

Ten simulation runs were performed using VISSIM for both the a.m. and p.m. peak hour periods along I-290 with year 2040 Tier Two Preferred Alternative volumes and geometry. Each simulation run consisted of five 15-minute periods in which the input traffic demands were increased in 5 percent increments from 95 to 105 percent and back down to 100 percent to account for the peak hour factor (PHF). The third period, consisting of 105 percent demands, was used for the analysis.

The exported simulation results included the volume, speed, and density per lane for individual links. This link data were then combined to form segments in accordance with the 2010 HCM methodology. These segments are Basic Freeway, Freeway Merge/Diverge, and Freeway Weaving. For this analysis, a Freeway Merge/Diverge influence area was defined as the ramp lane plus the two lanes nearest to the ramp for a distance of 1,500 feet after/before the merge/diverge. A Freeway Weaving influence area was defined as the lanes in which a weaving maneuver can be made with only one lane change for a distance of 500 feet before the merge until 500 feet after the diverge. Any other segment was defined as a Basic Freeway segment. The average density across the influence lanes was adjusted by dividing the density by a heavy vehicle factor of 0.962 to adjust the reported vehicle density from VISSIM to a HCM passenger car equivalent density. This density was then used to determine the LOS for each segment type using the LOS density criteria in *Chapters 11, 12, and 13 of the 2010 HCM*. The unadjusted average vehicle speed was also provided for this analysis.

The findings are as follows:

2010 Existing Condition Traffic Operations. The existing year VISSIM model is based on the 2010 traffic counts and traffic data collected from the Origin-Destination study performed to determine traffic patterns and vehicle destinations of vehicles entering EB I-290 from Thorndale Avenue. Table 3-3 summarizes system-wide VISSIM vehicle performance in the a.m. and p.m. peak hours. The average number of stops per vehicle in the network under

existing (2010) conditions is 1.6 and 1.7 during both the a.m. and p.m. peak hours, respectively. The average delay time per vehicle (seconds) is 84 seconds during the a.m. and p.m. peak hours. The average vehicle speed is 34 mph during the a.m. and p.m. peak hours. Table 3-4 lists VISSIM output results for system interchange traffic movement speeds and travel times in the a.m. and p.m. peak hours. Most ramps operate at speeds of less than 35 mph.

2040 No-Build Alternative. System-wide network performance of the 2040 No-Build Alternative scenario as determined by VISSIM is summarized in Table 3-3. The average number of stops per vehicle in the network is 3.3 and 2.0 during the a.m. and p.m. peak hours, respectively. The average delay time per vehicle (seconds) is 134 seconds and 108 seconds during the a.m. and p.m. peak hours, respectively. The average vehicle speed is 29 and 32 mph during the a.m. and p.m. peak hour, respectively. Table 3-4 presents VISSIM travel time and speed for each of the analyzed scenarios. The speeds in Table 3-4 represent average speeds for vehicles that travel along the measured routes and in multiple links. Along the multiple links, there are links with congestion and some links with higher speeds. In some instances, loop ramps that have a design speed of 25 mph are also included in the route. For the 2040 No-Build Alternative, the average vehicle speed in the I-290 EB direction is approximately 15 mph in the a.m. peak hour. In the 2040 No-Build Alternative, the I-290 interchange will operate at unacceptable conditions and will experience breakdown. Without any improvements to the corridor and associated interchanges as reflected under the 2040 No-Build Alternative, traffic will experience significant delays, with the majority of movements through the system interchange area having an average speed less than 20 mph in the p.m. peak hour, and some a.m. peak hour movements averaging less than 10 mph.

2040 Tier Two Preferred Alternative. Unlike the 2040 No-Build Alternative scenario, the 2040 Tier Two Preferred Alternative will accommodate average speeds close to free-flow speeds for all the traffic movements. In the a.m. peak hour, the overall average speed for all movements is 29 mph for the 2040 No-Build scenario and 54 mph for the 2040 Tier Two Preferred scenario. In the p.m. peak hour, average speeds are 32 mph for the 2040 No-Build Alternative scenario and 52 mph for the 2040 Tier Two Preferred Alternative scenario. See Table 3-3.

The VISSIM a.m. and p.m. peak hour segment density and speed for the critical locations along I-290, along with VISSIM LOS, are shown on Exhibit 3-6B. These VISSIM results along I-290 show acceptable density and speed along both WB and EB directions. A maximum density of 33 passenger cars per mile per lane (pc/mi/lane) occurs on I-290 WB at the I-290/I-355 merge to Elgin O'Hare diverge weaving segment, which results in an LOS D for both the a.m. and p.m. peak hours. The remaining segment densities along I-290 WB are lower than 28 pc/mi/lane and thus result in an LOS C or better. A minimum segment speed of 46 mph occurs on I-290 WB in the merge influence area at the Elgin O'Hare EB merge in the a.m. peak hour and all the remaining segment speeds are 52 mph or higher.

A maximum density of 33 pc/mi/lane occurs on I-290 EB at the Biesterfield Road merge to Elgin O'Hare diverge weaving segment, which results in an LOS D in the p.m. peak hour. The remaining segment densities along I-290 EB are lower than 33 pc/mi/lane and thus result in an LOS D or better. A minimum segment speed of 52 mph occurs on I-290 EB at both the Biesterfield Road merge to Elgin O'Hare diverge weaving segment in the p.m. peak

hour and the Elgin O'Hare EB merge to I-290/I-355 diverge weaving segment in the a.m. peak hour. All remaining segment speeds are 53 mph or higher.

Improved travel performance provided by the proposed system interchange is further verified by the VISSIM travel analysis data presented in Table 3-4. For example:

- Average travel speed on EB Elgin O'Hare (SB-SB) in the p.m. peak hour would improve from 23 mph under existing conditions to 61 mph with the interchange improvement.
- Average travel speed on WB Elgin O'Hare (WB-WB) in the p.m. peak hour would improve from 20 mph under existing conditions to 62 mph with the interchange improvement (average speed in 2040 No-Build Alternative would be 8 mph).
- Average travel speed on EB I-290 (EB-EB) in the p.m. peak hour would decrease from 49 mph under existing conditions to 15 mph in 2040 without interchange improvement. The proposed interchange improvement, however, would restore average travel speed to 51 mph in 2040.
- Average travel speed on the loop ramp from the WB Elgin O'Hare to EB I-290 (WB-EB) in the p.m. peak hour would improve from 19 mph under existing conditions to 43 mph in 2040 with the interchange improvement (average travel speed would decrease to 10 mph in 2040 without interchange improvement).
- Average travel speed on the loop ramp from the EB Elgin O'Hare to WB I-290 (EB-NB) in the a.m. peak hour would improve from 18 mph under existing conditions to 37 mph in 2040 with the interchange improvement (average travel speed would decrease to 12 mph in 2040 without interchange improvement).

2030 ICP. The ICP provides comparable average speeds to the 2040 Tier Two Preferred Alternative, representing improvements over the 2040 No-Build Alternative.

The measures of effectiveness for system-wide performance, as indicated by Table 3-3, show that the average delay time per vehicle in the a.m. peak hour is six times higher for the 2040 No-Build Alternative than for the 2040 Tier Two Preferred Alternative (134 seconds versus 19 seconds) and more than four times higher (108 seconds versus 27 seconds) in the p.m. peak hour. Speeds for the entire modeled network average about 30 mph for the 2040 No-Build and approximately 50 mph for the 2040 Tier Two Preferred Alternative and 2030 ICP scenarios. The VISSIM evaluation results confirm the I-290 traffic operational benefits resulting from the proposed Elgin O'Hare at I-290 system interchange construction.

TABLE 3-3
VISSIM Network Performance—Existing 2010, 2030 ICP, 2040 No-Build, and 2040 Tier Two Preferred Alternative

Parameter	Existing 2010		2040 No-Build		2040 Tier Two Preferred Alternative		2030 ICP	
	AM	AM	AM	PM	AM	PM	AM	PM
Average delay time per vehicle (seconds)	84	26	134	108	19	27	26	20
Average number of stops (per vehicles)	1.6	0.6	3.3	2.0	0.3	0.4	0.6	0.3
Average speed (mph)	34	52	29	32	54	52	52	54
Average stopped delay per vehicle (seconds)	40	8.0	60	43	6.4	6.8	8.0	6.0
Number of stops (all vehicles)	45,494	21,120	98,208	60,218	10,568	11,267	21,120	13,243

TABLE 3-4
VISSIM Travel Time and Speed—Existing 2010, 2030 ICP Volumes, 2040 No-Build, and 2040 Tier Two Preferred Alternative

	Existing 2010 Volumes				2040 No-Build Volumes				2040 Tier Two Preferred Alternative Volumes				2030 ICP Volumes			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Route	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)	Travel Time (sec)	Speed (mph)
WB-NB	94	33	132	24	100	31	270	12	80	51	78	52	80	51	81	47
WB-SB	141	26	188	19	158	23	361	10	89	41	87	43	85	43	81	42
WB-WB	90	24	108	20	97	22	256	8	46	61	45	62	45	62	39	61
EB-NB	179	18	101	33	269	12	101	33	90	37	84	39	85	38	79	41
EB-SB	90	28	77	33	114	22	83	30	57	46	73	38	57	47	55	48
EB-EB	306	9	112	24	435	6	113	23	56	62	57	61	51	60	45	63
SB-EB	367	12	203	21	486	9	240	18	115	50	118	48	125	46	113	51
SB-WB	68	43	72	40	69	42	108	27	102	53	107	51	76	53	106	53
SB-SB	68	58	80	49	70	56	256	15	79	60	99	51	78	61	80	60
NB-EB	299	8	104	23	376	6	102	23	87	45	81	48	99	40	78	50
NB-NB	55	61	51	64	55	60	52	64	80	60	78	62	78	61	78	62
NB-WB	250	10	107	24	298	9	109	24	122	49	121	49	82	55	122	50

Notes:
WB – northbound (NB) ramp from WB Elgin O'Hare Expressway just west of Park Boulevard to NB I-290 just north of the WB to NB on-ramp

WB – SB loop ramp from WB Elgin O'Hare Expressway just west of Park Boulevard to SB I-290 just south of the WB to SB on-ramp

WB – WB mainline from WB Elgin O'Hare Expressway just west of Park Boulevard to WB Elgin O'Hare Expressway just past the I-290

EB – NB loop ramp from EB Elgin O'Hare Expressway just east of IL 53 to NB I-290 just north of the EB to NB on-ramp

EB – SB ramp from EB Elgin O'Hare Expressway just east of IL 53 to SB I-290 just south of the EB to SB on-ramp

EB – EB mainline from EB Elgin O'Hare Expressway just east of IL 53 to EB Elgin O'Hare Expressway just east of I-290

SB – EB ramp from SB I-290 between Biesterfield on-ramp and Elgin O'Hare Expressway off-ramp to EB Elgin O'Hare Expressway just east of the I-290 NB to EB off-ramp

SB – WB ramp from SB I-290 between Biesterfield on-ramp and Elgin O'Hare Expressway off-ramp to WB Elgin O'Hare Expressway: for the base year and no-build cases, it is on WB Elgin O'Hare Expressway just east of IL 53; for the build cases, it is on WB on-ramp from SB I-290 just before the ramp joins the WB Elgin O'Hare Expressway

SB – SB mainline from SB I-290 between Biesterfield on-ramp and Elgin O'Hare Expressway off-ramp to SB I-290 just south of the EB to SB on-ramp

NB – EB ramp from NB I-290 just south of the EB off-ramp to EB Elgin O'Hare Expressway east of the NB to EB on-ramp

NB – NB mainline from NB I-290 just south of the EB off-ramp to NB I-290 just north of the WB to NB on-ramp

NB – WB ramp from NB I-290 just south of the EB off-ramp to WB Elgin O'Hare Expressway: for the base year and no-build cases, it is on WB Elgin O'Hare Expressway just east of IL 53; for the build cases, it is on WB on-ramp from SB I-290 just before the ramp joins the WB Elgin O'Hare Expressway

3.3.2 Safety

A comprehensive crash analysis was conducted for the I-290/Elgin O'Hare system interchange area for the existing, 2040 No-Build, and 2040 Tier Two Preferred Alternative conditions. The analysis area included both the Elgin O'Hare at I-290 system interchange, as well as adjacent interchanges and intersections within the interchange influence area. The existing safety analysis was performed using crash data for the most recent 5-year period (2005 through 2009) from IDOT in conjunction with the recently released *Illinois 2010 Five Percent Report* (IDOT, 2010) to identify any highway locations exhibiting the most-severe safety needs for the interchange area. The travel demand model used to develop existing and future traffic information in addition to using existing traffic count information from IDOT. The safety analysis for future traffic conditions for the 2040 No-Build network and the 2040 Tier Two Preferred Alternative network was performed using state-of-the-practice predictive methods from the *Highway Safety Manual* (HSM) to assess the number and severity of crashes expected to occur within the interchange area under consideration. In addition to predictive crash analysis methods, countermeasure effectiveness analysis was performed to assess potential benefits to implementing countermeasures as part of the system interchange construction. Safety performance functions (SPFs) developed by the University of Illinois at Urbana-Champaign (UIUC) in conjunction with IDOT were used as the basis of performing the safety analysis for the interchange area. It is important to note that the future year analysis performed for the 2040 No-Build and the 2040 Tier Two Preferred alternatives represent system-wide analysis for the interchange area and is not specific to interchange type, ramp configurations, or other design elements representing the system interchange.

3.3.2.1 I-290 Crash History

Existing Conditions. The first step in the analysis was an appraisal of existing highway safety conditions based on the most-recent crash records noted previously. A summary was created of the number and type of crashes occurring on each segment of the highway system within the interchange area. See Figure 1-2 for the limits of the interchange area.

Crashes included in the analysis were those designated by IDOT in the following categories:

- **"K" Fatal—**Involving one or more fatalities.
- **"A" Injury (incapacitating injury)—**Any injury, other than a fatal injury, that prevents the injured person from walking, driving, or normally continuing the activities he/she was capable of performing before the injury occurred. Includes severe lacerations, broken limbs, skull or chest injuries, and abdominal injuries.
- **"B" Injury (non-incapacitating injury)—**Any injury, other than a fatal or incapacitating injury, that is evident to observers at the scene of the crash. Includes lump on head, abrasions, bruises, and minor lacerations.

Table 3-5 summarizes existing crash characteristics by severity and functional class for the interchange complex sub-area. There were a total of 282 crashes observed in the interchange complex for the 5-year period. Note that the total crashes shown are not directly comparable with forecasted crash experience (described later) because the IDOT database does not include toll road crashes.

TABLE 3-5
Existing Crashes by Severity by Functional Class for I-290 Interchange Complex

	Crashes by Severity (2005 – 2009)			Average Annual Crashes by Severity		
Functional Class	**K**	**A**	**B**	**K**	**A**	**B**
Freeway	3	20	57	1	4	11
Principal Arterial	1	10	27	0	2	5
Minor Arterial	2	39	116	0	8	23
Collector	1	1	5	0	0	1
Total	**7**	**70**	**205**	**1**	**14**	**41**

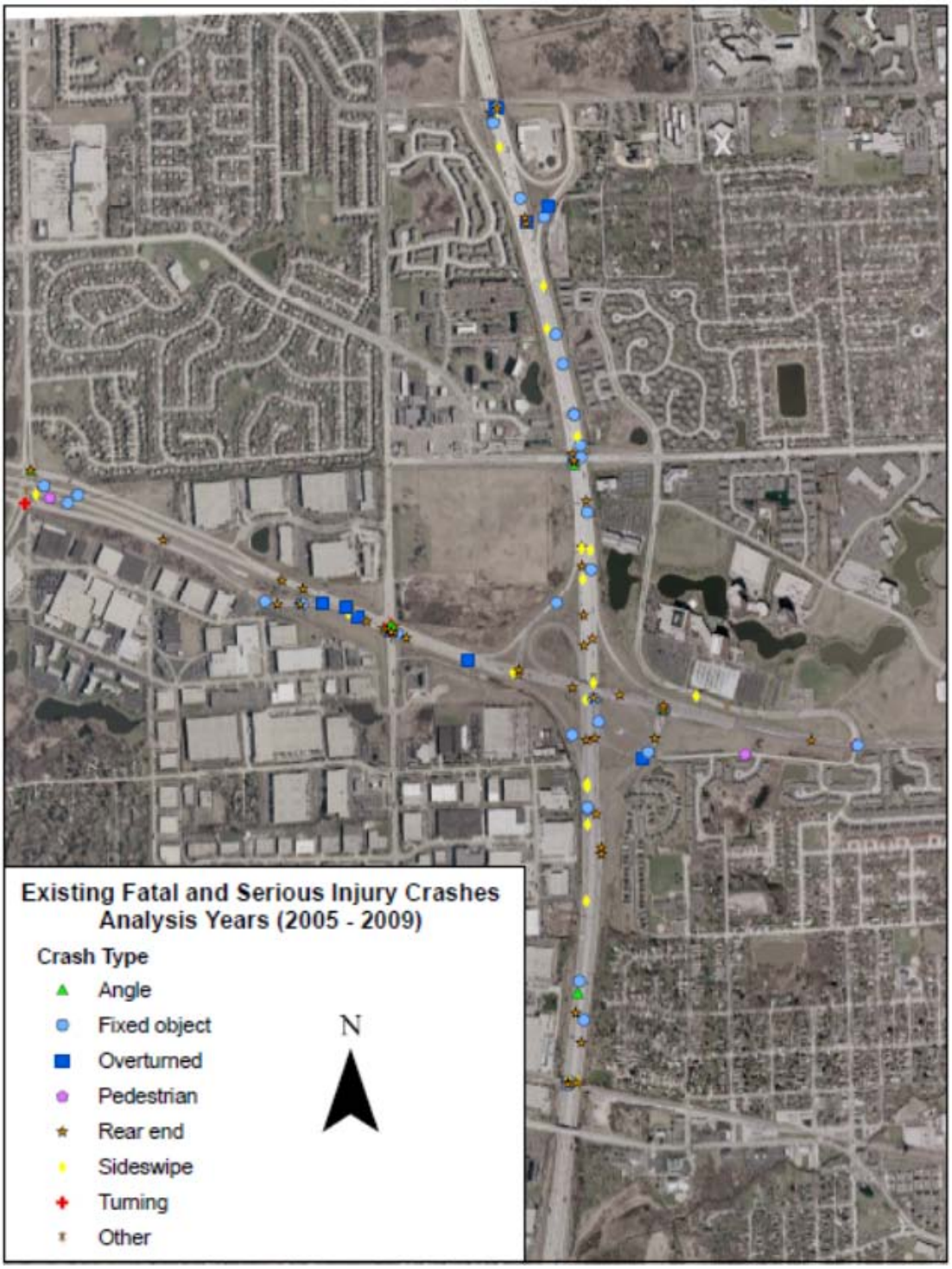
Table 3-6 summarizes the existing crashes for the 5-year period based on crash type and crash severity for the interchange complex sub-area. Of the total number of crashes in the 5-year period, over 33 percent of the total crashes are rear-end crashes, which is representative of significant congestion in the interchange area. In addition, about 25 percent of the crashes are fixed-object and angle crashes and about 19 percent are turning crashes, which represent issues with regards to intersection related operations in the interchange area. A more-detailed review of crash characteristics was also performed along the I-290 ramps and near merge/diverge areas. The review revealed that approximately 3 percent of all crashes occurred in the vicinity of merge/diverge areas and an additional 3 percent occurred along ramp proper sections. Of these crashes, approximately 60 percent were rear-end crashes with traffic operations and vehicle queues during peak hours as potential contributing factors.

TABLE 3-6
Existing Crashes (2005 through 2009): Crash Type and Crash Severity for I-290 Interchange Complex

	Crash Type										
Crash Severity	**Angle**	**Fixed Object**	**Head On**	**Over Turned**	**Pedestrian/ Pedalcyclist**	**Rear End**	**Sideswipe Opposite Direction**	**Sideswipe Same Direction**	**Turning**	**Other**	**Grand Total**
A-Injury	7	14	2	3	5	15	4	3	14	3	70
B-Injury	19	29	2	3	9	79	8	10	39	7	205
Fatal	1	3	1	0	0	1	0	0	1	0	7
Total	**27**	**46**	**5**	**6**	**14**	**95**	**12**	**13**	**54**	**10**	**282**

Figure 3-1 represents locations and types of crashes to identify clusters of crash locations during the analysis period in the system interchange area.

FIGURE 3-1
Elgin O'Hare WB Tier Two Preferred Alternative



As part of the Highway Safety Improvement Program, states are required to submit an annual report describing not less than 5 percent of their highway locations exhibiting the most-severe safety needs. The intent of this provision is to raise public awareness of the highway safety needs and challenges in the states. Table 3-7 shows the highway segment in the interchange area that was designated as a hazardous location in the *Illinois 2010 Five Percent Report* (IDOT, 2010). This 5 percent segment is located on Biesterfield Road from the intersection of Rohlwing Road to the ramp terminal of I-290 WB off-ramp. This location is represented in the Urban Multi-Lane Divided Highway Peer Group in the 5 percent analysis. Of all the 5 percent locations in this peer group, this location has a potential of safety improvement (PSI) index of 24.19 as compared to an average PSI index of 73.64.

There were a total of 19 fatal and serious injury crashes in the analysis period. Over 50 percent of the crashes are turning crashes and about 20 percent are rear end and 16 percent are pedal-cyclist crashes. The 2040 Tier Two Preferred Alternative does not propose any improvement along Biesterfield Road, but does include widening the Biesterfield Road to EB I-290 ramp to two lanes. No improvements are planned at this location as part of the 2030 ICP. It is anticipated that potential safety improvements along Biesterfield Road will be evaluated separately in the future as part of IDOT's Highway Safety Improvement Program.

TABLE 3-7
Segments within the Interchange Area

Inventory Number	Begin STA	End STA	Location
016 91339 000000	0.75	1.23	Biesterfield Road

Source: *Illinois 2010 5 Percent Report* (IDOT, 2010).

There are no intersections within the interchange area listed in the 5 percent report.

Future (2040) Conditions. The HSM predictive methods were used to predict the number and severity of crashes expected to occur within the interchange area for the forecast year 2040 No-Build and Tier Two Preferred Alternatives. The analysis was performed using predictive methods and followed HSM processes and procedures. Table 3-8 is a tabulation of lane-miles of highway by functional class for existing, 2040 No-Build and Tier Two Preferred Alternative conditions for the system interchange area. Increased mileage in the Tier Two Preferred Alternative for the system interchange complex area is primarily due to the provision of the Elgin O'Hare Extension east of the system interchange, which is not a component of the No-Build Alternative. The Freeway/Tollway classification accounts for 36 percent of total lane-miles in the No-Build Alternative, as compared with 50 percent for the Tier Two Preferred Alternative.

TABLE 3-8
Lane-Miles of Highway I-290/Elgin O'Hare System Interchange Area

	Lane-Miles of Highway		
Functional Class	**Existing**	**2040 No-Build**	**2040 Tier Two Preferred Alternative**
Freeway	36	36	67
Principal Arterial	10	10	0*
Minor Arterial	40	40	41
Collector	14	14	26
Total	**100**	**100**	**134**

Notes:
Excludes ramps
*Thorndale Avenue is converted from Principal Arterial into an access-controlled facility as the Elgin O'Hare Extension in the Tier Two Preferred Alternative.

Forecast 2040 daily VMT for the interchange area highways by functional class is shown in Table 3-9 for No-Build and Tier Two Preferred Alternatives. Daily VMT for the Tier Two Preferred Alternative would be approximately 27 percent greater than for the No-Build condition. Change in VMT between the No-Build and Tier Two Preferred Alternatives represents traffic diversions from other facilities outside of the interchange area to the proposed new high type highways within the interchange area. For the Tier Two Preferred Alternative, 2040 daily VMT on Freeway/Tollway would amount to approximately 82 percent of total interchange area VMT as compared with approximately 71 percent for the No-Build Alternative.

TABLE 3-9
Daily Vehicle-Miles Traveled: I-290/Elgin O'Hare System Interchange Area

	Daily Vehicle-Miles of Travel		
Functional Class	**Existing**	**2040 No-Build**	**2040 Tier Two Preferred Alternative**
Freeway	746,500	838,800	1,229,500
Principal Arterial	92,900	104,400	0*
Minor Arterial	169,800	190,800	159,600
Collector	42,400	48,200	109,400
Total	**1,051,600**	**1,182,200**	**1,498,500**

Notes:
Excludes ramps
*Principal arterial converted to Elgin O'Hare tollway extension.

Predicted annual crashes by severity for the forecast year 2040 No-Build and Tier Two Preferred Alternatives is summarized in Table 3-10.

TABLE 3-10
Predicted Fatal and Serious Injury Crashes: I-290/Elgin O'Hare System Interchange Area

	Annual Crashes by Severity								
	2040 No-Build			2040 Build without Countermeasures			2040 Tier Two Preferred Alternative with Countermeasures		
Functional Class	K	A	B	K	A	B	K	A	B
Freeway	4	40	106	5	56	166	2	23	69
Principal Arterial	0	3	8	0	0	0	0	0	0
Minor Arterial	1	6	16	0	5	15	0	5	13
Collector	0	2	5	0	4	11	0	2	6
Total	**5**	**51**	**135**	**5**	**65**	**192**	**2**	**30**	**88**

The proposed improvements at the I-290/Elgin O'Hare system interchange area will address intersection-related crashes, as well as crashes along ramp segments and ramp merge/diverge areas that occur with the current interchange configuration and operational characteristics. Appropriate countermeasures will be identified and incorporated through the planning and design development process for roadways proposed for improvement as part of the Tier Two Preferred Alternative. These countermeasures include lengthened deceleration lanes and increased distance to roadside features along the proposed system interchange ramps. These countermeasures would have a direct impact on rear-end and fixed-object crashes experienced in the existing conditions. Also, crash cushions along roadside features will be incorporated to reduce impact severity, assisting with reductions in fatal and serious injury crashes. In addition, advisory and warning signs will be implemented as part of the proposed Intelligent Transportation Systems (ITS) system.

The total number of fatal and serious injury crashes expected to occur in the interchange area highways would be approximately 37 percent higher for the Tier Two Preferred Alternative without countermeasures as compared to the No-Build Alternative. However, with the application of the applicable countermeasures, the total number of fatal and injury crashes reduces by over 37 percent as compared to the No-Build Alternative. In addition, the distribution of crashes would shift from secondary roadways to Freeway/Tollway facilities since there is higher exposure on access controlled facilities in the Tier Two Preferred Alternative as compared to the No-Build Alternative.

3.3.2.2 Functional Concept Signing

Concept signing plans were developed for the ICP during the geometric design development process. Signing plans are included in Appendix B. A full discussion of signing issues is covered in Section 3.4.

3.4 Policy Point 4—Access Connections and Design

FHWA Policy Point 4 states the following:

> *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g. transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 652.2[a], 625.4[a],[2], and 655.603[d]).*

The proposed system interchange at I-290 and the Elgin O'Hare corridor will be fully directional (provide for all traffic movements), connecting to a public road. The proposed interchange will be designed in accordance with IDOT, Illinois Tollway, and American Association of State Highway and Transportation Officials (AASHTO) criteria and standards.

3.4.1 Sizing and Planning Criteria

The following planning criteria were established through consultation with FHWA, IDOT, and the Illinois Tollway:

- **Design Year Traffic—**The project design year is 2040, which is consistent with CMAP's *GO TO 2040 Comprehensive Regional Plan* (CMAP, 2010). Thus, all travel forecasts conform to the 2040 time period, as do the facility design requirements. The ICP is based on year 2030 traffic forecasts derived from the 2040 model.
- **Design LOS—**Based on input from the FHWA, IDOT, and the Illinois Tollway, LOS D was chosen as the desirable LOS for the determination of lane requirements for mainline, ramps, and weaving sections. Design LOS E would also be considered acceptable on a case-by-case basis due to the urban nature of the study area and the existing operational characteristics.
- **Basic Number of Lanes and Lane Balance—**Lane balance through the I-290/Elgin O'Hare corridor interchange complex will be achieved. Along the Elgin O'Hare corridor, the Tier Two Preferred Alternative provides three basic lanes in both EB and WB directions between the Prospect Avenue and Meacham Road/Medinah Road interchanges. In either direction, auxiliary lanes are added and dropped to facilitate coordination of lane balance on the basic number of lanes. Similarly, along I-290, there are four basic lanes in both the WB and EB directions between IL 19 and the Biesterfield Road interchange with the Tier Two Preferred Alternative. Lane balance is achieved through the addition and reduction of auxiliary lanes at associated interchanges within the segment. While fewer travel lanes are provided in select locations with the ICP, lane balance will also be achieved with the initial construction condition. Exhibits 3-6 and 3-8 illustrate the proposed lane configuration for mainline and ramp facilities along the Elgin O'Hare corridor and I-290 corridor, respectively, for both the ICP and Tier Two Preferred Alternative scenarios.

3.4.2 Geometric Design Criteria

Geometric design criteria were established at the outset of the project to provide guidance in the development of the preliminary engineering effort. Geometric design criteria were

established on the basis of AASHTO policy, "*A Policy on Geometric Design of Highways and Streets*," (AASHTO, 2007), the IDOT BDE Manual, relevant IDOT design standards, and the Illinois Tollway design standards. Detailed project design criteria are summarized in Appendix C.

Interchange configurations were prepared in conformance with design criteria adopted for this project. The following design controls were adopted:

- **Mainline Functional Classification and Design Speed—**The functional classification of I-290 is interstate with a design speed of 60 mph. The functional classification for the Elgin O'Hare corridor and West Bypass mainline is a freeway/toll road, with a design speed of 60 mph.
- **Cross-Section Elements—**Cross-section elements were developed to be compatible with applicable FHWA, IDOT, and Illinois Tollway design requirements and to reserve accommodations for dedicated transit service along the Elgin O'Hare corridor. Lane widths are designed to be 12 (mainline), 16 (single-lane collector-distributor roadway), 12 (2+ or more lane collector-distributor roadway), 16 (single-lane ramp), 18 (single-lane loop ramp), and 12 feet (two-lane ramp).
- **Ramp Spacing—**Within the I-290 interchange complex, minimum ramp terminal spacing as recommended by the IDOT BDE Manual is exceeded in all cases. Further, weaving lengths created between the I-290 interchange and the Biesterfield Road interchange exceeds the 2,000-foot minimum system to service interchange spacing. Similarly, minimum ramp terminal spacing for minor convergences and divergences for the system interchange ramps is also exceeded in all cases. A summary of mainline ramp spacing is provided in Table 3-11 with all weaving sections identified. A summary of minor convergence and divergence spacing along system interchange ramps is provided in Table 3-12.

TABLE 3-11
Mainline Ramp Spacing

	Direction	Location	Location	Minimum Ramp-Ramp Distance (feet)[a]	Existing Ramp-Ramp Distance (feet)	Proposed Ramp-Ramp Distance (feet)
I-290	Westbound[b]	I-355 EN	Elgin O'Hare EX	1,600	6,000	4,700
	Westbound	Elgin O'Hare EX	Elgin O'Hare EB EN	500	2,000	2,960
	Westbound	Elgin O'Hare EB EN	Elgin O'Hare WB EN	300	1,440	1,640
	Westbound[b]	Elgin O'Hare WB EN	Biesterfield Rd EX	1,600	3,260	3,260
	Westbound	Biesterfield Rd EX	Biesterfield Rd EN	500	1,940	1,940
	Eastbound	Biesterfield Rd EX	Biesterfield Rd EN	500	3,090	3,090
	Eastbound[b]	Biesterfield Rd EN	Elgin O'Hare EX	1,600	2,800	2,520

TABLE 3-11
Mainline Ramp Spacing

	Direction	Location	Location	Minimum Ramp-Ramp Distance (feet)[a]	Existing Ramp-Ramp Distance (feet)	Proposed Ramp-Ramp Distance (feet)
	Eastbound	Elgin O'Hare EX	Elgin O'Hare WB EN	500	1,860	2,430
	Eastbound	Elgin O'Hare WB EN	Elgin O'Hare EB EN	300	1,390	1,780
	Eastbound[b]	Elgin O'Hare EB EN	I-355 EX	1,600	4,210	4,210
Elgin O'Hare	Westbound	Prospect Ave EX	Prospect Ave EN	500	N/A	2,690
	Westbound	Prospect Ave EN	Arlington Heights EN	300	N/A	1,000
	Westbound[b]	Arlington Heights EN	I-290 EX	2,000	N/A	2,760
	Westbound	I-290 EX	Park Blvd EN	500	N/A	1,420
	Westbound[b]	Park Blvd EN	Rohlwing EX	1,600	N/A	1,690
	Westbound	Rohlwing EX	Rohlwing EN	500	N/A	3,740
	Westbound	Rohlwing EN	Meacham EN	300	N/A	2,820
	Eastbound	Meacham EX	I-290 EX	1,000	N/A	2,270
	Eastbound	I-290 EX	Rohlwing EN	500	N/A	4,060
	Eastbound[b]	Rohlwing EN	Park Blvd EX	1,600	N/A	1,820
	Eastbound	Park Blvd EX	I-290 EN	500	N/A	1,880
	Eastbound[b]	I-290 EN	Prospect Ave EX	2,000	N/A	3,270
	Eastbound	Prospect Ave EX	Prospect Ave EN	500	N/A	2,580

Notes:
[a] Minimum ramp distance as recommended by IDOT BDE Manual
[b] Weaving section
EN = entrance; EX = exit

TABLE 3-12
Minor Convergence and Divergence Spacing

Direction	Movement[a]	Type	Minimum Ramp-Ramp Distance (feet)[b]	Proposed Ramp-Ramp Distance (feet)
Northbound	I-290/Ramp G5 EX to Ramp G5/G6 EX	System Ramp to System Ramp	800	1,180
	Ramp G5/G6 EX to Ramp G6/Park Blvd EX	System Ramp to Service Ramp	600	1,090
	Ramp G5/G6 EX to Ramp G5/G2 EN	System Ramp to System Ramp	400	7,360
	Ramp G5/G2 EN to Ramp G5/E4 EX	System Ramp to Service Ramp	1,600	1,630
Southbound	I-290/Ramp G1 EX to Ramp G1/G2 EX	System Ramp to System Ramp	800	1,010
	Ramp G1/G2 EX to Ramp G1/K3 EX	System Ramp to Service Ramp	600	3,300
	Ramp G1/G2 EX to Ramp G5/G2 EN	System Ramp to System Ramp	400	3,950
Eastbound	EB EO/Ramp G3 EX to Ramp G3/E3 EN	Collector-Distributor Road	N/A	1,800
	Ramp G3/E3 EN to Ramp G3/G4 EX	Collector-Distributor Road	1,600	3,080
	Ramp G3/G4 EX to Ramp G3/G7 EX	Collector-Distributor Road	800	1,370
Westbound	WB EO/Ramp G7 EX to Ramp G7/G8 EX	System Ramp to System Ramp	800	950
	Ramp G7/G8 EX to Ramp G7/K6 EN	Collector-Distributor Road	400	500

Notes:
[a]See Exhibit 2-4 for Ramp locations
[b]Minimum ramp distance as recommended by IDOT BDE Manual
EN = entrance; EX = exit

3.4.3 Interchange Type Study Alternates

A comprehensive interchange alternates development and evaluation was performed early in the Tier Two study process. Within the AJR study area, interchange alternates were evaluated for the overall I-290/Elgin O'Hare interchange complex extending from Meacham Road/Medinah Road on the west and to Prospect Avenue on the east. Interchange alternates were developed and evaluated with extensive input from the Geometric Working Group (GWG)—consisting of key technical and policy stakeholders from IDOT, the Illinois Tollway, and FHWA—as well as from local agencies and other stakeholders.

The primary design complications at the I-290/Elgin O'Hare interchange complex stem from the need to provide local access immediately adjacent to the system connections. In

particular, retaining effective access to the Hamilton Lakes facility located in the northeast quadrant of the system interchange complex was a significant concern to the Village of Itasca. There are several nearby crossroads vital to the local commerce, including Meacham Road/Medinah Road, IL 53, Park Boulevard, Arlington Heights Road, and Prospect Avenue.

Seven interchange alternates were examined at the I-290/Elgin O'Hare interchange complex in an effort to look at all the combinations that would attempt to satisfy operational objectives, improved access, and cost effectiveness. The alternates were developed to accommodate year 2040 traffic demand, with the objective of identifying an optimal alternate to be incorporated into the overall Tier Two Preferred Alternative. Interchange alternates were evaluated on the basis of the following factors: geometry/design, traffic operations, environmental/social impact, and cost. A summary of interchange alternates considered along with a comparative evaluation of the alternates is presented in Exhibit 3-10.

Throughout the interchange alternates development process, the GWG met 12 times over a 2-year period from late 2009 through 2011. Through the meetings, the group provided input to the development and evaluation of interchange alternates and ultimately endorsed the proposed interchange design. The GWG first reviewed and screened multiple interchange alternates in plan view, following IDOT procedures for interchange-type studies. Most promising solutions were advanced to geometric development in three dimensions, with sufficient detail to enable identification of the best solution. During this period, traffic operational analyses were continuously performed to support design reviews. FHWA – Illinois Division office staff was directly involved in the GWG. A summary of GWG meetings related to the I-290/Elgin O'Hare interchange complex is presented in Table 3-13.

TABLE 3-13
Elgin O'Hare at I-290 Interchange: Geometrics Working Group* Input

Meeting Date	Topics Presented	Input Received
12/08/09	Proposed design year and LOS for Tier Two studies Interchange-type study procedures; interchange alternates evaluation measures and procedures	GWG agreed to use 2030 DHVs GWG agreed to use 2040 traffic to evaluate critical areas of the corridor GWG noted that facilities will not have adequate capacity; justification for LOS less than C will need to be documented GWG agreed that the interchange-type studies will be used to identify/evaluate alternatives as a basis for the Tier Two Preferred Alternative and for AJR preparation.
01/19/10	Range of interchange alternates to be considered (presentation/discussion of Alternatives 1 to 6) Access requirements and ramp arrangements near I-290 system interchange	GWG provided comments and updates on the six alternatives submitted. GWG discussed local access and traffic operations in and around the I-290 interchange.
02/16/10	Presentation/discussion of preliminary interchange alternates evaluation Discussion of interchange alternate refinements	GWG provided comments on the revised six alternatives with subalternatives submitted. Items of discussion include ramp configurations, number of lanes, lane arrangement, and reconstruction.

TABLE 3-13
Elgin O'Hare at I-290 Interchange: Geometrics Working Group* Input

Meeting Date	Topics Presented	Input Received
03/23/10	Presentation/discussion of refined interchange alternates and performance (Alternatives 1 to 6)	GWG discuss the safety analysis procedures for the project. GWG provided comments on the six interchange type studies and subalternates, with discussions focusing on ramp configurations, local access, signing, frontage roads and field traffic data collection (origin/destination [O/D] study).
04/27/10	I-290 O/D study findings (presentation/discussion) Interchange alternates evaluation	The results of the O/D study were presented and highlighted the operational advantages and disadvantages of I-290/Elgin O'Hare Expressway interchange elements. The GWG Preference Survey and evaluation table were presented to the group to aid in alternative evaluation.
06/15/10	Interchange alternates evaluation and design criteria	GWG discussed updates and revisions to the roadway design criteria and system-wide safety analysis. Existing and proposed corridor size diagrams were presented.
08/03/10	Draft interchange type study report—presentation/discussion of recommended interchange alternates (Alternatives 3 and 4)	The GWG was presented with the draft interchange type study report, signing concepts, and the bridge reuse analysis for review and comment. GWG discussed financing strategies.
10/04/10	Traffic forecasting and analysis, construction phasing concepts and functional plans	GWG agreed to evaluate Alternatives 3 and 4 in traffic microsimulation software VISSIM. GWG discussed potential construction phasing concepts. GWG was presented with the functional plans concept format and schedule. Subalternative with collector-distributor roads along I-290 EB and WB was discussed and dismissed.
11/30/10	Elgin O'Hare at I-290—Alternatives 3 and 4 refined operational analysis findings	GWG was presented with the findings from alternative analysis using VISSIM.
05/12/11	Introduction/discussion of updated travel demand model and traffic forecasting (related to recently adopted CMAP *Go to 2040 Plan*). Introduction/discussion of ICP (interim 2030 design year).	GWG discussed revisions to the current traffic data based on the recently adopted CMAP *Go To 2040 Plan*. GWG was presented with three different tolling scenarios. GWG was presented with the latest Initial construction phase concept.

TABLE 3-13
Elgin O'Hare at I-290 Interchange: Geometrics Working Group* Input

Meeting Date	Topics Presented	Input Received
07/27/11	Presentation of 2040 Tier Two Preferred Alternative traffic forecasts and corridor sizing Presentation of 2030 ICP traffic forecasts and corridor sizing Refined operational analysis procedures. Revised Elgin O'Hare at I-290 interchange alternates (Alternate 7) (for 2040 design year)	GWG concurred with the 2030 and 2040 DHV/average daily traffic forecasts and corridor size diagrams. Alternative 7 was selected for further evaluation.
12/06/11	I-290 AJR content (2040 Tier Two Preferred Alternative and 2030 ICP) Presentation/discussion of revised recommended interchange alternate for 2040 Tier Two Preferred Alternative and 2030 ICP (Alternate 7) Review/discussion of I-290 improvement limits	GWG concurrence to AJR content for Tier Two Preferred Alternative and ICP conditions. GWG concurrence with Alternate 7 as preferred interchange alternate for Elgin O'Hare at I-290. GWG concurrence to proposed I-290 improvement limits.

Note:
*GWG members: IDOT Programming—Pete Harmet, Jason Salley, IDOT Project Management Consultants -Jim Prola, Ron Krall, Steve Nadalis, Scott Creech, Pat Pechnick; IDOT Bureau of Traffic—Steve Brink; IDOT BDE—Greg Feeny, Lance Kidd, Paul Niederhoffer, Scott Stitt; Illinois Tollway—Adam Lintner; FHWA - Mike Hine; CH2M HILL—Lidia Pilecky, Cheng Soong, Kevin Nichols, Jason Moller, Brian Connor, Athreya Sreenivasan, Amarpal Matharu

The preferred interchange alternate produced by the GWG achieves a recommended solution that best balances the objectives of acceptable traffic operations, improved access, enhanced safety, and cost effectiveness. The preferred interchange type alternative (Alternative 7) is shown in Exhibit 3-10.

3.4.4 Geometric Plans

The preferred interchange type alternative (Alternative 7) served as the basis for development of detailed geometric plans at the I-290/Elgin O'Hare interchange complex. The alternate was designed to accommodate year 2040 traffic. It was included in the overall layout of the Tier Two Preferred Alternative and used as the basis for defining construction footprint requirements and the projects' environmental consequences.

As discussed in Section 1.2, a phased approach will be used to implement the Tier Two Preferred Alternative, with the ICP being advanced by the Illinois Tollway as a functionally complete and operationally independent initial phase.[4] The geometric design of the ICP improvements at the I-290/Elgin O'Hare interchange is compatible with the Tier Two Preferred Alternative interchange layout, although several design features are deferred to future phases as described below and illustrated in Exhibit 2-4.

[4] *Initial Construction Plan Operational Independence Memorandum* (June, 2012). Concurrence on Operational Independence by FHWA is anticipated in summer 2012.

All I-290 access modifications will be completed with the ICP, with improvements deferred to future project phase(s) anticipated to include the following:

- Widen the EB and WB Elgin O'Hare corridor one lane toward the median from Meacham Road/Medinah Road to Arlington Heights Road
- Improve the interchanges at Meacham Road/Medinah Road, I-290, Park Boulevard, and Prospect Avenue:
  - Widen the Elgin O'Hare bridge over Meacham Road/Medinah Road to the outside; one lane in each direction
  - Widen the WB Elgin O'Hare to EB I-290 ramp (two-lane loop ramp)
  - Widen the WB I-290 to WB Elgin O'Hare ramp (on-grade sections only)
  - Reconstruct the WB Elgin O'Hare exit ramps to I-290 to provide a single exit
  - Construct direct service ramps connecting Park Boulevard to WB I-290 and WB Elgin O'Hare
  - Construct EB Elgin O'Hare exit ramp to Park Boulevard (slip connection from EB loop ramp)
  - Widen Elgin O'Hare EB exit ramp at Prospect Avenue
- Improve I-290, south of Biesterfield Road:
  - Widen the EB I-290 entrance ramp at Biesterfield Road to two lanes
  - Provide EB and WB auxiliary lanes along I-290 between Elgin O'Hare and Biesterfield Road

Geometric plans, profiles, typical sections, and signing plans have been developed for the ICP. As noted previously, the ICP design was developed to accommodate year 2030 travel demand. The ICP level of engineering detail is sufficient to confirm the viability of the plan, establish a construction footprint, and provide a basis for preliminary construction cost estimates. The ICP geometric plans are included in Appendix D.

Interchange/intersection design studies (IDSs) have also been prepared for the ICP. The studies present the detailed interchange/intersection design layout as well as traffic and operational characteristics of interchange and intersection elements. The IDSs are included in Appendix E.

3.4.4.1 Access Connections

Exhibit 2-4 depicts the Tier Two Preferred Alternative for the 2040 Full-Build configuration of the I-290 system interchange and proximate local service interchanges, as well as the 2030 ICP configuration of the interchange and local service interchanges. The designs provide all necessary requirements of a system interchange for their respective design horizons. As described in the previous section, all I-290 access modifications will be completed with the ICP, with some ramp and capacity improvements deferred to future project phases (see bulleted list in Section 3.4.4). System movements are incorporated to/from all directions of travel. The I-290/Elgin O'Hare corridor system interchange includes flyover direct

connection ramps in two directions (NB to WB and SB to EB), and loop ramps in two directions (WB to SB and EB to NB).

Site characteristics require the provision of access for service movements along the Elgin O'Hare in proximity to the I-290/Elgin O'Hare system movements; however, no additional service movements are proposed along I-290 within the system interchange area. The proposed design provides separation of system and service movements along the Elgin O'Hare via the use of ramp braids, thereby minimizing potential operational and safety issues. Proposed new service movements along the Elgin O'Hare corridor are accommodated through a series of ramp connections as follows:

- **Meacham Road/Medinah Road—** A service interchange providing full access to/from the Elgin O'Hare and I-290.
- **IL 53—** A service interchange providing access to/from the east along the Elgin O'Hare. Movements from I-290 to IL 53 are not provided directly due to the close proximity of IL 53 to I-290. Rather, traffic is required to use a Texas U-turn at Meacham Road/Medinah Road to return to IL 53 via a frontage road. Frontage roads are provided on both sides of the Elgin O'Hare Expressway between Meacham Road/Medinah Road and IL 53 to accommodate access to local east-west traffic movements and local development.
- **Park Boulevard—** A service interchange providing ingress to adjacent highways and developments from the north, south, and west. Complimentary egress movements are provided from the adjacent Arlington Heights Road and Prospect Avenue to all directions (east, west, north, and south). Additionally, future phase improvements included in the Tier Two Preferred Alternative include an additional ramp providing egress from Park Boulevard directly to the south and west.
- **Arlington Heights Road—** A service interchange providing egress from adjacent highways and developments to the north.
- **Prospect Avenue—** A service interchange providing full access to/from the Elgin O'Hare and I-290. A frontage road extending from Park Boulevard to Prospect Avenue provides highway access via the split-diamond interchange at Arlington Heights Road and Prospect Avenue.

3.4.4.2 Signalized Intersection Improvements

The ICP includes the removal of traffic signals at Thorndale Road and IL 53 and at Thorndale Road and I-290, as well as the addition of new traffic signals or modernization of existing traffic signals at the following locations:

- WB frontage road and IL 53 (proposed)
- EB frontage road and IL 53 (proposed)
- Park Boulevard West and EB Frontage Road (proposed)
- Park Boulevard and Hamilton Lakes Road (proposed)
- WB frontage road and Arlington Heights Road (proposed)
- EB frontage road and Arlington Heights Road (proposed)
- WB frontage road and Prospect Avenue (proposed)
- EB frontage road and Prospect Avenue (proposed)

- Pierce Road and Park Boulevard (proposed)
- Ketter Drive and WB ramp to EO-WB (proposed)

Future phase improvements included in the Tier Two Preferred Alternative will include the addition of a traffic signal at Park Boulevard and WB ramps (proposed).

3.4.4.3 Concept Signing

Concept signing plans were developed for the 2030 ICP. The new *2010 Manual on Uniform Traffic Control Devices* (MUTCD) was used as the basis for sign formats and conventions.

The plans demonstrate the ability to sign I-290 and all approaches clearly and concisely, following the premise that signs are for unfamiliar drivers. Attention to redundancy, spreading of messages, and simplicity of signs are all important.

As of completion of this report, a number of signing issues are being discussed and thus have not yet been resolved, including the following:

- Potential selection and designation of the Elgin O'Hare corridor as a numbered Illinois Route, similar to other "supplementary" expressways in the Chicago region (such as IL 394)
- Assuming construction of the Western Terminal at O'Hare Airport has been completed, signing for the airport is indicated in the ICP; however, the timing of the construction of the Western Terminal has not yet been determined (pre- or post-2030)
- The need for and selection of an appropriate destination for traffic heading east on the Elgin O'Hare corridor (the terminus is not a city or destination but rather the West Bypass, which also may carry an Illinois route designation)
- Provision for signing associated with toll operations for ramps and mainline Elgin O'Hare corridor (All Electronic Tolling will ensure that no decisions [such as lane changes, acceleration/deceleration, weaving, or separation of payment types] will be required, so the segments will act as a normal freeway, even within tolling zones. The locations of individual tolling points will be determined by the Illinois Tollway during future design development. Signing will be required prior to toll points, but the signs will be placed in accordance with all current MUTCD standards to not impact any proposed guide sign locations.)
- Engineering of the "overhead lane arrow" approach signs for major splits dictated by the new 2010 MUTCD (because the signs are new, neither IDOT nor the Illinois Tollway has yet established design standards and specifications, and the viability of providing sufficient truss support for the weight/wind load on the signs must still be verified)

The potential for route designations is noted on the signing plans. None of the other issues raises concerns over the ability to properly locate appropriate signs.

Concept Signing Plan for 2030 ICP. A separate concept signing plan for the 2030 ICP was developed. The major difference between this plan and Tier Two Preferred Alternative is the status of the proposed Western Terminal at O'Hare Airport.

There is no current commitment or timeframe for construction of the proposed Western Terminal. The 2030 ICP connects the Elgin O'Hare corridor to the West Bypass, but does not include ramp connections that penetrate the west airport boundary to the Western Terminal site. Until the Western Terminal is built and a connection is possible, drivers from the west, north, and south along I-290 need to be informed of the appropriate routing(s) to the airport itself. Indeed, should the toll road continue to be named the Elgin O'Hare Expressway, there is a risk of unfamiliar drivers assuming that in fact it is the route to O'Hare Airport.

Concept signing for the 2030 ICP explicitly addresses communication to drivers as to appropriate routes to O'Hare Airport. Concept Signing Plans for the 2030 ICP are provided in Appendix B.

Concept Signing for 2040 Tier Two Preferred Alternative. The geometric and access arrangement of the 2040 Tier Two Preferred Alternative is similar to the 2030 ICP with the exception of two additional movements that would be introduced with the 2040 Preferred Alternative. The two additional movements consist of the addition of direct service access from Park Boulevard to I-290 and the Elgin O'Hare Expressway WB, and EB Elgin O'Hare to Park Boulevard. Additionally, the 2040 plan assumes that the proposed Western Terminal at O'Hare Airport is built and opens, and the toll road thus becomes a route to the airport itself. The concept plan has not been prepared for the Tier Two Preferred Alternative. The ICP sign placement will be built with consideration of the future access improvements, but the messaging and physical placement will reflect the ICP design layout. Given the similarities between the ICP and 2040 plan, a separate signing concept plan was not prepared for the 2040 Tier Two Preferred Alternative.

3.4.5 Estimated Capital Costs

The cost of the I-290/Elgin O'Hare interchange complex construction as included in the ICP is estimated at $ 491 million (year of expenditure [YOE]), representing approximately 14 percent of the total YOE capital cost of the entire EO-WB ICP Project. The dollar amount represents the costs of ICP roadway improvements extending from Meacham Road/Medinah Road on the west through the I-290 interchange to just west of Salt Creek on the east. The total capital cost of the ICP is estimated at $3.46 billion (YOE) with a 70 percent certainty, as identified in the FHWA's independent cost estimate review (CER) in May 2012.

Costs for the additional Tier Two Preferred Alternative deferred improvements at the I-290/Elgin O'Hare interchange (see Section 3.4.4) are estimated at $364 million (YOE). The improvements would be considered in the future based on need, funding availability, and system-wide priorities; however, no improvements are anticipated before 2035.

3.4.6 Design Exceptions

A summary of anticipated Level One design exceptions based on the geometric plans is provided in Appendix C. Potential design exceptions were fully discussed in the GWG meetings. All design exceptions, including minor exceptions/deviations will be evaluated, documented, and acted upon by IDOT, FHWA, and the Illinois Tollway as design proceeds in subsequent phases.

3.5 Policy Point 5—Consistency with Transportation Land Use Plans

FHWA Policy Point 5 states the following:

> *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

3.5.1 Compatibility with Land Use Plans

Local land use planning is at various stages in the communities along the project corridor. Several communities have recently updated their comprehensive land use plans to assume completion of the EO-WB Project in the future. In other cases, communities have prepared plan updates for properties close to the proposed EO-WB Project corridor, and in some cases, subarea plans are being initiated for properties near the corridor.

Stakeholder outreach efforts for the entire EO-WB study area have been extensive to ensure understanding and acceptance of the plan by each community, and to identify and address any potential conflicts with footprint, access, or potential environmental issues. No such issues remain unresolved. The following summarizes the land use and transportation planning being conducted by local communities and the compatibility of the proposed improvements with the land use plans as expressed by their officials. The *Tier Two Draft Environmental Impact Statement* (FHWA and IDOT, 2012) contains further information regarding land use planning and coordination.

3.5.2 Compatibility with Transportation Planning

Studies and reports related to transportation initiatives in the study area were gathered from transportation providers in the early stages of EO-WB Project. The documents either defined specific capital improvements to be implemented over a specific period of time or proposed potential future improvements. The *2040 Regional Transportation Plan* (RTP) and associated *Transportation Improvement Program* (TIP) from CMAP were central to the development of the proposed project.

3.5.2.1 CMAP *GO TO 2040 Comprehensive Regional Plan*

The *GO TO 2040 Comprehensive Regional Plan* (CMAP, 2010) is the long-range comprehensive plan for the Chicago region that includes Cook and DuPage Counties. Several high-priority capital projects were evaluated under this plan. The EO-WB is one such project included in the fiscally constrained high-priority project list, including the West Bypass, extension of the Elgin O'Hare Expressway from IL 53 to the West Bypass, and adding one lane in each direction on the existing Elgin O'Hare Expressway. Another high-priority capital project included in the plan is completion of construction of the O'Hare Modernization Program, including construction of a new O'Hare West Terminal. As required by federal regulations,

the major capital projects were combined with the proposed fiscal year (FY) 2010–2015 TIP and tested for conformity to the State's Implementation Plan to achieve National Ambient Air Quality Standards. The analysis demonstrates that the region meets required air quality standards and conformity regulations.

3.5.2.2 Cook-DuPage Corridor Study

The Regional Transportation Authority (RTA) led a joint RTA-IDOT study to develop a multimodal plan for a 30-square-mile area centered on the I-88 and I-290 corridors and bounded by IL 50 to the east, the Kane/DuPage County line to the west, Metra's Milwaukee District–West (MDW) to the north, and the Burlington Northern Santa Fe line to the south. The plan addressed a series of transit and highway proposals, such as HOV lanes on I-290; adding lanes on I-88, extending the Chicago Transit Authority's (CTA) Blue Line Congress Branch to DuPage County; an Ogden Avenue (Chicago) transit way; BRT in several locations, including along Cermak Road, the DuPage J line; and inner circumferential rail service between O'Hare and Midway airports. The EO-WB was endorsed as a major project by the Cook-DuPage Policy Committee as part of this study.

3.5.2.3 DuPage County Comprehensive Road Improvement Plan

The county plan identifies roadway improvements required to meet future transportation needs for a 10-year period. It examines travel growth, development, land use trends, and existing and future roadway deficiencies. A program of capital improvements is expected for the period fiscal year 2005 to 2014 on the basis of anticipated revenue sources and funding levels.

3.5.2.4 DuPage Area Transit Plan

This plan, developed by the DuPage Mayors and Managers Conference, recommends short-, mid-, and long-term improvements for all modes of public transportation (bus, rail, or dial-a-ride) serving the county. The horizon year is 2020. Major recommendations, designed to improve mobility throughout the county, include establishing a high-speed corridor with service every 10 to 20 minutes from Naperville/Aurora to O'Hare Airport and Woodfield/Schaumburg (the DuPage County J line); developing 13 connector routes that complement the Metra system and connect major activity centers; and implementing community circulators that operate either as fixed route or flexible route services. The plan identifies six mobility objectives, three of which are pertinent to this study (integration with the regional transportation system, impact on roadway congestion, and connecting hard-to-fill jobs with the labor market) and concludes that the plan would change transit system performance from low impact to medium or high impact.

3.5.2.5 West O'Hare Corridor Economic Development Study

DuPage County initiated planning efforts for a long-term economic development vision in anticipation of future transportation improvements within the EO-WB study area. The West O'Hare Corridor Economic Development Study was structured to develop a long-term vision (through 2030) of the West O'Hare corridor. The study focused specifically on transportation infrastructure, economic impacts, and land use. The study was conducted with community and stakeholder outreach between DuPage County and DuPage

communities in the area of O'Hare Airport to create a vision for future development based on factual characteristics of the area combined with realistic market potential.

3.5.2.6 IDOT Highway Improvement Program

The FY 2013–2018 Proposed Multimodal Transportation Improvement Program identifies committed highway improvement projects based upon funding availability and system improvement priorities. IDOT's goal is to maintain state bridges at the current acceptable condition, while striving to keep the roadway system in a reasonably safe condition. Maintaining the system of roads and bridges under state jurisdiction is the priority, with most funds allocated to projects that improve the condition of Illinois roads and bridges. IDOT has identified four vital elements for the state highway system, with roadway safety the supreme goal—system maintenance, bridge maintenance, congestion mitigation, and system expansion.

3.5.2.7 Move Illinois: The Illinois Tollway Driving the Future

As required by the Toll Highway Act, the Illinois Tollway has developed a comprehensive 15-year capital program to complete rebuilding of the 52-year old system. It commits more than $12 billion in transportation funding to improve mobility, relieve congestion, reduce pollution, and link economies across Northern Illinois. The *Move Illinois: The Illinois Tollway Driving the Future,* prepared in August 2011, maps out the Illinois Tollway's next capital program for 2012 through 2026. The program includes the construction of the EO-WB, including the West Bypass between I-90 and I-294, the Elgin O'Hare Extension, and the rehabilitation and widening of the existing Elgin O'Hare Expressway.[5]

3.5.2.8 Federal Transportation Planning

In 2005, SAFETEA-LU was signed into law. The Act authorizes federal surface transportation programs. It included $140 million in earmarked funding to initiate project development for the EO-WB Project.

3.5.3 Planning Summary

The proposed EO-WB is consistent with land use programs, regional and corridor planning activities, and highway improvement programs. The project has been adopted by CMAP as part of *GO TO 2040 Comprehensive Regional Plan* and conforms to the State's implementation plan to achieve National Ambient Air Quality Standards. The project is included as part of the Illinois Tollway capital improvement program and is widely supported by local planning entities, Cook and DuPage counties and municipalities.

[5] The Illinois Tollway's commitment for the EO-WB Project is approximately $3.1 billion, escalated into YOE dollars. This represents approximately 90 percent of the funding for the entire EO-WB Project.

3.6 Policy Point 6—Comprehensive Interstate Network Study

FHWA Policy Point 6 states the following:

> *In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109[d], 23 CFR 625.2[a], 655.603[d], and 771.111).*

The proposed plan does not require, and IDOT is not requesting, any additional access to I-290 within the study area other than what currently exists. IDOT would not support any requests by others for additional access points along the portion of I-290 within the overall EO-WB study area extending from the I-90 system interchange to the north to the I-355 system interchange to the south (see Figure 2-1).

3.7 Policy Point 7—Coordination with Transportation System Improvements

FHWA Policy Point 7 states the following:

> *When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2 [a] and 655.603[d]). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2[a] and 655.603[d]).*

As noted previously, the request is not directly associated with a specific land use or development, but rather with an expected and desired (by all communities and entities within the study area) vision for both western access to O'Hare Airport, as well as improvements to transportation within the broad EO-WB study area. The EO-WB Project has been developed with substantial coordination, as described in the following subsections.

3.7.1 Project Coordination

The EO-WB Project communication structure has been highly organized to achieve consensus on process, design alternatives, construction phasing, environmental studies, and mitigation. Executive guidance of the process is provided by the lead agencies and the Governor's EO-WB Advisory Council concerning project financing, economic benefits, sustainability, and construction workforce diversity. Stakeholder input has been received through the formation of a Corridor Planning Group (CPG) comprised mostly of municipal mayors or their appointed staff, and its geographically based task forces; technical guidance has been provided by the working groups; and input on aesthetic treatments has been provided by the Corridor Aesthetic Advisory Team (CAAT). Together, the agencies and groups have managed the study and environmental review process and provided numerous opportunities for the public and participating agencies to get involved. The FHWA Division

Administrator, IDOT's Secretary of Transportation, the Illinois Tollway's Executive Director, and the FAA's Regional Administrator are the ultimate decision makers for the project. In the course of their responsibilities and decision making, valued input has been provided by the Governor's Advisory Council, the CPG, the various task forces, the CAAT, other agencies, and the public at large.

The consensus opinion of the Governor's Advisory Council, as stated in the *Elgin O'Hare West Bypass Advisory Council Final Report to Governor Pat Quinn* (June 2011), was that the objective of a financially achievable project would be attained through tolling with the Illinois Tollway as the preferred implementing entity. As discussed in Section 3.5.2.7, the Illinois Tollway Board of Directors enacted a system toll increase intended to finance their 15-year capital improvement program, *Move Illinois: The Illinois Tollway Driving the Future*, which includes the EO-WB Project (Illinois Tollway, 2011). The program would provide $3.1 billion (estimated funding at the mid-point of construction) in funding for the project. The project budget identifies an additional $300 million to be contributed by others, which may include federal, state, and local monies, or in-kind contributions.

3.7.2 Community Coordination

The I-290/Elgin O'Hare corridor system interchange provides service to a variety of communities within the Chicago metropolitan area. A brief summary of the nearest communities served, approximate distance (from the system interchange), and associated population is provided in Table 3-14. The communities of Elk Grove Village and Village of Itasca are directly affected by the footprint and changes in local access associated with the I-290 system interchange. Substantial coordination and consultation occurred with the two communities during the alternatives development and refinement process.

TABLE 3-14
Population and Distance of Served Communities

Community	Population	Distance
Village of Franklin Park	18,500	8.3 miles
City of Des Plaines	58,500	13.1 miles
Village of Mt. Prospect	54,000	11.6 miles
City of Northlake	12,500	13.1 miles
Village of Hanover Park	39,000	7.9 miles
City of Elmhurst	44,000	12.8 miles
Village of Schaumburg	75,000	5.9 miles
Village of Roselle	23,000	3.7 miles
Elk Grove Village	35,000	4.1 miles
Village of Itasca	8,300	1.6 miles
City of Wood Dale	14,000	3.7 miles
Village of Bensenville	21,000	5.9 miles
Village of Bloomingdale	22,000	5.6 miles
Chicago (metro area)	2,700,000	26.9 miles

3.7.3 Coordination with Development

The I-290/Elgin O'Hare corridor interchange complex extends from Meacham Road/Medinah Road on the west through the I-290 interchange to Prospect Avenue on the east. The primary design issue at this location stem from the need to provide local access immediately adjacent to the system connections. There are several nearby crossroads vital to the local commerce including Meacham Road/Medinah Road, IL 53, Park Boulevard, Arlington Heights Road, and Prospect Avenue. Frontage roads are provided on both sides of the mainline between Meacham Road/Medinah Road and IL 53 to accommodate access to local development. Direct access to Hamilton Lakes development (northeast quadrant of the interchange) from the toll road system will be provided from the north, south, and west. Access from the development to the south and west is provided at Park Boulevard in the southwest quadrant of the Hamilton Lakes development. Alternative egress access is located at Arlington Heights Road and Prospect Avenue to all directions. Access to and from the residential development in the southeast quadrant has been maintained, where all movements from the access-controlled facilities are immediately adjacent to the community. A frontage road extending from Park Boulevard to Prospect Avenue provides highway access via the split-diamond interchange at Arlington Heights Road and Prospect Avenue.

3.7.4 Local Road Network Improvements

A traffic analysis was conducted to study the effects of future traffic on the off-system routes in the vicinity of the proposed project. The analyses showed that with the proposed EO-WB in place, most of the arterial system would require no increase in capacity. Arterials in the immediate area of the project, however, would require some capacity improvements to accommodate increased travel in close proximity to the interchanges, and along some sections of arterials. The extent of the improvements typically requires added travel lanes, turning lanes, and traffic signal modernization. Added travel lanes commonly extend from the interchange areas for varying distances, which allows the high traffic volumes at the interchange areas to efficiently transition to the existing lane configuration of the arterial.

Table 3-15 summarizes those improvements specific to the I-290/Elgin O'Hare corridor interchange area. All of the arterial improvements have been included in the overall project footprint and have been accounted for in the project's right-of-way needs and costs.

TABLE 3-15
Local Crossroad Improvements

Arterial	Length of Improvements (feet)*	Improvement Description
Meacham Road/Medinah Road	1,800	Four through lanes
IL 53 (Rohlwing Road)	2,800	Four through lanes; additional turn lanes; new frontage road intersections
Devon Avenue	1,000	Four through lanes
Park Boulevard	5,600	Moved alignment in southwest corner of I-290 interchange; road extended to connect to Ketter Drive (four through lanes)

TABLE 3-15
Local Crossroad Improvements

Arterial	Length of Improvements (feet)*	Improvement Description
Arlington Heights Road	2,400	Four through lanes; new frontage road intersections
Prospect Avenue	2,400	Four through lanes; additional lanes; new frontage road intersections

Note:
*Length of improvement is total length of both sides of the mainline.

3.8 Policy Point 8—Status of Planning and the National Environmental Policy Act

FHWA Policy Point 8 states the following:

> *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

The project alternative development process for the EO-WB Project has spanned both Tier One and Tier Two. The Tier One study process focused on big picture questions ("What is the project?" and "Where is the project?") while taking into account the full range of environmental impacts. The Tier One Record of Decision completed in June 2010 approved the preferred type of improvement (a multimodal concept comprised of roadway, transit, and bicycle/pedestrian elements) and the preferred project corridors (location). With respect to the preferred project corridor, in Tier One, a conceptual plan of the project was developed with sufficient detail to define the project corridor with relative precision. The Tier One Record of Decision also enabled protective acquisition of right-of-way along the corridors in conformance with applicable federal and state procedures.

Tier Two studies were initiated in 2010, with a focus on the detailed engineering and environmental studies for the Tier One Preferred Alternative. Tier Two expands on Tier One with detailed engineering and environmental studies that refine the project concept "within the preferred project corridor." Tier Two alternative studies focus on refinements that optimize design choices within the project corridor (interchange types, tunnel versus bridge, drainage requirements, transit, and bicycle/pedestrian requirements) and facility type alternates (freeway, toll road, or combination of freeway and toll road). Environmental analyses and documentation include detailed studies of possible methods to avoid, minimize, and mitigate impacts on environmental resources within the project footprint.

Products of the Tier Two effort are the Tier Two EIS and Record of Decision. The Tier Two Draft EIS was circulated for review in March 2012. A public hearing was held on April 18, 2012, after notification of availability of the Tier Two Draft EIS in the Federal Register on March 30, 2012. The purpose of the hearing was to advise the public of the study findings and to obtain public comment on the proposed plan. The Tier Two Final EIS and

Record of Decision are on schedule to be completed in December 2012. In addition to the environmental documentation, associated geometry and preliminary engineering documentation in the form of the combined location/design report will also be completed. Another important aspect of the Tier Two studies is the development of an initial Financial Plan and Project Management Plan, consistent with major project requirements prescribed by FHWA; development of both plans is ongoing.

Avoidance and minimization strategies associated with potentially adverse environmental effects were considered throughout the EO-WB Project planning process. Stakeholder involvement and resource/regulatory agency meetings played a key role in understanding local resources and concerns, assessing various project alternatives, and avoiding and minimizing impacts to the natural and manmade environment to the extent practicable. However, based upon the current level of design and locations of the identified resources along the project corridor, some socioeconomic and environmental resource impacts were determined to be unavoidable.

As final design and right-of-way acquisition proceeds, the Illinois Tollway will implement, in accordance with state and federal regulations, mitigation measures to compensate for unavoidable resource losses and manage short- and long-term social effects as a result of this project, including the following environmental commitments which are documented in greater detail in the *Tier Two Final Environmental Impact Statement:*

- Providing relocation assistance and/or compensation for displaced residences, businesses, and industries (advanced planning with unique commercial and industrial properties will be conducted to produce a smooth transition from one site to the next)
- Restoring and/or creating wetlands offsite or outside the project area to increase the quality and quantity of the state's wetland resource base within the Des Plaines River drainage basin, improve water quality, provide habitat, and preserve open space, while taking into account aircraft safety pertaining to birds and other wildlife based on FAA mandate and proximity of the project to O'Hare Airport
- Providing riparian mitigation and stream enhancements (such as streambank stabilization, installing rock riffles, etc.) within the project corridor watersheds, including providing terrestrial wildlife crossings within riparian corridors/stream crossings and greenways
- Providing stormwater management measures that will address the roadway needs and promote the safety and well being of stakeholders working and residing near the project corridor
- Implementing best management practices to address water quality and quantity during construction, operation, and maintenance of the roadway, thereby minimizing impacts and potentially improving existing conditions to adjacent wetlands and the downstream aquatic environment (sustainable practices will be considered in all phases of the project)
- Compensating for floodplain fill and temporarily detaining stormwater runoff resulting from an increase in impervious surface through implementation of best management practices

- Providing added capacity to the Touhy Flood Control Reservoirs to compensate for the proposed roadway fill in the reservoirs
- Planting replacement trees and maintaining potential wildlife corridors, while taking into account aircraft safety pertaining to birds and other wildlife within the FAA restricted mitigation area by O'Hare Airport
- Controlling air pollution during construction with dust control practices and the use of low-emission construction equipment and low-sulfur fuels
- Controlling noise pollution during construction and implementing noise abatement in accordance with the Illinois Tollway and IDOT (I-290) policy that meets FHWA criteria
- Managing special waste in accordance with federal and state laws and regulations in a manner that would protect human health and the environment

Resource impacts and potential mitigation strategies were reviewed with the appropriate regulatory agencies, as necessary, during the planning process to allow for greater certainty and more-efficient permitting. Mitigation strategies will be implemented at the appropriate time (such as prior to and/or during construction).

SECTION 4

Conclusions

This AJR has been prepared for the proposed system interchange access at the Elgin O'Hare corridor and I-290 in suburban Chicago, Illinois. In accordance with the BDE Manual, 20 conditions have been reviewed in support of the access location. The conditions include examination of eight policy points required by FHWA in review of a proposed change in interstate access. The proposed system interchange access included in the Tier Two Preferred Alternative assists with meeting the Tier Two Purpose and Need for the EO-WB Project presented in Section 2.4, in that it improves regional and local travel by reducing congestion, improves travel efficiency, improves access to O'Hare Airport from the west, and ultimately will improve modal opportunities and connections. Additionally, results contained in the AJR confirm that the system interchange access is needed to support regional and local traffic demand, is consistent with local planning objectives, and will not have adverse effects on the safety and operation of I-290.

SECTION 5

References

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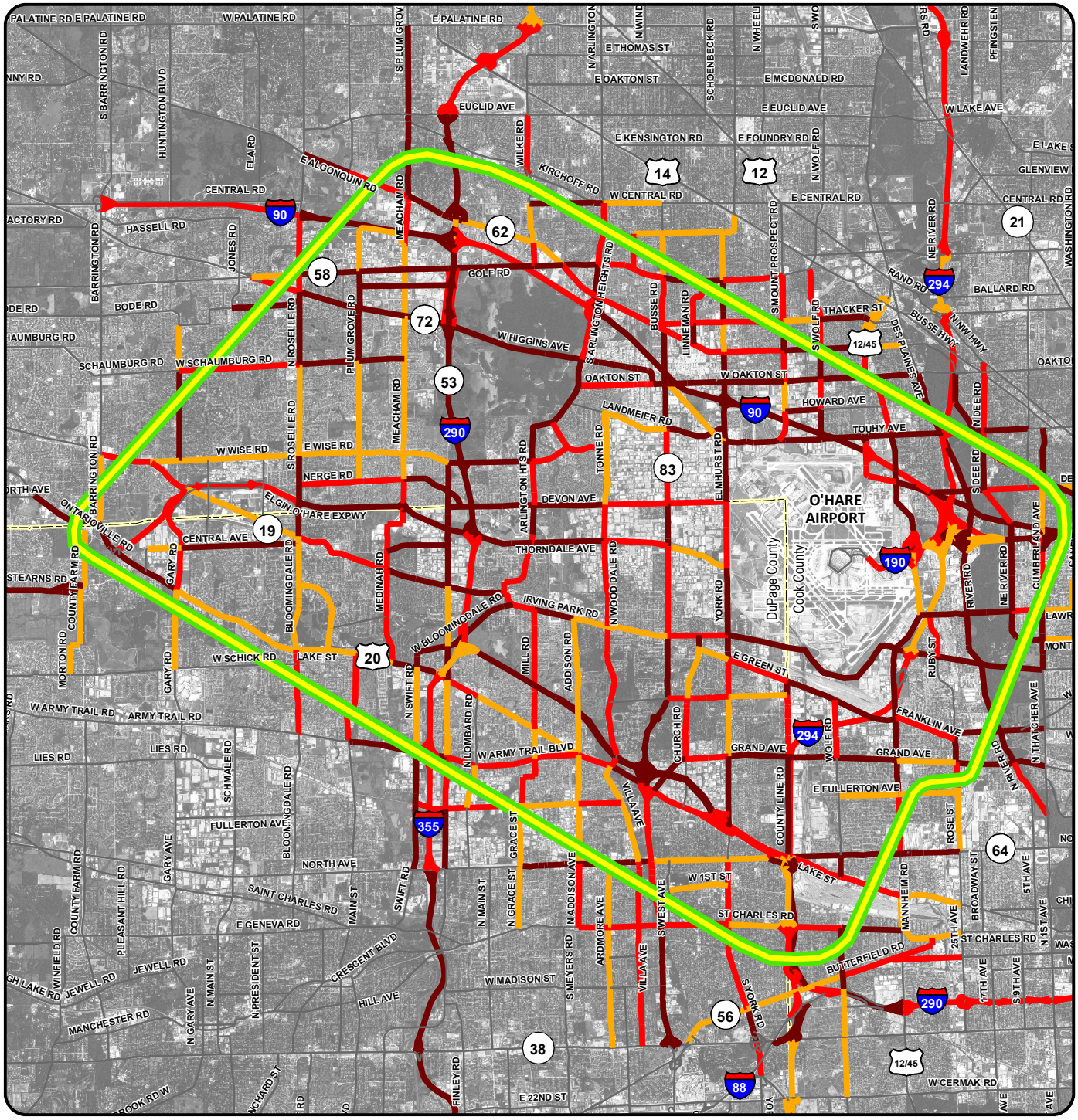
Exhibits



LEGEND

2010 Congested Roadway Sections
(P.M. Peak Period: 4:00 P.M. - 6:00 P.M.)

- Moderate Congestion (LOS D)
- Severe Congestion (LOS E)
- Extreme Congestion (LOS F)

- Study Area
- County Boundary

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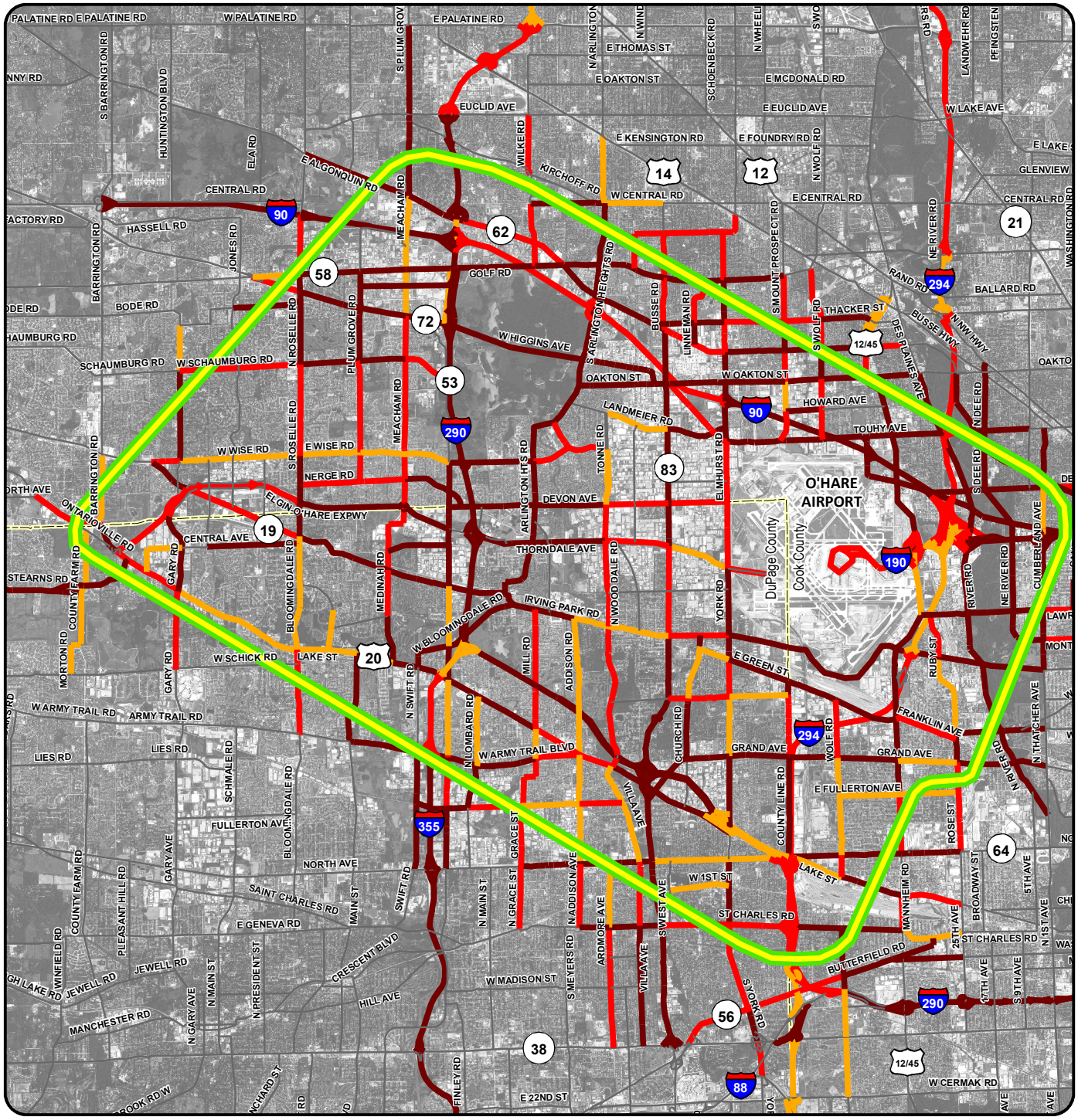
NORTH

0 0.5 1 2 3
Miles

Exhibit 2-1
Study Area Congested Roadways
P.M. Peak Period (Year 2010)



LEGEND

No-Build Congested Roadway Sections

- **Moderate Congestion (LOS D)**
- **Severe Congestion (LOS E)**
- **Extreme Congestion (LOS F)**

- **Study Area**
- **County Boundary**

Sources:
-Aerial photography: Airphoto USA, 2008
-County Boundary: U.S. Census Bureau, 2010

Notes:
- Level of Service (LOS) estimates are based on HCM 2000 thresholds for volume/capacity ratio and average speed values
- LOS estimates are generated by 2040 No-Build Travel Demand Model

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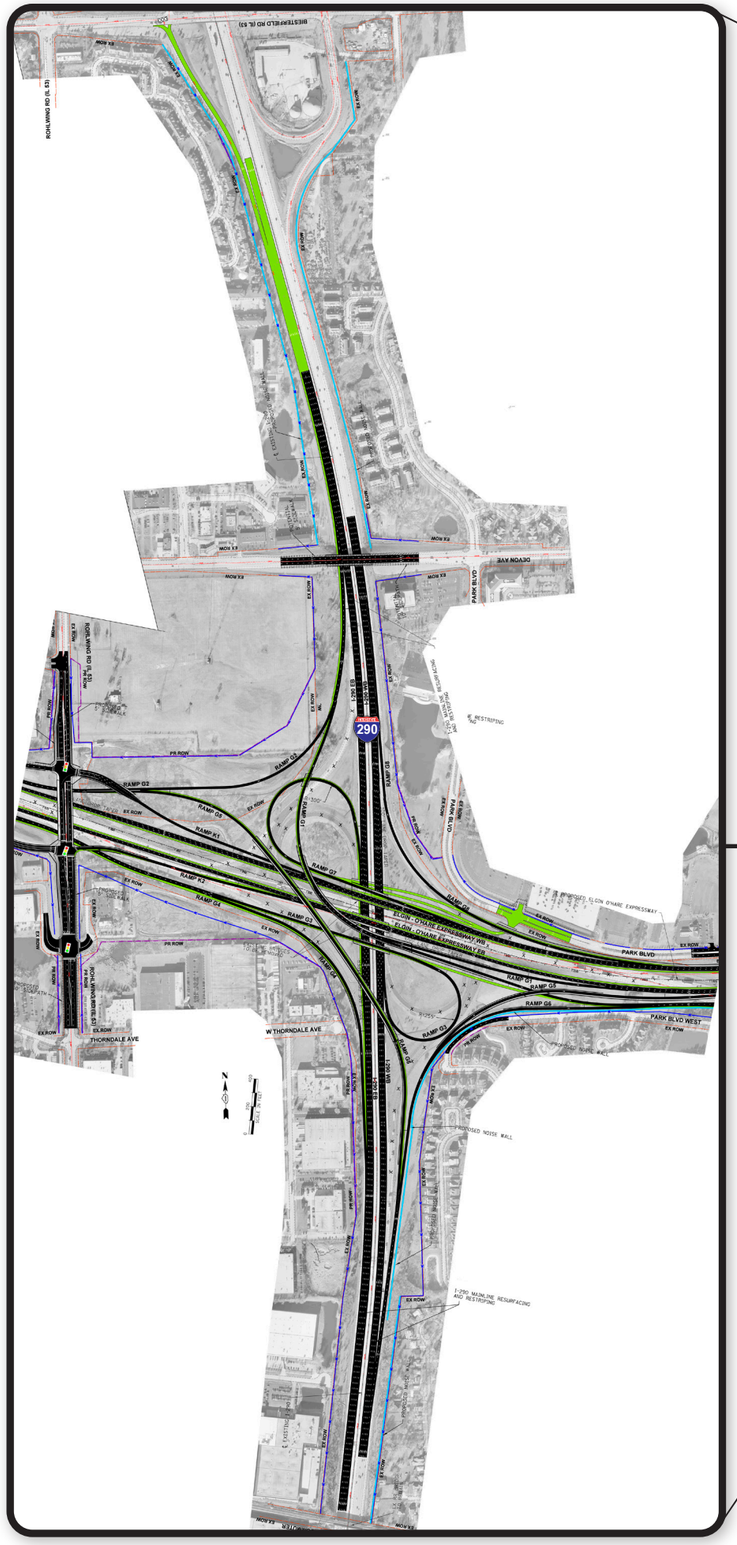
NORTH

0 0.5 1 2 3

Miles

Exhibit 2-2
Study Area Congested Roadways
P.M. Peak Period (No-Build)



LEGEND

- Existing Right-of-Way
- Proposed Right-of-Way
- Proposed Easement
- Proposed Temporary Easement
- Proposed Access Control
- Proposed Noise Wall
- Displacement
- Existing Signalized Intersection
- Proposed Signalized Intersection
- Tier Two Preferred Alternative
- Proposed Initial Construction Phase

LEGEND

- System Interchange
- Full Local Access Interchange
- Split Local Access Interchange
- Partial Local Access Interchange
- Proposed Transit Station
- Transit Improvement
- Arterial Improvements
- Mainline Improvements
- Roadway with No Improvements
- Existing/Proposed Toll Road

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EXHIBIT 2-3
I-290 INITIAL CONSTRUCTION PLAN

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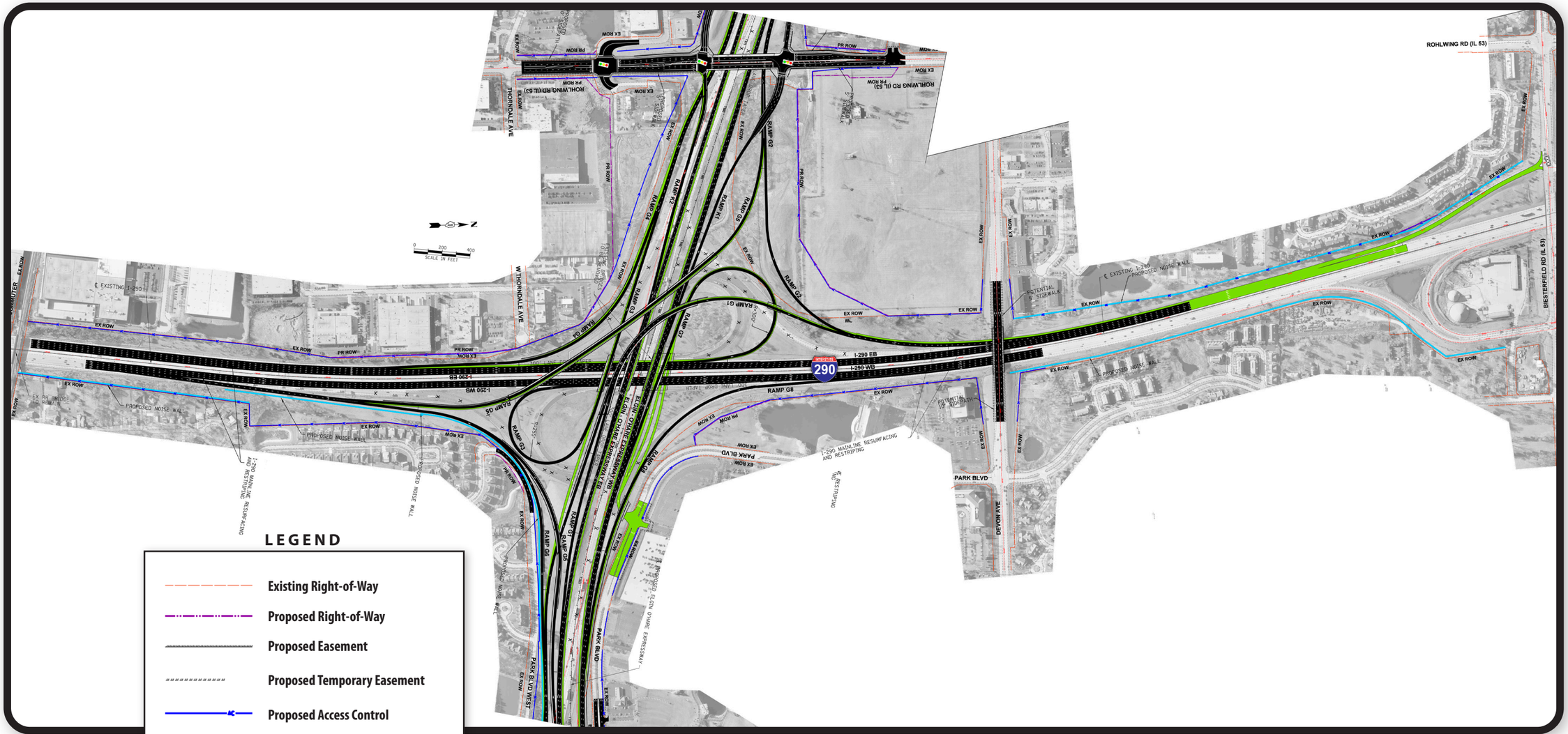

LEGEND

- Existing Right-of-Way
- Proposed Right-of-Way
- Proposed Easement
- Proposed Temporary Easement
- Proposed Access Control
- Proposed Noise Wall
- Displacement
- Existing Signalized Intersection
- Proposed Signalized Intersection
- Tier Two Preferred Alternative
- Proposed Initial Construction Phase

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EXHIBIT 2-4
INITIAL CONSTRUCTION PLAN AND TIER TWO PREFERRED ALTERNATIVE

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CH2MHILL

SEPTEMBER 2012

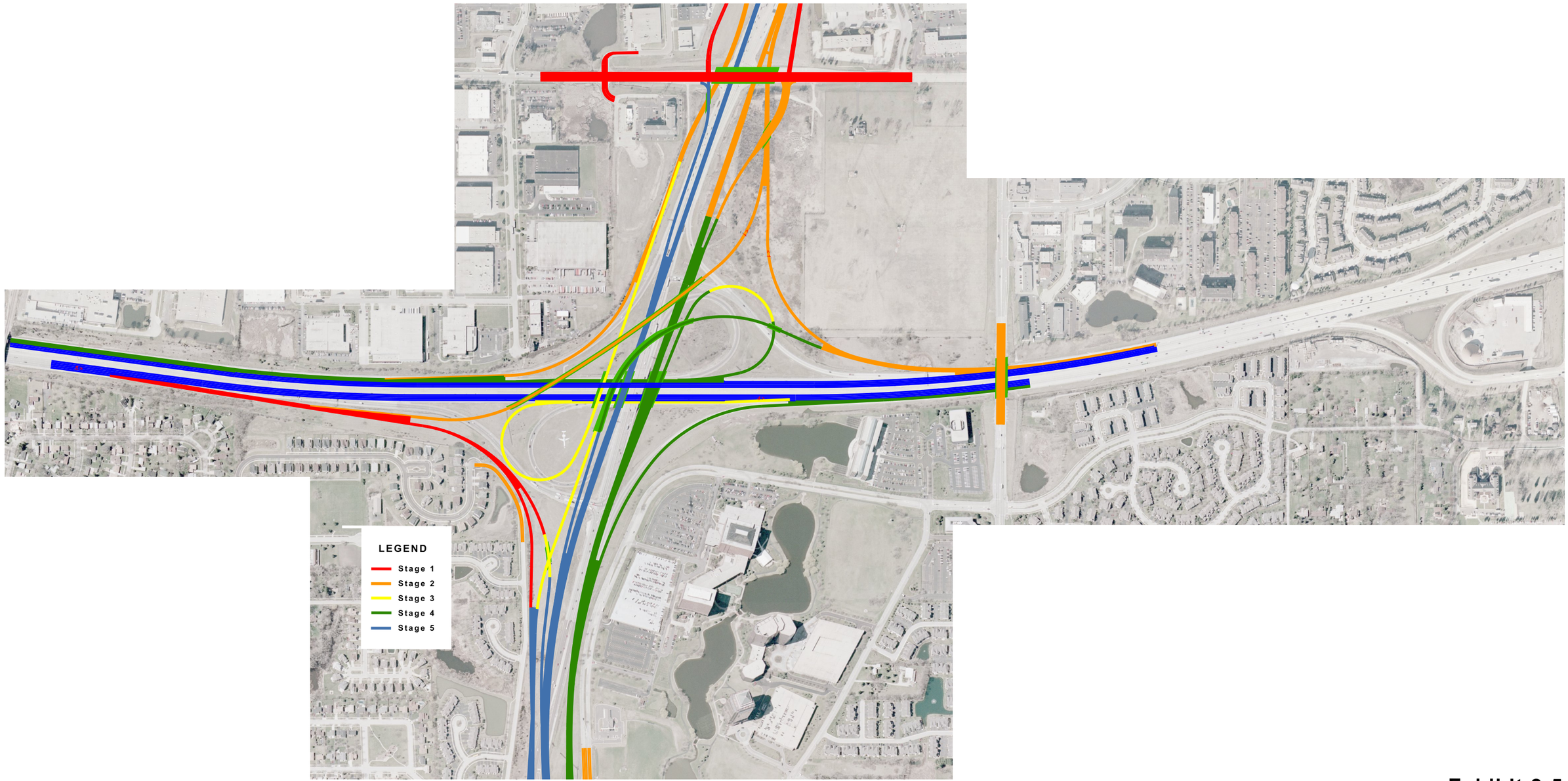
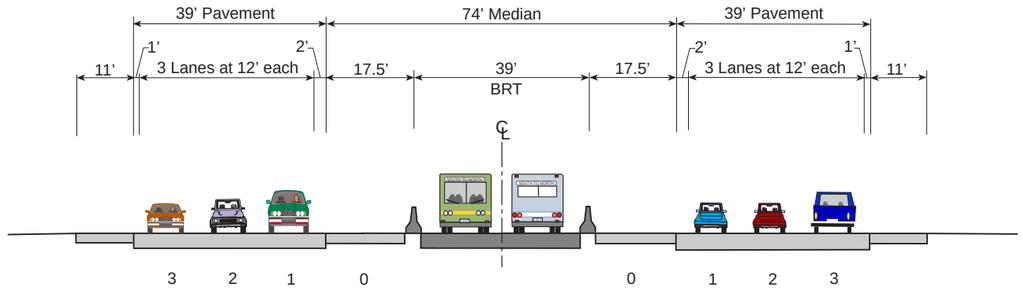


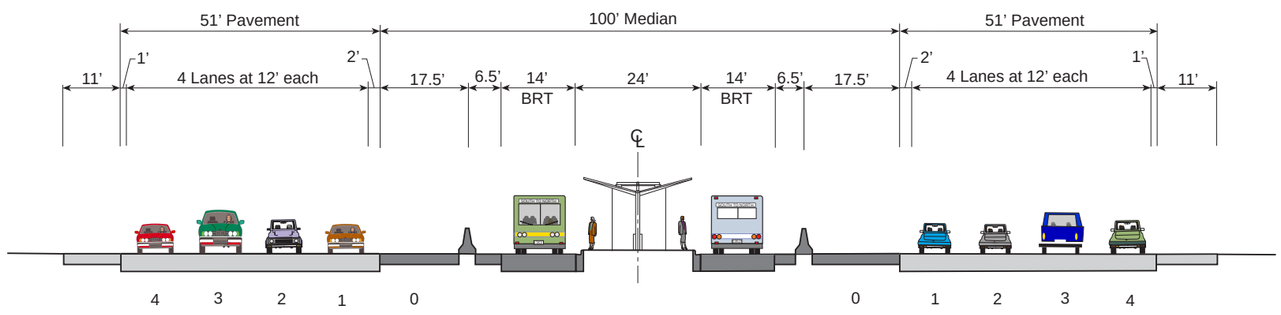
Exhibit 2-5

Elgin O'Hare at I-290
Construction Staging Concept

SEPTEMBER 2012

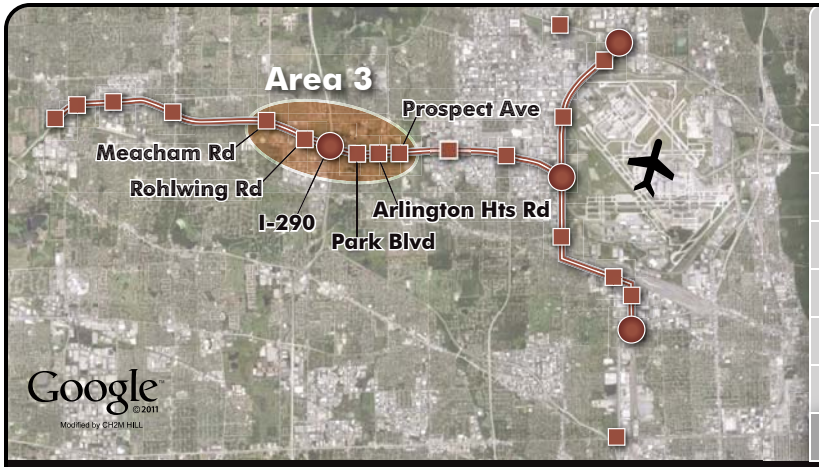


Full Build Roadway Cross-section without Transit Station
(Elgin O’Hare Corridor - 74’ Median)



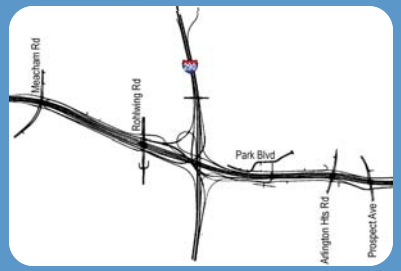
Full Build Roadway Cross-section with Transit Station
(Elgin O’Hare Corridor - 100’ Median)

TBG122011011653MKE



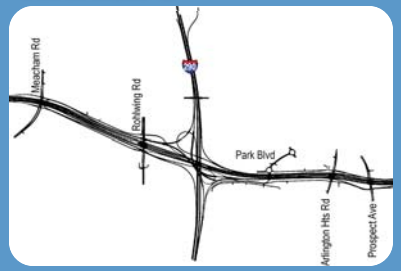
Alternates	Wetlands (ac)	Floodplains (ac)	Waters (ac)	Residential and Business Displacements (Number)	Cost	Traffic and Operations Evaluation Rating
1	12.83	10	0.4	11	Low	Moderate
2	12.88	10	0.4	11	Low	Poor
3	12.83	10	0.4	11	Medium	Good
4	12.83	10	0.4	11	Medium	Moderate
5	12.83	10	0.4	11	High	Poor
6	12.83	10	0.4	11	Highest	Poor
7	12.83	10	0.4	11	Lowest	Good

Alternate 1



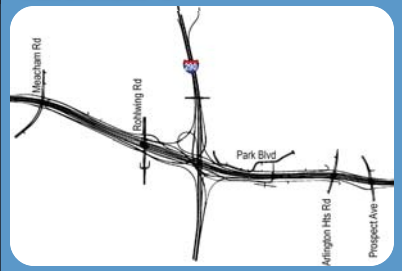
Four-level system interchange with westbound to southbound loop ramp and direct access to Park Boulevard from north, south, and west

Alternate 2



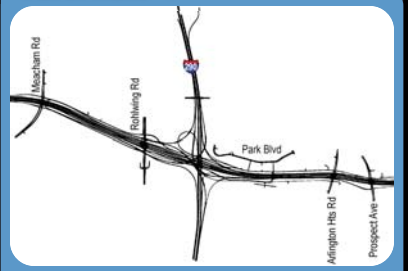
Three-level system interchange with westbound to southbound and eastbound to northbound loop ramps and direct access to Park Boulevard from north, south, and west

Alternate 3



Four-level system interchange with westbound to southbound loop ramp and direct access to Park Boulevard from north, south, and west and from Park Boulevard to the west via frontage road

Alternate 4



Four-level system interchange with westbound to southbound loop ramp and direct access to Park Boulevard from north, south, and west and from Park Boulevard to the north, south, and west via frontage road

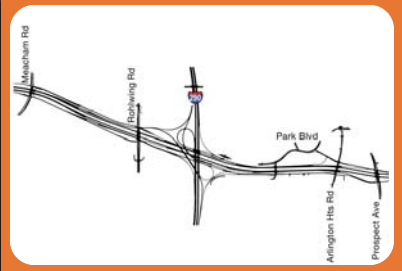
Alternate 5

Four-level system interchange with direct access to Park Boulevard from north, south, and west and from Park Boulevard to the west

Alternate 6

Four-level system interchange and direct access to Park Boulevard from north, south, and west and from Park Boulevard to the north, south (loop ramp), and west via frontage road

Alternate 7



Three-level system interchange with westbound to southbound and eastbound to northbound loop ramps and direct access to Park Boulevard from south and north and from Park Boulevard south and west

Preferred Alternate

Alternate 7 is a three-level system interchange with a two-loop interchange. It provides acceptable traffic operations at a lower cost.

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LEGEND

- Interchange Alternate Area
- Proposed/Improved System Interchange
- Proposed/Improved Local Access Interchange
- New or Widened Corridor
- Highest Cost, Highest Impacts, or Poor Travel Performance
- Average Cost, Average Impacts, or Average Travel Performance
- Low Cost, Low Impacts, or High Travel Performance
- Dismissed Alternate
- Preferred Alternate

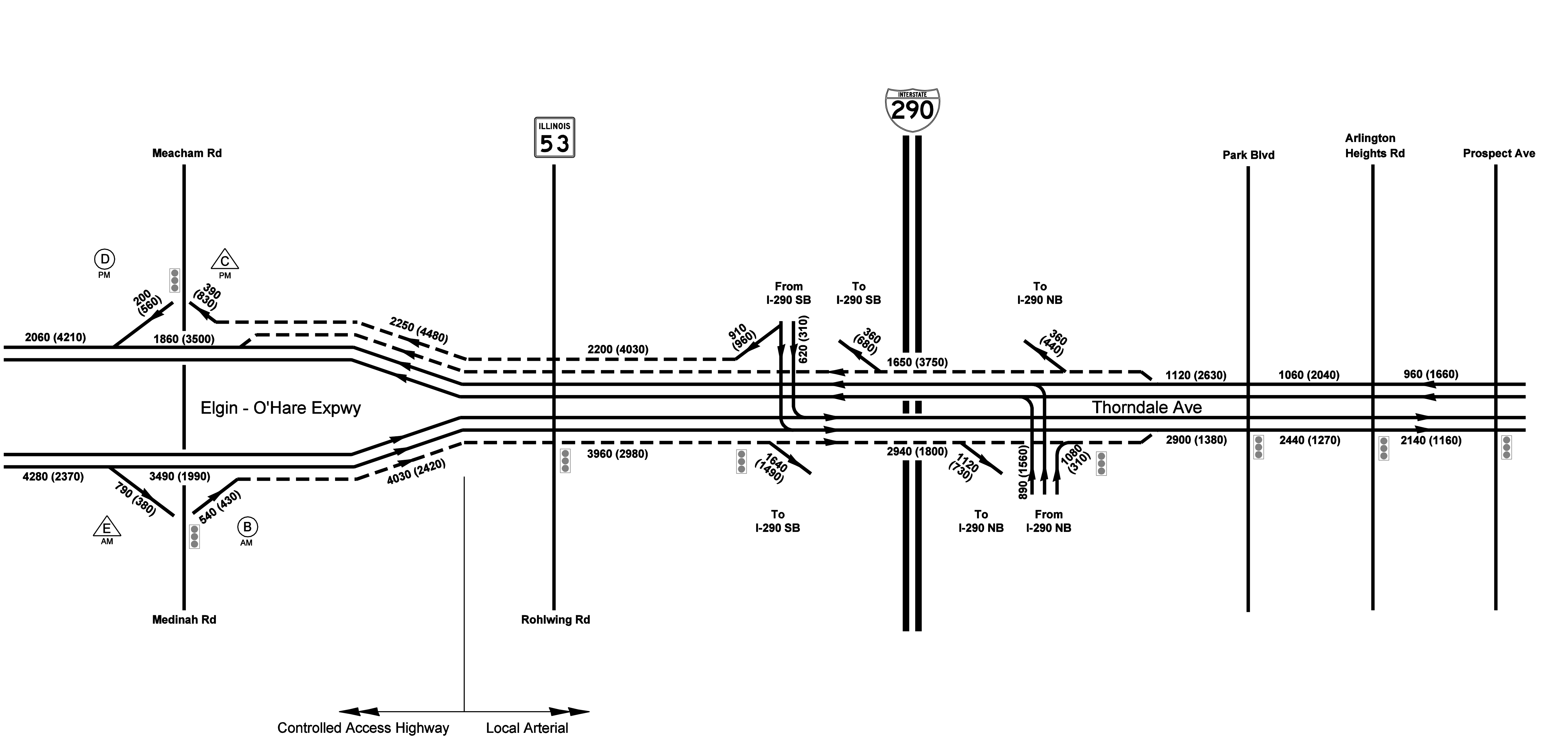
Note:
Quantities are based on area within project footprint for comparative purposes only. Impacts may vary following additional avoidance and minimization strategies.

Source:
Aerial photography: Google Earth Pro, 2011

NORTH
Not to Scale

Exhibit 3-10

Interchange Type Study Alternate Evaluation



LEGEND

000 (000) 2010 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM	PM	
C	C	AM (PM) Mainline Level Of Service
0.00	0.00	Volume To Capacity Ratio
55	55	Average Speed AM/PM Peak Hour (mph)

AM	PM	
D	D	AM (PM) Weaving Level Of Service
Wve	Wve	Weaving Controls Level Of Service
55	55	Average Speed AM/PM Peak Hour (mph)

C AM — Diverge Level Of Service Critical Peak Hour

B AM — Merge Level Of Service Critical Peak Hour

Existing Signalized Intersection

NOTES:

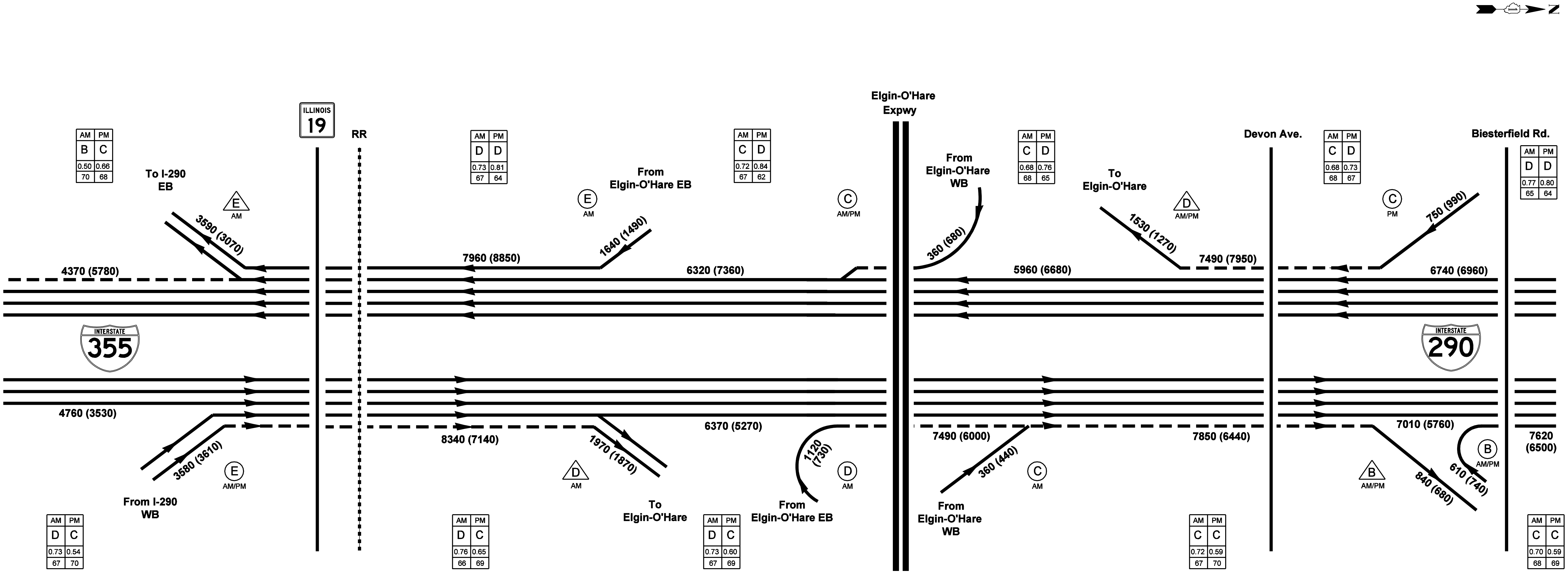
1. Eastbound Thorndale Ave. to I-290 ramp traffic backs up to and through the Thorndale Ave/Rohlwing Rd intersection during A.M. peak.

PRELIMINARY

Exhibit 3-2A

Elgin O'Hare - West Bypass
Existing Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012



LEGEND

000 (000) 2010 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM	PM	
C	C	AM (PM) Mainline Level Of Service
0.00	0.00	Volume To Capacity Ratio
55	55	Average Speed AM/PM Peak Hour (mph)

AM	PM	
D	D	AM (PM) Weaving Level Of Service
Wve	Wve	Weaving Controls Level Of Service
55	55	Average Speed AM/PM Peak Hour (mph)

C (AM) Diverge Level Of Service Critical Peak Hour

B (AM) Merge Level Of Service Critical Peak Hour

NOTES:

1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.
3. Southbound I-355 congestion at Army Trail Road Toll Plaza backs up to I-290 interchange with Thorndale Ave, affecting weaving operations.
4. Westbound I-290 to Thorndale Ave exit ramp traffic backs up to mainline auxillary lane during peak hours.

PRELIMINARY

Exhibit 3-2B

Elgin O'Hare - West Bypass
Existing Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012

MEACHAM RD

ILLINOIS 53

ROHLWING RD

WB FRONTAGE RD

ELGIN O'HARE EXPRESSWAY

EB FRONTAGE RD

MEDINAH RD

ITASCA MANUFACTURING DISTRICT

200 (560)

1860 (3500)

3490 (1990)

790 (380)

390 (830)

540 (430)

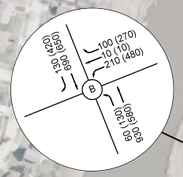
2250 (4480)

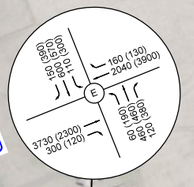
4030 (2420)

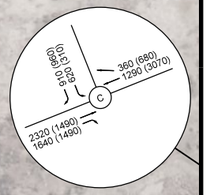
2200 (4030)

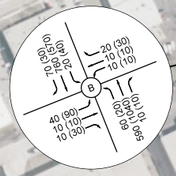
3960 (2980)

70 (70)









N

TRAFFIC LEGEND

1640 (410)	EXISTING AM(PM) PEAK HOUR VOLUME (VPH)
AM PM / C C / 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM / C / WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

DRAFT

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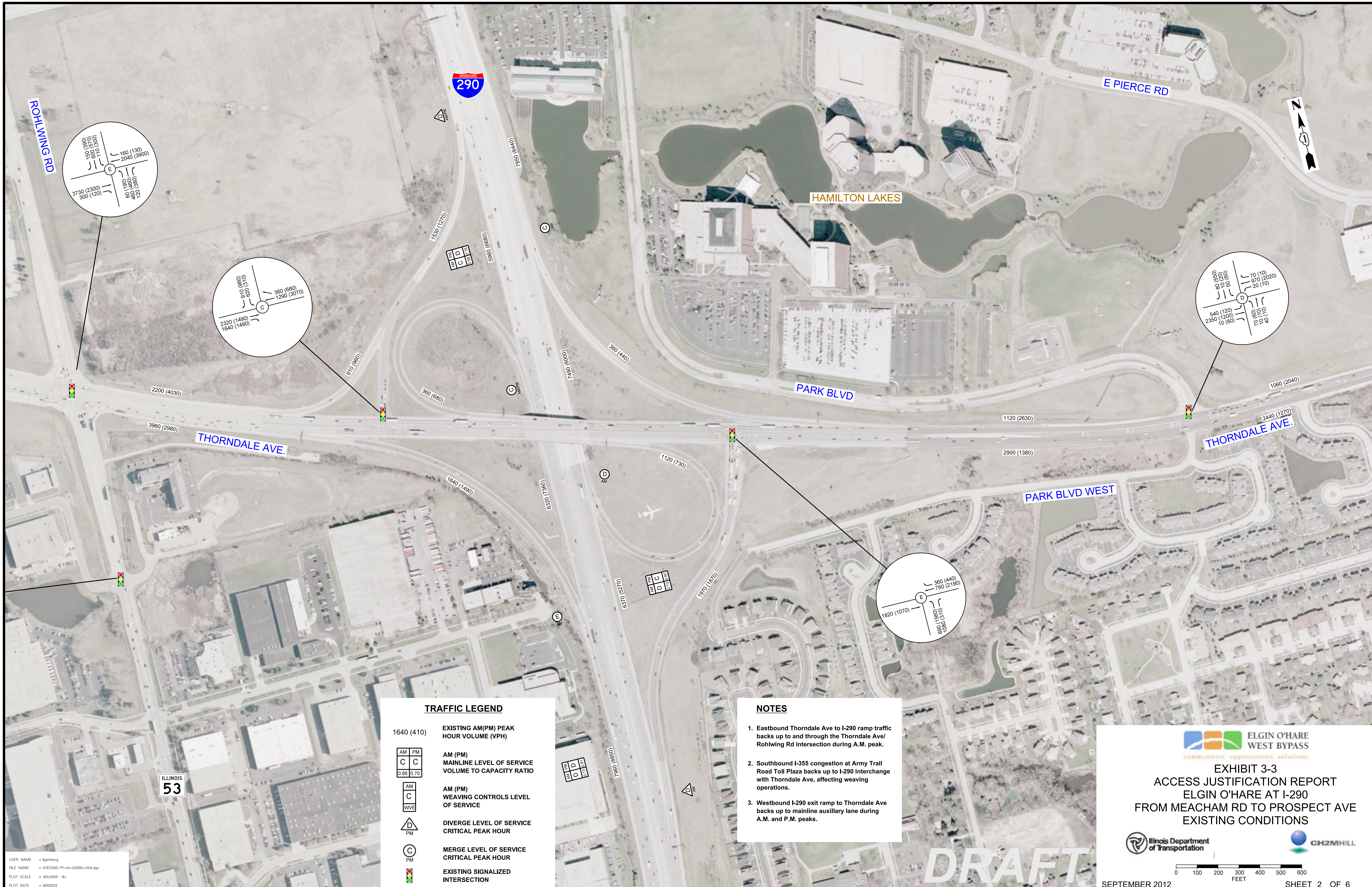
EXHIBIT 3-3
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
EXISTING CONDITIONS

Illinois Department of Transportation | CH2MHILL

0 100 200 300 400 500 600 FEET

SEPTEMBER 2012



TRAFFIC LEGEND

1640 (410)	EXISTING AM(PM) PEAK HOUR VOLUME (VPH)
AM PM / C C / 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM / C / WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

NOTES

1. Eastbound Thorndale Ave to I-290 ramp traffic backs up to and through the Thorndale Ave/ Rohlwing Rd intersection during A.M. peak.
2. Southbound I-355 congestion at Army Trail Road Toll Plaza backs up to I-290 interchange with Thorndale Ave, affecting weaving operations.
3. Westbound I-290 exit ramp to Thorndale Ave backs up to mainline auxillary lane during A.M. and P.M. peaks.

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EXHIBIT 3-3
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
EXISTING CONDITIONS

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CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 2 OF 6

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EXHIBIT 3-3
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
EXISTING CONDITIONS

Illinois Department of Transportation

CH2MHILL

SEPTEMBER 2012

SHEET 3 OF 6

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EXHIBIT 3-3
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
EXISTING CONDITIONS

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SEPTEMBER 2012

SHEET 4 OF 6

ILLINOIS 53

ROHLWING RD

ILLINOIS 19

AM PM
D D
0.73 0.81

3590 (3070)

E AM

7960 (8850)

INTERSTATE 290

8340 (7140)

AM PM
D C
0.76 0.65

WEST IRVING PARK RD \ IL 19

TRAFFIC LEGEND

1640 (410)	EXISTING AM(PM) PEAK HOUR VOLUME (VPH)
AM PM / C C / 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM / C / WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

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PLOT SCALE = 400.0000 '/ in.
PLOT DATE = 9/20/2012

DRAFT

ELGIN O'HARE WEST BYPASS
communities. opportunities. solutions.

EXHIBIT 3-3
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
EXISTING CONDITIONS

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

ROHLWING RD

ILLINOIS 53

INTERSTATE 290

DEVON AVE

BIESTERFIELD RD

3730 (2300)
300 (120)
150 (390)
600 (570)
110 (300)
60 (190)
460 (460)
120 (380)
180 (130)
2640 (3900)

1330 (940)
430 (310)
250 (450)
420 (250)
470 (1830)
320 (680)

1320 (900)
400 (290)
200 (350)
640 (330)
590 (2160)
210 (450)

AM | PM
C | D
0.68 | 0.73

AM | PM
C | C
0.72 | 0.59

AM | PM
C | C
0.66 | 0.70

AM | PM
D | D
0.77 | 0.80

D AM/PM

C PM

B AM/PM

750 (990)
6740 (6960)
7490 (7950)
7850 (6440)
840 (880)
610 (740)
670 (700)
7620 (7120)

TRAFFIC LEGEND

1640 (410)	EXISTING AM(PM) PEAK HOUR VOLUME (VPH)
AM | PM C | C 0.66 | 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM C WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

USER NAME = kjamburg
FILE NAME = D:\ECOWB~1\Projects\2009\Exhibits\008.dgn
PLOT SCALE = 400.0000 '/ in.
PLOT DATE = 9/20/2012

ELGIN O'HARE WEST BYPASS
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EXHIBIT 3-3
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
EXISTING CONDITIONS

Illinois Department of Transportation

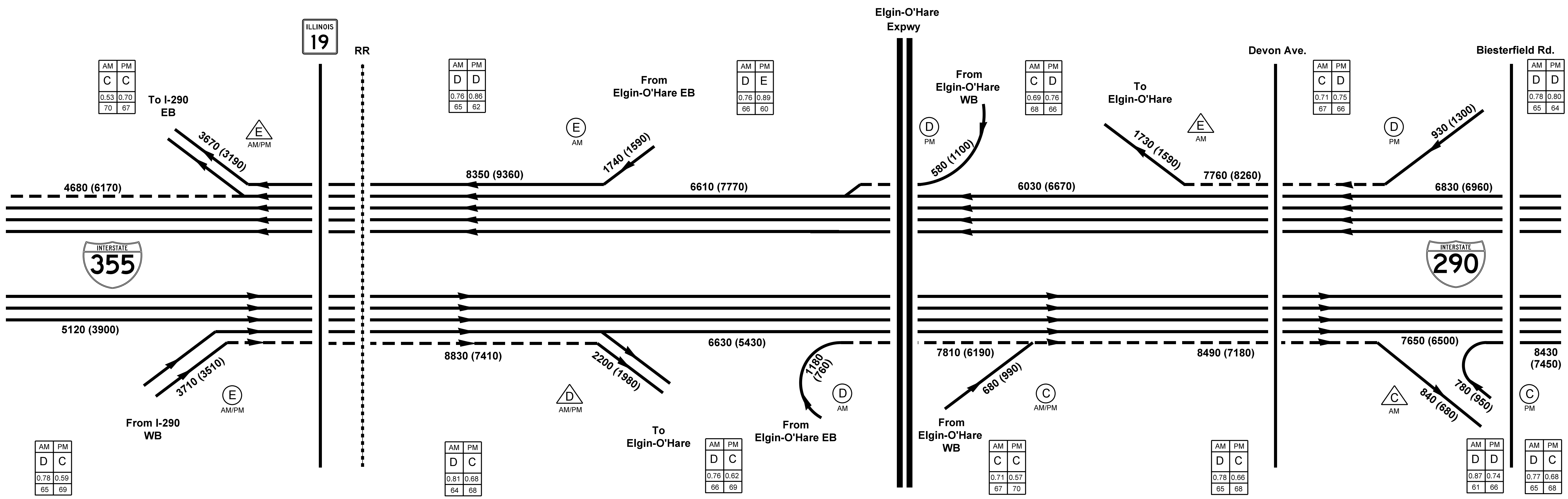
CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 6 OF 6

DRAFT



LEGEND

000 (000) 2040 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM	PM	
C	C	Mainline Level Of Service
0.00	0.00	Volume To Capacity Ratio
55	55	Average Speed AM/PM Peak Hour (mph)

AM	PM	
D	D	Weaving Level Of Service
Wve	Wve	Weaving Controls Level Of Service
55	55	Average Speed AM/PM Peak Hour (mph)

C (AM) Diverge Level Of Service Critical Peak Hour

B (AM) Merge Level Of Service Critical Peak Hour

NOTES:

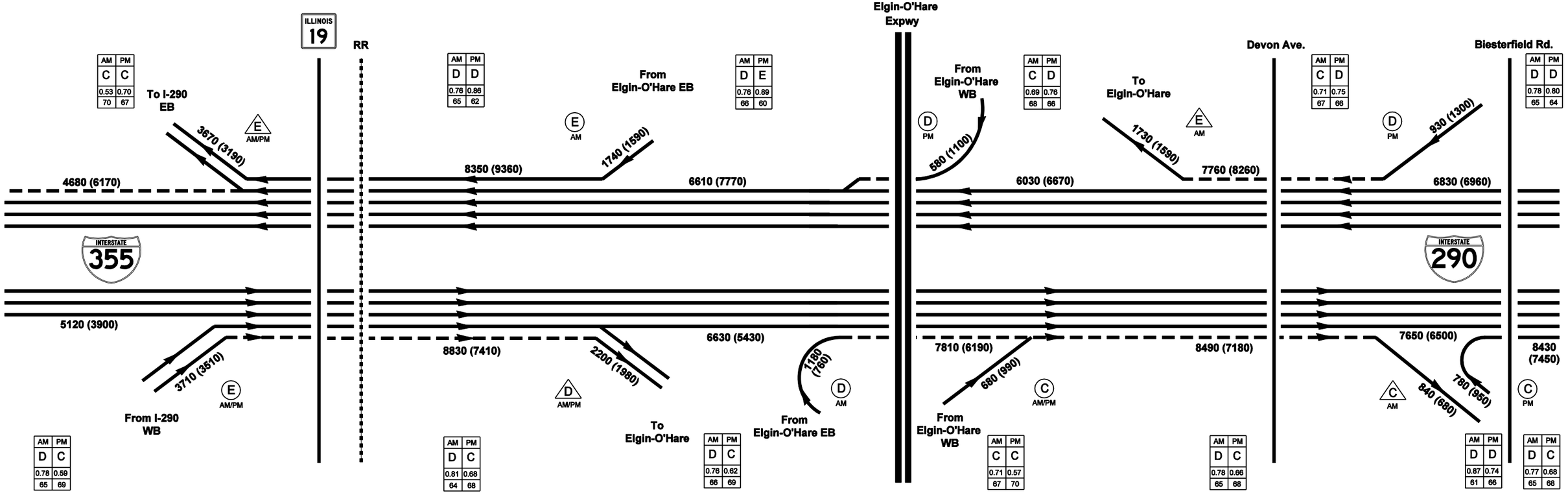
1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.
3. Westbound I-290 exit ramp traffic to Thorndale Ave backs up on mainline auxiliary lane during peak hours.
4. Southbound I-355 congestion at Army Trail Road Toll Plaza backs up through I-290 interchange with Thorndale Ave, affecting weaving operations.

PRELIMINARY

Exhibit 3-4B

Elgin O'Hare - West Bypass
2040 No-Build Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012



LEGEND

000 (000) 2040 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM	PM	
C	C	Mainline Level Of Service
0.00	0.00	Volume To Capacity Ratio
55	55	Average Speed AM/PM Peak Hour (mph)

AM	PM	
D	D	Weaving Level Of Service
Wve	Wve	Weaving Controls Level Of Service
55	55	Average Speed AM/PM Peak Hour (mph)

C AM — Diverge Level Of Service Critical Peak Hour

B AM — Merge Level Of Service Critical Peak Hour

NOTES:

1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.
3. Westbound I-290 exit ramp traffic to Thorndale Ave backs up on mainline auxiliary lane during peak hours.
4. Southbound I-355 congestion at Army Trail Road Toll Plaza backs up through I-290 interchange with Thorndale Ave, affecting weaving operations.

PRELIMINARY

Exhibit 3-4B

Elgin O'Hare - West Bypass
2040 No-Build Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012

USER NAME = lemburg
FILE NAME = DEIOWB-TP-ehr-2040NoBuild-002.dgn
PLOT DATE = 9/20/2012

MEACHAM RD

ILLINOIS 53

ROHLWING RD

WB FRONTAGE RD

ELGIN O'HARE EXPRESSWAY

EB FRONTAGE RD

MEDINAH RD

WILLY WONKA CANDY FACTORY

210 (650)

1900 (4370)

390 (890)

2290 (4260)

2240 (3910)

3870 (2220)

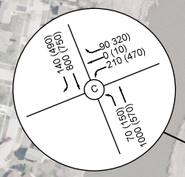
580 (430)

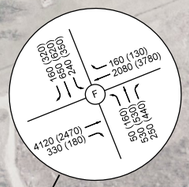
4450 (2650)

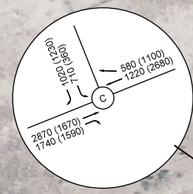
4610 (3260)

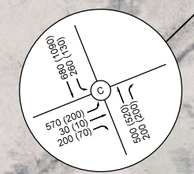
800 (280)

90 (90)









TRAFFIC LEGEND

1640 (410)	2040 NO-BUILD AM(PM) PEAK HOUR VOLUME (VPH)
AM PM / C C / 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM / C / WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

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EXHIBIT 3-5
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 NO-BUILD

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 1 OF 6

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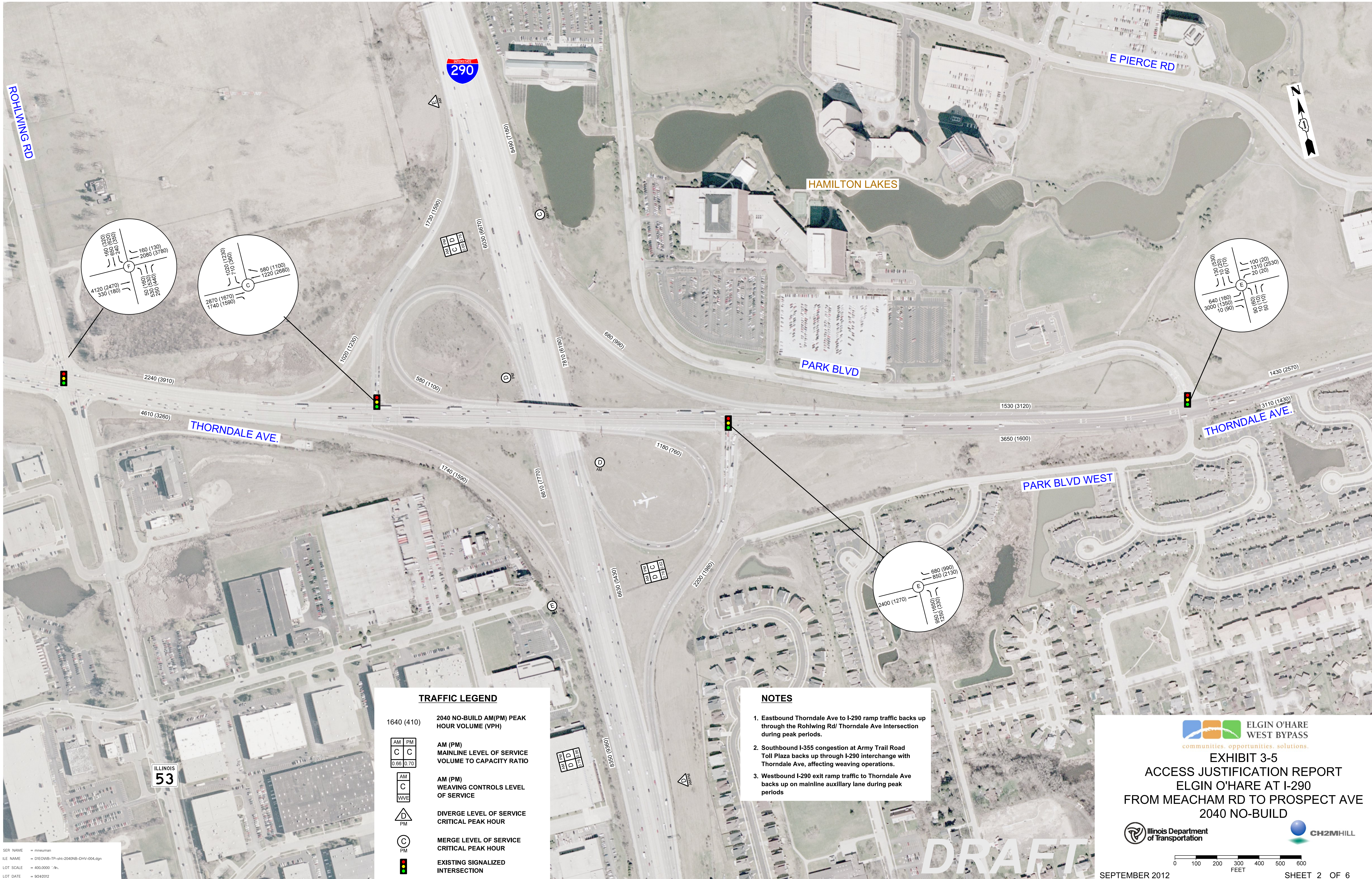
PLOT SCALE = 400.0000 '/ in.
PLOT DATE = 9/24/2012



TRAFFIC LEGEND

1640 (410)	2040 NO-BUILD AM(PM) PEAK HOUR VOLUME (VPH)
AM / PM; C C; 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM; C; WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D (triangle), PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C (circle), PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
(signal symbol)	EXISTING SIGNALIZED INTERSECTION

NOTES

1. Eastbound Thorndale Ave to I-290 ramp traffic backs up through the Rohlwing Rd/ Thorndale Ave intersection during peak periods.
2. Southbound I-355 congestion at Army Trail Road Toll Plaza backs up through I-290 interchange with Thorndale Ave, affecting weaving operations.
3. Westbound I-290 exit ramp traffic to Thorndale Ave backs up on mainline auxillary lane during peak periods

ELGIN O'HARE WEST BYPASS
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EXHIBIT 3-5
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 NO-BUILD

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 2 OF 6

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LOT SCALE = 400.0000 '/in.
LOT DATE = 9/24/2012

TRAFFIC LEGEND

1640 (410)	2040 NO-BUILD AM(PM) PEAK HOUR VOLUME (VPH)
AM C 0.66 / PM C 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM C WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

PROSPECT AVE

SALT CREEK

E PIERCE RD

THORNDALE AVE

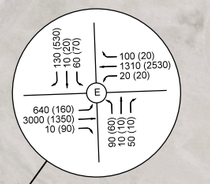
N. ARLINGTON HEIGHTS RD

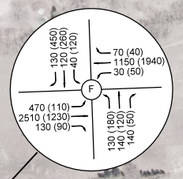
1250 (2030)

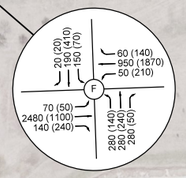
2690 (1400)

1430 (2570)

3110 (1430)







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ELGIN O'HARE WEST BYPASS

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EXHIBIT 3-5
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 NO-BUILD

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 3 OF 6

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PLOT DATE = 9/24/2012

TRAFFIC LEGEND

1640 (410)	2040 NO-BUILD AM(PM) PEAK HOUR VOLUME (VPH)
AM PM / C C / 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM / C / WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

SER NAME = rmeuman
ILE NAME = D:\EOWB-TR-ctx-2040NB-DHV-006.dgn
LOT SCALE = 400.0000 '/in.
LOT DATE = 9/24/2012

ELGIN O'HARE WEST BYPASS
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EXHIBIT 3-5
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 NO-BUILD

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

ROHLWING RD

ILLINOIS 53

ILLINOIS 19

INTERSTATE 290

WEST IRVING PARK RD \ IL 19

3670 (3190)

8350 (9360)

8830 (7410)

AM PM
D D
0.76 0.86

AM PM
D C
0.81 0.68

TRAFFIC LEGEND

1640 (410)	2040 NO-BUILD AM(PM) PEAK HOUR VOLUME (VPH)
AM PM / C C / 0.66 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM / C / WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

USER NAME = mneuman
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PLOT SCALE = 400.0000 '/ in.
PLOT DATE = 9/24/2012

DRAFT

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EXHIBIT 3-5
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 NO-BUILD

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

ROHLWING RD

ILLINOIS 53

INTERSTATE 290

DEVON AVE

BIESTERFIELD RD

780 (810)

930 (1300)

6830 (6960)

8430 (7450)

7760 (8260)

8490 (7180)

840 (880)

780 (950)

1510 (1090)
530 (410)
290 (520)
490 (290)
750 (1940)
400 (720)

1490 (1000)
510 (360)
200 (350)
640 (330)
950 (2310)
270 (570)

AM | PM
C | D
0.71 | 0.75

AM | PM
D | D
0.77 | 0.80

AM | PM
D | C
0.78 | 0.66

AM | PM
C | C
0.66 | 0.70

TRAFFIC LEGEND

1640 (410)	2040 NO-BUILD AM(PM) PEAK HOUR VOLUME (VPH)
AM | PM C | C 0.66 | 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM C WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING SIGNALIZED INTERSECTION

USER NAME = mneuman
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PLOT DATE = 9/24/2012

DRAFT

ELGIN O'HARE WEST BYPASS
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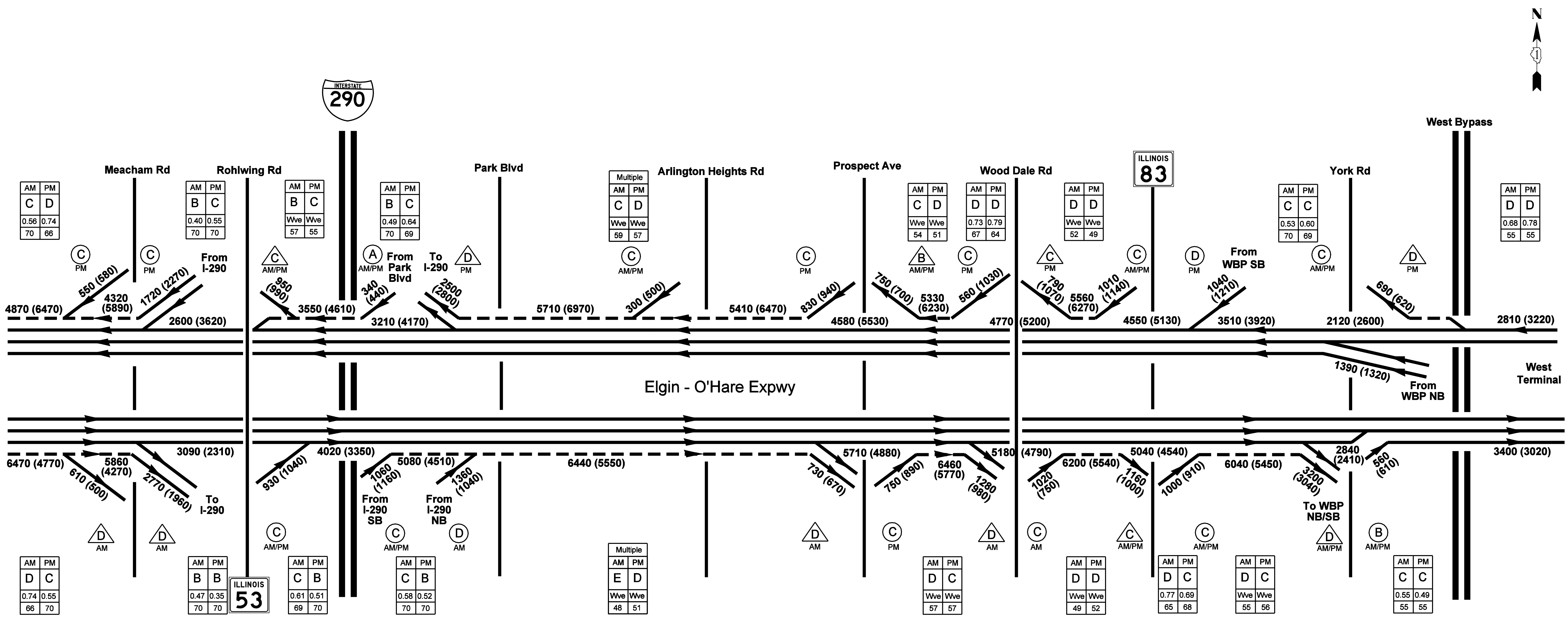
EXHIBIT 3-5
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 NO-BUILD

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012



LEGEND

000 (000) 2040 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM	PM	
		AM (PM)
C	C	Mainline Level Of Service
0.00	0.00	Volume To Capacity Ratio
55	55	Average Speed AM/PM Peak Hour (mph)

AM	PM	
		AM (PM)
D	D	Weaving Level Of Service
Wve	Wve	Weaving Controls Level of Service
55	55	Average Speed AM/PM Peak Hour (mph)

C AM — Diverge Level Of Service Critical Peak Hour

B AM — Merge Level Of Service Critical Peak Hour

NOTES:

1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.

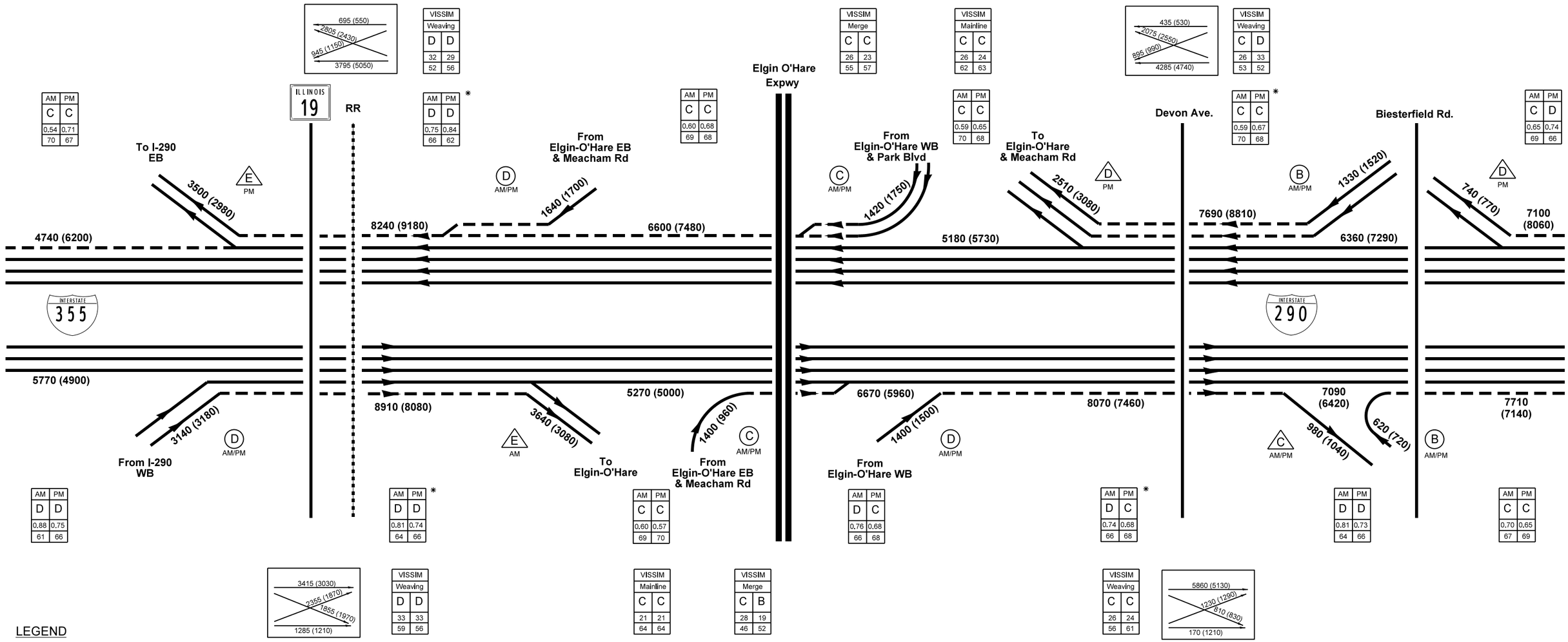
PRELIMINARY

Exhibit 3-6A

Elgin O'Hare - West Bypass
Tier Two Preferred Alternative Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012

USER NAME = lgamburg
FILE NAME = D\EOWB-TP-sht-2040TOLL-002.dgn
PLOT DATE = 9/20/2012



LEGEND

000 (000) 2040 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM PM C C 0.00 0.00 55 55 — AM (PM) Mainline Level Of Service; Volume To Capacity Ratio; Average Speed AM/PM Peak Hour (mph)

VISSIM Weaving D D 20 20 55 55 — Segment Type; Level Of Service; Density; Average Speed AM/PM Peak Hour (mph)

C AM — Diverge Level Of Service, Critical Peak Hour

B AM — Merge Level Of Service, Critical Peak Hour

NOTES:

* Determination of weaving sections and weaving section analysis are based on the VISSIM analysis which shows acceptable performance on these segments.

1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.

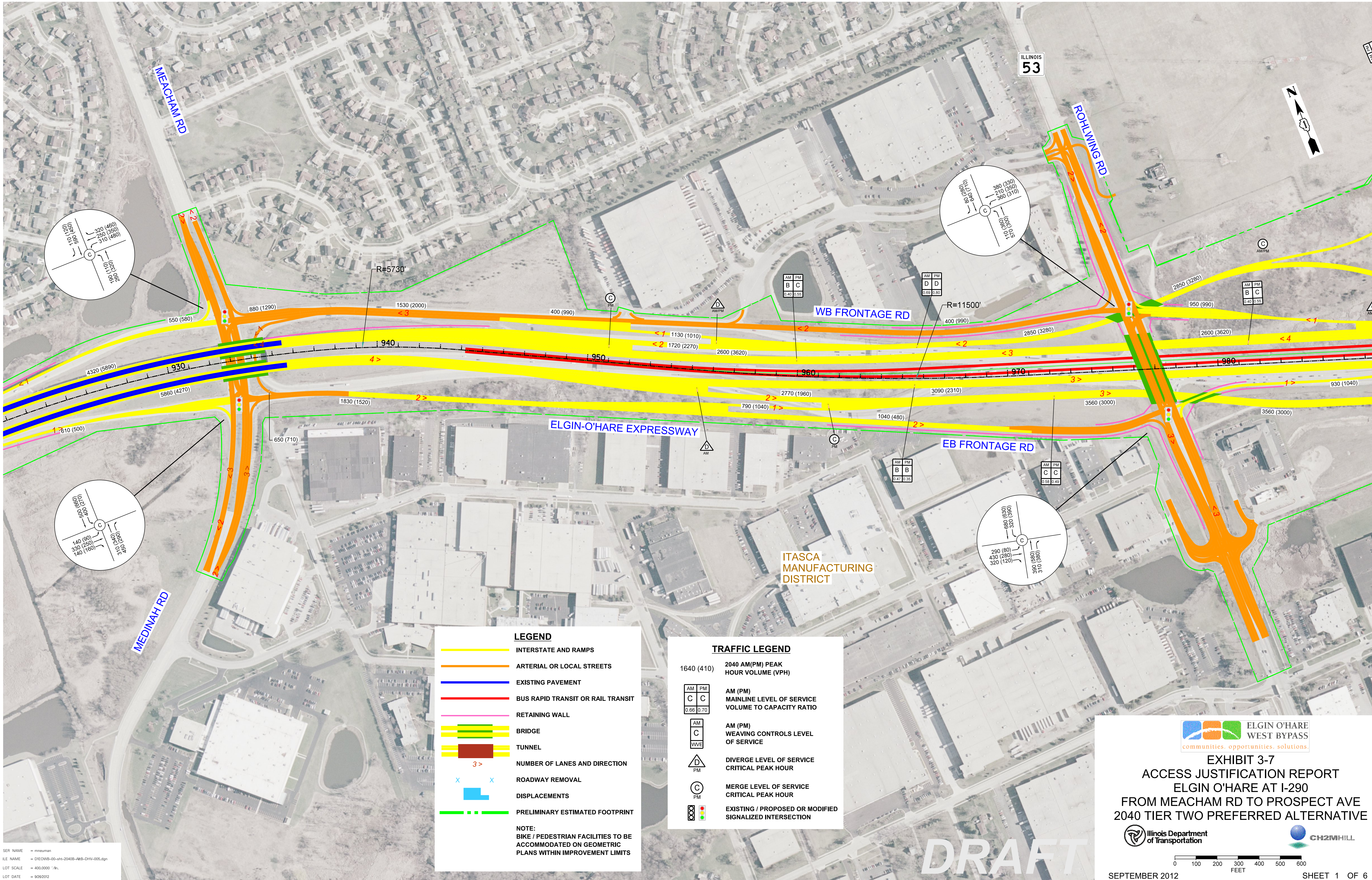
PRELIMINARY

Exhibit 3-6B

Elgin O'Hare - West Bypass
Tier Two Preffered Alternative Traffic Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012

USER_NAME = rbunik
FILE_NAME = DEIOWB-TP-eih-2040TOLL-d04_VISSIM.dgn
PLOT_DATE = 9/28/2012



MEACHAM RD
MEDINAH RD
ROHLWING RD
ILLINOIS 53
WB FRONTAGE RD
EB FRONTAGE RD
ELGIN-O'HARE EXPRESSWAY
ITASCA MANUFACTURING DISTRICT
R=5730'
R=11500'
DRAFT
LEGEND
INTERSTATE AND RAMPS
ARTERIAL OR LOCAL STREETS
EXISTING PAVEMENT
BUS RAPID TRANSIT OR RAIL TRANSIT
RETAINING WALL
BRIDGE
TUNNEL
NUMBER OF LANES AND DIRECTION
ROADWAY REMOVAL
DISPLACEMENTS
PRELIMINARY ESTIMATED FOOTPRINT
NOTE: BIKE / PEDESTRIAN FACILITIES TO BE ACCOMMODATED ON GEOMETRIC PLANS WITHIN IMPROVEMENT LIMITS
TRAFFIC LEGEND
1640 (410) 2040 AM(PM) PEAK HOUR VOLUME (VPH)
AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION
ELGIN O'HARE WEST BYPASS
communities. opportunities. solutions.
EXHIBIT 3-7
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 TIER TWO PREFERRED ALTERNATIVE
Illinois Department of Transportation
CH2MHILL
0 100 200 300 400 500 600
FEET
SEPTEMBER 2012
SHEET 1 OF 6

ROHLWING RD

E PIERCE RD

HAMILTON LAKES

ELGIN-O'HARE EXPRESSWAY

PARK BLVD

EB FRONTAGE RD

PARK BLVD WEST

ILLINOIS 53

INTERSTATE 290

R=11,459'

R=850'

R=1000'

R=300'

R=1200'

R=7000'

R=220'

R=700'

R=11459'

TRAFFIC LEGEND

1640 (410) — 2040 AM(PM) PEAK HOUR VOLUME (VPH)

AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO

AM (PM) WEAVING CONTROLS LEVEL OF SERVICE

DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR

MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR

EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION

LEGEND

- INTERSTATE AND RAMPS
- ARTERIAL OR LOCAL STREETS
- EXISTING PAVEMENT
- BUS RAPID TRANSIT OR RAIL TRANSIT
- RETAINING WALL
- BRIDGE
- TUNNEL
- NUMBER OF LANES AND DIRECTION
- ROADWAY REMOVAL
- DISPLACEMENTS
- PRELIMINARY ESTIMATED FOOTPRINT

NOTE:
BIKE / PEDESTRIAN FACILITIES TO BE ACCOMMODATED IN GEOMETRIC PLANS WITHIN IMPROVEMENT LIMITS

DRAFT

ELGIN O'HARE WEST BYPASS
communities. opportunities. solutions.

EXHIBIT 3-7
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 TIER TWO PREFERRED ALTERNATIVE

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600 FEET

SEPTEMBER 2012

USER NAME = mneuman
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PLOT SCALE = 400.0000 '/in.
PLOT DATE = 9/26/2012

TRAFFIC LEGEND

1640 (410) — 2040 AM(PM) PEAK HOUR VOLUME (VPH)

AM | PM
C | C
0.66 | 0.70
— AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO

AM
C
WVE
— AM (PM) WEAVING CONTROLS LEVEL OF SERVICE

D PM — DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR

C PM — MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR

— EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION

PROSPECT AVE

SALT CREEK

N

PARK BLVD

E PIERCE RD

KETTER DR

WB FRONTAGE RD

EB FRONTAGE RD

ELGIN-O'HARE EXPRESSWAY

N. ARLINGTON HEIGHTS RD

SALT CREEK

5710 (6970)
6440 (5550)
690 (660)
300 (500)
5410 (6470)
520 (460)
40 (40)
740 (680)
610 (540)
R=6000'
830 (940)
370 (420)
4580 (5530)
730 (670)
5710 (4880)
1140 (980)
200 (230)
750 (700)
750 (890)
5330 (6230)
6460 (5770)
1030
1040
1050
1060
1070
1080
1090

120 (110) 330 (480) — 120 (150) 60 (50) 190 (220) — 20 (20) 20 (20) — 340 (300) 470 (310)

370 (450) 440 (670) — 260 (180) 210 (230) 280 (290) — 420 (450) 800 (540)

20 (30) 380 (580) 140 (110) — 330 (280) 230 (220) 180 (180) — 480 (330) 240 (210)

540 (660) 180 (300) — 430 (330) 270 (270) 440 (380) — 790 (660) 300 (340)

LEGEND

- INTERSTATE AND RAMPS
- ARTERIAL OR LOCAL STREETS
- EXISTING PAVEMENT
- BUS RAPID TRANSIT OR RAIL TRANSIT
- RETAINING WALL
- BRIDGE
- TUNNEL
- 3 > — NUMBER OF LANES AND DIRECTION
- X X — ROADWAY REMOVAL
- DISPLACEMENTS
- PRELIMINARY ESTIMATED FOOTPRINT

NOTE:
BIKE / PEDESTRIAN FACILITIES TO BE ACCOMMODATED ON GEOMETRIC PLANS WITHIN IMPROVEMENT LIMITS

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ELGIN O'HARE WEST BYPASS
communities. opportunities. solutions.

EXHIBIT 3-7
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 TIER TWO PREFERRED ALTERNATIVE

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

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EXHIBIT 3-7
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 TIER TWO PREFERRED ALTERNATIVE

SEPTEMBER 2012

ILLINOIS 53
ROHLWING RD
ILLINOIS 19
AM PM
D D
0.75 0.84
8240 (9180)
8240 (9180)
E
PM
3500 (2980)
1290
1300
INTERSTATE 290
1310
1320
1330
1340
1350
4 >
2 >
8910 (8080)
3640 (3080)
E
AM
AM PM
D D
0.81 0.74
WEST IRVING PARK RD / IL 19
DRAFT
LEGEND
INTERSTATE AND RAMPS
ARTERIAL OR LOCAL STREETS
EXISTING PAVEMENT
CONSTRUCTED BY OTHERS
BRIDGE
TUNNEL
3 > NUMBER OF LANES AND DIRECTION
X X ROADWAY REMOVAL
TRAFFIC LEGEND
1640 (410) 2040 AM(PM) PEAK HOUR VOLUME (VPH)
AM PM C C 0.66 0.70 AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM C WVE AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION
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ELGIN O'HARE WEST BYPASS
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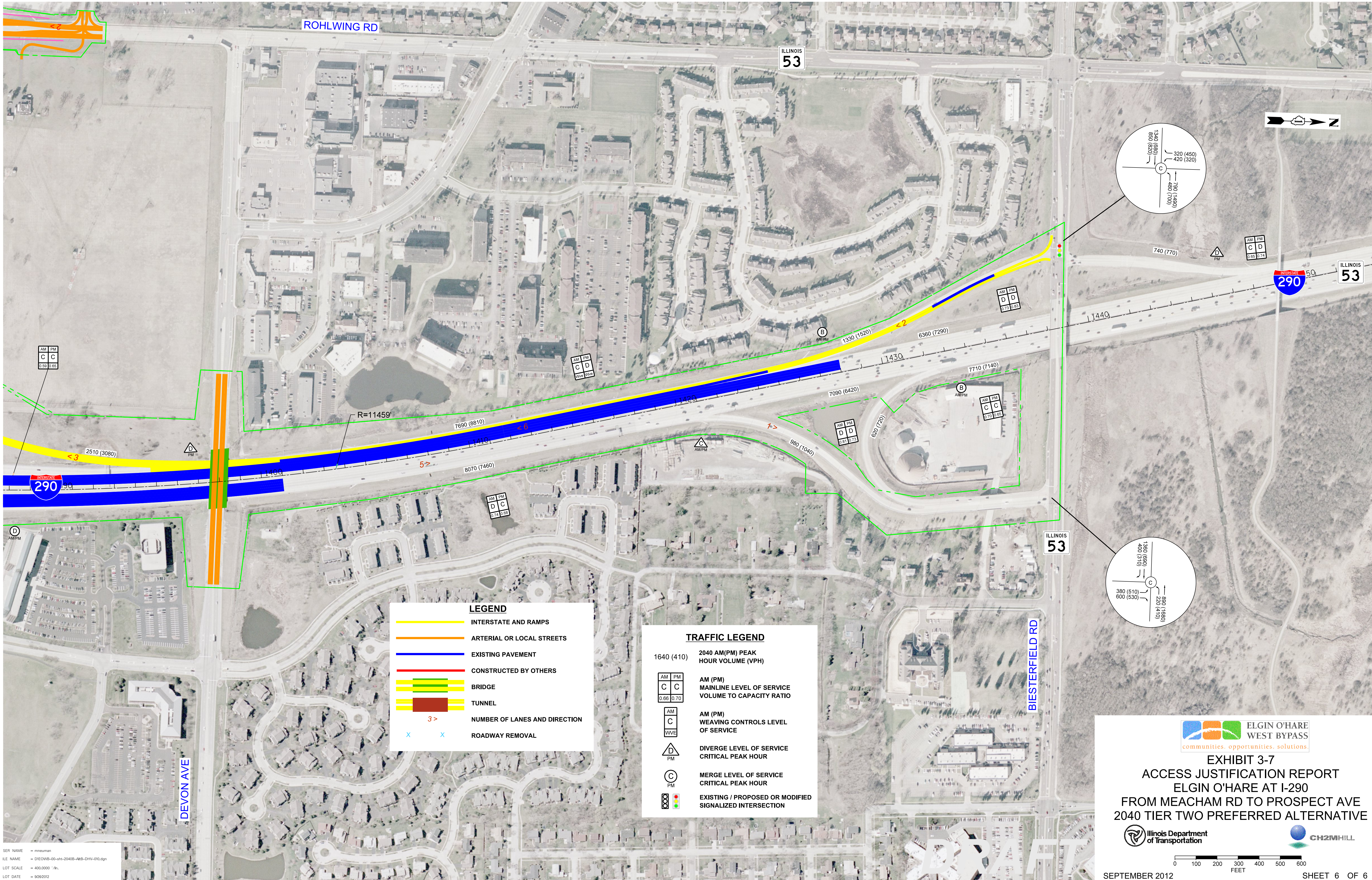
EXHIBIT 3-7
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2040 TIER TWO PREFERRED ALTERNATIVE
Illinois Department of Transportation
CH2MHILL
0 100 200 300 400 500 600
FEET
SEPTEMBER 2012
SHEET 5 OF 6



ROHLWING RD
ILLINOIS 53
290
1440
1430
1420
1410
1400
740 (770)
6360 (7290)
1330 (1520)
7710 (7140)
7090 (6420)
7690 (8810)
8070 (7460)
2510 (3080)
980 (1040)
620 (720)
R=11459'
1340 (680)
850 (820)
320 (450)
420 (320)
790 (1490)
480 (700)
1360 (650)
400 (310)
380 (510)
600 (530)
890 (1680)
220 (410)
BIESTERFIELD RD
DEVON AVE
LEGEND
INTERSTATE AND RAMPS
ARTERIAL OR LOCAL STREETS
EXISTING PAVEMENT
CONSTRUCTED BY OTHERS
BRIDGE
TUNNEL
NUMBER OF LANES AND DIRECTION
ROADWAY REMOVAL
TRAFFIC LEGEND
1640 (410) 2040 AM(PM) PEAK HOUR VOLUME (VPH)
AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION
ELGIN O'HARE WEST BYPASS
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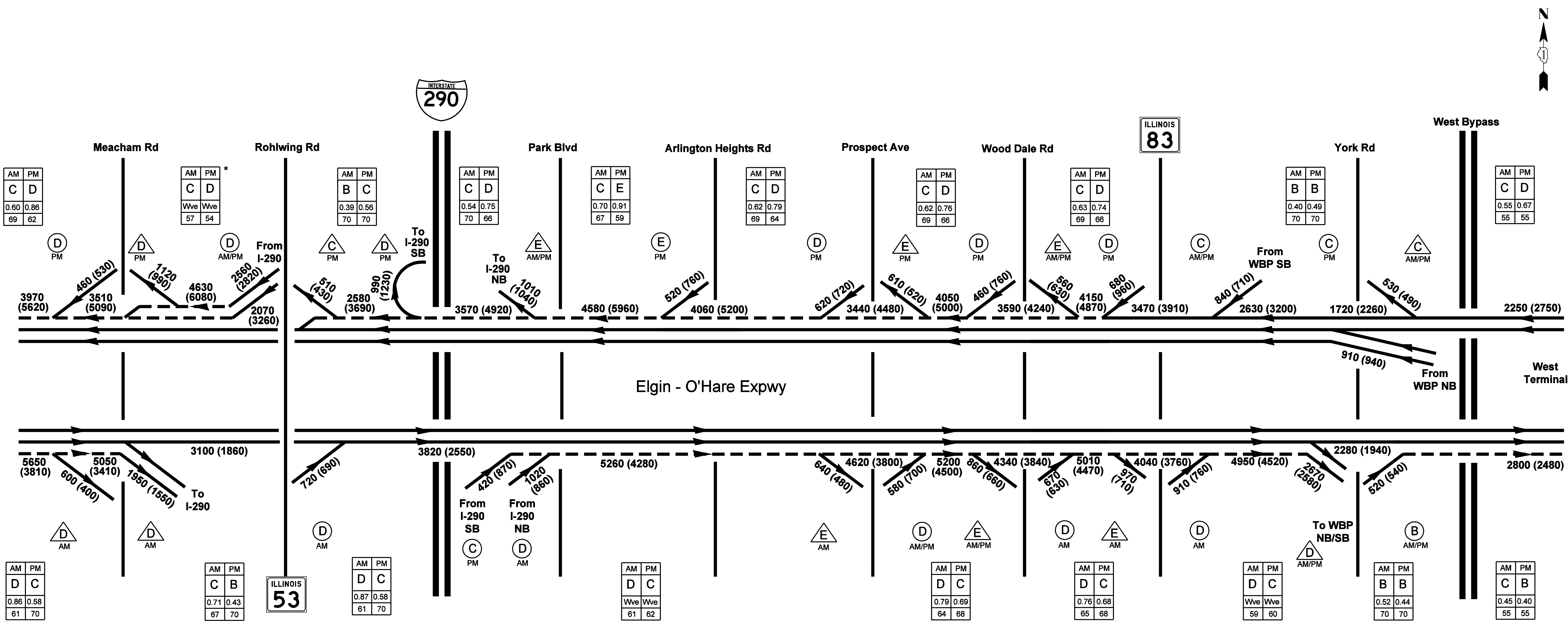
FROM MEACHAM RD TO PROSPECT AVE
2040 TIER TWO PREFERRED ALTERNATIVE
Illinois Department of Transportation
CH2MHILL
0 100 200 300 400 500 600
FEET
SEPTEMBER 2012
SHEET 6 OF 6
DRAFT



LEGEND

000 (000) 2030 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM (PM)
Mainline Level Of Service
Volume To Capacity Ratio
Average Speed AM/PM Peak Hour (mph)

AM (PM)
Weaving Level Of Service
Weaving Controls Level of Service
Average Speed AM/PM Peak Hour (mph)

Diverge Level Of Service
Critical Peak Hour

Merge Level Of Service
Critical Peak Hour

NOTES:

* Determination of weaving section and weaving section analysis are based on the 2000 Highway Capacity Manual. VISSIM analysis shows acceptable performance on this segment.

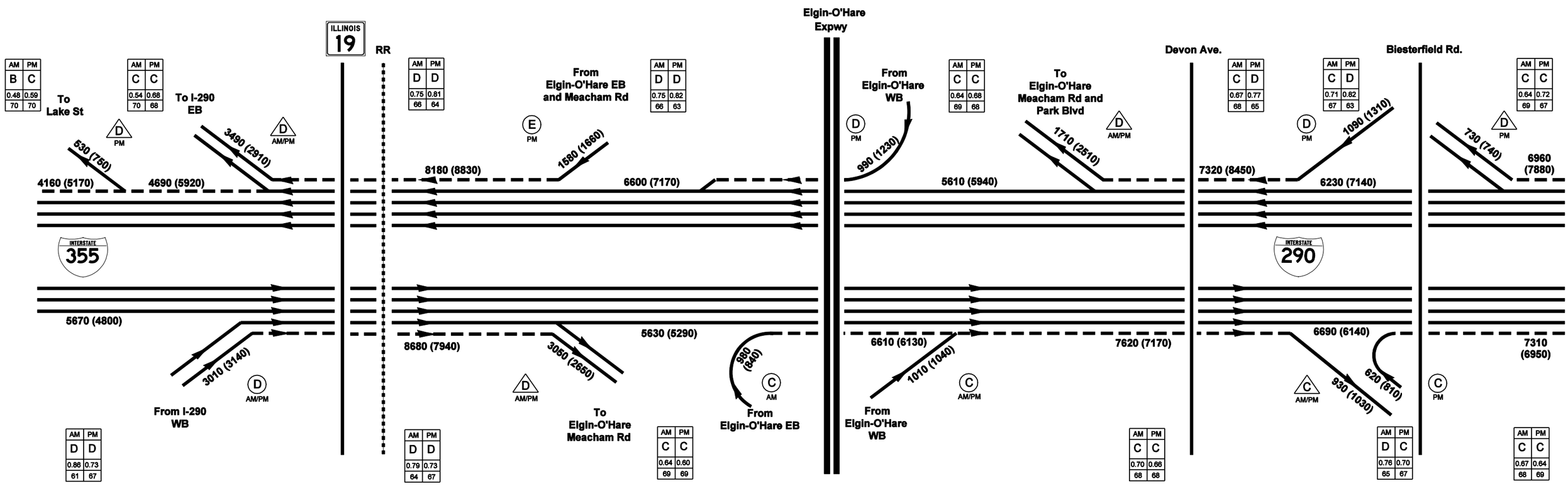
1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.

PRELIMINARY

Exhibit 3-8A

Elgin O'Hare - West Bypass
2030 ICP Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012



LEGEND

000 (000) 2030 AM(PM) Peak Hour Volume (vph)

Basic Lane

Auxiliary Lane

AM (PM)
C (C) Mainline Level Of Service
0.00 (0.00) Volume To Capacity Ratio
55 (55) Average Speed AM/PM Peak Hour (mph)

AM (PM)
D (D) Weaving Level Of Service
Wve (Wve) Weaving Controls Level Of Service
55 (55) Average Speed AM/PM Peak Hour (mph)

C AM — Diverge Level Of Service Critical Peak Hour

B AM — Merge Level Of Service Critical Peak Hour

NOTES:

1. System ramp design speeds vary from 30 mph to 50 mph based on proposed ramp radii.
2. Levels of service are calculated using methodologies of the 2010 Highway Capacity Manual.

PRELIMINARY

Exhibit 3-8B

Elgin O'Hare - West Bypass
2030 ICP Traffic
Corridor Sizing
AM (PM) Peak Hour Traffic

September 2012

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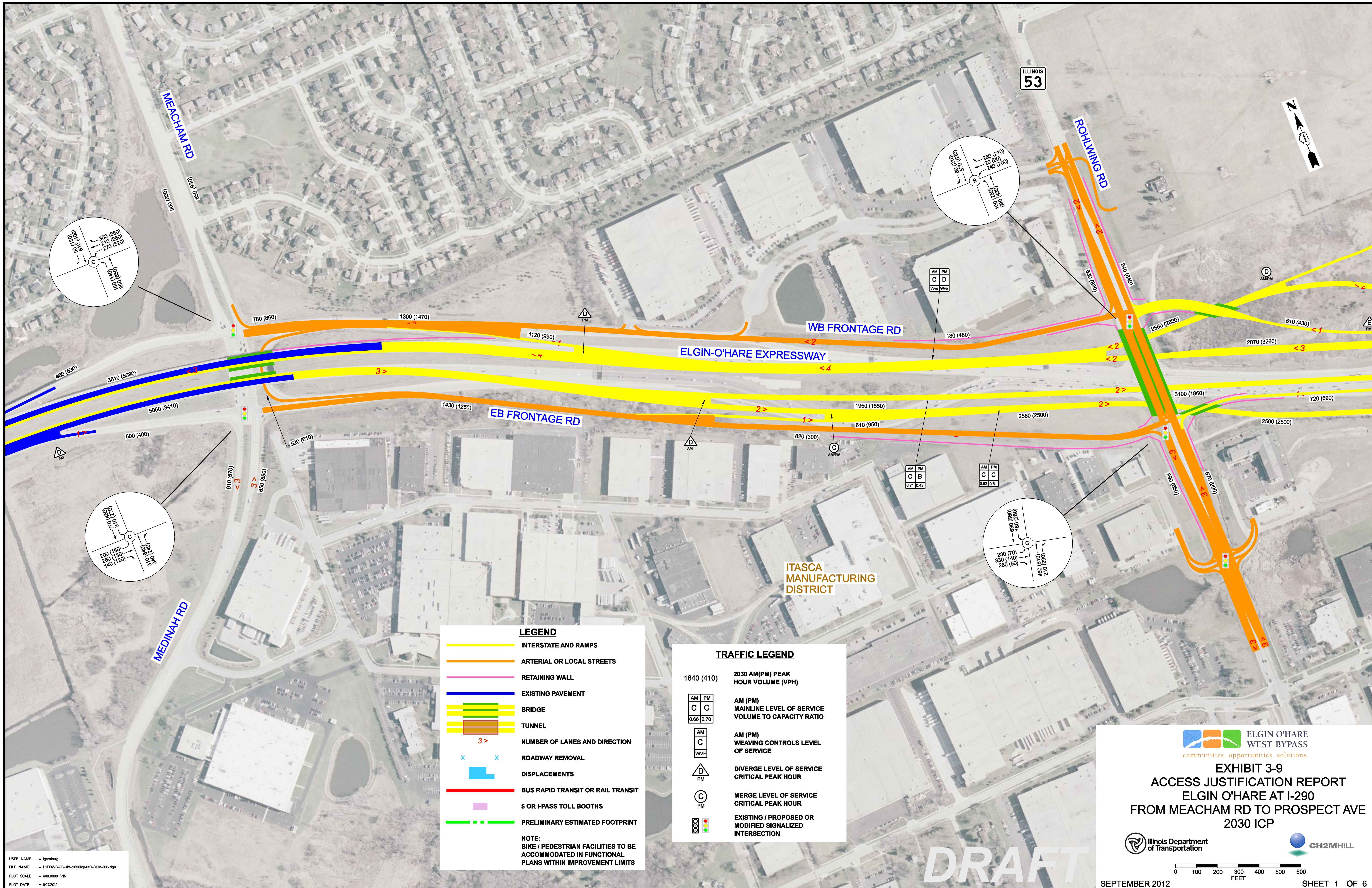

MEACHAM RD
MEDINAH RD
ROHLWING RD
ILLINOIS 53
WB FRONTAGE RD
EB FRONTAGE RD
ELGIN-O'HARE EXPRESSWAY
ITASCA MANUFACTURING DISTRICT
DRAFT
LEGEND
INTERSTATE AND RAMPS
ARTERIAL OR LOCAL STREETS
RETAINING WALL
EXISTING PAVEMENT
BRIDGE
TUNNEL
NUMBER OF LANES AND DIRECTION
ROADWAY REMOVAL
DISPLACEMENTS
BUS RAPID TRANSIT OR RAIL TRANSIT
$ OR I-PASS TOLL BOOTHS
PRELIMINARY ESTIMATED FOOTPRINT
NOTE: BIKE / PEDESTRIAN FACILITIES TO BE ACCOMMODATED IN FUNCTIONAL PLANS WITHIN IMPROVEMENT LIMITS
TRAFFIC LEGEND
1640 (410) 2030 AM(PM) PEAK HOUR VOLUME (VPH)
AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION
ELGIN O'HARE WEST BYPASS
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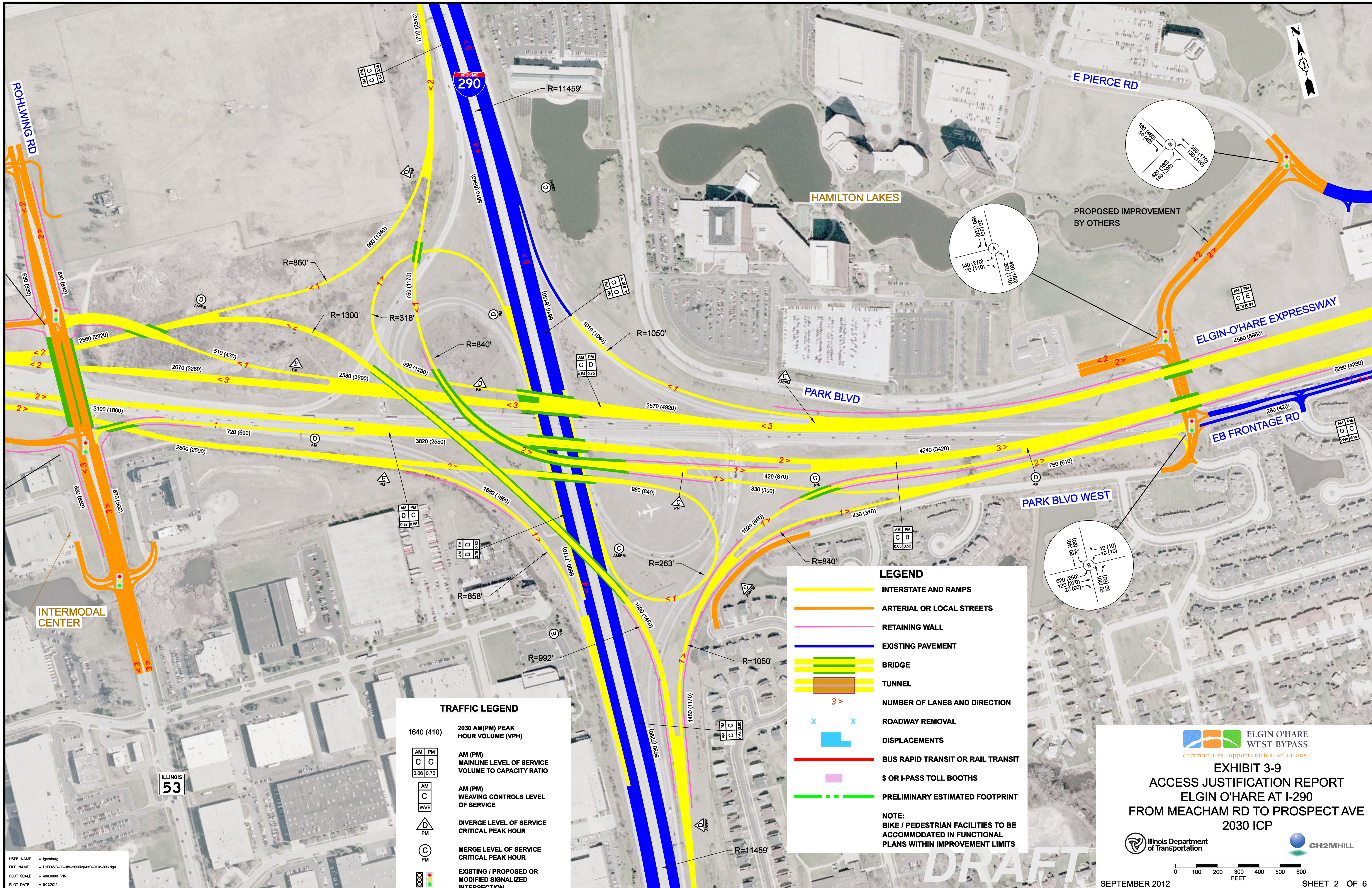
EXHIBIT 3-9
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2030 ICP
Illinois Department of Transportation
CH2MHILL
0 100 200 300 400 500 600
FEET
SEPTEMBER 2012
SHEET 1 OF 6



E PIERCE RD
ROHLWING RD
HAMILTON LAKES
PROPOSED IMPROVEMENT
BY OTHERS
ELGIN-O'HARE EXPRESSWAY
PARK BLVD
EB FRONTAGE RD
PARK BLVD WEST
INTERMODAL
CENTER
290
53
R=11459'
R=860'
R=1300'
R=318'
R=840'
R=1050'
R=263'
R=858'
R=992'
R=1050'
R=11459'
TRAFFIC LEGEND
1640 (410) 2030 AM(PM) PEAK HOUR VOLUME (VPH)
AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION
LEGEND
INTERSTATE AND RAMPS
ARTERIAL OR LOCAL STREETS
RETAINING WALL
EXISTING PAVEMENT
BRIDGE
TUNNEL
NUMBER OF LANES AND DIRECTION
ROADWAY REMOVAL
DISPLACEMENTS
BUS RAPID TRANSIT OR RAIL TRANSIT
$ OR I-PASS TOLL BOOTHS
PRELIMINARY ESTIMATED FOOTPRINT
NOTE:
BIKE / PEDESTRIAN FACILITIES TO BE ACCOMMODATED IN FUNCTIONAL PLANS WITHIN IMPROVEMENT LIMITS
DRAFT
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EXHIBIT 3-9
ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2030 ICP
Illinois Department of Transportation
CH2MHILL
0 100 200 300 400 500 600
FEET
SEPTEMBER 2012
SHEET 2 OF 6

TRAFFIC LEGEND

1640 (410) — 2030 AM(PM) PEAK HOUR VOLUME (VPH)

AM | PM
C | C
0.66 | 0.70
— AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO

AM
C
WVE
— AM (PM) WEAVING CONTROLS LEVEL OF SERVICE

D PM — DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR

C PM — MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR

— EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION

PROSPECT AVE

SALT CREEK

N

PROPOSED IMPROVEMENT BY OTHERS

PARK BLVD

E PIERCE RD

KETTER DR

EB FRONTAGE RD

N. ARLINGTON HEIGHTS RD

ELGIN-O'HARE EXPRESSWAY

SALT CREEK

LEGEND

- INTERSTATE AND RAMPS
- ARTERIAL OR LOCAL STREETS
- EXISTING PAVEMENT
- BRIDGE
- TUNNEL
- 3 > — NUMBER OF LANES AND DIRECTION
- X X — ROADWAY REMOVAL
- FUNDED BY OTHERS

DRAFT

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PLOT DATE = 9/23/2012

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ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2030 ICP

Illinois Department of Transportation

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0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 3 OF 6

ELGIN O'HARE WEST BYPASS

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ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2030 ICP

Illinois Department of Transportation

CH2MHILL

SEPTEMBER 2012

ROHLWING RD

ILLINOIS 53

ILLINOIS 19

INTERSTATE 290

WEST IRVING PARK RD \ IL 19

AM | PM
C | C
0.64 | 0.68

3490 (2910)

4690 (5920)

8180 (8830)

8680 (7940)

5670 (4800)

3010 (3140)

AM | PM
D | D
0.85 | 0.75

AM | PM
D | D
0.75 | 0.81

AM | PM
D | D
0.79 | 0.73

D AM/PM

<5

4>

5>

2>

3050 (2650)

N

LEGEND

- INTERSTATE AND RAMPS
- ARTERIAL OR LOCAL STREETS
- EXISTING PAVEMENT
- BRIDGE
- TUNNEL
- 3 > NUMBER OF LANES AND DIRECTION
- X X ROADWAY REMOVAL
- FUNDED BY OTHERS

TRAFFIC LEGEND

1640 (410)	2030 AM(PM) PEAK HOUR VOLUME (VPH)
AM | PM C | C 0.66 | 0.70	AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
AM C WVE	AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
D PM	DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
C PM	MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
	EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION

USER NAME = lgamburg
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ACCESS JUSTIFICATION REPORT
ELGIN O'HARE AT I-290
FROM MEACHAM RD TO PROSPECT AVE
2030 ICP

Illinois Department of Transportation

CH2MHILL

0 100 200 300 400 500 600
FEET

SEPTEMBER 2012

SHEET 5 OF 6

DRAFT

ROHLWING RD

ILLINOIS 53

INTERSTATE 290

DEVON AVE

BIESTERFIELD RD

1090 (1310)

6230 (7140)

7310 (6950)

6690 (6140)

620 (610)

930 (1030)

7320 (8450)

7620 (7170)

1710 (2510)

5610 (5940)

LEGEND

- INTERSTATE AND RAMPS
- ARTERIAL OR LOCAL STREETS
- RETAINING WALL
- EXISTING PAVEMENT
- BRIDGE
- TUNNEL
- 3 > NUMBER OF LANES AND DIRECTION
- ROADWAY REMOVAL
- DISPLACEMENTS
- BUS RAPID TRANSIT OR RAIL TRANSIT
- $ OR I-PASS TOLL BOOTHS
- PRELIMINARY ESTIMATED FOOTPRINT

NOTE:
BIKE / PEDESTRIAN FACILITIES TO BE ACCOMMODATED IN FUNCTIONAL PLANS WITHIN IMPROVEMENT LIMITS

TRAFFIC LEGEND

- 1640 (410) — 2030 AM(PM) PEAK HOUR VOLUME (VPH)
- AM C / PM C, 0.66 / 0.70 — AM (PM) MAINLINE LEVEL OF SERVICE VOLUME TO CAPACITY RATIO
- AM C / WVE — AM (PM) WEAVING CONTROLS LEVEL OF SERVICE
- D PM — DIVERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
- C PM — MERGE LEVEL OF SERVICE CRITICAL PEAK HOUR
- EXISTING / PROPOSED OR MODIFIED SIGNALIZED INTERSECTION

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FEET

SEPTEMBER 2012

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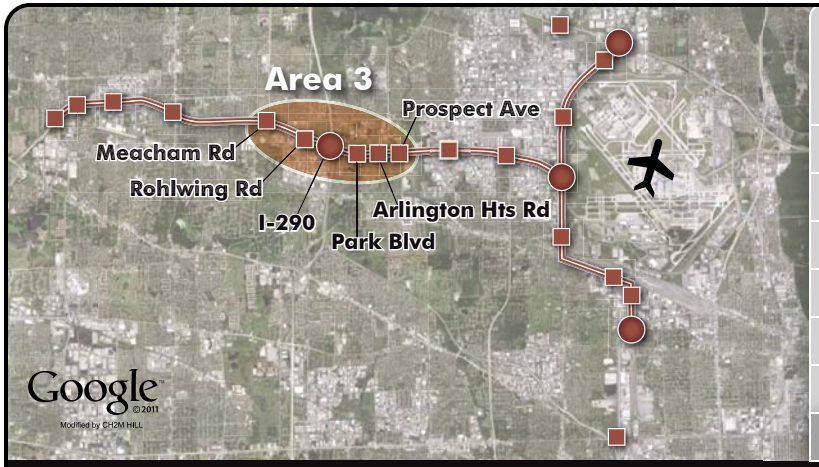
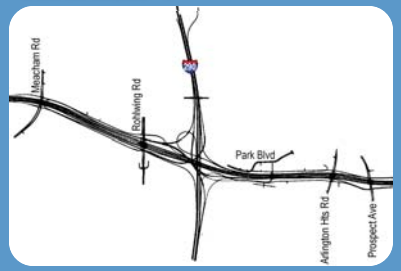


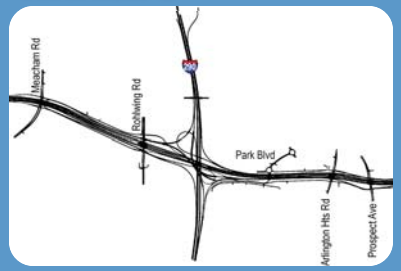
Alternates	Wetlands (ac)	Floodplains (ac)	Waters (ac)	Residential and Business Displacements (Number)	Cost	Traffic and Operations Evaluation Rating
1	12.83	10	0.4	11	Low	Moderate
2	12.88	10	0.4	11	Low	Poor
3	12.83	10	0.4	11	Medium	Good
4	12.83	10	0.4	11	Medium	Moderate
5	12.83	10	0.4	11	High	Poor
6	12.83	10	0.4	11	Highest	Poor
7	12.83	10	0.4	11	Lowest	Good

Alternate 1



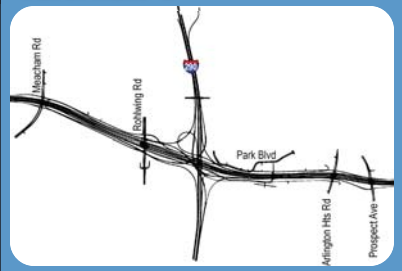
Four-level system interchange with westbound to southbound loop ramp and direct access to Park Boulevard from north, south, and west

Alternate 2



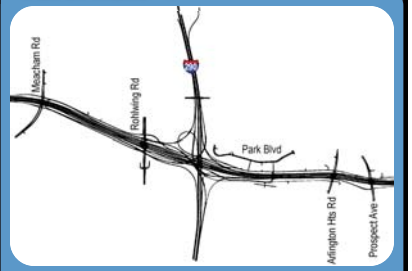
Three-level system interchange with westbound to southbound and eastbound to northbound loop ramps and direct access to Park Boulevard from north, south, and west

Alternate 3



Four-level system interchange with westbound to southbound loop ramp and direct access to Park Boulevard from north, south, and west and from Park Boulevard to the west via frontage road

Alternate 4



Four-level system interchange with westbound to southbound loop ramp and direct access to Park Boulevard from north, south, and west and from Park Boulevard to the north, south, and west via frontage road

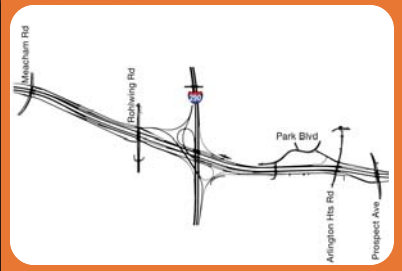
Alternate 5

Four-level system interchange with direct access to Park Boulevard from north, south, and west and from Park Boulevard to the west

Alternate 6

Four-level system interchange and direct access to Park Boulevard from north, south, and west and from Park Boulevard to the north, south (loop ramp), and west via frontage road

Alternate 7



Three-level system interchange with westbound to southbound and eastbound to northbound loop ramps and direct access to Park Boulevard from south and north and from Park Boulevard south and west

Preferred Alternate

Alternate 7 is a three-level system interchange with a two-loop interchange. It provides acceptable traffic operations at a lower cost.

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LEGEND

- Interchange Alternate Area
- Proposed/Improved System Interchange
- Proposed/Improved Local Access Interchange
- New or Widened Corridor
- Highest Cost, Highest Impacts, or Poor Travel Performance
- Average Cost, Average Impacts, or Average Travel Performance
- Low Cost, Low Impacts, or High Travel Performance
- Dismissed Alternate
- Preferred Alternate

Note:
Quantities are based on area within project footprint for comparative purposes only. Impacts may vary following additional avoidance and minimization strategies.

Source:
Aerial photography: Google Earth Pro, 2011

NORTH
Not to Scale

Exhibit 3-10

Interchange Type Study Alternate Evaluation

Appendix A
Traffic Operation Reports

Appendixes provided on attached CD.

Appendix B
ICP Signing Plans

Appendixes provided on attached CD.

Appendix C
Design Exceptions and Design Criteria

Appendixes provided on attached CD.

Appendix D
Geometric Plans 2030 ICP and 2040 Tier Two Preferred Alternative

Appendixes provided on attached CD.

Appendix E
Interchange Design Studies

Appendixes provided on attached CD.