Chapter 1 – Introduction

1.1 Transportation Perspectives

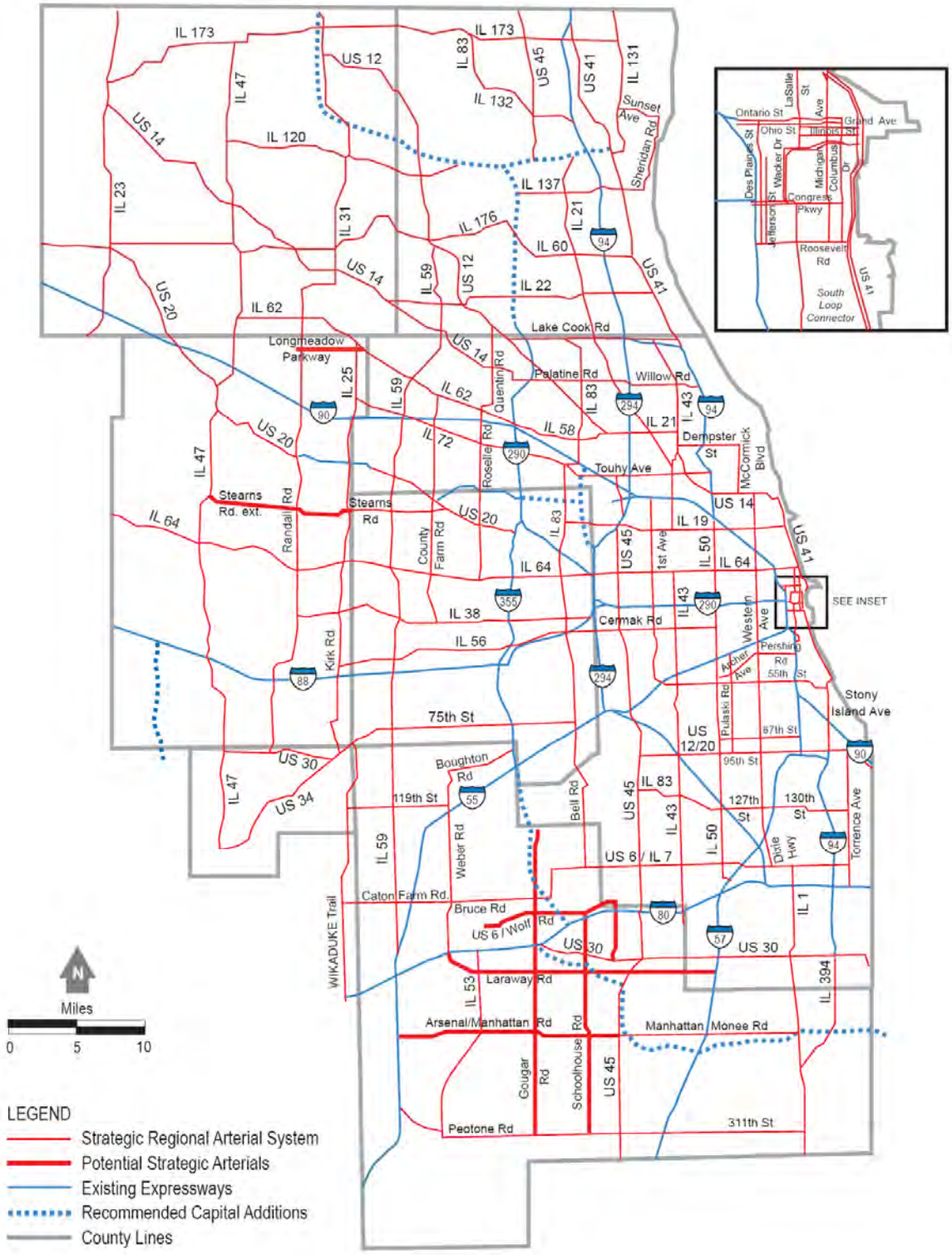
In the past, transportation system plans for Northeastern Illinois focused on major expressway and fixed rail transit facilities. State and Federal agencies planned and coordinated the inter-state highway system while counties and municipalities were responsible for local roads under their jurisdiction. Adopted in 1989, the 2010 Transportation System Development Plan recognized the need for a comprehensive network of routes one step below the expressway system to relieve congestion and facilitate long-distance regional traffic. In doing so, the plan established the Strategic Regional Arterial (SRA) System.

The 1994 Strategic Regional Arterial Design Concept Report established standard design concepts as well as the planning procedures needed to implement the SRA network. Since then, five sets of SRA candidate roadways have gone through the planning phases. This report is one of four reports written for the sixth network of SRA routes studied. It presents the Pre-Phase I planning study findings for SRA IL 176 as part of the proposed comprehensive regional SRA System.

1.2 The Strategic Regional Arterial System and the Chicago Metropolitan Agency for Planning (CMAP) Regional Transportation Plans

The SRA system, as proposed in the Chicago Metropolitan Agency for Planning (CMAP) 2020 and 2030 Regional Transportation Plans, is a 1,340 mile network of existing roads in Northeastern Illinois, encompassing 146 route segments in Cook, DuPage, Kane, Lake, McHenry, and Will Counties (see **Figure 1.1**). Spacing of routes in the SRA system was determined based upon the projected levels of future travel demand within the different parts of the region. They range from approximately three miles apart in the most densely developed areas to approximately eight miles apart in rural areas. This system is intended to supplement the existing and proposed expressway facilities by accommodating a significant portion of long-distance, high-volume automobile, and commercial vehicle traffic in the region.

Figure 1.1 Planning the SRA System



1.3 SRA Route Types and Improvement Techniques

Three design concepts for SRA roadways were created in the 2002 Bureau of Design and Environmental (BDE) Manual, Chapter 46 Strategic Regional Arterials. These designs were developed to meet vehicle needs as well as the general needs of roadside environments found throughout Northeastern Illinois. The types and corresponding household densities are:

- **Urban Routes:** Future densities over 5.0 households per acre
- **Suburban Routes:** Future densities between 0.5 and 5.0 households per acre
- **Rural Routes:** Future densities less than 0.5 households per acre

Desirable route characteristics were delineated for each of the three SRA route types related to the adjacent environment. These desirable characteristics serve as planning criteria to provide adequate traffic service and geometric design. As planning criteria, these design features and other route characteristics are intended to be generally applicable to all SRA routes. However, the SRA planning process recognizes that there may be situations along SRA routes where certain design features are not appropriate or where special treatment of some features is desirable such as:

- Bus lane/high occupancy vehicle lanes
- Signal preemption capability for transit vehicles
- Demand actuated signals at transit stations
- Channelization of interchanges at high volume intersections
- Use of continuous two-way left turn lanes
- Designation of route bypasses for constricted areas
- Location of transit, pedestrian, or bicycle facilities in or adjacent to the right-of way

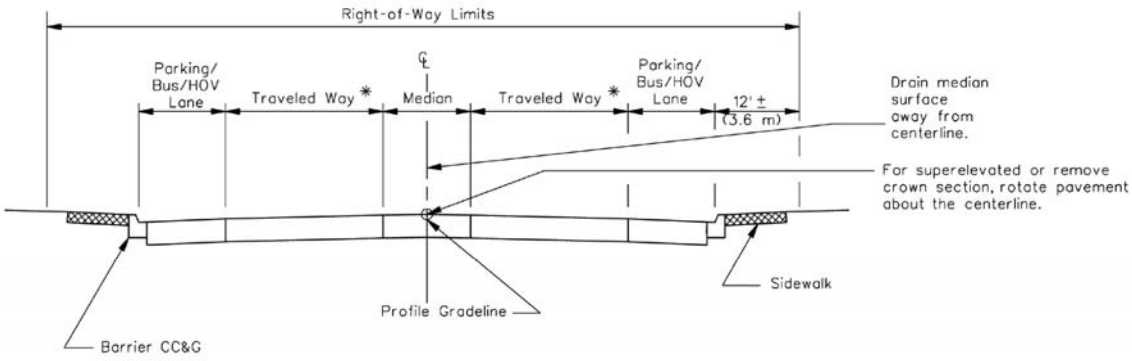
While some of these special techniques are not applicable to the IL 176 SRA route, they illustrate the range of treatments that were considered. A full description of the recommended designs and features applicable to all SRA routes as well as the techniques for special circumstances can be found in the 2002 BDE Manual. This document is available from the Illinois Department of Transportation (IDOT) and CMAP.

The southeastern corner of McHenry County and the southern half of Lake County were, for planning purposes, designated by CMAP as suburban, with the remainder designated as rural. After reviewing the current access, land use, and existing building offsets these designations were adjusted to better fit the character of the local community and minimize right-of-way impacts. For the purpose of this study the following route designations were assigned to the corresponding segments of IL 176:

- Urban Route: IL 176 from IL 23 in the city of Marengo east approximately one mile to Deer Pass Road (**Figure 1.2**).
- Rural Route: IL 176 from Deerpass Road east approximately 9.8 miles to Mt. Thabor Road (**Figure 1.3**).
- Suburban Route: IL 176 from Mt. Thabor Road east approximately 14.4 miles to US 12 (Rand Road) (**Figure 1.4**).

Figures 1.2, 1.3, and **1.4** identify the desirable characteristics for Urban, Suburban, and Rural SRA Routes as they pertain to IL 176 SRA based on the 2002 BDE Manual.

Figure 1.2 Urban Cross Section

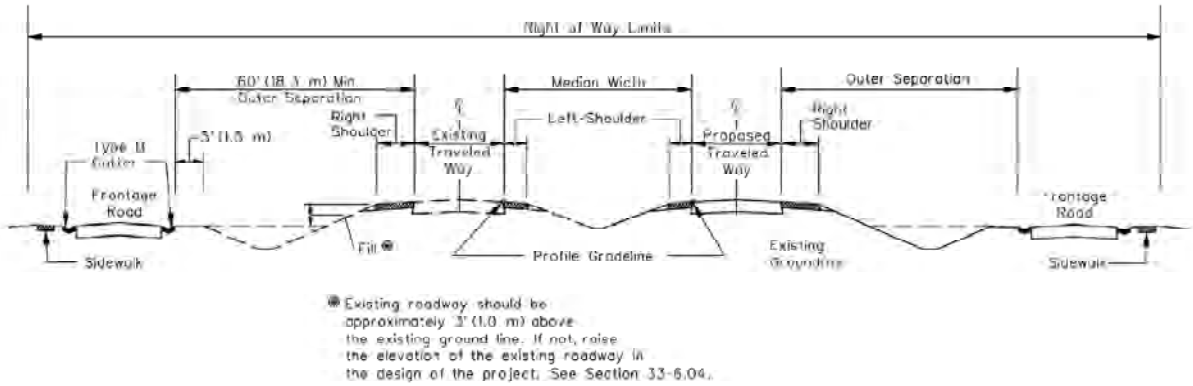


** Where it is desirable to accommodate bicycle demand and ROW is not restricted, an additional width may be added to each direction of the traveled way for bicycles.*

DESIRABLE URBAN SRA CROSS SECTION
(With HOV/Bus Lanes)

Desirable Route Characteristics for Urban Strategic Regional Arterials	
Design Element	**Urban Route**
Level of Service/Design Speed	D/40 mph.
Access Control	Managed access.
Cross Street/Signal Spacing	One quarter mile spacing.
Auxiliary Turn Lanes	Dedicated right turn lanes only if sufficient right-of-way. Dual left turn lanes at major intersections. Single left turn lanes at other intersections.
Median	11 foot two-way left turn lane.
Curbs	6 inch curb and 2 foot gutter.
Sidewalks	Where right-of-way permits.
Bicycle Accommodations	14 foot outside shared lane.
Curb Cut Access	Consolidate access or right-in/right-out only where possible.
Right-of-way Width	108 feet to 120 feet.
Parking	Not recommended.
Railroad Crossings	Automated gate and fencing if grade separation is not practical.
HOV-Bus Lanes and Turnouts	None – inadequate right-of-way.

Figure 1.3 Rural Cross Section

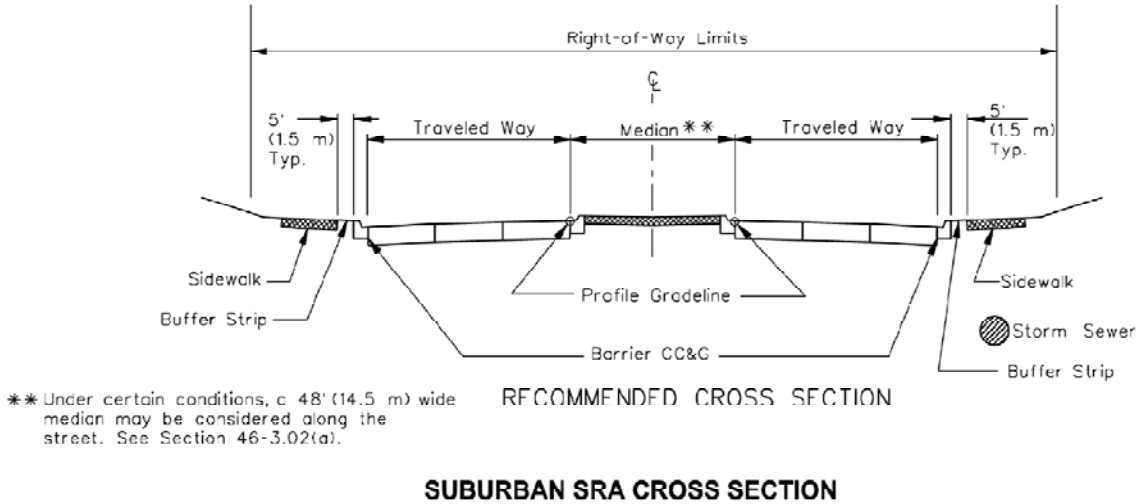


Note: Initial construction usually will not include frontage roads.

RURAL SRA CROSS SECTION
(Typical Design with Frontage Roads)

Desirable Route Characteristics for Rural Strategic Regional Arterials	
Design Element	**Rural Route**
Level of Service/Design Speed	C/60 mph.
Access Control	Managed frontage roads.
Cross Street/Signal Spacing	One mile spacing.
Auxiliary Turn Lanes	Dedicated right turn lanes. Dual left turn lanes at major intersections. Single left turn lanes at other intersections.
Median	50 foot depressed grass median.
Curbs	Shoulders.
Sidewalks	Frontage roads where appropriate.
Bicycle Accommodations	10 foot shoulders.
Curb Cut Access	Right-in/right-out until frontage road is complete.
Right-of-way Width	300 feet to 360 feet with frontage road. 850 feet to 1,360 feet at intersections.
Parking	No parking.
Railroad Crossings	Elevated grade separation at all railroads.
HOV-Bus Lanes and Turnouts	Frontage roads if appropriate.

Figure 1.4 Suburban Cross Section



Desirable Route Characteristics for Suburban Strategic Regional Arterials	
Design Element	**Suburban Route**
Level of Service/Design Speed	C/45 mph.
Access Control	Managed access.
Cross Street/Signal Spacing	One half mile spacing.
Auxiliary Turn Lanes	Dedicated right turn lanes. Dual left turn lanes at major intersections. Single left turn lanes at other intersections.
Median	22 foot barrier median or 14 foot two-way left turn lane.
Curbs	6 inch curb and 2 foot gutter.
Sidewalks	Where appropriate.
Bicycle Accommodations	14 foot outside shared lanes.
Curb Cut Access	Consolidated access or right-in/right-out only.
Right-of-way Width	120 feet to 150 feet.
Parking	Not recommended.
Railroad Crossings	Elevated grade separation at all railroads.
HOV-Bus Lanes and Turnouts	Future turnouts based on future Phase II studies and local/regional transit plans.

1.4 Study Objectives

The objective of this study is to apply the SRA route design concepts to IL 176 in order to maximize future vehicle flow while avoiding negative impacts to communities and their environments. The study identified SRA IL 176 developmental strategies by determining right-of-way needs, conceptual design, estimated costs, and major environmental issues as well as the timing of needed construction projects.

The IL 176 SRA Route Study identified both short-range and long-range improvements to enable these SRA routes to function as part of the SRA system. These objectives guided the study process:

- Determine the types of roadway changes needed to make SRA standards for each route including additional lanes, signalization, and interchanges.
- Define right-of-way requirements for such changes.
- Identify ways to enhance access to the regional transit system.
- Identify access management potentials to improve through traffic movement and reduce conflicts.
- Coordinate recommended route improvements with projected land use development.
- Identify necessary improvements to accommodate commercial traffic.
- Identify ways to accommodate bicycle and pedestrian travel.
- Identify potential environmental concerns.

This completed study is intended for use by local and state agencies to help guide implementation of needed changes on IL 176. This report should facilitate coordination between individual public and private entities developing projects along IL 176 to ensure that they are consistent with the long-range development of an arterial system in Northeastern Illinois.

This document is not intended to supplant the independent decision-making of local land use authorities. The incorporation of the report's recommendations into land use plans is encouraged. The supporting data compiled in this SRA report provides each land use authority the ability to determine the appropriateness of recommended concepts and timelines for inclusion into their plans.

1.5 The SRA Planning Study Process

This SRA Route Study continues a process begun following the development of the Recommended Design Features and Techniques. The planning process is designed to efficiently use available data in order to evaluate the recommended design features and techniques and then produce a comprehensive short-range and long-range improvement plan for the route.

There are five principal activities in the Route Studies work program as stated in the SRA Design Concept Report.

1.5.1 Data Collection/Evaluation

The SRA planning process is designed to efficiently use available data. For each route data was assembled from right-of-way information, roadway plans, traffic volume projections, transit information, bicycle usage, adjacent development characteristics, accident data, environmental studies and other sources, and was analyzed to establish current conditions, constraints, and improvement needs.

1.5.2 Route Analysis

Possible improvements for the SRA route were determined by incorporating the recommended design features in specific configurations for each segment of the overall route. These configurations included alternative designs and techniques where necessary to accommodate

local conditions or constraints. The timing of the recommended improvements, whether long-range or short-range, was also identified.

1.5.3 Environmental Issues/Screening

While the SRA planning process does not include detailed environmental assessment or analysis of specific mitigation measures, a screening process identified significant environmental conditions along each route. The results of this process were used to evaluate improvement alternatives and served as early indicators of environmental issues for future design studies.

1.5.4 Construction Cost Estimates/Identification of Right-of-Way Needs

Construction cost estimates for each route-segment were prepared, both for short-range and long-range improvements. Right-of-way needs to accommodate recommended long-range improvements were identified.

1.5.5 Local Involvement and Coordination

Throughout the SRA route planning process, the involvement of local and regional agencies is an important consideration. Information and coordination efforts included forming an Advisory Panel for the SRA route, which worked with IDOT during the planning process. A public hearing in an open house format will be conducted at the conclusion of the study.

1.6 Study Data Sources and Methodologies

1.6.1 Existing Roadway Characteristics

Several data sources were compiled in this report to create the route inventories. Aerial photography details route features existing in 2005. Traffic counts were collected for selected segments from IDOT Traffic Volume Maps. Existing right-of-way widths and roadway schematics, as noted by IDOT, were included. Videos and photographs were created for this study to document driving conditions and verify the following roadway features: number of lanes and turn bays; location of traffic signals, sidewalks, frontage roads and structures; type of median and access; and speed limits. In some cases, pavement widths were able to be confirmed by recent construction plans.

1.6.2 Existing Transit Characteristics

Recent transit data from Metra and Pace was compiled. This study used Pace's Vision 2020 report for identification of future Pace initiatives. CMAP Regional Transportation Plans were reviewed and used for the outline regional roadway and transit initiatives.

1.6.3 Land Use/Development Characteristics

Current land use/development characteristics were included in the route inventory. These characteristics were derived from aerial photography, local land use maps, videos, and on-site

inspection. Planned and committed developments were identified based on input gathered during the Individual Community Interviews. This information was used to understand how to best integrate route concepts with land use and access needs.

Certain land uses were identified along the routes due to their sensitive nature or special community roles. These land uses included: schools, religious institutions, theaters, auditoriums, parks, cemeteries, recreation facilities, nature and forest preserves, hospitals, nursing homes, and hotels.

1.6.4 Environmental Considerations

Environmental resources that could be impacted by changes along these routes were identified in this study. Numerous public and private entities were consulted to determine the locations of a variety of environmental concerns: wetlands, 100-year floodplains, natural areas and parks, habitats of threatened or endangered species, historical sites, and hazardous waste or leaking underground storage tank sites. These agencies were also asked to identify land uses that might be sensitive to the effects of highway construction on air quality and ambient noise levels.

The approximate locations of environmental resources and sensitive land uses were indicated on the Planning Constraints Exhibits included in this report. No field verification of such sites was required under this study; therefore, no representation was made regarding the accuracy of information received from governmental agencies concerning chemical releases, wetland limits, or threatened or endangered species habitat. Such determinations are most properly made during any Phase I Study.

1.6.5 Year 2030 Traffic Demand Projections

CMAP has projected the Year 2030 traffic for all routes in the SRA system, tollways, and expressways. The 2030 traffic projections are expressed in thousands of vehicles per day (vpd).

1.6.6 Roadway Capacity Estimates

Planning level capacity analyses was performed for route segments and at major intersections. Major intersections include intersections with SRA routes, state and US highways, as well as with roadways with an anticipated annual average daily traffic greater than 20,000 vehicles per day. At the intersections, appropriate intersection configurations were recommended in generic terms based on the Chicago Metropolitan Agency for Planning 2030 projected volumes.

For the road segments, **Table 1.1** was used to evaluate the level of service (LOS) for the recommended number of lanes. This evaluation tested the general ability of the recommended roadway to meet future traffic demand. According to the SRA Design Manual, an adequate LOS for a suburban SRA is C or D at 45 mph and for a rural SRA is C at 60 mph.

Table 1.1 Level of Service (LOS) Definitions

LOS - Traffic Conditions	Volumes (veh/h/dir.)			~ AADT (both directions)		
	2-Lane	Suburban 4-Lane	Suburban 6-Lane	2-Lane	Suburban 4-Lane	Suburban 6-Lane
A - Completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and by driver preferences. Maneuverability within the traffic stream is good. Minor disruptions to flow are easily absorbed without a change in travel speed.	660	1,100	1,650	10,200	16,900	33,000
B - Indicates free flow, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver. Minor disruptions are still easily absorbed, although local deterioration in LOS will be more obvious.	1,080	1,800	2,700	16,600	27,700	54,000
C - The influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles. On multi-lane highways with a free flow speed above 50 miles per hour (mph), the travel speeds reduce somewhat. Minor disruptions can cause serious local deterioration in service and queues will form behind any significant traffic disruption.	1,550	2,600	3,900	23,800	40,000	78,000
D - The ability to maneuver is severely restricted due to traffic congestion. Travel speed is reduced by the increasing volume. Only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.	1,980	3,420	5,130	30,500	52,600	102,600
E - Represents operations at or near capacity, an unstable level. The densities vary, depending on the free flow speed. Vehicles are operating with the minimum spacing for maintaining uniform flow. Disruptions cannot be dissipated readily often causing queues to form and service to deteriorate to LOS F. For the majority of multi-lane highways with free flow speed between 45 and 60 mph, passenger-car mean speeds at capacity range from 42 to 55 mph are highly variable and unpredictable.	2,200	4,000	6,000	33,800	61,500	120,000
F - Represents forced or breakdown flow. It occurs either when vehicles arrive at a rate greater than the rate at which they are discharged or when the forecast demand exceeds the computed capacity of a planned facility. Although operations at these points as well as on sections immediately downstream appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable with vehicles experiencing brief periods of movement followed by stoppages. Travel speeds within queues are generally less than 30 mph.	> 2,200	> 4,000	> 6,000	> 33.8 k	> 61.5 k	>120 k

Source: 2000 Highway Capacity Manual
Note: For Rural: free flow speed of 60 mph, 13% peak hour volume, 2-lane highway. For Suburban 6-lane: free flow speed of 50 mph, 10% peak hour volume, 10% truck, 6-lane divided highway. For Suburban 4-lane: free flow speed of 50 mph; 13% peak hour volume; 50/50 directional split, 5% truck; and two 12 foot lanes in each direction.

1.6.7 Cost Estimates

Cost estimates for the study year were developed in this report to provide IDOT and other involved agencies with a frame of reference and an idea of the investment necessary for the SRA routes. These cost estimates were based on historical figures from IDOT. The estimates provide a general understanding of what funding may be required in the future.

1.7 Organization of the Report

The organization of this report reflects the four major stages in development of the proposed SRA route design:

Chapter 1 – Introduction

The introduction of SRA objective and its planning study process.

Chapter 2 – Route Overview

Chapter 2 summarizes the existing conditions along the IL 176 SRA Route Corridor. The existing land use and development characteristics, regional transportation facilities, roadway characteristics, and transit services are presented.

Chapter 3 – Route Analysis

Chapter 3 presents the planning constraints and limitations on the SRA design concepts by route segments. Data was collected from CMAP, field surveys, the Department of Natural Resources, and IDOT, as well as information collected during the individual community interviews. The chapter reports the existing facility characteristics in **Exhibit A** and the existing land use and environmental characteristics in **Exhibit B**.

Roadway recommendations are presented by individual route segments. Recommendations include proposed lane arrangements, required right-of-way (**Exhibit C),** and intersection configuration (**Exhibit D**). Construction, right-of-way costs, and a prioritization of recommendations are included following the recommendations.

Chapter 4 – Public Involvement

Public involvement at various levels during this SRA route study was necessary in guiding and shaping the proposed design. Meeting schedules and notes are included in **Exhibit E** regarding the individual community interviews, the advisory panel meetings, and the public hearing. Also included is a corridor summary report which was compiled following the individual community interviews. This report summarizes community concerns and issues regarding the IL 176 SRA.

1.8 Timeframe

The IL 176 SRA study began in the autumn of 2001 and continued through 2009. Conclusions and recommendations were based on conditions existing during the study period as well as on future committed plans and developments established through zoning or comprehensive planning through the year 2030.

SRA planning for IL 176 involved IDOT, CMAP, and the communities served and/or affected by the route. Input was received through a series of individual community interviews as well as through two SRA Advisory Panels. A public hearing will be held on [*Date to be Set*], to present the draft recommendations.